

LARGE CAPACITY, REFRIGERATED COMPRESSED AIR DRYERS
WITH TRUE-CYCLING™ OPERATION AND REDUNDANT OPERATING SYSTEMS

MultiPlex™

3,200 – 19,200 scfm


CFX®
STAINLESS STEEL
HEAT EXCHANGERS



Compressed air contains moisture, oil, and other contaminants that must be removed to avoid damage to pneumatic valves, tools, and instruments, as well as spoilage in manufacturing and finishing processes. MultiPlex™ dryers remove these contaminants in large volume compressed air applications while consuming only the electricity necessary to meet the actual air treatment demand.

Multiple, Independent, Air Treatment Modules Within A Single Large Capacity True-Cycling™ Dryer Provides Many Benefits...

True-Cycling™ – The ZEKs Advantage

True-Cycling is not just a catchy phrase, it is the way the MultiPlex™ dryers operate. ZEKs has taken the customer's requirements for tight dew point control, rugged reliability, and low operating cost, and designed the world's most advanced cycling refrigerated air dryers. The ZEKs True-Cycling™ dryer is THE STANDARD by which all dryers are measured.

Common manufacturing practices, process machinery cycling, and changing production requirements result in variable compressed air volume use. This, combined with lower ambient and inlet air temperatures, results in a reduced load on the dryer. ZEKs pioneered the design of a dryer that includes a refrigeration system in conjunction with a thermal mass that efficiently stores cold energy. This allows the refrigeration compressor to cycle OFF during periods of reduced load while the dryer continues to remove moisture and contaminants from the air stream. The refrigeration system in a non-cycling dryer operates continuously which greatly increases its operating cost compared to a True-Cycling™ dryer.

Reliable Operation

Multiple refrigeration systems and a shared thermal mass produce stored cold energy that is used to cool compressed air as it passes through a MultiPlex™ dryer. Cooling causes moisture and contaminants to condense so they can be removed from the air stream in high efficiency separators and then be automatically discharged through pneumatically operated demand drains that waste no compressed air. Compressed air is warmed as it leaves the dryer to eliminate pipe sweating and to maintain air system efficiency. The dryer refrigeration systems automatically cycle ON and OFF to maintain cold energy as required while active circulation of the cold storage media further optimizes air drying efficiency.

Since ZEKs invented True-Cycling™ dryers in 1959, there have been many attempts to duplicate its superior performance. Other companies have utilized sand, refrigerant, aluminum, etc. for the storage media. Since the specific heat of these mediums is much less than the ZEKs propylene glycol/water mixture, they require as much as five times the weight of the media to approach the performance of the ZEKs design. If the thermal storage of the media is limited, the result will be varying dew points and/or excessive refrigeration compressor cycling. True-Cycling™ has been proven for over forty years. Due to the fact the refrigeration compressor operation is dramatically reduced, there is less wear and tear on the system.



Energy Savings Up To 80%

True-Cycling™ operation enables MultiPlex™ air dryers to provide significant energy savings when compared to non-cycling dryers. Air treatment cost is not wasted through continuous operation of the dryer refrigeration system as it is with non-cycling dryers. Changes in compressed air consumption resulting from variable shift and process demands as well as daily and seasonal fluctuations in ambient temperature provides tremendous energy saving opportunities. In many applications installation of a MultiPlex™ dryer can save as much as 80% of the operating cost of a non-cycling dryer.

Redundancy – Eliminate The Need For Multiple Air Dryers

Multiple air treatment modules with cycling refrigeration systems make up each MultiPlex™ large capacity dryer. Modules are integrated to make a single dryer with air treatment capacities from 3,200 – 19,200 scfm. Modules share a single INLET header and a single OUTLET header, each with dual connection capability, for installation versatility.

Coordinated dryer operation is digitally controlled and can be adjusted to suit application requirements. Individual module operation can also be adjusted to optimize the benefits provided by cycling operation. Because MultiPlex™ dryers include integrated drying modules with individual electrical disconnects, the dryer can remain operational and continue to provide compressed air treatment even if a module must be isolated for service or repair.

