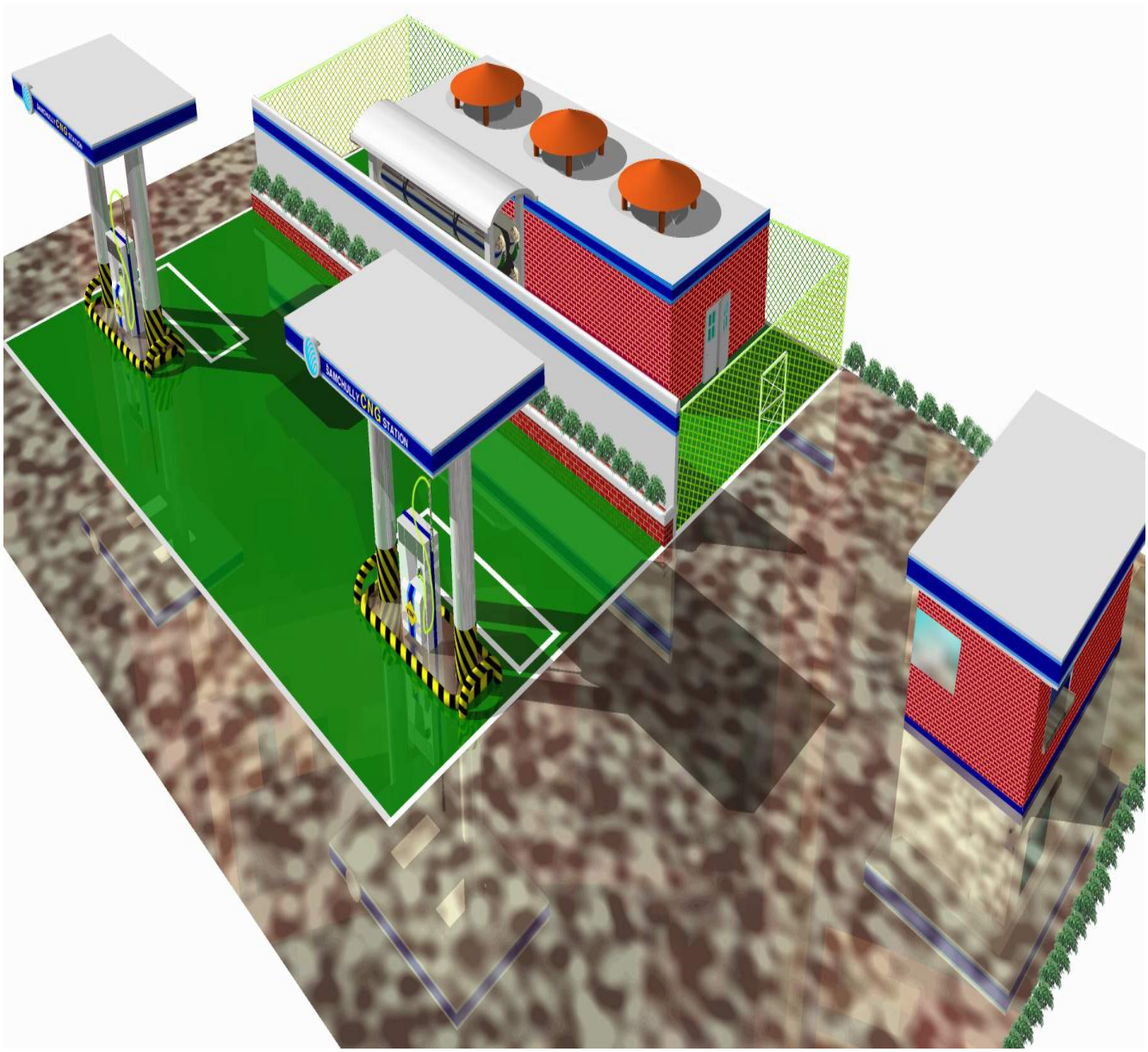
HALE HAMILTON
Excellence in Pressure & Flow Control
A CIRCOR International, Inc. Company
Alternative Fuels Business Unit

Alternative Fuels Business Unit Catalogue



In addition to our standard product range, we have a extensive range of special designs and offer a custom build service. Contact our Sales office if you don't see what you want in our catalogue.

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When selecting a product, the total system design must be considered to ensure safe, trouble free performance. Component function, material compatibility, adequate ratings, proper installation, operation and maintenance are the responsibility of the system designer and user.

Hale Hamilton (Valves) Ltd
Cowley Road, Uxbridge, UB8 2AF, UK
Tel: +44 (0) 1895 457 553
Enquiries to:
alternativefuels@halehamilton.com
www.halehamilton.com

Feb 09

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Contents

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Introduction

MARKET FOCUS

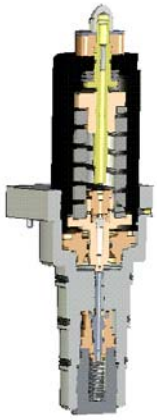
Hale Hamilton's Alternative Fuels Business Unit focuses primarily on products for the natural gas vehicle fuelling market. Products for the hydrogen vehicle fuelling and the natural gas distribution markets are also supplied.

OUR MISSION

To serve our customers' needs through providing a first class product and service, tailored to meet the specific requirements of the application and support our customers long after the product has been supplied.

TECHNOLOGY

A range of valve technologies are utilised in our pressure and flow control products. Hale Hamilton offers both fully mechanical products and products suitable for remote actuation via a control system (i.e. products using solenoid valves, actuated ball valves, proportional regulators, etc).



Our core range of valves, filters and instruments are used to create a series of manifold type products into which all necessary components are integrated reducing our customers' overall costs. This approach often provides a range of other advantages for the products and systems into which our manifold fits including fewer leak paths, more space, easier servicing, etc.

APPLICATIONS

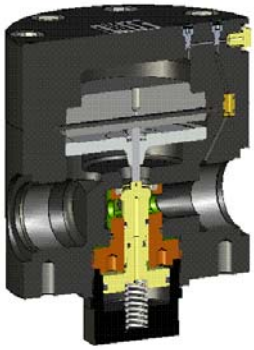
With such a comprehensive range of products, Hale Hamilton's Alternative Fuels Business Unit is able to serve a wide range of requirements. Particular expertise centres around Fuelling Stations and Gas Distribution markets where our core components are particularly useful.

Applications in which our products are most commonly used include those found in Priority Fill Systems, Dispensers, Compressors, Storage Modules, Pressure Control Stations and Overpressure Protection Systems.

We are constantly developing our standard product range to meet an ever increasing variety of applications. If you can't find what you need in our catalogue, we can build a custom made product that will suit your application.

OUR CUSTOM BUILD SERVICE

Our experience in the market shows that manifolds offer better value than piped systems.



Hale Hamilton offers a wide range of valves and instruments suitable for integration into a manifold block. Our sales and engineering teams work closely with our customers to produce a design which matches the requirements of the application exactly.

CONTACT US

If you would like to know more about our products and services, visit our website (www.halehamilton.com).

Alternatively, contact us at alternativefuels@halehamilton.com or phone +44 (0) 1895 457 553.

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Manifolds (Standard Range)

Priority Fill Manifolds

Slow Fill Manifolds

Custom Designs

Dispenser Manifolds

Relief & Vent Manifolds

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CNG Priority Fill Manifolds 12mm

Description

CNG Priority Fill Manifolds control the order in which storage cascade banks are filled. The priority valve pressure settings give priority to the high pressure bank, then the medium bank and finally the low pressure bank.

The order in which the storage banks are drained is dictated by the dispensers on the fuelling station. All manifolds include a direct fill function.

Our Priority Fill Manifolds are available for 1, 2 and 3 line systems and with a range of options allowing you to select the features you require for your system.

The key advantages of this product over traditional panels are: lower cost of installation, reduced footprint, fewer leak paths and easier servicing.

The 12mm (1/2") manifolds provide flow rates suitable for dispensing CNG to smaller vehicles such as cars and light vans.

Standard Configurations

The configurations shown in detail on the following pages are available as standard items. Other configurations can be designed as required using our modular manifold system.

Please contact us for details.

Standard Specification

- Nominal Bore: 12mm
- Maximum inlet pressure: 400bar
- Maximum priority set pressure: 250bar
- Nominal flow rate: 2000 N m^3/hr
- Ports: 1/2" NPT(F)
- Instrumentation ports: 1/4" NPT(F)
- Filtration requirement: 20 micron
- Temperature range: -20 to +70°C

Standard Materials

Alternative materials can be supplied

- Manifold and main valve components: Anodised Aluminium Alloy
- Elastomers: Nitrile
- Valve seats: PEEK

Options

Please contact us for details

- Add manual ball valves on storage outlets.
- Add ESD (Emergency Shut Down) valves on dispenser outlets.
- Add compressor (supply pressure) gauge
- Add low bank check valve (3 line only – prevents back flow to the compressor)
- Omit dispenser ball valves
- Omit storage bank gauges.

Ordering Information

Please supply the following information when ordering

- Number of Lines 1, 2 or 3
- Priority Valve Set Pressures
- What optional features are required?
- Certification and QA requirements

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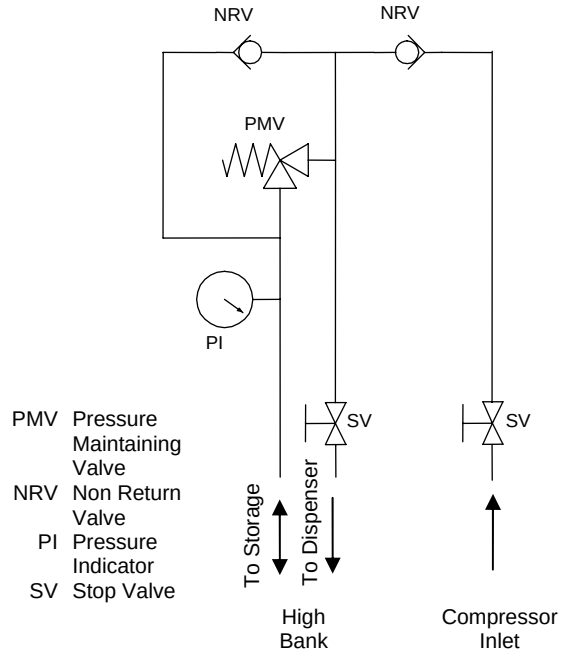
CNG Priority Fill Manifolds 12mm

1 Line (SA881)

Specification

- Weight: approx. 6kg

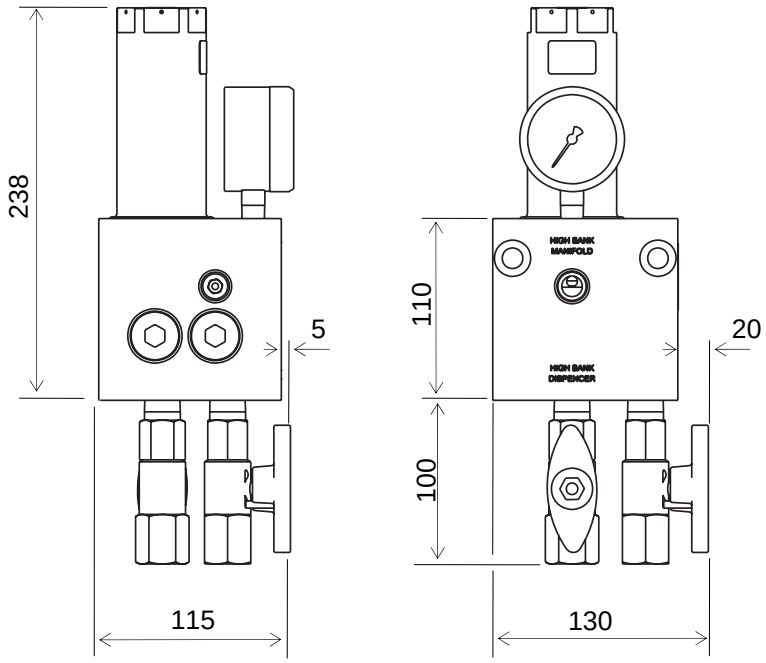
P & ID



PMV Pressure Maintaining Valve
NRV Non Return Valve
PI Pressure Indicator
SV Stop Valve

Typical Dimensions

in mm except where shown otherwise



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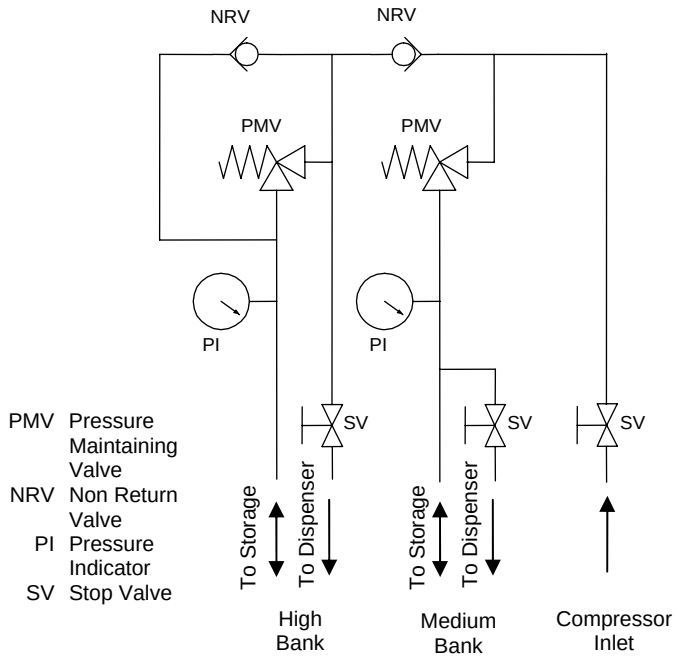
CNG Priority Fill Manifolds 12mm

2 Line (SA859)

Specification

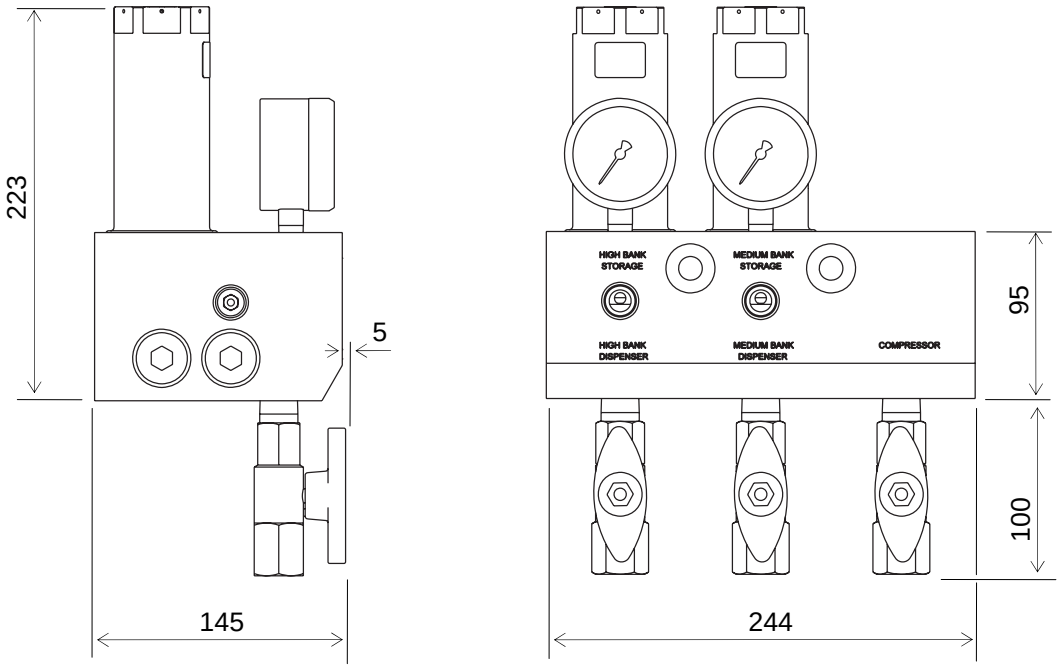
- Weight: approx. 10.5kg

P & ID



Typical Dimensions

in mm except where shown otherwise



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CNG Priority Fill Manifolds 12mm

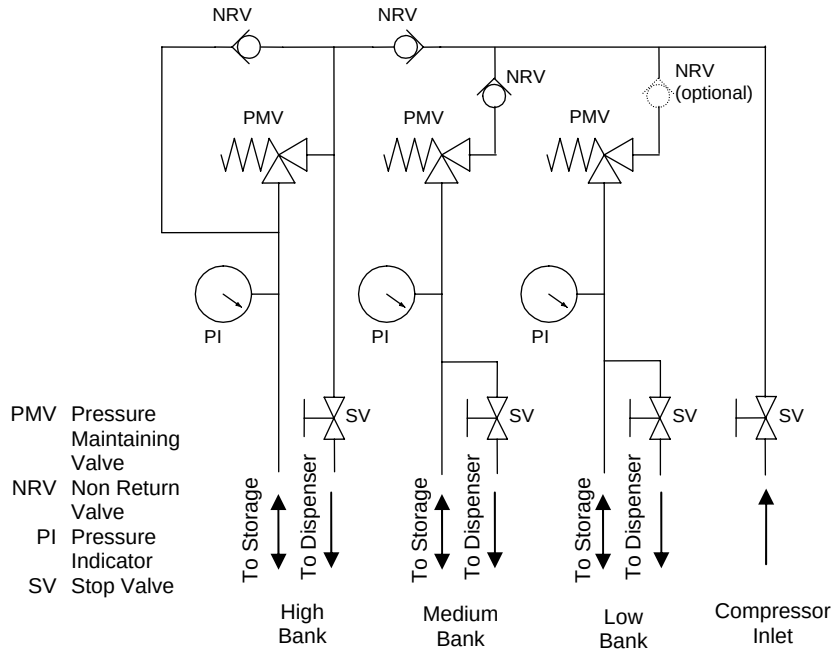
3 Line (SA899)

Specification

Optional low bank non return valve can be fitted internally.

