Energy Saving Refrigerated Air Dryers

SRC Cycling Dryers

Reduced Power Consumption • Accurate Dewpoint Control • Ease of Use
Microprocessor Control • Scroll Compressor • R407C Refrigerant

150 to 1000 scfm
Cycling Refrigerated
Air Dryers

SULLAIR
Always air. Always there.

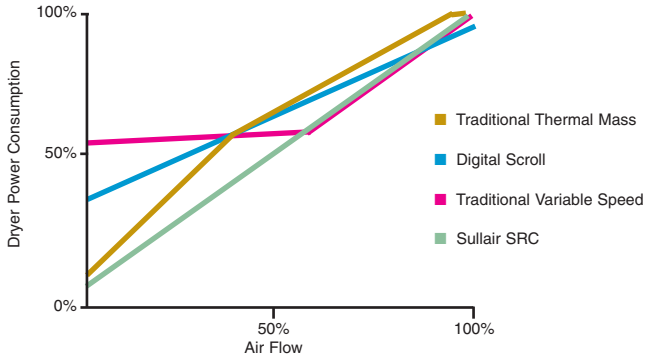
Sullair SRC dryers reduce the cost of drying compressed air

People tend to underestimate the effect of operating costs compared to the up front capital cost of a compressed air dryer or filter. Approximately 76% of the total cost of a compressed air system relates to the cost of energy required to operate it.

Purchase price, installation, and even maintenance costs pale in comparison.

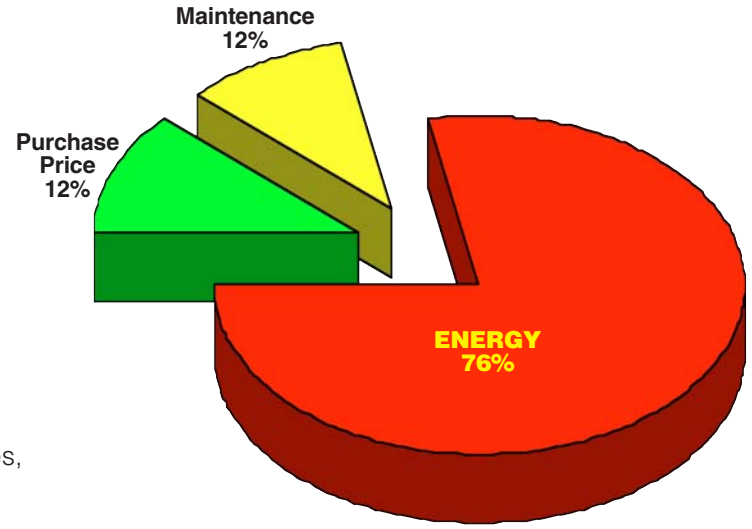
With all this money being spent to compress air, pressure drops in your system can be very expensive.

A pressure drop of only 2 psig can increase the power consumed by your compressor by one percent. The SRC pressure drop is as low as 0.9 psig, maximizing energy savings.



SRC energy saving curve versus traditional solutions

When compared to competing energy saving technologies, SRC dryers consume less energy across the full air flow range.



The Sullair Compressed Air System

This Sullair System consists of a:

- Sullair variable capacity compressor
- Sullair low pressure drop pre-filter
- Sullair SRC cycling refrigerated air dryer
- Sullair low pressure drop after-filter
- Compressed air storage tank
- Sullair SFP FlowLogic™ flow controller

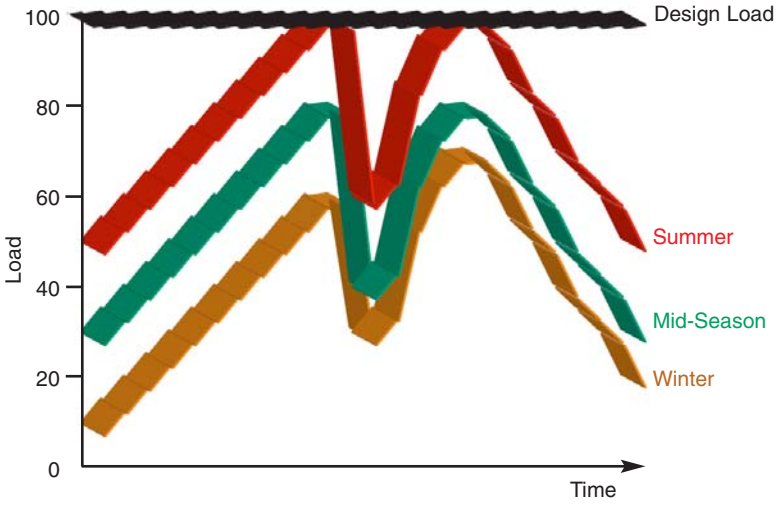
Why a cycling dryer?

