Allison Lockup Controller

Transmission Lockup and Pressure Controller

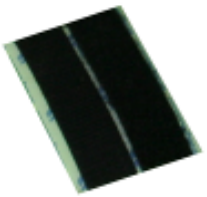
1031311	**2001-2010 Duramax Allison Lockup Controller ONLY LB7/LLY/LBZ/LMM**
1031312	**2011-2015.5* Duramax Allison Lockup and Pressure Controller LML**
1031313	**2015.5*-2016 Duramax Allison Lockup and Pressure Controller LML (RPO code “AVF”)**

*2015 trucks had a mid-year TCM change. To verify, open the glove box and locate the RPO code sticker. This has a series of 3 digit build codes on it. Look for **AVF**. If code **AVF** is present, order the 1031313 kit. If no **AVF** is found, order 1031312.

Kit Contents

1607263	1607261	1607265
		
Allison Control Module	Push Button Harness	Manual Switch Kit
Qty: 1	**Qty: 1**	**Qty: 1**

1301810	1301815	2000107
		
Push Button Switch	Switch Decal	Switch Bracket
Qty: 1	**Qty: 1**	**Qty: 1**

FT-10910-03116	1330052	1330054	1300131
			
Velcro	Bracket Screws	Double Sided Tape	Tie Wrap
Qty: 2 pcs	**Qty: 2**	**Qty: 1**	**Qty: 6**

1607264	1607260	1607266
IN DEVELOPMENT		*IN DEVELOPMENT*
Allison Harness 01-10	Allison Harness 11-15.5	Allison Harness 15.5-16
Qty: 1	**Qty: 1**	**Qty: 1**
KIT 1031311 ONLY	**KIT 1031312 ONLY**	**KIT 1031313 ONLY**

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Introduction

The Allison transmission control strategy works very well, even allowing torque converter clutch lockup in second gear in some cases. However, in high horsepower applications lockup is sometimes inhibited due to increased torque converter stall speed. Because of this, auxiliary lockup control devices are required to reliably engage the clutch for racing or high performance applications.

The BD Allison Lockup Controller gives you control over your torque converter clutch. The module is equipped with different automatic modes that will automatically engage the TCC when the truck is at high boost based on current gear or a set mile-per-hour. Additionally the module can be setup to use an override switch that will allow TCC operation at any speed as long as it won't stall the engine. TCC apply is firmer than stock but is cushioned by using PWM ramp up to prevent excessively harsh engagement.

2011-2016 Allison transmissions (LML) utilize variable line pressure that adjusts to different engine load to reduce heat buildup in the transmission and improve fuel economy. The problem with this is that it drops line pressure after a shift, causing clutch slippage and failure in higher powered trucks. The BD module is equipped with a pressure controller that boosts line pressure up to 275psi when the engine is over 15psi boost and runs stock pressure under normal conditions to prevent harsh shifting.

Operation

Automatic Lockup Controller Modes

The lockup controller has three automatic operation modes and one manual override mode. The automatic modes are controlled by the push button switch mounted in the dash. Engagement occurs only when the truck reaches 20psi boost and meets the gear or MPH requirement. On 2001-2010 models the BD logo will light up on the switch to show the truck is making 20psi. On 2011+ LML models this light is to indicate increased line pressure.

Mode 0 OFF – Stock TCC operation

Mode 1 The TCC will be engaged in second gear or higher when over 20psi of boost pressure.

Mode 2 The TCC will be engaged in third gear or higher when over 20psi of boost pressure.

Mode 3 The TCC will be engaged at the set MPH when over 20psi of boost pressure.

Adjust Set Engagement Speed

To adjust the set speed used in mode 3, first select mode 3 with the button, then press and hold the button down for 5 seconds. The LEDs will start flashing indicating the set speed chosen. The options are approximately 10MPH, 15MPH, 20MPH, 25MPH and 30MPH (this will change with gearing and tire size). To cycle through the options, tap the button. When finished, wait 10 seconds and the controller will resume normal operation.

10MPH 15MPH 20MPH 25MPH 30MPH

Manual TCC Control Switch

Manual control of the TCC is not recommended except for racing applications. This is because the Allison TCM will set fault codes if it does not see sufficient torque converter slip during normal driving. The manual control toggle switch is not recommended except for advanced users. Manual mode will automatically disengage if the turbine speed falls below 1000RPM to prevent stalling. Lockup is available in all gears on 6 speed transmissions and in 2nd and above on 5 speed transmissions unless the valve body has been modified to allow first gear lockup.

