



**Installation Manual v1.1:
2003 and newer Ford 6.0L Power Stroke
5R-110 Transmission**

Please read all instructions before the installation of the ATS Co-Pilot

Thank you for purchasing the ATS Ford 5R-110 Co-Pilot. This manual is to assist you with your installation and operation of the unit. If you are installing the unit for a customer, *please pass this manual on to your customer* for future reference.

Understanding the ATS Co-Pilot

The ATS Co-Pilot commands the lock-up clutch of the torque converter as well as the transmission line pressures based on load. The ATS Co-Pilot has been developed to provide lock-up capability in all gears. The factory computer is programmed to disengage lock-up under many conditions. By doing so the performance of the transmission is inhibited. A few of these conditions are:

- Lock-up disengagement at wide open throttle
- Lock-up disengagement at closed throttle
- Delayed lock-up engagement when accelerating from a stop
- Delayed lock-up engagement before engine temperatures are reached
- Lock-up disengagement under high power output

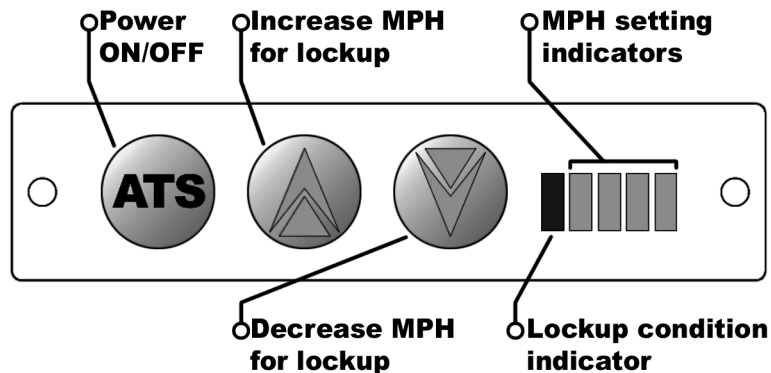
The factory has programmed the stock computer with these features to minimize the stress on the factory torque converter. The ATS Co-Pilot allows the driver to have control over the engagement and disengagement of the torque converter clutch and add line pressure when it's needed most.

When the Co-Pilot is sending the apply signal to the converter clutch the **green** light in the control panel will illuminate. The ATS Co-Pilot works off of an interface that will only take effect when the vehicle is above the speed selected by the driver and boost pressure is present. Note: If boost pressure is not present then the Co-Pilot will not command the torque converter clutch to lock-up even if the minimum speed setting has been reached. Both speed and boost conditions must be met for lock-up.

The Co-Pilot locks up the torque converter clutch (TCC) when the vehicle is at or above the speed set by the driver on the control box and sufficient boost is present. By monitoring boost, we can avoid locking up the converter before the engine is operating at sufficient power, which will cause poor performance. The Co-Pilot's torque converter lockup feature will allow you to efficiently get your power to the ground. Dependent on the ATS Computer's dipswitch #1 setting (discussed on page 3), the Co-Pilot can be programmed to engage the TCC on deceleration until the minimum set speed is reached to take advantage of the engine braking when your foot is off of the accelerator.

The other function of the Co-Pilot is to ramp up the transmission line pressure. By increasing the line pressure to the transmission clutch packs, the transmission's holding force increases, eliminating slip. The Co-Pilot increases the line pressure *only* when necessary by monitoring the load the engine is under. By applying the necessary pressure to prevent slippage under high demand conditions and not subjecting the transmission to high line pressures when not necessary, we can increase the life of your transmission. Note: Due to the design of factory shift solenoids, this feature is maximized with an ATS Transmission with ATS shift solenoids.

Using the ATS Co-Pilot



The control panel on the face of the Co-Pilot control box allows the driver to select and view the speed at which the torque converter clutch will engage and disengage. When the round button on the left side of the Co-Pilot face is depressed and the **blue** light is turned off, the Co-Pilot is disabled. This will allow the factory PCM (Powertrain Control Module) to operate the vehicle as it does in stock form. The OFF position is indicated by none of the lights being lit on the face of the box. To activate the unit, depress the round button (ATS Button) on the left side of the face, one of the **blue** lights on the face will light up, the light also indicates the level the Co-Pilot was set on before it was last shut OFF. This will tell the Co-Pilot what speed to watch for. The minimum speed the Co-Pilot will engage is approximately 18 mph. The minimum speed of around 18 mph is selected by depressing the down arrow button on the display until only one light is lit. This will cause the Co-Pilot to send a signal to the transmission to lock-up the torque converter at its minimum allowable speed when boost conditions are met. When the **up** arrow key is depressed the lock-up speed will increase by about 5 mph. When the **down** arrow key is depressed the lock-up speed will decrease by about 5 mph. When the **blue** lights are all the way to the right, the lock-up speed is set at approximately 55 mph when boost conditions are met.

