

REBUILDER NEWS



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from

TransTec®

"Mini-Manuals" Added to TransTec Kits

Technical "mini-manuals" have been added to TransTec rebuild kits for the following Ford applications:

E4OD 1989-96
AOD-E / 4R70W
4R44E / 4R55E 1995-96

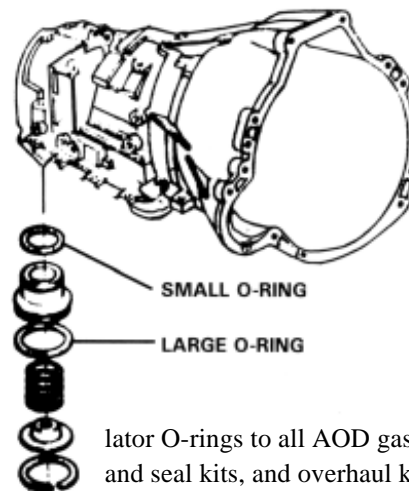
Information contained in these manuals includes: location of air pressure checks; checkball location diagrams; exploded views of valve bodies; clutch clearances; solenoid application charts; electrical schematics; and clutch and band application charts.

Accumulator O-Rings Added to AOD Kits

Some 1992 and 1993 AOD transmissions were produced with an aluminum 2-3 accumulator piston instead of the plastic piston normally found in the AOD.

This aluminum piston is the same part that is used in the AODE. It uses O-rings for seals, while the plastic piston uses Teflon sealing rings. The Teflon rings and the O-rings cannot be interchanged.

To cover these final two years of the AOD, TransTec has added the accumu-



lator O-rings to all AOD gasket and seal kits, and overhaul kits.

Ford E4OD Changes for 1996

The E4OD transmission has had several changes for the 1996 model year.

- 1) The upper and lower valve body gaskets are new, and have light green stripes for identification.
- 2) The low/reverse clutch piston now

has lip seals instead of lathe cut seals.

- 3) The pan gasket is now a molded rubber gasket instead of cork.

None of these parts interchange with the old parts! The new parts are listed below:

Description	TransTec #	OEM #
Upper Valve Body Gasket	12851	F6TZ-7C155-A
Upper Valve Body Gasket (optional .015" thick)	12852	N/A
Lower Valve Body Gasket	12850	F6TZ-7D100-A
Low/Reverse Outer Lip Seal	28325	F6TZ-7D403-A
Low/Reverse Inner Lip Seal	28326	F6TZ-7D404-A
Molded Pan Gasket	32414	F6TZ-7A191-A

Due to these changes, the year coverage on the current E4OD kits will end

at 1995. The new kits for 1996-Up are as follows:

Description	TransTec #
Gasket & Seal Kit with molded rubber pan gasket	1313
Overhaul Kit with molded rubber pan gasket	2313
Gasket & Seal Kit with molded rubber pan gasket and .015" upper valve body gasket	1314

In this issue...

- Our Troubleshooter feature article provides insight into rebuilding the VW/Audi AG4.
- Accumulator O-rings added to AOD kits. *See cover article.*
- Ford changes the E4OD for '96, and parts don't interchange with earlier models. *See cover article.*
- Teflon sealing rings for Chrysler's A727 and Powerglide stator support now available. *See page 2.*
- TransTec new product introductions. *See page 2.*
- Ford changes the 4R70W (AODE) for '96. *See page 7.*



NEW PRODUCT ANNOUNCEMENTS

For additional product announcement information, contact your local distributor

Ford 4R44E and 4R55E

Gasket Sets & Overhaul Kits Now Available

The 4R44E and 4R55E were introduced by Ford Motor Company in model year 1995, and are basically A4LD units with total electronic control (they're sometimes referred to as "A4LD-E" units). The 4R55E unit has more clutch plates than the 4R44E, and is found behind 4.0L engines because of its higher torque capacity. They're used in 1995-Up Rangers and Explorers, and 1996-Up Aerostars.

