FLUID-TORQUE DRIVE

Prepared by
CHRYSLER CORPORATION
PLYMOUTH, DODGE, DE SOTO
AND CHRYSLER DIVISIONS
Vol. 5 No. 1
Copyright 1951
Chrysler Corporation
Tech Sez:

THE TORQUE CONVERTER'S A "SOUPED-UP" FLUID DRIVE!

Yes—the torque converter and fluid-drive units have a lot in common. Both operate in an enclosed oil bath and transfer cushioned engine torque to the transmission and rear wheels. But, in addition, the torque converter multiplies torque—just like an extra, or second transmission.

This reference book points out where the torque converter and fluid-drive units are alike. It also explains how the converter works, how to remove and install it in case it requires servicing.
<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOW THE TORQUE CONVERTER WORKS</td>
<td>4</td>
</tr>
<tr>
<td>THE TORQUE CONVERTER HAS ITS OWN OIL SYSTEM</td>
<td>12</td>
</tr>
<tr>
<td>REMOVAL OF THE TORQUE CONVERTER</td>
<td>15</td>
</tr>
<tr>
<td>CHECKING RUNOUT OF THE TORQUE CONVERTER HUB</td>
<td>23</td>
</tr>
<tr>
<td>REASSEMBLING THE TORQUE CONVERTER</td>
<td>24</td>
</tr>
<tr>
<td>ROAD TEST THE CAR WHEN YOU'RE FINISHED</td>
<td>28</td>
</tr>
<tr>
<td>WHERE OIL LEAKS MAY SHOW UP</td>
<td>28</td>
</tr>
<tr>
<td>PERIODIC SERVICING OF THE CONVERTER OIL SYSTEM</td>
<td>29</td>
</tr>
<tr>
<td>SOME NOTES ON POWER TRAIN SERVICE DIAGNOSIS</td>
<td>30</td>
</tr>
<tr>
<td>A FINAL WORD</td>
<td>34</td>
</tr>
</tbody>
</table>

HOLD 'EM, TECH!
HOW THE TORQUE CONVERTER WORKS

As you probably know, torque in itself is a turning or twisting force. It's developed by the engine to turn the rear wheels. And, as you also know... you can increase torque at the expense of speed... or increase speed at the expense of torque by means of gears.

\[ \text{Higher Engine Speed} \quad \mathbf{THRU} \quad \text{Converter (Torque Multiplication)} = \quad \text{More Torque Same Engine Work} \]
For example . . . when you shift a car into low gear for lots of torque—a big push—and not much speed, you actually increase the engine's leverage on the rear wheels. This increased leverage is called torque multiplication. That's a job that an ordinary gear transmission does.

Increasing the leverage—or multiplying the torque—is exactly what the torque converter does. However, it uses a fluid to provide the right ratio of speed and torque. The fluid supplies the proper "gear ratios" instead of doing it with gears.

Under certain conditions, the torque converter is capable of torque multiplication up to more than 2½ times. Under some conditions, the torque converter acts similar to a simple fluid coupling between the engine and transmission.

To really understand how the torque converter operates, it'll help to review some principles basic to fluid-drive.
FLUID-DRIVE OPERATION—In the case of fluid-drive, the coupling consists of a vaned driving member, called an impeller, and a vaned driven member, called a turbine. Both impeller and turbine work somewhat like a couple of electric fans placed face-to-face. Let's say that one fan's plugged into an electrical outlet, while the other is disconnected.

When the connected fan blows, the second fan turns with the blast of air from the first fan. In general, that illustrates the basic principle of fluid-drive. Power is transmitted without the use of gears.

Now, no matter how efficient the two fans are, the first fan can transmit to the second one only the amount of torque or twist it has in its shaft. The second fan, in itself, cannot boost the twist.

And notice that the force of the air stream from the powered fan to the disconnected fan is used only once. After it passes through the second fan, the air stream is dissipated into the atmosphere—it does no more work, and any force left in it is wasted.
Fluid-drive in a car works pretty much the same way. It doesn’t “gear down”—it doesn’t multiply the torque. It still has to hitch into the gear train of a transmission to provide more “push” at the rear wheels. But suppose we go back to our electric fan example again.

