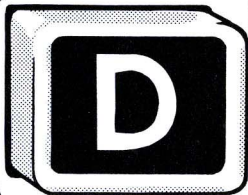


**THE
3-SPEED
AUTOMATIC
TRANSMISSION**



SERVICE REFERENCE BOOK

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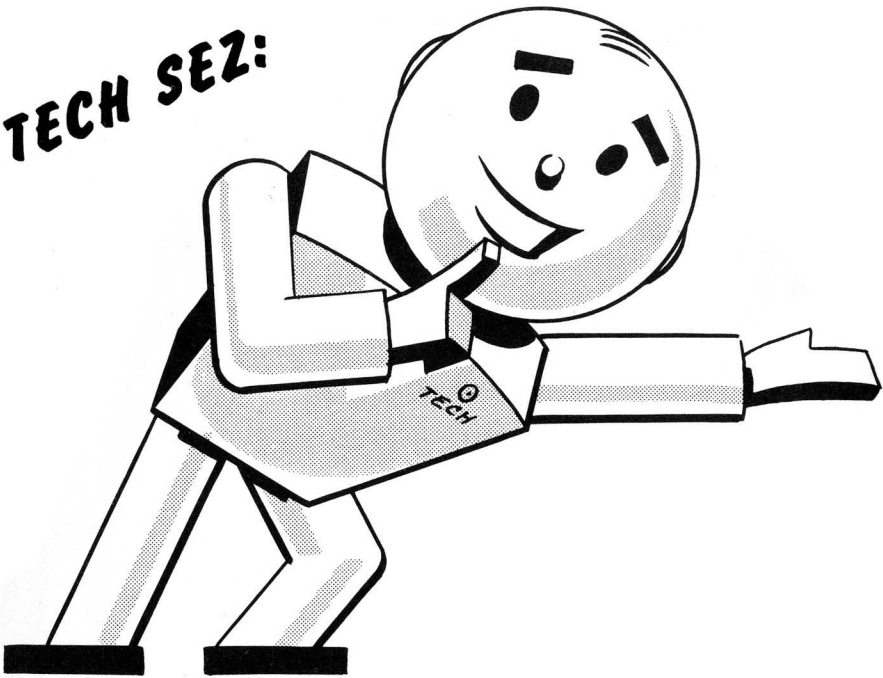
Prepared by **CHRYSLER CORPORATION**

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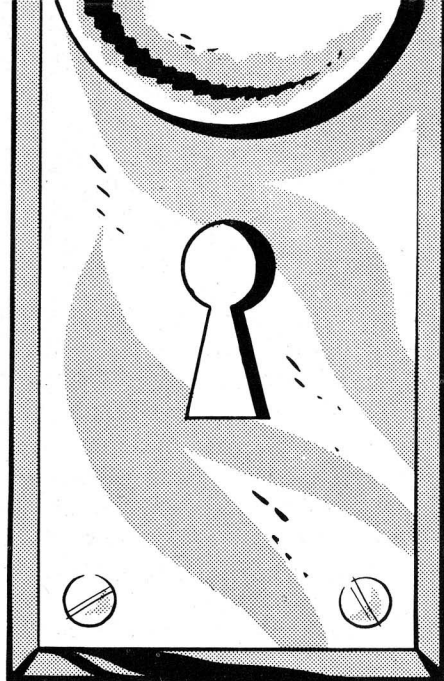
TECH SEZ:



“HERE’S A PREVIEW OF THE NEW 3-SPEED AUTOMATIC TRANSMISSION”

You’ve all heard about the new 3-speed automatic transmission. And maybe you’re wondering about the service attention it may need. If that’s the case, you’ll be interested in this Reference Book because it has answers to many of your questions.

So, get behind the wheel of a car equipped with the 3-speed automatic transmission and see for yourself how it performs. In fact, that’s one of the best ways to get acquainted with what it will do. Then you’ll have a better understanding of the information contained in this Book.



In addition to a description of how the transmission operates, you'll find information on how power flows through the unit, plus handy tips on maintenance and service. This table of contents, below, will help you find what you want.

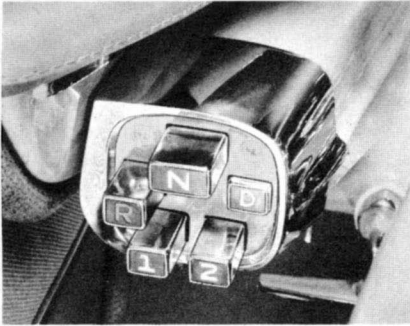
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OPERATION

Before we get into an explanation of what goes on inside this transmission let's learn how it operates—from the driver's point of view.

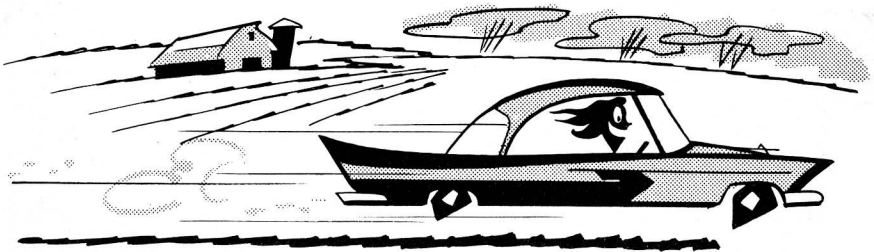
PUSH-BUTTON CONTROL

You'll notice immediately that the push-button control panel has a different look. Yep — there's five, not four, push buttons. The "N" button, of course, is Neutral . . . like on the Power-Flite. Also, "R" stands for Reverse . . . and "D" for Drive. Then there's a Number "1" button, and a Number "2" button, each with its specific function.



So you will know what type of operation to expect from each button, suppose we talk first about operation with "D" button pushed in. That's the button the average driver will use most of the time.

Operation with "D" Button In. The first thing you should know is that this new transmission has *three forward speeds* in the "D" range. For instance . . . you *start in Breakaway* . . . and *upshift* from *Breakaway* to *Second* between 10 and 40 m.p.h.—depending on throttle opening.

