

**DRI-AIR**  
**OPERATING MANUAL**  
**CA COMPRESSED AIR DRYERS SINGLE PASS**  
**HOPPER MOUNT**  
**MICRO**  
**FLOOR MOUNT**

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## **COMPRESSED AIR 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 CAHM with a membrane dryer capable of lowering the pressure dew point 40 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 contaminants 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:

If the dryer has been running and stopped:

Dri-Air Indust.  
Ultra Dryer 1.6

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

<b>Dryer</b>	<b>* ON</b>
Process	180 F
Set point	180 F
Dewpoint	-45

Indicates 180 F process air

Dryer	* ON
<b>Process</b>	<b>180 F</b>
Set point	180 F
Dewpoint	-45

Indicates set point of 180 F  
and dryer is in setback

Dryer	* ON
Process	180 F
<b>Set point</b>	<b>(180) F</b>
Dewpoint	-45

Indicates dew point of -45 C

Dryer	* ON
Process	180 F
Set point	180 F
<b>Dewpoint</b>	<b>-45</b>

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

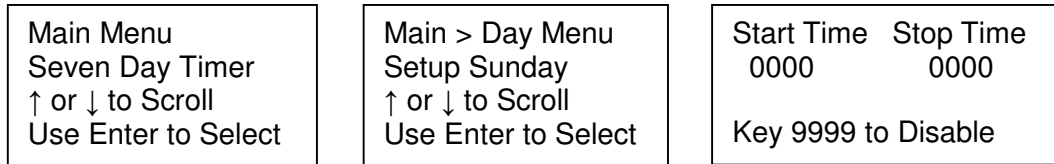
2. SETBACK SETUP----For those dryers with the setback option, this screen allows the operator to activate the setback option and to enter the setback delta from the process temperature for the setback temperature. Remember this setting is a delta rather than the actual setback temperature. For example, 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

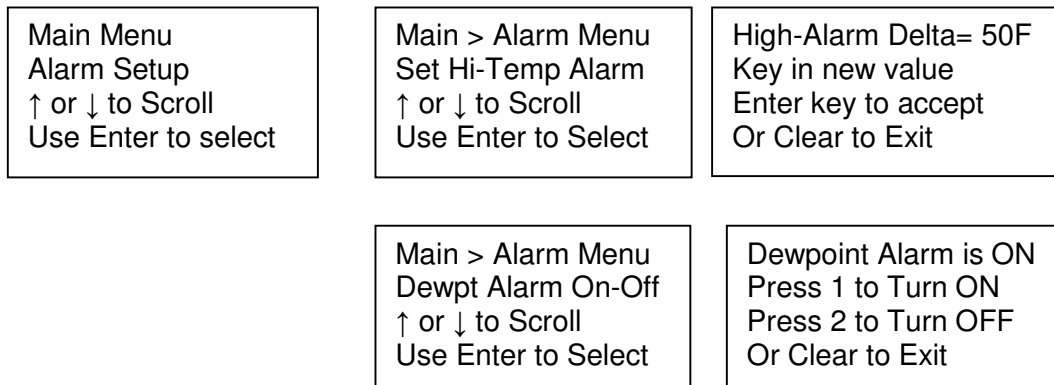
3. SEVEN-DAY TIMER---The dryer can be automatically started and stopped once per day using this feature. In this menu, the operator can select the day of the week and time of day to turn the dryer on and off. The days of the week are specified as Sunday, Monday, etc and the time is set in Military time. 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.



↓ 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.



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.

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

Main System Menu  
Degrees F or C  
↑ or ↓ to Scroll  
Use Enter to Select

Select F or C  
Press 1 for F  
Press 2 for C  
Or Clear to exit

Main System Menu  
Temp Calibration  
↑ or ↓ to Scroll  
Use Enter to Accept

Set Temp Cal =1  
↑ or ↓ to Change  
Enter key to accept  
Or CLEAR to Exit

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