65-66-68RFE Comparison

2012 – 2014 6 Speed

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65-66-68RFE

Rear Wheel Drive Full Electronic

- In June of 1998 Chrysler introduced the 45RFE in the 1999 WJ Jeep Grand Cherokee.
- In 2001 the 545RFE arrived and was the base that created the following three 6 speed transmissions.
- In 2006 the 68RFE derived from the 545RFE behind the 6.7L Cummins diesel.
- In 2012 the 65RFE arrived in the V8 Ram 1500, Durango and Grand Cherokee.
- In 2012 the 66RFE also appeared utilizing all six forward gears in the Heavy Duty vehicles.

The 66RFE can be identified by the label on the transmission case. The label contains the part number as well as the build sequence.

The part number and build sequence are also stamped into the case below the label.

The 545RFE was recalibrated in 2012 and introduced as the 65RFE in the Ram 1500, Durango & Jeep V8 models with an improved torque converter. Physically it's the same as the 545RFE.

The key difference is the ability to use all six forward gears in sequence when using Electronic Range Select mode (ERS).

This shifter design is the same as the one used in the NAG1 Chrysler applications available in WK models in the later part of 2005.

The Electronic Range Select (ERS) shifter allows the driver to select the desired top gear range providing more control.

The shifters share a common base assembly.

Since there are different strategies used to control these transmissions, some of the components inside the shifter assembly are different.

In the normal drive position, the 65RFE uses the same shift pattern as the 545RFE. Never using 2nd and 3rd gears in succession.

The 2500 and 3500 model trucks with the V8 gas engines received the 66RFE, a clone of some of the 68RFE internal components (including the gear set & ratios) packaged in a 545RFE case.

The 68RFE has the same torque capacity as the Aisin AS68RC in Ram heavy duty pickups.

The AS68RC case provides the capability to mount a power take off (PTO) the 68RFE does not. The AS68RC also has a steeper first gear for better power on take off with the same sixth gear ratio.

Gear Ratios

Gear	545RFE 65RFE	AS68RC	66RFE 68RFE
1	3.00	3.74	3.23
2	1.67	1.96	1.84
3**	1.50	1.34	1.41
4	1.00	1.00	1.00
5	.075	0.77	0.816
6	0.67	0.63	0.625
Reverse	3.00 or 2.21	3.54	4.445

