



Installation Manual for 2003 Dodge Cummins Version 3.0

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

Thank you for purchasing the ATS Co-Pilot Module 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.

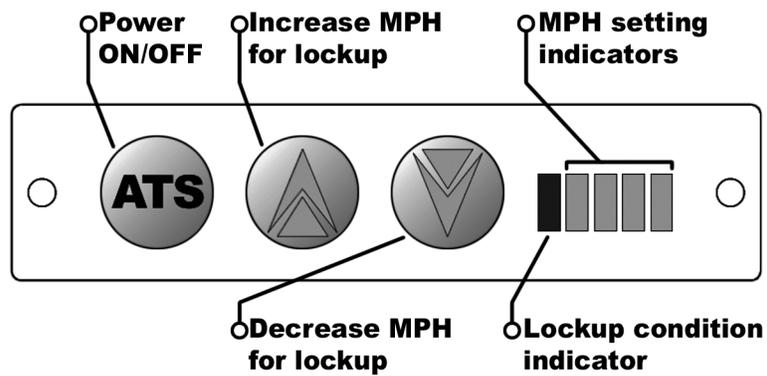


Understanding the ATS Five Star Co-Pilot

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 1/16th - 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; 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:

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

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 Co-Pilot 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**

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)

Switch #4

Set this switch to the **ON** position

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



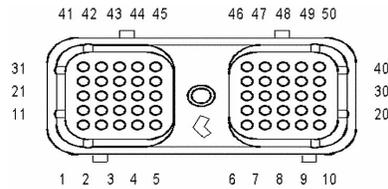
Co-Pilot Module Mounting Location

Find a convenient location to mount the Co-Pilot module with in reach and view of the driver. The Co-Pilot interface must be within visual range of the driver as well as in easy reach. We have found the ideal place to locate the module is just to the right of the driver on the lower dash panel just above the right knee. Use the Velcro supplied to secure it to the dash. Before sticking the Velcro to the dash use brake clean or acetone on the area the sticker will be. Run the Co-Pilot wires that are to be wired up to the PCM (Power-train control module) and the transmission through the firewall. Between 2003 and 2004 Dodge moved the PCM from the Passenger side firewall to the Driver side engine block. Follow the instructions for your application. This kit is for Dodges with the PCM on 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

C2 Connector

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	K31 18BR	FUEL PUMP RELAY CONTROL	-
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	-	-	-
35	K616 18BR/YL	INLET AIR PRESSURE SENSE	-
36	V32 18VT/YL	BRAKE SWITCH NO.2 SIGNAL	-
37	B29 18DG/WT	BRAKE SWITCH NO.1 SIGNAL	-
38	-	-	-
39	-	-	-
40	A209 16RD	FUSED BATTERY(+)	-
41	C13 18LB/OR	A/C CLUTCH RELAY CONTROL	-
42	-	-	-
43	K160 18BR/OR	FAN CLUTCH CONTROL	-
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 18VR/VT	APPS NO.2 RETURN	-
49	Z902 16BK	GROUND	-
50	Z902 16BK	GROUND	-

-Red Wire- +12V Power – 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**

Locate a Power wire at the vehicles PCM. Tap the **Pink/Gray** wire that goes to Pin **32** of the **C2** PCM Connector (PCM is located on the Passenger side firewall). This is the run/start signal.

-Black Wire- Ground (GND) – PIN #9

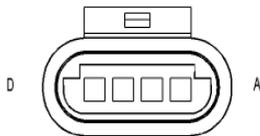
Reasons for use: The black wire is a constant ground which allows the Co-Pilot to turn on and be functional. **NOT OPTIONAL**

Locate a Power wire at the vehicles PCM. Tap the **Black** wire that goes to Pin **21** of the **C2** PCM Connector (PCM is located on the Passenger side firewall).

-Orange Wire- MAP – PIN #4 (* OPTIONAL*)

Reasons for use: This function allows the Co-Pilot to sense engine load to better enhance its ability to control the TCC application.

Locate the MAP sensor signal wire. If the vehicle has any aftermarket modifications that also tap this MAP wire, make sure that the Co-Pilot's tap is closest to the sensor. Tap the **Lt. Blue/White Cavity A**, wire that goes to the MAP sensor. MAP sensor is located on rear driver's side of engine.



INTAKE AIR
TEMPERATURE/
MANIFOLD
ABSOLUTE
PRESSURE
SENSOR
(DIESEL)

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.

Tap the **Dark Green** wire that goes to Pin **13** of the **C2** PCM Connector.

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

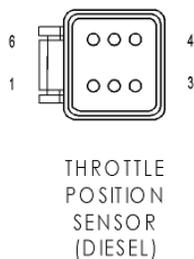
Locate the vehicle's Torque Converter Clutch (TCC) wire coming from the vehicle's PCM to the transmission. **Cut the Yellow/Light Blue** wire that goes to **Pin 25** of the **C2** Connector. **Be sure to leave at least 2 inches of wire coming from the plug. Reference the wiring diagram before cutting. Protect the connections.**

Connect the **Yellow** wire coming from the **Co-Pilot** to the wire that goes to the PCM. Connect the **Blue** wire coming from the **Co-Pilot** to the wire that goes into the wire loom to the transmission.

