nyle Dehydrators

FDG-SERIES

Indirect Gas-Fired Dehydrator

USER MANUAL

www.nyledehydrators.com

NSF

MADE IN USA
WITH U.S. & IMPORTED PARTS

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Introduction

General Information

Nyle FDG Dehydrators offer commercial users an energy-efficient and controllable means of dehydrating from 80° to 220°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 FDG Dehydrators consist of an insulated, energy saving chamber, an indirect fired gas furnace (natural gas or propane), blower and a user friendly touch screen control panel.

About The FDG-Series

The FD-G Series are batch dryers designed to operate by introducing a loaded product to heat and airflow to remove moisture from the product. By controlling the temperature and velocity of the air traveling through the product load and the degree of exhausted air, drying characteristics may be modified according to the operator's needs.

Safety Information

Installation and servicing of the 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 receptacle 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.

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.

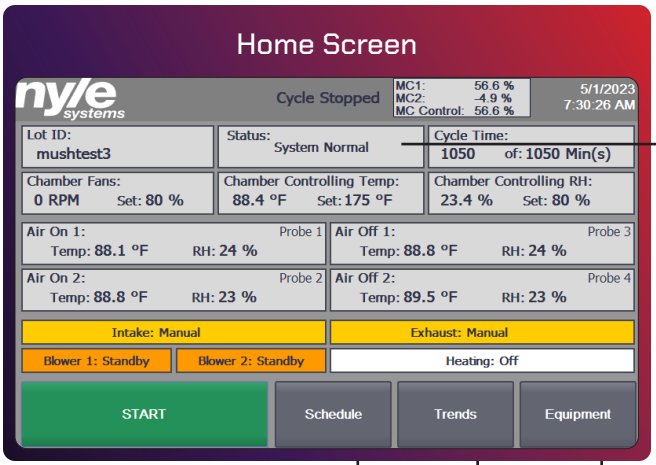
Follow the nameplate information located on the unit for proper voltage, phase, amps, breaker sizing, and wire sizing. Locate a fused disconnect as close as possible to the heat pump.

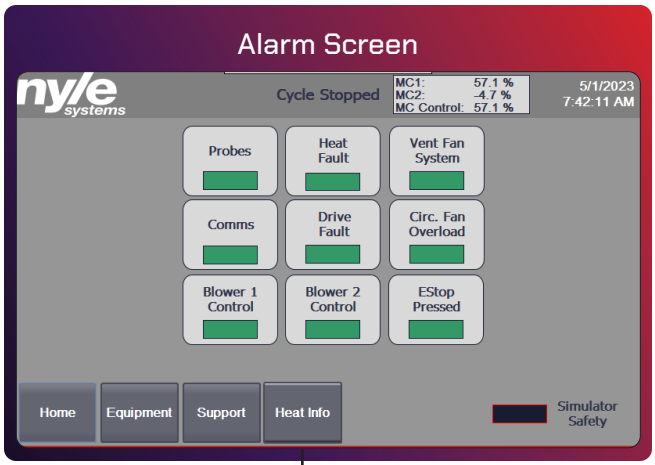
NOTE: Check to ensure that fans rotate in the correct direction. If fans run backward on a unit requiring 3-phase power, switch 2 legs of the incoming power at the distribution block.

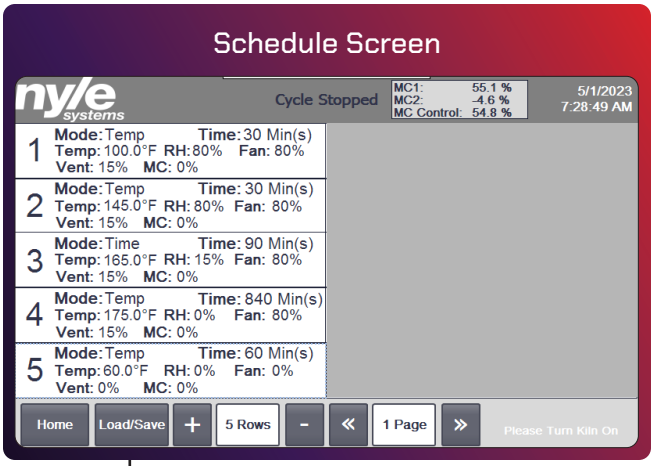
Controls Operation

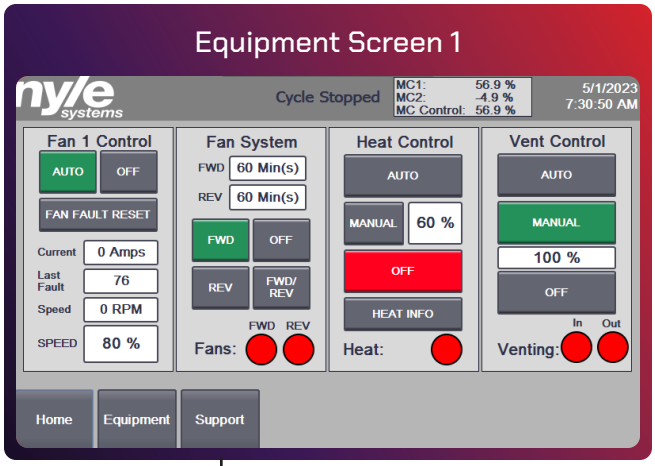
The FDG Series dryers are equipped with a controls package allowing manual and automatic control of system components, and manual or scheduled control of drying conditions.

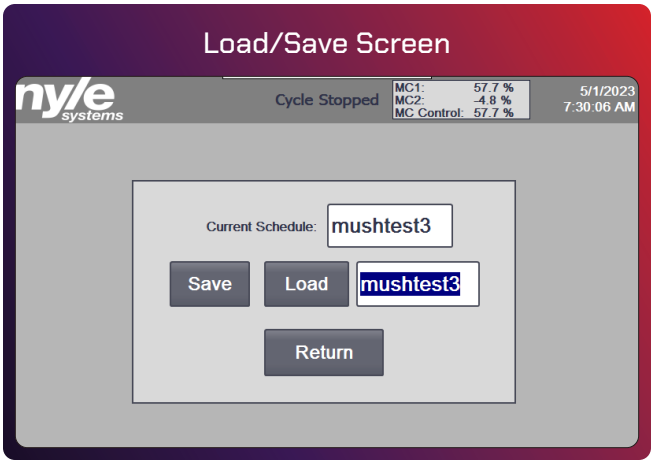
Control Screen Navigation

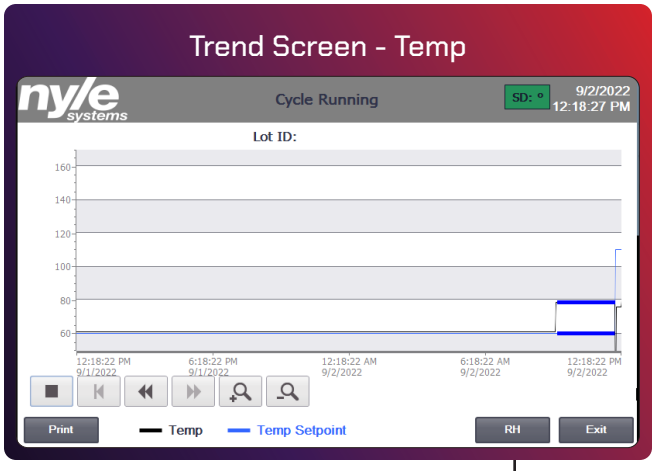






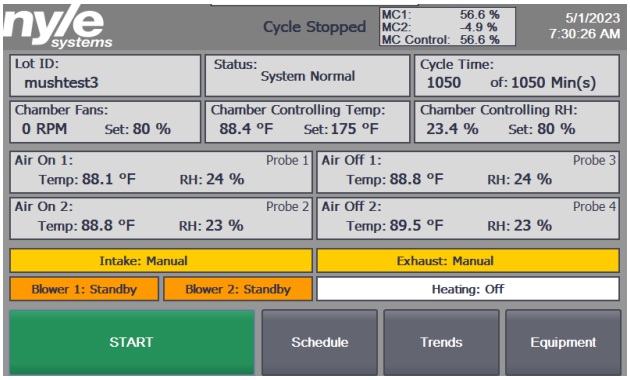






Control Screen Overview

Home Screen:



The home screen provides basic process information, including:

LotID: Indicates the name of the cycle that is running.

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

Cycle Time: Indicates how much time in the cycle has elapsed as well as the total amount of time the cycle will take.

Chamber Fans: Indicates the fans current RPMs as well was the setpoint for fan speed percentage.

Chamber Controlling Temp: Indicates the current step within the schedule as well as total amount of steps in the schedule.

Chamber Controlling RH: Indicated the current chamber RH percentage as well as the cycles RH setpoint.

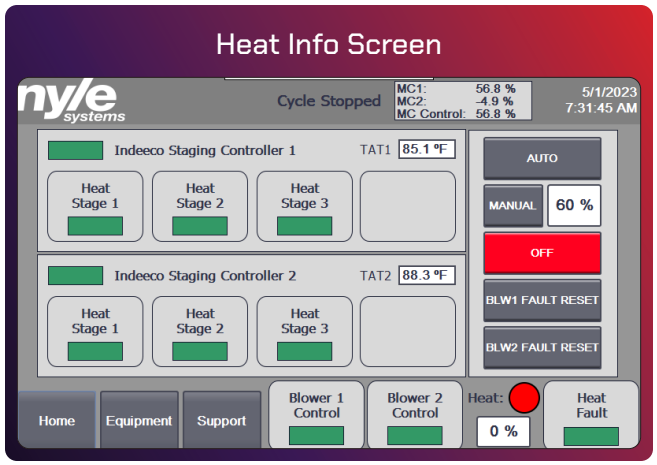
Probe Readings: Displays the current temperature and RH readings of each probe within the chamber.

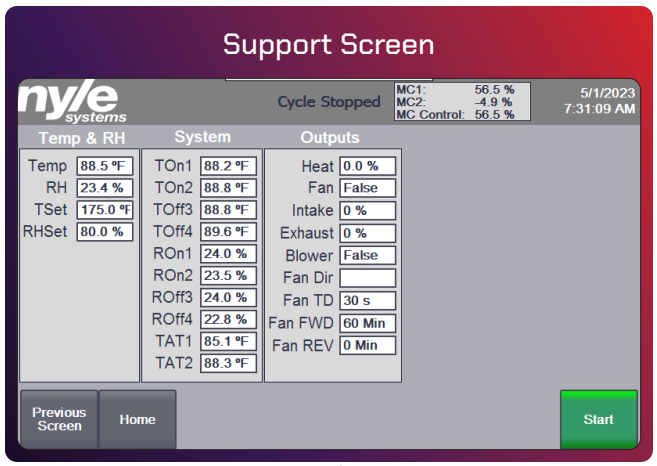
Along the bottom of the home screen is the navigation menu buttons. The buttons can help navigate you to additional screens.

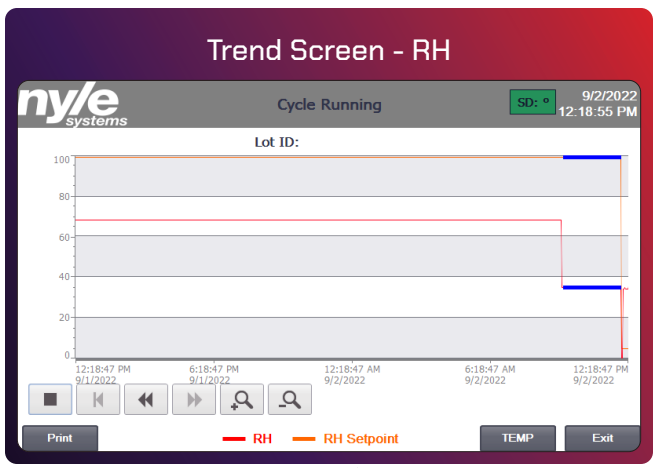
"Schedule" button: Changes the display to the Schedule Screen.

