



IQ SERIES GROW ROOM HVAC

Compressor Wall

OPERATION AND MAINTENANCE MANUAL

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General Information

Document Scope

This manual provides operation and maintenance information about the AGronomic IQ Compressor Wall HVAC system and its operation.

Additional information regarding installation, maintenance, and equipment commissioning and auxiliary devices (dry cooler, communication interfaces, etc.) is provided with the HVAC system and can also be obtained from the manufacturer.

Contact Us

AGronomic IQ

AgronomicIQ.com

For immediate assistance:

Phone: 1-833-327-2447 (Canada), 1-877-420-1330 (USA)

For unit commissioning, miscellaneous inquiries, parts requests and warranty:

Email: Service@AgronomicIQ.com

Operating Safety (Warnings, Cautions, and Notes)

FOR YOUR SAFETY: READ BEFORE PERFORMING ANY OPERATIONS, MAINTENANCE OR SERVICE TASKS!



Only qualified technicians should install, operate, maintain or service mechanical equipment including current dehumidification system.

Read this manual before performing any tasks to familiarize yourself with the equipment as well as with any potential hazards. Always exercise caution!



Beware of electrical power and high electrical voltage!

- Follow proper safety procedures – lockout, tagout, and other respective procedures
- Failure to follow safety procedures can result in serious injury or death



Beware of moving parts and hot surfaces!

- Make sure to stop all moving parts (fans, blowers, etc.) before accessing the equipment's internal compartments
- Be aware of hot surfaces (hot refrigeration, space heating pipes, coils, heaters, etc.)



Beware of high pressures and chemicals!

- HVAC systems, equipped with compressors, contain refrigerant under high pressure; oil is also contained in the compressor and refrigeration circuit(s)
- Some HVAC systems may also contain other liquids such as glycol mixtures

The following warnings, cautions, and notes appear throughout this manual and referenced documentation whenever special care must be taken to avoid potential hazards that could result in equipment malfunction or damage, personal injury, or death.



WARNING

Indicates a potentially hazardous situation which could result in serious injury or death if handled improperly.



CAUTION

Indicates a potentially hazardous situation which could result in moderate injury or equipment damage if handled improperly.

Note

Indicates a situation that could result in equipment damage or improper/ineffective operation if handled improperly.

Attention: Installation and Service Contractors



WARNING! Any work (installation, start up, service, maintenance, repair, etc.) on any mechanical equipment (HVAC system, dry cooler, etc.) must be performed in accordance with manufacturer's recommendations as well as submittal documentation, local Codes and Regulations, and appropriate field practices. Failure to do so could result in personal injury, equipment damage or malfunction, and will void equipment warranty. Only qualified and properly trained individuals should perform tasks on this equipment.

Attention: Maintenance Team

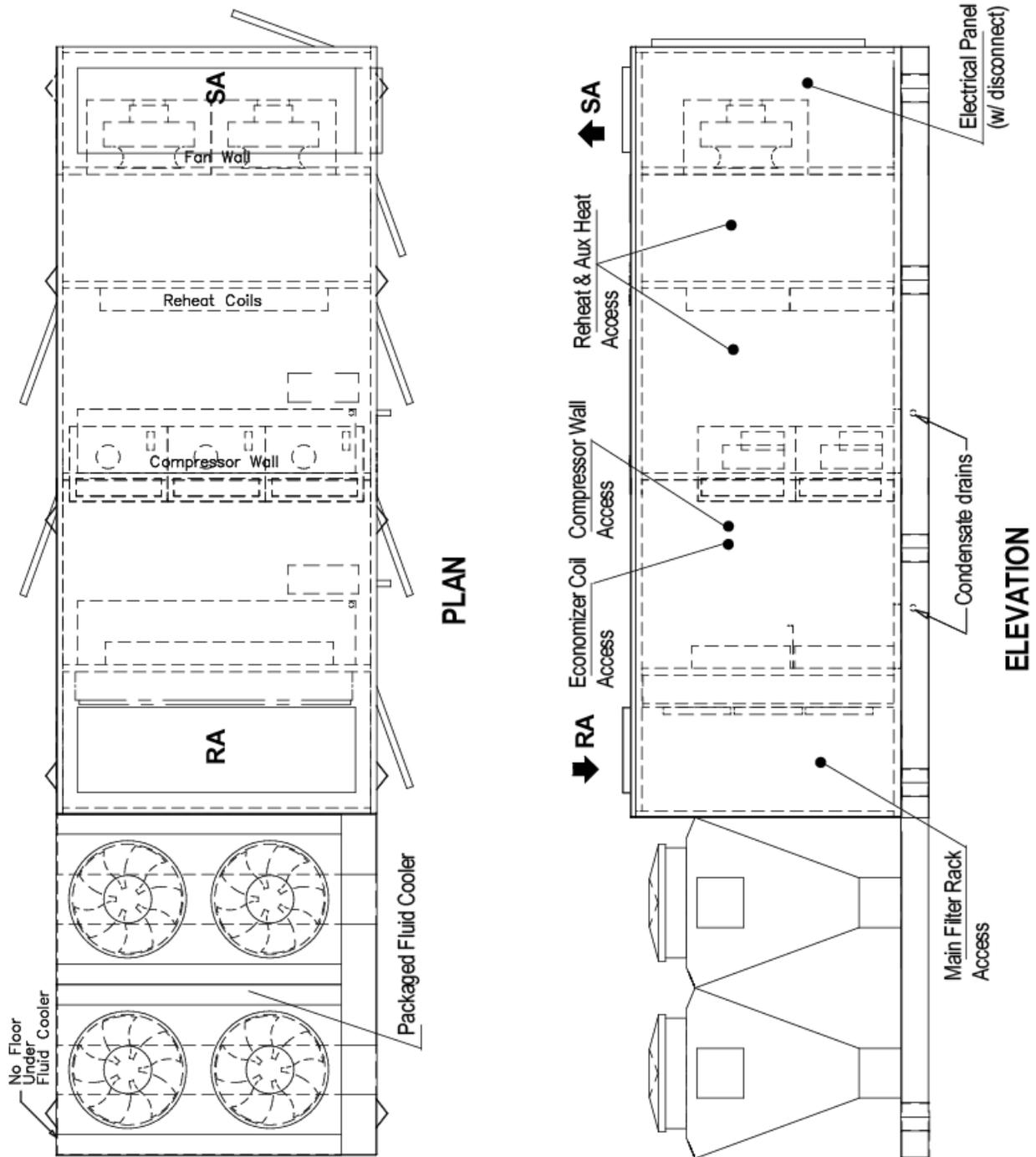


CAUTION. To ensure equipment longevity and proper and efficient operation, the HVAC system and its auxiliary systems and devices (e.g. dry cooler) should be maintained properly and regularly. Failure to do so could negatively affect premise comfort levels and people's health. It could also lead to equipment damage, malfunction, premature wear and tear and may void equipment warranty.

Basic Information

HVAC system View and Options

Standard AG series HVAC systems are semi-custom: while basic concept and layout is the same, options and specific systems and components layout and location may vary from one HVAC system to another. One of the typical HVAC system arrangement is shown on Pic.C.1.



