

# **Gardner Denver**

**HIGH PRESSURE SOLUTIONS**

## Natural Gas Vehicle Refuelling

Smarter Compressor Technology





## Gardner Denver - High Pressure Compressors

With the Gardner Denver Compressor 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.

### We are the experts for CNG High Pressure Applications

With over 2,000 Compressed Natural Gas (CNG) compression units supplied worldwide, Gardner Denver is a global leader in the design, manufacture and installation of ready-to-run CNG refuelling stations, offering 3 decades of unrivalled engineering pedigree.

Our global team meets the needs of a diverse range of customers through a series of modular, ready-to-run packages based around the Gazpack range of air and water cooled reciprocating compression units.

The Gazpack series is designed to cover the full range of station types from pilot projects and small forklift fleets, through to high capacity public stations and large bus/truck refuelling depots. Designed for flexibility and ease of installation, the Gazpack series is available in a wide range of packaging options.

In addition to our unique, unrivalled knowledge base in compression solutions and reciprocating unit manufacture, the organisation can also support you with its extensive expertise in project management.

### Key Benefits

- Compact modular design provides a small footprint unit with maximum flexibility
- Well balanced compressor design, plus the use of anti-vibration mounts and flexible connections removes the need for special foundations and reduces vibration
- Individual, compression stage separation using Reavell designed high efficiency separators reduces moisture carryover between stages thereby increasing component life
- Gas recovery system means no loss of gas to atmosphere under normal operation
- Fully automatic controls are designed for simple, unmanned compressor operation
- Complete set of safety trips and indicators, all wired to explosion proof and intrinsically safe terminal boxes, which simplifies installation
- Installation is made quick and simple through the use of flexible connections and the single outlet manifold for all pressure safety valve



## About us

Starting from modest beginnings in 1898 we have grown into one of the world's most respected organisations within high compression technology. Reavell is now part of Gardner Denver's High Pressure Solutions. We offer advanced research and development facilities, a dedicated and experienced team, a class-leading manufacturing centre and an undivided attention to high quality engineering excellence.

# Reavell

## Product Range

Gardner Denver offers a comprehensive range of high pressure technology systems for compressed natural gas. Renowned for providing high quality turnkey solutions, Gardner Denver can assist with specialist CNG requirements, utilising the latest technological innovations to create bespoke solutions that meet your requirements or choose from a standard product range of 10 model variants - from simple compressors through to complex custom-engineered solutions, all of which are dedicated to delivering CNG compression solutions.

The compression of air and gas via reciprocating units from gas main pressures up to 20 barg (290 psig) and discharge pressures up to 414 barg (6000 psig) is a highly specialised and sophisticated field of engineering.

Working to, within tolerances of 1/1000th of a millimetre, uncompromising quality of material, processes and personnel is paramount.

Gardner Denver and its high pressure brands provide high compression air and gas technology for a diverse and varied range of applications and clientele. Wherever high compression technology is used, our solutions are never far away. From Compressed Natural Gas refuelling across 5 continents to industrial process support, breathing air, offshore or defence units, we are ideally positioned to support the most demanding of customers.





## Turnkey Solutions

Gardner Denver offers the expertise to develop a complete refuelling station, covering:

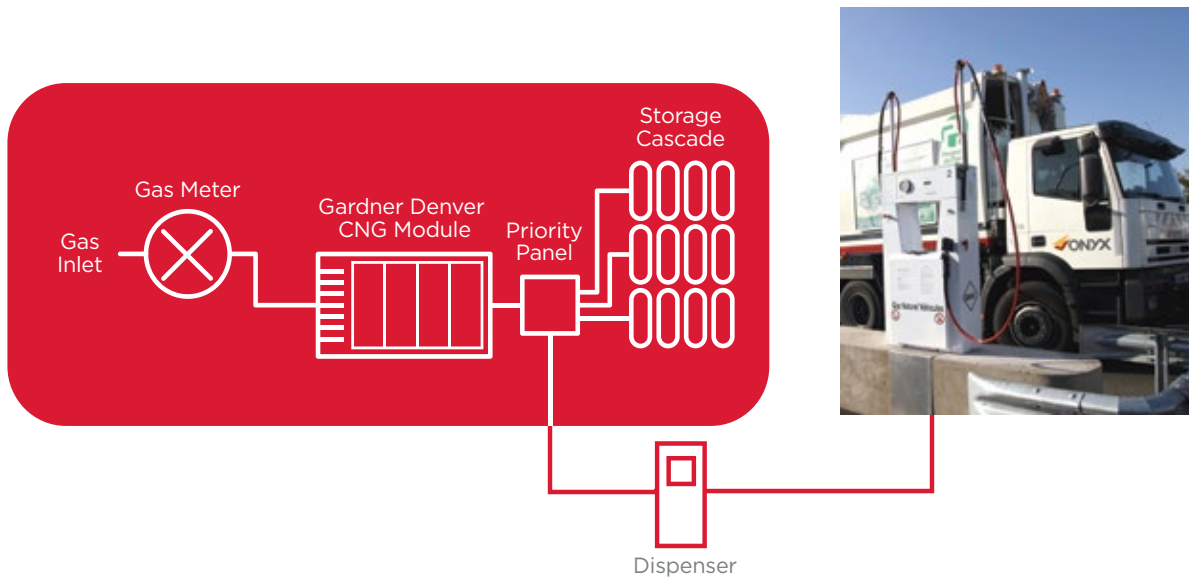
- Project feasibility
- Site suitability
- Planning and approvals process
- Station and equipment design
- Utility procurement
- Equipment manufacture
- Site preparation
- Installation
- Commissioning
- Training

# Station Design

Station design is a critical part of any refuelling project. Our team of experienced project managers and engineers can advise on all aspects of this process, taking into account the station and fleet type as well as its proposed purpose, fill volume, site limitations and budget.

