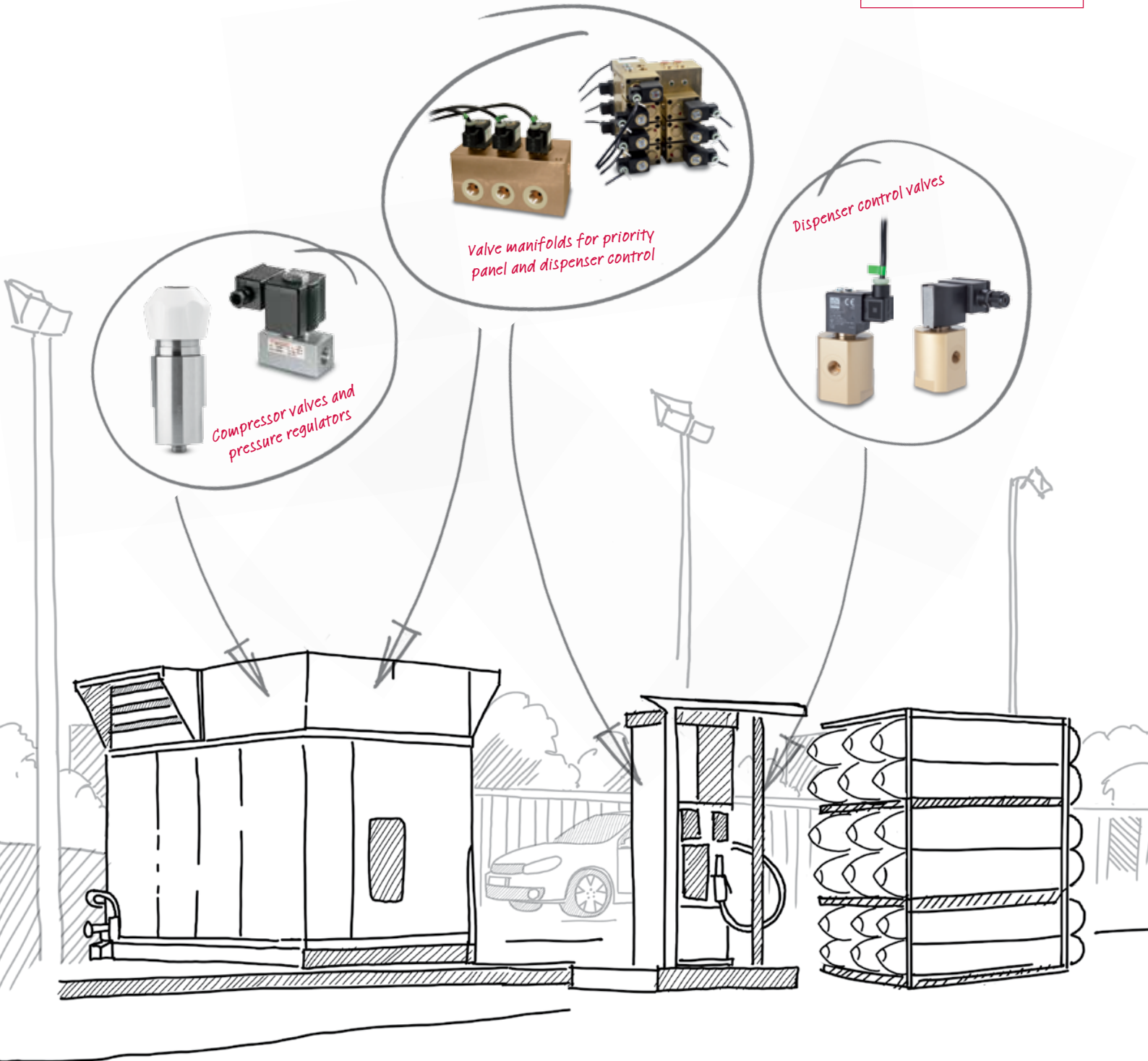


HIGH QUALITY COMPONENTS AND  
COMPLETE SYSTEM SOLUTIONS FOR THE  
COMPRESSED NATURAL GAS INDUSTRY

YOU CAN SEE  
OUR THINKING

ENGINEERING ADVANTAGE





## CREATING ADVANTAGE WITH PEOPLE, PRODUCTS, INNOVATION AND SERVICE

A WORLD LEADER IN MOTION AND FLUID CONTROL TECHNOLOGIES, NORGREN WORKS CLOSELY WITH CUSTOMERS TO GAIN A DEEPER UNDERSTANDING OF THEIR ENGINEERING NEEDS, AND THEN CONNECTS ITS PEOPLE, PRODUCTS AND EXPERTISE TO GIVE THEIR EQUIPMENT AND THEIR BUSINESS A CLEAR ADVANTAGE.



