Energy Saving Refrigeration Air Dryers

CRC Cycling Dryers (125 - 1000 scfm)
CRV Variable Operation Dryers (1200 - 2400 scfm)

EXTENDED WARRANTY - AVAILABLE -

domnick hunter

www.domnickhunter.com

Why an energy saving refrigeration air dyer?

The Problem

Compressed air is an essential power source that is widely used throughout industry. This safe, powerful and reliable utility can be the most important part of your production process. However, your compressed air will contain water, dirt, wear particles, bacteria and even degraded lubricating oil which all mix together to form an unwanted abrasive sludge. This sludge, often acidic, rapidly wears tools and pneumatic machinery, blocks valves and orifices causing high maintenance and costly air leaks. It also corrodes piping systems and can bring your production process to an extremely expensive standstill! Only compressed air that is clean and dry will ensure maximum savings.

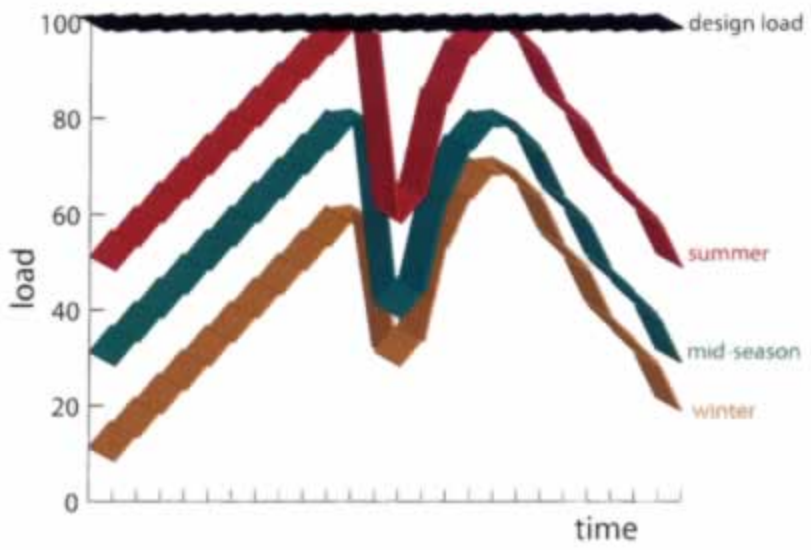
The Solution

These costly contamination problems can be avoided by installing a domnick hunter CRC or CRV compressed air refrigeration dryer package complete with OIL-X EVOLUTION filtration. Either package is suitable for use with any compressor type and provide air quality to ISO 8573.1 Class 1.4.1. Dryers are available from stock for quick and easy delivery.

Energy Saving Dryers

A refrigeration dryer is typically selected to achieve its design performance at the user's most extreme working conditions. (ie. a warm summer day with the air compressor operating at maximum load)

This maximum condition, however, is very rarely achieved in everyday conditions. First, the air compressor load will vary significantly during a working day and will rarely be at full load, thereby significantly reducing the load on the dryer itself.



typical daily system load

Furthermore, average temperatures are well below the maximum inlet and ambient temperatures for which the system has been sized. Reduced temperatures at colder moments during the day and overall temperature reductions during the mid-season and winter add a further reduction to the load on the dryer.

The result is that the refrigeration dryer could, if it were to adapt its working cycle to the real load it is under, save significant amounts of energy.

domnick hunter energy saving dryers do just that, continuously and precisely altering their operation according to the load, in the full 0 -100% operating range.

The result is close dewpoint control with power consumption reduction up to 80%.

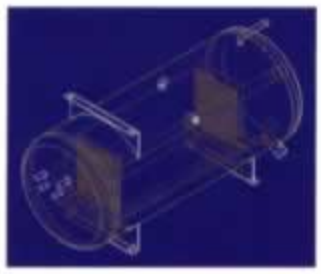
CRC: the new generation of cycling dryers

The CRC has taken cycling dryer technology to a new level. Nearly 40 years ago we introduced our first thermal mass cycling dryer; the CRC has built on this vast experience, offering even better control and lower power consumption.