Note: Since the Co-Pilot is capable of locking the TCC in all gears, engine RPM's might drop more than normal during upshifts. You can eliminate this effect and maximize performance by adding an ATS E-Power Tuner if you haven't done so already. The ATS E-Power tuner can be custom programmed to work in conjunction with the Co-Pilot giving you full control over your Ford's shift parameters. The E-Power tuner can also be programmed with three engine settings, which be selected from our full range of files including "Ultra-Economy" to maximize your mileage, "Torque-Tow" to safely give you up to 50 hp and 100 ft-lb of torque over stock while still increasing your towing fuel economy, and "Insanity" which gives you the ultimate in performance with up to 150 hp and 250 lb-ft of torque over stock for when you want to blow the doors off a Camaro at the drag strip. You can change these programs whenever you like.

The best way to familiarize yourself with the operation of the ATS Co-Pilot is to set the ATS Co-Pilot to the maximum (highest) set speed (up arrow) available. Hold a steady speed of approximately 35 mph. While cruising at a speed of 35 mph, depress the down arrow on the controller panel, watching for the **green** light on the ATS Co-Pilot to illuminate; about 3 seconds after the light illuminates, the torque converter clutch should engage if proper boost conditions exist. You can familiarize yourself with the adjustment of the control panel by repeating this step at different speeds and boost levels. When doing this drive carefully and be sure to obey traffic laws.

Setting up the ATS Co-Pilot for installation

The ATS Co-Pilot can be set up for your preferences. The Co-Pilot unit will need to be disassembled to access the dipswitches on the electronic board. You will need a 1/16th - inch hex (Allen wrench) to remove the face from the Co-Pilot. After the face has been removed the electronic board can be slid out of the casing from the front. The digital face is attached to the circuit board with a ribbon cable so do not force the board from the case. There are two (2) switches on the circuit board; the switches allow the user to select the desired features. The settings are listed below. When reinstalling the face on the Co-Pilot do not over tighten the 2 small screws on the face.

Dipswitch selection:

SWITCH #1: Tire Size Compensation

Enabling this feature recalibrates the Co-Pilot computer to compensate for very large tires (35 inches or taller). These tires can throw off the vehicle speed sensor signal if it is not already corrected with vehicle computer re-flash from a Ford dealership or the ATS E-Power Tuner. Do not enable this feature until you have confirmed that the lockup is not occurring at the correct speed.

To enable tire size compensation, flip switch to the **ON** position
To disable tire size compensation, flip switch to the **OFF** position

We preset this switch to the off position.

SWITCH #2: Lock-up during deceleration

Enabling this feature turns on the torque converter clutch (TCC) during deceleration for improved braking. The Co-Pilot will hold the TCC on until a speed that is 10 mph less than the Co-Pilot's set speed. When letting off of the throttle, there will be a 2 to 3 second delay until the TCC applies.

Example: If driving at 50 mph with 15 lbs of boost the Co-Pilot will be commanding TCC lock-up. As you release the throttle and boost falls off the Co-Pilot will unlock the TCC and wait 2 to 3 seconds until reapplying it to give you the full effect of the engine braking. If you reapply the throttle the Co-Pilot will not apply the TCC until the vehicle is above the set speed and has approximately 10 lb of boost.