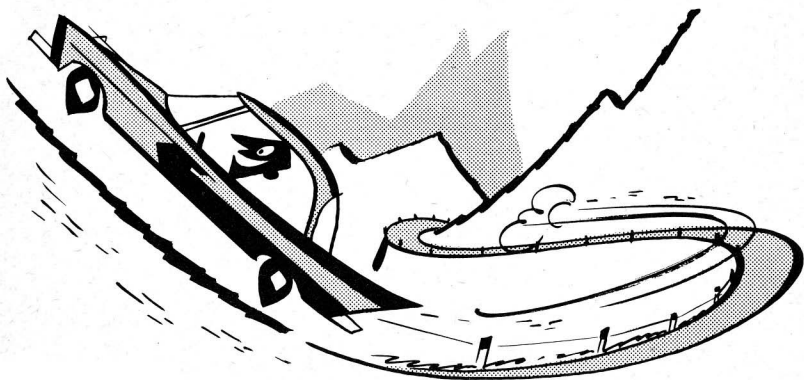


As you drive along with the “D” button pushed in . . . and with the unit upshifted from Breakaway to Second . . . you can expect an *upshift from Second to Direct Drive anywhere between 15 and 75 m.p.h.*, again depending upon throttle opening.

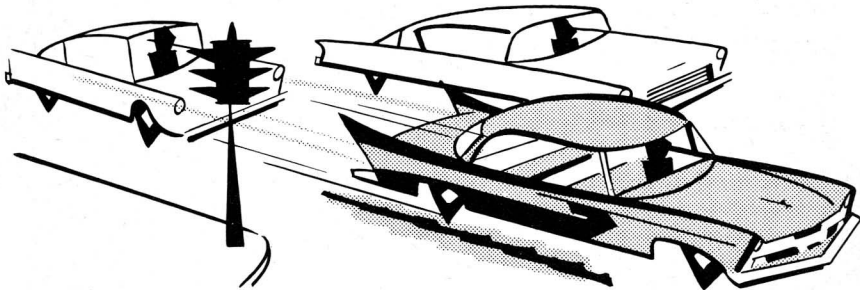
When you lift your foot off the accelerator, like when you’re slowing down to stop for a traffic light, you should get a *normal downshift from Direct Drive to Breakaway at about 8 miles an hour.*

Here’s the rest of the downshift story. In Direct Drive . . . if you’re traveling below 25 m.p.h.—and suddenly want to pass—push the accelerator *all the way to the floor.* This gives you a *forced downshift* from Direct to Breakaway, providing that extra acceleration you need to pass the car ahead, and get back on the right side of the road quickly. If you are in Direct, traveling at a speed between 25 and 70 m.p.h., the forced downshift will be to Second gear.

Operation with Number “1” Button In. You’d use this button when climbing an unusually steep grade, or when going down very steep grades and you want to use the braking effect of the engine. This Number “1” button would also be the one to use when you want to pull the car out of mud or sand. The point to remember about the Number “1” button is that the transmission *won’t upshift to a higher speed range* with the “1” button engaged. In other words, the Number “1” button is strictly a low-gear speed range.

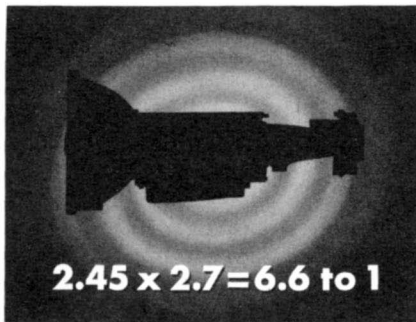


Operation with Number "2" Button In. The Number "2" button represents an *Intermediate speed range*, or *Second gear*. This is also a good mountain gear. It can be used for climbing, and also going down long grades when you want the braking effect of the engine. But even more important, the Number "2" button is excellent for *driving in heavy city traffic*. In this case, you have quick acceleration at a touch of your foot so you can take advantage of a break in traffic. The point to remember about the Number "2" button is that the unit won't upshift to Direct unless the car speed gets up to 75 m.p.h. As a result, with the "2" button in, there is far less up-and-downshifting than there is with the "D" button engaged. It's a very convenient speed range to use when driving in city traffic.



You'll be impressed with the amount of acceleration from a standing start delivered by cars equipped with this three-speed transmission. There's good reason, of course. When you start in Drive, you start in Breakaway speed with a transmission gear ratio of 2.45 to 1!

Besides this, you have a torque multiplication of 2.7 to 1 from the torque converter. If you multiply this out (2.45×2.7), you'll discover that you have a starting ratio of better than 6.6 to 1! It is easy to understand, therefore, why the acceleration is outstanding.



CAUTION

In view of all this torque available, here's one caution you *must* observe. **NEVER, UNDER ANY CIRCUMSTANCE, MAKE A STALL-TORQUE TEST OF A CAR EQUIPPED WITH THIS TRANSMISSION!** That's because you'll have difficulty holding the car, and, if it should get away from you, it could result in costly damage.

When the transmission operates in *Second* speed, the gear ratio is *1.45 to 1*. And, when the unit operates in *Direct Drive*, the car operates at a *1 to 1 ratio*.

SHIFTING PATTERN

As we mentioned earlier, when the Number "1" button is pushed in, the transmission won't upshift from Breakaway to Second speed. Neither will it upshift to Direct Drive. In other words, the speed range selected by the Number "1" button is *low gear only*.

When the Number "2" button is pushed in, you start in Breakaway (Low gear), as usual. The upshift to Second will take place between 10 and 40 m.p.h., depending upon the throttle opening.

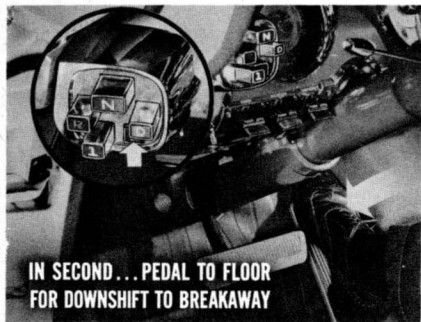
Now, ordinarily, you wouldn't drive faster than 60 or 65 m.p.h. with the *Number "2" button engaged*. But if you should, the transmission *will upshift from Second to Direct Drive*. But it won't do this until the car speed gets up to *about 75 m.p.h.*! That's why the Number "2" button is especially adapted for heavy traffic operation. It provides a lot of flexibility, and plenty of reserve power for acceleration when you want it.



