

IMPORTANT SAFETY INFORMATION • DO NOT DISCARD

# OPERATION MANUAL



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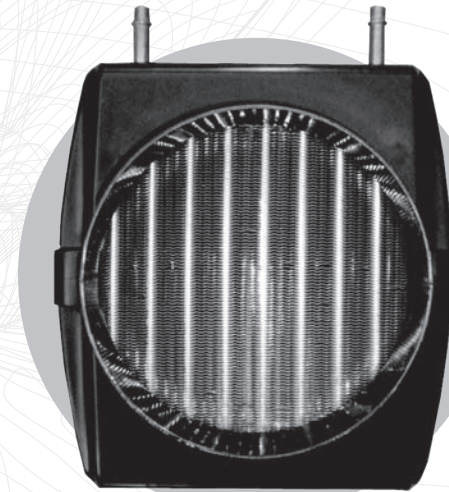
## Functions and Features:

- Engineered for maximum efficiency.
- Allows you to keep a sealed room which keeps your CO2 in and pests and pathogens out.
- Water approximately 10 degrees cooler than the room temp will eliminate the bulb heat from a 1000 watt lamp.
- Water approximately 20 degrees cooler than the room temp will reduce or even eliminate the need for a/c.
- Can be connected directly to the reflector or can be wall mounted with optional wall mount kit.

## Recommendations / Equipment Needed:

FOR PROPER FUNCTION THE ICE BOX MUST BE INSTALLED ON THE EXITING AIR DUCT FLANGE, NOT THE INCOMING AIR!

- Gardens with 50% humidity or higher may require dehumidification to avoid condensation of the equipment and water lines. Water cooled dehumidifiers are available from Hydro Innovations.
- Air-cooled reflector and inline fan with a MINIMUM of 250 CFM after exiting the Ice Box.
- Reflectors can be daisy chained using one fan as long as each reflector gets a MINIMUM airflow of 250 CFM.
- Pump sized at 300-500 GPH per Ice Box MINIMUM at 10 feet of lift/head pressure.
- Chiller size per 1000 watts: 1/4HP Minimum, 1/3HP-1/2 HP optimal.
- With properly sized chiller, reservoir size of 25 gallons is sufficient for almost any set up.
- For optimal performance use one IceBox per reflector.
- Designed to use with 1/2" tubing.



**Ice Box™** 8"

WATER-COOLED HEAT EXCHANGER

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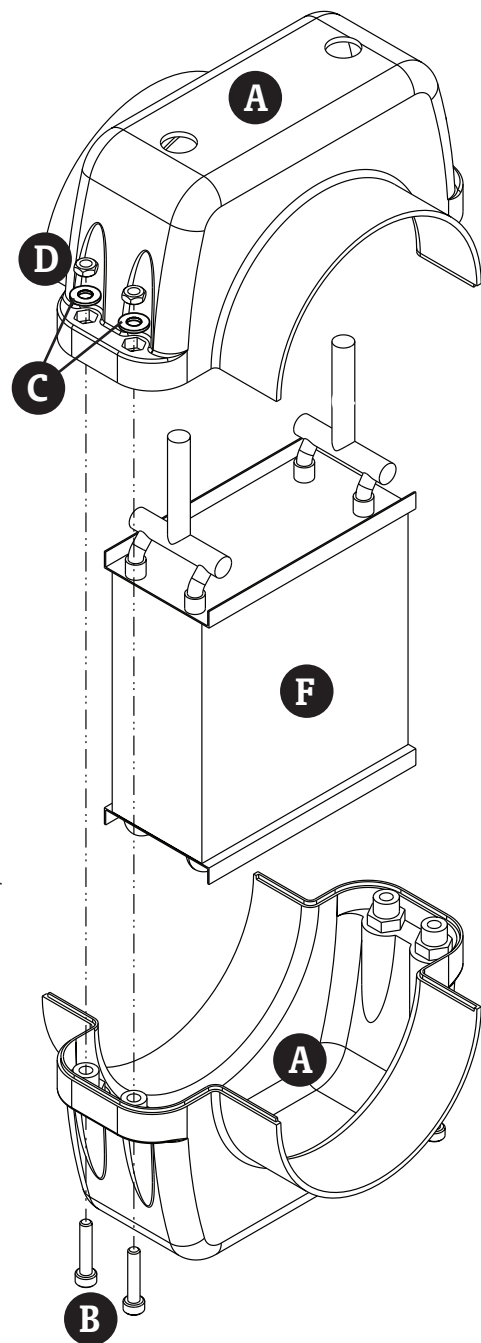
# Overview

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 W/(m\*K) which is much higher than the thermal conductivity of air which is only 0.03 W/(m\*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)
- H (2) rubber plugs (Not pictured)
- I (2) rubber grommets (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.

