nyle Dehydrators

MD-SERIES

Modular Heat Pump Dehydrator

USER MANUAL

www.nyledehydrators.com

NSF

MADE IN USA
WITH U.S. & IMPORTED PARTS

Table of Contents

Introduction

General Information

Nyle Dehydrators offer commercial users an energy-efficient and controllable means of dehydrating from 80° to 160°F. The dehydrators gather energy from moisture-laden air through a refrigeration cycle, depositing the extracted energy back into the circulating air to maintain the desired drying temperature. Through this cycle, water is removed from the product.

Nyle Dehydrators consist of a dehumidification unit and airflow control components positioned within an insulated drying chamber. These units are built specifically for small to large sized commercial batch dehydrating applications where temperature and humidity during the drying process may be closely monitored and controlled.

Safety Information

Installation and servicing of heat pump equipment can be hazardous due to system pressure and electrical components. Please note that only trained and qualified service personnel should perform installation, repairs, or service on Nyle dehydrators. When performing installation, repair, or service on the unit, observe precautions in the manual, tags, and labels attached to the unit. Follow all other safety precautions that may apply.

Improper installation, adjustment, alteration, service, maintenance, or use can cause an explosion, fire, electrical shock, or other hazardous conditions which may cause personal injury or property damage. Always consult a qualified installer, service agency, or distributor for information or assistance.

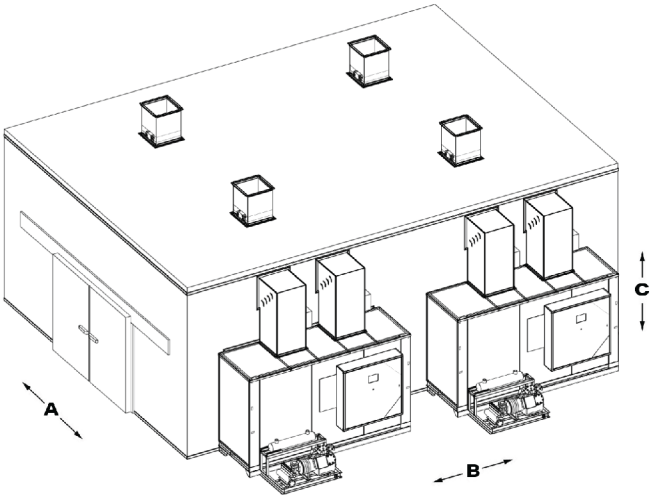
- Do not stand or sit on the unit.
- Disconnect all power before removing the control panel.
- There is no need to remove the control panel unless there is a malfunction internally. Only a licensed technician is to remove the control panel.
- Disconnect all power before installing or servicing the unit.
- Ensure the power supply is rated for the appropriate load.
- Ensure the electrical supply has proper over-load fuse or breaker protection rated for at least the appropriate amperage.
- Moving or lifting the unit components should be done with team lifting or appropriate equipment to prevent back injuries or damage to components. Never lift or move the unit alone.

Follow all safety codes. Wear safety glasses and work gloves. Read these instructions thoroughly and follow all warnings or cautions attached to the unit. Consult local building codes and the National Electrical Code (NEC) for special installation requirements.

Model Information

Dimensions

	A (ft +in)	B (ft +in)	C (ft +in)
MD-110	13’ 4”	15’ 0”	12’ 0”
MD-120	13’ 4”	29’ 0”	12’ 0”
MD-130	13’ 4”	43’ 0”	12’ 0”
MD-140	13’ 4”	57’ 0”	12’ 0”
MD-210	21’ 4”	15’ 0”	12’ 0”
MD-220	21’ 4”	29’ 0”	12’ 0”
MD-230	21’ 4”	43’ 0”	12’ 0”
MD-240	21’ 4”	57’ 0”	12’ 0”



Nomenclature

Model Number System

MD _ _ _ _ _ _

- DH Equipment: →
- Number of DH Units on the Rear
- Number of DH Units on the Front
- Chamber Depth: →
- Chamber Width:
- Series: FD

DH Unit	DH 145	DH 225
Water Removal Rate	145 lbs/hr	225 lbs/hr
Power Options	480V Three Phase, 50 HZ 480V Three Phase, 60 HZ	

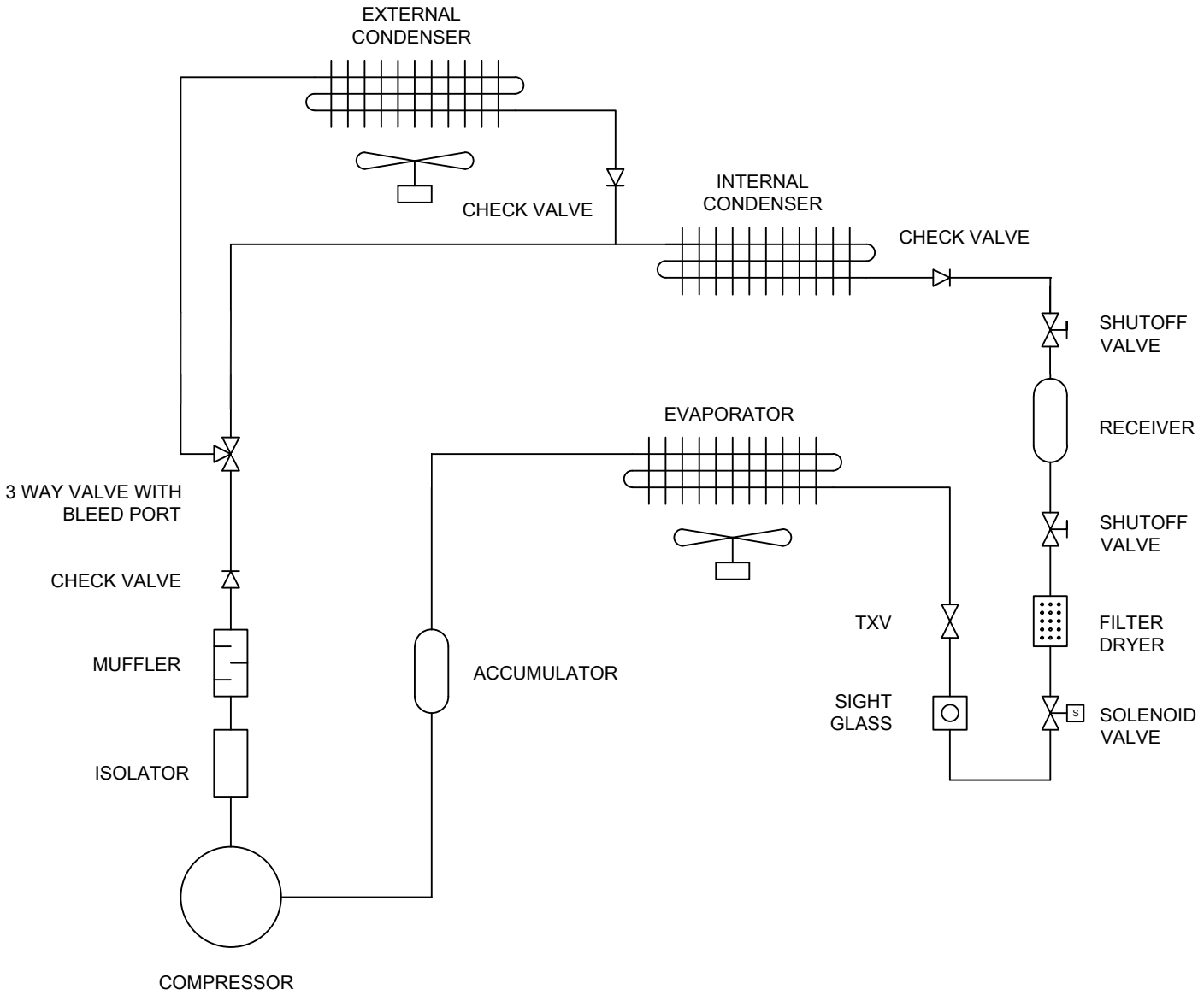
10	20	30	40
15’ 0”	29’ 0”	43’ 0”	57’ 0”

1	Single Width	13’ 4”
2	Dual Width	21’ 4”

Technical Specifications

Series	Compressor Type	Refrigerant	Temperature Range
MD	Semi Hermetic	R-513a	Drying Temperature: 80° - 160° F Auxiliary Heat (Kill Step): 160° - 180°F

Refrigeration Diagram



Pre-Installation

IMPORTANT: Please read this entire manual before installation. Be sure to follow all installation steps. Failure to conform to these instructions may decrease dehydrator performance and cause severe injury or death. Only qualified, licensed persons should install the equipment and electrical supply. Installation must conform to all applicable local, state, and federal codes.

Receiving & Storage

When receiving shipment at the job site, carefully inspect the shipment against the bill of lading. Please make sure that all units have been received as ordered. Inspect each unit's shipping crate/packaging and inspect each unit for damage. If there is a problem, notify the shipping company to properly notate any shortages or damage on all copies of the freight bill.

NOTE: It is the responsibility of the purchaser to file all necessary claims with the shipping company.

If the equipment is not needed for immediate installation upon arrival at the job site, it should be left in its shipping carton(s) and stored in a clean, dry area of the building. Heat pump units must be stored in an upright position at all times. Do not remove any equipment from its shipping carton(s) until it is needed for installation.

Unit Location

1. Units are for indoor use only.
2. Provide sufficient space for water and electrical connections.
3. Allow enough space for service personnel to perform maintenance. *(ensure there is at least 3ft in front of electrical cabinet.)*
4. Allow enough space around the chamber footprint for chamber construction.
5. If shifting partially assembled chamber walls into a building corner or against a building wall, allow a minimum of 2" clearance between the drying chamber and existing building walls to allow air circulation.
6. Allow enough space for free air movement to and from the external condenser fan.

