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# A6MF1/2/3 and A6LF1/2 Rebuild

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## Kia and Hyundai

## 6 Speed Front Wheel Drive



Presented by: Jarad Warren

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# Vehicle Application Guide

## *Hyundai*

Accent 2012-17 / 1.6L / A6GF1

Azera 2011-17 / 3.3L / A6LF1

Azera 2011-13 / 3.3L / 3.8L / A6LF2 / A6LF3

Elantra 2012-16 / 1.8L / A6MF1

Elantra 2015-17 / 2.0L / A6LF1

Santa Fe 2010-17 / 2.4L / 3.5L / A6MF2 / A6LF3

Santa Fe 2013-17 / 2.0L / A6MF1 / A6LF2

Sonata 2010-17 / 2.0L / 2.4L / A6LF1

Sonata 2010-15 / 2.4L / A6MF2

Sonata Hybrid 2016-17 / 2.0 (Plug In) / A6MF2H

Tucson 2010-15 / 2.4L / A6MF2

Tucson 2010-17 / 2.0L / A6LF1

Veloster 2012-17 / 1.6L (Turbo) / A6GF1

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**GEARS**  
FOR THE TRANSMISSION REBUILDING INDUSTRY





# Vehicle Application Guide

## Kia

Cadenza 2014-17 / 3.3L / 3.8L / A6LF2

Forte 2011-17 / 2.0L / A6MF1

Forte 2011-13 / 2.4L / A6MF1

Forte 2014-16 / 1.8L / A6MF1

Forte 2014-17 / 1.6L / A6GF1

Optima 2011-17 / 2.0L / 2.4L / A6MF1

Optima (Hybrid) 2013-14 / 2.4L / A6MF2H

Rio / Rio 5 / 2012-17 / 1.6L / A6GF1

Sedona 2010-14 / 3.5L / A6MF2

Sedona 2015-17 / 3.3L / A6LF2

Sorento 2010-17 / 2.4L / A6MF1

Sorento 2010-17 / 3.3L / 3.5L / A6MF2

Sorento 2016-17 / 2.0L / A6LF2

Soul 2012-17 / 1.6L / A6GF1

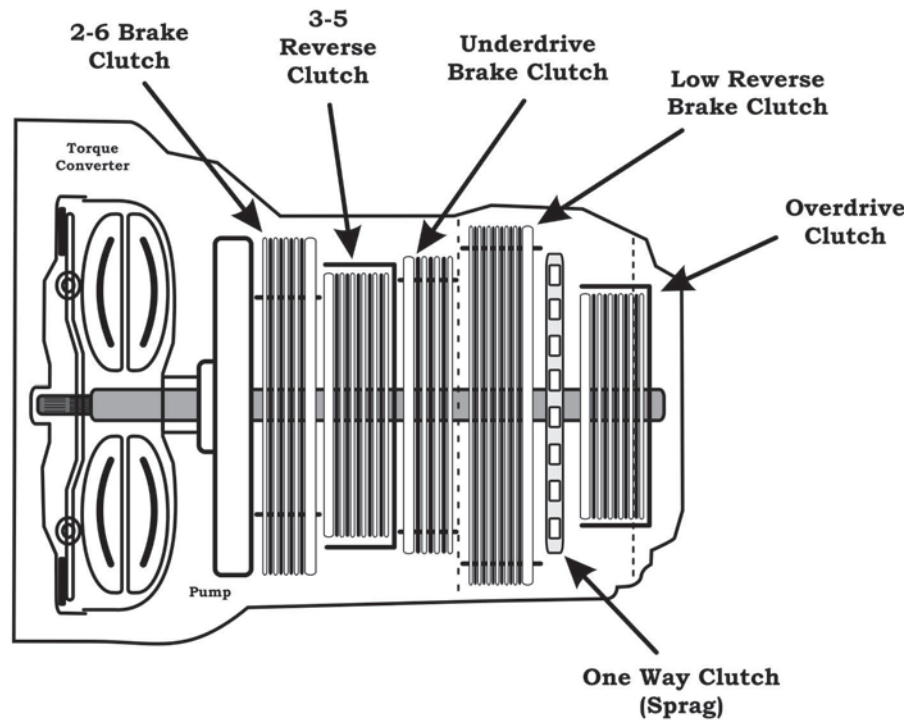
Soul 2012-17 / 2.0L / A6MF1

Sportage 2010-17 / 2.4L A6MF1 / A6MF2 /A6MF2-2

Sportage 2012-17 / 2.0L / A6LF1 /A6LF2



We did an introduction webinar for the A6MF1 in February 2018. The webinar is on the website and has some great info. We talked about components locations, sensor operation, solenoid function and more.



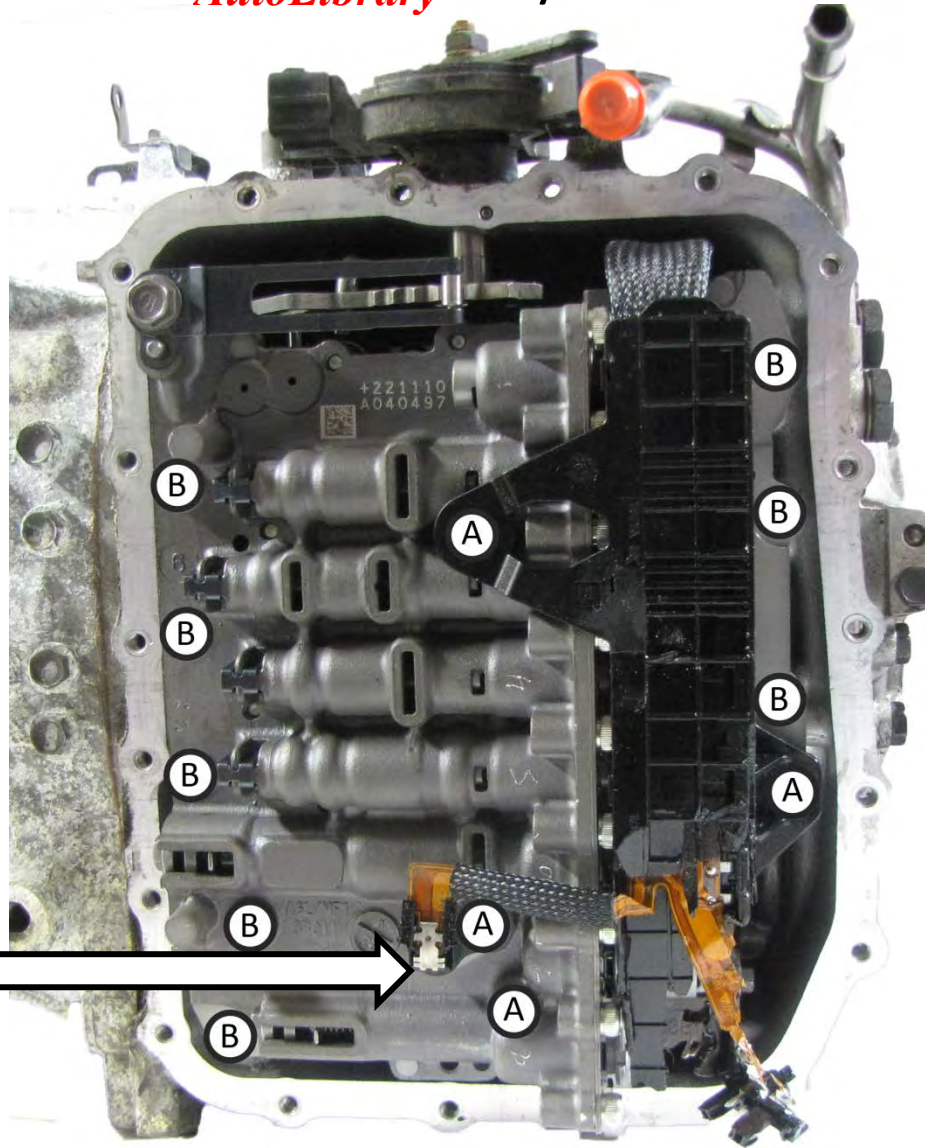
Gear	Clutch		Brake			OWC
	OD	3-5-R	LR	UD	2-6	
P			●			
R		●	●			
N			●			
D	1		○	●		●
	2			●	●	
	3		●		●	
	4	●			●	
	5	●	●			
	6	●				●
L			●	●		
Note	● : Active					
	○ : Active at speeds above 8 km/h and off at 6 km/h					



