Heated Blower Purge Desiccant Dryer

ABP Series
with Energy Management
The standard Energy Management System (EMS) control incorporates an integral air outlet dew point sensor to continually monitor the outlet moisture content and to display on the system color touch screen. The EMS control extends the drying time if the outlet dew point is below a preset adjustable set point saving a tremendous amount of energy, valve wear and tear (less switching) during low loading conditions. Energy saving is achieved since the overall regeneration time and dry air cooling time is reduced. The EMS control also provides an Outlet High Humidity Alarm.

Even more energy savings are realized with the early Heat Regeneration Termination Feature. This feature terminates the heat regeneration early if the temperature at the regeneration outlet reaches a specified temperature, then automatically switches to cooling mode. This feature eliminates the unnecessary heater and blower on-time saving energy.

Aircel has many other features built into the new ABP Series controls such as Backup Heatless Mode Operation, Heater Safety Backup Contactor, High Performance Butterfly Valves, Angle Body Piston Valves, Failure-to-Switch Alarm using pressure transducers and many other unique features.
ABP Series

How it Works

1. Pre-filtered wet compressed air enters the bottom of the on-line vessel.

2. Compressed air passes upward through the desiccant bed; moisture is removed, lowering the dew point to -40º F.

3. Dry compressed air exits the top of the vessel and flows downstream to the after-filter, monitored constantly via standard dew point sensor. This EMS feature extends the drying period until the target dew point occurs. This greatly reducing energy costs.

4. Prior to regeneration, saturated online vessel goes off-line and depressurizes to ambient through an angle seat valve and muffler.

5. After the off-line vessel has depressurized, a blower draws in ambient air for regeneration.

6. This air passes thru an immersion heater, check valve, and enters top of regenerating vessel.

7. As the hot ambient air passes downward through the desiccant bed, water molecules are released from the surface of the desiccant.

8. Hot regeneration air passes through a butterfly valve and exhausts to atmosphere. Heating phase may terminate early due to low load conditions; this energy savings is automatically passed onto the customer and allows for earlier cooling process to begin.

9. At the end of the heating phase of the cycle, the desiccant bed, although regenerated, remains hot. The temperature of the bed must be lowered to reduce dew point and temperature spikes in the process air when the bed goes back on-line. This is accomplished by allowing a slipstream of dry process air, controlled by an automatic valve, to flow from the on-line vessel into the off-line vessel. This slipstream is also used to repressurize the offline vessel after it has been cooled placing the unit into standby. The EMS control continues to save by extending the drying period through outlet dew point monitoring until the target dew point is reached.

10. Unique to the Aircel ABP is our parallel running period 10 minutes after vessel switchover. During this period, the incoming flow of wet compressed air is directed through both vessels. This step further reduces the dew point and temperature spikes associated with heated dryers. This parallel cooling mode requires no purge air.
ABP Series
Controls & Energy Management System

Maximum Savings with Accurate Dew Point Control

The Aircel Programmable Controller (APC) and Energy Management System (EMS) is standard on the new Aircel ABP Series. This energy-saving control reduces purge air and optimizes dryer performance by monitoring the dry air outlet dew point with a sensor. This control panel automatically adjusts the regeneration cycle maintaining dew point and extending the drying cycle. Switching is less frequent, reducing dryer maintenance and fully utilizing desiccant capacity. This addition will improve reliability and performance while sustaining a constant dew point. The end result is an overall purge reduction and significant energy savings.

Standard Control Features

- NEMA 4 Steel Enclosure
- UL/cUL-508a Control Assembly
- Allen Bradley MicroLogix 1100E PLC Controller
- 6” LCD Color Touch Screen
- Outlet Dew Point Reading (using EMS Sensor)
- On-Screen Display of Dryer Operation Status
- Service Mode of Operation
- 10/100 MB/s Ethernet with Built-in Peer-to-Peer Messaging
- Communication Through RS-232/RS-485 Combo Port
- UL/CUL, CE, C-Tick and Class1-Div2 Certified
- Data Logging - Time Based or Event Triggered
- Supports DHCP
- Up to 4 Add on 1762 I/O Modules

