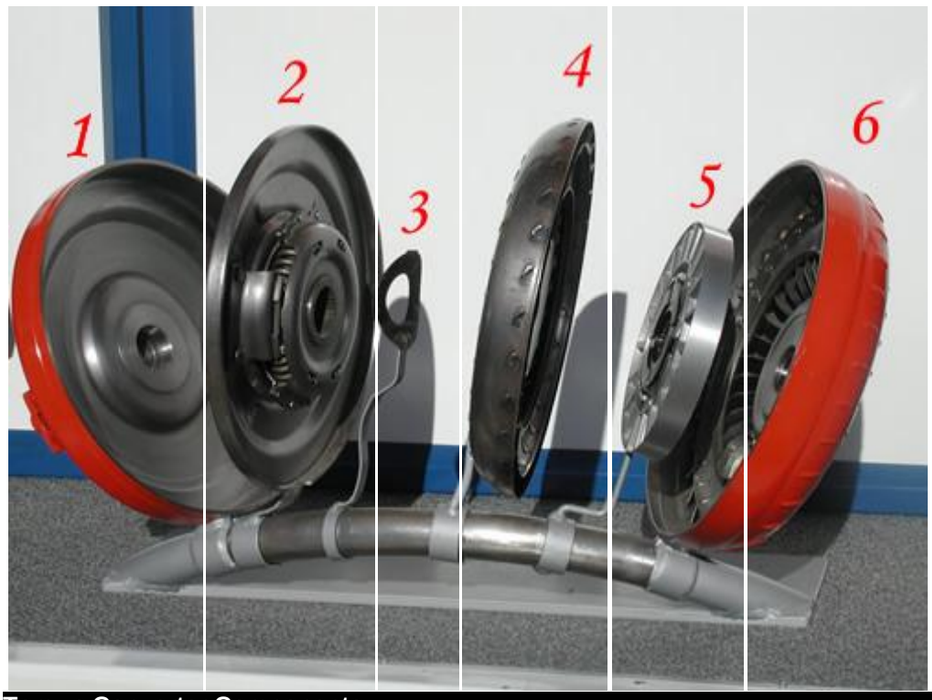
Torque Converter Explaination



Torque Converter Components

Shown above is an exploded view of the torque converter internal components used with a Th-700R4 (The unit used with a Th-2004R is essentially the same). In this introduction there is a brief description of the these individual components and how the relate to each other. We get hundreds of calls a month from people very confused about the torque converter clutch lock up function and why they need it or don't need it.. They are being told by lots of sources they don't need it, it's a big problem, it's prone to failure or it's too difficult to manage correctly etc. We've even had a number of people tell us that some sources state a locked up converter clutch will cause overheating which is exactly opposite of what it does! There's a lot of misinformation floating around and this whole web site section was developed to help potential customers be better informed, then they can make up their own minds.

#1 Engine Side Converter Cover

Seen here is the transmission side view of the **inside** forward surface of the torque converters **engine side** cover (component #1 above). The other (engine) side of this cover bolts to the engines flexplate which is, of course, bolted to the engines crankshaft. The red arrows show the surface which the carbon fiber friction material on the clutch disc (#2) engages with whenever forced hydraulically forward . **Note:** This cover is welded to the converter pump section (#6) shown below. This weld is ran around the outer rim where the two parts come together and overlap. When sections #1 (shown here) and #6 (shown below) are welded together they form the complete outer converter shell you would normally see.

#2 Engine side of the Clutch Disc

Pictured is the engine side of the clutch disc with its Carbon fiber friction material (three outside **red** arrows). The side of the disc you are viewing faces the Converter Cover in the picture above, with the friction material (three red arrows) riding on the surface shown above (indicated by the four red arrows). The inside **blue** arrow points to the turbine thrust spacer that maintains the correct internal component spacing. The center of this turbine thrust spacer is also the fluid feed point where **converter clutch release fluid** enters the space between this clutch disc and the inside forward converter cover (component #1). When this fluid moves the converter clutch away from the engagement surface, the converter clutch is **disengaged**.

#2 Transmission side of the Clutch Disc

Pictured here is the **transmission side** (rear) view of the converters clutch disc. Please note the centrally splined drive area (**blue** arrow). These inner splines engage with the **outer spines of the central drive hub of the turbine** (#4) providing a **direct mechanical connection at all times** from this clutch disc to the turbine. The turbine below is mechanically connected to the transmissions input shaft at all times thus providing a direct physical connection from this clutch disc to the input shaft/drum assembly via the turbine. Whatever the turbine is doing, this clutch disc and the input shaft/drum are likewise doing. The thing to understand here is; if the clutch disc is hydraulically forced against the front cover, there is direct drive. If this disc is hydraulically pushed away from the mating surface of the front cover, you have a fluid coupling that is not **direct drive**. This is now a normal fluid coupling converter.

#3 Wave Spring

This wave spring (**red** arrow) always tries to push the clutch disc (#2) forward to its engaged position. Whenever the engine is running, transmission pump fluid is directed into the space between the converter engine side cover and the front (engine side) of the clutch disc. This fluid moves the disc away from it's spring applied (engaged) position. This fluid is fed between the converter front cover and the disc as soon as the engine starts. Fluid automatically feeds between the disc and the converter front cover and pushes this disc away from the engaged position. In order for the disc to go to it's engaged position, hydraulic fluid must be intentionally fed to the back side of the disc and this fluid will move it

#4 Turbine-Engine Side

(this side faces towards the engine)

The **blue arrow** shows the central splines where the transmissions input shaft is connected to this turbine. The **turbine** is the torque input component (**drive**) from the torque converter to the transmissions input shaft. The turbine is **driven** by a hydraulic interaction between itself and the torque converters **centrifugal pump**, component #6.

#4 Turbine- Transmission side

This is a view of the same turbine as shown above but this view is the side that faces the rear or transmission. Shown are the turbine blades that fluid is forcefully thrown at by the converters **centrifugal pump, component** #**6** below. The force of this fluid hitting the turbine vanes causes it to rotate, thus causing the transmissions input shaft (also known as the turbine shaft) to rotate, because they are splined together at the center of the turbine (blue arrow). **This is the driving component of the converter.** It provides a direct mechanical connection to the transmissions input shaft/drum assembly. This mechanical connection is always engaged whether in the torque converter clutch is in direct drive (locked up) or standard fluid coupling mode!

#5 Stator and Sprag Assembly

This is the stator and sprag assembly which is located between the converters pump (#6) and the turbine (#4). The stator is mounted on a one way roller clutch (sometimes called a sprag) which prevents the stator from rotating in a counterclockwise direction. The function of the stator is to redirect the fluid returning to the center of the turbine. This redirected fluid is done in such a manner as to **assist the engine in turning the converter pump**. Thereby multiplying torque.

#6 Converter pump

This is the converters centrifugal pump which is driven directly by the vehicles engine. It's filled completely with transmission fluid when in operation. As it is spun by the engine, the fluid contained inside is centrifically thrown to the outer rim, where it is directed at the turbine blades (#4) above. The force of this fluid hitting the turbine blades causes the turbine to turn which drives the input shaft. This provides a fluid coupling for a smooth conversion of power (torque) between the engine and the mechanical components of the transmission when the converter is in normal (converter clutch unlocked) operation. The front hub which goes into the transmission, drives the transmissions internal hydraulic pump rotor at engine speed.