

**Gardner**  
**Denver**

# Energy Saving Cycling Dryers

Cycling Refrigeration Dryers  
GDDF-ES Series



Energy Efficient  
Compressed Air Treatment



# Next Generation Energy Saving Refrigeration Dryer

## High efficiency air treatment

Quality and efficiency are just as important for compressed air treatment as they are for the rest of your production facility. The GDDF-ES Series of cycling refrigeration dryers deliver consistently high performance with optimum energy efficiency for many industrial compressed air applications.

The high efficiency design and construction of these cycling dryers helps achieve better performance, at the same time reducing energy consumption – the high-efficiency heat exchanger combined with a thermal mass circuit delivers energy savings at any load, and automatically deactivates the refrigerant compressor when not needed.

## Investment protection through compressed air quality

Modern production systems and processes demand high quality compressed air, which is defined in the 6 classes outlined in international standard ISO 8573-1:2010 as illustrated below. These are only achievable with filtration, water separation and drying. Users in the food and pharmaceutical industry must adhere to stringent compressed air quality guidelines, as well as local legislation. Other industries may also follow specific advice regarding, the quality of compressed air they use to ensure the protection and efficiency of process equipment and finished product.

## Compressed air quality classes according to ISO 8573-1:2010

ISO 8573-1: 2010 Class	Solid Particulate			Mass Concentration mg/m <sup>3</sup>	Water		Oil Total Oil (aerosol liquid and vapour) mg/m <sup>3</sup>
	Maximum number of particles per m <sup>3</sup>				Vapour Pressure Dewpoint °C	Liquid g/m <sup>3</sup>	
	0.1 - 0.5 µm	0.5 - 1 µm	1 - 5 µm				
0	As specified by the equipment user or supplier and more stringent than Class 1						
1	≤ 20,000	≤ 400	≤ 10	-	≤ -70	-	0.01
2	≤ 400,000	≤ 6,000	≤ 100	-	≤ -40	-	0.1
3	-	≤ 90,000	≤ 1,000	-	≤ -20	-	1
4	-	-	≤ 10,000	-	≤ +3	-	5
5	-	-	≤ 100,000	-	≤ +7	-	-
6	-	-	-	≤ 5	≤ +10	-	-



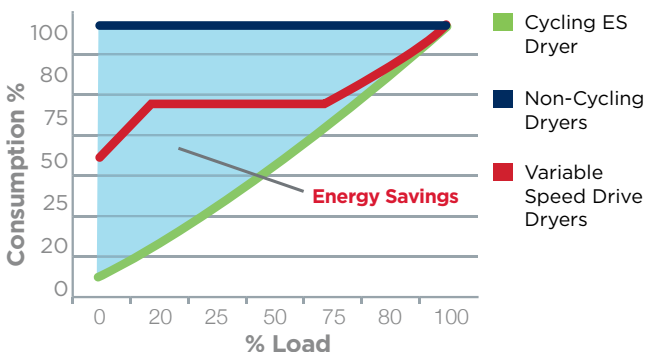
“Achieve maximum energy savings, while ensuring a continuous supply of dry high-quality air and timely return on investment.”



## Advanced Environmental Credentials

By shutting off the refrigerant compressor during low loads, Gardner Denver’s cycling dryers dramatically reduce energy consumption. Using environmentally-friendly R513A, R407C refrigerants with the lowest Global Warming Potential, also contributes to reducing greenhouse gas emissions. High quality components provide longer lasting dryers that require fewer replacement parts, again minimising impact on the environment.

## Energy Savings by Technology



## Save energy with cycling refrigeration dryers

The cycling dryer is designed to deliver the lowest cost solution by focusing on all of the cost contributors. In a typical compressed air dryer, the refrigerant compressor runs continuously regardless of demand.

- Patented heat exchanger design achieves highest heat transfer efficiency in the industry, reducing compressor run time and therefore lowering energy costs
- Lowest pressure drop in the industry, averaging less than 0.2 bar g
- Thermal mass cold energy storage reduces dryer's compressor run time
- High quality air with ISO Class 4 dew point (+3°C)
- Smart drain - electronic no-loss drain eliminates compressed air loss
- R513A, R407C, R410A refrigerants also reduce energy consumption
- Advanced circuit design eliminates the need for thermal expansion valves and fan control switches
- True plug-and-play with single point connections for minimal installation costs



