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Torqueflite Diagnosis

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TAKE TIME TO TEST

More than a few transmissions have been torn down unnecessarily because a hurried diagnosis missed the mark or there was no diagnosis at all. After all, checking out transmission trouble can take time and, when the pressure is on, it may seem more practical to get into the transmission directly without testing. However, unless the condition is obvious, like excessive noise or a no-drive condition, you will usually find that it actually saves time and lost motion to first localize the cause of trouble by testing.

Preliminary testing also makes it possible to compare transmission operation before and after any servicing, so you can tell whether you have corrected the trouble. In fact, you should know how the transmission performs before any work is started because, in some cases, repair or adjustment may produce a different, unsatisfactory condition instead of clearing up the original trouble.
A major feature of the TorqueFlite transmission is its infrequent service requirements. In normal passenger-car use, no servicing is required beyond checking the level and condition of the fluid and inspecting the control linkages every six months. These simple inspections should be made regularly to detect any below-standard conditions early, so possible corrections can be made before serious damage occurs.

When a car is used for trailer towing or in taxicab, police, or other heavy-duty service, the fluid and filter should be changed at intervals specified in the Service Manuals. This requirement also applies to the LoadFlite transmissions used in Dodge trucks.

**LOOK BEFORE YOU LEAP**

In all TorqueFlite repair work, the logical procedure should be *diagnosis before tear-down*. It's possible that the customer's complaint may be misleading, so it's wise to check out the job for yourself. Anyway, you should know how the transmission acts before the car goes into the service department so you can tell later whether the original trouble is corrected or not.

**POWER IS IMPORTANT**

When putting the transmission through its paces, be sure to remember that engine performance can have a distinct effect on TorqueFlite operation. In fact, engine power that is below normal can be the direct cause of upshifting delays and harshness, so don't jump to any conclusions about the transmission if engine power is sluggish.

**NARROW DOWN THE POSSIBILITIES**

In addition to the regular six-month maintenance checks, fluid and linkage inspection should be the first step to take when diagnosing TorqueFlite service problems. If the fluid and linkages check out okay, you can forget them as possible trouble causes when road testing. With these variables out of the way, your diagnosis becomes much simpler.

**LOOK FOR CLUES**

Obviously, you can't make a road test if the transmission is inoperative, but you can usually get some clues about the problem from the level and condition of the fluid. Along with this, a brief linkage inspection will also help you determine whether an incorrect linkage setting was the thing that started the trouble in the first place.

**ASK QUESTIONS EARLY**

Try to find out as much as you can when talking to the customer. You may learn that the transmission trouble started after some other work was done on the car, and the solution could be as simple as correcting an off-standard throttle linkage setting.

**GET ON THE TRAIL**

If the customer's complaint is a bit vague, or complete information about the condition is not available, you'll probably find that the old familiar process of elimination is the best procedure to follow when diagnosing TorqueFlite troubles.

**CHECKING ELIMINATES VARIABLES**

As mentioned earlier, the sequence for checking out a TorqueFlite transmission should begin with the simple things like fluid level and linkage adjustments. If you find the fluid and linkage in good condition, road testing will help to further isolate the cause of the transmission trouble. If road-test results are not conclusive, it may be advisable to follow up with transmission hydraulic system pressure tests in the shop.
DIPSTICK CLUES

The fluid level is okay when it is between the "Full" and "Add One Pint" marks on the dipstick with the fluid warmed to normal operating temperature. The engine should be running at idle speed and the range selector set in Neutral position when the dipstick is checked. Since the torque converter fills more slowly in the Park position, we put the selector in Neutral to make sure that the dipstick level check is accurate.

Before checking the dipstick, wipe the protective cap and top of the filler tube clean of dirt. After checking, seat the dipstick cap fully to seal out dirt and water.

