

## ***Grow Room HVAC System***

*Control Well Temperature and Humidity of Indoor Cannabis Cultivation*





### Mission Statement

Innovation make dream  
come true

### Vision Statement

Provide opportunities for  
the material and intellectual  
growth of all our employees

### Values That Guide Us

Strive harder than anyone  
Embrace changes to be better  
Be ready for more responsibility

Altaqua is built on a 16-year history of manufacturing HVAC and refrigeration products and works closely with commercial project customers for the long term. In 2019, Altaqua began to promote the grow room HVAC systems to commercial growers with his long-term experience in the indoor swimming pool industry, which has strict requirements similar to those of commercial indoor grow applications. Both applications must deal with high latent loads of moisture in the air and require high-duty equipment withstanding highly corrosive elements.

Altaqua builds long-term partnerships with customers to gain deep insights into customer needs and experiences with its grow room HVAC systems. The close relationship with customers provides direct feedback and observations of what works and what doesn't in the extreme secrecy industry. It helps us to fine-tune system performance further and customize components and control algorithms to deliver precisely what grow rooms need to maximize plant yield and quality.

Altaqua offers factory-direct service from pre-sale through installation, maintenance, and support. Each HVAC system undergoes rigorous testing and initialization by factory staff before delivery, ensuring optimal control of humidity, temperature, and airflow in one integrated unit for grow room management.

We are open to sharing our technology and experience of grow room environmental control with cannabis industry professionals, including owners, master growers, engineers, and contractors. Our goal is to deliver total environmental control with unprecedented precision and ease for commercial-scale grow rooms.



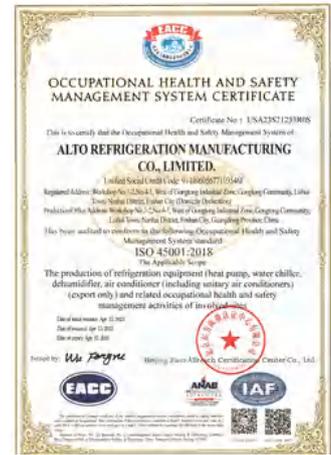
ISO standards provide Altaqua with a framework to enhance efficiency, ensure product quality, and meet regulatory requirements. With ISO 9001, Altaqua delivers consistent quality, while ISO 14001 helps manage environmental duties for sustainability. ISO 45001 ensures safe workplaces, reducing hazards and risks. These standards enable Altaqua to manage risks, improve continuously, and strengthen global competitiveness.



**ISO 9001: 2015**  
No.: USA22Q45183R2S



**ISO 14001: 2015**  
No.: USA23E41232R0S



**ISO 45001: 2018**  
No.: USA23S21233R0S

Altaqua's innovation is backed by an extensive portfolio of intellectual property, with 97 patent applications, of which 69 have been successfully granted. This highlights our strong commitment to innovation and positions us as a leader in technological advancements within our industry.



Altaqua's registration with Dun & Bradstreet reflects our commitment to transparency and reliability, offering partners a foundation of trust. With Intertek ETL certification, our Grow Room HVAC Systems meet recognized safety standards across the US and Canada. Our Alibaba verification further supports product authenticity and service quality, fostering confidence for global partnerships.



Cannabis cultivation has evolved from outdoor fields to greenhouses, and now to highly controlled indoor grow rooms, reflecting the increasing demand for higher quality and yield. Growers are continuously seeking ways to optimize the growing environment, and achieving this requires precise control of temperature and humidity. By creating ideal conditions, cultivators can ensure consistent, high-quality, and abundant harvests. To achieve these results, it's crucial to understand the key factors influenced by temperature and humidity control.

- Vapor Pressure Deficit**
- Water Quality**
- Air Circulation**
- Pests and Diseases**
- Lighting**
- Plant Genetics**
- Soil Composition**
- Nutrient Management**
- CO<sub>2</sub> Levels**



**Against Pests and Diseases**

Finding pests and diseases in your cannabis plants before harvesting can be devastating. So much time, money, and labor you've spent to grow healthy plants. They can attack every part of your plants and rot your buds from the inside out.