"Trend" button: Changes the display to the Trend Screen.

"Equipment" button: Changes the display to the Equipment Screen.

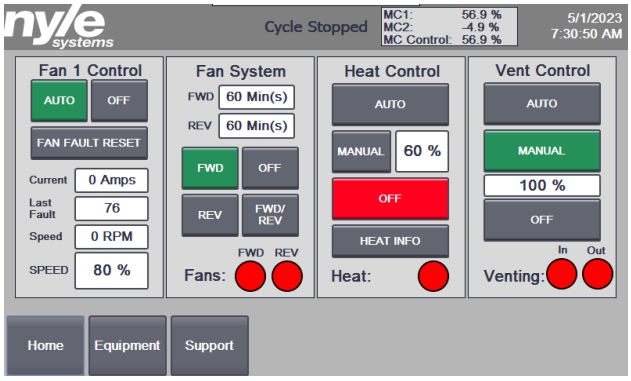






Equipment Screen

The equipment screen provides control options to the user.



Fan 1 Control: allows you to control the fan settings.

Fan System: allows you to set the fan direction and run time.

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

"Off" button: Overrides the furnace call and shuts the furnace down.

"Manual" button: Overrides the furnace call & allows the user to set the percent of full fire they desire the furnace to run. The percentage of full fire is set using the slider window.

"Auto" button: Allows the furnace call and modulation to be controlled by the software.

"Heat Percentage" window: Displays the percentage of full fire the furnace is currently running at, whether in manual or auto heat control mode.

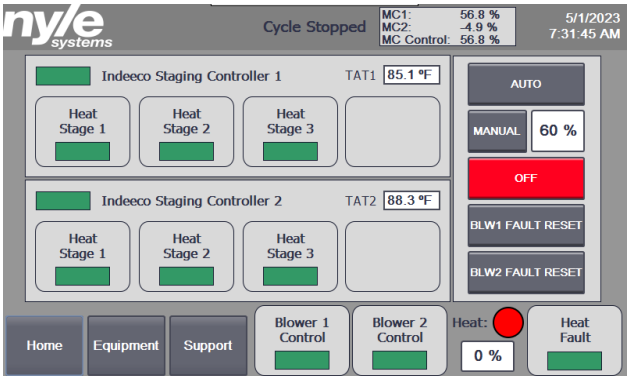
"Heat Info" button: navigates to the Heat Info screen.

Vent Control: allows you to control the vents.

Along the bottom of the Equipment screen are navigation buttons. These buttons can navigate you to the Support screen or back to the home screen.

Heat Info Screen

The Heat Info screen provides furnace control options to the user. The furnace is the only piece of dryer equipment that is automatically modulated under normal operation.



"Auto" button: Allows the furnace call and modulation to be controlled by the software.

"Manual" button: Overrides the furnace call and allows the user to set the percent of full fire they desire the furnace to run. The percentage of full fire is set using the slider window.

"Heat Percentage" window: Displays the percentage of full fire the furnace is currently running at, whether in manual or auto heat control mode.

"Off" button: Overrides the furnace call and shuts the furnace down.

"BLW Fault Reset" button: allows the user to reset any blower faults.

The Heat Info screen also provides furnace status metrics to the user. This screen provides such metrics as;

Heat Stages: shows the status of the staging controller and lists any faults.

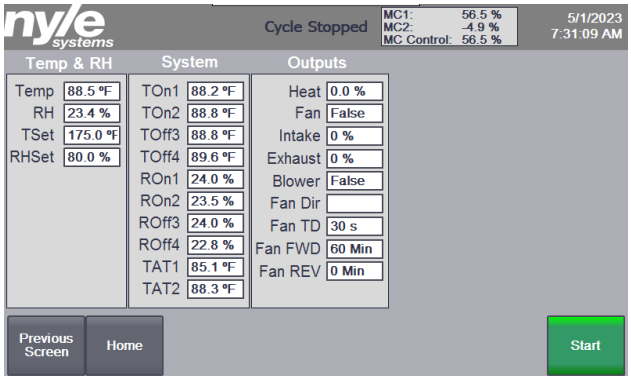
Blower Control: shows the status of the blowers and lists any faults.

Heat: shows the status of the heat call.

"Heat Fault: shows the status of the heat and lists any faults.

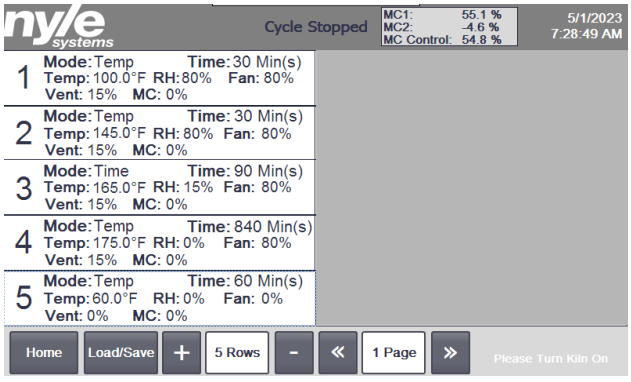
Support Screen

The Support screen provides the full status of the system and it's current metrics. This screen should be used when contacting customer support.



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.

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

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

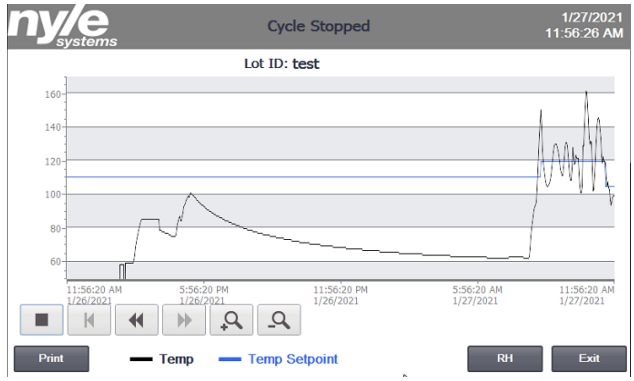
"RH" column: Indicates the relative humidity set point selected for an "RH" step mode.

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

"Vent" column: Indicates the percentage of Venting (100%) selected for each step number.

"MC%" column: Indicates the percentage of Moisture Content for each step number.

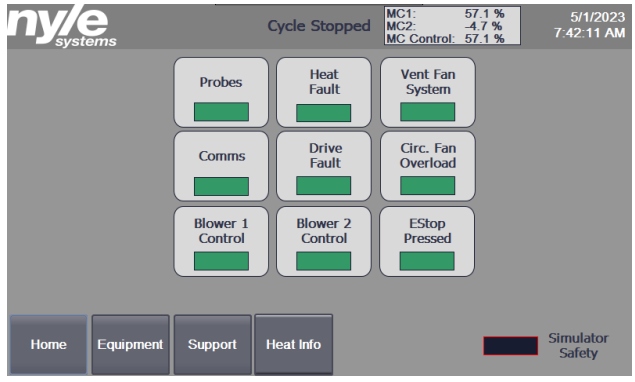
Trend Screen:



The trend screen lets the user view the previous 24 hours of dryer operation in a graphical display. The horizontal axis denotes the time and date that a data point was recorded. The left vertical axis serves as a scale for the logged temperature information. The right vertical axis serves as a scale for the logged relative humidity information.

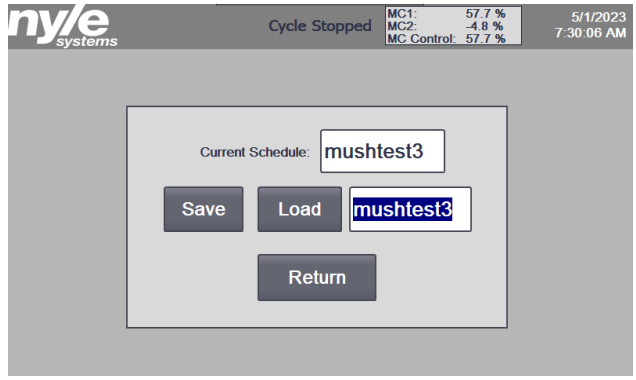
Logged parameters include "Air On Temp," "Air Off Temp," "Air Off RH," and "Temp Setpoint."

Alarm Screen:



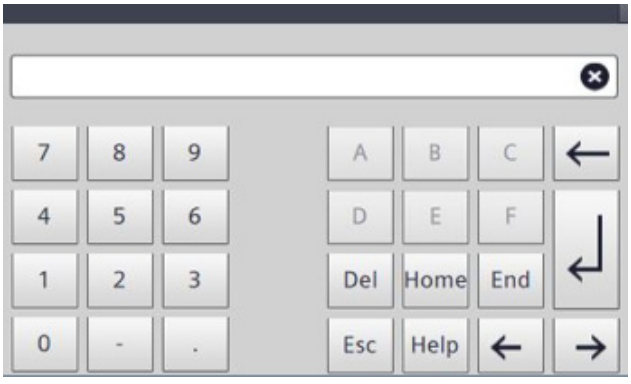
The alarm screen allows the user to view currently active alarm conditions and which equipment have faults.

Schedule Load/Save Screen:



The schedule load/save screen allows the user to save a currently programmed schedule or load a previously saved schedule. Further details concerning this screen are included in the schedule management portion of the manual.

Number Pad:



The value entry screen appears when the user taps a set point value window and allows the user to type a numerical value into the set point window. Cursor navigation keys are included in the lower right corner of this screen.

Start Up

Before Start Up

Verify the following:

- Ensure that blower and furnace service panels are in place.
- Ensure that electrical service panels are in place.
- Ensure that gas line shutoff valves are open.
- Once powered up, the controls screen will go through a boot process before the home screen is displayed.

Starting Your Equipment

Without entering a schedule, the dryer equipment may be operated manually from the home screen. After the dryer is powered up, conduct the following steps:

1. Tap any of the three windows from the home screen under the “Setpoints” column.
2. The value entry screen will appear. Enter a value and tap the return or enter button.
3. Repeat step 2 for the “Temp,” “Exhaust,” and “Blower” setpoints.
4. Tap the “Start” button.

The blower and damper actuators will immediately operate according to the setpoints entered. The furnace will enter a startup sequence, including a purge mode, before firing and operating according to the temperature setpoint entered.

Schedule Management

Schedule Operation

In order to operate a drying schedule, use the schedule management features included with the controls package. From the home screen, tap the schedule button along the bottom of the screen. Up to 10 schedule steps may be programmed into the schedule using the “+” and “-“buttons at the bottom of the schedule screen.

Schedule flexibility is provided primarily by allowing the user to select from 4 “step modes,” including Time, Temp, RH, and Cool Down. Each step mode uses different criteria to determine when to advance to the following step within the schedule. Each step mode operates as follows:

Time step mode: A time step allows the user to input a set amount of time in minutes that the step should run for before advancing to the following step. Setpoints available for user input during a time step include Temp, Exhaust, Blower, and RH.

NOTE: Do not adjust the time setpoint of a currently active time step. Doing so will cause the current time step to reset or advance to the next step.

Temp step mode: A temperature step allows the user to input a temperature value the dehydrator should warm up to before advancing to the following step. Setpoints available for user input during a temp step include Temp, Exhaust, Blower, and RH.

RH step mode: A relative humidity step allows the user to input a relative humidity value the

dehydrator should reach before advancing to the following step. Setpoints available for user input during an RH step include Temp, RH, Exhaust, and Blower.

Validation Step mode: A validation step allows the user to maintain a temp and RH for a specified period of time. This step is used to help achieve specific guidelines for certain food products. During this step, all vents will remain closed, and the compressor will remain off, allowing temperature and RH to climb. When both Temp and RH setpoints are satisfied, the timer will begin. Once the specified time is up, the schedule will advance to the next step.

Cool Down step mode: A cool-down step allows the user to end a cycle by venting heat from the dehydrator with no heater input. A cool-down mode ends the cycle when chamber temperature is measured to equal the setpoint the user specified in the schedule load/save screen.

