

Specifications

Amps / Volts requirements	400 ma @ 24 VDC
Propane pressure (VCG-6LP)	11" WC / 2.8 kpa
Natural Gas pressure (VCG-6NG)	4.5" WC / 1.15 kpa
Cu ft per hour / CO2	3-6 SCFH
BTU Rating (Variable)	LP 2,263-4,526
	NG 2,767-5,534
VariableCO2 Modes	1 or 2 burners
Weight / Dimensions	17 lbs / 17.7" x 10" x 10"
Life Expectancy	> 10 years

Instruction Manual

VCG-6

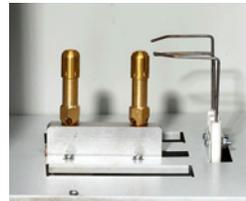
3-6 cuft/hr Variable CO₂ Generator

SENTINEL



Sentinel CO₂ Generators offer a **3-year** warranty.

Ask your retailer for details.



Sentinel products are distributed by:

GPS / Global Product Solutions LLC.



www.growgps.com

Printed in China

SENTINEL

Introduction

Carbon Dioxide / CO₂ is critical for all plants. Normal atmospheric air around the world averages about 380 Parts-Per-Million (PPM.) When plants are provided higher levels of carbon dioxide, they can grow faster and larger. It is normally agreed by experts that up to 1500 PPM is beneficial to plants and the best way to increase the CO₂ level is by using a CO₂ generator that burns either natural gas or propane.

The VCG-6 has two models, the LP (propane) and an NG (Natural Gas) model. Both come complete with (2) clean burning brass burners pre-installed and the appropriate regulator & hose.

The VCG-6 CO₂ generator is one of the most advanced CO₂ generator available today.

- 1) The VCG-6 has a **variable output** from 3 to 6 cubic ft of CO₂ per hour.
- 2) It has an electronic ignition control module that eliminates the open pilot flame for safer operation.
- 3) The 2 brass burners have been designed to burn cleaner and produce a **consistent blue flame**.
- 4) The **tip-over switch** automatically shuts off the entire unit in the event the unit falls or tips over.

TABLE OF CONTENTS

A quick look at the VCG-6
Installation of the VCG-6
VCG-6 Propane & Natural Gas
Starting the unit for the first time
Variable output and area sizes
Ignition control module
Connection Examples
Troubleshooting & Specs

Problem: One or more of the burners seem to be not burning correctly.

Make sure the gas supply is adequate and the gas hose is not kinked or twisted. If the flames are not blue and burning clean, do not operate the unit.

Problem: The growing area is getting too hot and / or humid.

Decrease the number of burners that are operating. Removing 1 of the 2 burners and replacing it with the supplied pipe plug will reduce the amount of heat and humidity added to the growing area.

Problem: The CO₂ level does not seem to be increasing enough.

If both burners are operating and the CO₂ level does not get to your desired PPM level, check for air leakage in the growing area and make sure that exhaust fans are not operating when the CO₂ production is supposed to be occurring.

Problem: I hear the unit buzzing and sparking.

The unit will attempt to fire the burners 5 times for 15 seconds each. During that time, you will hear a “sparking” sound. This is normal. It is not normal for the unit to fail to light after 5 tries. Check the gas supply / LP tank. If the gas supply tests OK, consult the factory.

Red Lock Out LED is blinking On & Off

The Lock Out function is automatic and will be activated if 5 attempts to light the pilot are not successful. Normally, it will mean the propane has run out or the gas supply has been interrupted. Once the problem is determined and fixed, cycling the power switch Off and then On will reset the error. *Note After 20-minutes, the lock out function will be automatically reset in an attempt to re-ignite the gas.

*** High-altitude operation:** The burners on the VGC-6 have been selected to operate correctly from sea-level up to 4500ft elevation. If you are at high altitude (4500+) and notice yellow flames, contact the factory. Special high-altitude burners are available.

Troubleshooting

Some of the more common questions and problems are listed here.

Consult the factory for other concerns not listed.

Problem: There is a gas smell in the area.

Shut off the gas supply immediately. Do not turn ON any electrical devices and ventilate the area by opening vent, doors or windows. Exit until the gas smell is not evident.

After ventilating, determine where the gas is leaking from by using a spray bottle with soapy water in it. Spray all gas connection with the water and look for small bubbles. Seal any leaks. If the problem persists, consult the factory.

Problem: The unit is trying but the burners are not lighting.

When the unit is first started or a LP tank is replaced, the gas lines make take some time to fill with gas. The unit will attempt to fire the burners 5 times for 15 seconds each. Each attempt is followed by a 30 second "purge" time. After 5 tries, the unit is locked out. Determine why gas is not getting to the unit. To reset the unit, cycle power OFF and then back ON. The unit will automatically reset after a 20-minute delay.