Line Pressure Booster (2011+)

The pressure controller built into the 2011 and up kit is automatic and does not require any special mode selection. Pressure boost is active when over 15psi boost. When pressure boosting is active the small BD logo in the push button switch will be illuminated, and will go out when the truck is operating normally.

Tools Required for Installation

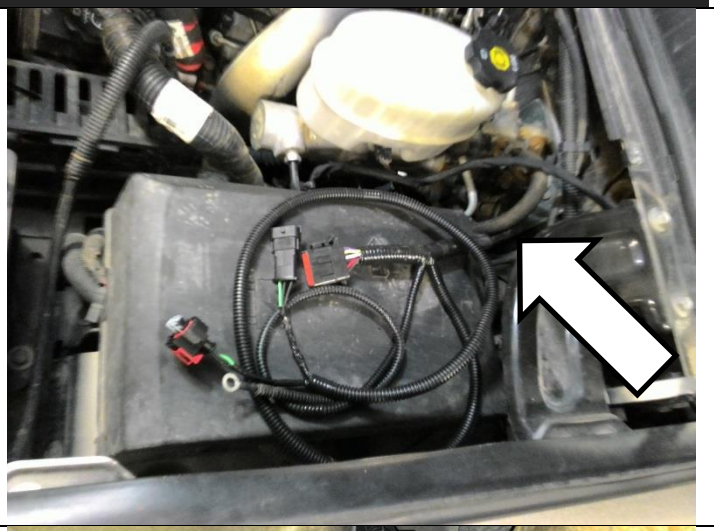
- Knife
- Stepped drill bit and drill
- 10mm wrench or ratchet
- Long needle nose or Allison transmission connector tool.
- Small fil

Note If the switch is not being permanently mounted in the dash, the file and drill bit are not required.

Installation

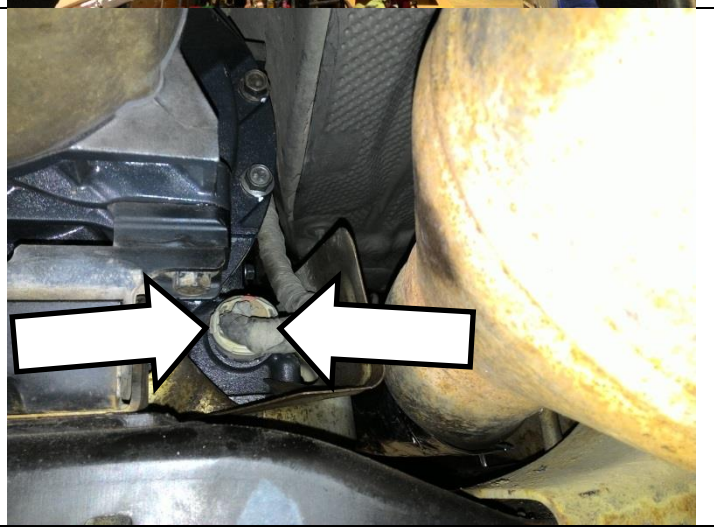
Open the hood, locate the large wiring harness supplied with this kit. Fish the transmission portion of this harness down the firewall behind the fuse box to below the vehicle to be connected to the transmission.

The transmission portion of the harness is the round white/gray plugs and the two small 2 pin plugs. Leave the remainder in the engine bay.



Feed the 20 pin round connector of the BD harness up over the transmission and down the back side by the main transmission connector.

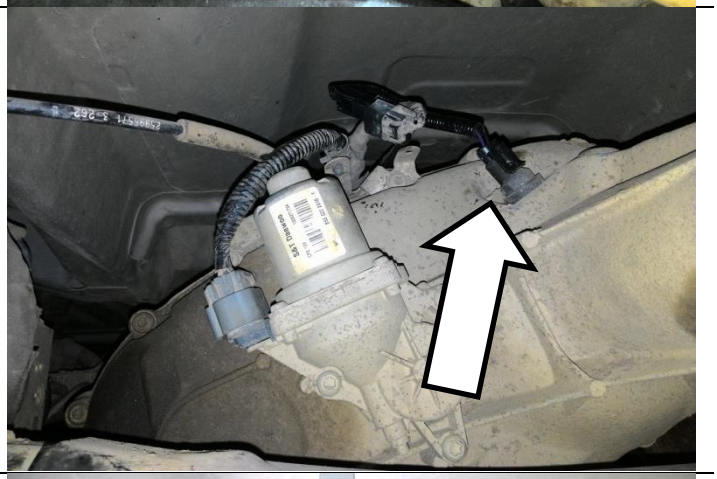
Disconnect the transmission 20 way round electrical connector by squeezing on both sides and wiggling it off. You may either use the special Allison tool for this, long needlenose pliars or remove the heat shield to get your fingers on the connector.