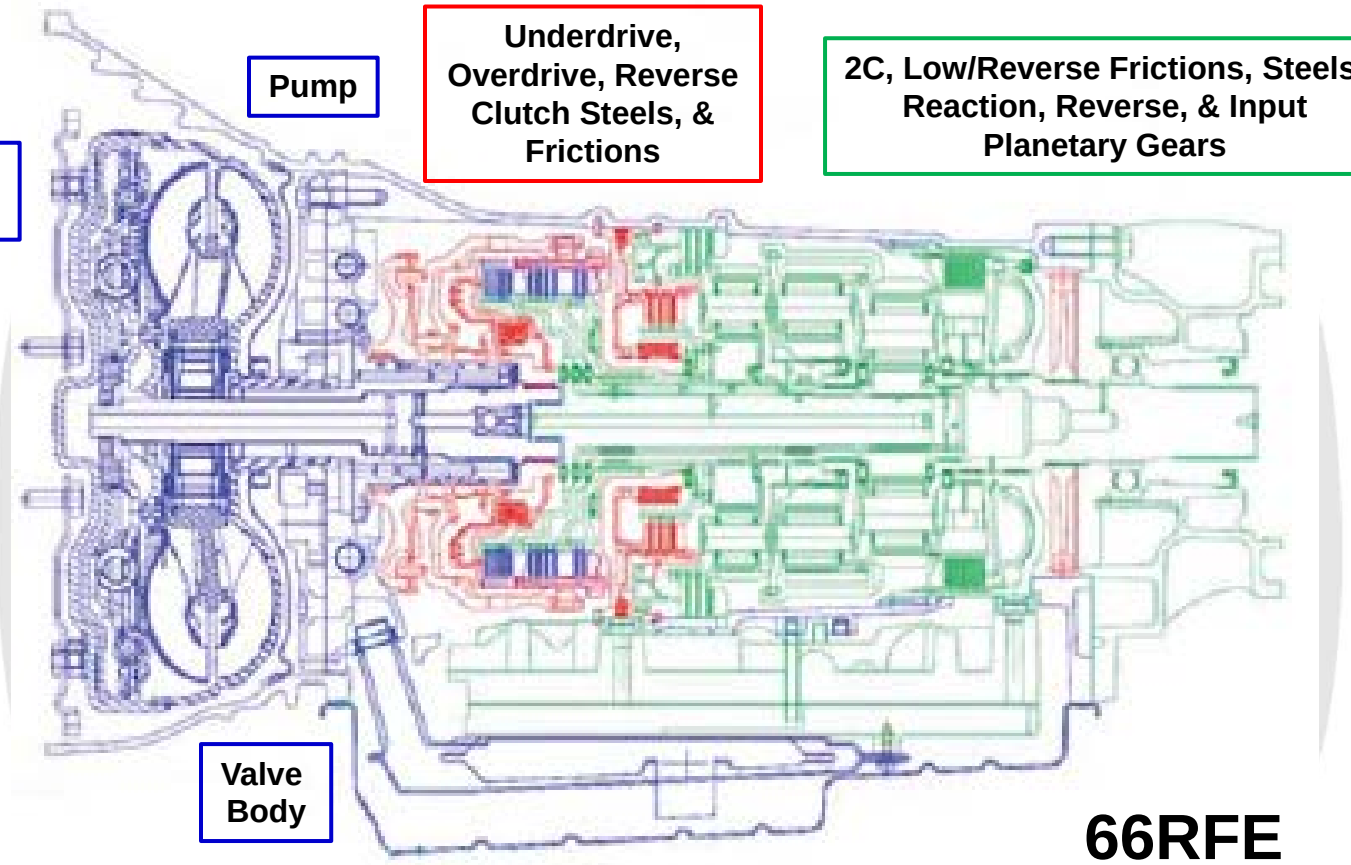
** On 545/65: "2 prime" normally unused.

The 66RFE derives some of its components from the 545RFE and others from the 68RFE.

The components carried over from the 545RFE are mainly in the front end of the transmission. These include the torque converter, pump, underdrive, overdrive, and reverse clutch steel plates and friction discs.

The valve body is also derived from the 545RFE.

Most of the other components are found further back in the case of the 68RFE. These include the 2C, low/reverse friction discs, steel plates, the reaction, reverse, and input planetary gear sets.



