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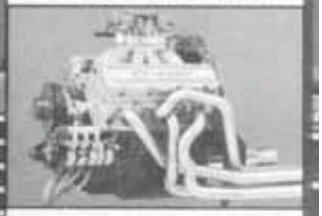

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4L60E-XTRAORDINAIRE

SHAVE 0.5 SECOND OFF YOUR E.T. WITH A PRECISION INDUSTRIES TORQUE CONVERTER AND A TRANSGO SHIFT KIT

By Robert Cassell

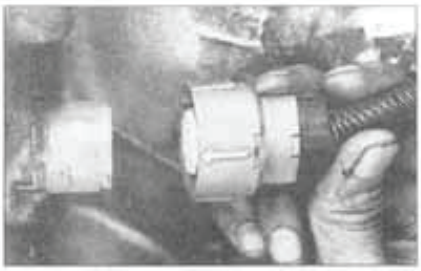
PHOTOGRAPHY: ROBERT CASSELL

The GM 4L60E four-speed automatic overdrive transmission offered in the late-model F-body is no doubt one of the strongest and most intelligent transmissions offered today. Its electronic controls and beefy construction allow this unit to match an engine's performance and hold up well in heavy-duty and high- performance applications.

Is there room for improvement? Not necessarily if it's in grandma's car. In fact, GM uses Dextron III automatic trans fluid in the 4L60E from the factory, claiming it never needs replacement under normal driving conditions. But if you've added some horsepower to the LT1 engine and you've got your foot in the throttle more than the average person, hopping up the 4L60E is a good idea, not only for improved performance, but as a preventive measure to avoid future breakdowns. And if you're pushing your 4L60E-equipped vehicle harder than that at your local dragstrip on the weekends, you're probably looking for all the upgrades you can muster to gain an edge on the competition. You can transform your meek-mannered stocker into a street/strip warrior and maybe shave a ½ second off your e.t. at the same time.

The Vigilante uses a CNC-machined billet front cover to allow for a larger clutch contact surface as well as to maintain the smallest amount of runout possible. Looking inside the converter itself, the impeller and turbine are furnace-brazed for strength, rigidity and better efficiency. Fully enclosed Torrington bearings are used to retain oil at the rollers for added durability. The Vigilante's unique stator design allows for torque multiplications as high as 2.55:1. The inner race of the stator is made of a special alloy that resists Brinnelling, and the hub is heat-treated to resist wear and breakdown. The clutch plate in a stock 12.5-inch torque converter has 19.4 square inches of clutch area, while the Vigilante has more than 28 square inches of clutch area of special friction material to supply increased holding power and long life. The impeller hub is protected by a special antiballooning plate to prevent the possibility of expansion due to high rpm and high oil pressure in the converter. Precision's converter is almost bulletproof.

The first upgrade we performed on our 4L60E was a torque-converter swap. We used an extraordinary new Vigilante unit from Precision Industries. The Vigilante is built by hand for each individual application and is electronically balanced and leak tested. The most obvious difference between a Vigilante and the stock converter is the overall diameter of the stock piece (12.5 inches) compared with the Vigilante (9.5 inches). The Vigilante's smaller size allows engine stall to be increased without losing the efficiency of the converter. By placing the 350 LT1 in the powerband from the start and at every shift thereafter, it actually increases the efficiency of the already potent LT1. Camaros have lowered their e.t. by more than 0.5 second and their 60-foot times by more than 0.2 second by just changing to the Vigilante converter. That's a tremendous gain for a part that can't throw a



The external electronic connections were then disconnected and set aside. Be very careful when removing and re-installing these connectors. Some of them have very delicate pins that can easily be damaged.

TransGo research and development technician, Steve Passey, started by draining the trans fluid, then removing the torque arm safety crossmember, torque arm and driveshaft.

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belt or needs to be refilled after three passes. Precision beefs up the Vigilante to handle the rigors of consistent street/strip action. Precision makes sure its converters are strong, as it offers a two-year unconditional warranty on every converter it sells.

