

## Specifications

Amps / Volts requirements	120-volt / 38 ma
Compressed CO2 connection	CGA-320
Maximum inlet pressure	3000 PSI
Cu ft per hour / CO2 (SCFH)	.5 to 15 SCFH
Weight	5 lbs
Life Expectancy	> 10 years



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

Ask your retailer for details.

Sentinel products are distributed by:

GPS / Global Product Solutions LLC.



[www.growgps.com](http://www.growgps.com)



## Instruction Manual **CO2-REG** CO<sub>2</sub> Regulator



## Introduction

Carbon Dioxide / CO<sub>2</sub> 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. Compressed CO<sub>2</sub> comes in pressurized tanks or cylinders.

The CO<sub>2</sub>-REG reduces the pressure of the CO<sub>2</sub> exiting the tank, controls the flow of CO<sub>2</sub> with a solenoid valve and regulates the amount of CO<sub>2</sub> being released with a precision flow-gauge.

The CO<sub>2</sub>-REG CO<sub>2</sub> regulator assembly comes complete with all of the required devices to make uses compressed CO<sub>2</sub> easy.

- 1) Regulator connects directly to either 20 lb or 50 lb CO<sub>2</sub> tanks.
- 2) The 120-volt solenoid valve is pre-wired with a 6 ft power cord to connect to controllers or timers.
- 3) The precision flow-gauge can release between 1/2 and 15 SCFH of CO<sub>2</sub> per hour (Standard Cubic Feet per Hour).
- 4) The optional CO<sub>2</sub>-EXP allows multiple tanks to be connected together to extend time between tank replacement. The low -pressure connection between the REG and EXP makes installation easy and SAFE.

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## Troubleshooting

Some of the more common questions and problems are listed here. Because the CO2-REG is a compressed gas device, do not take shortcuts during installation or set-up. Handle compressed gas tanks with care and transport only with state approved methods.

### **Problem: I suspect there is a leak or that the area is over-filled with CO2.**

Shut off the access valves on the compressed tanks. Ventilate the area by opening vent, doors or windows. Exit until the area has been replenished with fresh air.

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: When I plug the solenoid power cable into a 120-volt power source, there is no gas flowing.**

- 1) Check the pressure gauge to make sure the tank is not empty.
- 2) Verify the access valve on the compressed tank is opened.
- 3) Open the flow-gauge adjustment knob by turning the screw counter-clockwise.

If the problem persists, contact the factory.

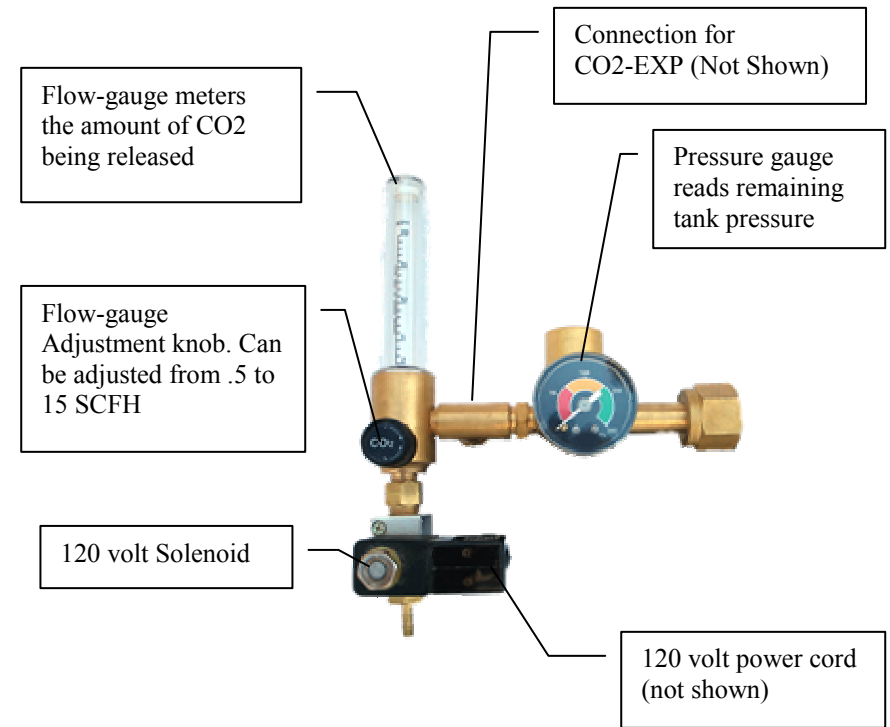
### **Problem: When the solenoid is turned OFF (no power) there is gas coming out of the flow-gauge.**