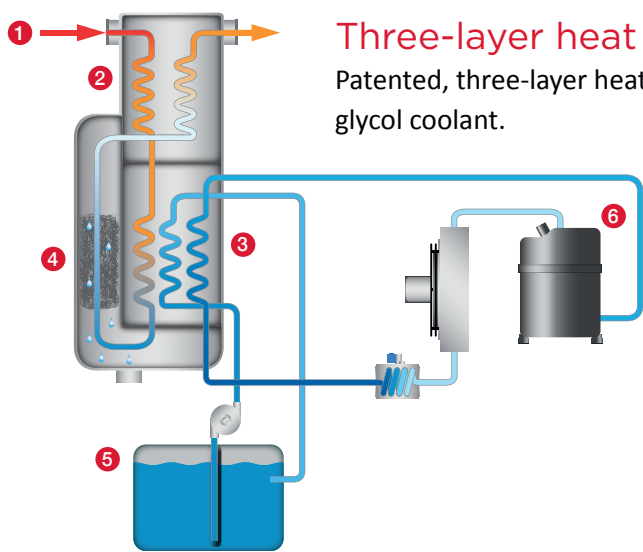
# Reliable, efficient & clean dry air

## How the cycling refrigeration dryers work

Most applications operate with varying degrees of compressed air usage. Gardner Denver's cycling dryers match that by minimising operating time through the use of thermal mass, cold energy storage.

### 1 Three-layer heat exchanger (GDD9F-ES - GDD160F-ES)

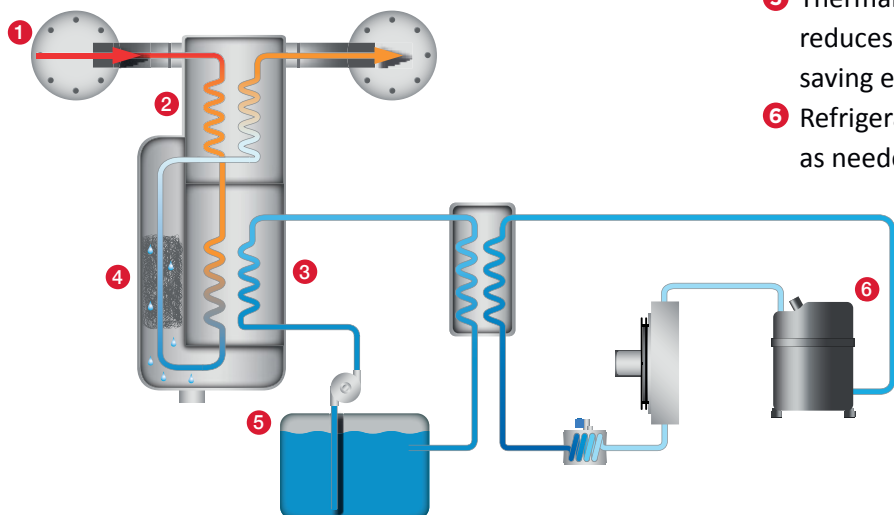
Patented, three-layer heat exchanger with no-loss Smart Drain and recirculating glycol coolant.



- 1 Compressed air enters the dryer through the heat exchanger
- 2 Air is cooled by cold outgoing air in the pre-cooler/re-heater
- 3 Circulating glycol cools the compressed air allowing the refrigerant compressor to turn-off during low demands
- 4 Stainless steel mesh removes the condensed liquid, which is purged from the dryer using no-loss Smart Drain
- 5 Thermal mass cold energy storage reduces compressor run time saving energy
- 6 Refrigerant compressor runs only as needed

### 1 Two-layer heat exchanger (GDD216F-ES - GDD900F-ES) (GDDA533F-ES - GDDA800F-ES)

Two-layer heat exchanger with no-loss Smart Drain and recirculating glycol coolant.







“GardnerDenver’s cycling refrigeration dryers deliver the very best combination of **high efficiency, low pressure drop and small footprint.**”

## Features are **your benefits**

### **Reliable and Simplistic Design**

Microprocessor control and no-loss Smart Drain increase reliability, while dryer self-regulation, plug-and-play installation and readily available parts make for simple and easy maintenance.

### **Innovative Control Panel**

With all the main functions you would expect to control and monitor the unit:

- Anti freeze mode – shuts dryer off to avoid icing
- Alarm display: Dew Point, high/low temperature, High ambient temperature
- Remote ON/OFF optional up to GDD160F-ES, standard from GDD216F-ES
- Alarm history
- Condensate drain management
- Ready for Industrial IOT with adoption of iConn, remote monitoring, preventive maintenance, free cloud portal

### **New 3-layer Heat Exchangers**

Designed and developed in our laboratories to deliver the highest levels of performance with the lowest pressure drop. The adoption of the new Gardner Denver heat exchanger has enabled the removal of the inlet and outlet headers.

### **Glycol Pumps**

Provides a constant circulation of glycol with the compressor on or off.

### **Innovative No-loss Smart Drain**

Fitted as standard, a sensor is installed directly in the moisture separator and control logic is managed by the main Control Panel.

