



Installation, Operation & Maintenance Manual

Electric Conveyor Oven
Effective: July 2012

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Warranty

NOTE: This warranty supersedes all previous editions.

Seller's warranty as stated herein shall be effective only upon payment in full by the Buyer for the affected goods and/or services.

Every LEWCO, Inc. product has been carefully inspected before shipment and we guarantee to correct any defect caused by faulty material or workmanship. Seller's obligation under this warranty is for one year or 4000 hours of use, whichever comes first, after shipment of products or equipment. The Seller warrants that the equipment furnished and the material used in its manufacturing shall be of good quality and free from defects. Subject to the conditions stated herein, the Seller will replace (F.O.B. Sandusky, OH) or repair any equipment proving defective in material or workmanship. Defect(s) to be verified by Seller's inspection upon receiving products or equipment at Seller's plant. Cost for shipping of defective and/or replacement parts to be incurred by Buyer. Credit for return shipping charges may be issued to the Buyer after any and all inspections are concluded. Failure due to abuse, overloading, maintenance neglect, exposure to corrosive or abrasive materials, or improper use shall not be subject to said warranty. Any modification to equipment or systems without Seller's written consent voids this warranty. Component parts not of Seller's manufacture (such as motors, fans and reducers) will be covered by the original manufacturer's warranty and not by Seller. In the case of failure during the warranty period, contact your Seller's representative or the nearest authorized service representative of the manufacturer. Standard warranty does not include labor to remove and/or install defective equipment. If a Seller's Representative is required for additional assistance, contact our Customer Service Department. Labor will be charged at a prevailing rate, plus travel expenses. Seller shall not be liable for loss of profits, delays or expenses incurred by failure of said parts, whether incidental or consequential. Except as stated herein, the Seller makes no other warranties, expressed or implied, including warranties of merchantability and fitness for a particular purpose. There are no warranties, which extend beyond the description on the face thereof. Buyer's exclusive remedy for claims arising hereunder shall be for damages. The Seller's alleged liability for defective products or equipment, irrespective of whether such defects are discoverable or latent, shall in no event exceed the cost to the Seller of repairing, at the Seller's option, the defective or damaged products or equipment. In no event, including in the cost of a claim of negligence, shall the Seller be liable for incidental or consequential damage. The Seller makes no warranties or representations, express or implied, with respect to the product or any service, advice or consultation, if any, furnished to the Buyer by any other party, by the Seller or its representatives. Seller shall not be liable for any loss, personal injury or property damage directly or indirectly arising from the use of its product, advice or service, or for incidental, consequential or punitive damages of any description, whether any such claim be based on warranty, contract, negligence, strict liability or other tort, or otherwise. No deviation from these standard Terms and Conditions of Warranty will be recognized or allowed unless prior written authorization is obtained by Buyer, from Seller.

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SECTION 1 – GENERAL INFORMATION

This manual has been prepared for use in familiarizing personnel with the design, installation, operation and maintenance of your LEWCO Industrial Oven. Information presented herein should be given careful consideration to assure safe, optimum performance of the equipment.

This manual should be used in conjunction with the drawing(s) attached hereto that clarify specific features, installation, utility connections, anchoring, rigging etc.

Any process heating application involves a combination of time and temperature to achieve desired material properties. Although the previous can sometimes be pre-determined based on heat transfer calculations and empirical data, these values are an engineering estimate at best. The precise combination of time and temperature, for a specific application, is best determined through actual trial use. By accurately monitoring time, temperature and material properties closely, in a controlled environment, optimum process parameters can be safely and accurately determined.

1-1 SAFETY

Typically an oven is purchased for a specific application. If the application for this equipment has changed, or you have reason to doubt the adequacy of the equipment for the application, consult the factory for proper use.

Applications that may introduce flammable solvents or combustible materials into an oven require special non-standard safety features. The National Fire Protection Agency (NFPA) designates these as “Class A” Ovens. Improper application is one of the leading causes of industrial oven failure.

CAUTION: Explosion or fire may result from misapplication of this equipment. Know the properties of the materials you are putting into the oven and be sure they can be heated safely at elevated temperature.

CAUTION: Do not leave the oven in operation unattended. Property damage or injury to personnel may result.

CAUTION: This equipment is to be operated by only trained and responsible personnel.

CAUTION: Oven surfaces may be hot and burns could result.

CAUTION: Heated oven air can burn lungs. Do not breathe oven air.

