SK® 604 Non-VLP

604/41TE & 606/42LE 1989-2006

Also fits 42RLE 2003-2006

Corrects / Prevents / Reduces

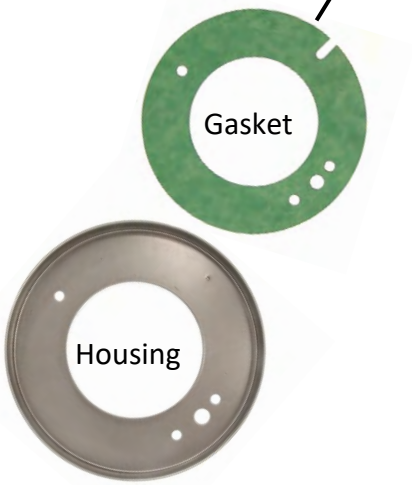
Delay or No Forward or Reverse, Rough Coast Down
4-3, Stabilizes Clutch Pressure & CVI's.

Working on **604 or 42RLE VLP** model that has a Pressure Control Solenoid?
Order P/N **SK 42RLE-VLP** Fits: 2006up 604 and 42RLE **VLP** Models

Hello Mechanic -- We LOVE this trans.

From 1989 we got hundreds of calls--The trans would go to **Limp** or ***burn*** OD clutches. At first we thought there must be **BIG errors** in the system that we could **find/fix.** We bought a van, installed 6 gauges, a scan tool. While installing dozens of parts we received from shops we managed to **burn** it up ***20 times*** in 60,000 miles of road testing.

For the first time in 35 years we had a trans control system that was *Intelligent & adaptive.* It took us two years to catch up with it. It had ***no*** **BIG** system **errors**, but it does have about ten things that ***need*** your careful ***attention.*** This trans loves the little things you do for it, so that it will shift good, stay out of **Limp** and please your **customer.**



This kit *does not* fit models with a **Pressure Control Solenoid!**

Models with Pressure Control Solenoid (VLP Models) Use **SK 42RLE-VLP** Fits 42RLE & 604 VLP Models.

If trans is in vehicle skip Step 1.

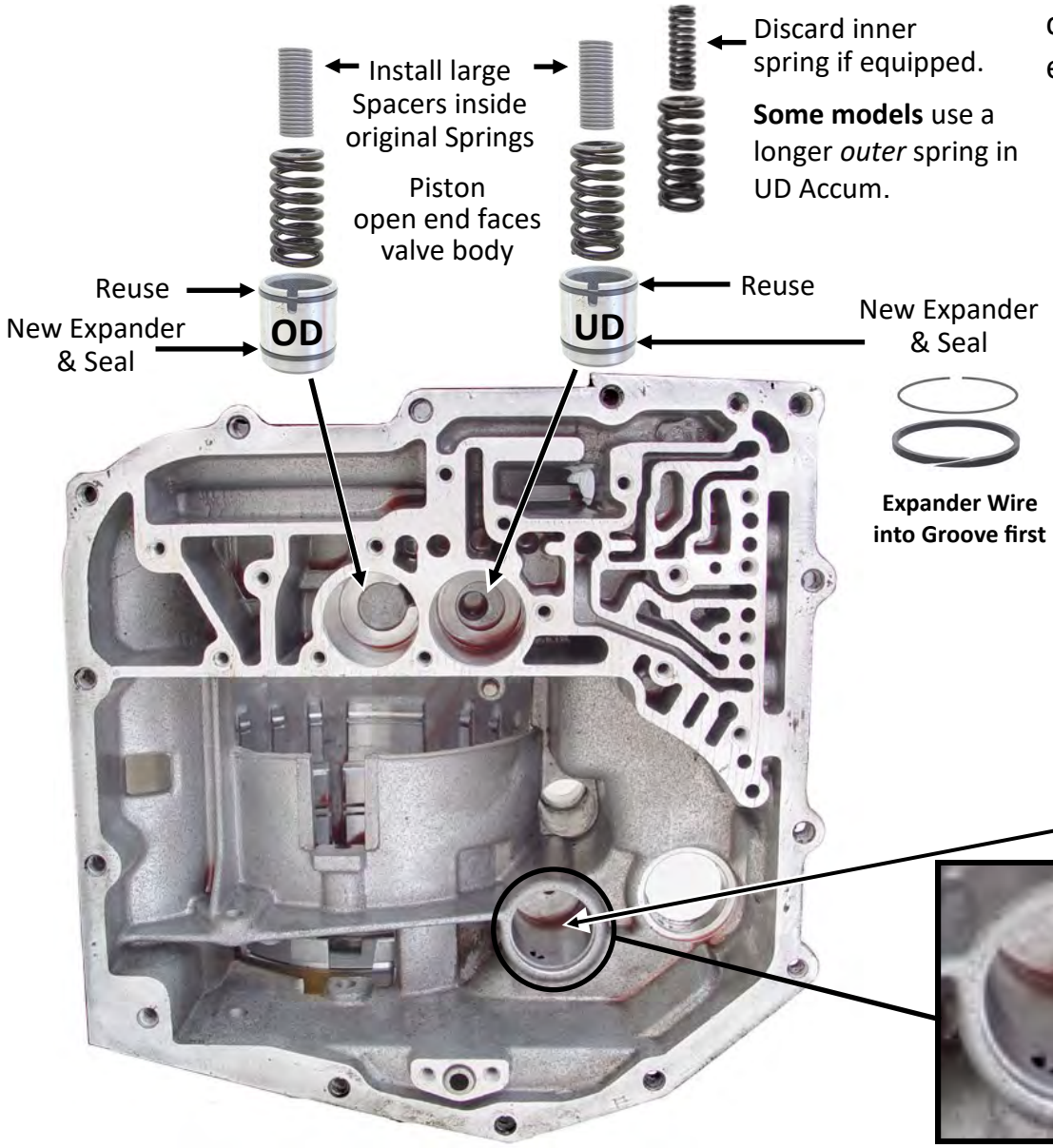
Step 1

Discard OE Housing Gasket. Install new *Non Shrinking Gasket* under Piston Housing. Gasket works with all piston housings.

