



**CHECKBALL BOOK**  
*Import Volume III*

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# INTRODUCTION IMPORT CHECKBALL BOOK VOLUME III

1st Printing  
September, 2008

The third volume of the series of import checkball location manuals contains the most current valve body checkball and small parts locations for the most current import transmissions on the road today.

All checkball locations are shown even when they are contained in a check valve located in one of the valve body bores. These check valve balls are often overlooked because they are not in plain sight.

This manual also contains information on what material the checkballs are constructed of as well as checkball and spring dimensions wherever possible.

***However, there is one very important caution, and that is for the technician to exercise caution when disassembling these valve bodies contained in this manual because many of these valve bodies are used in transmissions that are utilized by multiple car manufacturers. As a result of this, checkball and small parts locations may be different than the valve body you are working with.***

The technician should make notes as to any differences in checkball and small parts locations for future reference. We at ATSG would appreciate being notified of these differences in order to add this information when this manual goes to reprint.

*We wish to thank Hardparts For Transmissions  
and European Exchange for supplying ATSG with  
the necessary valve bodies and photos that have  
made this booklet possible.*

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*The information and part numbers contained in this booklet have  
been carefully compiled from industry sources known for their  
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**WAYNE COLONNA**  
PRESIDENT

**JIM DIAL**  
TECHNICAL CONSULTANT

**DALE ENGLAND**  
FIELD SERVICE CONSULTANT

**ED KRUSE**  
TECHNICAL CONSULTANT

**PETE LUBAN**  
TECHNICAL SUPERVISOR

**GREGORY LIPNICK**  
TECHNICAL CONSULTANT

**JON GLATSTEIN**  
TECHNICAL CONSULTANT

**DAVID CHALKER**  
TECHNICAL CONSULTANT

**GERALD CAMPBELL**  
TECHNICAL CONSULTANT

**ROLAND ALVAREZ**  
TECHNICAL CONSULTANT

**GABE DE LOS REYES**  
TECHNICAL CONSULTANT

**GREG CATANZARO**  
TECHNICAL CONSULTANT

**AUTOMATIC TRANSMISSION SERVICE GROUP**  
**18635 S.W. 107 AVENUE**  
**CUTLER BAY, FLORIDA 33157**  
**(305) 670-4161**



**CHECKBALL BOOK**  
*Import Volume III*

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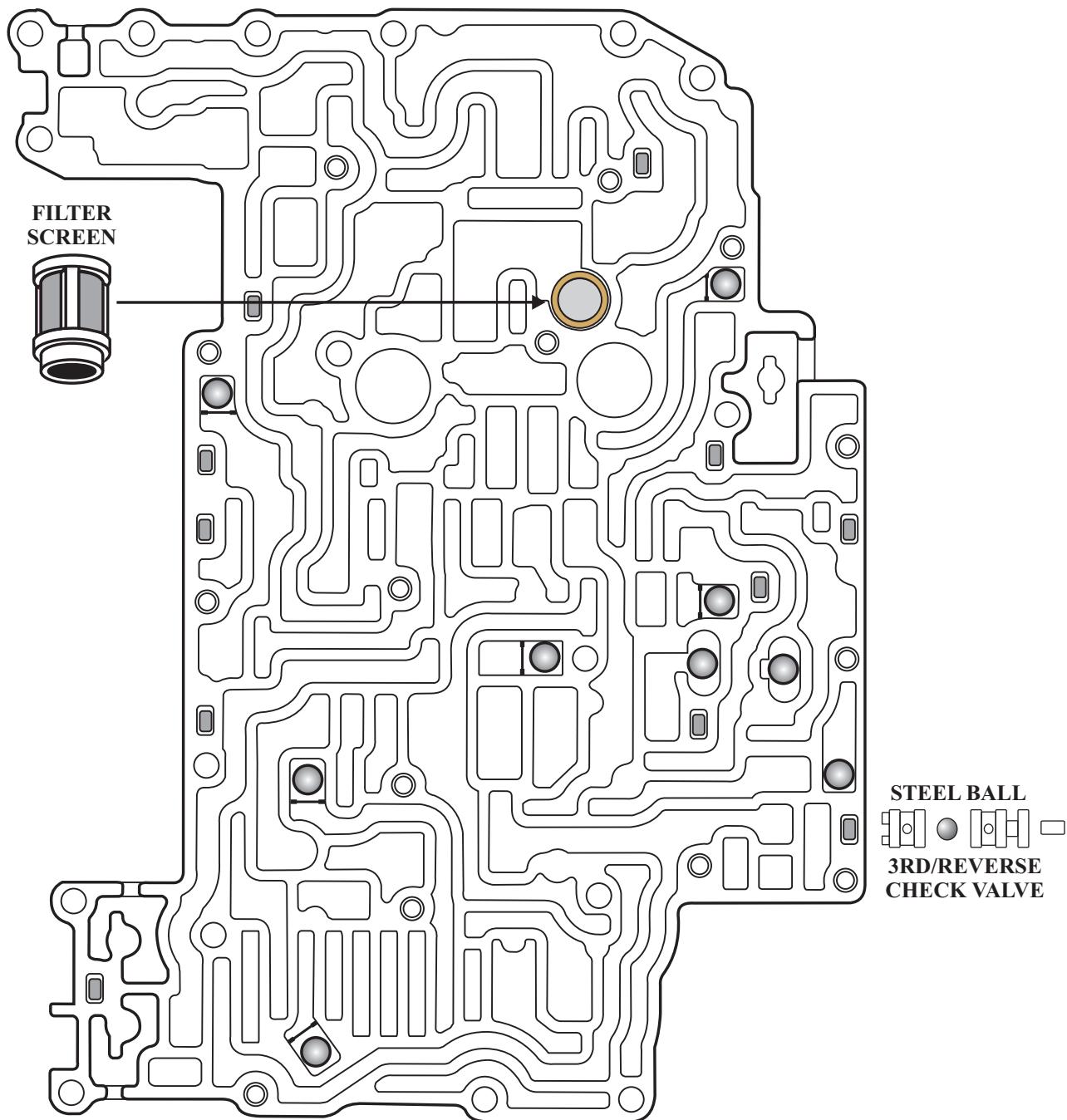
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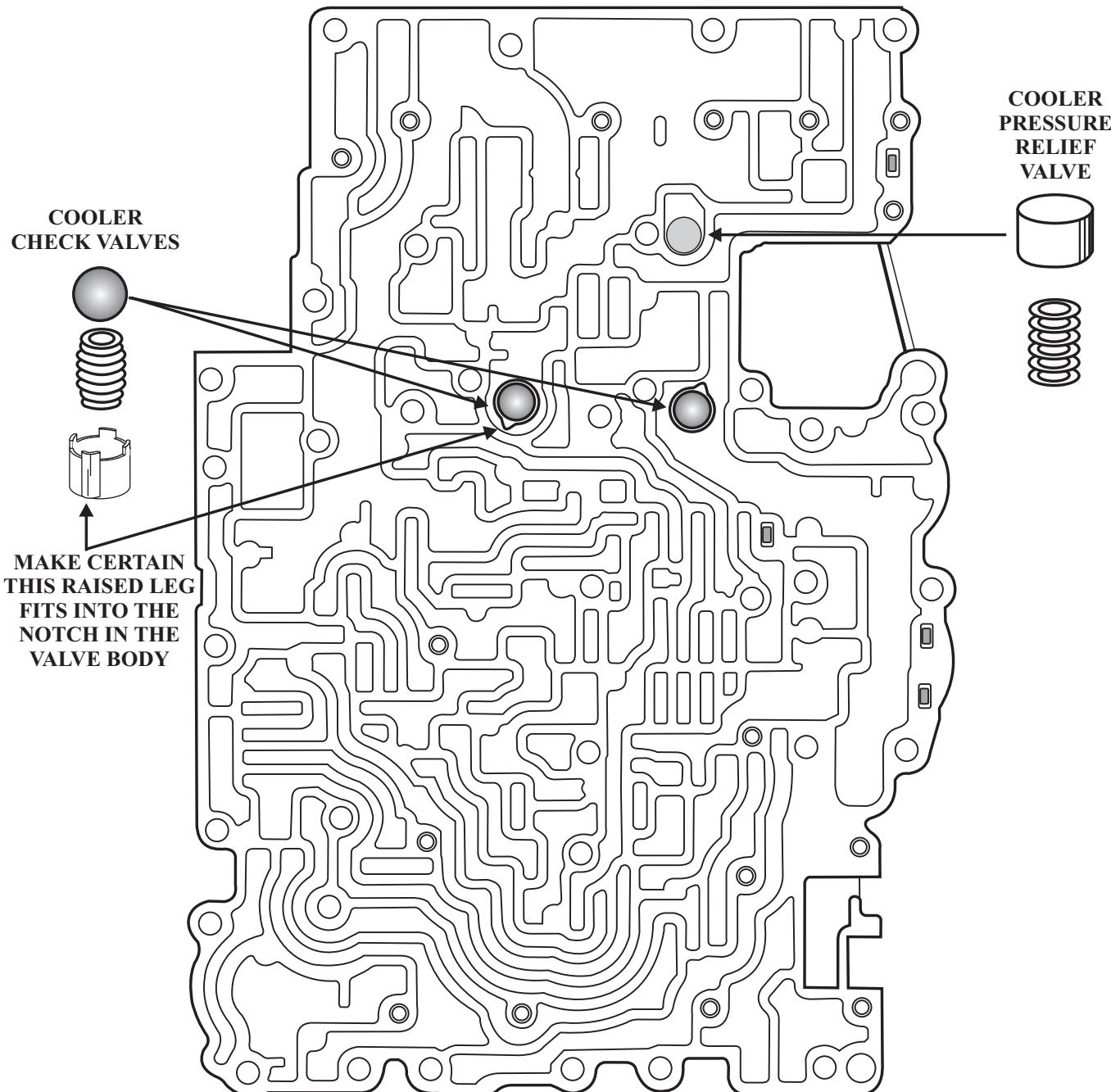
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UPPER VALVE BODY

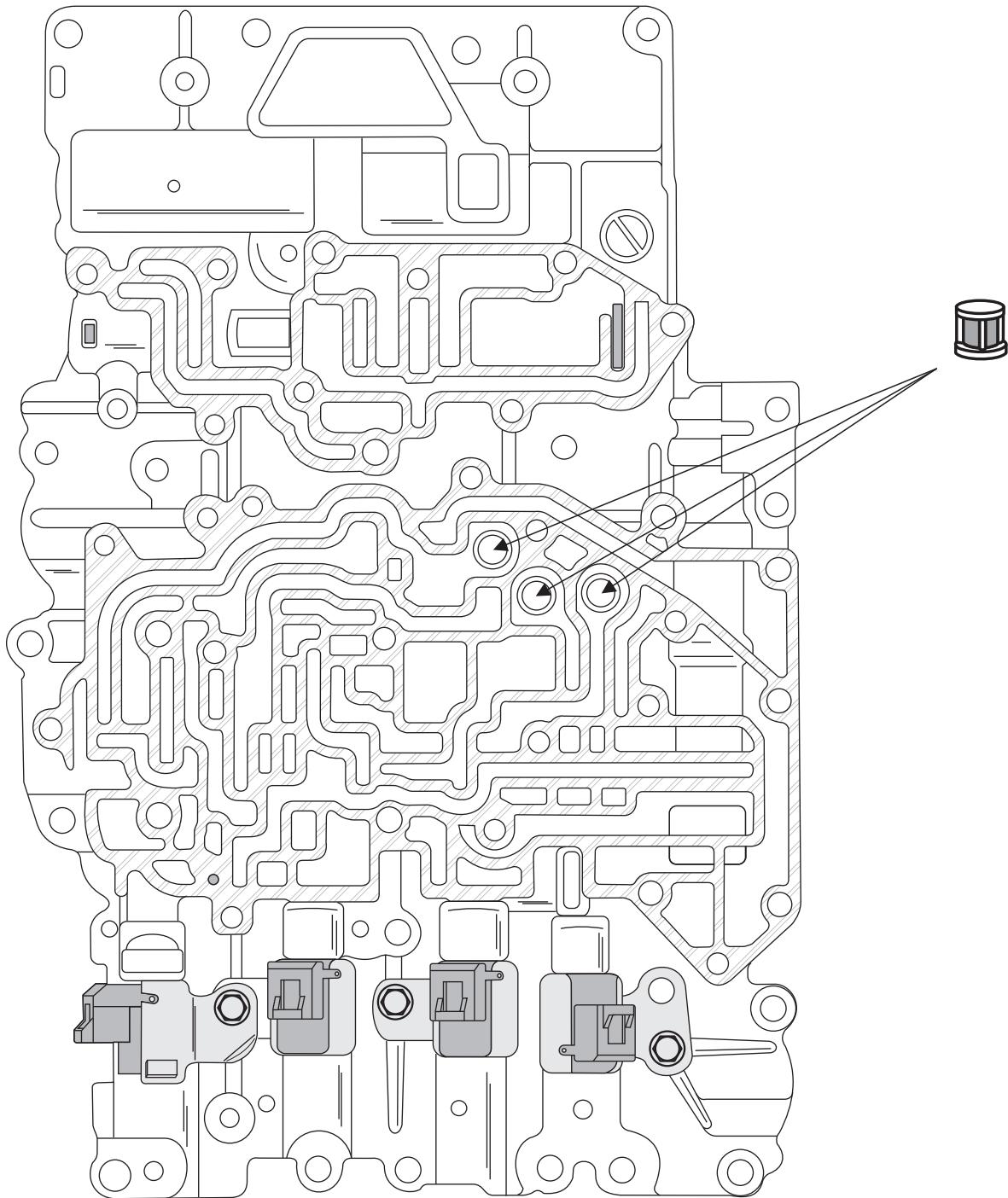
**THE UPPER VALVE BODY HAS NINE & ONE ENCAPSULATED  
6.35MM (.250") STEEL CHECKBALLS**

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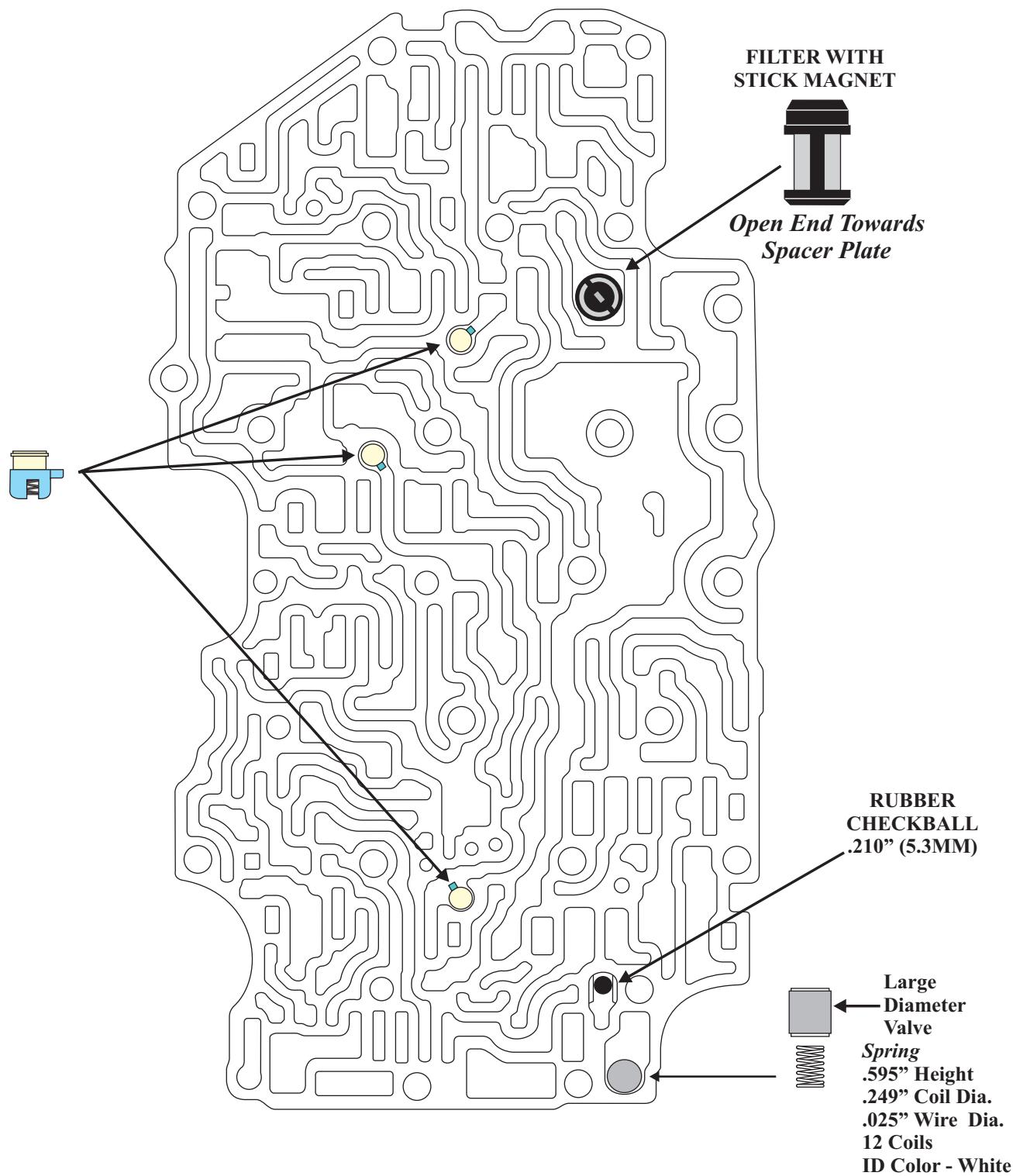
AISIN SEIKI  
450-43LE  
*LOWER VALVE BODY*

THE LOWER VALVE BODY HAS TWO 10.00MM (.394") STEEL CHECKBALLS  
ON BARREL SPRINGS AND CAPSULES

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AISIN SEIKI  
450-43LE  
***LOWER VALVE BODY - FILTER SIDE***

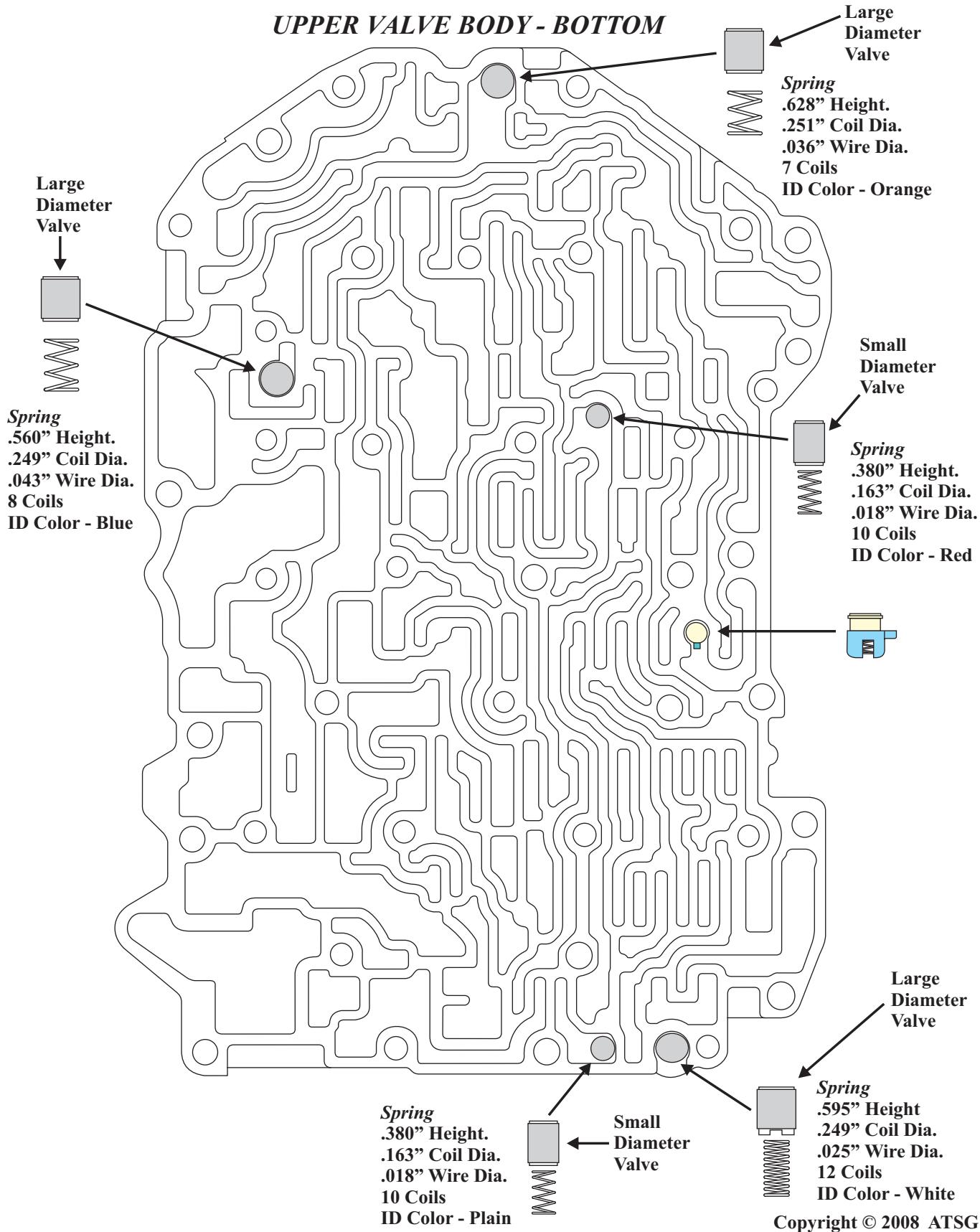
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AUDI/VOLKSWAGEN/MINI COOPER  
09G/AWTF60SN  
*LOWER VALVE BODY*

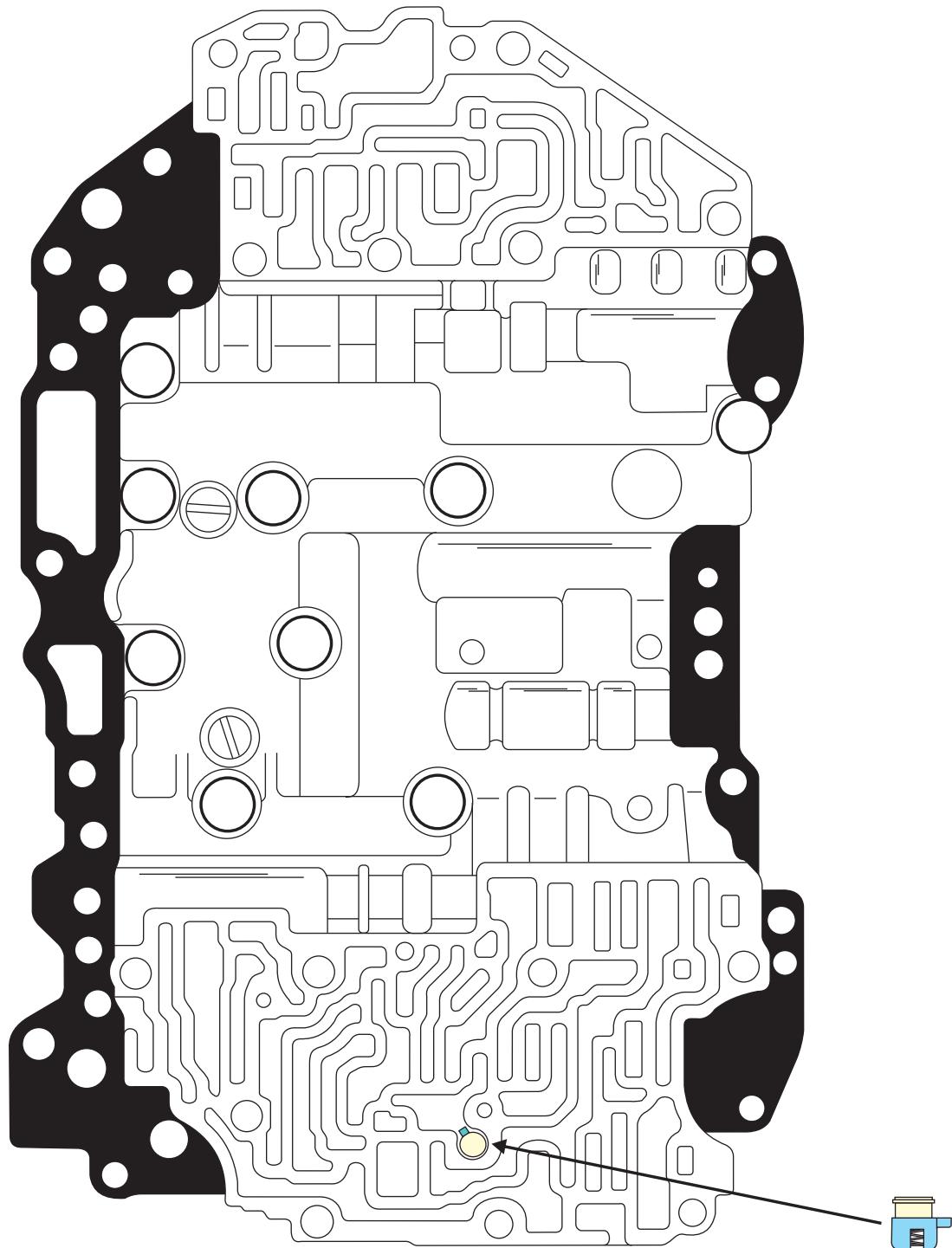
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**AUDI/VOLKSWAGEN/MINI COOPER**  
**09G/AWTF60SN**

**UPPER VALVE BODY - BOTTOM**

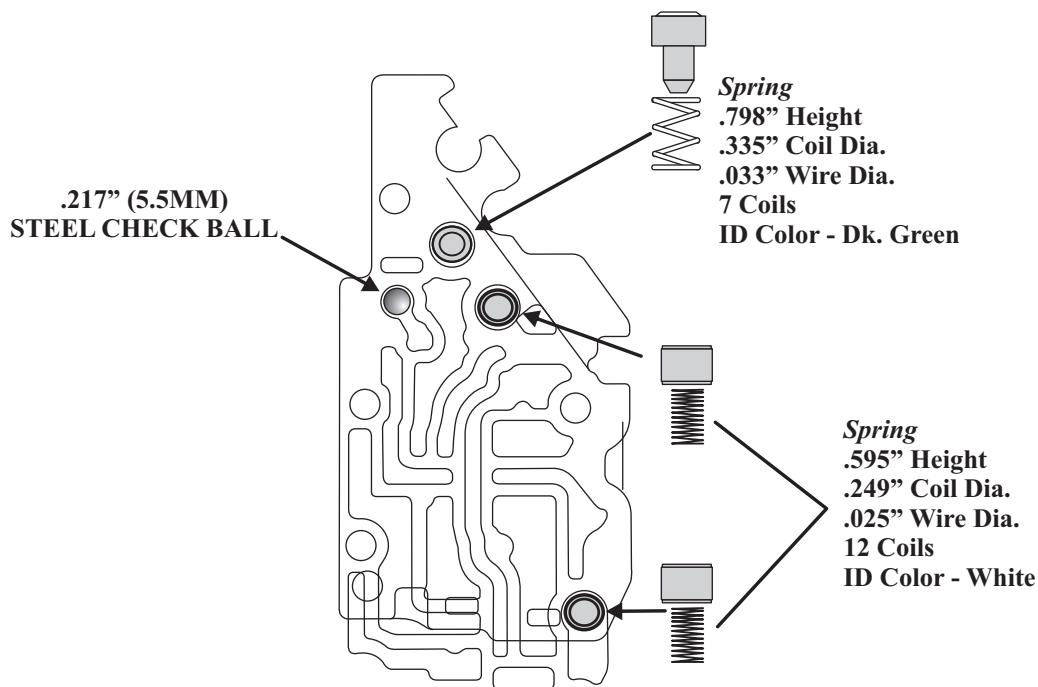


Copyright © 2008 ATSG

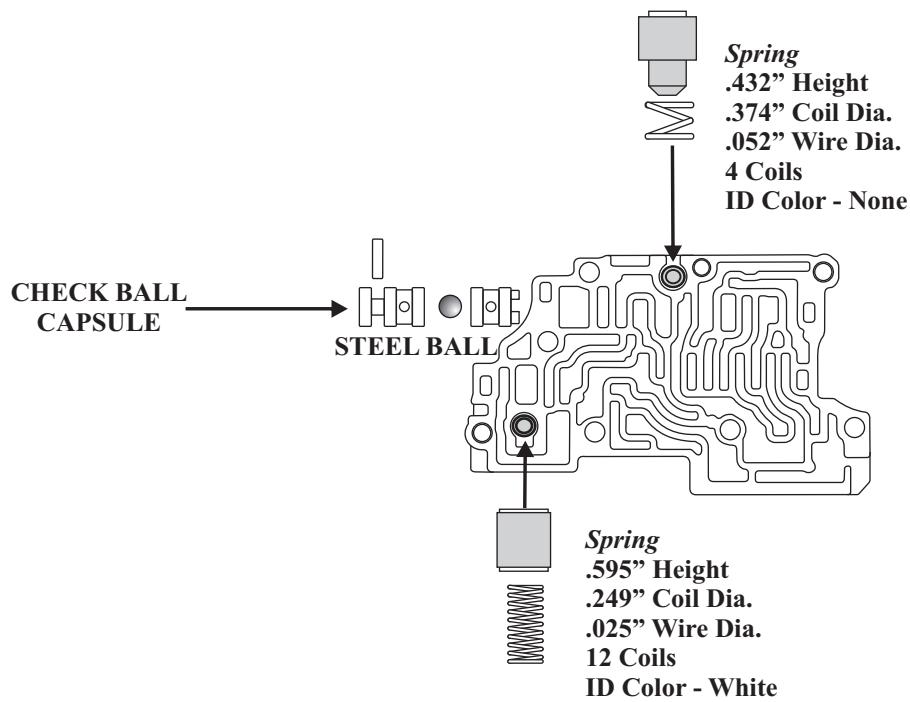
**AUDI/VOLKSWAGEN/MINI COOPER  
09G/AWTF60SN*****UPPER VALVE BODY - TOP***

## AUDI/VOLKSWAGEN/MINI COOPER 09G/AWTF60SN

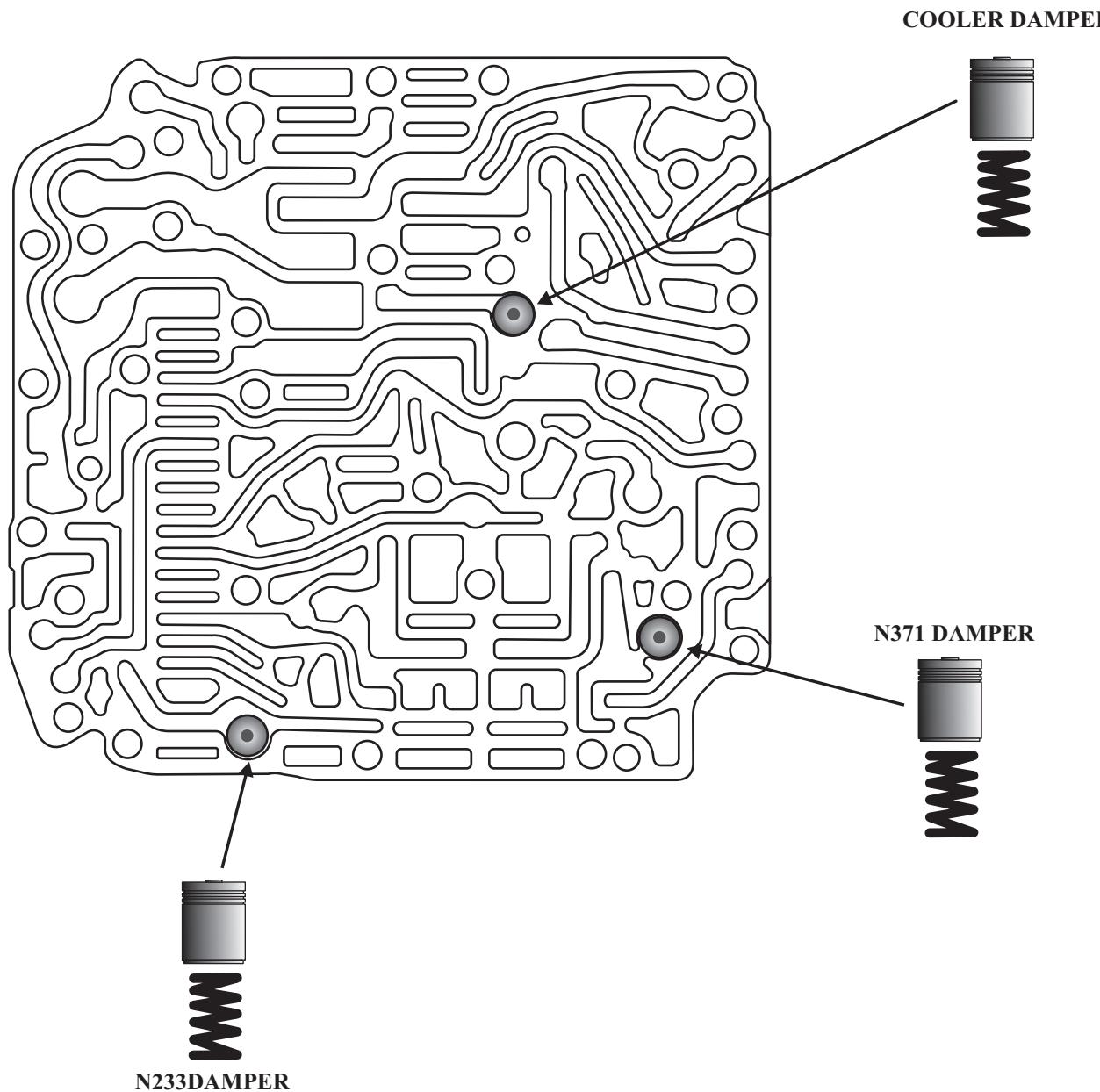
### ACCUMULATOR VALVE BODY #1



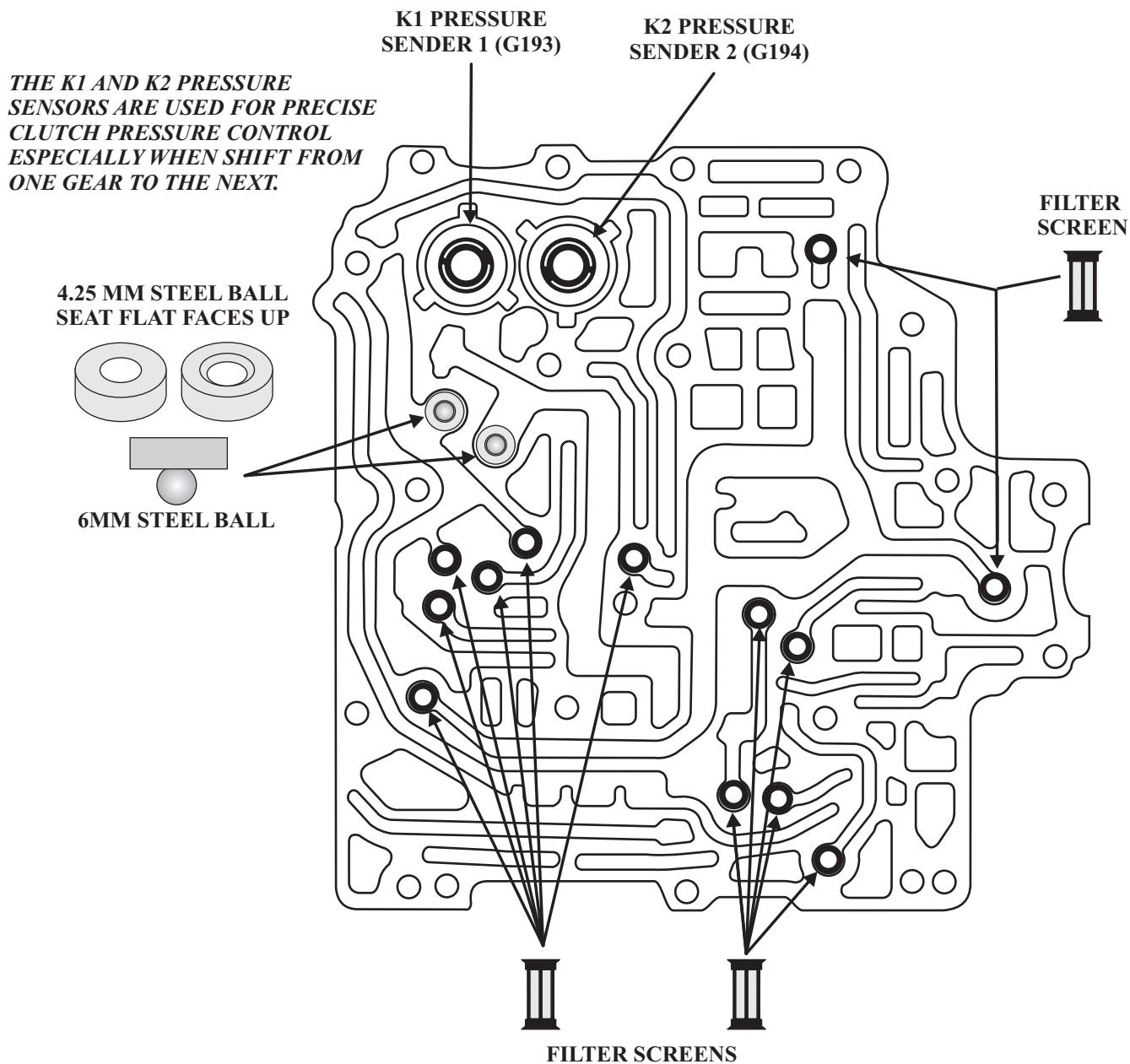
### ACCUMULATOR VALVE BODY #2



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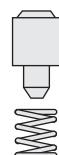
AUDI/VW "02E DSG"  
VALVE BODY  
DIRECT SHIFT GEARBOX

**AUDI/VW "02E DSG"  
VALVE BODY  
DIRECT SHIFT GEARBOX**



**VOLVO/Saab/NISSAN**  
**AW55-50SN/RE5F22A**  
**FRONT CONTROL VALVE BODY**

**PRESSURE RELIEF  
VALVE**

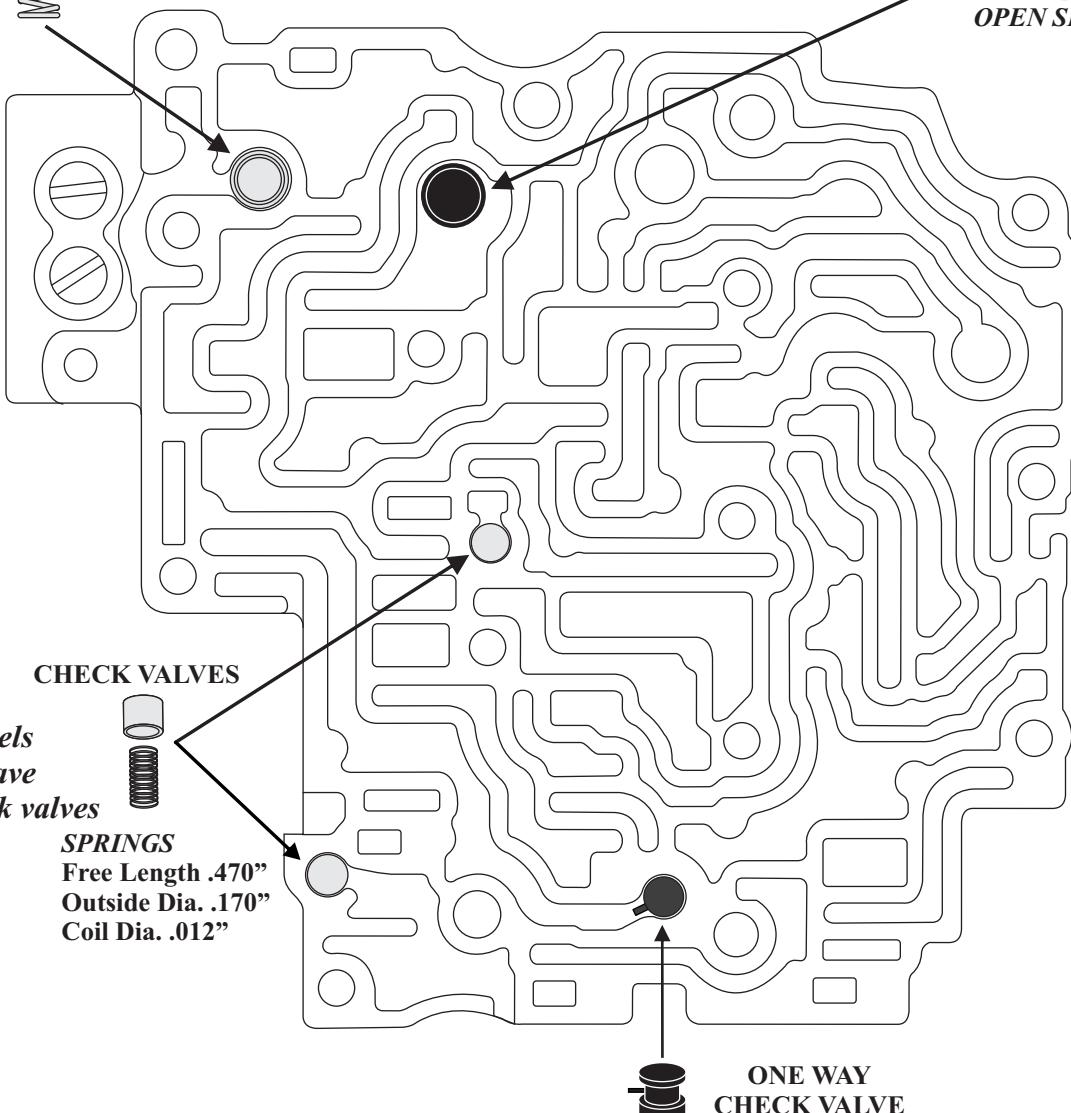


*Spring*  
Free Length .432"  
Outside Dia. .375"  
Coil Dia. .052"

**FILTER SCREEN**



*OPEN SIDE UP*



**NOTE:**

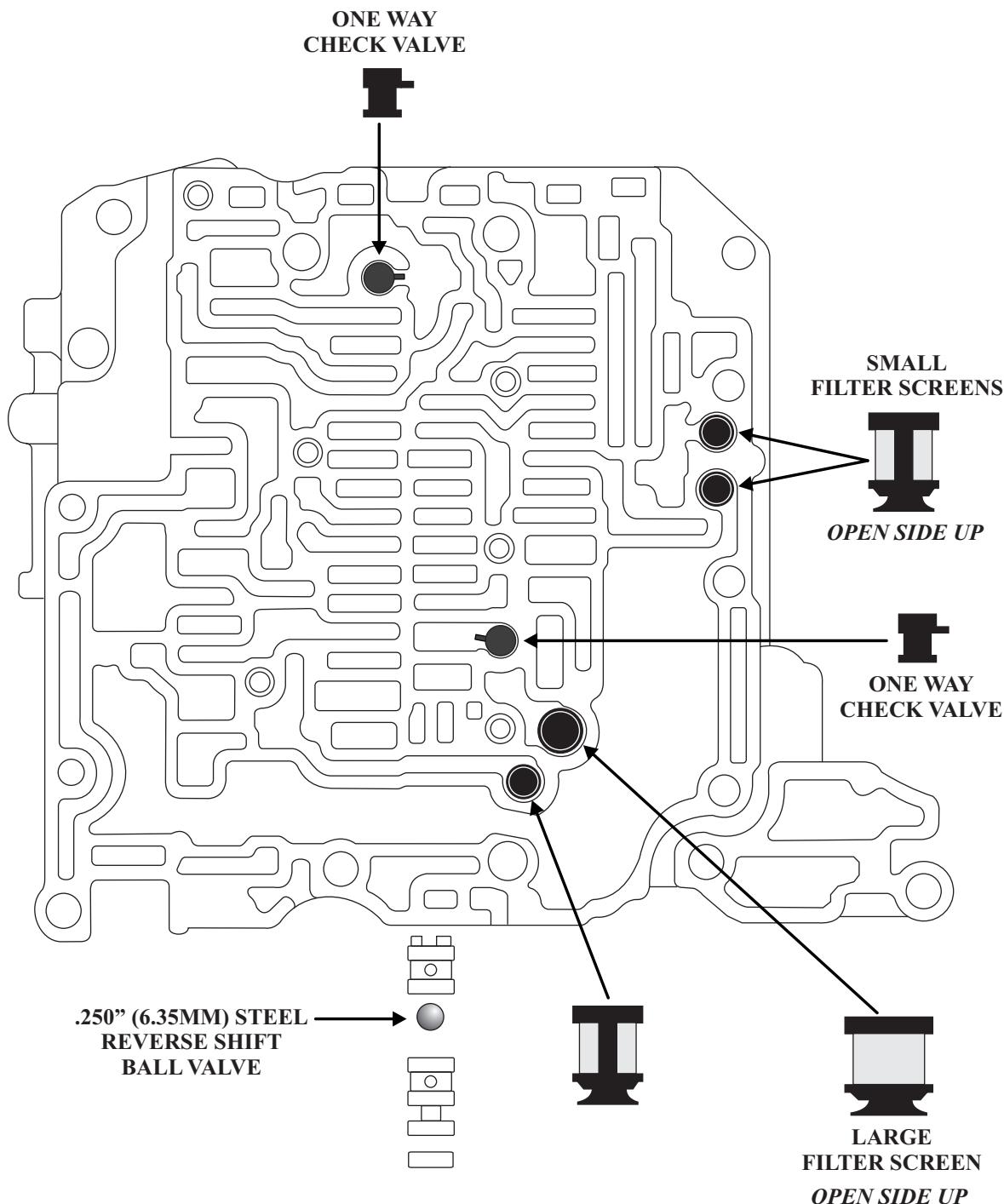
*Some models  
may not have  
these check valves*

**SPRINGS**

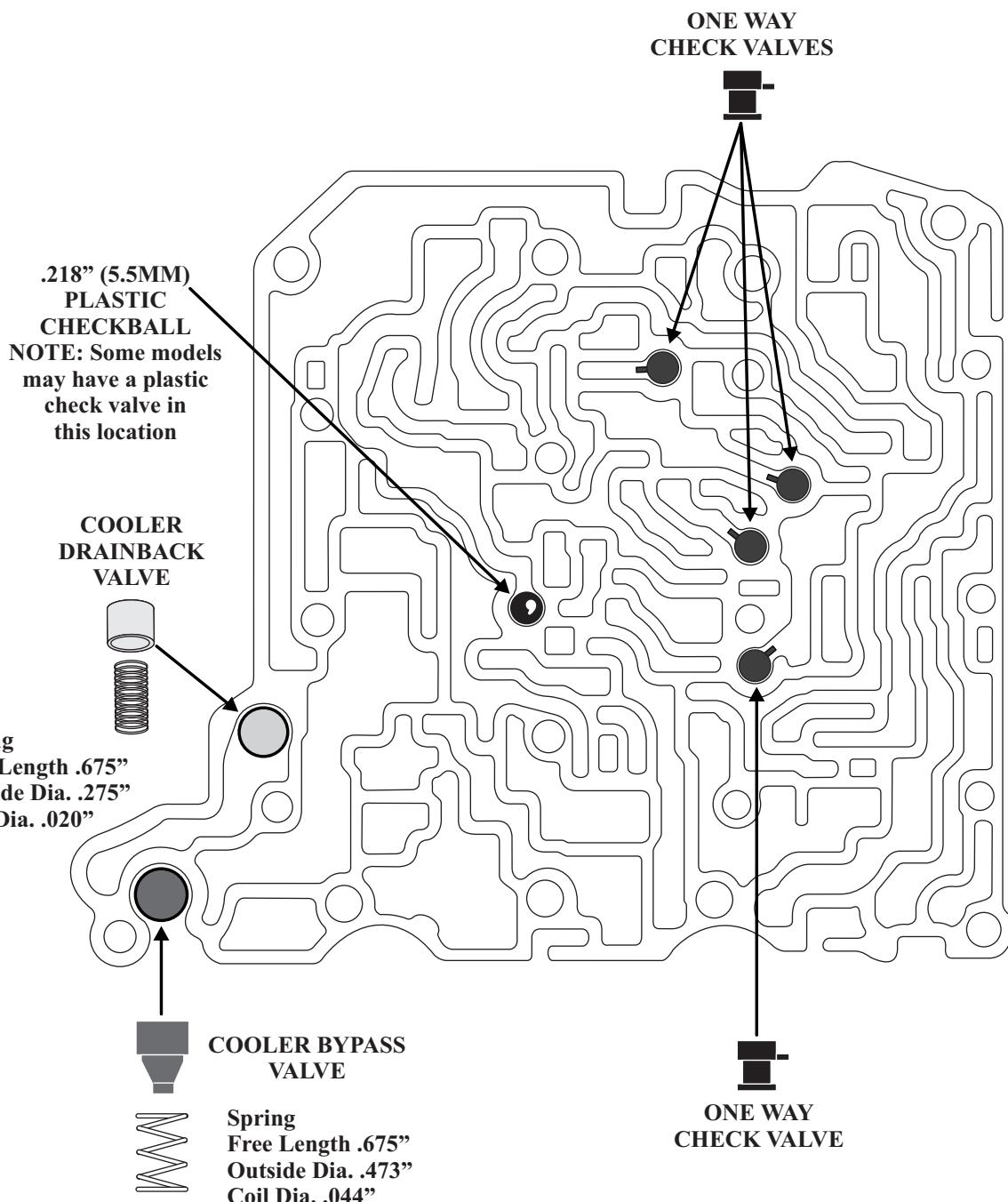
*Free Length .470"  
Outside Dia. .170"  
Coil Dia. .012"*

*NOTE: Some models may have a  
checkball in this location*

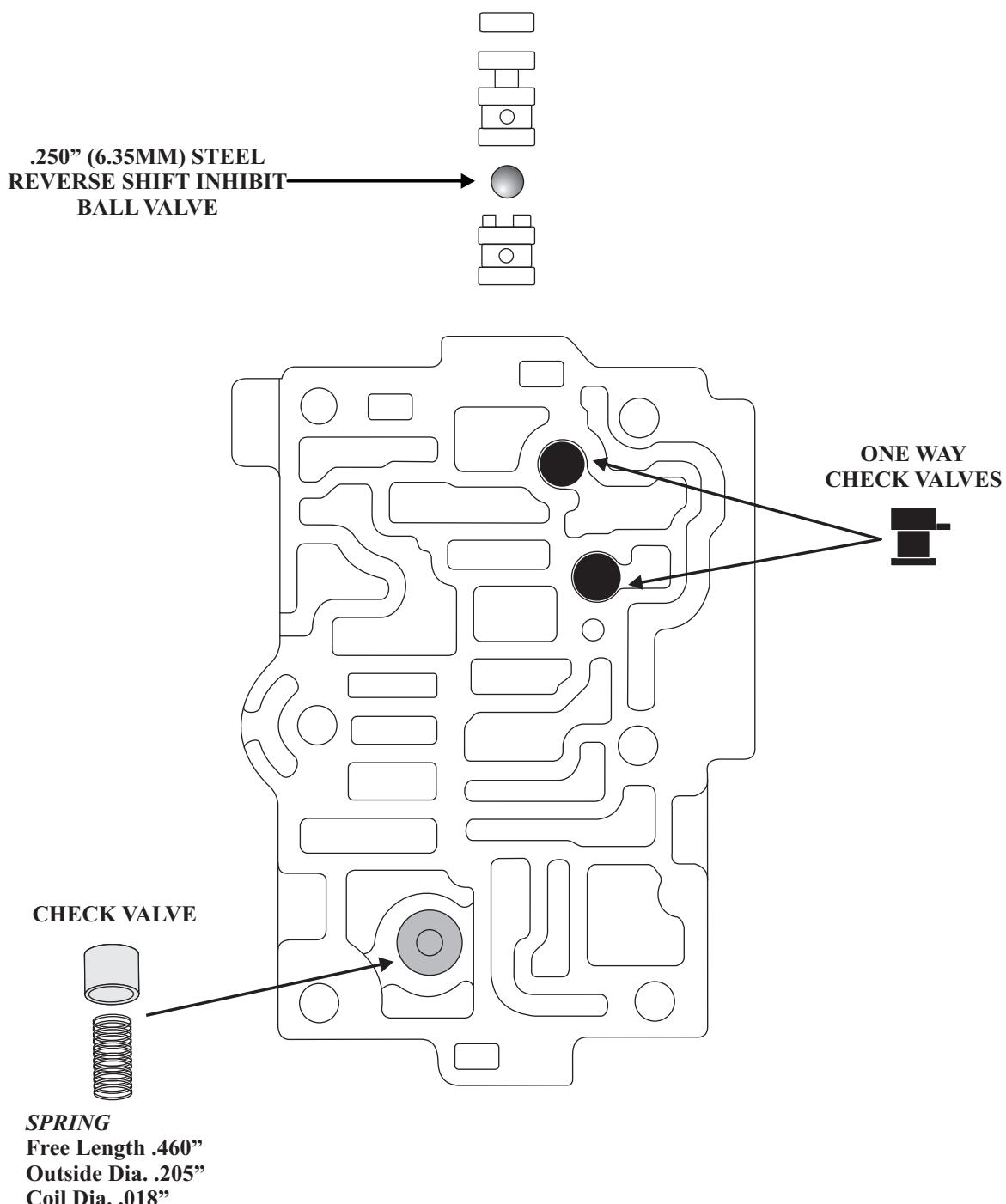
**VOLVO/Saab/Nissan**  
**AW55-50SN/RE5F22A**  
**MIDDLE VALVE BODY (FRONT SIDE)**

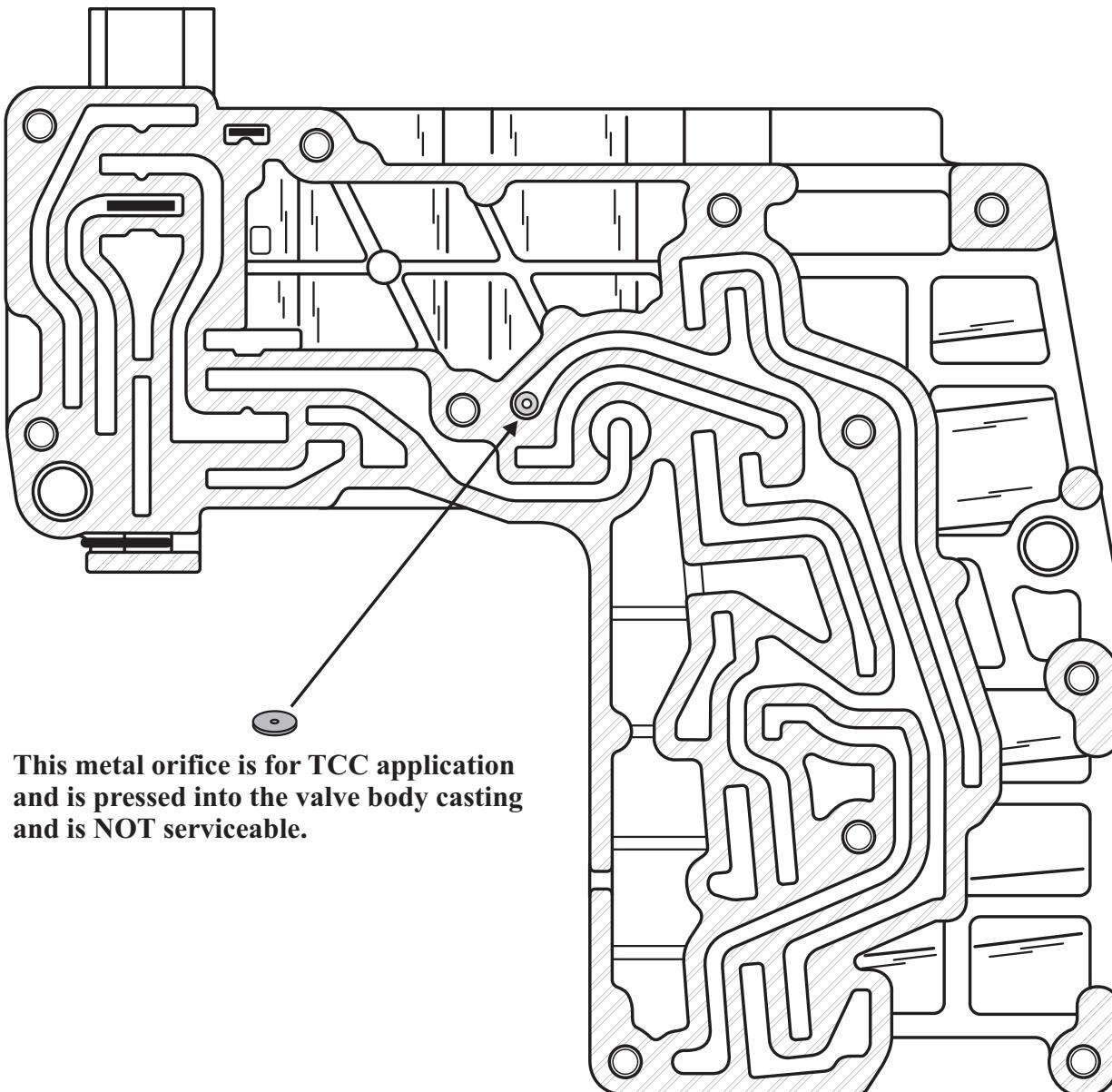


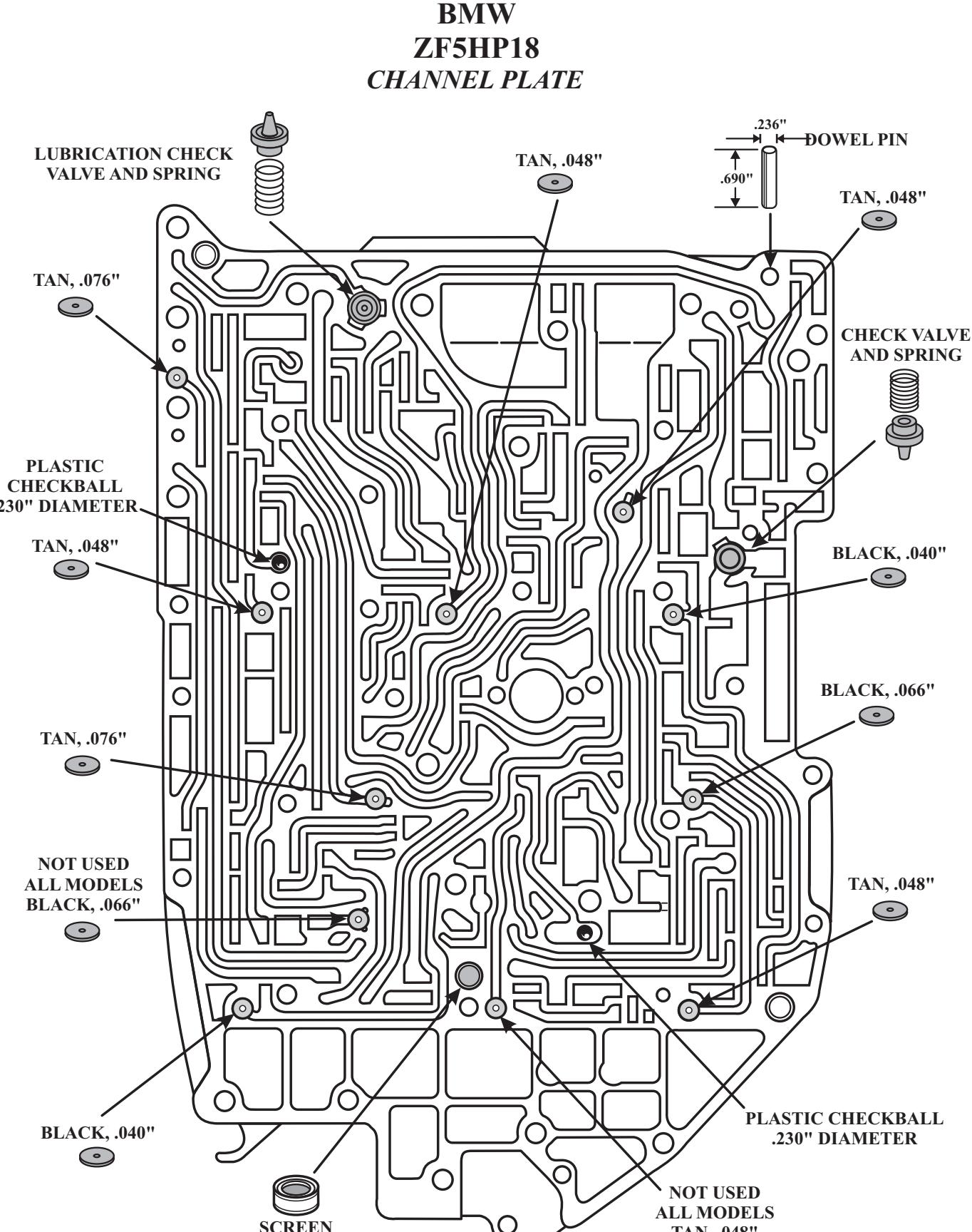
**VOLVO/Saab/NISSAN**  
**AW55-50SN/RE5F22A**  
**MIDDLE VALVE BODY (REAR SIDE)**



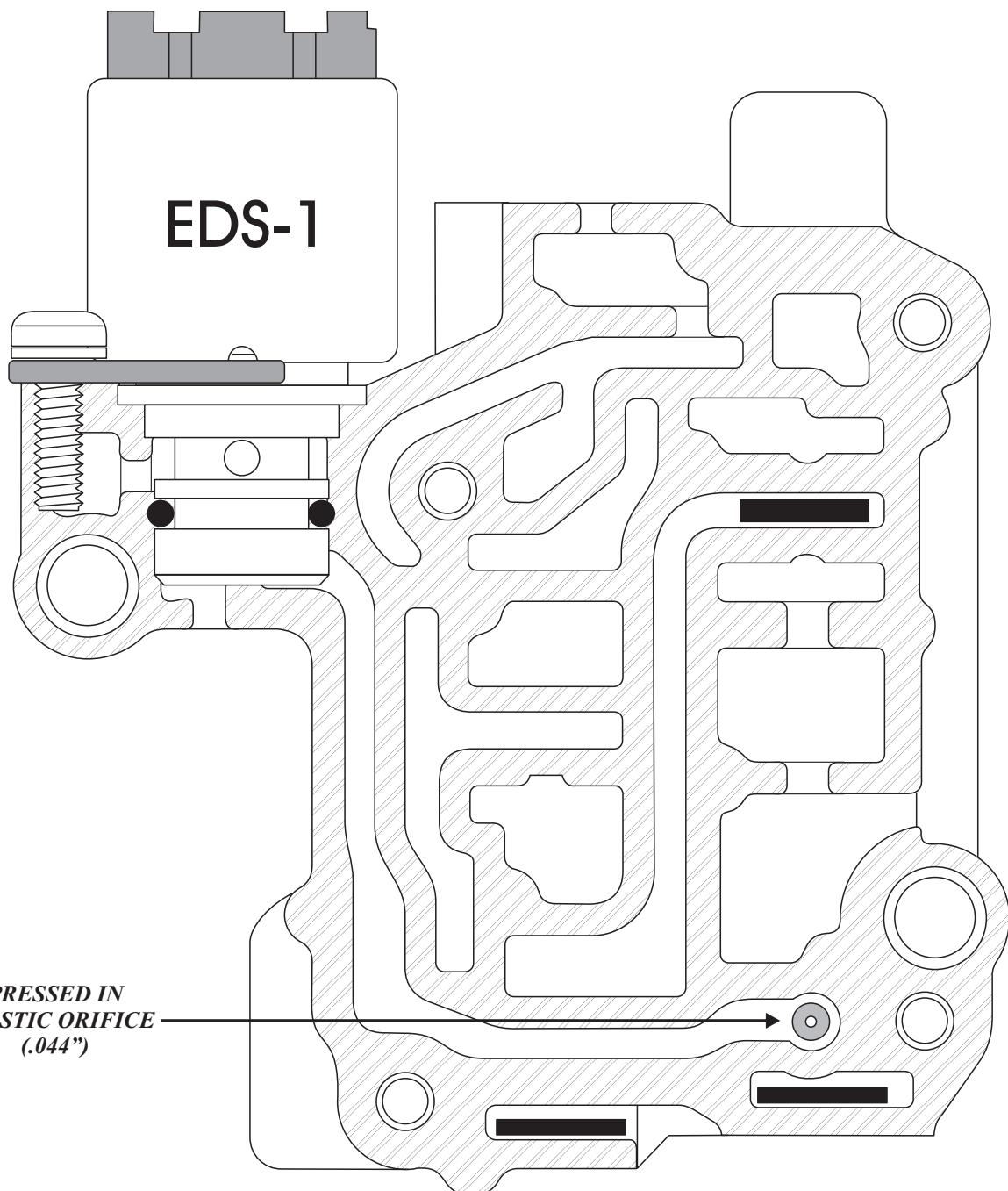
**VOLVO/Saab/NISSAN**  
**AW55-50SN/RE5F22A**  
**REAR VALVE BODY (REAR SIDE)**



