

Gardner
Denver

HIGH PRESSURE SOLUTIONS

Oil Free Compressors for PET Bottle Blowing

Smarter Compressor Technology





Gardner Denver High Pressure Compressors

With the GD Compressors brands, we have grown into one of the world's most respected organisations within high compression technology. We build our future with total respect for our unique heritage and by demonstrating our passion for our global brands through technology leadership. Our team is professional, customer focused and leaders in their field ensuring you are equipped with exactly the right high pressure solution.

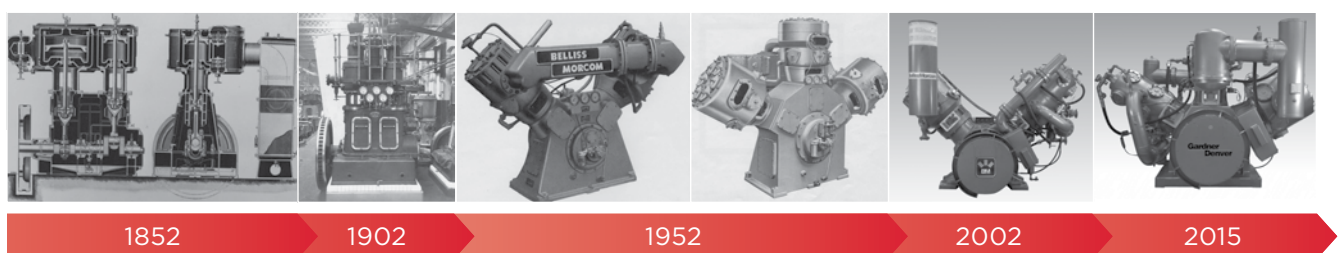
BellissMorcom



PET Bottle Blowing

We have over 40 years of experience in supplying oil free reciprocating compressors for the PET bottle blowing market and have supplied compressors for some of the largest PET bottling plants in the world today. Due to our vast experience, Belliss & Morcom have become the recognised industry leaders, where customers globally enjoy greater productivity and lower operating costs. Belliss & Morcom compressors set the standard for reliable, efficient and cost-effective PET bottle blowing operations.

Belliss & Morcom product Timeline 1852 to present





Performance. **Reliability.** Durability

Gardner Denver Belliss & Morcom have the ability to understand our customer's specific requirements and are committed to ensuring we provide intelligent solutions that meet your ultimate needs.

- **Lowest Cost of Ownership**

Our standard compressor units are all designed to seamlessly combine with our enhanced products and flexible package options, meaning the Gardner Denver Belliss & Morcom brand of products can create a lowest cost of ownership compressor solution. With the highest efficiency motors at 97.1% and the latest in extended life materials technology, both the VH and WH range continue to out perform all other 40 barg oil free compressors in the PET industry. Maintenance costs are also kept to a minimum due to our unique shaftless motor, with no belts or bearings there are fewer parts to maintain, which can eliminate unscheduled downtime.



- **Low Power Consumption – High on Efficiency**

The Gardner Denver Belliss & Morcom product range of oil free compressors have a proven track record for being the most energy efficient compressors available for PET applications. With each compressor driven by our EEF compliant water cooled motor, our 3 stage oil free compressor is proven to be the most power efficient design concept for a 40 barg PET compressor.

- **Small Compressor Footprint**

Where space is at a premium, the Belliss & Morcom range of oil free compressors offer a neatly arranged compressor system in the smallest available footprint. With no specialist foundations required, our compressor systems are easily installed and fully operational in the shortest possible time scale.

- **Balanced Operation**

All Belliss & Morcom compressors are dynamically balanced, therefore removing the need for any special and expensive structural foundations, the compressor room floor only requires to carry the static weight of the compressor.

- **Maximum Oil Free Air Quality**

With absolutely no risk of contamination, Belliss & Morcom compression technology delivers the highest quality, oil free compressed air meaning no possibility of oil contamination in your process up to ISO 8573 class 0. The intrinsically oil free air produced by a Belliss & Morcom compressor meets all air quality standards including Pure Air – ISO 8573-1.

VH & WH Oil Free Range

VH compressor

Performance summary

- 420 to 1,500 m³/hour at 40 barg
- 90 to 260kW direct zero drive loss 'shaftless' motor
- Oil free
- Water cooled
- 3 stages
- Capacity control – 0 to 100%
- Variable speed capacity range from 50 -100%
- Fully balanced operation

The Belliss & Morcom VH range of compressors offers a neatly arranged compressor system which provides maximum oil free air capacity in the smallest available footprint.



