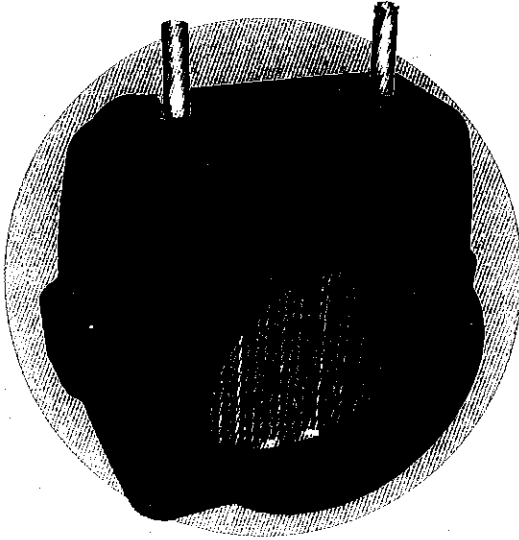
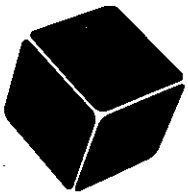


HYDRO INNOVATIONS™



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Ice Box™

WATER-COOLED HEAT EXCHANGER

OPERATION MANUAL

IMPORTANT SAFETY INFORMATION • DO NOT DISCARD

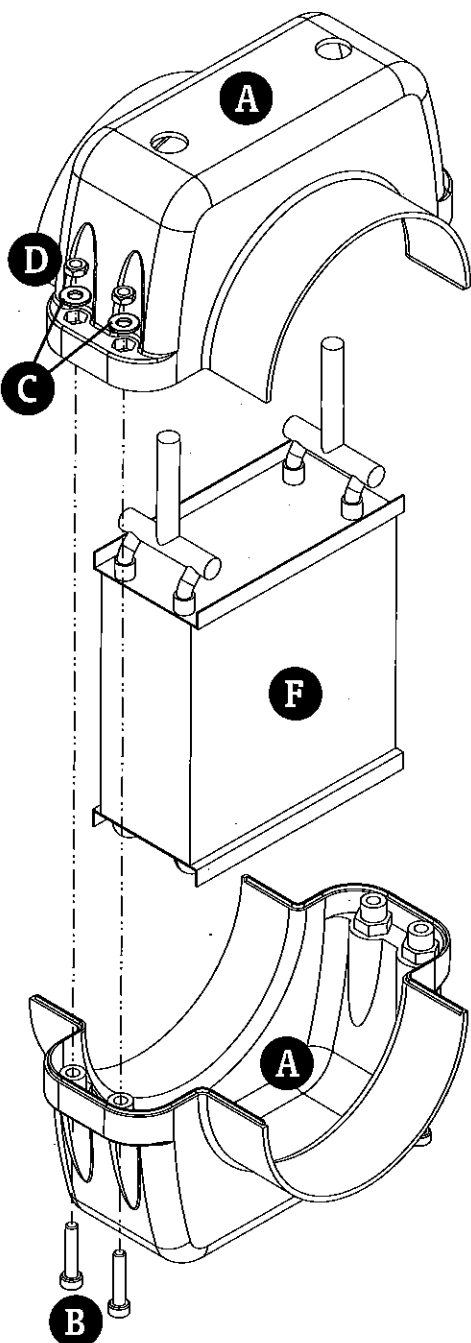
Overview

The Ice Box is a safe and effective way to cool the air leaving your reflectors without adding a/c or more fans. It uses a water to air heat exchanger to water-cool the hot air your reflectors produce, making the air leaving your reflectors as cool (or cooler if you want!) than the air entering them. Water-cooling is much more effective and efficient than air-cooling, here's some science to prove it: Water has a thermal conductivity of $0.6 \text{ W}/(\text{m}^{\circ}\text{K})$ which is much higher than the thermal conductivity of air which is only $0.03 \text{ W}/(\text{m}^{\circ}\text{K})$. Water also has a much higher specific heat capacity than air. What that means is water can absorb and remove from your garden 4 times the heat nearly 20 times faster than air.

The Ice Box design consists of a copper heat exchanger with a molded plastic housing. One side of the housing is designed to slip over a duct flange and the other side is designed to attach to your existing air ducting to run to an inline fan. Air from your room is pulled through your reflector just as it is now, and then over the Ice Box heat exchanger before exiting right back into the room. Cold water is circulated through the Ice Box, which is what draws the heat from the air before it re-enters your grow room. And a little bonus for all of us, with this device there is no need for air to enter or leave the growing environment, improving CO₂ efficiency and reducing the introduction of pests, fungi, etc. Increased CO₂ efficiency means lower costs for CO₂ production and, for those of us burning gas to create CO₂, even more control over heat production since we're not having an open flame in our rooms for quite as many hours a day. To adequately cool the air flow from a 1000 watt bulb, the circulated water only needs to be 10 degrees cooler than the ambient temperature in your room. So if you want to maintain a room temperature of 75 degrees, your water temperature only needs to be 65 degrees for the air temperature entering the reflector to be the same as the air temperature exiting the reflector. If you want to add supplemental air conditioning to your room, bring the water temperature down by more than 10 degrees and when it exits your reflector it will be cooler than the room itself. To cool the water you'll need a minimum 1/4 HP chiller per 1000 watts. The Ice Box itself can also be easily daisy chained for cooling power that is doubled, tripled, quadrupled, etc.

