RAM 2500 CNG

Features

- A complete engineered, tested and factory assembled product.
- Assembled and shipped from our assembly plant ready to go with no up fit required.
- 3 year/36,000 mile bumper to bumper warranty.
- 5 year/100,000 mile powertrain warranty.
- This truck has the capability of running on gasoline or CNG.
- Primary fuel is CNG but switches to gas under certain conditions.
- Fuel type switching is fully automatic and seamless, unnoticeable under most driving conditions.
- This vehicle comes equipped with two 130L, Class 1 CNG tanks mounted in the front area of the bed.
- The approximate driving range on fully charged CNG tanks is 255 miles.
- Gasoline tank volumes have changed over the model years. See Tank size chart below.

Gasoline Tank Volumes		
Volume (Gallons)	**Availability**	**Model Year**
8	Standard	2012
35	Optional	
8	Standard	2013 through 2015
32	Optional	
8	Optional	2016
32	Standard	
8	Not Available	2017 and Beyond
32	Standard	

- For model years 2012 through 2014, the CNG is configured as a Crew Cab 8 foot box 4x4.
- Starting in 2015, the CNG package is available in Regular and Crew cab, 8 foot box, 4x2 and 4x4.

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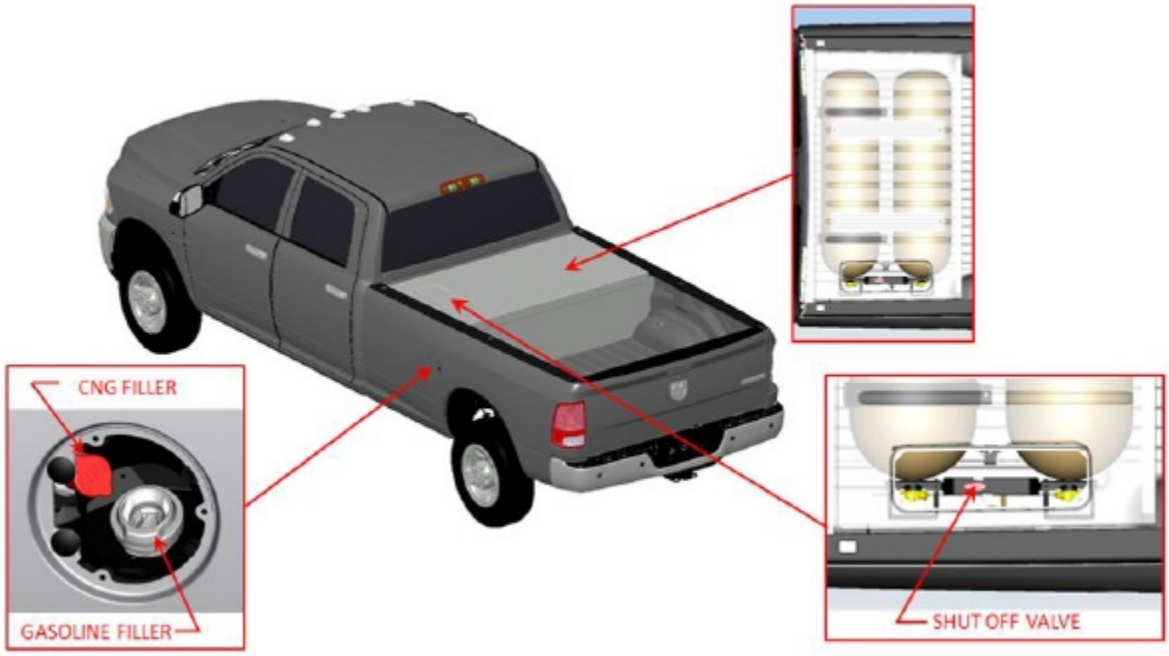
The image below shows the CNG tank and shutoff locations as well as gas and CNG filler locations.



