

# SP DIESEL PERFORMANCE

**Advanced Performance Solutions  
for TurboDiesel Engines**

<http://www.spdiesel.com>

[spdiesel@spdiesel.com](mailto:spdiesel@spdiesel.com)

**sales: 877.239.2990**

**support: 443.541.3331**

*Real Performance Real Savings*



*micro Brake & Torque Converter Controller*

## **Installation and Operation Manual**

***Compact Exhaust Brake and/or Optional TC Control for 7.3L  
PowerStroke Turbo-Diesel***

You must read entire document before beginning installation and use

SP Performance, LLC

Page1

<http://www.spdiesel.com>  
[spdiesel@spdiesel.com](mailto:spdiesel@spdiesel.com)  
"Intelligent Power"

## **Exhaust Brake and/or Torque Converter Controller Kit Contents**

- Integrated Control Module.
- Harness with labeled connections for a hassle-free install. Every possible convenience was included in the harnessing to ensure an easy installation experience.
- Small Parts Bag. A baggie containing fuse taps, taps, connectors, and zip-ties and such has been included to aid your installation.
- Optional Plug in Kits for your model year and make vehicle (if purchased with unit) (may also be purchased after initial sale)

## **Tools Required:**

- A good DMM or DVOM (Multimeter) for probing circuits. A test light will do in a pinch, but remember that test lights can be misleading if not understood or used properly.
- A good quality wire stripping/cutting/crimping tool. Your installation will only be as good as the tools used!
- A wire fish (coat hanger) for running wires in tough to reach locations or through the firewall if necessary.
- Any additional items you wish to use to tidy up your installation. It is up to the installers 'creativity' to ensure the unit is properly secured. We have supplied most if not all of what you need in this department but everyone's install will likely vary and therefore it is your responsibility to heed the warnings and specifications.

## **Vehicle Compatibility:**

In general this unit is designed to be compatible with Ford and Dodge Turbo-Diesels

- Ford Diesel (Exhaust Brake and/or Transmission)
- Dodge Diesel (Transmission Only)

## **Use of the Cruise Control as an interface:**

The methods used to read the cruise control circuit are the same ones used by the factory. We do not send any signaling on the wire(s) for your cruise control. We simply read the cruise control buttons and your new controller takes action based on those inputs. When you activate your cruise control (turn on or arm), we suspend acting on those signals. Simply put, when you have cruise on, you cannot change settings in your controller and when your cruise is off, you can make changes to your controllers programming.

## **The EBV as an Exhaust Brake**

### **Common Misconceptions:**

The use of an EBV brake will damage the engine or drivetrain...Not true. There is no excessive wear on your vehicle. This unit will not cause EBV sticking or valve float or anything like that. The factory EBV is an effective and safe method of assisted braking on your vehicle. The exhaust brake feature for Ford 7.3L PowerStroke Diesels will also not raise your EGTs, as it is never on when you are accelerating.

## **Why Lock-Up your converter earlier than the factory programming?**

### **Common Misconceptions:**

Most of the time the transmissions in modern turbo-diesel engines are tuned to maximize HP not torque, as well as emissions. This means letting the motor rev out further (like a gasoline engine), never achieving full load characteristics and fueling parameters. This behavior is not desirable for a diesel where the torque is put to the ground across the entire RPM band. Remember, Torque is what you want in a turbo-diesel. The high revving simply allows most of your horsepower to be converted into heat energy and it never gets a chance to see the rear wheels at lower RPMs. Locking up will put that power to the ground instantly on command. Think of your torque converter as the clutch for your automatic. It's an oversimplification, but for the purposes of this install guide it is sufficient.

### **Transmission Temperature:**

As stated in the last paragraph, when the TC is unlocked, a certain portion of the power that is getting put through the TC is lost through slippage. Slippage means incomplete power transfer, and hence that power gets turned into heat energy instead of mechanical energy. Running Locked-up sooner keeps the temps lower. Differences of up to 50 degrees (average) have been seen. Instantaneous temperature differences of up to 90 degrees have been seen in testing, by monitoring the before and after converter temperatures of the fluid.