TransTec #	Description
1309	Gasket & Seal Kit
DP1309	Gasket & Seal Kit with Duraprene® Gaskets
2309	Overhaul Kit
DP2309	Overhaul Kit with Duraprene® Gaskets

Teflon Sealing Rings for Chrysler's A727 and Powerglide

Due to customer requests, TransTec is offering Teflon sealing rings for the stator support (high clutch drum) for the Chrysler A727 and the aluminum Powerglide. Both of these transmissions are frequently used in race cars. Due to the high RPMs encountered in these applications, Teflon rings are preferred over cast iron because they cause less wear on the drums and pumps. These rings are available in bulk for the Torqueflite 727 **TransTec #21382** and Powerglide **TransTec #21383**

New TransTec Kits for the Ford 4R70W 1996-Up

Gasket & Seal Kit with molded rubber pan gasket - **TransTec # 1311**
Gasket & Seal Kit with Duraprene® pan gasket - **TransTec #DP1311**
Overhaul Kit with molded rubber pan gasket - **TransTec #2311**

BTR 93LE and 97LE Transmissions 1994-Up

Overhaul Kit: BTR 93LE and 97LE Transmissions - **TransTec #2304**

Coming Soon...

F4A33/32 End Clutch Kit

TransTec will soon offer an end clutch repair kit for the 1991-Up F4A33/32. The kit will include all the necessary components to rebuild the end clutch, including the rear cover gasket, inner & outer clutch seals, early & late metal clad seal, speed sensor O-ring, sealing ring, retainer bolts & seals, etc.

It's the Little Things That Count

It's the little things we do to make TransTec rebuild kits better than other brands. Since our engineers are on top of the latest microfiche (or other media) as it comes out, we're constantly updating kit contents in response to changes from the OEMs. We don't add "novelty" parts to our kits, like springs that alter shift characteristics, just for the sake of adding parts. But if it makes sense to add parts for the right reason, such as an OEM change, we do it.

In addition, as OEM parts become available to the aftermarket, we update our kits as soon as possible. Our kits contain the highest quality parts, and we don't cut corners.

In the end, rebuilders appreciate the higher quality, and that's what gives us the edge over the competition.

Here are some of the "little things" we're currently doing to improve our kits:

- Adding the governor filter (TT#81683) to the Toyota A440 kit.
- Adding the new differential rear cover gasket (TT#11315) to kits to cover the 1995-Up Hyundai A4AF-2.
- Changing the Toyota front pump seal to the OE seal (TT#29910).

REBUILDER NEWS

Denny Scher, Editor

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The VW/Audi AG4: Easy to Fix, IF you can get the parts.

By John Wozniak, TransTec Transmission Product Manager

I don't know about you, but I think this business gets harder every year. I've been putting trans kits together for almost ten years, and before that I worked in a rebuild shop just like you're doing now. When I started, our shop would see maybe eight or so different transmissions on a regular basis. And those were pretty simple things to work on, compared to what rolls into your shop these days. It seems that every vehicle that comes in sports a trans with something different on it or in it. Or both.

I just checked the 'puter, and TransTec now packs almost 100 different trans kits. To make each kit, we first have to figure out what the original components are. There was a time when this was not too difficult, but lately the OEMs are on some sort of a 'change-frenzy' that reminds me of sharks' feeding habits.

On top of all the changes - some little, some big - simply getting the information from the OEMs has become a real bear.

These days, almost all OEMs run some sort of reman program. One reason OEMs run these programs is to get back units under warranty so they can do failure analysis. Another big reason is the car dealers' shortage of people qualified to repair automatic

transmissions. Probably, like most Big Business reasons, the real reason is because it's cheaper.

And here's where the "Trickle-Down" principle snaps our solenoids.

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Apart from what we can learn by taking apart the unit itself, the biggest source for information about a new transmission's components *has* been the OEM's catalog. But catalogs on new transmissions are being issued far slower than ever before. The OEMs seem to be saying "Why spend money on a catalog if we're only going to replace the unit anyway?"

All of the above sort of sets the stage for the subject of this article: "What's with the VW/Audi series of computer-controlled four-speed automatic transmissions?" (You knew I'd get to the point sooner or later.)

The VW/Audi series of trans first showed up in the '90 Passat. We began developing kits for these about three years ago. We chose to hold off developing these until we finished our line of kits for Japanese transmissions, a decision largely driven by the greater number of faulty Japanese units. But even though we've been at it for three years, we're

still working like beavers to keep up with the changes VW/Audi keep making. What's dragging out the process is the fact that cataloging from VW is still not complete *six years* after they introduced the transmissions, and most of the inside parts are not available separately. Talk about a research nightmare!