Connect the BD harness inline and carefully zip tie the harnesses so that they stay away from the exhaust pipe.

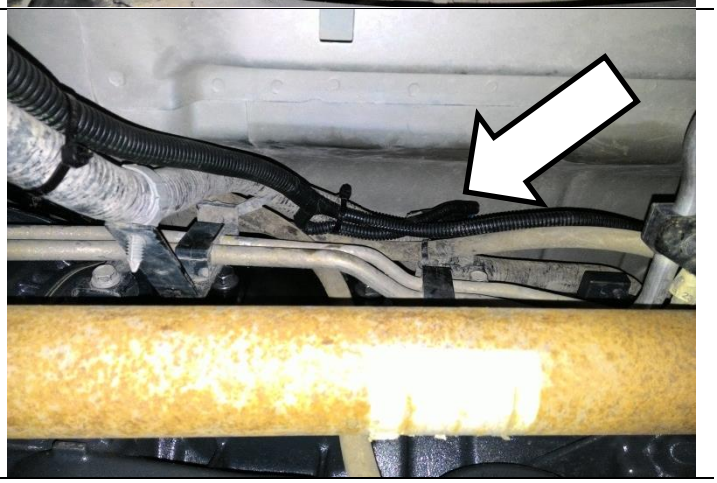
On the top rear of the transmission, locate the two pin output speed sensor connector. This will be on the top rear of the transfer case on 4wd models, or on the rear extension housing on 2wd models. (4x4 model shown).

Connect the BD harness inline. This is the two pin plug with BLACK and PURPLE wires. Zip tie wires in place.

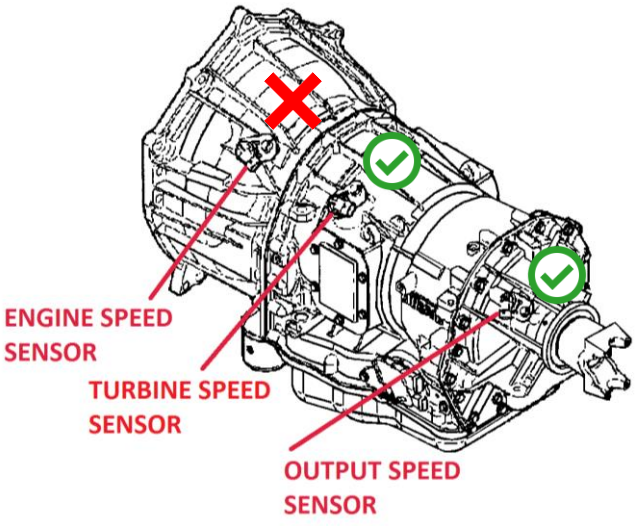


On the driver side of the transmission near the top, locate the turbine speed sensor. This is normally not visible from the ground so you will have to feel around for it. It is located above the PTO cover.

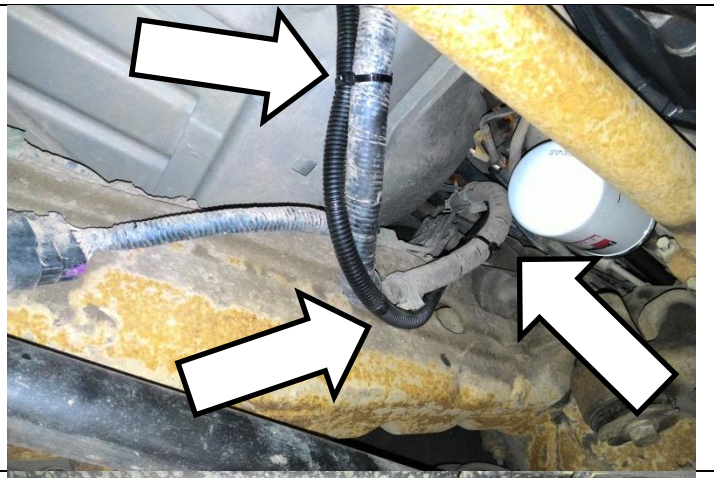
Connect the BD harness inline. This is the two pin plug with BLACK and BLUE wires. Zip tie wires in place.