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System Operation

The CNG vehicle utilizes CNG and gasoline. The Ram 2500 CNG engine starts and runs on CNG for all starts, when the engine coolant temperature is at or above 18°C (64.4°F). When the engine coolant temperature is below 18°C (64.4°F), the Ram 2500 CNG will start and run on gasoline until these conditions are met:

- The engine coolant temperature is above +10°C (50°F)
- The vehicle speed is above 24 KPH (15 MPH)
- The driver coasts (releases the accelerator pedal with the transmission in gear)

When all 3 conditions are met, the engine will automatically switch to CNG. The engine will switch back to gasoline when the CNG system falls below the low fuel threshold.

Certain high-load conditions may cause the fuel system to switch from CNG back to gasoline as well. For example, the system will switch to gasoline operation whenever the driver keeps the engine at wide open throttle for an extended period of time.

To make sure the gasoline does not get stale, the PCM uses a "Minimum Gasoline Consumption" feature. This feature will consume one tank of gasoline about every 8000 miles regardless of tank size. The routine will force the engine to run on gasoline until a programmed amount of gasoline is used. The routine will never run more than once per ignition cycle.

If a gas consumption event is required during a cold-start ignition switch cycle, the amount of gasoline consumed during operation of the Minimum Gasoline Consumption routine will be reduced by the amount of gasoline consumed during the cold start.

When a start occurs with the ambient temperature below approximately -18C (0.0°F), the gasoline consumed after the cold start will exceed the amount required by the Minimum Gasoline Consumption feature. The routine will not run during that key cycle.

CNG Control

Because of the high tank pressure, a pressure regulator is used to control the CNG entering the fuel rail to a lower consistent pressure. CNG pressures are outlined in the table below.

CNG Tank Pressure Range (To Regulator)	230 PSI (Empty Threshold) to 3600 PSI (Nominal Tank Temp) 4200 PSI Max (High Tank Temp)
CNG Pressure (Internal Regulator, Stage 1)	230 PSI
CNG Fuel Rail Pressure (After Regulator)	163 PSI
CNG Pressure Relief Device	4800 to 5000 PSI

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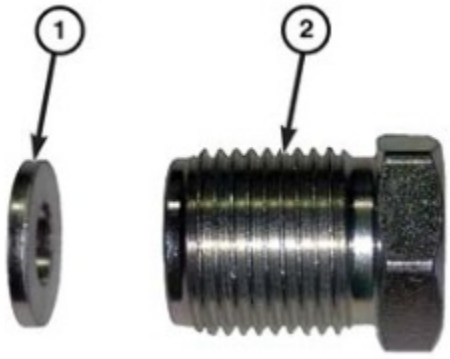
The fuel cylinders are equipped with a label which states the fuel cylinder expiration date. The label is attached to each individual fuel cylinder. The label on the fuel cylinder will state the following:

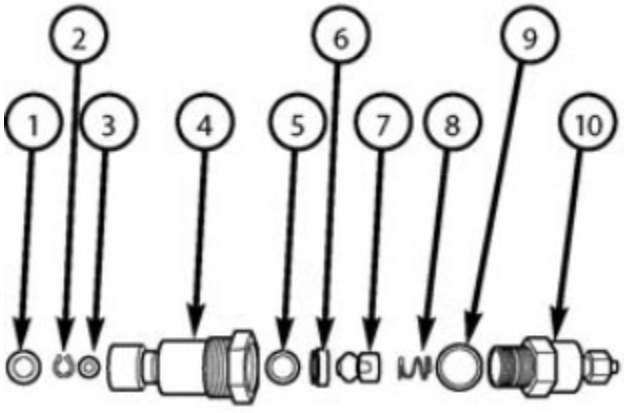
- Address of the fuel cylinder manufacturer
- Cylinder expiration date
- Certain warnings
- Cylinder certification numbers.

