

**LATEST TIPS**

**ON POWERFLITE AND**

**POWER STEERING SERVICE**



**SERVICE REFERENCE BOOK**

SESSION NO.

*Prepared by* CHRYSLER CORPORATION

PLYMOUTH • DODGE  
DE SOTO AND CHRYSLER  
DIVISIONS

**101**

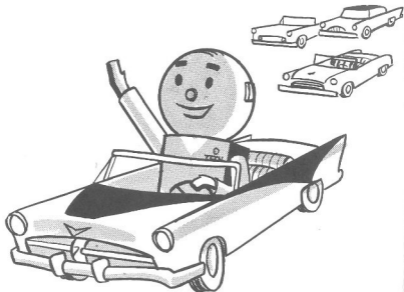
# "DESIGN CHANGES KEEP LIFE INTERESTING!"

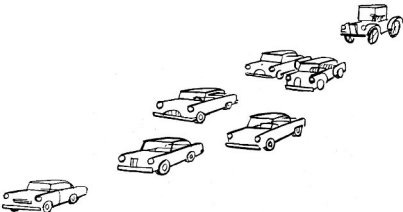
Who said a technician's life is dull? Far from it. With some of the recent design changes made on units like the PowerFlite transmission and Coaxial Power Steering, you learn something new every day.

In other words, that fella who said, "Variety is the spice of life," knew his onions. He must have had us technicians in mind. And, just to be sure every technician knows what's what on transmission and power steering improvements, this reference book spells them out.

What's more, you'll find the latest tips on how to take care of these cases where changes affect service. They'll help you improve your operations so you can maintain cars to the satisfaction of our owners.

Here's where to look for the service information you need:

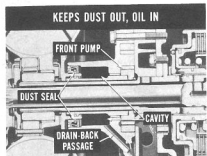




	<i>Page No.</i>
<b>POWERFLITE TRANSMISSION</b> .....	4
<b>FRONT PUMP HOUSING DUST SEAL</b> .....	4
<b>PUMP DRIVE SLEEVE SEAL RING</b> .....	5
<b>INPUT SHAFT</b> .....	6
<b>TORQUE CONVERTER CONTROL VALVE</b> .....	7
<b>THREE-STAGE GOVERNOR</b> .....	8
<b>REVERSE BLOCKER VALVE</b> .....	10
<b>THROTTLE VALVE AND SPRING PACKAGE</b> .....	12
<b>TRANSMISSION FLUID TYPE "A"</b> .....	12
<b>CLUTCH DRIVING PLATE AND DISC PACKAGE</b> .....	13
<b>TORQUE CONVERTER</b> .....	13
<b>CHECKING THE THREE-ELEMENT CONVERTER</b> .....	15
<b>CHECKING THE FOUR-ELEMENT CONVERTER</b> .....	15
<b>COAXIAL POWER STEERING</b> .....	16
<b>PISTON RINGS</b> .....	16
<b>PRESSURE HOSES</b> .....	18
<b>VALVE CONTROL SPACER SEAL</b> .....	18
<b>LOWER PISTON ROD RELIEF VALVE</b> .....	18
<b>VALVE OPERATING ROD ADJUSTING DISC</b> .....	19
<b>WORM THRUST BEARING AND LOCK NUT</b> .....	20
<b>SUMMARY</b> .....	22

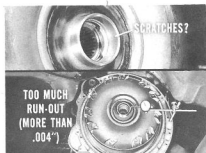
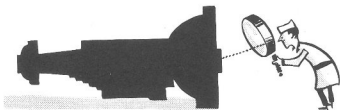
# POWERFLITE TRANSMISSION

**Front Pump Housing Dust Seal.** This seal not only keeps dust and foreign matter out of the front pump cavity, it also keeps oil in.



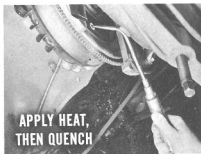
It also keeps oil in. This is more of an oil-splash control job. Some oil, normally, gets into the pump cavity. However, the front pump housing has a drain-back passage so oil that does get there can drain back to the transmission case.

Here's one important thing to keep in mind. If you spot an oil leak at the front end, don't simply replace the dust seal. Oil leakage past this point might be due to a seal ring leak at some other part of the transmission. So, be sure to check all possible causes of oil leakage.