### **Exhaust Gas Temperature:**

Manufacturers let the motors run out near redline against the stall speed of the converter to manage not only driveability but emissions. Keeping the motor fueling against a less than full load results in incomplete combustion, and that drives exhaust temps. Locking up sooner generally drops EGTs under load.

### **Precautions/Disclaimers**

- ! Check your Local Motor Vehicle Laws and emissions laws before installing.
- ! Use common sense when applying the technology you have purchased. Using this to street race or perform dangerous stunts or activities can not only be dangerous but deadly. That is to say observe local traffic laws when using this product.
- ! Use this product at your own risk. Due to the performance nature of this product, we do not make any warranty statements with regards to durability of your vehicle while using the product. In general, this product does not shorten the life of your drivetrain, but anything that gets abused or improperly used is subject to a shortened useful life.
- ! Do not, unless instructed by support to open the case of the VTT Controller. You may void any warranty on the unit by doing so without our instructions to do so.
- ! Use caution when using the exhaust brake or TC Lock features in inclement weather. This can have unpredictable behavior.

## microBrake and microTrans Features

### Pushbutton

The pushbutton is used to activate and set features that will be discussed later on in this installation guide.

- ! Do NOT press the button while in gear and stopped or traveling at low speeds. This will momentarily lock the converter and may cause bucking or stalling.

### microBrake/microTrans LED Light Indicators (left to right)

1. Power LED (Green) (Lit when truck is keyon/running)
2. EBV Solenoid(Ford) LED (Red) – LED 'A' (Lit when EBV Active)
3. IVS(Ford)– LED 'B' (Yellow) (Lit when at Rest)
4. TCC Status (Red) (Lit when Locked)

### Push Button Operation

- Push to Lock Converter. When pressed this button will momentarily lock the converter.

**Ford microBrake/microTrans General Vehicle Install** - Harness Wires are labeled for your convenience

**Switched 12V Power (Key On) Wire:** This should be connected to a good fused Key-On source. You may use a supplied fuse tap to ease your installation at the fuse panel. Ensure that you are tapping into the 'fused side' of the fuse though. With the key-on, remove the fuse from the prospective location and check for 12v. The side without voltage is the 'fused side'. If there are any questions we recommend purchasing and installing a fusible link from your local electronics supply store.

**Ground Wire:** Use a good clean grounding location under the dash. It should be free and clear of other accessories whenever possible. Use supplied grounding ring and attach using your wire crimpers.

**Pedal (IVS):** This is the idle validation switch on the pedal assembly. It reads 0VDC at rest and 12VDC (Line voltage may be as high as 14.4 VDC) when depressed (Key on or running)

**Cruise Wire:** This is the cruise control sense wire. This wire will read varying voltages (DC) when the truck is key on or running and various buttons are pressed on the cruise cluster.

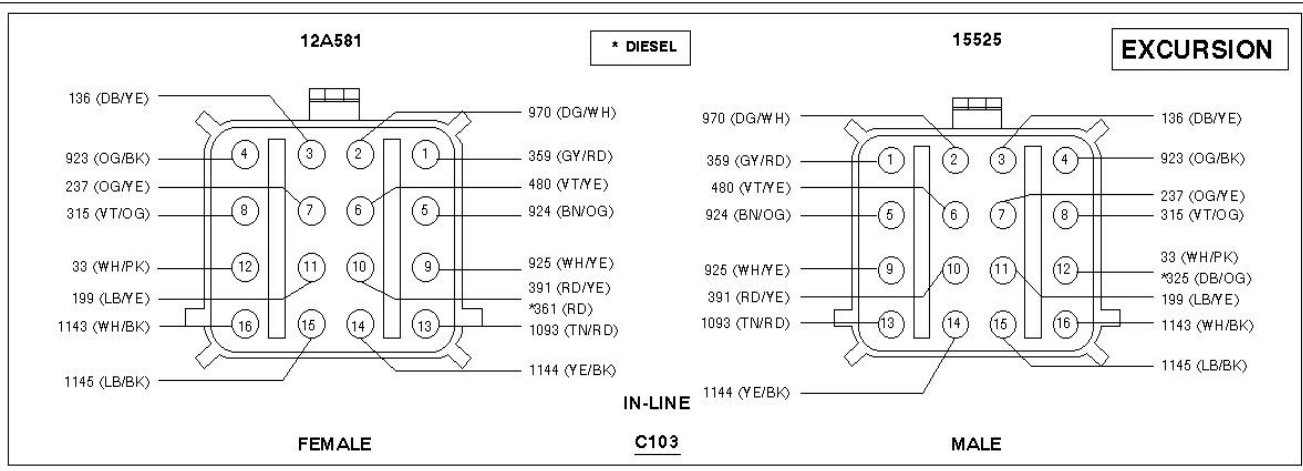
**EBV (Ford Exhaust Brake installations only):** These connections are pre-harnessed using plug-in style connectors. The EBV is located on the base of the turbo and is best accessed from the passenger-side of the engine. Make sure it's a cool or cold engine. Hot engines = even hotter turbos = burnt installer hand.

