

HOPPER MOUNT DRYERS

Model AHM 2-4

INSTRUCTION MANUAL



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DRYER OPERATION/ FEATURES



AHM-4

The AHM series dryers are a fully assembled dryer and hopper combination that can be mounted directly to the feed throat of small molding machines. They are ideal where floor space is limited and material changes are infrequent.

The AHM dryer series utilize the ARID-X dual bed design that provides a constant supply of dry air to the material hopper. While one bed is removing moisture from the process air the other is regenerating by heating the desiccant to a high temperature. Once the regenerated bed cools down, the Zone Valve switches the airflow, and the newly regenerated bed is used to desiccate the process air stream. The saturated bed is now regenerated in the same manner, completing the regeneration cycle. The cycle is depicted Page 8.

The airflow design of the ARID-X dryers makes the regeneration cycle more efficient because we utilize a small amount of the desiccated process air rather than ambient air to regenerate the desiccant bed. This reduces the impact of the high moisture content of the ambient air, which would contaminate the desiccant bed, and allows the dryer to attain a lower dew point. Please see the Air Flow Schematic on Page 6.

HP4-X Design

The HPHM series dryers utilize our patented HP4-X design, that incorporates 4 desiccant beds where two are stacked, one over the other. This nearly doubles the amount of desiccant available for drying the process air stream, and because of the tower design, the dryer is able to regenerate the desiccant in the same time as our ARID-X series. This allows the dryer to operate in very high humidity conditions without affecting the process air dew point. In fact, this design produces dew point levels of – 40' to -80' C for faster more complete drying of your material. Please see the Air Flow Diagram on Page 7.

Hopper Design

Dri-Air's "all stainless" hopper design utilizes a stainless steel inner shell surrounded by a stainless steel jacketed insulation layer. The easily removable stainless steel spreader cone

DRYER OPERATION/ FEATURES (Cont.)

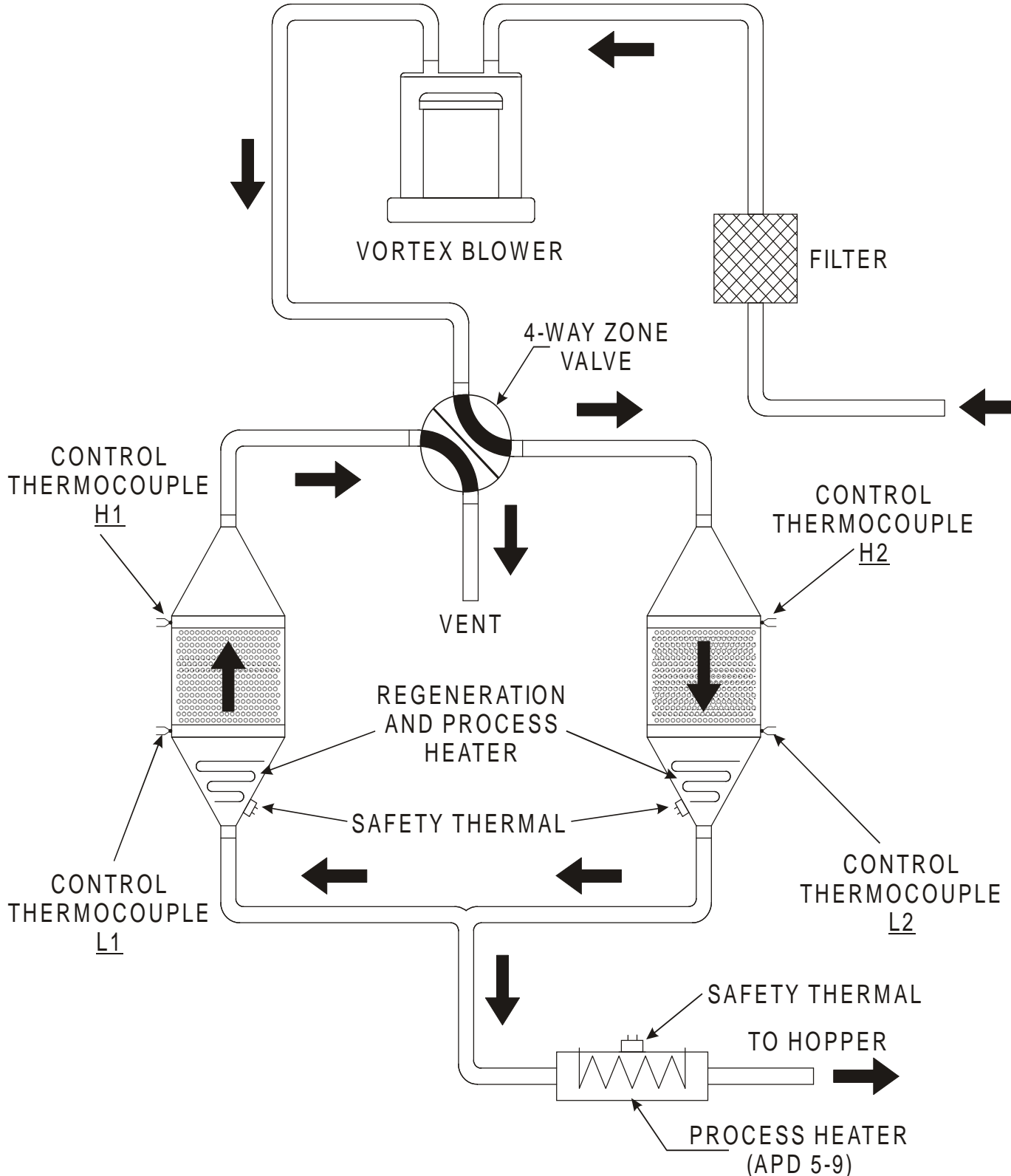
promotes proper material flow to ensure that the material is dried efficiently and no dried material is left at the hopper bottom that needs to be fed out prior to operating. You must ensure that your hopper is kept filled to ensure that you have sufficient time to dry the material.