Pic. C.1

HVAC system Options

- Indoor or outdoor installation.
 - *Note:* Pic. C.1. shows outdoor model.
- Capacity (number of 2-stage compressor pods or modules) – (see **HVAC system Optional Arrangement** below for more details):
 - 2-compressor modules AG-012 & AG-016
 - 3-compressor modules AG-020
 - 4-compressor modules AG-024 & AG-030
 - 6-compressor modules AG-036 & AG-045
 - 9-compressor modules AG-055
- Airflow/ductwork connection *. Pic. C.1 shows some options only; each option location availability depends on the HVAC system installation (indoor or outdoor) and other options:
 - **Return Air (RA)** ductwork connection - top, bottom, end, sides.
 - **Supply Air (SA)** ductwork connection – top, bottom, sides.
- Optional Space Heating - hot water coil, electric or gas heater **.
- Optional Economizer Coil – for additional cooling.
- Air Conditioning (AC)* – external water cooling or dry cooler (packaged or separate).
 - *Note:* Pic. C.1 shows outdoor model with “packaged” dry cooler (mounted with the HVAC system). “Packaged” AC option is available for outdoor models only; alternatively, indoor and outdoor models could be fitted for separate/remote AC option – remote dry cooler or other external cooling media source.

* *Some available options (tonnage, ductwork connections, AC options etc.) are shown. Refer to the submittal and other relevant documentation for your HVAC system’s options.*

** *For specific details on space heating (hot water, gas, electric) option, refer to the submittal and other documentation:*

- Gas-fired duct heater can be installed internally (fitted inside the HVAC system at the factory).
- Electric heater or hot water coil, depending on capacity, model, size, etc., mounted internally. Refer to your system’s submittal documentation.

Attention! Equipment Clearances and Dimensions!



CAUTION! For equipment proper operation, maintenance and service, respective clearances should be maintained. Generally, 30” clearances to the equipment must be kept for the maintenance and service purposes. For the specific required clearances information, as well as HVAC system overall dimensions, distances to pipe connections, duct connections etc., refer to the submittal documentation.

HVAC system External Systems Connection

Pic. C.1 shows provisions for external systems connections, including ductwork, electric power and control wires and various piping connections.

CAUTION! Current manual shows general/default connections' location. For details regarding specific HVAC system's connections (actual location, piping sizes and position dimensions, circuit type and flow direction etc.), refer to the HVAC system's submittal documentation as well as HVAC system's labels and stickers.

- ✓ Except for the condensate, all other piping systems are optional and may not be present in each HVAC system

- **Condensate Drain Line** – bottom, side (through the HVAC system base).

NOTE. HVAC system MUST be equipped with a P-trap at the condensate connection for proper operation! If HVAC system is requested from the factory without P-trap, one **MUST** be installed on site prior to HVAC system being commissioned. Refer to the **Installation Manual** for details.

- **Air Conditioning (AC) Connection.**
 - **Packaged AC option** (outdoor HVAC system with outdoor dry cooler (O AFC) incorporated with the HVAC system), does not require piping connection to external AC system or device.
 - *Pic 1.C. shows packaged outdoor model with O AFC mounted at the end of the HVAC system; alternatively, if requested, O AFC could be mounted on the roof of the HVAC system.*
 - **Remote ("split") AC option** (indoor or outdoor HVAC system, connected to external cooled water/glycol system or remote dry cooler) – side connection.
- **Space heating (Hot Water connection)** – bottom, side.
 - Some connection location options for space heating pipe lines are limited to indoor installation only – refer to submittal documentation
- **Space Heating (Gas Heater connection, gas line).** If the HVAC system is equipped with a gas heater (boiler, gas furnace etc.) for space heating purposes, the **gas** line connection is to be brought to the gas heater directly.

 **WARNING! Gas Line.** The gas line must be installed in accordance with respective device documentation (boiler, furnace, etc.) and local codes and regulations.

- **Electric Power and Control Connection.** Electric power is normally brought to the HVAC system disconnect, normally incorporated with main electric panel (see Pic. C.1). If HVAC system is not equipped with the disconnect, power lines to be brought directly to the main electric panel.

Air Conditioning Options – Outdoor Air Dry coolers (OAFc).

Basic views of standard air conditioning options are shown on Pic.C.4 (below); standard combinations of the HVAC system and dry cooler models (based on their capacities) are shown in Table C.1. Note, that depending on ambient conditions, HVAC system may have different cooler provided with it - refer to the HVAC system’s submittal documentation for more details.

Standard dry coolers used with this model of HVAC system is NG-V series, composed of number of “two-coils-two-fans” blocks, based on required capacity of the cooler:

- Dry cooler NG-V-12 (Pic.C.4, Fig.1) is composed of one such block; NG-V-22 (Fig.2) composed of two such blocks etc. largest single dry cooler, NG-V-62 (Fig.3) composed of six of them.

<i>HVAC system</i>	<i>Dry cooler</i>
AG012 & AG016	NG-V-11
AG020, AG024 & AG030	NG-V-21
AG036	NG-V-12
AG045 & AG055	NG-V-22

As an option, each block of dry cooler could be equipped with the pump package (as shown on Fig.1 for NG-V-12).

Attention! Equipment Clearances!

Proper clearances should be maintained for adequate airflow and heat rejection! Generally, up to 36" side and 96" top clearances are required. For more information on clearances as well as equipment dimensions and other details, refer to the submittal documentation.

