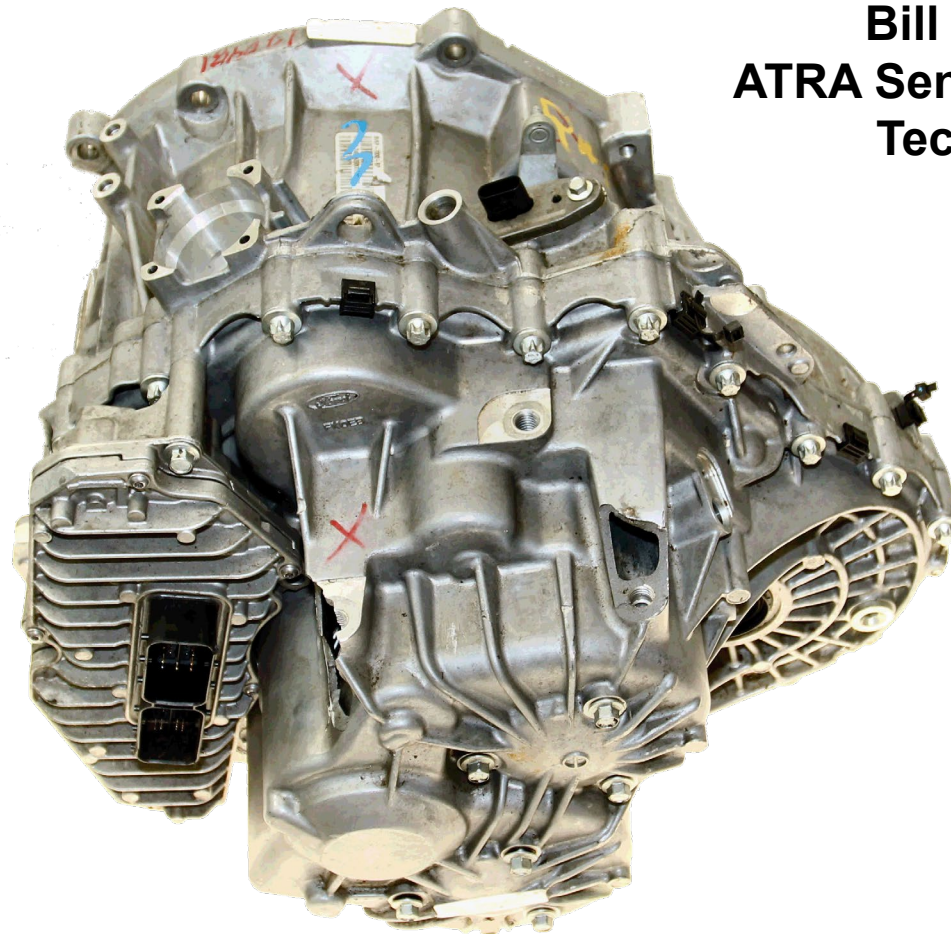




DPS6 Internal Operation

DPS6 Internal Operation

Presented by:
Bill Brayton
ATRA Senior Research
Technician





DPS6 Internal Operation

Welcome To Today's Presentation Sponsored By:

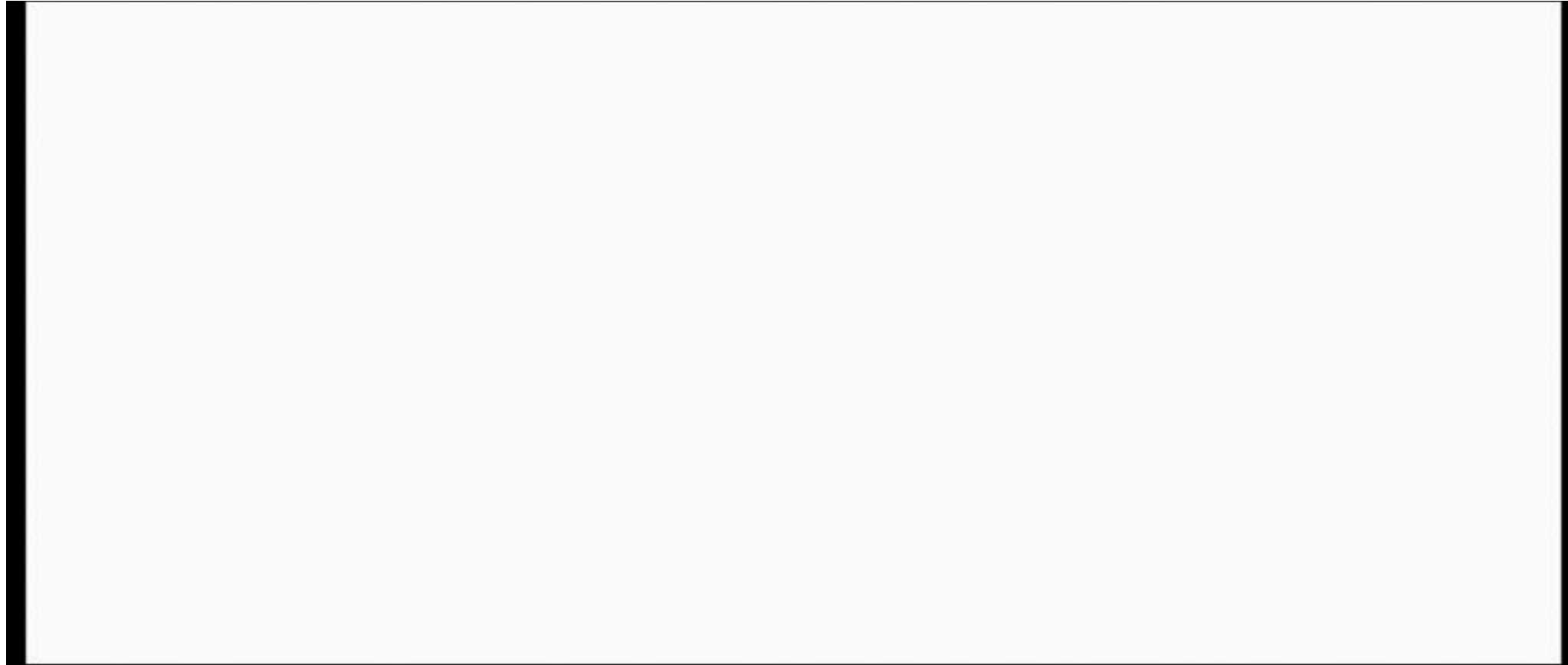


The banner features a central background image of a transmission assembly. Overlaid on this are several logos and text elements:

- Top Left:** Two blue circular components with the text **Hi-Per Blue™** below them.
- Top Right:** Two pistons with the **VOLT Electronics** logo below them.
- Center:** The **SEAL AFTERMARKET PRODUCTS™** logo in large, bold, black letters, with the tagline *your source for engineered solutions* in a script font below it.
- Bottom Left:** A box labeled **TK TOLEDO TRANS-KIT** showing a transmission kit.
- Bottom Right:** A box labeled **TK MAXX TOLEDO TRANS-KIT** showing a transmission kit.
- Bottom Center:** The phone number **(800) 582-2760** and the website **www.sealsap.com**.



DPS6 Internal Operation





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July 7/8	DPS6	Internal Operation
July 21/22	U660	Introduction
Aug 4/5	8L90	Internal
Aug 18/19	U660E	Rebuild
Sept 1/2	948TE	Internal
Sept 15/16	5R110W	Problems & Fixes
Sept 29/30	6R60 - ZF6HP	Comparison
Oct 13/14	6R140	Problems & Fixes







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May 2 - San Antonio, TX

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Applications



2011-2015 Fiesta



2012-2015 Focus



2012-2014 EcoSport (Global)





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Applications



2012-2014 B-Max (Global)



2014 C-Max (Global)





DPS6 Internal Operation

Common characteristics of the DPS6 transmission.

Common sounds a driver may notice are:

Double clicking metal sounds. These noises can likely be heard while driving on very smooth surfaces during a 1-2 upshift or a 3-2-1 coast down. The sounds occur with every gear engagement, but generally cannot be heard over the background engine, road and wind noises at higher speeds. Most noticeable if the windows are down and the radio is off, these sounds are of the shift forks moving and the synchronizers engaging a gear (similar to a manual transmission). These shifting sounds are part of normal operation.

Coast down whine. A slight gear whine while slowing or coasting is normal

Clicking sounds after the engine is turned off. As the vehicle is powered down, the transmission will cycle the clutches to the released position so it is ready for a safe restart of the engine. This is part of normal operation. Clicking sounds from the transmission immediately after the engine is turned off are normal.

Low speed grinding. A slight grinding noise may be heard at about 2 mph. This noise is more evident during “trailer-hitching” events. This noise is caused by a normal bearing rotation and does not affect the durability of the transmission.





DPS6 Internal Operation

Common characteristics of the DPS6 transmission (continued).

Common sounds a driver may notice are:

Reverse gear whine. Some DPS6 transmissions will exhibit gear whine in reverse. The level of whine has been significantly reduced in later build vehicles, but can still be detected to some level. This is characteristic of many manual transmissions, and is not a defect or a situation in which a repair should be attempted

“Green” clutch break-in period. New, replacement, and reset clutches are “green” and require a break in period before shift event quality is maximized. During the break-in period, green clutches may exhibit:

A rattle noise similar to a loose catalytic converter shield. This noise is commonly heard after light throttle 1-2, 2-3 or 3-4 upshifts. This rattle noise will diminish greatly as the clutch completes the break-in.

A take-off shudder/launch (shaky vs. smooth).

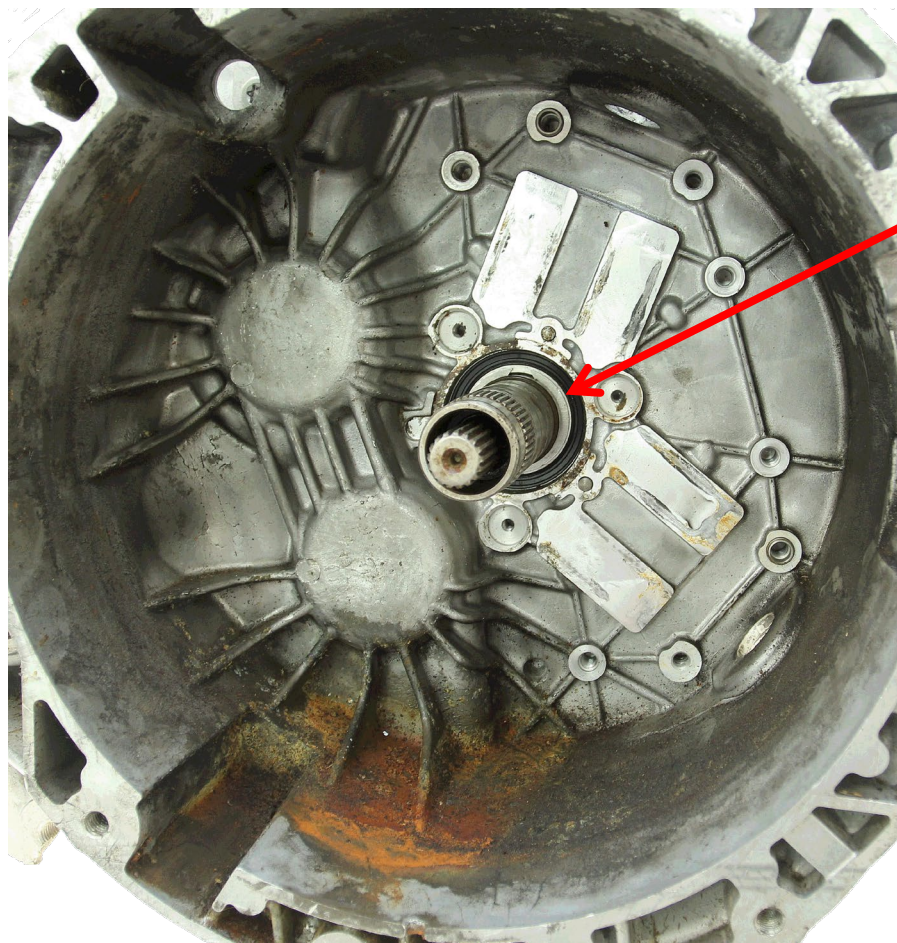
A harsh-shift feel during the first few cold shifts before the transmission reaches operating temperature.