The CNG fuel system has of three replaceable in-line filters to aid in moisture and debris removal. One is in the filler nozzle located under the gas service cap. It consists of a 50 micron filter. The second is located at the inlet side of the pressure regulator. It is a 50 micron filter. (Pressure regulator is located on the bulk head on the right side of the engine) The third is a 5 micron woven fiber cartridge located in a pencil style cylinder. The filter assembly is located in the cylinder tank cabinet.

In-line adapter fittings (2) are used to connect the CNG lines to the upper canister housing. An aluminum crush washer (1) seals the fitting to the housing. If loosened or removed, the washer and fitting must be replaced.



The CNG filler receptacle (10) is located behind the fuel fill door. The receptacle houses a replaceable 50 micron filter (3) and a one-way check valve. (7) Replacing of the filter requires the O-ring (1) and the snap ring (2) to be removed.



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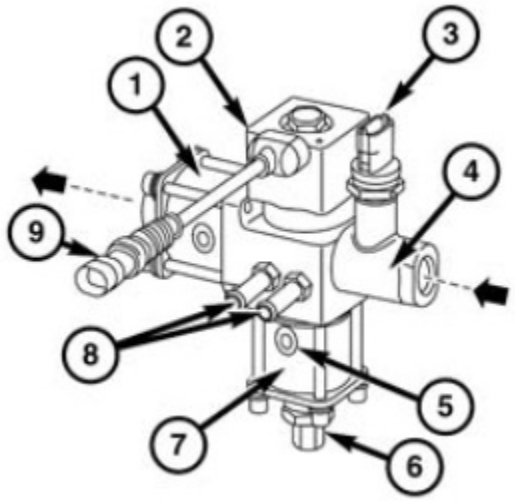
When the natural gas enters the system the opposing pressure forces the check valve open. When the flow stops, the spring forces the valve back onto a seat. The check valve is held closed by a spring and back pressure created from the natural gas is the system.

The fuel pressure regulator for the CNG is located in the engine compartment on the bulk head, to the right (passenger) side of the engine. The regulator reduces the pressure to the fuel rail in two stages. The first stage (7) will reduce the high pressure supply from the cylinder tanks down to 230 PSI The second stage (1) will reduce the 230 PSI down to 163 PSI.

When the fuel pressure is reduced, The CNG internal of the regular can rapidly cool down, even freeze. To regulate the CNG temperature, there are passages through-out the regulator that allow engine coolant to pass through. Flowing engine coolant through the regulator helps insure that the regulator doesn't malfunction due to freezing.



The regulator contains an electronically controlled shut off valve. (2) The device is used only as an on/off valve to electrically control high-pressure gas flowing through the fuel pressure regulator. It is controlled by the Powertrain Control Module (PCM) through the CNG control relay. The valve is closed when there is no powered supplied to the solenoid. When the solenoid is energized, it allows the flow of CNG through the regulator.

The Pressure Regulator Assembly consists of:

- Low Side Pressure Regulator (1)
- Electronically Controlled Shut Off Valve (2)
- High Pressure Sensor (3)
- Internal Filter (4)
- Venting Valves (5)
- Pressure Relief Valve (6)
- High Side Pressure Regulator (7)
- Engine Coolant Passages (8)
- Solenoid Valve Electrical Connector (9)

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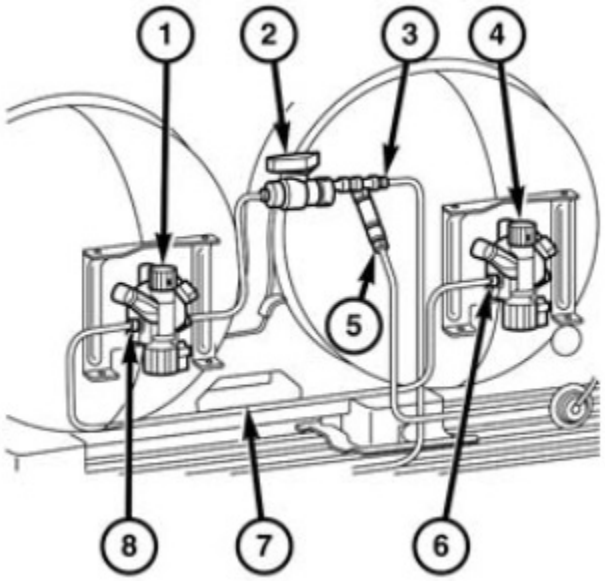
The CNG control relay (located next to the fuel regulator) gets its coil power from the Automatic Shut Down (ASD) relay circuit. It is low side driven by the PCM and provides power to the cylinder shutdown solenoids and the pressure regulator solenoid to energize (open).