Refrigerated air dryers rarely operate at full load. They are sized for maximum operating conditions – usually the hottest time of day at the hottest time of year with the air compressor at full load – however this is rarely the case.

Air demand and heat load fluctuate during the day… and temperatures fluctuate throughout the year, such that the dryer may rarely, if ever, operate at full load.

By choosing a dryer that matches power consumption to actual operating conditions, a significant amount of energy and energy cost can be saved.

Although energy savings depend on the operating conditions specific to the application, it is easy to see that energy savings can be easily in excess of 50%. For example a drop in inlet temperature alone, even without a change in flow can decrease the load on the dryer by 50%.



The graph above illustrates how heat loads fluctuate season to season. The SRC recognizes these fluctuations, maintaining dewpoint while maximizing energy efficiency.

Efficient and reliable components

Efficiency and reliability in Compliant Scroll Compressors

ENERGY EFFICIENT

SCROLL COMPRESSOR

These compressors employ two identical, concentric scrolls, one inserted within the other. One scroll remains stationary as the other orbits around it. This movement draws gas into the compression chamber and moves it through successively smaller "pockets" formed by the scroll's rotation, until it reaches maximum pressure at the center of the chamber. There, it's released through a discharge port in the fixed scroll. During each orbit, several pockets are compressed simultaneously, so operation is virtually continuous and pulse-free. Standard on models SRC-250 through SRC-1000, scroll compressors offer numerous benefits:

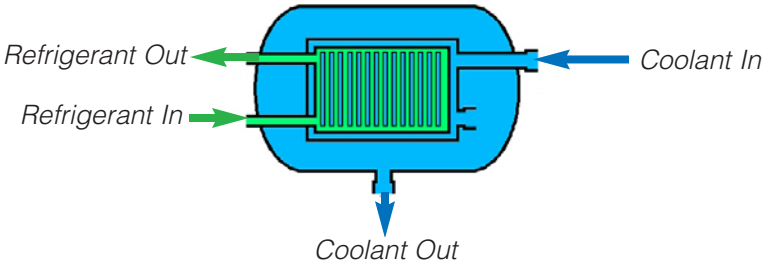
- A higher efficiency rating leads to energy savings of over 20%
- Extremely high reliability due to reduced vibration levels and fewer moving parts
- Compliant technology offers near indestructibility, even permitting liquid refrigerant returns

Dynamic Thermal Mass Storage Lowers Power Consumption

The SRC dryers overcome the typical disadvantages of cycling dryers—that of energy loss in the thermal mass, with two unique design features:

- The refrigerant to coolant exchanger is mounted inside the thermal tank itself. This unique feature reduces power consumption and improves temperature control.

- The coolant-to-air exchanger's compact design, with no interconnecting tubing or other sources of energy loss, improves thermal retention, further minimizing power consumption.



The use of the energy saving scroll compressors and R407C refrigerant ensures the SRC dryers avoid the high full-load power consumption associated with thermal mass-type dryers.

How the heat exchanger works:

A patented cross- and counter-flow heat exchanger combines heat transfer, separation and drain into a single combined component.

First is a cross-flow aluminum fin air-to-air heat exchanger. Then a counter-flow aluminum fin air-to-coolant heat exchanger. The air goes through a stainless steel demister separator. Condensate gathers in a segregated chamber that acts as an integral zero loss drain.

The air passes through the air-to-air exchanger being pre-cooled by the outgoing air. This reduces load on the refrigerant system reducing power consumption. It then passes through the air-to-coolant exchanger, which is fed cold coolant from the thermal mass. The air then passes through the efficient demister separator, and then back through the air-to-air exchanger to be re-heated before leaving the dryer.

The coolant recirculates through the air-to-coolant exchanger in the opposite direction to the air flow.