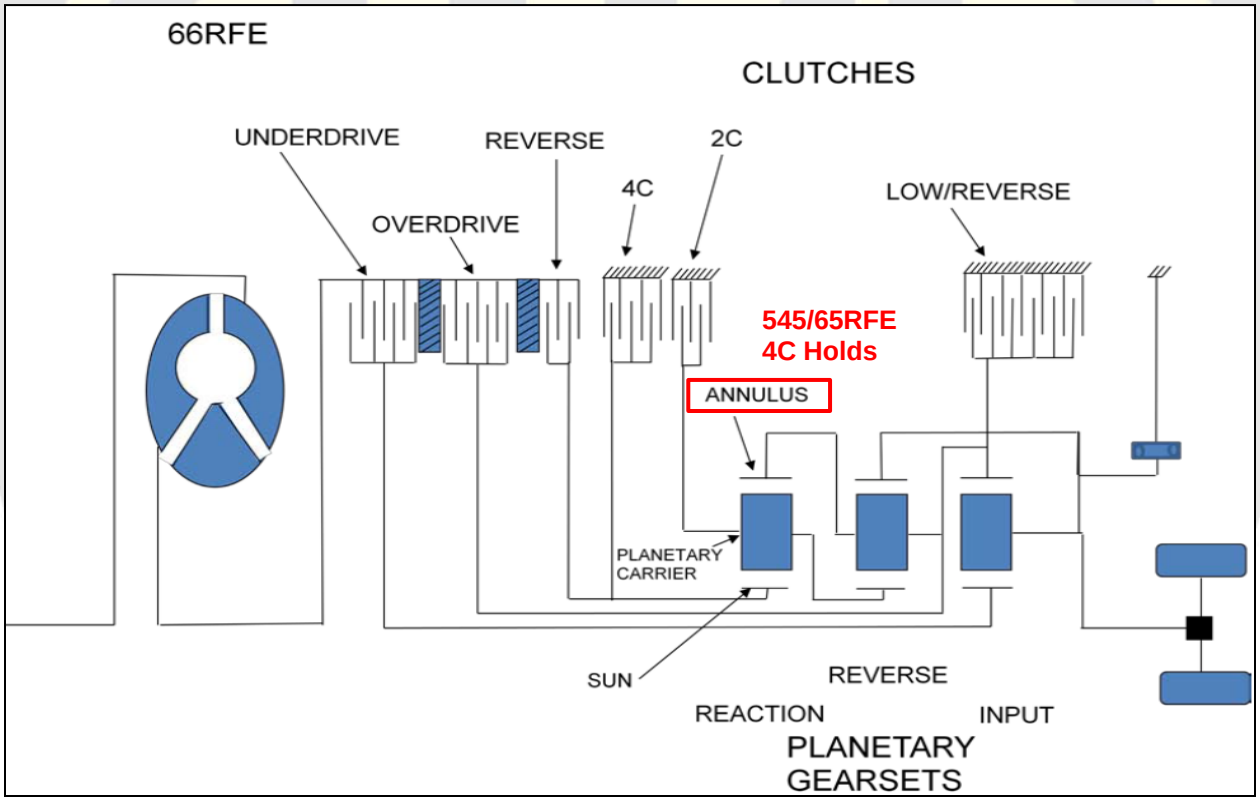
66RFE

Blue – Carry over 545RFE Parts
Green –Carry over 68RFE Parts
Red – Common 545RFE, 66RFE, and 68RFE Parts

66RFE operates closer to the 68RFE than to the 545RFE.

The gear train is identical to the one in the 68RFE.

Specifically, the connections to the reaction sun gear and reaction ring gear have been swapped, compared to the 545RFE.



The 66RFE like the 68RFE is designed to allow for full time 6 speed.

On the 66RFE & 68RFE the 4C holds the sun gear causing the ring gear to be driven by the planetary.

The 4C clutch on the 545RFE & 65RFE holds the ring gear as the planet is driven by a sun gear.

66RFE & 68RFE

545RFE 65RFE

Component Connection

66RFE & 68RFE

Shift Lever Position	Gear	Applied Driving Clutch	Driven Planetary Member	Applied Holding Clutch	Held Planetary Member
P	Park			L/R	Input Annulus
R	Reverse	Reverse	Reaction Sun	L/R	Input Annulus
N	Neutral			L/R	Input Annulus
D	First	UD	Input Sun Gear	L/R and Overrunning Clutch	Input Annulus
	Second	UD	Input Sun Gear	2C	Reverse Sun Gear
	Third	UD	Input Sun Gear	4C	Reaction Sun Gear
	Fourth	UD/OD	Input Sun Gear/Input Annulus		
	Fifth	OD	Reverse Carrier/Reaction Annulus	4C	Reaction Sun Gear
	Sixth	OD	Reverse Carrier	2C	Reverse Sun Gear
	Limp-in (4^{th})	UD/OD	Input Sun Gear/Input Annulus		

