



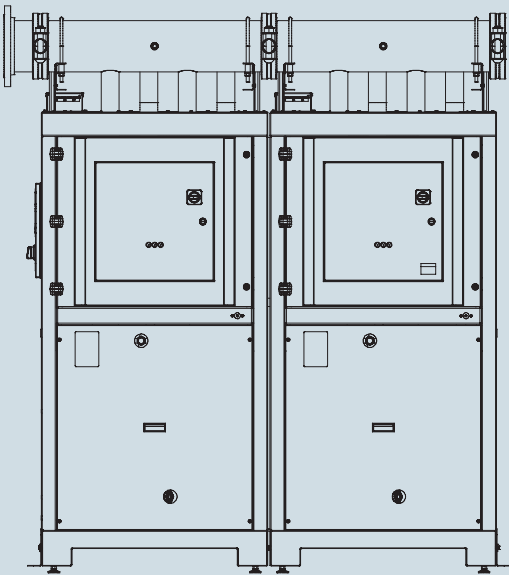
# Energy Saving Refrigerated Air Dryer

ESM SERIES 3750 to 12500 scfm (6371 to 21238 nm<sup>3</sup>/h)



Since 1946, the world has turned to Pneumatic Products for the quality and service demanded by the most critical of applications. Global leaders of industry require durable components that deliver unquestionable reliability. Our precision engineered components and designs deliver outstanding service life and operational longevity. Invest in our experience and gain annuities that will grow for years.

Based in Charlotte, North Carolina, SPX Corporation (NYSE: SPW) is a global Fortune 500 multi-industry manufacturing leader. For more information, please visit [www.spx.com](http://www.spx.com)



## Where Ideas Become Solutions

SPX is a place where innovation is valued, and the real needs of business are understood. We transform ideas into powerful solutions to help our customers meet their goals, overcome business challenges and thrive in a complex, always-changing marketplace.

Utilizing the latest technological advancements, ESM Series refrigerated dryers offer a new way of thinking and innovative approach to efficiently treat compressed air.

### **Saving Energy Is A Global Priority**

Compressed air users world-wide are integrating energy management best practices into their operations, with the goal of reducing power consumption and lowering their energy costs.

Demonstrating our commitment to continuous development of sustainable solutions, the ESM Series significantly lowers total cost of operation by consuming electrical power (kWh) in direct proportion to real-time demand.

### **Meeting the Needs of Today**

End-users demand compressed air systems that are easy to design, install, monitor and maintain.

The ESM Series features modular construction offering multiple design variations for flexible arrangement. Dimensionally standardized air treatment modules are efficiently combined to form larger capacity units.

### **Anticipating Opportunities of Tomorrow**

Operational through-put and minimal down time is critical to maintain a competitive business advantage over the long term.

Redundancy in critical components offers fault-tolerant operation, delivering optimal system reliability. The ESM Series offers back-up drying protection presenting alternative drying capability in the presence of component failure.

# Measurable Energy Savings

In a typical manufacturing facility, up to 30% of electricity consumed is for generating compressed air. To reduce total cost of operation and qualify for utility company incentive programs, proper air treatment equipment selection and application is required.

## Annualized Cost Savings

MODEL	AVERAGE HEAT LOAD (%) (1)						
	30%	40%	50%	60%	70%	80%	90%
ESM3750	\$8,997	\$7,751	\$6,367	\$5,121	\$3,737	\$2,491	\$1,384
ESM5000	11,274	9,713	7,979	6,418	4,683	3,122	1,734
ESM6250	14,634	12,607	10,356	8,330	6,079	4,052	2,251
ESM7500	16,854	14,521	11,928	9,594	7,001	4,667	2,593
ESM8750	20,271	17,464	14,345	11,539	8,420	5,613	3,119
ESM10000	22,548	19,426	15,957	12,835	9,366	6,244	3,469
ESM11250	25,908	22,320	18,335	14,747	10,762	7,174	3,986
ESM12500	28,185	24,283	19,947	16,044	11,708	7,805	4,336

### Digital Scroll Compressors

To maximize full energy savings potential, modules are designed with digital scroll refrigeration compressors that load and unload based on real-time demand.

