SS DURAMAX DIESEL

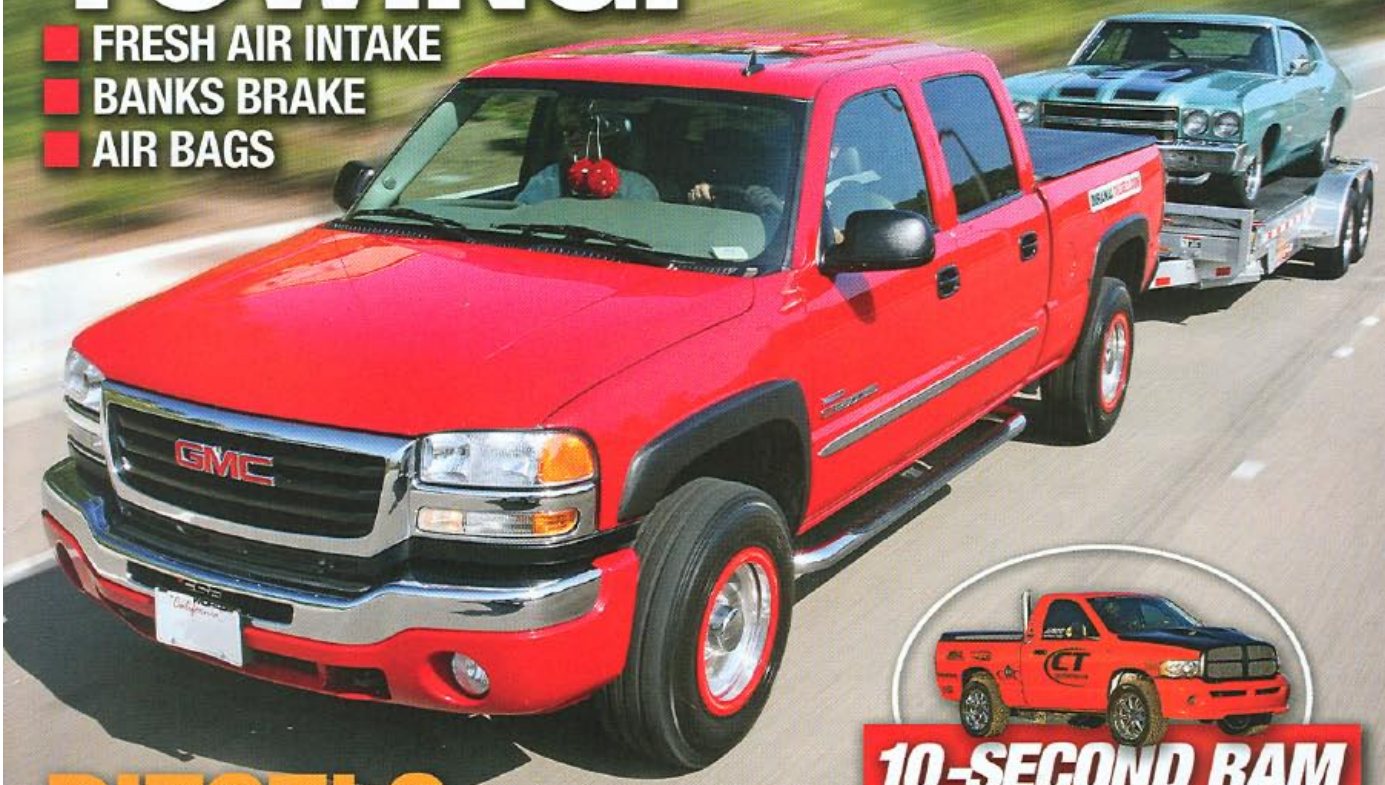
900 HP, 30+ MPG
DIESEL MUSCLE CAR

FIRST LOOK:
NEW WRANGLER M/T R

DIESEL WORLD

TOOLS FOR TOWING:

- FRESH AIR INTAKE
- BANKS BRAKE
- AIR BAGS



10-SECOND RAM

DIESELS AT THE ROCK

EZ DIESEL CLUTCH UPGRADE

TEST DRIVE: VW TDI JETTA

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QUICK STOPPING, QUICKER INSTALL