LEVEL IS OKAY BETWEEN MARKS

Fig. 2—Check fluid level with engine running

HIGH OR LOW MEANS TROUBLE

Because the relationship between correct fluid level and the proper transmission operation is not obvious, the dipstick check may not seem important. However, in the TorqueFlite Diagnosis Section of the Service Manuals, you’ll find that Low Fluid Level appears as a possible cause of 10 out of 20 conditions covered.

SPONGY FLUID COMPRESSES

Low fluid level can cause a variety of transmission conditions because it allows the pump to take in air along with the fluid. As in any hydraulic system, air bubbles make the fluid spongy and compressible, so system pressure tends to be low and pressure buildup is slow.

Fig. 4—Bubbles make fluid compressible

BUBBLES SLOW THE ACTION

The effects of air bubbles in the fluid show up in delayed clutch engagement when you move the selector into Drive or Reverse, and in slipping upshifts. Air in the system can also cause pump whine and governor valve buzzing.

Fig. 3—Incorrect level affects performance

Fig. 5—Check for leaks if level is low
LOW LEVEL CAUSES WEAR
Slipping which results from low fluid level causes overheating and severe wear of clutches and bands. Low fluid level can also starve the transmission lubricating system, causing other transmission parts to wear out rapidly.

LOOK FOR LEAKS
Low fluid level can result from an external leak or improper filling. If there’s no evidence of external leaking, it’s possible that someone did not bring the fluid up to proper level when refilling the transmission. Underfilling is possible if the torque converter and hydraulic control circuits are not full when the fluid level is checked.

HIGH LEVEL FLUID IS FOAMY
Improper filling can also raise the fluid level too high. When the level is too high, the gears can churn up foam and cause the same conditions you get with low fluid level bubbles. In either case, the air bubbles and overheating cause the fluid to oxidize and form varnish which can interfere with normal valve, clutch, and servo operation. A high level can also result in fluid escaping from the transmission vent where it may be mistaken for a leak.

FILL CONVERTER FIRST
When you refill a transmission with new fluid at average room temperature, first pour in about six quarts, and with the selector in Neutral, run the engine for about two minutes so the torque converter can fill. Next, apply the brakes and move the selector through all the range positions and back to Neutral to make sure that the hydraulic control circuits are full. Finally, add fluid to bring the level up to the “Add One Pint” mark, which will put the level between the dipstick marks when the fluid is up to operating temperature.

FLUID CONDITION TELLS THE TALE
Along with dipstick level, it is also important to check the condition of the fluid. When the fluid is discolored and smells burnt but the transmission operates okay, the cause may be overheating due to severe operating conditions. If this condition is detected early, and the fluid does not contain foreign particles, a fluid and filter change may be all that’s needed. Be on the lookout for evidence of severe usage or neglect when you check a car that has a trailer hitch or shows higher than average mileage on the odometer.

PARTICLES INDICATE TROUBLE
When the fluid is dark, and smells burnt, and is full of metal or friction material particles, it’s a sure sign that a complete transmission overhaul is needed. Be sure to examine the fluid on the dipstick closely and if there is any doubt, drain out a sample for a double check.

DIPSTICK SHOULD WIPE CLEAN
Varnish is caused by overheating and should be suspected when the dipstick does not wipe clean. You can confirm this condition and its extent by visual inspection after the transmission oil pan is removed. Sludge in the fluid is caused by water, glycol antifreeze, or other contaminants.

CHANGING MAY DO THE TRICK
If you find only a light coating of varnish, a fluid and filter change may be all that’s required especially if there have not been any operational problems. On the other hand, a heavy coating of varnish
calls for a complete teardown and cleanout. Since fluid overheating is a major cause of varnish, be sure to clean out the transmission oil cooler in the radiator and the connecting lines. To do a complete job, also make sure that the engine cooling system is in good condition.

DEXRON IS BEST
If the original fluid is replaced for any reason, both the fluid and the filter must be changed and the bands adjusted. When adding fluid or refilling, use only Chrysler-approved automatic transmission fluid labeled DEXRON type. Do not substitute Type F fluid because its different characteristics will cause harsh shifting in a TorqueFlite transmission.

