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PRECISION INTERNATIONAL

ATRA AUTOMATIC TRANSMISSION REBUILDERS ASSOCIATION

Raybestos® POWERTRAIN

GEARS FOR THE TRANSMISSION REBUILDING INDUSTRY

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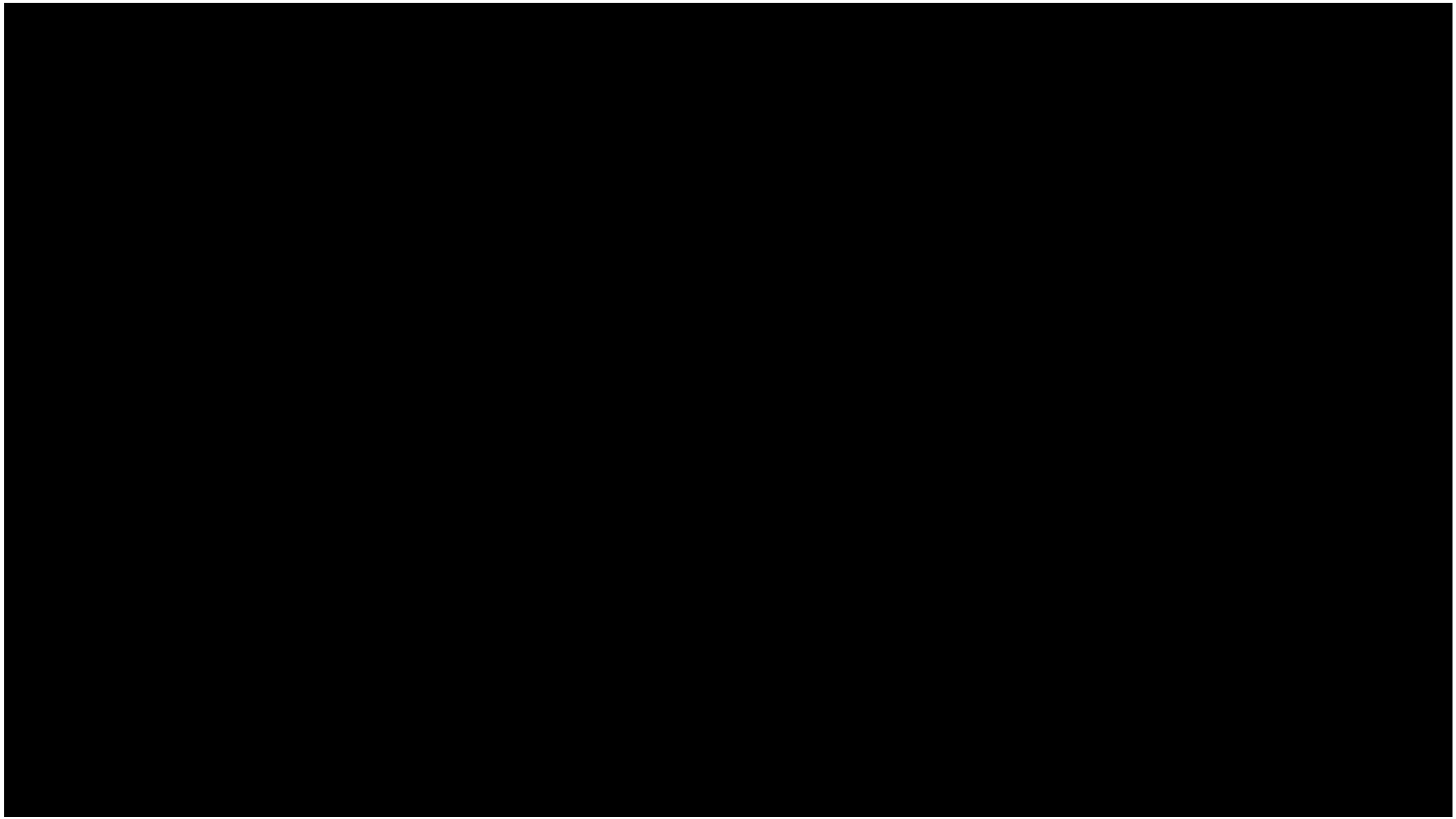


A6MF1/2/3 and A6LF1/2 Rebuild

Kia and Hyundai

6 Speed Front Wheel Drive

Presented by: Jarad Warren

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

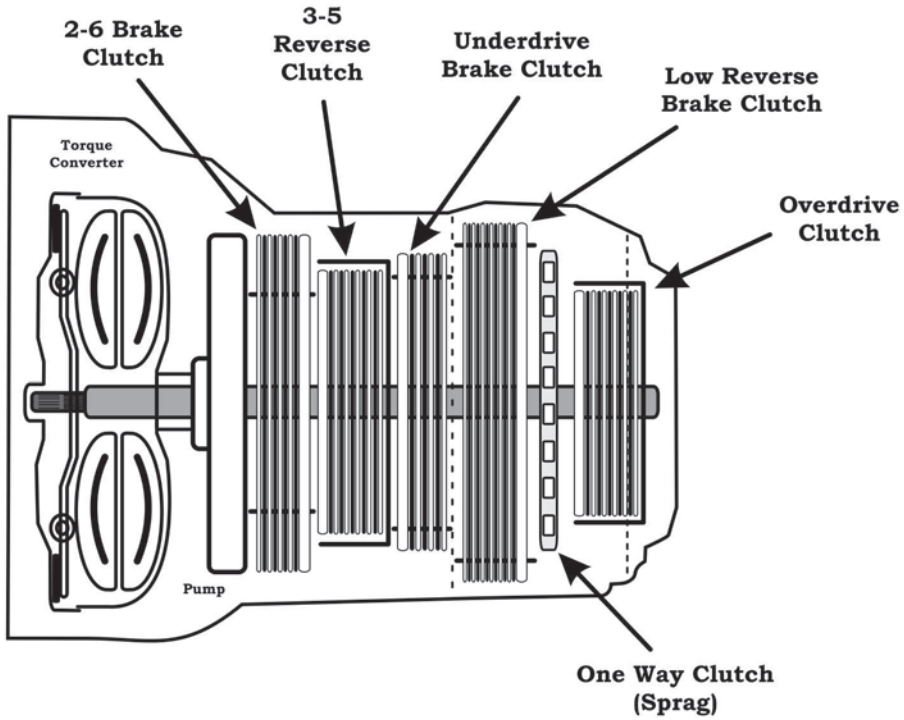
Vehicle Application Guide

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

Clutch Apply Chart

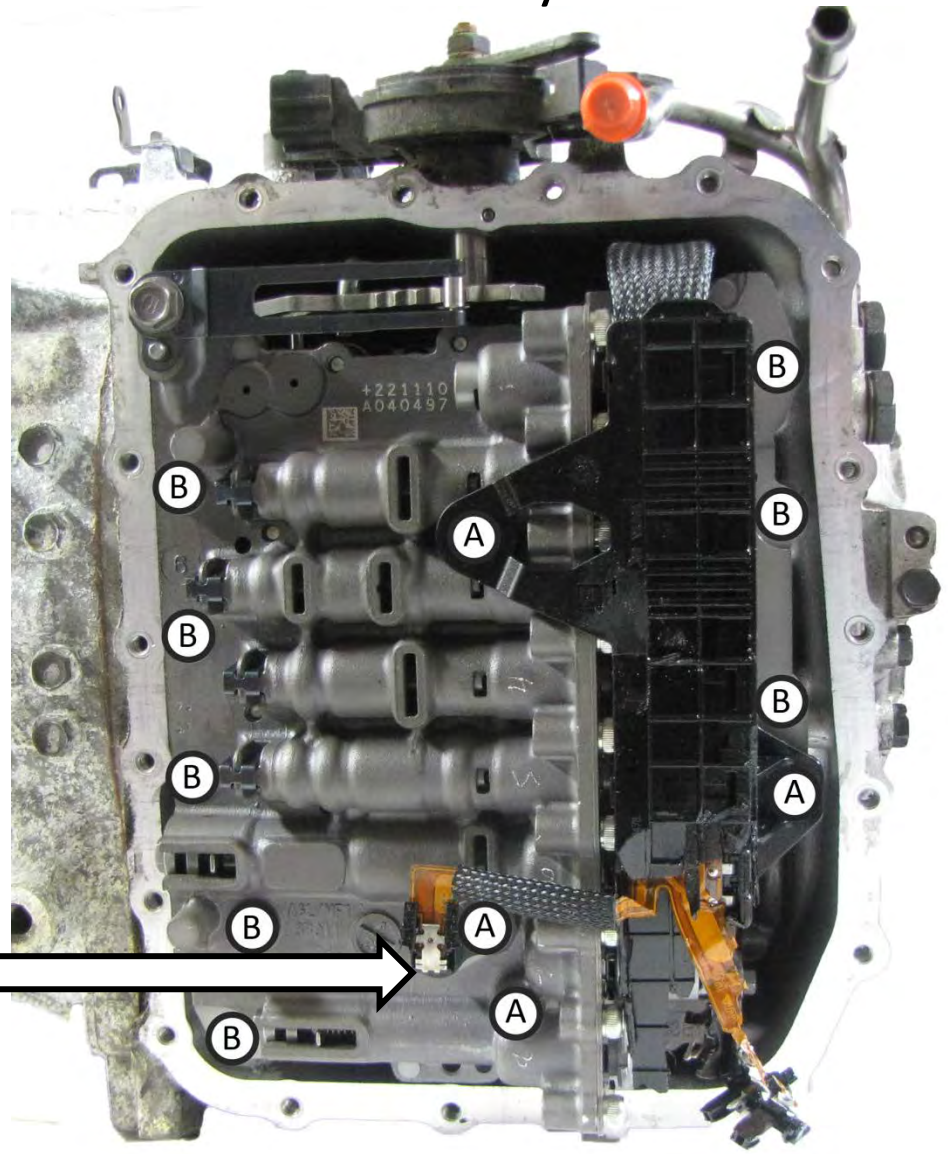
We did an introduction webinar for the A6MF1 in February 2018. The webinar is on the website and has some great info. We talked about components locations, sensor operation, solenoid function and more.



