



CHECKBALL BOOK

Domestic Volume I

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Updated
January, 2003

INTRODUCTION CHECKBALL BOOK DOMESTIC

This "Checkball Manual" will show you the checkball locations in the case and valve body of transmissions manufactured from 1980 up through 2003. We have covered the updates that have occurred in similar model transmissions, where checkball locations may have changed. This manual covers most transmissions manufactured by Chrysler Corporation, Ford Motor Company and General Motors Corporation. We also have included some Import transmissions that are found in Domestic vehicles.

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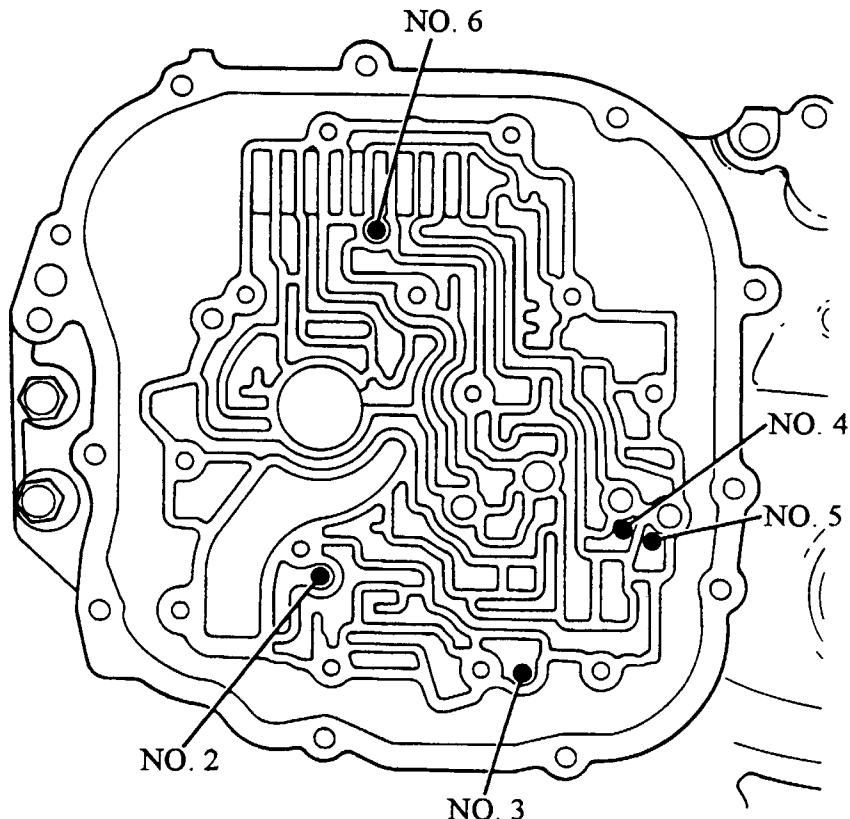
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CHECK BOOK DOMESTIC

NOTES

AUTOMATIC TRANSMISSION SERVICE GROUP

THM 125C
VALVE BODY & MAIN CASE CHECKBALL LOCATIONS

NO. 1 DIRECT CLUTCH EXHAUST
NO. 2 DIRECT CLUTCH ACCUMULATOR
NO. 3 LO 1ST CHECKBALL
NO. 4 LO AND REVERSE CHECKBALL
NO. 5 DIRECT AND REVERSE CLUTCH
NO. 6 RNDI AND DETENT CHECKBALL

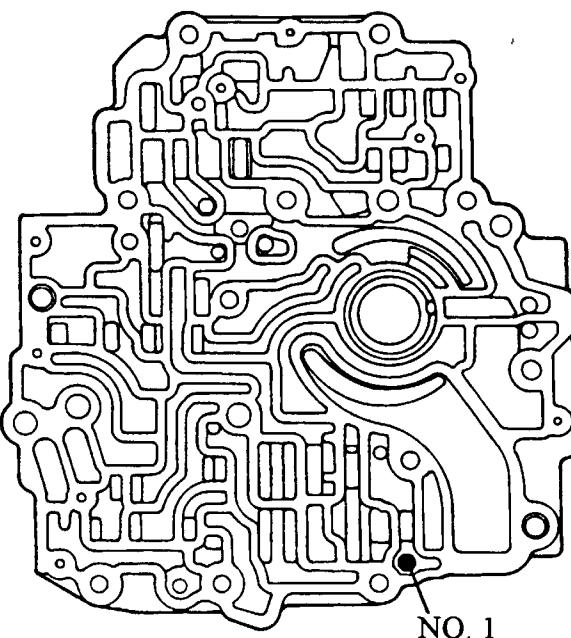
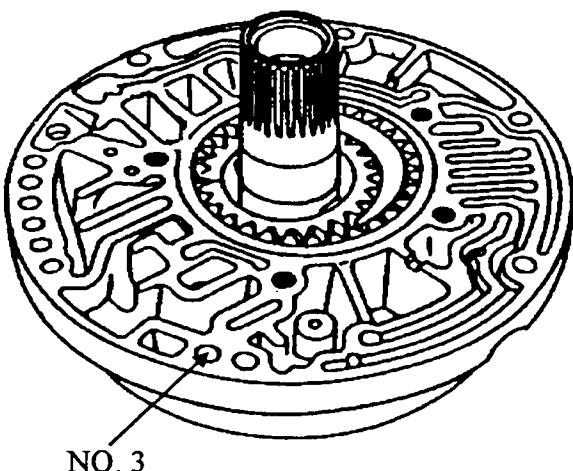
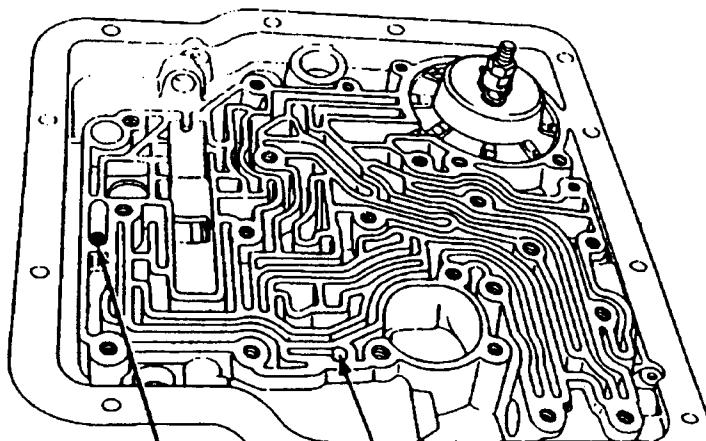


Figure 1

THM 180C
PUMP & MAIN CASE CHECKBALL LOCATIONS

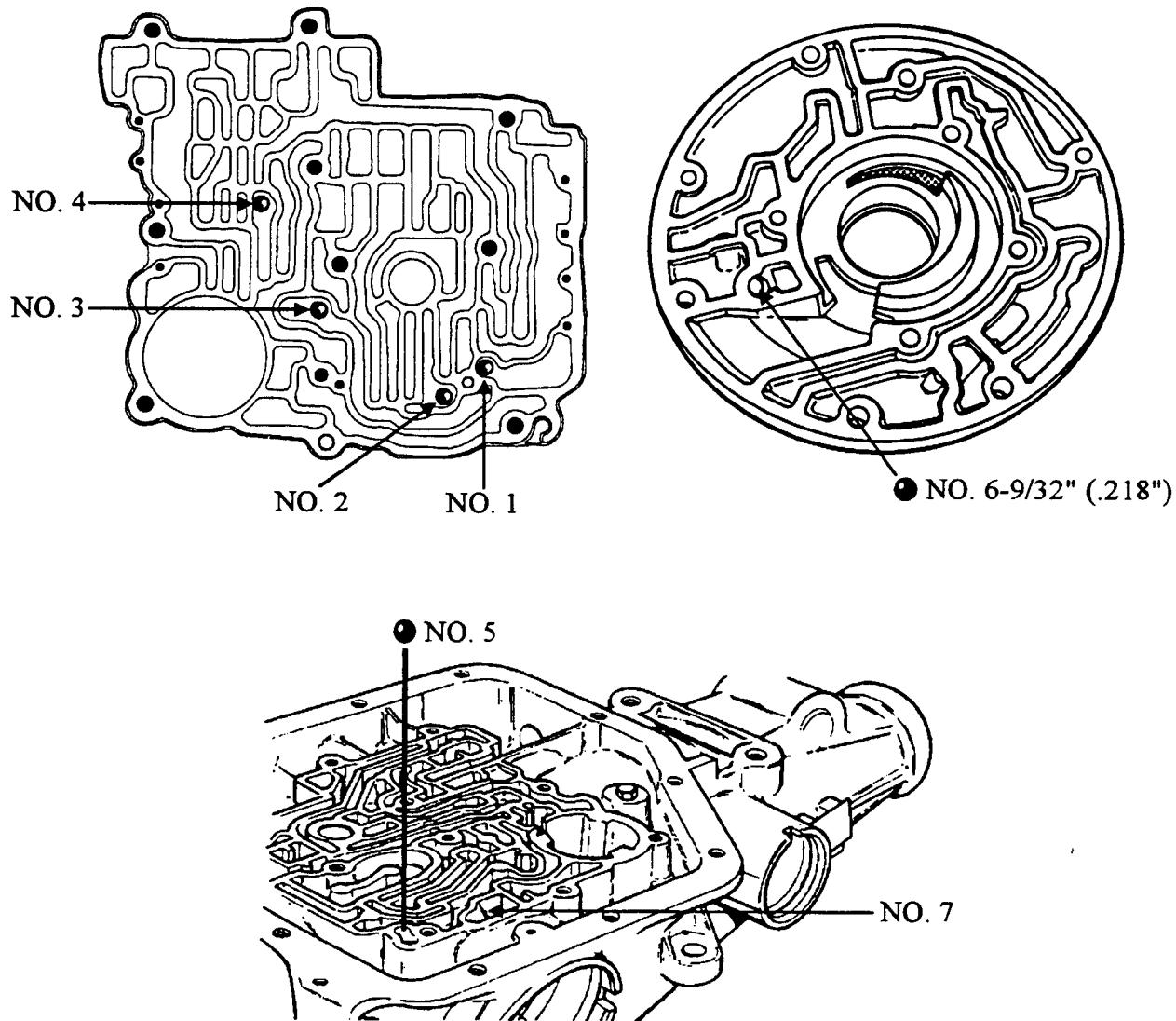
NO. 1 LOW/REVERSE BOOST SHUTTLE BALL

NO. 2 2ND GEAR ORIFICE BALL (On later models with 1759 or 2279 cm³ engines with H4 and L1 calibration respectively, the 2nd clutch orifice ball was deleted and a revised transfer plate installed)

NO. 3 REVERSE ORIFICE CONTROL BALL (Not used in most models)
(Can cause delayed engagements into reverse, take ball out and leave the capsule in)

Figure 2

THM 200C
PUMP, VALVE BODY & MAIN CASE CHECKBALL LOCATIONS



NO. 1 SHIFT T.V. & REVERSE BOOST SHUTTLE BALL

NO. 2 DIRECT CLUTCH ACCUMULATOR EX. BALL

NO. 3 INTERMEDIATE REVERSE BOOST SHUTTLE BALL

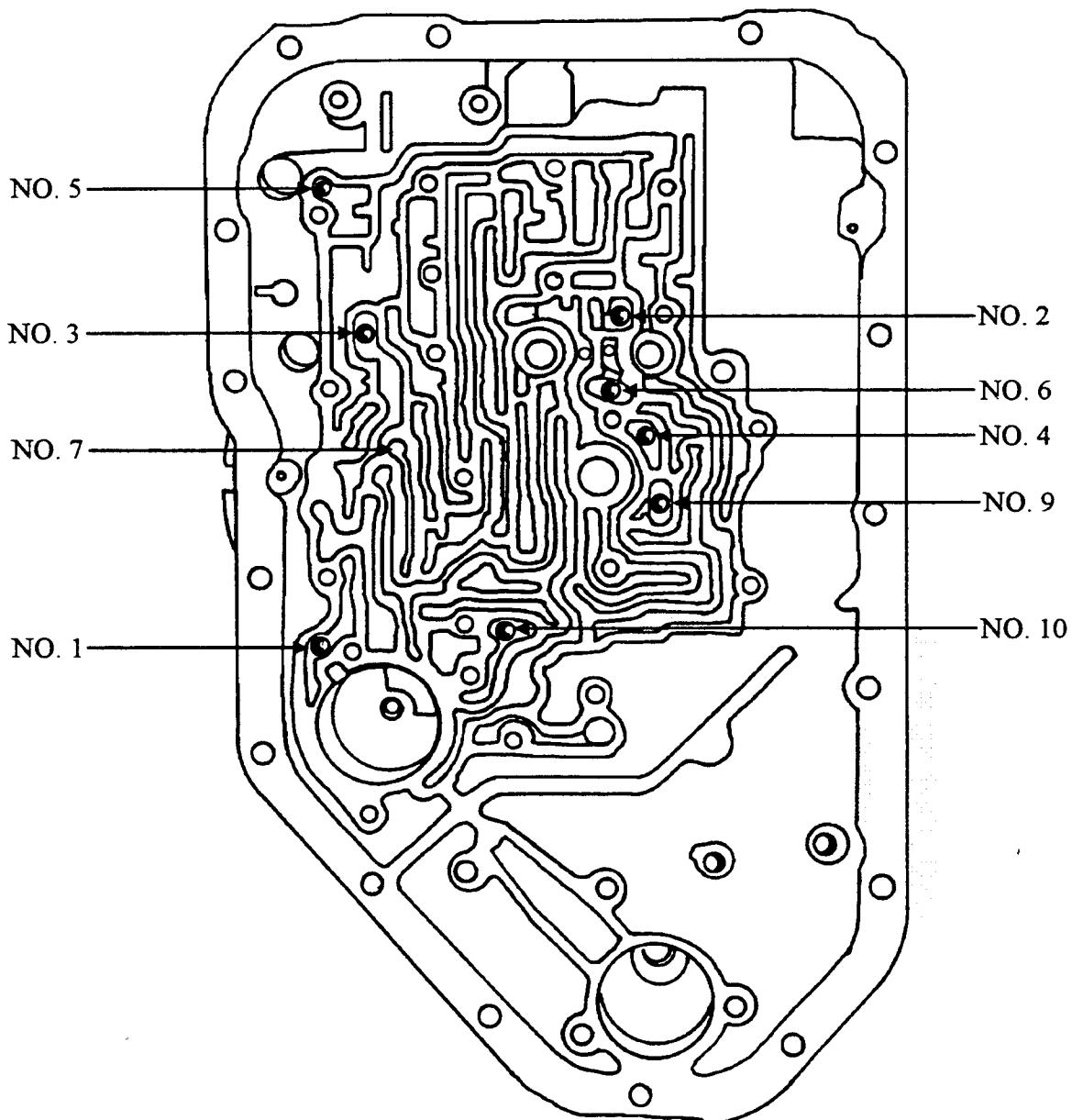
NO. 4 DIRECT CLUTCH EXHAUST BALL

NO. 5 T.V. EXHAUST LIFTER BALL

NO. 6 3RD & REVERSE SHUTTLE BALL

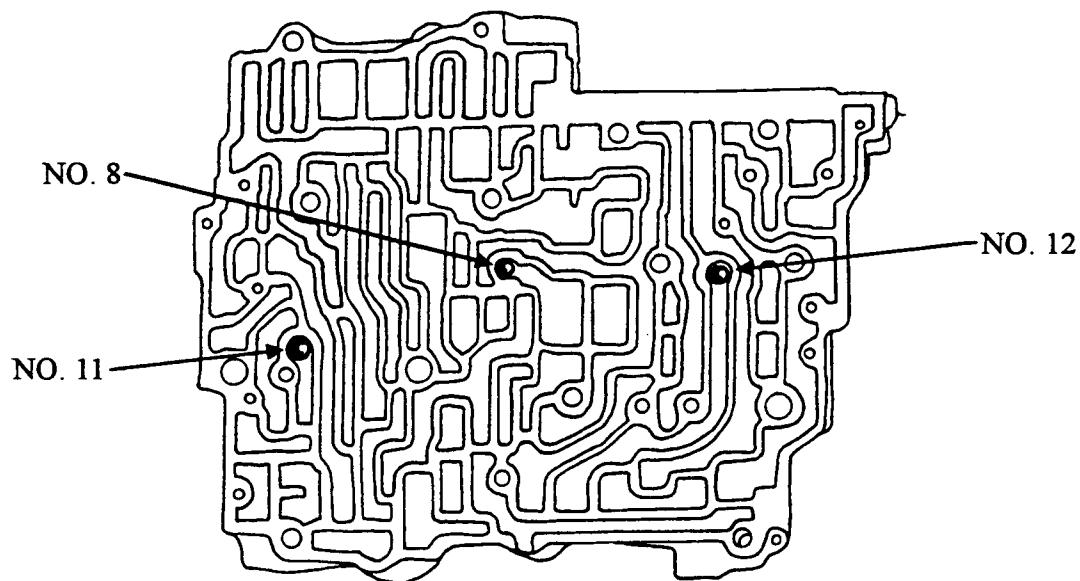
NO. 7 3RD ACCUMULATOR & 3-2 EXHAUST CAPSULE - 8630570

Figure 3

THM 200-4R
MAIN CASE CHECKBALL LOCATIONS

- NO. 1 FOURTH ACCUMULATOR
- NO. 2 THIRD CLUTCH ACCUMULATOR
- NO. 3 PART THROTTLE & DRIVE 3
- NO. 4 3-2 EXHAUST
- NO. 5 T.V. EXHAUST
- NO. 6 THIRD & REVERSE SHUTTLE BALL
- NO. 7 THIRD CLUTCH ACCUMULATOR & EXHAUST BALL
(located in a capsule inside the case - 8634400)
- NO. 9 LO/DETENT
- NO. 10 LO/ REVERSE

Figure 4

THM 200-4R
VALVE BODY CHECKBALL LOCATIONS

NO. 8 1-2 SHIFT CHECKBALL

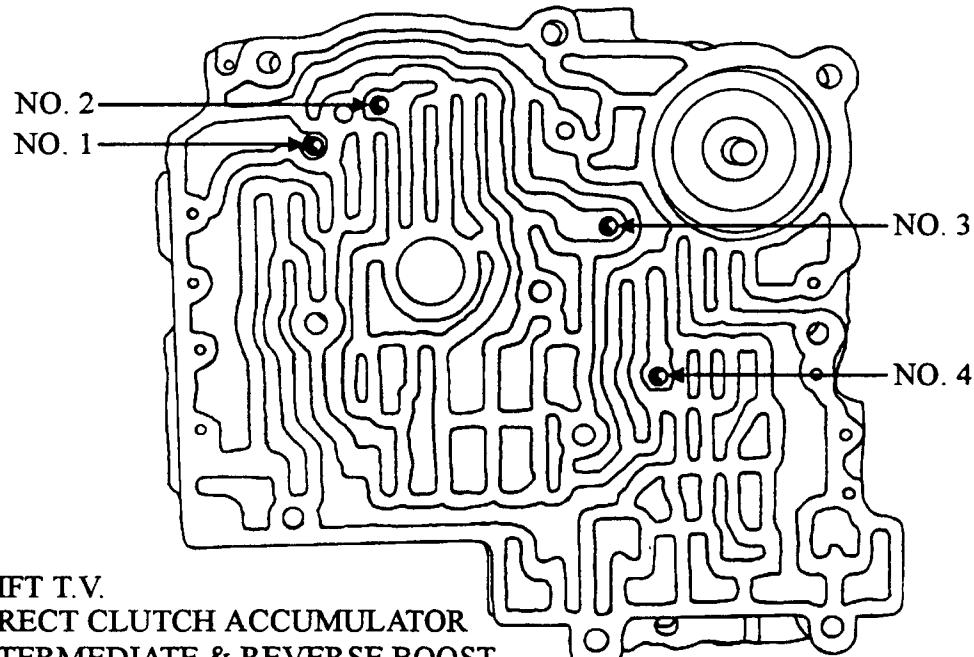
NO. 11 DRIVE 3 (D3) CHECKBALL

NO. 12 LO/1ST CHECKBALL

Figure 5

THM 325

VALVE BODY & MAIN CASE CHECKBALL LOCATIONS



- NO. 1 SHIFT T.V.
- NO. 2 DIRECT CLUTCH ACCUMULATOR
- NO. 3 INTERMEDIATE & REVERSE BOOST
- NO. 4 DIRECT CLUTCH EXHAUST
- NO. 5 T.V. EXHAUST
- NO. 6 DIRECT & REVERSE CLUTCH SHUTTLE BALL

NOTE: The #7 Direct Clutch Accumulator
Exhaust is located in the case cover.
(See 325-4L for Check Ball location)

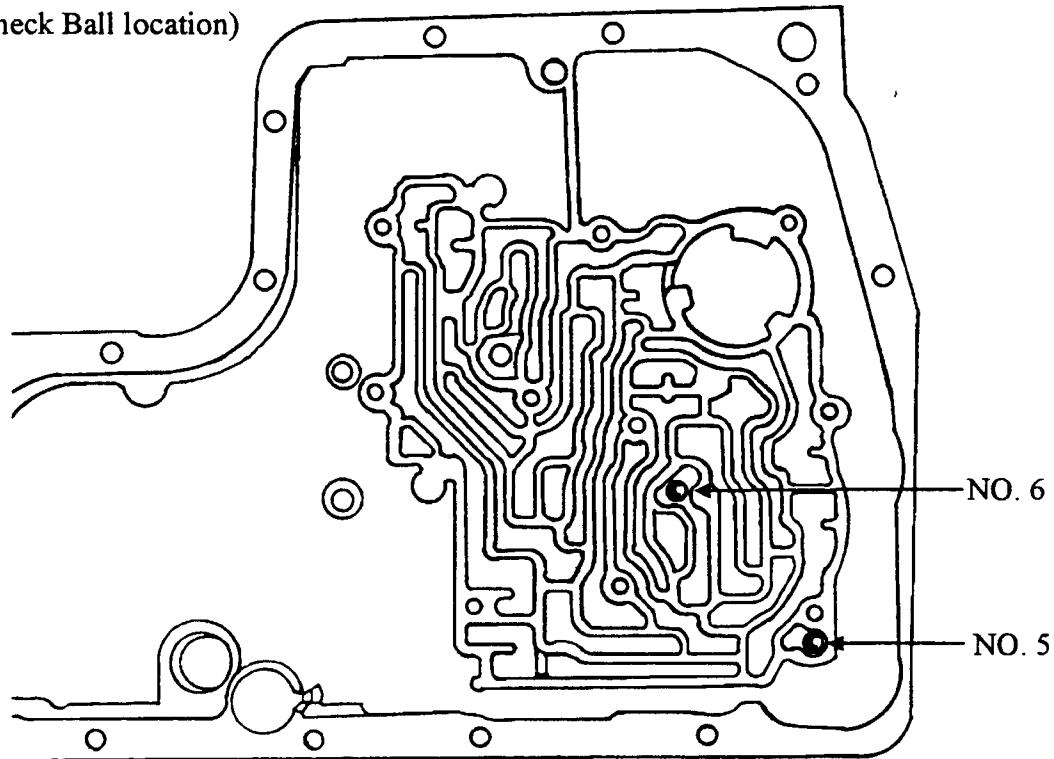


Figure 6

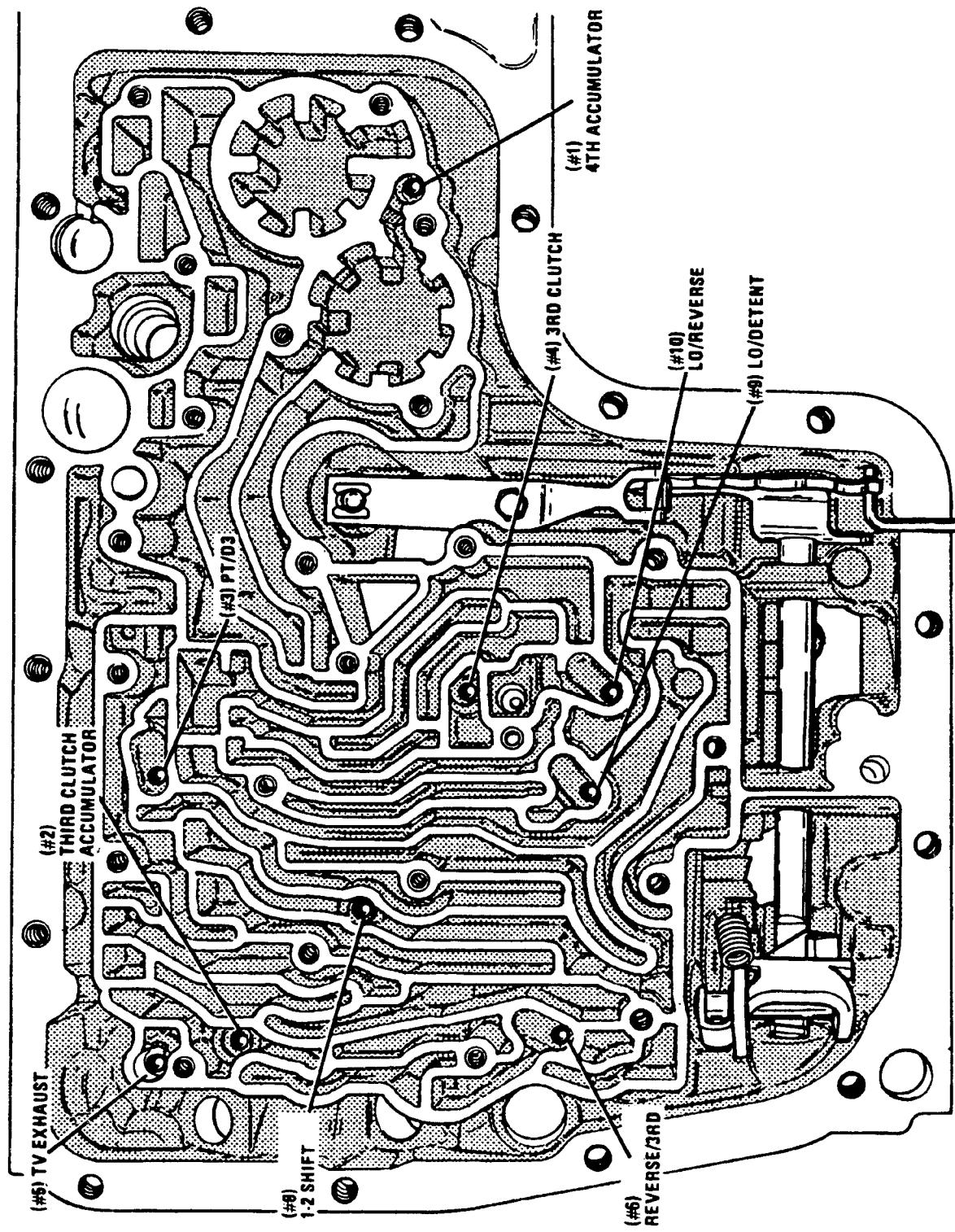
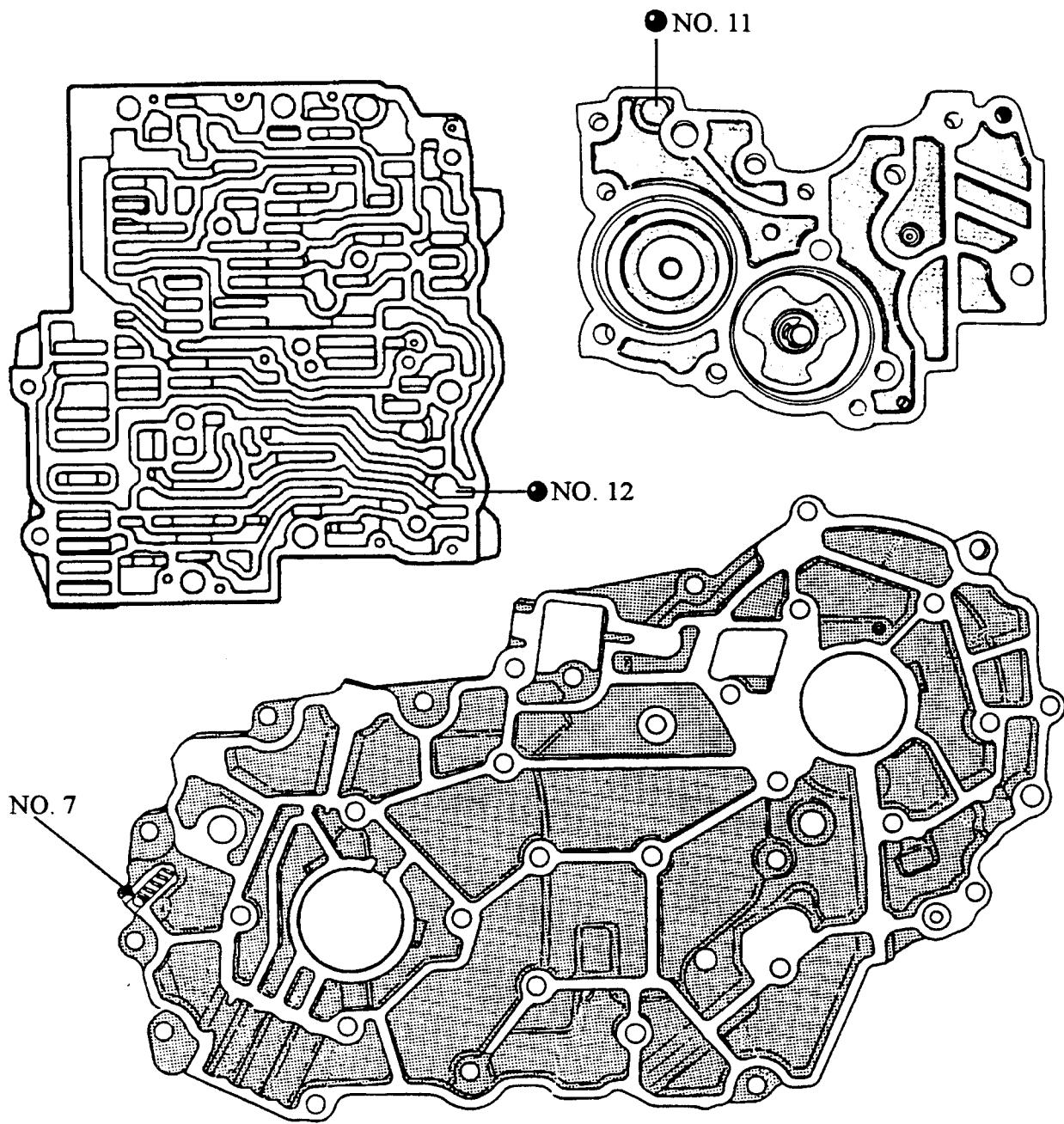
THM 325-4L
MAIN CASE CHECKBALL LOCATIONS

Figure 7

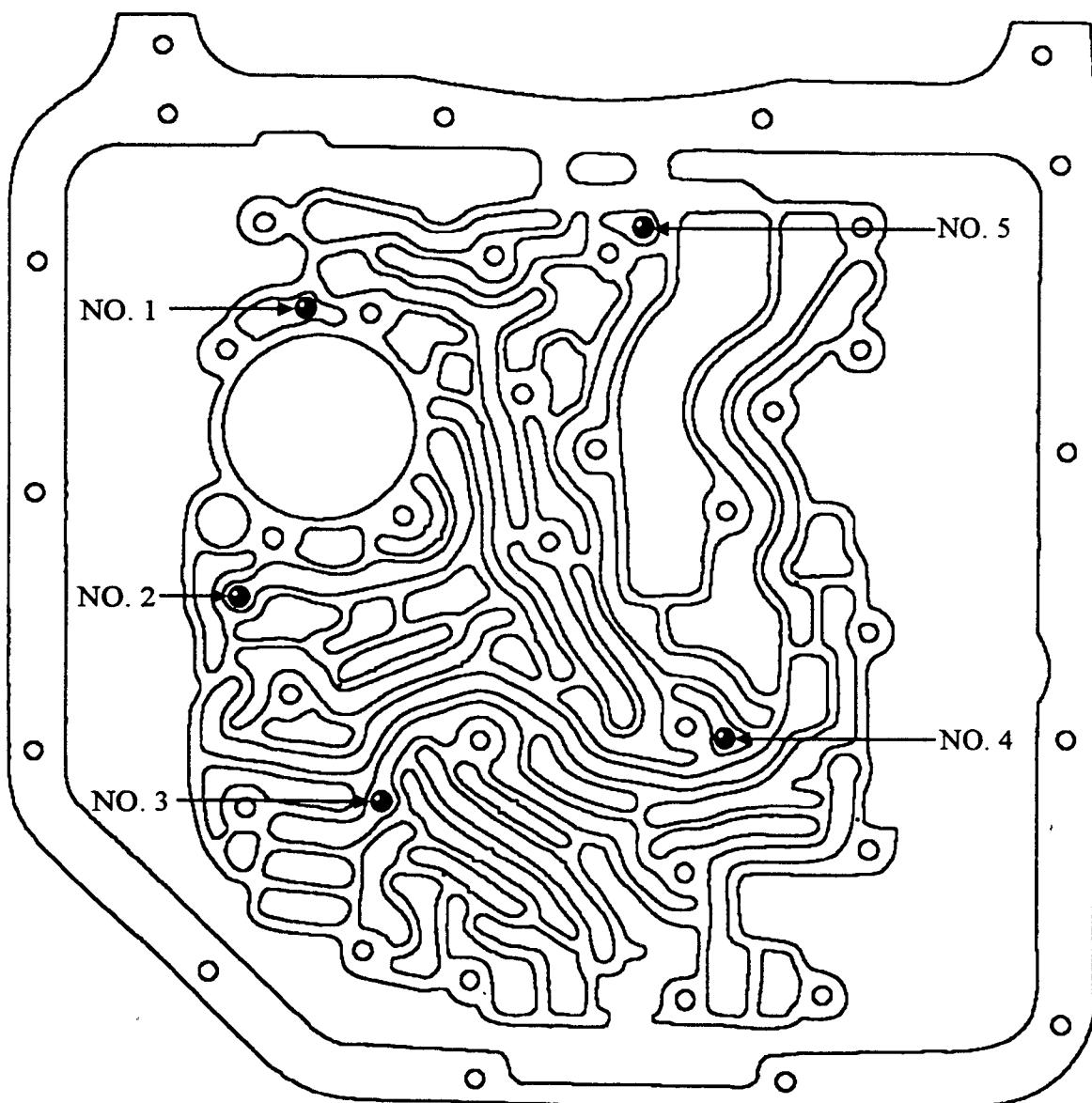
THM 325-4L**VALVE BODY, ACCUM. BODY & CASE COVER CHECKBALL LOCATIONS**

NO. 7 3RD CLUTCH ACCUMULATOR CHECK BALL & SPRING

NO. 11 D3 OVERRUN CLUTCH CHECK BALL

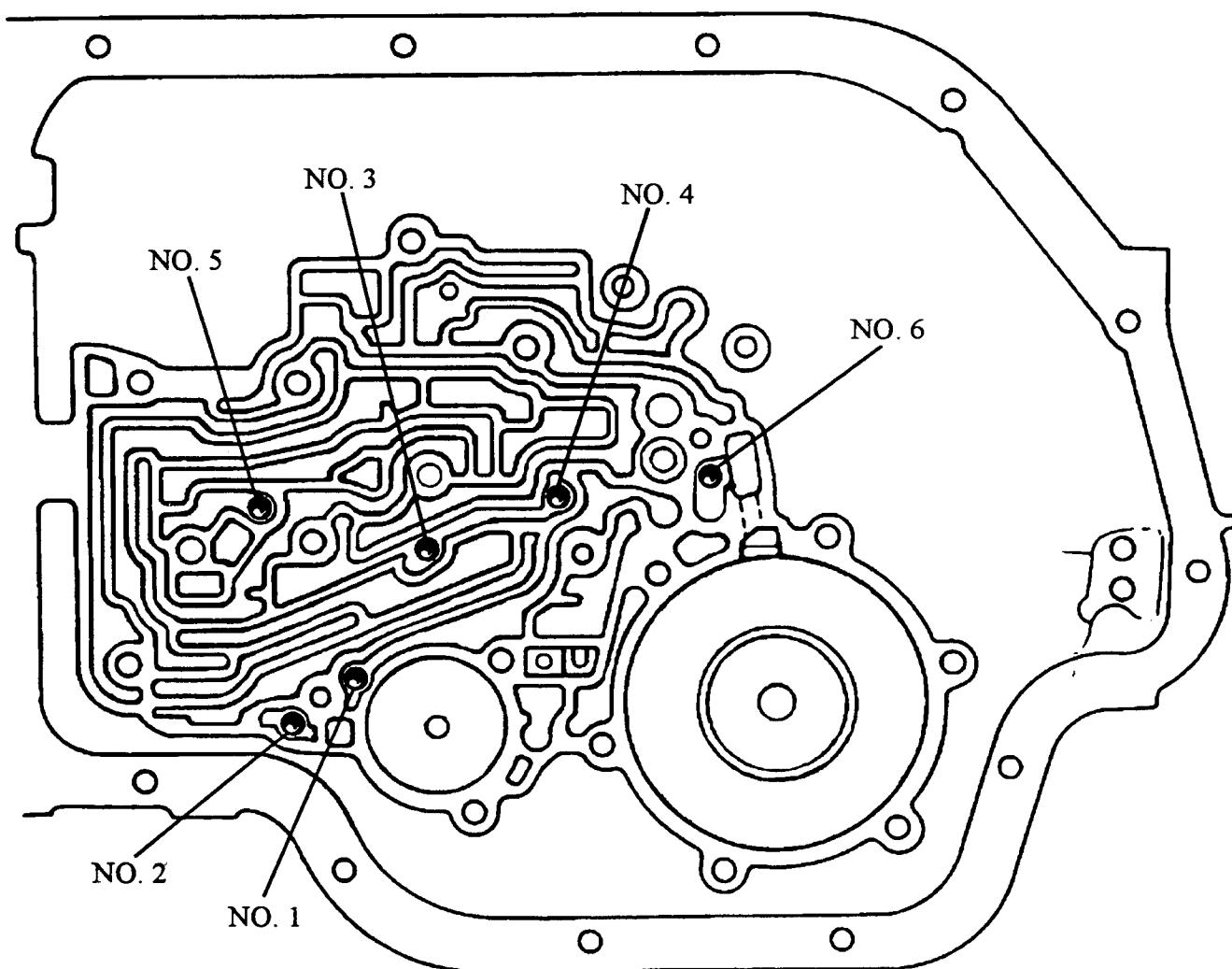
NO. 12 LO/1ST CHECK BALL

Figure 8

**THM 350C
MAIN CASE CHECKBALL LOCATIONS**

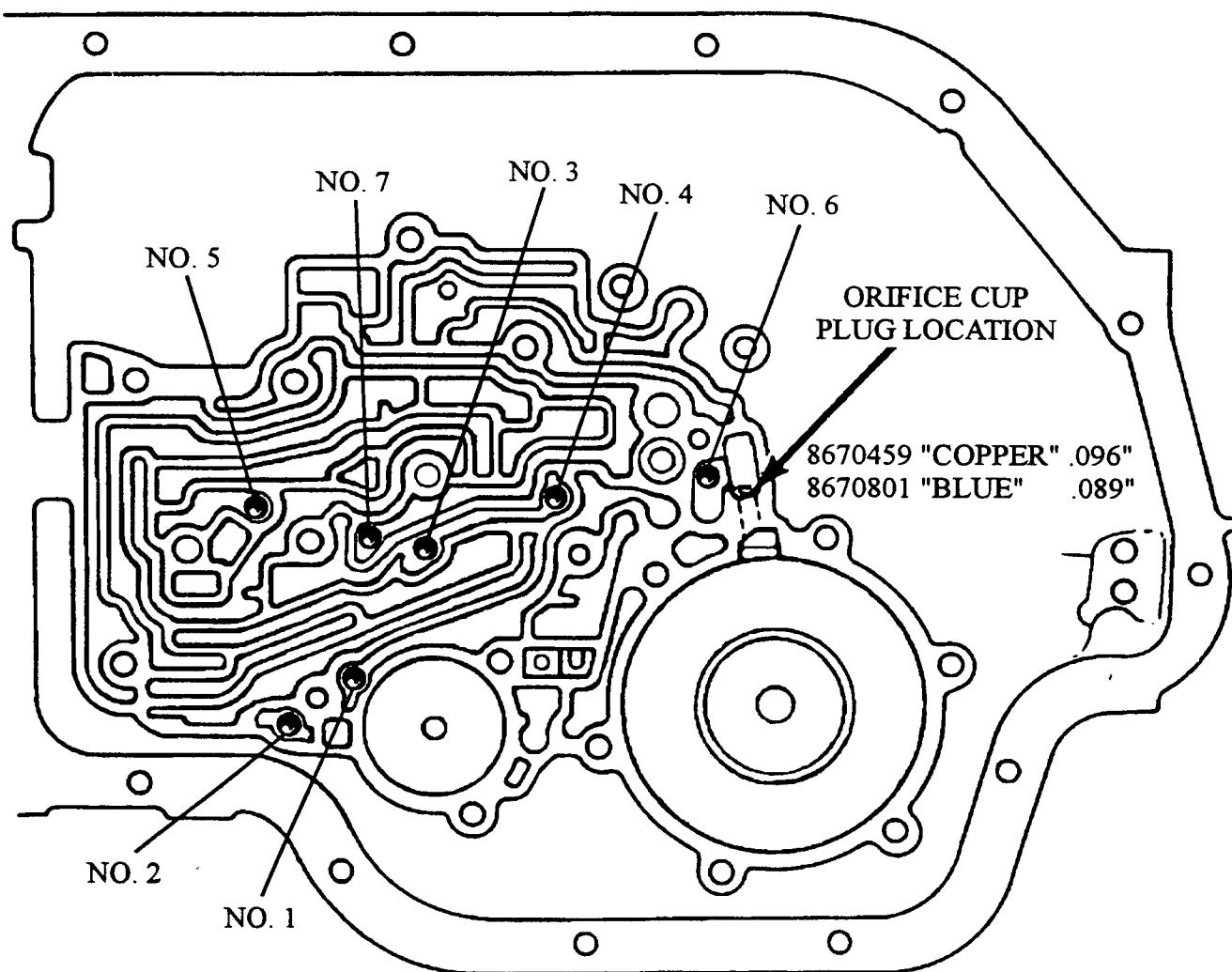
- NO. 1 2-3 ACCUMULATOR BALL
- NO. 2 LINE TO 1-2 ACCUMULATOR (PISTON SIDE)
- NO. 3 MODULATOR BALL
- NO. 4 REVERSE BALL
- NO. 5 CONVERTER RELEASE BALL

Figure 9

THM 400
1965 - 1987 MODELS, SIX BALL CASE

- NO. 1 NON-FUNCTIONAL (OMIT DURING REBUILD)
NO. 2 INTERMEDIATE SERVO
NO. 3 2-3 DRIVE
NO. 4 1-2 SHIFT
NO. 5 INTERMEDIATE
NO. 6 LO/REVERSE

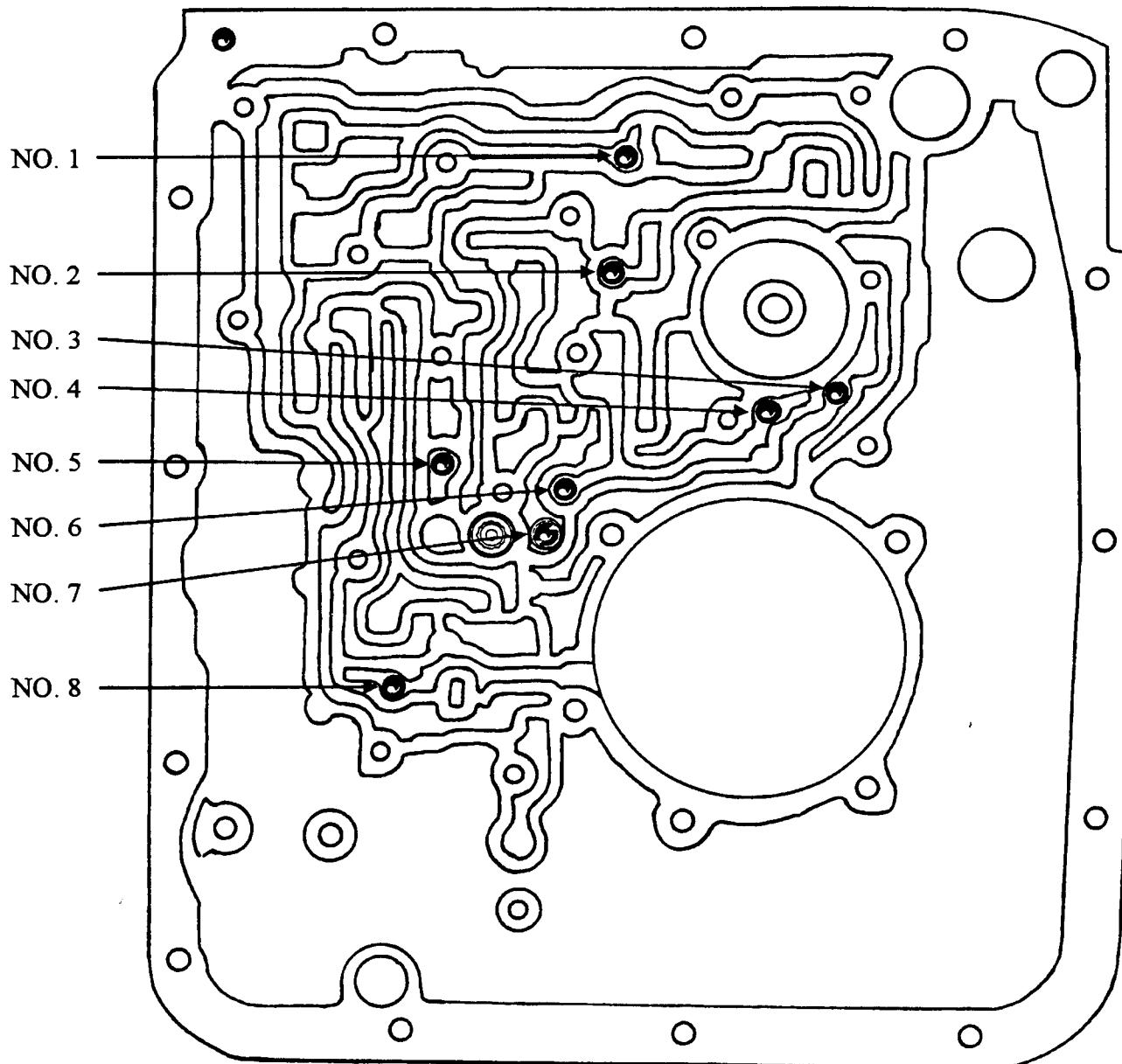
Figure 10

THM 400
1988 - 1990 MODELS, 7 BALL CASE

- NO. 1 NON-FUNCTIONAL (OMIT DURING REBUILD)
- NO. 2 INTERMEDIATE SERVO
- NO. 3 2-3 DRIVE
- NO. 4 1-2 SHIFT
- NO. 5 INTERMEDIATE
- NO. 6 LO/REVERSE
- NO. 7 REVERSE

Figure 11

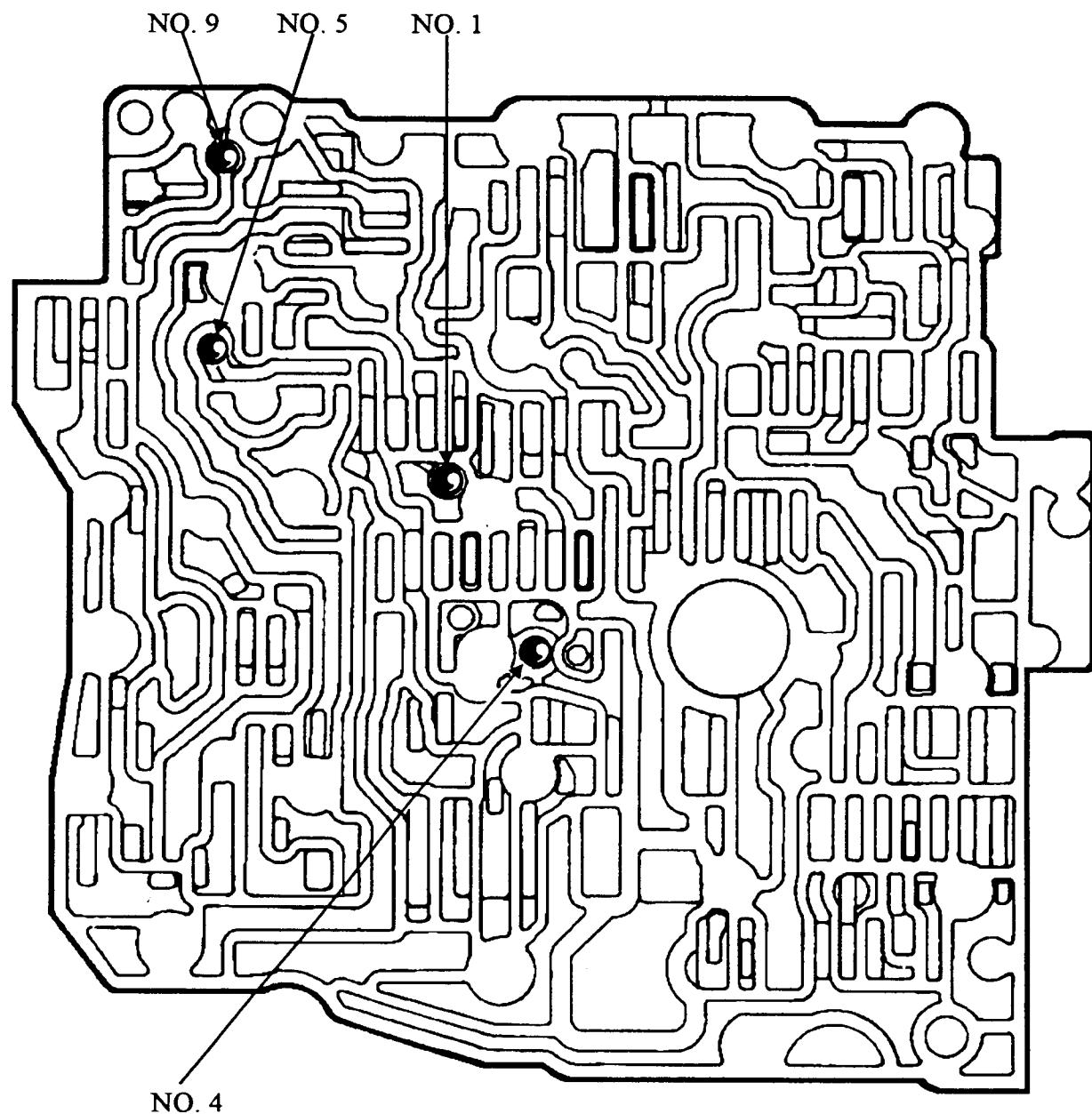
THM 425 CASE CHECKBALL LOCATIONS



- NO. 1 - RND ORIFICE CONTROL BALL TO FRONT SERVO
- NO. 2 - MODULATOR/INTERMEDIATE LINE BOOST DIRECTIONAL CONTROL BALL
- NO. 3 - DIRECT CLUTCH ACCUMULATOR ORIFICE CONTROL BALL
- NO. 4 - INTERMEDIATE SERVO ORIFICE CONTROL BALL
- NO. 5 - LOW/REVERSE DIRECTIONAL CONTROL BALL
- NO. 6 - INTERMEDIATE CLUTCH ORIFICE CONTROL BALL
- NO. 7 - REVERSE ORIFICE CONTROL BALL
- NO. 8 - LOW/REVERSE SERVO ORIFICE CONTROL BALL

Figure 12

THM 440-T4
VALVE BODY CHECKBALL LOCATIONS
1985 HYDRAULICS ONLY



NO. 1 3-4 SHIFT

NO. 4 2-3 SHIFT

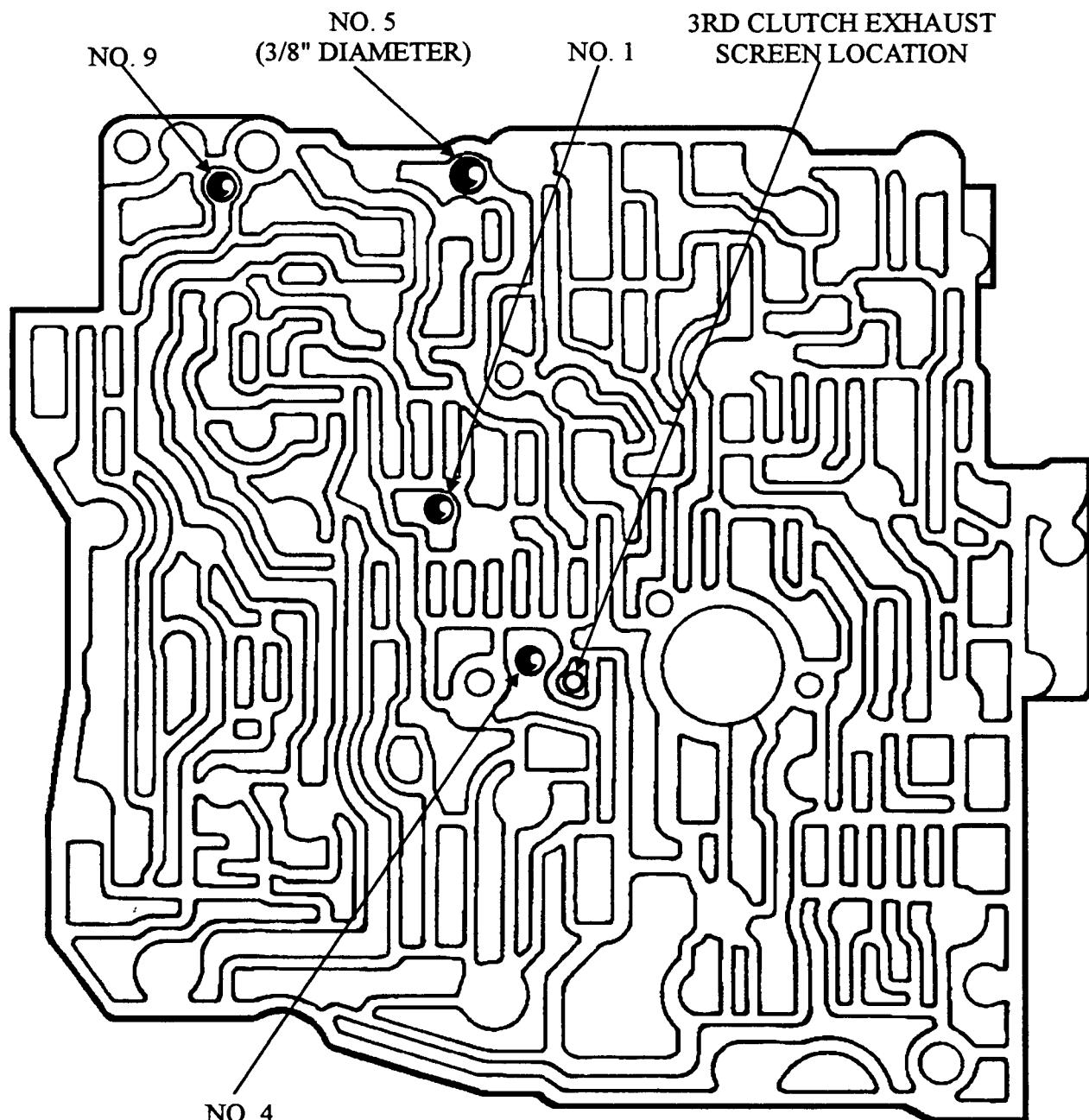
NO. 5 2-3 ACCUMULATOR FEED

NO. 9 REVERSE SERVO FEED

ALL CHECKBALLS IN THIS MODEL ARE 1/4" DIAMETER.