Dryer Controls

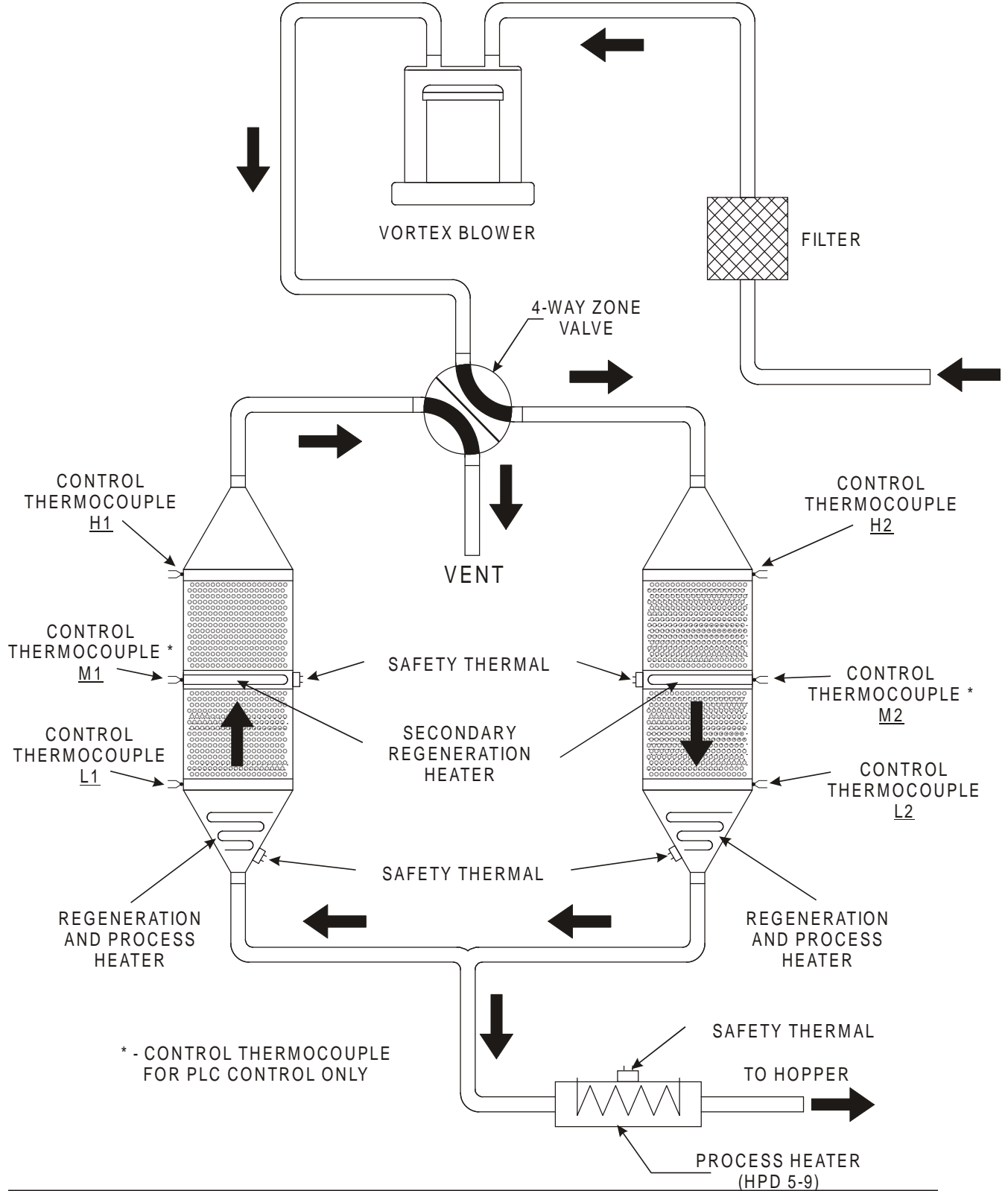
The ARID-X and HP4-X Hopper Mount dryers are supplied with the standard PLC Control Module.