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					

Valve Body Removal

Valve body bolts torque 7.2-8.7 lb-ft

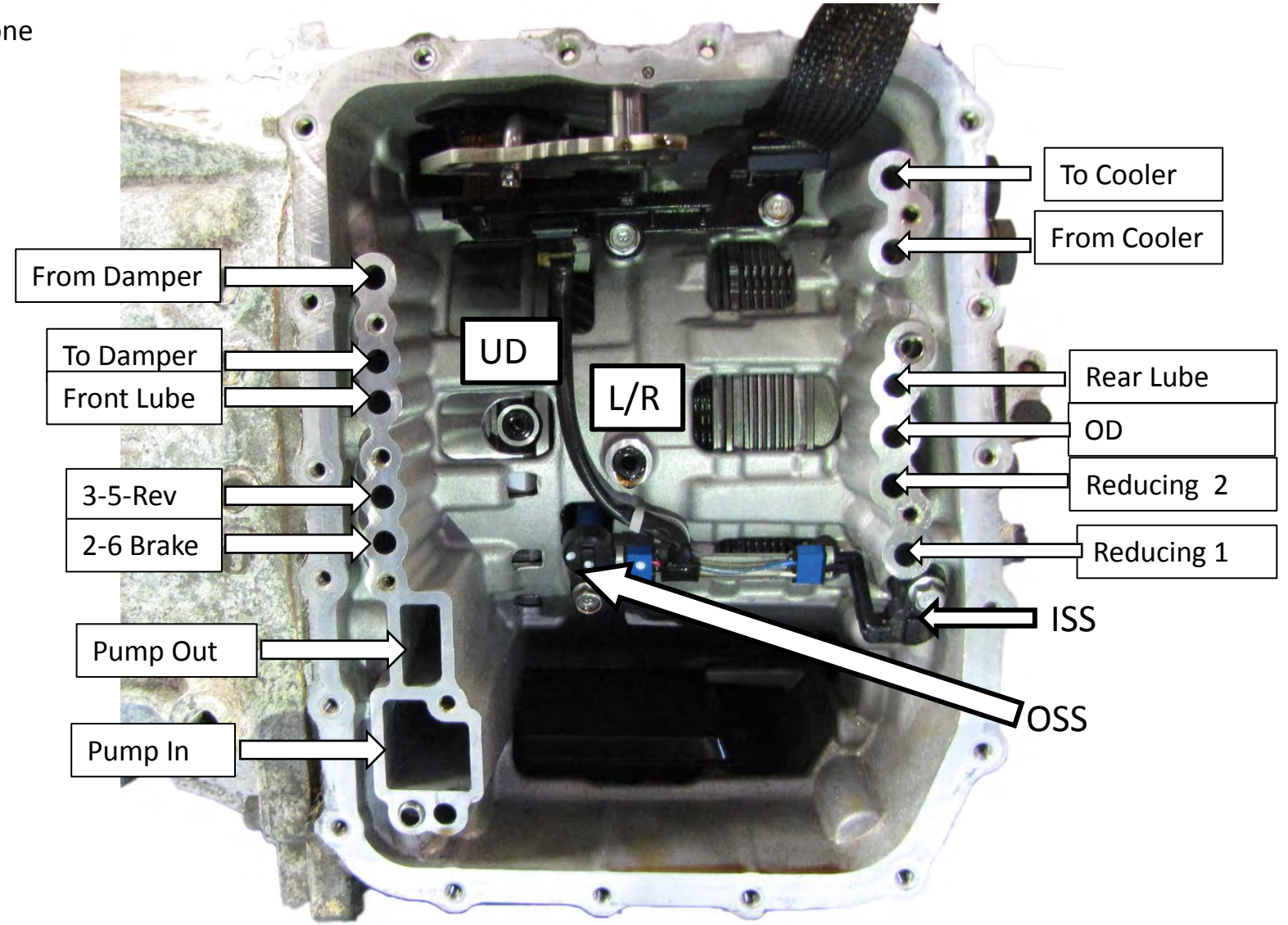


The Temperature Sensor on the old style harness disconnects from harness. The updated harness has the temperature sensor that is part of the harness. We recommend to always update the harness.

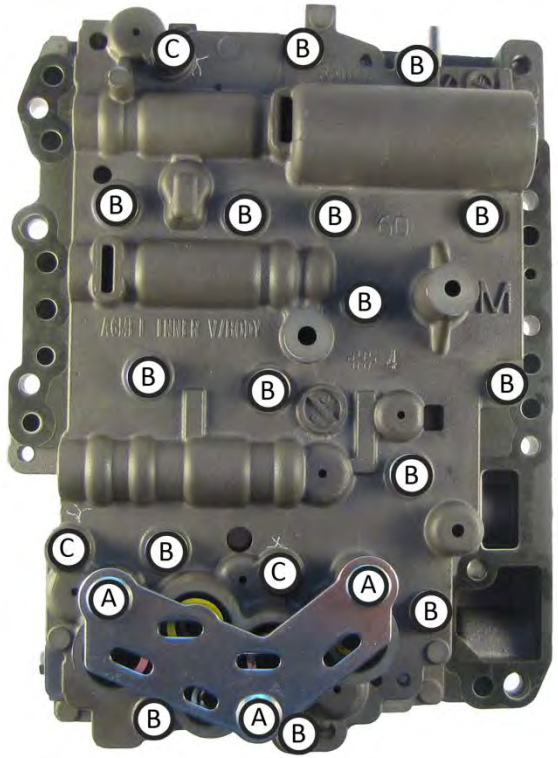
After removing the valve body cover, you will first take out the bolts labeled “A”. Unplug harness from solenoids and move it out of the way. Next remove bolts labeled “B” and this will allow you to remove the valve body.

Case Passages

Air test should be done with around 35 PSI.