To optimize the new Precision torque converter's potential and improve the 4L60E's overall performance, we had TransGo in El Monte, California, install its PN4L60E Performance Shift Kit. This kit produces crisp musclecar shifts and holds First, Second and Third to any rpm. TransGo has always worked to link throttle movement with firmness. Under light throttle, shifts are soft, while heavier throttle produces firm shifts. TransGo kits are not complicated, they just require removing the trans pan, filter and valvebody. The kits provide detailed video and illustrated instructions that outline a surprisingly straightforward procedure. The job involves resizing holes in the valvebody separator plate and casting, installing new spool valves into the body assembly and then bolting everything back together. TransGo color codes every spring in its kits and even bags parts for each step of the way separately so that you can proceed without guesswork.

It is always a good idea to have a GM 4L60E service manual on hand (available at your local GM parts counter) when working on the 4L60E. This article does not replace the detailed video and illustrated instructions provided by the manufacturer.

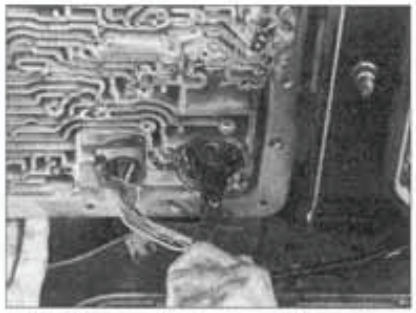
After removing the converter dust cover, Passey used a flexplate rotating tool to rotate the flexplate and converter as he unbolted the converter from the flexplate.

The trans was then re-installed back up into the car, and the new converter bolted to the flexplate using Loctite® on the new nuts and bolts. The TransGo shift kit can be installed while the trans is out of the vehicle, but we wanted to demonstrate how easily the shift kit can be installed with the trans in the vehicle.

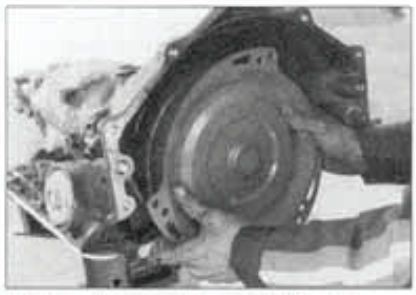
After the detent spring and 1-2 accumulator are removed, all but the center valvebody bolts are removed so that the valvebody can be supported with one hand as the last bolt is removed. The valvebody was then placed on a clean working area where the body modifications where to be performed. The separator plate and gaskets are then removed as caution is taken not to lose any of the check balls that may fall from the assembly.

With the trans crossmember removed, the trans was lowered to simplify access to the bellhousing bolts.

With the trans oil pan removed, the five valvebody bolts holding the computer wiring harness and lockup solenoid were removed and the assembly was set aside.

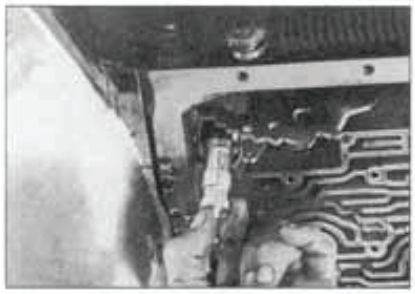


The 1-2 accumulator assembly is supported in the case by a snap ring. Snap-ring pliers are used to remove the ring and drop the accumulator out of the case.



With the trans safely cradled in a trans jack, the old torque converter was simply pulled off the input shaft, and the new Precision converter was filled with new fluid and fitted onto the input shaft and front pump hub watching for complete engagement.

As the pressure switch manifold is removed from the valvebody, extreme caution is taken not to disturb any of the five O-rings inside the manifold. If they are disturbed, they must be re-installed using petroleum jelly as an adhesive. These O-rings must be in place properly when re-installing the manifold or the trans will lose pressure and the car will not move after it's all back together.



The valve pressure-regulator assembly is also supported by a snap ring. Sometimes the assembly will not just fall out of the case. Pushing the assembly up into the case and quickly releasing it usually does the trick.