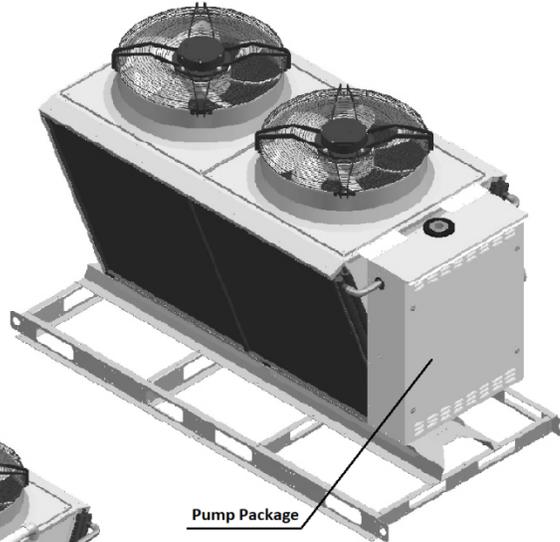


Fig. 1

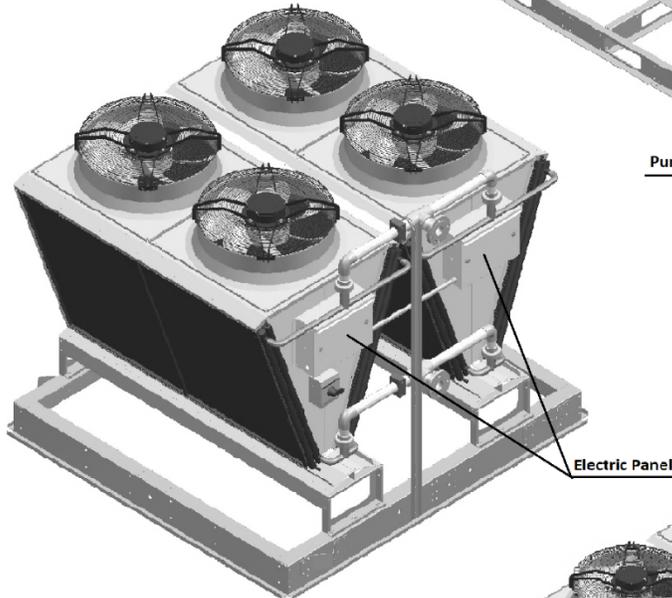


Fig. 2

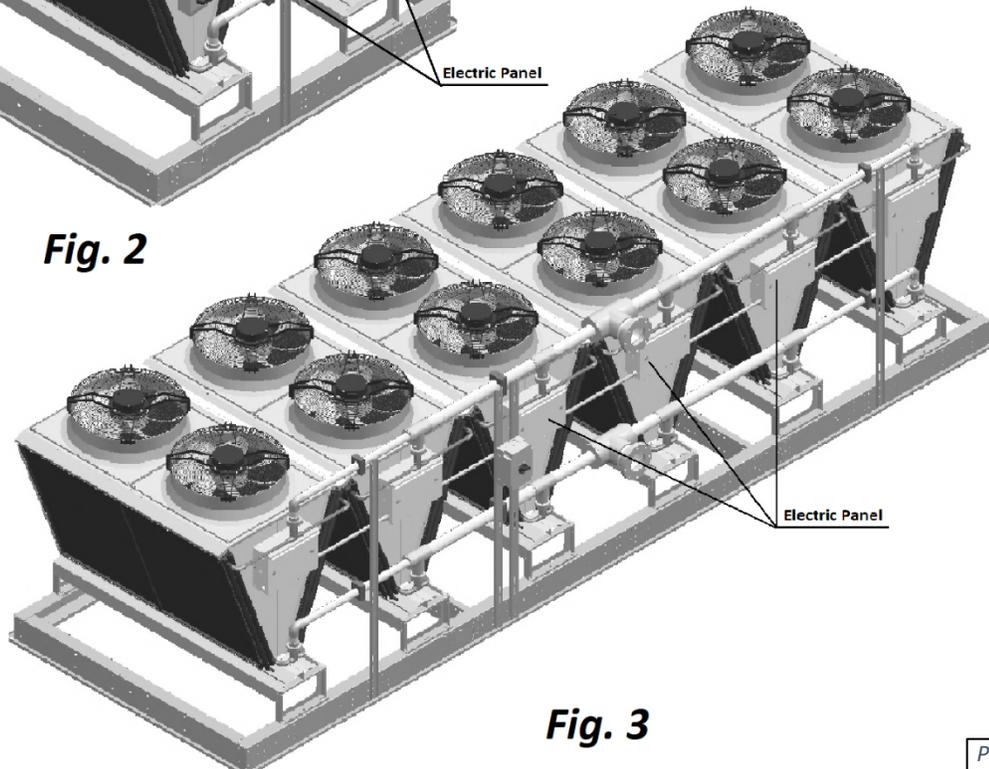


Fig. 3

Pic. C.4

Equipment Specific Data

Specific information for individual HVAC systems is provided in the following methods:

Nameplate (Pic. C.5): the manufacturer tag attached to the front of the system includes the system's most critical data:

- ✓ General data including:
 - Serial number
 - HVAC system model (nomenclature)
 - Design room conditions (air temperature and humidity)
- ✓ Operational data, including:
 - Refrigeration (refrigerant type, charge, etc.)
 - Electrical/airflow (HVAC system voltage, CFM, etc.)
 - Other applicable data (space/auxiliary heating features, etc.)

Labels and Stickers: attached when applicable to the exterior and interior of the HVAC system to show:

- ✓ External systems connections location/direction (space heating, cooling circuits, condensate)
- ✓ Air filter locations, quantity, and size.
- ✓ Additional Info (warning, caution stickers, etc.)

Wiring Diagrams: attached to the interior side of the HVAC system, depict HVAC system control and power wiring.

AGronomic IQ			
Serial #: XXXXXXXX			
Unit Model: AG-050-NB-X-P0NBD173J5E5AN02H			
Electrical Data:		Voltage:	460/3/60
(Use copper conductors only)	MCA:	132.0	A
	Max Fuse or CKT BKR:	150.0	(HACR type NEC)
Short-circuit current:		5 kA rms symmetrical, 460V maximum	
Supply Airflow:		10500 CFM	
Main Blower Motor 1-3:	HP: 8.0	FLA: 7.4	
Glycol Pump Motor:	HP: 1.75	FLA: 3.4	
OAFB Blower Motor 1-4:	HP: 3.9	FLA: 4.3	
Compressors 1-9:	RLA: 9.6	LRA: 84.0	
Factory Charge (Each Circuit):		3.5 lbs R410A	
High Pressure Cutout:		565 psig	
Low Operating Cutout:		75 psig	
Application: Outdoor Use			
Electric Heater:		kW: 30.00	Amp: 38
1-833-327-2447			Made in Canada
Service@agronomicIQ.com			

Pic. C.5

Note: The main label shown above is just an example.

Remotely installed cooler would have its specific information provided in similar manner (labels etc.).

Attention! Glycol Circuits.

Unless otherwise indicated, equipment fluid circuits (except for refrigeration fluid circuit) such as compressor glycol loop, dry cooler etc., are normally filled/to be filled with water/glycol mixture; normally, rust inhibitor-infused food-grade propylene glycol is used.

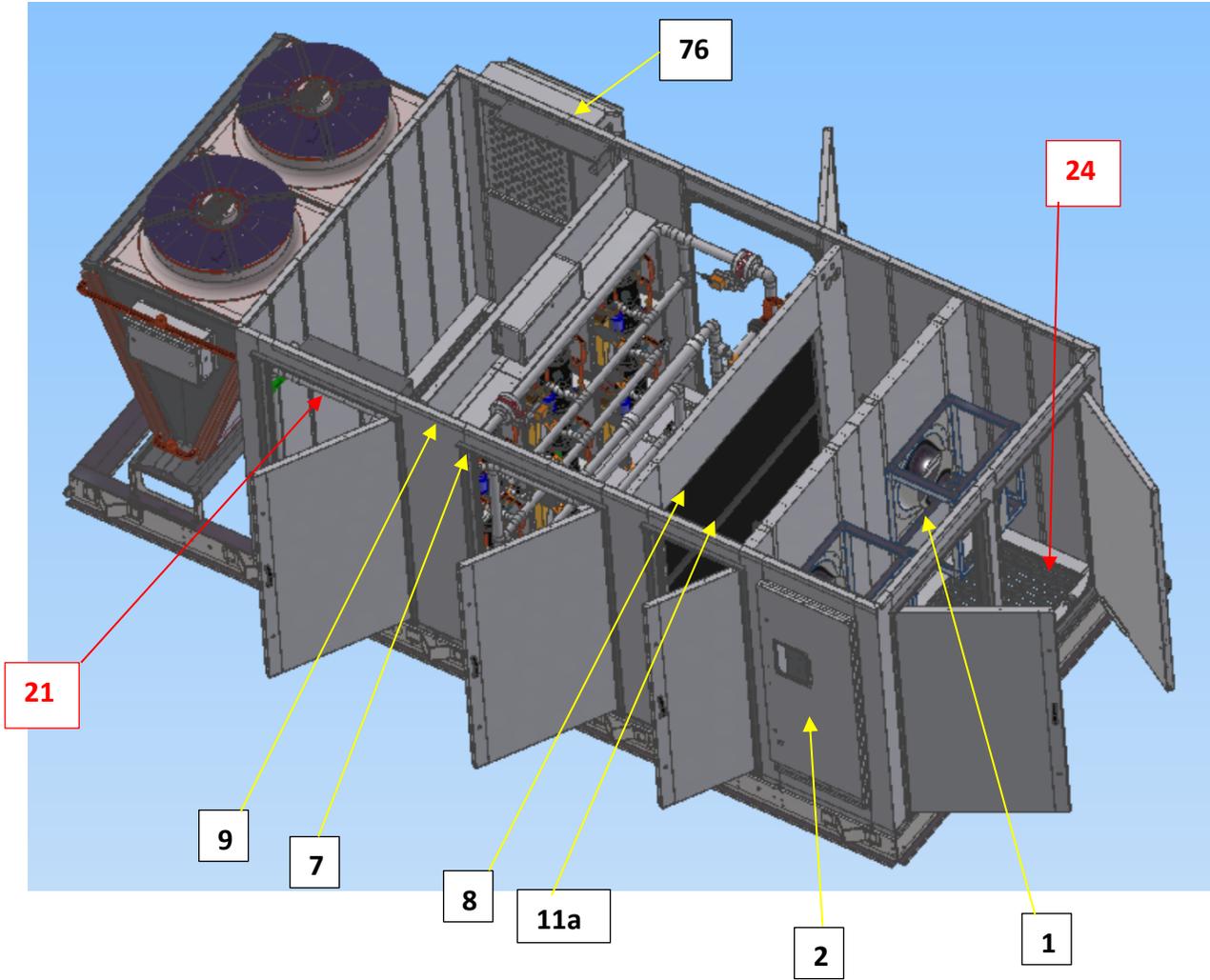
Glycol mixture concentration is normally shown on Main Label – refer as needed.