Scratches in the torque converter hub, for instance, can wear away the seal and cause oil to get past. In addition, there might be too much run-out at the hub. Hub run-out shouldn't exceed .004".

To correct an occasional case of excessive run-out, use a torch to apply heat to the front side of the converter. Then, quench the heated surface quickly with wet cloths to shrink the hub back in line.

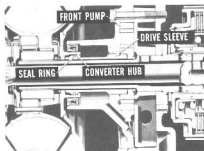


In addition to run-out at the torque converter hub, misalignment of the transmission input shaft in relation to the torque converter housing bore can also cause abnormal wear of the dust seal. We're talking about the aluminum housing used between the engine and transmission case.

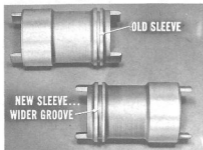
You'd have to check for this with a special tool piloted in the end of the crankshaft, and with a dial indicator attached to determine the alignment of the bore of the housing to the centerline of the crankshaft. Alignment must be true within .004 inch. If it isn't, drill out the dowel pin holes and shift the housing on the engine to bring it back in line.

#### **Pump Drive Sleeve Seal Ring.**

Another possible cause of oil leakage is a worn, or broken, front pump drive sleeve seal ring. This ring seals against leaks between the converter hub inner surface and the sleeve.



Incidentally, this seal ring has been changed to an "O" ring.



So, if you use the new "O" ring for replacement, be sure to remove any burrs on the inside of the hub. In addition, install the new sleeve also, because it has a wider groove to accommodate the new "O" ring.



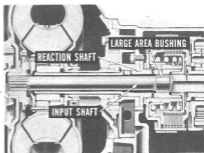
Don't forget to check that drain-back passage in the pump housing. It is a 1/4" hole that should be drilled completely through the housing. Make sure it's open all the way and not plugged up.

**Input Shaft.** Now, here's another item. Early production transmission had an input shaft with three steel seal rings.

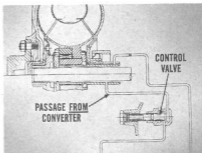


These sealed against the inside diameter of the reaction shaft to prevent leaks. Check these rings for wear, or breakage. If you find a worn or broken input shaft seal ring, you can still get new ones for replacement. However, a change has been made at this point, and the input shaft now being used doesn't have the three seal rings.

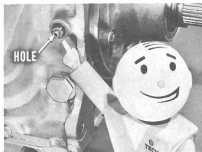
Instead, a large area bushing, pressed in the reaction shaft, supports the input shaft. This construction provides a better bearing support for the input shaft. But, *you can't service this bushing separately.* It's supplied only as a part of the new reaction shaft. Therefore, if you want to install the new *input shaft* as a replacement for the early production shaft, you'll have to install a new *reaction shaft*, too.



**Torque Converter Control Valve.** Another new item on the transmission is an improved regulator valve body with a new torque converter control valve. This control valve formerly was in the passage leading *to* the converter. In the new valve set-up, the control valve is in the passage *from* the converter. At this location it controls pressure

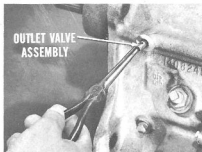


inside the converter. This makes it more efficient. What's more, it prevents the loss of transmission fluid out through the filler tube under extreme operating conditions. This new control valve, by the way, uses a spring with less tension. As a result, the valve spring is not interchangeable with the spring of the earlier type. You can install the regulator valve body in early production units. But remember this: You must install the new torque converter control valve in it.



Be sure to install the new control valve correctly. Install it with the hole in the end of the valve *facing away* from the valve body.

If the installation's made wrong, you won't be able to remove the valve from the regulator body without first removing the transmission and front oil pump body assembly.



You'll have to remove the converter outlet valve assembly from the oil line outlet passage on the left side of the case. If you don't, it will prevent proper lubrication of the transmission. You won't need the outlet valve with the new control valve, so throw it away.

**The 3-Stage Governor.** Transmissions being built today have a new

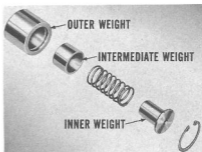
three-stage governor instead of the two-stage governor formerly used. The three-stage governor provides much closer control of the shift speeds. It also limits the wide-open throttle upshift to a more uni-



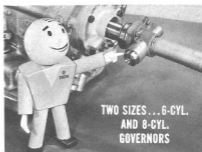


form speed. Besides this, it provides a more uniform high-speed kickdown limit. All are worthwhile advantages and improve shifting performance generally.

