DRI-AIR

OPERATING MANUAL

MPD 5-30 D

Mini Portable Dryer Series

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DRYER OPERATION/FEATURES

The MPD-5-30 dryer is a fully portable dryer designed to dry hygroscopic resins quickly and efficiently. It is ideal for insert molders and laboratory applications, or where production rates are 10 lbs/hr or less.

The MPD-5-30 dryer is available in 110 volt and 230 volt models. The power requirements for the 110 volt model are a voltage range of 105-130v AC at 50/60 Hz. single phase with a 20 amp current rating and the 230 volt model requires a range 220-250v AC at 50/60 Hz. single phase with a 10 amp current rating.

Regeneration Cycle

The **MPD-5-30** utilizes our HP4-X dual desiccant bed design that provides a constant supply of dry air to the material hopper. While one bed is removing moisture from the process air stream, the other bed is being regenerated. The entire process is controlled by an ADC microprocessor with the tower heat-up and cool temperature controlled to regenerate the desiccant. When the regenerated bed completes this cycle, 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. Please see the Regeneration Cycle Diagram.

The airflow design of the ARID-X/HP4-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. This cycle is depicted in the schematic.

HP4-X Design

Our patented HP4-X design incorporates 4 desiccant beds where two are stacked, one over the other in each tower. 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 Airflow diagram.

Material Hopper Requirements

The MPD-5-30 dryer can be used with any material hopper that is designed to allow proper air flow. Hoppers that are equipped with a material spreader cone and diffuser basket will provide the best performance. To obtain optimal drying performance, we recommend that you utilize our uniquely designed material hoppers. 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/ diffuser basket assembly promotes proper material flow to ensure that the material is dried efficiently and no un-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 MPD-5-30 dryer is supplied with our ADC microprocessor that controls the regeneration cycle described in the previous section. 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 operating parameters by timing the regeneration cycle as well as monitoring and controlling the regeneration heaters and dryer alarms.

Dri-Air Electric Rotary Zone Valve

The MPD-5-30 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 feedback on the valve indicate the zone position of the valve.

INSTALLATION PROCEDURE

CAUTION:
Prior to installing the dryer a qualified
Electrician should ensure that the facility power supply is compatible with the unit. Any wiring required for installation must be performed by a qualified electrician.

Installation Requirements

Electrical

The power requirements for the unit are detailed on page 4 of this manual. The unit is supplied with power connector cord and should be installed as directed below. *All 230 volt models require a minimum operating voltage of 220v AC to operate properly.*

Facility Location

The unit is suitable for use in industrial and laboratory environments. The location should be adequately ventilated, with no flammable vapors or gasses present. The unit must be positioned to allow the operator to view the control panel and access the controls. Do not locate the dryer in an enclosed area. Allow at least 3 feet (1 meter) of clearance around each side for proper ventilation and heat dissipation. If the unit is to be installed on a bench or stand, be sure they are adequately sized to accommodate the dryer's weight (72 lbs/32Kg).

Hopper Connection

Each MPD-5-30 dryer is supplied with a
Process Air Hose/Thermocouple Assembly and a return hose.
The dryer, hopper and hoses are pre-installed on the PD cart

Electrical Connection

The MPD 5-30 dryer is available in 110 or 220 volt, single-phase models. The 110 volt model is supplied with a pre-assembled power cord with a grounded three prong male plug already attached, while the 220 volt model requires the user to have a qualified electrician attach an appropriately grounded male plug, suitably configured to the facility's power supply outlet.

220 volt Connection - USA/Canada
Connect WHITE and BLACK wires to power leads on plug and the GREEN wire to the ground lead.

220 volt Connection - Europe
Connect BROWN and BLUE wires to the power leads on plug and the GREEN/YELLOW wire to the ground lead.

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

CAUTION: Do not operate this dryer using an ungrounded power receptacle.

Compressed Air Connection

The MPD 5-30 dryer is available with many options that require air for loading. The compressed air that is supplied must be clean and supplied at a minimum of 60 psi. Pressures below 60 psi will result in improper loading.

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. Hopper is clean and ports are clear.

