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**CULTIVATOR "I" & *HYBRID* CULTIVATOR I  
SERIES PACKAGED UNIT**

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***Precision Indoor Dehumidification Units***



***"HYBRID" TECHNOLOGY  
SAVING ENERGY***

# “Cultivator I” and **HYBRID** “Cultivator I” Indoor Packaged Dehumidification & Cooling Units for Commercial Indoor Gardens

CGEE **Cultivator “I” Series** indoor packaged units are specifically engineered to provide precision humidity and temperature control maintaining quality indoor environment for gardens.

The “I” series, Indoor Packaged Dehumidifiers offer indoor gardens precise climate control by providing all the necessary features in a single unit. The packaged unit provides Dehumidification, Cooling, Outside air, FREE Cooling, FREE Reheat, CO<sub>2</sub> Control, Building Pressurization Control, Superior Filtration, single point power connection and much more. The **Hybrid** series unit utilizes both chilled water or condenser water and DX cooling coils to providing additional efficiency while providing redundancy and improved risk management.



This is **the most efficient system** in the industry and is provided with advanced variable speed compressors and fans. The **Cultivator I** series equipment offers flexible setpoints, remote monitoring, alarms and easy integration to Building Automation Systems. These features allow each grower the ability to change indoor air temperatures and humidity levels as desired. The **Cultivator I** provides the highest quality of air for the plants while improving the indoor air quality for personnel.

CGEE provides solutions for the all the major concerns that should be addressed in every good HVAC design.

## Major design concerns for Indoor Gardens

- Indoor Air Quality (IAQ)
- Energy Savings
- Risk Management (Redundancy)
- Code Compliance
- Ease of design and installation
- Equipment Quality and Longevity



## HVAC Systems for Indoor Gardens Facilities

### “Indoor Garden Climate Control - Solutions for Dehumidification

#### Complete Unit Package Design

For owners, contractors and engineers, the **Cultivator I** dehumidification units are completely assembled with:

- Supply and Exhaust Fans
- Chilled Water Coils
- DX and Hot Gas Re-Heat coils
- Gas Furnace section (Duct Mounted)
- Hot Water Coil section
- Pre and Mixed Air Filters
- Final HEPA Filter Section (Discharge Mounted)
- Condenser Water Cooled
- CO2 Purge Control
- And much more

And ready to install and operate.



**Single Packaged Unit Design**

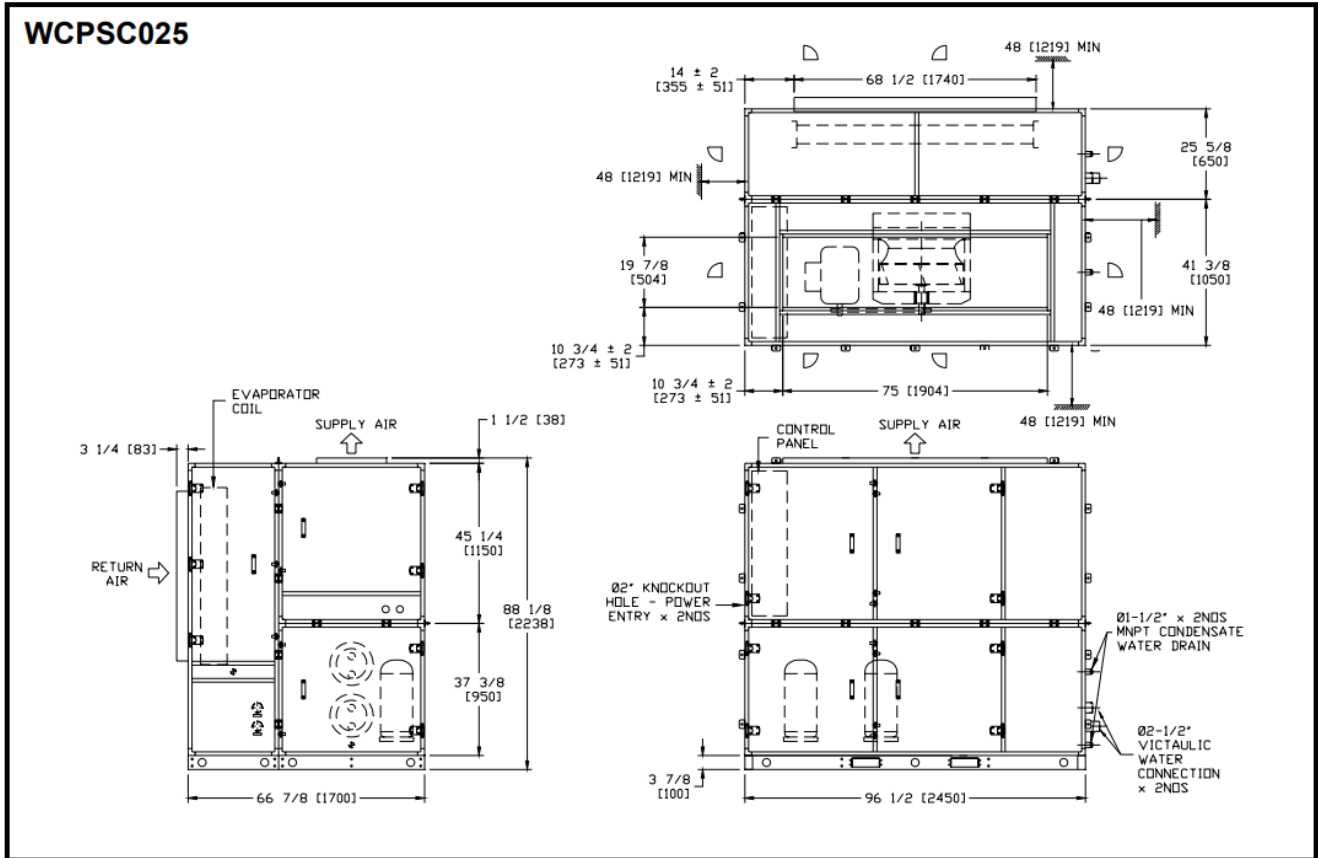
There is no need to have additional exhaust fan(s) in the space to remove the outside air or remote gas furnaces installed in the supply air duct. This will reduce maintenance while reducing installation and controls cost. Additionally, since this is a packaged unit, there is no need to have a split system with separate power supplies, field installed refrigeration piping and heating duct furnace. This dehumidification unit has a compliment of sizes ranging from 3 tons to 70 tons.



