

# **VCN-500 Recluse™**

**Venom Computerized Nitrous System**

## **Installation and Operation Manual**

**COMPLETELY READ THIS MANUAL BEFORE STARTING INSTALLATION**

**Revised February, 2004**

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# 1.0 GENERAL INFORMATION

## 1.1 WARRANTY INFORMATION

With the statements below, the term "Nitrous Oxide System" shall refer to the complete VENOM Recluse Nitrous Oxide System, including any hoses, wires, connectors, bottles, displays or modules.

### LIMITED WARRANTY

Every Nitrous Oxide System is rigorously tested at the factory. Python Injection warrants the Nitrous Oxide System to be free from manufacturer's defects for a period of 90 days from the date of purchase. During this period, if any of the Nitrous Oxide System components are found to be defective by Python Injection, we, at our option, will repair or replace the defective Nitrous Oxide System components. No allowances will be made for labor or other installation charges. Consequential damages are not covered.

**There will be no warranty coverage for engine damage.**

### LIMITATION OF LIABILITY

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL PYTHON INJECTION, INC. OR ITS SUPPLIERS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES WHATSOEVER (INCLUDING BUT NOT LIMITED TO CITATIONS, DAMAGE TO VEHICLE, VEHICLE ENGINE, OR COMPONENTS OR ANY OTHER PECUNIARY LOSS) ARISING OUT OF THE USE/INSTALLATION OR INABILITY TO USE/INSTALL THE NITROUS OXIDE SYSTEM OR THE FAILURE OF PYTHON INJECTION, INC OR ITS SUPPLIERS TO PROVIDE SUPPORT SERVICES, EVEN IF PYTHON INJECTION, INC. HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THE ENTIRE LIABILITY OF PYTHON INJECTION, INC. UNDER THE WARRANTY SHALL BE LIMITED TO THE AMOUNT PAID BY THE PURCHASER FOR THE NITROUS OXIDE SYSTEM. BECAUSE SOME STATES/JURISDICTIONS DO NOT ALLOW EXCLUSION OR LIMITATION OF LIABILITY, THE ABOVE LIMITATION MAY NOT APPLY TO YOU. PURCHASER MUST NOTIFY PYTHON INJECTION, INC. OF ANY DEFECT OR MALFUNCTION OF THE NITROUS OXIDE SYSTEM PROMPTLY UPON DISCOVERY.

### CONDITIONS THAT WILL VOID THE WARRANTY

- Incorrect installation of the Recluse.
- Opening the Recluse Module or performing any unauthorized modifications to the Recluse Module or its components.
- Damage caused by heat, water, improper electrical connection, physical damage or improper installation.
- Modifying (shortening, lengthening, cutting, etc.) the Recluse harness.

## 1.2 WHAT IS INCLUDED

The Recluse kit includes all of the necessary parts to perform a professional installation of the Recluse Nitrous System. Check the contents of the kit prior to beginning the installation. If any part of the kit is missing, contact the place of purchase for replacement. The Recluse kit should include:

- Installation Manual
- The Recluse Module
- The Recluse Main Wiring Harness with LED indicator
- The Recluse Injector Wiring Harness
- Nitrous Solenoid with Mounting Hardware
- 10 oz. Nitrous Bottle with Valve and Valve Fitting
- Bottle Brackets with Bolts
- 10' Nitrous Hose
- 2.5' Nitrous Hose
- Connector Splices
- Nitrous Nozzles (3)
- Product and Warranty Registration Card
- Wire Ties and Adhesive Mounting Bases

## 1.3 NECESSARY TOOLS

- Basic hand tools, I.E. screw drivers, wrenches, pliers, etc.
- **The Recluse includes a dash-mounted LED indicator display.** A drill and drill bit may be necessary to provide passage between the engine compartment and the passenger cabin if you cannot locate an existing firewall grommet. A drill and drill bit may also be necessary to tap into the air intake.
- A Digital Volt/Ohm Meter. This may be obtained at any electronics store (such as Radio Shack) for about \$25.00.