If at anytime you would like to bypass the Co-Pilot's operation, simply unplug the wiring harness from the Co-Pilot Module and jumper the harness' blue and yellow terminals together with a paperclip. See the Troubleshooting section for more detail.

-Pink Wire- Accelerator Pedal Position Sensor (APPS) – PIN #12(* OPTIONAL *)

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:** 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 **Yellow** wire in the APPS Plug wire loom **Cavity 3**.



THROTTLE POSITION SENSOR (DIESEL) - 6 WAY		
CAV	CIRCUIT	FUNCTION
1	K104 18RD/WT	SENSOR GROUND
2	K101 18WT	THROTTLE POSITION SENSOR RETURN
3	K232 18YL	THROTTLE POSITION SIGNAL
4	K56 18LG/OR	SUPPLY VOLTAGE
5	K900 18DB/DG	SENSOR GROUND
6	K49 18VT/BK	No Function Defined

-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**

Locate the VSS (Vehicle Speed Sensor) wire in the vehicle's computer wiring harness. Tap the **Dark Green/Brown** wire that goes to Pin **44** of the **C2** Connector.

-Tan Wire- PRNDL – PIN #8

Reasons for use: This allows lock up when manually downshifting into 2nd gear.

Locate the PRNDL Switch/Transmission Range Selector (6-Pin Connector) that is located on the driver's side of the transmission, near the pan rail. Tap the **Yellow w/ Red** wire.



View from bottom for 48RE Transmission

-Brown Wire (Pin #6) and Purple Wire (Pin #16) is NOT USED in this installation

-Gray Wire- Exhaust Brake – 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.

Locate the exhaust brake solenoid. There should be 2 wires coming off of the solenoid. One wire delivers power to the solenoid via a power switch mounted inside the cab. The other wire supplies ground to the solenoid. The ground wire that comes from the solenoid to the ground on the engine must be removed and connected to the gray wire that comes from the Co-Pilot module. The Exhaust-brake feature of the **Co-Pilot** will only work with an exhaust brake that uses a solenoid to actuate it. We recommend the use of a **Pacbrake** with our **Co-Pilot**. Some exhaust brakes do not use a solenoid, instead they use a computer module. In this case you will need to add a relay in the circuit to control the exhaust brake or use the **Co-Pilot** as a stand-alone unit. We have supplied wiring diagrams that detail the connection to a Pacbrake.

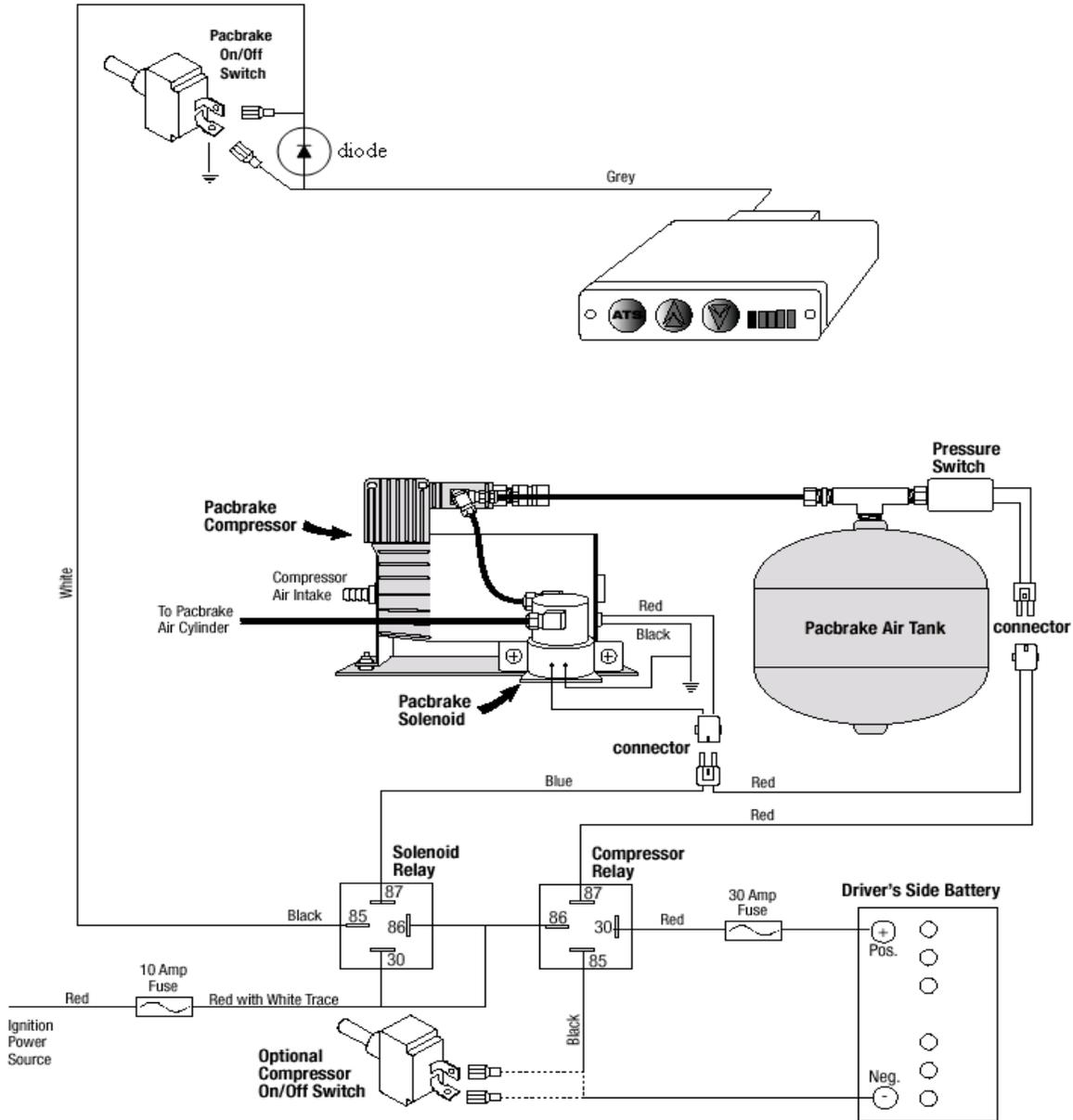
You can use the warm-up feature of your exhaust brake by simply turning off the Co-Pilot Box and turning on the exhaust brake's toggle switch.