With a sales and service network in 75 countries – as well as manufacturing capability in the USA, Germany, China, UK, Switzerland, Czech Republic, Mexico and Brazil – we have genuine global capability. We also think local and niche: on focusing our resources on delivering a specific product, solution or service to meet our customers' needs.

As a responsible business, we're committed to working practices which contribute positively to the environments in which we work.

Our products are setting the standard for reliability and safety, helping reduce installation time and potential leak paths, and extend the time interval between servicing intervals.

We offer:

→ **HIGH PERFORMANCE PRODUCTS** covering pneumatics, actuators, airline preparation, fittings and valves. We can supply these either singly to meet MRO needs, or combined in powerful customised solutions.

→ **EXCEPTIONAL LOCAL SERVICE** delivered through Key Account Management teams and sector specialists committed to understanding and meeting our customers' engineering challenges, wherever they are.

→ **INNOVATION & TECHNICAL EXCELLENCE** through four global technical centres and the experience of specialist engineering teams. We have a portfolio of patented solutions, and are always developing new and cost-effective technologies.

## EXPERTISE IN CNG TECHNOLOGIES

NORGREN HAS OVER 150 YEARS OF COMBINED EXPERIENCE IN PROVIDING ENERGY SOLUTIONS

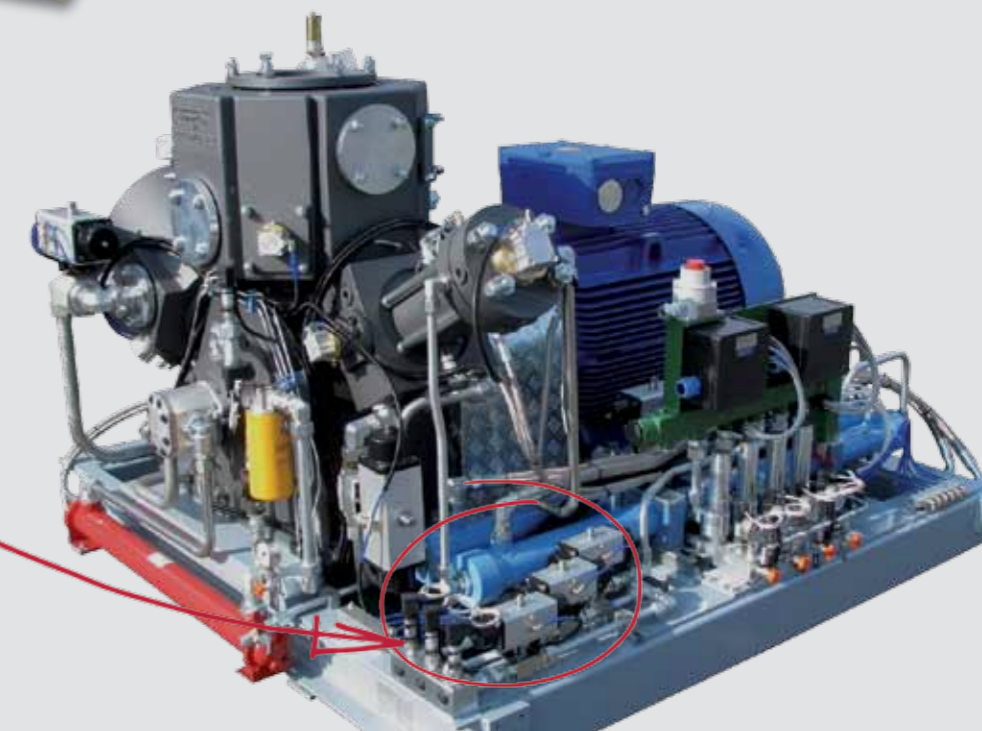
- PROVEN IN SAFETY
- PROVEN IN RELIABILITY
- PROVEN IN DURABILITY
- PROVEN IN KNOWLEDGE

Our market-leading product ranges - Buschjost, Herion, IVP and IMF - are now combined within the Norgren group to create an extensive range of high quality components and complete system solutions to meet the specific requirements of the Compressed Natural Gas industry.

