INSTRUCTION MANUAL

ACTIVE AIR™ CO_2

COSYS / COSYS20

Congratulations on the purchase of our carbon dioxide (CO_2) system. Its unique design and top quality components make it the best CO_2 enrichment system available to the home gardener. Check all your parts carefully against the diagram and components listed below.

PLEASE READ ALL DIRECTIONS CAREFULLY BEFORE SETTING UP YOUR SYSTEM.

SETTING UP YOUR SYSTEM

1. **IMPORTANT!** Before attaching the regulator to the CO_2 tank, slowly open the tank valve wide for 3-5 seconds to blow out any sediment. Close the valve tightly.
   Whenever you are opening the tank valve, do it extremely slowly to avoid damaging the inner seals in the regulator.
2. Make sure the washer is seated evenly in the regulator valve. Attach regulator assembly to tank.
   DO NOT OPEN THE TANK VALVE.
3. Insert the shorter extension tube into the plastic fitting on the back of the flow meter.
4. Insert the other end of the extension tube and insert it onto the "T" fitting.

ATTACHING THE DISTRIBUTION RING

The distribution ring is designed to be suspended above the plants in a circular pattern.

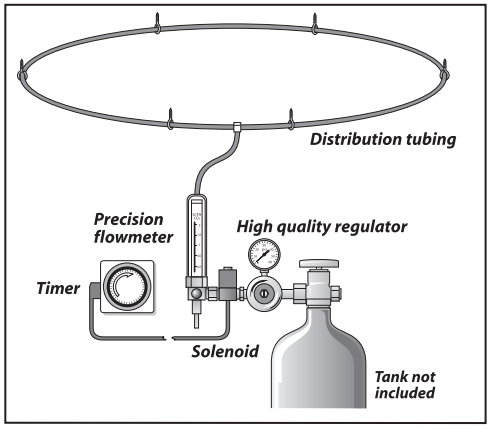
1. Screw in the eyelets according to the diagram.
2. Thread the tubing through the eyelets in a circular pattern over your growing area.
3. Connect the return end to the other side of the "T" fitting.

CO_2 is heavier than air and will spread downward from the distribution points. ***Make sure the distribution tubing is secured and does not interfere with your lighting or light movement systems.***

ADJUSTING THE REGULATOR

The regulator is factory pre-set at 30 psi, if your regulator gauge does not read 30 psi during the injection period, use the following steps to adjust.

1. Plug the solenoid cord into the timer and rotate the dial until the tabs are in an **"ON"** position.
2. Open the tank valve **SLOWLY** until it is fully open.
3. Remove the CO2 sticker from the front of the unit. Adjust with 4mm (5/32) hex key or flat head screwdriver by turning clockwise or counter clockwise until the gauge reads 30 psi.
4. Tighten the locknut.
5. Unplug the solenoid valve.



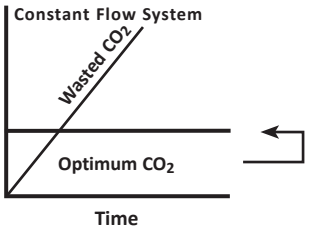
Components list:

1 - High Quality Regulator
1 - Solenoid
1 - Precision Flow Meter
(the three above pieces are pre-assembled together)

1 - Timer (TM01015D)
2 - Distribution Tubing (3' non-drilled, 15' drilled)
1 - "T" connector for tubing
6 - Eye screws
1 - 4mm Hex Key

WARRANTY

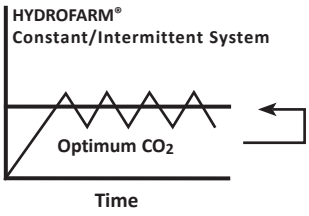
Our CO_2 systems are guaranteed to the original owner for 3 years from the date of purchase. Misuse, abuse, or failure to follow instructions are not covered. If you have a problem, recheck your system and timer to isolate the problem. If this doesn't remedy the situation, call the place of purchase to get a Return Authorization for the faulty part. Send only that part. Unauthorized returns will not be accepted. Save your receipt/invoice — a copy is required for all warranty work.



One of the unique features of our system is its ability to raise the CO_2 up to the appropriate level each day when your lights come on and then maintain it. CO_2 is an essential ingredient for photosynthesis, which is the main provider of energy for plant growth. Without enough carbon dioxide, plant growth will slow down or can actually stop. A lack of CO_2 can occur very easily in an enclosed growing area unless you add a supplemental source of CO_2 gas.

