ATI PERFORMANCE PRODUCTS

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800-284-3433 • FAX: (410) 298-3579 • www.atiracing.com

# TRANSMISSION AND CONVERTER

## INSTALLATION INSTRUCTIONS

***Read before installation of units!***
***Extreme care must be exercised before and during installation for maximum benefits and longevity of ATI precision units.***

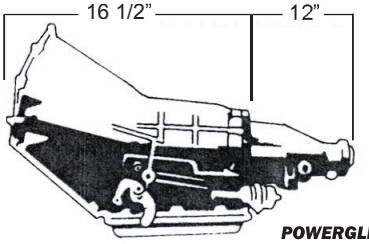
## *BEFORE INSTALLATION OF CONVERTER TO TRANSMISSION*

1. If transmission is not fresh, drain all old oil, clean the pan and replace the filter or clean screen.
2. Thoroughly flush oil cooler lines and cooler with clean Varsol or other suitable solvent. Repeat process alternately in both lines until clean then blow air through the system. If any restriction is noticed in the lines or cooler, they must be replaced. If there are any twists or kinks in the lines restricting oil flow, the lines must be replaced.
3. The cooler in the radiator must be clean and in good condition. If you had previous transmission failure which deposited metal particles in the lines and cooler - replace it. Your local radiator shop can install it. It could be the best investment you make. ATI highly recommends the addition of a heavy duty external oil cooler. This will greatly increase the life of your transmission. When installing, route oil flow from the transmission through the radiator, then through the air cooler and back to the transmission. The line closest to the lower radiator hose is the return line to the transmission and should route through the air cooler. Use only steel line. ***Never use steel braided line for cooler lines unless it is Teflon lined!*** A blockage in steel braided line may impair fluid flow while not being externally visible. This condition may lead to inconsistent performance or transmission failure.

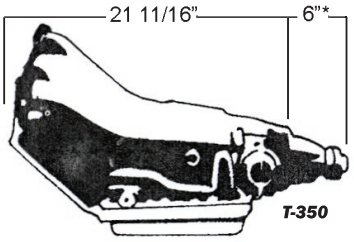
**Need a cooler?** ATI features several Transmission Coolers to extend the life of your transmission and improve it's performance.

| | |
|---|---|
| Standard Transmission Cooler | #925130 |
| Derale® *"Electra Cool"* Trans Cooler with Integral Fan (10" 650CFM) | #925139 |
| Derale® *"Atomic Cool"* Trans Cooler with Integral Fan (8" 400C FM) | #925140 |
| ATI Transmission Cooler Installation Kit | #925132 |

4. If an external oil cooler is not used, a jumper line must be connected to the “in and out” lines of the transmission. ATI transmissions are NOT guaranteed against overheating.
5. Check the bolt size (supplied with your converter) used in securing the converter to the flexplate for proper fit. If necessary, drill the flexplate to the proper size. ***Drill holes in the flexplate .010" bigger than the bolts being used!***
6. Be certain that the mating surface of the engine block and the transmission case are clean and free from nicks, paint, dirt, etc. Use a file to clean and smooth the surface.
7. Inspect the mating surface of the engine block for dowel pins. The dowel pins must be firmly in the block, in good condition, and long enough to protrude into the transmission bell housing at least 3/16 of the full diameter not counting the chamfer.

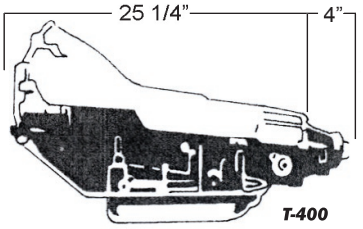


***POWERGLIDE***

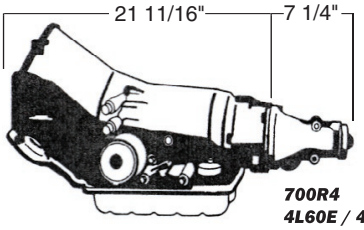


***T-350***

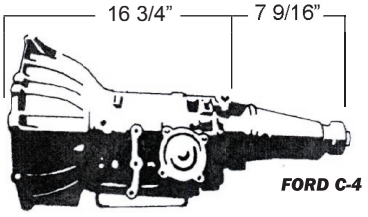
**Tailhousings also available in 9” and 12”.*