If, while the "2" button is engaged, and car speed has reached 75 m.p.h. and the transmission has upshifted to Direct, the transmission

will remain in Direct Drive as long as the car speed stays above that speed. But, if you raise your foot off the accelerator so car speed drops *below 75 m.p.h.*, then the transmission will downshift and the unit will be right back in Second speed again.

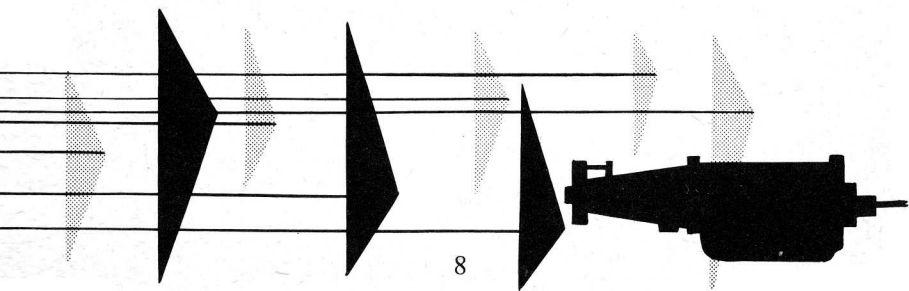
While driving with the Number "2" button in, a kickdown is possible under 25 m.p.h. if you want more acceleration than is available from Second gear. If the unit has upshifted to Second gear and

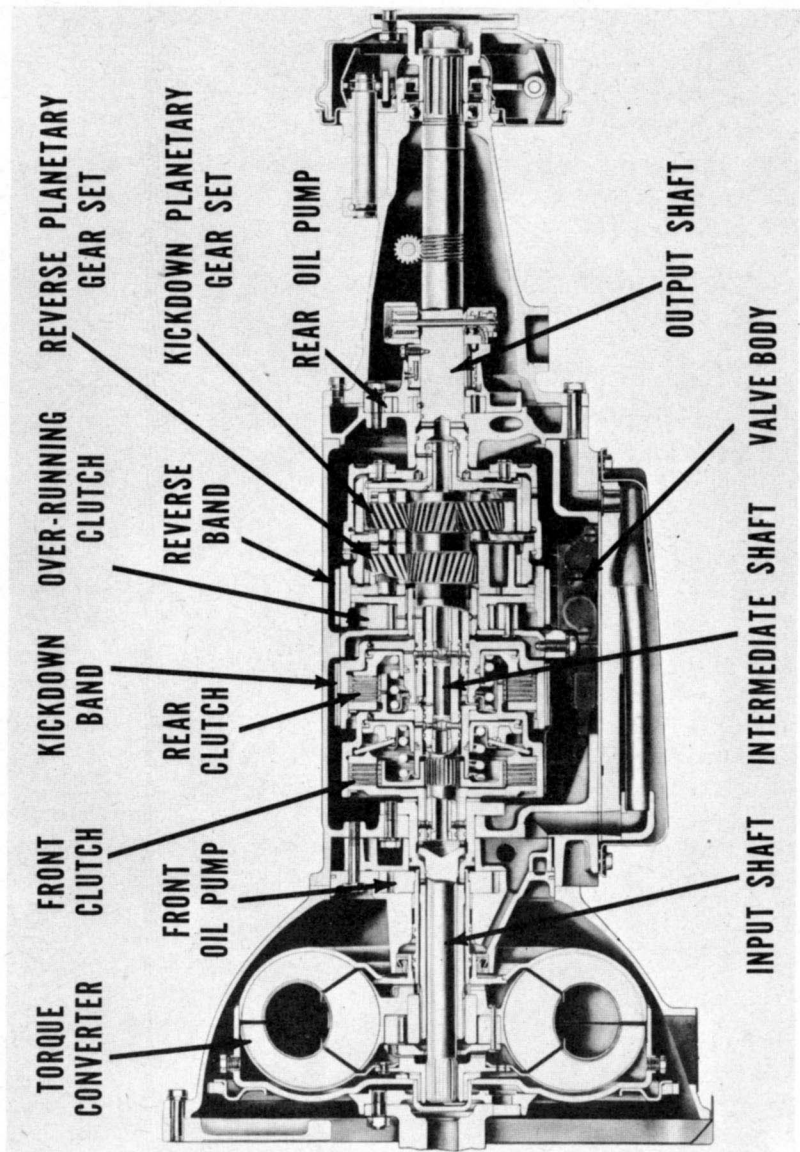


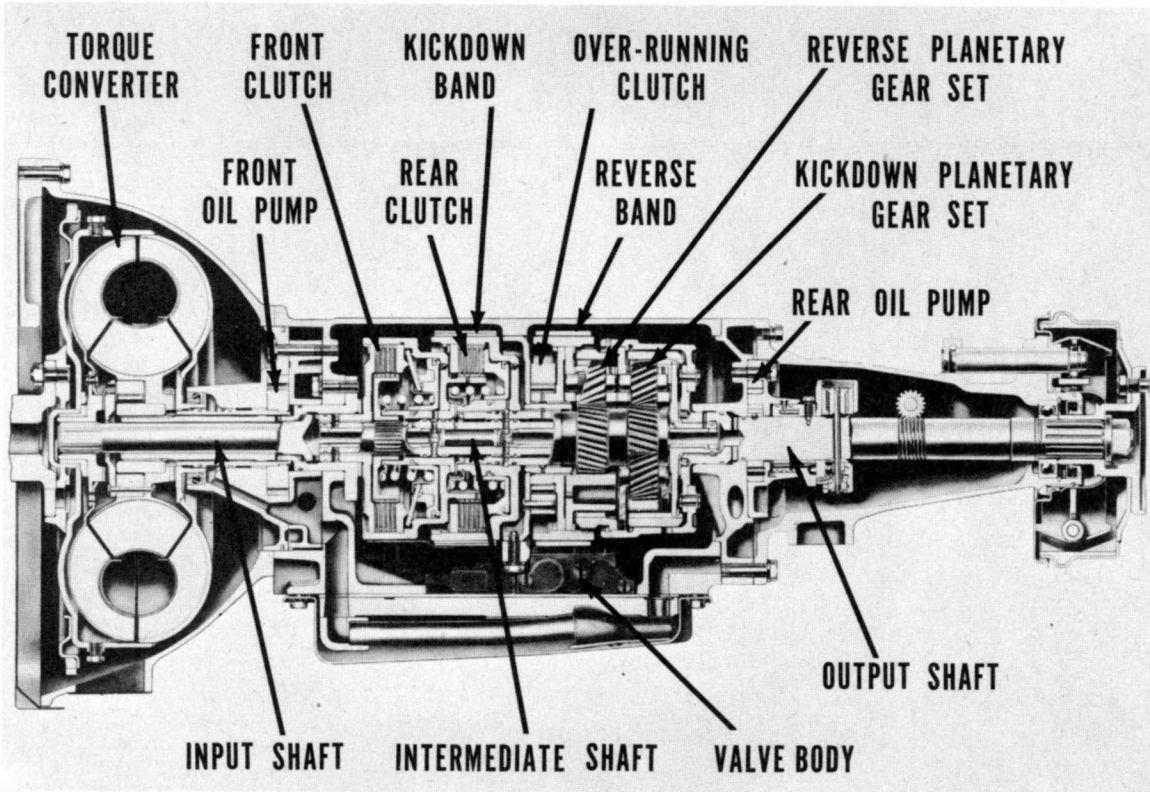
you press the accelerator pedal all the way to the floor, you'll get a forced downshift to Breakaway. Before you do this, however, just be sure you've got some clear space ahead. Once you tramp down on that accelerator, you're going to go places in a hurry!

