


**AHM-1B HOPPER
MOUNT DRYER
OPERATING MANUAL**

 **DRI-AIR** INDUSTRIES, INC.
16 THOMPSON ROAD
P.O. BOX 1020
EAST WINDSOR, CT 06088-1020

Tel. (860) 627-5110

FAX (860) 623-4477

Internet <http://www.dri-air.com>

e-mail: sales@dri-air.com

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DRYER **DESCRIPTION**



The **AHM-1** dryer is a fully assembled dryer and hopper combination that can be mounted directly to the feed throat of small molding machines. It is ideal where floor space is limited and material changes are infrequent. This dryer model will dry most materials at throughputs up to 10 pounds per hour.

The **AHM-1** utilizes our ARID-X dual desiccant bed design that provides a constant supply of dry air to the attached 30-pound material hopper. While one bed is removing moisture from the process air stream, the other bed is regenerated by heating the desiccant to a high temperature. Once the regenerated bed cools down, the zone valve switches the air stream and the newly regenerated bed is now used for drying the process air. The saturated bed is then regenerated, repeating the cycle. This cycle is described below and depicted in the schematics on pages 7 and 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 figure on page 7.

HP4-X Design

Our patented HP4-X design 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

DRYER DESCRIPTION

(Cont'd)

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 Airflow and Regeneration Cycle diagrams on the following pages.

Hopper Design

Our “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 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 AHM-1 dryer is supplied with our standard PLC Control Module that includes a PLC Control Board, Display Control Board with Control Panel Display/touch Pad, and Digital Temperature Controller.

PLC Control Board

The PLC Control Board is programmed for the drying cycle described above. It monitors and controls the dryer's operation by controlling the regeneration cycle, heaters and alarms.

Display Board with Control Panel Display/touch Pad

The Display Control Board works in conjunction with the PLC Control Board to actuate the solid state relays controlling the dryer's heaters. The Touch Pad and Control Panel indicate the machine status and start or stop the dryer.

