



DIESEL CONVERSION
Specialists

406-755-8878
SALES • PARTS
INSTALLATION

Cummins Engine Information

We provide this information as a guide to help you plan what components you will want to use for your project, and also to define some descriptions to the parts that are referred to in the installation manual. If all these options are overwhelming, ask us to make a recommendation for you.

Picking a 5.9 Cummins Engine

There are three types of fuel systems used on the 5.9 Cummins engines, and these differences are the only major aspects that set them apart from each other. The engines are universal as far as transmission mounting, if a tranny fits one engine, it will fit another (providing the proper adapter plate is used). For states with emissions concerns, the general rule is to go with an engine of the same year as, or newer than, the implant truck; however, you should check with your inspector if there is a concern.

Some preferences to consider are fuel economy, horse power and torque, mechanical or electronically controlled fuel system, noise level, ease of installation, governed rpm limit, and purchase price.

The 12 Valve

RPM range

0- 2500 Bosch VE rotary pump (89-93 stock equipment on most automotive application) Max stock torque - 400 ft/lbs

0-2700 Non-modified P-7100 pump (94-98 stock equipment)

Max stock torque- 460 ft/lbs

0-4000 Modified inline pump we make available.

The **89-93** engines are readily available, inexpensive, get the best fuel economy stock, and have decent torque. These use the Bosch VE rotary pump which can be adjusted to achieve a little more horse power. The 89-91½ are non-intercooled. 91½ and newer are all intercooled. The non-intercooled engines can be intercooled if desired; it is highly recommended if you plan to turn the power up any to control exhaust temperatures.



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93 and earlier engines may have a diaphragm style vacuum pump, which does not work as well as the later style pump in the conversion. If you are planning to use an electronically controlled transmission, you should know that throttle position sensors are hard to come by for these, however there are alternative sensor options available so it can be solved without much of a problem. The a/c compressor can also be an issue, as they are usually longer than the 94-98 versions, and may use a different mounting bracket. The vacuum pump and the a/c compressor mounting bracket will interchange. Sometimes the 93 pumps and brackets are the same as the more conversion friendly 94-98 versions pictured below. In addition to these differences, some of the early engines have a different fan support that is higher and more centered with the engine. These fan supports work ok in the 69-97 trucks, although the fan is too high for the stock fan shroud it is at least centered. It does not work so well in the 99- and newer trucks as the fan will not fit under the radiator shroud, and the shroud cannot be raised as easily as the older trucks. We have been told from a few customers that it works ok in the 03-07 6.0L diesel shroud.



“old” style vacuum



“Old” Style Fan Support and Thermostat Housing



94-98 Vacuum Pump



94-98 A/C Pump



“New” Thermostat Housing and Fan Support



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The **94-98** engines offer good power and torque, as well as good fuel economy. These engines have the Bosch P7100 inline manual fuel pump which produces 160-215HP stock. With this pump, one can easily add 15-95hp by installing a simple **fuel plate**.

There are also several other horse power upgrades that can be done to these engines with out totally sacrificing fuel economy or reliability. When using a Ford radiator that has the upper radiator connection on the passenger side, it is helpful to replace the thermostat housing with the housing we offer; it points straight up, so it makes the upper radiator hose connection easier. It includes a new thermostat and seals for \$69.00. When using this housing you will also need our Dodge alternator bracket for \$45.00.

The 94-98 engines are the most desirable 12 valves because power upgrades are easily accomplished with fuel plate adjustments etc. If you get an extremely good deal on an earlier engine it may be cost effective to convert it to a P7100 pump if you like.

All 12 valves are non-electronic injection pump engines and do NOT require any electronics from the truck to run. The simplicity of the 12 valve engine makes it the easiest to install, maintain, and most dependable.

The 24 Valve

Rpm range- 0-3200 max stock torque- 505 ft/lbs

The **98.5-02** 24 Valve engines are computer controlled and provide a bit more horsepower than the earlier engines. For this engine we provide wiring instructions to help you make it run in your Ford or Chevy. You do not need the Dodge PCM to use this engine, although it is necessary if you want to use OBDII diagnostics or use an aftermarket tuner that requires the data link connector. *Without the Dodge PCM, diagnostic information can still be accessed at a Cummins dealer through the Cummins data link connector located in the engine wiring harness, but certain performance programmers will not work as a result.*

The 01-02 engines require an electronic speed signal input to run properly. Ford trucks that have a rear axle speed sensor can easily accommodate this, and it can be done in an older truck with an aftermarket speed sensor. It's just another thing you need to know.