- Weight: approx. 14kg

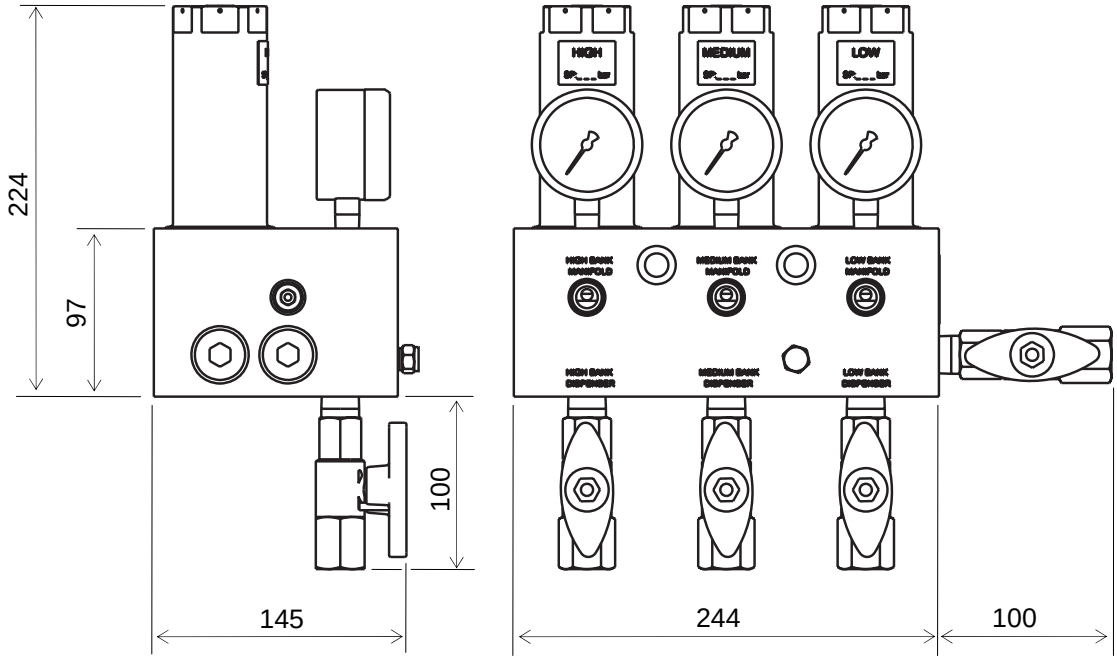
P & ID



PMV Pressure Maintaining Valve
NRV Non Return Valve
PI Pressure Indicator
SV Stop Valve

Typical Dimensions

in mm except where shown otherwise



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CNG Priority Fill Manifolds 12mm

With Relief Valves

Description

CNG Priority Fill Manifolds control the order in which storage cascade banks are filled. The priority valve pressure settings ensure the high pressure bank is filled first followed by the medium, then low pressure banks utilising storage capacity more effectively.

Consistent priority valve functioning increases the efficiency of the cascade storage system.

The order in which the storage banks are drained is dictated by the dispensers on the fuelling station. All manifolds include a direct fill function.

Our Priority Fill Manifolds are available for 1, 2 and 3 line systems and with a range of options allowing our customers to select the features required for their system.

The key advantages of this product over traditional panels include lower cost of installation, reduced footprint, fewer leak paths and easier servicing.

Integrating relief valves into the block further reduces installation cost. All relief valve vents exit from a single port requiring only one vent pipe.

Standard Configurations

The configurations shown in detail on the following pages are available as standard items. Other configurations can be designed as required using our modular manifold system. Please contact us for details.

Standard Specification

- Nominal Bore: 12mm
- Maximum inlet pressure: 400bar
- Maximum priority set pressure: 250bar
- Nominal flow rate: 2000 N m^3/hr
- Ports: ½" NPT(F)
- Instrumentation ports: ¼" NPT(F)
- Filtration requirement: 20 micron
- Temperature range: -20 to +70°C

Options

Please contact us for details

- Add manual ball valves on storage outlets.
- Add ESD (emergency shut down) valves on dispenser outlets.
- Add compressor (supply pressure) gauge.
- Add low bank check valve (3 line only – prevents back flow to the compressor).
- Omit dispenser ball valves.
- Omit storage bank gauges.

Standard Materials

Alternative materials can be supplied

- Manifold and main valve components: Anodised Aluminium Alloy
- Elastomers: Nitrile
- Valve seats: PEEK

Ordering Information

Please supply the following information when ordering

- Number of lines 1, 2 or 3.
- Priority Valve Set Pressures
- What optional features are required?
- Certification and QA requirements

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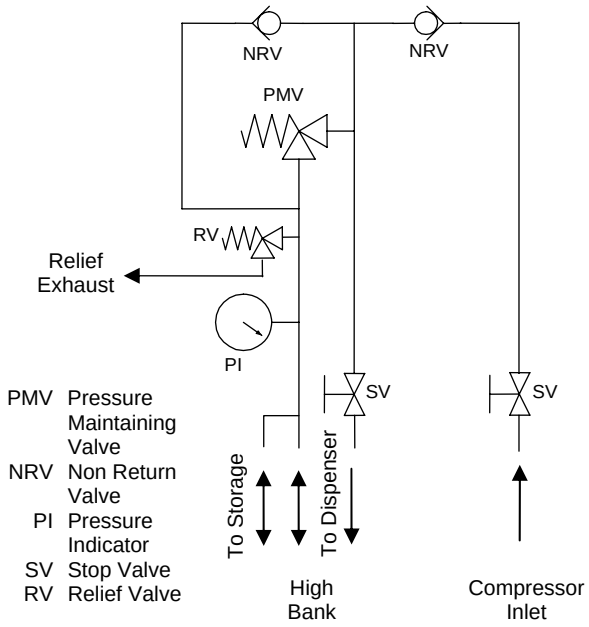
CNG Priority Fill Manifolds 12mm
With Relief Valves

1 Line (SA880)

Specification

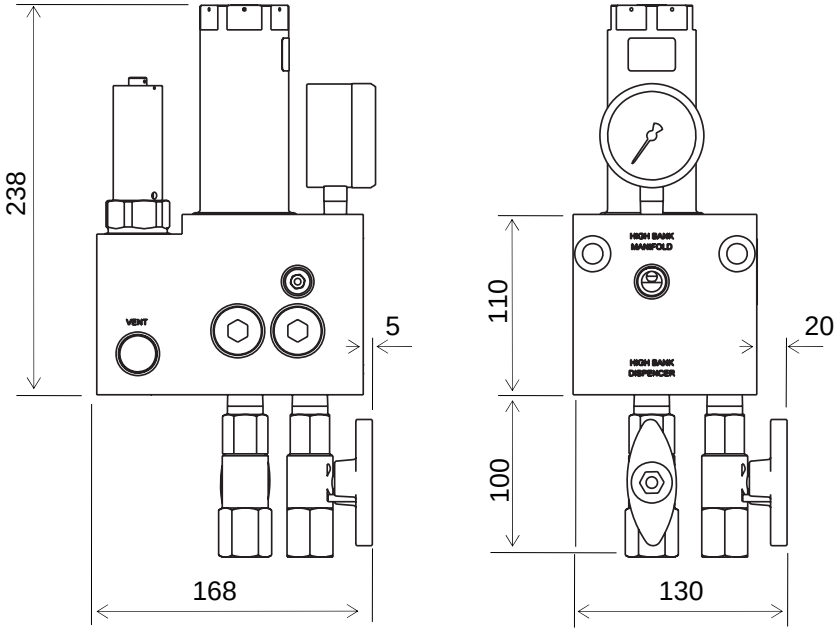
- Weight: approx. 7.5kg

P & ID



Typical Dimensions

in mm except where shown otherwise



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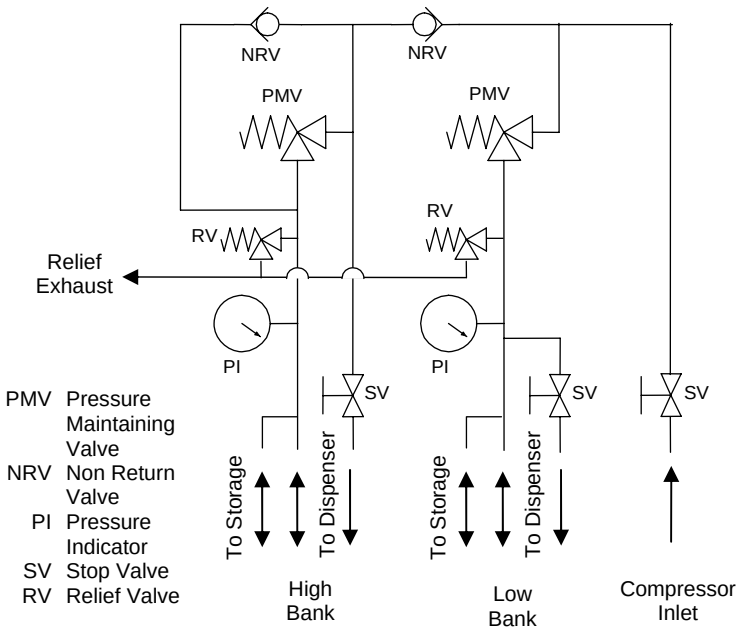
CNG Priority Fill Manifolds 12mm
With Relief Valves

2 Line (SA878)

Specification

- Weight: approx. 12.5kg

P & ID



PMV Pressure Maintaining Valve
NRV Non Return Valve
PI Pressure Indicator
SV Stop Valve
RV Relief Valve

Typical Dimensions

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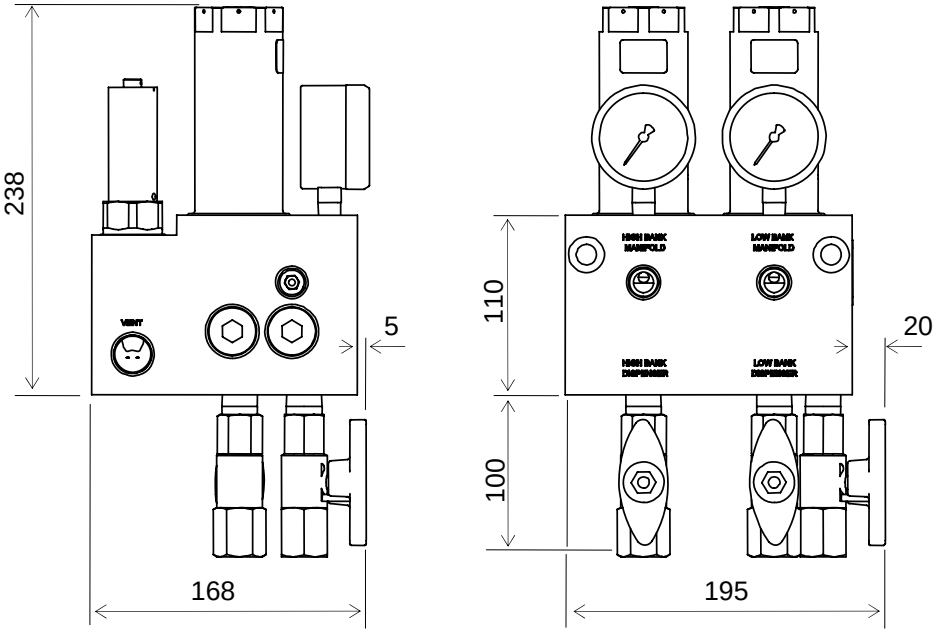

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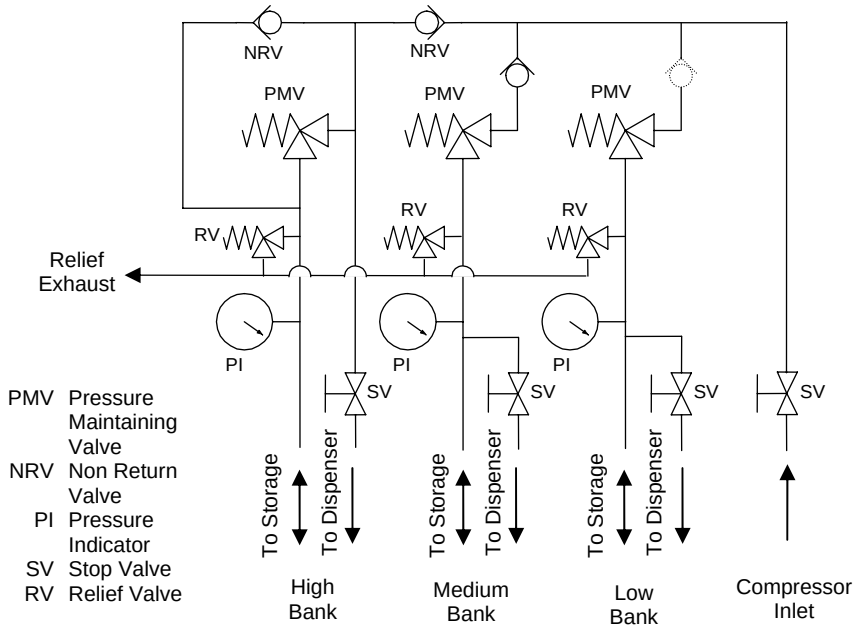
CNG Priority Fill Manifolds 12mm
With Relief Valves

3 Line (SA875)

Specification

- Optional low bank check valve can be fitted internally in place of a compressor outlet check valve.
- Weight: approx. 18kg

P & ID



Typical Dimensions

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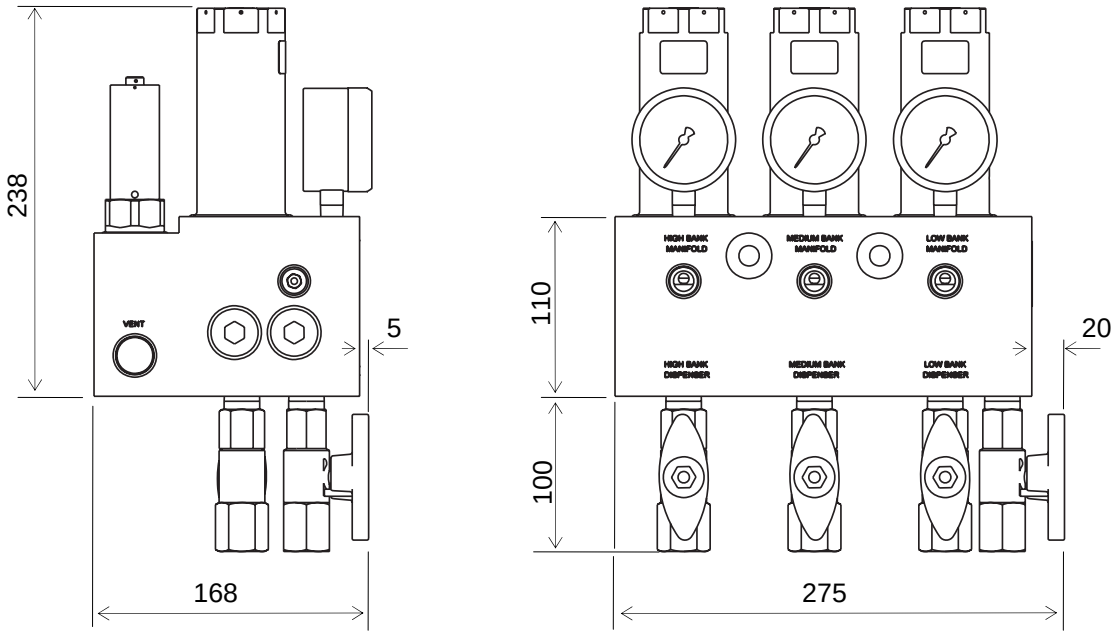

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CNG Priority Fill Manifolds 19mm

Description

CNG Priority Fill Manifolds control the order in which storage cascade banks are filled. The priority valve pressure settings give priority to the high pressure bank, then the medium bank and finally the low pressure bank.