Problem: The power is connected, but the Green indicator is not on.

The "tip-over" switch may be activated. Tilt the unit to one side and listen for a clicking noise. The switch is like a pendulum and will shut off the burner if the unit is not operated level.

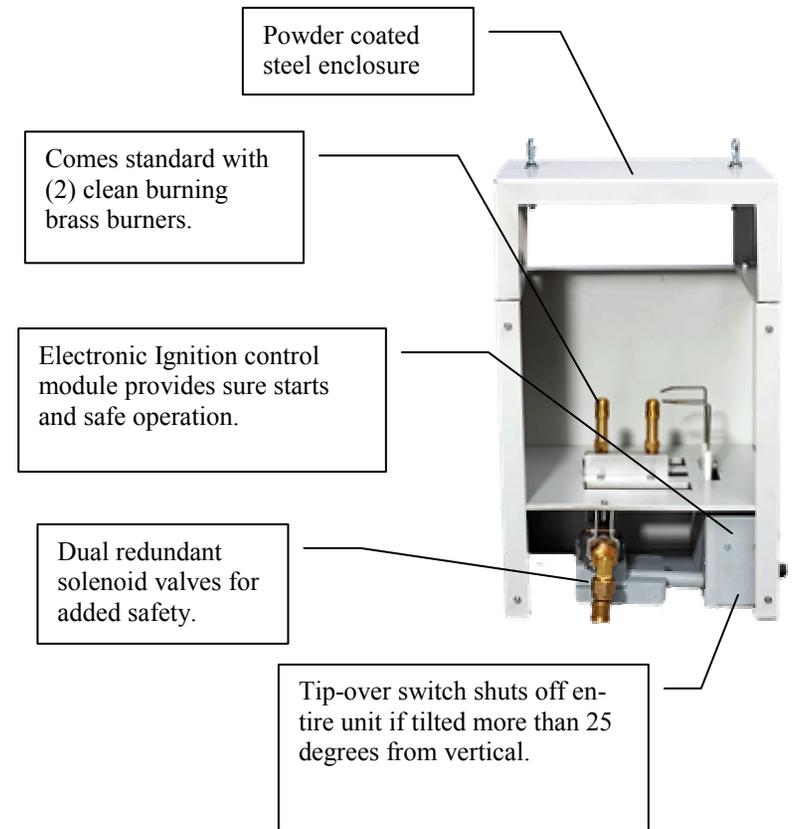
Problem: The flames appear to be too large or yellow.

Verify you are using the correct fuel, (LP or NG). The supplied regulator must be installed or high pressure may increase the flames to dangerous heights. Check the regulator. **DO NOT operate the unit with yellow or large flames.** Consult the factory.

Problem: Some of the flames appear to be blue but small in size or "lazy". The flames should resemble a flower when operating correctly.

Check the regulator and gas supply, low pressure/ low LP tank level will also cause this condition to occur. **DO NOT operate the unit with lazy blue flames.** Consult the factory.

A quick look at the VCG-6...



Regulator supplied with Natural Gas Generators



Regulator supplied with Propane Generators



NOTE: The ignition control module produces a spark from a pair of electrodes near the tip of one of the brass burners to ignite the gas. Do not attempt to service the sparking electrode or place foreign objects anywhere near the electrodes.

Installing the VCG-6

NOTE: In order to ensure a safe and proper installation, follow the steps below. Be aware that in closed spaces without ventilation, toxic levels (above 5000 PPM) of CO₂ can accumulate. Do not allow the unit to operate without the proper controls or timers.

- 1) The unit is designed to hang from a ceiling joist or overhead support. It comes with two eyebolts, hooks and sections of chain.
- 2) **DO NOT** place the unit on top of something like a table to operate it. The generator **requires a free flow of air** coming in through the bottom of the enclosure.
- 3) The chains provided are 20" long. A minimum of 20" must be maintained between the unit and any walls or other obstructions.
- 4) Install the two screw hooks into a suitable supports. The chains are then secured to the unit and the screw hooks with the included S hooks. Bend the S hooks so that they cannot slip from the chain and the hanging hooks. Ensure that the unit is hanging level.
- 5) The gas connections must be tightened properly. The supplied 12 foot hose is connected from the flare fitting on the CO₂ generator to the provided gas regulator. Secure the connection with two wrenches.
- 6) Once the gas connections are secured, pressurize the gas line and check for leaks using the soapy water. Spray the water onto the gas connection fittings and look for any bubbles. Re-secure if necessary.
- 7) The VCG-6 operates on 24 volts DC. The power supply included with the unit is connected to a controller or timer that will determine how long / often the unit will operate. Connect the power supply jack to the unit and the desired controller or timer.
- 8) The main power switch on the side of the unit will activate the ignition module and firing sequence. When the **RED** indicator light is illuminated, the unit is powered and operating.