This Page 604/41TE, 606/42LE & 42RLE

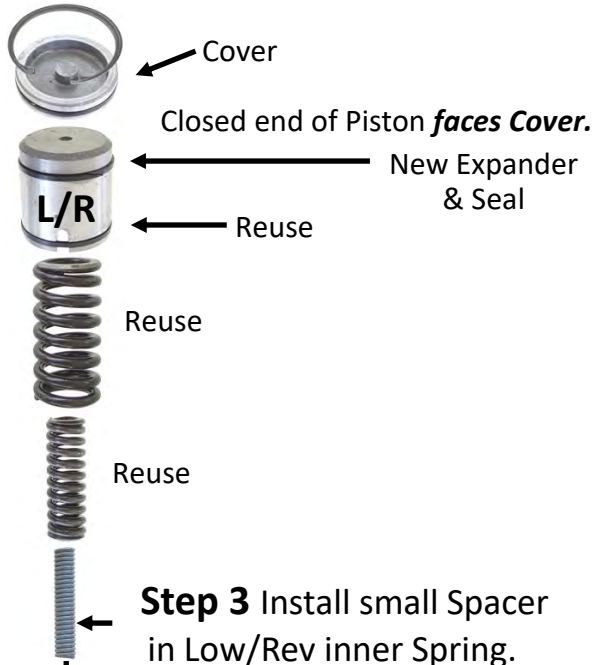
Do NOT use Plastic Accumulator Pistons! All 1989-2006 must have aluminum pistons!

Step 1 Install new Expanders & Seals on the **CLOSED END** of **Aluminum** Accumulator Pistons.



Step 2 Install Large Spacers into OD & UD Springs.

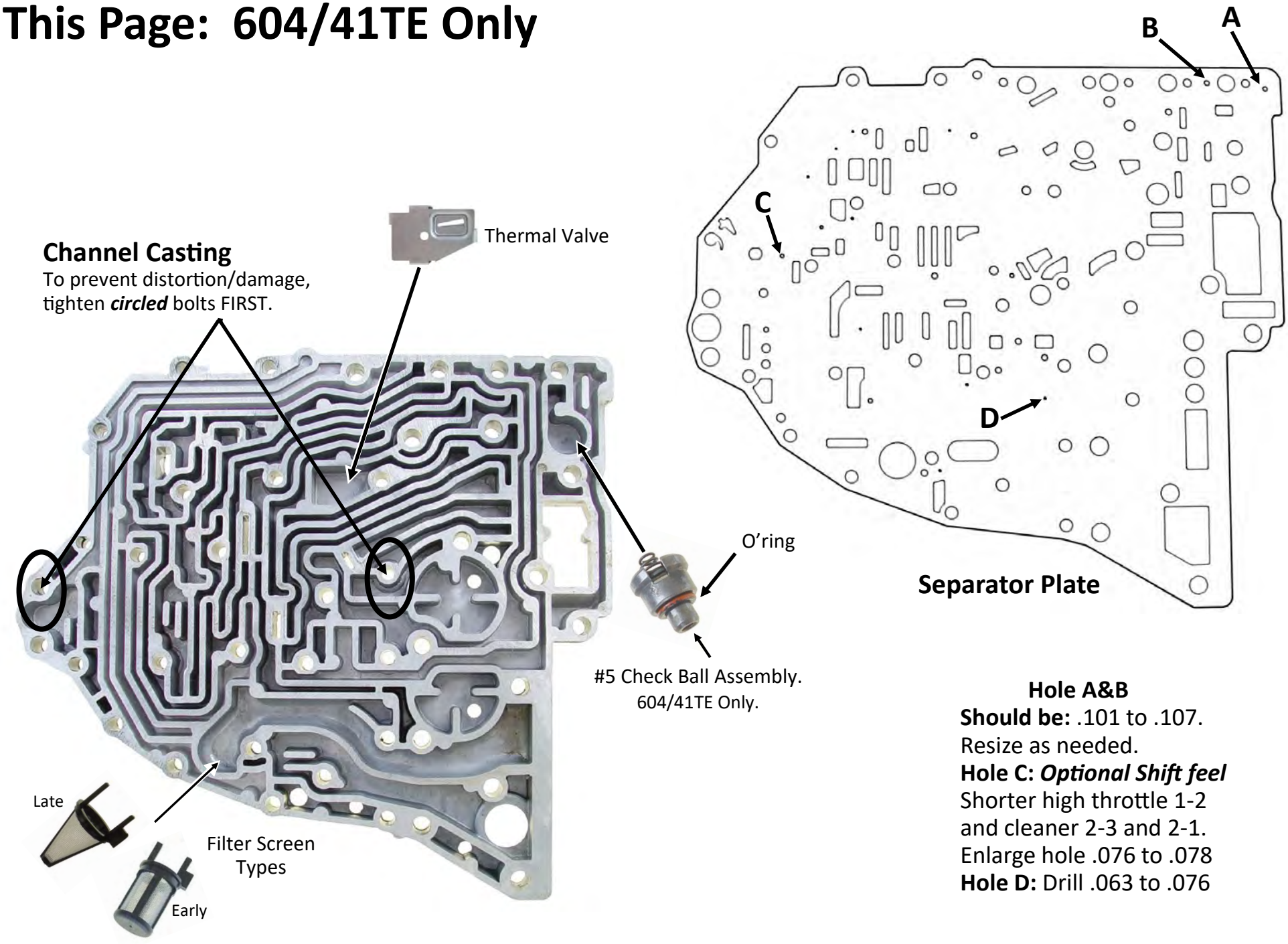
Tech: Installing Spacers causes shifts to be shorter and cleaner. It does this by allowing the releasing Clutch to exhaust faster.



Step 3 Install small Spacer in Low/Rev inner Spring.

LOOK: Don't damage seal.
When installing the L/R Accum hold a .002 to .005 feeler blade across feed hole so the sharp edge of hole won't cut the seal.