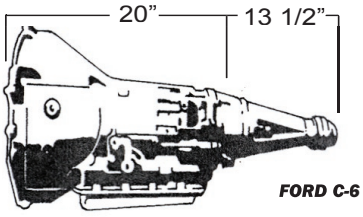
***T-400***



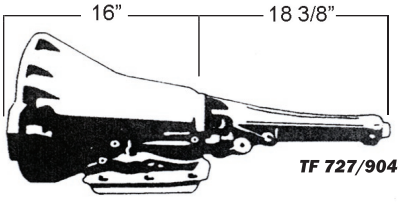
***700R4***
***4L60E / 4L80E***



***FORD C-4***



***FORD C-6***



***TF 727/904***

8. Before final installation, put the converter up to the flexplate and make sure the mounting pads fit flush to the flexplate and are in correct alignment to the bolt pattern. With the pads flush to the flexplate, the converter pilot should be a good fit into the crankshaft with approximately 1/8" minimum extending into the crank below the chamfer.
9. Inspect the condition of the old converter hub for wear, scoring or other damage. Abnormal wear may indicate that the bushing that supports the hub is defective and should be replaced before installation of the new converter. The front pump seal and bushing should be replaced by a competent transmission shop.
10. ***On all Ford and Chrysler transmissions, the factory bronze front pump bushing must be replaced with a babbitt-type bushing.*** Bushings are available from most transmission shops or directly from ATI. All ATI transmissions come standard with this bushing installed and are packaged with the ATI converter.

***When using a midplate between the engine and the transmission, dowel pins must be lengthened at least the thickness of the flexplate to insure proper engine - transmission alignment***

## BEFORE INSTALLING THE UNIT IN THE CAR

1. Install one quart of a quality brand fluid that is red in color in the converter. (Refer to the chart at the right for your specific application.) Do not use type FLM! Use of any fluid or oil that is not red in color will void all warranties. Some specialty trick oils are actually harmful to transmissions and should be avoided. Install the converter on the transmission and be absolutely sure that the converter is engaging all the splines and the pump, and that it is seated all the way back into the transmission. To be certain, take measurements as shown in Figure 1 Note: for GM, "A" measurement will be 1" if the converter is properly installed.
2. On C-4 and C-6 converters equipped with drain plugs, make certain that the drain plugs are aligned with the holes in the flexplate.
3. On Chrysler converters align the small hole in the flexplate opposite the drain plug in the converter. There is only one correct alignment pattern for bolt holes in the converter and flexplate. If the converter does not have a drain plug, determine the correct pattern and mark before attempting installation.

**CHOOSING THE CORRECT TRANSMISSION FLUID**

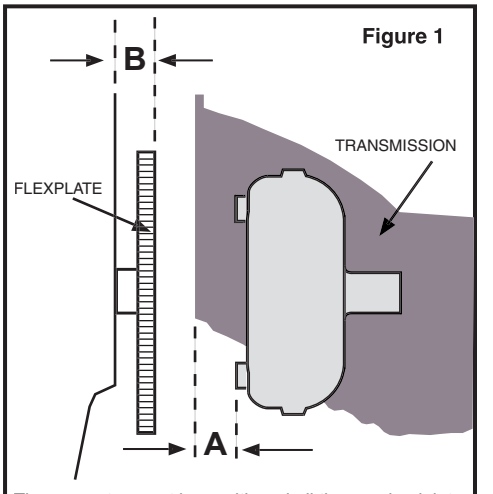
| Fluid Type | Application |
|---|---|
| Type F | Powerglide<br>C-4<br>C-6<br>TF 727/904 |
| Dexron 3/4 | T-350<br>T-400<br>700R4<br>4L60E/65E |

All fluids must be red. Do NOT use blue, hydraulic or compressor oils!

**Now available!**
ATI Super F 100% synthetic Type F for firmer shifts, faster clutch engagement and and high temperature protection.

