

REBUILDER NEWS



Volume 3, Issue 1 / First Quarter, 1995

from **TransTec**

A4LD TCC Filter Added To TransTec Kits



TransTec Rebuild kits for the Ford A4LD transmission now contain the valve body TCC filter. The filter, Ford #E8TZ-7N113-B, snaps into the separator plate, and is easily lost or damaged. Since the filter is critical for

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Mazda G4A-EL, G4A-HL & F4A-EL

TransTec Kits Now Contain the OE Turbine Shaft Sealing Rings

Most technical services currently recommend buying these turbine shaft sealing rings, as well as the other sealing rings for these applications, from a dealer. This is no longer necessary because TransTec overhaul kits now contain the OE turbine shaft rings. All the other sealing rings in these TransTec kits already were the OE rings, so the addition of the OE turbine shaft rings make all the rings in the kit OE.

Dealer (OEM) rings were recommended for these applications due to

design differences in PTFE (Teflon®) sealing rings in the U.S. and Japan. In the U.S., PTFE rings generally fit loosely in the piston groove. Consequently, a molded ring with a tolerance of $\pm .005$ " works fine. U.S. ring manufacturers mold their rings and are able to hold these kind of tolerances.

In Japan, the PTFE rings fit much more tightly, like a rubber seal would fit. Therefore, the tolerances must be much closer than can be achieved by molding, the only manufacturing

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AODE Forward Clutch Sealing Ring

The forward clutch sealing ring in the Ford AODE has gone through a few changes recently. In 1992, the first year of the AODE, they used the original black cast iron ring from the AOD (part # E0AZ-7D019-A).

A new ring was introduced in 1993 only in the AODE-W (4R70W) transmission used in the Lincoln Mark VIII. This ring (part # F3LY-7D019-A) was dimensionally the same as the black ring. But it was ammonium nitrated to harden it to withstand the high RPM full throttle shifts encountered in the Mark VIII. It is easily identified by its silver-gray color.

In 1994, the F3LY-7D019-A was modified. The inner and outer edges of the ring were chamfered, and the part

number changed to F4AZ-7D019-A. This new ring is used in all 1994 AODE transmissions and will retrofit all AODE and AOD transmissions. The black rings and the non-chamfered silver rings cannot be used in 1994 or later transmissions. These rings can bind up in the ring groove due to different machining of the bottom of the groove on 1994 (and later) stators.

The new ring, part #F4AZ-7D019-A, is available under TransTec #20208, and is included in all TransTec AODE sealing ring kits with a date code of M94 or later. The original black ring will still be used in TransTec ring kits for the AOD.

In this issue...

- Our *Troubleshooter* feature article introduces you to Ford's new CD4E transmission, a light-duty overdrive transaxle.
- Dispelling competitor's myths; the truth about updated kits and their contents. *See page 7.*
- A4LD TCC filter now added to TransTec kits. *See cover article.*
- GM replaces 4L80E extension housing O-ring with lathe cut seal. *See page 2.*
- Evolution of Ford's AODE forward clutch sealing ring. *See cover article.*
- Mazda's OE turbine shaft sealing rings now included in TransTec kits. *See cover article.*

Mazda OE Turbine Shaft Sealing Rings...*continued from front cover.*

method currently available in the U.S.

Japanese PTFE rings are made from a solid rod of PTFE. After curing, the I.D. is bored and the O.D. is machined. Because of this process, the rings are capable of holding tolerances of $\pm .001$ ". Such close tolerances are required in these applications.

Some kit producers are recommending the use of rubber to replace PTFE in these applications. This is because PTFE rings made to these precise tolerances were not available prior to now.

The solution is OEM machined PTFE sealing rings. They are manu-

factured by NOK in Japan, and available only from authorized TransTec distributors. These rings enable the rebuilt transmission to perform exactly as it was originally designed.