NOTE 2001-2005 models have an additional speed sensor (engine speed sensor) that is not used in this kit located in the top of the torque converter housing. Do not connect to this sensor.



Zip tie the new harness to the existing vehicle harnesses, out of the way of the front drive shaft and other moving parts on its route to the engine bay.

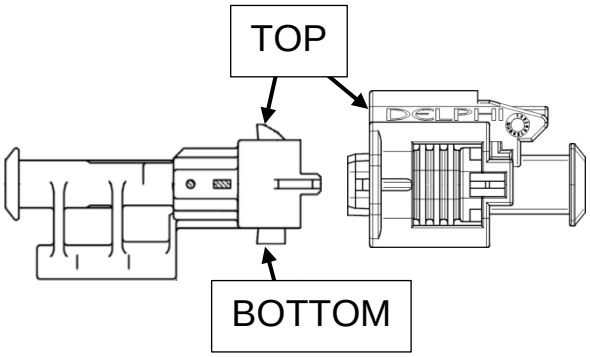


Back up in the engine bay; attach the ground terminal to the body. This is the single black wire with ring terminal. The suggested ground location is the large stud on the firewall. Use a 10mm wrench to remove and reinstall the nut over the ring terminal.

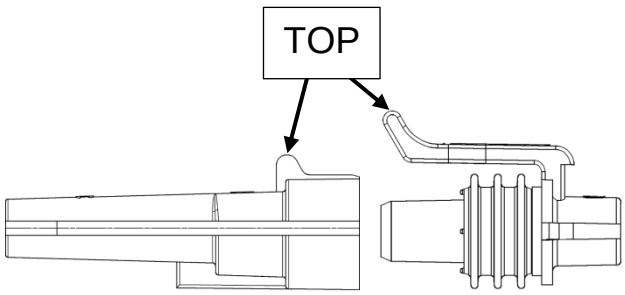
Locate the engine MAP sensor and plug the BD harness inline. Zip tie the wiring to keep it away from moving or hot parts. (LML model shown)

NOTE It may be possible to connect this plug upside-down. Refer to the pictures below for correct orientation.

