



**Installation Manual v3.0:  
2004-2005 Dodge Cummins**

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

Thank you for purchasing the ATS Co-Pilot Torque converter/exhaust brake controller. 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.

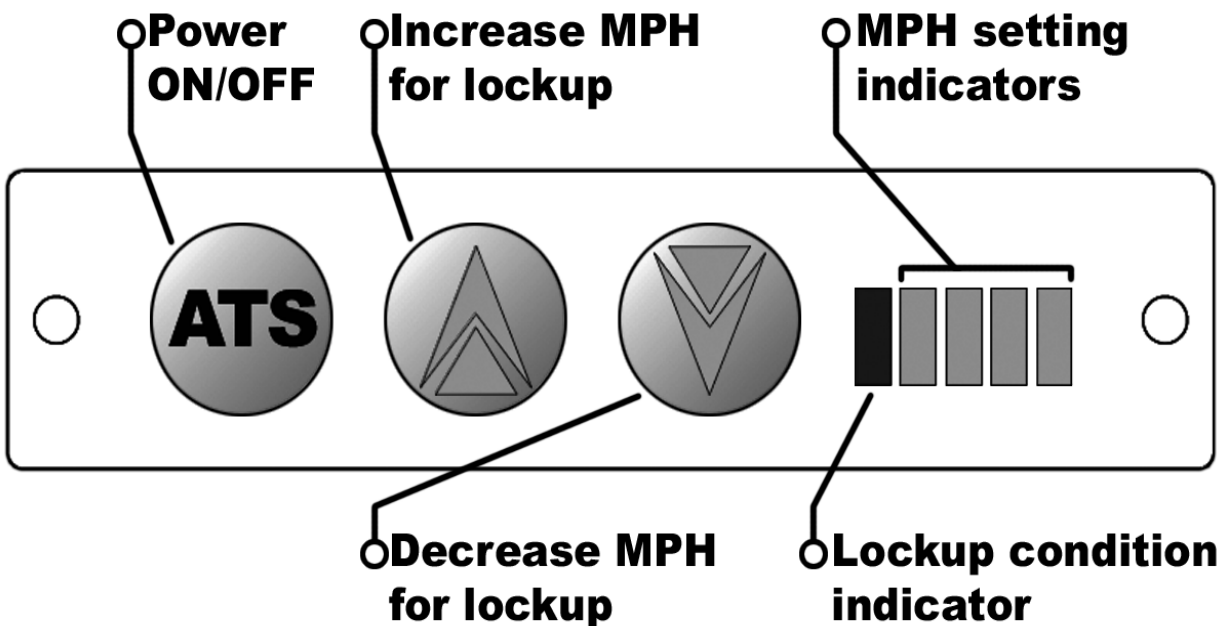


**Understanding the ATS Five Star Co-Pilot**

The ATS Co-Pilot transmission controller is recommended for use with light duty pickup trucks when a heavy-duty aftermarket transmission and torque converter package have been installed on vehicle. While the Co-Pilot will still function perfectly on a stock transmission, factory transmission shafts are weak and prone to breakage. The factory torque converter clutch will also fail if applied under high load conditions. Factory computers are programmed to disengage lockup under certain conditions which will protect the transmissions internal components under higher load. This is why we recommend having a heavy-duty aftermarket transmission installed in your vehicle to prevent transmission failure. ATS Diesel Performance sells many parts for all levels of trucks that will strengthen your transmission and improve reliability, whether you have a stock daily driver or a fully built race truck! Give us a call today if you feel the need to get a fully rebuilt transmission for your truck, or if you just want to strengthen your current transmission with a few upgraded parts. Our experts can help answer any questions you have and guide you in the right direction.