Dehumidification equipment is very expensive and selecting the proper equipment is a very important process to owners. Understanding available features and accessories that can reduce energy and maintenance costs is important to owners. This brochure helps identify features and benefits that are important to the owner and operator.

The following is a list of Key Features and Benefits specifically suited for the indoor grow room market with a short description of each.

SAMPLE DRAWING – BASIC 10 TON UNIT



**CULTIVATOR I (Standard Features)**

1. Single Piece Unit Design
2. Hi-Capacity DX Coil (Dehumidification)
3. Hi-Capacity Hot Gas Re-Heat Coils
4. Chilled Water Coils (Sensible Load) (Hybrid Unit)
5. Condenser Water Coil (Water-side economizer)
6. Filters: Pre, Mixed & HEPA final filters
7. Final Filters - Integral MERV15 to HEPA
8. UV Lights (Mold Mitigation)
9. Ionization (Odor Control) – Code Compliance
10. Carbon Filters (Odor Control)
11. Positive Building Room Pressurization Control
12. CO2 level and Purge Control
13. Hi-Efficiency Vari-Speed Compressors
14. Hi-Efficiency Vari-Speed EC Fan motors
15. Hi-Efficiency Supply and Exhaust Fans
16. Single and Dual Supply & Exhaust Fan Options
17. Variable Speed Scroll Compressors
18. Industrial/Commercial Equipment Standards
19. BACnet building automation controls
20. Easy Building Automation Integration
21. Touch Screen Interface Device
22. Remote Monitoring & Alarms (Text & Email alerts)
23. Utility Rebates
24. Warranty



**“Dehumidification for Better  
Indoor Climate”**

These High Efficiency Dehumidification Packaged Units also provides the grower with key features to help with meeting local codes involving odor mitigation and CO2 purge control. It also offers the option for positive pressure room control, (3) three levels of filtration including a HEPA final filters and the latest ionization and UV light integration. All factory installed into a single packaged unit (some accessories may require field installation.

CGEE HVAC Systems focuses on dehumidification equipment both standard design and custom units to fit project and owner requirements. Whether the unit is a 100% outside air unit or recirculation unit, the standards were designed to meet the needs of the indoor garden cultivator proving precision dehumidification and temperature control.

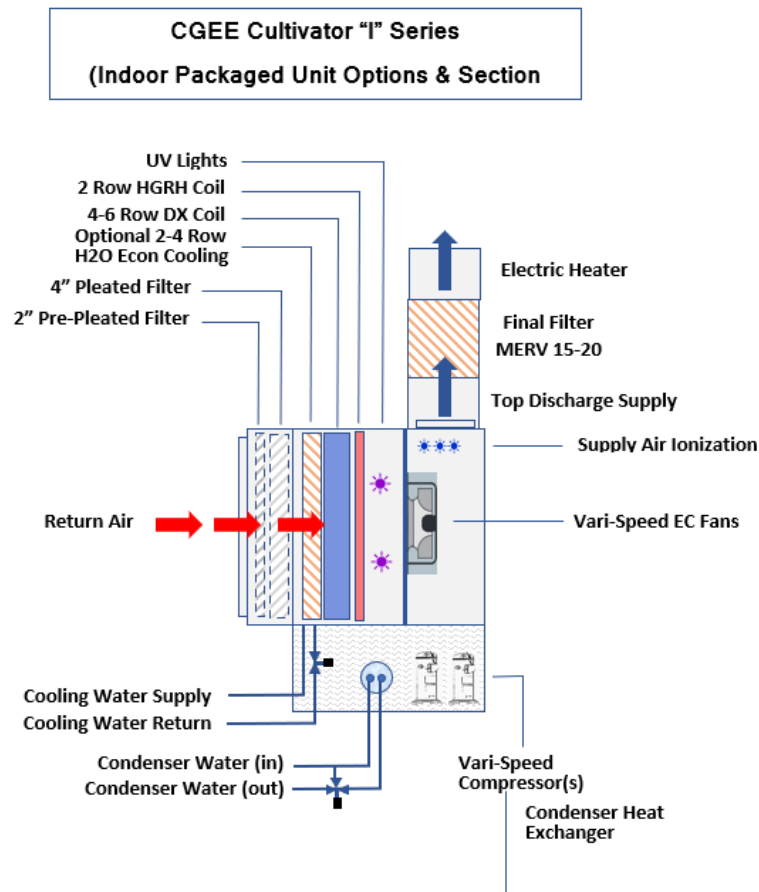
## CGEE *Cultivator I* Indoor Packaged Units

The **CGEE *Cultivator I*** & **HYBRID *Cultivator IH*** (*I* = Indoor) Series Packaged Units are specially designed to meet the Dehumidification and Cooling requirements. The Hybrid unit utilizes both Direct Expansion (DX) technology for core dehumidification while incorporating the use of a more economical condenser or chilled water coil for sensible cooling demand. Traditional systems either use DX HVAC equipment to do both the dehumidification (latent load) and cooling demand (sensible load). This typical approach requires the DX unit to be sized to handle both demand. If the DX unit is not sized large enough, additional dehumidification equipment may be required.