Installation

Chamber Installation

Follow the chamber manufacturer's instructions for installing the pre-fabricated insulated drying chamber. These instructions will be included with the chamber shipment or in this manual.

All seams and gaps should be closed either by NSF-approved gaskets or NSF-approved silicone caulking. The unit must be sealed to the floor using NSF-certified gaskets or NSF-certified silicone caulking.

Particular attention should be given to caulking joints between insulated panels during installation. This will prevent moisture migration into panel joints.

Connecting Wiring

A licensed professional should perform all electrical work and adhere to all local and state codes.

The wiring panel is located behind the door, which sits on the D.H. unit. Follow the nameplate information located on the unit for proper voltage, phase, amps, breaker sizing, and wire sizing. Locate a fused disconnect as close as possible to the heat pump.

NOTE: Check to ensure that fans rotate in the correct direction. If fans run backward on a unit requiring 3-phase power, switch 2 legs of the incoming power at the distribution block.

System Usage

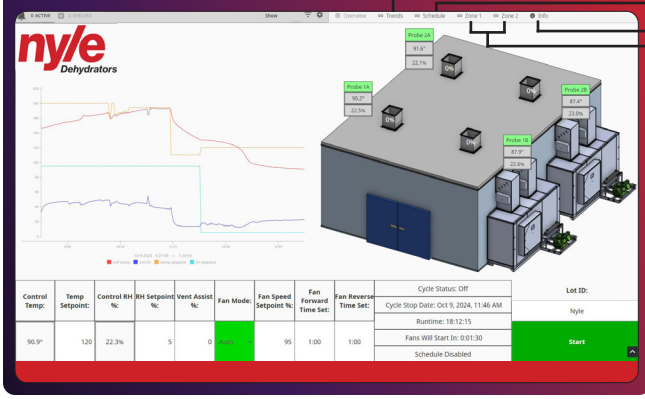
Before Start Up

Verify the following:

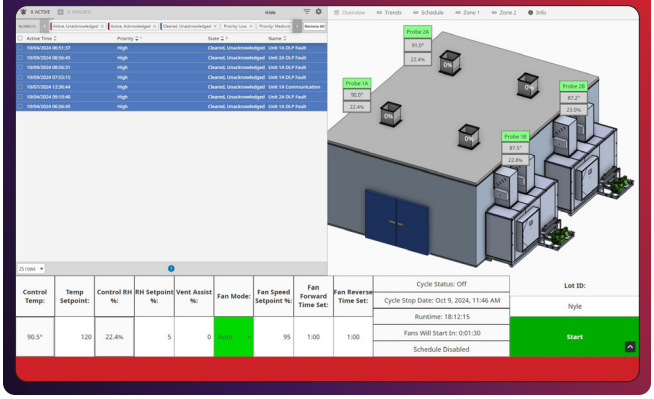
- Voltage is correct and matches the nameplate.
- Temperature/RH sensor is mounted near the air intake of the DH unit.
- Service panels are in place.
- Emergency stop is deactivated (twist counterclockwise until the button pops out)

Control Screen Navigation

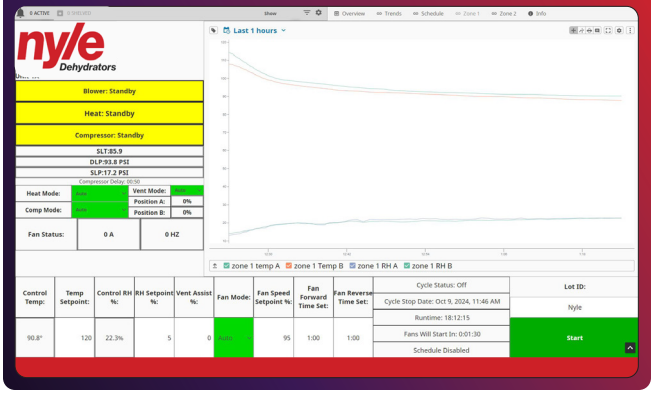
Home Screen



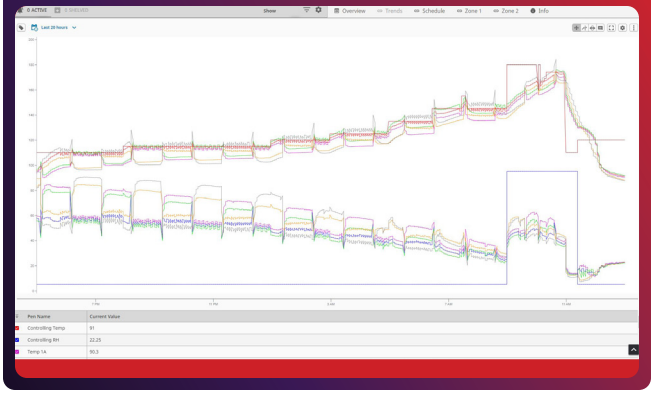
Alarm Screen



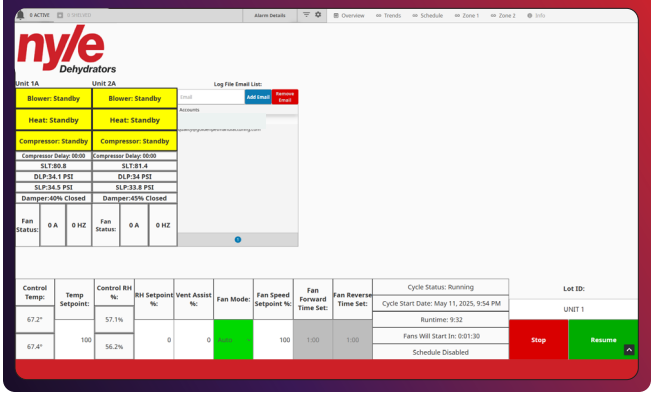
Equipment Screen



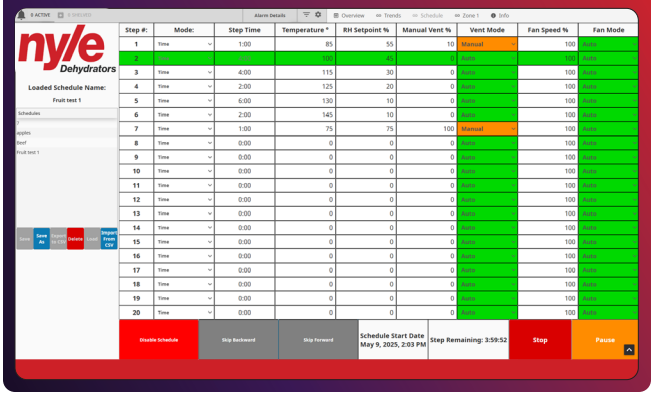
Trend Screen



Information Screen

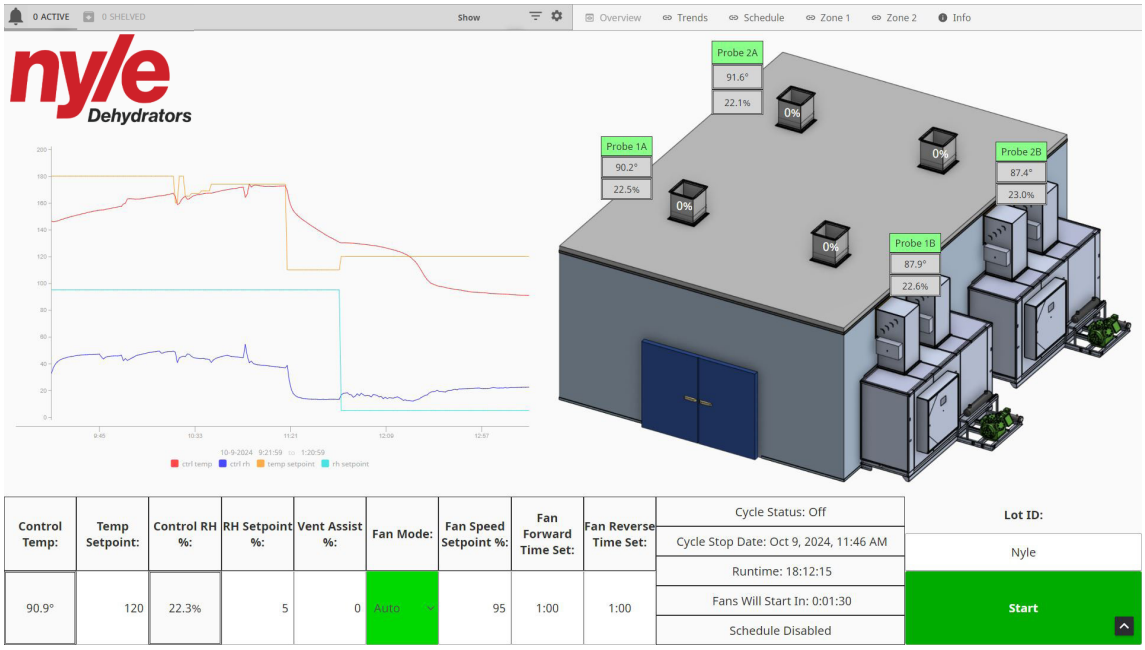


Schedule Screen



Control Screen Overview

Home Screen



The home screen provides basic process information, including:

LotID: Indicates the name of the cycle that is running. This is also the name of the log file that will be created for each batch.

Status: Indicates the status of the dehydrator. If an alarm is present, it will show here.