Lowest Power Consumption

The CRC overcomes the traditional disadvantage of cycling dryers, that of energy loss in the thermal mass, due to two unique design features:

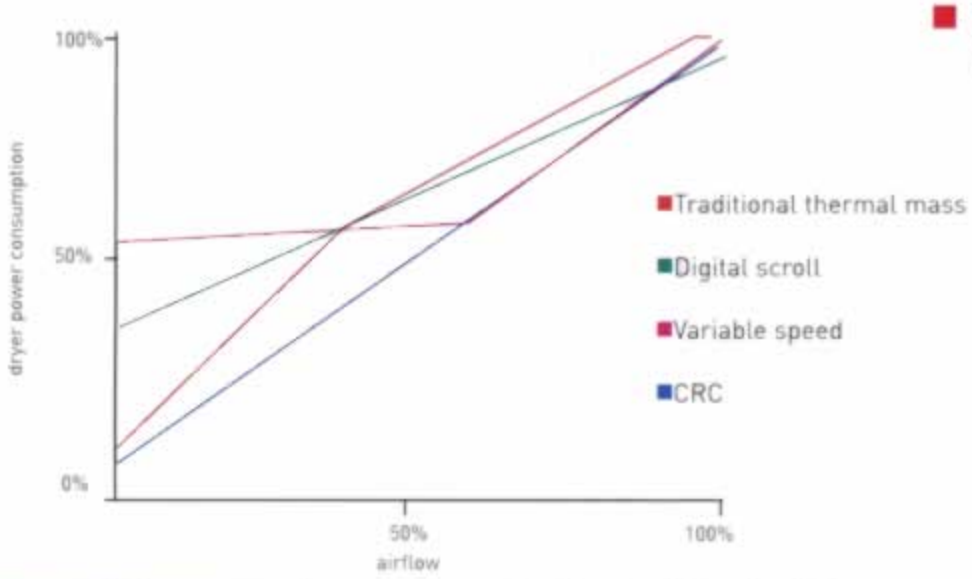
- The refrigerant-to-coolant exchanger is mounted inside the thermal mass tank itself. This unique feature both reduces power consumption and improves temperature control.



thermal mass tank with integral exchanger

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

Together with the application of energy saving scroll compressors and refrigerant R407C, this ensures that CRC avoids the high full load power consumption typically suffered by thermal mass type dryers.



CRC energy saving curve versus leading traditional solutions

When compared with competing energy saving technologies, CRC consumes less energy across the full air flow range. Consequently CRC is the optimum solution, whatever the working cycle.

Accurate Dewpoint Control

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

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

As the dewpoint sensor is positioned in the air flow itself it senses the real air conditions in the dryer, to the benefit of improved control.

The CRC's thermal mass is continuously circulated ensuring a stable temperature. Traditional dryers using sand or non-circulating liquids cannot guarantee uniform temperature control, thereby putting the dew-point at risk.

Maximized Ease of Use

The CRC's thermal mass features a closed circuit design, offering numerous benefits:

- The dryer arrives pre-filled and ready to use.
- No risk of coolant losses.
- No chance of long term performance reduction due to thermal mass deterioration.
- No risk of oxidization because the circuit is sealed from the external ambient.

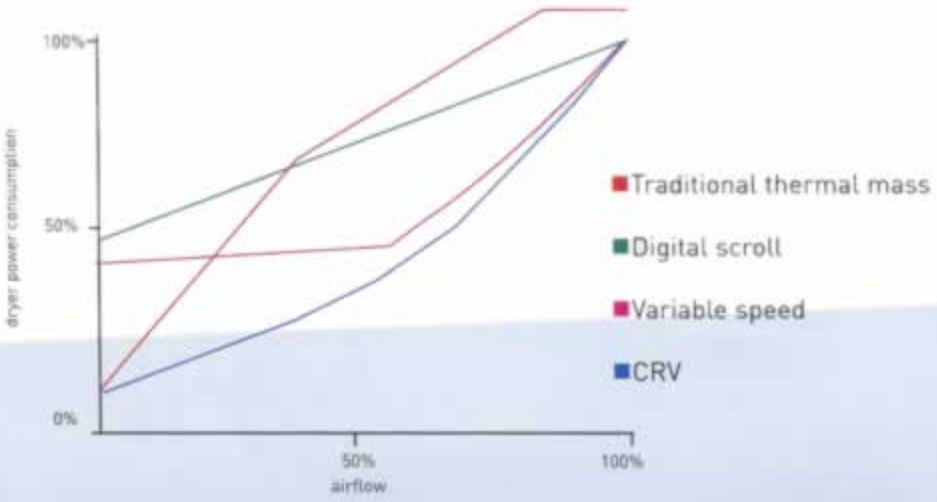
CRV: the most intelligent refrigeration dryer available

The CRV is truly a unique concept in energy saving refrigeration drying. No technology available today can match its innovative approach towards achieving maximum energy savings whatever the working conditions. And all this in a package offering tight dewpoint control and compact dimensions.