Packing List

- A (2) halves plastic housing
- B (4) 1/4 x 20 Allen head screws
- C (4) lock washers
- D (4) nuts
- E (2) self tapping screws
- F (1) heat exchanger
- G (2) hose clamps (Not pictured)



Installation Instructions

The Ice Box comes completely assembled and ready to install. After removing the Ice Box from its packaging make sure that all (4) of the Allen head screws are installed and tight.

There are several ways to install the product. All include using air-cooled reflectors and either pushing or pulling fresh air from the grow room through the reflector. The air circulating through the reflector is what cools the lamp, but you've already noticed that the air exiting the reflector is very warm. This warm air simply needs to pass through the Ice Box to be cooled before reentering the grow room. Chilled water is pumped through the Ice Box, removing the heat from the air. This heat is trapped inside the water and away from your garden. The water passes back into a reservoir where it is cooled by a chiller.

Reflector ducting flanges vary in size ranging from 5 3/4" to 6" and the Ice Box is designed to compensate for that. One side of the Ice Box fits 6" to 5 7/8" and the other side fits 5 7/8" and smaller duct flanges. Try both sides of the Ice Box on your reflector to see what side fits the best. After deciding which side is the best fit install it by slipping it on all the way to the reflector housing.

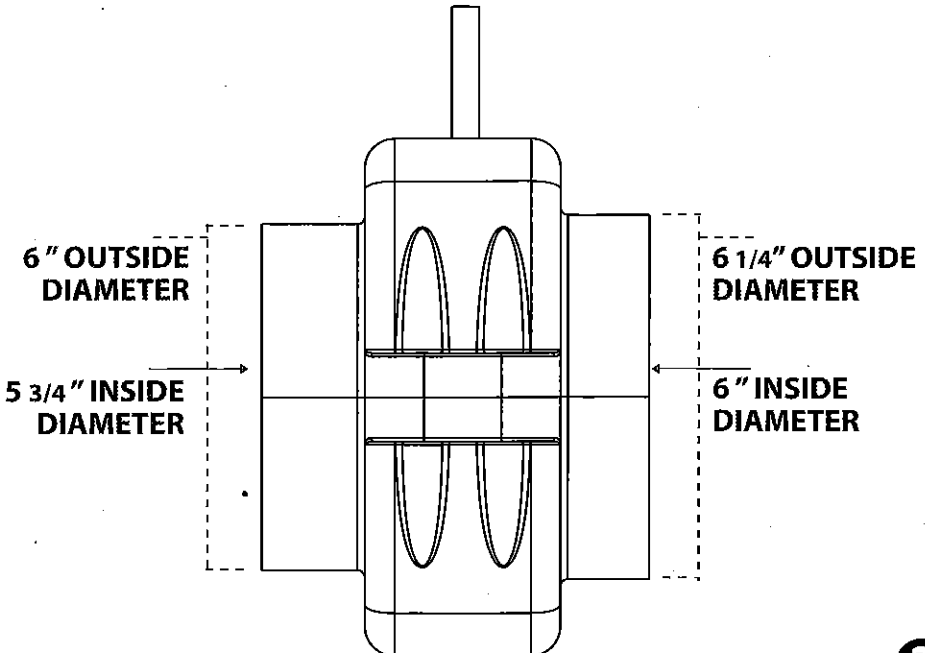
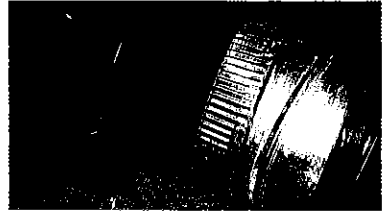


IMPORTANT NOTE:

If the IB doesn't fit snugly you can install the supplied self tapping screw through the IB flange and reflector duct flange using an electric drill. Do not over tighten.

IMPORTANT NOTE:

If using the smaller side of the Ice Box to attach to the reflector you will need a 6" ducting coupler to connect the ducting.