The shutdown solenoids are located in the cylinder tank shut-off valves (1 & 4) on the CNG tanks. The solenoids remain closed when de-energized. When driven by the PCM, the CNG control relay applies voltage to the solenoids. When voltage is applied, the solenoid is energized allowing the valve to overcome the tank pressure. When the valve is de-energized, a spring and tank pressure aid in sealing the valve against the valve seat allowing for a secure seal.

When filling of the cylinder tank occurs. The pressure from the fill station will overcome the one way valves spring pressure, allowing the CNG to enter the tanks without restriction.



Cylinder tank shut-off valves (1, 4) are located in the cylinder tank cover access hatch. Each of these valves is equipped with a pressure relief safety device. A ¼ turn master valve (2) is a ball style valve used as a first response safety device. The valve can be easily be shut off by rotating the valve in a clockwise position so that the valve lever is parallel with the cylinder tanks. When in the open position, the valve is parallel with the bracket that the valve is mounted to.

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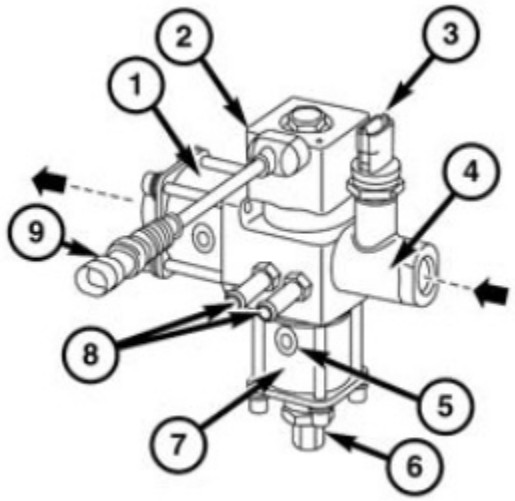
The CNG system utilizes two separate fuel pressure sensors. The high pressure sensor or cylinder tank pressure sensor (3) is located on the fuel pressure regulator.



The pressure signal is used for determining the fuel level in the CNG fuel system. The low side pressure sensor is part of the fuel rail sensor that is located on the CNG fuel rail on the engine. The fuel rail sensor monitors the pressure and temperature of the fuel entering the fuel rail. The pressure and temperature signals are monitored by the PCM. The PCM uses those values to help calculate CNG injector pulse width controlling CNG flow to the engine.

Fuel Lines

Due to the high-pressure requirements of the CNG system, special stainless steel, SAE straight thread, single-ferrule, compression-type fuel tube fittings are used. These will connect all fuel tubes and components on the high-pressure side of the system (inlet side of the fuel pressure regulator).

- Where applicable, use only single-ferrule compression type fittings on the CNG system. If a fitting must be replaced, use only an original equipment replacement part.
- Always check and remove any burrs from the end of tubes before installing fittings.
- After high-pressure fittings are tightened, a go no-go gauge inspection tool must be used. This is to be sure they are properly drawn up (tightened).
- Do not attempt to remove or tighten a fitting with the fuel system under pressure.
- Surface finish of the fuel tube is very important for proper sealing. Fuel tubes that are oval shaped, have any depressions, heavy scratches or raised portions should not be used.
- Never attempt to force a fuel tube into a fitting or ferrule. The fuel tube should fit easily into fittings/ferrules if they are not damaged.
- The fuel tubes on the CNG system are under extreme high-pressure. Never use steel, copper, brass or any other material as a substitute for the original seamless stainless steel fuel tubes.
- When removing/installing a fitting, always use a backup wrench on the fitting body to prevent any fuel tube twist.