POWER FLOW DETAILS

The new three-speed automatic transmission has two planetary gear sets, like the PowerFlite. But, instead of one multiple-disc clutch, this new unit has *two*. In addition to the multiple-disc clutches, there is an over-running clutch located between the rear clutch and the reverse planetary gear set. The job of this clutch is to smooth out the upshift between Breakaway and Second, and the downshift from Direct to Breakaway.

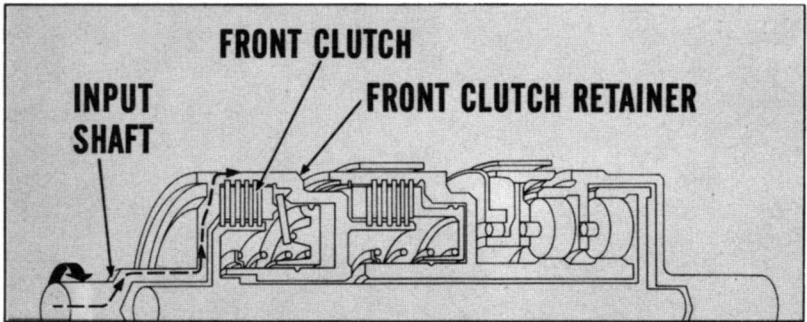




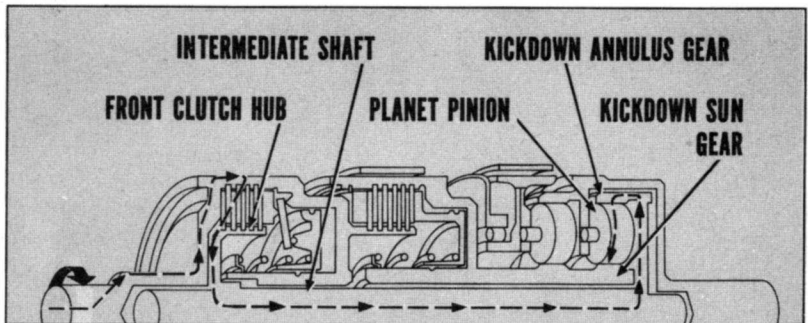


POWER FLOW IN ("D") DRIVE RANGE.

For a better understanding of the transmission operation, it will help to trace out the way power flows through the unit. In Drive range, remember, there are three speeds—Breakaway, Second, and Direct. Starting in *Breakaway*, the front clutch is applied, and the over-running clutch locks up. The rear clutch and the kickdown and low-reverse bands are released.



Power flows from the torque converter to the input shaft and through the front clutch retainer. From there, the drive is through the clutch plates and discs, which are tightly compressed, to the clutch hub. The hub is splined to the intermediate shaft, which—in turn—is splined to the annulus gear of the kickdown planetary gear set.

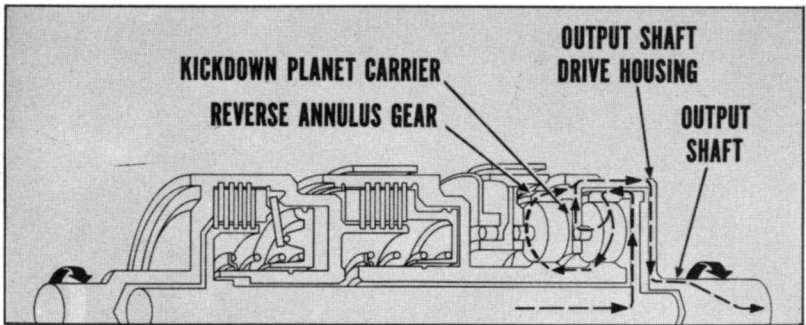


The kickdown annulus gear meshes with and drives the kickdown planet pinions, rotating them in the same direction. These pinions are meshed with the kickdown sun gear, which is integral with the reverse sun gear.

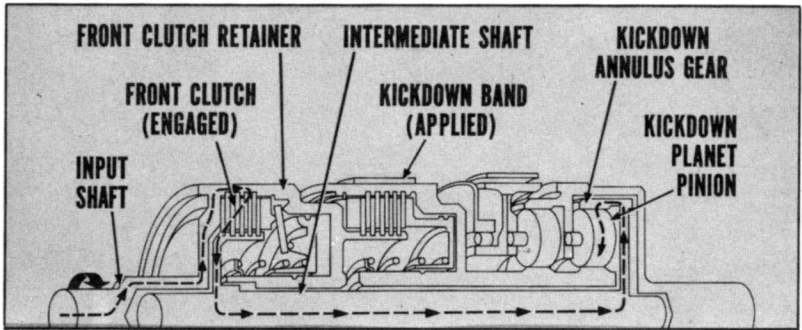
Since both sun gears are on the same shaft, they are forced to rotate in a reverse direction by the reaction of the kickdown planet pinion carrier.