Unique 4-in-1 heat exchanger technology

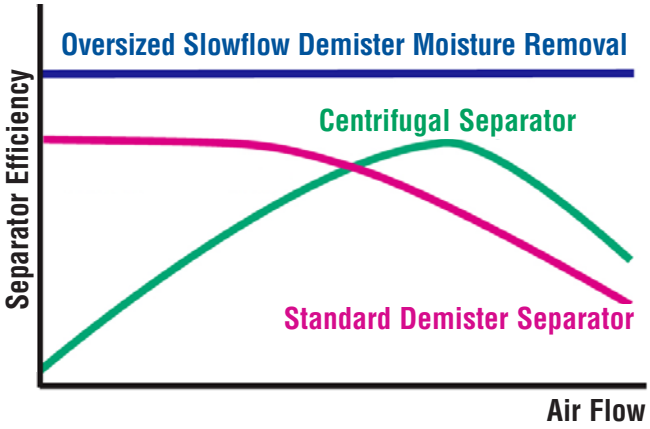
A feature of the 4-in-1 heat exchanger design is it's heavy cast aluminum construction, and it's thick styrofoam insulation, providing a high level of thermal storage. The short wide air channels provide low air flow velocity for maximum contact time, better heat exchange, very efficient separation and very low pressure drop.

The oversized air-to-air pre-cooler reduces load on the refrigerant system, allowing for a smaller compressor, lowering overall power consumption.

The assembly acts as a separator. Separation occurs when condensate forms, so most of it is already removed before the air reaches the demister separator. The demister now acts as a final polisher - removing the finest condensate droplets that have made it this far.

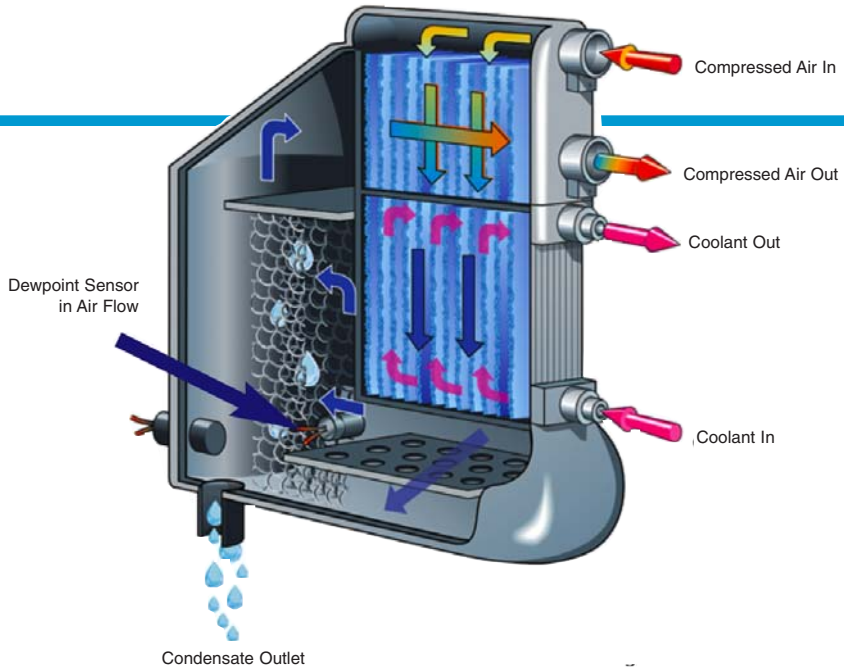
Oversized demister separator

The Sullair oversized slowflow demister is unique in that it provides efficient separation at any air flow. Other manufacturers use centrifugal or standard demisters, which are designed to operate efficiently at 100% of their rated flow, but lose efficiency at higher or lower flows.



Sullair's Cold Coalescing Separation

Since cycling dryers are specifically designed to operate in varying air flows, cold coalescing separation is the optimum choice for a cycling dryer. The cold coalescing design condenses oil vapors to liquid more efficiently than standard refrigerated dryers.



The condensate is separated in the demister separator, and is stored in a segregated condensate chamber at the bottom.

The dewpoint temperature sensor is in the air flow for accurate dewpoint measurement.

There is a drain level sensor which operates the integral zero-loss drain.

R407C: Friendly and efficient refrigerant

The most environmentally friendly refrigerant

R407C is used on all SRC dryer models. Why? With R407C being the most environmentally green refrigerant on the market, as well as being the most efficient, its many benefits made it an obvious choice:

- Zero ODP, ensuring compliance with the Montreal Protocol
- Lowest global warming potential
- No damage or depletion of the ozone layer
- No planned phase-out date

It's more efficient than any other refrigerant:

In addition to having the lowest environmental impact, R407C offers lower power consumption. This refrigerant is so efficient, smaller refrigerant charges are required and therefore use of a smaller refrigerant compressor.