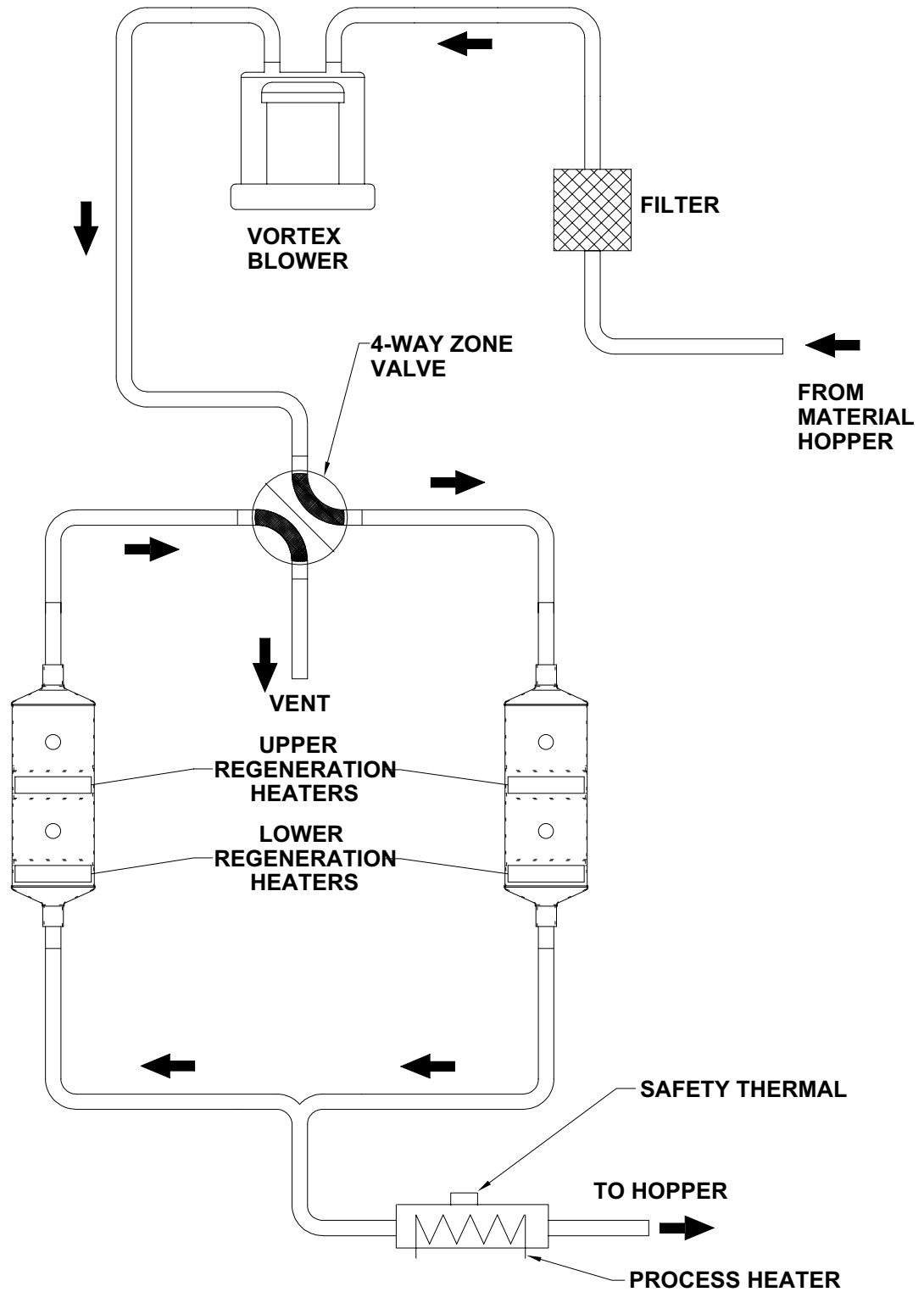
DRYER DESCRIPTION

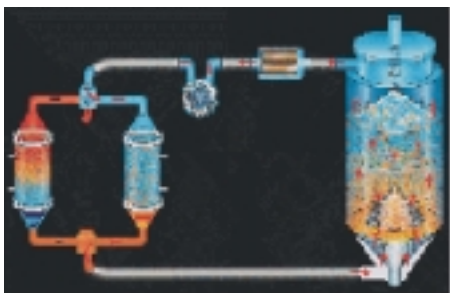
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Digital Temperature Controller

The Digital Controller works in tandem with the PLC Control Board to monitor and control process air temperature. Its touch pad allows you to input the dryers operational settings and alarm points. These are explained in more detail later in this manual.

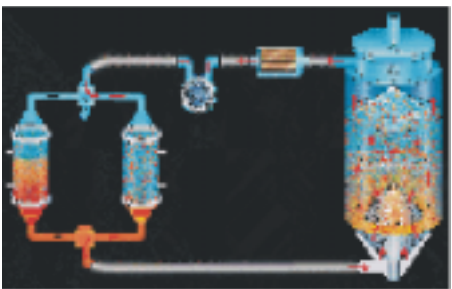
AIR FLOW SCHEMATIC FOR ARID-X 10/AHM-1 DRYER



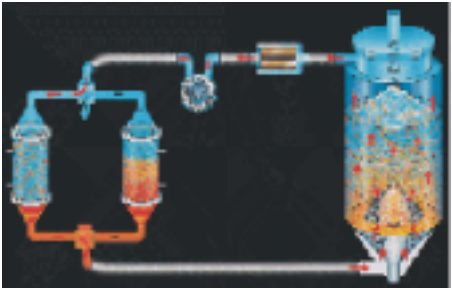
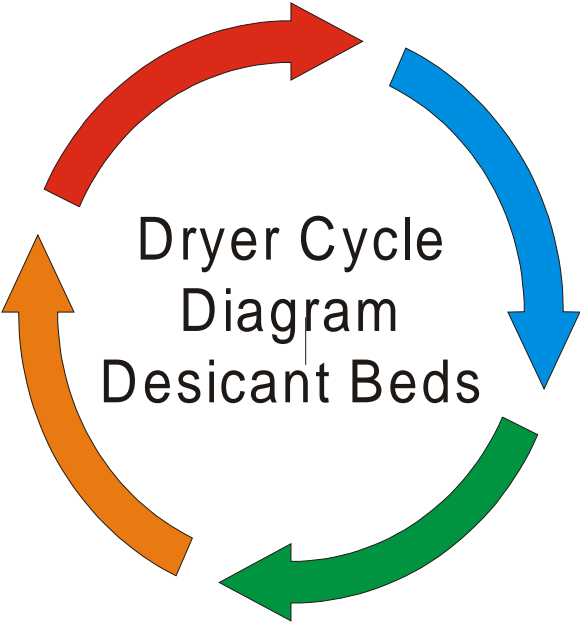


