REBUILDER NEWS

Freudenberg NOK™

Volume 5, Issue 1 / First Quarter, 1998

from TransTec®

Win A Harley-Davidson® Super Glide in TransTec's 20th Anniversary *"Head Out On The Highway"* Give-Away!

The next TransTec transmission rebuild kit you open may qualify you to win a new Harley-Davidson Super Glide motorcycle. It's all part of TransTec's *"Head Out On The Highway"* contest celebrating the company's 20th anniversary of supplying transmission professionals with rebuild kits.

No purchase is necessary, but you must be a professional transmission technician or shop owner to participate. Official entry forms can be found in TransTec transmission kits with a date code of A98 to K98. If you open a TransTec kit that doesn't contain an official entry form, you can still enter the contest. Simply fill out a postcard after reviewing contest rules presented in TransTec advertisements. You can also call TransTec's toll-free contest "hotline" at 1-800-852-0340 (ext. 6405) for contest information.

"The '*Head Out On The Highway*' contest inaugurates our 20th year of serving transmission professionals and shop owners" noted Dave Gardner, president of Freudenberg-NOK's Aftermarket Division, the company that brings you TransTec kits. "Our growth and success over the past 20 years is a direct result of their support," he added.

Freudenberg-NOK is a supplier of original equipment seals for Harley-Davidson. "Their motorcycles and our kits are both made in America, and both known for their quality" said David McGee, director of aftermarket operations. "Harley-Davidson has a lot of appeal with transmission technicians,"

added McGee. "Rebuilders attending our tech seminars frequently wear clothes emblazoned with the Harley logo. Awarding some rebuilder or shop owner with a Super-Glide has tremendous appeal, especially since we're a supplier for Harley-Davidson."

The next time you're rebuilding with a TransTec kit, look for the 20th anniversary *"Head Out On The Highway"* contest entry form. You may become the proud owner of a brand new Harley-Davidson Super Glide. The drawing for the motorcycle will be held December 1, 1998.

In this issue...

Vespel® Sealing Rings Deliver Superior Performance in A604/606 Reaction Support Ring

TransTec is proud to announce the first in a series of Vespel® brand sealing rings developed exclusively for the aftermarket. A joint effort between TransTec and DuPont has produced an A604/606 reaction support ring that features superior sealing at all temperature ranges, increased longevity, and ease of installation.

Vespel® seal rings have been thoroughly tested, in the laboratory by DuPont and in the field by Certified Transmissions of Omaha, Nebraska, and outperformed the OEM metal ring and the 4L80E Teflon ring used by some rebuilders.

The chart on the next page shows the results of laboratory testing. It should be

Vespel® Sealing Rings ... *continued from front cover*

noted that all tests were done using new parts. This is especially important in the case of the solid Teflon rings, which tend to shrink after time. This increases the clearance between the ring and drum, resulting in more leakage. If the test could have been done with seasoned components, the results would have been even more dramatic.

Don't be confused if the kit you're using does not include the metal ring. The new Vespel® ring (P/N 21442) replaces the metal ring (P/N 21051) in all kits and for bulk sales.

This ring is also used in the A500, for which kits have also been updated. As a further bonus, this ring will also fit TH400 and 4L80E center supports, as well as TH400 front covers. We are still in the process of testing the rings in these applications. The tests are expected to show that the rings are superior for these applications as well. Due to the high RPM capacity of Vespel®, these rings should be especially useful in racing applications.