Control well the humidity and temperature levels can act as a natural shield against common cannabis threats like Bud Rot, Powdery Mildew, and Root Rot. By consistently maintaining these parameters, growers can significantly reduce the chances of outbreaks, ensuring a healthy and abundant harvest.

**Achieving Ideal VPD**

Precise control of temperature and humidity is crucial for achieving the ideal VPD, which directly influences plant transpiration and nutrient uptake. When VPD is optimized, plants efficiently absorb water and nutrients, promoting healthy growth. If VPD is too high or too low, it can cause stress, slow growth, and increase the risk of disease. By maintaining the right balance, growers can maximize plant health, growth rates, and yields.

TEMPERATURE		relative humidity													
°C	°F	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
15	59	1.11	1.02	0.94	0.85	0.77	0.68	0.60	0.51	0.43	0.34	0.26	0.17	0.09	0
16	61	1.18	1.09	1.00	0.91	0.82	0.73	0.64	0.55	0.45	0.36	0.27	0.18	0.09	0
17	63	1.26	1.16	1.06	0.97	0.87	0.77	0.68	0.58	0.48	0.39	0.29	0.19	0.10	0
18	64	1.34	1.24	1.13	1.03	0.93	0.83	0.72	0.62	0.52	0.41	0.31	0.21	0.10	0
19	66	1.43	1.32	1.21	1.10	0.99	0.88	0.77	0.66	0.55	0.44	0.33	0.22	0.11	0
20	68	1.52	1.40	1.29	1.17	1.05	0.93	0.82	0.70	0.58	0.47	0.35	0.23	0.12	0
21	70	1.62	1.49	1.37	1.24	1.12	0.99	0.87	0.75	0.62	0.50	0.37	0.25	0.12	0
22	72	1.72	1.59	1.45	1.32	1.19	1.06	0.92	0.79	0.66	0.53	0.40	0.26	0.13	0
23	73	1.82	1.68	1.54	1.40	1.26	1.12	0.98	0.84	0.70	0.56	0.42	0.28	0.14	0
24	75	1.94	1.79	1.64	1.49	1.34	1.19	1.04	0.89	0.75	0.60	0.45	0.30	0.15	0
25	77	2.06	1.90	1.74	1.58	1.42	1.27	1.11	0.95	0.79	0.63	0.47	0.32	0.16	0
26	79	2.18	2.02	1.85	1.68	1.51	1.34	1.18	1.01	0.84	0.67	0.50	0.34	0.17	0
27	81	2.32	2.14	1.96	1.78	1.60	1.43	1.25	1.07	0.89	0.71	0.53	0.36	0.18	0
28	82	2.46	2.27	2.08	1.89	1.70	1.51	1.32	1.13	0.94	0.76	0.57	0.38	0.19	0
29	84	2.60	2.40	2.20	2.00	1.80	1.60	1.40	1.20	1.00	0.80	0.60	0.40	0.20	0
30	86	2.76	2.54	2.33	2.12	1.91	1.70	1.48	1.27	1.06	0.85	0.64	0.42	0.21	0
31	88	2.92	2.69	2.47	2.24	2.02	1.80	1.57	1.35	1.12	0.90	0.67	0.45	0.22	0
32	90	3.09	2.85	2.61	2.38	2.14	1.90	1.66	1.43	1.19	0.95	0.71	0.48	0.24	0
33	91	3.27	3.02	2.76	2.51	2.26	2.01	1.76	1.51	1.26	1.01	0.75	0.50	0.25	0

■ Green - Optimal    ■ Yellow - Borderline    ■ Red - Too high/too low

**Maximizing Cannabis Quality and Yield**

Precise temperature and humidity control is beneficial for improving the quality, yield, and consistency of cannabis crops. By maintaining optimal environmental conditions, growers can ensure uniform growth, maximize cannabinoid and terpene production, and reduce variability between harvests, ultimately achieving higher-quality and more reliable outputs.





While every grower has their preferences and faces a multitude of variables that may impact the best climate to achieve your intended quality, yield, odor, potency, and color, there are humidity and temperature ranges that are generally accepted. So growers need to know that humidity and temperature levels should be regulated at each stage of a cannabis plant's life to promote healthy growth.