Layout and Components

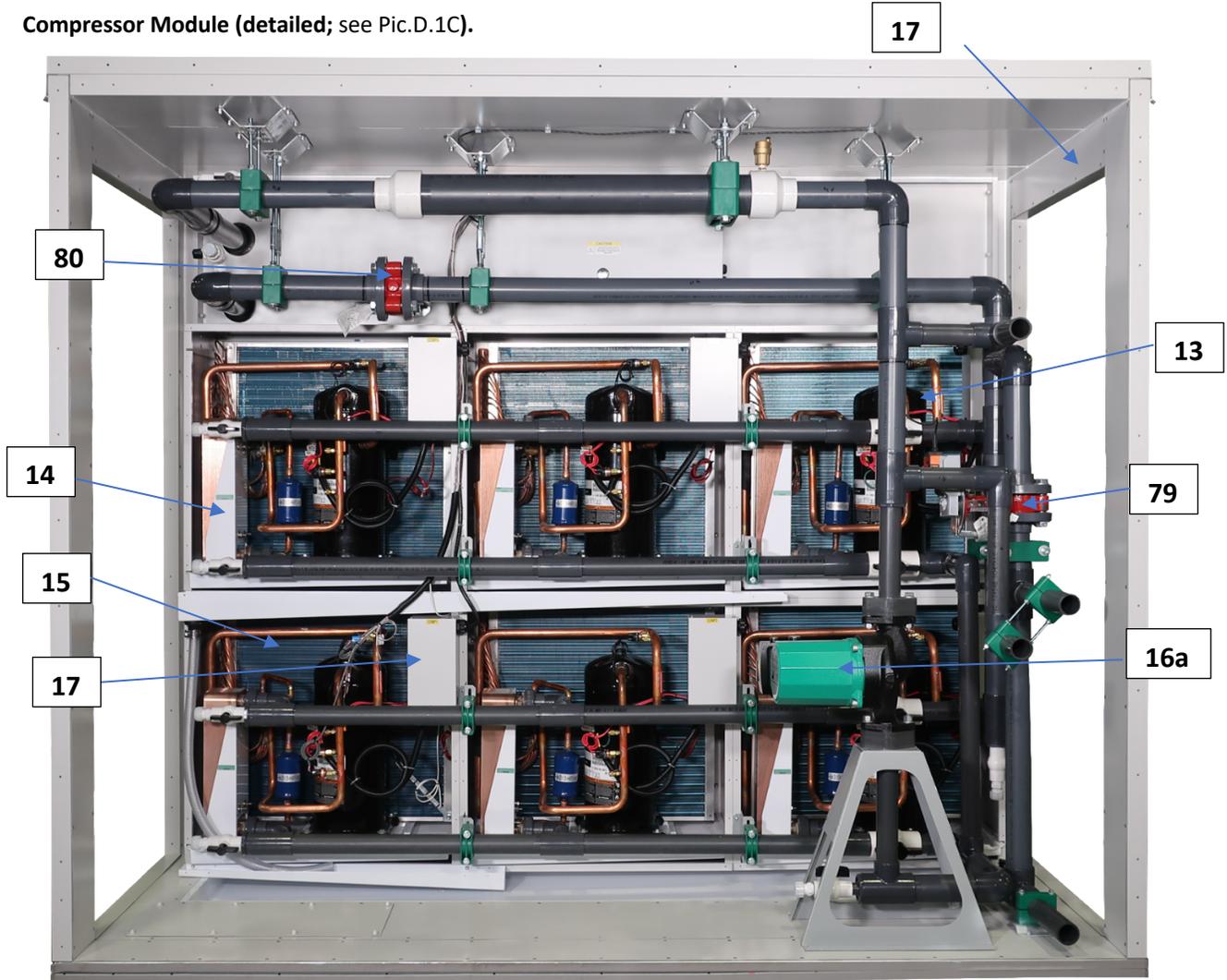
The general layout and components location is the same for all HVAC systems of current type, however some may vary, based on the HVAC system's specific options – refer to submittal documentation. Pic. D.1 below shows all/most available options, some of which may not be present on your HVAC system.

HVAC system Main Components

- **Main Blower** (1) is a supply fan array located next to the **Main Electric Panel** (2). Number of blowers may vary based on airflow requirements. In the compressor wall design variation used by AGronomic IQ, EC supply fans are mounted to the fan wall.
- **Min Outdoor Air (OA) Opening** (not shown) has a motorized damper and filter(s). Motorized damper is used to provide the option of space 'purge'. It could be equipped with modulating actuator for automatic adjustment of outdoor air intake.
 - Outdoor-installed HVAC system would have **louvers** (76) installed at the OA opening.
- **Min Exhaust Fan(s) (EF) Assembly** (not shown) (fan and motorized damper), while unlikely on a AGronomic IQ product, is technically possible. If provided, the EF assembly is located on the HVAC system's return air side; Exhaust Air opening in outdoor-installed HVAC system is equipped with **louvers** (76) also.
 - Min Exhaust Fan Assembly is hinged and could be opened for better access to the fan electric box.
- Economizer functionality (cooling/dehumidification) will be provided by the water-side economizer coil.
- The **Main Filter Rack** (9) is typically face-loaded on each of the compressor modules on units not equipped with economiser coils.
- Refrigeration **Evaporator** coils (7) are located directly downstream from the **Main Filter Rack** (9) on each compressor module.
- Water/glycol **Reheat** coils (8) are located directly downstream of the compressor modules.
 - Current compressor wall design has a fixed bypass through each module.
 - Each compressor circuit has its own evaporator coil(s) set while all reheat coils are manifolded together and serve all compressor circuits together.
- **Space heater** location, if the HVAC system is equipped with one, depends on the heater type:
 - **Hot water coil** or **Electric heater** (11a) is usually located directly downstream of the **reheat** coil;
 - **Gas heater** (not shown) is located downstream of the main blower(s).



Compressor Module (detailed; see Pic.D.1C).



Pic. D.1C

- Each compressor module contains a **Compressor (13)**, **Plate heat exchanger (14)**, **Evaporator Coil (15)**, and other refrigeration components to complete a self-contained refrigerant circuit within each module. Each module also includes a **Control Module (17)**.
- Common to the compressor modules is the **Glycol Pump (16a)**, that circulates water/glycol to reject compressor-generated heat.
 - Motorized water/glycol **Reheat (79)** and **AC (80) valves'** opening position determines how much fluid is diverted to respective coil(s) (reheat and dry cooler or external heat sink).

- Control sub-panel with **Main Control Board** (not shown) and **Operator Panel** (not shown) is normally mounted with the **Main Electric Panel (2)** on the compressor stand frame.
- **Main Electric Panel (2)** contains main **Disconnect (77)**, if one is installed, and other electrical and control components (contactors, fuses, control transformer etc.).
- Packaged **Dry Cooler (19)**, if HVAC system is equipped with it, is normally mounted at the end of the HVAC system, adjacent to compressor compartment/supply air end (see Pic. D.1D).

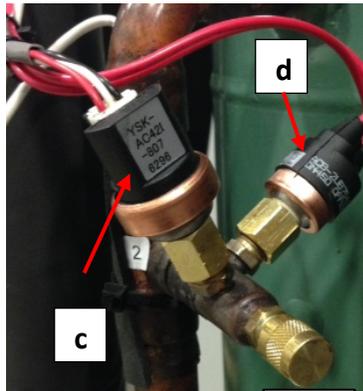


Control System

The HVAC system control system is composed of sensors, spread throughout the HVAC system, **Main Control Board**, **Operator Panel** and other electric components, located in the **Main Electric Panel**.

