

SELECT SERIES

DHA/CDA HEAT-LES® DESICCANT COMPRESSED AIR & GAS PURIFICATION SYSTEMS



Value and
Performance
Through
Advanced
Technology



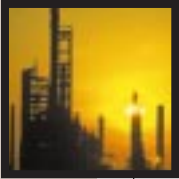
PNEUMATIC PRODUCTS

ABOUT PNEUMATIC PRODUCTS



PPC's Heritage

Since 1946, PPC has been recognized as the world's largest manufacturer of compressed air purification equipment. PPC leads the industry in technology, system hardware and support services. PPC has more patents granted and pending than any other manufacturer.



Our heritage has been built with a solid foundation of successfully solving the contamination problems of the most demanding industries: aerospace, food, beverage, chemical, biochemical, electronics, primary metals, power generation, petro-chemical and pulp & paper.



PPC's Pre-Engineered Components

PPC's unique approach to integrated system components allows you to design a system that specifically meets your needs. Highly engineered components provide the lowest life-cycle costs.

PPC's Proven Quality/Reliability

PPC serves more than 5,000 customers with an average of four PPC desiccant dryer systems per facility.

PPC solves over 33% of the world's contamination problems, while other manufacturers average below 5%. Facts that support our reputation.

No Problem is Too Big or Too Small

PPC manufactures standard pre-engineered systems for flows of 2 scfm up to 14,000 scfm. Larger systems and custom designs are available upon request.

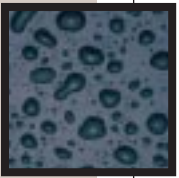


Pre-Engineered Components

Proven Quality/Reliability

No Problem Too Big Or Too Small

THE NEED FOR COMPRESSED AIR PURIFICATION SYSTEMS



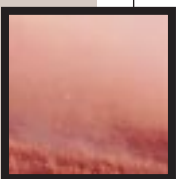
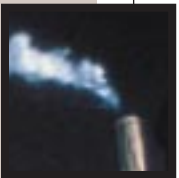
What are Contaminants?

Liquids—Water and oil introduced by the atmosphere and compressor.

Vapor—Water and hydrocarbons introduced by the atmosphere and compressor.

Gases—Atmospheric sulfur dioxide, hydrogen chloride, hydrogen sulfide and others.

Solid Particulates—Dust, soot, fly ash and sand, as well as corrosive by-products within the system.



Why are Contaminants a Problem?

Erosion—Erosion is a major cause of destruction and failure of components in a compressed air system. Erosion is caused by liquid aerosols and dirt traveling at high velocities and impinging on system and component surfaces.

Corrosion—Corrosion is caused by oxidation and chemical attack in the presence of liquids or vapor phase contaminants. It also is a leading cause of system or component destruction. Further air system corrosion can be stopped with dew points <-30°F pdp.

Freeze-Ups—Compressed air lines are often exposed to freezing temperatures. Condensation of vapors and eventual freezing cause loss of system air pressure and possible blockage of flow.

Product Spoilage—Processes such as chemical mixing, spraying, drying, painting, pneumatic transporting, and padding are affected by direct contact with contaminated air.

Biological Effects—Wet air promotes biological growth. Various forms of bacteria decompose and form acids which contribute to corrosion. Biological growth can be stopped with dew points <-10°F pdp.

THE PPC DRYER SYSTEM

Poppet Switching Valves

Used in over 7,000 PPC installations, independent inlet and exhaust valves eliminate flow interruptions during switching. Rugged construction guarantees long life and reliability. The valves open and close without any friction or wear between the poppet and valve seat. Full-ported design minimizes pressure drop and contributes to energy savings. In the event of a power failure, inlet valves open and exhaust valves close bringing both chambers on-line. This provides an extended period of drying until power can be restored. Two designs available:

- Aluminum components tested bubble-tight to 500,000 cycles
- Stainless steel internal components tested bubble-tight to 1,000,000 cycles

AMLOC® Energy Saving Control System

The AMLOC® control system saves energy by matching purge air used to dryer moisture load. The system uses “in-bed” capacitance sensing. The sensor carries a lifetime warranty and never needs calibration. Three controller options:

- Fixed-cycle electronic timer
- Modular Electronic Control (MEC) with AMLOC® energy management
- Advanced Diagnostic Control (ADC) with AMLOC® energy management

Purge Exhaust Mufflers

PPC offers two types of purge exhaust mufflers to enable the dryer to operate and meet most noise standards. The unique muffler design resists clogging by desiccant dust. For stricter requirements on noise, a “hush” muffler is also available.