Just like children require different care at different stages of growth, cannabis plants have changing needs as they mature. It's not about setting a static climate but rather adjusting the environment as your plants move from one phase to the next. We do know there are certain ranges that yield the most desirable results for your reference.

### Seedling Stage

Seedlings absorb water mainly through leaves. Maintaining these conditions aids in nurturing their budding root systems without stress.

### Vegetative Stage

Mature roots mean plants now primarily absorb water through the roots. The settings ensure the plants adapt and grow robustly.

### Early Flowering Stage

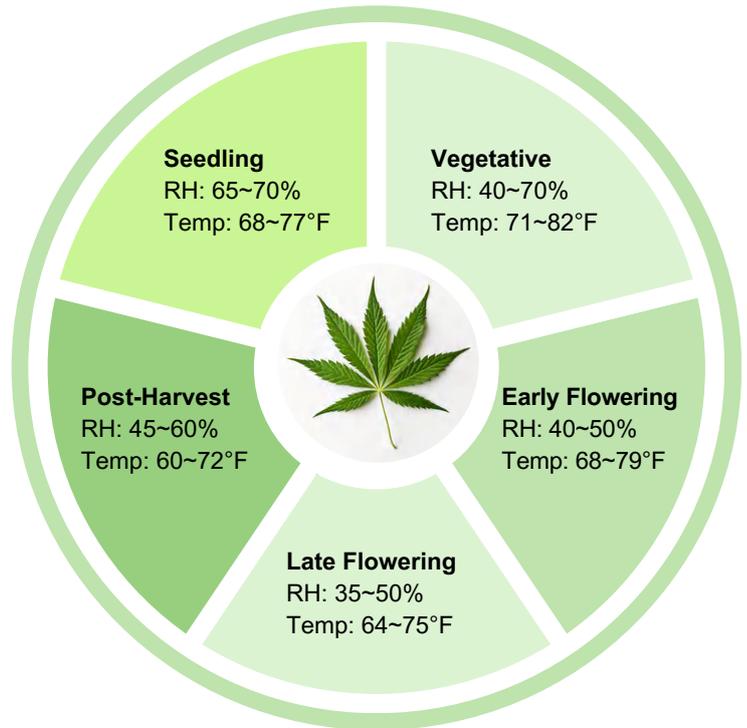
Reduced humidity levels minimize mold risk. Adjustments in this stage support robust bud production and general plant well-being.

### Late Flowering Stage

As buds develop and densify, these settings ensure no mold formation and set the stage for the final harvest.

### Post-Harvest: Perfecting the Cure

Even after the harvest, maintaining the ideal environment is pivotal. Proper curing ensures the preservation of the bud's flavor, potency, and overall quality. A slow, consistent curing process is vital. It's the difference between a flavorful, potent yield and a mediocre one.



Keep in mind that these values are generally accepted industry best practices, and every cultivator has their preferences to achieve the ultimate result in quality, odor, potency, and color. These are loose guidelines, and we encourage you to discuss your climate goals with cultivation experts and our mechanical engineer to make the practical solution that meets your expectations.



Seedling



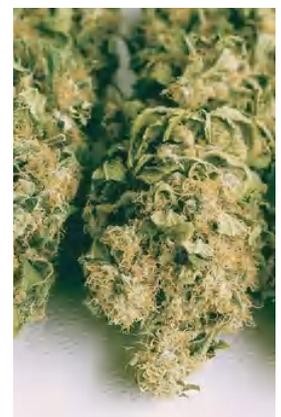
Vegetative



Early Flowering



Late Flowering



Post-Harvest

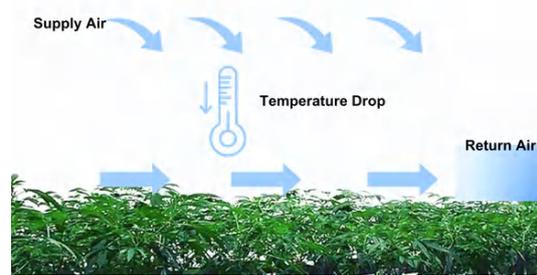
Altaqua's Grow Room HVAC System is an all-in-one solution that delivers precise temperature and humidity control for commercial growers, ideal for various controlled agriculture environments. Available in sizes from 5 to 65 tons with water removal of 3 to 38 gallons/hr, it offers an energy-efficient and cost-effective solution. These advanced technologies can help clients boost yields by 30% to 50%.