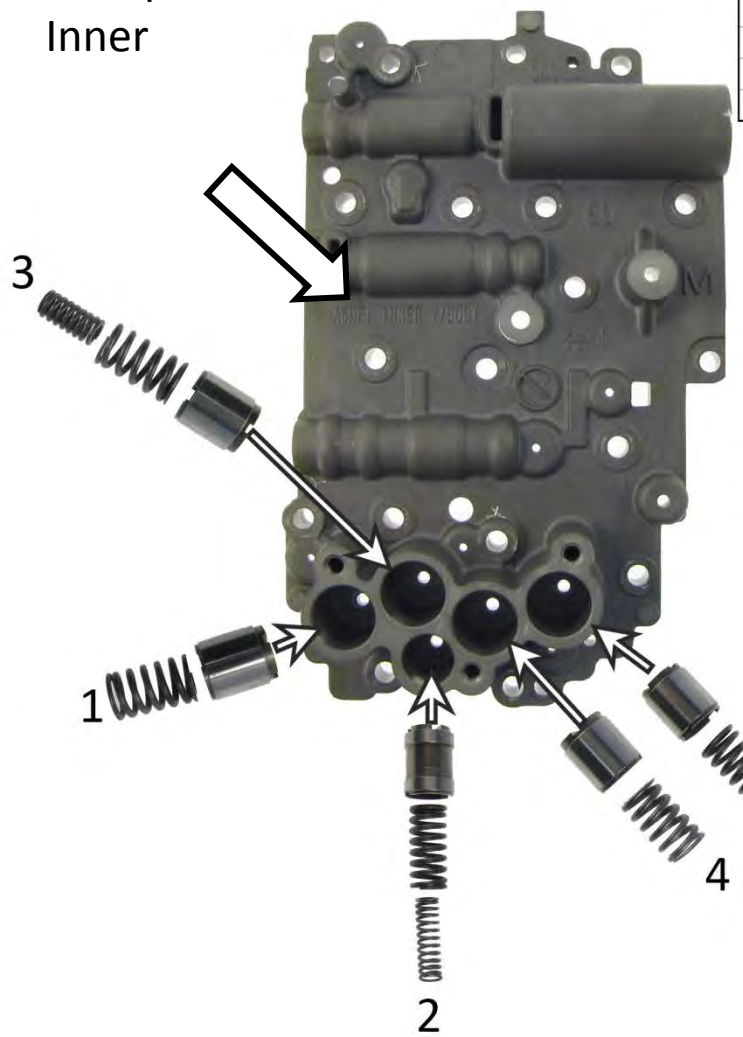


Valve Body Inner Section



Stamped A6MF1
Inner

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



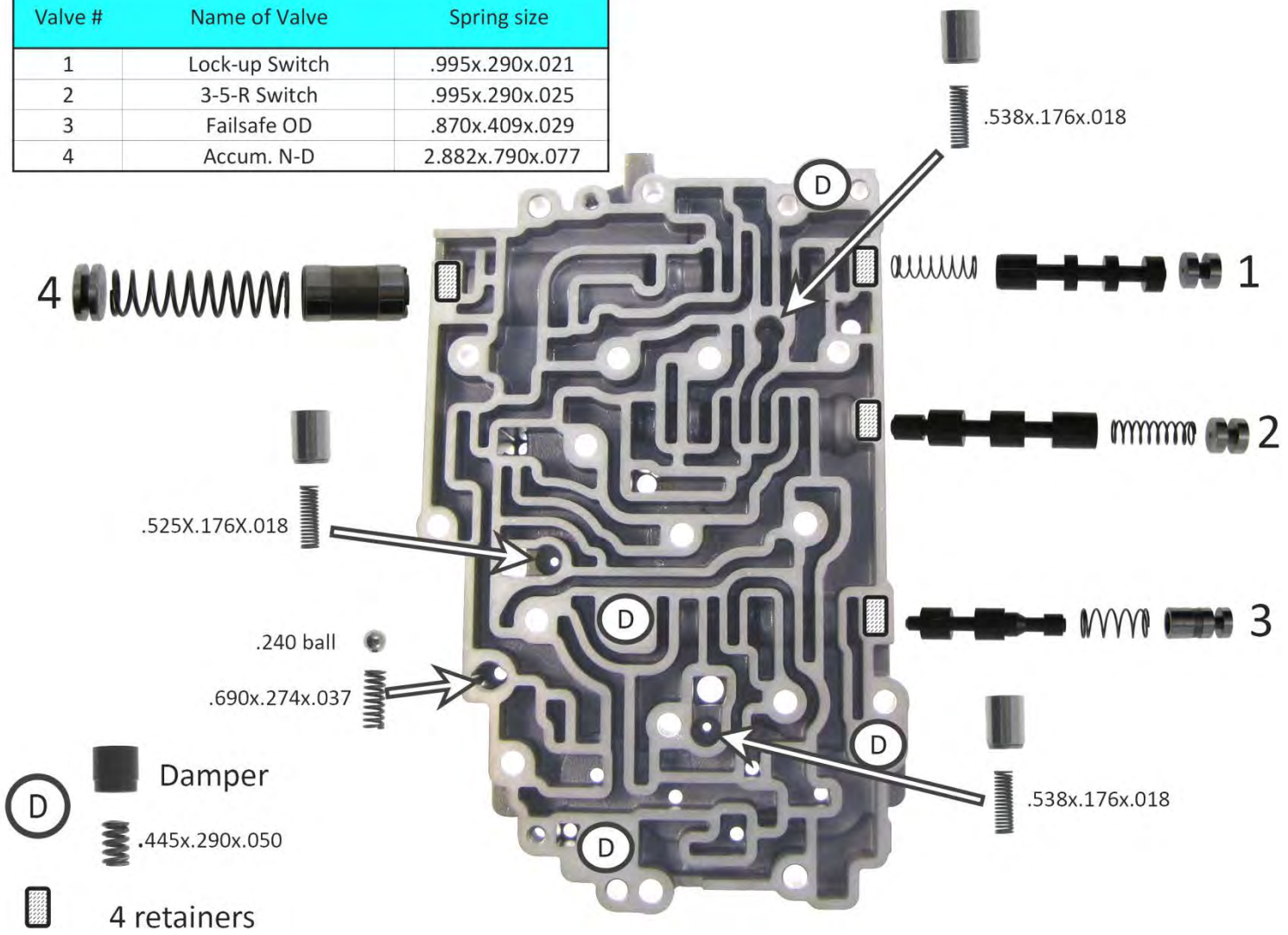

Ⓐ 1” Long


Ⓑ 1.4” Long

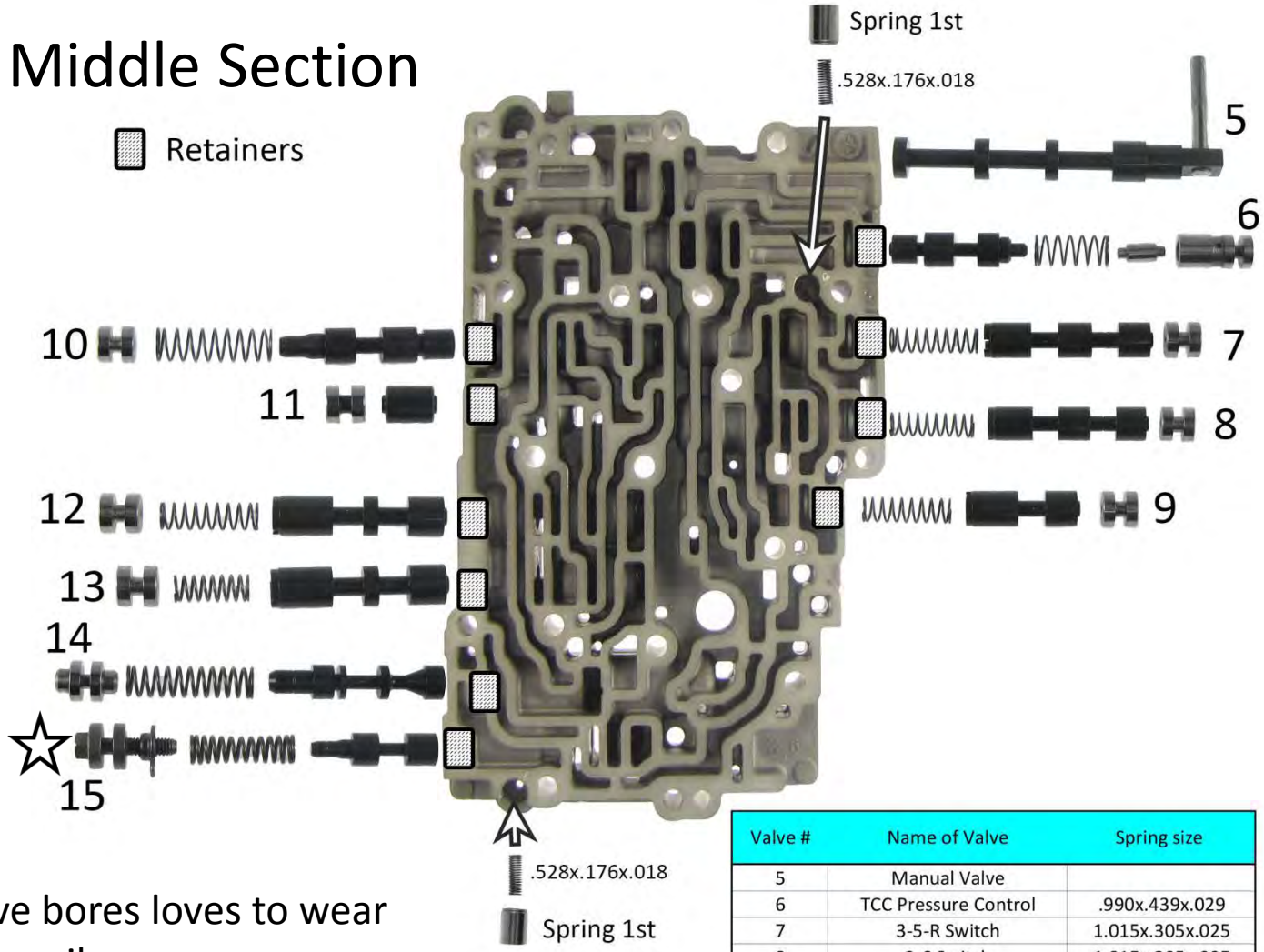

Ⓒ 1.6” Long

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



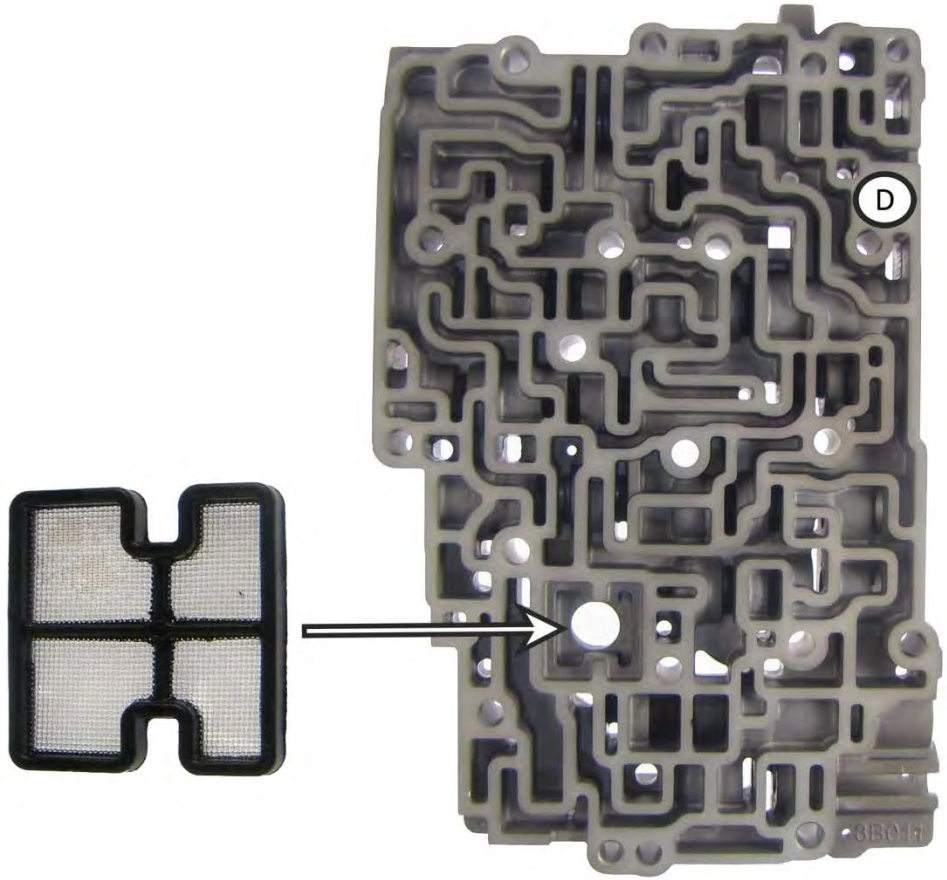
Valve #	Name of Valve	Spring size
5	Manual Valve	
6	TCC Pressure Control	.990x.439x.029
7	3-5-R Switch	1.015x.305x.025
8	2-6 Switch	1.015x.305x.025
9	UD Switch	1.022x.308x.025
10	Low - Rev Switch	1.330x.404x.028
11	3-5-R & 2-6 Clutch Switch	No spring
12	OD Switch	1.017x.305x.025
13	OD & Low - Rev Switch	.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.