DPS6 Internal Operation

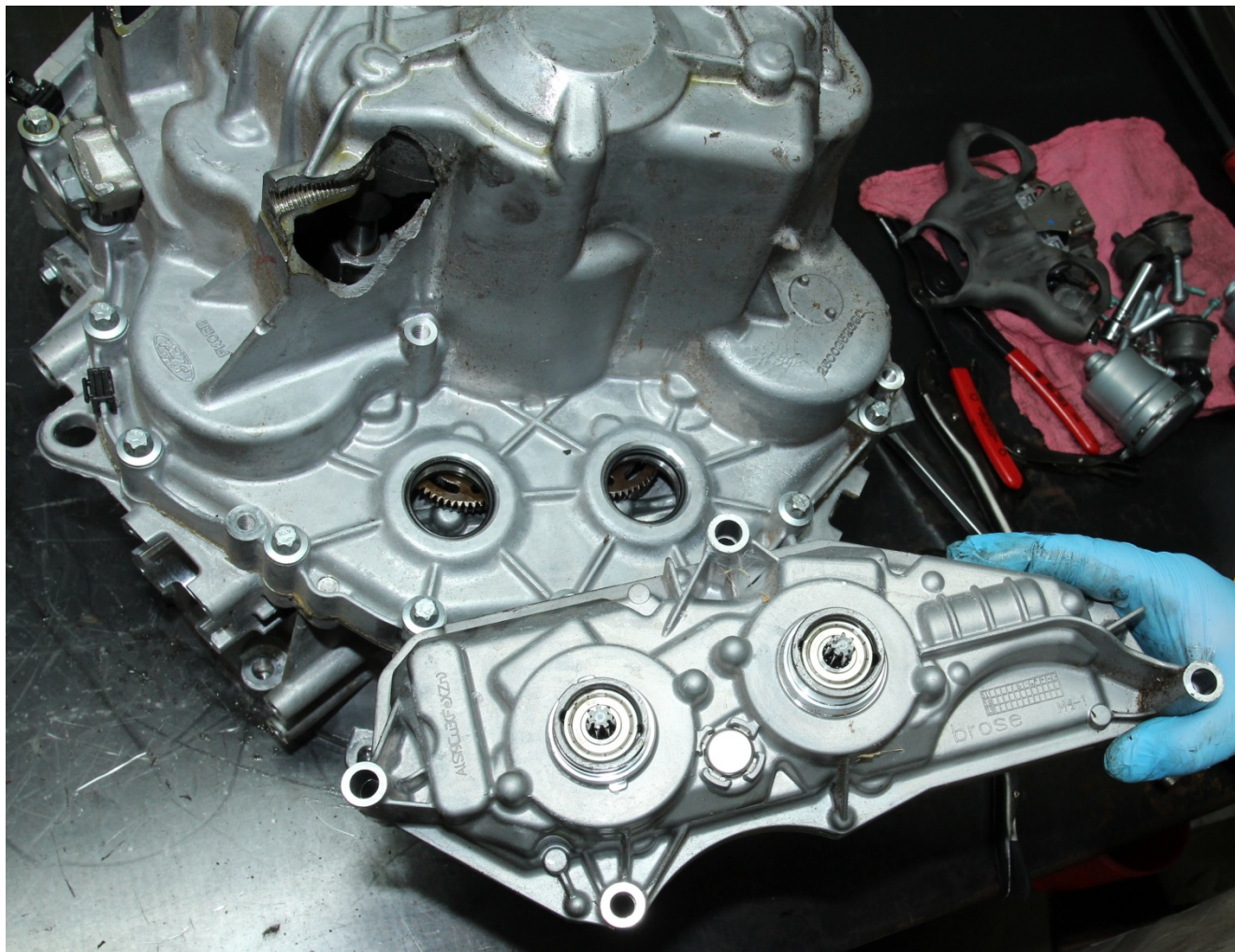
Remove the front cover and the front seal to get to the front snap ring.
Just like most other sticks this has to come off to split the cases





DPS6 Internal Operation

Remove three bolts and remove the TCM/Shift Motor body





DPS6 Internal Operation

Remove the park lever position sensor and the park lever arm. This will allow the park actuator and the park pawl to stay with the main case.



Park lever arm

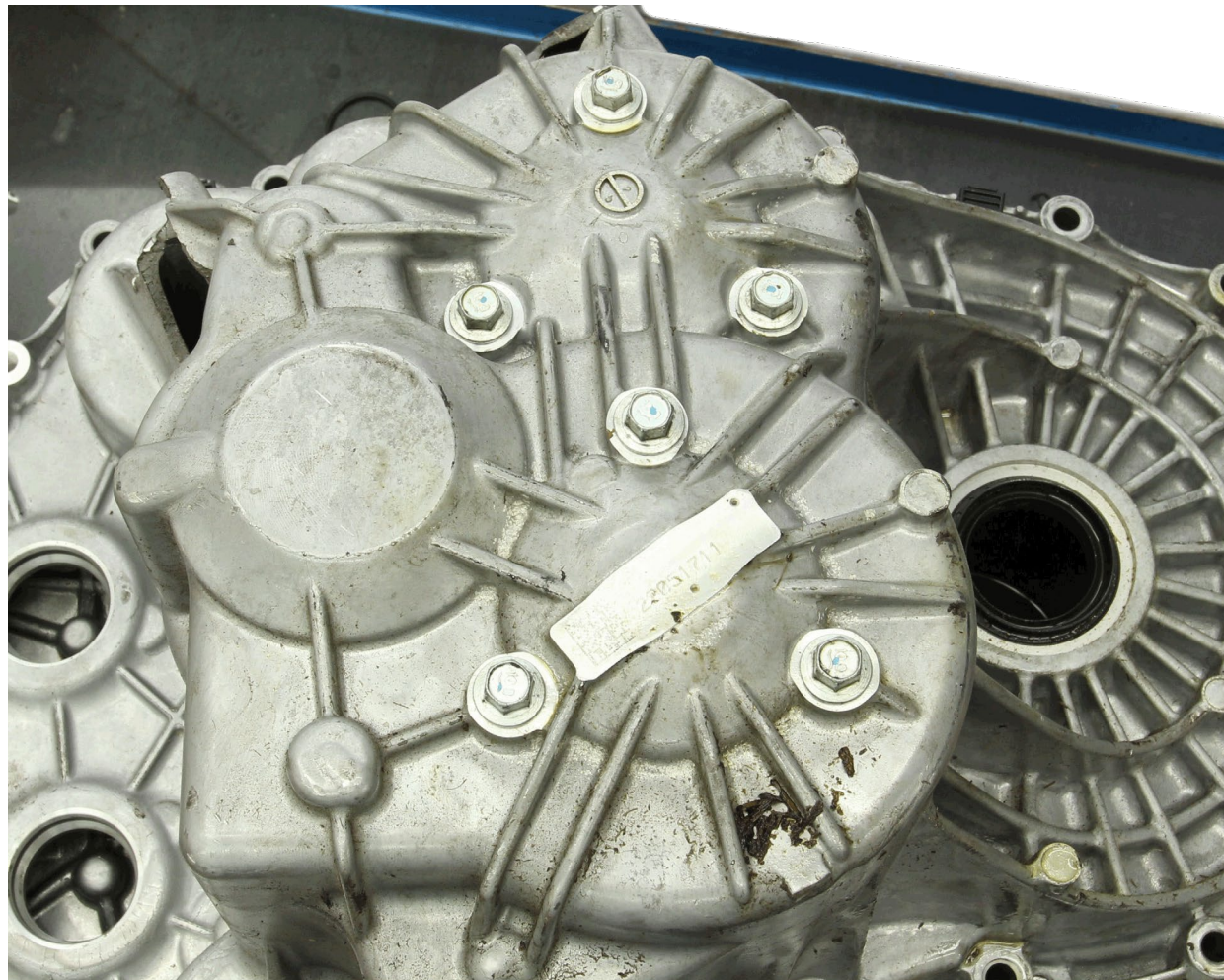
PLPS





DPS6 Internal Operation

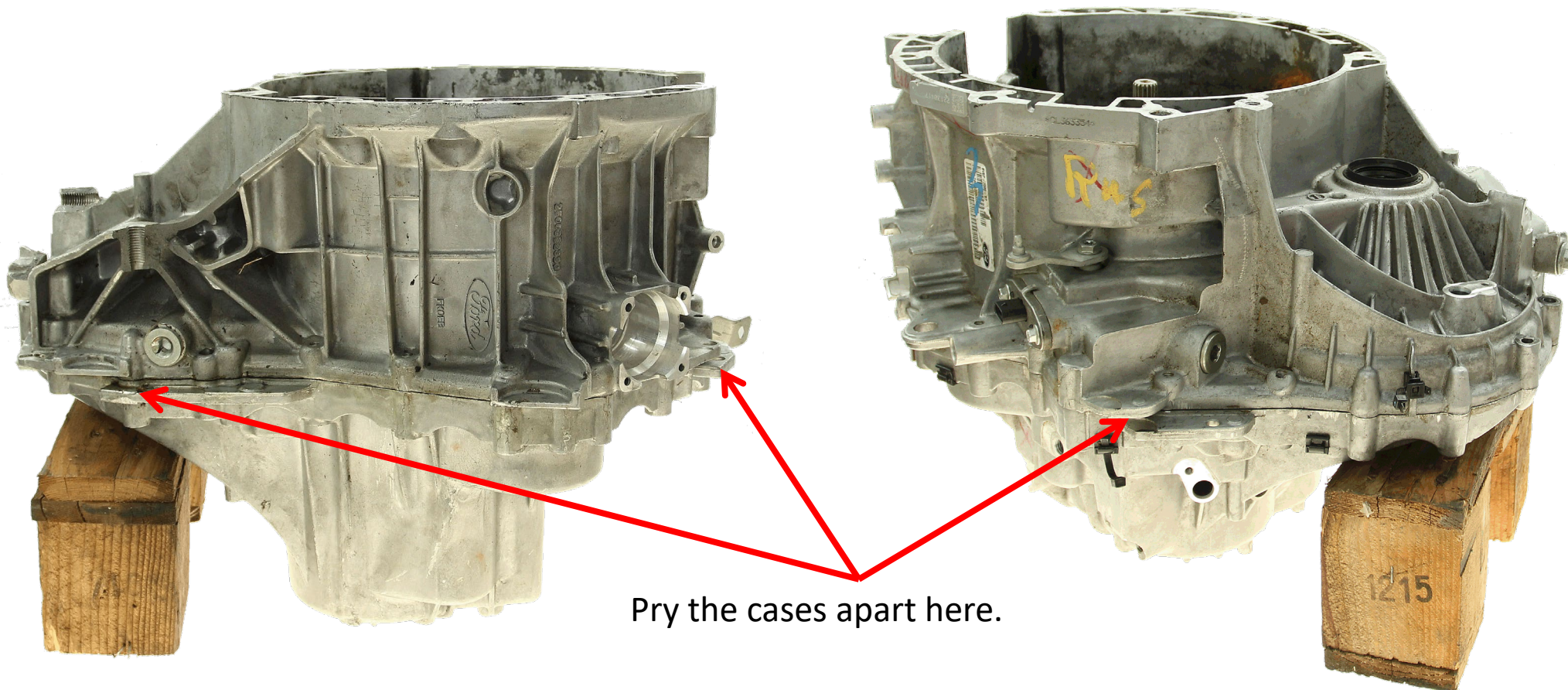
Remove six (6) 10mm bearing retainer bolts and twenty three (23) the case to bellhousing bolts





DPS6 Internal Operation

Roll the case over and support the case so its level. Here we are using a block of wood. To split the cases we must pry them apart.