This Page: 604/41TE Only

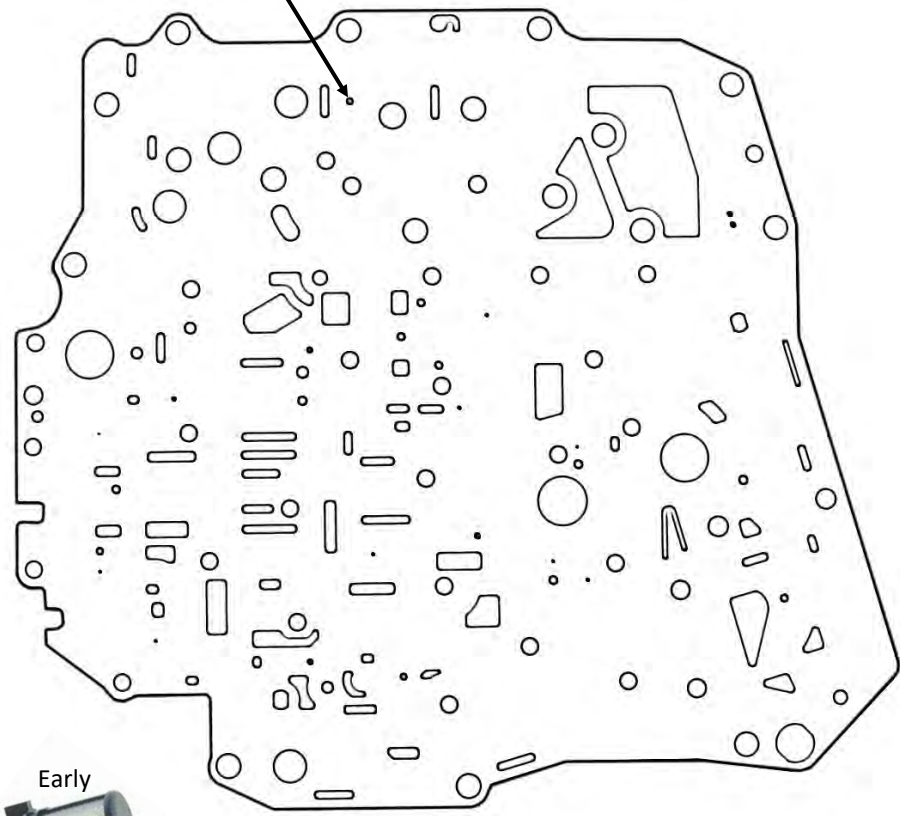


Hole A&B
Should be: .101 to .107.
Resize as needed.
Hole C: ***Optional Shift feel***
Shorter high throttle 1-2
and cleaner 2-3 and 2-1.
Enlarge hole .076 to .078
Hole D: Drill .063 to .076

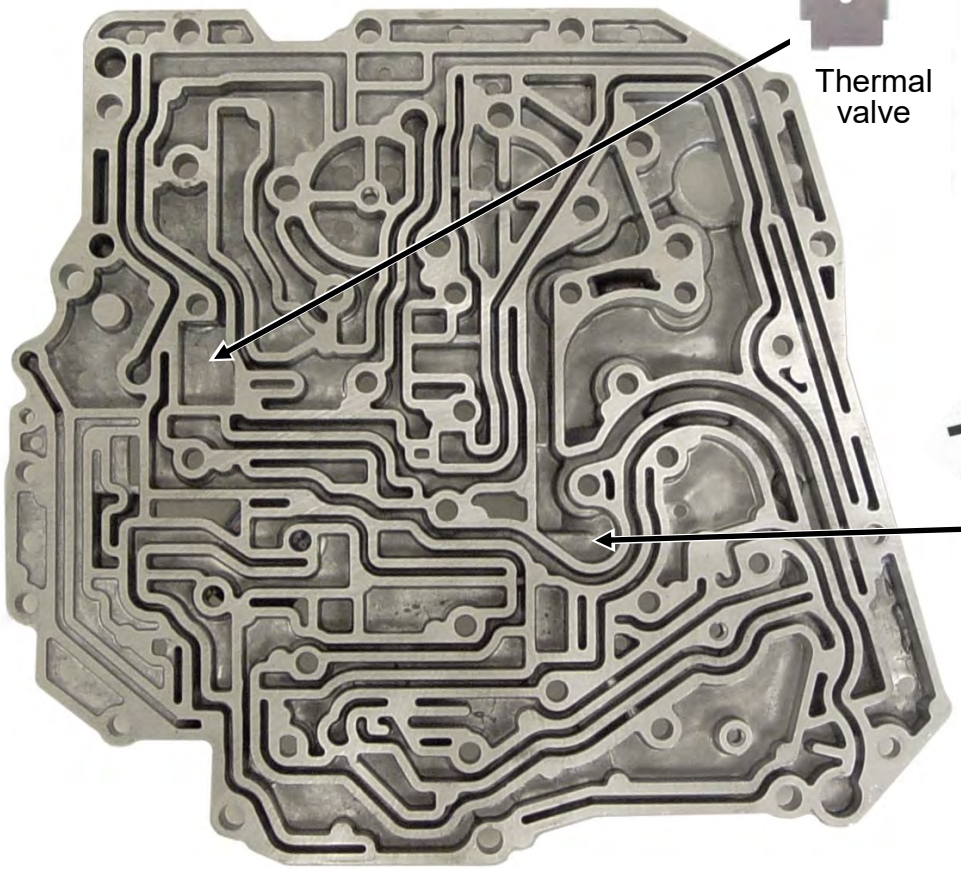
This Page:
606/42LE & 42RLE Only

Drill this hole
To .101 to .106

Separator Plate



606/42LE Channel Casting



Thermal valve

Early

Filter Screen Types

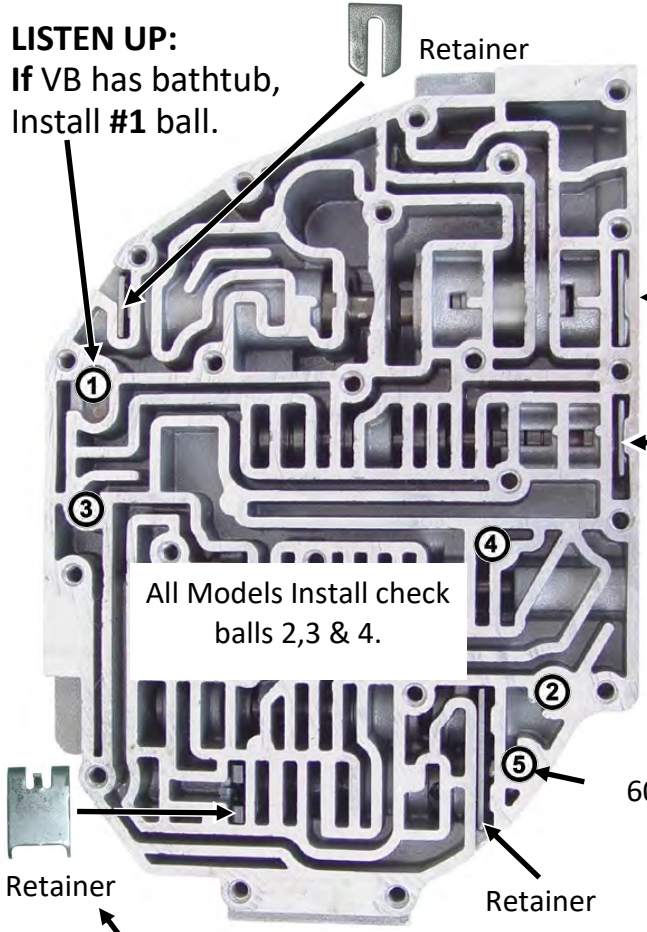
Late

This Page: 604/41TE, 606/42LE & 42RLE

VLP Check-ball layout & PR lineup are different than shown.

Use **SK42RLE** for 42RLE & 604 **VLP Models.**

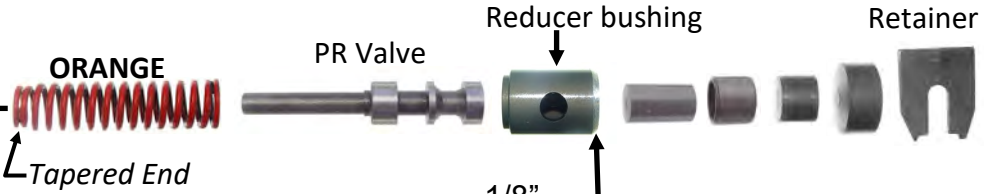
LISTEN UP:
If VB has bathtub,
Install **#1** ball.