545/65RFE 4C Holds Input Ring Gear in 2^{nd} Prime & 4th

Component Application

SLP	545RFE/65RFE		68RFE/66RFE		Clutches Applied						
					Driving			Holding			
	Gear	Ratio	Gear	Ratio	UD	OD	REV	2C	4C	L/R	ORC
P	Park		Park							A	N/A
R	Reverse	3.00:1	Reverse	4.44:1			A			A	N/A
N	Neutral		Neutral							A	N/A
D	1st	3.00:1	1st	3.23:1	A					A*	H
	2nd	1.67:1	2nd	1.837:1	A			A			OR
	2nd Prime	1.50:1	3rd	1.41:1	A				A		OR
	3rd	1.00:1	4th	1.00:1	A	A					OR
	4th	0.75:1	5th	0.816:1		A			A		OR
	5th	0.67:1	6th	0.625:1		A		A			OR

*Low/Reverse clutch is on continuously in manual first gear. Otherwise, the L/R clutch is on in 1st gear until output speed reaches 150 rpm. On deceleration, with the gear selector in OD or manual 2, the L/R clutch is reapplied when output rpm reaches 100.

The 2nd prime is enabled to enhance vehicle performance by allowing for a higher passing gear ratio at highway speeds.

In the 2010 model year, all RFE transmissions use the filter that was previously used only for 4 wheel drive applications.

Another change for the 2010 model year is all of the RFE transmissions are now controlled by a TCM that is housed within the PCM in a single module.

The 66RFE's underdrive, overdrive, and reverse clutch discs are the same as those in the 545RFE.

The underdrive and overdrive hub/shaft are different. Because they are installed into a 68RFE type planetary gear set they are like the components on the 68RFE.

One way to distinguish between the two is that the 66 and 68RFE have only one set of splines on the overdrive shaft instead of the 545RFE's two.

66RFE

545RFE

On all RFE applications, the underdrive, overdrive, and reverse clutch assembly snap rings may look the same but they are not interchangeable.

When it comes to clutch clearance adjustments, there are some similarities and some differences between the three transmissions.

Underdrive clutch clearance is not adjustable on any of the transmissions.

Overdrive clutch clearance is different. It's adjustable on the 68RFE by way of a selectable overdrive/reverse pressure plate, but not on the 545RFE or 66RFE.

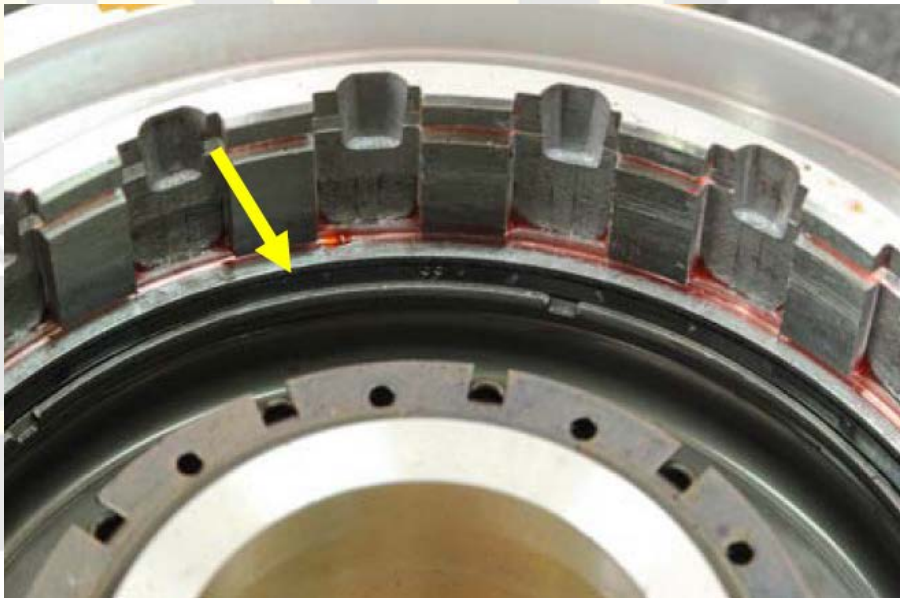
The reverse clutch clearance is adjustable on all three transmissions by way of a selectable snap ring.

There are two tapered snap rings with the input clutch assembly and that these are directional. The tapered side must face up.

Just as with the input clutch assembly, there are some similarities and differences between the 4C and 2C clutches on the three RFE transmissions.