## 1.4 PRODUCT REGISTRATION

A product and warranty registration card is included with the Recluse kit. This card must be filled out and received by Python Injection to activate the warranty. Have this information available if you call for technical assistance.

Online registration is also available at <http://www.venom-performance.com>.

## 1.5 TECHNICAL ASSISTANCE

Technical assistance regarding the installation process is available Monday through Friday between 8 A.M. to 5 P.M. Pacific Standard Time. Assistance is provided directly by Python Injection by calling toll free (800) 959-2865. Be prepared to have your serial number ready when calling. Do not call the place of purchase for technical assistance questions.

Online Technical Support is also available at <http://www.venom-performance.com>.

## 1.6 PRECAUTIONS

Observe the following precautions while installing the Recluse Wire Harness and Injector Harness:

- Never install the Wire Harness or Injector Harness or work under the hood of a vehicle with the engine running.
- Some engine parts become extremely hot. Use caution when working under the hood.
- Read over the entire installation manual prior to starting the installation. Familiarize yourself with the procedures. Installation is very easy if the procedures are followed.
- Wear safety glasses at all times during the installation process.
- Nitrous is a gas that is under extreme pressure and can cause frostbite if it comes in contact with the skin.
- If you are unfamiliar with working on or around automobiles it is suggested you have the system professionally installed.

## 1.7 VEHICLE REQUIREMENTS

In order for the Recluse system to operate your vehicle must have the following features and equipment:

- Port Electronic Fuel Injection (One Injector Per Cylinder) Return-Less Fuel Systems are fine. (Neon, Focus)
- Linear Throttle Position Sensor (Voltage Increases with Throttle Movement).
- A Standard Oxygen Sensor (0-1 Volt)<sup>1</sup>.
- Use of High Octane fuel (92 Octane or Greater) and/or use of a pour in Octane booster.

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<sup>1</sup> Refer to Appendix B for LEV or ULEV vehicles. Your vehicle may require the installation of a standard oxygen sensor.

## 2.0 SYSTEM OPERATION

### 2.1 BASIC OVERVIEW

The Recluse Nitrous System is a computer controlled nitrous system. The heart of the system is the Recluse control module, which controls the flow of nitrous and fuel to the engine when the system is active. Most importantly, the module maintains the proper air fuel ratio at any bottle pressure and will terminate the flow of nitrous to the engine should the air fuel ratio become too lean.

The Recluse module is designed so that when the ignition is turned on the system will power up, when this occurs the Blue LED will light up for 2 seconds then go out. Once the engine is started the module will perform an Oxygen Sensor test. During the Oxygen Sensor Test the Blue Light will be off. After the module has determined the Oxygen sensor is warmed-up and functional, which can take up to 2 minutes<sup>2</sup>, it will go into ready mode. When this occurs the Blue LED will **flash 5 times** indicating the system is ready. In this mode, the module will continually monitor the throttle position. If the module senses that the throttle is wide open **and** the push-button switch is engaged, it will activate the nitrous solenoid and nitrous will flow into the engine. The Blue LED will come on solid when the nitrous is being injected. The amount of nitrous is controlled by the installation of different sized nozzles at the throttle body. As nitrous is injected into the engine the module will monitor the Oxygen Sensor and will maintain the proper air fuel mixture. The nitrous will continue to flow into the engine until the throttle is released or the push-button switch is disengaged. Once the nitrous is deactivated the Blue LED will turn off. If the module automatically terminates the nitrous because the air fuel mixture is too lean, the module will flash "trouble code 3" using the Blue LED. This will be indicated by 3 flashes followed by a pause, which will repeat continually. If this occurs the ignition will need to be cycled off and then back on in order to reboot the module. If this occurs, refer to the troubleshooting section for instructions.

### 2.2 NITROUS TUNING

The amount of nitrous introduced into the engine is determined by the size of nozzle you are using. Although there are seven different sized nozzles, your kit contains four nozzles depending on whether it is a four, six or eight cylinder engine. The nozzles are color coded for quick reference. Other nozzles as well as custom sized nozzles may be purchased for a nominal charge.