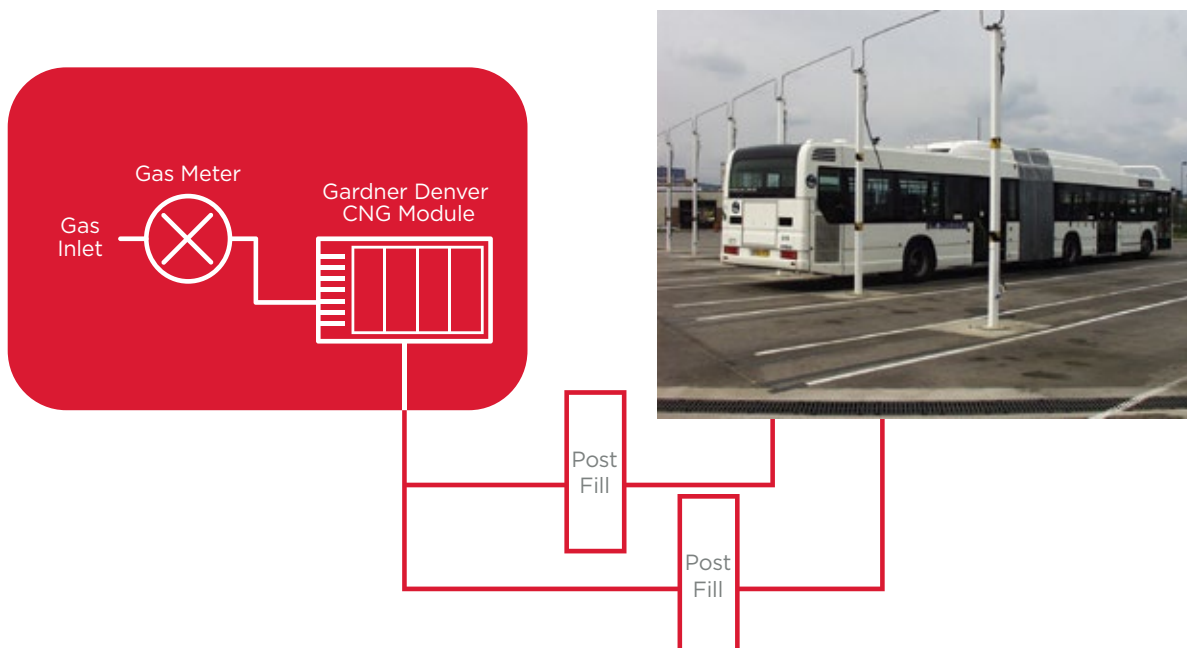
## Fast Fill

Fast fill stations primarily utilise gas drawn from a storage element previously filled by the compression unit, rather than direct from the gas supply pipe. The speed of fill is comparable to petrol or diesel and is typically found on public forecourts. This method is always used where the exact volume of gas in each vehicle must be quantified.



## Time Fill

With time fill systems the vehicle is refuelled directly from the compressor without the need for storage cylinders. Refuelling is therefore slower and more suited for vehicles left overnight at a depot, such as buses. With time fill systems the quantity of fuel dispensed into each vehicle is not precisely measurable and therefore time fill is unsuitable for public refuelling stations.





## Modular System

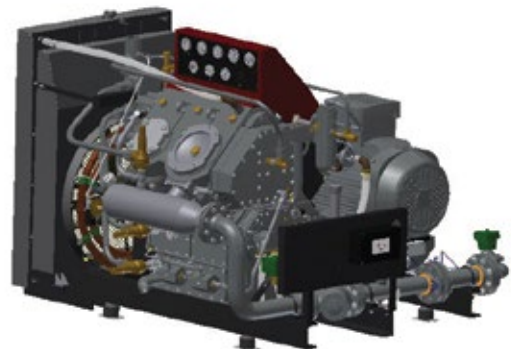
The Gazpack range is a modular ready-to-run system available in a variety of configurations, custom-built to meet customer specification. Gardner Denver is able to supply Gazpack modules and ancillaries to meet most customer requirements.