**Precise Humidity and Temperature Control**

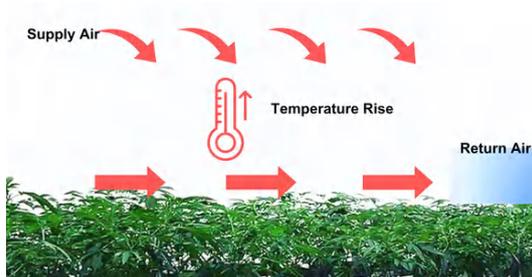
Altaqua's Grow Room HVAC System seamlessly integrates dehumidifying, air conditioning, air heating, ventilation into a single unit, allowing precise control over temperature, airflow, and humidity. This all-in-one solution ensures optimal environmental management, making it the most efficient and reliable choice for maintaining ideal conditions in grow rooms.



**Dehumidifying**



**Air Conditioning**



**Air Heating**



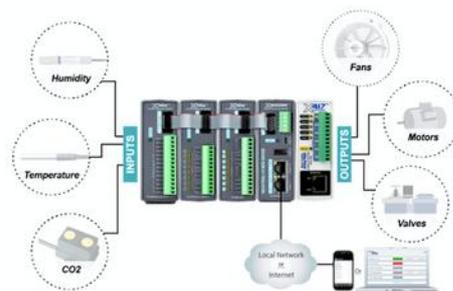
**Ventilation**

**Offer Abundent Optional Functions**

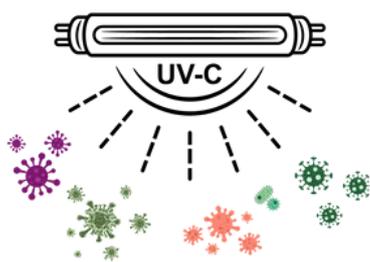
Altaqua's Grow Room HVAC System offers customizable options such as wifi control, modbus control, air sterilization, CO<sub>2</sub> level control, and fresh air ventilation. These optional features allow growers to tailor the system to their specific project requirements, enhancing environmental control and optimizing plant growth conditions.



**WiFi Control**



**Modbus Control**



**Air Sterilization**



**CO<sub>2</sub> Level Control**

Choosing the right equipment not only saves money through increased efficiency and longevity but can also boost revenue. The higher upfront cost of superior equipment is often recovered within the first year. Over 10-15 years, a quality grow room HVAC system can generate hundreds of thousands in operational savings and higher revenue from better quality, consistent crops. Unitary Grow Room HVAC systems integrate heating, cooling, and dehumidification into one unit, unlike traditional setups that may conflict. These systems are designed specifically for cannabis cultivation, ensuring optimal conditions for plant growth

**Outstanding Advantages for Cannabis Cultivation**



 **Precision and Stability**

Cannabis plants require precise control over temperature, humidity, and airflow for optimal growth. Integrated HVAC systems offer consistent, stable environmental conditions throughout the entire grow cycle, ensuring uniform crop development and maximizing both yield and quality.

 **Redundancy and Reliability**

Cannabis growers need uninterrupted climate control to avoid damaging crops. The built-in redundancy ensures that if one subsystem fails, the others keep running, protecting the plants and maintaining stable conditions.

 **Intelligent Automation**

These systems can automatically adjust based on the growth stage, daily light cycles, and other environmental factors. This automation eliminates manual adjustments, ensuring plants always receive the ideal conditions without constant monitoring.

 **User-Friendly Control**

With easy-to-use control panels, growers can monitor and adjust critical factors like temperature, humidity, and VPD values in real-time. Additional features such as CO<sub>2</sub> level control and air sterilization enhance flexibility, allowing growers to fine-tune the environment to their specific needs.

 **Efficient Control Algorithms**

Driven by Siemens PLC and advanced control algorithms, our system automatically processes real-time temperature and humidity data to adjust conditions precisely to target levels. This built-in intelligence ensures a consistently stable environment without the need for additional engineering or attachments.

