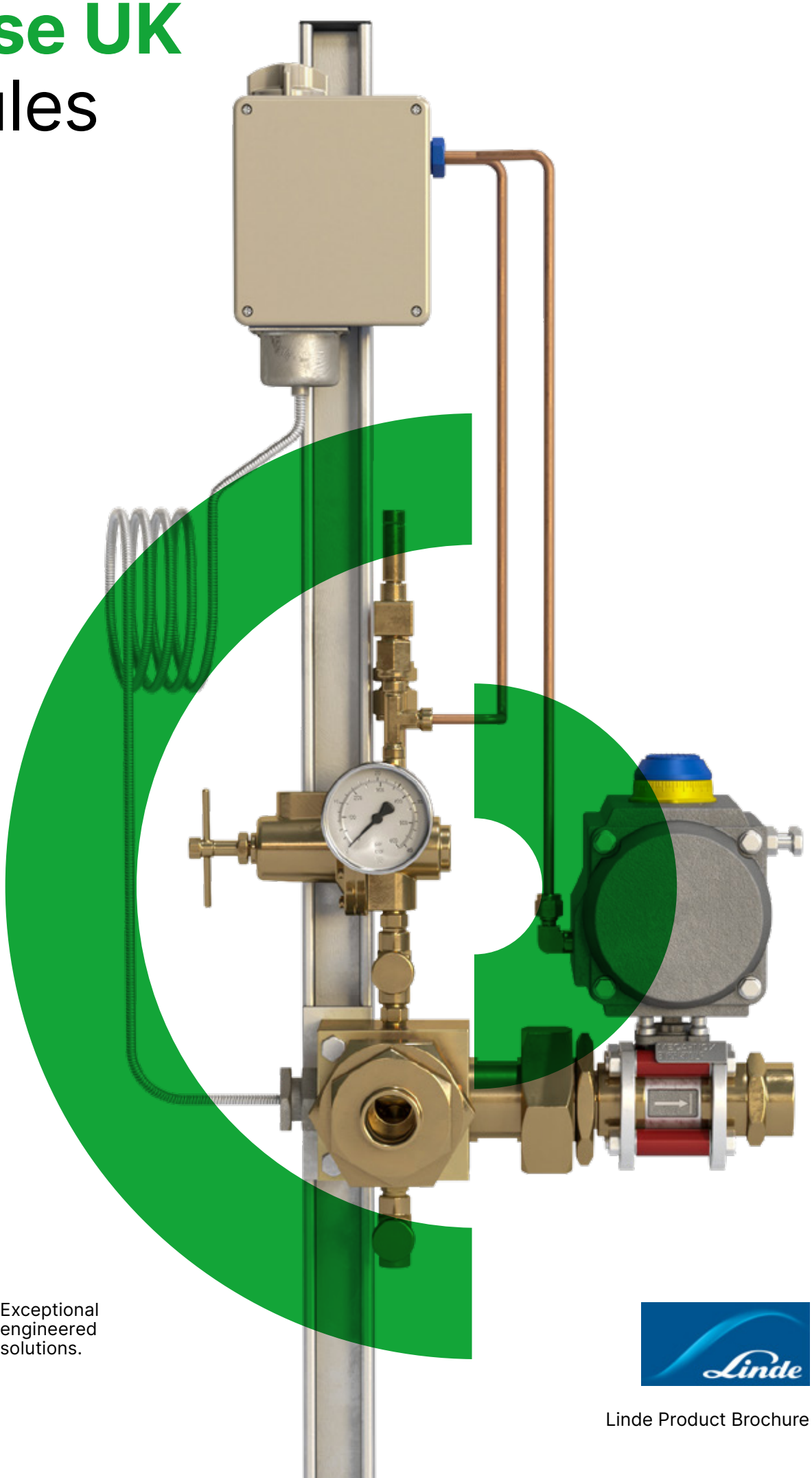
Herose UK
Modules



HEROSE LIMITED

Exceptional engineered solutions.

Linde Product Brochure

Herose UK
Exceptional engineered solutions.

Herose UK are world leaders in comprehensive valve and module packages to the industrial gas industries.

Since 1999, we have provided European quality, knowledge and expertise, as well as an exceptional safety record, to the major international gas companies including Air Products, Air Liquide, The Linde Group, Praxair and others. We also supply several prestigious equipment manufacturers such as Chart Industries, INOXCVA and Taylor-Wharton.

Modules timeline:

2009
- First module introduced

2014
- CE approval

2020
- Rolled out globally
- 8,000 modules supplied
- Royal Academy of Engineering award