Application	Years	Turbine Shaft Sealing Ring	
		TransTec #	OEM #
G4A-EL, G4A-HL	1986-87	21292	FU01-19-762A
G4A-EL, G4A-HL	1988-ON	21291	FU50-19-762A
FORD 4EAT-G	1989-ON	21291	E92Z-7G090-A
F4A-EL	1990-ON	21291	FU50-19-762-A
FORD 4EAT-F	1990-ON	21291	E92Z-7G090-A

A4LD TCC Filter Added...*continued from front cover*

TCC operation, it cannot be left out - it must be replaced. TransTec is the only A4LD rebuild kit on the market to include this filter. All TransTec kits

with a date code of **A95** or later will include the filter, and it is also available separately from authorized TransTec distributors.

The A4LD TCC Filter has been added to these TransTec Kits:

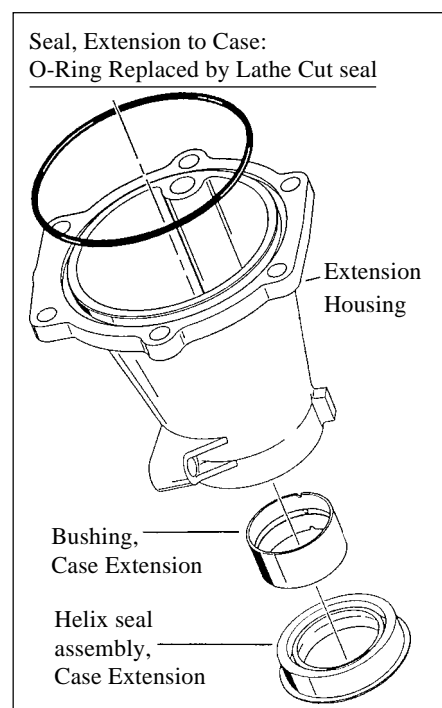
Gasket & Seal Kits	Year	TransTec #
W/Cork & Rubber Pan Gasket	1985-87	1110
W/Cork & Rubber Pan Gasket	1988-On	1193
W/Cork & Rubber Pan Gasket	1985-On	1206
W/German Gaskets & Viton Governor Rings	1985-On	1254
W/Duraprene Pan Gasket	1985-87	DP1110
W/Duraprene Pan Gasket	1988-On	DP1193
W/Duraprene Pan Gasket	1985-On	DP1206
Overhaul Kits	Year	TransTec #
W/Cork & Rubber Pan Gasket	1985-87	2110
W/Cork & Rubber Pan Gasket	1988-On	2193
W/Cork & Rubber Pan Gasket	1985-On	2206
W/German Gaskets & Viton Governor Rings	1985-On	2254

4L80E Extension Housing to Case Seal

General Motors has made a running change on the extension housing to case seal for the 4L80E transmission.

Originally, an O-ring was used for this application (TransTec #15248, OEM #8661297). GM changed this to a lathe cut seal, TransTec #25096 (OEM # 8681168). This seal replaces the O-ring and will fit all 4L80E transmissions.

TransTec gasket & seal kits and overhaul kits with a date code of L94 or later will contain this seal. It is also available in bulk.



REBUILDER NEWS

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THEY'RE PLAYING A FAMILIAR TUNE ON FORD'S NEW CD

By John Wozniak, TransTec Transmission Product Manager

Ordinarily, these little essays deal with the quirky problems of somebody's transmission, and we give you tips on how to overcome the engineers' head-in-dark-space nutty design.

This time, we're introducing you to Ford's new CD4E trans, so that when - maybe sooner than later - one of these new units gets hauled into your shop, you'll be ready to deal with an old friend, inside a new case.

Transaxles, one Deo At A Time

Here's the deal: Ford is replacing their 3-speed ATX with a light-duty overdrive transaxle they've named "CD4E". Ford began using the new CD4E on the 1993 *Mondeo*. If that nameplate doesn't ring a bell, it's because the *Mondeo* was available only in Europe. (Makes me wonder if they'll next introduce a *Tuesdeo*, a *Wednesdeo*, etc.? Maybe a *Sundeo* for the Religious Market?) Sorry for the digression...back to business.

