Gardner Denver

Compressed Air Filters & Separators

Innovative Compressed Air Treatment

GDF & GDWS Series

Improve air quality

The removal of contamination from compressed air systems remains as important as the compressor that is used to compress the air. Dirt, oil and liquid are abundant in the atmosphere and can also be introduced by the compressed air system itself.

If untreated this contamination passes downstream into production processes threatening damage to equipment and also potentially coming into contact with produce.

Failure to remove or reduce contamination will cause many problems with the compressed air system, for example:

- Corrosion within compressed air storage vessels and the air distribution system
- Blocked or damaged valves, cylinders, air motors and air tools
- Damaged production equipment
- Premature and unplanned desiccant changes for adsorption dryers
- Product contamination

Compressed air contamination will ultimately lead to:

- Inefficient production processes
- Spoiled, damaged or reworked products
- Reduced production efficiency
- Increased manufacturing costs

Most problems experienced by compressed air users derive from contamination already in the compressed air system. Typically there are 10 different contaminants from four different sources and even more in critical applications. that need to be removed or reduced to acceptable levels.

Atmospheric dirt

Water vapour

Oil vapour

Micro-organisms

Installed to reduce or remove contaminants from compressed air; water separators and filters are essential to the health and performance of a compressed air network. The primary function of any filter is to improve air quality, although modern demands mean this performance should not be at the expense of energy. Using high quality compressed air to supply the nitrogen generators, ensures long and trouble-free service and guarantees optimum performance.

Optimum performance & efficiency

A significant amount of research and development has gone into ensuring that Gardner Denver filter housings and elements provide the optimum performance, energy efficiency, operational life and cost of ownership. We asked a 3rd party to carry out tests to compare Gardner Denver filters with other leading brands. The results speak for themselves:

- No Competitor Matched Gardner Denver for filtration performance
- No Competitor Exceeded Gardner Denver for filtration performance
- 67% of the wet dp

Low differential pressure = Low energy consumption

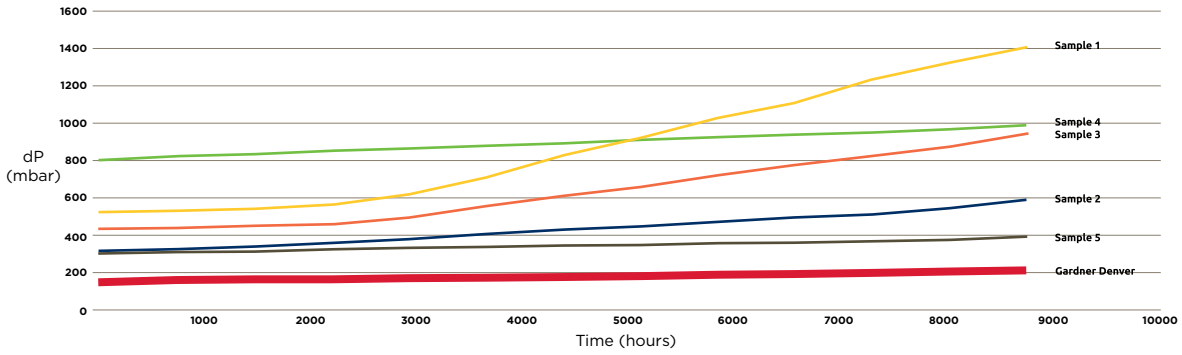
When designing a compressed air system it is common practice to avoid unnecessary changes in pipe size and air flow direction. Each of these can have significant and adverse effect on the amount of differential pressure created leading to increased energy required by the compressor in order to provide the correct air pressure at its point of use.

Gardner Denver filters employ several design features which ensure that this best practice philosophy is carried on through our filter and water separator housings to maximise energy savings caused by differential pressure

Differential Pressure – An accurate picture

In a comparative test of our filters against five commonly available alternative filters, the blockage characteristics and therefore the true differential pressure of each filter can be demonstrated.