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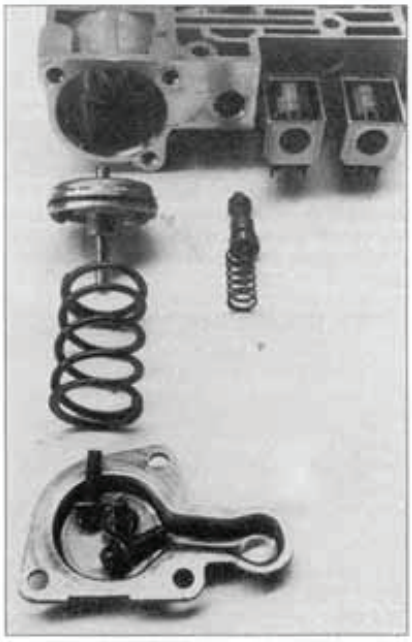
Although this project was performed using a lift to aid us in photography, this project can be done at home using jackstands and a good selection of standard handtools.

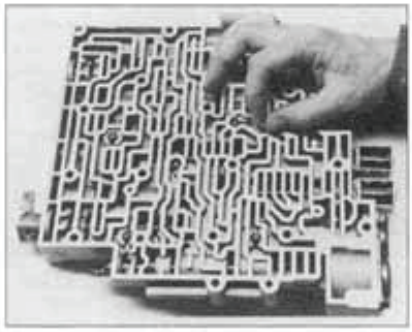
Driving the Camaro on the street after the installation of the Precision torque converter and TransGo shift kit proved to be quite a different experience. Because of the relatively high 2500-rpm stall speed compared to the stock 1800-rpm stall speed, the car had totally different characteristics on the street. In fact, Jason Brooks, the owner of the Camaro, couldn't believe that just a torque converter change could make such a difference. Since the modifications, he finds it hard to leave a red light without lighting up the rear tires because the Vigilante converter gets the engine into the powerband so quickly. Brooks says it's like having a transmission with a split personality. The upshifts changed in nature from crisp and friendly with moderate throttle, to barking and hooking the rear tires with a heavier throttle. Downshifts are almost an intuitive experience now, happening at precisely the moment you want them to occur.

Valvebody modifications involve installing new valves and springs into the body assembly. Here, the factory 1-2 valve (right) was replaced with a TransGo valve (left), an extra spring and a ¼-inch ball.



The forward clutch accumulator was modified with beefy TransGo springs. All springs are color coded to eliminate confusion.

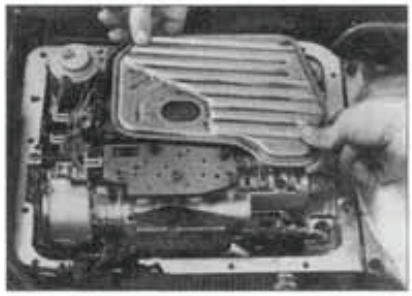
The second accumulator assembly was also modified with beefier TransGo springs. The 1-2 shift firmness is adjusted by adding or subtracting the big, thick washers under the return spring.



The TransGo instructions show where the check balls are to be replaced. If the trans is in the car while performing this step, a gob of petroleum jelly will hold the check ball in its place.

TransGo's detailed instructions map out what bypass holes are to be enlarged on the separator plate, why and to what size. Triple-checking is recommended before you drill.

The newly drilled holes in the separator plate were then deburred to remove any filings, and the plate was meticulously cleaned before it was re-installed with the new gaskets. The gaskets are marked and must be installed in their proper order. When working with the trans in the car, a film of trans fluid or assembly lube can be applied to the gaskets to help keep them in place while installing the accumulator assembly.



The most common mistake people make as the trans goes back together is not checking to see if the O-ring from the old filter is stuck up inside the case before installing the new O-ring and filter. Be sure the new filter and O-ring is installed correctly before you reinstall the oil pan and new gasket. Passey gave his work a second check to be sure everything was buttoned up correctly before filling the trans with new fluid and firing up the Camaro. The vehicle needed to be warmed up to normal operating temperature and the trans fluid level double-checked before a test drive.