CAPTIVE CLUTCHES

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Why is this topic important?

- Previous talks have focused on most relevant issues and/or industry problems
- This year the "captive clutch" topic has been a very hot issue on tech calls .
- The "NUTS and BOLTS" of rebuilding Captive Clutches will be presented today.

GM 258mm

- This is the Captive Clutch of the GM 258mm
- These are the 4 leaf springs that connect the piston to the cover.
- The 4 leaf springs do not serve any purpose in the apply or release of the clutch.
- Their only job is to **quietly** keep the piston from rotating.

GM 258mm

- This is a close up of one of the springs.
- One end (left) is attached to the cover and the other end (right) is riveted to the piston.
- Attached means…
- Separate the leaf spring from the piston at the piston end.

GM 258mm

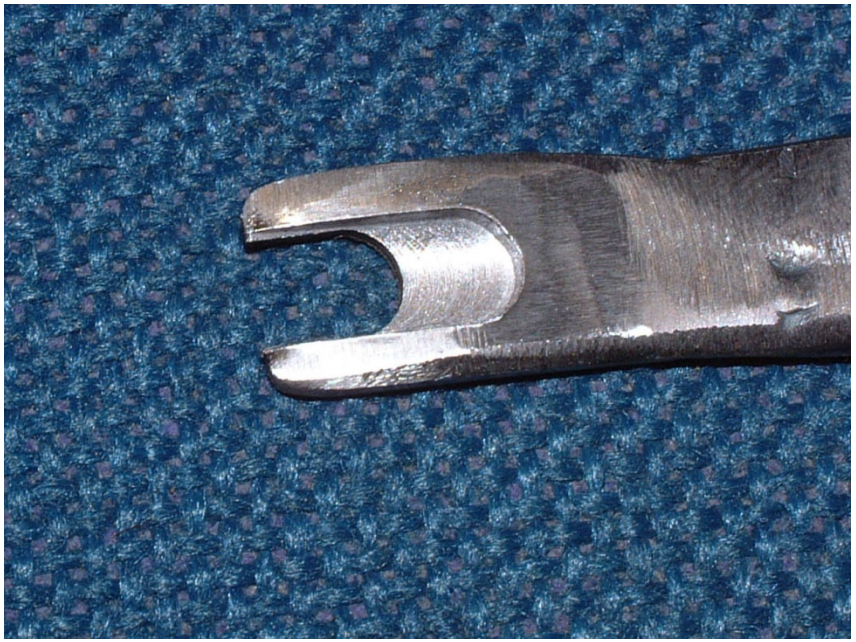
- This shows where the metal is displaced from the cover to make the stand that looks like the rivet.

GM 258mm

- This shows the head of the rivet ground off.
- Use an 1¼ abrasive wheel on an right angle air grinder.

GM 258mm

- The trick is to get the rivet out **without** bending the piston or damaging the cover.
- Use this tool to remove the rivets.
- You will need to make this tool.



The thickness of the tool is the thickness of the gap between the piston and cover.

GM 258mm

- The opening has to be wide enough for the head of the rivet to pass through. The tool supports the piston when you drive the rivet out.
- The step next to the opening supports the rivet head when you are reinstalling the rivet. (thickness of the tool minus the thickness of the rivet head).