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 right 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 ADC display panel should illuminate; indicating power is supplied to the unit. The dryer is now operating, follow the instructions in the ADC manual to turn operate the dryer.

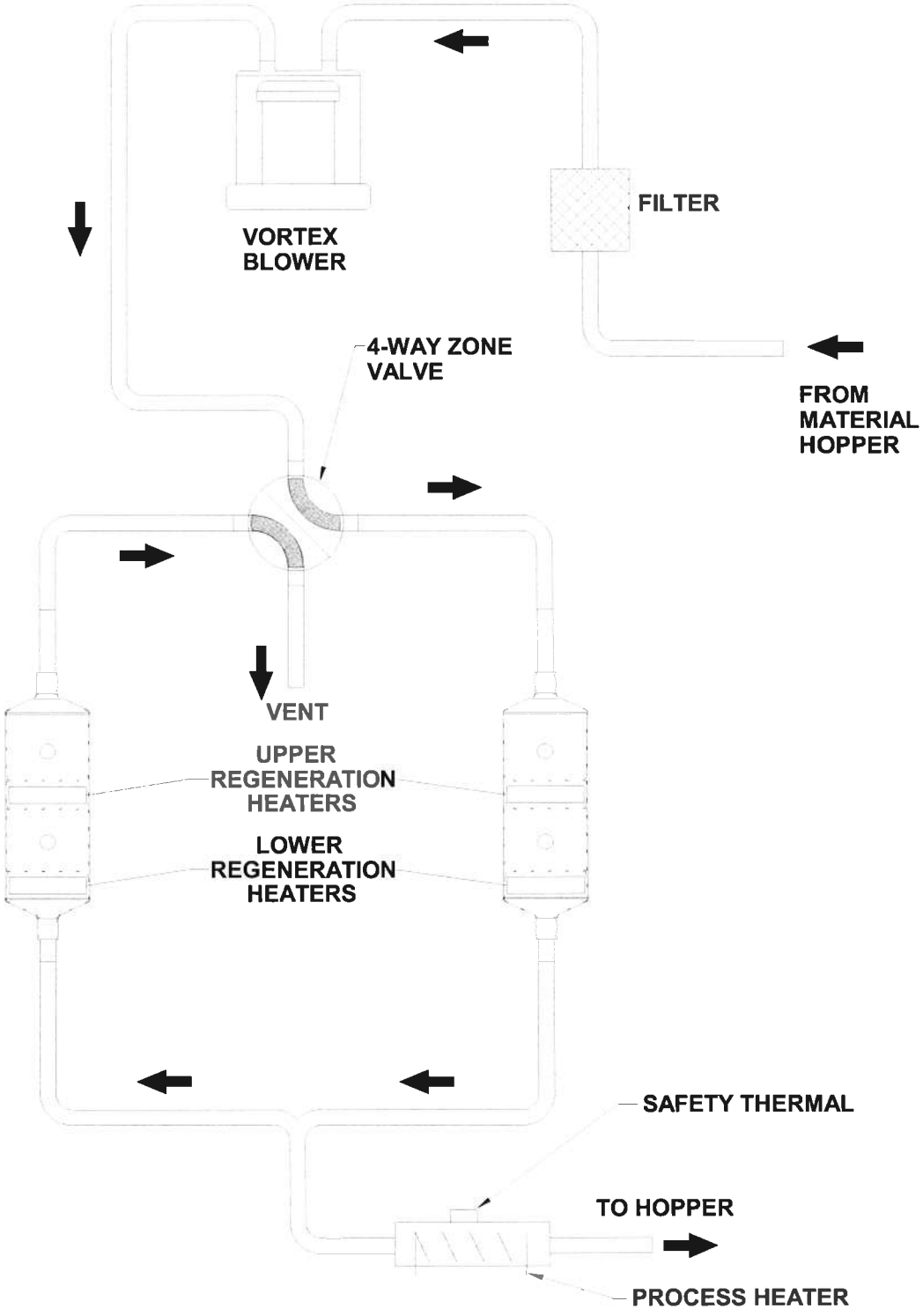
CAUTION: Do not operate this dryer below 140 degrees F (60 deg. C) or above 350 degrees F (177 deg. C).