Downflow Drying

Desiccant fluidization and attrition, characteristic of upflow drying, are eliminated. The benefits are longer desiccant and afterfilter cartridge life with resultant cost savings to the user. Desiccant life extended up to 3 times over other designs.

Rugged ASME Coded Pressure Vessels

Long dryer life is ensured through the use of a 1/16" corrosion allowance on pressure vessels. To resist harmful corrosion, PPC uses sealed welds plus a corrosion resistant primer and a two-part epoxy paint coating on all exposed parts.

Optional Panel Mounted Gauges

The panel on the dryer includes inlet, outlet, and chamber pressure gauges, and an Aquadex® moisture indicator. The benefit is rapid troubleshooting of the dryer.

Pilot Air Filtered

A PPC filter protects air actuated switching valves from erosion and clogging. The filter cartridge is rated at 0.9 micron absolute removal, for maximum protection. The benefit is exceptional valve operation. See page 8 for information about PPC's prefilter and afterfilter components.

Inlet Diffusers and Desiccant Supports

PPC uses “slotted” stainless steel diffusers and desiccant supports. The benefits are longer life through resistance to corrosion and energy savings through reduced pressure drop.



PPC DHA-PM (-40°F pdp) or CDA-PM (-100°F pdp) Dryer

DHA/CDA SELECT SERIES DRYER CONFIGURATIONS

At the heart of the Pneumatic Products compressed air & gas purification system is the DHA/CDA Select Series heatless desiccant dryer. Select Series dryers have been pre-engineered in five basic configurations to yield the highest degree of flexibility between application requirements, cost and delivery. Standard models are available to supply either -40°F pdp (DHA) or -100°F pdp (CDA) air purification levels. Additional modifications to the standard EM, EM1, PM, PME/P and PMX models are available to further match our dryer to your specific requirement. Even more demanding applications can be handled through our Engineering Support Services group where you will benefit from access to some of the best engineers in the compressed air & gas purification industry.

DHA/CDA Select Series Configurations

EM Model – The DHA/CDA-EM dryer has been designed for those applications that will benefit from a high-quality unit, but do not have the same demands requiring more expensive features. The EM model has been configured to keep costs down and delivery times short. DHA/CDA-EM heatless desiccant dryers have the following features:

- Poppet-style control valves with aluminum internal parts designed specifically for desiccant dryer service and tested to 500,000 cycles, bubble-tight.
- Welded manifold construction to eliminate leaks. ASME coded vessels—full penetration welds (with backing rings), 1/16" corrosion allowance and two-part epoxy finish.
- Solid-state fixed-cycle controller.
- Pre-mounted prefilter and afterfilter (other mounting options available: duplex, block and bypass valves).
- Heavy-duty low-noise exhaust muffler.

EM1 Model – The DHA/CDA-EM1 dryer starts with same high-quality EM frame, but is upgraded with the following features for more demanding applications:

- Poppet-style control valves with *stainless steel* internal parts designed specifically for desiccant dryer service and tested to 1,000,000 cycles, bubble-tight.

- Modular Electronic Controller (MEC) with AMLOC® energy management.
- Aquadex® moisture indicator.

PM Model – The DHA/CDA-PM dryer is further upgraded with our Advanced Diagnostic Controller (ADC) with AMLOC® energy management and panel mounted Aquadex® and inlet/outlet gauges. Additional modifications made available to this model:

- ADC with AMLOC® energy management standard to PM model.
- Stainless steel or copper instrument air tubing (SS instrument packages also available).

PME/P Model - The same features as the PM Model with the addition of Stainless Steel Filter Housings. Includes the ADC Controller with AMLOC® energy management and panel mounted Aquadex® and inlet/outlet gauges.