- More efficient
- Less refrigerant required
- Smaller refrigerant compressor
- Lower power consumption

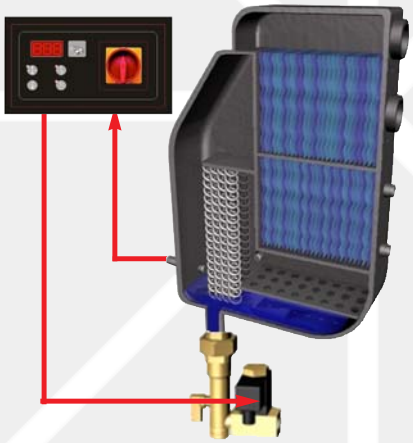
Intelligent integral zero-loss drain

The drain is one of the most important components

Models SRC-400 to SRC-1000 utilize a truly unique zero-loss drain integrated into the heat exchanger. Condensate is collected in a chamber, segregated from the air flow. As condensate builds, it activates a drain level sensor built into the chamber. This opens an external solenoid valve to evacuate the condensate, closing the valve again before any air escapes. The drain cycle continually adjusts itself to working conditions.

Self-diagnostic software avoids fault situations. And should an error occur, an alarm will be signalled and the drain will continue to operate on a pre-programmed timed drain cycle. The controls for the drain are part of the dryer's microprocessor fully integrated control and alarms.

All other models are equipped with a reliable timed drain but are available with a zero-loss drain on request.

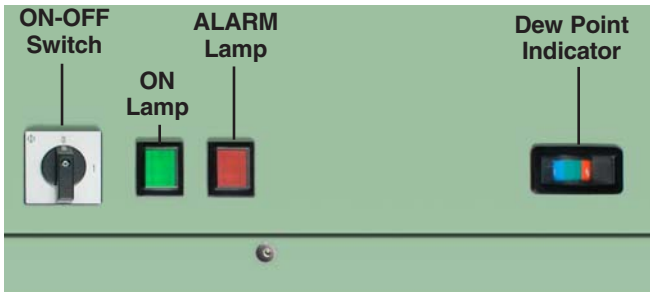


Sullair offers a drain alcove on all its standard dryers. This simple solution is a major benefit to the user . The drain is one of the most important components within the dryer. If it doesn't work properly the dryer's whole operation is compromised. The alcove offers simple access to perform any required maintenance.

On the SRC dryer the drain is not placed externally where it can be damaged during transport or operation, nor is it placed internally where it would be difficult to access it. The valve mechanism is fitted into an easily accessible niche. The solenoid valve is located in the drain alcove, accessible from the outside of the dryer without removing any panels for ease of testing and maintenance.

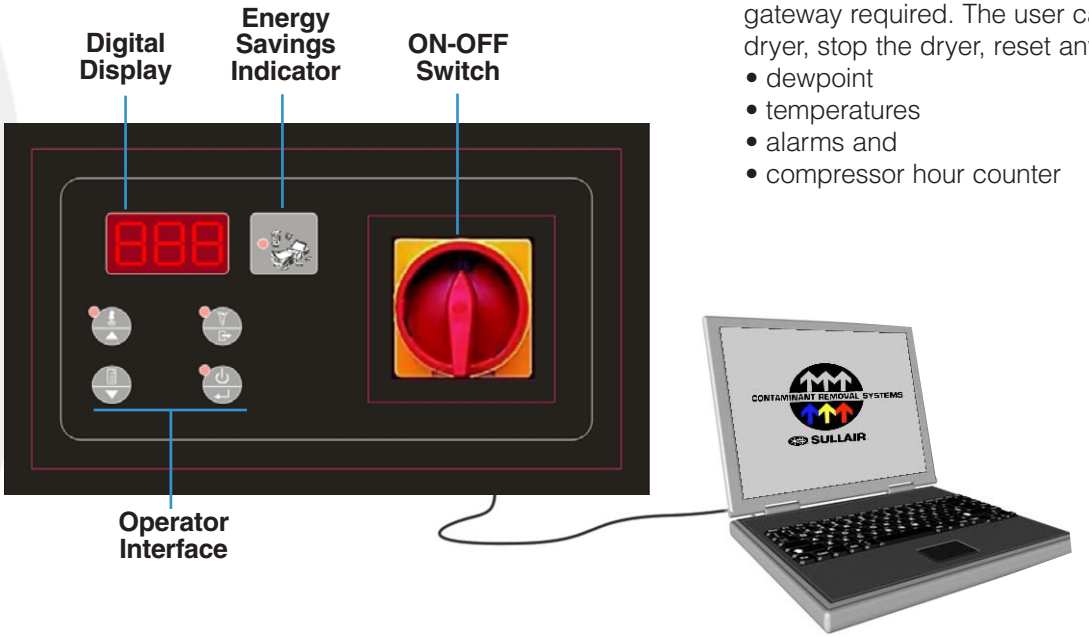
SRC Comprehensive Controls

Simple analog controls
The SRC-150 through SRC-200 use simple analog indicators and controls.