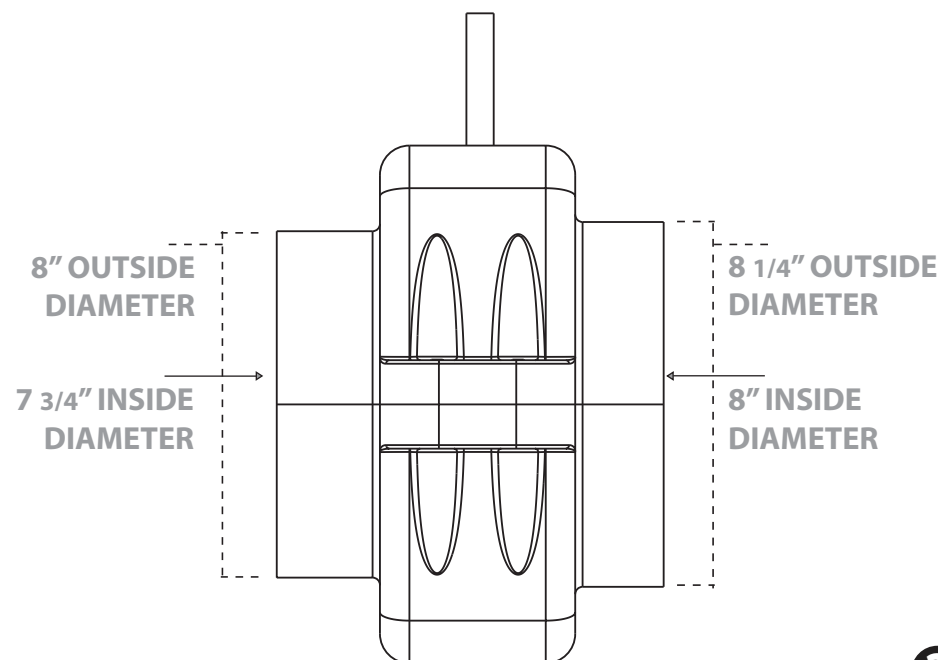
There are several ways to install the product. All include using air-cooled reflectors and either pushing or pulling fresh air from the grow room through the reflector. The air circulating through the reflector is what cools the lamp, but you've already noticed that the air exiting the reflector is very 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 7 3/4" to 8" and the Ice Box is designed to compensate for that. One side of the Ice Box fits 8" to 7 7/8" and the other side fits 7 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 8" 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.

## Tubing:

We recommend high grade rubber tubing to prevent kinks. 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 without getting a bigger pump, you may run a larger line and reduce it to 1/2" tubing just before attaching to the Ice Box. For systems larger than 2 lights you should use a distribution manifold (see below). High quality tubing is available from Hydro Innovations.

## Fan:

You will need an inline fan (not duct booster fans!) with a minimum of 250 CFM minimum of airflow per 1000 watts. You can link several hoods together and use one fan as long as there is a minimum of 250 CFM of airflow exiting the last Ice Box. Please note that air flowing through reflectors and Ice Boxes will be restricted so the fans will not perform at maximum CFM. Also note that your fans perform better if pulling air through the reflector and not pushing. You are essentially air-cooling the reflector, and water-cooling that air, 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, so the higher the CFM, the better. The fan can be inline before or after the reflector.

## Pump:

We recommend pumps with a minimum of 300 GPH at 10' of lift for each Ice Box. One pump can be used for several Ice Boxes but keep in mind the total GPH of the pump will be divided between each Ice Box. 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. Keep in mind long water lines, the ice boxes, and your chiller will restrict the GPH somewhat and will ultimately result in lower GPH from any pump. Your GPH should be tested after installation by returning the water temporarily to a 5 gallon bucket and timing exactly how long it takes to fill it up. With this information you can calculate your precise actual GPH. High quality pumps are available from Hydro Innovations.