Cycle Start/Stop Date: Indicates the date and time a cycle was started or stopped.

Runtime: Indicates the total runtime in Hours and Minutes

Schedule: Indicates the status of the schedule, If enabled it will display the current step number, and the time remaining for the current step.

Fan Status: Indicates when fans will start, and the amount of time before they reverse direction.

Fan Time Setpoints: Used to adjust the time that the fans will spend running in each direction, these fields are only editable when the unit is not running.

Fan Speed Setpoint: Adjusts the fan speed between 25% and 100% to vary the airflow in the chamber, this field is display only when a schedule is enabled.

Fan Mode: Sets the direction for the fans to run, Auto will alternate airflow depending on the forward and reverse fan timers, this field is display only when a schedule is enabled.

Control Temp: Indicates the current chamber temperature used for controlling equipment.

Control RH: Indicates the current chamber Humidity used for controlling equipment.

Temp Setpoint: Desired temperature setpoint, this field is displayed only when a schedule is enabled.

RH Setpoint: Desired humidity setpoint, this field is displayed only when a schedule is enabled.

Individual Probe Readings: Displays the current temperature and RH readings of the temperature probe within the chamber. These will be labeled with the zone number, and a letter denoting what side of the chamber it is installed on ie. “Probe 1A” .

Navigation Menu Bar:

“Overview”: Changes the display to the Overview screen.

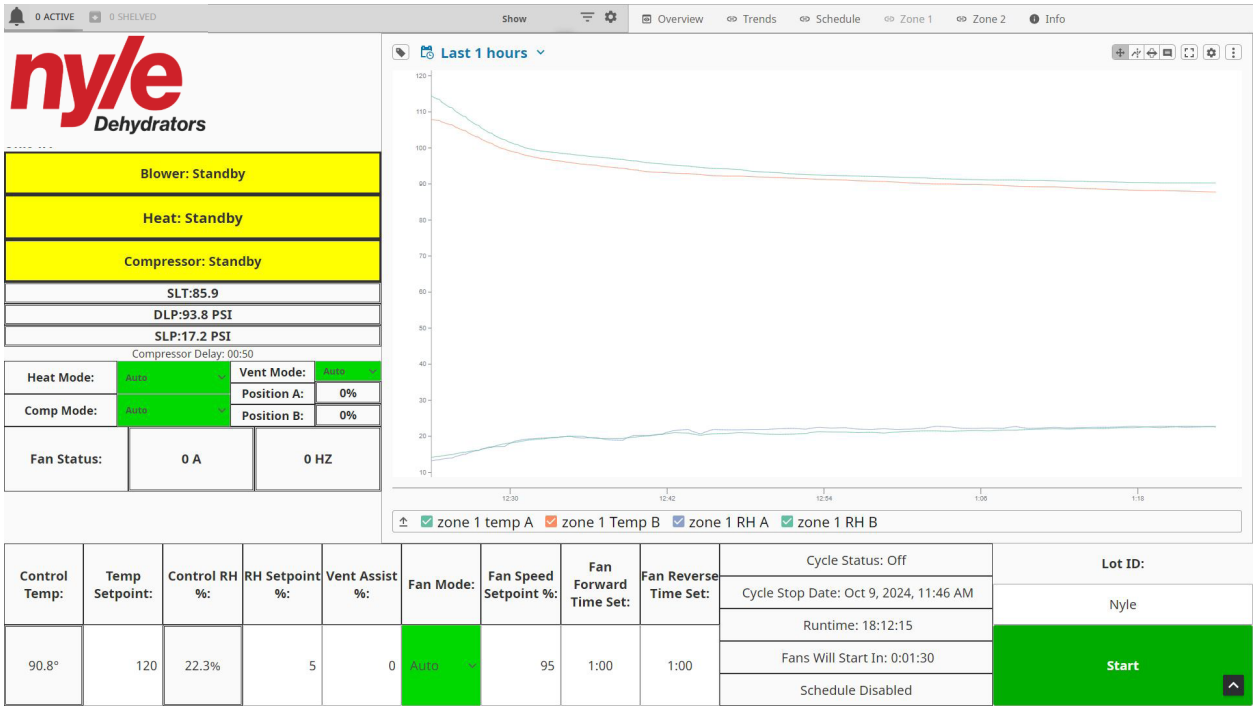
“Trends”: Changes the display to the Trend Screen.

“Schedule”: Changes the display to the Schedule Screen.

“Zone 1”: Changes the display to the Equipment Screen for that zone.

“Information” button: Changes the display to the Information Screen.

Equipment Screen



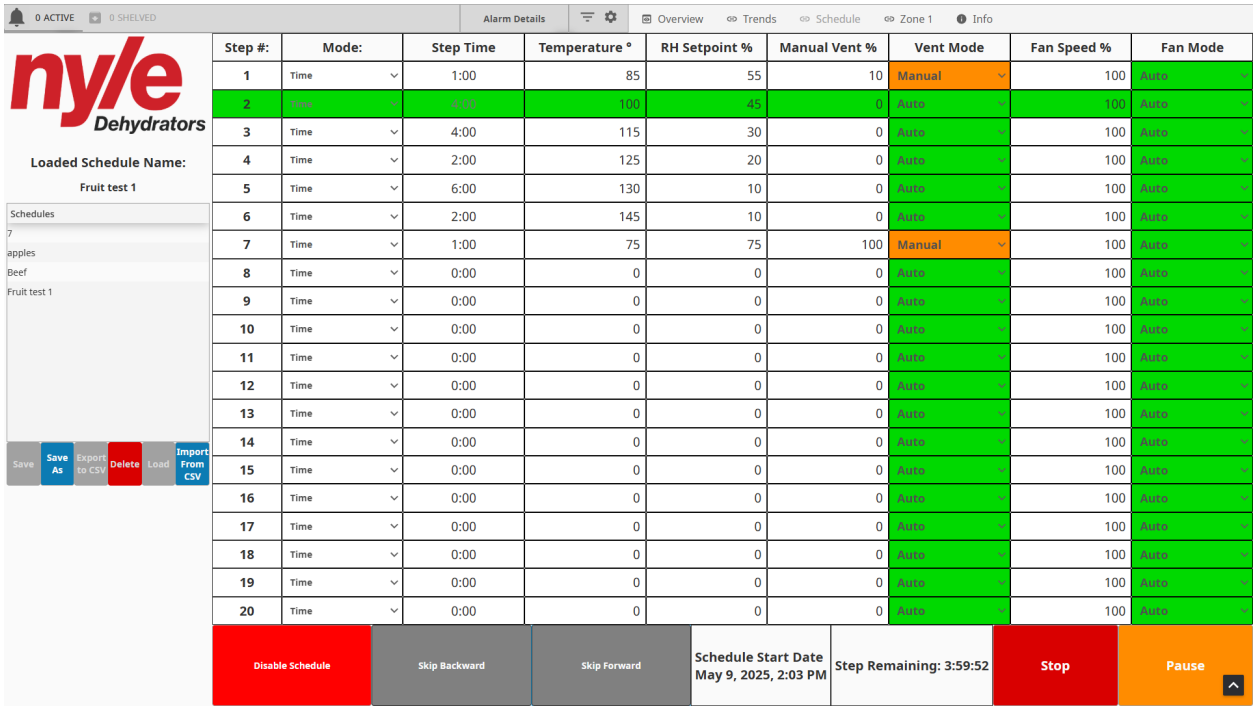
The equipment screen provides control options to the user. There is a screen associated with each modular zone of your chamber.

Heat Control: allows you to control the heater and the setpoints.

Cool Control: allows you to control the vents.

Comp 1 Control: allows you to control the compressor as well as monitor the line pressures.

Schedule Screen



The schedule screen allows the user to manage dryer scheduling. Further details concerning schedule operation are included in the schedule management portion of the manual.

"Step" column: Identifies the step number.

"Step Mode" column: Indicates the type of step mode selected for the particular step number.

"Step Time" column: Indicates the run time in minutes selected for a "Time" step mode.

"Temperature" column: Indicates the temperature set point selected for each step number.

"RH Setpoint %" column: Indicates the relative humidity set point selected for an "RH" step mode.

"Manual Vent %" column: Allows you to set a manual vent amount per step, This setting is only used if the vent mode is set to "Manual".

"Vent Mode" column: Allows you to set the vent mode to enable, disable, or manually adjust the vents per step.