Starting in 1994, Ford put this new trans on the 4-cylinder *Probe*, and on *Mazda's 626*. Ford *Probes* and *Mazdas* with a V-6 engine still use Mazda's G4A-EL (4EAT-G). They're still putting the AXOD-E (AX4S) on their larger vehicles.

Wait, Here Comes More...

Ford has introduced the 1995 *Contour* and the Mercury *Mystique*, the American versions of the European *Mondeo*. The new CD4E is up front on these two models. Since the *Contour* and *Mystique* will replace the ever-popular *Tempo* and *Topaz*, you can expect to see a bunch of these car models tooling around your shop, too.

And, as things go, you'll eventually be looking down the business end of a CD4E. Not to worry.

All-New It's Not

There's one certain thing you can expect the first time you look at a "new" transmission: You can almost bet that the new transmission's design isn't really a radical departure from what you've been working on.

In the past 15 years or so, we've only seen three really new transmissions: GM's TH700-R4 and TH440-T4, and the one that took the cake when it first appeared, Chrysler's infamous A604. Talk about initial failure-rate! Remember how some of the first Chryslers equipped with that transmission couldn't be backed off the carrier at the dealer's lot? They fixed that fast, of course, but it sure was exciting while it lasted.

Three For The Road

Fact is, if you check out all 4-speed overdrive transmissions on the road today, you'll quickly see how each fits into one of three design categories: The design of the TH700-R4, the design of the TH440-T4, or a 3-speed design with an overdrive section tacked on to it.

So, faced with the need for a new transmission design, Ford's engineers did what engineers do best; they took the TH700-R4, moved some stuff around to different locations inside the case, gave new names to some components, and tada!...(drum roll, plus trumpet fanfare)...proudly announced the CD4E.

Hit The Play Button, Clyde

Let's play Ford's new CD - refer to the exploded view of the trans as we sing

along - and you'll see how it sounds (and works) just like a TH700-R4, even though the CD has a beat of its own.

Sitting on your bench, Ford's CD looks pretty much like other transaxles, except for one thing; It doesn't have a bottom pan. What it has is a side cover over the valve bodies.

What that means is that you can't replace the filter without first disassembling the transmission. With the new fluids, maybe that isn't as important as it used to be. Even so...

You Can't Get There From Here

If you're interested in hearing all the notes in this new CD, here's the score. After you take off the valve body and all the external stuff, you'll probably be tempted to continue taking the thing apart by going in through the pump, just like you'd do on an ATX. Wrong-O, Buffalo Bob. If you tried that, you wouldn't get very far. On the CD4E you have to first split the case, and take the pump out last.

Once you split the case, you'll spot a chain that drives a planetary-type final drive assembly. All this stuff pulls right off, which is good because otherwise you'd never see the filter.

But before you remove the filter, you have to take off the recirculating regulator exhaust seal (#165 in the exploded view diagram). You get to this seal through the valve body area. Pull it out with a large pair of snap-ring pliers or with a slide hammer that's got a hook on the end of it. Once you've removed the seal, you can lift the filter out of the case. A standard top hat seal is on the other end of the filter.

Back To The Front!

Next on our Top 40 List is the drive line. Watch the director closely now, gang, because we're going in *backwards*, compared to how we'd handle a TH700-R4.

First, remove the planetary. See how it is splined to both the low one-way clutch and to the low and reverse clutch plates? Now that you see the splines, forget the clutches for now.

Next comes the sun gear shell. If it sort of resembles a TH700-R4 component, don't say we didn't warn you.

Now that you're on a roll, take out the front ring gear and the planetary and you're looking at a couple of clutch drums. Remove the double drum and you'll see another. Splined into this drum is the input sprag assembly. (OOPS!...Ford calls this one the "Forward One-Way Clutch". Sounds a lot classier than "sprag", doesn't it?). Anyhow, once you take it out of the case, you can lift out both drums.