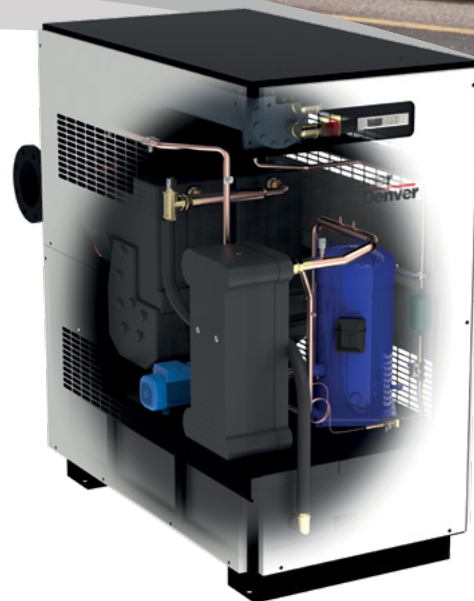




## Reliable efficient design

### No-loss Smart Drain

The powerful no-loss electronic Smart Drain is standard on all units and eliminates the need for pre-setting the unit. It uses state-of-the-art software combined with a special transducer interface to measure the presence of condensate so that it is released only when needed. Continuous monitoring ensures fast and effective discharge of the condensate with no deficit of compressed air.



### Correction Factors

Correction Factors for working pressure														
bar	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FC1	0.7	0.78	0.85	0.93	1	1.06	1.11	1.15	1.18	1.2	1.22	1.24	1.25	1.26

Correction Factors for inlet air temperature							
°C	30	35	40	45	50	55	60
FC2	1.2	1	0.85	0.71	0.58	0.49	0.42

Correction Factors for dew point temperature								
°C	3	4	5	6	7	8	9	10
FC3	1	1.04	1.09	1.14	1.18	1.25	1.3	1.33

Correction Factors for ambient temperature (for air cooled)							
°C	25	30	35	40	42	45	50*
FC4	1	0.96	0.92	0.88	0.85	0.8	0.7

\*units up to, and including GDD160F

Correction Factors for different water inlet temperature (for water cooled version)								
°C	15	20	25	29.4	30	35	38	40
FC4	1.08	1.06	1.03	1	0.99	0.95	0.91	0.88

Calculation for correct Dryer Air flow = Nominal Dryer Air Flow x FC1 x FC2 x FC3

### Energy Consumption

Model	kW Nominal Power at % Load			
	100%	75%	50%	25%
GDD9F-ES	0.24	0.19	0.14	0.09
GDD12F-ES	0.32	0.25	0.18	0.11
GDD18F-ES	0.45	0.35	0.25	0.14
GDD24F-ES	0.51	0.39	0.28	0.16
GDD30F-ES	0.54	0.42	0.29	0.17
GDD40F-ES	0.64	0.49	0.34	0.19
GDD50F-ES	0.79	0.60	0.42	0.23
GDD60F-ES	0.94	0.72	0.49	0.27
GDD80F-ES	1.03	0.78	0.54	0.29
GDD100F-ES	1.28	0.83	0.57	0.30
GDD130F-ES	1.80	1.16	0.79	0.41
GDD160F-ES	2.18	1.40	0.95	0.50
GDD216F-ES	2.14	1.64	1.14	0.64
GDD250F-ES	2.45	1.87	1.29	0.71
GDD300F-ES	2.92	2.22	1.53	0.83
GDD375F-ES	3.68	2.79	1.91	1.02
GDD430F-ES	4.69	3.55	2.41	1.27
GDD533F-ES	6.68	5.10	3.53	1.95
GDD700F-ES	7.18	5.48	3.78	2.07
GDD800F-ES	7.18	5.48	3.78	2.07
GDD900F-ES	9.74	7.36	4.98	2.60