CAUTION: Do not operate the oven above its rated maximum temperature.



- CAUTION:** When heating materials that may generate hazardous vapors, venting or exhausting of the oven is required. Use caution when opening doors to avoid breathing air from inside the oven.
- CAUTION:** This equipment may create a confined space hazard. The user is responsible for analyzing the installation in order to make a determination, posting warnings and complying with applicable OSHA standards pertaining to confined space hazards.
- CAUTION:** Maintain cleanliness inside and around the oven. Plenums and ducts may be subjected to a build-up of flammable deposits or combustible debris that are fire hazards.
- CAUTION:** Disconnect and lockout electrical power and all other sources of energy before performing maintenance on any portion of this unit.
- CAUTION:** Do not operate fans without belt & bearing guards in place as bodily injury may result. Always disconnect and lockout power before removing covers or guards.
- CAUTION:** Do not operate conveyor ovens with drive guards or covers removed. Disconnect and lockout power before removing covers and guards.
- CAUTION:** Do not walk, ride or climb on moving conveyor. Do not allow personnel to ride on the conveyor. Do insure that all personnel are clear of the conveyor prior to starting it.
- CAUTION:** Do not touch moving conveyor parts.
- CAUTION:** Do not walk under or near a moving conveyor. Products falling from the conveyor can cause serious injury.
- CAUTION:** Do not load the conveyor beyond its rated capacity.
- CAUTION:** Do not allow long hair or loose clothing near the moving conveyor. Long hair and clothing can become entangled in the equipment and cause serious injury.
- CAUTION:** Do not operate the conveyor before becoming familiar with operating and safety procedures.
- CAUTION:** Make sure all power is OFF prior to performing any maintenance on the conveyor. Shut off the conveyor before attempting to remove jammed objects.



CAUTION: Insure that starting and stopping controls are free from obstructions. Instruct personnel working at or near the conveyor of their locations.

CAUTION: Keep the area around the loading and unloading points free from obstructions.

CAUTION: Pinch points may exist at door(s). Keep hands and arms clear.

To reduce the possibility of injury to personnel operating or in the vicinity of the oven, warning signs are posted at potential hazard points on the equipment. Examine the equipment and become familiar with potential hazard areas. Instruct all personnel to be aware of these areas and to heed all posted caution and warning signs.

After complete installation of the equipment, a safety study should be made of the application and additional guards and warnings should be installed and posted as is appropriate. Any code requirements are the responsibility of the user and not that of LEWCO, Incorporated. Violation of the above safety rules hereby removes all product liability claims from LEWCO, Inc.

It is the responsibility of the user to comply with all safety standards, including OSHA and other Federal, State and Local codes regulations.

1-2 RECEIVING & HANDLING

1-2.1 RIGGING

Special care must be taken in handling this equipment due to its configuration, size and weight. Lifting lugs are provided at the (4) top corners on most models. It is important to note that rigging cables or chains must not exceed a maximum angle of 10 degrees from vertical (see figure 1-2.1a). Use a spreader beam, or rigging of adequate length, to avoid damage to the equipment.