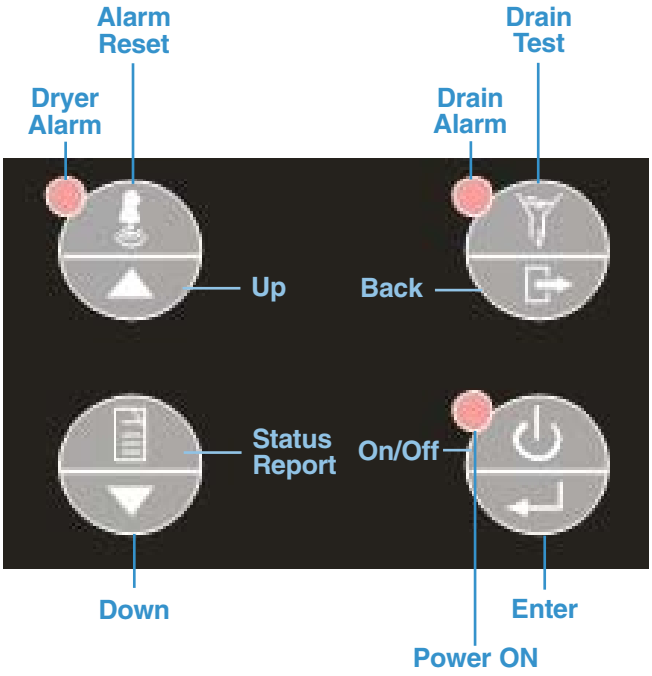


Advanced, user-friendly microprocessor controls
Models SRC-250 and larger features include:

- Digital multi-functional display
- Digital dewpoint temperature read-out for an accurate indication of actual working conditions
- Multiple alarm safety with easy-to-understand coded messages
- Extensive programmability allows system to be personalized to individual user needs
- Status reports for quick reference to dryer operation
- Indicator to optimize preventive maintenance
- Energy saving indicator shows when the dryer is in cycling standby
- Volt-free alarm contact offers a remote status signal



Operator Interface
Close-up of panel shows its many features:



Remote monitoring capabilities (optional)
The SRC dryer is the first and only Sullair dryer that includes an option for remote monitoring capabilities beyond standard alarm contacts. Through a simple RS-485 connection, the dryer can be connected directly to any MODBUS compatible system. No gateway required. The user can remotely start the dryer, stop the dryer, reset any alarm and monitor:

- dewpoint
- temperatures
- alarms and
- compressor hour counter

Dewpoint control and performance

Accurate Dewpoint Control

The SRC's sophisticated control program ensures lowest dewpoints at all times.

Typically cycling dryers only control the temperature of the thermal mass. The SRC monitors both the thermal mass and dewpoint temperature, allowing it to better control the dewpoint and anticipate load variations.

As the dewpoint sensor is positioned in the air flow itself, it senses the actual air conditions in the dryer improving the control.

The SRC's thermal mass is continuously circulated ensuring a stable temperature. Traditional dryers using sand or non-circulating liquids cannot guarantee uniform temperature control and put the dewpoint at risk.

Excellent Dewpoint Performance

Wide air channels and low air velocities maximize dew point performance. Standard demisters provide inferior separation at high air flows and centrifugal separators provide inferior separation at low air flows. Sullair's oversized "slowflow" demister is non-velocity sensitive and therefore offers perfect cross separation whatever the airflow.

The Sullair

All Inclusive "Peace of Mind" Warranty

Six refrigerant leak tests and seven operational tests are performed on every dryer. All test data is collected and stored for each and every dryer. This is Sullair's commitment to quality. And Sullair backs it with an unparalleled, non-pro-rated 5-year warranty (*parts and labor*) on the major components. No other manufacturer offers a warranty that is as all inclusive.

(Note: a Sullair prefilter must be installed upstream of the dryer as a prerequisite for this warranty.)