The order in which the storage banks are drained is dictated by the dispensers on the fuelling station. All manifolds include a direct fill function.

Our Priority Fill Manifolds are available for 2 and 3 line systems and with a range of options allowing you to select the features you require for your system.

The key advantages of this product over traditional panels are: lower cost of installation, reduced footprint, fewer leak paths and easier servicing.

The 19mm (3/4”) manifolds provide flow rates suitable for dispensing CNG to larger vehicles such as trucks and buses.

Standard Configurations

The configurations shown in detail on the following pages are available as standard items. Other configurations can be designed as required using our modular manifold system.

Please contact us for details.

Standard Specification

- Nominal Bore: 19mm
- Maximum inlet pressure: 400bar
- Maximum priority set pressure: 250bar
- Nominal flow rate: 5500 N m^3/hr
- Ports: 3/4" NPT(F)
- Instrumentation ports: 1/4" NPT(F)
- Filtration requirement: 20 micron
- Temperature range: -20 to +70°C

Standard Materials

Alternative materials can be supplied

- Manifold and main valve components: Anodised Aluminium Alloy
- Elastomers: Nitrile
- Valve seats: PEEK

Options

Please contact us for details

- Add manual ball valves on storage outlets.
- Add ESD (Emergency Shut Down) valves on dispenser outlets.
- Add medium bank check valve (3 line only)
- Add compressor (supply pressure) gauge
- Omit storage bank gauges.

Ordering Information

Please supply the following information when ordering

- Number of Lines 2 or 3
- Priority Valve Set Pressures
- What optional features are required?
- Certification and QA requirements

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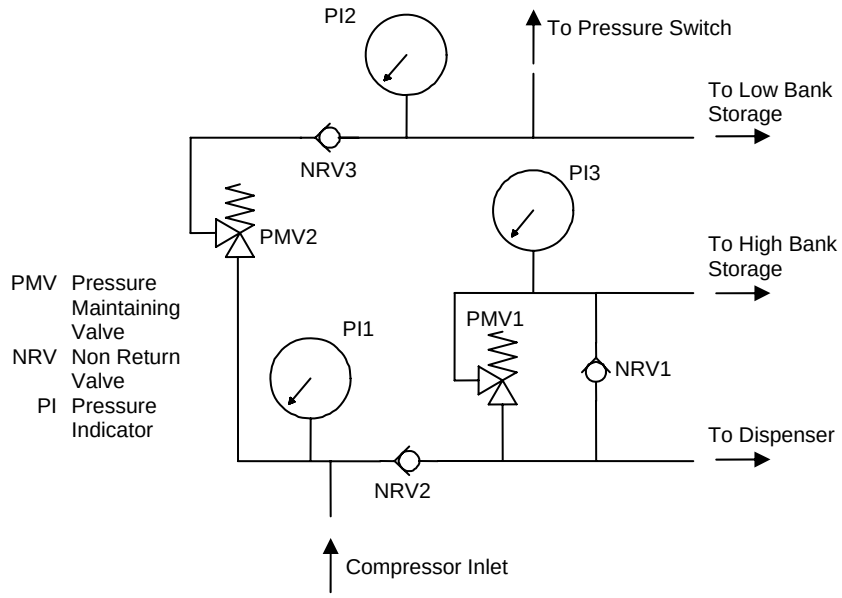
CNG Priority Fill Manifolds 19mm

2 Line (SA854)

Specification

- Weight: approx. 17kg

Typical P & ID



Typical Dimensions

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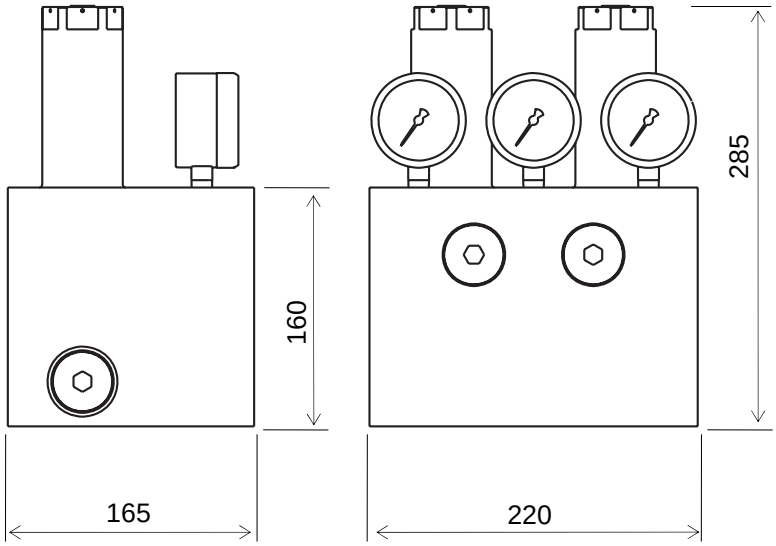

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CNG Priority Fill Manifolds 19mm

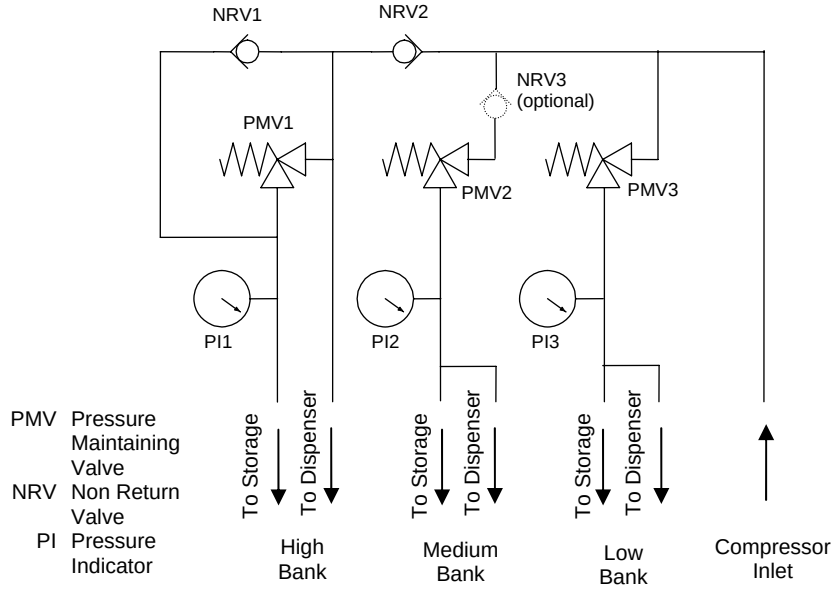
3 Line (SA891)

Specification

Optional medium bank non return valve can be fitted internally.

- Weight: approx. 20kg

Typical P & ID



Typical Dimensions

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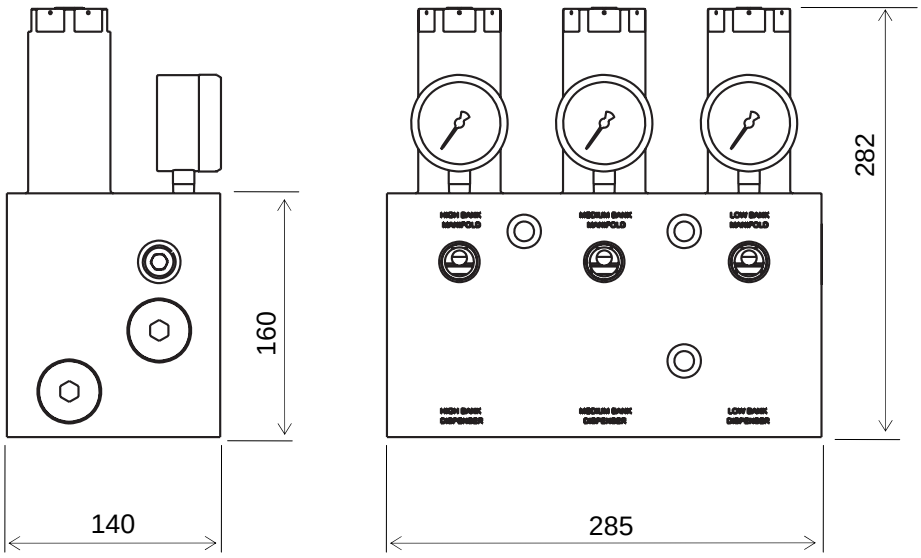

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CNG Dispenser Manifolds 10mm

Description

The CNG Dispenser manifold integrates the valves and instrumentation used in a dispenser into a single block. This reduces the space requirements and the number of potential leak paths when compared with a piped assembly. We can customise the design to suit your requirements.

Actuated ball valves control the sequence in which gas is drawn from the storage cascade and supplied to the vehicle tank. Gas is usually directed into two hose lines although a version with one hose line can be supplied as an option.

Each inlet is protected by an optional coalescing filter which includes a valve for draining off fluid.

A longer block is available with integrated cartridge relief valves and ports for gauges, transmitters, vent valves, etc. The relief valves have a common exhaust port.

Actuators, valves and filters can be removed without disturbing the manifold block.

Standard Specification

- Nominal Bore: 10mm
- Maximum pressure: 345bar
- Inlet and outlet ports: 1/2 NPT female
- Gauge ports: 1/4 NPT female
- Actuator pilot pressure: 8bar
- Pilot ports: Compression fittings for 6mm tube
- Nominal flow rate: 25 kg/min
- Temperature range: -30 to +65°C

Standard Materials

Alternative materials can be supplied

- Manifold and main valve components: Anodised Aluminium Alloy
- Valve ball: Stainless Steel
- Elastomers: Nitrile
- Valve seats: Delrin

Options

Please contact us for details

- Integrated relief and check valves
- Pressure switches, transducers and gauges
- Vent and drain valves
- Filters
- Alternative port configurations and additional ports
- Materials: suitable combinations of materials can be supplied for various applications.

Ordering Information

Please supply the following information when ordering

- Number of inlets (1, 2 or 3)
- Number of outlets (1 or 2)
- Port configuration and additional ports
- Additional valves (relief, check, drain or vent)
- Operating and storage temperature ranges
- Certification and QA requirements

In addition to our standard product range, we have an extensive range of special designs and offer a custom build service. Contact our Sales office if you don't see what you want in our catalogue.

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Hale Hamilton (Valves) Ltd
Cowley Road, Uxbridge, UB8 2AF, UK
Tel: +44 (0) 1895 457 553
Enquiries to:
alternativefuels@halehamilton.com
www.halehamilton.com

CNG Dispenser Manifolds 10mm

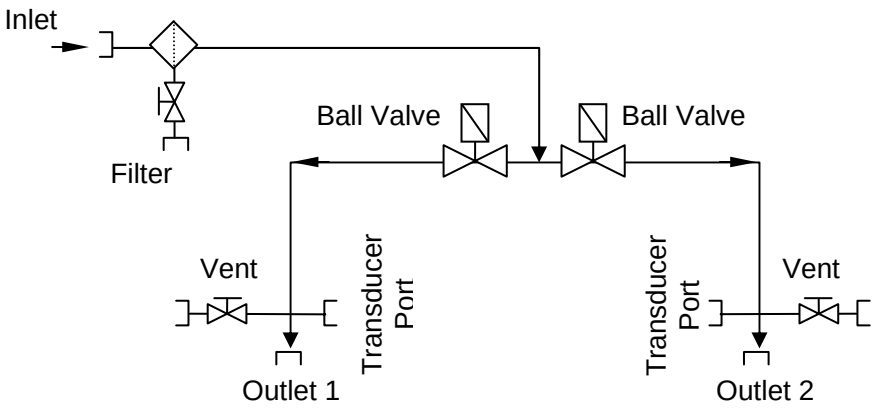
1 Inlet (SA893)

Specification

- Dispenser with one inlet.
- Two pneumatically operated ball valves direct flow from the inlet to one of two outlets.
- A filter with drain facility is fitted to the inlet.
- Each outlet has a vent valve and transducer port.
- Weight: approx. 8kg

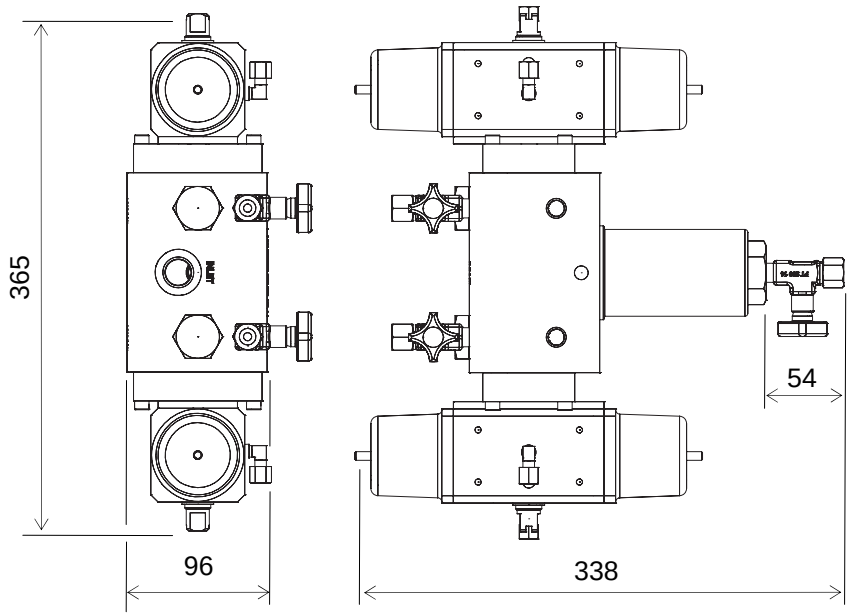
This configuration is available as a standard item. Other configurations can be designed as required using our modular manifold system. Please contact us for details.