Since the 4C clutch retainers are the same on all three transmissions, with the same number of clutch discs, 4C service features are the same as well.

On all of these transmissions, use care when installing the 4C piston to avoid damaging the outer lip seal.



On all three transmissions, 4C clutch clearance is adjustable by way of a selectable snap ring.

The 2C clutch on the 66 and 68RFE has one more disc than the 545RFE, and the 66 and 68RFE piston is shorter.

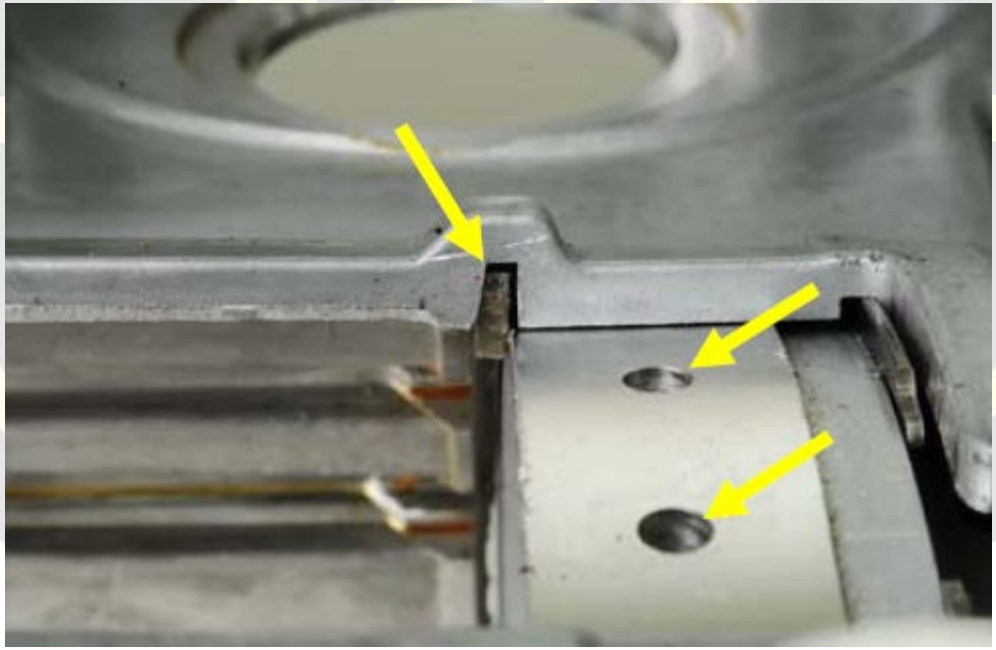
On all three applications, when assembling the 2C clutch, be sure the 2C reaction plate goes in first.

To measure 2C clutch clearance, you will need to temporarily install the 2C clutch and 4C bulkhead retainer in the case before installing other transmission parts.

The 2C clutch clearance is not adjustable so if the clearance is out of spec, you will need to replace all of the clutch Components.

On final assembly, be sure the oil feed holes in the 4C retainer/bulkhead point toward the valve body. Also take care when installing the 2C/4C clutch retainer snap ring.

The tapered side of the snap ring must face forward and the snap ring opening must face the case opening at the valve body.



Another area where you will find differences in components is planetary gear sets. The 66RFE and 68RFE gear sets are different than those used in the 545RFE & 65RFE.

On the 66RFE & 68RFE, you will notice that the reaction sun gear is welded to the 4C clutch hub.

The 65RFE & 545RFE the reaction ring gear is welded to the 4C clutch hub.

66RFE & 68RFE

4C Hub

Sun Gear

545RFE & 65RFE

Ring Gear

The 66RFE & 68RFE reaction ring gear is welded to the reverse carrier.

66RFE & 68RFE

545RFE & 65RFE

The 66RFE & 68RFE input carrier assembly includes the reaction ring gear and input ring gear.

Input Planet Carrier

Input Ring Gear

The 66/68RFE & 65/545RFE input carrier assemblies.