“HURRYING UP” THE TURNING FORCE—Suppose you used a funnel to catch the air that is normally wasted as it leaves the second fan. And, suppose you stove-piped it back around to the first fan, and redirected the air to blow behind the powered fan. In that way, the speed of the air stream passing between the powered fan and the second fan would be constantly increased up to a “terminal” limit (governed mainly by the capacity of the powered fan).

In other words, the turning force, or torque, being transmitted to the disconnected fan would be built up, or multiplied, by the ever-increasing speed of the air stream. You can easily see that the torque multiplication would be most helpful when the fan was first starting up. That’s because the driven fan, at the beginning, presents a lot of resistance to the flow of air. The multiplication would naturally taper off as the speed of the disconnected fan approached that of the powered fan, bringing the flow of air through the system toward a constant speed.
What it all adds up to is that you’d have more twisting force at the first shaft than the small electric motor could supply all by itself. The source for this extra “push” is the energy in the air that otherwise would be wasted.

**THE SAME PRINCIPLE APPLIES TO FLUID-TORQUE DRIVE—**

Now, just about the same idea applies to a fluid coupling in which swirling oil takes the place of the air stream, and turns it into a torque converter. If you will trace the flow of oil through the unit, you will see how it functions as a torque converter.

For instance . . . the engine crankshaft transmits its twisting effort to a vaned impeller in the converter. The oil flows outward from the impeller hub to its outside edges.

At that point, the curved vanes catch the oil and toss it across to the turbine—just as a basketball player would pass the ball to a teammate across the court.

The turbine vanes catch the oil which has a “push” imparted to it by the impeller. So, the turbine turns under the impact.

Up to now, the oil is willing and well-behaved. But it soon gets stubborn. That’s because it flows from the turbine’s outside edges down to the hub. There you get a traffic jam. You see . . . the oil still has a lot of “push.” And, due to the curve of the turbine blades, the oil starts to toss this “push” against the vanes of the impeller. This reverse English comes in a ricocheting action off the turbine vanes.

The impeller would conscientiously try to toss the ball to the turbine. But the turbine would keep splattering the oil back at the impeller if it weren’t for the *stators.*
**THE STATORS MAKE THE IMPORTANT DIFFERENCE**—Two stators—or guide wheels—play an important part in the operation of a torque converter. These stators are stationary vanes mounted on wheels and nest between the impeller and turbine at the hub—right where the oil returns to the impeller from the turbine.

The stator vanes catch the oil leaving the turbine, and route it so that it’s sent off in the right direction. In other words, the stators serve the same purpose as the funnel and stovepipe in our electric fan example. They deflect the flow of oil coming off the turbine vanes back to the impeller. This speeds up the fluid flow and increases the torque transmitted to the turbine. As a result, the car gets a very fast starting acceleration, especially when it’s operating under its heaviest load—like moving from a standing start, or climbing up a steep incline.

To summarize, the stators redirect the oil from the turbine to boost the impeller’s torque. They make the oil help impeller rotation, and give it the extra torque required.
THE STATORS DON’T TURN AS ACCELERATION BEGINS—
To do the most effective job of speeding up the fluid as acceleration begins, the stators have to be stationary. If they weren’t, the fluid “bouncing” off the turbine blades would set the stators turning in a direction opposite to that of the impeller, instead of helping the impeller. So . . . mechanical “stops” (overrunning clutches) are built into the unit to keep the stators from turning against impeller rotation.

However... the stators are free to turn with impeller rotation. That’s needed because, as acceleration increases, there are directional changes in the fluid and the stators would begin to interfere with power flow if they were to remain fixed.
In other words, at a given point, the fluid pressure on the back of the stator vanes begins to overcome the diminishing force against the face of the stator vanes, as the fluid is being deflected back from turbine to impeller. That’s just another way of saying that as road speed increases, the turbine starts to “catch up” with the impeller and less help is needed from the stators. So, the stators begin to rotate—slowly at first, then faster and faster—with the impeller and turbine until finally, the stators no longer have any torque-multiplying effect.