## Skid Mounted Options

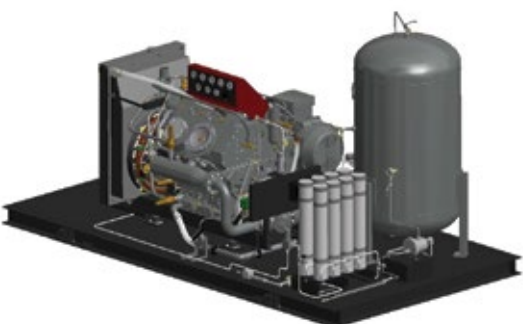
Skid mounted compressor and inlet train



Skid mounted compressor and inlet train with cooling system



Skid mounted compressor and inlet train with cooling system, filtration and gas recovery



Skid mounted compressor and inlet train with cooling system, filtration and gas recovery system contained within a weatherproof acoustic enclosure





## Gazpack Range

The Gazpack range is a modular ready-to-run system available in a variety of configurations, custom-built to meet customer specification. Gardner Denver is able to supply Gazpack modules and ancillaries to meet most customer requirements.

## Fill Stations

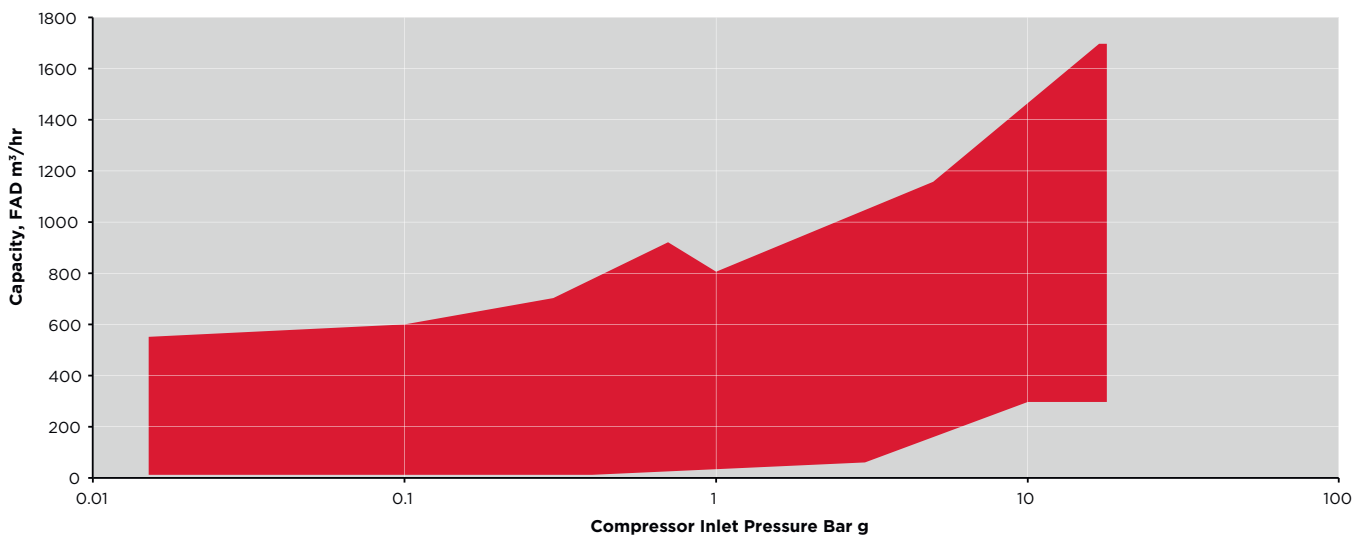
- Time Fill Station
- Fast Fill Station





## Advanced Compressor Design

- Compact modular design provides a small footprint unit with maximum flexibility
- Well balanced compressor design, plus the use of anti-vibration mounts and flexible connections removes the need for special foundations and reduces vibration
- Individual, compression stage separation using Gardner Denver designed high efficiency separators reduces moisture carryover between stages thereby increasing component life
- Gas recovery system means no loss of gas to atmosphere under normal operation
- Fully automatic controls are designed for simple, unmanned compressor operation
- Complete set of safety trips and indicators, all wired to explosion proof and intrinsically safe terminal boxes, which simplifies installation
- Installation is made quick and simple through the use of flexible connections and the single outlet manifold for all pressure safety valves







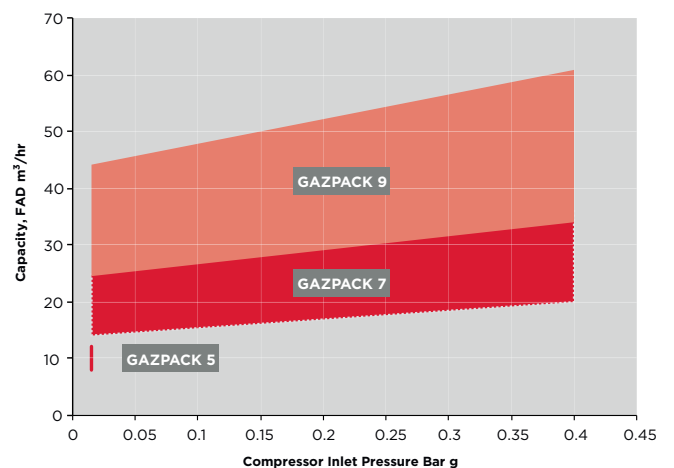
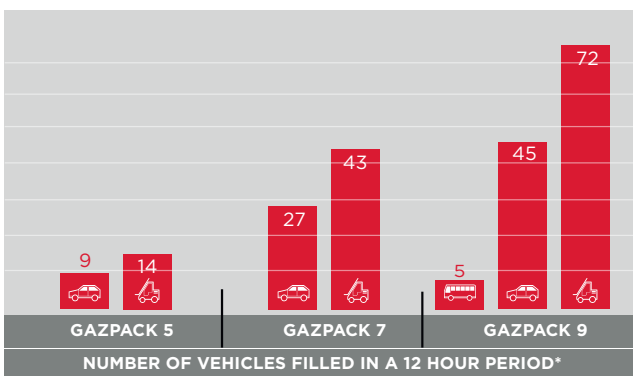
## Gazpack Series 5 | 7 | 9