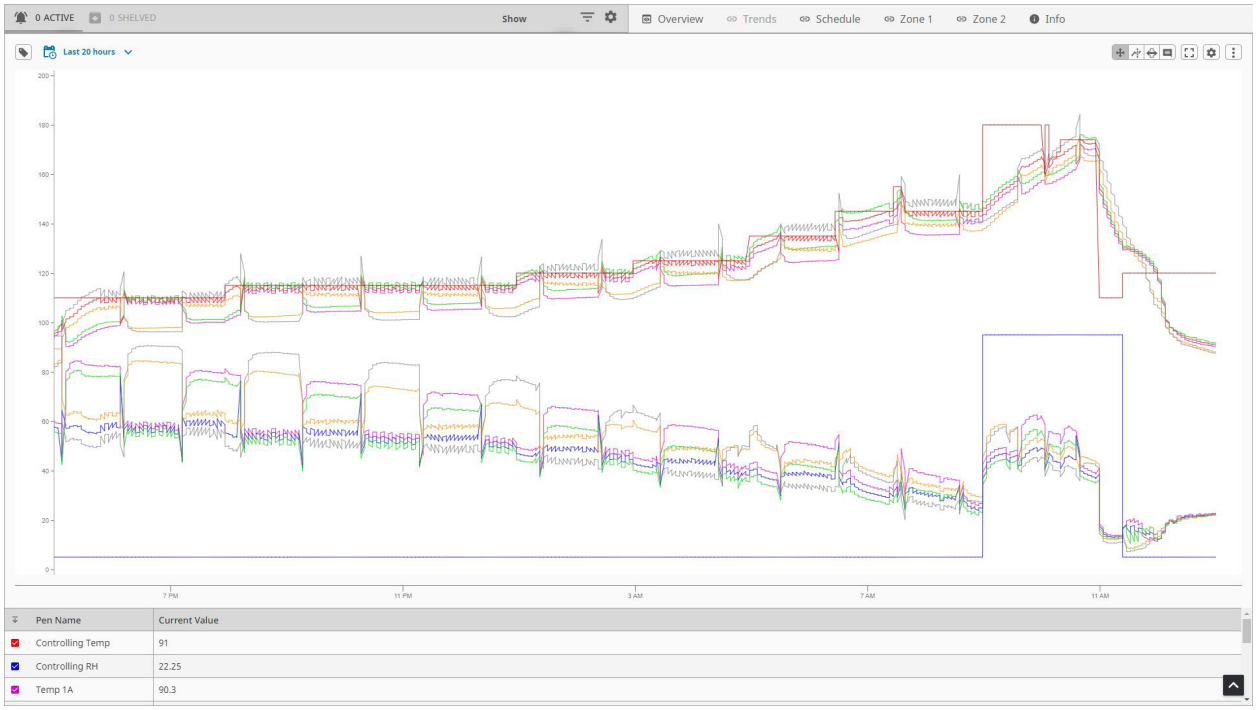
- **Off:** Disables the vents and keeps them closed.
- **Auto:** Puts vents in regular auto mode.
- **Manual:** sets the vents to hold a fixed setpoint as shown in the "Manual Vent %" column.

"Fan Speed %" column: Indicates the percentage of fan speed (25-100%) selected for each step number.

"Fan Mode" column: Indicates the fan mode.

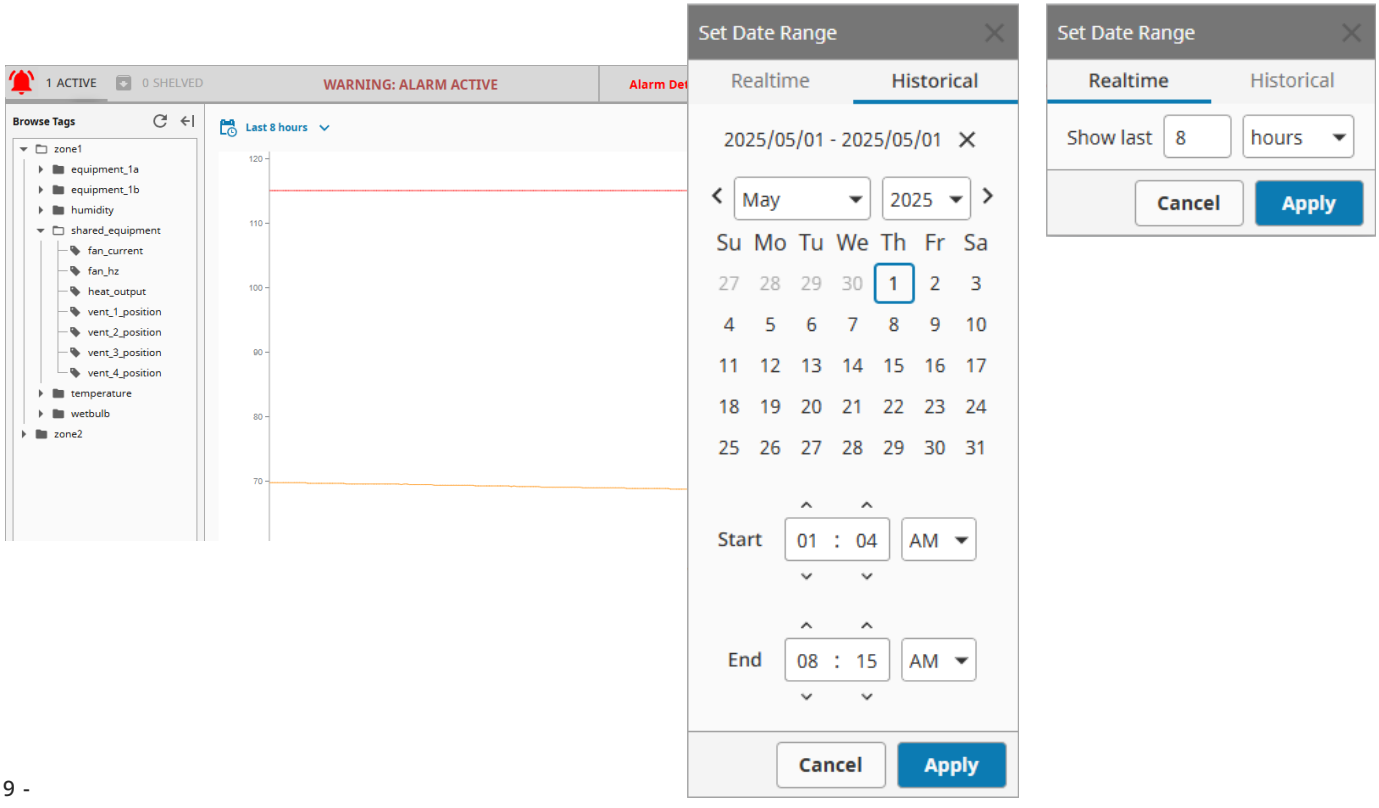
- **Off:** Disables the fans for the entirety of the step.
- **Auto:** fans automatically reverse at set time intervals.
- **FWD:** Fans run in the forward direction only.
- **REV:** Fans run in the reverse direction only.

Trend Screen

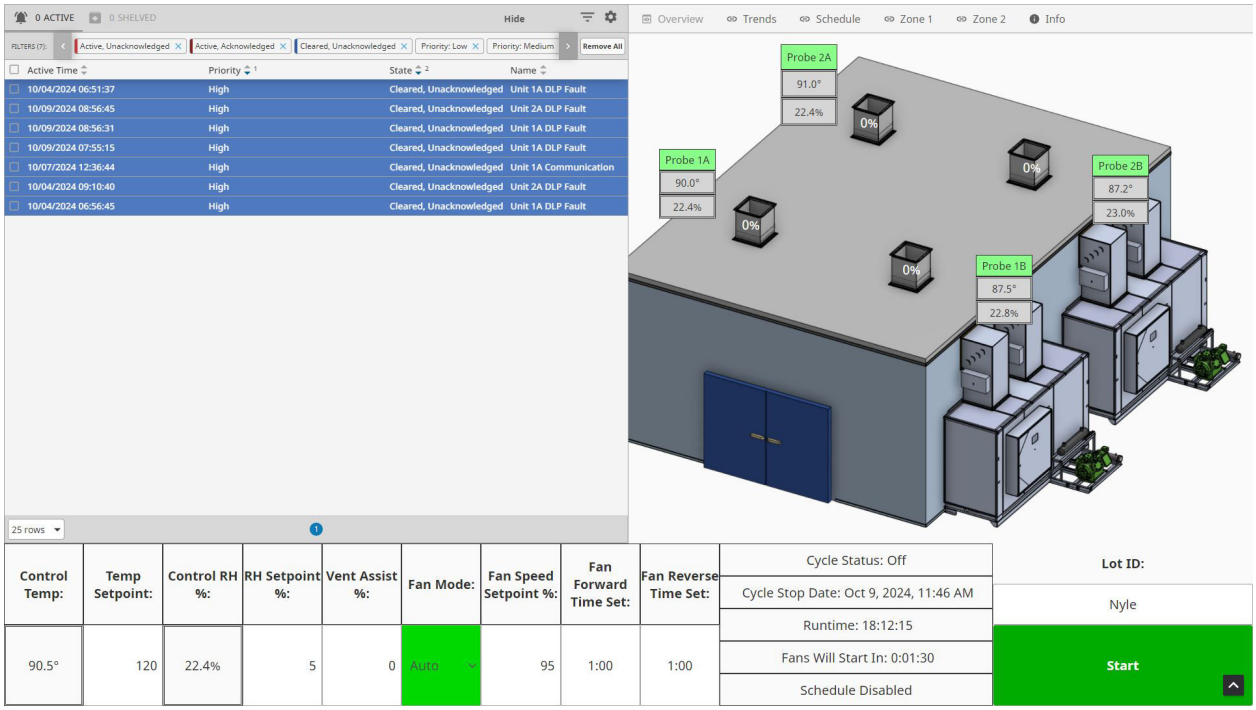


The trend screen lets the user view datapoints recorded in the historian. The datapoints shown on the graph can be viewed and edited at the bottom of the trend. Other datapoints can be added by selecting the tag icon in the top left. This will open a menu where you can browse the datapoints and add them to the trend.

You can also adjust the time frame to display real time data, or a fixed range in history by clicking on the calendar icon and adjusting settings to set the time frame you would like to view.