4. Install the transmission to the dowel pins making certain the converter is free to move during and after the unit is bolted to the block. Under no circumstances should the transmission be “drawn up” to the block, but should go flush to the back with relative ease. Do not allow the weight of the transmission to hang on the block. It must be supported until the two bolts are in place firmly holding the transmission to the block.
5. Check the converter as soon as the transmission is bolted to the block. The converter must be free to move at least 1/8" to no more than 3/16" to contact the flexplate. If there isn’t any play between the converter and the flexplate remove the transmission and check proper installation of the converter.
6. If all previous conditions are in order, finish installing the transmission. Use “Loctite” on the converter bolts to prevent them from coming loose.
7. After installation is complete, adjust the shifter with the shifter and transmission in all gear ranges. The rod and pin should slide with ease through the arm on the transmission. Adjust as required.
8. Filling the transmission - Position the rear wheels about 3" above the ground on safety stands. Add 4 quarts of fluid to the transmission. Start the engine at the lowest possible RPM and complete filling the trans as quickly as possible. The correct level for a cold transmission is 1 pint low. (Check in Park and Neutral.) Do not overfill! Run the transmission through all the forward gears and reverse gears at light throttle. Perform a final fluid check with the vehicle on level ground, in Neutral, warm at idle.

**Figure 1**




The converter must be positioned all the way back into the transmission during measurements. "B" is the flange surface on the flexplate for the converter pad. "A" must always be GREATER than measurement "B". If not, recheck the converter's position. Remember to hold the converter while installing the transmission!

9. It is highly recommended that the dipstick be taped or fastened to the fill tube to prevent it from coming out during hard runs or use ATI's self-locking Trick Stick or the screw-in Lokar style.
10. After completion, raise the vehicle with the engine running to carefully check for leaks, especially at the cooler lines and radiator fittings.
11. Always warm the transmission with a light throttle run before competition.

**If you have any difficulties or problems in installing any ATI units, please feel free to call us for information and advice. You have an investment to protect, so don't take any chances if you are in doubt.**

## *ATI RECOMMENDS THE FOLLOWING PROCEDURE FOR HEATING TIRES:*

1. Spin tires ***slowly*** in water to get them wet while avoiding soaking the wheel wells.
2. Pull to the front edge of the water using Low to High for Powerglide, Low to 2nd to High for Turbo 400, Ford C-4 and C-6, and 2nd to High only for Torqueflite and Turbo 350. For high performance vehicles, do high gear burn-outs only to save 1 to 2 shifts per burnout.
3. When the tires are hot enough, release the line lock and power the car out of the water 5 to 10 feet and lift. Avoid hook up that will scuff the tires.
4. ***Stage immediately!*** Dry burn outs **reduce** traction and consistency. If you don't believe this, pay attention to your first dry leave behind the line. It will hook solid every time. Small amounts of water left on the tires will dry completely from the tire heat long before the green comes on.

   ***NOTE! There is no warranty for a broken transmission case!***

## *FOR ALL POWERGLIDE, TORQUEFLITE AND FORD C-4 OR C-6 TRANSMISSIONS:*

After filling with oil:

- Road test, shifting through all forward gears with light to medium throttle at least 20 times.
- Band adjustments: Unlock and hold the lock nut. Turn in tight with a torque wrench (75 in/lbs). Adjust out to specified turns

  PG Steel Drum = 4 turns
  PG Aluminum Drum = 5 turns
  Ford C-6 = 1 turn
  Ford C-4, course thread = 1 turn
  Ford C-4, fine thread = 3 turns
  Torqueflite 727/904 = 1 3/4 turns

  Hold adjuster in position while locking the lock nut.
- On Torqueflites without manual shift valve bodies, the stock throttle pressure rod from the carburetor to the transmission must be retained and adjusted properly.

***NOTE! There is no warranty for a broken transmission case!***

## *FOR ALL MANUAL SHIFT TORQUEFLITE COMPETITION TRANSMISSIONS:*

If you let off the throttle in Low Gear, you must shift to second!

- **Do not** downshift to Low unless completely stopped.
- **Do not** downshift to 2nd with the throttle closed.