What's In A Name?

Inside these two drums are four clutch packs. In the rear of the double drum are the forward and overrun clutches. In the front of the drum is the 3-4 clutch. (Damn! I keep forgetting! Ford calls this the "Direct Clutch".) The other drum holds the reverse clutch; the 2-4 band is wrapped around it.

If you're still in step with this different drummer, you can now go back and remove the low one-way clutch, the low and reverse clutch, and the low and reverse piston. Next out is the pump, and finally, the 2-4 band. Whew!

For you folks who know the insides of a TH700, the power flow of the CD4E is, well, old hat. But just in case, I've included a power flow chart.

At Last: Pure Ford

Now that we've progressed this far, let's look at two things that are All-Ford areas: Controls for the Hydraulics and controls for the Computer.

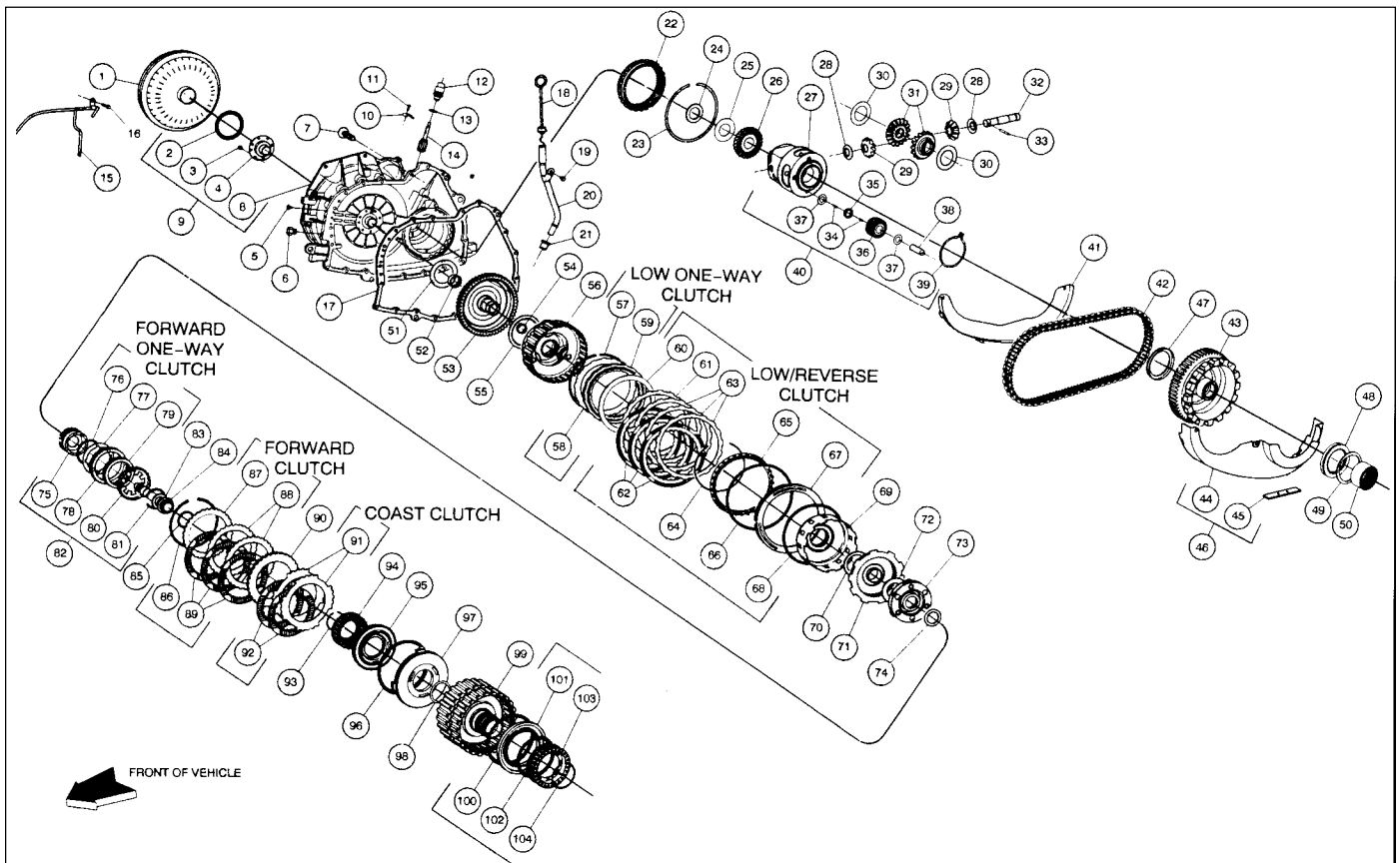
Starting with the driver's controls, the shifter lists six positions: P, R, N, D, 2, and 1. Positions 2 and 1 are manual hold positions. Put the selector into 2 and you'll get 2nd gear; into 1 and get 1st gear. Would that the rest of life was so easy.