GM 258mm

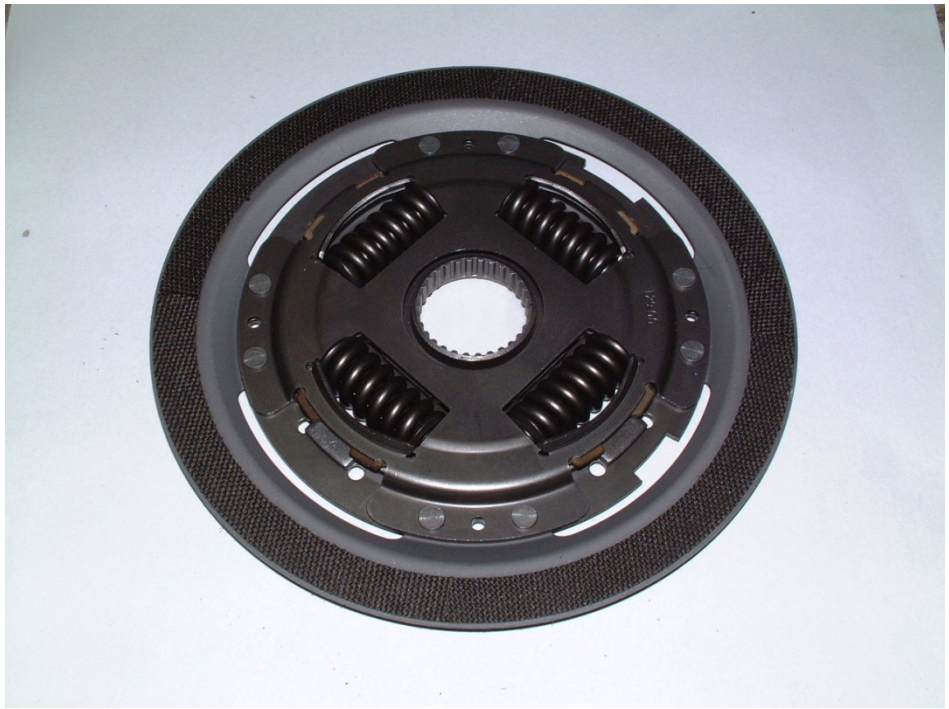
- You can see the tool in action.
- Outside arc is the shape of the inside of the cover.
- Inside arc is the shape of the O.D. of the piston.
- Bend in the tool allows you to hold on to it.

GM 258mm

- This is the clutch that you are servicing under the piston.
- Double sided

spun woven

friction material.



EARLY 6R80 FORD

- **Look at the important places on this cover:**
- 1) The pilot on this type of converter has issues because of how narrow the base is. It is a good idea to run an extra bead of weld around the base of the pilot.

EARLY 6R80 FORD

- **Look at the important places on this cover:**

2) This converter is balanced with the flex plate. The orange dot on the converter matches the orange dot on the flex plate

- You may want to consider marking the spot where the orange dot on your converter.
- NOTICE the indentations: they

are the cavities where the metal was displayed for the stands that holds the springs.

EARLY 6R80 FORD

- Like the GM 258mm converter, the leaf springs that attach the piston to the cover are retained to the cover by the peened over stands.
- The piston end of the leaf springs are attached to the piston by rivets.
- If you increase the opening on the tool that you used on the GM 258mm Converter by .025" you can use it on this converter.

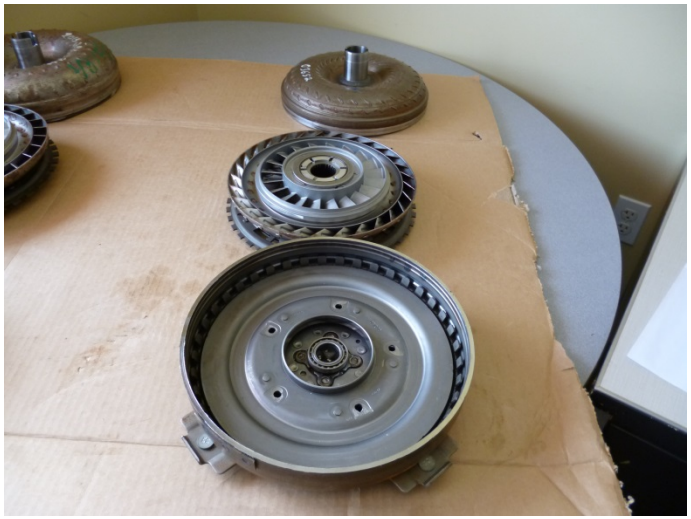
EARLY 6R80 FORD

- The clutch release clearance on this converter is about .030” to .035”.
- One thing you need to be aware of is how the converter is build. Ask yourself, does the turbine hub touch the cover or not?
- If the turbine hub touches the cover, the end play is .005” to .010” and the clutch release clearance is set separately.
- If the turbine hub does not touch the cover, the end play is the clutch release clearance.

CAPTIVE CLUTCHES

- The **GM 6L90 converter** and the four (4) pad version of the **Allison 1000** converter both use a captive clutch similar to the Early 6R80 Ford converter.
- You will need to enlarge the opening on the tool another .010” for the Allison 1000 converter.