WATER CONTAMINATES FLUID
Engine coolant or plain water turns transmission fluid milky in appearance. This contamination also swells seals and softens friction material so the transmission must be completely reconditioned to put it back in workable condition. If the source of contamination is internal, you'll probably find the leak at the cooler unit in the radiator.

ALWAYS MAKE SURE THE DIPSTICK COVER IS FULLY SEATED
When a cooling system pressure test does not show up any leaks, road splash or rain water may have entered the transmission past a partly unseated dipstick cover.
LINKAGE SETTING POSITIONS VALVES
The point to remember is that the basic positions of the manual and throttle valves depend on their linkage settings. For example, if improper selector linkage adjustment displaces the manual valve far enough, the car will creep in Neutral. In addition, the starter may not operate in Neutral or Park position, and the parking sprag may not hold. In fact, the most obvious symptom of poor selector linkage adjustment is no starter action unless the selector is moved slightly off the Neutral or Park detents.

Fig. 12—Manual valve in Neutral position

VALVE MUST BE CENTERED
In Neutral, the selector lever detent should position the manual valve to cut off pressure to the Drive and Reverse ports in the valve body. If the linkage is not properly adjusted, it positions the valve off-center, opening one of the ports to line pressure which causes creeping.

Fig. 13—With engine stopped move selector to P

A LITTLE IS TOO MUCH
In some cases, a small variation in the linkage setting can displace the manual valve just far enough to produce partial clutch engagement, which allows slipping without causing the car to creep. When this condition continues uncorrected, the friction material will wear rapidly.

SAFETY SWITCH CHECKS LINKAGE
Normal operation of the Neutral Safety Switch gives you a quick check of the selector linkage adjustment. With the engine stopped, move the selector lever slowly until it clicks into the Park notch on the selector position gate. If the starter will operate at this point, the Park position is okay.

Fig. 14—Detent "feel" locates stopping point

MOVE SELECTOR SLOWLY
After checking the Park position, move the selector lever slowly toward Neutral and stop when the neutral detent bottoms. If the starter will also op-
erate at this point, it indicates that the selector linkage is properly adjusted.

CHECK THE OVERTRAVEL
Another quick way to check selector linkage adjustment is to note how far the selector lever can be moved upward beyond the Neutral detent point and downward beyond the Drive detent point. If selector linkage adjustment is correct, the additional movement beyond the detents should be nearly the same in each direction.

SETTING AFFECTS SHIFT QUALITY
The throttle linkage adjustment is also important to proper TorqueFlite operation. Here again, the linkage setting determines the operating position of a control valve, but in this case, the results of incorrect adjustment show up in the shift quality.

SHORT SETTING LOWERS PRESSURE
When the length of the throttle linkage is set too short, the throttle valve opens less than normal, so the transmission throttle pressure is lower than it should be in relation to the carburetor throttle opening and engine power output. As a result, upshifting tends to be early, and you may get an engine speed flareup during the 2-3 upshift.

NOTE THE CONDITIONS
If there's an engine speed flareup on a very light acceleration upshift, but no flareup under heavier pedal pressure, it's a tipoff that the throttle linkage is set too short. In some cases, short linkage will prevent full throttle kickdown action.

LONG SETTING GOES TOO FAR
In the opposite direction, throttle linkage that is extended or set too long, opens the throttle valve too far. This excessive valve opening raises the throttle pressure higher than normal so upshifts are delayed and harsh. Linkage that is set too long also tends to make part-throttle downshift operation very sensitive.

USE SPECIAL HOLDING TOOL
Always remember that throttle linkage adjustment is critical, especially in our current TorqueFlites which now feature the part-throttle downshift feature. In fact, when checking the linkage adjustment we now use a special throttle lever holding tool to eliminate linkage free play which could cause an adjustment error.

ROAD TESTING

Along with throttle linkage, we must also consider engine performance. If the engine is not putting out normal power, the gas pedal must be pushed down farther than usual to make up for the power loss. When the pedal moves farther than normal, you get the delayed and harsh upshifting that is typical of operation with an over-long throttle linkage setting, even though the linkage is set correctly.