Temperature Sensors (Pic. D.2):

- a) **Temperature** sensors (thermistors) are used to monitor various temperatures (air, water, compressor, etc.);
- b) **Combo** sensor is used to monitor air temperature and humidity.



Compressor operation is monitored with **pressure sensors** (Pic. D.3):

- c) **Pressure Transducers** (only a single set of transducers on the lead circuit only for information purpose, not used for control) and
- d) **Pressure Switches** (fast-reacting backup safety).

Note. Sensors and safeties approximate location is shown on Pic. D.1B and

D.1C – refer as **Pic.D.3** needed.

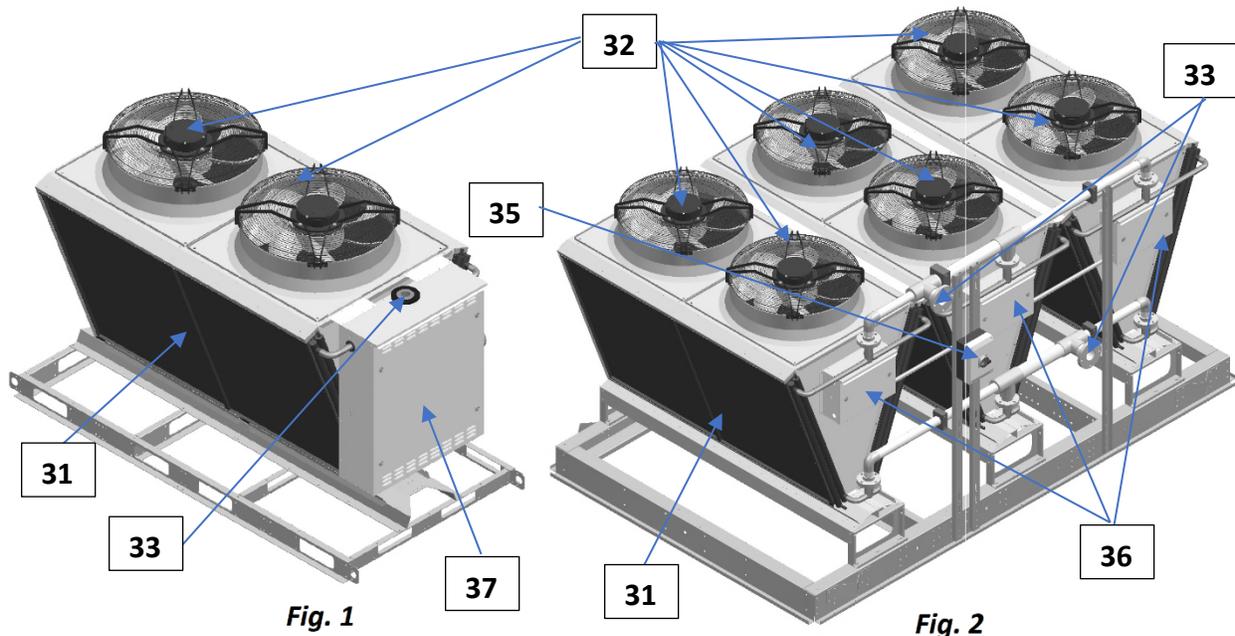
- **RA Combo Sensor (21)** measures temperature and humidity of the pool room air (Return Air) entering the HVAC system. It is located at the return air ductwork connection to the HVAC system.
- **SA temperature sensor (24)** measures the temperature of the air leaving the HVAC system (supplied to the premise). It must be located downstream of the space heater:
 - SA temperature sensor of HVAC system, equipped with gas heater, would be composed of four regular temperature sensors, installed in different points at supply duct connection, averaging temperature reading.

- Each compressor module is equipped with High and Low Pressure switches **Transducer** and **High Pressure Switch** to protect the compressor and control its operation.

Main Electric Panel, apart from devices listed above (control board, OP, etc.) also contains **Voltage Monitor**; some optional control sensors and devices such as an air pressure differential sensor, current sensor(s). It may also be located in main electrical panel or in the HVAC system in general.

Dry Cooler Layout and Components.

The general layout of AC options is shown on Pic.D.5 below with the dry cooler *NG-V-12*, equipped with additional pump package (*Fig.1*) and *NG-V-32* (*Fig.2*) as an example. While layout and main components are similar for all applicable AC options, there are some deviations (number of fans, composition, etc.). Refer to **AC Options Basic View** (**Basic Information** chapter) for additional information.



Pic. D.5

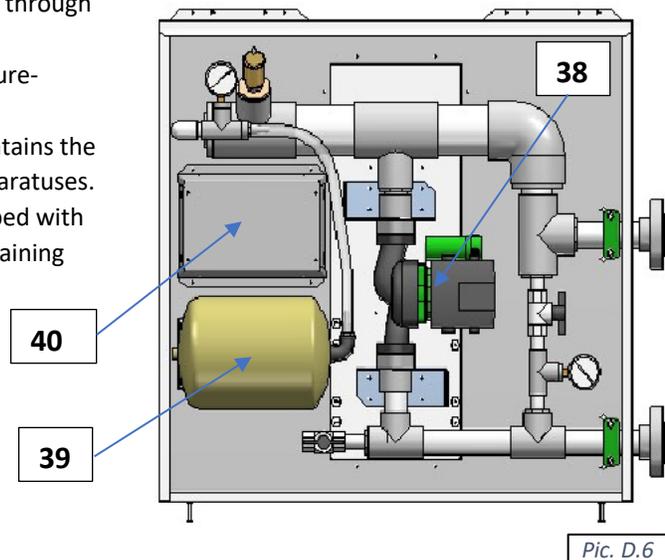
- Cooling (AC) **coils** (31) (where heat from glycol mixture is rejected to the ambient air) is mounted onto metal frame, upstream (before) the **fans** (32), that pulls the air through the coils to absorb the heat.
 - Normally, dry cooler would have multiple coils and fans. Cooler NG-V-12 (Fig.1), comprised of two coils, mounted on the angle to each other, and two fans, presents a single block. Depending on the capacity, cooler could be comprised of up to six such single blocks, stacked side by side on the same frame and manifolded together – NG-V-32 is comprised of three such blocks.
- Cooler **piping connections** (33) are identified respectively (IN – OUT);
 - In some cases, dry cooler piping connection(s) may be located within **pump package** box (37), if dry cooler is provided with one.

- Piping connection location may vary – refer to particular cooler labels, stickers, submittal and other documentation.
- Electric power is normally to be brought to **disconnect** (35) (if cooler is equipped with such), which feeds it to the **electrical box** (36), that contains cooler power and control apparatuses.
 - Depending on dry cooler specifics, location of electrical box may slightly differ; in some cases, electrical box may be incorporated into pump package or located on the opposite side of the dry cooler.

Dry Coolers Pump Package.

Dry Coolers, if equipped with such option, would have a **pump package** box. Pic.D.6 below shows general layout of pump packages, used for NG-V model dry coolers. Note, that the package could be mounted onto the dry cooler directly (standard) or provided separately.

- **Pump** (38) establishes glycol mixture circulation through the dry cooler and HVAC system;
- **Expansion tank** (39) compensates for temperature-based glycol volume fluctuation;
- The pump package **electrical sub-panel** (40) contains the pump package electrical power and control apparatuses.
- The pump package manifolds are usually equipped with pressure gauges, automatic air venting valve, draining and other valves.