- HELPING TO INCREASE ENERGY EFFICIENCY
- IMPROVING THE ENVIRONMENT BY SIMPLIFYING THE DELIVERY OF CNG INTO VEHICLES AND ELIMINATING WASTAGE
- IMPROVING THE SAFETY OF CNG DELIVERY SYSTEMS



3 station valve manifold - priority panel control

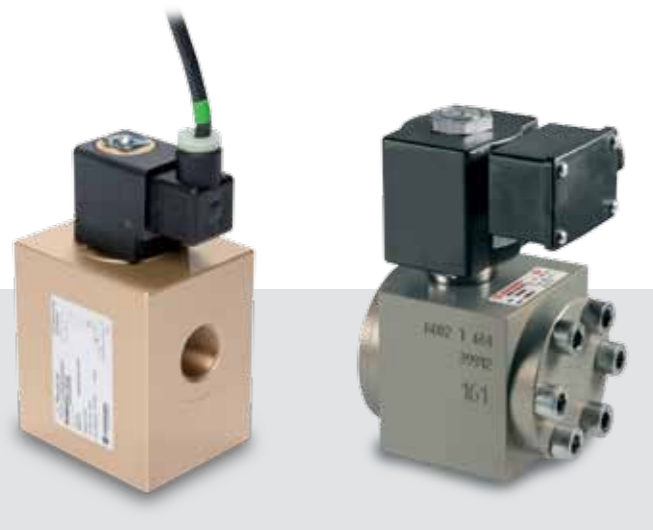


## CNG VALVE TECHNOLOGY

### BUSCHJOST AND HERION HIGH PRESSURE SOLENOID VALVES

Norgren has been supplying high pressure valves to customers manufacturing CNG compression and dispense systems since 1996. With pressures up to 350 bar, we understand the need for valves to be safe, have very high levels of pressure integrity and to be reliable - particularly with regard to the high number of switching cycles that a typical valve needs to perform.

Due to the requirement for zero internal and external leakage, we have to ensure the highest standards of production, coupled with premier quality materials in the design and manufacture of our valves.



### CNG SOLENOID VALVE RANGE

- Nominal diameter; DN0.9 to DN15mm
- Body Material; Aluminium, Brass or Stainless Steel
- Port Sizes; G1/8 to G3/4
- Ambient temperature range; -40 to +70°C
- Pressure range; 10 to 350 bar
- Pressure differential; 0 to 350 bar
- Function; NO or NC
- Sealing material; PEEK or Acetal (POM)
- PED; Compliant
- Mounting position; Horizontal or Vertical

## SOLENOID COIL TECHNOLOGY

The interchangeable coil system on Norgren CNG valves enables us to select from our extensive range of globally approved coils to match with the required approval and meet the demands of the most hostile of environments.

### SOLENOID COIL OPTIONS

- Electrical connections; Terminal box with M16, M20 or 1/2" NPT thread glands for cables Ø5 to 14mm  
Flying leads 0.45m, 3m or 10m long
- ATEX Category; II 2G, II 2D
- EX protection class; me, mb, emb, dmb, tb, tD
- Approvals; ATEX, FM, CSA, NEMA
- Ambient temperature range; -40 to +110°C
- Ingress protection range; IP65 to IP67
- Duty Cycle; 100%

