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5.0 MUSTANG

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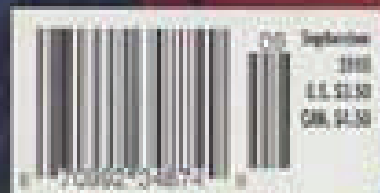
**SVO
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**Gearbangin'
Automatic
Trans Trick**

ROAD TEST:



Roush's Runner



September
2000
U.S. \$5.50
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A FORD MOTOR COMPANY PUBLICATION

There are AOD cars running nines these days, and though the setups in those cars are too serious for your daily driver, there are ways to make your automatic respond better, run quicker, and feel a ton better. Just as in the old days of the automatic, a good high-stall converter and a performance shift kit will do wonders for the trans, even the late-model electronically controlled AODE. And, contrary to popular belief, a shift kit and torque converter will not shorten the life of your transmission; in fact, quite the opposite is true. Making the transmission more efficient reduces clutch/band slippage and increases clutch/band life. And because most high-stall converters are designed for high-horsepower applications, they are actually stronger than the factory piece.

We decided to reduce the mushiness of a certain '94 Mustang GT here at the Petersen offices with a TransGo Shift Kit and a Precision Industries Stallion high-stall, lockup torque converter. While we were waiting for the parts to arrive, we took our Mustang to Los Angeles County Raceway in the high desert country of Palmdale, California, to see how it would perform with the stock transmission. After a dry burn-out and launching the car against the foot brake, we netted a series of mid-15-second passes with a best e.t./speed of 15.58 at 91 mph (hey, it's still bone stock, OK?) and a 2.29 60-ft time.

We then contacted West Coast Transmission in Sepulveda, California, and coerced owners Henry Martini and Scott Warren into installing the TransGo kit and converter in our car. West Coast Transmission has been in the business of building street and performance transmissions for 10 years, but Henry and Scott combined have 40 years experience, and they regularly use TransGo products in their customers' cars. Finding guys with that kind of experience isn't easy, so we considered ourselves lucky to have them volunteer their time and effort. Besides, it's really hard to do tranny work and take pictures at the same time—all that slippery ATF makes holding a camera kinda tough.

With the TransGo Performance Shift Kit and Precision Industries torque converter in place, we immediately noticed a change in our Mustang's personality. Not only did it shift Second gear like a real transmission, but downshifts had real life in them too. Also, the converter made a huge difference in acceleration from a dead stop. LACR confirmed what we were feeling; our car responded with 15.16, a .42 reduction in e.t. and a reduction of .21 in 60-ft times.

If you enjoy the comfort and convenience of an automatic transmission but want the performance of a five-speed (or close to it), do three things: Install a set of 3.55 or 3.73 gears, a TransGo Performance Shift Kit, and a Precision Industries torque converter. You won't be sorry.



Remove the two bolts that secure the starter motor to the bellhousing.



Disconnect the transmission oil cooler lines.



Lower the rear of the transmission, then use the longest extension available to access the bellhousing bolts. The transmission can now be lowered.



After removing the transmission oil pan and the oil filter, it's time to disconnect more electrical stuff. From left to right: electronic pressure control, lock-up solenoid, and shift solenoids. Temperature sensor is in the lower right corner.

Shifty Business

TransGo has been building its Performance Shift Kits for the professional transmission builder for almost 40 years now, and a few years ago it began offering do-it-yourself kits for the enthusiast. You can reprogram your transmission to provide either firm or hard, tire-chirping shifts by removing the valvebody and performing a few basic modifications. And while you may have thought this was possible only with early transmissions, such as the C4 and C6, you might be surprised to learn that TransGo has kits to transform the AOD as well as the latest auto trans from Ford, the electronically controlled AODE.

In its stock form, the AODE is a horribly soft shifter, and as we explained earlier a soft shift actually increases clutch/band wear. It does this by allowing the clutches and bands to slip, creating a gradual, smooth shift—something the average buyer wants ("Oooh jeez, this transmission is sooo smooth"). In the case of the AODE, clutch/band application can take as long as six seconds, according to TransGo. While it may feel like a split second, you only feel the end of the shift cycle—it actually starts several seconds earlier. All this slippage increases heat and wear, which eventually destroy the forward clutch and overdrive band.