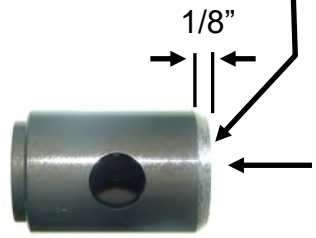


92up with a two piece lockup control valve, has a retainer here. Missing retainer causes low line and trans burn up.

Do NOT use Plastic Accumulator Pistons! Aluminum Only!

Step 1 Install Orange PR Spring, tapered end in first.

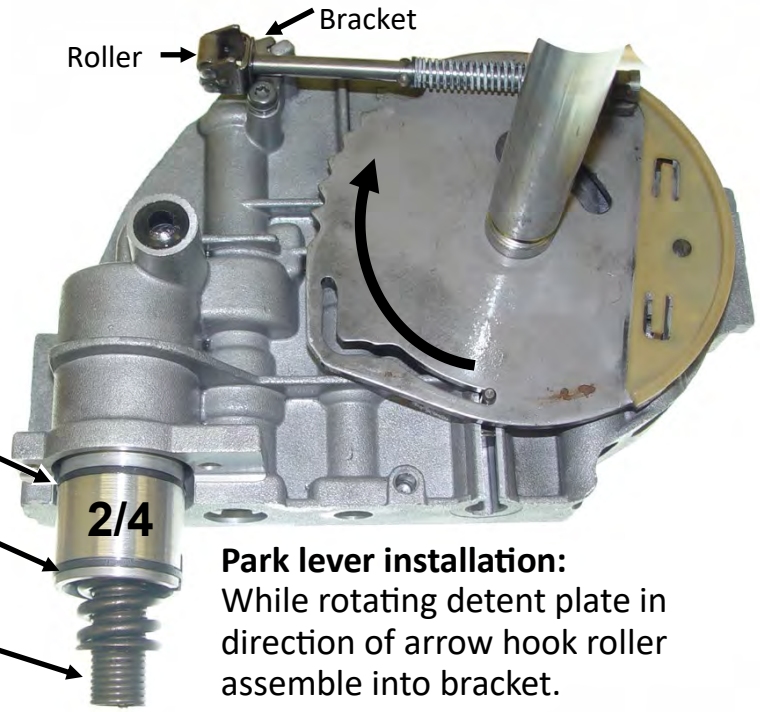




Step 2 Grind 1/8" (.125) chamfer on outboard end of reducer bushing.

Worn bushing bore causes high line PSI. Rough or chatter on 1-2, 4-3 coast clunk and lock up plate failure. Order TransGo 604-BSH.

606, 42LE & 42RLE **Install #5 Ball.**
(All others= No ball here)



Step 3 2/4 Accum Piston.
Install Wire Expander & the new Seal on closed end of the **Aluminum** Piston.

Step 4 Discard inner Spring.
Install **Large Spacer** inside the original outer Spring.

Park lever installation:
While rotating detent plate in direction of arrow hook roller assemble into bracket.

604/42RLE 4th Type** Stack-up

Note: Some small engine models can come equipped with only 3 OD clutches & 1 Reverse clutch. This stack-up is not covered here. Use your specific vehicle data when ordering replacement parts.

UD clutch: Has four .073 thick frictions. High Energy/Brown Paper

OD clutch: Has four .073 thick frictions should be High Energy.

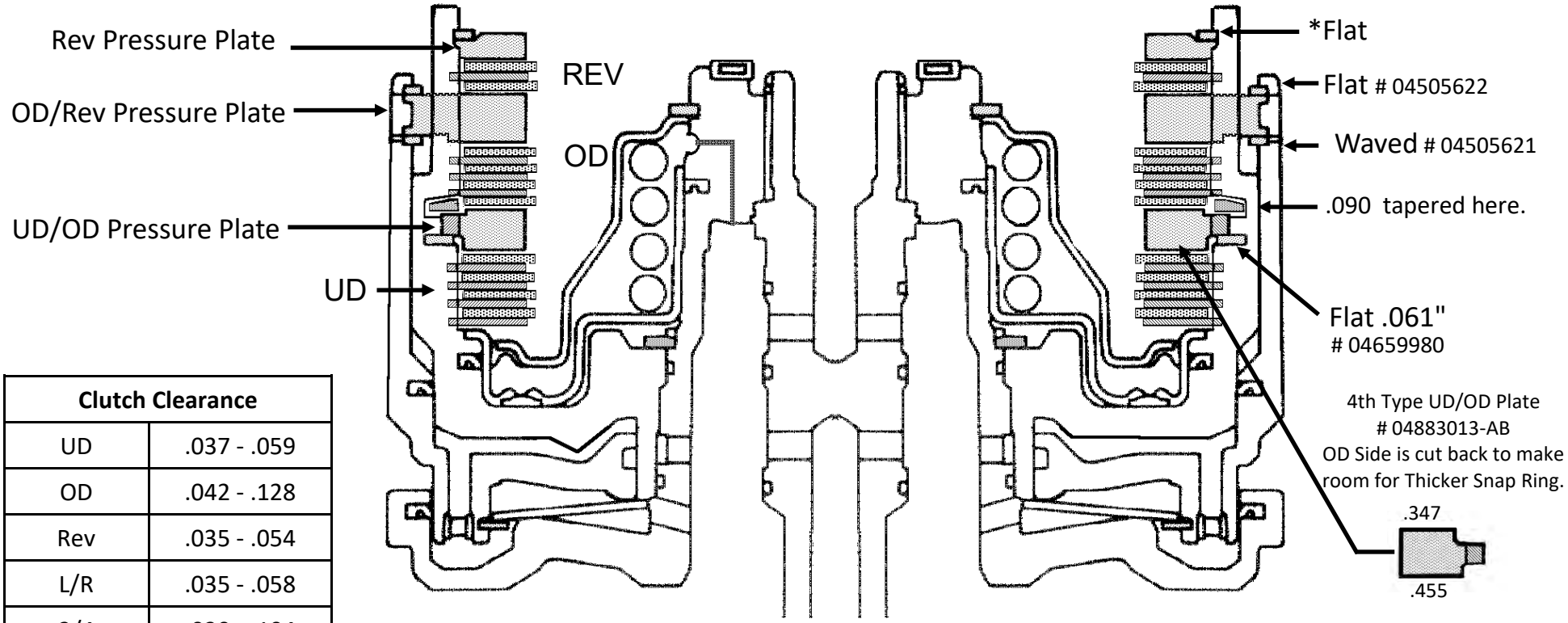
Reverse clutch: Has two .073 frictions High Energy/Brown Paper

UD stack- Start with .068 steel plate, alternate .073 clutch plates, the stack will end with a friction. Install .061" flat snap-ring, 4th design UD/OD Pressure plate then tapered .090 snap-ring.

