Featuring DemandCycle
Energy Management System
On Models CRD250 & Above

domnick hunter

CRD Refrigeration Dryers

125 - 3000 cfm

Energy efficient
compressed air refrigeration dryers

Compressed Air contains water, oil and dirt

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 totally clean and dry will ensure maximum savings.

Corrosion

Unwanted Abrasive Sludge

Damaged Tools

The Solution

All of these costly problems can be avoided by installing a **domnick hunter** CRD compressed air refrigeration dryer package complete with OIL-Xplus filtration. The packages are suitable for use with any compressor type and provide air quality to ISO 8573.1 Class 1.4.1.

Benefits

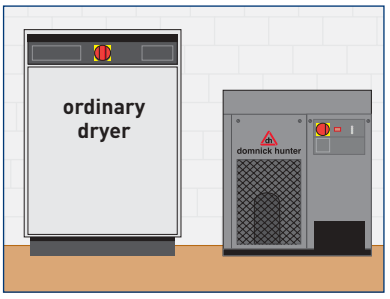
Clean, Dry, Compressed Air

Stops Damage & Corrosion

- Prevents product spoilage
- Prolongs life of compressed air systems and pneumatic tools

Energy Efficient, Low Running Costs

- Compliant scroll compressors (Models CRD250 – CRD3000) reduce energy costs by 20%
- Use of R407C refrigerant in combination with High Performance Cross Flow Heat Exchanger provides savings of up to 10%.
- Zero air loss condensate drain ensures no unnecessary loss of valuable compressed air.



Compact & Lightweight

- Heat exchanger and refrigeration circuit design combined with R407C refrigerant reduces size and weight of dryer.
- Easy manoeuvrability and positioning

Reliable Operation

- Simple circuit design and use of high quality components ensures a long operating life.
- Simplified routine cleaning and maintenance due to single, easy to remove casing and instant access to condensate drain.

R407C - THE NEXT GENERATION REFRIGERANT

- Energy savings of up to 10% compared with traditional HFC refrigerants.
- Performance 30% better than traditional HFC refrigerants, resulting in a smaller refrigeration circuit
- Environmentally friendly HFC refrigerant ensures compliance with the Montreal Protocol.
- No proposed 'phase-out' of R407C refrigerant ensures the dryer will not have to replaced prematurely.

CRD - Designed for Energy Efficiency

The majority of plants run single, possibly two, shifts which means there is a significant amount of off-load time. Air leaks are a major problem and unless the dryer is kept on during down time, the system will be contaminated by water. However, running the dryer at 100% is not energy efficient when used during off-load periods.

The Solution - DemandCycle Energy Saving System

- Permits storage of cold energy within the aluminum heat exchanger
- Only uses refrigeration compressor to bring the storage of cold energy back down to a user pre-determined dew point temperature.
- Energy savings of up to 80% with DemandCycle in operation
- Constant supply of dry air with the benefit of stand-by savings
- Speedy return to dew point on air compressor start-up
- No dew point fluctuations during operation
- Standard on Models CRD250 - CRD3000

Efficient Heat Exchanger Design

- Single unit with integral pre-cooler/re-heater, evaporator and moisture separator
- Less power consumed during full load operation
- No interconnecting pipe work to leak and increase pressure drop
- Non-velocity sensitive stainless steel demister moisture separator