SHIFT QUALITY IS A CLUE
If time is short, you can make a fairly accurate check of the throttle linkage setting by noting shift quality during your road test. If you notice any of the erratic shifting symptoms we've just covered, you'd better have the linkage setting checked and adjusted before you go on with your road test.
CHECK IN EACH POSITION
Assuming that the fluid is okay and the linkages are properly adjusted, the transmission should be operated in each selector position to check for any variation in shifting. Note whether the shifting is harsh and check the speeds where the upshifts and downshifts occur.

SLIPPING MEANS TROUBLE
In road testing, the main thing to check for is slipping or engine speed flareup. Slipping or flareup in any gear usually means clutch, band or overrunning clutch trouble. If the condition is far advanced, complete reconditioning is needed to restore normal operation. However, in some cases, engine speed flareup during a full-throttle 3-2 kickdown is caused by a loose kickdown band, which may only need adjustment.

ROAD TEST HELPS DIAGNOSIS
Since there can be several possible causes of transmission slipping, your diagnosis will be more exact and useful if you try to localize the trouble when you road-test the car. In most cases, you can tell whether a clutch or a band is slipping by comparing the transmission operation in all the selector settings. When only one clutch or band slips, it's fairly easy to isolate because the clutch engagement and band application combinations are different in each range setting.

IT'S ON THE CHART
The Service Manuals provide a detailed chart which lists the clutch and band combinations at the different stages of transmission operation. However, for routine road-testing analysis, you can use the simplified chart shown below.

<table>
<thead>
<tr>
<th>CLUTCH AND BAND APPLICATION CHART</th>
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<tbody>
<tr>
<td><strong>LOW (D)</strong> (Breakaway)</td>
</tr>
<tr>
<td>REAR CLUTCH</td>
</tr>
<tr>
<td>OVERRUNNING CLUTCH</td>
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</table>

Fig. 17—Burned-out discs and kickdown band
REVIEW THE SEQUENCE
Before you try to use the chart, let’s briefly review the normal shifting sequence in each selector position. In D or Drive position, the car gets under way in Breakaway Low, and then at appropriate speeds, the transmission upshifts to Second and Direct Drive. Number 2 position follows the same pattern but the transmission upshifts only to Second. In Number 1 position, transmission operation is limited to Manual Low.

OVERRUNNING CLUTCH HOLDS IN D AND 2
When the selector is in D or Position 2, the rear clutch applies. At breakaway in both selector positions the overrunning clutch holds during acceleration but releases on deceleration. In other words, there’s no engine braking in Breakaway Low.

NO UPSHIFT IN POSITION 1
In Position 1, the transmission is locked in low gear. As in D and Position 2, the rear clutch engages, but here the low and reverse band applies and takes over from the overrunning clutch. Unlike breakaway low in Drive, this position provides low gear both for acceleration and engine braking.

OVERRUNNING CLUTCH SMOOTHSH SHIFTING
Essentially, the overrunning clutch and the low and reverse band do the same job to start the car moving in low gear. However, since upshifting from the low band to the kickdown band would be hard to synchronize and probably harsh, the overrunning clutch is used in D and Position 2 so the band can take over smoothly for the upshift to Second.

CLUTCH OVERRUNS AS BAND APPLIES
In a normal 1-2 upshift, the overrunning clutch
simply overruns without resistance when the kickdown band applies to cause the shift. After a closed-throttle downshift, the overrunning clutch coasts until the car is accelerated again.

DIFFERENT ACTION IN EACH POSITION
By analyzing the normal clutch and band action for each selector position, you can pick out the cause of slipping by the process of elimination. On the simplified chart, you’ll see that the rear clutch is engaged in both the D and Number 1 positions. From this you can deduce that the rear clutch is the cause when you get slipping in Drive Breakaway Low and Position 1.