P & ID



Typical Dimensions

in mm except where shown otherwise



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CNG Dispenser Manifolds 10mm

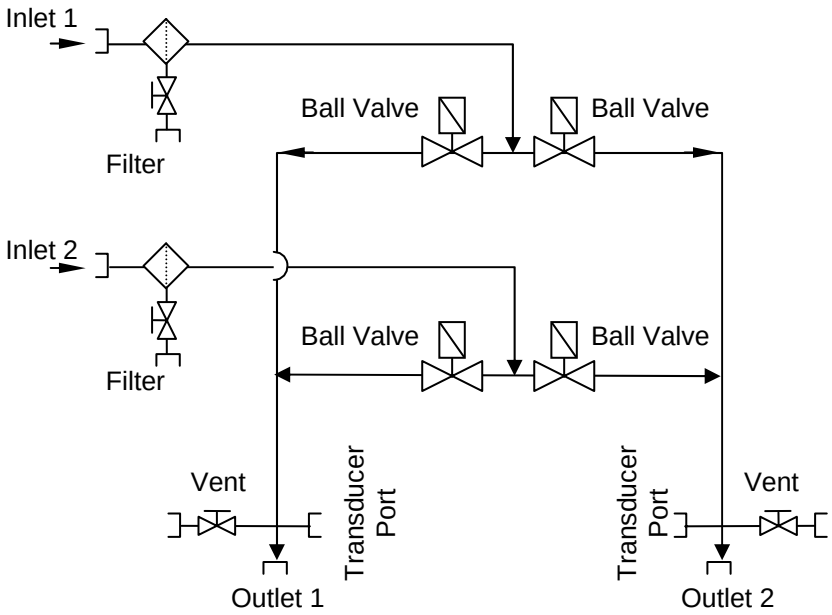
2 Inlet (SA892)

Specification

- Dispenser with two inlets.
- Four pneumatically operated ball valves direct flow from either of two inlets to one of two outlets.
- A filter with drain facility is fitted to each inlet.
- Each outlet has a vent valve and transducer port.
- Weight: approx. 16kg

This configuration is available as a standard item. Other configurations can be designed as required using our modular manifold system. Please contact us for details.

P & ID



Typical Dimensions

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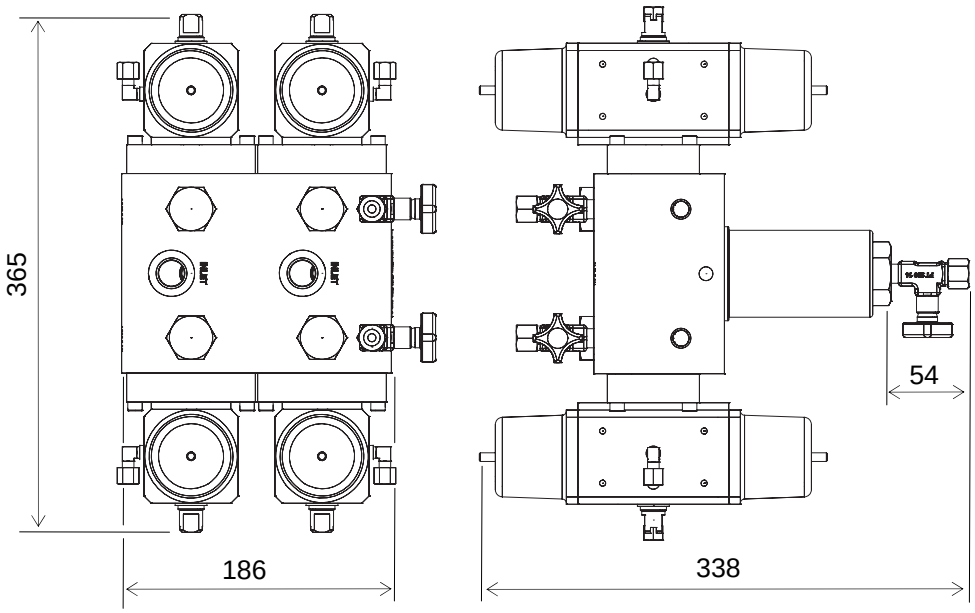

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CNG Dispenser Manifolds 10mm

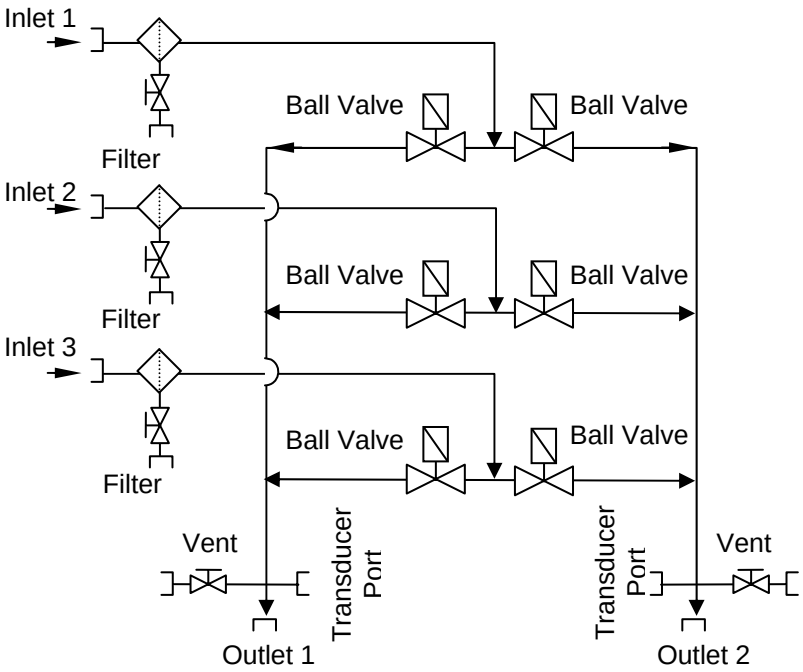
3 Inlet (SA889)

Specification

- Dispenser with three inlets.
- Six pneumatically operated ball valves direct flow from any one of three inlets to one of two outlets.
- A filter with drain facility is fitted to each inlet.
- Each outlet has a vent valve and transducer port.
- Weight: approx. 26kg

This configuration is available as a standard item. Other configurations can be designed as required using our modular manifold system. Please contact us for details.

P & ID



Typical Dimensions

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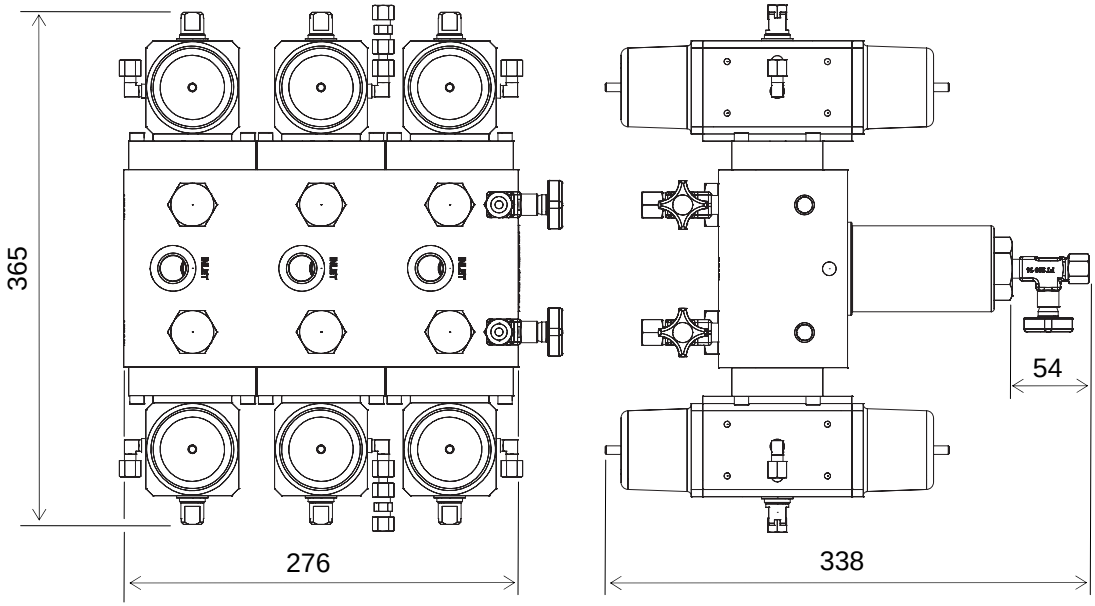

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CNG Slow Fill Manifold

Description

CNG slow fill manifolds reduce the pressure of the gas in a storage bank to a level suitable for direct connection to a vehicle. Flow stops when the pressure in the vehicle tank reaches the set pressure.

The outlet is protected by an external relief valve and outlet pressure is indicated by a gauge. An external valve is provided to isolate the outlet.

Our tried and tested designs are incorporated into a compact manifold which offers significant improvements, in terms of installation footprint and minimisation of potential leak paths, compared with traditional panels using discrete components.

The pressure regulator is of a cartridge or insert configuration and can be removed and replaced easily without disturbing the manifold block.

Standard Configuration

The configuration shown in detail is available as a standard item. Other configurations can be designed as required using our modular manifold system.

Please contact us for details.

Standard Specification

- Nominal Bore: 12mm (Regulator is 6mm)
- Maximum inlet pressure: 250bar
- Filtration requirement: 20 micron
- Temperature range: -20 to +70°C

Standard Materials

Alternative materials can be supplied

- Manifold and main valve components: Anodised Aluminium Alloy
- Elastomers: Nitrile
- Valve seats: PEEK
- Relief valve: Bronze
- Ball valve: Stainless steel

Options

Please contact us for details

- Alternative body materials such as Nickel Aluminium Bronze or Stainless Steel
- Manual control knob or tamperproof locking
- Limit stop(s)
- Alternative gauge or ball valve configuration

Ordering Information

Please supply the following information when ordering

- Maximum inlet pressure
- Set pressure
- Flow medium
- Operating temperature range
- Certification and QA requirements

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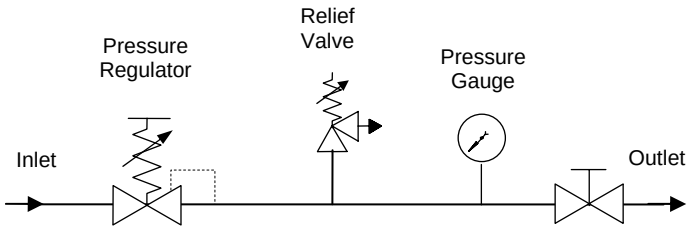
CNG Slow Fill Manifold

SA896

Specification

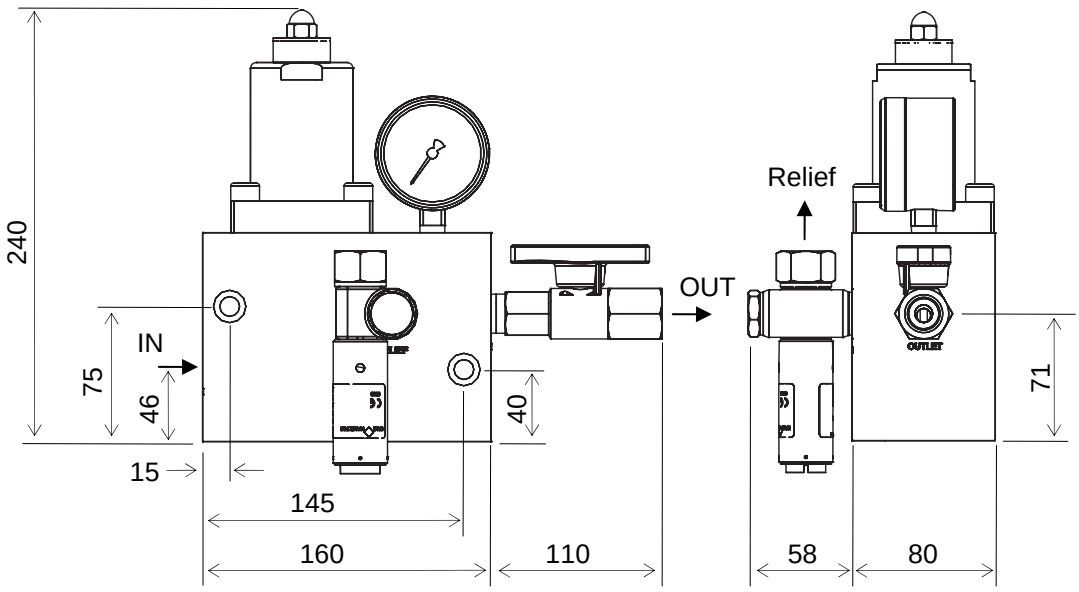
- Relief valve exhaust port is G3/8 all other ports are ½" NPT female.
- 2 mounting holes to suit M10 cap head screws.
- Relief valve can be rotated about banjo bolt to orientate exhaust as required.
- Weight: approx. 6.3kg

P & ID



Typical Dimensions

in mm except where shown otherwise



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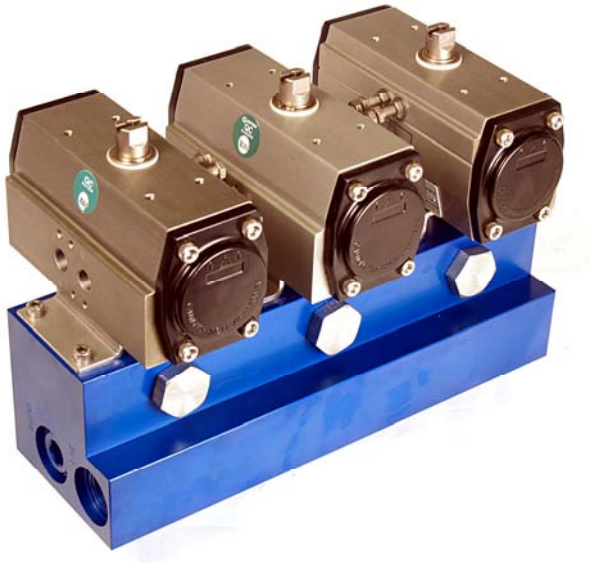
CNG Actuated Valve Manifolds 12mm

Description

The CNG actuated valve manifold integrates three valves into a single block. This reduces the space requirements and the number of potential leak paths when compared with a piped assembly. We can customise the design to suit your requirements.

SA951 has a separate inlet for each outlet and SA952 has a common inlet. An actuated ball valve isolates each outlet. SA951 has a non-return valve on the first inlet while SA952 has a non-return valve for each outlet.

Actuators and valves can be removed without disturbing the manifold block.



Standard Specification

- Nominal Bore: 12mm
- Maximum pressure: 400bar
- Inlet and outlet ports: 3/4 NPT female
- Actuator pilot pressure: 8bar
- Pilot ports: G1/4 or Compression fittings for 6mm tube
- Temperature range: -30 to +65°C

Standard Materials

Alternative materials can be supplied

- Manifold and main valve components: Anodised Aluminium Alloy
- Valve ball: Stainless Steel
- Elastomers: Nitrile
- Valve seats: Delrin

Options

Please contact us for details

- Alternative port configurations and additional ports
- Materials: suitable combinations of materials can be supplied for various applications.

Ordering Information

Please supply the following information when ordering

- Number of inlets
- Number of outlets
- Internal cross connections
- Port configuration and additional ports
- Operating and storage temperature ranges
- Certification and QA requirements

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CNG Actuated Valve Manifolds 12mm

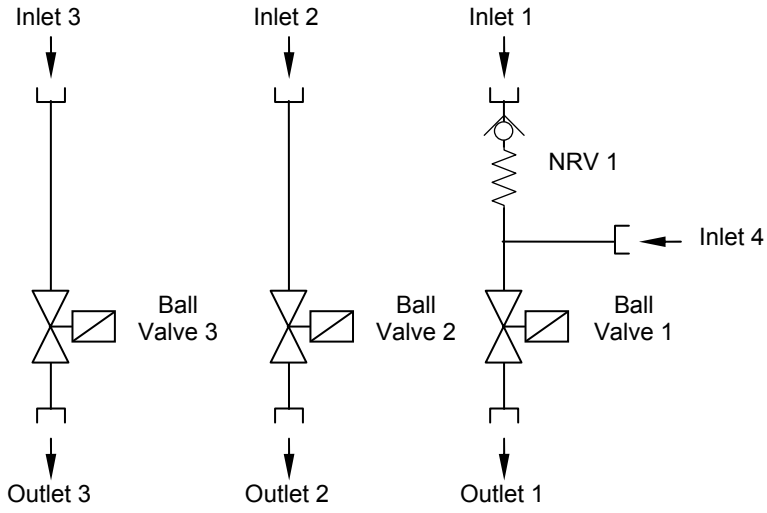
Separate Inlets (SA951)

Specification

- Actuated valve manifold with one inlet for each outlet.
- A pneumatically operated ball valve isolates each outlet.
- An additional inlet is provided on the first leg with a non return valve to prevent back flow into the first inlet.
- Weight: approx. 15.5kg

This configuration is available as a standard item. Other configurations can be designed as required using our modular manifold system. Please contact us for details.