Multiple Operation Mode

The CRV is two dryers in one. It combines the merits of thermal mass and variable speed operation, offering a variable operation dryer which continuously and accurately matches its operating mode to the real working conditions.

The operation mode is controlled by CRV's advanced microprocessor, which automatically adapts dryer operation in order to achieve unmatched energy savings.



CRV energy saving curve versus leading traditional solutions

Energy savings are further improved due to performance enhancing concepts that maximize savings:

- "frequency enhancements" during variable speed operation
- and "soft compressor start" during cycling operation.

The result is a dryer that offers the very lowest energy consumption at all load conditions, offering significant savings and excellent dew point control when compared with all solutions currently available on the market. If the very lowest energy consumption across a broad working range is the goal, then CRV is the solution.

Variable Speed Operation

The CRV features an inverter for operation at medium to high air flows.

The compressor runs continuously with the inverter varying the compressor power to the actual working conditions. Energy consumption is reduced accordingly.

frequency enhanced inverter

The CRV also offers the unique "frequency enhancement" concept to effectively increase the variable speed operating span by up to 50% compared with conventional variable speed dryers. The CRV continues to save energy when traditional variable speed dryers cannot.

Cycling Operation

Cycling operation takes place at lower air flows, with the compressor cycling on and off according to the effective load on the dryer.

The inverter controlled "soft compressor start" process allows the compressor to start up twice as often as traditional dryers. The result is tight dew-point control and improved compressor service life.

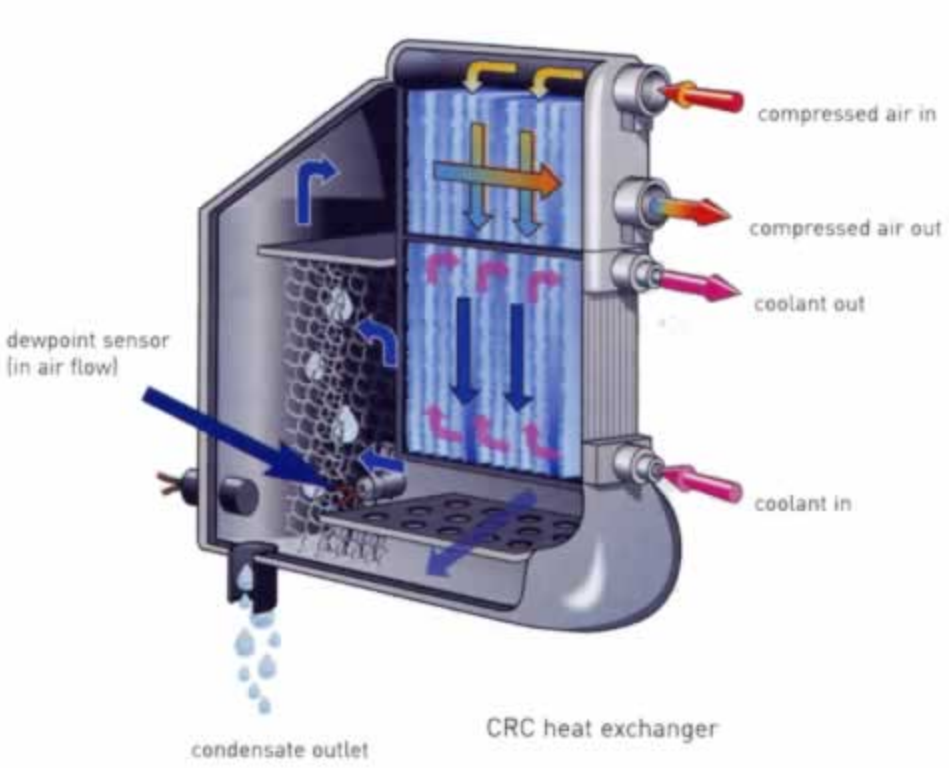
The unique cold mass exchanger is encased in a special high density thermal shield insulation (TSI) and acts as the thermal mass. At reduced loads CRV maintains accurate dewpoint control without using any more energy than required.