The Banks SpeedBrake Makes For Easy Stopping While Hauling

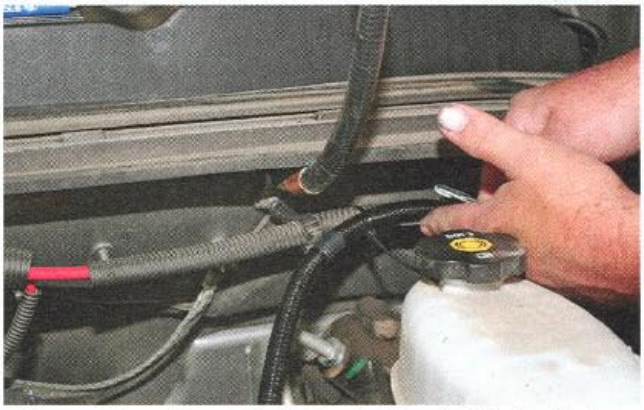
BY CHRIS NEPRASCH
PHOTOGRAPHY: CHRIS NEPRASCH

Diesel technology has continued to evolve. Gone are the days of mechanical injection, and now a computer controls the cycles of high-pressure injectors down to the millisecond. Horsepower, torque and mileage numbers are up, while emissions emitted from the tailpipe and engine noise are down. It's a brave new world from the days of IDI. With the engine improvements comes a new breed of aftermarket parts designed to take full advantage of the latest diesel powerplants.

Take, for example, exhaust brakes, which were designed to save brakes and make towing safer and easier. In the past, the installation included cutting and welding a flap apparatus into place. Getting all the plumbing and hardware set up was a solid day job for a professional, and could take the better portion of a weekend for the novice. If you own a 2004.5-to-2009 Duramax pickup, though, you could get all of the benefits of an exhaust brake and then some without having to break out the welder. Actually, all you really need are basic hand tools.

The new SpeedBrake from Gale Banks Engineering is the latest in all-electronic exhaust brakes, with plug-and-play connections for a clean and simple installation, and no cutting or tapping required. It's a feature-packed brake different from other exhaust brakes on the market. Not only does it increase the stopping power and extend the service life of brakes, it's adjustable, maintenance-free and also capable of reading and cleaning the computer of codes.

Utilizing the factory VGT turbocharger on the Duramax, the SpeedBrake captures control of the varying vane position. Instead of closing a flap like traditional exhaust brakes, the SpeedBrake closes the vanes on the turbocharger to create backpressure. The SpeedBrake also takes charge of torque converter lockup and transmission gear selection to aid in the deceleration process. Meanwhile, the PowerPDA gives the driver feedback on important engine parameters and user-set on-screen alerts.



1. *Disconnect the negative ground cables from the battery. Locate the SpeedBrake wire harness and start by placing the wire harness near the underhood fuse box. Run the main transmission intercepting connector down to the transmission following the factory main connector harness from the TCM.*

2. *The main connector is on the rear right side of the transmission. Disconnect the plug by applying pressure on both sides and pulling out.*

3. *Insert the female connector on the SpeedBrake wire harness into the transmission connector, and the male connector on the SpeedBrake wire harness.*

4. *Secure the wire harness using some of the supplied cable ties along the factory harness.*

We followed the install of the SpeedBrake into an '08 Chevy 2500HD back at the Banks headquarters in Azusa, Calif. In less than 90 minutes, the truck was on the road with the SpeedBrake up and running. It was a painless process that produced some serious results when the truck was loaded with more than 10,000 pounds-worth of trailer and taken for a test-drive, all with barely getting the installer's hands dirty.

While we have scientific results in the sidebar, we carried our own impressions of the SpeedBrake separate from strictly numbers. The thing that impressed us most about the SpeedBrake was the Speed Control feature. Think of speed control as cruise control of sorts, but instead of controlling acceleration, it controls deceleration.

Coming down Southern California's Cajon Pass fully loaded and with the Speed Control set at 55, the SpeedBrake took advantage of the VGT turbo, closing the vanes at just the right amount needed to maintain the preset speed. It was as quiet as it was smooth, while the speedometer didn't deviate from our desired cruising speed. Its smoothness is what really impressed us. Even on steep sections of the pass, the transmission didn't have to downshift once the initial set speed was obtained.

The other shining point was the adjustability of the SpeedBrake from the PowerPDA. With the touch of a screen, the aggressiveness of the braking could be changed to low, medium or high. The high mode is slam-you-forward hard, as the transmission downshifts in a hurry to bring you to a quick halt. Under fairly light loads, it was almost too much. But throw some serious weight behind the truck, and the aggressiveness was welcomed when it came time to bringing the truck to a stop.

Along with the level settings, the other thing that stands out was the adjustability on how the SpeedBrake was activated. You have the option to allow the SpeedBrake to control itself and act like a traditional exhaust brake where it engages on deceleration, or you could activate it through the brake pedal.