Plumbing:

If using one Ice Box you will most likely use a submersible pump inside of a reservoir. The pump's supply line should run to the inlet of the chiller, from the outlet of the chiller, to the inlet of the Ice Box, and then from the outlet of the Ice Box back to the reservoir. If using multiple reflectors you would either need a high GPH pump and daisy chain the Ice Boxes to each other to keep the chilled water flowing, or to make a manifold type water supply as shown in diagrams 3-5.

Tubing:

The Ice Box water inlet and outlet are designed to fit inside of 1/2" tubing and should be held tight with hose clamps. Running 1/2" tubing from the pump is completely sufficient, but if you would like to increase your water flow rate with out getting a bigger pump, you may run a larger line and reduce it to 1/2" tubing just before attaching to the Ice Box.

Fan:

You will need a 6" inline fan (not duct booster fans!) with roughly 250 CFM minimum of airflow per 1000 watts. You are essentially air-cooling the reflector so the rules that applied to ducted cooling will apply to this water-cooling method. Keep in mind that lower CFM's result in warmer reflectors, always. The fan can be inline before or after the reflector as shown in diagrams 1 and 2.

Pump:

You can use any pump that has at least 8' of lift regardless of the GPM. However the more water flow you have the more efficiently you can remove heat. You don't want to undersize both your pump and your fan as you will get less than optimal results. A larger pump will circulate the chilled water faster through the Ice Box heat exchanger, removing more of the heat from the air. We recommend a submersible pump with a minimum of 250 GPH and a maximum of 1000 GPH. Keep in mind that the longer the water lines, the lower the GPH.

Chiller:

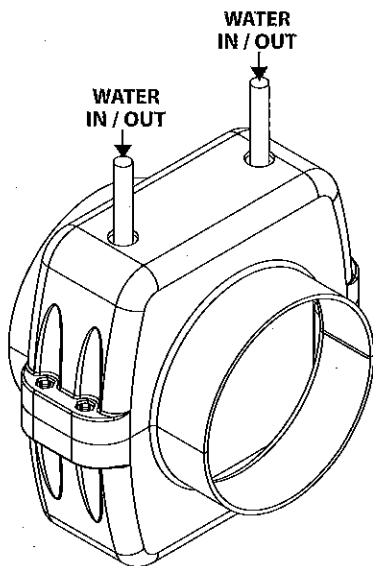
For the Ice Box to remove 100% of the heat produced by a 1000 watt bulb you will need a 1/4 hp minimum. Minimum means that if you do have some air conditioning being added to your room or just live in a cooler climate then 1/4 hp chiller should be adequate. If your garden is already experiencing high heat problems or you want to use the Ice Box to add air conditioning to your space then upgrade your chiller size. This will allow you to consistently maintain a lower water temperature which has the ability to cool your grow room too. Like we said before you will need to keep your water temperature 10 degrees cooler than your room in order to remove the heat created by the lamp itself and anything below that will cool the room.
(continued on next page.)

IMPORTANT NOTE:

If possible always run from your pump, through the chiller and then to the Ice Box heat exchanger. This ensures that the coldest water will be inside the Ice Box used to remove heat.

IMPORTANT NOTE:

If the tubing is difficult to install over the beaded end of the Ice Box inlet or outlet, soak the end of the tubing briefly in very hot water to improve flexibility.



IMPORTANT NOTE:

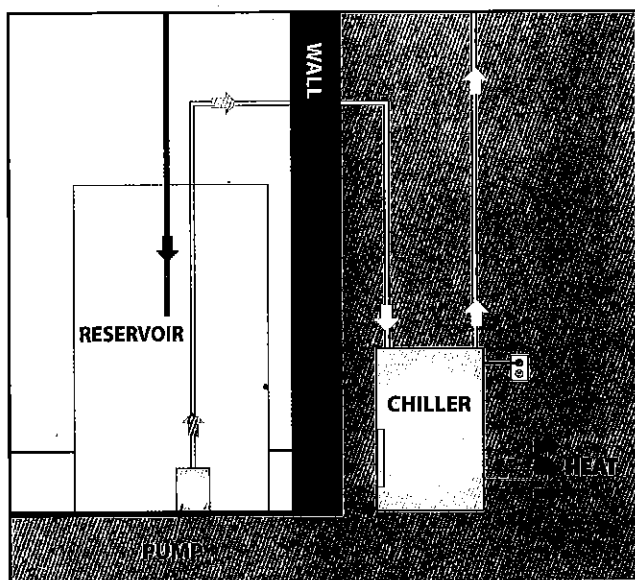
Chillers must be used outside your growing environment. The heat that is extracted from your garden is expelled out of the chiller and if used in the same area as the Ice Box it will not only cancel out your cooling attempts but increase the heat in that area more than if you weren't water cooling. You will also need the area that your chiller is in to have adequate fresh airflow to ensure that the chiller operates properly. If the temperature of the air being used to cool the chiller is too high you will not be able to exchange the heat from the garden.