Always move the drivetrain forward slightly before applying full throttle in Low Gear. If you shift to Neutral, then back to Low, the car must move forward slightly again to engage drive components. Failure to follow this procedure could result in personal injury and damage to the unit!

## *DO NOT DO STALL TESTS!*

Don't do stall tests! Stall tests break parts, and not just converter and transmission parts! Remember you are at wide open throttle (full power) and maximum load. The pistons, pins, rods, and crank will really take a beating. Many racers ask why it's OK to leave the line at wide open throttle but not OK to do stall tests. The difference is this. When at the starting line at wide open throttle, you release the brake and the RPMs accelerate from that point. In the converter, the stator is locked via the clutch assembly (sprag) and goes from maximum load in a controlled constant reduction in force to zero load (free wheel) as the car accelerates. The hydraulic forces in the converter are directed in a smooth and efficient manner for maximum torque multiplication and flow for adequate cooling. When performing a stall test at wide open throttle (or even with a rev limiter such as the MSD Two-Step), you lift off the throttle and the RPMs, now at 5000 or 6000, get jerked down to idle. The stator and clutch assembly goes from maximum load and torque multiplication to zero load in an instant. The clutch is unloaded rapidly and the hydraulic forces are instantly disrupted into unknown flow paths due to the rapid reduction in torque. We have seen many converters damaged by this rapid unloading when a ring and pinion, planetary gear set, or input shaft fail. The rampant hydraulic pressure actually breaks the pump blades (fins) completely off the converter pump. It is for this reason that converter manufacturers have for years warned against "snagging" the slicks coming out of the water as RPMs can go from 5000 or 6000 to an idle as the tires catch. Once again, damage can be done to the sprag assembly.

Also remember that the converter builds up a tremendous amount of heat in a short period of time. By not running an engine after a stall test, all that heated fluid lays in the converter without having a chance to go through the cooler. Excessive heat eventually "fatigues" the metals in the converter. So just say no to stall tests. They hurt parts. Use the transbrake on the ***STARTING LINE ONLY...***NOT in the pits, NOT in the driveway, NOT for your burnouts...***STARTING LINE ONLY!*** Your cost per run will diminish significantly.

## *VALVE BODY SPECIFICATION CHART*

Make a note of what valve body is installed in your transmission. Complete Valve Body instructions are available for download at our website: http://www.atiracing.com/instructions/instructions.htm

| PART # | MANUAL OR AUTOMATIC | FORWARD OR REVERSE PATTERN | BRAKE | SAFETY | NOTES |
|---|---|---|---|---|---|
| **POWERGLIDE** | | | | | |
| 203050 | Manual | Forward | YES | YES | External |
| 203070 | Manual | Forward | YES | YES | Internal (soft hit) |
| 203200 | Manual | Forward | | | |
| 203220 | Manual | Reverse | | | |
| 203240 | Manual | Forward | | | Circle Track |
| 203250 | Manual | Forward | | | External |
| 203300 | Manual | Forward | YES | | Internal (soft hit) |
| 203350 | Manual | Reverse | YES | | Internal (soft hit) |
| **T-350** | | | | | |
| 353080 | Manual | Reverse | YES | YES | External |
| 353100 | Automatic | Forward | | | |
| 353200 | Manual | Reverse | | | |
| 353300 | Manual | Forward | | | |
| 353400 | Manual | Reverse | | | |
| **T-400** | | | | | |
| 403080 | Manual | Reverse | YES | | Internal (soft hit) |
| 403081 | Manual | Reverse | YES | YES | Griner |
| 403100 | Automatic | Forward | | | |
| 403200 | Manual | Reverse | | | |
| 403300 | Manual | Forward | | | |
| **FORD C-6** | | | | | |
| 603080 | Manual | Reverse | YES | YES | |
| 603100 | Automatic | Forward | | | |
| 603110 | Automatic | Forward | | | |
| 603200 | Manual | Reverse | | | |
| **FORD C-4** | | | | | |
| 643080 | Manual | Reverse | YES | YES | External |
| 643100 | Automatic | Forward | | | Early<br>Detent on the valve body |
| 643110 | Automatic | Forward | | | Late<br>Detent on the case |
| 643200 | Manual | Reverse | | | Early<br>Detent on the valve body |
| 643200L | Manual | Reverse | | | Late<br>Detent on the case |
| **700R4** | | | | | |
| 706200 | Manual | Reverse | | | |
| **TORQUEFLITE 727 - 904** | | | | | |
| 723080 | Manual | Reverse | YES | YES | Griner |
| 723100 | Automatic | Forward | | | |
| 723110 | Automatic | Forward | | | |
| 723200 | Manual | Reverse | | | |

