



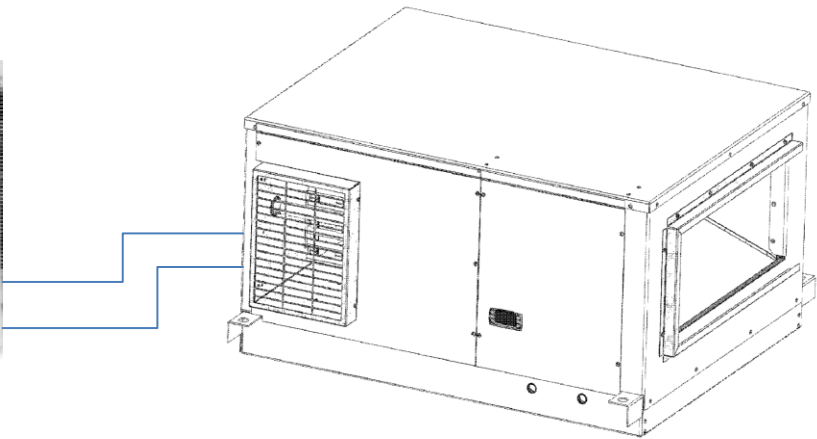
CellarPro

Large Air Handler Split Systems

AH12Sx, AH18Sx, AH24Sx
Residential & Commercial



Outdoor Condensing Unit



Evaporator

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Product Nomenclature

AH - 24 - Sx

Model

AH = Air Handler

Nominal Cooling Capacity (BTUH at 55°F Cellar Temp)

12 = 12,400 / 1.25 Ton
18 = 15,500 / 1.50 Ton
24 = 18,200 / 2.00 Ton

Configuration

Sx = S = Split System with Remote Condensing Unit
x = Designed for Interior or Exterior Exposure

Standard Design Features

Our Large Air Handler cooling systems use a common approach to optimize compressor size, fin spacing and coil size, and blower air fan. The goal is to maximize cooling power without stripping humidity and maintain consistent temperatures.

Our Large Air Handlers offer a wide array of modifications, such as a networkable controller, integrated humidifier and integrated heater.

Evaporator Housing

The housing is manufactured from aluminum for light weight, corrosion resistance and aesthetics. The cabinet is structurally reinforced throughout to provide a stable and secure platform for the components.

The evaporator section is insulated for thermal efficiency. Panels are fastened with quick release hardware to simplify internal access.

Evaporator Coils

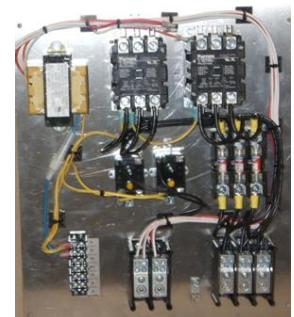
The unit has a large-face A-Frame coil for increased cooling efficiency and efficient power usage. The copper tube + aluminum fin evaporator coils are mounted in a stainless steel condensate pan with a condensate safety switch to guard against condensate overflow. Commercial-grade Electrofin coating protects the evaporator coil from leaks and corrosion.

Blower and Blower Motor

Our Large Air Handler units incorporate a blower and motor in a draw-thru configuration for even air distribution across the coils. The large blower runs at low RPM that minimizes noise and motor horsepower consumption. The blower assembly is mounted to an internal chamber to further reduce noise levels.

Electrical System

The electrical system features a Class 2, 24 VAC control circuit, and includes all required contactors, fuses and/or circuit breakers. Field connections (24 VAC) and high voltage connections are provided through separate terminal blocks in the electric box. A defrost controller is mounted to the unit and manages defrost cycles, freeze protection and high/low temperature alarms. The temperature control circuit is compatible with standard or networkable 24 VAC thermostats.



Refrigeration System Components

Easily accessible components in the Evaporator include: thermal expansion valve, pump-down solenoid valve, suction line service access port, and condensate overflow emergency shut-off float switch.

Condensing Unit components include an electronic controller for low pressure control cut-in/cut-out adjustment, mounted filter drier and sight glass, and liquid/suction service valves.

All units are evacuated and charged with dry nitrogen prior to shipment. Two dedicated power supplies are required, one to the evaporator and one to the condensing unit. No communication wiring is required between the Evaporator and the Condensing Unit. The Condensing Unit enclosure is suitable for indoor or outdoor installations.

Without the optional Integrated Humidifier, the Evaporator operating range is 45°F to 62°F cellar temperature. With the Integrated Humidifier, the Evaporator operating range is 51°F to 62°F. In addition to managing the defrost cycle, the defrost controller is programmed to ensure that the cellar does not drop below the minimum allowable temperature. The defrost cycle is time initiated, temperature terminated, with a factory default of 1 hour, field adjustable in one-hour increments. If defrost is not required, the system will terminate the defrost and return to refrigeration automatically after a 3-minute delay.

Compressor

All systems incorporate scroll compressors for high reliability, high efficiency and low noise. Compressors are mounted on vibration isolators to minimize noise transmission to the cabinet.



Evaporator Ducting

Flanges are provided on the Evaporator air intake and exhaust plenums for easy attachment of ducting.

Using 14" diameter R-6 insulated flex ducting, the Evaporator can be ducted up to 100 equivalent feet (50 equivalent feet per duct). Using R-6 insulated hard ducting, the Evaporator can be ducted with maximum external static pressure of 0.3"wg and minimum cross sectional area of 153 sq inches. Units are rated to 0.30"wg external static pressure. All ducting must be insulated to R-6 minimum.

The condensing unit cannot be ducted.

Evaporator Air Filter – FOR NON-DUCTED INSTALLATIONS ONLY

We provide a Merv 5 air filter measuring 12"x25"x1" for the Evaporator cold air intake. The purpose of the filter is to keep the evaporator fins free of debris; it is not an air quality filter. **This filter is for non-ducted operation only. If the Evaporator is ducted, the filter must not be installed at the unit.**

To use a filter in a ducted application, **the filter size must be increased** to offset the duct pressure loss from the filter. In a ducted application, the filter must be at least 2.6 ft² (approx. 16"x24"), 1" deep maximum, non-pleated, and Merv 5 or less.

Options & Upgrades

Electrode Canister Humidifier

We offer an integrated Electrode Canister humidifier inside the cooling unit that provides humidification and allows you to maintain ideal humidity conditions inside the cellar. The humidifier senses cylinder current draw, automatically flushing and filling the cylinder to control the mineral content of the water and humidity output. The output is field adjustable from 1 to 5 lbs/hr. A “Change Cylinder” light alerts service personnel when the humidifier requires service.

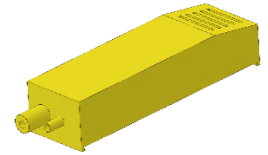
The humidifier must be connected to a water line. When a humidifier is purchased, we provide a 1/4” water supply shut off ball valve which is mounted on the exterior of the cabinet housing.

A dedicated Humidistat is included with the humidifier, because most 24VAC thermostats will only allow humidity control up to 50%RH. The Humidistat must be installed inside the cellar near the return airflow in an area with good air circulation. The Humidistat controls the humidity from 5% to 70%RH in 5% increments. The humidistat controls only humidity and is not Internet accessible.



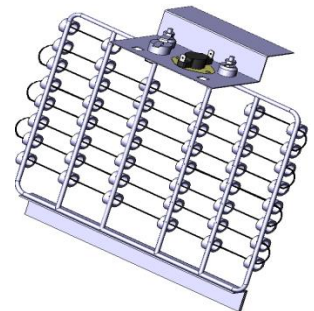
Internal Condensate Pump

We offer an integrated condensate pump that will be mounted in the evaporator drain pan. This option includes 25ft of 1/4” ID PVC drain line. In the event that the condensate pump cannot remove the water fast enough, the emergency shut-off float switch (included as standard equipment) locks out the compressor until the condensate pump has emptied the drain pan.



Electric Heat

For wine cellars that are exposed to conditions below 55°F temperatures, CellarPro Air Handlers can be configured with optional integrated heaters to provide 3kW (10236 BTUH) of heat. The unit incorporates a factory installed nichrome wire heater. The heater has low voltage thermal safety cutouts with automatic reset and a second power line fuse link (over-temperature) safety device.



Ecobee Networkable Thermostat

The cooling unit is compatible with most 24V Networkable Thermostats (sold separately).

We offer the Ecobee SmartThermostat Pro (P/N 31453) which incorporates temperature control and humidity display in an attractive, backlit, easy to install wall-mounted unit.

Features include:

- Internet connectivity for monitoring, management and configuration of the thermostat
- Set up alerts and service reminders, including air filter monitor, over or under temperature, high humidity, or customer selected contact closure
- Displays the cellar humidity from 5% to 95%
- Voice recognition through Amazon's Alexa
- Personalized web portal and smart phone apps available
- Simple program editing and preferences
- Manage vacations and building shutdowns
- Full color 3.5" LCD display
- Energy Star and FCC Class B Compliant
- Adjustable differential
- Compressor short cycle protection
- E-Mail or Text Messaging