Economizer water systems can do most of the sensible cooling and some latent cooling, but often require additional heating systems and numerous smaller dehumidification units to properly cool and dehumidify an indoor garden.

### CGEE Cultivator I & Hybrid Cultivator IH Series

**“The most flexible unit in the industry”**



\*Flexibility allows for components to be added as required by facility needs

## FEATURES and BENEFITS

### 1. SINGLE PIECE UNIT DESIGN

CGEE provides a single unit design. This means that the major components: the air handling section, condenser section, dehumidification, cooling, heating and filtration are all in a single unit. This sounds simple, but many manufacturers will offer a 3 or 4 separate pieces of equipment to accomplish indoor climate control for gardens. More pieces of equipment will translate to increased installed cost and maintenance. But for areas where a knock-down unit is required, the unit may be shipped in several pieces allow entry through narrow doors and elevators.

All components are factory assembled into a single unit. This reduces installation and design costs. All standard features and available options are offered to the owner to best fit their requirements and construction budgets. For owners, contractors, and engineers, the *Cultivator I* dehumidification units is a complete solution.

There is no need to have additional exhaust fans in the space to remove the outside air or remote gas furnaces installed in the supply air duct. This will reduce maintenance while reducing installation and controls cost. Additionally, since this is a packaged unit, there is no need to have a split system with separate power supplies, field installed refrigeration piping and heating duct furnace.

#### Benefits:

- Simpler design and installation
- Reduced equipment installation
- Reduced power connections and breakers
- Reduced control wiring
- Less installed sheet metal
- Fewer roof supports & smaller footprint
- Less maintenance & trouble shooting
- No field installed refrigerant piping
- Factory assembled and tested
- Single point electrical (less electrical connections)
- **Less installed costs**
- **Factory constructed**

## 2. HIGH-CAPACITY DX COILS (IAQ)

The DX refrigeration coil is specially sized for high dehumidification requirements. The coils are sized for lower air velocities and additional rows of tubing are added for expanded dehumidification capacity.

A typical DX coil will only do about 20% latent to total cooling capacity ratio. CGEE coils can achieve up to a 50% + latent to total cooling capacity. This high latent (moisture) removal capacity can substantially reduce the size of the DX equipment when used in conjunction with the chilled water coil option. The primary function of the chilled water is to cool the high sensible load generated by the lighting systems.

Each unit will have either a single circuit or two independent interlaced DX circuits. Option split face coils can be provided allowing each circuit to completely dehumidify its airstream independent of the other circuit. Failure in a single circuit will not prevent the unit from dehumidifying.

### Benefits:

- Improved Latent Capacity (moisture Removal)
- Lower Air Velocities
- Independent Refrigeration Circuits
- Integrated Hot Gas Reheat Coils for reheat (Free Reheat)
- Precision Temperature Electronic Expansion Valve Control
- Redundant split face refrigeration circuits
- Improved Risk Management
- Factory Installed

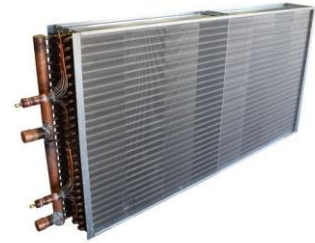
## High Efficiency Refrigeration Tubing – Efficiency & Climate Control

CGEE HVAC Systems has not made a change to the cheaper aluminum condenser coils and continue to use high quality enhance copper tubing. This enhance 3/8" seamless copper tubing increases surface area by 25-30%, increasing heat transfer and efficiency.

These coils are factory tested to 650 psi for reliability. All fins are mechanically bonded to the tubing for optimum heat transfer.

### Benefits:

- Increase Surface Area
- Higher Efficiency
- Strength of copper over aluminum



**High Latent Capacity  
DX Coil**



**Enhance Copper  
Refrigeration Tubing**



### 3. HOT GAS REHEAT COIL (IAQ – Efficiency)

All CGEE units come with a high capacity Hot Gas Re-Heat (HGRH) Coil. During the dehumidification mode, the DX coil sub-cools the air below the dewpoint to remove the moisture from the air. Because the air is sub-cooled, the air must be reheated, so the room does not get overcooled.

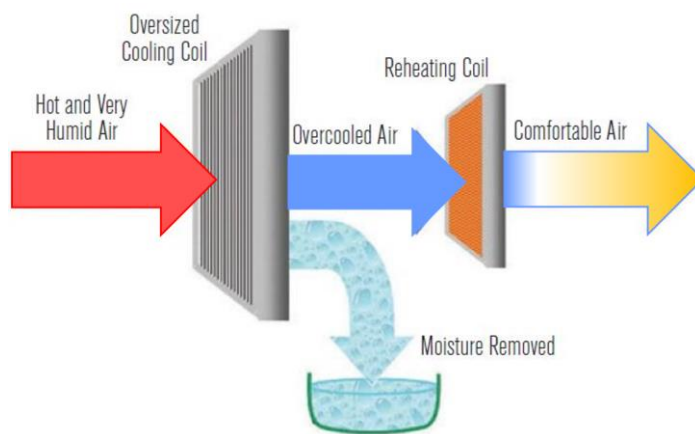
The leaving air temperature off the HGRH coil is then precisely controlled through a full modulating HGRH control valve.

The Hot Gas Re-Heat Coil provides **FREE** reheat. No reheat is less expensive to operate than through this **FREE** heating coil.