Capacity at 40 barg

| VH & WH PET Range | | Belliss VH7 | Belliss VH9 | Belliss VH12 | Belliss VH15 | Belliss VH18 | | |
|-------------------|------------|--|-------------|--------------|--------------|--------------|------------|--|
| SPECIFICATIONS | 50 Hz Data | Capacity at 40 barg m ³ /hr FAD cfm | 420 / 247 | 580 / 341 | 729 / 431 | 916 / 539 | 1116 / 657 | |
| | | Delivery Pressure barg / psi(g) | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 | |
| | | Speed rpm | 735 | 985 | 585 | 735 | 585 | |
| | | Shaft Power kW / HP | 75 / 100 | 101 / 135 | 116 / 155 | 146 / 196 | 185 / 248 | |
| | | Motor Power kW / HP | 90 / 125 | 110 / 150 | 120 / 200 | 150 / 235 | 185 / 2820 | |
| | 60 Hz Data | Capacity at 40 barg m ³ /hr FAD cfm | 406 / 247 | 518 / 304 | 729 / 431 | 885 / 521 | 1116 / 657 | |
| | | Delivery Pressure barg / psi(g) | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 | |
| | | Speed rpm | 710 | 880 | 585 | 710 | 585 | |
| | | Shaft Power kW / HP | 72 / 97 | 90 / 120 | 124 / 166 | 150 / 202 | 192 / 256 | |
| | | Motor Power kW / HP | 90 / 125 | 110 / 150 | 150 / 200 | 175 / 235 | 210 / 280 | |

Capacity at 30 barg

| VH & WH PET Range | | Belliss VH7 | Belliss VH9 | Belliss VH12 | Belliss VH15 | Belliss VH18 | | |
|-------------------|------------|--|-------------|--------------|--------------|--------------|------------|--|
| SPECIFICATIONS | 50 Hz Data | Capacity at 30 barg m ³ /hr FAD cfm | 431 / 254 | 593 / 349 | 743 / 437 | 933 / 549 | 1122 / 660 | |
| | | Delivery Pressure barg / psi(g) | 30 / 435 | 30 / 435 | 30 / 435 | 30 / 435 | 30 / 435 | |
| | | Speed rpm | 735 | 985 | 585 | 735 | 585 | |
| | | Shaft Power kW / HP | 69 / 92 | 93 / 124 | 112 / 150 | 141 / 188 | 177 / 237 | |
| | | Motor Power kW / HP | 90 / 125 | 110 / 150 | 132 / 200 | 160 / 235 | 210 / 280 | |
| | 60 Hz Data | Capacity at 30 barg m ³ /hr FAD cfm | 417 / 245 | 530 / 312 | 743 / 437 | 901 / 530 | 1122 / 660 | |
| | | Delivery Pressure barg / psi(g) | 30 / 435 | 30 / 435 | 30 / 435 | 30 / 435 | 30 / 435 | |
| | | Speed rpm | 710 | 880 | 585 | 710 | 585 | |
| | | Shaft Power kW / HP | 67 / 89 | 83 / 111 | 112 / 150 | 136 / 182 | 177 / 237 | |
| | | Motor Power kW / HP | 90 / 125 | 110 / 150 | 150 / 200 | 175 / 235 | 210 / 280 | |

WH compressor

Performance summary

- 1,680 to 3,200 m³/hour at 40 barg
- 280 to 550kW direct zero drive loss 'shaftless' motor
- Oil free
- Water cooled
- 3 stages
- Capacity control – 0%/50%/100%
- Variable speed capacity range from 30 -100%
- Fully balanced operation



The Belliss & Morcom WH range of compressors offers higher volumes of oil free air utilising energy efficient equipment and components. The double acting design provides greater flexibility in capacity control and lower power consumption.

Our unique design includes a three step capacity control with the piston compressing air on the up stroke as well as the down. This type of capacity control allows our customers to save energy and money.

Our inclined cylinder arrangement optimises balance and extends component life, reducing maintenance costs and minimising floorspace.