ENERGY EFFICIENT SCROLL COMPRESSOR

High Efficiency Scroll Refrigeration Compressor

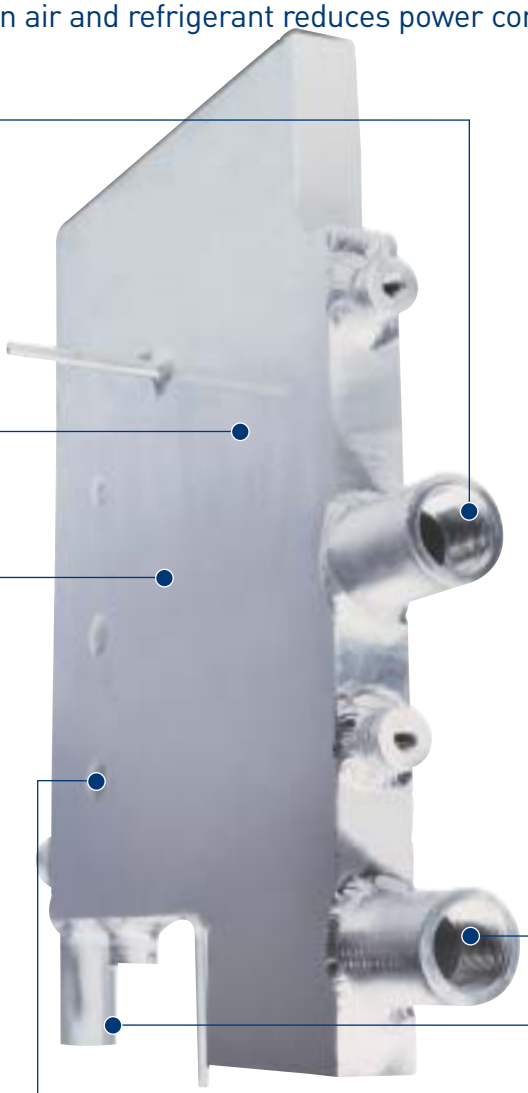
- Standard on Models CRD250 – CRD3000
- Consume 20% less energy than an equivalent output piston compressor
- Ability to tolerate liquid refrigerant returns
- No need for dryer pre-heating at start-up
- 50% less moving parts and reduced vibration increases dryer and compressor reliability
- Reduced noise levels

Timed Solenoid or Level Sensing Drain

- Drain type selectable at time of ordering
- Level sensing drains increase energy efficiency
- Level sensing drains do not discharge compressed air
- Saving Air – Saves Energy – Saves Money

High Performance Cross Flow Heat Exchanger

- Cross flow design with reduces size and energy consumption of the refrigeration circuit
- Compact module of all aluminum, vacuum brazed design has no interconnecting piping for maximum leak protection
- Generously sized air to air heat exchanger reduces required refrigerating capacity, saving energy and money
- Low velocity, low pressure drop geometry for greater heat transfer
- Continuous Active Separation and large stainless steel demister separator ensures liquid is removed throughout the entire heat exchanger module, increasing efficiency
- Single heat exchange step between air and refrigerant reduces power consumption during full load operation



1 **Air Circuit**

2 **Air to Air Heat Exchanger**

The air to air heat exchanger is a pre-cooler / re-heater. It pre-cools the hot, saturated, incoming air by transferring heat to cold air that is returning from the stainless steel water separator. This part of the process also has the effect of re-heating the cold air before distribution to the compressed air system, reducing the likelihood of external pipeline condensation or "sweating" that can occur on chilled surfaces in humid conditions. The importance of this heat exchanger is that it produces some of the cooling load that would otherwise have to be handled by the refrigeration system. **This significantly reduces the size and energy consumption of the refrigeration circuit.**

3 **Air to Refrigerant Heat Exchanger**

The air to refrigerant heat exchanger takes the pre-cooled air from the air to air heat exchanger and cools it to the required dewpoint by transferring heat into the evaporating refrigerant. After cooling, the air enters directly into the high efficiency stainless steel water separator to remove the condensed water.

4 **Continuous Active Separation**

The heat transfer matrix of the Cross Flow Heat Exchanger Module has an enhanced low velocity, low pressure drop geometry, providing greater heat transfer. Low velocity allows the inclusion of an integral stainless steel water separator. Most of the droplet separation occurs in the heat transfer matrix with a stainless steel wire mesh removing any remaining droplets suspended in the air flow..

5 **Condensate Outlet**

6 **Air Outlet**

The dry cold air returns to the air to air heat exchanger through an inverted "L" shaped wrap around manifold. This completely eliminates any need for external piping between the two heat exchangers and the water separator.