Vespel® Sealing Rings

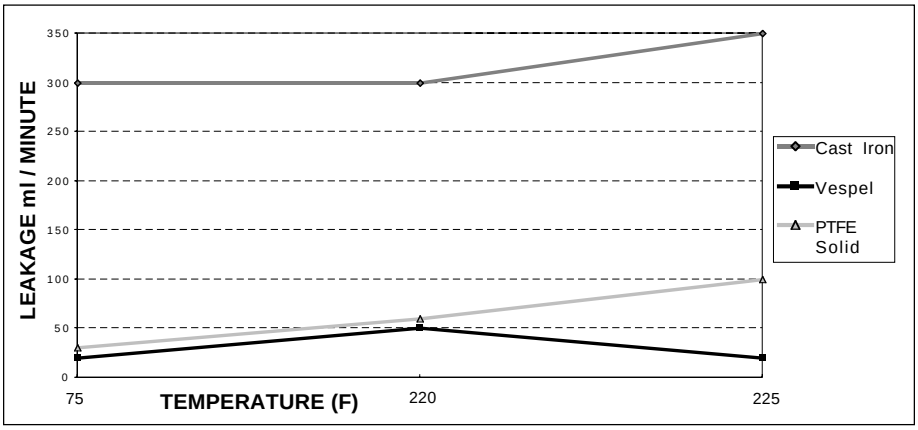
Recommended Installation Procedure

One of the advantages of the Vespel® ring is its ability to seal against an irregular ring groove surface. To accomplish this, the ring must "seat" against the side of the ring groove. The use of assembly gel or grease, especially grease, interferes with this seating process.

1. Install seal dry or lightly lubricated with transmission fluid. Do NOT use any type of assembly gel or grease!
2. Carefully install ring over shaft lands. Be careful not to over expand the ring.

Caution: It is strongly recommended that assembly lube NOT be used for installation of these sealing rings.

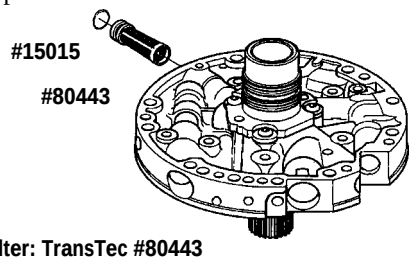
Comparison of Sealing Ring Material



GM Changes Color of Pump Cover Filter Screen

General Motors has made a running change in the color of the pump cover line pressure filter on 1982-up TH700-R4, 4L60, and 4L60E transaxles. Current parts are made from a black plastic resin material, which will change to a white plastic resin. This is a color change only; everything else remains the same.

The new white pump cover filter will be added to TransTec rebuild kits when stock of the current black part is depleted.



Filter: TransTec #80443
(OEM #8642912 & #24210086)
O-ring: TransTec #15015 (OEM #8642581)

New Vamac® Lathe Cut Seal Introduced for GM Front Pump

The front pump O-ring for GM applications detailed below changed for the 1997 model year. The new seal is made of Vamac, which replaces the polyacrylate material previously used. It is easily identified by its pink edge, in contrast to the yellow edge of the polyacrylate seal.

GM Applications

1982-up: TH700-R4, 4L60, 4L60E
1990-up: 4L80E

TransTec #23503 / OEM #24210605

TransTec rebuild kits for these applications will contain the new Vamac seal when stock of the previous seal (TransTec #25054, OEM #8654716) is depleted. The new seal will be available from your local TransTec Distributor.

REBUILDER NEWS

Denny Scher, Editor

Rebuilder News is dedicated to providing current technical information to the automatic transmission rebuilder. Reader's comments/suggestions are welcomed. Write: Editor, Rebuilder News, P.O. Box 556, Milan, Ohio 44846-0556.

Invasion of the 5040;

Aisin Warner's transaxle comes in many disguises

By Tony Darr, Transmission Technician

In the early '90s Volvo developed their first front wheel drive vehicle, the 850. When it came time to pick a transmission, they logically turned to their long-time supplier, Aisin Warner. What Aisin offered was the AW5040LE. Volvo was not the first car company to use this transmission. Opel has had this unit in production since 1989 in the Calibra and Cavalier. *Not to be confused with the Chevy Cavalier, they're two different cars.*

Coming Soon...

For you guys that are saying to yourself, *Who cares? I know I'll never work on an Opel; and hopefully I can avoid Volvos, too!* Listen up... Opel has already arrived in the states. The Cadillac Catera is an Opel in Cadillac clothing. The Catera is a rear drive vehicle and uses a 4L30E, but you get my point.