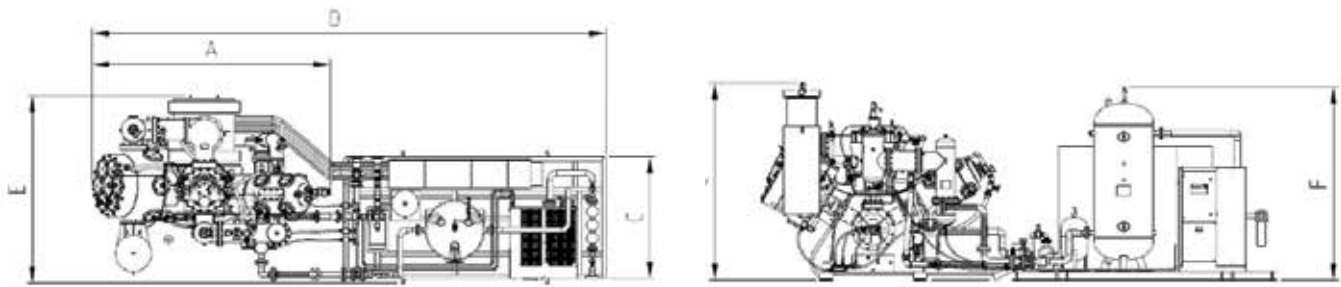
| | Belliss VH21 | Belliss VH25 | Belliss WH28 | Belliss WH29 | Belliss WH35 | Belliss WH40 | Belliss WH45 | Belliss WH50 |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 1402 / 825 | 1500 / 882 | 1680 / 988 | 1800 / 1058 | 2120 / 1248 | 2300 / 1354 | 2700 / 1589 | 3200 / 1883 |
| | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 |
| | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 |
| | 227 / 305 | 242 / 325 | 258 / 346 | 270 / 362 | 330 / 442 | 350 / 470 | 437 / 585 | 505 / 677 |
| | 235 / 350 | 260 / 350 | 260 / 375 | 270 / 435 | 350 / 483 | 350 / 535 | 450 / 603 | 505 / 737 |
| | 1354 / 797 | 1449 / 853 | 1623 / 955 | 1739 / 1024 | 2045 / 1204 | 2222 / 1308 | 2608 / 1535 | 3091 / 1819 |
| | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 | 40 / 580 |
| | 710 | 710 | 710 | 710 | 710 | 710 | 710 | 710 |
| | 227 / 304 | 242 / 323 | 256 / 343 | 277 / 371 | 330 / 443 | 355 / 476 | 422 / 565 | 500 / 670 |
| | 260 / 350 | 260 / 350 | 280 / 375 | 325 / 435 | 348 / 467 | 385 / 535 | 450 / 603 | 550 / 737 |

| | Belliss VH21 | Belliss VH25 | Belliss WH28 | Belliss WH29 | Belliss WH35 | Belliss WH40 | Belliss WH45 | Belliss WH50 |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 1410 / 829 | 1509 / 887 | 1693 / 995 | 1817 / 1068 | 2145 / 1262 | 2313 / 1360 | 2716 / 1597 | 3229 / 1899 |
| | 30 / 435 | 30 / 435 | 30 / 435 | 30 / 435 | 40 / 580 | 30 / 435 | 30 / 435 | 30 / 435 |
| | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 |
| | 221 / 296 | 248 / 332 | 242 / 324 | 262 / 351 | 316 / 424 | 337 / 452 | 412 / 552 | 463 / 619 |
| | 260 / 350 | 260 / 350 | 280 / 375 | 325 / 435 | 333 / 447 | 385 / 535 | 450 / 603 | 550 / 737 |
| | 1362 / 801 | 1457 / 857 | 1635 / 962 | 1755 / 1032 | 2070 / 1218 | 2234 / 1314 | 2624 / 1543 | 3119 / 1834 |
| | 30 / 435 | 30 / 435 | 30 / 435 | 30 / 435 | 40 / 580 | 30 / 435 | 30 / 435 | 30 / 435 |
| | 710 | 710 | 710 | 710 | 710 | 710 | 710 | 710 |
| | 213 / 286 | 240 / 321 | 234 / 313 | 253 / 339 | 305 / 409 | 326 / 436 | 398 / 533 | 447 / 598 |
| | 260 / 350 | 260 / 350 | 280 / 375 | 325 / 435 | 322 / 432 | 350 / 535 | 450 / 603 | 550 / 737 |

