

REBUILDER NEWS



Volume 2, Issue 1 / First Quarter, 1994

from **TransTec**

In this issue...

Our *Troubleshooter* feature article addresses problems rebuilders experience when working on Mitsubishi transmissions.

DuraTec, a new dimensionally stable paper gasket is introduced in this issue along with new valve body gaskets for Ford's E4OD, and pan gaskets for 3-speed Subaru's.

On the inside back cover, there's some important information regarding new transmission designations for GM, Chrysler and Mitsubishi. Save this page as it's a handy reference for future use.

As always, your comments and suggestions are important to us. Write to Editor, Rebuilder News, c/o TransTec, P.O. Box 556, Milan, OH 44846

New DuraTec® Gaskets Retain Shape in Replacement Applications

What's good for the original equipment market is not always good for the replacement market. This is particularly true of paper gaskets that are designed to be installed on original equipment shortly after they are produced.

The same gaskets, when packaged in rebuild kits, tend to absorb moisture and swell as they sit for months on the shelves of kit packagers, distributors and rebuilders, before they're actually installed. During this time, the paper acts like a sponge, absorbing moisture that distorts their shape so the bolt holes don't line up when you go to install them.

TransTec has addressed this problem with the introduction of



new DuraTec gaskets. Developed specifically for the replacement market by Farnam Sealing Systems, the leading OE supplier of transmission gaskets,

DuraTec gaskets are designed to hold their shape. With over twice the dimensional stability of O.E. gaskets and exceptional erosion and compression/recovery characteristics, DuraTec gaskets withstand the test of time.

DuraTec gaskets are available exclusively from TransTec and its authorized distributors listed on the back cover of this newsletter.

For a free sample of DuraTec and technical specifications, write to DuraTec, *Rebuilder News*, c/o TransTec, P. O. Box 556, Milan, Ohio 44846-0556.

E4OD Valve Body Gaskets

Ford has made a running change on the E4OD upper and lower valve body gaskets for 1990-Up models. Three holes have been modified, as indicated in the drawings that follow. One hole has changed shape, another has

become a slot, and the third has increased in diameter.

Although the Ford engineering numbers have changed on these gaskets, the Ford Service numbers

Cont'd on page 2

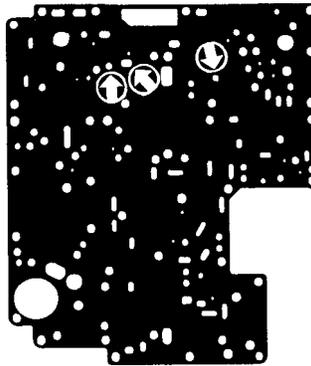
E4OD Gaskets...

and TransTec part numbers will remain the same. The new gaskets will retrofit back through 1990, and have a yellow ink stripe for identification, as opposed to a blue stripe on the previous gaskets.

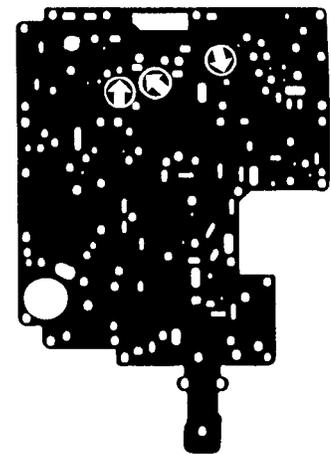
The valve body gaskets for 1989 transmissions are not affected by this change, and will remain the same. They have no color identification.

All TransTec Gasket & Seal and Overhaul Kits with a date code of B94 or later will include the yellow striped gaskets along with the plain 1989 gaskets..