## AutoLibrary Valve Body Removal

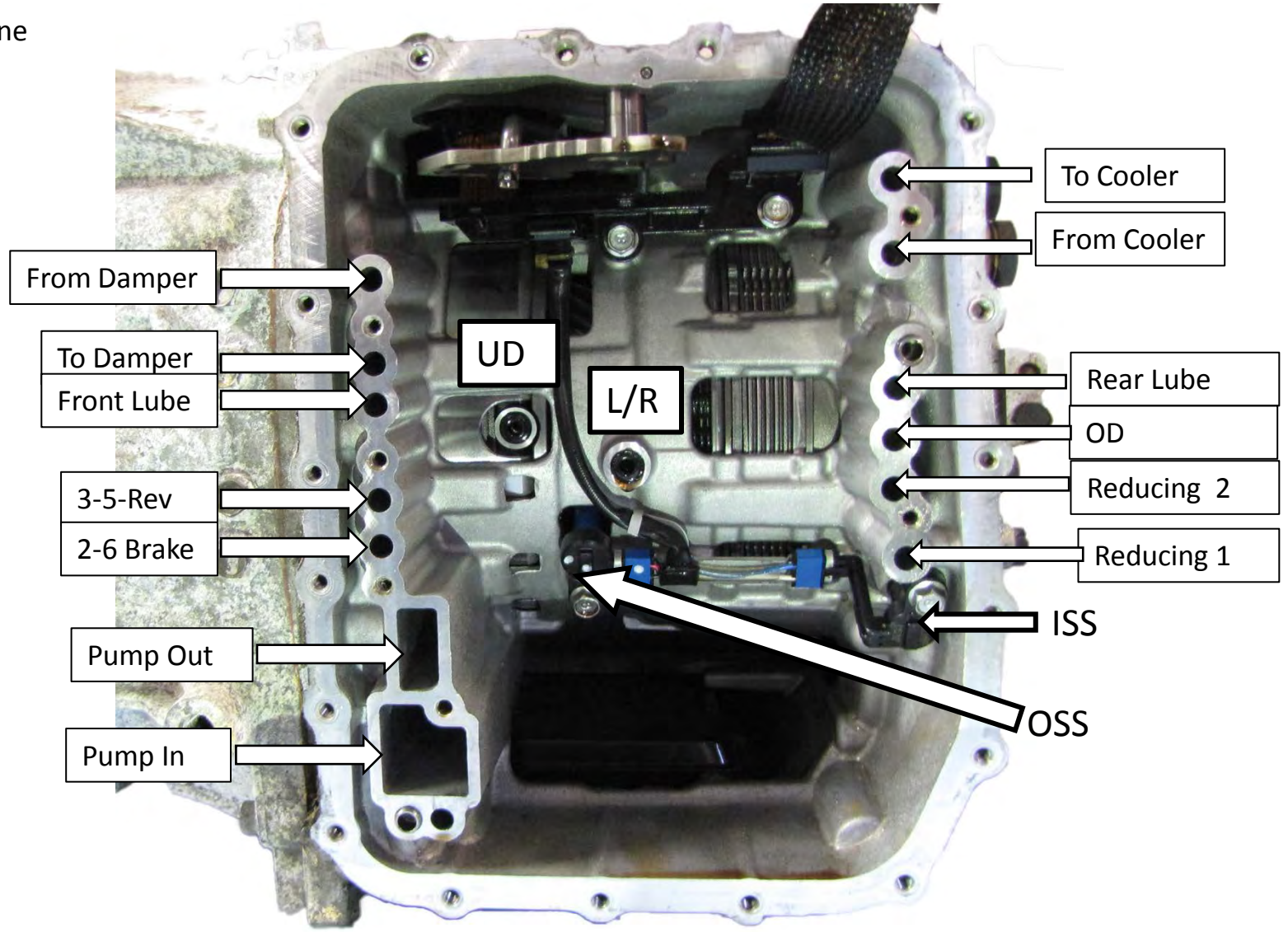
Valve body bolts  
torque 7.2-8.7 lb-ft

The Temperature Sensor on the old style harness disconnects from harness. The updated harness has the temperature sensor that is part of the harness. We recommend to always update the harness.



After removing the valve body cover, you will first take out the bolts labeled "A". Unplug harness from solenoids and move it out of the way. Next remove bolts labeled "B" and this will allow you to remove the valve body.

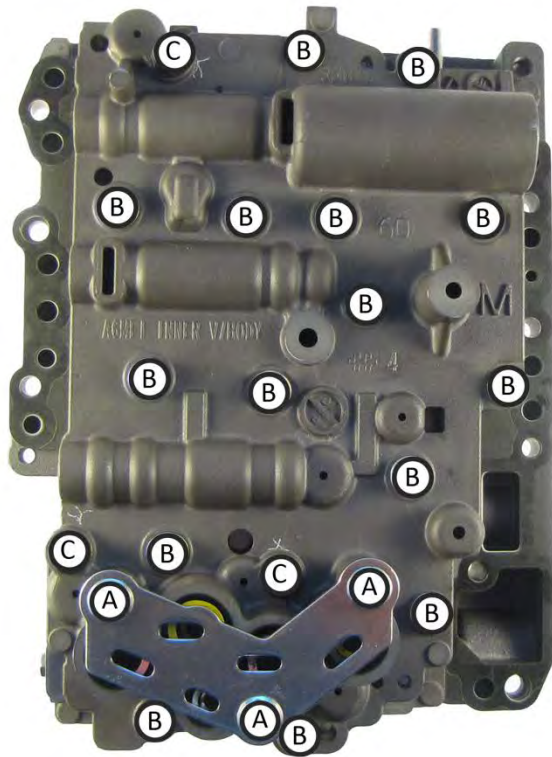
Air test should be done with around 35 PSI.



# Valve Body Inner Section

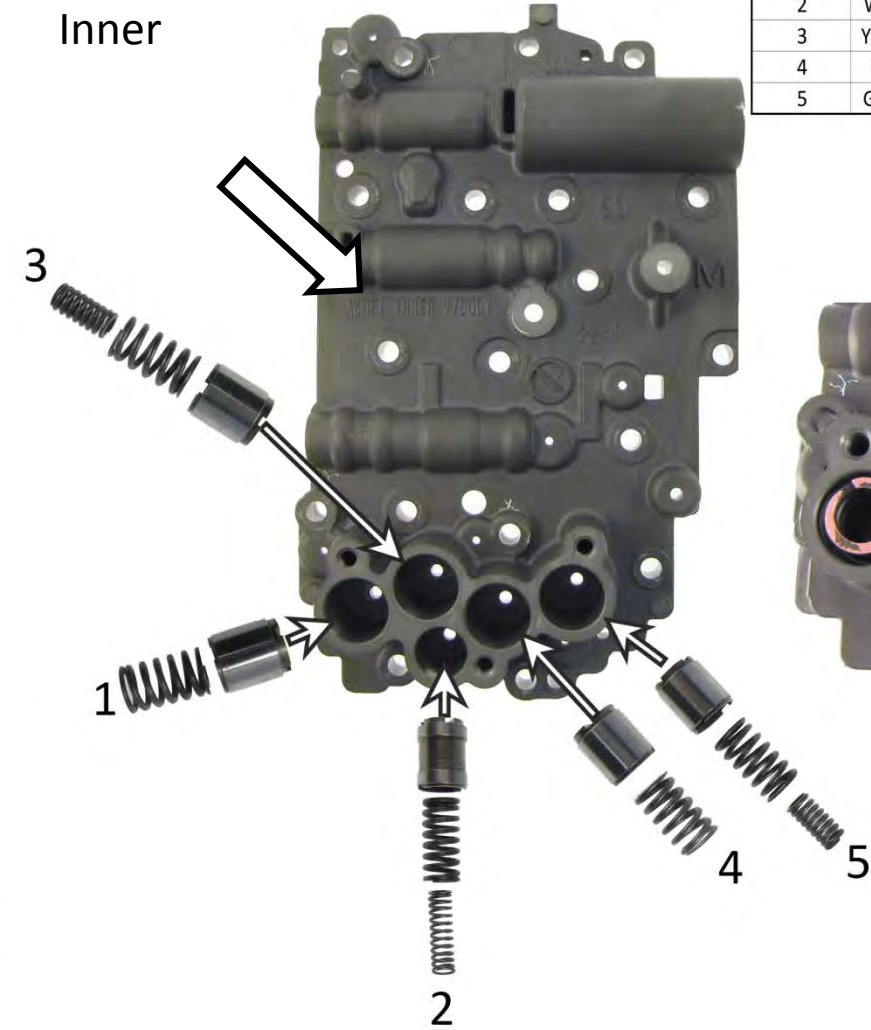
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ACC #	Large Spring	Small Spring
1	Pink 1.058X.642X.088	N/A
2	White 1.034X.478X.065	White 1.058X.311X.041
3	Yellow 1.078X.652X.089	Yellow .842X.416X.073
4	Pink 1.058X.642X.088	N/A
5	Green 1.140X.644X.077	Yellow .945X.416X.073