Sequence of Operation

The HVAC system's ventilation system establishes the required airflow through the HVAC system. The control system compares air temperature and humidity to their desired values (set points) and proceeds to dehumidify, cool or heat the recirculating air.

Set Points

The control system is constantly adjusting HVAC system operation to achieve and maintain said parameters within couple degrees/percent of the set point.

- Grow room temperature and humidity set point may vary based on the pre-set schedule ("lights on", "lights off" etc.).

Note: Refer to the HVAC system's main label for the design value of control parameters.

Ventilation

The **main blower** runs continuously, establishing required airflow. The main blower speed is pre-set via adjustable variable signal.

HVAC system can control the **outdoor air** intake (OA1) damper and the external **minimum exhaust fan** (EF1) (to bring outdoor fresh air in and to directs portion of return air outdoors, respectively).

- If such option is used, exhaust fan speed would be controlled, like the main blower, via adjustable (pre-set) variable signals: the exhaust fan speed may vary depending on scheduled ventilation mode.
- **Note.** *Externally installed Exhaust Fan(s) and Outdoor Air damper(s) could be also controlled by the HVAC system control system for Exhaust/Purge purposes.*

Space Heating

When premise air temperature drops below the set point, the HVAC system control system issues a call for Space Heating Mode and engages space heater (electric heater, hot water coil with valve, gas boiler etc.) by sending space heating signal, respective to space heater control type - on/off, variable (0-10VDC), etc.

Air Conditioning and Dehumidification

When premise air temperature goes over (exceeds) its set point, the HVAC system control system issues a call for Air Conditioning Mode. Respectively, when premise air humidity goes over (exceeds) its set point, the HVAC system control system issues a call for Dehumidification Mode. In some instances, these calls may co-exist.

To execute Dehumidification or Air Conditioning (Cooling) mode, control system, depending on current conditions, would resort to available means of cooling or dehumidification.

Compressors

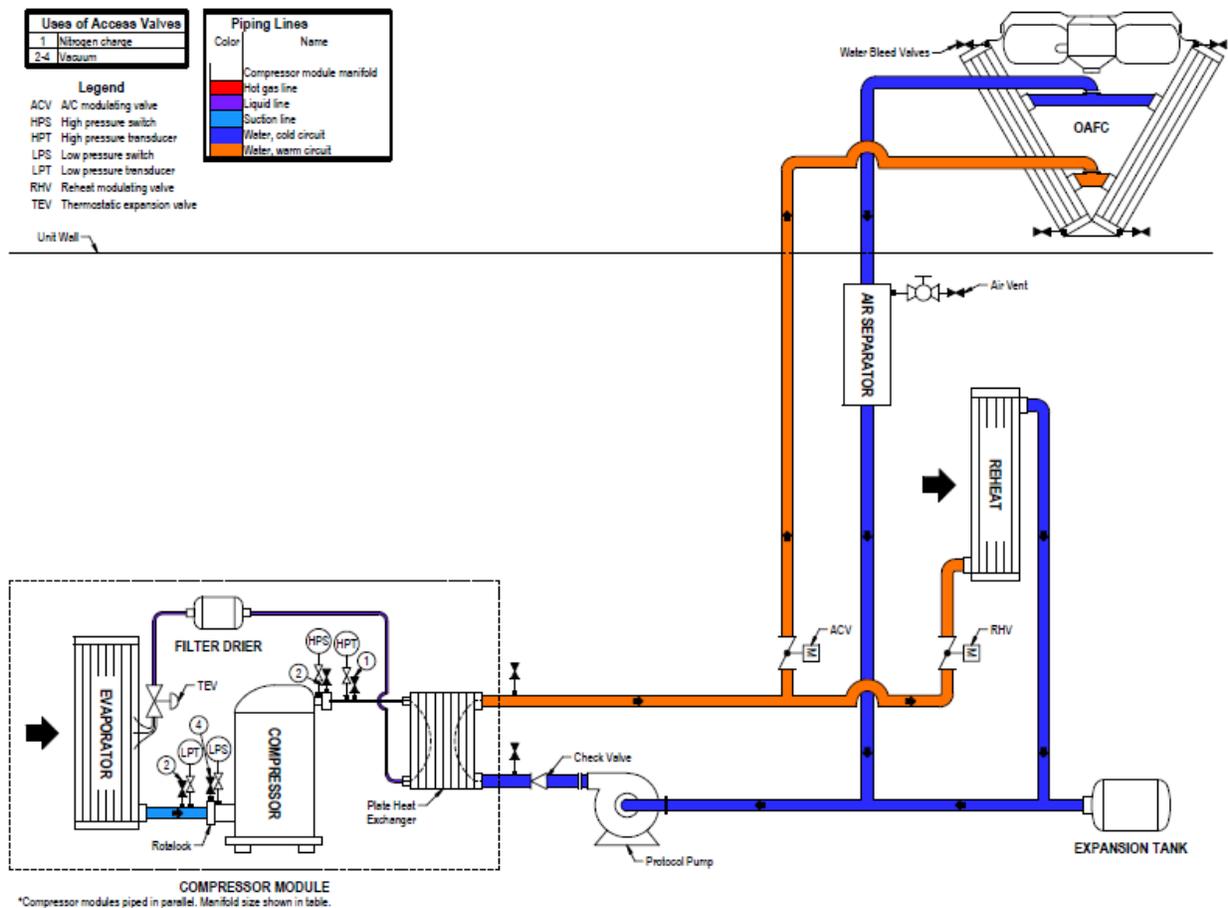
Whenever the compressor operates, the evaporator is always dehumidifying and cooling the return air. The heat removed from the air at the evaporator, as well as the heat from the compressor's action, must be rejected to one of three heat sinks: grow room (premise) air or outdoors. The control system will direct the heat to where it is needed based on grow room air temperatures:

- If room air is needed to be warmed up – more heat is diverted towards reheat coil;
- Rest of the heat (if any) is diverted towards outdoors (dry cooler)

Compressor Circuit Operation

Piping schematic for compressor circuit is shown on Pic. E.2.

- Schematic shows single compressor module (additional compressor modules schematic is the same) and common to all compressor modules' glycol cooling circuit.
- Compressor operation below applies to all modules; compressors are staged – if first compressor's capacity is not enough to satisfy the call, second compressor will be engaged after certain time delay.



Pic. E.2

When a demand requires the compressor to operate, the following sequence occurs:

- Once blower operation, related safeties and timers are confirmed by the control system, following occurs:
 - Compressor glycol pump starts, establishing cooling glycol/water flow through the compressor fluid circuit - plate heat exchanger(s) and fluid cooling coils (reheat and/or dry cooler or external cooling source).
 - Pump down solenoid valve opens and once pressure stabilizes, the compressor starts.

- Based on the premise air temperature, the Reheat and AC valves would adjust their opening position (open more/close more), reducing or increasing fluid flow to and through the respective fluid coils:
 - Reheat and AC valves are controlled in the same manner with opposite effect: for example, when AC valve opens 10% more, Reheat valve closes 10% more etc.
 - if more heat is required by the room air, the Reheat valve opens more, and AC valve closes more, thus diverting more fluid to the reheat coils (heat is rejected to the premise);
 - if more cooling is required by the room air, the AC valve opens more, and Reheat valve closes more, thus diverting more fluid to the dry cooler (heat is rejected outdoors).
 - Outdoor dry cooler fans are engaged only if at least some fluid is diverted towards outdoor dry cooler and compressor pressure is higher than pre-set level (see **Outdoor Dry Cooler Operation** below).
- Once demand for the compressor's operation is removed (respective call is satisfied), the pump down solenoid valve closes; once the compressor suction pressure reaches the pre-set pressure, the glycol pump and compressor stop.

Outdoor Dry Cooler Operation.