PMX Model – The DHA/CDA-PMX dryer is our top-of-the-line configuration designed for the most demanding applications. It features the following standard components:

- Poppet-style control valves with stainless steel internal parts designed specifically for desiccant dryer service and tested to 1,000,000 cycles, bubble-tight.
- Flanged manifold construction with removable stainless steel inlet and outlet diffuser screens.
- ASME coded vessels—full penetration welds (no backing ring), 1/8" corrosion allowance, two-part epoxy finish with sand-blast preparation.
- Modular Electronic Controller (MEC) with AMLOC® energy management (upgradeable to ADC or pneumatic controls).
- Stainless steel air tubing and instrument package.
- Pre-mounted PPC prefilter and afterfilter with stainless steel housings.
- Heavy-duty low-noise muffler.
- SS Aquadex® moisture indicator.

See page 9 for a complete side-by-side model comparison with available modifications.

HOW IT WORKS

Incoming air or gas is first passed through the system prefilter to remove liquid water and oil contaminants. The DHA Select Series dryer then removes vaporous contaminants. The dryer's cycle control system alternately cycles the compressed gas flow through the unit's twin desiccant chambers. As the vapor-laden gas stream enters and flows downward through a desiccant chamber, the contaminant vapors are attracted to and adsorbed on the surface of the activated desiccant.

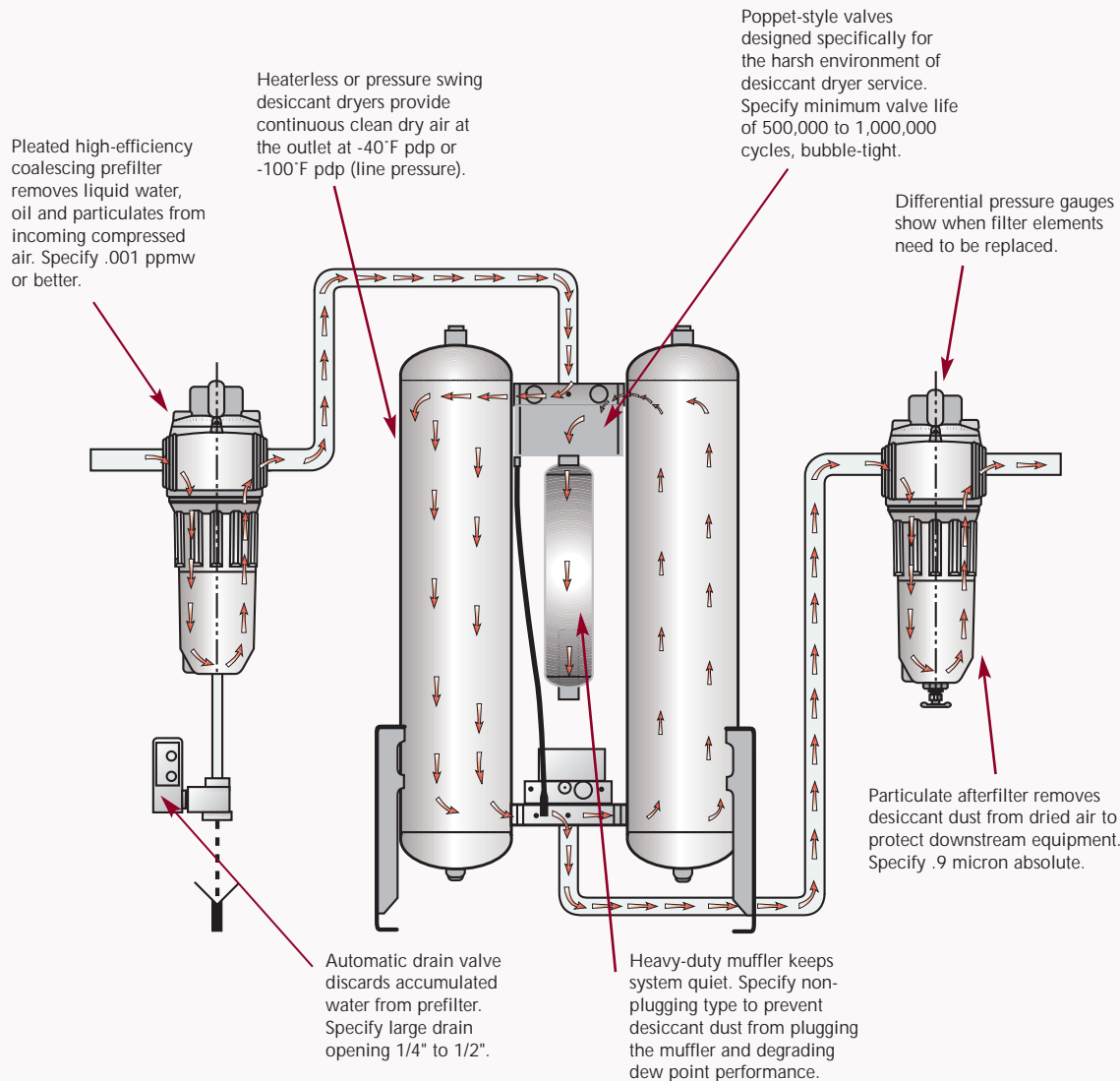
Adsorption is an exothermic (heat releasing) process, the heat of which later contributes to regeneration. Dry gas exits the dryer through an afterfilter for particulate removal. The clean and dry gas then proceeds downstream into the compressed air system.