The PLC Control module includes a PLC control board, display board, digital temperature controller and touch pad that is programmed for the drying cycle described above. The controller, display board and touch pad indicate the machine status, alarms, set points and allow you to enter operational settings for the dryer. These are explained in more detail later in this manual.

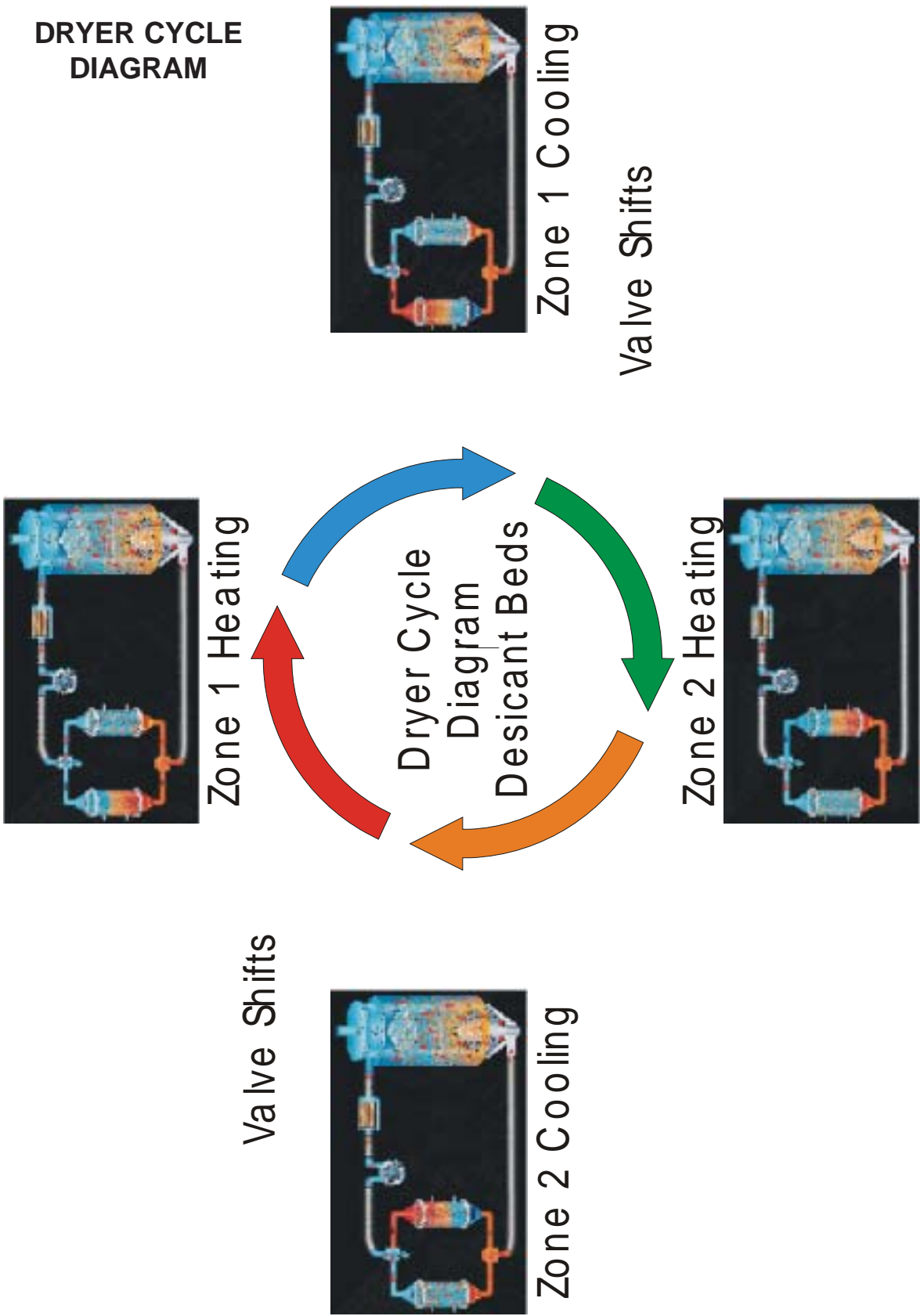
AIR FLOW SCHEMATIC FOR ARID-X DRYERS



AIR FLOW SCHEMATIC FOR HP4-X DRYERS



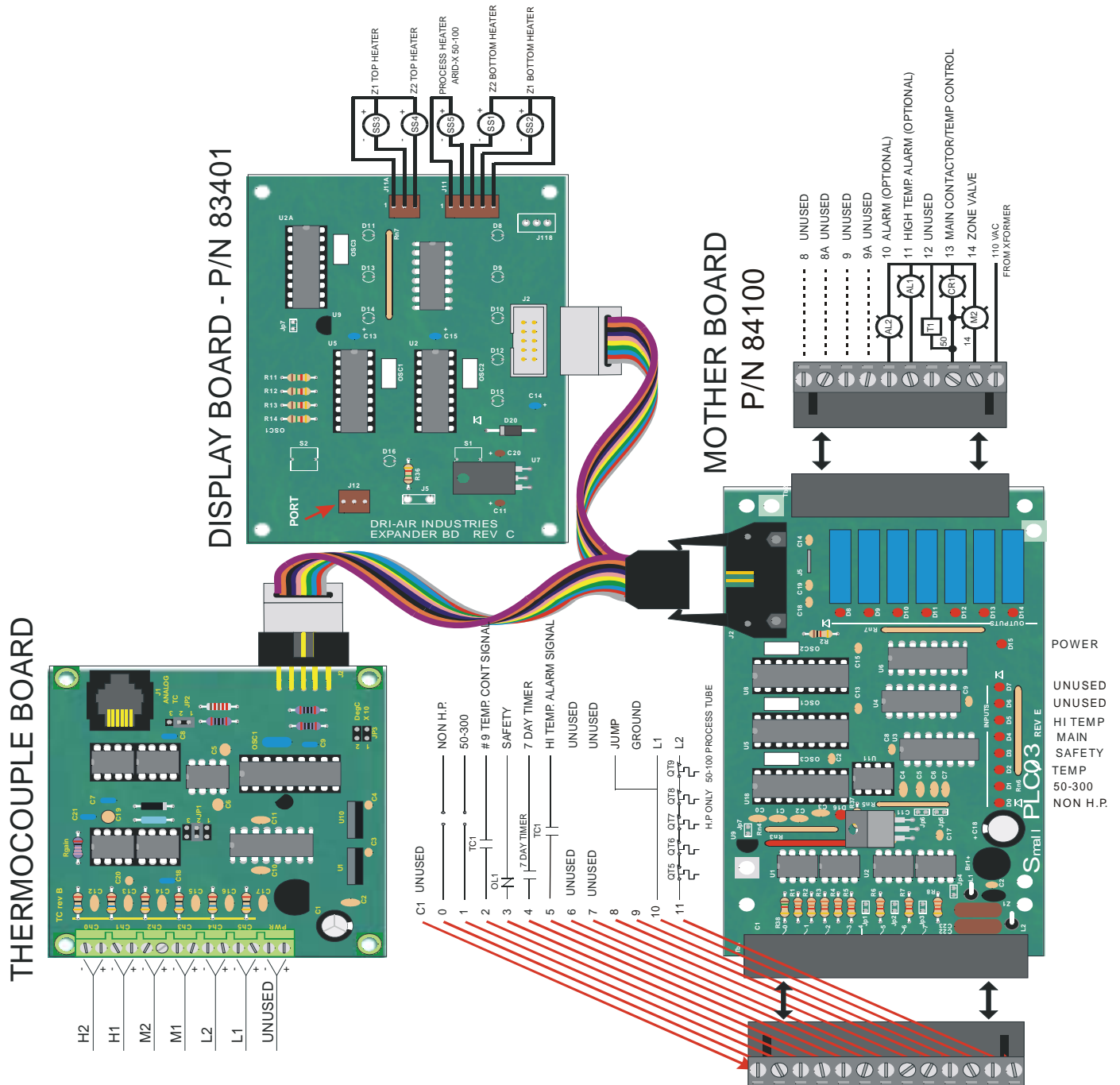
**DRYER CYCLE
DIAGRAM**



PLC STANDARD ELECTRICS

The control package includes a PLC controller which is programmed for the drying cycle previously discussed. The display board indicates the machine status, heater operation and alarms. See section on start up for details.

Below are descriptions of the inputs and outputs of the PLC which are used for trouble shooting. A lit LED indicates the input or output is actuated. All inputs are 12 volts AC and all outputs are 110 volts AC and 15 v DC to the heater relays. Refer to the electrical schematic for more detail.

