

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

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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 a factory programmed ELC Control Module and Digital Temperature Controller.

ELC Control Module

The ELC Control Module controls the regeneration cycle described above. It has been factory programmed and does not require any additional input by the operator. The module will automatically monitor and control the dryer’s operation by controlling the regeneration cycle, heaters and alarms.

Digital Temperature Controller

The Digital Controller works in tandem with the ELC Control Module to monitor and control process air temperature. Its touch pad allows you to input the dryers operational settings and alarm

DRYER DESCRIPTION

(Cont'd)

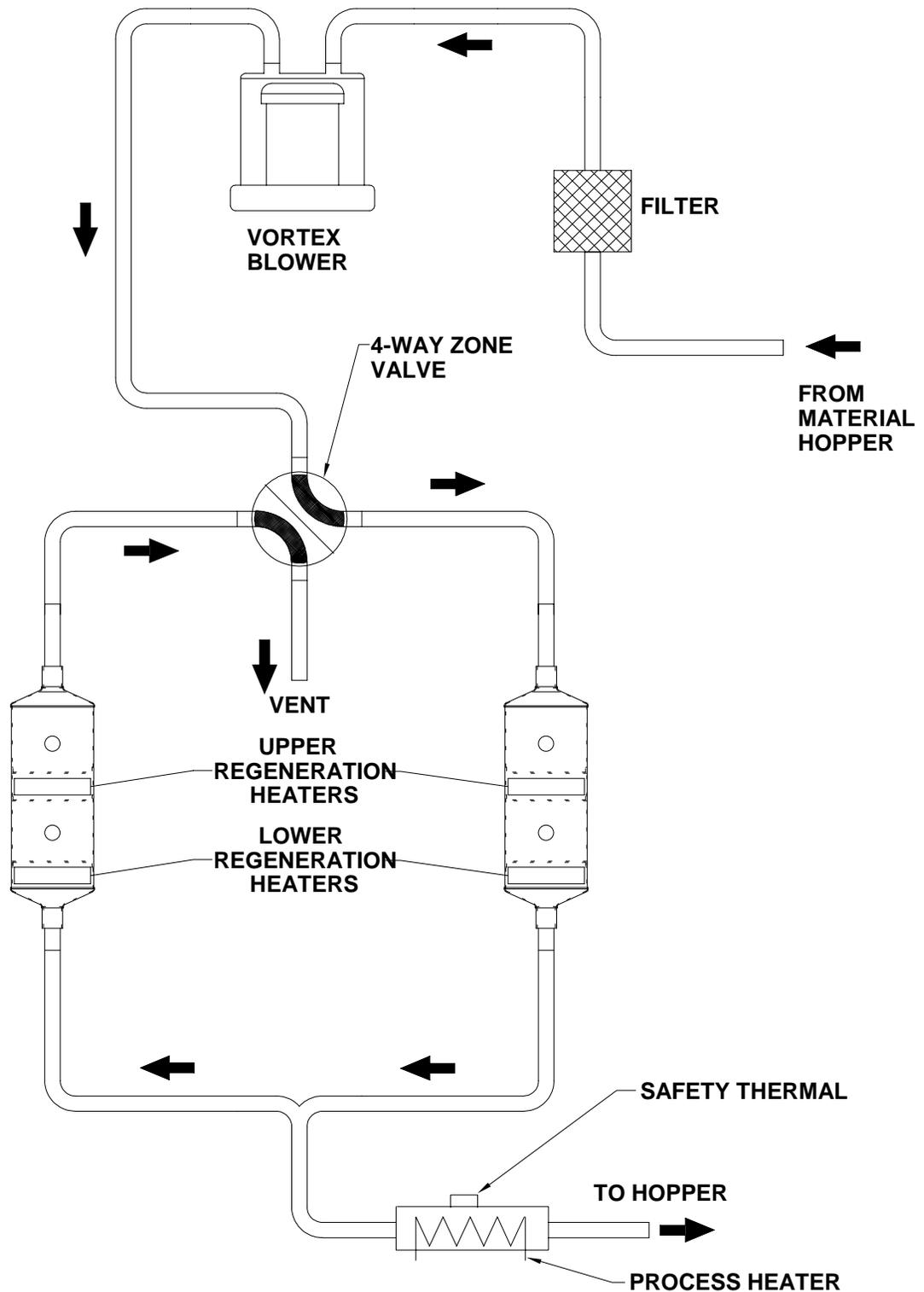
points. These are explained in more detail later in this manual.