The SpeedBrake is electronic and basically knows everything going on in the factory computer relevant to its operation. When you activate it through the brake pedal, you can push the pedal slightly and the SpeedBrake does its thing, creating backpressure and downshifting while enabling the truck to stop. We liked it enough that when the truck is empty, the SpeedBrake is set to activate via the pedal on medium strength, saving some wear on the brake pads in the process.

Overall, we think Banks Engineering hit a homerun with the SpeedBrake. It's a snap to install, is extremely effective and the adjustability allows the driver to tailor it to his or her preference. If you're in the market for an exhaust brake for your 2004.5-to-2009 Chevrolet or GMC, it's definitely worth consideration.

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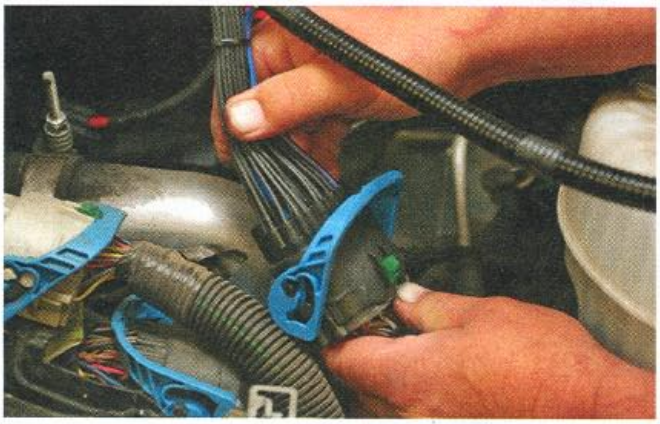
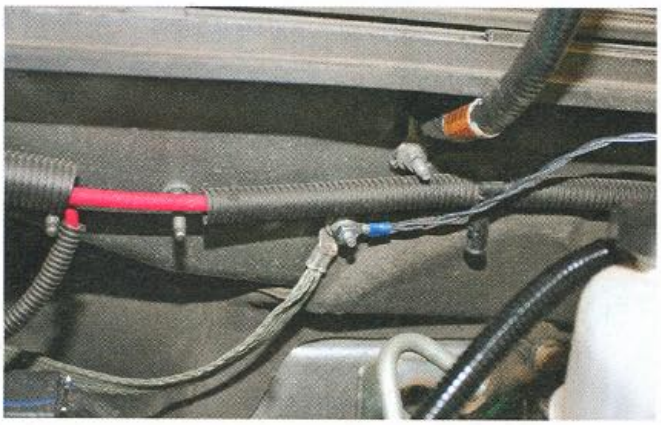
5. Locate the black wire harness-locking connector on the driver side of the engine. List the blue connector and disconnect.



6. Insert the male black connector on the SpeedBrake harness into the female black connector on the factory harness. Insert the black female connector on the SpeedBrake harness onto the male black connector of the factory harness.



7. Attach ground ring terminal to an existing bolt on the firewall by removing the existing nut and sliding the ring terminal over the bolt.

8. Run the two-connector in-cab cable from the main wiring harness to the inside of the cab. Remove the fuse access panel.

Testing The Banks SpeedBrake

We hooked up a weighted trailer to the LMM-powered 2500HD, and brought the gross combined weight (GCW) to about 18,500 pounds. With trailer in tow, we headed to a desolate strip of road off California Highway 138, where we found a 1-mile strip with a 6.16-percent grade.

As the vehicle crested the top of the hill, speed was maintained at 55 mph, with drive as the selected gear. As needed to maintain consistent speed, the driver lifted off the accelerator pedal, which determines the beginning of the test. All tests were conducted with Tow/Haul mode active. The foot brake was purposely not applied during descent, except to prevent unsafe speeds and runaway conditions. Speed was noted at the end of the run using a GPS-based data acquisition system.

When the vehicle is in drive with tow/haul mode active, the approach conditions to the test hill result in a fifth-gear selection. In stock condition, as the vehicle descended the hill, it immediately began to accelerate. With no application of the foot brake, the factory electronics allow for an upshift to sixth gear at 63 mph. This occurred 1,150 feet into the run. After traveling 2,400 feet, vehicle speed exceeded 70 mph.

To maintain safety, the driver applied the foot brake and slowed the vehicle to 68 mph. At this point, the Tow/Haul mode strategy took over and shifted the transmission to fourth gear. Vehicle speed still increased and reached 69 mph by 3,400 feet. The foot brake was again applied and vehicle speed slowed to 65 mph. At this point, the Tow/Haul strategy allowed for a downshift to third gear. This allowed for vehicle speed to be maintained at about 65 mph for the duration of the run.