P & ID



Typical Dimensions

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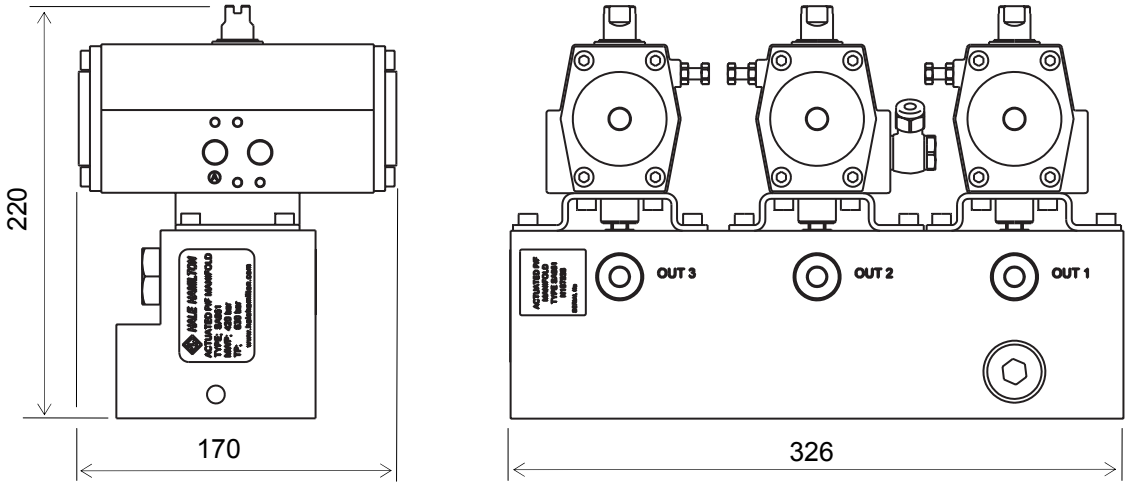

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CNG Actuated Valve Manifolds 12mm

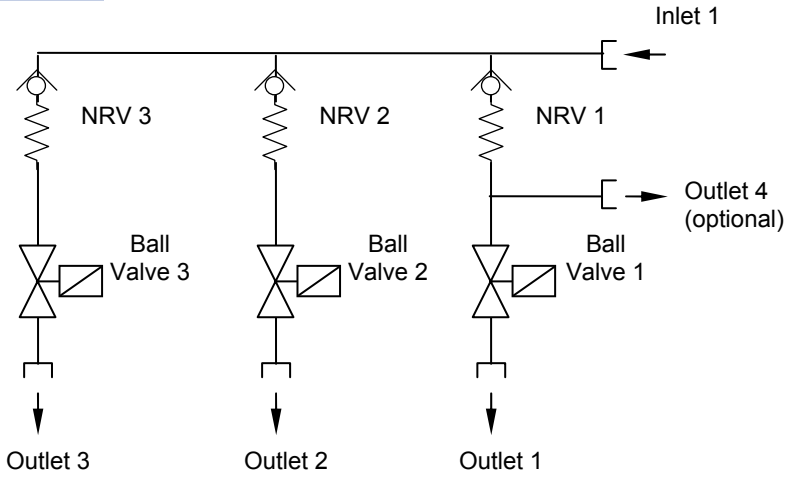
Common Inlet (SA952)

Specification

- Actuated valve manifold with one inlet for all outlets.
- A pneumatically operated ball valve isolates each outlet.
- An additional outlet is provided on the first leg before the ball valve.
- Weight: approx. 15.5kg

This configuration is available as a standard item. Other configurations can be designed as required using our modular manifold system. Please contact us for details.

P & ID



Typical Dimensions

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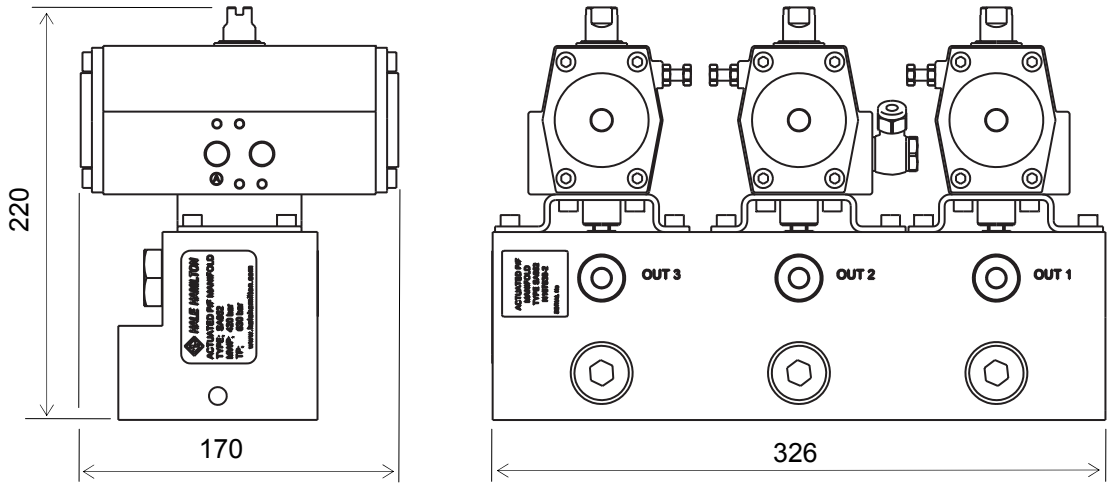

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Cartridge Valves and Accessories

Hale Hamilton's range of manifolds offer better value than piped systems (panels) when the unit cost of the product and reduced installation costs associated with our products is taken into account.

Our range of cartridge inserts and accessories are used as the building blocks of our manifold range. This range together with our method of manifold production enable Hale Hamilton to generate both standard products and customer specific designs quickly, in an economically viable manner.

The datasheets for our range of cartridge valves and accessories are contained within this section of the catalogue.

Contact our sales department for more information on +44 1895 457 553 or send an email to alternativefuels@halehamilton.com.

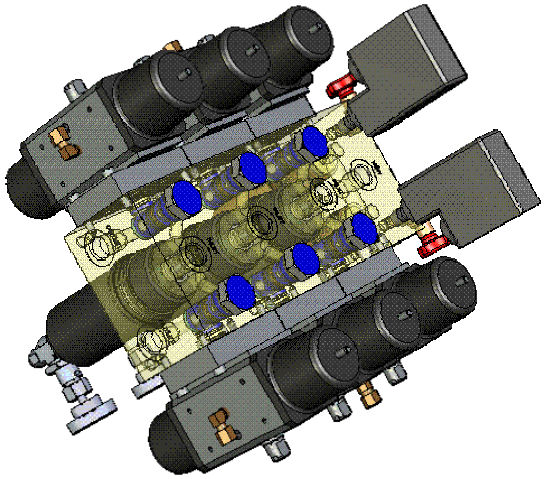
Pressure Regulator

Gauge

Ball Valve

Filters
(Coalescing & Particle)

Relief Valve



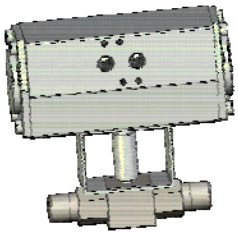
Pressure Switch

Priority Valve

Check Valve

Vent Valve

Pressure Transmitter



Actuated Ball Valve

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CNG Manifold

Back Pressure Maintaining Valve Cartridge

Description

Back pressure maintaining valves (BPMV) control the inlet pressure by venting pressure to the outlet if the inlet pressure exceeds the set value.

The internal mechanism uses a piston to isolate the process fluid from the spring compartment. The range of inlet pressure depends on the diameter of the piston and the strength of the spring. The inlet pressure is set by adjusting the preload on the spring.

VIC56 has a balanced piston to reduce the load on the spring.

The valve has a cartridge or insert configuration for mounting in a manifold. This means that the manifold can be very compact and that the valve can easily be removed for repair or refurbishment.

Originally developed for our CNG (Compressed Natural Gas) manifold this valve can also be used for other similar applications.

Back pressure maintaining valve cartridges are only available as part of a Hale Hamilton manifold assembly.

Standard Specification

See next page for specification of individual types

- Filtration requirement: 20 micron
- Working Pressure: up to 400 bar (5800 psi)
- Set Pressure: up to 250 bar (3625 psi)
- Temperature range: -20 to +70°C (extended temperature range versions can be supplied)

Standard Materials

Alternative materials can be supplied

- Body: Aluminium Alloy
- Inlet seat retainer: Brass
- Piston: Bronze
- Valve Seat: PEEK
- O rings: Nitrile

Options

Please contact us for details

- Materials: suitable combinations of materials can be supplied for various applications.
- Certification: ATEX to category 3

Ordering Information

Please supply the following information when ordering

- Maximum inlet pressure
- Set pressure
- Flow medium
- Operating and storage temperature ranges
- Certification and QA requirements

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CNG Manifold

Back Pressure Maintaining Valve Cartridge

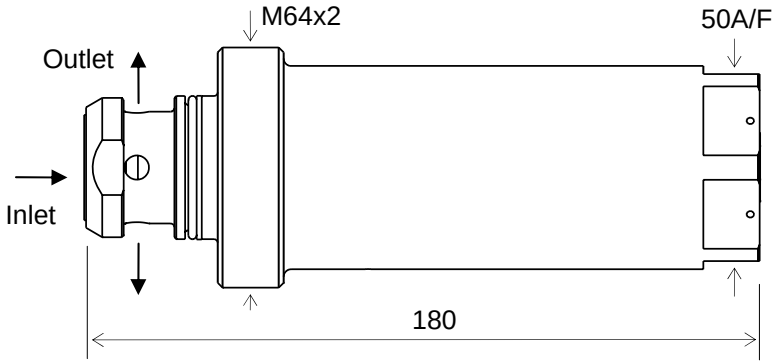
VIC55 (12mm)

Specification

- Nominal Bore: 12mm (1/2")
- Weight: approx. 1.2 kg
- Nominal flow rate: 2000N m^3/hr

Typical Dimensions

in mm except where shown otherwise



VIC57 (12mm)

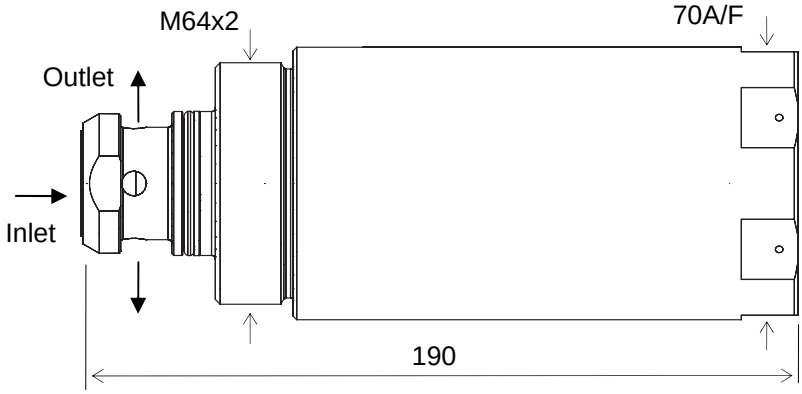
Specification

- Nominal Bore: 12mm (1/2")
- Weight: approx. 1.2 kg
- Nominal flow rate: 2000N m^3/hr

VIC57 has a larger spring to give better sensitivity at lower pressures

Typical Dimensions

in mm except where shown otherwise



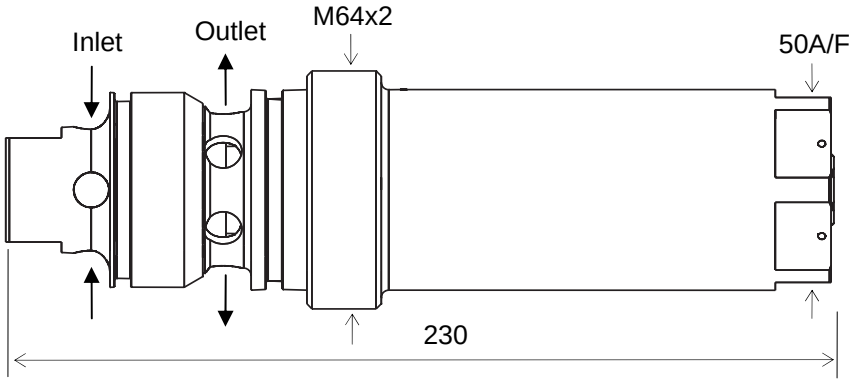
VIC56 (19mm)

Specification

- Nominal Bore: 19mm (3/4")
- Weight: approx. 1.5 kg
- Nominal flow rate: 5500N m^3/hr

Typical Dimensions

in mm except where shown otherwise



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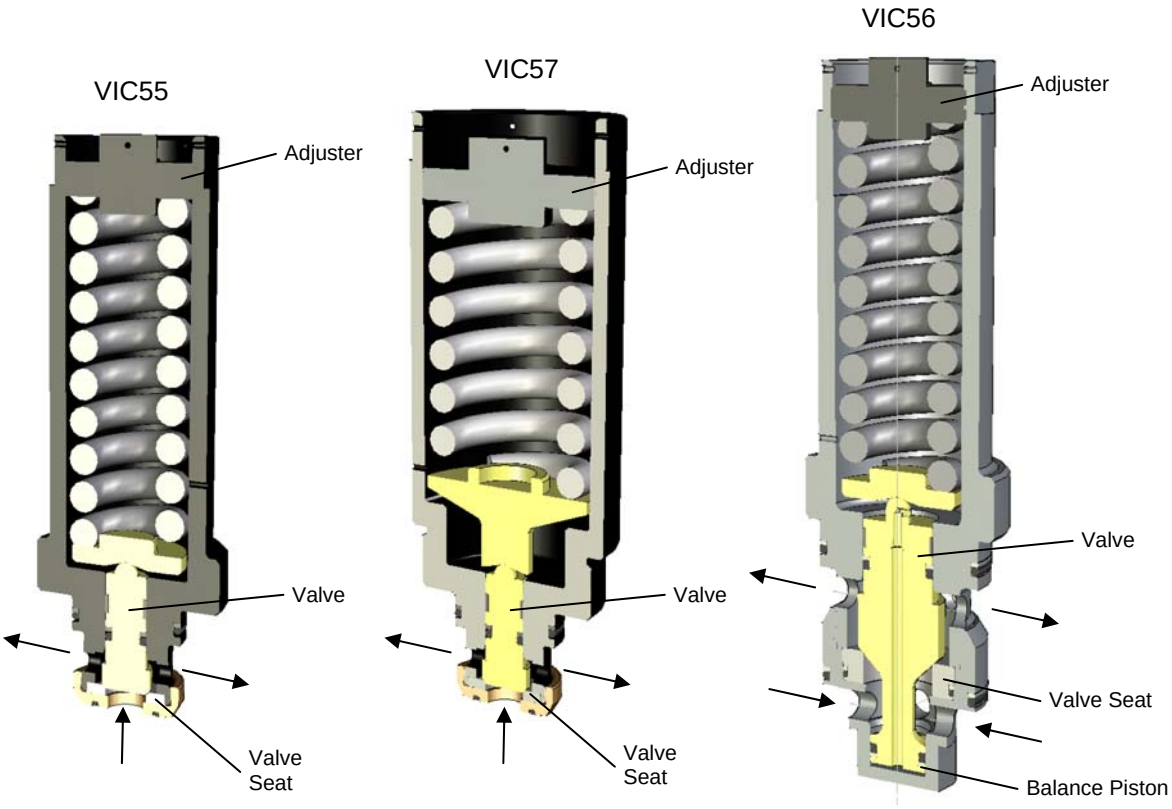
CNG Manifold

Back Pressure Maintaining Valve Cartridge

How it Works



The inlet pressure acts directly on the valve which is held closed by the spring. The valve opens when the force developed by the inlet pressure acting on the seal area of the valve exceeds the spring force. In the balanced versions the effective area of the seal is reduced by the area of the balance piston which is vented to atmosphere through the spring compartment.

