Conquering the planets

By Gregg Nader

In order to remain competitive, many shops are offering transmission warranties that are longer than the original new vehicle factory warranty! Due to the high cost, installing all new OEM planets is rarely a good option. Remaining options are limited to reusing the original parts; finding what you hope are good used parts; using someone else's rebuilt parts; taking a chance on new aftermarket parts; or disassembling, inspecting and reassembling planets in your own shop.

Figure 1

Repair all of these planets with Sonnax parts. See page 189 for detailed parts list.

There are degrees of risk with all of these options, but in-house rebuilding of planets is one of the best ways to control cost, quality and warranty exposure – especially when Sonnax has the quality parts you need for a lasting repair. Our needle bearings have dimensions specified in millionths of an inch. Our thrust washers meet or exceed the durability of OEM parts, including advanced PTFE-coated washers for some applications. Our pins and gears are manufactured to exacting hardness and bearing surface finishes. Our replacement captive bearings are high-quality Torrington® bearings. Figure 1 shows all the planets that can be repaired with Sonnax parts and see chart on page 189 for a comprehensive list of all Sonnax planet components.

In transmissions, space, weight and durability constraints are pushed to their limits. With modern high-torque, high-RPM engines, the transmission ratings have increased. For example, the same basic planet system used in

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the old THM400 is now rated at 885 lb-ft maximum gearbox torque and 22,000 lb. maximum gross combined vehicle weight in the 4L80-E!

Figure 2

Worn planet pins and needle bearings

Do planets wear? You bet they do, but a wiggle test with fingers calibrated by experience cannot detect degrading pins or needles. Just as we can't see the dark side of the moon, many times we can't see or even detect pinion pin wear without disassembling the planet. Amazingly, the parts in Figure 2 felt smooth and tight as a new planet, yet the pins and needles were badly worn.

Fortunately, servicing the 4L80-E overdrive planet does not involve pin swedging. It is just a matter of inspecting and replacing the worn pieces. For swedged-in-place pins, you can disassemble by pushing the pin straight through with a press, or drill out one end of the pin to weaken the factory crimp and minimize the stress on the carrier as the old pin is pushed out. But disassembling the planet is the easy part – it's getting it all back together that's the hard part, and even when swedging the pins is not required, dealing with a loose jumble of needle bearings is about as inviting as a varnished and contaminated valve body first thing in the morning.

Like other areas in transmission rebuilding we're all looking for the easiest solution – you know, "Just tell me what I need to do." I wish I could say we had all the tools, fixtures and detailed instructions for recrimping planet pins for all applications. At Sonnax this is something we are working on, but the reality is you will have to get creative in setting up fixtures to service the planets you work on most often. What we do have are quality parts and some tips to help you get past the major hurdles in setting up a planet service center in your shop.

So, what's the trick for swedging planet pins in place? Forget any memories you have of using a hammer and punch. That method leaves too much room for error. Some larger rebuilders use a commercial floor-standing riveter to crimp pins in place. However, a typical hydraulic H-press has proven to be a consistent and practical method for getting the job done. You can use your existing shop press, or pick up one of the newer low-cost bench-top presses. For greater consistency it is best to add an accurate pressure gauge with a T-fitting to supplement the existing tons gauge. Be sure to take all necessary safety precautions that go along with using a powerful press.

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The press shown in Figure 3 is being used to swedge pins in a 4T65-E input planet. If you're just after replacing the captured bearing that commonly fails, then only two pinions have to be removed to install Sonnax bearing **34821-01** and

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Figure 3

An inexpensive shop press, with swedging tool crimping the pin in place after replacing the captured bearing.

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Figure 4

Allison swedging forming tool J-25587-25 and 4T65-E / 4L80-E / 400 pin after swedging with three tons of pressure in a hydraulic press.

the only other parts needed are two Sonnax **34875-02** replacement pins.

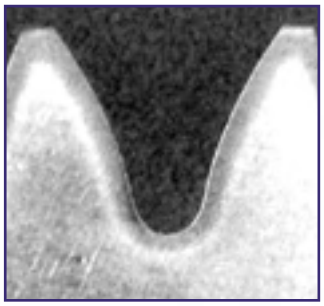
For forming the crimps, there is a swedge-forming tool available from Allison. (See Figure 4 for tool and example of pin that was swedged with 3 tons of pressure in the press and Figure 5 for picture of the 4T65-E planet with two new pins swedged in place after replacing the captured bearing.) The results are a neat OEM-style swedge that swells and forms the end of the pin. This one tool can be adapted to a number of different applications and pin diameters. For a more economical alternative, cross-shaped concrete chisels come in many sizes and are adaptable to swedging the pins.

Figure 5

A 4T65-E planet with two pins swedged in place after replacing the captured bearing.