Get to know Renault

At the start, this series of transmissions was planned as a joint venture between Renault and VW/Audi. That makes sense when you realize that most of Europe still shifts by hand. Even today, 56% of all European-made vehicles with automatic transmissions are exported, mainly to the US.

Since less than 5% of our vehicles come from Europe, you can see why their car manufacturers try to share the expense of designing and building

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automatic transmissions.

The original plan called for Renault to make automatic transmissions for VW/Audi as well as for their own vehicles. That plan didn't last long. (Rumor has it that VW/Audi was not overjoyed with

Renault's quality. Imagine that!) VW now makes their own units and Audi has almost totally switched over to

ZF's 5-speed trans. So much for plans. I think Audi is trying to break away from its image as a fancy VW and grab some of the territory claimed by BMW and Mercedes.

(As a direct result of the different trans coming out of VW and Audi these days, I won't use the compound name "VW/Audi" anymore in this article. Besides, I'm tired of typing all that. When you smoke along at a blazing 30 words per minute, such things become important.)

But Forward Into History

The Renault-built trans first showed up in the US in 1988. They put it into a 4-cylinder Eagle Premiere. Renault proudly called it the AR4. The AR4 is a north-south mounted unit that to you is similar to the 097 you've seen in the Audi. (The AR4 might look similar to you, but to us it's a major change because most of the metal-clad seals are different from those in the 097, as

are the pan gasket and most external seals.)

Mercifully, the AR4 was gone by 1990, so the chances of you seeing this thing in the US are slim.

Of course, Renault remains active in Europe. They developed two new versions of the AR4, which they've called the AD4 and the AD8. One of those is a transverse unit while the other is a different version of the north-south trans. To be brutally frank, we don't yet know which is which. Our work on this series of trans has concentrated on the Renault versions. We already have a pretty good handle on the VW side of things.

If you're Germanically inclined, you need to call these versions the AG4. In reality, three *different* versions have

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been produced; the 095/096, the 097, and the 098. To add to your storehouse of confusion, in 1995 VW and Audi made major changes in these trans, and gave them three new designations. I'll walk you through those things later in this article. For now, let's stick with the base units.

Base Unit 095/096

These are base units for VW. These front-wheel drive trans are on all VWs, except for the Eurovans. (Check the Application Chart for the exact coverage.)

The 095 - which came out first - became the 096 in October '91 when they changed the

pinion setup and changed the pinion seal. This differential uses different lubricant, just like the A404 does.

NOTE: VW stiffly denies ever making the 095 and will only admit to the 096. That's a little hard to swallow, since I have a '90 Passat service manual that specifically refers to the "095 Transmission." I suspect we are seeing a typographic error or an example of the OEM mentality that holds "Out of Service, Out of Mind."

This is the Audi version of the AG4. The 097 has a north-south configuration and is put together just like the Audi 3-speed, or the Subaru. First comes the torque converter housing, then the differential with axle stubs hanging out the side, and finally, the trans itself.

The differential is isolated from the trans and converter housing, with pinion seals front and rear. Those are necessary to handle the different lubricants. As you'd correctly guess, all the

VW/AUDI AG4 TYPE APPLICATION CHART

Model	Years	Trans Type	Engine Type/ Size	Trans Model
100	91	4 Speed FWD	L5 2.3L	097
Cabriolet	94	4 Speed FWD	V6 2.8L	097
Cabriolet	95-96	4 Speed FWD	V6 2.8L	01N
Cabrio	95-96	4 Speed FWD	L4 2.0L	01M
Corrado	90-10/91	4 Speed FWD	L4 1.8L V6 2.8L	095
Corrado	10/91-94	4 Speed FWD	L4 1.8L V6 2.8L	096
Corrado	95	4 Speed FWD	L4 1.8L V6 2.8L	01M
Golf	93-94	4 Speed FWD	L4 1.8/1.9/2.0L	096
Golf	95-96	4 Speed FWD	L4 1.8/1.9/2.0L	01M
Jetta	93-94	4 Speed FWD	L4 1.8/1.9/2.0L	096
Jetta	95-96	4 Speed FWD	L4 1.8/1.9/2.0L	01M
Jetta GLX	94	4 Speed FWD	V6 2.8L	096
Jetta GLX	95-96	4 Speed FWD	V6 2.8L	01M
Passat	90-10/91	4 Speed FWD	L4 2.0L V6 2.8L	095
Passat	10/91-94	4 Speed FWD	L4 2.0L V6 2.8L	096
Passat	95-96	4 Speed FWD	L4 2.0L V6 2.8L	01M
Eurovan	92-94	4 Speed FWD	L4 2.4/2.5L	098
Eurovan	95-96	4 Speed FWD	L4 2.4/2.5L	01P

