Utah CNG LLC Installation Guide – Fitting CNG Components To The Vehicle:

Introduction – Utah CNG LLC will substitute or upgrade components at our discretion. Some parts included in your kit may vary from those depicted in our photographs. The order of operation listed herein may be modified at the discretion of the Installer:

1) Tank Placement – Choosing a mounting location open to the atmosphere, but protected from road debris and within a safety zone from possible vehicle collision damage is suggested. Ready Access to Fuel Cylinder Valve(s) should be preserved in case of emergency shutoff. Securely mounting the tank(s) to the vehicle is required to prevent damage to the tank or valve. (Note: The Following Warning Appears on CNG Tanks & Vehicles - Natural Gas Vehicle Fuel Cylinders Shall Be Periodically Inspected; Normally Every 3-years/36,000 Miles, or After an Accident or Fire For Damage or Deterioration & To Insure Safe Operation of The Vehicle. Contact Vehicle or Cylinder Manufacture. [Cited in essence].)

2) Fuel Cylinder Valve(s) – (Typically a single valve per CNG Fuel Cylinder. Note that CNG Fuel Cylinders are normally shipped containing compressed room air. Suggest not bleeding the compressed air out of the cylinders until the final step of installation process to allow for initial system leak testing.) High-pressure piping will be connected via compression ferrule fitting at the fuel cylinder’s valve body. Maintain ample clearance between the valve body and vehicle’s body/frame to allow long-radius bends of the rigid piping, free from interference.

3) Control Head (Changeover Switch) - Select a location visible & easily accessible from the driver’s station for permanent mounting of the Control Head. Route the 8’ Foot wire bundle to the Regulator avoiding pinch-points. Provide abrasion protection at rigid surface penetrations. The wire harness white colored, flat electrical connector attaches at the rear of the Control Head. A plastic under-dashboard bracket is included. In-dashboard mounting of the Control Head is accomplished by using the mounting bracket as a template. (Trace the interior shape of the mounting bracket onto the dashboard surface. After placing the Control Head into the mounting hole, slide the bracket over the switch body from behind the dashboard using silicone base glue or other plastic-safe adhesive to secure it.)

4) Regulator Unit Mounting – A 6” Inch flat stock mounting bracket is provided and will serve to secure the Regulator body at many surfaces of the vehicle. Mounting bracket attaches at the backside center of the Regulator. (Look for the stud threaded into the Regulator’s body.) Regulator must become securely, permanently mounted to a rigid vehicle or engine surface at an elevation lower than the upper radiator hose. Regulator body should be mounted in a location sheltered from road debris, adverse atmosphere conditions and heat sources such as...
the exhaust system. **Careful consideration should be given for the high-pressure “Pipe to Regulator” compression fitting attachment.** (The 6mm high-pressure piping is bendable by hand, but rigid; thus requiring long-radius bends. An unobstructed, straight-approach into the Regulators mounted location makes inserting the high-pressure pipe much easier!) Other connections to the Regulator body will include the hot water lines & electrical connections which are quite flexible. Allow enough clearance for the pressure gauge to extend 3” Inches beyond the Regulator’s body!

5) Pressure Gauge – Mounts atop the high-pressure piping inlet of the Regulator body. Two soft metallic shimming washers are provided. **One shimming washer must be used or the gauge fitting will not seal.** Note that the shims are of different thickness. Select the thickness of shim that allows the face of the pressure gauge to be visible after the Regulator becomes permanently mounted. The shimming washer surface provides the high-pressure CNG seal; thus the pressure gauge must be securely tightened into the threaded female fitting. Use of Thread Seal Tape at this fitting is not necessary. Note – Spraying some multipurpose adhesive onto the shimming washer will stick it to the gauge fitting during installation.

6) Heating Water – After the mounting location for the Regulator is selected, locate the vehicle’s heater hoses supplying radiator water to the vehicle’s heater core. (Normally large rubberized heater hoses penetrating the vehicle’s firewall on the passenger side) Select a desirable location to cut the vehicle’s heater hoses to allow easy of access for insertion of the T-Fittings. Determine a suitable route for the 5/16” Inch (8mm) CNG system heater hoses to travel to the Regulator. Without cutting the supplied 5/16” Inch CNG system heater hoses, attach each open end to the Regulator’s barbed fittings marked “Water” securing with a small hose clamp. Provide abrasion protection at rigid surface penetrations. (Suggest cutting into the vehicle’s heater hoses as the last step to avoid contaminating the installation field with spilled radiator fluid. Note that radiator fluid normally contains an antifreeze solution which is poison if ingested by animals or humans. Make sure to capture and wipe up any spilled radiator fluid.)