**SUMMARY OF OPERATION**—As a result, the torque converter operates as a simple fluid coupling when the car’s running under a constant-speed, no-load condition. In short, the torque converter works something like a fluid-drive unit when the impeller, stators, and turbine rotate together at about equal speeds similar to a “solid” mechanical drive in high gear (1-to-1 gear ratio). Efficiency of the torque converter in this case is almost equal to that of a direct mechanical drive. Actually, it is better from a ride-comfort, long-life of parts aspect because of the smoother operation due to the cushion of oil within the coupling.

So, when there’s a heavy load on the rear wheels and the car needs extra torque, the converter delivers that extra “push” up to 2½ times the normal torque transmitted. At steady, cruising speeds, when there’s no need for extra torque, you get a fluid-drive-like action. That about covers how the torque converter operates.
THE TORQUE CONVERTER HAS ITS OWN OIL SYSTEM

Another outstanding difference between a fluid coupling and a torque converter is that the torque converter has its own oil circulation system. You’ll recall that the fluid-drive unit is only partially full of oil. The torque converter, on the other hand, is full of oil. In fact, it’s not only full, but is also kept full under pressure!

The torque converter oil system uses a rotary gear-type pump located in the converter support plate. This pump has two jobs to do: First, it supplies oil under about thirty pounds pressure to the torque converter; second, it circulates the oil through an external cooler to control the temperature of the oil.

The pump’s first job—keeping the converter full of oil under pressure—is necessary to prevent cavitition and noise. “Cavitation” is just a five-dollar word for air pockets—or bubbles—that get into the converter and upset the flow of oil in a noisy, inefficient way.
If you've ever been in a boat with an outboard motor, you've probably noticed times when the prop lifts out of the water a little too high and grabs air. All of a sudden the prop spins very fast, and very noisily, but the boat doesn't move. That's an example of cavitation's upsetting effect.

NEVER SEEN SUCH CAVITATION!

The pump's second job—circulating the oil to control its temperature—is necessary because the oil in a converter runs at a higher temperature than oil in a fluid-drive unit. To prevent overheating, a cooler is mounted on the engine. This cooler is like a miniature radiator, with engine coolant circulating around a small core. Oil from the converter is circulated by the pump through the cooler core where it is cooled just as the radiator cools the engine. The oil is then returned to the torque converter oil reservoir. It's up to the pump to maintain this circulation.
**HOW THE OIL CIRCULATES**—The pump draws oil from the oil reservoir and forces it, under pressure, into the converter. The oil *enters* the converter through the clearance between the converter hub and the stator shaft. The oil *leaves* the converter by way of the clearance between the stator shaft and the turbine shaft.

Reaching the transfer plate, the oil is directed through a passage in the plate to the relief valve sleeve. The oil passes through an orifice in the relief valve sleeve which restricts the flow of oil and helps maintain pressure in the converter during engine idle speed. From the relief valve sleeve orifice, oil enters the external line to the cooler. Passing through the cooler, the oil returns to the reservoir.

**COOLER**—The cooler, consisting of a radiator-type core enclosed in a metal housing, is mounted on the left front side of the engine. Water circulates around the core, and the oil from the converter passes through the narrow passages within the core.
The water from the engine cooling system enters the cooler at the bottom, from the engine radiator outlet. It passes upward, around the cooler core, and leaves the cooler at the intake side of the water pump. The oil from the converter enters the cooler at the top, passes through the core and returns to the reservoir.

PRESSURE RELIEF VALVE—When pressure in the converter oil system builds up higher than 30 pounds per square inch, the pressure relief valve in the converter support plate by-passes the oil not needed, returning it to the inlet side of the pump. An additional bleed-off is drilled under the ball check in the relief valve to prevent the possibility of hydrostatic lock. This bleed dumps oil into the reservoir.

