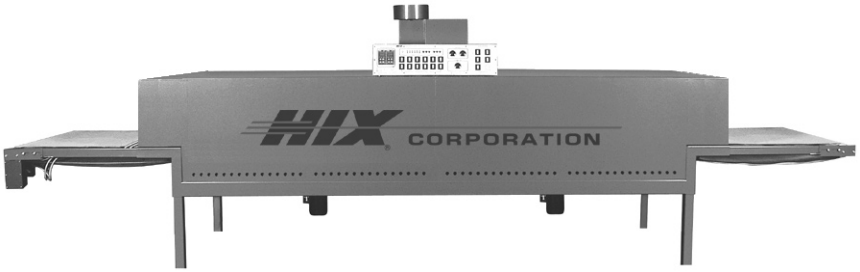
HIX Thermatrol™

Commercial & Industrial Ovens / Dryers

CONVEYOR DRYER

OWNER'S MANUAL



HIX® CORPORATION

For Customer Service Call,
(620) 231-8568

CONTENTS

INSTALLATION / SET UP

Installation and Set Up Instructions

1. Leg Assembly
   A) Remove four nuts on inside of dryer frame that secures the dryer to crate bottom.
   B) Raise dryer from crate bottom with forklift to allow access to four corner posts.
   C) Insert legs to paint line.
   D) Secure each leg bolt, lower forklift to allow dryer to rest on legs.

2. Top Exhaust Blower Motor
   A) Position housing to allow dampener lever to fit through slot on exhaust fan assembly.
   B) Secure housing to dryer top using provided #14 x 1/2" HEX head tap screws with #14 Star Washer.
   C) Attach black wires to flex conduit tan colored wires using orange wire nuts. Polarity is not important.

3. Bottom Blower Motor
   A) Secure to bottom of dryer using 4 Greer lock nuts. Align point of arrow in motor plate to point of arrow on bottom of dryer.
   B) Attach black and red wires of blower motor to flex conduit tan colored wires using orange wire nuts. Polarity is not important.

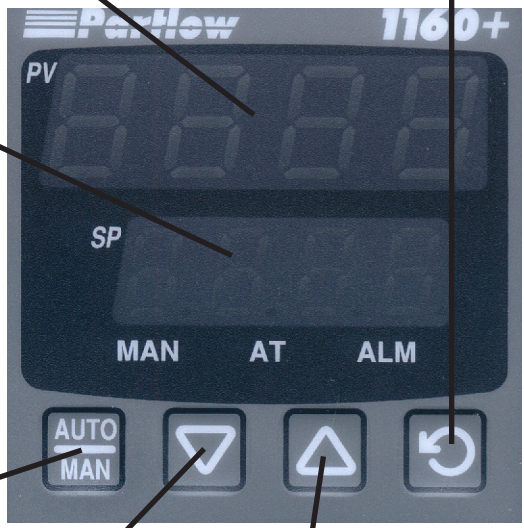
4. Conveyor Belt
   A) Take out the bolts on the end of the conveyor frame.
   B) Loosen the bolt closest to the dryer tunnel and drop the conveyor pulleys down parallel with the conveyor frame and reinsert the end bolts. NOTE: Line up the punch marks to each other, one punch mark will be on the conveyor frame and one will be on the metal bracket that holds the pulley.

5. Duct Work
   A) Run duct from the exhaust stack on the dryer to the outside of building. Install a rain cap to prevent water damage to the dryer. Maximum duct length 30 feet (9 meters) from dryer to where it exists the building. If longer duct runs are required a booster fan must be installed.

Temperature Control

PRESENT DATA MAIN DISPLAY
Displays the present temperature.

SET POINT DATA MAIN DISPLAY
Displays the set temperature and alarm data each time the return key is pressed.



DON'T USE

RETURN KEY
Each time pressed, changes the value displayed on the main display in the following sequence, "Present Temperature", return, "Set Temperature", return, back to "Present Temperature".

UP KEY
When pressed, increases the set temperature / alarm value. Successively increases the value when held down.

DOWN KEY
When pressed, decreases the set temperature / alarm value. Successively decreases the value when held down.