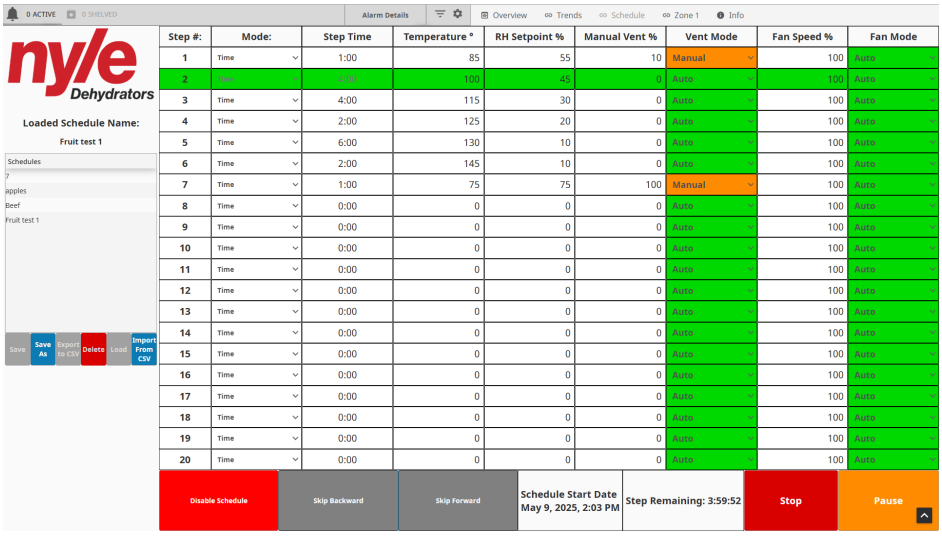


Alarm Screen



The alarm screen allows the user to view both current active alarm conditions, and the history of previous alarms. Alarms will display red if they are active, and they will show as blue when they have been cleared. To remove the blue alarm history, you can select the alarm and acknowledge it to clear it from that alarm table. If there are active alarms the alarm notification bar will display a flashing red warning, and the number of active alarms in the top left corner.

Schedule Management



Schedule Operation

The schedule is equipped with 20 Steps, and 4 step modes. The schedule is used to automatically change setpoints depending on the step number. To enable a schedule, fill out the schedule as desired, then start the dehydrator with the start button on the bottom right, then you can press the enable button on the left to start the schedule. You can skip forward and backwards through steps in the schedules with the skip buttons. This will restart the schedule at the next or previous step. For unused steps, set the mode to “Time” and the step time to 0:00. You can edit all steps while the schedule is running except the current active step.

The schedule has several columns for setpoints, and their use is shown below:

“Step #” column: Identifies the step number.

“Step Mode” column: Indicates the type of step mode selected for the step number. The mode is used to determine when the “Step Time” timer starts counting.

- **Time:** Timer starts as soon as the step starts
- **Temp:** Timer starts once the temperature setpoint has been reached
- **RH:** Timer starts once the RH setpoint has been reached
- **Validation:** Timer starts once both the Temperature and RH setpoints have been reached

“Step Time” column: Indicates the run time in Hours and Minutes to run the step. This timer starts depending on when the mode conditions are reached.

“Temperature” column: Indicates the temperature set point selected for each step number.

“RH Setpoint %” column: Indicates the relative humidity set point selected for each step number.

“Manual Vent %” column: Allows you to set a manual vent open percentage per step, this setting is only used if the vent mode is set to “Manual”

“Vent Mode” column: Allows you to set the vent mode to enable, disable, or manually adjust the vents per step

- **Off:** Disables the vents and keeps them closed
- **Auto:** Puts vents in regular auto mode
- **Manual:** sets the vents to hold a fixed setpoint as shown in the “Manual Vent %” column

"Fan Speed %" column: Indicates the percentage of fan speed (25-100%) selected for each step number.

"Fan Mode" column: Indicates the fan mode.

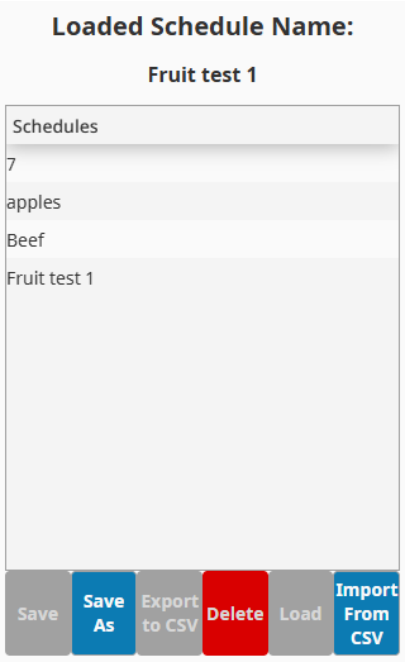
Off: Disables the fans for the entirety of the step

Auto: fans automatically reverse at set time intervals

FWD: Fans run in the forward direction only

REV: Fans run in the reverse direction only

Save, Load, Delete, Import, and Export Schedules:



The browser on the left hand side will show the schedules that are currently saved, and can be loaded into the schedule.

To save a new schedule: enter your setpoints on the schedule, then click the "Save As" button. This will open a text box where you can enter the name of the new schedule. After it saves, it will appear in the list.

To save edits to a schedule: make all adjustments to the setpoints, then select the schedule you would like to save to in the schedule browser. Once you have selected a schedule, the save button will become enabled. Clicking the save button will ask you to confirm your changes and save the schedule.

To load a schedule: select a schedule from the schedule browser, this will enable the load button. Clicking the load button will replace all the schedule setpoints with the selected schedule after confirming.

To delete a schedule: select the schedule you would like to remove from the schedule browser. Then click the delete button. After confirming it will delete the schedule out of the schedule browser.

To export a schedule to a CSV: you will have to install a FAT32 USB drive into the usb port on the Opto22 groov epic controller. Once you have a USB Drive installed, you can select a schedule from the schedule browser and click the export button. After confirming it will create a new CSV file in the "Schedules" folder on the USB drive.

To Import a schedule from a CSV: install the FAT32 USB drive with the schedules stored on it into the opto22 groov epic controller. Then click the import button, This will bring a popup of all the schedules on the USB drive. Select the schedule you would like to import and then click the import button. Once imported the new schedule will appear in the schedule browser and it can be selected and loaded.

If a schedule has been loaded it will display the name of the currently loaded schedule. Since schedules can be edited without being saved, it will display the name of the last loaded schedule, and if it has been edited under the "Loaded Schedule Name"

Schedule Monitoring

If a schedule is active, the current running step will display in green. The bottom will also show when the schedule was started, and how much time is remaining for the step. If the step timer is not counting down then the conditions to start the time determined by the step mode have not been met.

Schedule Start Date **May 12, 2025, 8:13 AM**	**Step Remaining: 3:49:42**

Drying Theory

Dehumidification drying should be understood as a two-step process: moving dry air absorbs water from a moist product, & the refrigeration system removes the water from this air as it passes over a cold surface. This cycle repeats until the moisture in the product reaches equilibrium with the moisture content of the air. Several factors affect each step of this drying process, ultimately affecting the drying time achieved by your Nyle dehydrator.

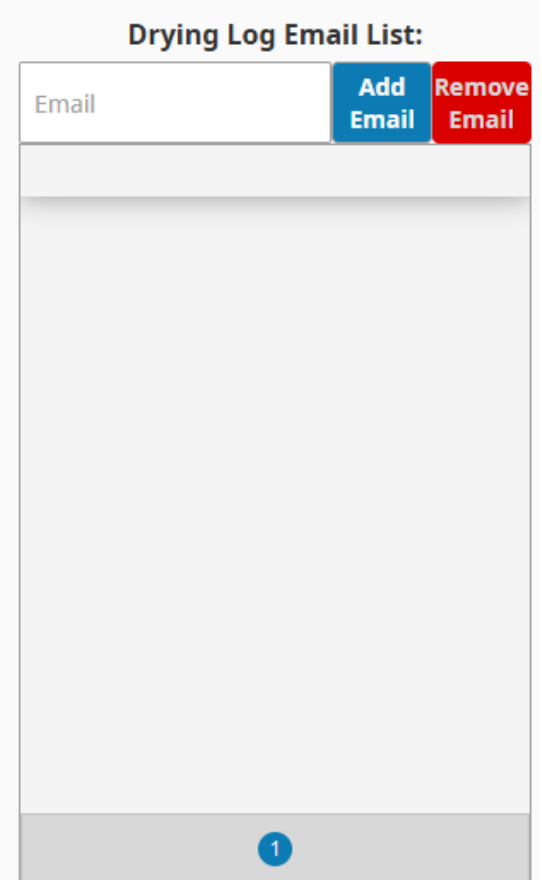
For moisture to be removed from the air within your chamber, moisture must first be removed from your product. Air temperature, velocity, and product characteristics affect this process. Generally speaking, higher temperature and air velocity will result in shorter drying cycles. Product characteristics vary widely and include characteristics inherent to the raw product itself and those caused by any processing that takes place before the drying process begins. For example, thinner, more porous products usually dry more quickly than thicker, dense products.

Once moisture is removed from your product and absorbed into the air within the chamber, the dehumidification system can remove this moisture and drain it away. The moisture removal capacity of the dehumidification system is most affected by the desired drying temperature. Drying temperatures warmer or cooler than the rated condition (115°F) will tend to change capacity.

To control your drying process, you will choose a drying temperature and relative humidity "target." The relative humidity target represents the air moisture content at which you wish your product to be in equilibrium with when it is finished. This equilibrium occurs at the point of the "Equilibrium Moisture Content" (EMC) and varies by product and drying temperature. Although published data is available for many products, your results may vary based on raw product inconsistencies, ambient atmospheric conditions, and proprietary product processing. Some experimentation will be necessary to achieve your desired results.