Capacity of the entire converter oil system is about $10\frac{1}{2}$ quarts of either Fluid-Drive oil, or a high-quality 10-W engine oil obtained from a reputable refiner or marketer.

REMOVAL OF THE TORQUE CONVERTER

You may never find it necessary to remove the torque converter. In case you do, however, there are a few tips that will save you some time and make the job of removing the torque converter easier.

Let's suppose, for instance, that you are going to have to service a car with a ratchety or siren noise that occurs either when the car's operating in neutral or in gear. Generally, this type of noise indicates that the oil pump pinion gear may be striking the island in the oil pump body. Explaining how to
service this condition will also give you the low-down on replacing seals that may be leaking oil, plus other possible conditions you'll want to know about.

To begin with, drain the oil reservoir and remove it from the clutch housing. Don't drain the torque converter at this time. It's easier to do later and you won't dump any hot oil in your lap.

Once the reservoir's removed, take out the starter and drop the lower half of the flywheel housing pan. Then's the time to drain the converter. Just turn it so one drain plug's at the bottom, remove the plug and let the oil drain. The reservoir, being off, will act as a vent so that all the trapped oil will flow out. As soon as the converter is drained, reinstall and tighten the plug.

The two converter drain plugs are diametrically opposed and located in the outer diameter of the converter. Access plates are provided in the upper and lower flywheel housing to permit removal of the drain plugs. They can be used when draining and refilling the torque converter.

Disconnect the oil lines from the rear support plate, and pull the transmission. Next, unhook the clutch-release-fork pull-back spring, and then disconnect and remove the clutch fork rod assembly.

Now, to remove the release bearing from the clutch fork, pivot the release bearing assembly away from the fork so that it will slide off easily. Then you can disconnect the pivot bracket assembly from the clutch housing and torque shaft.

HERE'S A NEW TOOL
REMEMBER...

the rear engine mounts are on the clutch housing. So, you'll have to use a special tool, No. C-3169, to support the rear of the engine. This tool hooks into holes in the frame side rails, and will hold the weight of the engine while you remove the clutch housing.

To remove the crossmember, first remove the engine rear mounting bolts, and then raise the engine slightly. That'll take the weight off while you remove the crossmember bolts and drop the crossmember. Next, remove the clutch housing. But remember to lower the engine about three inches first, so you can get at the cap screws on the upper part of the housing.

After that, remove the clutch cover and disc, taking care to keep grease from getting on the clutch facings. That gets you ready to pull out the converter support plate with the clutch driving plate attached. Put this assembly on the bench and you can then take a look at the oil pump or any of the oil seals you might suspect are leaking.

NOTE: If the support plate has a tendency to "hang up" on the dowels in the flywheel housing flange, don't pry or hammer it loose. Jerk the clutch driving plate back, and you'll be able to work the support plate free of the dowels.
REMOVING THE OIL PUMP—As you may know, the oil pump body and its seal ring are a tight fit in the converter support plate. You'll have to be very careful when removing or installing the oil pump body to avoid damaging or scoring the seal ring surface in the support plate.

That's because a scratch or score mark on this sealing surface will permit oil to leak past the seal ring. The following method of removal and installation has been thoroughly tested in the field and deserves your careful study.

First, remove the six attaching pump body screws that hold the pump to the converter support plate. Notice that two of the holes are threaded. That's so you can use two special puller screws to pull the pump body evenly out of its recess.

But before you can use those puller screws, it's necessary to heat the support plate. That expands the aluminum plate's counterbore enough to permit removal of the pump body and stator shaft without scoring the inner surface of the pump recess.

WHILE I'M HEATIN' THE PLATE...
**HEY... NOT THAT WAY! HERE'S HOW TO HEAT THE PLATE**

One of the safest ways to heat the plate is to use three or four ordinary, 250-watt heat lamps placed uniformly around the outer edge. Photo-flood lamps with built-in reflectors can also be used. Either of these can be bought in almost any hardware or drug store.