For 1998, Saab (owned by GM) is offering the 9-5 and 9-3, but guess what? They're Opels in disguise. Both of these are using the front drive Aisin units.

Rumor has it that in 1999 Saturn will start selling a car based on the Opel Calibra. Currently, the Calibra also uses the Aisin unit.

With everyone worried about the "world economy," auto manufacturers are starting to design cars to be sold worldwide. Chances are, stuff only seen in other parts of the world will eventually find its way to the states.

So brace yourself for the invasion of the 5040, we're just beginning to see the tip of the iceburg *(an appropriate reference with all the "Titanic" hype we're hearing lately).*

Unraveling the Transaxles

The 5040 is offered in quite a few different versions. Volvo uses the AW5040LE and the AW5042LE. Opel, just to be difficult, uses different designations. Opel calls their units the AF14, AF20 and AF22.

There are some differences between Opel and Volvo; the most notable being the axle seals. Opel uses a GM-type seal with a steel stone guard, similar to the TH125. Volvo on the other hand, uses a typical Japanese rubber-coated seal. There are some other internal differences, but basically they are the same unit.

The reason for different versions within the same car families is torque capacity. Basically, the higher the model number, the larger the engine, and greater number of clutch plates installed in the unit.

Not Much Info Available

One reason we decided to write this article is to address the lack of information available. That's also why it took us so long to develop a kit for these transmissions. Volvo does not service this transmission, they only sell reman units. The Volvo factory manual only contains R&R and electrical information. Volvo's parts cataloging was also lacking - the only parts you can buy at the Volvo dealer are external items or a whole transmission.

Most of our information came from Europe. Opel does service parts and we were able to obtain a service manual. The rest of the information came from disassembling both a Volvo and Opel unit and seeing for ourselves. The following pages present a photo record

Resistance Chart

Component	Remarks		Resistance (Ω)
Engine Speed RPM Sensor Solenoid A Solenoid B Solenoid Lock-Up	Resistance between the solenoid pin and the solenoid cover/transmission housing		300-600 10-15 10-15 10-15
Solenoid - Pressure Control	Resistance between the solenoid pins		2-6
Oil Temperature Sensor	Temperature (°C) (°F)	0 (43) 20 (68) 40 (104) 80 (176) 100 (212) 150 (302)	1700-2300 765-1035 340-460 107-143 64-86 23-31

of our efforts.

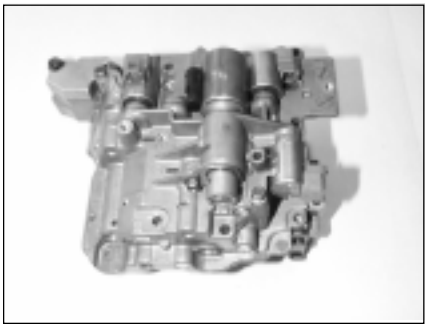
Before reviewing the photos, there is one other unit I would like to mention. There is a smaller version of this puppy running around. Aisin Warner downsized this unit and called it the AW6040. Opel, of course, has to have their own name; the AF13.

Basically the two units are similar in function; the large difference being that the 6040 gets the same job done with one less clutch and one less sprag element. The easiest way to tell the two apart is that the servo on the 5040 is on top of the case, and in the 6040 it comes in from the bottom of the case. You will find this smaller unit in the Suzuki Esteem (here in the states), Suzuki Baleno (overseas), Daihatsu Charade and Applause (overseas), Opel Astra, Tigra and Corsa (overseas), and the Holden Barina SB (overseas). More on this baby brother next time.

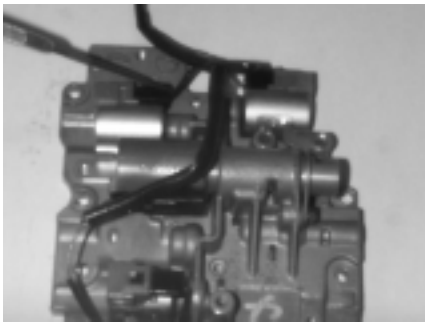
A Note of Thanks...

