User Manual

FD Series
Benefits of a Nyle Systems FD Series

Cost Effective
Our dryers cost significantly less than our competitors. This allows you to dry more for less!

Energy Efficient
Our systems utilize heat pumps, using up to 60% less energy than conventional drying.

User Friendly
All of our units come with intuitive touch screen controls and a flexible user interface.

Easy Installation
Installation process is simple and does not require ductwork or gas lines to be installed in your facility.

Higher Quality Output
Our systems are capable of drying at lower temperatures, resulting in higher quality product.

Tech Support
You get the straight answers you need from the professionals that design and build your systems.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>General Information</td>
<td>1</td>
</tr>
<tr>
<td>About the Nyle Systems FD Series</td>
<td>1</td>
</tr>
<tr>
<td>Safety Information</td>
<td>1</td>
</tr>
<tr>
<td>Model Information</td>
<td>2</td>
</tr>
<tr>
<td>Physical Dimensions</td>
<td>2</td>
</tr>
<tr>
<td>Nomenclature</td>
<td>3</td>
</tr>
<tr>
<td>Technical Specifications</td>
<td>3</td>
</tr>
<tr>
<td>Electrical Diagrams</td>
<td>4</td>
</tr>
<tr>
<td>Control Wiring</td>
<td>4</td>
</tr>
<tr>
<td>Power Wiring</td>
<td>5</td>
</tr>
<tr>
<td>Field Wiring</td>
<td>7</td>
</tr>
<tr>
<td>Refrigeration Diagram</td>
<td>8</td>
</tr>
<tr>
<td>Preinstallation</td>
<td>9</td>
</tr>
<tr>
<td>Receiving and Storage</td>
<td>9</td>
</tr>
<tr>
<td>Unit Location</td>
<td>9</td>
</tr>
<tr>
<td>Installation</td>
<td>10</td>
</tr>
<tr>
<td>Chamber Installation</td>
<td>9</td>
</tr>
<tr>
<td>Internal Components Installation</td>
<td>9</td>
</tr>
<tr>
<td>Connecting Wiring</td>
<td>10</td>
</tr>
<tr>
<td>System Usage</td>
<td>10</td>
</tr>
<tr>
<td>Before Start up</td>
<td>10</td>
</tr>
<tr>
<td>Quick Start Guide</td>
<td>10</td>
</tr>
<tr>
<td>Drying Theory</td>
<td>11</td>
</tr>
<tr>
<td>Data Logging</td>
<td>11</td>
</tr>
<tr>
<td>Maintenance</td>
<td>12</td>
</tr>
<tr>
<td>Replacement Procedures</td>
<td>12</td>
</tr>
<tr>
<td>Trouble Shooting</td>
<td>12</td>
</tr>
<tr>
<td>Compressor Will Not Run</td>
<td>12</td>
</tr>
<tr>
<td>Insufficient Heating</td>
<td>12</td>
</tr>
<tr>
<td>Unit Operation is Noisy</td>
<td>12</td>
</tr>
<tr>
<td>Limited Warranty</td>
<td>13</td>
</tr>
</tbody>
</table>
Introduction

General Information

Nyle Systems food dehydrators offer commercial users an energy efficient and controllable means of dehydrating food products in a temperature range of 80° to 160°F. Nyle food dehydrators work by gathering energy from moisture-laden air and 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.

The Nyle Systems FD Series food dehydrators consists of a dehumidification unit and airflow control components positioned within a pre-fabricated insulated drying chamber. This unit is built specifically for use in small to medium sized commercial batch dehydrating applications where temperature and humidity during the drying process may be closely monitored and controlled.

About the Nyle Systems FD

The Nyle Systems FD10 is rated to remove 10 pounds of water per hour, FD14 is rated to remove 14 pounds of water per hour, FD24 is rated to remove 24 pounds of water per hour, FD60 is rated to remove 60 pounds of water per hour at air conditions of approximately 115°F dry bulb temperature and 70% relative humidity. Actual water removal rates will depend largely on the ability of the food product to release moisture at the desired drying temperature. Nyle Systems encourages experimentation within the confines of the dehydrator operating characteristics to achieve the desired drying cycle time.