Unique heat exchanger technology

All-in-one Patented Technology

The CRC and CRV feature:

- Aluminum heat exchangers for maximum ease of use.
- Tightest dewpoint control and excellent long-term durability.
- Compact design.
- Unique 3-in-1 configuration including:
  - Pre-coolor/re-heater stage
  - Final cooling stage
  - Separation stage
- Models CRC400 - CRC1000 feature a unique 4-in-1 configuration with an integral electronic zero-loss drain.



CRC heat exchanger

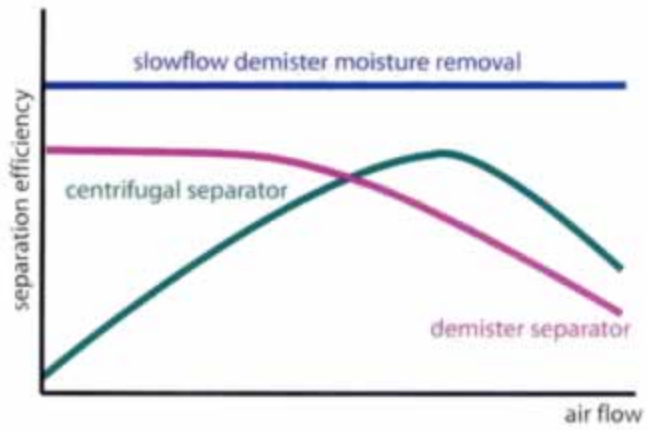
Easy to Use

The use of aluminum throughout offers notably better resistance to aggressive air than copper solutions without suffering the reduced energy efficiency of stainless steel heat exchangers.

The CRV features a modular design concept.

Excellent Dewpoint Performance

Wide air channels and low air velocities maximize dew point performance.



The oversized "slowflow" demister is non-velocity sensitive and therefore offers perfect cross separation whatever the airflow. Standard demisters provide inferior separation at high air flows and centrifugal separators provide inferior separation at low air flows.

Reduced Power Consumption

The use of aluminum allows for an extremely high exchange surface area, offering an improved exchange efficiency when compared with other materials.

The all-in-one design with extremely low air velocities provides class leading pressure drop levels and offers the user notable energy savings. The oversized precooler-reheater offers a high freecooling effect for additional reduction in power consumption.

Special high density thermal shield insulation (TSI) ensures low thermal transmission from the heat exchanger and maximizes energy efficiency.

Advanced technical solutions

Microprocessor Control

Advanced microprocessor controls are standard on Models CRC250 - CRC1000. The microprocessor controls on CRV models have been specifically designed to allow it to maximize its variable operation potential.

The following features are offered:

- User friendly.
- Digital multi-function display.
- Digital dewpoint temperature read-out for a highly accurate indication of the actual working conditions.
- Multiple alarm safety with easy to understand coded alarm messages.
- Extensive programmability to allow the system to be personalized to individual customer needs.
- Status Report (historical data), offering a quick reference to dryer operation.
- Maintenance indicator to allow the user to optimize preventative maintenance.
- Volt-free alarm contact offering a remote status signal.
- Optional RS485 serial port connection available.

CRV microprocessor

Energy saving indication (10 segment on CRV), informing the user that the dryer is in energy saving mode.

CRC250-1000 microprocessor

Dryer hour counter and compressor hour counter indicate energy savings.

Compliant Scroll Compressors

Compliant scroll compressors (standard on Models CRC250 - CRC1000) 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 for near indestructibility, even permitting liquid refrigerant returns.

ENERGY EFFICIENT

SCROLL COMPRESSOR

Refrigerant R407C

R407C, used on all models, is the most environmentally friendly refrigerant available.

Benefits include:

- Zero ODP, ensuring compliance with the Montreal Protocol, no damage to the ozone layer and no planned phase-out date.
- Around 10% less power consumption than R134a, and 5% less than R404A.
- 50% less Global Warming Potential than R404A.