## Co-Pilot Adjustment

The control panel on the face of the ATS Co-Pilot allows the driver to adjust the lockup of the transmission. Keep in mind that the Co-Pilot will only lock the torque converter when enough boost is reached. This keeps the engine from bogging down due to excessively early converter clutch lockup that is commanded by many factory transmission control modules. The adjustments allow you to trim the converter clutch lockup based on MPH. To raise the vehicle speed at which the transmission locks up, you press the up arrow button. To decrease lockup speed, press the down arrow button. When the torque converter is locked, the Co-Pilot will display a green light to indicating that the converter has locked up. Due to the protection the Co-Pilot provides and the engine load sensing of the Co-Pilot, it is not possible to command Lock-up at too-low engine speeds or low torque levels. This unique feature ensures the engine will never bog or run at a low engine RPM, thusly causing lugging when the engine does not have boost. At the other end of the spectrum, during high power output when the engine is running at full load, the Co-Pilot will keep the torque converter clutch engaged, allowing full torque to be transferred through the torque converter clutch to the transmission input shaft. The factory often disengages the torque converter clutch during these high torque conditions to reduce the load exerted on the factory transmission shafts. This is the primary reason we do not recommend installing a Co-Pilot transmission controller on a stock torque converter or transmission.



The ATS Co-Pilot will need to be set up for your vehicle and application. The Co-Pilot will need to be disassembled to access the dip switches on the electronic board. You will need a 1/16<sup>th</sup> - 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; do not force the board from the case. There are four (4) switches on the circuit board; the switches allow the user to select the features desired. The settings are listed below. When reinstalling the face on the Co-Pilot do not over tighten the 2 small screws on the face or faceplate damage will result.

## Dip switch selection:

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### Switch #1

If your Dodge's transmission has a stock valve body flip #1 switch to **ON** position  
If your Dodge's transmission has an ATS valve body flip #1 switch to **OFF** position

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### Switch #2

Automatically cancels OD from a stop, only cancels after ignition has cycled, cancels at speed above 3mph.

**IMPORTANT:** If the white wire of the Copilot harness is not connected, then switch #2 must be set to the "ON" position. With the wire connected the options below are available.

If you want automatic OD cancel from a stop flip #2 switch **ON**  
If you **do not** want automatic OD cancel from a stop flip #2 switch **OFF**

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### Switch #3

#### Speed setting

On=low speed cut out (deceleration only) This setting is designed to be used with an exhaust brake.

**Off=Hi speed cut out (deceleration only)**

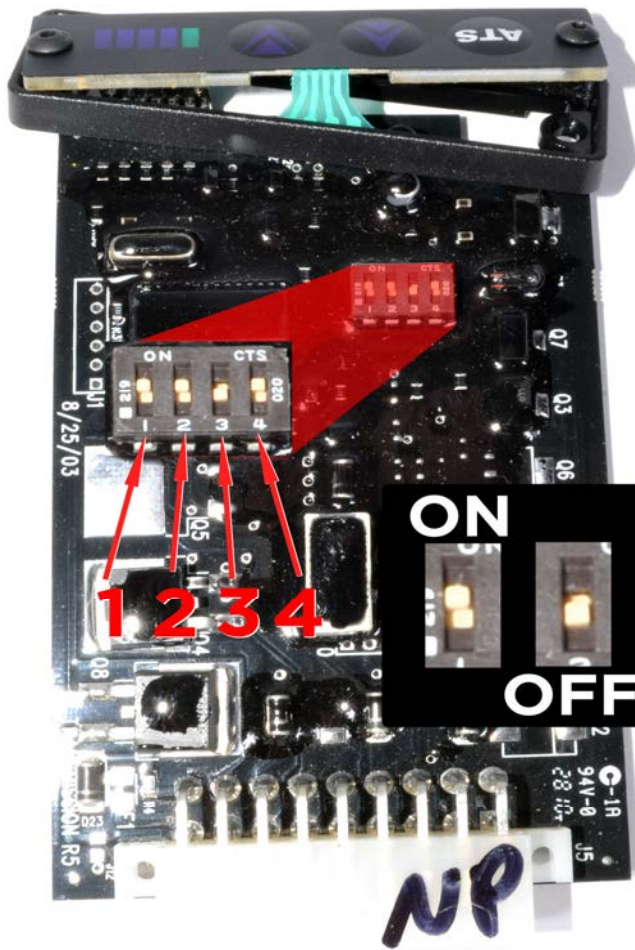
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### Switch #4

Set this switch to the **ON** position

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We have preset the Co-Pilot module #1-ON, #2-ON, #3-OFF, #4-ON



### **Co-Pilot Mounting Location**

Find a convenient location to mount the Co-Pilot 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 clean. Run the Co-Pilot wires to be wired up to the PCM (Power-train control module) and the transmission through the firewall.