LATE 6R80 FORD



These pictures show you TWO different diameter converters. **No parts** will interchange when building these two different diameter converters.

The rivet heads have been removed on the small diameter converter (on right). This is a no-no!

LATE 6R80 FORD

This picture shows the larger cover with the piston removed by drilling out the stands in the cover. This is also **NOT** a good idea.

There is only .100" between the leaf springs at the cover end and the turbine hub. That is not enough room to use a nut and lock washer.

LATE 6R80 FORD

This piston has been removed properly.

By removing the peened over end of the stand, you can remove the piston, reinstall it, and Tig it in place. This is a one shot deal.

LATE 6R80 FORD

FORD 5R110W 8 Stud

Turbine, Turbine Hub and Damper Assembly – this is a unit.

- If you need to replace the Turbine Hub because of worn splines or service the Damper Assembly, you will need to separate this unit.
- This is very hard to impossible to do.

FORD 5R110W 8 Stud

- There is a blind snap ring that holds the two parts of the turbine hub together.
- To do this you need to remove the turbine and machine the turbine hub from the opposite side from this view.
- As you can see, there is no place to hold this piece in a lathe from this side.

FORD 5R110W 8 Stud

- **Machined** front of turbine hub for holding purposes.

FORD 5R110W 8 Stud

- **Machining – Left is After, Right is Before**

FORD 5R110W 8 Stud

Turbine

- You need to remove the rivet heads to take the turbine off of the Turbine Hub.

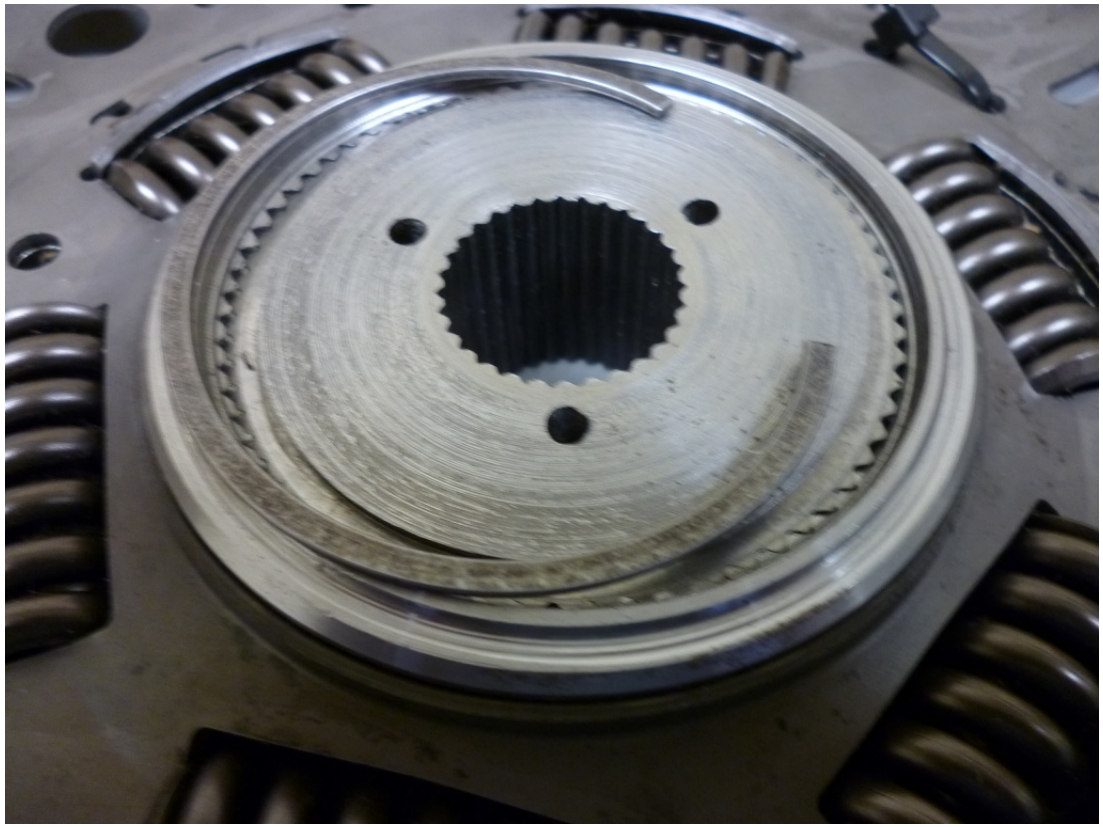
FORD 5R110W 8 Stud

- Turbine Hub
- The rivets you just removed were in the flange of this hub.
- You will need to machine off the entire hub down to the snap ring groove.