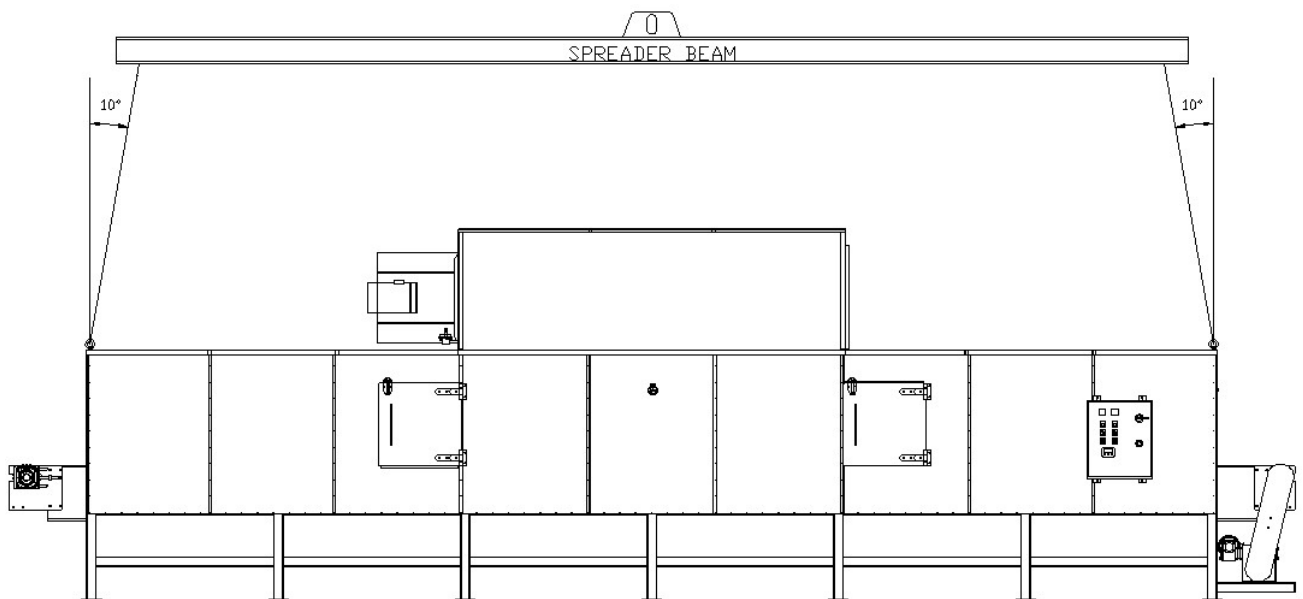


FIGURE 1-2.1A
Typical rigging.



1-2.2 RECEIVING INSPECTION

Before removing banding and/or packaging materials, locate the packing slip. The packing slip contains a complete list of all materials shipped. Verify completeness of shipment against packing slip for each item. Inspect each item for damage that could have occurred during shipment.

On collect shipments, all claims for shipping damage must be made against the carrier by the purchaser. All shipments received "short or damaged" must be so noted on the freight bill when signed by the receiver. The delivering carrier may deny a claim if not so noted on the freight bill when signed by the receiver. However, if damage is concealed, and not discovered at the time of delivery, an inspection must be requested to the delivering carrier within 24 hours.

All claims for shortages against the packing list must be made against LEWCO within 48 hours of receipt. Claims for replacement materials and equipment must be submitted within 48 hours of receipt or will be invoiced to the customer.

SECTION 2 – INSTALLATION

Prior to installation, the owner should consult with their insurance underwriters for recommendations and requirements regarding the installation and maintenance of industrial ovens and dryers.

2-1 LOCATION

Due to the inherent hazards of heat processing equipment, including the possibility of fire, property damage, and personal injury, selection of the oven's location must be carefully planned. In planning the location, consideration should be given to the following.

PERSONNEL SAFETY: Avoid installations near exits or main aisles to minimize the risk to personnel associated with fire, explosion, or asphyxiation. Explosion venting doors and panels are designed to release if pressure builds inside the oven. If possible, the oven should be located such that these devices are oriented away from aisles and work areas.

FLOOR: The oven should always be placed on a non-combustible surface. Avoid installations in basements and on upper floors of multi-story buildings. Check floor capacity. Consideration must be given to the weight of the oven, as well as the weight of the materials being processed.

PROXIMITY: Do not locate the oven against walls. To protect adjacent structures and equipment from excessive temperatures, provide a minimum air space equal to the wall thickness of the oven. If the oven is equipped with explosion venting doors or panels, allow adequate clear distance at these devices to permit their full release. Consider maintenance access to controls, blowers, thermocouples, burners, and filters. Consideration should also be given to the proximity of adjacent storage areas, particularly those that may include flammable liquids or gasses, or combustible materials as these vapors or materials may be drawn into the oven through combustion blower(s) or make-up air vents.

VENTILATION: The oven should be located so that air circulation around the equipment is not restricted. Do not block fresh air inlets or exhaust outlets. Particular consideration should also be given to all blowers and motors.

Standard Industrial Ovens are not suitable for outdoor installation. Installation in unheated shelters may result in non-uniform temperatures or the inability of the unit to attain temperature.



2-2 LEVELING & ANCHORING

Set the oven on a non-combustible, level surface. The oven should be leveled both side-to-side and front-to-back. This is important to insure proper alignment and operation. Secure the oven to the floor through the anchor holes provided. Use an anchor 1/8" diameter smaller than the hole provided.

2-3 EXHAUSTING & VENTING

This oven may be equipped with a vent connection or optional powered exhaust blower. Check the general arrangement drawing to confirm external ventilation requirements.