Pry the cases apart here.





DPS6 Internal Operation

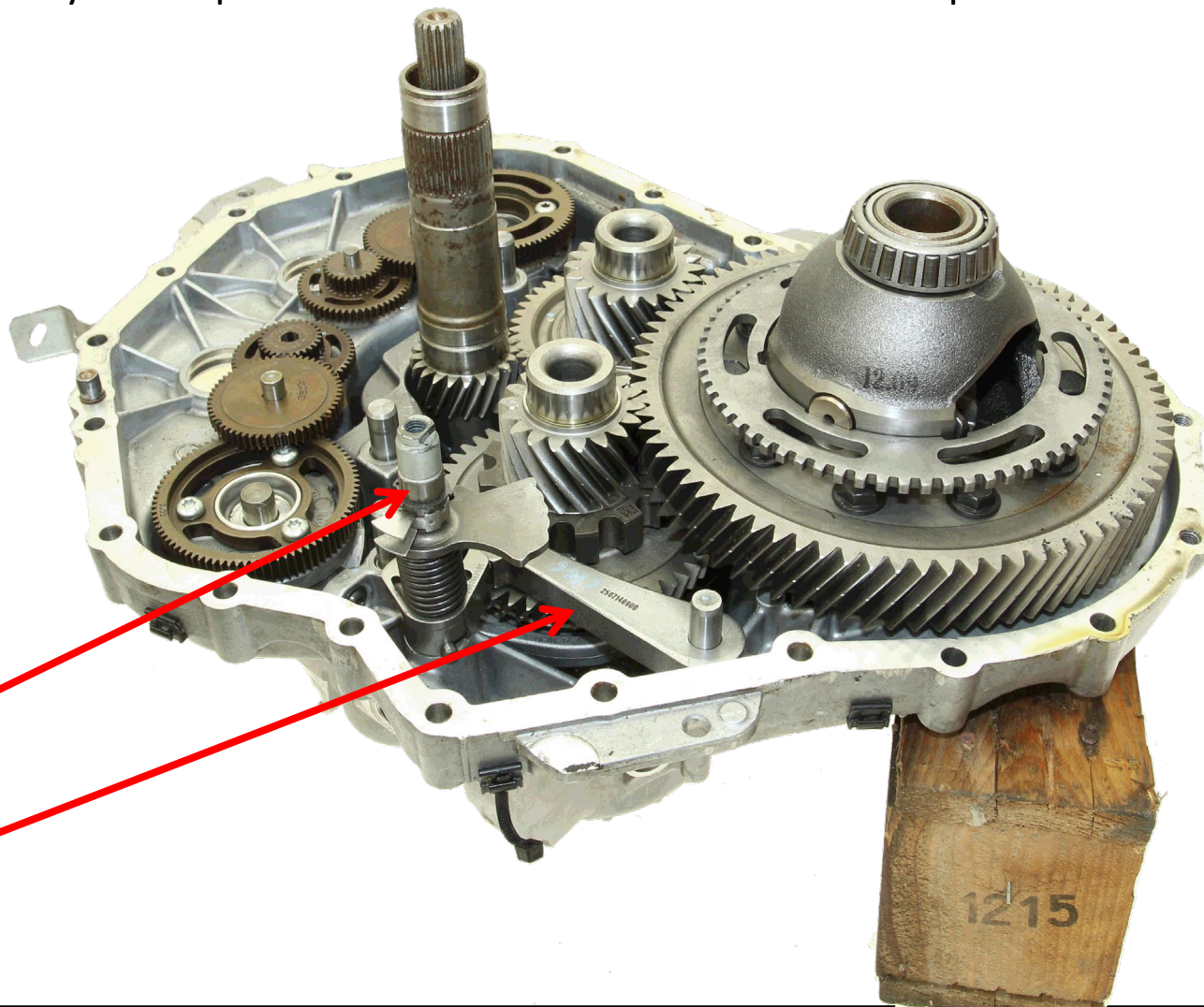
When prying on the case its best to use a deep socket on the outer shaft. This will drive the shaft out of the bearing.





DPS6 Internal Operation

The bellhousing set aside we can see components that make a dual clutch unit so unique. What we are looking is basically two separate transmissions in one case. Two input shafts and two output shafts.



Park actuator
lever

Park pawl

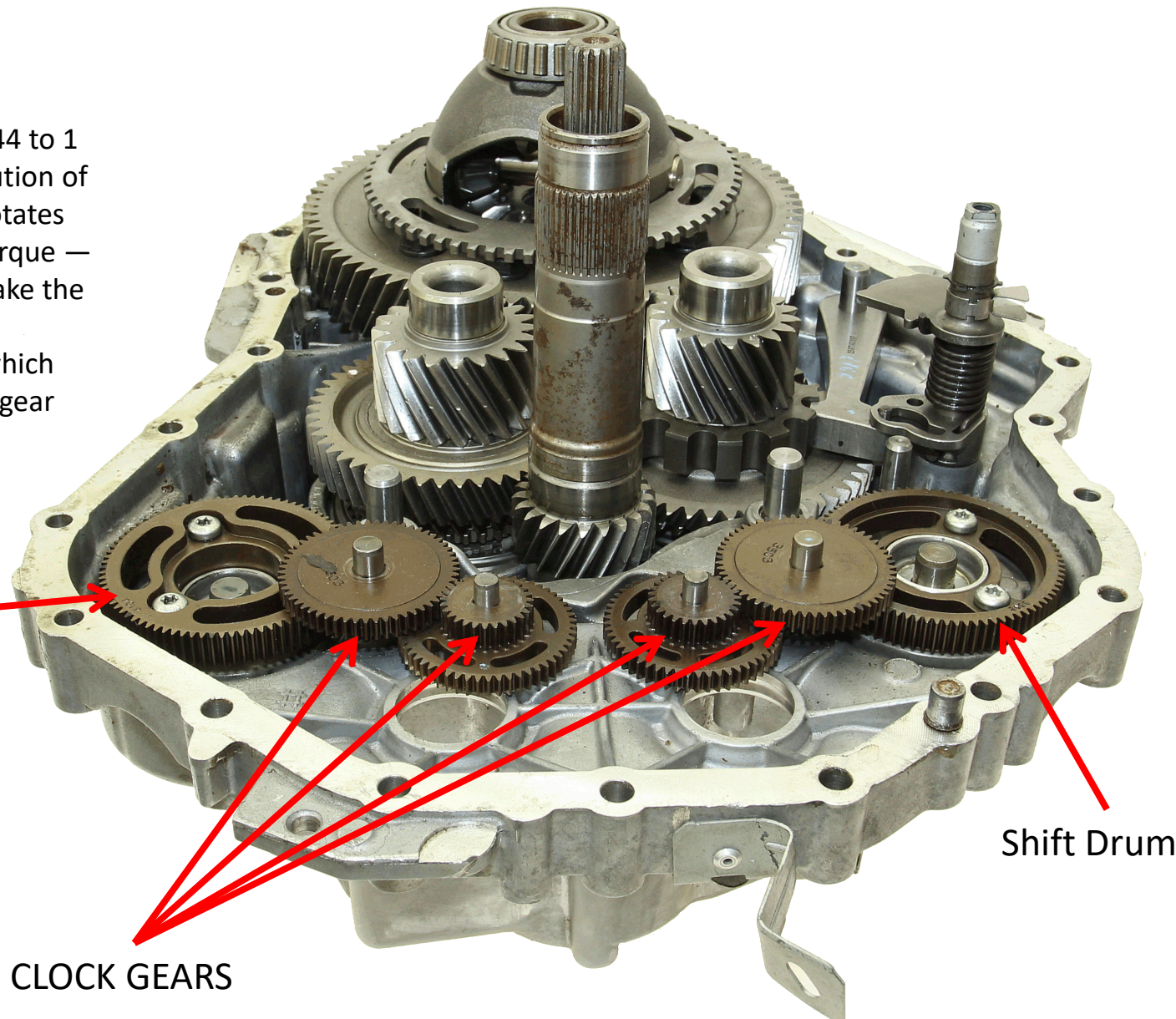




DPS6 Internal Operation

Clock Gears

These gears combine to provide a 61.44 to 1 ratio. This means, for every one revolution of the shift drum, the brushless motor rotates 61.44 times. This ratio provides the torque — up to 330 pound-feet — needed to make the shifts happen swiftly and smoothly. The clock gears turn the shift drums which moves the shift forks for the different gear ranges.



Shift Drum

Remove the gear shafts and remove the clock gears at this time. The shift drums stay with the case.

CLOCK GEARS

Shift Drum

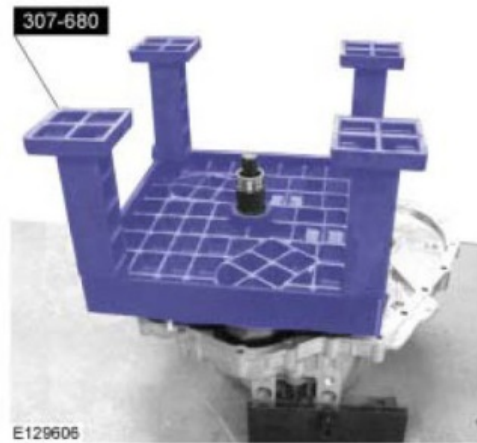




DPS6 Internal Operation

Ford's Way

Here is a few pics from the ford factory manual of the special tools they require to disassemble shift forks and the geartrain.