Data Logging

Data is continuously recorded in the tag historian, and it can be viewed and exported from the trend screen. The controls also automatically create drying log files with a comprehensive list of probe data for each cycle. These log files are automatically emailed to the recipients added to the log file email list on the info screen. The log files are also stored internally and are transferred to the USB drive in the opto22 groov epic controller. If an email isn't sent because of an internet outage, the data logs can be retrieved from the USB drive. The USB must be a FAT32 formatted drive.



Maintenance

General Maintenance

The MD-Series is designed for continuous duty with little maintenance. However, when a problem does arise, prompt repair will ensure a long life for the machine.

Preventative Maintenance

Schedule

Prior to Loading the Chamber

- Chamber clean, swept or blown out with compressed air
- Baffles visually inspected, lifting mechanism, hinges, plates/sheets
- Cart Check – wheels spring freely? grease if required
- Cart Check – Bend? Bolsters/bearers level & parallel
- Fans & Motors, all running, close door & run empty, check for loose panels
- Mechanical Overloads Tripped
- Fuses checked
- Vents - manual test full close-open-close from controller
- Drain line clean (free from debris that could plug it up)

Daily

- Electric panel, check overloads, fuses
- Check Control graphs for abnormal movement in temperatures
- Observe one vent cycle through close open close
- Check Compressor operating temps & pressures are within range
- Check Compressor oil levels while running
- Check refrigeration system for leaks
- Check if baffles are still in place, visually if possible

Monthly

- Clean and replace filter
- Grease cart bearings
- Inspect: Fans & Blowers, V-belts, bearings shafts, motor covers, blower assemblies
- Inspect Vent/damper system, linkages, actuators
- Inspect Evaporator coil coating for flaking or peeling
- Inspect Refrigeration piping
- Check probe accuracy
- Blow dust out of electric & VFD panels with dry air

Every Three Months

- Grease all motors & bearings
- Clean drain pans
- Check belt tension to >1/2 inch of play
- Check electrical components for unusual wear, burnt or pitted contacts & loose connections

Yearly

- Lubricate Exhaust Dampers and Linkages*

**Lubricate with NSF-compliant lubricant; details on following pages for maintenance.*

Parts List

- Belt(s) 10022870 1
- Filter material 10147153 2
- Refrigerant 10194820 3
- Filter Drier 10055134 3
- Acid Test Kit 10055148 3
- NSF Grease 1018753 1
- Comet Sensor 10063871 2
- Suction Line Temp Sensor 1064000 3
- Belimo ZTH Tool 10000394 1

Unit/Chamber Inspection

Inspect the unit and chamber for signs of leaks. Yellow-tinted streaking will appear near leaks on both the chamber and unit. Troublesome areas are typically the seams between chamber panels, near vents, fans, and unit/duct cutouts in the chamber. If streaking is present, use NSF-compliant 100% RTV silicone rated at 160°F+ to seal these areas. Remove old silicone before applying a new bead. Keeping the unit sealed tight will ensure your drying cycle is as efficient as possible.

Air Inlet Filter Maintenance

The air filters are provided to keep the air inside the DH unit as clean as possible. Dirt build-up on the coils will lead to poor heat transfer with a loss of water removal efficiency. In extreme cases, the coil will clog entirely. The supplied filter should be replaced when light can no longer shine through it after cleaning.

Damper assembly inspection

The interior damper assembly consists of metal blades just behind the unit's blue filter media. The damper assembly should consist of 3 sections of blades, two sections on the ends and one in front of the evaporator. The sections on the ends should be approx. 180° apart from the ones in front of the evaporator. This allows us to regulate flow over the evaporator as necessary. Be sure all linkages are tight and work together without binding. The nylon bearings supporting the damper assembly are also a point of wear and should be inspected during this time.

Coil Cleaning

NOTE: These recommendations apply to all Nyle Systems DH-based drying units and may be considered a part of standard maintenance procedures for the trouble-free operation of the system.

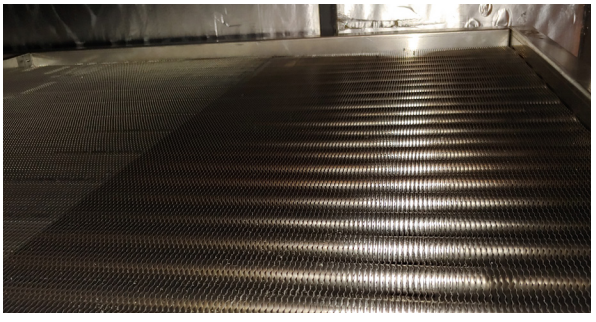
Your dehydrator relies on a refrigeration system to efficiently dehydrate your product. As part of each refrigeration system, refrigerant-to-air heat exchangers ("coils") are used to complete the refrigeration cycle. Over time, refrigeration coils may become dirty as air is pulled through them, resulting in lower dehumidification performance and reduced operating efficiency. Your dehydrator includes two to six coils which should be inspected and cleaned periodically to maintain optimum performance and efficiency.

The coil most prone to soiling is the evaporator coil. The Evaporator Coil must operate below the dew point temperature of the chamber conditions to allow process condensate to form on it. Process Condensate is generated from the moisture removed from your product. In this process, condensate drips down into a stainless steel drain pan, where it is piped away. A trap needs to be added in the condensate line for the condensate to drain properly. Because this coil becomes wet during drying, it tends to gather particulates traveling in the air stream, which build up over time.

Coil cleaning procedure:

1. Ensure that the DH unit is shut down. Follow proper lock-out tag-out procedures.
2. Remove service panels allowing access to the coil to be cleaned.
3. Inspect the coil for damage or debris. Remove dry debris by gently blowing compressed air through the coil fins or vacuuming the coil fans. If using compressed air, blow through the coil from the back towards the front or opposite the direction of airflow.

Warning: Coil fins are sharp and represent a cut hazard to bare hands. Wear proper PPE before conducting coil cleaning. Coil fins are fragile and require gentle treatment to prevent bending, which can result in a subsequent reduction in performance.



4. Use an FDA-approved coil cleaning chemical to remove built-up material on the fins. Follow all manufacturer directions included with the cleaner. Depending upon the chemical chosen, gently rinsing the coil after applying the cleaning chemical may or may not be necessary. Repeat cleaning if necessary.
5. Rinse the condensate drain pan and drain line to prevent clogging.
6. Reinstall service panels before using the system again.

Blower System Maintenance

This system should be serviced every 4-6 months.

The system should be checked for the following:

1. Worn blower shaft bearings.
2. Loose, tight, or worn belts.
3. Loose drive and driven sheaves.
4. Loose bearing and motor mount bolts.

The blower shaft bearings require 2 pumps of high-quality NSF-compliant grease.

The belt tension must be correct. If too tight, reduced bearing and belt life will result. If too loose, belt life will be shortened due to slippage. The ideal situation would be for the belts to be as loose as possible without squealing.

Correct tension is ½" deflection at mid-span with a force of 5 to 8 pounds.

Belt tension should be checked after the first few days of high temperature (140° F +) operation due to initial belt stretch.

Always change belts in pairs because a new belt will do more work than a stretch-used belt, ruining the new belt.

Belts should never bottom in the groove of the sheave. This is a sign of over-tightening. Belts get their grip from the sides. If it bottoms, this grip goes away, and no amount of tightening will return the grip.

Never stretch the belt over the pulleys; this will break the inner cords. Always reduce the center distance when replacing belts motor base moves to reduce center distance. Install the belt on the smaller pulley first.

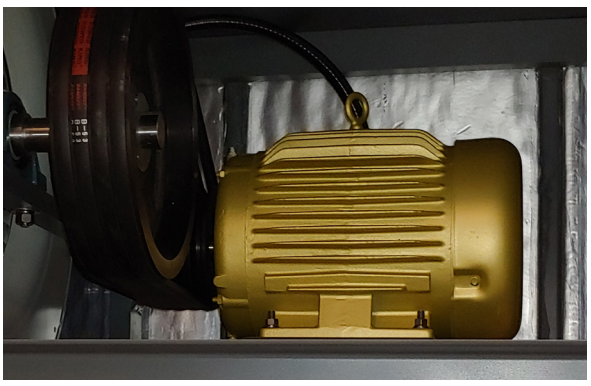
Electrical Panel Inspection

Before opening any electrical panel, be sure the electrical disconnect is in the off position and follow your specific company's lockout procedures. With the disconnect off, the electrical panel can be opened. Visually check all components in here for signs of burns/shorts. If any wire connections inside the panel appear black or brown, don't turn the power back on until a licensed electrician has observed the area of concern. Check the heater's electrical boxes using the same method. The disconnect should also remain off when checking the heater's electrical boxes.

Lubricating Motors

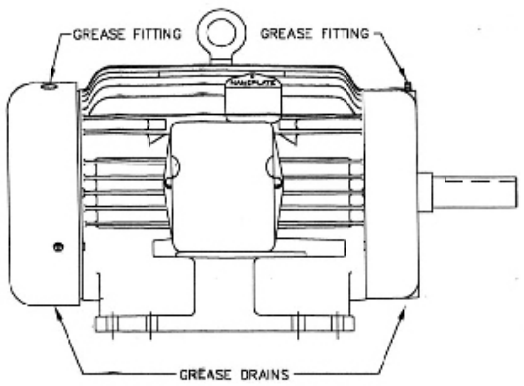
- On motors equipped with a grease fitting, clean the tip of the fitting and apply a grease gun. Remove excess grease from the fitting when done.
  - Use 1 to 2 full strokes on motors.
- On motors equipped with slotted head grease screws, remove the screw and apply the grease tube to hold.
- Insert 2 to 3-inch length of grease string into each hole on motors in NEMA 215 frame and smaller.
- Insert 3 to 5-inch length on larger motors.
- On motors with grease drain plugs, remove the plug and operate the motor for 20 minutes before replacing the drain plug.