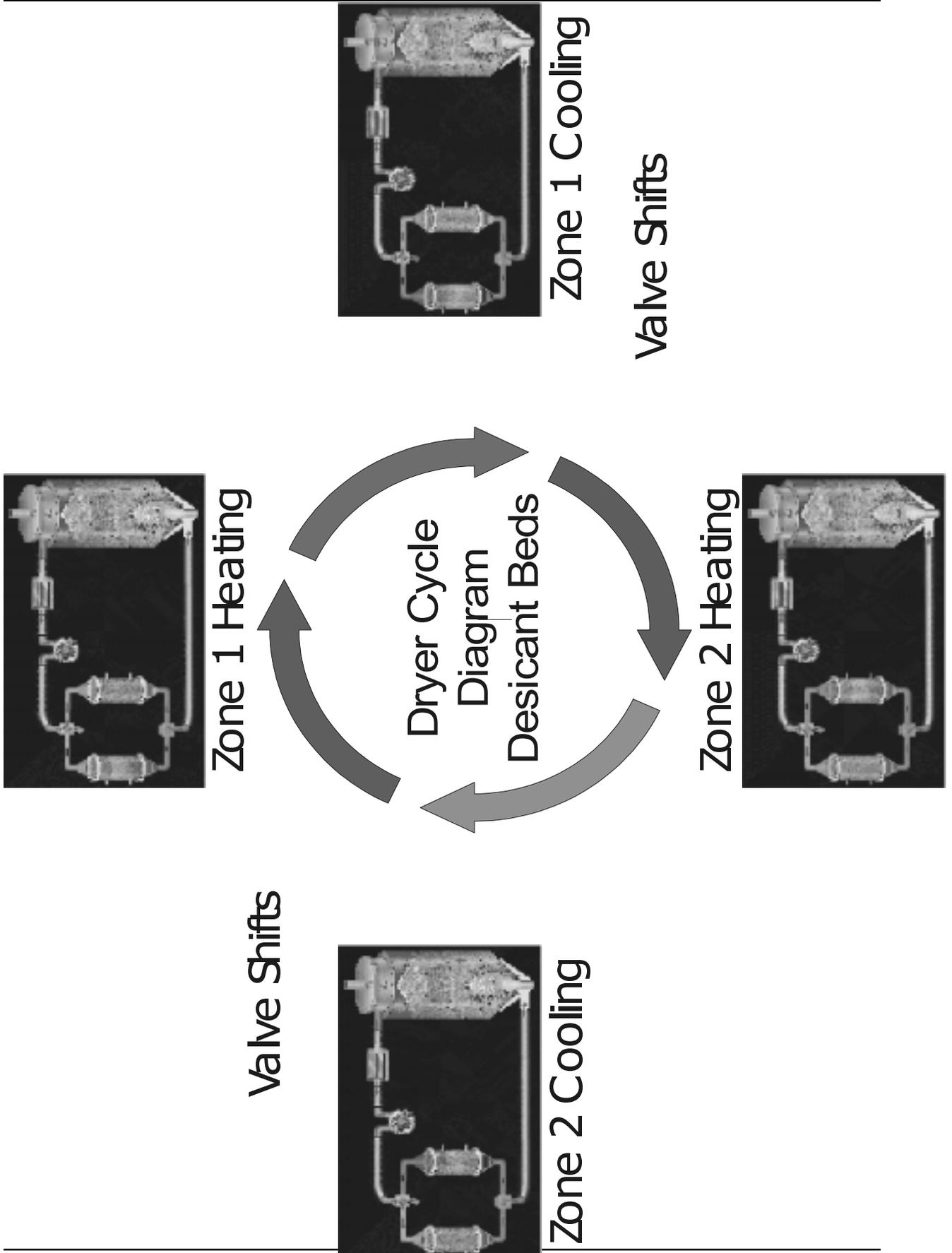
Dri-Air Electric Rotary Zone Valve

The AHM-1 utilizes our exclusive electric rotary valve technology, which helps make this dryer truly portable and low maintenance. As the valve does not need compressed air to operate, it is far more reliable than valves that depend on clean compressed air at a constant pressure.

The valve is designed to be practically maintenance free, as the seals are self seating and are designed to provide years of trouble free service. The electric controls are easily accessible for trouble-shooting, and are equipped with lights to indicate the zone position of the valve.