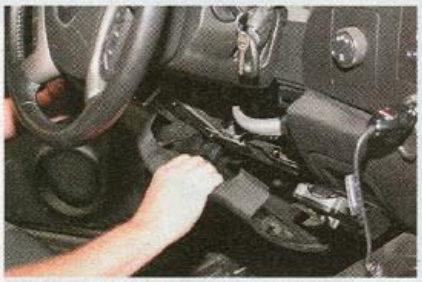
1,000-foot speed = 62.0 mph
¼-mile speed = 64.3 mph
½-mile speed = 69.9 mph (foot brakes applied)
¾-mile speed = 65.5 mph (foot brakes applied)
Final speed = 64.6 mph

The first test of the SpeedBrake was performed in the speed control mode with a set target speed of 50 mph. As with the previous runs, the vehicle started the descent in fifth gear. But as soon as the driver lifted his foot from the accelerator, the SpeedBrake began braking activity by closing the turbine vanes and downshifting the transmission to third gear. After traveling 1,400 feet, the vehicle had been slowed to its target speed of 50 mph. Once the target speed was achieved, the SpeedBrake varies the position of the turbine vanes such that speed was maintained at 50 for the duration of the run.

1000-foot speed = 53.6 mph
¼-mile speed = 51.1 mph
½-mile speed = 51.2 mph
¾-mile speed = 50.9 mph
Final speed = 50.7 mph

The next test of the SpeedBrake was performed in the Brake ON mode with the strength setting on high. This evaluates the SpeedBrake's maximum braking capability. As in all the previous runs, the test began with the vehicle in fifth gear. Like the previous run while in speed control mode, the transmission was shifted into third and the truck quickly decelerated. But since the ON mode does not have a target speed, the vehicle continued to decelerate and shifted clear down into first gear. After traveling 4,175 feet, the vehicle was slowed to 15 mph for a speed reduction of 40 mph.

1000-foot speed = 53.6 mph
¼-mile speed = 51.1 mph
½-mile speed = 35.3 mph
¾-mile speed = 21.6 mph
Final speed = 15.0 mph



9. Remove the lower knee bolster panel by taking out the two screws on the lower edge of the panel. Unbolt the brake release lever and pull out the panel.

10. Connect the 4-pin intercepting wire harness to the 2-pin connection on the SpeedBrake in-cab cable.

11. Under the steering column, locate the 4-pin connection and disconnect. Insert male 4-pin connector from the SpeedBrake harness onto male 4-pin factory harness. Reinstall the lower knee bolster panel.

12. Clean the fuse box cover with non oil-based solvent, such as mineral spirits or lacquer thinner.

13. Peel the backing from the supplied Velcro fasteners and attach to the SpeedBrake module.

Understanding VGT Turbos and the SpeedBrake

The latest LMM Duramax uses this Garret VGT turbocharger.

Variable Turbine Technology (VGT) is the latest in turbocharger technology, and variations are being used on the newest diesels. Because of the large displacement and requirements for air, engines like the 6.6L Duramax require large turbochargers. The bigger the turbo, the more exhaust pressure required to spool it, which creates a problem at lower engine speeds.

The vanes on the turbo are open here.

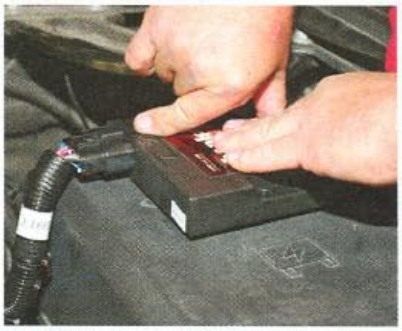
A VGT turbo has small vanes connected to an actuator that can be moved to direct exhaust flow onto the turbine blades. The vanes are constantly moving open and closed based on engine speeds. Vanes on VGT turbochargers aren't like an on/off switch; they can be fully open, fully closed or positioned anywhere between.

Here are the turbo vanes closed.