In position D, the trans shifts 1st through 4th gear, or 1st through 3rd gear, depending on the transmission control switch. Located on the shifter, this switch should be called the Overdrive Cancel Switch because when you push the button, 4th gear is canceled and the overrun clutch is turned on to deliver engine braking action. An O/D Off light also lights up on the dash.

Haven't We Met Before, Baby?

One last driver control to note is the Economy/Sport switch that's on the console. Turning this switch to 'power' delivers slightly higher and firmer shifts. To you guys who work on Japanese transmissions, this is old news; Toyota has been using a setup like this since 1977. I thought the Japanese copied us?

CD4E TRANSAXLE EXPLODED VIEW #1



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Before we fool with the solenoids, hold off a spell and remind yourself how basic hydraulics are to this whole thing. From what I hear in the bay where I work, a lot of folks forget all about hydraulic valves when they're trying to diagnose problems in electronically-controlled transmissions.

Just Dolled-Up Hydraulics

But hey, except for Chrysler's A604/606, what we all work on are old-fashioned hydraulic transmissions festooned with solenoids.

On Ford's CD4E - like on most everybody else's trans - to get a 2-3 shift, the 2-3 shift valve has to stroke. Main line pressure is still controlled by a pressure regulator valve. Sure, solenoids tell the valves *when* to move, but the actual shifts are activated by hydraulic pressure, and that's controlled by valves.

Stuck Valves Can Stick You

You can use the most expensive,

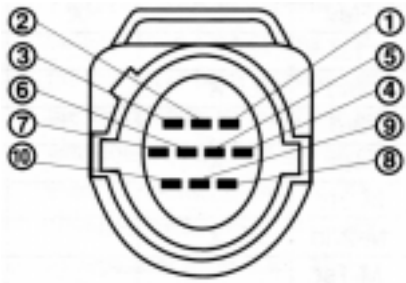
most sophisticated electronic testing instruments ever devised by the mind of man, and you still wouldn't know if the 3-4 shift valve is stuck. And guess what...all the solenoids could be working just peachy-keen, and you still would not get a 3-4 shift if the valve is stuck.

So it's Back-to-Basics Time, Wranglers. Computer test all you want, but check them-thar valves too!