I would like to take this opportunity to thank ATP A.T.R.S. Ltd. in England for the samples, the cores and technical information used to write this article and develop the kits for these units.

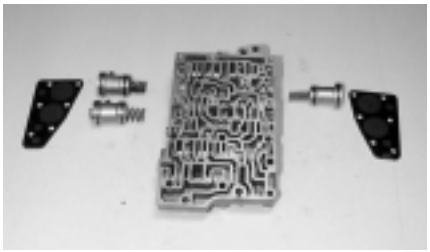
1) The Volvo and Opel versions of this trans use totally different axle seals. The Volvo uses the typical Aisin rubber coated seal, while the Opel seal is similar to the metal clad TH125 axle seals.



3) Solenoid identification: Top row from left to right: Lock-up solenoid (SL), pressure control solenoid (STH) shift solenoid A (S^1). Bottom row left to right: Arrow shows retainer end of the PCS, shift solenoid B (S^2).



2) The wiring harness for the shift solenoids can be swapped. The wire for shift solenoid A (SI) is black with a shield on both Opel and Volvo units.



4) Accumulator pistons located in the rear valve body, have Teflon® seals to perform sealing duties. Note there are only 3 pistons, while the V.B. housing has 4 bores. Identification: Left side upper intermediate (B^2), lower direct (C^2), right side underdrive (C^3).

Applied Elements

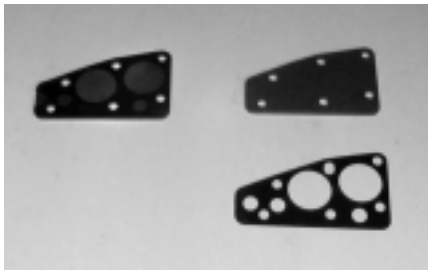
B1 = Over Run Clutch
B2 = Intermediate Clutch
B3 = Low & Reverse Clutch
B4 = Underdrive Brake Band

C1 = Forward Clutch
C2 = Direct Clutch
C3 = Underdrive Clutch

F1 = Intermediate Sprag
F2 = Low Sprag
F3 = Underdrive Sprag

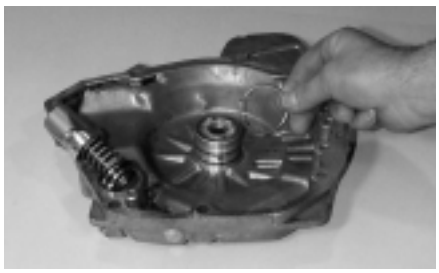
S1 = Shift Solenoid A
S2 = Shift Solenoid B

POSITION		S1	S2	C1	C2	C3	B1	B2	B3	B4	F1	F2	F3
P	Parking		●							●			
R	Reverse		●		●				●	●			
N	Neutral		●							●			
D	1st		●	●						●		●	●
	2nd	●	●	●			●	●		●	●		●
	3rd	●		●		●	●	●			●		
	4th			●	●	●		●					
3	1st		●	●						●		●	●
	2nd	●	●	●			●	●		●	●		●
	3rd	●		●		●	●	●			●		
L	1st		●	●					●	●		●	●
	2nd	●	●	●			●	●		●	●		●



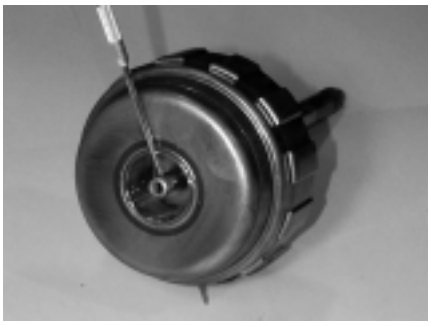
5) The valve body accumulator cover plates for Volvo versions use gaskets bonded to the plates while Opel uses separate plates and gaskets.

