



**Installation Manual v3.0:  
Early 2006 Dodge 48RE Cummins 5.9L**

**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.

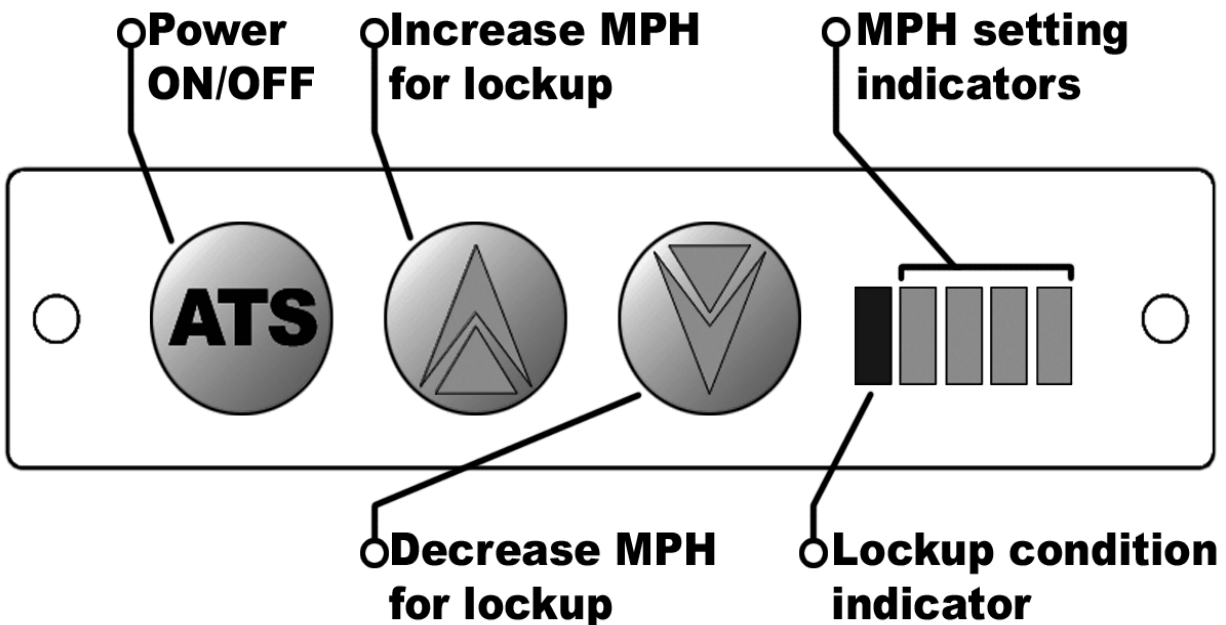


**Understanding the ATS Five Star Co-Pilot**

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 failure 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)**

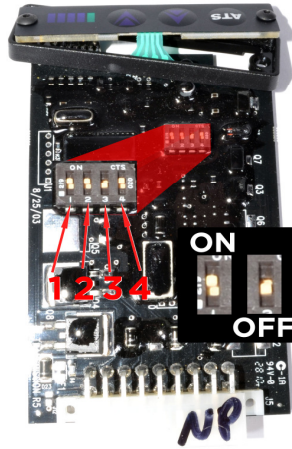
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**Switch #4**

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



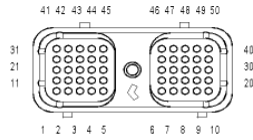
### **Co-Pilot Mounting Location**

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.