Color	Orifice Size	Included In Kit
Blue	.025"	4 Cyl
Red	.030"	4 Cyl
Green	.035"	4 Cyl, 6 Cyl
Purple	.040"	6 Cyl
Gold	.045"	6 Cyl, 8 Cyl
Black	.050"	8 Cyl
Clear (aluminum)	.055"	8 Cyl

**CAUTION:** Always start off using the smallest nozzle included in your kit! Increase the size of the nozzle only after you have determined that the fuel system and engine can handle the additional flow of nitrous (no code 3 termination, no detonation or overheating).

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<sup>2</sup> If after 4 minutes the module cannot determine the Oxygen Sensor is working it will begin flashing a code 2 using the Blue LED. If this occurs refer to the troubleshooting section.

## 3.0 INSTALLATION INSTRUCTIONS

### 3.1 INSTALLATION PRECAUTIONS

NOTE: The Recluse module is susceptible to electrical noise or interference. You must maintain 8" of clearance between Recluse harness and module from any of the following components:

- Spark Plug Wires
- Ignition Coil(s)
- Alternator
- Stereo Amplifiers
- Stereo Speakers

### 3.2 LOCATING THE MODULE

The module must be mounted as close as possible to the vehicle's Electronic Control Unit (ECU). The ECU is usually located inside the passenger compartment under the kick panel or beneath the seat. The ECU is sometimes located under the hood, however avoid locating the module near any of the following; rotating engine parts, the Alternator, radiator or where water intrusion may occur (I.E. near the front of the engine compartment) or where excessive heat build up may occur (I.E. near the exhaust manifold).

### 3.3 MAIN HARNESS INSTALLATION

After locating the vehicle's ECU, you must determine the signal wires for the Throttle Position Sensor (TPS), Oxygen Sensor (O2), Injector Return Signals and two Ignition Power wires. If the ECU is located under the hood the LED indicator display and push-button should be routed through the firewall. Secure the harness with the supplied wire ties and adhesive mounting bases. Use alcohol to clean the area to which the adhesive base will be installed to ensure secure mounting. Mount the LED on the dash where it is easily viewable to the driver.

**WARNING: The Gray wires on the Recluse Main Harness are shielded cables – do not cut the cable to shorten or lengthen it. If the harness is too short, you may obtain extension cables in various lengths for a nominal charge.**

Two wiring harnesses are included with the kit, a main harness (12 pin connector) and injector connector (8 pin connector with green wires). Locate the main harness. Make the following connections:

### 3.4 CONNECTING POWER AND GROUND

Connect the RED wire with the 20 Amp in-line fuse from the main harness to a switched power source from the ignition switch using the supplied splice connectors and male slide terminal.

**NOTE: do not bypass the fuse or connect to the wire past the fuse, doing so could cause an electrical fire if the system becomes shorted. Only replace the fuse with a 20 Amp Fuse. If the fuse blows repeatedly there is a short in the system and all wiring should be inspected.**

Connect both BLACK wires to a good ground using the ring terminal.

### 3.5 CONNECTING KOEO POWER

The BLUE wire will be connected to a power source that is only "hot" when the vehicles ignition switch is turned to the on position or "Key-On-Engine-Off" (KOEO). This connection should be made using one of the supplied red splice connectors.

**NOTE: DO NOT cut or strip the insulation of the existing wire on the vehicle. DO NOT connect the green wire directly to the positive battery terminal or a wire that has voltage at all times. Doing so will cause improper operation and will drain the vehicle's battery.**

### 3.6 MOUNTING THE NITROUS SOLENOID

Using the supplied hardware, mount the Nitrous Solenoid within 2 feet of the throttle body. Locate the wire on the main harness that has the 2 wire mating connector to the solenoid and plug the solenoid into the harness.