Operational dP

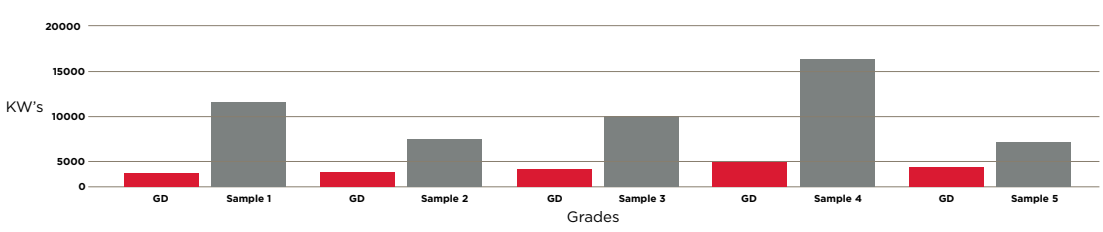


Test criteria: Filters were tested at their full rated flow and injected with ISO 12103 A4 course test dust using a pressurised dust injection system. The dust was injected in 12 intervals to simulate the monthly loading of the filter element and show a total annual differential pressure curve. Gardner Denver filters were tested at an identical flow rate to the comparative filter and with an identical dirt loading.

The accurate running costs of a filter

Using the above data, a true picture of energy consumption can be seen.

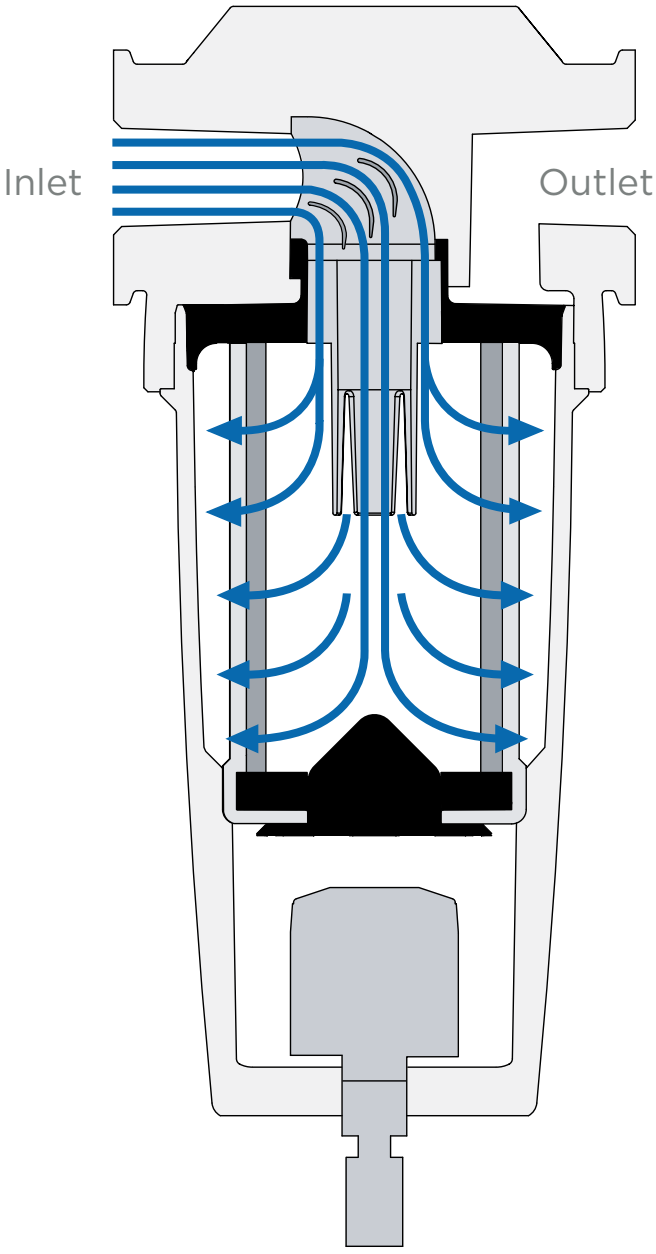
Comparison of annual energy usage (4000 hrs operation)



This calculation based upon a 75kW compressor operating for 4000 hours

Energy efficient by design

Compressed air flow path optimisation and anti-turbulence features.



Smooth 90° elbow & aerospace turning vanes

Flow distributor

Conical flow diffuser

Deep bed pleating

Specialist media treatment

Providing an optimal flow path for the compressed air through the filter housing and element is key to reducing system operating costs.