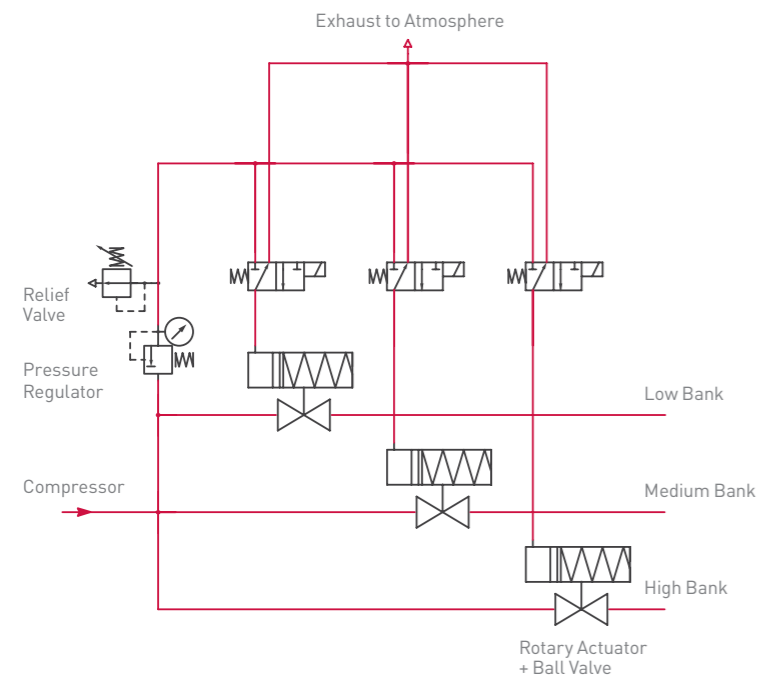


## CNG MANIFOLD SOLUTIONS

With 75 years' experience manufacturing sophisticated solenoid valves, we are confident in the reliability and performance of our products, and we are now providing valued added solutions by incorporating our proven valve technology into customized valve manifolds.

### TYPICAL PRIORITY PANEL THREE BANK SYSTEM USING; BALL VALVES, ROTARY ACTUATORS AND PILOT SOLENOID VALVES

Typical systems used in priority panels and dispensers utilize the CNG to drive rotary actuators, which in turn open and close ball valves. Alternatively, a compressed air infrastructure is installed, and compressed air is used to drive the rotary actuator.



#### PROBLEMS ASSOCIATED WITH THIS SYSTEM ARE:

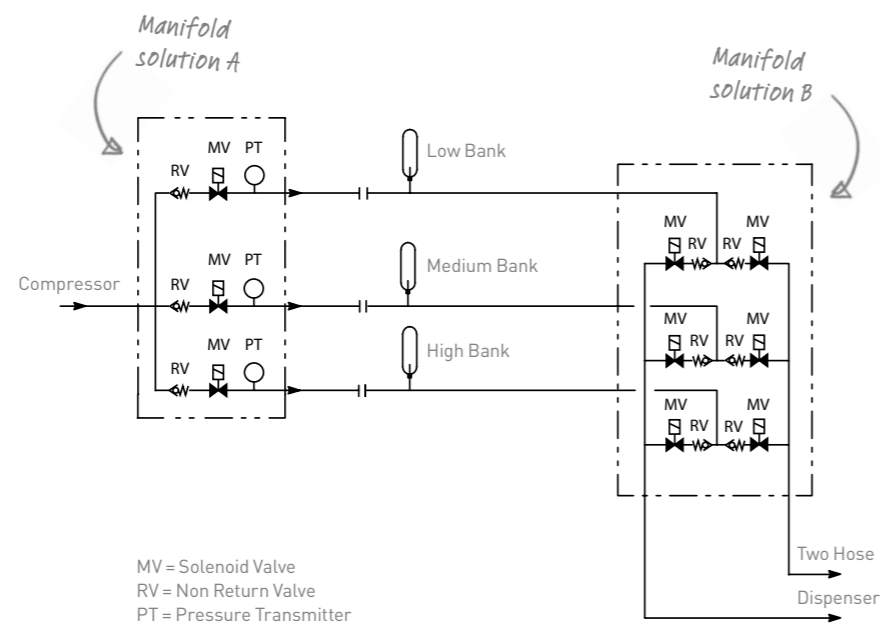
- Gas or air is vented to atmosphere on every filling cycle
- Complex pipe work system with a large number of high pressure fittings
- Costly and time consuming to install and maintain
- High number of potential leak paths

### NORGREN SOLUTION

Each CNG line previously consisting of ball valve, rotary actuator and pilot solenoid is replaced by a solenoid valve manifold with integrated check valves and filters.