Figure 13

THM 440-T4

VALVE BODY CHECKBALL LOCATIONS
1985-1/2 AND LATER HYDRAULICS ONLY

NO. 1 3-4 SHIFT

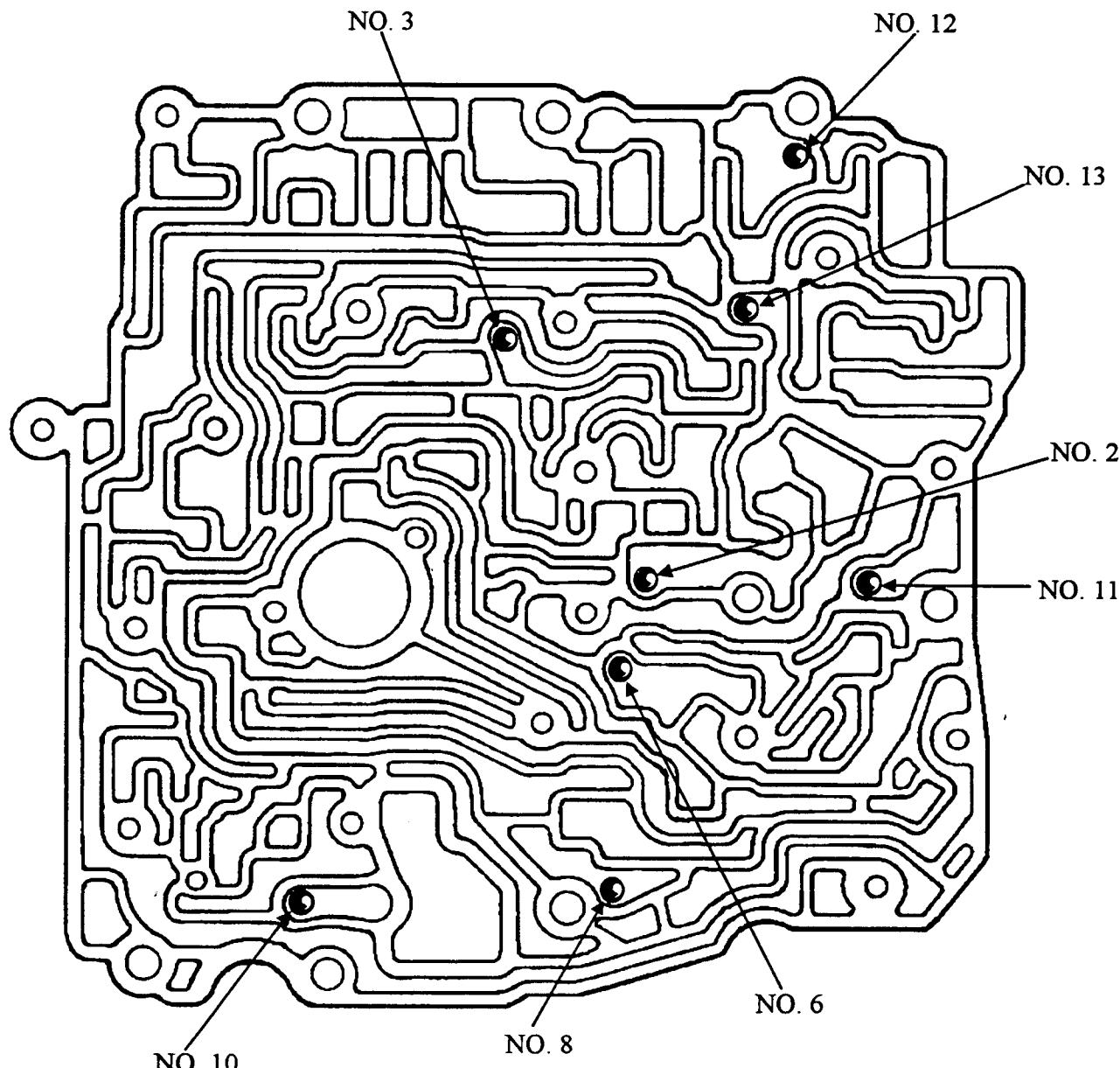
NO. 4 2-3 SHIFT

NO. 5 2-3 ACCUMULATOR FEED (3/8" DIAMETER)

NO. 9 REVERSE SERVO FEED

Figure 14

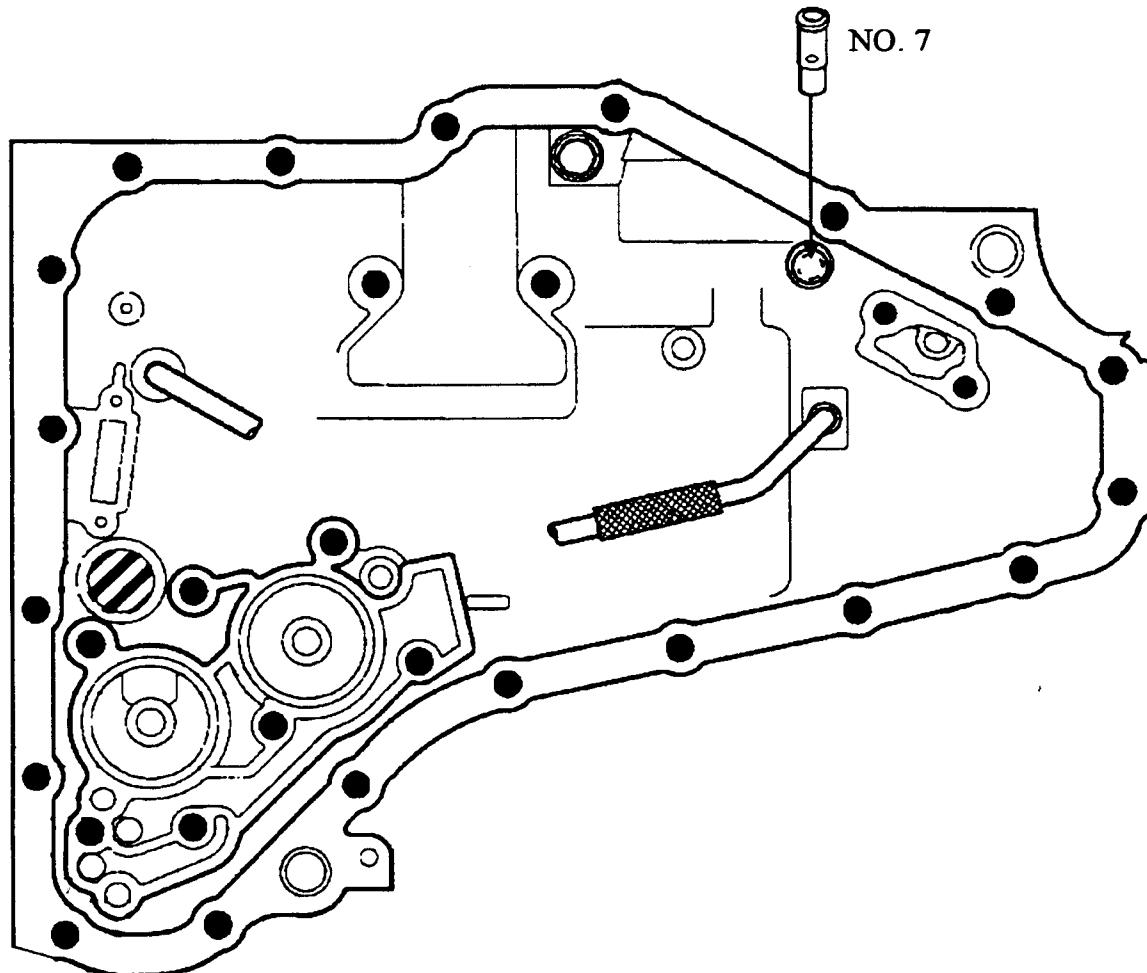
THM 440-T4
CHANNEL PLATE CHECKBALL LOCATIONS
FOR ALL MODELS OF 440-T4



- NO. 2 3-2 CONTROL
- NO. 3 PART THROTTLE/DRIVE 3
- NO. 6 2-3 ACCUMULATOR EXHAUST
- NO. 8 1-2 SHIFT
- NO. 10 TCC APPLY/RELEASE
- NO. 11 THIRD/LO-1ST
- NO. 12 1-2 SERVO FEED
- NO. 13 INPUT CLUTCH/REVERSE

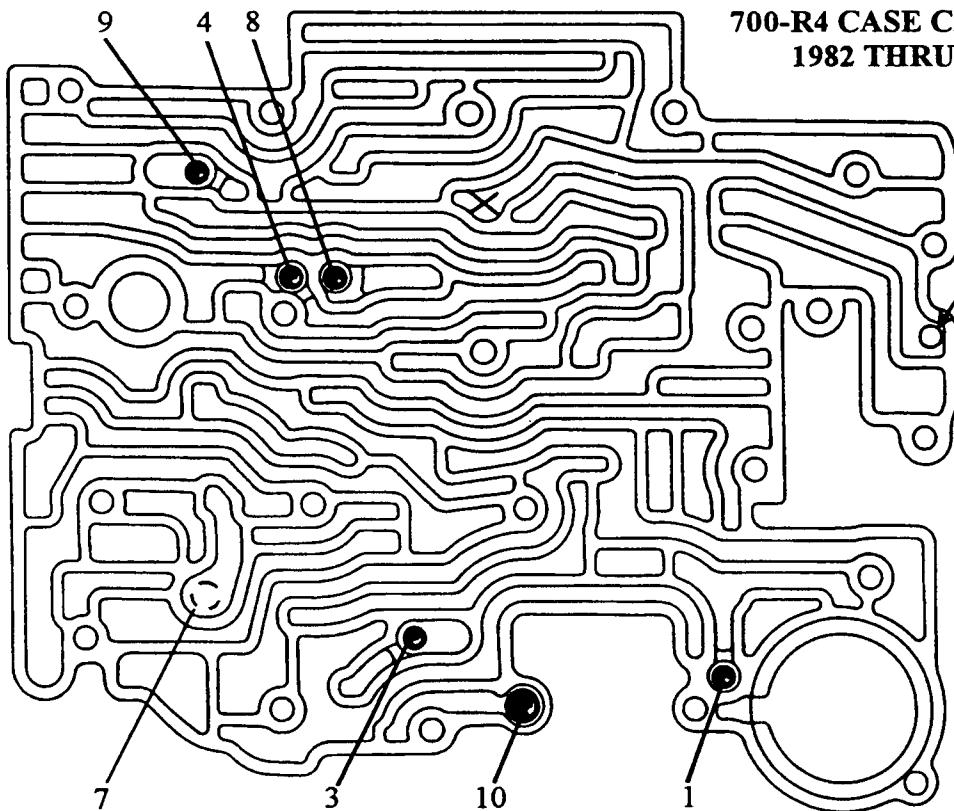
Figure 15

THM 440-T4
MAIN CASE CHECKBALL LOCATION
FOR ALL MODELS OF 440-T4



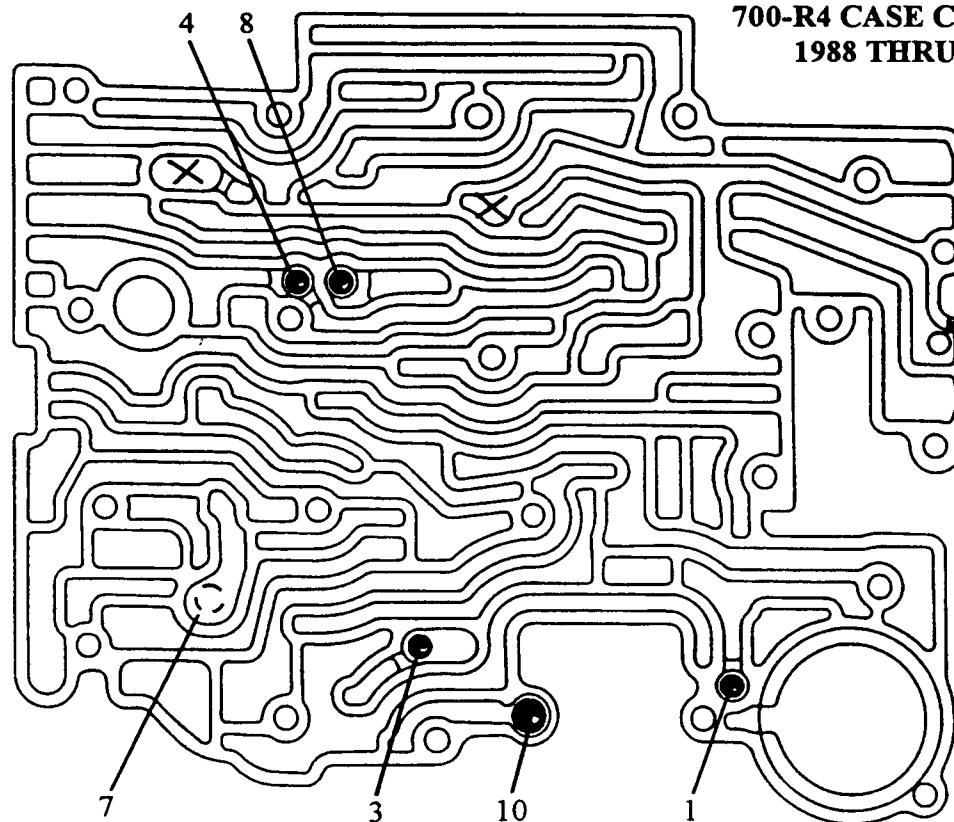
NO. 7 3RD ACCUMULATOR & 3-2 EXHAUST CAPSULE - 8668287

Figure 16



Began in 1987:
Double orifice check ball
Allows for both controlled
apply and rapid release of
the low/reverse clutch.
Part # 8663890

- 1 4TH ACCUMULATOR
- 3 PT. THROTTLE/D3
- 4 3-2 EXHAUST
- 7 3RD ACCUM. & EX
CAPSULE - 8634400
- 8 1-2 SHIFT
- 9 LO/DETENT
- 10 TV EXHAUST



Began in 1987:
Double orifice check ball
Allows for both controlled
apply and rapid release of
the low/reverse clutch.
Part # 8663890

- 1 4TH ACCUMULATOR
- 3 PT. THROTTLE/D3
- 4 3-2 EXHAUST
- 7 3RD ACCUM. & EX.
CAPSULE - 8634400
- 8 1-2 SHIFT
- 10 TV EXHAUST

Figure 17

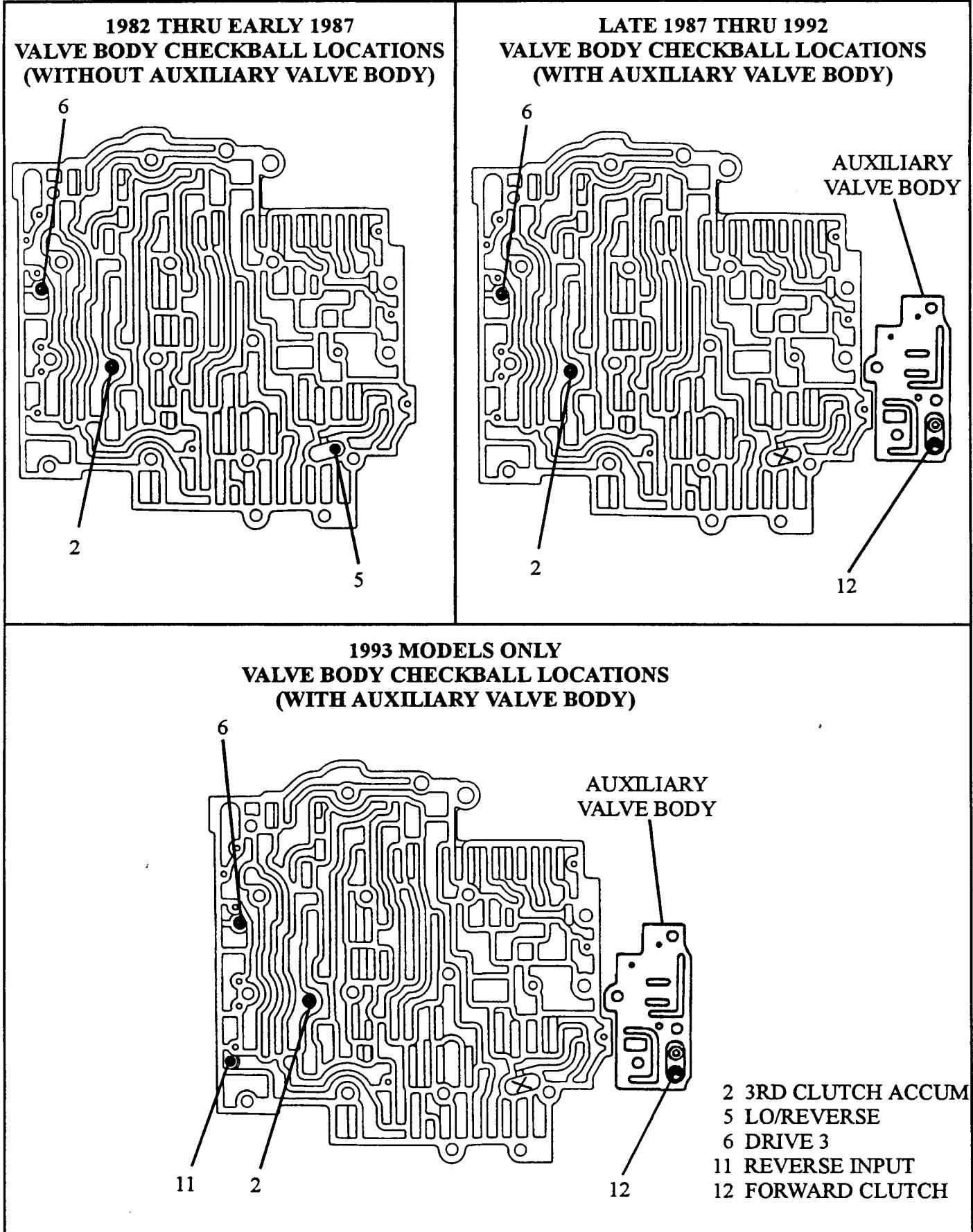
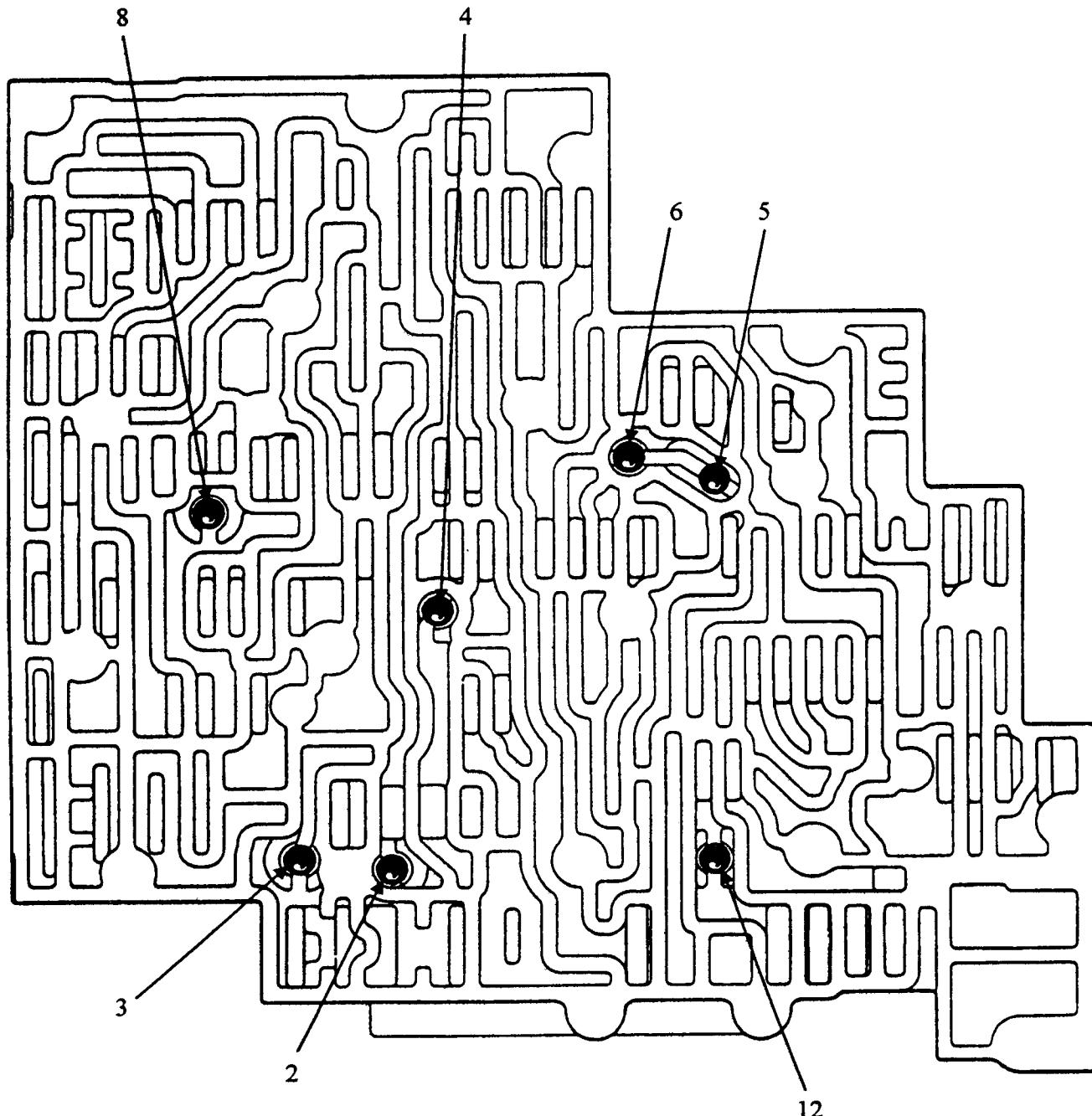


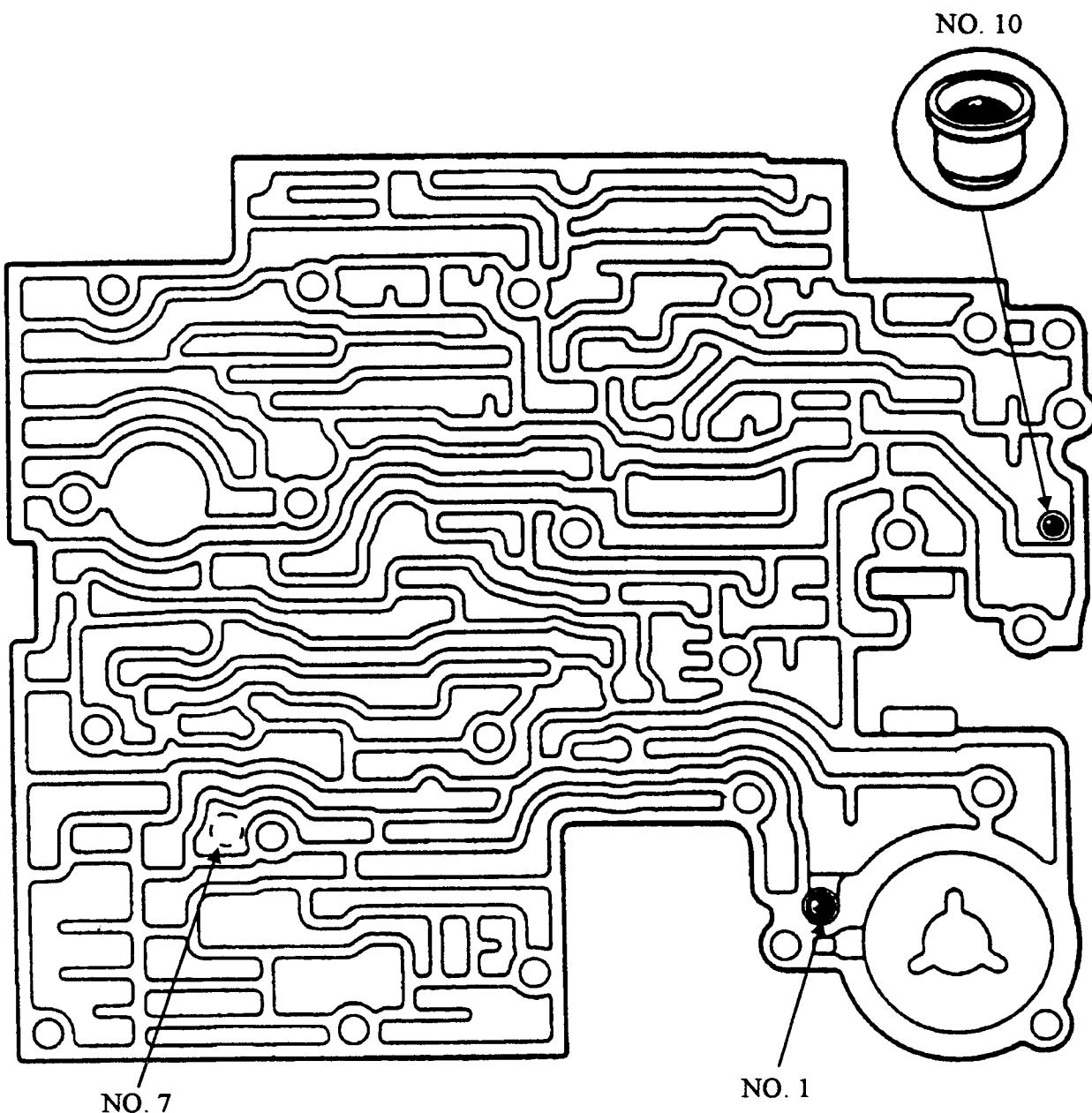
Figure 18

AUTOMATIC TRANSMISSION SERVICE GROUP

THM 4L60-E
VALVE BODY CHECKBALL LOCATIONS

- 2 3RD ACCUMULATOR
- 3 REVERSE INPUT
- 4 3-4 CLUTCH EXHAUST
- 5 OVERRUN CLUTCH FEED
- 6 OVERRUN CLUTCH CONTROL
- 8 1-2 UPSHIFT
- 12 FORWARD CLUTCH ACCUMULATOR

Figure 19
AUTOMATIC TRANSMISSION SERVICE GROUP

THM 4L60-E
CASE CHECKBALL LOCATIONS

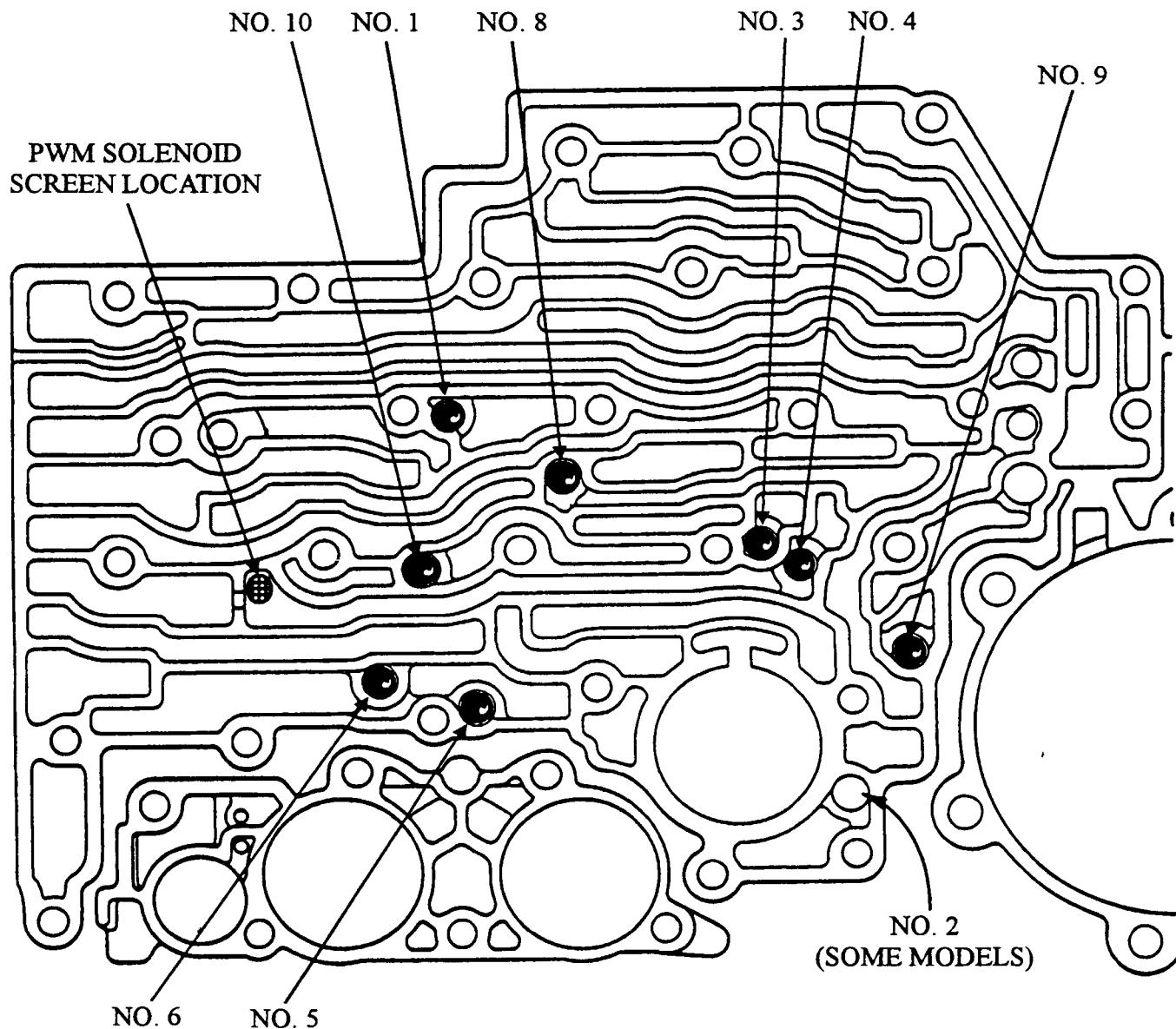
NO. 1 3-4 ACCUMULATOR

NO. 7 3RD ACCUMULATOR & EXHAUST CAPSULE - 8634400

NO. 10 REVERSE BALL CAPSULE - 8663890

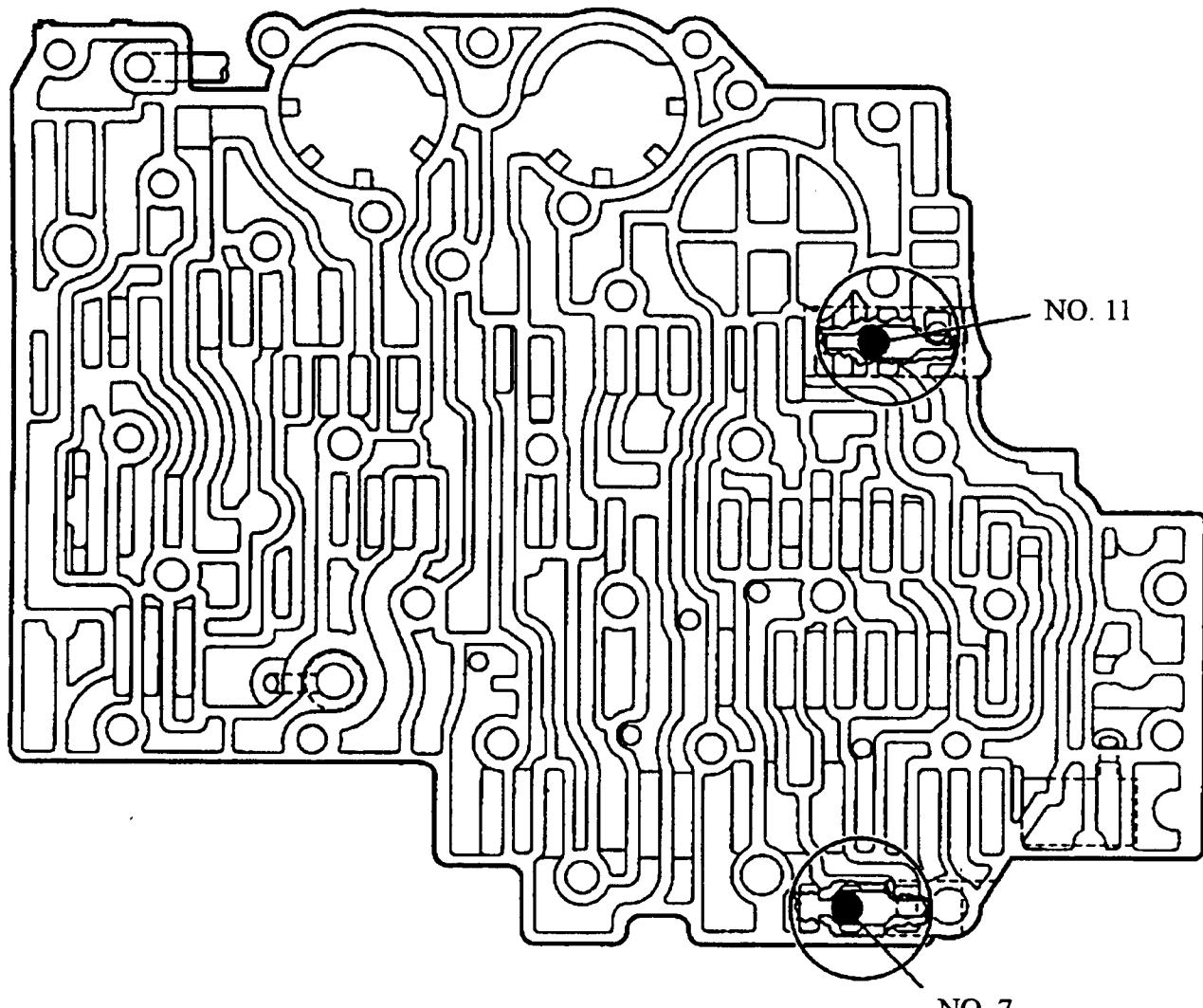
Figure 20

AUTOMATIC TRANSMISSION SERVICE GROUP

THM 4L80-E/4L80-EHD
CASE CHECKBALL LOCATIONS

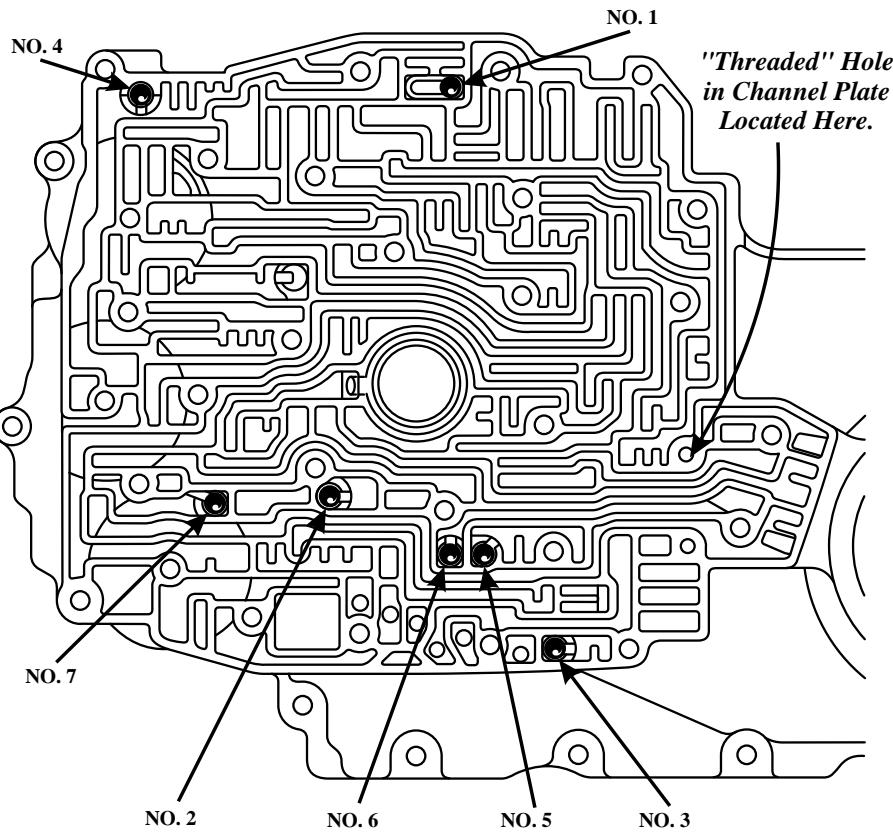
- NO. 1 OVERRUN CLUTCH
- NO. 2 2ND ACCUMULATOR (SOME MODELS)
- NO. 3 FRONT BAND APPLY
- NO. 4 2ND CLUTCH
- NO. 5 3RD ACCUMULATOR
- NO. 6 4TH ACCUMULATOR
- NO. 8 3RD CLUTCH
- NO. 9 REVERSE
- NO. 10 4TH CLUTCH

Figure 21
AUTOMATIC TRANSMISSION SERVICE GROUP

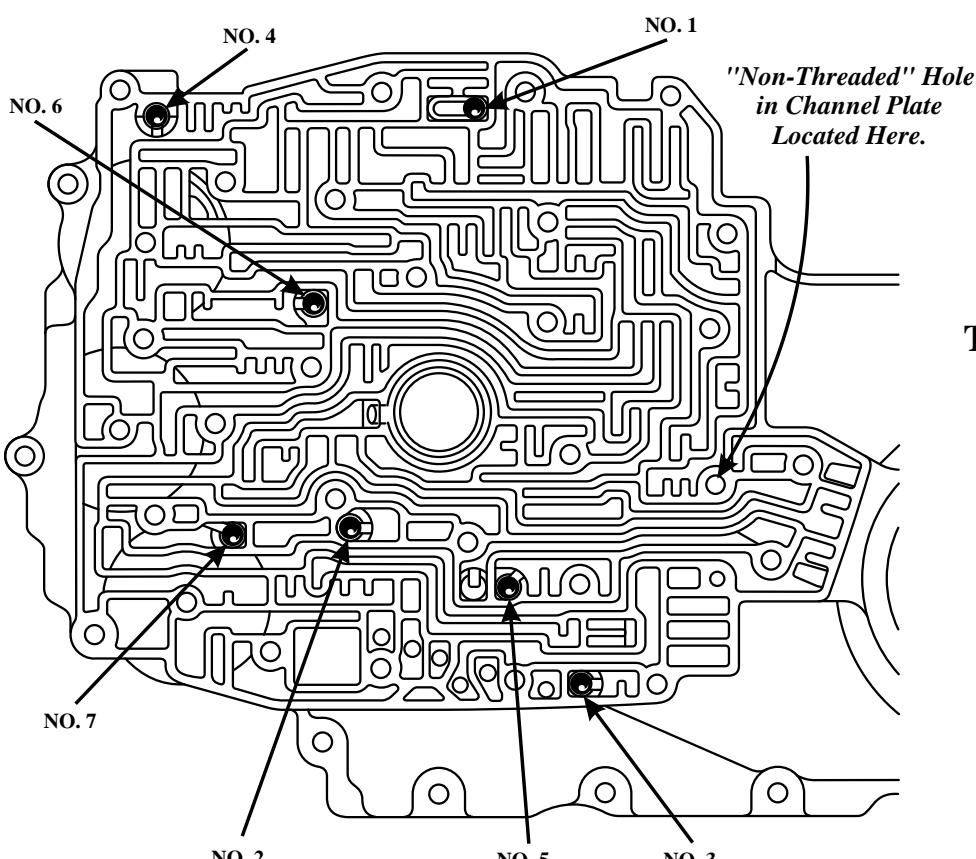
THM 4L80-E/4L80-EHD
VALVE BODY CHECKBALL LOCATIONS

NO. 7 LO/REVERSE SHUTTLE BALL
NO. 11 3RD/REVERSE SHUTTLE BALL

Figure 22
AUTOMATIC TRANSMISSION SERVICE GROUP



**THM 4T40-E 1995-1996
MODELS "ONLY"**

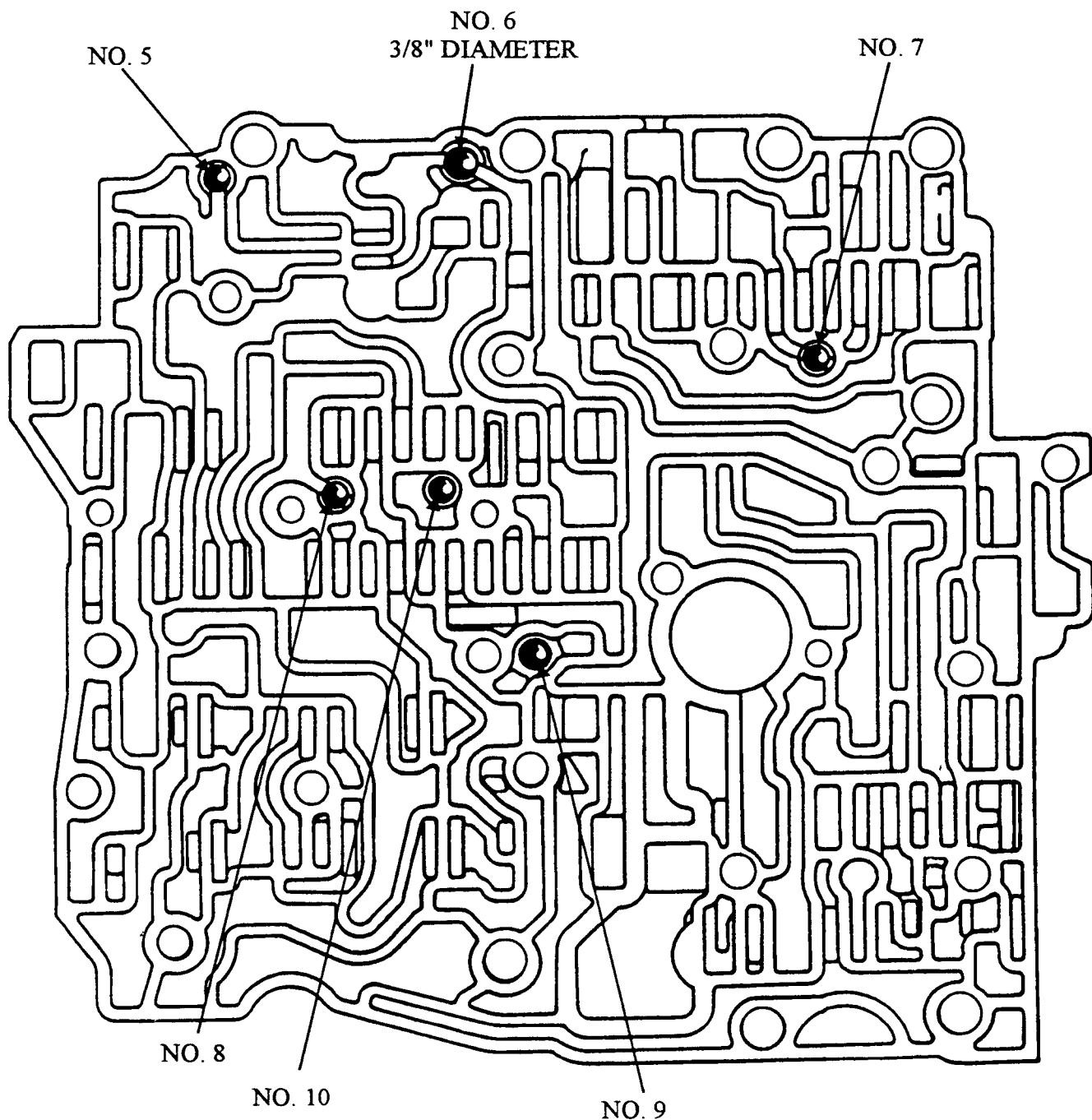


**THM 4T40-E 1997-UP
MODELS "ONLY"**

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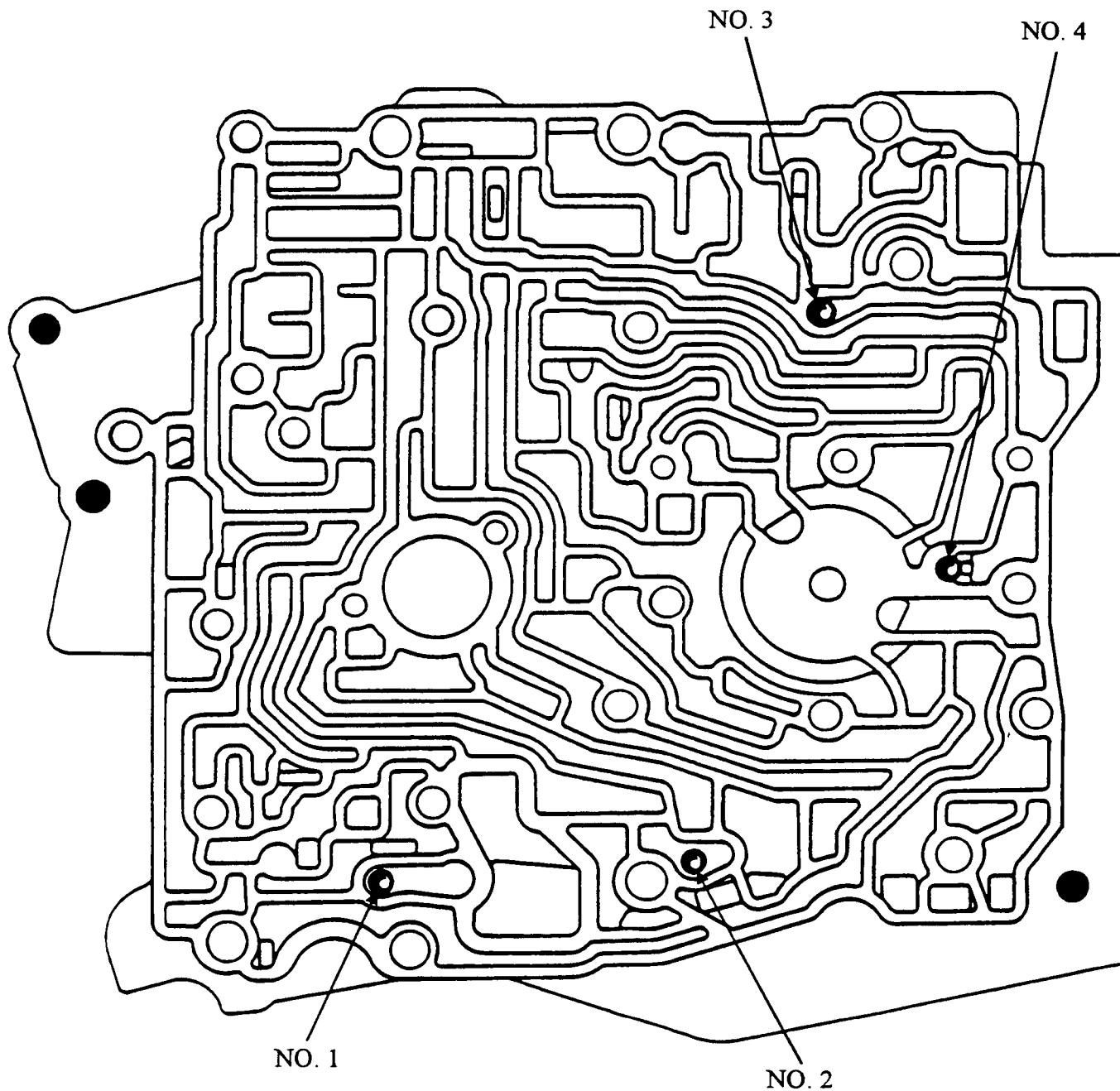
Figure 23

AUTOMATIC TRANSMISSION SERVICE GROUP

THM 4T60-E
VALVE BODY CHECKBALL LOCATIONS

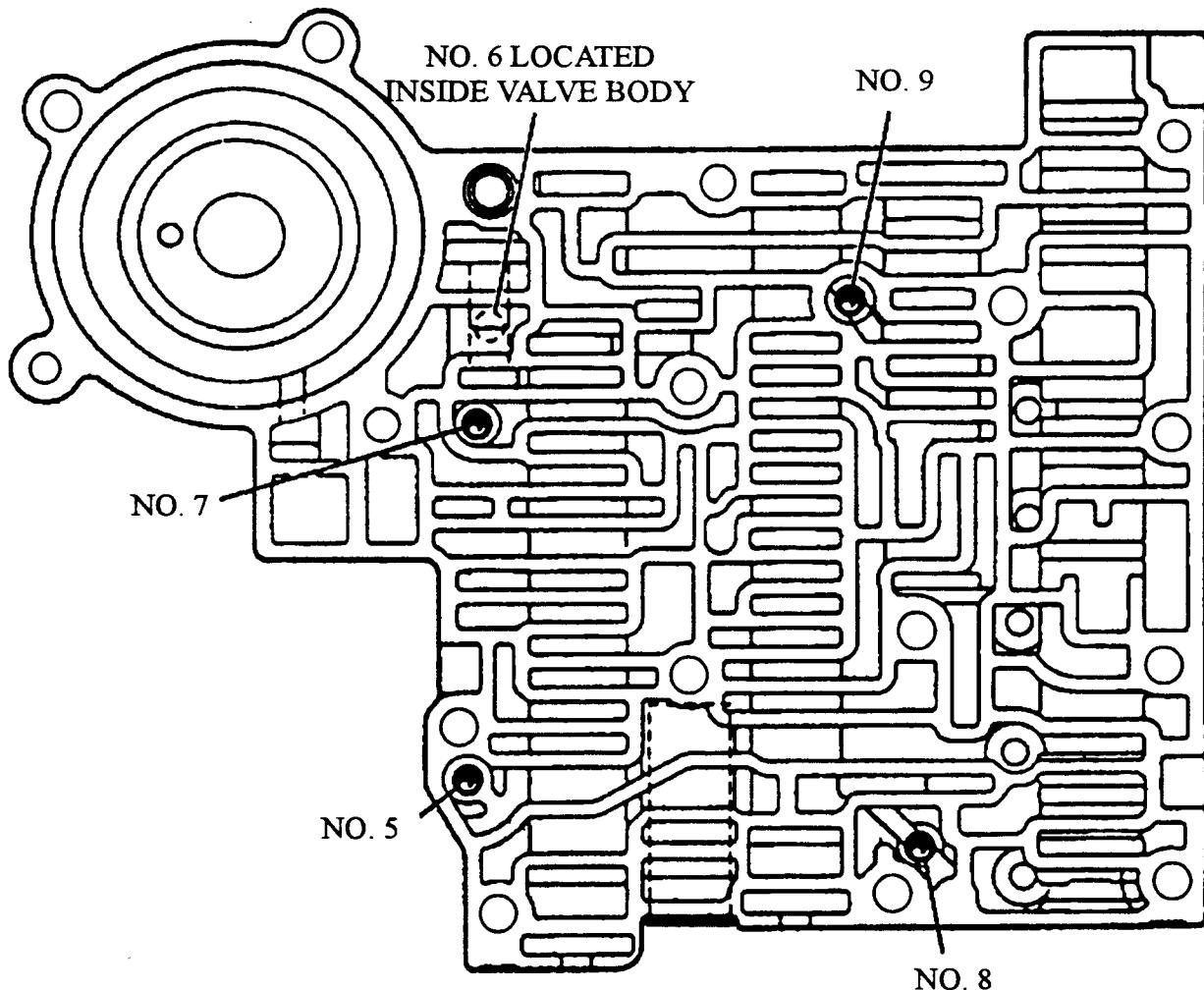
- NO. 5 REVERSE SERVO
NO. 6 FORWARD SERVO APPLY (3/8" DIAMETER)
NO. 7 3RD CLUTCH LO-1ST
NO. 8 MANUAL 2-1 SERVO FEED
NO. 9 2-3 SHIFT
NO. 10 3-4 SHIFT

Figure 24
AUTOMATIC TRANSMISSION SERVICE GROUP

THM 4T60-E
CHANNEL PLATE CHECKBALL LOCATIONS

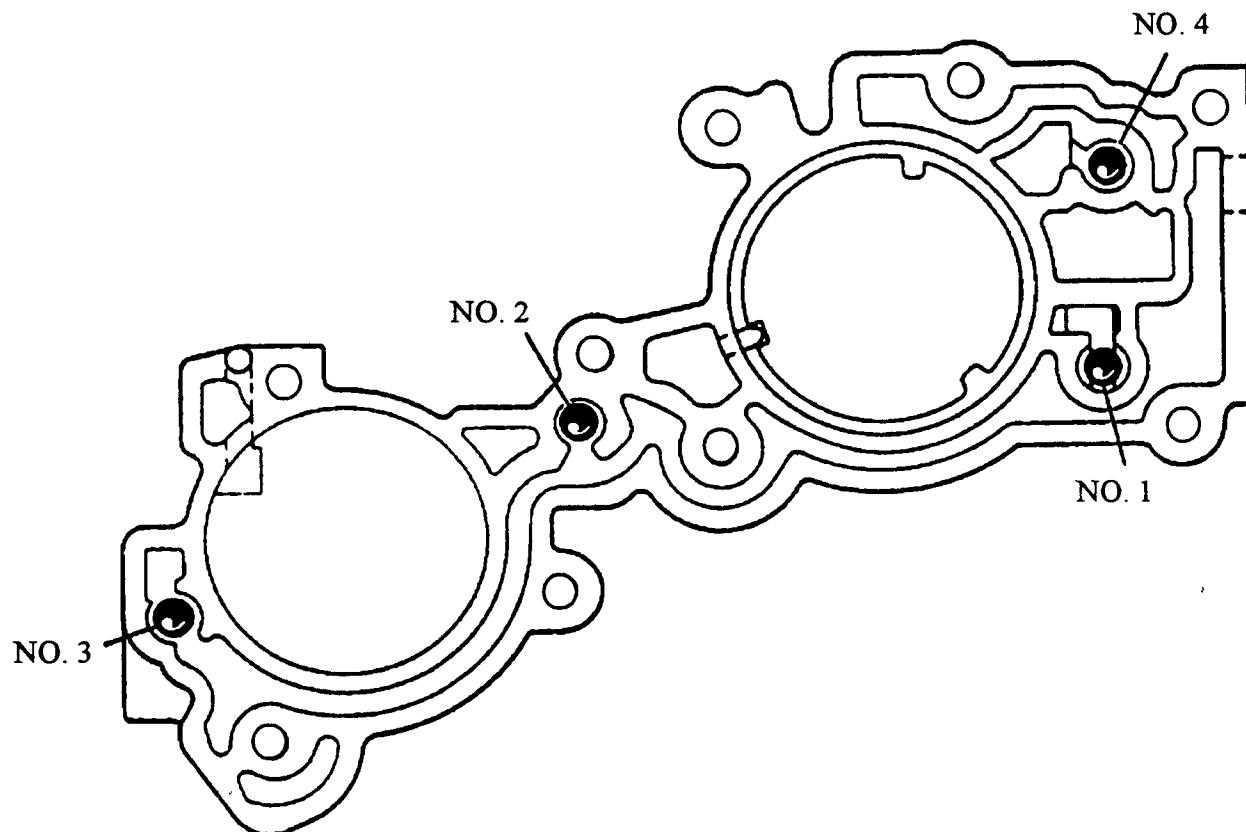
- NO. 1 TCC APPLY/RELEASE
- NO. 2 1-2 SHIFT
- NO. 3 INPUT CLUTCH/PRN
- NO. 4 3RD CLUTCH/LO-1ST

Figure 25

THM 4T80-E
VALVE BODY CHECKBALL LOCATIONS

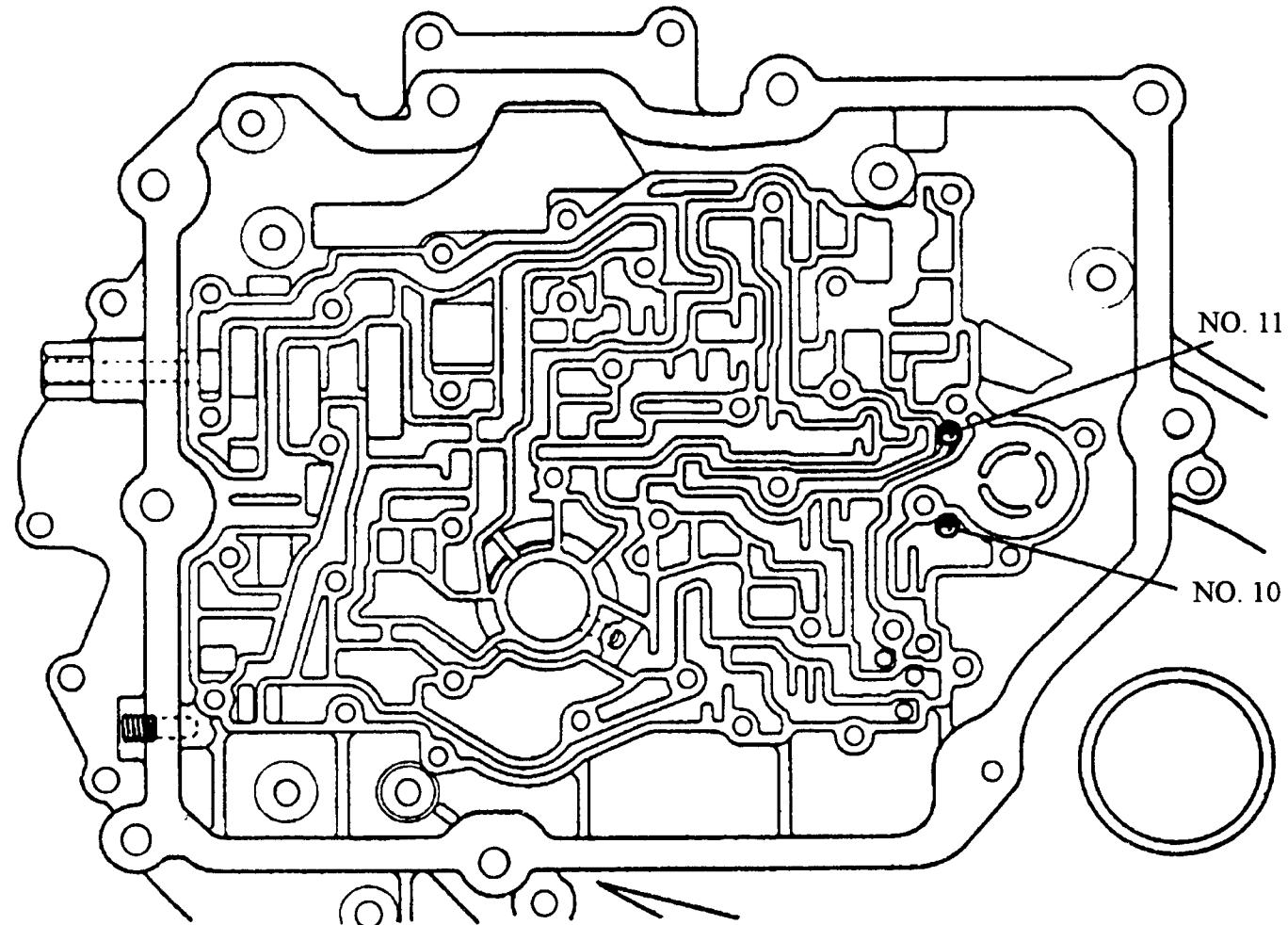
- NO. 5 FORWARD CLUTCH
- NO. 6 REV BAND/LO-REV BAND REDUCE
- NO. 7 REVERSE CLUTCH
- NO. 8 LO
- NO. 9 COAST CLUTCH FEED