Note: for all step modes except for time, the schedule will advance based on a selected parameter other than time. Therefore, experimentation will be necessary to understand the amount of time a particular schedule will take to run to completion. Factors affecting the run time of a particular schedule include product type, product load size, and ambient air conditions.

To enter and run a new schedule, conduct the following steps:

1. From the home screen, tap the schedule button along the bottom of the screen.
2. Using the "+" and "-"buttons along the bottom of the screen, adjust the number of steps desired for the schedule.
3. For the first step, tap the step to enter the step edit screen. Then select the step mode you desire.
4. Depending upon the step mode selected, continue down the screen until each selectable parameter has been entered for the step. Hit return to navigate back to the schedule menu or change the step input box to any of the other 10 steps to modify them without leaving that screen.
5. Repeat steps 3 and 4 for each step.
6. Return to the home screen.
7. Tap the start button. The dehydrator will start up based on the values displayed on the home screen.
8. Return to the schedule screen.
9. Tap the "Schedule: OFF" button in the lower right corner of the schedule screen to activate the schedule. It should then read "Schedule: ON." The dryer should now begin with step 1 of the entered schedule.

Schedule Monitoring

While a schedule is running, the schedule screen will indicate which step is being run and whether or not a transition is being considered. While a particular step is active, the step number will be highlighted in green. When the condition has been met for enough time to filter out sensor flutter, the next step will be highlighted in green, and the equipment will follow the entered conditions for the highlighted step.

Loading/ Saving a Schedule

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), schedules may be saved to or loaded from the SD card from the control schedule load/save screen.

To load or save a schedule, conduct the following steps:

1. From the schedule screen, tap the load/ save button to enter the load/save dialog. If a saved schedule is loaded, the "Current Schedule" window will display the name of a previously saved schedule. Otherwise, the "Current Schedule" window will be empty.
2. Tap the load/save value entry window and enter a name in the value entry screen. Tap the return or enter button.
3. Tap the load or save buttons to either load the entered schedule or save the entered schedule to the selected number slot.
4. Tap the "Return" button to return to the schedule screen.

Remote Monitoring

With customer-provided IP addresses, Ethernet connection to the dryer PLC and installation of a VNC client on a customer-provided device (PC or smartphone), remote monitoring, and control are possible. When prompted by the VNC client, enter the following:

IP Address: 192.168.1.61

Password: 100

The HMI screen should appear as it does at the local control box. Using the mouse pointer, buttons may be pressed and values adjusted from this display.

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 software will automatically create the folder.

Do not remove the SD card from the HMI slot to retrieve or otherwise manage data. 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 dehydrator’s 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 the “Log in” button at the bottom right of the login 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_[schedulename].”
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.

Safeties

Safety	Setpoint	Action	Reset
Dryer Over Temperature	150°F	Shut Down Furnace, HMI Alarm, Text Alarm	Auto-Reset
Emergency Stop	Control Panel Button Pressed	Shut Down Furnace/Blower, HMI Alarm	Twist out E-Stop (Schedule continues to run)
Low Air Flow	Blower RPM < 400	Shut Down Furnace, HMI Alarm, Text Alarm	Auto-Reset
Burner Over Temperature	150°F	Shut Down Furnace, HMI Alarm, Text Alarm	Manual Button Press
VFD Fault	N/A	Furnace Shutdown, HMI Alarm, Text Alarm	Auto-Reset Code 28, All other codes Manual Reset at HMI
Dryer Temperature Setpoint Drift	> +/- 5° F for 15 minutes	Text Alarm	No Reset
Vent/ Damper Fault	Compare Exhaust Setpoint with Feedback	HMI Alarm	Investigate and Repair

Maintenance

The following maintenance recommendations are based on an operating schedule, including 6 days of operation per week. These items should also be checked regardless of the previous inspection after any lengthy period of inactivity.

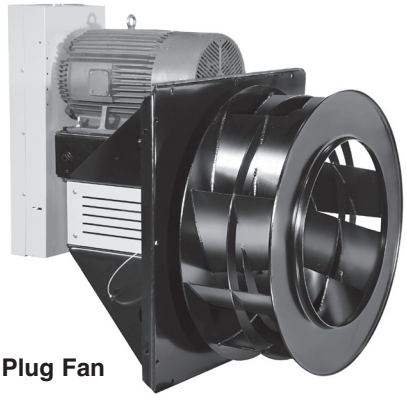
Component	Interval	Action
Furnace	Each Load	Inspect combustion air opening for dirt / debris. Inspect vent stack for deterioration. Inspect condensate drains to ensure lack of blockages.
	Annually	The duct furnace should be inspected by a qualified service agency. The condition of the burners, heat exchanger, draft inducer, vent system, operating controls and wiring should be determined. Check for obvious signs of deterioration, accumulation of dirt and debris and any heat or water related damage. Any damaged or deteriorated parts should be replaced before the unit is put back into service. A combustion analysis should be completed to be sure that the system is performing normally.
Blower	Annually	Inspect fan intake to ensure lack of dirt/ debris. Ensure that bolts are tight.
Blower Motor	As Necessary	Preventative maintenance is not necessary for the blower motor. VFD feedback concerning motor operation will warn of motor problems.
Damper Actuators	Annually	Inspect damper actuator positions at 0% and 100% exhaust to ensure full range of motion.
Temp / RH Sensor Filters	Annually	Inspect sensor filters for corrosion, discoloration, or clogging, and replace if necessary
Door Gasket	Quarterly	Recommend NSF approved gasketing around and between loading and unloading doors to ensure lack of gaps. Replace as necessary.
Chamber Sealant	Quarterly	Recommend NSF approved sealant between chamber panels and between chamber and floor. Add or replace as necessary.

Plug Fan

SAFETY - INSTALLATION - OPERATING AND MAINTENANCE INSTRUCTIONS

INDUSTRIAL PLUG FANS

This Manual is for the following Fans: D/44 Plug Fans; D/70 Plug Fans.



D/70 Plug Fan

TO ORDER SPARE PARTS:

Spare or repair parts may be ordered from your nearest Chicago Sales Engineer by giving the part name, (Wheel, Motor, Bearing, etc.) and the FAN SERIAL NUMBER taken from the nameplate or the JOB ORDER drawings. If possible also give the bearing or shaft size and the fan class. Due to the small number of parts required, spare parts lists are neither necessary nor available. Use these instructions instead.

RECEIVING:

Chicago Blower Corporation equipment is prepared for shipment in accordance with the Uniform Freight Classification. It is thoroughly inspected at the factory and, barring damage in transit, should be in good condition upon arrival.

When a carrier signs Chicago Blower Corporation's bill of lading, the **carrier accepts the responsibility** for any subsequent shortages or damage evident or concealed, and **any claim must be made against the carrier by the purchaser.** Evident shortage or **damage should be noted on the carrier's delivery document** before signature of acceptance. Inspection by the carrier of damage evident or concealed must be requested. After inspection, issue a purchase order for necessary parts or arrange for return of the equipment to Chicago Blower Corporation factory for repair.

Chicago Blower fans are shipped, skidded, and may be handled and moved using good rigging techniques, being careful to avoid concentrated stresses that distort any of the parts.

STORAGE:

If the fan installation is to be delayed, store the unit in a dry, protected area. Protect the fan, especially fan and motor bearings, from moisture and vibration. Protect all machined surfaces such as shafts, couplings, and bushings. Rotate the wheel several revolutions every two weeks, stopping the wheel in a position other than its initial position. Keep the bearings fully greased by filling monthly with a grease compatible to that originally supplied. Contact Chicago Blower for extended storage instructions.

SAFETY PRECAUTIONS:

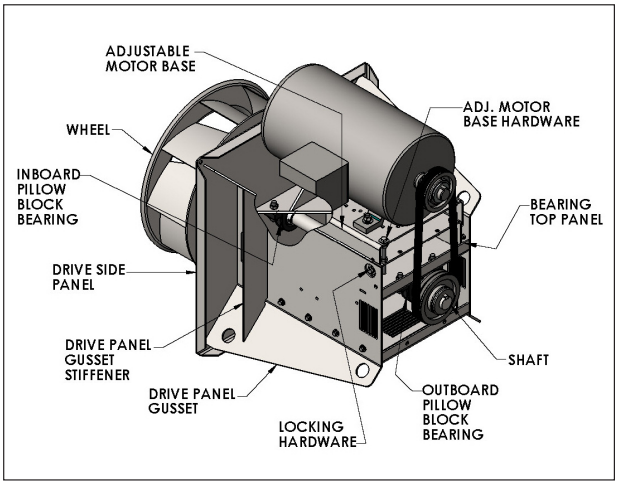
The fan which you have purchased is a rotating piece of equipment and can become a source of danger to life or cause injury if not properly applied. The **maximum operating temperature** or **speed** for which this fan is designed **must not be exceeded**. These limits are given in our catalog or on Chicago Blower Corporation drawings.

Personnel who will operate this fan, or those who will perform maintenance thereon, **must be given this bulletin to read and warned of the potential hazards of this equipment.**

This pamphlet contains general recommendations, but specific requirements may apply to the individual installation. Such requirements are outlined in federal, state and local safety codes. Strict compliance with these codes, and strict adherence to these installation instructions are **the responsibility of the user.**

INSTALLATION:

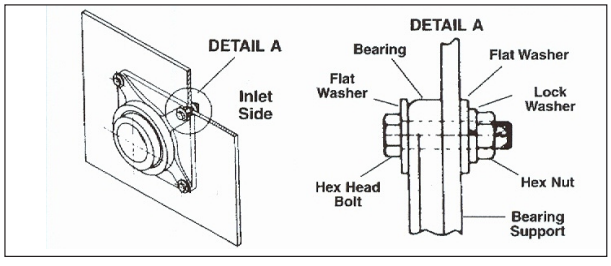
1. Inspect the equipment for correctness and condition. If any discrepancies are found, contact your local Chicago Blower Corporation Engineer immediately for assistance.
2. The fan wheel assembly has been dynamically balanced for vibration-free operation. Any damage or rough handling may destroy this balance and require rebalancing. Take care to prevent damage to the wheel hub finished bore. Protect the fan shaft from mars, gouges, nicks or bending.
3. The fan bearings have been factory lubricated and are shipped in cartons to protect them. Do not remove the bearings from the cartons until ready for assembly.



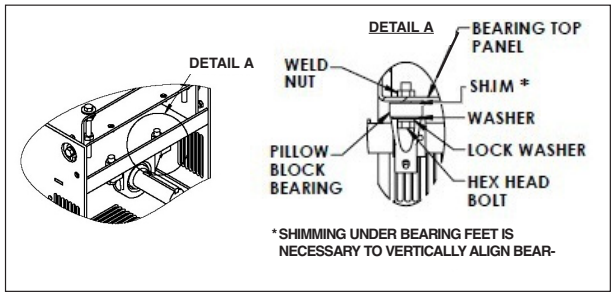
ASSEMBLY PROCEDURE:

1. Drive panel must be mounted on a rigid and substantial foundation on the plenum chamber wall. Careful design of the mounting structure is needed to insure vibration-free operation. If the structure is not rigid, harmonic vibrations occur. On some "soft" structures, field touch-up balancing may be necessary to **balance the complete system structure.**
2. Make sure the wheel rotation is correct (**clockwise or counterclockwise as viewed from the drive side**) for the planned discharge from the plenum chamber or accessory housing.
3. If the accessory housing is being used, it should be installed flush against the inside plenum wall before the wheel is put on the fan shaft. Fasten to the plenum wall by bolting or stitch welding.
4. Check shaft and keyways for nicks from handling. File off. Slide the wheel onto shaft end with the longest keyway. Insert the key and lightly tighten the wheel set screws with the wheel positioned half way along the keyway.
5. From inside the plenum, push the drive end of the drive shaft through the plenum shaft hole and through the inboard bearing bracket. With the shaft end halfway to the outboard bracket, slip one bearing on the shaft. Then push the wheel-shaft assembly all the way through and install the drive bearing. Use mounting hardware as shown below. Both bearings are the same.