Chiller (continued):

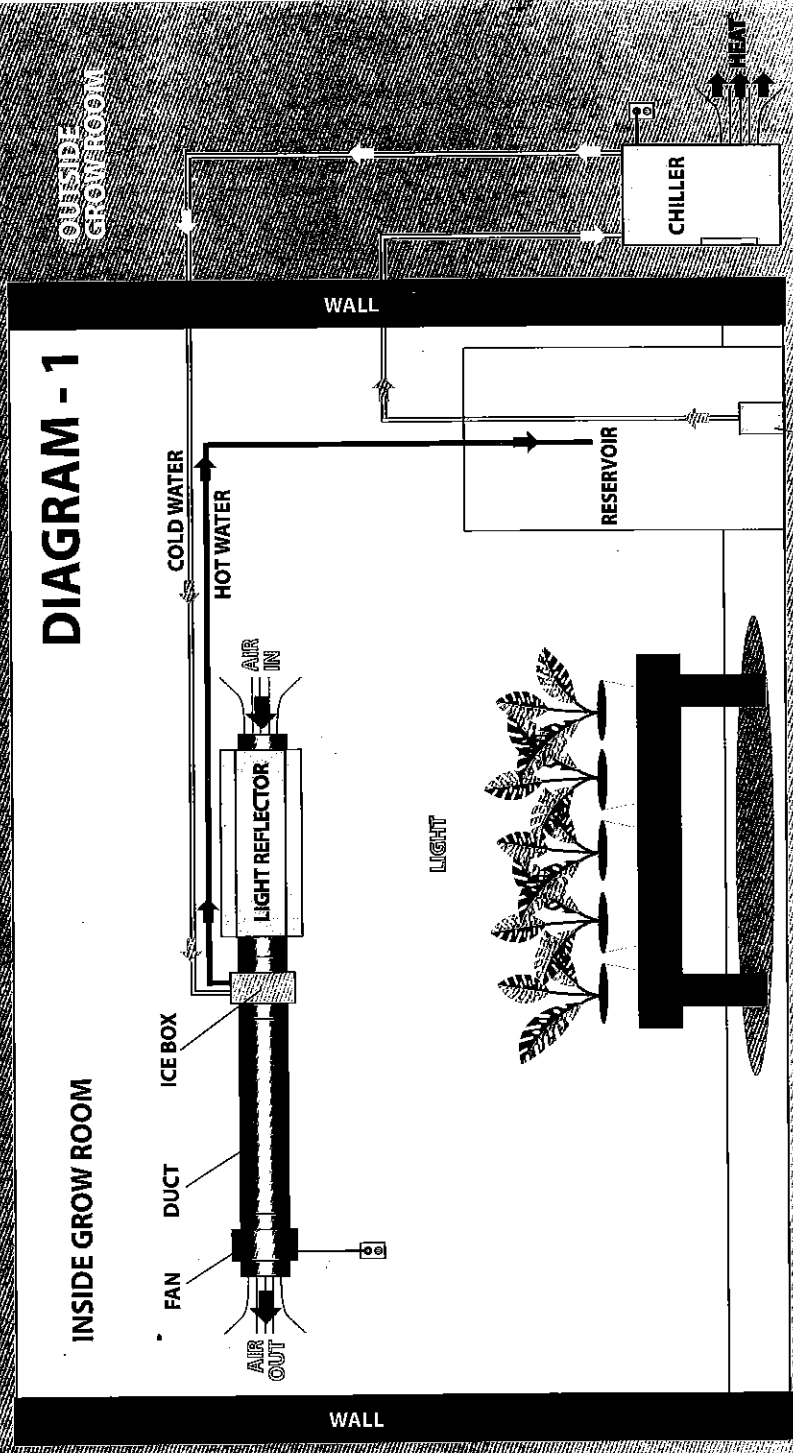
We recommend leaving your chiller on 24 hours a day so that when the light cycle starts your reservoir will already be at the desired temperature. Chillers function like air conditioners in the sense that they only run when they are needed, so if your reservoir is the desired temperature when the lights turn off then it will consume very little energy during the lights off cycle. If you are using an undersized or borderline chiller, running it 24 hours a day on a larger reservoir will usually work fine. If using an undersized or borderline chiller during the lights off cycle you want to bring your water temperature down as low as you can so that as the water temperature rises, lets say 20 degrees total during the 12 hour cycle, you will be starting from let say 50 degrees ending up at 70 degrees instead of starting at 70 and ending at 90.