OPERATION

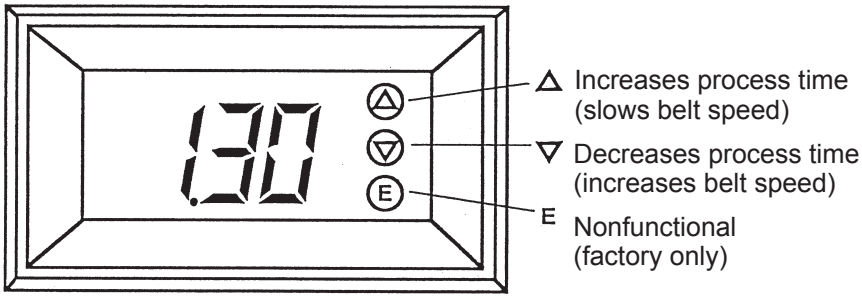
Process Time Controller

1. Controls belt speed and maintains a constant speed by monitoring the motor RPM via a Hall-effect Sensor attached to the motor shaft. Belt speed not effected by varying belt loads.

2. Displays process time (oven retention time) in Minutes and Seconds.
   Examples: 1.30 = 1 minute, 30 seconds
   1.59 = 1 minute, 59 seconds

3. When the dryer is turned off, the controller will remember the last setting. So resetting the controller is not necessary each time the dryer is turned on.

4. Function buttons detailed below:



Recirculating Air Control

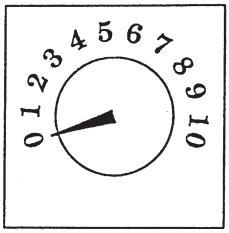
The dryer is equipped with a very effective top delivery/bottom recovery variable flow air recirculating system. One zone is provided on models 2410, 3610, and 3616. Two zones are provided on 3619 and 4819 models.

Air recirculation provides these functions:

1. Drives off water/solvents from the garment and ink to provide quicker and more effective drying and curing.

2. Minimizes scorching of delicate fabrics and paper.

The recirculating air control is a simple rotary knob with graduations numbered from 0 to 10 as shown below.



Air speed settings below #2 should be avoided as incomplete air recirculation will occur (not enough air velocity to force the air down through the belt) resulting in temperature fluctuations.

Typical baseline settings:

Plastisol on Cotton, 50/50, Nylon, or Transfers: #3-5

NOTE: As with changing any variable, substrate temperature should be rechecked after any recirculating air flow adjustments. Typically the substrate will heat up quicker with higher air flow so you may find you can decrease the temperature control setpoint/or increase the belt speed (reduce retention time) and still achieve proper substrate and ink film temperature.

Exchange Air

A continual flow of air is exhausted automatically inside the exhaust box. The purpose is to prevent the atmosphere inside the oven chamber from becoming saturated with water or solvents. An atmosphere that is saturated makes it very difficult for the dryer to further evaporate or dry the garment efficiently and in the case of water or solvent based inks it can prevent the ink from curing properly.

OPERATION

Remember, most garments, especially 100% cotton (and to a lesser degree 50% cotton/50% polyester) absorb moisture out of the air during storage which the dryer must then evaporate and remove during the drying curing process. Therefore even when curing plastisol it is beneficial to provide for some air exchange when printing on 50/50 or 100% shirts. When printing on nylons not as much exchange is necessary since nylon absorbs very little water in storage. Relative humidity in your local climate and changes in humidity can also require changing the exchange air setting which is why it is always critical that you pretest your substrate temperature prior to a production run with temperature tapes or a digital thermocouple probe. When testing a garment, always use a fresh one of the box to simulate actual printing conditions. Never run a garment through twice as most of the water will be evaporated on the first pass which will allow the garment to heat up much quicker (because the lost cooling effect of the evaporating water) giving you an erroneous higher temperature reading.

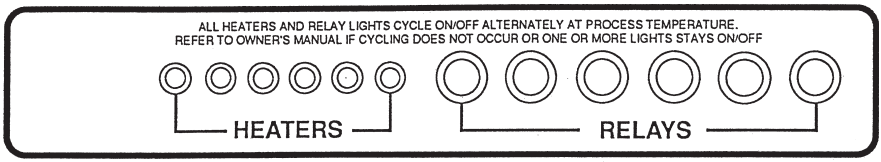
Too much exchange will not cause problems in curing (providing substrate and ink temperatures still reach ink manufacturers recommendations), but remember you are exhausting some oven heat which the heaters must replace resulting in lost efficiency and more energy usage.