Holding fixture
bottom view



Holding fixture top
view



Shaft Support tool

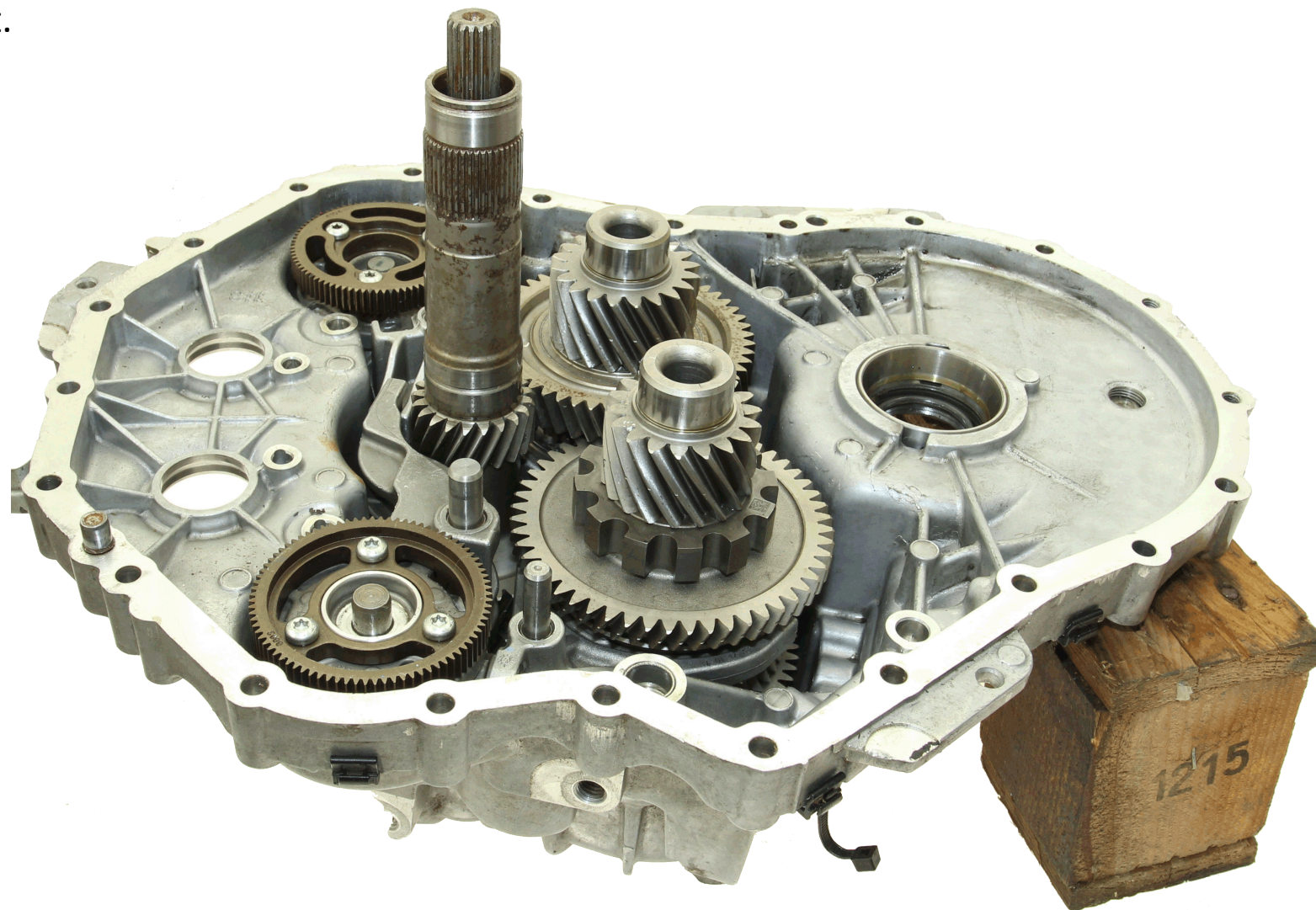




DPS6 Internal Operation

ATRA's Way

To remove the geartrain and forks from the main case first remove the differential, park pawl and park actuator shaft.

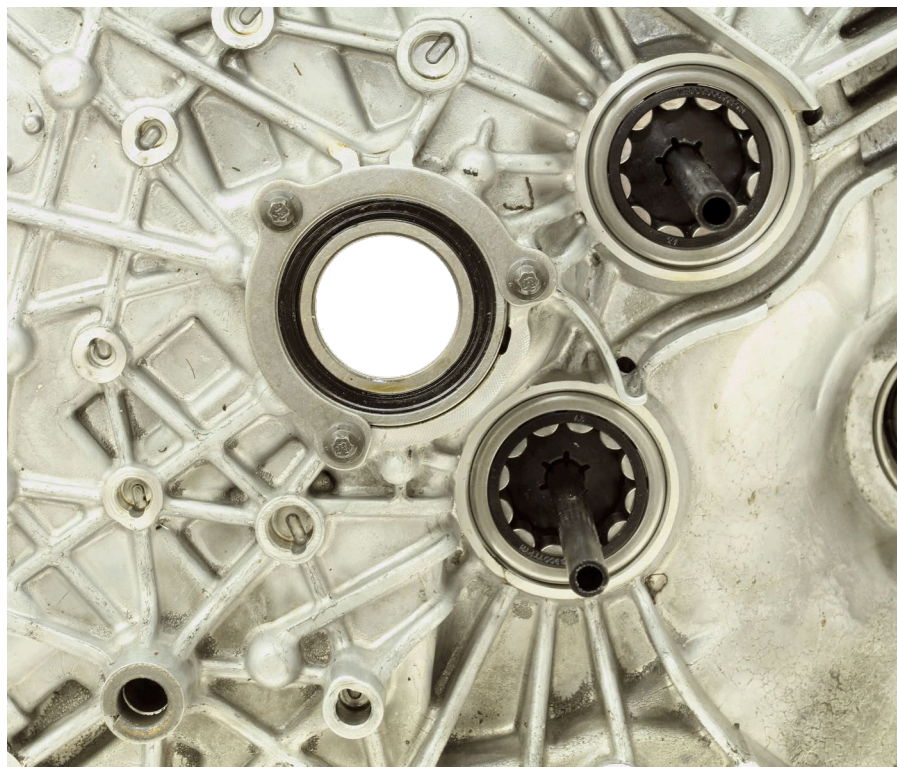




DPS6 Internal Operation

ATRA's Way (continued)

Remove the three (3) # E8 star bolts and the front bearing retainer.
Use an appropriate driver to drive the bearing out of the bellhousing.

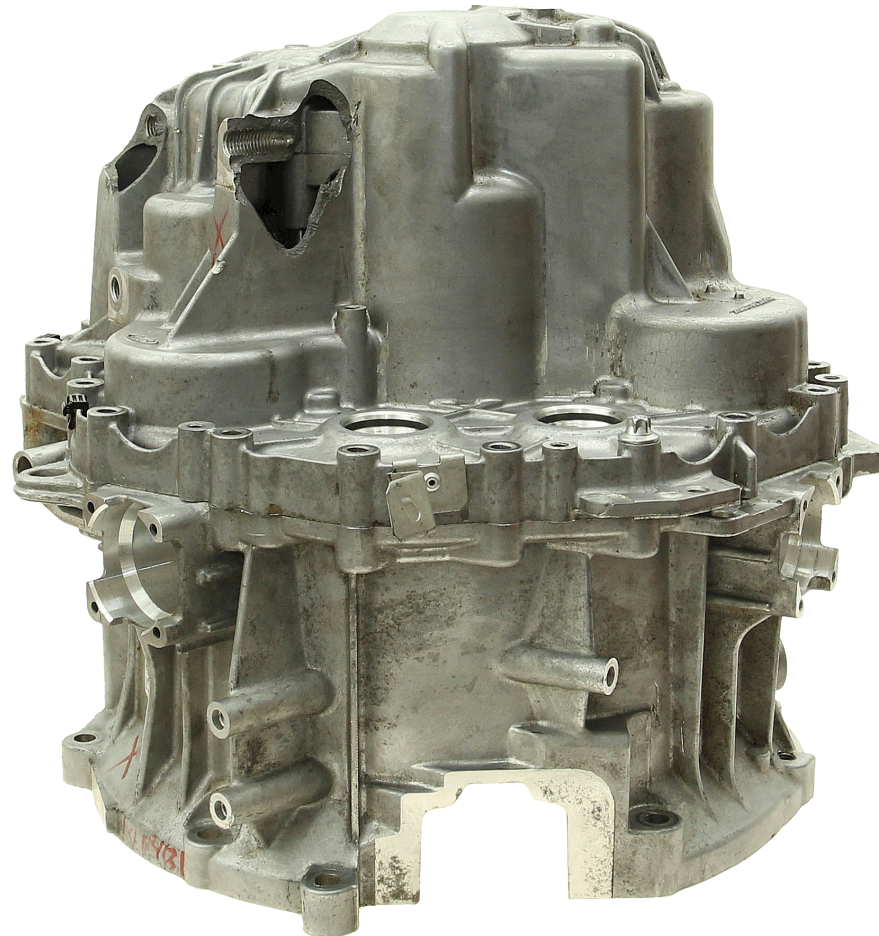




DPS6 Internal Operation

ATRA's Way (continued)

Now place the bellhousing back onto the main case. The plastic tubes fit into the output shafts. Put two (2) case to bellhousing bolts in finger tight and flip the case over.

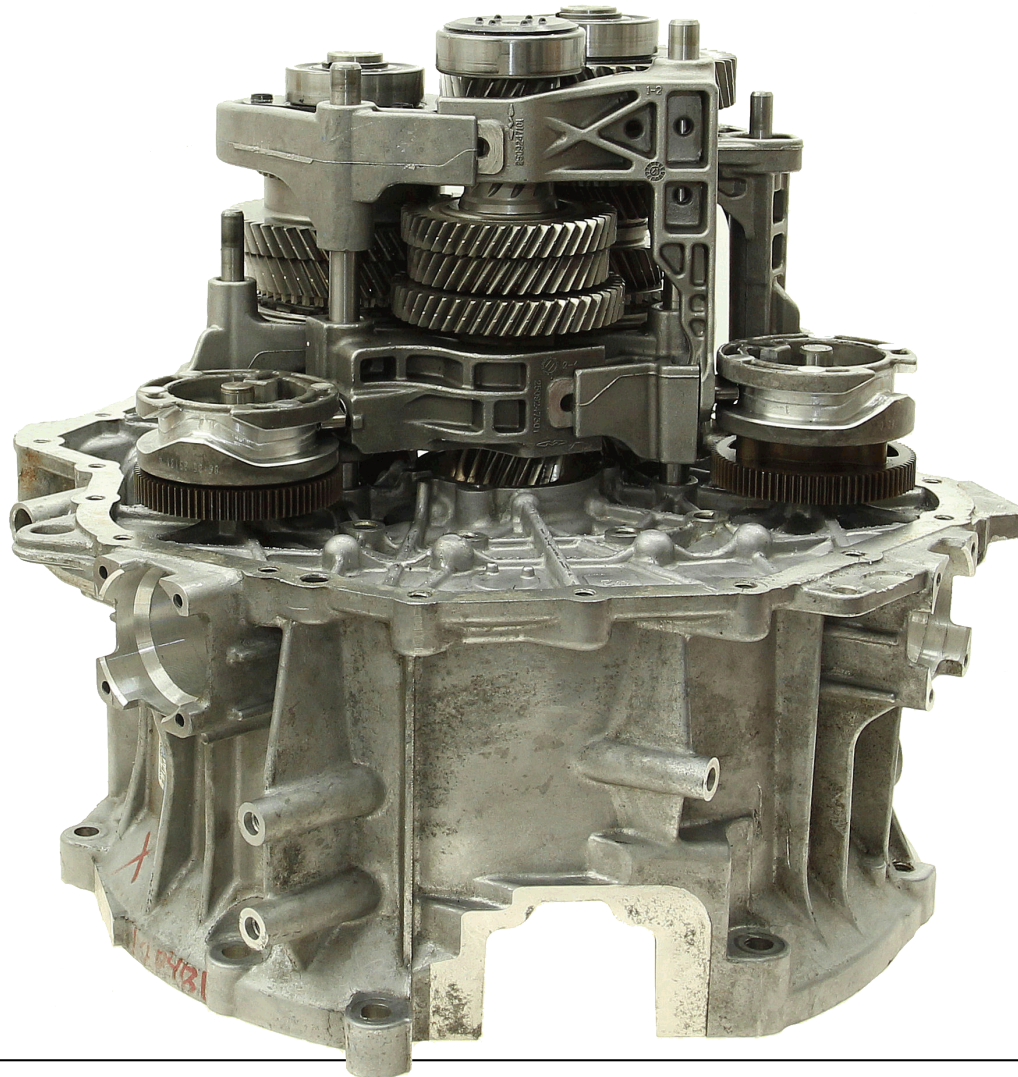




DPS6 Internal Operation

ATRA's Way (continued)