FORD 5R110W 8 Stud

- Turbine Hub Machined Down to the Snap Ring Groove

FORD 5R110W 8 Stud



6R140 FORD

- Like many Ford converters, the pilot is a weak spot – it is too narrow at its base.
- The issue of balancing the converter with the flex plate started with the 5R55 converters and continues today.

6R140 FORD

- Note the external splines

6R140 FORD

- Note the internal splines

6R140 FORD

- This pump uses a bearing instead of a bushing.
- Ford recommends a very close tolerance on run out.

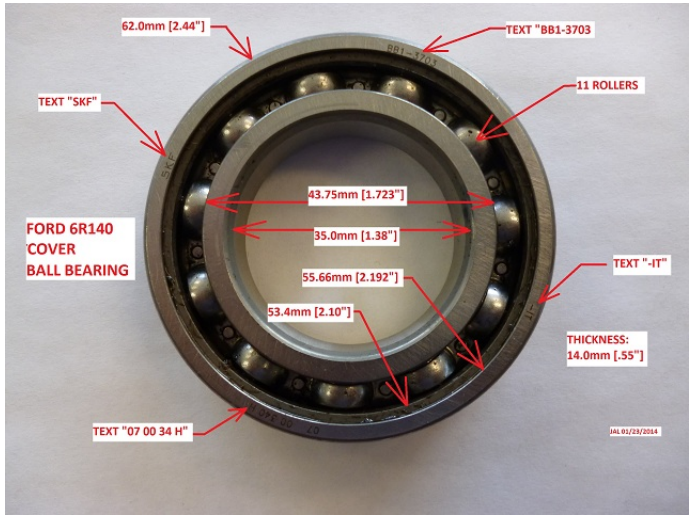
sonnax

6R140 FORD

- On this pump cover, the gap between the two parts is where the PTO gear lives.

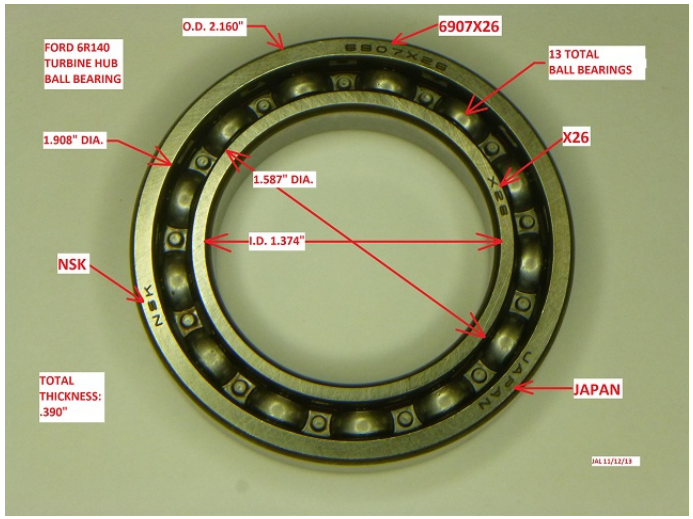
6R140 FORD

- 4 and 6 stud bearing – it is an SKF bearing, has 11 balls, and 1.380” I.D. and 2.440” O.D.



- 8 stud bearing – it is a NSK bearing, has 13 balls, and 1.374” I.D. and 2.160” O.D.