FLANGE MOUNT BEARING DETAIL



PILLOWBLOCK BEARING DETAIL



6. With the wheel temporarily pushed flush against the inside plenum wall, the shaft can be centered on the hole, the inboard bearing mounting bolts tightened and then the outboard bearing mounting bolts tightened. This locates the shaft perpendicular to the plenum wall and fan drive panel. Check level shaft.

   If the fan is vertically mounted with inlet down, block the wheel and shaft in place with wood blocking to prevent damage. Do not block bearings to shaft yet.
7. Slide the shaft through the bearings and locate its drive end flush with the end of the motor shaft. Make sure the bearing locking collar is in position and tighten set screws to the bearing manufacturer's torque levels. See bearing manufacturer's instructions enclosed for details.
8. Slide the wheel along the shaft and position it a distance from the plenum wall, determined by the thickness of the insulation or the gap designed in the plenum. This dimension is not critical. Any extra length of shaft may extend through the hub without harm.
9. Install the inlet cone loosely on the housing or plenum structure, attaching it only at four points until final adjustments are made. Move the wheel along the shaft so that it slightly overlaps the inlet cone. Position the inlet cone to be concentric to the wheel opening with equal spacing in a radial direction all around. The inlet cone can be firmly fastened at this time.

   On a Heat Fan or a fan not operating at maximum static pressure, it is satisfactory to have an axial gap between the wheel and inlet cone of 3/16" to 5/8" depending upon the fan size. This axial gap can be adjusted by moving the wheel closer to or farther away from the cone. Position the wheel so that the set screw over the key is at the bottom. Torque the bottom set screw first and then the opposing set screw next. Torque all set screws per the Torque Values chart.

SET SCREW TORQUE VALUES

Bolt Size (In. Dia.)	Threads Per Inch	Steel Grade 2 Non-Plated (Inch-lbs.)
1/4	20	65.5
5/16	18	136.0
3/8	16	239.0
7/16	14	381.0
1/2	13	586.0
5/8	11	1163.0
3/4	10	2076.0

   Recheck the wheel cone to inlet cone clearance.
10. Mount the adjustable motor base on the drive panel gusset as shown in the illustration. Mount the motor on the adjustable motor base and adjust the base height for the approximate center distance of the V-belt being used.
11. Loosely install the fan and motor sheaves and the belts. Tighten the fan sheave first, then align the motor sheave to the fan sheave. The fan and motor shafts must be parallel. See V-belt Drive section of this manual for sheave alignment and installation.
12. If the fan handles air above 300° F, install the shaft-cooling wheel by either centering it in the space between the inboard bearing and drive panel, or by setting it in the recessed area in the drive panel. Two self-tapping bolts clamp the cooler to the shaft. Install all shaft, cooling wheel, bearing guards and belt guards as required.
13. If the fan has been provided with an Inlet Volume Control (IVC), it is mounted in the inlet cone and no further adjustments are required except to hook up the operating lever to the Customer's Control.
14. The IVC should be checked for correct rotation. Looking at the IVC from the inlet side with IVC blades half closed, the blades should pre-spin the entering air in the same direction as the fan wheel is rotating.
15. Chicago Blower requires that all appurtenances, including ductwork or stacks, which are attached to the fan inlet or outlet, be inpendently supported, unless prior approval has been obtained from Chicago Blower. Excess dead loads or wind loads can distort the fan housing causing misalignment and possible failure. Flexible connections are also necessary to prevent duct expansion or movement from adding loads to the fan.

NOTE: For High Temperature Applications – The fan should not be shut off until the airstream temperature is below 200°F.

BEARING LUBRICATION

AMBIENT CONDITIONS		OPERATING CONDITIONS		BEARING OPERATING TEMPERATURE (°F)		SUGGESTED GREASING INTERVAL**	USE THESE GREASES or EQUIVALENT
Dirt	Moisture	Load	Speed	Low	High		
Clean	Dry	Light to Medium	Slow to Medium	0	120	2 to 6 Months	High quality NLGI #1 or #2 multi-purpose bearing greases are generally satisfactory. Consultation with a reputable lubricant supplier is recommended.
				120	200	1 to 2 Months	
Moderate to Dirty	Dry	Light to Medium	Slow to Medium	0	120	1 to 4 Weeks	
				120	200	1 to 7 Days	
Extreme Dirt	Dry	Light to Medium	Slow to Medium	0	200	Daily - Flushing Out Dirt	
	High Humidity - Direct Water Splash*	Light to Heavy	Slow to Medium	32	200	1 to 4 Weeks - Grease at Shutdown	Mobil Oil Corporation, Mobilith AW-2 Texaco Inc., Premium RB2 Shell Oil Company, Gadus S2 V220
		Heavy to Very Heavy	Slow	0	200	1 to 8 Weeks	Shell Oil Company, Gadus S2 V220
				– 20	120	1 to 8 Weeks	Mobil Oil Corporation, Mobiltemp 78
		Light	High Speed	100	200	1 to 8 Weeks	Amoco, Rykon No. 2 Texaco Inc., Premium RB 2
	Possible Frost	Light to Heavy	Slow to Medium	– 65	250	1 to 4 Weeks - Grease at Shutdown	Mobil Oil Corporation, Mobiltemp SHC32 Texaco Inc., 2346EP Low Temp Shell Oil Company, Aeroshell 7A
Clean to Moderate	Dry	Light to Medium	Slow to Medium	80	250	1 to 8 Weeks	Union Oil Company, Unoba EP2 Mobil Oil Corporation Mobiltemp 78
Clean to Dirty	Dry	Light	Slow	80	300	1 to 4 Weeks	Keystone Lubricants Company, No. 89 Dow Chemical Company, DC44

* Additional bearing protection or special sealing may be required.
** Suggested starting interval for maintenance program. Check grease condition for oiliness and dirt and adjust greasing frequency accordingly. Watch operating temperatures. Sudden rises may show need for grease or indicate over lubrication on higher speed applications.

Chicago Blower Corporation cannot be held responsible for performance of individual batches of grease. Changes in lubricant specifications, performance, and lubricant guarantees are the responsibility of the lubricant manufacturer.

FAN BEARINGS:

1. Units are prelubricated with lithium base NLGI #2 grade grease, but make sure they have adequate grease. As a precaution, if equipment is to be built and left idle for any period of time prior to actual use, the units should be filled 100% full to provide maximum protection from corrosion, etc. The suggested relubrication schedule above is a general guide.

   The specific conditions on an application such as exact hours of operation, temperature, moisture, speed and dirt govern the required lubrication cycle. This can be determined by inspection of the flushed out lubricant during a trial period of operation. Add grease slowly. Use a sufficient volume to purge bearing seals of old lubricant. It is preferable to rotate bearings during relubrication where good safety practice permits.

   Inspect bearing installations at least every six months. Any unusual noise or vibration change should be immediately investigated.

2. Bearing must be properly locked to the shaft. Check before operation. Make sure bearing locking collar is in position and set screws are tightened to the bearing manufacturer's recommended torque levels. See bearing manufacturer's instructions enclosed for details. The bearing set screws should be re-torqued after eight and twenty-four hours of operation.

VERTICAL OPERATION:

If the fan is to operate with its shaft vertical, reset the bearings as follows:

a. With the shaft vertical, unlock the drive end bearing set screws and turn the shaft by hand. This allows the wheel end bearing to take the gravity load of the shaft and wheel.

b. Re-lock the drive end bearing locking device and replace and torque set screws as required by the bearing manufacturer's instructions so that this bearing now takes only the belt pull.

V-BELT DRIVES:

1. Alignment of the drives must be checked with a straightedge or string. Belt tension must must be properly adjusted to assure good belt and bearing life. Sheave faces should be parallel and aligned within 1/16". **Use balanced sheaves.**

2. With all belts in their proper grooves, adjust the centers to take up all slack and until the belts are fairly taut.

3. It is normal on v-belt drives handling more than 20 HP to "squeal" on start-up. **Do not tighten belts too tight.** Normal belt tension can be determined by being able to depress belt, at mid-point a distance equal to one belt width, with normal finger pressure.

4. After a few days of operation the belts will seat themselves in the sheave grooves and it may become necessary to readjust so that the drive again shows a slight "bow" in the slack side. The drive is now properly tensioned and should operate satisfactorily with only an occasional readjustment to compensate for belt and groove wear.

OPERATION OF FAN:

After installing the fan per these instructions and the instructions of the manufacturers, make final safety checks to prevent injury to personnel or damage to the equipment. **Always block rotating parts to prevent windmilling while inspecting the fan.**

1. Lock power source in “OFF” position.
2. Check bearings for alignment and proper lubrication, with wheel and inside of the housing clean and free of debris.
3. Check wheel position for proper clearance and rotation. Unblock rotating parts and turn wheel by hand to insure that it rotates freely.
4. Check sheave set screws or bushings and wheel set screws for tightness. If fan is a HEAT FAN, check to see that the shaft cooling wheel bolts are tight. Check foundation bolts. Secure safety guards and access doors.
5. If fan is designed for low density (such as high temp), make sure overload of fan motor is avoided if fan is run with standard air.
6. Start fan and allow unit to reach full speed, then shut down. During this short period, check for rotation, excessive vibration, any unusual noise, or overheating of the motor. Check the motor amps drawn against the nameplate rating. A plate over the fan inlet will limit the horsepower drawn during a test run with limited ductwork.
7. After the trial run lock the power “OFF”.
8. Recheck for tightness of hold-down bolts, wheel set screws and keys, and retighten if necessary. Recheck after eight and twenty-four hours of operation.
9. The run-in period should be at least eight hours. Check bearings a minimum of once each hour during this period. Overgreasing may cause bearings to heat up. There need be no concern if the bare hand can be held on the bearings briefly. Bearings will vent extra grease and cool down after start-up. Recheck torque of all bearing set screws after eight and twenty-four hours of operation to insure levels are maintained per the bearing manufacturer’s recommended levels.

   Take vibration readings at the bearings, or the motor bearings if the fan wheel is mounted directly on the motor shaft. Adhere to these limits. Velocity limits in inches/second – Normal: 0.15; Alarm: 0.22; Shutdown: 0.50. These values are peak velocity values, filter-in, at the fan rotational speed.

MAINTENANCE:

To insure long life and trouble-free service, frequently check all bearing lubrication. See the bearing manufacturer’s instructions packed with the fan. Should excessive vibration develop, check the following possibilities:

1. Build-up of dirt or foreign material on the wheel.
2. Loose bolts on bearings, housings, foundation and drive.
3. V-belt drive improperly aligned. Belts must have proper tension, sheaves must be balanced.
4. Check wheel set screws or bushing cap screws.
5. Foreign matter may have entered fan causing damage to wheel, shaft or bearings.
6. Vibration may be coming from a source other than the fan. Stop the fan and determine if the vibration still exists. Disconnect the driver from the fan and operate it by itself to determine if it produces vibration.
7. Improper clearance between the wheel and the inlet cone.

A preventive maintenance schedule is a necessity for extending fan life. Establish a lubrication schedule based on time periods suggested in lubrication instructions and by motor and bearing manufacturers.

After approximately one (1) month of operation, all base, hub bearing, pedestal, etc. bolts should be checked.

Potentially damaging conditions are often signaled in advance by change in vibration and sound. A simple, regular audio-visual inspection of fan operation leads to correction of the condition before expensive damage occurs. Vibration levels should be checked by an approved technician using electronic balancing equipment.