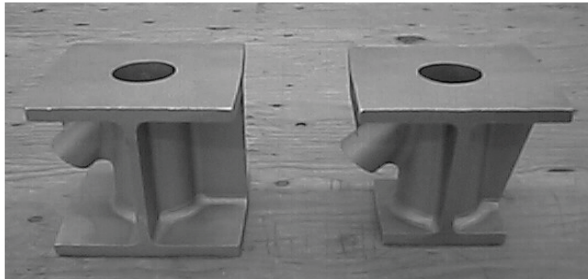


INSTALLATION PROCEDURE

Press Mounting

Each AHM series dryer hopper is supplied with a 6 x 6 inch mounting flange with a slide gate. The flange is configured with two rectangular 3.25 x 5 inch bolt hole patterns, rotated 90° from each other to allow for the dryer to be oriented in any quadrant.

Depending on the user's requirements, the dryer is supplied with a Mounting Adapter with flange dimensions of either 6"x 6" to 4"x 4" or 6"x 6" to 6"x 6". Please see below. The Mounting Adapter's upper 6"x 6" hopper flange is pre-drilled with the above mentioned bolt hole pattern.



6x6" to 6x6"

6x6" to 4x4"

To install the adapter to the molding machine, drill the adapter's bottom mounting flange with holes corresponding to the bolt hole pattern on the molding machine's feed throat mounting flange. Bolt the adapter to the feed throat, using grade 5 bolts or better. **CAUTION:** Please note the orientation of the adapter drain port prior to drilling and attaching the adapter. Position this port to best facilitate the draining of material from the hopper.