If the dryer is operating at temperatures outside the range above, a High Temp Alarm condition could occur and "Dryer Shutdown" that cuts power to the blower and the ADC controls can be observed

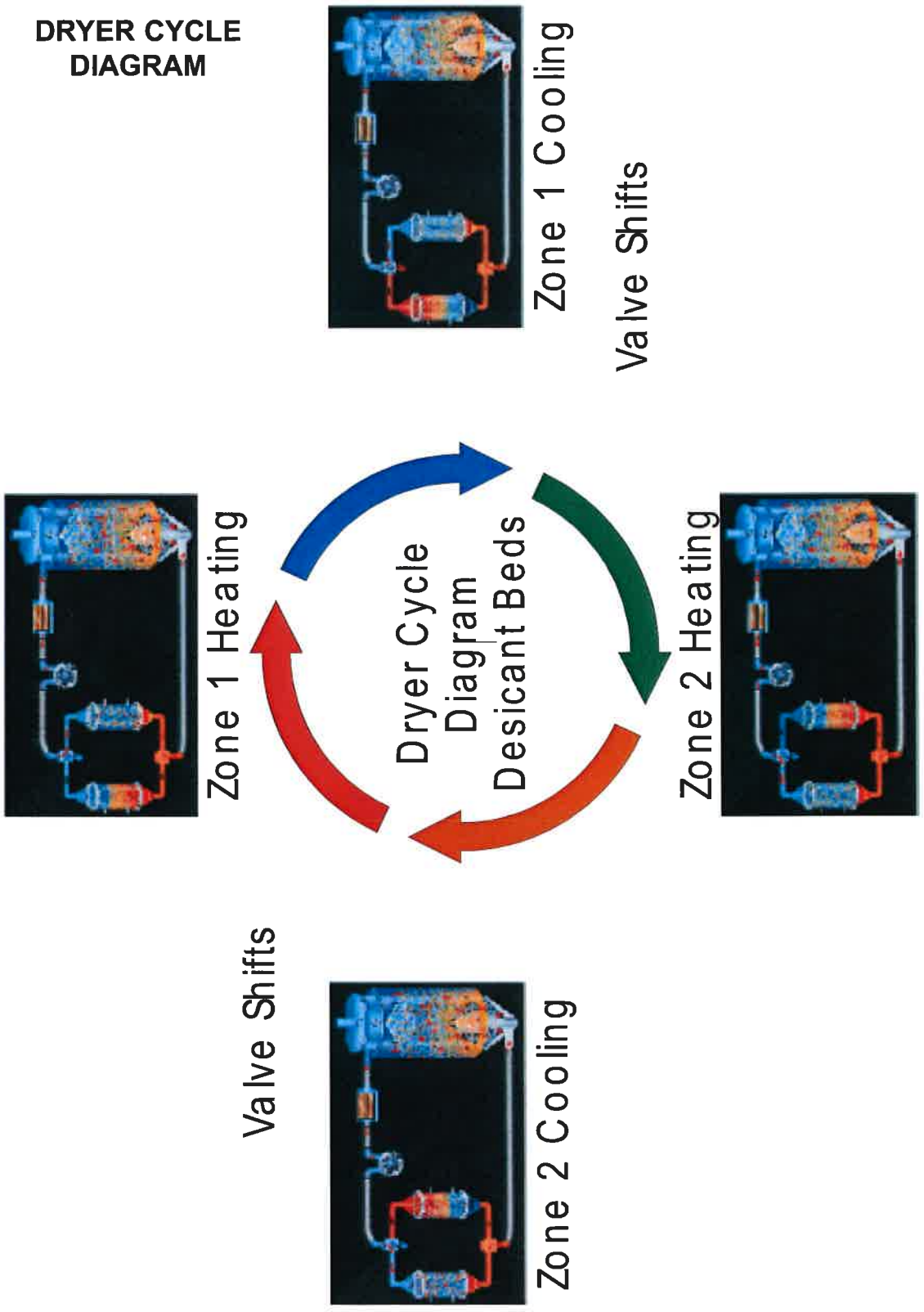
DRI-AIR INDUSTRIES, INC.