Pressure losses in a compressed air filter is a combination of fixed pressure losses and incremental pressure losses. Fixed pressure losses are derived from the filter housing and the interface between the filter housing and filter element. Incremental pressure losses are directly related to the filter element as it blocks up with contamination.

In most filters, high operational costs can be attributed to an inefficient air flow path within the filter housing and element and poorly selected filtration media. In addition to this, the high differential pressure “change points” recommended by many filter manufacturers increase operational costs even further.

GDF Series filter housings

Gardner Denver threaded port filter housings provide simple installation and long housing life with reduced maintenance.

The design provides more connection options for each size to avoid unnecessary pipe diameter changes which create pressure losses. The element has been designed so that service technicians do not have to directly handle contaminated filter elements during maintenance.

Filter connections

More port sizes are available to match both pipe size and system flow rate giving additional customer choice and reduced installation costs. Standard range suitable for pressures up to 20 bar g (290 psi g).

No corrosion with Alocrom treatment.

Rapid corrosion of untreated aluminium.

Compact and lightweight

Advanced element design provides a smaller, more compact filter.

Full corrosion protection

GDF series filter housings undergo cleaning, de-greasing and Alocrom treatment before painting. This not only primes the aluminium surface for painting, but also provides corrosion protection. All die-cast filter housings are protected with a tough, durable dry powder epoxy coating.

Quick, Clean and Easy Maintenance

Filter element changes are now easy and do not require the user to directly handle the contaminated element during annual maintenance.

Minimal service clearance

Space saving design minimises service clearance and allows installation in confined spaces.

Float drain

Choice of drains

Grade G and H coalescing filters are fitted with energy efficient, zero air loss float drains as standard for the removal of coalesced liquids. Grade V oil vapour removal filters are fitted with manual drains.

GDF Series

High efficiency coalescing and dust removal filters

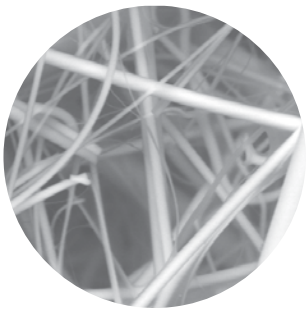
- For the removal of water and oil aerosols, atmospheric dirt and solid particles, rust, pipescale and micro-organisms
- Coalescing filter performance tested to the stringent requirements of ISO12500-1 and ISO8573-2
- Dry particulate filter performance tested in accordance with the requirements of ISO8573-4

Features that provide air quality

The Gardner Denver GDF series range of diecast compressed air filters has been designed from the outset to meet the air quality requirements of all editions of ISO8573-1, when validated in accordance with the stringent requirements of ISO12500-1.

Construction of the filtration media into a filter element

Filter media is constructed into a filter element using a unique deep bed pleating technique in place of the more conventional wrapped construction. This provides 450% more filtration surface area when compared to a traditional wrapped filter element and around 200% more surface area compared to a traditional pleated element. Deep bed pleating also reduces the air flow velocity within the media, which further improves filtration performance. Additionally, the high efficiency H grade elements have a unique graded density media construction which provides even greater filtration performance without adding to pressure loss or energy consumption.



Correct selection of filtration media

Coalescing and dust removal filters use a high efficiency borosilicate glass nanofibre material which has a 96% voids volume, providing media with excellent filtration efficiency and a high dirt holding capacity.

Gardner Denver Filters or larger flowrates

The Gardner Denver GDF series includes cast aluminium 4” ported filters and a range of fabricated carbon steel filters from DN80 to DN300 sized flanges.

These filters are available in the standard filtration grades.

4” Die-cast aluminium filters

- Cost effective alternative to flanged, fabricated carbon steel vessels
- Standard range up to 20 bar g (290 psi g)
- Alocrom and dry powder epoxy coated for full corrosion protection
- Easy fit element location for quick and simple maintenance

Carbon steel fabricated filters

- Fabricated from carbon steel
- Standard range up to 16 bar g (232 psi g)
- Stainless steel models also available
- Designed in accordance with AD-2000
- Easy fit element location for quick and simple maintenance

Easy fit element location for quick and simple maintenance

- Low pressure drop when compared to traditional wrapped filter elements
- Drainage layer is suitable for use up to 100°C and is compatible with all compressor oils

No tie-rod to reduce pressure drop and simplify installation.

