REBUILDER NEWS

Freudenberg NOK ™

Volume 1, Issue 3 / Fourth Quarter, 1993

from TransTec

Season's Greetings

All of us at TransTec wish you and yours a very bright and joyous Holiday Season!

This issue features the G4A-EL transmission used in the Mazda 626 & MX6 1987-Up and the Ford Probe 1989-Up (Ford's designation for this trans is 4EAT-G).

In addition to the cover story about the G4A-EL's accumulator pistons, the *Troubleshooter* feature article gives insightful rebuilding tips for this transmission.

Thanks to all of you who wrote to us with all your positive comments about the first two issues of ***Rebuilder News.*** Our goal is to continue to provide you with timely technical information to help keep you up-to-date on the frequent changes in the transmission rebuilding industry.

If you have a problem, tip or comments you would like to share with us, write to Editor, Rebuilder News, c/o TransTec, P. O. Box 556, Milan, OH 44846.

G4A-EL Accumulator Pistons

TransTec overhaul kits for Mazda G4A-EL transmissions have now been updated to include 4 new pistons with rings installed as original equipment at the factory.

Originally, these pistons were made of aluminum, and used teflon rings with a 3.0mm width.

Due to leak problems, the pistons were changed in mid-1990 from aluminum to plastic, and the sealing rings went to a 2.0mm width.

Mazda recommends replacing the aluminum pistons with the later design, plastic pistons during overhaul.

TransTec has sourced the pistons, complete with rings, from NOK in Japan. NOK, the O.E. supplier to Mazda, is the Japanese partner of TransTec's parent company, Freudenberg-NOK.

Both the early (3.0mm) and the late (2.0mm) rings have been discontinued, and will be removed from the TransTec overhaul kit #2194. The 4 new pistons with rings (3 in the valve body and 1 in the case) will replace the rings in this kit. The pistons are also available as a separate kit under TransTec #3396.

All TransTec kits with a date code of H93 or later will be updated.

AOD & AODE Forward/Reverse Friction Plate

There has been some confusion regarding the latest forward & reverse friction plate used in the AOD & AODE. Since TransTec is the O.E. packager of the service (dealer) kits for Ford, our experience with this situation enables us to shed some light on the issue.

Cont'd. on page 2

TransTec *Truth Squad*

In response to occurrences of inaccurate technical information in the transmission rebuilding industry, we have formed the **TransTec *Truth Squad*** to dispel rumors, eliminate the "bull", and give you the cold, hard facts.

Whenever you see the Truth Squad "No Bull" symbol beside an article in ***Rebuilder News,*** you can be assured that it's the truth; dispelling incorrect information given by non-credible sources.

BW T65/66 Servo O-Rings

There has been an O-ring change in the kit for the Borg Warner T65/66, the 3 Speed, RWD transmission found in the Jaguar XJ6 1974-87, and limited BMW usage in the mid-70's.

Until now, TransTec has been using the OEM servo O-rings in these kits. The O-rings have a cross section of 3.0mm (.118"). The effectiveness of an O-ring with a 3.0mm cross section in this application could be described as marginal at best. The biggest problem is in the intermediate servo area.

Some aftermarket kit packagers are using a standard 3.55mm (.139") cross section O-ring in this application. These "off-the shelf" O-rings have an inside diameter much smaller than the originals. The small I.D. is necessary so that the O-ring can be stretched enough to reduce the cross section, thus allowing the servos to be installed.

TransTec examined this option and determined it is not a wise move. The "off-the-shelf" O-rings have to be stretched much further than 4%, which is the maximum recommended by the Society of Automotive Engineers (S.A.E.).

TransTec has examined the hard parts, and redesigned the O-rings for a more accurate fit. The new parts have a cross section of 3.30mm (.129"). We have reduced the I.D. slightly (1.5mm) to prevent rolling. This O-ring change will make an appreciable improvement in the sealing application.

All TransTec kits with a date code of K93 or later will include the new O-rings.

