A GUIDE TO
PRECISION CLIMATE CONTROL
FOR YOUR CANNABIS GROW
IT’S ALL ABOUT YOUR CONTROL

The quality and yield of a cannabis crop is directly proportional to the amount of control the cultivator has over the plants’ environment. But let’s not get ahead of ourselves. First, let’s consider the different types of environments.

OUTDOOR

The outdoor cultivator has total control over the amount and timing of the nutrients, but not much else.

GREENHOUSE

The greenhouse cultivator has total control over nutrients and watering and, depending on the type of greenhouse, they may also have control over day and night. And to some extent, temperature and humidity may be controlled – albeit within a relatively broad range. That range depends to a certain degree on the type of greenhouse.

INDOOR

Indoor cannabis cultivation gives the cultivator the potential to control everything about the plants environment within tight tolerances. Of course, an indoor cultivator doesn’t control nature, but they do have the potential to create it; the operative word here is potential. Without the right equipment this potential can never be realized.

THE CHALLENGES

Control of water, nutrients, and lights on/lights off is second nature to most cultivators. But, trying to control the temperature, humidity, and CO₂ level in the space makes control exponentially more complicated. Watering affects humidity, humidity affects temperature and lights on/lights off affects everything. The CO₂ level with lights on needs to be different than the CO₂ level with lights off. Growing different strains changes all the above, and so on, and so on. The indoor cultivator can try to do all these things with off-the-shelf equipment bought from a big box hardware store. The first step is to purchase an air conditioner to cool the space, and then…

1. A dehumidifier needs to be installed to dry the space.
2. A local CO₂ supplier needs to set up a system to put CO₂ into the space.
3. Additionally, you will need to buy the relays and switches required to tie all of those things together.
Now that you have each of the pieces, what about controlling them all…and with precision? What turns all this stuff on and off and changes set-points when it’s needed? What is working behind the scenes to make sure that everything functions in harmony? The equipment has the potential to be controlled but the control itself is up to somebody, or something, else – if a cultivator is focused on cultivating a quality yield.

One answer to control (but certainly not the most cost effective) would be to add an expensive programmable controller to each air conditioner, each dehumidifier, each lighting system, and each CO₂ distributor. Only after all of that has all been implemented can a customized central system be used to manage all of the programmable controllers. If this is starting to look a bit mindboggling, that’s because it’s an inefficient use of your time, resources and money.

“As the price of marijuana continues to drop, maximizing yields is becoming more and more important, and the requirement for uncontaminated plants is increasing as well. The need for proper HVAC control is paramount to achieve the full potential of cannabis plants,” according to an article written in Marijuana Venture Magazine by Brian Zimmerman, president of Impact Engineering and founder of www.grow2guys.com.

So then, why doesn’t someone pull all of this “important stuff” together into one piece of equipment that is the complete solution a cultivator needs to increase yields and decrease time-to-market? Fortunately for cultivators and owners, somebody already has.

**A HISTORY OF INNOVATION APPLIED TO TODAY’S EMERGING CANNABIS MARKET**

For 50 years Data Aire has been designing and building custom equipment for use in one of the most demanding markets in the air conditioning business – data centers. You may not know it, but the data center business shares similar challenges with indoor cannabis cultivation. If the air conditioning stops working in a data center; production shuts down. There is a loss in productivity, and sensitive data does not reach its intended audience without timely and massive intervention. In response to the need for reliability, Data Aire developed robust, innovative products designed to operate 24 hours a day, seven days a week, and 365 days a year to provide data center professionals with peace of mind.

In order to keep an entire room at the same temperature and humidity, the multitude of computer room air conditioners serving each room need to communicate with one another – with precision. If one unit is being serviced, or repaired, a standby unit has to start automatically and immediately. When any of the units require attention, alarms are emailed to the operators. It’s important that the equipment have the ability to be monitored and controlled by a mobile device because operators may be off site. Most importantly, the units have to control both temperature and humidity and have to move...
seamlessly from one mode of operation to the other while the temperature and humidity remains stable. Data Aire’s technology is engineered to do all of these things — and more — in response to customer needs.

**ALL-IN ONE CLIMATE CONTROL BUILT FROM THE GROUND UP**

Data Aire was the first computer room air conditioning manufacturer in the world to recognize the similarities between the data center industry and indoor cannabis cultivation. When recreational use of Cannabis became legal in Colorado in January 2014, Data Aire began talking to cultivators and engineers about their wants and needs. By November of 2014, the first purpose-built units to control the climate in indoor cultivation rooms were rolling off Data Aires’ assembly line. gPod is the latest custom-built offering from a company with a 50-year history of innovative products designed to meet customers’ specific needs.

“Growing cannabis indoors combines the 24/7 mission critical demands of a data center with the humidity control of a small indoor swimming pool. As cultivators have evolved in their knowledge of indoor cultivation, they are now realizing precise indoor climate conditions for both lights-on and lights-off cycles is the most important factor for optimal plant growth, reduced instances of VPD and mold or powdery mildew,” says Zimmerman.