Lower Gasket TT#12700
(OEM#F0TZ-7D100-A)



Upper Gasket TT#12701
(OEM#F1TZ-7C155-A)

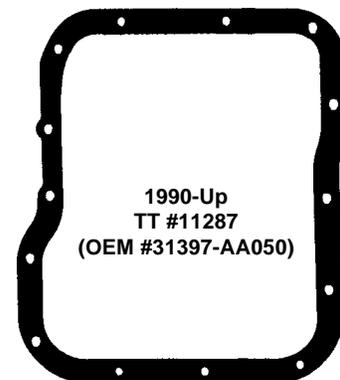
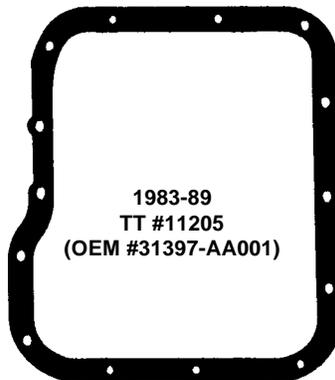


Subaru 3-Speed Pan Gaskets

In 1990, the configuration of the pan changed on Subaru 3-speed transmissions. As a result, a third design pan gasket was created. The first design gasket, TransTec #11202, is used on 1975 through 1982 models. It has only 13 holes. The second and third designs (shown here) both have 14 bolt holes.

TransTec #11205 is used on 1983-89 models, and TransTec #11387 fits 1990-Up models.

All TransTec Gasket & Seal Kits (#1122) and Overhaul Kits (#2215) with a date code of A94 or later will include the #11287 pan gasket.



Appearing Soon

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

Date

March 4-5, 1994
March 18-19
March 25-26

City

Charlotte
Jackson
Jericho

State

North Carolina
Michigan
New York

Transtec NEW PRODUCT ANNOUNCEMENTS

For additional product announcement information, contact your local distributor.

Toyota A245E, 1993-Up; Transmission used in Corolla and Geo Prism • TransTec Overhaul Kit #2275

BTR 85LE, 91LE, 95LE, 1989-Up; Transmission used in cars manufactured by Ford of Australia • TransTec Overhaul Kit #2272

Metal Clad Extension Housing Seal for Mitsubishi & Dodge with Aisin Warner AW372 transmissions, 1987-Up. Available in bulk • TransTec #29632 (OEM ref. #MD951482).

TransTec® TROUBLESHOOTER

THE MITSUBISHI F4A33

The MITS F4A33; The #1 Pucker Producer

By John Wozniak, TransTec Transmission Product Manager

I'll fill you in on the F4A33 in a minute, but first I have a confession to make: The Japanese transmission that sends the worst pucker impulse through my jeans is anything named Mitsubishi (Mits).

What's irritating is that a Mits transmission should be one of the easiest to deal with. Their basic design is fairly simple and there are fewer parts in a Mits kit than you'll find in kits for other Japanese transmissions.

So what's troubling you, Bunky?

There are two things that make Mits transmissions the ones you love to hate:

1) Mits makes a bunch of different versions, and most are far too similar to one another for any kind of comfort. You have to spend an unreasonable amount of time trying to convince yourself that you've got the exact kit you need for the trans you're working on. And you're never really, truly, sure until you button up the thing and it drives away. Then pray that it won't quickly come back.

2) Worse than that is the cataloging. It's a toss-up whether the Mits cataloging is worse than the Aftermarket's. Follow along with me, and you'll see what I mean.

Aftermarket Catalogs

Let's pick on the Aftermarket cataloging first. The problem started way back in 1979 with the Dodge Colt.

For the first 10 years or so, most Mits transmissions in this country were on cars with either a Dodge or a Chrysler nameplate. And, since Chrysler

parts catalogs were a lot easier to lay hands on than were Mits parts catalogs, everybody used Chrysler catalogs. In those days, all anybody had to mess with was the KM170 transmission, so things weren't too bad.

Then came 1984, and Mits hooked a new, heavy-duty KM172 onto a 2.0L engine in the Colt Vista Wagon. If they had cataloged it that way, your life and mine would have been tons better.

Model 45 Can Lead To Colt 45

Instead, this transmission came to be known as "model 45". That raised a teensy-weensy problem:

If you had a Colt Vista Wagon in your shop, you could look forever without finding reference to "45" anywhere on it. Many transmission jockeys did just that, and were they frosted! I speak from first hand experience.