A powered exhaust blower is required on NFPA Class A ovens to remove flammable vapors. The blower outlet must be connected to an exhaust stack of adequate size for discharge to an outside location.

Exhaust stacks are to be installed in accordance applicable state and local codes and regulations. The shortest and most direct path should always be used. Stack temperatures are the same as oven temperatures and care must therefore be taken to protect building materials from the hot exhaust stack. Stacks passing through combustible walls or roof must be insulated. Stacks installed lower than 8 feet of the floor must be insulated to protect personnel.

Stacks must be constructed of sheet metal or stovepipe with tight seams and laps in the direction of air flow. Never install dampers or restrictions that can impede flow. **For Class A Design ovens handling flammable solvents, the exhaust rate must be checked against the minimum safe exhaust rate shown on the oven data plate.**

2-4 ELECTRICAL POWER CONNECTIONS

Electrical connections should be made by a qualified electrician in accordance with NFPA 70, The National Electric Code. The installation must also meet the requirements of any applicable state and local codes.

Oven models shipped as single units are factory wired complete. Connect power to the main disconnect switch using wire of adequate size to carry the full load current rating of this device. Secure all connections and ground the unit adequately. A grounding lug is provided in the main control panel.

After wiring is complete, make a final check of all electrical connections to confirm that none have vibrated loose in shipping from the factory. Tight power connections will reduce component failure due to poor contact.



Check blowers for proper rotation. An arrow on each blower housing indicates proper direction of rotation. The rotation direction of three phase motors may be reversed by simply switching any (2) of the (3) leads supplying power to the oven. The installer should also verify that the fan drive components (belt and pulleys) have not become misaligned or loose during shipment. Excessive noise is the result of loose or misaligned drive components.

Check conveyor for proper rotation. The rotational direction of three phase motors may be reversed by simply switching any (2) of the (3) supply power leads to the oven. The installer should also verify that the drive components have not become misaligned or loose during shipment. Remove the drive chain guard and inspect the drive chain and sprockets. Excessive noise is the result of loose or misaligned drive components.

Ovens shipped disassembled due to size may require additional field wiring. Refer to installation and wiring drawings at the end of the manual as applicable.

SECTION 3 – OPERATION AND USE

3-1 GENERAL

Operators must be adequately trained in start-up and shutdown procedures as well as the oven’s safety features. It is the owner’s responsibility to insure that operators are also familiar with the oven’s intended application and aware of the design limitations of the equipment in order to avoid misapplication.

For optimum performance, do not overload the oven. Restricted airflow caused by too densely packed parts will adversely affect temperature uniformity. Leave space between parts on the conveyor belt to allow air to move freely between them. If at all possible, stagger parts to minimize dead spots in the air flow pattern.

For safety, temperature uniformity and operating efficiency, proper balance of exhaust and fresh air are essential. Adjust intake and exhaust damper(s) enough to prevent fouling of the work. **For “Class A” Design ovens handling, the exhaust rate must be checked against the minimum safe exhaust rate shown on the oven data plate.** If the process generates significant amounts of smoke or moisture, it is necessary to exhaust enough air to remove these materials. When exhaust is increased fresh air intake must also be increased. Failure to provide adequate fresh air will result in air being drawn into the oven, thus creating cold spots within the oven workspace. Excessive exhaust or inadequate fresh air intake can also create negative pressure in the oven.

Operating instructions, specific to this equipment, are detailed in Section 5-1 of this manual. It is recommended that the owner post a copy of these operating instructions at the oven installation.

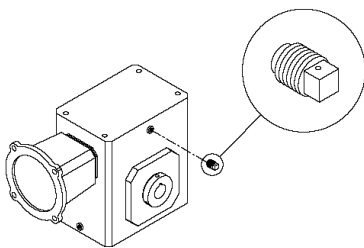
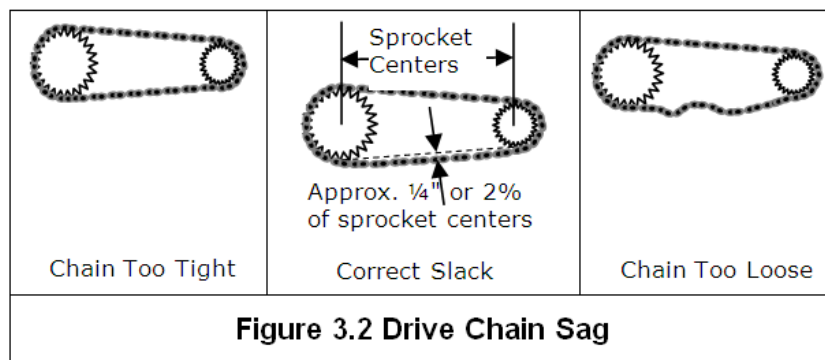