Special endcap design allows for quick and easy maintenance.

Pleated element technology for increased filtration area

Lower endcap design eases installation and prevents damage to drainage layer. High capacity drainage layer ensures that all coalesced liquids are removed.

GDWS Series

Condensate Separators

- The world's most energy efficient Condensate Separators
- For the removal of bulk condensed water and liquid oil
- Used to protect coalescing filters from bulk liquid contamination
- High liquid removal efficiencies at all flow conditions
- Tested in accordance with ISO8573-9

How Gardner Denver Water Separators work

- Wet air enters the inlet port and is directed into the separator module fixed turning vanes causing the air to spin inside the vessel and then change direction as it passes the impinger.
- A vortex is then created which narrows and intensifies as it reaches the lower part of the separator.
- Bulk liquid is therefore removed from the air stream due to a combination of:
  - Directional changes of the air stream.
  - Velocity changes.
  - Centrifugal action of the vortex.
- As the vortex reaches the bottom of the separator module, air is forced through the centre of the vortex.
- Aerospace turning vanes located in the outlet of the separator module now turn an "inefficient corner" into a number of more "efficient corners" to reduce turbulence, minimise pressure loss and therefore operational costs.

In addition to protecting coalescing filters from bulk liquid contamination, Water Separators can be used on compressor inter-cooler and after-cooler stages, wet air receivers and refrigeration dryers.

Maintaining air quality

Annual filter element changes are essential (coalescing and dust removal filters)

To maintain your guaranteed air quality, filter elements must be replaced every year with genuine Gardner Denver parts.

Annual filter element changes ensure:

- Optimal performance is maintained
- Air quality continues to meets international standards
- Protection of downstream equipment, personnel and processes
- Low operational costs
- Increased productivity and profitability
- Peace of mind

Maintenance of oil vapour removal filters

Unlike oil aerosol removal filters which are changed annually to guarantee compressed air quality, the lifetime of an oil vapour removal filter can be attributed to various factors and require more frequent changes.

Filtration Grades

Filtration Grade	Filter Type	Particle removal (inc water & oil aerosols)	Max Remaining Oil Content at 21°C (70°F)	Filtration Efficiency	Initial Dry Differential Pressure	Initial Saturated Differential Pressure	Change Element Every	Precede with Filtration Grade
G	Coalescing	Down to 1 micron	0.6 mg/m^3 0.5 ppm(w)	99.925%	<70 mbar (1psi)	<140 mbar (2psi)	12 months	WS (for bulk liquid)
H	Coalescing	Down to 0.01 micron	0.01 mg/m^3 0.01 ppm(w)	99.9999%	<140 mbar (2psi)	<200 mbar (3psi)	12 months	G

Filtration Performance

Filtration Grade	Filter Type	Particle removal (inc water & oil aerosols)	Max Remaining Oil Content at 21°C (70°F)	Filtration Efficiency	Test Methods Used	ISO12500-1 Inlet Challenge Concentration	Initial Dry Differential Pressure	Initial Saturated Differential Pressure	Absorbent Life	Precede with Filtration Grade
V	Oil Vapour Removal	N/A	0.003 mg/m^3 0.003 ppm(w)	N/A	ISO8573-5	N/A	<200 mbar (3psi)	N/A	When oil vapour or odour is detected	H

GDF Filter Grade	Temperature Range		Initial Differential Pressure				Filtration	Pressure Max.		Recommended Temperature	
			Dry		Wet						
	°C	°F	mbar	psi	mbar	psi		bar	psi	°C	°F
G [3]	1.5 - 66	35 - 150	70	1	140	2	Wet	16	232	1.5 - 80	35-176
H [3]			100	1.5	200	3					
V [4]	1.5 - 50	35 - 122	35	122	•	•	Dry	20	290	1.5 - 50	35 - 122

Line Pressure																
	bar g	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	psi g	15	29	44	58	73	87	100	116	131	145	160	174	189	203	218	232
Correction Factor		0.38	0.53	0.65	0.76	0.85	0.93	1.00	1.07	1.13	1.19	1.25	1.31	1.36	1.41	1.46	1.51