 **Cost Efficiency**

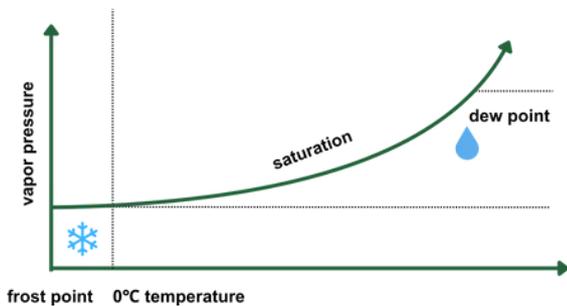
Integrated systems streamline the process by combining heating, cooling, and dehumidification into one platform. This reduces installation, maintenance, and operational costs, making it more efficient and easier to manage than traditional setups with multiple units.





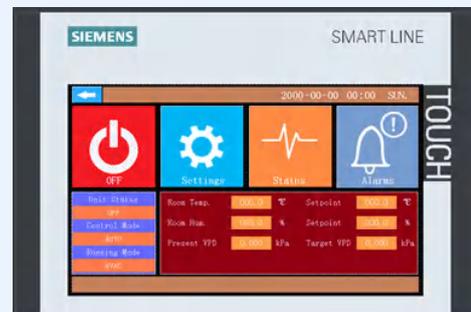
## Use Dew Point Control instead of Relative Humidity

Conventional dehumidification systems measure relative humidity, but this often leads to errors due to temperature. Grow room temperatures fluctuate due to frequent changes in equipment, causing relative humidity to fluctuate. Dew point is not affected by temperature and more accurately reflects actual humidity. Altaqua grow room HVAC systems control both temperature and humidity for more reliable and efficient dew point control, ensuring consistent yields and quality.



## Seamless Operation Ensures High Efficiency

Leveraging the power of Siemens Smart PLC and HMI, our system offers an adaptable and efficient program according to cannabis growing needs. Choose from two different control settings tailored to your grow room's needs. Set your target humidity and temperature, and watch as the machine dynamically adapts by switching functions.



## E+E Precision Control and Superior Reliability

Austria's E + E brand humidity and temperature sensors deliver superior accuracy, maintaining  $\pm 2.5\%$  RH and  $\pm 0.54^\circ\text{F}$  accuracy during operation for efficient environmental control. Combined with Schneider Electric's high-quality components, our systems ensure excellent reliability, long service life, and customizable operating parameters to meet user needs. These features provide precise control, maximizing efficiency and performance in any environment.



## WiFi Control Provide Easy Access & Control

WiFi control allows 24/7 real-time internet monitoring and remote system access and control to ensure optimum performance. Ability to provide automatic fault alert technology to help prevent serious problems. Modbus communication can also be provided to seamlessly integrate our products with your building management system, giving you peace of mind and reducing service costs. This ensures efficient operation and minimizes downtime, keeping your system running smoothly at all times.



**Redundant and Scalable Design**

Altaqua's Grow Room HVAC System is engineered as one to four independent, multi-stage circuits in a single system to provide precise dehumidification and cooling performance, with multi-circuit reliability and redundancy. When dehumidification or cooling loads are below the peak, the system modulates to use less energy while matching the precise room requirements. It saves energy and eliminates over-drying or over-cooling when demand is low, which provide precise control of the variable humidity loads throughout each phase of growth.



**Outdoor Air-Cooled Condenser Unit**

Outdoor Air-Cooled Condenser efficiently removes the heat generated by the cooling process, ensuring it is discharged outdoors, preventing any impact on indoor cooling efficiency. The unit's primary fan, controlled by an ABB frequency converter, automatically adjusts fan speed based on demands, optimizing energy use and maintaining stable performance.



**Reliable EC Fan Motor Saves Energy Costs**

GreenTech EC technology EC centrifugal fans from Ebm-papst, provide higher performance and lower sound level to realize the lowest operating costs. The Fine-tuned variability offers a wide adaptability range to guarantee impeccable crop conditions Whether it's intense moisture or fluctuating temperatures.