## Manifolds:

Distribution manifolds can be made from PVC or copper tubing and are designed to evenly distribute water of the same temperature though any of your water-cooled equipment. Typically the supply manifold is connected to the pump or chiller and the return manifold is routed back to the reservoir. The key to a proper distribution is to have the return manifold be larger than the supply manifold so that there is negative pressure on the return. This is what will create even distribution through all of your equipment. If you prefer not to build your own manifold, standard and custom manifolds are available for purchase from Hydro Innovations.



Distribution Manifold

## Chiller:

For the Ice Box to remove 100% of the heat produced by a 1000 watt bulb you will need a high quality chiller sized at 1/4 hp minimum. Minimum means that if you do have air conditioning in the garden 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 to 1/3hp - 1/2hp per 1000 watt lamp. This will allow you to consistently maintain a lower water temperature, which is the single biggest component to sufficient cooling. As previously mentioned, 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. If you need additional air conditioning, the water temperature will need to be brought down further.



Chiller



3/10 HP Pump



1/2 HP - 2HP Pump

## 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, let's say 20 degrees total during the 12 hour cycle, you will be starting from let's say 50 degrees ending up at 70 degrees instead of starting at 70 and ending at 90.

## Reservoir:

Large reservoirs are not necessary, but they can store additional cooling energy. If you are using a properly sized chiller you can use as little as 25 gallons for nearly any sized setup. If you're using a chiller and the reservoir is consistently cool, it's acceptable to keep it in the garden. 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.

### IMPORTANT NOTE:

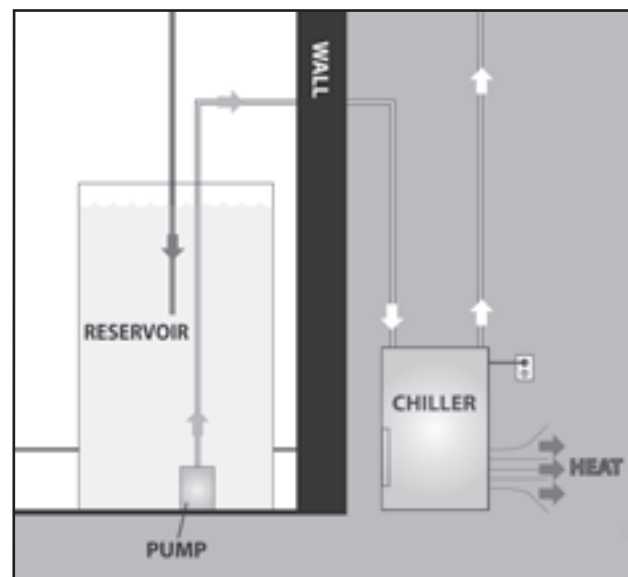
*If possible always run from your pump, through the chiller and then to the Ice Box heat exchanger. This ensures that the coldest water will be inside the Ice Box used to remove heat.*

### 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 efficiently. Hydro Innovations' ChillKing chillers can be placed outdoors or window-mounted, so this is a simple thing to accomplish.*



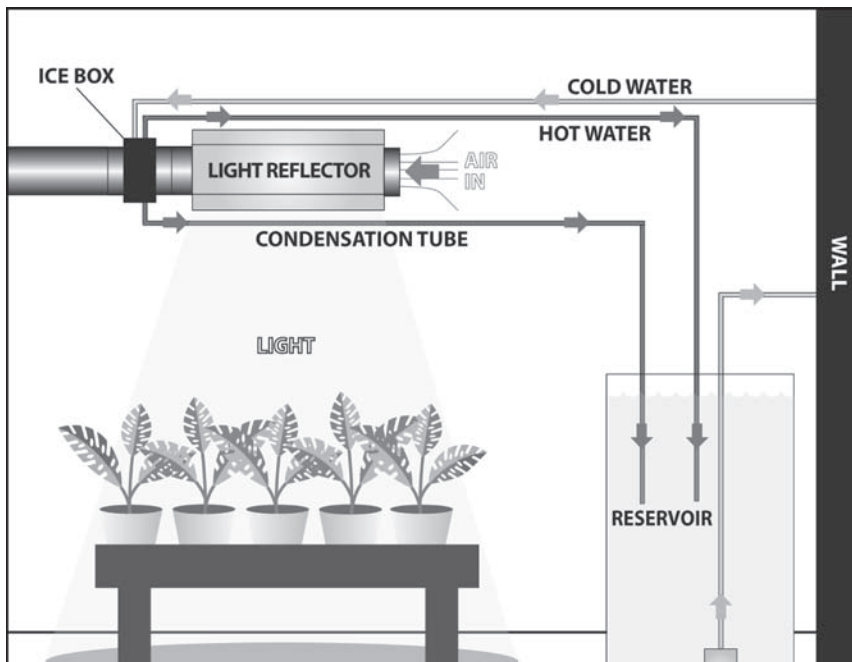
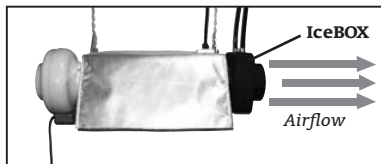