OD stack- Start with .073 friction plate, alternate with .068 steel plate. The stack will end with a friction plate. Install waved snap-ring, OD/Rev Pressure Plate then install flat snap-ring.

***Rev stack-** Start with .073friction, .068 steel, .073 friction, Pressure Plate and flat selective snap-ring.
Selective Rev Snap Rings: 1.53-1.58mm- # 04377195, 1.77-1.83mm- # 04412871, 2.02-2.07mm- # 04412872, 2.27-2.32mm- # 04412873.

****Earlier stack-up- Types 1 through 3 can be found in the SK 604 kit Additional Information Lesson 3A**

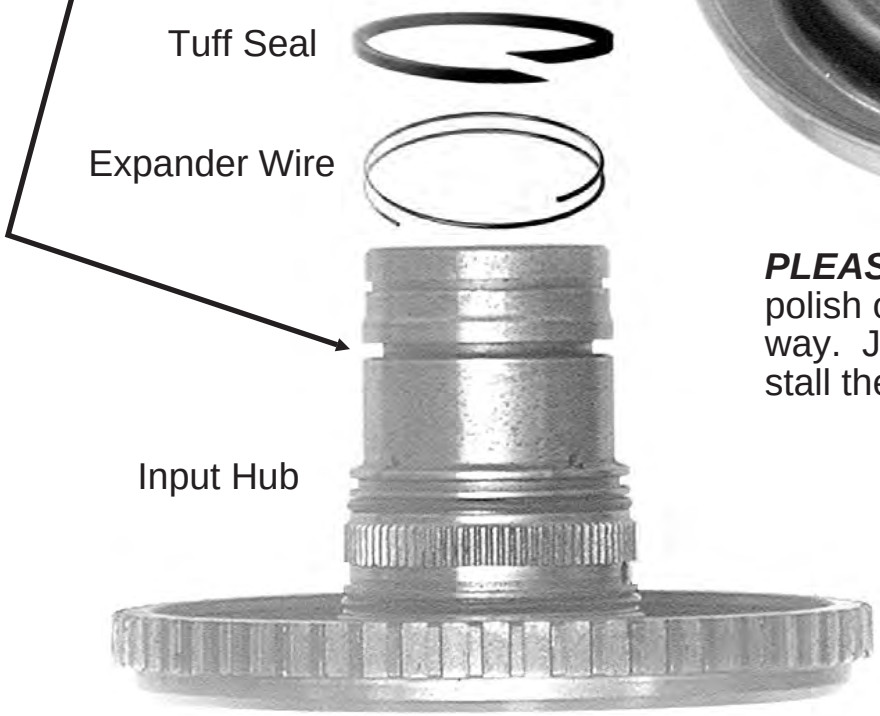


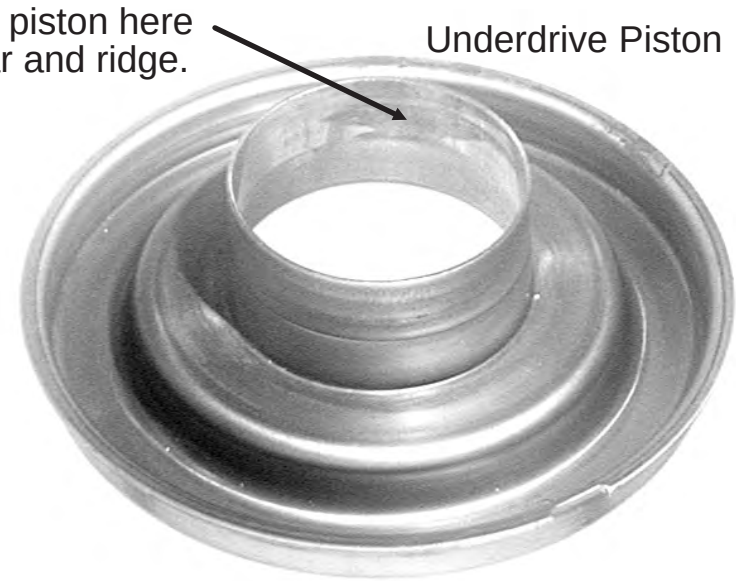
Clutch Clearance	
UD	.037 - .059
OD	.042 - .128
Rev	.035 - .054
L/R	.035 - .058
2/4	.030 - .104

UD-Ring
604/606/42LE

Tough Self Expanding Seal:

A. Install wire expander into groove.
B. Then install the seal.





PLEASE: Don't hone, sand, scrap, polish or try to fix the piston in any way. Just leave it like it is and install the seal. It'll work just fine.

Seal does not air check very well, but works great in the trans, even with a badly worn piston.

COMPLAINT: Limp or Delayed Forward movement when cold, OR Limp after long freeway run: Code 36 & 39 or 53

Close inspection of underdrive piston bore will show wear and a ridge where the piston has rubbed against the seal groove in the input hub. This ridge nibbles the seal and the wear causes cold leak.

With a worn piston or a cut seal there will be a delay or no forward cold and sometimes limp on cold startup: until the seal warms and becomes more pliable.

During a long run in 4th the seal relaxes and fails to re-seal quickly causing limp, during a 4-3 coast downshift between 26 and 19mph.

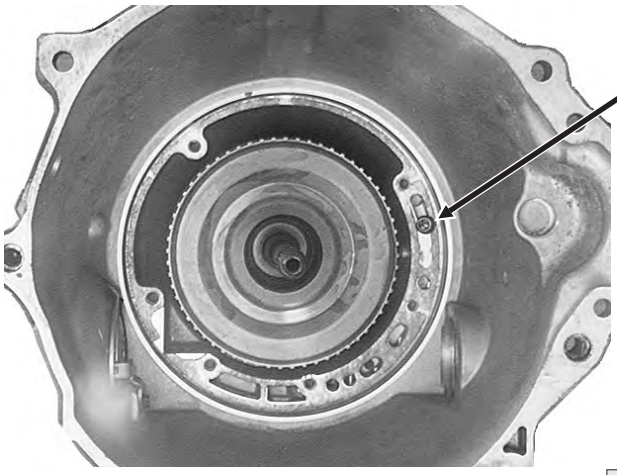
The computer sees the delayed apply by watching the sensors and places trans in limp and sets code 36 along with 39 or 53.

An ignition cycle restart will get trans going again until it gets cold again or has long run in 4th.

A temporary solution is a new piston for $27. A better fix is a quality self expanding seal that is pliable enough to seal into worn area and tough enough that the ridge won't cut it.
It's included in 606/604 Shift Kit®.

Important Repair Data

Drill cup plug in underdrive hub .086 to .096 to increase lube flow to the planets.