FIGURE 3-1



3-2 PRE-STARTUP CHECKS

- The conveyor drive gear box should be checked prior to initial field runs, to insure proper oil level.
- MOST speed reducers are shipped with oil, HOWEVER, DO check for proper oil level before operating the conveyor.
- CHECK FOR REDUCER VENT PLUG AND INSTALL IF NECESSARY. See Figure 3.1. To install, remove the solid plug and replace with vent plug.
- Remove drive chain guard and inspect drive chain and sprockets.
- Chain should have sag on the slack side per Figure 3.2. Measure the sag half way between the two sprockets.
- Sag should be $\frac{1}{4}$ " or 2% of the sprocket center distance.
- Inspect drive sprocket and pulley set screws. These should be tight against the reducer and pulley shafts. Using a straight edge check to assure the sprockets are aligned by placing the straight edge flush against the sprocket flanges.
- Re-install chain guard after inspection.



SECTION 4: MAINTENANCE

4-1 GENERAL

To maximize service life and to assure safe, optimum performance of the equipment, the owner must develop and follow a preventative maintenance program for this equipment.

Industry experience indicates that improper maintenance is another leading cause of industrial oven failure, often resulting in property damage or injury to personnel. Operation of the oven's safety features, such as airflow switches and exhaust blowers must be confirmed at least semi-annually. Safety devices should never be bypassed or "jumpered" out. Cleanliness must be maintained inside and around the oven.

Do not attempt any maintenance on this equipment unless all sources of energy are disconnected and locked out. Before performing work on fans or blowers, special caution must also be taken to secure the wheel.

Refer to Section 5 of this manual for more detailed maintenance instructions on component parts specific to this equipment.

The following outlines a minimum list of recommended preventative maintenance items your program should include. The actual list may vary depending on the specific equipment provided.

4-2 OVEN MAINTENANCE ITEMS

4-2.1 DAILY MAINTENANCE

1. Inspect electrical connections and components periodically for tightness and signs of wear. Replace or tighten as required. Pay particular attention to heater and fan power and drive connections.
2. The oven door(s) should be inspected regularly for gasket wear. Explosion venting latches on doors and panels must be inspected monthly to confirm adequate lubrication and freedom of movement. Oil the pivot joint and apply grease to the latch spring and cam.
3. Inspect the oven workspace, ductwork, plenums, air intake(s), and exhaust ducts for accumulation of foreign matter. Clean thoroughly as required. This is particularly important for "Class A" ovens processing flammables or combustibles.
4. Inspect belt.
5. Turn ON conveyor and LISTEN for unusual sounds such as squealing, rattling, thumping, and rubbing—any of which could indicate a problem. Turn OFF conveyor immediately if any unusual sounds are heard. Inspect for cause.

4-2.2 MONTHLY MAINTENANCE

1. Fans and blowers should be inspected monthly. Tighten set screws between bearings and shaft and also wheel set screws. Check for belt tension and wear on belt driven fans. Air streams containing particulate or chemicals can cause abrasion or corrosion of the fan parts. When such wear is discovered, a decision must be made as to whether to rebalance or replace the wheel.
2. Fan and blower shaft bearings should be lubricated each 500 hours of operation. As standard, no special heat resistant grease is required.
3. Remove drive chain guard and inspect drive chain and sprockets.
4. Make sure reducer is filled to the proper level with oil and the vent plug is removed.
5. Grease all flange type bearings that have grease fittings. Use a NLGI Grade 2 Lithium base grease, Shell Alvania EP2, or equal. Snub roller, return rollers, and take-up roller are lubed-for life.