IT'S ONE OR THE OTHER
Following the same process, it should be obvious that the overrunning clutch has failed if you find there is slipping in Drive Breakaway Low but not in Position 1. If there is no engine braking in Position 1, the cause is in the low and reverse band.

SLIPPING IN 2 POINTS TO BAND
In a normal 1-2 upshift, the rear clutch stays on and the kickdown band applies. Here, if the transmission does not slip in Breakaway Low, but does slip in Second, the cause is in the kickdown band and not in the rear clutch.

BAD SLIP SKIPS SECOND
When the kickdown band slips badly or does not apply at all, the upshift will skip Second completely. When this happens, the overrunning clutch holds from Breakaway Low until car speed is high enough for a shift to Direct Drive.

SLIGHT SLIP DELAYS UPSHIFT
If there is only a slight kickdown band slip it can cause a short upshift delay and then a thump as the kickdown band takes over from the overrunning clutch.

Fig. 22—Overrunning clutch can slip in D or 2

Fig. 23—Loose band can cause slipping in 2nd

Fig. 24—Thump is clue to slipping band

Fig. 25—Front clutch engages in direct drive
clutch. This condition is sometimes called a “Slide-Bump”.

**BOTH CLUTCHES ARE ENGAGED**
On the chart, you’ll see that both the front clutch and the rear clutch are engaged when the transmission is in Direct Drive. Based on this combination,
it’s obvious that any slipping in Direct Drive must be in one or both clutches.

**DIRECT DRIVE USES FRONT CLUTCH**
Working backward on the chart sequence, we find that the rear clutch is engaged in Low, Second, and Direct Drive. However, in all forward speeds the front clutch engages only in Direct Drive. From this it follows that when Low or Second operate okay but there’s slipping in Direct, the cause has to be in the front clutch. In some cases when you get an engine flareup during the 2-3 upshift, but no apparent slip in Direct Drive, it can mean that the front clutch is beginning to fail.

**CHECK OUT REVERSE**
Again on the chart we can note the clutch and band combination that applies to checking out the remaining selector position. In Reverse, the front clutch and the low and reverse band are the working elements. If there is no slipping in Direct Drive but you get slipping in Reverse, it indicates that the front clutch is holding but the low and reverse band is slipping.

**PRESSURE TESTING**

Besides clutch or band slipping, a road test may show up other conditions such as erratic upshifting or sluggish downshifting. If the transmission has varnish or sludge deposits, it is not unusual to get sticky valve, clutch, or band action, any of which can result in slipping as well as poor shifting quality. However, these conditions can also be the result of low hydraulic system pressure or low pressure at a clutch or servo, so if there is any doubt as to the cause, it makes good sense to make pressure tests before you open up the transmission.

**TESTS ONLY CHECK PRESSURE**
Pressure tests will not tell you if the servos operate properly, but you can eliminate the hydraulic supply system as a possible cause of trouble if the operating pressures check out okay.

**OPERATING SYSTEM TESTS**

We check operating system pressures at three points when slipping is involved. These tests are used to check Accumulator Line Pressure, Kickdown Servo Release Pressure, and Low-Reverse Servo Apply Pressure.

**GOOD READING OKAYS SOURCE**
If you get the specified test pressure at any one of these test points, you’ll know that the main pressure source is okay. In other words, you’ll know that the transmission oil pump and the system pressure regulating valve are working properly.

**WORN PUMP LOWERS PRESSURE**
Low pressure readings at all test points can indicate a worn or leaking pump, but the more probable causes are a clogged filter, an internal leak, or a stuck valve in the supply system. Slow clutch engagement in reverse is a symptom of low pressure.
CLOGGED FILTER LOWERS VOLUME
Pump output volume lowers gradually as the filter clogs and this reduction delays clutch engagement and band application. If a fluid and filter change, along with band adjustment, does not restore normal operation, the transmission probably needs reconditioning.