The three-stage governor has three weights: The outer, intermediate, and the inner weights. The two-stage governor had only an inner and an outer weight.



The three-stage governor, as a complete assembly, can be used to replace the two-stage governor. But, you'll also have to replace the governor body support. And remember . . . there are *two* sizes of three-stage governors. One goes in 6-cylinder cars. The other goes in 8-cylinder cars.



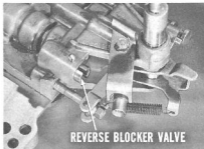
There is no assembly number on the governor. There is, however a governor repair package for 6- and 8-cylinder models. This consists of the governor body, the valve, valve spring, shaft, weights, and necessary lock rings. For 6-cylinder Plymouth models, the part number is 1653464. For Plymouth and all other V-8 models the part number is 1653463.

6-CYLINDER PLYMOUTH	ALL V-8 MODELS
<b>1653464</b>	<b>1653463</b>

**THIS CAN'T HAPPEN**



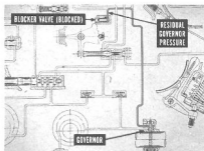
**Reverse Blocker Valve.** You may recall that the 1955 transmission units didn't have the reverse blocker valve. However, all cars with push-button control do have the blocker valve. The purpose of the blocker valve is to prevent shifting into reverse at speeds above 10 to 15 m.p.h.



**REVERSE BLOCKER VALVE**

This is a mighty good safety device, as you know. If an owner accidentally pushes the Reverse button when driving

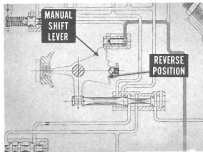
around 10 to 15 m.p.h., the manual valve simply moves to Neutral. Consequently, no damage occurs.



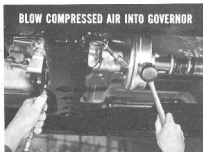
The blocker valve is actuated by governor pressure. So, if the governor valve sticks, it would cause the blocker valve to remain in the "blocked" position due to residual governor pressure in Neutral. In other words, it would be impossible for the manual shift

lever to move into Reverse. This, naturally, would call for checking to determine the cause. It could be due to either the governor valve or the blocker valve being stuck. The governor valve is the easier to check, so do that first.

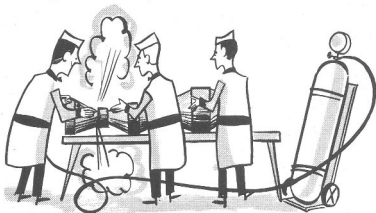
With the engine running, try to shift the transmission into Reverse by pushing the "R" button in. If the transmission will not shift to Reverse, either the governor valve is sticking or there is a line pressure leak in the valve body, admitting pressure to the governor circuit.



If you have this condition, remove the governor pressure take-off plug from the output shaft support. Then, blow short blasts of clean, compressed air into governor circuit while you tap on the parking brake drum. Usually, this will free up the governor valve.



Now, if that doesn't free up the governor valve, you'll have to remove the governor assembly, and clean it thoroughly.



If the Reverse button won't go in, regardless of whether the engine is running or not, it is an indication that the blocker valve is sticking.



That means you'll have to remove the valve body, and take out the blocker valve. Then, very lightly, use crocus cloth to smooth down the valve surface. But, take it easy! Don't remove more than .0015" as measured at the diameter. Another thing . . . it's wise to install a new blocker valve spring

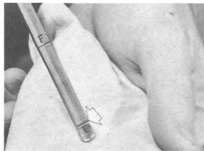
when you reinstall the valve. This spring is available as Part No. 1672323.

Now, if the blocker valve gets a clean bill of health, and you do have to remove the governor valve assembly, remember this. After cleaning, be sure to reinstall the governor with the proper torque on the governor-body-to-support screws. Tighten each screw evenly, 5 to 10 foot-pounds. Uneven tightening can set up a strain in the housing which can cause the weights to stick. The governor locating screw, too, should be tightened  $3\frac{1}{2}$  to 4 foot-pounds.

**Throttle Valve and Spring Package.** Once in a great while you might be consulted by an owner who reports a buzzing noise when the transmission downshifts. If your check confirms his report, drain the fluid and remove the oil pan. Next, remove the valve body. Replace the throttle valve and spring with the new throttle valve and spring package, Part No. 1752242. Reinstall the valve body and pan, and add enough fluid to bring it up to proper level.