AIRAHM1

AIR FLOW SCHEMATIC FOR ARID-X 10 DRYER



DRYER CYCLE DIAGRAM



Set the drying temperature on the control using the **TEMP SET** button.

The **ADC** control has the following features:

- Easy setting of process temperature
- Selection of F or C
- Open thermocouple detection
- High temperature shutdown
- 7-day timer operation, one start and one shutdown per day
- Adjustable dew point alarm
- Day and time indication with battery backup
- Fault indication without codes to look up

MAIN OPERATING SCREEN WITH ADC CONTROL:

Indicates the dryer is on

*Indicates setback is actuated

Dryer	*** ON**
Process	180 F
Set point	180 F
Dewpoint	-45

Indicates 180 F process air

Dryer	* ON
Process	**180 F**
Set point	180 F
Dewpoint	-45

Indicates set point of 180 F and dryer is in setback

Dryer	* ON
Process	180 F
Set point	**(180) F**
Dewpoint	-45

Indicates dew point of -45 C

Dryer	* ON
Process	180 F
Set point	180 F
Dewpoint	**-45**

To set the temperature, press the **TEMP/SET** button and enter desired temperature. Press **ENTER.**

To access the menu, press the **MENU** button and arrow up or down to access the screen you need,

To return to the main screen, press **CLEAR** or wait 15 seconds and it will automatically appear.

MENU DEFINITIONS:

1. SET PROCESS TEMP--- This screen allows the operator to easily change the process temperature. The **SET/TEMP** button can also be used.

- Press the TEMP SET button or MENU and arrow down key.

Main Menu Set Process Temp ↑ or ↓ to Scroll Use Enter to Select

Process Temp =180 Key in new value Enter key to accept Or Clear to Exit

2. SETBACK SETUP----For those dryers with the setback option, this screen allows the operator to activate the setback option and to enter the setback delta from the process temperature for the setback temperature. Remember this setting is a delta rather than the actual setback temperature. For example, if the process temperature is 250 degrees F and the delta is set for 30, the actual setback temperature will be 220 degrees F. This option eliminates over drying of the resin if for any reason the process is interrupted for a period of time. See appendix for a more in detail description of all the settings for this feature.

- To select this feature, press the MENU button and arrow down ↓ to the SETBACK SETUP screen.
- To turn this feature on or off, press ENTER at the SETBACK ON OFF screen. Press 1 to turn on and 2 to turn off.
- To change the setback delta setting, press ENTER at the SETBACK DELTA screen. Key in new value and press ENTER.

Main Menu Setback Setup ↑ or ↓ to Scroll Use Enter to Select

Main Setback Menu Setback On Off ↑ or ↓ to Scroll Use Enter to Select

Main Setback Menu Setback Delta ↑ or ↓ to Scroll Use Enter to Select

3. SEVEN-DAY TIMER---The dryer can be automatically started and stopped once per day using this feature. In this menu, the operator can select the day of the week and time of day to turn the dryer on and off. The days of the week are specified as Sunday, Monday, etc and the time is set in Military time. Each day can be set to start and stop, start only, stop only, or have no events. A setting of 9999 means there is no time set.

Main Menu Seven Day Timer ↑ or ↓ to Scroll Use Enter to Select	Main > Day Menu Setup Sunday ↑ or ↓ to Scroll Use Enter to Select	Start Time Stop Time 0000 0000 Key 9999 to Disable