- (A) 1" Long
- (B) 1.4" Long
- (C) 1.6" Long

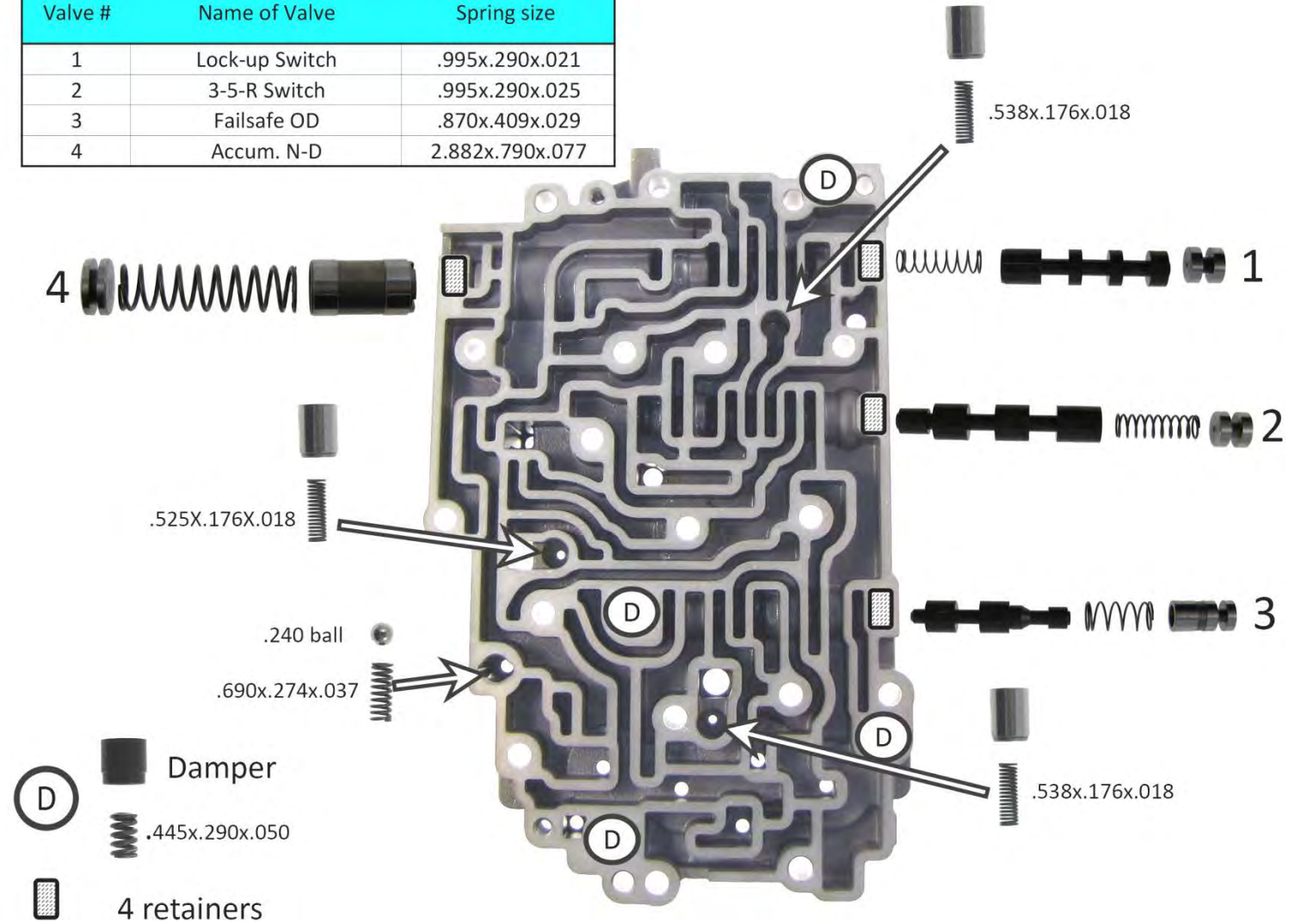
Stamped A6MF1 Inner



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# AutoLibrary Inner Valve Body

Valve #	Name of Valve	Spring size
1	Lock-up Switch	.995x.290x.021
2	3-5-R Switch	.995x.290x.025
3	Failsafe OD	.870x.409x.029
4	Accum. N-D	2.882x.790x.077

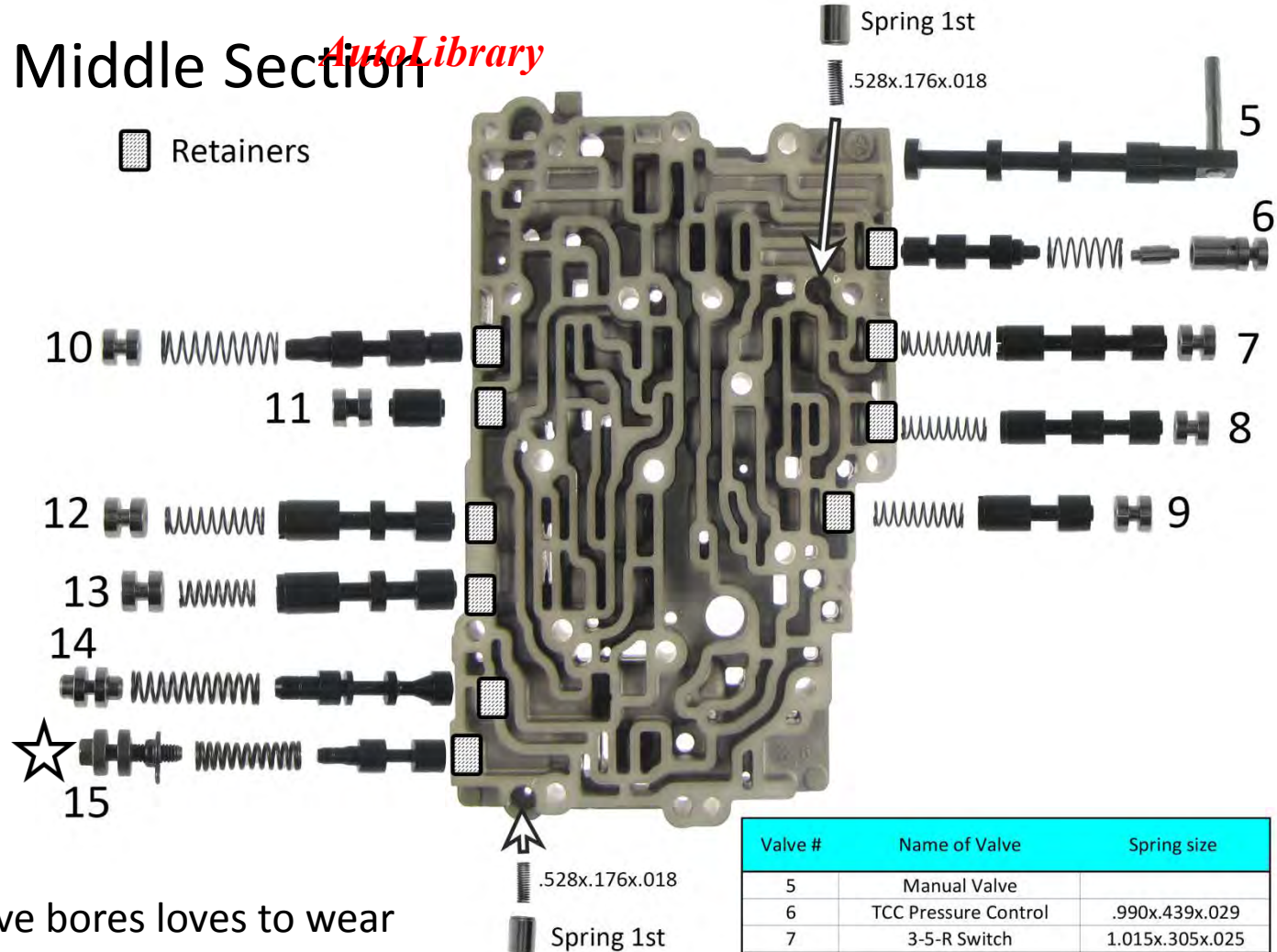




# Valve Body Middle Section

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Retainers



Valve #	Name of Valve	Spring size
5	Manual Valve	
6	TCC Pressure Control	.990x.439x.029
7	3-5-R Switch	1.015x.305x.025
8	2-6 Switch	1.015x.305x.025
9	UD Switch	1.022x.308x.025
10	Low - Rev Switch	1.330x.404x.028
11	3-5-R & 2-6 Clutch Switch	No spring
12	OD Switch	1.017x.305x.025
13	OD & Low - Rev Switch	.770x.291x.027
14	TCC Control	1.640x.432x.044
15	Reducing 2	1.195x.355x.045

The Reducing valve bores loves to wear out, even with low miles.

Transgo has a new kit out for the A6MF/LF series.

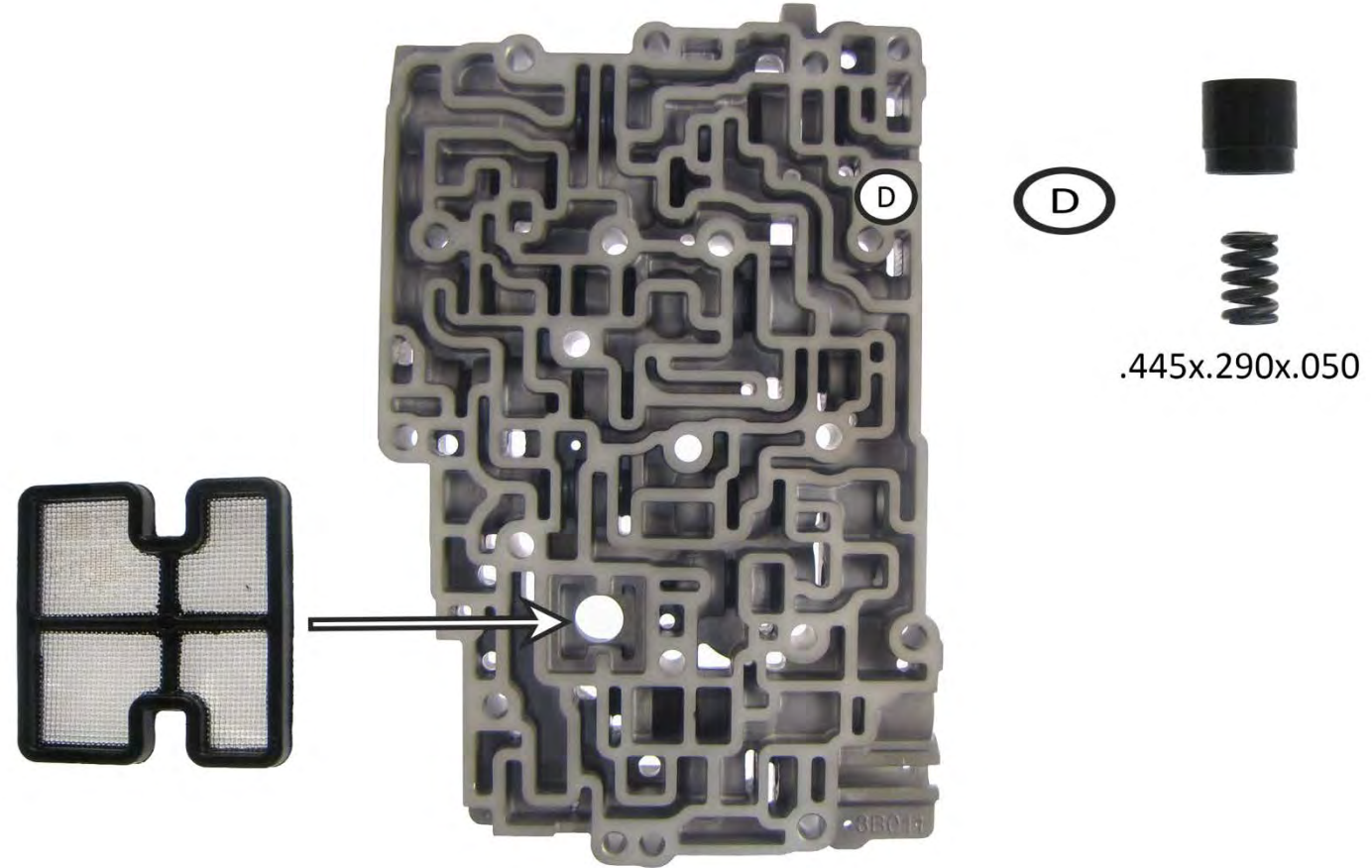
Sonnax also has their tools and valves.