Each module includes our patented CFX® stainless steel heat exchangers and a 99.5% efficient vortex separator. Each has an independent refrigeration system that includes a fully hermetic compressor, as well as a digital controller, and an automatic drain that wastes no compressed air when discharging moisture. Models are available with air-cooled refrigeration condensers or with water-cooled condensers.

Consistent Pressure Dew Point

The Sentinel™ circulation system, exclusive to ZEKS, enables the dryers to maintain a consistent pressure dew point throughout the full range of air flow. Our thermal storage module is shared by the integrated air treatment modules, making it possible for MultiPlex™ dryers to continue to provide clean dry air even if a module is isolated for maintenance, or in the unlikely event of component failure. The active system continuously circulates the cold media through each air treatment module to evenly distribute the stored cold energy and to prevent temperature stratification within the thermal storage module. When a compressor fails in competitors' dryers that include fewer refrigeration compressors, the pressure dew point will jump to levels unacceptable for continued operation.

Expandability

The header centerline position is common among all MultiPlex™ models 4000 scfm and larger. This feature, along with the modular design of the MultiPlex™, allows you to "bolt on" additional modules to expand your air treatment capacity as operations expand. MultiPlex™ dryers are engineered to address the ever-changing manufacturing environment.

MultiPlex™... Best-In-Class For

ZEKS engineering has incorporated Best-In-Class features that ensure quality. Expect superior operating efficiency and long reliable service life.

CFX® – The Standard Of Excellence For Heat Exchanger Design

ZEKS patented CFX® stainless steel Corrugated, Folded heat eXchangers have been engineered exclusively for compressed air drying to include a high heat transfer coefficient and industry-leading low pressure drop. A multi-path flow area that is 3–5 times that of the equivalent copper tube exchanger combined with continuous self-cleaning action minimizes fouling potential. Corrosion resistant 304L stainless steel is used in all air circuit exchangers. CFX® provides durability in environments where copper or other metals are not suitable.



CFX® = Benefits

- 100% Stainless Steel Construction
- Less Prone To Fouling Than Copper Or Aluminum Exchangers
- Flow Area That Is 3 – 5 Times That Of Competitive Exchangers
- Industry-Leading Low Pressure Drop
- Higher Energy Efficiency Than That Of Competitive Exchangers
- ZEKS Exclusive 10-Year Warranty



Heat is transferred on both sides of the exchanger simultaneously to maximize operating efficiency. (Diagram depicts exchanger cross section)

Protected under U.S. Patent Nos. 6,186,223 and 6,244,333

Low Pressure Drop

The unique CFX® design has allowed ZEKS to provide air treatment with an extremely low pressure drop. This minimizes the overall compressed air energy requirement and the need for greater air compressor capacity.

Reliable Refrigeration Systems

The refrigeration system components in each module are sized to handle the maximum moisture loading for each MultiPlex™ model. Water cooled and air cooled refrigeration condensers have been selected to maintain efficiency in all environments. High quality fully hermetic compressor life is maximized because of cycling operation. Refrigeration system components are configured for convenient access and maintenance.

High Volume Applications

MultiPlex™ dryers to provide the highest level of value and life.

Digital Performance Control

MultiPlex™ operation is automatically controlled to optimize air treatment and manage energy consumption. A digital performance controller combines PLC technology with an integrated HMI (human/machine interface) that includes an LCD display with 16 illuminated characters and keypad that is convenient to access on the front of each dryer module. These dryer functions are easily monitored and adjustments can be made to optimize air treatment:

- **Digital Display Of:**
 - Chiller Temperature
 - % Energy Savings
 - Refrigerant Suction Pressure
 - Refrigerant Suction Temperature
 - Refrigerant Discharge Pressure
 - Dryer Compressor Running Time
 - Dryer Running Time
 - Diagnostic Memory
 - Compressed Air INLET and OUTLET Pressure and Temperature
- Automatic Dryer RESTART
- Remote START/STOP
- Remote Communication-Ready
- Condensate Level Alarm-Ready
- Automatic Refrigerant Compressor Crankcase Heater Delay