**NOTE: Use caution when mounting the solenoid and wiring to ensure it is away from the throttle body linkage to avoid entanglement. Failure to do so could result in a sticking throttle and uncontrollable vehicle acceleration.**

### 3.7 SENSOR CONNECTIONS

#### 3.7.1 Throttle Position Sensor

**Note: Refer to the vehicle specific engine performance wiring diagrams to obtain the proper wire color codes for your vehicle.**

Locate the Gray wire with the YELLOW heat shrink tubing on the end. This wire will be connected to the output of the vehicles Throttle Position Sensor (TPS). The output wire will usually have between .5-1.2 volts at closed throttle and 3.5-4.75 volts at wide-open throttle with the ignition in the ON position and the engine OFF. The voltage should increase proportionate to throttle angle. Using the red splice, tap into the OUTPUT wire and plug the Gray wire with the YELLOW heat shrink onto the splice until it is fully seated.

**CAUTION: The module must be connected to the output of the Throttle Position Sensor. Connecting to the reference wire (the wire with nearly 5 volts or more) will cause the nitrous to activate at idle causing severe engine damage and possible loss of vehicle control, which could lead to possible injury or death. If you are unsure consult with a qualified professional.**

### 3.7.2 Oxygen Sensor

**Note: Refer to the vehicle specific engine performance wiring diagrams to obtain the proper wire color codes for your vehicle.**

Locate the Gray wire with the WHITE heat shrink tubing on the end. This wire will be connected to the output of the vehicles Oxygen Sensor. Some vehicles use multiple oxygen sensors. The connection must be made to the oxygen sensor signal wire that is located between the engine and catalytic converter. Connecting to the oxygen sensor after the catalytic converter will lead to improper operation and possible engine damage. The output of the oxygen sensor is 0-1 volt. The system uses this input to control the amount of fuel injected into the engine while nitrous is being injected. If this connection is poor or incorrect, engine damage may occur. The oxygen sensor's output is the result of the oxygen content in the exhaust. A signal below .45 volts indicates the engine is lean while a signal of .45 to 1.0 volts indicates a rich condition. During normal operation the signal should swing back and forth. This is called "closed loop" operation and is controlled by your vehicles on-board computer to keep emissions low. The oxygen sensor must heat up to almost 600 degrees before it begins to work. Some oxygen sensors have heaters in them that assist in getting them to operating temperature quickly. In order to determine which wire is the output, the oxygen sensor must be at operating temperature (the engine running at normal operating temperature). The voltage should be swinging back-and-forth between 0 and 1 volt. If the voltage is 12 volts or 0 volts at all times you have probably probed the voltage supply to the heater or the sensor ground. Once the proper signal has been located use the red wire splice to tap into the signal wire. If you wish to monitor the air/fuel ratio, you may purchase a Venom Air/Fuel Monitor Display Kit for a nominal charge.

### 3.8 INJECTOR HARNESS INSTALLATION

**NOTE: The Recluse Module provides additional fuel to support the addition of nitrous through the existing injectors. It accomplishes this by pulsing the injectors. This procedure deals with the connection to each injector. If the connection to the injector is not complete or secure, the cylinder associated with that injector will run lean, causing engine damage. If the wire from the Recluse Injector Harness is connected to the wrong side of the vehicle harness at the injector, the module will be permanently damaged, causing incorrect operation and engine damage.**

Locate the fuel injector harness. The injector harness (8 pin connector with green wires) will be connected to the negative side of each fuel injector. Refer to the vehicle specific engine performance wiring diagrams to obtain the proper wire color codes for your vehicle. The harness should have the same number of wires as your engine has injectors, I.E. 4 cylinder, 4 injectors, 4 orange wires. Perform procedures 1A, 1B and refer to the vehicle specific wiring diagrams.

Secure the harness using the supplied wire ties and adhesive mounting bases.

### 3.9 HOSE & BOTTLE INSTALLATION

**NOTE: Since installation of the bottle brackets will vary from vehicle to vehicle, mounting hardware to mount the bottle brackets to the floor of the vehicle is not included. This hardware may be obtained from any local hardware store.**

You can mount the nitrous bottle in the dash, under the seats or side panel of the vehicle and route the nitrous hose through the firewall. If you decide to mount the bottle inside the trunk and the hose is not long enough, you may purchase a longer hose for a nominal charge. Position the bottle so that it mounts sideways in the trunk (valve NOT facing the front or rear of the vehicle). Rotate the bottle in the brackets so that the outlet of the valve is facing the floor of the vehicle.

