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Most vehicles equipped with JR403 transmissions are 1-ton delivery vehicles, and they're likely to be small regular diesels or small turbo-charged diesels. In either case, fuel economy is seldom an issue. Since most delivery vehicles are shared among a bunch of drivers, a company would have to be diligent about fuel economy to notice a sudden drop in fuel efficiency. What usually brings attention to the fact that something's wrong with the vehicle is a totally different symptom.

When the operating temperature of the transmission rises to the point that ATF is forced out of the vent, some of this oil usually finds its way to the exhaust system. The smoke that results from the ATF contacting the hot exhaust system is usually the wake-up call that something is wrong. When the technician looks into the overheat problem, that's usually when the decline in fuel economy comes to light.

Once the overheating and low fuel economy problems have been identified, it shouldn't be difficult to come up with a plan of action for finding the root cause. The technician doesn't want to overlook something simple so the vehicle should first be checked for dragging brakes, restricted exhaust and injector pump problems.

If all the vehicle-related problems check out OK, the next logical step is to make sure the lockup clutch in the torque converter is functioning properly. You can check the electrical end of the circuit by probing the positive and negative solenoid wires where the wiring harness enters the case. A Sonnaflow™ can be installed into the cooler line to verify that the TCC solenoid and control valve are functioning properly. If all of the external checks turn out well, you will have to look further into the transmission for the answer. Since the computer on the larger vehicles does not set a fault code for converter slip-related problems, the only way to verify an internal converter problem is to take the transmission out of the vehicle and cut the converter apart.

When the converter is cut open, you'll want to check the friction material on the clutch plate and the mating surface on the cover for signs of clutch slippage. If these look good, turn the clutch over and examine the damper assembly (see Figure 1). This is the time when the finger-pointing usually starts, and the converter rebuilder feels confident enough to suggest that the transmission technician had better look at his work a little more closely.

The problem is, once the vehicle has been rechecked, the transmission has been gone through from end to end and the con-

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verter has been looked at for the second time, the root cause of the problem is generally still not obvious. At this point the usual strategy is to replace the transmission and converter with a completely different unit. That makes the immediate problem go away, but no one has learned anything except for the fact that the problem was somewhere in the original transmission or converter. There may be some knowledge gained if the failed part is used in another vehicle, but most likely the failed part will be discarded with a lot of good parts because the problem was never resolved.

In this case, the failed part was inside the torque converter. The mechanical link that connects the turbine hub to the springs of the damper assembly has four tabs where it contacts the springs. These tabs had broken off, so that there was no longer a link between the turbine hub and the damper assembly. The lockup clutch is the driving member when the torque converter is in lockup mode, so it could no longer physically turn the turbine hub with this link broken. Since the turbine was no longer able to rotate 1:1 with the rest of the converter (like it should in lockup mode), heat was generated. When you refer back to Figure1 you can see how easy it was to miss this broken part because the broken parts are completely contained within the damper assembly. Nothing can come out and self-destruct the unit, which is a good thing, dollar-wise, but can really raise your frustration level. In Figure 2 you can see what the broken parts look like with the top retaining plate removed.

Similar damper assemblies can be found in the DA18, DA21, DA25, DA27 and DA36 converters. The vehicles that have the DA18, DA21 and DA27 converters will have a computer sophisticated enough to show a ratio code for converter slip The vehicles that use the DA25 and DA36 converters will not have a computer that will recognize converter slip. Of course, it's the latter vehicles that are most likely to have the failed damper assemblies. (Didn't you just know it would be that way?)

Some shops are putting a turbine hub into the damper assembly and applying rotating pressure to check for failed units. If you are checking the damper assemblies in this manner, keep in mind that all four tabs must be broken for the unit to test as bad. If one, two or even three of the tabs are broken, the unit will still test as being good – but the damper assembly may be one lockup away from failure. It may not be economical for shops to look at all of their damper assemblies, but this information will surely give you a place to look if you have an overheating and low fuel economy combination that you can't figure out.

Special thanks to Ulf Jarnmark from Belco Torque Converters in Cape Coral, Florida, for helping to identify this problem.

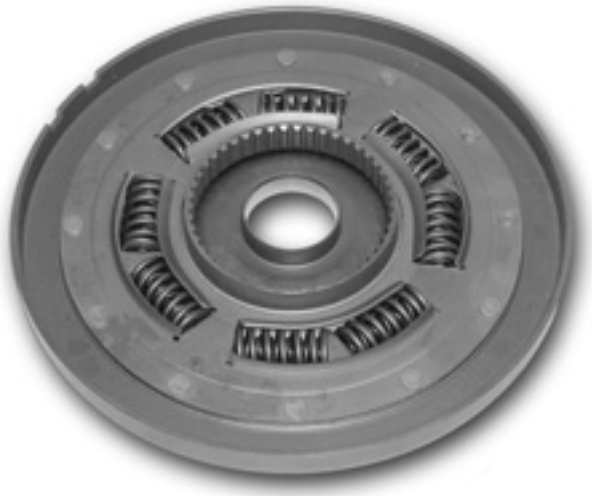
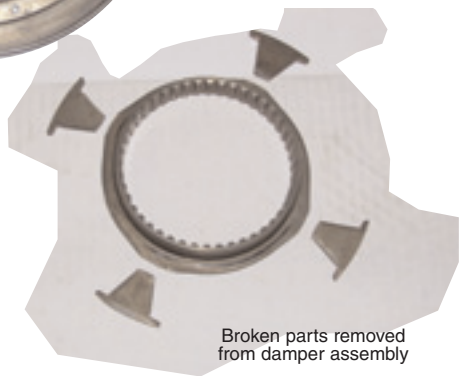


Figure 1
Jatco damper assembly, TCC clutch and damper assembly.

Figure 2
Damper assembly with top plate removed.



Broken parts removed from damper assembly