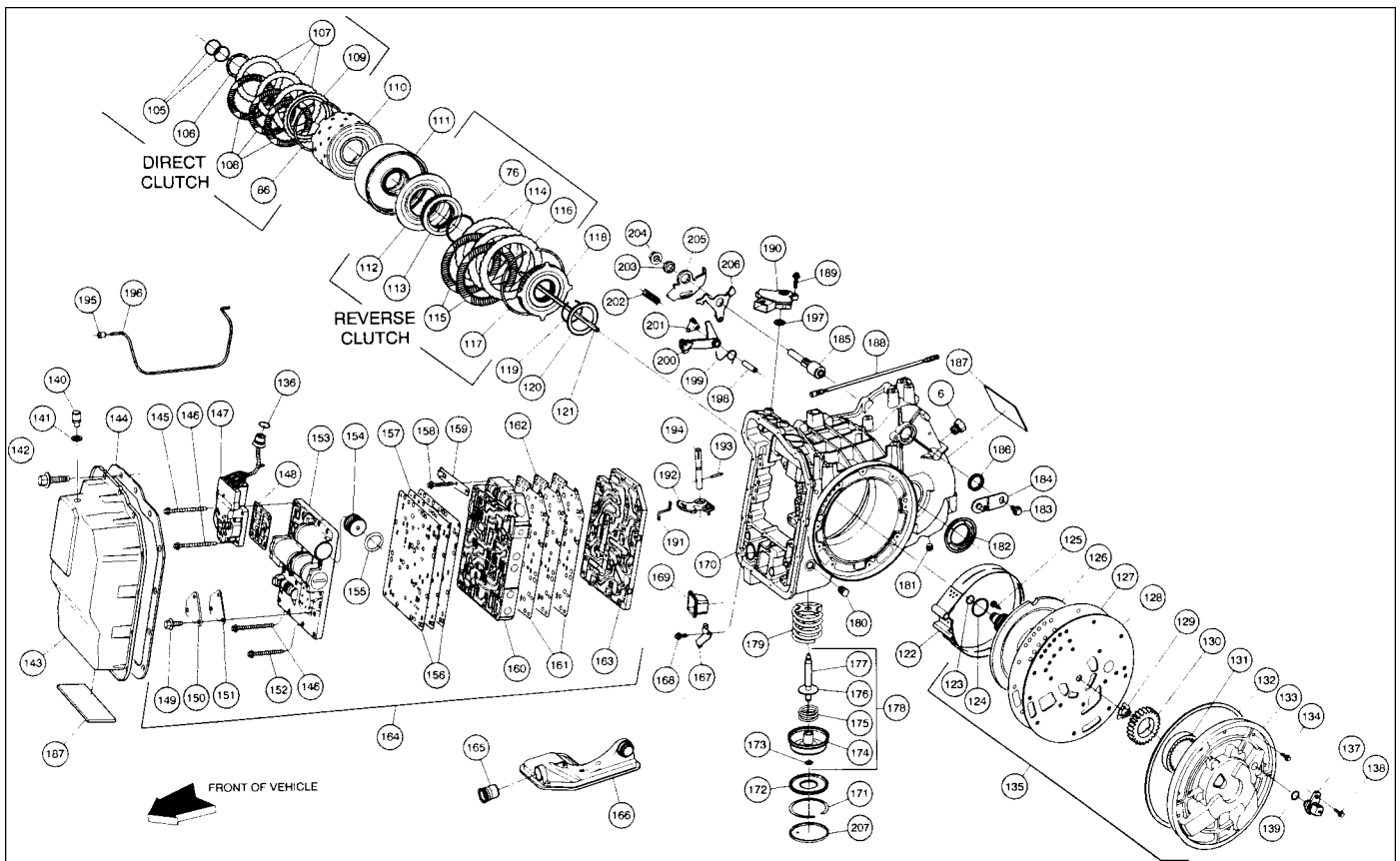
This is Progress?

Incidentally, all five solenoids on the CD4E are located on the solenoid block that's bolted to the valve body. Sad to say, but you have to replace the whole block if even one solenoid craps out; you can't replace just one at a time. Such is progress, I guess. Oh, lest I forget...the transmission temperature sensor is on the same block. If this sensor does a deep-six, you have to replace the whole block of solenoids, too.

Here are the tunes played by the several solenoids on Ford's new CD4E.