What makes the Gardner Denver Belliss & Morcom range **unique?**

| | |
|--|---|
| Low Power Consumption | Use of energy efficient equipment ensuring lower operating costs |
| Small Compact Footprint | Reduction in space requirements leads to cost savings for floor space |
| Direct Drive Shaftless Motor | Reduces power absorbed and eliminates any belt drive losses |
| Simple Installation | Compact skid packages thus reducing installation costs |
| Balanced Operation | Dynamically balanced removing the need for any special foundations |
| Single Compressor Block | One single 3 stage block resulting in the most efficient air solution |
| Half Load Capability | Reduced power at partial load conditions for the WH range |
| Low Maintenance | Only one major annual service required |
| Robust Construction | Ensures continuous 24/7 operation maintaining production output |
| High Operating Efficiency | Results in maximum compressor and plant performance |
| High Quality Oil Free Air | Guaranteed clean dry air to ISO 8573.1 Class 1.2.4 |
| Single Turnkey Partners | A single source for both PET blowing and utility air requirements |
| Global Supply & Local Support | Dedicated sales and service centres protect your investments |

VH and WH PET range dimensions



| Model | Installed min area* | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | Weight Comp. (Kg) | Weight Skid (Kg) |
|-------|---------------------|--------|--------|--------|--------|--------|--------|-------------------|------------------|
| VH7 | 7750 x 4600 | 2350 | 2260 | 1980 | 5770 | 2100 | 2695 | 3875 | 2350 |
| VH9 | 7750 x 4600 | 2350 | 2260 | 1980 | 5770 | 2100 | 2695 | 3875 | 2350 |
| VH12 | 8650 x 4600 | 2950 | 2300 | 2645 | 6670 | 2100 | 2695 | 5160 | 2400 |
| VH15 | 8650 x 4600 | 2950 | 2300 | 2645 | 6670 | 2100 | 2695 | 5160 | 2400 |
| VH18 | 8750 x 4600 | 3025 | 2370 | 2600 | 6750 | 2100 | 2695 | 6345 | 2500 |
| VH21 | 8750 x 4600 | 3025 | 2370 | 2600 | 6750 | 2100 | 2695 | 6345 | 2500 |
| VH25 | 7800 x 4300 | 3025 | 2370 | 2600 | 6900 | 2100 | 2740 | 6800 | 2600 |
| WH28 | 9300 x 4900 | 3275 | 2980 | 2950 | 7350 | 2100 | 2740 | 9900 | 2900 |
| WH29 | 9300 x 4900 | 3275 | 2980 | 2950 | 7350 | 2100 | 2740 | 9900 | 2900 |
| WH35 | 9950 x 4900 | 3500 | 3110 | 3190 | 7950 | 2100 | 2740 | 10410 | 3000 |
| WH40 | 9950 x 4900 | 3500 | 3110 | 3190 | 7950 | 2100 | 2740 | 10410 | 3000 |
| WH45 | 9950 x 4900 | 3400 | 3150 | 3190 | 7950 | 2100 | 3210 | 11500 | 3600 |
| WH50 | 10500 x 4900 | 4000 | 3150 | 3315 | 9000 | 2100 | 3210 | 12000 | 3600 |

* installed minimum area required for Ancillary Skid package - (indication only - sizes differ depending on application)

VH & WH Range

The VH & WH Ranges are also available as complete packages including all essential ancillary items such as starter control panels with PLC logic systems, energy efficient motors, air dryer, air receiver, filters and optional cooling systems to suit all site conditions.

Ancillary Skid Options

All our ranges can be installed as floor mounted compressors with all ancillary equipment fixed on a baseplate, complete with all interconnecting pipework and electrical wiring, with options for acoustic enclosures.

Loose Equipment

All equipment can be supplied as loose items with a 'kit' of interconnecting parts that just require final connections on site.



Gardner Denver Full Turnkey Installation, Commissioning & Training

Correct installation is essential in providing long-term compressor reliability. Gardner Denver provide full turnkey solutions from initial site surveys through to design, installation and final commissioning.

Our fully qualified engineers assess all critical factors such as location, radiated heat, noise and air inlet conditions to ensure the complete compressor installation functions reliably whatever the environment.



Enhanced Products – Designed to Monitor, Control & Save

The Most Efficient Solution for PET Bottle Blowing Intelligent Multi Compressor Systems

The AirPET compressor control system is designed to give a better and more accurate overall control of the air pressure on a multi-compressor system than the conventional methods.

