DRI-AIR

OPERATING MANUAL

MPD-5-30 C

Compressed

Air Mini

Portable Dryer

& CAFM Series

Dryers

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://.dri-air.com

e-mail: sales@dri-air.com

TABLE OF CONTENTS

DRI-AIR INDUSTRIES, INC.

16 Thompson Road
East Windsor, CT 06088
Tel (860) 627-5110
Fax (860) 623-4477
www.dri-air.com

DRYER OPERATION/FEATURES

The MPD-5-30 dryer & CAFM dryers are dryers r designed to dry hygroscopic resins quickly and efficiently. It is ideal for insert molders and laboratory applications, or where production ratesare 10 lbs/hr or less.

The MPD-5-30 & CAFM dryers 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 ampcurrent rating.

Material Hopper Requirements

The MPD-5-30 & CAFM 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. Ori-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.

COMPRESSED AIR PORTABLE DRYER OPERATING MANUAL

Principle of operation:

The DRI-AIR compressed air dryer (CA) uses compressed air to provide a

source of dry air and to circulate dry air through the material to dry plastic resin. Normal plant compressed air is presumed to be relatively dry and at or near room temperature. In order to reach -40 degree dew point process air, the compressed air supply has to be no more than +40 degree dew point at 90 psi. If it is above this level, additional drying of the air will be required or the ultimate dew point will be above the -40 degree level.

The compressed air is first dried in the CA with a membrane dryer capable of lowering the pressure dew point -40 F degrees at the set flow rate. The dried compressed air is then passed through a process heater to heat the air to the desired process air temperature. The process heater will either be mounted on the drying hopper or inside the dryer enclosure. See the flow diagram in the back of this manual.

The heated, dry air goes to the drying hopper where it passes through the resin, removing the moisture trapped in the resin. This wet, moist air is vented out to atmosphere and not returned to the dryer

The dryers air flow is set at the factory via the flow control located prior to the membrane. It is important that this flow control is not readjusted or the ultimate dew point may not be achieved. A sample of the dried air flows through the dew point sensor to verify the membrane dryer is working properly. (on dryers with ADC control or UDC controlled dryers with the dewpoint monitor option)

There are two types of controllers available with the CA series dryers, our UDC and ADC control:

The DRI-AIR UDC control is the standard controller and is used to control the temperature at the drying hopper. This controller also includes a high temperature alarm and has an option for a dew point monitor

The DRI-AIR ADC control is used to control the temperature, measure the dew point, and incorporates the 7-day timer function. This control monitors all of the thermocouples and can be supplied with our temperature setback option.

INSTALLATION:

ELECTRICAL:

The CA is supplied in both 110 and 220 volt models. Check the label for which voltage your model uses. The 110 model has a standard plug on the cord while the 220 volt model has a cord only. The customer will have to supply the proper plug for his outlet.

COMPRESSED AIR:

NOTE: DO NOT ADJUST THE INTERNAL REGULATOR OR FLOW VALVE

The CA is supplied with air filtration to protect the membrane dryer from most factory compressed air supplies. If your supply has water or oil in it, install a coalescent filter to remove these contaminates prior to the CA.

Connect the compressed air line to the ¼" NPT fitting on the lower left side of the enclosure. Connect the air using an air line of ¼" capable of 2 CFM. The air supply must be at least 90 psi for best operation. If the supply is in excess of 110 psi, install a pressure regulator prior to the CAHM and set it for 90 psi.

The CA incorporates a pressure switch to prevent the dryer from operating without the compressed air connected and operating. If the compressed air is not present, the dryer will not operate and an error message **AIR PRESS** will appear on the screen.

Once the CA is connected to all services and mounted on the molding machine or extruder, start the dryer by pressing the start button.

UDC Control Pages 5 - 7

ADC Control Pages 8 – 15

DRI-AIR ULTRA DRYER CONTROL MANUAL

ULTRA MICROPROCESSOR DRYER CONTROL

The new ULTRA dryer control is based on the advanced ADC control platform. Control of the dryer cycle is based on thermocouple in the process air stream at the drying hopper

The dual line alpha-numeric display indicates the set and actual temperatures as well as the status of the dryer cycle. (dryer cycle is not applicable on compressed air dryers) Alarms are indicated on the display for easy troubleshooting of the system.

FEATURES:

- Easy setting of process temperature
- Adjustable high temperature alarm and shutdown
- Open thermocouple detection
- Actual fault detection- no codes to look up
- Degrees F or C selection
- Closed Loop loader control

OPTIONS:

- Dew point indication

ULTRA CONTROL OPERATION:

INSTALLATION OF DRYER:

1. Connect incoming power to the top of the disconnect located on the electrical panel.
2. Connect all hoses to hopper, loader, etc,
3. Connect process thermocouple by plugging it into the port on the side of the dryer panel if the dryer is separate from the hopper.
4. Turn on the disconnect.