CRD How it Works

Refrigeration Circuit

This compressor forms part of a closed loop system compressing the refrigerant and circulating it around the system. Models CRD125 to CRD200 use piston compressors, and models CRD250 to CRD3000 use energy efficient scroll compressors.

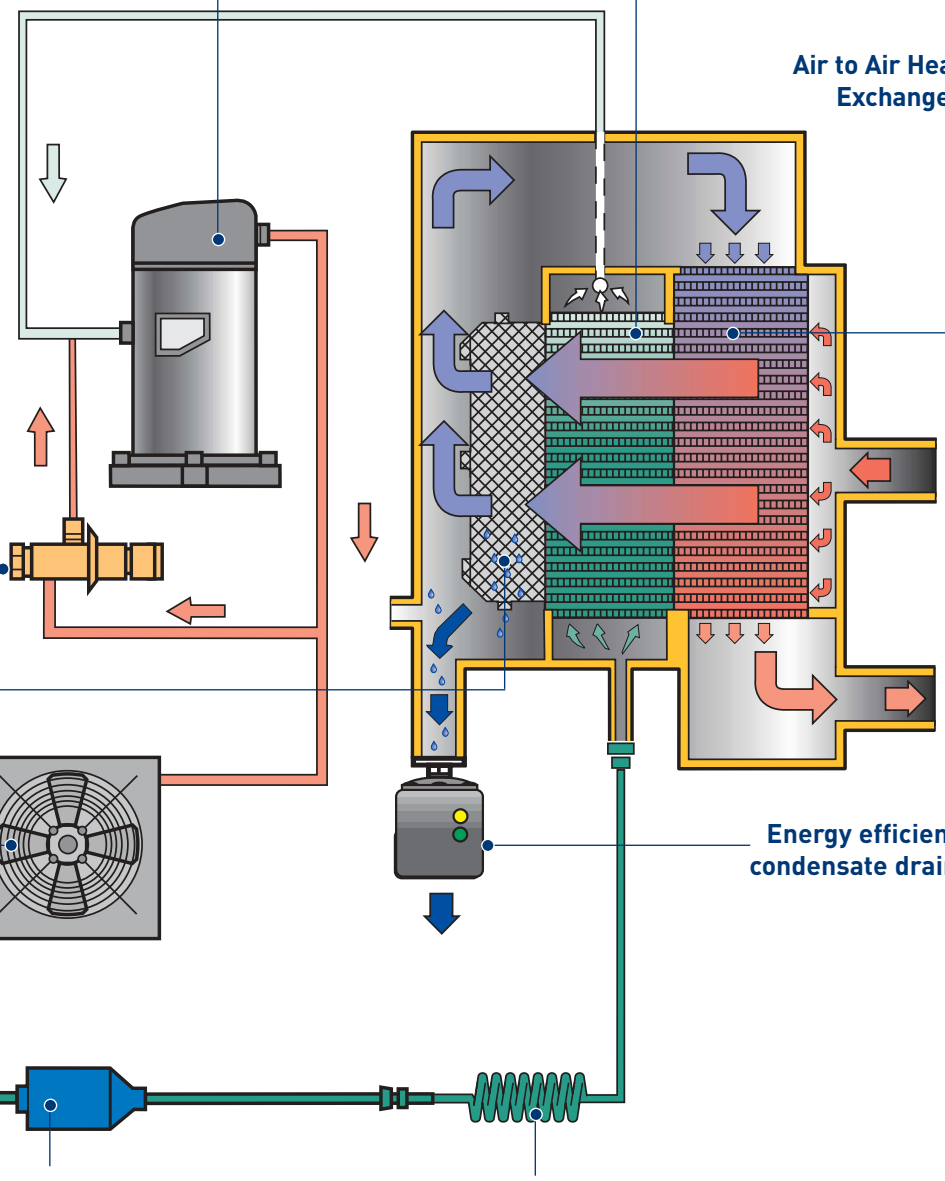
ENERGY EFFICIENT
SCROLL COMPRESSOR

Evaporator (air to refrigerant heat exchanger)

The evaporator removes heat from the compressed air and transfers it to the cold refrigerant. The saturated refrigerant evaporates with the heat from the compressed air. Superheated vapor is then returned to the compressor.