Suitable for	Capacity (FGD)		Inlet Gas Pressure	
	m <sup>3</sup> /hr	CFM	bar g	psi g
Forklift Trucks	12 - 60	7 - 35	0.015 to 0.4	0.218 to 5.8

The Gazpack 5 / 7 / 9 range offers a compact ready-to-run refuelling package. Contained within a weatherproof acoustic enclosure, the units include a 4 stage, lubricated air cooled compressor, gas recovery vessel, filtration and control panel.

These modular packages can also be combined with dispensers, storage and safe area controls.



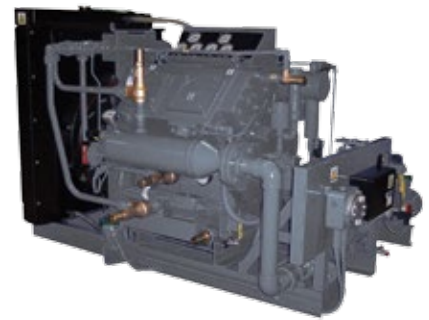
## Technical Data

Gardner Denver model	Volume Output		Operating Pressure		Motor Output	Dimensions			Weight	Cooling
	m <sup>3</sup> /hr	CFM	bar g	psi g	kW	Length	Width	Height	kg	°C
GAZPACK 5	12	7	250 - 350	3626 - 5076	4	1250	745	1925	800	Air Cooled
GAZPACK 7	21 - 36	12 - 21	250 - 350	3626 - 5076	11 - 15	1293	870	2405	875	Air Cooled
GAZPACK 9	43	25 - 35	250 - 350	3626 - 5076	18.5 - 22	1900	970	2260	1650	Air Cooled

\*This information is for our standard CNG compressor performance information. Each model is capable of performing outside of these parameters if required.

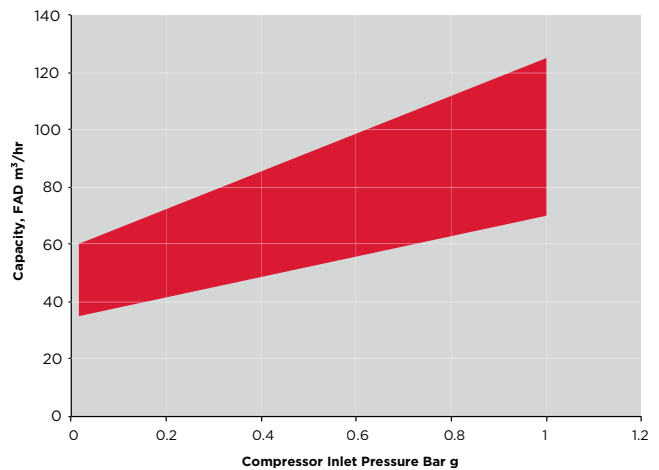
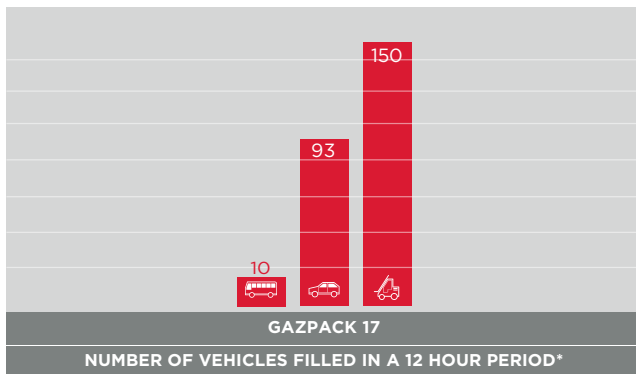


## Gazpack Series 17



Suitable for	Capacity (FGD)		Inlet Gas Pressure	
	m <sup>3</sup> /hr	CFM	bar g	psi g
Medium Sized Refuelling Stations	60 - 125	35 - 73	0.015 to 1.0	0.217 to 14.5

The Gazpack 17 is a Gardner Denver 4 staged, lubricated water cooled compressor offering larger capacities and higher inlet pressures for maximising gas mains pressure in an energy efficient package. This compressor is available in modular packages with optional gas recovery systems, filtration, base frame and weather proof enclosures.



## Technical Data

Gardner Denver model	Volume Output		Operating Pressure		Motor Output	Dimensions			Weight	Cooling
	m <sup>3</sup> /hr	CFM	bar g	psi g	kW	Length	Width	Height	kg	°C
GAZPACK 17	60 - 125	35 - 75	350	5076	37	Dependent on packaging option				Water Cooled

\*This information is for our standard CNG compressor performance information. Each model is capable of performing outside of these parameters if required.