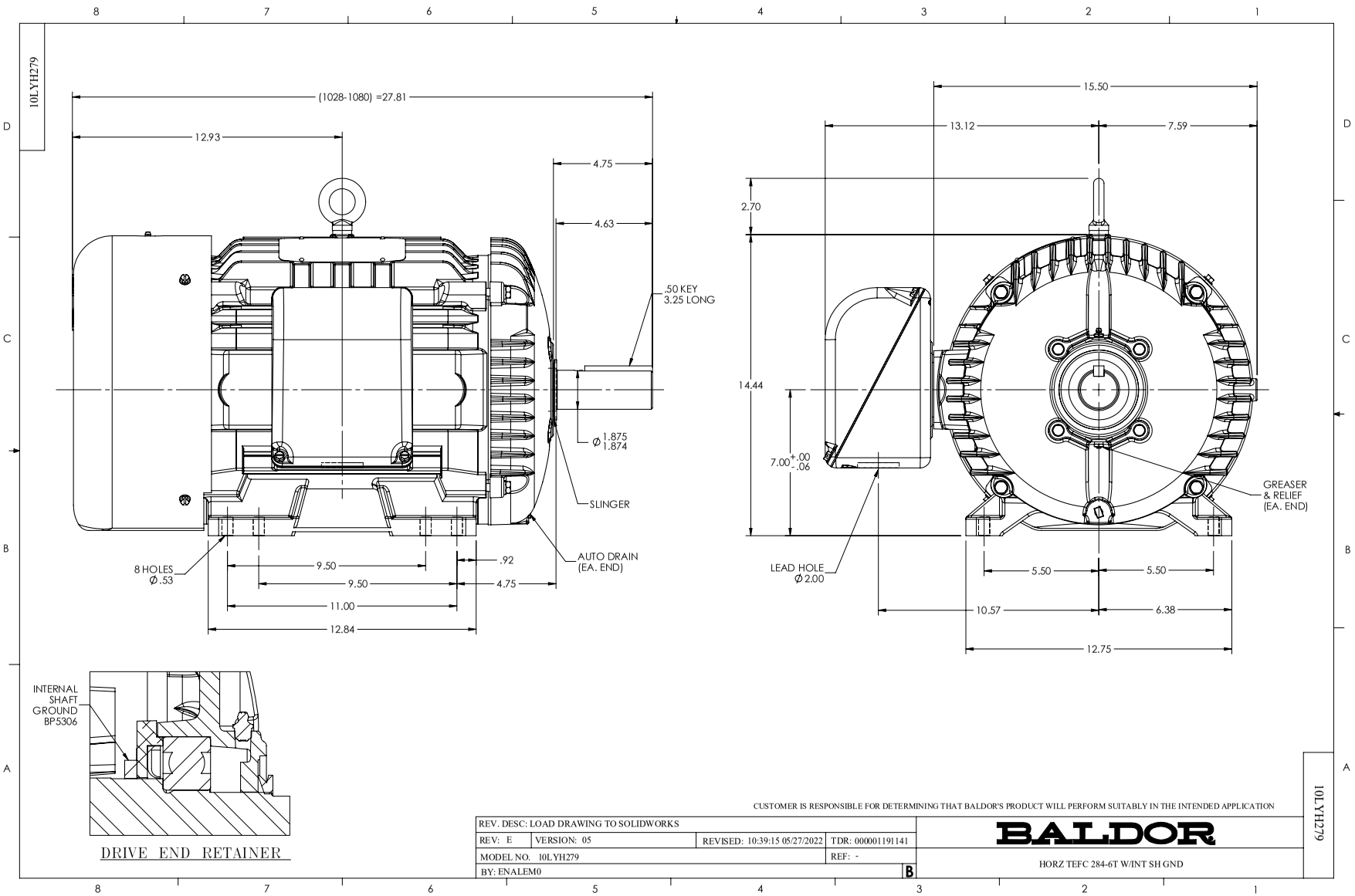
If air handled by the fan contains corrosive, erosive or sticky materials, fan should be shut down regularly for inspection, cleaning and reconditioning of interior parts.

If the fan is to remain idle for an extended period, fill bearing with grease. Protect motor and exposed surfaces. Follow the motor manufacturer’s recommendations for storage and rotate the shaft by hand several revolutions each month.

Mechanical Integrity: Certain operating conditions reduce the built-in strength in the fan impeller and may cause unsafe operation. It is the user’s responsibility to inspect for these conditions as frequently as necessary and make corrections as required. Failure to comply with the following limits voids the Chicago Blower Corporation warranty.

Maximum Safe Speed and Temperature: Operation exceeding maximum safe RPM and temperature even for a short time causes overstressing or fatigue cracking of the impeller resulting in unsafe condition. Maximum safe speed and maximum safe temperature are shown on fan assembly drawings, catalogs or order acknowledgement.

Warranty: The warranty on Chicago Blower fans is our standard warranty. The warranty on the motor is that extended by the motor manufacturer.


10LYH279
(1028-1080) =27.81
12.93
4.75
4.63
.50 KEY
3.25 LONG
Ø 1.875
1.874
SLINGER
AUTO DRAIN
(EA. END)
8 HOLES
Ø .53
9.50
9.50
.92
4.75
11.00
12.84
15.50
13.12
7.59
2.70
14.44
7.00 +.00 -.06
GREASER
& RELIEF
(EA. END)
LEAD HOLE
Ø 2.00
5.50
5.50
10.57
6.38
12.75
INTERNAL
SHAFT
GROUND
BP5306
DRIVE END RETAINER
CUSTOMER IS RESPONSIBLE FOR DETERMINING THAT BALDOR'S PRODUCT WILL PERFORM SUITABLY IN THE INTENDED APPLICATION
REV. DESC: LOAD DRAWING TO SOLIDWORKS
REV: E
VERSION: 05
REVISED: 10:39:15 05/27/2022
TDR: 000001191141
MODEL NO. 10LYH279
REF: -
BY: ENALEM0
B
BALDOR
HORZ TEFC 284-6T W/INT SH GND
10LYH279

Nameplate

NP3443LUA												
CAT.NO.	EM4103T-G			**CUST. P/N**						**ENCL**	TEFC	
SPEC.	10H279Z651G1	**CC**	010A	**FRAME**	284T			**SER.NO.**				
HP	25	**CLASS**	H	**HZ**	60							
R.P.M.	1775	**PH.**	3	**DES.**	A							
VOLTS	230/460	**CODE**	J	**ODE BRG**	6309	**DE BRG**	6311					
AMPS	62/31	**USABLE AT 208V**	64									
RATING	40C AMB-CONT	**NEMA NOM. EFF.**	93.6	**GREASE**	POLYREX EM							
P.F.	81	**SER.F.**	1.15	**CT6-60H(10:1)VT3-60H(20:1**								
USABLE AT	50HZ 25 HP 190/380V 72/36A			SF1.0								
VOLTS	**AMPS**	**MAX. SPACE HEATER TEMP.**										

Gas-Fired Duct Furnaces

Operating & Safety Instructions

Wiring diagram and Sequence of Operation are included in this information package for the specific control system provided on the duct furnace. Refer to these documents before attempting to place in service.

1. This duct furnace does not have a pilot. It is equipped with a direct spark ignition device that automatically lights the gas burner. DO NOT try to light burners by hand.
2. **BEFORE OPERATING**, leak test all gas piping up to heater gas valve. Smell around the unit area for gas**. DO NOT** attempt to place furnace in operation until source of gas leak is identified and corrected.
3. Use only hand force to push and turn the gas control knob to the "ON" position. **NEVER** use tools. If knob does not operate by hand, replace gas valve prior to starting the unit. Forcing or attempting to repair the gas valve may result in fire or explosion.
4. Do not attempt to operate unit, if there is indication that any part or control has been under water. Any control or component that has been under water must be replaced prior to trying to start the unit.

Start-up

1. Turn thermostat or temperature controller to its lowest setting
2. Turn off gas supply at the manual shut-off valve
3. Turn off power to the unit at the disconnect switch.
4. Remove access panel or open door to unit vestibule housing the gas heater.
5. Move gas control knob to "Off" position.
6. Install a tapped fitting for attachment to a manometer, or other gauge suitable for 14.0" w.c., in the inlet pressure tap, and for 10.0" w.c., in the manifold pressure tap.
7. Wait 5 minutes for any gas to clear out. If you smell gas, see Step 2 above and correct leak. If you don't smell gas or have corrected any leaks, go to the next step.
8. Turn gas control knob to "On" position
9. Open all manual gas valves
10. Turn power on at disconnect switch
11. Set thermostat or controller to its highest position to initiate call for heat and maintain operation of unit.*
12. Draft inducer will run for a 15 to 30 second pre-purge period (See Sequence of Operation provided)
13. At the end of the pre-purge the direct spark will be energized, and gas valve will open
14. Burners ignite.

Inlet Gas Pressure

Verify inlet (line) gas pressure to the combination gas valve provided. A 1/8 NPT tapping is provided on the gas valve for measuring inlet pressure as shown. See Figure 13 for Gas Valve adjustment locations**.**

Input

The correct heat capacity of the furnace is controlled by the burner orifices and the gas manifold pressure. The manifold pressure is factory set but should be checked at the time of start-up.

Failure to Ignite

1. On the initial start-up, or after unit has been off long periods of time, the first ignition trial may be unsuccessful due to need to purge air from manifold at start-up.
2. If ignition does not occur on the first trial, the gas and spark are shut-off by the ignition control and the control enters an inter-purge period of 15 to 90 seconds, during which time the draft inducer continues to run.
3. At the end of the inter-purge period, another trial for ignition will be initiated.
4. Control will initiate up to three ignition trials on a call for heat before lockout of control occurs.
5. Control can be brought out of lockout by turning thermostat or controller to its lowest position and waiting 5 seconds and then turning back up to call for heat. Some controls provided will automatically reset after one hour and initiate a call for heat.

Manifold Pressure Adjustment

A pressure tap is provided in each furnace manifold for measuring the gas manifold pressure. Manifold pressure must be checked at start-up and during any service or maintenance. All control systems operate at a manifold pressure of 3.40 to 3.50 in. w.c. at **maximum input** on Natural Gas, and 10.0 in. w.c. on Propane Gas.

***Note**: If modulating controls are provided on duct furnace, refer to separate set-up sheet included with this manual.