Respective signal(s) are sent by control system to engage EC-type fans via a variable 0-10VDC signal (proportional to the compressor head pressure level). Refer to the wiring diagram if/when needed.

If the dry cooler is equipped with the built-in pump package (to establish cooling fluid flow between HVAC system and the dry cooler or to serve as additional/booster pump), the said pump is also engaged along with dry cooler fans – pump would stay engaged while fans are engaged (regardless of the fans' speed).

Economiser Option (Eco-Coil).

HVAC system, equipped with eco-coil and dry cooler, can take an advantage of economiser option and use outdoor air to cool the premise without resorting to compressor operation.

- When Air Conditioning (cooling) mode is requested and outdoor air conditions warrant (outdoor air and, respectively, cooling media in the dry cooler are cool enough), ECV (eco-coil mixing valve) would divert cool media from dry cooler into eco-coil, thus cooling recirculating air without running the compressor.

Basic Maintenance

Although equipment is built for minimal service downtime, periodic preventative maintenance is required to ensure maximum reliability, safety, and operating efficiency.

 **WARNING!** To ensure equipment longevity and proper and efficient operation, the HVAC system and its auxiliary systems and devices (e.g. dry cooler) **must be maintained** properly and regularly. It is recommended to create a **facility-specific Routine Maintenance Program**. Failure to maintain the equipment properly and regularly could result in personal injury, equipment damage or malfunction and will void the equipment warranty.

Maintenance and Safety

Only qualified/properly trained personnel should attempt to perform respective maintenance tasks.

- When it is necessary to work with live electrical components, have a licensed electrician or other qualified professional perform the required task.
- **Be properly trained and equipped.** Some maintenance tasks may involve usage of power tools, chemicals, etc. Refer to such tools and materials data (manuals, MSDS, etc.). Personnel performing such maintenance tasks should be:
 - Properly trained to handle such tools and materials safely
 - Equipped with proper personal protective equipment
- **Turn the power off.** Before performing any maintenance, disconnect all electrical power, including remote disconnect, and discharge all energy storing devices (VFDs, etc.) before servicing. Follow proper lockout procedures to ensure that power cannot be accidentally restored. Failure to follow provided safety warnings and labels could result in serious injury or death.
- **Be aware of potential hazards.** The equipment contains moving mechanical parts, components under high refrigerant pressures and surfaces with high temperatures. Before entering the HVAC system and/or performing any equipment maintenance work, make sure that all moving parts are stopped, and it is safe to perform required task.

Maintenance Key Points

Here are some basic/key maintenance considerations, pertinent to all HVAC systems and their auxiliary systems:

- *HVAC system in mechanical room.* **No chemicals** should be stored **in the same mechanical room** where the HVAC system is installed. Chemical fumes/off-gas can cause premature deterioration of the equipment.
 - Store chemicals in a separate, well-ventilated room.
- *Access to the Equipment.* Ensure that the **equipment is accessible** (minimum clearances are maintained): approaches to the HVAC system are not restricted/limited with materials in mechanical room (indoor installed) or with snow (outdoor installed HVAC systems, OACC and OAFc).
- *“MUST DO” maintenance task.* Although all other maintenance tasks are as important, these two maintenance tasks are the most common and most helpful:
 - Maintain **clean air filters** (return, outdoor air filters, etc.). Make sure to replace dirty filters regularly.
 - Maintain **clean air-side coils** (especially Dry Cooler). Make sure to clean coils regularly.

Routine Maintenance Program

Creating facility-specific routine maintenance program and following it is vital to equipment longevity and efficient operation.

The suggested general maintenance operations and their frequency/intervals, listed in the table M-1 below, can be used to create such a program. For more detailed maintenance recommendations related to specific components, refer to the respective component manufacturer’s manual.

Table M.1. Recommended Maintenance Tasks and Intervals	
Interval	Maintenance Task
Weekly	Observe the equipment for any changes in running conditions and unusual noise
Quarterly	Air filters: Industry recommendation is to change air filters every process cycle (at minimum)
	Verify that all set-points are correctly programmed as specified by the facility operator
Semi-Annually	Inspect and clean the drain pan(s)
	Tighten electrical connections, if required
	Check and tighten, if required, hose clamps and sensor mounts
	Inspect all airside coils (dry cooler, HVAC system coils – evaporator, etc.) for dirt, cobweb build-up, etc.; clean as needed
	Check that the P-trap is primed (filled with water). It is good practice to pour some water into the drain pan to ensure that the P-trap is primed and operational
	Check the louvres and dampers (as applicable) for accumulation of dust and clean as required
	Inspect the equipment’s cabinet for corrosion or other deterioration. If any damage is found, clean and repaint the affected surface with a rust-resistant primer
Annually	Clean the fan wheel(s). Exercise caution not to disturb balance weights/clips, if any.
	Check dampers operation (linkage/actuator is not loose, damper opens/closes properly etc.)
	Inspect electrical components, wiring and insulation
	Rotate the fan wheel(s) and check for obstructions and rubbing
	Check gasket condition on all doors to ensure an airtight seal
	Check bolts on compressors, motor mounts, HVAC system bases and coils and tighten if required
	Verify that the airflow around the remote condenser or dry cooler is unobstructed

Specific Components Maintenance

Actual maintenance plan may vary from installation to installation, yet there are several key components from maintenance prospective.

If needed, contact respective component manufacturer for additional maintenance information.

Filters

- Ensure air filters are clean. Dirty air filters will negatively affect HVAC system performance and lifetime
- Frequency of filters replacement will vary based on air quality, HVAC system usage, facility type, etc. Make sure to replace filters regularly
- Replace with filters of equivalent size and rating – refer to HVAC system details (compartment stickers, etc.)

Insulation

Inspect HVAC system insulation, exposed to airstream for microbial growth (i.e., mold). If there is evidence of microbial growth on the interior insulation, the insulation should be removed and replaced prior to operating the HVAC system.

Air-Side Coils

- **Warning: Hazardous chemicals!** Cleaning agents can be highly acidic or alkaline. Handle all chemicals carefully and use appropriate personal protective equipment (PPE). Refer to the cleaning agent manufacturer's Materials Safety Data Sheet (MSDS) for safety and handling information. Failure to follow all safety instructions could result in serious injury or death.
- **Warning: Hazardous pressures!** Coils containing refrigerant under pressure must not be cleaned using a solution over 150 °F. Failure to follow these safety precautions could result in coil bursting, which could result in serious injury or death.

To clean the coil

- Disconnect all electrical power to the equipment
- Use a soft brush to remove loose debris from the coil
- Mix a high-quality coil cleaning detergent with water according to the manufacturer's instructions
- Clean coil according to detergent instructions
- Thoroughly rinse both sides of the coil and the drain pan with, clean water
- Straighten any coil fins that have been bent during the cleaning process
- Confirm the drain line is clear
- Replace all panels and parts and restore electrical power to the equipment

Dry Cooler Maintenance

AGronomic IQ equipment is intended to provide the ability to perform sensible cooling year-round. As such, systems are sold with appropriate glycol concentrations to prevent freezing/burst hazards.

Though dry cooler itself is normally equipped with means to be drained properly/fully, it is recommended to have same means in place for entire system (dry cooler – piping – HVAC system etc.):

- Have each local high point of the system equipped with means to bleed the air (air bleeding valve etc.)
- Have each local low point of the system equipped with means to drain the fluid.

 **CAUTION.** Draining and re-filling the dry cooler must be performed by trained personnel, according to proper field practice and system layout. Improper draining or re-filling the system could lead to equipment damage, malfunction, premature tear and wear and may void equipment warranty.

 **CAUTION.** Ensuring that the dry cooler and associated system(s) equipped with proper means of draining, creating draining and re-filling procedures as well as determining whether draining is warranted to protect the equipment is outside of manufacturer's scope and is a responsibility of installing contractor and local maintenance team.