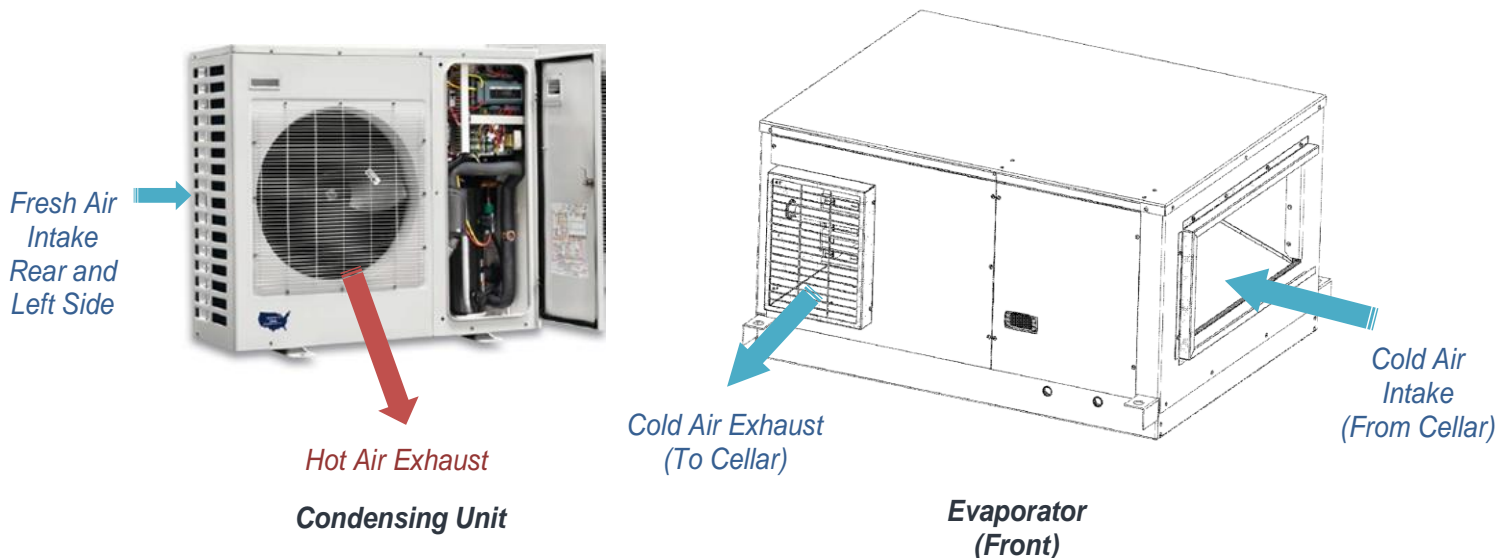
System Specifications

Evaporator Module			
Model	Dimensions LxWxH (inches)	Sound Level @3 Ft (dBA) Non-Ducted / Ducted	Weight (lbs)
AH12Sx	41.4 x 36.6 x 22.4	76 / 65	156
AH18Sx	41.4 x 36.6 x 22.4	78 / 67	156
AH24Sx	41.4 x 36.6 x 22.4	78 / 67	156

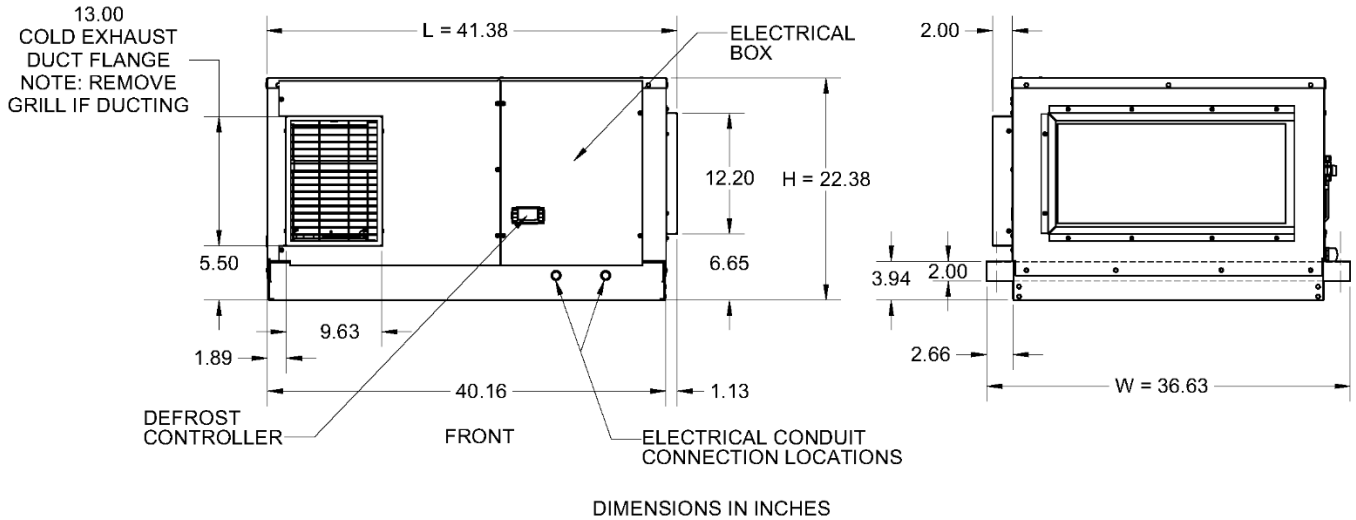
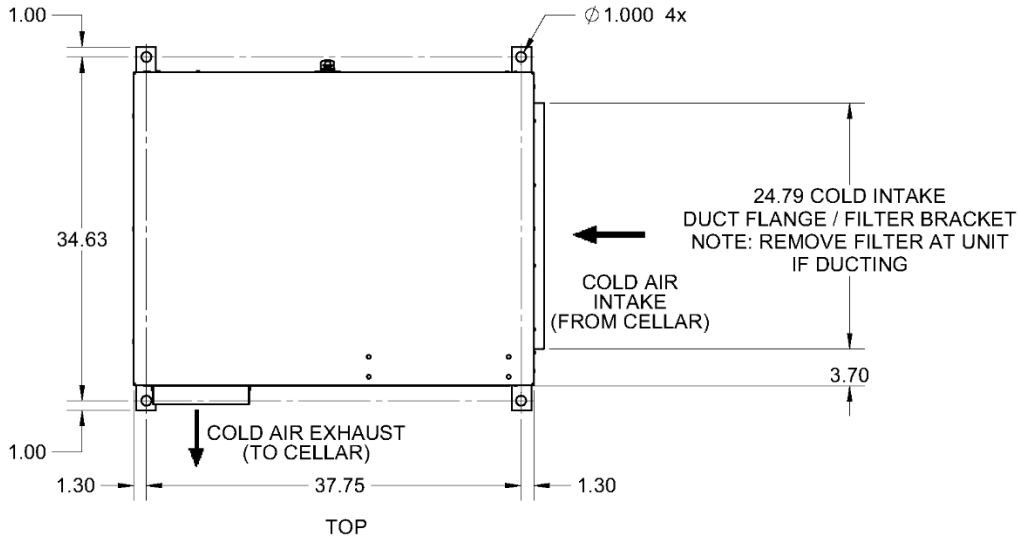
Condensing Unit			
Model	Dimensions LxWxH (inches)	Sound Level @3 Ft (dBA)	Weight (lbs)
AH12Sx	16.7 x 40.5 x 33.1	61	219
AH18Sx	16.7 x 40.5 x 33.1	61	219
AH24Sx	16.7 x 40.5 x 33.1	61	236

Add 5lbs to the Evaporator Module for the Integrated Heater Option.
Add 20lbs to the Evaporator Module for the Integrated Humidifier Option.