7) CNG Fill Valve Assembly – A 6” Inch powder coated flat-stock mounting bracket is provided. Two high-pressure compression ferrule fittings exist on the Fill Valve Assembly. The Inlet from the CNG Fuel Cylinder(s) enters at the rear of the Fill Valve Assembly. The Outlet from the Fill Valve Assembly is equipped with 7/8” Inch (22mm) external threads used to securely mount the Fill Valve Assembly to a rigid surface. (High-pressure piping will travel from the ferrule fitting of this Outlet to the CNG Regulator) An ideal mounting location for the Fill Valve Assembly would be one protected from possible collision damage; adverse atmosphere conditions, roadway & engine splatter debris. The valves Red colored thumb-handle must remain immediately accessible for use while filling and in the event of emergency shutoff.

8) High-Pressure Pipe Routing – 16’ Feet of high-pressure piping is provided and is readily cut by the Installer with a hacksaw. (Additional lengths of bendable high-pressure piping can be purchased on our website Utah-CNG.com as needed.) Cut ends should be de-burred by using a fine surface file prior to use of compression ferrule fittings. Suggest covering open ends of pipe with vinyl tape or slide-on caps to prevent foreign objects from entering the pipe during installation. Making sure to create long-radius bends, route the piping from the CNG Fuel Cylinder to the Regulator. Chose routing that remains clear of roadway debris and other
mechanical interference. Under vehicle routing should follow the interior side of the vehicle frame. (Suggest routing adjacent to the vehicle's fuel lines already installed from the original vehicle manufacture.) Sliding a 3/8" Inch (9mm) interior diameter rubberized hose (not supplied) over the high-pressure piping is suggested to provide additional protection from future damage and unintended mechanical interference. At a minimum, provide abrasion protection anywhere piping contacts rigid surfaces and at penetrations.

9) Compression Ferrule Fittings – Use Thread Seal Tape only at the threaded base of the fitting body. (Use no tape at the Ferrule Nut side of the fitting.) Remove enough of the vinyl covering from the high-pressure pipe to allow ease of installing fittings. (Make sure to remove any burrs from cut pipe ends prior to use of fittings.) Provide a 2" Inch-straight section of high-pressure pipe end. Slide the ferrule nut, then the ferrule ring onto the straight section of pipe. (Some Ferrule Rings have a flange at one end; the flange mates at the Ferrule Nut surface.) Firmly slide the pipe into the base until a solid stop is felt. Holding the pipe against the stop, tighten the Ferrule Nut. Safety Tip – As a final step, before charging the system with CNG, open storage cylinder valves one at a time. Drip a few drops of thick dish soap onto each fitting; watch for bubbles forming that indicate a leak. This step will be repeated after your 1st CNG fill.

10) Malleable Air Reservoir Connection – (Suggest removing the Air Reservoir ducting from the vehicle when installing the penetration to avoid fallout from being sucked into the engine.) Low pressure/high volume natural gas must be routed from the Regulator outlet to the vacuum side of the vehicle’s air intake. The short length of 3/4” Inch (19mm) hose (supplied) is used for this purpose. The vehicle’s Air Reservoir is the large diameter air-duct situated after the air filter and before the air horn (inlet) of the carburetor, throttle body or turbocharger. (Aside from routing filtered air to the engine’s intake; this section of ducting creates a large reserve volume of air for use at times of rapid acceleration.) The Air Reservoir section of ducting is normally a rubberized boot, plastic duct, or other soft material capable of being penetrated without deforming or fracturing. Rubberized ducting is normally easier to penetrate by tracing the outline of the 3/4” Inch (19mm) hose onto the surface, then cutting the opening with a razor-knife. Plastic ducting may require a hole-saw for the opening then sealing the barbed fitting (included) into the hole.

11) Electrical Connections – (See Wiring Diagram) Special Considerations –1st twisting two stripped wire ends together, then crimping only one of the butt-splice to secure the wires allows easy access for later electrical troubleshooting, if necessary, with a VOM Meter. Tapping into a vehicle’s wiring harness is made easier by using a Posi-Tap™ splice (included) instead of cutting through vehicle wires. Butt Splices normally fail when the Installer attempts to crimp only the vinyl covering onto the bare wire. Make sure that your crimping tool makes full purchase atop the metal barrel of the butt splice, not just the vinyl covering. A correctly applied butt splice will withstand a six-pound pulling force so a gentle tug after each crimp will help prove the connection.