Route the 10 foot nitrous hose from the trunk into the engine compartment. Avoid the exhaust system, braking components, suspension and steering components. If the hose is not long enough, you can purchase a longer hose for a nominal fee.

**NOTE: Use a rubber grommet when routing the hose from the trunk floor to the outside of the vehicle. Failure to do so will cause the hose to wear and eventually fail causing high-pressure nitrous gas leakage. Do not cut the nitrous hose or modify the fittings.**

Connect the end of the hose in the engine compartment to the fitting on the nitrous solenoid marked "IN". Do not use any Teflon tape or other sealants.

**CAUTION: Connecting the hoses backwards on the solenoid will cause solenoid to leak resulting in engine damage. Ensure you connect the hose from the nitrous bottle to the fitting on the solenoid marked "IN".**

Ensure the hose is pulled snugly so that it will not drag on the ground. Excess hose should be coiled inside the trunk. Secure the hose using the supplied wire ties or other suitable mounting hardware. Connect and tighten the hose fitting to the outlet of the nitrous valve. Do not use any Teflon tape or other sealants.

Locate the 2.5 foot nitrous hose. Connect one end of the 5' hose to the other side of the nitrous solenoid marked "OUT". Do not use any Teflon tape or other sealants.

Locate the smallest orifice nitrous nozzle in your kit (Refer to the color code chart at the beginning of the manual). The nozzle should be mounted approximate 3" before the throttle body between the air filter and throttle body. If your vehicle uses an airflow meter it should be mounted between the airflow meter and the throttle body.

In most applications it is suitable to drill a ¼" hole into the rubber boot just before the throttle body. Remove the boot when drilling to ensure no rubber shavings are ingested into the engine. Push the nozzle into the rubber boot ensuring that the outlet of the nozzle is aligned with the intake of the throttle body.

Connect and tighten the other end of the 2.5' hose to the nozzle. Do not use any Teflon tape or other sealants. Secure the hose using the supplied wire ties.

### 3.10 TESTING THE SYSTEM

Because nitrous bottles are shipped empty you will need to have the nitrous bottle filled prior to testing.

Turn the ignition key on. The BLUE LED should come on for 2 seconds then go out. Start the engine. Revving the engine to about 2,000 RPM will help the oxygen sensor warm-up. This may take longer if the engine is cold. Once the module has determined the oxygen sensor is switching and warmed up the BLUE LED will flash 5 times and then turn off indicating the system is ready. The system will now activate once it sees wide-open throttle AND the push-button is engaged. When the system is active the BLUE LED will come on solid. Once the throttle is released or the push-button disengaged, the BLUE LED will turn off. The system will not activate if the push-button switch alone is depressed, although the system will still perform the oxygen sensor test.<sup>3</sup>

## 4.0 Troubleshooting

As a general rule most malfunctions are the result of improper or poor electrical connections. If you are experiencing erratic operation or the system is not functioning as designed you should recheck all electrical connections with a volt-meter. In particular the red splice connections should be inspected to ensure they are piercing the wire that they are connected to.

### System Will Not Power Up

The Blue LED should come on for two seconds then go out as soon as the key is turned on. If this does not occur check the following:

- System Fuse – Inspect to make sure the 20 amp fuse is not blown. If the fuse is blown check for electrical shorts and make sure you have installed the correct rating fuse.
- Blue Wire – It must be connected to a KOEO power source.
- Red Wire – It must be connected to a switched power source from the ignition switch or suitable junction box.
- Black Wires – Ensure BOTH black wires are connected to a good ground.

### Fuse Blows Repeatedly After Activation

Check for incorrect fuse rating. Ensure fuse is a 20 amp fuse.

If fuse is okay the most likely cause is a shorted solenoid. Disconnect solenoid and retry (there will be no nitrous flow) if the fuse remains good the solenoid will need to be replaced.