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# Valve Body Middle Section

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# Valve Body Outside Section

Valve #	Name	Spring size
16	3-5-R	.732x.256x.025
17	2-6 Brake	.730x.242x.025
18	Underdrive	.752x.255x.025
19	Overdrive	.732x.255x.025
20	Regulator	1.428x.590x.048
21	Reducing	1.195x.348x.045

On this valve body there are some adjusters on the regulator and reducing valve. You do not want to change the adjustments.

There are also four adjustments for clutch control, they are label with the white and black circles.

All the linear solenoid resistances is 5.1 Ohms.

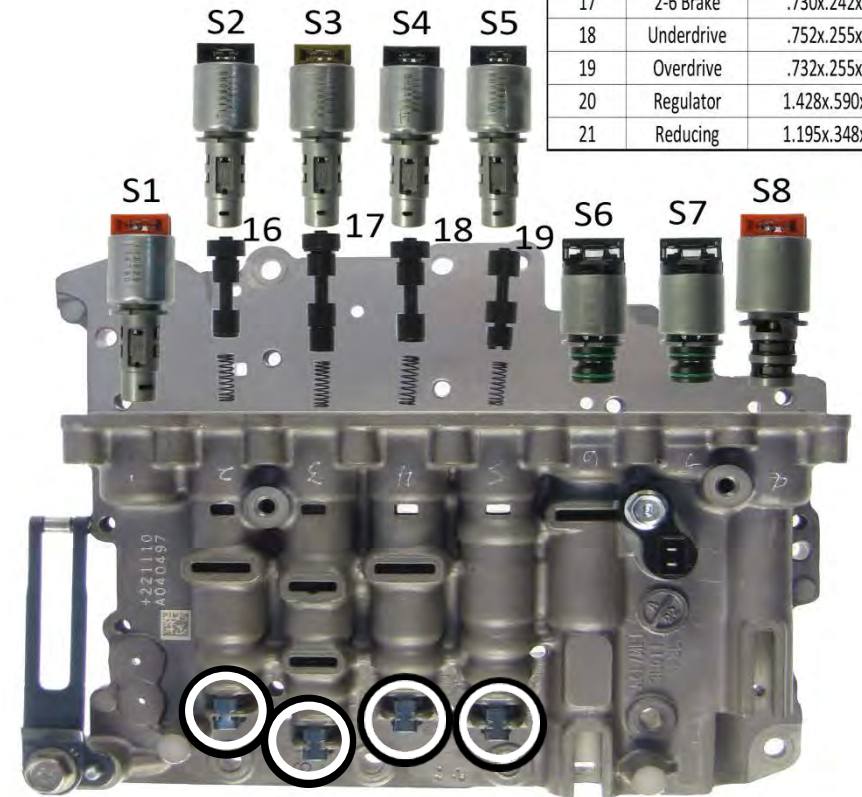
The on/off solenoid resistance is 10-11 Ohms.

The Reducing valve bores loves to wear out, even with low miles.

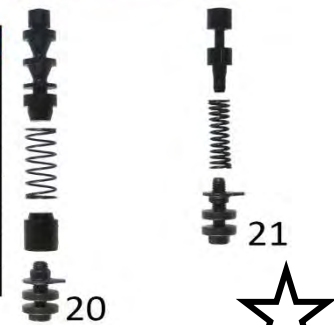


Transgo has a new kit out for the A6MF/LF series.

Sonnax also has their tools and valves



S #	Solenoid Name	Type
S1	TCC	N/L
S2	3-5-Reverse	N/H
S3	2-6 Brake	N/L
S4	Underdrive	N/H
S5	Overdrive	N/H
S6	Shift B	on/off
S7	Shift A	on/off
S8	Line Pressure	N/H



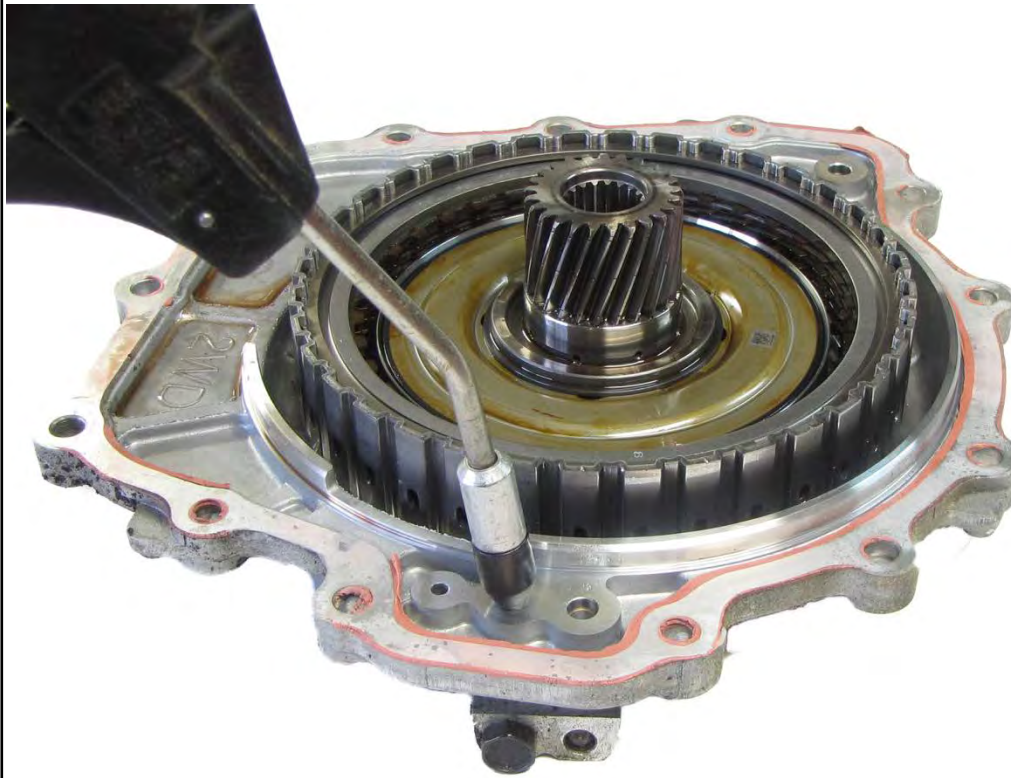
# Rear Cover / OD Drum

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I like to air check the unit when taking the transmission apart. Air check the OD drum on the rear cover.

The cover has a bearing race and back of OD drum takes a thrust bearing. Also check for ring grooves.

Rear end play .009"-.017"



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Snap ring is selective.  
Clearance .049-.061"



Snap Ring .090"

Pressure Plate .113"

Five .064" Clutches  
Four .082 Steels  
Apply Plate .090"

5 clutches, 5 steels



Measured clutch clearance .052"

# AutoLibrary Overdrive Clutch Drum

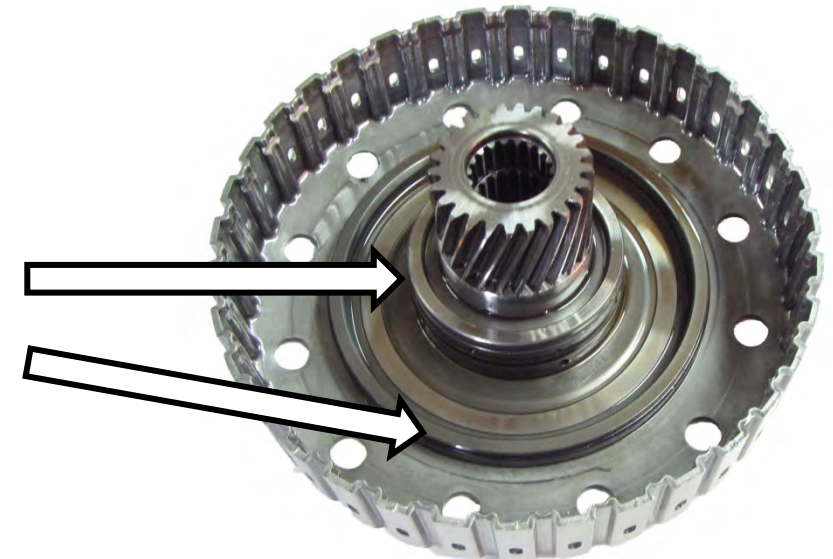
Has a molded balance piston.