Quality is Third Party Certified and Guaranteed by Sullair.

Dryers are manufactured in an ISO 9001 environment and are ETL (UL), CSA Approved.

Smart Maintenance: easy access to all components from front panel

Access all components through one panel

All SRC dryers provide a single panel access to all components for standard maintenance. Some competitive dryers require as many as all four sides free for maintenance access (and for air flow making them difficult to install in an out-of-the-way location).

The control panel, located in a separate enclosure, is easily accessed from the front of the dryer.

The condenser section is separated from the main body of the dryer to allow proper air flow and condenser cooling during maintenance.

A condenser prefilter (standard on the SRC-250 and larger) reduces maintenance by protecting the condenser coils from dirt and blockage.

Maintenance is simplified by offering you two options:

1. Avoid emergencies by proactively maintaining your dryer.
2. Or if a component should fail, perform the required maintenance using a comprehensive service kit. Most parts are also available individually.

The solenoid valve is located in the drain alcove, accessible from the outside of the dryer without removing any panels for ease of maintenance and testing.

How to size your dryer and estimate your annual energy savings

The annual energy savings provided by a Sullair SRC Cycling Refrigerated Air Dryer can be significant. These savings can be approximated using the steps outlined below:

1. ***Determine*** **the following average and maximum operating conditions for your application:**

Air Flow:	Average =	***500*** cfm	Maximum =	***600*** cfm	**** Example:***
Ambient Temperature:	Average =	***70*** °F	Maximum =	***90*** °F	
Inlet* Temperature:	Average =	***90*** °F	Maximum =	***110*** °F	
Inlet* Pressure:	Average =	***125*** psig	Minimum =	***100*** psig	

* The actual conditions at the inlet to the dryer, considering the effects of all upstream equipment.

2. ***Divide*** **the Maximum Air Flow by Correction Factors C1, C2 & C3 (on next page) for your Maximum Ambient Temperature, Maximum Inlet Temperature and Minimum Inlet Pressure**
   This will give the Maximum Actual Flow at nominal conditions.
   600 cfm ÷ 1.08 ÷ 0.80 ÷ 1.00 = 694 cfm

3. ***Choose*** **the first model of dryer (from the table on the next page) with a Nominal Flow that exceeds Maximum Actual Flow.**
   Dryer needed: SRC-700 (700 cfm > 694 cfm)

4. ***Divide*** **the Average Air Flow by Correction Factors C1, C2 and C3 for your Average Ambient Temperature, Average Inlet Temperature and Average Inlet Pressure**
   This will give the Average Actual Flow at nominal conditions.
   500 cfm ÷ 1.23 ÷ 1.26 ÷ 1.03 = 313 cfm

5. ***Divide*** **the Average Actual Flow by the dryer's Nominal Flow to get your % Load.**
   313 cfm ÷ 700 cfm = 0.45 or 45%

6. ***Interpolate*** **the chart below to get the Estimated Power Consumption for the dryer at the % Load**

Power Consumption at % Load

Model	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
SRC-150	0.58	0.70	0.82	0.93	1.03	1.12	1.20	1.27	1.34	1.40	1.44
SRC-175	0.63	0.76	0.88	0.99	1.10	1.20	1.28	1.36	1.43	1.50	1.54
SRC-200	0.69	0.83	0.97	1.09	1.21	1.32	1.41	1.50	1.58	1.65	1.70
SRC-250	0.85	1.14	1.39	1.60	1.78	1.94	2.09	2.24	2.40	2.58	2.66
SRC-325	0.78	1.11	1.38	1.61	1.81	1.99	2.16	2.33	2.51	2.71	2.80
SRC-400	0.99	1.46	1.84	2.15	2.39	2.59	2.77	2.93	3.10	3.28	3.35
SRC-500	0.96	1.45	1.85	2.16	2.41	2.62	2.80	2.97	3.15	3.34	3.41
SRC-700	0.71	1.61	2.40	3.08	3.67	4.16	4.56	4.86	5.07	5.20	5.24
SRC-850	0.88	1.92	2.83	3.62	4.29	4.86	5.31	5.66	5.90	6.05	6.10
SRC-1000	0.84	1.98	2.98	3.85	4.59	5.21	5.71	6.10	6.37	6.53	6.58

Power Consumption of SRC-700 at 45% load = 3.9 kW

7. ***Multiply*** **the Estimated Power Consumption by the hours per day and days per year the dryer will be operating, and then** ***multiply*** **by the price of energy in $ per kWh. This will give you your Total Annual Energy Costs:**
   kW x hr/day x days/year x $/kWh = $/year
   3.9 kW x (24hrs per day) x (365 days per year) x ($0.10 per kWh) = $ 3,416 per year

8. ***Calculate*** **the estimated annual energy cost of a typical non cycling dryer which would operate at full load all the time:**
   5 kW** x (24hrs per day) x (365 days per year) x ($0.10 per kWh) = $ 4,380 per year

9. ***Compare*** **the two to get your annual energy savings:**
   $ 4,380 - $3,416 = $964 annual energy savings!