While one desiccant chamber is in the drying cycle, the offstream chamber depressurizes and proceeds through a fixed time, atmospheric

pressure, regeneration cycle using a portion of the -40°F dew point outlet air. This outlet air is expanded through an orifice, further reducing the dew point to -70°F . This extremely dry purge gas, in conjunction with the heat of adsorption, regenerates the bed. Upon completion of the regeneration cycle, the desiccant chamber will repressurize and once again be placed on-stream for another drying cycle.

If the PPC AMLOC[®] probe (on EM1, PM, PME/P and PMX models) senses a low desiccant moisture level, the off-line chamber is not depressurized and purging is delayed until the desiccant bed requires regeneration. Therefore, purge air is only used when required.

The dryer's fail-safe design provides continued gas flow through both desiccant chambers if the control system's power supply is ever lost or interrupted.



DHA/CDA SELECT SERIES POPPET-STYLE CONTROL VALVES

The harsh operating environment of heatless desiccant compressed air dryers creates very high demands on control valves. Frequent cycling, along with the presence of water vapor at the inlet and desiccant dust at the outlet, requires valves which utilize the highest quality materials and design characteristics to minimize the wear and tear resulting from these conditions. Pneumatic Products has used poppet-style valves for over 40 years and in over 40,000 applications. The poppet-style control valves are full-ported, non-lubricated and pilot air actuated—the characteristics required for the highest reliability and durability.

DHA/CDA-EM Select Series Dryers

The EM model dryer utilizes a combined inlet/exhaust poppet-style valve with many of the characteristics of our highly regarded stainless steel valves, but redesigned with cost reducing features. The EM model valve is constructed with a hard-anodized aluminum body with aluminum internal parts. It has been tested to 500,000 cycles, bubble-tight. This valve has the same features as our stainless steel valves.



DHA/CDA-EM1, PM, PME/P, and PMX Select Series Dryers

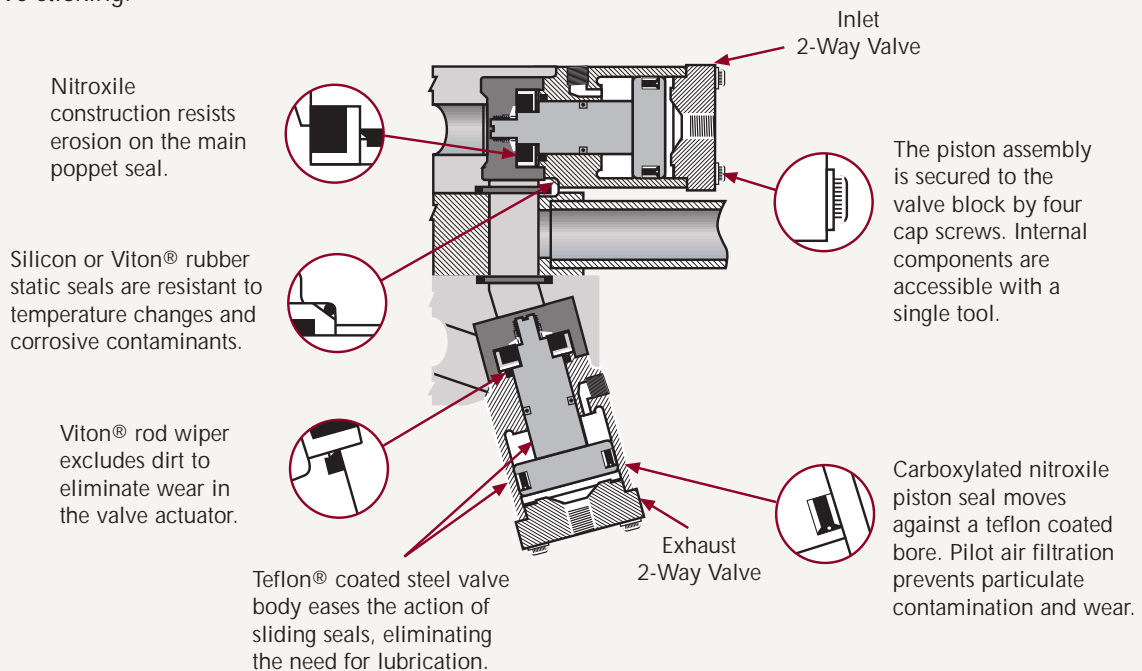
EM1, PM, PME/P & PMX model dryers are equipped with Pneumatic Products' highly regarded and time-tested stainless steel poppet-style control valves. These valves feature Teflon® coated carbon steel bodies and stainless steel internal components. The valve's bubble-tight elastomer seals have been tested to 1,000,000 cycles without failure.