To enable lock-up during deceleration flip switch to the **ON** position
To disable lock-up during deceleration flip switch to the **OFF** position

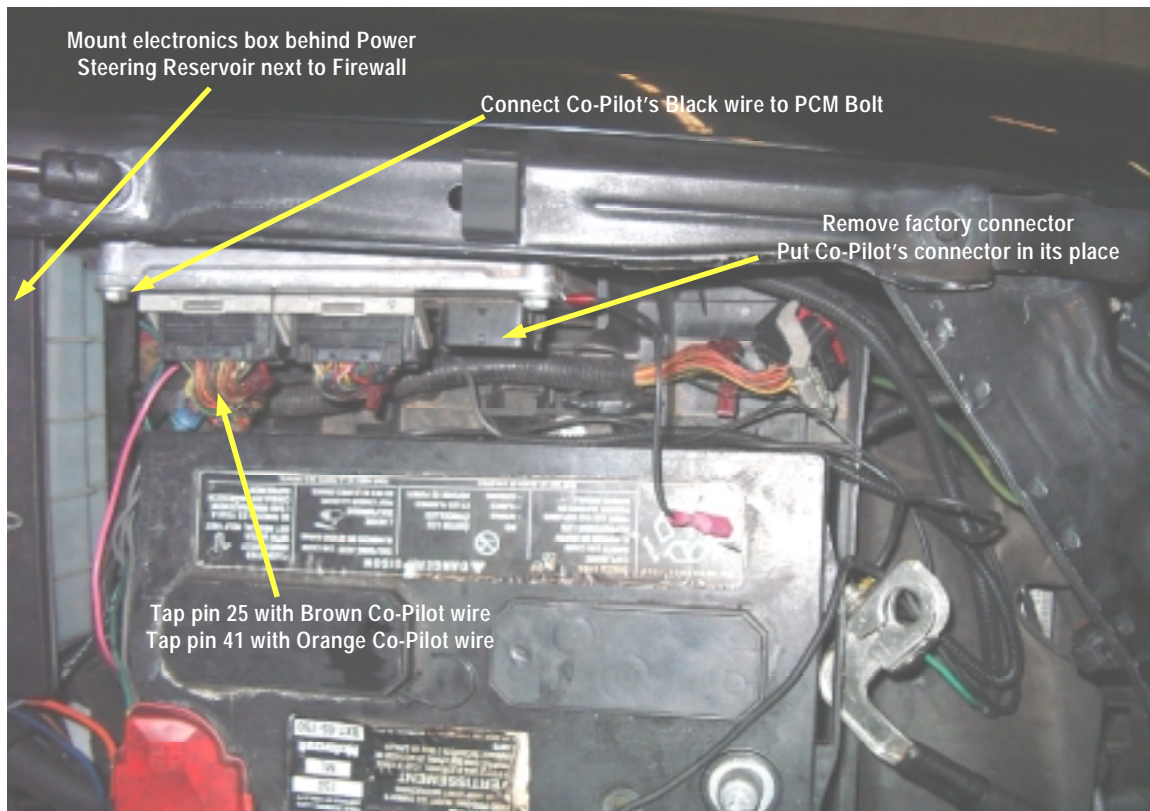
We preset this switch to the off position.

Co-Pilot Mounting Location

Find a convenient location to mount the Co-Pilot control box within reach and view of the driver. We recommend locating the unit just to the right of the driver on the lower dash panel (above the driver's right knee). Use the supplied Velcro to secure it to the dash. Before sticking the Velcro to the dash thoroughly clean the area with a cleaner such as acetone or brake cleaner.

Mount the larger Computer box (with the PCM Connector port) behind the power steering reservoir next to the firewall. Route the wire loom with the white connector through the firewall to the Co-Pilot control box and plug it into the back. There is a plastic plug in the firewall that you can cut or drill through. Seal the hole with a rubber grommet.

Wiring



Remove the driver's side battery cover and disconnect the negative terminals on all vehicle batteries before starting installation. We urge you to solder all connections for reliable results. These wire connections must be shielded from the elements (we recommend heat shrink tubing). Locate the PCM, which is on the driver's side of the engine between the battery and the inner fender. It may ease installation to remove the driver's side battery. The PCM has three connectors; there are two wires that need to be tapped which are in the rear connector (*closest* to the firewall). Remove the connector by pulling back on the white lock tab, and tap the wires as directed below:

For 2003-2004: Tap the **Yellow with White** wire that is in **Pin 25** with the **Brown** wire.
Tap the **Light Green with Black** wire that is in **Pin 41** with the **Orange** wire.

For 2005+: Tap the **White with Red** wire that is in **Pin 25** with the **Brown** wire.
Tap the **Light Green with Black** wire that is in **Pin 41** with the **Orange** wire.

Reconnect the PCM connector by pressing the white lock tab all the way down and then unplug the Connector *furthest* from the firewall. Plug that connector into the Co-Pilot Computer Box and take the connector from the Co-Pilot Computer Box and connect it in place of the *stock* connector. Note: You will need to redirect this connector's wire loom under the power steering reservoir to reach the Co-Pilot Computer Box.