**True Modulating  
Reheat Control**

### Sub Cooling & Reheat Cycle



#### Benefits:

- **FREE** reheat
- Precise discharge air temperature control
- Lower condensing refrigeration temperatures and pressures
- Reduced wear and tear on the compressors
- Reduced energy costs
- Lower installed cost over electric and hot water heating systems
- Reduces power requirements on the building electrical load.
- Factory installed

#### 4. WATER SIDE ECONOMIZER COIL

The addition of a water-side water coil will provide free cooling from the fluid cooler or dry cooler. This coil can also be hooked up to a chilled water loop. This coil will allow the unit to perform sensible and latent cooling capacity thus reducing the size of the DX refrigeration equipment. This coil as well provides redundancy to the DX compressor circuits in case of compressor failure.

The use of the water coils shifts the cooling demand from the DX coil to the water coil. A chiller or other cooling means provides sensible cooling at a lower Kw/ton than a standard DX packaged unit. This use of the chilled water coil will also reduce the total installed cost of the system(s).

Additionally, the water coil will add cooling redundancy to the HVAC cooling and dehumidification systems offering risk management to the facility.

##### Benefits:

- Reduces the size of the DX unit
- Lowers installed cost
- Increased sensible capacity of the unit
- Lowers risk to cooling failure
- Lower utility costs
- Reduces compressor run time
- Lower maintenance costs
- Factory installed

#### 5. FILTERS - PREFILTERS & HEPA FILTRATION (IAQ)

For growers/botanist and owners, providing the **best air quality** in the indoor garden has become paramount concern. Many areas of the country are now requiring product testing before public consumption can occur. Lost crops due to test failure can be a crippling and a cost that no facility wants to incur.

Removal of air borne pathogens and contaminants is not only good for the plants but provides the best Indoor Air Quality (IAQ) to the personnel working in the environment. Thus, filtration can be one of the highest priorities of any environmental control system.

All units are provided three (3) levels of filtration and can provide the cleanest air possible. Each unit is provided with a 2-inch Pre-filters and 4-inch Secondary Filters and are located before the DX coil which removes larger particles keeping the air and coils clean. The Final Filters (HEPA HOSPITAL STYLE FILTERS) are installed in the leaving air section of the unit and is the last component in the air stream before the air enters the room ensuring the cleanest air possible is delivered to each room. This level of FINAL filtration can equal that of clean rooms and hospitals. Filter efficiency is rated in a MERV



**Water-side  
Economizer Coil**

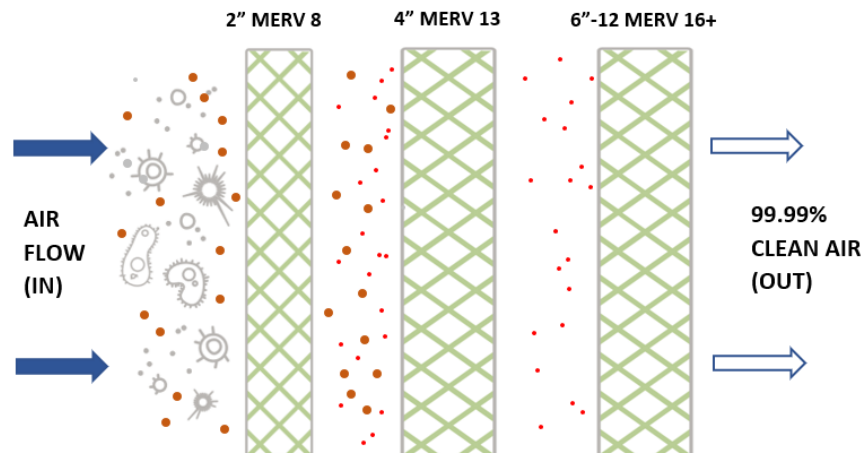
rating ranging from MERV1-MERV20. The higher the rating number the higher the efficiency. A MERV20 filter has an efficiency rating of 99.999%.

**A typical Hybrid Cultivator unit may have MERV 8 + MERV 11 + MERV 15**

RATING	EFFICIENCY	ARRESTANCE %	CONTAMINANT	APPLICATION
MERV 8	30-35 %	=>90%	3-10 pm Particle	Commercial Buildings
MERV 11	60-65%	=>96%	Humidifier Dust	Better Commercial Buildings
MERV 15	>95%	=>99%	All Bacteria	Hospital Care

Values are based upon Standard 52.5 Minimum Efficiency Reporting Value

## HOSPITAL 99.99% Filtered Air



By having superior filtration, factory installed in the unit, fresh air can now be introduced through the HVAC unit and provide positive pressure to each grow room without the worry of contamination from outside air. Additionally, this will allow the owner to realize considerable energy savings as the unit can now operate with a **FREE COOLING** mode (economizer) equating to substantial yearly energy savings to the owner.

Additionally, there are substantial installation cost saving by having these (3) levels of filtration factory installed and will eliminate separate installation of the following systems:

- Air Filtration
- Outside Air Ventilation
- Exhaust Air Systems
- Air Ducting
- Roof and wall penetrations
- Additional Electrical & Controls

**FILTER OPTIONS**

There are many filter options that include the following list:

- Throw-a-way pre-filters (inexpensive low efficiency) (e.g. MERV 3)
- Pleated filters (lower – medium efficiency) (e.g. MERV 8)
- Box filters (medium - high efficiency) (e.g. MERV 15)
- Final HEPA filters (high efficiency) (e.g. MERV 20)
- Carbon filters

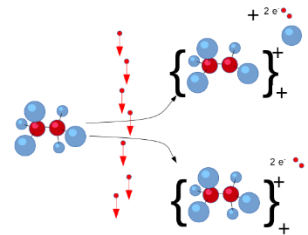
**FRESH AIR:** Many growers recognize the importance of providing fresh outside air to their plants and personnel. The unit is provided with factory installed outside air dampers which allows for the introduction of fresh air to the system while providing positive pressure room control. Because of the advanced filtration options, all outside air is filtered eliminating the concern of outside airborne contaminants to the indoor environment. Now, because of these advanced options, you have a choice!