Figure 26

THM 4T80-E
ACCUMULATOR BODY CHECKBALL LOCATIONS

- NO. 1 FORWARD CLUTCH
NO. 2 1-2 ACCUMULATOR
NO. 3 3-4 ACCUMULATOR
NO. 4 REVERSE CLUTCH

Figure 27

4T80-E
CASE COVER CHECKBALL LOCATIONS

NO. 10 2-3 ACCUMULATOR
NO. 11 3RD CLUTCH

Figure 28

TAAT

SATURN UPPER VALVE BODY CHECKBALL LOCATIONS

FORWARD/REVERSE SERVO
APPLY CONTROL BALL

.250" Ball

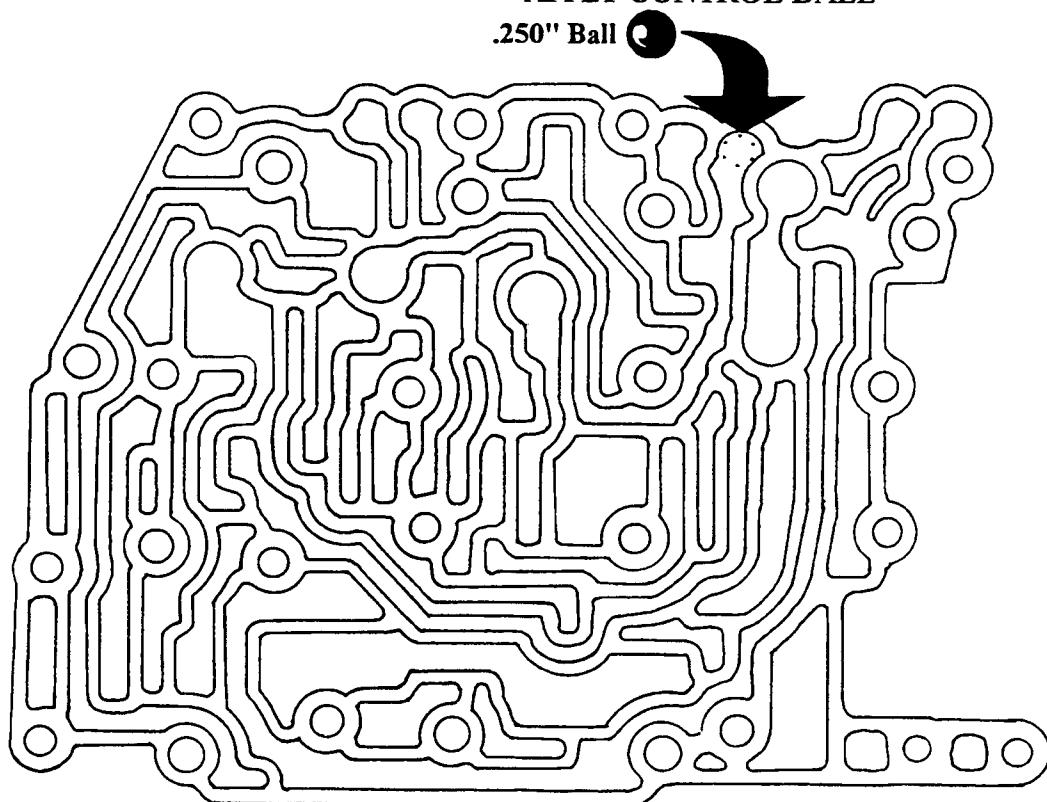


Figure 29

TAAT
SATURN LOWER VALVE BODY CHECKBALL LOCATIONS

BOTH BALLS FUNCTION TOGETHER TO CONTROL FIRST CLUTCH APPLY AND SERVO RELEASE IN ALL FORWARD RANGES

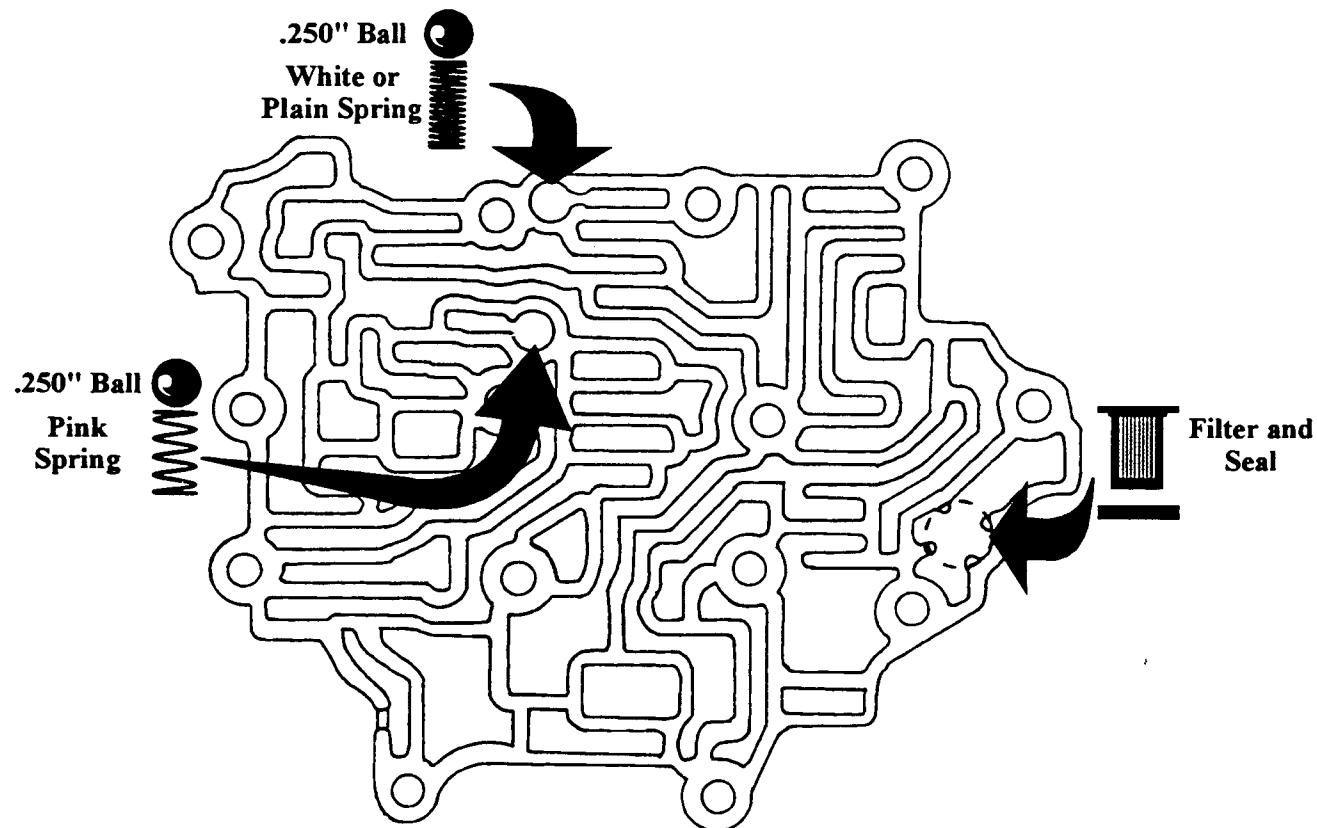
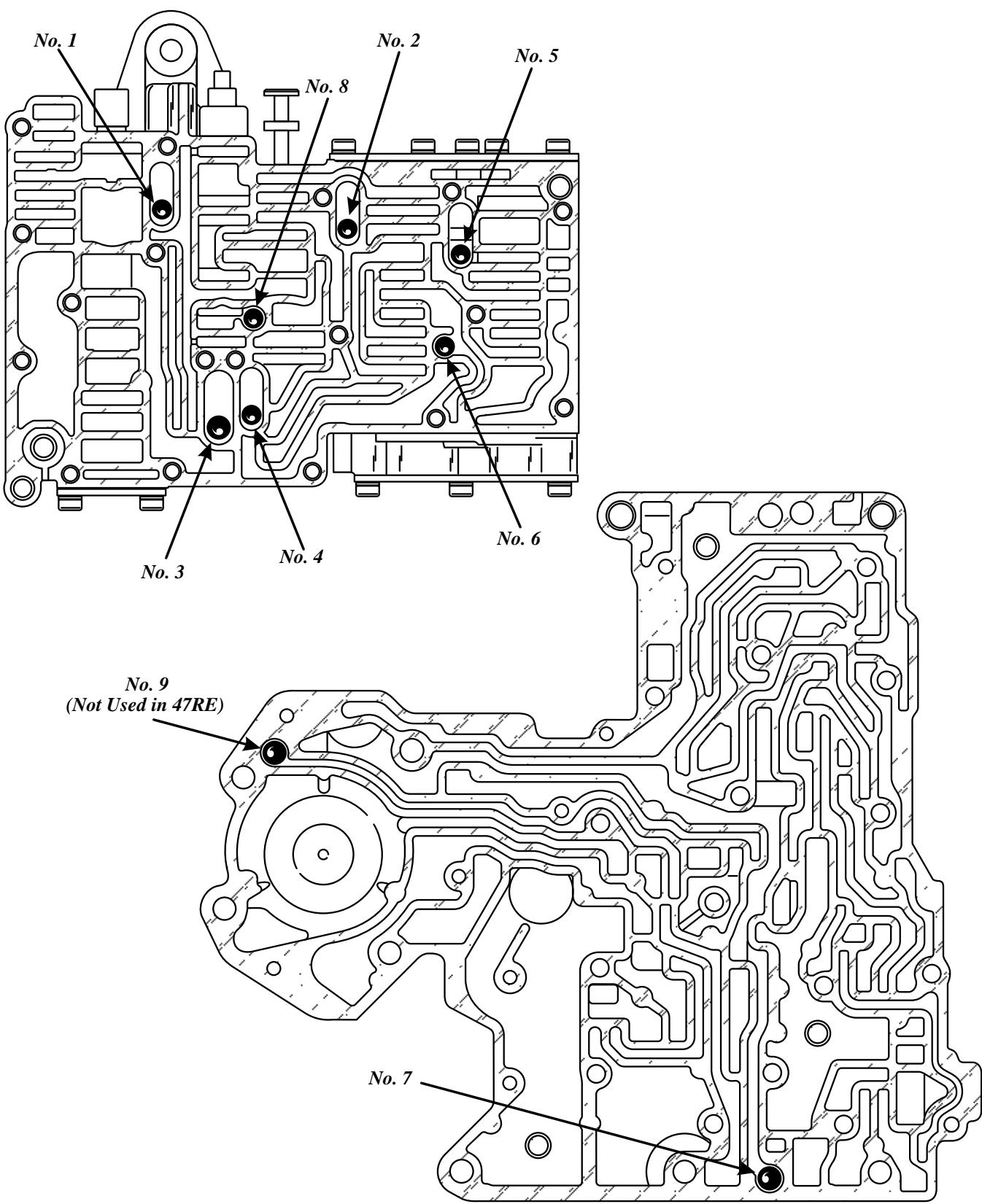


Figure 30

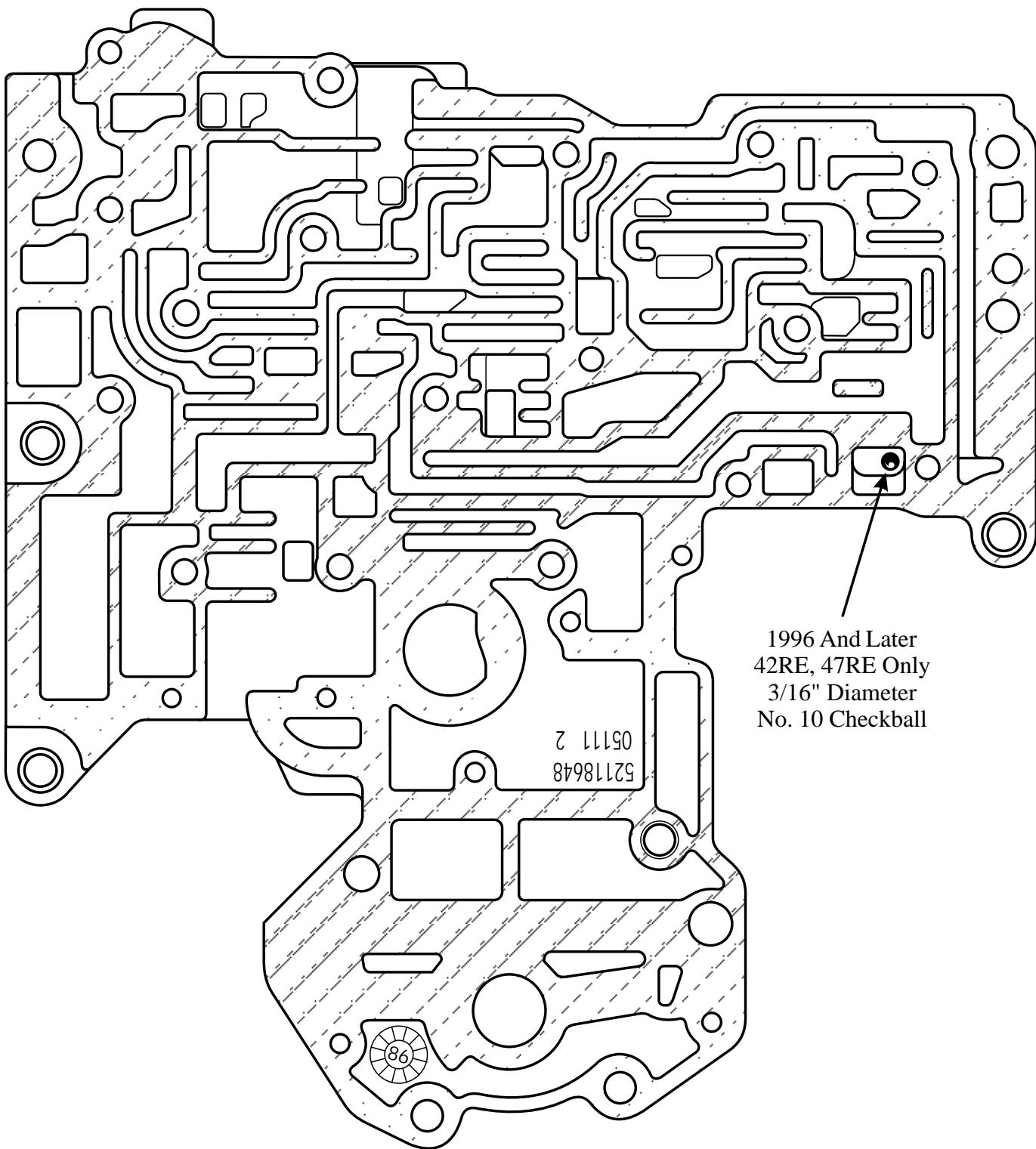
A904, A727, A500, A518, 42RE, 47RE

MAIN VALVE BODY AND TRANSFER PLATE "UPPERSIDE"



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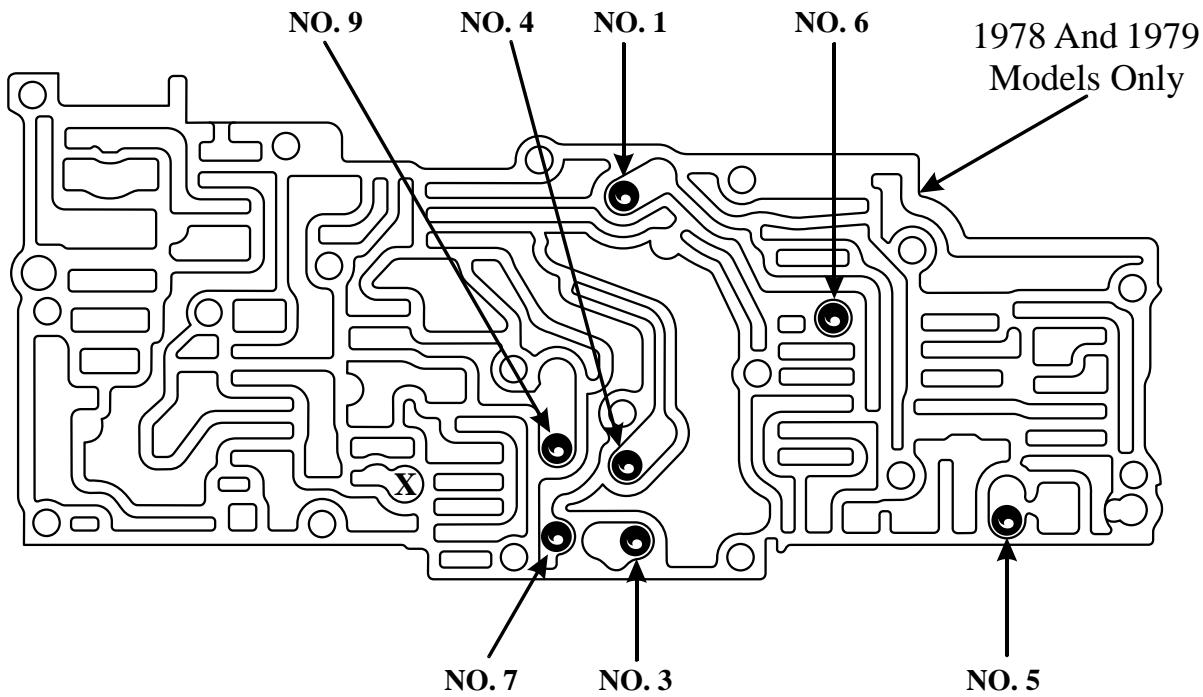
Figure 31

TRANSFER PLATE "LOWER SIDE"
CHECKBALL LOCATIONS, 1996-UP 42RE, 47RE ONLY

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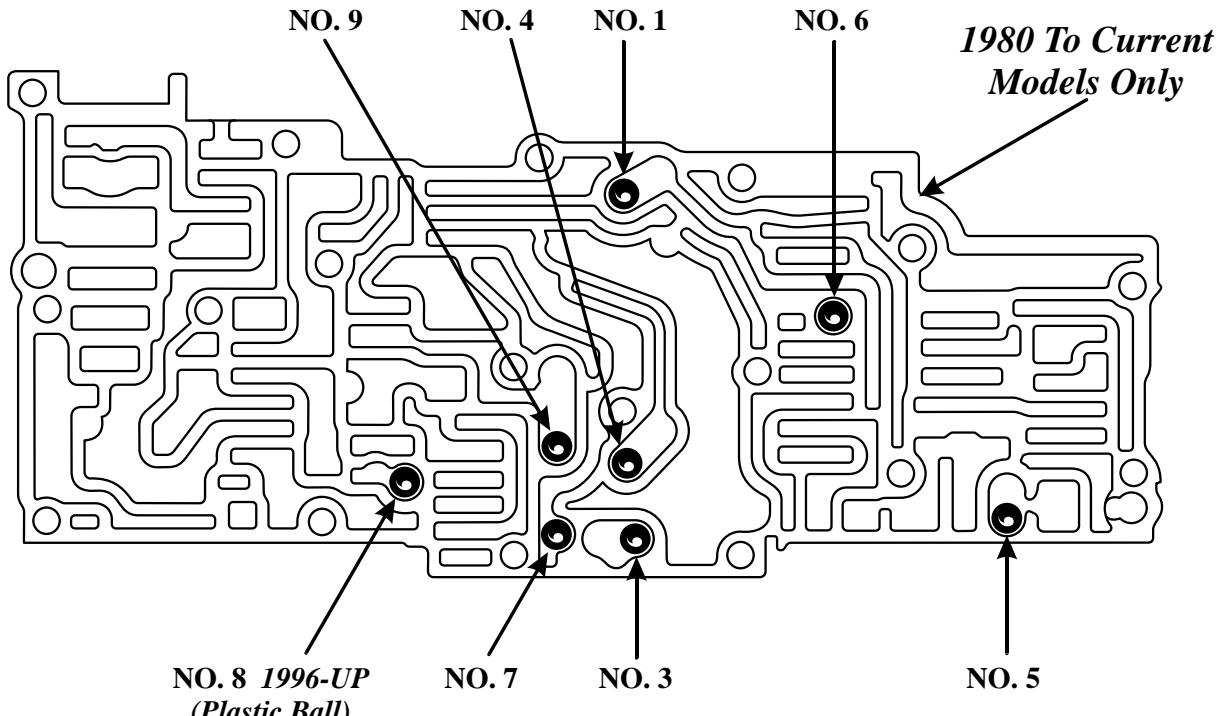
Figure 32

AUTOMATIC TRANSMISSION SERVICE GROUP



NO. 1 Manual Low Control Checkball
NO. 3 3rd/Reverse Shuttle Ball
NO. 4 Low/Reverse Shuttle Ball
NO. 5 TV And Line Control To Shift Valves

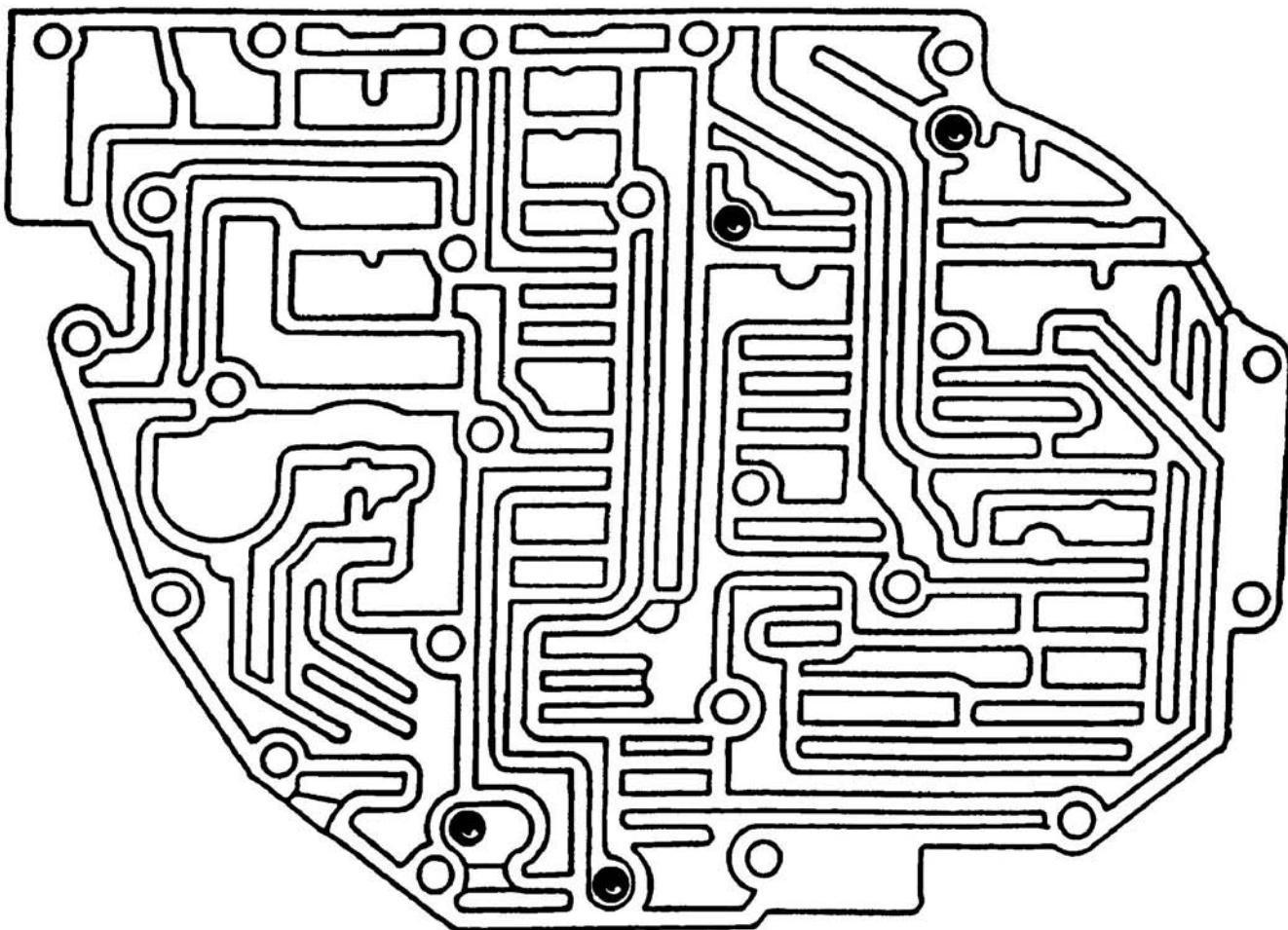
NO. 6 Intermediate Accumulator And Front Servo Control Checkball
NO. 7 Forward Clutch Control Checkball
NO. 8 TV Feed Control Checkball
NO. 9 TV Feed, 1-2 Accumulator And Exhaust Checkball



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Figure 33

AUTOMATIC TRANSMISSION SERVICE GROUP

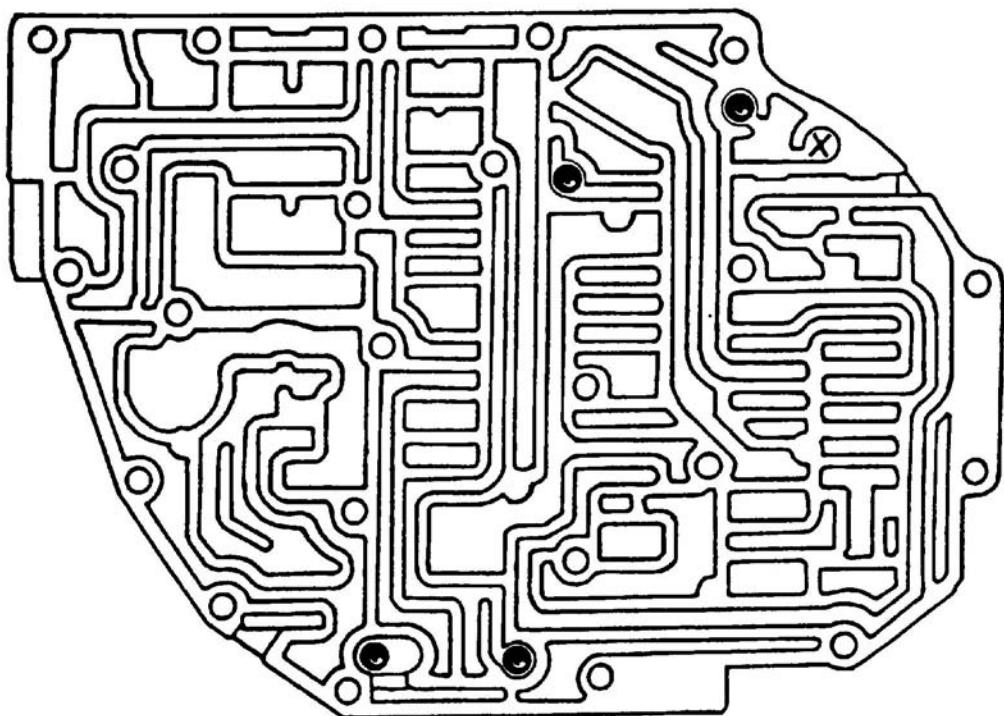
1989-1991 VALVE BODY CHECKBALL LOCATIONS
FOR VALVE BODY CASTING NO. 4446639

REQUIRES "FOUR" CHECKBALLS IN THE LOCATIONS SHOWN ABOVE.

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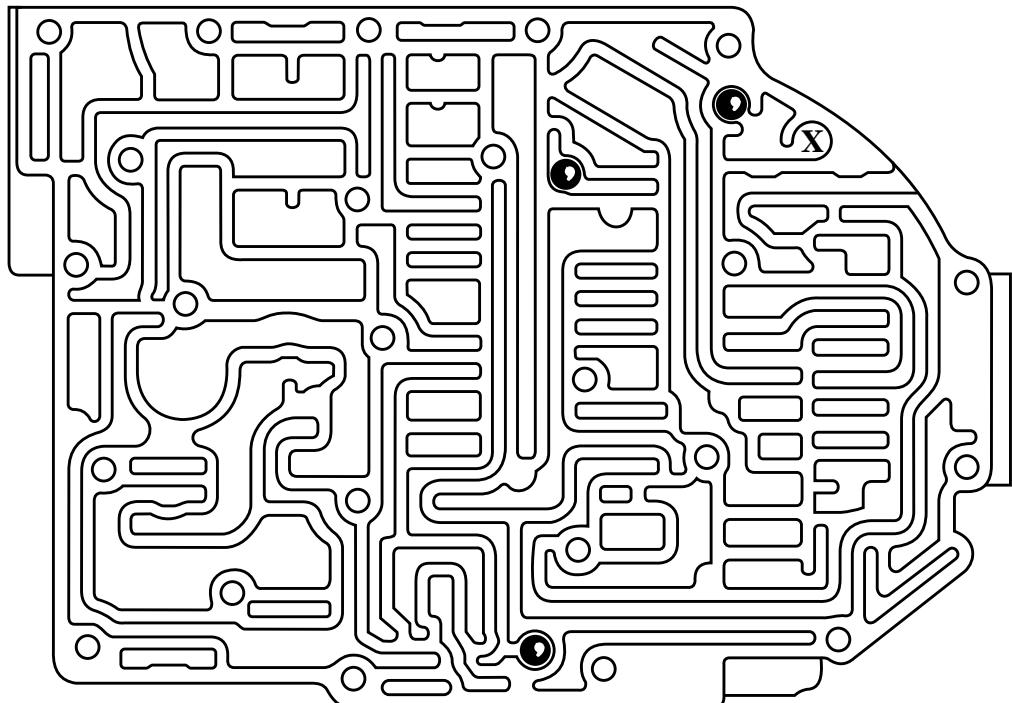
Figure 34

AUTOMATIC TRANSMISSION SERVICE GROUP

1992-1994 VALVE BODY CHECKBALL LOCATIONS
FOR VALVE BODY CASTING NO. 4511644

REQUIRES "FOUR" CHECKBALLS IN THE LOCATIONS SHOWN ABOVE.

1995-UP VALVE BODY CHECKBALL LOCATIONS

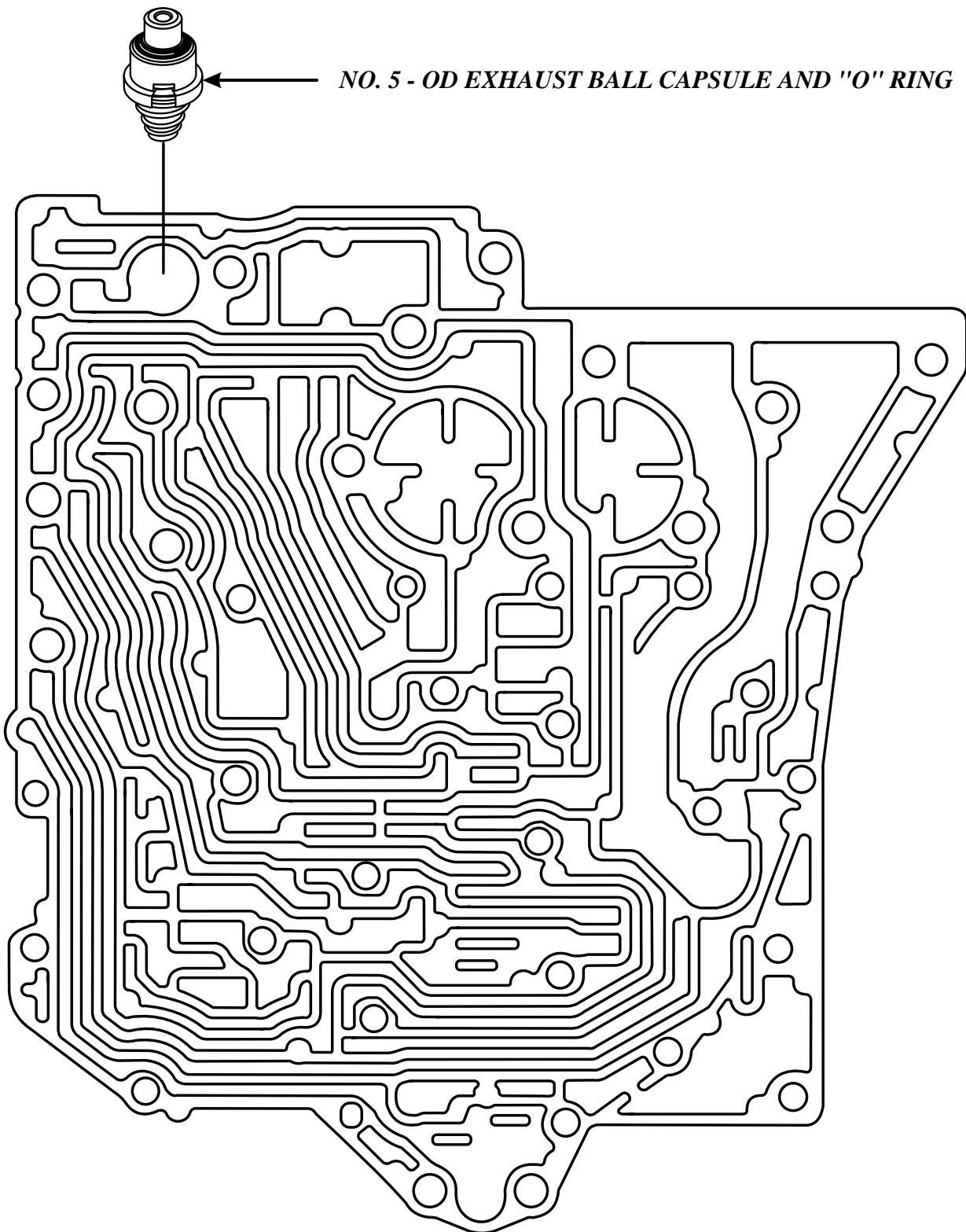


REQUIRES "THREE" CHECKBALLS IN THE LOCATIONS SHOWN ABOVE.

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Figure 35

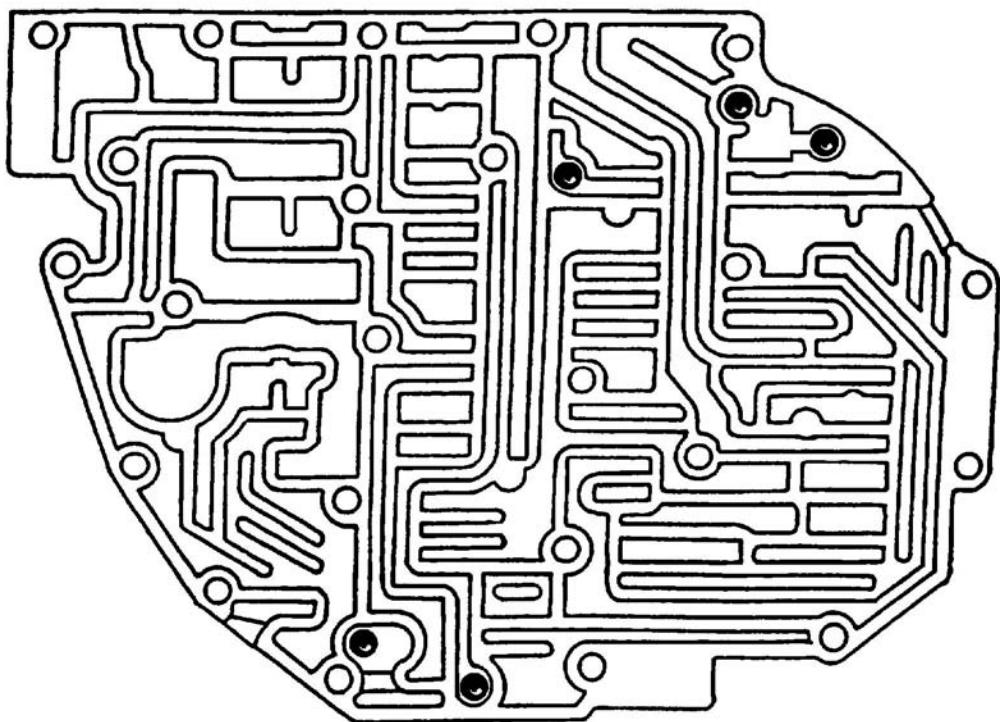
AUTOMATIC TRANSMISSION SERVICE GROUP

**A604 TRANSFER PLATE
(ALL YEARS)**

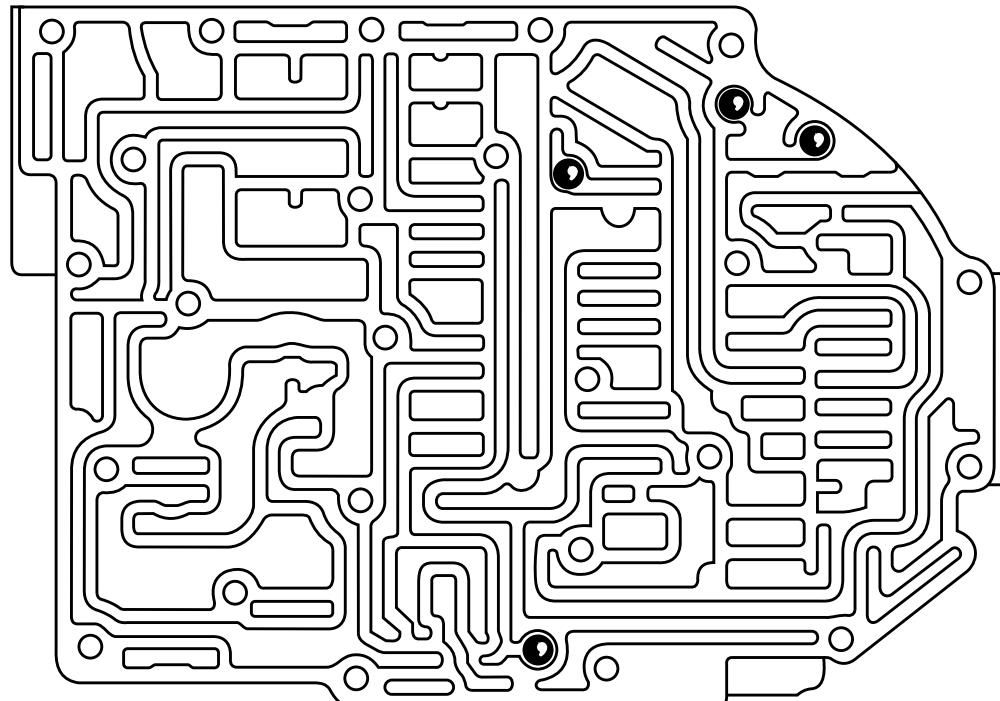
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Figure 36

AUTOMATIC TRANSMISSION SERVICE GROUP

CHRYSLER 42LE (A606)
1993 AND 1994 ONLY

REQUIRES "FIVE" CHECKBALLS IN THE LOCATIONS SHOWN ABOVE.

CHRYSLER 42LE (A606)
1995 TO CURRENT

REQUIRES "FOUR" CHECKBALLS IN THE LOCATIONS SHOWN ABOVE.

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Figure 37

AUTOMATIC TRANSMISSION SERVICE GROUP

FORD FMX TRANSMISSION VALVE BODY CHECKBALL LOCATIONS

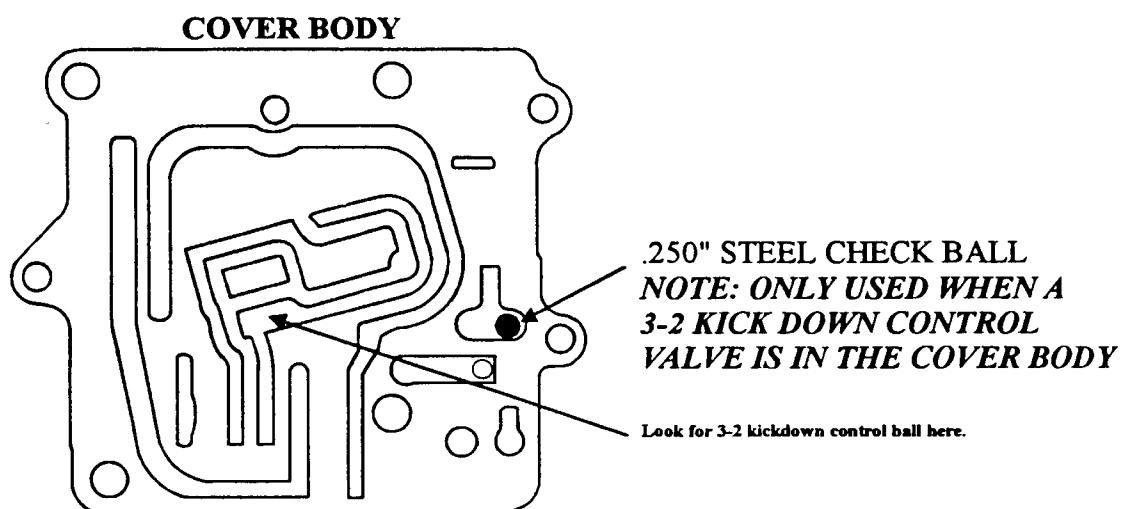
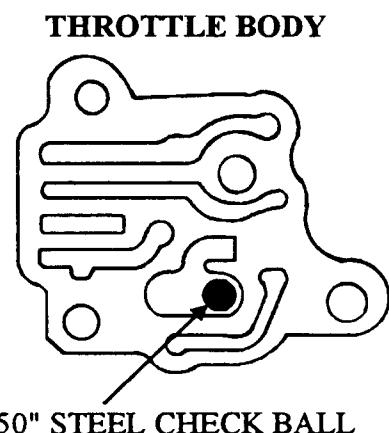
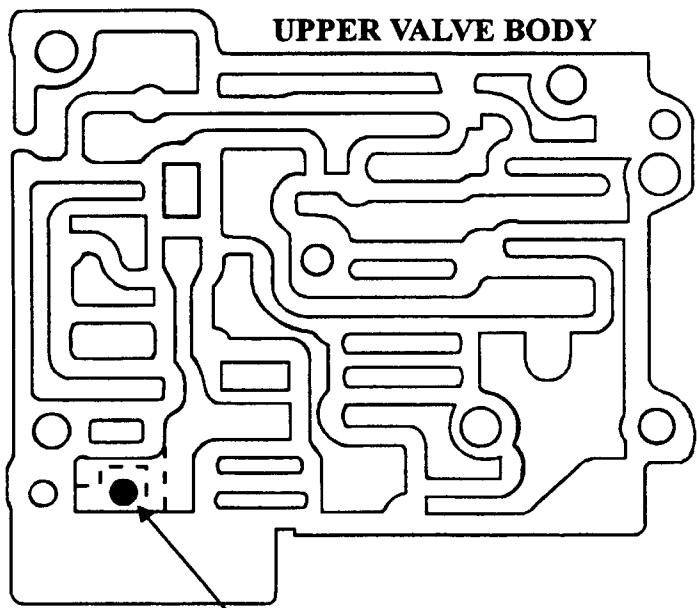
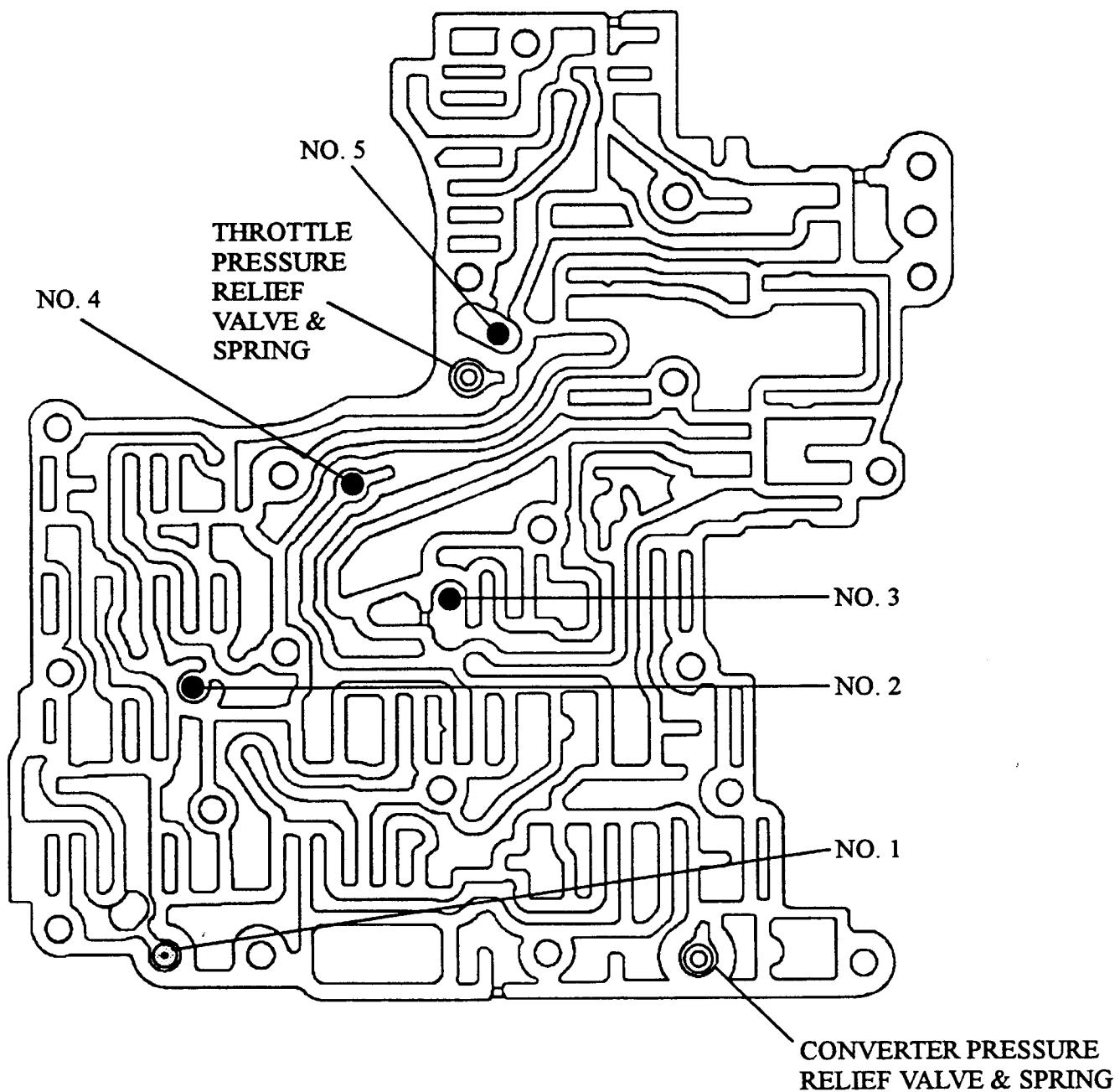
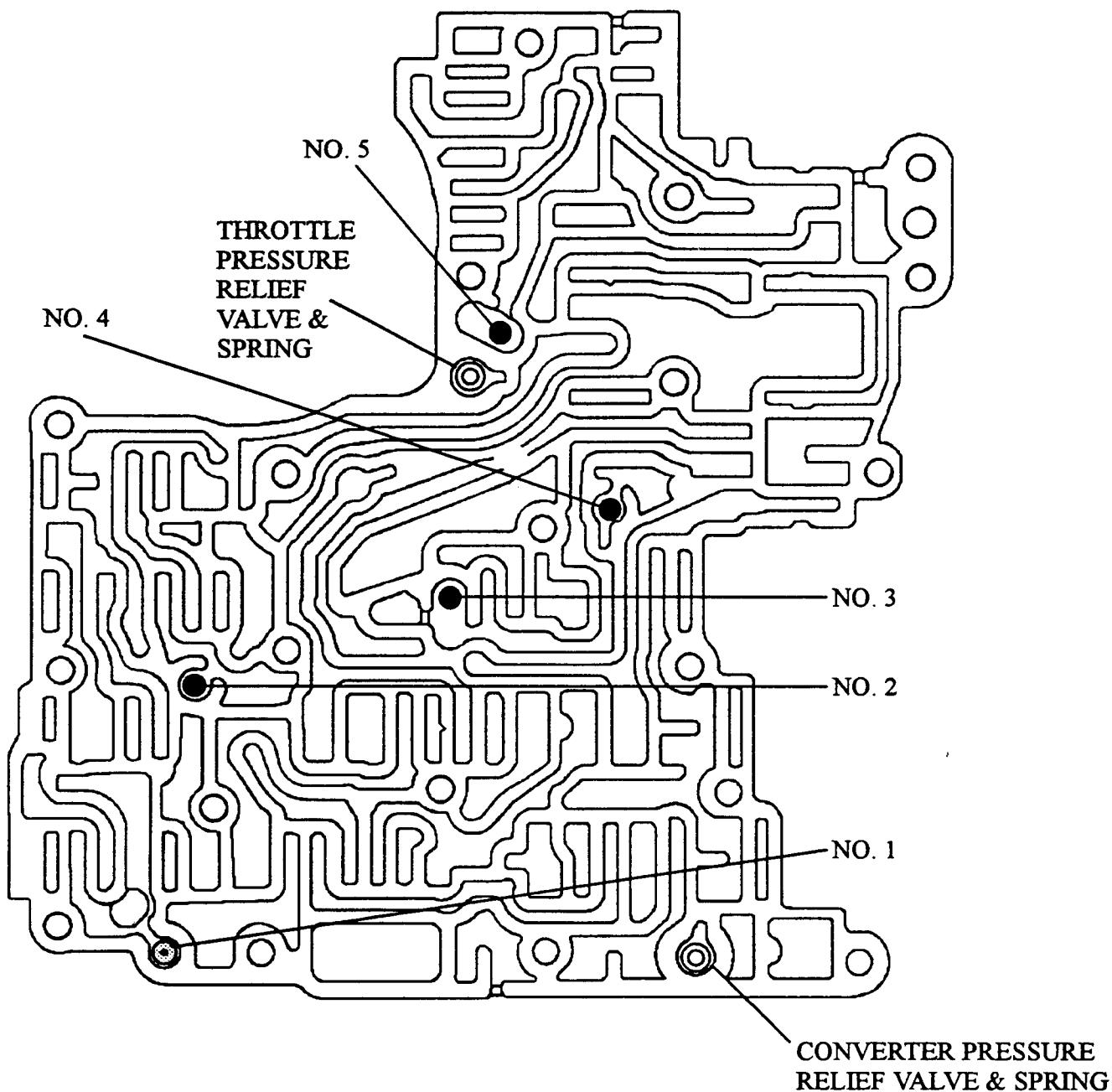


Figure 38

FORD C-3 TRANSMISSION
1973-1979 VALVE BODY CHECKBALL LOCATIONS

- NO. 1 INTERMEDIATE SERVO RELEASE PUCK
- NO. 2 DIRECT CLUTCH CONTROL AND EXHAUST BALL (3rd & REV)
- NO. 3 REVERSE/MANUAL 2 AND MANUAL 1 DIRECTIONAL CONTROL BALL
- NO. 4 DIRECT CLUTCH CONTROL BALL - REVERSE ONLY
- NO. 5 TV COAST & BOOST CONTROL BALL

Figure 39

FORD C-3 TRANSMISSION
1980-1986 VALVE BODY CHECKBALL LOCATIONS

- NO. 1 INTERMEDIATE SERVO RELEASE PUCK
- NO. 2 DIRECT CLUTCH CONTROL AND EXHAUST BALL (3rd & REV)
- NO. 3 REVERSE/MANUAL 2 AND MANUAL 1 DIRECTIONAL CONTROL BALL
- NO. 4 DIRECT CLUTCH CONTROL BALL - REVERSE ONLY
- NO. 5 TV COAST & BOOST CONTROL BALL

Figure 40

FORD C-4 TRANSMISSION

UPPER VALVE BODY CHECKBALL LOCATIONS (1971 & UP)

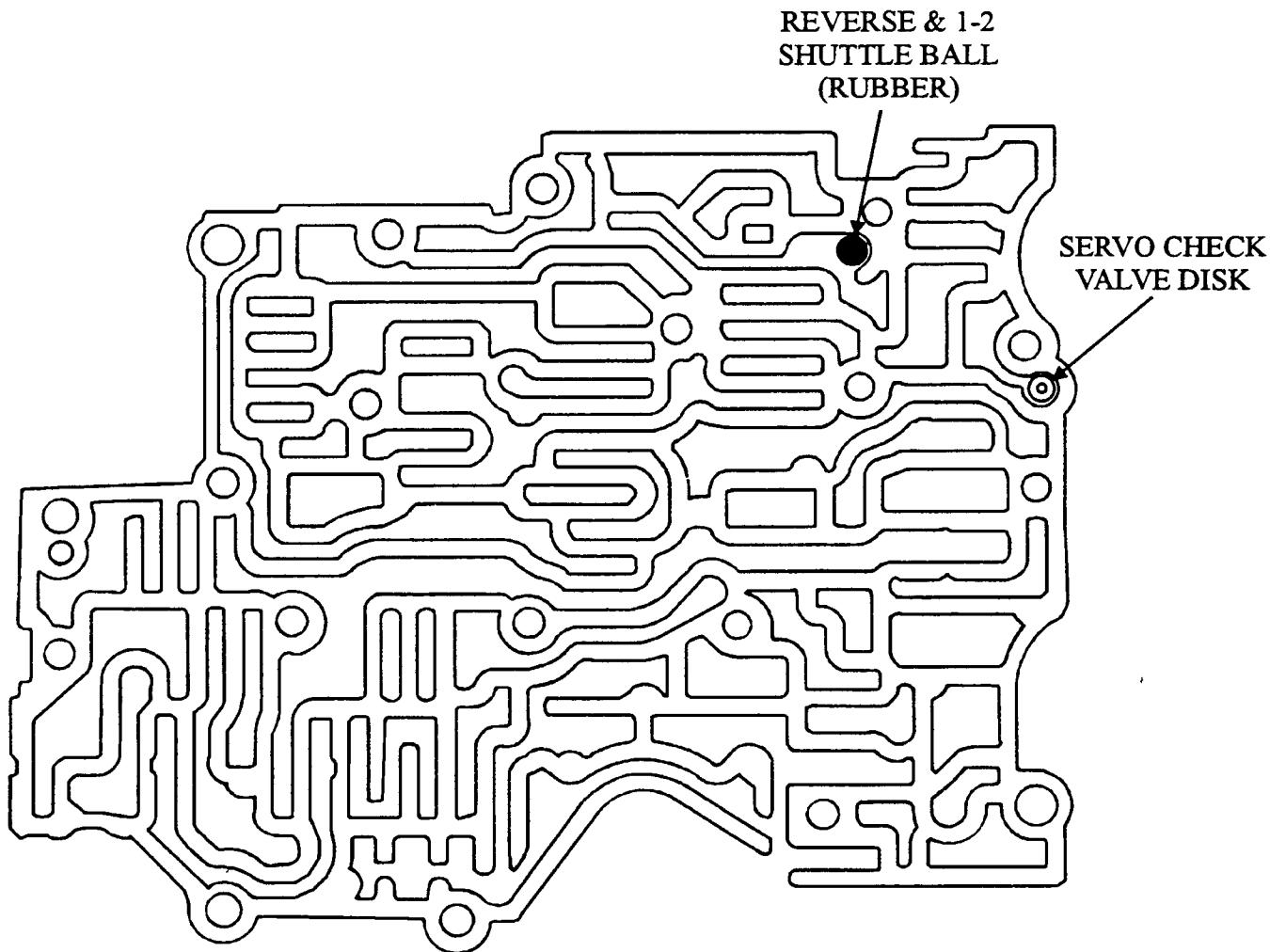


Figure 41

FORD C-4 TRANSMISSION

LOWER VALVE BODY CHECKBALL LOCATIONS (1971 & UP)