BMW  
ZF5HP18  
*SOLENOID VALVE BODY*

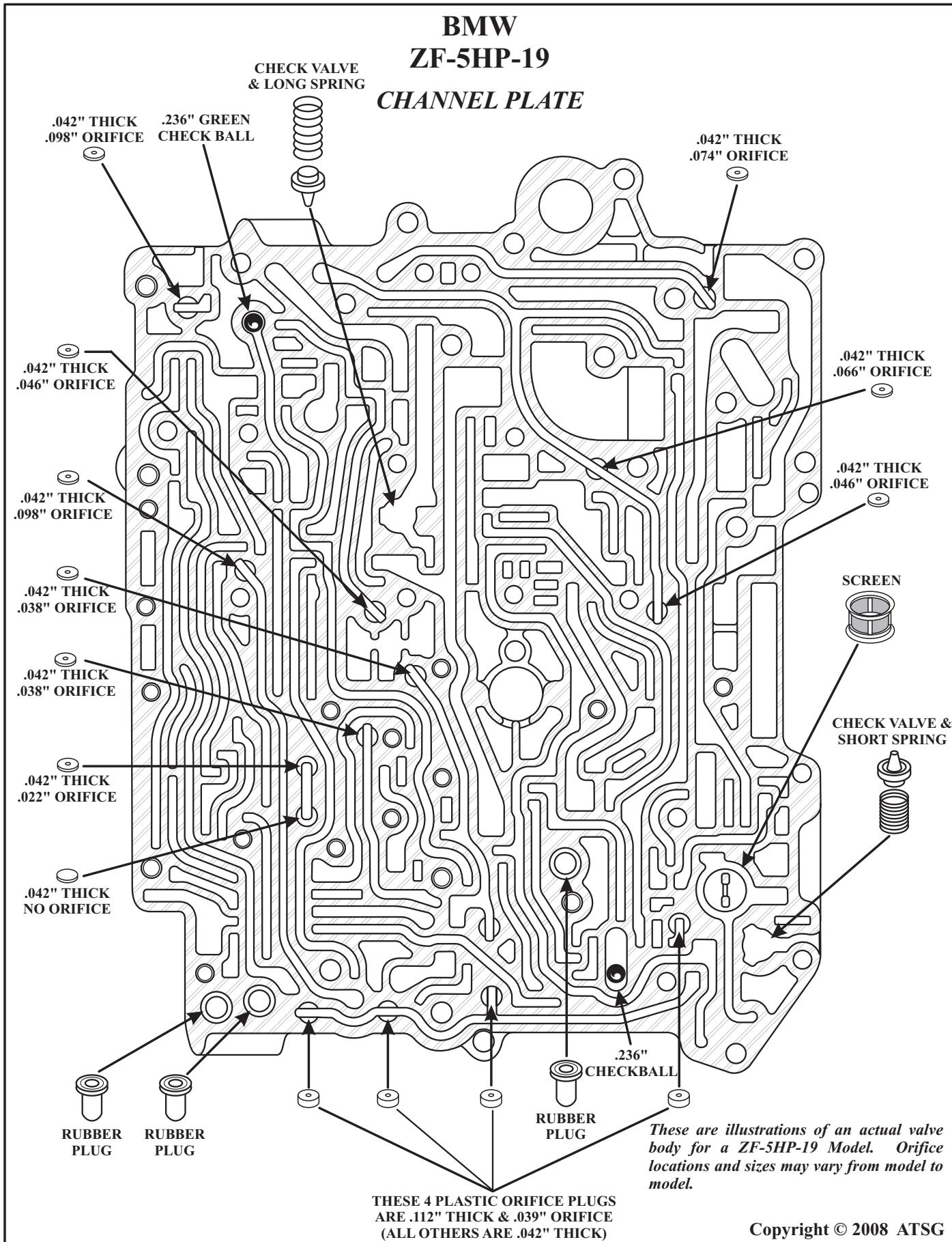


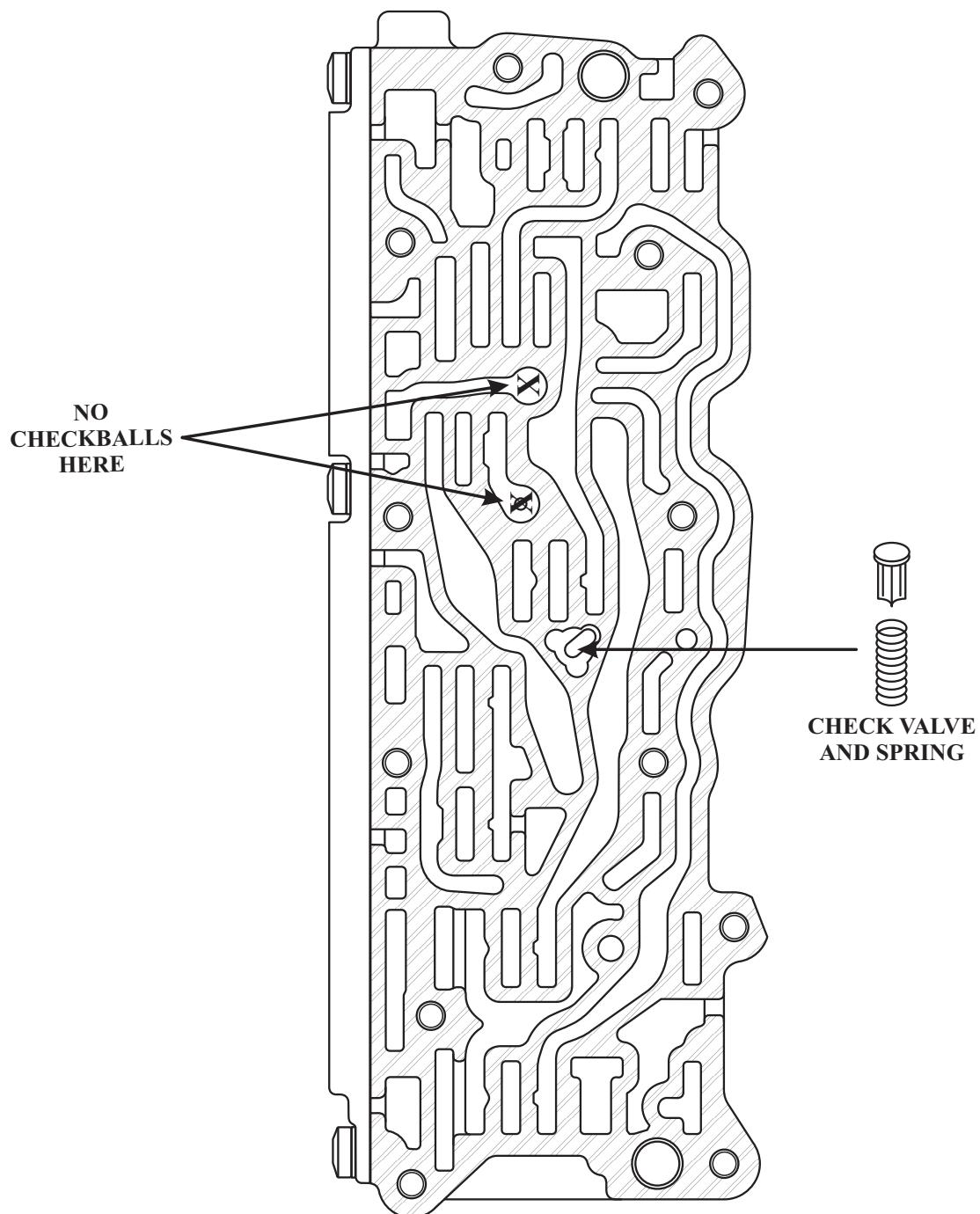
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BMW  
ZF-5HP-19  
*UPPER REAR VALVE BODY*

**NOTE:** This transmission can also be found in Audi and Volkswagen (01V/01L), small parts locations may be different.

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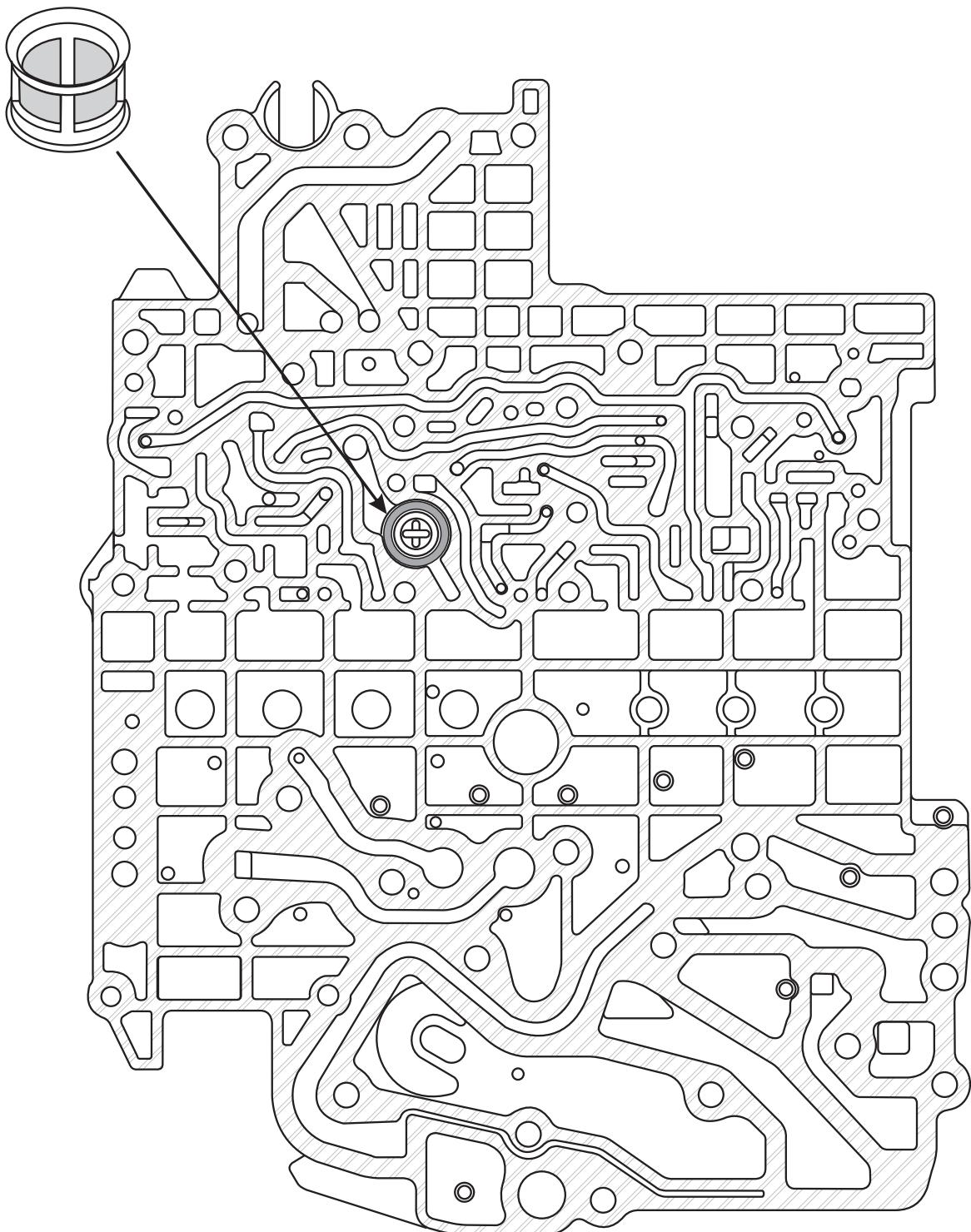
BMW  
ZF5HP24  
*UPPER VALVE BODY*

**NOTE:** This transmission can also be found in Jaguar and Land Rover, small parts locations may be different.

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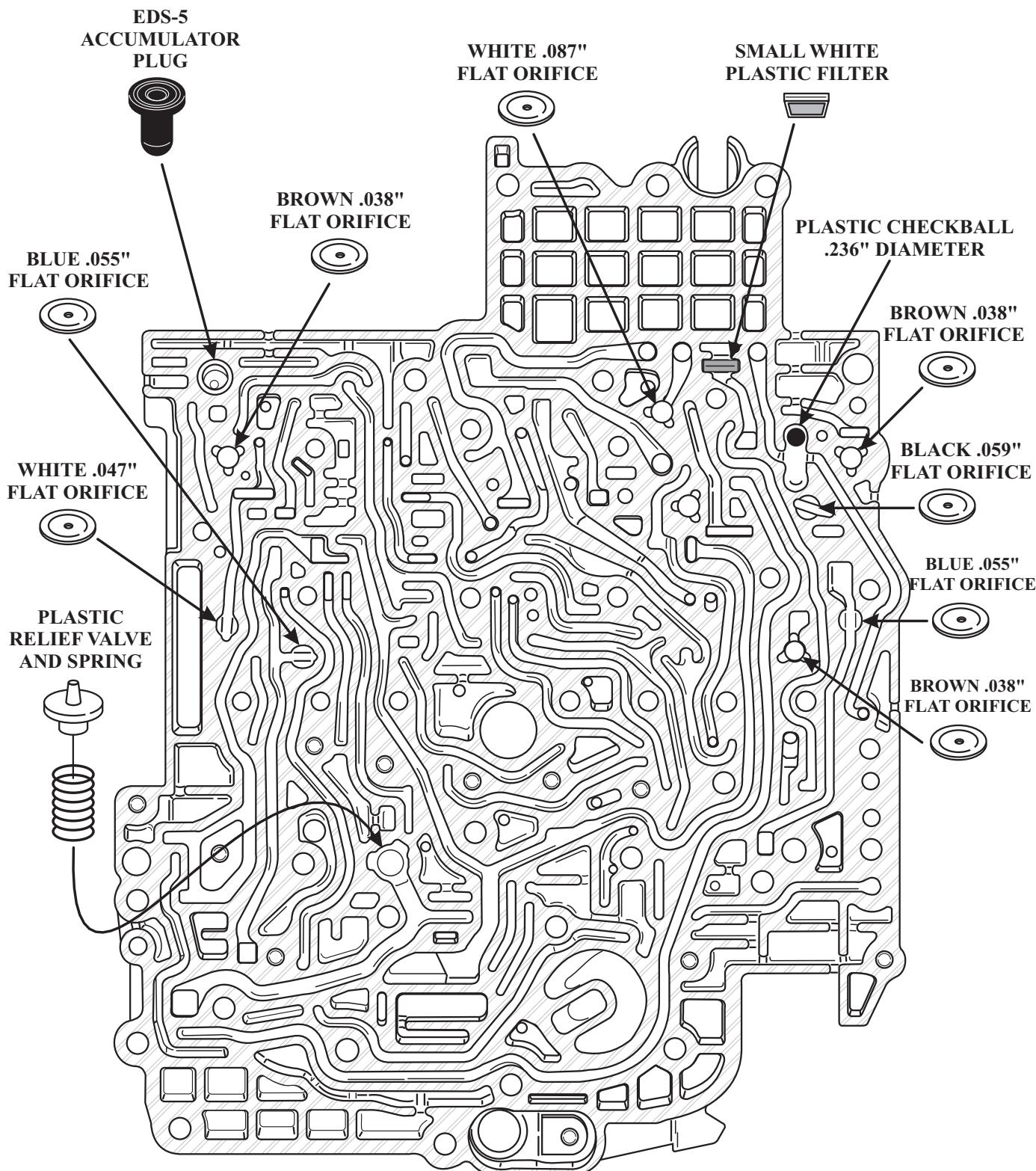
BMW  
ZF5HP24  
CHANNEL PLATE - BOTTOM

ROUND SCREEN

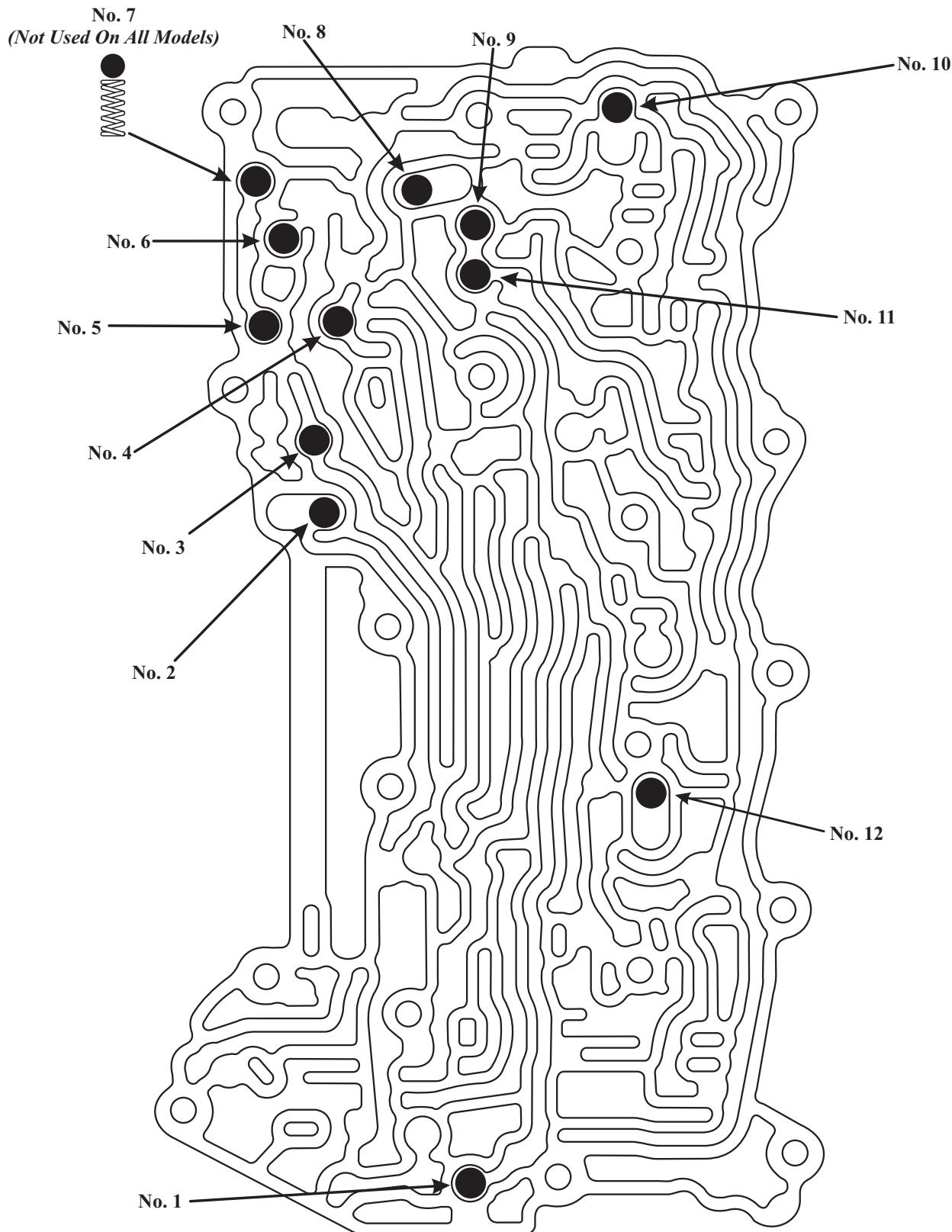


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**BMW**  
**ZF5HP24**  
**CHANNEL PLATE - TOP**



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**BMW 5L40E**  
**BOTTOM CHANNEL PLATE**

NOTE: All Checkballs Are .254" (6.5MM) Plastic

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# CHECKBALL BOOK

## *Import Volume III*

BMW  
5L40E

### BMW 5L40E

#### **CHECKBALL FUNCTION**

**Check Ball No. 1:** Seats to force reverse lockout fluid through orifice 13 in the spacer plate, and into the reverse clutch circuit to help control the apply rate of the reverse clutch.

**Check Ball No. 2:** Seats to allow either reverse fluid (In Reverse) or 2345 fluid (In 2nd, 3rd, 4th, and 5th) to enter the reverse or 2345 circuit, while blocking the other fluid circuit.

**Check Ball No. 3:** Seats to force four five fluid through orifice 27 in the spacer plate and into the overdrive clutch feed circuit to help control the apply rate of the overdrive clutch.

**Check Ball No. 4:** Seats to force 123 fluid through orifice 16 in the spacer plate and into the coast clutch feed circuit to help control the apply rate of the coast clutch.

**Check Ball No. 5:** Seats to force forward clutch fluid through orifice 17 in the spacer plate to help control the apply rate of the coast clutch.

**Check Ball No. 6:** Seats to force forward clutch fluid through orifice 15 in the spacer plate and into the forward clutch circuit to help control the apply rate of the forward clutch.

**Check Ball No. 7:** Seated by a calibrated spring that goes in channel plate before the check ball and provides extra D432 fluid in the forward and coast clutch circuits to reduce garage shift response time.

**NOTE: Not used in all models.**

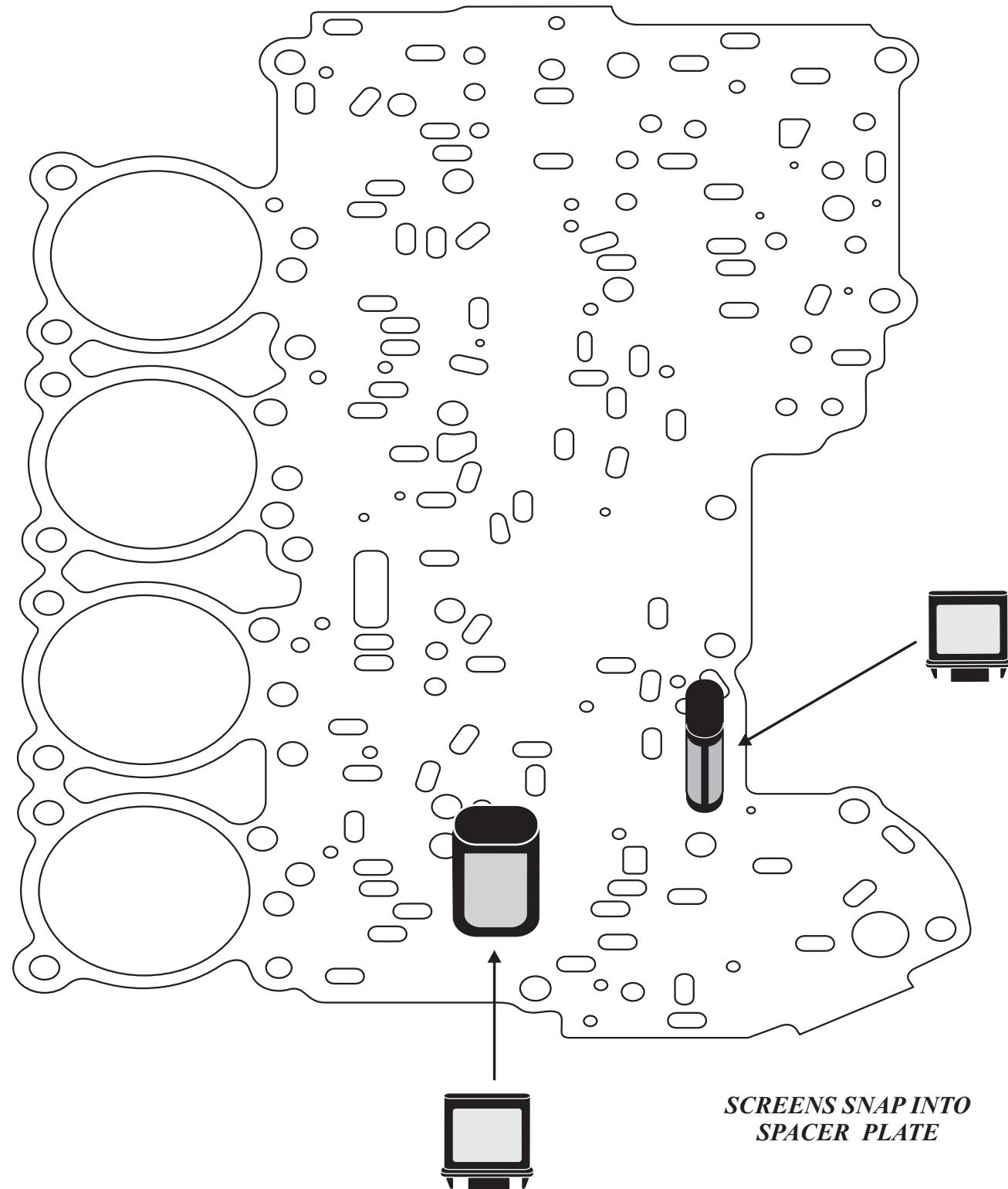
**Check Ball No. 8:** Seats to allow either low/reverse clutch fluid (In 1st gear coast condition) or reverse lockout (RLO) fluid (In Reverse) to enter the low/reverse clutch or reverse lockout circuit, while blocking the other fluid circuit.

**Check Ball No. 9:** Seats to force two-three regulated fluid through orifice 22 in the spacer plate and into the overdrive clutch feed 1 circuit to help control the apply rate of the overdrive clutch when in a 3rd gear coast condition.

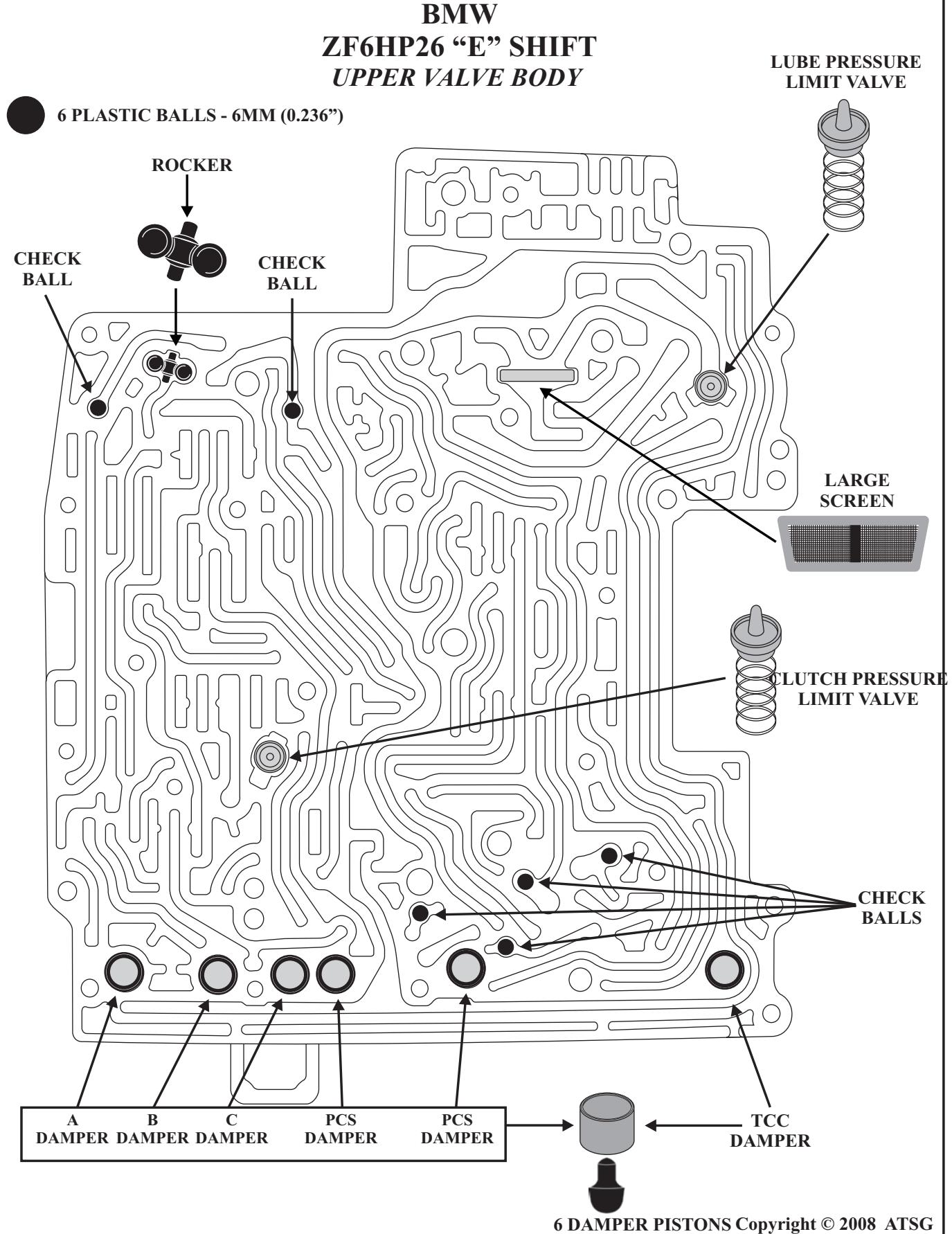
**Check Ball No. 10:** Seats to allow either three-two safety mode fluid (Safety Mode Operation Only) or FDL fluid (In 1st Gear) to enter the 3-2 safety mode or FDL fluid circuit while blocking the other.

**Check Ball No. 11:** Seats to force two-three regulated fluid through orifice 23 in the spacer plate and into the second coast clutch circuit to help control the apply rate of the 2nd coast clutch when in a 2nd gear coast condition.

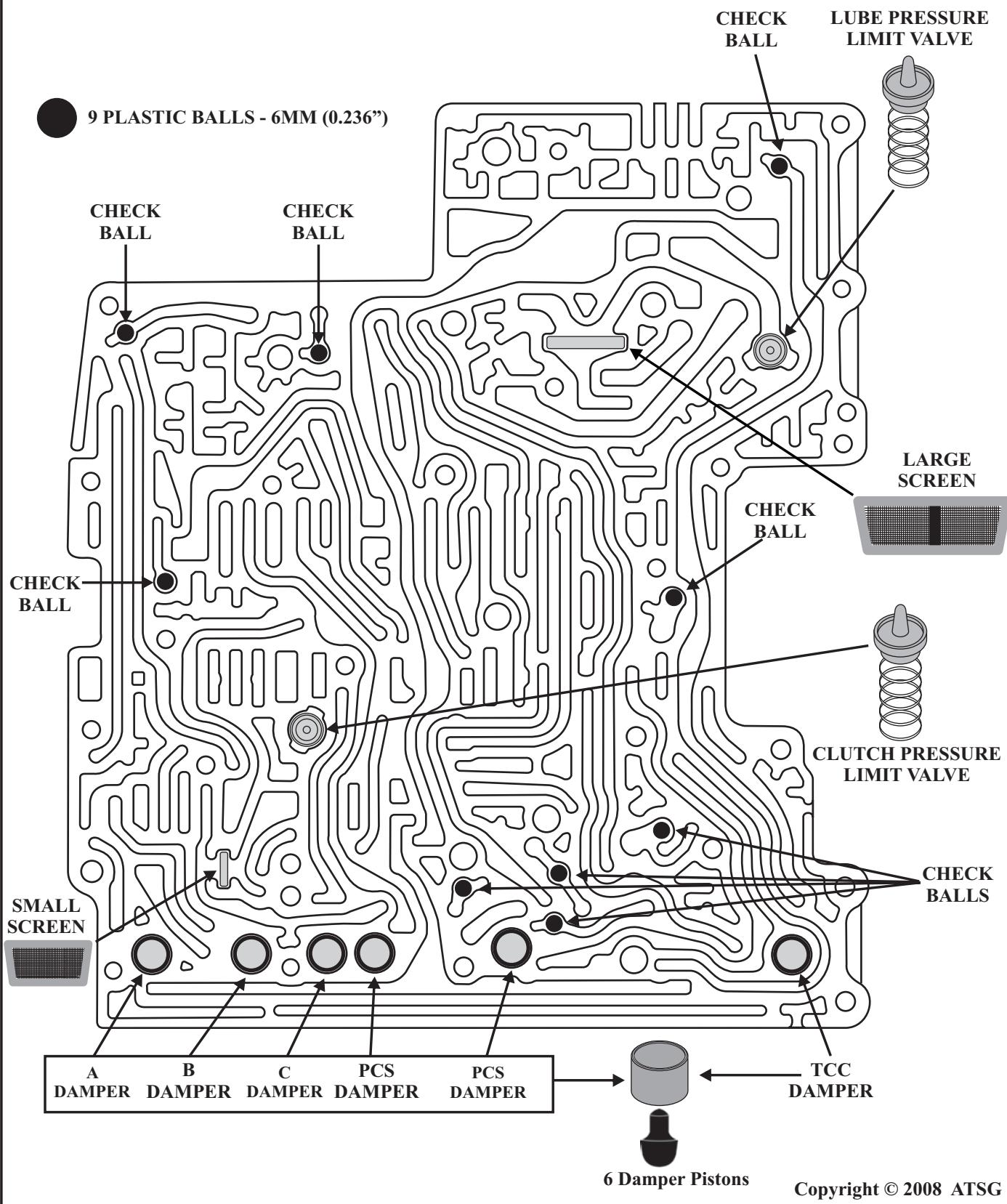
**Check Ball No. 12:** Seats to allow either overdrive clutch feed 1 fluid (In a 3rd Gear Coast condition) or overdrive clutch feed 2 fluid (In 5th Gear) to enter the overdrive clutch circuit while blocking the other fluid circuit.

BMW 5L40E  
***SPACER PLATE FILTERS***

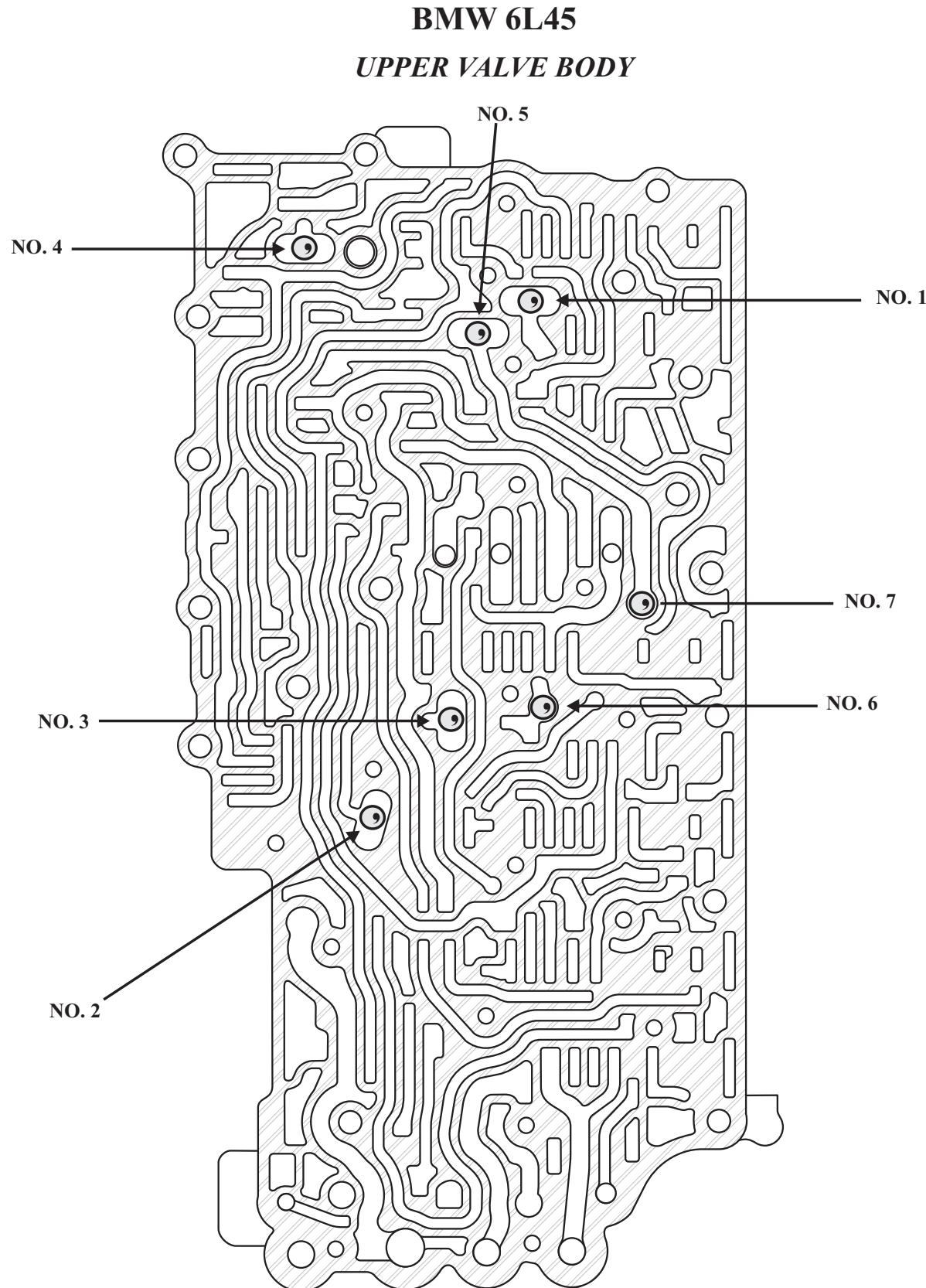
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**BMW/JAGUAR**  
**ZF6HP26 "M" SHIFT**  
**UPPER VALVE BODY**



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All Checkballs Are .250" (6.35MM) White Plastic

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# CHECKBALL BOOK

## Import Volume III

BMW  
6L45

### BMW 6L45

#### CHECKBALL FUNCTION

##### **Number 1 Checkball**

The number one checkball is located in the upper valve body. When the transmission is operating in Drive 1st, 2nd, 3rd, 4th, 5th or 6th gear, drive 1-6 fluid seats the checkball 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.

##### **Number 2 Checkball**

The number two checkball is located in the upper valve body. This shuttle type checkball is seated against the reverse passage while the transmission is operating in Park, Neutral and Drive 1st. With the checkball in this position, shift solenoid 1 fluid enters the CSV2 enable circuit to the "clutch select valve 2". When the transmission is operating in Reverse, the checkball seats against shift solenoid 1 passage to allow reverse fluid to enter the CSV2 enable circuit and hold the "clutch select valve 2" in the applied position.

##### **Number 3 Checkball**

The number three checkball is located in the upper valve body. This shuttle type checkball is seated against the 4-5-6 clutch passage while the transmission is operating in Park, Reverse, Neutral, Drive 1st, 2nd and 3rd gear. With the checkball in this position, shift solenoid 2 fluid enters the CSV3 enable circuit to apply the "clutch select valve 3". When the transmission is operating in Drive 4th, 5th or 6th gear, the checkball seats against the shift solenoid 2 passage to allow 4-5-6 clutch fluid to enter the CSV3 enable circuit and hold the "clutch select valve 3" in the applied position.

##### **Number 4 Checkball**

The number four checkball is located in the upper valve body. This shuttle type checkball is seated against the 4-5-6 clutch passage by Pressure Solenoid 5 fluid, while the transmission is operating in Park, Reverse, Neutral, Drive 1st, 2nd and 3rd gear. With the checkball in this position, PS 5 fluid enters the CSV2 latch circuit to hold the "clutch select valve 2" in the released position. When the transmission is operating in Drive 4th, 5th or 6th gear, 4-5-6 clutch fluid seats the checkball against the PS 5 passage to allow 4-5-6 clutch fluid to enter the CSV2 latch circuit to hold the "clutch select valve 2" in released the position.

##### **Number 5 Checkball**

The number five checkball is located in the upper valve body. This shuttle type checkball is seated against the Drive 1-6 passage by 3-5/Reverse Feed fluid while the transmission is operating in Reverse. With the checkball in this position, 3-5/Reverse Feed fluid enters the 3-5/Reverse Supply circuit and is routed to the number 7 checkball. When the transmission is operating in Drive 1st, 2nd, 3rd, 4th, 5th or 6th gear, Drive 1-6 fluid seats the ball against the 3-5/Reverse Feed passage to allow Drive 1-6 fluid to enter the 3-5/Reverse Supply circuit.

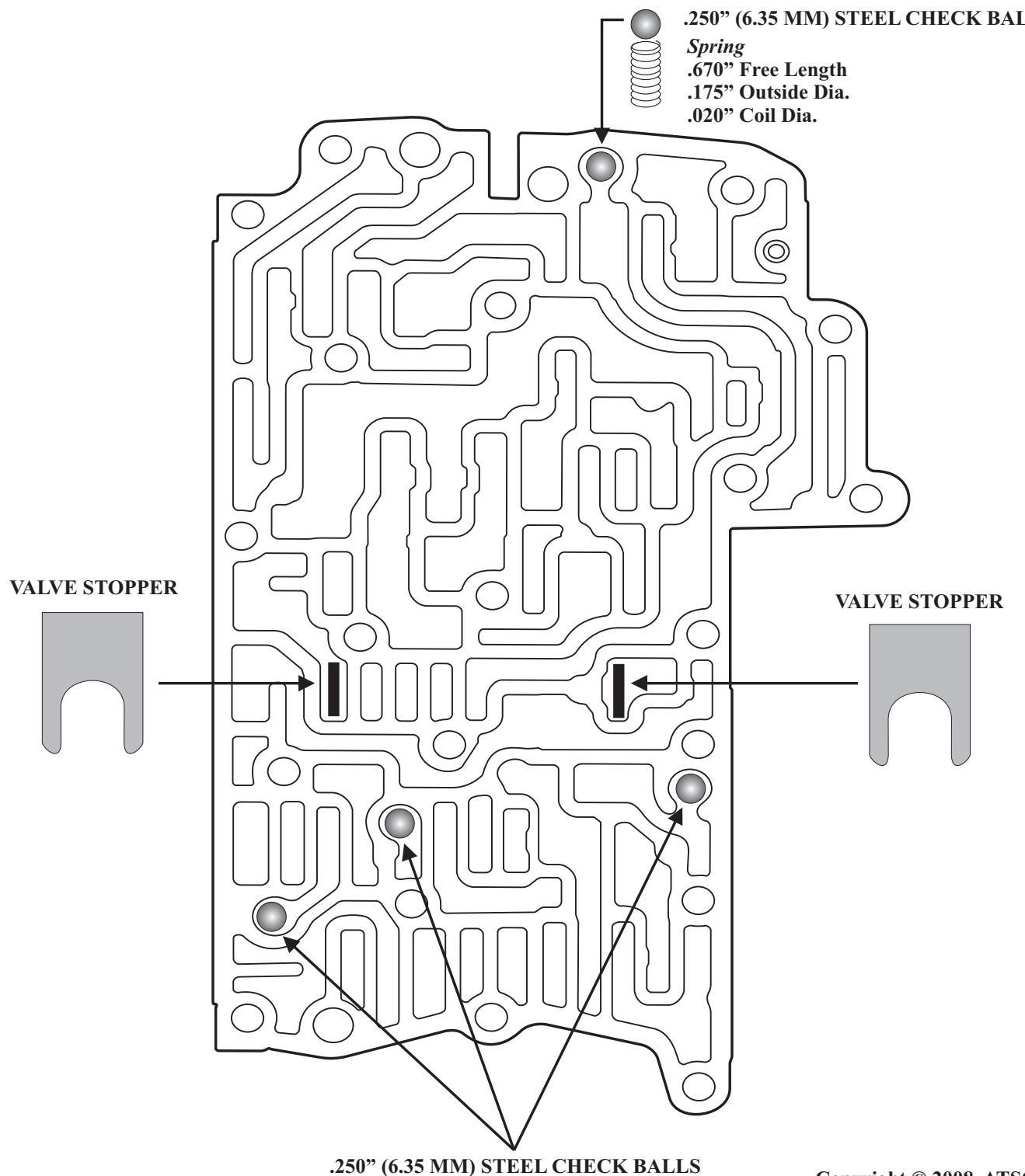
##### **Number 6 Checkball**

The number six checkball is located in the upper valve body. This "one way orifice control" type checkball is used to differentiate the flow rate of fluid between applying and releasing the 1-2-3-4 clutch. 2-6 clutch/1-2-3-4 clutch feed fluid opens the checkball, while the transmission is operating in Drive 1st, 2nd, 3rd, 4th, 5th or 6th gear. With the ball in this position, 2-6 clutch/1-2-3-4 clutch feed fluid flows freely into the 1-2-3-4 clutch feed passage. When Park, Reverse or Neutral is selected after the transmission was operating in Drive, exhausting 1-2-3-4 clutch feed fluid seats the checkball, and forces exhausting fluid through orifice number 32, which allows for a controlled exhaust of the 1-2-3-4 clutch.

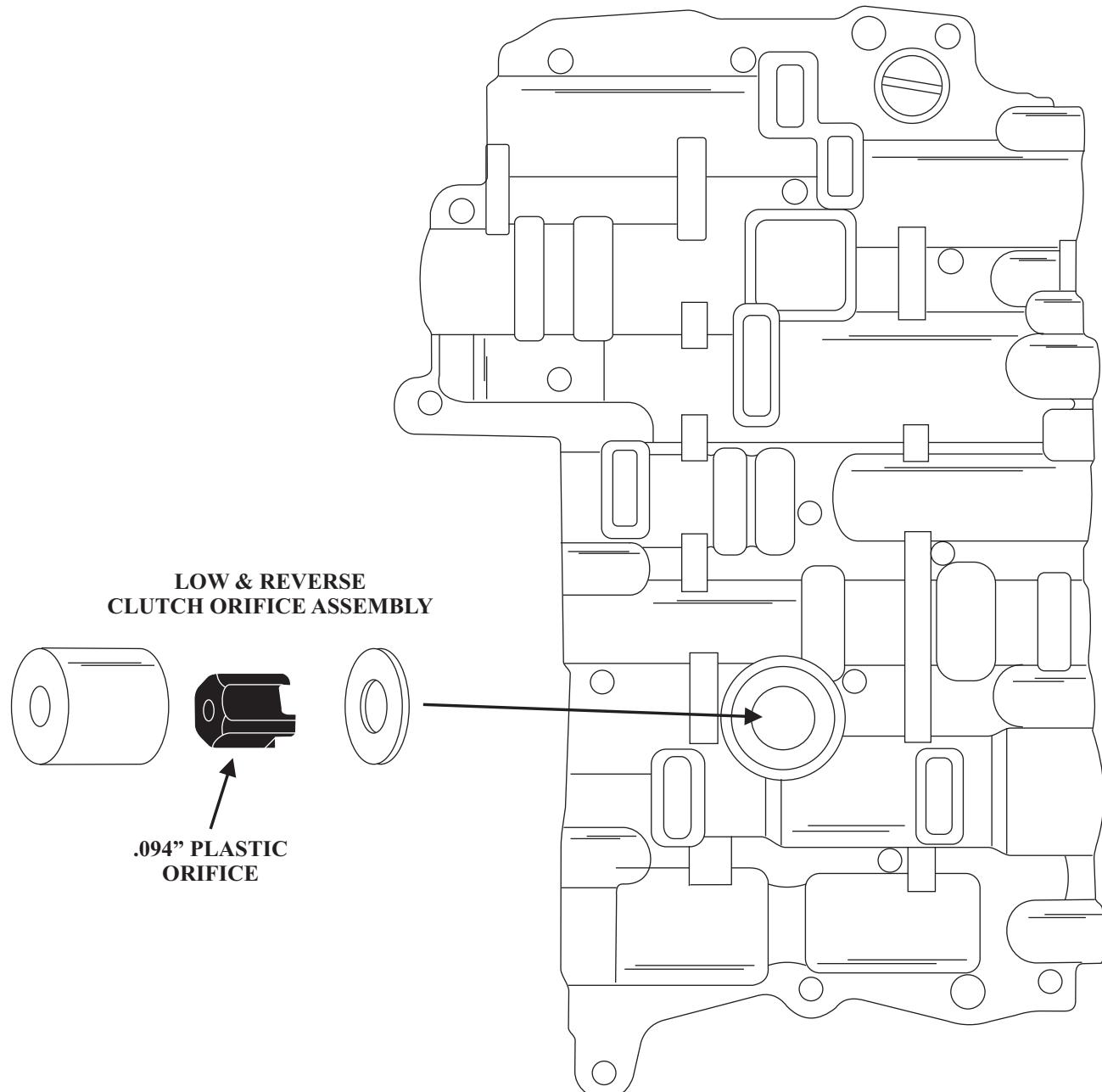
##### **Number 7 Checkball**

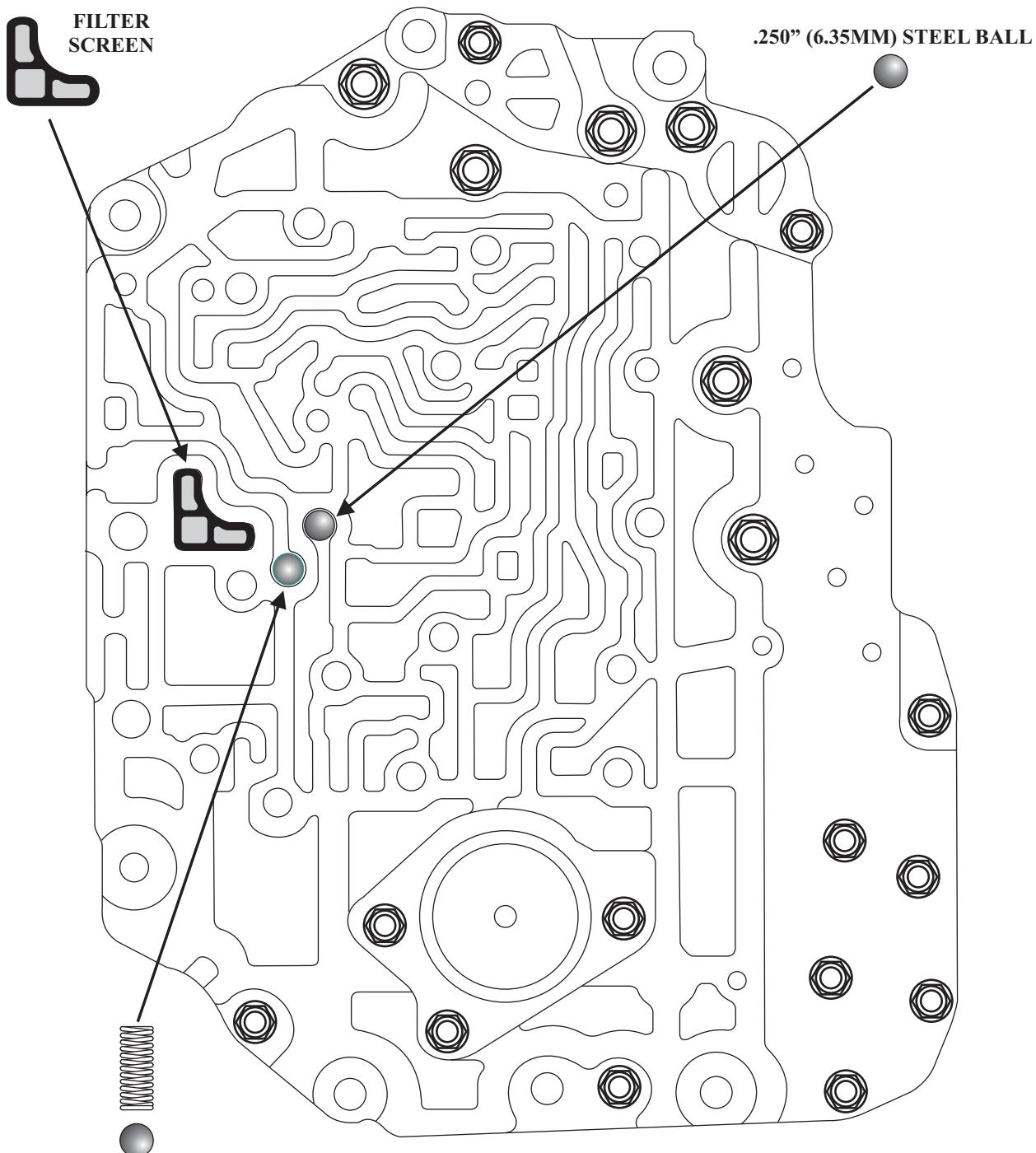
The number seven checkball is located in the upper valve body. This "one way orifice control" type checkball is used to differentiate the flow rate of fluid between applying and releasing the 3-5/Reverse clutch. 3-5/Reverse Supply fluid pressure seats the checkball against the 3-5/Reverse Feed passage, while the transmission is operating in Reverse, Drive 1st, 2nd, 3rd, 4th, 5th or 6th gear. With the checkball in this position, 3-5/Reverse Supply fluid is forced through orifice number 25 before entering the 3-5/Reverse Feed passage. The orifice helps control the apply rate of the 3-5/Reverse clutch when the transmission shifts into Reverse, 3rd or 5th gear. When Park or Neutral is selected after the transmission was operating in Drive, or Reverse, exhausting 3-5/Reverse Feed fluid unseats the checkball. This allows for a faster exhaust of 3-5/Reverse Feed fluid and a quick release of the 3-5/Reverse clutch.

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HYUNDAI  
A4AF1/A4AF2/A4BF1  
A4AF3/A4BF2  
*UPPER VALVE BODY*

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HYUNDAI  
A4AF1/A4AF2/A4BF1  
A4AF3/A4BF2  
(REVERSE SIDE)

HYUNDAI  
A4AF1/A4AF2/A4BF1  
A4AF3/A4BF2  
*INTERMEDIATE PLATE*

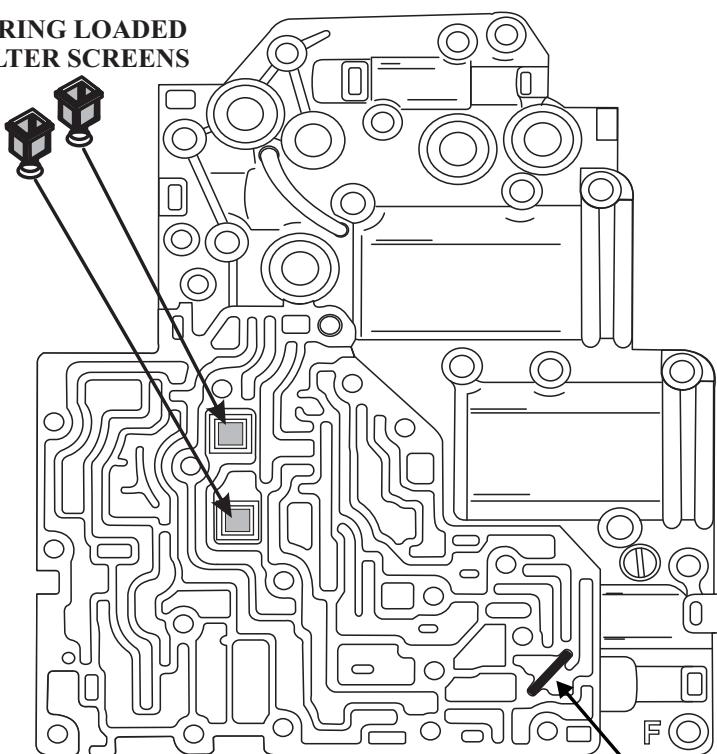
INSTALL .250"  
STEEL BALL FIRST  
THEN .680" x .274" x .040"  
SPRING

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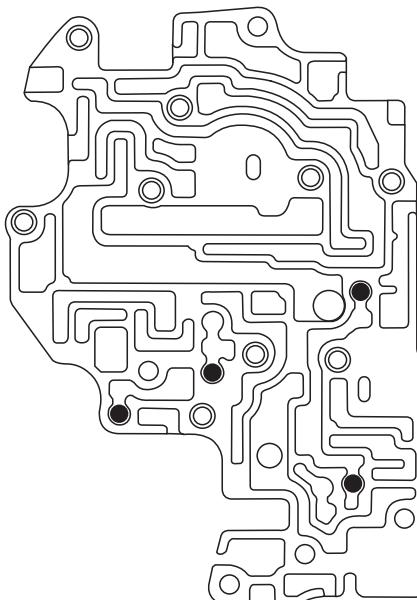
**MAZDA**  
**JA5A-EL/5F31J (JF506E)**

**LOWER VALVE BODY**

SPRING LOADED  
FILTER SCREENS



**UPPER VALVE BODY**

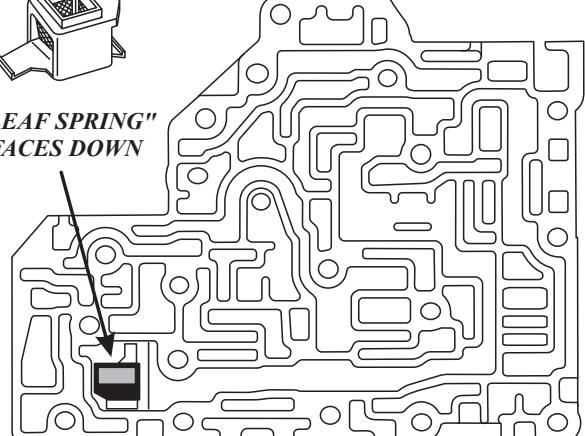


- = 9 PLASTIC BALL .218" (5.5MM) DIAMETER
- = 4 STEEL BALL .218" (5.5MM) DIAMETER

STAND OFF  
FILTER SCREEN

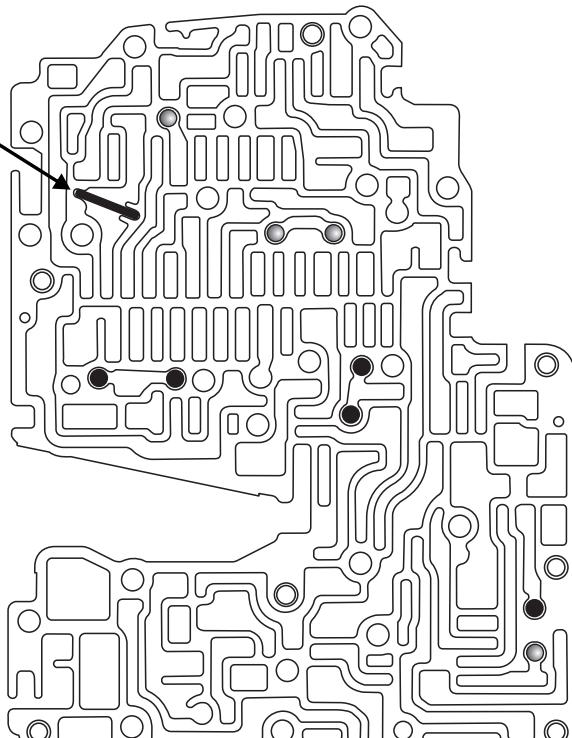


"LEAF SPRING"  
FACES DOWN



**SUB LOWER VALVE BODY**

FILTER  
SCREEN



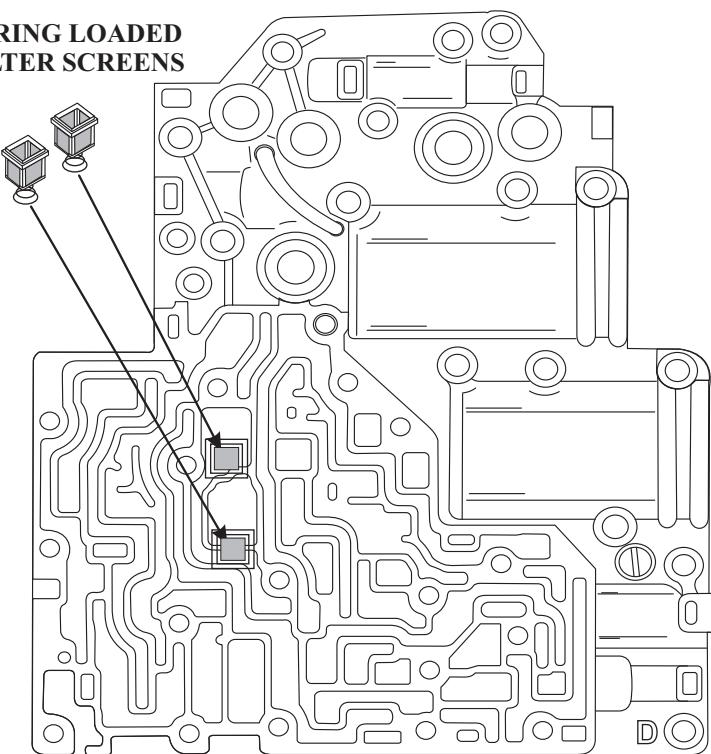
**INTERMEDIATE VALVE BODY**

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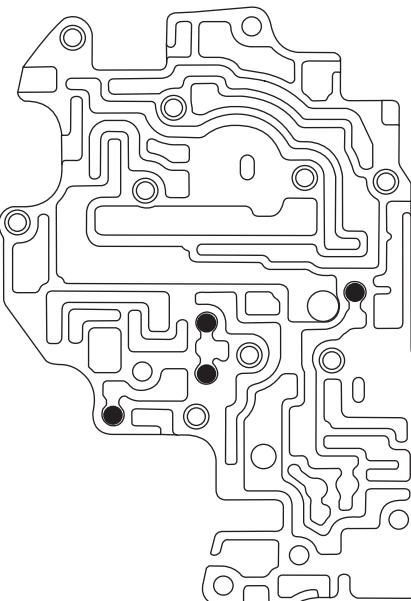
**VOLKSWAGEN  
09A (JF506E)**