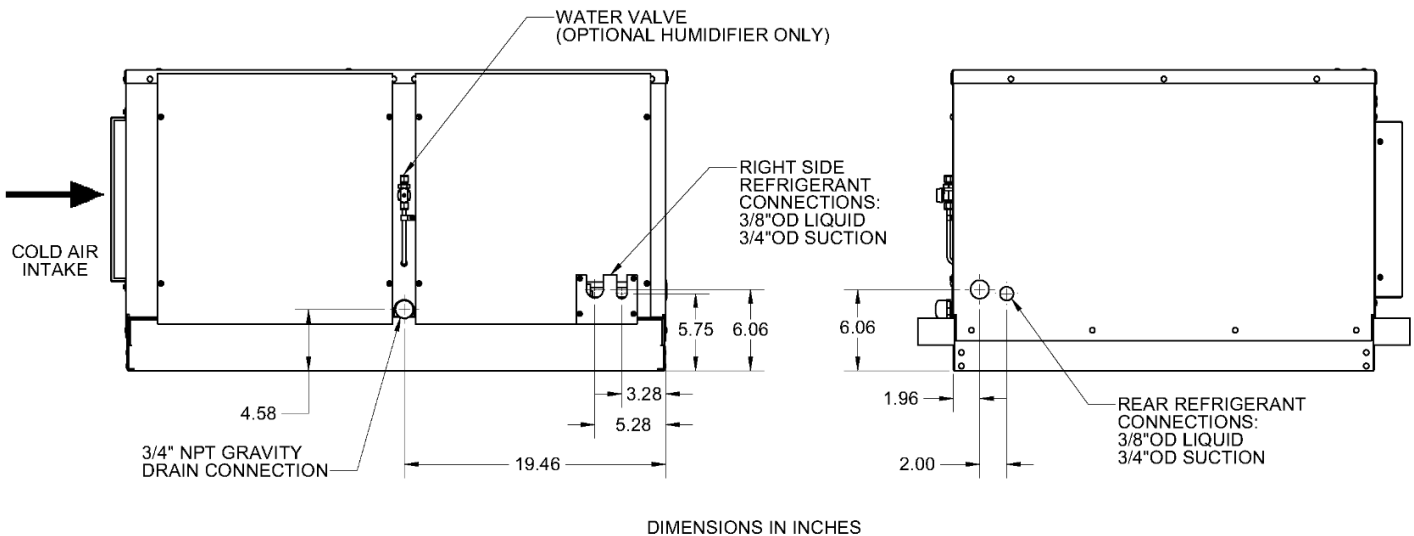
System Airflows



Evaporator Cut Sheet

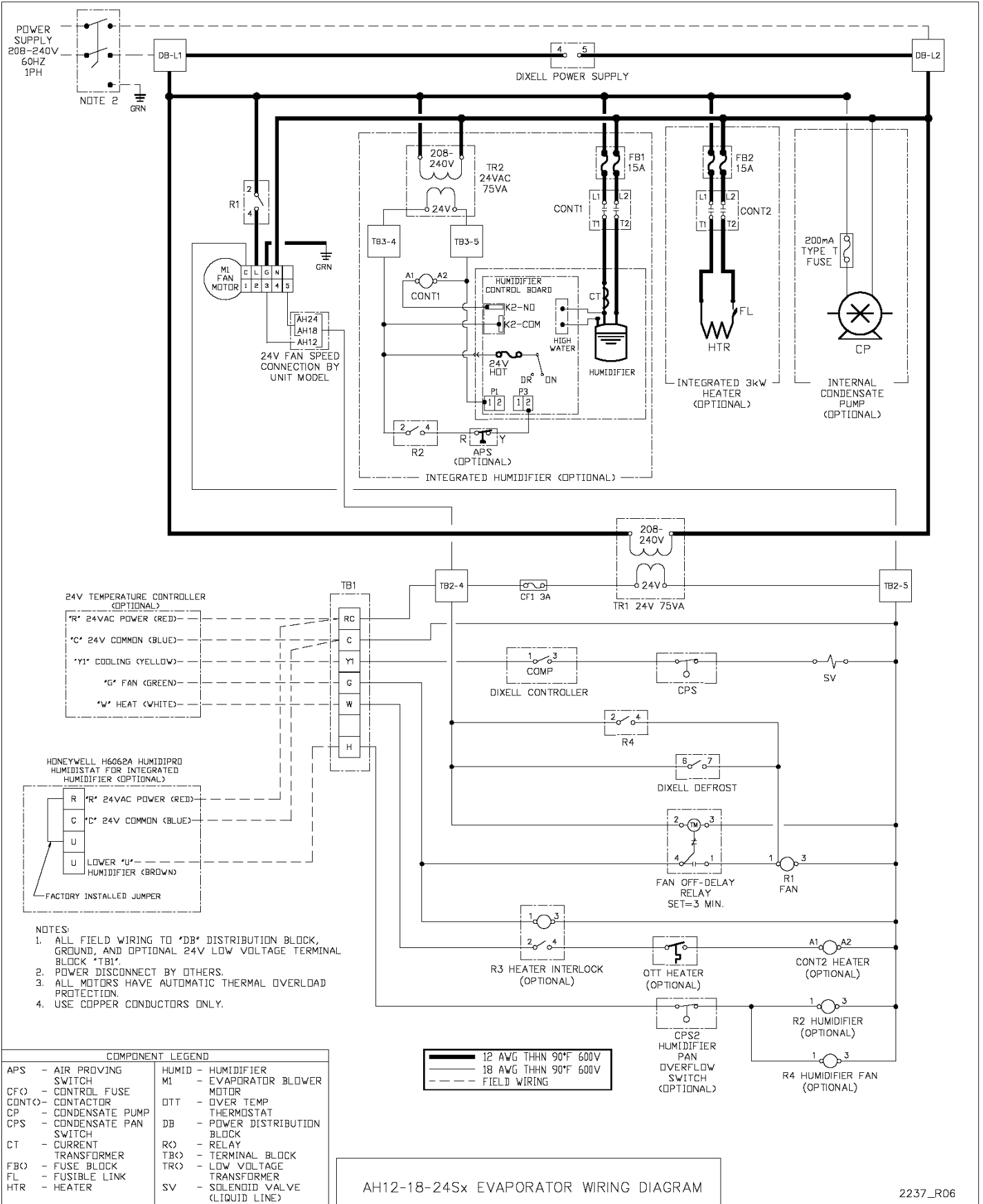


Evaporator Piping Connections

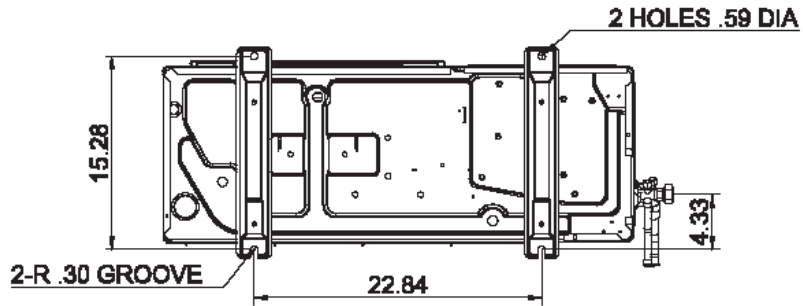
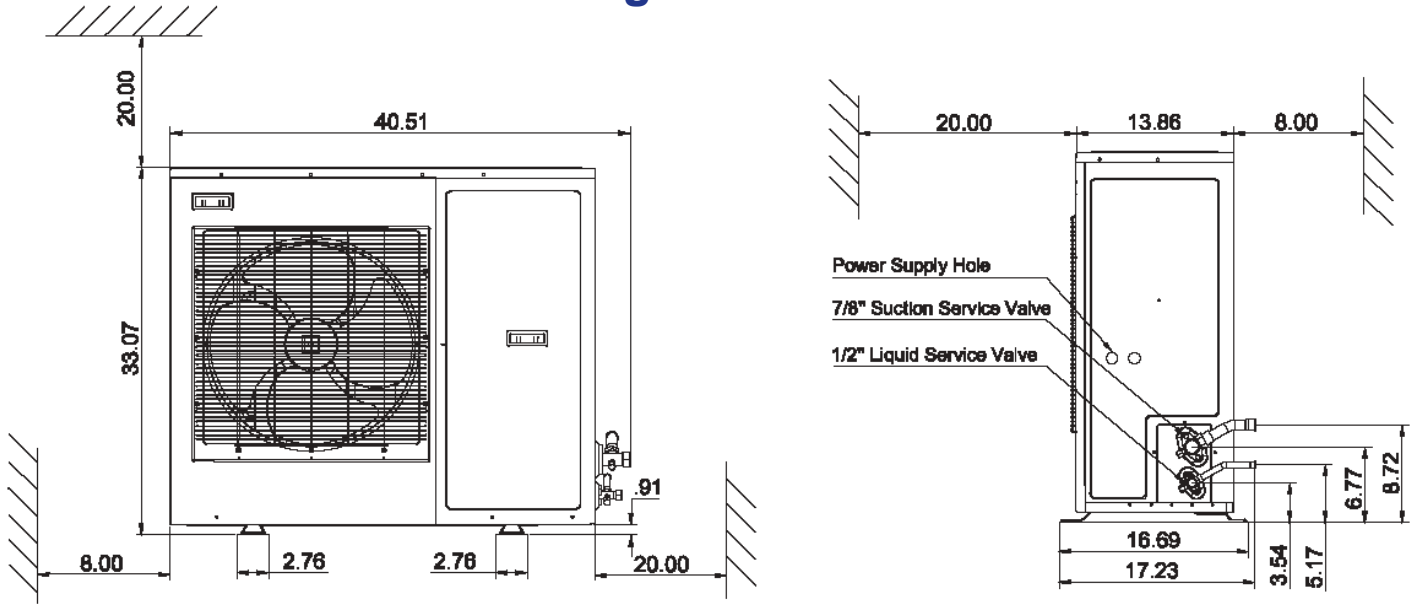