HIGH SPEED KICK DOWN
SHUTTLE VALVE BALL

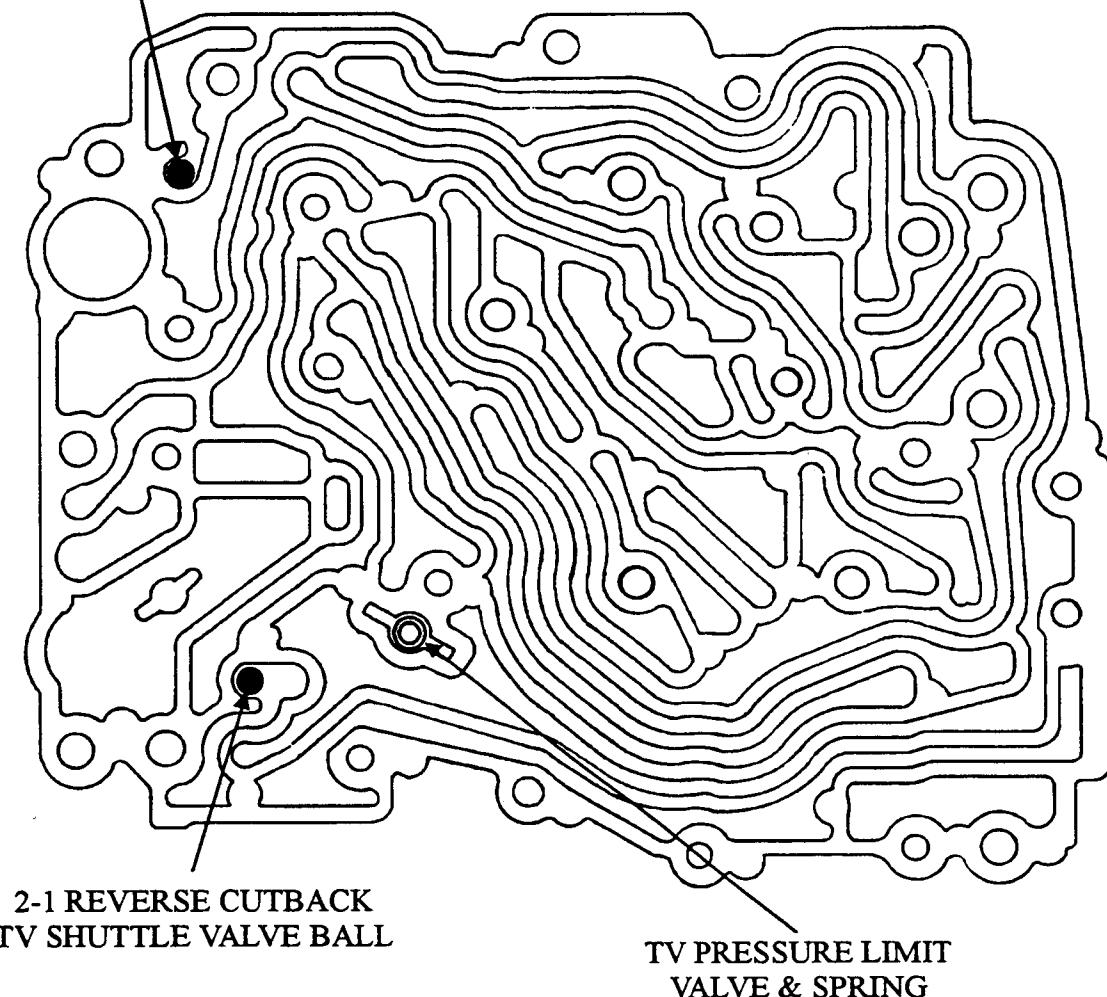


Figure 42

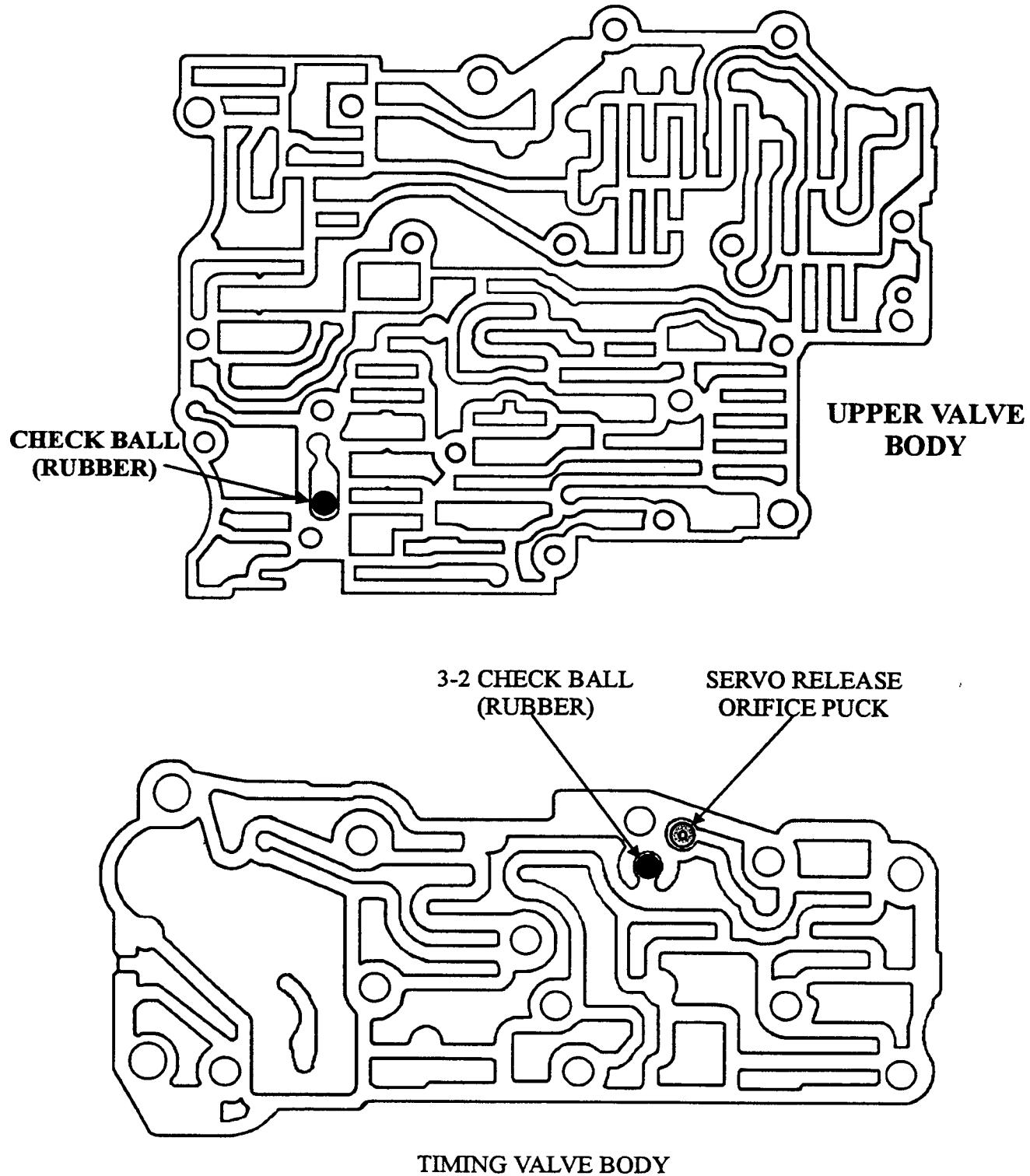
FORD C-5 TRANSMISSION
UPPER & TIMING VALVE BODY CHECKBALL LOCATIONS

Figure 43

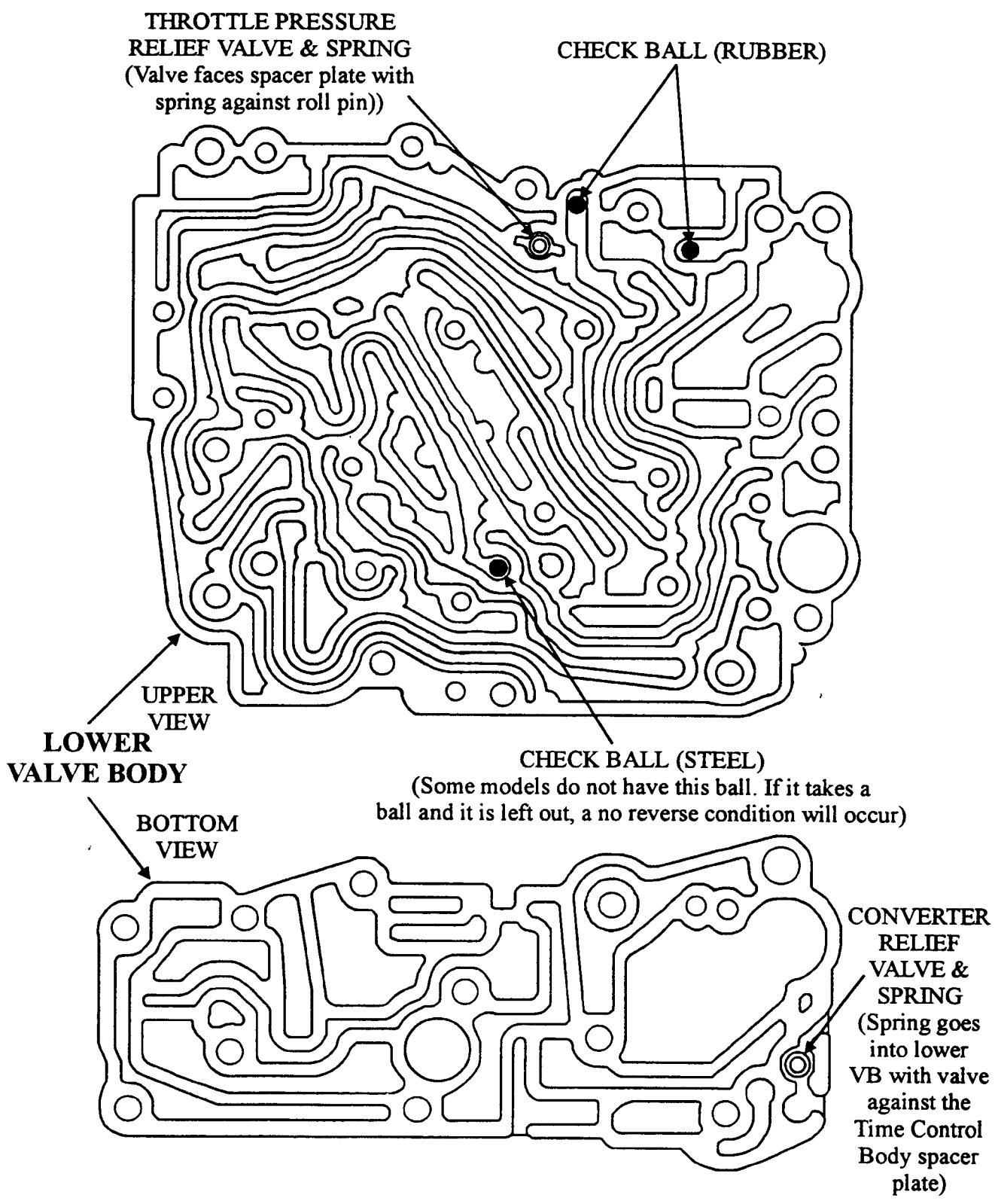
FORD C-5 TRANSMISSION**LOWER VALVE BODY (Bottom & Upper View) CHECKBALL LOCATIONS**

Figure 44

FORD C-6 TRANSMISSION

MAIN VALVE BODY CHECKBALL LOCATIONS

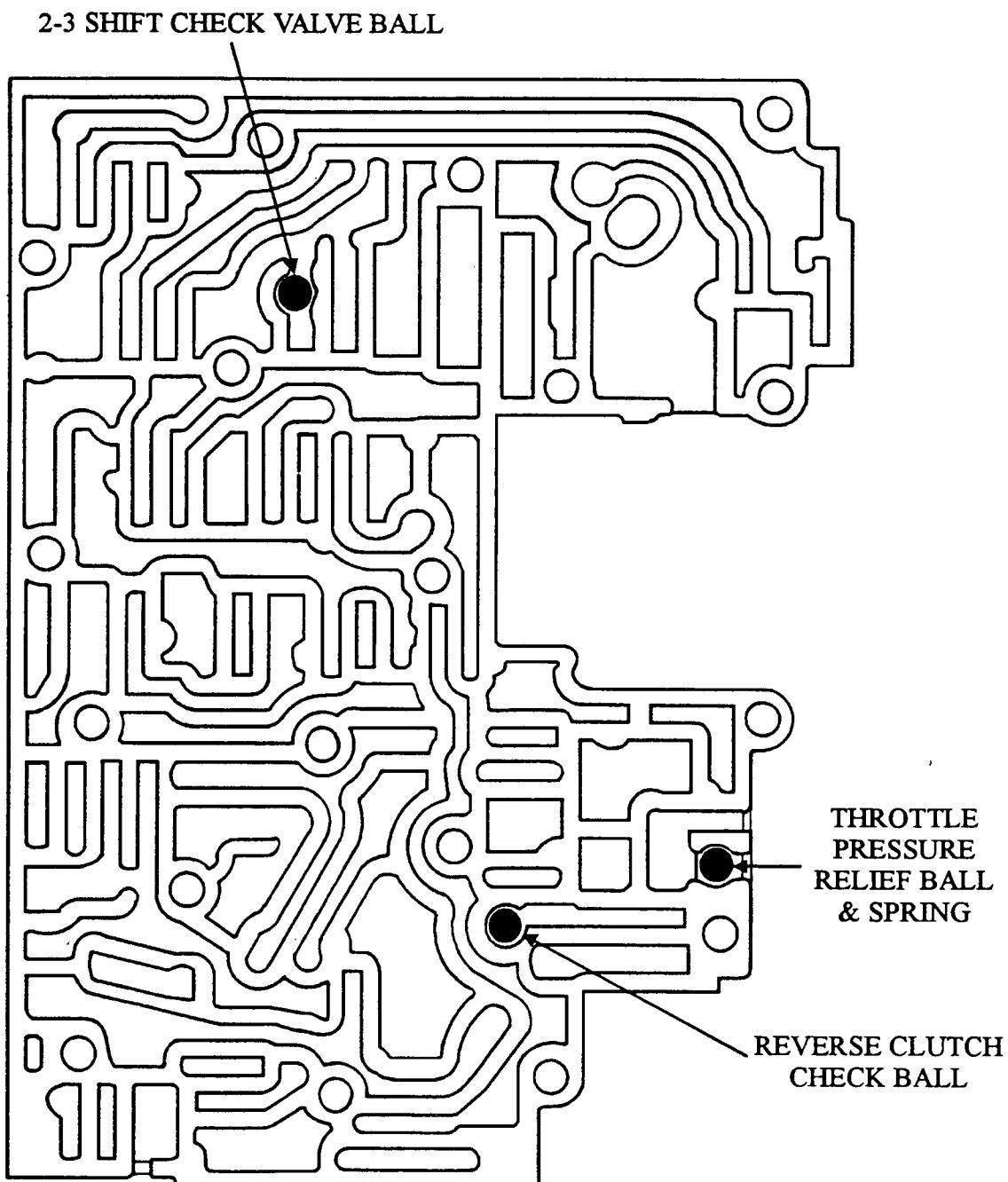


Figure 45

FORD A4LD TRANSMISSION

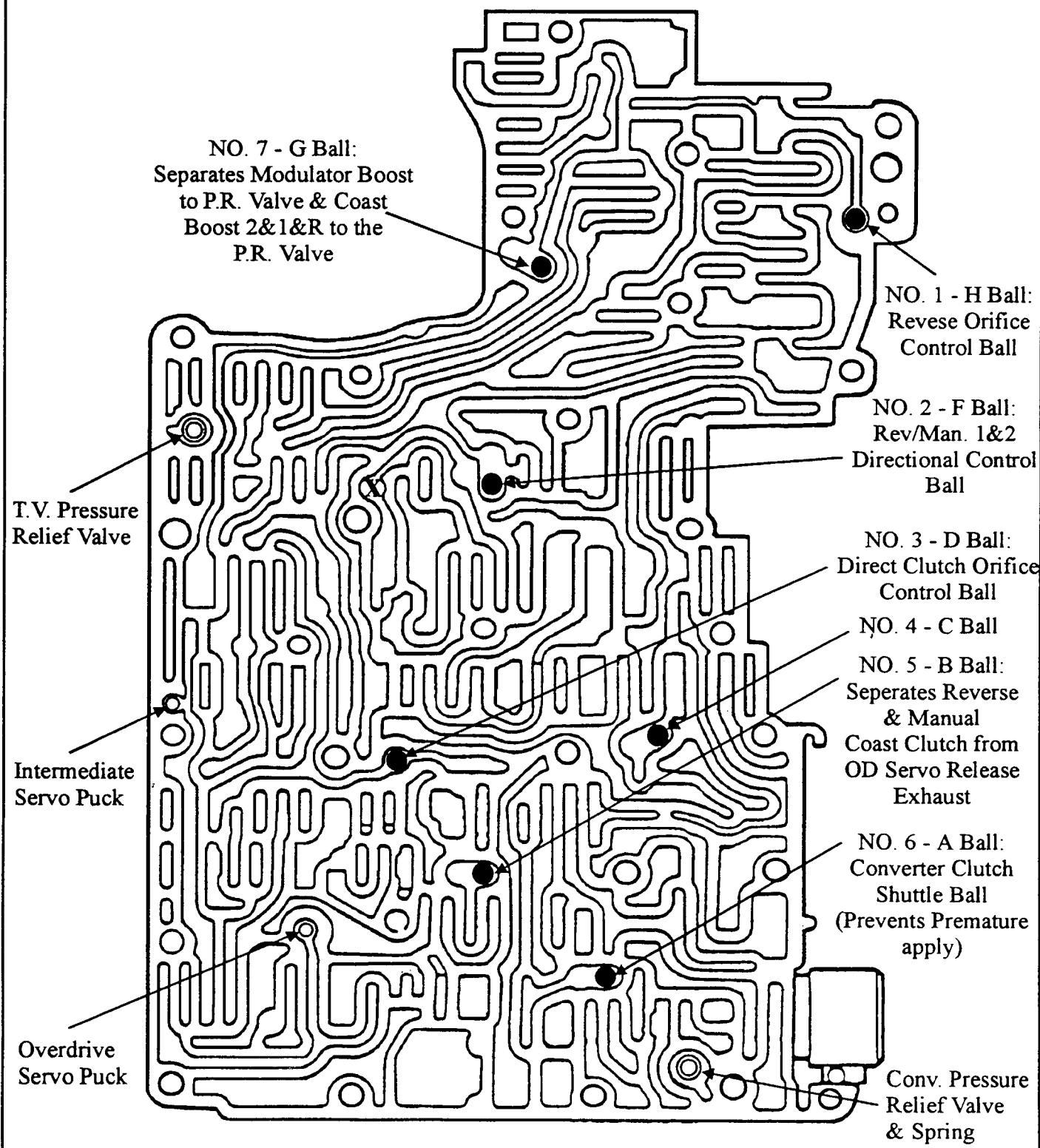
SINGLE SOLENOID MAIN VALVE BODY CHECKBALL LOCATIONS
SCORPIO/MERCUR ONLY

Figure 46

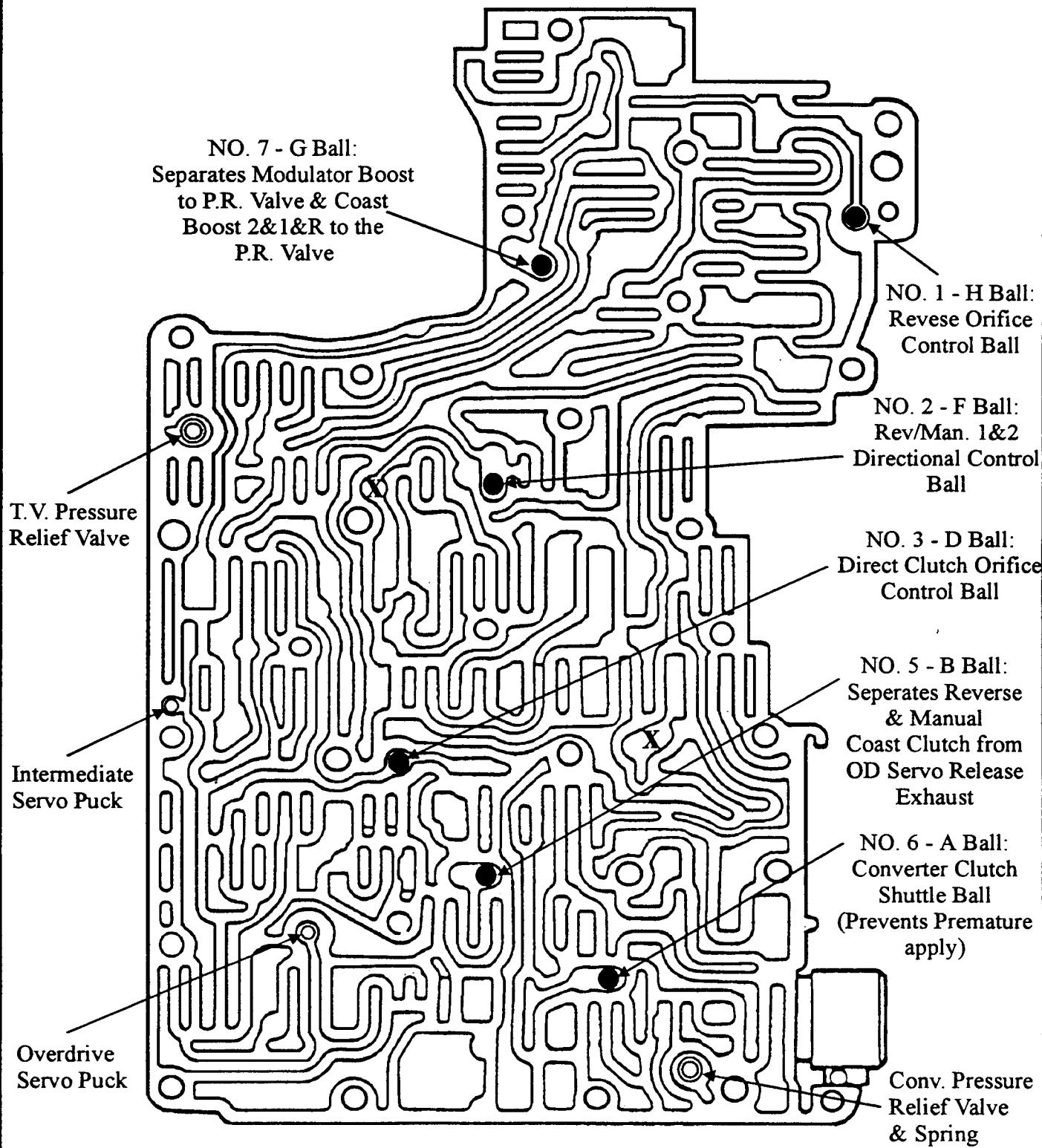
FORD A4LD TRANSMISSION**SINGLE SOLENOID MAIN VALVE BODY CHECKBALL LOCATIONS
ALL MODELS EXCEPT SCORPIO/MERCUR**

Figure 47

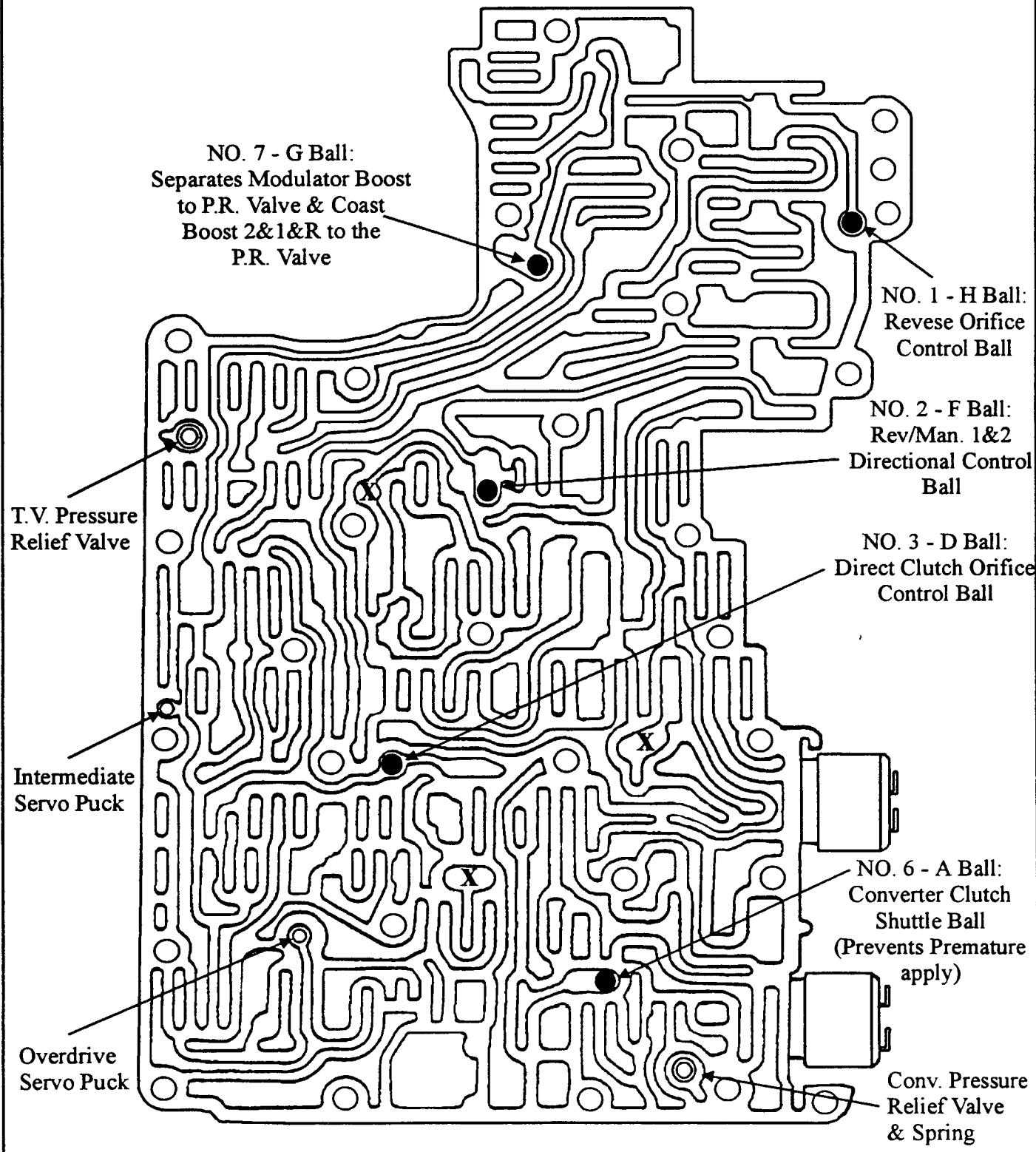
FORD A4LD TRANSMISSION**DOUBLE SOLENOID MAIN VALVE BODY CHECKBALL LOCATIONS
WITHOUT REVERSE ENGAGEMENT CONTROL VALE**

Figure 48

FORD A4LD TRANSMISSION

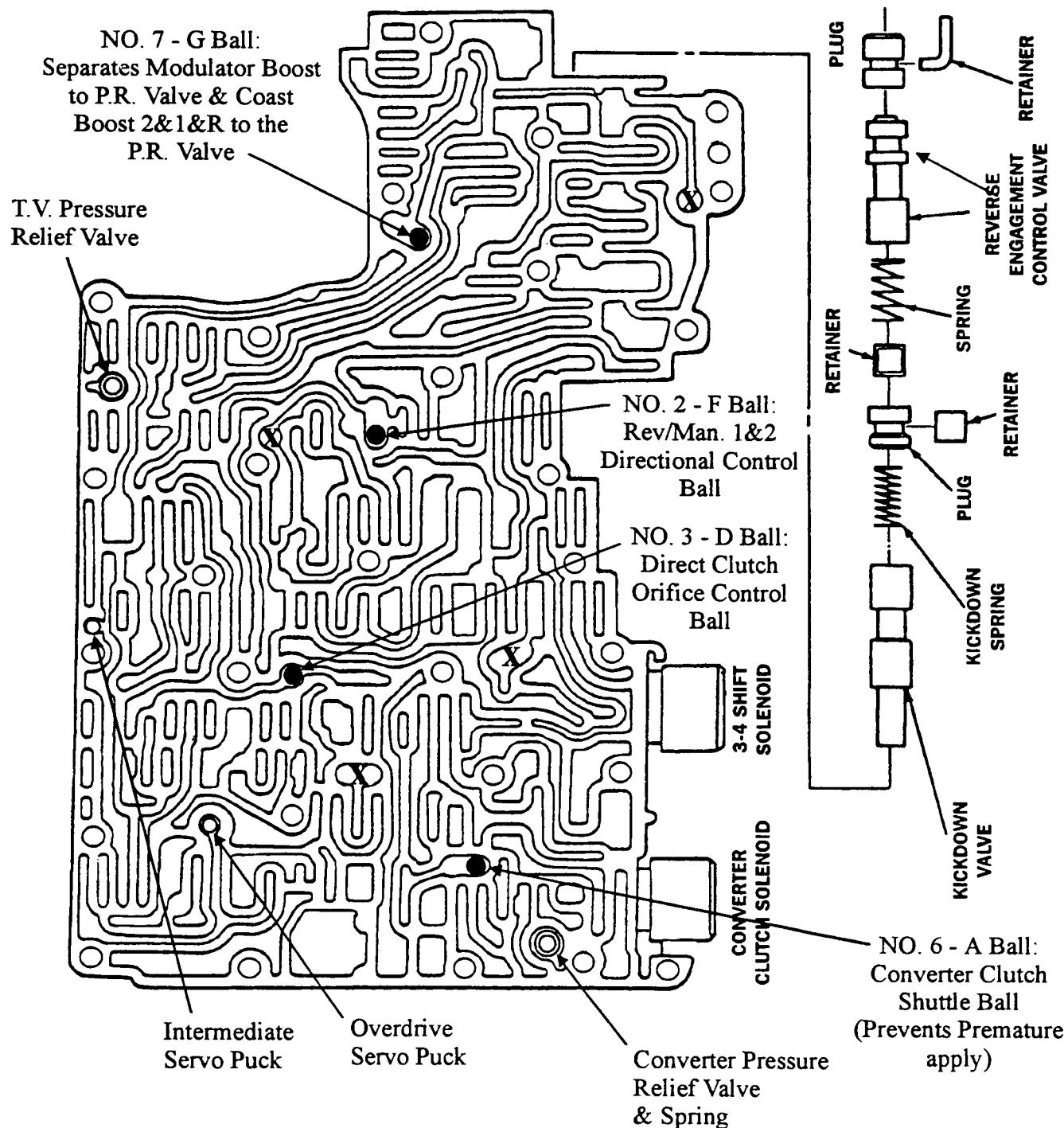
DOUBLE SOLENOID MAIN VALVE BODY CHECKBALL LOCATIONS
WITH REVERSE ENGAGEMENT CONTROL VALE

Figure 49

FORD A4R44/55-E TRANSMISSION

MAIN VALVE BODY CHECKBALL LOCATIONS

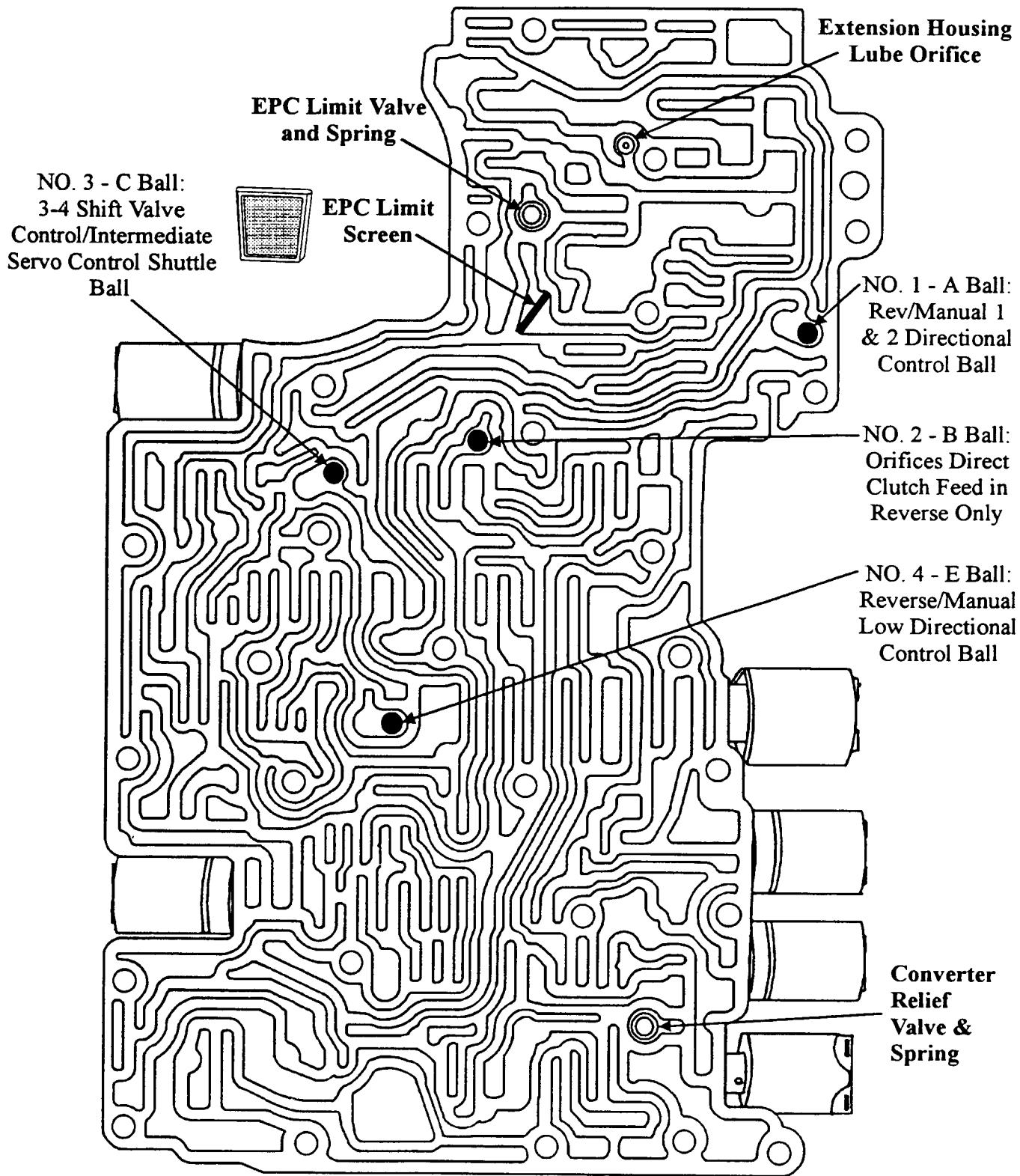
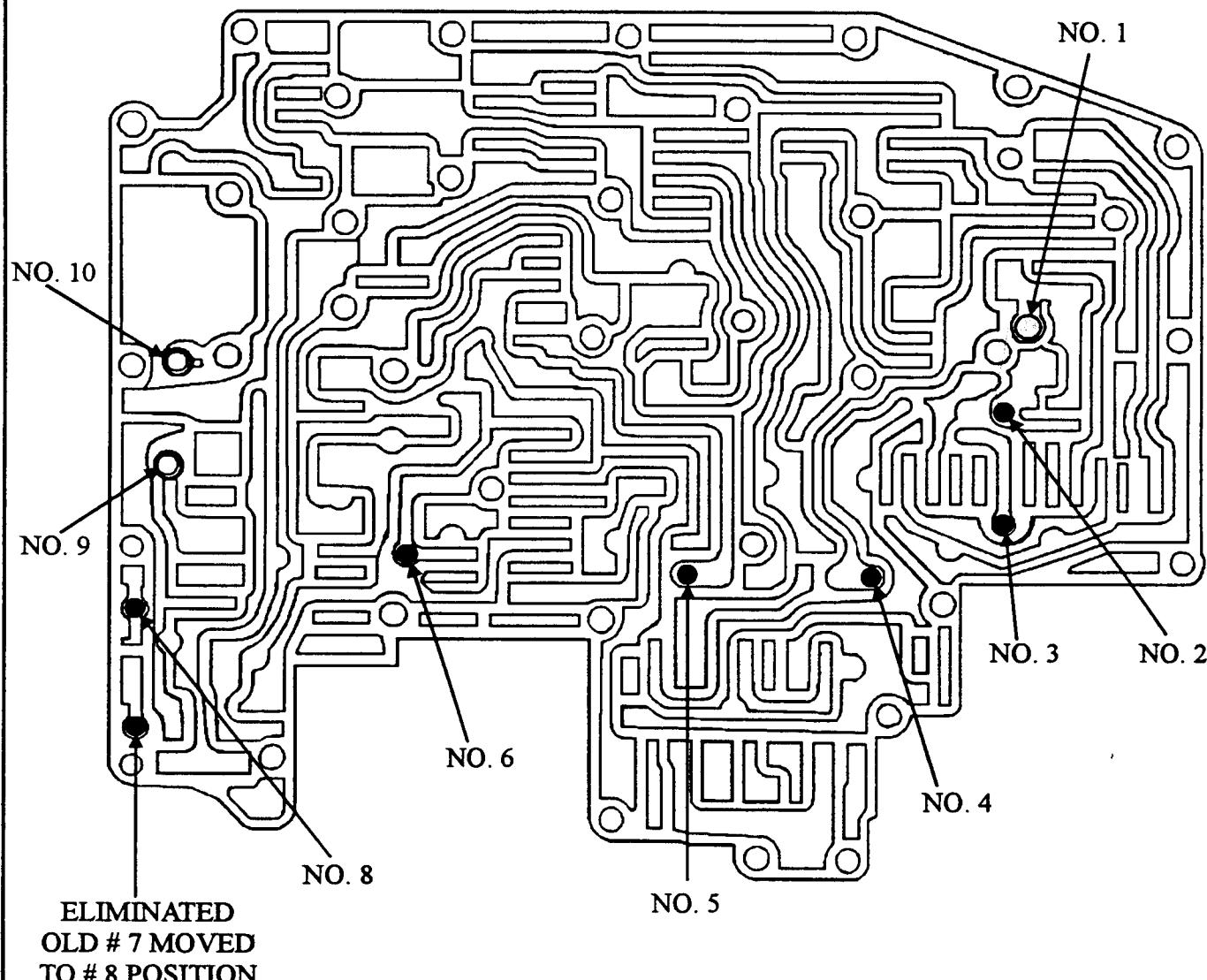


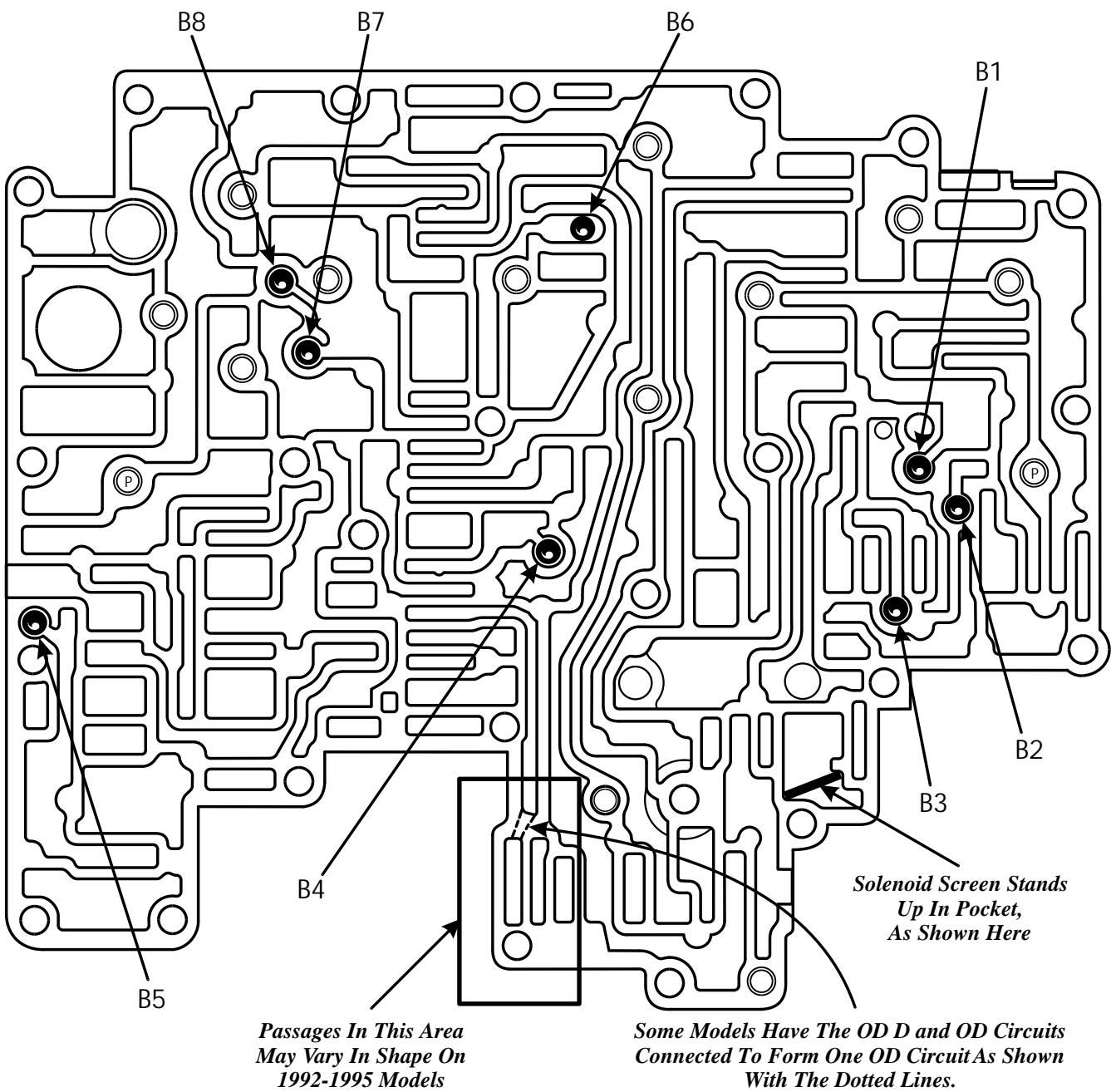
Figure 50

FORD AOD TRANSMISSION
MAIN VALVE BODY CHECKBALL LOCATIONS

- NO. 1 FORWARD CLUTCH TIME CONTROL & EXHAUST BALL (4-3 KD - .310" Orange)
- NO. 2 2-3 ACCUMULATOR TIME CONTROL & EXHAUST BALL
- NO. 3 2-3 ORIFICE K CONTROL BALL
- NO. 4 PARK, REVERSE, MANUAL 3,2,1 & KD SHUTTLE BALL
- NO. 5 PARK, REVERSE, MANUAL 2,1 & KD SHUTTLE BALL
- NO. 6 3-4 EXHAUST CONTROL BALL
- NO. 8 3-4 ACCUMULATOR SHOULDER PRESSURE ORIFICE CONTROL BALL
- NO. 9 CONVERTER PRESSURE RELIEF VALVE
- NO. 10 T.V. PRESSURE RELIEF VALVE

Figure 51

1992-1995 AODE/4R70W CHECKBALL LOCATIONS



B1 - Between the Forward Clutch circuit and the 23BP circuit (92-95 Only).

B2 - In the Forward Clutch circuit near the 3-4 shift valve.

B3 - In the Direct Clutch circuit near the 2-3 backout valve.

B4 - In the Overdrive and Forward Clutch circuits near the 1-2 shift valve.

B5 - In the Reverse circuit near orifice number one.

B6 - Shuttle ball between the Low and Reverse circuits.

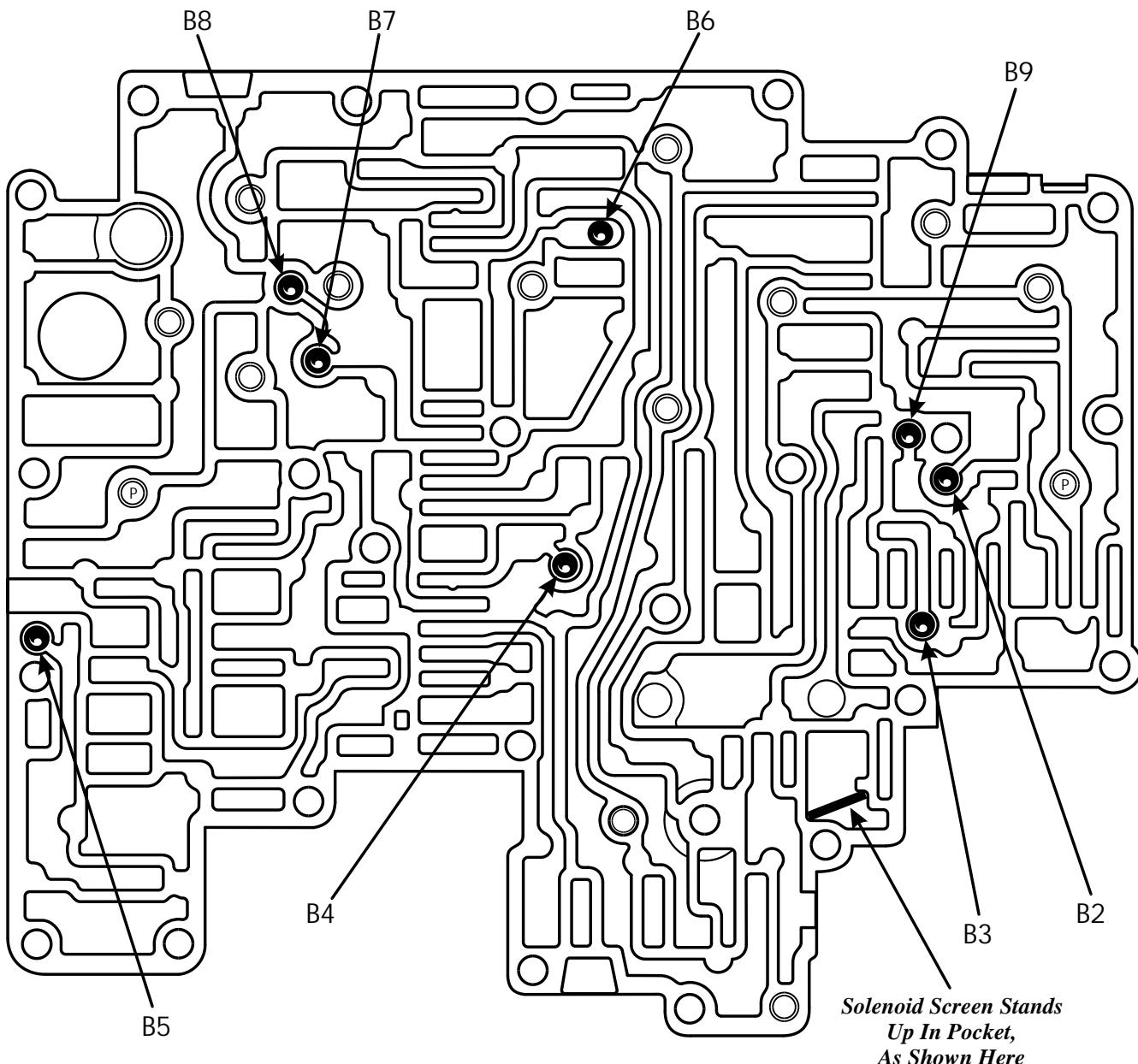
B7 - Between the L234 and Torque Converter Clutch circuits.

B8 - Between the L234 and Intermediate Clutch circuits.

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Figure 52

1996-UP AODE/4R70W CHECKBALL LOCATIONS



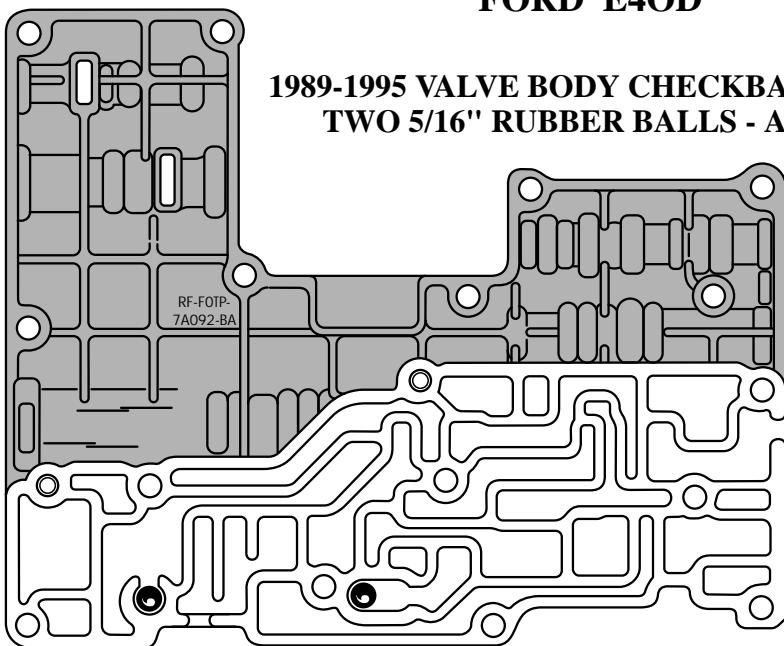
- B2 - In the Forward Clutch circuit near the 3-4 shift valve.
- B3 - In the Direct Clutch circuit near the 2-3 backout valve.
- B4 - In the Overdrive and Forward Clutch circuits near the 1-2 shift valve.
- B5 - In the Reverse circuit near orifice number one.
- B6 - Shuttle ball between the Low and Reverse circuits.
- B7 - Between the L234 and Torque Converter Clutch circuits.
- B8 - Between the L234 and Intermediate Clutch circuits.
- B9 - Between the FC34 and 23BP circuits (1996-Up Only).

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Figure 53

FORD E4OD

1989-1995 VALVE BODY CHECKBALL LOCATIONS
TWO 5/16" RUBBER BALLS - ALL MODELS

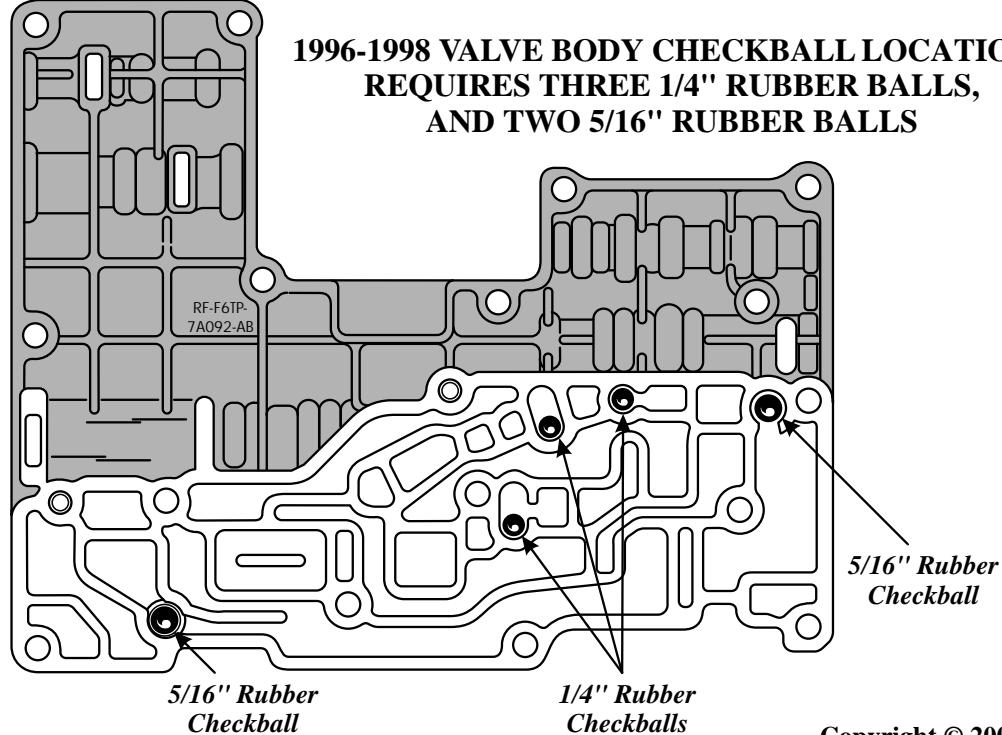


SPECIAL NOTE:

Some 1995 models were built with 1996 production valve body, spacer plate, and valve body gaskets. Be very careful to identify the parts on any 1995 model properly.