The Future
- Ever-expanding range of modules to meet Linde's global requirements

12
12 years design

11
11 years module approval management

10
10 years value engineering

45
45 suppliers managed

270
270 module variants

CE Standard marking according to the PED 2014/68/EU

The global Linde standard

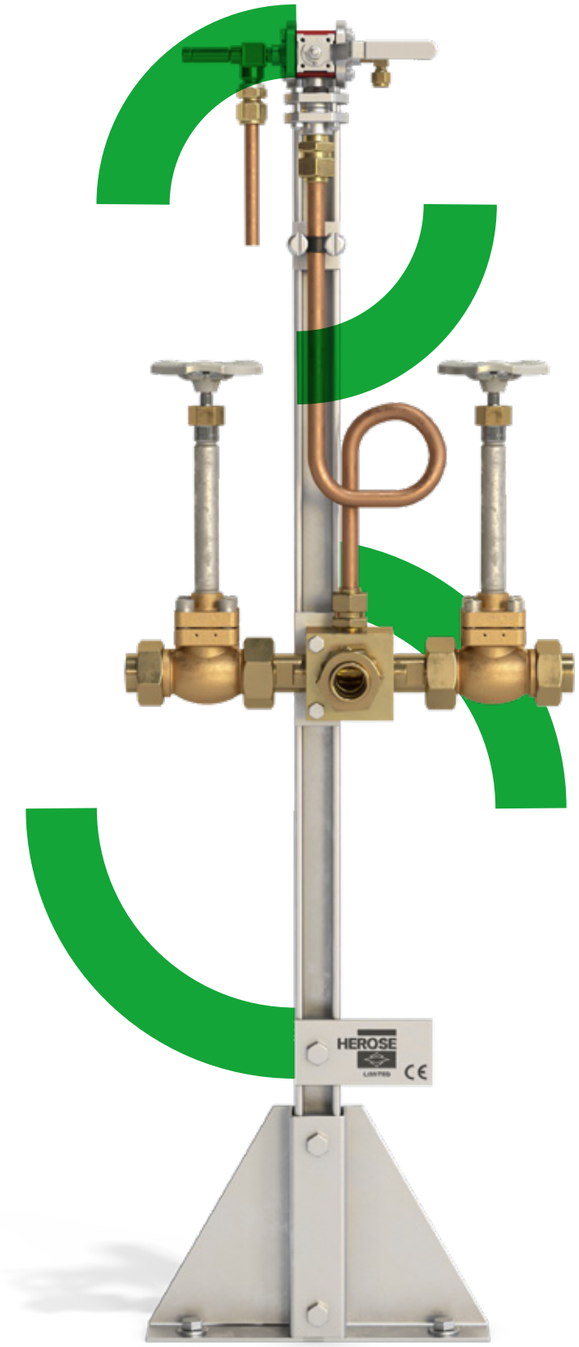
We advise on and supply the valve and module packages needed for every stage of the industrial process, aiming to provide Linde with a seamless experience, from start to finish.

All of our modules have been designed to reflect a global Linde standard. As an ISO 9001 approved company with module D quality approval in place, we have created a streamlined process to design and implement new assemblies — all of which are PED approved.

Our team of experts provide exceptional engineered solutions for the Linde group; this brochure highlights the range of modules we have available to suit your specific needs.

We support Linde with the simplification and standardisation of the installation process. Benefits of Herose UK modules include:

- Reduced installation time
- Reduced lead times
- Reduced stock outlay
- Simplified and efficient purchasing process
- Easy identification and maintenance
- Standardised modules
- Standardised installation designs



Standard Modules Install

1. MLC: Manual Liquid Changeover Modules
2. SV: Safety Valve Modules
3. TC: Timed Changeover Modules
4. LTC: Low Temperature Cut-off Modules
5. PREG: Single or Dual Pressure Regulating Modules
6. SVGC: Safety Valve Module c/w Globe Check Valve

Herose UK's unique modules deliver exceptional benefits.

Reduced installation time
Our modules contain all components in a single, compact and portable section and are fully assembled and tested before shipping. Our modules are ready to install as soon as they arrive on site, reducing installation and test times by days.

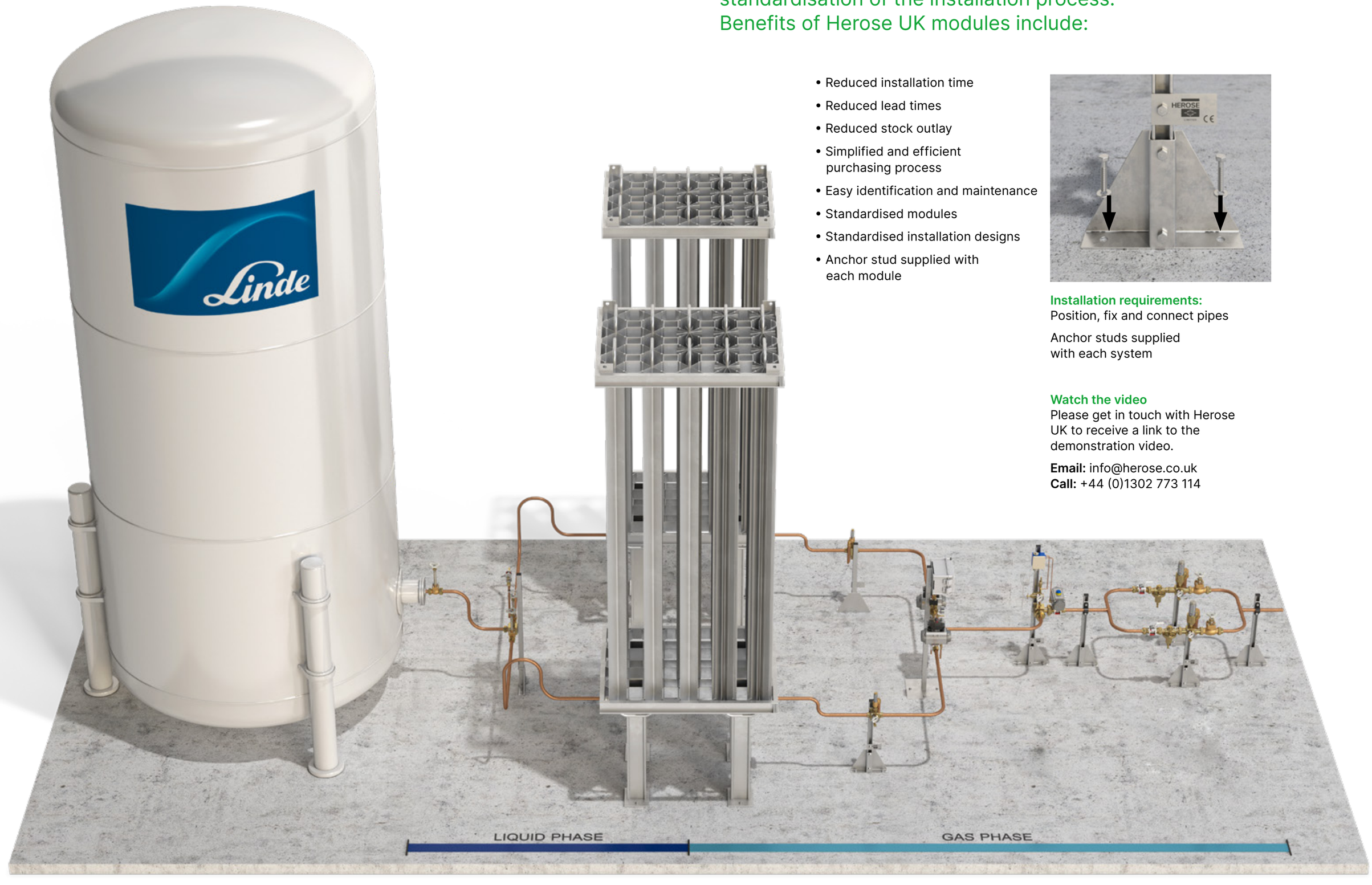
Simplified and efficient purchasing process
By sourcing all your components from a single supplier, we make the ordering process more efficient and ensure you have all the components on site, when you need them.