DIMENSIONS IN INCHES

Evaporator Wiring Diagram AH12-24Sx

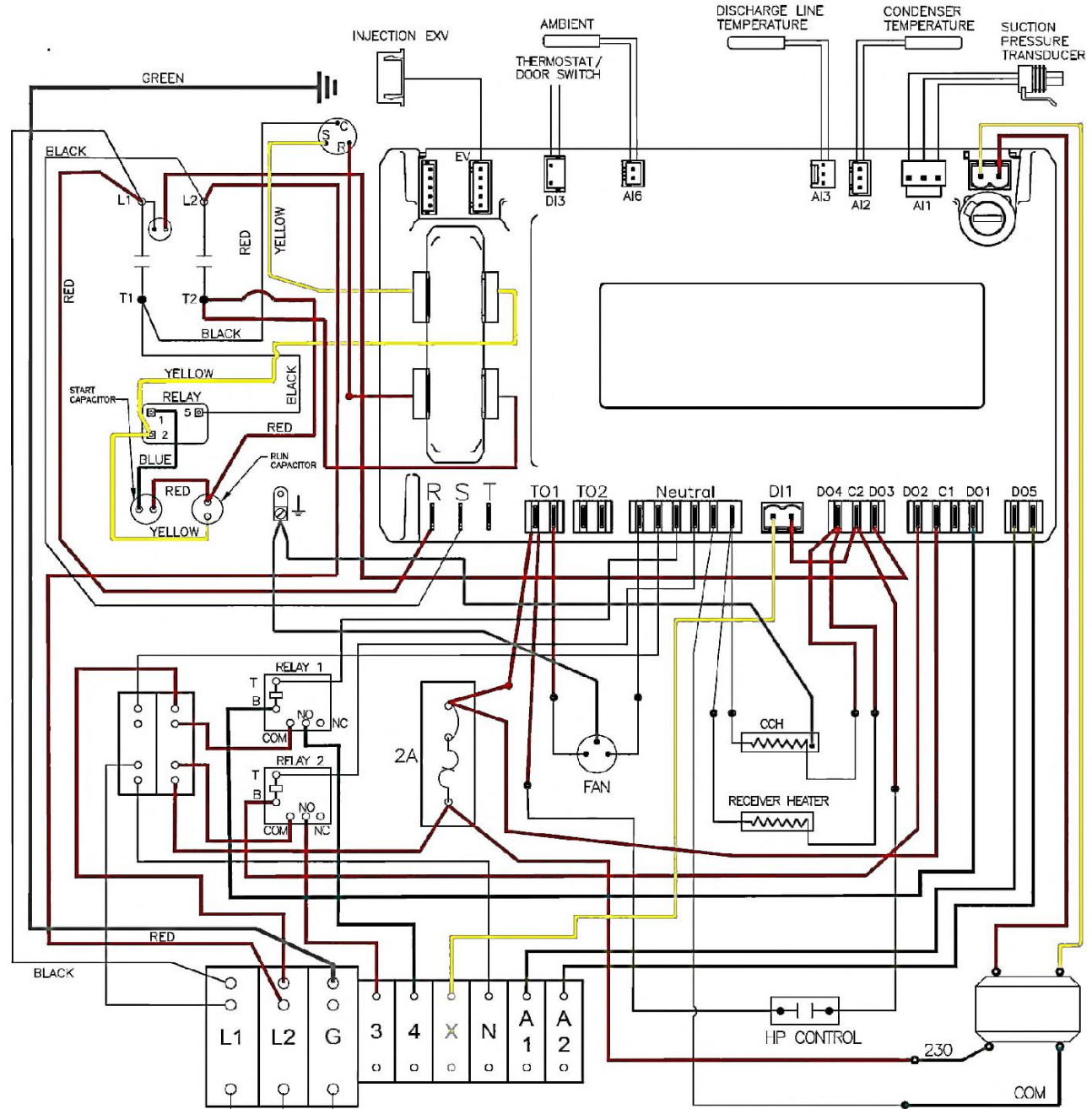


Condensing Unit Cut Sheet

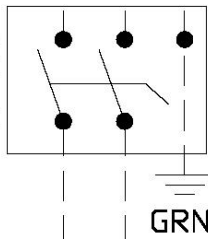


DIMENSIONS IN INCHES

Condensing Unit Wiring Diagram AH12-24Sx



POWER DISCONNECT BY OTHERS



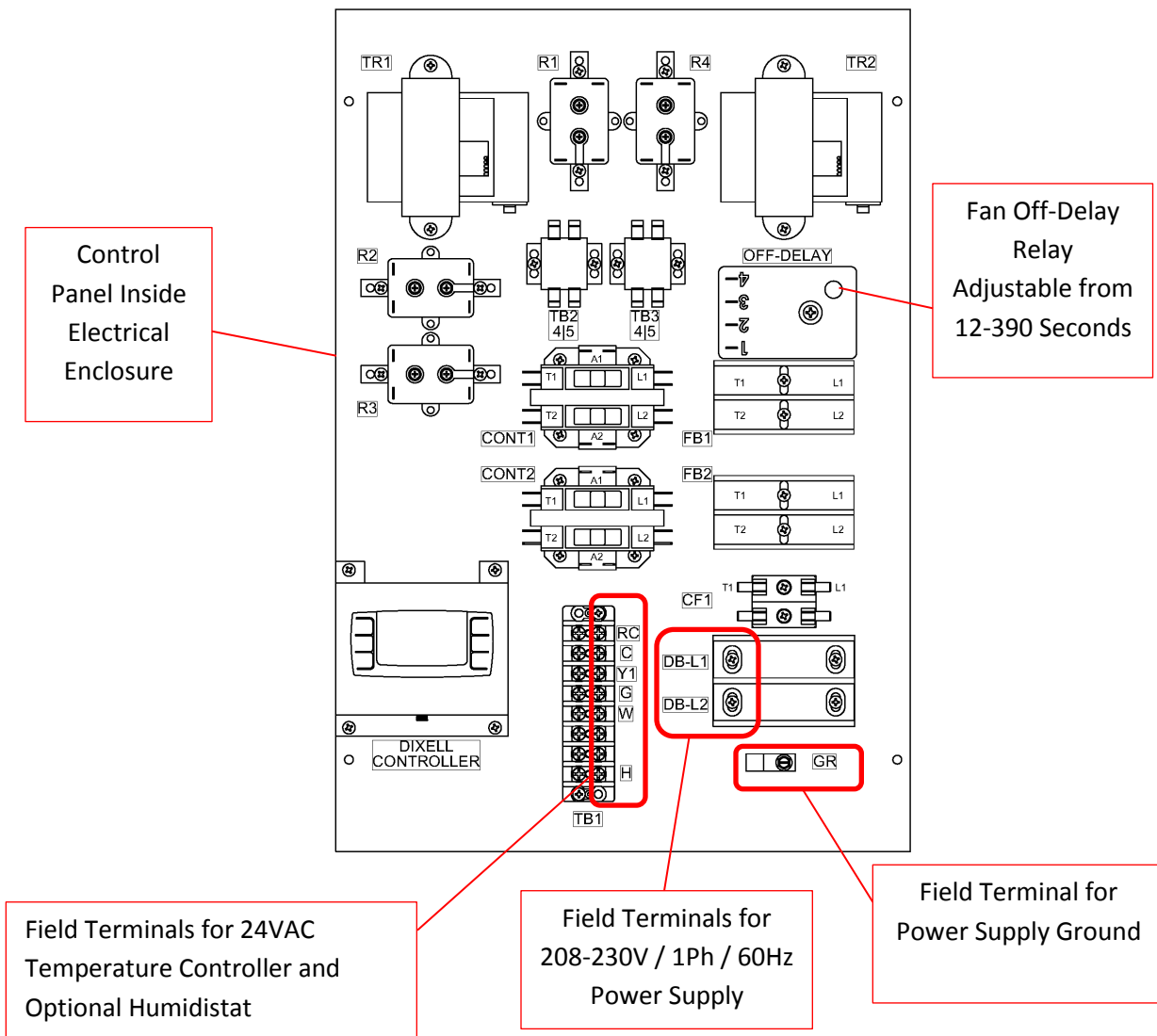
POWER SUPPLY
208-240V/60HZ/1PH

NOTES:

1. ----- = FIELD WIRING.
2. ALL MOTORS HAVE AUTOMATIC THERMAL OVERLOAD PROTECTION.
3. USE COPPER CONDUCTORS ONLY.

AH12-24Sx Evaporator Power Supply Requirements

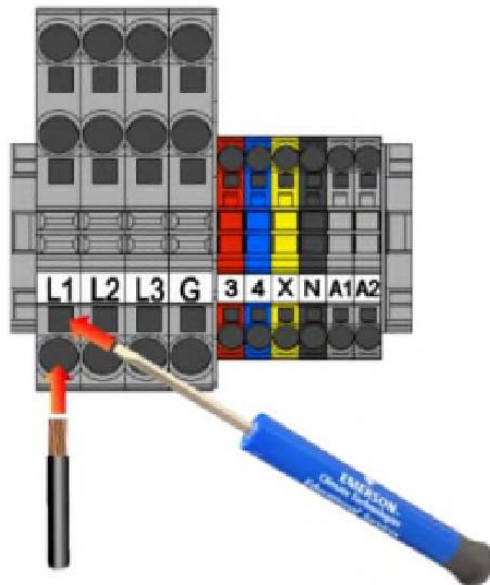
Model	Power Supply	Evaporator Fan		Humidifier		Heater		Evaporator Circuit Rating		Evaporator Circuit Rating		Evaporator Circuit Rating		Evaporator Circuit Rating	
		FLA	W	FLA	W	FLA	W	Fan Only		Fan / Humid		Fan / Heater		Fan / Humid / Heater	
								MCA	Max Fuse	MCA	Max Fuse	MCA	Max Fuse	MCA	Max Fuse
AH12Sx	208-230V 1Ph 60Hz	4.1	300	7.4	1700	12.5	3000	5.13	15	12.53	20	17.63	20	25.03	30
AH18Sx	208-230V 1Ph 60Hz	4.1	422	7.4	1700	12.5	3000	5.13	15	12.53	20	17.63	20	25.03	30
AH24Sx	208-230V 1Ph 60Hz	4.1	422	7.4	1700	12.5	3000	5.13	15	12.53	20	17.63	20	25.03	30



AH12-24Sx Condensing Unit Power Supply Requirements

		Matched Condensing Unit						
		Circuit Rating						
Model	Power Supply	Condensing Unit Model Number: Mfg Emerson/Copeland	Nominal HP	RLA	LRA	Watts	MCA	Max Fuse
AH12Sx	208-230V 1Ph 60Hz	XFAM-020Z-CFV-081	2	12.0	56.0	1385	16.10	25
AH18Sx	208-230V 1Ph 60Hz	XFAM-025Z-CFV-081	2.5	18.0	75.0	1755	23.60	40
AH24Sx	208-230V 1Ph 60Hz	XFAM-030Z-CFV-081	3	23.2	112.0	2075	30.05	50

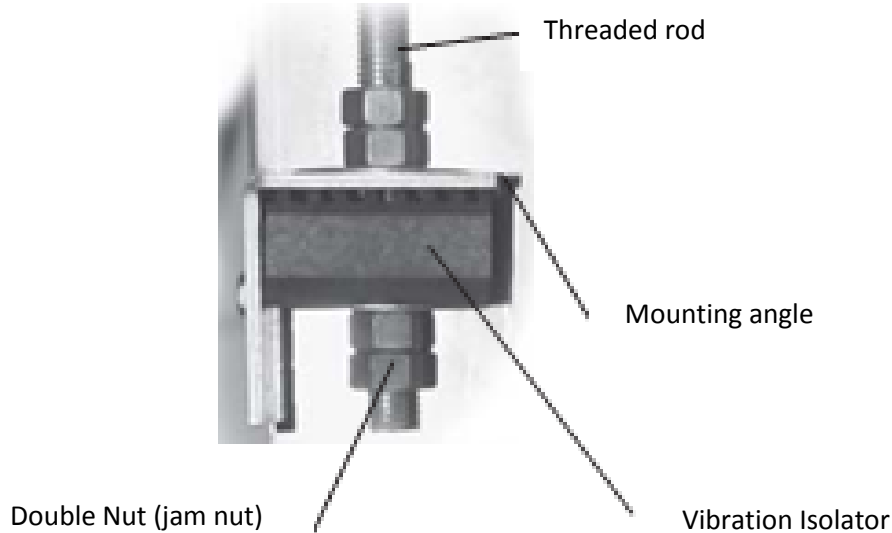
Strip wire insulation back to expose ½ inch bare wire. Firmly insert a small screwdriver into the square opening to open the spring cage. Insert the wire into the round opening and remove the screwdriver (see **Figure 1 - Electrical Connections).**



**Figure 1 – Electrical Connections Inside Condensing Unit
Electrical Enclosure**

Installation Instructions

- **Unit Clearance:** The evaporator supply and return openings should be located at least 24 inches from any obstructions for proper airflow on non-ducted units. The left side electrical enclosure and right side access panels should be located at least 24 inches from any obstructions for service access. Reference the Condensing Unit Dimensional Data drawing for required condensing unit clearances.
- **Mounting the Evaporator:** Mount to a support structure using 5/16" or 3/4" threaded rod, passing through the mounting angle and optional vibration isolator (by others) in the four mounting locations. The unit can be ceiling hung or floor mounted, but it must be secured to the support structure through the mounting angles.



- **Gravity Drain Line:** The condensate drain trap must be properly designed to ensure the removal of condensate; incorrect trapping can hold water in the pan causing system shut down, or possible condensate overflow. Be sure the external condensate drain line pitches downward at a slope of one inch every ten feet, and terminates to an open drain. When installing make sure to properly level the unit to maintain proper condensate drainage. If using the optional internal condensate pump, the drain connection can remain capped.
- **Condensing Unit Flooded Start Protection (Bump Start):** On initial startup, the compressor will cycle through a series of 3 short start and stops. The compressor will cycle on for 2 seconds, then off for 15 seconds. This process protects against flooded starts, and occurs any time power is lost and reapplied to the unit, or any time the unit is off for more than 4 hours and the ambient temperature is below 95°F.
- **Evaporator Ducting:** Duct adapters and ducting provided by others. Design to the following guidelines:

Evaporator Module Duct Guidelines			
Model	Airflow (CFM)	Flex Duct diameter (in) 100ft maximum equivalent length R-6 insulation	Hard Duct minimum cross sectional area (in ²) Maximum external static pressure 0.3" wg R-6 insulation
AH12Sx	1175	12	113
AH18Sx	1300	14	153
AH24Sx	1300	14	153

24VAC Thermostat

Overview

Cooling units are compatible with 24VAC temperature thermostats, including Networkable Thermostats (NT (sold separately)). The Evaporator is also configured with a unit-mounted temperature display that provides troubleshooting, operational safety controls, defrost cycles, and freeze protection.