Typical baseline settings as follows:

Plastisol ink: Lever set somewhere between horizontal (minimum) and 45° (halfway open).

Water/Solvent inks: Lever set somewhere between 45° (halfway) and vertical (wide open).

Heater and Relay Lights



1. Heater LED's: Cycle On When Heaters Are On

Small (1/8") light-emitting diodes (LED's) are driven by a current sensor (one for each heater in the dryer). They can, in conjunction with relay lights explained below, determine if heater(s) are burned out or if a relay is at fault.

2. Relay Lights: Cycle Off When Heaters Are On

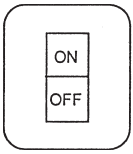
Large (1/4") neon lights indicate proper opening and closing of each heater relay. When relay lights are "on", the relays are "open" and no power is applied to the heaters (Heater LED's Off). When relay lights are "off", the relays are "closed" and power is applied to the heaters (Heater LED's On). If one relay light stays "on" while the others are off, then that pole is stuck "open" and should be replaced. The heater LED's will still function as normal as they are "double switched".

NOTE: If all relay lights operated normally yet one of the heater LED's will not come on, check the suspected heater with an ampclamp. Normal reading should be 9 - 12 amps depending on element size and voltage available. If readings indicate no current flowing, then the heater will require replacing.

Door Adjustment

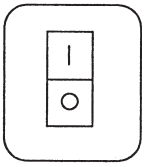
The dryer is equipped with adjustable doors located at each end of the oven chamber inside the fume hoods. The maximum opening is 6 inches (12" in the case of bottle dryers) and may be pulled down to belt level on standard dryers (6" minimum opening on bottle dryers). Always run the doors as far closed as safely possible (typically allow 1-1/2" above product height) to contain the oven heat and help eliminate problems caused by air drafts in the shop. Exercise caution when adjusting the door height when the oven is hot, use a rag or wear a glove to prevent burning your fingers.

ON/OFF POWER BREAKER



Turns all dryer power and control circuits on and off. Provides protection to contactor coil only. Dryer MUST be externally fused with appropriate size fuse or circuit breaker (FLA x 125% = fuse size). See the following sheet for fuse size to be used for each dryer.

IN/OUT (I/O) CIRCUIT BREAKERS



Provide protection for control and heater circuits only! ***DO NOT*** use for ON/OFF control! If a breaker trips, determine the cause before resuming operation.

FUSES

220 Volt Dryers

NOTE:
Fuse ratings shown below
are for 220 volt supply.
Deduct 5% for 208 volt supply.
Add 10% for 240 volt supply.

WARNING!
MODEL 2410
MUST BE EXTERNALLY FUSED WITH
FRN-R 45 AMP 1 PHASE
OR EQUIVALENT CIRCUIT BREAKER

WARNING!
MODEL 3610
MUST BE EXTERNALLY FUSED WITH
FRN-R 40 AMP 3 PHASE
FRN-R 65 AMP 1 PHASE
OR EQUIVALENT CIRCUIT BREAKER

WARNING!
MODEL 3616
MUST BE EXTERNALLY FUSED WITH
FRN-R 50 AMP 3 PHASE
FRN-R 90 AMP 1 PHASE
OR EQUIVALENT CIRCUIT BREAKER

WARNING!
MODEL 3619
MUST BE EXTERNALLY FUSED WITH
FRN-R 80 AMP 3 PHASE
OR EQUIVALENT CIRCUIT BREAKER

WARNING!
MODEL 4819
MUST BE EXTERNALLY FUSED WITH
FRN-R 100 AMP 3 PHASE
OR EQUIVALENT CIRCUIT BREAKER

THESE STICKERS WILL BE
PLACED NEXT TO THE
ELECTRICAL SERVICE INLET.

380 Volt Dryers

NOTE:
Fuse ratings shown below
are for 380 volt 3-phase supply.
5-Wire with Neutral.
Add 10% for 415 volt supply.