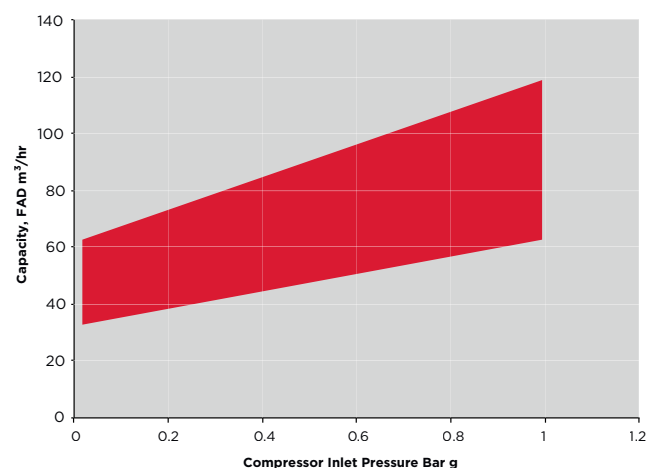
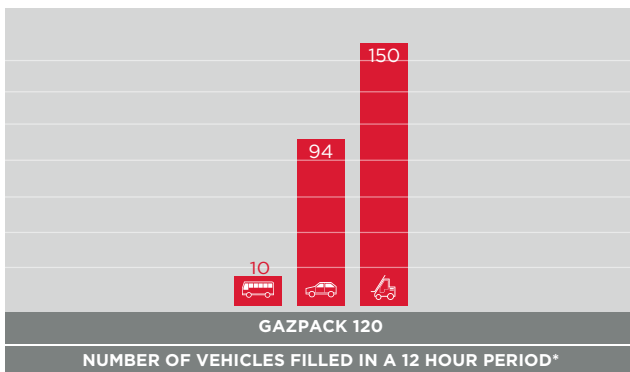


## Gazpack Series 120



Suitable for	Capacity (FGD)		Inlet Gas Pressure	
	m <sup>3</sup> /hr	CFM	bar g	psi g
Medium Sized Refuelling Stations	65 - 125	38 - 73	0.015 to 1.0	0.217 to 14.5

The Gazpack 120 is a 4 staged, lubricated air cooled compressor offering a range of suction pressures with high delivery flow for increased flexibility for a range of sites. The 4 single acting compression stages helps reduce wear with increased reliability.



## Technical Data

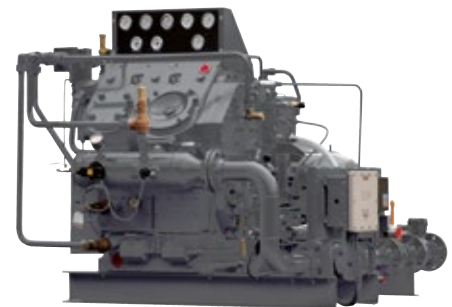
Gardner Denver model	Volume Output		Operating Pressure		Motor Output	Dimensions			Weight	Cooling
	m <sup>3</sup> /hr	CFM	bar g	psi g	kW	Length	Width	Height	kg	°C
GAZPACK 120	65 - 125	38 - 73	250 - 414	3626 - 6000	45	Dependent on packaging option				Air Cooled

\*This information is for our standard CNG compressor performance information. Each model is capable of performing outside of these parameters if required.

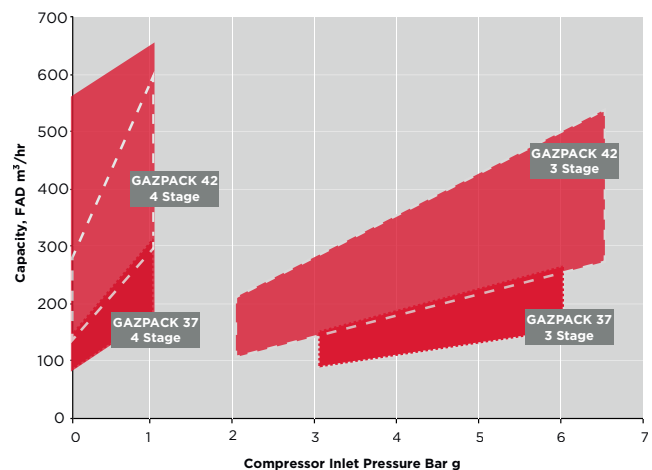
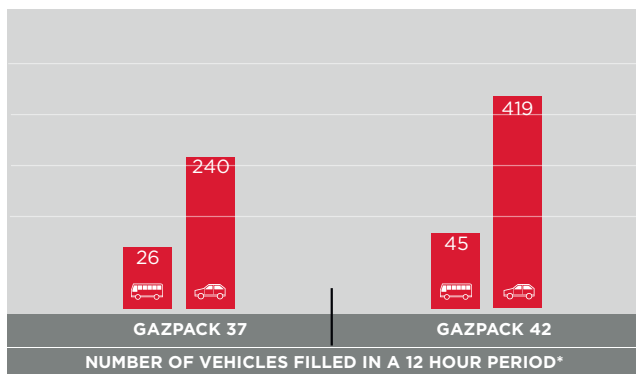


## Gazpack Series 37 | 42

Suitable for	Capacity (FGD)		Inlet Gas Pressure	
	m <sup>3</sup> /hr	CFM	bar g	psi g
Medium Sized Refuelling Stations	130 - 600	76 - 353	0.015 to 6.8	0.217 to 100



The Gazpack 37 and Gazpack 42 multistage, lubricated water cooled compressor packages offer reliability and increased capacity for medium sized stations. As modular units, the Gazpack 37 and 42 can be supplied as simple skid mounted blocks through to fully packaged systems with cooling systems, recovery vessels and filtration within acoustic enclosures.