MONTREAL 1989 PROTOCOL

Unique Condensate Drain

Models CRC400 - CRC1000 utilize a unique patent pending condensate drain integrated into the heat exchanger, with the valve mechanism fitted in an easily accessible niche. The drain cycle continuously adjusts itself to the working conditions ensuring zero air loss and zero energy loss. Self diagnostic software avoids fault situations and if an error does occur, an alarm will be signalled and the drain will continue to operate with a pre-programmed drain cycle.

All other models are fitted with a reliable timed drain, with a zero-loss version available on request.

Peace of mind

Easy to Use

The CRC and CRV offer the user maximum peace of mind.

- High operating limits.
- Easily removable panels with frontal access to all major components.
- Compact unit dimensions.
- Drain niche for easy drain access.
- Condenser pre-filter (Model CRC250 and above) for improved performance and reduced maintenance.
- User friendly control section.

drain niche

Easy to Select

Correct dryer selection is at the heart of an optimized compressed air system.

domnick hunter's selection software permits dryer sizing according to the user's exact operating conditions and allows an accurate calculation of the notable energy savings CRC and CRV will offer according to the user's system demand.

The Best Long-Term Investment

The CRC and CRV are produced in a state-of-the-art manufacturing site featuring the most advanced production processes.

Stringent individual testing of each unit, including multiple helium leak tests, ensure that the user receives a product designed for years of trouble-free operation.

domnick hunter service back-up ensures that the compressed air system will be operating at optimum conditions at all times.

helium leak test

Compressed Air Quality & Product Selection

COMPRESSED AIR QUALITY TO ISO 8573.1

The international standard for compressed air quality provides a simple system of classification for the three main contaminants present in any compressed air system - DIRT, WATER and OIL. To specify the quality class required for a particular application, simply list the class for each contaminant in turn.

Class	Solid Particle Maximum number of particles per m^3			Water Pressure Dewpoint °F (°C)	Oil (incl. vapor) mg/m^3
	0.1-0.5micron	0.5-1 micron	1.0-5micron		
1	100	1	0	-94 (-70)	0.01
2	100,000	1,000	10	-40 (-40)	0.1
3	-	10,000	500	-4 (-20)	1
4	-	-	1,000	37.4 (3)	5
5	-	-	20,000	44.6 (7)	-
6	-	-	-	50 (10)	-

Intelligent filtration solutions

A compressed air system does not only necessitate the removal of condensate by means of a refrigeration dryer but also requires filtration in order to remove oil and impurities.

Modern synthetic compressor oils allow equally good oil removal as long as the air remains below 100°F (38°C) giving no added benefit in installing the filter at the coldest point in the dryer. By avoiding the deteriorating oil removal capacity due to liquid water carry-over suffered by integral filters, domnick hunter OIL-X EVOLUTION external filters provide superior oil removal.

NEW filtration technology

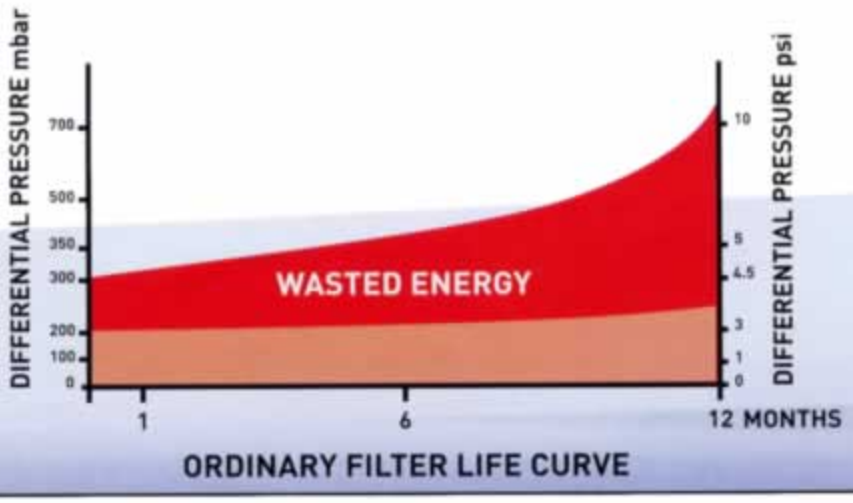
OIL-X EVOLUTION compressed air filters use very little energy as they have a low resistance to air flow. Advancements such as deep bed pleating, graded density media and an oleophobic coating have led to a high performance filter element with low initial energy costs. Differential pressure starts low and stays low throughout its life thus the element service life no longer depends exclusively on pressure drop. The optional incident indicator is valuable for indicating premature blockage of an element. However, since element media breaks down over an element's life, changing the element at regular intervals is critical to maintain downstream air quality.