Standard Control Alarms

- Backup Heatless Mode Operation
- Failure-to-Switch (pressure control safety)
- High Dew Point
- Dew Point Sensor Failure
- Regeneration Thermocouple Failure
- Loss of System Pressure
- Blower Not Running
- Blower Motor Overload
- Early Heat/Cool Termination
- Heater Backup Safety Contactor
- Heater Outlet Low Temperature
- Heater Outlet High Temperature
- Heater Over Temperature
- Heater Sheath Thermocouple(s) Failure
- Vessel 1 Reppressurization Failure
- Vessel 2 Reppressurization Failure
- Vessel 1 Depressurization Failure
- Vessel 2 Depressurization Failure
- Pressure Sensor Vessel 1 Failure
- Pressure Sensor Vessel 2 Failure

Standard Control Readout

- Heater Sheath Temperature (°F)
- Regeneration Outlet Temperature (°F)
- Heater Outlet Temperature (°F)
- Vessel 1 Pressure
- Vessel 2 Pressure
- Outlet Dew Point
The Aircel ABP Series utilizes the Allen Bradley MicroLogix 1100E PLC Controller for automatic control and flexible programming. This addition sets a higher standard of configurations and capabilities that exceeds other blower purge dryers in the market. With built-in Ethernet connection, you can access, monitor and program from any available connection. An embedded web server is also included to configure controller data easily on a web page.

### Controls & Energy Management System

#### Exceptional Operational Controls & Components

The Aircel ABP Series utilizes the Allen Bradley MicroLogix 1100E PLC Controller for automatic control and flexible programming. This addition sets a higher standard of configurations and capabilities that exceeds other blower purge dryers in the market. With built-in Ethernet connection, you can access, monitor and program from any available connection. An embedded web server is also included to configure controller data easily on a web page.

#### Standard On-Screen Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Control Menu</td>
<td>Provides easy road map for on-screen navigation</td>
</tr>
<tr>
<td>Flow Diagram</td>
<td>Visual P&amp;ID with real time data: active objects, temp, pressure, and dew point readout</td>
</tr>
<tr>
<td>Interactive Service Menu</td>
<td>User step-by-step service screens</td>
</tr>
<tr>
<td>Operation Screens</td>
<td>Step-by-step real time process data</td>
</tr>
<tr>
<td>Alarm Banner</td>
<td>Provides immediate pop-up display</td>
</tr>
<tr>
<td>History Log</td>
<td>Captures triggered alarm with time/date stamp</td>
</tr>
<tr>
<td>Alarm Status Screen</td>
<td>Indicates all alarm states</td>
</tr>
<tr>
<td>Settings Screens</td>
<td>Provides user access to various control set points</td>
</tr>
<tr>
<td>Control Push Buttons</td>
<td>Touch system control, EMS Off/On</td>
</tr>
<tr>
<td>Dryer Status</td>
<td>Days of operation, hours of energy savings, system timers and mode of operation</td>
</tr>
</tbody>
</table>

#### Optional Controls (consult factory)

- Digital Flow Meter
- Valve Inlet Position Switches
- Valve Regeneration Outlet Position Switches
- Condensate Drain Alarm
- Inlet Temperature
- Vessel Bed Thermocouple Temperature (°F)
- Filter Differential Pressure Alarm
**ABP Series**

**Standard Features & Benefits**

- **Thermal Relief Valves**: ASME UV stamped set @ 150 psi
- **Desiccant Media & Fill Port**: For easy desiccant replacement of premium grade Activated Alumina (3/16”) with high moisture capacity
- **Thermal Relief Valves**: ASME UV stamped set @ 150 psi
- **ASME Carbon Steel Vessels**: 150 psi @ 450°F
- **Purge Exhaust Mufflers**: For low noise with built-in safety relief valve
- **Mounted Pre & After Filter**: Optional package with Zero Air-Loss Drain
- **Desiccant Drain Port**: For easy desiccant removal
- **High Performance Butterfly Valve**: Highly reliable with long-life consistent operation designed to reduce seal wear and leakage.
- **Angle-Body Purge Exhaust Valve**: Durable 10 year longevity
- **High Temperature Tubing**: UV resistant and easy component replacement
- **Regulated & Filtered Pilot Air**: Ensures reliable pneumatic control operation
- **Outlet Dew Point Sensor**: Standard digital readout, adjustable alarms and Energy Management System control
- **Desiccant Media & Fill Port**: For easy desiccant replacement of premium grade Activated Alumina (3/16”) with high moisture capacity
- **Mounted Pre & After Filter**: Optional package with Zero Air-Loss Drain
- **Tower Pressure Gauges**: Large easy-to-read 3.5” display
- **NEMA 4 Immersion Heater**: Incoloy sheath material that is highly corrosion and heat resistant with low watt density
- **High Performance Butterfly Valve**: Highly reliable with long-life consistent operation designed to reduce seal wear and leakage.
- **High Temperature Tubing**: UV resistant and easy component replacement
- **High Voltage Enclosure (Optional)**
- **Pressure Control**: Accurate stainless tower transducers that are reliable and rugged with safety alarms (see how it works)
- **Regulated & Filtered Pilot Air**: Ensures reliable pneumatic control operation
- **Outlet Dew Point Sensor**: Standard digital readout, adjustable alarms and Energy Management System control
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**Additional Standard Features**