The over-running clutch, in Breakaway, remains locked up as long as torque is applied to it. It is attached to the reverse planet pinion carrier. So, since it is stationary, the over-running clutch prevents the pinion carrier from turning backward.

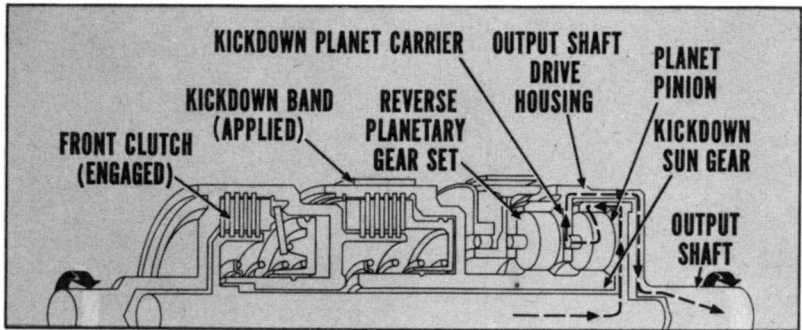
As a result, the reverse carrier pinions are forced to turn forward. This turns the reverse annulus gear in the same direction. The annulus gear is splined to the output shaft so power is transmitted to the rear wheels with an increase of 2.45 to 1 in torque.



Power Flow During Second Speed. When the unit shifts to Second, the front clutch remains applied. In addition, the front, or kickdown band is applied. So, power flows from the converter to the input shaft, to the front clutch. It goes through compressed discs and plates to the hub splined on the intermediate shaft. From there, power flows to the kickdown planetary gear set. Since the kickdown band is applied to the rear clutch retainer, it holds the sun gear stationary.

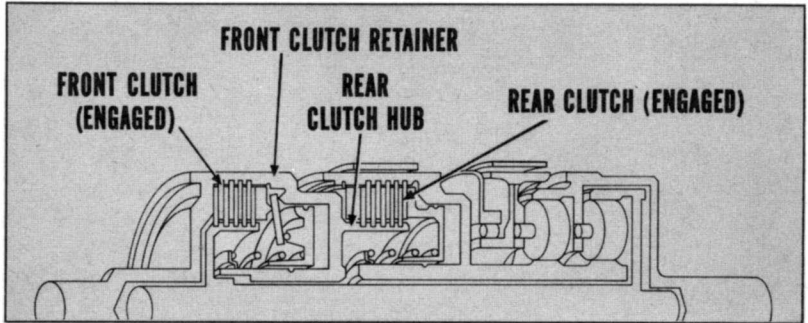


So, power flow through the kickdown annulus gear drives the kickdown planet pinions. They turn the same way the input and intermediate shafts are turning. And since the kickdown planet pinions are in mesh with the sun gear, they *walk around* the sun gear and exert force through the kickdown pinion shafts to rotate the kickdown carrier. That carrier, which is splined to the output shaft drive housing, moves at a slower speed than the annulus gear and provides an increase of 1.45 to 1 in torque.

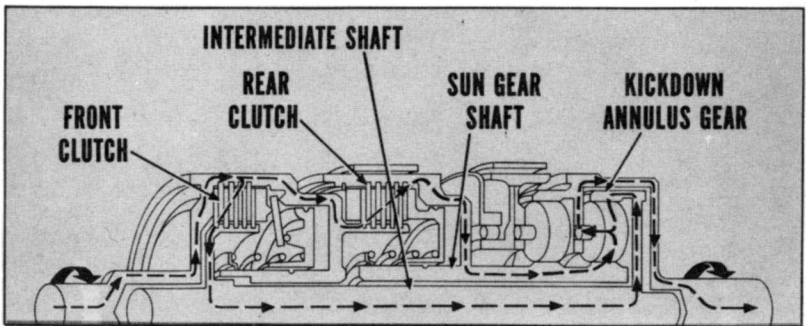


Power Flow during Direct Drive. In Direct Drive, the flow of power from the torque converter goes *directly through the transmission*. Both front and rear clutches are applied. This locks up the two planetary gear sets. The two bands are released. So, in this case, part of the power which flows from the input shaft goes through the front

clutch and to the intermediate shaft. From there, it follows the normal path to the annulus gear of the kickdown planetary, then through the kickdown pinions and their shafts to the kickdown carrier.



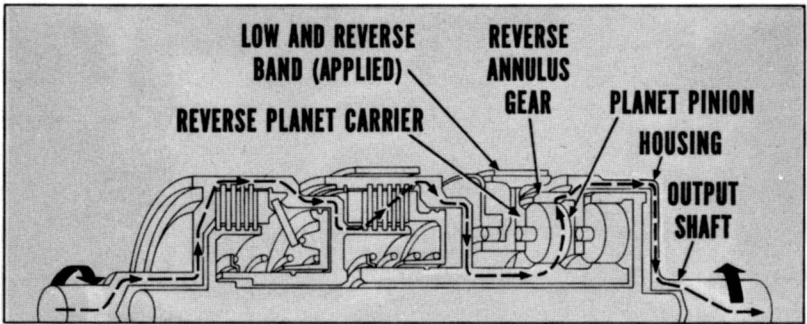
From the carrier, the power goes to the output shaft drive housing and then to the output shaft. There is an *additional power flow* from the *front* clutch retainer to the compressed clutch discs and plates of the *rear* clutch. From this point, power goes to the rear clutch *retainer* and through the two *sun* gears, into the kickdown planet pinions. Right there it combines with the power flow from the kickdown annulus gear.



So, you can now understand that with both planetary gear sets locked up, and power flowing straight through, the torque converter provides all of the torque multiplication.