### System Flashes Code 2 – Oxygen Sensor Failure

If the system cannot determine the oxygen sensor is functional after 90 seconds of operation, the Blue LED will flash a code 2 and the system will be disabled. When this occurs the Blue LED will flash twice, then pause and then repeat the sequence until the modules power is cycled (key off then back on). This is usually the result of a poor or improper connection to the vehicles oxygen

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<sup>3</sup> The engine must be running in order for the module to perform the oxygen sensor test. If the engine is off and the key is on the BLUE LED will remain off and the system will be in stand-by until the engine is started and the module has determined the oxygen sensor is functional.

sensor. Recheck your connections and make sure the blue splice is connected to the correct wire of the oxygen sensor. If the problem persists you may need to replace your vehicle's oxygen sensor.

**NOTE: The system will not activate until this problem is corrected.**

### **System Flashes Code 3 – Lean Termination (System Too Lean)**

If the system cannot correct the air fuel mixture during nitrous injection it will terminate the flow of nitrous and flash a code 3. When this occurs the Blue LED will flash three times, then pause and then repeat the sequence until the module's power is cycled (key off then back on).

This is a result of too lean of an air fuel mixture. You should do the following:

- Check the connections to EVERY injector wire. If the connection to even one injector wire is poor, the entire air fuel balance can be thrown off causing improper operation.
- If you are using one of the bigger nozzles that came with the kit it may be too large for your engine's fuel system. Verify this by switching to the smallest nozzle. If system functions normally you need to switch to a smaller nozzle. Increase nozzle sizes one step at a time. If the system terminated itself due to a lean condition, you have reached the limits of your fuel system and you need to switch back to the next smaller nozzle. If you wish to use bigger nozzles, you should consider larger injectors or an adjustable fuel pressure regulator. Most stock fuel systems will support an addition 40-60% of your vehicle's stock horsepower, although this will vary from vehicle to vehicle.

### **Engine "Pings" or "Detonates"**

- You may be running too much nitrous, consider reducing the size of the nozzle you are using.
- Use of high-octane fuel is required when nitrous is used. Use premium grade pump gas of 92 octane or higher. Consider the use of a pour-in octane booster.
- Check the connections to EVERY injector wire. If the connection to even one injector is poor the entire air fuel balance can be thrown off causing improper operation.
- If you are using one of the larger nozzles that came with the kit consider using a colder temperature range spark plug.

### **Engine Surges – Low Bottle Pressure**

The bottle pressure is low. Also check to ensure the bottle is installed properly. Installing the bottle with the valve facing the rear of the vehicle will cause the liquid nitrous in the bottle to move to the top of the bottle during acceleration. This can cause a surging condition.

### **System Will Not Activate at Wide Open Throttle**

If the system is ready (Blue LED flashed 5 times after initial O2 sensor test) but will not activate at wide-open throttle, you should check your connection to the Throttle Position Sensor wire. Check to ensure your vehicles TPS output reaches at least 3.5 volts at wide-open throttle. Verify this with the key on, engine off using a digital volt-ohm-meter. If it does not reach this voltage your module will need to be recalibrated by the Venom Technical Service Department. Contact Venom Technical Support for assistance toll free (800) 959-2865.

### **System Activates At Idle or Part Throttle**

Connection to Throttle Position sensor is incorrect. Refer to the vehicle specific engine performance wiring diagrams to ensure the correct TPS wire connection.

## 5.0 Quick Reference Guide

### **Electrical Connections**

<b><u>Recluse Main Harness</u></b>	<b><u>Function</u></b>	<b><u>Connection to Vehicle</u></b>
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Red Wire w/Fuse	Main Power, Solenoid	Switched Power Source
Blue Wire	Key On Power, Module	Key-On-Engine-Off Power Source
Black Wires (2)	System Ground, Injector Ground	Ground/Chassis
Gray w/Yellow End	TPS Input Voltage	Output of Throttle Position Sensor
Gray w/White End	Oxygen Sensor Voltage Input	Output of Upstream Oxygen Sensor

<b><u>Recluse Injector Harness</u></b>	<b><u>Function</u></b>	<b><u>Connection to Vehicle</u></b>
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Green Wires (4,6 or 8)	Injector Ground Switching	Negative Injector Circuit
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### **Filled Out By Purchaser:**

**Date of Purchase** \_\_\_\_\_

**Place of Purchase** \_\_\_\_\_