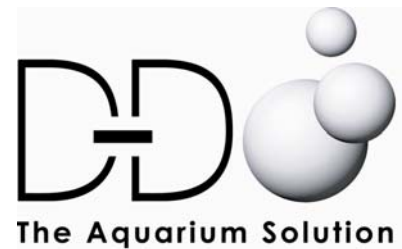


# Operation Instructions

## D-D Freshwater CO2 Set.



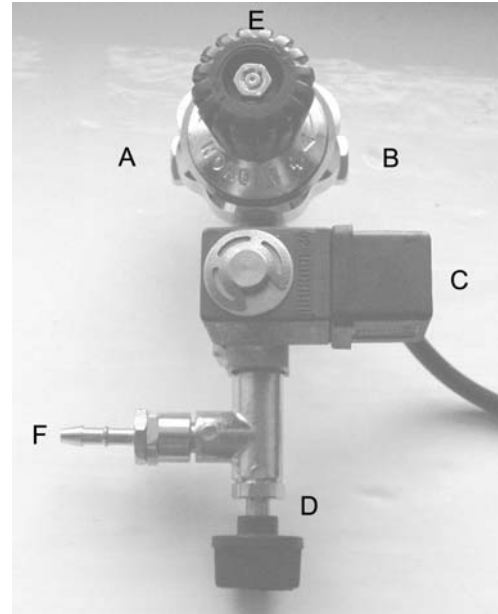
Use of CO2 within the planted aquarium will greatly improve the growth and health of your plants and can have a positive effect on the pH and KH stability of the whole aquarium.

### Contents of the D-D Freshwater CO2 kit

- Regulator with two stage regulation.
- Integral non-return valve.
- Solenoid valve.
- Low pressure gauge.
- 3m of tubing.
- 600g disposable CO2 bottle.
- PTFE plumbers tape.
- CO2 Disk Diffuser.
- 100 ml of Rowaphos phosphate remover.

### Details

- A – Position for optional High Pressure Gauge.  
B – Position for Low Pressure Gauge.  
C – Solenoid Valve.  
D – Fine Regulation Valve.  
E – Coarse Regulation Valve  
F – CO2 Outlet and Non-Return Valve.



### Assembly of the main regulator set.

As the CO2 is stored under high pressure within the disposable bottle we cannot over emphasise how important it is to ensure that every joint on the whole assembly is sealed tightly to prevent the gas from leaking out.

When supplied, every joint is sealed with a either jointing compound or fitted with a plastic seal to prevent any escape of gas, however through use, handling or final positioning of the various components during installation these joints can become disturbed.

**Any badly sealed joint is a potential source for a leak which can empty your bottle within hours – days - weeks.**

In order to ensure that the unit continues to remain leak free in the long term we suggest that you test the joints using the method described below and use the PTFE, (plumbers) tape supplied to seal any discovered. The PTFE tape should be wrapped around the male part of the joint in an anti clockwise direction.

Having done this, continue with the following assembly instructions:

1. Take the Low pressure gauge and apply PTFE tape to all of the threads.
2. Remove the blanking plug at position B and replace this with the gauge, tightening using the correct spanner

*Note: The solenoid and needle valve items C and F may face in the opposite direction if screwed further into the regulator during assembly. If the knob D is pointing towards you and E is pointing up then the low pressure gauge should always be fitted to the port on the right hand side.*

3. Ensure that the coarse regulation valve E is fully unscrewed in an anti clockwise direction.
4. Ensure that the fine regulation valve D is fully tight in a clockwise direction.
5. Do not apply PTFE tape to the threads on the bottle before screwing it onto the base of the regulator. A hiss will momentarily be heard as the plunger on the bottle is depressed. Continue to tighten up until sealed.
6. Plug the solenoid valve into the mains electrical supply and listen for the click as it opens.

### Testing for leaks

Great care must be taken during this stage as the solenoid is plugged in and energised.

1. With the fine regulation valve D tightly closed, open up the main coarse valve E until the gauge reads 5 Bars. No gas should escape from any joint.
2. Using dish washing detergent make up a small amount of concentrated soapy water and with a small brush apply a little of the solution to each joint in turn. If there are any bubbles produced or even fine fizzing from any joint then there is a leak which must be tightened up or undone and PTFE tape must be reapplied.

**CAUTION -TAKE CARE NOT TO GET WATER INTO THE ELECTRICAL COMPONENTS OF THE SOLENOID VALVE**

3. Turn the pressure back down to zero by using the coarse regulation valve E and then open D to release the gas.

## Use within the aquarium

### STANDARD MODELS

The disk diffuser supplied with the unit is designed to act both as a bubble counter and to diffuse the CO<sub>2</sub> into the water which it does via a sintered disk in one end.

1. Fill the diffuser  $\frac{3}{4}$  full with water from the aquarium
2. Commissioned the main regulator unit as described on page one and then simply stand the bottle in a suitable position and connect the tube supplied between the push on fitting on the regulator and the diffuser.
3. Place the diffuser near the **bottom of the tank** in a position where it can be observed in operation.
4. Turn the coarse regulation valve E until the low pressure gauge reads 1 bar.