Compatible NT

CellarPro has tested and approved the following NT brands/models:

- Ecobee4 Pro
- Nest
- Honeywell / Lyric T6
- Any other 24VAC HVAC Thermostat with power consumption less than 4VA

Installation Instructions

IMPORTANT: CONNECT THE THERMOSTAT WIRE TO THE NT BEFORE CONNECTING POWER TO THE COOLING UNIT.

Install the cooling unit but DO NOT connect power the cooling unit. The temperature display on the cooling unit must be blank, indicating no power is connected to the cooling unit. It is now safe to connect the 18/5 thermostat wire to the NT.

If the NT does not have a remote sensor, the NT must be installed inside the cellar. It is very important to locate the Thermostat in an area that gets good airflow, ideally in a location near the air return to the cooling unit.

If the NT has a remote sensor option, it may be possible to locate the main Thermostat outside the cellar, and the remote thermostat inside the cellar. Make sure to disable the temperature input from the main Thermostat, and control the cellar using the remote sensor. It is very important to locate the remote sensor in an area that gets good airflow, ideally in a location near the air return to the cooling unit.

If there are multiple units (and therefore multiple thermostats) in the cellar, it is important to locate the individual unit's thermostat as close as possible to the return air for that unit. If this is not done, the run time for each unit will not be properly balanced.

Connect the color-coded thermostat lead wire to the NT terminals as follows:

- Red wire to terminal “Rc” (24VAC Power Supply)
- Blue wire to terminal “C” (24VAC Common)
- Yellow wire to terminal “Y1” (cooling / compressor)
- Green wire to terminal “G” (cooling unit fan)
- White wire (Integrated Heater option only) to terminal “W” or “W1” (cooling unit heater)

If the Thermostat does not have the terminal markings listed, it will be necessary to contact the Thermostat manufacturer to advise the correct terminal mapping.

Once the wires are connected to the NT, connect power to the cooling unit, and turn “on” the power on the cooling unit’s digital display. The current temperature will show on the digital display. There is a factory-set startup delay of 3 minutes before the cooling unit will start to run.

Activate the NT and begin initial set up.

Recommended Settings

The following guidelines are general recommendations to optimize the NT for wine cellar applications. It will be necessary to reference the available NT menus and available options from the documentation provided with the NT.

- Set the mode to “Cool Only”, unless the Integrated Heater option is specified. In that case set the mode to “Auto”.
- Disable all scheduling, learning, and occupancy tracking functions. These routines are intended for comfort cooling and are not suitable for long term wine storage applications.
- If the Thermostat has a configurable minimum/maximum set point range, set the minimum to 45°F (or as low as possible) and set the maximum set point to 62°F. This is the safe operating range for CellarPro cooling units.
- Enter the desired cellar set point temperature. The NT will control the cooling unit to manage this set point temperature.
- Set fan to “Auto”.
- Compressor Minimum Off Time: If this setting is disabled by default, it must be enabled, with a minimum off time for CellarPro products of 3 minutes.
- If the Thermostat allows high/low temperature alarms, we recommend the following settings: 40°F (Low) and 70°F (high).
- If the Thermostat has an adjustable temperature differential (cooling on/off range), a setting of 4°F is recommended. Many Thermostats have a tight fixed differential of 1-2°F. In this case the cooling unit will cycle more frequently than recommended. Therefore, it is advisable to set a longer Compressor Minimum Off Time to minimize frequent cycling.
- If the NT has a “Change Air Filter” reminder, set the reminder for every 3 months. This is for inspection and cleaning or replacement of the condenser filter.

- **Humidity Management:** The humidity level in the cellar can be maximized by allowing the cooling fans to run at the end of every cooling cycle. The unit is equipped with an Off-Delay relay in the electrical enclosure and can be adjusted from 12-390 seconds. The recommended setting is 180 seconds (3 minutes). With this setting, at the end of each cooling cycle the cooling unit fans will continue to run for 3 minutes.
- **Integrated Humidifier Option:** The humidifier cannot be controlled from the Networkable Thermostat. A separate humidistat is provided with this option that is not networkable. It must be located inside the cellar along with the NT. Refer to the Integrated Humidifier Owner's Manual for detailed instructions on setting up the humidistat. Note: The Ecobee4 NT will display the humidity level, and high/low alarms can be set, but the humidity set point can only be accessed on the separate humidistat.

Temperature Display on Cooling Unit

The temperature display provided on the cooling unit enhances the functionality of the NT for wine cellar applications. Alarms trigger an audible alarm only at the cooling unit, the alarms are not communicated through the NT. Note that the temperature shown on the unit mounted controller display may differ from the NT display due to the different locations of the temperature measurements and slower temperature response of NT devices. If there is a large difference between the two, it may indicate that the NT is not in a good location. Relocate closer to the return air stream in an area that has good airflow.

- The "Set" button has no effect since the set point is managed by the NT. The controller is programmed to fixed value of SET=45 to provide freeze protection. If the unit mounted temperature probe records an inlet air temperature below 45°F, the Dixell controller will shut off the compressor overriding a call for cooling from the NT thermostat.
- The following parameters and functions are not available with the NT configuration: HY, FON, SET, HES, Quick Chill and Energy Saver.
- A factory preset start up delay of 3 minutes is enabled when power is first supplied to the unit.
- The defrost cycle will be managed automatically. When the cooling unit is in defrost, "DEF" is shown on the display. Defrosts are time initiated, temperature terminated, with a factory default of 1 hour (idF=1). With this setting, every hour the evaporator will go into air defrost mode, with fan on/compressor off. When the coil is clear of frost the defrost will terminate, followed by a 3 minute off cycle delay. For installations where there is minimal frost loading, the defrost frequency can be changed by adjusting the Dixell parameter "idF". The values are in hours, for example to change the defrost frequency to every 4 hours, set idF=4.
- The power button can be used to turn the controller to the "OFF" position. When the display reads "OFF", the compressor cannot be energized, however the NT still has 24VAC power and may continue to operate the fan, heater, and humidifier. **To completely shut down the system, turn off both the cooling unit and the NT, or disconnect power to the cooling unit.**

Optional Integrated Humidifier

General Description

The humidifier is designed to increase the cellar humidity level above a 50% threshold where wine bottle storage is more stable for preserving the corks. It is intended for situations where the ambient relative humidity of the air surrounding the cellar is insufficient to maintain the desired humidity level inside the cellar, as indicated by the shaded areas in the chart below:

Typical Relative Humidity Range (%RH) for 55°F Cellar Temperature without Humidifier							
Ambient RH	Ambient Temperature °F						
	65	70	75	80	85	90	95
10	9-14	12-17	15-20	18-23	22-27	27-32	33-38
15	16-21	20-25	25-30	30-35	37-42	44-49	50-60
20	23-28	29-34	35-40	42-47	50-60	50-60	60-70
25	30-35	37-42	44-49	50-60	50-60	60-70	60-70
30	38-43	44-49	50-60	50-60	60-70	60-70	65-70
35	44-49	50-60	50-60	60-70	60-70	65-70	65-70
40	50-60	50-60	60-70	60-70	65-70	65-70	65-70
45	50-60	60-70	60-70	65-70	65-70	65-70	65-70
50	50-60	60-70	65-70	65-70	65-70	65-70	65-70
55	60-70	60-70	65-70	65-70	65-70	65-70	65-70
60	60-70	65-70	65-70	65-70	65-70	65-70	65-70

The humidifier is controlled by a 24V remote humidistat powered from the cooling unit. The humidistat must be mounted inside the cellar near the return air plenum inside the cellar. The humidifier operates independently from the cooling unit, and uses the cooling unit evaporator fan to circulate the air. The factory set-point on the humidistat is 55%RH, adjustable in 5% increments to a maximum of 70%RH.

WATER SUPPLY AND PLUMBING

- Supply water pressure must be 30 to 80 PSIG,
- For cases above 80 psi, install a pressure reducing valve in the water feed line to the unit.
- With extremely dirty or muddy water sources, e.g., some well sources, ensure proper filtration by adding an external filter to the water line entering the unit.
- DO NOT use completely de-mineralized water with this unit as it is the minerals that allow the electrode principle to work.
- DO NOT use a hot water source as it will cause deposits that will eventually block the fill valve orifice.
- A copper compression coupling for ¼" O.D. soft copper tubing is provided on the inlet to the isolating ball valve provided on the unit and requires no soldering for the water connection to the unit.
- The Humidifier is installed inside the evaporator drain pan, so a separate condensate drain line is not required for the Humidifier.