Easy identification and maintenance
All components are tagged with a Herose UK customer part number so that your site engineers can easily identify individual components.

Reduced lead times and stock outlay
We handle every element of the ordering process for you, significantly reducing your stock, management time and costs. All of our modules are supplied against guaranteed delivery programmes.

Standardised modules
Every Herose UK module is standardised enabling an efficient and safe installation by your engineers on site.

Standard Modules Install



We support Linde with the simplification and standardisation of the installation process. Benefits of Herose UK modules include:

- Reduced installation time
- Reduced lead times
- Reduced stock outlay
- Simplified and efficient purchasing process
- Easy identification and maintenance
- Standardised modules
- Standardised installation designs
- Anchor stud supplied with each module

Installation requirements:
Position, fix and connect pipes

Anchor studs supplied with each system

Watch the video
Please get in touch with Herose UK to receive a link to the demonstration video.

Email: info@herose.co.uk
Call: +44 (0)1302 773 114

Herose UK
Modules

1

MLC: Manual Liquid Changeover Module

Bronze PN40 manual changeover module for alternation between vaporisers; also provides protection against thermal expansion in stationary vessel-to-customer feed applications. Suitable for use with all air gases, including oxygen and CO_2.

Page 10-11

2

SV: Safety Valve Module

Bronze safety module for protection against overpressure in stationary vessel-to-customer feed applications. Suitable for use with all air gases, including oxygen and CO_2.

Page 12-13

3

TC: Timed Changeover Module

Bronze PN40 automated timed changeover module for alternation between vaporisers; also provides protection against thermal expansion in stationary vessel-to-customer feed applications. Suitable for use with all air gases, including oxygen and CO_2.

Page 14-15

4

LTC: Low Temperature Cut-off Module

Pneumatic, electric and mechanical actuated low temperature cut-off module for line shut down should the temperature drop below a pre-set point (-18˚C Air Gas/ -12˚C CO_2), in stationary vessel-to-customer feed applications. Suitable for use with all air gases, including oxygen and CO_2.

Page 16-17

5

PREG: Single or Dual Pressure Regulating Module

Gas line pressure regulating station, bronze, PN30 BAR rated. Regulates pressure to a desired set point and protects from overpressure. Includes high flow and high pressure options. Cleaned and degreased for oxygen service.

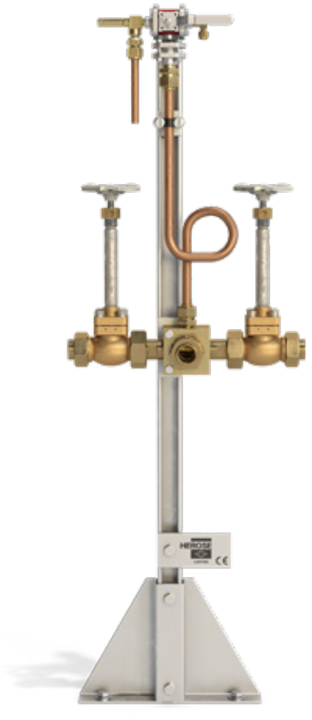
Page 18-19

6

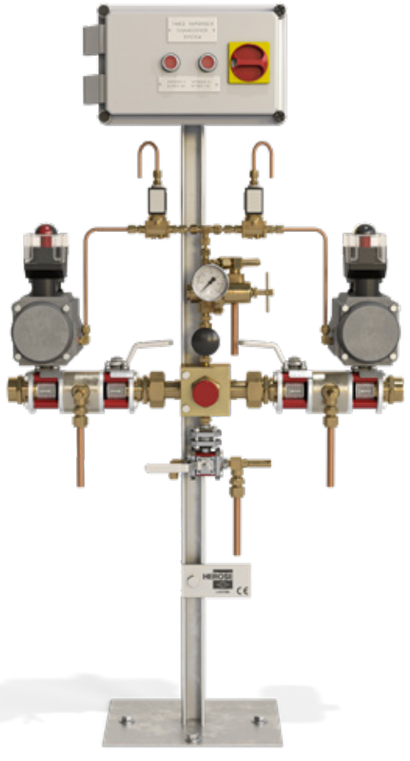
SVGC: Safety Valve Module c/w Globe Check Valve

Bronze safety module for protection against overpressure in stationary vessel-to-customer feed applications. The globe check function provides back flow protection. Suitable for use with all air gases, including oxygen and CO_2.

Page 20-21



CE Standard marking according to the PED 2014/68/EU



Interconnecting fittings available to suit all stainless and copper pipe standards.

See Pages 22-33 for additional modules.

MLC: Manual Liquid Changeover Module

TYPE: MLC: 25–40
MWP: 40 BAR – 580 PSI

Liquid line manual changeover module, bronze, PN40 BAR rated. Protects from thermal expansion at a desired set point and allows manual changeover between vaporisers.

Cleaned and degreased for oxygen service.