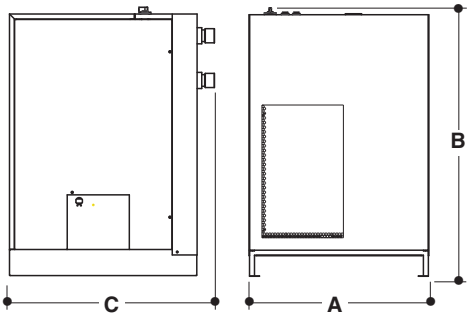
** Typical value intended for comparison only.

Specifications:
Models SRC150 to SRC1000

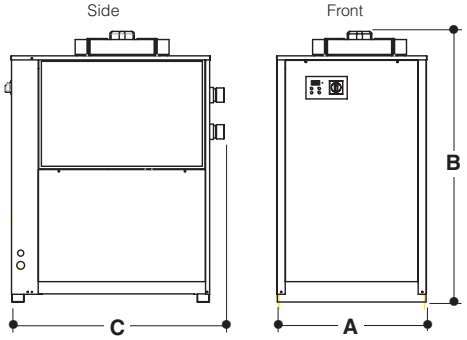
Model	Nominal Flow (scfm)	Air Connections	Absorbed Power (kW)	Pressure Drop (psi)	Dimensions (in) A	B	C	Weight* (lbs)	Primary Voltages
SRC150	150	1-1/2" NPT-F	1.42	1.71	28.5	42.5	32.5	322	115V/1Ph/60Hz 230V/1Ph/60Hz
SRC175	175	1-1/2" NPT-F	1.62	2.07	28.5	42.5	32.5	335	230V/1Ph/60Hz
SRC200	200	1-1/2" NPT-F	1.62	2.97	28.5	42.5	32.5	335	230V/1Ph/60Hz
SRC250	250	1-1/2" NPT-F	3.23	1.17	29.0	52.1	42.3	562	230V/3Ph/60Hz 460V/3Ph/60Hz
SRC325	325	1-1/2" NPT-F	3.23	1.89	29.0	52.1	42.3	562	460V/3Ph/60Hz 230V/3Ph/60Hz
SRC400	400	2" NPT-F	3.23	0.99	29.0	52.1	42.3	591	460V/3Ph/60Hz 230V/3Ph/60Hz
SRC500	500	2" NPT-F	3.23	1.35	29.0	52.1	42.3	591	460V/3Ph/60Hz 230V/3Ph/60Hz
SRC700*	700	3" NPT-F	4.94	0.90	29.0	72.6	55.3	895	460V/3Ph/60Hz 230V/3Ph/60Hz
SRC850*	850	3" NPT-F	4.94	1.17	29.0	72.6	55.3	970	460V/3Ph/60Hz 230V/3Ph/60Hz
SRC1000*	1000	3" NPT-F	6.17	1.62	29.0	72.6	55.3	970	460V/3Ph/60Hz 230V/3Ph/60Hz

* Also available as water-cooled models Other voltages available on request

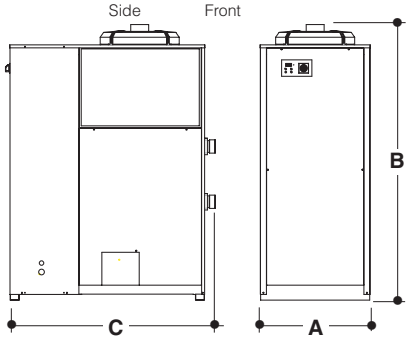
SRC-150 to SRC-200



SRC-250 to SRC-500



SRC-700 to SRC-1000



Performance data based on:

Ambient temperature	100°F
Inlet temperature	100°F
Inlet pressure	100 psig

For flow rates at other conditions, please contact Sullair for correct sizing

Performance data obtained and presented in accordance with CAGI Standard No. ADF 100, "Refrigerated Compressed Air Dryers – Methods for Testing and Rating"

Technical Data

Maximum ambient temperature	113°F
Maximum inlet temperature	140°F
Minimum ambient temperature	41°F
Maximum pressure	203 psig
Refrigerant	R407C

Flow correction factors

Capacity correction to be used when operating conditions differ from those shown above. To obtain dryer capacity at new conditions, multiply nominal capacity x C1 x C2 x C3.