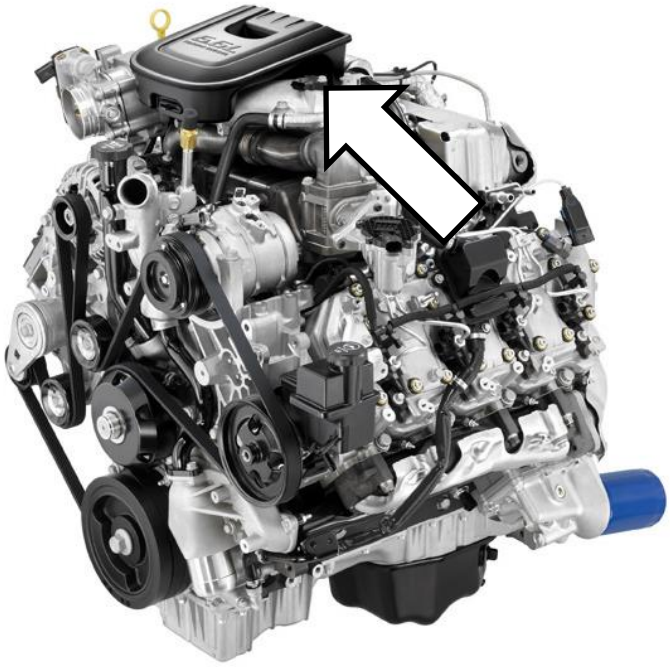
LML Map Plug Orientation



LB7/LLY/LBZ/LMM Map Plug Orientation

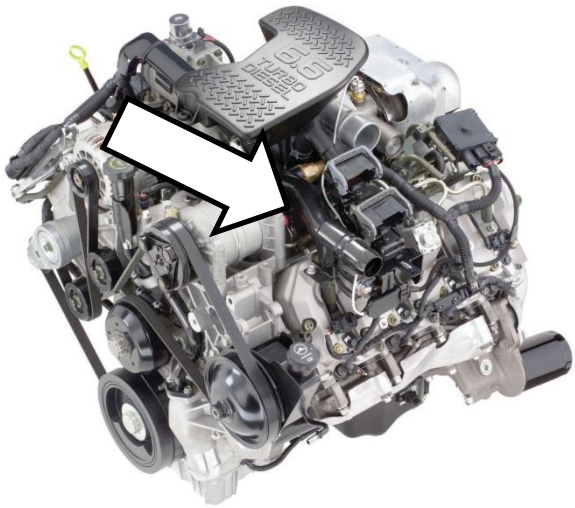


LML – The MAP sensor is located on the aluminum intake tube at the top of the motor.

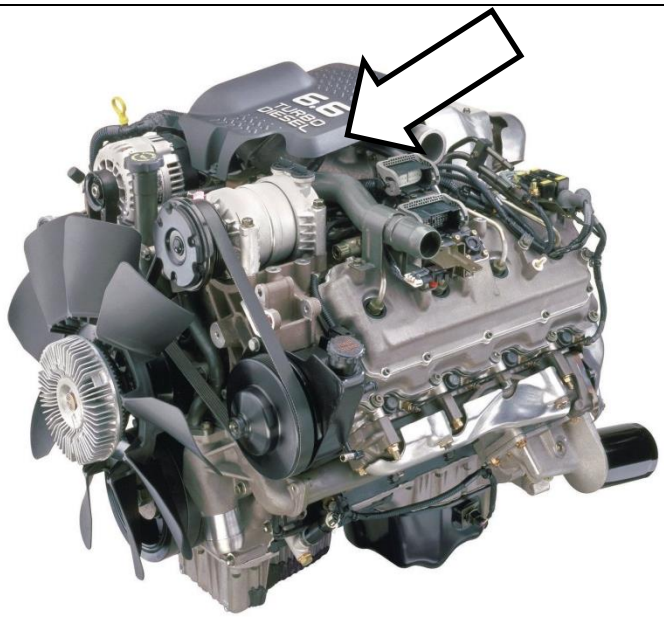


LMM/LBZ – The MAP sensor is located on the passenger side aluminum intake pipe just before the grid heater.

LLY – The MAP sensor is under the steel coolant pipe on the top of the motor, behind the AC compressor. Do not mix this up with the barometric pressure sensor located nearby.



LB7 – The MAP sensor is located on the aluminum intake manifold below the plastic engine cover.

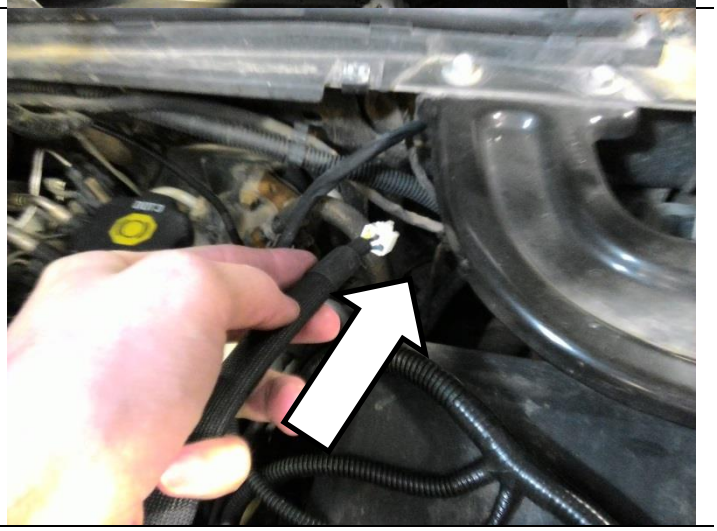


Connect the module to the black plug from the transmission/engine wiring harness.