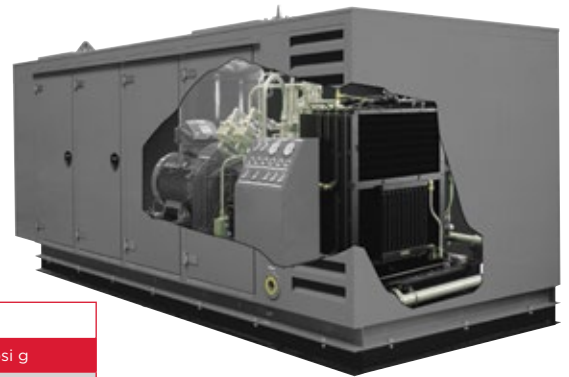
## Technical Data

Gardner Denver model	Volume Output		Operating Pressure		Motor Output	Dimensions			Weight	Cooling
	m <sup>3</sup> /hr	CFM	bar g	psi g	kW	Length	Width	Height	kg	°C
GAZPACK 37	130 - 320	76 - 188	250 - 350	3626 - 5076	75 - 90	Dependent on packaging option				Water Cooled
GAZPACK 42	21 - 36	12 - 21	250 - 350	3626 - 5076	75 - 150	Dependent on packaging option				Water Cooled

\*This information is for our standard CNG compressor performance information. Each model is capable of performing outside of these parameters if required.

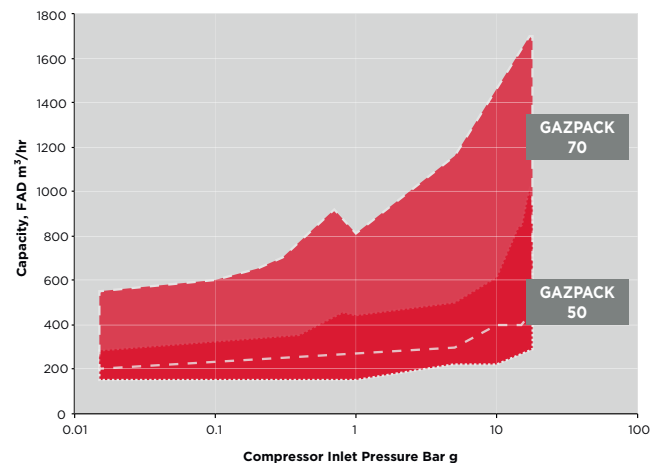
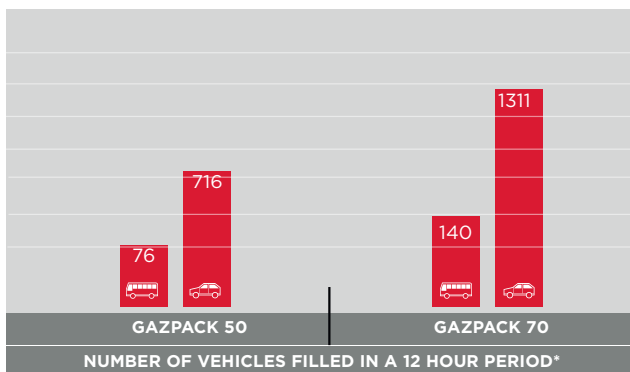


## Gazpack Series 50 | 70



Suitable for	Capacity (FGD)		Inlet Gas Pressure	
	m <sup>3</sup> /hr	CFM	bar g	psi g
Medium Sized Refuelling Stations	170 - 1748	100 - 1028	0.015 to 18	0.217 to 261

The Gazpack 50 and Gazpack 70 series multistage air cooled compressors offer larger capacities and higher inlet pressures for maximising gas mains pressure and thereby providing energy efficiency savings. These are modular packages with optional air blast cooling, gas recovery system, filtration, base frame and weatherproof acoustic enclosure.



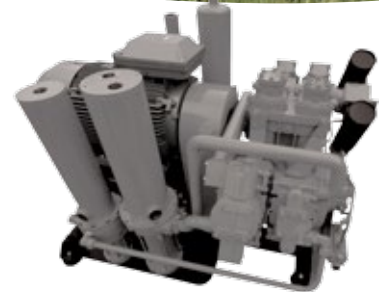
## Technical Data

Gardner Denver model	Volume Output		Operating Pressure		Motor Output	Dimensions			Weight	Cooling
	m <sup>3</sup> /hr	CFM	bar g	psi g	kW	Length	Width	Height	kg	°C
GAZPACK 50	170 - 600	100 - 353	250 - 350	3626 - 5076	45 - 150	Dependent on packaging option				Air Cooled
GAZPACK 70	229 - 1028	229 - 1028	250 - 350	3626 - 5076	75 - 250	Dependent on packaging option				Air Cooled

\*This information is for our standard CNG compressor performance information. Each model is capable of performing outside of these parameters if required.