Reservoir:

Large reservoirs are preferable because they can store additional cooling energy that can be created while the light(s) are off, so using a larger reservoir will allow you to use a smaller chiller. Since the water temperature in the reservoir should be below the room temperature then it is ok to have the body of water inside your grow room. We recommend insulating your reservoir to save energy especially if it's outside your grow room in a warmer area. If the desired water temperature is 65 and the surrounding air is 85 degrees your water reservoir will be constantly absorbing heat. If using outdoors in colder climates then it is actually preferable to leave the reservoir uninsulated. You do not want to house your uninsulated reservoir and your chiller in the same room, as your reservoir will constantly reabsorb the heat being expelled from your chiller.



In diagram 1 air from the garden is pulled through the reflector over the ice box and exits back into the garden.



In diagram 2 there is no ducting needed. In this diagram the fan is actually attached to the reflector using the same self tapping screws and same mounting method as the Ice Box. Since the fan inlet and outlets vary and also reflector ducting flanges vary in size you may or may not be able to use the product this way. After the fan is securely attached it is used to PUSH air through the reflector and Ice Box before reentering the room.

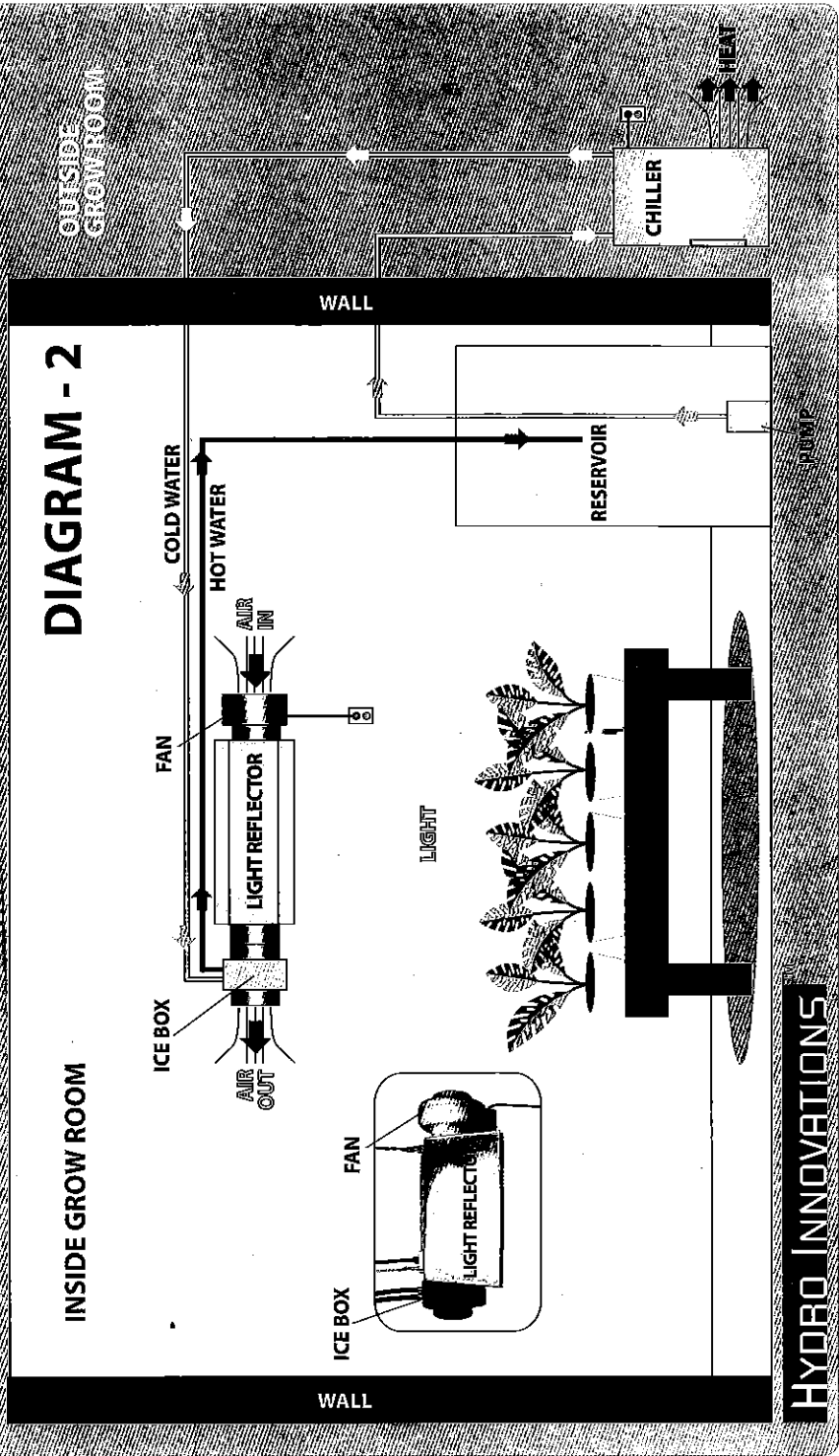


Diagram 3 shows how you can install several Ice Box units together. The Ice Box is designed to fit securely together using a daisy chain setup. This type setup would be most beneficial to a gardener using double bulbs in their reflector or for those requiring supplemental a/c in particularly harsh environments. The more Ice Box units that are tied together the higher your water temperature can be with the same results. This is because as you add units you become more and more efficient at removing heat.