**Benefits:**

- Superior Air Quality (IAQ)
- 3-levels of filtration options as required
- Removal of all airborne pathogens and microbials
- Positive Building Pressure Control
- Minimum Ventilation Options
- Full Economizer Options
- HEPA final filtration
- Energy Savings
- Reduced installed cost (single unit vs separate systems)
- Reduced maintenance (single unit vs separate systems)
- Factory installed in the unit

**6. IONIZATION (Odor Mitigation) - (Code & IAQ)**

As an option, the units may be provided with unit mounted ionizers and are mounted in the unit. These are non-ozone generating technology. Ionization (non-ozone producing) offers odor mitigation by breaking down complex gases to oxygen, nitrogen, water vapor and carbon dioxide and thus reducing odors.

**Ionization****ODOR MITIGATION**

Ionizers have helped in both odor mitigation as well as a very good antiseptic prevent mold, bacteria and viruses from propagating and reproducing. The final filter, if installed will as well be the final protection in providing the best IAQ (Indoor Air Quality) to the indoor facility. As well, this feature is great for employee health.

**CODE COMPLIANCE**

Many new building codes are requiring that facilities to install odor control measures and filtration to mitigate all discharge air and provide better indoor environments for the facility's personnel. Control of odors created by cannabis gardening in municipal areas is a topic of importance for growers, owners and government oversight agencies. Municipal and state regulations are being enacted requiring the mitigation of odors emitted by with cannabis & hemp plants.

Ionizers can be installed in several different locations within the unit: Return Air, Exhaust Air and Supply Air sections. Ionization can be installed in lieu of carbon filters but as well can be used in conjunction with the carbon filters

Ionizers have as well been proven to reduce and assist in mitigation of mold, mildew and bacteria in the garden.

**Benefits:**

- Conforms to code enforcement of odor mitigation
- Breaks down mold, bacteria, viruses and microbials ability to reproduce
- Reduced maintenance
- Factory installed in the unit.

**7. UV LIGHTS (IAQ)**

UV light is a useful tool in the fight to mitigate microbial growth including bacteria, virus and mold. UV lights are an effective means of disinfecting the air by impairing the DNA of the pathogens rendering them unable to reproduce.

UV lights are typically installed in front of filters and on the DX coil where the most moisture occurs in the air conditioning system. The leaving side of the DX coil is the best location for the UV lights installation as this is location is where most of the water and moisture will accumulate.

UV lights can be installed in multiple locations in the unit as required by the user.

**Benefits:**

- Mitigates microbial growth
- Keeps coils cleaner
- Improves indoor air
- Reduces coil cleaning and maintenance
- Factory installed in the unit

**UV Lights - Filters****UV Lights - Coils**

## 8. CARBON FILTERS (Odor Mitigation)

As an option, the units may be provided with carbon filtration. This can be on mixed air, outside air and exhaust air streams.

## 9. BUILDING PRESSURIZATION CONTROL (IAQ)

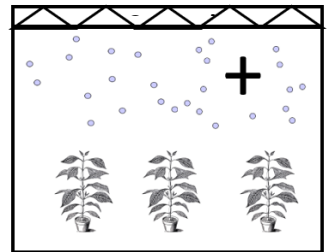
All units are provided with a building pressure control sequence of operation to maintain the desired positive pressure in the interior space. The unit is provided with a pressure transducer that is mounted in the space and wired to the unit's microprocessor control panel. The unit will modulate the outside air damper to maintain minimum ventilation rates. If economizer is used, the damper will open to provide free cooling to the space.

The exhaust fan will modulate to maintain the positive pressure as required. All of this is done through the unit's microprocessor control. All set points are user definable and adjustable to meet the grower's needs.

### Benefits:

- No infiltration from other rooms
- Positive pressure to hallways and service rooms
- A consistent supply of fresh air to the plants
- Reduction in cross contamination.
- Healthier plants
- Outside air is filtered through the units HEPA filtration system
- Factory installed in the unit

+ Positive Room Pressure



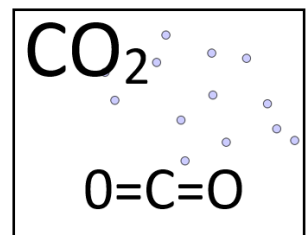
## 10. CO<sub>2</sub> PURGE CONTROL (Code & IAQ)

All units are provided with high CO<sub>2</sub> alarm control built into the microprocessor controller. A sensor mounted in the return air portion of the unit or in the space will continuously monitor the indoor CO<sub>2</sub> levels. If the CO<sub>2</sub> levels get to high, the outside air damper will modulate open to maintain maximum user definable levels. The unit's exhaust fan will modulate to maintain the desired building positive pressure setpoint.

This CO<sub>2</sub> monitoring and purge control is designed to meet all building and health codes requirements for monitoring and purge control.

### Benefits:

- Meets local CO<sub>2</sub> purge Control requirements
- Self-monitors levels
- Automatically adjust the outside air damper to meet threshold requirements.
- Automatically ramps up the exhaust fan to maintain building pressure in the system
- Factory installed in the unit.



CO<sub>2</sub> Purge Control

## 11. VARIABLE SPEED SCROLL COMPRESSORS (Efficiency – Climate Control)

CGEE HVAC Systems utilize variable speed scroll compressors, the best and most efficient technology available. These variable speed compressors will vary the capacity control of the compressor thus delivering and providing precision capacity control, more accurate temperature control while saving money and increasing compressor life.

The standard scroll compressor is staged ON and OFF for capacity control with dead band control to start and stop the compressors. The variable speed compressor control keeps the compressors from short cycling increasing compressor life and reducing future maintenance. The variable speed scroll compressor is the most efficient compressor operation available.