Zone 1 Cooling

Valve Shifts



Zone 1 Heating



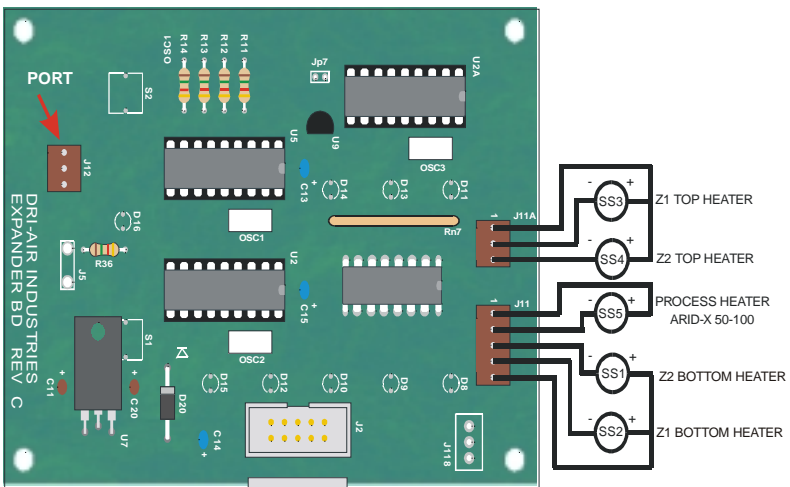
Zone 2 Heating



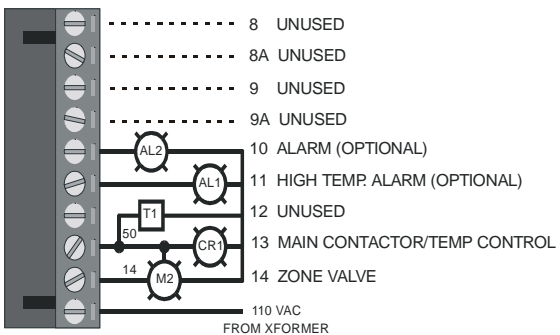
Zone 2 Cooling

Valve Shifts

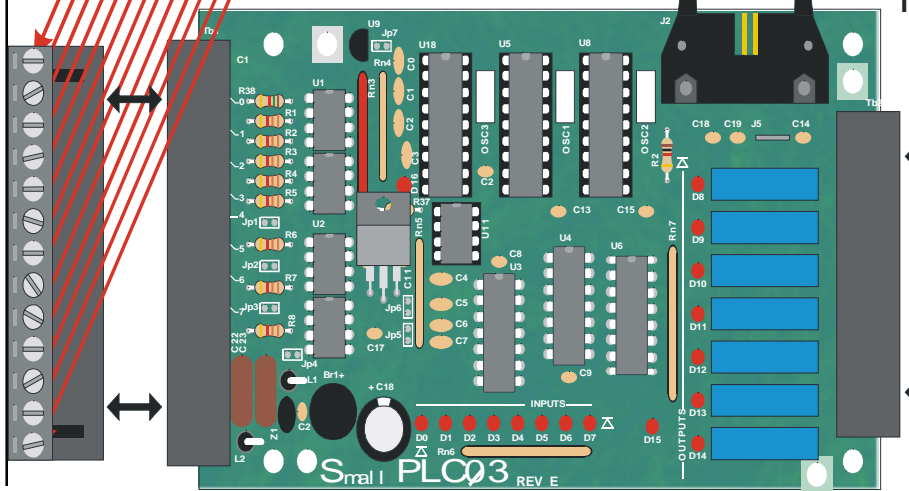
DISPLAY BOARD - P/N 83401



MOTHER BOARD P/N 84102



- C1 UNUSED
- 0 Z1 BOTTOM
- 1 Z2 BOTTOM
- 2 #9 TEMP. CONT SIGNAL
- 3 SAFETY
- 4 7 DAY TIMER
- 5 HI TEMP. ALARM SIGNAL
- 6 Z1 TOP
- 7 Z2 TOP
- 8 JUMP
- 9 GROUND
- 10 L1
- 11 L2