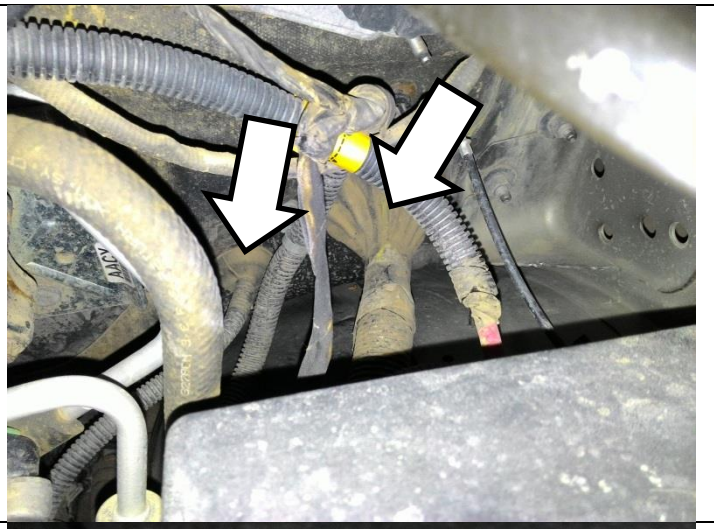
Connect the module to the gray plug from the push button switch wiring harness.

The module may now be zip tied to existing wiring at the firewall, or mounted to the fuse box with Velcro.

Feed the white plug from the push button switch wire harness through the firewall to below the dashboard.



If there is existing aftermarket wiring through the firewall use that location. Otherwise, using a knife, cut a slit in one of the rubber boots on the firewall and feed the harness through.



Mount the push button switch in the desired location. You may either drill a hole directly in the dash or use the supplied steel switch bracket.
If using the bracket, attach it to the dash with self-tapping screws or with double sided tape. Install the AUTO LOCKUP decal then install the switch. The tabs on the side of the switch will need to be squeezed while installing the switch in the bracket.

Plug the push button switch into its wiring harness brought into the cab in previous steps. Zip tie excess wire.

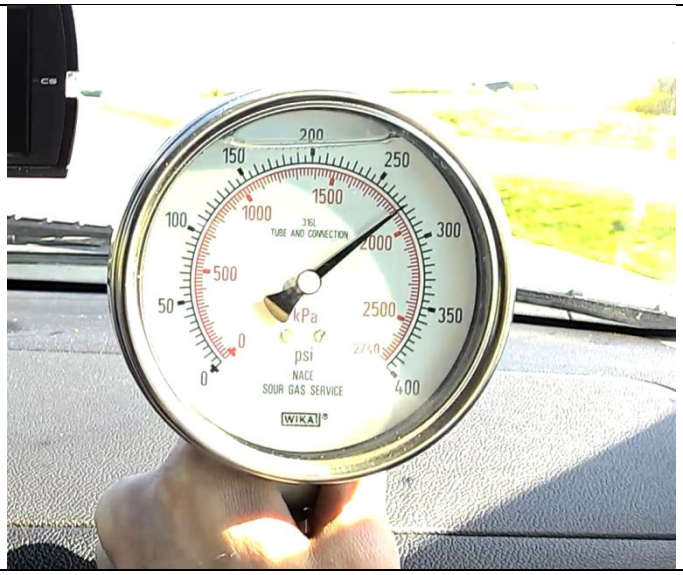
Installation should now be complete. Proceed to next section to test system operation.

Functional Checks

To check operation of the lockup controller, we must operate the vehicle in a situation where it would not already be in lockup. Start with the vehicle stationary and in drive. Put the push button switch in mode 1 (first light). This will command lockup in 2nd gear. Accelerate at full throttle (traction permitting), to achieve over 20psi boost. When the truck shifts into second gear you should feel the torque converter engage. You can check for TCC slip RPM using a scan tool. If the TCC does not engage, consult the troubleshooting section.

To check operation of the pressure controller (2011+ only); attach a mechanical pressure gauge to the Allison transmission test port. Whenever the truck is over 15 psi of boost the line pressure should go to maximum (250-275psi).

The BD logo will illuminate on the push button switch when the module commands full pressure on LML trucks.