You can use a blow torch to heat the plate if you are careful to apply the heat at the outer edge, and to rotate the plate to spread the heat throughout the entire support plate. Remember... this is a large area that you are heating and you won't want to cause any distortion or other stresses in the aluminum by concentrating the heat in one spot—particularly near the center.

With heat lamps, it's going to take about 15 to 20 minutes to warm the plate up to about 160° F., or just so it's hot to the touch.

**PULL THE PUMP BODY**—Put the two special puller screws in the threaded holes and turn them alternately, a quarter turn at a time. That way, the pump body will come up evenly with no danger of damaging the inner surface of the machined recess in the support plate.
Once the pump body and gears are out, turn the heat lamps on again to keep the support plate warm. You are then ready to inspect the pump parts and oil seals.

**INSPECT THE PARTS**—Look especially at the turbine shaft oil seal ring. If it's broken, replace it. Look closely at the pump recess in the support plate for burrs, nicks and score marks. Examine the sidewall especially for scoring that might allow oil to leak past the pump body seal.

Next, look closely at the ends of the pinion gear teeth. If they show signs of wear or scoring, it means that they've been rubbing against the pump body island and causing a noise. This condition is usually brought about because the converter isn't running true. The hub of the converter, which drives the pump pinion, moves the pinion out of position, allowing the teeth to rub on the pump island.
REPLACE WORN PARTS—If that’s what you happen to find, you’ll naturally have to replace the pump body and pinion gear. A new pump body’s needed because the bushing in the old one will be worn by the hub runout.

The bore on the new pump body is slightly larger. That’s because the new pump pinion is an Oilite gear with a pilot hub to control clearance between the pinion gear teeth and island. This Oilite gear doesn’t require a bushing. In addition, a change has been made in the transfer plate, so you should replace that also.

There is a torque converter oil pump service package available to cover conditions of this nature. This package is identified as Part No. 1450206—Torque Converter Pump Housing and Pinion Gear Package. Inside you will find:

1—1323720 Oil Pump Body Seal Ring
1—1408352 Oil Pump Housing and Seal Assembly
1—1408335 Oil Pump Pinion Gear
1—1323727 Oil Pump Transfer Plate
6—1406490 Oil Pump Body Attaching Screw Washers
6—1323747 Oil Pump Reservoir Seal Connectors
ASSEMBLE THE OIL PUMP—Clean all of the pump parts carefully. Then, install the new pump body seal on the new body. Install the outer gear and pinion gear in the pump body. Use the old outer gear unless it is damaged.

Use the transfer plate as a straightedge and check with a feeler gauge to see if there's .001" to .003" clearance between the pump body and face of the gears. If not, try a new pump body, or a new set of gears.

Once you have the clearance okay, install the new transfer plate—with its large counterbore down—over the stator shaft. Hold the pump body by the hub and pour a little oil between the gear teeth for initial lubrication and to prime the pump.

Following that, turn the stator shaft and transfer plate upside down and install them in the pump body. Invert the pump and line up the attaching holes. Use two cap screws to keep the holes in line.

Turn off the heat lamps, center the turbine shaft oil seal ring so you won’t break it, and ease the pump into the machined recess. Using new copper gaskets, tighten the pump body attaching screws alternately. Tighten them to a torque of seventeen foot-pounds.

NOTE: If the attaching screws don’t draw down tight enough to compress the copper gaskets it may mean that either the holes are not tapped deep enough, or the screws are too long. Use shorter screws.
CHECKING RUNOUT
OF THE TORQUE CONVERTER HUB

Every time you remove the converter support plate, you should check the converter hub runout before reinstalling the plate. To do this, first use a fluid-drive wrench to tighten the crankshaft-flange-to-drive-plate bolts.

Next, use a torque wrench and tighten the six drive-plate-to-converter bolts to seventeen foot-pounds. One loose bolt might be enough to give you false readings on the dial indicator that you use as you finish tightening up the bolts.

Mount the dial indicator in either of the lower holes of the flywheel housing flange. Line up the indicator follower at right angles to the hub—about a quarter-inch from the base of the driving lugs.