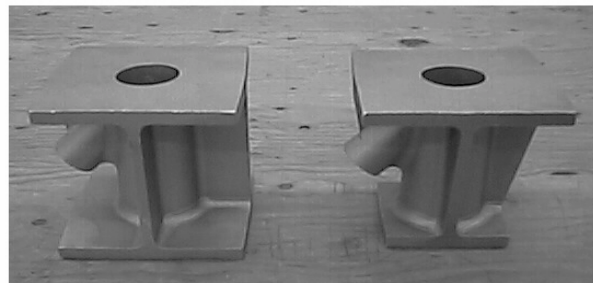
- POWER
- Z2 TOP
- Z1 TOP
- HI TEMP
- 7 DAY/TIMER
- TEMP
- SAFETY
- Z2 BOTTOM
- Z1 BOTTOM

INSTALLATION PROCEDURE

Press Mounting

Each AHM-1 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 install the dryer, utilize a hoist or other suitable means (The unit weighs 95 pounds when empty.) to lift the unit and place it on the mounting adapter. For ease of use, orient the unit with the hopper door facing the operator. Bolt the dryer in place using the bolts provided.

INSTALLATION PROCEDURE

(Cont'd)

Electrical Connection

The AHM-1 dryer is available in 110 or 220 volt, single-phase models. The 110 volt model is supplied with a power cord and grounded three prong plug, while the 220 volt model requires an appropriately grounded plug, suitable to the user's power supply to be attached to the power cord.

To connect the dryer to electrical power, plug in the cord to any suitably grounded power source. With all units being single phase, blower rotation will be correct.

Post-Installation Inspection

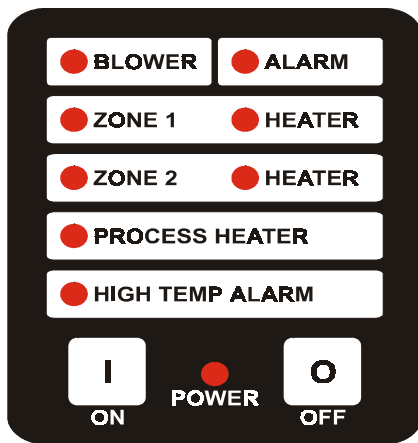
Prior to starting the dryer, inspect the unit to ensure the following:

1. All hose couplings are tight and secure.
2. Hoses are not crushed or obstructed.
3. Process Air Thermocouple is connected.
4. Inside of hopper is clean before filling with material

DRYER OPERATION

STARTUP PROCEDURE

To initiate dryer start-up, press the rocker switch on the side of the unit's electrical panel enclosure. The POWER light on the Control Panel (pictured to the left) should illuminate; indicating power is supplied to the unit. To continue the start-up procedure, follow the instructions below.

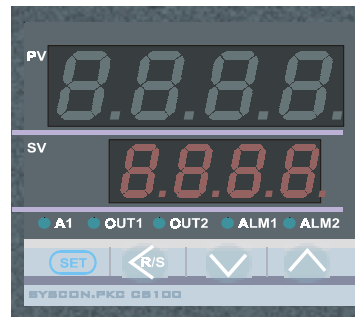


CONTROL PANEL

1. Illuminated POWER light indicates power is on. Press ON button on key pad to start dryer.
2. Illuminated BLOWER light indicates Blower is on.
3. Flashing ZONE light means designated bed is regeneration cycle.
4. Steady ZONE light means designated bed is cooling cycle.
5. Illuminated HEATER lights indicate designated heater is on.

Alarm Conditions

6. Flashing TEMPERATURE ALARM light indicates an over or under-temp condition. Unit shuts down.
7. Steady TEMPERATURE ALARM light indicates thermocouple failure. Further diagnostics required.
8. Flashing ALARM light indicates a safety override condition has occurred. Dryer shuts down.
9. Press OFF to stop dryer.



Digital Controller

To Set Temperature:

Using the Digital Temperature Controller:

1. Press **SET** button on the controller and the Temperature Set display on the bottom will flash.

2. Press the < key to move the cursor to each digit you wish to change. Using the ↑ key to increase the digit or the ↓ key to decrease the digit, set each digit to the desired temperature setting.