↓ to access each day

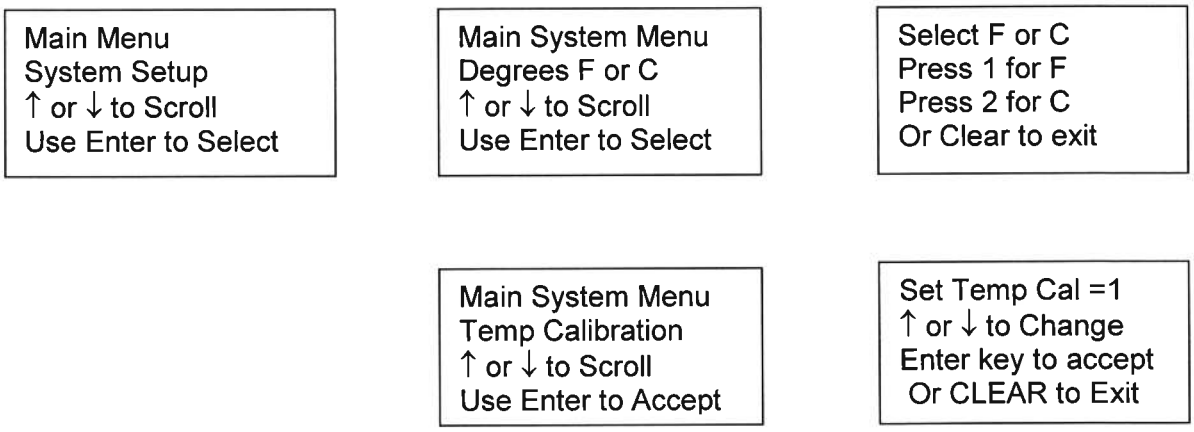
Enter new start/stop times
Press ENTER to save.

4. ALARM SETUP---The high temperature alarm is factory set for a 50 degree F delta above the set temperature. Again, this is a delta setting, so a setting of 50 means the high temperature alarm will activate at 50 degrees above the set temperature. While this setting does not normally have to be changed, this screen is used to make changes. The dew point alarm can be turned on or off within this menu also. The high temperature alarm also shuts the dryer down and cannot be de-activated.

Main Menu Alarm Setup ↑ or ↓ to Scroll Use Enter to select	Main > Alarm Menu Set Hi-Temp Alarm ↑ or ↓ to Scroll Use Enter to Select	High-Alarm Delta= 50F Key in new value Enter key to accept Or Clear to Exit
	Main > Alarm Menu Dewpt Alarm On-Off ↑ or ↓ to Scroll Use Enter to Select	Dewpoint Alarm is ON Press 1 to Turn ON Press 2 to Turn OFF Or Clear to Exit

5. SYSTEM SETUP---This section is used to configure the dryer for degrees F or C and to calibrate the thermocouple.

- Press the MENU button and arrow down ↓ to THE SYSTEM SETUP screen.
- Press ENTER to select SYSTEM SETUP
- Press ENTER to select Degrees F or C.
- Press 1 for degrees F and 2 for degrees C.
- Press ENTER.
- Press arrow down to temp calibration, press enter and enter delta from reading on the screen.
- To calibrate the temperature, remove the connector for the thermocouple in question. Place a standard in place of the thermocouple and read the displayed temperature. Enter the difference in the Temp Cal screen using the up and down arrows. A minus entry will display a lower temperature.



6. FACTORY SETTINGS: For factory use only. Password protected.

7. DIAGNOSTIC MENU--- The diagnostic menu is used primarily for trouble-shooting assistance. It allows our servicemen and qualified repair personnel to view a history of events and other pertinent information to locate the problem in a shorter period of time. Included in this section:

    - View Event Log – The last 128 events are stored in this area and can be
      viewed to spot any anomalies of operation. The last event is displayed first with the prior events visible by pressing the down button. These events are start, stop, and all alarms.

Main Menu Diagnostics ↑ or ↓ to Scroll Use Enter to Select	Main Diag Menu View Event Log ↑ or ↓ to Scroll Use Enter to Accept	Event Log # 1= System Start Thu 10:35 ↑ or ↓ to Scroll

OTHER FEATURES:

- AUTOMATIC RESTART---In the event of a power failure. The dryer will not operate. If the power is restored within 30 seconds, the ADC control will check the status of the dryer and any alarms and restart the dryer if all tests pass. This feature eliminates having to manually start our dryers for a short duration power outage.
- LOOP BREAK ALARM (indicated as "LOOP" in an alarm)—This feature checks all actual temperatures compared to their set values to see if they are approaching the set value. If the temperature does not reach its set value, the dryer is shut down and the heater in question is displayed. One of the main reasons for this feature is to locate a problem before it can cause any damage. One such condition would be if the process thermocouple were to be removed from the input port of the hopper resulting in an incorrect temperature and possible melt down of the resin.
- OPEN THERMOCOUPLE PROTECTION—All thermocouples are constantly monitored for correct operation. If one should fail, the dryer will stop and an alarm indicating the failed thermocouple will be displayed.
- TEMPERATURE SETBACK (OPTIONAL)—This option prevents material from being over dried if the process is interrupted for a period of time. When activated, the return temperature is compared to the set temperature. If they are within certain specifications for a period of time, the process temperature will be set back to a level where continued drying will not take place. This setback condition is displayed by () parenthesis around the set temperature on the display.