FORD E4OD

1996-1998 VALVE BODY CHECKBALL LOCATIONS
REQUIRES THREE 1/4" RUBBER BALLS,
AND TWO 5/16" RUBBER BALLS

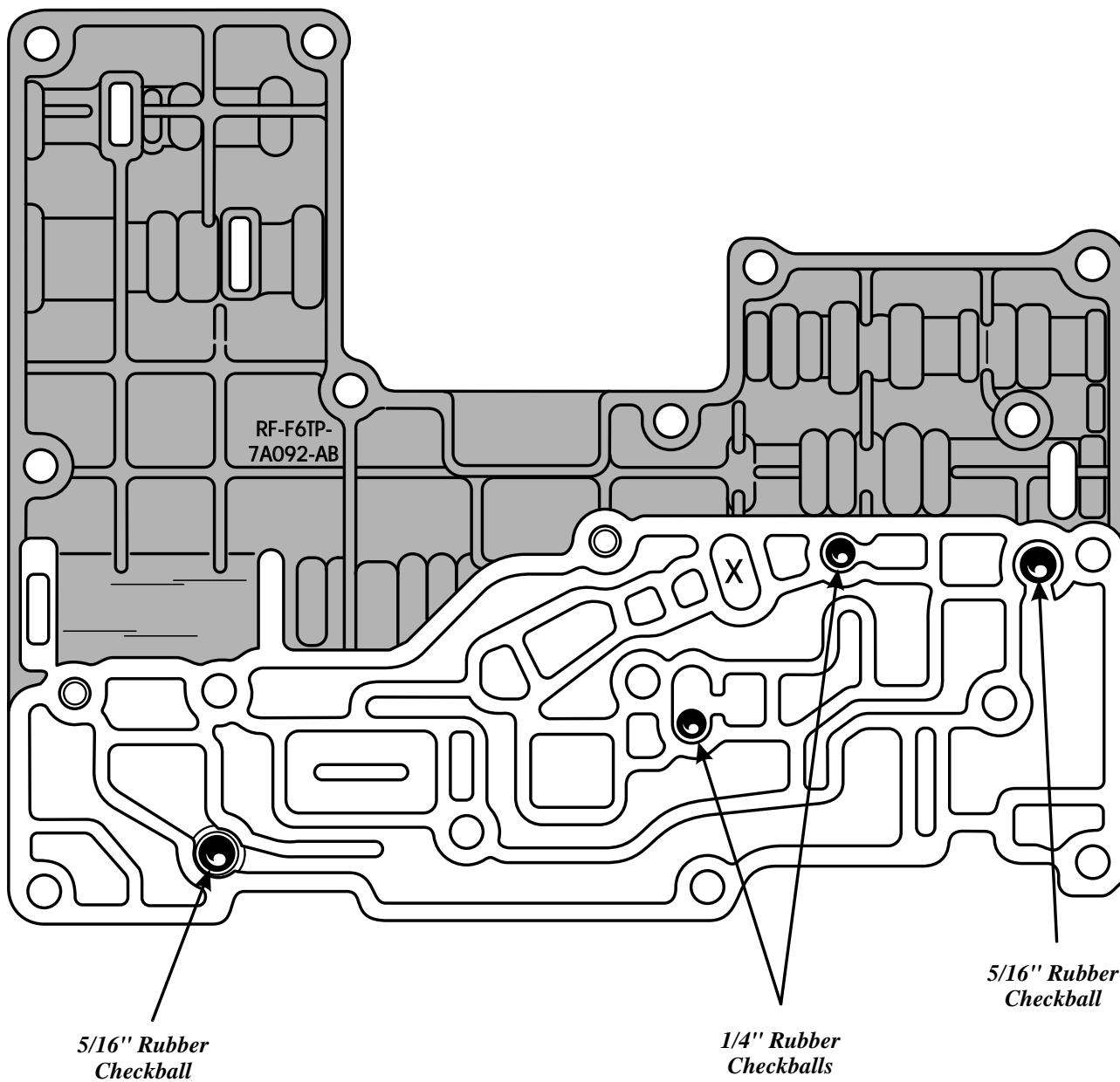


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Figure 54

FORD 4R100

1998-2003 VALVE BODY CHECKBALL LOCATIONS
REQUIRES "TWO" 1/4" RUBBER BALLS,
AND "TWO" 5/16" RUBBER BALLS



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Figure 55

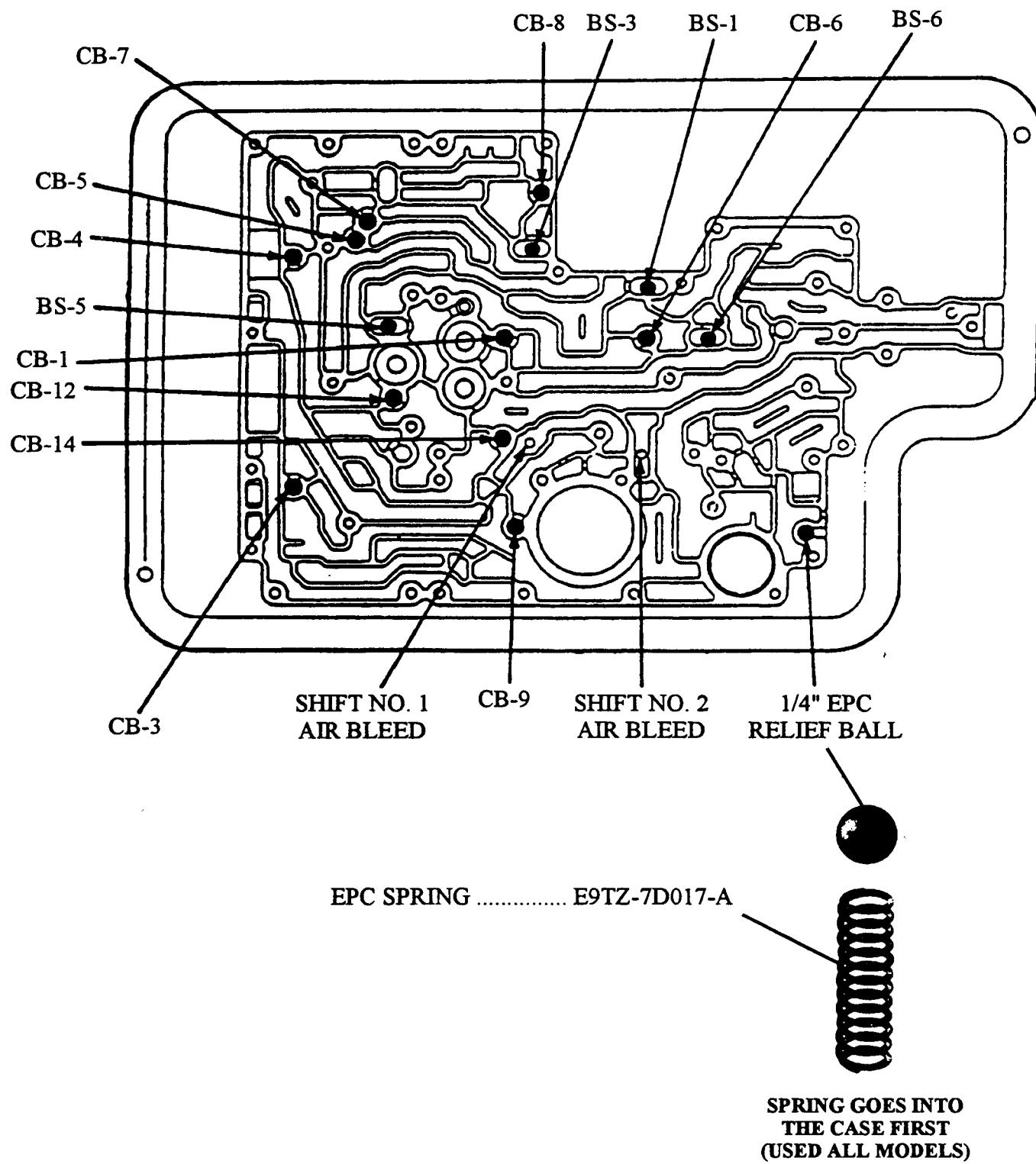
**EARLY 1989 CASE CHECKBALL LOCATIONS
REQUIRES FOURTEEN (5/16") RUBBER BALLS**

Figure 56

LATE 1989 CASE CHECKBALL LOCATIONS
REQUIRES TEN (5/16") RUBBER BALLS AND
ONE 5/16" STEEL BALL IN CASE

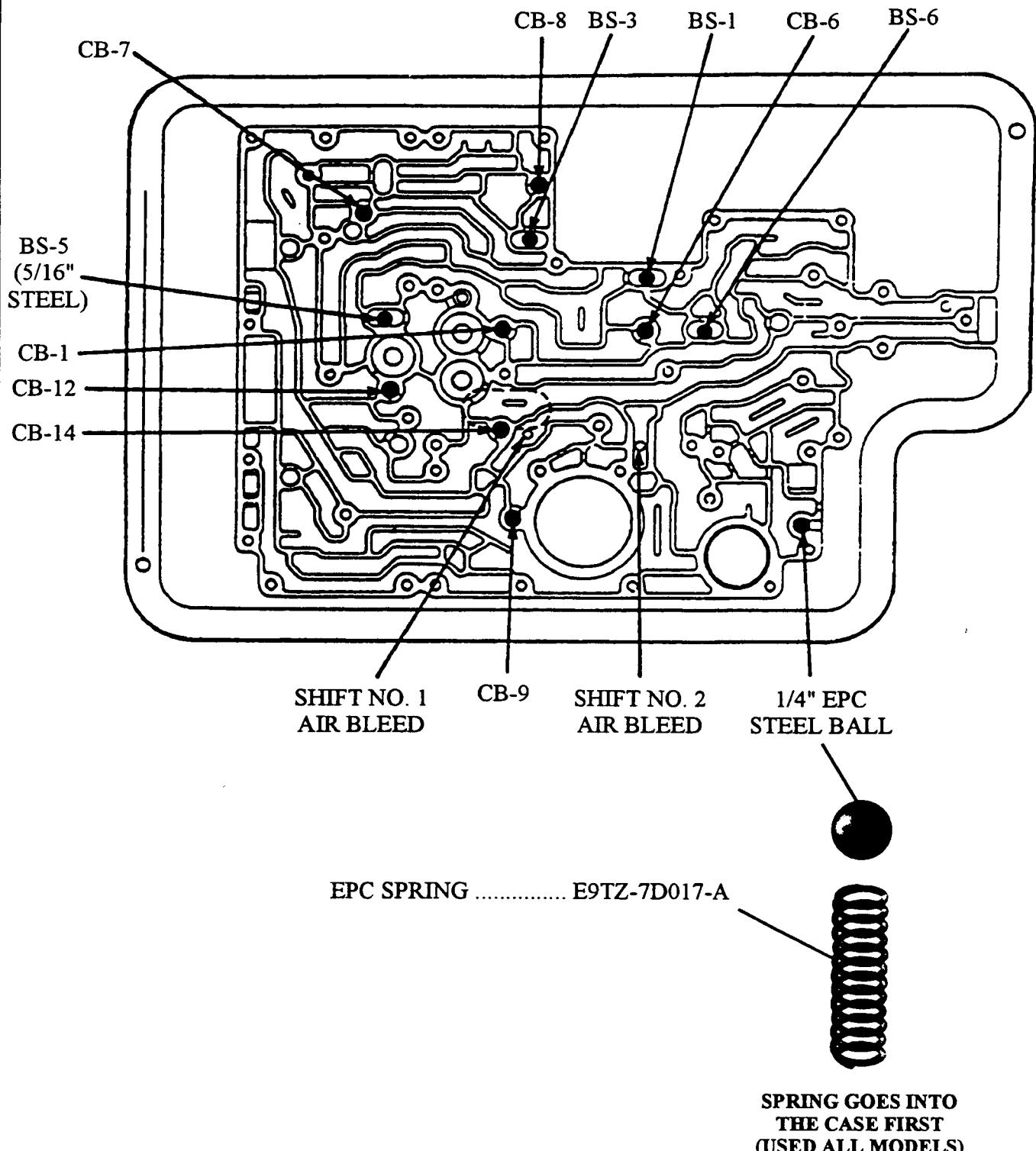


Figure 57

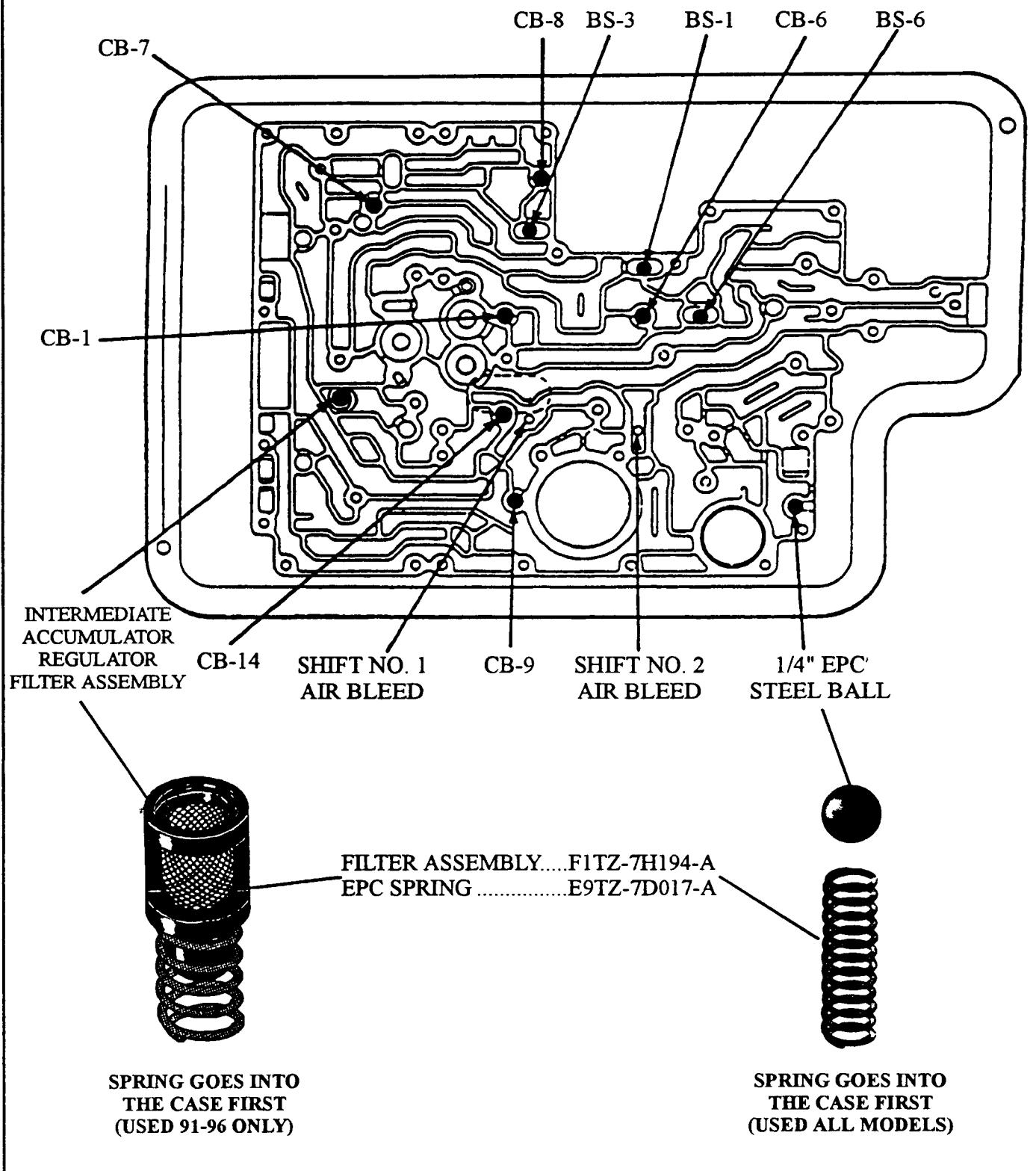
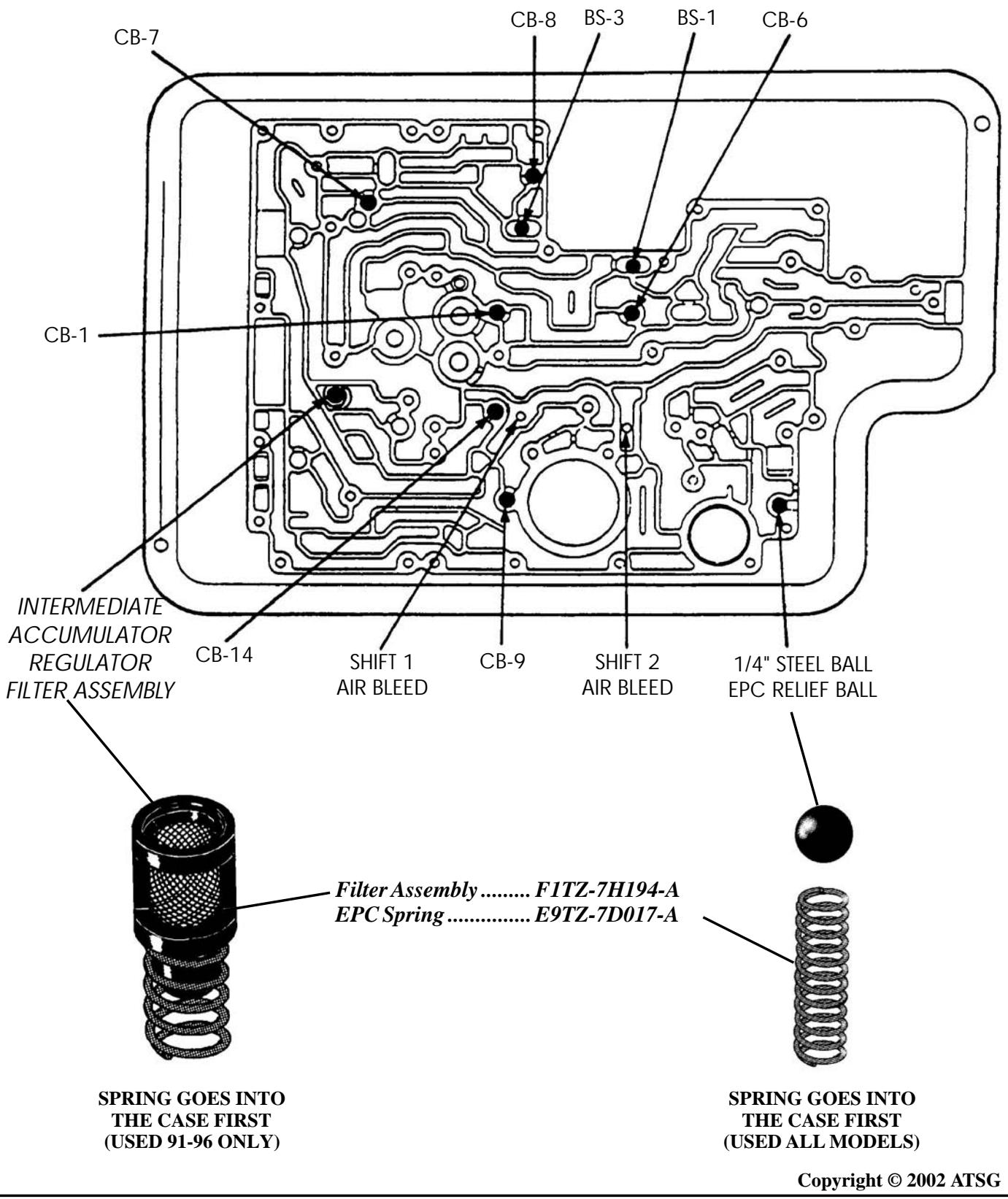
**1990 - 1995 CASE CHECKBALL LOCATIONS
REQUIRES NINE (5/16") RUBBER BALLS**

Figure 58

FORD E4OD

1996-1998 CASE CHECKBALL LOCATIONS
REQUIRES EIGHT (5/16") RUBBER BALLS



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Figure 59

AUTOMATIC TRANSMISSION SERVICE GROUP

FORD 4R100

1998-2003 CASE CHECKBALL LOCATIONS
REQUIRES EIGHT (5/16") RUBBER BALLS

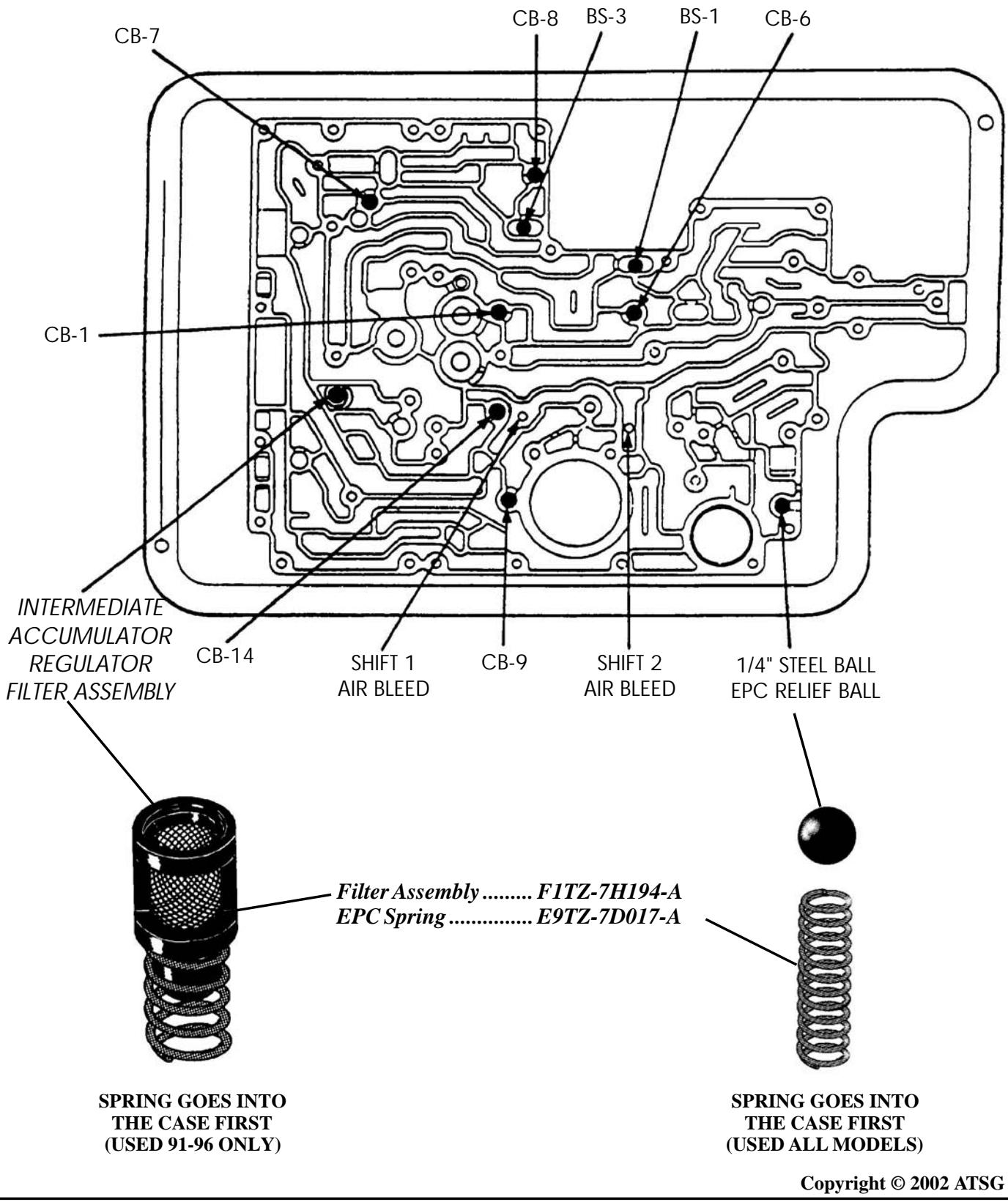


Figure 60

FORD ATX
VALVE BODY CHECKBALL LOCATIONS
1981 - 1986 ONLY

**(USES THE GEAR TYPE CONVERTER)
REQUIRES 5 CHECKBALLS**

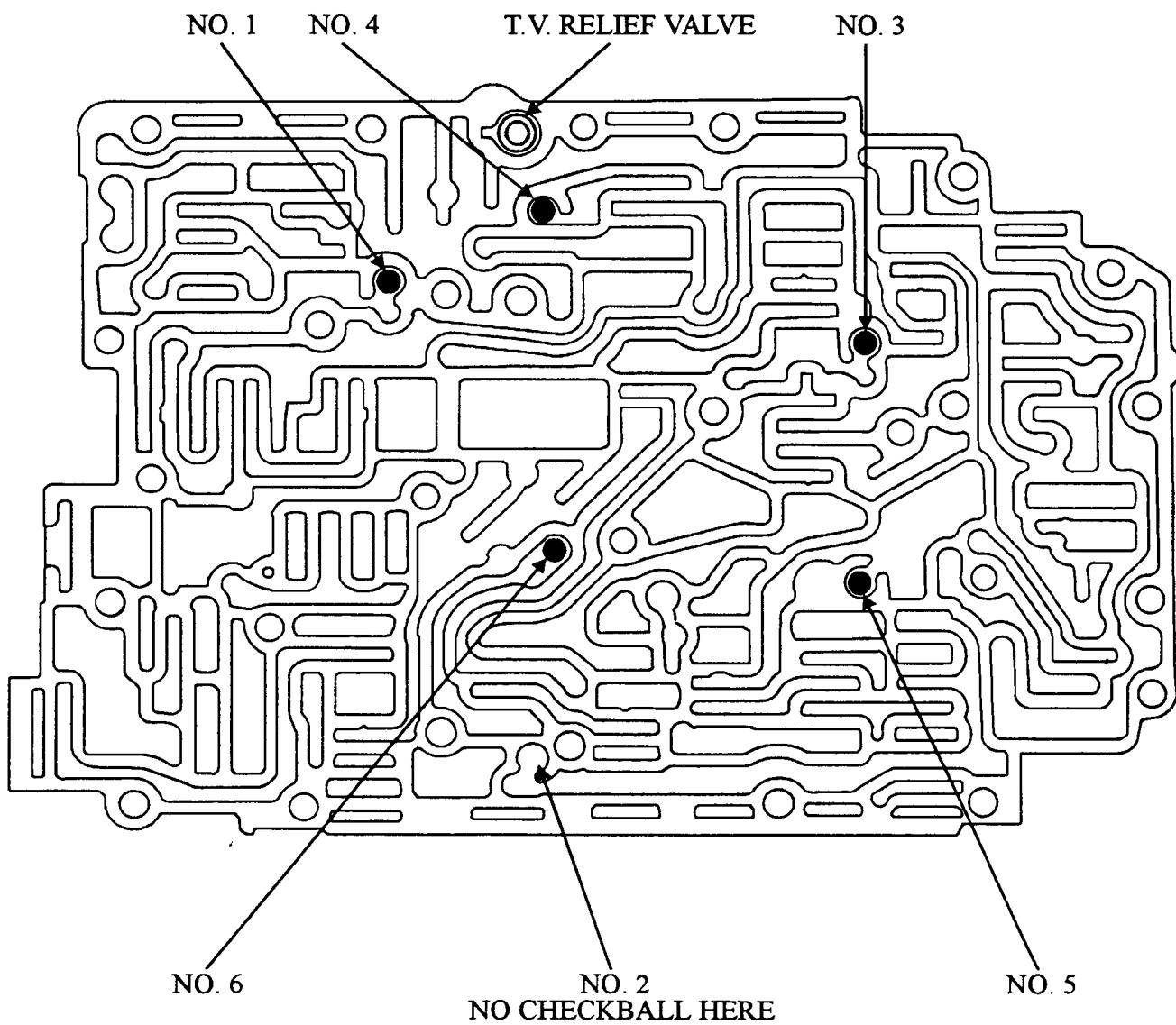


Figure 61

FORD ATX

VALVE BODY CHECKBALL LOCATIONS
TAURUS/SABLE 2.5L ENGINE

(USES THE CLC TYPE CONVERTER)
REQUIRES 6 CHECKBALLS

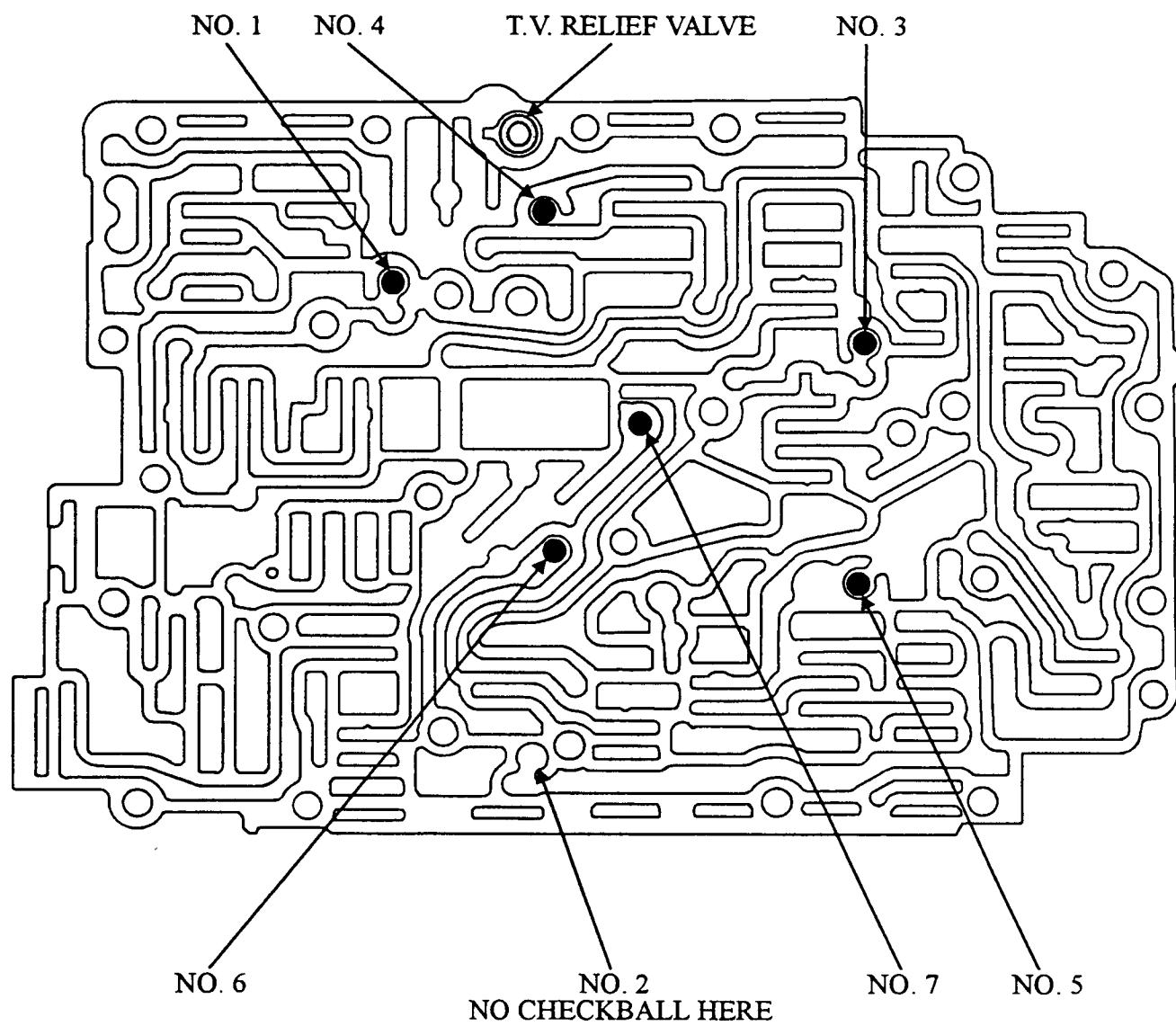


Figure 62

FORD ATX

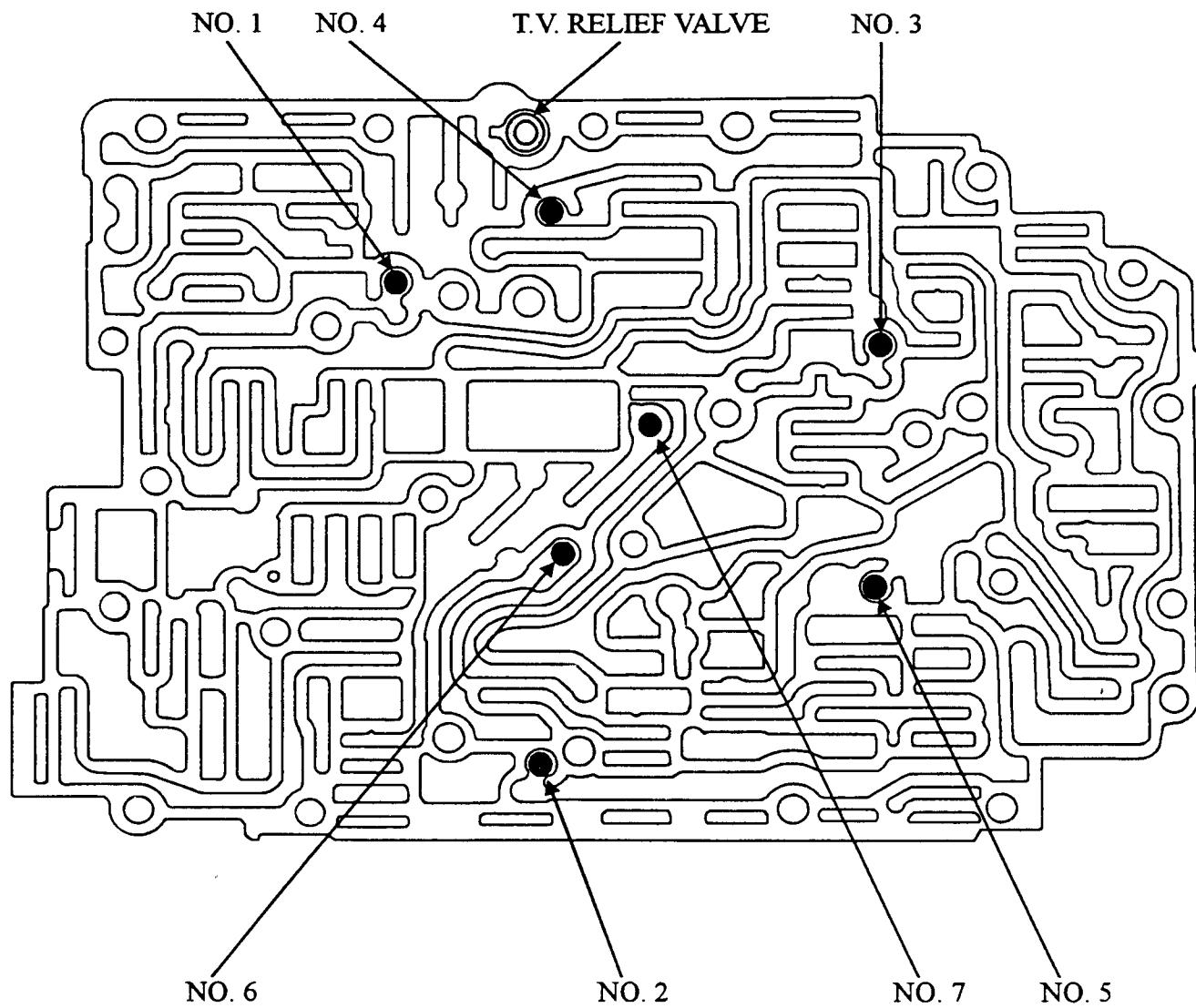
VALVE BODY CHECKBALL LOCATIONS
1987-UP TEMPO/TOPAZ(USES THE FLC TYPE CONVERTER)
REQUIRES 7 CHECKBALLS

Figure 63



FORD ATX TRANSMISSION

CHECK BALL FUNCTION

NO. 1 - Reverse clutch orifice control ball - controls the apply of the reverse clutch.

NO. 2 - Direct clutch orifice control ball - controls the apply of the third clutch through the "B" orifice in the spacer plate.

NO. 3 - D, 1, 2 orifice control ball for servo apply - forces servo apply oil through a "C" orifice in the spacer plate via the 2-3 backout valve.

NO. 4 - Reverse orifice control ball through 2-3 shift valve for servo release - the direct clutch is applied by a modulated line pressure through the # 4 check ball, the 2-3 shift valve, the manual downshift modulator valve and orifice B. When the selector lever is moved out of reverse, it forces this pressure to be exhausted through the "D" orifice in the spacer plate.

NO. 5 - Reverse/3rd servo release exhaust ball - forces servo release oil to be exhausted through the 3-2 kickdown valve, 3-2 torque demand timing valve, 2-3 shift valve, through orifice "D" in the spacer plate and out to an exhaust at the manual valve.

NO. 6 - R, 1, 2/Kick down shuttle ball - allows Reverse, manual low and manual 2 oil to be directed to the 2-3 shift T.V. modulator valve to prevent the valve from going into regulation causing the circuit to be filled with line pressure. This action keeps the 2-3 shift valve in a closed position. In the drive position, this ball allows kick down pressure to enter the spring chamber of the 2-3 shift T.V. modulator valve kickdown valve. This action prevents the valve from modulating allowing full T.V. pressure to work on closing the 2-3 shift valve for a 3-2 kickdown.

NO. 7 - This ball orifices intermediate clutch exhaust on a 3-1 or 2-1 downshift for a controlled release.

Figure 64

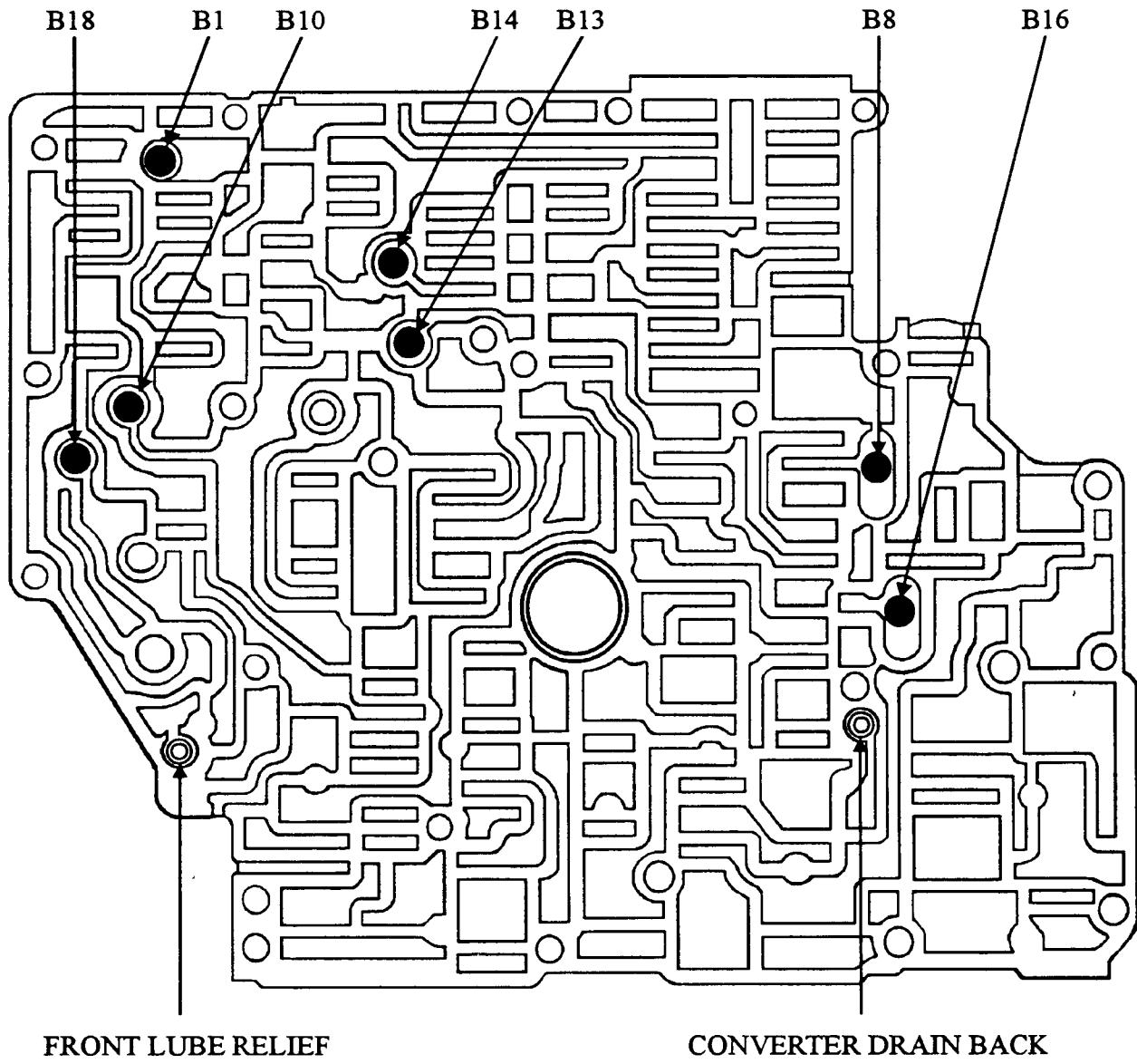
**FORD AXOD TRANSMISSION
VALVE BODY CHECKBALL LOCATIONS**

Figure 65

FORD AXOD TRANSMISSION
PUMP BODY CHECKBALL LOCATIONS
(9 CHECK BALL PUMP ONLY)

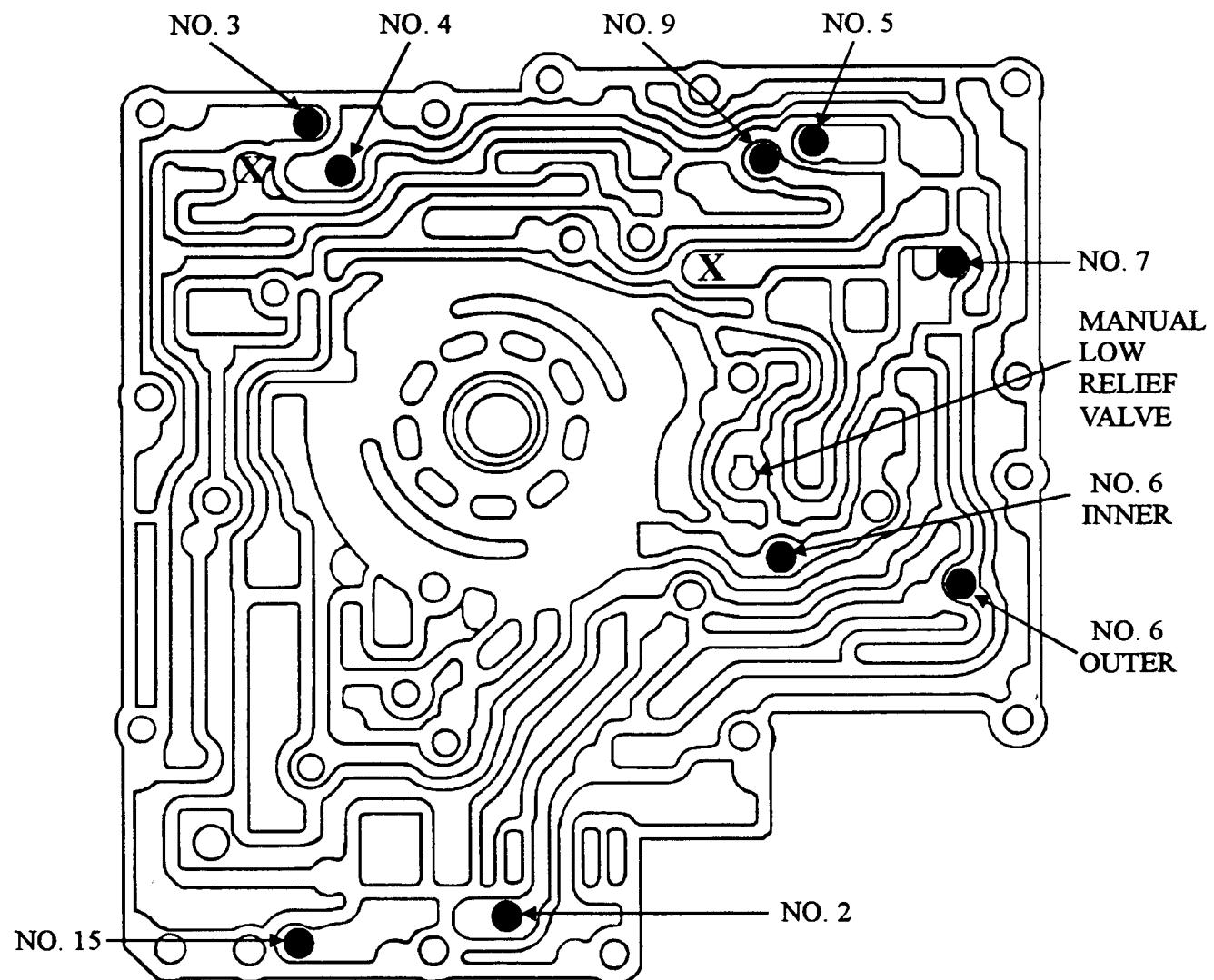


Figure 66

FORD AXOD TRANSMISSION
PUMP BODY CHECKBALL LOCATIONS
(10 CHECK BALL PUMP ONLY)

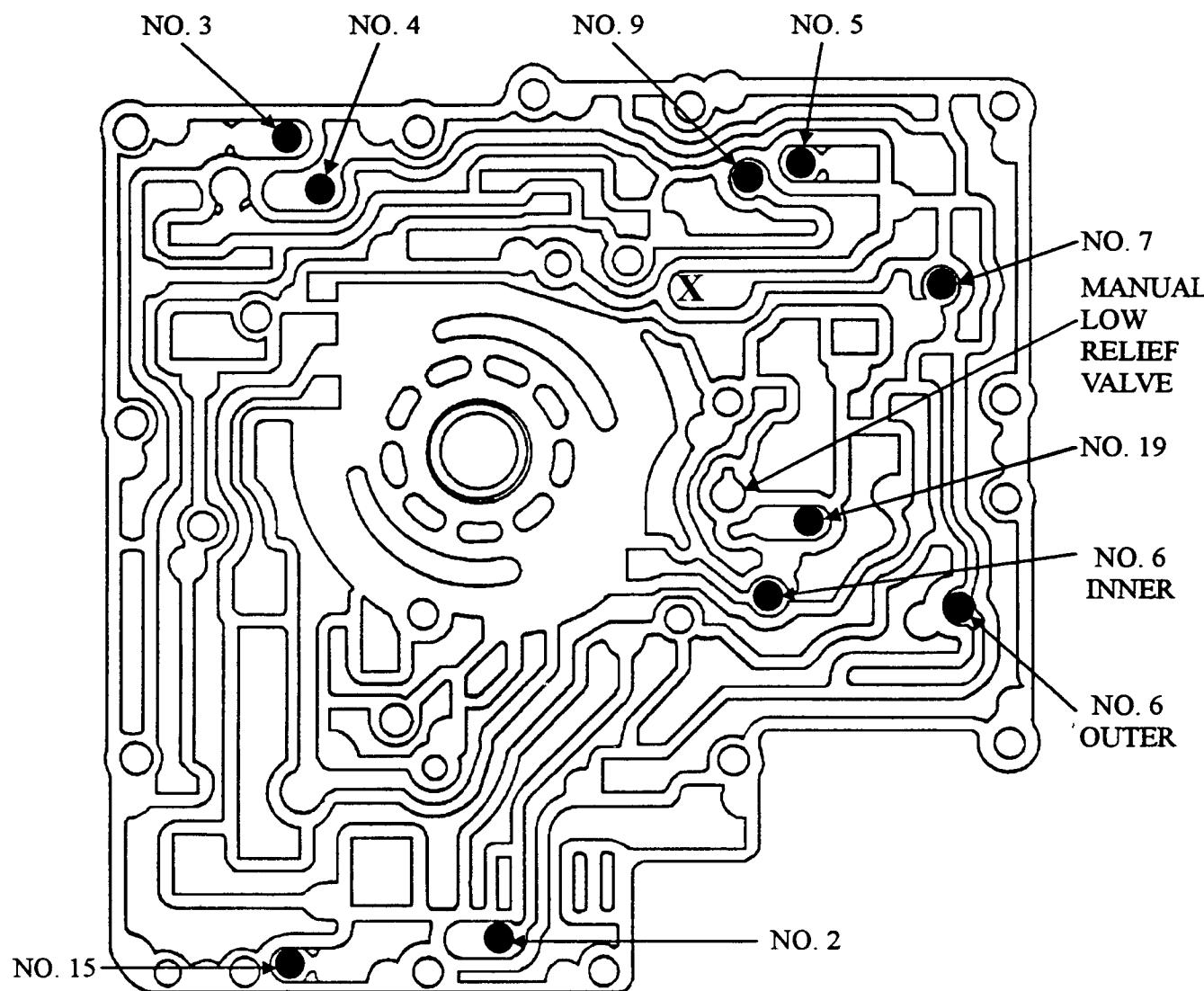


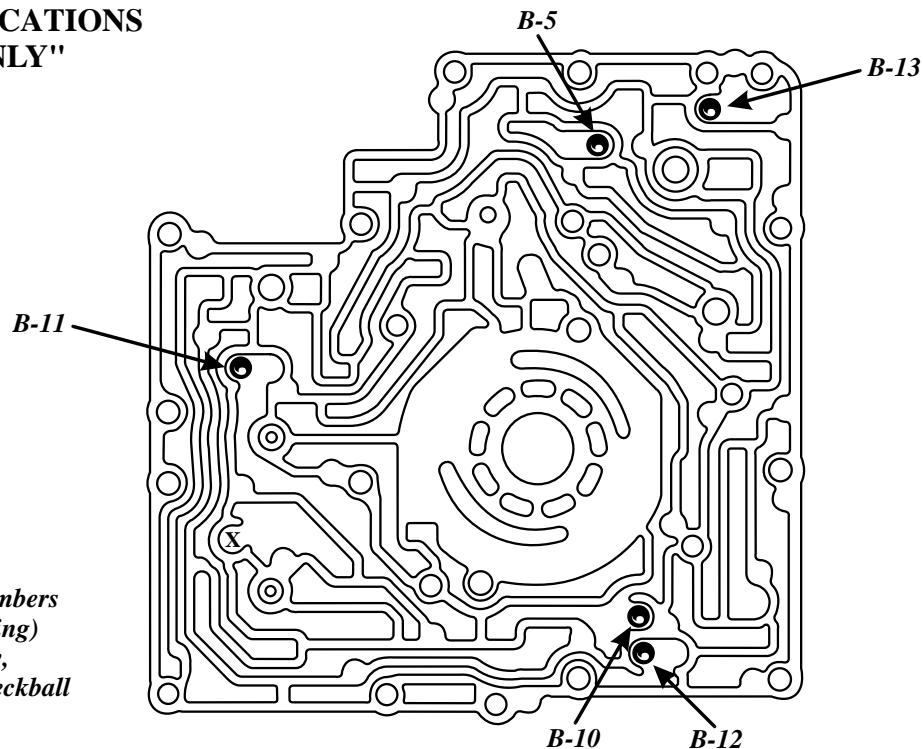
Figure 67

FORD AXOD TRANSMISSION CHECK BALL FUNCTION

- B1: Forces reverse clutch feed oil through the A orifice and thermal element while allowing the clutch to exhaust without restriction.
- B2: Separates reverse clutch and forward clutch circuits feeding the forward clutch.
- B3: Separates manual low relief and TVLM passages to the main regulator boost valve.
- B4: Separates manual low relief and direct clutch circuits to the direct clutch.
- B5: Connects low/intermediate servo release and direct clutch passages during pressurization of these circuits while forcing low/intermediate servo release to be exhausted through the L orifice and the 3-2 control valve.
- B6: (2 required) Forces forward clutch feed oil through the K orifice for the 4-3 downshift while bypassing the orifice for a drive engagement.
- B7: Allows forward clutch to exhaust freely on the 3-4 upshift but forces forward clutch apply through the K orifice for the 4-3 downshift.
- B8: Separates low and kickdown circuits to the 2-3 shift valve.
- B9: Forces the direct clutch to exhaust through the M orifice on a 3-2 downshift while bypassing the orifice for the 3-1 downshift.
- B10: Exhausts low/intermediate servo apply directly through the manual valve on a drive-neutral or a drive-reverse engagement bypassing the B orifice.
- B11: Not used.
- B12: Not used.
- B13: Forces direct clutch feed through the E and F orifice bypassing the M orifice.
- B14: Forces overdrive servo apply feed through the H and G orifices while bypassing the orifices for exhaust.
- B15: Applies forward clutch through the PP orifice as well as the K orifice for a manual 3 pull in.
- B16: Separates the low and backout circuits to the backout valve.
- B17: Not used.
- B18: Feeds the N-D accumulator through the RR and SS orifices in parallel and exhausts N-D accumulator through the RR and SS orifices in series.

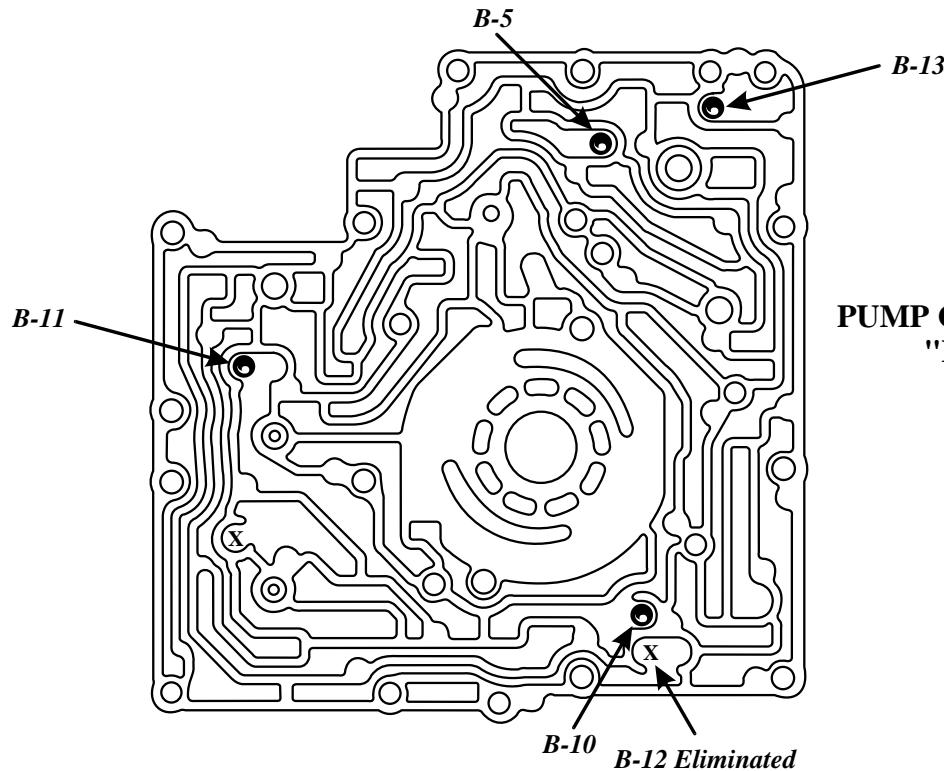
Figure 68

PUMP CHECKBALL LOCATIONS
"EARLY" 1991 "ONLY"



*Transaxle Serial Numbers
(Up To And Including)
See Chart Below,
Get A Number 12 Checkball*

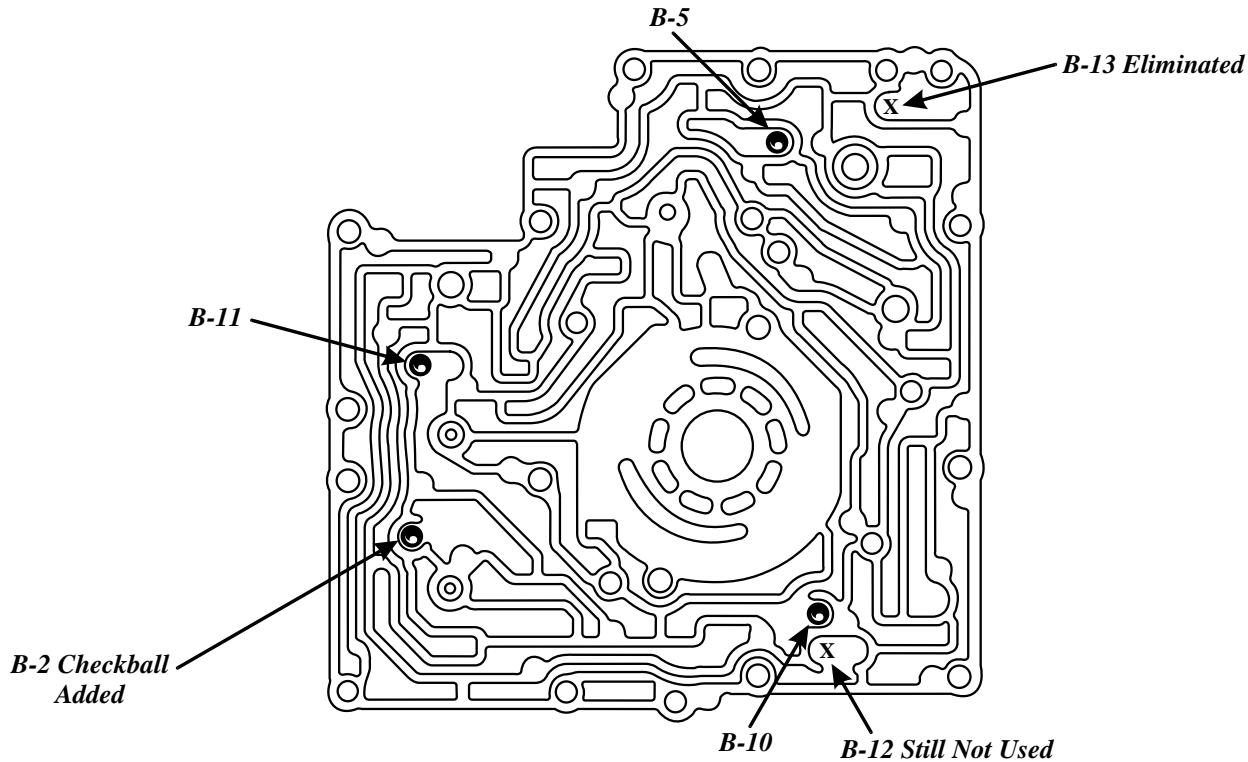
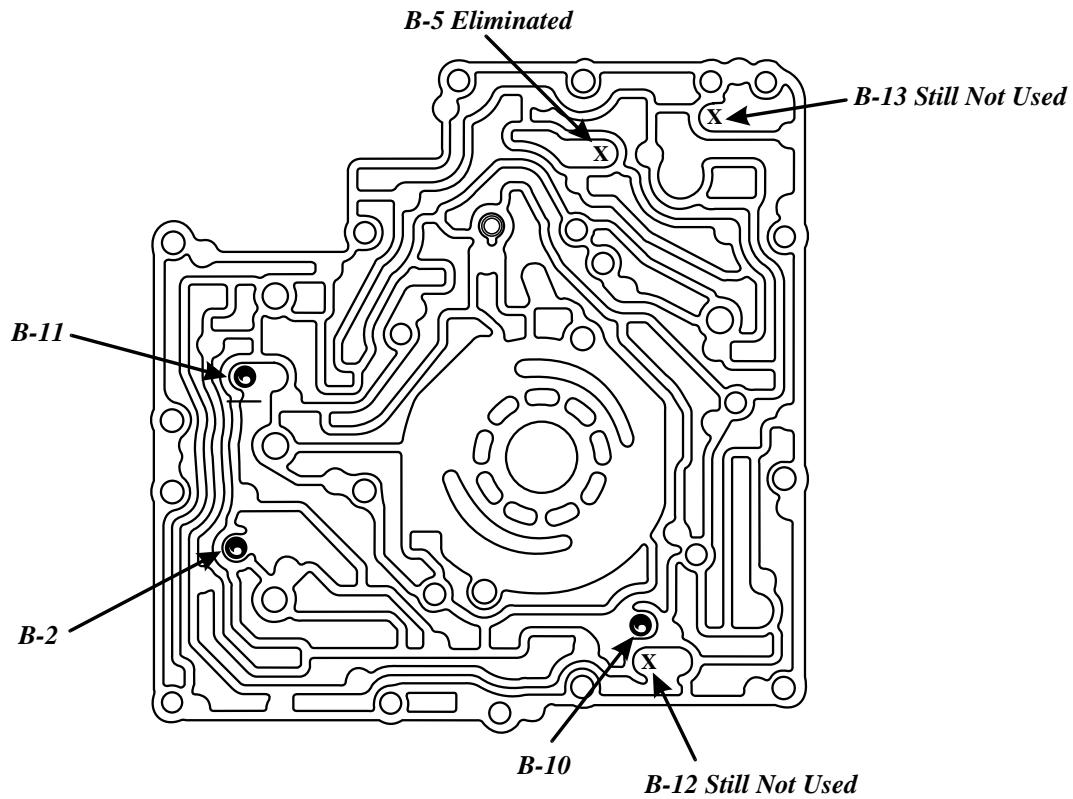
Vehicle Line	Up To And Including Serial Number	Model Code
1991 Taurus/Sable 3.8L	54553	PNA-EA
1991 Taurus/Sable 3.0L	195343	PNA-EC
1991 Continental 3.8L	39653	PNA-EB
1991 All Police 3.8L	10936	PNA-EE



PUMP CHECKBALL LOCATIONS
"LATE" 1991 "ONLY"

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Figure 69

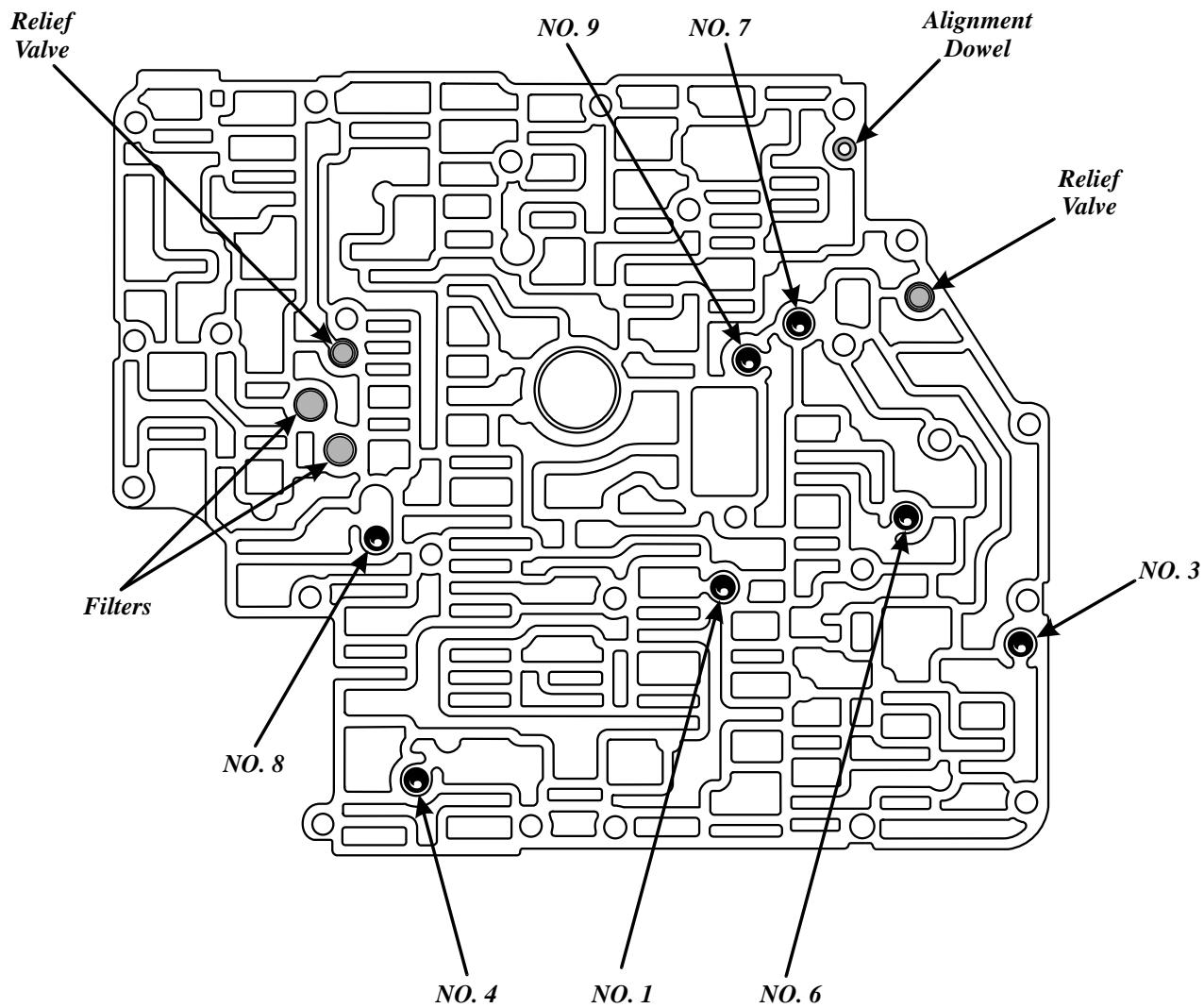
PUMP CHECKBALL LOCATIONS 92-98 MODELS "ONLY"**PUMP CHECKBALL LOCATIONS 1999 AND LATER "ONLY"**

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Figure 70

AUTOMATIC TRANSMISSION SERVICE GROUP

**AXODE (AX4S) 1991-1992 ONLY
CHECKBALL AND RELIEF VALVE LOCATIONS**



B1: Forces reverse clutch feed oil through the A orifice while allowing the clutch to exhaust without restriction.

B2: Forces forward clutch feed oil through the K orifice for a controlled engagement. Added in 1992.

B3: Forces Low/Inter. Servo apply pressure to be routed through the 2-3 servo regulator valve and engagement valve.

B4: Forces Overdrive Servo apply oil through the H orifice for a controlled apply.

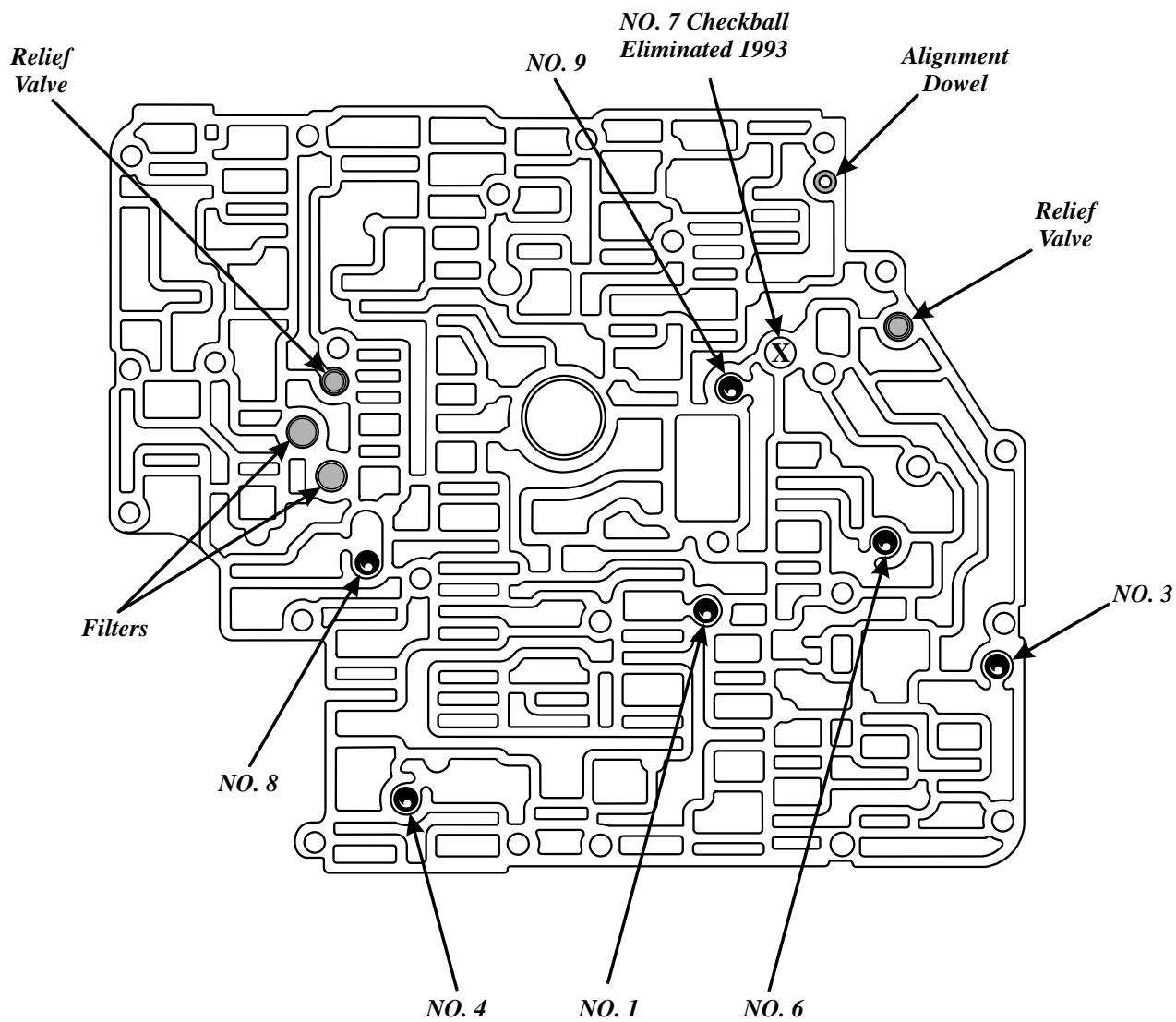
B5: Separates Reverse apply oil from the Low/Intermediate band apply circuit. Eliminated in 1999.