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**CHOOSING WISELY TO IMPROVE QUALITY AND YIELD**

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<th>Feature</th>
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<td>gPod</td>
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<th>Feature</th>
<th>gPod</th>
<th>Comfort Cooling</th>
<th>Comfort Dehumidifier</th>
<th>Commercial CO₂ System</th>
<th>Humidifier (Cure Room)</th>
</tr>
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<tbody>
<tr>
<td>STANDARD Manufacturer-designed for Indoor Cannabis Growers</td>
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<td>High CO₂ Concentration Alarm</td>
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<td>Unit Mounted Lights On/ Lights Off Control</td>
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<td>Different Set Points Lights On/ Lights Off</td>
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<td>Internet Monitoring from Mobile Device</td>
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<td>Change Setpoints from Mobile Device</td>
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<td>Emails Alarms, Alerts and SMS Texts</td>
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<td>Uses Recovered Energy for Dehumidification</td>
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“Using the gPod allows our plants to flourish in a stress-free environment and maximize harvest after harvest.”
—Kemsley Wilton, CEO of Igadi in Tabernash, Colorado

**ADOPT A HARMONIZED SOLUTION**

While all of the parts and pieces purchased from a big box hardware store have the potential to control CO₂ levels, temperature, and humidity, gPod by Data Aire engineered all those parts into a single piece of equipment, which allows a grow to reach its potential through a more seamless cultivation experience.

Once again, it all comes down to control. Factory mounted and wired controls installed on gPod by Data Aire make sure that all functions operate in harmony. Standard, factory-set programming can be modified by the cultivator to meet desired results. And it can all be done from your mobile device. gPod gives a cultivator total control.

1. Temperature is controlled within a couple of degrees,
2. Relative humidity is controlled within 3 to 5%,
3. CO₂ level is controlled within a few parts per million, and
4. **There are different set-points for all of that with lights on and lights off.**
Flexibility of controls is also an important consideration. Cultivators are always experimenting, always looking for that perfect combination that will maximize both quality and yield. While controls come with preprogrammed settings, the set-points and the timing of all functions can be changed to meet the cultivators own unique requirements.

As prices of cannabis trend downward, precise control of operating cost is becoming more and more important. It is a little known fact that dehumidification in your rooms requires more energy with the lights off than cooling your rooms requires with the lights on. Beware of environmental control systems that use electric or natural gas heaters for dehumidification. Data Aire uses recovered energy that is normally rejected outdoors for dehumidification. Using this recovered energy lowers the cost of dehumidification at night by over 60% compared to electric heaters. This amounts to savings of up to $85,000 per year in a typical grow.*

**DESIGN TO FIT YOUR SPACE WITH PROFESSIONALS**

Data Aire recommends multiple gPod units in each room to provide extra capacity and flexibility so that the environment can be maintained, even when regularly scheduled maintenance occurs. Properly sized gPod units for your space are paramount to maintaining the best control. The foremost equipment available can only deliver satisfactory results if it is properly sized and applied. At a minimum, gPods are recommended for veg and flowering rooms. Often a gPod is included in curing rooms as well. Veg and flowering room units always include dehumidification and CO₂ control. Units for curing rooms on the other hand often include factory mounted and wired humidifiers to prevent the humidity from dropping too low during the curing process.

A professional mechanical engineer should always be consulted to size the equipment to ensure the best results. The engineer should be brought into the process as soon as you have selected an architect to design a floor plan. Data Aire can submit drawings for approval as soon as the mechanical engineer has properly sized the gPods for your grow. This important step should be taken as soon as possible in order to get your gPods on site in a timely manner. To ensure the best control of your environment, Data Aire does not accept orders until the mechanical engineer has given the gPod drawings his stamp of approval.

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* Savings are based on electricity cost of $0.10 per kWh and a facility with flower and veg rooms having a total combined area of 10,000 square feet.
Partner with Data Aire to support the correct in-space design. If you have a trusted professional engineer experienced with indoor cultivation design, use them. Upon request, your gPod order can include a peer review of your engineer’s design by an independent professional engineer – one that has designed more than 300 indoor cultivation facilities. This independent professional engineer helps your engineer with sizing and schematic drawings, teaching him or her the details of gPod design. Your engineer learns best practices and produces final project documents used for construction. This ensures your design is optimized for your gPod equipment.

Finally, if you don’t have an engineer in mind, Data Aire can provide a list of qualified professional engineers to produce your complete gPod design from concept through construction drawings.

**WHEN TO PURCHASE**

As this guide has outlined, the research, design and purchase of your precision environmental control shouldn’t be left to the last minute. Cultivators should consider that orders for custom equipment are subject to manufacturing lead time. Unlike the equipment at a big box hardware store, units that are purpose-built, by any manufacturer, for the indoor cannabis market, are built for your specific grow. gPod is produced more quickly than that of all known competitors: plan for our typical manufacturing lead time of 5-6 weeks from the time the order is received to the time the equipment is delivered to your facility.

**REMEMBER...IT’S ALL ABOUT CONTROL**

Absolute control is needed to optimize the quality and yield of a cannabis grow through a positive experience for both cultivator and owner. gPod delivers that experience with an all-in-one precision climate control system. In less than 3 years, Data Aire has provided gPods to over 30 cultivators in multiple states and U.S. territories. The results have been that gPod has become an integral part of maximizing their yields and quality.

If you would like to learn more about gPod by Data Aire, and how it can improve your cannabis grow, please contact us at 800.347.2473 or email us at sales@dataaire.com.