Application:
Provided as a manual changeover device for alternation between vaporisers, also provides protection against thermal expansion in stationary vessel-to-customer feed applications. Suitable for use with all air gases including oxygen and CO_2. Supplied to site fully leak tested and complete with declaration of conformity.

Working temperature:
-196˚C / -320˚F up to +50˚C / 122˚F

Installation:
2 x Hilti 12mm anchor studs supplied with each module.

MLC – Part numbers

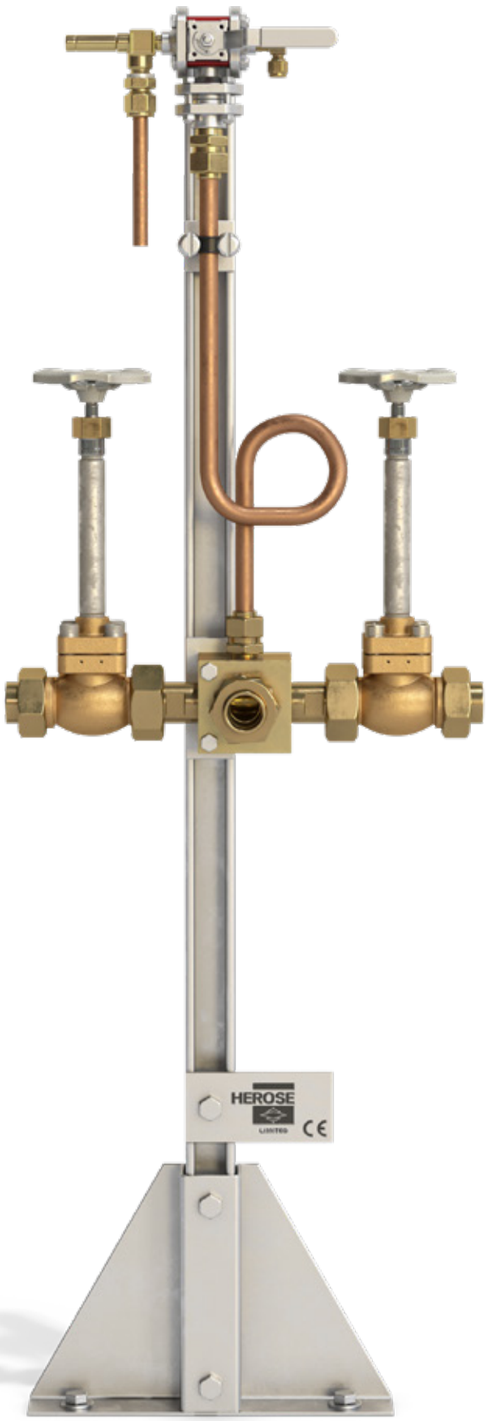
SV set pressure	23.5 BAR	30.0 BAR	40 BAR
25mm module	19317152	19317153	19317154
40mm module	19317156	19317157	19317158

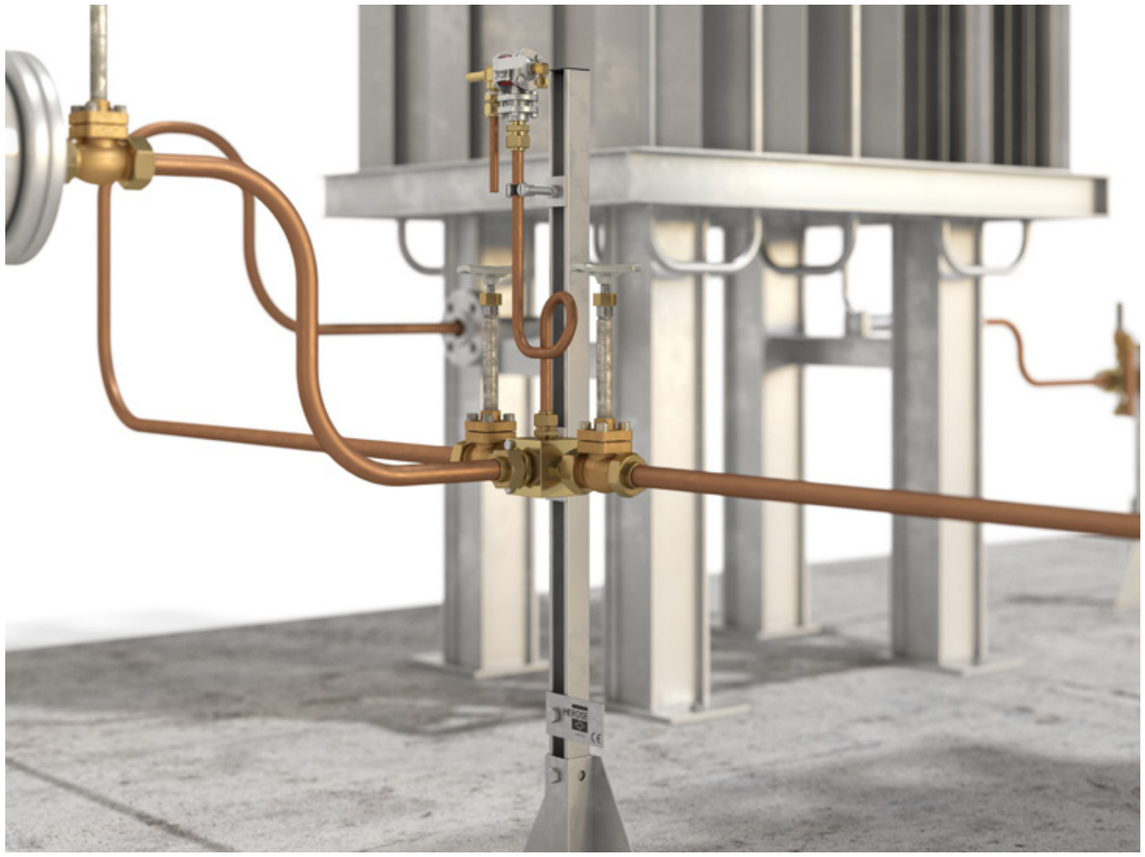
Materials	DIN EN
Globe valve	CC491K
Union nut	CW614N
Bullnose nipple	CW614N
Block	CC493K
Pressure gauge	CW614N / st case
Gas loop	17671
3 way ball valve	316L
Safety valve	CW610N
Fitting	CW614N
Vent pipe	17671