To make it worse, when you asked your friendly Mits dealer for parts for a "model 45", the counter guy acted like you were smoking Mexican Mind-Bender. Eventually, folks learned that "45" was the internal code found *only* in Chrysler's parts catalog. It was no help at all that the Mits Cordia and Tredia also used the same transmission. So much for catalog help from the Aftermarket boys!

The Mits Catalog; No Help There

But let's not let Mits off the hook on this one, either.

I want you to know that, without the slightest exaggeration on my part the Mits parts catalog is the most pitiful, error-filled OEM catalog available anywhere.

I'd suggest that it belongs in the outhouse next to the Sears catalog, if that wasn't such an insult to the quality of the Sears book. Besides, we all use Microfiche, and those little plastic sheets could be a tad uncomfortable.

Well, anyway..

Here's just one example of how bad that Mits catalog is. There are a lot more examples where this came from, but this will do for now.

Take a look at Figure 1. There you'll see the Mits listings for shift solenoid O-rings on the F4A33-1 in the Expo van. They list three different O-rings:

- MD611659, a 15.8mm O-ring was used from 5/91 through 4/92
- MD618561, a 12.8mm O-ring used *only one month*, 5/92
- MD 622003, the ??mm O-ring they've used ever since.

Let's Play "Find the O-Ring"

I've put "??mm" in that list above to alert you that you'll have to look elsewhere for the size of the O-ring on

Figure 1

FROM-UP-TO	TYPE	MODEL APPLICABLE DESCRIPTION	PART NO (REPL P/NO)	QTY
28086U	O-RING, A/TVALVE BODY INNER			
9105-9204	N44W A/T		MD611659	2
9205-9205	N44W A/T		MD618561	2
9206-	N44W A/T		MD622003	2

the MD622003, because the part *does not exist* in the Mits parts system. Here's what I had to go through to find the answer for you.

The first thing to do is check the mating part - in this case, the solenoids - to see if they changed, too. You bet they were! Next, I checked all the other vehicles that use this same transmission to see if they match.

To absolutely nobody's surprise, the Expo is the only vehicle using this particular set up, and of course, my sample core is not an Expo. There was no other option, so I bit the bullet and ordered up the latest solenoid assembly. Guess what I found when I opened the box?!: this brand new solenoid uses the *same* O-ring that's in the original MD611659! @##-*@)(!@!

Instead of it taking a couple of minutes to figure out this O-ring, it took 30 days and several hundred dollars! (Please don't tell my boss; he thinks I know what I'm doing.)

And remember, that's only one example of the fun you can have with the Mits parts catalog.

I feel better, now that I got all that off my chest, so let's see what the F4A33 is all about.

How They Came Up With The F4A33

When Mits began building larger cars with more powerful engines, they needed a heavy-duty transaxle. So they took an old KM175, enlarged it, and announced to the world that they had two new units, the F4A33-1 and the F4A32-1. They added a transfer case for all-wheel drive vehicles and came up with the W4A33-1 and the W4A32-1.

The "-1" designation just means that these are the first versions of the trans, so for the rest of this article, we'll ignore that number. At this writing, the F4A32 is not on vehicles

sold in this country, so you've got only three of these Mits transmissions to worry about. That's enough, thank you.

The Key Is The Case

The major difference between the old KM series and the new F4/W4 series is in the case.

Instead of a bolted split case, the new design has a one-piece case. You can easily tell the difference between the old and the new cases by looking for a differential cover that's similar to the one on Chrysler's A413. Inside, the new design is identical to the older units; the parts are just larger.

32 and 33; Close But Different

Before we dive into the inner mysteries of these new transaxles, we'd best look at the difference between the "32" and the "33" models.

On top of the bell housing, you should find a pad with the model number stamped into it. If you can't find it, grab a ruler and measure the servo cover. The cover on the "32" is about 3-3/4". The cover on the "33" measures about 4".

It's important to be sure you know which unit you're about to attack, because most suppliers sell two different master kits, and those kits aren't interchangeable.