Equipment Warranty

General Policy

All AGronomic IQ service and warranty work is managed exclusively by Dehumidified Air Services (DASV). All warranties apply to the original equipment owner and are not transferable. All warranty inquiries should be made through either AGronomic IQ Customer Account Management or Dehumidified Air Services.

AGronomic IQ Customer Account Management:

Phone: 1-833-327-2447 Email: Service@AgronomicIQ.com

Dehumidified Air Services:

Phone: 1-833-327-7665 Email: Warranty@DehumidifiedAirServices.com

AGronomic IQ warrants as set forth and for the time periods shown below that it will provide through either a DASV Service Technician or an authorized service organization specified and approved by DASV, a new or rebuilt part to replace a factory installed part which has failed because of defect in workmanship or material.

NOTE: EVERY REQUEST RELATED TO WARRANTY OF ANY NATURE AS DESCRIBED BELOW MUST BE OFFICIALLY AUTHORIZED AND DOCUMENTED IN ADVANCE BY DASV TO QUALIFY FOR WARRANTY COVERAGE.

Warranty Void Unless Registered

All Warranties are void unless the start-up of the equipment is approved by a DASV service technician. Upon completion of the start-up, a "Warranty Registration Certificate" will be issued, along with the Start-Up Report, which activates the Warranty Period of the equipment. The Warranty Period will commence either upon completion of start-up registration of the equipment or 6 months from factory ship date, whichever comes first.

Initial 90-Day Comprehensive Warranty

During the first 90 days from initial start-up, all parts and repairs related to factory defects or replacement parts are covered by the AGronomic IQ manufacturer warranty. All parts and labor requirements will either be handled by DASV technicians directly or managed and approved in advance by DASV through DASV authorized technicians.

Internet Connected, Conditional One-Year Repair Warranty

If and only if the equipment is connected to the internet from the date of the warranty activation, a Repair Warranty will be provided for an additional 9 months subsequent to the initial 90-Day Comprehensive Warranty for a total of 12 months of parts and labor warranty coverage. The unit must be connected and communicating to AGronomic IQ's GrowSentry™ for the entire term from start-up in order to qualify.

If qualified, AGronomic IQ will provide or pay for the required part and direct labor only, related to the part replacement. Only the labor required to replace the defective part is under warranty for this 9-month extension. Travel time, diagnostic time, per diems, truck charges, shipping charges etc. are not covered under this Conditional Repair Warranty.

Two-Year Parts Warranty

If any factory installed part supplied by AGronomic IQ fails because of a defect in workmanship or material, prior to the completion of the 24th month from date of completion of the warranty activation, AGronomic IQ will provide a new or rebuilt part F.O.B. our factory. No labour reimbursement will be made for expenses incurred in replacing the part except as set in the *Initial 90-day Comprehensive or Internet Connected Conditional One-Year Repair Warranty*.

AGronomic IQ reserves the right to have the defective part returned to the factory in order to determine the warranty applicability. Parts shipping and handling costs (to and from the factory) are not covered outside of the *Initial 90-day Warranty*.

Replacement Part Warranty

If a replacement part provided by AGronomic IQ under this warranty fails due to a material defect prior to the end of the Two-Year Parts Warranty (or the end of the extended warranty period if applicable), whichever comes first, **AGronomic IQ** will provide a new or rebuilt part F.O.B. factory.

Applicability

This warranty is applicable only to products that are purchased and installed in the United States and Canada. This warranty is NOT applicable to:

1. Products that have become defective or damaged as a result of non-DASV or unauthorized service work, poor maintenance, faulty electrical supply, act of God, or any other circumstances outside of the specified care, maintenance or operation of the equipment including:
 - Components that have been relocated from their original placement during manufacturing.
 - Any portion of the system not supplied by AGronomic IQ.
 - Components on which the model and/or serial number plates have been removed or defaced.
 - Components which have become defective or damaged as a result of unauthorized opening of the refrigeration circuit, improper wiring, electrical supply characteristics, poor maintenance, accidents, transportation, misuse, abuse, fire, flood, alteration and/or misapplication of the product.
 - Products not installed, operated and maintained as per the AGronomic IQ Operating and Maintenance Manual.
 - Products on which payment is in default.

2. Parts that wear out due to normal usage such as; air filters, fuses and sensors are not covered by this warranty.

NOTE: Refrigerant lost during the *Initial 90-day Comprehensive or Internet Connected Conditional One-Year Repair Warranty* will be reimbursed in accordance to the current market price of refrigerant at the time of repair and upon discretion of Customer Support team. **AGronomic IQ** will not be responsible for refrigerant lost from the system due to improperly installed contractor piping to the remote outdoor air-cooled condenser.

Limitations

1. DASV is a Manufacturer Service organization, not a first-response or urgent response local service company. As such, we highly recommend that equipment owners have a relationship with their own qualified first response service organization or one recommended by DASV.

DASV hours of operation are from 8:00 AM to 6:00 PM Monday through Friday, unless otherwise agreed to under a separate agreement.

Parts replacement can be subject to availability. We highly recommend for mission-critical applications that owners purchase and maintain a local stock of critical components in case immediate replacement be required. If for any reason one of those components is replaced under applicable warranty conditions, AGronomic IQ will reimburse the original cost of any component used under terms of Warranty.

NOTE: **AGronomic IQ** expressly disclaims any liability for parts replacement delays due to parts unavailability or shipping delays.

2. This warranty is given in lieu of all other warranties. Anything in the warranty notwithstanding, any implied warranties of fitness for particular purpose and merchantability shall be limited to the duration of the warranties described above. AGronomic IQ expressly disclaims and excludes any liability for consequential or incidental damage for breach of any express or implied warranty.

Where a jurisdiction does not allow limitations or exclusions in a warranty, the foregoing limitations and exclusions shall not apply to the extent of the legislation, however, in such case the balance of the above warranty shall remain in full force and effect.

This warranty gives specific legal rights. Other rights may vary according to local legislation.

Force Majeure

AGronomic IQ will not be liable for delay or failure to provide warranty service due to government restrictions or restraints, war, strikes, material shortages, acts of God or other causes beyond AGronomic IQ control.

Optional Extended Warranties

If purchased prior to shipment and documented with a registered extended warranty statement certificate, AGronomic IQ will provide replacement components within the specified period of the extended warranties. Extended warranties commence at the time as start-up and cover parts replacement only for parts that fail as a result of manufacturing defect. The failed parts must be returned to the factory with transportation prepaid by the customer as a condition of these warranties. Optional extended warranties are for parts only and subject to all the terms of the Two-Year Parts Warranty.

1. Optional Five-Year Compressor Warranty

Subject to the terms above, AGronomic IQ will provide a replacement compressor for up to 60 months from the date of the warranty activation.

2. Optional Five-Year Dehumidifier Coil Warranty

Subject to the terms above, AGronomic IQ will provide a replacement coil for up to 60 months from the date of the warranty activation. Extended coil warranties are for parts of the dehumidifier only and does not cover parts of dry cooler or OACC coils.

3. Optional Ten Year Dehumidifier Coil Warranty

Subject to the terms above, AGronomic IQ will provide a replacement coil for up to 120 months from the date of the warranty activation. Extended coil warranties are for parts of the dehumidifier only and does not cover parts of dry cooler or OACC coils.

4. Optional Five-Year Driveline Warranty

Subject to the terms above, AGronomic IQ will provide driveline replacement parts for up to 60 months from the date of the warranty activation.

Driveline Components Include:

- Supply fan motor
- Exhaust fan motor (including Min Exhaust and Purge Exhaust motors)
- Heat recovery loop pump
- Compressor glycol/water pump
- Dry cooler/outdoor condenser fan(s)
- Dry cooler pump(s)