**Automatic Transmission Fluid, Type "A".** Speaking of adding fluid, you may have noticed it looks a lot like engine oil. The two, in fact, could almost pass for twins. As a result, some technicians might think that engine oil was put in the transmission by mistake.

To guard against that, always be extra careful to use only the approved automatic transmission fluid, type "A", when you refill, or bring the unit up to its proper level. This means that at room temperature (about 70°F.) the fluid level should be at the "Low" mark on the dipstick. When the unit is hot, the fluid level should be between the "Low" and "Full" marks, but it should *never be above the "Full" mark!*



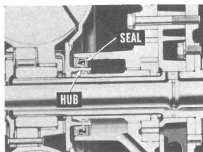
**Clutch Driving Plate and Disc Package.** If you have occasion to repair the PowerFlite clutch, be sure to order the correct disc and plate replacement package. Two packages are available—one contains six plates and discs, and the other contains seven.

Imperial, Chrysler and De Soto models require 6 plates and discs for the direct clutch, excepting the Windsor model equipped with Power Package which requires 7 discs and plates. Plymouth and Dodge eight-cylinder models use 5 discs and plates. At present, four discs and plates are used in Plymouth and Dodge six-cylinder models.

## TORQUE CONVERTER

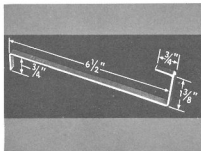
Related to transmission operation, of course, is torque converter performance. Occasionally, the converter might be responsible for sluggish, logy operation, poor fuel economy, or excessive transmission fluid temperatures at high speeds. Naturally, you'd check the converter for these causes only when every other possible cause was checked out first. Keep in mind that there are two torque converts available for Plymouth cars—one for six-cylinder engines, and one for V-8 engines. They are easily identified: the outer shell of the

six-cylinder converter is plain, while the converter for V-8 engines has a one-eighth-inch groove completely around the outer shell.



A *frozen stator* will cause poor performance because it will raise fluid temperatures much higher than normal. In a case like this, the torque converter hub seal might harden and fail. If you find a seal in this condition, chances are the stator's frozen. And, if that is what you do find, you'd

normally replace the converter. However, you can check the converter with the help of two special tools while it's on the car before you undertake this major replacement.

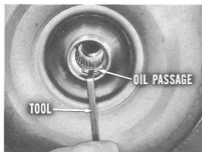


The first tool you can make easily from 1/4" flat stock about 10 1/4" long. Bend one end U-shaped, the other L-shaped as shown in the sketch.

Use a Plymouth Hy-Drive reaction shaft for the other tool. Both tools are very handy for checking both the three- and the four-element torque converters.



**Checking the 3-Element Converter.** This converter, as you know, has a single stator. You check it by inserting the U-shaped end of the tool into one of the four rectangular oil passages in the rear face of the stator.

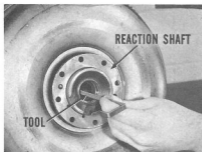


Next, you insert the Hy-Drive reaction shaft into the torque converter hub. Hold the tool stationary and rotate the reaction shaft. It should move *freely, clockwise*. If it doesn't, the stator is seized to the hub, and you'll have to replace the converter.



When you move the reaction shaft *counterclockwise*, it should carry the tool in the stator along with it.

**Checking the 4-Element Converter.** The 4-element converter has two stator units. You check the rear stator like you checked the one on the 3-element converter. But, when it comes to checking the front stator, do this. Install the reaction shaft. Then, install the L-shaped end of the tool



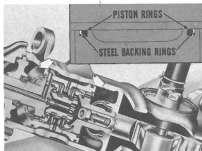
through the reaction shaft, and into one of the oil passages in the face of the front stator. You won't be able to see those passages. So, just probe around carefully with the tool until you locate one of them.

Like before, the reaction shaft should rotate freely clockwise. When rotated counterclockwise, it should carry the tool around with it. If it won't move freely clockwise, replace the converter. You see, we have no way of repairing the converter. As a result, the only thing you can do is to replace the complete unit.

That about takes care of what's new and coming your way on transmissions. It should go far in preventing any arguments between you and your parts man if he supplies you with a part that looks different from the one you've replaced. When ordering transmission parts, be sure to give the identifying letter and number you'll find on the case. This applies particularly to Plymouth, since later models use the larger transmission.