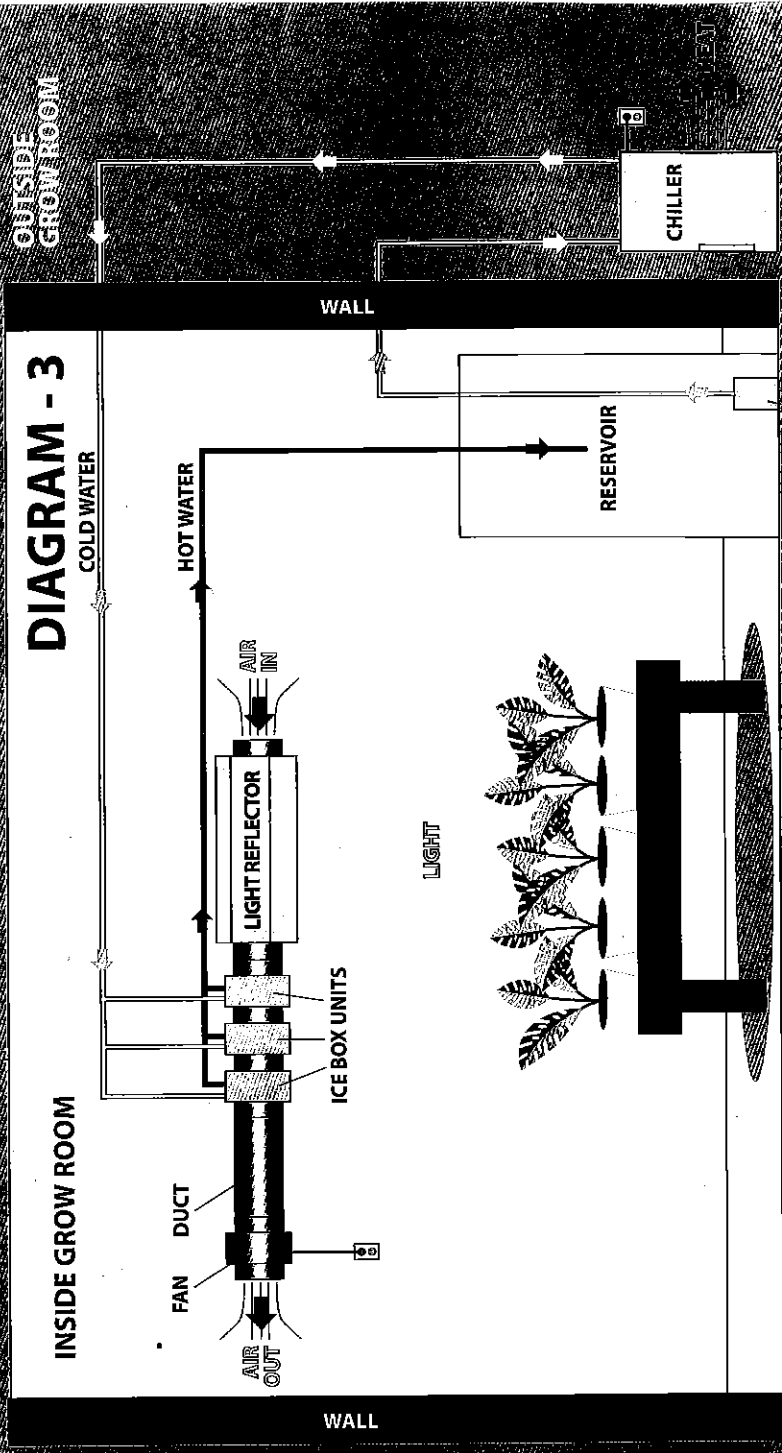


Diagram 4 shows how you can use one fan effectively for two reflectors. Notice there is an Ice Box attached to each reflector. If sufficient airflow is supplied, an entire garden can be cooled using one fan as long as each reflector has an Ice Box unit attached.