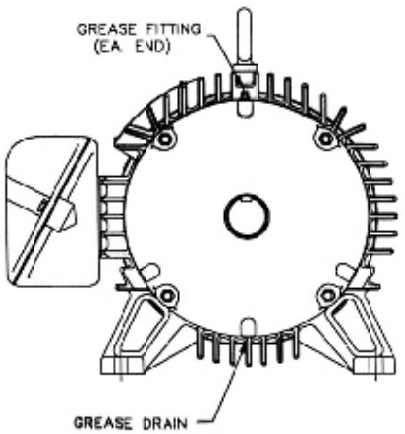
CAUTION: Keep grease clean—Lubricate motors at a standstill. Remove and replace drain plugs at a standstill. Do not mix petroleum grease and silicone grease in motor bearings.



Lubrication Schedule		
Service and Conditions	HP Range	Suggested Schedule
Minimal Use 5,000 Hrs or less	1/8 to 7 1/2	5 years
	10 - 40	3 years
	50 - 150	1 year
Seasonal Use 6 months or less	All	At the start of every season
Continuous Use Normal conditions	1/8 to 7 1/2	1 year
	10 - 40	1 year
	50 - 150	9 months
Continuous Use Harsh conditions	1/8 - 40	6 months
	50 - 150	3 months

Fan Motor Lubrication Points





Refrigerant System Information

The refrigeration system is a closed-loop system with its own lubrication oil supply. Nyle uses only the best trade practices when assembling these systems. The system should give years of trouble-free service. However, if the system is not removing the right amount of water, or if a problem should arise from rough shipping or a refrigeration leak, the system should only be worked on by a qualified refrigeration mechanic.

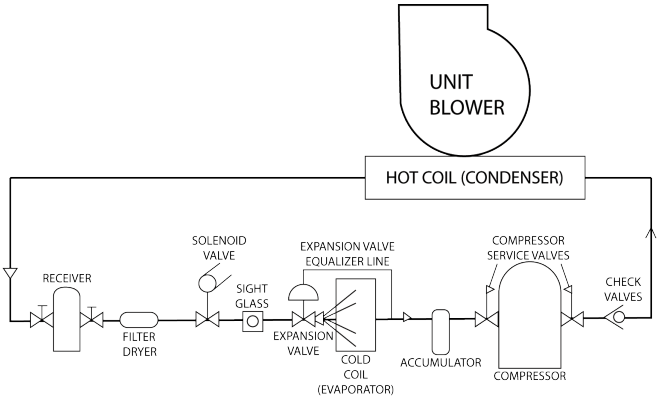
Warning: Refrigeration professionals should use caution; these refrigeration conditions are uncommon.

These systems operate over a very wide temperature and humidity range. The pressures will be relatively high compared to air conditioners and heat pumps. For these reasons, you cannot charge by the sight glass, the sight glass will eventually clear at certain conditions, but it is unlikely that those conditions will exist when servicing.

If the chamber is loaded, running the unit at extreme limits will be very dangerous, as the product will degrade severely. With this danger factor and the factor of time involved in heating the chamber, Nyle insists that these machines have weighed in charge. The amount is as follows:

DH145 - 60lbs. R-513a
DH225 - 75lbs. R-513a

Call nyle if your technician lacks the recommended refrigerant. We can recommend alternatives.



Refrigerant Charging

WARNING: This procedure is extremely dangerous and should only be performed by a certified HVAC Technician. Failure to comply could result in significant property damage, serious injury, and even death.

The proper refrigerant charge is essential for the efficient use of the system. The charging procedure outlined below will result in optimum performance.

Because this unit's load and operating conditions vary, normal procedures followed in the refrigeration and air conditioning industry cannot be used for charging the system.

At the extremes of high and low temperatures, the following criteria must be met:

1. At high temperatures (160°F, 32% RH), adequate sub-cooling must be present in the suction gas to cool the motor windings.
2. The discharge gas pressure must not exceed 330-360 PSIG at high temperatures.
3. At High temperatures, the actual discharge gas temperature must not exceed 265°F.
4. At low temperatures, prevent excessive liquid flood back.

Nyle suggests that the refrigerant charge be adjusted **at maximum** operating conditions (160°F, 32% RH). **Do Not** allow the system to exceed the maximum temperature limits. **Do Not** run the compressor when chamber temperatures are below 80°F unless the unit is low temp.

These conditions should be simulated if the chamber is empty by operating the heaters and dehumidifier. If the chamber is loaded, it may not be possible to accurately adjust the charge until maximum conditions are reached at the end of the cycle. If an approximate charge is put in the system, it is imperative the refrigeration technician return when conditions are at the extreme. If the conditions are simulated in an empty chamber, it will be necessary to closely watch both temperature and relative humidity because the dehumidification system will have a dramatic effect on both readings when the chamber is empty.

Install service gauges on the suction and discharge line valves and thermometers on the suction and discharge lines as close to the compressor as possible. If you have reversing fans, be sure the fans are in the "Forward" mode, the belts are tight on the blower, the blower is turning in the proper rotation, the filters are clean, and check the damper operation (this is essential, and instructions are given elsewhere in this manual). Be sure the air flows are all normal, and note the temperature and relative humidity.

A sight glass is installed in the liquid line. Do not charge to a clear sight glass. The sight glass is provided as a reference and moisture indicator only. There are only limited periods when the sight glass will clear.

Add refrigerant while monitoring suctions and discharge pressure. When the actual suction line temperature drops to 80°F.-90°F, stop charging and observe pressure readings. Also, note the damper position. At 32% RH, they should be nearly closed or modulating from closed to slightly open. If they remain fully closed and the discharge pressure allows, add refrigerant to lower suction line temperature until they begin to modulate slightly.

At the maximum operating temperature (160°F, 32% RH), the following approximate readings will be noted.

Suction Pressure	50-60 PSIG
Discharge Pressure	330-360 PSIG Do not exceed 375°F.
Suction Temperature	75°F - 95°F Do not exceed 100°F
Discharge Temperature	204°-255° Do not exceed 265°F
Evaporator Damper	Modulating from closed to slightly open

The following can affect actual discharge temperature:

1. Excessive suction gas temperature: Check the operation of the damper system. Be sure the relative humidity is below 32%, and check the refrigerant charge.

2. Excessive discharge pressure: Check airflow over the condenser, check blower operation (direction and belt tightness), filter for obstructions, and check the refrigerant charge. Be sure the set temperature is under 160ºF.
3. A mechanical failure in the compressor, broken reed valves, bearings, etc.
4. An electrical problem with the compressor motor, such as low voltage, unbalanced voltage, loose electrical connections, motor insulation failure, etc.

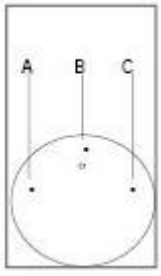
An increase in suction gas temperature is usually related to improper refrigerant charge, improper damper operation, airflow problems, or, occasionally, a compressor or expansion valve malfunction.

Unbalance 3 Phase Supply

A very slight voltage unbalance will cause a significant unbalance in the amperage draw. Operating a motor where these conditions exist will shorten equipment life and waste energy, dramatically increasing winding temperature. The following example will show how to calculate your unbalance.

To assess the % unbalance, you must find your maximum standard deviation. This number represents how much your voltage is deviating from the average voltage.

First, measure the voltage for A-B, B-C & A-C, as shown in the figure to the left.



Example: AB = 200
BC = 205
AC = 216

Then find the average voltage.

Example: 200 + 205 + 215 = 621

621 / 3 = 207

Find the difference between the average voltage and the measured voltages for AB, BC, and AC. This is called the standard deviation. The highest number is your maximum deviation.

Note: Always put the larger number first.

Example: AB = 207 - 200 = 7
BC = 207 - 205 = 2
AC = 216 - 207 = 9

This voltage unbalance is accompanied by a motor temperature rise. A 10% unbalanced is equivalent to a 200% rise in temperature. Phase unbalances (which some might consider to be minimal but are quite serious) greatly shorten motor life and can cause catastrophic failure at any time.

Never operate a motor with a phase unbalanced supply voltage greater than 2%. If this happens, consider it a severe electrical issue and immediately contact your local electric utility company.

Replacement Procedure

When contacting Nyle for service or replacement parts, refer to the model and serial number of the unit as included on the data sticker attached to the unit. If replacement parts are required, mention the date of installation of the unit and the date of failure, along with an explanation of the malfunctions and a description of the replacement parts required.

Troubleshooting

Compressor Will Not Run

1. The breaker may be open, or the circuit breaker is tripped. Check electrical circuits and motor windings for shorts or grounds. Investigate possible overloading. Replace the fuse or reset the circuit breakers after the fault is corrected.
2. Emergency stop may be depressed. Ensure that E-stop is deactivated.
3. Supply voltage may be too low. Check the voltage with a volt meter.
4. Control system may be faulty. Check control for correct wiring of temperature/relative humidity sensor and check the control transformer for proper voltage.
5. Wires may be loose or broken. Replace or tighten.
6. The low-pressure switch may have tripped due to one or more of the following:
    - Compressor suction line clogged
    - Low refrigerant
7. The high-pressure switch may have tripped due to one or more of the following:
    - Compressor discharge line clogged
    - Airflow in the D.H. unit is reduced due to a blockage
    - Airflow in the D.H. unit is reduced due to a blower malfunction.