Technical Data - Compressed Air Condensate Separators

Separator Type [3] including float drain	Port Size ISO228-1 BSPP	Air Flow Rates m³/min cfm										Length		Height		Depth		Weight	
		5 bar		7 bar		9 bar		10 bar		13 bar									
		m³/min	CFM	m³/min	CFM	m³/min	CFM	m³/min	CFM	m³/min	CFM	mm	in	mm	in	mm	in	Kg	lbs
GDWS006G1/4	¼"	0.45	15.9	0.60	21.2	0.71	25.2	0.75	26.5	0.84	29.9	76	3.0	181.5	7.2	64	2.5	0.6	1.3
GDWS006G3/8	⅜"																		
GDWS006G1/2	½"																		
GDWS024G3/8	⅜"	1.80	63.8	2.40	84.8	2.86	101	3.00	106	3.38	119	97.5	3.8	235	9.3	84	3.3	1.1	2.4
GDWS024G1/2	½"																		
GDWS024G3/4	¾"																		
GDWS024G1	1"																		
GDWS066G3/4	¾"	4.96	175	6.60	233	7.86	278	8.25	291	9.29	328	129	5.1	275	10.8	115	4.5	2.2	4.8
GDWS066G1	1"																		
GDWS066G11/4	1 ¼"																		
GDWS066G11/2	1 ½"																		
GDWS210G11/4	1 ¼"	15.79	558	21.0	742	25.0	883	26.25	928	29.58	1045	170	6.7	432	17	156	6.1	5.1	11.2
GDWS210G11/2	1 ½"																		
GDWS210G2	2"																		
GDWS480G21/2	2 ½"	36.09	1275	48.0	1696	57.1	2019	60.0	2120	67.6	2389	205	8.1	504	19.9	181	7.1	10	22
GDWS480G3	3"																		

Flange housing	Port Size	Air Flow Rates m³/min cfm										Length		Height		Depth		Weight	
		5 bar		7 bar		9 bar		10 bar		13 bar									
		m³/min	CFM	m³/min	CFM	m³/min	CFM	m³/min	CFM	m³/min	CFM	mm	in	mm	in	mm	in	Kg	lbs
GDWS480GF	DN80	41	1441	48	1695	54	1915	57	2017	65	2305	370	14.6	1070	42.1	285	11.2	66	146
GDWS600GF	DN100	51	1801	60	2119	68	2394	71	2522	82	2882	450	17.7	1120	44.1	340	13.4	102	225
GDWS1080GF	DN150	92	3242	108	3814	122	4310	129	4539	147	5187	580	22.8	1240	48.8	460	18.1	191	434
GDWS1800GF	DN200	153	5556	180	6537	203	7387	214	7779	245	8890	750	29.5	1585	62.4	640	25.2	397	875
GDWS2880GF	DN250	245	8645	288	10171	325	11493	343	12103	392	13833	862	33.9	1570	61.8	715	28.2	537	1184
GDWS4320GF	DN300	358	12652	421	14885	476	16820	501	17713	573	20244	1000	39.3	1610	63.5	840	33.1	675	1488