If the case has a 2" deep hole here it MUST HAVE a cooler bypass valve installed. Less than 1" no bypass valve.

Cooler Bypass Valve

O'ring

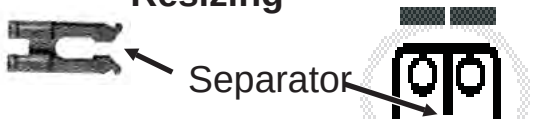
Check bypass valve: Mouth blow on o'ring end of cooler bypass valve, it must be air tight. If the valve is not air tight replace it #4539880.

Eyelet resizing and wiggle testing connections: The most important thing to save your time and assure success.

COMPLAINTS: LIMP with one or more of these codes: 39-51-52-53-54-56-57.

Unplug 60 pin connecter at the controller. With OHM meter set to 1000 range hold leads against pins 13 and 14 while someone wiggles the wires going to the output sensor.
Meter must read 350 to 900 and stay absolutely steady when the wires are wiggled. Check turbine sensor the same way between pins 13 and 52 while someone wiggles the wires.
If OHM meter wiggles on either test, resize the eyelets or replace wires with #4419478 and retest with wiggle.

Resizing



Separator

A. With edge of razor blade pop out the center separator.
B. Insert #59 or #60 drill into eyelet. With small screwdriver squeeze the eye down against the drill.
C. Then test size. A #56 or 3/64" drill must go in snug.

Wire Kit #4419478

Solenoid Pack: Connect computer. Wheels in air, start engine, put trans in "1" and let the wheels turn at idle. Wiggle the wires going to the Sol pack for one minute. If the trans shifts to 2nd resize solenoid connector eyelets.

Listen up: If the trans has passed the wiggle test and it is still going to Limp when driving on the road, then for a test change both speed sensors.

27 Sept 04

604 9/94

Partial Lesson #3A

HERE'S HOW TO USE THIS DATA:

Read it now. Don't STUDY it just read it. Start trans assembly by doing page 4. Then DO page 2&3. Before road test DO "Fast Re-scheduling" on page 1.

[To obtain this type of data on a regular basis and some help by phone when you have a trans that is giving you a problem: Call and ask about our Tech Program.]

Tech Sales: (626) 443-0991

This information is given in the order of how often the complaint occurs.

A few rules will save you several days or weeks of brain straining figure-outs.

Electrical parts on the trans

Remove all electrical parts BEFORE disassembly of the trans. Don't place electrical parts in a parts washer. The magnets and electrical contacts will collect metal particles and cause complaints that can drive you up the wall. Sensors and switches can be cleaned by hand in clean solvent. [No metal particles]

If oil, moisture, or corrosion is in the connectors or connector cavity of the solenoid pack, sensors or switches, replace them.

If the trans has serious metal contamination REPLACE PRNDL switch.

OUTPUT & Turbine Sensor Complaints: Immediate limp, under 12 mph. Goes limp during warmup. Occasiona limp with no apparent cause. Upshifts delayed. Downshifts for no reason and may go to limp. [Produces code 39 and/or 51 to 58.]

CAUSE: *Most often the connection or the wires are bad,* ***not the sensor.***

1. Replace connector wires 4419478.
2. Replace the output sensor.
3. Still has problem replace input sensor.

[Fast pre-check: Connect 1M ohm scale to pins 13&14. ***Reading must stay steady at 730 to 850 when you wiggle the wires.*** Turbine sensor pins 13&52]

604 trans: The first trans to control the release of one gear and apply of the next gear without use of sprags or band. The clutch retainer [drum] stackup may seem strange, but when you consider that one assembly produces four ratios plus reverse, it's the most comprehensive design built today.

Most errors made during major repair is mis-assembly in the clutch drums. Learning correct stackups will save you many R&R hours in the next few years.

Prevent 2-3 and 4-3 bindup/damage.

VERY IMPORTANT: Because OD clutch is usually burnt the controller has increased OD clutch apply rate [CVI]. Most controllers won't reset enough [some not at all] to prevent severe 2-3 bindup with new clutches. To prevent damage "FAST re-schedule" the controller before road test.

All controllers, old-new-used or swapped require re-scheduling BEFORE road test.

Controller: FAST Re-schedule

Setup: Wheels off the floor and the selector in the "OD" position.

1. Apply throttle slowly until speed of 45 to 50 is reached.
2. Lift throttle gently and allow speed to slow to 20 or less.
3. Apply brake, ever so gently, and bring wheels to standstill.

Repeat this over and over, at least 75 times, while noticing the feel of the 2-3 shift. When a light throttle 2-3 shift no longer bogs the engine [bindup] the trans is ready for a road test. [With scanner attached you are ready for road test when OD CVI reading gets under 55].

Immediately after "Fast Re-schedule" road test & re-schedule 4-3 coast shift.

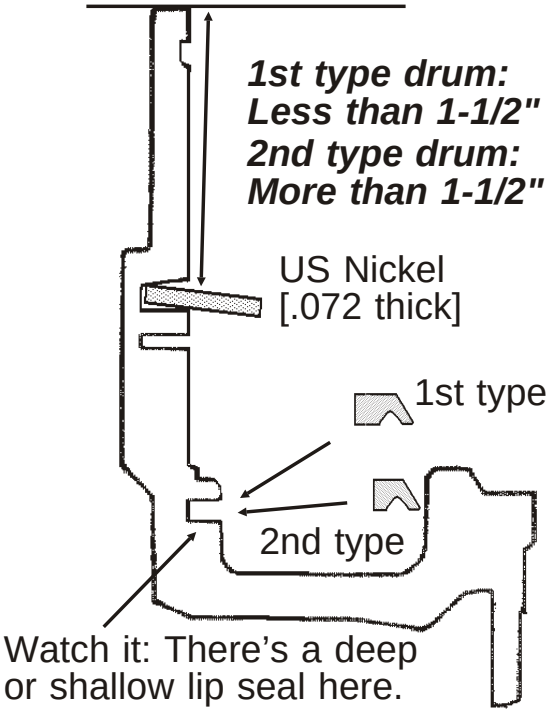
At 38mph lift throttle and apply a very small amount of brake. Is the 4-3 coast downshift at 26 to 20mph rough? If it is rough re-schedule coast 4-3 like this:

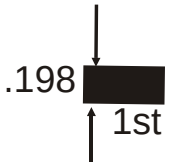
Lift throttle at 38mph. ***At 32 to 35 mph add just enough throttle to barely make a 3-2 KD.*** Do this 40 times and then recheck for rough 4-3 coast downshift. If 4-3 is still rough, do it again 80 times.

Clutch Retainer Assm

Identify Clutch Retainer [Clutch Drum]

Insert a nickel in tapered groove.
Measure from top of drum to nickel.