- Remote start/stop control
- Purge air consumption reduced down to an average of 2%
- Fail-safe design: failure of power causes the purge exhaust valves to close, drying air flow is uninterrupted
- Stainless steel desiccant supports and air diffusers to prevent channeling
- Counter-current regeneration, upflow drying, and downflow depressurization
- Ambient air used for heat regeneration, no compressed air used
- 10 minutes of parallel flow with both desiccant chambers online at switch-over to reduce the temperature and moisture spikes

**Optional Equipment**

- Pre-piped & mounted Package “B” pre & after filter
- Low ambient temperature with heated pre-filter drain
- 3-valve dryer block and bypass package
- Special filtration and valving packages
- +100°F pressure dew point for critical applications
- Class I, Division II, Group C & D, Z-Purge Enclosure
- Vessel insulation to optimize efficiency of regeneration
- Aircel’s Zero Purge AZP Series air dryer

Consult factory for optional equipment information.
# ABP Series

## Model Comparison & Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity (scfm)</th>
<th>Connection (in.)</th>
<th>Heater kW</th>
<th>Blower HP</th>
<th>Full Load Amps</th>
<th>Dimensions (in.)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABP-800</td>
<td>800</td>
<td>3&quot; FLG</td>
<td>18</td>
<td>5</td>
<td>34</td>
<td>93 x 50 x 95</td>
<td>3,500</td>
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<tr>
<td>ABP-1000</td>
<td>1,000</td>
<td>3&quot; FLG</td>
<td>22</td>
<td>5</td>
<td>39</td>
<td>95 x 52 x 100</td>
<td>4,500</td>
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<tr>
<td>ABP-1200</td>
<td>1,200</td>
<td>3&quot; FLG</td>
<td>27</td>
<td>7.5</td>
<td>48</td>
<td>98 x 60 x 70</td>
<td>5,100</td>
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<tr>
<td>ABP-1400</td>
<td>1,400</td>
<td>3&quot; FLG</td>
<td>32.5</td>
<td>10</td>
<td>55</td>
<td>100 x 73 x 110</td>
<td>6,800</td>
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<tr>
<td>ABP-1600</td>
<td>1,600</td>
<td>4&quot; FLG</td>
<td>37</td>
<td>10</td>
<td>60</td>
<td>115 x 71 x 112</td>
<td>7,500</td>
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<tr>
<td>ABP-2000</td>
<td>2,000</td>
<td>4&quot; FLG</td>
<td>45</td>
<td>10</td>
<td>70</td>
<td>117 x 73 x 112</td>
<td>8,850</td>
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<tr>
<td>ABP-2500</td>
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<td>4&quot; FLG</td>
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<td>15</td>
<td>86</td>
<td>119 x 73 x 122</td>
<td>9,800</td>
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<tr>
<td>ABP-3000</td>
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<td>6&quot; FLG</td>
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<td>101</td>
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<td>12,800</td>
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<tr>
<td>ABP-3500</td>
<td>3,500</td>
<td>6&quot; FLG</td>
<td>78</td>
<td>15</td>
<td>119</td>
<td>161 x 82 x 132</td>
<td>13,500</td>
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<tr>
<td>ABP-4000</td>
<td>4,000</td>
<td>6&quot; FLG</td>
<td>90</td>
<td>15</td>
<td>140</td>
<td>163 x 86 x 135</td>
<td>15,600</td>
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<tr>
<td>ABP-5000</td>
<td>5,000</td>
<td>6&quot; FLG</td>
<td>110</td>
<td>20</td>
<td>165</td>
<td>174 x 93 x 147</td>
<td>17,900</td>
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<tr>
<td>ABP-6000</td>
<td>6,000</td>
<td>8&quot; FLG</td>
<td>120</td>
<td>20</td>
<td>178</td>
<td>174 x 93 x 147</td>
<td>22,377</td>
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<tr>
<td>ABP-7000</td>
<td>7,000</td>
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<td>140</td>
<td>20</td>
<td>203</td>
<td>C/F x C/F x C/F</td>
<td>24,652</td>
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<tr>
<td>ABP-8000</td>
<td>8,000</td>
<td>8&quot; FLG</td>
<td>160</td>
<td>25</td>
<td>235</td>
<td>C/F x C/F x C/F</td>
<td>31,327</td>
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<tr>
<td>ABP-10000</td>
<td>10,000</td>
<td>8&quot; FLG</td>
<td>200</td>
<td>30</td>
<td>291</td>
<td>C/F x C/F x C/F</td>
<td>44,755</td>
</tr>
</tbody>
</table>