SETTINGS:

TEMPERATURE:

Set the process temperature by either pressing the "TEMP SET" button or "MENU" button.

HIGH TEMP ALARM DELTA:

Press the "MENU" button and then arrow down to the ALARM MENU. Press enter to access setting. Enter a new delta using the keypad and press ENTER. Remember this setting is a delta above the set temperature and not an actual temperature.

TEMPERATURE SETBACK:

Going to the "SETBACK MENU" and pressing enter can actuate the temperature setback feature. The display will indicate how to turn on or off this feature. The setback delta is factory set for 30 degrees F based on field experience. If this value needs to be changed, go to the "SETBACK MENU" and arrow down to SETBACK DELTA. A new value can then be entered. All other variables are located in the FACTORY SETTINGS and will require assistance by our servicemen to make any changes.

SELECTION OF DEGREES F OR C:

This setting is located in the menu section "SYSTEM SETUP".

SEVEN-DAY TIMER:

Select the "SEVEN-DAY TIMER" menu. Press enter to access the days of the week and ENTER again to set the times. Only one start and stop time per day is allowed. All times are in Military time. See the section on menu selection for more detail.

SETTING TIME ON CLOCK:

Using the MENU button, scroll down to seven day timer screen and press ENTER. Arrow down to SET CLOCK TIME and follow instructions on screen.

ALARMS:

TC1.....Thermocouple failure.

- Check thermocouple connections and wiring to the control. Replace thermocouple if wiring is proper.

P1 HiTemp...High temperature shutdown.

- Check the solid state relay located to the right of the control to make sure it is shutting off with no input signal.

P1 LOOP.....Process heater loop alarm

- This alarm indicates the dryer cannot reach the desired process temperature set point. Check the air flow, heater continuity, and solid state relay.

AIR PRESS.....Air pressure alarm

- This alarm indicates the loss of air pressure to the dryer. Check air supply to the dryer including any valves, hoses, or filters.

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 interior, 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.

MAINTENANCE

Filter maintenance

1. Open filter canister and clean filter element
on a daily basis using compressed air.
2. Change filter cartridge every 6 months
(Sooner if process materials 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.

Desiccant maintenance

The MPD-5-30 is a dual bed desiccant dryer. Desiccant
change should be part of the regular maintenance schedule.
It is recommended to change desiccant every 2-3 years
to prevent problems with dewpoint.

TROUBLESHOOTING GUIDE

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 on rocker switch.

b. Dryer fuse (F3). It has a blown fuse indicator that lights up if the fuse is defective.

c. Is the Rocker Switch tripped?
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. At initial start, the unit will test valve position. If it is not in the proper position, valve out of position alarm will occur.
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. Use the Output/Input Enunciators on the ADC motherboard 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.

4. Operating Conditions:

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

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)

Machine will not reach temperature:

A. Turn Dryer off. Check internal fuses.
B. Check position of the Process Air Thermocouple. The probe tip should be in the middle of the hose.
C. Check resistance of process heater. If resistance is not present, the heater has failed.
D. Check the solid-state relay on panel.
E. Check airflow through process air hose.

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 multimeter.

The Dri-Air Electric Rotary Valve is designed to provide very little process air flow restriction and no leakage between zones. 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 feedback valve position to the ADC motherboard.

If there is a failure with the valve, please contact factory for advanced troubleshooting.