**TCC (Torque Converter Clutch) Solenoid:** This wire is located in the C103 pack of wires under the airbox/brake booster assembly (1999-2003). On 1997's the wire can be accessed directly at the transmission. On 1999 and up the wire is violet/yellow.

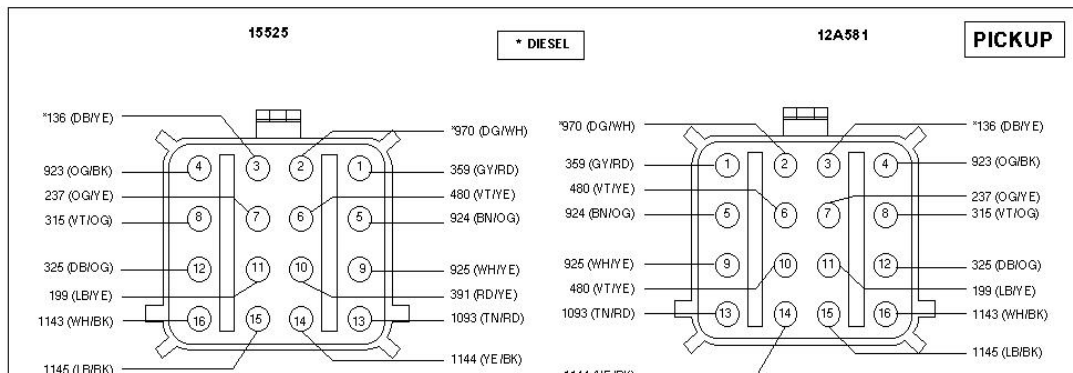
**OSS (Output Shaft Speed) Sensor:** This wire is also located in the C103 pack of wires under the airbox/brake booster assembly (1999-2003). On 1997's the wire is located in the cab.

Connection	Harness Wire Color	Truck Wire Color (primary/trace)	Location
Key On 12V	Purple	Customer Choice	Fuse Panel or known 12v source
Ground	Grey	Customer Choice	Known good ground
Pedal IVS	White	Red/Green	Pedal Assembly
Cruise Sense Wire	Orange	Medium Blue/Black	Just to the right of the steering column
EBV	Pre-Harnessed	N/A Wires Pre-Harnessed	Turbo Base behind intercooler pipes
Torque Converter Clutch Solenoid (TCC)	TC PCM = Blue TC Trans = Yellow	Violet/Yellow	C103 Under Airbox in 16 way connector OR at transmission connector at trans housing.
Output Shaft Speed Sensor (OSS)	Green	Blue/Yellow	C103 Under Airbox in 16 way connector OR at transmission connector at trans housing.

C103 Graphic (connectors under airbox)



C103 In-Line, Pickup



SP Performance, LLC

Alternate Install Point for OSS/TCC = At Transmission Connector under truck. We recommend C103 as it's closer and better weather sealing, but ultimately it's up to you.