Hot Gas by-pass Valve

The function of the hot gas by-pass valve is to prevent freezing of the evaporator in low load conditions. It does this by sensing low pressure refrigerant leaving the evaporator and re-directing hot refrigerant gas back to the compressor inlet as required. This ensures optimum dewpoint control under all operating conditions. CRD dryers use a 100% modulating valve which is pressure operated, providing a quicker response than temperature controlled valves.



Condenser

The condenser receives the hot, high pressure vapor from the compressor and cools it. The heat added to the refrigerant is exchanged with the cooling air flow. Condensation occurs as the refrigerant passes through the condenser and high pressure, sub-cooled liquid is formed to feed the capillary expander.

Filter / Dryer

The filter dryer removes moisture or particulate that may be present in the refrigerant system.

Capillary Expander

The capillary expander reduces the pressure of the liquid refrigerant to ensure the correct refrigerant flow rate enters the evaporator. This provides maximum heat exchange, and correct compressed air dewpoint. Simple design with no moving parts offers increased reliability.

Technical Specifications

Dryer flow capacities are shown at two reference conditions CAGI (ADF 100) /NFPA (Class H) and ISO7183.

CAGI (ADF100) / NFPA (Class H) Standards
100°F (38°C) Inlet Temperature, 100 psi (7 bar) Inlet Pressure, 100°F (38°C) Ambient Temperature, to deliver 33°F to 39°F (0.5°C to 3.9°C) pressure dewpoint.

ISO7183
Air suction of FAD 68°F (20°C), 14.5 psi (1 bar). Ambient temperature = 77°F (25°C), Inlet temperature = 95°F (35°C), Relitive humidity = 60%. Inlet Pressure = 102 psi g (7 bar g), Dewpoint 37°F)

Model	CAGI Condition Nominal Capacity cfm	Adsorbed Power kW	ISO Condition Nominal Capacity cfm	Adsorbed Power kW	Electrical Supply V/Ph/Hz				Compressor hp	Air Connections
					V1 115/1/60	V2 230/1/60	V3 230/3/60	V4 460/575/3/60		
CRD125	125	0.71	154	0.62	●	●			0.72	1 1/2" NPT-F
CRD150	150	0.76	158	0.61	●	●			0.83	1 1/2" NPT-F
CRD175	175	1.07	215	0.86		●			1.13	1 1/2" NPT-F
CRD200	200	1.36	228	1.00		●			1.43	1 1/2" NPT-F
CRD250	250	1.43	310	1.20		●	●	●	1.50	2" NPT-F
CRD325	325	1.69	380	1.30		●	●	●	1.98	2" NPT-F
CRD400	400	2.33	474	1.80			●	●	2.45	2" NPT-F
CRD500	500	2.34	603	1.80			●	●	2.46	2" NPT-F
CRD700	700	2.94	840	2.2			●	●	3.47	3" NPT-M
CRD800	800	2.96	971	2.3			●	●	3.48	3" NPT-M
CRD1000	1000	4.06	1213	3.2				●	4.84	3" NPT-M
CRD1200	1200	4.23	1448	3.3				●	5.07	3" NPT-M
CRD1400	1400	6.13	1704	4.7				●	7.09	4" ANSI
CRD1600	1600	7.57	1952	5.6				●	9.12	4" ANSI
CRD1800	1800	7.80	2196	5.8				●	9.49	4" ANSI
CRD2000	2000	7.81	2426	5.9				●	8.90	6" ANSI
CRD2400	2400	9.17	2876	7.5				●	9.90	6" ANSI
CRD3000	3000	11.75	3644	8.8				●	12.90	6" ANSI