Moving inside the case of the new units, the main difference is in the planetary/low & reverse clutch area.

The "32" uses a smaller planetary,

plus smaller low & reverse frictions and steels. The two clutch plates on the "32" are the same as those on the 1989-up KM series. The "33" uses a larger planetary, plus larger low & reverse plates.

Now you know why there are two master kits.

Large and Small Differentials

There are also large and small differential setups. You can tell which is which by looking at the differential cover. The small differential uses a cover with a paper gasket; the large differential uses a molded rubber seal.

Now, if you were casual about such things, you'd expect that the "32" uses the small differential cover and the "33" uses the large one. You should know better; this is Mitsubishi, remember?

The all-wheel drive "W4" models, whether a "32" or a "33", use the small differential. On the two-wheel drive "33" models you could have *either* the large *or* the small differential, depending on what kind of mood the Mits boys were in the day they slapped it together. (Do I detect a bit of pucker time approaching?).

The Old Axle Seal Trap

Since they're nearby, let's talk about the axle seals on these hummers. Until June, 1992, all Mits two-wheel drive models used 35mm (1.378") axles. After that, Mits changed to a 37mm (1.457") axle, but lookout! ... they didn't change the O.D. of the axle seal.

MITSUBISHI F4A33 W4A33 W4A32 APPLICATION GUIDE

VEHICLE	YEARS	ENGINE	TRANSMISSION	REMARKS
MITSUBISHI				
GALANT	90-93	2.0L	W4A32	ALL WHEEL DRIVE
GALANT	94	2.0L	F4A33	DOHC ENGINE ONLY
ECLIPSE	91-94	2.0L	F4A33	TURBO ONLY
ECLIPSE	91-94	2.0L	W4A33	ALL WHEEL DRIVE
DIAMANTE	92-94	3.0L	F4A33	
EXPO/LRV	92-94	2.4L	W4A32	ALL WHEEL DRIVE
3000GT	91-94	3.0L	F4A33	
CHRYSLER				
COLT/VISTA	92-94	2.4L	W4A32	ALL WHEEL DRIVE
2000 GTX	92-94	2.0L	W4A32	ALL WHEEL DRIVE
STEALTH	91-94	3.0L	F4A33	
LASER/TALON	92-94	2.0L	F4A33	TURBO ONLY
LASER/TALON	92-94	2.0L	W4A33	ALL WHEEL DRIVE

Thusly, it's not all that hard to install a seal made for a 35mm axle in a unit with 37mm axles. It's downright easy to do. The car will likely leave your shop on a very short round trip, returning with truly impressive leaks from both worn out axle seals. (A pucker occasion, if there ever was one!) If you're working on an all-wheel drive unit you don't have this worry because the seals stayed the same all the way up.

Now that we have that out of the way, let's hike through the mechanical and hydraulic workings of these trans. Incidentally, all the rest of this article also pertains to any Mits 4-speed transaxle.

The Driveline

Back when Mitsubishi designed their first 3-speed automatic transaxle, they did what Japanese Engineers do best: They copied. In this situation, they copied Ford's old cast iron FMX design. All the Mits engineers did was replace the low and reverse band with a low and reverse clutch. A technical breakthrough it wasn't.

Since some reading this are not yet gray and wizened by years, it's probably wise to review what the Mits 3-speed was like, back in those old days.

The main feature of the Mits 3-speed is a compound-type planetary; most other 3 -speed trans use two separate planetaries.

How the 3-Speed Works

Other than that, the Mits 3-speed works like any other 3-speed ... forward (rear) clutch and the roller clutch hold for first, the intermediate band comes on for second, and direct (front) clutch comes on/the band comes off for third. Reverse is obtained by using the direct clutch and low and reverse clutch.

When they needed to develop a 4-speed transaxle, the intrepid Mits engineers added a clutch to the back of the 3-speed's case. They call this the "end clutch." To

drive this clutch, they extended the input shaft all the way to the back.