### Cruise Control Button Functionality Meanings

Cruise Button	Function	Description
On	Disable microTrans/microBrake programming Function/ Enable Cruise	On will enable the cruise control, thereby disengaging the Solid State Exhaust Brake and disabling programming changes to the controller
Short Off	Disable Cruise	A short off will disable cruise but NOT activate the controller.
2 Second Off	Disable Cruise/Enable microTrans/microBrake Programming	Holding the Off Button for 2 seconds will enable the brake. When the truck is keyed-on, the brake will default to ON.
Coast	Cancel Lock/Unlock Set Points	Clears memory!
Set	Sets Lock Speed of Converter.	With the Exhaust brake enabled, Achieve the desired speed and push the set button. LED 4 will illuminate when the TC locks
Resume	Sets Unlock Speed of Converter	With the Exhaust Brake enabled, achieve the desired unlock speed and hit the resume button. LED#4 will go dark on the unit.

### A Note on the TC Lock Feature

\*\*\*There are safeties built into the microBrake/TC unit that prevent automatic lock from being programmed below roughly 22-25MPH. If you wish to have those safeties removed you must contact us after you have installed and are familiar with the operation of this unit.

### When is a good speed to lock?

Generally the lower the better, but a higher lock speed may correct shifting harshness as well

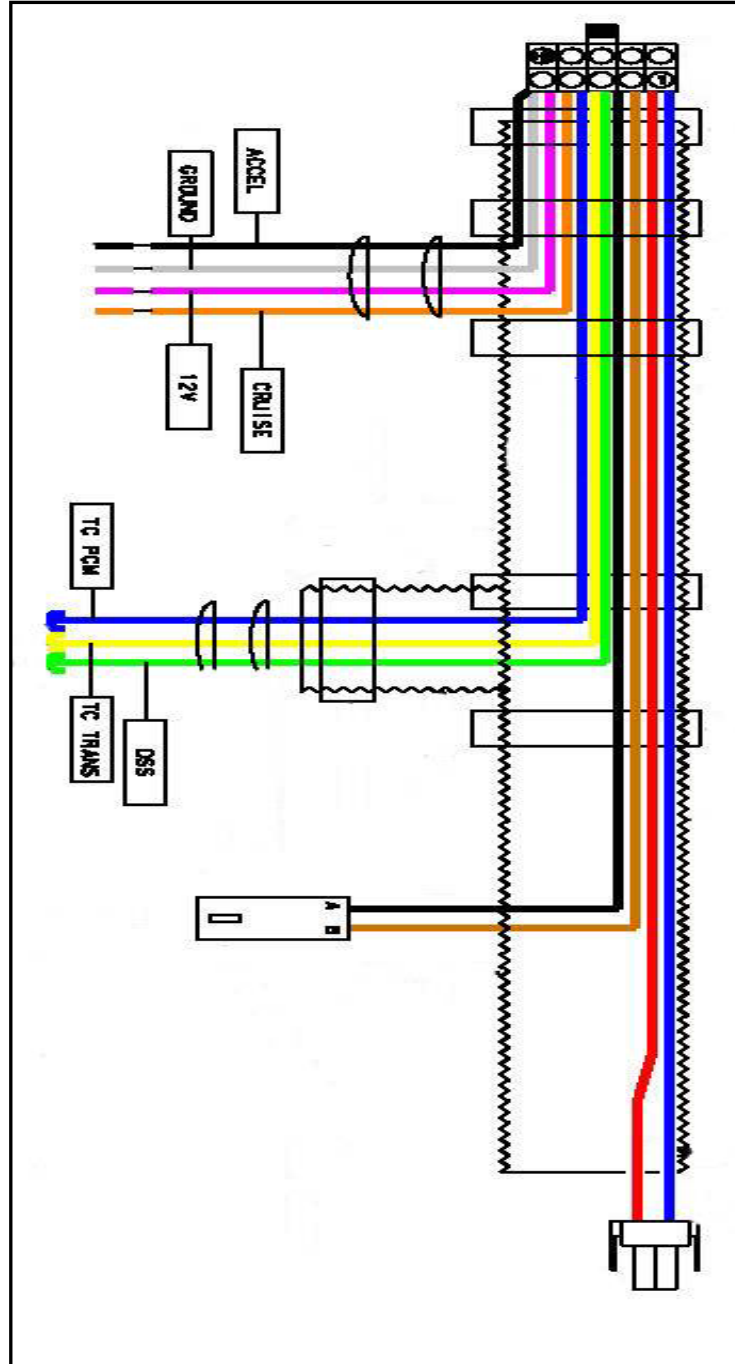
### IMPORTANT:

This installation manual assumes that you are cutting the wire to the TC. This prevents the flashing OD light. If you are not interested in cutting the wire, please do not cut it and only tap connect to the TC wire using the TC Trans wire(yellow).