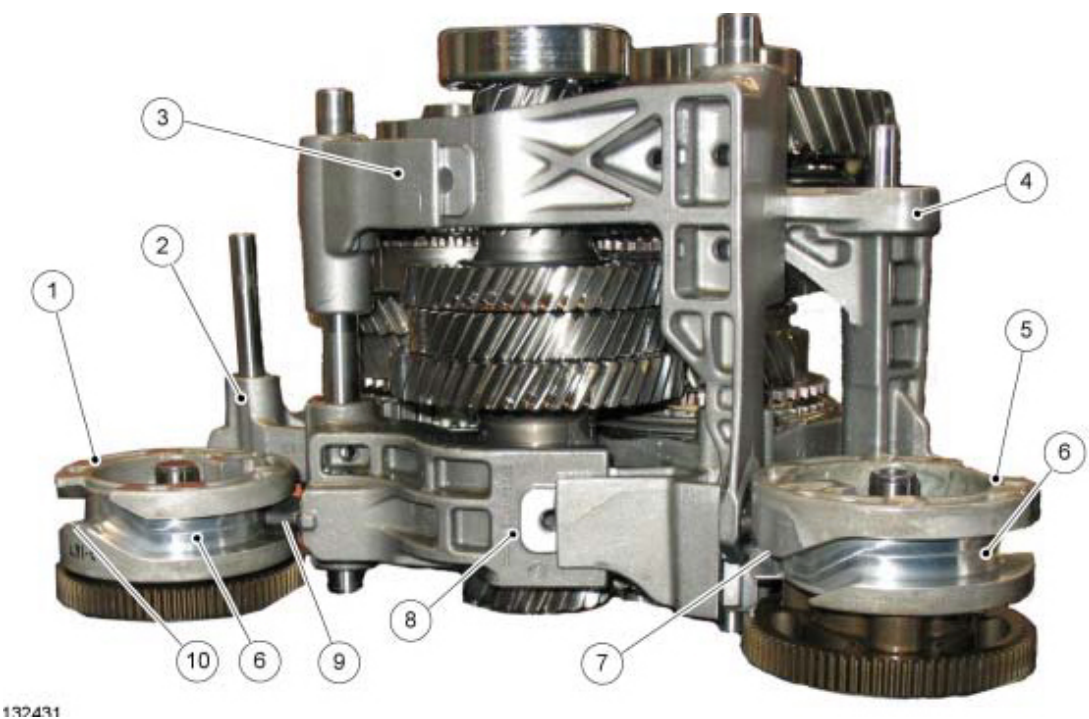
Now remove the two bolts and pry the main case off the bellhousing. The bellhousing has now become the holding fixture for the gear trains and shift forks.





DPS6 Internal Operation

Shift Mechanism Identification



132431

Shift Mechanism Identification	
1	Gear selector drum 2 with spur gear
2	Selector fork - reverse gear/4th gear
3	Selector fork - 3rd gear
4	Selector fork - 1st/5th gear
5	Gear selector drum 1 with spur gear
6	Shift slot
7	Lower cam
8	Selector fork - 2nd/6th gear
9	Sliding block
10	Upper cam

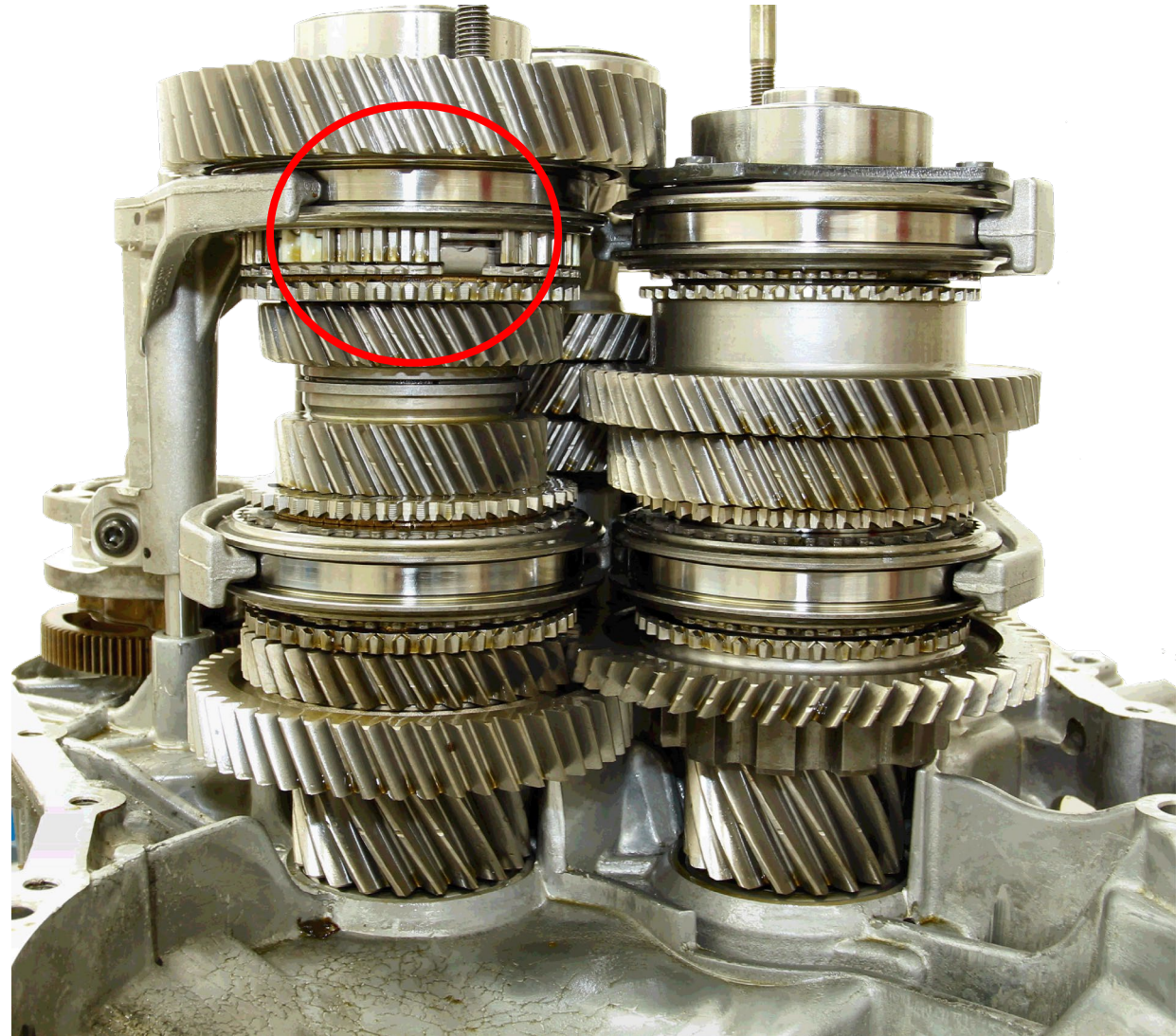




DPS6 Internal Operation

Before we take this apart the rest of the way lets take a minute to see this unit in action.

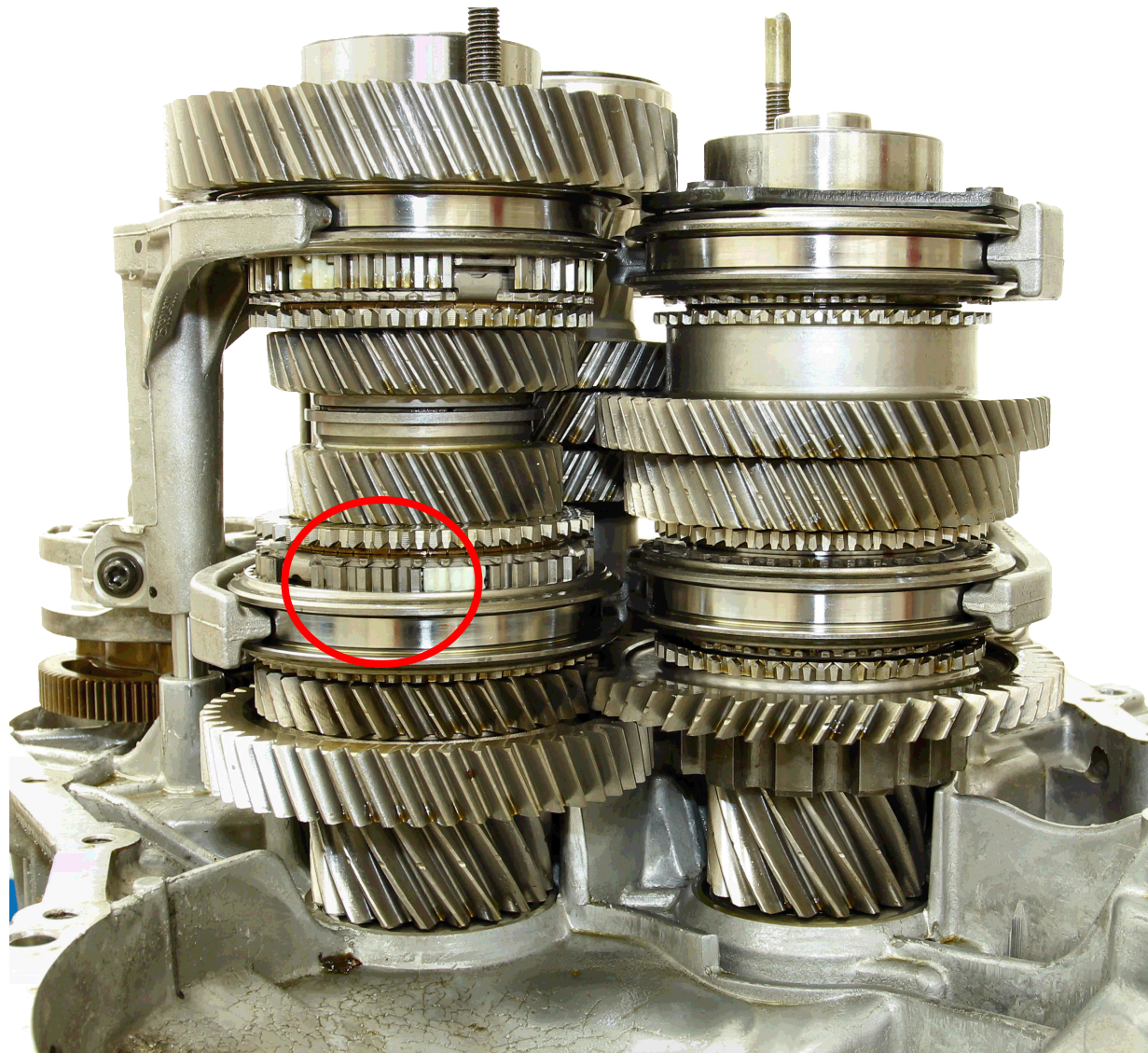
Here the unit is in first gear, driving off the inner/solid shaft, driven by clutch 1 as in a take off situation.