**Supply Air Flange Offers Customizable Airflow**

Air movement is essential for dehumidification, air distribution, and healthy plant growth. It delivers fresh, cool, dehumidified air to the foliage, preventing low VPD in static areas that can hinder plant function. Our system offers adjustable airflow direction, including top and side options, to meet your specific needs.





## Simple Installation

In the world of HVAC systems, installation can be daunting, often involving multiple steps, intricate procedures, and complex manuals. However, Altaqua Grow Room HVAC System provides an intuitive process from pipingwork and ductwork to electrical connection. The users will no longer have to grapple with cumbersome installations, and it's as straightforward as possible.



## Easy Operation

### Precise VPD Control

Altaqua Grow Room HVAC System is meticulously designed considering the distinct temperature and humidity demands at every stage of plant growth. The Siemens PLC control panels display the current VPD and target VPD. Just set your desired combination of humidity and temperature target, and our system will do the rest accordingly to create the ideal growth environment.

### Seamless Operation

Leveraging the power of Siemens Smart PLC and HMI, our system offers an adaptable and efficient program according to cannabis growing needs. Choose from three different control settings tailored to your grow room's needs. Set your target humidity and temperature, and watch as the machine dynamically adapts by switching functions.

### Remote Control Technology

Our advanced online system provides 24x7 access, facilitating real-time internet monitoring and Wi-Fi control. Whether you're using a desktop, tablet, or smartphone, our platform ensures uninterrupted control tailored for your convenience.

## Convenient Maintenance

Although Altaqua Grow Room HVAC system is built for minimal service downtime, periodic preventative maintenance is still required to ensure maximum reliability, safety, and operating efficiency. The most common and helpful maintenance tasks are two key points:

1. Maintain clean air filters and replace dirty filters regularly.
2. Maintain clean air-side coils and keep them clean regularly.

Create a facility-specific routine maintenance program and follow it, you can have the equipment longevity and efficiency.



**Technical Specification & Parameters**

Model		GAS-05D	GAS-07D	GAS-11D	GAS-13D	GAS-16D	GAS-22D
Total cooling capacity	MBH	65.8	88.4	132.8	152.6	196.2	264.5
	Ton	5.5	7.4	11.1	12.7	16.3	22.0
Sensible cooling capacity	MBH	36.5	49.5	74.7	85.0	109.6	148.1
Reheat coil capacity	MBH	82.7	110.8	166.2	190.4	245.3	331.3
Max. moisture removal capacity	L/hr	12.2	16.5	24.5	28.5	36.6	49.1
	Pint/hr	25.7	34.8	51.7	60.1	77.2	103.6
	Gallon/hr	3.2	4.4	6.5	7.5	9.7	13.0
Supply air	cfm	1350~1460	1810~1950	2800~3020	3110~3360	4000~4320	5450~5890
External static	Pa	200					
Rated current	A	9.0	11.1	17.2	19.2	25.4	33.5
Protections	type	Phase Protection, High/Low Pressure Protection, Overload Protection, Compressor staged start, Compressor Auto-Protection, Fan Motor Auto-Protection					
Model		GAS-25D	GAS-32D	GAS-38D	GAS-43D	GAS-50D	GAS-65D
Total cooling capacity	MBH	302.4	389.1	453.9	518.8	604.1	778.2
	Ton	25.2	32.4	37.8	43.2	50.3	64.8
Sensible cooling capacity	MBH	169.6	218.1	254.6	290.8	339.2	436.9
Reheat coil capacity	MBH	378.2	487.2	567.6	646.2	755.6	974.3
Max. moisture removal capacity	L/hr	55.9	71.9	83.9	95.8	112.0	144.0
	Pint/hr	117.9	151.7	177.0	202.1	236.3	303.8
	Gallon/hr	14.8	19.0	22.1	25.3	29.6	38.0
Supply air	cfm	6300~6800	8100~8750	9450~10210	10800~11660	12600~13610	16200~17500
External static	Pa	200					
Rated current	A	38.0	49.5	56.4	61.1	75.9	99.0
Protections	type	Phase Protection, High/Low Pressure Protection, Overload Protection, ompressor staged start, Compressor Auto-Protection, Fan Motor Auto-Protection					

\*Test standard: Return air dry bulb temperature of 27°C, relative humidity of 60RH%. Outdoor air temperature 35°C

\*\*All specifications are subject to change without notice.