## Condensation

Gardens with 50% humidity or higher may require dehumidification to avoid condensation of the equipment and water lines. Water-cooled dehumidifiers are available from Hydro Innovations. The Ice Box does not create humidity in your garden because the water is flowing in a closed loop system. If you are using water cooled to below the dew point temperature in your garden, you will have condensation on any part of the system that has flowing water. This water is pulled out of the air in your garden and if collected and removed is actually dehumidifying your garden. The Ice Box condensation is usually minimal unless it's being used in humid conditions, airflow through the reflector is the wrong direction, or airflow is too slow. If humid room air is passing over the Ice Box before entering the reflector there will be much more condensation then when the Ice Box is mounted on the exiting duct flange (the warmed air has a higher dew point). We do not recommend using the Ice Box on the incoming air of the reflector because condensation can enter the reflector and could possibly damage the bulb (along with losing cooling efficiency). If you experience high levels of condensation in your Ice Boxes and you have reflectors daisy chained together, you must make sure that there is enough space in between them to be sure condensation doesn't enter the reflectors. The Ice box is supplied with a rubber plug located at the bottom of the unit, which can be used to insert 1/4 plastic tubing so that the water can be routed to a reservoir or can be placed down the drain. Note: This water is pure and can be used in the garden.

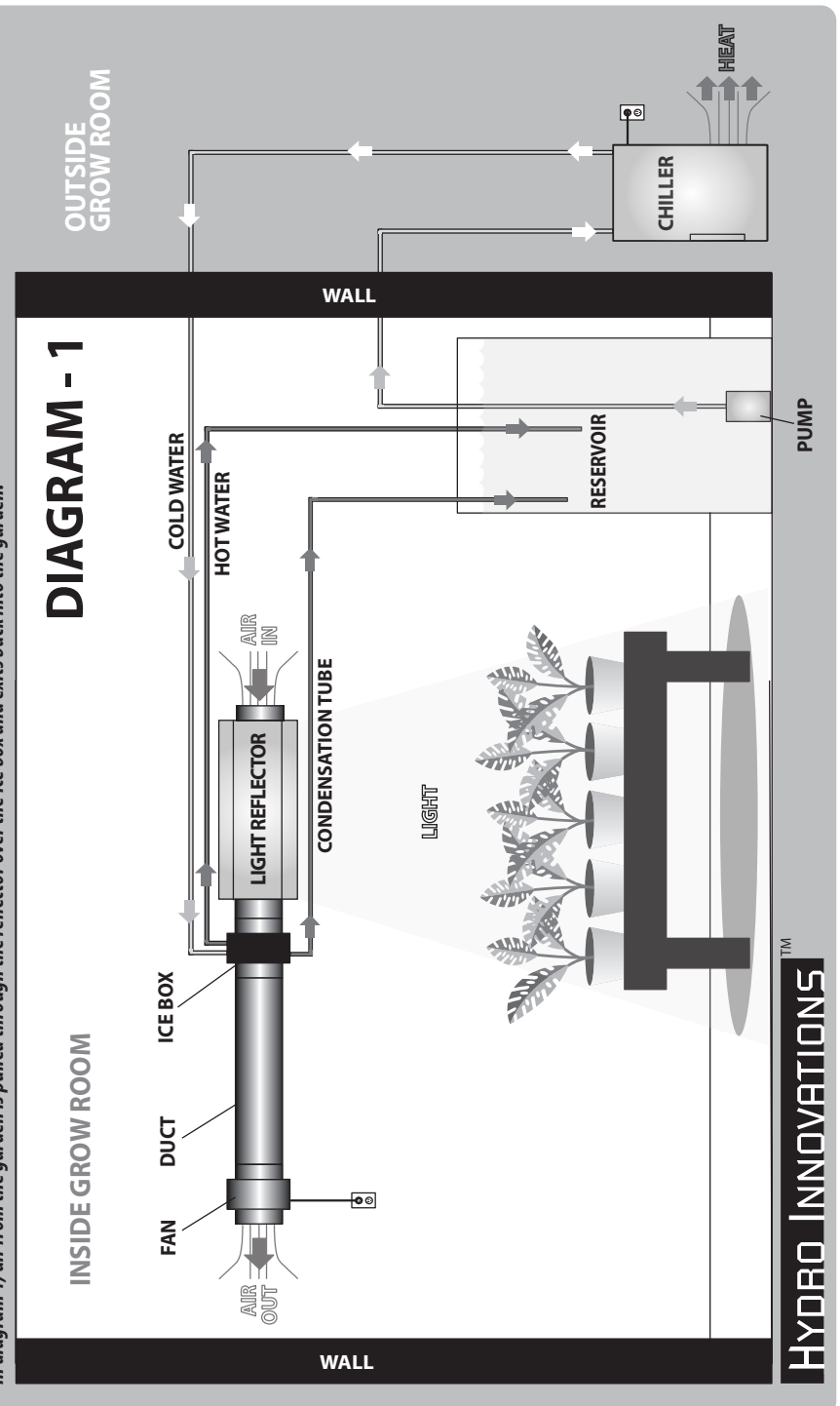
### IMPORTANT NOTE:

The Ice Box must be installed on the exiting air duct flange for best results and for a safer installation. The air should be pushed or pulled through the reflector and should then pass over the Ice Box before reentering the room. The IB must be placed PAST the heat source in order for it to actually remove the heat. Also if there is any condensation it will not be blown in to the reflector.



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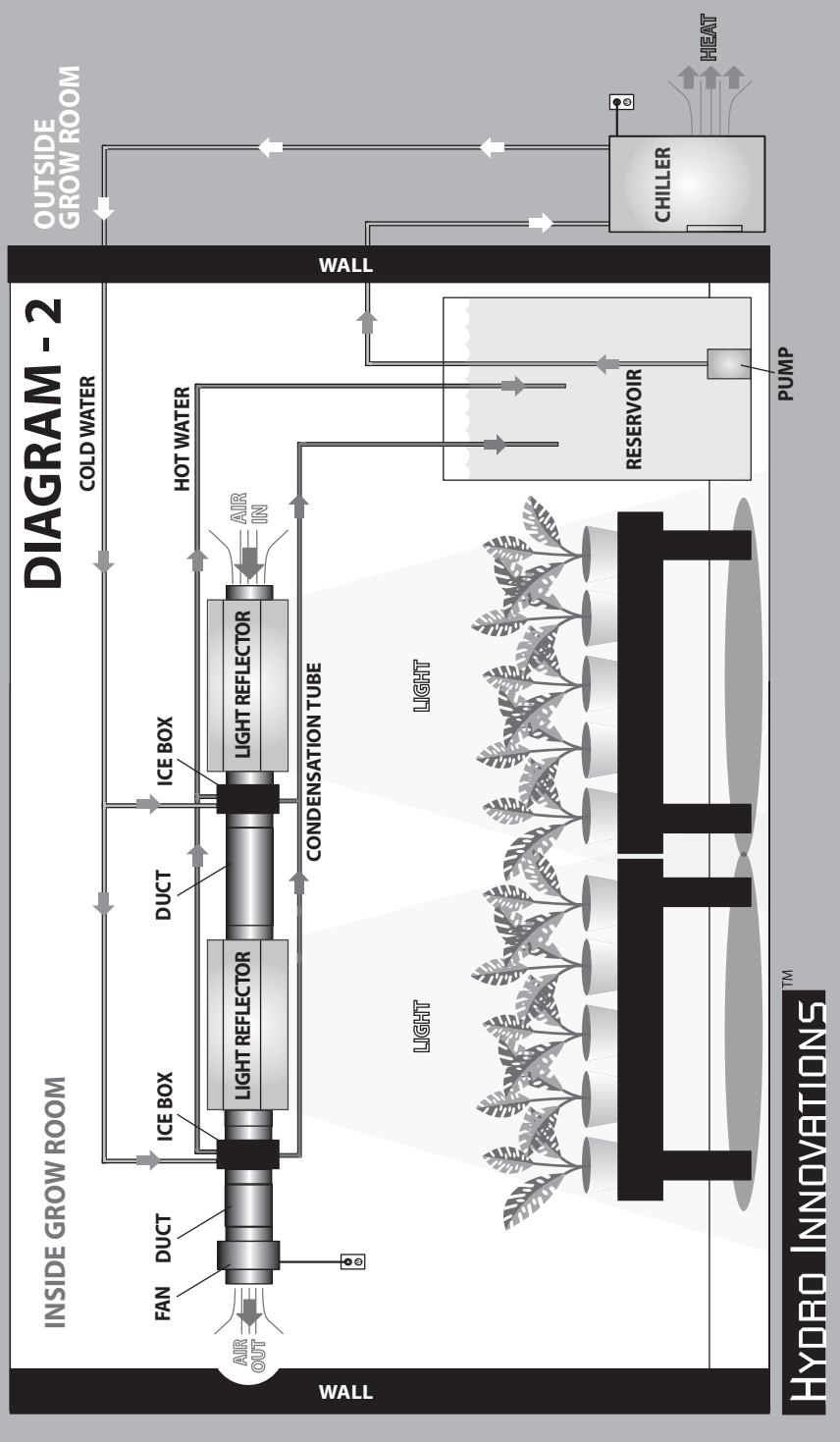
In diagram 1, air from the garden is pulled through the reflector over the Ice box and exits back into the garden.