Valve Body Middle Section



.445x.290x.050

Valve Body Outside Section

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.

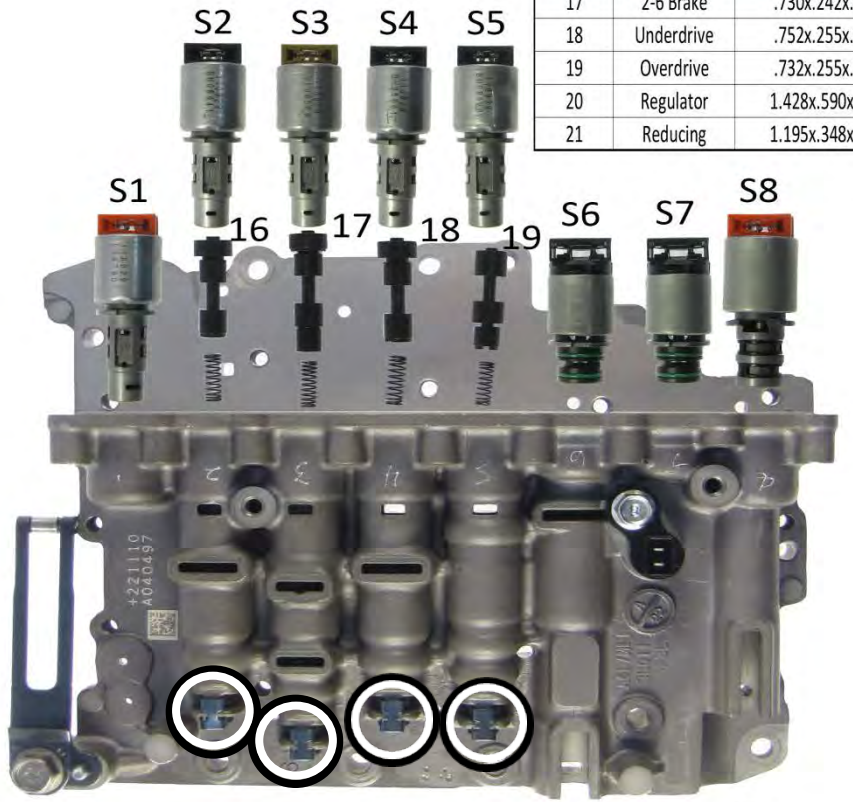
The on/off solenoid resistance is 10-11 Ohms.

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

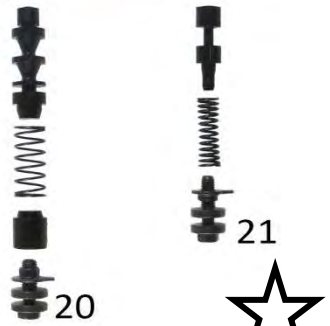
Transgo has a new kit out for the A6MF/LF series.

Sonnax also has their tools and valves.

Valve #	Name	Sping 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



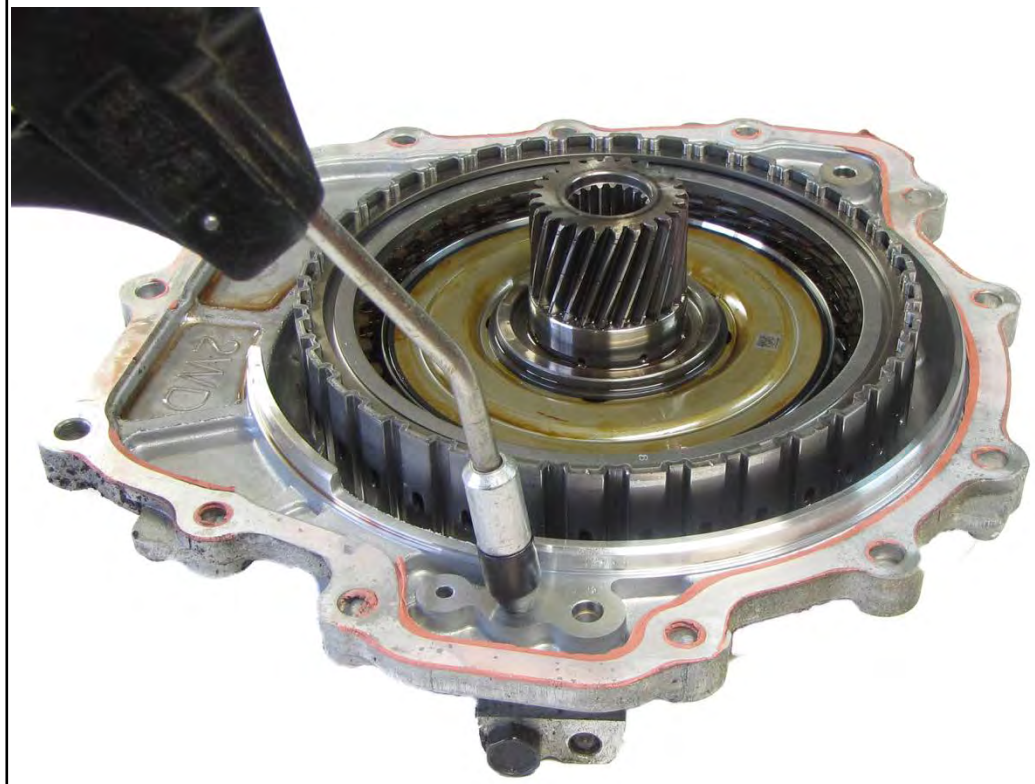
S #	Solenoid Name	Type
S1	TCC	N/L
S2	3-5-Reverse	N/H
S3	2-6 Brake	N/L
S4	Underdrive	N/H
S5	Overdrive	N/H
S6	Shift B	on/off
S7	Shift A	on/off
S8	Line Pressure	N/H



Rear Cover / OD Drum

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”

Overdrive Clutch Drum

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

5 clutches, 5 steels

Measured clutch clearance .052”

Has a molded balance piston.

Snap Ring .090”

Pressure Plate .113”