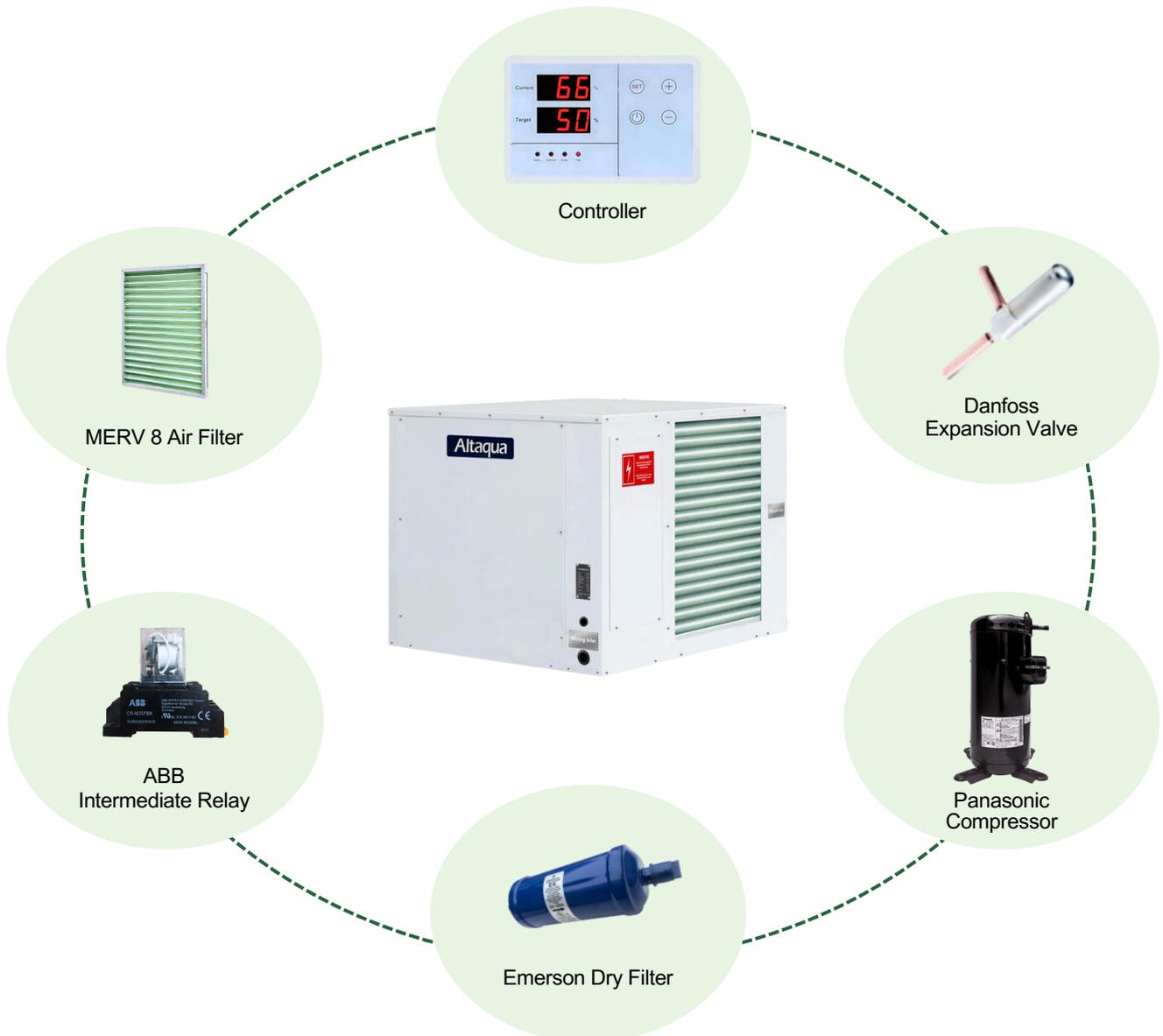


Altaqua Grow Room Dehumidifier can remove more moisture for a given electrical cost and deliver less heat to the grow space. Maintenance cost is very minimal. Only the filters need to be washed at regular intervals and replaced, typically between each grow cycle. It is popularly used for small grow facilities that require the ability to remove moisture during both lights on and lights off operation, as well as during the drying of harvested product, which offer the scalability, redundancy and operational flexibility.