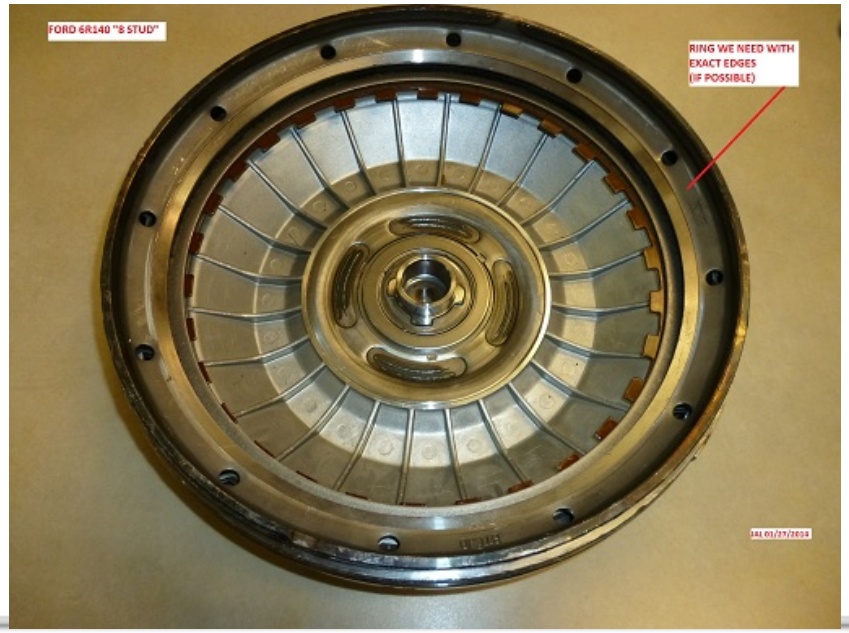
NOT INTERCHANGABLE



sonnax

6R140 FORD

- The bearing is missing, but everything else is complete on this cover.
- Note: the pressure plate is welded in place



6R140 FORD

- Side view of weld
- It is very important that you use proper parting procedure.

6R140 FORD

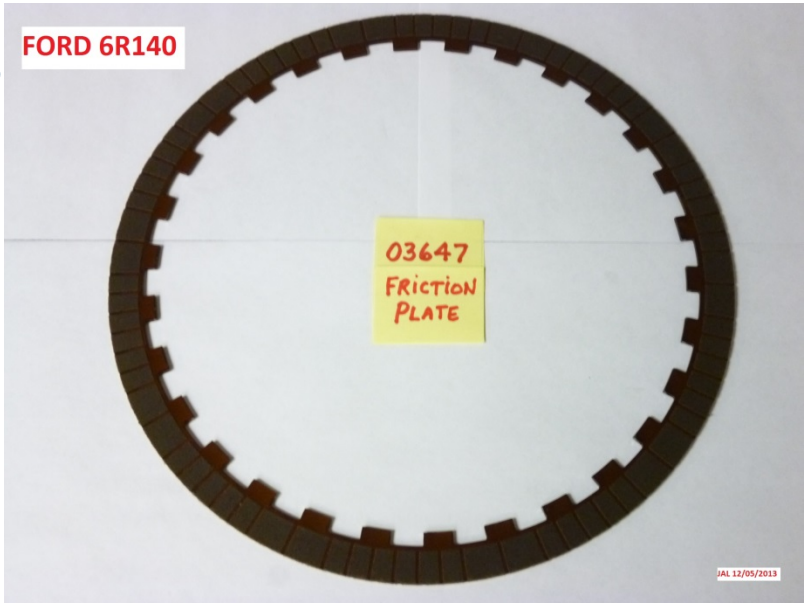
- Pressure Plate out of the cover

6R140 FORD

- Steel clutch plates with multi-layer springs
- Springs are located in three (3) positions
- The friction clutch is located between the two steels
- It is necessary to separate one spring to service the friction.

6R140 FORD

- Friction clutch
- Clutch release clearance is about .035”
- Installing shims during the pressure plate welding process will keep the clutch release clearance correct.



6R140 FORD

- Damper Assembly and the Turbine complete
- This one part of this converter is heavier than some complete converters.

6R140 FORD

- Damper with top plate missing

6R140 FORD

- After the springs are removed

6R140 FORD

- Damper spring plate removed

- Wear Plate – called a turbine hub sleeve

6R140 FORD

- Turbine

Captive Clutches

Thank you

Questions?