Aerospace Technology

The new domnick hunter OIL-X EVOLUTION range of compressed air filters has been designed from the outset to meet current and forthcoming requirements for compressed air quality. Using aerospace technology, domnick hunter has optimized the flow path through the housing and element, significantly reducing air turbulence and pressure losses. Providing an optimal flow path is key to reducing system operating costs.

Old filtration technology

Ordinary compressed air filters can consume too much energy, as any filter by design is a restriction to air flow. During their working life, this restriction increases dramatically, and typically over one year can consume more energy than it costs to replace the element. Historically, service life has been dependent on differential pressure and manufacturers have recommended a replacement filter element at between 7 psi and 10 psi differential. This will cost you a significant 5% increase in compressor energy. In fact you are driving your compressor with the brakes on!



ORDINARY FILTER LIFE CURVE

OIL-X EVOLUTION FILTER LIFE CURVE

OIL-X EVOLUTION

The most energy efficient filter element in the world

Full Flow Inlet
Inlet conduit matches inlet diameter, reducing pressure drop and running costs.

Even Flow Distribution
Air flow is distributed evenly throughout the filter element using a flow distributor.

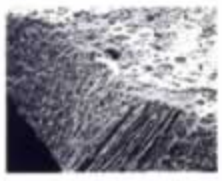
Conical Air Diffuser
Air flow distribution is further improved by elimination of turbulence.

Deep Bed Pleating

Graded density nanofiber filter media

For particle and aerosol removal, deep bed pleating provides 4.5 x more filter media than an ordinary element. This allows for a larger filtration surface area, lower flow velocities, increased dirt holding capacity, lower running costs and a more compact filter element. Graded density further improves filter life and overall performance.

Oil Vapor Removal



Activated carbon

While mechanical filtration is capable of removing extremely fine liquids and solid particles, it cannot remove gaseous contaminants such as oil vapor or odors. To efficiently remove these vapors, OIL-X EVOLUTION ACS/OVR filters employ adsorption techniques using a deep bed of activated carbon.

domnick hunter Complete Solution including OIL-X EVOLUTION filtration Pressure drop = <4 psid

Traditional System including Pre and After Filtration Pressure drop = <10 psid

Technical Specifications
CRC125 - CRC1000

***Capacities are based upon:**

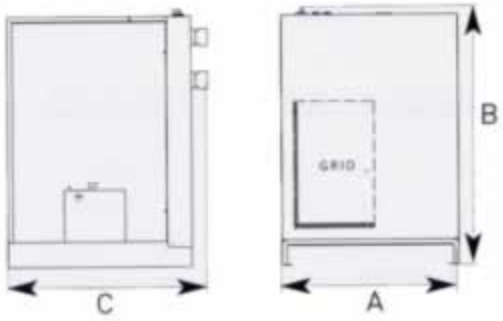
Ambient temperature:	100°F (38°C)
Inlet temperature:	100°F (38°C)
Inlet pressure:	100 psi g (7 bar g)

For flow rates at other conditions, please contact domnick hunter for correct sizing.