**Variable Speed Compressor**

Additionally, all compressors come standard with crankcase heaters to minimize refrigerant in the oil sump when in the off cycle. Discharge and suction service valves for ease of maintenance and rubber-n-shear vibration isolation for sound transmission control are factory installed.

### Benefits:

- Precision capacity control
- Accurate temperature control
- Better dehumidification control
- Precision Refrigerant Control using Electronic Expansion Valves
- Less compressor cycling
- Longer compressor life
- Quiet operations especially compared to digital scroll compressors
- Reduced operating & maintenance costs
- Low ambient operation
- Lower utility costs
- Factory installed in the unit

## 12. HI-EFFICIENCY VARI-SPEED - EC FAN MOTORS

### (Electronically Commutated Motors)

CGEE provides EC fan motors as a standard for all supply, return and exhaust fans. The ECM direct drive fan, by the nature of converting the AC power to DC power to run and control the fan speed, will run as much as 50% more efficiently than a fan with a standard AC motor. Speed control of the fan is made simple with a speed control voltage of 0-10VDC which is provided by the controller. No bulky and complicated VFDs to program and maintain.



**EC MOTOR**

**Benefits:**

- The EC motor has internal protection much like a VFD providing protection against under voltage, over voltage, phase protection and provides soft start and many more features
- By converting the power from AC to DC power, the ECM cleans up the dirty utility power and provides a clean power supply to the motor, thus, making the motors more efficient and reducing energy consumption
- Easy Speed Control through 0-10VDC control signal eliminates the need for adjusting belts or programming VFDs. This will also reduce the amount of time required to Test and Balance the system saving the owner money
- If the system ever needs additional air or a reduced air volume, then, this can be achieved by simply resetting the speed setting on the LCD controller to a lower speed level. Simple!
- Factory installed in the unit

**13. VARIABLE SPEED DIRECT DRIVE FANS (Efficiency & Climate Control)**

All units are provided with high efficiency direct drive variable speed fans and motors. There will be no belts to tighten, no sheaves and pulleys to adjust. The EC Motors come with permanently lubricated bearing that require no maintenance. Estimated bearing life is over 30,000 hours. Not like other fan assemblies, this fan module can be replaced in less than an hour from start to finish.

Direct drive fans reduce losses that occur in belt drive fans that have an internal loss of 3-5% due to belt slippage.



**ECM Fan – Variable Speed  
Direct Drive**

**Benefits:**

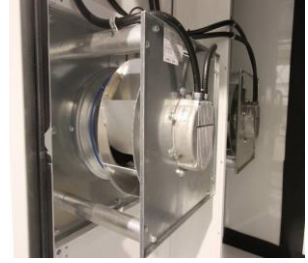
- High efficiency
- High torque motors
- Built-in motor protection: Phase, low voltage, high voltage
- Easy to maintain and replace
- Since there are not belt losses, the direct drive fans will operate approximately 5% more efficient than belt drive fans, thus, saving energy and money
- The speed of each fan is controlled by the controller (0-10VDC signal) making air volume adjustments easy and inexpensive
- The ECM motors are totally enclosed with Aluminum motor housing which ensures longer life over the standard ODP motor usually provided on belt drive fan arrangements
- No belts to adjust
- Reduced operating & maintenance cost
- Factory installed in the unit

## **14. DUAL SUPPLY & EXHAUST FANS - (Risk Management)**

### **SUPPLY FANS**



One of the most critical parts of a dehumidification unit is the supply and exhaust fans. It is extremely important with all dehumidification units to have air circulation. Without the fans, no dehumidification occurs. Since the fan is critical, we provide as part of the base unit, when cabinet size allows, dual supply and exhaust fans with aluminum BI fans and with high efficiency EC motors. This means that if one of the fans is out of operation, the second fan will continue to work. This is the preferred fan arrangement for dehumidification units.



**Dual ECM Fan Arrangement  
for Redundancy**

**Benefits:**

- Reduced equipment down time
- Risk Management
- Better fan profile under part load
- Reduced fan inertia offering low fan vibration
- Quick and easy fan replacement
- Factory installed in the unit

**EXHAUST FANS**

A factory installed exhaust serves to exhaust the air from the system to maintain building pressure control. There are several conditions in which the factory installed exhaust fan is of benefit.

To have positive pressure in a room, outside air must be introduced into the system. There is usually a minimum outside air set point at which the outside air dampers will adjust to maintain positive pressure. The exhaust may be used to maintain this positive pressure at the designated pressure levels.

In addition, when the economizer is used for **FREE Cooling**, the outside air dampers will modulate open as required to maintain the cooling setpoint. As this economizer damper opens, the exhaust fan will ramp up and exhaust the additional air to maintain the specified building pressure set point.

This exhaust fan(s) is the same type as the supply fans and offers the same benefit as the supply fans.

**Benefits:**

- High efficiency
- High torque motors
- Built-in motor protection: Phase, low voltage, high voltage
- Easy to maintain and replace
- Since there are not belt losses, the direct drive fans will operate approximately 5% more efficient than belt drive fans, thus, saving energy and money



**Exhaust Fan – Variable  
Speed Direct Drive**

- The speed of each fan is controlled by the controller (0-10VDC signal) making air volume adjustments easy and inexpensive
- The ECM motors are totally enclosed with Aluminum motor housing which ensures longer life over the standard ODP motor usually provided on belt drive fan arrangements
- No belts to adjust
- Reduced operating & maintenance cost
- Factory installed in the unit

## 15. INDUSTRIAL/COMMERCIAL EQUIPMENT STANDARDS

### CGEE COMMERCIAL EQUIPMENT CONSTRUCTION STANDARDS

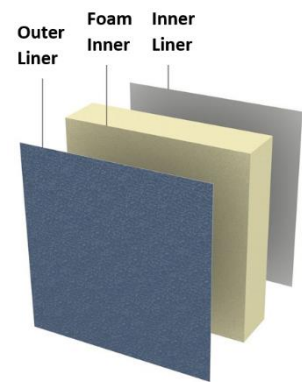
- Hinged Access Doors for easy service access
- Double Wall insulated panel construction
- Stainless Steel Drain Pans
- Epoxy Coated Panels
- Polyurethane Foam Insulation
- Separate Control Panel Section

### Double Wall Construction

CGEE units offer, as standard, 2-inch double wall construction with 2.5lbs/ft<sup>3</sup> pressure injected polyurethane foam insulation in walls and doors. The PU foam injected panels not only offer extremely high R values, but also add rigidity and strength to the panel and cabinet assembly.