Spring Retainer

Piston

Two seals





# A6MF1 Overdrive Snap Ring Part Numbers *AutoLibrary*

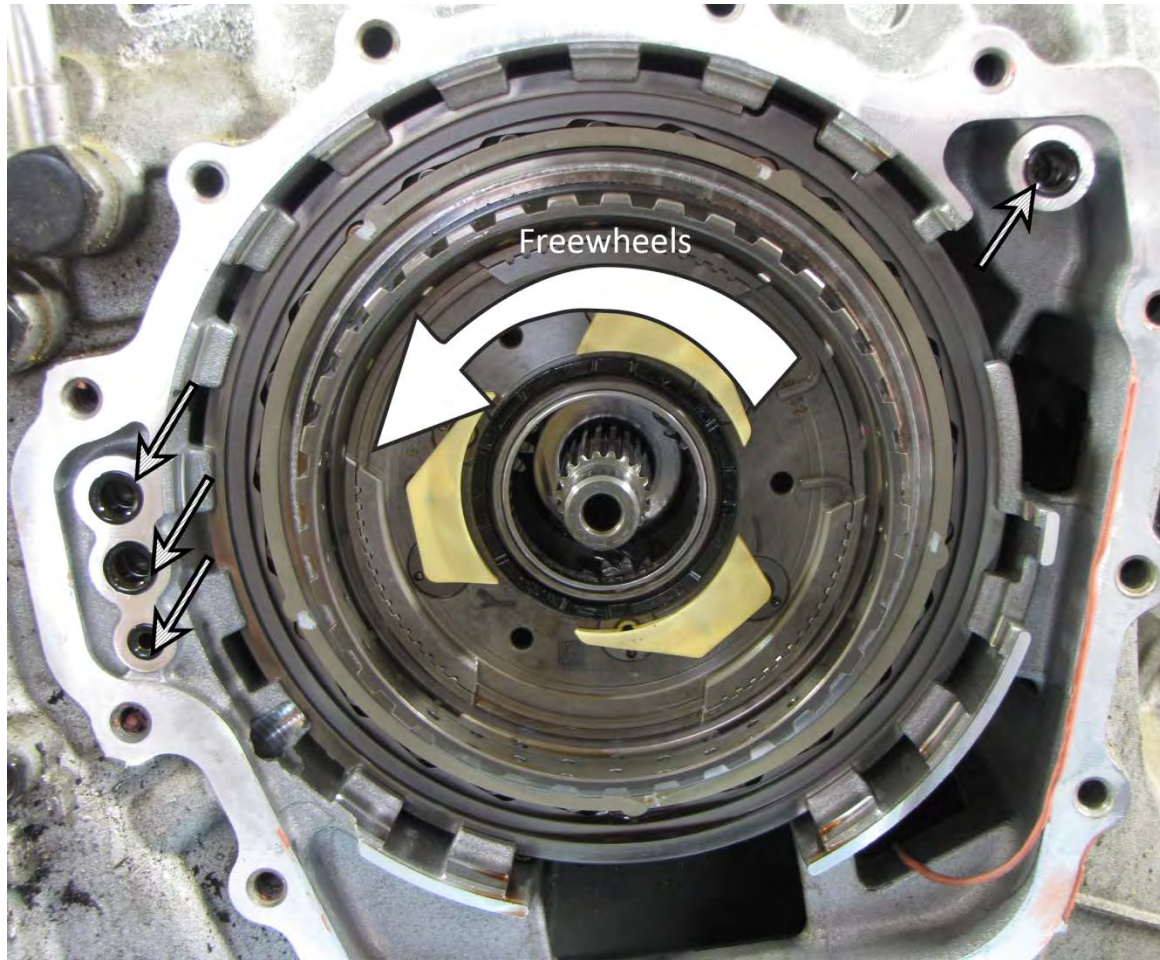
Part No.	Thickness[mm(in.)]
45552-3B617	1.7 ± 0.5 (0.0669 ± 0.0197)
45552-3B619	1.9 ± 0.5 (0.0748 ± 0.0197)
45552-3B621	2.1 ± 0.5 (0.0827 ± 0.0197)
45552-3B623	2.3 ± 0.5 (0.0906 ± 0.0197)
45552-3B625	2.5 ± 0.5 (0.0984 ± 0.0197)
45552-3B627	2.7 ± 0.5 (0.1063 ± 0.0197)
45552-3B629	2.9 ± 0.5 (0.1142 ± 0.0197)

Overdrive clutch clearance .049" - .061"



# One Way Clutch Rotation

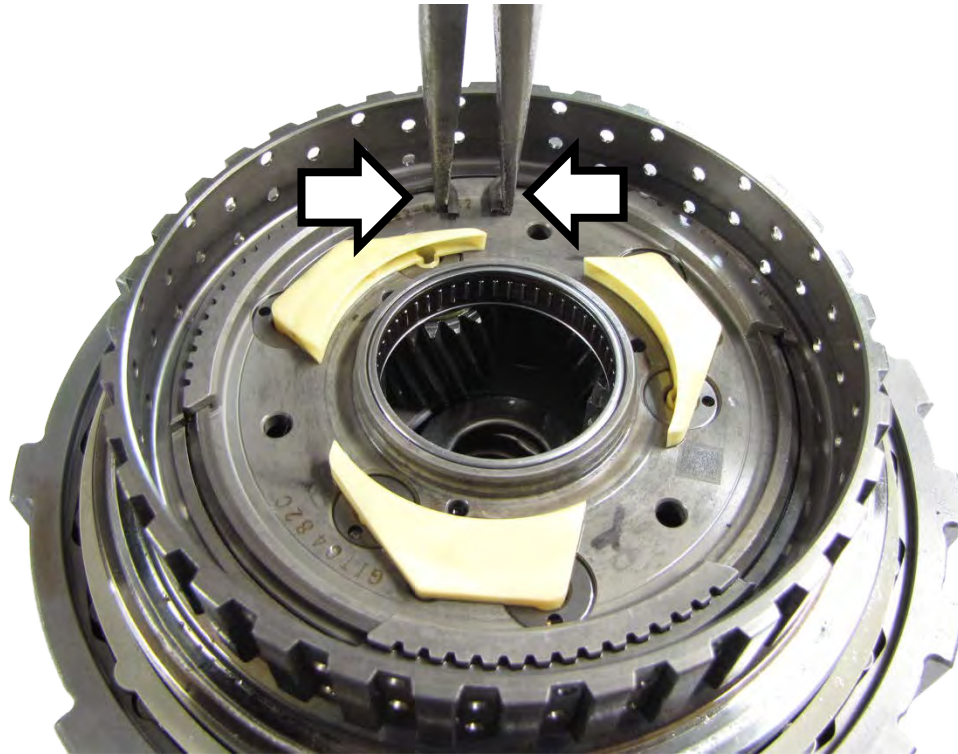
There are four seals under the rear cover. Remove the snap ring (.098"). The opening of the snap ring is at 1 o'clock position. Pull the gear train and one way roller assembly out.



Large seals .400" Tall .460" Wide



1 Small seal .410" Tall .315" Wide



Squeeze the snap ring together and at the same time pull the one-way assembly up and off the planet.



As pictured here, the "front" would be facing down.





# AutoLibrary Gear Train



3 Tab Washer  
(Selective)



Snap ring  
.098"



Remove outer snap ring to get gear train apart.

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Gear Train End Play



End play .003”-.015”

Part No.	Thickness[mm(in.)]
45729-26030	3.0 ± 0.5 (0.1181 ± 0.0197)
45729-26032	3.2 ± 0.5 (0.1260 ± 0.0197)
45729-26034	3.4 ± 0.5 (0.1339 ± 0.0197)
45729-26036	3.6 ± 0.5 (0.1417 ± 0.0197)
45729-26038	3.8 ± 0.5 (0.1496 ± 0.0197)
45729-26040	4.0 ± 0.5 (0.1575 ± 0.0197)
45729-26042	4.2 ± 0.5 (0.1654 ± 0.0197)
45729-26044	4.4 ± 0.5 (0.1732 ± 0.0197)
45729-26046	4.6 ± 0.5 (0.1811 ± 0.0197)

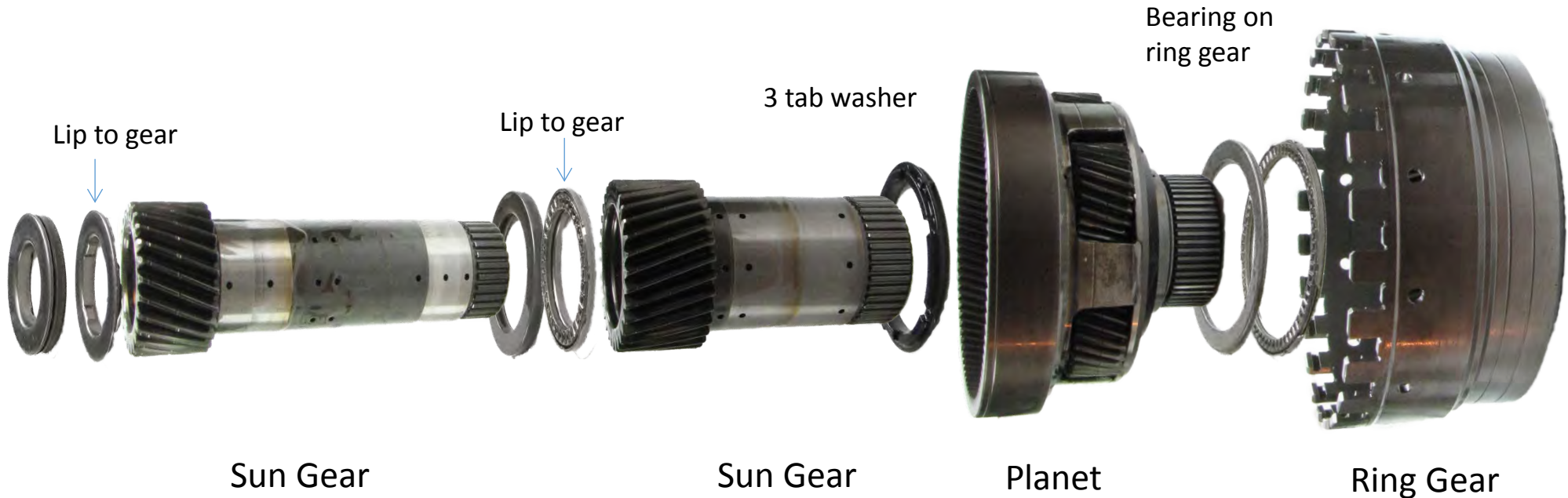


Remove the snap ring then pull ring gear up and off.

