ZEKS COMPRESSED AIR SOLUTIONS®

MultiPlex™

LARGE CAPACITY TRUE-CYCLING™ REFRIGERATED COMPRESSED AIR DRYERS

3,250-19,200 SCFM Models

- **Energy-Saving Operation**
- **Safeguards Against Air Treatment Failure:**
  - Redundant Refrigeration Circuits
  - Redundant Electrical Circuits
  - Redundant Digital Controls
  - Redundant Thermal Storage Circulation Pumps

CFX® **Stainless Steel Heat Exchangers**

Specialized Air Treatment

For Large Compressed Air Systems

Compressed air contains moisture and other contaminants that must be removed to avoid damage to pneumatic valves, tools and instruments. Failure to remove these impurities can compromise critical manufacturing and finishing processes and cause product waste and production downtime.

ZEKS MultiPlex™ dryers combine multiple air treatment modules for the removal of moisture, oil and contaminants in very large compressed air systems. Modular design provides redundancy of critical dryer systems to assure delivery of clean, dry air while cycling-operation consumes only the electricity needed to meet actual air treatment demand.

True-Cycling™–The ZEKS Advantage

Common manufacturing practices, process machinery cycling, and changing production requirements result in uneven compressed air volume use. This, combined with lower ambient and inlet air temperatures, results in a variable, reduced load on a compressed air dryer. ZEKS pioneered the thermal mass refrigerated dryer design and True-Cycling™ operation that efficiently stores cold energy. This allows the dryer refrigeration compressors to cycle off during periods of reduced load while the dryer maintains the capacity to remove moisture and contaminants from the air stream. When compared to non-cycling dryers, True-Cycling™ dryers provide significant energy savings - as high as 80%!

Eliminate The Need For Multiple Dryers

MultiPlex™ dryers are an assembly of multiple air treatment modules, each with a cycling refrigeration system, stainless steel heat exchangers and a high efficiency vortex separator and no-air loss drain. The modules are integrated and configured in eleven dryer models with air treatment capacities from 3,250 –19,200 SCFM. This modular approach provides inherent redundancy of critical dryer components.

The design enables users to maintain dryer operation even when one of the independent refrigeration systems is taken off-line for service or maintenance. Properly sized, the dryer outlet pressure dew point will not be compromised if a single module is de-energized.

3-Module 7200HSFMA MultiPlex™ model with air-cooled refrigeration condensers and NEMA 1 electrical arrangement

Reliable Operation

MultiPlex™ dryers are designed to endure extreme conditions that can exist in typical manufacturing facilities. To ensure long service life, the dryers include:

- **High Quality, Fully Hermetic Refrigerant Compressors**
- **Generously Sized Refrigeration Condensers** (air or water)
- **Highly Efficient Thermal Mass Solution**
- **Coordinated Digital Dryer Control**
- **No Air-Loss Condensate Drains**

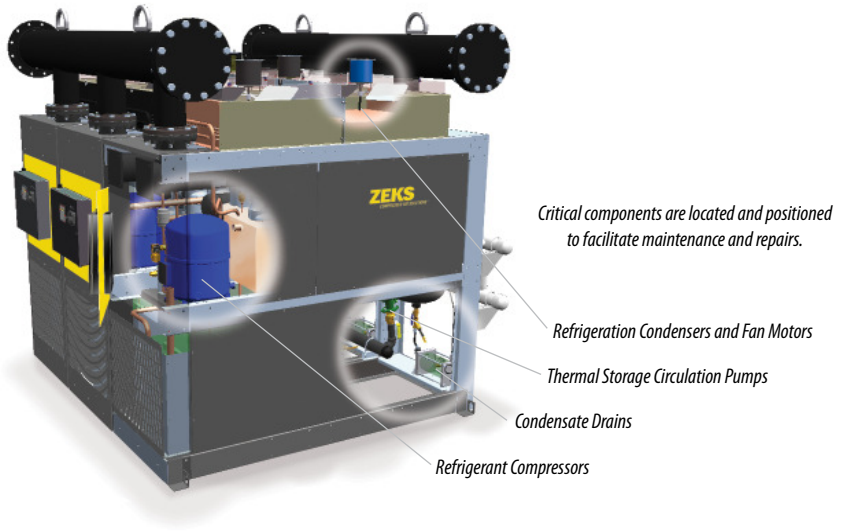
Since ZEKS invented True-Cycling™ dryers in 1959, no competitors have been able to duplicate the superior performance and reliability. True-Cycling™ operation has been proven to maintain dew point and reduce wear and tear on the dryer refrigeration systems.

Consistent Pressure Dew Point

Each air treatment module includes a pump that circulates a thermal storage solution throughout the dryer for even distribution of the stored cold energy to all modules. Circulation is maintained even if the pump of a single module is disabled. Exclusive to ZEKS, this active circulation optimizes efficiency of MultiPlex™ True-Cycling™ operation and helps maintain consistent pressure dew point throughout the full air flow range of the dryer.