#### Benefits:

- Stronger cabinet construction
- Lower Sensible heat gain through the cabinet in high ambient conditions
- Less chance of internal air stream condensation
- Lower cabinet leakage ratings



**Double Wall Panels**

### CORROSION PROTECTIVE COATINGS

On all dehumidification units CGEE can provide corrosion protection to the coils and casing. The exterior is painted with a corrosive resistant powder coat paint to protect against rusting and corrosion. This not only makes the unit look great but will increase the life of the unit and provide a wash down surface if required. The coils are manufactured with stainless steel casing. The fan motors are a TEFC (total enclosed fan cooled) with aluminum housing matched to an all-aluminum fan for maximum life.

For sea-coast installations, additional protection can be applied to both the coils and cabinet especially designed to combat the corrosive natural of the sea-coast salt air.

**Benefits:**

- Stronger cabinet construction
- Less interior & exterior corrosion
- Less maintenance & Longer accessory life
- Easy Maintenance and Clean down
- Longer unit life

**STAINLESS STEEL BOLT CONSTRUCTION**

The CGEE units are considered heavy commercial or industrial equipment with double wall construction. The units are built with the upmost quality and are built with very few screws utilizing stainless steel bolts as the primary construction methodology. All access doors are hinged as opposed to removeable panels that are screwed into place.

Exterior of the units are painted with long life durable epoxy paint. All refrigeration penetrations are accompanied with rubber or plastic escutcheons.

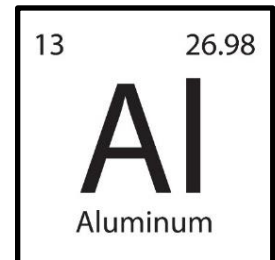
**Benefits:**

- Durability
- Long High efficiency
- Serviceable

**EPOXY PAINTED GALVANIZED STEEL CONSTRUCTION**

CGEE HVAC Systems is constructed heavy gauge galvanized steel. The inner and outer panels including the floor, walls and ceiling constructed of a double wall panels. Having painted interior liners provide non-porous surfaces inhibiting any microbial growth while providing a washable surface. Many manufacturers use an interior insulation but do not provide the interior liner.

The panels are painted with an epoxy paint ensuring long life and durability and carries a 1,000-hour salt spray test, ASTM B-117 standards.

**Benefits:**

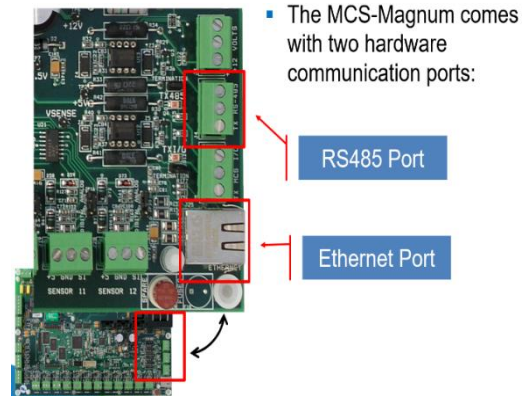
- Strong rigid construction
- Hinged Access panels for easy service and maintenance
- Long equipment life
- Polyurethane Foam Injected panel insulation
- Sound Attenuation benefits of double wall insulated construction
- Low cabinet air leakage

### 16. BACnet CONTROLS

All CGEE units come standard with Modbus and **BACnet IP** (BACnet over Internet) protocol controls. BACnet MSTP and LonWorks are also available. Having BACnet controls allows a BAS (Building Automation System) to access set up parameters, monitor the operation and conditions of the unit as well as allowing the operator to view all these points on a graphic presentation making it easy to view and analyze the unit's operation. 365-day calendars are easy to setup and makes planning ahead for events and holidays simple. All these features are easy access through your computer.

A frontend BAS (Building Automation System) will also allow alarms to be sent out to the operator via text, phone call or email. These alerts will allow the owner to have up-to-date information about the operation and forewarn of any failures that might be occurring with the unit.

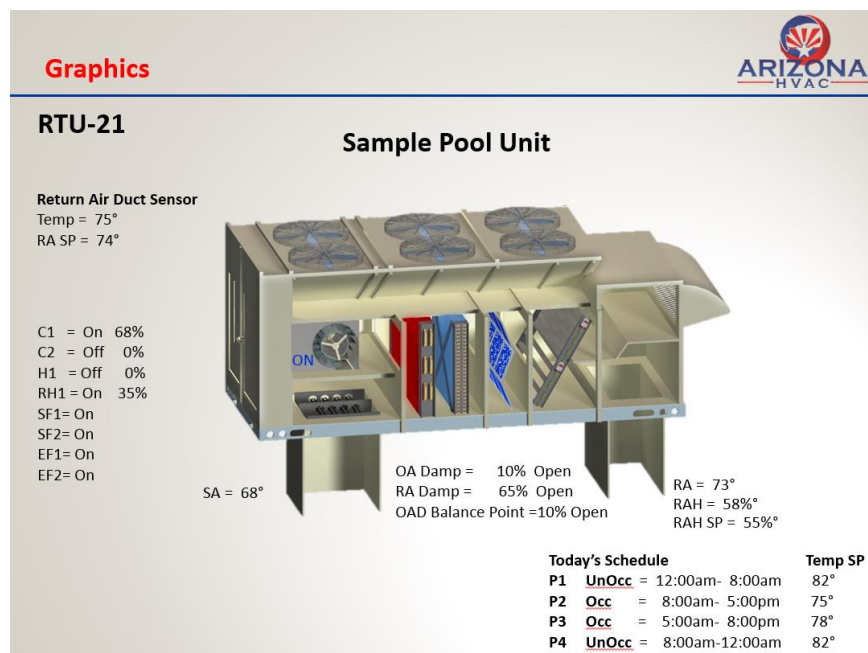
Although not required, a frontend BAS can be added at any time after the point of installation.