Ready, Set, Shift to 4th

When the clutch is on it drives the rear sun gear. The process leading to overdrive (4th) starts in third, with the "end clutch" being applied. (It really doesn't do anything in third, but it's applied just to get ready.)

To make 4th, a lot has to happen. Both forward and direct clutches are released and the intermediate (2-4) band comes back on. The band holds the front sun gear stationary, and, ta-da! you've got overdrive. Actually, this part of it works just like a Ford AOD.

The Hydraulic/Electronic Controls

All the Mits 4-speeds use computer controls. The computer controls either 3 or 4 solenoids, depending on whether or not the transmission has a lock-up torque converter.

The TCC solenoid - or the "damper clutch solenoid" as Mits calls it - is a pulse solenoid. The solenoid pulses to dampen the torque converter clutch "feel." Depending on the throttle opening, lock-up will apply in second gear or higher. Obviously, only lock-up torque converter vehicles get this solenoid. Score one for the Mits team!

The pressure control solenoid, affecting main line pressure, is only used to control garage shifts and - somewhat - the 1-2 shift. It changes main line pressure only about 10 to 15 psi.

The 2 shift solenoids exhaust fluid when they are on, and block fluid when they are off. (Figure 2 shows which solenoid is on in which gear.) Like every other solenoid, these are magnets that really suck up stray metal particles, so be careful during overhaul that you keep them ultra-clean.

Figure 2

GEAR	SOLENOID A	SOLENOID B
1ST	ON	ON
2ND	OFF	ON
3RD	OFF	OFF
4TH	ON	OFF

Some Input, Please

These Mits transmissions have a couple of input devices that deserve a bit of your attention, too.

Located on the shifter is the overdrive control switch. It must be *turned on* in order for the transmission to shift into overdrive. This is NOT like the overdrive cancel switch used by Toyota (among others) which, when it is turned on, prevents the transmission from shifting to overdrive.

Also in the driver's compartment is the Power/Economy switch. Switching this to the Power mode makes the transmission shift a little later.

Built into the servo cover is a sensor that reads when the servo is applied. This is not a component to toss into the cleaning machine.

It's As Eay As A, B, See?

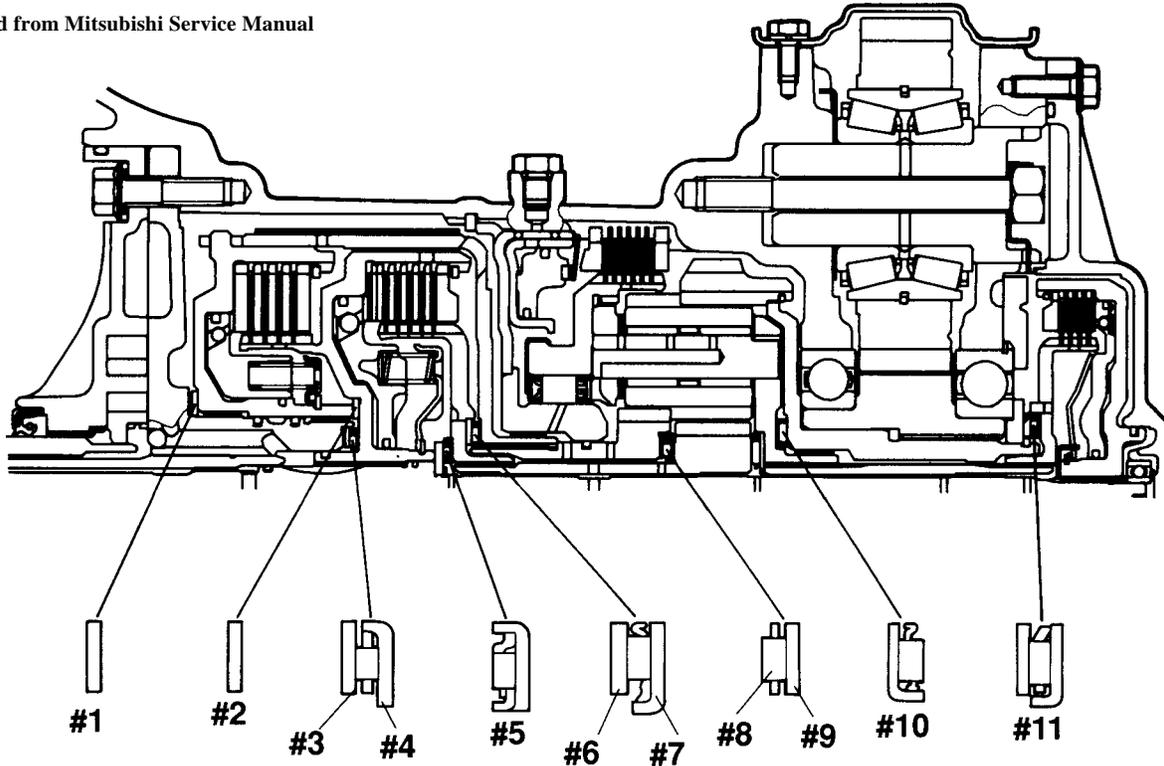
Last are the A and B pulse generators. Here's the one place where the "32"