Then, use a screw driver between the crankshaft flange nuts to turn the engine and get your indicator readings. You won’t get an accurate reading if you try to turn the engine by prying or pulling on the drive plate or ring gear because the plate will deflect. Removing the spark plugs will naturally let you turn the engine easier.

HUB RUNOUT SHOULD NOT EXCEED .005” — If runout exceeds .005”, chalk the spot where the runout’s the highest. Bring that chalk mark around to the indicator follower. Get a pry bar and put it between the flywheel housing flange and against the head of the converter drive plate bolt nearest the chalk mark.
You may have to position the converter slightly to use that bolthead as a fulcrum. You use that bolthead to pry against so you won’t put a crimp in the flexible drive plate.

Now, pry so that you’ll spring the plate away from the engine. Keeping the bar on the side of the housing with the dial indicator, close to the chalk mark, will also protect the indicator from damage.

You’ll find that you’ve got to spring the drive plate about \( \frac{1}{8} \)th of an inch to change hub alignment a few thousandths. After springing the plate, read the dial indicator again. You may have to repeat this operation a few times until the hub is within its 0.005” runout limit.

**REASSEMBLING THE TORQUE CONVERTER**

With the new pump assembled in the support plate, and the converter hub runout brought within the allowable limit, you are ready to install the support plate assembly in the car.

First, see that both the mating surfaces of the support plate, as well as the flywheel and clutch housing flanges are clean and free from burrs. Even tiny particles between these surfaces can seriously affect converter alignment. Then, get a helper to turn the converter slowly as you hold the support plate up to index the splines and driving lugs.
This is easily a job for four hands. After all, there are three different points to index: First, the splines of the turbine shaft into the turbine; second, the stator shaft splines have to engage the stator hub; third, the drive lugs have to engage the slots in the oil pump pinion gear. If one should let the support plate assembly hang on the converter, it might bend the converter drive plate out of line.

SAYS HE'S A TORQUE CONVERTER EXPERT...
Above all, be sure you tag those three indexing bases. If the support plate lacks about a quarter inch of fitting tightly against the flywheel housing flange, it means the hub hasn’t entered the slots in the pinion gear. When the support plate is flush against the flywheel housing flange, you can install the clutch housing.

**INSTALL THE CLUTCH HOUSING**—Be sure that the clutch assembly is free from oil. Install the clutch disc and the clutch cover and pressure plate assembly to the clutch driving plate. Then, put the flywheel housing pan cover on the bottom of the flywheel housing. Finally, install the clutch housing.

To assemble the release bearing to the clutch fork, avoid forcing the pull-back springs and bearing onto the fork. Instead...insert the tip ends of the pull-back springs into the fork prongs. Then, pivot the bearing assembly toward the fork and it will slide into place easily.

Install and connect the remaining parts of the clutch linkage. That gets you ready to install the oil reservoir.

**INSTALL AND FILL THE RESERVOIR**—Make sure that the oil connector holes in the support plate and reservoir are clean and free from burrs. It’s smart to use two new seals on each of the three oil connectors before installing the reservoir. Grease the seals a little and install them.
Now, when you install the reservoir, be sure to use the two long cap screws and spacers at the back end of the reservoir. Then, connect the oil lines. Following this . . . raise the engine above normal level and install the crossmember to the frame. Then, lower the engine to normal position and install the engine rear mounting bolts.

After you've got everything back together, you're ready to fill the converter. So, remove the reservoir filler plug and add either MoPar Fluid-Drive Oil, or a high-quality 10-W engine oil obtained from a reputable refiner or marketer. Just add oil to the level of the hole. This will give the pump something to run on.

Next, put the transmission in neutral, start the engine and run it at 500 to 600 r.p.m. Keep adding oil until the level remains at the bottom of the hole. Total capacity is about 10½ quarts. Then, replace the filler plug.