**Benefits:**

- Remote monitoring and diagnostics
- Graphical view of unit and operating and set points
- Alarms alerts via text, phone and email
- Less down time
- Reduced maintenance costs

### Sample Graphics Tool



## 17. EASY BUILDING AUTOMATION

All units are provided with BACnet over IP as standard. Any ethernet connection allowing access from the unit to the internet allows remote monitoring and factory support. This internet access capability can be extremely helpful when trying to diagnose a fault of software issue. The unit's software does not have any proprietary locks or keys allowing for easy integration to other BAS (Building Automation Systems) software.

## 18. TOUCH SCREEN

Provided with each unit as standard is the high resolution 7" Touch Screen with LCD display. An alternate 15.4" screen available.

The Color LCD Display (1280 x 800) with LED backlighting offers easy interface to the units programming and setpoints. The user friendly menus make it easy for owners and technical support to find setpoints and operating parameters of the unit.



**WITH INTERNET CONNECTION:** With an internet connection, the user can receive "Alarm Alerts" via email. The email will offer "Save Diagnostic Data" to help troubleshoot the system.

Also, the internet connection can send SMS "Text Messages" with the project site and the alarm.

**WITHOUT INTERNET CONNECTION:** The user can save the Alarm Data to a USB memory stick. Also, the user can download Extended History via the USB memory stick.

Some of the easy user information displayed via the user-friendly graphics are: Unit Status, Setpoints, Alarms, Extended History, Alerts and more. The display is equipped with authorization password protection which will give access to setpoints

The Touch Screen has a robust design and is rated from -4° F to 158° F.

The controls system can be accessed through an internet communication port via a ethernet port. The system can as well be accessed by a laptop and the MCS Connect Software. This tool makes programming and changing parameters simple and easy.

## 19. REMOTE MONITORING & ALARMS

The Touch Screen has a robust design and is rated from -4° F to 158° F. Remote monitoring is a service offered by CGEE. While not mandatory, there are several advantages of having remote monitoring.

Remote monitoring allows the factory to remotely access the controls and view the operation of the unit. The remote access allows the factory and local service to view the operating points, current conditions and help diagnose a problem before heading to the job site.



Alarms can be generated by the BAS front end and sent through email or text messages. Early alarm features will allow the operator to remotely monitor and be aware of indoor climate conditions that might ultimately affect the health of the plants.

Additionally, by including the remote monitoring feature, the factory will double the parts warranty to an extended parts warranty period of 2 years.

### Benefits:

- Remote monitoring and diagnostics
- Ability to add BACnet front end
- Less down time
- Reduced maintenance costs
- Factory trouble shooting support
- Early alarm notification

## 20. UTILITY REBATES

By using variable speed EC motors with variable speed compressors, this project might be available for energy rebates. Each project should check with their utility provider to check for current programs and inquire about what rebates might be available for their project.

## 21. WARRANTY

All equipment will come with the following warranty as standard. Additional warranty and services are available upon request.

- 5-year (Compressors)
- 2-year (Main Controller)
- 1-year (Parts)

**22. OPTIONAL ACCESSORIES**

- A. INVERTER COMPRESSOR
  - B. DISCHARGE PLENUM
  - C. DISCHARGE PLENUM ATTENUATOR
  - D. SOUND ATTENUATION
  - E. HEAT PIPE
  - F. BPHE – Brazed Plate Heat Exchanger
  - G. HEAD PRESSURE CONTROL
  - H. WATER REGULATING VALVES
  - I. HOT GAS BYPASS
  - J. HOT WATER COILS
  - K. STEAM COILS
  - L. HOT GAS REHEAT COILS
  - M. WATER-SIDE ECONOMIZER
  - N. AIR-SIDE ECONOMIZER
  - O. EXHAUST FANS
  - P. RETURN FANS
  - Q. SERVICE VALVES
  - R. PROTECTIVE COATINGS
  - S. FILTER DRIERS – Replaceable Core
  - T. ELECTRONIC EXPANSION VALVES
  - U. FILTERS
  - V. DISCONNECTS
  - W. INDICATION LIGHTS
  - X. POWER PROTECTION - UVR/Phase Failure Protect Phase Failure Relay
  - Y. COMMUNICATIONS – Modbus BACnet IP, BACnet MSTP / LonWorks communication protocol  
EMERGENCY LOCK OUT - Lock Out Stop Emergency stop switch shall be provided for Blower Fan.
  - Z. FAN PROVING SWITCH - Differential Pressure Switch for Evaporator Blower
  - AA. ELECTRIC HEATERS – Staged and SCR control
  - BB. CO2 SENSORS
  - CC. CO2 PURGE CONTROL RELAYS
  - DD. IONIZATION POWER & RELAYS
  - EE. VARIABLE FREQUENCY DRIVES
  - FF. FIRE ALARM RELAY
  - GG. DUCT STATIC PRESSURE CONTROL
  - HH. BUILDING PRESSURE CONTROL
  - II. CONVENIENCE OUTLET
- ... AND MORE

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