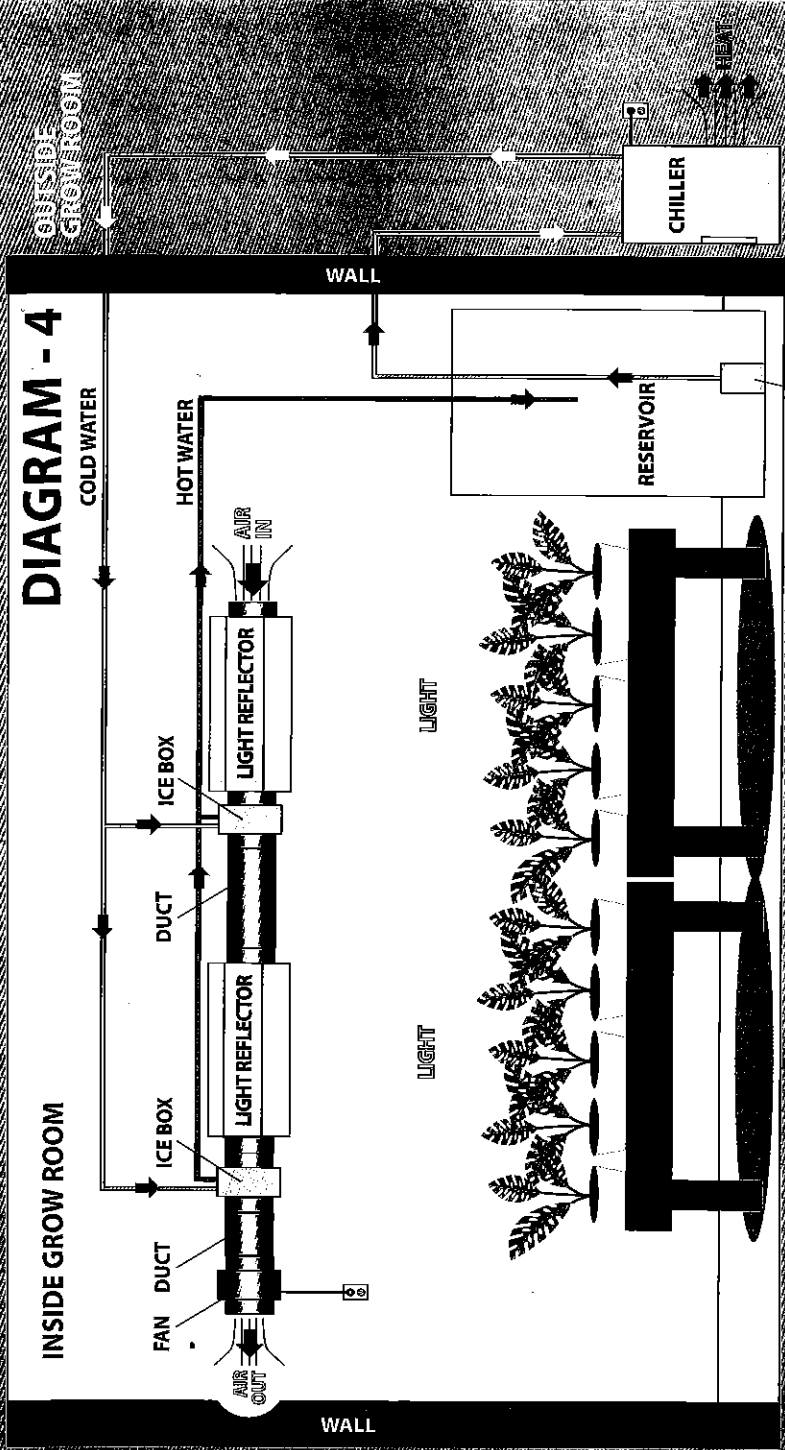
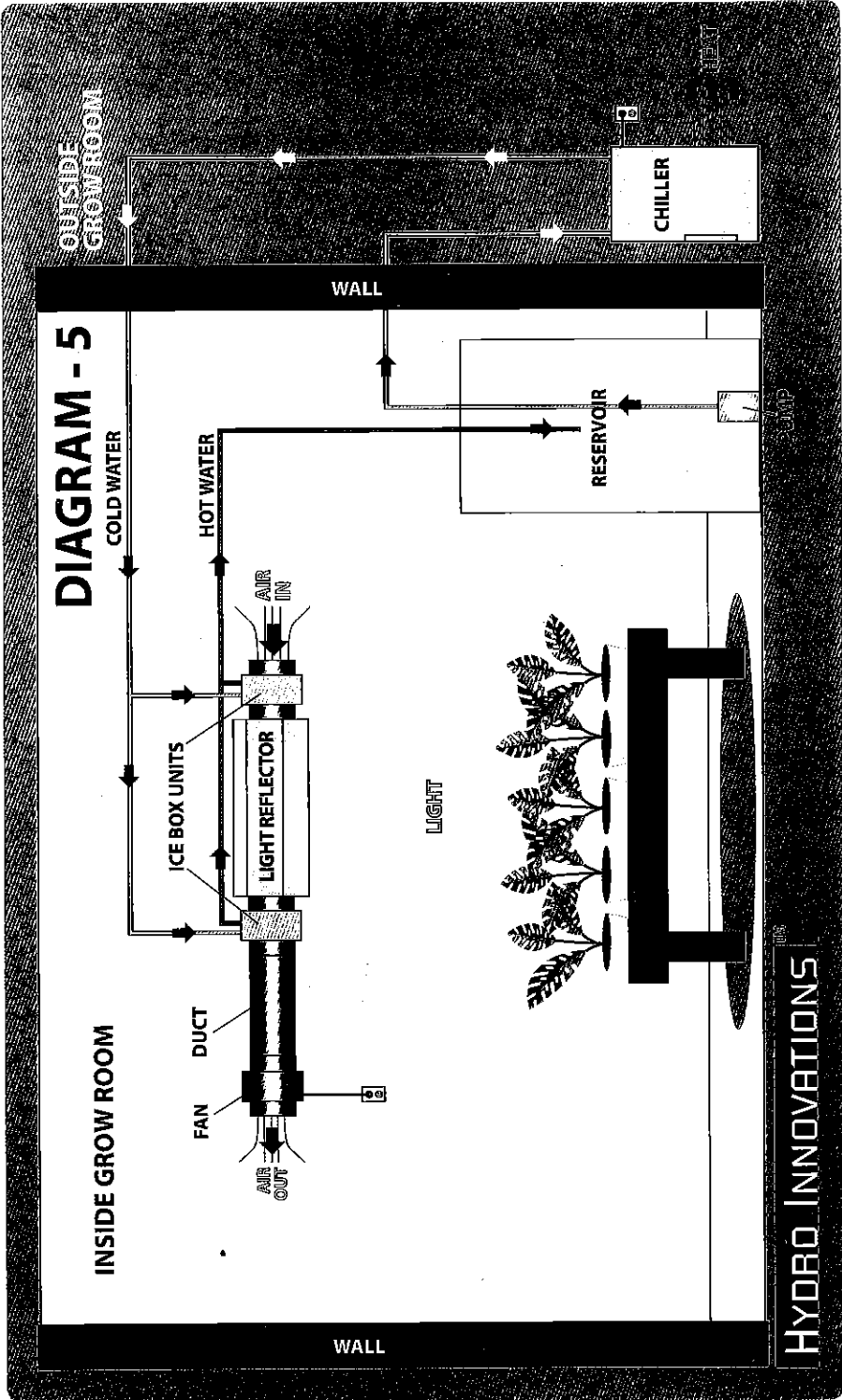