BORG WARNER T65/66 SERVO O-RINGS

PREV. TT#	NEW TT#	B.W.#	DESCRIPTION
15878	15618	0465-141002	Rear Servo Small (Front Servo Small, Triumph)
15879	15619	0465-016003	Front Servo Small (Except Triumph)
15880	15617	0465-141001	Front Servo Small (Triumph Only)
15881	15620	0465-141004	Front Servo Large, Front Servo Cover
15882	15621	0465-016001	Rear Servo Small

AOD & AODE Friction Plate...

This plate, Ford reference #F2VP-7E311-BA, is commonly known as the "grob" (pronounced *grobe*) forward friction, referring to the "grõb" drum, which is stamped steel (as opposed to cast).

The only difference between the early and the late plate is a minor material change. However, there is confusion over the *size* of the plate.

The new plate supposedly has a .030" larger *inside* diameter. However, it is the same size as the earlier plate. Ford *did* use a plate with a .030" larger *outside* diameter for a time in production.

This plate, Ford reference #F2VP-7E311-AA, was used to fix a production problem. The problem was that the "grob" drum is larger, and it allows the friction to float around. Consequently, it was harder to line up the spines on the assembly line. It is our information that Ford has since gone back to the normal size plate.

We are currently using the new plate in the AODE kit, and will soon be using it in the AOD kit as well.

TransTec NEW PRODUCT ANNOUNCEMENTS

For additional product announcement information, contact your local distributor.

Mazda F4A-EL 1990-Up-323, MX3, and Protege; Ford 4EAT-F 1991-Up - Escort and Tracer TransTec Kit #2265

Mazda G4A-EL and Ford 4EAT-G 1993-Up Gasket & Seal Kit - TransTec #1273 • Overhaul Kit - TransTec #2273

Acura Vigor 1991-Up (transmission code MPWA) Overhaul Kit #2271

Honda 4 Speed and Del Sol 1992-Up (transmission code M24A) Gasket & Seal Kit #1270 • Overhaul Kit #2270

3L30 (TH180/C except Holden) 1969-Up Combo Kit Gasket & Seal Kit #1278 • Overhaul Kit #2278

TransTec TROUBLESHOOTER

MAZDA MIGRAINES:

Technically, it's Show-N-Tell Time

By John Wozniak, TransTec Transmission Product Manager

Trying to find reality with Japanese transmissions gives me migraine headaches. After years of suffering from this malady, I've classified these headaches in degrees of severity, for example: any Honda 4-speed provides a Mini-Migraine, Nissan's RE4R01A always results in a Midi-Migraine, and for a rip-snorting Maxi-Migraine, just tangle with a MITS F4A-33.

In the next few pages, I'll show you the insides of a full-blown Midi-Migraine...Mazda's G4A-EL transmission.

Date of Birth, Please

When I started to gather data for this report, I intended to explain some tricky things you need to know about Mazda's G4A-EL transmission. But as so often happens with Japanese transmissions, things got real complex, real quick. Like, when did this trans first show up?

Did the G4A-EL first show up in 1986 Mazdas (as some catalogs list it), or was it in the 1987 626 (as other catalogs list it)?

At Long Last, The Truth!

After straining my eyeballs looking at a zillion (that's what it felt like) micro- fiche, and phoning a number of transmission experts who refuse to have their names associated in any way with this trans, I uncovered what I believe is The Truth: The '86 was really an '87.

Mazda first used the G4A-EL in June, 1986, but the car they put it in was a 1987 Model Year vehicle.

NOTE: Even TransTec got snookered on this one, We've listed 1986 as the year when Mazda first used this trans. We're correcting our catalog, even as you read this.

Better Than The Lottery

At any rate, overhaul kits for these transmissions have become one of our fastest sellers. Not only are there a lot of these transmissions out on the road, there are a lot of them being towed off the road and into shops like yours because, plainly, this trans is a piece of ——— well, let's just say that the unit's failure rate could make you filthy rich.

Before we get into the Show part of this report, here are some Tell things that you need to know about the G4A-EL.