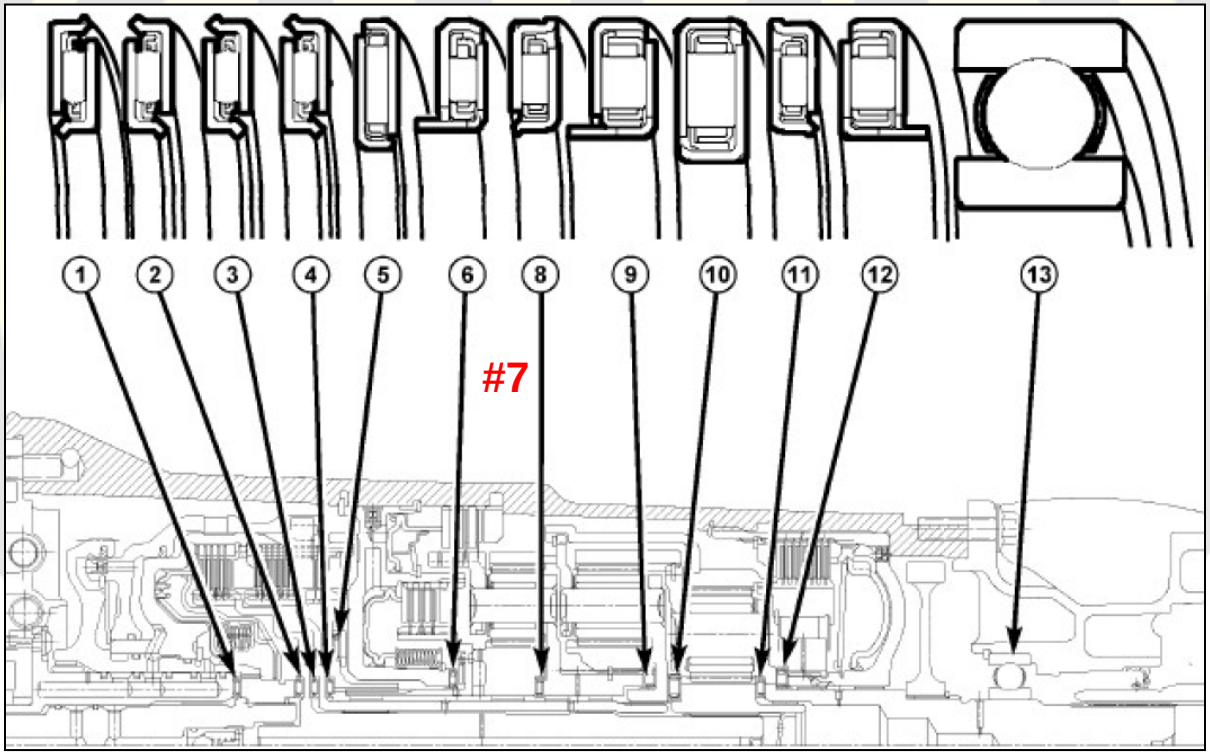
66RFE & 68RFE

65RFE & 545RFE

Because of their design, the 66 and 68RFE assemblies do not use a number 7 thrust bearing and the number 11 bearing is trapped in the input and reverse planetary assembly.

The rest of the planetary gear set thrust bearings are positioned and numbered the same on all three transmissions.

When installing thrust bearings, pay particular attention to their orientation. Use this 66/68RFE illustration as a guide.



As a general rule, note that the rolled surface of a thrust bearing's outer race must always mate with the surfaces it is piloted on.

This example shows the thrust bearing being installed correctly on the outside diameter of the component.