To mount the dryer, hoist the unit from its crate utilizing the lifting holes located on each side of the dryer frame. While lifting, stabilize the dryer by holding it so that the slide gate is oriented down. Position the unit on the mounting adapter (For ease of use, orient the unit with the hopper door facing the operator.) and bolt the dryer in place using the bolts provided.

CAUTION: To ensure the safe operation of this unit, the dryer should be securely fastened to the ceiling or other support utilizing safety chains or cables fastened to the lifting holes located on the dryer frame.

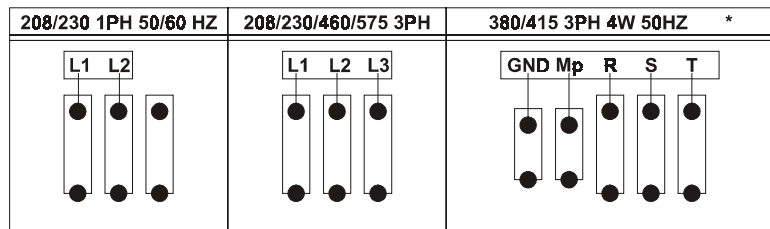
Electrical Connection:

Open electrical panel enclosure by turning the disconnect off and removing the four enclosure cover allen-head screws so that the enclosure cover can be removed. Locate the disconnect by following the operating handle down to the electrical panel.