For instructions on adjusting the set pressure or on servicing the valve please contact Hale Hamilton Valves Ltd.

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CNG Manifold
Pressure Regulator Cartridge

Description

Pressure regulators provide a flow of gas at controlled pressure. The outlet pressure is substantially unaffected by flow rate but it does drop slightly as the inlet pressure is increased.

The outlet pressure is locked but can be adjusted using a spanner. Alternatively, a control knob can be fitted or, for more security, a tamperproof type which requires a special tool.

The regulator has a cartridge or insert configuration for mounting in a manifold. This means that the manifold can be very compact and that the regulator can easily be removed for repair or refurbishment.

Originally developed for our CNG (Compressed Natural Gas) manifold this regulator can also be used for other similar applications.

Pressure regulator cartridges are only available as part of a Hale Hamilton manifold assembly.

Standard Specification

See next page for specification of individual types

- Filtration requirement: 20 micron
- Temperature range: -20 to +70°C (extended temperature range versions can be supplied)

Standard Materials

Alternative materials can be supplied

- Body: Aluminium Alloy
- Valve: Monel
- Piston: Bronze
- Valve Seat: PEEK
- O rings: Nitrile

Options

Please contact us for details

- Alternative body materials such as Nickel Aluminium Bronze or Stainless Steel can be supplied.
- Manual control knob or tamperproof locking
- Limit stop(s)

Ordering Information

Please supply the following information when ordering

- Maximum inlet pressure
- Set pressure
- Flow medium
- Operating temperature range
- Certification and QA requirements

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Excellence in Pressure & Flow Control
A CIRCOR International, Inc. Company
Alternative Fuels Business Unit

CNG Manifold
Pressure Regulator Cartridge

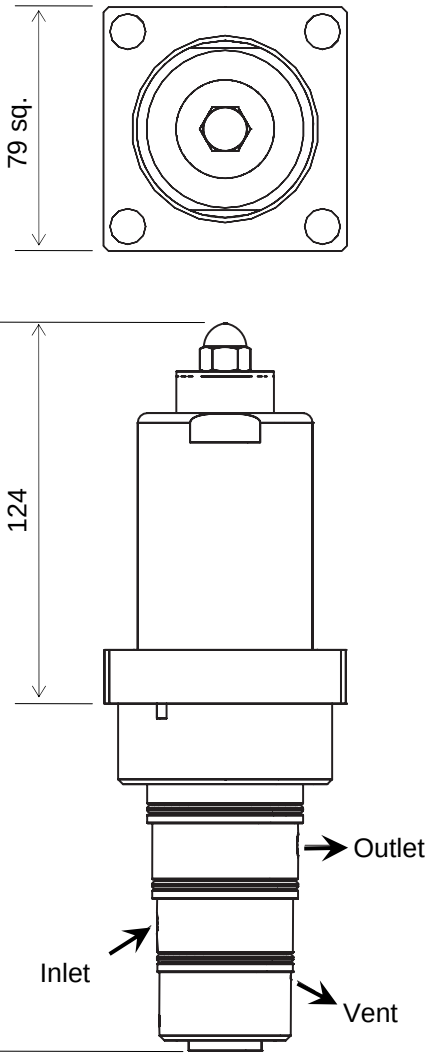
VIC62 (6mm)

Specification

- Nominal Bore: 6mm (1/4”)
- Weight: approx. 1.6 kg
- Max. Inlet Pressure: 250 bar
- Outlet Pressure Range: 96 to 241 bar

Typical Dimensions

in mm except where shown otherwise



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Hale Hamilton (Valves) Ltd
Cowley Road, Uxbridge, UB8 2AF, UK
Tel: +44 (0) 1895 457 553
Enquiries to:
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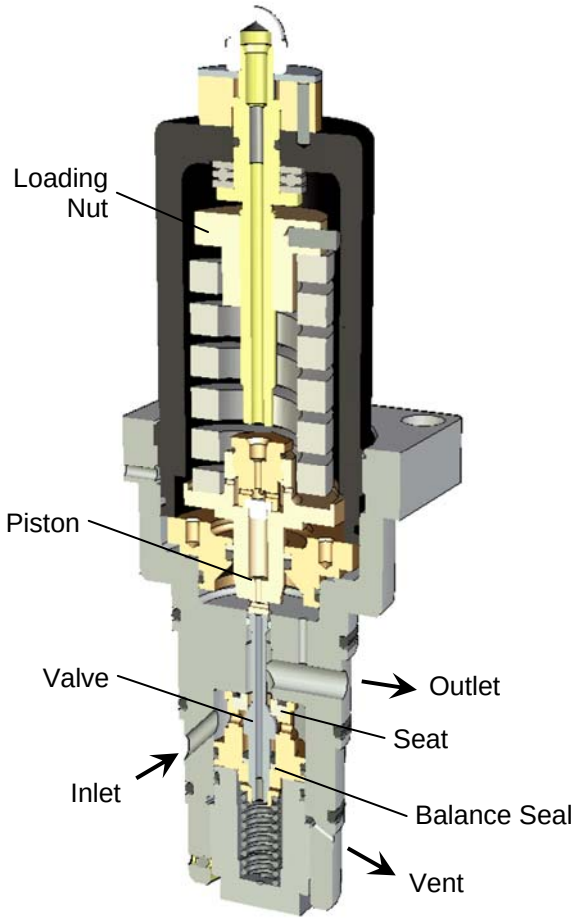
CNG Manifold
Pressure Regulator Cartridge

How it Works



The outlet pressure is regulated by the force applied by the loading spring acting against the force applied by the outlet pressure acting over the area of the piston seal. As the outlet pressure rises the valve closes onto the valve seat and shuts off flow from the inlet port.

The inlet pressure acts on the valve and tends to hold it closed. A seal on the back of the valve is connected to the outlet pressure and this reduces the effective area of the valve. This balancing system means that changes in inlet pressure have minimal effect on outlet pressure.

For instructions on adjusting the set pressure or on servicing the regulator please contact Hale Hamilton Valves Ltd.

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Non Return Valve Cartridge

Description

Non-return or check valves prevent reverse flow in high-pressure systems.

The valve has a cartridge or insert configuration for mounting in a manifold. This means that the manifold can be very compact and that the valve can easily be removed for repair or refurbishment.

The valve is sealed by an elastomer O ring. The main closing force is provided by the process pressure. A spring ensures that the valve will close at any orientation.

The internal design of the valve ensures that there is minimal restriction to flow.

Originally developed for our CNG (Compressed Natural Gas) manifolds this valve can also be used for other similar applications.

Standard Specification

See next page for specification of individual types

- Working Pressure: up to 400 bar (5800 psi)
- Temperature range: -20 to +70°C (extended temperature range versions can be supplied)

Standard Materials

Alternative materials can be supplied

- Body: Aluminium Alloy or Brass
- O rings: Nitrile

Options

Please contact us for details

- Materials: suitable combinations of materials can be supplied for various applications.
- Certification: ATEX to category 3

Ordering Information

Please supply the following information when ordering

- Maximum inlet pressure
- Flow medium
- Operating and storage temperature ranges
- Certification and QA requirements

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Non Return Valve Cartridge

VINRS13 (12mm)

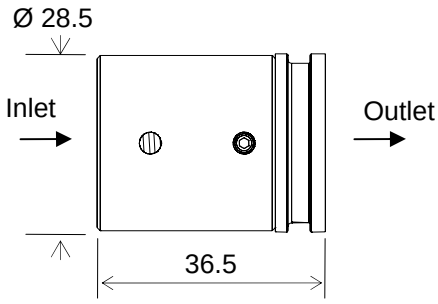
Specification

VINRS13 is a sliding fit in a machined bore. It is retained by a second valve (such as a regulator) in the same bore.

- Nominal Bore: 12mm (1/2")
- Weight: approx. 0.12 kg (brass body)

Typical Dimensions

in mm except where shown otherwise



VINRS16 (12mm)

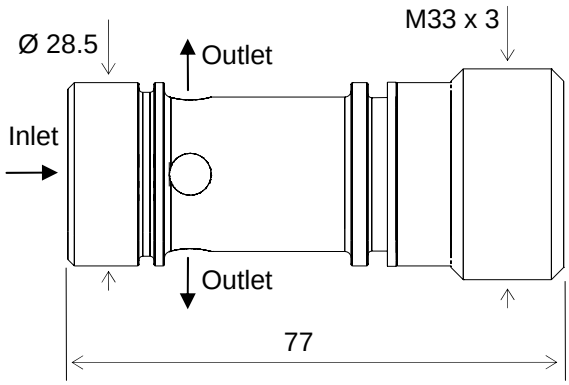
Specification

VINRS16 is screwed directly into the manifold block.

- Nominal Bore: 12mm (1/2")
- Weight: approx. 0.10 kg (aluminium body)

Typical Dimensions

in mm except where shown otherwise



VINRS18 (19mm)

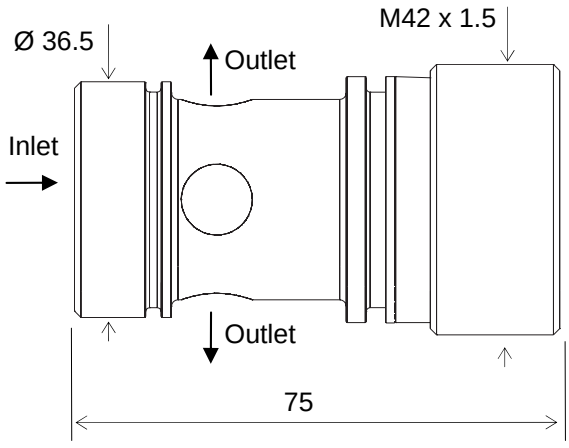
Specification

VINRS18 is screwed directly into the manifold block.

- Nominal Bore: 19mm (3/4")
- Weight: approx. 0.16 kg (aluminium body)

Typical Dimensions

in mm except where shown otherwise



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CNG Manifold
Relief Valve Cartridge

Description

A range of differential relief valves suitable for Compressed Natural Gas (CNG) service. The valve is operated by an internal piston that is larger than the flow area. The process pressure acts on the difference in these areas (hence “differential”). This means that the spring can be small for high pressures. It also means the valve snaps open to full bore because as soon as the valve starts to open the process pressure acts on the full piston area.

Each valve is adjustable within a range of pressures. The range depends on the size of the piston and the strength of the spring.

The valve has a cartridge or insert configuration for mounting in a manifold. This means that the manifold can be very compact and that the valve can easily be removed for repair or refurbishment.

Originally developed for our CNG (Compressed Natural Gas) manifold this valve can also be used for other similar applications.

Standard Specification

See next page for specification of individual types

- Working pressure: up to 275 bar (4000 psi)
- Nominal Bore: 9.5 mm
- Temperature range: -20 to +70°C
- Wire locking is standard

Standard Materials

Alternative materials can be supplied

- Body: Brass
- Valve/Piston: Stainless Steel
- Insert body seals: Nitrile
- Seat: HNBR (a PTFE O ring is used in some variants)
- Piston seal: Viton

Options

Please contact us for details

- Materials: suitable combinations of materials can be supplied for various applications.
- Certification: variants are available as “Safety Accessories” to PED Category 4

Ordering Information

Please supply the following information when ordering

- Relief pressure range
- Relief set pressure – we can supply valves pre-set to your required pressure
- Wire locking required (please state set pressure)
- Flow medium
- Operating and storage temperature ranges
- Certification and QA requirements

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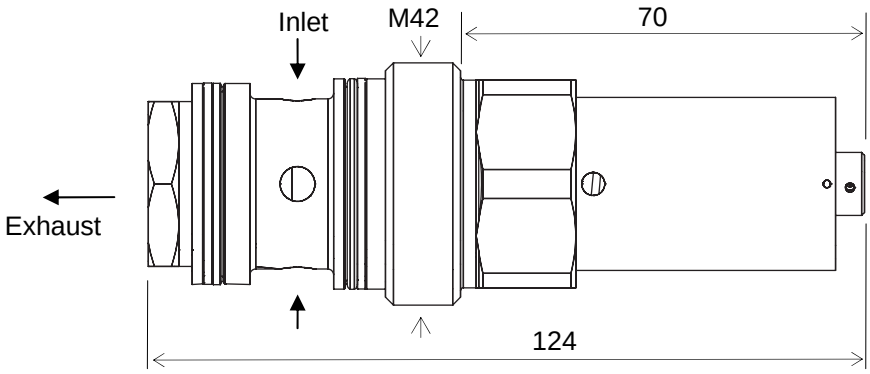
CNG Manifold
Relief Valve Cartridge

Specification

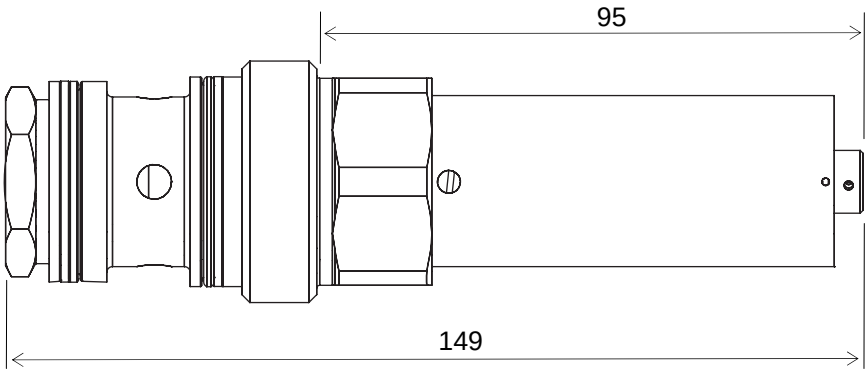
Type	VIRV47	VIRV48	VIRV49
Piston Size (inch)	1/2"	7/16"	7/16"
Piston Size (mm)	12.7	11.1	11.1
Pressure Ranges (bar)	17 to 34.5 34.5 to 69	120 to 172	248 to 310
Pressure Ranges (psi)	250 to 500 500 to 1000	1750 to 2500	3600 to 4500
Weight (kg)	0.7	0.7	0.8

Typical Dimensions

in mm except where shown otherwise



VIRV47 & 48



VIRV49

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CNG Manifold
High Pressure Ball Valve

Description

A high pressure 3 piece ball valve with a bi-directional floating ball design to ensure leak-proof shut-off on pressure or vacuum.
Anti-blow-out internally loaded stem for safety.
The quarter turn operation means that the handle indicates OPEN/CLOSED position at a glance.