Significantly less energy is consumed during periods of unloading, delivering proportional energy savings.

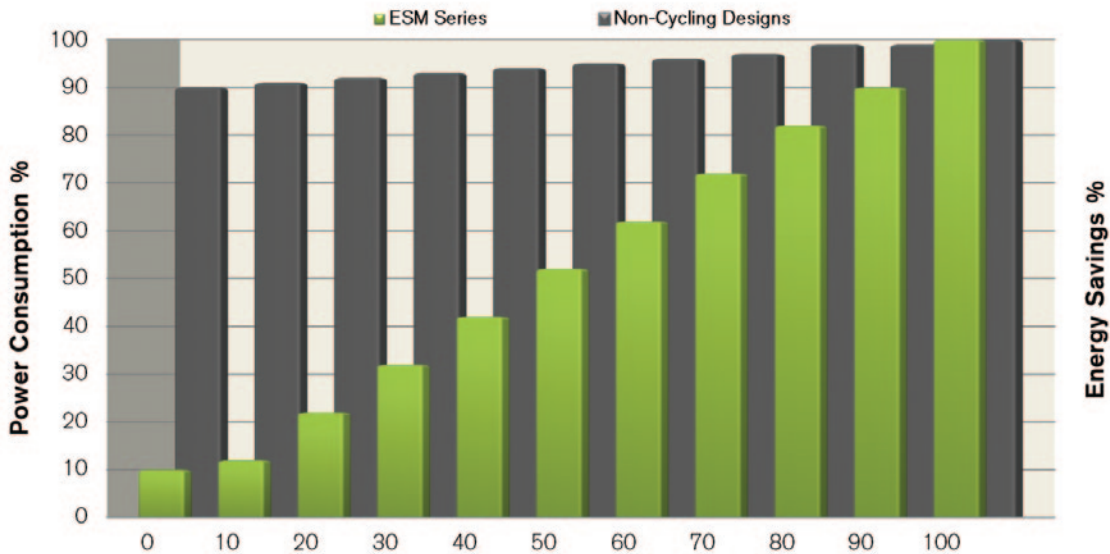
### Rapid Return on Investment

The table below provides annualized cost savings of ESM Series refrigerated air dryers compared to non-cycling designs.

COST OF POWER \$0.10 KWH; 8760 OPERATING HOURS  
 1 AVERAGE HEAT LOAD IS THE TIME AVERAGED EFFECTS OF FLOW RATE, INLET TEMPERATURE AND INLET PRESSURE.

### Load Matching Performance

Compressed air load profiles in most manufacturing facilities fluctuate. The ESM Series provides cost-effective energy savings by matching electrical power consumed in direct proportion to incoming air demand. Linear load matching is achieved from 0 to 100%.



# Modular Construction

## Multi-Station Design

Dryer systems are organized by connecting up to five individual modules in a line-up arrangement to construct the desired flow capacity.

Modules may be configured in 1250 and 2500 scfm (2124-4148 nm<sup>3</sup>/h) increments precisely matching system air flow demand.