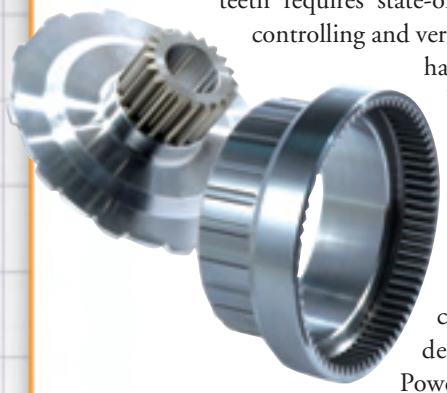
Crimping pins with a hammer and staking tool was never a procedure that instilled confidence. There was always that nagging feeling that if not done perfectly the planet would be a time bomb waiting to create an expensive comeback. With the control and consistency that come with using the hydraulic press and the appropriate crimping tool, pin-swedging becomes a confidence-inspiring procedure that can become routine in your shop. ■

Sonnax & Powerglide



Dark line is uniform heat-treat depth from tooth tip to root.

Sonnax offers a complete line of Powerglide planet components, including our new ultimate Gear Sets. Figure at right shows a polished gear tooth section and the uniform depth of case hardness from the tip of the tooth to the tooth root. Due to the varying heat absorption of the different thicknesses of a tooth, obtaining this level of consistent case hardness on gear teeth requires state-of-the-art processes. By controlling and verifying the depth of case hardness, Sonnax Powerglide components provide both maximum strength and maximum wear resistance.



See pages 84-85 of this catalog for a more detailed list of our Powerglide products, or visit **www.sonnax.com** to request your free Sonnax High Performance Transmission Parts Catalog Volume 6.

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APPLICATION & LOCATION	REBUILD KIT	PINS	NEEDLES	PINION WASHERS	GEARS	BEARING	OTHER	NOTES
4T65-E, 4T60 & E Input						34821-01		Torrington Captured Thrust Bearing
		34875-01						4 Pinion Pins (1.346" x .434") Swedge in
TH 400 & 4L80-E to '98 Reaction & Output	34875RK							4 Pinion Pins, Needles, Washers
		34875-01						4 Pinion Pins (1.346" x .434") Swedge In
			34875-02					72 Needle Rollers (.735" x .0905")
				34875-03				8 Round Steel Washers
				34875-04				8 Round Bi-Metal Washers
4L80-E '99 & up Reaction & Output	34880RK							Pinion Pins, Needles, Washers
		34875-01						4 Pinion Pins (1.346" x .434") Swedge in
			34880-02					72 Needle Rollers (.800" x .0905")
				34875-03				8 Round Steel Washers
				34880-03				8 Washers (PTFE-bonded)
4L80-E Output							34880-01	Speed Sensor Reluctor Ring
4L80-E Overdrive	34821RK							Pinion Pins, Needles, Washers
		34821-05						4 Pinion Pins
			34821-06					80 Needle Rollers (.850' X .125")
				34821-07				8 Round Steel Washers
				34821-08				8 Bi-Metal Tabbed Washers
						34821-01		Torrington Captured Thrust Bearing
4L60 4L60-E 4L65-E Rear	77731-RK							4 Gears, Pinion Pins, Needles, Washers
	77732-RK							5 Gears, Pinion Pins, Needles, Washers
		77731-02K						4 Cross Drilled Pins (1.35" x .491") Swedge in
		77732-02						5 Solid Pins (1.35" x .491") Swedge in
			77731-03					80 Needle Rollers (.730" x .907")
			77732-03					100 Needle Rollers (.730" x .907")
				77731-04				1 Round Washer
				77731-05				1 Batwing Washer
				77732-04				10 Round Washers for OEM 5-pinion
				77732-05				10 Tri-Metal Washers for OEM 5-pinion
					77731-01			1 Pinion Gear
						77731-09		Thrust Bearing (Captured)
							77731-08	Oil Deflector
THM 350 Front & Rear	35731RK							Pinion Pims. Needles, Washers (for 4 gears)
		35731-01K						4 Pinion Pins (1.344" x .393") Swedge in
			35731-02					76 Rollers (.725" x .077")
				35731-03				8 Round Steel Washers
				35731-04				8 Batwing Washers
A4LD 4R/5R44E, 4R/5R55E Front	56412RK							Pinion Pins, Needles, Washers (for 6 gears)
		56412-02						6 Pinion Pins (1.138" x .334") Swedge in
			56412-03					102 Needles
				56412-04				12 Washers
Powerglide 1.80 Ratio			8413					245 Needle Rollers
				8415AK				Includes Front & Rear Thrust Washers
					180S-K			Straight Cut Gears (includes Ring & Sun Gears)
Powerglide 1.76 Ratio	28922-01K							Complete Planetary Rebuild Kit
		28435K						6 Pinion Pins, Washers & Bolts
			28413					185 Needle Rollers
				8415BK				Includes Front & Rear Thrust Washers
							K28414	Roller Spacer Kit