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



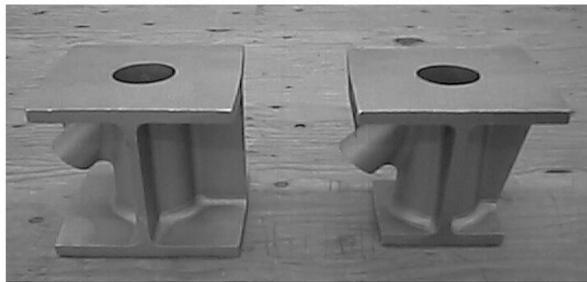


INSTALLATION PROCEDURE

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

CAUTION: Only personnel qualified to operate this dryer should start and run this dryer.

Dryer Controls

Main Power - The rocker switch located on the left side of the dryer face panel controls all power to the dryer. It functions as the main circuit breaker for the dryer and in emergencies, will cut all power to the unit.

Dryer Start-up

To initiate dryer start-up, press the rocker switch on the unit's face panel. The Rocker Switch should illuminate; indicating power is supplied to the unit. The dryer is now operating, follow the instructions below to set the process air temperature or to shut the dryer off.

CONTROL PANEL

1. Rocker Switch POWER ON light indicates there is power to the controls, heaters, valve and blower.
2. The dryer is now ready for setting the Process Air temperature. Follow instructions in next section.
3. The AMBER TEMPERATURE ALARM light will illuminate if an alarm condition arises. Further diagnostics required. See sections on Alarms and Trouble-shooting.
4. To stop dryer press the Rocker Switch to the OFF position.



Digital Controller

To Set Process Air Temperature:

Using the Digital Temperature Controller:

1. Press **SEL** button on the controller to enable the red Temperature Set display (labeled SV) to be altered.
2. Press the up arrow key ↑ key to increase the set point or the down arrow ↓ key to decrease the setting until the

desired process air set point is displayed.

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

CAUTION: Do not operate this dryer below 140 degrees F (60 deg. C) or above 350 degrees F (177 deg. C).

ALARMS

The High Temp Alarm condition discussed below will initiate a “Dryer Shutdown” that cuts power to the blower, digital controller and ELC output relays. See Trouble-Shooting section of this manual.

Process Air Temperature Alarms

The ELC/Digital Control system is preprogrammed with alarm set points that will shut the dryer down and activate the TEMPERATURE ALARM light on the dryer control panel and the ALM1 light on the digital controller.

The alarm will be activated if either the process air temperature fails to reach the set point within the allotted time period or the temperature exceeds the high limit. The HIGH TEMP ALARM light will illuminate for both conditions.

Thermocouple Failure Alarm

If a failure is detected with the Process Air Thermocouple, the upper Process Air Temperature display (labeled PV) on the Digital Controller will flash and display 0000. This alarm will be displayed if the thermocouple is not connected or is faulty.

ROUTINE OPERATION & MAINTENANCE PROCEDURES

When operating this dryer please follow the procedures detailed below:

Routine Operation

The dryer should be operated in a dry environment at ambient temperatures between 50 and 110 degrees F (10-44 deg. C). The unit should be situated so that the air hoses are not crimped or restricted after connection with the material hopper and the controls are easily accessible to the operator.

When moving the dryer allow the dryer to cool completely before handling. Recheck the hose and thermocouple connections to ensure that they are tight.

To shut the dryer down, press the OFF button on the Control Panel and press the rocker switch to the off position. Always unplug the unit when not in operation.

Emergency Shutdown

In the event that a condition should arise that requires the operator to immediately halt the dryer's operation, the operator can press the rocker switch to the off position and the unit will shut down completely. Remove the power plug from the facility outlet to cut all power from the dryer.

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.).

Never operate dryer without filter element installed.

Dryer Cleaning

Always unplug the dryer before cleaning.

The dryer is supplied with a surface coating that is easily cleaned and maintained by simply wiping the dryer with a moistened cloth or rag. Never clean the dryer with solvents or corrosive liquids. Always allow the dryer to cool completely before cleaning.

TROUBLE- SHOOTING GUIDE

BASIC TROUBLE- SHOOTING

All maintenance and trouble-shooting should be performed by a qualified electrician and a trained operator.

Nearly all diagnostic procedures can be performed with a volt ohmmeter and an AC/DC Ammeter.

In the event that the dryer will not start or shuts down in an alarm condition please take the following steps prior to other diagnostic steps.

1. Check the Power Circuit:

- a. Incoming power fuses (F1 & F2).
- b. Dryer fuse (F3). It has a blown fuse indicator that lights up if the fuse is defective.
- c. Is POWER light in Rocker Switch illuminated?
- d. Check heater's continuity using a volt ohmmeter.

2. Air Flow Circuit:

- a. Ensure Zone Valve is operating correctly and is in proper zone position. See VALVE TROUBLE SHOOTING.
- 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 ELC LCD Output/Input Enunciators as a guide for the status of the dryer regeneration cycle, check that all inputs are proper for the part of the regeneration cycle that the unit is in. See page 18.