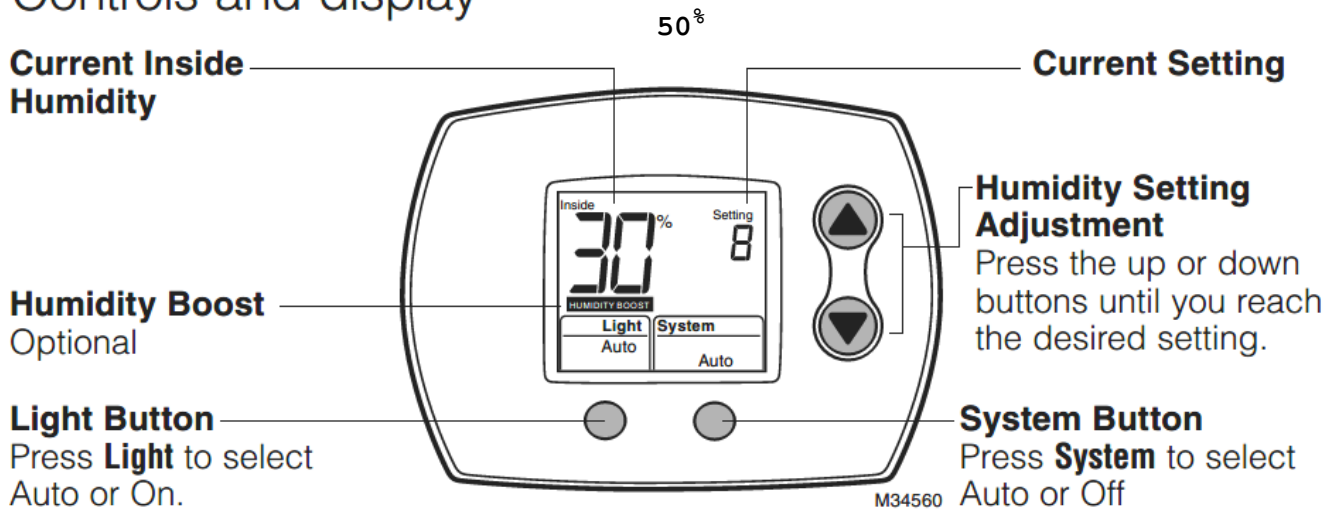
HUMIDIFIER START-UP AND OPERATION

- Check to see that the unit is securely mounted on a level surface with the proper drain and water supply. Check for correct voltage with appropriately sized service.
- DO NOT connect power the cooling unit. The temperature display on the cooling must be blank, indicating no power is connected to the cooling unit. It is now safe to connect the thermostat wire to the Humidistat. Ensure that the external control humidistat is located in the cellar near the return air stream to properly sense the relative humidity to be maintained by the humidifier, and that the interconnecting low voltage wires between the humidistat and the unit's control terminal strip are in accordance with the wiring diagram.
- Check all electrical connections for wires which may have become loose in shipping.
- Check electrode plugs to ensure they are pressed firmly onto the electrode pins.
- Important: Loose connections will cause overheating of the cylinder plugs, possibly melting the plugs and/or cylinder.
- Open the isolating valve in the feed water line to the unit.
- Make sure the humidistat is set high enough to call for humidification.
- Turn on the main disconnect switch in the primary service feeding the unit and check that unit has power at the primary terminal block. PUSH THE AUTO ON/OFF DRAIN SWITCH TO "ON".
- Water will start to enter the cylinder through its bottom port and rise in the cylinder to a point determined by the solid-state control circuitry.
- Refer to the Humidifier Owners Manual for additional details on the operation of the humidifier.
- The humidifier may produce a visible fog in the discharge air. This is normal and will quickly dissipate into the cellar air.

OPERATING INSTRUCTIONS

The humidifier is controlled by the remote humidistat located in the cellar. The only function enabled on the controller is humidity. The humidistat displays temperature in addition to relative humidity; however the cooling unit temperature control is managed by the primary temperature controller. The humidistat controller will have no effect on the air handler temperature settings for the cellar.

Controls and display



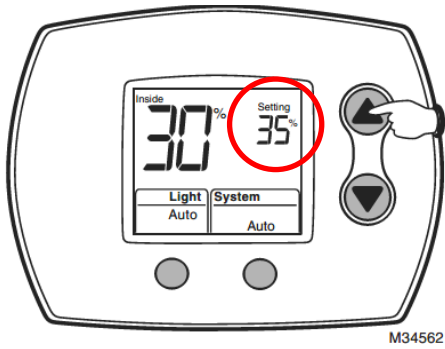
Auto: the most commonly used setting. The backlight will turn on when any button is pressed. It will turn off in 10 seconds if no other buttons are pressed.

On: the backlight is always on.

Auto: the most commonly used setting. The humidity control calls for humidity when needed.

Off: the humidity control does not call for humidity.

The humidistat has a factory set point of 55%RH, adjustable in 5% increments using the "Up" or "Down" arrows. The maximum humidity set point is 70%RH. Settings above 70% are not recommended, because mildew will grow on the bottle labels and walls of the cellar. A range of 50-60% humidity is ideal for the cellar and optimal operation of the handler. Humidity above 60% will negatively affect the performance of the handler because the increased humidity on the evaporator coil will cause it to work harder.

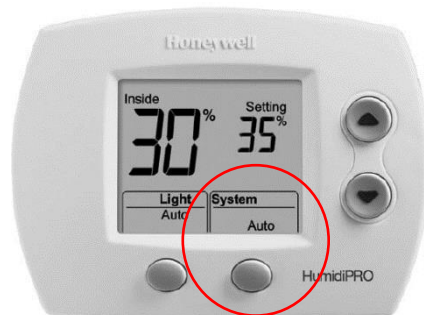


Pressing the "Up" or "Down" arrows will cause the display to change and the current set point value to blink. Use the arrows to increase or decrease the humidity set point to the desired value. The display will return to the normal display mode after a few seconds, showing the current relative humidity.

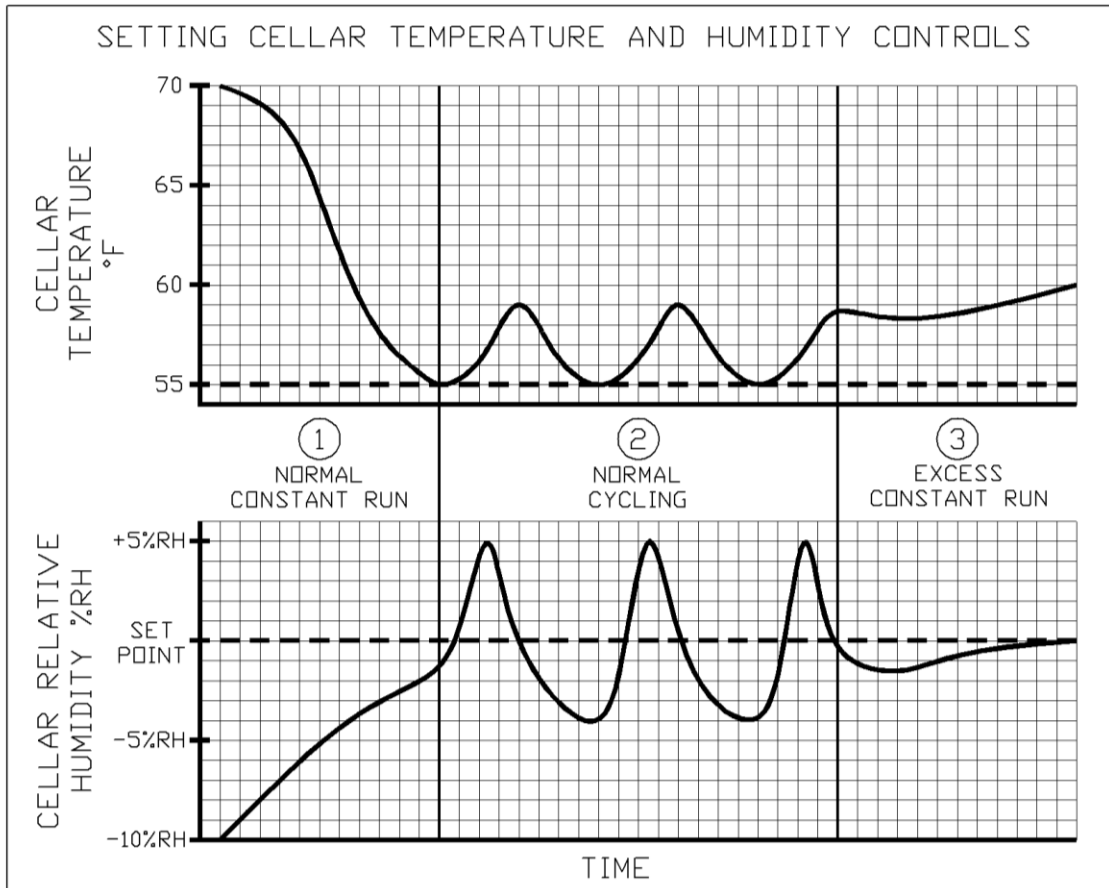
"Auto" runs the humidifier automatically based on the set-point, "Off" turns the humidifier off. To turn the humidifier off, press the "System" button until the following screen is shown:



To set the humidifier to "Auto", press the "System" button until the following screen is shown:



GUIDELINES



Region 1: Initial Cellar Startup

As the temperature pulls down, the relative humidity rapidly increases from the base humidity level. This increase in humidity will happen naturally, so for a faster pull down it is strongly recommended that the humidifier not be turned on until the cellar pulls down to the set point temperature.

Region 2: Normal Cooling Cycle

As the cellar temperature decreases it will reach the temperature set point, and the cooling unit turns off. The cellar temperature increases over time until the controller calls for cooling, and the cycle repeats. During the cooling cycle, it is normal for the humidity to drop below the humidistat set point. When the cooling unit turns off, there will be a spike in humidity that will balance out during the cooling unit off cycle. This is caused by water left on the fins of the cooling coil re-evaporating into the cellar, causing the short overshoot in humidity levels. The humidifier will control to the humidistat set point independently of the cooling unit cycles.