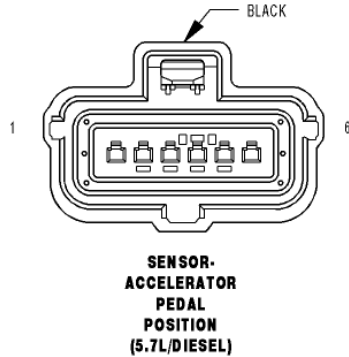
**MODULE-  
ENGINE  
CONTROL C2**

MODULE-ENGINE CONTROL C2 - 50 WAY

CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	K23 18BR/WT	APPS NO. 1 SIGNAL
4	-	-
5	T515 18YL/DB (A/T)	TRANSMISSION CONTROL
6	K174 18BR/YL	INTAKE AIR HEATER RELAY CONTROL
7	K31 18BR	FUEL PUMP CONTROL
8	-	-
9	T41 18YL/DB (A/T)	PARK/NEUTRAL POSITION SWITCH SENSE (T41)
10	-	-
11	-	-
12	-	-
13	T6 18DG (A/T)	TOW-HAUL OVERDRIVE OFF SWITCH SENSE
14	T118 18DG (A/T)	GOVERNOR PRESSURE SOLENOID CONTROL
15	T9 18DG/TN (A/T)	3-4 SOLENOID CONTROL
16	-	-
17	T38 18YL/BR (A/T)	GOVERNOR PRESSURE SENSOR SIGNAL
18	-	-
19	-	-
20	A209 16RD	FUSED B(+)
21	Z902 16BK	GROUND
22	-	-
23	F856 18YL/PK (A/T)	5 VOLT SUPPLY
24	K900 18DB/DG	SENSOR GROUND
25	T75 18YL/LB (A/T)	TORQUE CONVERTER CLUTCH SOLENOID CONTROL
26	-	-
27	K312 18CR (A/T)	TIVA POSITION SENSOR SIGNAL
28	-	-
29	T54 18DG/CR (A/T)	TRANSMISSION TEMPERATURE SENSOR SIGNAL
30	A209 16RD	FUSED B(+)
31	-	-
32	F202 18PK/GY	FUSED IGNITION SWITCH OUTPUT (RUN-START)
33	K854 18VT/BR	5 VOLT SUPPLY
34	-	-
35	K29 18WT/BR	APPS NO. 2 SIGNAL
36	V32 18VT/YL	BRAKE SWITCH NO. 2 SIGNAL
37	B29 18DG/WT	BRAKE SWITCH NO. 1 SIGNAL
38	-	-
39	-	-
40	A209 16RD	FUSED B(+)
41	C13 18LB/CR	A/C CLUTCH CONTROL
42	-	-
43	K160 18BR/CR	PWM FAN COIL SIGNAL
44	T14 18DG/BR (A/T)	OUTPUT SPEED SENSOR SIGNAL
45	T13 18DG/VT (A/T)	SPEED SENSOR GROUND
46	V37 18VT	S/C SWITCH NO. 1 SIGNAL
47	K25 18DB/VT	BATT TEMP SIGNAL
48	K400 18BR/VT	APPS NO. 2 RETURN
49	Z902 16BK	GROUND
50	Z902 16BK	GROUND

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

Connect at the TPS connector located at the top of the accelerator pedal arm under the dash. It is easiest if you unplug the connector to access the wire. This is a six-wire connector. In the fifth terminal there is a **brown with white** tracer wire, tap this wire with the Co-Pilot’s Pink wire using the technique shown in the second to last page in this manual.



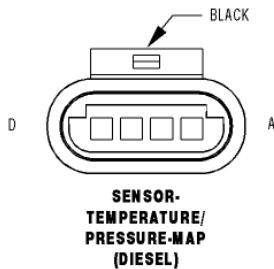
SENSOR-ACCELERATOR PEDAL POSITION (5.7L/DIESEL) - BLACK 6 WAY

CAV	CIRCUIT	FUNCTION
1	F856 20YL/PK	5 VOLT SUPPLY
1	K854 20VT/BR (DIESEL)	5 VOLT SUPPLY
2	K29 20WT/BR	APPS NO. 2 SIGNAL
3	K400 20BR/VT	APPS NO. 2 RETURN
4	K167 20BR/YL	APPS NO. 1 RETURN
5	K23 20BR/VT	APPS NO. 1 SIGNAL
6	F855 20PK/YL	5 VOLT SUPPLY
6	K852 20BR/VT (DIESEL)	5 VOLT SUPPLY

**The remaining wires must be run through the firewall to the engine compartment.**

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

Connect 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 into the **light blue** wire, which is in the fourth (“D”) terminal. Use the technique shown in the second from last page of this manual.



SENSOR-TEMPERATURE/PRESSURE-MAP (DIESEL) - BLACK 4 WAY

CAV	CIRCUIT	FUNCTION
A	K210 18DB/TN	SENSOR GROUND
B	K21 18DB/LG	INTAKE AIR TEMPERATURE SENSOR SIGNAL
C	F855 18PK/YL	5 VOLT SUPPLY
D	K37 18LB	BOOST PRESSURE SENSOR SIGNAL

**Important:** 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. The Co-Pilot may not work properly if it receives signals that have been modified by other aftermarket devices. The Co-Pilot does not modify the signal and will not interfere with any other devices that are connected “down stream”. This wire is only for sensing engine load.



**-Tan Wire- PRNDL- PIN #8**

Connect at the 6-pin transmission range sensor located on the driver's side of the transmission near the pan rail. Tap into the **dark green with yellow** tracer wire with the Co-Pilot's **Tan** wire. Use the technique shown in the second from last page of this manual.





### **Red Wire- +12V Power - Co-Pilot Harness PIN #1 NOT OPTIONAL**

**Reason for use:** The red wire is used to supply key on power to the Co-Pilot allowing it to operate.

Connect at the “C2” connector of the PCM into the **Pink w/ gray** wire in **pin 32**. Use the technique shown in the second from last page of this manual.

### **-Black Wire- GND Ground - PIN #9 NOT OPTIONAL**

**Reason for use:** The black wire is used to supply ground to the Co-Pilot constantly, allowing it to power up.

Connect at the negative (-) terminal of the battery. Connecting to PCM “C2” connector pin #50 can interfere/malfunction when used with some aftermarket modules.

### **-White Wire- Overdrive - PIN #5**

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

Connect at the “C2” connector of the PCM into the **Dark Green** wire in **pin 13**. Use the technique shown in the second from last page of this manual.

### **-Brown Wire- From Transformer**

Connect at the “C2” connector of the PCM into the **Dark Green wire with Brown tracer** in **pin 44**. Use the technique shown in the second from last page of this manual.