Figure 13A – Honeywell VR8305Q Gas Valve

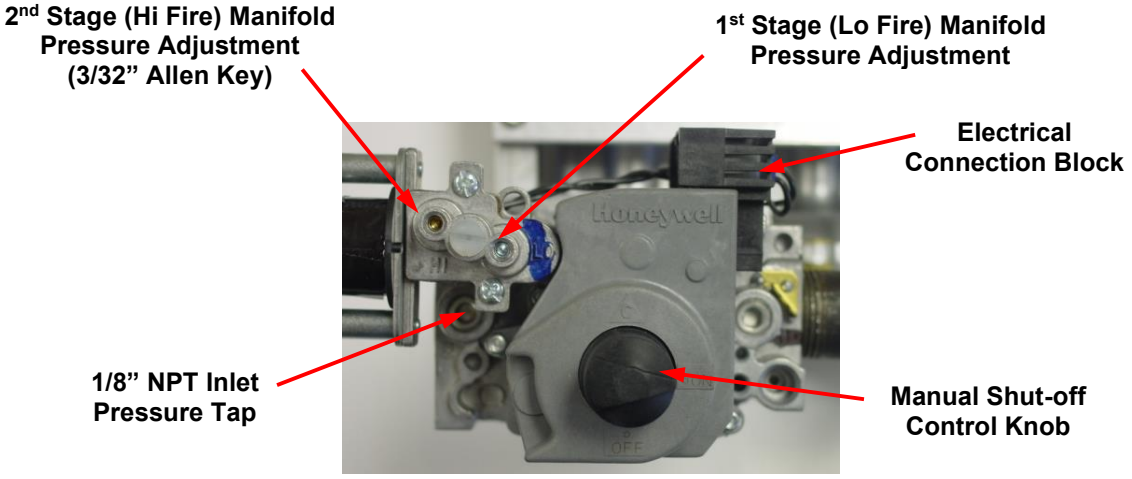


Figure 13B – White Rodgers 36H Gas Valve

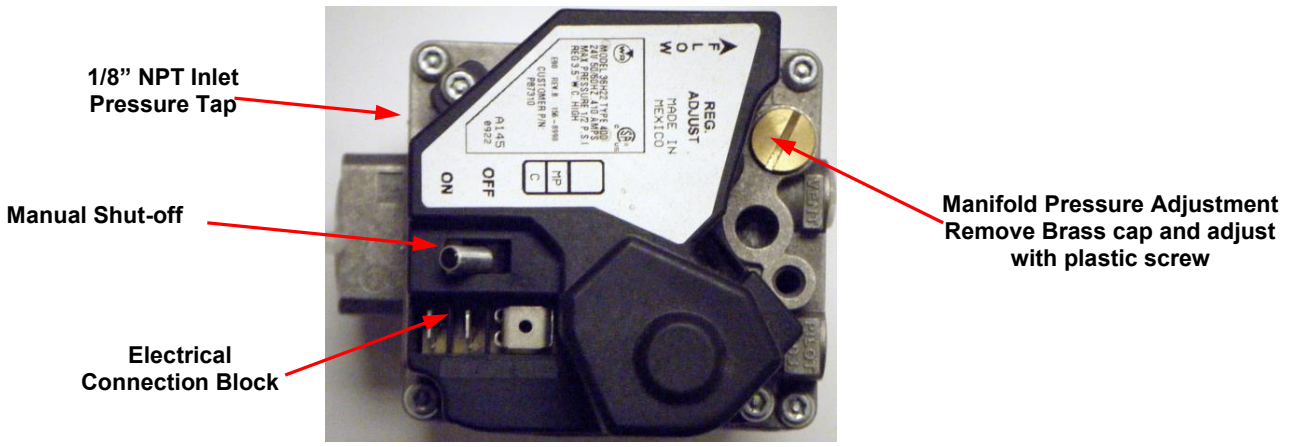
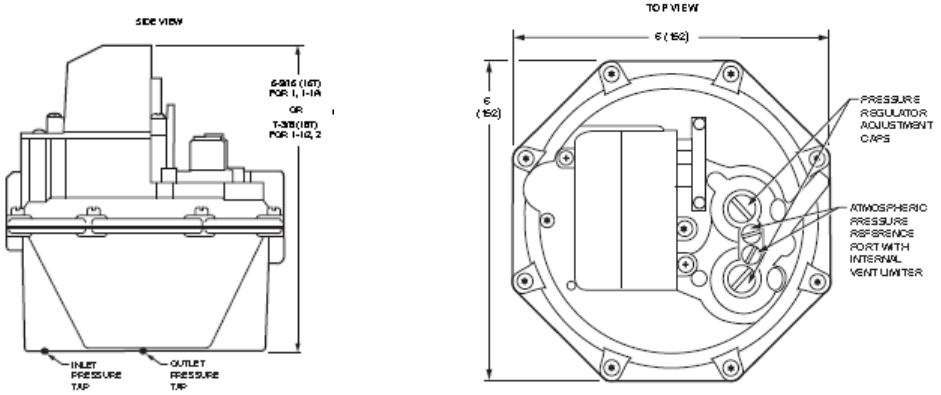


Figure 13 C – Honeywell V8944 Gas Valve

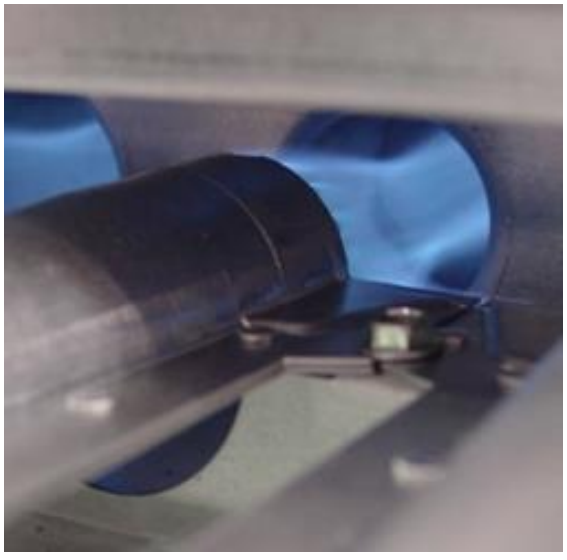


Burner Flames

Prior to completing the start-up, check the appearance of the main burner flame. See Figure 14 below for flame characteristics of properly adjusted Natural gas systems.

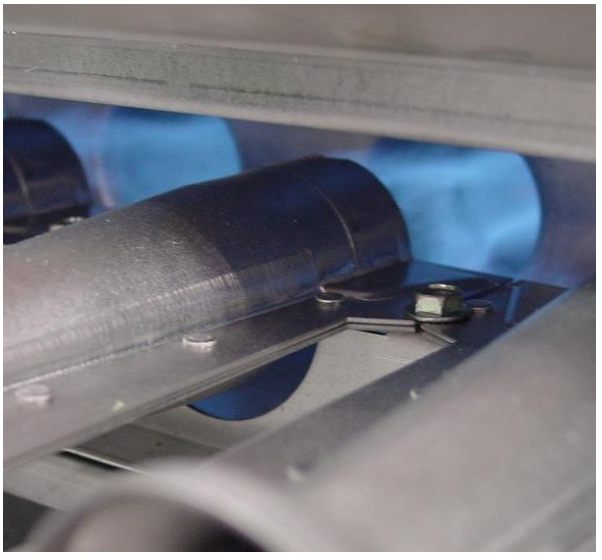
1. The burner flame should be predominately blue in color and well defined and centered at the tube entry as shown in Figure 14. Distorted flame or yellow tipping of natural gas flame, or a long yellow flame on propane, may be caused by lint and dirt accumulation inside burner or at burner ports, at air inlet between burner and manifold pipe, or debris in the main burner orifice. Soft brush or vacuum clean affected areas.
2. Poorly defined, substantially yellow flames, or flames that appear lazy, indicate poor air supply to burners or excessive burner input. Verify gas supply type and manifold pressure with rating plate information.
3. Poor air supply can be caused by obstructions or blockage in heat exchanger tubes or vent discharge pipe. Inspect and clean as necessary to eliminate blockage. Vacuum any dirt or loose debris. Clean heat exchanger tubes with stiff brush. Poor flame characteristics can also be caused by undersized combustion air openings or flue gas recirculation into combustion air supply. Increase air opening size or re-direct flue products to prevent re-circulation.
4. Reduced air delivery can also be the result of fan blade slippage, dirt accumulation the fan blade or low voltage to draft inducer motor. Inspect draft fan assembly and be sure fan blade is secure to motor shaft. Check line voltage to heater.

Figure 14A



Burner Flame @ 1.2" w.c. Manifold
Pressure Draft Inducer – High Speed

Figure 14B



Burner Flame @ High Fire 3.5" w.c. Manifold
Pressure Draft Inducer – High Speed

Shutdown

1. Set thermostat or controller to lowest setting.
2. Turn off electrical supply to unit at disconnect switch.
3. Turn off manual gas supply.
4. Disconnect manifold and inlet pressure taps and re-install pipe plugs
5. Replace vestibule access panel or close door.

Normal Operation

1. Turn on electrical supply to unit at disconnect switch
2. Turn on manual gas supply
3. Set Thermostat or Temperature controller to desired temperature.
4. Information outlining the normal Sequence of Operation and Wiring Diagram for the control system supplied with the furnace model is enclosed with this instruction.

FOR YOUR SAFETY

The use and storage of gasoline or other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.

Controls

Combustion Air Pressure Switch

A combustion air pressure switch is provided as part of the control system to verify airflow through draft inducer by monitoring the difference in pressure between the draft inducer and the atmosphere. If sufficient negative pressure is not present, indicating lack of proper air movement through heat exchanger, the switch opens shutting off gas supply though the ignition control module. On units with two speed draft inducer operation, a dual air pressure switch is used, monitoring high and low speed pressures. The air pressure switches have fixed settings and are not adjustable.

Rollout Switch (Manual Reset)

The duct furnace is equipped with manual reset rollout switch(es) in the event of burner flame rollout. The switch will open on temperature rise and shut-off gas supply through the ignition control module. Flame rollout can be caused by insufficient airflow for the burner firing rate (high gas pressure), blockage of the vent system or in the heat exchanger. The furnace module should not be placed back in operation until the cause of rollout condition is identified. The rollout switch can be reset by pressing the button on the top of the switch.

High Limit Switch

The duct furnace is equipped with a fixed temperature high limit switch mounted on the vestibule panel that shuts off gas to the heater through the ignition control module in the event of reduced circulating airflow over the heat exchanger. Reduced airflow may be caused by dirty or blocked filters, restriction of the air inlet or outlet to the unit, or incorrect setting of circulating air fan variable frequency drive. The high limit switch will automatically reset when the switch temperature drops to 30^{o}F below the set point. Determine the cause of the reduced air flow and correct.

Ignition Control Module

Ignition control modules are available having a number of different operating functions. Refer to Sequence of Operation sheet provided for a detailed description of the control features for the model control installed.

Additional recommended safety interlocks

Circulating Air Flow Proving Switch

The installation of a circulating airflow proving switch in the cabinet or duct is recommended, to prevent operation of the gas heater in the event of failure of the circulating air fan. This switch should be installed upstream of the heating section to prove operation of the circulating air fan during heater operation (See Fig. 13). This switch shuts off electrical supply to the ignition controller if a positive pressure is not detected by the switch due to lack of air flow through the heat exchanger. An airflow proving switch kit with air probe is available for this heating unit.

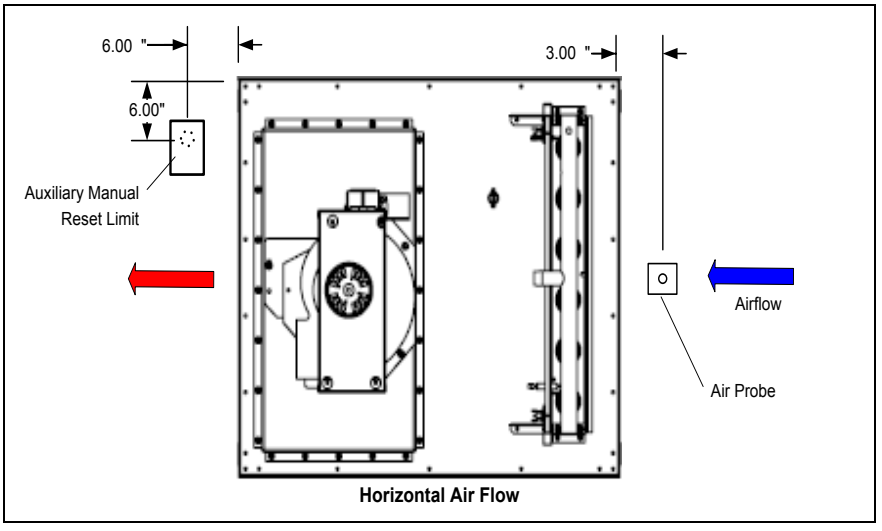
CAUTION: The limit switch provided integral to the heating is an automatic reset type as required by the approval standard for this product. On circulating air fan failure, heater will cycle on limit resulting in possible heat build-up and damage to components.

Auxiliary High Limit

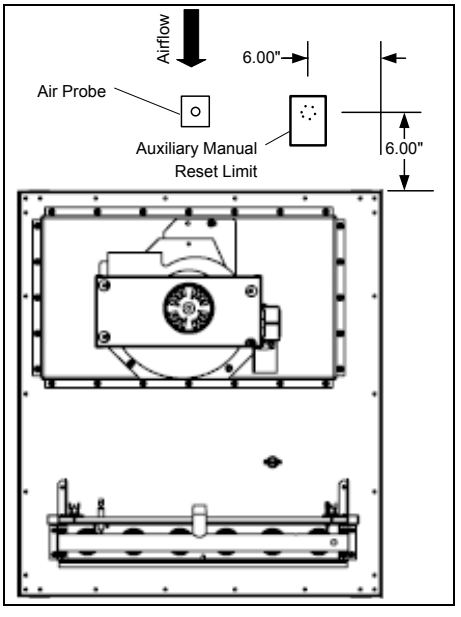
In certain airflow configurations including vertical air flow or zoned airflow applications, the installation of a manual reset auxiliary limit is recommended. See Fig. 15 for typical location. In the event of a reverse flow or limited flow conditions, this limit would function to shut-off the gas supply to the heating unit. An auxiliary manual reset limit is available for this heating unit.