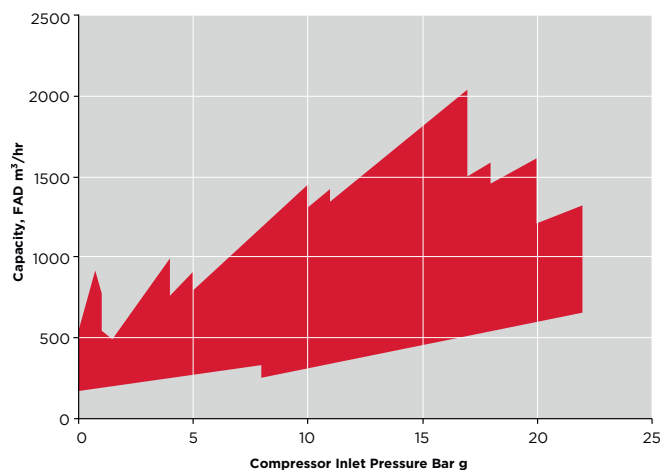
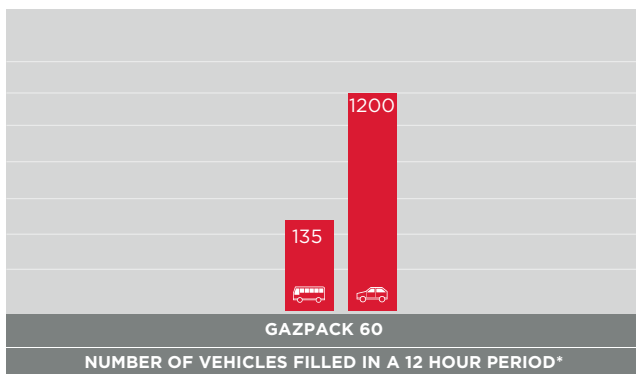


## Gazpack Series 60



Suitable for	Capacity (FGD)		Inlet Gas Pressure	
	m <sup>3</sup> /hr	CFM	bar g	psi g
large fleet refuelling	550 - 1600	323 - 941	0.015 to 18	0.217 to 261

The Gazpack 60 series multi staged, lubricated water cooled compressor offering larger capacities and higher inlet pressures for maximising gas mains pressure and thereby providing energy efficiency savings. This compressor is available in modular packages with optional gas recovery systems, filtration, base frame and weather proof enclosures.



## Technical Data

Gardner Denver model	Volume Output		Operating Pressure		Motor Output	Dimensions			Weight	Cooling
	m <sup>3</sup> /hr	CFM	bar g	psi g	kW	Length	Width	Height	kg	°C
GAZPACK 60	550 - 1600	323 - 941	250 - 350	3626 - 5076	90 - 250	Dependent on packaging option				Water Cooled

\*This information is for our standard CNG compressor performance information. Each model is capable of performing outside of these parameters if required.

# Ancillaries

Gardner Denver offers all the ancillaries required for a fully operational refuelling station:

- Storage
- Priority Panel
- Dispensers – fast fill and time fill options
- Controls
- Dryers
- Electronic access
- Remote access
- Gas detectors
- Dew point monitors

## Cascade Storage Systems

A Fast Fill refuelling system provides gas on demand using a combination of the compressor and pre-pressurised storage to maximise a 200 bar fill for the vehicle. There are three key elements: Priority Panel, Cascade Storage (typically 3 banks – High, Medium and Low) and Electronic Dispenser. The Priority Panel prioritises the use of gas from the compressor to the Cascade Storage: firstly to the High Bank, then the Medium Bank and finally the Low Bank. The Electronic Dispenser draws on gas from the storage in reverse order (Low, Medium, High) and finally directly from the compressor if demand has exceeded the storage capacity. This system maximises vehicle fill and station capacity and is recommended for public stations.

## Storage

We offer a variety of storage systems designed specifically to local standards. All vessels and cylinders can be designed to meet ASME, DOT and TPED specifications and are fully weatherproof, removing the need for enclosures, although enclosures are available on request.

### Typical Specifications

- 80 litres water capacity per cylinder
- Compressor feed lines – 12mm OD 316 stainless steel tubing and fittings
- Dispenser bypass line – 16mm OD 316 stainless steel tubing and fittings
- Mechanical valves set storage bank filling priority
- Maximum working pressure 350 barg
- Gauges fitted to compressor feed line and all storage bank lines
- Lightweight panel with flexible mounting options