MITSUBISHI W4A32 F/W4A33 CLUTCH CLEARANCE CHART

CLUTCH	CLEARANCE mm(inch)	PARTS YOU CHANGE	# OF PARTS	DIMENSION RANGE
Low & Reverse "32"	1.0 (.039) - 1.2 (.047)	Pressure Plate	15	5.6-7.0
Low & Reverse "33"	1.0 (.039) - 1.2 (.047)	Pressure Plate	11	5.9-6.9
End	0.6 (.024) - .085 (.033)	Snap Ring	5	1.05-2.05
Direct "32"	0.7 (.028) - 0.9 (.035)	Snap Ring	12	1.3-2.4
Direct "33"	0.8 (.031) - 1.0 (.039)	Snap Ring	12	1.3-2.4
Forward "32"	0.7 (.028) - 0.9 (.035)	Snap Ring	12	1.3-2.4
Forward "33"	1.0 (.039) - 1.2 (.047)	Snap Ring	12	1.3-2.4

F4A3, W4A3 - TRANSAXLE - FWD

Reprinted from Mitsubishi Service Manual



IDENTIFICATION OF THRUST BEARINGS, THRUST RACES AND THRUST WASHERS

O.D.	I.D.	THICKNESS	PART NO.	SYMBOL
70 mm (2.76 in.)	55.7 mm (2.193 in.)	1.4mm (.055 in.)	*1	# 1
		1.8mm (.071 in.)	*2	
		2.2mm (.087 in.)	*3	
		2.6mm (.102 in.)	*4	
66mm (2.60 in.)	54 mm (2.13 in.)	1.8mm (.071 in.)	MD731212	# 2
48.9 mm (1.925 in.)	37 mm (1.46 in.)	1.0mm (.039 in.)	MD997854 (incl.*1)	# 3
		1.2mm (.047 in.)	MD997847 (incl.*1)	
		1.4mm (.055 in.)	MD997848 (incl.*2)	
		1.6mm (.063 in.)	MD997849 (incl.*2)	
		1.8mm (.071 in.)	MD997850 (incl.*3)	
		2.0mm (.079 in.)	MD997851 (incl.*3)	
		2.2mm (.087 in.)	MD997852 (incl.*4)	
2.4mm (.094 in.)	MD997853 (incl.*4)			
48.1mm (1.894 in.)	34.4mm (1.354 in.)	---	MD707271	# 4
42.6mm (1.677 in.)	28mm (1.10 in.)	---	MD720753	# 5
54mm (2.13 in.)	38.7mm (1.524 in.)	1.6mm (.063 in.)	MD704936	# 6
52mm (2.05 in.)	36.4mm (1.433 in.)	---	MD720010	# 7
45mm (1.77 in.)	28mm (1.10 in.)	---	MD735062	# 8
46mm (1.81 in.)	31mm (1.22 in.)	0.8 mm (.031 in.)	MD735063	# 9
52mm (2.05 in.)	36.4mm (1.433 in.)	---	MD720010	#10
58mm (2.28 in.)	44mm (1.73 in.)	---	MD724206	#11

On all models, the B generator reads the output, and becomes the output speed sensor.