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 preform installation, repairs, or service on Nyle Systems food dehydrators. When preforming 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 explosion, fire, electrical shock or other hazardous conditions which may cause personal injury or property damage. Always consult a qualified installer, service agency, or your 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 Nyle Systems FD.
- Ensure the power receptacle is rated for the appropriate load.
- Ensure that the electrical supply has proper overload fuse or breaker protection rated for at least the appropriate amperage.
- Moving or lifting of Nyle Systems FD components should be done with team lifting 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.
## Physical Dimensions

<table>
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<tr>
<th>Unit</th>
<th>Rack Capacity (# of Racks)</th>
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<th>B (in)</th>
<th>C (in)</th>
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### Nomenclature

**Model Number**

- **Options**: Refer to
- **Power**: Refer to
- **Rack Capacity**: # of Racks
- **Water Nominal (lbs/hr)**
- **Series**: Food Dehydrator

### Technical Specifications

#### Model
- **FD Series**

#### Compressor Type
- **Semi Hermetic**

#### Refrigerant
- **R-416A**
OUTPUTS 115 VOLT

LEGEND:
TBI- TERMINAL BLOCK #1
BCC- BLOWER CONTACT COIL
LLSV- LIQUID LINE SOLENOID VALVE
CCC- COMPRESSOR CONTACTOR COIL
C. AUX. C. - COMPRESSOR AUX CONTACTS
HCC- HEAT CONTACTOR COIL
FFCC- FAN FORWARD CONTACTOR COIL
FRCC- FAN REVERSING CONTACTOR COIL
EXT FCC- EXT. CONDENSER FAN CONTACTOR COIL

DAMPER CONTROL 120V AC DAMPER
Refrigeration Diagram
Preinstallation

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

Receiving and Storage

When receiving shipment at the jobsite, 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 make proper notation of 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 jobsite, 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.
4. Allow enough space around 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 movement of air to and from the external condenser fan.

Installation

Chamber Installation

Follow the chamber manufacturer instructions for installation of the pre-fabricated insulated drying chamber.

These instructions will have been included with the chamber shipment, or will be attached with this installation manual.

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

All seams and gaps must be closed using NSF certified gaskets or NSF certified silicone caulking.

Unit must be sealed to floor using NSF certified gaskets or NSF certified silicone caulking.

Internal Components Installation

IMPORTANT: Always wear gloves when handling sheet metal internal components.

1. Install the dehumidification unit. The external condenser housing should slide through the chamber opening located on the right hand side of the chamber when viewed from the front. Roll the unit snugly against the chamber wall and lock the wheels.

2. Install the supply plenum elbow. The elbow fits over the fixed supply plenum of the dehumidification unit and attaches with fasteners on either side.

2. Install the baffle frame. The aluminum baffle frame should be placed in the left side of the chamber with the vertical supports closer to the left wall of the chamber.

3. Install the slanted baffle onto the baffle frame. The slanted baffle will sit over the top back horizontal support and rest on the slanted aluminum portion of the baffle frame. DO NOT install wing bolts through pre-drilled holes at this time.

4. Install the perforated baffle onto the baffle frame. The perforated baffle will sit over the top front horizontal support and rest on the slanted aluminum portion of the baffle frame. Install 2 wing bolts through pre-drilled holes at this time.

5. Install the false ceiling. The ceiling will need to be carried into the chamber diagonally, with the cutout for the supply plenum fitting through the door to the lower right hand side. Once inside, slide the ceiling all the way to the frame side of the chamber, and lift the cutout end up until the ceiling is nearly level. Slide the ceiling toward the dehumidification unit until the ceiling contacts the chamber wall. Install 4 wing bolts: 2 on the baffle frame side and 2 into the chamber walls on the dehumidification unit side.
Connecting Wiring

All electrical work should be performed by a licensed professional, and should adhere to all local and state codes.

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

**NOTE:** Check to make sure blower is rotating in the correct direction. If blower is running backward, switch the wiring.

System Usage

**Before Start up**

Verify the following:

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

Quick Start Guide

1. When the dehumidification unit is energized, the touch screen will undergo a boot process until the Home screen is displayed.

**Home Screen:**

Chamber temperature and relative humidity will be displayed, along with current user set points for desired chamber temperature and relative humidity.

2. To change set points, touch the box representing the parameter you desire to change. A number pad will appear. Enter the desired set point, and press the return button. The value entered should now be displayed in the appropriate set point box.