CD4E TRANSMISSION CONNECTOR/HARNESS LAYOUT		
		
Pin	Description	PCM Test Pin
1	TFT Signal	49
2	Signal Return	46
3	TCC Power	37, 57
4	TCC Signal	53
5	SS2 Signal	52
6	Solenoid Power	37,57
7	SS1 Signal	51
8	3-2T/CCS Signal	55
9	EPC Power	37, 57
10	EPC Signal	38

CD4E TRANSAXLE EXPLODED VIEW #2



CLUTCH/BAND APPLICATION CHART

X = Transmits Torque OR = Overrunning

Gear	INT/OD (2/4) Band	Reverse Clutch	Direct Clutch	Forward Clutch	Forward One-Way Clutch		Coast Clutch	Low/Rev Clutch	Low One-Way Clutch	
					Drive	Coast			Drive	Coast
Rev		X						X		
1st				X	X	OR			X	OR
2nd	X			X	X	OR			OR	OR
3rd			X	X	X	OR			OR	OR
4th	X		X	X	OR	OR			OR	OR
M-3rd			X	X	X		X		OR	OR
M-2nd	X			X	X		X		OR	OR
M-1st				X	X		X	X	X	

Electronic Pressure Control (EPC) Solenoid

This is a variable-force solenoid that controls TV pressure. By varying the current, the computer changes TV pressure which, in turn, works on the pressure regulator valve. That's the way TV pressure worked in the good old days. The more things change...
LOW CURRENT= HIGH PRESSURE.

Shift Solenoids (SS1 & SS2)

Both of these shift solenoids are On/Off solenoids that allow fluid to exhaust when the solenoid is Off, and stops the fluid exhaust when the

solenoid is On. Different On/Off combinations deliver the four gears. (See chart).

Torque Converter Clutch (TCC) Solenoid

This pulse-width modulated solenoid constantly turns On and Off. Output pressure changes by varying the time the solenoid is On or Off. This pressure works on the bypass clutch control valve that controls both the TCC apply and the feel. Depending on how fast you're going and how hard you're mashing the gas. TCC is available in 2nd, 3rd, and 4th.

3-2 Timing/Coast Clutch (3-2T/CCS) Solenoid

The name tells it all, almost. This has two functions and, like the EPC, is a variable-force solenoid. Variable pressure is needed to activate the 3-2 timing valve that controls the release of the direct clutch during 3-2 downshift. Clutch release is variable, too, depending on road speed, engine load, and throttle position. The second function of this solenoid could really be controlled by a simple On/Off solenoid. When the pressure is high enough, the coast clutch shift valve is stroked to apply the clutch. LOW VOLTAGE = LOW PRESSURE.

All the solenoids are controlled by the Power Control Module (PCM). This is a fancy name for the computer that controls both the engine and the transmission. Most electronic scanners can read trouble codes and all the sensors. If you don't have any electronic diagnosis equipment, by all means *buy some!*

Now that you have been introduced to Ford's new CD4E, you could do worse than to buy a copy of Ford's CD4E Manual. Most of the data in this article came from the Manual. Ford has a full line of Manuals covering all their transmissions. The Manuals cost \$40 to \$50, but they're worth every penny. Several Parts Distributors carry these Manuals, or you can order them direct by contacting the company that distributes Ford publications: Helm, Inc., P.O. Box 07150, Detroit, MI 48207.

SOLENOID VALVE APPLICATION

Transmission Range Selector Position	PCM Commanded Gear	SS1	SS2	3-2T/CCS	TCC
Park	*	OFF	ON	*	OFF
Reverse	*	OFF	ON	*	#
Neutral	*	OFF	ON	*	OFF
OD ON					
D	1	ON	ON	*	#
D	2	OFF	ON	**	
D	3	OFF	OFF	*	*
D	4	ON	OFF	ON	*
OD OFF					
D	1	ON	ON	ON	#
D	2	OFF	ON	OFF	*
D	3	OFF	OFF	OFF	*
2	2	OFF	ON	OFF	*
2**	3**	OFF	OFF	OFF	*
1	1	ON	OFF	OFF	*
1**	2	OFF	OFF	OFF	*
1**	3	OFF	ON	OFF	*



Dispelling Competitor's Myths

TransTec Kits Updated Quicker Than Other Brands

To a rebuilder, there is nothing more important than using a rebuild kit that contains all the right parts. At TransTec, we pride ourselves on producing up-to-date kits that contain the right parts. Our engineering efforts ensure it. Our kit packaging business with the service divisions of Ford, GM, and Chrysler keep us abreast of OEM changes, so we use this advantage to update TransTec kits before the competition.