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Be aware that some of these engines have what is referred to as a “53” block. This number is cast onto the side of the block just above the oil pan rail on the rear driver’s side or front passenger side. These blocks are known to crack on the exterior water jacket.

The thermostat housing on these trucks also points toward the driver’s side of the truck, so if you plan to run a Ford radiator that has the upper hose connection on the passenger side of the radiator, you will want to buy our straight up thermostat housing to make your upper radiator hose connection easier.

The Common Rail

Rpm range- 0- 3400

The 2003-2006 24valve engines are excellent engines as well. They are referred to as the “Common Rail” engine as their injection pump pressurizes a single fuel rail that supplies the six individual electronic controlled injectors. These engines have higher horse power to begin with (usually starting at 305hp) and have decent fuel economy as well.

These are the engines that are known for being “quiet”. These engines do not need the Dodge PCM to run in your truck, only the Engine Control Module that is bolted to the side of the motor. There is a bit more wiring required when using one of these engines in a conversion, but we take a lot of the work out of it by modifying your existing engine harness to “plug into” the Commonrail. These engines require an electronic speed signal, just like the 24 valves.



Security key immobilizer modules (SKIM) may prevent your engine from starting in a different truck. Plan to spend additional money, work, and planning to get around this problem. We provide instructions to test start your 03-04 engine to find out if you have this problem, so plan to find out early on in your project so you are not waiting for your ECM to get reflashed.



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Early 03 engines and those that were equipped with a manual transmission *may* be the only exception to this. A different way to get around the SKIM is to add in the Dodge SKIM module and reprogram it with a locksmith's help. You may need to have the Dodge truck's VIN number it came out of and use the same year of module for this to work. If you are working with a 03-05 engine, the other option is to have the ECM reflashed, or some aftermarket tuners can get around it as well with the VIN of the Dodge the engine was originally installed in.

The **'03 to early '04** commonrails that were in front of an **automatic** transmission are best suited for conversions, due to their having a cable operated throttle position sensor (TPS). This type of sensor has two important advantages; it easily accommodates the use of a cable operated cruise control servo, and gas engine type gas pedals, which can easily be bolted into the diesel equipped trucks.



Auto trans equipped tps

'03 to early '04 manual trans equipped engines- These engines use a different cable operated tps. They can be modified to accept a cruise control cable, but it takes a bit of work. The gasser gas pedal also works fine with the manual TPS cable.

Most 04 ½ (325hp) and 05 and newer engines use a fly by wire gas pedal. They also use an in tank transfer/lift pump. So you have some options to consider when using one of these engines.

Option one: The 05 and older engine computer can be reflashed to an early '04 program that does not have the SKIM. This would require you to use the automatic trans equipped TPS, which more easily allows you to have cruise control at this time. This is an option to consider, especially since some engine computers need to be reflashed anyway due to security issues. You may also have to change the coolant temperature sensor. The boost pressure sensor on the newer turbo has to be abandoned, which does not seem to have any adverse effects. All the other sensors interchange.



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You have two options when converting to the earlier system.

*Currently the '06 and newer computer cannot be reflashed to the early '04 program.

1. One way is to get an '03-early '04 computer, engine harness, valve cover, injector wire harness plate (under the valve cover), rocker box, and TPS.
2. The other way is to get the early computer, engine harness, and TPS and have us modify the early harness with a 06 donor harness to plug into the later injector wire harness plate.

Option two: Use the engine the way it is. You will have to get around the SKIM, and to have cruise control, you will have to figure out how to run the Dodge cruise with the Ford buttons (we have no support for this yet), or go without cruise. IF you stay with the original electrical system, you will have to install the Dodge gas pedal in your truck.

Whatever you do, you will need a lift pump of some kind. Use the early common rail lift pump/filter, use your Ford pump(s) and a bypass regulator, or buy an aftermarket performance lift pump system.

Follow the common information for '05-'06 for planning what type of fuel pump you will use.

07 and newer 6.7 Common Rail - In stock form, this engine is not what we would call "conversion friendly". It has the same problems the 05 and 06 engines have regarding cruise control and security issues. Other issues are EGR concerns and differences in the intake plenum and turbocharger. It may be possible to use the engine as is if you have the VIN number of the Dodge truck the engine was originally in and getting around the SKIM as described in the 03 to early 04 sections. Of course you will have the same cruise control issues as the 05-06 engines and use the Dodge gas pedal. Call us for information on specific parts you will need from the Dodge pickup.

These engines can be converted to earlier electronic control making them more conversion friendly, however it does require even more converting than the 05-06 5.9 engines. This also does away with the EGR system and variable pitch turbo. If you are considering a 6.7, call us for information on getting the modifications done by us here at our shop.