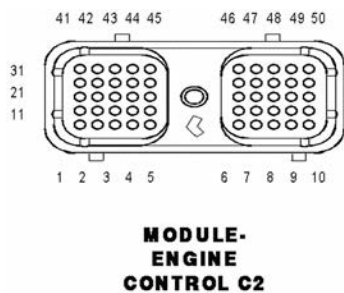
## Wiring the Co-Pilot

The Co-Pilot has several connections that need to be made in order for it to function properly. There are several wires which are optional but still included to give the Co-Pilot a more versatile use depending on your trucks current setup. Use the diagram below as a reference when installing your Co-Pilot to avoid any conflicts or confusion.

### -Pink Wire- Throttle Position Sensor (TPS) – PIN #12 Recommended

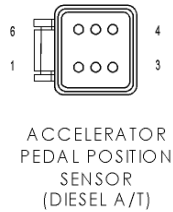
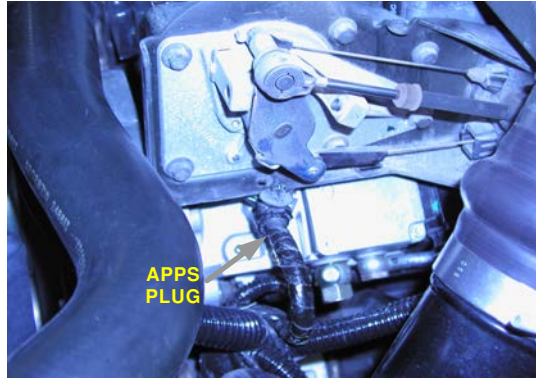
**Reason For use:** This wire give the Co-Pilot the ability to lock the torque converter on deceleration. This gives the vehicle an engine-braking effect. Recommended. **OPTIONAL**