12) Pulse Wire – An electrically generated pulse must be detected by the Control Head from the engine when running. This pulse is normally intercepted by tapping into the vehicle tachometer pulse wire. (Alternatively, the Crankshaft or Camshaft Position Sensor signal wire may be tapped) Use caution tapping into pulse generating engine sensors on the vehicle as error modes can be created in the vehicle’s onboard computer. Consult your vehicle’s wiring diagram.

Note – Components Supplied By Utah CNG LLC Are Of The Highest Quality. Building A Safe CNG Vehicle System Is The Sole Responsibility Of The Installer. Make Sure To Become Familiar With All Safety Standards Of The Natural Gas Industry, and Any Regulations That May Pertain To Your Installation.
to locate the signal wire to tap. Generally speaking, there are three wires connected to the Crankshaft or Camshaft position sensor. One wire is Ground. Another is the Voltage Reference wire that carries a constant DC voltage supplied by the Control Module (Vehicle Computer) to the sensor. Typically 5VDC, the reference voltage will appear immediately when the vehicle is placed into the Key On, Engine Off position. It will also remain constant after the engine has been started, as opposed to the 3rd wire, the signal/pulse wire. The signal/pulse wire carries alternating electrical impulses back to the vehicle's Control Module. Using a VOM Meter (Volt-Ohm Meter) to identify these three wires is necessary as a typical 12 VDC test light will not activate. An inexpensive analog VOM Meter (the kind with the needle that swings across the face of the meter, not the digital readout variety) is best suited to this task. (Digital VOM Meters cannot sample the signal/pulse voltage quickly enough to let you know you have found the signal/pulse wire. The digital VOM Meter readout will merely be an average of the signal pulses it encounters while the analog meter should let you see the small pulses.)

Safety Tip – As a final step, before charging the system with CNG, open storage cylinder valves one at a time. Drip a few drops of thick dish soap onto each fitting; watch for bubbles forming that indicate a leak. This step will be repeated after your 1st CNG fill.

Control Head (Changeover Switch) Lighting Operation

Top Red LED Indicates 12VDC In The Vehicle’s Key-On Position.

Green LEDs - Relative CNG Fuel Volume Remaining In The Onboard Fuel Cylinders

Lower Yellow LED Lights To Indicate A Key-On, Engine-Running Pulse Is Detected At The Control Head’s Brown Wire.

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Regulator Unit Mounting – Note The CNG Delivery Volume Adjustment Knob Located On The Lower Left of The Regulator Body.

Regulator Solenoid Electrical Connection - Blue (+) & Black (-) of Control Head Wire Harness

Leave An Unobstructed Straight Approach For The High-Pressure Pipe To Reach The Regulator Unit.

CNG Outlet Volume Adjustment

Heating Water – Select a desirable location to cut the vehicle’s heater hoses to allow ease of access for insertion of the T-Fittings.

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CNG Fill Valve Assembly Should Be Mounted to a Rigid Surface (Not Depicted In Photo) Two high-pressure compression ferrule fittings exist on the Fill Valve Assembly. The Inlet from the CNG Fuel Cylinder(s) enters the Fill Valve Assembly at the rear fitting. Outlet supply piping to the Regulator exits the Fill Valve Assembly at the base.

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Correct Installation of The CNG Compression Ferrule Fittings

ONLY Apply Teflon Tape To Threads At Base of Body (Do Not Use Teflon Tape At Ferrule Nut Threads!)
Strip 2" Vinyl From Pipe End. Slide Ferrule Nut & Ring Onto CNG Pipe. Insert CNG Pipe Fully Into Fitting Body Until You Feel Solid Stop. Tighten Ferrule Nut While Holding Pipe At Full Stop.

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Tapping into a vehicle's wiring harness is made easier by using a Posi-Tap™ splice (included) instead of cutting through the vehicle's sensor wire.

Tapping the pulse wire of the tachometer or camshaft or crankshaft position sensor.

Instructional Diagram Courtesy of Posi-Lock.com

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Malleable Air Reservoir Connection – The vehicles Air Reservoir is the large diameter air-duct between the air filter and air inlet of the engine. The Air Reservoir section of ducting is normally a rubberized boot, plastic duct, or other soft material capable of being penetrated without deforming or fracturing.