A small amount of debris could be blocking the solenoid valve from fully closing and sealing. Activate the solenoid several times with the tank connected and pressurized. Powering the solenoid valve ON & OFF a few times may clear the obstruction.

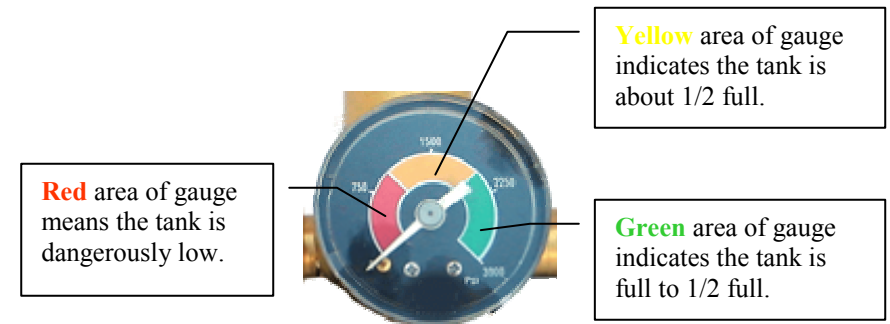
### **Problem: The connecting to the compressed tank will not seal properly.**

The seal inside the CGA-320 stem which connects to the compressed CO2 tank can become worn out or torn after a few tanks are installed & removed. Replacement seals are available through your local retailer or at welding supply businesses.

## A quick look at the CO2-REG...



The tank pressure gauge on the CO2-REG and the CO2-EXP is simple to read and understand.



**NOTE:** CO2 tanks / cylinders are under extremely high pressures and frostbite can occur if exposed to escaping CO2 gas. Always use caution while handling pressurized gas.

## Installing the CO2-REG

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 CO2-REG to operate without the proper controls or timers.

- 1) The CO2-REG is designed to be used with 20 or 50 lb compressed CO2 tanks. The CGA-320 connection valve has an internal gasket that seals the pressurized gas when the regulator is installed.
- 2) Locate an area away from heat sources where the CO2 tank can be located. The tank should be secured to a support or wall so that it cannot fall or tip over accidentally.
- 3) With the access valve on the top of tank closed, use a wrench to secure the regulator to the tank access valve.
- 4) Once secured, open the access valve on the tank and check for leaks. A spray bottle with a small amount of liquid soap can be used. Spray the liquid around the connections and looks for any bubbles that would indicate a leak.
- 5) The 1/4" outlet of the solenoid valve can be connected to 1/4" tubing. The outlet of the solenoid or the end of the tubing should be placed near or in front of a circulating fan to "mix" the CO2 with the air in the area.
- 6) To test and set the flow-gauge, connect the power cable from the solenoid valve into a 120 volt power source. As the gas is being released, the flow-gauge can be set by turning the adjustment knob until the steel ball hovers at the desired flow setting.
- 7) When the setting is correct, unplug the power cable and reconnect it to the controller or timer you will be using. CO2 should only be used during the daylight hours.

**WARNING:** Compressed CO2 tanks have pressures as high as 3000PSI. Do not drop or store tanks where they may fall. Damage to the regulator assembly could result in high-pressure gas released with enormous energy.