**LOWER VALVE BODY**

SPRING LOADED  
FILTER SCREENS

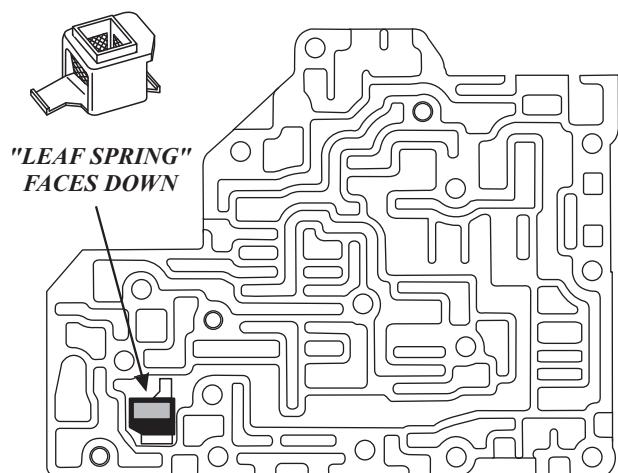


**UPPER VALVE BODY**

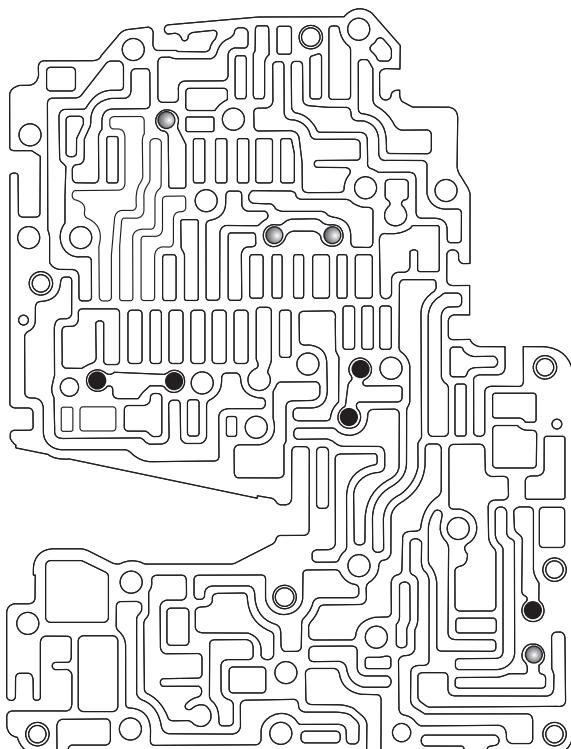


- = 9 PLASTIC BALL .218" (5.5MM) DIAMETER
- = 4 STEEL BALL .218" (5.5MM) DIAMETER

STAND OFF  
FILTER SCREEN



**SUB LOWER VALVE BODY**



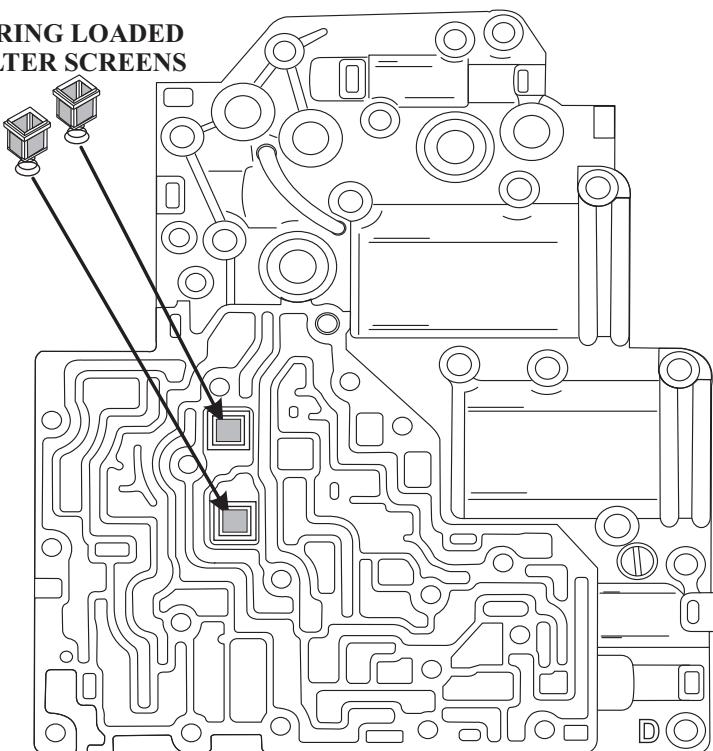
**INTERMEDIATE VALVE BODY**

Copyright © 2008 ATSG

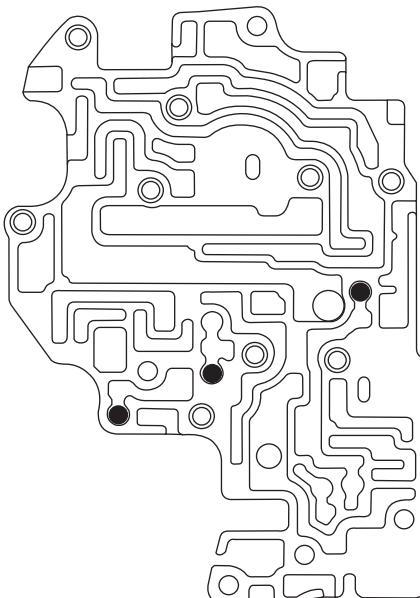
**JAGUAR**  
**JF506E**

**LOWER VALVE BODY**

SPRING LOADED  
FILTER SCREENS

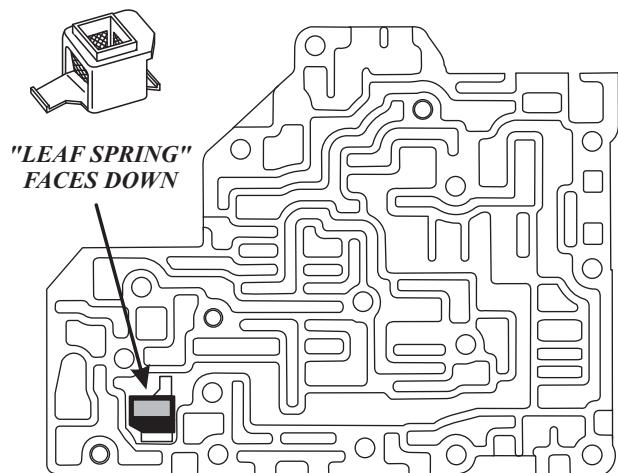


**UPPER VALVE BODY**

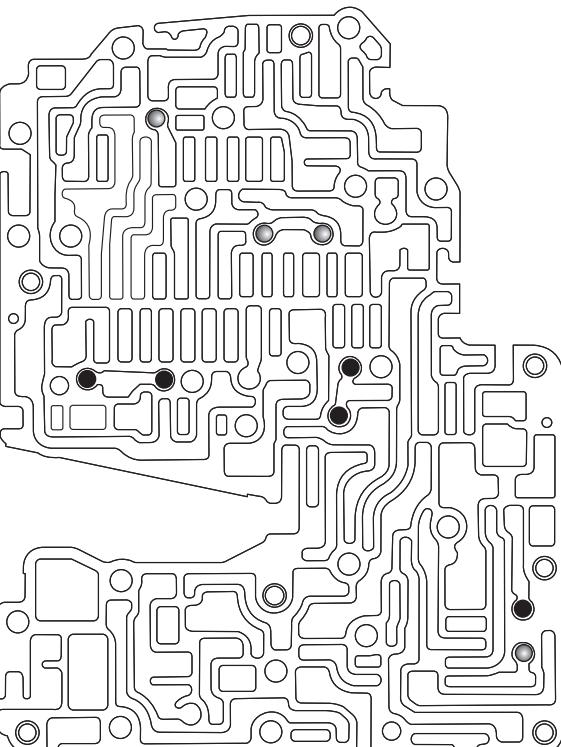


- = 8 PLASTIC BALL .218" (5.5MM) DIAMETER
- = 4 STEEL BALL .218" (5.5MM) DIAMETER

STAND OFF  
FILTER SCREEN



**SUB LOWER VALVE BODY**

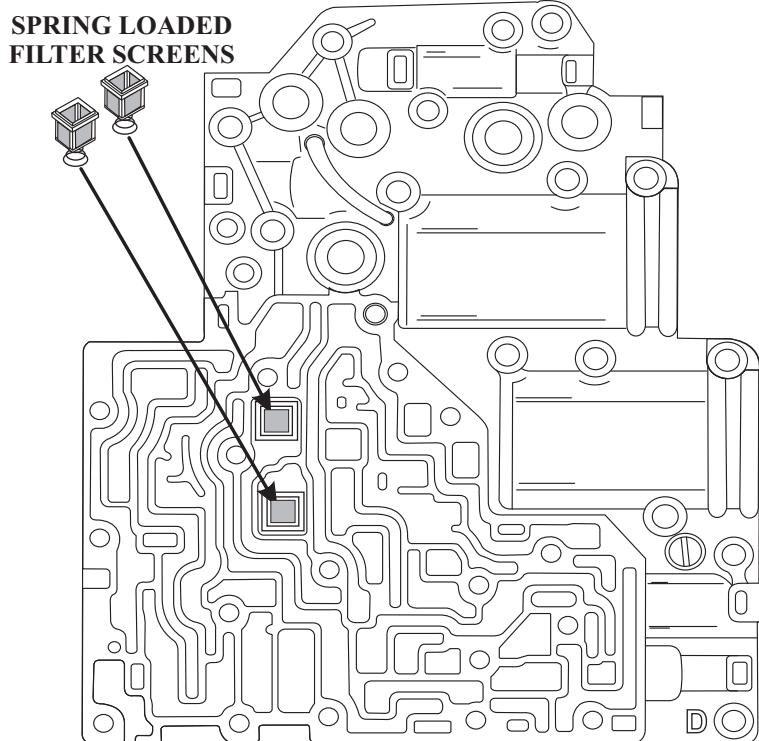


**INTERMEDIATE VALVE BODY**

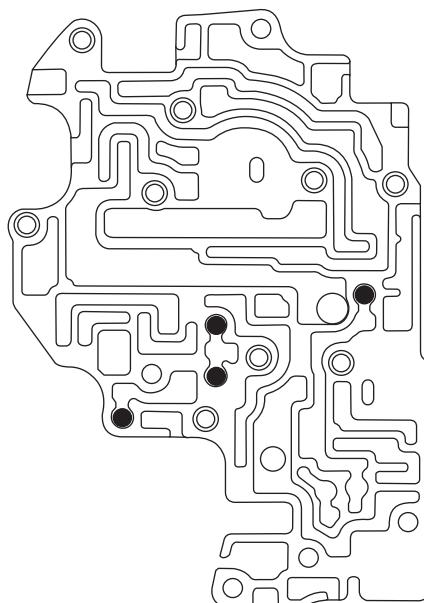
Copyright © 2008 ATSG

**LAND ROVER FREELANDER**  
**JF506E**

**LOWER VALVE BODY**

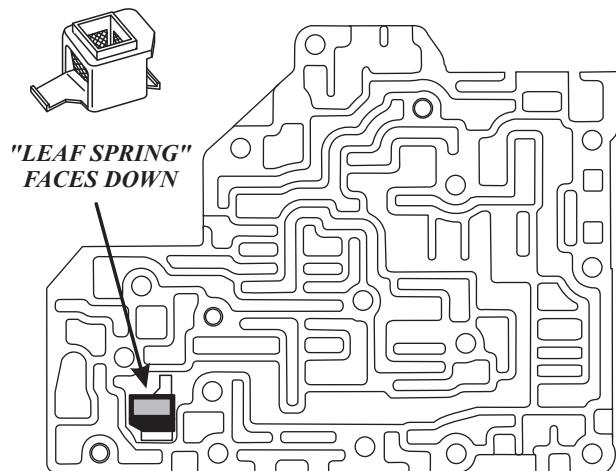


**UPPER VALVE BODY**

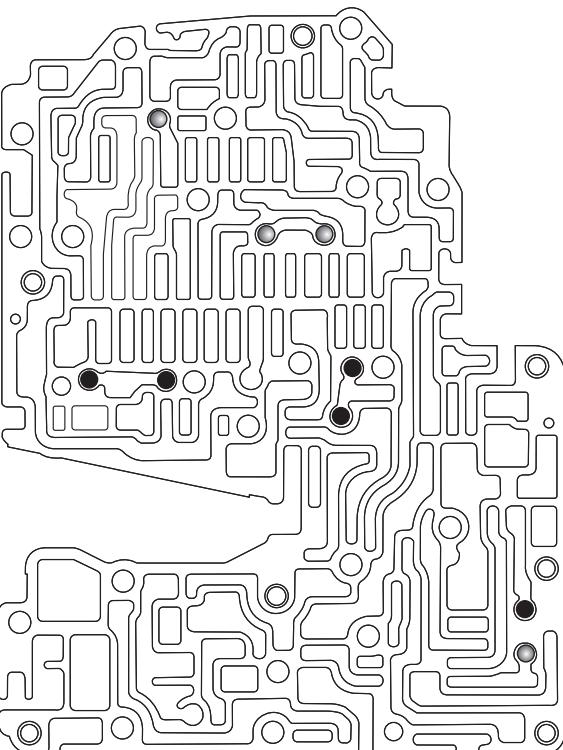


- = 9 PLASTIC BALL .218" (5.5MM) DIAMETER
- = 4 STEEL BALL .218" (5.5MM) DIAMETER

**STAND OFF  
FILTER SCREEN**

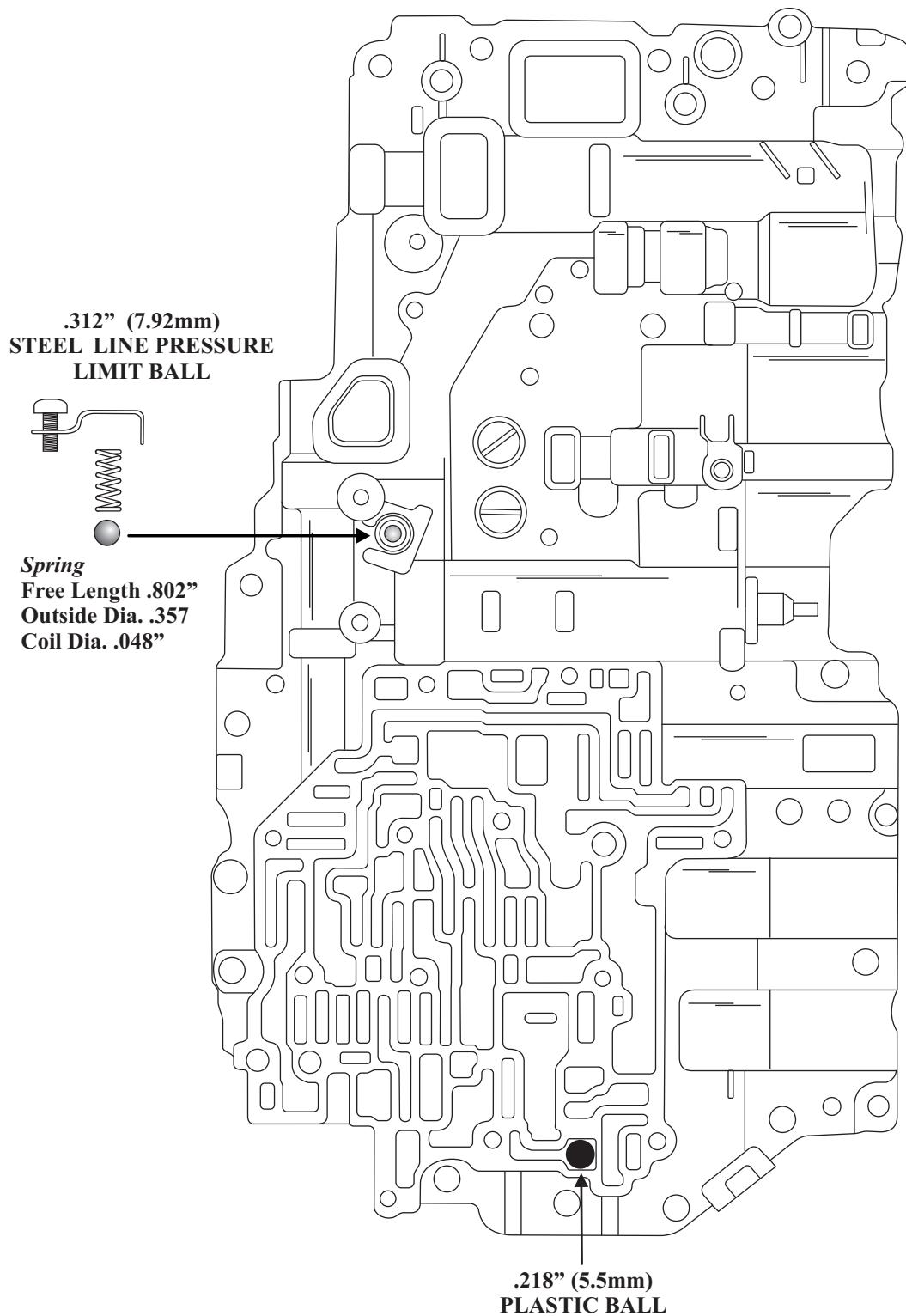


**SUB LOWER VALVE BODY**

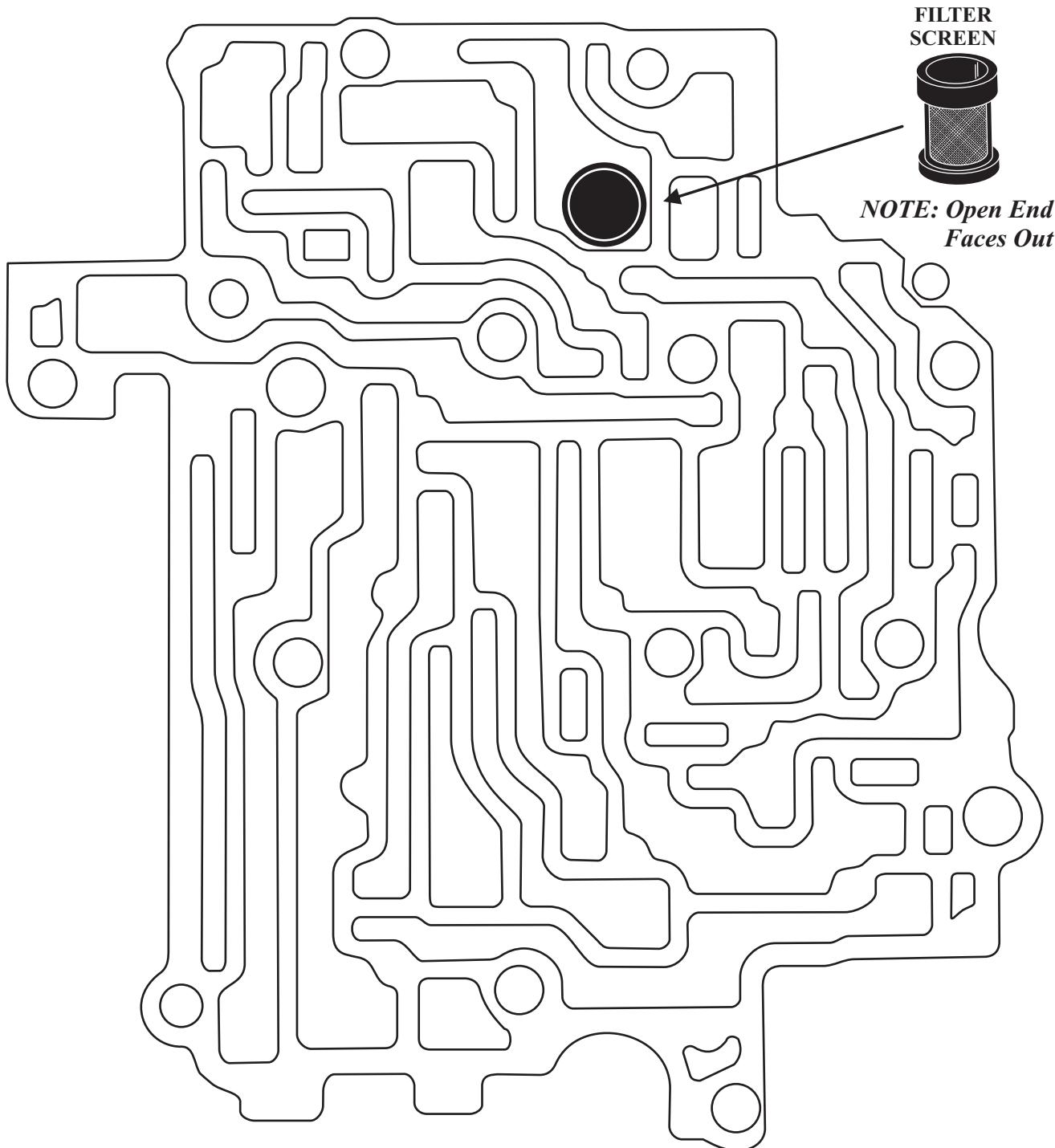


**INTERMEDIATE VALVE BODY**

Copyright © 2008 ATSG

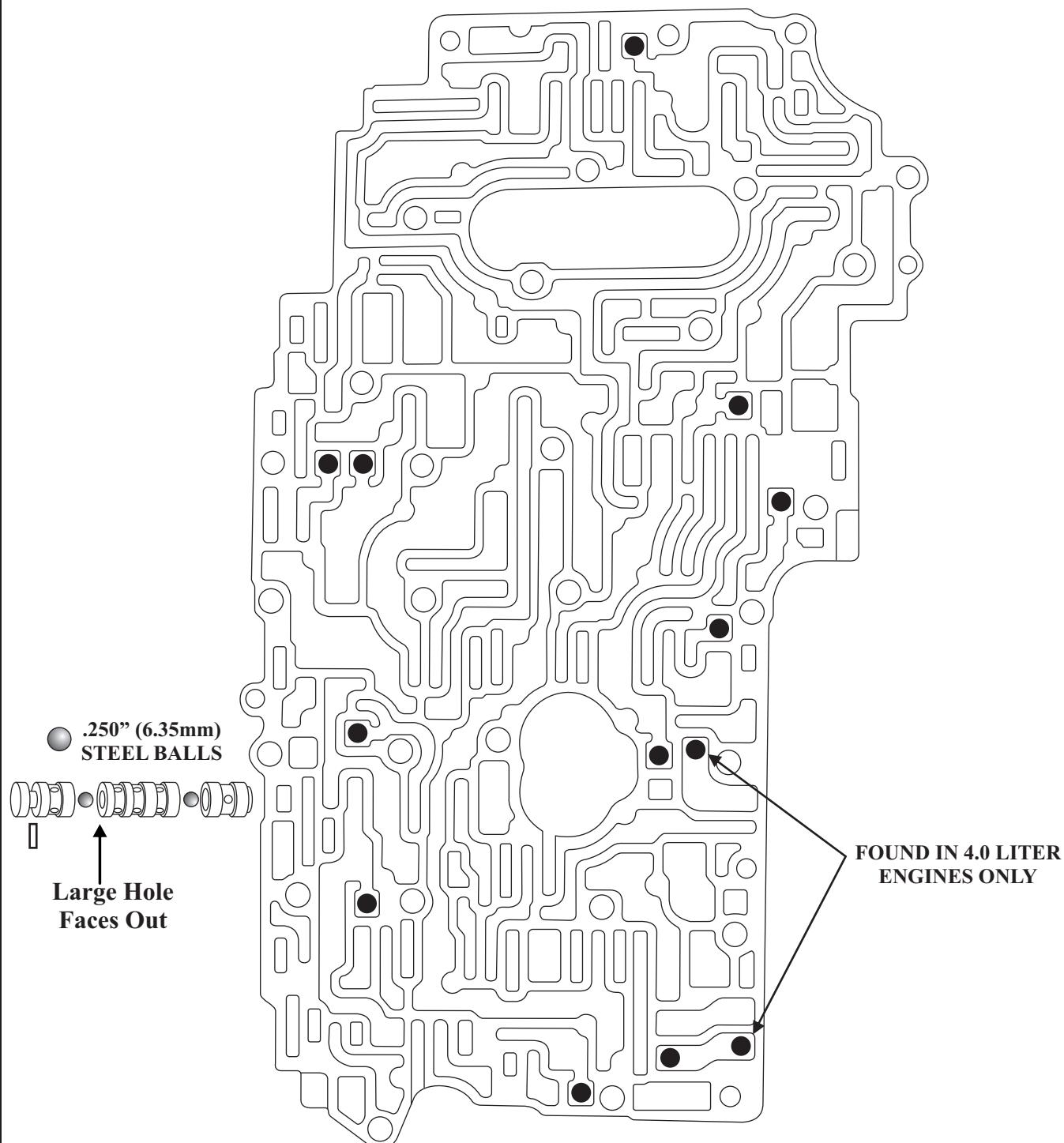
LEXUS  
A650E**LOWER VALVE BODY - BOTTOM SIDE (LARGE)**

Copyright © 2008 ATSG

LEXUS  
A650E***LOWER VALVE BODY - BOTTOM SIDE (SMALL)***

LEXUS  
A650E

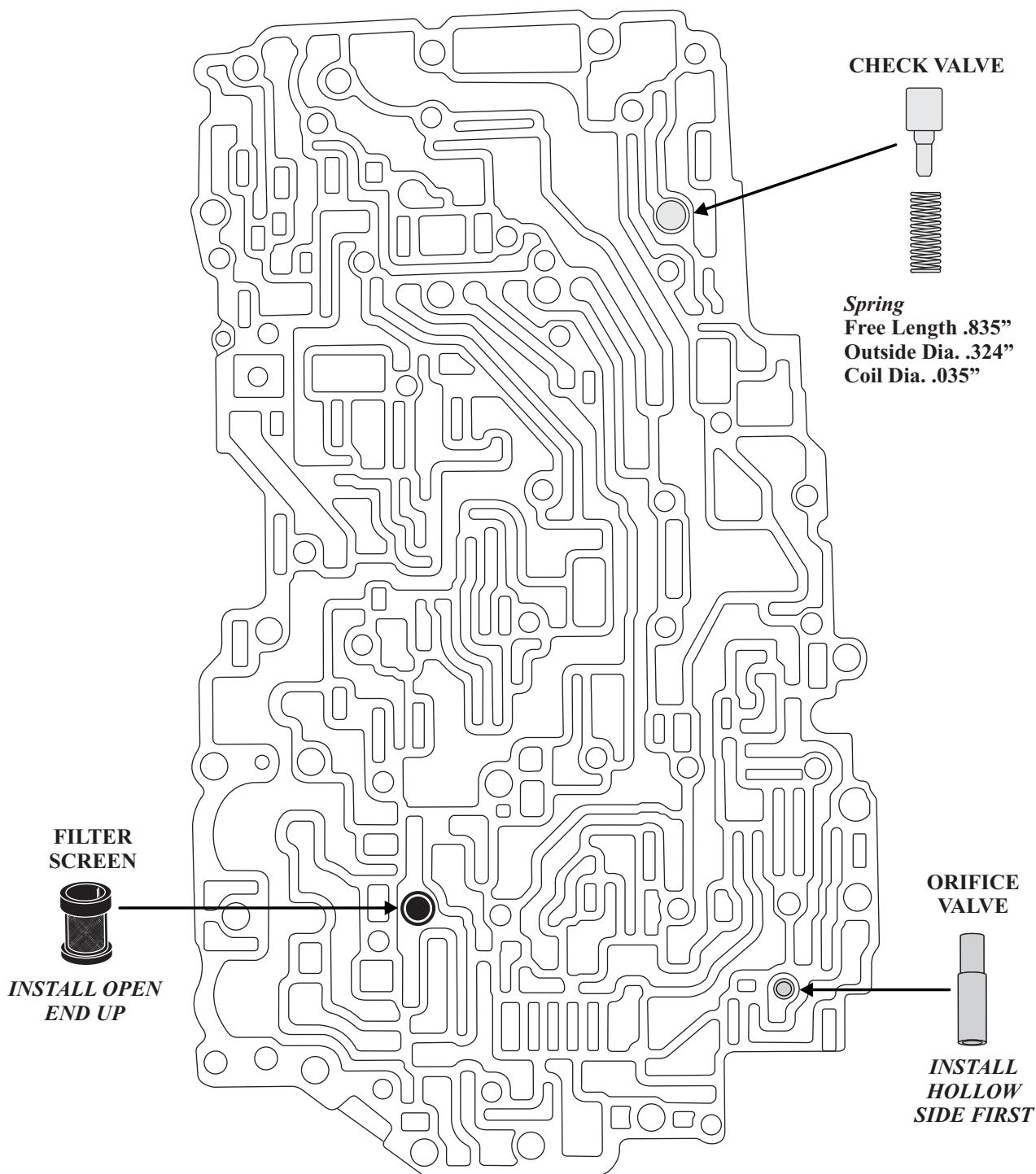
## UPPER VALVE BODY

*All Checkballs. 218" Plastic Balls*

Copyright © 2008 ATSG

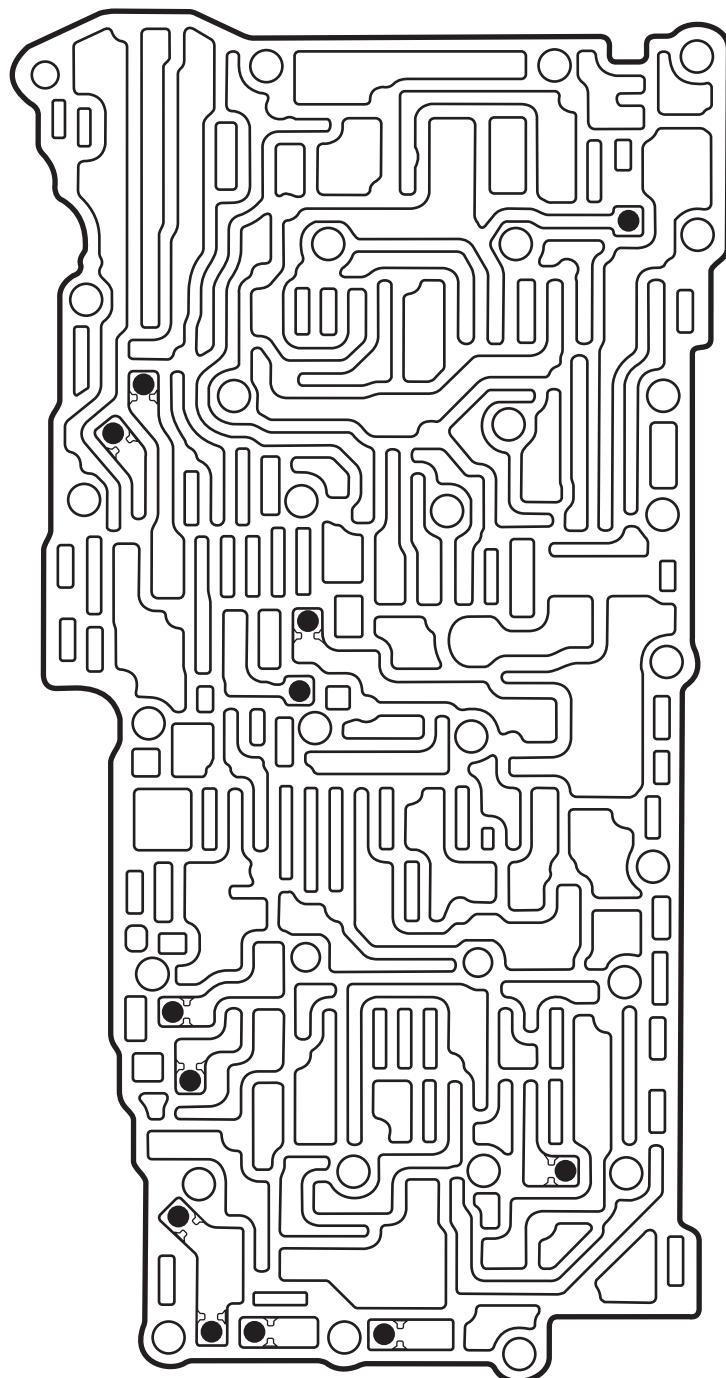
LEXUS  
A650E

## LOWER VALVE BODY



LEXUS  
A761E

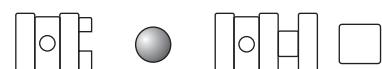
## UPPER VALVE BODY #1



C3 CHECK VALVE



B4 CHECK VALVE

 .250" (6.35mm)  
STEEL BALLS*All Checkballs Are Rubber .217" (5.5mm)*

Copyright © 2008 ATSG



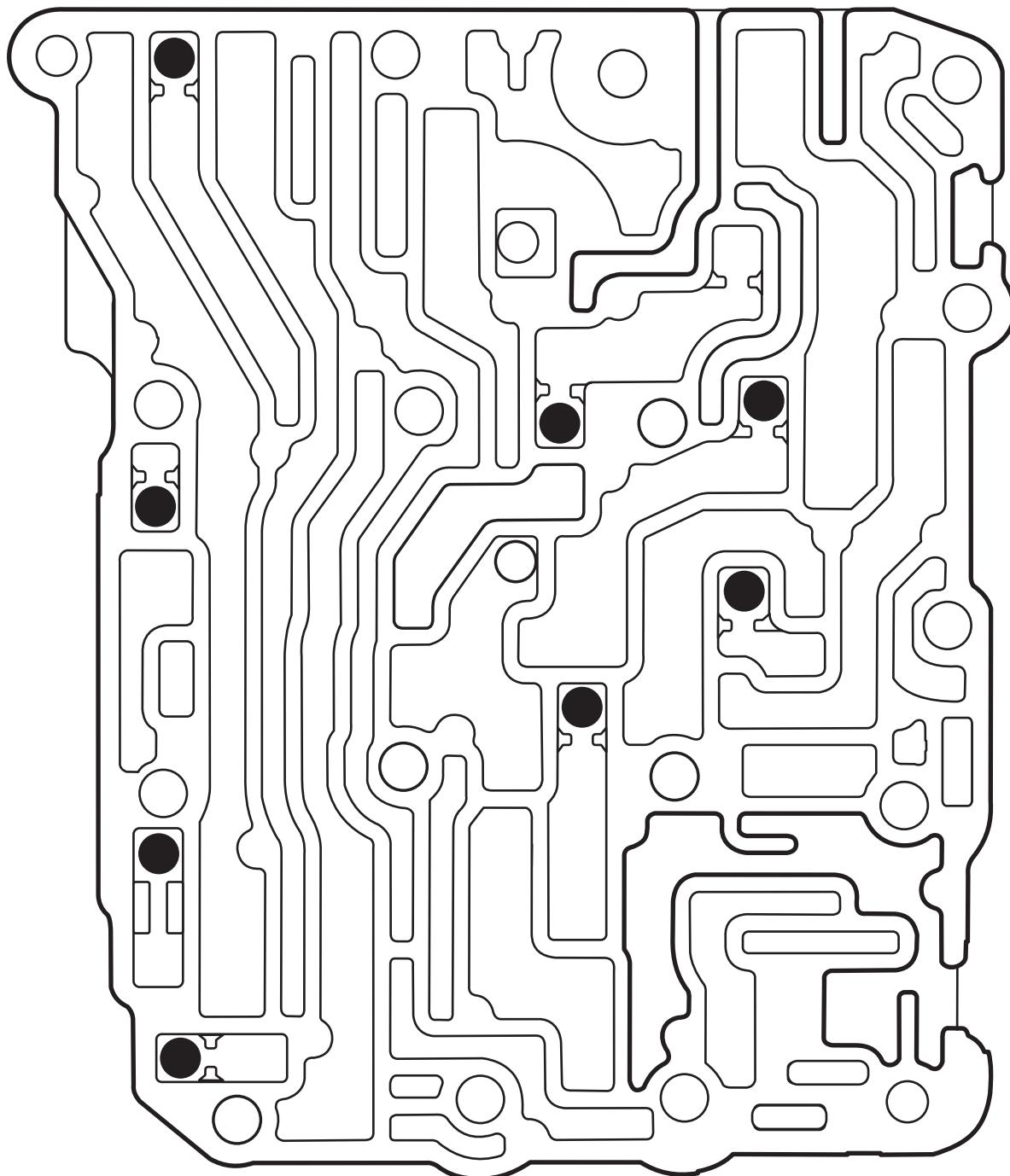
# CHECKBALL BOOK

## *Import Volume III*

LEXUS  
A761E

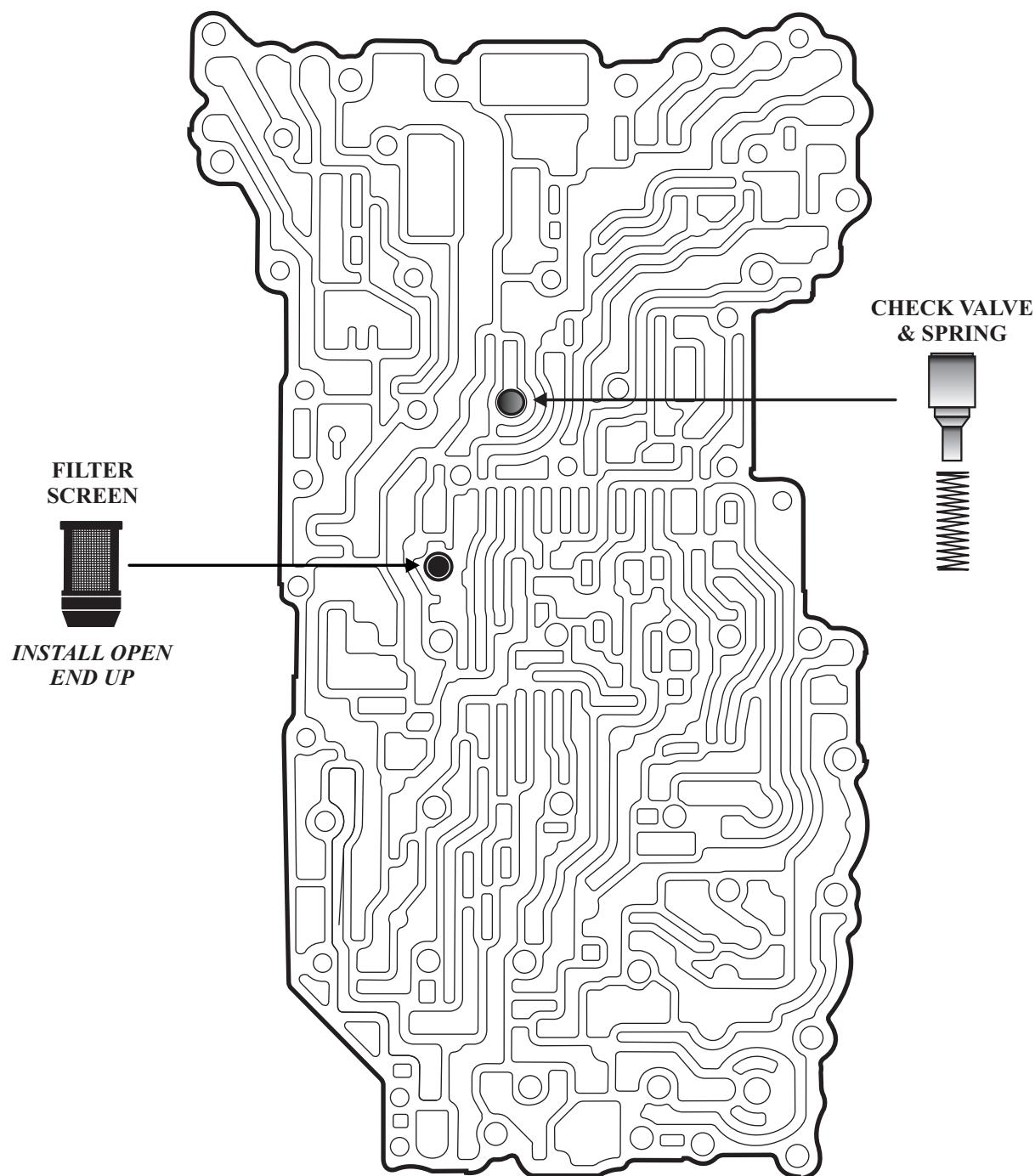
LEXUS  
A761E

**UPPER VALVE BODY #2**



*All Checkballs Are Rubber .217" (5.5mm)*

Copyright © 2008 ATSG

LEXUS  
A761E**LOWER VALVE BODY #1**

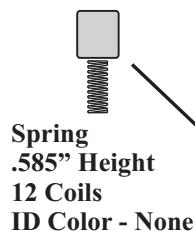
Copyright © 2008 ATSG

## MAZDA

## AW6A-EL

## SOLENOID VALVE BODY

Piston  
.392" Outside Dia.  
.433" Height



*NOTE: This is an AW6A-EL valve body from a Mazda.  
This transmission is used in the other following vehicles:*

*Ford - AWF21*

*Saab - AF40-6*

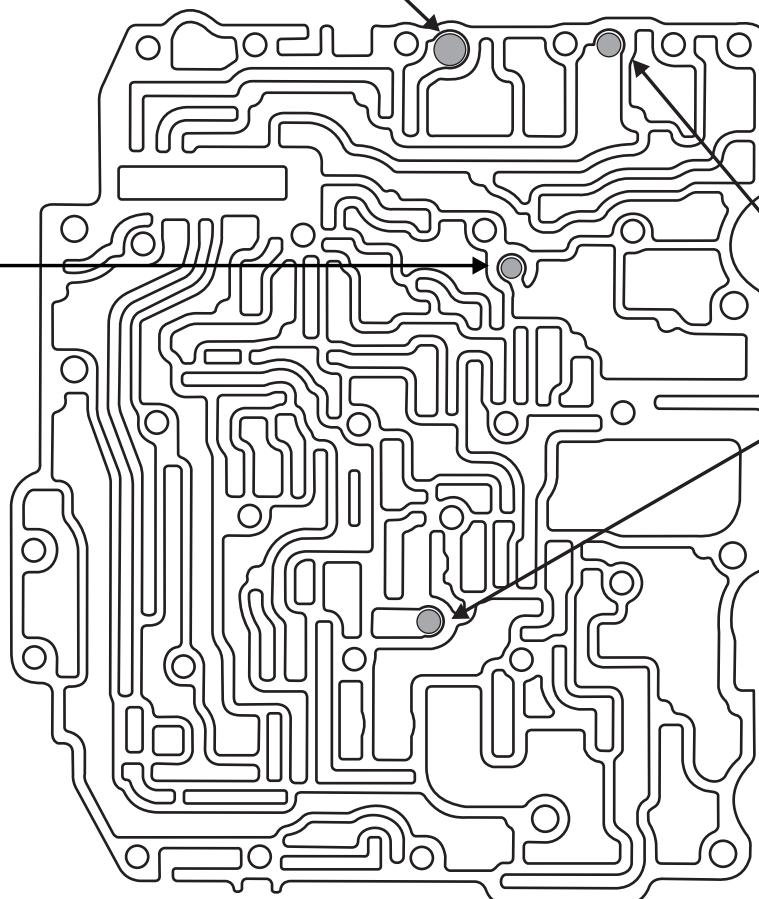
*Volvo - AWTF-80SC*

*Land Rover - AWF21*

*Hyundai - Shiftronic*

*Exercise care when disassembling your valve body  
as it may have different small parts locations.*

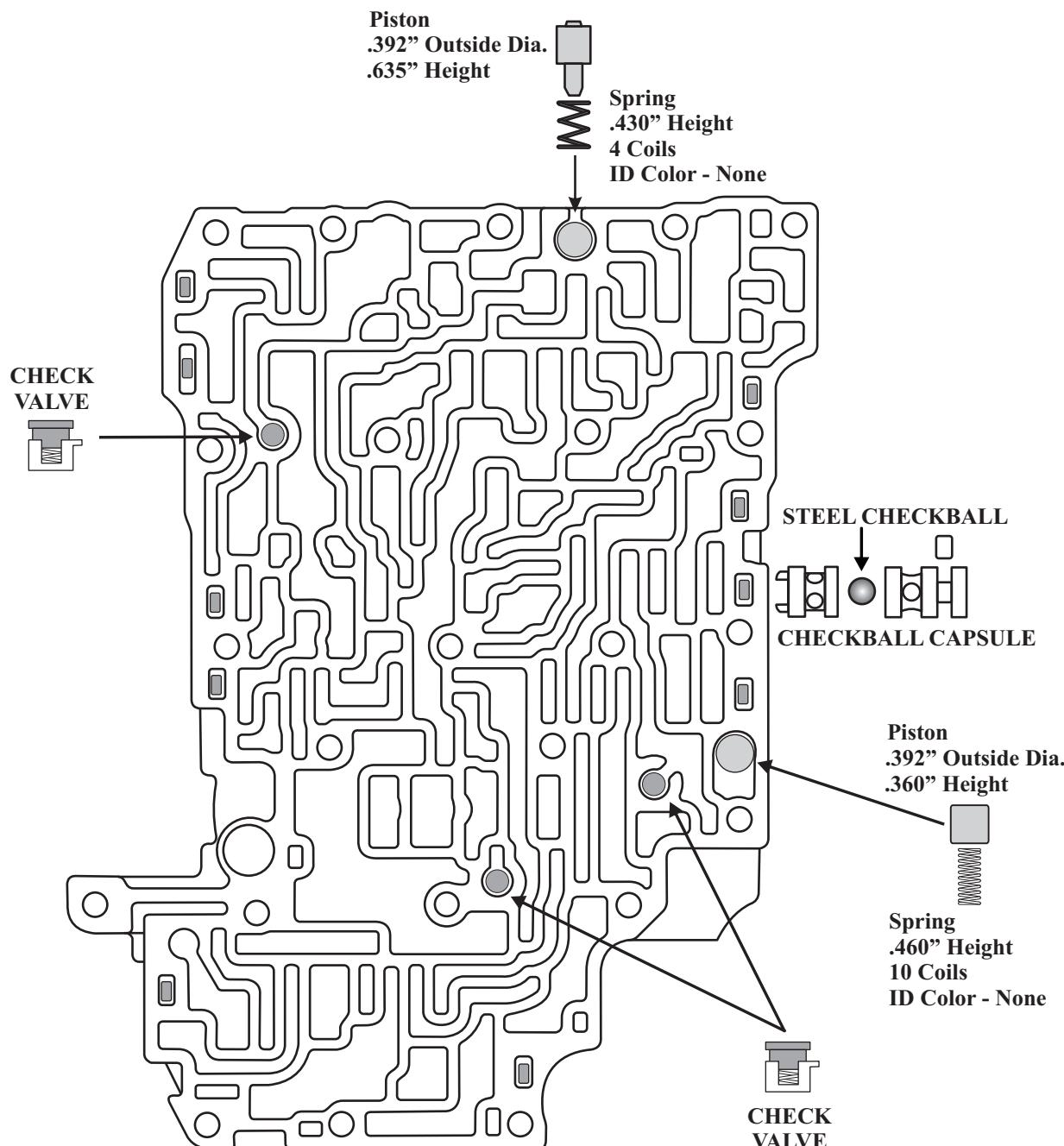
CHECK  
VALVE



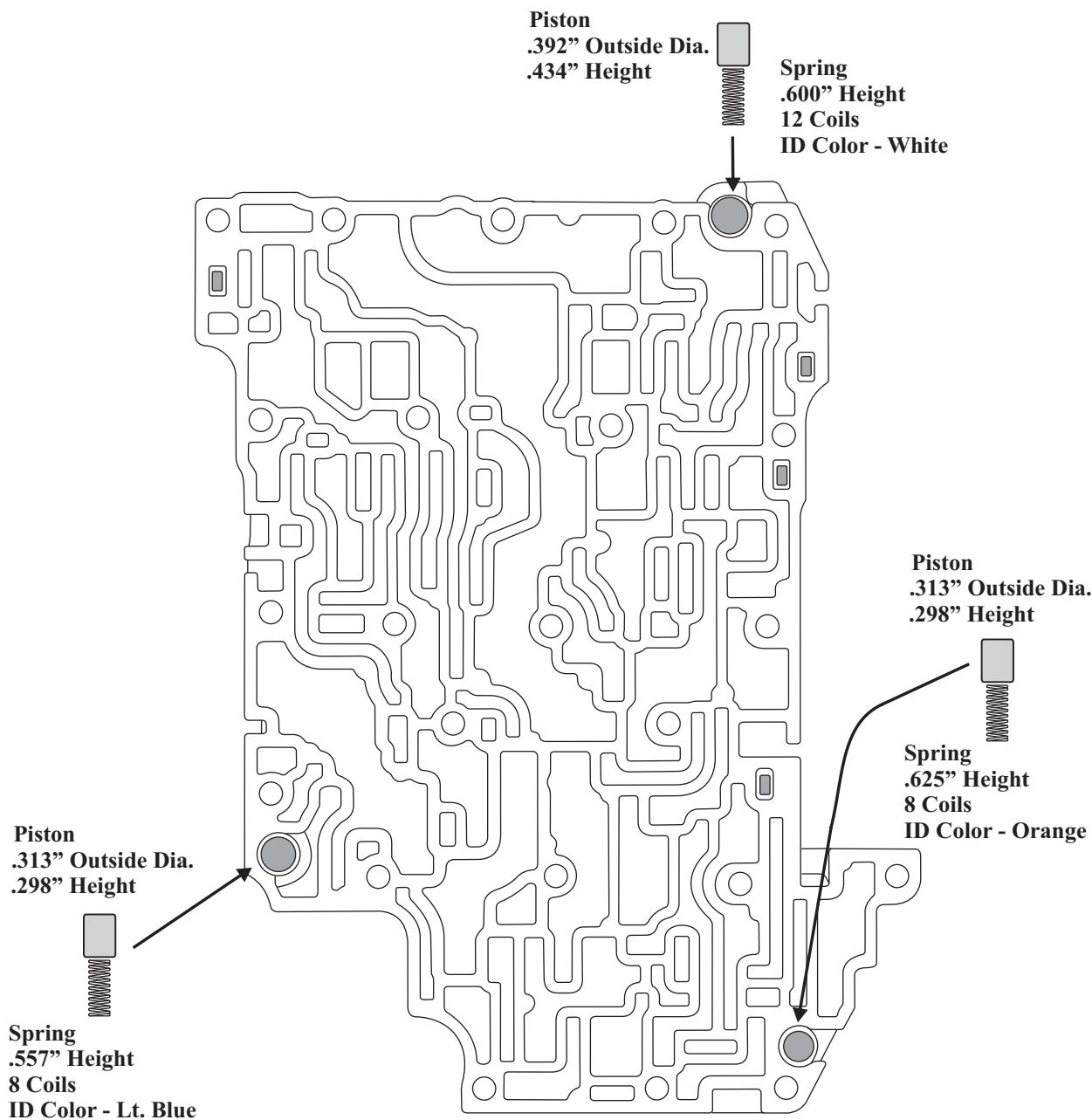
Piston  
.313" Outside Dia.  
.298" Height

Spring  
.377" Height  
10 Coils  
ID Color Orange

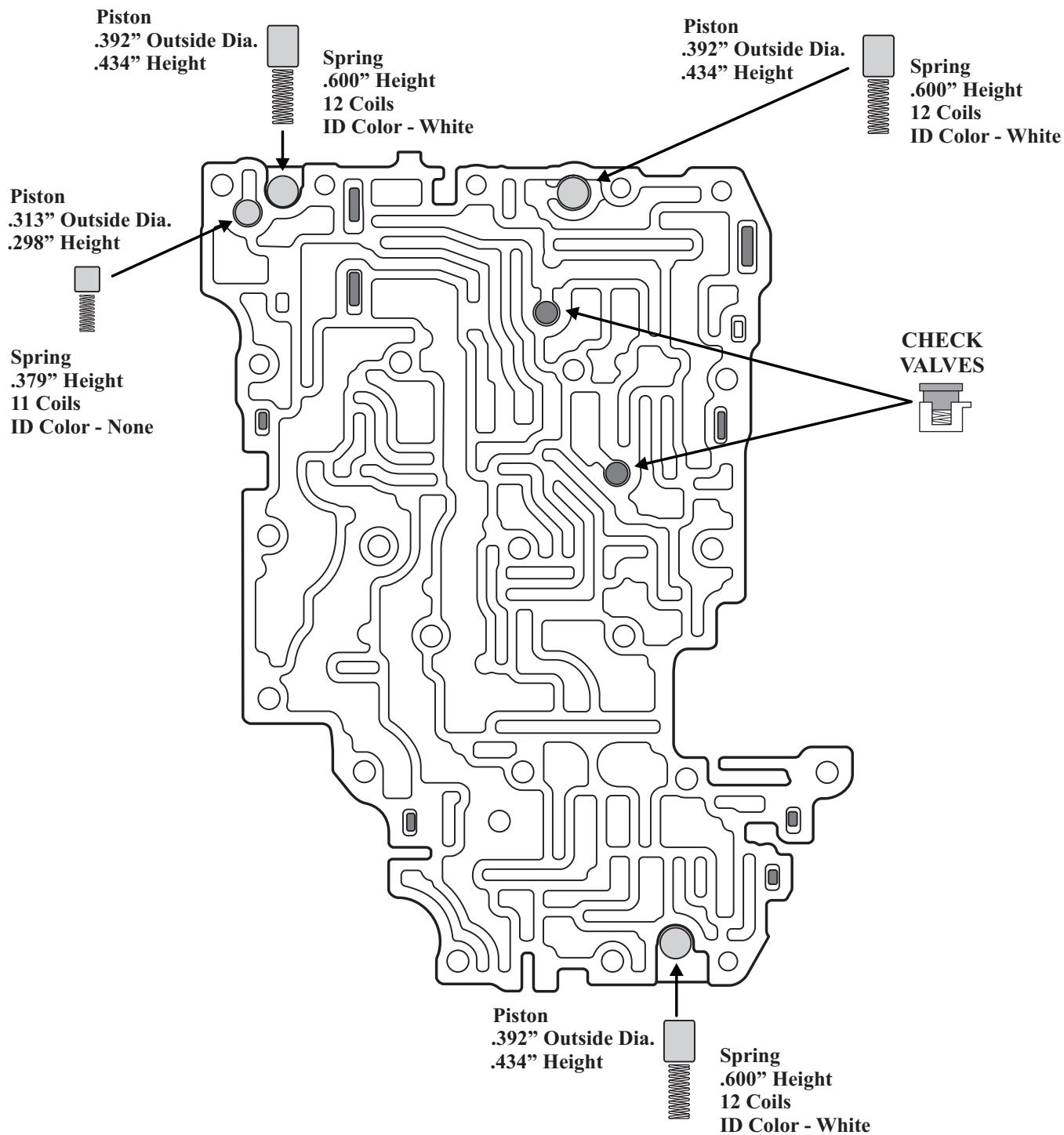
**MAZDA**  
**AW6A-EL**  
**MIDDLE VALVE BODY (Front Side)**



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MAZDA  
AW6A-EL  
*MIDDLE VALVE BODY (Rear Side)*

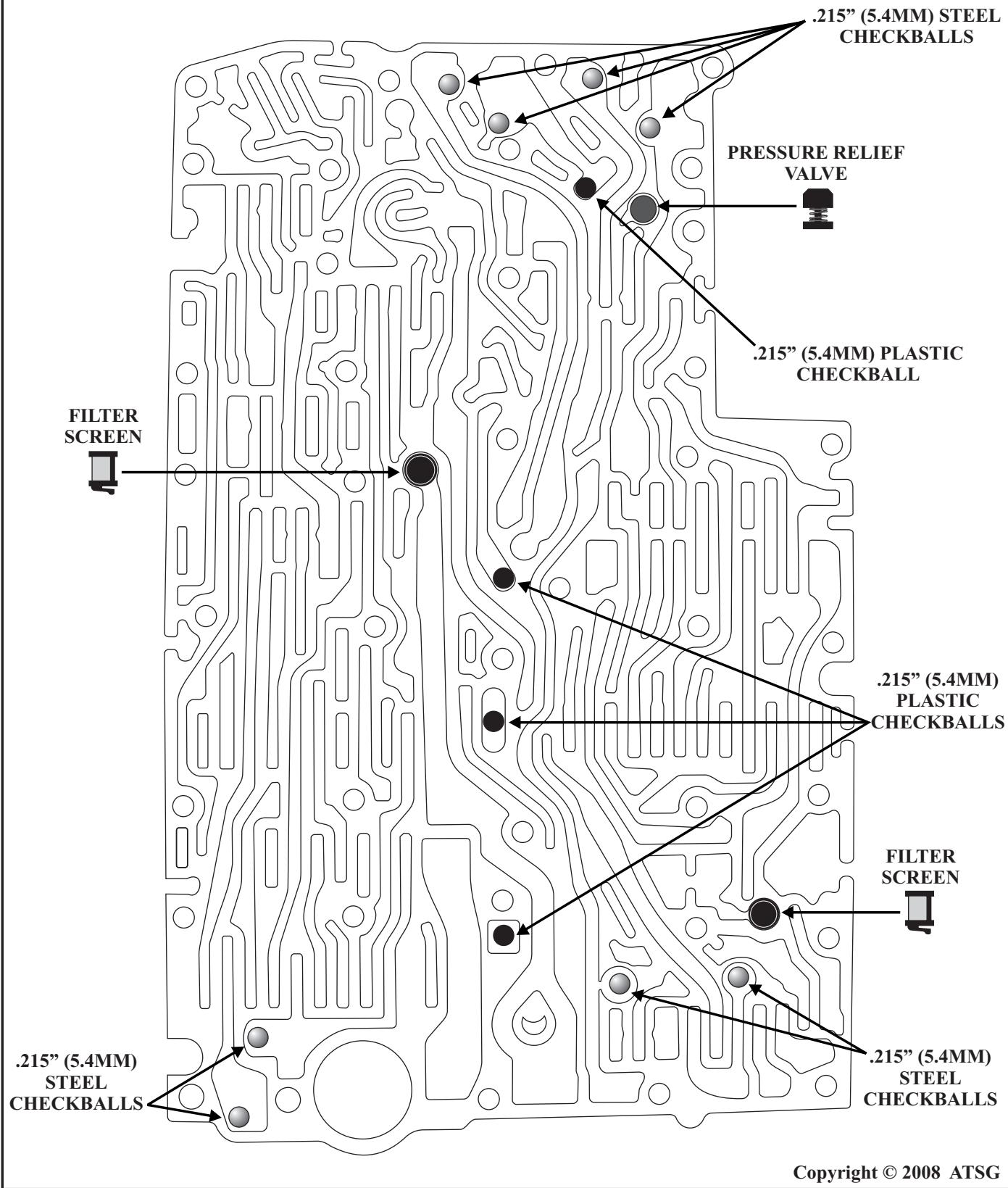
**MAZDA**  
**AW6A-EL**  
**ACCUMULATOR VALVE BODY**



Copyright © 2008 ATSG

## MERCEDES BENZ 722.6

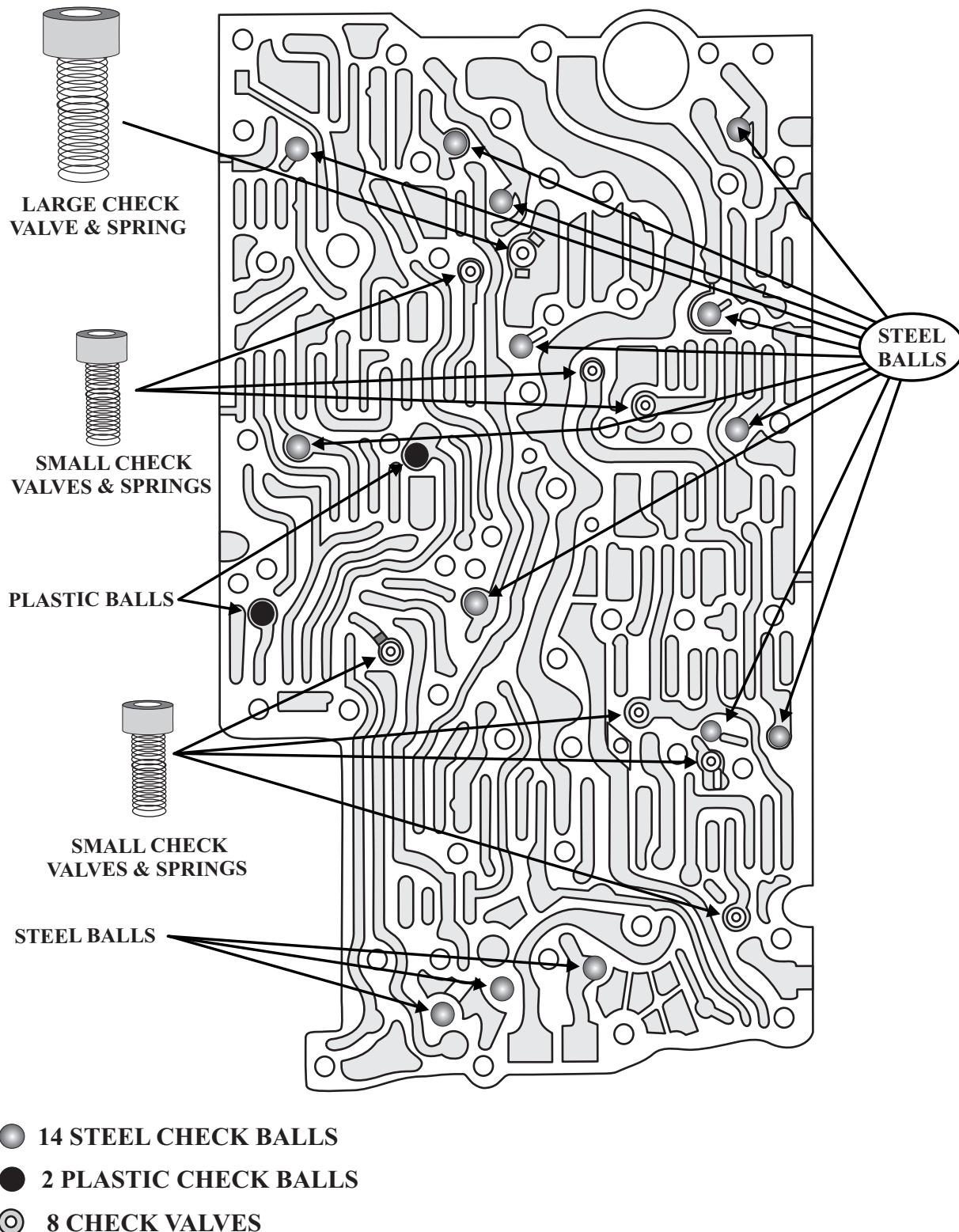
## LOWER VALVE BODY



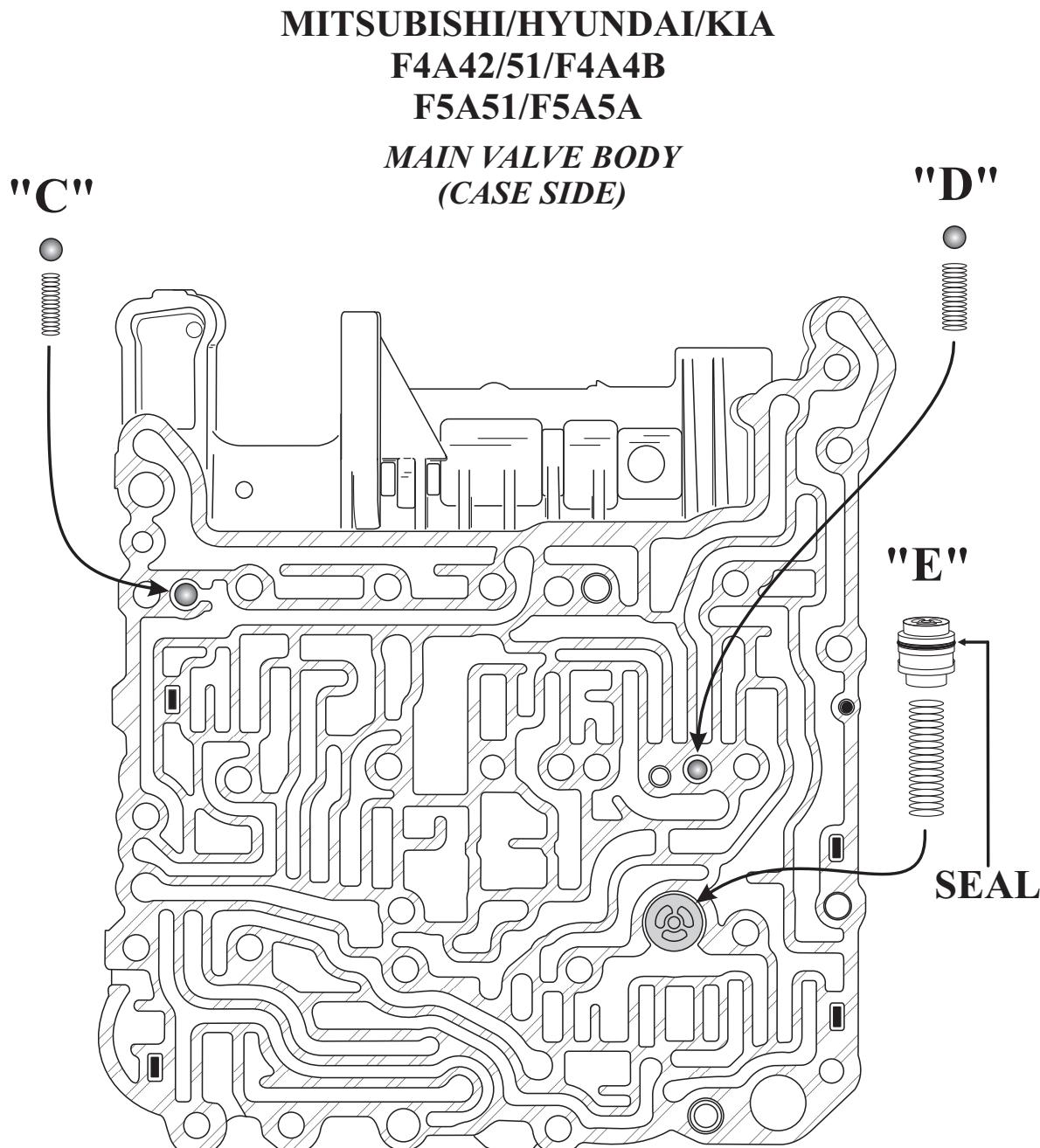
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## MERCEDES BENZ 722.9

7 SPEED



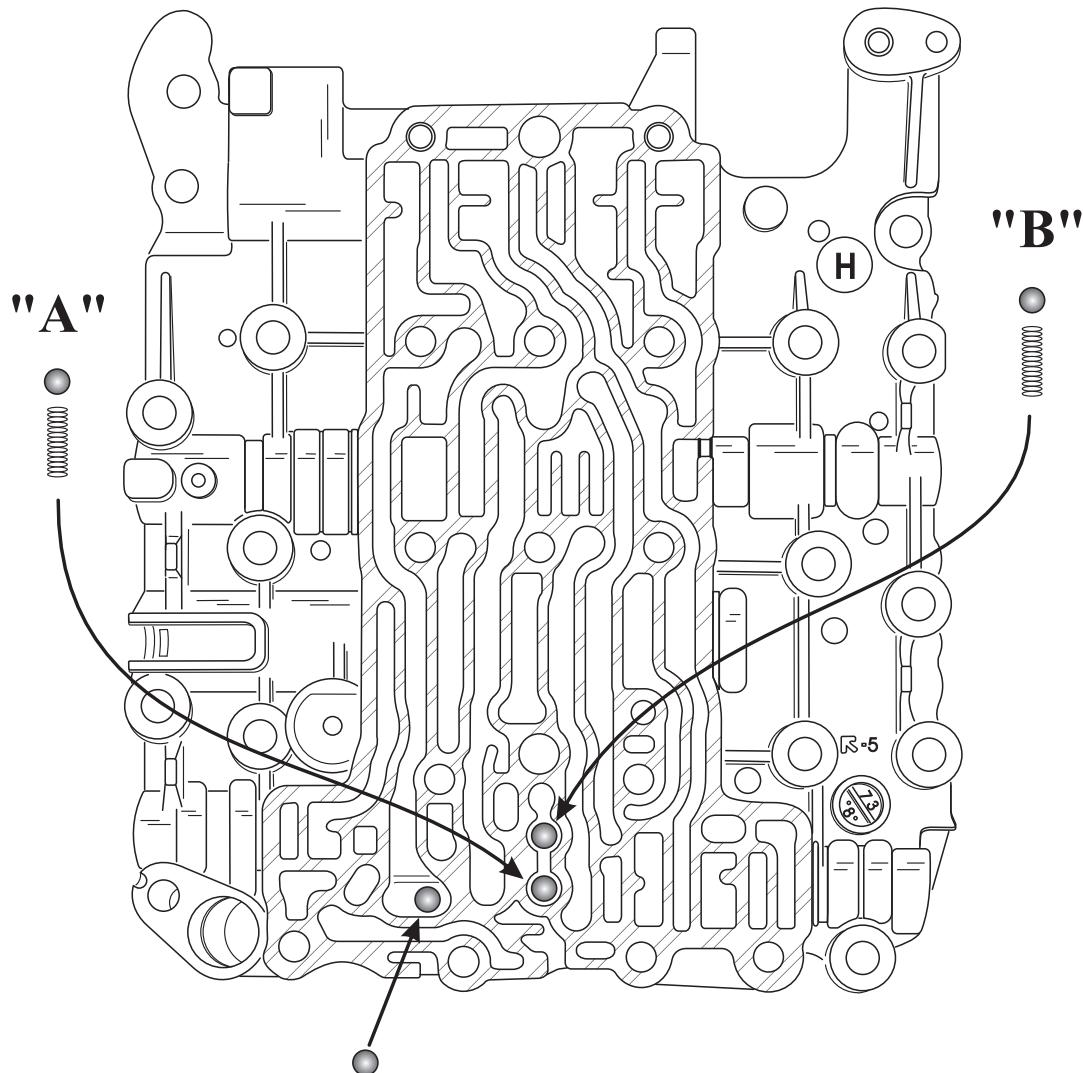
Copyright © 2008 ATSG



CHECKBALL AND SPRING DIMENSIONS		
SPRING	LENGTH	DIAMETER
"C"	.665"	.177"
"D"	.677"	.277"
"E"	1.398"	.300"

ALL CHECKBALLS ARE .250" (6.35MM) DIAMETER STEEL

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MITSUBISHI/HYUNDAI/KIA  
F4A42/51/F4A4B  
F5A51/F5A5AMAIN VALVE BODY  
(SOLENOID BODY SIDE)

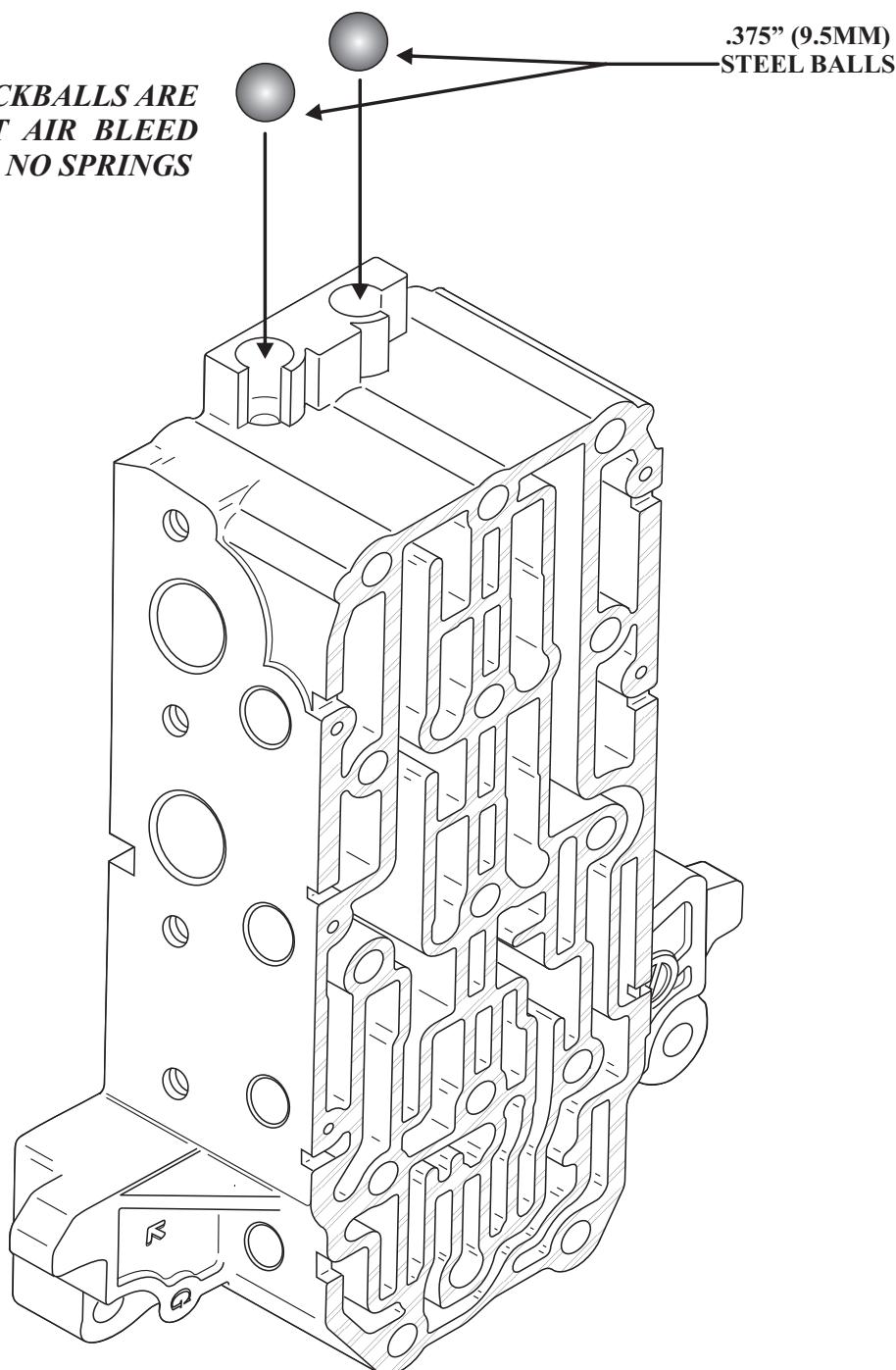
## CHECKBALL AND SPRING DIMENSIONS

SPRING	LENGTH	DIAMETER
"A"	.665"	.177"
"B"	.665"	.177"