Spring Retainer

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

Piston

Two seals

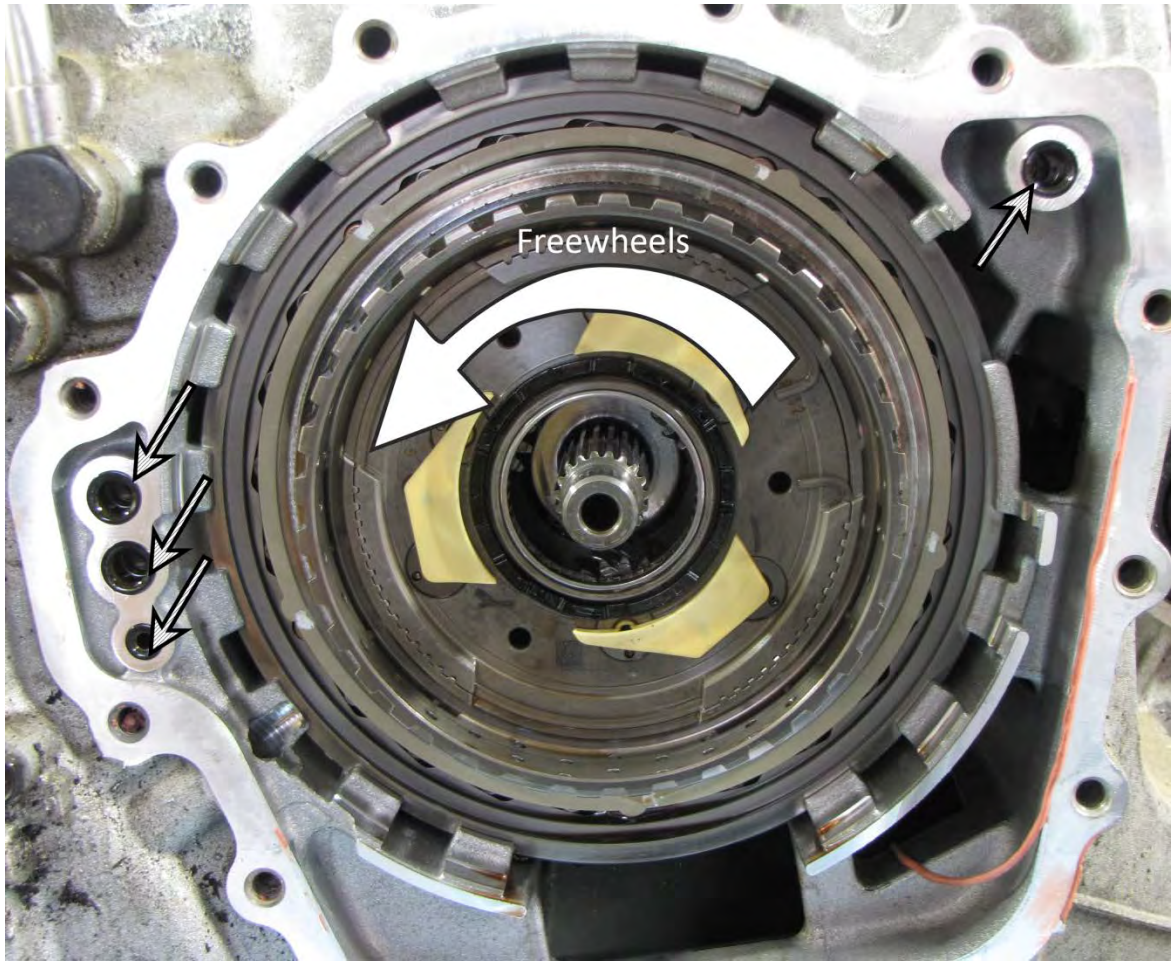
A6MF1 Overdrive Snap Ring Part Numbers

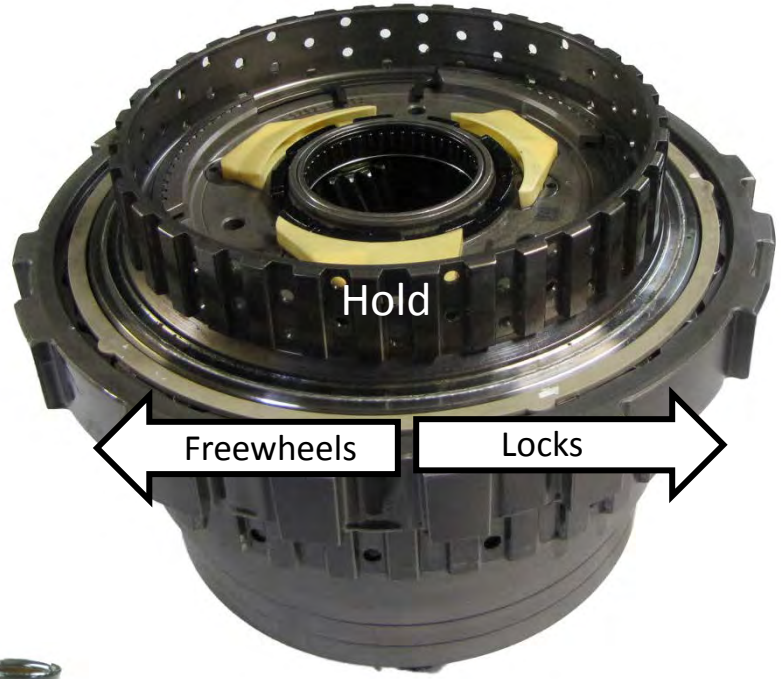
Part No.	Thickness[mm(in.)]
45552-3B617	1.7 ± 0.5 (0.0669 ± 0.0197)
45552-3B619	1.9 ± 0.5 (0.0748 ± 0.0197)
45552-3B621	2.1 ± 0.5 (0.0827 ± 0.0197)
45552-3B623	2.3 ± 0.5 (0.0906 ± 0.0197)
45552-3B625	2.5 ± 0.5 (0.0984 ± 0.0197)
45552-3B627	2.7 ± 0.5 (0.1063 ± 0.0197)
45552-3B629	2.9 ± 0.5 (0.1142 ± 0.0197)

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.

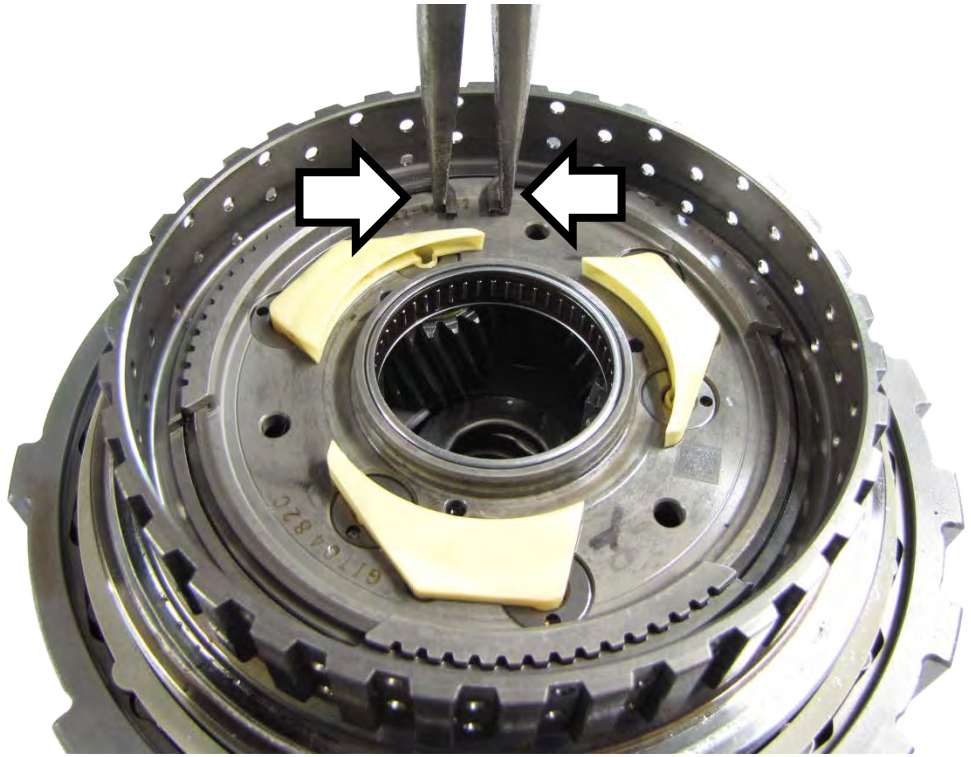




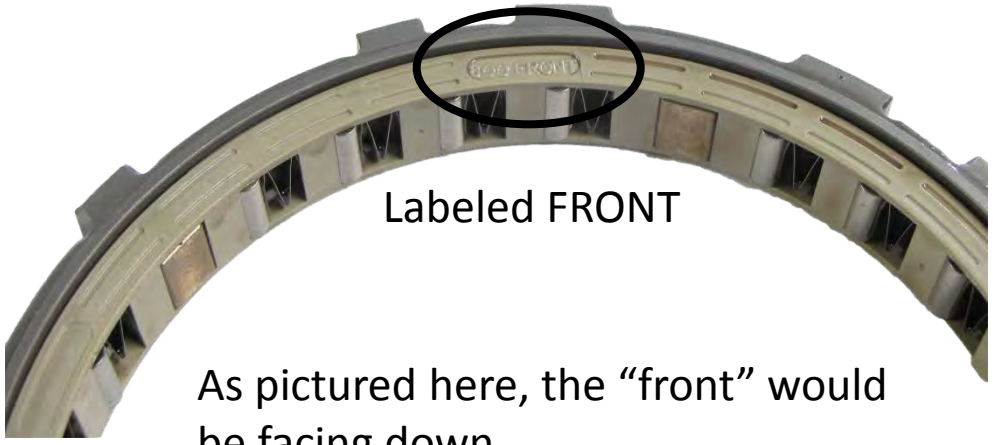
Large seals .400” Tall .460” Wide

1 Small seal .410” Tall .315” Wide

Gear Train



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.

Gear Train

3 Tab Washer
(Selective)

Snap ring
.098”

Remove outer snap ring to get gear train apart.

Gear Train End Play

End play .003”-.015”

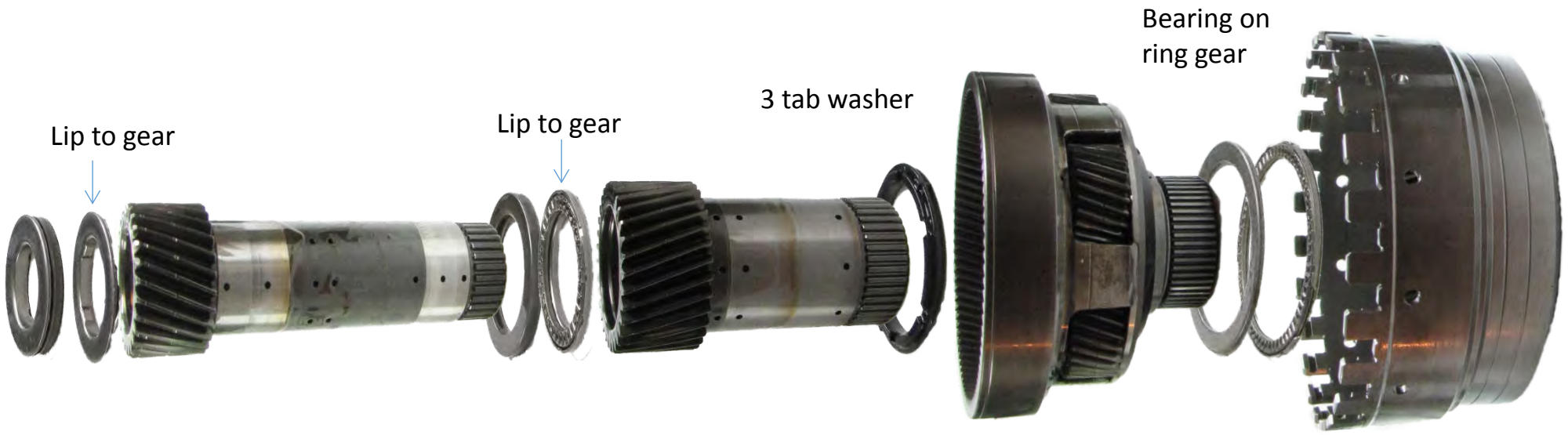
Part No.	Thickness[mm(in.)]
45729-26030	3.0 ± 0.5 (0.1181 ± 0.0197)
45729-26032	3.2 ± 0.5 (0.1260 ± 0.0197)
45729-26034	3.4 ± 0.5 (0.1339 ± 0.0197)
45729-26036	3.6 ± 0.5 (0.1417 ± 0.0197)
45729-26038	3.8 ± 0.5 (0.1496 ± 0.0197)
45729-26040	4.0 ± 0.5 (0.1575 ± 0.0197)
45729-26042	4.2 ± 0.5 (0.1654 ± 0.0197)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