Recently, TransTec competitors have been claiming to be first to include certain parts in their kits, when in fact those parts have been in TransTec kits all along. Most of the reasons they are updating their kits make sense technically. In fact, we're glad they're updating their kits - that's good for the industry in general. The problem is they're making a big deal about updating their kits, when in fact they're just bringing them up to the TransTec standard already demanded by rebuilders.

We've put this short list together to show you some of the "Bull" recently advertised by our competitors. After each "Bull" statement from the competition is our response to it, the Truth. All this is very important because it shows you why TransTec kits have advantages over other brands.

BULL: They include the A604 (41TE) O-ring for the O.D. check ball assembly ("Previously ... rebuilders had to buy a complete valve body from a dealer at high cost...")

TRUTH: TransTec kits have included this O-ring since September 14, 1992. As far as "eliminating the expense" of buying a complete valve body, you only had this expense if you used a

competitor's kit. If you were using a TransTec kit, you already were eliminating this expense since 1992.

BULL: Their kits for Nissan FWD vehicles now offer fiber gaskets with a silicone bead that "outperform" regular paper gaskets.

TRUTH: How do they "outperform" regular paper gaskets? What tests did they perform to determine this? This is just another unfounded, misleading statement. We will investigate this further, but at this point we are unaware of any problems caused by the O.E. gaskets.

BULL: Their 4L60-E kits now contain the filter screen seal.

TRUTH: Bravo! TransTec kits have had the filter screen seal since June 14, 1994.

BULL: They have upgraded the check balls to harder ones in their AXOD & AXODE kits. ("...the first kit manufacturer to offer this...")

TRUTH: What a bunch of bull! TransTec kits were the first to have the harder check balls. We added the higher durometer check balls in January, 1994, and the sample competitor kit we analyzed with a date code of April 25, 1994 still contained the lower durometer (softer) check balls.

BULL: Their 4L80E kits will now contain the center support bolt.

TRUTH: Not only have TransTec 4L80E kits already included the center support bolt, but it is the OEM bolt. The competitor's is some inferior looking aftermarket bolt. The superior quality of TransTec's bolt is obvious.

BULL: They upgraded their E4OD kits to contain thicker valve body gaskets.

TRUTH: Due to a recent technical bulletin by ATRA stating that thicker valve body gaskets used on the valve body-to-separator plate side could cause forward engagement problems, TransTec only supplies thicker gaskets on the case-to-separator plate side. These gaskets are available in bulk or in gasket set # 1287.

BULL: Their AXOD-E kits now contain the redesigned rear lube seal.

TRUTH: TransTec kits have had it since 3/24/94.

BULL: They now offer thicker A4LD valve body gaskets.

TRUTH: TransTec has offered the thicker gaskets since 8/20/93. Lower # 12703, upper # 12704.

BULL: They have updated their Nissan kits "...with features which are not available elsewhere..."

TRUTH: This statement is certainly true - competitor kits for Nissan *do* have features which are not available elsewhere, *and for good reason*. Here's an example: We're talking about the Nissan RE/RL4R01A, RL4F02A, and RE4F02A/V. They say they're using steel pump slide rings "...compared to OEM metal and competition's Teflon..." In reality, OEM uses metal rings on the RWD versions, and Teflon on the FWD versions. TransTec kits match what the OEM does. Why fool around and take a chance with the competitor's guesswork? Use TransTec kits and be assured of high quality, OEM components, and the right components in the kits.