1st design press plate—-Thickness .198

Fits early retainer only:
Use .068 taper snap ring on top of UD/OD plate. ***OD plate stackup:***
Three .085 friction & two .101 steel.

To convert to four OD plates:

Plate, kit, 3rd , w/s'ring	4723683	$17
Retainer, UD/OD	4505623	$51

2nd design press plate—Thickness .160

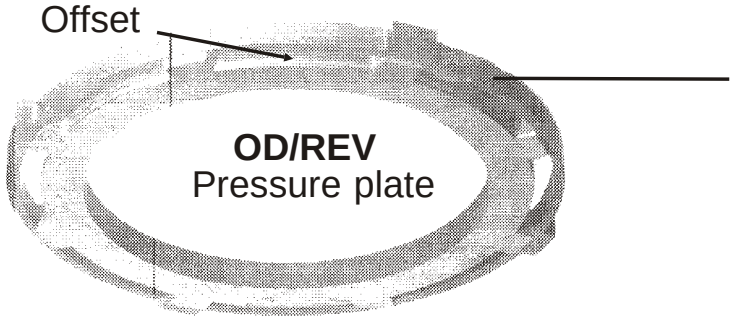
Fits late retainer only:
Use .068 taper snap ring [4377189] on top of UD/OD pressure plate.

OD plate stackup:
One .085 friction, three .071 friction and three .068 steels.

WARNING: Bottom OD friction plate must be .080 to .087 thick.

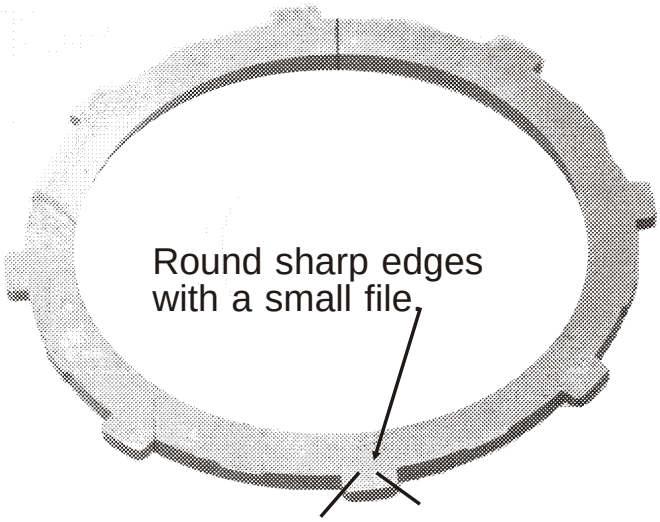
If UD/OD press plate is worn buy:
Plate kit, 3rd,

To install four friction in early retainer:
Machine .045 to .055 of the offset side of the OD/Rev pressure plate.



OD plate stackup:
One .085 friction, three .071 friction and three .068 steels.

Warning: Install .085 friction on top of the UD/OD pressure plate.



1st & 2nd type UD/OD pressure plates are flat & <u>sharp</u> across top and tooth.
File teeth edges. Just barely file edge of teeth so sharp edge won't cut snap ring.

Don't use .061 taper snap ring anywhere.

Do not install .071 to .075 friction against 1st or 2nd design UD/OD pressure plate. It will let the first steel plate butt against snap ring
&
keep 1st OD friction from holding.
WARNING: Never install 2nd or 3rd type UD/OD plate into an early type drum.

[Clutch Drum & Pressure Plates]

Mis-matched parts and wrong clutch plate stackup is a common cause of rework & comeback.

Assemble the drums without installing the clutch hubs. Then check the clutch clearance. Then install hubs.

Don't adjust clearance below minimum.

UD .035 to .058. OD .042 to .096
Rev .036 to .039 L/R .042 to .065 [not pictured]

Thickness: Place tooth against spot

Tooth

UD/OD pressure plate
1st and 2nd design: Flat across top and tooth.
Use .068 taper snap ring on top. 4377189
Use .061 flat snap ring under this plate. 4377195

HOLD THIS PAGE AGAINST PAGE TWO

UD/OD pressure plate
3rd design: Offset for taper snap ring.
.075 to .079 taper snap ring on top. 4567602
.061 flat snap ring under this plate. 4377195
Stackup: (4) .071 friction—(3) .068 steel
.140 thickness tooth
3rd

CODES
Friction
Steel
Snap ring

OD/REV Press plate

REV OD

UD

Offset

Waved snap ring

Taper snap ring

1st & 2nd type: Use .068
3rd: .075 to .079

.061 flat snap ring.

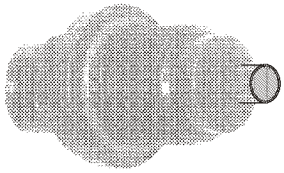
Lip Seals
Install with lip down

Removal damages this snap ring.
Always install a new one. 6501812

Internal Repair Data/Methods

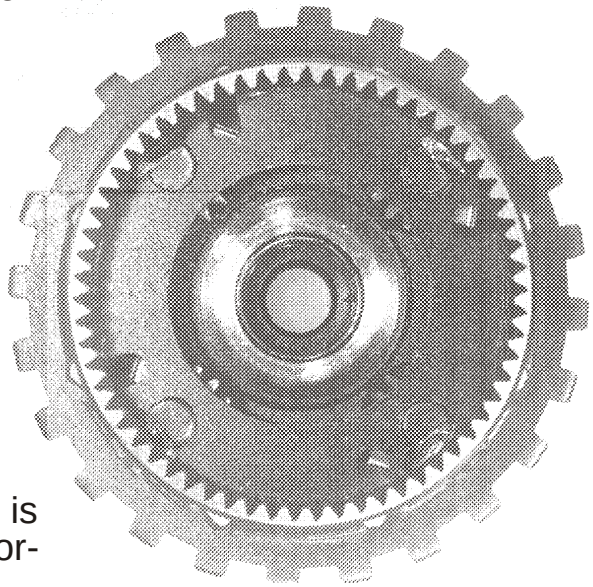
Important: Prevent sensor caused and limp caused codes 39, 36, 51, 57.

Look carefully at the end of the sensors. If there are scratches on the magnet it is rubbing. If it has scratches grind end shorter prox .032.
A new sensor may also rub and need grinding.



Has scratches on the end?

Grind 1/32" off the end



Clearance between the end of sensor and carrier lugs should be .020 to .045.