To correct these problems, the TransGo Performance Shift Kit alters the accumulator apply angles and boosts line pressure from the stock 185 psi to 210–215 psi. These and other subtle changes turn the AODE into a true performance trans, reducing shift cycle time to 1.5 seconds and improving overall shift quality. The TransGo kit also allows you to hold the transmission in First, Second, or Third gear as long as you want and downshift manually at any speed without the computer acting like Big Brother.

In addition to breathing new life into this lazy trans, the TransGo kit actually solves a potentially hazardous problem inherent in the unit. The AODE utilizes an electronic pressure control (EPC) valve. According to TransGo, if this unit malfunctions, line pressure can shoot as high as 600 psi, causing mid-shaft breakage, forward clutch failure, overdrive band failure, or all of the above. To safeguard against such a costly event, TransGo's kit features a patented relief system that bleeds off excessive line pressure in the event that the EPC valve should stick or fail.

Last but not least, the kit sorts out the funky 4-2 downshift characteristic of the AODE. When you mash the throttle at highway speeds with the stock transmission, the overdrive band releases and the forward clutch applies. The problem is that this action takes place too slowly, and by the time it is complete, the engine has revved to 4,000–4,500 rpm. The transmission then slams into Second gear with a bang, placing undue stress on both the intermediate shaft and the second roller clutch. The TransGo Performance Shift Kit keeps excessive engine rpm in check by making the overdrive band release and momentarily grab Third gear before dropping into Second.

Automatic Improvement



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Remove the 24 8mm bolts that secure the valvebody to the transmission, followed by the bolt and retainer that secure the lock-up and shift solenoids. The valvebody can now be pulled free.



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Remove the fluid transfer plates, followed by the thin sheetmetal separator plate and gaskets. Underneath, you'll find a selection of plastic check balls that will be removed and

replaced in strategic locations later.

Several holes are drilled in the separator plate. For our application, two existing holes are enlarged, and small aluminum plugs inserted. The plugs are pounded flat with a hammer, filed flush, and re-drilled to a smaller size.



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Two holes must be drilled in this partition for the electronic pressure control (EPC) valve installation. Here, Scott steadies the drill with his other hand to prevent the drill bit or chuck from going astray. A new valvebody is \$400, according to Scott, so it's kinda important you don't screw up this step. The EPC valve will be installed when the valvebody is reinstalled.



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Much of the work in the valvebody involves removing valve assemblies and effecting small changes. The replacement parts are shown underneath the originals. From bottom to top: Pressure regulator valve gets a new white spring; lock-up valve gets a new orange spring; 1-2 valve is replaced and gets a new red spring. Top right: Stock manual valve gets replaced. Top middle: Back-out valve receives an orange spring. Left: Both the 3-4 capacity valve and low valve receive new springs. With the requisite changes, the valvebody is ready to be reassembled (less two check balls) with modified separator plate and gaskets.

The only mods to the transmission itself involve the removal of the 1-2 and 2-3 accumulator valves. Here, the 1-2 valve is disassembled; it will receive one blue and one red spring, plus a spacer and washer. Next, the 3-4 accumulator is removed. It will be reassembled with yellow and blue springs, a spacer and a piston stop in place of the stock retainer.

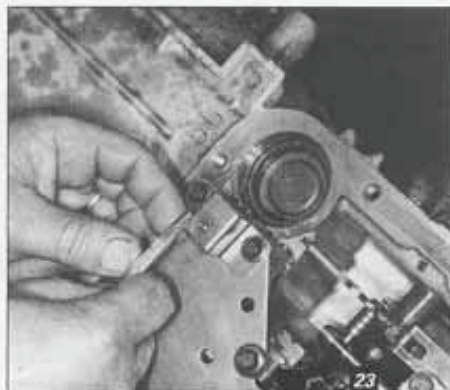


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The valvebody can now be reinstalled in the transmission. Use a speed wrench or a 1/4-inch drive ratchet to ensure you do not overtighten the 8-mm bolts.



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Remember when the holes were drilled for the EPC relief valve? The valve itself is installed after the valvebody is replaced and then (and only then) is this small cotter pin removed. This little valve corrects extreme line pressure due to electrical malfunction, a stuck EPC valve, or cross leaks. The relief valve reduces accidental neutral condition (run-away) and violent clutch reapply that can break the 2nd roller and/or midshaft.