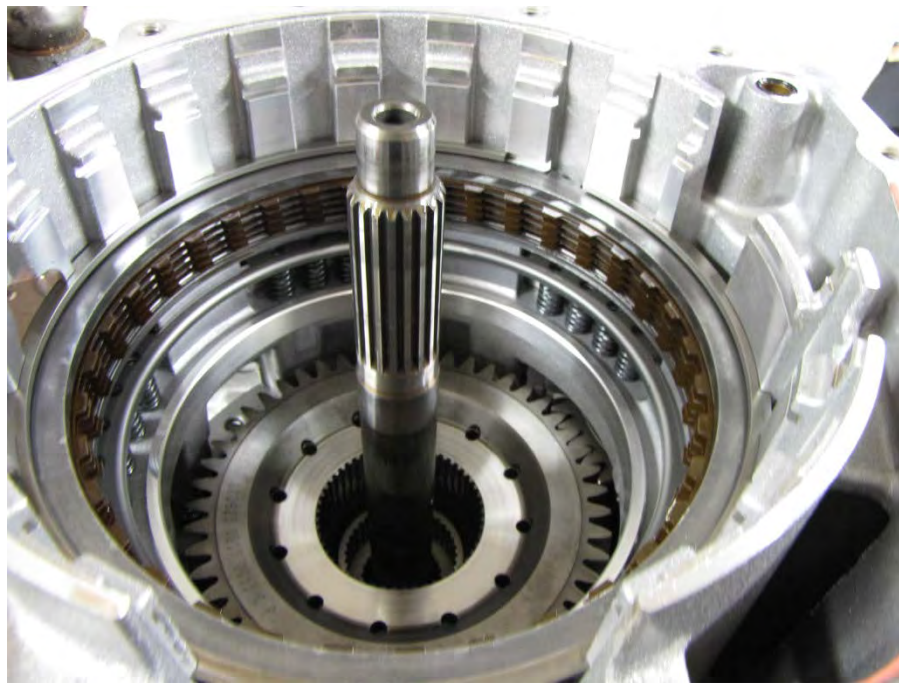
Inspect the planet teeth and the bearings for wear. Inspect the thrust washer.



# AutoLibrary Gear Train



Low & Reverse Clutch  
Clearance .080"-.092"



Snap Ring .098"

Selective Pressure  
Plate .176"

5 Clutches .068"  
5 Steels .045"

Cushion .062"

Apply Plate .129"

Snap Ring .084"

Spring Cage

Piston



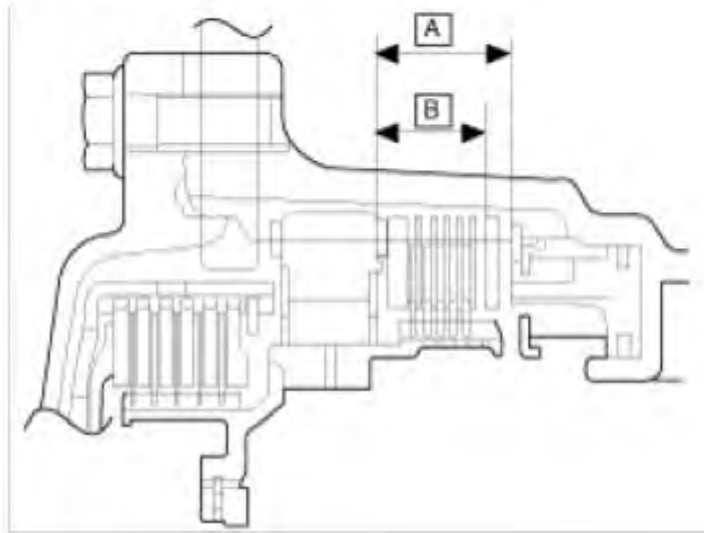
# AutoLibrary Low & Reverse Clearance

Method of selecting the pressure plate

Pressure plate thickness = A - B - Specified end play (Average)

A : Low & reverse (L/R) brake snap ring ~ Low & reverse brake return spring snap ring [Under the load 49 N.m (5 kgf.m, 36 lb-ft)]

B : The height of pressing the disc set (L/R brake) including the cushion plate under the load about 3,433 N.m (300 kgf.m, 2532 lb-ft) + The snap ring thickness



They want you to load clutch with 2532 lbs. of pressure and measure clutch. That is not going to happen most likely. I would measure clearance without the cushion plate. Then measure thickness of cushion plate and subtract that from your clearance.

Measured clearance without the cushion plate was .154".

.144"-.062"= .082" clearance.

Part No.	Thickness[mm(in.)]
45649-3B611	1.1(0.0433)
45649-3B613	1.3(0.0512)
45649-3B615	1.5(0.0591)
45649-3B617	1.7(0.0669)
45649-3B619	1.9(0.0748)
45649-3B621	2.1(0.0827)
45649-3B623	2.3(0.0906)
45649-3B625	2.5(0.0984)
45649-3B627	2.7(0.1063)
45649-3B629	2.9(0.1142)
45649-3B631	3.1(0.1220)
45649-3B633	3.3(0.1299)
45649-3B635	3.5(0.1378)
45649-3B637	3.7(0.1457)
45649-3B639	3.9(0.1535)

# Remove The Front Case Half

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Remove the case half bolts, than pry the front case half off.

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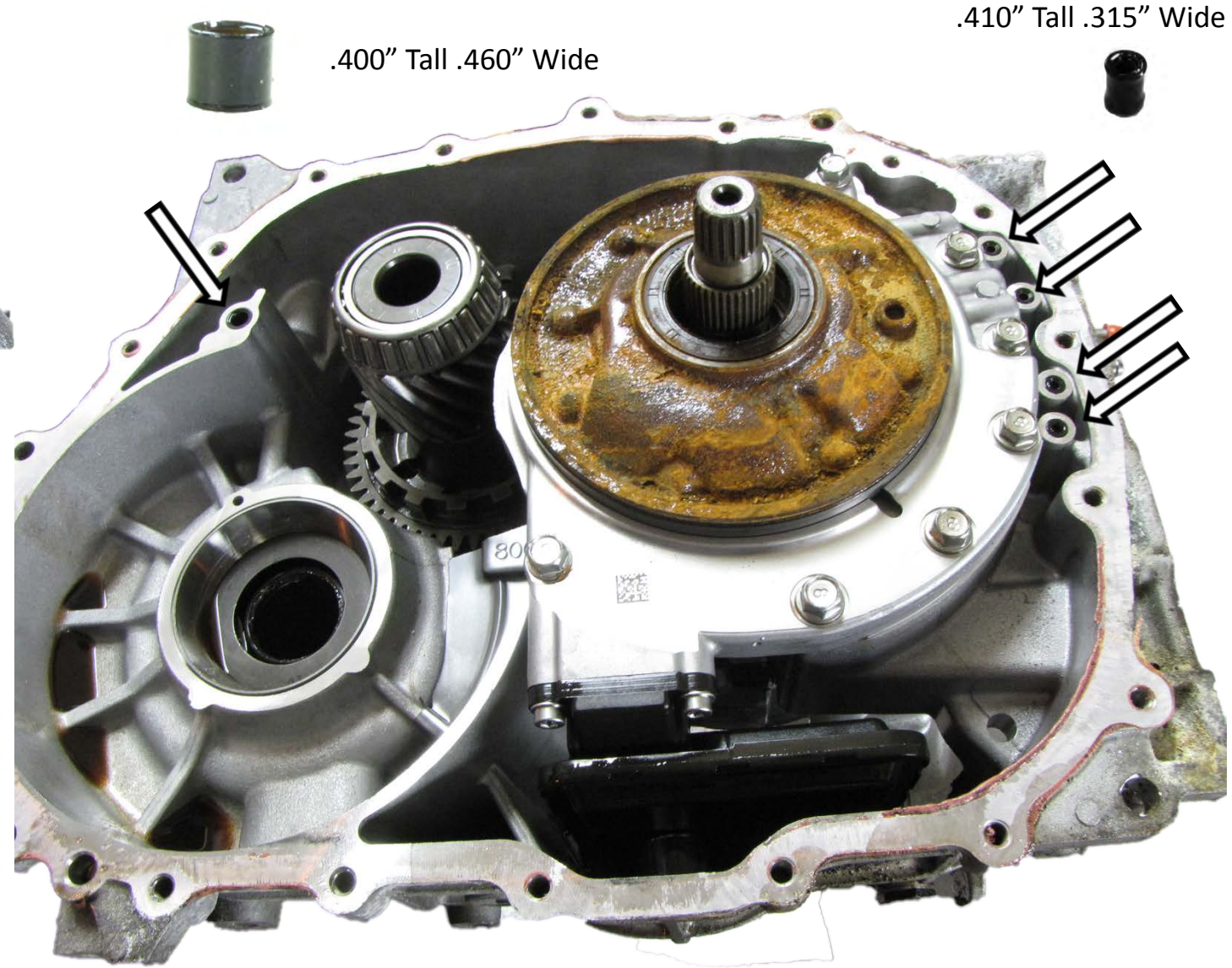


Case bolt torque 20-22 ft./lbs.

# Differential and Case Seals

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Two seals inside spider gears shafts.



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# *AutoLibrary* Pump



Filter bolt torque 7.2-8.7lb/ft.

3 tab washer on pump. Check seal rings.



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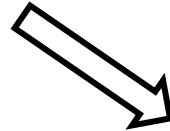


# AutoLibrary Pump

Check front bushing



Cut out for  
tab on piston



Check pump surface

Pump to case torque 14.5-18.1lb/ft.