*Where to connect it:*



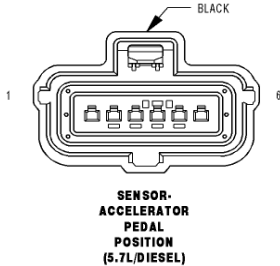
| CAV | Circuit      | Function                                 | Co-Pilot Connection                |
|-----|--------------|--|------------------------------------|
| 1   | -            | -  | -                                  |
| 2   | -            | -  | -                                  |
| 3   | K615 18VT/WT | INLET AIR TEMPERATURE SENSOR             | -                                  |
| 4   | -            | -  | -                                  |
| 5   | K176 18BR/OR | INTAKE AIR HEATER NO.2 RELAY CONTROL     | -                                  |
| 6   | K174 18BR/YL | INTAKE AIR HEATER NO.1 RELAY CONTROL     | -                                  |
| 7   | V32 18VT/YL  | SPEED CONTROL SUPPLY                     | -                                  |
| 8   | -            | -  | -                                  |
| 9   | T41 18YL/DB  | PARK/NEUTRAL POSITION SWITCH (T41)       | -                                  |
| 10  | K161 18BR/LB | FAN SPEED SENSOR                         | -                                  |
| 11  | B22 18DG/YL  | VEHICLE SPEED SIGNAL NO.1                | -                                  |
| 12  | G6 18 VT/GY  | OIL PRESSURE SENSOR                      | -                                  |
| 13  | T6 18DG      | TOW/HAUL OVER DRIVE CANCEL SWITCH        | Tap White Co-Pilot Wire Pin 5      |
| 14  | T118 18 DG   | GOVERNOR PRESSURE SOLENOID CONTROL       | -                                  |
| 15  | T9 18DG/TN   | 3-4 SOLENOID CONTROL                     | -                                  |
| 16  | D21 18WT/BR  | SCI TRANSMIT(ECM)                        | -                                  |
| 17  | -            | -  | -                                  |
| 18  | T38 18YL/BR  | GOVERNOR PRESSURE SENSOR SIGNAL          | -                                  |
| 19  | D20 18WT/LG  | SCI RECIEVE(ECM)                         | -                                  |
| 20  | A209 16RD    | FUSED BATTERY(+)                         | -                                  |
| 21  | Z902 16BK    | GROUND                                   | Tap Black Co-pilot Wire Pin 9      |
| 22  | -            | -  | -                                  |
| 23  | F856 18YL/PK | 5 VOLT SUPPLY                            | -                                  |
| 24  | K900 18DB/DG | SENSOR GROUND                            | -                                  |
| 25  | T75 18YL/LB  | TORQUE CONVERTER CLUTCH SOLENOID         | Connect Co-Pilot Pin 10 and Pin 11 |
| 26  | N4 18DB/WT   | FUEL LEVEL SENSOR SIGNAL                 | -                                  |
| 27  | -            | -  | -                                  |
| 28  | D25 18WT.VT  | PCI BUS                                  | -                                  |
| 29  | T54 18DG/OR  | TRANSMISSION TEMERATURE SENSOR SIGNAL    | -                                  |
| 30  | A209 16RD    | FUSED BATTERY(+)                         | -                                  |
| 31  | T55 18YL/DB  | TRANSMISSION CONTROL RELAY CONTROL       | -                                  |
| 32  | F202 18PK/GY | FUESED IGNITION SWITCH OUTPUT(RUN-START) | Tap RED Co-Pilot Wire Pin 1        |
| 33  | K854         | 5 VOLT SUPPLY                            | -                                  |
| 34  | V36 18VT/YL  | S/C VACUUM CONTROL                       | -                                  |
| 35  | K616 18BR/YL | INLET AIR PRESSURE SENSE                 | -                                  |
| 36  | V32 18VT/YL  | SPEED CONTROL SUPPLY                     | -                                  |
| 37  | B29 18DG/WT  | BRAKE SWITCH SIGNAL                      | -                                  |
| 38  | -            | -  | -                                  |
| 39  | -            | -  | -                                  |
| 40  | A209 16RD    | FUSED BATTERY(+)                         | -                                  |
| 41  | C13 18LB/OR  | A/C CLUTCH RELAY CONTROL                 | -                                  |
| 42  | -            | -  | -                                  |
| 43  | K160 18BR/OR | PARK LOCKOUT SOLENOID                    | -                                  |
| 44  | T14 18DG/BR  | OUTPUT SPEED SENSOR                      | Tap Green Co-Pilot Pin 17          |
| 45  | T13 18DG/VT  | SPEED SENSOR GROUND                      | -                                  |
| 46  | V37 18VT     | S/C SWITCH NO.1 SIGNAL                   | -                                  |
| 47  | K25 18DB/VT  | BATTERY TEMP SIGNAL                      | -                                  |
| 48  | K400 18V/VT  | APPS NO.2 RETURN                         | -                                  |
| 49  | Z902 16BK    | GROUND                                   | -                                  |
| 50  | Z902 16BK    | GROUND                                   | -                                  |

**For 2004 models:** Locate the APPS, it is under a black plastic cover, on the driver's side of the engine, in front of the intake manifold. Tap the **Brown w/ White** wire in the APPS Plug wire loom.



| ACCELERATOR PEDEL POSITION SENSOR (DIESEL A/T) - 6 WAY |              |                                 |
|--|--------------|---------------------------------|
| CAV  | CIRCUIT      | FUNCTION                        |
| 1  | K914 18RD/WT | SENSOR GROUND                   |
| 2  | K556 18OR/BR | NOT IDLE SWITCH                 |
| 3  | K22 18BR/WT  | TP SIGNAL                       |
| 4  | K922 18LG/OR | THROTTLE POSITION SENSOR RETURN |
| 5  | K851 18VT/PK | 5-VOLT SUPPLY                   |
| 6  | K565 18OR    | IDLE SWITCH                     |