Technical Data - Compressed Air Filter - GDF Series

Filter Model GDF Port & Grade G_H_V	Port Size ISO228-1 BSPP	Air Flow Rates [1] m³/min cfm										Length		Height		Depth		Weight	
		5 bar		7 bar		9 bar		10 bar		13 bar									
		m³/min	CFM	m³/min	CFM	m³/min	CFM	m³/min	CFM	m³/min	CFM	mm	in	mm	in	mm	in	Kg	lbs
GDF0006G1/4 (Grade)	G¼"	0.51	18.0	0.6	21.2	0.68	24.0	0.71	25.2	0.82	28.8	76.0	3.0	181.5	7.12	64	2.5	0.6	1.3
GDF0006G3/8 (Grade)	G⅜"																		
GDF0006G1/2 (Grade)	G½"																		
GDF0012G3/8 (Grade)	G⅜"	1.02	36.0	1.20	42.4	1.36	47.9	1.43	50.5	1.63	57.7	97.5	3.8	235	9.3	84	3.3	1.1	2.4
GDF0012G1/2 (Grade)	G½"																		
GDF0018G1/2 (Grade)	G½"	1.53	54.1	1.80	63.6	2.03	71.9	2.14	75.7	2.45	86.5	97.5	3.8	235	9.3	84	3.3	1.1	2.4
GDF0018G3/4 (Grade)	G¾"																		
GDF0018G1 (Grade)	G1"																		
GDF0036G3/4 (Grade)	G¾"	3.06	108	3.60	127	4.07	144	4.28	151	4.90	173	129.0	5.1	274.8	10.8	115	4.5	2.2	4.8
GDF0036G1 (Grade)	G1"																		
GDF0066G1 (Grade)	G1"	5.61	198	6.60	233	7.46	263	7.85	277	8.98	317	129.0	5.1	364.3	14.3	115	4.5	2.7	5.9
GDF0066G11/4 (Grade)	G1 ¼"																		
GDF0066G11/2 (Grade)	G1 ½"																		
GDF0096G11/4 (Grade)	G1 ¼"	8.16	288	9.60	339	10.8	383	11.4	404	13.1	461	170.0	6.7	432.5	17.0	156	6.1	5.1	11.2
GDF0096G11/2 (Grade)	G1 ½"																		
GDF0132G11/2 (Grade)	G1 ½"	11.22	396	13.20	466	14.92	527	15.71	555	17.95	634	170.0	6.7	524.5	20.6	156	6.1	5.7	12.5
GDF0132G2 (Grade)	G2"																		
GDF0198G2 (Grade)	G2"	16.83	595	19.80	670	22.37	791	23.56	833	26.93	951	170.0	6.7	524.5	20.6	156	6.1	5.7	12.5
GDF0258G21/2 (Grade)	G2 ½"	21.93	775	25.8	912	29.15	1030	30.70	1085	35.09	1240	204.8	8.1	641.6	25.3	181	7.1	11.1	24.4
GDF0258G3 (Grade)	G3"																		
GDF0372G21/2 (Grade)	G2 ½"	31.62	1117	37.20	1314	42.04	1485	44.27	1564	50.59	1788	204.8	8.1	832.1	32.8	181	7.1	13.9	30.6
GDF0372G3 (Grade)	G3"																		
GDF0600G4 (Grade)	G4"	51.0	1802	60	2120	67.8	2396	71.4	2523	81.6	2883	840	16.5	1694	33.3	282	11.1	44.5	98.1

Fabricated Housing [2]	Port Size	5 bar		7 bar		9 bar		10 bar		13 bar		Length		Height		Depth		Weight	
		m³/min	CFM	m³/min	CFM	m³/min	CFM	m³/min	CFM	m³/min	CFM	mm	in	mm	in	mm	in	Kg	lbs
GDF0372G (GRADE) F	DN80	32	1115	37	1312	42	1483	44	1561	51	1784	440	17.3	1065	42	340	13.4	70	154
GDF0744G (GRADE) F	DN100	63	2231	74	2625	84	2966	89	3124	101	3570	500	19.7	1152	45.4	405	16	97	214
GDF1116G (GRADE) F	DN150	95	3347	112	3938	126	4450	133	4686	152	5356	600	23.6	1256	49.5	520	20.5	148	326
GDF1488G (GRADE) F	DN150	126	4463	149	5251	168	5934	177	6249	202	7141	650	25.6	1332	52.4	580	22.8	187	412
GDF2232G (GRADE) F	DN200	190	6695	223	7877	252	8901	266	9374	304	10713	750	29.5	1415	55.7	640	25.2	240	529
GDF3720G (GRADE) F	DN250	316	11160	372	13129	420	14836	443	15624	506	17855	1000	39.4	1603	63.1	840	33	470	1036

[1] For flowrates at other pressures, apply the correction factor shown.
[2] Fabricated housings flanged to BS 4504 PN16 and designed to CEN 286 Part 1 (1991). Other pressure vessel standards available.
[3] Supplied with float drain / optional electronic drain.
[4] Supplied with manual drain.

Gardner Denver

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 – 160 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.

G6 91.GB.03/15.CI