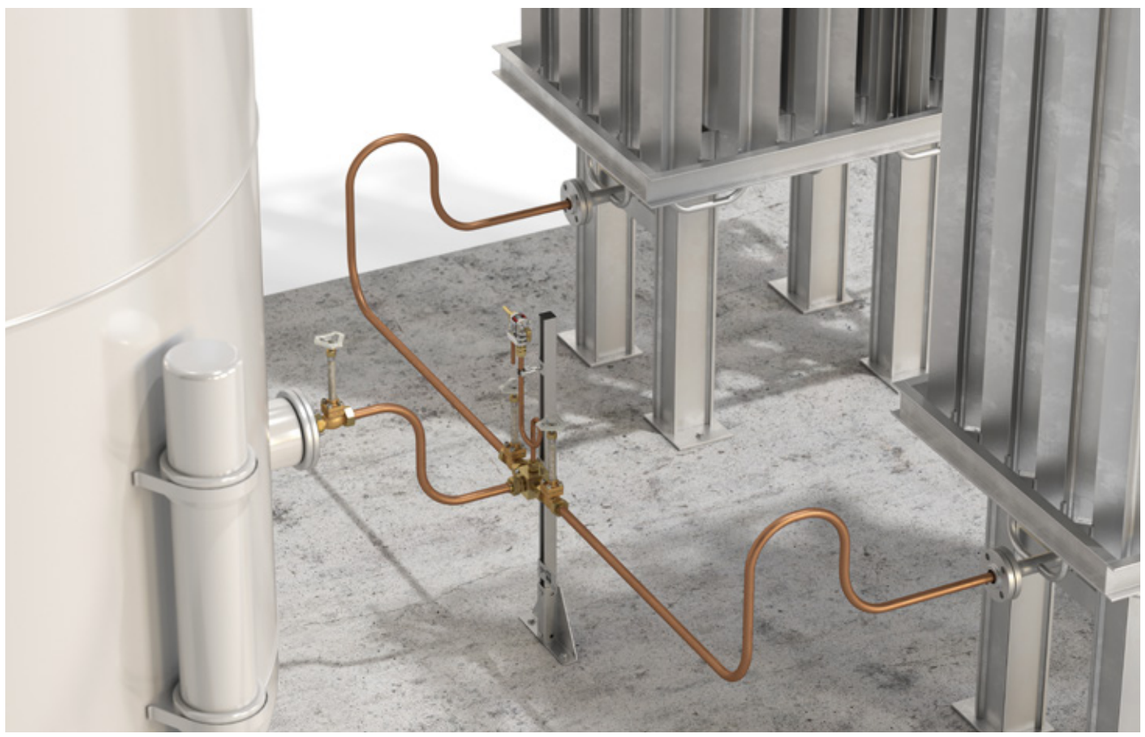
MLC - Dimension table

Nominal size	25mm	40mm
Inlet	1.1/4" MCR	2" MCR
Outlet	1.1/4" MCR	2" MCR
Height (mm) o/a	1025	1025
Height (mm) c/l	600	600
Length (mm)	350	450
Weight (kg)	15	24

Interconnecting fittings available to suit all stainless and copper pipe standards.







CE Standard marking according to the PED 2014/68/EU

3D images are representative of the modules – sizes and connections may differ.

2

SV: Safety Valve Module

TYPE: SV: 25–50
MWP: 40 BAR – 580 PSI

Gas line overpressure protection module, bronze, PN40 BAR rated. Protects from over pressure at a desired set point.

Cleaned and degreased for oxygen service.

Application:
Provided as a safety device for protection against overpressure in stationary vessel-to-customer feed applications. Suitable for use with all air gases including oxygen and CO_2. Supplied to site fully leak tested and complete with declaration of conformity.

Working temperature:
-54˚C / -65˚F up to +50˚C / 122˚F

Installation:
2 x Hilti 12mm anchor studs supplied with each module.