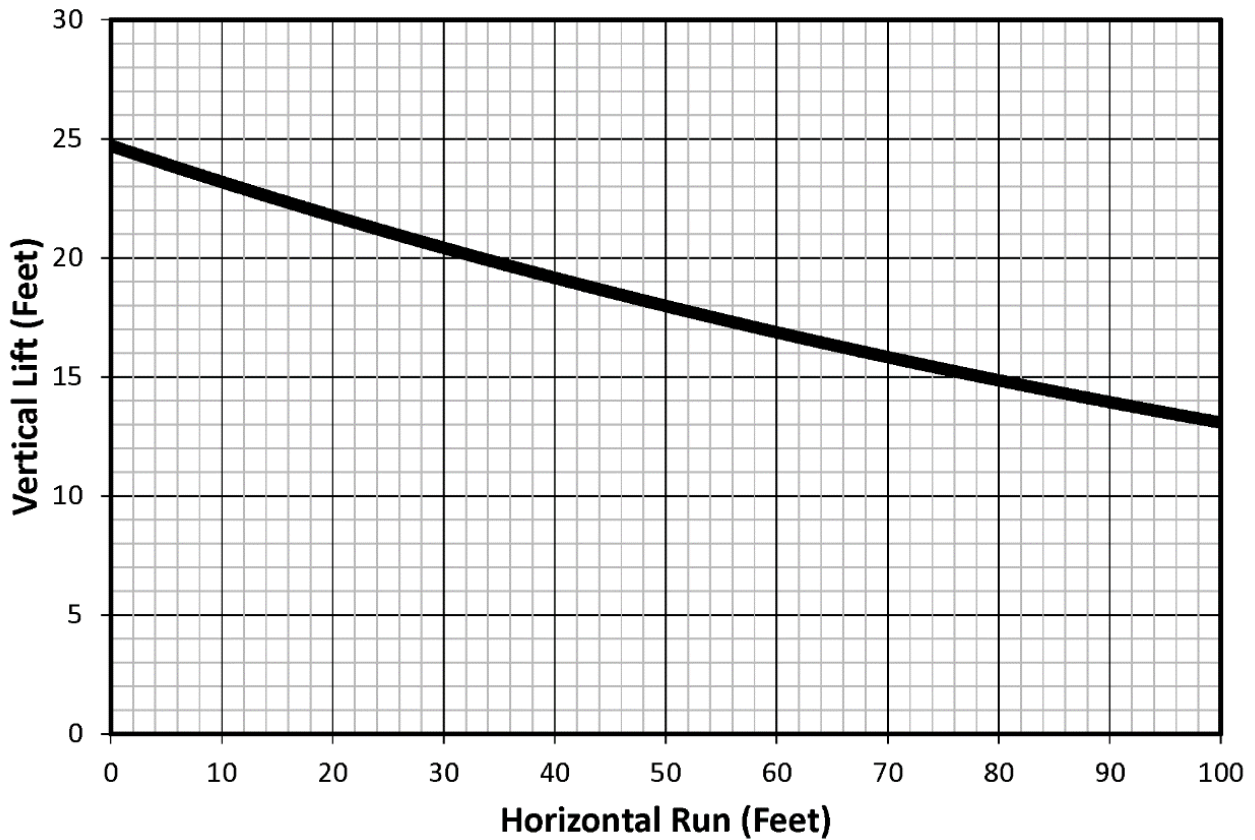
Region 3: Excess Run Time

Based on the ambient conditions and the cooling unit loading, it is possible that the humidity set point will be too high to allow the cooling unit to reach the desired temperature set point. If so, the unit will run constantly, wasting electricity and shortening the life of the unit. If the unit runs excessively, either the temperature set point must be raised or the humidity set point must be lowered until the unit cycles as shown in Region 2.

Optional Condensate Pump

The condensate pump is mounted inside the evaporator drain pan. The pump activates when the water level in the drain pan reaches a depth of 5/8", and shuts off when the water level reaches a depth of 3/16". The pump is provided with 25 feet of 1/4" PVC drain tubing. This tubing should be routed to a suitable open drain according to the following design limits:

Condensate Pump Discharge Line Design Limits



Over time, the pump sensor may become contaminated by particles in the condensate water causing the pump to run constantly. If this occurs, flush the sensor with clean water through the pump sensor housing vents.

Line Sizing Chart

Refer to the Line Sizing Chart below for selecting the appropriate tubing size for the length of the piping run. Note that the recommended line size may not match the connection ports on the Condensing unit and the Evaporator. Refrigeration grade fittings must be supplied by the installing technician to make the necessary transitions. **Transitions should be made as close to the unit as possible.** Suction line routing must be designed to ensure oil return to the Condensing unit.

Split System Line Sizing Chart

			Suction Line Size by Length ("ODS)			
Model	Liquid Line Size ("ODS) Up to 150 feet	Minimum Suction Line Insulation Thickness (in)	Up to 25 feet	Over 25 feet up to 50 feet	Over 50 feet up to 100 feet	Over 100 feet up to 150 feet
AH12Sx	3/8	5/8	3/4	3/4	7/8	1-1/8
AH18Sx	1/2	5/8	3/4	7/8	1-1/8	1-1/8
AH24Sx	1/2	5/8	7/8	1-1/8	1-1/8	1-1/8

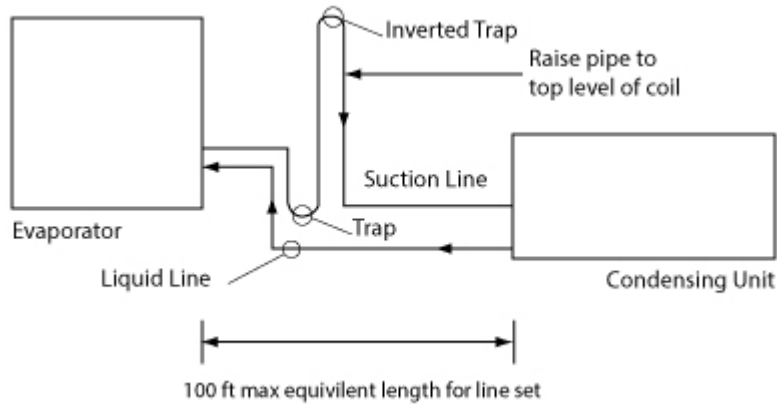
Notes:

- 1) Line lengths expressed in equivalent feet = actual run length + fitting allowances.
- 2) Chart includes allowances for Condensing Unit and Evaporator Fittings, Filter Drier, and Sight Glass.
- 3) Use only dehydrated refrigeration service tubing and refrigeration grade fittings.
- 4) Install refrigeration piping in accordance with local codes and ASHRAE guidelines.
- 5) Vertical liquid line riser limit = 30ft (when evaporator is above the condensing unit)
- 6) Vertical liquid line riser limit with optional liquid/suction Heat Exchanger = 60ft (when evaporator is above the condensing unit)

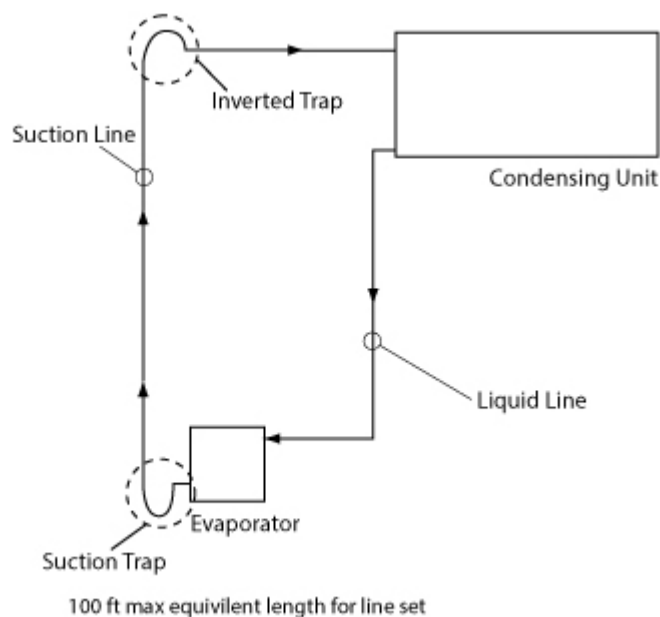
Vertical Piping Guidelines

Piping runs should be kept as short and compact as possible. Low-lying areas (oil “traps”) where oil can accumulate should be avoided. Refer to the following guidelines with regards to the vertical placement of the evaporator and condensing units:

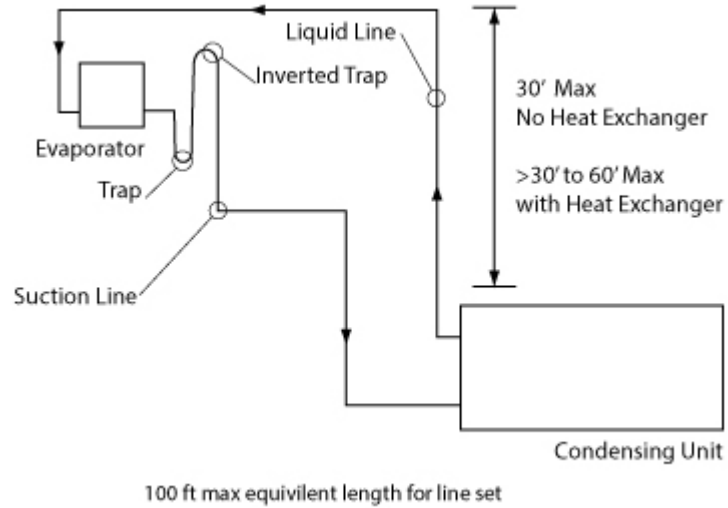
1. **When the evaporator and condensing unit are located on the same level**, pipe suction line with inverted trap as shown to prevent liquid migration to the compressor during the off cycle. Pitch the suction line **slightly downward** to the condensing unit:



2. **When the evaporator is located below the condensing unit**, a suction trap must be installed at the evaporator, and an inverted trap must be installed at the condensing unit, for proper oil return, as follows:



3. **When the evaporator is located above the condensing unit**, pipe suction line with inverted trap as shown to prevent liquid migration to the compressor during the off cycle. The vertical lift of the liquid line is limited to 30 feet. The lift may be increased to 60 feet if an optional liquid/suction Heat Exchanger is added to the field piping.



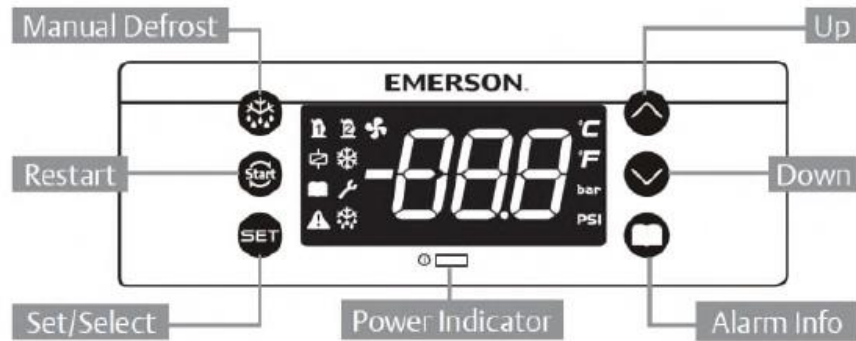
Evacuation, Leak Detection and Charging

Important note: The condensing unit and evaporator are shipped with a nitrogen holding charge. Please verify positive pressure through the access valve prior to installation. If you cannot verify the holding charge, please contact Cellarpro at 707.794.8000.