B6: Directs Low/Inter. Band release oil to be exhausted at the 1-2 shift valve, on 4-2 or 3-2 downshift.

B7: Forces Direct Clutch and Low/Intermediate Band release oil to be exhausted at the 1-2 shift valve, on a 4-2 or 3-2 downshift, and was eliminated in 1993.

B8: Separates Direct Clutch apply circuit, from Manual 1st direct clutch apply circuit.

**AXODE (AX4S) 1993-1998
CHECKBALL AND RELIEF VALVE LOCATIONS**



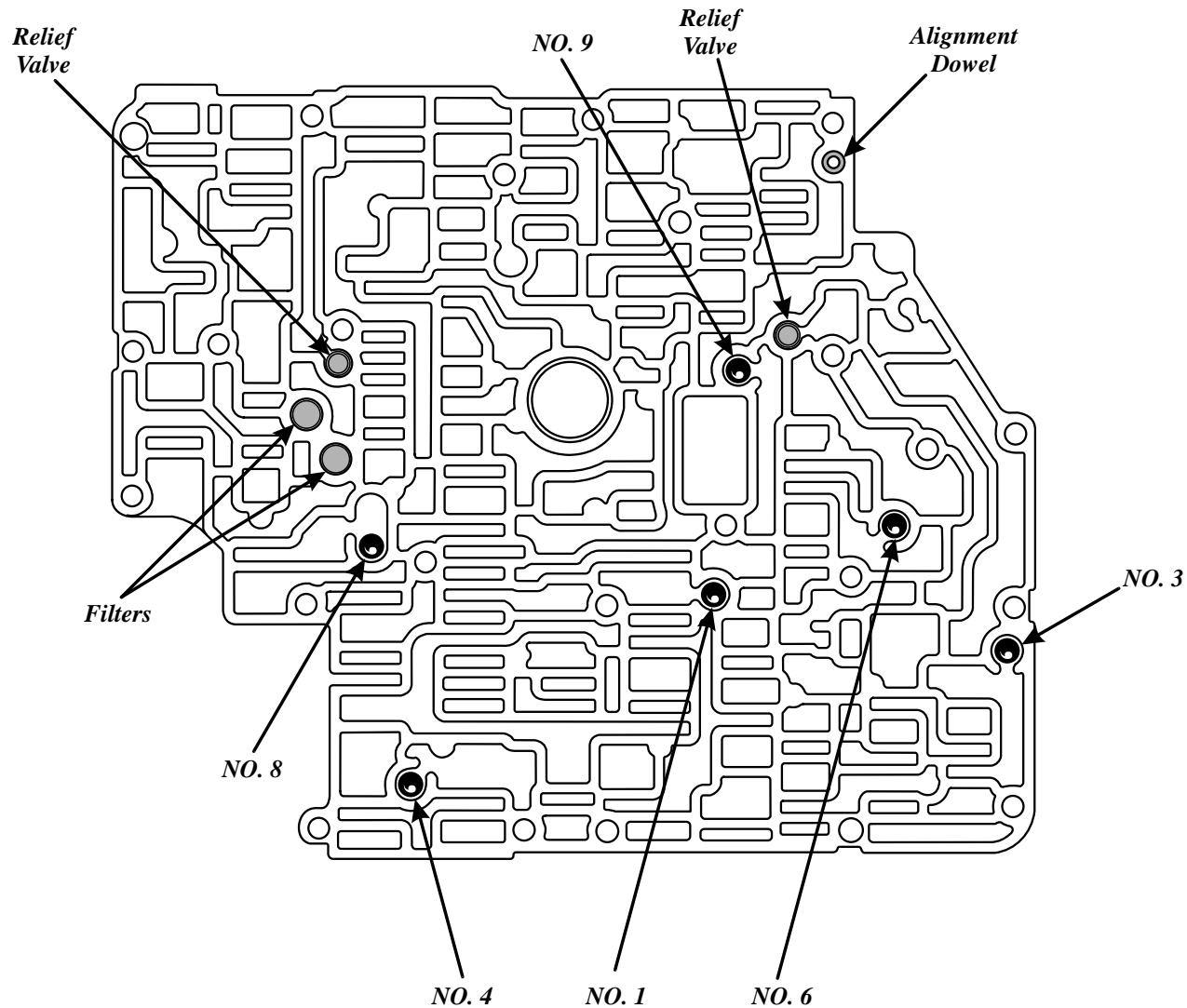
B9: Forces Direct Clutch apply oil and Low/Intermediate release oil to pass through the F orifice.

B10: Blocks Intermediate Clutch apply oil from entering the Low/Intermediate Band release circuit.

B11: This is Direct Clutch "Shuttle" ball. On the 2-3 shift, the direct clutch and band release is fed from the 2-3 shift valve via the 1-2 shift valve. When the 3-4 shift valve strokes, the 3-4 shift valve becomes the source of direct clutch and band release feed.

B12: Separates EPC pressure from the L234 pressure passages, and eliminated in late 1991.

B13: Forces Forward Clutch oil to be exhausted through the B orifice during a 3-4 upshift, and eliminated in 1992.

AXODE (AX4S) 1999-2002
CHECKBALL AND RELIEF VALVE LOCATIONS

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Figure 73

AUTOMATIC TRANSMISSION SERVICE GROUP

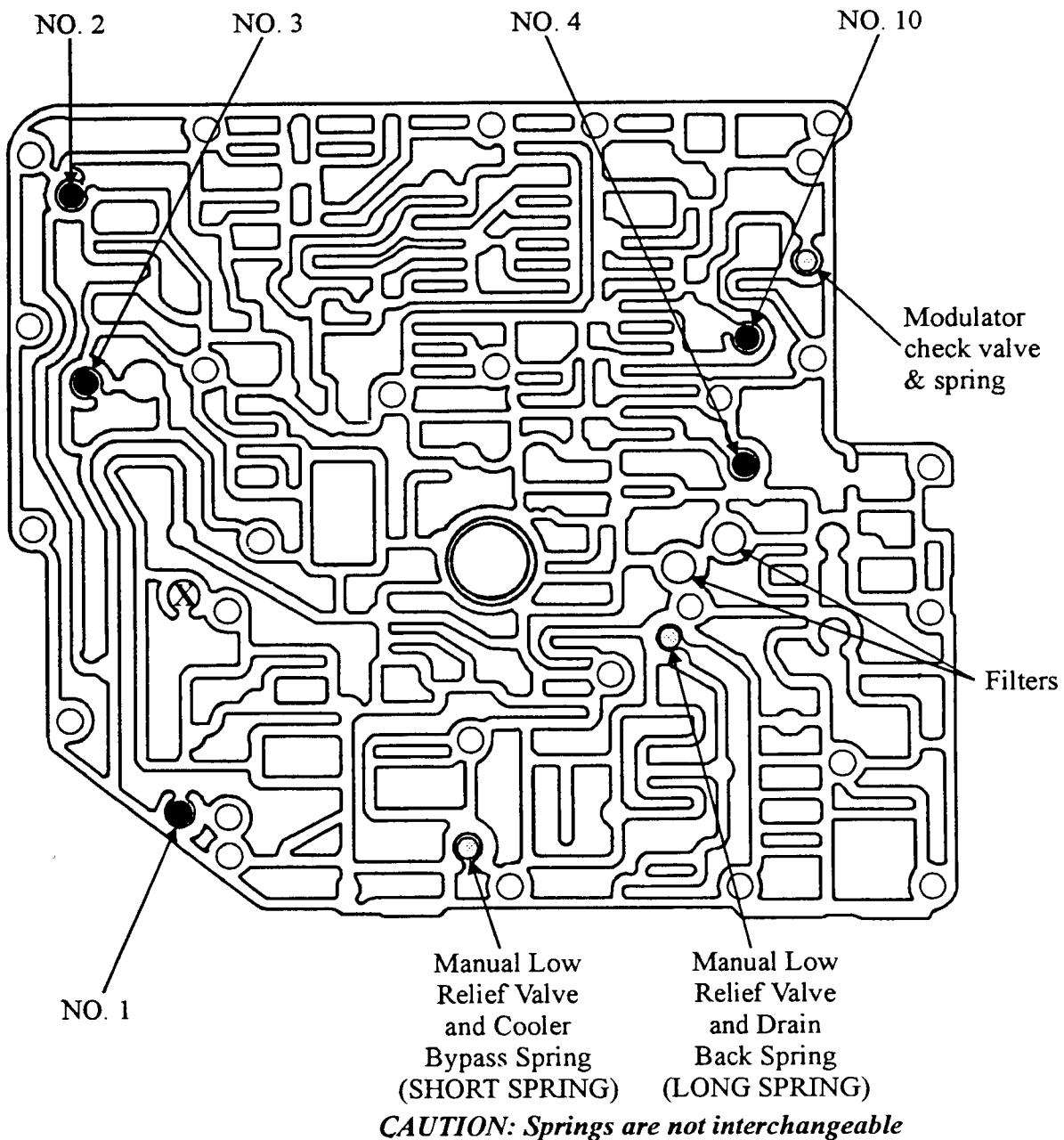
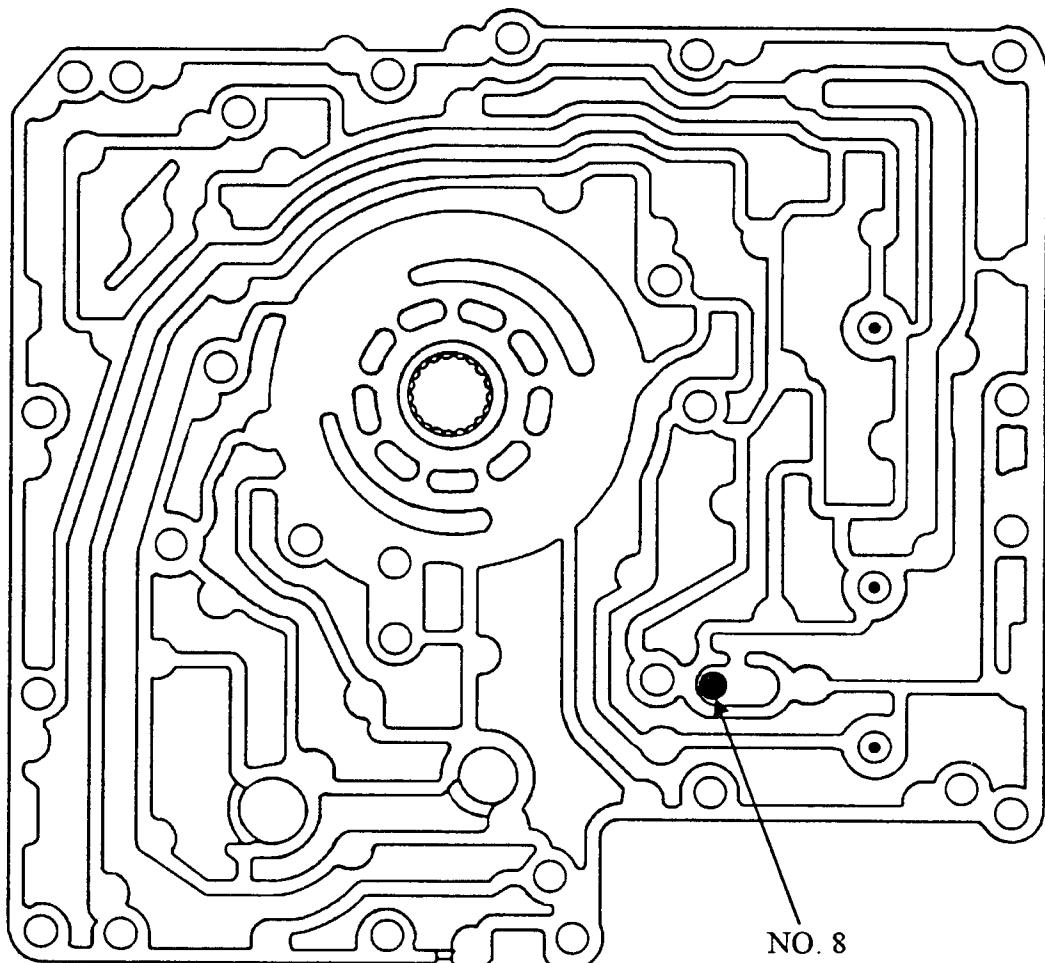
**FORD AX4N TRANSMISSION
VALVE BODY CHECKBALL LOCATIONS**

Figure 74

**FORD AX4N TRANSMISSION
PUMP CHECKBALL LOCATIONS**

*NOTE: If the number 8 ball is missing direct clutch oil will exhaust through the 1-2 shift valve.
A no 2-3 upshift will occur as well as no engine breaking in manual low.*

Figure 75



CHECKBALL BOOK

Volume I

AX4N

FORD AX4N TRANSMISSION

CHECK BALL FUNCTION

- B1: Forces reverse clutch feed oil through the A orifice while allowing the clutch to exhaust without restriction.
- B2: Forces the Coast Band apply oil through the N orifice for a controlled apply.
- B3: Forces Low/Intermediate Clutch apply pressure through the E orifice for a controlled apply.
- B4: Forces Forward Clutch apply pressure through the X orifice for a controlled apply.
- B8: Separates Direct Clutch apply pressure in the drive range from Direct Clutch apply pressure in the manual low range.
- B10: Forces Intermediate Clutch apply through the GG orifice for a controlled apply.

Figure 76

F3A
MAIN VALVE BODY & CASE CHECK BALL
& ORIFICE LOCATION

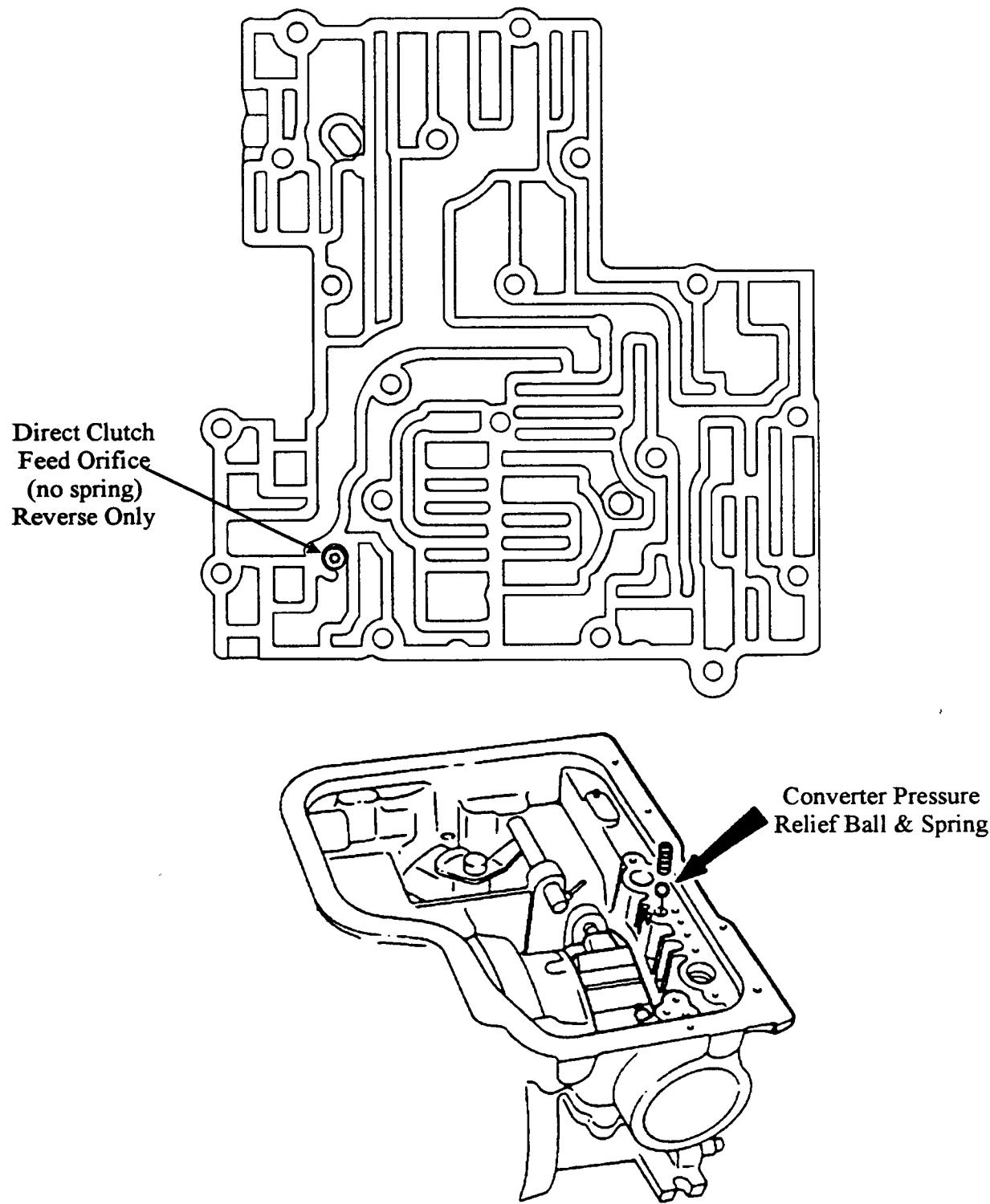


Figure 77

F3A
MAIN VALVE BODY & CASE CHECK BALL
& ORIFICE LOCATION

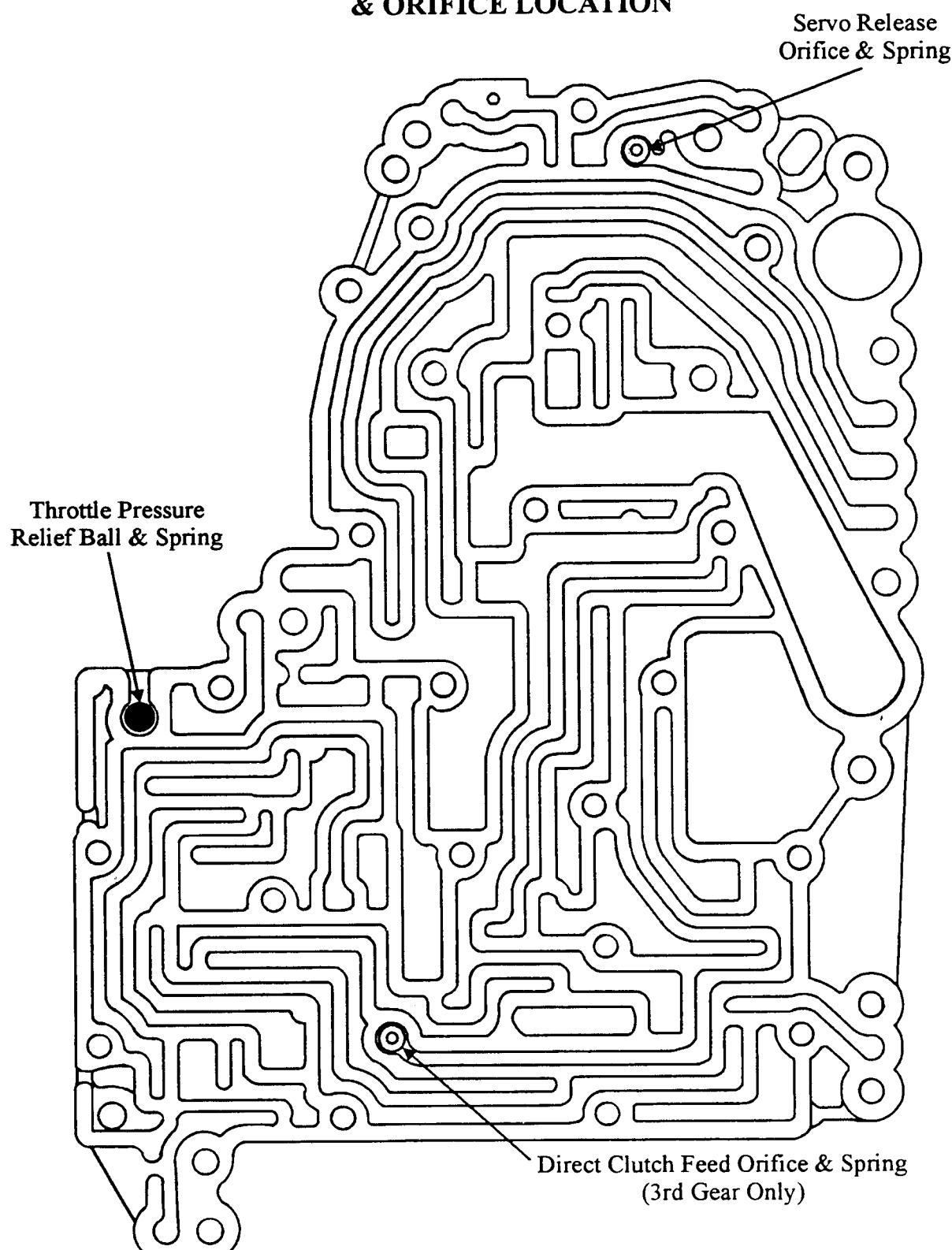
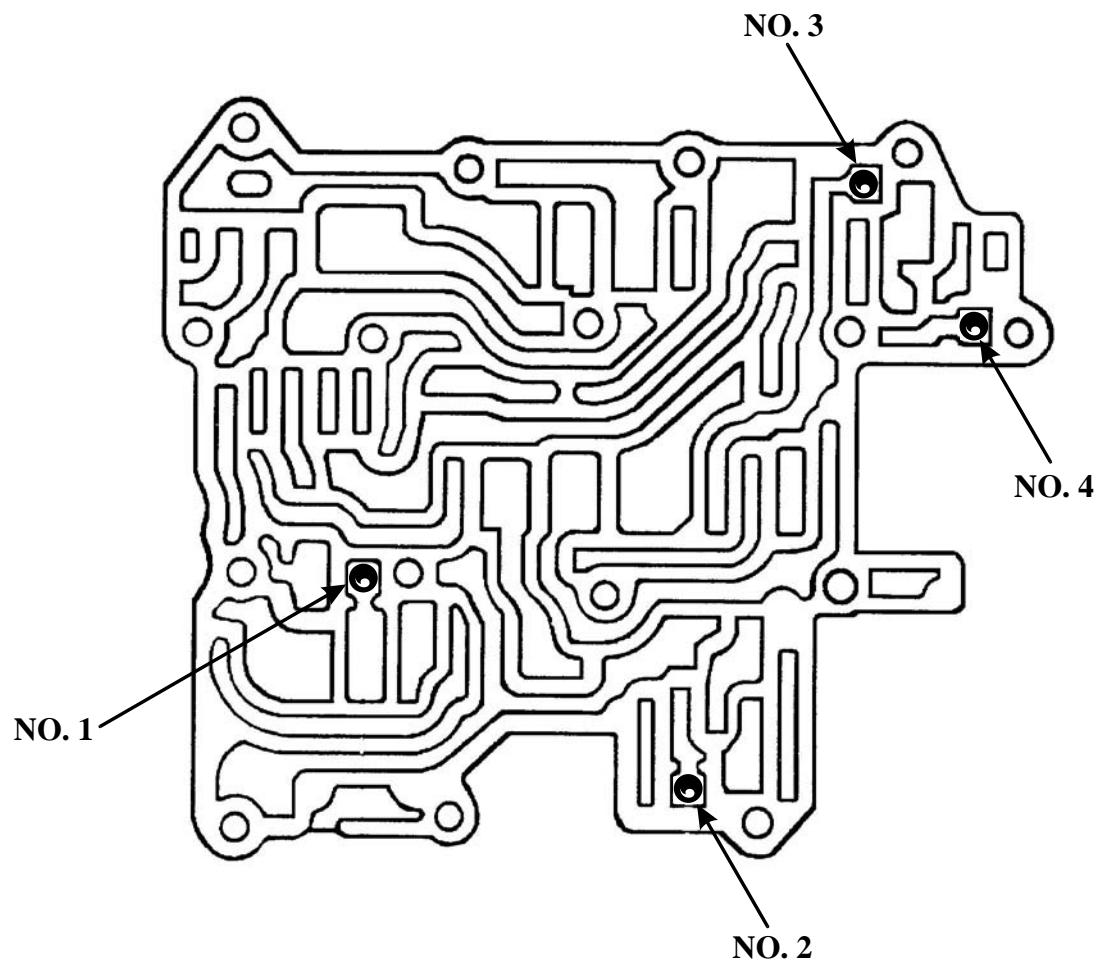


Figure 78

SPRINT MX-17
UPPER VALVE BODY
CHECKBALL LOCATIONS

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Figure 79

AUTOMATIC TRANSMISSION SERVICE GROUP

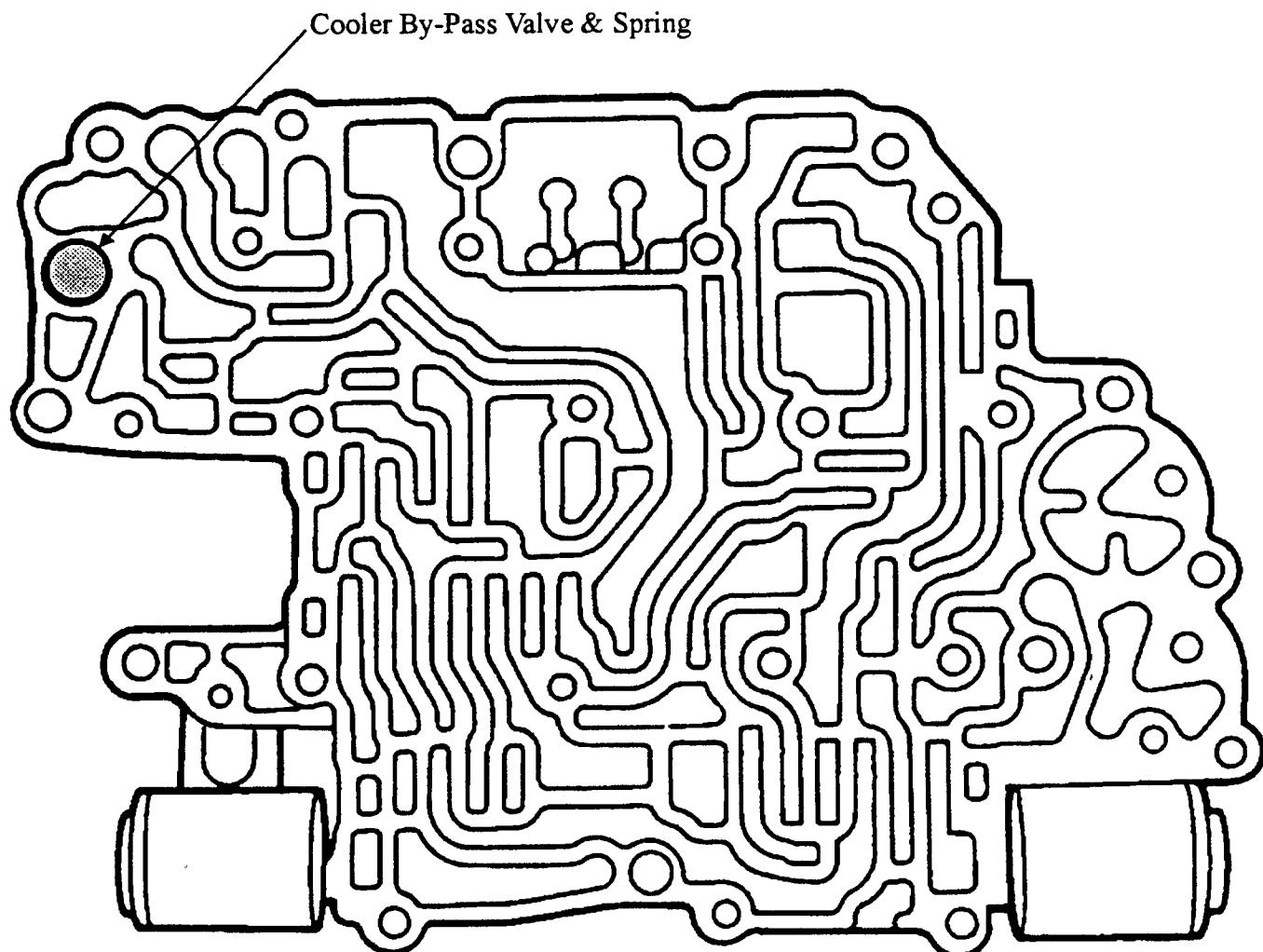
MX17
LOWER VALVE BODY BY-PASS
VALVE LOCATION