3-5-Rev

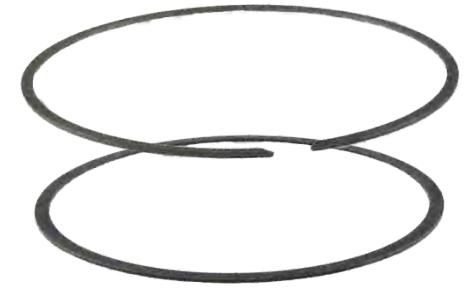
2-6 Brake

# AutoLibrary Pump

Pump gears have ID marks on them. Marks face up.



Snap Ring .060"



Ring .062"



Waved spring

Piston

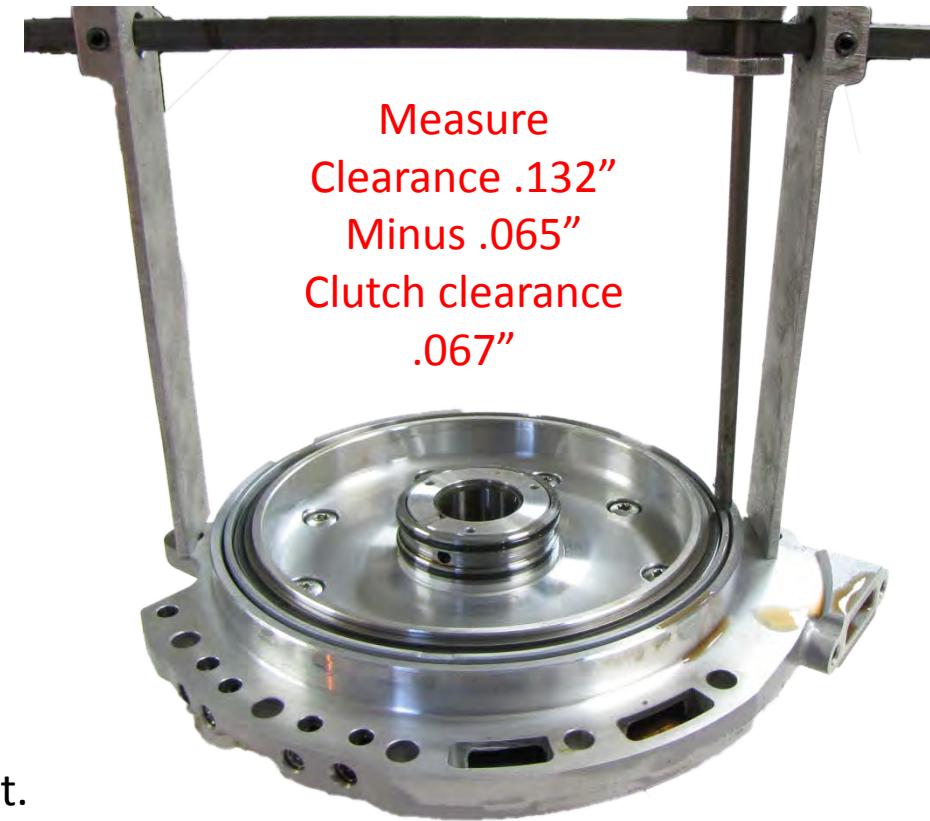
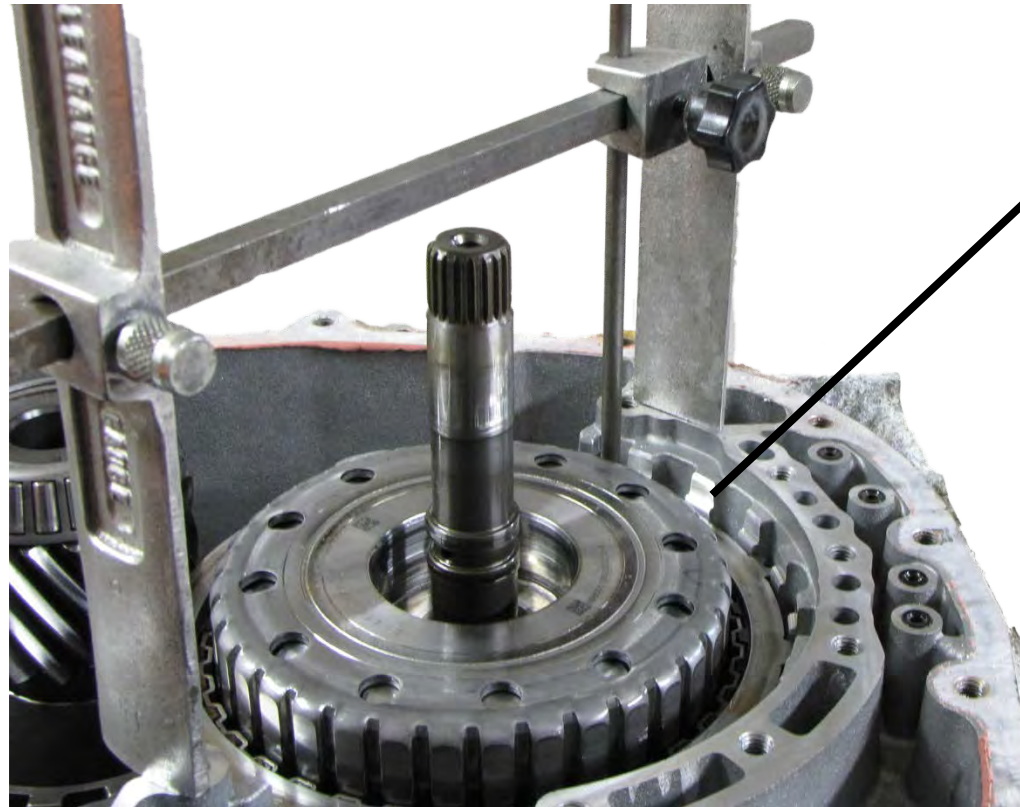


Tab on piston goes in the slot.



## AutoLibrary 2-6 Brake

Remove the waved cushion 1<sup>st</sup>! Set up the H-gauge to check 2-6 brake clearance.



Measured clearance minus cushion = clutch clearance  
.132" - .065" = .067 was the clutch clearance on this unit.



# 2-6 Brake cont.

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Cushion .065"



Apply Plate .096"



4 Clutches .070"  
3 Steels .156"



Selective

Pressure Plate .100"  
Step down



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# AutoLibrary 3.5-Rev Drum



Snap Ring .086"

Apply Plate .094"

5 External Teeth .118"  
5 Internal Teeth .090"

Snap Ring .050"

Balance Piston

Return Spring Fingers Up

Piston

Measured clearance  
.040"





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Hubs and Washers



Underdrive  
Clutch Hub



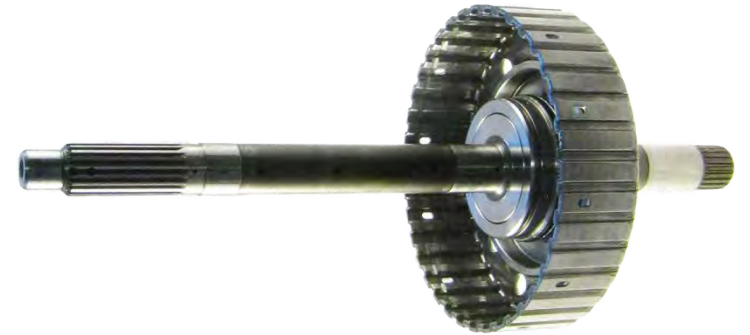
2 Tab  
Thrust  
Washer



2-6 Clutch & 3-5-R Hub



Thrust Bearing



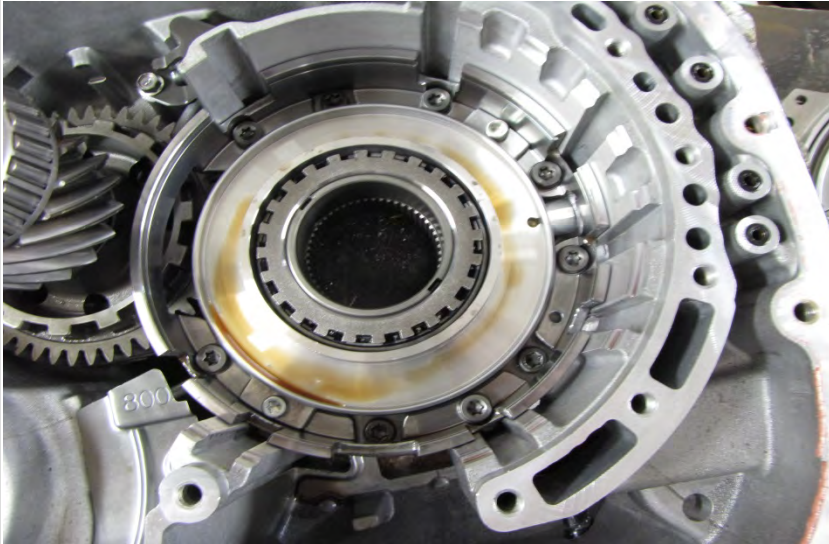
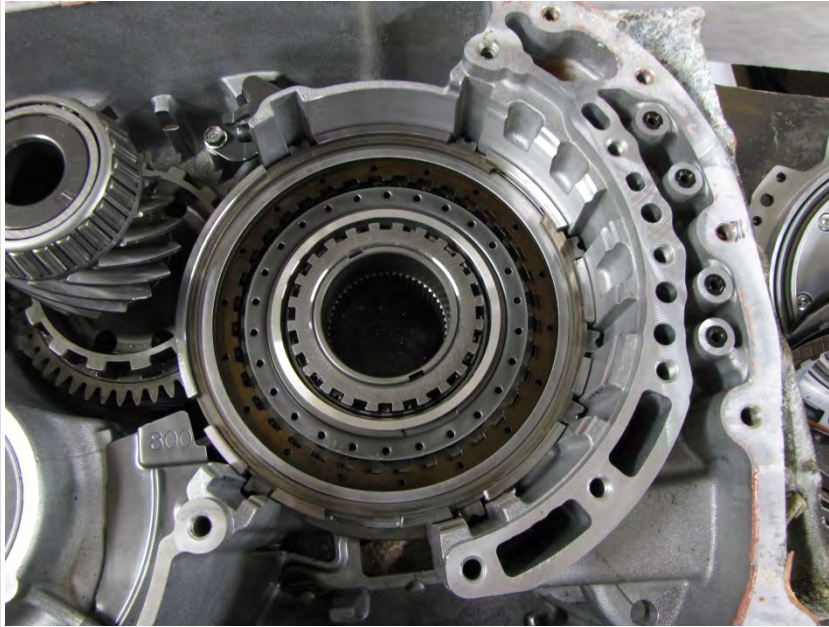
3-5-Rev Drum