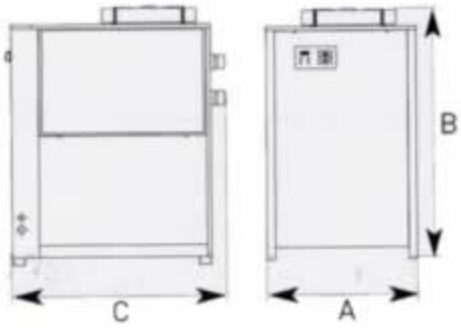
Model	*Nominal Flow (scfm)	Air Connections	Absorbed Power (kW)	Pressure Drop (psi)	Dimension ins (mm)			Weight		Primary Voltages
					A	B	C	lbs	kg	
CRC125	125	1½" NPT-F	1.42	1.08	28.5 (723)	42.5 (1080)	32.5 (826)	322	146	115V/1Ph/60Hz 230V/1Ph/60Hz
CRC150	150	1½" NPT-F	1.42	1.71	28.5 (723)	42.5 (1080)	32.5 (826)	322	146	115V/1Ph/60Hz 230V/1Ph/60Hz
CRC175	175	1½" NPT-F	1.62	2.07	28.5 (723)	42.5 (1080)	32.5 (826)	335	152	230V/1Ph/60Hz
CRC200	200	1½" NPT-F	1.62	2.97	28.5 (723)	42.5 (1080)	32.5 (826)	335	152	230V/1Ph/60Hz
CRC250	250	1½" NPT-F	3.23	1.17	29.0 (737)	52.1 (1323)	42.3 (1074)	562	255	230V/1Ph/60Hz 230V/3Ph/60Hz 460V/3Ph/60Hz
CRC325	325	1½" NPT-F	3.23	1.89	29.0 (737)	52.1 (1323)	42.3 (1074)	562	255	460V/3Ph/60Hz
CRC400	400	2" NPT-F	3.23	0.99	29.0 (737)	52.1 (1323)	42.3 (1074)	591	268	460V/3Ph/60Hz
CRC500	500	2" NPT-F	3.23	1.35	29.0 (737)	52.1 (1323)	42.3 (1074)	591	268	460V/3Ph/60Hz
CRC700	700	2½" NPT-F	4.94	0.90	29.0 (737)	72.6 (1844)	55.3 (1405)	895	406	460V/3Ph/60Hz
CRC850	850	2½" NPT-F	4.94	1.17	29.0 (737)	72.6 (1844)	55.3 (1405)	970	440	460V/3Ph/60Hz
CRC1000	1000	2½" NPT-F	6.17	1.62	29.0 (737)	72.6 (1844)	55.3 (1405)	970	440	460V/3Ph/60Hz

Other voltages available upon request.

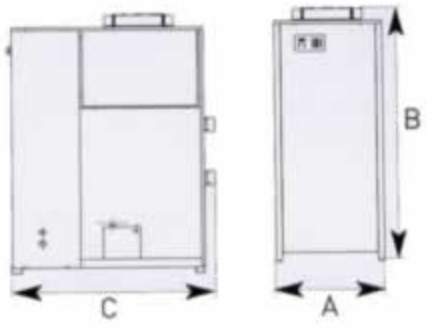
CRC125 - CRC200



CRC250 - CRC500



CRC700 - CRC1000



Technical data

Maximum ambient temperature:	115°F (46°C)
Maximum inlet temperature:	140°F (60°C)
Minimum ambient temperature:	41°F (5°C)
Maximum Pressure:	203 psi g (14 bar g)
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 x C4.

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

Dewpoint (C4)

°F	45	50
°C	7	10
Correction Factor	1.22	1.42

Technical Specifications
CRV1200 - CRV2400

***Capacities are based upon:**

Ambient temperature:	100°F (38°C)
Inlet temperature:	100°F (38°C)
Inlet pressure:	100 psi g (7 bar g)

For flow rates at other conditions, please contact domnick hunter for correct sizing.