Note: *Capacity rated in accordance with CAGI ADF 200 @ 100 psig, 100°F Inlet, 100°F Ambient and a PDP of -40°F.

Operating Pressure: 60-135 psig.
Ambient Air Temperature: 38°-120°F.
Inlet Air Temperature: 40°F-120°F.
Standard Voltage: 460V/3Ph/60Hz

For larger capacities and custom dryer options, please contact an Aircel factory representative.

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## Recommended Installation

The Compressed Air and Gas Institute (CAGI) has developed standards to protect users of compressed air & gas equipment. ADF200 the current standard for desiccant compressed air dryers, specifies the dryers performance to be rated at 100°F inlet temperature, 100°F ambient temperature, and 100 psig system pressure. To adjust the dryer capacity from these "CAGI conditions" to your specific application, please use the correction factors below for differing system pressures (C1) and inlet air temperatures (C2).

### Capacity Correction Factors

#### To Size the Dryer Capacity for Actual Conditions

\[
\text{Adjusted Capacity} = \text{scfm} \times C1 \times C2
\]

To calculate the capacity of a given dryer based on non-standard operating conditions, multiply the standard capacity by the appropriate correction factor(s).

**Example:**
- Dryer Model: ABP-1200
- Standard Capacity: 1200 scfm
- Actual Operating Conditions: 80°F ambient temperature: C1 = 1.15
- 90 psig system pressure: C2 = 0.91
- Adjusted Capacity = 1200 scfm x 1.15 x 0.91 = 1256 scfm

#### To Select the Dryer Model for Actual Conditions

\[
\text{Adjusted Capacity} = \frac{\text{scfm}}{C1 \times C2}
\]

To choose a dryer based on a given flow at non-standard operating conditions, divide the given flow by the appropriate correction factor(s).

**Example:**
- Given Flow: 1200 scfm
- Actual Operating Conditions: 80°F ambient temperature: C1 = 1.15
- 130 psig system pressure: C2 = 1.27
- Adjusted Capacity = 1200 scfm x 1.15 / 1.27 = 922 scfm

#### Capacity correction factors for inlet air temperature (C1)

<table>
<thead>
<tr>
<th>Ambient Temperature (°F)</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
<th>105</th>
<th>110</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correction Factor</td>
<td>1.2</td>
<td>1.15</td>
<td>1.10</td>
<td>1</td>
<td>0.9</td>
<td>0.8</td>
<td>0.6</td>
</tr>
</tbody>
</table>

#### Capacity correction factors for system air pressure (C2)

<table>
<thead>
<tr>
<th>System Pressure (psig)</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
<th>110</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correction Factor</td>
<td>0.65</td>
<td>0.73</td>
<td>0.82</td>
<td>0.91</td>
<td>1</td>
<td>1.09</td>
<td>1.18</td>
</tr>
</tbody>
</table>

Due to a continuous program of product improvement, specification and dimensions are subject to change without notice.