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Diagram 2 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 - 2



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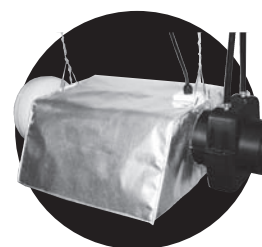
To find out more information about these and other  
HYDRO INNOVATIONS products, Visit our website:

[hydroinnovations.com](http://hydroinnovations.com)



### HydroGEN™ PRO 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.

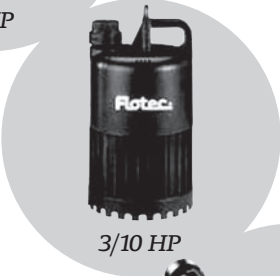


## HydroGEN™ CO<sub>2</sub> Monitor

- Simply all you need to regulate CO<sub>2</sub>.
- Indicator lights to show CO<sub>2</sub> levels.
- Quality SenseAir® brand CO<sub>2</sub> detector.
- Self calibrated and maintenance free.



1/6 HP



3/10 HP



1/2 HP - 2HP

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## Rubber Tubing

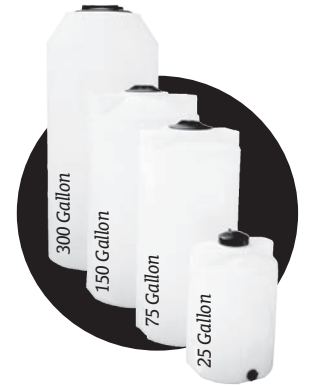
- Simply all you need to regulate CO<sub>2</sub>.
- Indicator lights to show CO<sub>2</sub> levels.
- Quality SenseAir® brand CO<sub>2</sub> detector.
- Self calibrated and maintenance free.



## Doorway Reservoirs

Reservoirs designed for water cooling that also fit through most interior doors. FDA approved for drinking water, lids and drain plug included. 3 year warranty.

Optional insulating kits for the reservoirs are available and include a foil wrap and foil tape.



## Dehumidifier

This 70 pint per day dehumidifier is that it has a water-cooled motor that eliminates 95% of the heat produced by traditional dehumidifiers.

- Washable filter removes moisture and airborne particulates.
- Collection container with level indicator.
- Operates continuously when plumbed to a drain.



## Indoor/Outdoor Chiller

- Assembled in the USA.
- Quality Samsung compressors.
- Available in 1/2, 1, and 2 HP sizes.
- Flow sensor upgrade available.
- BTU for BTU, the most powerful chiller on the market.



## DigiCOOL™ Ballast Cooling Enclosure

- All anodized aluminum construction.
- Cool most digital ballasts with our ballast enclosure.
- Can be used with 6" or 8" air ducting for air-cooling.
- Can be used with 6" or 8" Ice Box for water-cooling.
- Sealed cord outlets.