Features

- Powerful trending and logging facilities to implement effective plant management
- Main plant networked if required
- Can monitor other items of equipment and plant, giving a common database to assist with effective plant management
- Can monitor low pressure compressors if required
- A broadband connection will allow remote monitoring and assistance
- Proven Technology with International hardware and software support
- Can monitor up to 30 Compressors of any make, model or combination

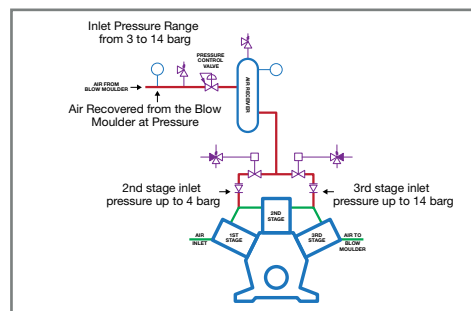
Benefits

- Reduces energy costs by reducing compressor off-load time
- Provides live energy usage, energy costs and live CO₂ emissions data
- AirPRESSURE control of the main line to within +/- 0.5 barg
- AirPREDICT allows a compressor to be online smoothly before the demand is required
- AirSAVE allows the compressor to be switched off, or at low pressure, at weekends or on non-productive shifts
- Ensures optimum compressor usage and improved compressor performance
- Predictive planned maintenance and downtime management

Air Recovery

The Air Recovery System is designed to accommodate a returned pressure from the Blow Moulding machines that can be ‘recycled’ back through the compressor.

- Reduction in compressor energy consumption
- Easily installed to existing installation
- Can be used to supplement LP air requirements

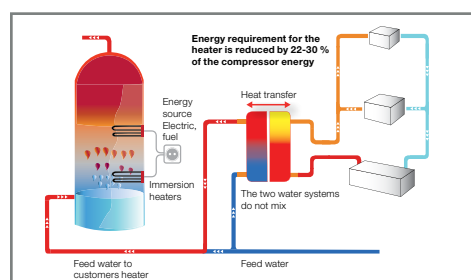


Air Recovery

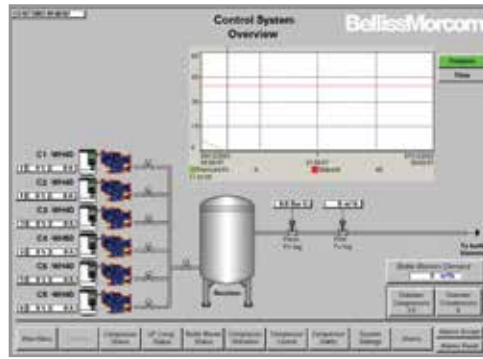
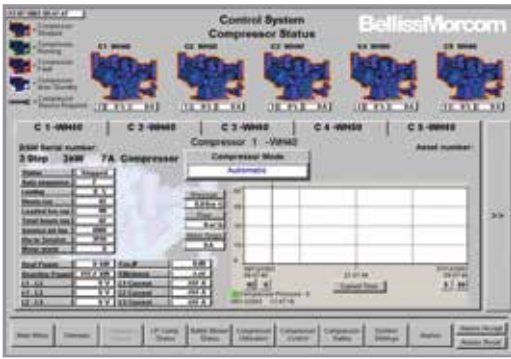
Heat Recovery

Belliss & Morcom have developed a Heat Recovery System to work with the PET compressor. The PET compressors use cooling water to cool the compressor and the compressed air. The water once heated through the compressor will then need to be cooled through the compressor cooling tower.

The compressor cooling system can be modified to provide water at around 80°C to pre-heat the customers own feed water to their heating systems (water or steam) and thus reduce their energy load through the water / steam heater. Savings are typically 22-30% of the compressor motor rating kW.



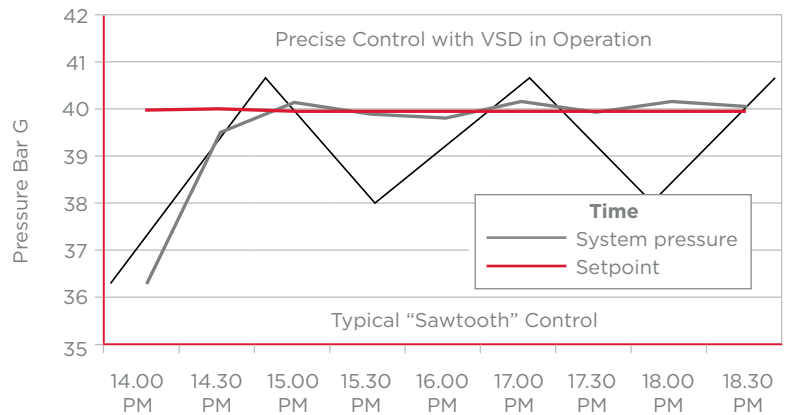
Heat Recovery



AirPet System

Variable Speed Drives

- Reduced energy costs
- Variable capacity control – 30% to 100%
- Reduced motor starting current (within the FLC of the motor)
- Improved efficiency and power factor
- Extended component life
- Accurate and repeatable pressure control