## COAXIAL POWER STEERING

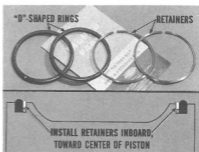
**Piston Rings.** Some changes have taken place on power steering



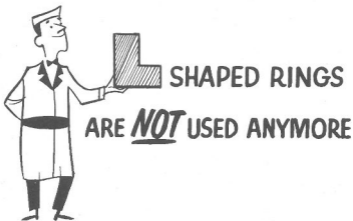
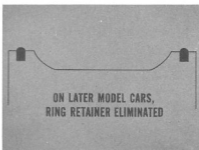
units. For instance, if you get a unit that needs new piston rings installed, bear this in mind. On cars using steering gears with the steel backing ring behind the synthetic rubber ring, there's a new piston ring package available.



This package contains two D-shaped rings and two ring retainers. For proper piston ring support and tension, be sure to install the retainers *inboard* -- toward the center of the piston.



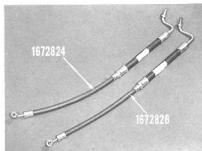
In case you're wondering about the L-shaped piston rings, don't! The *L-shaped rings aren't used any more*. Forget you ever knew they were around. And, on later model cars, the ring retainer has also been eliminated. So, don't install retainers if they were not in place to begin with.



**Pressure Hoses.** You'll recall that there was an occasional case of a hissing noise when the steering wheel was in the straight-ahead driving position. This was tracked down to a restriction within the hose. In addition, there were a few leaks caused by hose couplings that loosened up during operation.



To correct these conditions, new pressure hoses have been re-

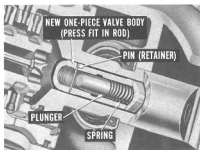


leased. The latest power steering gear pressure hose to use on 1956 V-8 engine models is Part No. 1672826 for Plymouth and Dodge. For 1956 Chrysler and De Soto cars, use Part No. 1672824. For 1955 Chrysler and De Soto cars, the pressure hose to use is Part No. 1672814.

**Valve Control Spacer Seal.** Not too long ago, a change was made in the composition of the material for the valve control spacer seal used in Chrysler and De Soto power steering units. To identify this seal, a silver-colored letter "M" was provided on the outer surface of the seal. Because all seals now in field stocks are of the latest material specification, this identifying "M" has been discontinued. You won't have to look for the silver "M" any more.

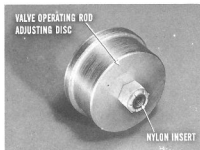
**Lower Piston Rod Relief Valve.** Another new steering gear item is the lower piston rod relief valve. You'll remember that the relief valve was secured with a drive-fit end plug. In some cases, the end plug was pressed too far into the hole. This applied too much pressure to the valve body.

A new, one-piece valve body, which is a press fit in the piston rod, is now being used. A pin, driven through the valve body, serves as the plunger and spring retainer.



If you ever have to service this valve, use a bolt as a puller to draw the valve body out of the piston rod. Then, use a small drift to knock out the pin.

**Valve Operating Rod Adjusting Disc.** There's something else that's new on the power steering horizon. It's a redesigned valve operating rod adjusting disc. A *nylon-insert nut* is now being built into the disc to hold the adjustment more securely. In addition, the disc retainer is being made as a part of the disc assembly.



This part is now called the Valve Rod Adjusting Cup Assembly. You will still follow the same manual control valve adjusting procedure you've always used. This nut just makes it more secure.

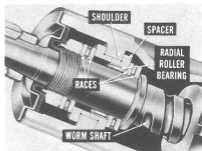


**IT'S MORE SECURE!**

## Worm Thrust Bearing and Lock Nut.



Power steering units now being produced have a new worm thrust bearing and lock nut arrangement. This replaces the two tapered roller bearings with inner and outer cups. The set-up now consists of two small-diameter roller thrust bearings, four bearing races, a radial roller worm bearing, and two thrust bearing spacers.



The spacer containing the radial roller bearing is installed against the lower shoulder of the upper housing. The races are used above and below each roller thrust bearing.

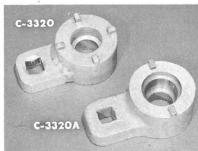


The new lock arrangement is a combination lock nut and washer. The flange which extends above the nut is used as a means to lock the nut securely to the worm shaft.