#### BENEFITS

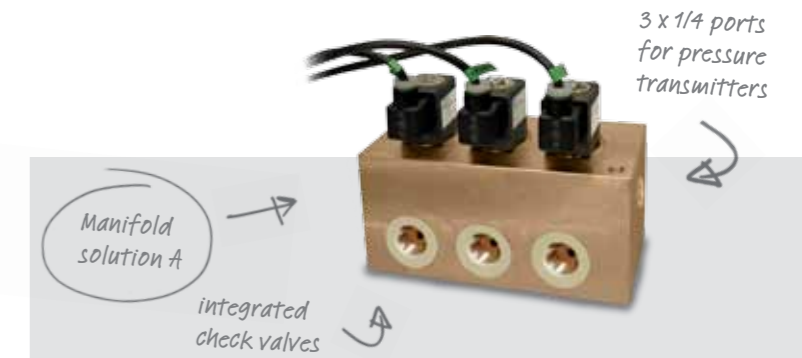
- Great increase in the system reliability
- Reduction in installation cost
- Simplified servicing
- Zero wasted Gas vented to atmosphere
- No requirement for a compressed air infrastructure
- High reduction in component count and fittings
- Reduction in potential leak paths



## CNG MANIFOLD SOLUTIONS

### THREE STATION VALVE MANIFOLD

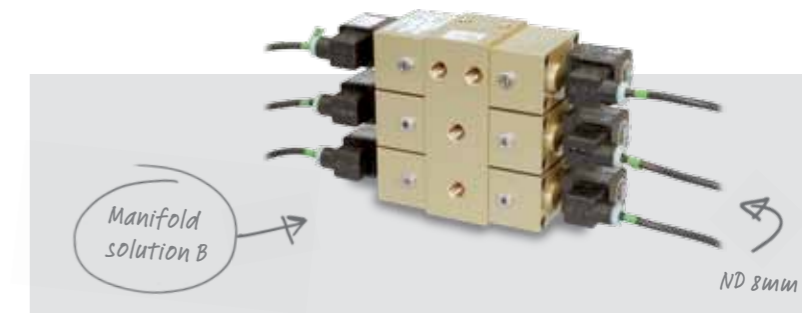
Solenoid valve manifold with integrated check valves which can be used in priority panels and even in a bus or truck dispenser



### SIX STATION MANIFOLD

Solenoid valve manifold with integrated check valves which can be used in a two sided small vehicle dispenser

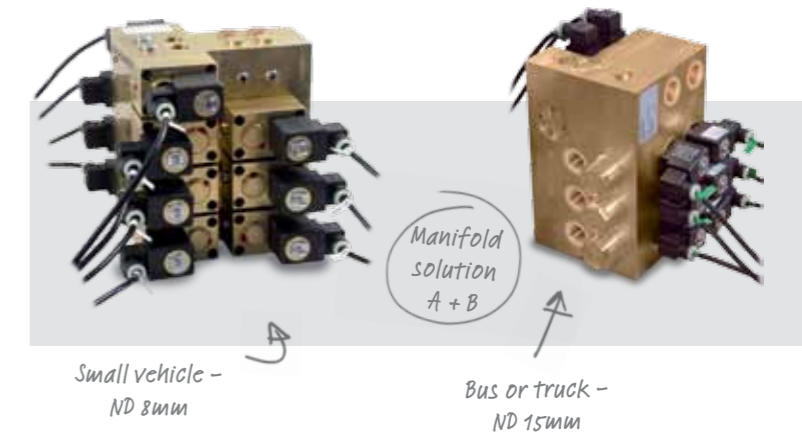
- Option; 3 x 40µm integrated filter



### ELEVEN STATION MANIFOLD

Solenoid valve manifold with integrated check valves and filters to control a three bank priority panel and two hose vehicle or bus dispenser

- Option with two additional check valves to enable direct filling from the compressor to the dispenser



## PRESSURE CONTROL SOLUTIONS

PROVEN SOLUTIONS FOR HIGH PRESSURE GAS CONTROL ON THE OUTLET FROM THE COMPRESSOR AND IN DOWNSTREAM PRESSURE REDUCTION APPLICATIONS SUCH AS IN THE DISPENSER

### SPRING LOADED REGULATORS

Pressure regulators (reducers or controllers) control the outlet pressure over a range of varying inlet pressures and flows. Regulators are sometimes called 'Forward Regulators' to prevent confusion with Back Pressure Maintaining Valves.