**REVERSE VS FORWARD PATTERN**

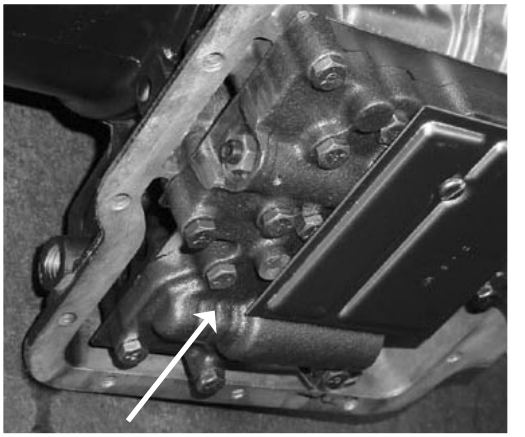
**REVERSE**


**FORWARD**


Note! Valve bodies with the Safety feature require the shifter to be placed in **reverse** AND the transbrake button pushed to back up. Some valve bodies will also back up when the button is pushed and the shifter is in **neutral.**

# ADJUSTABLE PRESSURE REGULATOR

***For use with Compu-Flow Valve Bodies #203050, 203200, 203220 & 203250***



U.S. PATENT # 7,780,564

Your new ATI Valve Body features an exclusive Adjustable Pressure Regulator. The baseline pressure of this unit is 145 - 160 psi. The regulator has been factory pre-set at 165 psi. This is the highest pressure ATI recommends for an OEM GM Powerglide case. Pressures exceeding 165 psi in a GM case have been known to break the case at the reverse piston bore. If you have a GM case, no adjustment is required. ATI further recommends that when using a GM cased transmission in cool weather (sub 60° F), that the unit be thoroughly warmed up before engaging Reverse or Brake to prevent case breakage.

### *Adjustment procedure for AFTERMARKET cases only*

The pressure can be increased by loosening the lock nut with a 9/16" box wrench and turning the adjuster screw in (clockwise) with a 3/16" Allen Key. The rate of change is 16 psi per turn. Tighten the lock nut after adjusting.

**ATI Pressure Recommendations**

| **PRESSURE PSI** | 165 | 175 | 185 | 200 | 225 | 230 - 250+ |
|---|---|---|---|---|---|---|
| **HORSEPOWER** | < 500 | 500-750 | 750-900 | 900-1500 | 1500-2500+ | Not Recommended |

Note!

1. Heavier cars generally require more pressure as horsepower amounts increase.
2. Generally, higher pressures may cause premature wear to occur on internal components and cause parasitic horsepower losses.

### *Testing With A Pressure Gauge (ATI Part # 151001)*

Use the test port at the Servo Cover. A reading may be obtained with the transmission in first or with the brake applied (if equipped). Bring the RPMs up until the pressure stops climbing and reads steady. This is the regulated pressure.

*The ATI Powerglide Adjustable Pressure Regulator is patented.*
*Patent infringements will not be tolerated and are subject to legal action.*