**For 2005 models:** Connect at the TPS connector located at the top of the accelerator pedal arm. This is a six wire connector, in the fifth terminal there is a **brown with white** tracer wire, tap this wire.



| SENSOR-ACCELERATOR PEDAL POSITION (5.7L/DIESEL) - BLACK 6 WAY |                       |                   |
|---|-----------------------|-------------------|
| CAV   | CIRCUIT               | FUNCTION          |
| 1   | F856 20YL/PK          | 5 VOLT SUPPLY     |
| 1   | K854 20VT/BR (DIESEL) | 5 VCLT SUPPLY     |
| 2   | K29 20VT/BR           | APPS NO. 2 SIGNAL |
| 3   | K400 20BR/VT          | APPS NO. 2 RETURN |
| 4   | K167 20BR/YL          | APPS NO. 1 RETURN |
| 5   | K23 20BR/WT           | APPS NO. 1 SIGNAL |
| 6   | F855 20PK/YL          | 5 VOLT SUPPLY     |
| 6   | K852 20BR/VT (DIESEL) | 5 VCLT SUPPLY     |

**How to connect it:** Strip back approximately 1/2" of the insulation from the brown with white tracer wire and solder the Co-Pilot's **Pink** wire to the **Brown with white tracer** wire. Protect this connection.

### **-Red Wire- +12V Power - Co-Pilot Harness PIN #1**

**Reasons for use:** The red wire supply's key on power to the Co-Pilot so it can turn on and be functional. **NOT OPTIONAL**

**Where to connect it:** On the C2 connector of the PCM which is located on the driver's side of the engine block. There are two connectors here, a 60-pin C1 and a 50-pin C2. The power (**Pink w/ gray**) wire is on the connector that is closer to the firewall in pin 32.



**How to connect it:** Strip back approximately ½” of the insulation from the Pink w/ gray PCM power wire and solder the red Co-Pilot wire to the 12 V power wire. Protect this connection.

**-Black Wire- GND Ground - PIN #9**

**Reason for use:** The black wire supply’s ground to the Co-Pilot so the Co-Pilot can turn on and function. **NOT OPTIONAL**

**Where to connect it:** On the **C2** connector of the PCM which is located on the driver’s side of the engine block. The ground (**black**) wire is on the connector that is closer to the firewall in **pin 50**.

**How to connect it:** Strip back approximately ½” of the insulation from the black PCM wire and solder the Co-Pilot’s **black** wire to the PCM **black** wire. Protect this connection.

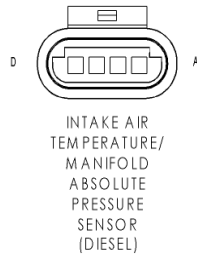
**-Orange Wire- Manifold Absolute Pressure (MAP) Sensor - PIN #4 (\* OPTIONAL \*)**

**Reasons for use:** This function prevents the Torque converter for locking up until 10-13 Psi of boost has been made. This allows to turbo to begin to spool before the torque converter locks up.

**Where to connect it:** At the MAP sensor connector located on the driver’s side of the engine, next to the valve cover, and just over halfway back on the engine. The connector has four wires; tap the **light blue/white** wire, which is in the first (“A”) terminal.

**How to connect it:** Strip back approximately ½” of the insulation from the light blue wire and solder the Co-Pilot’s **orange** wire to the **light blue/white** wire. Protect this connection.

**Tips:** If the vehicle has had any aftermarket power modules installed, be sure to tap the MAP sensor wire **before** any taps from these power modules, i.e. place the Co-Pilot’s tap closest to the sensor. Do your best to shield this connection from the elements.



| INTAKE AIR TEMPERATURE/MANIFOLD ABSOLUTE PRESSURE SENSOR (DIESEL) - 4 WAY |             |                                      |
|---|-------------|--------------------------------------|
| CAV   | CIRCUIT     | FUNCTION                             |
| A   | K55 18LB/WT | MAP SENSOR SIGNAL                    |
| B   | K21 18BK/RD | INTAKE AIR TEMPERATURE SENSOR SIGNAL |
| C   | K72 18DG/OR | 5 VOLT SUPPLY                        |
| D   | K9 18LB     | 5 VOLT SUPPLY                        |

### **-White Wire- Overdrive - PIN #5 (\* OPTIONAL \*)**

**Reason for use:** This wire gives the Co-Pilot the ability to automatically cancel overdrive.

**Where to connect it:** On the C2 connector of the PCM which is located on the driver's side of the engine block. The OD (**Dark Green**) wire is on the connector that is closer to the firewall in **pin 13**.