The display will show:

Dri-Air Indust. Ultra Dryer 1.6

If the dryer has been running and stopped:

Dri-Air Ultra Dryer is off

Press the Start button. Display will show: The control is initializing.

Starting Dryer Please Wait

After initializing and checking the valve position, the display will show:

Temp 200F 2H Set point 200F

To change the setpoint, press SET/ENTER:

The display will show:

Change 200F ↑ Set point ↓

Press arrow up or down until the desired setpoint is reached and press SET/ENTER

To access other settings: DRYER MUST BE TURNED OFF!

To change High Temp alarm, loader fill time, loader drop time, or temperature units from F to C:

Press and hold the SET/ENTER button for 2-3 seconds and release, display will show:

Arrow up or down to change High temp alarm Delta above Setpoint.

50F Change ↑ Hi Alarm ↓

Press SET/ENTER again, display will show:

Arrow up or down to change loader fill time.

Set Loader On 8 ↑ Seconds ↓

Press SET/ENTER again, display will show:

Arrow up or down to change loader delay to empty receiver.

Loader 10 ↑ Delay Seconds ↓

Press SET/ENTER again, display will show:

Arrow up to change temperature units.

Press ↑ F To Toggle F or C

Press SET/ENTER to return to the main display.

ALARM DISPLAY/ CODE:

P1 OVERTEMP……,,,	HIGH TEMP ALARM
ALR=HOPPER 1 LOO…….	PROCESS TEMP CANNOT BE HELD (Check process temperature thermocouple)
ALR=AIR PRESSURE …….	No Compressed air connected

DRI-AIR ADC ADVANCED DRYER CONTROL MANUAL

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.

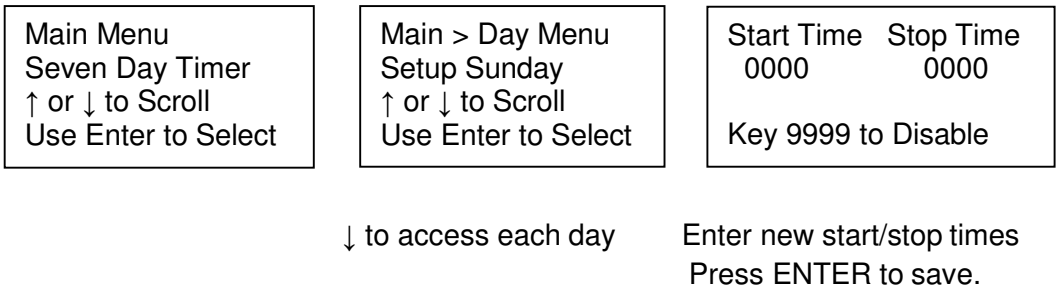
- To select this feature, press the MENU button and arrow down ↓to the SETBACK SETUP screen.
- To turn this feature on or off, press ENTER at the SETBACK ON OFF screen. Press 1 to turn on and 2 to turn off.
- To change the setback delta setting, press ENTER at the SETBACK DELTA screen. Key in new value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

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

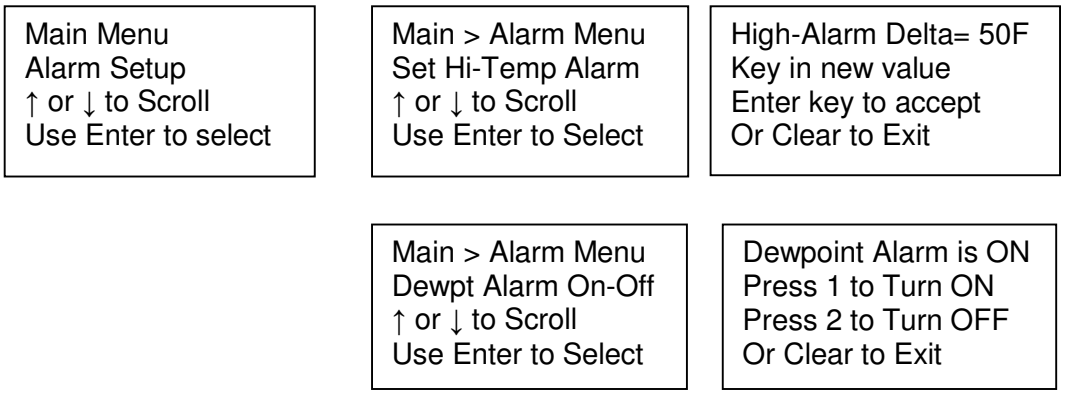
Main Setback Menu Setback On Off ↑ or ↓ to Scroll Use Enter to Select

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.