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

Options: Water Cooled Condenser on models CRD700 to CRD3000

Correction Factors
Capacity correction factors are 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

Correction factors to be used with CAGI ADF100 nominal flow rates

Ambient Temperature (C1)					
Degree's F	90	100	110	120	122
Degree's C	32	38	43	49	50
Correction Factor	1.05	1.00	0.94	0.79	0.71

Inlet Temperature (C2)						
Degree's F	90	100	110	120	130	140
Degree's C	32	38	43	49	54	60
Correction Factor	1.22	1.00	0.82	0.68	0.56	0.46

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	0.77	0.93	1.00	1.07	1.12	1.15

Dewpoint (C4)				
Degree's F	38	40	45	50
Degree's C	3.3	4.4	7.2	10
Correction Factor	1.00	1.05	1.19	1.34

Correction factors to be used with ISO7183 nominal flow rates

Ambient Temperature (C1)							
Degree's F	68	77	86	95	104	113	122
Degree's C	20	25	30	35	40	45	50
Correction Factor	1.03	1.00	0.96	0.92	0.88	0.80	0.70

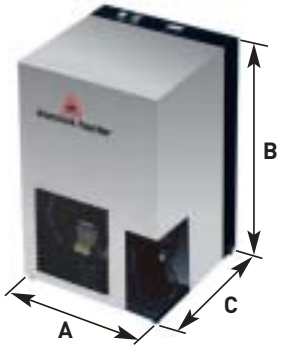
Inlet Temperature (C2)							
Degree's F	86	95	104	113	122	131	140
Degree's C	30	35	40	45	50	55	60
Correction Factor	1.20	1.00	0.84	0.71	0.60	0.50	0.45

Inlet Pressure (C3)										
Pressure psi g	44	58	73	87	100	116	131	145	160	174
Pressure bar g	3	4	5	6	7	8	9	10	11	12
Correction Factor	0.74	0.84	0.90	0.96	1.00	1.04	1.06	1.09	1.11	1.13

Dewpoint (C4)				
Degree's F	38	41	45	50
Degree's C	3	5	7	10
Correction Factor	1.00	1.14	1.25	1.35