Also on all models, the connectors on both these sensors are the same, and they are close enough to make it easy to flop the connectors, enabling you to drive the computer completely bonkers.

The rest of the electronic system is pretty much like any other, but if you intend to mess around in it, I recommend a good manual and a scanner.

Confession #2

Before I close, I have another confession to make: I own a Mitsubishi TV. It's the best I've ever owned. I can tell you this, though; I'll never try to fix it.



and the "33" models differ from the earlier models. The A generator on the older models measured the speed of the sun gear shell. This old sensor reads 0 with the band on in 2nd or 4th.

Sensory Perceptions

In the new models, the A generator reads the end clutch drum and becomes a true input sensor. All models switched to this setup in 1993.

New Designations for Transmissions

Mention a 700 transmission, and everyone knows you're referring to a THM700-R4. But talk about a 4L60 and sometimes it takes a minute for it to sink in that you're still talking about that same 700, but General Motors has given it a new designation. Since GM started referencing the new designations around 1988, it's been long enough that most of us may be pretty familiar with them. But we thought it might still be useful to list them for you.

Chrysler recently followed suit, and as of the 1994 microfiche, Chrysler lists new transmission designations as well. These are presented here as well.

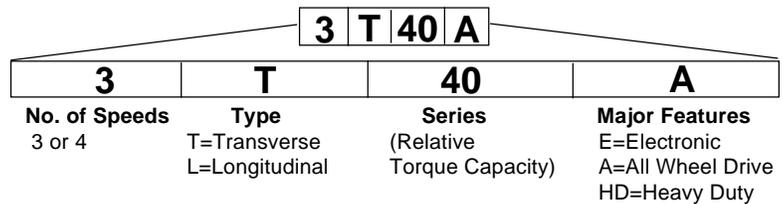
And while we're at it, let's not forget Mitsubishi. Although they may not be as familiar to you as GM or Chrysler, they also went to new designations around 1991, so we've listed them also.

All three have similar purposes as far as what each letter or number refers to, but with variations. They all tell you how many speeds the transmission has, if it's front or rear wheel drive, relative torque capacity, and major features. Since they are slightly different for the three makes, we've listed an example with each one to help illustrate the designation system.

You may want to save this - it may prove to be a handy reference for the future.

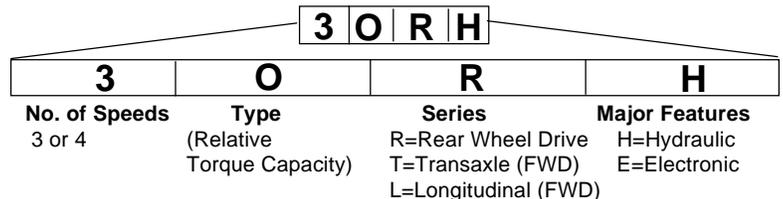
General Motors Hydra-Matic

Previous	New
THM 180/180C	3L30
THM R1	4L30-E
THM A-1	3T40-A
THM 125/125C	3T40
THM 700-R4	4L60
THM 440-T4	4T60
THM 400	3L80
THM 475	3L80-HD
N/A	4L60-E
N/A	4T60-E
N/A	4L80-E
N/A	4L80-EHD



Chrysler

Previous	New
A904	30RH
A998	31RH
A999	32RH
A727	36RH/37RH
A500	40RH/42RH
A518	46RH
A404	30TH
A413/670	31TH
A604	40TE/41TE
A606	42LE



Mitsubishi

Previous	New
KM171-5	F3A21-2
KM172-5	F3A22-2
KM175-5	F4A22-2
KM176-5	F4A21-2
KM177-8	F4A23-2
N/A	F4A32-1
N/A	F4A33-1
N/A	W4A32-1
N/A	W4A33-1