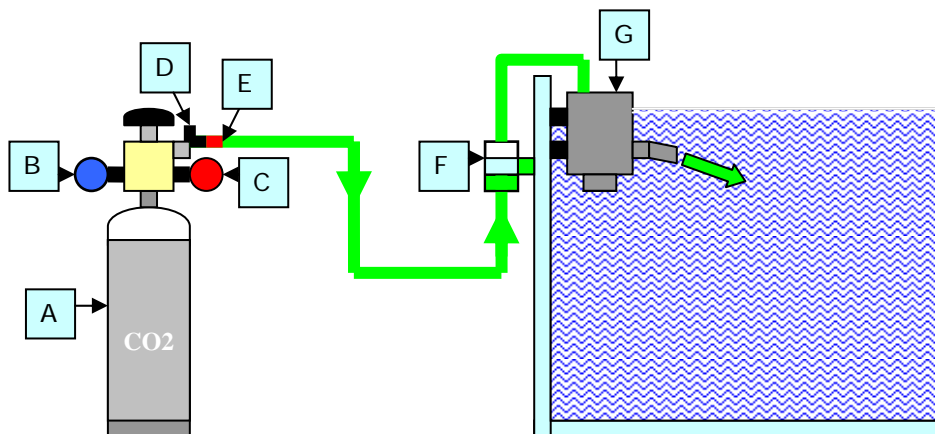
**Note do not use the unit at a higher pressure than this as it is not necessary and will merely put more gas pressure on all of the joints increasing the possibility of any leaks.**

5. Open up the fine regulation valve D until bubbles are observed entering the diffuser. On leaving the diffuser the small bubbles of CO<sub>2</sub> should dissolve before reaching the surface.
6. The unit is now operating correctly.

### TURBO PLUS MODEL

The turbo plus models are fitted with a venture pump for maximum dispersion of the CO<sub>2</sub> into the water using less gas and giving more positive results.

Fit the bubble counter and pump as shown in the diagram below and use generally as with the standard kit.



A – CO<sub>2</sub> Cylinder

B & C - Gauges

D – Fine regulation check

E – Non-return check valve

F – Bubble-counter

G – Turbo Kit

### Suggestions for Use

The level of CO<sub>2</sub> used will be different in each aquarium depending on the water volume, the hardness, whether the aquarium is open or not, the degree of water movement, the surface area, lighting level, planting level and whether there is additional aeration in the tank.

Without sufficient CO<sub>2</sub> planted tanks tend to suffer from poor or distorted plant growth or death, can be prone to algae growth and the whole tank can suffer from a pH instability causing fluctuations which will stress the fish and may lead to death or disease.

With CO<sub>2</sub> at the correct levels the plants and fish thrive. Algae levels are lower as the healthy plants out compete the algae for nutrients at the leaf surface preventing their growth.

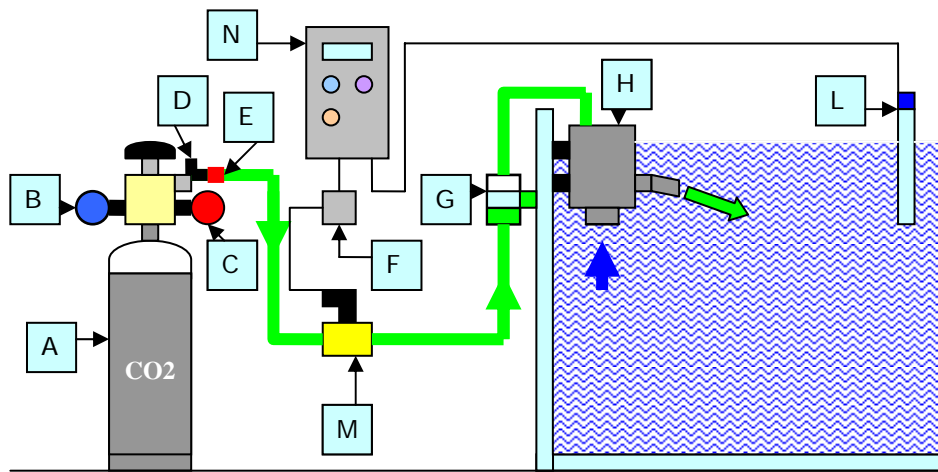
Many natural biotopes are slightly acidic and aquarium fish respond in a positive healthy way if the correct conditions are provided for their sensitive skins.

The level of CO<sub>2</sub> within the tank varies from day to night. During the day when photosynthesis occurs, the plants use up CO<sub>2</sub> for growth and the pH rises. At night the plants produce CO<sub>2</sub> and the pH falls. It is important to realise this and to use the solenoid valve provided, connected to a simple timer, to switch the CO<sub>2</sub> off at night when the tank lights go out. This can even be plugged in to the same timer as the lights.

There are 2 ways of controlling the level of CO2 used in the aquarium.

1 – Automatically using a separate pH controller. This system measures the pH within the aquarium and switches the solenoid off and on continuously as required to maintain the correct levels within the tank.

**AUTOMATIC LAYOUT WITH TURBO PLUS KIT**



A – CO2 Cylinder	B & C - Gauges
D – Fine regulation check valve	E – Non-return check valve
F – Solenoid	G – Bubble-counter with NR valve
H – Turbo kit	L – PH electrode
M - Solenoid	N – PH controller

2 – Manually by measurement of the pH and kH within the aquarium and adjusting the number of bubbles accordingly, testing regularly to check that the levels are correct.

As a rule of thumb the volume of the tank in litres multiplied by the kH divided by 50 will give you the approximate number of bubbles per minute.

Eg for a 150lt tank which is required to be at a kH of 4 =  $(150 \times 4) / 50 = 12$  bubbles per minute

The levels that you are generally trying to achieve are a kH of 3 – 5 which will correspond to a pH of 6.5 – 7.0.

Based on a dose rate of 1.5g of CO2 per 100 Ltrs per day the 600g bottle should therefore last for 400 days.

The variations in dosing levels and tank parameters are too extensive to be covered in full in these operating instructions and we suggest that ideally you should read up further on the subject to fine tune the use of this product.

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