As Sherman might have said, "..it's EL out there."

The 1987-92 G4A-EL is a computer shifted transmission that uses three shift solenoids and one lock-up solenoid. A throttle cable controls line pressure. Inside the box you'll find a familiar overdrive setup. All the friction elements are the same as in a 4L60 (TH700-R4), but Mazda engineers moved the frictions to new locations.

In keeping with Japanese automotive tradition, hardly had the '87 hit the road when Mazda engineers made wholesale changes in the EL.

It's a Conspiracy to Confuse

In 1988, one year after the introduction of the trans, those engineers went ballistic and changed - are you ready for all this? --the 3-4 clutch steel, the low and reverse, the coast, and the reverse input frictions, the input shaft, the stator support, the torque converter, the filter, the valve body, and the 3-4 drum.

(Sort of tells you how much trust they placed in their original engineering design!)

But since they were on a roll, the Mazda engineers also cobbled up an hydraulically-controlled version of the trans, proudly named it the G4A-HL, and stuck it into the 1988 323s where it stayed through the '89 model year.

Ford, Like Frank, Does It "Their Way"

Incidentally, Ford also uses the HL in the Capri, from 1991-up. And in '89, Ford began using the EL version in the Probe. Ford, of course, had to rename the EL trans "4EAT-G".

Between ’88 and ’92, Mazda engineers must have had something important to do, because they didn’t mess with the EL trans again until 1993. But they made up for the pause in a big way: the ’93 EL is now fully-computer-controlled.

EL is Not A Constant State of Being

The two biggest changes Mazda made in the ’93 EL involve the valve body and the pump. The trans now has seven (7) solenoids and the pump is now a rotor type, not a vane type (talk about digging up old, bad ideas!). There’s no throttle cable anymore because the computer controls line pressure. A whole bunch of hard parts and three steel plates have also been changed, just to keep you awake.

Here are some tips you need to remember before you attack any version of these transmissions that’s dragged into your shop.

Diagnose First, Take Prisoners Later

The first tip is to diagnose. Lest you forget, this is an electronic-controlled transmission. So before you go to the bother of pulling the unit for overhaul, make sure you aren’t looking at a computer problem.

Tip #2 is to remember that with this transmission, having the fluid level where it's supposed to be is critically important. Make sure that the fluid level is dead-on the Full Mark when the unit is hot.

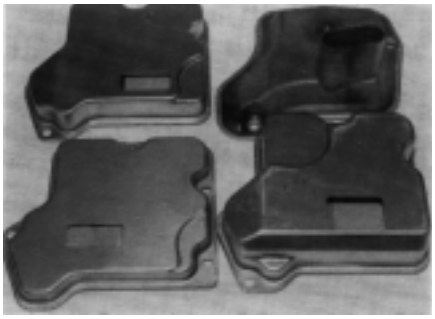
Better Late Than Never...

On 1986 Model Year Mazdas that were produced before December, 1986, overfill the unit with about a half-inch of fluid. After December ’86, Mazda engineers raised the Full Mark to where it should have been all along.

And the Third Tip to keep in mind is that throttle pressure adjustment is very touchy on this unit. A good starting point is to allow Zero slack in the cable at idle. Remember, the cable controls how it shifts, not when it shifts.

It's Show Time!

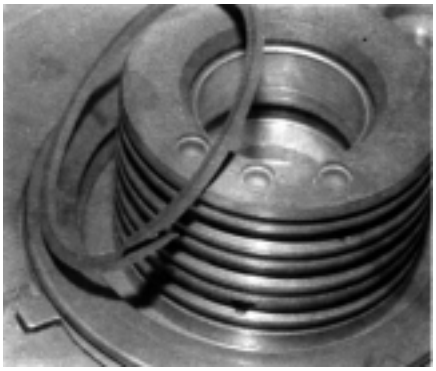
The Show part of this Show-and-Tell report is the result of my tearing down a Mazda G4A-EL transmission and going into snapshot frenzy. So if you ever wanted to know how to cope with a Mazda Migraine, here are 16 ways to look at one.