Gear Train

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

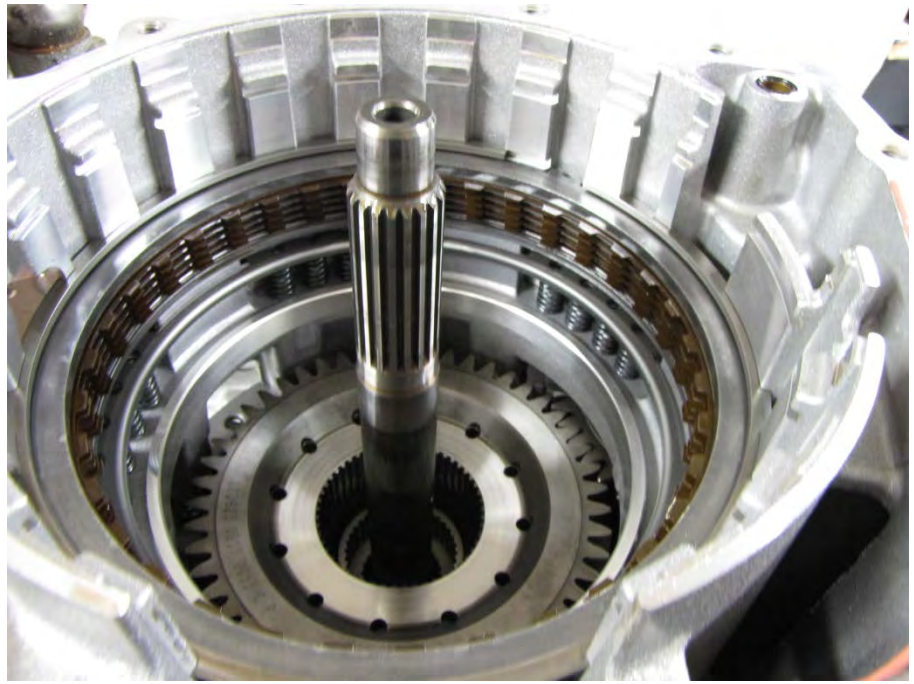
Inspect the planet teeth and the bearings for wear. Inspect the thrust washer.

Gear Train


Lip to gear
Lip to gear
3 tab washer
Bearing on ring gear
Sun Gear
Sun Gear
Planet
Ring Gear

Low Reverse Brake

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

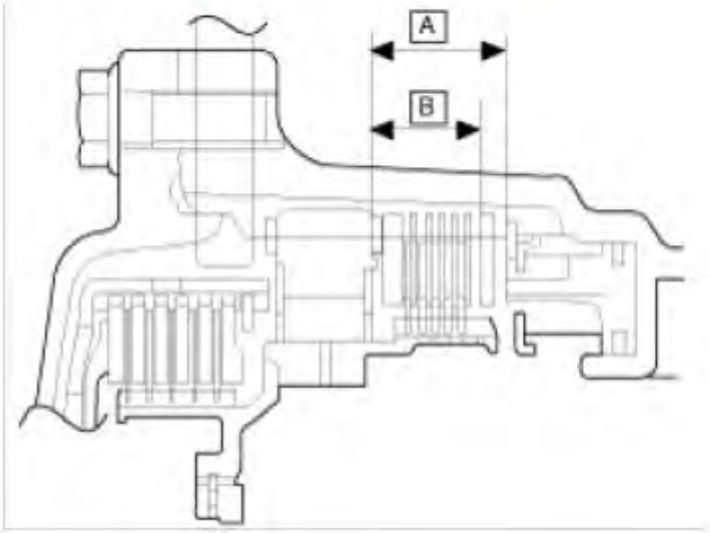
Low & Reverse Clearance

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 (350 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

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

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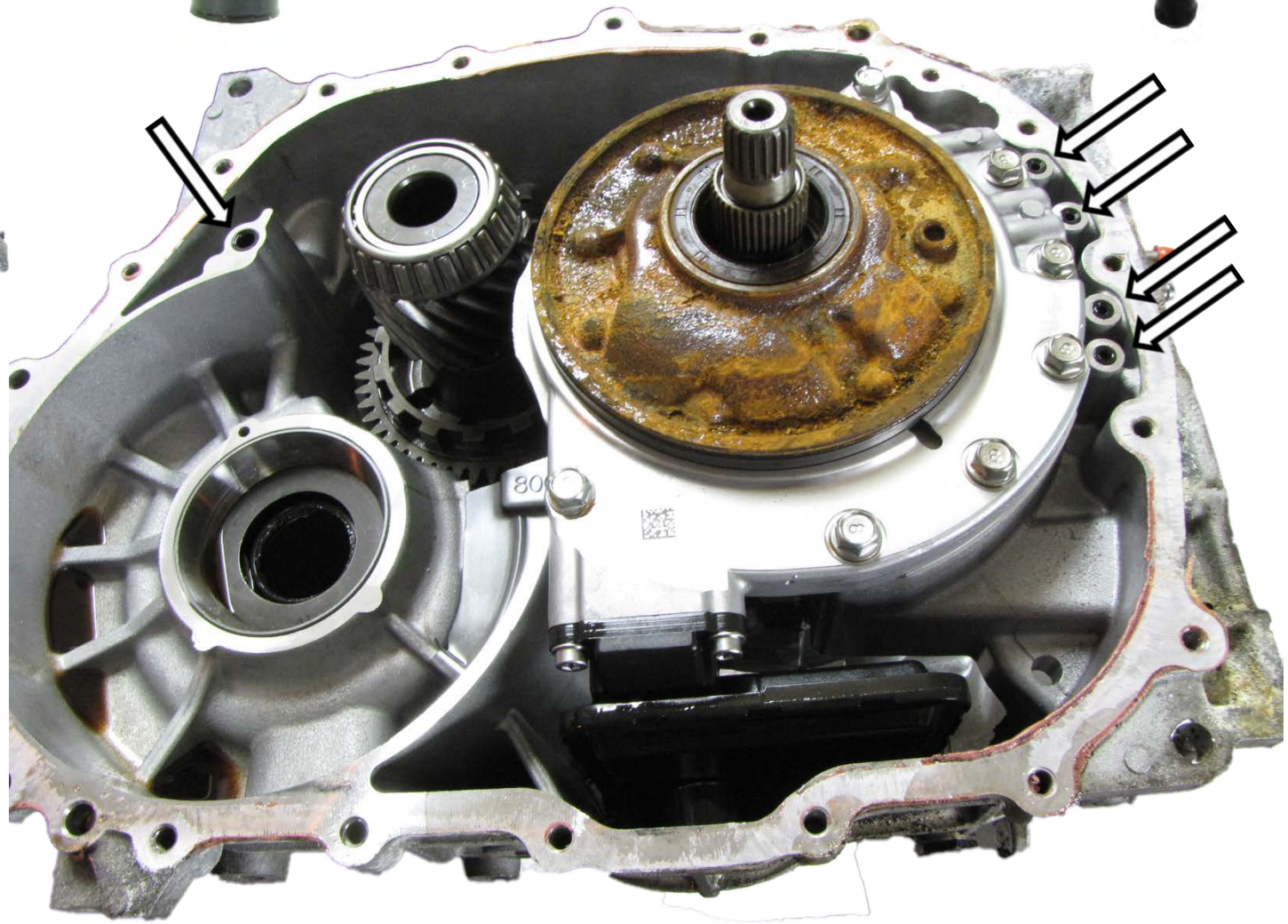
Case bolt torque 20-22 ft./lbs.

Differential and Case Seals

Two seals inside spider gears shafts.

.400” Tall .460” Wide

.410” Tall .315” Wide



Pump

Filter bolt torque 7.2-8.7lb/ft.

3 tab washer on pump. Check seal rings.

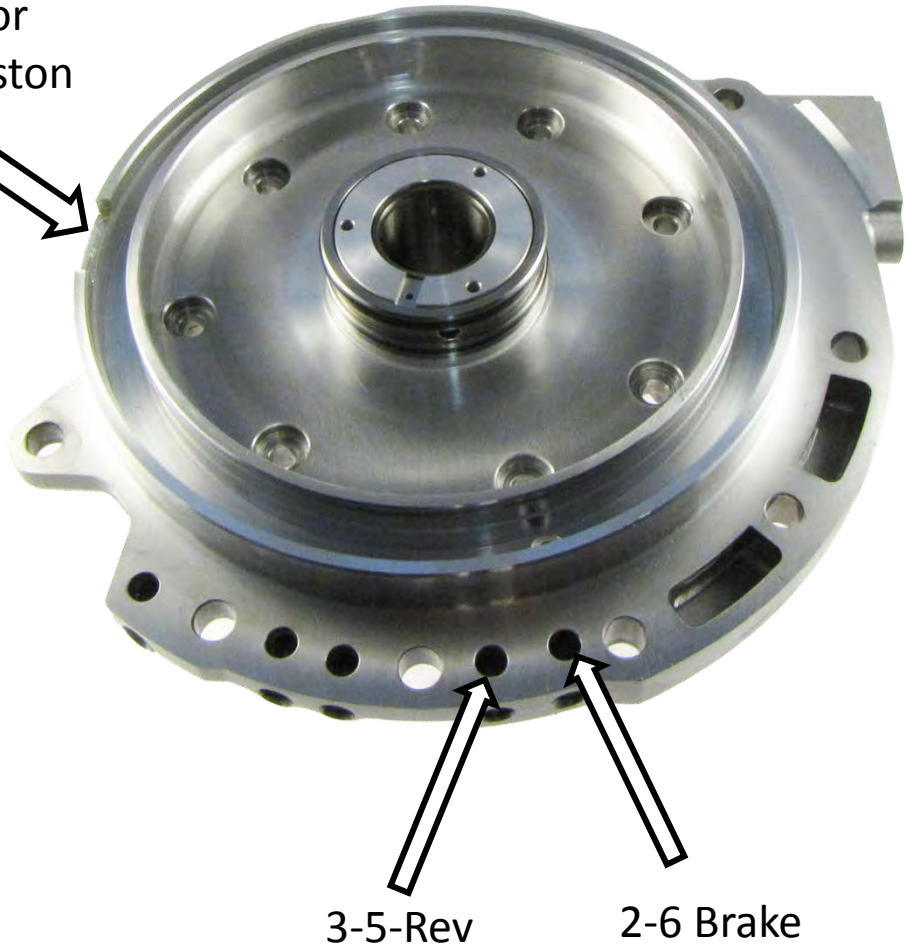
Pump

Check front bushing

Check pump surface

Pump to case torque 14.5-18.1lb/ft.