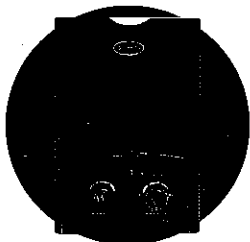
Diagram 5 illustrates the use of two Ice Box units per reflector. This would be recommended if using the product to cool the lamp and air condition the grow room in parallel.



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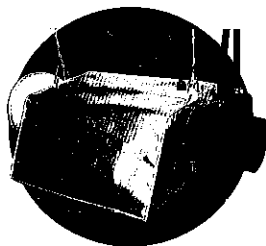
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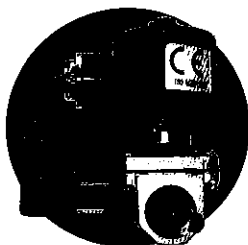
HydroGEN CO2 Generator

- Safe to use, easy to operate.
- Quality construction and manufacturing.
- Built-in safety features for worry free operation.
- Adjustable CO2 output.



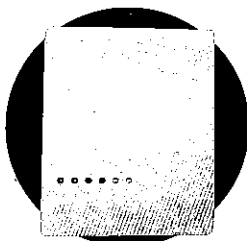
HeatShield Reflector Covering

- Helps reduce the temperature of your growroom.
- Heavy duty, quality construction.
- Also available in duct and fan size covers.



HydroGEN Water Valve

- Automatically controls the flow of water.
- Heavy duty brass construction.
- 1 Year Warranty.



HydroGEN CO2 Monitor

- Simply all you need to regulate CO2.
- Indicator lights to show CO2 levels.
- Quality SenseAir® brand CO2 detector.
- Self calibrated and maintenance free.

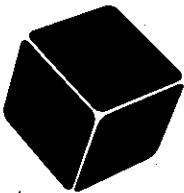


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OPERATION MANUAL

Functions and Features:

- Engineered for maximum efficiency.
- All copper water passages.
- Hydrophilic coated fins for higher efficiency.
- Beaded 1/2" inlets and outlets.
- Threaded copper tube for higher efficiency.
- High flow design.
- 6" wide x 6" tall x 2.5" thick heat exchanger.
- Rugged abs plastic housing.
- Can connect to ducting or your reflector.
- Can be used to add a/c to your environment.
- Safe and affordable.
- Simple to install in minutes.



Ice Box™

WATER-COOLED HEAT EXCHANGER