#1 *How many filters does one transmission need? Mazda's engineers apparently like crowds, as evidenced by these filters for the EL trans. Reading clockwise from lower left: The ’87 EL filter is attached with four bolts; the ’88-’92 EL Takes a thin, three-bolt plastic filter; the ’93-up EL has a three-bolt plastic filter; the HL version is a thick, three-bolt filter.*

#2 *This is a ’93-up “zero-leak” filter made by Sealed Power. It has a real filter element instead of the “back door screen” found in early Mazda filters. Note: Sealed Power says they will soon replace Mazda’s ’88-’92 filters with this new filter. A small step toward balance of trade.*

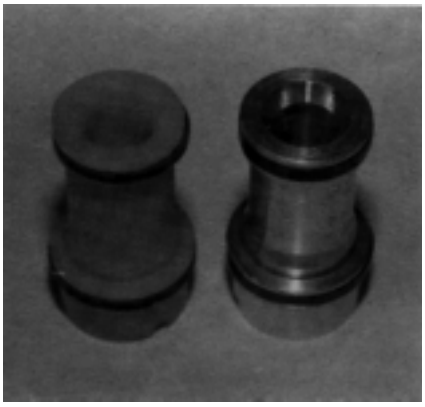
#3 *Pan and valve body gaskets are different for turbo and non-turbo applications. You’re looking at a non-turbo case; make sure you know which of the two gaskets goes with it. You can stay a happy camper if you make sure you have the right gasket before you.*



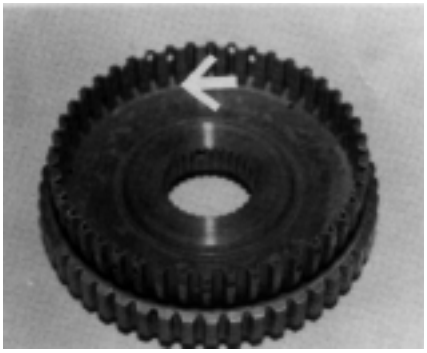
#4 *If you want to avoid cross leaks, always use OEM sealing rings on the pump cover. You can get burned bad by some afermarket rings that aren’t OEM and aren’t made with the close tolerances required. Of course, when you get a TransTec overhaul kit, you get OEM sealing rings. You can also use Ford E92Z-7D019-A.*

#5 *Here are four great opportunities for cross leaks. The four oil passages between the pump halves are sealed with O-rings. Inside those O-rings are wire expanders. The key word is inside.*

Mazda used smaller O-rings in the '87 trans than they did in the '88-'92 units, so don't get expedient. And shown here is what some guys consider a "hot fix". The little metal and rubber seals are valve body-to-case seals for a Toyota A40D. They fit Mazda '88-'92 pumps perfectly. Get Toyota 35893-30010 or tell your distributor you want a TransTec 32409. When Mazda switched to a rotor pump in '93-up units, they eliminated the O-rings. Pity.

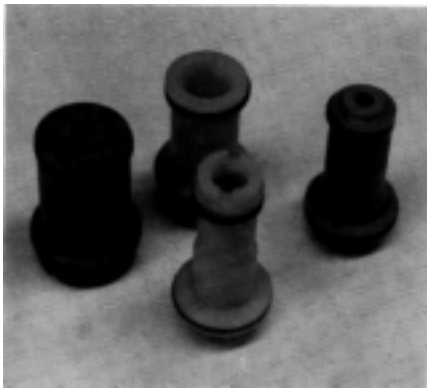


#8 *This unit uses four accumulator pistons; three in the valve body and one bolted to the case. Mazda first used aluminum pistons with 3.0mm-thick rings. That setup leaked like a seive. Then they got smart and switched to plastic pistons with 2.0mm-thick rings.*