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Additional/Unique Components for CNG Fuel System

- Shut-down relay
- NVG-1 high-pressure fuel fill receptacle with an internal one-way check valve and 50 micron
- Two high-pressure fuel cylinders
- Manual fuel control valves (on each fuel cylinder)
- CNG high-pressure fuel shut-off solenoids
- Separate, one-way check valve near the ¼ turn gas shut-off valve on the filler line
- Manual (mechanically operated) ¼ turn gas shut-off valve
- Canister style filter located in the cylinder tank cabinet
- High-pressure, stainless steel seamless fuel lines
- Single-ferrule, compression-type fuel tube (line) fittings
- 50 micron fuel filter mounted in the fuel pressure regulator inlet
- High pressure sensor mounted on the inlet side of the pressure regulator.
- Fuel pressure regulator warmed by engine coolant
- Compression-type flexible steel line
- Fuel rail mounted, fuel low-pressure/ temperature sensor
- Unique, separate CNG fuel rail
- Eight unique CNG fuel injectors
- Two relay packs to control the switching of the injectors between gasoline and CNG.
- Fuel pressure regulator mounted, and electrically controlled, high-pressure fuel shut-off solenoid
- Unique Powertrain Control Module (PCM) computer
- Certain unique wiring harnesses

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Warnings

ANY service that is required on the Compressed Natural Gas, purging of the fuel tube system must be done.

If a physical inspection of the CNG cylinder tanks is required, any service required on the CNG cylinder tanks must be done by a certified CNG service technician.

WARNING: Before performing any service or repair on Compressed Natural Gas (CNG) equipped vehicles, the following warnings and safety precautions must be read and followed:

The CNG system should be serviced only by qualified natural gas vehicle technicians

Natural gas vapors at atmospheric pressure are lighter than air and will rise and disperse in open areas. In enclosed areas, natural gas vapor may collect and form a combustible mixture. If the vehicle is routinely placed in an enclosed area, the area should be provided with adequate ventilation and/or a natural gas detection system. For long term storage, the manual shutoff valve and each individual fuel control valve should be closed.

A fire or explosion could result if a source of ignition or flame is present with natural gas in a confined-unventilated area. Provide proper ventilation when servicing CNG vehicles.

Natural gas contains an odor additive. Occasionally, mild natural gas odors may be noticed during engine starting and after engine shut down. This is because of small quantities of unburned gas in the engine intake and exhaust manifolds. While these are normal, as are gasoline odors in similar circumstances, a persistent odor of natural gas indicates a leak is present. Have the vehicle checked immediately for source of leak. If a leak is determined to exist, do not bring the vehicle into an unventilated area.

Do not attempt to weld any part of the fuel cylinders or any other fuel system component.

Do not attempt to modify any fuel system component or replace any component with parts that do not meet Chrysler corporation requirements.

Do not apply any paint or undercoating material to any fuel system component.

Do not attempt to force open or tamper with any fuel tubes or valves. A sudden release of high-pressure gas may occur resulting in bodily injury.

Do not park or service vehicle near any source of excessive heat or open flames.

Do not use a paint oven to cure any paint repairs as CNG fuel cylinders on these vehicles are equipped with pressure relief safety devices. These devices will vent to the atmosphere at approximately 103°C (217°F).

When a vehicle has been involved in an accident which may have caused damage or dislocation to the CNG system, the system should be inspected and pressure tested. This should be done before being returned to service.

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Any fuel system component, including the cylinders, which have been subjected to fire, may not be returned to service due to reduced pressure capability.