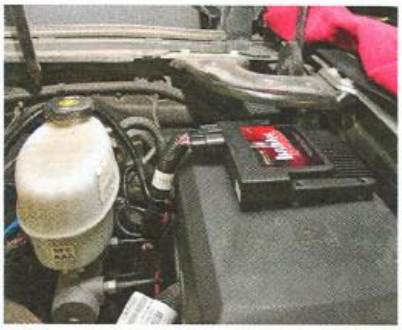
At lower engine speeds, the vanes are closed, or close to it, which creates a narrow passage, accelerating exhaust gas and directing them as they hit the blades of a turbine. As RPMs rise, more exhaust gas is generated, and the vanes begin to open up now that the engine is producing enough exhaust gas to spool the turbo. The result is the characteristics of a smaller turbo at lower engine speeds with enough flow on the top end to support the demands of larger, more powerful engines. A computer that takes in data from sensors, and then adjusts the vanes accordingly, controls the actuator that closes and opens the vanes on a VGT engine.

Think about a traditional exhaust brake in its simplest form. A flap is basically in the exhaust stream. When the truck needs to decelerate, the flap closes and the backpressure bottlenecks the exhaust system, which in turn builds pressure upstream from the brake. The pressure acts as negative torque, slowing down the engine for a braking effect.

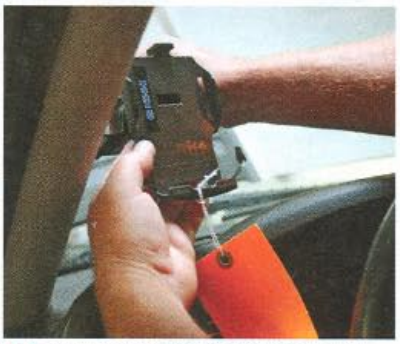
Because a VGT turbocharger has vanes open and closed by a computer-controlled actuator, they can move at any time when given the command. Rather than have a flap, the SpeedBrake shuts the vanes on deceleration, essentially creating the same effect as a flap placed in the exhaust stream. Because it does it through computer manipulation, the system can be controlled with a module and a plug rather than having to weld in an actuated flap.



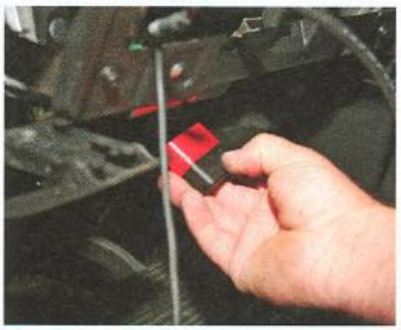
14. *Position the SpeedBrake module on top of the fuse box to the edge closest to the engine side of the fuse cover, and then press adhesive onto the outside of the cover.*



15. *Insert SpeedBrake 20-pin module connector on the wire harness of the module. Using supplied cable ties, secure the wire harness away from any heat source.*



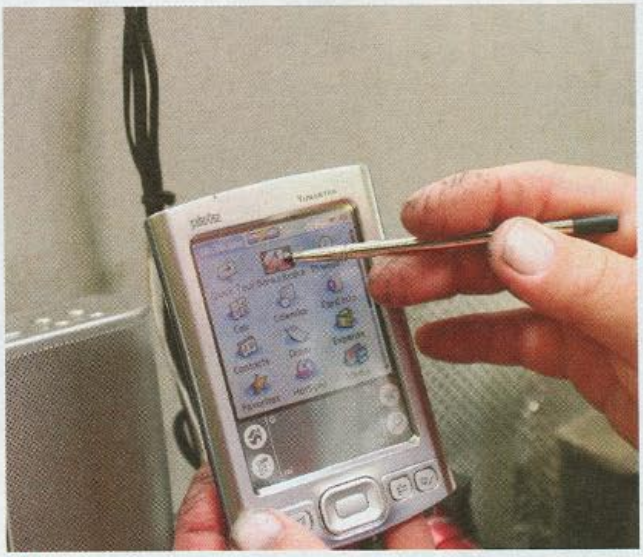
16. *Find a convenient place to mount the docking station and secure according to directions.*



17. *Find the Banks OBDII interface cable and secure it to the vehicle's OBDII connector. Connect the 6-terminal plug to the 6-pin connector on the Banks SpeedBrake wire harness.*

18. Route the RJ12 connector on the OBDII interface cable under the dash and out where the fuse access panel was. Plug the cable into one of the docking stations and reinstall the fuse panel. Route all wires away from moving parts and secure with cable ties.

19. It's a good idea to charge the PowerPDA while you're performing the installation. Banks includes an SD card loaded with the SpeedBrake software. After it's charged, place the SD card into the PowerPDA.



20. Tap the BanksBrake icon on the PowerPDA, and follow the installation instructions. Put in the docking situation, reconnect negative battery terminals and the installation is complete.

SOURCE:

GALE BANKS ENGINEERING
(800) 816-3405
www.bankspower.com