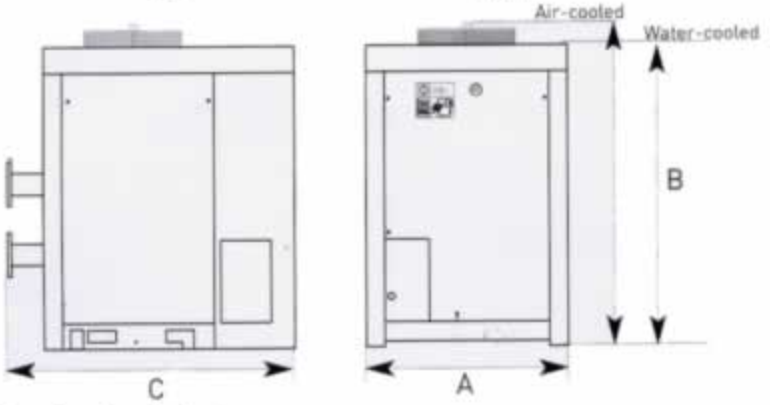
Air-Cooled

Model	*Nominal Flow (scfm)	Air Connections	Adsorbed Power (kW)*	Pressure Drop (psi)	Dimension ins (mm)			Weight		Primary Voltages
					A	B	C	lbs	kg	
CRV1200	1200	3" NPT-M	5.22	3.57	39.8 (1010)	64.6 (1640)	58.7 (1491)	990	449	460V/3Ph/60Hz
CRV1600	1600	4" ANSI	9.09	2.65	39.8 (1010)	64.6 (1640)	78.4 (1991)	1116	506	460V/3Ph/60Hz
CRV2000	2000	6" ANSI	10.26	2.36	39.8 (1010)	64.6 (1640)	78.4 (1991)	1210	549	460V/3Ph/60Hz
CRV2400	2400	6" ANSI	10.26	2.65	39.8 (1010)	64.6 (1640)	78.4 (1991)	1232	559	460V/3Ph/60Hz

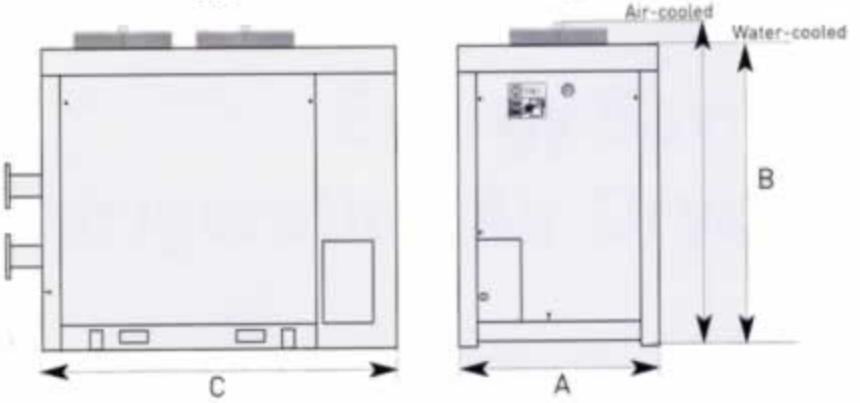
Water-Cooled

Model	*Nominal Flow (scfm)	Air Connections	Adsorbed Power (kW)	Pressure Drop (psi)	Dimension ins (mm)			Weight		Primary Voltages
					A	B	C	lbs	kg	
CRV1200-W	1200	3" NPT-M	4.62	3.57	39.8 (1010)	59.1 (1501)	58.7 (1491)	990	449	460V/3Ph/60Hz
CRV1600-W	1600	4" ANSI	7.61	2.65	39.8 (1010)	59.1 (1501)	78.4 (1991)	1116	506	460V/3Ph/60Hz
CRV2000-W	2000	6" ANSI	7.26	2.36	39.8 (1010)	59.1 (1501)	78.4 (1991)	1210	549	460V/3Ph/60Hz
CRV2400-W	2400	6" ANSI	7.11	2.65	39.8 (1010)	59.1 (1501)	78.4 (1991)	1232	559	460V/3Ph/60Hz

CRV1200



CRV1600 - CRV2400



Technical data

Maximum ambient temperature:	122°F (50°C)
Maximum inlet temperature:	140°F (60°C)
Minimum ambient temperature:	41°F (5°C)
Maximum Pressure:	174 psi g (12 bar g)
Refrigerant:	R407C

Flow correction factors

Capacity correction factors 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 x C4.

Ambient Temperature (C1) (air-cooled only)

°F	90	100	110	120	122
°C	32	38	43	49	50
Correction Factor	1.09	1.00	0.95	0.81	0.72

Inlet Temperature (C2)

°F	90	100	110	120	130	140
°C	32	38	43	49	54	60
Correction Factor	1.24	1.00	0.84	0.70	0.58	0.47

Inlet Pressure (C3)

Pressure psi g	50	80	100	125	150	174
Pressure bar g	3.5	5.5	6.9	8.6	10.3	12.0
Correction Factor	0.80	0.95	1.00	1.08	1.13	1.17

Dewpoint (C4)

°F	45	50
°C	7	10
Correction Factor	1.23	1.40

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