Insert the incoming power cable or conduit through the hole provided on the top side of the enclosure.

« use approved wire and fastening means «

Wire incoming power to the top of the disconnect as shown in the diagrams below.



NOTE:

When 3 wire supplies are used in place of 4 wire supplies, a control transformer is required.

3 PHASE DRYER INSTALLATION
CHECK FOR CORRECT MOTOR ROTATION
BEFORE RUNNING DRYER

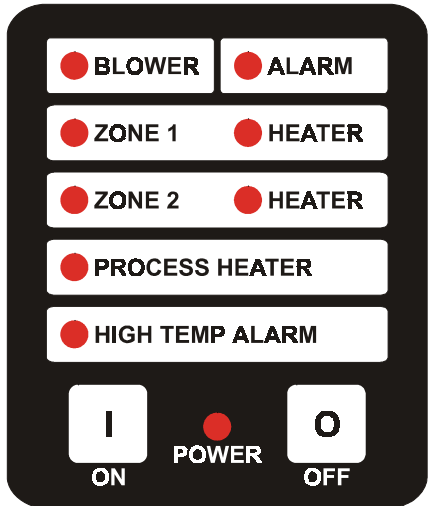
To check motor rotation.....

Turn on the power to the dryer and press the **ON/START** touch pad and then immediately press the **OFF/STOP** touch pad. Observe the cooling fan on the top of the blower motor and verify the fan is turning clockwise. If the motor is not turning clockwise, switch any two adjacent supply wires.

The unit is now ready for operation.

Standard Electrics

START-UP PROCEDURE



Operating this unit is very simple. Once the dryer is connected to the facility power supply, the unit can be started by turning the disconnect located on the electrical panel enclosure to the ON position and pressing the ON button on the Control Panel Key Pad. To shut the dryer off, simply push the OFF button on the Control Panel Key Pad and turn the disconnect to the OFF position.

Setting the process air temperature is done using the Digital Controller.

For a more detailed explanation, see the following sections.

Control Panel - Operating Display

Turn power on at dryer using disconnect:

1. Power light indicates power to the unit is on.

Press ON button on key pad:

2. Illuminated BLOWER light indicates Blower is on.
3. Flashing ZONE light indicates bed is in Regeneration cycle.
4. Steady ZONE light means bed is in cooling cycle.
5. Illuminated HEATER light indicates heater is on.

Alarm Conditions:

6. Flashing HIGH TEMP. ALARM light indicates an over or under temp alarm. Unit shuts down.
7. Steady HIGH TEMP. ALARM light indicates thermocouple has failed. Further diagnostics are required
8. Flashing ALARM light indicates a safety override condition has occurred. Dryer shuts down.



Digital Controller - Setting Process Air Temperature:

Press SET button - temperature set display will flash.

Press up arrow to increase temperature and down arrow to decrease temperature.

Press SET again to enter the new temperature.

If the display flashes, the temperature is out of the control range.

If the display shows 0000 the thermocouple is not connected or is faulty.

DRYER OPERATION TROUBLE SHOOTING

The new Dri-Air Standard PLC Electrics were designed for quick diagnosis of problems.

The following steps should be done before proceeding with other diagnostic steps.

1. Check the Power Circuit:

- a. Incoming fuses or circuit breaker
- b. All dryer fuses:
Each fuse, with the exception of the main fuses, has a blown fuse indicator light that illuminates when the fuse is blown.
- c. Is power supplied to the unit?
- d. Check heater continuity using a volt ohmmeter.

2. Air Flow Circuit:

- a. Ensure Zone Valve position corresponds to the regeneration cycle by comparing the Zone position lights on the Zone Valve to the ZONE position lights on the dryer panel.
- b. Make sure that all hoses are connected, not crushed, and free from obstructions.
- c. Inspect filter and make sure cover is tight and the filter is clean.

3. Control Circuit:

- a. Using the PLC Display Panel ZONE indicator lights as a guide for the dryer regeneration cycle, check that all inputs/outputs are proper for the part of the regeneration cycle that the machine is in.
- b. Monitor the PLC output lights to ensure the corresponding LED on the power board is illuminated and there is an output voltage to the heater.

4. Operating Conditions:

- a. Check the process temperature. It should **not** be set below 140° F (60° C) because the unit will go into high temp alarm.

DRYER OPERATION DETAILED DIAGNOSIS (PLC Controlled Dryer)

Machine will not start: Power light is not on.