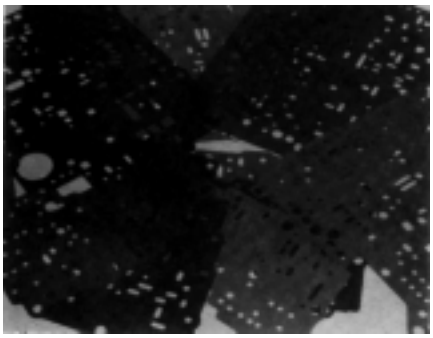


#10 *Because it's not all that hard to assemble the sprag backwards, make sure it free-wheels in the direction shown here. If there's no movement, except in manual 1st or 2nd, you're probably looking at a bad input sprag.*

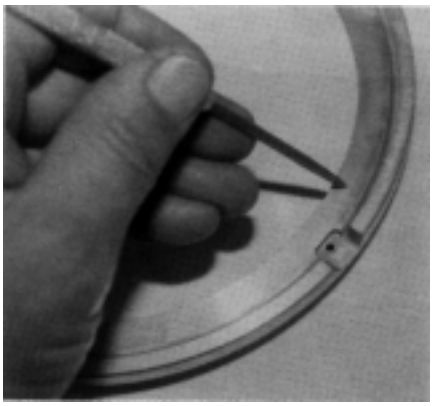
#6 *Between the case halves are other O-rings, but without interior wire expanders. Seal the rest of the case with silicone. But take care: Blocking one of these passages with sealer will seal your fate for a day, at least.*



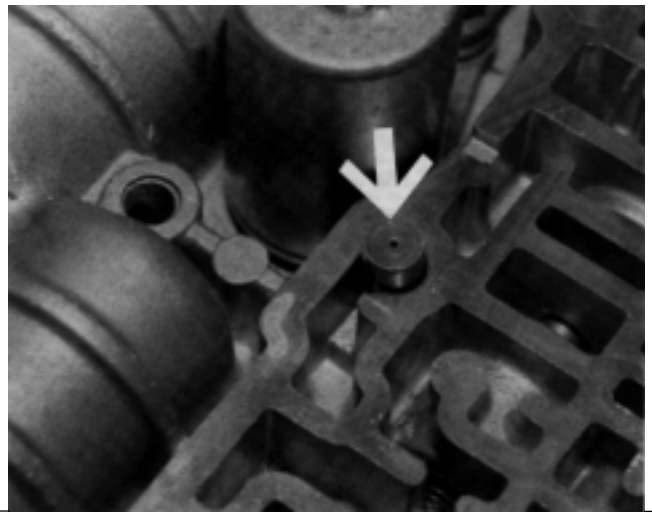
#9 *Here are all four OEM pistons, complete with rings, which were taken from a TransTec overhaul kit.*



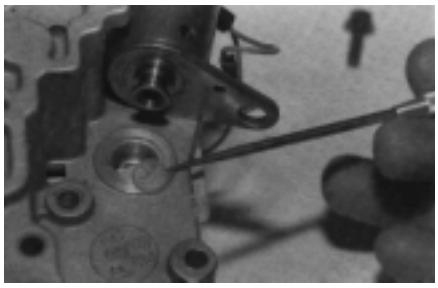
#11 *This pile of gaskets includes only some of the 24 different possibilities that confront you when you work on one of these transmissions. Each valve body uses six gaskets. Be very careful that you correctly match the gaskets with the valve bodies. Otherwise...well, you know.*



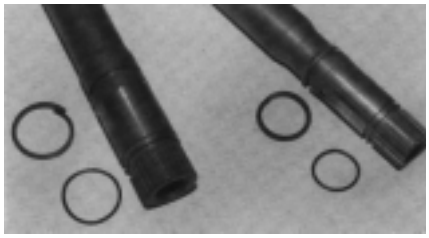
#7 *Reverse clutch failures can happen if you don't use OEM O-rings or if cross leaks let the clutch apply when the vehicle is moving forward. Only your smarts will keep you from putting in wrong O-rings, but to eliminate cross leak problems, drill a .030" hole in the location you see here. The hole lets any cross leak fluid exhaust.*