- Manual adjustment via knob
- Port sizes: 1/4" to 1"
- Pressure range: 100 to 420 bar
- Flow rate: up to 1000 Nm<sup>3</sup>/h
- Flow rate range: -20 to +80°C
- Body materials: Aluminium bronze, Brass or Stainless Steel

### DOME LOADED REGULATORS

Functioning in the same way as the spring loaded pressure regulator, but rather than using a manually adjusted spring, force is applied to the control element (diaphragm or piston) by pressure inside the dome of the regulator. The pilot pressure can be applied from a proportional valve, or a small low flow spring loaded regulator.

- Particularly suited to high flow applications
- Can be remotely electrically adjusted by using a proportional valve
- Port sizes; 3/8" to 3"
- Pressure range; 100 to 420 bar
- Flow rate: up to 10 000 Nm<sup>3</sup>/h
- Temperature range: -20 to +80°C
- Body materials; Aluminium bronze, Brass or Stainless Steel

## PRESSURE CONTROL SOLUTIONS

### BACK PRESSURE MAINTAINING VALVES – SPRING OR DOME LOADED

Back pressure maintaining valves regulate the inlet pressure to keep this pressure at a constant level. This means the valve will open to reduce excessive pressure in the line, or close when the pressure drops below the set point.

- Ideally suited for maintaining the output pressure from the compressor or drier
- Port sizes: 1/4" to 3"
- Pressure range: 100 to 420 bar
- Flow rate: up to 10 000 Nm<sup>3</sup>/h
- Temperature range: -20 to +80°C
- Body materials: Aluminium bronze, Brass or Stainless Steel

### PROPORTIONAL PRESSURE CONTROL VALVES

Functioning in the same way as the spring and dome loaded regulators, except the output pressure is controlled by an electrical signal. They can be used to control the pilot pressure onto a dome loaded pressure regulator and therefore automate a pressure control process.

- Port sizes: 1/4" or flange mounted directly on dome loaded regulator
- Pressure range: Up to 420 bar
- Temperature range: -20 to +80°C
- Control signal: 4-20 mA or 0-10V
- Internal closed loop control
- Body Materials: Brass or Aluminium bronze

### PRESSURE RELIEF VALVES

The valve opens to the atmosphere if the inlet pressure rises above the pre-set point. Excess pressure is therefore relieved from the system in a safe and controlled manner.

- Port sizes: 1/4" to 1" 1/2
- Pressure range: Up to 450 bar
- Pre-set pressure range: up to 450 bar
- Tamper proof seal
- Body Materials: Aluminium bronze, Brass or Stainless Steel



## ANCILLARY PRODUCTS

### NON RETURN VALVES

Used to prevent the back flow of media.

- Port sizes: 1/4" to 1"
- Pressure range: Up to 420 bar
- Temperature range: -35 to +120°C
- Materials: Brass or Stainless Steel



## ANCILLARY PRODUCTS

### INLINE FILTERS

Particle contamination at high pressures will reduce the service life of CNG control equipment, in line filters provide protection against particle ingress.

- Port sizes: 3/8" to 3"
- Pressure range: Up to 750 bar
- Temperature range: -40 to +150°C
- Filter element: 5, 15 or 25 micron Stainless Steel mesh or sintered Bronze
- Body Materials: Brass, Aluminium bronze or Stainless Steel

### STOP VALVES

Shut off the flow of gas enabling maintenance and service access to the CNG system.

- Balanced needle valve construction enabling constant low torque adjustment
- High pressure tight integrity
- Port sizes: 1/4" to 1"
- Pressure range: Up to 420 bar
- Temperature range: -20 to +80°C
- Body Materials: Stainless Steel, Aluminium bronze or Brass



### TUBE FITTINGS

Connect components and pipe work in the CNG system.

- 3 piece flat face sealing construction enabling system components to be removed without disturbing the pipe work installation
- Connection sizes: 1/8" up to 3"
- Tube sizes: Ø 4 to 80mm
- Pressure range: Up to 420 bar
- Temperature range: -20 to +80°C
- One end available for But or Socket welding
- Materials: Brass, Aluminium bronze or Stainless Steel



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