ALL CHECKBALLS ARE .250" (6.35MM) DIAMETER STEEL

MITSUBISHI/HYUNDAI/KIA  
F4A42/51/F4A4B  
F5A51/F5A5A  
SOLENOID VALVE BODY

THESE TWO CHECKBALLS ARE  
CLUTCH CIRCUIT AIR BLEED  
BALLS AND HAVE NO SPRINGS



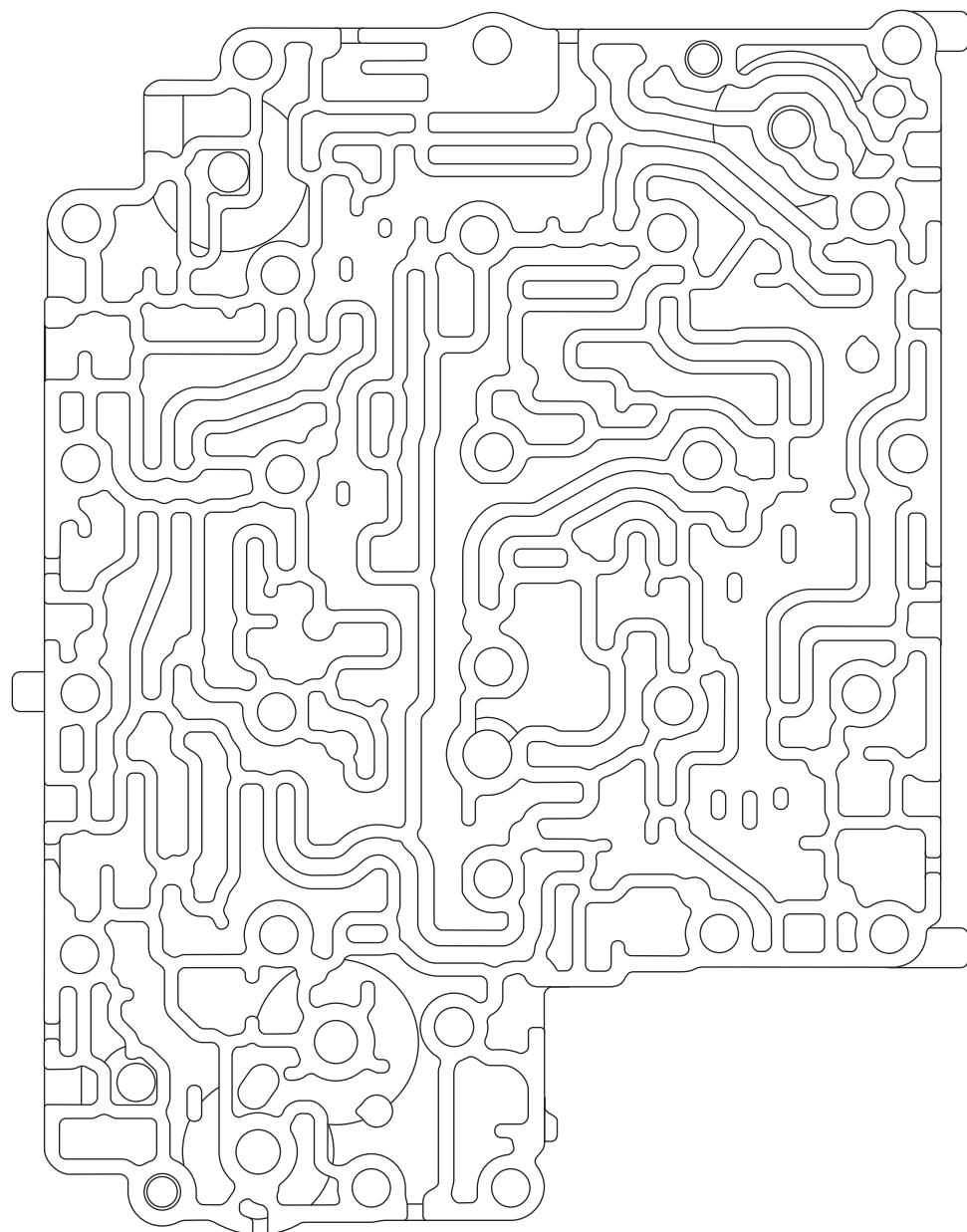


# CHECKBALL BOOK

## *Import Volume III*

MITSUBISHI  
F6AJA/JF613E

### MITSUBISHI F6AJA/JF613E *LOWER VALVE BODY*

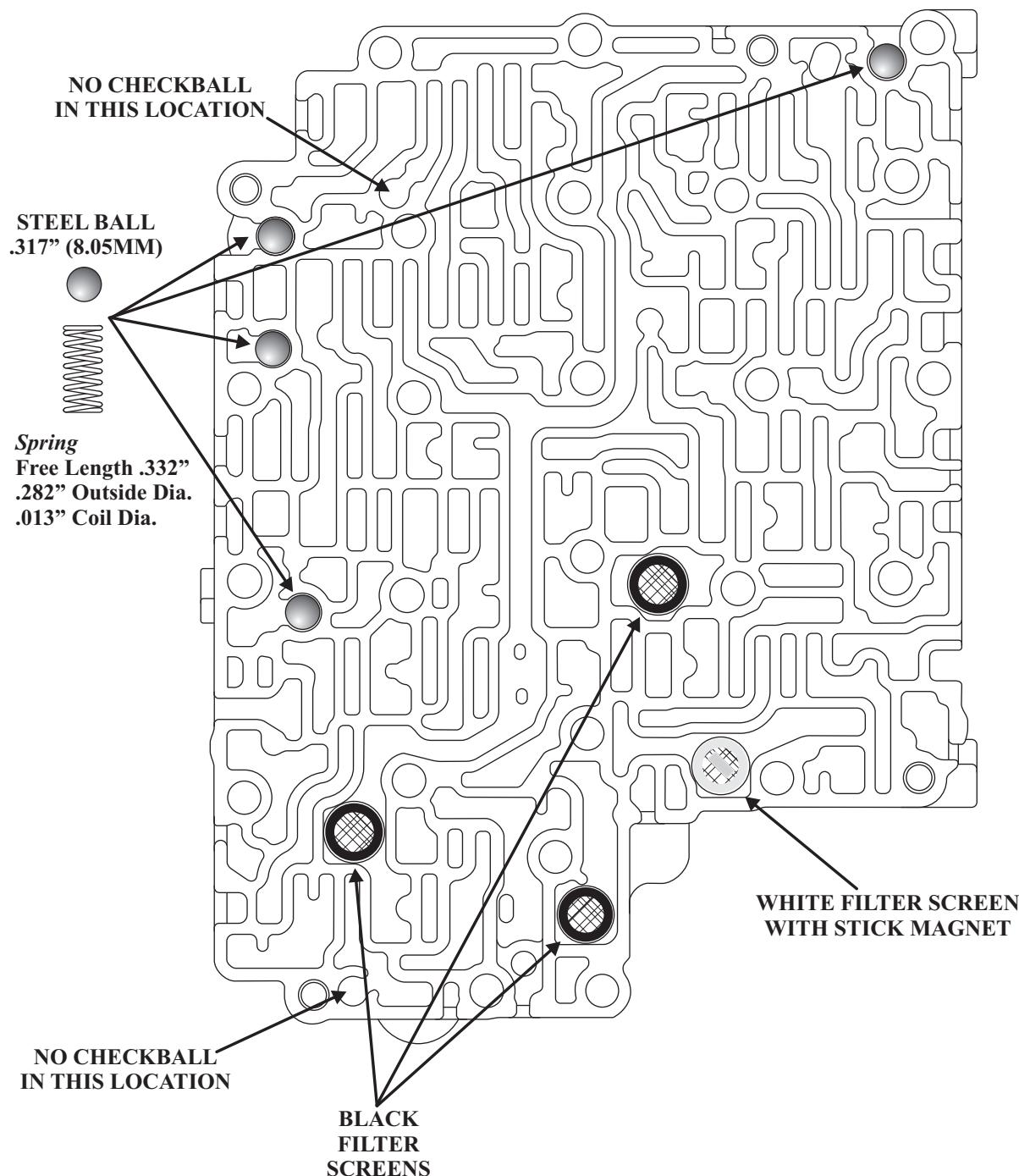


**THERE ARE NO SMALL PARTS IN THIS VALVE BODY SECTION**

Copyright © 2008 ATSG

MITSUBISHI  
F6AJA/JF613E

## CENTER VALVE BODY - LOWER VB SIDE





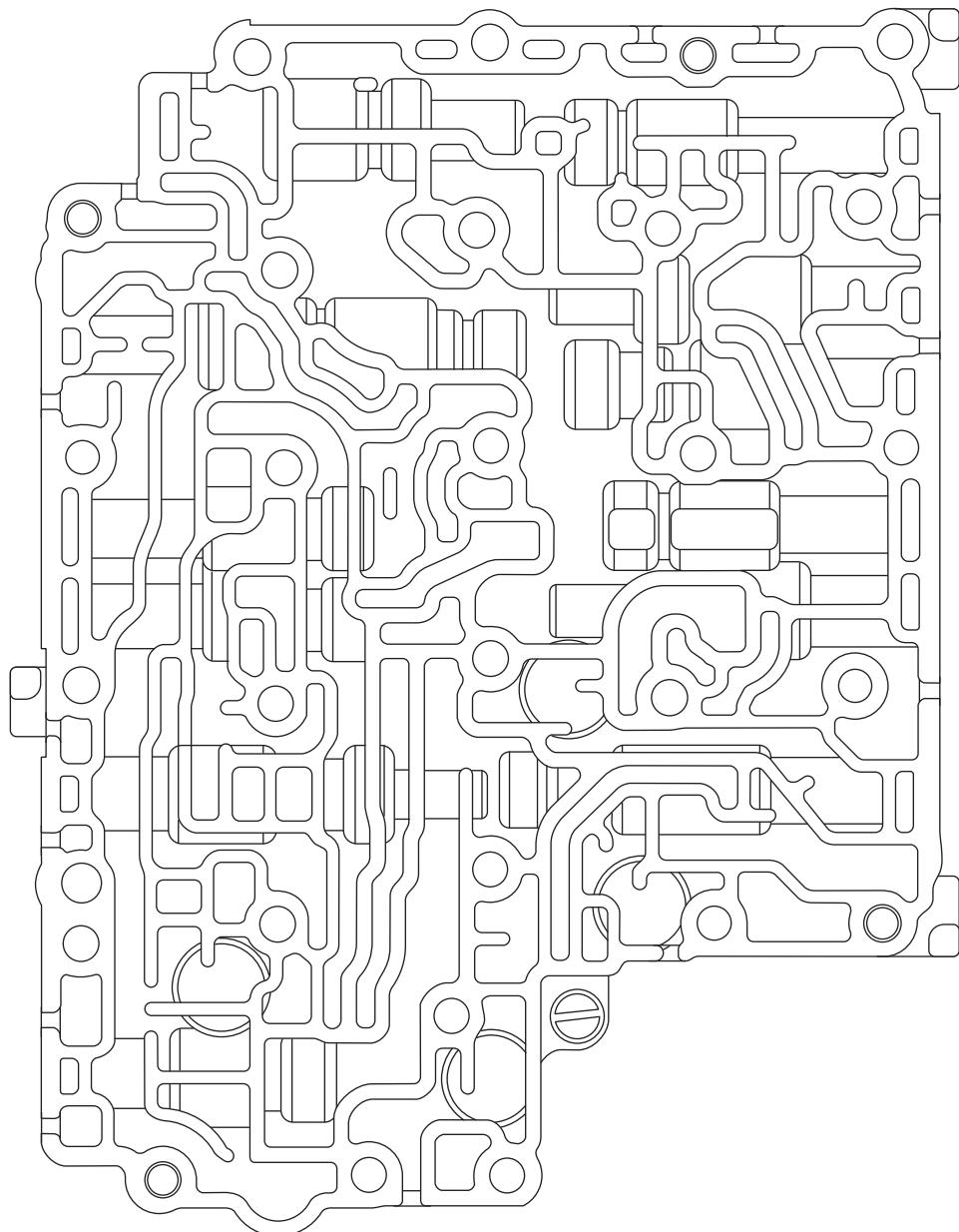
# CHECKBALL BOOK

## *Import Volume III*

MITSUBISHI  
F6AJA/JF613E

MITSUBISHI  
F6AJA/JF613E

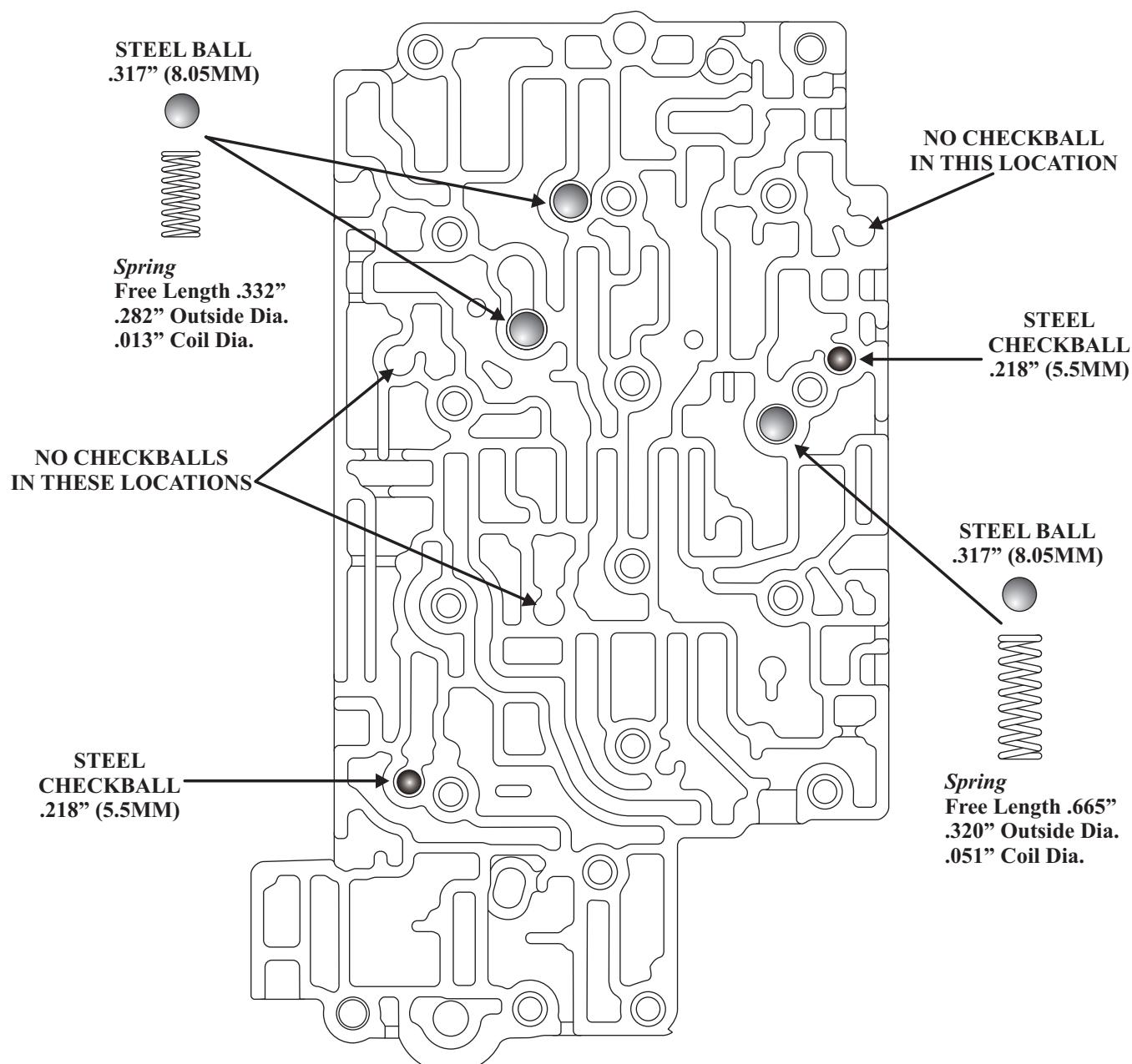
***CENTER VALVE BODY - UPPER VB SIDE***



***THERE ARE NO SMALL PARTS IN THIS VALVE BODY SECTION***

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**MITSUBISHI**  
**F6AJA/JF613E**  
**UPPER VALVE BODY**

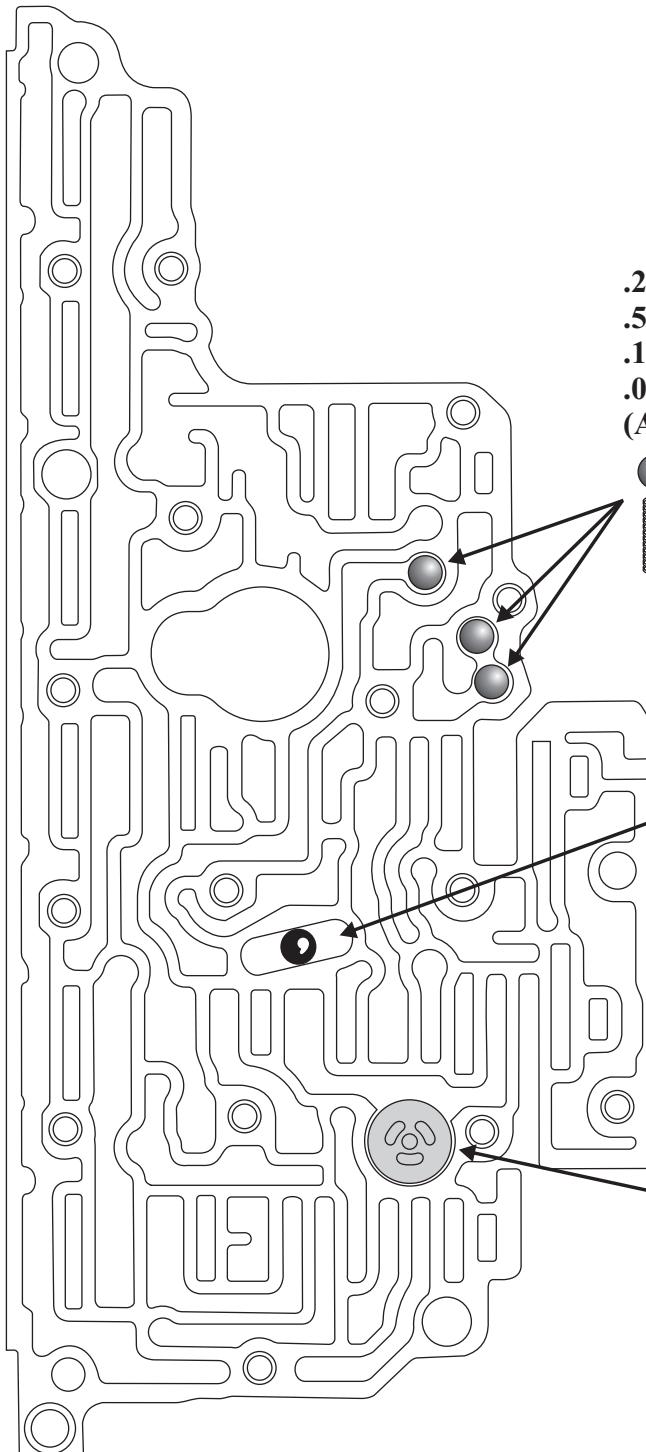


## MITSUBISHI

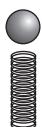
R/V4A51

R/V5A51

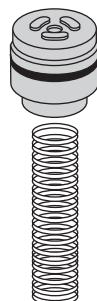
## UPPER VALVE BODY



.250" STEEL BALL  
.587" FREE LENGTH  
.175" OUTSIDE DIAMETER  
.020" COIL THICKNESS  
(ALL THREE ARE THE SAME )



.250" PLASTIC BALL  
(THIS MAY BE A RUBBER BALL  
IN THE R/V5A51 FIVE SPEED)



DAMPING VALVE  
W/SEALING RING

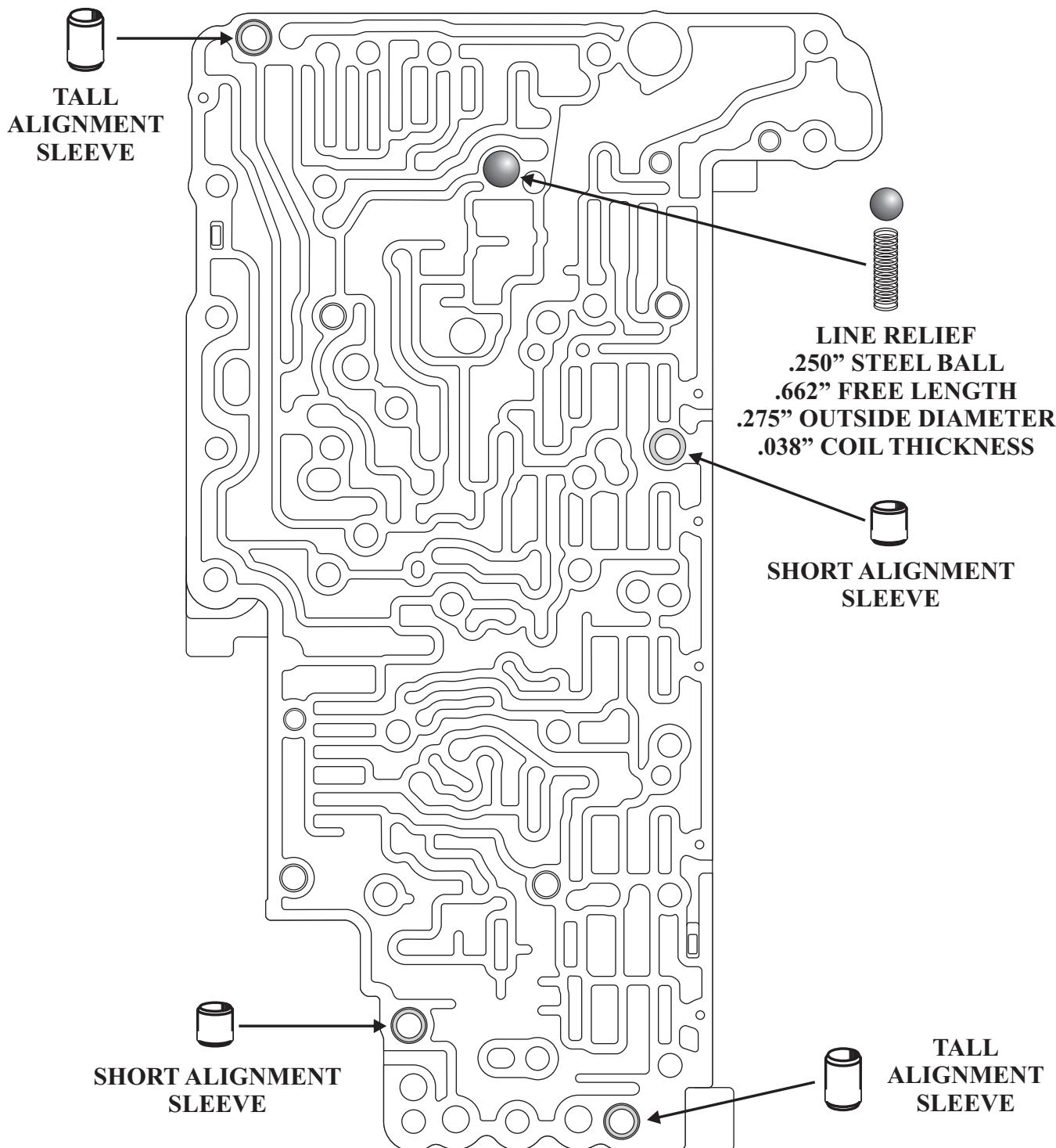
1.4" FREE LENGTH  
.300" OUTSIDE DIAMETER  
.039" COIL THICKNESS

## MITSUBISHI

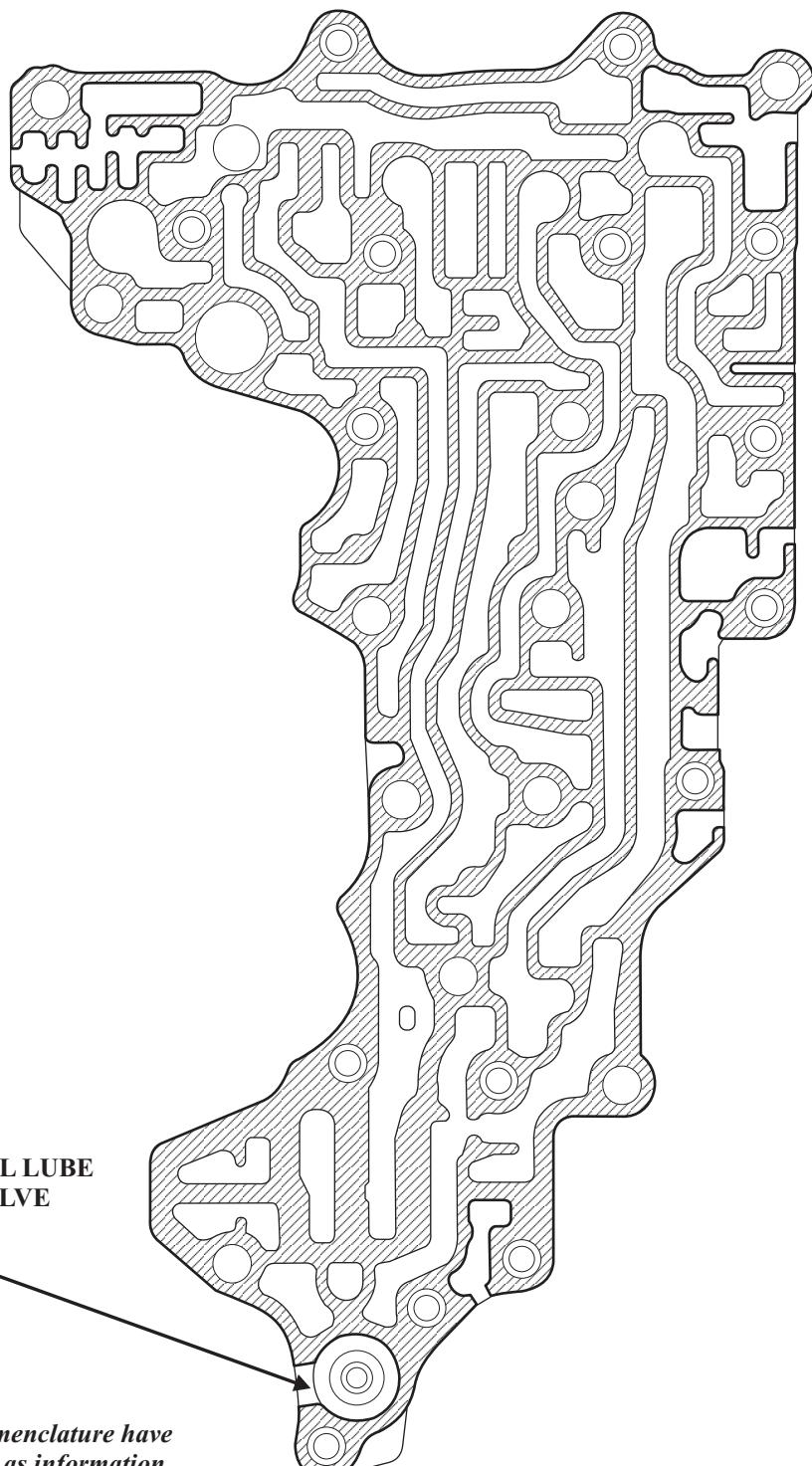
R/V4A51

R/V5A51

## LOWER VALVE BODY

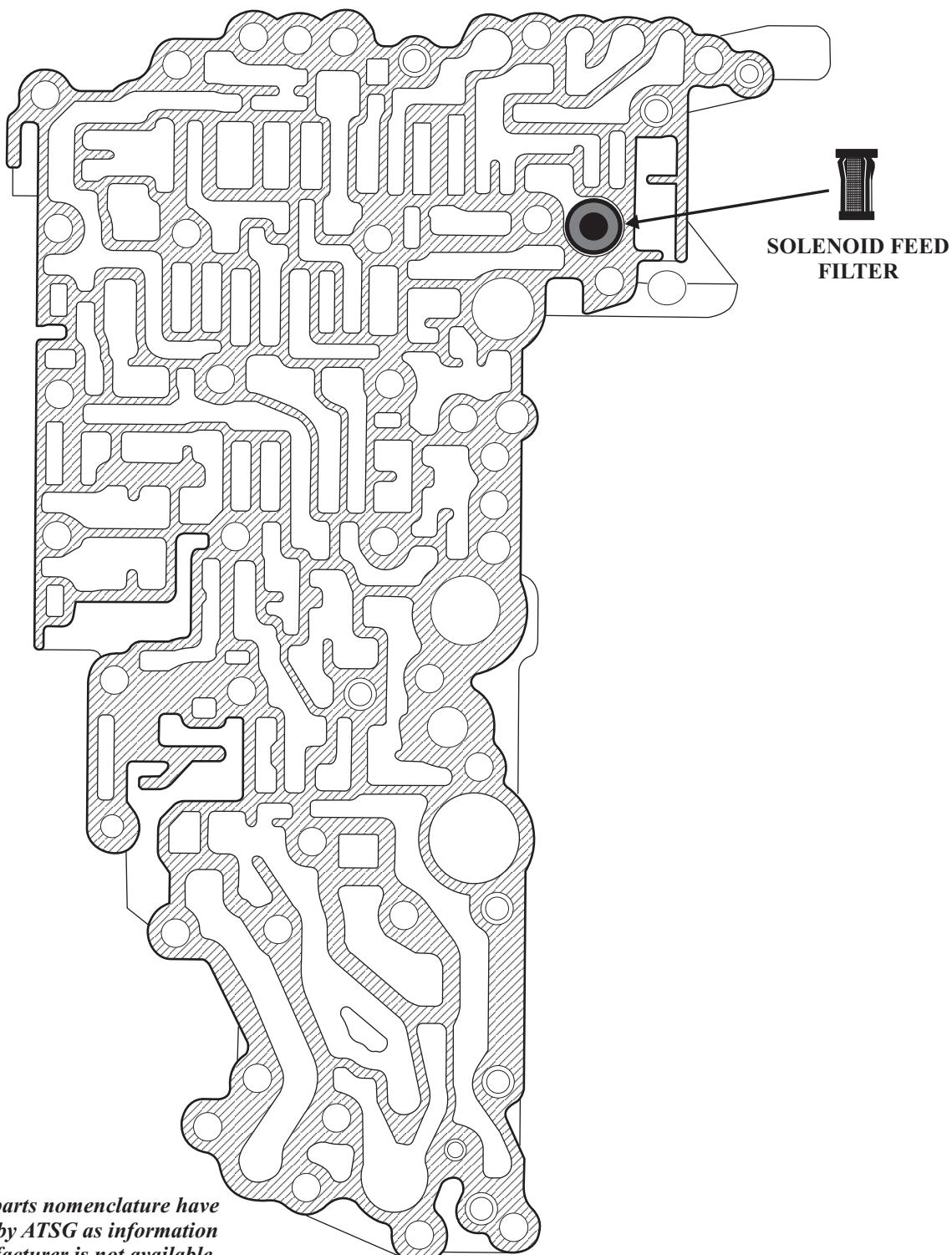


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NISSAN  
RE0F09/JF010E CVT  
*UPPER VALVE BODY*

*NOTE: Small parts nomenclature have been assigned by ATSG as information from the manufacturer is not available at the time of printing.*

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NISSAN  
RE0F09/JF010E CVT  
**CENTER VALVE BODY UPPER SIDE**

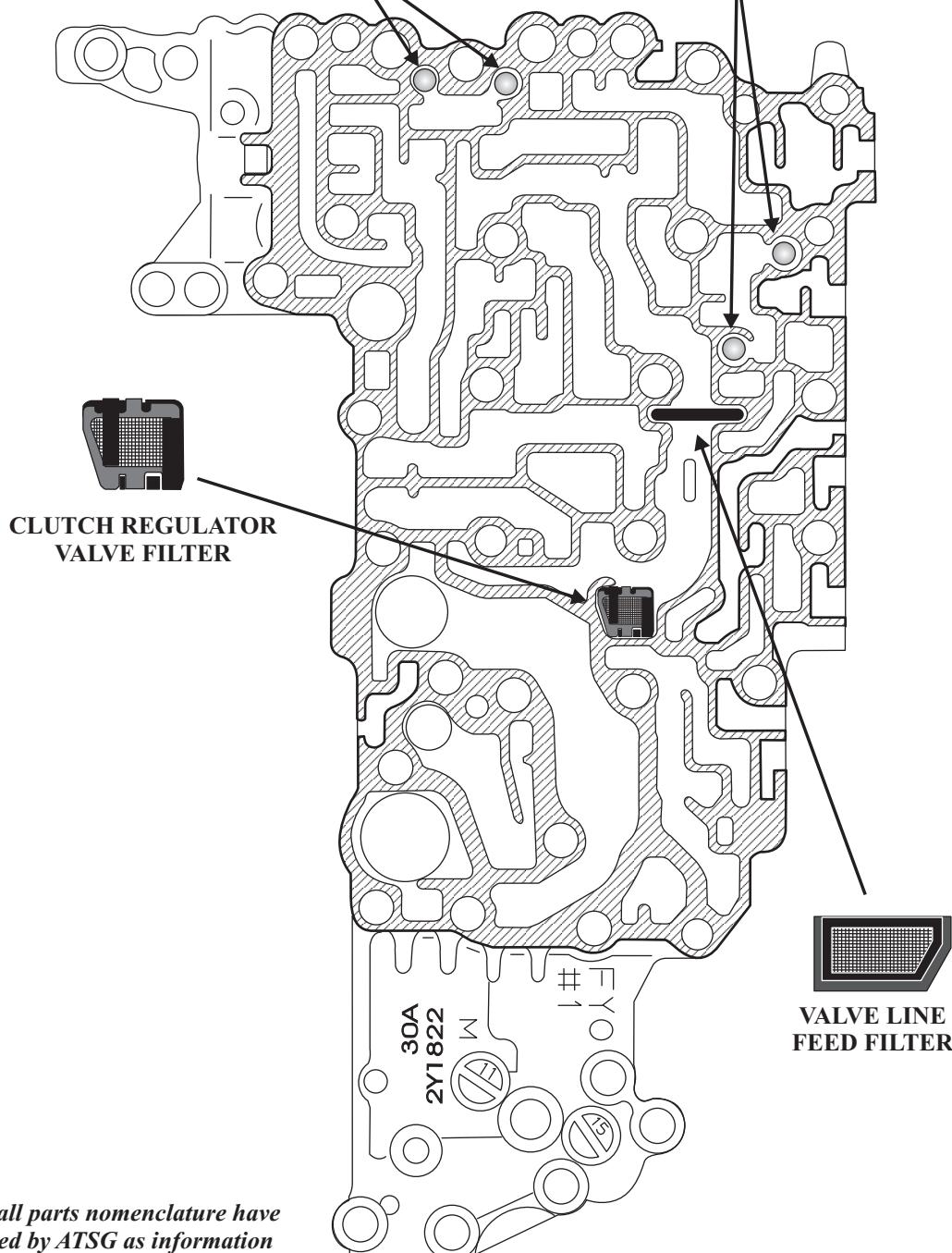
*NOTE: Small parts nomenclature have been assigned by ATSG as information from the manufacturer is not available at the time of printing.*

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**NISSAN  
RE0F09/JF010E CVT  
CENTER VALVE BODY BOTTOM SIDE**

**FORWARD CLUTCH APPLY AND  
RELEASE CONTROL STEEL BALLS  
(0.218" DIA.)**

**REVERSE CLUTCH APPLY AND  
RELEASE CONTROL STEEL BALLS  
(0.218" DIA.)**



**NOTE:** Small parts nomenclature have been assigned by ATSG as information from the manufacturer is not available at the time of printing.

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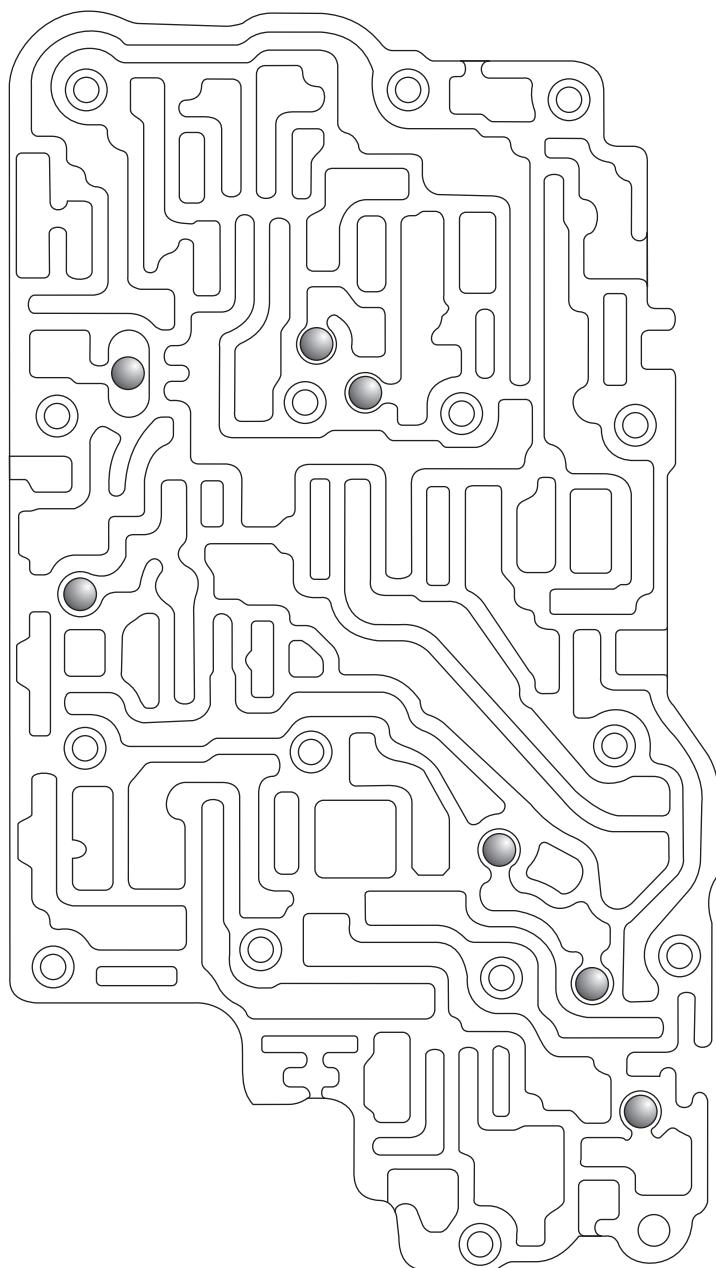
# CHECKBALL BOOK

## *Import Volume III*

NISSAN/INFINITI  
RE4F03B/W  
RE4F04B/W

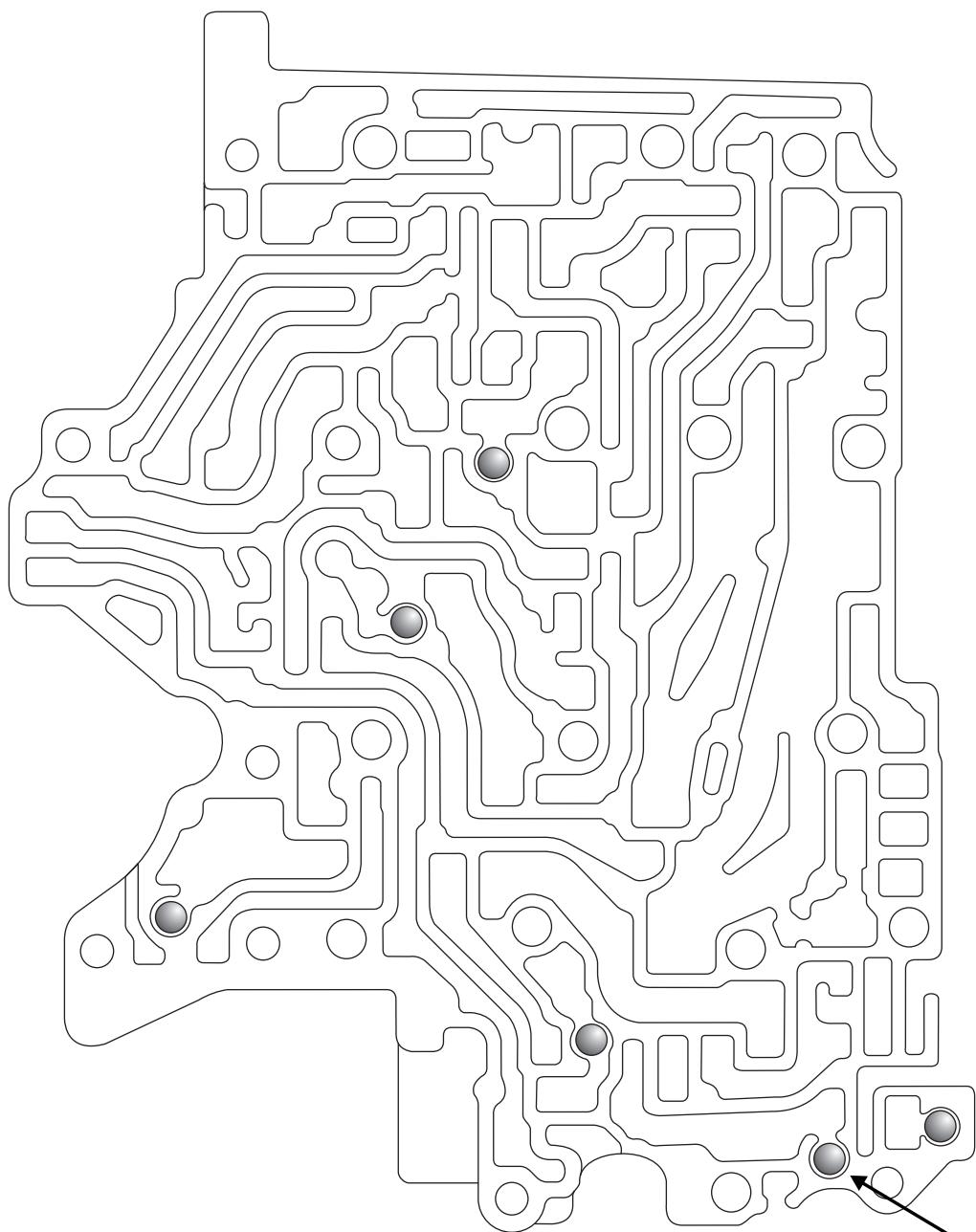
**NISSAN/INFINITI  
RE4F03B/W - RE4F04B/W**

**UPPER VALVE BODY**

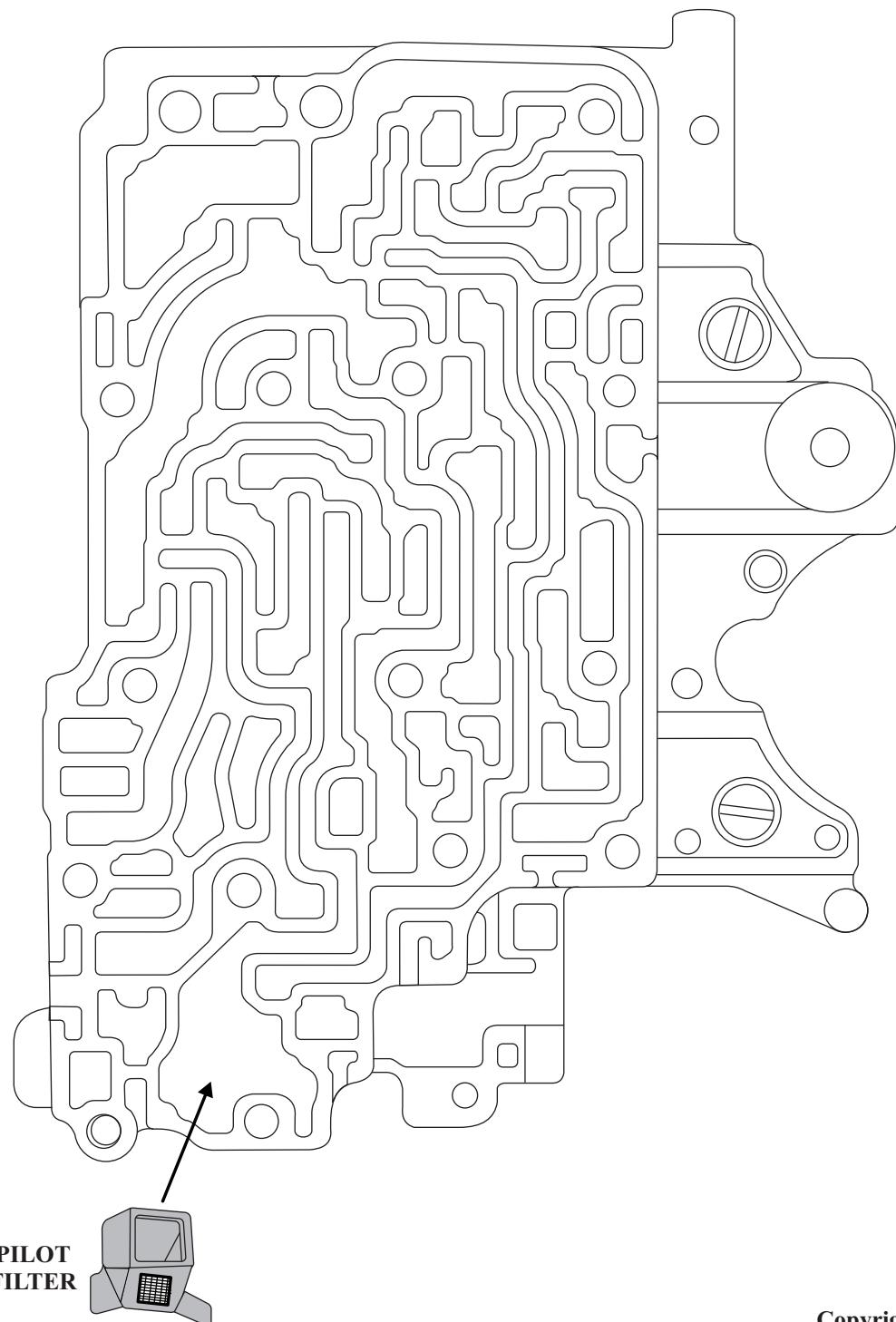


*All 7 CheckBalls Are Steel .218" (5.5MM)*

Copyright © 2008 ATSG

NISSAN/INFINITI  
RE4F03B/W - RE4F04B/W**INTERMEDIATE VALVE BODY - BOTTOM SIDE***Not Used In RE4F04B/W**All 6 CheckBalls Are Steel .218" (5.5MM)*

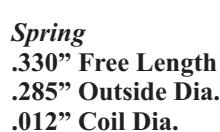
Copyright © 2008 ATSG

NISSAN/INFINITI  
RE4F03B/W - RE4F04B/W***INTERMEDIATE VALVE BODY - TOP SIDE***

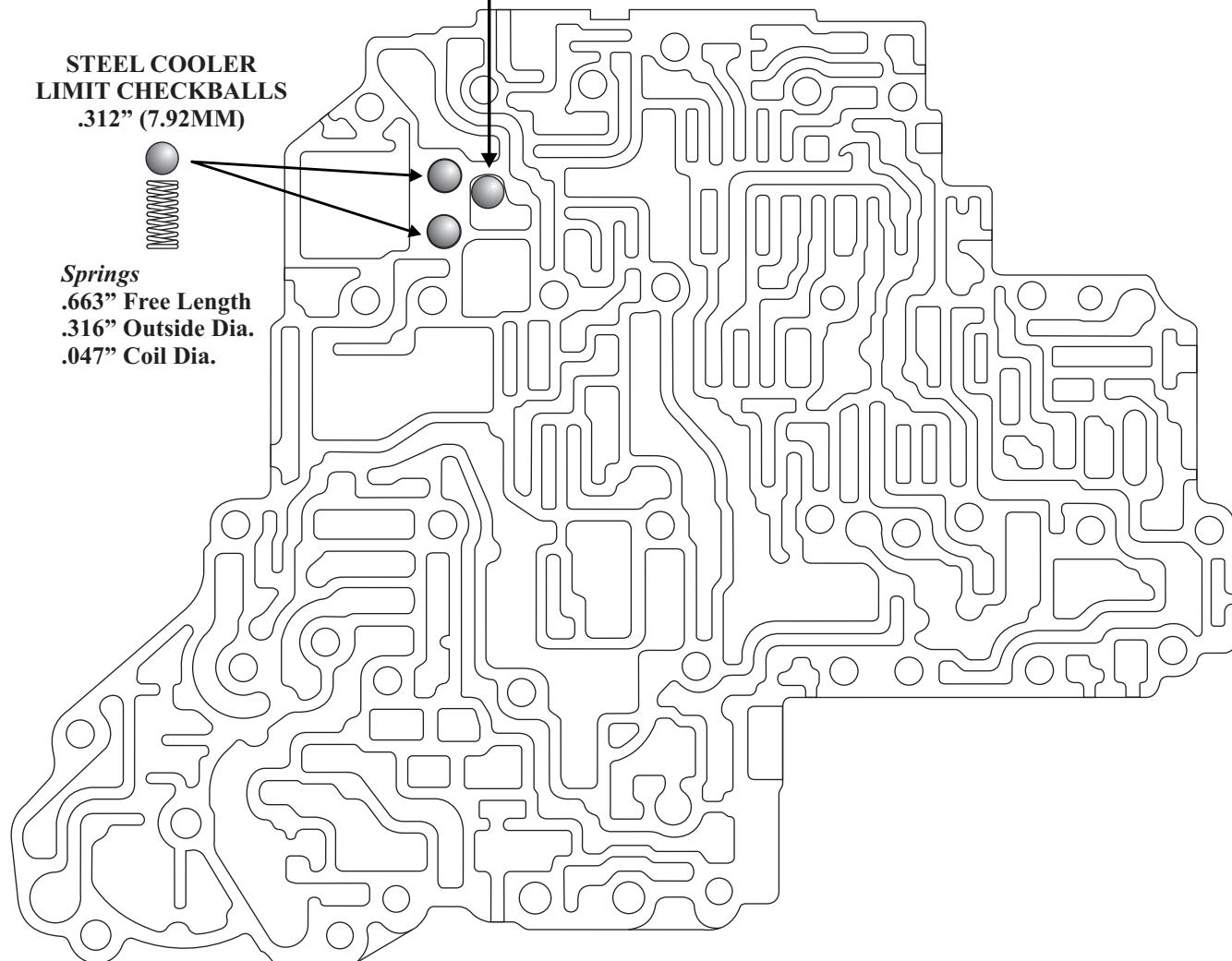
Copyright © 2008 ATSG

NISSAN/INFINITI  
RE4F03B/W - RE4F04B/W  
*MAIN VALVE BODY*

*RE4F03B/W ONLY*  
STEEL TCC PRESSURE  
LIMIT CHECKBALL  
.312" (7.92MM)



STEEL COOLER  
LIMIT CHECKBALLS  
.312" (7.92MM)

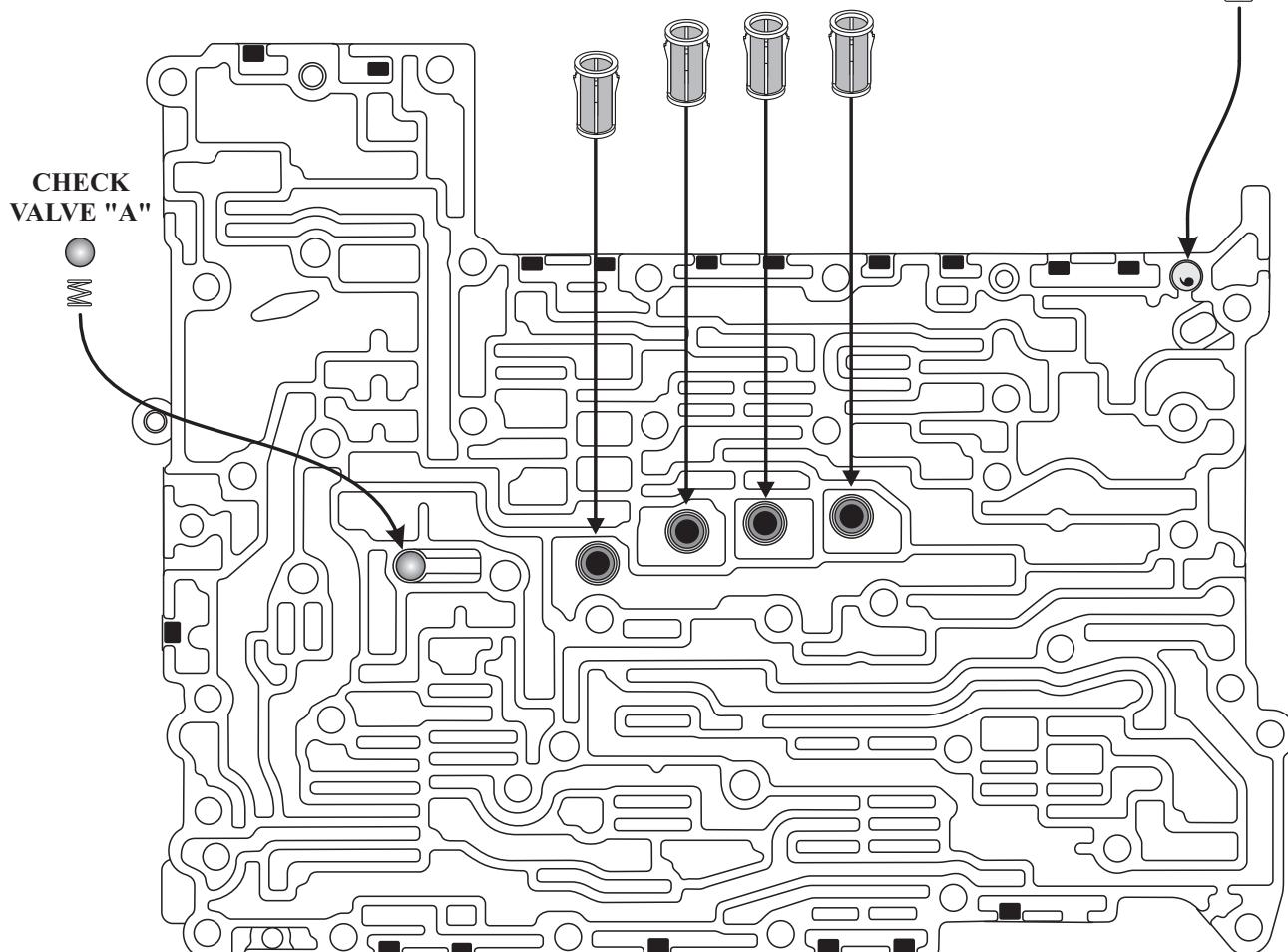


NISSAN  
RE5R05A

**UPPER VALVE BODY  
(EARLY)**

CHECK  
VALVE "B"

THERE ARE 4 VALVE BODY SCREENS  
THAT "MUST" GO IN AS SHOWN,  
AS THEY PILOT INTO SPACER PLATE

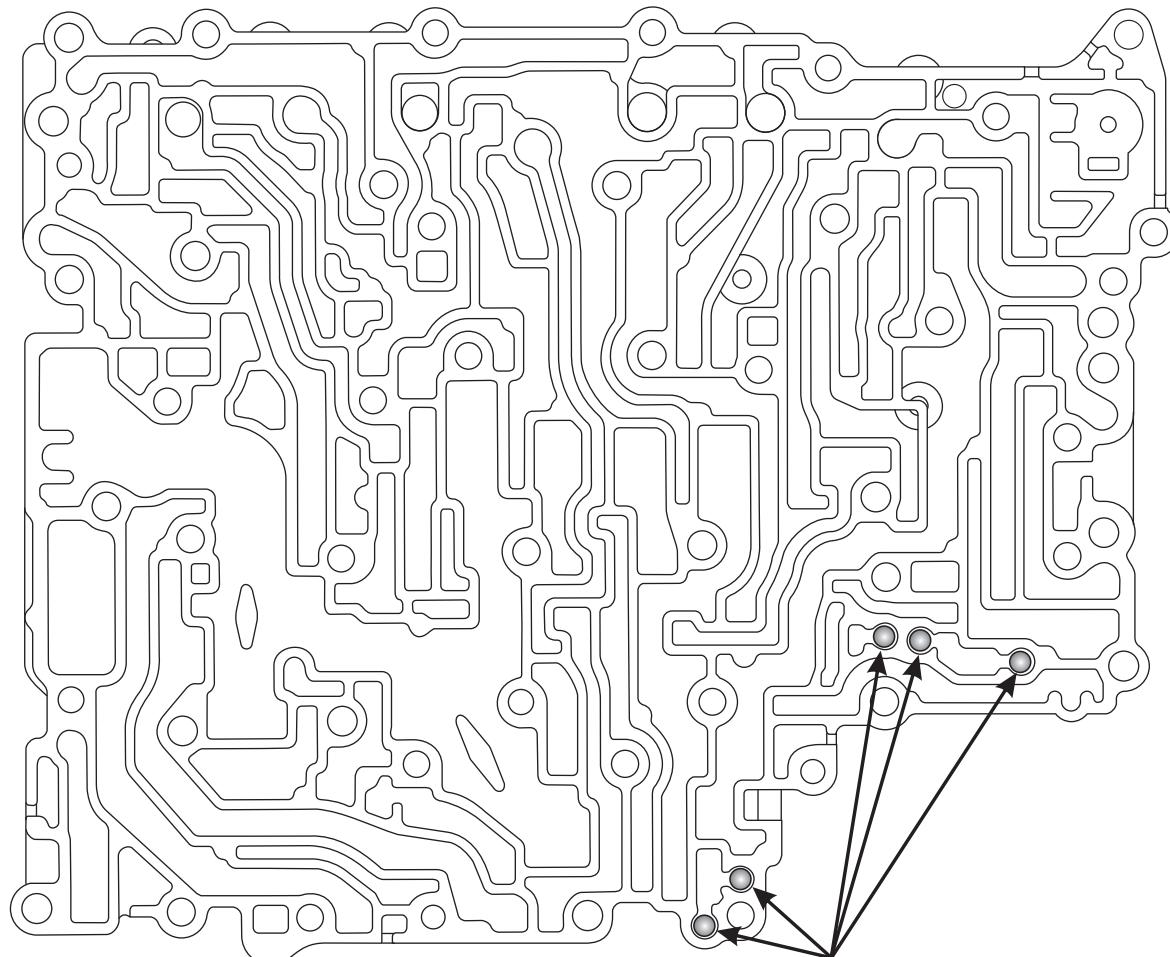
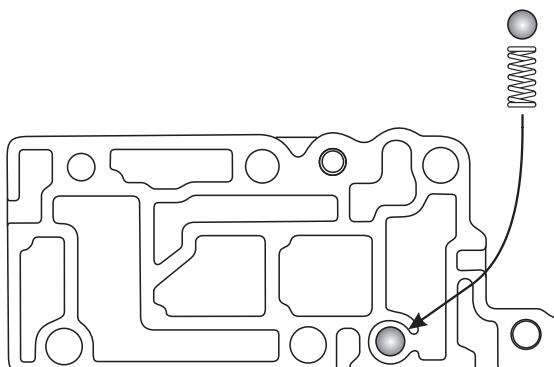


CHECK VALVE "A"

BALL DIAMETER	.312"
SPRING FREE LENGTH	.350"
SPRING DIAMETER	.285"
WIRE DIAMETER	.016"
APPROX COILS	5

CHECK VALVE "B"

BALL DIAMETER	.312"
SPRING FREE LENGTH	.705"
SPRING DIAMETER	.316"
WIRE DIAMETER	.039"
APPROX COILS	11

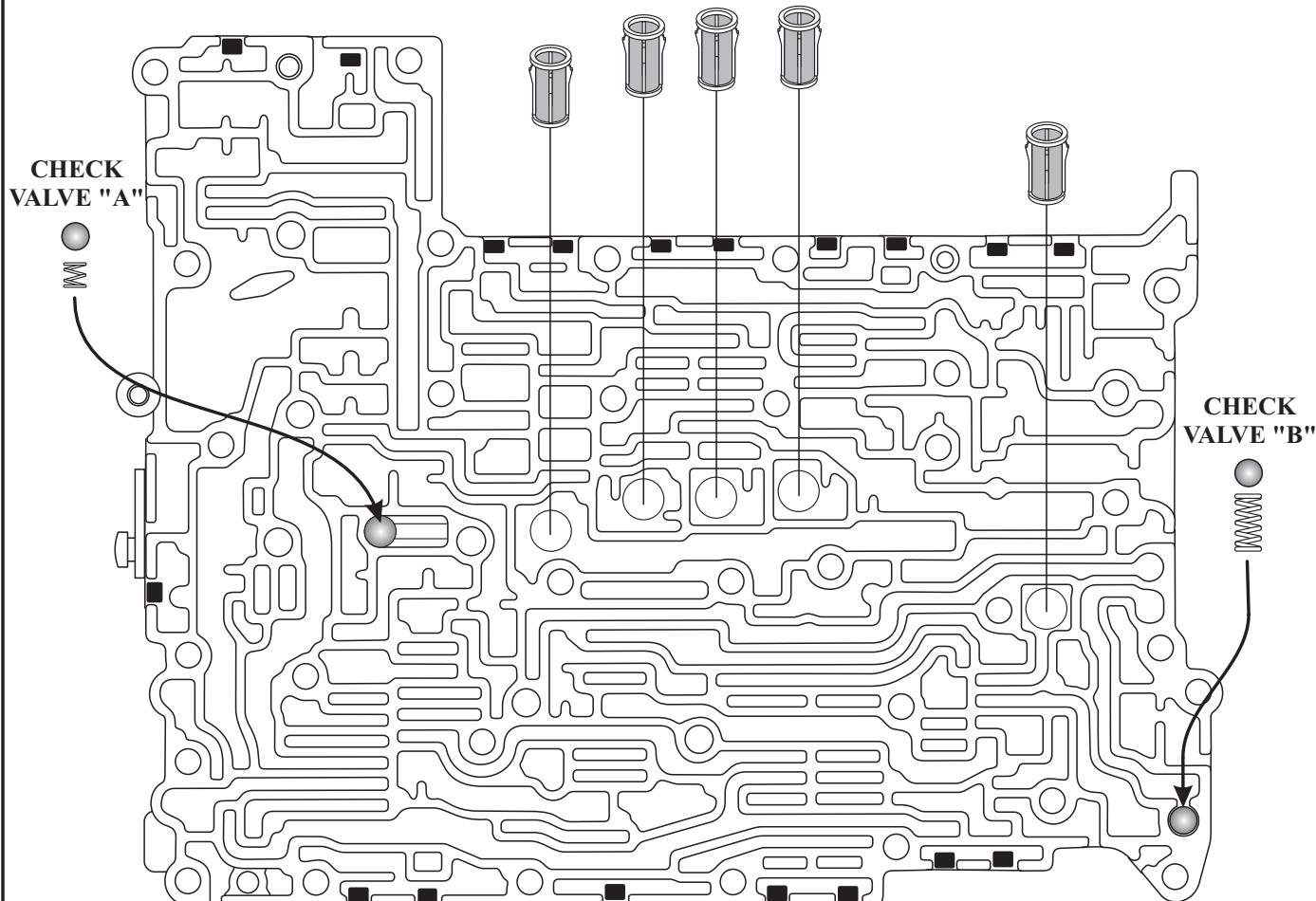
NISSAN  
RE5R05A**LOWER VALVE BODY  
(EARLY)****5 STEEL CHECK BALLS REQUIRED  
5.5MM (.218") DIAMETER****MANUAL VALVE BODY  
(EARLY)**CHECK  
VALVE "C"

CHECK VALVE "C"	
BALL DIAMETER	.312"
SPRING FREE LENGTH	.705"
SPRING DIAMETER	.316"
WIRE DIAMETER	.039"
APPROX COILS	11

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NISSAN  
RE5R05A**UPPER VALVE BODY  
(LATE)**