As the car accelerates the computer has the clutch 2 disengaged at this time so to get ready for the 1-2 shift the computer moves 2nd gear shift for into position. When the gear change happens the computer transfers the drive from clutch 1 to clutch 2. Because the shift happens this way the computer can unshift first gear after the 1-2 shift has taken place

DPS6 Internal Operation



DPS6 Internal Operation

In this last example we are in 2nd gear driving off the clutch 2. Clutch 1 is disengaged so the computer has unshifted first gear and has shifted into 3rd gear in preparation for the 2-3 shift. When the 2-3 shift is commanded all that happens is the computer changes the drive from clutch 2 back to clutch 1.

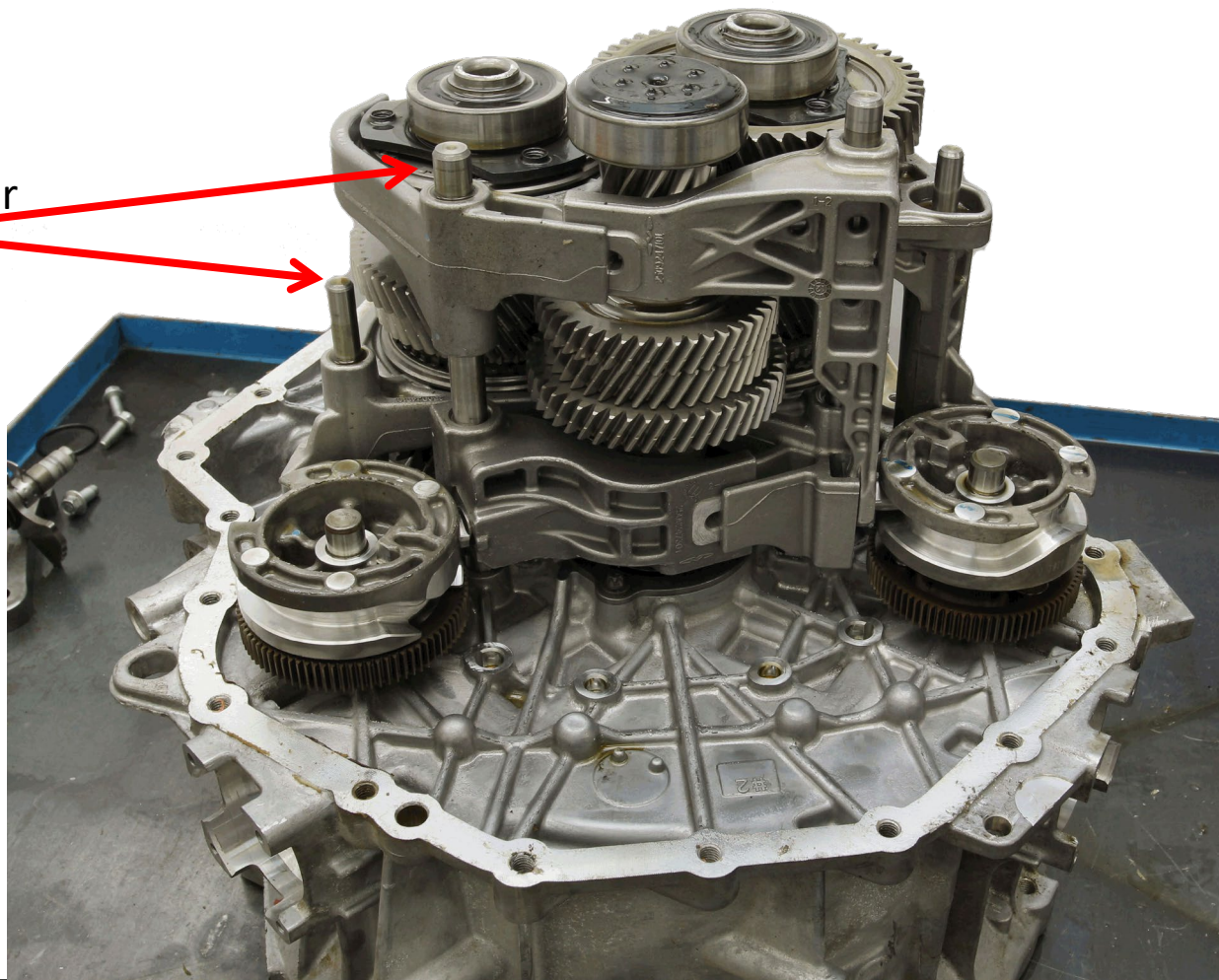




DPS6 Internal Operation

Now that we can see how the unit works lets finish taking it apart.
Pull the shift shafts out of the shift forks

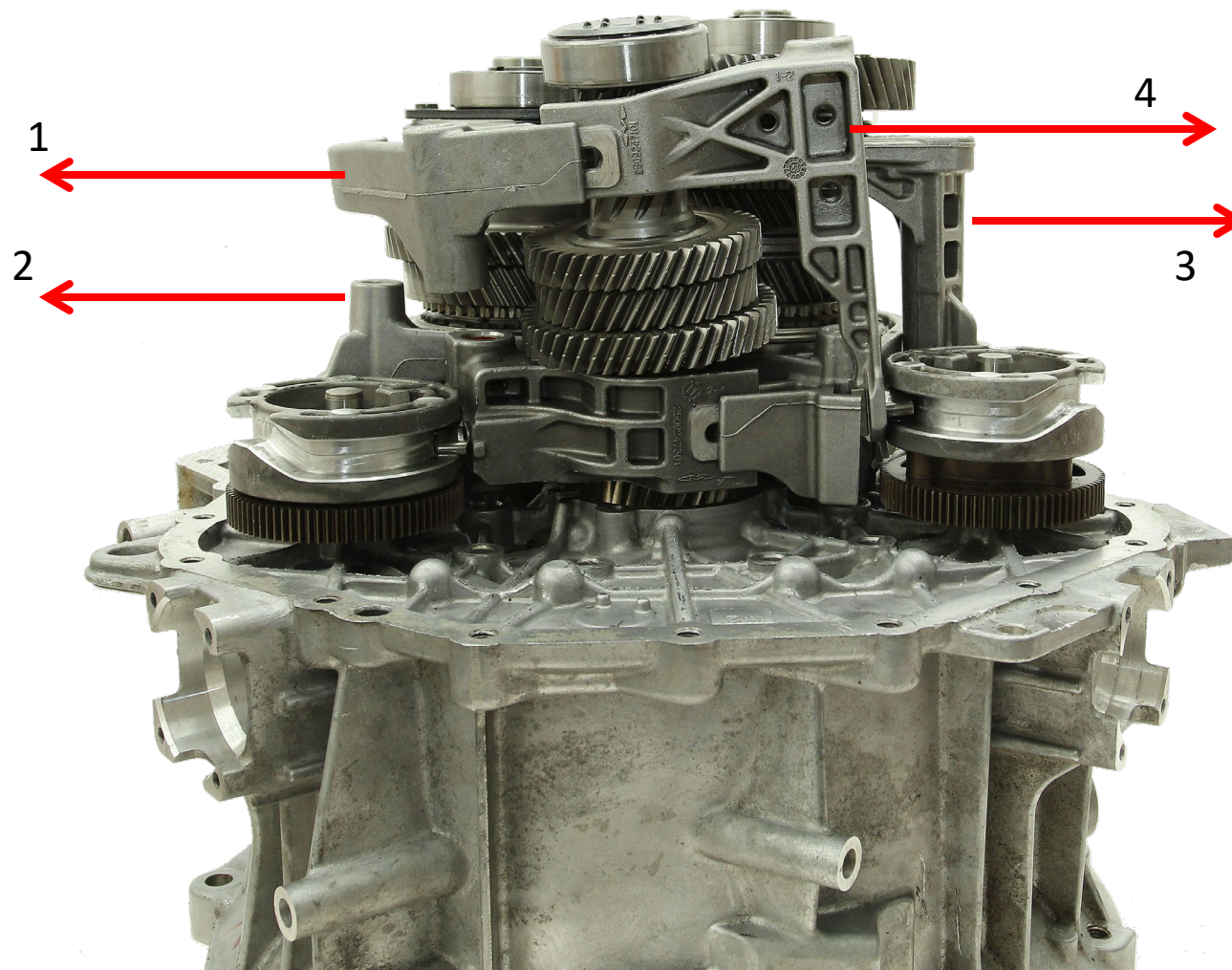
These two shift
shafts are shorter





DPS6 Internal Operation

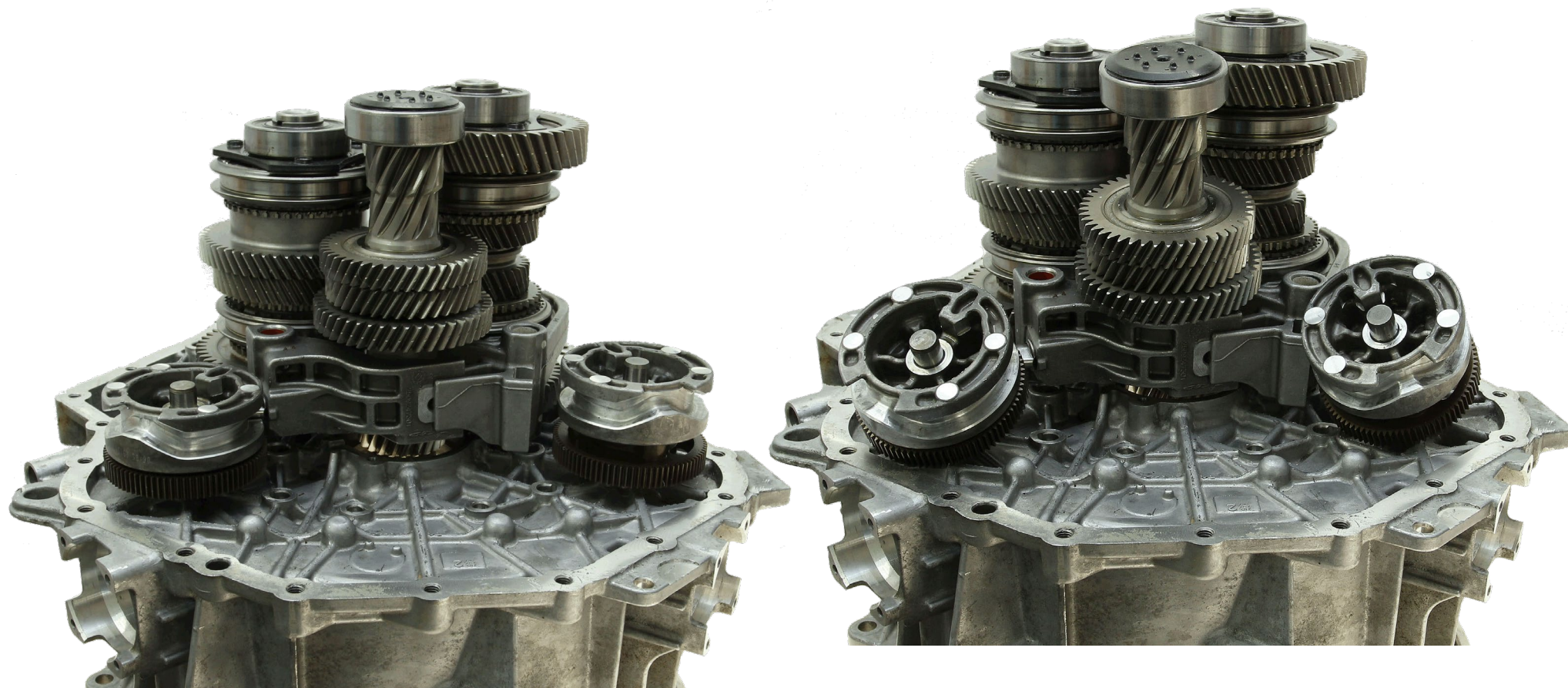
When the shafts are removed the input shaft will fall to the side. This is totally normal because the front bearing is not there to support the input shaft.
Remove the shift forks.