POWER FLOW IN REVERSE

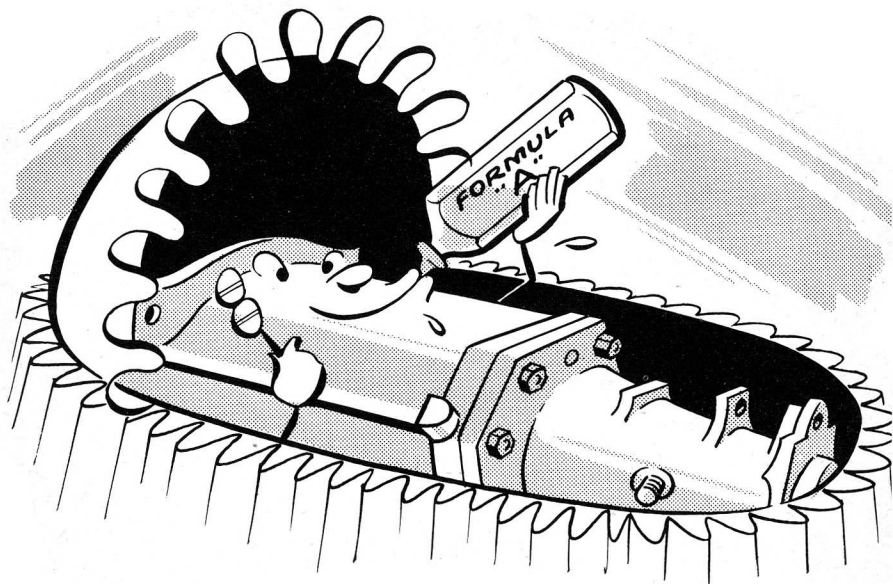
When the Reverse button is pushed in and reverse action takes place, the rear clutch and the low-reverse band are applied. The over-running clutch is released. Power flow is through the input shaft and the front clutch retainer to the rear clutch, which is splined to the reverse sun gear. Since the reverse (front) planetary gear set is held stationary by the low-reverse band, the gear set acts as a simple reverse train through the reverse planet pinion gear to the reverse annulus gear which is splined to the output shaft drive housing and output shaft.



MAINTENANCE

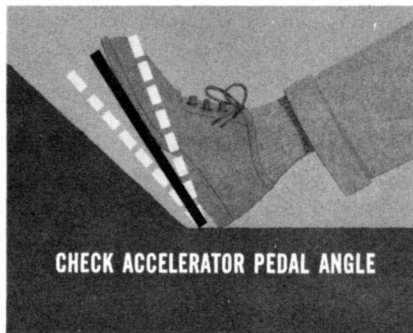
You'll be glad to know the unit uses the same kind of fluid as the PowerFlite automatic transmission fluid, Type A. Just remember to keep it up to the proper level. Also, it will be wise to check fluid level every 1000 miles, with the unit in neutral and while the engine is running at idle speed.

With regard to tracking down the cause of a possible condition, let's suppose you road-tested a new car being readied for delivery. And let's suppose your check indicated the transmission wasn't acting the way it should. Here's a complete sequence of testing you can follow to uncover just about any possible condition.

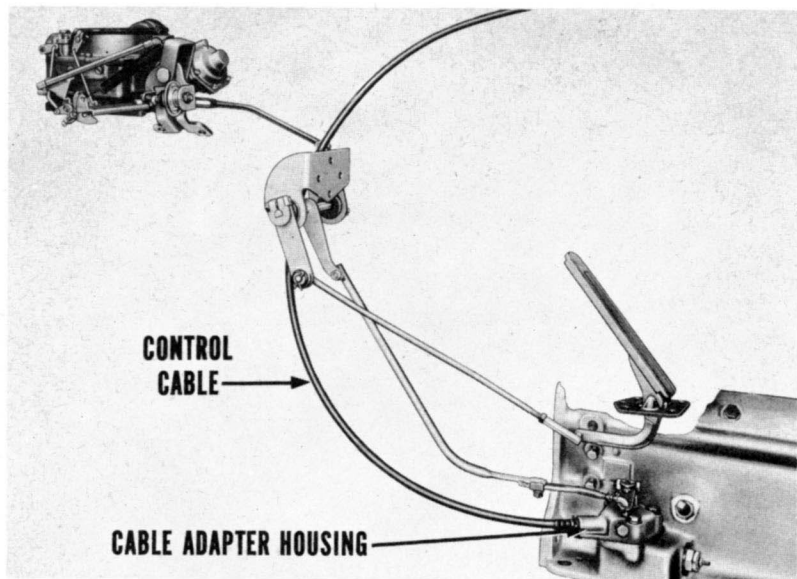


Check Fluid Level and Accelerator Pedal Angle—

First of all, naturally, you'd check fluid level. Since you already know how to do that, we'll talk about the next check . . . the accelerator pedal angle. An accelerator set too high, remember, will cramp the driver's foot. If it's set too low, it won't travel far enough for wide-open throttle operation, or for kickdown. So, when the pedal is pressed to the floor for wide-open throttle, make sure that the underside of the pedal will *touch* the floor mat—but *will not compress* the mat.

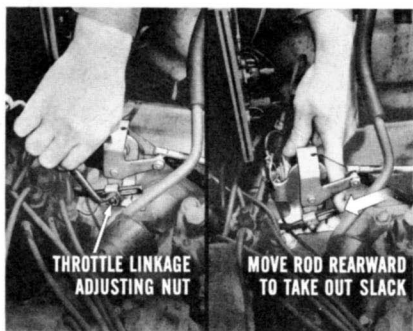


You can get proper pedal angle by making the accelerator shaft rod longer or shorter. Just remove the cotter key and slip the rod out of the bracket lever. Loosen the lock nut, and turn the rod. You'll notice the threaded section of this rod down at the ball joint end.



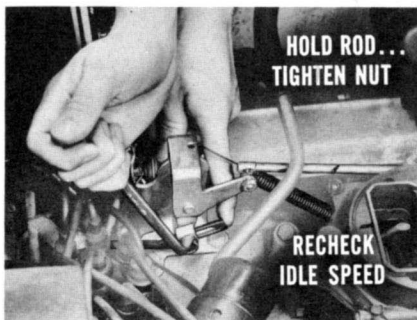
Once you get the pedal angle right, check the throttle linkage for any binding or lost motion. If it's okay, then check engine idle speed. Just start the engine, warm it up, hook up a tachometer, and set idle at 475-500 r.p.m. in Neutral. Then stop the engine.