Figure 15 – Auxiliary Limit & Airflow Probe – Suggested locations

Horizontal Air Flow
Set Auxiliary Limit @ 180 oF



Vertical Air Flow (Downflow)
Set Auxiliary Limit @ 120 oF



Optional Controls

Low Gas Pressure Switch

A low gas pressure switch may be factory installed on the inlet side of the gas train to monitor gas pressure upstream of the gas controls. This switch shuts off the electrical supply to the ignition controller, closing the gas valve, if low gas pressure occurs. This pressure switch is factory set for the minimum inlet gas pressure for the heater model.

High Gas Pressure Switch

7

A high gas pressure switch may be factory installed on the gas train to monitor the gas pressure downstream of the combination gas valve. This switch shuts off the electrical supply to ignition controller, closing the gas valve, if high gas pressure occurs. The pressure switch is factory set so that the maximum manifold pressure does not exceed 4.0 in. W.C. on Natural Gas and 10.5 in. W.C on Propane Gas.

Annual Maintenance

This duct furnace should be inspected and serviced annually by a qualified service agency, to assure proper operation

Furnace Module Inspection

Turn off all electrical power to the unit before inspection and servicing.

1. The condition of the burners, heat exchanger, draft inducer, vent system and operating controls should be determined. Check for obvious signs of corrosion, accumulation of dirt and debris and any heat or water related damage. Any damaged or deteriorated parts should be replaced before the unit is put back into service.
2. Clean burners, heat exchanger, draft inducer and vent ducts as outlined on Page 11.
3. Check Heat Exchanger for cracks. If any are present, replace heat exchanger before putting unit back into service.
4. Check electrical wiring for loose connections or deteriorated insulation.
5. Check the attachment point of the furnace module to the cabinet or ducts to verify that they are airtight.
6. Check for gas tightness of all pipe joints and connections
7. Check the automatic gas valve to ensure that the gas valve seat is not leaking.

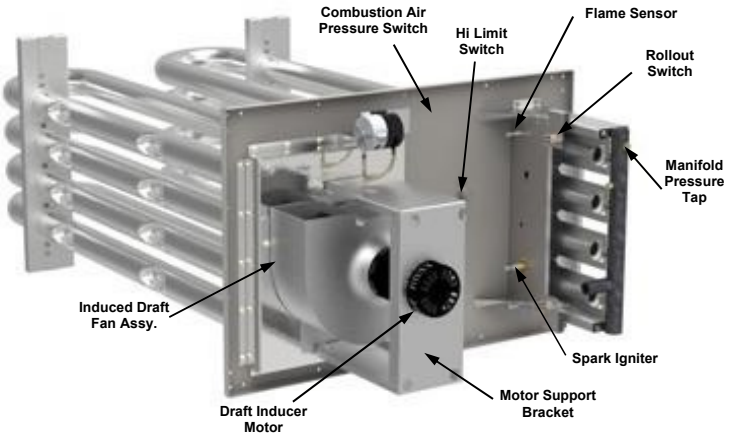
If duct furnace is located downstream of cooling coils a condensate drain line should be connected to the flue collector box. Be sure that drain line is not obstructed. Clean any debris or blockage from the line.

Furnace Module Operation Check

1. Turn on power to the unit and set thermostat or heat controller to call for heat, allowing furnace module to operate.
2. Check for proper start-up and ignition as outlined in Sequence of operation for the control provided.
3. Check the appearance of the burner flame (See Figure 10A and 10B on Page 11).
4. Return thermostat or heat controller to normal setting.
5. Refer to the appliance manufacturer's instructions for annual maintenance procedures on the complete unit.

CAUTION !

If any of the original wiring needs to be replaced it must be replaced with wiring materials suitable for 105°C.
Label all wires prior to disconnection when servicing unit. Wiring errors can cause improper or dangerous operation. Verify proper operation after servicing.



Operating & Safety Instructions

1. This heater module does not have a pilot. It is equipped with a direct spark ignition device that automatically lights the gas burner. DO NOT try to light burners by hand.
2. **BEFORE OPERATING**, leak test all gas piping up to heater gas valve. Smell around the unit area for gas**. DO NOT** attempt to place heater in operation until source of gas leak is identified and corrected.
3. Use only hand force to push and turn the gas control knob to the “ON” position. **NEVER** use tools. If knob does not operate by hand, replace gas valve prior to staring the unit. Forcing or attempting to repair the gas valve may result in fire or explosion.
4. Do not attempt to operate unit, if there is indication that any part or control has been under water. Any control or component that has been under water must be replaced prior to trying to start the unit.

Start-up

1. Turn thermostat or temperature controller to its lowest setting
2. Turn off gas supply at the manual shut-off valve
3. Turn off power to the unit at the disconnect switch.
4. Remove access panel or open door to unit vestibule housing the gas heater.
5. Move gas control knob to “Off” position.
6. Install a tapped fitting for attachment to a manometer, or other gauge suitable for 14.0” w.c., in the inlet pressure tap, and for 10.0” w.c., in the manifold pressure tap.
7. Wait 5 minutes for any gas to clear out. If you smell gas, see Step 2 above and correct leak. If you don’t smell gas or have corrected any leaks, go to the next step.
8. Turn gas control knob to “On” position
9. Open all manual gas valves
10. Turn power on at disconnect switch
11. Set thermostat or controller to its highest position to initiate call for heat and maintain operation of unit.*
12. Draft Inducer will run for a 15 to 30 second pre-purge period (See Sequence of Operation provided)
13. At the end of the pre-purge the direct spark will be energized and gas valve will open
14. Burners ignite.

***Note**: If modulating controls are provided on heater module, a separate set-up sheet is included with this manual. Refer to that set-up sheet for complete start-up instructions

Failure to Ignite

1. On the initial start-up, or after heating unit has been off long periods of time, the first ignition trial may be unsuccessful due to need to purge air from manifold at start-up.
2. If ignition does not occur on the first trial, the gas and spark are shut-off by the ignition control and the control enters an inter-purge period of 15 seconds, during which the draft inducer continues to run.
3. At the end of the inter-purge period, another trial for ignition will be initiated.
4. Control will initiate up to three ignition trials on a call for heat before lockout of control occurs.
5. Control can be brought out of lockout by turning thermostat or controller to its lowest position and waiting 5 seconds and then turning back up to call for heat. Controls provided will automatically reset after one hour and initiate a call for heat.

Manifold Pressure Adjustment

A pressure tap is provided in each furnace module manifold for measuring the gas manifold pressure. Manifold pressure must be checked at start-up and during any service or maintenance. All control systems require a **manifold pressure of 3.40 to 3.50 in. w.c. at maximum input on Natural Gas,** and 10.0 in. w.c. on Propane Gas at rated input. See **Fig. 8** for Gas Valve adjustment locations.

For two stage and modulating control applications, verify proper low fire adjustments as outlined in the "Sequence of Operation" sheet provided in the instruction package.

Figure 8A – Honeywell VR8305Q Gas Valve

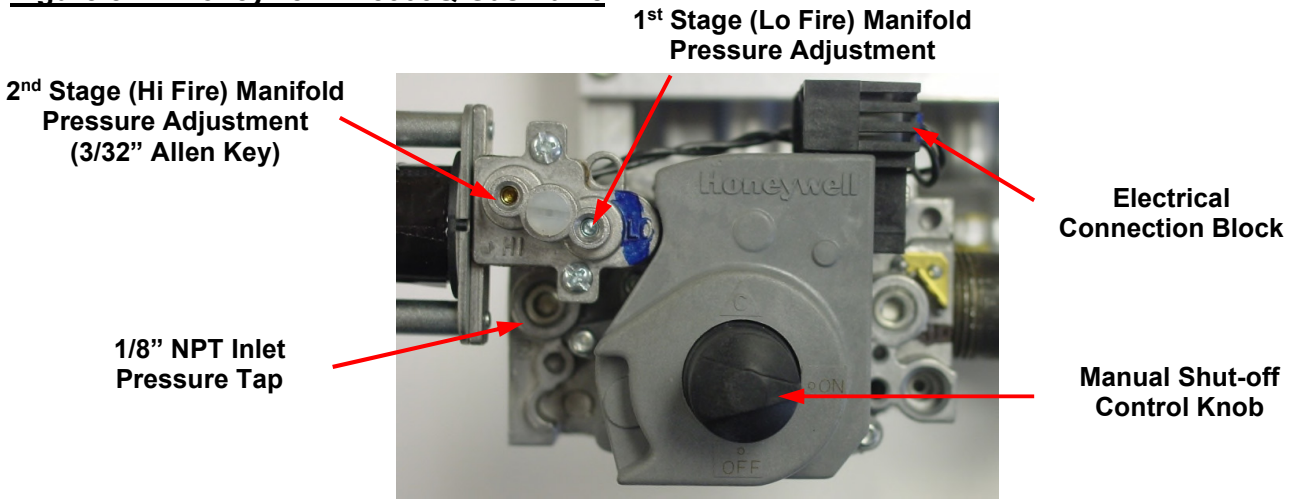


Figure 8B – White Rodgers 36H Gas Valve

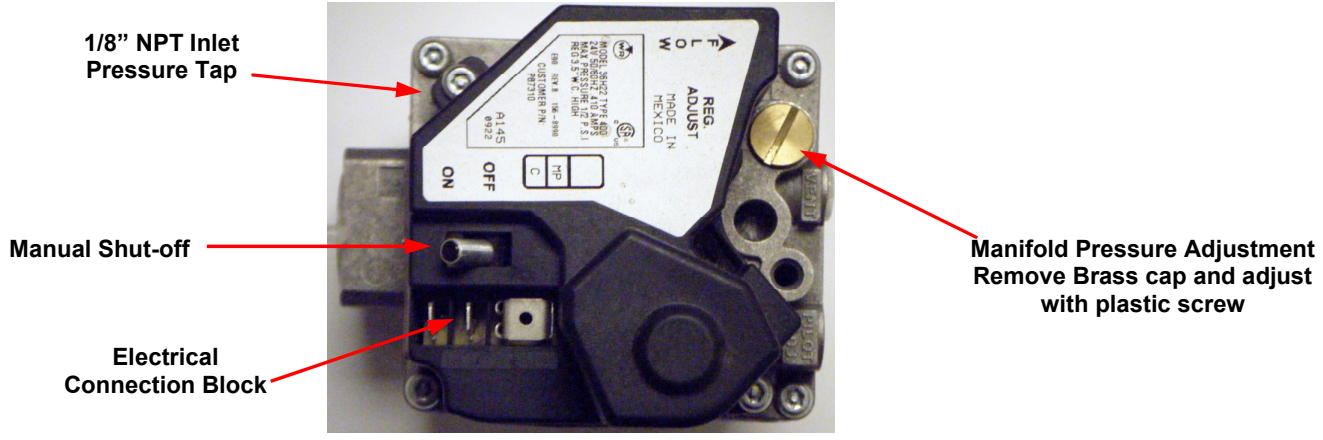
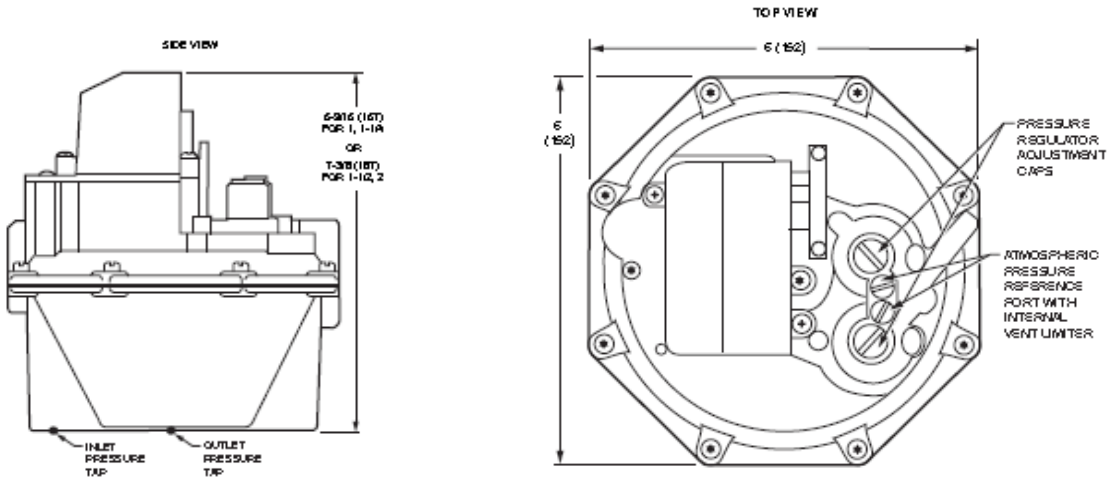