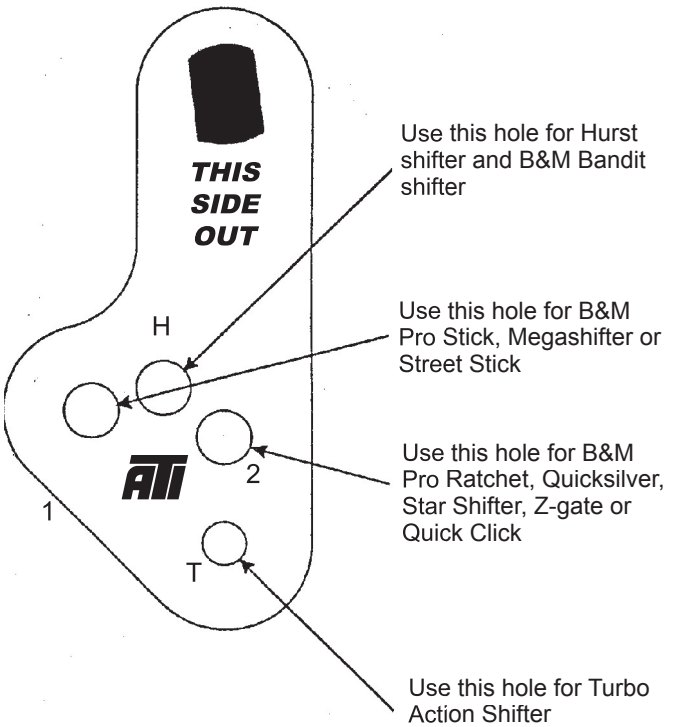
# POWERGLIDE UNIVERSAL LEVER

***Part # 202100***

The ATI Universal Lever is designed for use on aluminum Powerglide transmissions without the throttle lever and shaft. It is a two-piece lever rather than the usual one-piece lever. It has 4 holes for the cable swivel so that it can be used with B&M, Turbo Action or Hurst shifters.

The shaft portion of the lever is installed in the transmission in the normal Powerglide manner. The lever is then put over the end shaft with the lever pointing down (for standard installation). The cable bracket for your particular shifter is bolted on, the cable is installed in the bracket and the swivel is then inserted into the correct hole on the lever as shown in the illustration.

If the cable comes from the front (usually a rear engine car) the lever is installed pointing upwards. You will have to make a cable bracket for this installation.



## *The Transbrake*

The Transbrake's main function is to unload the chassis while staging to make the car shock the suspension and hook consistently. The brake will accomplish this at a mere 1000 RPM. Going higher on the brake only serves to super heat the oil in the converter and make for inconsistent launches.

You should find an RPM that your engine is comfortable with (no stumble or hesitation), hopefully below 4000 RPM. Then the only reason for you to go higher on the brake is if you are late on the light. Going higher on the brake will only reduce the reaction time of the car, automatically putting you closer to the light. If you run a delay box, be sure to remove the time delay before testing. Many people have over a second in the delay box and stage the car at 5500+ RPM.

The lower the RPM at which you launch the car (relative to the stall speed of the converter), the more free energy the converter gives you. That's a plus and your converter and transmission will live longer without the excessive heat. Many large, long stroke engines will run faster from a very low stage RPM.

Many of our 350 cubic inch Super Stockers run the quickest from 1800 RPM. The converter will flash to its stall speed no matter at what RPM you stage it provided the engine will respond properly to that RPM. Engines with two carbs and big plenums on the intake system will require higher RPMs to respond consistently. Again, going higher on the converter only serves to reduce the reaction time of the race car.

True stall speed occurs when two things are present at the same time. They are:

1 - The maximum amount of torque (power) is input to the converter.

2 - The maximum amount of load (work) is present for the converter to accomplish.

Perfect example: The car is in a wheel stand climbing the ring gear and has not moved an inch forward stall speed is occurring.

When checking stall speed using the transbrake, it must be checked on the starting line. Stage the car, deck the throttle, look at the stall speed, then release the brake and let the car leave. Most converter damage is caused by lifting the throttle from stall speed. Wide open throttle on the brake is extremely detrimental to the health of your converter.

## *Why can't I get above 2500 RPM on the footbrake?*

That is called "free speed" and is a direct function of your brakes to hold the torque being transmitted.

Remember! Converters multiply torque 2 to 1. The 400 lbs of torque which the engine is producing is 800 ft / lbs at the transmission input shaft multiplied by the low gear of the transmission. It's a huge amount of torque to hold.

Drum brakes are a must and the shoes must be warmed up in the burnout. It also helps to reverse the brake lines at the master cylinder to route higher pressure of the front brakes to the rear. Remove the proportioning valve from the system and use caution down the track as the rear brakes will lock up before the front!


***ATI PERFORMANCE PRODUCTS, INC.***

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