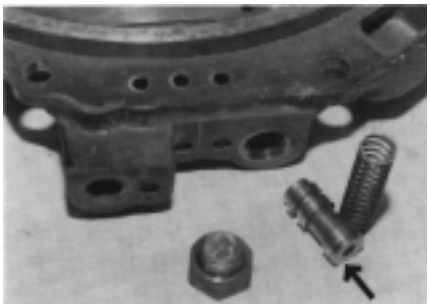
#12 *This valve body uses orifice-cup plugs to control pressure, but the plugs aren't all the same size. Don't mix them up, and for Pete's sake, don't leave any of them on your work-bench when you button up the trans.*



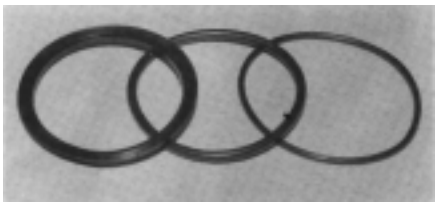
#13 *Solenoids hate what metal does to them, but since solenoids are magnets, metal is always attracted to them. It's sort of like the action in a Singles Bar. Your task is to always make sure you clean and/or replace solenoid screens.*



#15 *The meatier input shaft at left is from an '87 unit. In '88 Mazda began using the shaft at the right, and (surprise!) started having problems with cracking shafts. the sealing rings and TCC O-rings are not interchangeable, shaft to shaft. If you try to use them where they don't belong, you know who gets the shaft.*



#16 *1990-'92 pump relief valves use a spring seat that goes here. In early units, the spring sometimes snagged in the bore and caused low line pressure. The '90-'92 valve retrofits back to '87. Order Mazda FU02-19-735F or the identical F02Z-7Z306-A from Ford.*



#14 *Here are the three different 3-4 clutch inner seals. Left to right: '87 Lip Seal; '88-'92 3.5mm-thick O-ring; '93-up 2.4mm-thick O-ring. This is no place to play "mix-n-match".*

EPILOGUE: (That's a fancy word to tell you that this Show and Tell exercise is about over.) If you want to cast a ballot for my enshrinement in the Snapshooters Hall of Fame, or want to talk about any of the things we showed you with these pictures, just drop me a line.

JOHN WOZNIAK
Transmission Products Manager

A4LD Center Support Viton Rings

In 1993, Ford changed the center support, and consequently the viton sealing rings in the A4LD transmission. The new support has wider ring grooves to accept the **new, wider** viton rings. there has been some confusion on which seals to use. To insure using the right seals, you should measure the width of the ring grooves on the center support.

The early support has a groove width of approximately .105" and uses the .083" wide seal, TransTec part #27503 (OEM #E5TZ-7D429-A). The late support has a groove width of approximately .120" and uses the .102" wide seal, TransTec part #27504 (OEM #F3TZ-7D429-A). For easy identification, the wider seal will have a blue stripe on the inside diameter. All late TransTec A4LD gasket & seal and overhaul kits with a date code of L93 or later will contain **both** seals.

A4LD Kits

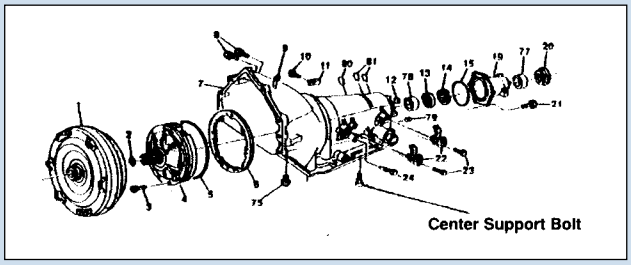
TransTec Kit No.	Year Coverage	Kit Type	Sealing Rings
1110	1985-87	Gasket & Seal	27503 Only
1193	1988-Up	Gasket & Seal	27503 & 27504
1206	1985-Up	Gasket & Seal	27503 & 27504
1254	1985-Up	Gasket & Seal W/German Gaskets	27503 & 27504
2110	1985-87	Overhaul	27503 Only
2193	1988-Up	Overhaul	27503 & 27504
2206	1985-Up	Overhaul	27503 & 27504
2254	1985-Up	Overhaul W/German Gaskets	27503 & 27504
DP1110	1985-87	Gasket & Seal W/Duraprene® Pan Gasket	27503 Only
DP1193	1988-Up	Gasket & Seal W/Duraprene® Pan Gasket	27503 & 27504
DP1206	1985-Up	Gasket & Seal W/Duraprene® Pan Gasket	27503 & 27504