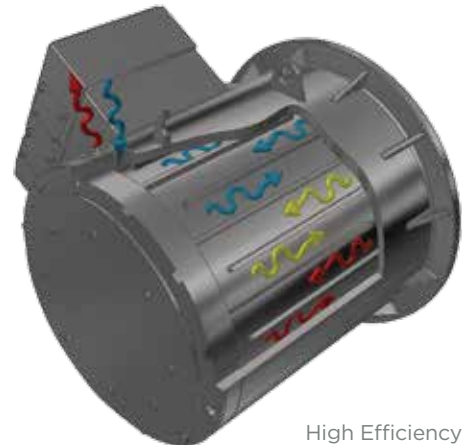


High Efficiency Water Cooled Motor

It is widely accepted within industry today that the running of motors and drives account for a large percentage of energy usage. Using the right energy efficient motors will help lower your carbon footprint as well as your energy bills. With this in mind Belliss & Morcom developed a unique water cooled shaftless motor, which makes our compressor systems the most energy efficient on the market.

Benefits

- Lower electricity consumption
- Higher efficiency of 97.1%
- Lower CO₂ emissions
- Suitable for variable speed drive
- IP56 construction, suitable for all operating environments
- 100% reduction in radiated heat
- Low noise specification
- Maintenance free
- Connects direct to the existing compressor cooling circuit
- The environmentally friendly 'green' option
- Specifically designed for the global drinks industry



High Efficiency



Water Cooled Motor

Energy Audits

In order to reduce energy costs and CO₂ emissions, Belliss & Morcom offer audits tailored to suit your specific needs by our team of dedicated experts.

Please contact us for more details.



AFTERMARKET

Enhanced Products – Designed to Monitor, Control & Save

Protect Your Investment with Confidence

To ensure optimum compressor performance and reliability, only one specification of spare part should be used: the original one. Belliss & Morcom guarantee every spare part ordered.

Comprehensive Parts Stock Holding

Stock holding around the world means parts can be dispatched from our support centres within hours of order.

Convenient Service Packs

Service packs and kits provide all the necessary components to carry out field services and repairs efficiently.

Aftermarket Products & Services

- Fixed Cost Preventative Maintenance
- Compressor and Component Refurbishment
- Enhanced Product Upgrades
- On Site Commissioning and Training
- Full Turn Key Installations
- Unrivalled Product & Technical Support

Our Day to Day Commitment to You and Your Business

- 24 Hours a Day, 365 Days a Year Support
- Extensive Spare Parts Stock Holding
- Experienced Local Product and Technical Support

Plus the added advantage of the best technical advice and support available in the market place today.





Gardner Denver

AFTERMARKET

How Does it Work?

- Unlimited protection programme for the life of your compressor(s)
- You will be fully budgeted against any unforeseen or unscheduled breakdown and failures
- It gives you peace of mind through maximised productivity and lowered costs

Features include

- A simple, straightforward agreement – no hidden extras, no small print
- Unlimited operating hours on the compressor
- 100% original spare parts with proven performance and reliability
- Scheduled maintenance carried out by factory-trained technicians
- Only one service required each year, depending on model, increasing compressor availability

Benefits include

- Parts stocked locally to minimise downtime
- Interactive and proactive compressor monitoring
- Elimination of unexpected repair costs
- Long term reliability and improved operational visibility, with free user-friendly expert advice



Gardner Denver

HIGH PRESSURE SOLUTIONS



Global Expertise

For more information about the Gardner Denver High Pressure compressor ranges please contact your local Gardner Denver Sales & Service Centre, or see below for details of our High Pressure Centre of Excellence.

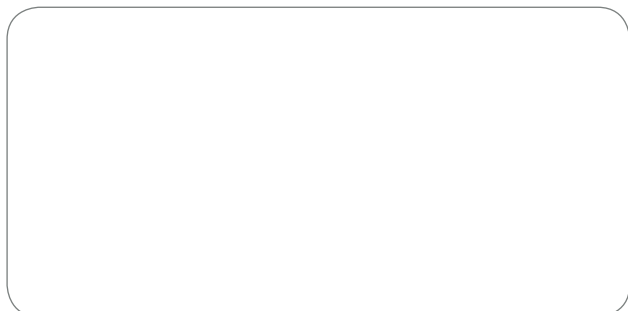
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For additional information please contact Gardner Denver or your local representative.

Specifications subject to change without notice.