NOTE: When you are ready to start the unit for the first time, refer to the "Starting the unit for the first time" section of this manual.

Connection Examples

Good



Use a timer like the DRT-1 to turn the CO₂ generator On and Off and regular intervals.

Better



Use a Part-per-million CO₂ controller like the CPPM-1 or CHHC-1. Measuring the exact amount of CO₂ in PPM, provides the most accurate method of control.



A CO₂ generator is the most cost-effective method of adding CO₂ to an area. You must also consider what type of controller will turn the CO₂ generator On and Off to avoid creating too much CO₂ and heat. CO₂ can be measured by special sensors the measure CO₂ levels in Part-Per-Million or PPM.

CO₂ above 2500 PPM will make you feel uncomfortable and may cause headaches and other problems. CO₂ levels above 500 PPM can be fatal so it is important to control the amount of CO₂ being created by the VCG-6.

Normally 1200 to 1500 PPM is considered correct for rapid growth of plants, above that level is a waste. To properly control CO₂ levels, nothing is better than a CO₂ PPM controller like the CPPM-1. It automatically measures the amount of CO₂ in the area and activates the VCG-6 only when required.

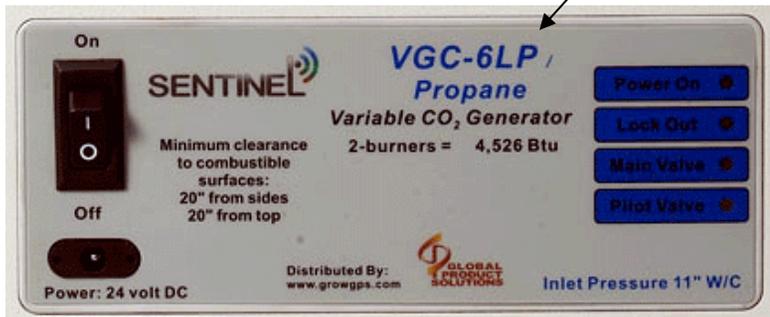
NOTE: Do not operate the VCG-6 or any other CO₂ generator without proper controls or timers. Do not operate the VCG-6 in closed spaces with inadequate ventilation.

Ignition control module

The VCG-6 uses the newest and most advanced ignition controller available today. The module provides the spark to light the (2) burners. This provides consistent & controlled starts. If the module senses the flame is not present, it shuts off the solenoid valves.

One feature that is also worth mentioning is the “dual-redundant” solenoid valves that are controlled by the ignition controller. Provides double the safety of single solenoid CO2 generators.

The ignition controller has (4) LED indicators to verify correct operation.



Power On (Green LED) Indicates 24 volt power is supplied to the unit.

Lock Out (Red LED) The Lock Out LED blinking indicates the ignition controller shut off the solenoid valves and the unit is locked out.

Cycling the power switch Off & On will reset the error. (See troubleshooting for more info)

Main Valve (Green LED) Indicates the ignition controller has activated the main solenoid and the unit is in operation. (Not used on VCG-6)

Pilot Valve (Yellow LED) When the power is switched On, the ignition controller will provide a spark for 15 seconds, During that time, the pilot solenoid is activated. The Pilot Valve LED indicates that the pilot solenoid has been activated. (Should be On during operation with VCG-6)

VCG-6 Propane & Natural Gas

NOTE: The VCG-27 **MUST** be used on the appropriate gas supply and **MUST** be used with the supplied gas regulator.

There are two different VCG-6 units, one is used for Propane (VCG-6LP) and one is used for Natural Gas (VCG-6NG). Below is the differences between the two units. Make sure you have selected the correct unit and are using the matching gas.

VCG-6LP / Propane: Liquid Propane otherwise known as LP or Propane is stored in pressurized tanks of varying sizes. The gas exiting the pressurized tank **must** first be regulated to a very low pressure before it enters the gas burners. The standard for measuring the low pressure is inches of water column or ” WC. The VCG-6LP operates at 11” WC or about 1/2 PSI. Once the gas is regulated down to the correct pressure, it enters the unit and flows through the brass burners. Each brass burner has been designed to produce approximately 3 cu ft of CO2 per hour. Each LP burner will also produce 2263 BTU of heat and quite a lot of water vapor along with the 3 cu ft of carbon dioxide. The Propane regulator provided with the unit **MUST** be used unless it is verified that the propane gas supply is already regulated to 11” WC.

The provided LP regulator is designed to connect directly to portable LP tanks. It also has a built-in safety function that limits the flow of gas to a very low level in the event of a large gas leak.

Any questions...Consult a licensed installer or contact the factory.