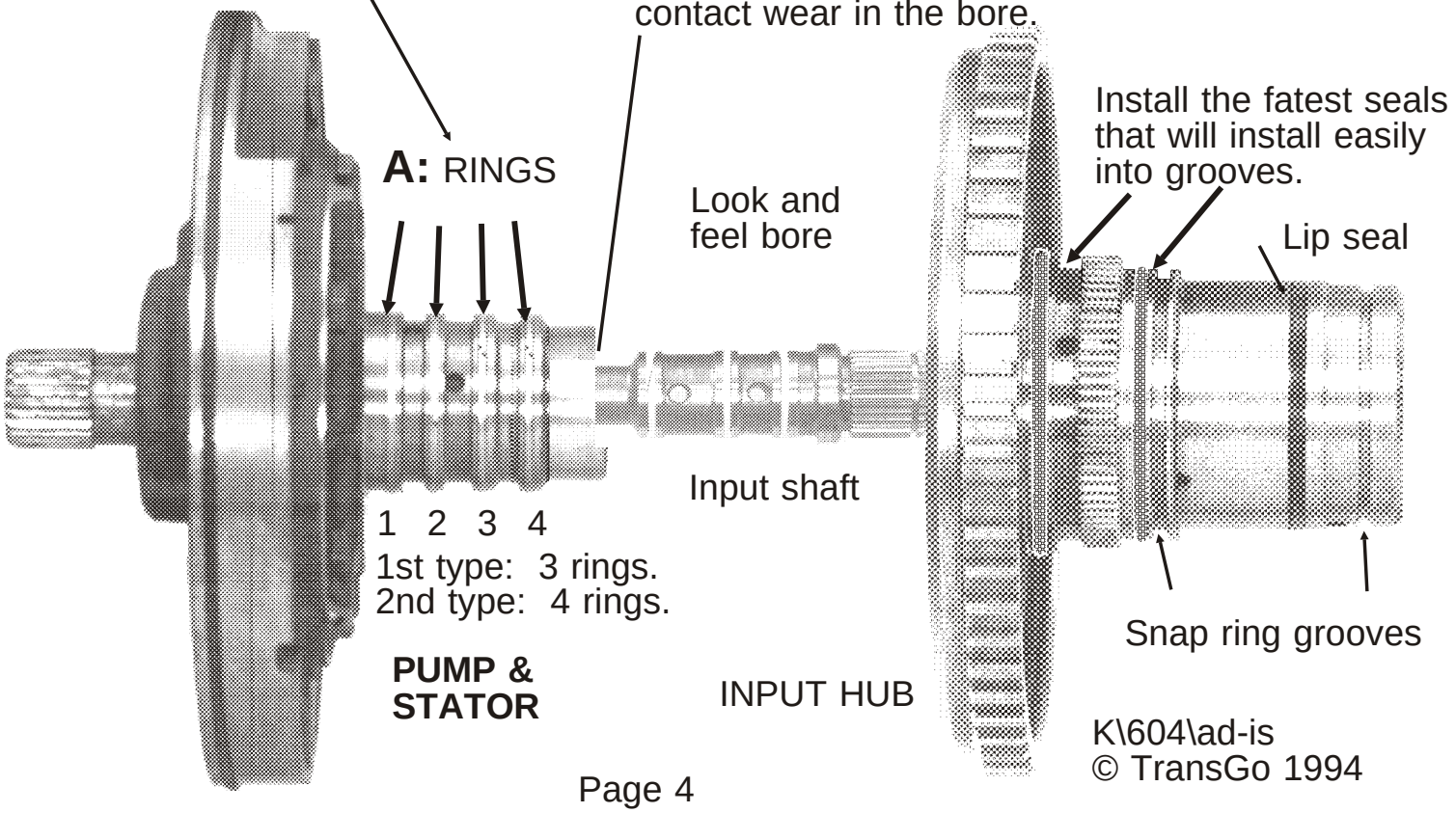
Sensors: If connector pins will finger wiggle it is time for another one. If there is oil, moisture or corrosion in the connector cavity—get another one.

Reduce/avoid these pressure loss complaints:

Delayed and/or rough engagements. 4-3 coast clunk. 4-3 or 4-2 KD bang [tieup].

A. If .005 feeler will go into groove with the ring, replace the ring. If .005 will go in with new ring, replace the support.

B. Stator Support: Feel input shaft <u>bore</u>, with your finger, where input shaft rings ride. If bore has even ***slight wear, replace the support and the input hub. Listen:*** If input shaft bore in stator is smooth it's OK to re-use input hub with contact wear in the bore.

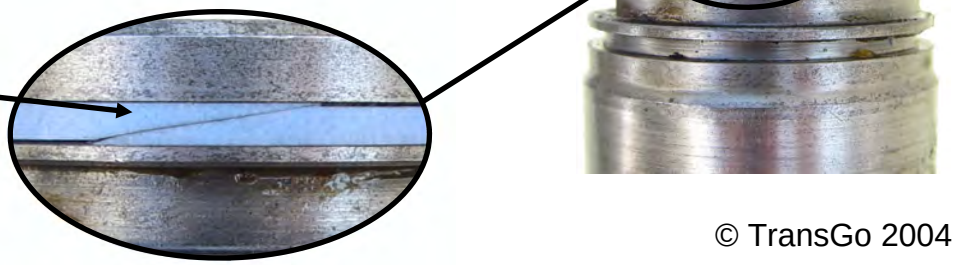


K\604\ad-is

Hi Temp RING INSTALLATION

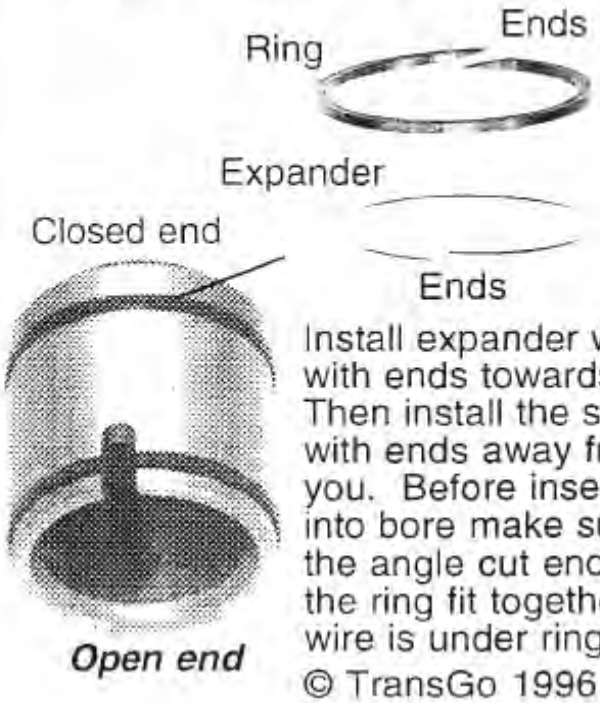
Ends of rings should have small gap or just touch ***GENTLY***. **Don't push** the ends together **firmly** or they will **bind** in the groove and will **not seal.**

The ring shown was pushed firmly and is locked in the groove



IS-Angle Cut 2013

604 Accumulator Seals



Install expander wire with ends towards you. Then install the seal with ends away from you. Before inserting into bore make sure the angle cut ends of the ring fit together and wire is under ring.