U.S. Requirements: Each CNG fuel cylinder manufactured on or after March 27, 1995 must be removed and inspected after a motor vehicle accident or fire and at least every 36 months or 36,000 miles (whichever comes first) for damage and deterioration in accordance with Motor Vehicle Safety Standard No. 304 Compressed Natural Gas Fuel Containers And Compressed Gas Association (CGA), Arlington, VA. Guidelines C-6.4. Retest markings must be stamped on the cylinder neck or marked on a label securely affixed to the cylinder and over coated with epoxy near the original test date. Reheat treatment or repair of rejected cylinders is not authorized. The fuel cylinder expires and must be removed from service fifteen years from the date of manufacture. A label on the fuel filler door states the cylinder expiration date. A similar label is attached to each fuel cylinder. If there is a question about the proper inspection of the CNG cylinder, contact the manufacturer as identified on the cylinder label.

Canadian Requirements: The cylinder must be inspected after a motor vehicle accident or fire and at least every 36 months or 36,000 miles (whichever comes first) for damage and deterioration in accordance with Canadian Standards Association (CSA) B51-97, Part 2 High-Pressure Cylinders For The Onboard Storage Of Natural Gas As A Fuel For Automotive Vehicles And Compressed Gas Association (CGA), Arlington, VA. Guidelines C-6.4. Retest dates must be stamped on the exposed metallic surface of the cylinder neck or marked on a label securely affixed to the cylinder and over coated with epoxy near the original test date. Reheat treatment or repair of rejected cylinders is not authorized. The fuel cylinder expires and must be removed from service fifteen years from the date of manufacture. A label on the fuel filler door states the first cylinder expiration date. It is recommended that the fuel system components be inspected periodically for leaks and/or excessive wear.

Fuel the vehicle using a NGV 1 certified fill nozzle as specified on the label inside the fuel filler door. Do not attempt to fuel the vehicle with any other type of nozzle

Before any part of the CNG fuel system is opened for repair, the system must be purged of all natural gas. Refer to FUEL TUBE PURGING in the service information.

WARNING: THE MANUAL SHUT-OFF VALVES ARE NON SERVICEABLE. DO NOT REMOVE THE MANUAL SHUT-OFF VALVE FROM THE CNG CYLINDER TANKS. REMOVAL OF THE VALVE MAY CAUSE ONE OR MORE OF THE FOLLOWING: THE COMPRESSED GAS IN THE CYLINDER TANK MAY RUSH OUT RAPIDLY ENOUGH TO CAUSE THE VALVE AND/OR THE CYLINDER TANK TO BECOME A PROJECTILE: MAY CAUSE A FLAME AT THE TANK AND/OR A FIRE TO OTHER NEAR BY COMBUSTIBLES; MAY CAUSE AN EXPLOSION OF THE CNG CYLINDER TANK; MAY DISPLACE OR DEPLETE AIR IN A CONFINED WORK SPACE; OR MAY CAUSE LEAKED CNG TO COLLECT IN CEILING LIKE AREAS IN SUFFICIENT QUANTITIES AND MIXTURE TO BECOME COMBUSTIBLE OR EXPLOSIVE .

WARNING: NEVER STORE A CNG VEHICLE OR CYLINDER TANK UNATTENDED IN A FACILITY NOT SPECIFICALLY DESIGNED FOR THE STORAGE OF NATURAL GAS.

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WARNING: **The first high pressure component to be serviced, must be loosened slowly, so that the pressure inside the fuel system can adjust to ambient pressure.**

WARNING: **Extreme care must be taken when servicing the CNG tank. Any type of minor damage to the CNG tank (for example, a .025 in nick, scratch or dent) can render the CNG tank unusable. Any damage, regardless of how minor, requires the tank to be officially inspected and re-certified. Before working around the CNG tank perform a visual inspection to ensure no damage is present, if any damage is discovered, do not service this vehicle until a certified Inspector can certify that the CNG tank is safe.**

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