Specification

- Working Pressure: up to 414 bar (6000 psi)
- Temperature range: -50 to +250°C
- Connections: 1/2 NPT male & female
- Nominal Bore: 10mm (3/8")
- Cv: 4.5
- Weight: approx. 0.35 kg

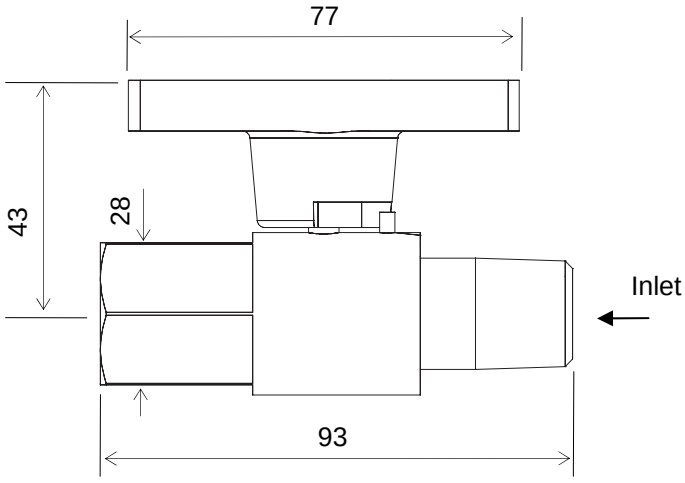
Standard Materials

Alternative materials can be supplied

- Body: Stainless Steel
- Body seals: PTFE
- Stem seals: PEEK

Typical Dimensions

in mm except where shown otherwise



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CNG Manifold
Pressure Gauge

Description

A safety pressure gauge with solid baffle wall designed in compliance with the operational safety requirements of EN 837-1, BS 1780 and ASME B 40.1

Ingress protection to IP 65 per EN 60 529 / IEC 529

Specification

- Pressure range: 0 to 400 bar (5800 psi)
- Accuracy class: 1.6
- Temperature range: -20 to +60°C
- Connection: 1/4 NPT male
- Weight: approx. 0.25 kg

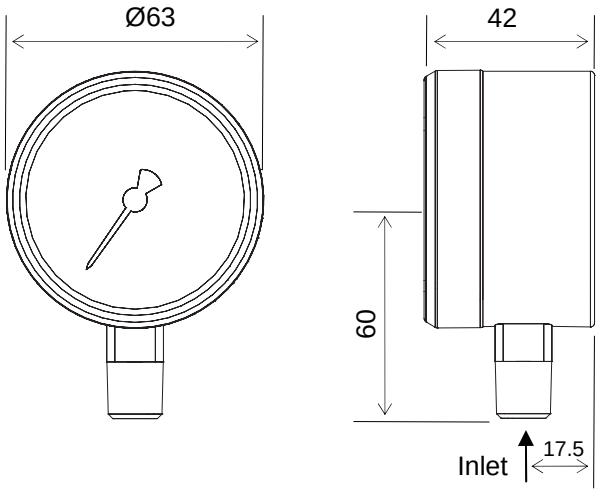
Standard Materials

Alternative materials can be supplied

- Stainless Steel

Typical Dimensions

in mm except where shown otherwise



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Line Mounted Valves and Regulators for CNG

RH25/RH35
Dome Loaded Pressure Regulators
Cv 1.8 & 5

Series 28
Spring Loaded Regulators
Cv 0.6

RS Series
Relief Valves
9.5mm NB

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CNG Service
High-Pressure Dome-Loaded Regulator (Balanced)

Description

A balanced, dome-loaded regulator suitable for Compressed Natural Gas (CNG) service. The regulator provides a flow of gas at controlled pressure and the balancing feature ensures that changes in inlet pressure have hardly any effect on outlet pressure.

The outlet pressure is set by adjusting the pressure in the dome. A flexible diaphragm separates the gas in the dome from the process fluid. The diaphragm responds to small changes in outlet pressure faster and more accurately than piston based designs.

The valve in the regulator is balanced by a piston. This piston is sized for the required outlet pressure range. A selection of piston sizes and end caps is available for each body size and these can easily be changed.

The dome must be charged with gas (see “How it Works” on this data sheet).

Standard Specification

See next page for specification of individual types

- External charging port: G1/8 female
- Temperature range: -20 to +70°C
- Pressure Equipment Directive 97/23/EC (PED) category “SEP”

Standard Materials

Alternative materials can be supplied

- Body: Aluminium Alloy (Anodised)
- Valve: Nickel Aluminium Bronze
- Valve Seat: Nylon
- Diaphragm: Butyl

Options

Please contact us for details

- Alternative Materials:
  - Nickel Aluminium Bronze - see RH20/RH30
  - Stainless Steel
  - Brass
- Oxygen compatible / CTE tested models
- Extended Temperature ranges
- Certification other than PED

Ordering Information

Please supply the following information when ordering

- Inlet pressure range
- Outlet pressure range
- Flow rate
- Flow medium
- Operating temperature range
- Certification and QA requirements

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CNG Service
High-Pressure Dome-Loaded Regulator (Balanced)

RH25 (9mm)

Specification

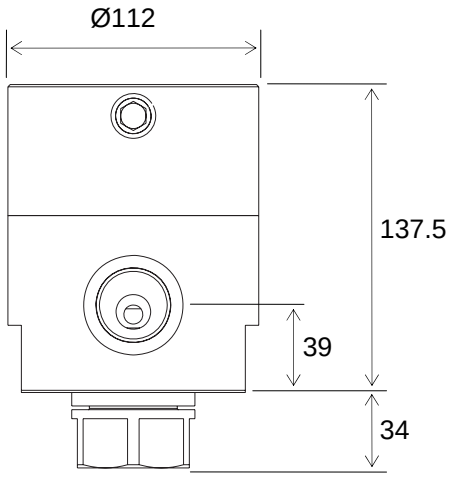
- Nominal Bore: 9 mm (3/8")
- Flow capacity (Cv): 1.8
- Maximum inlet pressure: 414 bar (6000psi)
- Weight: 4.2kg (Aluminium body)

Part Number	N106188/1	N106188/2	N106188/3
Balance Piston Size mm (inch)	28 (1 1/8)	19 (3/4)	12.5 (1/2)
Minimum Outlet Pressure	2.8bar (40psi)	28bar (400psi)	131bar (1900psi)
Maximum Outlet Pressure	31bar (450psi)	138bar (2000psi)	241bar (3500psi)
End Cap Colour	Black	Blue	Green

- Inlet & outlet Ports G1 female (alternative ports can be supplied. Note that alternative port configurations may affect the overall dimensions)

Typical Dimensions

in mm except where shown otherwise



RH35 (19mm)

Specification

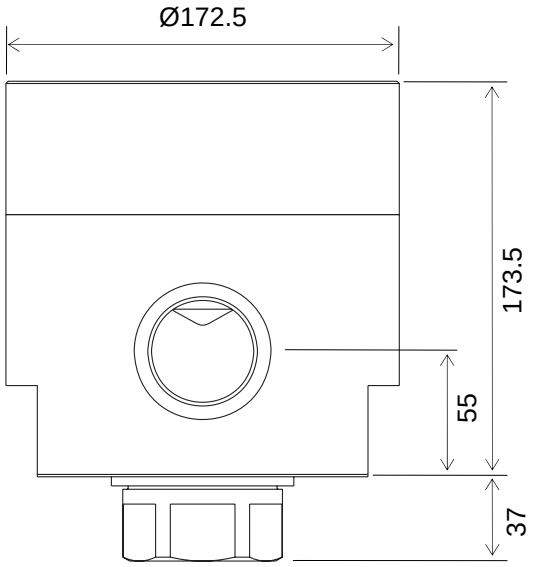
- Nominal Bore: 19 mm (3/4")
- Flow capacity (Cv): 5
- Maximum inlet pressure: 310 bar (4500psi)
- Weight: 12kg (Aluminium body)

Part Number	N106261/1	N106261/2
Balance Piston Size mm (inch)	50 (2)	28 (1 1/8)
Minimum Outlet Pressure	2.8bar (40psi)	52bar (750psi)
Maximum Outlet Pressure	52bar (750psi)	172bar (2500psi)
End Cap Colour	Black	Blue

- Inlet & outlet Ports G1 1/2 female (alternative ports can be supplied. Note that alternative port configurations may affect the overall dimensions)

Typical Dimensions

in mm except where shown otherwise



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CNG Service
High-Pressure Dome-Loaded Regulator (Balanced)

How it Works

While the outlet pressure is higher than the dome pressure the valve is closed and there is no flow from inlet to outlet. If the outlet pressure is lower than the dome pressure, the diaphragm pushes down and the valve opens. This connects the inlet to the outlet and allows flow until the desired pressure is reached.

The balancing feature consists of a piston open to the outlet pressure. This counteracts the effect of the inlet pressure pushing on the back of the valve and tending to hold it closed.

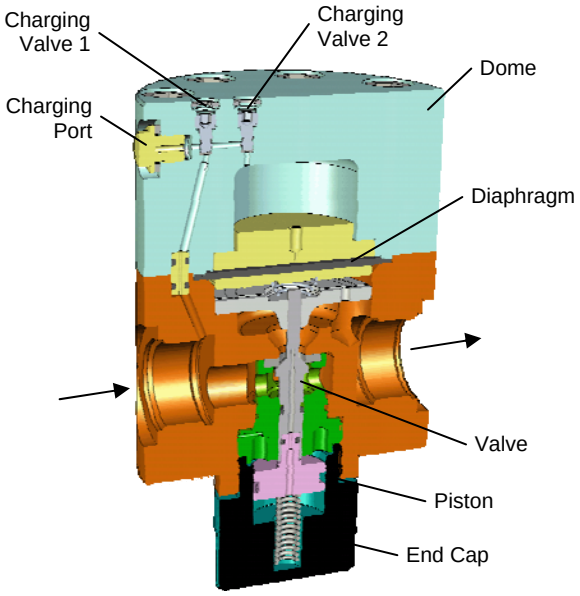
Before the regulator can be used the dome must be charged with gas – liquids must not be used. There are two ways to charge the dome:

External Charging: connect a separate source of gas to the charging port and open charging valve 2. Adjust the external pressure to give the required outlet pressure.

Internal charging: plug the charging port and open charging valve 2. Open charging valve 1 and monitor the outlet pressure. Close charging valves 1 and 2 when the outlet pressure reaches the required value. DO NOT exceed the maximum outlet pressure in the dome as this can damage the regulator.

To reduce dome pressure: close both charging valves, unscrew the charging port plug about one turn and use charging valve 2 to bleed off the pressure.

Unlike previous similar designs, the charging valves do not vent so flammable gases can be used to charge the dome. However, care must be taken not to remove the valves as they may have full inlet pressure behind them – DO NOT remove the circlips.



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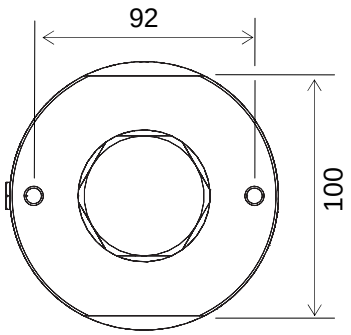
High-Pressure Dome-Loaded Regulator (Balanced)

Installation

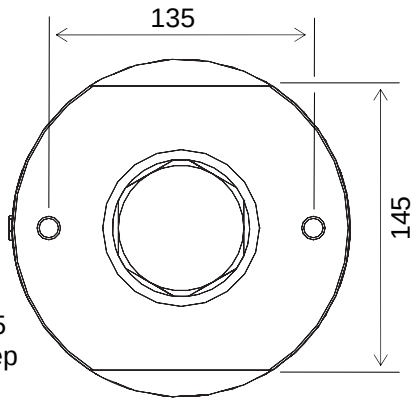
The valve may be supported by its connecting pipework. Mounting holes are also provided as shown.

RH25



2 holes
M8x1.25
12mm deep

RH35



2 holes
M12x1.75
18mm deep

Spares & Tools

The full spares kit contains the parts that we recommend are changed at regular intervals.

The modification kit contains the parts required to change the outlet pressure range.

The peg spanner is required to remove the seat retainer for a full strip down - it is not required to change the pressure range.

Please request Service Instruction SI1239 for details on maintenance and on changing the pressure range.

RH25	**K2101/1**	Full Kit 2.8 to 31bar
	K2101/2	Full Kit 28 to 138bar
	K2101/3	Full Kit 131 to 241bar
	K2102/1	Modification Kit 2.8 to 31bar
	K2102/2	Modification Kit 28 to 138bar
	K2102/3	Modification Kit 131 to 241bar
	N106485	Peg spanner
RH35	**K2103/1**	Full Kit 2.8 to 52bar
	K2103/2	Full Kit 52 to 172bar
	K2104/1	Modification Kit 2.8 to 52bar
	K2104/2	Modification Kit 52 to 172bar
	N106571	Peg spanner

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CNG Service
RS Relief Valve (9.5mm)

Description

The RS series is a range of differential relief valves suitable for Compressed Natural Gas (CNG) service. The valve is operated by an internal piston that is larger than the flow area. The process pressure acts on the difference in these areas (hence “differential”). This means that the spring can be small for high pressures. It also means the valve snaps open to full bore because as soon as the valve starts to open the process pressure acts on the full piston area.

Each valve is adjustable within a range of pressures. The range depends on the size of the piston and the strength of the spring.

RS valves are available with either direct or banjo bolt mounting.

Standard Specification

See next page for specification of individual types

- Working pressure: up to 310 bar (4500 psi)
- Nominal Bore: 9.5 mm
- Exhaust port: 3/8” NPT or BSP female
- Inlet port – direct mounting type: 3/8” NPT or BSP female
- Inlet port – banjo bolt type: 3/8” BSP male
- Temperature range: -20 to +70°C (versions with an extended temperature range up to 235°C can be supplied)

Standard Materials

Alternative materials can be supplied

- Body: Nickel Aluminium Bronze or Brass
- Valve/Piston: Stainless Steel or Phosphor Bronze
- Seals: Nitrile (a PTFE O ring is used on the piston in some variants). Viton or Chemraz can be supplied for high temperature applications

Options

Please contact us for details

- Ports: alternative port configurations can be supplied
- Operation: wire locked variants can be supplied
- Materials: suitable combinations of materials can be supplied for various applications.
- Certification: variants are available for ATEX service and as “Safety Accessories” to PED Category 4

Ordering Information

Please supply the following information when ordering

- Relief pressure range
- Relief set pressure – we can supply valves pre-set to your required pressure
- Wire locking required (please state set pressure)
- Flow medium
- Port configuration
- Operating and storage temperature ranges
- Certification and QA requirements

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CNG Service
RS Relief Valve (9.5mm)

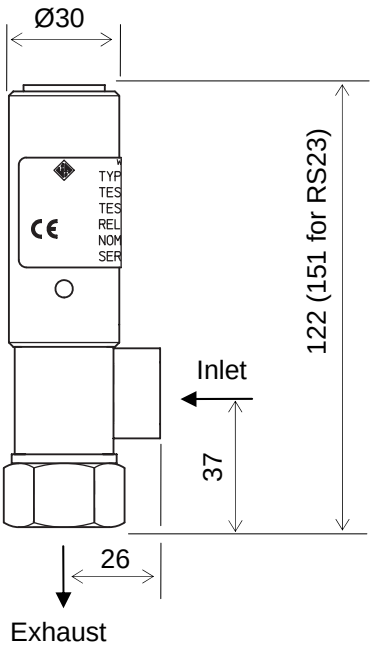
Specification

Type	RS9	RS11	RS12	RS23	RS32
Piston Size (inch)	11/16"	1/2"	7/16"	7/16"	7/16"
Piston Size (mm)	17.5	12.7	11.1	11.1	11.1
Pressure Ranges (bar)	3.5 to 7 7 to 17	17 to 34.5 34.5 to 69 69 to 120	120 to 172 172 to 248	248 to 310	251 to 350
Pressure Ranges (psi)	50 to 100 100 to 250	250 to 500 500 to 1000 1000 to 1750	1750 to 2500 2500 to 3600	3600 to 4500	3640 to 5075
Weight (kg)	0.5	0.5	0.5	0.8	1.1

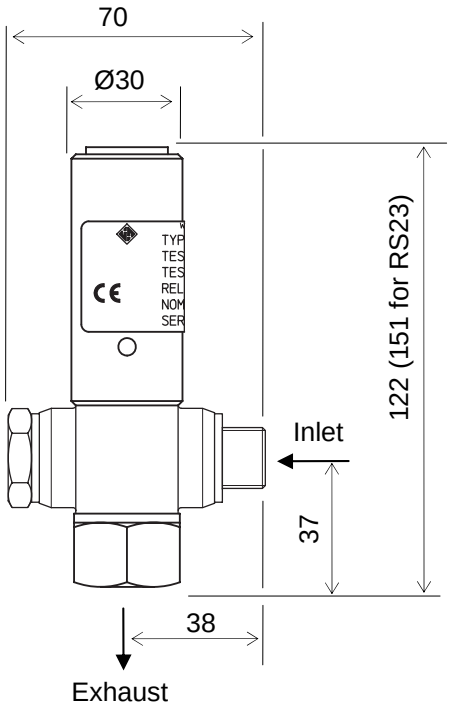
Typical Dimensions

in mm except where shown otherwise

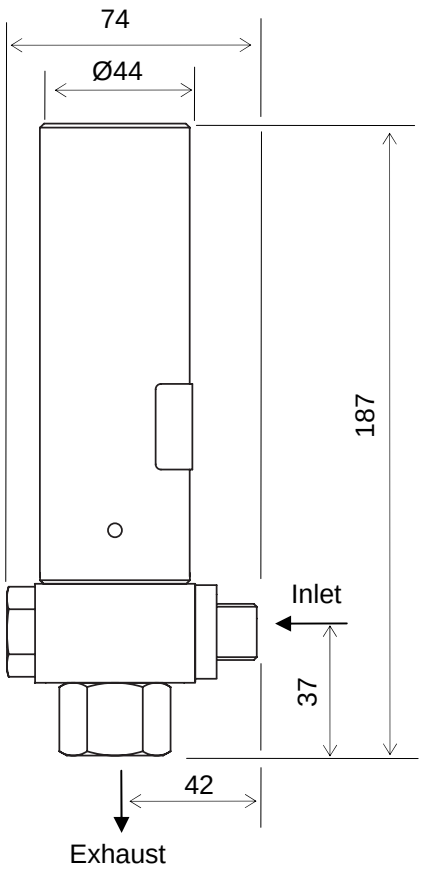
Direct Mounting Type



Banjo Bolt Type



RS32 only



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www.halehamilton.com

Feb-09

HALE HAMILTON
Excellence in Pressure & Flow Control
A CIRCOR International, Inc. Company
Alternative Fuels Business Unit

Series 28
High-Pressure Spring-Loaded Regulator

Description

Series 28 is a range of spring-loaded regulators that provide a flow of gas or liquid at controlled pressure. The outlet pressure is substantially unaffected by flow rate but it does drop slightly as the inlet pressure is increased.