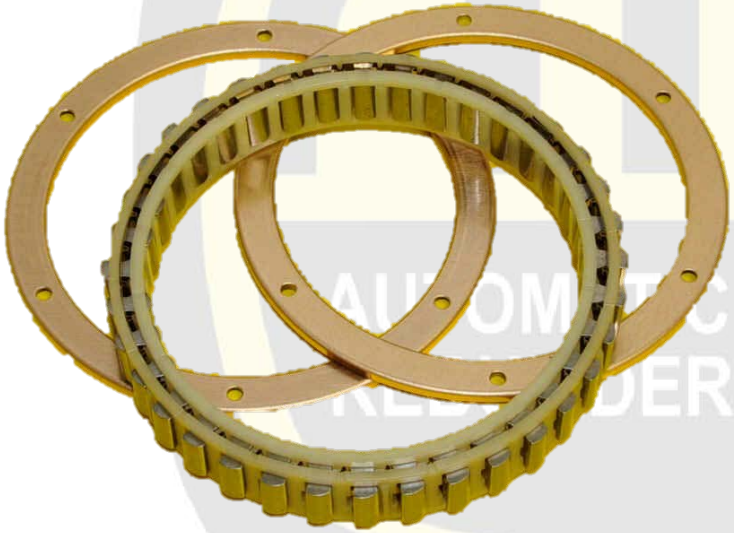
In the 66 and 68RFE transmissions, you will notice that the low/reverse clutch uses 14 single-sided clutch discs that have a larger inside diameter than the 12 double-sided clutch discs in the 545RFE.

The low/reverse reaction plate is directional (flat side down).

In all three transmissions, the low/reverse clutch clearance is adjustable by way of the clutch pack snap ring.

66RFE & 68RFE transmissions use a sprag-type overrunning clutch while the 545RFE uses a roller type clutch.

66RFE & 68RFE



545RFE

14 Rollers

As with other RFE transmissions, the input shaft endplay check can be used prior to disassembly for diagnostic purposes.

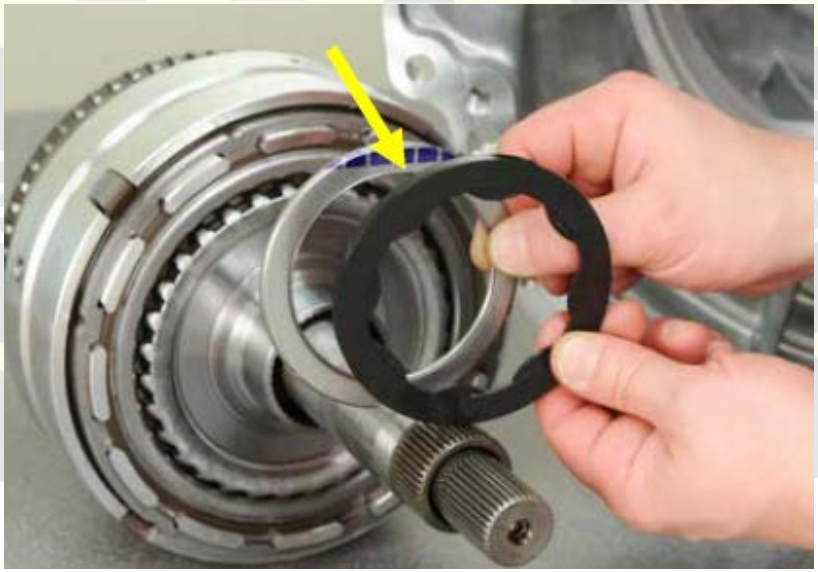
It should also be used afterwards to ensure correct endplay as well as correct assembly.

The tool used for the input shaft endplay check on the 66RFE is the same as that used for the 545RFE (adapter 8266-1 from tool set 8266B)

You will notice two stops as you move the input shaft during the check. The first stop is the movement of the input shaft in the input clutch hub, and should be subtracted from the final measurement.

The movement between the first and second stop is the actual input shaft endplay.

Input shaft endplay is adjustable with a selectable thrust plate located behind the input clutch and number 5 bearing



The tools used for the output shaft endplay measurement on the 66RFE are the same as those used on a 68RFE (alignment plate 10065, socket 8266-20, and the handle from the 8266B set)

The output shaft endplay thrust plate is located immediately in front of the reaction sun gear.

Take care when aligning the thrust plate notches with the lugs on the hub.

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