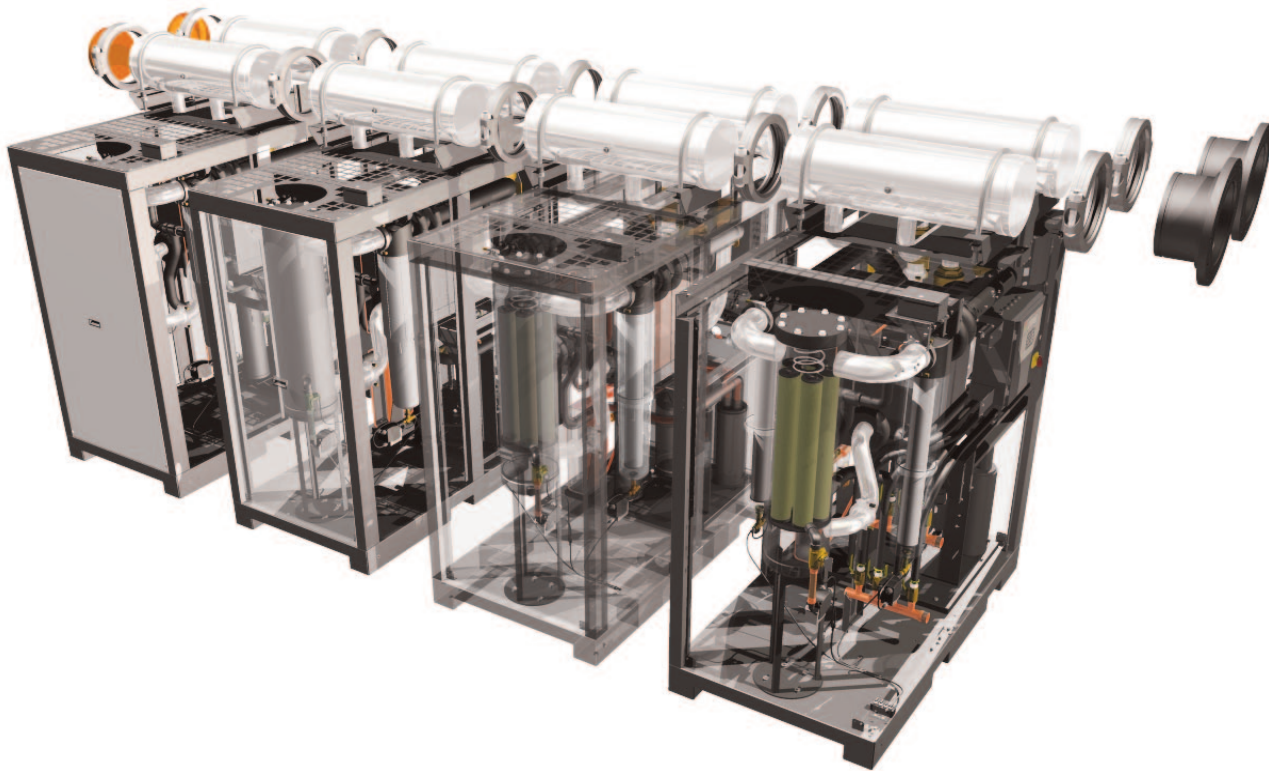
Self-sufficient modules easily interface with couplings to form larger systems, responding to increased air demand.

## Complete Module Isolation

Full flow air-side isolation valves permit maintenance of individual modules without interrupting the air supply to other modules.

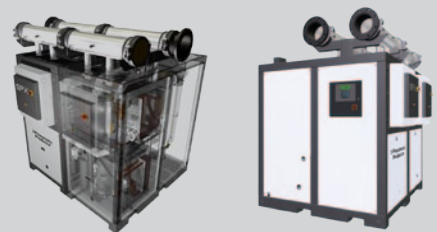
Each module maintains separate water regulating valves, strainers and water isolation valves for ease of maintenance.

Modules are furnished with a disconnect switch, enabling the operator to remove electrical power without de-energizing other modules in the system line-up.



## Ease of Movement

Independent modules are fully enclosed with fork channels constructed in the base pan allowing movement with a pallet jack into tight spaces and through low clearances. Modules are 40% lighter-weight than glycol designs. No crane is required for installation.



# System Redundancy

## Fault-Tolerant Operation

Redundancy in critical components presents system back-up, ensuring uninterrupted air supply when a module is removed from operation.

Systems may be operated with additional modules gaining the added benefit of lower pressure drop plus back-up redundancy, without compromising power consumption.

Common sub-components include —

- Stainless steel brazed plate heat exchangers
- Module isolation valves
- Integral filtration
- No-air-loss condensate drains
- Water-cooled condenser
- Digital scroll refrigeration system

## Integral Filtration

Each module is a self-contained air treatment station, furnished with integral high performance filtration and energy saving no-air-loss demand drains.

Integral filtration is accessed through the top and removable back panel for ease of service.