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Here, the transmission has been reassembled and is ready for the pan to go back on. Scott recommends you reuse the stock gasket (if it is in good shape) because it is specifically designed for the factory oil pan.

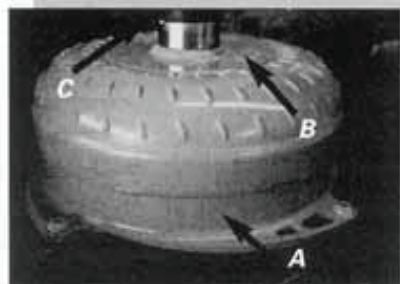


Installing the new converter is easy. Pour about a quart of trans fluid into the converter's neck, then slide it onto the input shaft of the transmission. Rotate the converter clockwise, then counter-clockwise several times until you hear it "clunk" into place. You are now ready to put the transmission back into the car. But just to make sure that the converter is all the way in, push the transmission onto the engine's dowel pins and tighten two bellhousing bolts. You should be able to move the converter back and forth on the shaft slightly; if it seems wedged in, the converter is not located properly.

Start Stalling

A converter that is properly matched to your application will slip or "stall" until the engine has reached its torque peak, allowing the car to leave the starting line with maximum power. A good torque converter will also offer "torque multiplication," or the ability to take the torque the engine makes at the flywheel (input torque) and multiply it at the output shaft of the transmission.

Traditionally, a torque converter increases stall by employing a smaller converter, so it tends to slip more (much the way a smaller clutch in a manual transmission car slips more than a big one). This is no problem for a standard street/street converter, but it becomes a real issue with lock-up converters, which are used in nearly every late-model automatic, including the AODE. If you decrease the size of the converter, you also decrease the size of the front cover/clutch assembly, making the clutch sorely inadequate for a performance application.



Terry Hedrick, ex-drag racer and president of Precision Industries, saw a real market for a small-diameter, high-stall torque converter with the lock-up feature and acceptable highway cruising and mileage. Since there were no 9-inch lock-up torque converter cores, the only alternative was to build his own, making a front cover out of a CNC-machined steel billet and

spec'ing out his own high-performance lock-up clutch with a ceramic-impregnated Kevlar lining. Though the diameter of the clutch may be smaller than stock, the clutch and the front cover mating surfaces are wider, effectively doubling total surface area.

Hedrick also incorporates many other proven racing converter features. For example, the pump and turbine fins are furnace-brazed for maximum strength, and the front hub of the converter incorporates a large steel "anti-ballooning plate" that prevents the converter from swelling due to the high pressure and heat placed on it by a high-powered engine. Finally, the turbine hub (the part that slips over the input shaft) is made of 4130 chrome-moly steel to prevent spline wear within the converter.

The stator in the stock AODE converter has a torque multiplication ratio of 2:1; Hedrick uses his own stator design with improved stator fin angles to increase torque multiplication to 2.53:1.

To ensure long life, the stator is protected on both sides by enclosed Torrington bearings instead of the open Torrington bearings the factory uses. Hedrick has found that when the converter is in a stall condition and the trans fluid is under pressure, the fluid is actually centrifuged away from the stator bearings, leaving them to survive on only a thin film of oil. Using an enclosed bearing lets the oil in but won't let it get washed away.

Precision Industries offers the 9.5-inch "Stallion" lock-up converters in stall speeds ranging from 2,600 rpm all the way up to 4,000 rpm (depending on the application), and has an even wider variety of stall speeds in non-lock-up-style Stallion converters.

Sources

Precision Industries
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626/443-4953

West Coast Transmission
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8953 Sepulveda Blvd.
Sepulveda, CA 91343
818/893-8443

9.5" Stallion

NEW Ford AOD & AODE Converters

Precision Industries introduces their new 9.5" Stallion Converter for all 1994 and later Mustangs and Thunderbirds. The new Stallion can be used with stock, supercharged or nitrous engines, your vehicle remains completely streetable. Tests show improved E.T. by .5 second and 60' time by .2 second.



Every Stallion is custom built with Precision Industries' trademark one-piece steel billet front cover exclusively for your personal application and comes with a two year unconditional warranty.



Stalls available from 2,600 to 5,000 and can be shipped within three working days.

No cooler is required for this easy bolt-on installation and the Stallion will not void your factory warranty.

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LASTS LIKE IT.**



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