The outlet pressure is set by turning the control knob. Depending on outlet pressure range, the internal mechanism uses either a piston or a diaphragm to isolate the process fluid from the spring compartment. The range of outlet pressure is set by the diameter of the piston or diaphragm and the strength of the spring. A locked outlet type is available which can be adjusted using a spanner. Alternatively, the tamperproof type requires a special tool.

A relieving valve can be included in the mechanism. This vents the outlet pressure to a spill port if it is higher than the set pressure.

A back pressure variant is available. This controls the inlet pressure by venting pressure to the outlet if the inlet pressure exceeds the set value.

Additional outlet ports can be provided for gauges and/or relief valves. A panel mounting kit is available.

Standard Types

Alternative types are available

Series 28 consists of several types which have a consistent naming system. The type name is made up of two parts – letters and numbers:

- GLD*nn* – diaphragm type – good sensitivity at low outlet pressures
- GLP*nn* – large piston type – suitable for intermediate outlet pressures
- GHP*nn* – small piston type – suitable for high outlet pressures
- GXP*nn* – extra small piston type – suitable for very high outlet pressures

- G*xx*15 – forward pressure regulator with relieving valve – 3/8” ports
- G*xx*16 – forward pressure regulator without relieving valve – 3/8” ports
- G*xx*17 – back pressure regulator – 3/8” ports
- G*xx*20 – balanced forward pressure regulator with relieving valve – 1/2” ports
- G*xx*21 – balanced forward pressure regulator without relieving valve – 1/2” ports
- GLD41/42 – forward pressure regulator without relieving valve – manifold mounting

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Standard Specification

See next page for specification of individual types

- Inlet pressure: up to 465 bar (6750 psi) for gas, up to 690 bar (10000 psi) for liquid
- Temperature range: -20 to +70°C (extended temperature range versions can be supplied)
- Regulators for gas service have a filter in the inlet

Standard Materials

Alternative materials can be supplied

- Body: Stainless Steel, Brass, Nickel Aluminium Bronze or Aluminium Alloy
- Valve: Stainless Steel or Monel
- Valve Seat: PEEK, Vespel or Copper
- Diaphragm: Nitrile

Options

Please contact us for details

- Ports: alternative port configurations can be supplied including additional ports for gauges and relief valves
- Materials: suitable combinations of materials can be supplied for various applications such as Oxygen or Offshore service.
- Certification: variants are available approved for use with Oxygen, for medical Oxygen service or for ATEX service. Materials complying with NACE MR-01-75 can be supplied.

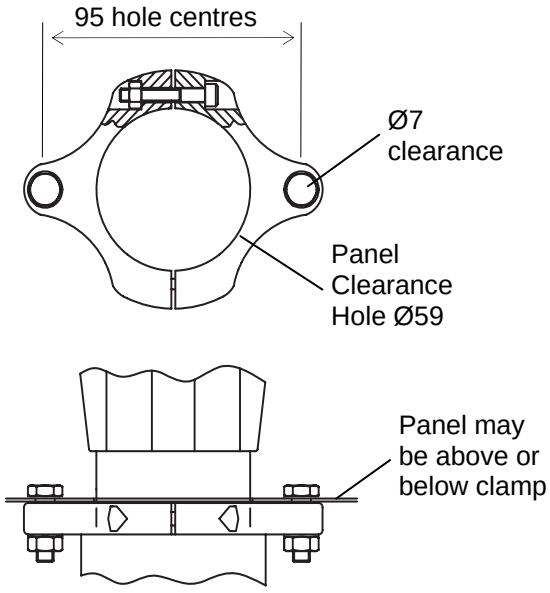
Ordering Information

Please supply the following information when ordering

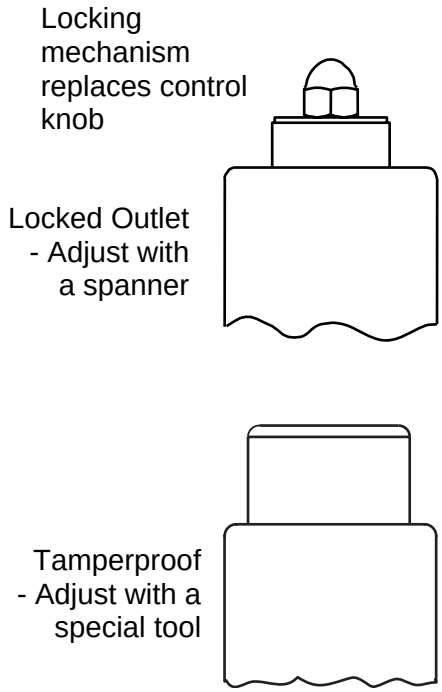
- Outlet pressure range
- Forward or back pressure
- Relieving valve required
- Flow medium
- Control knob or locked output (state required outlet pressure)
- Internal limit stops – state maximum pressure
- Port configuration
- Operating and storage temperature ranges
- Mounting kit required
- Certification and QA requirements

Panel Mounting

Dimensions in mm



Locked Output Variants



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Series 28
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Gxx15, 16 & 17 – 3/8" ports

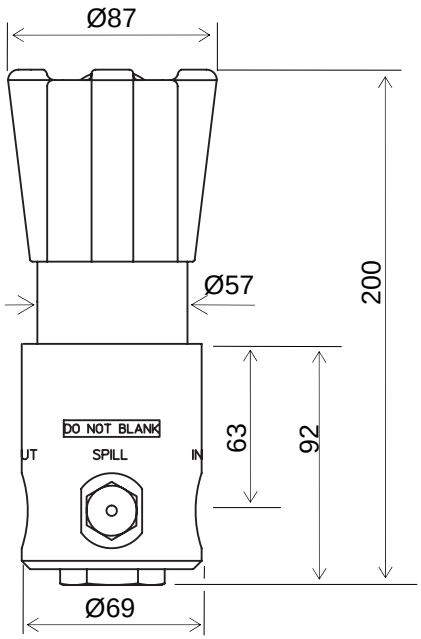
Specification

Type	GLD	GLP	GHP	GXP
Min outlet pressure* bar *psi*	1.5	34	207	390
	25	*500*	*3000*	*5650*
Max outlet pressure bar *psi*	58	241	414	655
	850	*3500*	*6000*	*9500*
Pressure Variation**	0.5%	2%	3%	4.5%

- Nominal Bore 5mm (outlet passage)
- Flow factor (Cv) 0.08
- Inlet, outlet, spill & gauge ports G3/8 (3/8 NPT is supplied on Stainless Steel variants)
- Weight: less than 4.5kg (Bronze or Stainless Steel body) less than 2kg (Aluminium body)

Typical Dimensions

in mm except where shown otherwise



Gxx20 & 21 – 1/2" ports

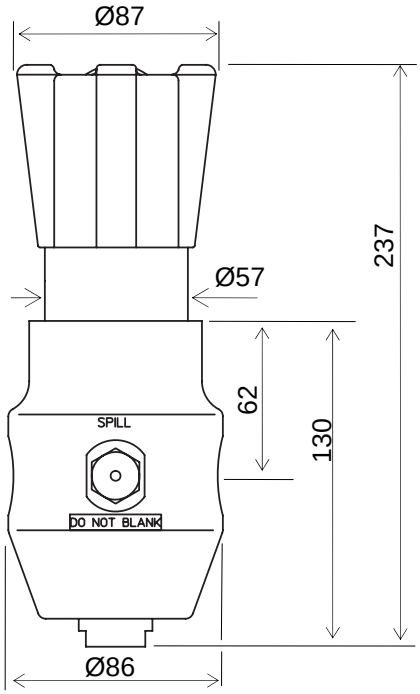
Specification

Type	GLD			GLP		GHP
Min outlet pressure* bar *psi*	10	16	25	48	96	220
	150	*230*	*370*	*670*	*1400*	*3200*
Max outlet pressure bar *psi*	17	27	58	103	241	414
	250	*400*	*850*	*1500*	*3500*	*6000*
Pressure Variation**	1.25%			6.5%		12%

- Nominal Bore 7mm (outlet passage)
- Flow factor (Cv) 0.6
- GLD and GLP are available with alternative springs to give a selection of pressure ranges
- Inlet & outlet ports G1/2, spill port G3/8, gauge ports G1/4 (NPT ports of the same size are supplied on Stainless Steel variants)
- Weight: less than 5kg (Bronze or Stainless Steel body) less than 2.5kg (Aluminium body)

Typical Dimensions

in mm except where shown otherwise



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* Recommended minimum outlet pressure. All regulators can be turned down to approximately zero pressure but sensitivity is low below the recommended value.

** Pressure variation is the RISE in outlet pressure for a DROP in inlet pressure

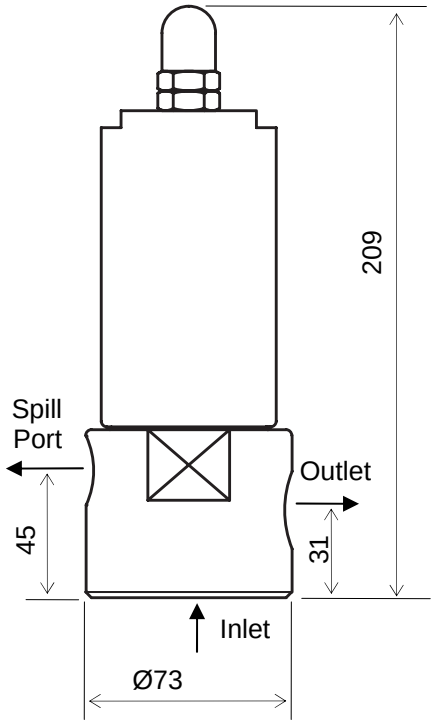
Manifold Mounting
GLD41 (Soft Seat)
GLD42 (Hard Seat)

Specification

- Nominal Bore 4mm (outlet passage)
- Seat material: PEEK (GLD41), Copper (GLD42)
- Min outlet pressure*: 1.5 bar (25 psi)
- Max outlet pressure: 58 bar (850 psi)
- Inlet Port: O ring seal manifold face mounting
- Outlet Port: G1/4
- Spill Port: G1/8
- Weight: less than 4.5kg (Brass body)

Typical Dimensions

in mm except where shown otherwise



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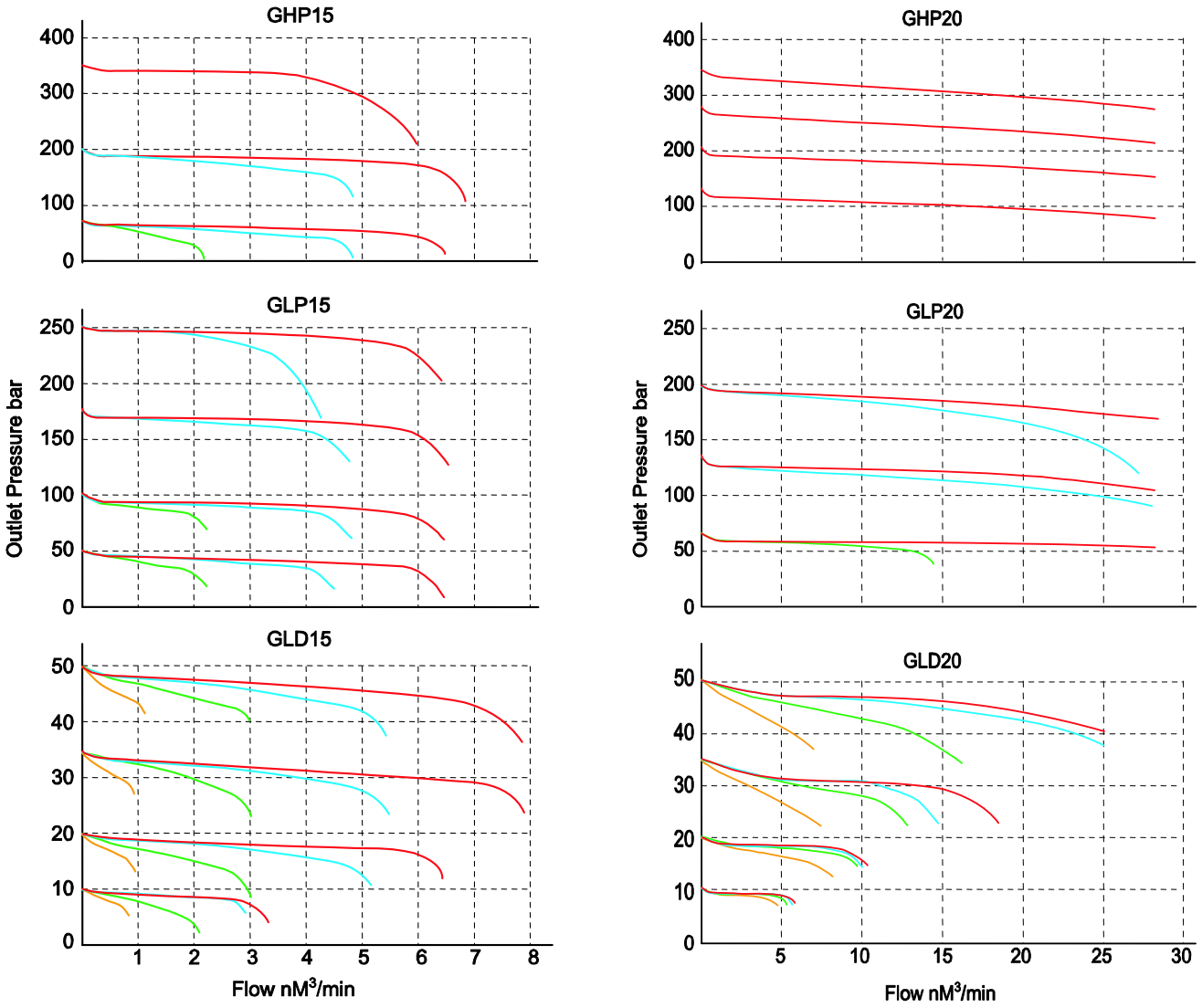
Flow Characteristics

Typical characteristics of sample regulators. Detail design changes may affect these characteristics

The regulator is set to a desired outlet pressure at zero flow using the control knob. Flow is induced by opening a metering valve downstream and the change in outlet pressure is measured without adjusting the knob. This is repeated for various inlet pressures.



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