THERE ARE 5 VALVE BODY SCREENS  
THAT "MUST" GO IN AS SHOWN,  
AS THEY PILOT INTO SPACER PLATE

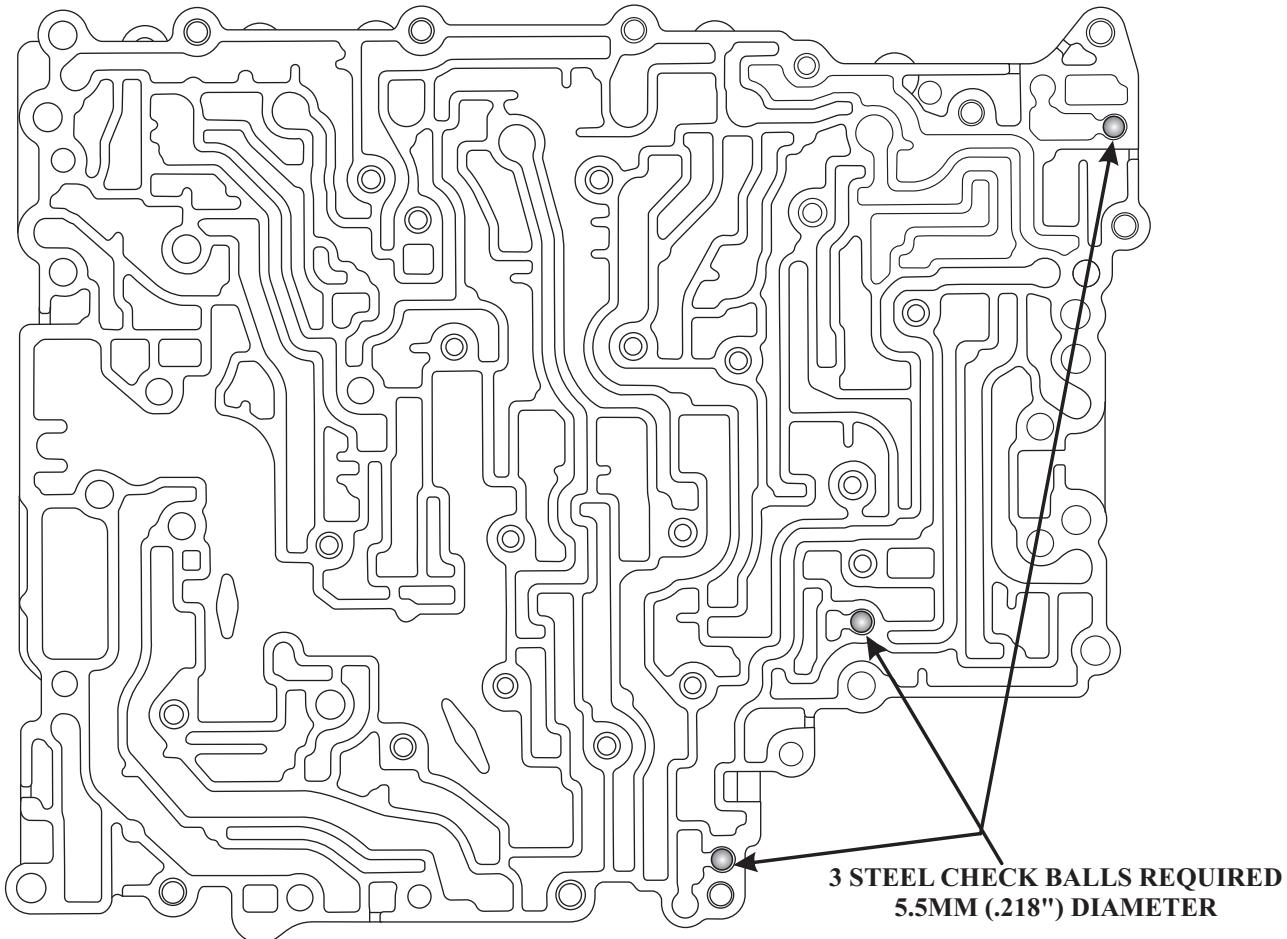


CHECK VALVE "A"	
BALL DIAMETER	.312"
SPRING FREE LENGTH	.350"
SPRING DIAMETER	.285"
WIRE DIAMETER	.016"
APPROX COILS	5

CHECK VALVE "B"	
BALL DIAMETER	.312"
SPRING FREE LENGTH	.705"
SPRING DIAMETER	.316"
WIRE DIAMETER	.039"
APPROX COILS	11

NISSAN  
**RE5R05A**

**LOWER VALVE BODY**  
**(LATE)**

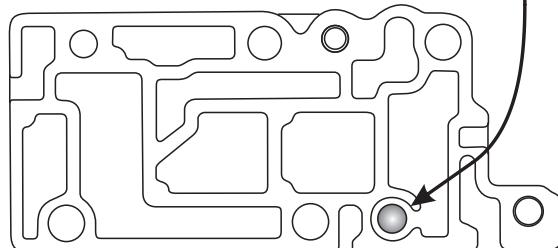


*NOTE: This transmission can also be found in the Kia Sorrento (A5SR1/2), checkball locations may be different.*

**MANUAL VALVE BODY**  
**(LATE)**

 CHECK  
 VALVE "C"

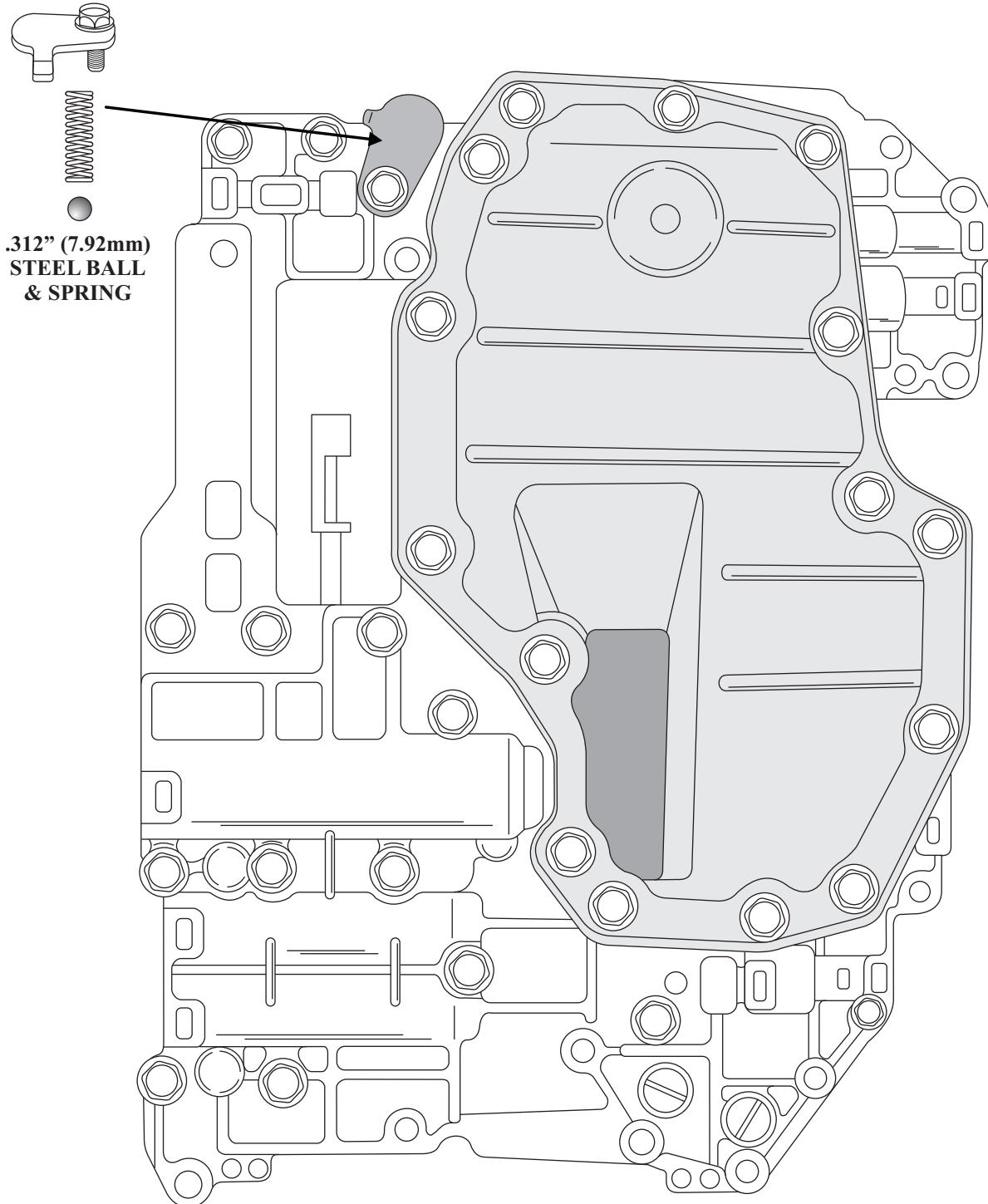
CHECK VALVE "C"	
BALL DIAMETER	.312"
SPRING FREE LENGTH	.705"
SPRING DIAMETER	.316"
WIRE DIAMETER	.039"
APPROX COILS	11

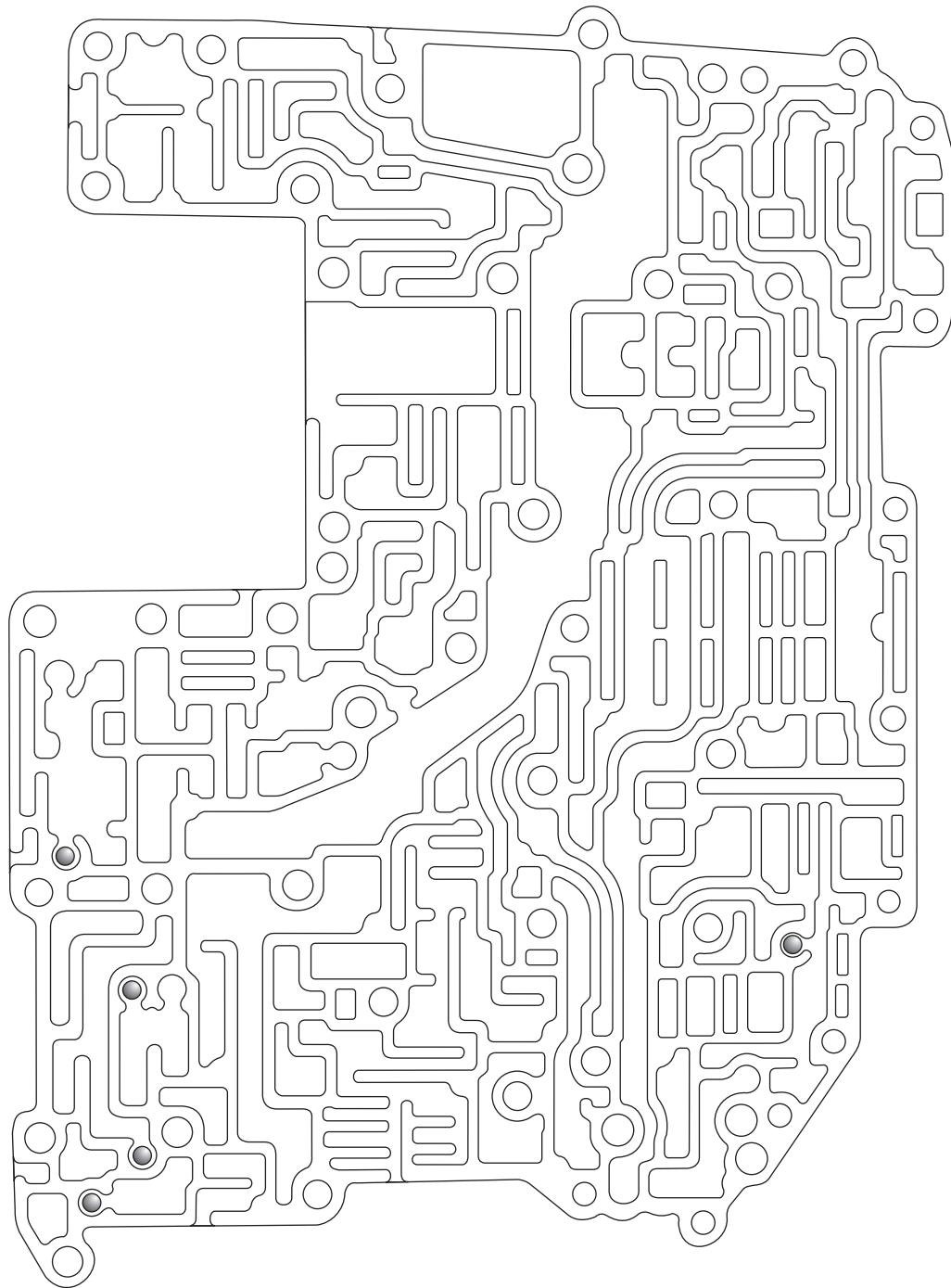


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## SUBARU 5EAT

## LOWER VALVE BODY (BOTTOM SIDE)



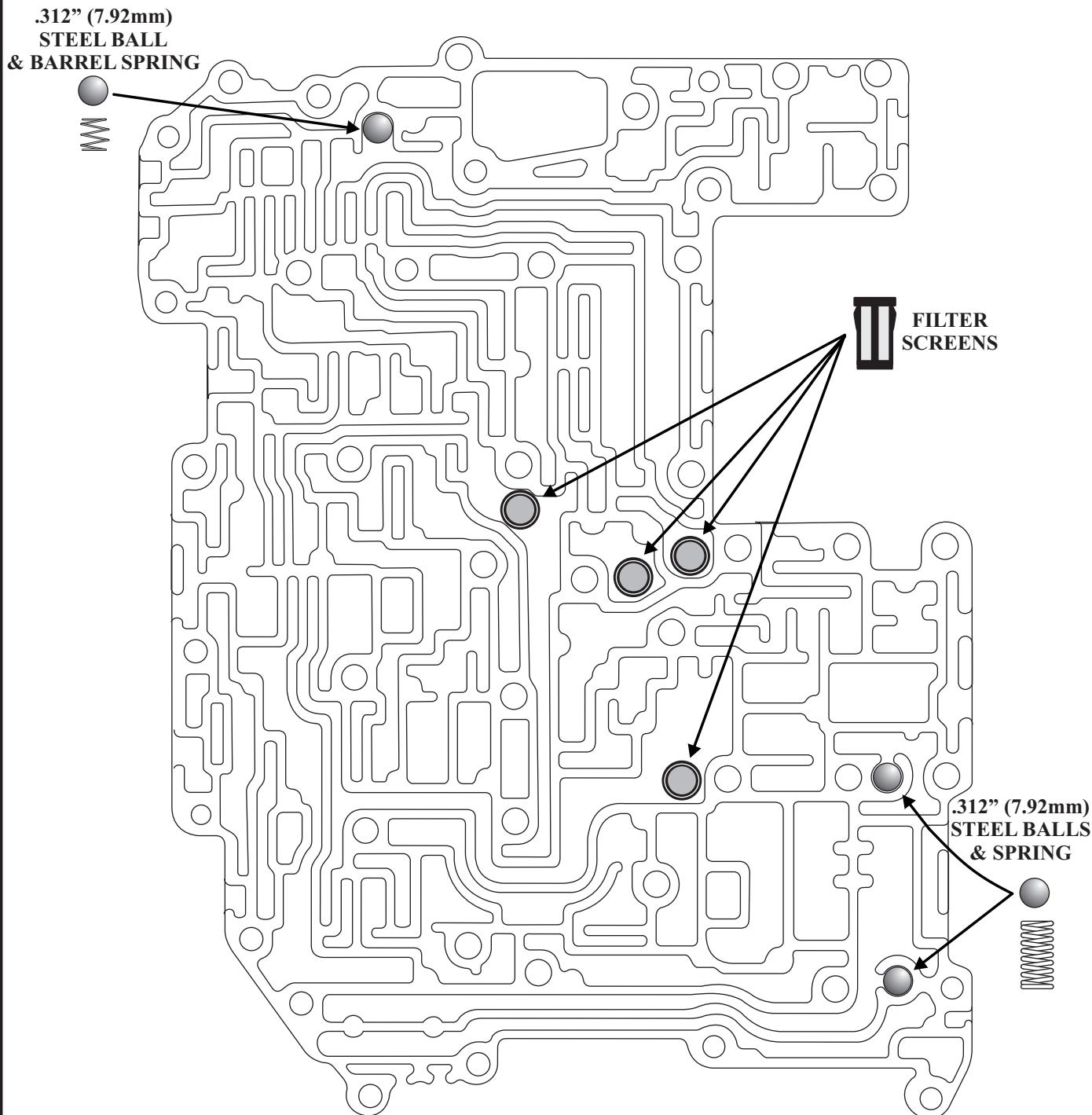
SUBARU 5EAT  
*LOWER VALVE BODY (TOP SIDE)*

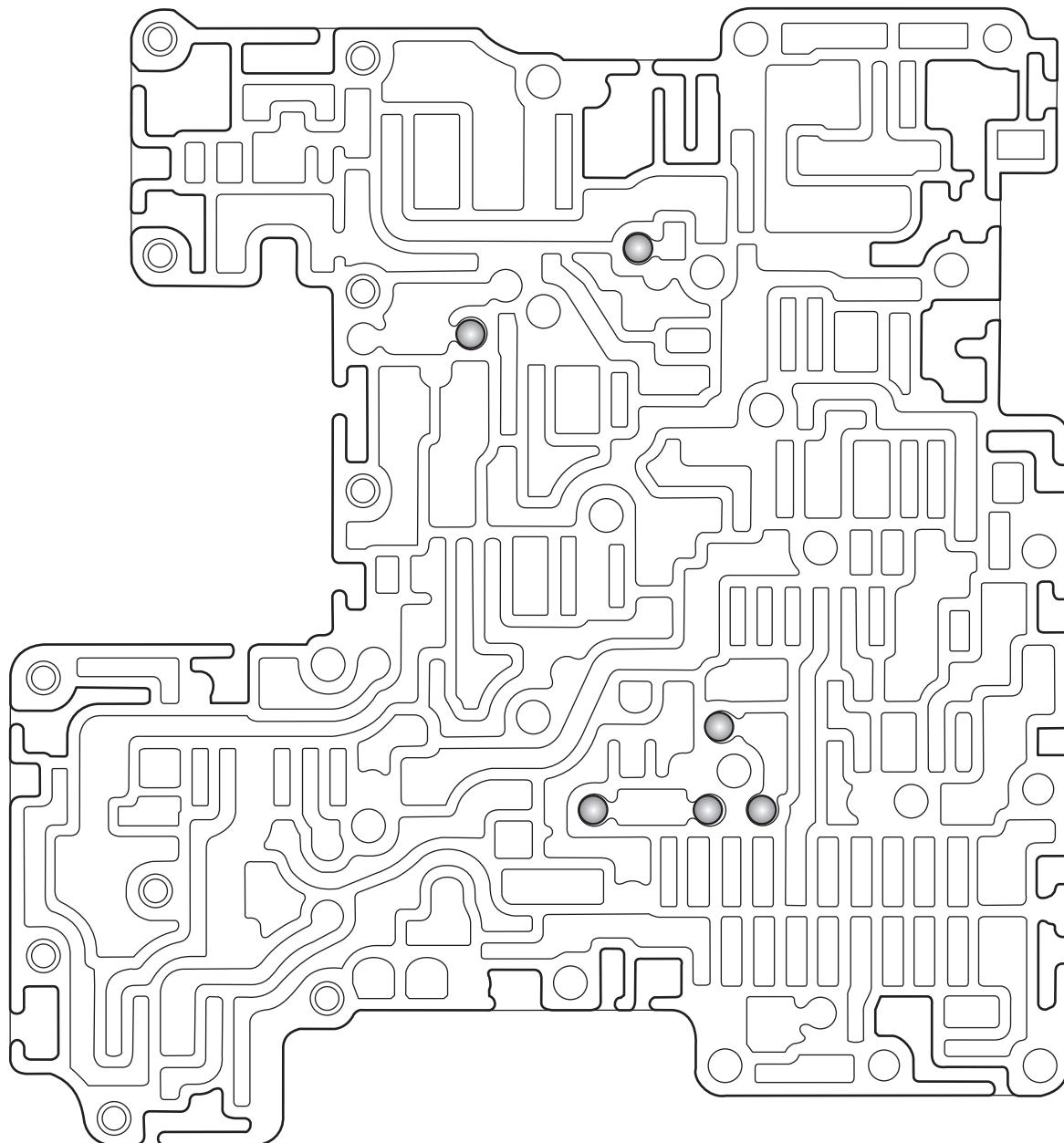
*All 5 checkballs are Steel .250" (6.35mm)*

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## SUBARU 5EAT

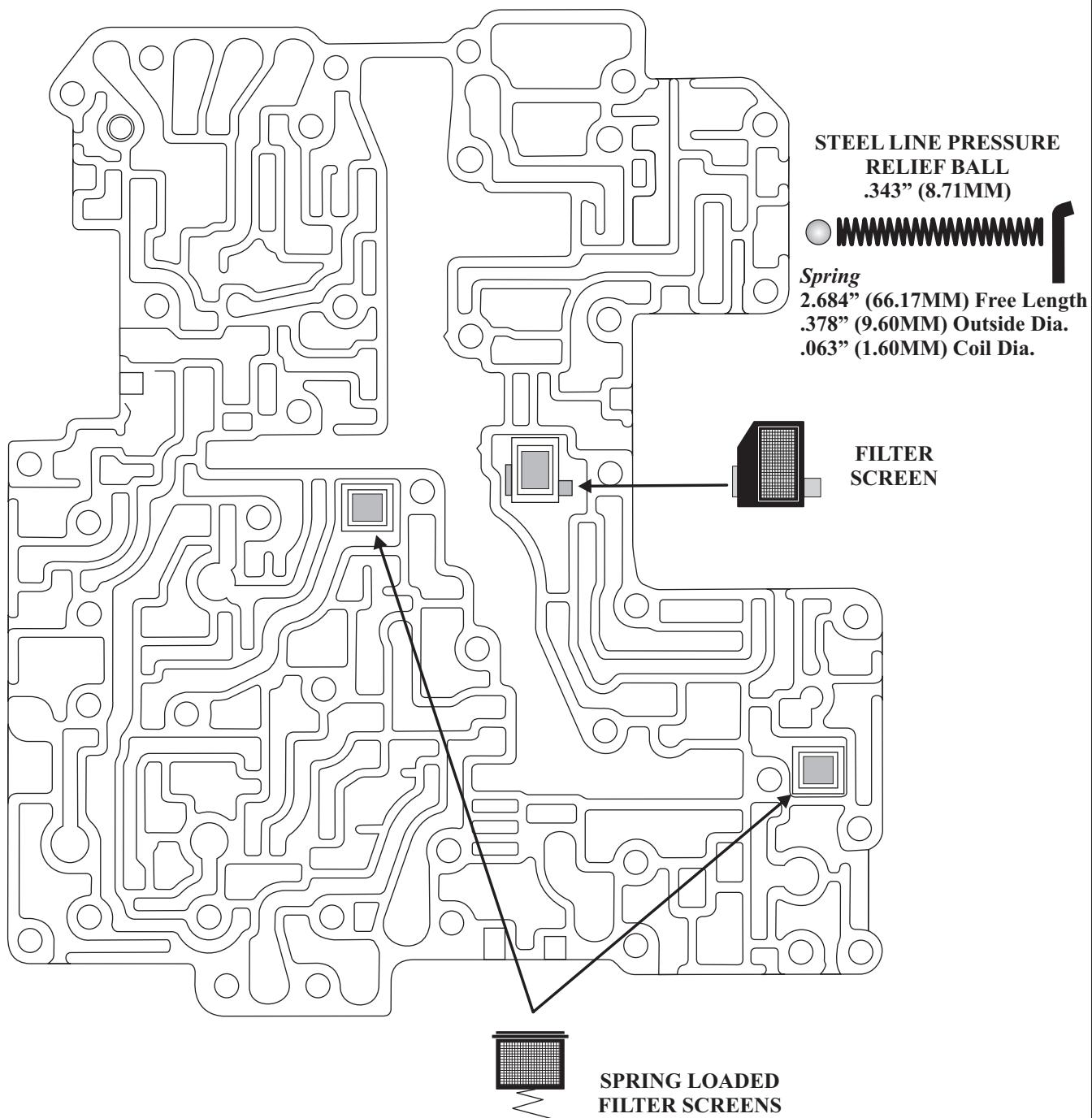
## UPPER VALVE BODY

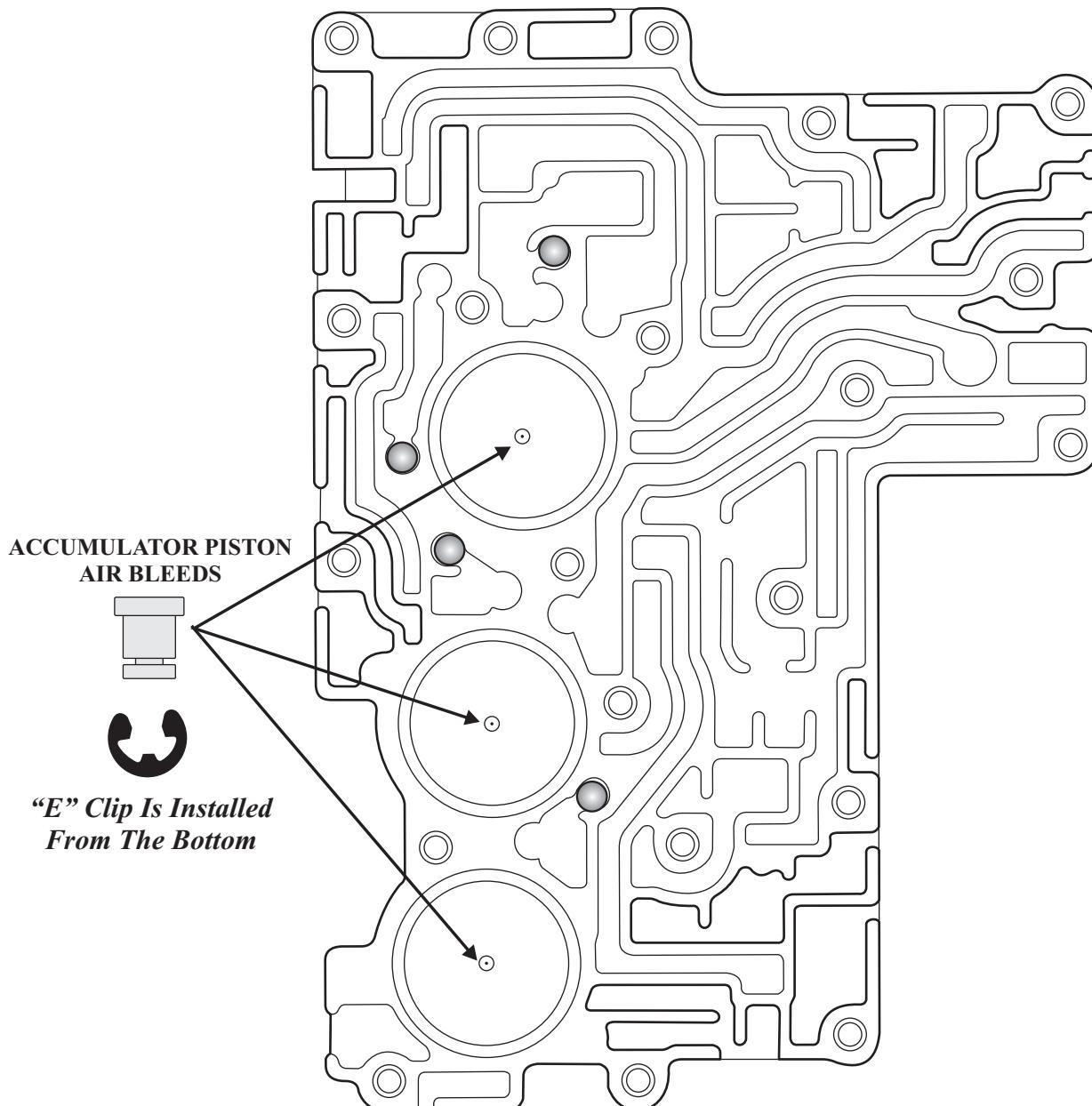


SUBARU 4EAT  
PHASE II  
*MIDDLE VALVE BODY*

ALL 6 CHECKBALLS ARE STEEL .215" (5.5MM)

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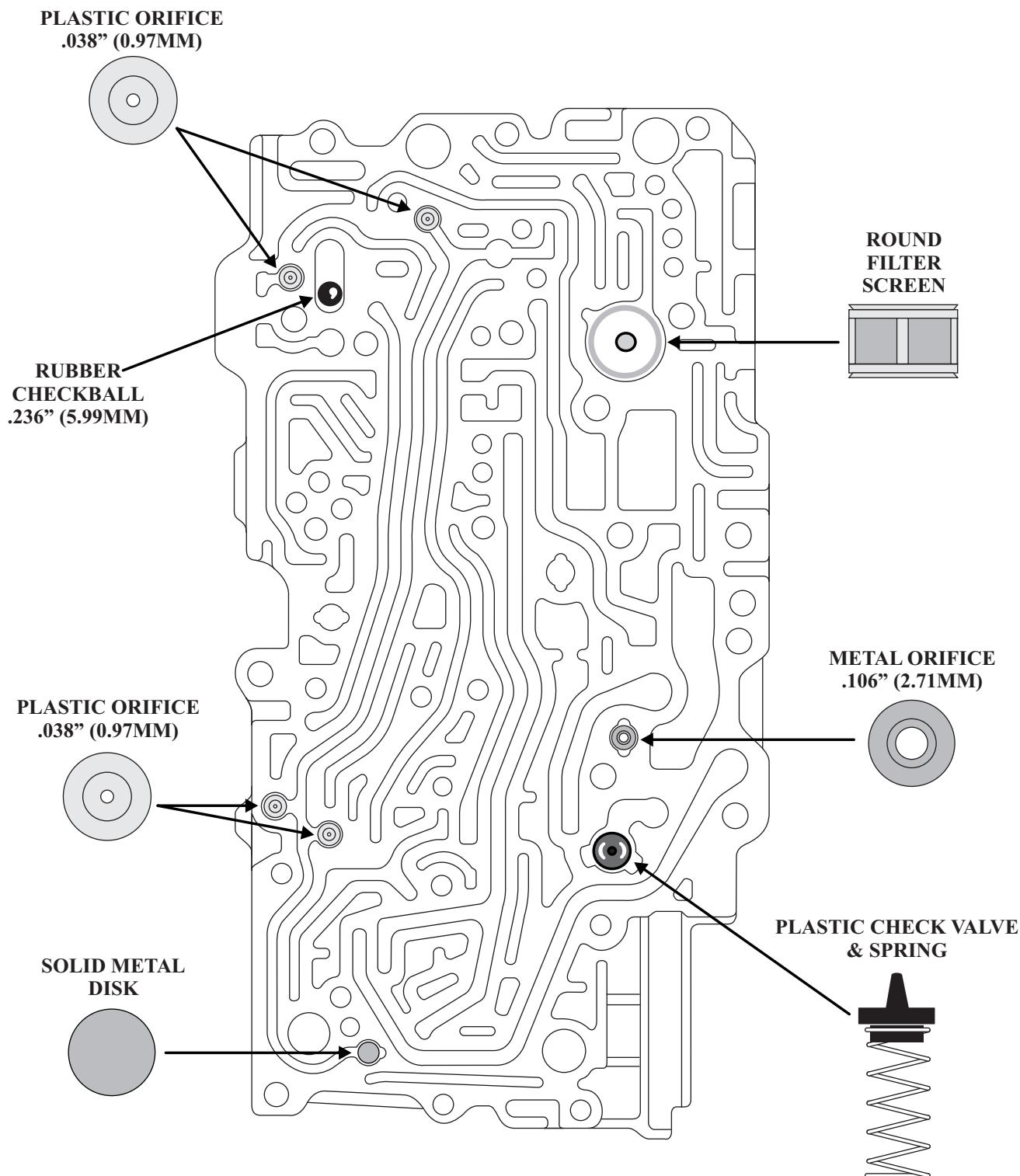
SUBARU 4EAT  
PHASE II  
*LOWER VALVE BODY*

SUBARU 4EAT  
PHASE II  
*UPPER VALVE BODY*

ALL 4 CHECKBALLS ARE STEEL .215" (5.5MM)

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**SUZUKI  
ZF4HP16  
UPPER VALVE BODY**

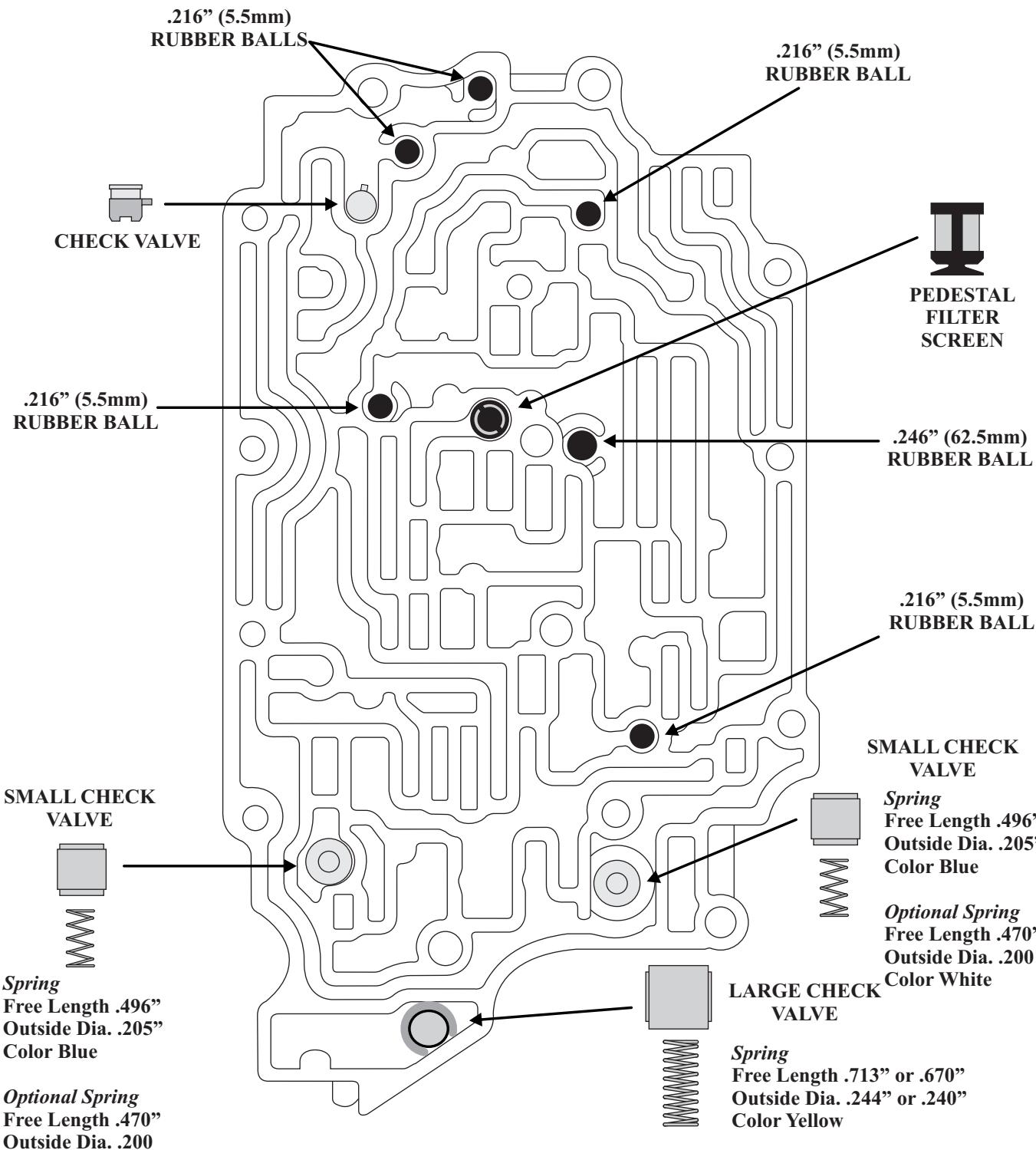


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**SUZUKI**

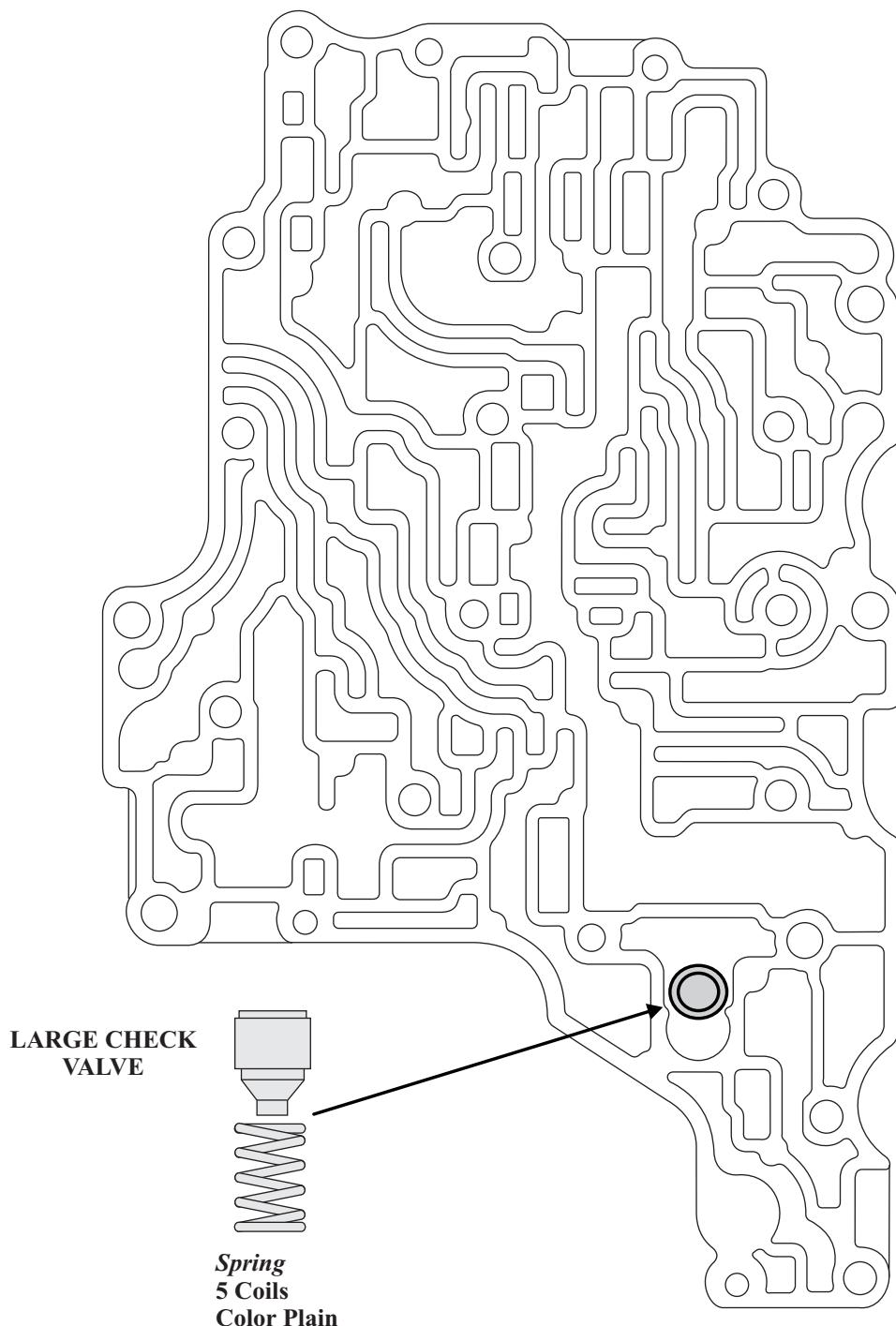
**AW60-40LE/AF13**

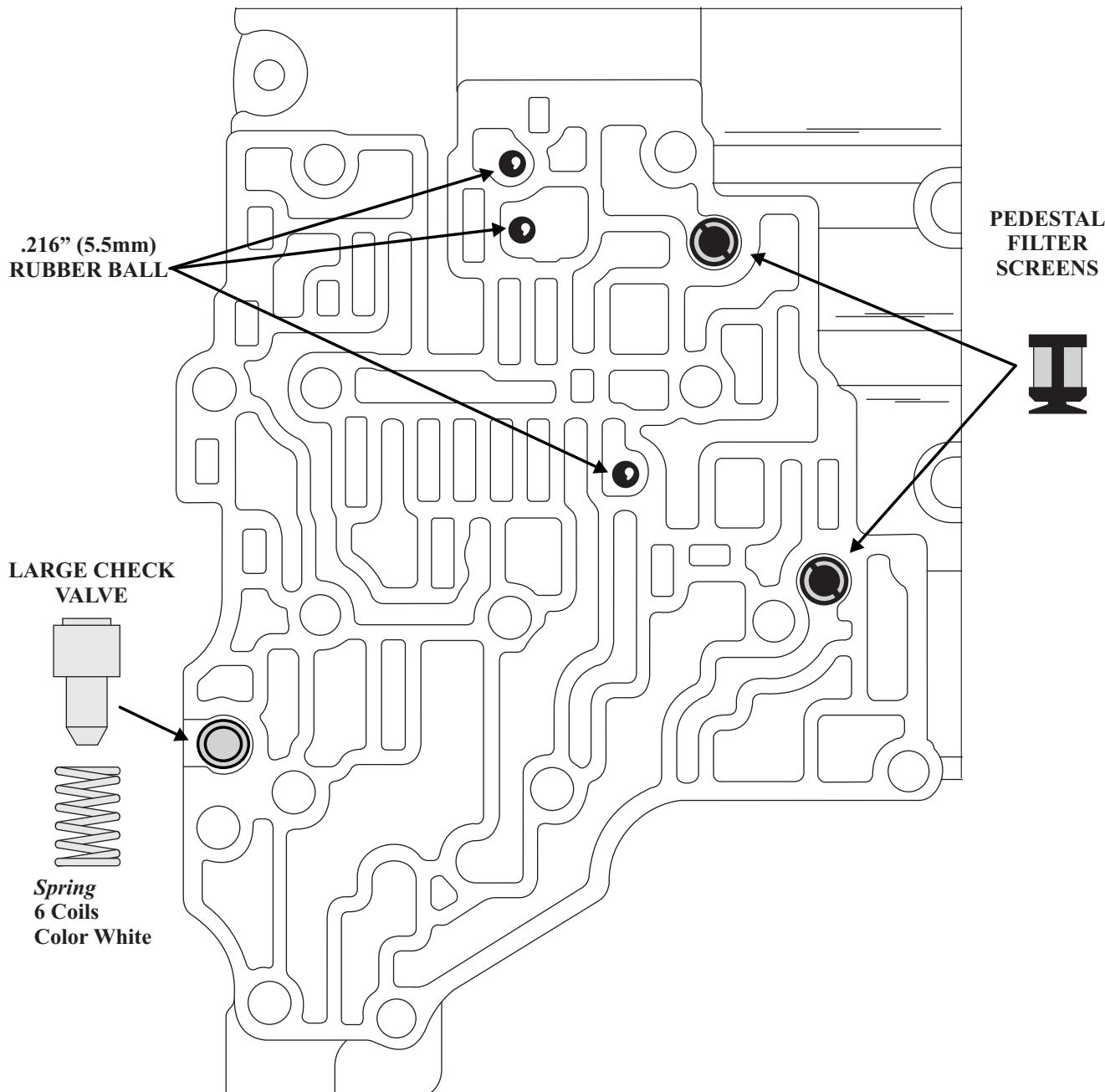
**REAR VALVE BODY**



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SUZUKI  
AW60-40LE/AF13  
**FRONT VALVE BODY - TOP SIDE**

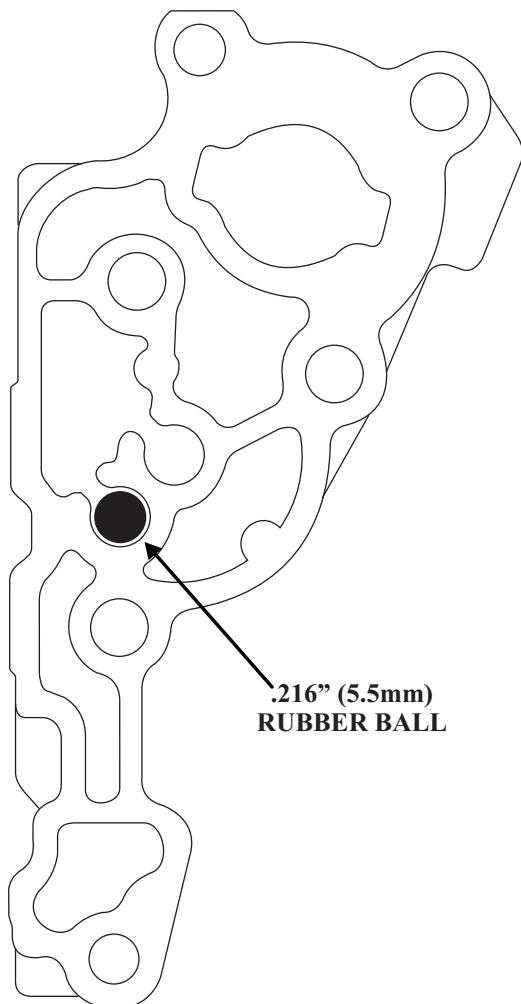


SUZUKI  
AW60-40LE/AF13  
*FRONT VALVE BODY - BOTTOM SIDE*

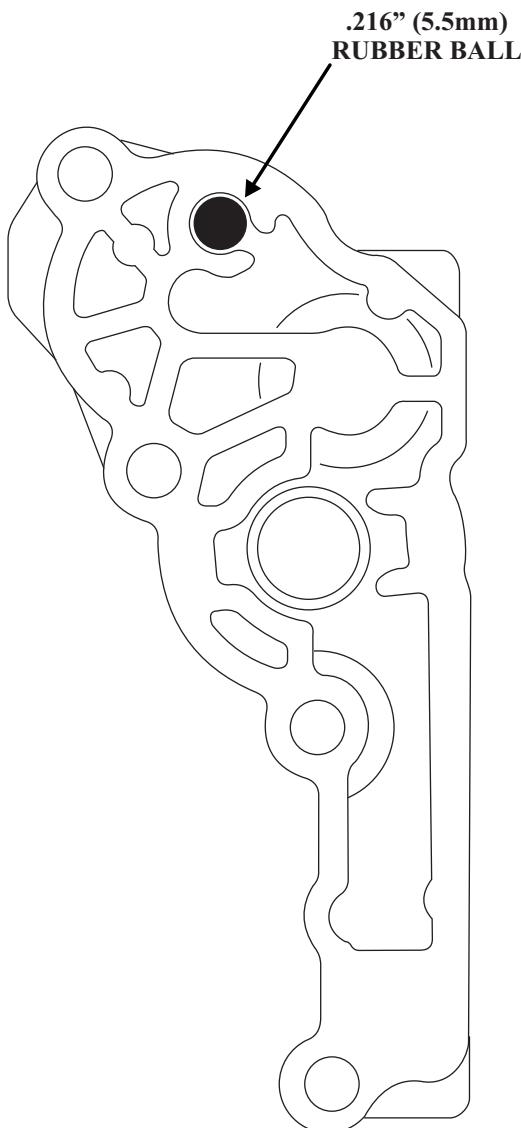
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SUZUKI  
AW60-40LE/AF13

## FRONT ACCUMULATOR COVER



## REAR ACCUMULATOR COVER



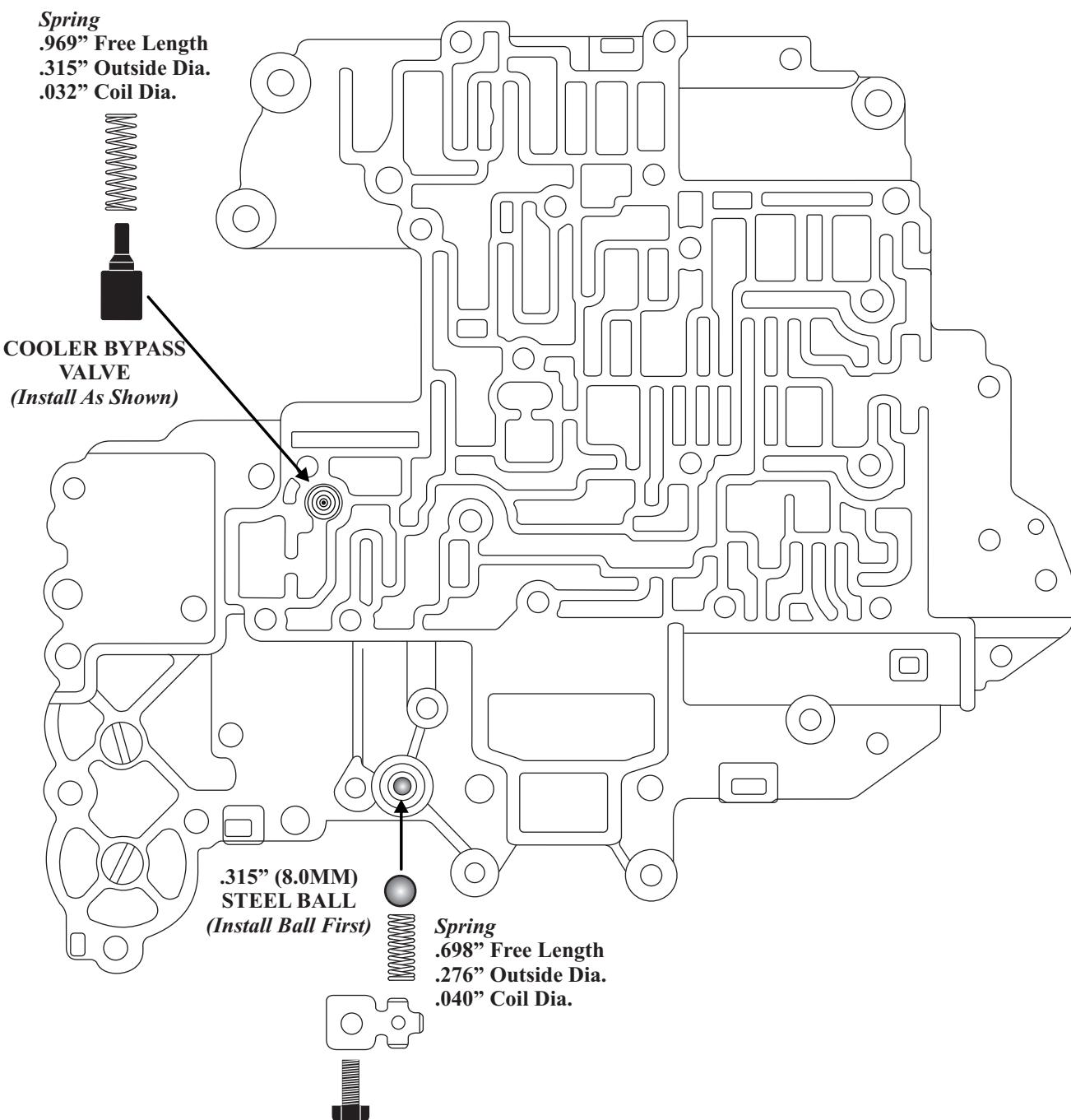
**NOTE:** Care should be taken when removing these accumulator covers due to spring tension.  
These covers contain a total of five accumulator springs & 4 accumulator pistons.

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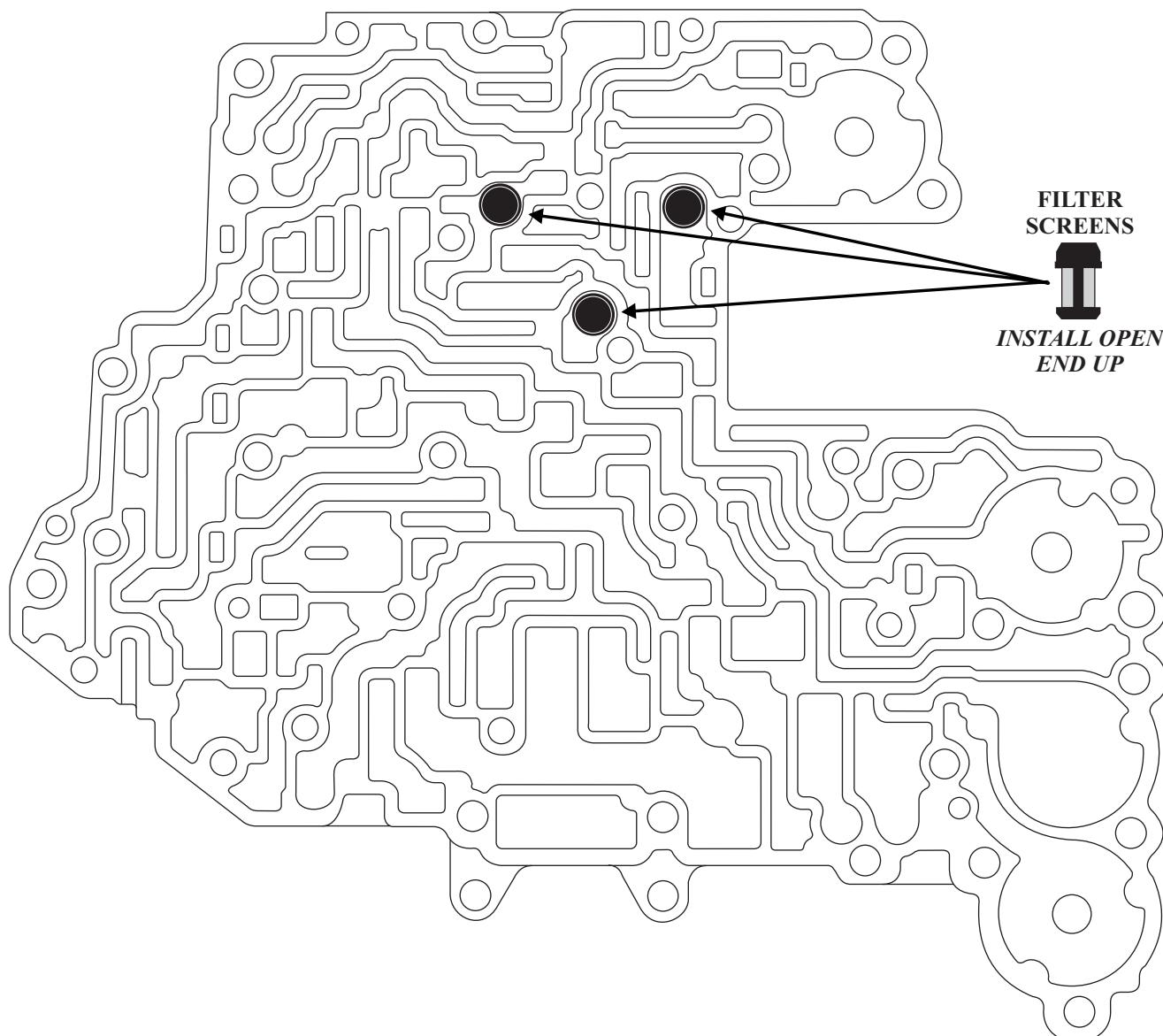
## TOYOTA A245E/246E

LOWER VALVE BODY (*Bottom Side*)

(With TV Cable)



**TOYOTA A245E/246E**  
***LOWER VALVE BODY (Top Side)***  
**(With TV Cable)**

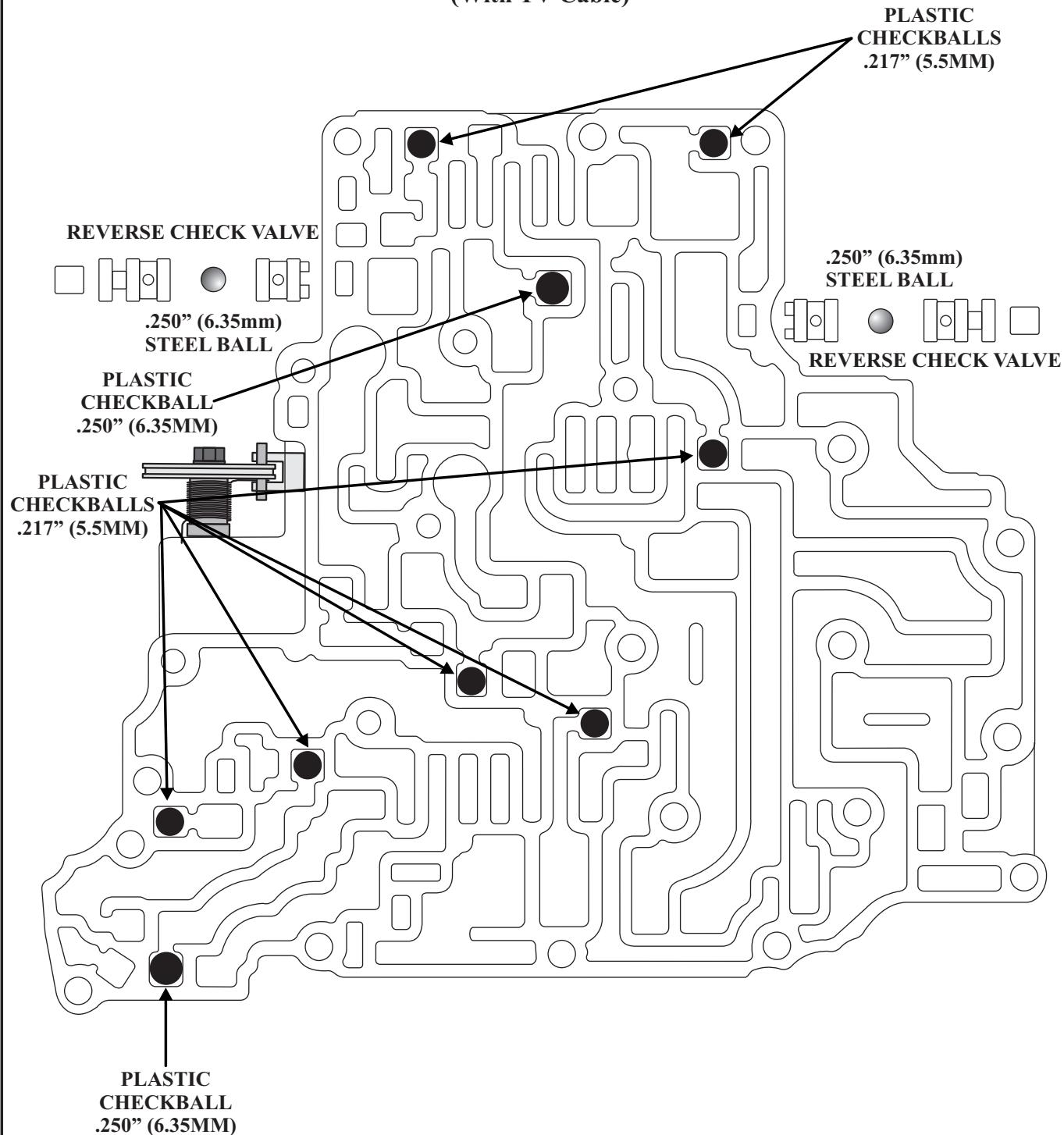


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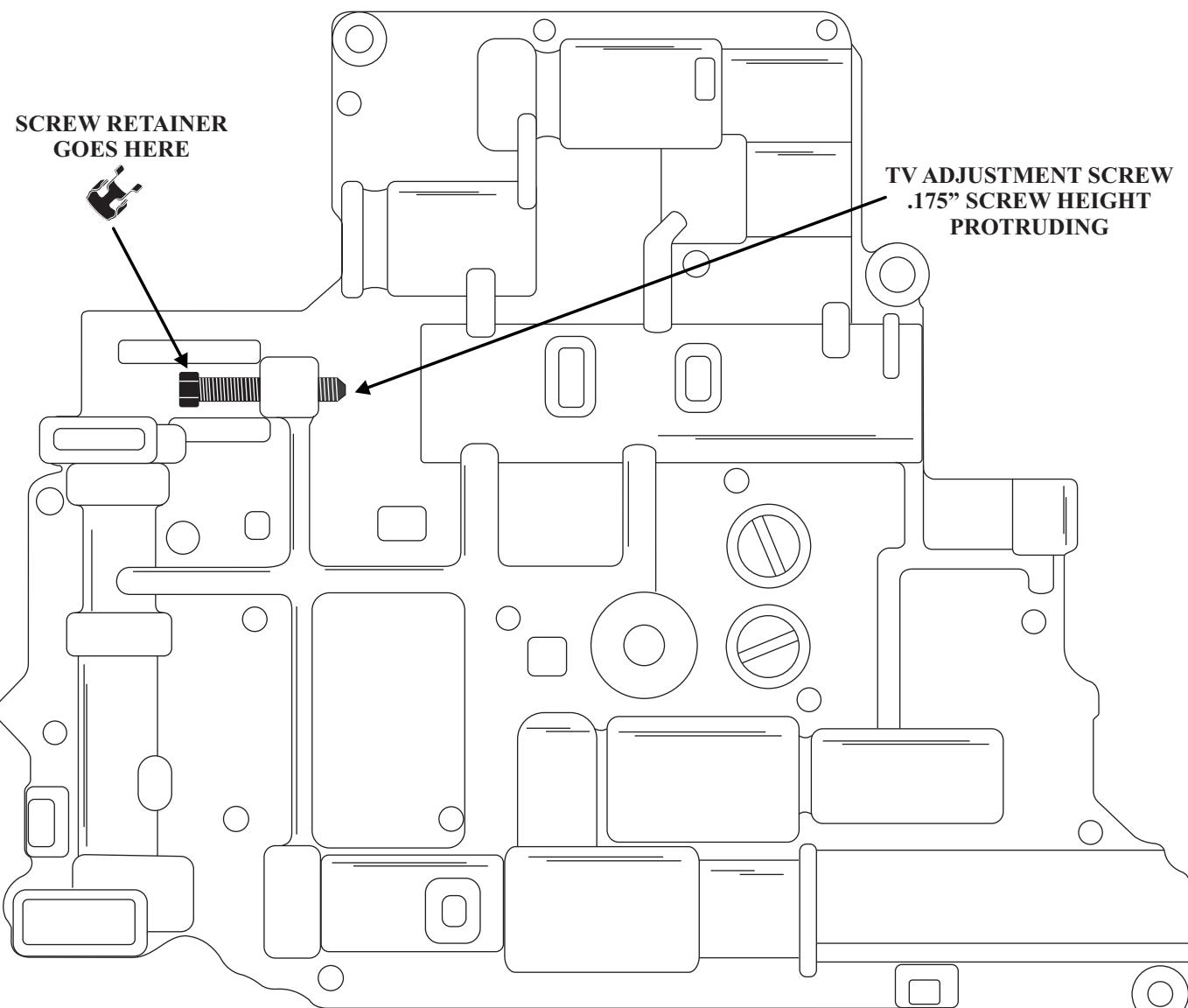
**TOYOTA A245E/246E**

**UPPER VALVE BODY (Front Side)**

(With TV Cable)



**TOYOTA A245E/246E**  
**UPPER VALVE BODY (Back Side)**  
**(With TV Cable)**



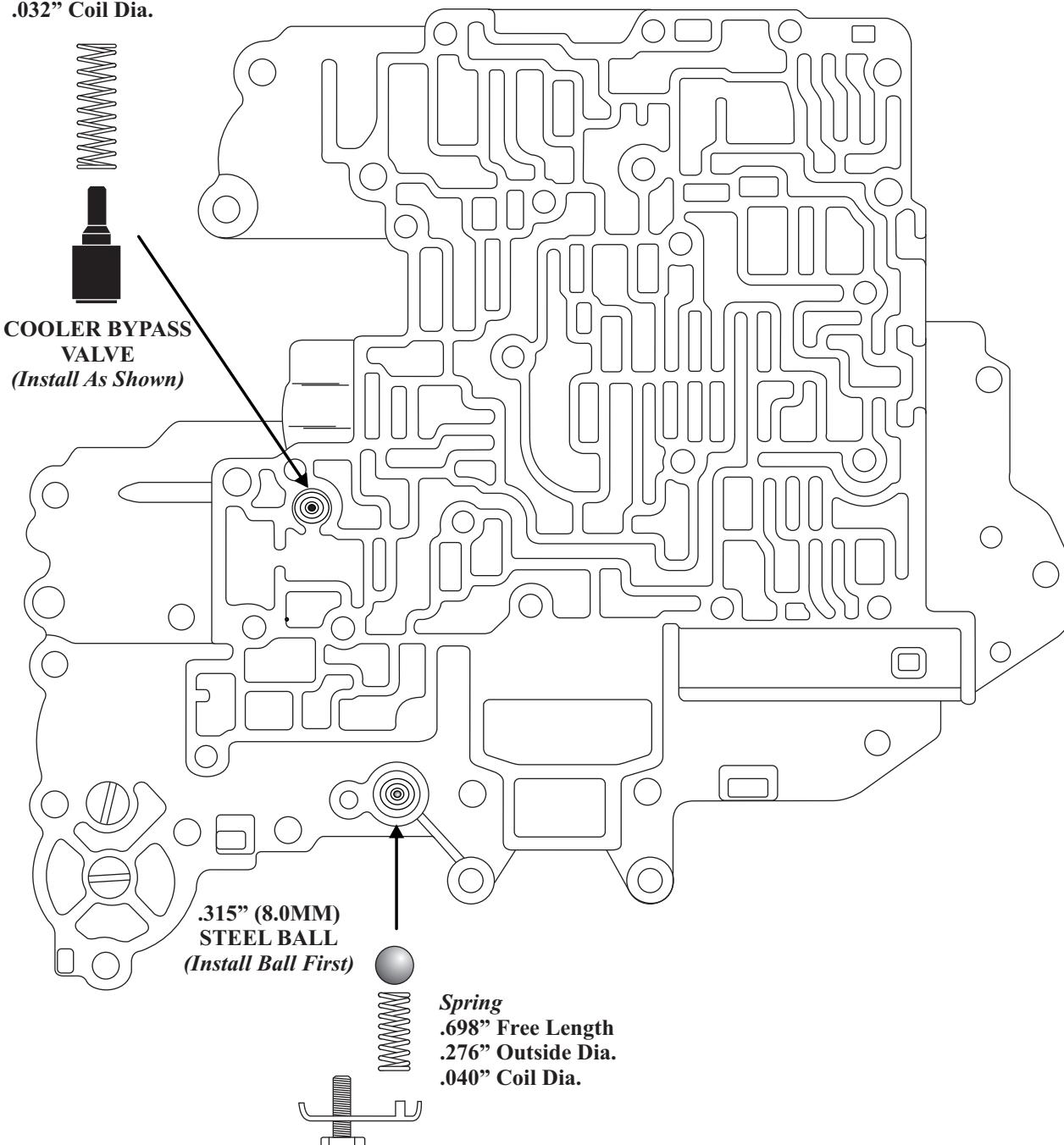
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## TOYOTA A245E/246E

### *LOWER VALVE BODY (Bottom Side)*

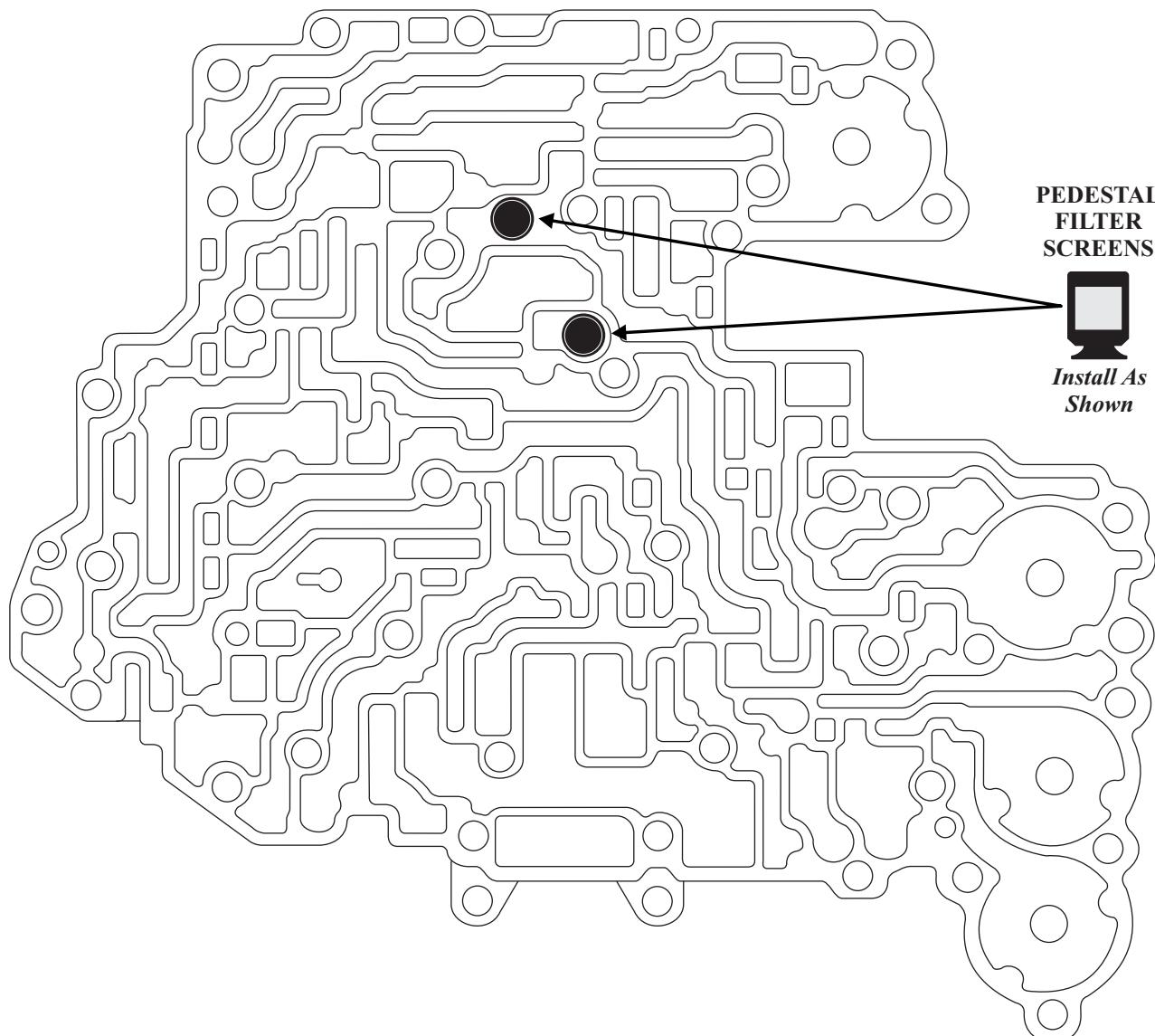
(Early With Line Pressure Solenoid)

*Spring*  
.969" Free Length  
.315" Outside Dia.  
.032" Coil Dia.