## Connection Examples

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.

The connection examples are provided as a guide. It is HIGHLY recommended to use a PPM controller with the CO2-REG to properly regulate the CO2 level within the growing area.



### Good



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

### Better



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

**NOTE:** Compressed CO2 tank capacity is:  
Small 20lb bottle = 172.8 cu ft / Large 50lb bottle = 432 cu ft

## Optional CO2-EXP (Expansion Regulator)

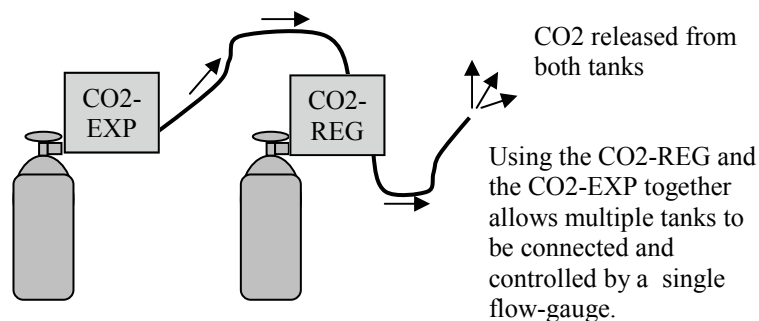
The optional CO2-EXP Expansion regulator allows multiple compressed tanks to be connected together. That allows an extended amount of time between tank changes. The CO2-EXP consists of a separate regulator to reduce the pressure from 3000PSI down to 30 PSI.



A 1/4" flexible line connects from the CO2-EXP to the back of the CO2-REG. Each tank has its own regulator and gauge. To install the CO2-EXP, follow the steps below.

- 1) Turn OFF the compressed CO2 tanks to be used.
- 2) Locate the pipe-cap on the back of the CO2-REG between the regulator body and the flow-gauge. Loosen and remove the cap.
- 3) Connect the flexible hose from the CO2-EXP to the open connector on the back of the CO2-REG. Tighten securely.
- 4) Secure the CO2-REG and CO2-EXP to the compressed CO2 tanks.
- 5) Open the access valves on the compressed tanks and check for leaks.
- 6) Activate the solenoid by plugging the 120-volt cable into a power source. Verify the flow-gauge is set correctly.

Each tank will provide CO2 to the flow-gauge. If one tank runs empty before the other one, the second tank will continue to provide CO2.



## Determining area and settings

It is highly recommended to use a CO2 Part Per Million (PPM) controller with the CO2-REG. If you are not going to use a controller, the CO2-REG must be used with a timer to regulate how often and how much CO2 is released into the area.

The chart below is for reference only. In order to determine the proper timer settings and flow-gauge settings, you can find a calculation tool online at [www.growgps.com](http://www.growgps.com)

LENGTH	A	10.0		Enter the enclosed area length
WIDTH (FT)	B	12.0		Enter the enclosed area width
HEIGHT (FT)	C	8.0		Enter the enclosed area height
ROOM CAPACITY (CU FT)	D	960	Multiply A x B x C	This is the total area of the enclosed growing zone.
EXISTING CO2 LEVEL (PPM)	E	375		Enter the average background CO2 level.
DESIRED CO2 LEVEL (PPM)	F	1500		Enter the desired PPM level you want to have
SUPPLEMENT CO2 LEVEL (PPM)	G	1125	Subtract E from F	This is the amount of CO2 to be added PPM
VOLUME OF CO2 REQUIRED (CU FT)	H	1.080	(Multiply G x .000001) x D	Amount of CO2 to bring the area to the desired PPM.
INJECT PERIOD (MIN)	I	10.0		The amount time the CO2 will be released.
FLOW RATE (CFM) (For CFH, see below)	J	0.108	Divide H by I	Set the flow-gauge to this setting.
FLOW RATE (CFH) (For CFM, see above)	K	6.5	Multiply J x 60	Set the flow-gauge to this setting.

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