SV – Part numbers

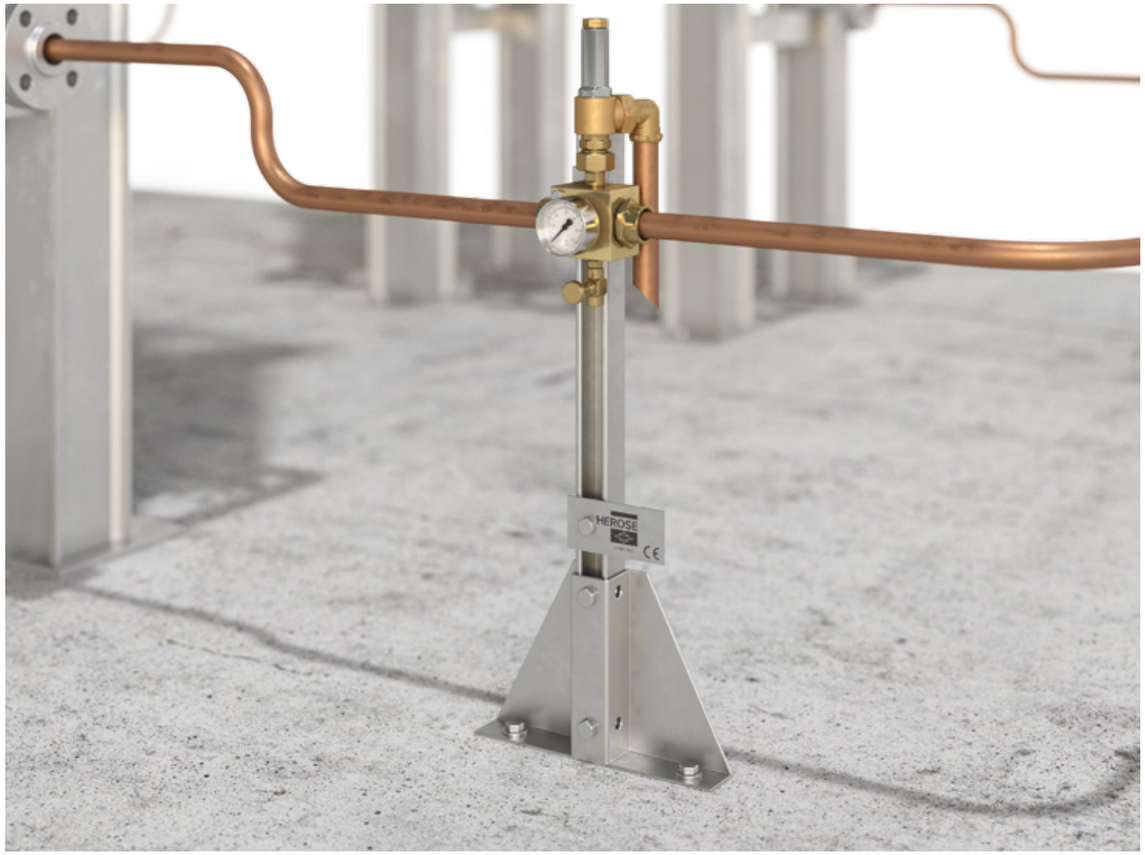
SV set pressure	15.0 BAR	19.0 BAR	26.0 BAR	37.0 BAR
25mm module	19314220	19314221	19314222	19314223
40mm module	19314225	19314226	19314227	19314228
50mm module	19314229	19314230	-	-

Materials	DIN EN
Male nipple	CW614N
Block	CC493K
Bullnose nipple	CW614N
Union nut	CW614N
Safety valve	CC491K
Elbow	CC614N
Vent pipe	17671
Needle valve	CW614N
Pressure gauge	CW614N / stainless case

SV - Dimension table

Nominal size	25mm	40mm	50mm
Inlet	1.1/4" MCR	2" MCR	2.1/2" MCR
Outlet	1.1/4" MCR	2" MCR	2.1/2" MCR
Height (mm) o/a	870	920	920
Height (mm) c/l	600	600	600
Length (mm)	150	180	190
Weight (kg)	9	15	16

Interconnecting fittings available to suit all stainless and copper pipe standards.



CE Standard marking according to the PED 2014/68/EU

3D images are representative of the modules – sizes and connections may differ.

3

TC: Timed Changeover Module

TYPE: TC: 25–50
MWP: 40 BAR – 580 PSI

Gas line timed changeover station, bronze, PN40 BAR rated. Protects from thermal expansion at a desired set point and allows timed changeover between vaporisers.

Cleaned and degreased for oxygen service.

Optional limit switches available for medical, 24 hour and other installations.

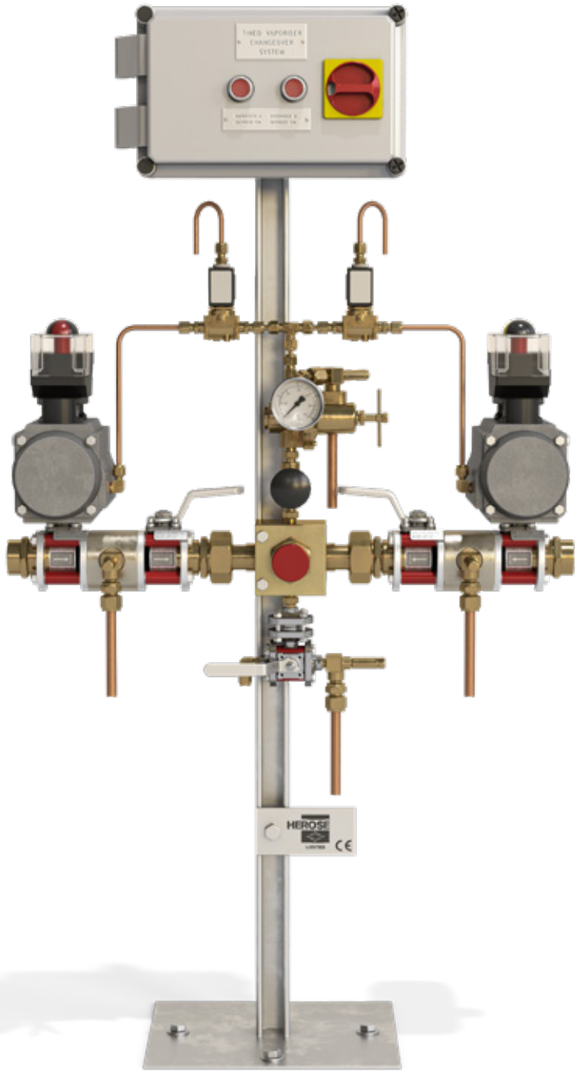
Application:
Provided as an automated timed changeover device for alternation between vaporisers; also provides protection against thermal expansion in stationary vessel-to-customer feed applications. Suitable for use with all air gases including oxygen and CO_2. Supplied to site fully leak tested and complete with declaration of conformity.