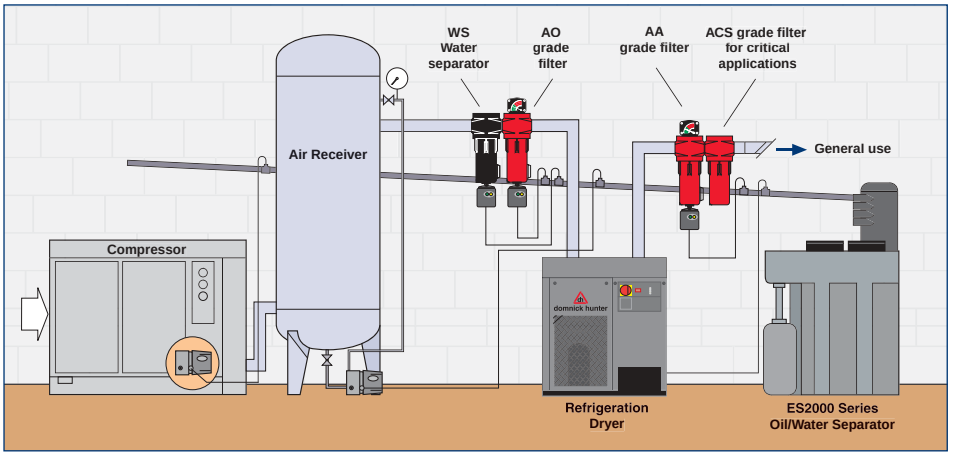
Weights and Dimensions

Model	Width (A)		Height (B)		Length (C)		Weight	
	in	mm	in	mm	in	mm	lbs	kgs
CRD 125	24.21	615	31.14	791	21.73	552	143	65
CRD 150	24.21	615	31.14	791	21.73	552	146	66
CRD 175	24.21	615	31.14	791	21.73	552	150	68
CRD 200	24.21	615	31.14	791	21.73	552	154	70
CRD 250	36.22	920	39.96	1015	26.46	672	309	140
CRD 325	36.22	920	39.96	1015	26.46	672	313	142
CRD 400	36.22	920	39.96	1015	26.46	672	317	144
CRD 500	36.22	920	39.96	1015	26.46	672	331	150
CRD 700	39.76	1010	59.06	1500	51.57	1310	882	400
CRD 800	39.76	1010	59.06	1500	51.57	1310	926	420
CRD 1000	39.76	1010	59.06	1500	51.57	1310	992	450
CRD 1200	39.76	1010	59.06	1500	51.57	1310	1014	460
CRD 1400	39.76	1010	59.06	1500	51.57	1310	1036	470
CRD 1600	39.76	1010	59.06	1500	71.26	1810	1212	550
CRD 1800	39.76	1010	59.06	1500	71.26	1810	1223	565
CRD 2000	39.76	1010	59.06	1500	71.26	1810	1290	585
CRD 2400	39.76	1010	59.06	1500	71.26	1810	1301	590
CRD 3000	39.76	1010	59.06	1500	71.26	1810	1455	660



ISO 8573.1 Air Quality classes

QUALITY CLASS	DIRT Particle size in Micron	WATER Pressure Dewpoint °F (ppm. vol.) at 101.5 psi g	OIL (Including vapor) mg/m³
1	0.1	-94 (0.3)	0.01
2	1	-40 (16)	0.1
3	5	-4 (128)	1.0
4	15	+37.4 (940)	5
5	40	+44.6 (1240)	25
6	-	+50 (1500)	-



OIL-Xplus filtration required to meet ISO 8573.1

Grade AO

High Efficiency General Purpose Protection

For the removal of particles down to 1 micron including coalesced liquid water and oil, providing a maximum remaining oil aerosol content of 0.5 mg/m³ @ 70°F (21°C).

Grade AA

High Efficiency Oil Removal Filtration

For the removal of particles down to 0.01 micron including water and oil aerosols, providing a maximum remaining oil aerosol content of 0.01 mg/m³ @ 70°F (21°C).

(Precede with Grade AO filter).

Grades AC & ACS

Activated Carbon Filtration

For the removal of oil vapor and hydrocarbon odors giving a maximum remaining oil content of <0.003 mg/m³ (<0.003 ppm) (excluding methane) @ 70°F (21°C).

(Precede Grade ACS with Grade AA filter).
(AC filter combines AA and AC Grades).

Environmental Impact of Inefficient Compressed Air Systems

Global Warming

The greatest environmental impact of any compressed air system is the indirect contribution to global warming.

Any compressed air system which uses electricity produced by fossil fuel burning power stations contributes to carbon dioxide emissions.

Carbon dioxide is the major "greenhouse gas" contributing to global warming.

The more energy efficient the compressed air system, the less carbon dioxide produced.

domnick hunter can provide a total solution to inefficient compressed air systems

CRD - Clean, dry compressed air to ISO 8573.1 Class 1.4.1 Energy efficient. Low running costs.

Environmentally friendly refrigerant and components.

OIL-Xplus - Highest quality compressed air.

Energy efficient filter housings and elements giving low pressure drop and running costs.

ED SERIES - Electronic level sensing drains discharge only condensate and not compressed air.

Saving Air and Energy – Saves Money.

ES SERIES OIL/WATER SEPARATORS - ES Series Oil/Water Separator treat oily condensate at a fraction of the cost of other disposal methods and keep discharges within legal limits.

This can also assist in attaining ISO 14000 environmental approval.

ISO 9001 REGISTERED FIRM Q 5240 Since 1987

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Publication Reference: USA Ref 567 10/01 Rev. 002