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.

VALVE TROUBLE SHOOTING

To determine proper ZONE POSITION for valve, follow procedures detailed below:

1. Open front panel of dryer to view ELC's LCD.
2. Open Right Side Panel to view Valve Control Board.
3. Note if enunciator under #4 on ELC LCD is on, indicating dryer is in Zone 2. If no enunciator is visible, the dryer is in Zone 1.
4. Note which Zone Light is illuminated on Valve Control Board. Light should correspond to ELC LCD.

DETAILED TROUBLE- SHOOTING

Rocker Switch light is not on. Unit will not start:

1. Check small fuse. The LED will be lit if it is blown. Replace if necessary by opening the fuse holder and put new fuse into holder.
2. Check that incoming power to the unit is proper.
3. Check safety snap disc with multi-meter. (Should be normally closed)

HIGH TEMP ALARM light is illuminated. Unit will not run:

This indicates that the process air temperature has; exceeded the high limit programmed into the temperature controller, failed to reach the process air temperature set point, or there has been a thermocouple failure. To determine which of the aforementioned conditions caused the alarm, perform the procedure below.

Press Rocker Switch to OFF position and restart machine by moving switch to ON position. View what is displayed on the digital controller Process Air Temperature display. If it exceeds the set point an overtemp condition has occurred. If it is below the set point, the dryer cannot reach the set point. If 0000 is displayed, a thermocouple failure has occurred. Perform the following procedures for the indicated failure.

Depending on when the operator discovered the alarm, the dryer may restart if it had sufficient time to cool down. If this happens simply allow the dryer to operate until the alarm occurs and then perform the above procedure.

Machine will not reach temperature:

1. If the Output Light (C1) on Digital Controller is not lit.
 - A. Check position of the Process Air Thermocouple. The probe tip should be in the middle of the hose.
 - B. Check Digital Controller - may be faulty.

2. If the Output Light (C1) on Digital Controller is lit.
 - A. Check the solid-state relay on panel.
 - B. Check airflow through process air hose.

Check the alarm limit first, by pressing and holding the **SEL** button on the temperature controller until **STBY** is displayed. Then press the **DOWN** arrow key until **AL1** is displayed in the upper (PV) display. The setting displayed in the lower (SV) display 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 quickly.

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 the solid state relay 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 input power is not activated.

If thermocouple has failed, check following:

1. Ensure thermocouple plug is securely inserted into dryer outlet.
2. Check thermocouple continuity with multi-meter.

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 - ELC

REFERENCE GUIDE LCD ENUNCIATORS

The following list details the corresponding inputs & outputs to the numbered enunciators displayed on the ELC's LCD.

UPPER ENUNCIATOR ROW

NO.	INPUT#	DESC.
1	I1	Main Power
2	I2	High Temp Alm
3-6	Spare	

LOWER ENUNCIATOR ROW

NO.	OUTPUT#	DESC.
1	Q1	Z1 Heaters
2	Q2	Z2 Heaters
3	Q3	Main Contactor
4	Q4	Zone Valve

ELC Control Module

The dryer control package includes a ELC controller that is programmed for the drying cycle discussed previously. Each input/output terminal on the Module has a corresponding enunciator displayed on the Module's LCD display that can be used for trouble-shooting. In normal operation the LCD displays numbers 1 to 6 with with a row of enunciators above the numbers for the inputs and a row of enunciators below for the outputs. (See Reference Guide to the left.) When the enunciator is displayed the input or output is actuated. All ELC inputs/ outputs are 120 volts AC.

Dryer Control Panel

The Control Panel for the dryer includes an ON/OFF Rocker switch that acts as the Main Power Switch and EMERGENCY STOP. When this switch is in the OFF position all power is cut to the Controllers, Blower and Electric Valve.

<u>PARTS LIST: AHM-1</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
General	84231	FILTER CARTRIDGE
	83707	ZONE VALVE
	82125	BLOWER
	84054	THERMOCOUPLE
	85241	TEMP. CONTROLLER (FUJI)
	80082	DESICCANT 4 lb./MACHINE
	80221	THERMAL SWITCH (500°)
	85232	FUJI ELC CONTROL
	80857	2 POLE RELAY
	82496	1 POLE RELAY
	82303	SOLID STATE RELAY
	82035	.5A FUSE HOLDER
	83443	.5A FUSE
	84691	LARGE FUSE HOLDER
	80907	AMBER LIGHT
83079	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