# Gardner Denver Cycling Refrigeration Dryer - Technical Data

## Gardner Denver Dryers from 0.9 to 90.00 m<sup>3</sup>/min

Model	Air Flow-Rate	Absorbed Power	Power Supply	Dew Point	Max Pressure	Air Connection	Refrigerant	Dimensions	Weight	Recommended Filter**
	3°C							W x D x H		
	m <sup>3</sup> /min	kW	V/Ph/Hz	ISO Class	bar g	BSP	[mm]	[kg]		
GDD9F-ES	0.90	0.24	230/1/50	4	16	½"	R513A	386 x 500 x 651	39	GDDF013
GDD12F-ES	1.20	0.32	230/1/50	4	16	½"	R513A	386 x 500 x 651	43	GDDF013
GDD18F-ES	1.80	0.45	230/1/50	4	16	¾"	R513A	386 x 500 x 651	48	GDDF018
GDD24F-ES	2.40	0.51	230/1/50	4	16	¾"	R513A	386 x 500 x 651	51	GDDF025
GDD30F-ES	3.00	0.54	230/1/50	4	16	1"	R513A	423 x 567 x 771	67	GDDF032
GDD40F-ES	4.00	0.64	230/1/50	4	16	1"	R407C	423 x 567 x 771	71	GDDF067
GDD50F-ES	5.00	0.79	230/1/50	4	16	1½"	R407C	500 x 718 x 980	105	GDDF067
GDD60F-ES	6.00	0.94	230/1/50	4	16	1½"	R407C	500 x 718 x 980	108	GDDF067
GDD80F-ES	8.00	1.03	230/1/50	4	16	1½"	R407C	500 x 718 x 980	120	GDDF0100
GDD100F-ES	10.00	1.28	230/1/50	4	16	2"	R407C	779 x 720 x 1360	186	GDDF0100
GDD130F-ES	13.00	1.80	400/3/50	4	16	2"	R407C	779 x 720 x 1360	227	GDDF0133
GDD160F-ES	15.83	2.18	400/3/50	4	13	2"	R407C	779 x 720 x 1360	237	GDDF0167
GDD216F-ES	21.67	2.14	400/3/50	4	14	3'	R407C	806 x 1012 x 1539	394	GDDF0260
GDD250F-ES	25.00	2.45	400/3/50	4	14	3'	R407C	806 x 1012 x 1539	394	GDDF0260
GDD300F-ES	30.00	2.92	400/3/50	4	14	3'	R407C	806 x 1012 x 1539	394	GDDF0305
GDD375F-ES	37.50	3.68	400/3/50	4	14	3'	R407C	806 x 1012 x 1539	399	GDDF0383
GDD430F-ES	43.33	4.67	400/3/50	4	14	3'	R407C	806 x 1012 x 1539	399	GDDF0450
GDD533F-ES	53.33	6.31	400/3/50	4	14	DN150 PN16	R513A	880 x 1819 x 1796	810	GDDF0700
GDD700F-ES	70.00	6.81	400/3/50	4	14	DN150 PN16	R513A	880 x 1819 x 1796	840	GDDF0700
GDD800F-ES	80.00	6.81	400/3/50	4	14	DN150 PN16	R513A	880 x 1819 x 1796	840	GDDF0950
GDD900F-ES	90.00	9.89	400/3/50	4	13	DN150 PN16	R407C	1510 x 1500 x 1555	1020	GDDF0950

Features	GDD9F-ES – GDD40F-ES	GDD50F-ES – GDD80F-ES	GDD100F-ES – GDD160F-ES	GDD216F-ES – GDD900F-ES
Dew Point Indication	•	•	•	•
On/Off Switch	• <sup>1)</sup>	•	•	•
Terminal for Remote Alarm Signal	•	•	•	•
High Pressure Switch			• <sup>3)</sup>	•
Fan Pressure Switch			• <sup>3)</sup>	•
Alarm History (Last Entries)	10	10	10	50
Heat Exchange Layers	1 x 3	1 x 3	1 x 3	2 x 2
Anti-Freezing Protection	•	•	•	•
No-loss Smart Drain	•	•	•	•
Glycol Circulator	•	•	•	•
Aluminium Heat Exchanger with Anti-Corrosion Manifold	•	•	•	•
% Energy Saving Display	•	•	•	•
Number of Probes*	2	2	2	4
Quick Restart Function			•	•

• Standard Feature "blank" not applicable

\* 2 probes = glycol control and frigorific circuit, 4 probes = glycol control, refrigerant suction, compressor oil, air inlet + 1 thermal switch contact on refrigerant discharge line

\*\* We recommend the installation of additional pre and post filters depending on air quality requirements

<sup>1)</sup> Only on GDD40F-ES    <sup>2)</sup> Only on GDD100F-ES    <sup>3)</sup> Only on GDD130F-ES & GDD160F-ES



## Global Expertise

The GD rotary screw compressor range from 2.2 – 500 kW, available in both variable and fixed speed compression technologies, are designed to meet the highest requirements which the modern work environment and machine operators place on them.



The oil-free EnviroAire range from 15 – 355 kW provides high quality and energy efficient compressed air for use in a wide range of applications. The totally oil-free design eliminates the issue of contaminated air, reducing the risk and associated cost of product spoilage and rework.



A modern production system and process demands increasing levels of air quality. Our complete **Air Treatment Range** ensures the highest product quality and efficient operation.



Compressor systems are typically comprised of multiple compressors delivering air to a common header. The combined capacity of these machines is generally greater than the maximum site demand. To ensure the system is operated to the highest levels of efficiency, the **GD Connect** air management system is essential.



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For additional information please contact Gardner Denver or your local representative.

Specifications subject to change without notice.