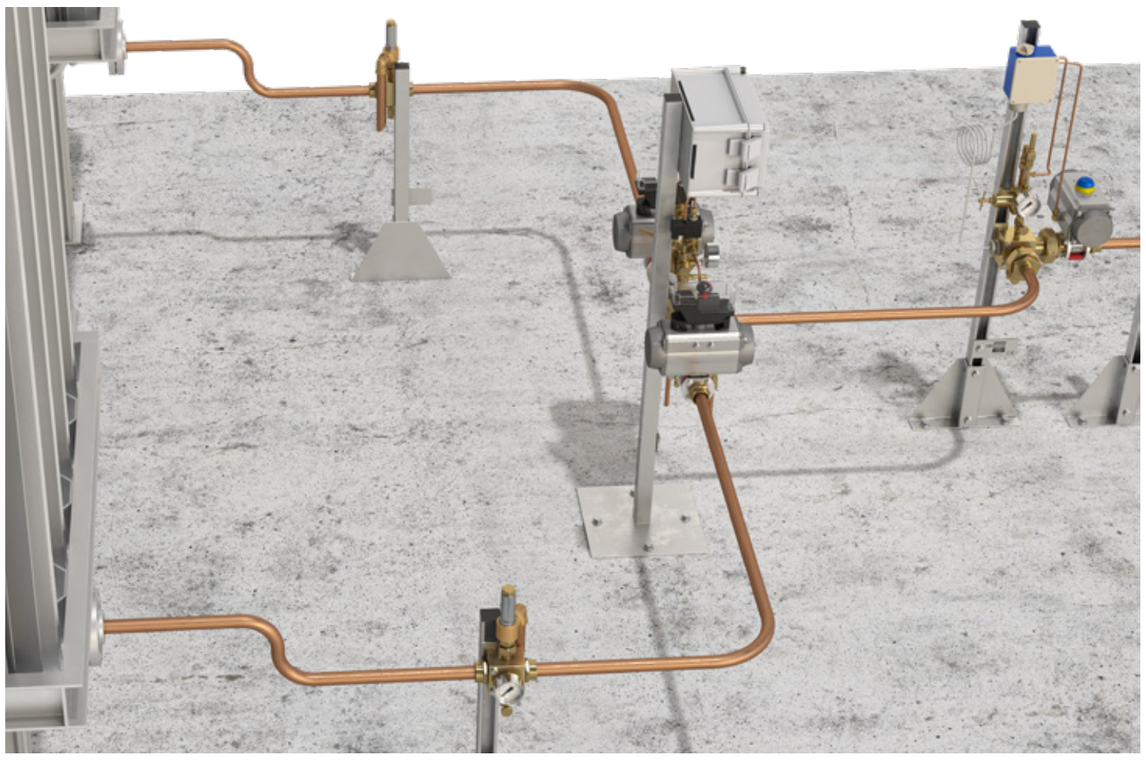
Working temperature: -40˚C / -40˚F up to +50˚C / 122˚F

Installation:
4 x Hilti 12mm anchor studs supplied with each module.

Voltage: 24 VAC

Supply voltage: 110 / 230 VAC





TC – Part numbers

SV set pressure	23.5 BAR	30.0 BAR	40 BAR
25mm module	19317160	19317161	19317162
40mm module	19317164	19317165	19317166
50mm module	19317168	19317169	19317170

TCLS – Part numbers - with limit switches

SV set pressure	23.5 BAR	30.0 BAR	40 BAR
25mm module	19324445	19324446	19324447
40mm module	19324449	19324450	19324451
50mm module	19324453	19324454	19324455

Materials	DIN EN
Male nipple	CW614N
Ball valve	CC493K
Bullnose nipple	CW614N
Union nut	CW614N
Block	CC491K
3 Way valve	316L
Safety valve	17671
Fitting	CW614N
Vent pipe	17671
Needle valve	CW614N
Gas delivery reg	CW614N / EPDM seal
Pressure gauge	CW614N / stainless case

TC - Dimension table

Nominal Size	25mm	40mm	50mm
Inlet	1.1/4" MCR	2" MCR	2.1/2" MCR
Outlet	1.1/4" MCR	2" MCR	2.1/2" MCR
Height (mm) o/a	1240	1240	1240
Height (mm) c/l	600	600	600
Length (mm)	655	790	930
Weight (kg)	44	70	83
Solenoid voltage	24v AC	24v AC	24v AC

Interconnecting fittings available to suit all stainless and copper pipe standards.

CE Standard marking according to the PED 2014/68/EU

3D images are representative of the modules – sizes and connections may differ.

4

LTC: Low Temperature Cut-off Module

TYPE: LTC: 25–50, LTCM: 25
MWP: 40 BAR – 580 PSI

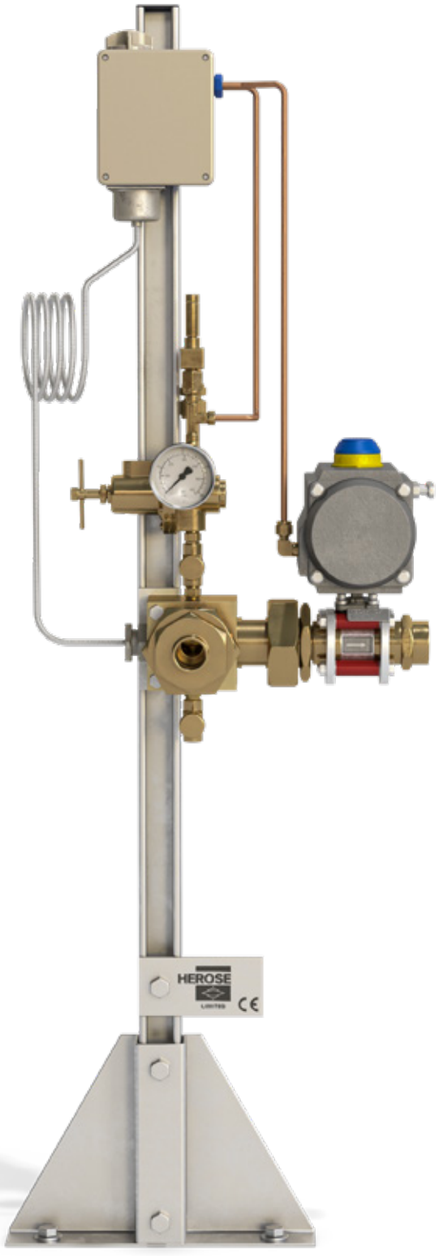
Gas line low temperature cut-off module, bronze, pneumatic or mechanical, PN40 BAR rated.
Protects from low temperature at a desired shut-off point via the pneumatic switch or mechanical valve.