Loader Installation Procedure:

For DAC-1: to load a molding machine

1. The DAC-1 loader is supplied with either a 3.5"x3.5" (P/N 83641) or 5.5"x5.5" (P/N 83668) square bottom mounting flange. Drill the mounting flange to match the pattern on the machine feed throat flange and bolt the mounting flange to the machine.
2. Mount the receiver to the flange by slipping it over the flange stub. Notice that the 2 O-rings are in place.
3. Mount the controls to a convenient location near the receiver and accessible to the operator using the bracket on the controls. It must be within 8 feet of the receiver so the wires can reach.
4. Connect the material conveying hose (1-¼") to the receiver and tighten the clamp.
5. Connect the Line-vac assembly to the other end of the hose and tighten the clamp. The Line-vac assembly includes a wand or tube for pickup from a take-off-box or material supply such as a bag or gaylord.
6. Connect the black compressed air hose from the control box assembly to the Line-vac. No tools are required; just push the hose into the fittings.
7. Plug the sensor wire from the receiver into the control box. Twist the plug after insertion to lock it into place.
8. Connect shop compressed air to the regulator on the controls. The supply air must be at least 90 psi using a ¼" airline.

For DAC-2: to load a hopper

1. Drill the top of your hopper to mount the adapter for the DAC-2 loader. The actual pattern can be duplicated from the following pattern.
2. Mount the adapter to the hopper and install the receiver. Follow the instructions above to complete the assembly.

Operation:

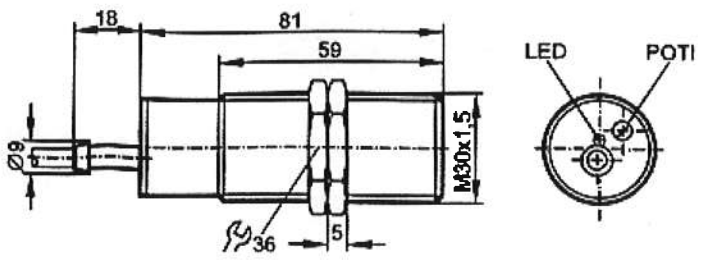
Compressed air is used to convey the material from the source to the receiver. The Line-vac creates a vacuum on one end and amplifies the air volume to convey material. The higher the pressure, the more material that will be conveyed. Once the sensor is satisfied, the air supply is shut off and conveying stops.

Adjustments:

1. The sensor is adjusted at the factory for most materials. If the unit does not load material and the sensor light is not lit, turn the adjustment screw on the back of the sensor counter-clockwise until the light is lit. If the loader does not stop loading with material in front of the sensor, turn the adjustment screw (POT1) clockwise until the light goes out. The adjustment screw has a 20-turn adjustment with a slip clutch to prevent damaging the sensor. If the sensor is completely out of adjustment, turn the screw 20 turns counter clockwise to reach a home position. Then turn it clockwise until the light goes out.
2. Adjust the air pressure using the regulator on the controls until the material conveys at a proper rate. Too low a pressure will result in not moving the material to the receiver or too long a fill time. If the pressure is too high, the material will not drop properly into the receiver.

DAC PARTS LIST:

PART NUMBER	DESCRIPTION
81055	Filter
81180	Proximity Switch



PARTS LIST:

	PART NUMBER	DESCRIPTION
	85699	COOLING FAN
GENERAL:	84231	FILTER CARTRIDGE
	85438	ZONE VALVE
	82125	BLOWER
	84054	THERMOCOUPLE
	85584	ADC MOTHERBOARD
	84930	DISPLAY BOARD
	86823	DESICCANT (4-LBS)
	80221	THERMAL SWITCH (500°F)
	87165	SOLID STATE RELAY
	82035	.5A FUSE HOLDER
	83443	.5A FUSE
	84691	LARGE FUSE HOLDER
	84183	ROCKER SWITCH
	85668	SOLENOID VALVE LOADING
	86371	CONTACTOR
	86288	SOLENOID VALVE SLIDEGATE
110-V DRYER:	86927	REGEN HEATER, 110-V, 250-W
	84409	PROCESS HEATER, 110-V
	85959	TRANSFORMER, 110-V
	80800	20 AMP FUSE
220-V DRYER:	86928	REGEN HEATER, 220-V, 250-W
	84410	PROCESS HEATER, 220-V
	85959	TRANSFORMER, 220-V
	81583	10 AMP FUSE