**Number Pad:**

Before starting your cycle, change the “Room Temp Set” to the temperature you desire the chamber to cool down to after reaching the relative humidity setpoint and before shutting down.

3. With your temperature, relative humidity, and room temperature set points entered, you can start your dehydrator by pressing the “Start” button on the right hand side of the screen. To stop your cycle at any time, press the “Stop” button on the right hand side of the screen. In case of emergency, press the E-stop button below the touch screen.

During a drying cycle, the dehumidification unit will run until the relative humidity set point is reached. At this time the unit will enter a cool down mode prior to shutting down at the room temperature set point.

4. The diagnostic screen is accessed by pressing the “Diagnostic” button on the Home screen. The diagnostic
screen provides refrigeration system operation information for troubleshooting purposes by a qualified service technician. You may be asked to access this screen during a troubleshooting call with a Nyle technician.

**Diagnostic Screen:**

![Diagnostic Screen Image]

**Drying Theory**

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

In order for moisture to be removed from the air within your chamber, moisture first needs to be removed from your moist product. This process is affected by air temperature, air velocity, and product characteristics. 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 as well as those caused by any processing that takes place prior to beginning the drying process. For example, thinner, more porous products usually dry more quickly than thicker, dense products.

Once moisture is removed from your product and absorbed by 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 reduce 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. The point at which this equilibrium occurs is known as 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 upon raw product inconsistencies, ambient atmospheric conditions, and proprietary product processing. Some experimentation will be necessary to achieve your desired results.

**Data Logging**

As long as an SD card is inserted into the appropriate slot in the back of the control screen (accessed by opening the control panel door), operational data may be logged. Data logging functionality is active when:

1. An SD card is present AND
2. A cycle is active.

No further user action is necessary to activate data logging as long as the above conditions are met. Data is logged at a frequency of 1 measurement per minute.

Data is logged to a folder named “NyleDataLogs” on the inserted SD card. If a new SD card is inserted, the folder will be automatically created by the software.

In order to retrieve or otherwise manage data, **do not remove the SD card from the HMI slot.** Data management may be accomplished from a computer web browser using the following steps:

1. Enter the IP address of your dryer PLC into the web browser address bar. The dryer IP address is: **192.168.1.61**
2. Click on the “ENTER” button at the top left of the page.
3. Sign in with the following information:
   a. Name: Administrator
b. Password: 100

4. Press Enter on your keyboard or click on the “Log in” button at the bottom right of the log in context box to enter the PLC management screen.

5. On the left side of the page, locate and select the following: File Browser → SD Card → Nyle Data Logs

6. You should see data logs collected during previous cycles and named: “Nyle_[schemulename]”

7. Use the file operations to the right of the file name to download, download and clear, or delete data logs from the SD card.

**Maintenance**

Ensure that the washable filter on the intake of the DH unit is maintained free of contaminants which would reduce air flow through the DH unit. Reduction of air flow will result in reduced moisture removal capacity and extended cycle times.

**Replacement Procedures**

When contacting the Nyle for service or replacement parts, refer to the model number 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.

**Trouble Shooting**

**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 for possible overloading. Replace fuse or reset circuit breakers after fault is corrected.

2. Emergency stop may be depressed. Ensure that E-stop is deactivated.

3. Supply voltage may be too low. Check 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:
   1) Compressor suction line clogged
   2) Low refrigerant

7. The high pressure switch may have tripped due to one or more of the following:
   1) Compressor discharge line clogged
   2) Air flow in D.H. unit reduced due to blockage

**Insufficient Heating**

1. Check for restriction in air flow.

2. Check auxiliary electric heater for appropriate current draw.

3. Consult with a qualified electrician concerning the heating circuit. The heating circuit

**Unit Operation is Noisy**

1. Check compressor for loosened mounting bolts. Make sure compressor is floating free on its isolator mounts. Check for tubing contact with the compressor or other surfaces.

2. Check screws on all panels.

3. Check for chattering or humming in the contactor or relays due to low voltage or a defective holding coil. Replace the component.

4. Check for abnormally high discharge pressures.

5. Compressor rotation may be incorrect.

6. Check for any loose panels or parts that maybe in contact with each other, vibrations from the compressor may cause them to chatter against one another.

7. Check for vibration related to the blower. Debris in the blower wheel may cause an unbalanced condition.
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 remanufactured 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 labor or other costs incurred for diagnosis, repairing or removing, installing or 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.