1. Check circuit breakers (CB1) or incoming fuses inside control box to see if they are tripped or blown. Reset circuit breakers by turning them off and then on.
2. Check small fuses (FU1 & FU2) next to contactor. The LED will be lit if they are blown. Replace if necessary by opening the fuse holder and put new fuse into holder.
3. Check that incoming power to the unit is proper.
4. Check safety snap discs.

Alarm light is flashing: Unit will not run. Main contactor is not pulling in.

1. Check the motor overload OL1 located in the panel. If it is tripped, the window will show as orange/yellow. Reset overload by pushing in the reset button.

Machine will not run: High Temp Alarm Light flashing:

This indicates that the temperature has exceeded the high limit programmed into the temperature control or the set temperature can not be reached.

Press stop and restart machine holding in the start button. Monitor the actual temperature to see if it exceeds the set point or can not reach the set point. If it can not reach set point, see section below.

Machine will not run. High Temperature Alarm on, not flashing:

1. This indicates an “open” thermocouple or the temperature in the desiccant tower exceeded 900° F.

Machine will not reach temperature:

1. If the process heater light is not lit.
 - A. Check output from temperature controller and input to PLC.
 - B. Check the thermocouple. The tip should be in the middle of the hose.
2. If the process heater light is lit.
 - A. Check fuses on power board
 - B. Check solid state relays on power board.
 - C. Check that the air flow is correct.
 - D. Check blower rotation
 - E. Check heater for continuity.

Check the limit first by pressing the SET button on the temperature control and holding until AL is displayed. The setting shown indicated the amount over set point that the alarm will be actuated. It is factory set to 50°F (30°C) and should not be set below 30°F (16°C) or it will actuate too soon.

If the temp exceeds the set point check the following:

1. Remove the hose from the top of the hopper to check air flow. There should be air flow out of the hopper with a suction on the hose. If there is little or no flow, check the inlet hose.
2. Inspect the filter to make sure that it is clean and not affecting the air flow.
3. Check the power boards to see if one of the solid state relays has failed on. Using an ammeter or voltmeter on the output to the heater, see if there is power when the LED is not lit which will indicate a failed relay.
4. Check the valve position.

DRI-AIR ROTARY ZONE VALVE

The Dri-Air rotary valve is designed to provide very little flow restriction and no leakage. It incorporates high temperature, self adjusting seals for years of trouble free service. The electrical controls are built into the end of the valve and include position lights.

Trouble shooting is easy. If the lights indicating position do not match the zone displayed on the control panel, or there are no lights, the valve is not working properly. See if the cam is actuating a switch.

DO NOT PUT FINGERS INTO VALVE WITH POWER ON

Check all electrical connections to make sure they are tight.

Contact factory with the serial number of the dryer for a replacement valve.

PARTS LIST

**ARID-X & HP4-X
AHM-2, AHM-3, AHM-4**

GENERAL

<u>DESCRIPTION</u>		<u>Arid-X</u>	<u>HP4-X</u>
Dryer Filter Element		81055	81055
Zone Valve		83705	83705
Thermocouple (Process)		84054	84054
Desiccant (Pounds / Machine)	80082	8 lbs.	14 lbs.
Tower Clamp		81017	80017
Tower Gasket		81028	81028

ELECTRICAL

STD

NOTE:

*TO ORDER BLOWERS OR
OVERLOAD REFER TO
PART NUMBER ON ITEM.*

*IEC CONTACTOR USED IN ALL
FM, PD & HM DRYERS AND CLL
POWER PACKS WITH SERIAL
NUMBERS GREATER THAN
D14650*

Disconnect	82308
Temperature Control (RKC CB-100)	84016
Main Board	84100
Display Board	83401
Thermocouple Board	84049
Transformer	83437
IEC Contactor	80576
IEC Contactor *	84860
Power Board	83397
Power Board (208 & 230 v Dryers)	84080
Safety Thermal Switch(Tower)	80221
Thermocouple (Tower)	82174
Dewpoint Sensor	81908

HEATERS

208V 230V 400V 480V 575V

Regeneration (Cone Style)	83342	83373	83982	83374	84235
HP Center (Flat Style)	82373	82373	83958	82505	82505
Process	NR	NR	NR	NR	NR



NOTES:

A series of horizontal lines provided for taking notes.