Adjusting the Throttle Linkage—For proper operation of the throttle



valve, the linkage down to the transmission must be adjusted correctly. What you do is loosen the throttle linkage adjusting nut on the rod at the carburetor. Next, move the rod *rearward* to take out all the slack in the linkage.

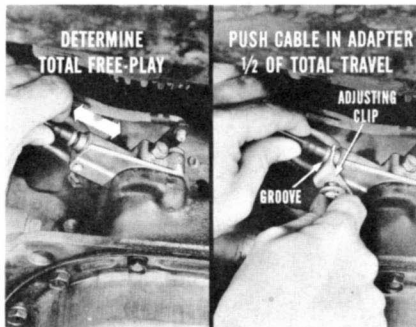
Hold the rod preloaded in this position and tighten the adjusting nut. This should be to about 7 to 9 foot pounds. Start the engine and recheck the idle speed. If it's still between 475 and 500 r.p.m., the linkage adjustment is right.



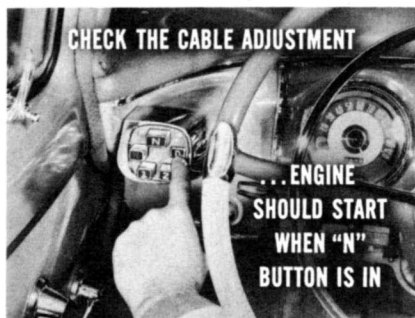
Adjusting the Push-Button Control Cable. If there is any reason to suspect that the push-button control cable is not adjusted properly, a few simple tests can be made to be sure if an adjustment is necessary.

If the engine starts with the "R" button pushed in, the control cable should be moved "out". If the engine starts when the "D" button is pushed in, it means the cable should be moved "in".

To make the adjustment, if required, have someone get in the car and hold the "R" button *all the way in*. The "R" button is held in because in this position it removes the slack from the linkage. Then, raise the car. Remove the screw and washers that hold the control cable adjusting clip to the adapter housing. Next, determine the total "free-play" of the cable. Push the cable into the adapter housing and then gently pull it out. Estimate the amount of travel of the cable. Next, slowly push the cable into the housing one-half of the total "free-play". This splits the total "free-play" in two parts. Hold the cable and install the adjusting clip in the groove in the cable. Secure the clip with the screw and washers.

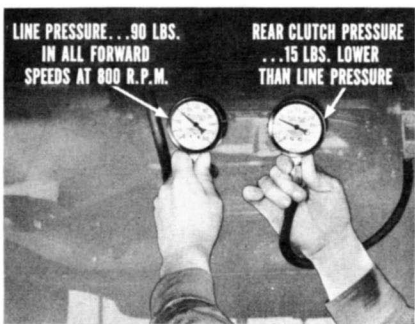
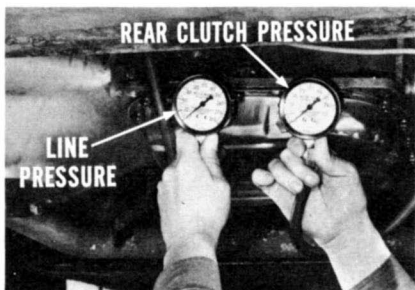


Always check the cable adjustment right after you make it. Do this by slowly pushing in the "D" button, then the "N" button. Repeat this operation, using the "R" and "N" buttons. The engine should



only start when the "N" button is pushed in. Should it start when any other push button is engaged, you'll have to readjust the control cable. If you prefer, you can use a test light connected to the neutral starting motor switch instead of the starting motor when you check your cable adjustment.

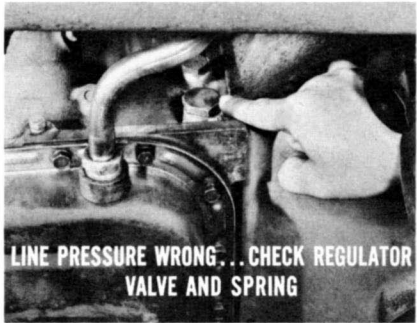
Checking the Hydraulic Pressures—After making sure the control cable is adjusted properly, you're ready to check line and rear clutch pressures. You test both of these pressures at the same time. So, install a pair of 300-pound gauges (C-3293) at the line and rear clutch pressure take-off holes. Hook up a tachometer and hang it under the car. Then, with the *rear wheels free to turn*, start the engine.



Line pressure should be 90 psi in all forward speeds at 800 r.p.m. Rear clutch pressure should be 15 pounds lower than line pressure, which would make it 75 psi at 800 r.p.m.

Line pressure should be 225 psi in Reverse, at 1600 r.p.m. Rear clutch pressure cannot be checked with the transmission in Reverse because the ball check valve cuts off pressure to the servo.

If line pressure was wrong, you'd check the regulator valve . . . and the valve spring for sticking. The procedure in this case is the same as the one you've used right along on the PowerFlite transmission.



If you discovered that the rear clutch pressure was off, you'd check the front servo release pressure. Just install a 300-psi gauge at the front servo take-off hole on the lower right side of the transmission case. Front servo release pressure should be the same as rear clutch pressure in Drive—or 75 psi.

Other pressures to check are the governor and lubrication pressures. To check governor pressure, install the 300-psi gauge at the governor take-off hole on the lower left side of the output shaft support. With the wheels free to turn, start the car and push in the "D" button. Here are the pressures you should read at corresponding car speeds:

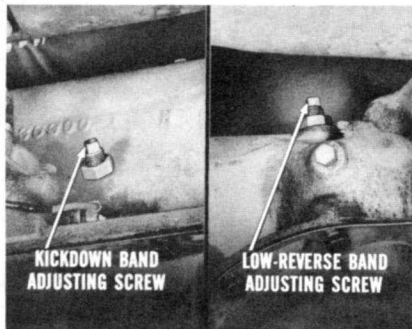
<u>Governor Pressure</u>	<u>Car Speed</u>
2-3 psi	8 m.p.h.
27-32 psi	27 m.p.h.
44-47 psi	38 m.p.h.
75-82 psi	75 m.p.h.

To check lubrication pressure, install the 300-psi gauge at the lubrication take-off hole on the left side of the transmission case. With the engine running at 800 r.p.m. in Neutral, lubrication should be about 10 to 30 psi. If pressure is above 50 psi, that usually means there's a restriction due to dirt or foreign matter in the lubrication passages.