Design Features

- Designed specifically for desiccant dryer service.
- Full-ported to resist clogging, scoring and friction wear for long life and low maintenance.
- Low differential pressure drop to reduce energy consumption and operating costs. Allows for more pressure downstream.
- Pilot air operated for high reliability and fail-safe operation.
- Self-cleaning via a rod scraper to reduce scoring and accelerated wear from contaminants.
- Easy maintenance—no special tools required.

DHA Switching Valve Features

Stainless steel poppet shaft and piston resist corrosion. Provides solid support for dynamic seals and freedom from valve sticking.



DHA/CDA SELECT SERIES CONTROLS

DHA/CDA-EM Select Series Dryers

With ease of operation and cost containment in mind, the DHA/CDA-EM Select Series dryer has been designed to utilize a solid-state fixed-cycle electronic timer for cycle control. This type of control is ideal and economical for small flow systems or applications in which the dryer is operating at or near capacity and around-the-clock. In such cases, more sophisticated controls with energy management systems are simply not required.

DHA/CDA-EM1 and -PMX Select Series Dryers

With an emphasis on minimizing energy consumption, DHA/CDA-EM1 and PMX Select Series dryers have been designed to utilize Pneumatic Products' proprietary Modular Electronic Controller (MEC) with AMLOC® energy management. Experience has shown that dryers seldom operate at maximum design moisture load conditions. In fact, operating at 20 to 30 percent of design load is quite common. In such cases, the AMLOC® energy management system will save you money by reducing the number of regeneration cycles that the dryer would otherwise go through. This cuts the amount of purge air consumed by the dryer, reducing energy consumption by the air compressor.

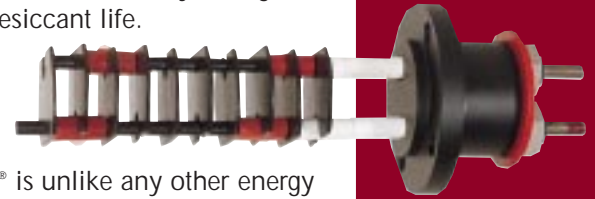
DHA/CDA-PM, PME/P, or PMX Select Series Dryers

Our top-of-the line Advanced Diagnostic Control (ADC) with AMLOC® energy management is available standard on our DHA/CDA-PM and PME/P Select Series dryer and is optional on our DHA/CDA-PMX Select Series Dryers.

The benefits of PPC's AMLOC® energy management system Supplied standard on EM1, PM, PME/P & PMX Select Series dryers. Saves up to 75% on energy costs.

AMLOC® (Automatic Moisture Load Control) offers maximum energy savings by minimizing energy consumed for regeneration. It also provides superior dryer diagnostics and alarm capabilities.

Not only does AMLOC® reduce energy consumption, but by limiting the number of regeneration cycles when the dryer is not operating at capacity, it reduces desiccant attrition, thus yielding longer desiccant life.



AMLOC® is unlike any other energy management system on the market today. Only AMLOC® senses the actual condition of the desiccant bed. This unique feature utilizes a virtually indestructible and very accurate capacitance probe imbedded in the desiccant. The probe senses the actual moisture content of the desiccant bed.