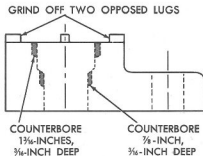
The shaft has a keyway into which the lock nut flange is staked. As you've probably guessed, this provides a much more positive bearing adjustment. What's more, the adjustment once made, lasts longer.

In view of this change, you might ask whether or not the bearings should be adjusted differently. Actually, you make the adjustment the same way. The nut must turn freely on the worm shaft threads or your torque readings will be way off.

Besides that, a new worm bearing adjusting nut wrench will be required. It's available as Part No. C-3320A and replaces the former adjusting nut wrench (C-3320—Miller Mfg. Company).

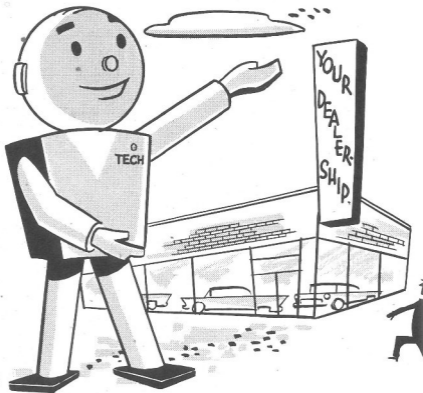


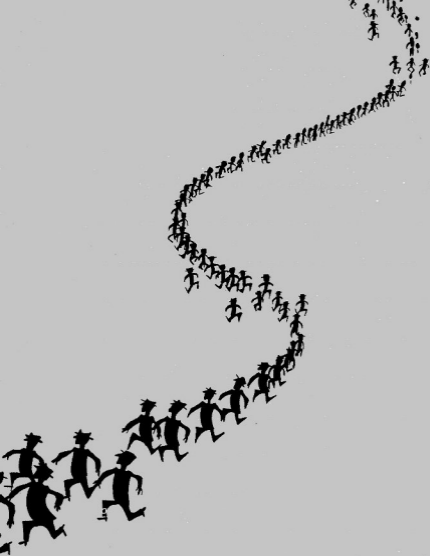
If you have a lathe in your shop you can modify the wrench you now have (C-3320). Grind off two opposing lugs so the wrench will have two lugs instead of four to grip the nut. Then counterbore the wrench to increase its inside diameter from .984 inch to  $1\frac{3}{16}$  inches, and to a depth of  $\frac{3}{16}$  inch. Also counterbore the  $\frac{3}{4}$  inch diameter hole to  $\frac{7}{8}$  inch, for a depth of  $\frac{3}{16}$  inch.



# SUMMARY

By keeping posted on the latest changes in PowerFlite and power steering units, you're bound to do an easier and better job. Better work, of course, builds up your reputation for performing outstanding service. As that word gets around, you'll find more new-car buyers attracted to your dealership. This, naturally, is important to the growth and prosperity of all of us!





# RECORD YOUR ANSWERS TO THESE QUESTIONS ON QUESTIONNAIRE NO. 101

The front pump housing dust seal has nothing to do with sealing oil in the transmission.  RIGHT 1  WRONG

If you spot an oil leak at the front end of the PowerFlite transmission, simply replace the front pump housing dust seal.  RIGHT 2  WRONG

The input shaft now being used in PowerFlite transmission doesn't have the three seal rings.  RIGHT 3  WRONG

If you install a new regulator valve body with its new control valve, remove the converter outlet valve assembly from the oil line outlet passage so the transmission will be properly lubricated.  RIGHT 4  WRONG

There are two sizes of three-stage governors available: one for 6-cylinder cars; the other for 8-cylinder cars.  RIGHT 5  WRONG

The governor has no relation to the operation of the reverse blocker valve.  RIGHT 6  WRONG

If the "R" button won't go in whether the engine is running or not, the blocker valve is sticking.  RIGHT 7  WRONG

A frozen stator in the torque converter will raise fluid temperatures much higher than normal and cause the hub seal to harden and fail.  RIGHT 8  WRONG

When replacing rings on the Coaxial power steering piston, use the new package containing "D-shaped" rings.  RIGHT 9  WRONG

There are two converters available for use in Plymouth cars: one for the 6-cylinder engines; the other for the 8-cylinder cars; be sure to use the right converter for replacement.  RIGHT 10  WRONG