LEAK MAKES UPSHIFT HARSH
Line pressure can be low if there's a leak at the accumulator. When this pressure is lower than normal, the accumulator does not cushion kickdown band application as it should so you get a harsh 1-2 upshifting.

SERVO PRESSURE SHOULD FOLLOW
With the selector in the D position, kickdown servo release pressure should follow right along with accumulator line pressure after the 2-3 upshift. Low servo release pressure can result from a leak at the front clutch seals or at the reaction shaft support seal rings.

LEAK IS HARD TO SPOT
Another possible cause of low kickdown servo pressure is a leak at the servo seal. However, a leak here is hard to spot because both sides of the servo are pressurized in direct drive.

FOLLOW TEST SEQUENCE
If the tests show that servo kickdown release pressure is within limits, you can go on to check the low-reverse servo apply pressure. A leak in the low and reverse servo can cause low pressure and slipping when the selector is in the Reverse position. There will be low pressure at the servo if the front clutch seals are leaking.

CHECK LINE PRESSURE FIRST
When you are sure that accumulator line pressure is within specified limits, low pressure at the other test points usually means that there is a leak in the part of the system with the low pressure.

CONTROL SYSTEM TESTS
As we have seen, line pressure and servo pressures are directly related to the operation of the clutches and bands that produce the upshift, downshift, and reverse actions in the transmission. In comparison, the main functions of the throttle and governor pressures are to control shifting smoothness and the timing of the shifts with respect to engine speed and vehicle speed.

PRESSURE BALANCE CONTROLS TIMING
The throttle-governor pressure relationship is easy
to understand when you consider that shift timing is controlled by a balance between the two pressures. Throttle pressure increases as the gas pedal is pushed down, and governor pressure increases as vehicle speed goes up.

SHIFT VALVES ARE RELAYS
The shifting action is directly controlled by the 1-2 and 2-3 shift valves, but these valves are only pressure-operated, two-way hydraulic relays which react to throttle pressure on one end and governor pressure on the opposite end.

GOVERNOR PRESSURE MOVES VALVES
Each shift valve is moved to its downshift position by a spring and throttle pressure. As the vehicle accelerates, governor pressure increases and at the proper vehicle speed moves the shift valves to their upshift positions in sequence so the shifts can occur. Obviously, both pressures must be correct or the shift timing will be off.

LINKAGE SETTING IS ONLY ADJUSTMENT
Since the governor valve is not adjustable, getting the proper pressure balance depends largely on correct throttle linkage adjustment. Just remember that when the throttle linkage setting is extended too far, you get higher than normal throttle pressure which delays upshifting. In the opposite direction, linkage that is set too short causes low throttle pressure and early upshifting.

![Fig. 30—Governor pressure affects shift timing](image)

STICKY GOVERNOR VALVE CAN MAKE PRESSURE LOWER OR HIGHER THAN NORMAL

STICKY VALVE KEEPS PRESSURE LOW
If the throttle valve sticks for any reason, throttle pressure can remain low and cause early upshifts until full-throttle kickdown action mechanically forces the valve to move. When this happens, the valve breaks loose and the throttle pressure increases abruptly.

PRESSURE CHECK IS NOT CONCLUSIVE
There is no positive way you can check throttle pressure, so you can’t rely on pressure test readings to link early or late upshifts to incorrect throttle valve action. Short of disassembly, all you can do in this situation is make sure that the throttle linkage is set properly.

CENTRIFUGAL FORCE MOVES THE VALVE
The governor valve turns with the transmission output shaft and operates by balancing centrifugal force against spring pressure. When the vehicle is stopped, the valve vents the governor hydraulic circuit and allows the pressure to drop. The reduced governor pressure allows the shift valves to move to their downshift positions, putting the transmission in breakaway low.

PRESSURE INCREASES WITH SPEED
As vehicle speed increases, centrifugal force gradually moves the governor valve which causes governor pressure to increase at the shift valves so they will tend to move against throttle pressure to their upshift positions.