Checking the Kickdown and Low-Reverse Band Adjustments—Checking and making the band adjustments on this new transmission is easier, as you can do the entire job *from the outside*. There's no longer any need to drain oil and remove the pan to adjust the reverse band.

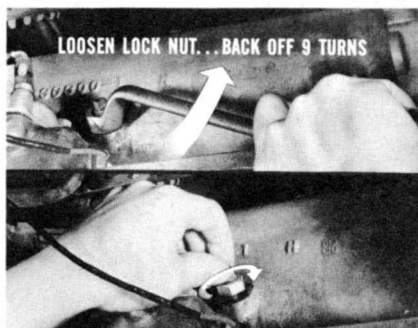


IT'S AN OUTSIDE JOB!

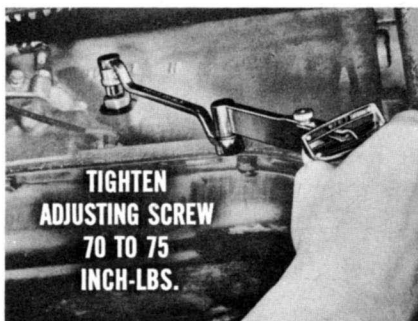


The adjusting screws for both bands have lock nuts and are handled in the same way. The kickdown band adjusting screw is on the left side of the case. The low-reverse band adjusting screw is on the right side.

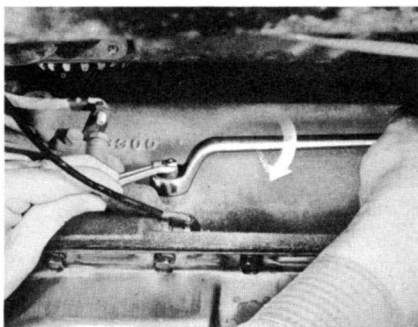
By explaining the procedure for adjusting one band, say the kickdown, you'll know the same procedure applies to the other. In this case, you first loosen the lock nut and back it off 9 turns. Then, with your fingers, turn the adjusting screw to see that it is free. Run it down—fingertight.



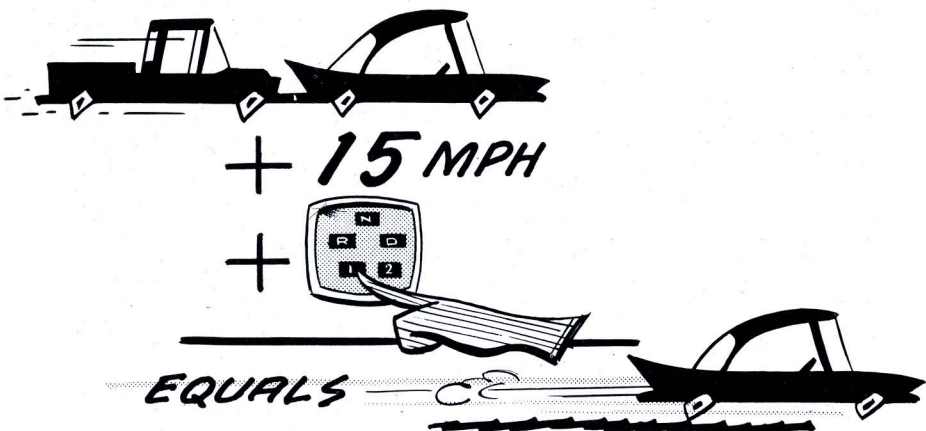
Next, use the inch-pound torque wrench to tighten the adjusting screw 70 to 75 inch-pounds. Following that, mark the adjusting screw head and the transmission case. Then, back the screw out *exactly two turns*.



With a small wrench, keep the screw from turning. Using a box wrench, tighten the lock nut securely. This should be about 35 to 40 foot-pounds. And that's all there is to the kickdown band adjustment.



Starting Engine By Pushing Car. In case the engine fails to start in the normal manner, it may be started by pushing. This is preferred to towing because there's a possibility of damaging the towing car when the engine starts.



To push-start the engine, turn the ignition key "on" and depress the accelerator pedal slightly. After the car has been pushed to a speed of about 15 m.p.h., push the "1" button and the transmission will turn the engine over to start it.

A CLOSING SUGGESTION

As you can see, the same basic principles of the PowerFlite transmission apply to this new unit. You fellas have done a great job at keeping PowerFlite one of the finest transmissions in the field. Chances are you'll do an equally good job with this new transmission.

But, learn all you can about the service and maintenance this unit requires. You'll not only find the work easier to do, but you'll help get customer reception to the new transmission off to a good start. Naturally, how our customers feel about our product—and our service skill—is increasingly important to all of us.



RECORD YOUR ANSWERS TO THESE QUESTIONS ON QUESTIONNAIRE NO. 99

With the Number "1" button pushed in, the transmission won't upshift to a higher speed range.

RIGHT

1

WRONG

With the "2" button in, the transmission will upshift to Direct when car speed gets up to 75 m.p.h.

RIGHT

2

WRONG

Never stall-test a car with the new transmission because too much torque is involved.

RIGHT

3

WRONG

With the "D" button in, upshift from Second to Direct Drive occurs anywhere between 15 and 75 m.p.h., depending upon throttle opening.

RIGHT

4

WRONG

In Direct Drive, at a speed between 25 and 75 m.p.h., you can get a forced downshift from Direct to Second by pushing the accelerator all the way to the floor.

RIGHT

5

WRONG

While you wouldn't ordinarily drive over 65 m.p.h. in Second, if you do, the transmission will upshift to Direct Drive when the car gets up to about 75 m.p.h.

RIGHT

6

WRONG

The over-running clutch has the job of smoothing out the shifting operation.

RIGHT

7

WRONG

To adjust the control cable properly, hold the "R" button in all the way to remove slack from the linkage.

RIGHT

8

WRONG

You check the line and rear clutch pressures at the same time by using two 100-psi pressure gauges.

RIGHT

9

WRONG

Adjusting the kickdown and low-reverse bands is easier as it's done on the outside of the unit without having to drain oil and remove the pan.

RIGHT

10

WRONG