Cut out for
tab on piston



Pump

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

Snap Ring .060”

Ring .062”

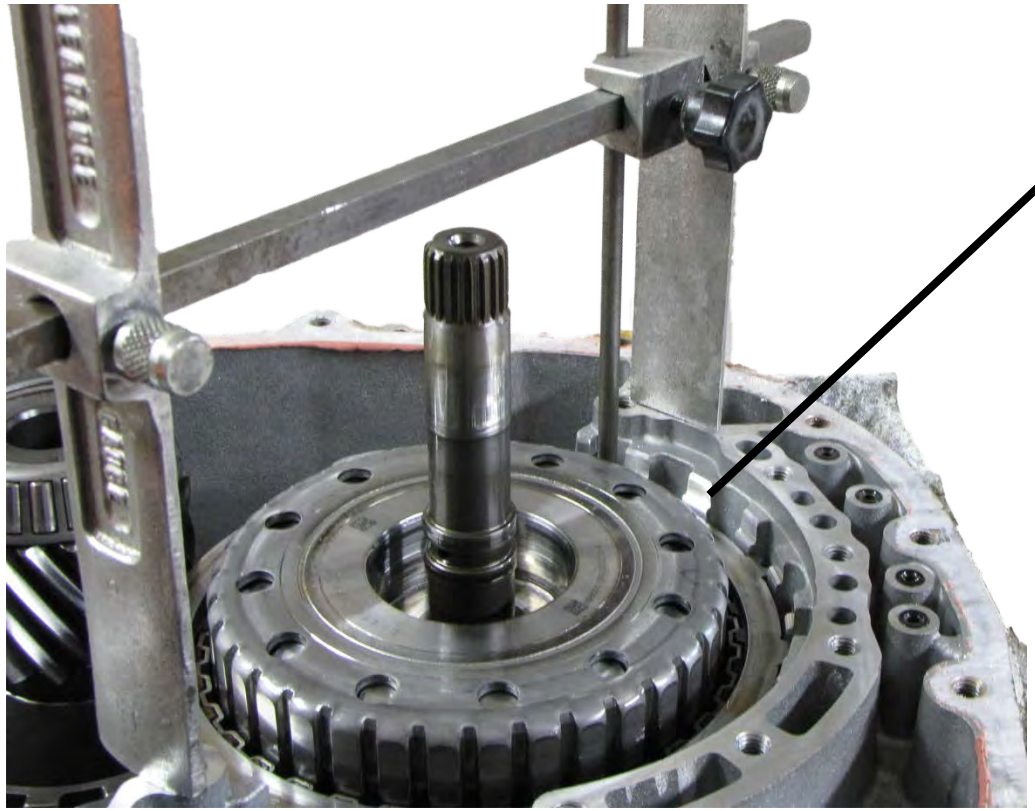
Waved spring

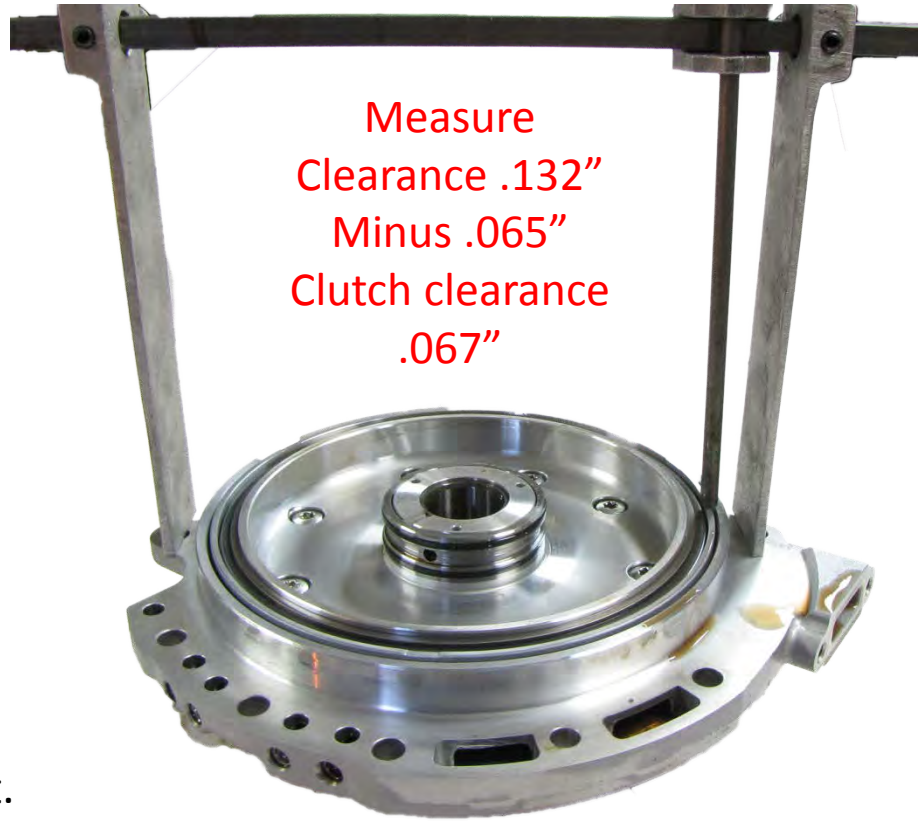
Piston

Tab on piston goes in the slot.

2-6 Brake

Remove the waved cushion 1st! 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.

Cushion .065”

Apply Plate .096”

4 Clutches .070”
3 Steels .156”

Selective

Pressure Plate .100”
Step down

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”