### Features

- Auto-restart after loss of power
- Creates less heat load in your space
- Pulls less energy, saving money on utility bills
- Smaller footprint saves space with more capacity
- Optional Ductable intake and exhaust kits available
- Integrated lift and hang points for easier, flexible installation
- Advanced defrost system prevents coil freezing in low temperatures
- Removable access panel for easy, in-place maintenance and serviceability
- WiFi control allows you to manage grow room environment from anywhere using a smartphone app.

Altaqua Grow Room Dehumidifier is equipped with high-quality components designed for durability and performance. Each part is carefully selected to ensure reliable operation, optimal energy efficiency, and seamless integration with the overall system, providing growers with a robust solution for their climate control needs.





**Model  
AGD-078**



**Water removal @ 27°C/60%RH**  
 165 Pints | 78 Liters | 21 Gallons per day

**Airflow rate: 680 m<sup>3</sup> /hr | 400 CFM**

**Power consumption: 1.49 kW**

**Water removal @ 27°C/60%RH**  
 296 Pints | 140 Liters | 37 Gallons per day

**Airflow rate: 1250 m<sup>3</sup> /hr | 736 CFM**

**Power consumption: 2.59 kW**



**Model  
AGD-140**

**Model  
AGD-278**



**Water removal @ 27°C/60%RH**  
 587 Pints | 278 Liters | 73 Gallons per day

**Airflow rate: 2500 m<sup>3</sup> /hr | 1472 CFM**

**Power consumption: 5.01 kW**

**Water removal @ 27°C/60%RH**  
 729 Pints | 345 Liters | 91 Gallons per day

**Airflow rate: 2960 m<sup>3</sup> /hr | 1742 CFM**

**Power consumption: 5.96 kW**



**Model  
AGD-345**

**Model  
AGD-568**



**Water removal @ 27°C/60%RH**  
 1200 Pints | 568 Liters | 150 Gallons per day

**Airflow rate: 4725 m<sup>3</sup> /hr | 2781 CFM**

**Power consumption: 9.10 kW**



**Custom-Designed HVAC Programming and Structure:** Our engineers meticulously design and program each HVAC system to meet specific operational needs, ensuring maximum efficiency and reliability.



**Professional Manufacturing by Technician Team:** With strict ISO 9001 standards and lean manufacturing, our skilled team ensures each HVAC unit meets the highest quality, delivering reliability and durability you can trust.



**Strict Quality Check from Design to the Testing:** Our comprehensive testing process documents every quality check, from materials inspection to final performance, ensuring each unit meets high standards with full traceability for long-term reliability.



**Secure Packaging and Global Delivery:** Altaqua ensures secure, high-quality packaging to protect equipment during transit, safeguarding against shock and weather. With reliable global shipping and strict deadline coordination, we deliver on time, keeping your projects on track.





Quality Parts from International Famous Suppliers



You can just focus on growing. We will keep HVAC equipment running perfectly to provide the expected performance. All our equipment is backed with industry-leading service and support to provide you with no worry ownership experience.



Commissioning & Start-Up Instructions



Performance Optimization Advising



Comprehensive Maintenance Guidelines



Dedicated Service and Support Assistance



Altaqua provides full after-sales support from installation to maintenance, with genuine parts and flexible service options to keep your grow environment optimal. Rely on us for seamless, factory-backed care without hidden costs.



**Supporting Material**

Comprehensive documentation for troubleshooting and product operation

**Call Service**

Direct line to our experts for quick advice and solution

**Zoom Meeting**

Interactive sessions for real-time assistance for complicate case

**Video Tutorial**

Visual instruction, step-by-step guides for a range of scenarios

**On-Site Support**

Personalized, hands-on assistance at your location (Optional paid service)

# Altaqua

Partner of Commercial Indoor Growers



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