Direct sensing of moisture content by the probe assures accurate readings. Microcomputer-based controls further assure system reliability and fail-safe operation. AMLOC® can be monitored with a comprehensive, easy-to-read, liquid crystal display supplied standard on all ADC/AMLOC® systems.

Made of Teflon® coated stainless steel, the AMLOC® probe is immune to corrosion and contamination and requires no calibration. The design has been proven in over 25,000 installations and is backed-up by a lifetime warranty.



Pneumatic Products' Advanced Diagnostic Control (ADC)-Standard on PM and and PME/P Select Series dryers, optional on PMX Select Series dryers:

The ADC's synoptic display and information center work together to provide automatic dryer operation, monitor all dryer functions and diagnose system faults. The system, including AMLOC® energy management, can be reprogrammed in the field to match unusual operating conditions.

Dryer operating history is stored in the system's memory (up to 20 alarms) and can readily provide operators and service technicians with this information to maximize dryer uptime. ADC systems can also be programmed to alert operators to the need for regular preventive maintenance such as filter element changeout, valve rebuild schedules and desiccant replacement cycles.

ADC is equipped with a standard serial communication port to allow remote monitoring of system operation.

DHA/CDA SELECT SERIES P-2000 & STAINLESS STEEL FILTERS

DHA/CDA-EM, EM1 and PM Select Series Dryers

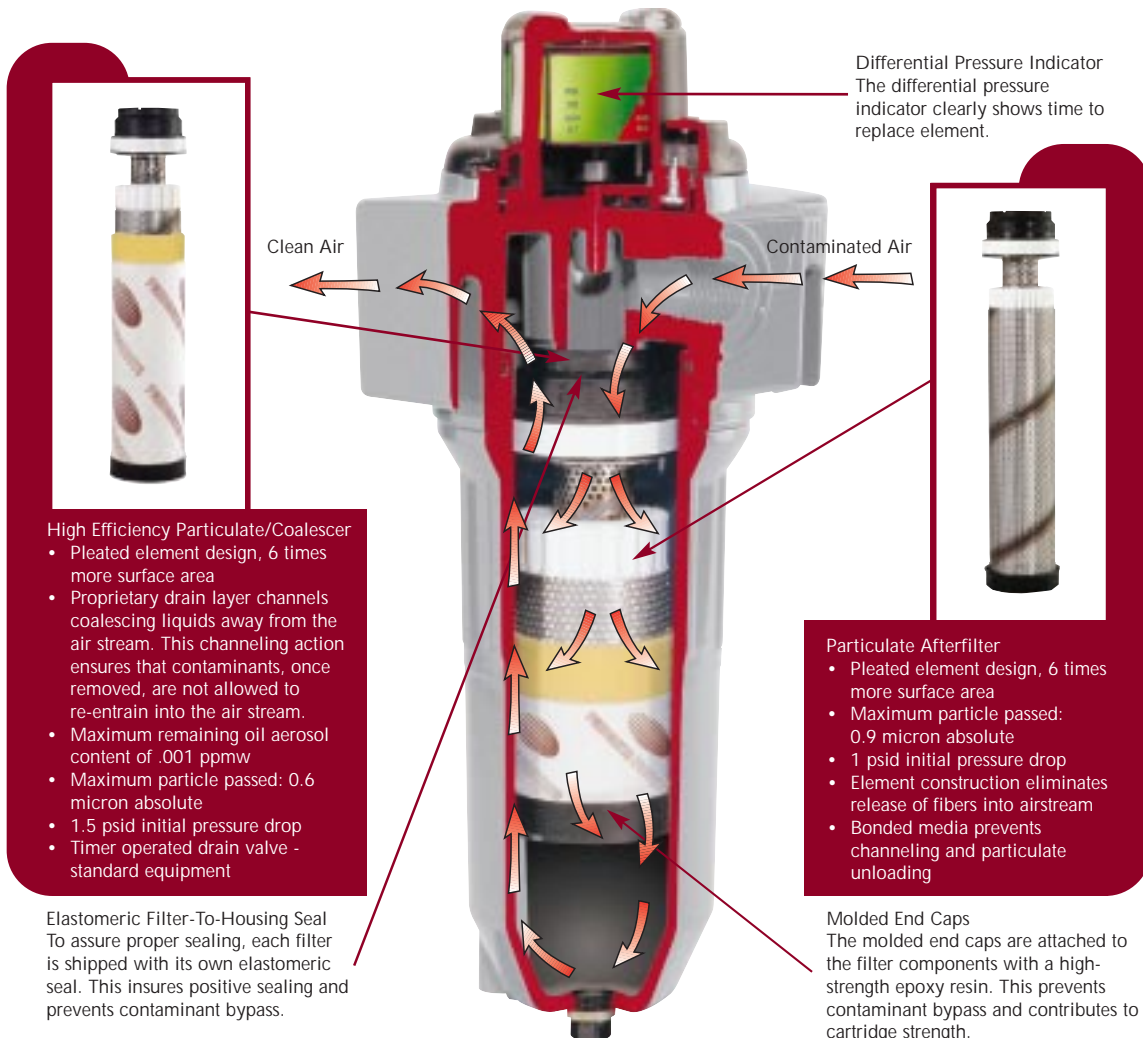
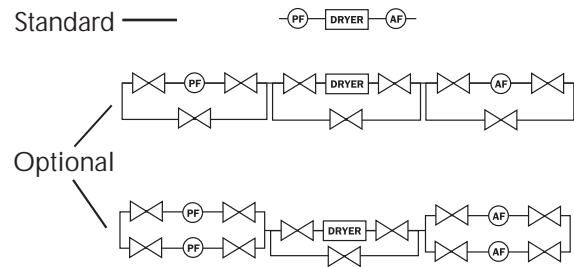
Every DHA/CDA-EM, EM1 and PM Select Series dryer is equipped with pre-mounted Pneumatic Products P-2000 Series prefilters and afterfilters. New state-of-the-art technologies in filtration medias, engineering design and manufacturing practices are incorporated in P-2000 compressed air filters. P-2000 Series filters offer the following features and benefits:

- Posi-Lock element snap-on feature which eliminates tie rods and makes element replacement quick and easy.
- Pleated media for high surface area and long element life.
- Powder coating inside and out; resistant to corrosion, chipping or scratching.
- Pre-installed differential pressure gauges for notification of need to replace element.
- Inner and outer element support cores for strength and long life.

DHA/CDA-PME/P & PMX Select Series Dryers

Corrosion Resistant DHA/CDA-PMX and PME/P Select Series dryers will be equipped with Pneumatic Products High Performance Filter Systems. These filter housings are constructed of stainless steel and utilize an "L" inlet/outlet configuration for lower pressure drop.

FILTER MOUNTING



TECHNICAL DATA

DHA/CDA Select Series Configuration Overview

Feature	EM Configuration	EM1 Configuration	PM Configuration	PME/P Configuration	PMX Configuration
Vessels	Welded manifold; w/ 1/16" C.A.	Welded manifold; 1/16" C.A.	Welded manifold; 1/16" C.A.	Welded manifold; 1/16" C.A.	Flanged/welded manifold; 1/8" C.A.
Finish	Two-part epoxy	Two-part epoxy	Two-part epoxy	Two-part epoxy	Two-part epoxy
Valves	Aluminum inlet/exhaust	SS Internals inlet and exhaust	SS Internals inlet and exhaust	SS Internals inlet and exhaust	SS Internals inlet and exhaust
Controls	Electronic fixed-cycle controller	MEC w/ AMLOC®	ADC w/ AMLOC®	ADC w/ AMLOC®	MEC w/ AMLOC®*
Alarms	None	Switching failure: high humidity	Switching failure: high humidity	Switching failure: high humidity	Switching failure: high humidity
Inst. Air Tubing	Nylon	Nylon	Nylon*	Nylon*	Stainless steel
Pressure Gauges	Locally mounted tower and purge	Locally mounted tower and purge	Panel mounted gauges	Panel mounted gauges	SS Panel mounted gauges*
Filters	F-01, aluminum housings w/Δ P gauges*	F-01, aluminum housings w/Δ P gauges*	F-01, aluminum housings w/Δ P gauges*	F-01, stainless steel housings	F-01, SS housings*
Drain Valve	Timer operated drain valve	Timer operated drain valve	PDV-100/400 drain valve	PDV-100/400 drain valve	PDV-100/400 drain valve
Muffler	Heavy duty/non-plugging/low noise*	Heavy duty/non-plugging/low noise*	Heavy duty/non-plugging/low noise*	Heavy duty/non-plugging/low noise*	Heavy duty/non-plugging/low noise*
Moisture Indicator	None	Aquadex®	Aquadex®	Aquadex®	Aquadex®