4-2.3 SIX-MONTH MAINTENANCE

1. Confirm operation of airflow pressure switches semi-annually. Disconnecting the copper tubing at the switch should cause a loss of interlocks and therefore a shutdown. Repeat for each pressure switch.
2. Larger motors, or those subjected to severe duty, should be lubricated more frequently, at least every 6 months.
3. Fractional horsepower electric motors should be lubricated at least every 5,000 hours of service.
4. For NFPA "Class A" ovens processing flammable solvents, the exhaust rate at the stack outlet must be confirmed at least semi-annually. The exhaust rate must be at least that shown on the oven nameplate or drawings attached hereto. Inspect the exhaust stack for cleanliness and integrity.
5. Calibrate all thermocouples / RTD's at least annually.
6. Semi-annual belt inspection:
Inspect drive sprocket and pulley set screws. These should be tight against the reducer and pulley shafts. Check to assure that the sprockets are aligned by placing a straight edge flush against the sprocket flanges. Re-install the chain guard after inspection.
7. Check sprocket and drive.
8. Inspect gear reducer oil level
9. Inspect under side of belt for dirt, oils, abrasives, or other chemicals.
10. Lubricate drive and take-up pulley bearings



4-2.4 Sprocket and Chain Maintenance

Remove drive chain guard and inspect drive chain and sprockets.

Chain should have about 2 to 3 percent sag when measured on the lower run of chain one-half way between the two sprockets (SEE FIGURE 2.7B). A loose chain can jump the drive sprockets and can cause sprocket wear and failure. A tight chain requires excessive motor power, and can cause chain and sprocket failure.

Inspect drive sprocket and pulley set screws for tightness against the reducer and pulley shafts.

Check sprocket alignment. Misalignment causes wear on one side of the sprocket.

Check for a miss-aligned shaft or a sprocket off center.

Check shaft bearing set screws.

Lubricate the drive chain with SAE-30 oil approximately every 40 hours of operation.

Lubricate more frequently under extreme ambient conditions. Rinse chain in solvent before lubricating.

4-2.5 Motor and Reducer

Make sure the reducer is filled to the proper level with oil. Use only oil recommended by the reducer manufacturer.

Make sure breather hole is clean and the orifice is open.

Inspect reducer for leaks.

4-2.6 Rollers and Bearings

Check all rollers for tightness. All rollers must rotate freely. If roller does not turn freely check for dirt accumulation in bearing area and clean.

Lubricate all flange type bearings that have grease fittings. Use a NLGI Grade 2 Lithium base grease, Shell Alvania EP2, or equal. Snub roller and return roller bearings are lubed for life.

Listen to bearing for excessive noise. Replace as required.

4-3 CLEANING

Spills of any product on the belt should be cleaned up with detergent and water immediately. DO NOT USE belt dressing, solvents, pastes or chemicals on the belt—these products can cause premature belt failure. Inspect under side of belt for dirt, oils, abrasives, or other chemicals. Clean under side of belt as required with detergent and water.

Periodically remove drive chains and clean by immersing in solvent and scrubbing with a wire brush. Rinse thoroughly and relubricate. Verify proper chain tension.

4-4 REPLACEMENT PARTS

Replacement parts are available through your LEWCO representative. Be prepared to provide the oven SERIAL NUMBER and MODEL NUMBER when ordering.



SECTION 5: APPENDIX

5.1 OPERATION INSTRUCTIONS FOR LEWCO ELECTRIC CONVEYOR OVENS

START-UP

1. Turn main power disconnect switch to the "ON" position.
2. Turn on control power.
3. Turn on the Circulating Fan.
4. If applicable, turn on the Exhaust Fan. The "Interlocks Proven" lamp should now be illuminated.
5. Press the "RUN" Button on the Drive Control pad to start the conveyor. Adjust the conveyor drive to the desired speed. Refer to the enclosed control manufacturer's literature.
6. Push the "Heat Enable" button. Set the desired operating temperature on the Process Controller. Refer to the enclosed control manufacturer's literature. The High Limit Controller has been factory set at 20° F above the maximum rated temperature. The High Limit set point may be lowered at the owner's discretion, although it should always exceed the process controller temperature by 20°F. Refer to the enclosed manual for unlock instructions.

SHUT-DOWN

1. Push the "Heat Disable" button to turn off heater power.
2. Press the "STOP" button on the drive control pad to stop the conveyor.
3. If the oven set point was greater than 200° F, allow the oven temperature to cool below 200° F to prevent damage to the Circulating Fan and Heaters.
4. Turn off the Circulating Fan after the oven temperature has cooled below 200 F.
5. If applicable, turn off the Exhaust Fan after the oven temperature has cooled below 200 F.
6. Turn off Control Power.
7. Turn main power disconnect switch to the "OFF" position.