**NOTE:** If the oil pump doesn't draw oil up from the reservoir and into the converter, the pump is out of prime. You can assist priming of the pump by disconnecting the vent line on the upper right-hand side of the reservoir and applying a small amount of air pressure while the engine is running. Do not use more than five pounds pressure or some of the oil seals might be damaged.

Ordinarily, no air pressure will be needed if the oil pump gears are lubricated during assembly.
Shift the transmission into high range and run the engine briefly at 500 to 600 r.p.m. again. That will eliminate any trapped air or bubbles in the oil, and you can check for external leaks at the same time. Inspect all the oil fittings, connections, and check the level of fluid once more, just to be sure that everything's okay. If the level dropped down, refill the reservoir.

**ROAD TEST THE CAR WHEN YOU’RE FINISHED**

When you’ve completed the work, it’s smart to road test the car thoroughly. So, take it out and put it through its paces.

On your return to the shop, run the car up on the hoist and check the oil level. While you’re there, you may as well make another quick check for evidence of oil leaks.

**WHERE OIL LEAKS MAY SHOW UP**

Look first at the oil lines and fittings on the left side of the support plate. Next, examine the reservoir. If a connector seal was damaged, for instance, oil would leak into the hollow of the reservoir and drip through the breather hole in the bottom. So, every time you remove a connector, remember to replace the two seals on each connector.
A leak on the rear side of the support plate usually means that the turbine shaft oil seal’s at fault. Oil on the front side of the support plate will point to the impeller hub seal, the pump body seal, or the copper gaskets being at fault. That’s why it’s wise to use new seals whenever an old seal is removed.

PERIODIC SERVICING OF THE CONVERTER OIL SYSTEM

Check the oil level in the reservoir every 1,000 miles. Oil should be changed every 20,000 miles. You can add 10-W engine oil or MoPar Fluid-Drive Oil, provided that it is a high-quality engine oil obtained from a reputable refiner or marketer.

NOTE: On some cars, no access plate was provided in the lower flywheel housing. On these models, you will have to remove the upper access plate, the drain plug, and then rotate the converter so that the open drain hole is at the bottom. Remove opposite plug to vent the system, so it will drain easier.

Keep the rear of the car slightly higher than the front end when draining the converter in order to allow the oil to drain out of the small hole in the lower flywheel housing.
SOME NOTES ON POWER TRAIN SERVICE DIAGNOSIS

Most mechanics are blessed with a lot of common sense. By using that natural talent you can figure out just which unit in an automobile power train isn’t doing its job. All you have to do is brush up on how each power train unit works, and what it is supposed to do.

THANK YOU...

As you know, power from the engine is transmitted smoothly to the rear wheels when the power train units are all working properly. However, when one of the units lays down on the job, the power train can act up. At that point it’s up to you to find out whether the condition is in the clutch, transmission, torque converter, or the engine.

In a case like that, there are some questions you can ask yourself. They’ll help you put your finger on the guilty power train unit:
1. DOES THE ENGINE RUN SMOOTHLY?
   If the engine is rough, or the idle is high, you may get all kinds of symptoms from the power train—especially the transmission. So, be sure the engine is tuned properly before you look any farther.

2. DOES THE TRANSMISSION SHIFT SMOOTHLY?
   Upshift and downshift conditions are sure to be in the transmission units, if engine idle and operation are okay. If the automatic shifting is satisfactory, and the engine runs okay in neutral, but the car doesn’t run smoothly, that means difficulty between engine and transmission. In that case, you’d better check the torque converter and clutch.

3. IS THERE A SLIPPING CLUTCH EFFECT?
   This, of course, points to something wrong with the clutch, converter, or both. The following checks will help you locate the cause:

   A. “Slipping Clutch” Effect with Car Stopped, Brakes Applied, Transmission in Gear and Throttle Open—
      This may be caused by oil leakage onto the clutch from converter. Replace the clutch-driven disc and thoroughly clean oil from the entire clutch assembly. In addition, be sure to correct the cause of the leak.