DPS6 Internal Operation

The other forks out of the way the 2-6 fork assembly is left in the case. Remove the gear selector drums to remove the 2-6 fork assembly.





DPS6 Internal Operation

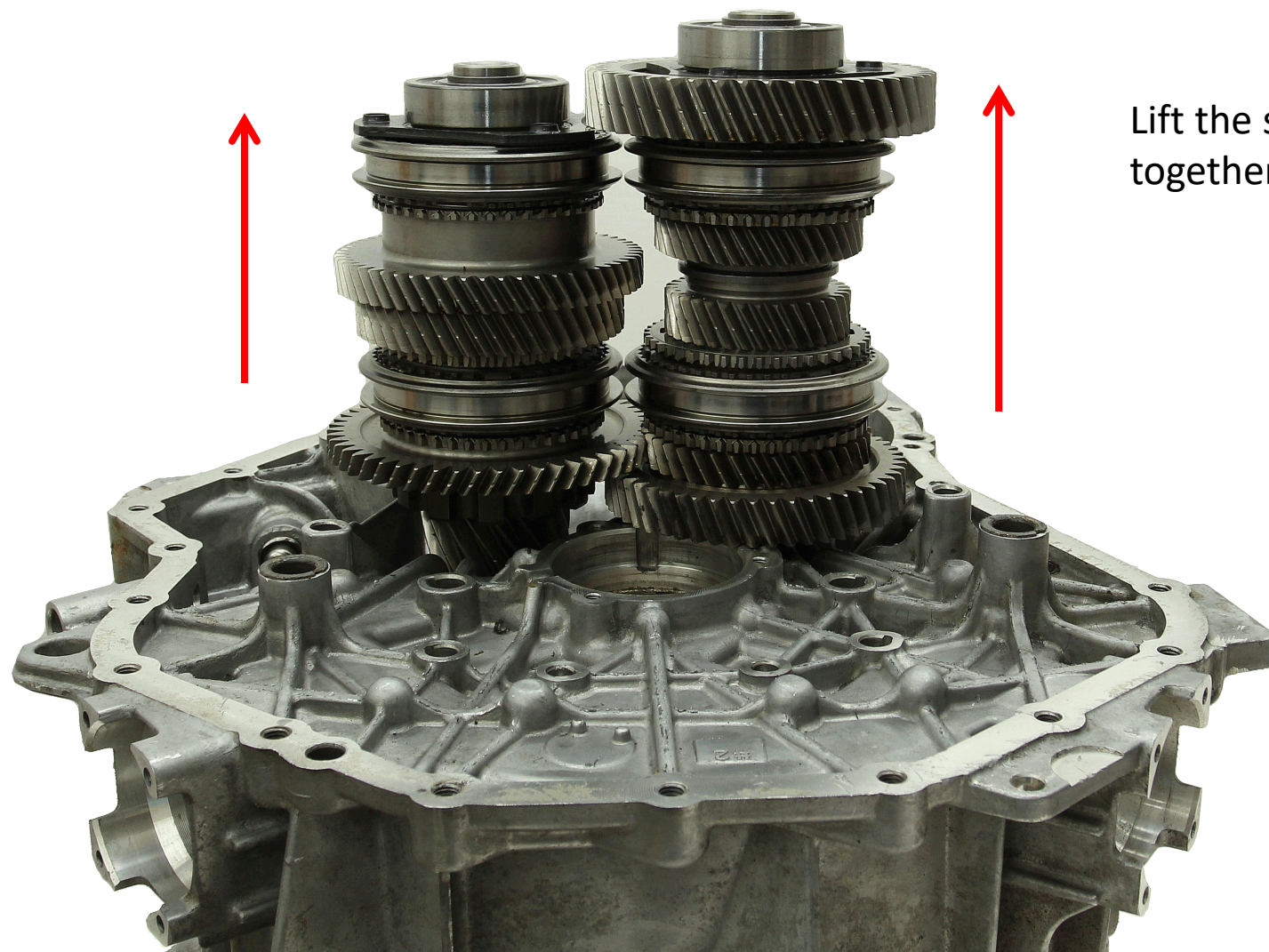
Now that the forks are out of the way the input shafts come right out of the case.





DPS6 Internal Operation

Carefully lift the two output shafts off the plastic lube tubes.



Lift the shafts off together



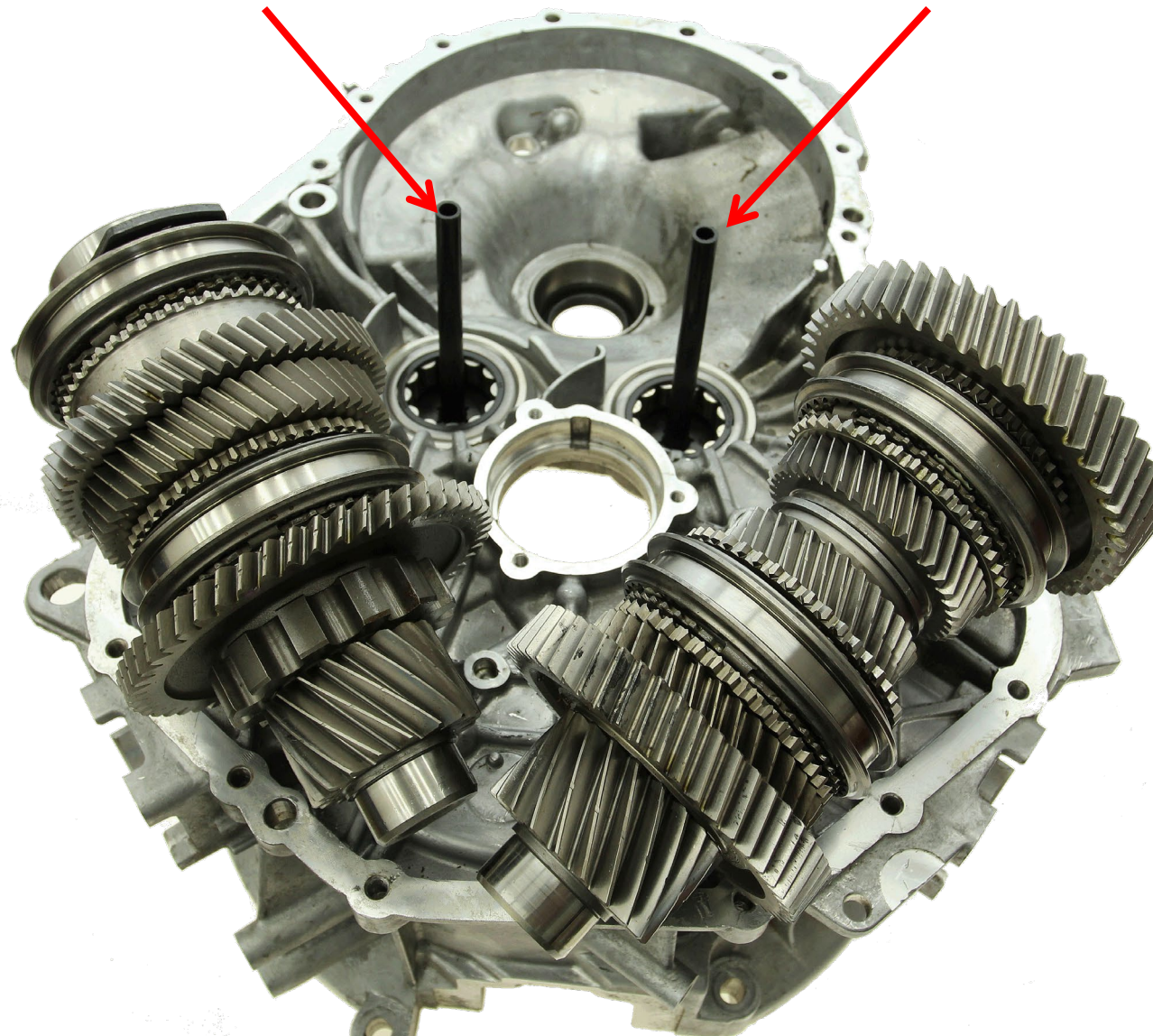


As of this printing the only available parts are complete output and input shaft assemblies. Ford is working on getting the individual parts out within the next 6-12 months.



DPS6 Internal Operation

DON'T BREAK THE PLASTIC LUBE PIPES!





DPS6 Internal Operation

If you see material that is not shown in your handout just double click on the camera icon at the top right of your screen and it will leave a picture (jpg. file) on your desktop.

62TE Clutch Volume Index

This information can be found on the ATRA website to members in the repair center by typing in 62TE CVI in the search box. If you're a non member take a moment and write these specifications down.

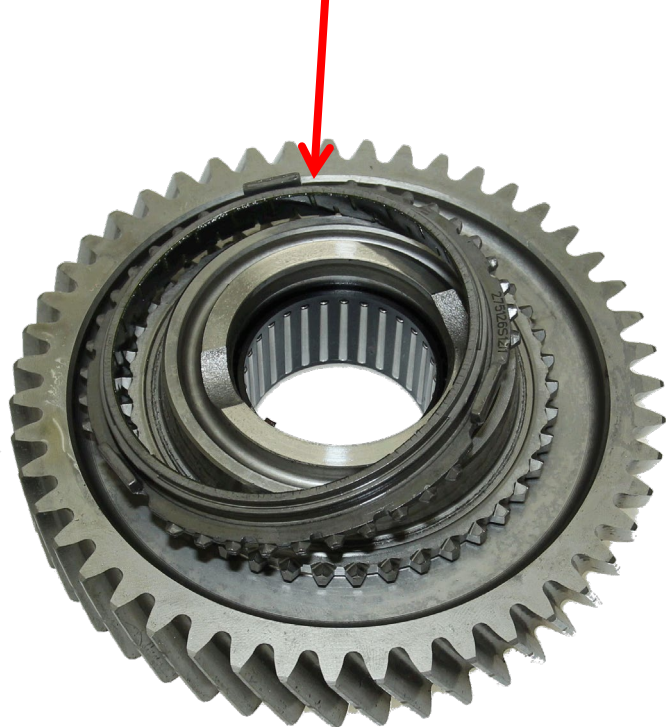
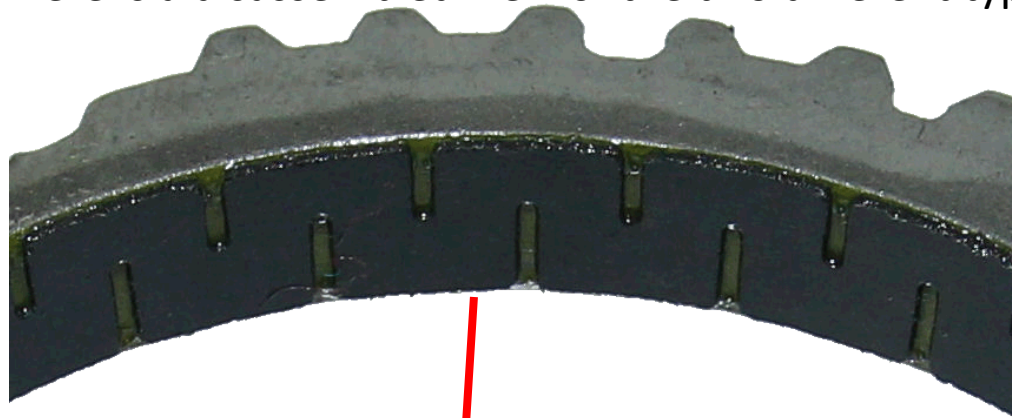
62TE Clutch Volumes	(Preliminary)
UD	26-74
2/4	16-54
OD	42-143
L/R	16-63
LC	16-25
DC	26-34