Figure 80

A130
LOWER VALVE BODY
CHECK BALL LOCATION

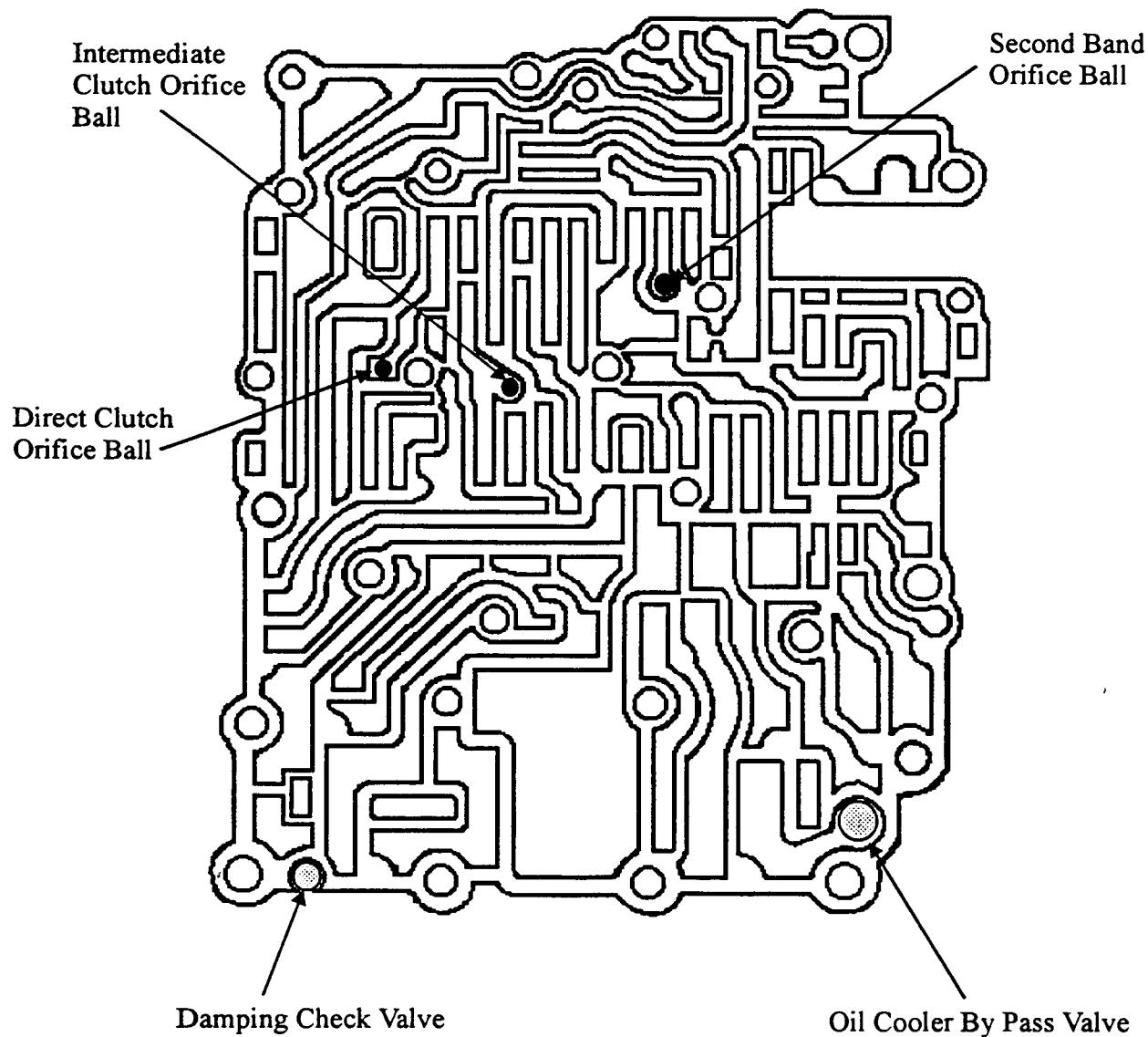


Figure 81

A130
UPPER VALVE BODY
CHECK BALL LOCATION

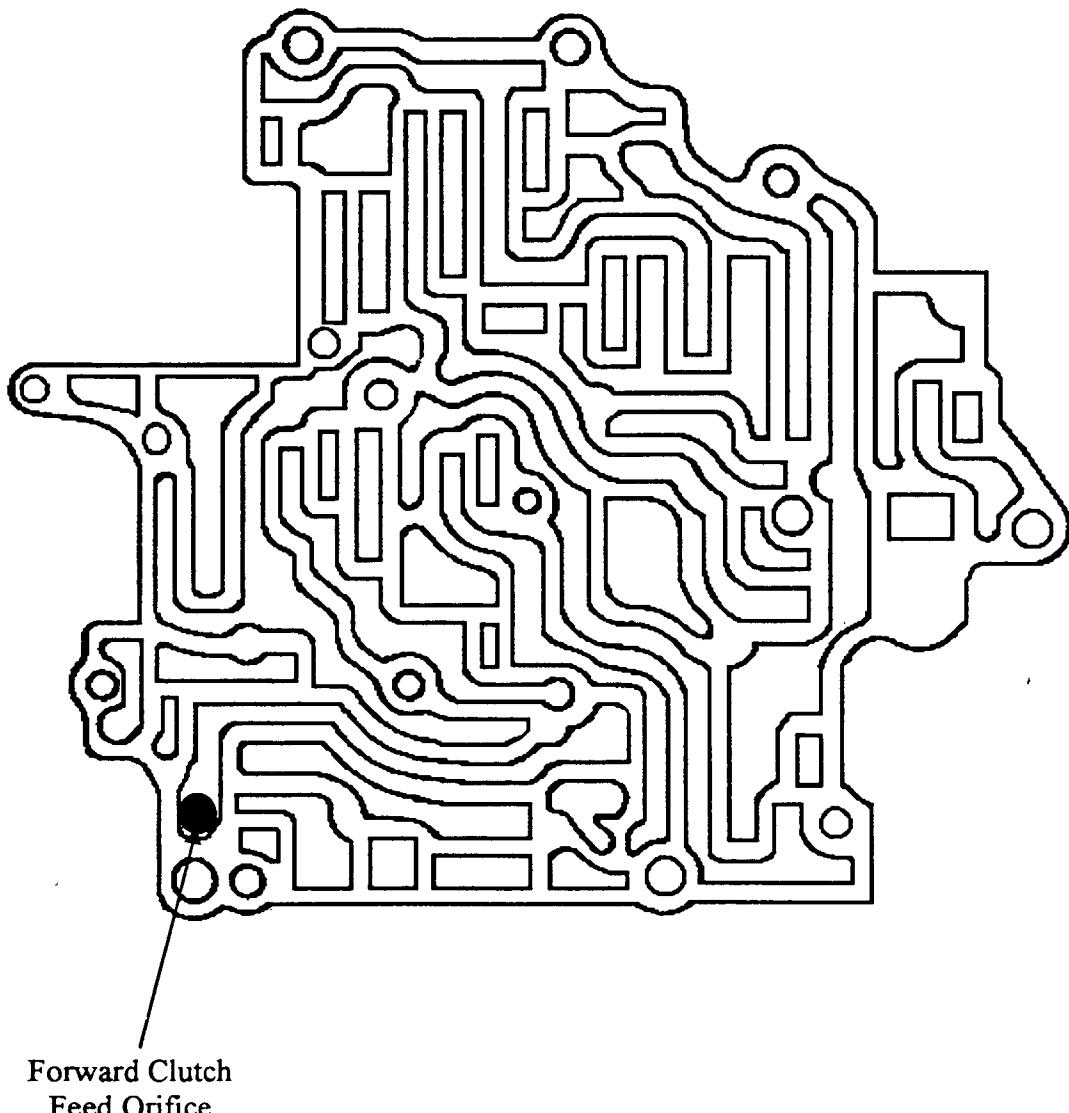


Figure 82

3N71B
VALVE BODY
CHECK BALL LOCATION

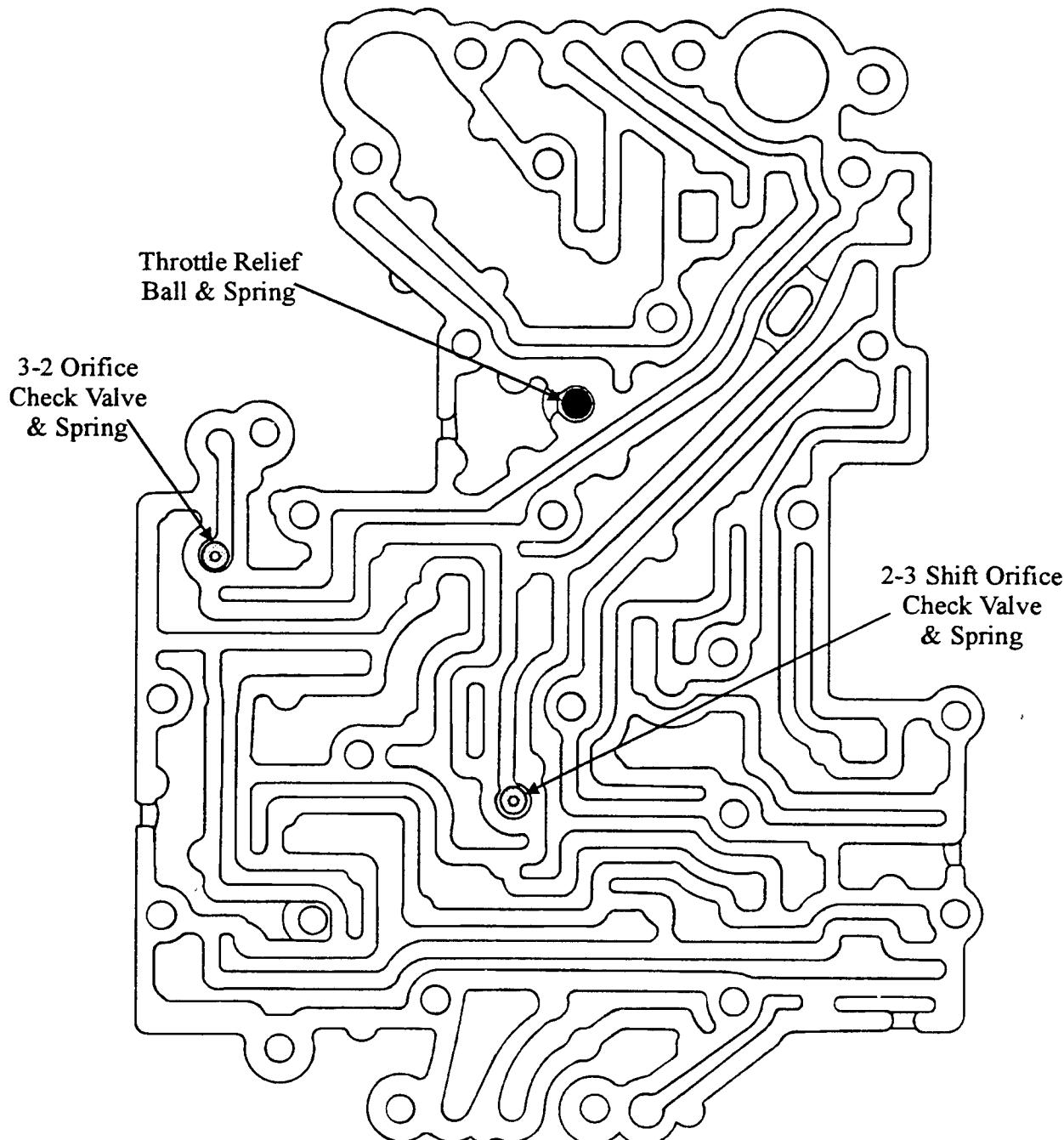


Figure 83

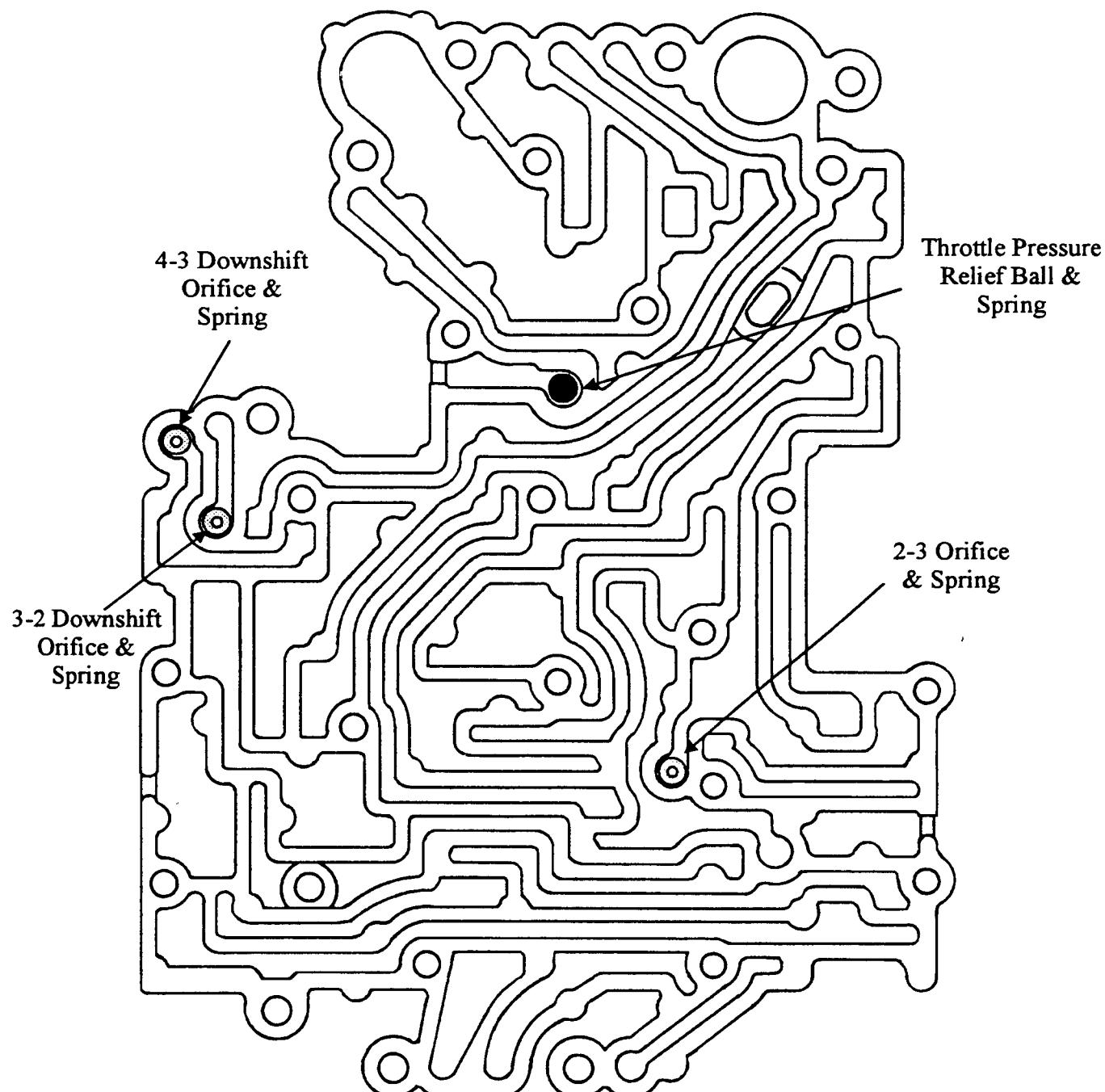
4N71B
VALVE BODY
CHECK BALL LOCATION

Figure 84

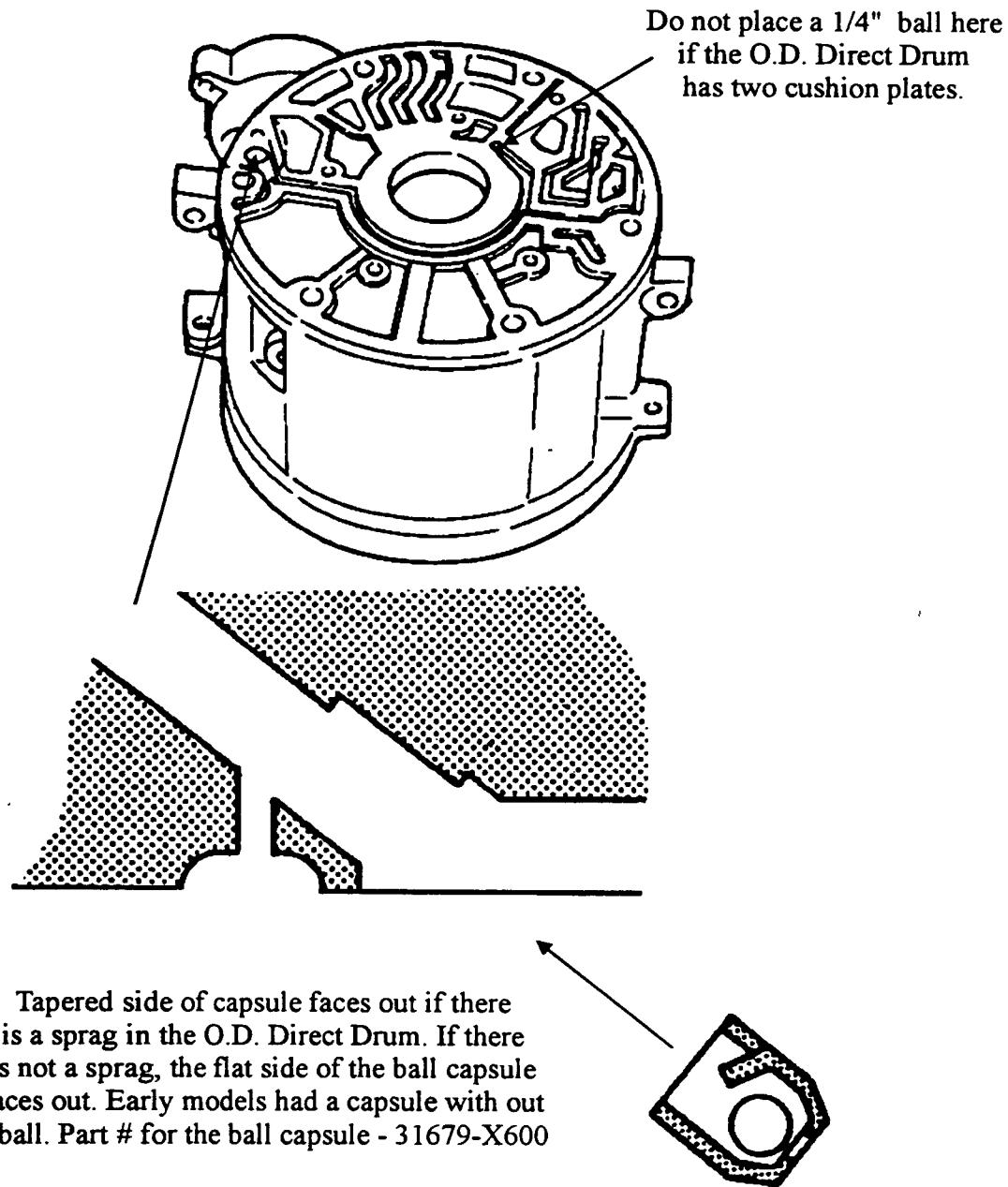
4N71B
OD CASE
CHECK BALL LOCATION

Figure 85

G4A-HL REAR CONTROL BODY ORIFICE & CHECK BALL LOCATION

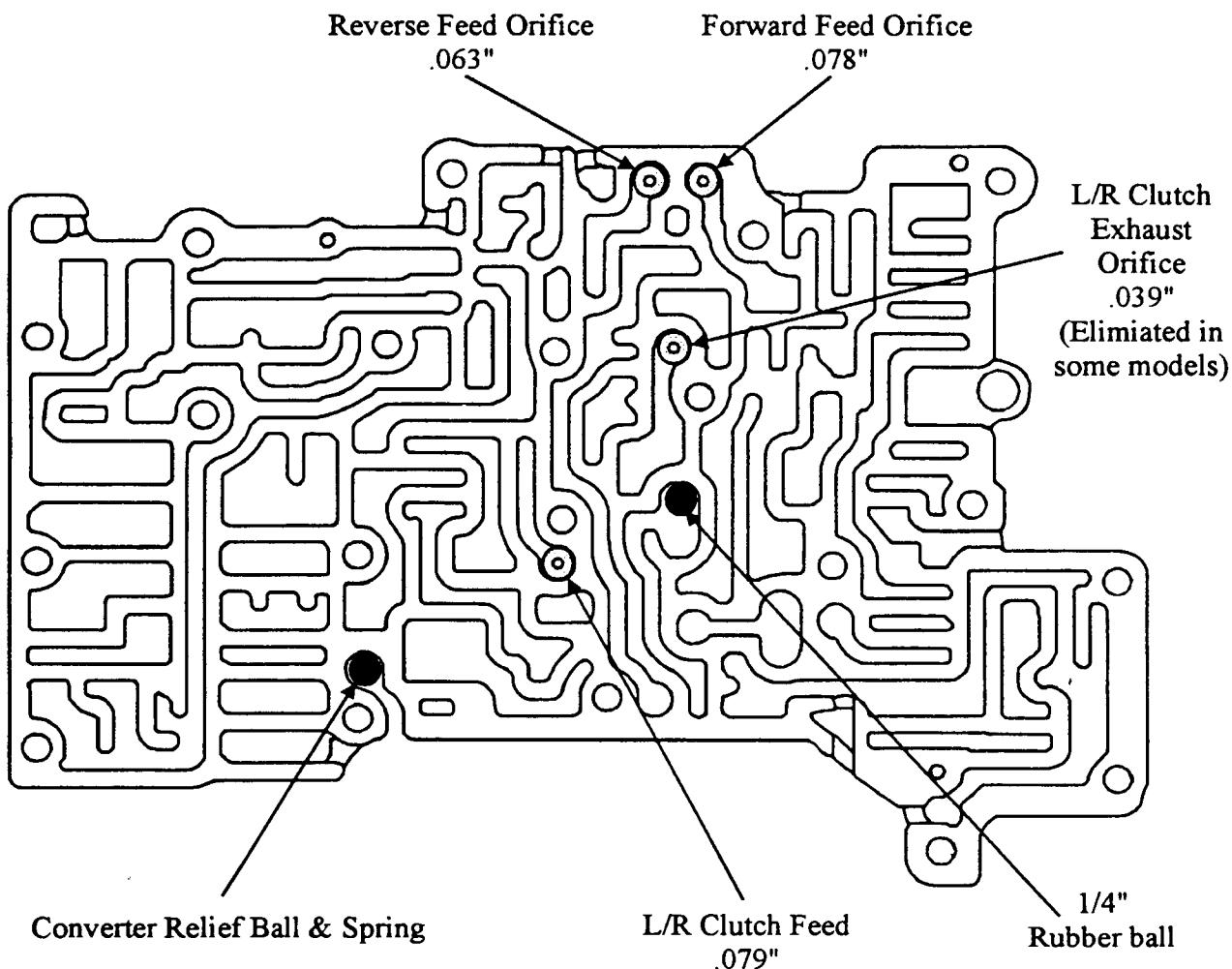


Figure 86

G4A-HL
MAIN CONTROL VALVE BODY
ORIFICE & CHECK BALL LOCATION

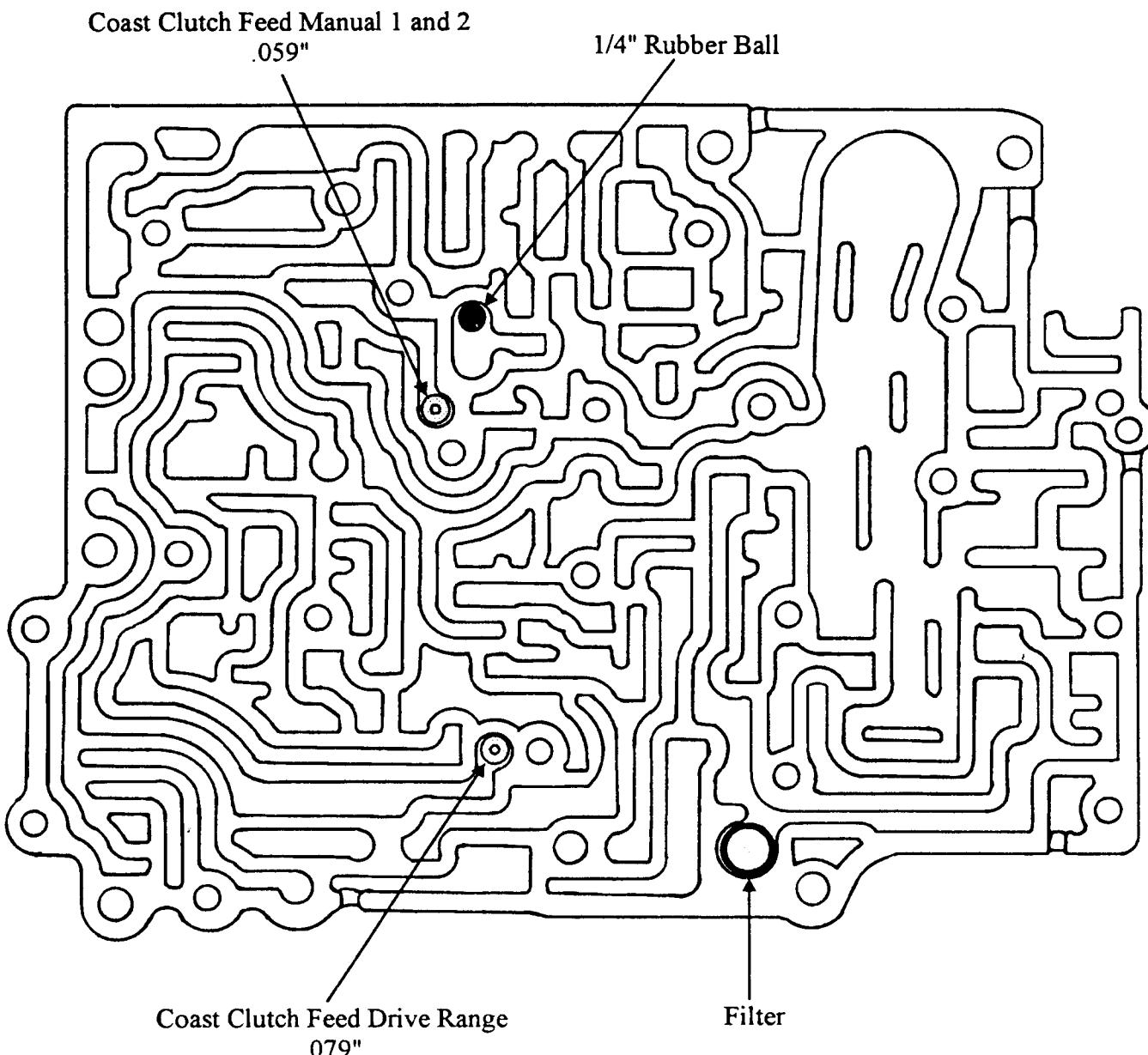


Figure 87

G4A-HL
MAIN CONTROL VALVE BODY
CHECK BALL LOCATION

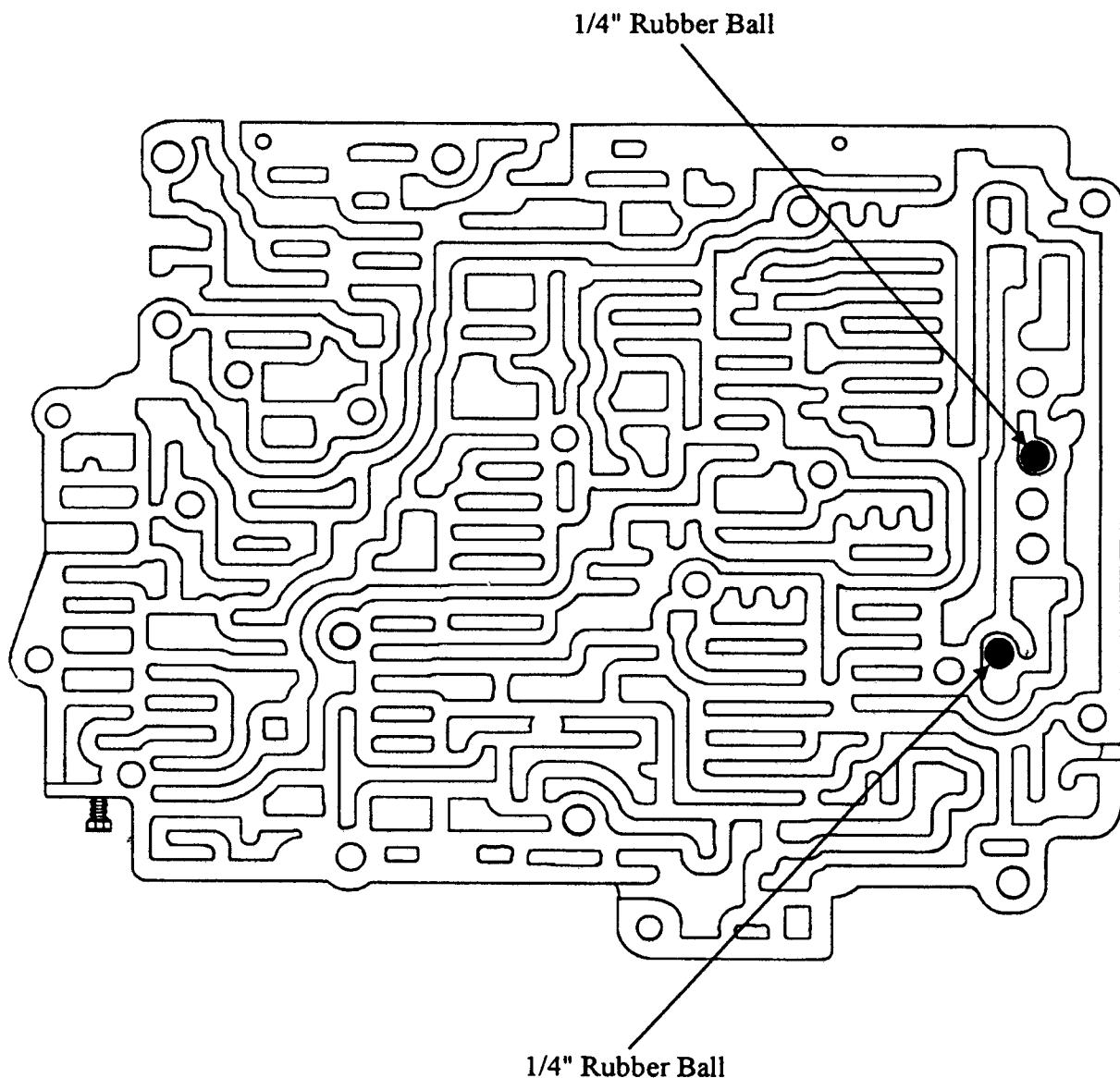


Figure 88

G4A-HL
PREMAIN VALVE BODY
ORIFICE & CHECK BALL LOCATION

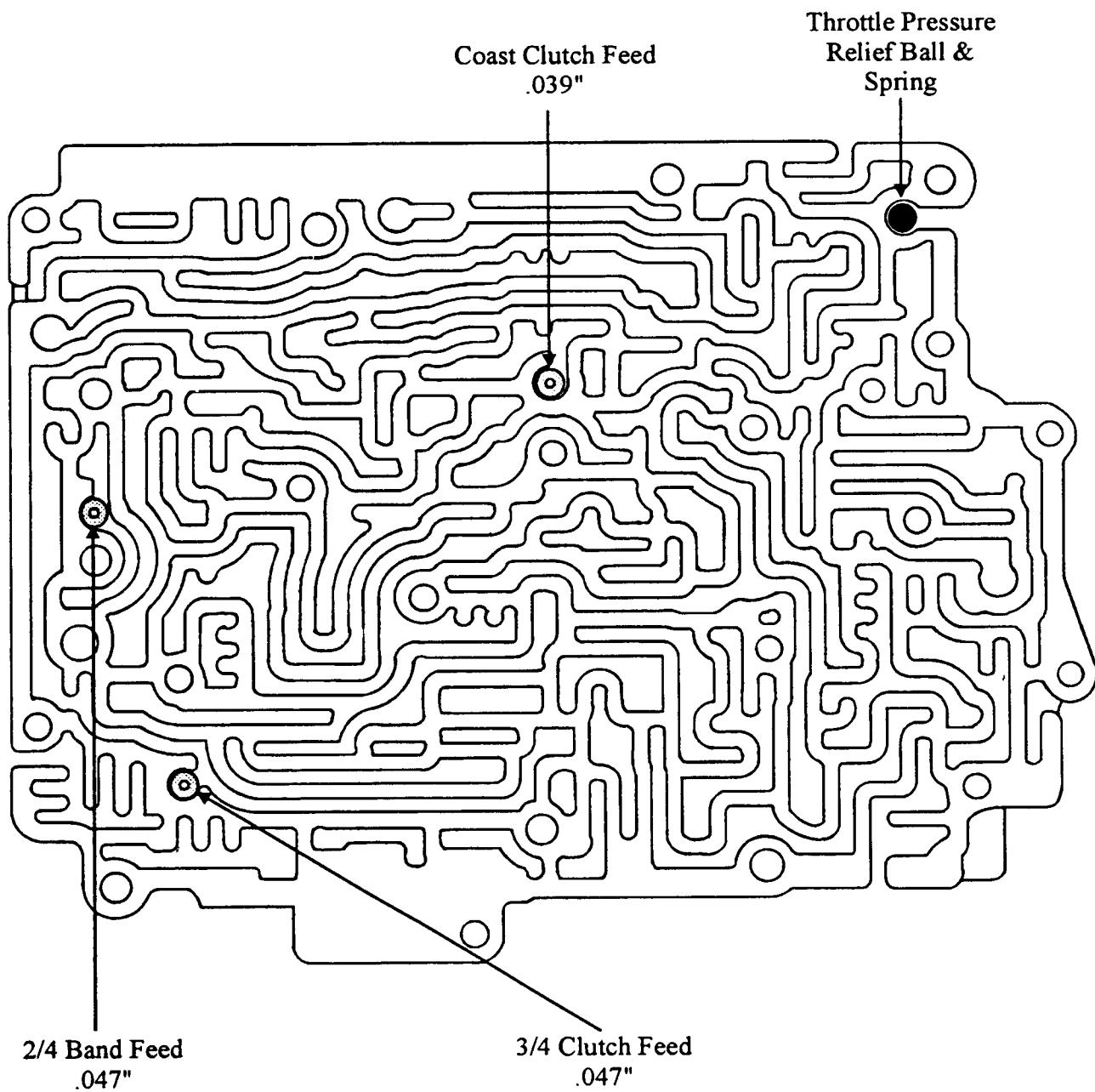


Figure 89

G4A-HL
PREMAM VALVE BODY
CHECK BALL LOCATION

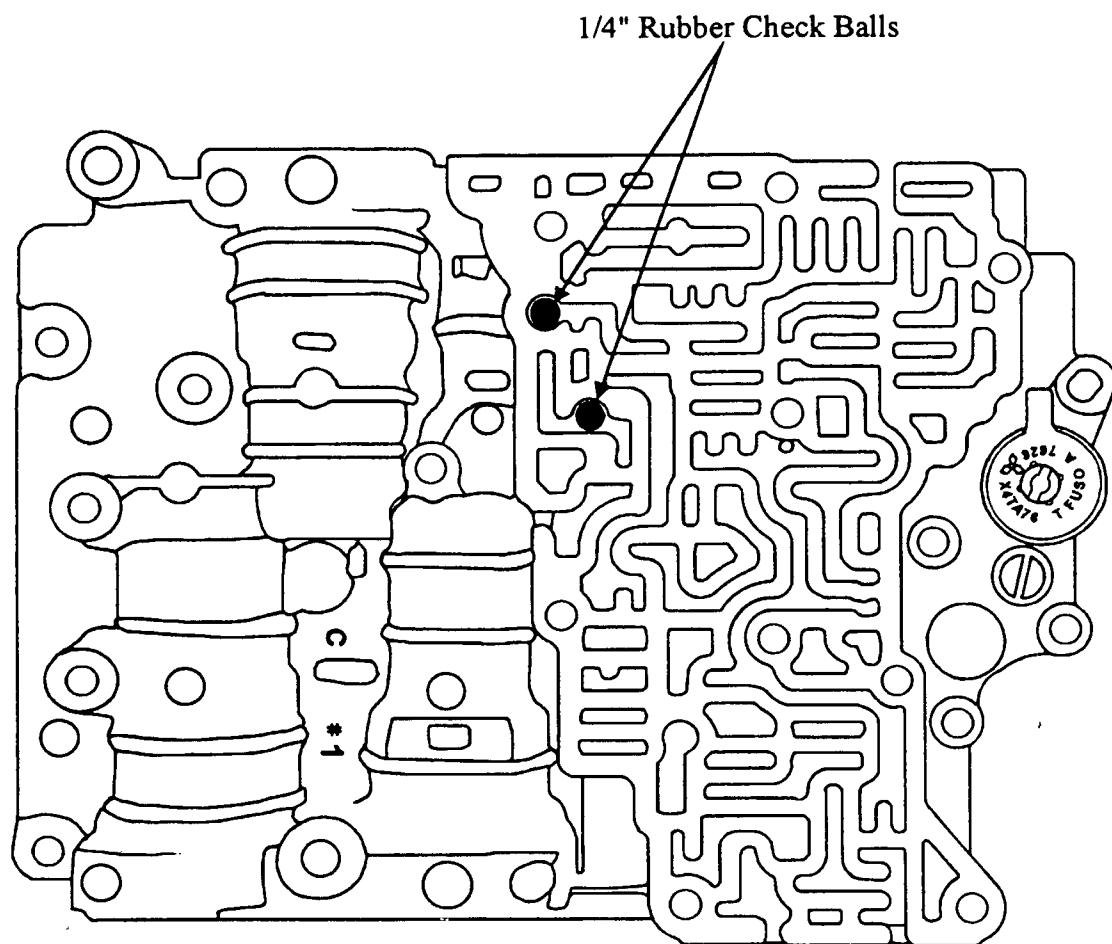
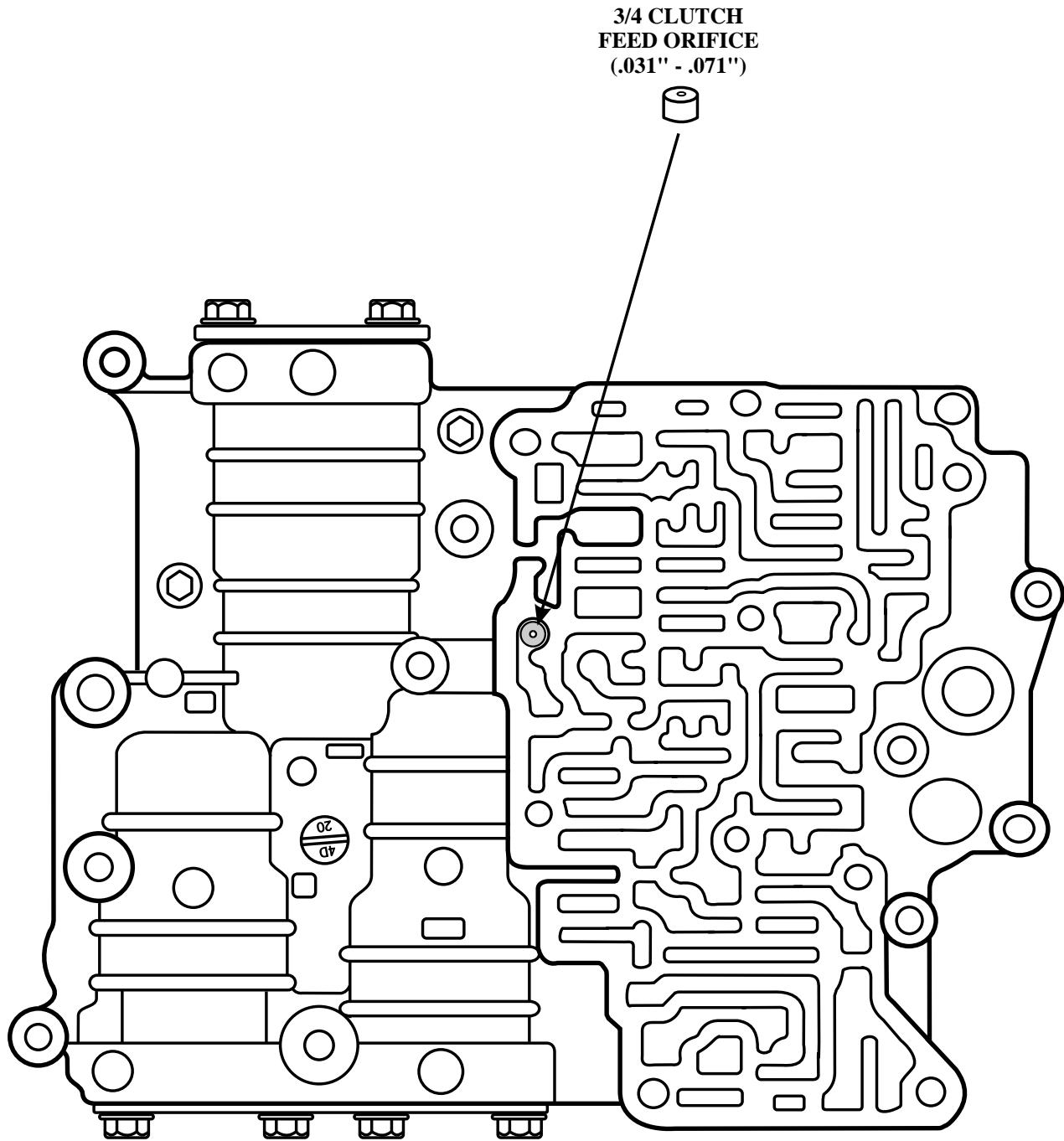


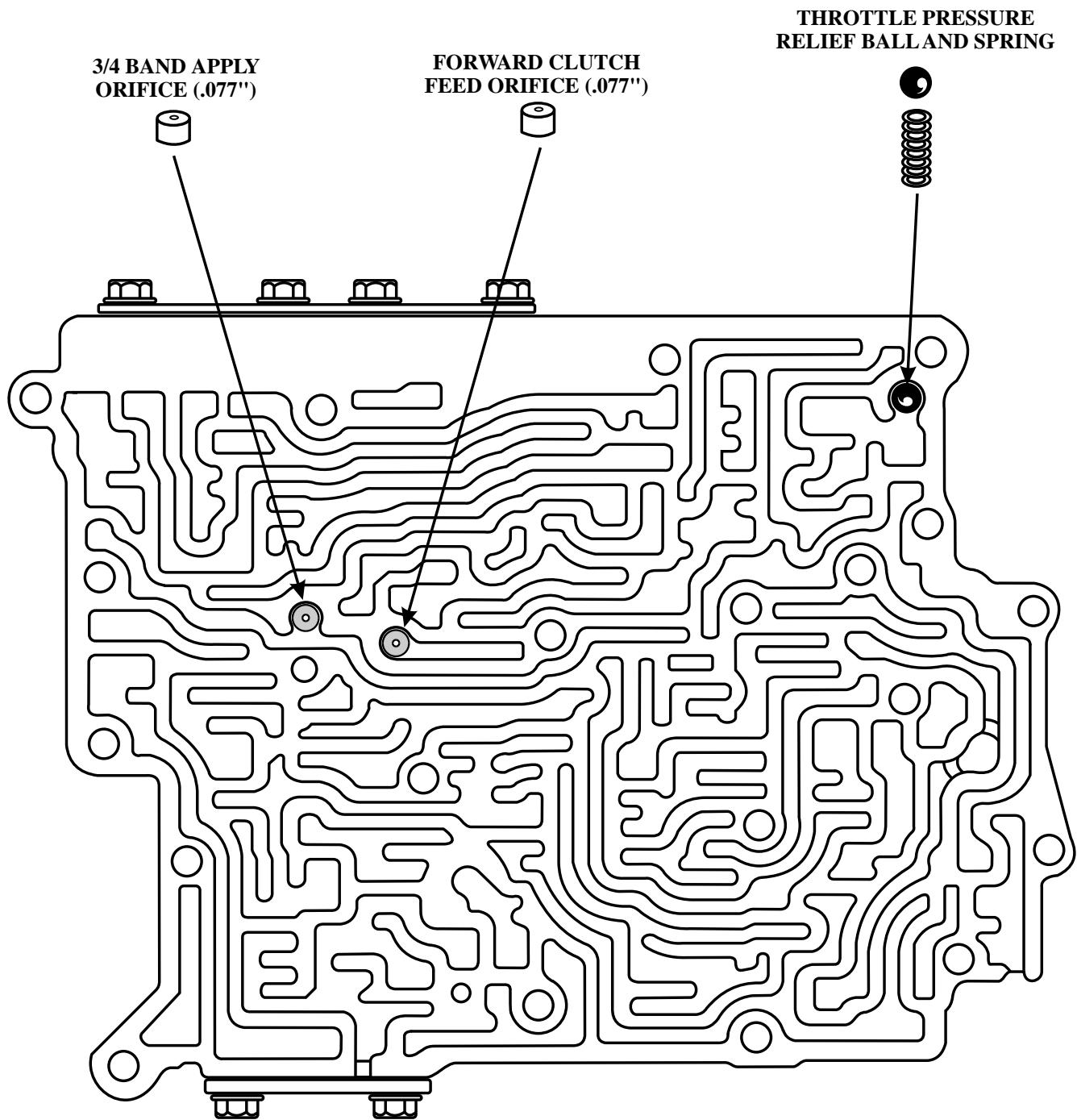
Figure 90

FORD G4A-EL
PREMAIN VALVE BODY "COVER SIDE"

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Figure 91

AUTOMATIC TRANSMISSION SERVICE GROUP

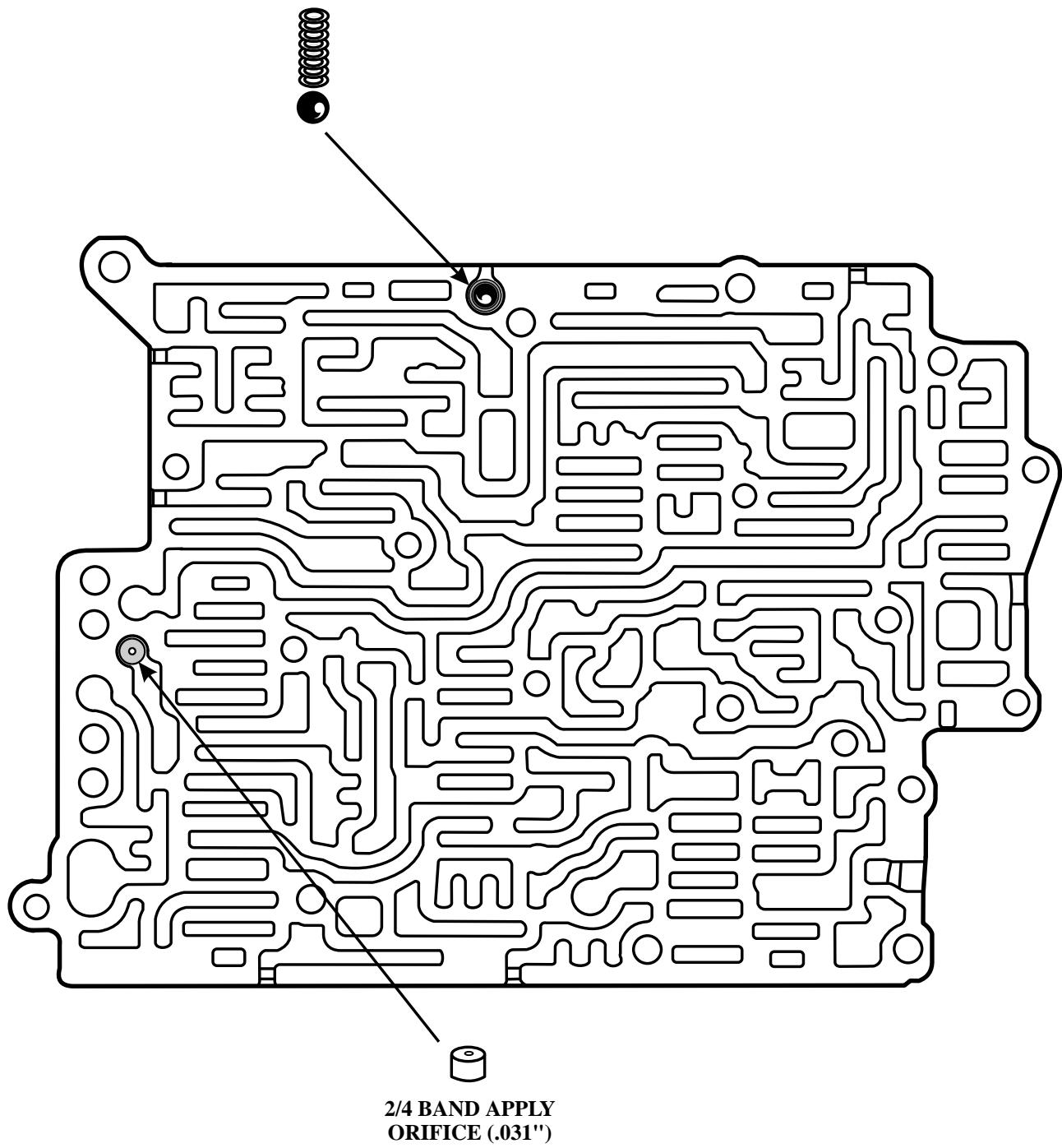
FORD G4A-EL
PREMAM VALVE BODY "MAIN BODY SIDE"

Copyright © 2002 ATSG

Figure 92

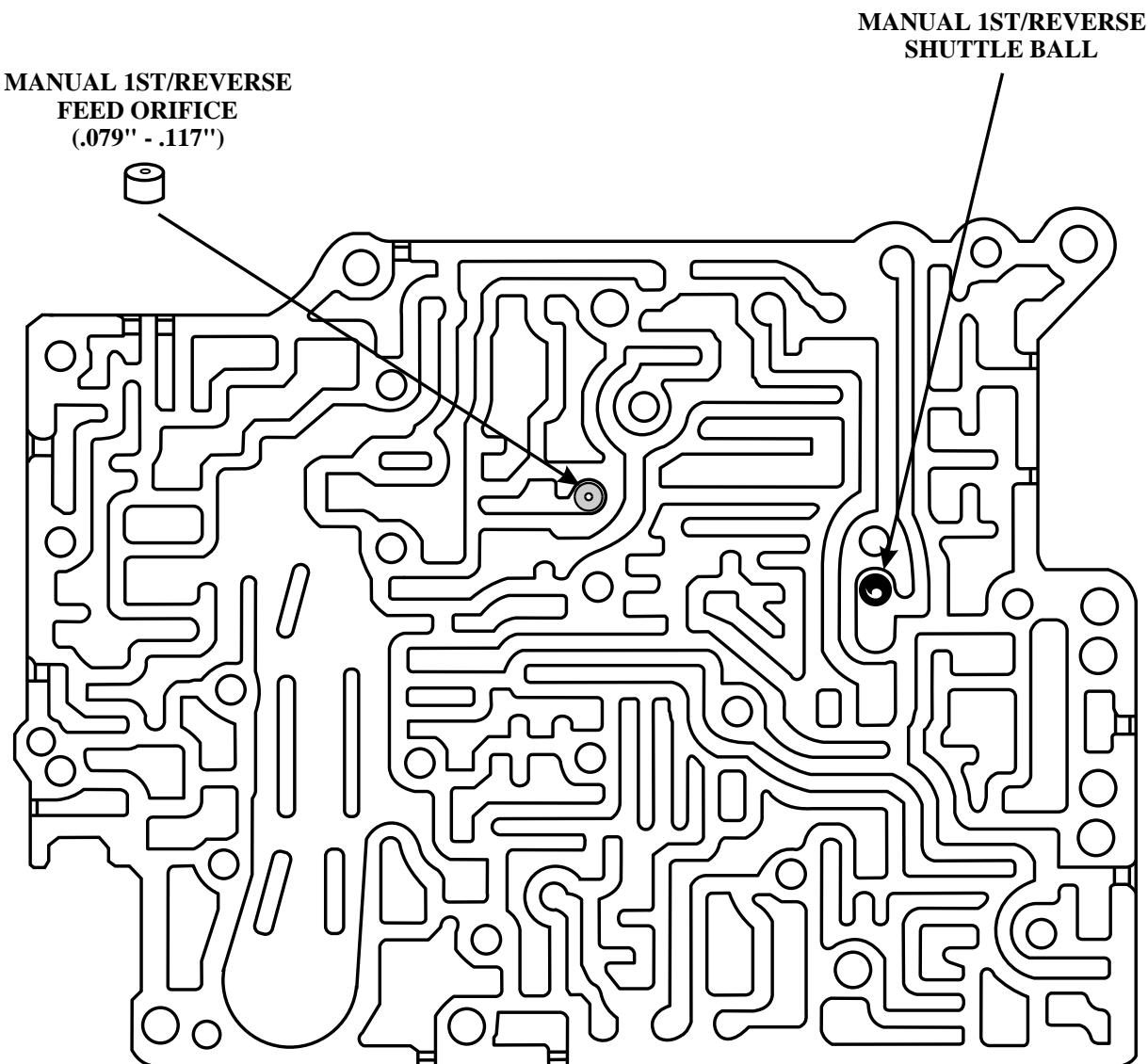
FORD G4A-EL
MAIN VALVE BODY "PREMAIN BODY SIDE"

**CONVERTER PRESSURE
RELIEF BALL AND SPRING**
(Ball Down First)



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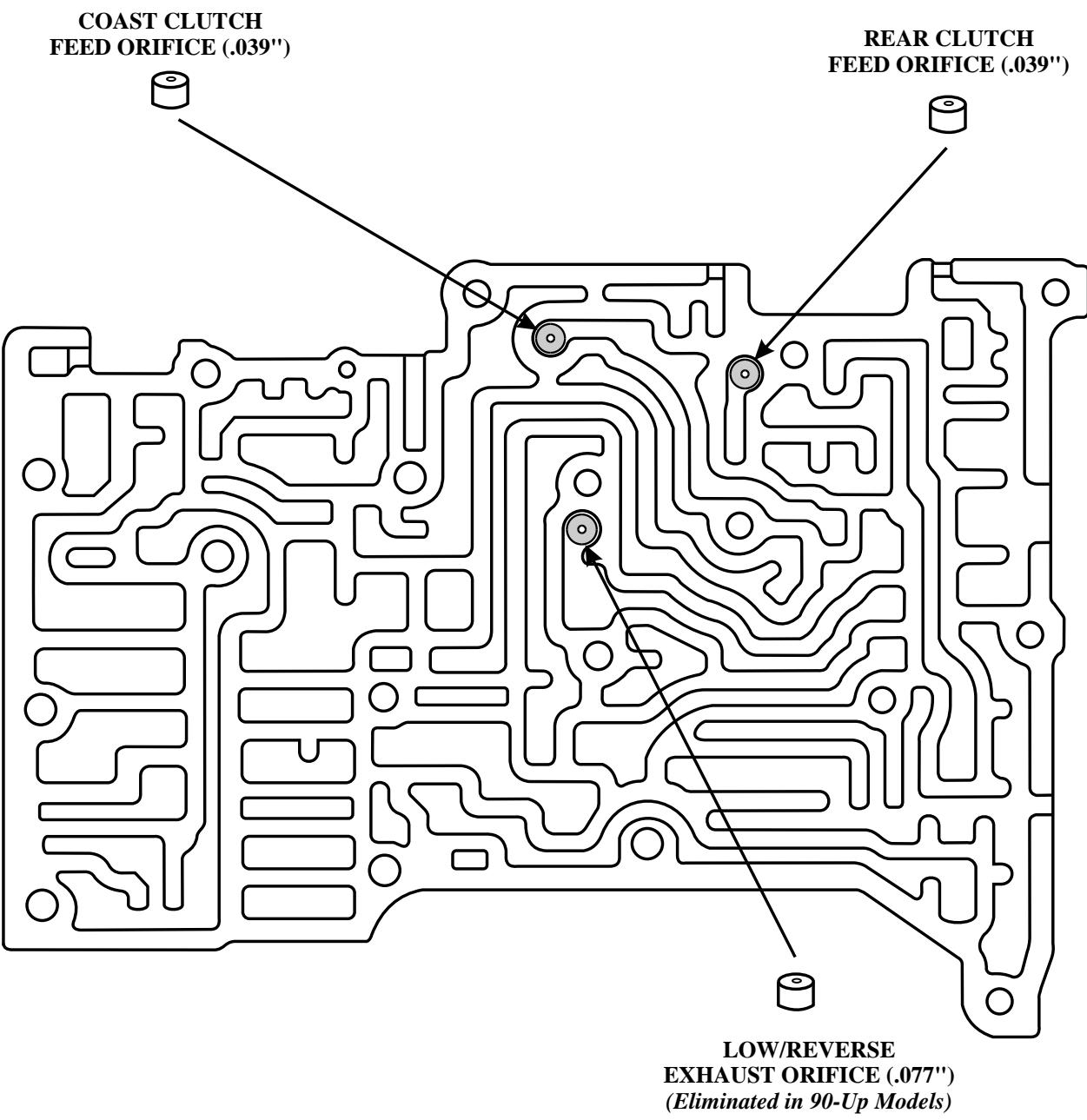
Figure 93

FORD G4A-EL
MAIN VALVE BODY "REAR BODY SIDE"

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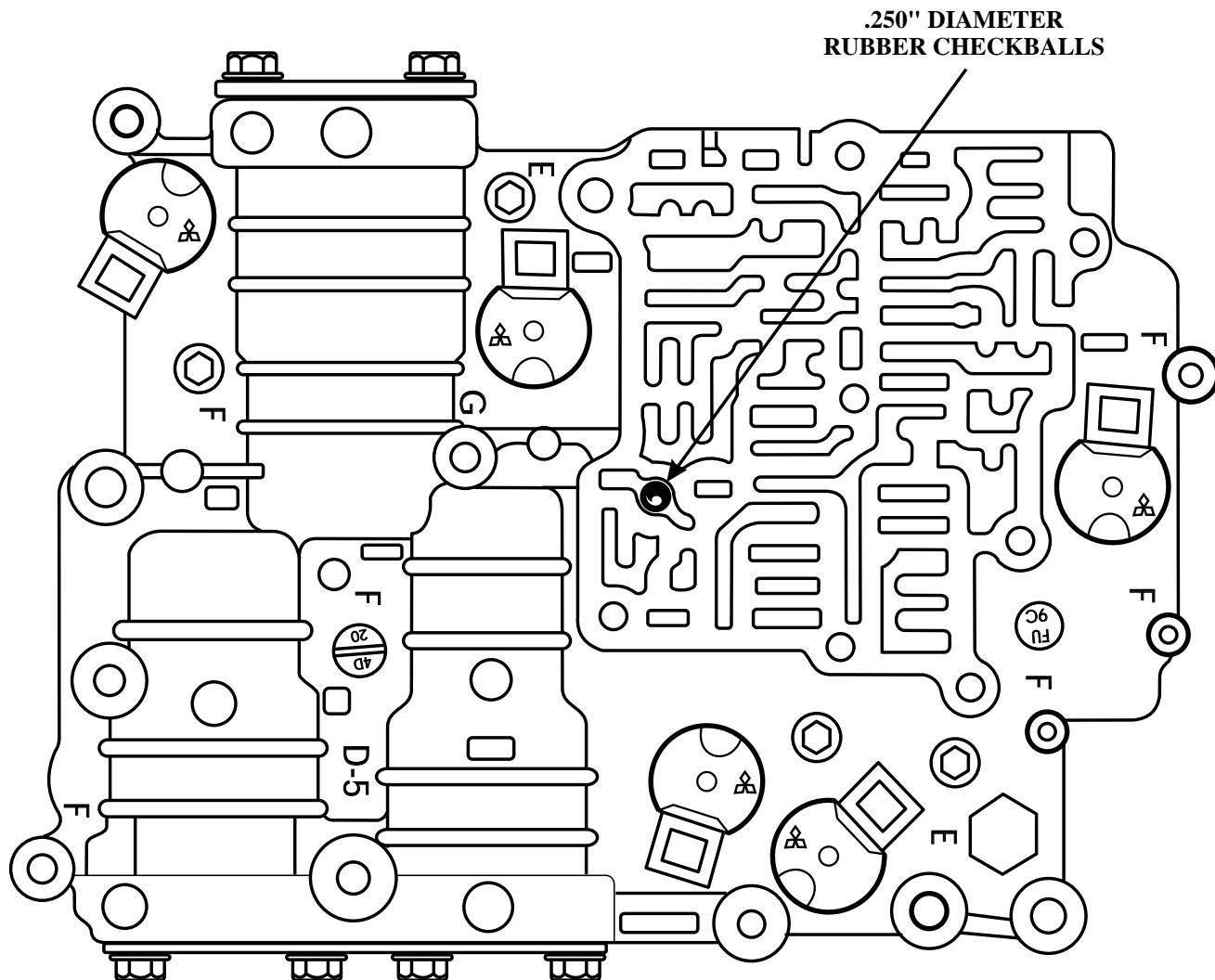
Figure 94

AUTOMATIC TRANSMISSION SERVICE GROUP

FORD G4A-EL
REAR VALVE BODY

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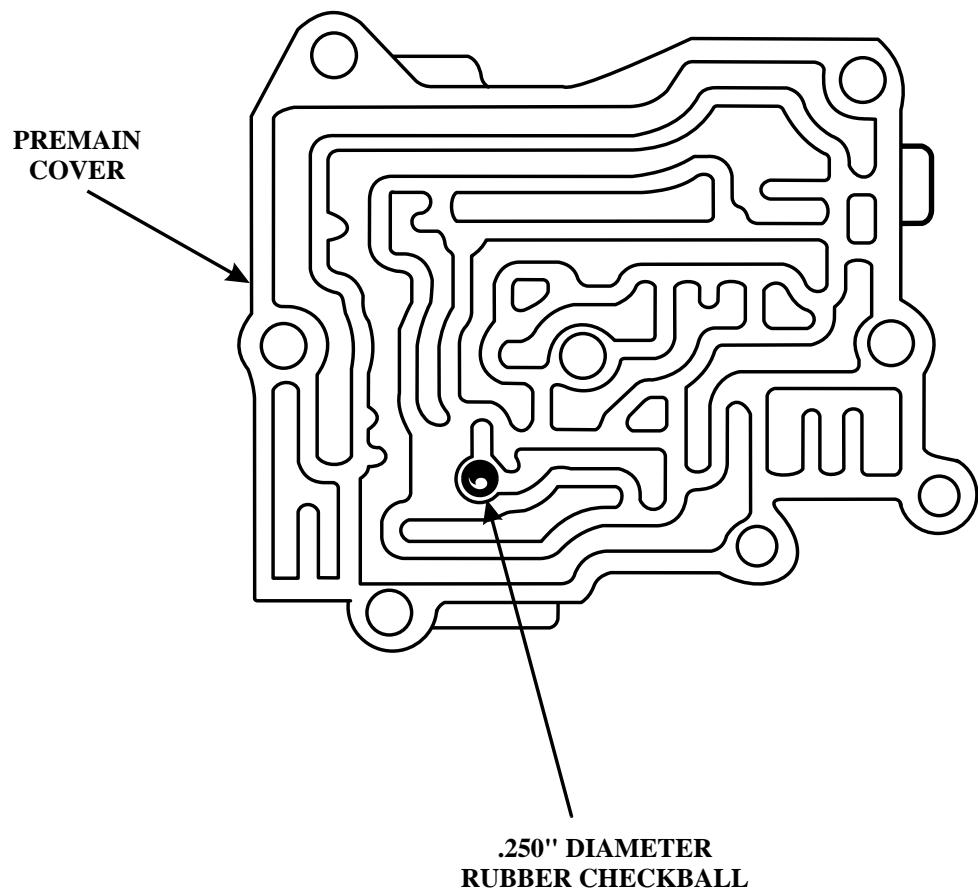
Figure 95

FORD GF4A-EL
PREMAIN VALVE BODY "COVER SIDE"

Copyright © 2002 ATSG

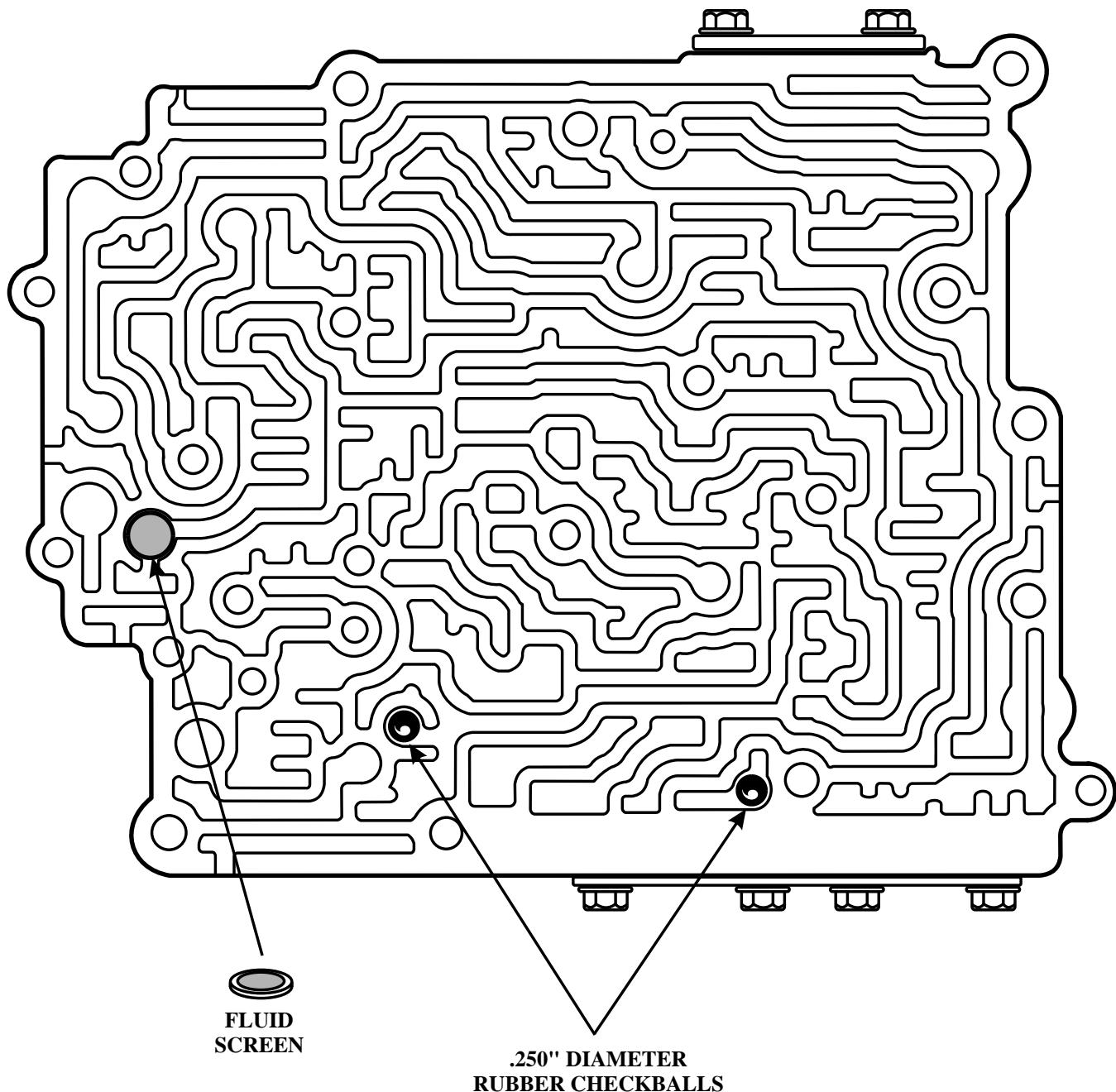
Figure 96

AUTOMATIC TRANSMISSION SERVICE GROUP

FORD GF4A-EL
PREMAIN VALVE BODY COVER

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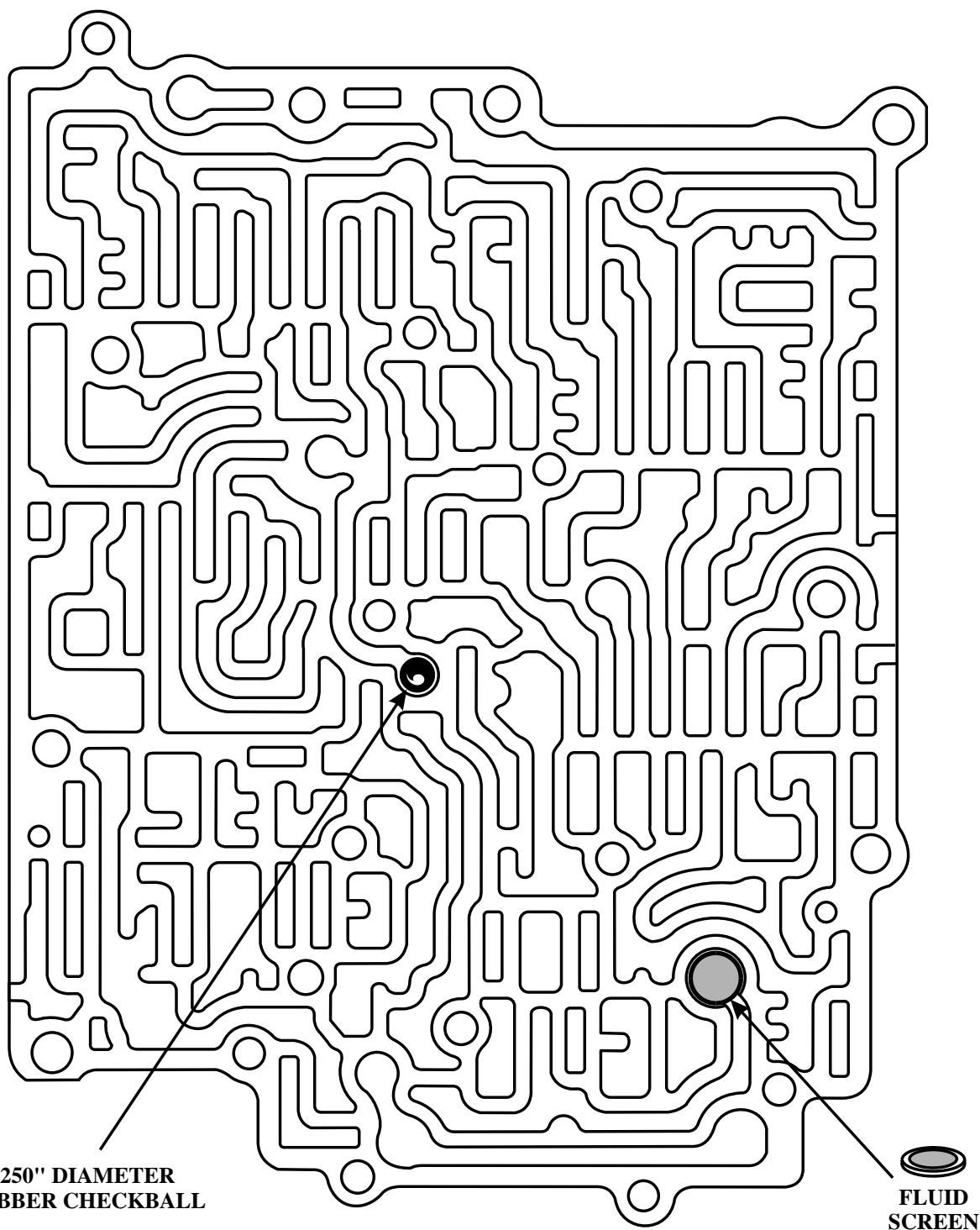
Figure 97

FORD GF4A-EL
PREMAIN VALVE BODY "MAIN BODY SIDE"

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Figure 98

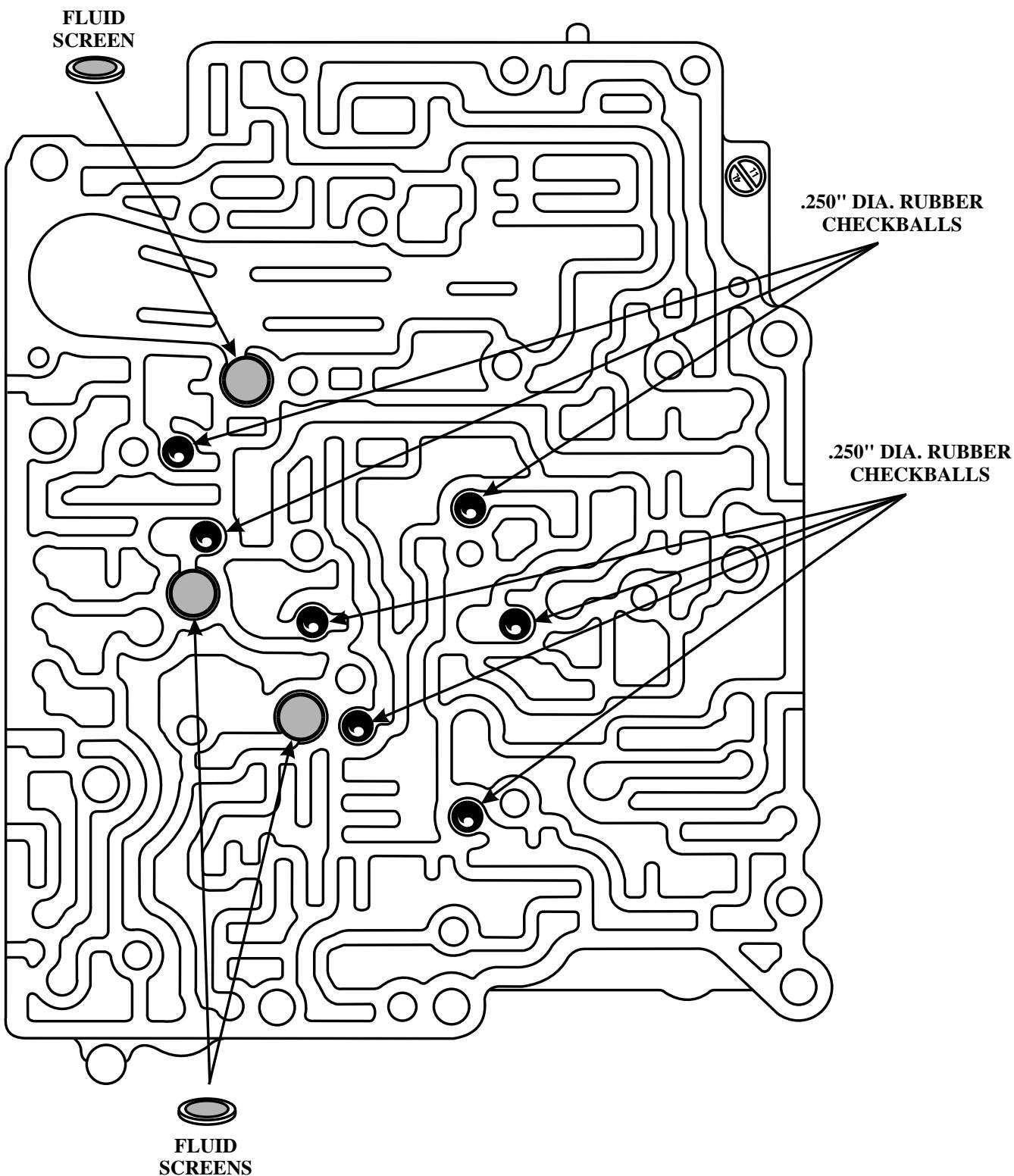
AUTOMATIC TRANSMISSION SERVICE GROUP

FORD GF4A-EL
MAIN VALVE BODY "PREMAIN BODY SIDE"

Copyright © 2002 ATSG

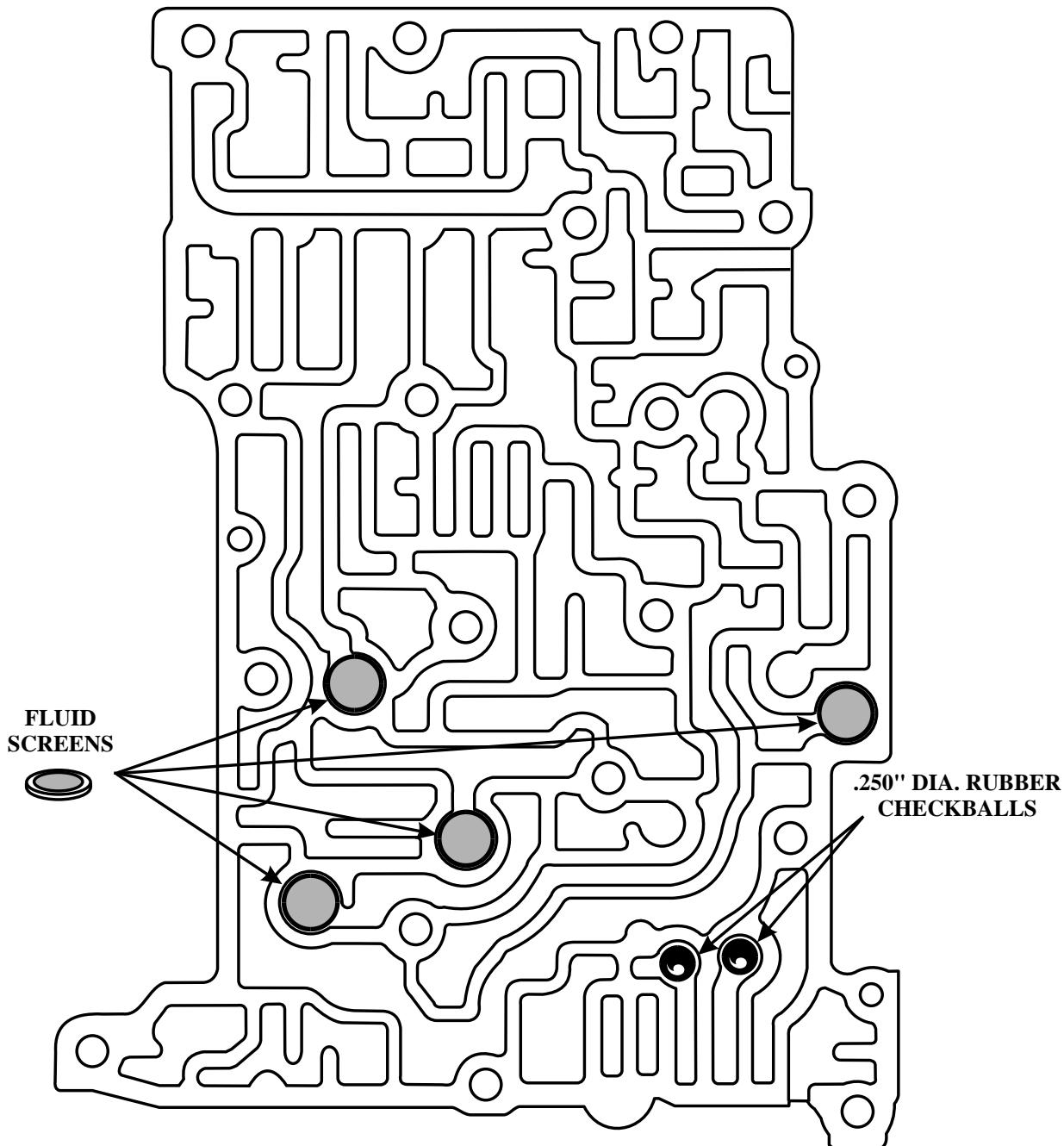
Figure 99

AUTOMATIC TRANSMISSION SERVICE GROUP

FORD GF4A-EL
MAIN VALVE BODY "REAR BODY SIDE"

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Figure 100

FORD GF4A-EL
REAR VALVE BODY "MAIN BODY SIDE"

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Figure 101

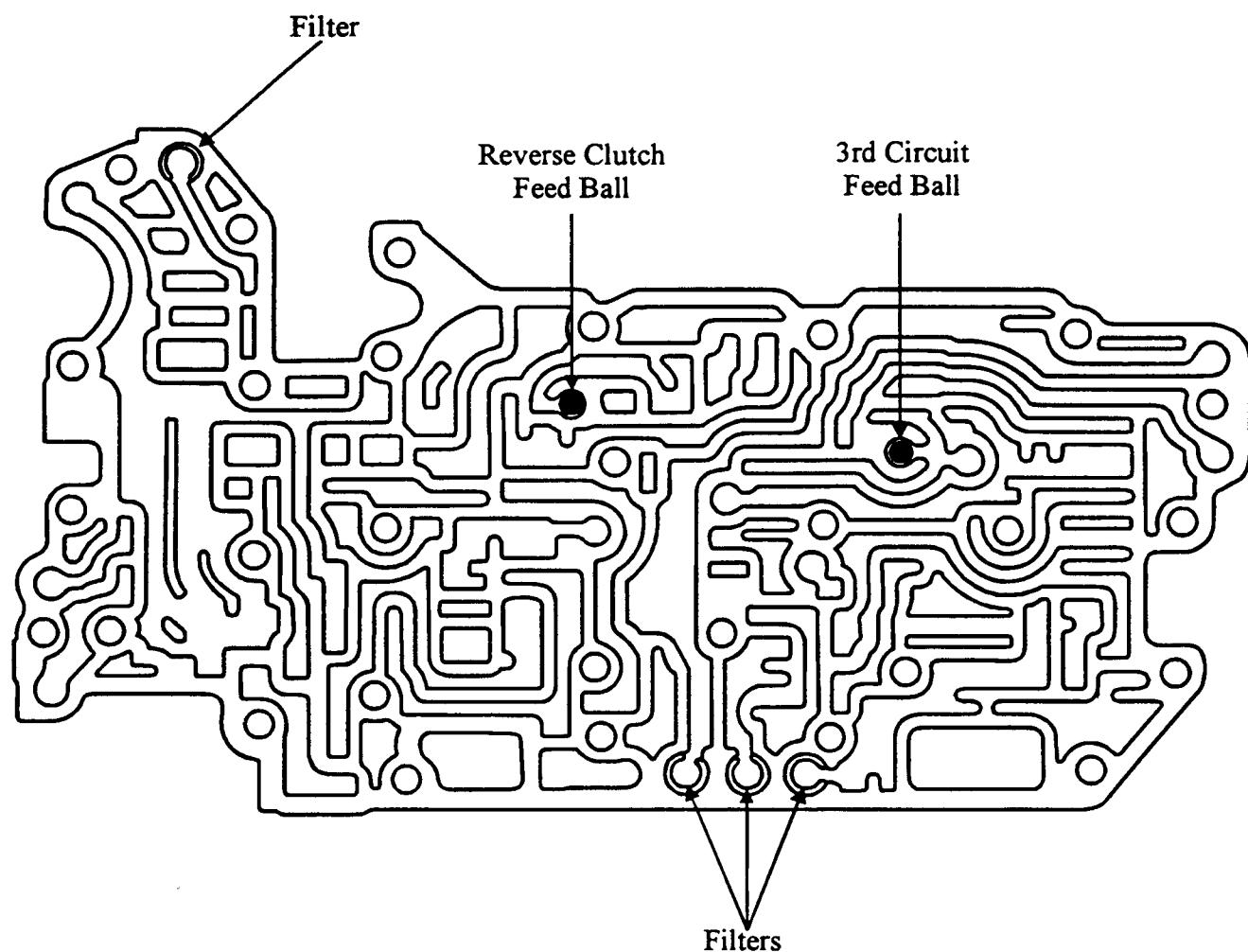
F-4EAT
MAIN VALVE BODY
CHECK BALL LOCATION