   B. “Slipping Clutch” with Car in Motion—
      This can be due to low oil level in the reservoir, or low pressure in the torque converter. Fill the converter and reservoir to their proper level. If the condition still continues, check the pressure relief valve for proper seating of the ball, and for correct spring tension.
4. DOES THE OWNER REPORT A RATCHETY (PICKET FENCE) NOISE OR WHINING (SIREN) SOUND WHICH INCREASES IN PITCH AND VOLUME AS ENGINE SPEED INCREASES?

Some drive-line noise is normal in any car. However, converter misalignment can cause the noise described as a ratchety or picket fence sound. Excessive hub runout can cause the oil pump pinion gear teeth to strike the island in the pump body. The only sure correction is to remove the support plate, correct hub runout, replace the pinion gear, pump body, and transfer plate, and replace the oil seals.

5. DOES THE OWNER REPORT OVERHEATING, OR A “HOT OIL” SMELL?

An overheating converter case is easy to spot. There’s too much heat at the floor pan, a hot oil smell, and high engine temperatures. The condition may even show up as converter slippage that feels very much like clutch slippage. But, in this case, you’ll want to make sure it’s the converter—and not the engine—that’s overheating. Here are the things to check:

(a) Coolant level in the radiator, water pump operation, slippage of the water pump belt. In addition, you may want to check the thermostat.

(b) Always check the level of oil in the reservoir. Low oil level may mean improper circulation of oil through the cooler.
(c) Make sure that the water hose connections to the oil cooler are not kinked and that circulation through the cooler is okay.

(d) Check the converter-to-cooler oil lines for kinks, stone damage, or plugging that might restrict circulation.

(e) Do not replace the converter unit until each of the foregoing checks are made, and you are sure—by process of elimination—that the converter unit itself is at fault.

6. DOES THE OWNER REPORT OVERHEATING, AND POOR TOP SPEED?

If you get an owner report that the torque converter runs very hot, and that the car’s unable to run above 55 mph, you’ve got a case where the torque converter’s at fault. Failure to reach top speed is the key point in this condition.

So, don’t waste time checking oil pressure or other factors. Just replace the converter.
A FINAL WORD . . .

As you can see, maintenance of the torque converter is fairly simple. Actually, there aren't many parts involved, and the unit itself runs trouble-free in most cases.

If there's no noise, and no evidence of oil leakage, you'll just be concerned with periodic checks of the oil level every 1,000 miles, and changing the oil every 20,000 miles. Follow the suggestions outlined in this reference book and you can assure your owners many thousands of miles of driving satisfaction.

LET ME AT THOSE CONVERTERS!
## QUESTIONNAIRE

**TEST YOURSELF**
**WITH THESE QUESTIONS!**

1. The converter oil pump performs two jobs: It keeps the converter full of oil under pressure, and it circulates the oil to keep it cool.  
   - RIGHT  □
   - WRONG □

2. Capacity of the converter oil system is about 10½ quarts.  
   - RIGHT  □
   - WRONG □

3. To fill the converter, first fill the reservoir to the level of the filler hole, start the engine, and keep adding oil up to 10½ quarts.  
   - RIGHT  □
   - WRONG □

4. Always check the runout of the torque converter hub whenever the converter is disassembled.  
   - RIGHT  □
   - WRONG □

5. Runout of the torque converter hub should not exceed .005 inches.  
   - RIGHT  □
   - WRONG □

6. Always heat the converter support plate before attempting to remove the converter oil pump assembly.  
   - RIGHT  □
   - WRONG □

7. If the inner surface of the machined recess in the converter support plate has been scored, it can result in oil leaking past the pump body seal ring.  
   - RIGHT  □
   - WRONG □

8. The bolts which attach the drive plate to the converter must be tightened with a torque wrench to 17 foot-pounds.  
   - RIGHT  □
   - WRONG □

9. Excessive runout of the torque converter hub can be corrected by springing the converter drive plate.  
   - RIGHT  □
   - WRONG □

10. The oil pump body attaching screws should be tightened with a torque wrench to 17 foot-pounds.  
    - RIGHT  □
    - WRONG □