CO_2 is an odorless, invisible, non-flammable gas. It is safe for humans in the maximum concentrations recommended for plant growth.

The average level of CO_2 in the atmosphere is about 300 PPM (parts per million). If the level decreases down below 200 PPM in an enclosed growing area, plant growth slows to a halt. Through years of testing and research, the optimum enrichment level of CO_2 for plant growth has been determined to be about 1500 PPM. This assumes there is plenty of bright light and a good growing system. With CO_2 enrichment, under good conditions, plant growth rates and flowering will increase 20-100%. CO_2 should be used from seedling right through harvest.



The easiest way to raise the CO_2 level is by the compressed CO_2 gas method with a tank. Tanks come in 20 lb. and 50 lb. sizes and are available for rent at your local beverage supply, welding, or gas products company. We recommend Hydrofarm's 20lb aluminum tank (item code CCO2).

HELPFUL INFORMATION:
CO_2 Tank Quantities - If you multiply your flow rate per hour times the number of hours of "on" time, you will find out how long a tank will last.

SETTING THE PROGRAMMABLE TIMER

Set your timer to go on continuously for 2.5 hours each day when your lights turn on. This time period will bring your room level close to the desired range. After this period, set the timer to go off for 15 minutes, then on for 15 minutes. Repeat this on/off cycle throughout the lighted period until 1 hour before the lights turn off.

DETERMINING A FLOW RATE

This is the basic formula for determining flow meter settings:
cubic ft. of growing area x .0012 = A A ÷ 3 = B B ÷ 2 = flow meter setting

To determine the flow rate for your growing area, follow the steps outlined below.

Step 1 - Determine the cubic volume of your area:
Room height x width x length = cubic volume
Example: 8' high x 10' long x 10' wide = 800 cubic feet

Step 2 - Take desired level of CO_2 (1500 PPM) and SUBTRACT existing CO_2: 1500PPM - 300PPM = 1200 PPM. This is the amount of CO_2 you need to add to raise the level to optimum.

Step 3 - Multiply your room volume x .0012 (1200 PPM) to determine how much CO_2 to add to your area. Example: 800 cubic feet x .0012 = .96 cubic feet.

For practical purposes we will round this off to 1 cubic foot. This is the quantity of CO_2 to add in an 800 cubic foot size room to reach the desired 1500 PPM level.

Before continuing on to the next steps, the following assumptions need to be established:

FIRST ASSUMPTION: The average growing area enriched to 1500 PPM of CO_2 will return to normal levels in about 3 hours due to plant usage and room leakage.

SECOND ASSUMPTION: When calculating the flow rate for any growing area, this usage and leakage of CO_2 should be compensated for in that particular area.

Step 4 - Now for the 800 cubic foot room, we take the approximately 1 cubic foot of CO_2 and divide it up over the 3 hour average period into 1 hour increments. There are 3 one hour periods in 3 hours. 1 cubic foot ÷ 3 = 1/3 cubic foot of CO_2 (.333)

This means that every hour, an 800 cubic foot room needs 1/3 (.333) cubic foot of CO_2 to replenish it back up to 1500 PPM. Because our system operates on a 15 minute OFF / 15 minute ON cycle, the flow rate setting should allow 0.1665 (or 0.2) cubic foot of CO_2 to be emitted within each 15 minute ON cycle.

To arrive at the appropriate flow rate setting, we need to divide .333 by 2 (there are two 15 minute ON periods per hour) to reach the flow rate per hour (.333 ÷ 2 = 0.1665 cubic feet per 15 minutes of flow). For practical purposes, round this up to 0.2 cubic feet. This is the flow meter setting.

After following the regulator adjustment steps, set the flow with the flow meter adjusting knob.

SYSTEM CHECK

Once the flow rate and programmable timer have been set, test the system by plugging it in and slowly rotating the timer dial clockwise to check the on/off of the solenoid valve. Check the flow of CO_2 by using the flow meter setting.

TROUBLESHOOTING

1. Test the regulator assembly with some soapy water if you suspect any leakage.
2. Check all your connections to the flow meter.
3. **ALWAYS TURN OFF THE TANK VALVE BEFORE DETACHING ANY PARTS.** Check the solenoid valve's function by plugging and unplugging it directly to an outlet.
4. Any fitting leakage can be remedied by re-attaching firmly with some teflon tape (available from your local hardware store.)
5. Plug the system back into the timer and slowly rotate the dial clockwise to check its on/off functions.
6. If these steps don't solve the issue, contact the place of purchase to get a return authorization form.