AG4 CLUTCH COUNTS

Clutch	098/01P		096/01M 4Cyl		096/01M 6Cyl & Diesel		097/01N	
	Friction	Steel	Friction	Steel	Friction	Steel	Friction	Steel
2-4 Brake (B2)	6	7	6	7	6	7	6	7
Reverse Clutch (K2)	5	5	5	5	5	5	5	5
Forward Clutch (K1)	5	5	5	5	5	5	5	5
4th Clutch (K3)	5	4	5	4	6	5	6	5
Reverse Clutch (B1)	6	6	5	5	5	5	5	5

How Goes The Power Flow

Strip away the external differences, and you'll discover that *all* these units are about the same inside. The easiest way to

metal-clads and the pan gasket are different from the 095/096.

Base Unit 098

You'll find this trans in the rear-engine Eurovan, the vehicle which - in its original life as a Microbus - found fame in Arlo Guthrie's song about Alice's Restaurant. That won't

mean anything to those of you who are into Smokin' Grooves, but hey...life is like that. Anyhow, this trans looks similar to the 095/096, except it has a long extension housing hanging off one side. But don't get expedient...a closer look will show you that the 098 has a different pan, a different transfer gear cover, and different metal clads.

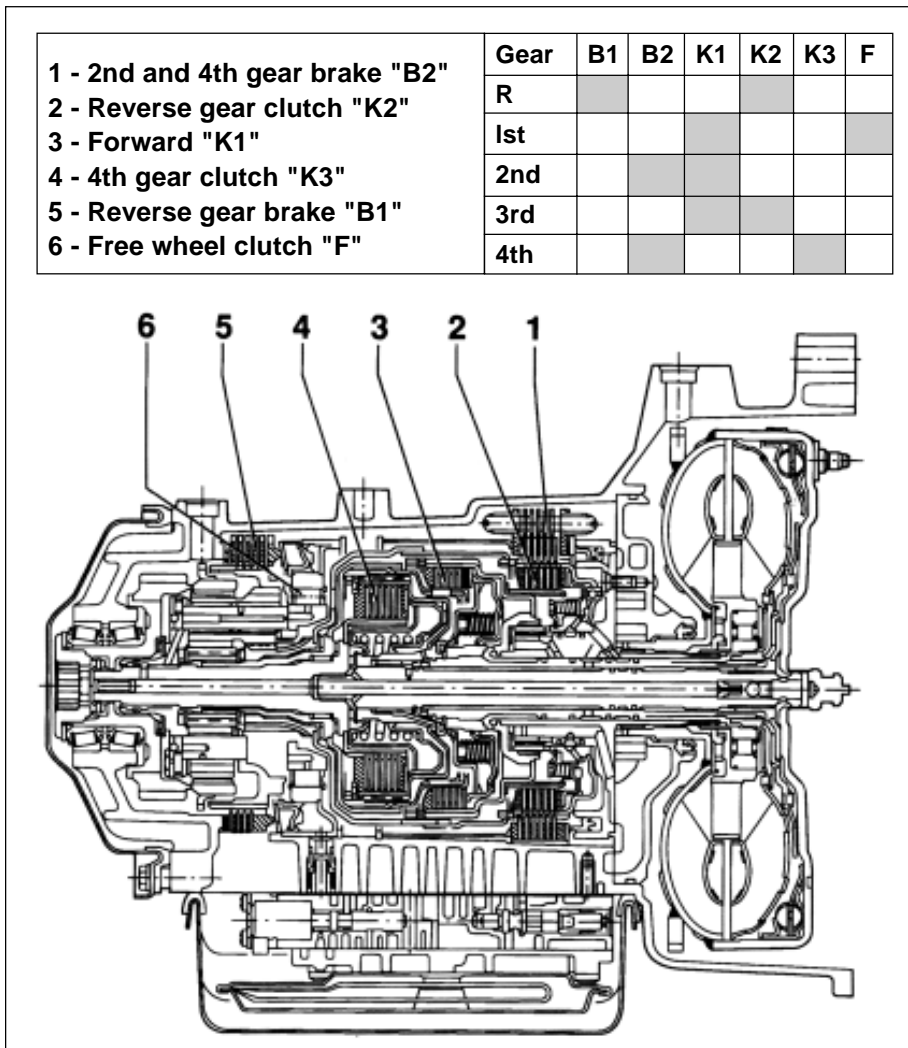
figure it all out is to think of the original Ford AOD. There was no true lock-up converter in the AOD; there's none here either. Instead, there's a damper in the converter that's splined to a separate input shaft. And the damper in these units is used partially in 3rd and fully in 4th; it's like *deja vu* with the AOD all over again.