Take the black wire from the Co-Pilot Computer Box and connect it to one of the PCM hold-down bolts to provide a good ground. (See the picture on page 4)

Make sure that the Co-Pilot Computer Box and all wires are secured and reattach the negative battery terminals. The wiring of your Co-Pilot is complete.

In the event you have installed the ATS Co-Pilot on a transmission/converter package that does not have the ability to hold properly you have option to up-grade the converter to an ATS Five Star Viskus Drive Torque Converter. The ATS Viskus Clutch Drive, along with the fluid-coupling portion of the torque converter, share in the increased power transfer through the torque converter. Unlike other torque converters relying on fluid transfer from the impeller to the turbine via the stator, the Five Star utilizes ATS Viskus Clutch Drive technology that transfers rotational energy from the engine to the transmission. When the Torque Converter Clutch is commanded to come on, the 5 clutch plates provide a 100% mechanical engagement ensuring no plate slippage during lockup, even at power levels in excess of 2,000 foot-pounds of torque. The ATS Five Star™ Torque Converter increases acceleration from a stop, eliminates the excessive heat caused by a slipping single disc converter clutch, improves economy and allows full engine retarding force to be transferred to the wheels on deceleration. All Five Star™ torque converters carry a **3 yr/150,000** mile parts warranty.

We strive to make our instructions as clear and complete as possible. To achieve this, our instructions are under constant construction. We encourage you to visit our Technical Support Website (<http://www.atsdiesel.com/ATSWebsite/Technical.asp>) for the **most up-to-date manuals and diagrams as well as other information**. If you have any suggestions as to how we can improve this installation manual, let us know at Suggestions@ATSDiesel.com

Have Any Questions?

Thank you for purchasing the ATS Co-Pilot. Please check our website at www.atsdiesel.com for technical support and other performance products such as the Five Star torque converter and ATS High Performance 5R-110 Transmission along with our full line of power enhancers for the Ford 6.0L Power Stroke. ATS products for the 6.0L include Aurora Turbochargers, Stainless Steel Exhaust, E-Power Tuners, Torque Pro Propane Injection, Head Studs and Fire-Rings, and a Complete High Performance Fuel System with Performance Fuel Injectors. Please call or e-mail our Sales or Technical Service Department, 8:00am to 5:30pm Mountain Standard Time, Monday through Friday.

Contact Information

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ATS Diesel Performance
Limited Warranty Statement

ATS Diesel Performance warrants the original purchaser that any parts purchased shall be free from defects in material and workmanship. ATS Diesel Performance is the warrantor of this product, in the event this product is purchased from a distributor or retailer other than ATS Diesel Performance the customer must contact ATS Diesel Performance for any warranty concerns, not the purchasing dealer. A defect is defined as a condition that would render the product inoperable. This warranty does not cover deteriorating of plating, paint or any other coating. ATS liability is limited to the repair or replacement, at ATS's option, of any warrantable product returned prepaid with a complete service history and proof of purchase to the factory. A valid proof of purchase is a dated bill of sale. Repaired or replaced, product will be returned to the customer, freight collect on a like-for-like part number basis. Accepted warranty units, which have been replaced, become the sole property of ATS.

A Return Product Authorization number obtained in advance from an ATS customer service representative must accompany products returned for warranty determination. ATS will be the final authority on all warranty decisions.

This warranty shall not apply to any unit which has been improperly stored or installed, subjected to misapplication, improper operating conditions, accidents, or neglect; or which has been improperly repaired, altered or otherwise mistreated by the owner or his agent.

This warranty shall terminate at the end of 12 months in service with the original user. Labor cost incurred by the removal and replacement of an ATS product, while performing warranty work, will be the responsibility of the vehicle owner; in no case does the obligation of ATS Diesel Performance exceed the original purchase price of the product as indicated on the original bill of sale.

Except as set forth in this warranty, ATS disclaims any implied warranty, including implied warranties of merchantability and fitness for a particular purpose. ATS also disclaims any liability for incidental or consequential damages including, but not limited to, repair labor, rental vehicles, hotel costs or any other inconvenience costs. This warranty is in lieu of all warranties or guarantees, either expressed or implied, and shall not extend to any customer or to any person other than the original purchaser residing within the boundaries of the continental US or Canada.

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