NO UPSHIFT WITH VENTED CIRCUIT
If the governor valve is stuck in the vented position, it prevents pressure buildup in the governor circuit. When this happens, the transmission does not upshift.

HIGH PRESSURE DELAYS DOWNSHIFT
In the opposite direction, when the governor valve is stuck in full pressure position, governor circuit pressure will be too high. In this case, upshifts are early or erratic, and you probably won’t get normal downshifting action.

STICKY VALVES MAKE SHIFTING SLOW
Sticky shift valves can also affect upshift and downshift timing. Since they are operated by throttle and governor pressure, sticky shift valves need more than normal pressure to make them move, so upshifts and downshifts are delayed.

STUCK PLUG PREVENTS KICKDOWN
On earlier six-cylinder TorqueFlites and most current models, the 2-3 shift valve assembly includes a throttle plug which provides part-throttle downshift action. If this plug is stuck, the shift valve can still operate but there will be no part-throttle downshift action.
SHUTTLE VALVE MUST BE FREE
The shuttle valve controls shifting smoothness. As with the throttle valve, there’s no positive way of checking shuttle valve operation by pressure testing. If shifting is erratic and linkage adjustments or pressure tests do not give the answers, a sticky shuttle valve may be the cause.

ADEQUATE LUBRICATION IS A MUST
Lubrication system pressure should be up to specifications when you check out the line pressure and servo release pressure. This check should also be made after a transmission overhaul, a system clean-out, or following repairs when coolant has leaked into the system.

### DIAGNOSIS SUMMARY

#### FLUID LEVEL & CONDITION:
- Fluid level should be between FULL and ADD ONE PINT
- Low fluid level admits air, can cause delayed engagement, slipping, overheating and noise
- High fluid level causes foam and fluid loss, can form varnish
- Dark fluid with burned smell indicates overheating and worn friction material
- Milky fluid indicates coolant leak
- Varnish makes dipstick hard to wipe clean

#### LINKAGE ADJUSTMENTS:
**If Selector Linkage setting is off . . .**
- Car may creep in Neutral
- Starter may not operate with selector in Neutral or Park positions
- Parking sprag may not hold

**If Throttle Linkage is set too short . . .**
- Upshifting is early
- Engine speed may flare up on 2-3 upshift
- No full-throttle kickdown response

**If Throttle Linkage is set too long . . .**
- Upshifts are delayed and harsh
- Part-throttle downshift operation is sensitive

#### CLUTCH AND BAND CONDITIONS:
- **D Position . . .** Car gets underway in Breakaway Low then upshifts to 2nd and Direct
- **2 Position . . .** Same as in D but upshifts only to 2nd
- **1 Position . . .** Limited to Low

**In D or Position 2 . . .**
- Rear clutch applies and overrunning clutch hold during breakaway acceleration
- Overrunning clutch releases on deceleration

**In Position 1 . . .**
- No engine braking in Breakaway Low
- Rear clutch engages, low-reverse band applies
- Overrunning clutch does not operate
- Full engine braking is available during coastdown

**In Reverse . . .**
- Front clutch engages, low-reverse band applies

#### ROAD TESTING:
**In D and Position 1 rear clutch is engaged . . .**
- Slipping in Drive Breakaway Low and Position 1 points to rear clutch
- Slipping only in Drive Breakaway Low indicates trouble in overrunning clutch

**In a 1-2 upshift, rear clutch stays on and kickdown band applies . . .**
- Slipping in 2nd but not in Breakaway Low results from kickdown band trouble
- When kickdown band slips badly or does not apply, upshift skips 2nd
- If band only slips a little, there’s a short upshift delay followed by a bump

**In Direct Drive both clutches are engaged . . .**
- The front clutch engages only when in direct drive and reverse
- Slipping in direct drive but not in 2nd and Low is caused by front clutch
- Engine speed flareup only during 2-3 upshift may indicate failure starting in front clutch

**In Reverse, front clutch and low-reverse band are applied . . .**
- Slipping in Reverse but not in direct drive points to Low-Reverse band