Please note: If you are installing a Pacbrake now, or in the future, you do not need to make any Pacbrake connections at the ECM or install the Pacbrake ECM Bypass Kit.

-Diode- All models with Exhaust Brake

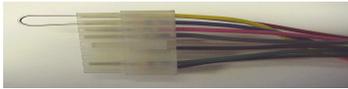
There is a stripe on the diode that indicates the positive side. Attach the positive side of the diode to pin 85 of the Pacbrake relay. Attach the negative side of the diode to the gray Co-Pilot wire. See the provided wiring diagram for clarification.

Recommended exhaust brake wiring



Troubleshooting

If you experience problems after installation, there is a simple test to help diagnose the problem. 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.



If your pickup behaves normally after bypassing the Co-Pilot: Make sure you are following the operating instructions correctly and that all wire connections are good and to the *proper* wires. If the problem continues, contact our Technical Support department at Tech@ATSDiesel.com or 800-949-6002.

If the problem continues after bypassing the Co-Pilot: There is a problem with a wire connection. Double-check all connections. Make sure your solder connections are good, if any look suspect, re-solder. Make absolutely sure that all taps were made on the *correct* wires. Some of these wires can be easily confused with neighboring ones especially if the connection was made away from the plug, inside the wiring harness. If the problem continues, contact our Technical Support department at Tech@ATSDiesel.com or 800-949-6002.



2003 Dodge

WIRE	FUNCTION
1	RED
2	ORANGE
3	WHITE
4	BROWN
5	BLACK
10	YELLOW
11	BLUE
12	PINK
13	GRAY
14	PURPLE
17	GREEN

PRNDL SWITCH
6-1 Pin Connector
Located on driver side of transmission floor the pin rail

DARK GREEN W/ YELLOW

Applies **ONLY** to vehicles equipped with an Exhaust Brake

Remove the brake on/off switch's ground wire and replace with the Gray Co-Pilot wire

Splice the supplied diode across positive and negative leads (Make white cap towards positive)

For 2005 Vehicles ACCEL SENSOR / TPS
(located above accelerator pedal)
PIN 5
BROWN W/ WHITE WIRE

For 2004 Vehicles APPS
ACCELERATOR PEDAL POSITION SENSOR
(located at front of engine, driver side, under black plastic cover)
BROWN W/ WHITE WIRE

Co-Pilot™

18	17	16	15	14	13	12	11	10
9	8	7	6	5	4	3	2	1
RED - 12 V POWER (PIN 1)								
ORANGE - MAP SENSOR (PIN 4)								
WHITE - OD (PIN 5)								
BROWN - N/A (PIN 6)								
TAN - PRNDL (PIN 8)								
BLACK - (GROUND) (PIN 9)								
YELLOW - PCM (PIN 10)								
BLUE - ICC (PIN 11)								
PINK - ACCELERATOR / TPS (PIN 12)								
GRAY - EXHAUST BRAKE (if equipped) (PIN 13)								
PURPLE - N/A (PIN 16)								
GREEN - VSS (PIN 17)								

MAP SENSOR
(located on top of engine, driver's side, next to valve cover)
PIN 4
LIGHT BLUE WIRE
Note: Tap before any other modules

PCM
(located on driver side of engine block)

Pin D01 **DRK GREEN W/ YELLOW (VSS)**

Pin B25 **YELLOW W/ LT BLUE**

Pin B03 **BLACK**

Pin D02 **PINK W/ GRAY**

Pin B15 **DARK GREEN**

Splice yellow from Co Pilot with yellow w/lt blue

Cut yellow w/lt blue wire

Splice blue from Co Pilot with yellow w/lt blue