Starting at the front of all these transmissions, the first clutch you see is the 2-4 (B1). Like the AOD, once more. Absent from this one is the intermediate one-way clutch. But unlike the AOD, the clutch in this trans is *not* on in 3rd.

The next clutch you encounter is the reverse clutch (K2). As you might guess, this clutch is on in reverse, just as it is in the AOD. Unlike the AOD, this clutch is also on in 3rd, taking the place of the AOD's direct clutch. Following that one is the forward clutch (K1). VW more accurately calls this one the "1st-3rd clutch" because it is on in those gears.

Moving right along, you come to the 4th (K3) clutch, which takes the place of the overdrive band in the AOD. And finally, you meet up with the 2nd reverse clutch (B2). Again, VW chooses accuracy over gloss, and calls this one the "Reverse Brake." It replaces the reverse band that's in the AOD and performs the same function here as the band did there.

Hiding in the back is the low one-way clutch that holds in 1st gear and



freewheels in 2nd gear. If all this gets to be too much to absorb, refer to the clutch application chart in this article.

Electronics

There's no way to avoid discussing electronics when you talk about any new transmission. In order to give you the information below, I have scoured every service manual I could find. Unfortunately, information about the electronics on all these transmissions is - like everything else available about them - sketchy at best.

Things are fairly standard on the input side. Inputs from the speed sensor, multi-function switch, throttle position sensor, transmission temperature sensor, RPM, and the engine control module go directly to the transmission control module. The computer sorts out all the stuff it wants and sends signals to the solenoids to control the transmission's operation. Pretty straightforward up to here, but things spice up a bit now.

**VW/AUDI
095-098 SOLENOID
APPLICATION CHART**

1995-96 Solenoid				
Gear	N88	N89	N90	N91
Park	X			X
R				
N	X			X
1st				X
2nd		X		X
3rd				
4th	X	X	X	X
1995-96 Solenoid				
Gear	N88	N89	N90	N91(1)
Park	X		X	
R				
N	X		X	
1st			X	
2nd		X	X	
3rd				
4th	X	X		

Is Seven A Lucky Number?

Attached to the valve body are seven solenoids. You read it right...seven solenoids to control four gears and no lock-up. Take a deep breath before you read on.

Four of those seven solenoids control the four speeds. Solenoids N88, N89, N90 and N91 all perform that function. Why they started with "88" beats me; I've looked everywhere but can't find any reference to solenoids N1 through N87. Take a squint at the solenoid application chart in this article to see which solenoid is on in which gear.

Next is a quote straight out of VW's Service Manual. "*Solenoid valves N92 and N94 are supplementary valves that affect gear selection changes and are only controlled during gear changes.*" Boy! What a diagnosis section they provide!

Checking the solenoids electrically is a no-brainer operation. Of course, most solenoids don't fail electrically, they fail mechanically. Apparently, VW figures that transmission repair guys have a sixth sense, because they don't tell you what any of those solenoids do, and they don't include an oil schematic in their service manual, either. They let you figure out if you have a solenoid problem some other way. Lotsaluck.

The Guessing Game

Here's an educated guess: I think that N94 controls shift timing during 3-4 and 4-3 shifts, and that N92 controls shift timing for 2-3 and 3-2 shifts. That leaves us guessing about the N93. It appears to be a down-shift solenoid that's on when the throttle is wide open.

The transmission computer also controls an interlock solenoid that's located on the shift lever. This solenoid won't allow the shifter to be moved unless the brake is on. I suspect Audi may be a bit touchy on that subject.

Checking the solenoids electronically is a no-brainer operation. Of course, most solenoids don't fail electronically, they fail mechanically.