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**TOYOTA A245E/246E**  
***LOWER VALVE BODY (Top Side)***  
**(Early With Line Pressure Solenoid)**

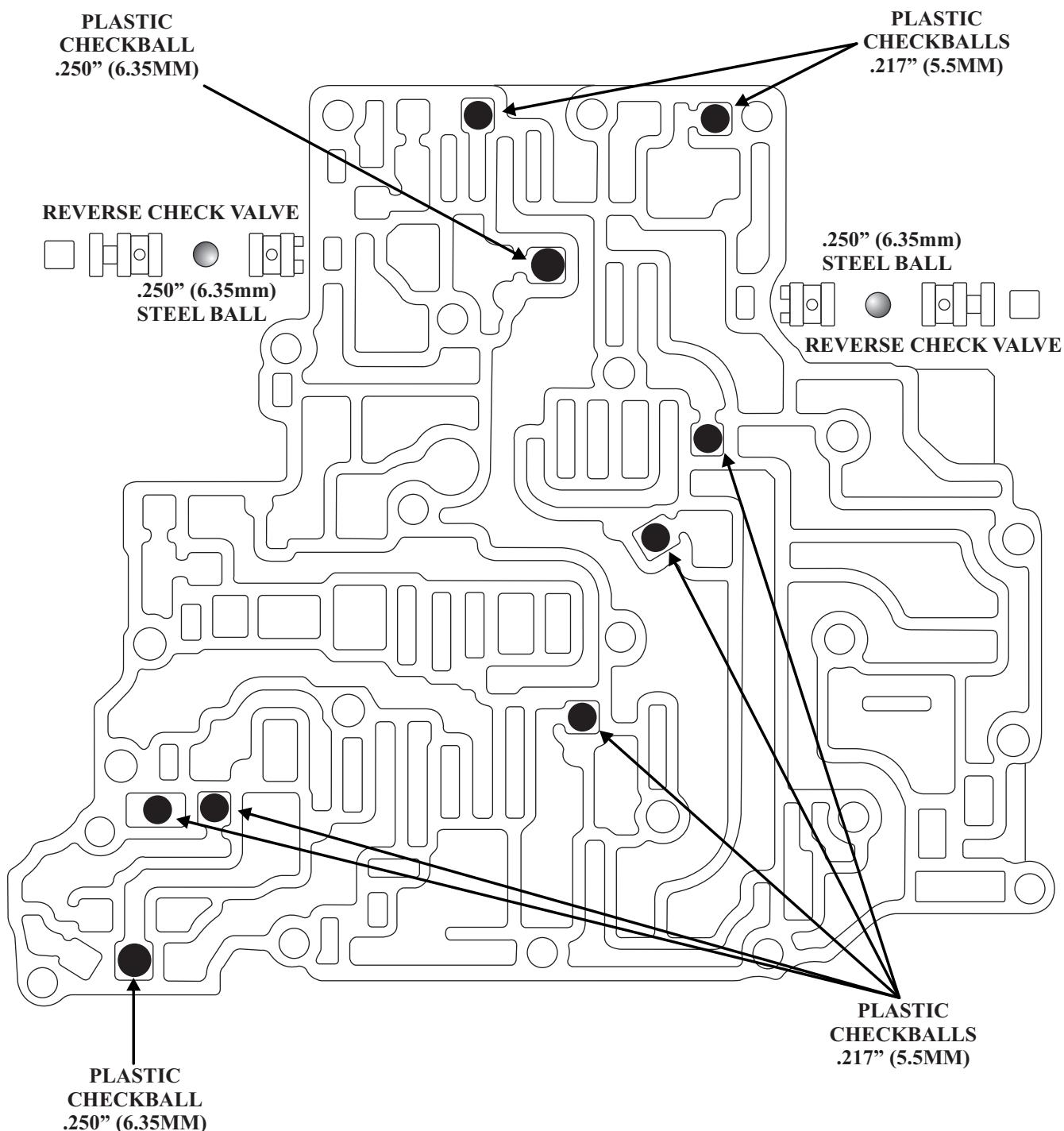


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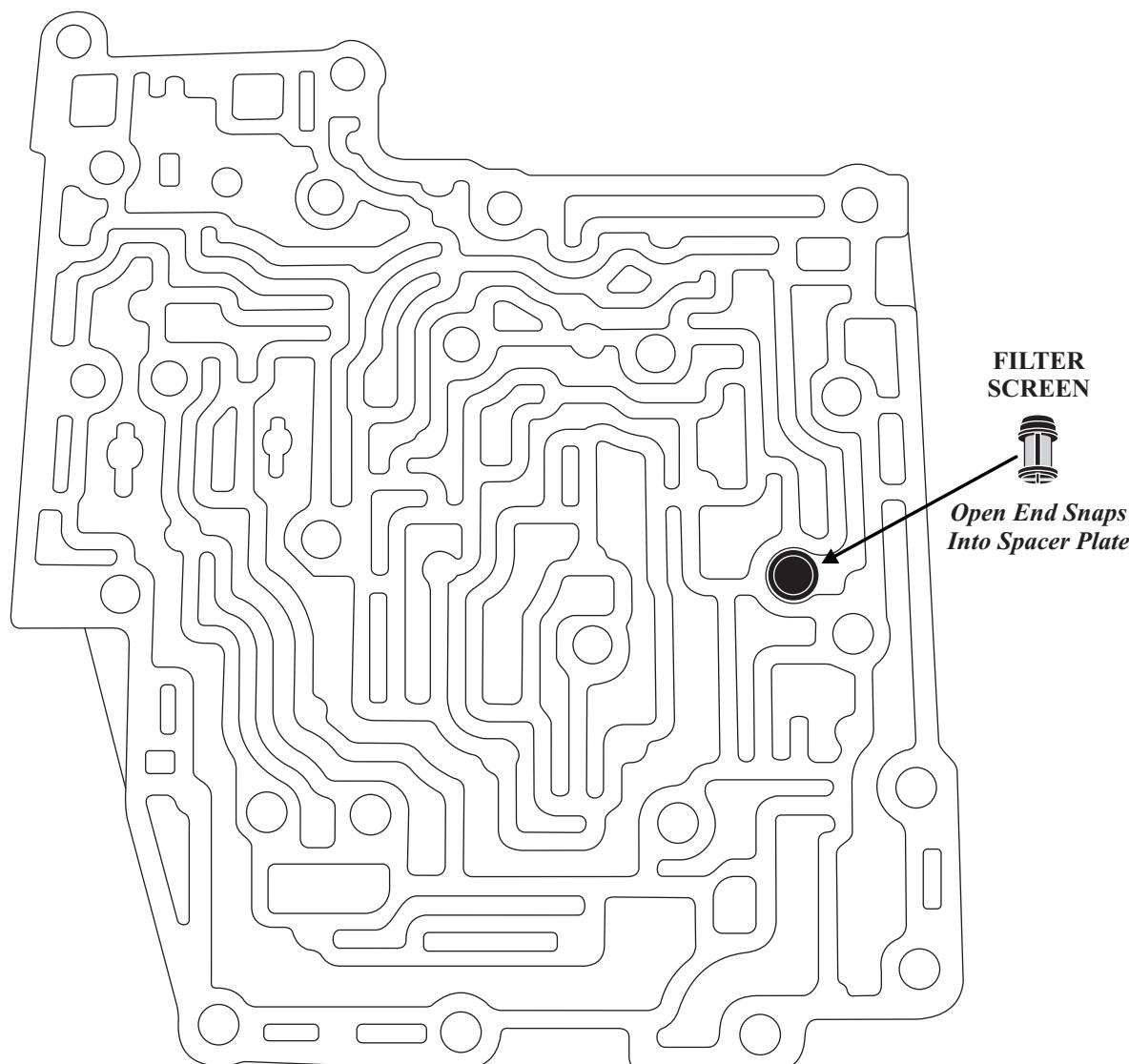
**TOYOTA A245E/246E**

**UPPER VALVE BODY**

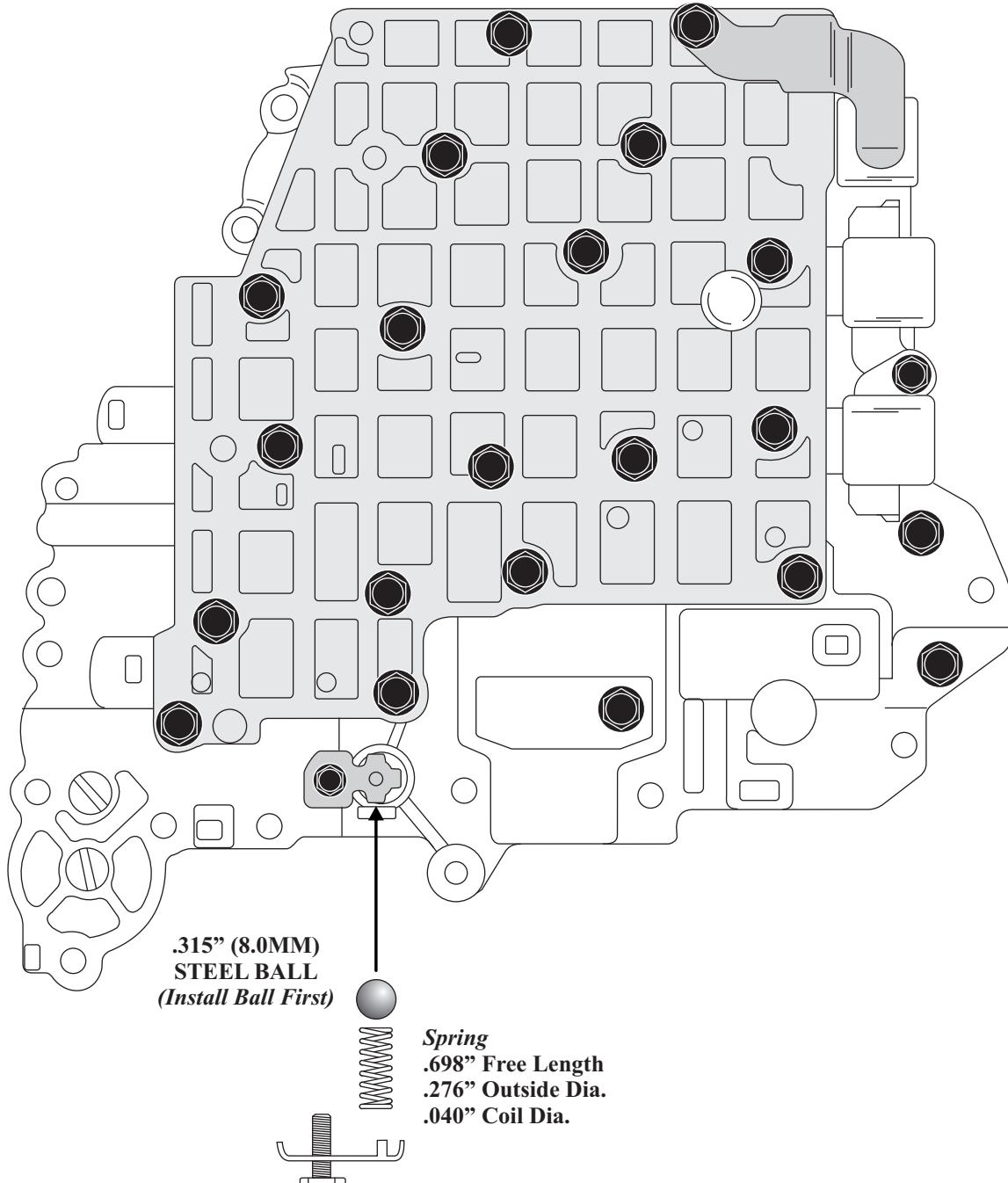
(Early With Line Pressure Solenoid)



**TOYOTA A245E/246E**  
**LOWER VALVE BODY COVER**  
**(Late With Line Pressure Solenoid)**

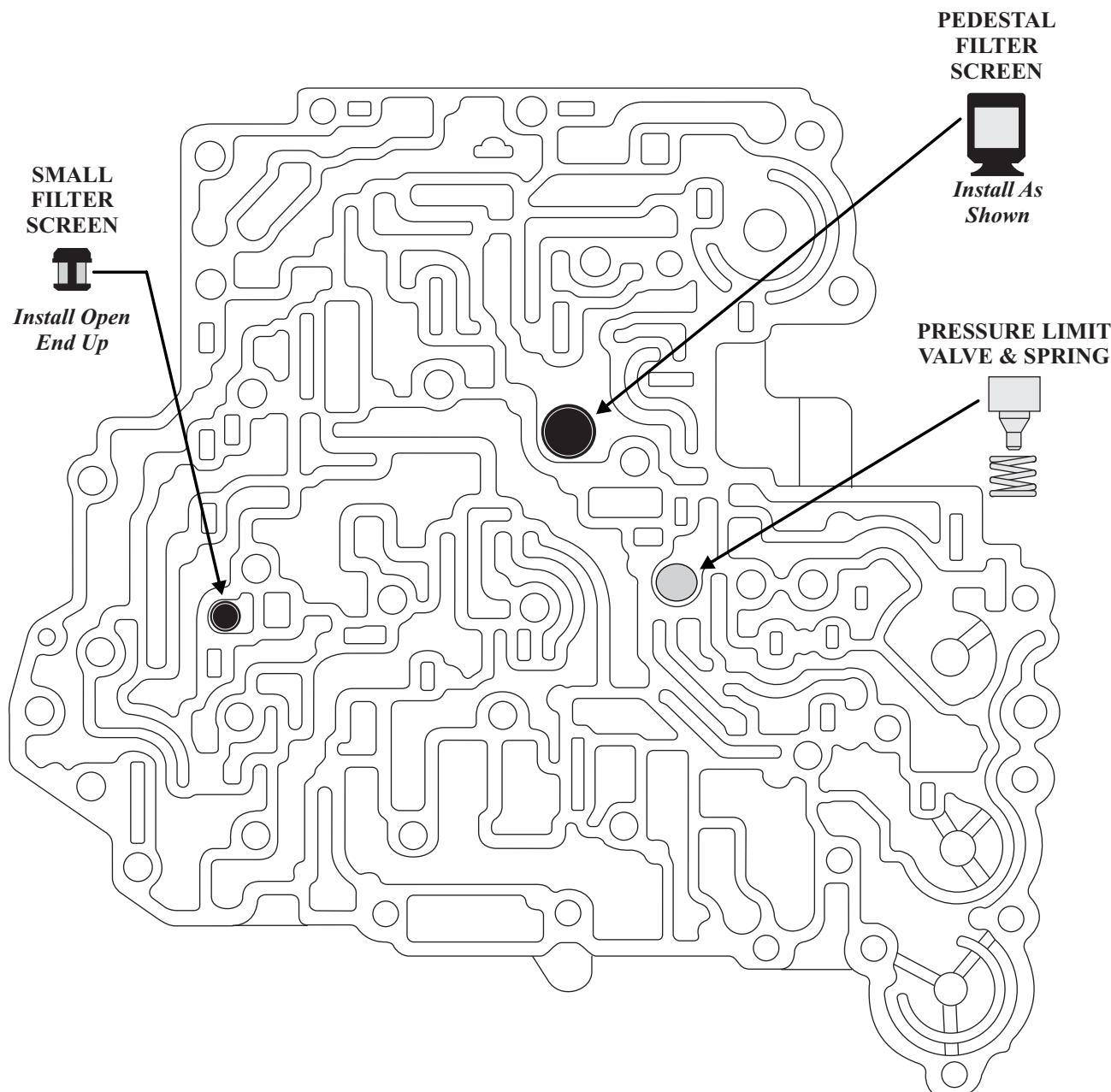


**TOYOTA A245E/246E**  
***LOWER VALVE BODY (Bottom Side)***  
**(Late With Line Pressure Solenoid)**



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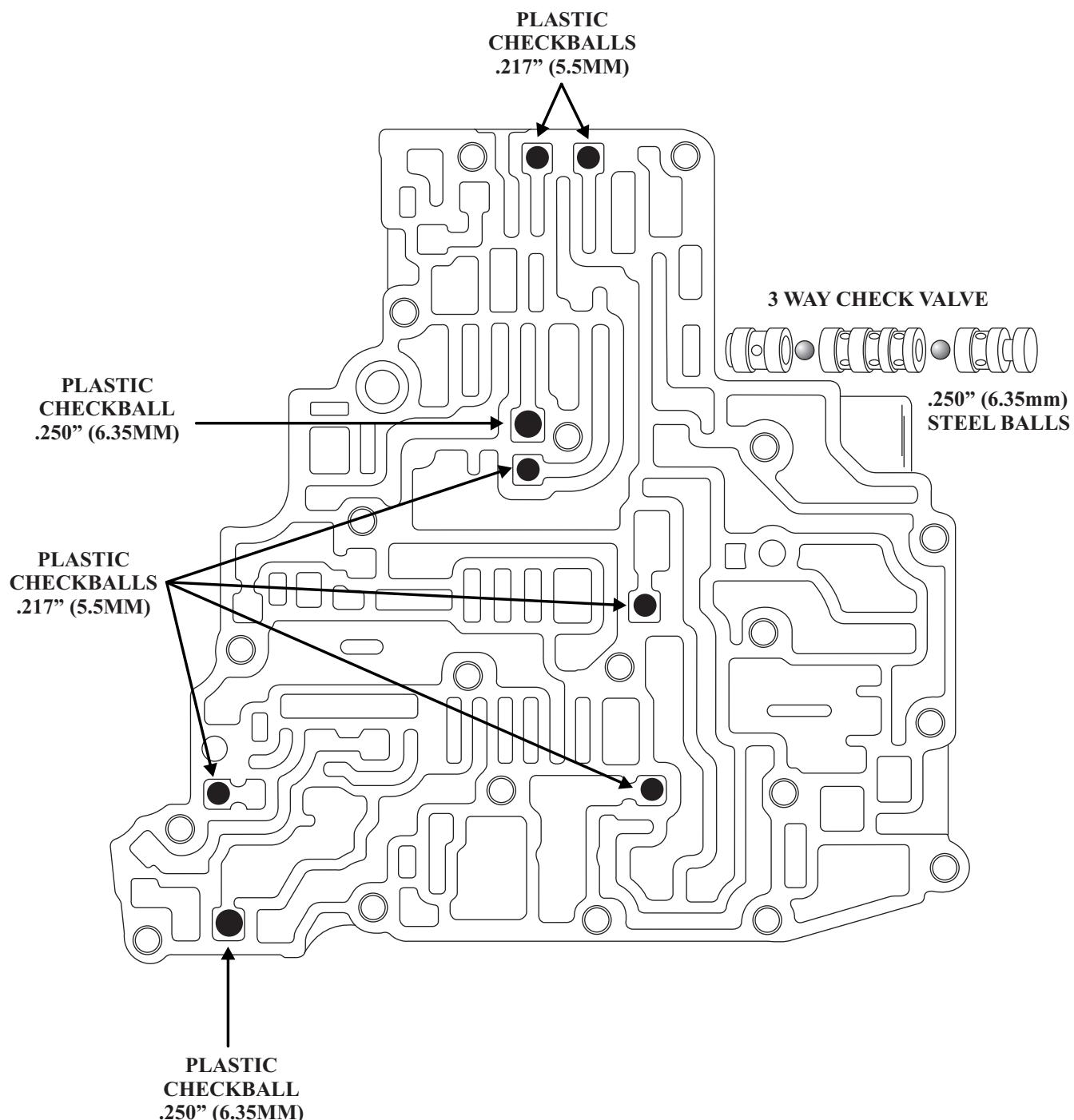
**TOYOTA A245E/246E**  
***LOWER VALVE BODY (Top Side)***  
**(Late With Line Pressure Solenoid)**



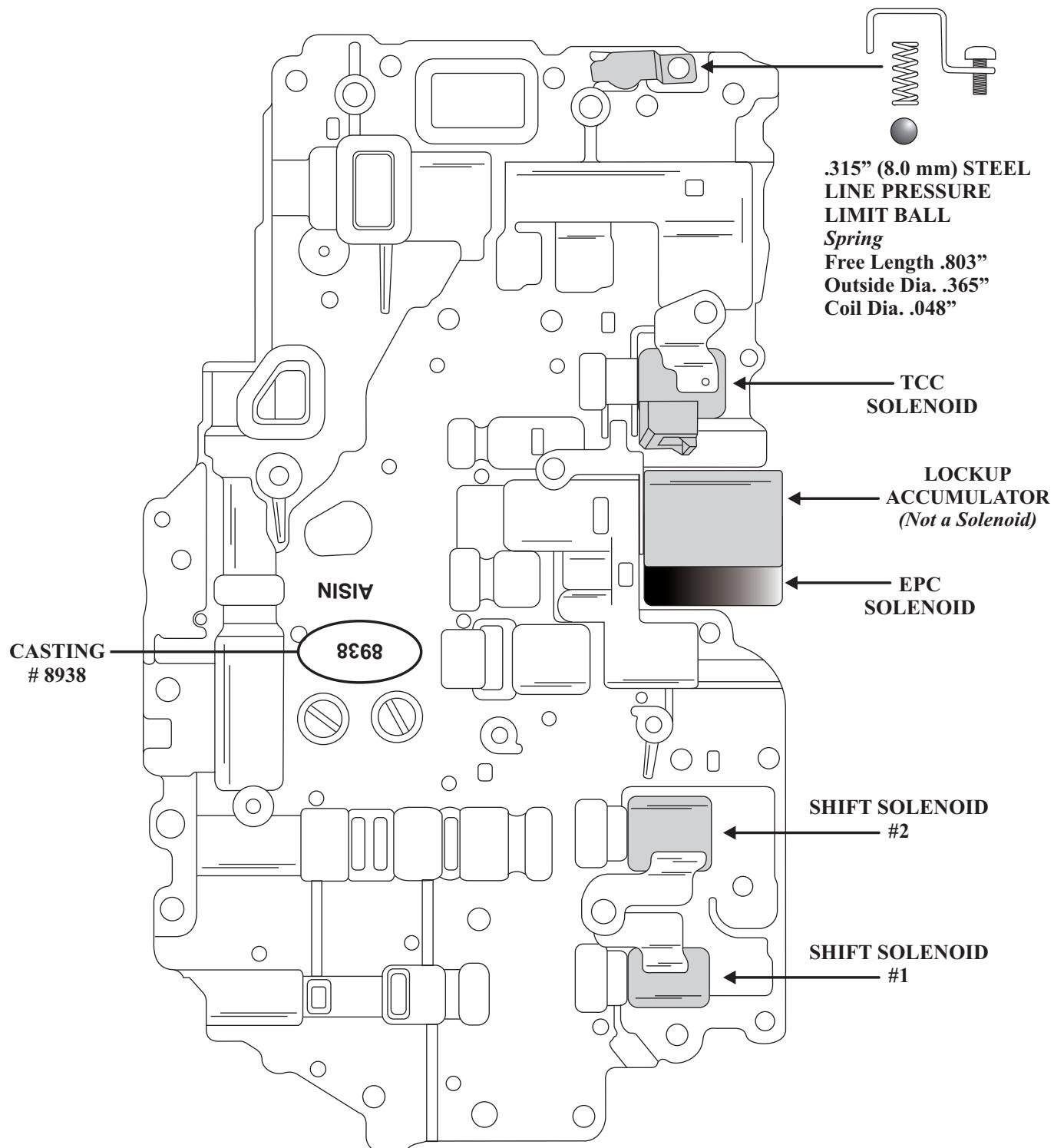
## TOYOTA A245E/246E

## UPPER VALVE BODY

(Late With Line Pressure Solenoid)



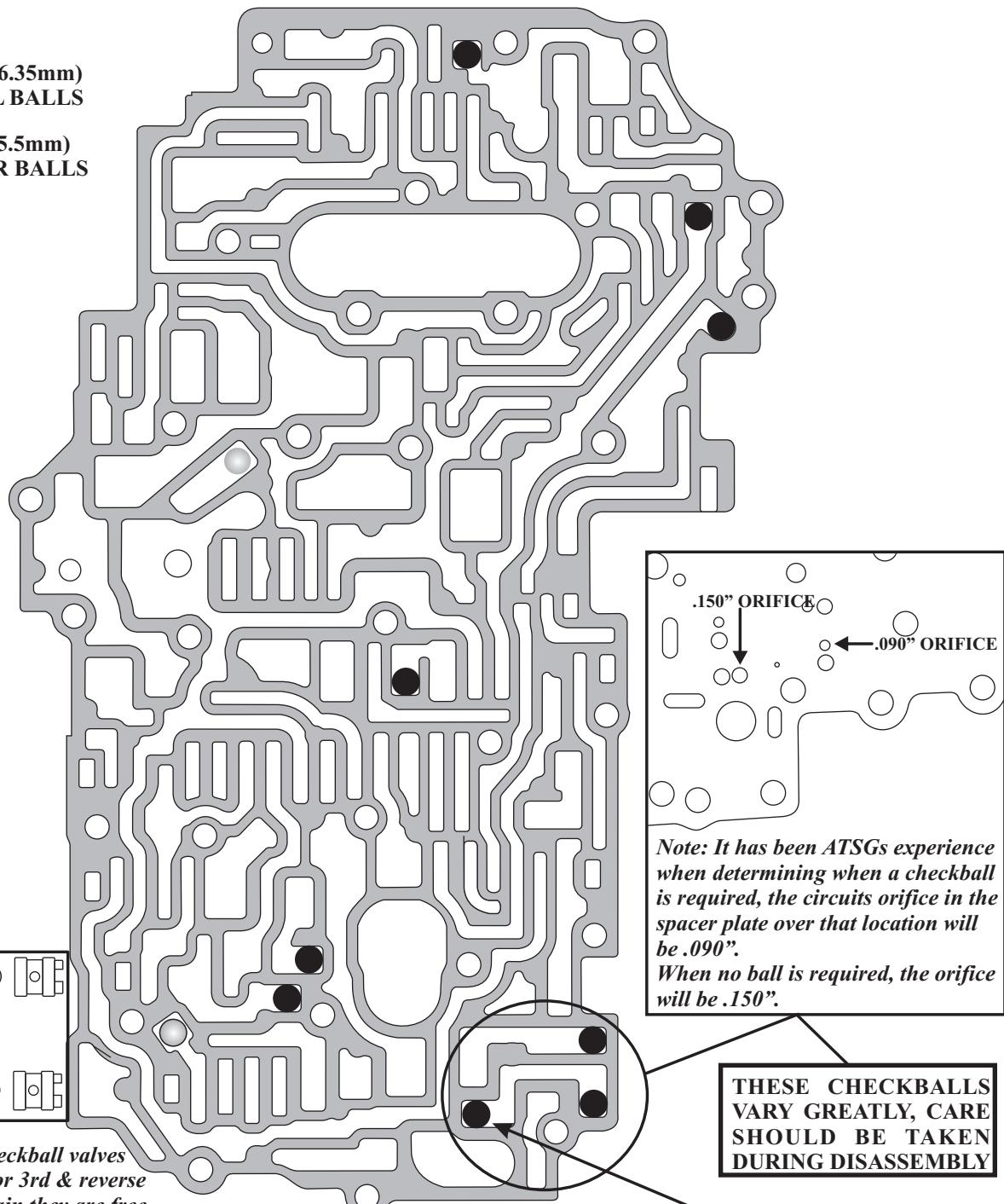
**TOYOTA A340E/F - 2000 & LATER**  
**VALVE BODY CASTING NUMBER 8938 WITH EPC SOLENOID**



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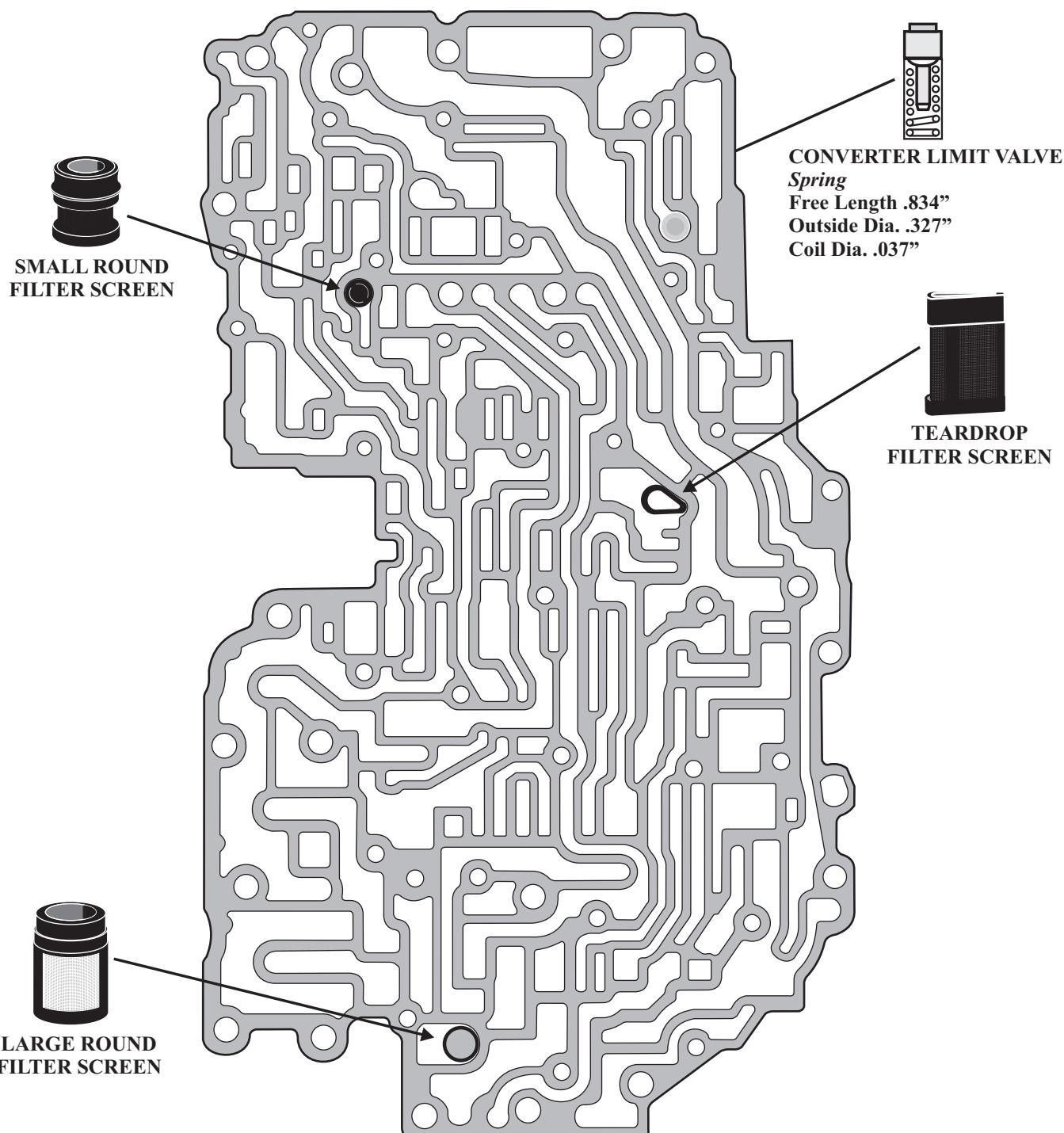
**TOYOTA A340E/F - 2000 & LATER**  
**VALVE BODY CASTING NUMBER 8938 WITH EPC SOLENOID**  
**UPPER VALVE BODY**

- .250" (6.35mm)  
STEEL BALLS
- .218" (5.5mm)  
RUBBER BALLS



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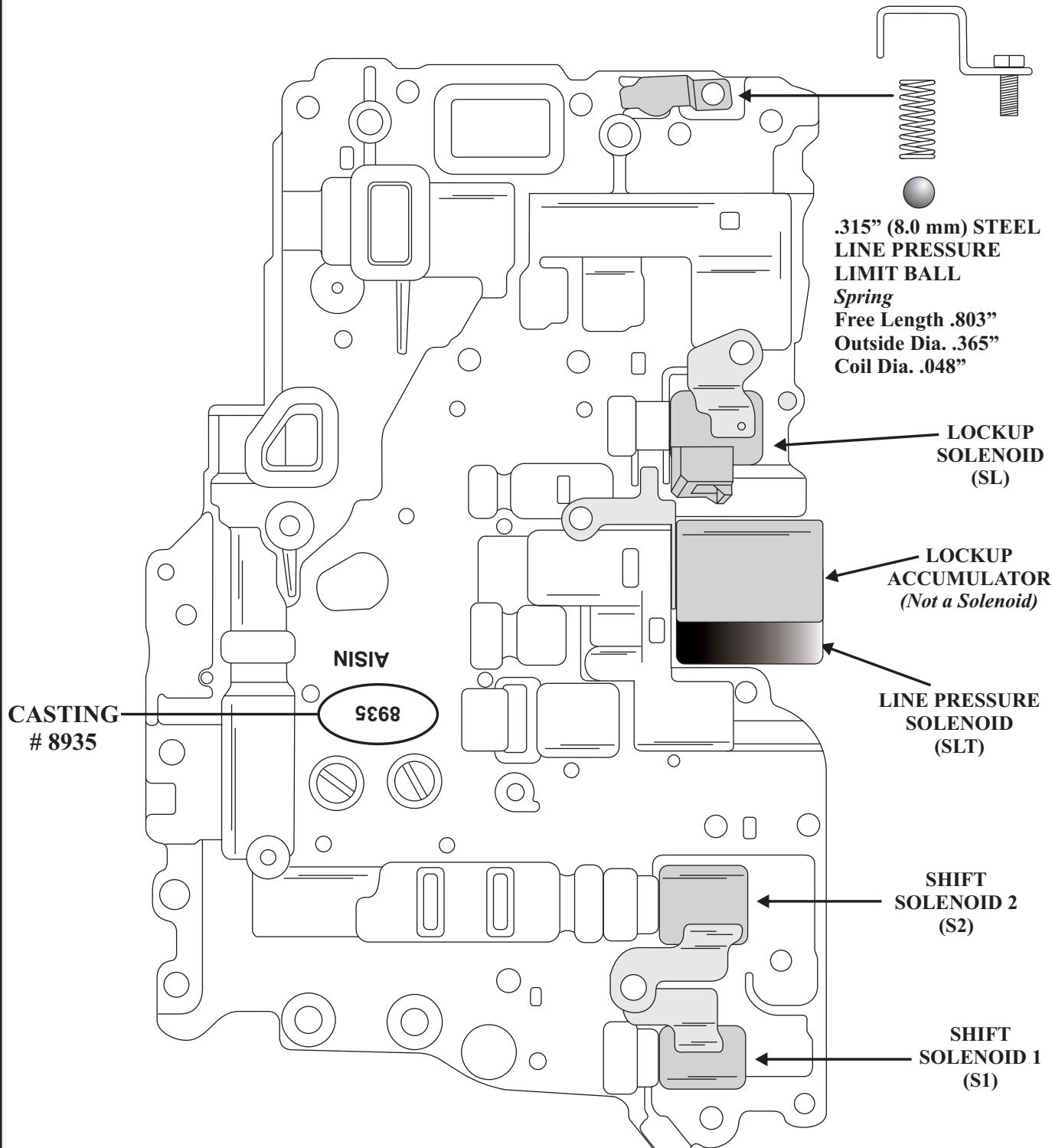
**TOYOTA A340E/F - 2000 & LATER**  
**VALVE BODY CASTING NUMBER 8938 WITH EPC SOLENOID**  
**LOWER VALVE BODY**



*NOTE: Open End Of Screens Face Separator Plate And Snap In*

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**TOYOTA A340E/F - 2000 & LATER**  
**VALVE BODY CASTING NUMBER 8935 WITH EPC SOLENOID**

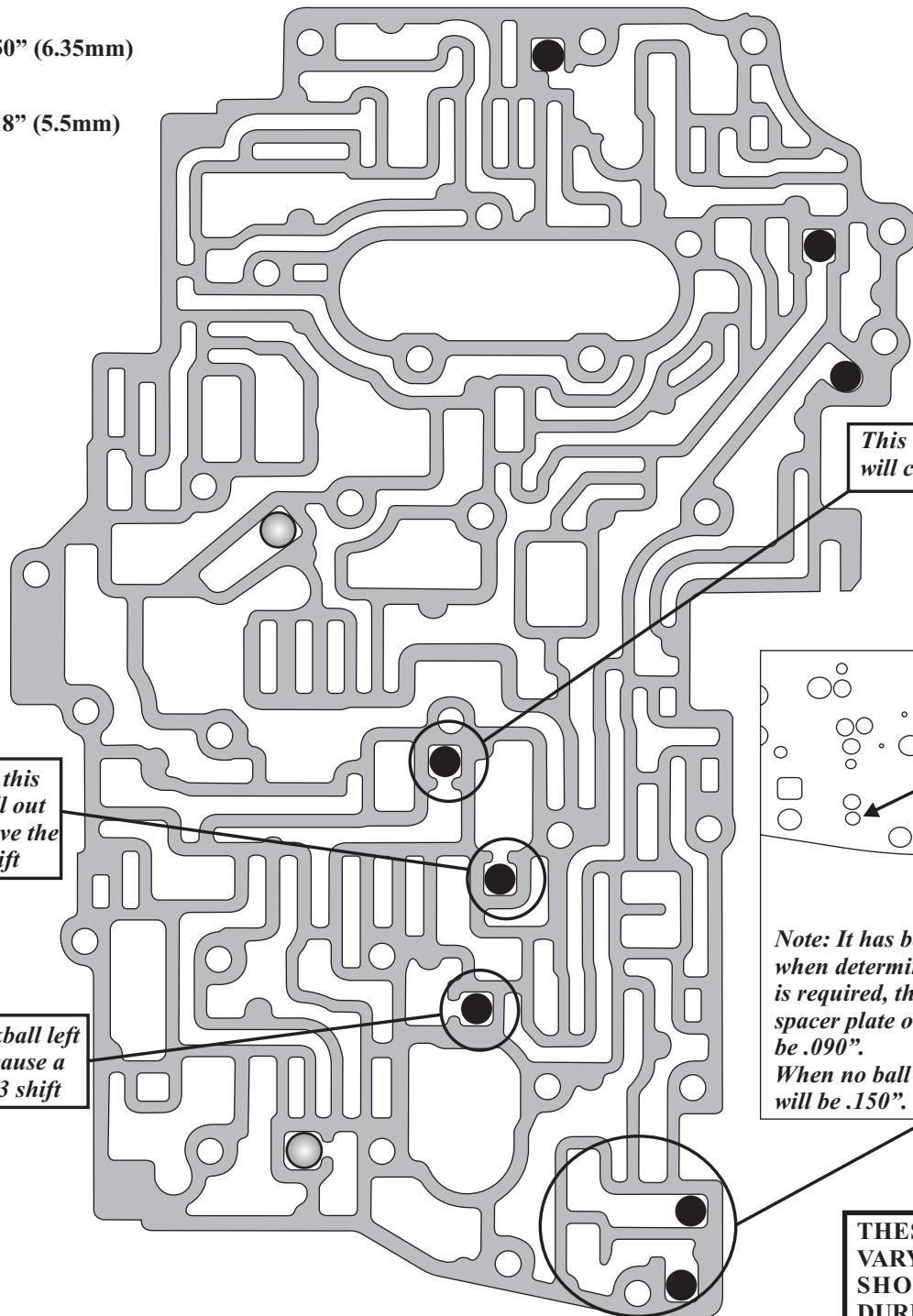


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**TOYOTA A340E/F - 2000 & LATER**  
**VALVE BODY CASTING NUMBER 8935 WITH EPC SOLENOID**  
**UPPER VALVE BODY**

● .250" (6.35mm)

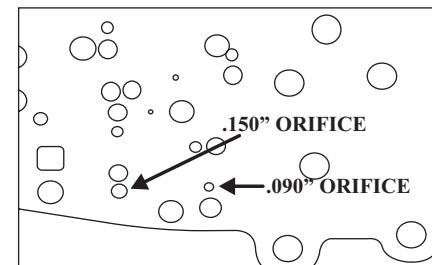
● .218" (5.5mm)



*This checkball left out will cause a harsh 1-2 shift*

*Leaving this checkball out will improve the 3-4 shift*

*This checkball left out will cause a harsh 2-3 shift*

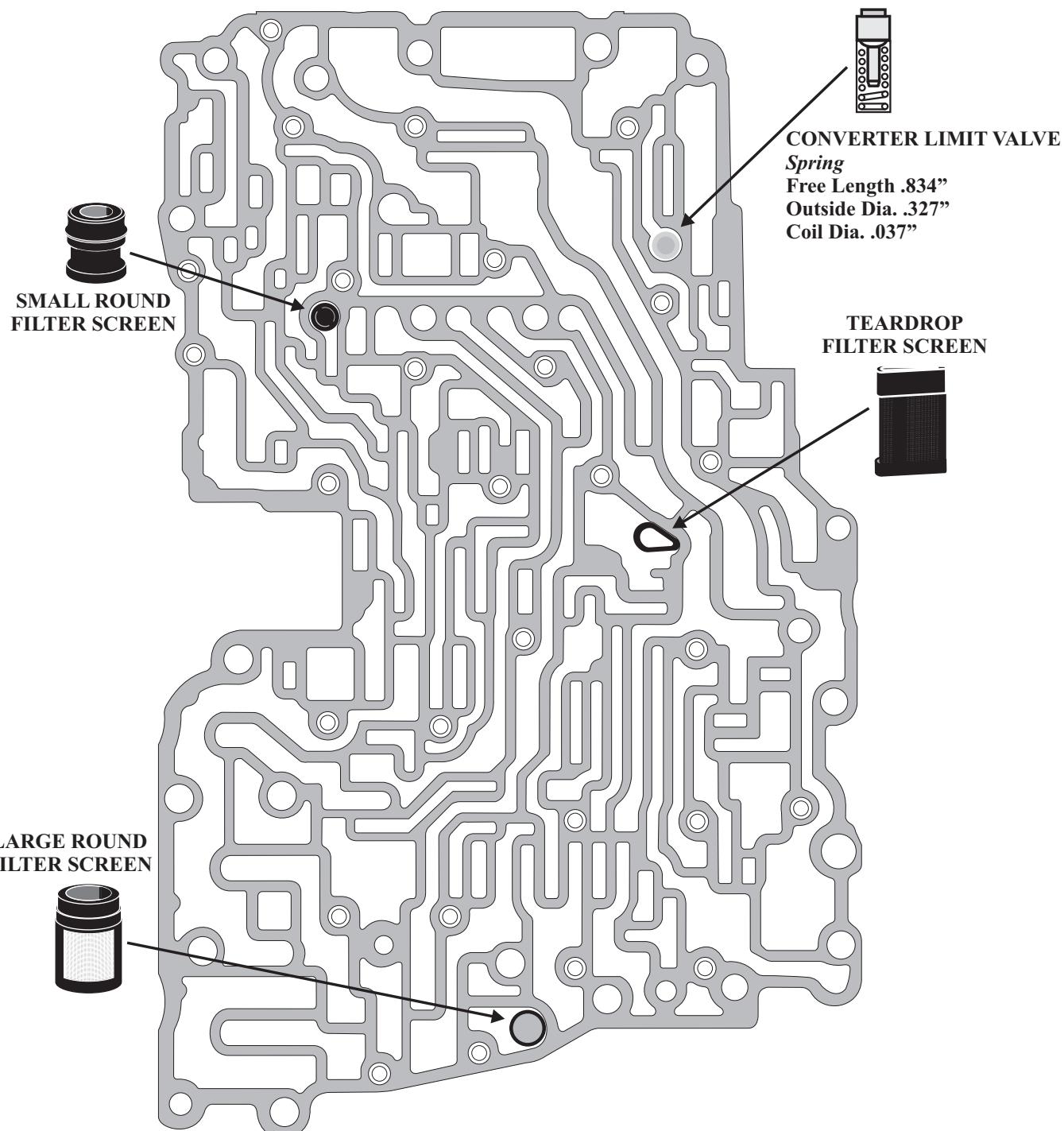


*Note: It has been ATSGs experience when determining when a checkball is required, the circuits orifice in the spacer plate over that location will be .090".*

*When no ball is required, the orifice will be .150".*

**THESE CHECKBALLS VARY GREATLY, CARE SHOULD BE TAKEN DURING DISASSEMBLY**

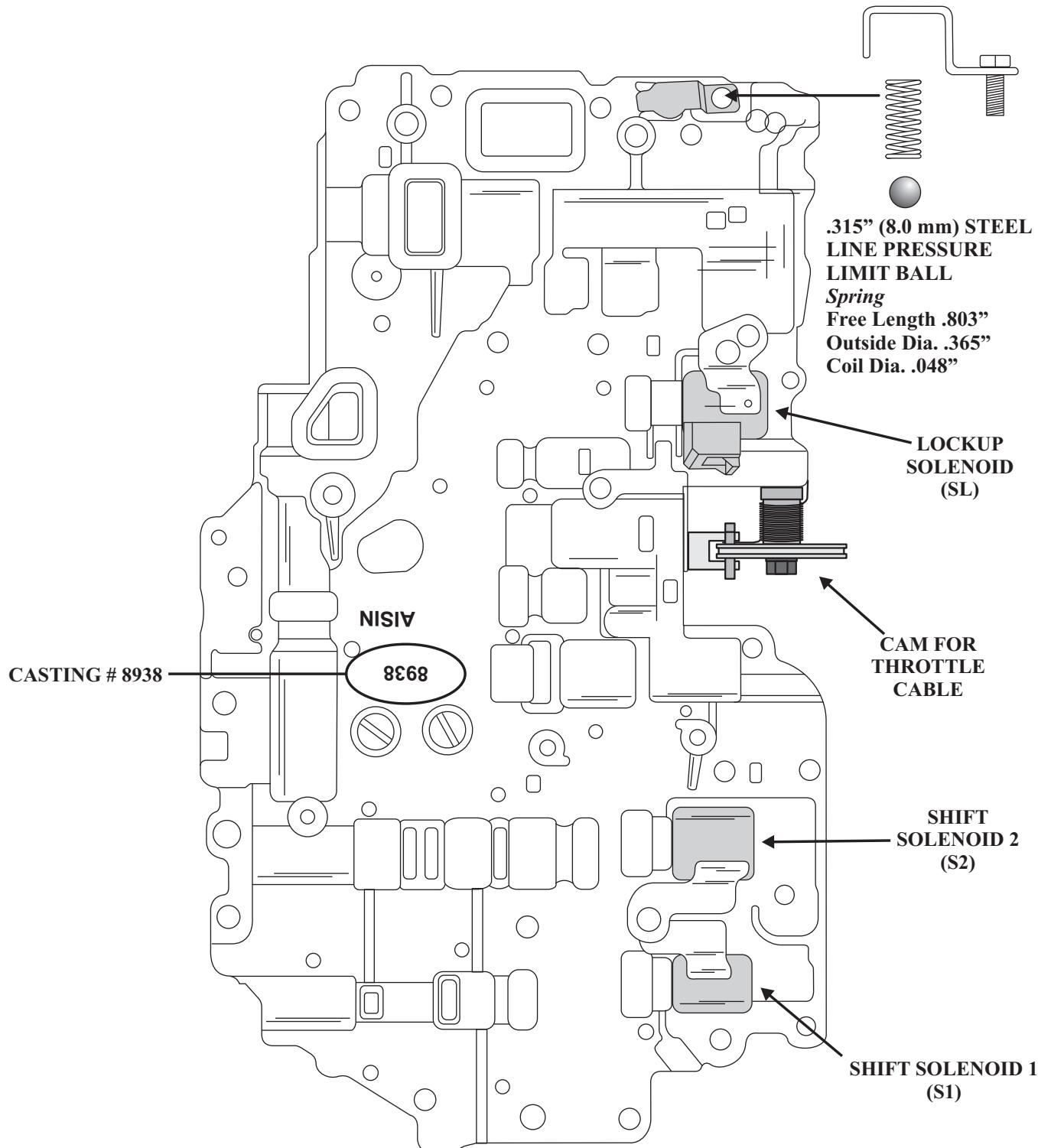
**TOYOTA A340E/F - 2000 & LATER**  
**VALVE BODY CASTING NUMBER 8935 WITH EPC SOLENOID**  
**LOWER VALVE BODY**



*NOTE: Open End Of Screens Face Separator Plate And Snap In*

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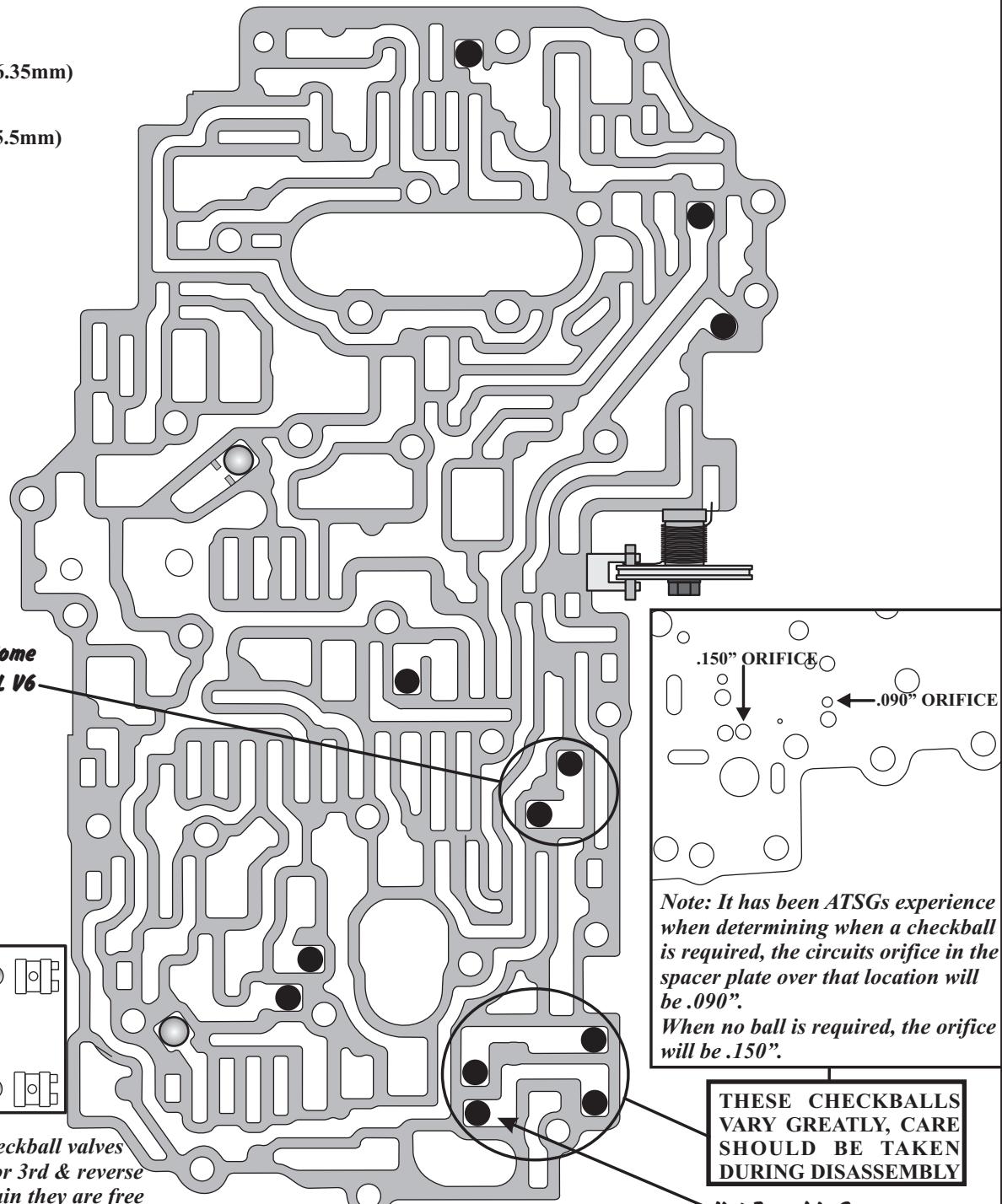
**TOYOTA A340E/F - 2000 & LATER**  
**VALVE BODY CASTING NUMBER 8938 WITH TV CABLE**



**TOYOTA A340E/F - 2000 & LATER**  
**VALVE BODY CASTING NUMBER 8938 WITH TV CABLE**  
**UPPER VALVE BODY**

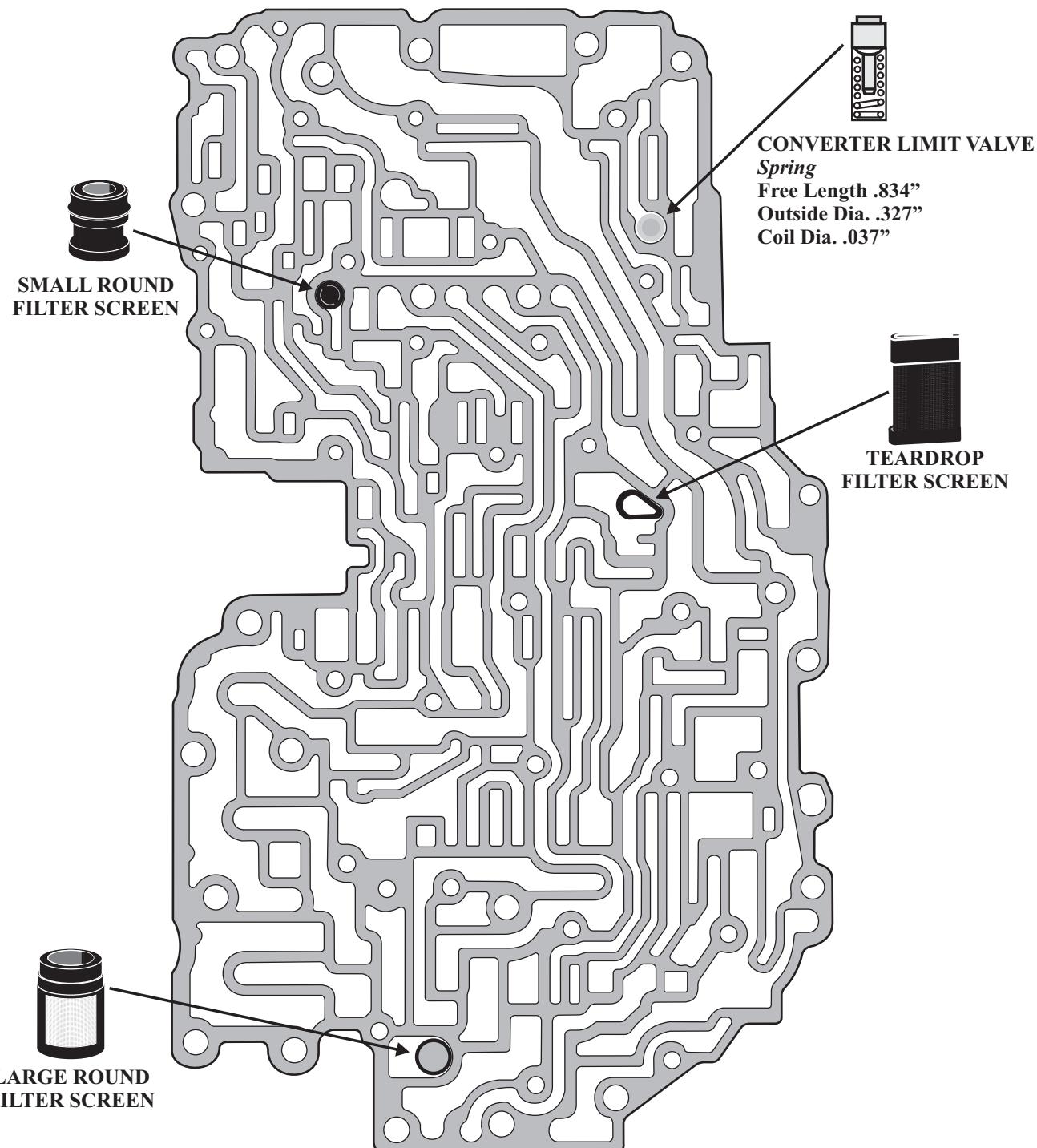
● .250" (6.35mm)

● .218" (5.5mm)



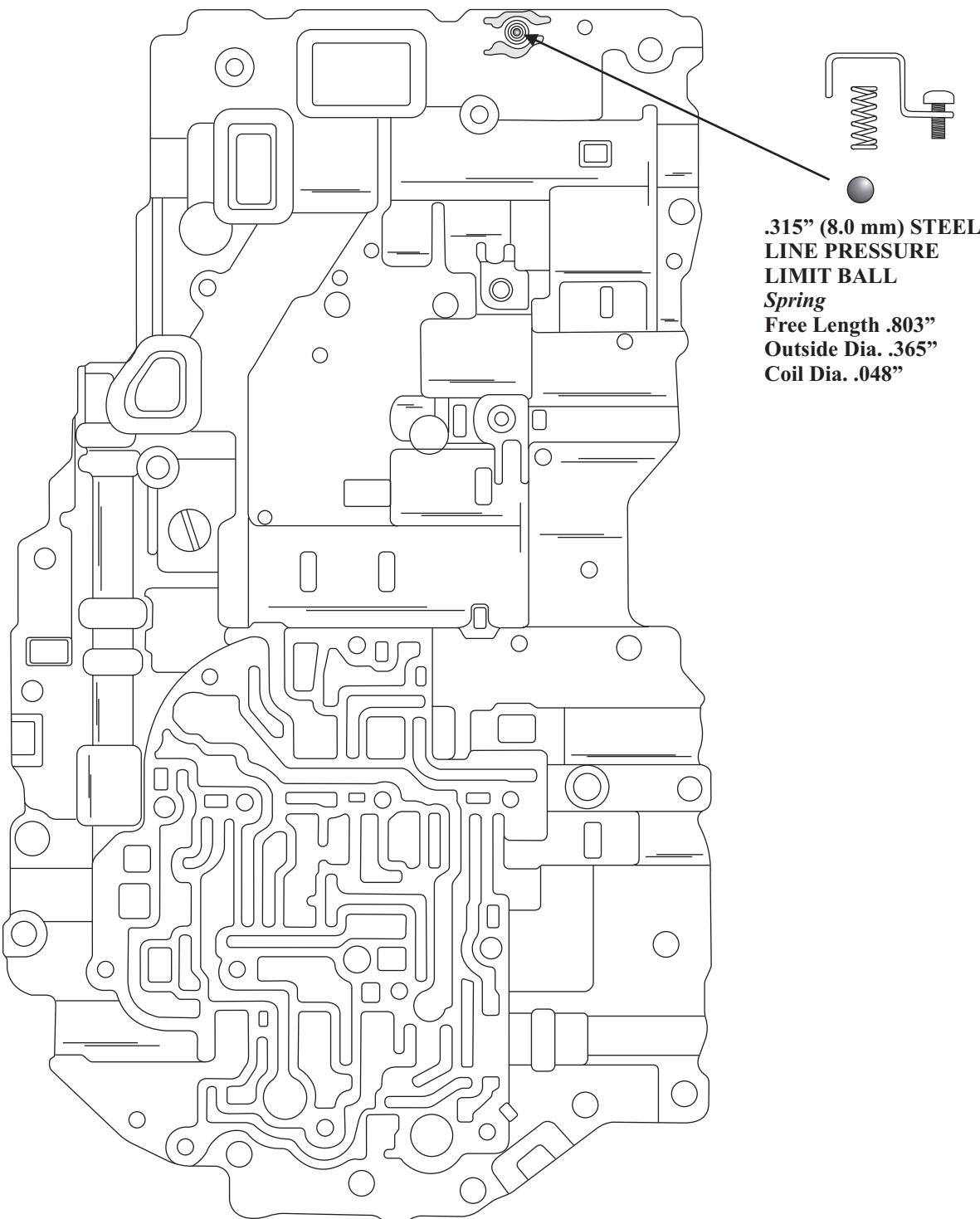
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**TOYOTA A340E/F - 2000 & LATER**  
**VALVE BODY CASTING NUMBER 8938 WITH TV CABLE**  
**LOWER VALVE BODY**



*NOTE: Open End Of Screens Face Separator Plate And Snap In*

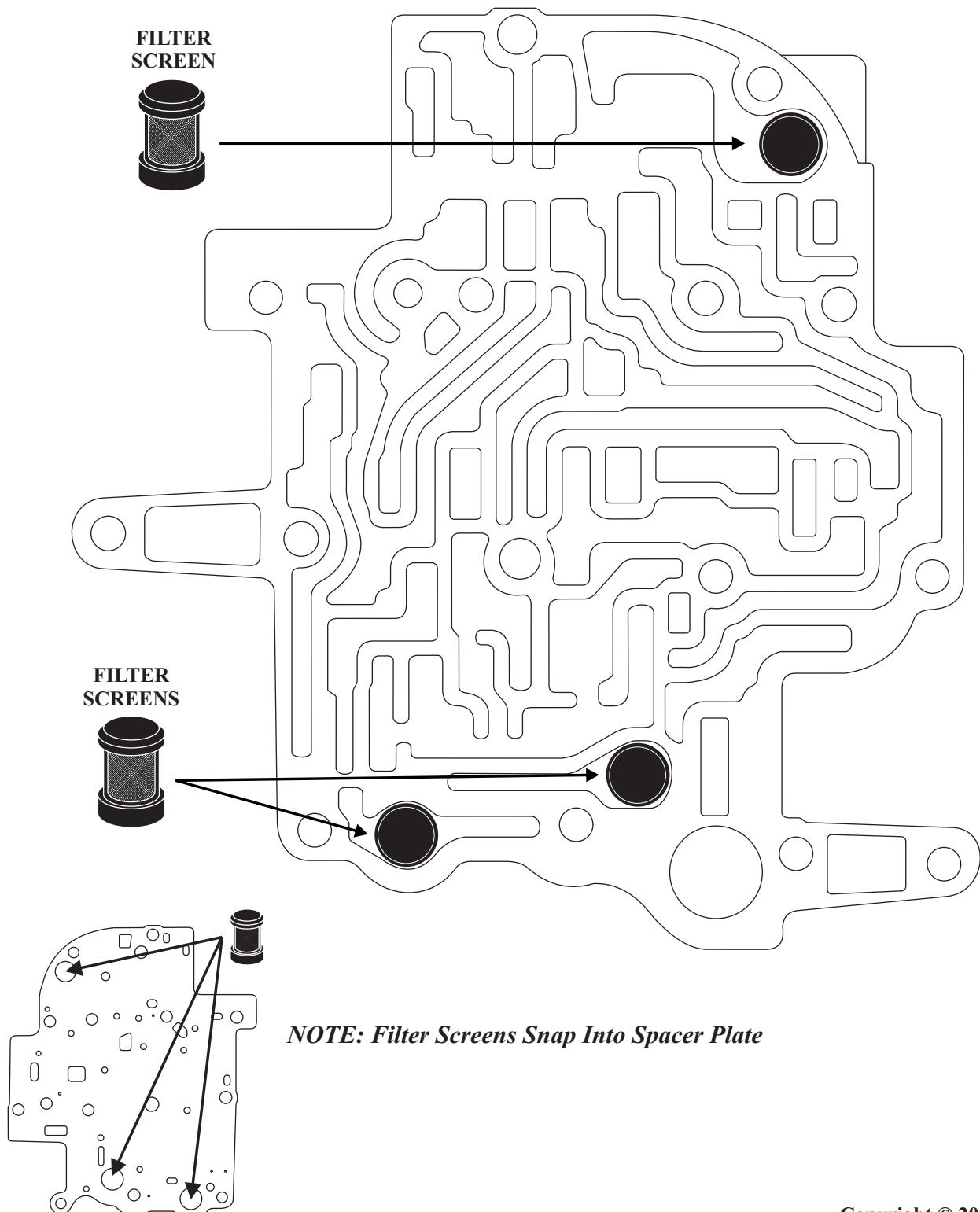
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LEXUS A350E  
**LOWER VALVE BODY - BOTTOM (LARGE)**