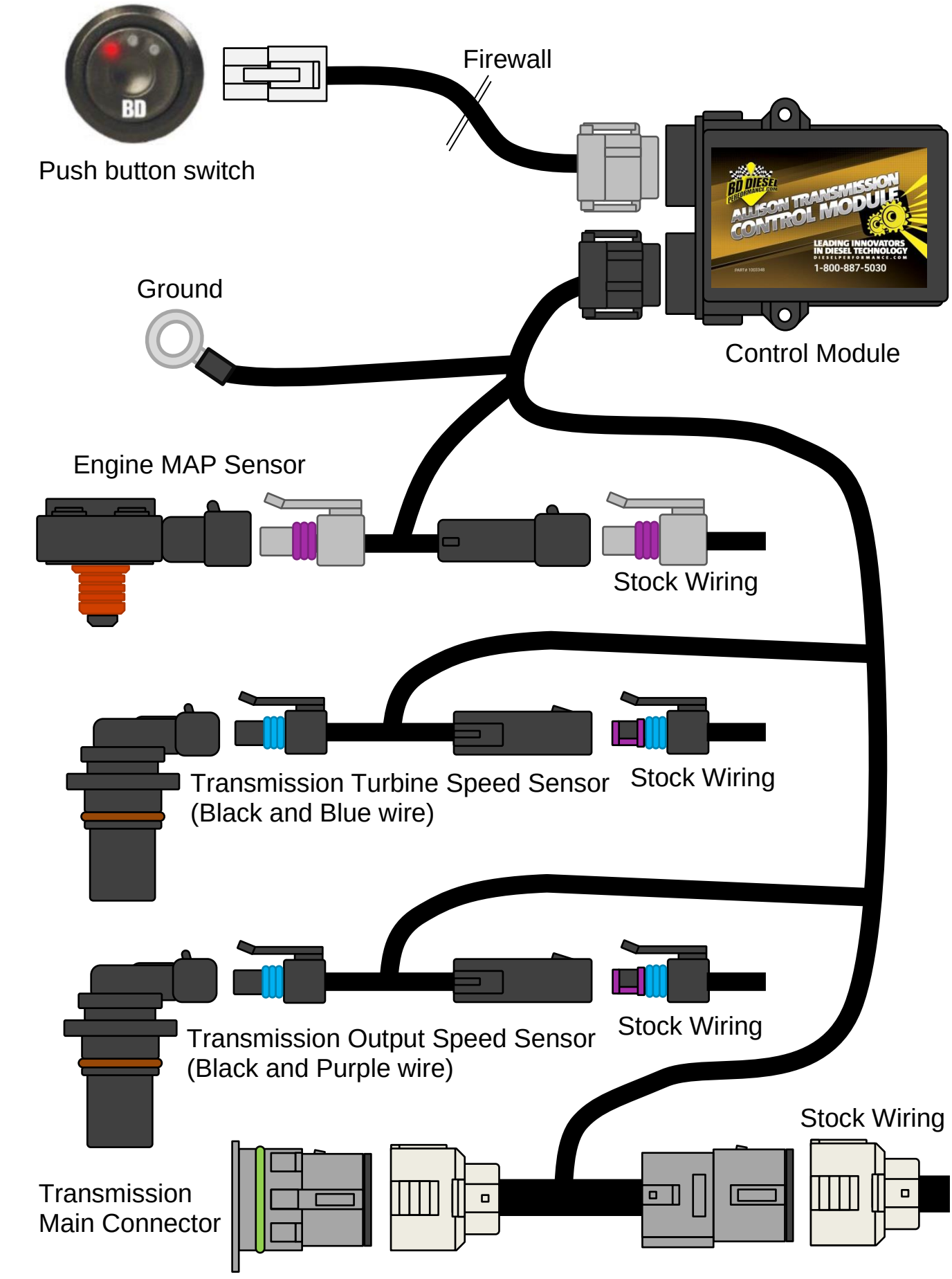
Troubleshooting

The PCB is equipped with a number of indicator LEDs to aid in troubleshooting.

POWER Lit when the module is powered. The module power comes from the transmission power only when the engine is running.
STATUS Shows the status of the MAP sensor input. This light will be flashing if the MAP circuit is disconnected or at low voltage. The light will be off if boost is between 0-20psi. The light will be on if boost is over 20psi (enough boost to engage lockup if the automatic mode is enabled).
ISS Turbine shaft speed sensor over 1000RPM (the input shaft of the transmission). To verify this sensor input is okay, rev the engine in neutral with the vehicle stationary. The light should go on when the engine is revved up, OSS should not be lit.
OSS Output shaft speed sensor over 1000RPM. To verify this sensor you must have the rear wheels spinning over approx. 25mph/40kph.
TCC This is the output control to the TCC from the module. It will flicker as the torque converter applies and go solid once it's commanded fully on.