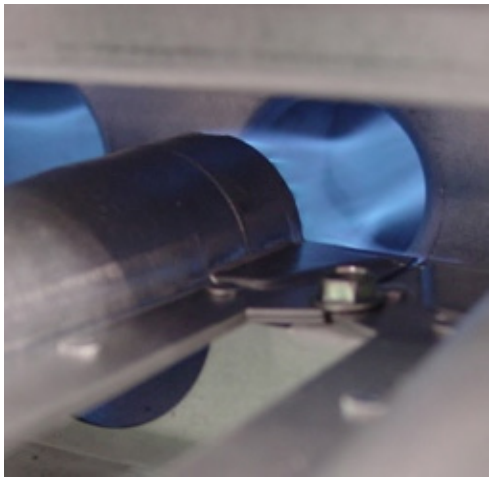
Figure 8C – Honeywell V8944 Gas Valve



Burner Flames

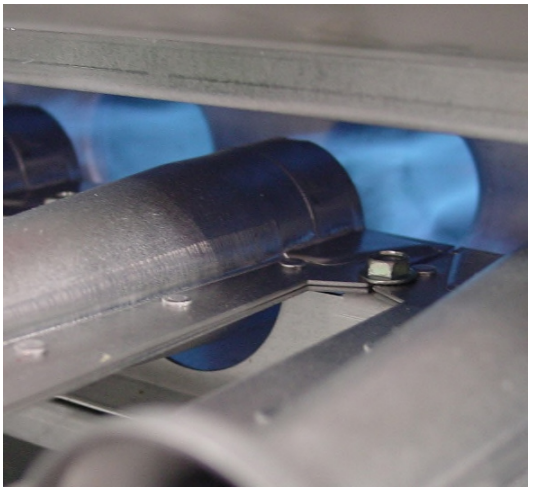
Prior to completing the start-up, check the appearance of the main burner flame. See Figures below for flame characteristics of properly adjusted Natural gas systems.

Figure 9A



Burner Flame @ Start-up 1.2" w.c. Manifold Pressure Draft Inducer – High Speed

Figure 9B



Burner Flame @ High Fire 3.5" w.c. Manifold Pressure Draft Inducer – High Speed

1. The burner flame should be predominately blue in color and well defined and centered at the tube entry as shown in Figures above. Distorted flame or yellow tipping of natural gas flame, or a long yellow flame on propane, may be caused by lint and dirt accumulation inside burner or at burner ports, at air inlet between burner and manifold pipe, or debris in the main burner orifice. Soft brush or vacuum clean affected areas.
2. Poorly defined, substantially yellow flames, or flames that appear lazy, indicate poor air supply to burners or excessive burner input. Verify gas supply type and manifold pressure with rating plate.
3. Poor air supply can be caused by obstructions or blockage in heat exchanger tubes or vent discharge pipe. Inspect and clean as necessary to eliminate blockage. Vacuum any dirt or loose debris. Clean heat exchanger tubes with stiff brush. Poor flame characteristics can also be caused by undersized combustion air openings or flue gas recirculation into combustion air supply. Increase air opening size or re-direct flue products to prevent re-circulation.
4. Reduced air delivery can also be the result of fan blade slippage, dirt accumulation in the fan blade or low voltage to draft inducer motor. Inspect draft fan assembly and be sure fan blade is secure to motor shaft. Check line voltage to heater.

Shutdown

1. Set thermostat or controller to lowest setting.
2. Turn off electrical supply to unit at disconnect switch.
3. Turn off manual gas supply.
4. Disconnect manifold and inlet pressure taps and re-install pipe plugs
5. Replace vestibule access panel or close door.

Normal Operation

1. Turn on electrical supply to unit at disconnect switch
2. Turn on manual gas supply
3. Set Thermostat or Temperature controller to desired temperature.
4. Information outlining the normal Sequence of Operation and Wiring Diagram for the control system supplied with the furnace model is enclosed with this instruction.

Operating Controls

Ignition control

Direct spark ignition with flame supervision and 100% safety shut-off, multiple ignition trials on call for heat, pre-purge and post-purge and auto reset on lockout after one (1) hour. Control incorporates a diagnostic LED.

Refer to Sequence of Operation and Control Diagnostic data sheets provided in the instruction package for a detailed description of the control features, operation and troubleshooting for the model control installed.

Air Pressure Switch

A combustion air pressure switch is provided as part of the control system to verify airflow through draft inducer by monitoring the difference in pressure between the draft inducer and the atmosphere. If sufficient negative pressure is not present, indicating lack of proper air movement through heat exchanger, the switch opens shutting off gas supply though the ignition control module. On units with two speed draft inducer operation, a dual air pressure switch is used, monitoring high and low speed pressures. The air pressure switches have fixed settings and are not adjustable.

Rollout Switch (Manual Reset)

The heater module is equipped with manual reset rollout switch(es) in the event of burner flame rollout. The switch will open on temperature rise and shut-off gas supply through the ignition control module. Flame rollout can be caused by insufficient airflow for the burner firing rate (high gas pressure), blockage of the vent system or in the heat exchanger. The furnace module should not be placed back in operation until the cause of rollout condition is identified. The rollout switch can be reset by pressing the button on top of the switch.

High Limit Switch

The heater module is equipped with a fixed temperature high limit switch mounted on the vestibule panel that shuts off gas to the heater through the ignition control module in the event of high temperatures in the air tunnel due to low circulating airflow over the heat exchanger. Determine the cause of the reduced air flow and correct.

Note: The limit is an automatic recycle type and on circulating air fan failure, heater will cycle on limit resulting in possible heat build-up. Prolonged operation under this condition can cause heat damage to components and cabinet structure.

Circulating Airflow Proving Switch

The installation of an airflow proving switch in the cabinet or duct is recommended, to prevent operation of the gas heater in the event of failure of the circulating air fan or low airflow caused by dirty or blocked filters or restriction of the air inlet or outlet to the unit. The air switch should be located upstream of the heating section in the duct or cabinet.

Inspection & Maintenance

Turn off all electrical power to the unit before inspection and servicing.

Periodic Inspection

Periodic maintenance inspections should be conducted during the heating season to ensure that combustion air openings are clear and free of any dirt or debris that might restrict combustion air. Also, inspect vent stack for any deterioration, blockages or debris. Correct any conditions that might result in unsatisfactory operation.

Inspect condensate drains during summer air conditioning operation to insure there are no blockages.

Annual Air Heater Module Inspection

The heater module should be inspected annually by a qualified service agency. The condition of the burners, heat exchanger, draft inducer, vent system, operating controls and wiring should be determined. Check for obvious signs of deterioration, accumulation of dirt and debris and any heat or water related damage. Any damaged or deteriorated parts should be replaced before the unit is put back into service.

1. Clean burners, heat exchanger, draft inducer and vent ducts as outlined on Page12.
2. Check Heat Exchanger for cracks. If any are present, replace heat exchanger before putting unit back into service.
3. Check the attachment point of the furnace module to the cabinet or ducts to verify that they are airtight.
4. Check the automatic gas valve to ensure that the gas valve seat is not leaking.
5. Check connection terminals to make sure they are safe and inspect the wiring for any deterioration.
6. Label all wires prior to disconnection when servicing unit. Wiring errors can cause improper or dangerous operation. Verify proper operation after servicing.

CAUTION !

If any of the original wiring needs to be replaced it must be replaced with wiring materials suitable for 105°C.

Air Heater Module Operation Check

1. Turn on power to the unit and set thermostat or heat controller to call for heat, allowing furnace module to operate.
2. Check for proper start-up and ignition as outlined in “Start-Up” on Page 10.
3. Check the appearance of the burner flame (See Figure 9A and 9B on Page 12).
4. Return thermostat or heat controller to normal setting.
5. Refer to the appliance manufacturer’s instructions for annual maintenance procedures on the complete unit.

TECHNICAL DATA

SIN EP2

MULTIPURPOSE GREASE

Issued from a skilful blend of overbased calcium sulfonate complex and SINTO's antifriction, this high quality grease outperforms popular greases such as: lithium complex, aluminum complex, calcium complex and polyuria with same base oil viscosity. Moreover, SIN EP2 is compatible with most grease on the market.

SIN EP2 has been developed for bearing lubrication but gives excellent results in many other applications such as: automotive or recreational vehicles, on road or off road heavy equipment, saw mills or mines, municipalities or recreational resorts and food processing industries where an approved no food contact grease is required.

FEATURES	**BENEFITS**
Overbased calcium sulfonate complex	Considerably reduces wear and friction
Superior mechanical stability	Reduces maintenance costs
Exceptional extreme pressure (EP) performance and wear protection	Contributes to reduce energy consumption (electricity, fuel, etc.)
Superior protection against rust and corrosion	Reduces grease consumption
Excellent thermal stability	Reduces operating temperature
Contains no heavy metals or other additives harmful to health or environmentally undesirable	Exceptional performance at high temperature and speed
Very high resistance to oxidation	Exceptional resistance to water and contaminants
Recommended for bearings with rotational speed ≤ 3600 rpm	Authorized for use in food processing industries (Ref: 3100-3/S378)
Meets the requirements of NLGI GC/LB approval	

Product Number: Size

SINT : tube 440 g SIN55 : 55 kg
SIN17 : 17 kg SIN180 : 180 kg

TECHNICAL DATA

LUBRICATION EXPERTS
SINTO
EXPERTS EN LUBRIFICATION

SINEP2 (CONTINUED)

DESCRIPTION	TEST	RESULT
N.L.G.I. Grade		Grade 2
Color		Brown
Base Oil Viscosity at 40°C (cSt) at 100°C (cSt)	ASTM D445	 120 12.5
Penetration at 25°C 60 strokes, mm/10	ASTM D217	280
Dropping Point (°C)	ASTM D2265	318
Mechanical Stability (%) 100 000 strokes 10 000 strokes, with 50/50 water	ASTM D217	 2.5 7.5
Timken Load, kg (lbs)	ASTM D2509	34.1 (75)
Resistance to Load Wear Index Weld load (kg)	ASTM D2596	 80 620
Wear Test on 4 Ball Bearings (40 kg, 1,200 rpm, 75°C, 1 hour) Scar (mm)	ASTM D2266	0.42
Wheel Bearing Leakage, g	ASTM D4290	3.0
Bearing life performance, hours	ASTM D3527	120
Oil Separation at 25°C (%)	ASTM D1742	0.2
Resistance to Rust	ASTM D1743	Pass
Copper corrosion of grease	ASTM D4048	1B
Salt Fog Corrosion, hours	ASTM B117	>300
Resistance to Oxidation Pressure loss (psi) after 1000 hours	ASTM D942	8.0
Shell Roll Stability (% change)	ASTM D1831	3.0
Resistance to Water Washout at 80°C, % loss	ASTM D1264	0,5
Resistance to Water Spray, %	ASTM D4049	50
Low Temperature Torque (-40°C)	ASTM D4693	14
Pumpability 0°F, -18C -10°F, -23°C -20°F, -29°C -30°F, -35°C	US STEEL	 42,3 19,8 6,0 2,1
Grease gun dispensing (°C)		-20

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

FDG-Series User Manual Rev 2024.01

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