### **-Purple Wire- From Transformer**

Connect at the “C2” connector of the PCM, into the **Dark Green wire with Purple tracer** in **pin 45**. Use the technique shown in the second from last page of this manual.

### **-Yellow Wire- PCM – PIN #10 and -Blue Wire- TCC – PIN #11 NOT OPTIONAL**

Connect at the “C2” connector of the PCM, into the **yellow with light blue tracer** wire in pin 25.

**Cut** the **yellow with light blue tracer** solder and shrink-wrap the end that leads into the harness towards the transmission to the Co-Pilot’s **Blue** wire. Solder and shrink-wrap the end that leads to the PCM plug to the Co-Pilot’s **Yellow** wire. Reference the attached wiring diagram.

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

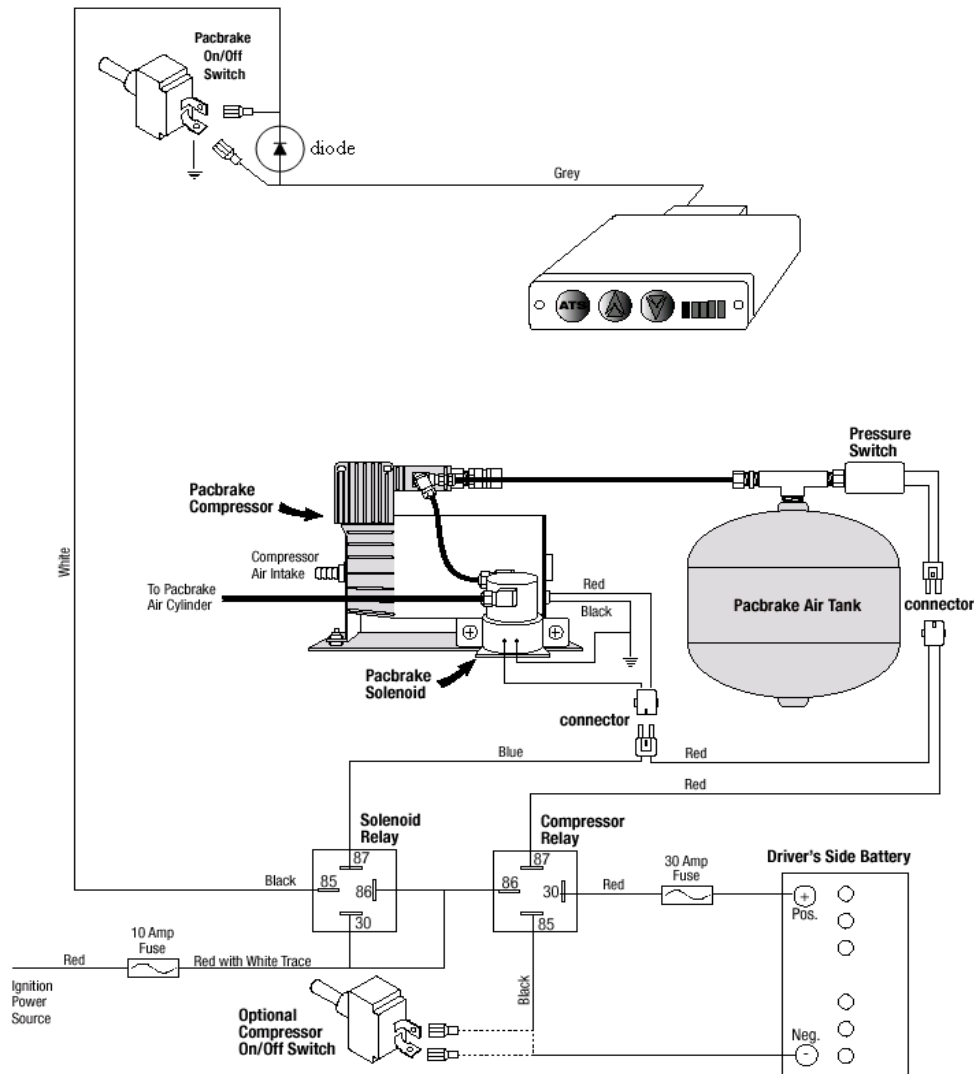
**If you do not have an exhaust brake, skip this section.**

Cut the Exhaust brake solenoid's ground wire and attach it to the Co-Pilot's **Gray** wire with shrink wrap and solder.

**You can use the warm-up feature of your exhaust brake by simply turning off the Co-Pilot Box and turning on the exhaust brake's toggle switch.**

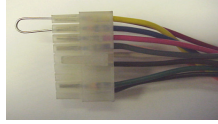
**-Diode- All models with Exhaust Brake**

There is a stripe on the diode that indicates the positive side. Attach the positive side of the diode to pin 85 of the Pacbrake relay. Attach the negative side of the diode to the gray Co-Pilot wire. See the provided wiring diagram for clarification.



## **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.





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PIN	WIRE COLOR
1	RED
4	ORANGE
5	WHITE
8	BLACK
10	YELLOW
11	BLUE
12	PINK
13	GRAY
17	GREEN