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## LEXUS A350E

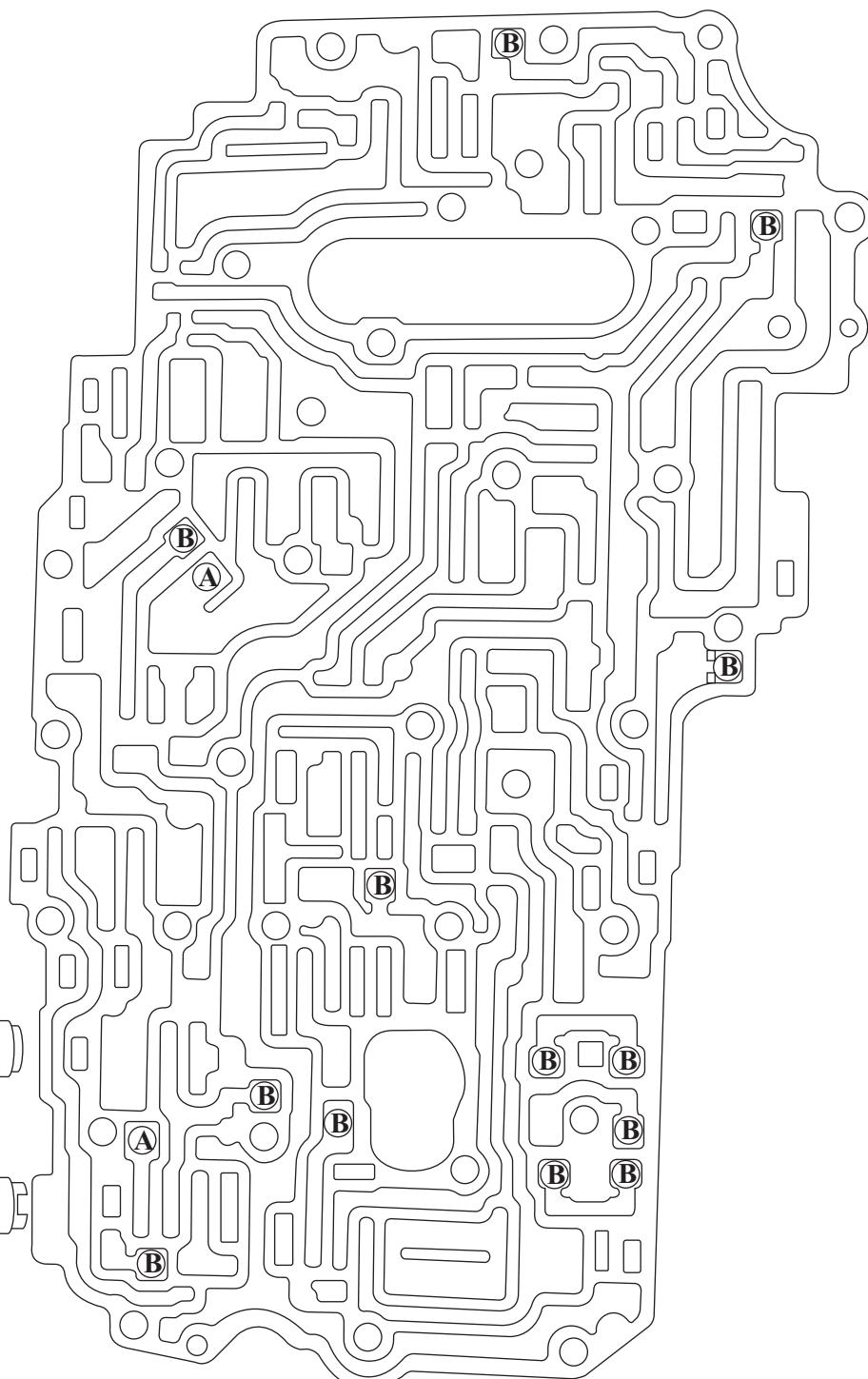
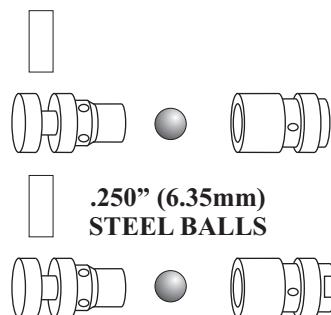
## LOWER VALVE BODY - BOTTOM (SMALL)



## LEXUS A350E

## UPPER VALVE BODY

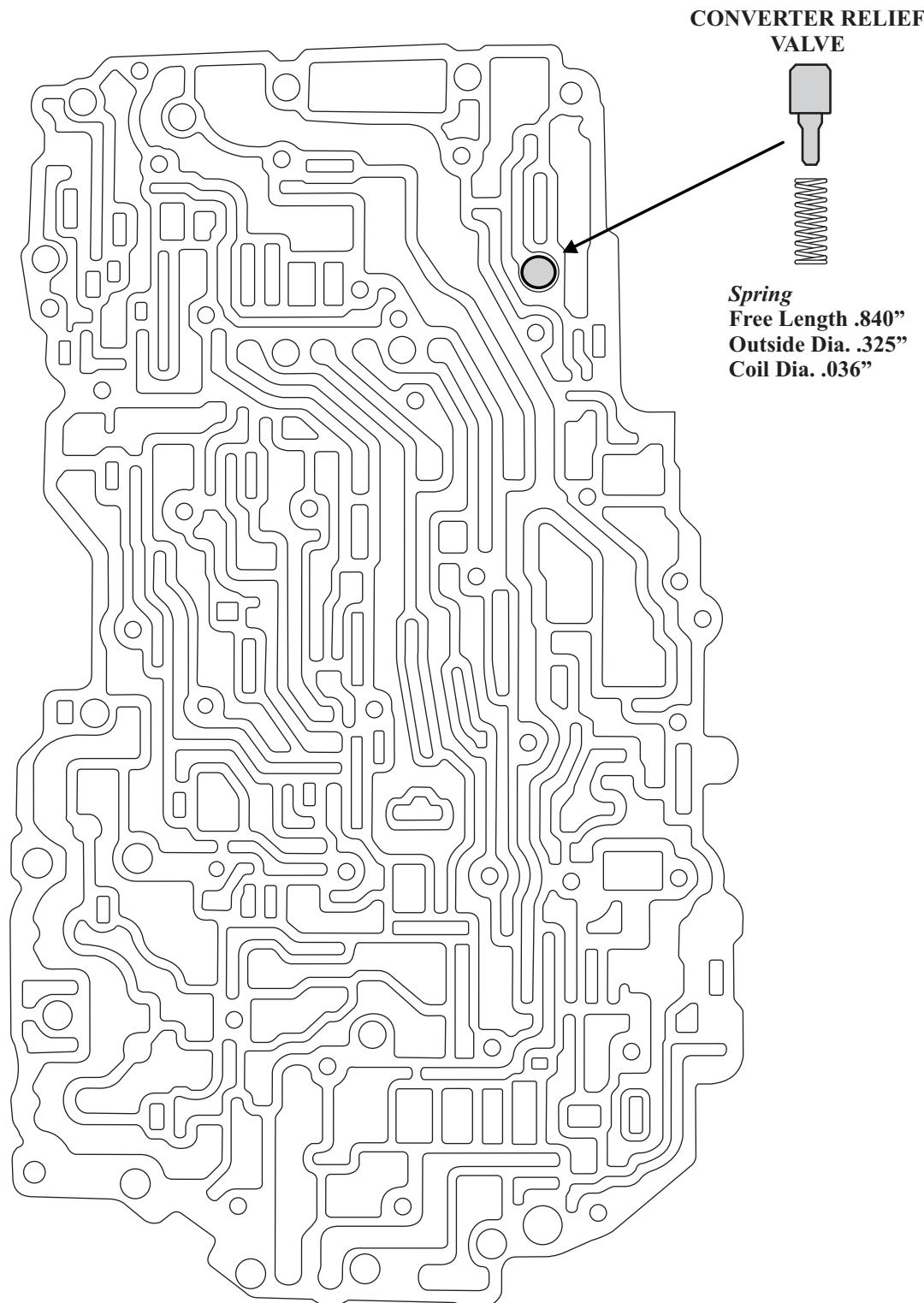
- Ⓐ INSTALL .250" PLASTIC BALLS AT "A" LOCATIONS
- Ⓑ INSTALL .218" PLASTIC BALLS AT "B" LOCATIONS



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## LEXUS A350E

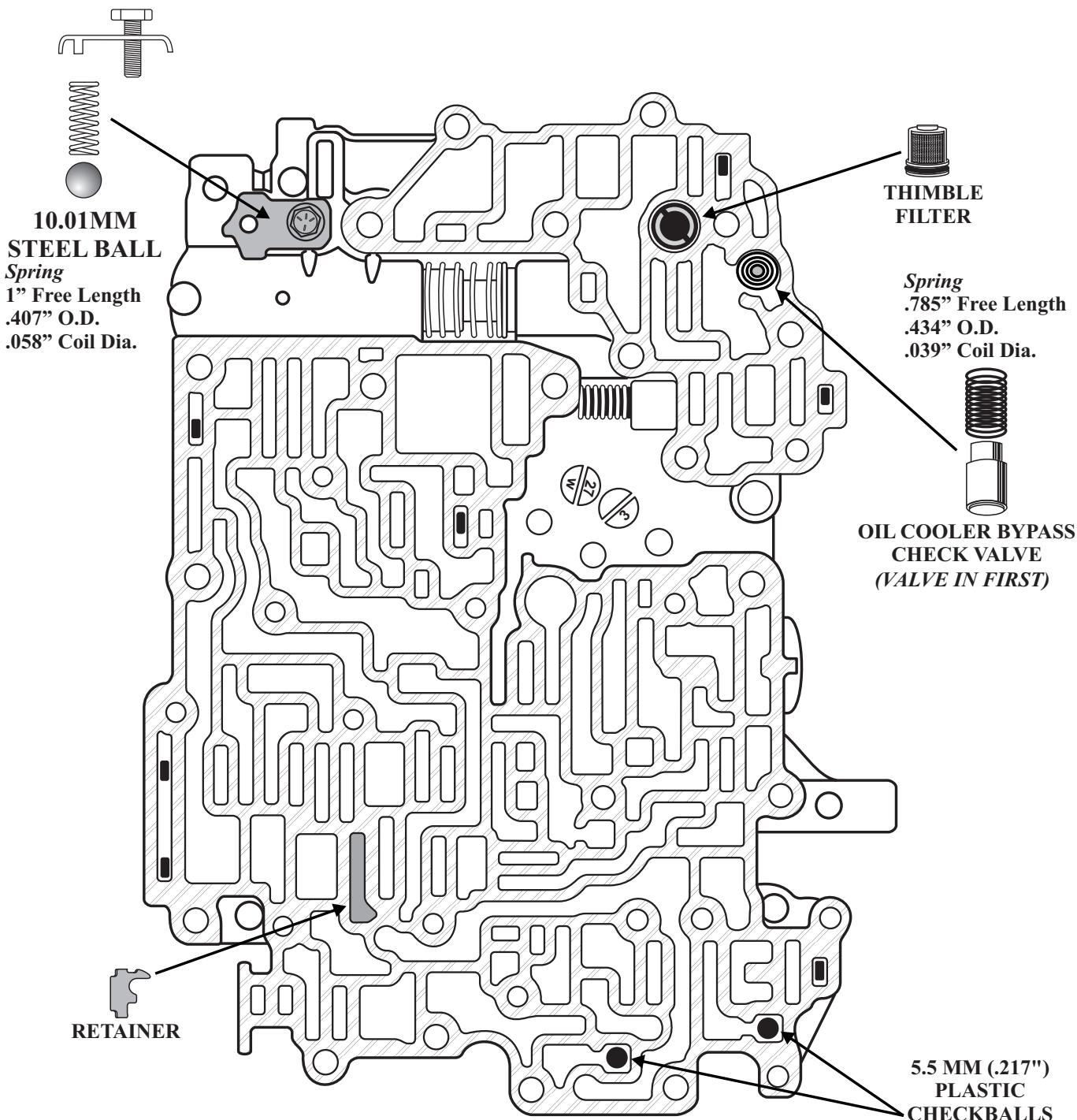
## LOWER VALVE BODY



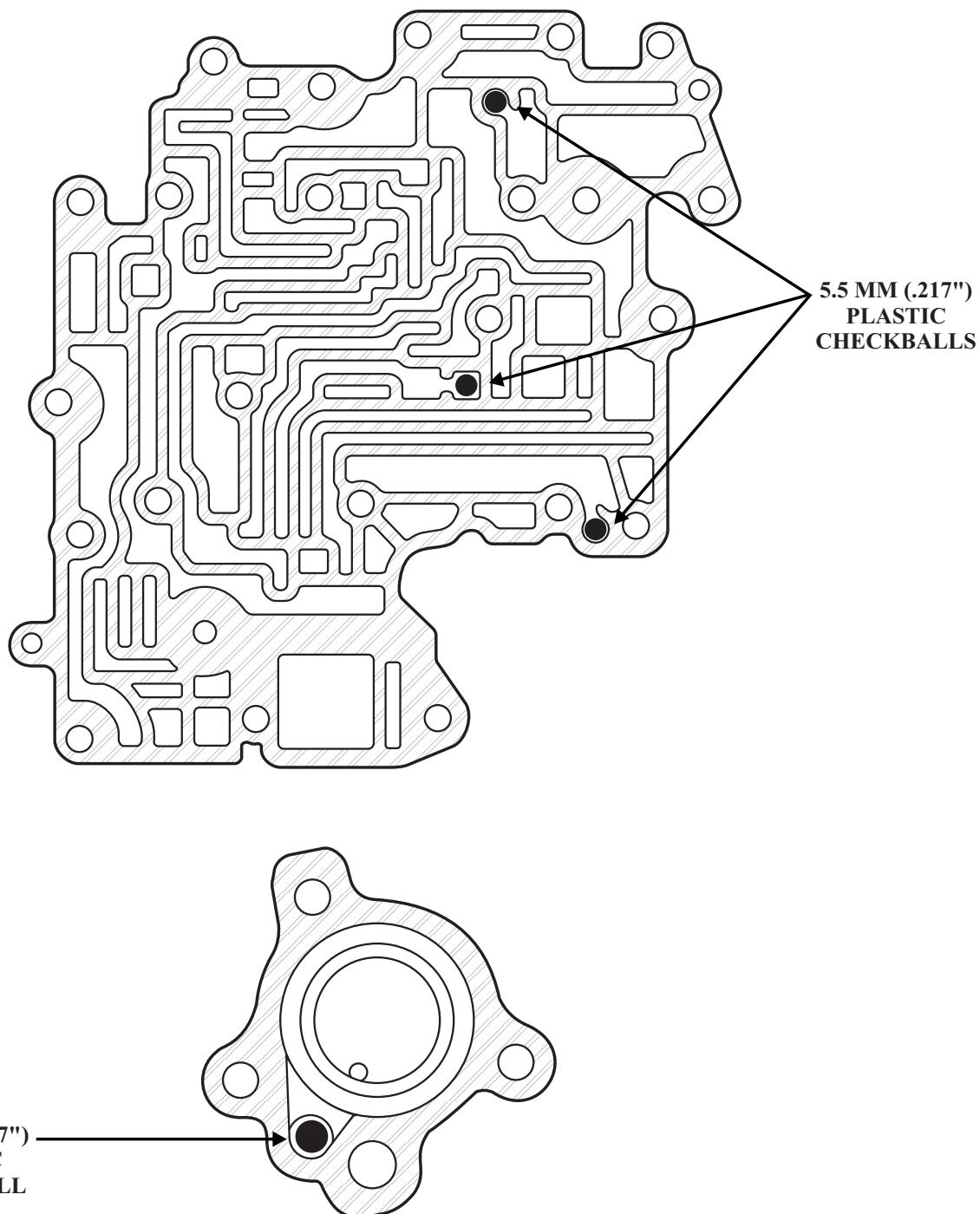
Copyright © 2008 ATSG

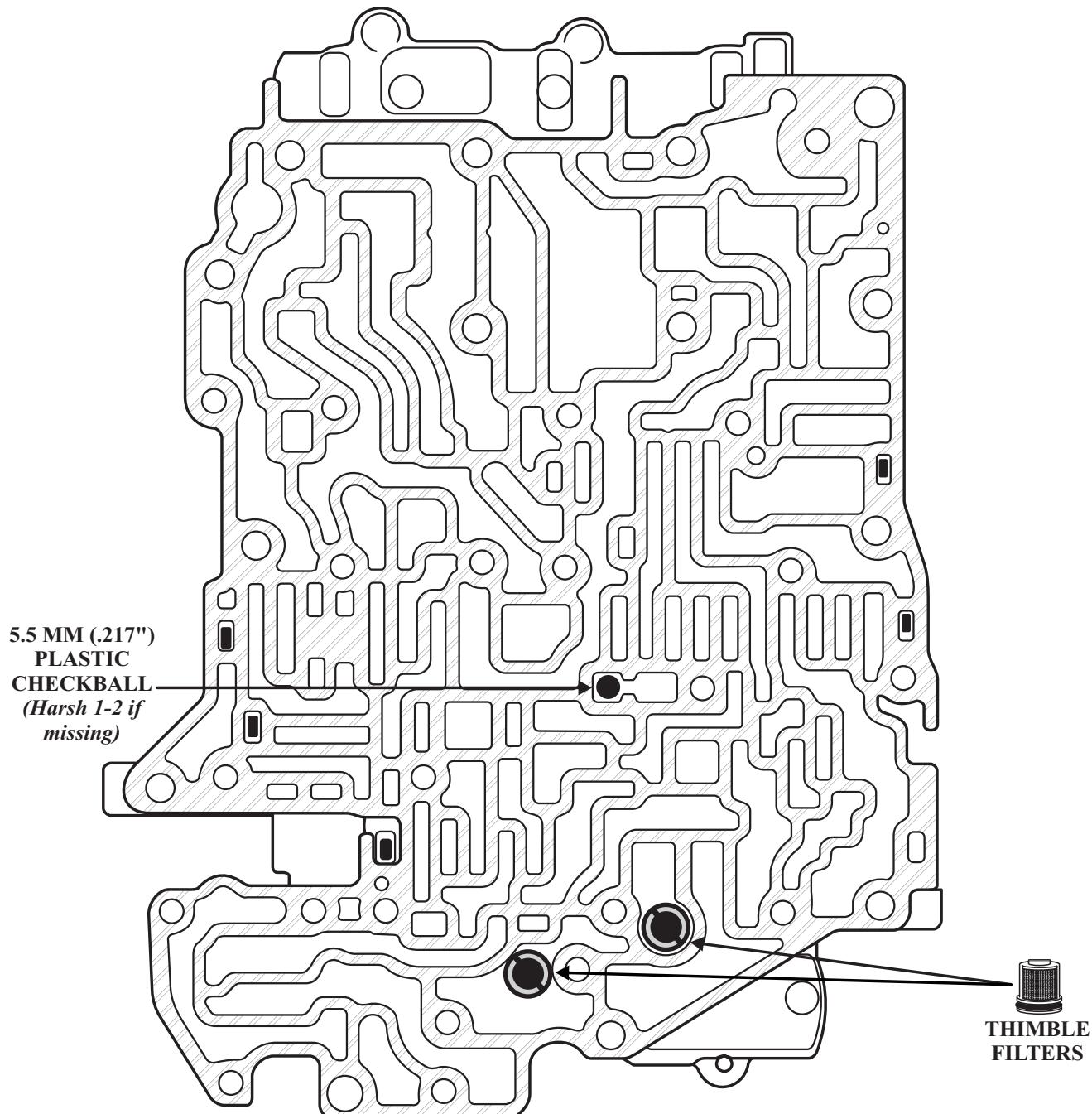
**TOYOTA/LEXUS**  
**A541E**

**LOWER VALVE BODY - FILTER SIDE**

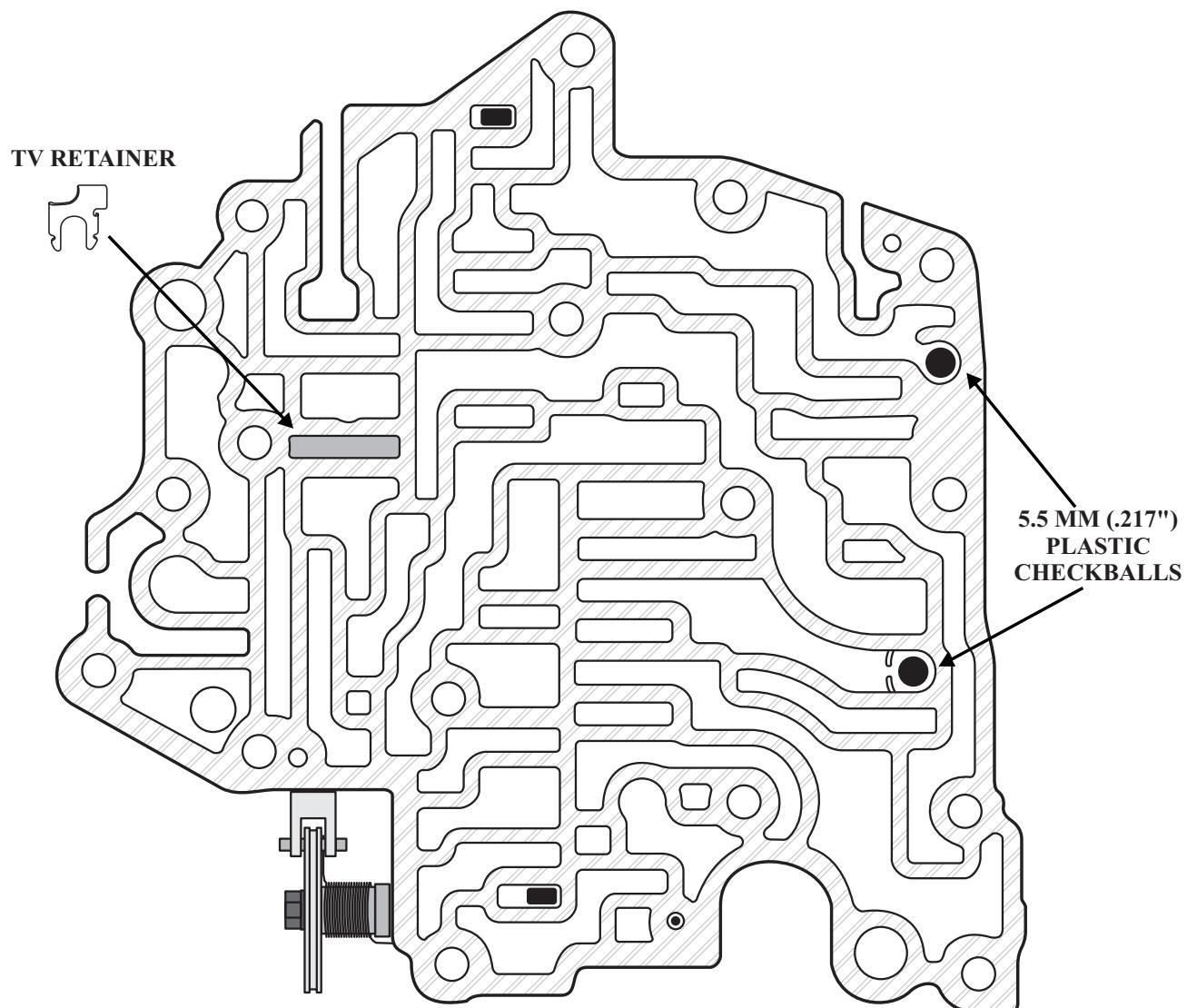


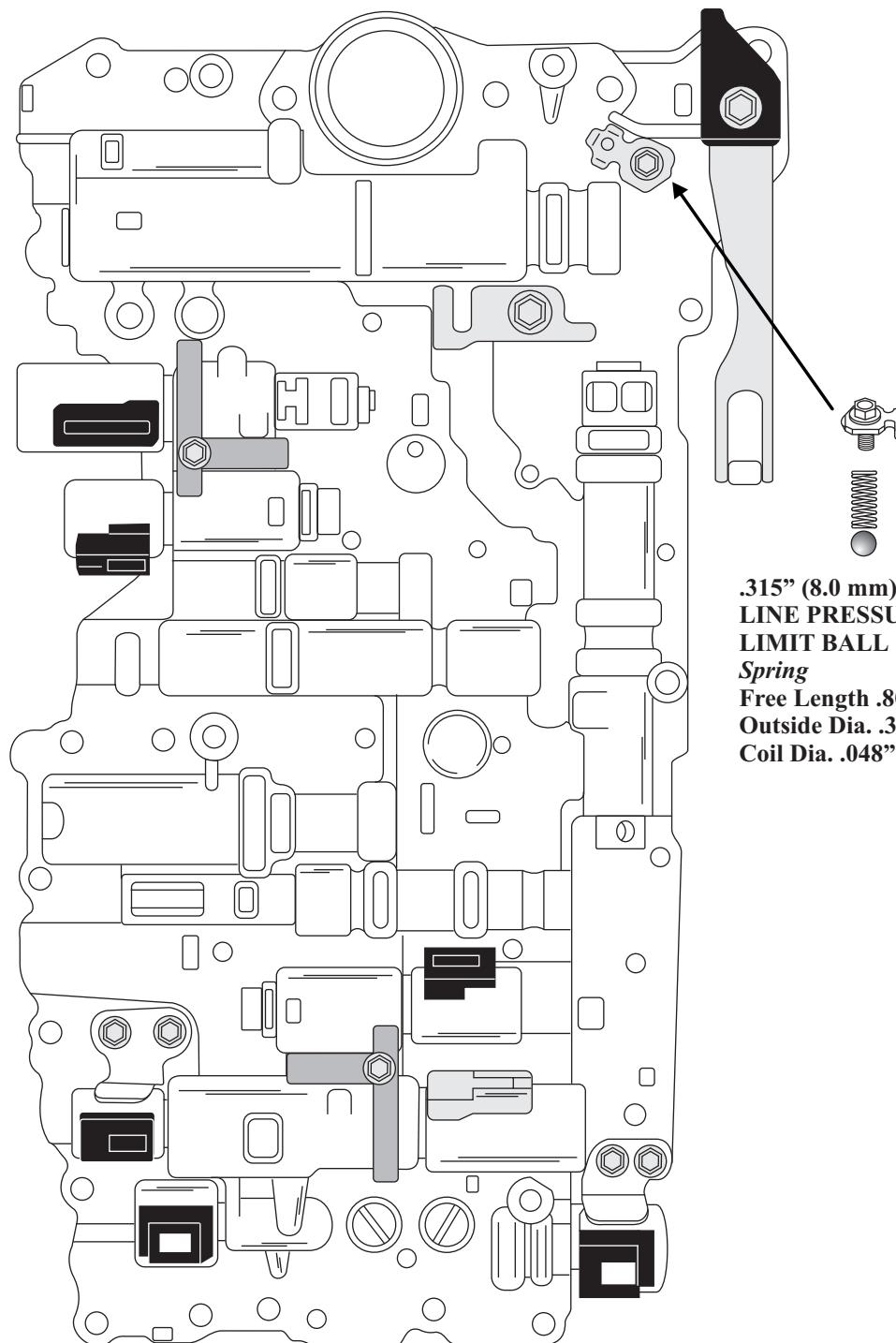
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TOYOTA/LEXUS  
A541E***LOWER VALVE BODY COVER  
OVERDRIVE CLUTCH (BO) ACCUMULATOR***

TOYOTA/LEXUS  
A541E  
*LOWER VALVE BODY - CASE SIDE*

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TOYOTA/LEXUS  
A541E  
*THROTTLE VALVE BODY*

TOYOTA/LEXUS  
A750E/F**LOWER VALVE BODY - BOTTOM SIDE**

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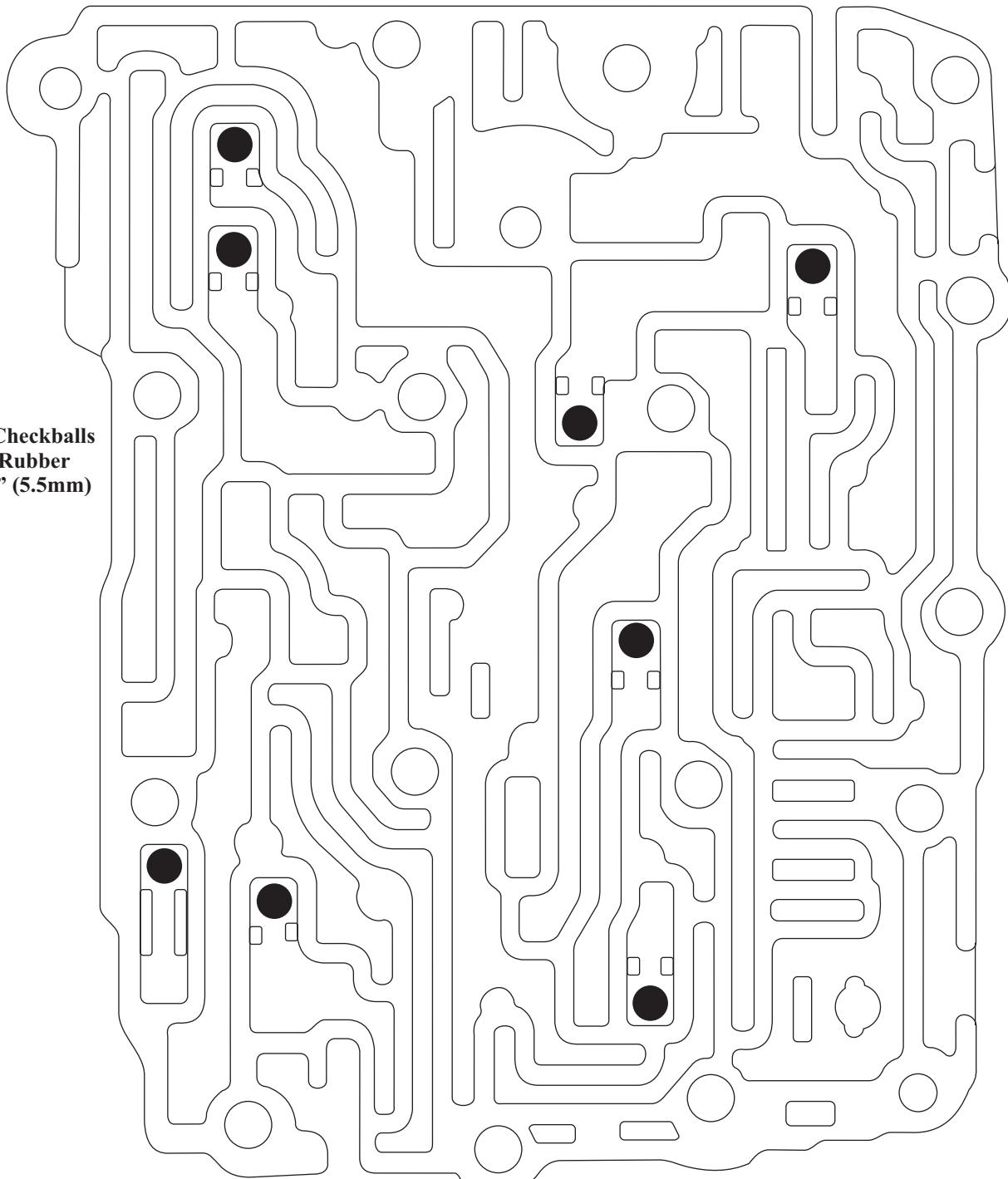
# CHECKBALL BOOK

## *Import Volume III*

TOYOTA  
LEXUS  
A750E/F

**TOYOTA/LEXUS  
A750E/F**

**UPPER VALVE BODY - COVER**

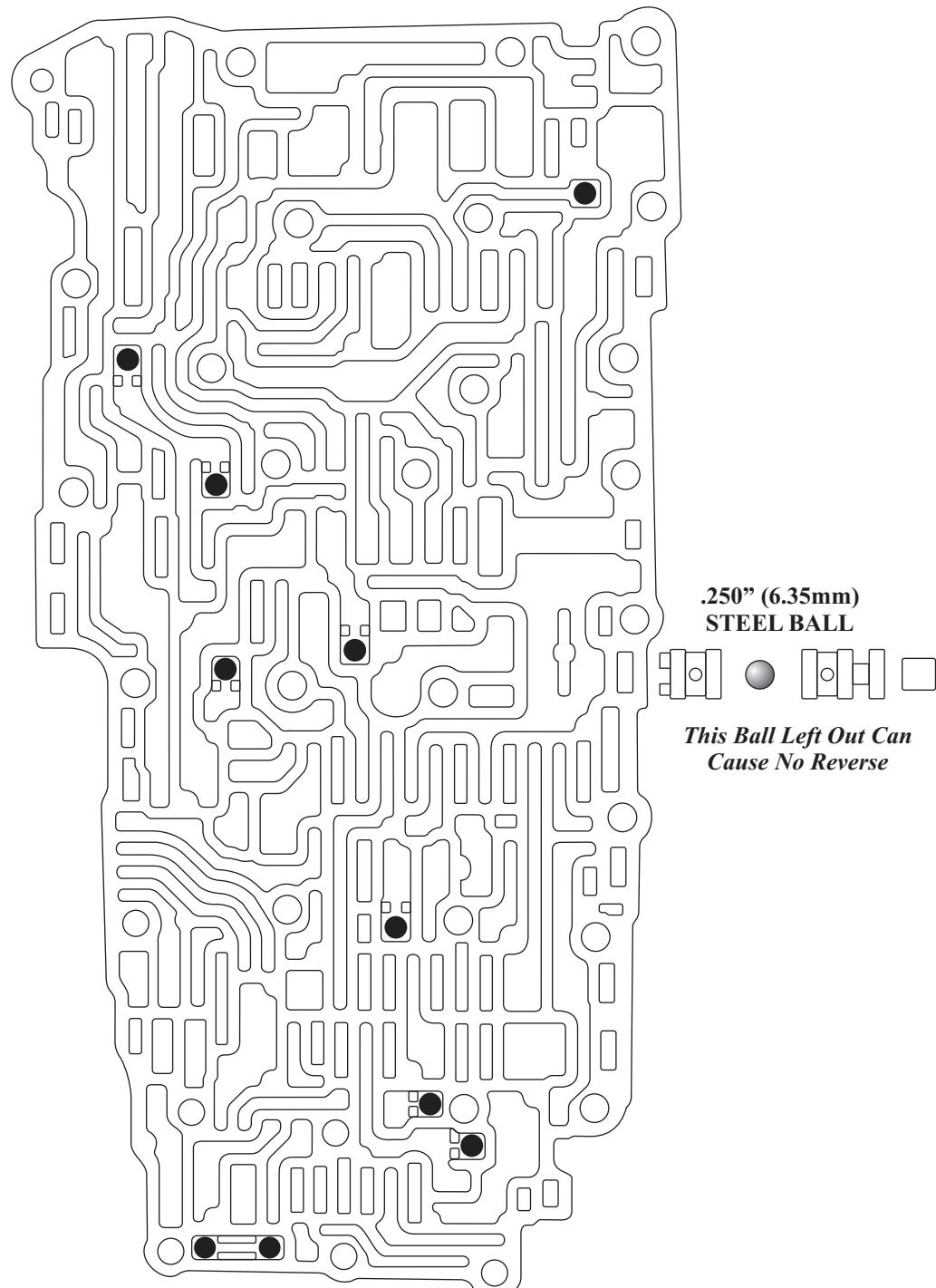


**IMPORTANT NOTE:** The Checkball Locations Shown Here Are From A 2006 Toyota Land Cruiser,  
Exercise Caution During Dis-Assembly As Other Models May Be Different.

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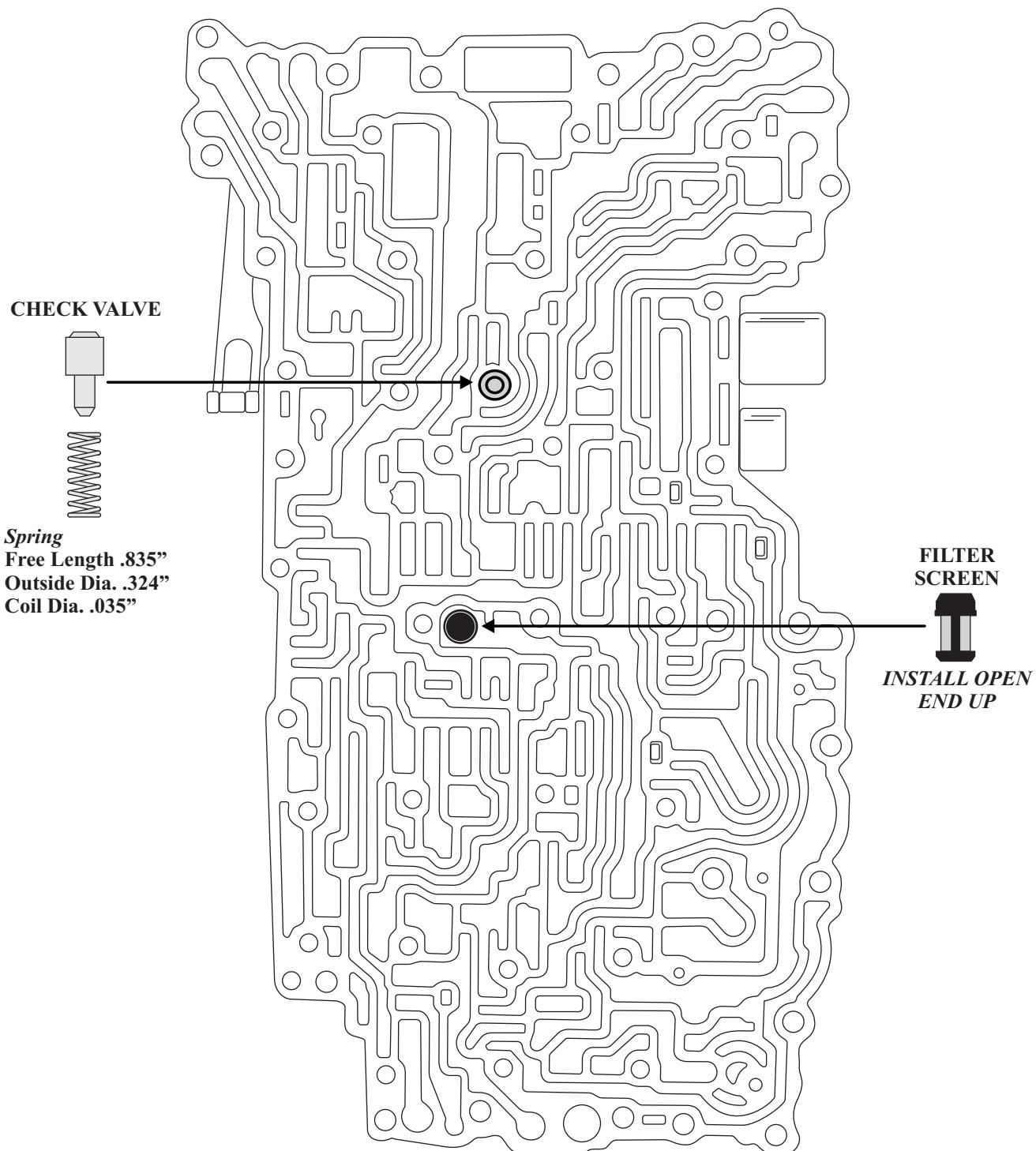
TOYOTA/LEXUS  
A750E/F  
**UPPER VALVE BODY**

All Checkballs  
Are Rubber  
.217" (5.5mm)

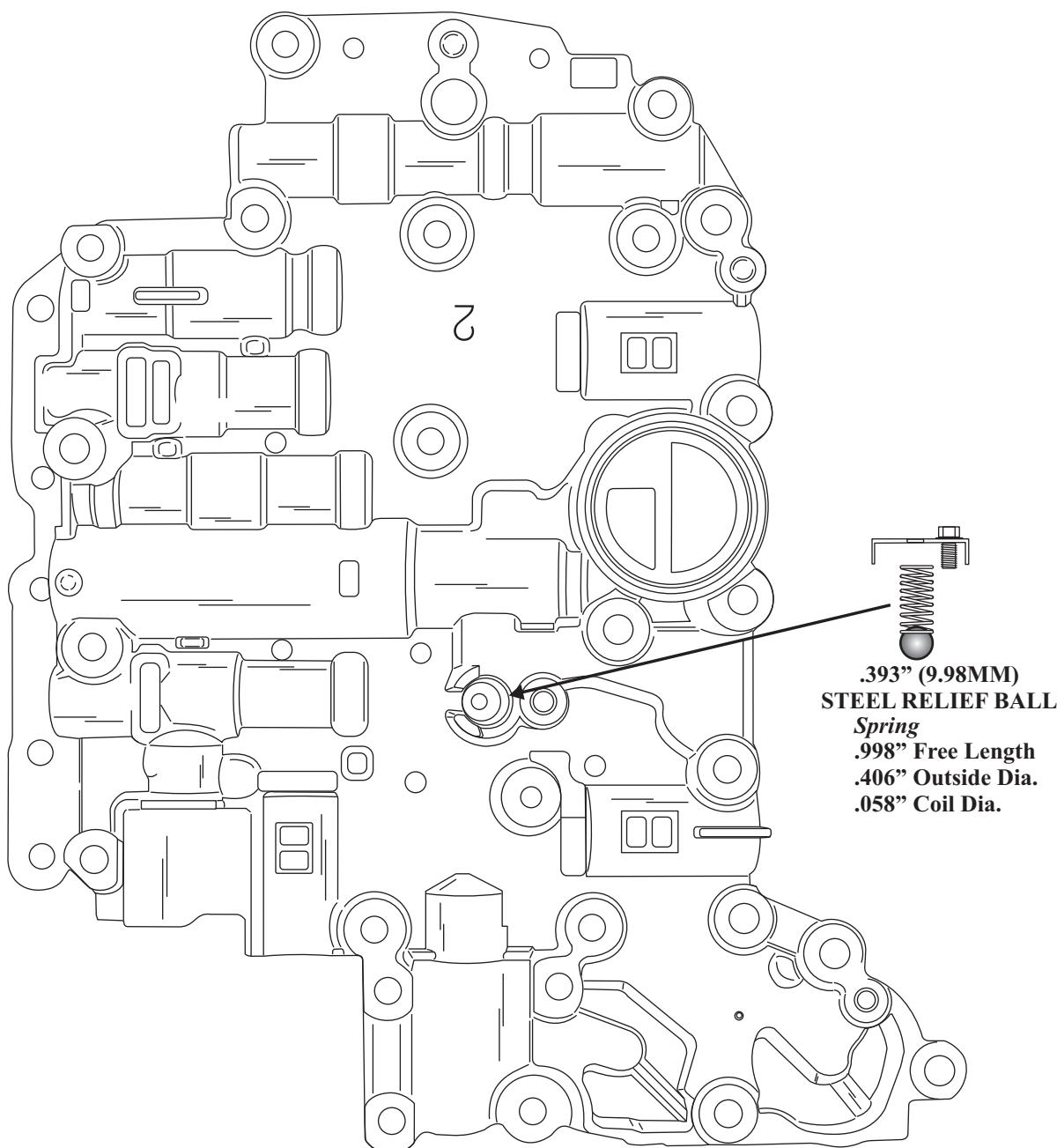


**IMPORTANT NOTE:** The Checkball Locations Shown Here Are From A 2006 Toyota Landcruiser,  
Exercise Caution During Dis-Assembly As Other Models May Be Different.

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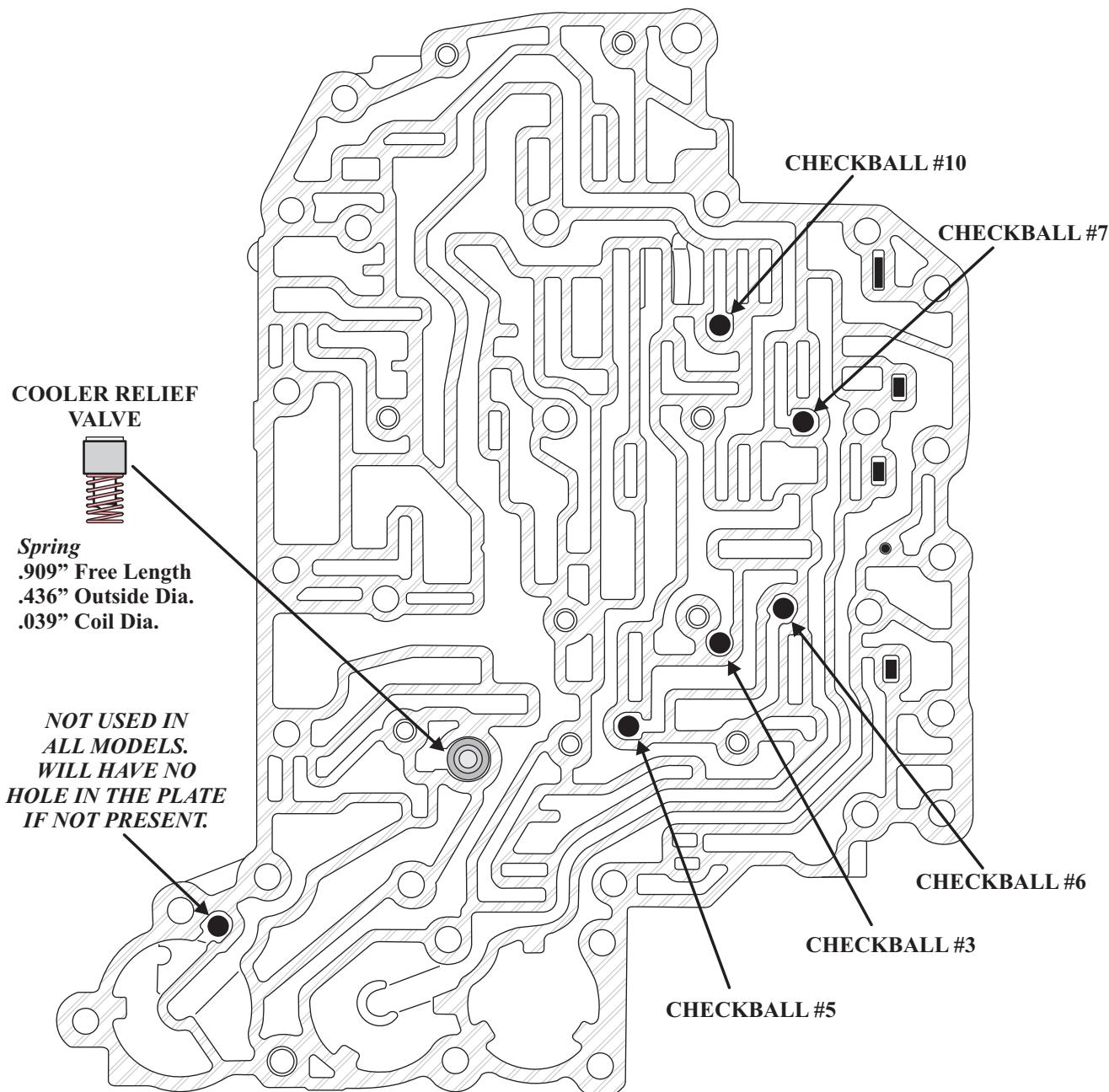
TOYOTA/LEXUS  
A750E/F*LOWER VALVE BODY*

## TOYOTA U140E/240E

*LOWER VALVE BODY (Filter Side)*

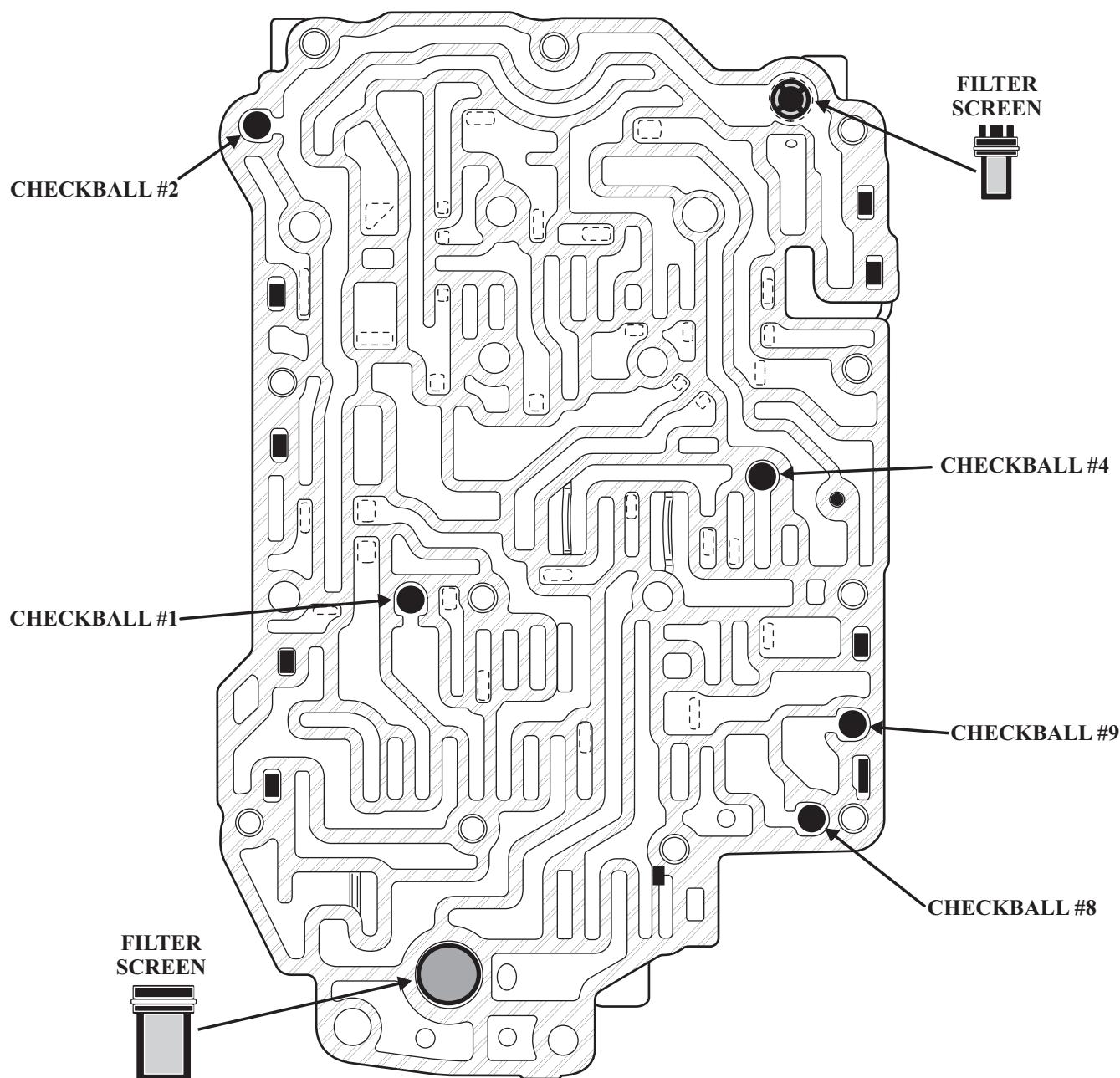
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**TOYOTA U140E/240E**  
**LOWER VALVE BODY**



*NOTE: All Checkballs are Plastic 5.5 mm (.217")*

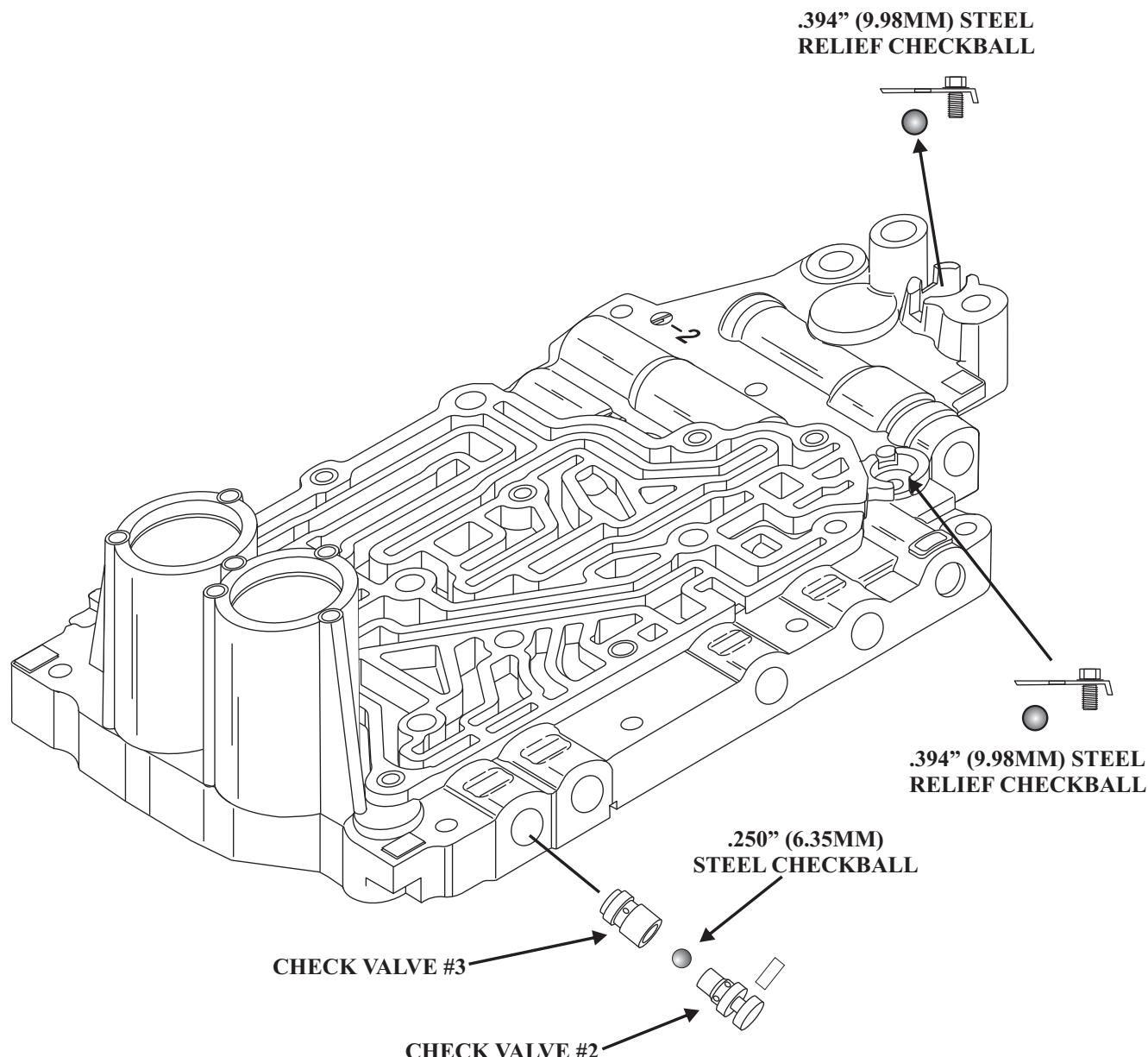
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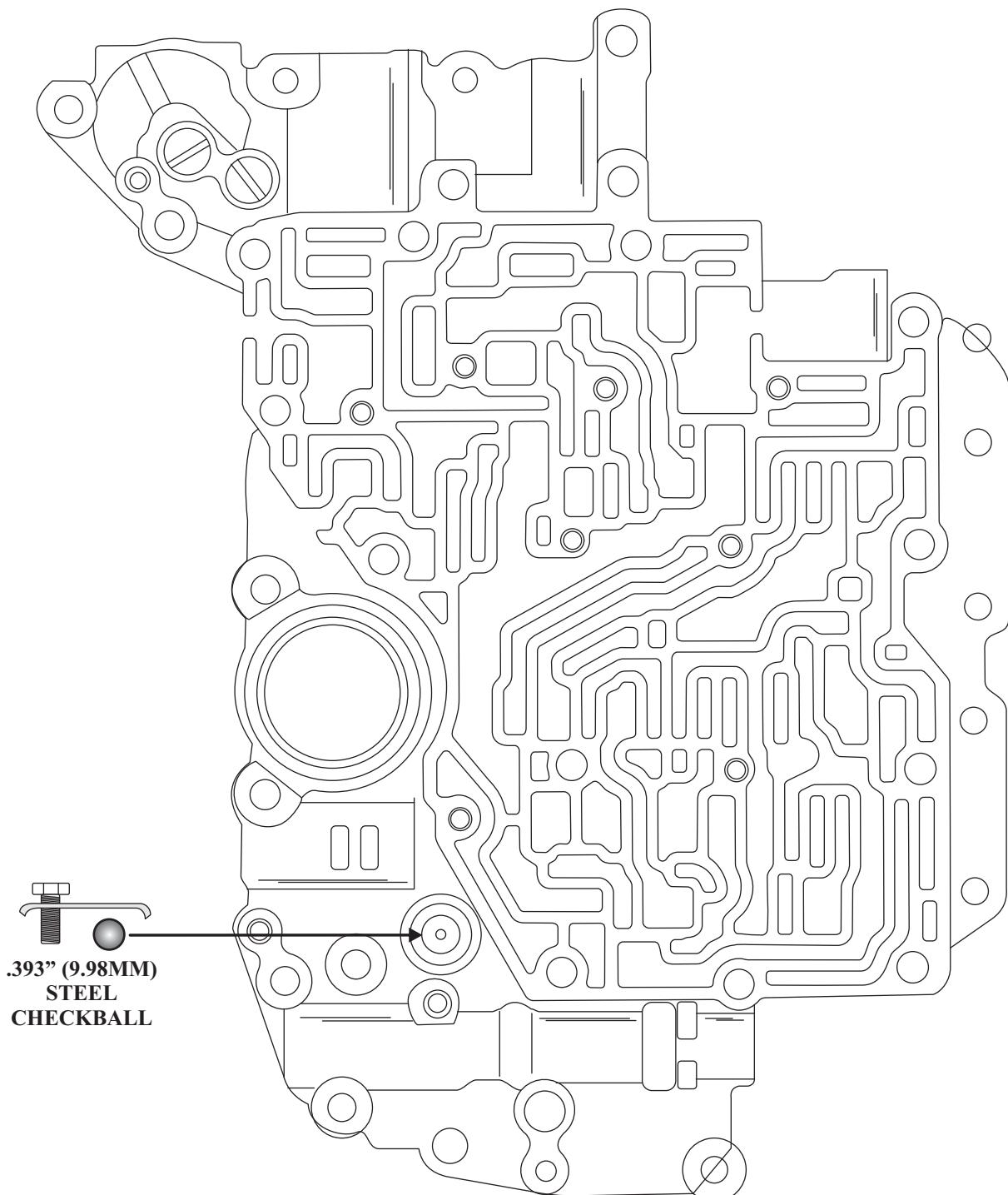
TOYOTA U140E/240E  
*UPPER VALVE BODY*

*NOTE: All Checkballs are Plastic 5.5 mm (.217")*

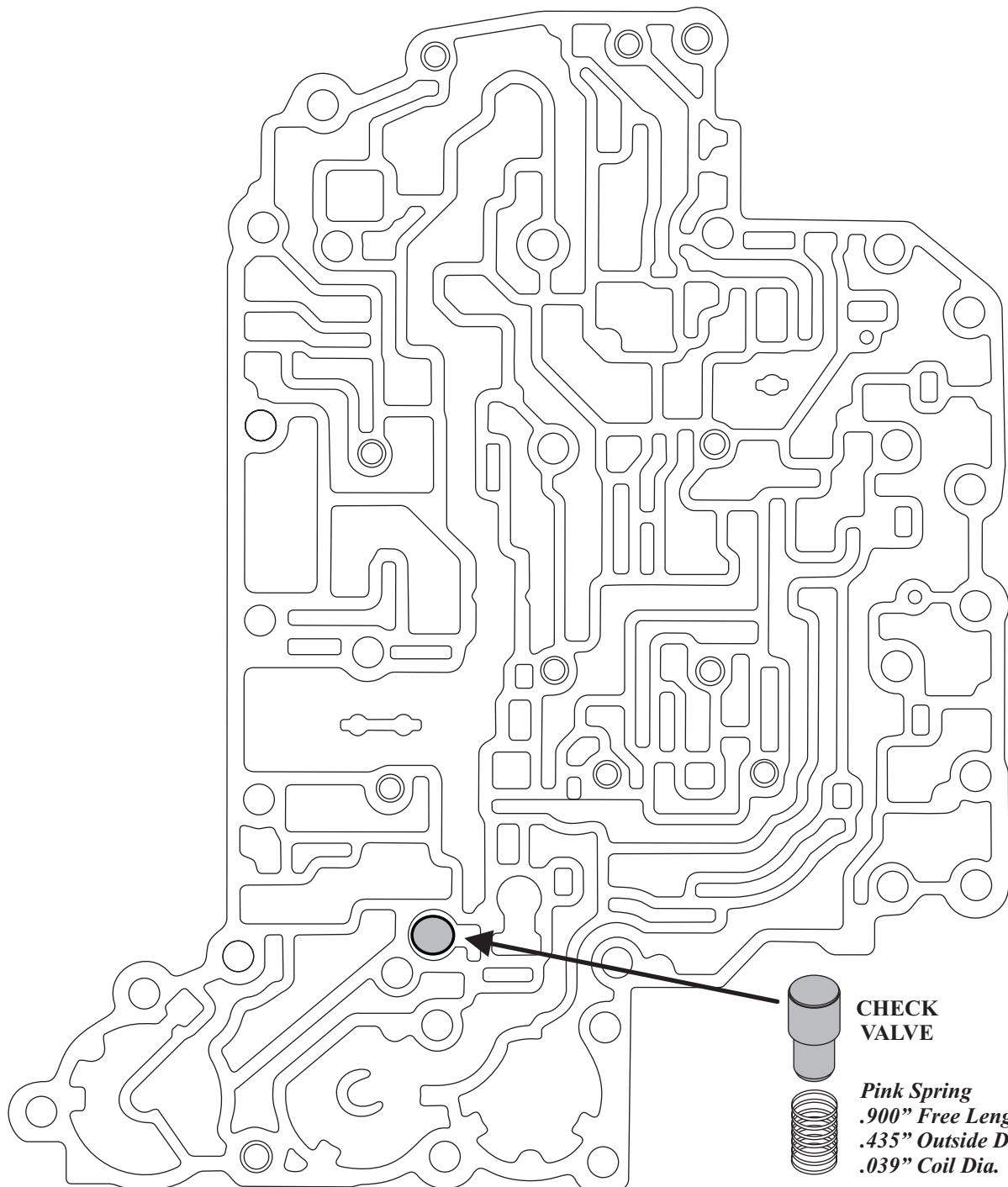
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## TOYOTA U140E/240E

UPPER VALVE BODY (*Case Side*)

TOYOTA/LEXUS  
U151E***LOWER VALVE BODY - FILTER SIDE***

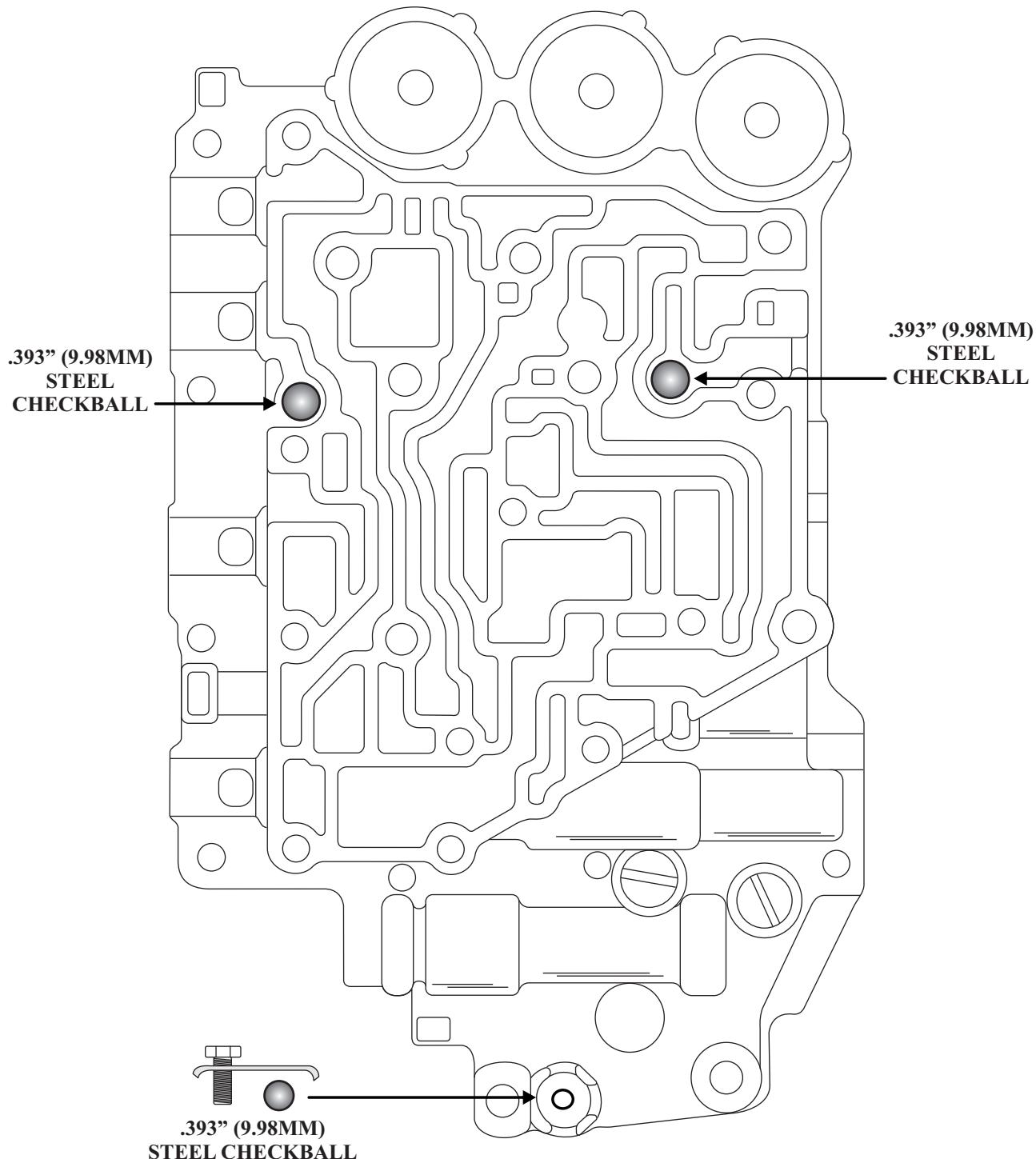
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TOYOTA/LEXUS  
U151E*LOWER VALVE BODY*