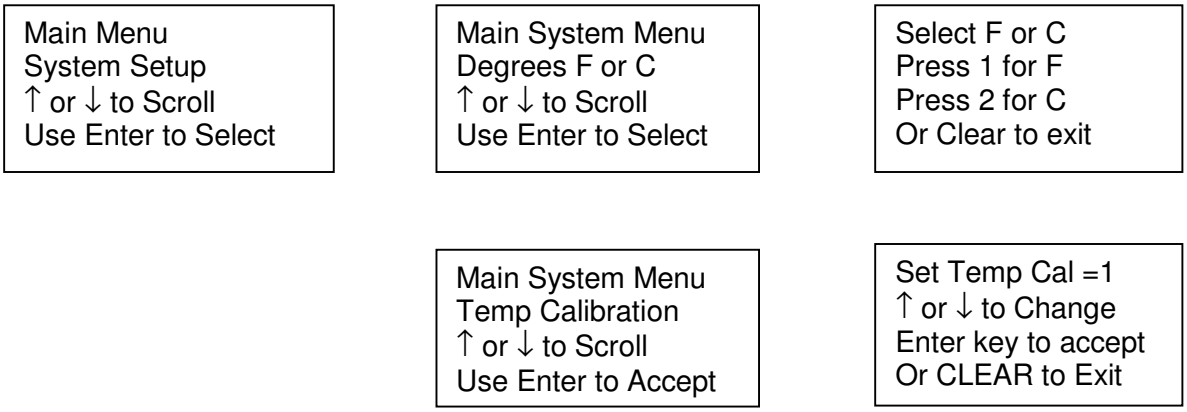


4. ALARM SETUP---The high temperature alarm is factory set for a 50 degree F delta above the set temperature. Again, this is a delta setting, so a setting of 50 means the high temperature alarm will activate at 50 degrees above the set temperature. While this setting does not normally have to be changed, 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.



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.

MAINTENANCE:

The most important part of the CA is the membrane compressed air dryer that provides a constant source of dry air. The membrane is sensitive to oils and it is important the air supply is free from any oil in it. For maximum protection, install a coalescent filter prior to the CA and service it weekly.

Inspect the external filter prior to the membrane dryer to make sure it is draining properly. There should be nothing in the sight glass.

Refer to the electrical schematic P/N 86177 for any electrical problems.

APPENDIX

TEMPERATURE SETBACK THEORY

The optional temperature setback feature for the ADC control prevents over drying of the material due to excessive residence in a drying hopper at the suggested drying temperatures. This is especially true for Nylon, which can be over dried leading to degradation of the resin resulting in molding problems and brittle parts. It can also be useful in hopper bank applications to dry material to specific moisture levels.

When the temperature setback is actuated, a timer is started allowing the material to dry for a specified time. Once this time has expired, the return temperature from the hopper is compared to the process temperature using a thermocouple located in the return port of the hopper. If the return temperature is within a specified delta from the process temperature, the process temperature is reduced by the programmed setback delta. This indicates that the material has been dried and further drying is not required.

The process temperature is restored to the set temperature when the return temperature reaches 100 degrees F indicating new material has been added and needs drying. The process temperature will remain at the set temperature until the return temperature again reaches the delta from the set point. The process temperature will then be setback by the setback delta.

DEFINITIONS:

Setback Delta

The Setback Delta setting is the amount below the set point that the process temperature will be reduced by. If the process temperature is set to 250 F and the setback delta is set at 30, the setback temperature will be 220 F. Our experience has shown the factory setting of 30 for the setback delta is ideal for most resins.

Caution: Do not enter a Setback Delta that will reduce the setback temperature below 140 degrees F, as the dryer will not maintain temperatures below 140F.

Setback Inhibit

The Setback Inhibit setting is the time in minutes to dry the material before the setback can be initiated. The setting has a range of 10 to 360 minutes and is factory set for 120 minutes. The inhibit time is started when the hopper is turned on, a new drying temperature is entered, or the setback option has been selected.

Setback display:

Selection of the setback option is shown on the main screen by an asterisk * prior to the hopper number.

Parenthesis around the set point temperature indicates the temperature has been setback. The setback temperature is then displayed.

SPARE PARTS LIST:

UDC mother board	85589
UDC display board	85588
UDC Keypad	85703
ADC mother board	85584
ADC display board	84930
ADC Keypad	85197
Solid-state relay	86371
24V power supply	85351
Heater 110 Volt	83196
Heater 220 Volt	83197
Thermocouple	84054
RH sensor	84936
Air valve	85967
Pressure switch	82813
Membrane	86131
Dew Point Sensor	85374

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" (PIN 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 0-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-Y:i") 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 %" 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