6) Don't forget these little seals hiding beneath the valve body! Leave these out and your day may be ruined. The left seal is for lube to the transfer gear, the one on the right is for low and reverse apply.

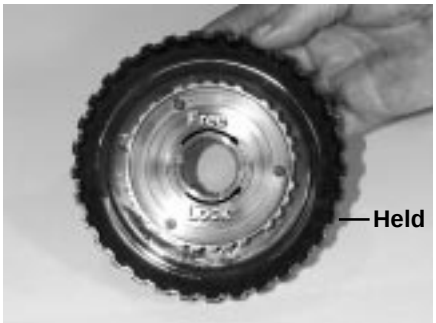


7) Careful! Early units take cast iron rings here. Late units use Teflon rings riding on a steel sleeve! If you use the late seals on the early cover, the Teflon rings will destroy the aluminum cover. *You can imagine how pleased a customer will be with a car that has no forward range.* The forward accumulator piston also resides in the rear cover.

8) If you are counting along, there are now six little seals like this to ruin your day! These seal the forward and direct clutch apply fluid as well as lube fluid to the planetary assembly.

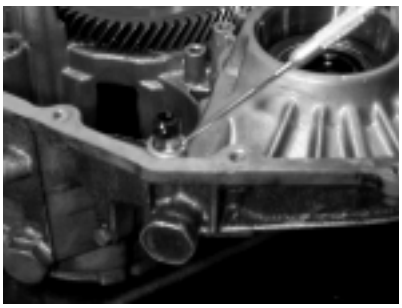


9) Here is another one of those "easily missed - ruined my day" parts. This small Vespel® ring seals lube oil for the forward/direct drum pilot shaft bearing. Be sure to check this drum carefully... it tends to crack around the weld, leaving you with no forward again.



10) Intermediate sprag rotation, inner hub locks counter clockwise and free wheels clockwise.

11) Low sprag rotation, inner hub freewheels counter clockwise and locks clockwise.

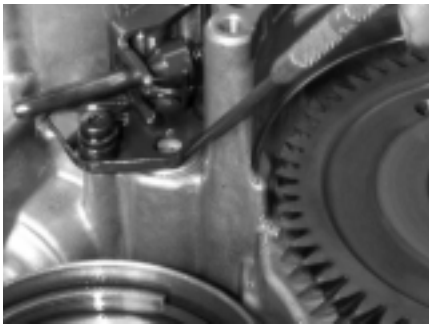


12) Bet you thought you were through with these pesky seals! This one is between the case halves and seals lube oil for the differential bearings.

13) Located in the converter housing case half is another "easily missed-ruined my day" sealing ring. This one seals lube oil for the planetary gear sets. This Vespel® ring has a gap that is normal when installed.

14) Care must be taken when re-assembling the planetaries. This photo shows the retaining ring mis-positioned. The internal ring gear is below the level of the carrier pinions.

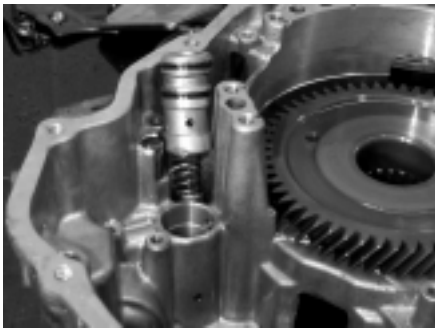
16) Underdrive sprag rotation, drum assembly freewheels counter clock-wise and locks clockwise. This photo also shows the underdrive brake band and the underdrive clutches.



18) "I'm hiding! Can you find me?" teases the underdrive brake accumulator.

15) This photo shows the planetary retaining ring correctly installed. The internal ring gear is flush with the carrier pinions.

17) Did you think you were through with those #!# "Little" parts? Leave this anti-clunk spring out and you'll be chasing a driveline clunk all day.