Convenient Service Access

MultiPlex™ design promotes uninterrupted dryer operation by providing unobstructed access to serviceable parts. Each module includes an electrical disconnect, enabling service on an individual module while the balance of the dryer remains energized. Critical components, such as refrigeration compressors and controls, condensate drains and fan motors, are located to facilitate maintenance and repairs, minimizing downtime.



The Standard Of Excellence For Heat Exchanger Design

ZEKS patented CFX® heat exchangers have been engineered exclusively for compressed air drying. The unique design features:

- **100% Stainless Steel Construction**
- **Very Low Pressure Drop**
- **3 - 5 Times More Flow Area Than Competitive Exchangers**
- **Greater Fouling Resistance Than Competitive Exchangers**
- **Higher Energy Efficiency Than Competitive Exchangers**
- **ZEKS Exclusive 10-Year Warranty**

Even well maintained compressed air systems can contain corrosive impurities that are introduced at the air compressor intake. The corrosion-resistance of CFX® stainless steel heat exchangers addresses this threat, providing durability in environments where exchangers made of copper or other metals are not suitable.

Versatile and Expandable

All MultiPlex™ modules share a single INLET and a single OUTLET air header, each with dual connection capability. This permits connection to either side of the dryer to suit site conditions.

In addition, MultiPlex™ dryers are engineered to address the ever-changing manufacturing environment. Because header center line position is common among all MultiPlex™ models, planned increase in air treatment capacity can be accommodated through addition of modules.

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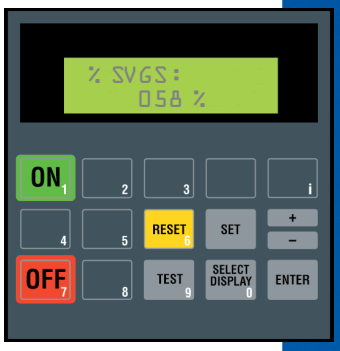
Digital Performance Control

MultiPlex™ operation is automatically controlled to optimize air treatment and manage energy consumption. A digital performance controller (DPC™) combines PLC technology with an integrated backlit LCD display and keypad. DPC™ Controllers are conveniently located on the front of each dryer module, allowing the user to monitor critical dryer parameters and adjust performance to suit varying demand and ambient conditions. The controller provides the following functions and features:



- **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**
- **Refrigerant Compressor Crankcase Heater Delay**

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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 safely isolate each module, permitting maintenance or repair without de-energizing entire dryer.
- **Active Thermal Storage Circulation System**
  Dedicated circulation pump on each dryer module circulates shared thermal storage fluid, providing inherent redundancy.
- **Savair™ No Air-Loss Condensate Drains**
  Pneumatically operated demand drains waste no compressed air. Each has a large discharge port that resists clogging.
- **Digital Performance Controllers**
  Enable performance modification and real-time monitoring of complete dryer and individual modules.
- **Water-Cooled Refrigeration Condensers**
  Multiple water-cooled condensers provided with single INLET and OUTLET water connections to reduce installation costs.
- **Environmentally Friendly Refrigerant**
  MultiPlex™ dryers use environmentally friendly R-404A refrigerant.
- **Air Circuit Precoolers/Reheaters**
  Reduce refrigeration load requirements as well as eliminate condensation on outlet air piping.
- **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. See ZEKS Dryer Warranty for details.

Optional Features

- **Complete Stainless Steel Air Circuit**
  Complete corrosion protection.
- **NEMA 4 Electrical Enclosures**
  Water-tight and dust-tight enclosures for protection against rain, splashing water, and wash-down. Indoor and outdoor use.
- **Air-Cooled Refrigeration Condensers**
  Air-cooled condensers maintain individual module efficiency in all ambient conditions.
- **Cold Coalescing Piping**
  Single INLET and OUTLET flanges enable connection of a Mist Eliminator or flanged filter for removal of oil aerosols at the coldest temperature.
- **Removable-Head Condensers**
  Permit cleaning of the condensers in applications where water has high concentrations of silt or particulate. Units are top-mounted for convenient access.

Annual Energy Savings From MultiPlex™ Dryer Operation

The example shown below calculates the annual energy savings derived from a water-cooled MultiPlex™ dryer compared to a water-cooled non-cycling dryer. 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 during 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:

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

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. *Estimated Annual Savings ($) From True-Cycling™ Operation** (Based on $.10/kWh)
Refer to the following table (water-cooled) for a 7,200 scfm dryer and interpolate between a 10% and 20% utilization factor:

Water-Cooled MultiPlex™ Utilization Factor

Dryer Size (scfm)	10%	20%	30%	40%	50%	60%
3250HSFM	14253	12912	11572	10232	8891	7551
4000HSFM	13955	12141	10328	8515	6701	4888
4800HSFM	18501	16504	14507	12509	10512	8515
6000HSFM	20928	18203	15479	12755	10030	7306
7200HSFM	27752	24756	21760	18764	15768	12772
8000HSFM	27909	24283	20656	17029	13403	9776
9600HSFM	37002	33008	29013	25019	21024	17029
12000HSFM	46253	41260	36266	31273	26280	21287
14400HSFM	55503	49512	43520	37528	31536	25544
16800HSFM	64754	57763	50773	43782	36792	29802
19200HSFM	74004	66015	58026	50037	42048	34059