TransTechnical Bulletins

4L80E Center Support Bolt

The center support bolt in the 4L80E has a modified 3/8-16 thread to provide an interference fit. General Motors recommends this bolt be replaced during overhaul or any repair requiring its removal.

As a convenience to our customers, TransTec will supply this bolt, TransTec #81625 (OEM #8661762), in all 4L80E gasket and overhaul kits with a date code of G93 or later..

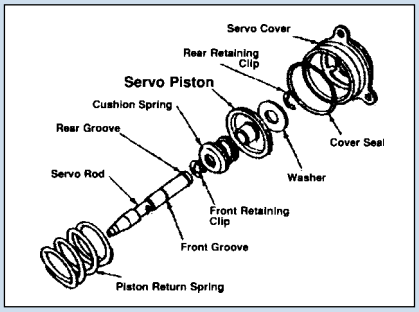


AXOD & AXOD-E Overdrive Servo

The AXOD and AXOD-E use a molded rubber piston for the overdrive servo. In 1993, Ford changed the rubber compound of this piston from polyacrylate to Vamac®, which has a higher temperature range.

This piston has a new Ford engineering number; however, the Ford part number, E6DZ-7F200-A, and the TransTec number, 81598, will remain the same.

The new pistons are currently in stock and ready for immediate shipment.



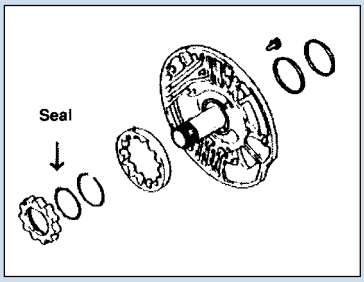
Mitsubishi Pump Gear Seals

The Mitsubishi "KM" series transaxles have always used a seal between the inner pump gear and the torque converter hub. In the early units, this seal was an O-ring that fit in a groove on the inside of the inner pump gear.

In mid-1988, this O-ring was changed to a metal clad type seal. This seal has 3 dimples on the outside diameter that fit into pockets which are machined on the inside diameter of the pump gear.

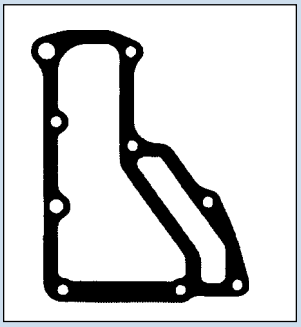
The transaxles affected by this change are the "-5" series (KM 171-5, 175-5, etc.), and all later units.

This seal is manufactured by NOK, and TransTec has it in stock under part number 32622 (OEM#MD729928). It is available for bulk sales and will be included in the late Mitsubishi ovrhaul kits #2216 and #2217, starting with date code L93.

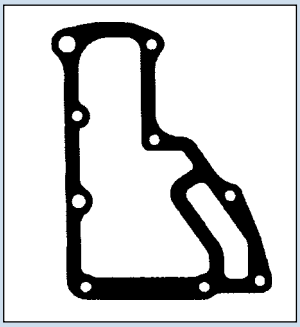


Toyota A540E Gasket Change

Toyota has made a change in the upper case cover gasket on the A540E transazles. 1992 and newer transaxles use the new design gasket, TT# 12620 (OEM#35153-33010). Models prior to 1992 require the old gasket, TT# 12420 (OEM# 35153-32010). All TransTec overhaul kits with a date code of J93 or later will contain both gaskets.



TT# 12420
(OEM# 35153-32010)



TT# 12620
(OEM# 35153-33010)