**How to connect it:** Strip back approximately ½" of the insulation from the Dark Green PCM wire and solder the Co-Pilot's white wire to the PCM dark green wire. Protect this connection.

### **-Green Wire- Vehicle Speed Sensor (VSS) - PIN #17**

**Reasons for use:** This is how the Co-Pilot is able to know what speed of the vehicle is traveling so it can control the TCC lock up speed. **NOT OPTIONAL**

**Where to connect it:** On the C2 connector of the PCM which is located on the driver's side of the engine block. The VSS wire (**green with yellow tracer**) is on the connector that is closer to the firewall in **pin 11**.

**How to connect it:** Strip back approximately ½" of the insulation from the green with yellow tracer wire and solder the Co-Pilot's **green** wire to the **green with yellow**. Protect this connection.

### **-Yellow Wire- PCM – PIN #10 and -Blue Wire- TCC – PIN #11**

**Reason for use:** These wire control torque converter lockup.

**Where to connect them:** At the **yellow with light blue tracer** wire on the circular 8 pin connector which is located on the upper-driver's side of the transmission OR on the C2 connector of the PCM which is located on the driver's side of the engine block. The TCC (**yellow with light blue tracer**) wire is on the connector that is closer to the firewall in **pin 25**.

**How to connect them:** Cut the **yellow with light blue tracer** wire (Read the "Tips" section) and butt connector to the end that leads back to the transmission and crimp another butt connector to the end that leads to the PCM.

Crimp the Co-Pilot's **Yellow** wire to butt connector that goes to the **PCM**.

Crimp the Co-Pilot's **Blue** wire to the butt connector that goes to the **transmission**.

**Tips:** There are multiple yellow wires in this connector, take your time to make sure that you cut the correct one. Reference the supplied wiring schematic before cutting wire. Do your best to shield this connection from the elements. If possible, connect at PCM rather than transmission.

### **-Tan Wire- PRNDL– PIN #8**

**Reasons for use:** Preventing trouble codes

**Where to connect it:** At the **dark green with yellow** tracer wire in the 6-Pin connector that is located at the transmission range sensor, driver's side of transmission, near the pan rail.

**How to connect it:** Strip back approximately ½" of the insulation from the dark green with yellow tracer wire and solder the Co-Pilot's **tan** wire to the **dark green with yellow**. Protect this connection.



**BROWN (PIN #6) AND PURPLE (PIN #16) WIRES ARE NOT USED IN THIS INSTALLATION.**

**-Gray Wire- Exhaust Brake (Vehicles with exhaust brake *only*) – PIN #13**

**If you do not have an exhaust brake, skip this section.**

**Reason for use:** This function allows your aftermarket or factory exhaust brake to turn on with the Co-Pilot torque converters lockup when decelerating only. **OPTIONAL**

**If you do not have an exhaust brake, leave the Grey wire unconnected.**



## **Troubleshooting**

If you experience problems after installation, simply unplug the wiring harness from the back of the Co-Pilot module and **put a bent paperclip into blue and yellow terminals of the harness' plug** (jumper the blue and yellow together). This reconnects the wire that you cut at the transmission plug and bypasses the Co-Pilot completely.





## 2004-2005 Dodge

| PIN | WIRE COLOR |
|-----|------------|
| 1   | RED        |
| 4   | ORANGE     |
| 5   | WHITE      |
| 6   | BROWN      |
| 9   | BLACK      |
| 10  | YELLOW     |
| 11  | BLUE       |
| 12  | PINK       |
| 13  | GRAY       |
| 16  | PURPLE     |
| 17  | GREEN      |