DPS6 Internal Operation

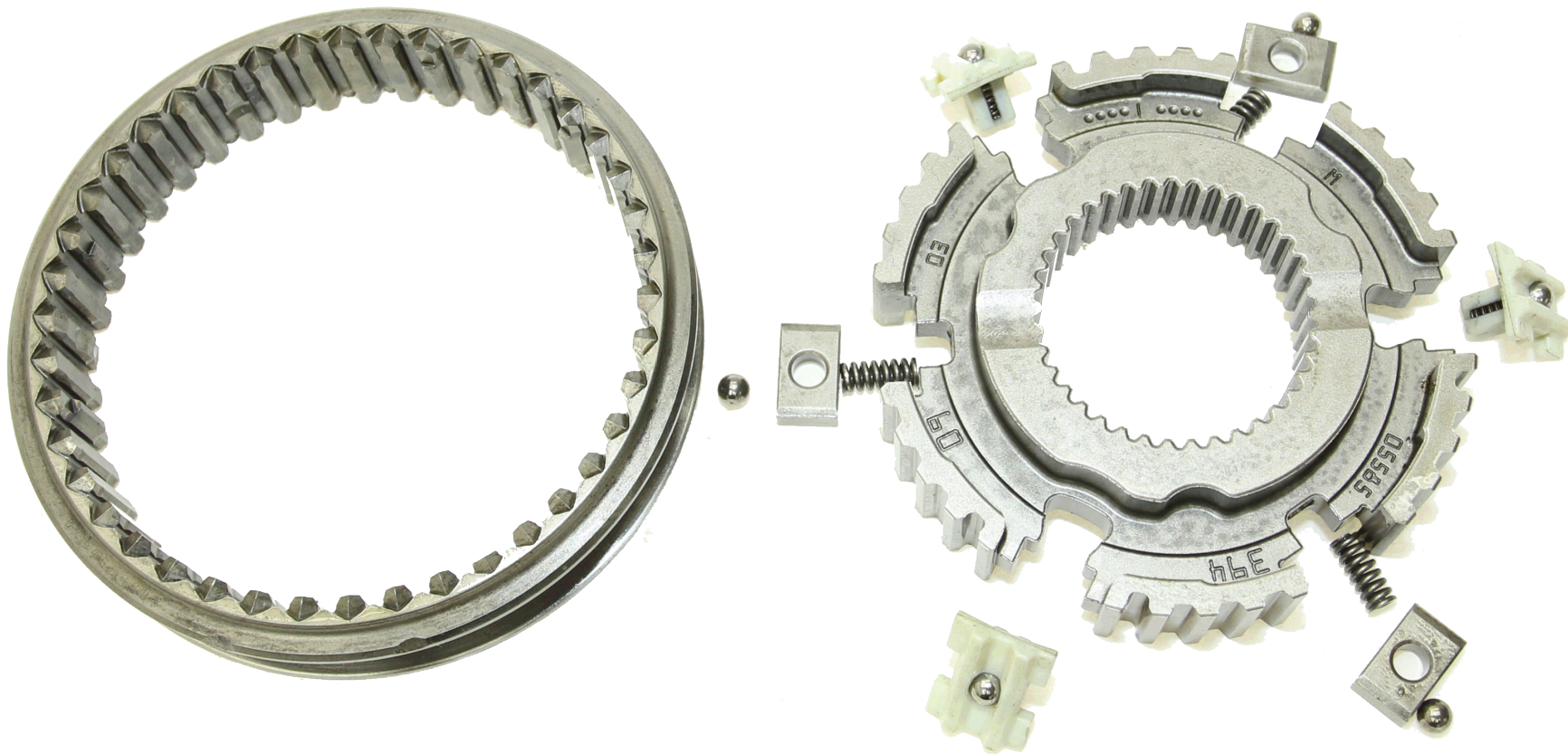
Here is a disassembled view of the two different types of synchronizer rings used in the DPS6





DPS6 Internal Operation

View of a disassembled shift hub and slider assembly. DO NOT take these apart as they are extremely difficult to reassemble!





DPS6 Internal Operation

Assembly Tips

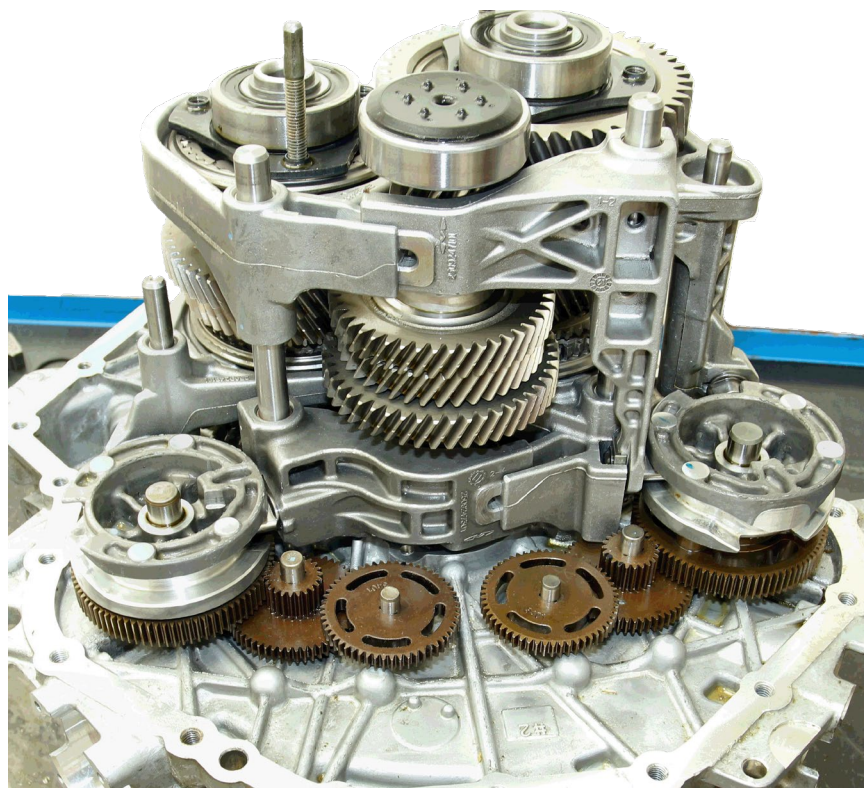
After the output and input shafts have been installed into the case the input shaft must be supported to install the shift forks. An easy way to do this is to wrap masking tape around the output shaft and the input shaft. This holds the two shafts together while the shift forks are installed.





DPS6 Internal Operation

This unit is ready to have the main case installed. Always install guide studs into the bearing support plates for easy alignment through the main case.



To complete the transmission assembly reverse the disassembly procedure.





DPS6 Interna

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Any Questions? Thank You For Attending



PISTON KITS (Individual pistons are also available)

SAP #	Description	Pcs.	Brand
Chrysler	222 HTE Assem. Cover low and reverse 24 clutch 2004hp	3	OE
	221 HTE Assem. Cover low and reverse 24 clutch 2004hp	3	OE
	4851 45RE 1999hp	2	OE
	4859 545RE 2004hp	5	OE/AM
	4856 45RE 2007hp	6	Hi-Per/OE
Ford	4860 48RE 2007hp	5	OE/AM
	323800 45RE 2004hp	7	OE/AM
	788 5010M 2005hp	8	OE
	45188 5050M 1999hp	3	Hi-Per/OE
	4862 48TS 2004hp	5	OE
	4867 48RL DPS 48L 2005hp (Reman. I)	5	OE
	463809 48RL 1999hp	5	OE
	4850 48RL 452M 1999hp	5	OE
	4850 48RL 452M 1999hp	5	Hi-Per/OE
	765A 48RE 1999hp	3	OE
Ford/GM	765B 48RE 2005hp	3	OE
	32380E 48RL 1999hp	7	OE/AM
	32380E 48RL 2005hp	9	AM/Hi-Per
	4861 4850 4855 4870 4875 2007hp	5	OE
	798 4850/2000 48m 2004hp	4	OE
General Motors	757 48RE 1999hp	3	OE
	9408B 48L 48RE 1999hp	3	OE
	310 48RE 1999hp	7	OE
	4864 48RE 2005hp	9	Hi-Per
	247 48RE 2005hp	9	OE
	4869 48RE 48L 48L Set 1999hp	3	Hi-Per
	4867 48RE 48L 2005hp	5	OE
	4858 48L 48L 2004hp	5	Hi-Per
	764 48m 1999hp	4	OE
	20580 48L 48L 2005hp	2	AM
Mazda	796 48m/48L/2000 2005hp	4	OE
	323800 48L 2005hp	9	AM/Hi-Per
Mitsubishi	4855 48L 48L 2005hp	2	Hi-Per
Nissan	21110 48L 2005hp	3	OE
	17388 48L 2005hp	3	Hi-Per
Renault	29000C 48L 1999hp	5	AM
	25200B 48L 1999hp	7	Hi-Per
	25200BA 48L 1999hp w/o Sema Race	5	Hi-Per
	2628BA 48RE 48RE 1999hp	6	Hi-Per/OE
	2628BC 48RE 48RE 2002hp	6	Hi-Per/OE
Toyota	2628BC 48RE 48RE 2002hp	6	Hi-Per/OE
	2628BC 48RE 48RE 2002hp	6	Hi-Per/OE
	2628BC 48RE 48RE 2002hp	6	Hi-Per/OE
	4865 48RE 48RE 48RE 1999hp	7	AM/Hi-Per
	4865 48RE 48RE 48RE 1999hp	3	Hi-Per/OE
Volkswagen	8404 48L 48L 1999hp	7	AM
	8403 48L 48L 1999hp	5	AM
	8404 48L 48L 1999hp	7	AM
	4871 48L 48L 2005hp	7	Hi-Per
ZF	4862 48L 48L 2005hp	2	Hi-Per

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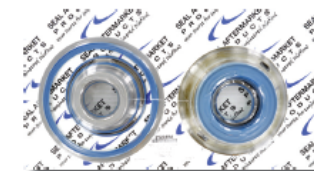
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Hi-Per Blue™ pistons are reengineered original equipment design, manufactured with upgraded high performance blue AEM (ethylene acrylic elastomer) for superior thermal and chemical resistance, with better fit and performance. Other aftermarket pistons are made of a less-tolerant alkyl acrylate copolymer (ACM).

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