WARNING!
MODEL 2410
MUST BE EXTERNALLY FUSED WITH
NOS/OTS 20 AMP FUSE
OR EQUIVALENT CIRCUIT BREAKER

WARNING!
MODEL 3610
MUST BE EXTERNALLY FUSED WITH
NOS/OTS 25 AMP FUSE
OR EQUIVALENT CIRCUIT BREAKER

WARNING!
MODEL 3616
MUST BE EXTERNALLY FUSED WITH
NOS/OTS 35 AMP FUSE
OR EQUIVALENT CIRCUIT BREAKER

WARNING!
MODEL 3619
MUST BE EXTERNALLY FUSED WITH
NOS/OTS 45 AMP FUSE
OR EQUIVALENT CIRCUIT BREAKER

WARNING!
MODEL 4819
MUST BE EXTERNALLY FUSED WITH
NOS/OTS 65 AMP FUSE
OR EQUIVALENT CIRCUIT BREAKER

THESE STICKERS WILL BE
PLACED NEXT TO THE
ELECTRICAL SERVICE INLET.

ADJUSTMENTS

<u>1-PH/3-PH Conversion</u> (220 Volt Dryers Only)

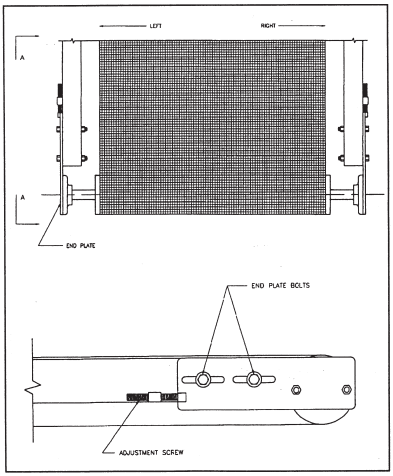
To switch from 3-PH to 1-PH or from 1-PH to 3-PH some requiring is required in the Power Entry Box located to the right of the control panel. 3-PH wiring employs all three positions in the box, while 1-PH wiring uses only the left and right positions. The middle position is not used. Contact HIX Customer Service for instructions. Provide your dryer's model and serial number when calling.

NOTE: 3619 and 4819 models are 3-phase only.
2410 models are 1-phase only.

WARRANTY IS VOID IF CONVERSION IS NOT DONE BY A QUALIFIED ELECTRICIAN!!

<u>Belt Tracking Adjustment</u>

1. After the conveyor belt has been installed some adjustment may be necessary to ensure that the belt is tracking properly. The adjusting mechanism is shown in the diagram below.
2. Bring the oven up to normal operating temperature as the belt will track differently when hot than when it is cold.
3. Adjust the belt speed control to it's fastest setting.
4. Prior to making adjustment, loosen end plate bolts, just enough to allow end plate movement (see diagram). If the belt is moving to the left, tighten the left-hand adjusting screw by turning it approximately 1/4 turn in a clockwise direction. Move to opposite end of dryer and check for proper tracking. Make similar adjustment if necessary. Repeat procedure if belt is still not tracking properly.



NOTE: Allow at least one complete revolution of the belt between adjustments. If belt is moving to the right, repeat procedure above using right-hand adjusting screw.

5. Tighten end plate bolts and make final check of belt alignment. Do not overtighten belt as damage could occur not covered under warranty!

NOTE: Normal belt direction is toward the drive motor so that the top of the belt is under tension. It is not recommended to attempt to reverse the motor rotation or belt direction as the belt may slip under load and proper tracking of the belt will not be possible.

OPERATING PRECAUTIONS

General Operating Precautions

While the below information will not cover every operating situation, these guidelines should be understood and general common sense applied when operating the equipment. Failure to do so could cause a fire hazard, explosion hazard and possible serious personal injury or death.

Intended Use:

HIX electric conveyor ovens may be used to cure or dry a number of inks, substrates or products such as textiles, wood, plastic, glass or any other similar substrates. The oven process temperature is to be set within the safe temperature limitations of the ink or substrate. Research of the temperature limitation of the particular ink or substrate is solely the responsibility of the end user and not of HIX Corporation. HIX Corporation will not be responsible for any damages to product, oven, facilities or personnel caused by product being exposed to temperatures exceeding their limitations or operating the oven in any manner in which it was not intended.

Proper Venting:

Never block any of the air vents leading into or out of the control box. Likewise never block any of the air vents located in the sheet metal side covers along the lower frame rails. Blocking any of these vents can cause overheating of the unit and create a fire hazard. The top mounted exhaust on the oven shall be vented outside of the building. See instructions in this manual for additional information on proper venting of the exhaust.