Unit Is Noisy

1. Check the compressor for loosened mounting bolts. Make sure the compressor is floating free on its isolator mounts. Check for tubing contact with the compressor or other surfaces.
2. Check the screws on all panels.
3. Check for chattering or humming in the contractor or relays due to low voltage or a defective holding coil. Replace the component.
4. Check for abnormally high discharge pressures. 350 psi + (see page 30)
5. Check for loose panels or parts that may be in contact with each other; vibrations from the compressor may cause them to chatter against one another.
6. Check for vibration related to the blower. Debris in the blower wheel may cause an unbalanced condition.

Insufficient Heating

1. Check for restrictions in airflow.
2. Check for leaks at the intake, exhaust duct, and damper openings.
3. Check the auxiliary electric heater for an appropriate current draw. (displayed on heater cover)
4. Consult with a qualified electrician concerning the heating circuit.

Troubleshooting Matrix

Issue: Cycle is running too long; product is not drying; RH is not dropping as expected			
Potential Cause	**Secondary Cause**	**Root Cause**	**Solution**
User RH setpoint is satisfied (in or out of schedule)	N/A	Input error	Lower RH setpoint
Load size is larger	Moisture removal	System sizing	Allow system more time to dry
Poor circulation	Circulating fan	Input error	Raise fan speed setpoint
	Circulating airflow restriction	Overloaded product racks	Reduce product loading on racks
		Perforated baffle plugged	Clean baffles
		Circulating fan intake restricted	Remove restriction
	Circulating fan(s) not running	Fan motor fuse blown	Replace fuse; investigate reason for blown fuse
		Fan motor failure	Replace fan motor
Compressor not running	SLP not achieving cut in	Crank case heater faulty	Replace crank case heater
		Cold mechanical space (at compressor location)	Heat mechanical space
		User temp setpoint too low	Raise user temp setpoint
		LLSV malfunction	Verify control and power wiring integrity for LLSV
			Verify control logic integrity for LLSV (opens with compressor call)
			Verify valve mechanism is not stuck
		Refrigerant Leak	Identify leak; re-charge system
	Oil pressure safety tripped	Liquid floodback to compressor	Verify control and power wiring integrity for LLSV
			Verify control logic integrity for LLSV (opens with compressor call)
			Verify valve mechanism is not stuck closed
		Dampers not modulating properly	Verify control logic integrity for dampers (opening when SLT <77°, closing when SLT >77°)
			Replace damper actuator
Compressor cycling (runs briefly then shuts back down)	DLP exceeding high- pressure safety	Loose blower drive belts (where applicable)	Tighten or replace drive belts
		DH blower motor fuse blown	Replace fuse; investigate reason for blown fuse
		DH blower airflow restriction	Clean intake filters
			Remove blockage
		DH blower motor starter tripped	Reset motor starter
		DH blower motor failure	Replace blower motor
		DH blower not spinning freely	Grease bearings
			Replace bearing

Potential Cause	Secondary Cause	Root Cause	Solution
Compressor cycling (runs briefly then shuts back down) *(Continued)*	DLP exceeding high- pressure safety *(Continued)*	User temp setpoint exceeds performance envelope	Reduce user temp setpoint
		System overcharge	Reduce refrigerant charge
		External condenser fan not running properly	Verify control and power wiring integrity to external condenser fan motor
			Replace external condenser fan motor
			Check for blockage in Condenser air stream (verify no debris in coil and fins are not bent restricting airflow) address blockage.
			Verify control logic integrity for external condenser fan (Fan runs when Chamber temp is >Temp Set-point +2)
		External condenser running too hot ambient temp (85°F+)	Reduce ambient temp
	SLT exceeding SLT limit	Dampers not modulating properly	Verify control logic integrity for dampers (opening when SLT <77°, closing when SLT >77°)
			Verify nothing is tangled in dampers jamming them up.
			Replace damper actuator
		Refrigerant leak	Identify leak; re-charge system
	SLP not remaining above cut out	Refrigerant leak	Identify leak; re-charge system
	DLP not remaining below high pressure safety	Loose blower drive belts (where applicable)	Tighten or replace drive belts
		DH blower motor fuse blown	Replace fuse; investigate reason for blown fuse
		DH blower airflow restriction	Clean intake filters
			Remove blockage
		DH blower motor starter tripped	Reset motor starter
		DH blower motor failure	Replace blower motor
		DH blower not spinning freely	Grease bearings
			Replace bearing
		User temp setpoint exceeds performance envelope	Reduce user temp setpoint
		System overcharge	Reduce refrigerant charge
	DLT exceeding high temp safety	Refrigerant leak	Identify leak; re-charge system
		User temp setpoint exceeds performance envelope	Reduce user temp setpoint

Issue: Process is running >5° over temperature setpoint; cool down is taking too long

Potential Cause	Secondary Cause	Root Cause	Solution
	Vents not opening	Intake or exhaust vent damper actuator not opening	Verify control and power wiring integrity for vent actuators
			Verify control logic integrity for vents (open when temp >2° above user setpoint)
			Replace damper actuator
		Vents blocked	Remove blockage
		Intake or exhaust vent actuator loose on damper shaft	Tighten actuator connection to shaft
		Energy exchange is too low	Increase venting capacity

Issue: Process will not reach setpoint temp; warm up is taking too long

Heater is not running	Heater internal safety is tripped/blown	Heater fuse is blown	Replace fuse; investigate reason for blown fuse
		Loose blower drive belts (where applicable)	Tighten or replace drive belts; replace blown heater safety
		DH blower airflow restriction	Clean intake filter; replace blown heater safety
			Remove blockage; replace blown heater safety
		DH blower motor fuse blown	Replace fuse; investigate reason for blown fuse; replace blown heater safety
		DH blower motor starter tripped	Reset motor starter; replace blown heater safety
Heater is not running	Heater internal safety is tripped/blown	DH blower motor failure	Replace blower motor; replace blown heater safety
		DH blower not spinning freely	Grease bearings; replace blown heater safety
			Replace bearings; replace blown heater safety
Air leakage from process	Vents not operating	Intake or exhaust vent damper actuator not closing	Verify control and power wiring integrity for vent actuators
			Verify control logic integrity for vents (open when temp >2° above user setpoint)
			Replace damper actuator
		Intake or exhaust vent actuator loose on damper shaft	Tighten actuator connection to shaft
		Energy exchange is too high	Decrease venting capacity
	Chamber leakage	Sealant failure	Replace sealant
		Chamber fasteners not tight	Tighten fasteners
	DH unit leakage	Discharge duct joint gasket/sealant failure	Replace sealant/gasket

Alarm Codes

Alarm Name	Root Cause	Solution
Estop Pressed	An estop button is actively pressed	Reset estop button
Estop Lockout	An estop button was pressed. Equipment is locked out.	Reset physical estop button and press the “Estop reset” button on HMI.
Probe Fault	A digital Temperature and Humidity sensor has failed.	Inspect probe and ethernet cable for damage. Ensure probe is receiving power from ethernet switch.
UK24MOD Communication Fault	Communications with the vent controller faulted.	Ensure UK24MOD vent controller has power and communication wiring is not damaged.
Unit Communication Fault	Main controller has lost communication with DH unit.	Ensure DH unit is powered, check ethernet connectivity, and PLC for error lights
Zone x Fan overload	A fan motor overload has tripped on overcurrent	Have a qualified electrician reset the circuit and verify circuit for faults.
Zone x Fan VFD Fault	A fan VFD has faulted	Take note of the fault number. Have a qualified electrician reset the circuit and verify circuit for faults.
Blower Fault	A blower in one of the DH units has faulted	Have a qualified electrician reset the circuit and verify circuit for faults.
SLP Faulty	SLP transducer on compressor has failed	Ensure probe has power and replace if needed
DLP Faulty	DLP transducer on compressor has failed	Ensure probe has power and replace if needed
SLT Faulty	SLT transducer on compressor has failed	Ensure wiring is correct. Replacement likely needed
DLT or Oil Fault	The compressor safety circuit has tripped.	Check oil switch for faults and reset by pressing the white button. If DLT has tripped, the fault will clear itself when the DLT is within a safe operating range again.
SLP Fault	SLP outside of operating range	Contact a refrigeration specialist to determine cause and solution.
SLT Fault	SLT has exceeded the high limit	Set the temperature lower. Contact a refrigeration specialist if fault continues
DLP Fault	High pressure limit exceeded	Set the temperature lower. Contact a refrigeration specialist if fault continues

Glossary

DLP - Discharge Line Pressure

DLT - Discharge Line Temperature

E-Stop - Emergency Stop

SLP - Suction Line Pressure

SLT - Suction Line Temperature

VFD - Variable frequency drive

Limited Warranty

The equipment supplied by Nyle is warranted to be free from defects in workmanship and materials for a period of one year from the date of the original installation or 15 months from the date of delivery, whichever comes first. In the event of component failure, a new or re-manufactured part will be supplied by Nyle, providing the defective part is first returned to Nyle for inspection. The replacement part assumes the unused portion of the warranty. The warranty does not include the following:

- Labor or other costs incurred for diagnosis.
- Repairing or removing.
- Installing.
- Shipping the defective or replacement parts.

Nyle makes no warranty as to the fitness of the equipment for a particular use and shall not be liable for any direct, indirect, or consequential damages in conjunction with this contract and/or the use of its equipment. Buyer agrees to indemnify and save harmless Nyle from any claims or demands against Nyle for injuries or damages to third parties resulting from buyer's use or ownership of the equipment.

No other warranties, expressed or implied, will be honored unless in writing by an officer of Nyle Systems.

Service Log

Issue Description	Date	Servicer

Service Log

Issue Description	Date	Servicer

Service Log

Issue Description	Date	Servicer

MD-Series User Manual Rev 2025.01

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