MultiPlex™

Your Safeguard Against Disruption Of Compressed Air Treatment

- ...Redundant Refrigeration Circuits
- ...Redundant Electrical Circuits
- ...Redundant Digital Controls
- ...Redundant Thermal Storage Circulation Pumps
- ...CFX® Stainless Steel Heat Exchangers
- ...True-Cycling™ Energy Saving Performance
- ...Expandable, Modular Construction

STANDARD FEATURES

- **Stainless Steel Heat Exchangers**
Patented CFX® stainless steel heat exchangers used in all precooler/reheater and chiller assemblies.
- **Multiple Electrical Disconnects**
Individual module electrical disconnects for safe isolation of modules for maintenance or repair.
- **Sentinel™ Circulation System**
Each dryer module has a dedicated pump that circulates shared thermal storage fluid.
- **Savair™ No Air-Loss Condensate Drain**
Pneumatically operated demand drain wastes no compressed air and has large port that resists clogging.
- **Digital Performance Controller**
Enables performance modification and real-time monitoring of complete dryer and individual modules.
- **Thermal Storage Media**
Food grade propylene glycol.
- **Water-Cooled Refrigeration Condensers**
Water-cooled condensers have convenient single INLET and OUTLET water connections.
- **Closed Frame Construction**
Full powder coated cabinetry protects internal components.
- **R22 Refrigerant**
Meets all current regulations and performance standards.
- **Air Circuit Precooler/Reheater**
Conditions air optimally for compressed air system.
- **Fully Hermetic Refrigeration Compressors**
Include lubricant level site glass, thermal overload protection, and vibration isolation mounting.
- **Single Point Electric Service Connection**
Minimizes installation cost.
- **Exclusive Warranty**
In addition to the standard dryer warranty, the refrigeration compressors are warranted for five years and the CFX® heat exchangers for ten years.

OPTIONAL FEATURES

- **Complete Stainless Steel Air Circuit**
Complete corrosion protection.
- **NEMA 4/12 Electrics**
Water tight and dust tight enclosures for protection against rain, falling water, and washdown. Indoor and outdoor use.
- **Semi-Hermetic Refrigeration Compressors**
Fully serviceable compressors include oil failure protection and vibration eliminators.
- **Air-Cooled Refrigeration Condensers**
Air-cooled condensers maintain individual module efficiency in all ambient conditions.
- **JIC Electrics**
Electrical enclosures, wire marking, electrical component separation, and wire raceways provided in accordance with Joint Industry Council code requirements.
- **Cold Coalescing Piping**
Single INLET and OUTLET flanges enable connection of a Mist Eliminator or flanged filter for removal of oil aerosoles at the coldest temperature.
- **Removable Head Condensers**
Maintain refrigeration system efficiency. Units are top-mounted for convenient access.

The example below calculates the annual energy savings of a water cooled MultiPlex™ dryer compared to a water cooled non-cycling design. The factors can be replaced with those of any compressed air system.

A. Determine Maximum Capacity of Dryer

Assume a maximum capacity of 7,200 scfm for this example.

B. Determine Weekly Compressed Air Volume

Multiply the number of hours worked per week on all shifts times the compressed air volume (scfm x 60 min.) used on each shift. Total all shift numbers to determine the actual compressed air volume used per week:

Shift	Hours	(60 min.)	scfm	=	Air Volume
FIRST	35	x 60	x 6,800	=	14,280,000
SECOND	35	x 60	x 5,600	=	11,760,000
THIRD	35	x 60	x 3,000	=	6,300,000
SATURDAY	7	x 60	x 1,800	=	756,000
Weekly Compressed Air Volume					33,096,000

C. Calculate Weekly Air Treatment Potential of The Dryer

Multiply the total number of hours per week (168 assuming the equipment is ON, 24/7) times the maximum capacity of the dryer:

Weekly Air Treatment Potential 168 hrs. x 7,200 scfm x 60 min. = 72,576,000

D. Calculate The Plant Operation Factor

Divide the total compressed air volume used per week by the total weekly air treatment potential to determine the plant operation factor:

Plant Operation Factor = $\frac{33,096,000}{72,576,000} = .46$

E. Select Ambient Air Temperature Reduction Factor

The factor varies based on geographic location and takes into account the impact of lower ambient temperatures on energy consumption. Typical factors are:

Climate (United States)	Air Cooled	Water Cooled
Northern	.24	.41
Central	.31	.49
Southern	.34	.53

F. Calculate Utilization Factor

This incorporates all of the above:

Plant Operation Factor x Ambient Air Temperature Reduction Factor

If we assume the plant is in the Northern US, the Utilization Factor will be:

Utilization Factor = .46 x .41 = .19 (19%)

G. Estimate Annual Savings

Refer to the following table (water cooled) for a 7,200 scfm dryer and interpolate between a 10% and 20% utilization factor:

Estimated Annual Savings (\$) From True-Cycling™ Operation* (Based on \$.10/kWh)

Dryer Size (scfm)	Water Cooled MultiPlex™ Utilization Factor								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
3200HSFM	10232	9075	7919	6763	5606	4450	3294	2137	981
4000HSFM	11949	10582	9216	7849	6482	5116	3749	2383	1016
4800HSFM	15698	14051	12404	10757	9110	7464	5817	4170	2523
6000HSFM	17923	15873	13823	11773	9724	7674	5624	3574	1524
7200HSFM	23547	21077	18606	16136	13666	11195	8725	6255	3784
8000HSFM	23898	21164	18432	15698	12964	10232	7498	4766	2032
9600HSFM	31396	28102	24808	21515	18221	14927	11633	8340	5046
12000HSFM	39245	35128	31010	26893	22776	18659	14542	10424	6307
14400HSFM	47094	42153	37212	32272	27331	22391	17450	12509	7569
16800HSFM	54943	49179	43415	37650	31886	26122	20358	14594	8830
19200HSFM	62792	56204	49617	43029	36442	29854	23267	16679	10092

Dryer Size (scfm)	Air Cooled MultiPlex™ Utilization Factor								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
3200HSFM	15900	13992	12084	10176	8268	6361	4453	2545	637
4000HSFM	16304	14118	11932	9746	7560	5374	3188	1002	0
4800HSFM	19564	16941	14318	11695	9072	6449	3826	1203	0
6000HSFM	24455	21176	17898	14619	11340	8061	4782	1503	0
7200HSFM	29346	25412	21477	17542	13608	9673	5739	1804	0
8000HSFM	32608	28236	23864	19492	15120	10748	6376	2004	0
9600HSFM	39128	33882	28636	23390	18144	12898	7651	2405	0
12000HSFM	48911	42353	35795	29237	22680	16122	9564	3006	0
14400HSFM	58693	50823	42954	35085	27216	19346	11477	3608	0
16800HSFM	68475	59294	50113	40932	31751	22571	13390	4209	0
19200HSFM	78257	67765	57272	46780	36287	25795	15303	4810	0

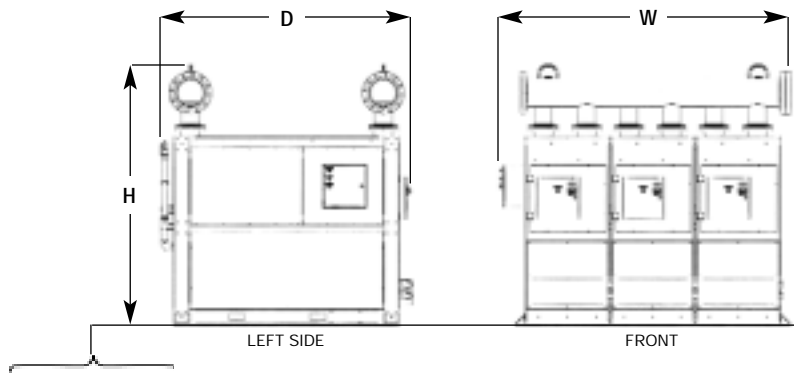
*Consult factory for calculation details

MultiPlex™ Handles The Load...