Once the piping is installed, the following steps should be performed to ensure a dry and leak-free system:

1. The Condensing unit is pre-charged with compressor oil. To avoid moisture contamination of the oil, do not leave the system open to atmosphere for more than 15 minutes.
2. Supply power to the Evaporator only - DO NOT connect power to the Condensing unit. Turn on the temperature controller and set to call for cooling, which will energize and open the liquid line solenoid valve.
3. Pressurize the system to a maximum of 150PSIG of dry nitrogen. It is important to add nitrogen through both the high and low side access valves on the condensing unit to make sure the system is fully pressurized. Mark the pressure and hold for a minimum of 1 hour. If the pressure holds, proceed to the next step, otherwise locate and repair the leak and repeat this step.
4. **Evacuate the system to a minimum of 500 microns.** It is important to pull a vacuum through both the high and low side access valves on the condensing unit to make sure the system is fully evacuated. If the vacuum is achieved, proceed to the next step, otherwise locate and repair the leak and repeat from step 4.
5. Disconnect the vacuum pump, but **leave the system under vacuum.** Use a charging scale to accurately weigh in the refrigerant. **Charge liquid R-134a refrigerant through the liquid service valve according to the charge pounds indicated in the "System R-134a Charge Guidelines" chart.** Additional refrigerant may need to be added, using the steps outlined below. DO NOT USE REFRIGERANT WITH ADDITIVES.
6. **Important: The most common causes of compressor failure are refrigerant overcharge, adding liquid refrigerant through the suction access valve, and cold compressor starts.** In order to assure that liquid refrigerant does not return to the compressor, adjust the charge as necessary to maintain a MINIMUM of 20°F superheat, measured on the suction line 6 inches from the suction valve on the condensing unit.
7. Connect power to the Evaporator and Condensing unit, and activate the system. The evaporator is programmed with a 3 minute start up delay. After the delay, the compressor will cycle through 3 Bump Starts to protect against floodback damage, then start normally. **IMPORTANT:** If the system does not power up after the start up delay and Bump Start, verify field wiring according to the appropriate wiring diagram. If correct, disconnect power from the system and contact Cellarpro at 707.794.8000.

- **Condensing Unit Controller Startup Settings:** After powering up the condensing unit, adjust the following settings on the condensing unit controller:



- Hold “SET” and “Down” for 3 seconds to enter programming mode.
- Use “Up” and “Down” to cycle through the parameters until “PAR” is displayed.
- Press “SET” to select.
- Use “Up” and “Down” to cycle through the parameters shown below. Once a parameter value is displayed, press “SET” then “Up” and “Down” to adjust, and “SET” again to save, advancing to the next parameter.
- Low Pressure Cut-In Parameter “Cin”: Set to 17
- Low Pressure Cut-Out Parameter “Cou”: Set to 5
- Defrost Mode Parameter “EdF”: Set to “nU” (off)
 - (Note: Defrost is managed by the controller on the evaporator, so this function on the condensing unit must be turned off)
- When finished, hold “SET” and “Up” to exit programming mode or wait 60 seconds for programming mode to time out.

Refer to the Condensing Unit Owners Manual provided in the condensing unit electrical enclosure for additional details on the operation of the condensing unit.

8. Measure pressures and temperatures to verify the system is within normal operating limits as indicated on the Split System Data Sheet. A loose copy of the Data Sheet is provided with the unit, and an additional copy is included at the end of this manual. The condensing pressure must be above 105 PSIG when taking these measurements. In a low ambient environment, it may be necessary to temporarily block off the condenser air intake to force the condensing pressure higher. Do not run the system if the suction superheat at the condensing unit is below 20°F.
9. It may be necessary to slightly adjust the charge amount after weighing in the recommended initial charge. 1) Not enough refrigerant: If the Evaporator is not providing enough cooling, the system may be undercharged. If liquid subcooling is below 10°F and the suction superheat is well above the minimum of 20°F, slowly add vapor refrigerant through the suction service valve until the subcooling is within specifications. 2) Too much refrigerant: If the suction superheat is below 20°F, remove refrigerant until the superheat is above this minimum limit.

10. (Optional) It should not be necessary to manually adjust the thermostatic expansion valve superheat from the factory default setting. However if desired, the superheat may be adjusted as follows: 1) Remove the cork tape insulation from the expansion valve body to locate the cap on the superheat stem, and unscrew the cap using a 5/32 in. Allen wrench. 2) Using a 5/32 in. Allen wrench, locate the setting spindle inside the superheat stem and make superheat adjustments ¼ turn at a time (¼ turn≈1°F). Turning clockwise increases superheat. Turning counter-clockwise decreases superheat. The target superheat at the evaporator is 15°F +/- 3°F. 3) Reinstall the cap and cork tape insulation.
11. Confirm that the compressor, condenser fan, and evaporator fan are energized. Allow the system to balance for 30 minutes, then record all readings on the Data Sheet and submit to CellarPro for warranty activation review.
12. Observe that the condensing unit turns on and shuts off after pump down from the 24VAC temperature controller. It may be necessary to temporarily raise the set point to force the unit to cycle off. Once the solenoid valve closes, the system pumps down and the condensing shuts off based on the value of the Low Pressure Cut-Out parameter Cou. If the condensing unit does not cycle on/off in conjunction with the status on the temperature controller, please contact the factory for assistance.

INSTALLATION TIPS & GUIDELINES

- Make sure all electrical connections are secure.
- Inspect Evaporator and Condensing unit fans to confirm airflow. There shouldn't be any excessive vibration, noise or obstructions to airflow.
- Observe system pressures and temperatures during charging and initial operation and keep note of them as they will be required for the Service and Support Data Sheet which initiates the warranty.
- Do not overcharge or use refrigerant with additives.
- Remember that bubbles in a sight glass may be caused by a restriction as well as a shortage of refrigerant. A properly charged system still may have small bubbles in the sight glass, so use actual superheat and subcooling readings to charge the system.
- Do not leave unit unattended until the system has reached normal operating conditions, and the system has been observed properly cycling on/off to the desired set point and differential.
- Make sure all access valve caps are in place and tight.

Split System R-134a Charge Guidelines

Weigh in the R-134a refrigerant via the liquid service valve according to the chart below:

Actual Line Length (ft)	System Charge (lbs) by Split System Model		
	AH12	AH18	AH24
5	5.98	6.17	6.35
10	6.19	6.56	6.75
15	6.40	6.96	7.15
20	6.61	7.35	7.55
25	6.81	7.74	7.95
30	7.02	8.18	8.44
35	7.23	8.58	8.86
40	7.44	8.98	9.27
45	7.65	9.38	9.69
50	7.86	9.78	10.11
55	8.13	10.34	10.52
60	8.34	10.76	10.93
65	8.55	11.17	11.35
70	8.77	11.59	11.77
75	8.98	12.00	12.18
80	9.20	12.42	12.60
85	9.41	12.84	13.01
90	9.63	13.25	13.43
95	9.84	13.67	13.85
100	10.05	14.08	14.26
105	10.57	14.50	14.68
110	10.80	14.91	15.09
115	11.03	15.33	15.51
120	11.26	15.74	15.92
125	11.49	16.16	16.34
130	11.72	16.58	16.75
135	11.95	16.99	17.17
140	12.18	17.41	17.59

Note:

- 1) Actual charge may vary - follow charging instructions detailed under the section titled **Evacuation, Leak Detection, and Charging** (above).
- 2) Lines sized according to Line Sizing Chart assuming actual line length plus 10 equivalent feet for fitting losses.

Limited Warranty

For five years from the date of original delivery, your CellarPro warranty covers the internal compressor if it proves to be defective in materials or workmanship. In addition, for two years from the date of original delivery, your CellarPro warranty covers all parts and labor to repair or replace any components in the wine cooling unit that prove to be defective in materials or workmanship. The warranty period starts from the time of purchase, regardless of the time of activation.

Under the terms of this warranty, CellarPro will repair or replace the original cooling unit with a new or refurbished cooling unit and, once replaced, the original cooling unit must be returned to CellarPro.

All service provided by CellarPro under the above warranty must be performed by a designated repair center, unless otherwise specified by CellarPro. Purchaser is responsible for shipping the cooling unit to and from CellarPro or to and from a designated repair facility, and for removing and reinstalling the cooling unit from the wine cellar.

The limited warranty applies only to cooling units purchased from the factory or an authorized dealer. Damage caused by others or by any cause beyond the control of CellarPro, shall not be considered defects in material or workmanship and are not covered by the warranty. The limited warranty does not cover any parts or labor to correct any defect caused by negligence, commercial use, accident, or improper use, maintenance, installation, service or repair.

THE REMEDIES DESCRIBED ABOVE FOR EACH WARRANTY ARE THE ONLY ONES, WHICH CELLARPRO WILL PROVIDE, EITHER UNDER THESE WARRANTIES OR UNDER ANY WARRANTY ARISING BY OPERATION OF LAW. CELLARPRO WILL NOT BE RESPONSIBLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES ARISING FROM THE BREACH OF THESE WARRANTIES OR ANY OTHER WARRANTIES, WHETHER EXPRES, IMPLIED OR STATUTORY.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other legal rights, which vary from state to state.

To receive parts and/or service and the name of a CellarPro designated repair facility nearest you, contact your CellarPro dealer. You may also contact CellarPro directly by calling us at 1.877.726.8496.

****REQUIRED** TO ACTIVATE THE WARRANTY
 INSTALLERS **MUST** FILL OUT THIS SHEET AND FAX TO
 707.794.8005 OR SCAN & EMAIL TO **INFO@CELLARPRO.COM****

CellarPro Split Systems must be installed by an experienced professional in adherence with industry practices and as described in the manual. If you need technical assistance during the installation, call 877.726.8496 x2.

Tech Name: _____ **Tech Phone:** _____ **Date of Measurement:** _____

System Information

Customer Name	
Condensing Unit Model #	
Condensing Unit Serial #	
Evaporator Model #	
Evaporator Serial #	
Operation Start Date	

Piping Information

MM/DD/YY

R-134a System Charge (lb)	
Line-set Length (ft)	
Liquid line diameter (OD)	
Suction line diameter (OD)	
Trap installed in drain line, charged with water, and tested for drainage (Y/N)	

Initial Refrigerant Charge Through (Check One)	<input type="checkbox"/> Suction Access Valve	<input type="checkbox"/> Liquid Access Valve
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Operational Data: *Take the following measurements during a normal refrigeration cycle, once the cellar has pulled down to the set-point temperature. Make sure the compressor is running when recording the data.*

Evaporator						Range
Air temp. at Evap coil (°F)	Inlet		Outlet		TD	8-10°F TD
Evaporator power supply	Volts				Amps	187-253V nameplate amps

Condensing Unit						
Air temp at Condenser coil (°F)	Inlet		Outlet		TD	20-30°F TD
Condenser fan status	___ On		___ Off			
Suction readings access valve	PSIG		°F		SH	25-35 PSIG 20°F Min. Superheat
Liquid readings at access valve	PSIG		°F		SC	105-180 PSIG 8-12°F Subcooling
Emerson Controller Parameters	Cin		Cou		EdF	
Condensing unit power supply	Volts				Amps	187-253V nameplate amps

Please provide the email address to contact with the warranty activation: _____