BD Logo on push button switch flashing	MAP sensor input is below 0.1V (disconnected). Check MAP connection. This would also disable lockup modes or pressure boost.
Manual lockup switch light flashing and no manual lockup	Turbine shaft speed too low to engage lockup. Min 1200RPM input shaft speed for lockup engagement, disengages at 1000RPM. Use the ISS LED on the PCB for diagnosis.
No lockup engagement in auto modes	-Is the truck making over 20psi boost? *Check the BD logo on the push switch or STATUS LED on the PCB*. -Is the TCC LED on the PCB lighting up? *If yes, then there may be a mechanical or solenoid issue in the transmission. If not, the module is not commanding lockup. Check for TCC slippage with Tech2 scanner, command lockup and confirm function.* -Are the ISS and OSS sensor plugs connected correctly? *Do the ISS and OSS LED checks.* *The module determines gear ratio using both of these sensors so they must both be working and not reversed.*
"SHIFT INHIBITED" or FLASHING "R" on PRNDL Code P0742	Using the manual lockup switch excessively and in light load situations can cause a TCC stuck on code to set. Reverse gear will be disabled until the engine is turned off and back on. Forward gears will still function normally.

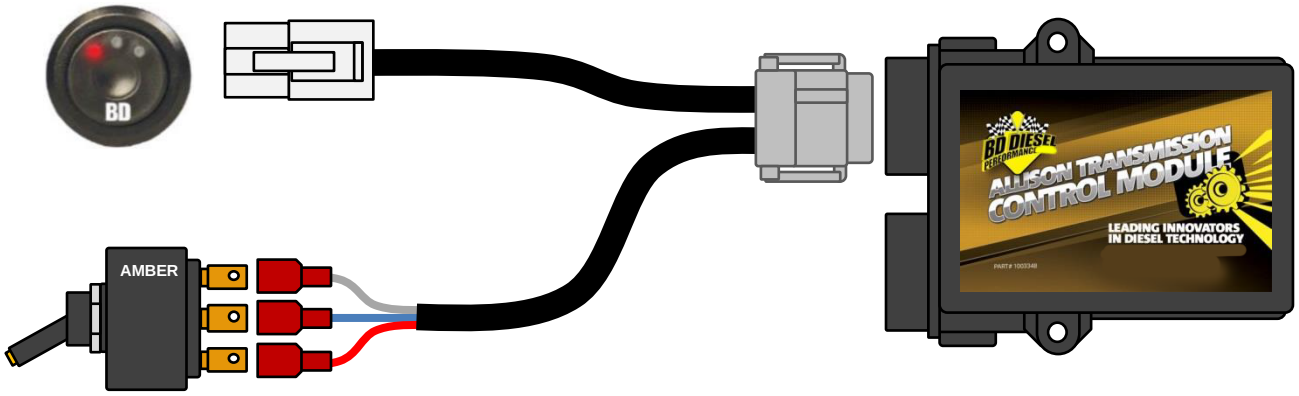
Wiring Diagram – Normal Installation

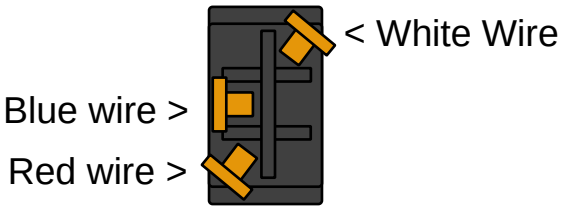


Wiring Diagrams – Optional Hookups

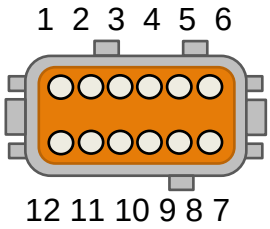
Manual Lockup Switch

This kit is supplied with a toggle switch to manually engage torque converter lockup. The switch is not normally installed except for advanced users and race use.
To install the switch, the wires must be installed into the gray electrical connector at the control module. Remove the orange wedge lock, remove the seal pins from the back of the connector and install the terminals in the locations shown below.





Switch Rear View



Gray Plug Rear View

Gray Plug
3 - Red wire (12V)
4 - Blue wire (Input)
5 - White wire (Lamp)

Lockup/Pressure Indicator LEDs

An indicator LED (not supplied) can be added to show when the module is commanding lockup. On LML models, an indicator LED (not supplied) can also be added to show when line pressure boosting is active.

Gray Plug
2 – 12V for Pressure Light
3 – 12V for TCC Light/Switch
5 – Ground for TCC Light
6 – Ground for Pressure Light