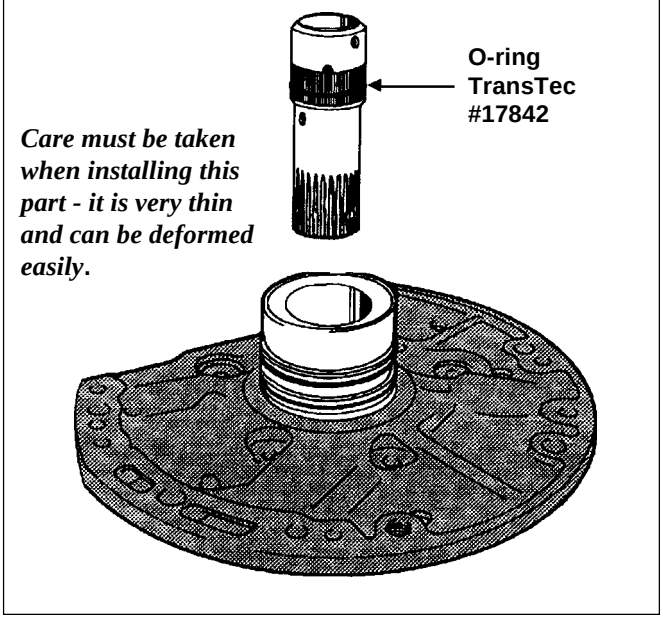


19) The parking pawl assembly plays double duty by also retaining the underdrive brake accumulator assembly. Caution: This is under spring pressure and may very well pop you in the nose.

Stator Support Shaft O-ring Now Available for Mitsubishi KM and F4A/W4A series with Lock-up Converter

Complaints of a continuously shuddering converter clutch have been traced to a deteriorated O-ring on the pump stator support shaft. Deterioration of this O-ring causes converter release fluid pressure loss, allowing the clutch to drag, causing shudder and premature failure.

It is advisable to replace the entire assembly. However, due to the demand, an O-ring has been designed for this application. The O-ring, TransTec #17842, is made of Viton®. It will be added to the TransTec gasket/seal and overhaul kits for the appropriate Mitsubishi applications.



TransTechnical Bulletin

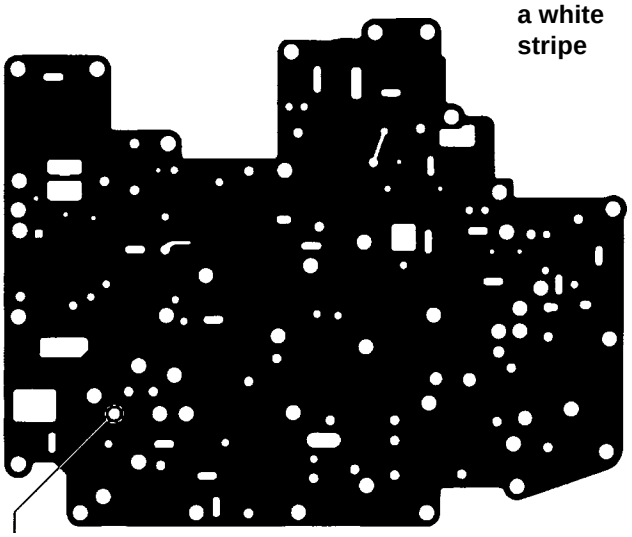
Running Change Made to 4R70W Valve Body Gaskets 1996-Up

There has been a running change made to the lower valve body gasket in the 4R70W (1996-up). This change involves the hole shown in the illustration and the identification color stripe.

The hole for the 2-1 exhaust has been enlarged from .200" to .230" in diameter to aid in shift timing. The color stripe has been changed from light orange to white.

This revised gasket will retro-fit all previous 1996-up models, and will be added to all 4R70W gasket/seal kits and overhaul kits when stock on the previous part is depleted.

TransTec No. 12862
OEM No. F7AZ-7D100-AA



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