## Ancillaries

### Dispensers

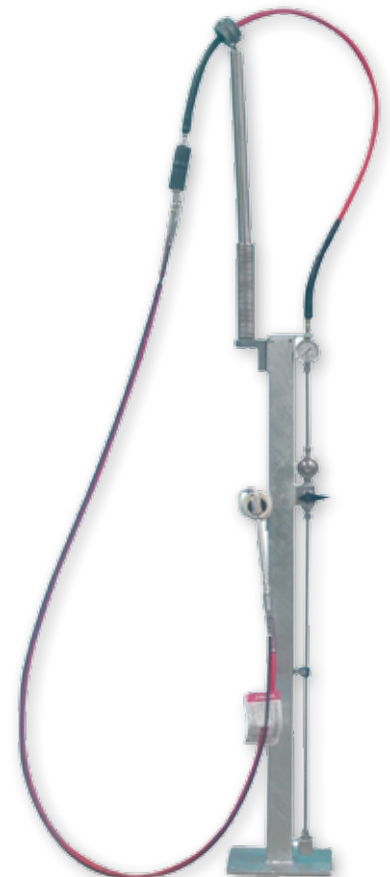
A full range of electronic and manual dispensers are available, with simple manual operation or fully automatic dispensing with card access technology.

### Time Fill Posts

- Includes fuelling valve, pressure gauge, hose and connector assembly
- Cost effective with high reliability
- Unmanned operation once connected
- Can lower energy costs through use of cheaper off peak energy rates
- No need for storage systems
- Ideal for depot based overnight refuelling with modest daily mileage

### Manual Fast Fill Dispensers

- Single or dual hose designs with 'Breakaway' safety connections
- NGV1 or NGV2 nozzles available
- 1 – 3 bank sequencing options
- Ideally suited for single car dispensing or as a backup dispenser at a refuelling depot







## Electronic Fast Fill Dispensers

- Flow rates up to 80 kg/min
- Single or dual hose designs with
- 'Breakaway' safety connections
- NGV1 or NGV2 nozzles available
- Coriolis mass flow meter
- Explosion proof and intrinsically safe electronics
- 1 – 3 bank sequencing options
- Suitable for electronic card access and payment systems and stations with high speed filling requirements

## Dryers

Natural gas vehicles require high quality clean gas to ensure long life and minimum maintenance. We offer a range of dryer systems to ensure full protection for the vehicle and the refuelling station. Options include both low inlet dryers (pre-compression) and high inlet dryers (post-compression). High inlet dryers are available as static or re-generative systems.

## Controls

Gardner Denver and other brands of Gardner Denver are able to provide a full range of control systems from simple manual controls to complete systems, with optional PLC, designed for unmanned operation.

Control systems can be mounted remotely or within the canopy and are designed around local and national standards ensuring full compliance with regulations.

We can also offer remote monitoring capabilities. This provides useful data from the installation which can help to devise more efficient ways of working, including energy conservation, early fault diagnostics and shutdown planning.





## Unrivalled Application Know-how

Gardner Denver understands the challenges facing our global client base in today's changing environment and takes pride in offering an exemplary global aftermarket programme covering spare parts, service and support. Our global teams fulfil all service requirements throughout the life cycle of your equipment. Effective maintenance of your high compression systems not only ensures uninterrupted process stability, but offers the additional security of scheduled maintenance programmes.

Choosing our aftermarket professionals offers you a comprehensive service support package that can continue far beyond the initial installation phase.

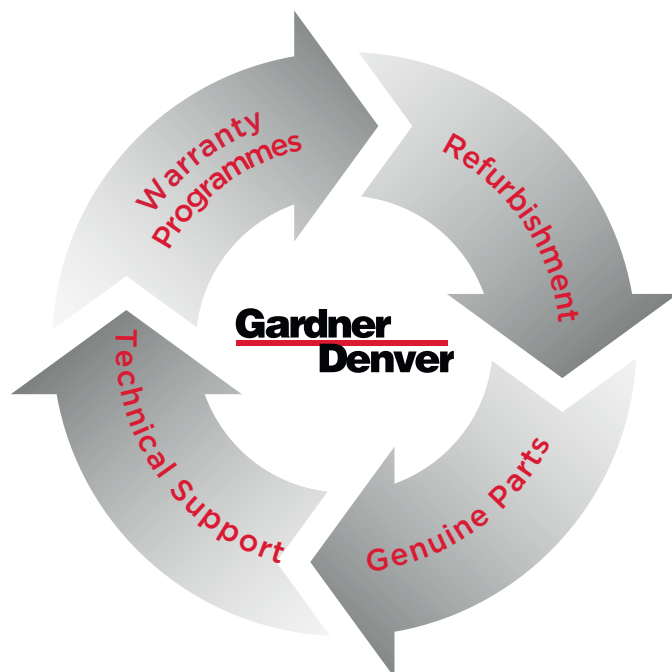
As part of our life cycle commitment, Gardner Denver can additionally offer you a total solution approach, providing a variety of extended service programmes within a service contract framework.





## Training

We have the ability to undertake CNG training all around the world including customer operator training, installation and commissioning training, and on-going service and maintenance training, either in-house or at the customer's premises.



# 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.

### Gardner Denver Ltd

Claybrook Drive, Redditch, Worcestershire, B98 0DS UK

T: +44 (0) 1527 838 600, F: +44 (0) 1527 838 630

E: [highpressure@gardnerdenver.com](mailto:highpressure@gardnerdenver.com)

W: [www.gdhighpressure.com](http://www.gdhighpressure.com)



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

Specifications subject to change without notice.