3. Press the **SET** key again to enter the new temperature setting.

If the upper Process Air Temperature display flashes, the temperature is below the preset lower control limit.

If the upper Process Air Temperature display flashes 0000, the thermocouple is not connected or is faulty.

When operating this dryer please follow the procedures detailed below:

ROUTINE OPERATION & MAINTENANCE PROCEDURES

Hopper Maintenance

1. Always clean hopper, air inlet port and diffuser basket prior to adding or changing materials.
2. Never over-fill the hopper. Material should not obstruct the exhaust port at the top of the hopper.

Filter maintenance

1. Open filter canister and clean filter element on a daily basis.
2. Change filter cartridge every 6 months (Sooner if materials dried are dusty.).

TROUBLE- SHOOTING GUIDE

BASIC TROUBLE-SHOOTING

The following steps should be taken prior to other diagnostic steps.

1. Check the Power Circuit:

- a. Incoming fuses or circuit breaker.
- b. All dryer fuses. Each fuse (with exception of main fuses) has a blown fuse indicator that lights up if the fuse is defective.
- c. Is POWER on light illuminated?
- 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 indicator lights on the control panel
- b. Make sure that all hoses are connected, not crushed, and free from obstructions.
- c. Inspect filter and make sure cover is tight.

3. Control Circuit:

- a. Using the PLC Display Panel ZONE indicator lights as a guide for the dryer regeneration cycle, check that all inputs 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 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.

DETAILED TROUBLE-SHOOTING

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 disc. (Should be normally closed)

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

1. Check the inputs to the mother board P/N 84101/84102. The LED for the safety circuit should be on. If it is off, then one of the safety thermostats is open indicating a defective sensor or a high temperature condition exists at one of the sensors.

Machine will not run: TEMPERATURE ALARM light is flashing.

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

Press OFF and restart machine holding in the ON 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 reach temperature:

1. If the PROCESS HEATER light is not lit.
 - A. Check output from temperature controller and input to PLC.
 - B. Check the Process Air Thermocouple. The tip should be in the middle of the hose.

2. If the PROCESS HEATER light is lit.
 - A. Check solid-state relays on power board.
 - B. Check airflow through process air hose.

Check the limit first by pressing and holding the **SET** button on the temperature controller until **AL** is displayed. The setting shown indicates the number of degrees over the 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 airflow. There should be airflow out of the hopper exhaust port and a vacuum 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 airflow.
3. Check the to see if one of the power board solid state relays has failed on by using a multi-meter on the output to the heater. The relay has failed if there is power to the heater when the Solid-state relay's LED is not lit.

TROUBLE-SHOOTING ROTARY ZONE VALVE

The Rotary Zone 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 for a replacement valve P/N 83707 with serial number of dryer.

TROUBLE-SHOOTING CONTROLS - PLC & DISPLAY BOARD

The dryer control package includes a PLC controller that 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.

Inputs and outputs of the PLC that are used for trouble shooting are detailed on Drawing # 83542 enclosed with this manual. 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 volts DC to the heater relays. Refer to the electrical schematic for more detail.

PARTS LIST: AHM-1

	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
General	84231	FILTER CARTRIDGE
	83707	ZONE VALVE
	82125	BLOWER
	84054	THERMOCOUPLE
	84016	TEMP. CONTROLLER (CB-100)
	80082	DESICCANT 4 lb./MACHINE
	80221	THERMAL SWITCH (500°)
	84101	PLC CONTROL
	84102	PLC CONTROL w/ 7 DAY TIMER
	83401	DISPLAY BOARD
	81789	3 POLE RELAY
	83794	OUTPUT BOARD
	83443	.5A FUSE
	84183	ROCKER SWITCH
	81942	7 DAY TIMER
110v Dryer	84414	UPPER TOWER HEATER 110 v
	84412	LOWER TOWER HEATER 110v
	84409	PROCESS HEATER 110v
	83625	TRANSFORMER – 110v
220v Dryer	83437	TRANSFORMER – 220v
	84413	UPPER TOWER HEATER 220v
	84411	LOWER TOWER HEATER 220v
	84410	PROCESS HEATER 220v