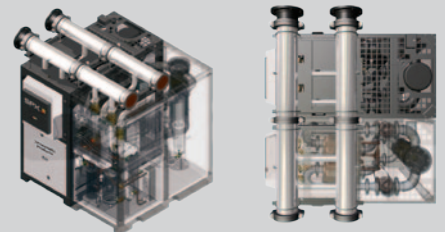
Standard modules are equipped with two stage separation to remove solids 3 micron and larger, with a remaining oil content of 4 mg/m<sup>3</sup>.

Optional cold coalescing filters capture solids 0.01 micron and larger, with a remaining oil content of 0.008 mg/m<sup>3</sup>.



## Installation Versatility

The modules share a common inlet air header and outlet air header that are engineered to maintain even air flow distribution and minimize system pressure drop. Headers may be blanked off at either end offering dual installation capability.



# Customer Focus

## Energy Management Control (emc™)

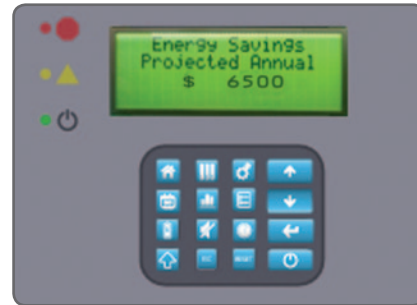
The emc™ is an intuitive operator interface that monitors system performance, tracks energy savings and actively communicates with individual dryer modules. The monitor is equipped with a MODBUS RS-485 interface and ethernet with MODBUS TCP/IP support.

A membrane keypad, with a full menu of universally recognized symbols, enables the user to selectively retrieve information from any given module. The operator may program parameters for predictive maintenance and predetermined times for module on and off times.

Information is communicated in a highly visible LCD (liquid crystal display) screen with four (4) line — twenty (20) character capability.

### Measured energy savings performance:

- Instantaneous Load (as a %)
- Cumulative Energy Savings (currency in \$/€)
- Projected Annual Savings (currency in \$/€)
- Average Monthly Load (last 30 days as a %)
- Average Daily Load (last 24 hours as a %)



### Individual module operation and real-time status:

- Module Status (on/off, scheduled on/off, standby)
- Refrigerant Suction Temperature (°F/°C)
- Refrigerant Suction Pressure (psi/bar)
- Coldest Air Temperature (°F/°C)
- Refrigerant Discharge Temperature (°F/°C)
- Refrigerant Discharge Pressure (psi/bar)

### Alarm indication and history:

- Drain-Failure to Discharge
- Crankcase Heater Current not Detected
- Low Refrigerant Suction Pressure
- High Refrigerant Discharge Pressure
- Coldest Air Temperature
- Routine Maintenance Interval
- A real-time clock, with power back-up, fault time-stamps for month/day/year — hour/min/sec



### Each module is equipped with LED indicators for:

- Alarm (red)
- Active Fault (yellow)
- Power On (green)

## ISO Quality Classes

Air Quality Classes	Solid Particles			Water		Oil	
	Maximum number of particles per m <sup>3</sup>			Vapor Pressure Dew Point		Total Oil Concentration: Aerosol, Liquid and Vapor	
ISO 8573-1:	0.10 - 0.5 micron	0.5 - 1.0 micron	1.0 - 5.0 micron	°C	°F	mg / m <sup>3</sup>	ppm <sub>ww</sub>
<b>2010</b>							
<b>0</b>	<b>As specified by the equipment user or supplier and more stringent than class 1</b>						
<b>1</b>	≤ 20,000	≤ 400	≤ 10	≤ -70	≤ -94	0.01	0.008
<b>2</b>	≤ 400,000	≤ 6,000	≤ 100	≤ -40	≤ -40	0.1	0.08
<b>3</b>	-	≤ 90,000	≤ 1,000	≤ -20	≤ -4	1	0.8
<b>4</b>	-	-	≤ 10,000	≤ +3	≤ +37	5	4
<b>5</b>	-	-	≤ 100,000	≤ +7	≤ +45	-	-

Standard filtration delivers

ISO Quality Class:

- 3 Solids
- 4-5 Pressure Dew Point
- 5 Oil

Optional filtration provides

ISO Quality Class:

- 3 Solids
- 4-5 Pressure Dew Point
- 1 Oil

# Product Specifications

MAX WORKING PRESSURE PSIG (BAR)	MIN WORKING PRESSURE PSIG (BAR)	MAX INLET AIR TEMPERATURE °F (°C)	MIN INLET AIR TEMPERATURE °F (°C)	MAX AMBIENT AIR TEMPERATURE °F (°C)	MIN AMBIENT AIR TEMPERATURE °F (°C)
232 (16)	30 (2)	130 (54)	40 (4)	110 (43)	40 (4)

MODEL	RATED FLOW (1)		NUMBER OF MODULES (2)	REFRIGERANT COMPRESSOR HORSEPOWER (3)	AVAILABLE VOLTAGES (4)	OPERATING POWER CONSUMPTION (5)	IN/OUT CONNECTION	WATER FLOW @ 85°F	WATER SUPPLY CONNECTION	OVERALL DIMENSIONS			TOTAL WEIGHT
	SCFM	NM <sup>3</sup> /H								H	W	D	
ESM3750	3750	6371	2	(1) 10 + (1) 6	Standard: 460/3/60  Optional: 575/3/60; 230/3/60	15.8	8"	19	2.5"	96	84	81	3391
ESM5000	5000	8495	2	(2) 10		19.8	8"	26	2.5"	96	84	81	3474
ESM6250	6250	10619	3	(2) 10 + (1) 6		25.7	10"	32	2.5"	97	125	81	5412
ESM7500	7500	12743	3	(3) 10		29.6	10"	39	2.5"	97	125	81	5624
ESM8750	8750	14866	4	(3) 10 + (1) 6		35.6	12"	45	2.5"	99	163	81	7664
ESM10000	10000	16990	4	(4) 10		39.6	12"	52	2.5"	99	163	81	7876
ESM11250	11250	19114	5	(4) 10 + (1) 6		45.5	12"	58	2.5"	99	202	81	9623
ESM12500	12500	21238	5	(5) 10		49.5	12"	65	2.5"	99	202	81	9836

Dryers meet agency approvals: CSA (CAN/CSA-C22.2 No.236-95) - Heating and Cooling Equipment and UL Standard No. 1995.  
 Canadian Registration Numbers- standard separator vessel and optional cold coalescing housing.  
 Standard separators include one vessel and are equipped with an electric demand drain. Units with optional cold coalescing filters are equipped with a dedicated electric demand drain- one per housing.

1 Rated Flow Capacity - Conditions for rating dryers are in accordance with ISO 7183 (option A2) working conditions:  
 inlet air temperature 100°F (38°C), inlet air pressure 100 psig (6.9 bar), cooling water temperature 85°F (29°C), 100% saturated air

2 Individual modules are combined in 1250 scfm and 2500 scfm increments to provide the desired flow capacity.

3 Digital scroll compressors utilize environmentally friendly R404a refrigerant.

4 Optional Voltages: 575/3/60 requirements utilize module-mounted transformers to step-down incoming power to 460/3/60; 230/3/60 requirements utilize module-mounted transformers to step-up to 460/3/60.

5 Full flow kW value operating on 460/3/60 Hz power supply.

## Correction Factors for Inlet Air Pressure and Temperature

INLET AIR PRESSURE		INLET AIR TEMPERATURE				
PSIG	BAR	90°F 32°C	100°F 38°C	110°F 43°C	120°F 49°C	130°F 54°C
30	2.1	0.92	0.71	0.56	0.44	0.35
50	3.5	1.07	0.83	0.66	0.54	0.44
80	5.6	1.19	0.95	0.77	0.63	0.52
100	6.9	1.25	1.00	0.82	0.68	0.56
125	8.6	1.31	1.05	0.86	0.72	0.61
150	10.3	1.34	1.08	0.90	0.75	0.64
175	12.1	1.37	1.11	0.92	0.78	0.66
200	13.8	1.39	1.14	0.95	0.80	0.68

# Energy Saving Refrigerated Air Dryer

**ESM SERIES**



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