Be Prudent, Pal

Before you do anything rash, like blaming things on a bad solenoid, better make absolutely sure you've got the real culprit. You can't just buy one of these sweethearts. All seven solenoids must be

bought as a single assembly. That will set you back about \$150 at your friendly dealership.

'95 Changes, a La AOD

Back in '90 when Ford unleashed the AODE as the replacement for the AOD, one of the biggest non-electronic changes was the replacement of the mechanical lock-up system with a true hydraulic lock-up converter. That one change eliminated one of the biggest driveability problems associated with Fords. The funky-feeling 3rd and 4th gears were gone.

It took the vaunted VW engineers only five more years to come up with the same solution to the same problem. Starting in '95, the 095-098 transmissions now have a true lock-up. Strange though it seems, the units still operate with seven solenoids. They figured out that they can make four gears work with three solenoids instead of with four. Most everybody else does the same thing with two solenoids, but who counts?

More Changes Still

There are changes worth noting. The molded rubber clutch pistons have

been altered and the 4th (K3) clutch and the forward (K1) clutch changed too. The retainer for the release springs now has a rubber lip seal molded into it. That seal fits into the regular piston and acts as a guide; it works like the A604's molded piston.

I'm going into all this minutiae because - so far as I can tell - those parts are not yet available on the aftermarket. One of the OEM vendors refuses to sell two of the parts to the aftermarket, which makes things doubly nice. For the dealer, that is. The only way you can get those parts is to buy the whole drum from the dealer who will be all too glad to sell it to you.

We're also in the process of confirming that the pistons were changed in '95 along with all those other changes. It's possible that some trans made *before* '95 also contain these new pistons. If you see a trans with those new pistons, treat them with great respect.

Of course, when they added lock-up they changed the model designations on all the units. To keep things straight, check the designation chart in this article.

Final Thoughts

From what I hear, repairing one of these gems isn't all that difficult. Good

rebuilding practices plus quality parts usually results in a successful rebuild. But from what I also hear, getting the right parts can be a sizable pain in the drip pan.

I've taken several calls from

I've taken several calls from rebuilders who tried to fix an 097 or an 098 with a kit for the 095/096. Guess what. It won't work.

rebuilders who tried to fix an 097 or an 098 with a kit for the 095/096. Guess what. It won't work.

Identifying what you're working on is no big deal. Cast into the top of every case is the part number for the assembly. The

first three digits tell you which transmission is staring up at you.

1995-Up Model Designations	
1990-95	1995-UP
095/096	01M
097	01N
098	01P

When you see "097" on the case, you're working on an 097 trans. Etc., etc. Pretty simple, after all.

But Watch Out

If you are looking at a case that shows 097 (01N) or 098 (01P) don't let your parts guy sell you a kit for an 095/096 (01M).

And watch out for those pistons.

TT

Ford 4R70W (AODE) Changes for 1996

The 4R70W first came out in 1993 in the Lincoln Mark VIII as a heavy-duty version of the AODE. Each year since then, it has been used in more vehicles while the AODE usage has diminished. By 1995, the 4R70W had completely replaced the AODE.

In 1996, the 4R70W went through some changes. The upper and lower valve body gaskets changed, the valve

body cover gasket changed, and the extension housing gasket had a material change and Silicone bead added. Due to these changes, plus the fact that the 4R70W always had a larger rear seal than the AODE, we will be coming out with new kits to cover the 4R70W for 1996-Up. Our current AODE/4R70W kits will cover both transmissions through 1995 (except for the rear seal).

Description	TransTec #	OEM #
Upper Valve Body Gasket	12863	F7AZ-7C155-AA
Lower Valve Body Gasket	12862	F7AZ-7D100-AA
Valve Body Cover Gasket	12861	F6AZ-7H173-A
Extension Housing Gasket	12860	F6AZ-7086-A

Appearing Soon

A TransTec representative will be at the following "Tech Seminars"

Date	City	State
October 12th	St. Louis	Missouri
November 1st-3rd	Las Vegas	Nevada
<i>Powertrain Industry Expo - Transmissions '96</i>		
November 16th	Pittsburgh	Pennsylvania

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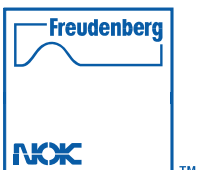
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