VCG-6NG / Natural Gas: Natural Gas otherwise known as NG is piped directly into homes and businesses from an extensive pipeline system. The gas supply entering the building can vary from very low pressure (less than 1/4 PSI) to over 5 PSI. The natural gas provided to the VCG-6NG **must** first be regulated to a very low pressure before it enters the gas burners. The standard for measuring the low pressure is inches of water column or INCH /WC. The VCG-6NG operates at 4.5” WC or about 1/4 PSI. Once the gas is regulated down to the correct pressure, it enters the unit and flows through the brass burners. Each brass burner has been designed to produce approximately 3 cu ft of CO2 per hour. Each NG burner will also produce 2767 BTU of heat and quite a lot of water vapor along with the 3 cu ft of carbon dioxide. The NG regulator provided with the unit **MUST** be used unless it is verified that the natural gas supply is already regulated to 4.5” WC.

Any questions...Consult a licensed installer or contact the factory.

Starting the unit for the first time

Here is a quick checklist and suggested start-up procedure.

- 1) Follow the installation instructions on page 4 of this manual. Once installed go to step #2.
 - 2) Look inside the unit and verify there is no loose packing material or other foreign objects. Look at the gas connections and verify nothing appears damaged or out of place.
 - 3) Make sure the power switch is turned OFF.
 - 4) Pressurize the gas lines by opening any shut-off valves on the gas supply. Double check for leaks if this is the first time the unit will be used. Gas leaks can be extremely dangerous.
 - 5) Once the gas supply has been pressurized and tested for leaks, verify there is no objects within 18" of the surface of the unit.
 - 6) Plug in the 24 volt DC power supply to a 120 volt power source. Connect the small cable to the power inlet jack of the unit.
 - 7) Turn the power switch ON, the **Green** "Power On" indicator light should turn ON. After a short pause, the ignition module will attempt to ignite the burners for 5 seconds. During this time the **Yellow** LED "Pilot Valve" LED is illuminated.
 - 8) If the unit fires, go to step #9. If this is the first time the unit was used or if the LP tank was recently replaced, it may not successfully start after the first attempt. After a 30-second delay, the unit will attempt to re-fire for 15 seconds. If after five (5) attempt to fire the burners is unsuccessful, the module will lock itself until power to the unit is recycled OFF & ON or after a 20-minute delay.
 - 9) Once the burners fire, look from under the unit and verify the flame is blue and consistent.
- NOTE:** If the flame appears yellow or excessively large, **shut the unit off** and refer to the troubleshooting section of the manual. The flames should appear blue and resemble a small 6-pointed star.
- 10) If the unit will be operated in the maximum configuration, ensure no materials around the unit are getting hot. The VCG-6 produces up to 6,000 BTUs of heat at full capacity so be sure the heat will not become too great for the area or the surroundings.
 - 11) Once the generator is tested at full capacity, connect the VCG-6 to your controller or timer.

Variable output and area sizes

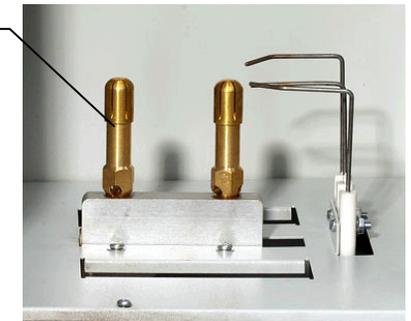
For small set-ups, the user can select to reduce the heat being produced by removing one of the two burners and replacing the burner with a pipe plug that is supplied with the unit. The CO₂ production will be reduced from 6 cuft / hr, down to 3 cuft / hr with only 1 burner installed.

Both the Propane (LP) and Natural Gas (NG) burners have been designed to produce about 3 cu ft of CO₂ per hour each. LP has a higher fuel value than NG so each LP burner produces 2263 BTUs of heat while the NG burners produce 2767 BTUs of heat to create 3 cu ft of CO₂.

# of burners	Cu Ft of CO ₂ / hr	BTUs of Heat	Recommended Area size (Cu Ft)
1	LP 2.6	LP 2,263	0 - 1,000
	NG 2.7	NG 2,767	
2	LP 5.3	LP 4,526	1,000 - 2,000
	NG 5.5	NG 5,534	

Determine your area's cubic feet by multiplying height x width x depth and then refer at the recommended burner setting.

To reduce CO₂ output, remove this burner and install pipe plug into the left side of the aluminum manifold. **NEVER remove the right side burner. The burner directly under the electrode MUST remain in place.**



The most common recommendation for PPM levels for rapid plant growth is between 1000 and 1500 PPM. The plants will benefit most by maintaining the CO₂ level within this range during the daylight hours.

Whenever possible, use a CO₂ PPM controller or other appropriate controller to maintain an accurate CO₂ level.