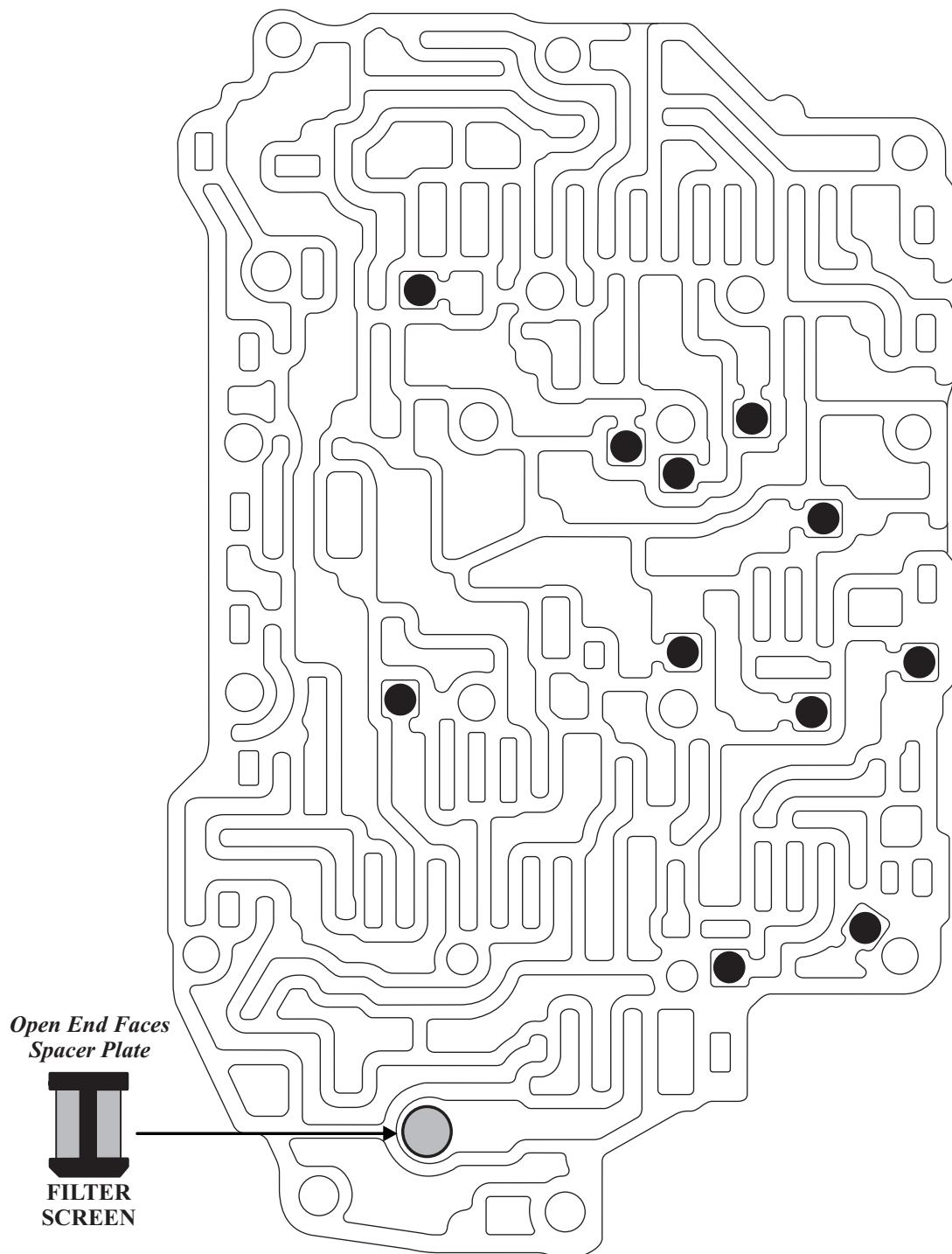
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TOYOTA/LEXUS  
U151E

## UPPER VALVE BODY - ACCUMULATOR SIDE



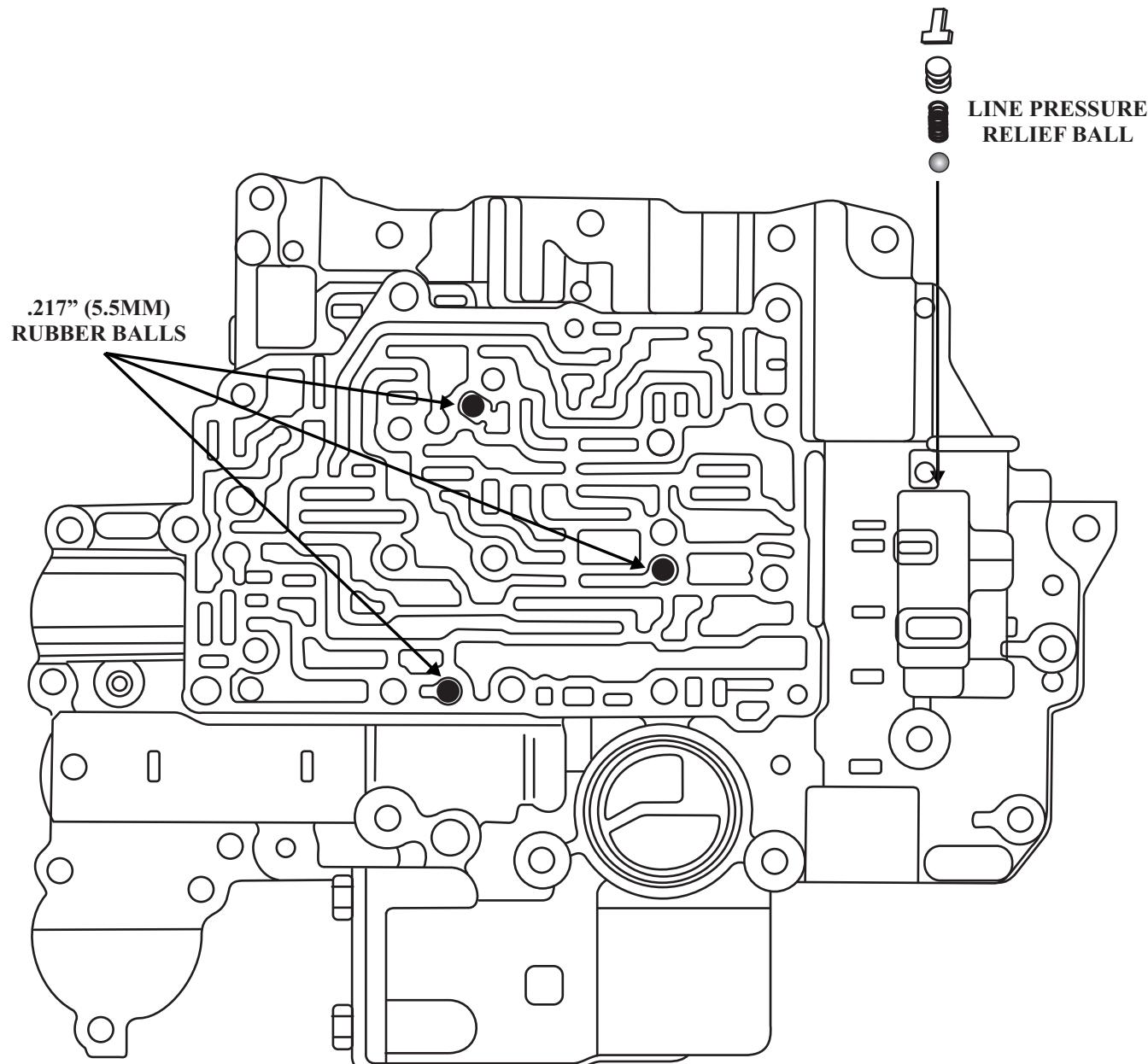
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TOYOTA/LEXUS  
U151E**UPPER VALVE BODY**

*NOTE: All 11 Plastic Checkballs Are .218" (5.5MM)*

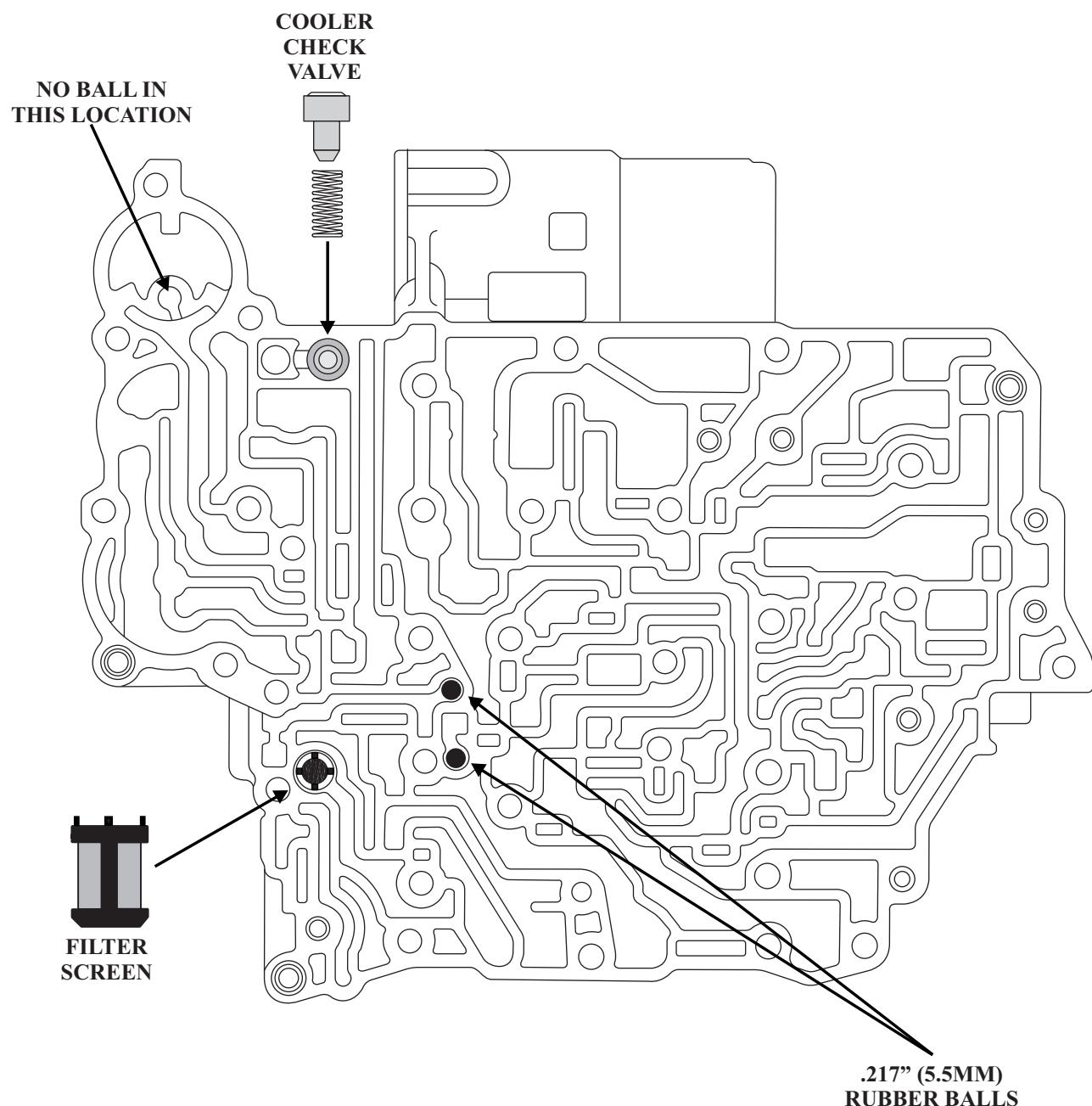
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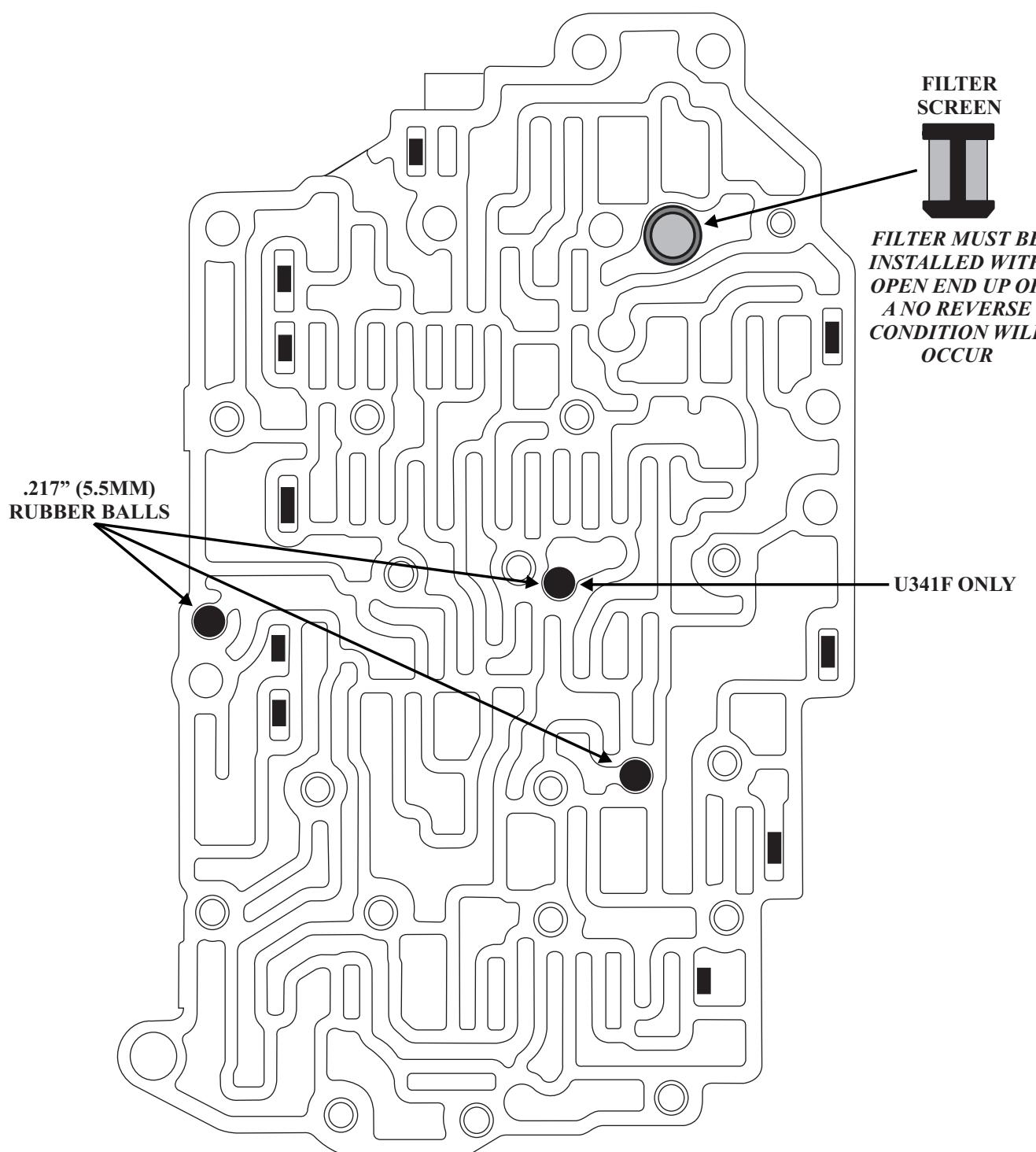
## TOYOTA U341E/F

*LOWER VALVE BODY (Filter Side)*

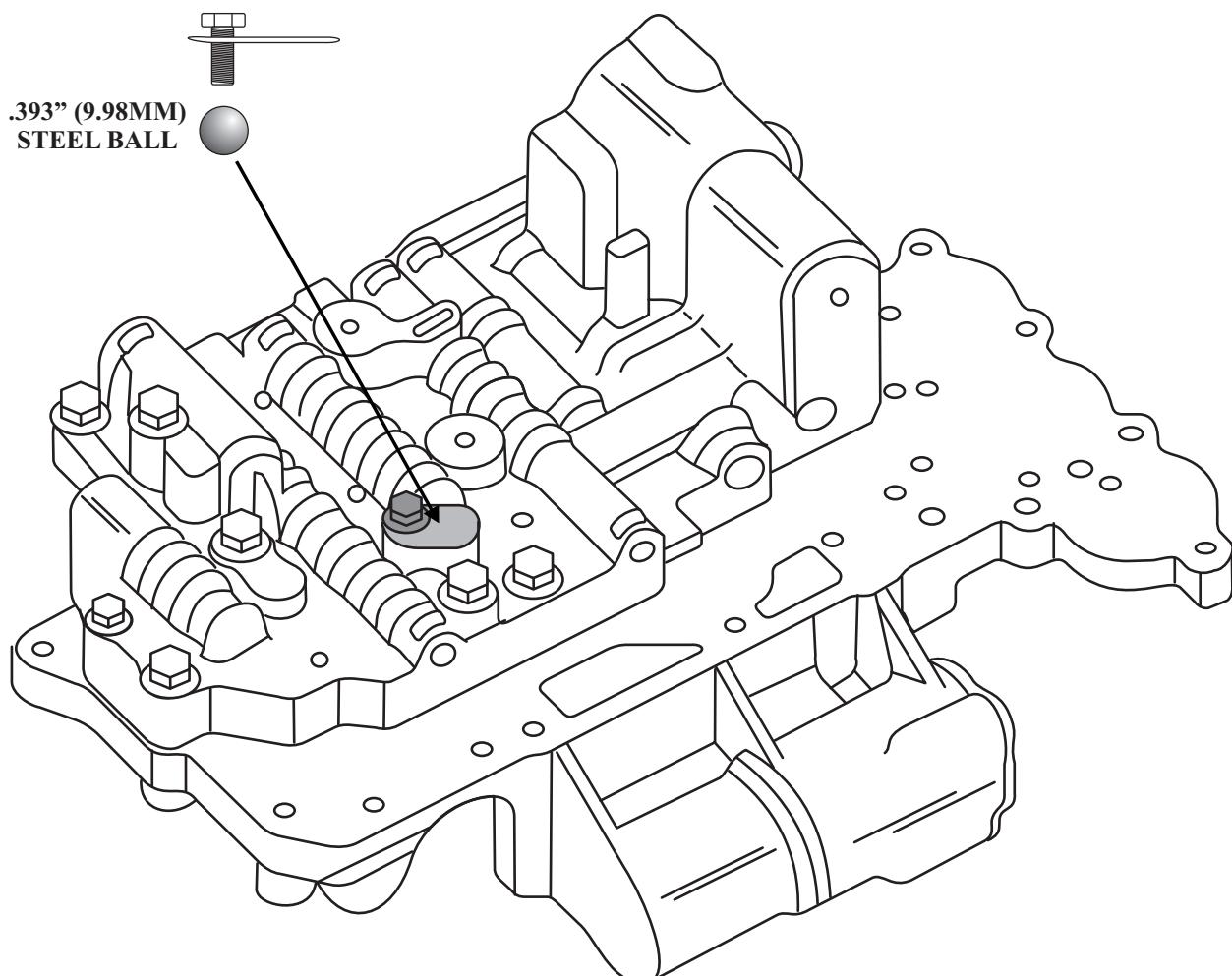
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## TOYOTA U341E/F

*LOWER VALVE BODY (Upper Valve Body Side)*

TOYOTA U341E/F  
UPPER VALVE BODY

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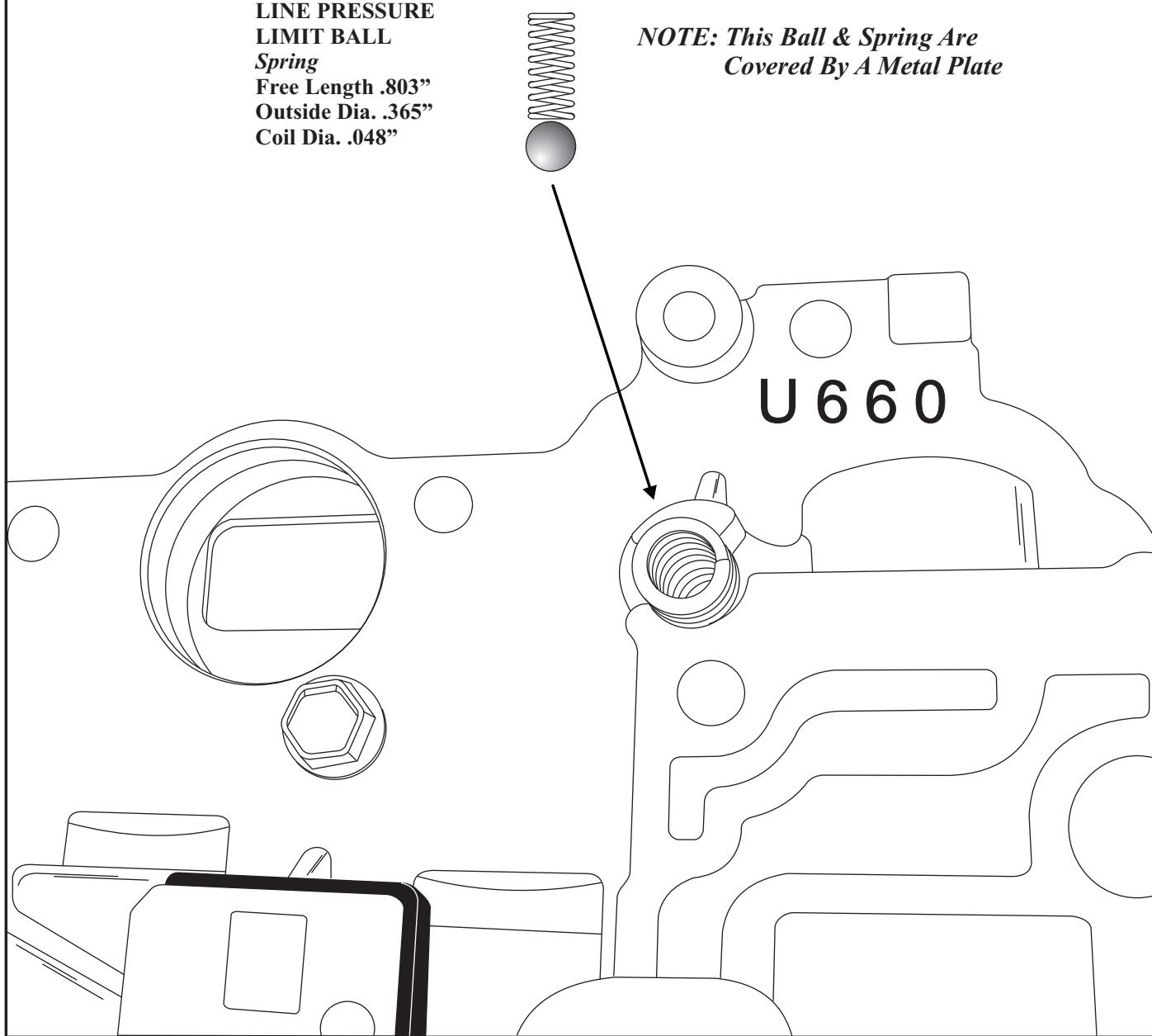
TOYOTA U341E/F  
*UPPER VALVE BODY*

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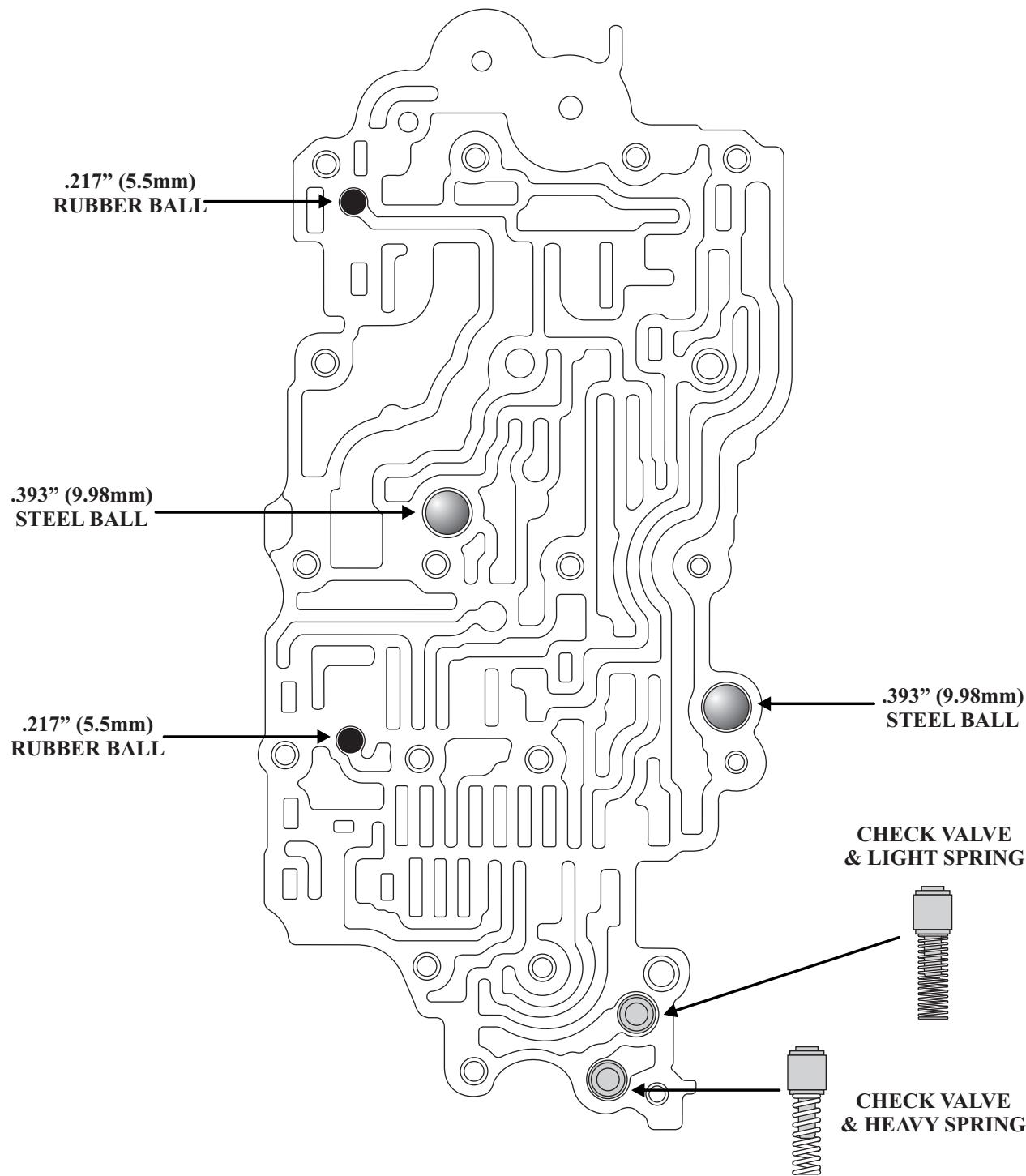
TOYOTA/LEXUS  
U660E*LOWER VALVE BODY - BOTTOM*

.315" (8.0 mm) STEEL  
LINE PRESSURE  
LIMIT BALL  
Spring  
Free Length .803"  
Outside Dia. .365"  
Coil Dia. .048"

*NOTE: This Ball & Spring Are  
Covered By A Metal Plate*



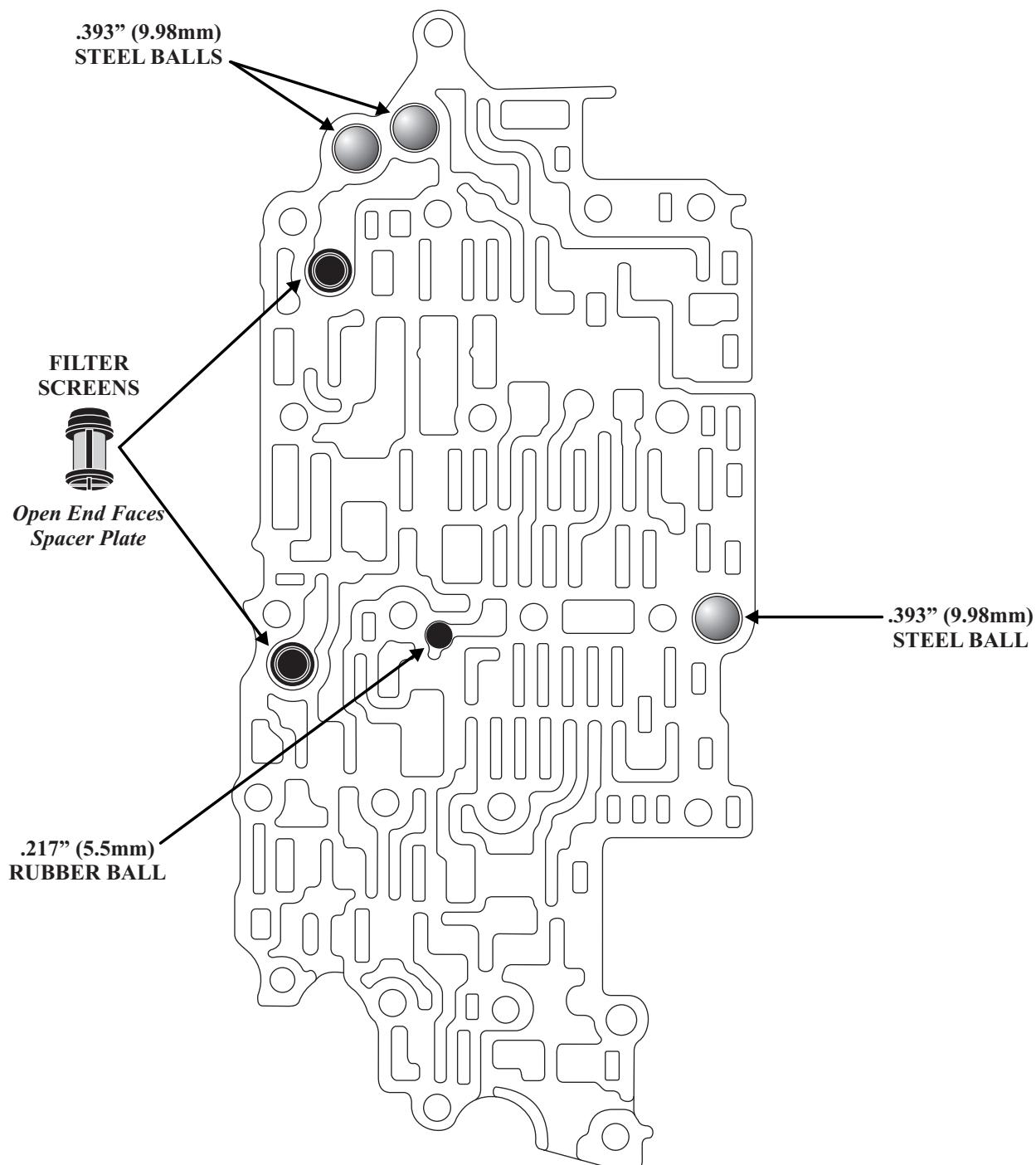
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TOYOTA/LEXUS  
U660E**UPPER VALVE BODY**

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TOYOTA/LEXUS  
U660E

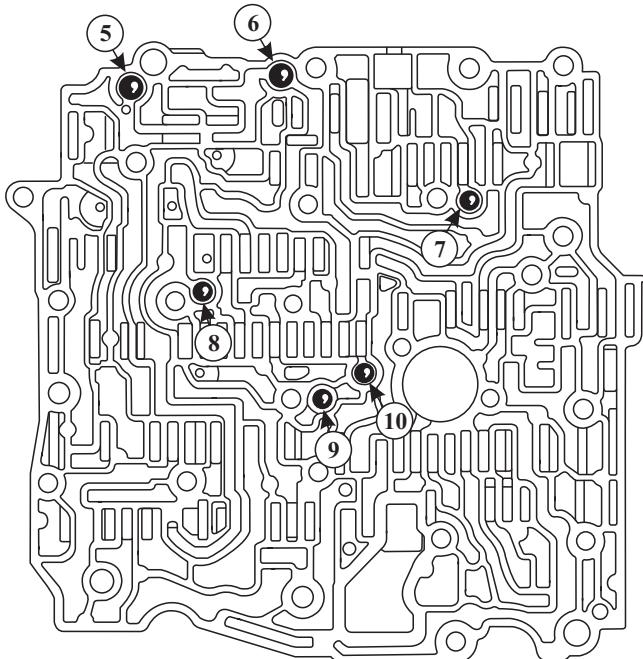
## MIDDLE VALVE BODY



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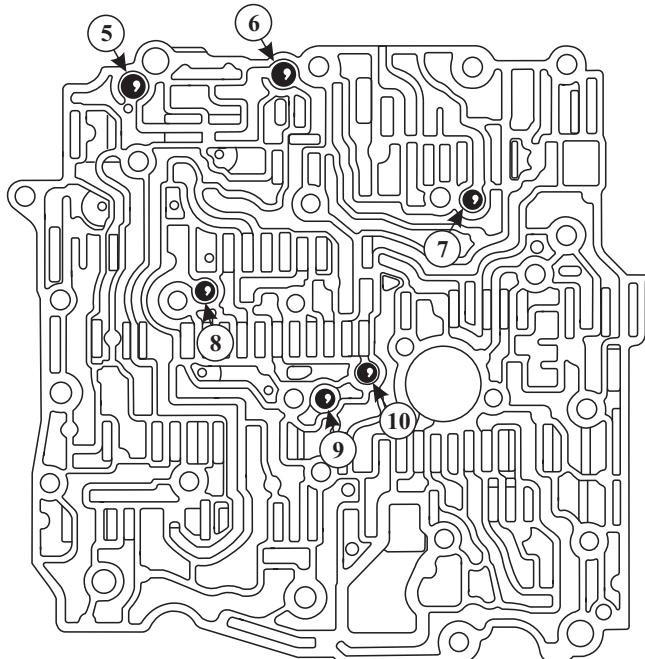
VOLVO  
4T65E/EV-GT  
VALVE BODY

## CONVENTIONAL PRNDL VERSION



Checkballs 5 and 6 are .375" (9.52mm) steel balls  
All other steel checkballs are .250" (6.35mm)

## GEARTRONIC/TIPTRONIC VERSION



Checkballs 5 and 6 are .375" (9.52mm) steel balls  
All other steel checkballs are .250" (6.35mm)

*Checkball locations are the same for both "Conventional" and "Tiptronic", but the No. 7 and No. 8 Checkball functions are different between the two.*

## CONVENTIONAL PRNDL VERSION

**Number 7: LO/LO-1st**

Located in the valve body, it blocks the lo-1st passage when Drive Range Manual First gear is selected, and sends Lo fluid pressure to the 1-2 shift valve where it passes through the valve and is forced through orifice 27 into the Lo-1st circuit.

**Number 8: D2/Manual 2-1 Servo Feed**

Located in the valve body, it is fed by D-2 fluid from the manual valve and seated against orificed manual 2-1 servo feed fluid at the spacer plate. D-2 fluid is then directed to the 3-2 Manual Downshift valve, where it enters the 2-1 manual servo feed passage and is forced through orifice 13. When the 2-1 manual band servo releases, the ball check valve unseats and fluid exhausts without going through orifice 13.

## GEARTRONIC/TIPTRONIC VERSION

**Number 7: LO**

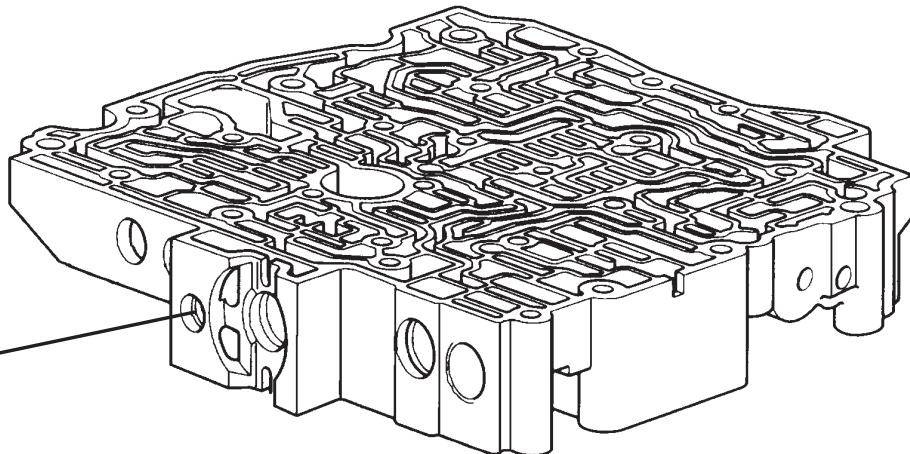
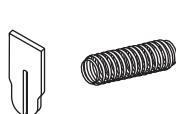
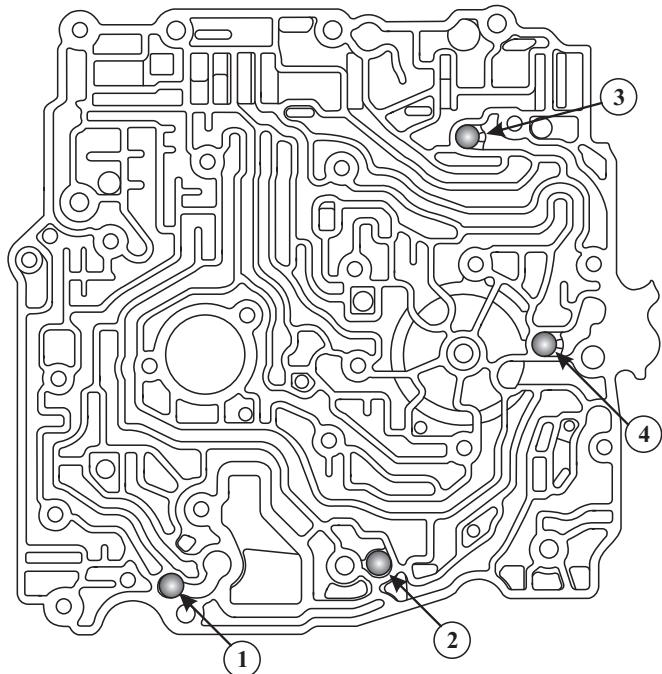
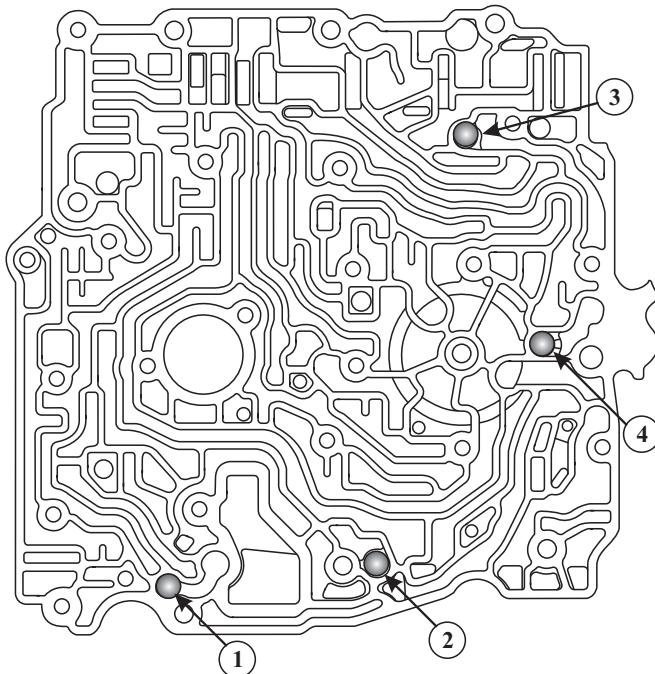
Located in the valve body, it is part of the Lo fluid circuit but has no function as the fluid is blocked at the spacer plate.

**Number 8: D2/Manual 2-1 Servo Feed**

Located in the valve body, it is fed by D-3 and D-2 fluid from the manual valve and seated against orificed manual 2-1 servo feed fluid at the spacer plate. D-2 or D3 fluid is then directed to the 3-2 Manual Downshift valve, where it enters the 2-1 manual servo feed passage and is forced through orifice 13. When the 2-1 manual band servo releases, the ball check valve unseats and fluid exhausts without going through orifice 13. **The D3 and D2 circuits are connected in this version.**

VOLVO  
4T65E/EV-GT  
**VALVE BODY**

STEEL LINE PRESSURE  
RELIEF BALL  
Unseats when line pressure  
exceeds 245 to 360 lbs.

**CHANNEL PLATE (Valve Body Side)****CONVENTIONAL PRNDL VERSION****GEARTRONIC/TIPTRONIC VERSION**

*Checkball Function and Locations in the Channel Plate are the same for both versions.  
All channel plate checkballs are steel .250" (6.35mm)*

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# CHECKBALL BOOK

## Import Volume III

VOLVO  
4T65E/EV-GT

### VOLVO 4T65E/EV-GT **CHECKBALL LOCATION & FUNCTION**

#### **#1 Converter Clutch Release/Apply**

Located in the case cover, it directs either release or apply fluid pressures to the TCC blow off ball check valve in the case cover.

#### **#5 Reverse/Reverse Servo Feed**

Located in the valve body, it blocks the reverse servo feed passage forcing reverse fluid through an orifice before entering the reverse servo feed passage. When the manual valve is moved out of Reverse gear range, the ball check valve unseats allowing reverse servo fluid to exhaust through the reverse fluid passage.

#### **#2 2nd Clutch**

Located in the case cover, it directs 2nd (apply) fluid through orifice 25 on the spacer plate into the 2nd clutch passage. When the 2nd clutch releases, it seats in the case cover forcing 2nd clutch fluid through orifice 26 and into the 2nd fluid passage.

#### **#6 D4/Servo Apply**

Located in the valve body, it blocks the forward servo apply passage and forces D4 fluid pressure to the forward servo feed orifice on the spacer plate. When the manual valve is moved from Drive Range to Park or Neutral or Reverse, the ball check valve unseats to allow for a quick exhaust of the servo apply fluid and release of the forward band assembly.

#### **#3 Input Clutch/PRN**

Located in the case cover, it blocks the PRN passage to direct input clutch fluid to the input clutch during the appropriate gear range. In Park, Reverse or Neutral gear ranges, PRN fluid unseats the ball check valve and also feeds the input clutch.

#### **#9 3rd/3rd Clutch**

Located in the valve body, it forces 3rd fluid through feed orifice 24 into the 3rd clutch passage during apply of the 3rd clutch. When the 3rd clutch releases, 3rd clutch fluid seats the ball check valve against the 3rd passage, forcing fluid through orifice 28 and into the 3rd fluid passage to the 2-3 shift valve where it exhausts.

#### **#4 3rd Clutch/Low Reg**

Located in the case cover, during Overdrive Range Third Gear, it seats against the low reg passage allowing 3rd clutch fluid into the 3rd clutch/low reg passage to apply the 3rd clutch. During a 3-2 shift, it allows 3rd clutch/low reg fluid to exhaust into the 3rd clutch fluid passage. In Drive Range - Manual First, it seats against 3rd clutch fluid allowing low reg fluid to enter the 3rd clutch/low reg fluid passage to apply the 3rd clutch.

#### **#10 Line/4th Clutch**

Located in the valve body, it is seated against the 1st gear fluid passage during all forward ranges, except first, and directs line fluid through orifice 33. In drive range first gear or manual first 1st gear fluid pressure unseats the ball check valve and bypasses orifice 33 to send fluid to the input clutch apply passage.

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## VOLVO

4T65E/EV-GT

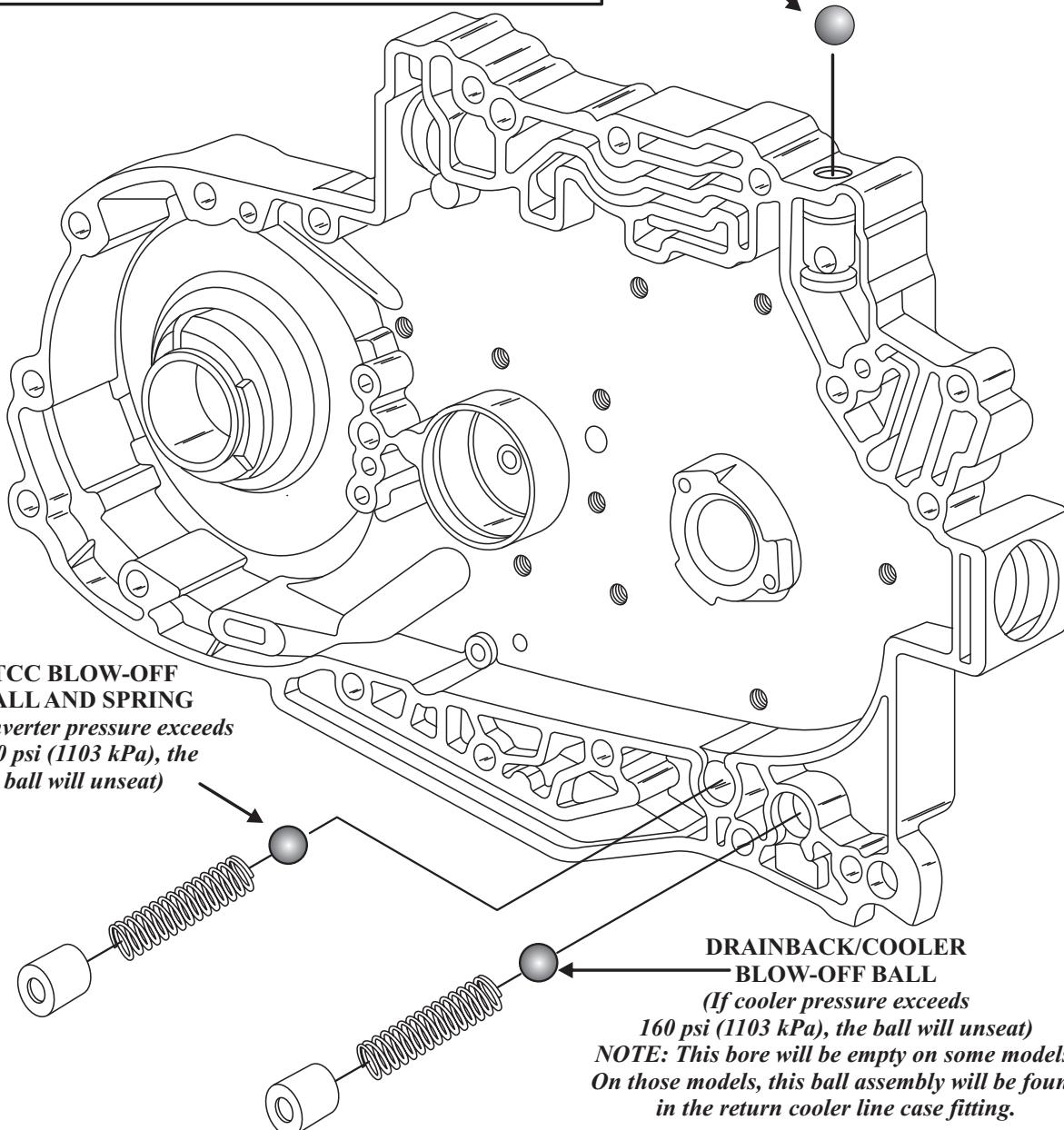
## CHANNEL PLATE (Case Side)

## Volvo Non-Geartronic Application Only

**Low Blow Off Ball Lineup**

The low blow off valve (420A) located in the channel plate is a pressure relief valve that exhausts excess Low-1st fluid pressures above 448 kPa (65 psi) in the 3rd clutch apply circuit.

**NOTE: The Geartronic version will have a valve in this location.**

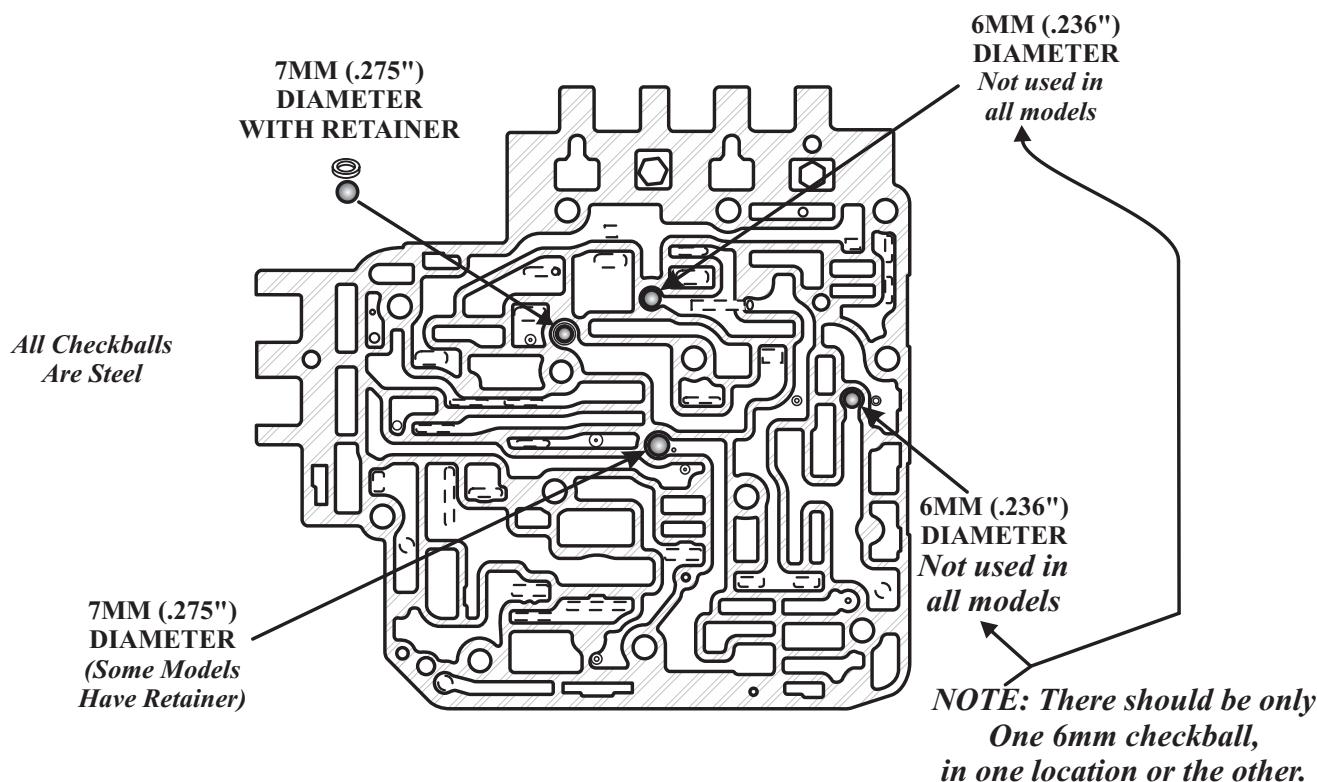


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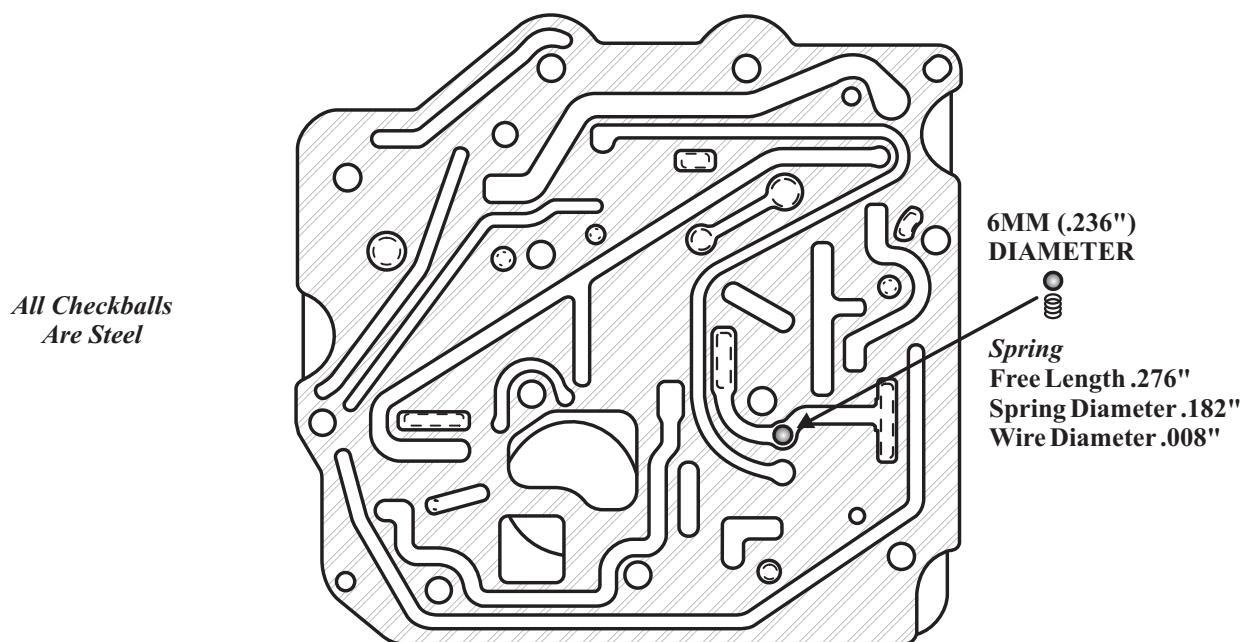
### VOLKSWAGEN

**01M**

#### **95-97 UPPER VALVE BODY**



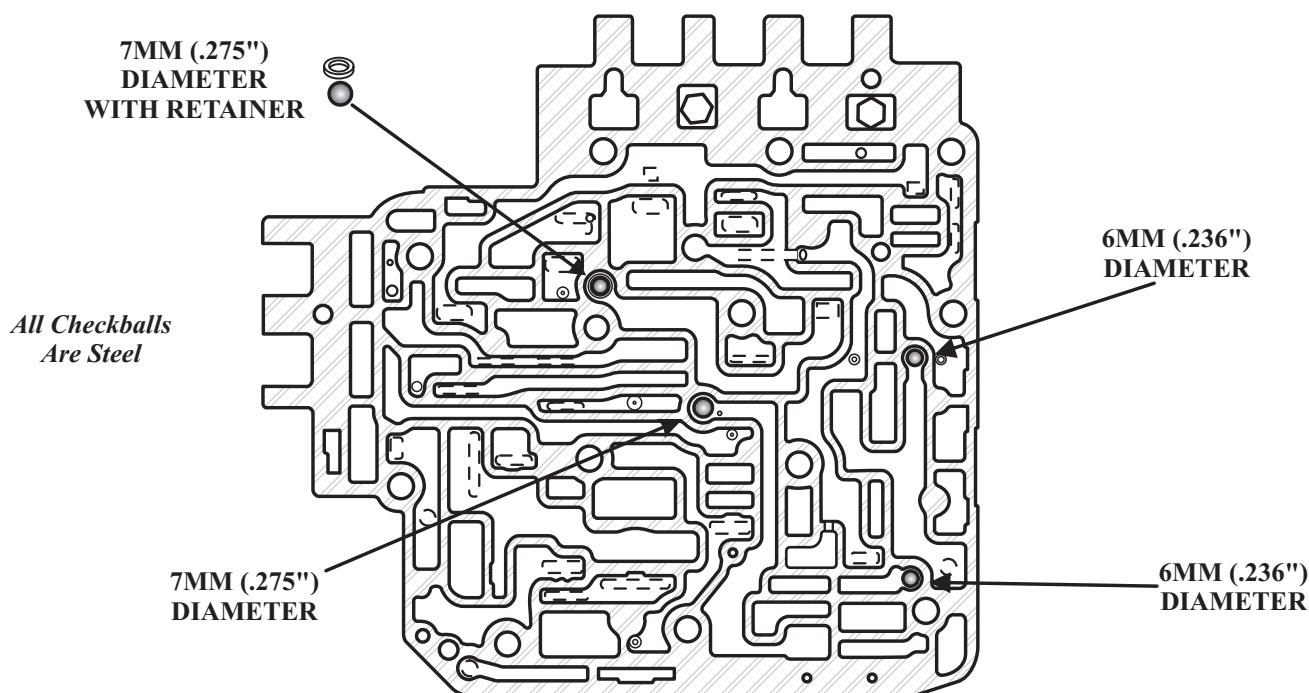
#### **95-97 CHANNEL PLATE**



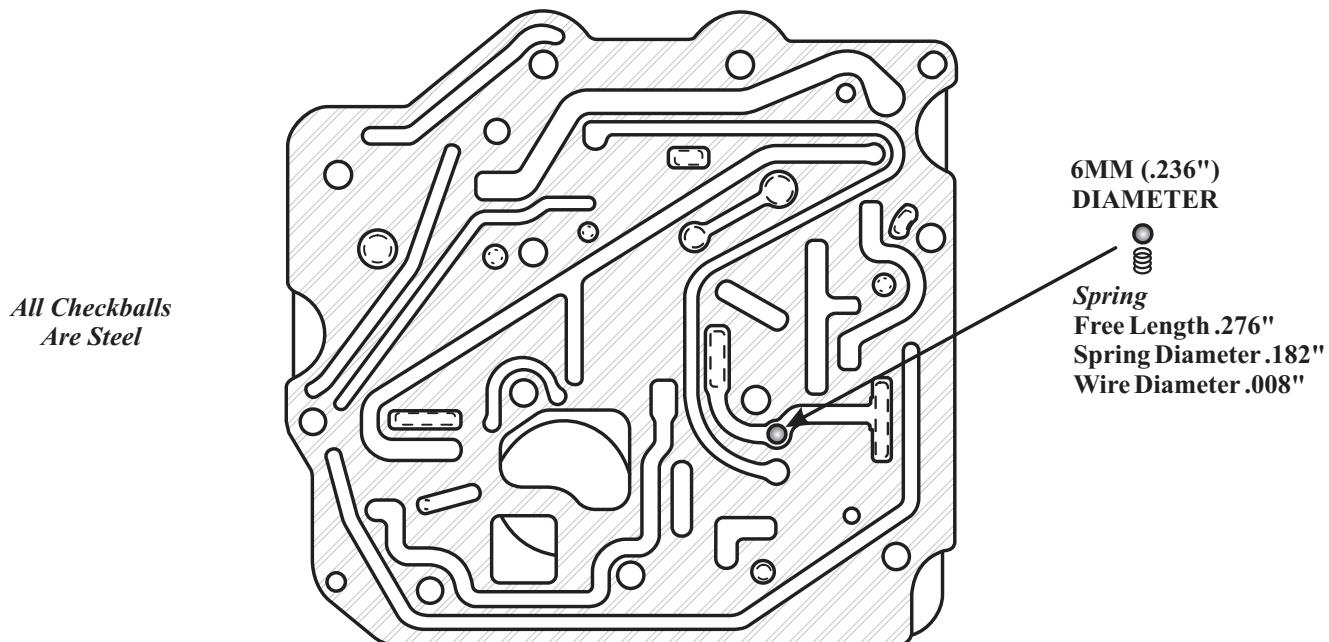
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**VOLKSWAGEN**  
**01M**

**98 AND LATER UPPER VALVE BODY**

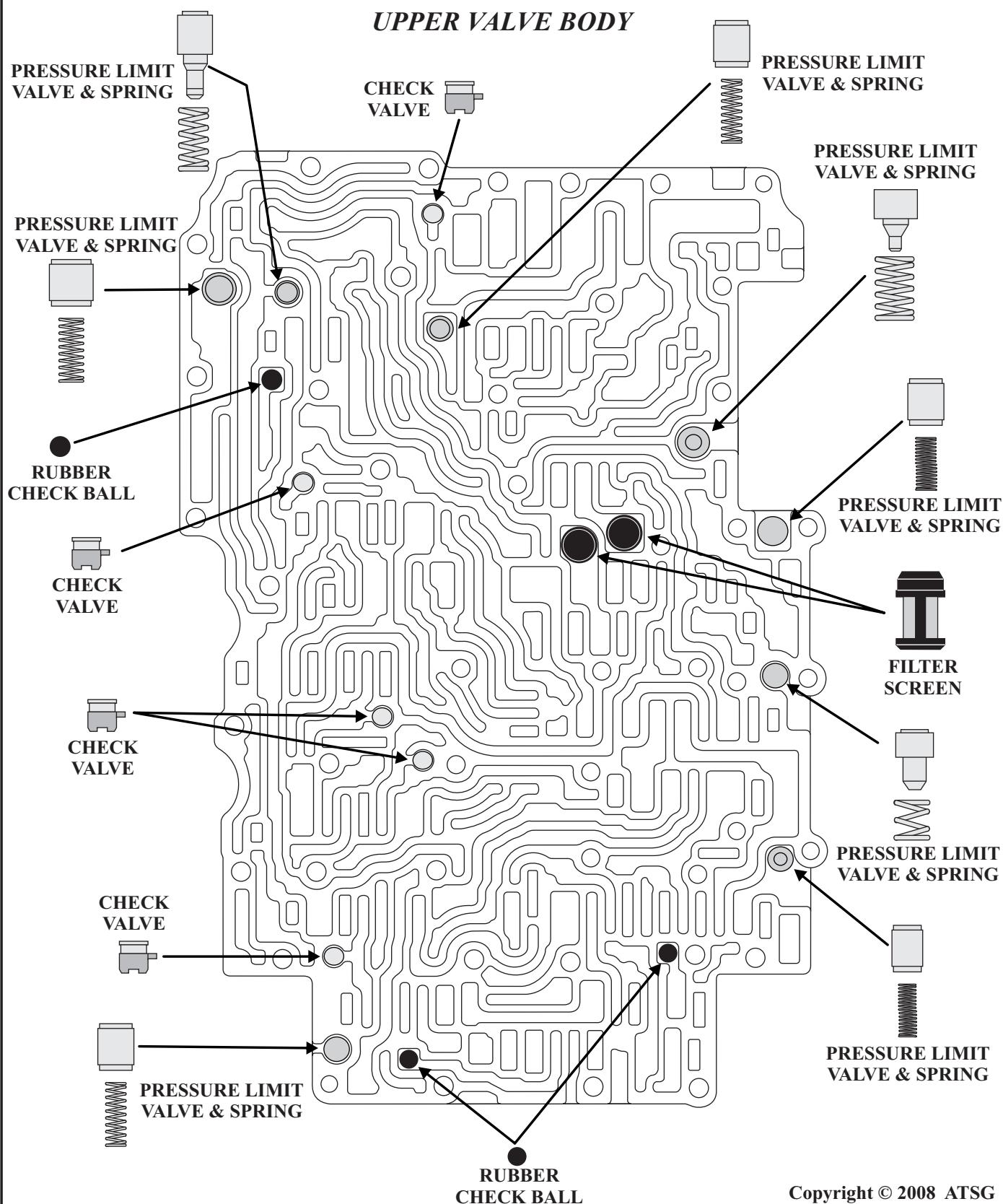


**98 AND LATER CHANNEL PLATE**

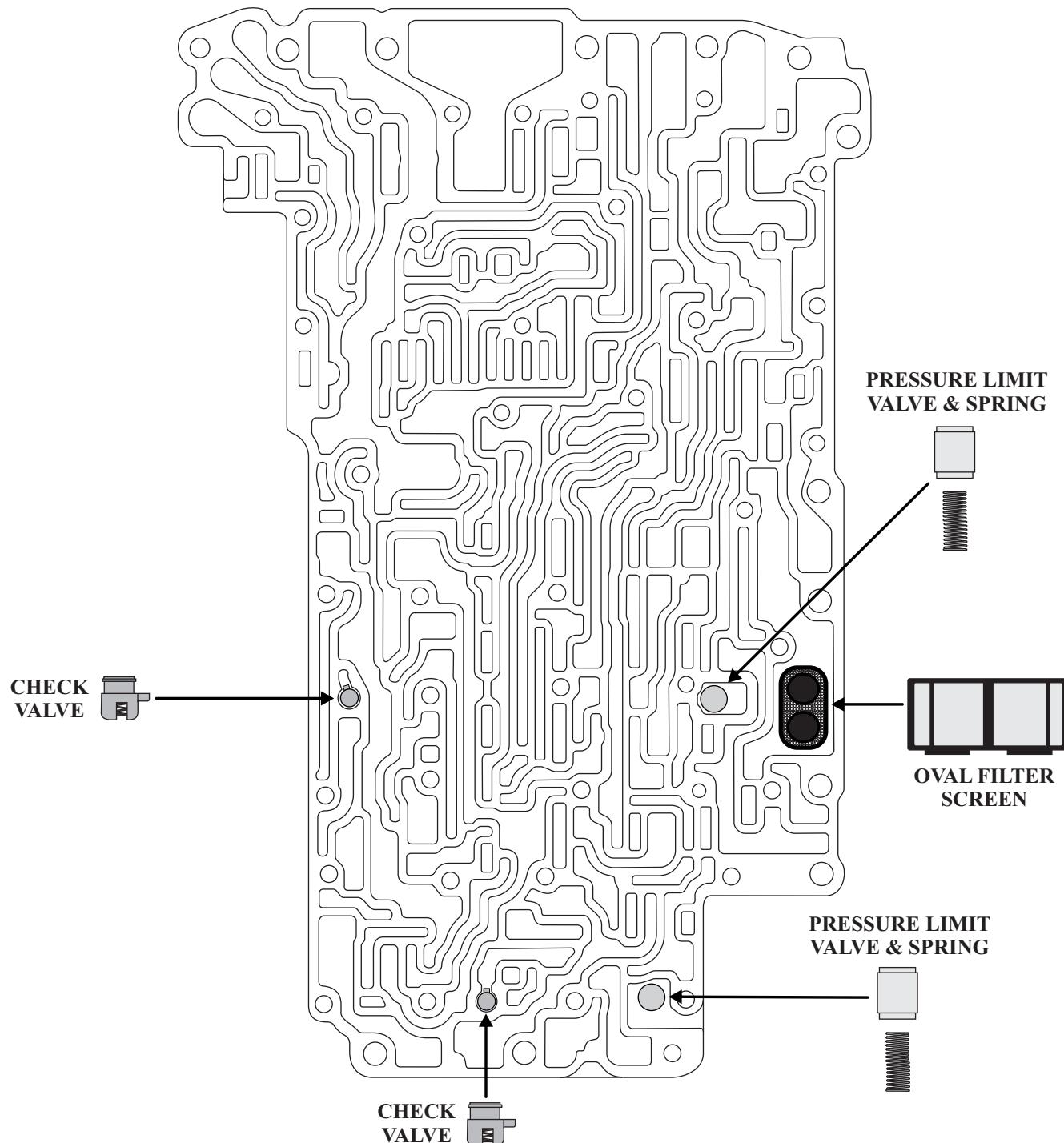


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**AUDI/VOLKSWAGEN**  
**09D/AWTR60SN**  
**UPPER VALVE BODY**



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*LOWER VALVE BODY*

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