UD Clearance .025"-.037"

# Underdrive Clutch

Measured clearance .030"



Snap Ring .082"  
Selective

Pressure Plate .098"

3 Clutches .065"  
3 Steels .078"

Retainer Snap Ring .058"

Spring Retainer

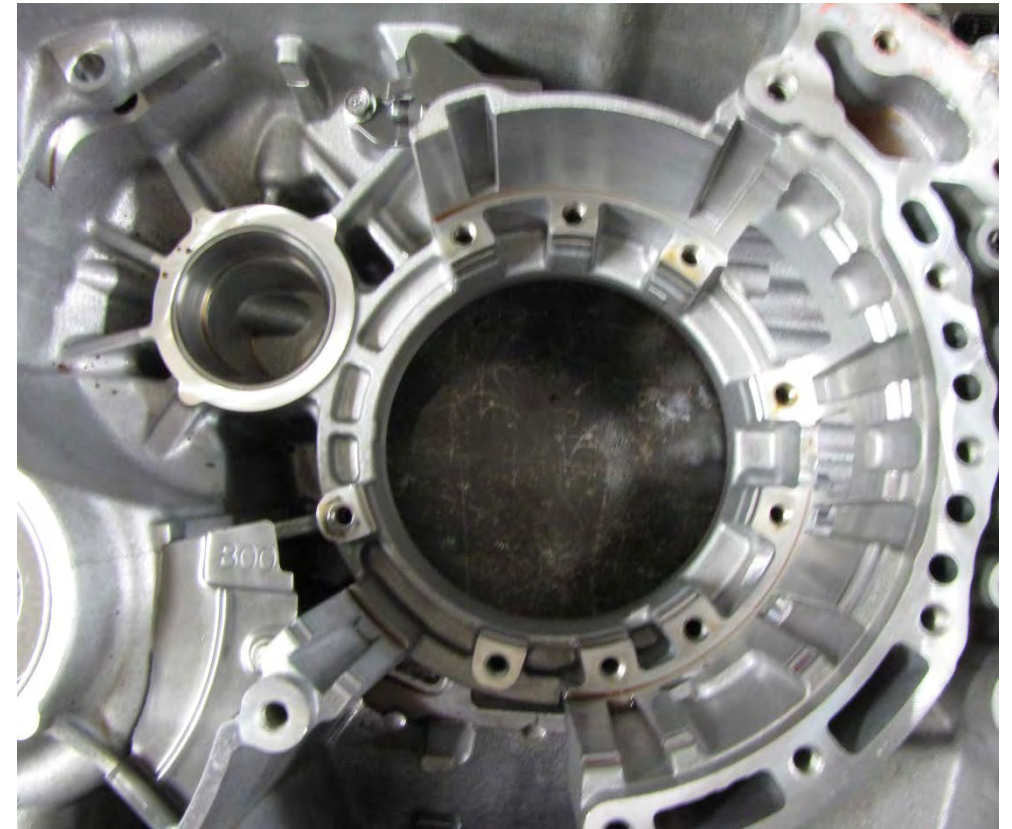
Piston

Piston Housing  
Note: Issues with rough surface causing seal to wear.



UD Housing bolt torque 3.6-7.2 LB/ft.

Housing bolts and Transfer Gear bolts  
torque 22-26 ft./lbs.



# Transfer Gear Disassembly *AutoLibrary*

Kia part number for nut removal tool  
A6MF1 09457-26300  
A6MF2 09453-3L220  
I found online for \$65-\$85. This tool  
would make the job easier.

I did not have the tool and heated the nut  
up and knocked it loose with a hammer  
and punch.

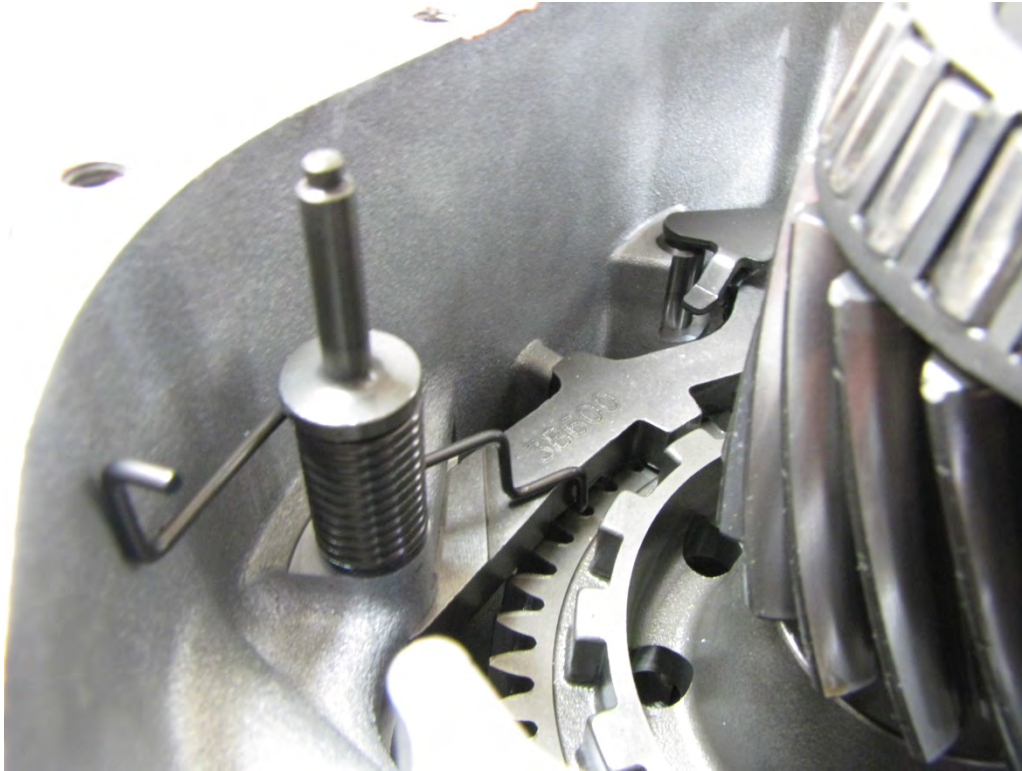
I marked the nut position before I took it  
apart and reinstalled in the same place  
after checking bearings and races.

Note there are no shims to set preload.





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Transfer Gear and Park Pawl





# AutoLibrary Differential



There is an O-ring on this side of the spider gear to keep dirt and water from entering splines. It would be a good idea to apply spline grease to axle splines.



Inside the diff on the spider gear has a cup plug to keep ATF inside the transmission.





# A6MF1 Specifications

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## Service Standard

Item	Specifications [mm(in.)]
Input shaft end play (Rear)	0.25 ~ 0.45 (0.0098 ~ 0.0177)
2/6 brake pressure plate end play	2.35 ~ 2.65 (0.0925 ~ 0.1043)
Low & reverse brake pressure plate end play	A6LF1/2 : 2.45 ~ 2.75 (0.0964 ~ 0.1082) A6LF3 : 2.65 ~ 2.95 (0.1043 ~ 0.1161)
Under drive brake snap ring end play	A6LF1/2 : 0.65 ~ 0.95 (0.0255 ~ 0.0374) A6LF3 : 0.85 ~ 1.15 (0.0334 ~ 0.0452)
Over drive clutch snap ring end play	1.25 ~ 1.55 (0.0492 ~ 0.0610)
35R clutch snap ring end play	1.05 ~ 1.35 (0.0413 ~ 0.0531)
Middle & rear planetary gear end play	0.1 ~ 0.4 (0.0039 ~ 0.0157)
Input shaft end play (Front)	0.55 ~ 0.85 (0.0216 ~ 0.0334)
Differential side gear & differential pinion gear backlash	0.025 ~ 0.150 (0.0009 ~ 0.0059)

## Tightening Torques

Item	N.m	kgf.m	lb-ft
Transfer drive gear	30.4 ~ 35.3	3.1 ~ 3.6	22.4 ~ 26.0
Rear cover	27.5 ~ 34.3	2.8 ~ 3.5	20.3 ~ 25.3
Under drive brake retainer	30.4 ~ 35.3	3.1 ~ 3.6	22.4 ~ 26.0
Under drive brake chamber	4.9 ~ 9.8	0.5 ~ 1.0	3.6 ~ 7.2
Parking rod guide	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Oil pump pipe	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Oil pump	19.6 ~ 25.5	2.0 ~ 2.6	14.5 ~ 15.9
Oil filter assembly	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Torque converter housing	27.5 ~ 34.3	2.8 ~ 3.5	20.3 ~ 25.3
Valve body cover	12.8 ~ 14.7	1.3 ~ 1.5	9.4 ~ 10.8
Detent spring	24.5 ~ 35.3	2.5 ~ 3.6	18.1 ~ 26.0
Valve body cover	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Inhibitor switch	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Manual control lever	17.7 ~ 24.5	1.8 ~ 2.5	13.0 ~ 18.1

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