Safe Operation:

Pay careful attention to the adjustable doors located on each end of the oven. Ensure that the door on the exit end of the oven is raised higher than that on the entrance end of the oven so there is no possibility that product may get accumulated or lodged inside the oven chamber and create a fire hazard.

Keep aerosol spray cans away from the oven. If they accidently fall on the belt and enter the oven chamber they can overheat and explode inside the oven chamber causing a fire hazard and or personal injury.

Never introduce any flammable liquid into the oven to evaporate, such as solvents, including, but not limited to alcohol, MEK, acetone, toluene, etc. without consulting the specific application with HIX Corporation to determine what amount can be safely introduced into the oven without causing a dangerous situation. Failure to do so can cause fire, personal injury or death.

This equipment is considered to be “Category 2” level of safety in accordance with standard EN 954-1.

MAINTENANCE

Maintenance Schedule

Every month:

1. Remove and clean or replace filters located on each side of control box.

2. Inspect belt tracking and adjust tension if necessary as outlined in this manual.

Every 6 months:

1. Lubricate top mounted exhaust motor as indicated on its label (two places) with SAE 20 weight oil. (No lubrication required on 3619 and 4819 models.)

2. Vacuum any lint/dust accumulation around air intake holes on both sides of oven and on fume hoods.

3. Check brushes on bottom mounted recirculating air blower motor and vacuum out any carbon dust accumulation; inside the motor housing.

Every Year: (Disconnect power at main panel)

1. Remove top chain guard cover and lightly lubricate the conveyor drive chain; with SAE 20 weight oil. Replace after lubricating. **DO NOT leave off!**

2. Have a qualified electrician check all heater elements to specifications shown on wiring diagram.

3. Check brushes on conveyor drive motor.

4. Check brushes on recirculating air blower motors and vacuum out any carbon dust accumulation inside the motor housing.

5. Check/tighten all electrical connections on relays and contactor inside control box.

6. Check thermocouples with ohm meter disconnected from temperature control. Cold resistance should be between .5 to 2 ohms. Higher resistance readings indicate possible problems with the thermocouple and in this case it should be replaced.

WARRANTY

HIX THERMATROL INDUSTRIAL DRYER WARRANTY

Date Purchased:_____ From:_____

Model #_____ Serial #_____

This warranty extends to the first Buyer only and terminates if the equipment is transferred or sold.

For all components manufactured by HIX: HIX will repair, replace or substitute, at it's sole option, items due to defective workmanship, materials or construction, machined and manufactured surfaces, for a period of one year from the date of purchase. For all components purchased by HIX, the specific manufacturers warranty applies. This does not include claims due to shipping, handling, accident, and lack of proper maintenance, misuse, negligence, lubrication, misalignment or normal wear and tear items such as finish and belts. Parts determined to be defective by HIX within the warranty period will be sent to the owner at no charge. The owner is responsible for any duties, taxes, transportation, insurance and installation.

In the event the owner is unable to successfully repair the unit the owner may return it to HIX or an Authorized Repair Center for repair upon authorization from an officer of the Corporation. Should the owner request and HIX agree, HIX will send a factory service technician to make any on site repairs. The owner is responsible for all incidental costs including travel, room and board. HIX is responsible for the technician's time and applicable materials covered in the warranty. IF THE REPAIR IS DUE TO NON- WARRANTY ABUSE, MISUSE, OR NEGLECT THE OWNER IS RESPONSIBLE FOR ALL COSTS AT OUR CURRENT SERVICE CALL CHARGES. HIX will not assume responsibility for consequential damages including products, materials, parts, substrates or substances dried, processed or cured in our dryers or ovens.

This warranty is given in lieu of any and all other warranties whether expressed or implied, including but not limited to those of merchantability and fitness for a particular purpose, and constitutes the only warranty made by HIX CORPORATION. In no event will HIX's liability for breech of the warranty extend beyond the obligation to repair or replace the non - conforming goods. HIX will not be liable for any other damages, either incidental or coincidental, including loss of profits whether based on contract, tort, or other legal theory. BUYER may bring arising out of transactions under this agreement no action, regardless of form, more than one (1) year after the cause of action has occurred. Any distributor, representative, their employees, agent any or employee of the HIX CORPORATION, may not modify this warranty. An officer of the HIX CORPORATION can only modify this warranty.

HIX® CORPORATION

Manufacturers of the Finest Quality Textile and Graphics Screen Printing and Heat Transfer Equipment

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