MODIFICATIONS** (Available as indicated above)

Feature	Modifications
Controls	ADC or Pneumatic controls
Inst. Air Tubing	Stainless steel or copper
Pressure Gauges	Δ P gauges (aluminum or SS)
Filters	F-11 or F-21 filter mounting
Muffler	Hush muffler

**Add two weeks to lead times when modifications are selected.

Connections sizes on the following Models may be different for F11 & F21 Filter Packages
Contact factory for F11, F21, and PMX dimensions.

DHA-EM, EM1, PM, & PME/P Models (-40 F pdp)

Model #/ Capacity scfm*	Dimensions inches (cm)			EM, EM1, PM Connection Size Inlet/Outlet	PME/P Connection Size Inlet/Outlet	Operating Weight lbs. (kg)
	H	W	D			
60/60	55 (140)	34 (86)	27 (69)	1" NPT	1" NPT	344
110/110	74 (185)	34 (86)	27 (69)	1" NPT	1" NPT	386
130/130	59 (147)	34 (81)	29 (74)	1" NPT	1" NPT	489
185/185	73 (185)	38 (91)	29 (74)	1-1/2" NPT	1" NPT	595 (270)
240/240	88 (224)	41 (102)	29 (76)	1-1/2" NPT	1" NPT	654
270/270	86 (216)	41 (102)	30 (76)	1-1/2" NPT	1" NPT	685 (311)
360/360	86 (218)	42 (102)	29 (76)	2" NPT	1" NPT	1063
505/505	88 (224)	48 (122)	32 (81)	2-1/2" NPT	1-1/2" NPT	1250 (567)
630/630	89 (224)	49 (130)	32 (81)	2-1/2" NPT	1-1/2" NPT	1440 (653)
760/760	90 (226)	55 (140)	32 (81)	2-1/2" NPT	1-1/2" NPT	1873
900**/900	94 (239)	55 (140)	33 (84)	3" FLG	2" NPT	2022
1200**/1200	114 (290)	55 (140)	33 (84)	3" FLG	2" NPT	2500
1600**/1600	106 (269)	58 (147)	33 (84)	3" FLG	3" FLG	4700

CDA-EM, EM1, PM, PME/P

Model #/ Capacity scfm*	Dimensions inches (cm)			EM, EM1, PM Connection Size Inlet/Outlet	PME/P Connection Size Inlet/Outlet	Operating Weight lbs. (kg)
	H	W	D			
30/31	55 (140)	32 (86)	27 (69)	1/2" NPT	1" NPT	344
60/57	74 (185)	32 (86)	27 (69)	3/4" NPT	1" NPT	386
70/68	59 (147)	34 (81)	29 (74)	1" NPT	1" NPT	489
100/96	73 (185)	34 (91)	29 (74)	1" NPT	1" NPT	595 (270)
125/125	88 (224)	40 (102)	29 (76)	1" NPT	1" NPT	654 (290)
140/140	86 (216)	39 (102)	29 (76)	1" NPT	1" NPT	685 (311)
190/187	86 (218)	41 (102)	30 (76)	1-1/2" NPT	1" NPT	1063 (476)
265/263	88 (224)	48 (122)	33 (81)	1-1/2" NPT	1" NPT	1250 (567)
330/328	89 (224)	51 (130)	33 (81)	2" NPT	1" NPT	1440 (653)
400/395	90 (226)	55 (140)	33 (81)	2" NPT	1" NPT	1873 (748)
500**/500	115 (292)	53 (135)	33 (84)	2-1/2" NPT	1-1/2" NPT	1780 (807)
600**/600	102 (259)	55 (140)	33 (84)	2-1/2" NPT	1-1/2" NPT	2050 (930)
750**/750	113 (287)	55 (140)	33 (84)	2-1/2" NPT	1-1/2" NPT	2375 (1077)
900**/900	127 (323)	55 (140)	33 (84)	3" FLG	2" NPT	2500
1200**/1200	119 (302)	58 (147)	33 (84)	3" FLG	2" NPT	2980

*Capacity at standard inlet conditions of 100 psig, 100°F, 100% RH.

**Not available in EM configuration.