**Harness Line Drawing for microBrake and microTrans FORD (Trans Only do not use connectors at end of line drawing.)**

The below line drawing assumes no optional plug ins have been purchased. Plug-Ins are available for the C103(99 and up) and the pedal connector (only for 01 and up)

**Exhaust Brake/Trans**



## Where to install

microTrans/microBrake Controller: Controller is designed to be installed in the cab. Installation under the hood is **never** recommended and will void any warranty or support on the mTrans/mBrake product.

microTrans/microBrake Harness: install and secure safely under the dash.

- ! Make sure that the harness and wire connections do not interfere with the accelerator, clutch, or brake pedal operation.

Vehicle Specific Information (see end of instruction sheet for additional information)

Ford F250, F350 and Excursion

## TROUBLESHOOTING...

Common Installation Issues

- Improper Key-On Power Source (if the key-on source is part of the ignition power circuit in the truck, the unit may not power up.
- Improper Ground
- Incorrect install wires.
- Email customer support. [support@SPdiesel.com](mailto:support@SPdiesel.com) should be your first line of support for installation issues.

## Installation Pictures

Fuel Pedal and grounding location  
on a 99-01 (pre-10way pedal connector)



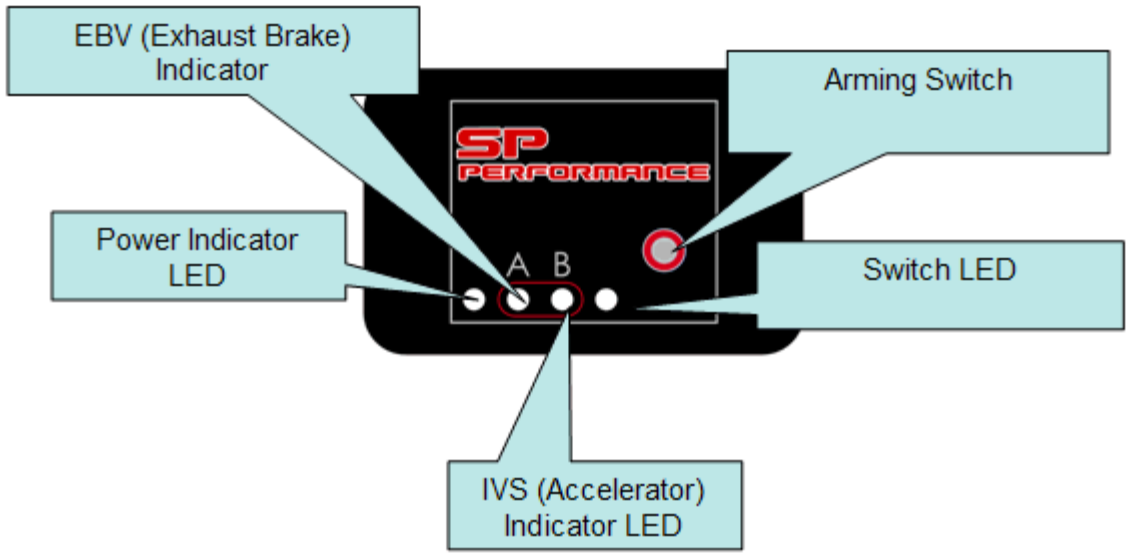
Pedal on 01 and up (10 way)



EBV Connector on 99 and up Ford (do not confuse with IPR which is next (to the drivers side) to filter bowl. The EBV connector connects directly to the base of the turbo. If you connect to the IPR, your truck won't start....



### Exhaust Brake Only Operation



### Exhaust Brake With TC Control Operation