Heat load on refrigerated compressed air dryers is based on the combination of inlet air flow volume, inlet air temperature, ambient air temperature, and compressed air pressure. Of these, inlet air flow volume (scfm) and inlet air temperature have the greatest effect. Even a slight reduction of inlet air temperature will greatly reduce the heat load on a dryer. Dryer model selection is based on capacity sufficient to handle the heat load during the hottest months of the year. Cycling operation provides the greatest way to realize energy savings as inlet air temperature drops.

MultiPlex™

LARGE CAPACITY, REFRIGERATED COMPRESSED AIR DRYERS



Overall dimensions indicated.

Air INLET and OUTLET header centerline remains consistent throughout the MultiPlex™ model range (except 3200HSFM).

Module number varies depending on model. See last column in Technical Specifications chart to identify modules per model. 3-module model depicted in this illustration.

Technical Specifications

MODEL	CAPACITY* SCFM 38°F PDP	PRESSURE DROP**	OVERALL DIMENSIONS			SHIP WT. LBS.	CONNECT SIZE IN/OUT	DRAIN (QTY) SIZE FPT	REFRIG COMP AIR-COOLED (QTY) HP	REFRIG COMP WATER-COOLED (QTY) HP	H ₂ O FLOW GPM @85°F	H ₂ O CONN NPT	OPERATING KW*** AIR-COOLED	OPERATING KW*** WATER-COOLED	NO. OF MODULES
			W IN.	D IN.	H IN.										
3200HSFM	3,200	3	75	91	82	5,800	6" FLG	(2) 1/2"	2 x 10.5	2 x 9.0	38	1.5	18.03	14.77	2
4000HSFM	4,000	3	80	99	98	6,720	8" FLG	(2) 1/2"	2 x 13.5	2 x 10.5	54	1.5	21.77	15.26	2
4800HSFM	4,800	3	80	99	98	6,880	8" FLG	(2) 1/2"	2 x 13.5	2 x 10.5	54	1.5	28.72	19.32	2
6000HSFM	6,000	3	112	100	100	9,700	10" FLG	(3) 1/2"	3 x 13.5	3 x 10.5	81	2.0	32.65	22.89	3
7200HSFM	7,200	3	112	100	100	9,950	10" FLG	(3) 1/2"	3 x 13.5	3 x 10.5	81	2.0	43.08	28.98	3
8000HSFM	8,000	3	148	100	102	13,020	12" FLG	(4) 1/2"	4 x 13.5	4 x 10.5	108	2.5	43.54	30.52	4
9600HSFM	9,600	3	148	100	102	13,350	12" FLG	(4) 1/2"	4 x 13.5	4 x 10.5	108	2.5	57.44	38.64	4
12000HSFM	12,000	3	176	101	104	16,400	14" FLG	(5) 1/2"	5 x 13.5	5 x 10.5	135	3.0	71.80	48.30	5
14400HSFM	14,400	3	209	101	104	19,600	14" FLG	(6) 1/2"	6 x 13.5	6 x 10.5	162	3.0	86.16	57.96	6
16800HSFM	16,800	3	242	104	106	23,000	16" FLG	(7) 1/2"	7 x 13.5	7 x 10.5	189	4.0	100.52	67.62	7
19200HSFM	19,200	3	275	104	106	26,400	16" FLG	(8) 1/2"	8 x 13.5	8 x 10.5	216	4.0	114.88	77.28	8

* Performance data obtained and presented in accordance with CAGI Standard No. ADF 100, "Refrigerated Compressed Air Dryers – Methods for Testing and Rating." Pressure dew point at 100 psig, 100°F inlet air, 100°F ambient air.

** Pressure drop ±.5 psi

*** Average kilowatts per hour of dryer operation at full rated capacity.

460/3/60; 380/3/50; 575/3/60 voltages available.

220 psig maximum working pressure.

Dimensions subject to change without notice.

Shipping weights shown are for air cooled models.

Water cooled model weight is less.

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ZEKS meets stringent high volume air treatment requirements for continuous duty and consistent dew point and exceeds them with built-in redundancy, low operating cost and rugged reliability. MultiPlex™ dryers are the world's most advanced large capacity refrigerated air dryers.

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