Figure 102

F-4EAT
THROTTLE & LOWER VALVE BODY
CHECK BALL LOCATION

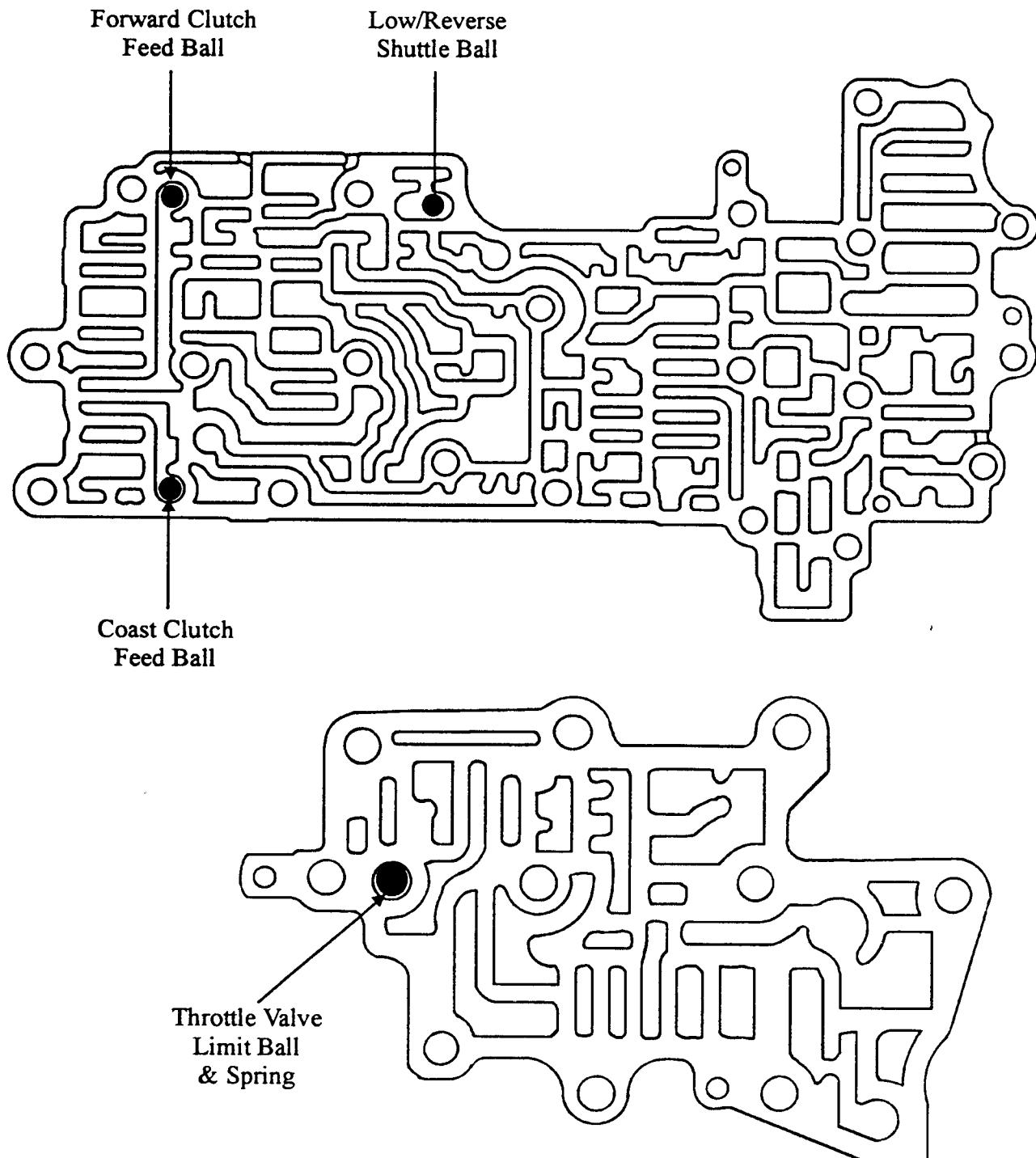


Figure 103

KM 171
MAIN VALVE BODY
CHECK BALL LOCATION

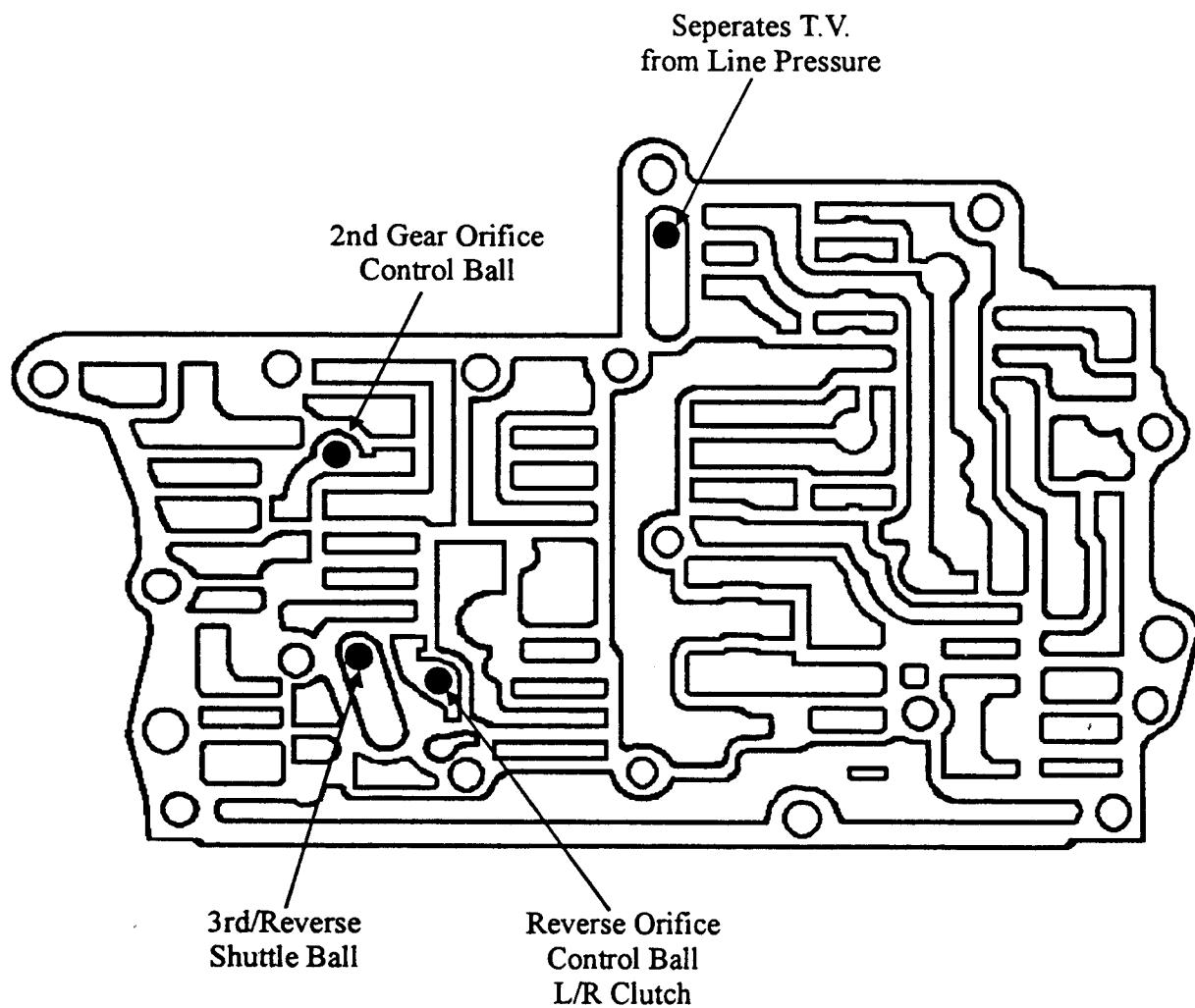


Figure 104

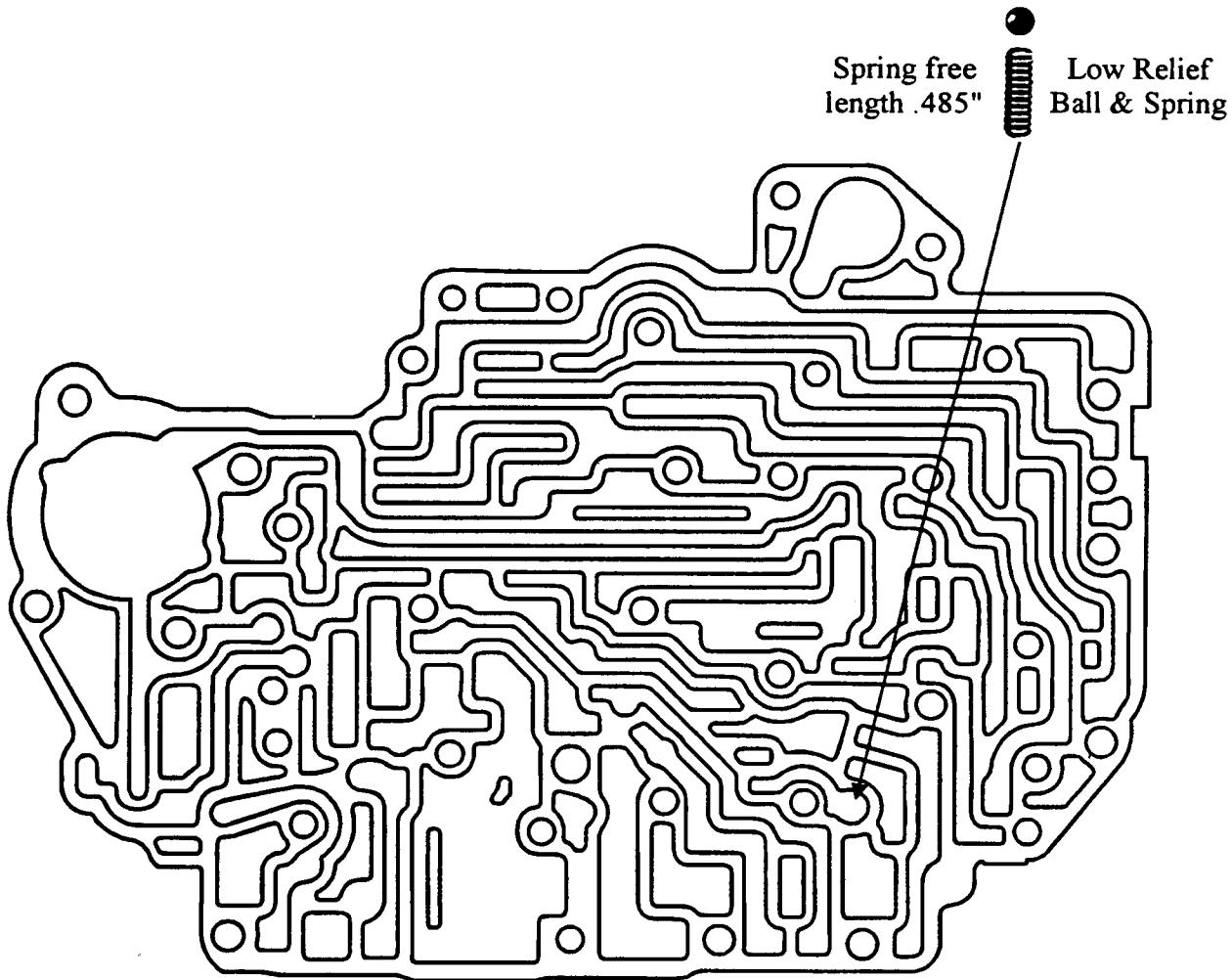
KM 171
LOWER VALVE BODY
CHECK BALL LOCATION

Figure 105

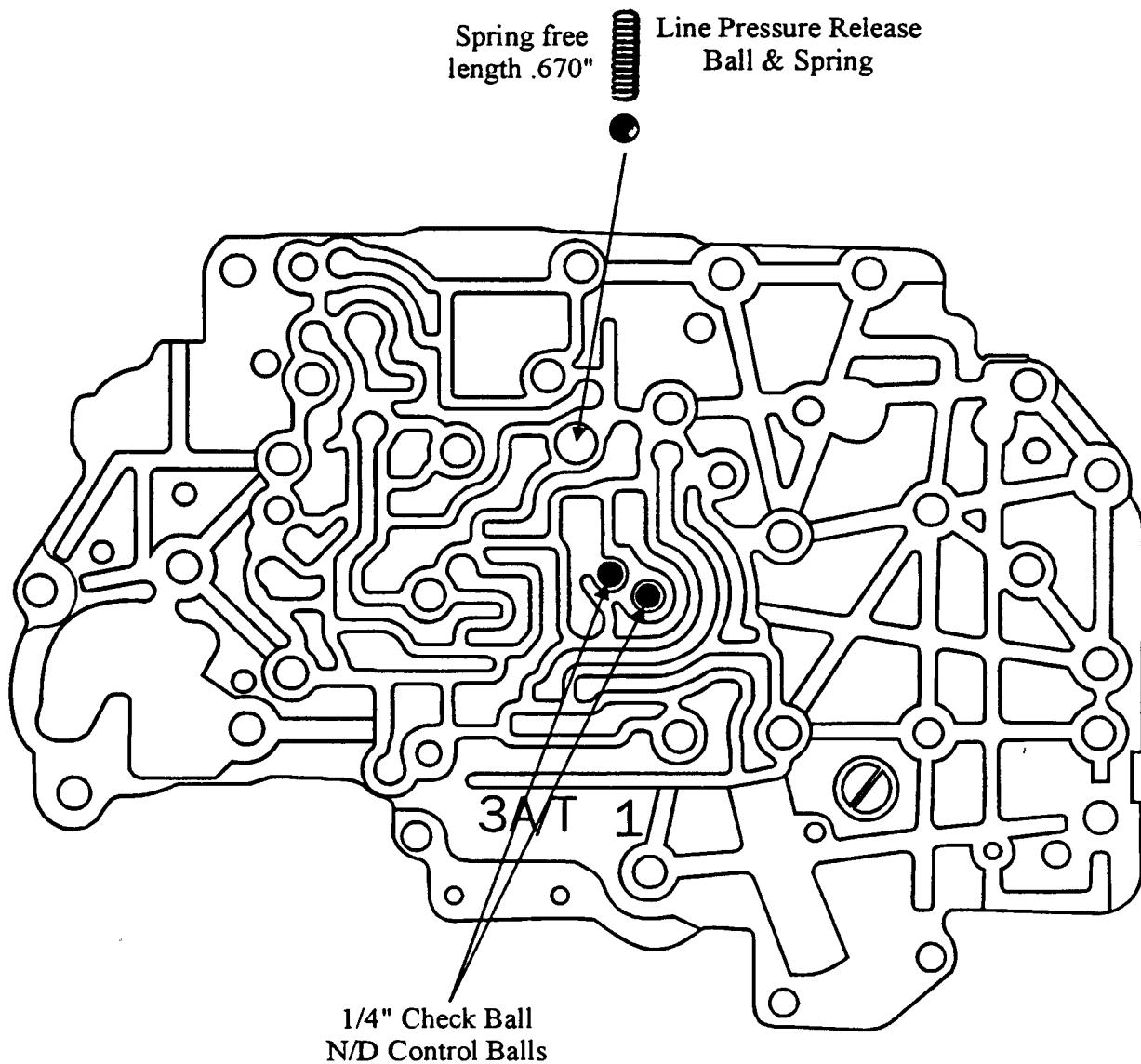
**KM 171
LOWER VALVE BODY
CHECK BALL LOCATION**

Figure 106

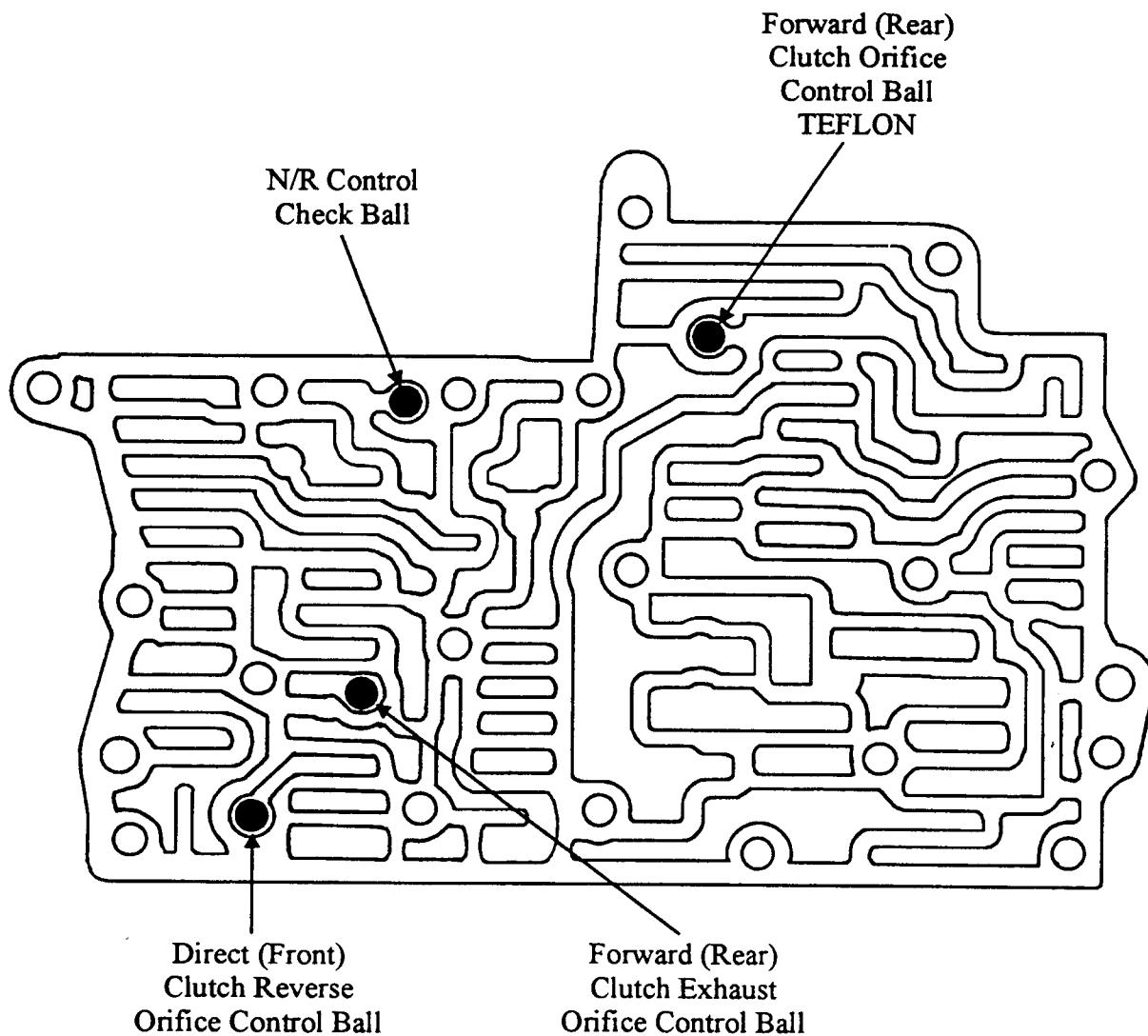
KM 175
MAIN VALVE BODY
CHECK BALL LOCATION

Figure 107

KM 175
UPPER VALVE BODY
CHECK BALL LOCATION

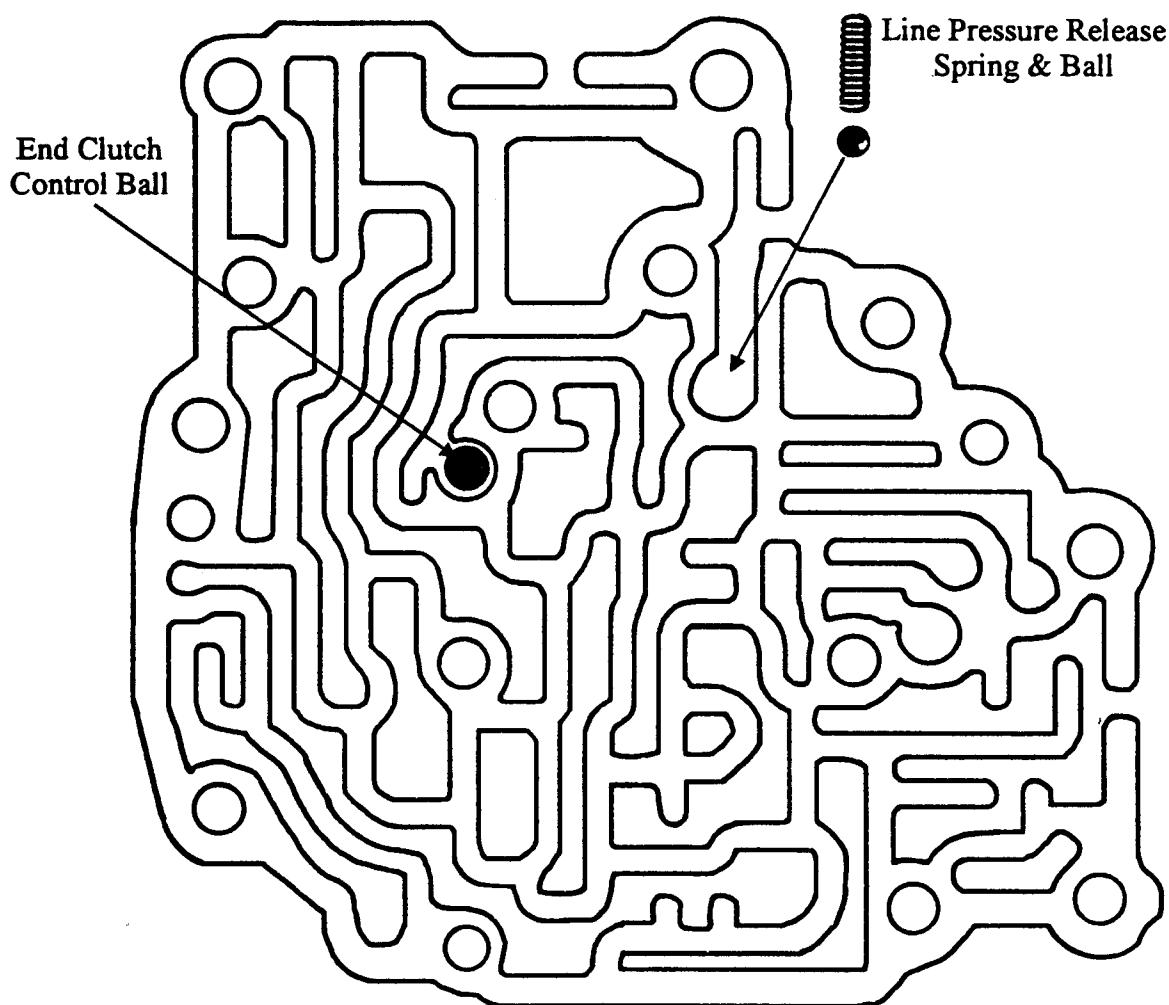
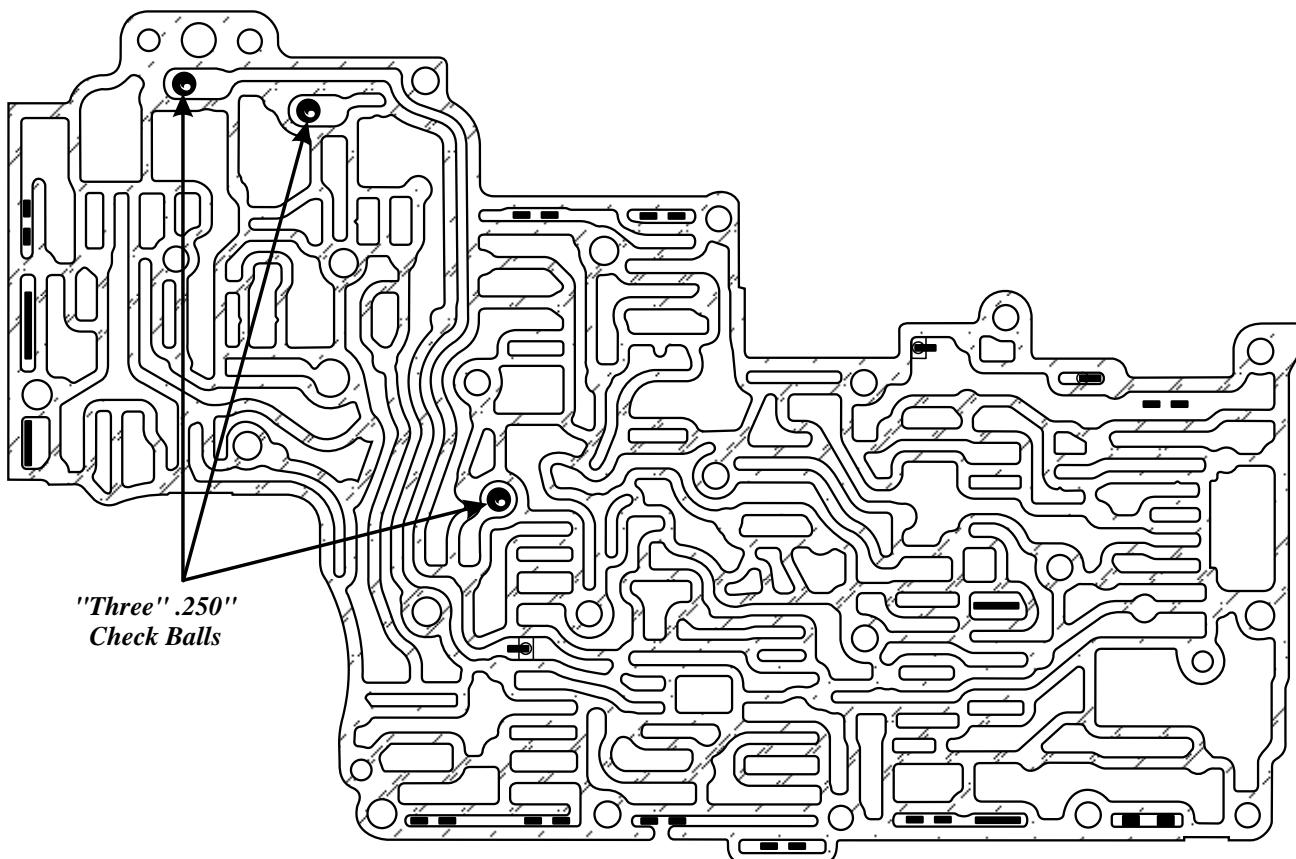


Figure 108

FORD 5R55N

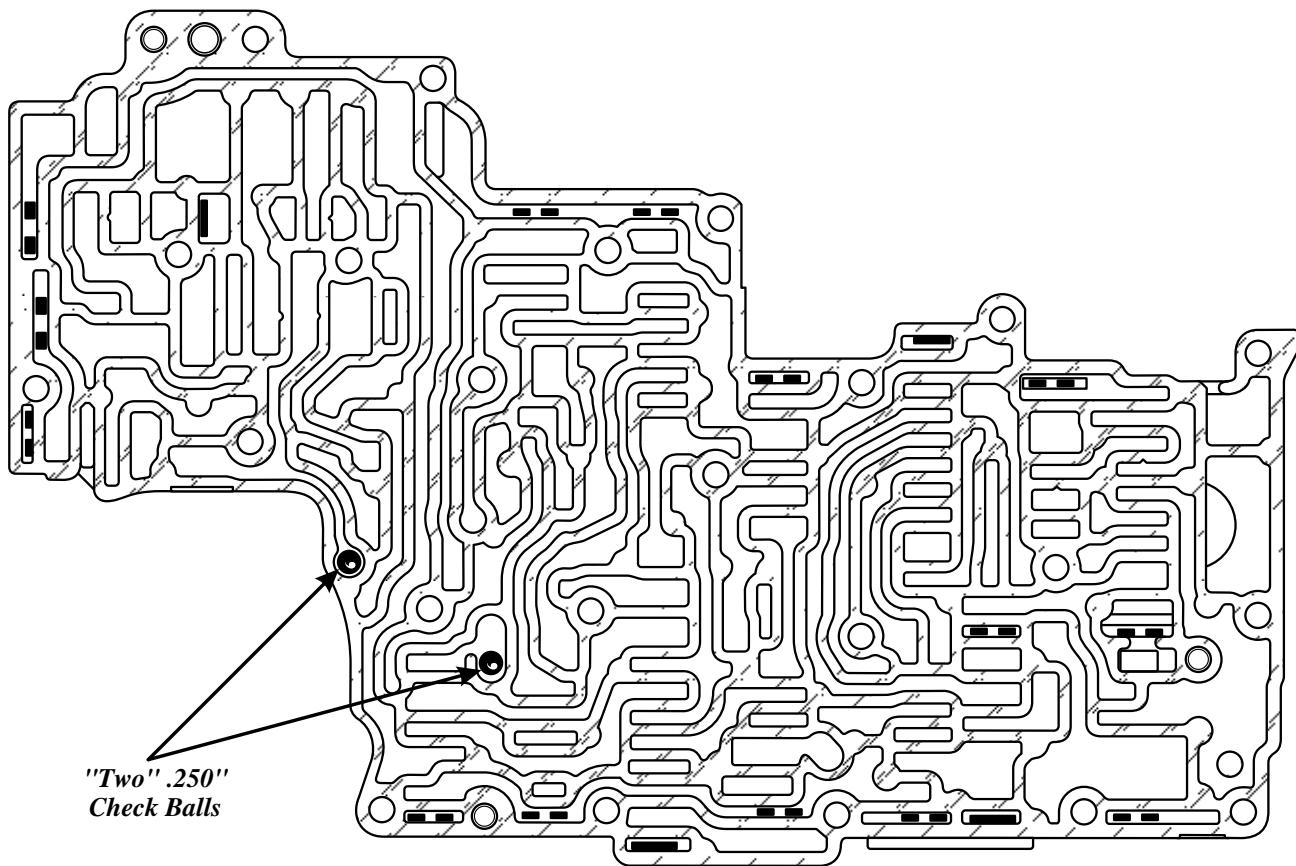
"5R55N" VALVE BODY
CHECKBALL LOCATIONS

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Figure 109

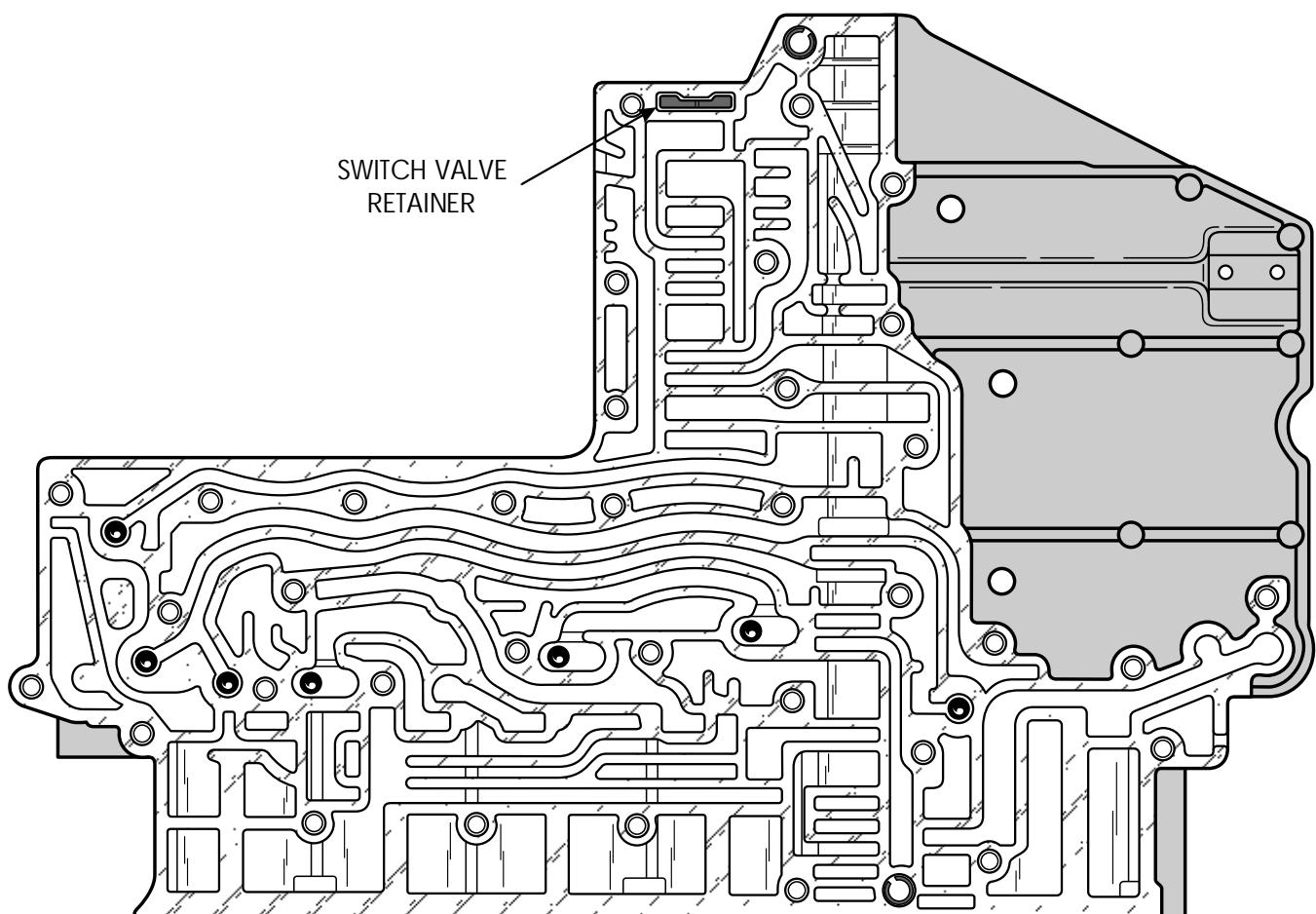
AUTOMATIC TRANSMISSION SERVICE GROUP

FORD 5R55W

"5R55W" VALVE BODY
CHECKBALL LOCATIONS

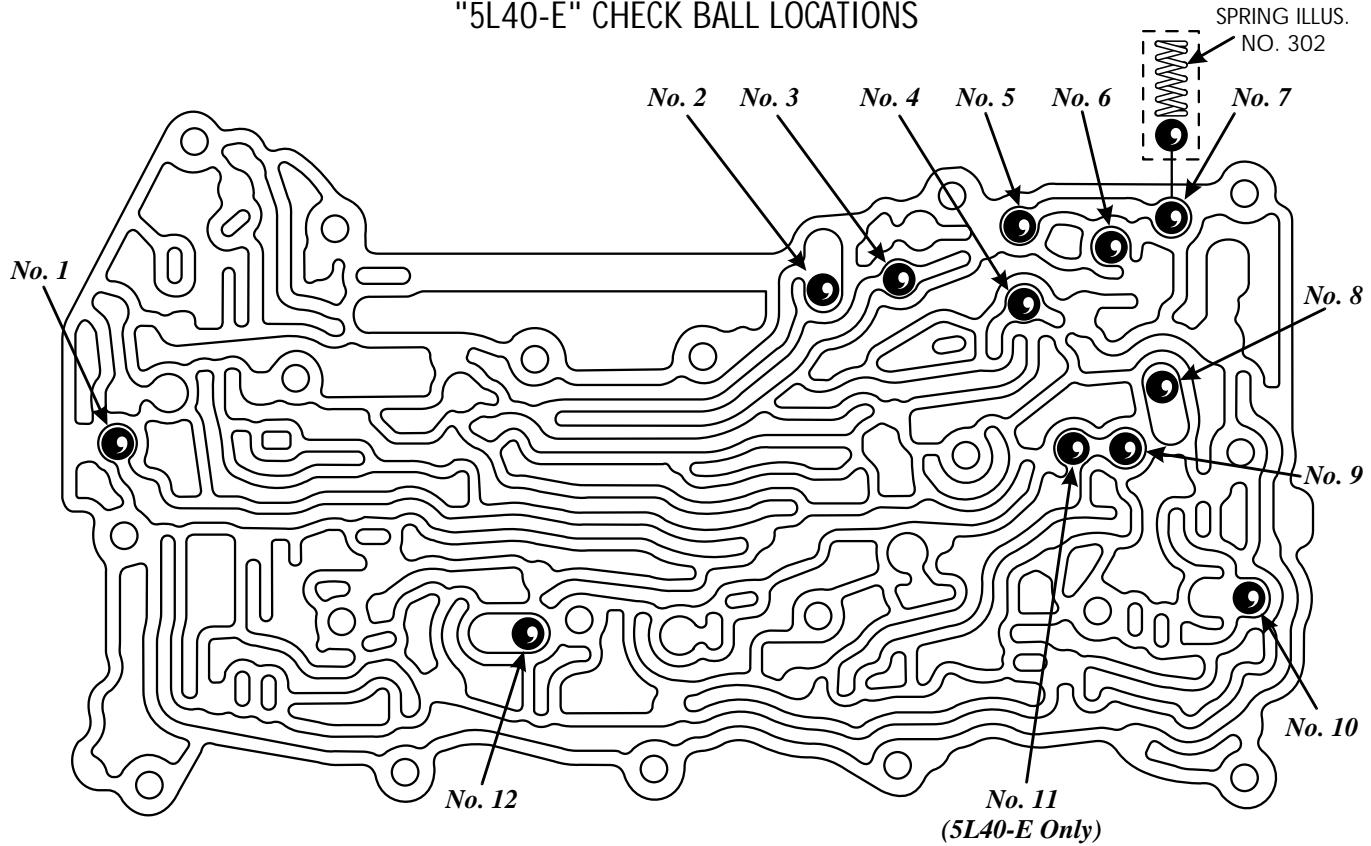
Copyright © 2001 ATSG

Figure 110

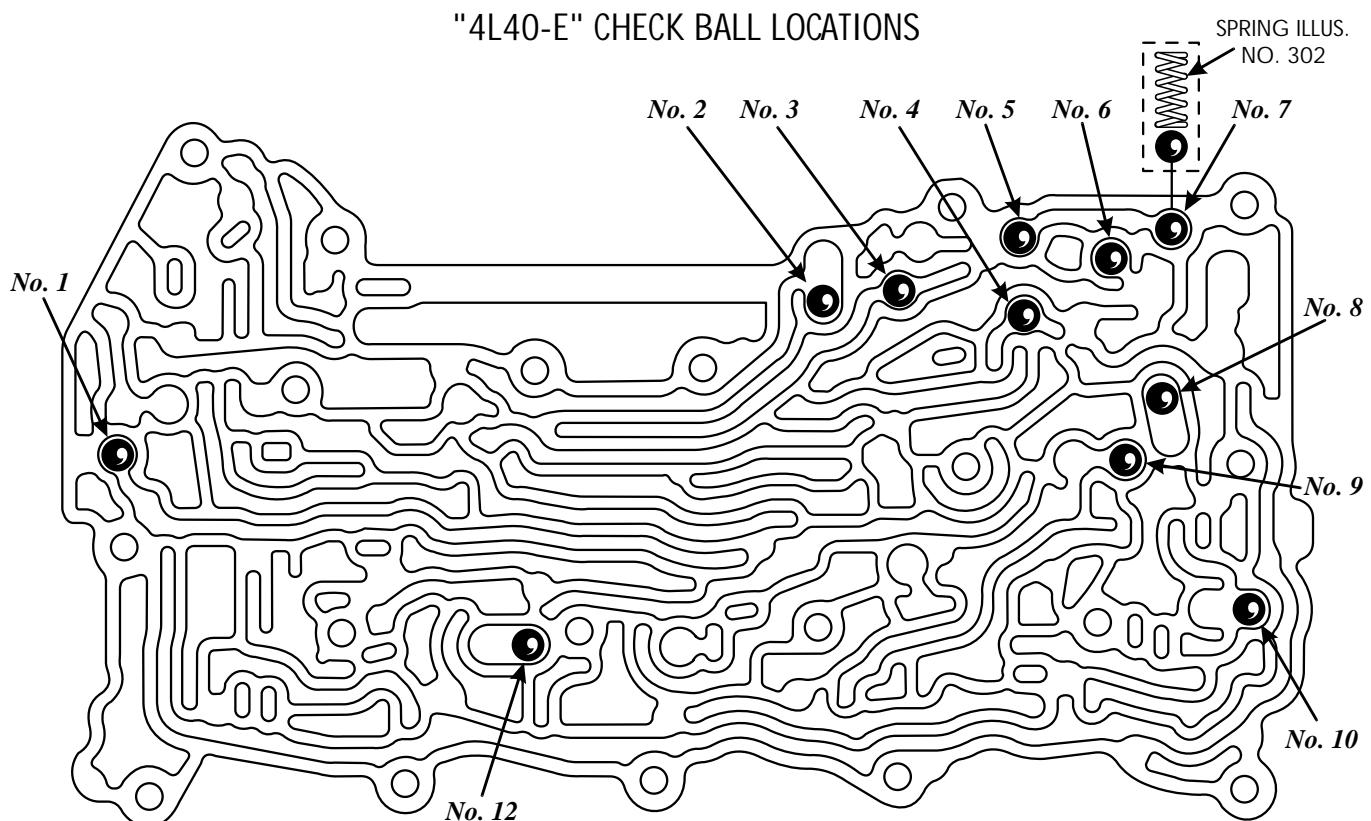
CHRYSLER 45RFE
VALVE BODY CHECKBALL LOCATIONS

REQUIRES "SEVEN" 1/4" STEEL CHECKBALLS

"5L40-E" CHECK BALL LOCATIONS

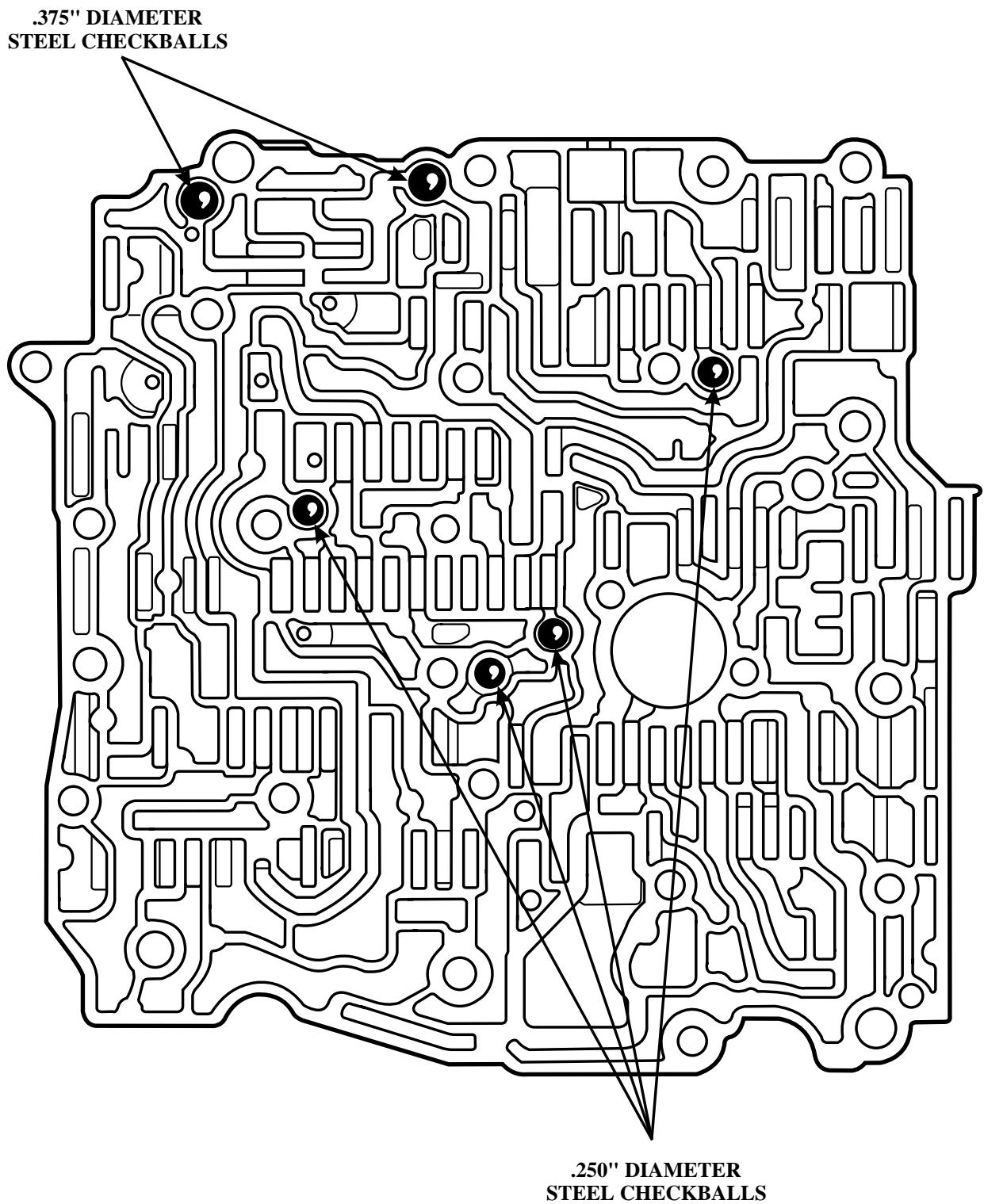


"4L40-E" CHECK BALL LOCATIONS



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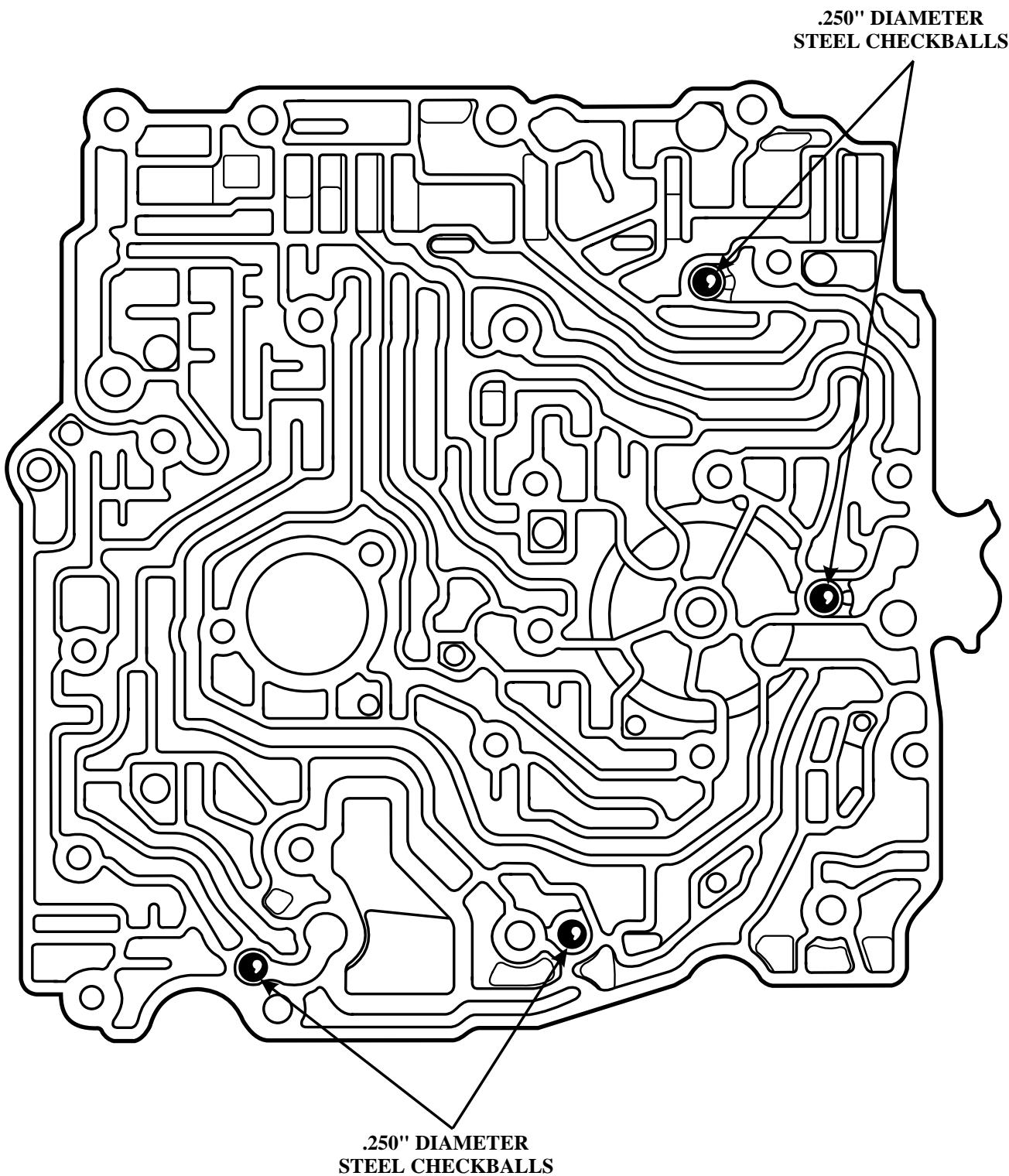
Figure 112

THM 4T65-E
VALVE BODY CHECKBALL LOCATIONS

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Figure 113

AUTOMATIC TRANSMISSION SERVICE GROUP

THM 4T65-E
CHANNEL PLATE CHECKBALL LOCATIONS

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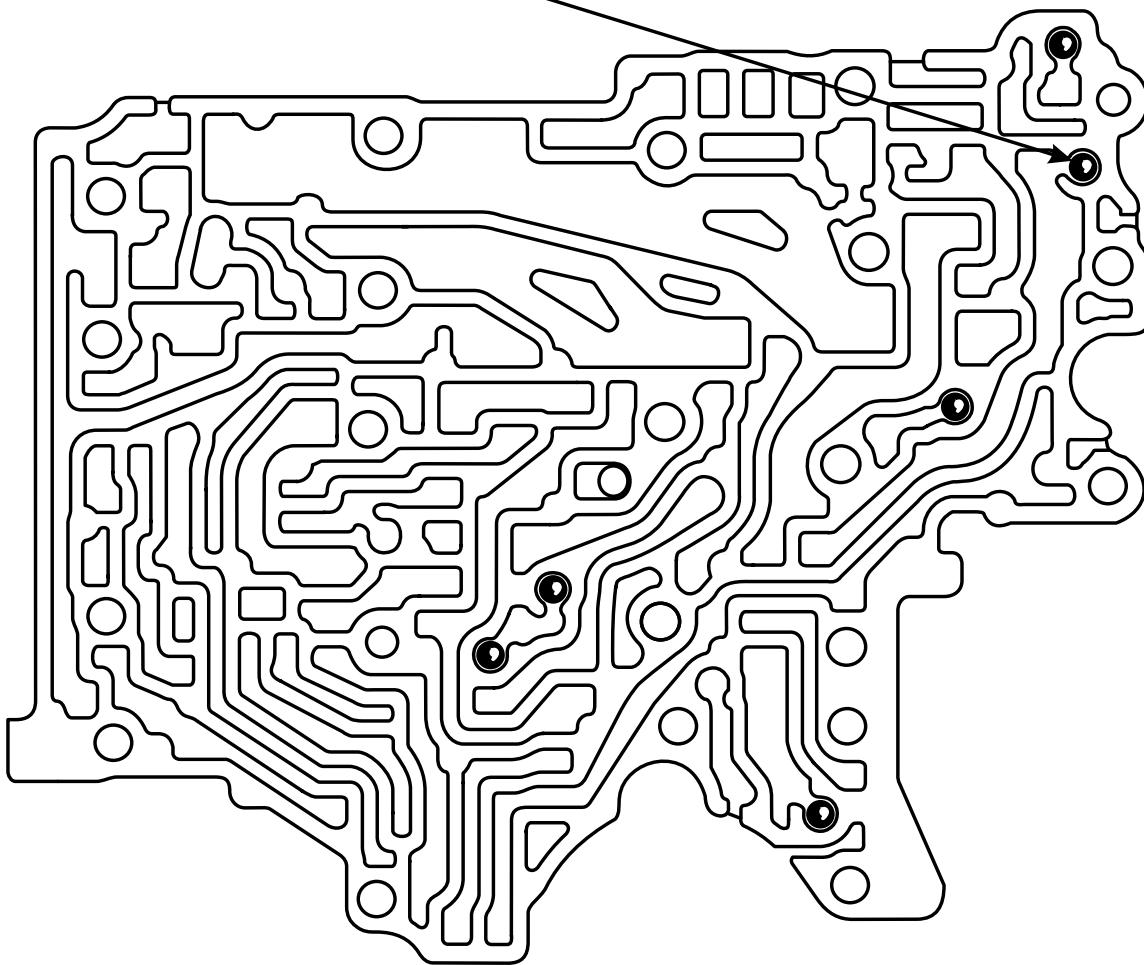
Figure 114

AUTOMATIC TRANSMISSION SERVICE GROUP

FORD 4F20E
"INTERMEDIATE" VALVE BODY CHECKBALL LOCATIONS

REQUIRES SIX (6) STEEL CHECKBALLS
5.5mm (.217") DIAMETER IN THE
LOCATIONS SHOWN BELOW

*This Checkball Is Omitted
On 1995-Up Models*



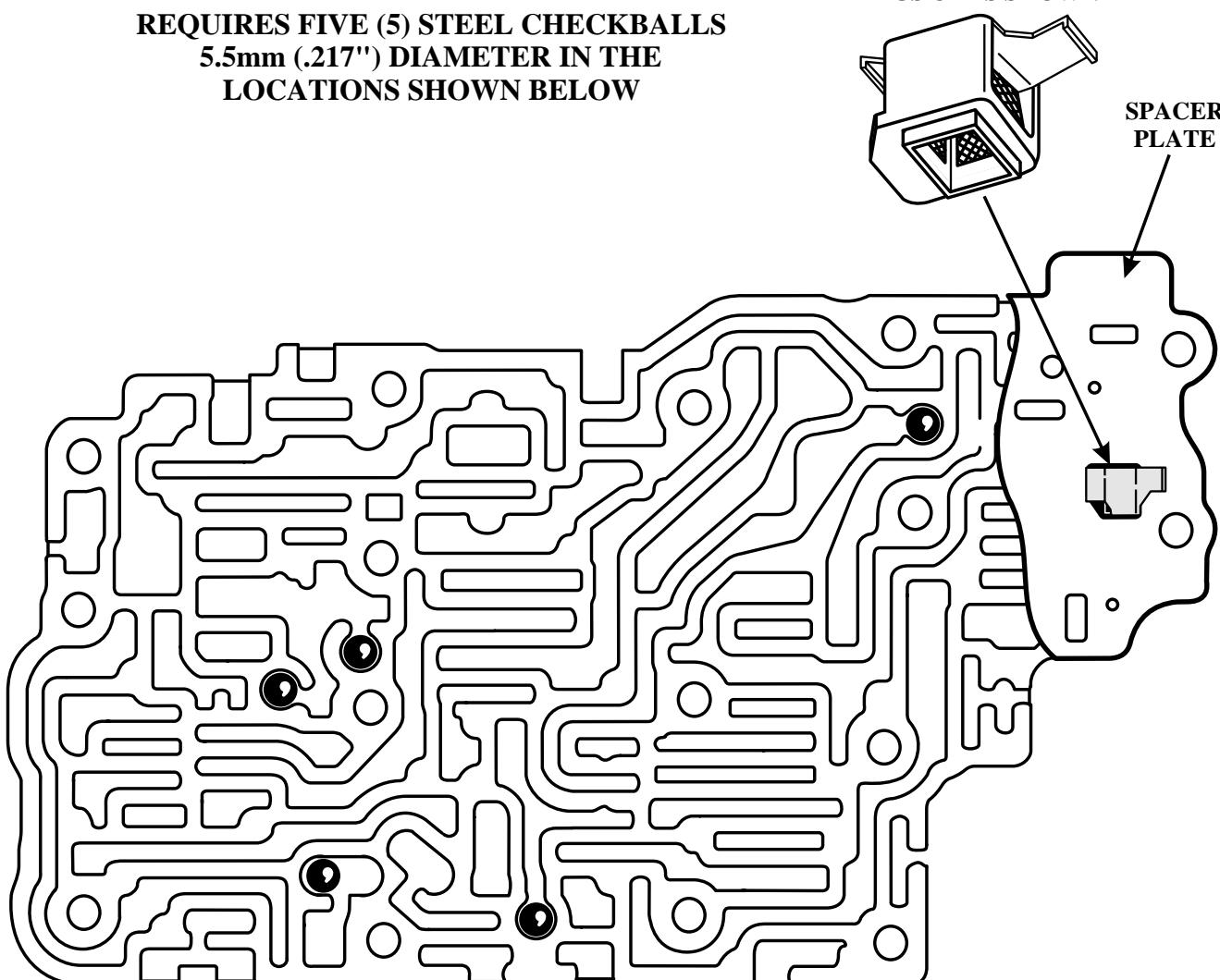
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Figure 115

FORD 4F20E
"UPPER" VALVE BODY CHECKBALL LOCATIONS

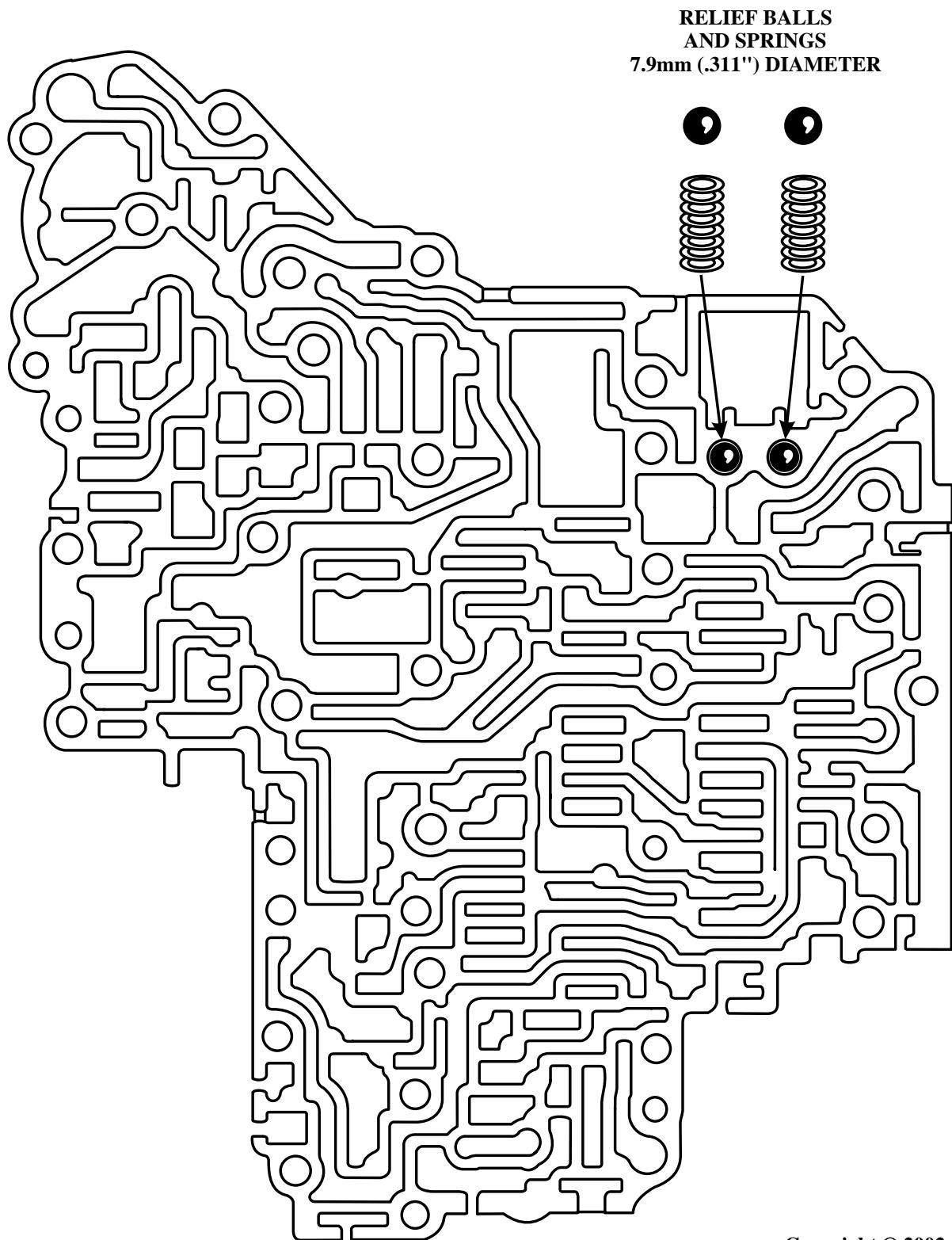
REQUIRES FIVE (5) STEEL CHECKBALLS
5.5mm (.217") DIAMETER IN THE
LOCATIONS SHOWN BELOW

PILOT FILTER INSTALLED
ON SPACER PLATE WITH
LEGS UP AS SHOWN



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Figure 116

FORD 4F20E
"LOWER" VALVE BODY RELIEF BALL LOCATIONS

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Figure 117