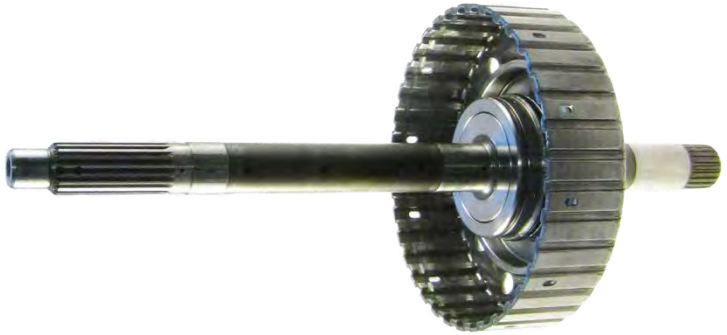
Hubs and Washers

Underdrive Clutch Hub

2 Tab Thrust Washer

2-6 Clutch & 3-5-R Hub

Thrust Bearing

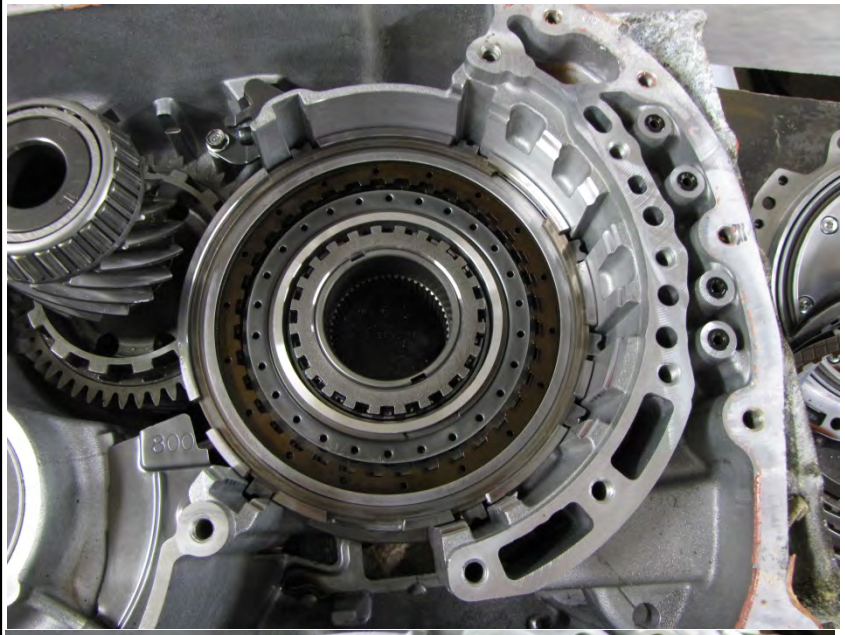


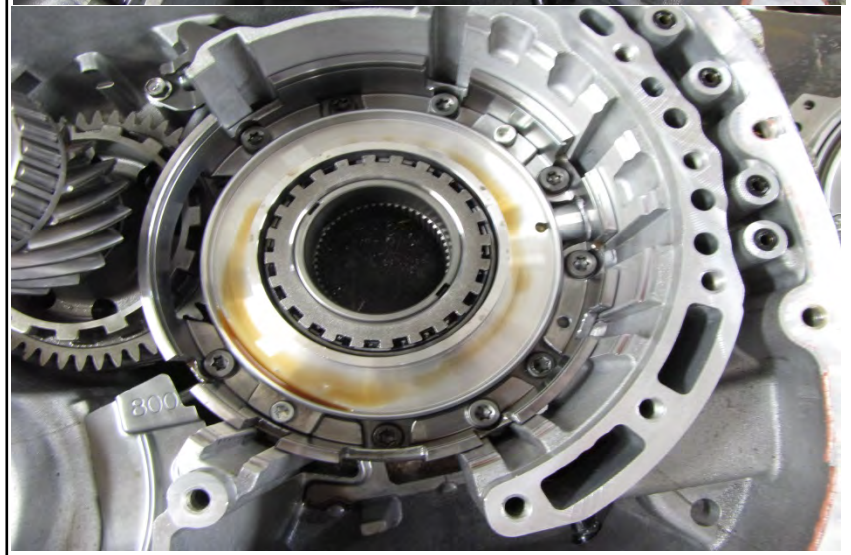
3-5-Rev Drum

Underdrive Clutch

UD Clearance .025”-.037”

Measured clearance .030”





Snap Ring .082”
Selective

Pressure Plate .098”

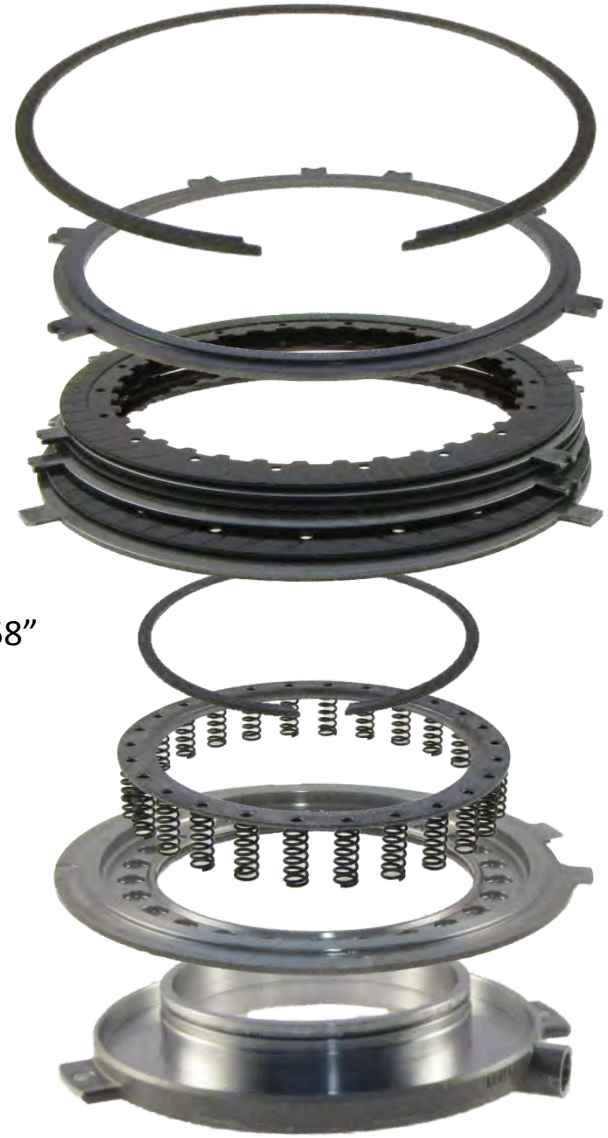
3 Clutches .065”
3 Steels .078”

Retainer Snap Ring .058”

Spring Retainer

Piston

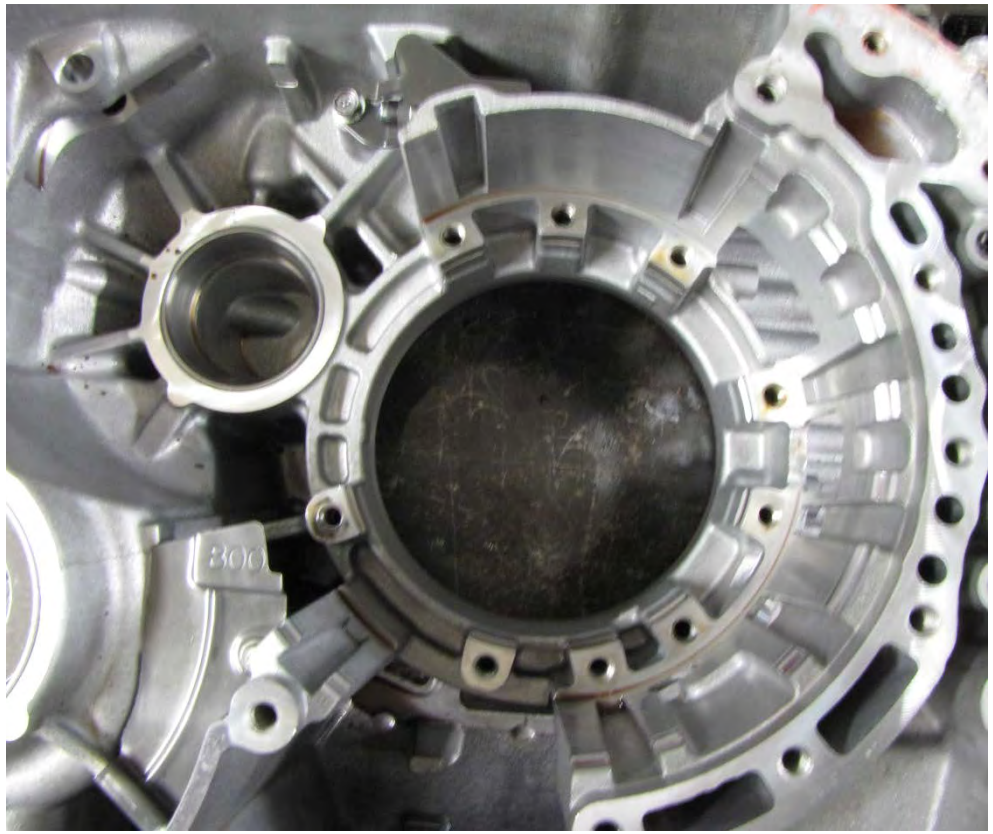
Piston Housing
Note: Issues with rough surface causing seal to wear.



UD Housing bolt torque 3.6-7.2 LB/ft.

Transfer Gear

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



Transfer Gear Disassembly

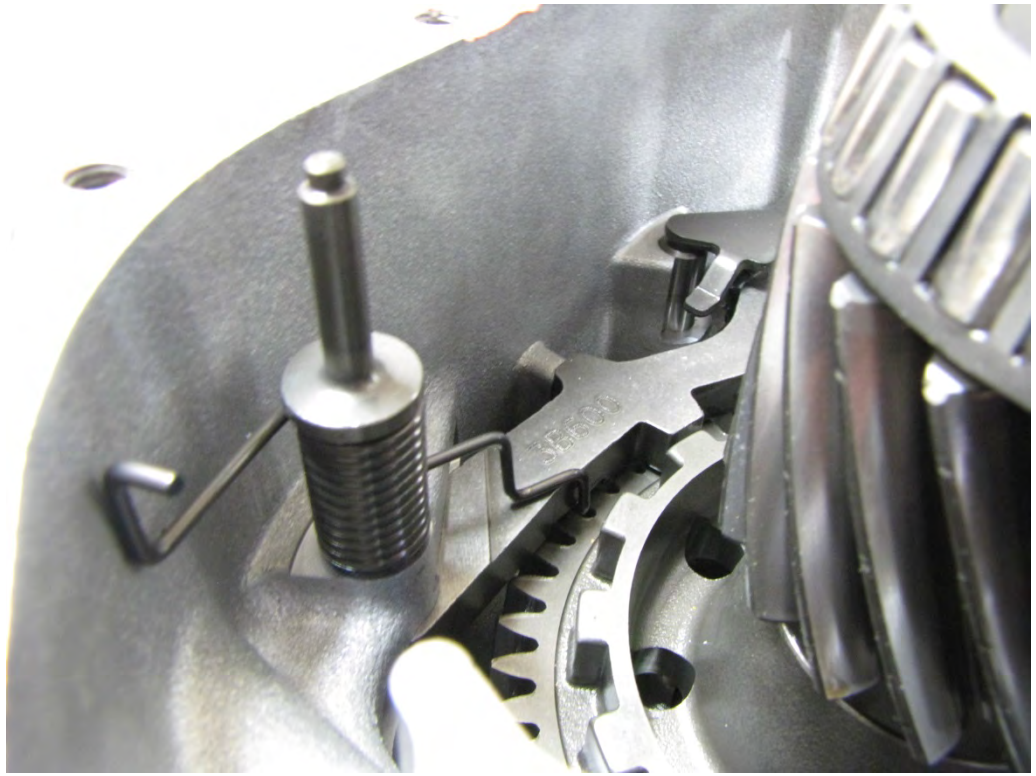
Kia part number for nut removal tool
A6MF1 09457-26300
A6MF2 09453-3L220
I found online for $65-$85. This tool would make the job easier.

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.

Transfer Gear and Park Pawl



Differential

Spider Gear Seals

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

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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