Air-Cooled MultiPlex™ Utilization Factor

Dryer Size (scfm)	10%	20%	30%	40%	50%	60%
3250HSFM	17502	15207	12912	10617	8322	6027
4000HSFM	21812	19447	17082	14717	12352	9986
4800HSFM	25614	22846	20078	17310	14542	11773
6000HSFM	32719	29171	25623	22075	18527	14980
7200HSFM	38421	34269	30117	25965	21812	17660
8000HSFM	43625	38894	34164	29434	24703	19973
9600HSFM	51228	45692	40156	34620	29083	23547
12000HSFM	64036	57115	50195	43274	36354	29434
14400HSFM	76843	68538	60234	51929	43625	35320
16800HSFM	89650	79961	70273	60584	50896	41207
19200HSFM	102457	91384	80312	69239	58166	47094

*Consult factory for calculation details

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MultiPlex™ Will Handle The Load...

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

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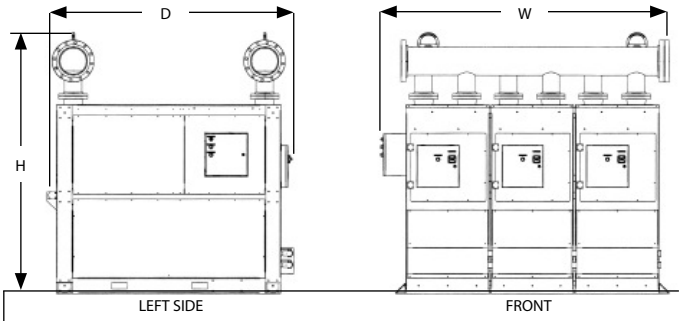

Overall dimensions indicated.

Air INLET and OUTLET header centerline remains consistent throughout the MultiPlex™ model range.

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 W IN.	D IN.	H IN.	SHIP WT. LBS.	CONNECT SIZE IN/OUT	DRAIN (QTY) SIZE FPT	REFRIG COMP AIR-COOLED (QTY) HP	REFRIG COMP WATER-COOLED (QTY) HP	H2O FLOW GPM @85°F	H2O CONN	OPERATING KW*** AIR-COOLED	OPERATING KW*** WATER-COOLED	NUMBER OF MODULES
3250HSFM	3,250	3.4	76	96	100	6,520	8″FLG	(2) 1/2″	(2) 10.5	(2) 9.0	38	1.5 NPT	26.2	15.4	2
4000HSFM	4,000	3.5	76	96	100	6,720	8″FLG	(2) 1/2″	(2) 13.5	(2) 10.5	54	1.5 NPT	27.0	20.8	2
4800HSFM	4,800	3.5	76	96	100	6,880	8″FLG	(2) 1/2″	(2) 13.5	(2) 10.5	54	1.5 NPT	31.6	22.8	2
6000HSFM	6,000	3.5	110	98	102	9,700	10″FLG	(3) 1/2″	(3) 13.5	(3) 10.5	81	2.0 NPT	40.5	31.2	3
7200HSFM	7,200	3.5	110	98	102	9,950	10″FLG	(3) 1/2″	(3) 13.5	(3) 10.5	81	2.0 NPT	47.4	34.2	3
8000HSFM	8,000	3.5	143	99	103	13,020	12″FLG	(4) 1/2″	(4) 13.5	(4) 10.5	108	2.5 NPT	54.0	41.6	4
9600HSFM	9,600	3.0	149	99	103	13,350	12″FLG	(4) 1/2″	(4) 13.5	(4) 10.5	108	2.5 NPT	63.2	45.6	4
12000HSFM	12,000	3.0	176	101	103	16,400	14″FLG	(5) 1/2″	(5) 13.5	(5) 10.5	135	3.0 NPT	79.0	57.0	5
14400HSFM	14,400	3.0	209	101	103	19,600	14″FLG	(6) 1/2″	(6) 13.5	(6) 10.5	162	3.0 NPT	94.8	68.4	6
16800HSFM	16,800	3.0	243	101	104	23,000	16″FLG	(7) 1/2″	(7) 13.5	(7) 10.5	189	4.0 NPT	110.6	79.8	7
19200HSFM	19,200	3.0	276	101	104	26,400	16″FLG	(8) 1/2″	(8) 13.5	(8) 10.5	216	4.0 NPT	126.4	91.2	8

* Performance data obtained as per ISO 7183, Table 2, Option A2. Pressure dew point at 100 psig inlet air pressure, 100°F inlet air temperature, 100°F ambient air temperature.

** 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.

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

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