Ambient Temperature (C1)

°F	60	70	80	90	100	110	113
°C	16	21	27	32	38	43	45
Correction Factor	1.3	1.23	1.16	1.08	1.00	0.92	0.89

Inlet Temperature (C2)

°F	90	100	110	120	130	140
°C	32	38	43	49	54	60
Correction Factor	1.26	1.00	0.80	0.63	0.50	0.38

Inlet Pressure (C3)

Pressure psi g	50	80	100	125	150	170	190	203
Pressure bar g	3.5	5.5	6.9	8.6	10.3	11.7	13.1	14.0
Correction Factor	0.76	0.93	1.00	1.03	1.11	1.14	1.16	1.17

Air Audits

Sullair air audits review your entire compressed air system to identify ways to maximize efficiency; reduce waste; and reduce utility, maintenance, and equipment costs. And, Sullair is the only compressor manufacturer to offer three levels of air system audits that address the Department of Energy's standard levels — walk-through, assessment, and audit.

CUSTOMER CARE BY SULLAIR™

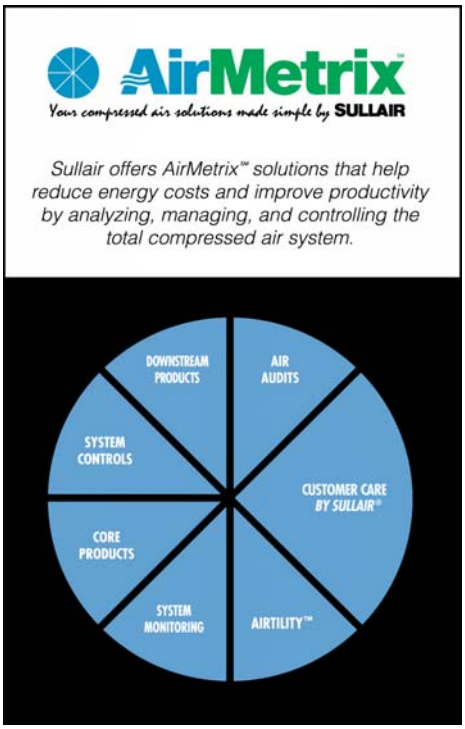
Our Customer Care program gives you a complete package of all the system maintenance resources you need, and our training programs teach you how to properly operate, maintain, and service Sullair equipment. Our global customer support network gives you high-speed access to genuine Sullair service parts and responsive, knowledgeable service.

AirTility™

Sullair's AirTility™ is the industry's most comprehensive air outsourcing solution. Think of AirTility™ for your compressed air system just as you think of the electrical and water systems at your facility — as a utility. AirTility™ is for those who want a reliable, safe compressed air system with no capital expenditures and no maintenance worries.

System Monitoring

Sullair's eConnect™ remotely monitors and diagnoses the health of your compressed air equipment. Using only a computer and a web browser, the status of your entire system can be viewed from anywhere in the world. System monitoring also helps in preventive maintenance and trend analysis.



Core Products

No one gives you more ways to efficiently produce clean air power than Sullair. Compressors are the heart of our business, and our reputation for reliability is reflected in our entire industrial compressor range, from 5 to 600 hp. Sullair also offers a wide range of dryers and filters for contaminant removal, as well as a range of rotary screw vacuum systems.

System Controls

Compressed air system controls match compressed air supply with system demand, and let you take a total systems approach to the most efficient production, distribution, and use of compressed air. Proper control is essential to efficient system operation and high performance.

Downstream Products

Sullair — and our distributor partners — are complete systems solutions providers for the demand side of your compressed air system. From the filter, regulator, and lubricator to the piping system and storage tanks, we provide a complete range of equipment and expertise to help keep your system at peak productivity.

For more information on Sullair products and services, please contact your local Sullair distributor.

SULLAIR®

Always air. Always there.

www.sullair.com
Sullair Corporation, 3700 East Michigan Boulevard
Michigan City, IN 46360
Telephone: 1-800-SULLAIR or 1-219-879-5451