Cleaned and degreased for oxygen service.

Application:
Provided as a low temperature cut-off device for line shut down should temperature drop below a pre-set point (-18°C Air Gas / -12°C CO_2), in stationary vessel-to-customer feed applications. Suitable for use with all air gases including oxygen and CO_2. Supplied to site fully leak tested and complete with declaration of conformity. Also available for low temperature cut-off down to -50˚C

Working temperature:
-50°C / -58°F up to +50°C / 122°F

Installation:
2 x Hilti 12mm anchor studs supplied with each module.



LTC – Part numbers

CO_2 -12°C	25mm	40mm	50mm
Pneumatic	19324736	19324737	19324738
Mechanical	19329679	-	-
Air gas -18°C	25mm	40mm	50mm
Pneumatic	19324733	19324734	19324735
Mechanical	19329678	-	-
Low temp -50	25mm	40mm	50mm
Pneumatic	19332093	19332094	19332095

Materials	DIN EN
Ball valve	CC491K
Union nut	CW614N
Bullnose nipple	CW614N
Block	CC493K
Pressure gauge	CCW614N / stainless case
Gas delivery reg	CW614N / EPDM Seal
Needle valve	CC614N
Safety valve	CC610N
Fitting	CC614N
Vent pipe	17671

LTC - Dimension table

Nominal Size	25mm	40mm	50mm
Inlet	1.1/4" MCR	2" BN	2.1/2" BN
Outlet	1.1/4" MCR	2" MCR	2.1/2" MCR
Height (mm) o/a	1000	1000	1000
Height (mm) c/l	600	600	600
Length (mm)	260	280	360
Weight (kg)	24	31	40

Interconnecting fittings available to suit all stainless and copper pipe standards.

CE Standard marking according to the PED 2014/68/EU

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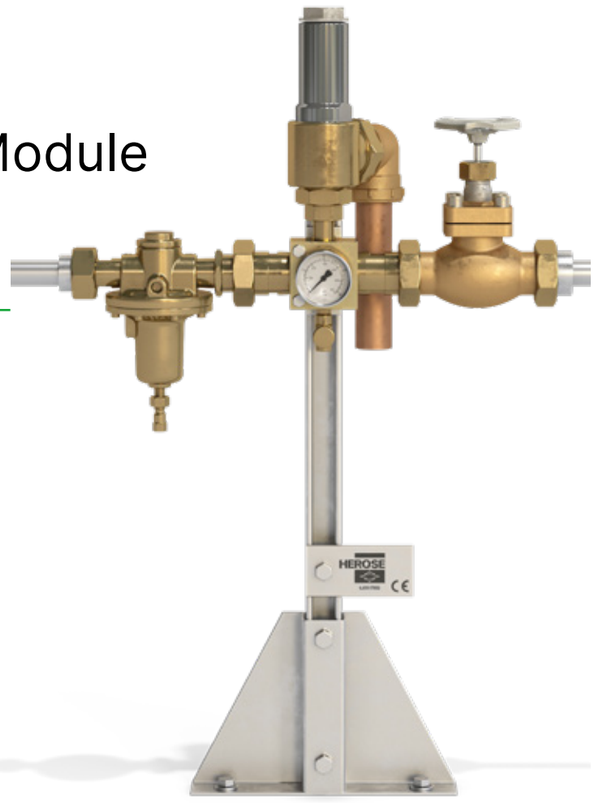
5

PREG: Single or Dual Pressure Regulating Module

TYPE: PREG: 15–40
MWP: 30 BAR – 435 PSI



Gas line pressure regulating station, bronze, PN30 BAR rated. Regulates pressure to a desired set point and protects from overpressure. Includes high flow and high pressure options.

Cleaned and degreased for oxygen service.

Applications:
Provided as a pressure control and safety device for reduction in line pressure and protection against overpressure in stationary vessel-to-customer feed applications. Suitable for use with all air gases including oxygen and Co². Supplied to site fully leak tested and complete with declaration of conformity.

Working temperature:
-34˚C / 29.2˚F up to +50˚C / 122˚F

Installation:
2 x Hilti 12mm anchor studs supplied with each module.

PREG – Part numbers

Pressure and part number *safety valves set pressure 14 BAR			
DN15 - CO_2	0-3.8 BAR	3.5-9.3 BAR	8.6-15.5 BAR*
	19314270	19314271	19314272
DN15 - Air gas	0-3.8 BAR	3.5-9.3 BAR	8.6-15.5 BAR*
	19314232	19314233	19314234
DN25 - CO_2	0-3.8 BAR	3.5-9.3 BAR	8.6-15.5 BAR*
	19329741	19329742	19329743
DN25 - Air gas	0-3.8 BAR	3.5-9.3 BAR	8.6-15.5 BAR*
	19315080	19315081	19315082
DN40 - Air gas	0.5-15 BAR*	-	-
	19330182		

Note: For dual regulating module part numbers, contact Herose UK

Materials	DIN EN
Globe valve	CC491K
Union nut	CW614N
Bullnose nipple	CW614N
Block	CC493K
Pressure gauge	CW614N / stainless steel case
Gas delivery reg	CW614 / EPPM or VITON
Safety valve	CW610N
Fitting	CW614N
Vent pipe	17671

PREG - Dimension table

Nominal size	15mm	25mm	40mm
Inlet	3/4" BN	1-1/4" BN	2" MCR
Outlet	3/4" MCR	1-1/4" MCR	2" MCR
Height (mm) o/a	950	950	950
Height (mm) c/l	600	600	600
Length (mm)	360	440	580
Weight (kg)	11	18	30

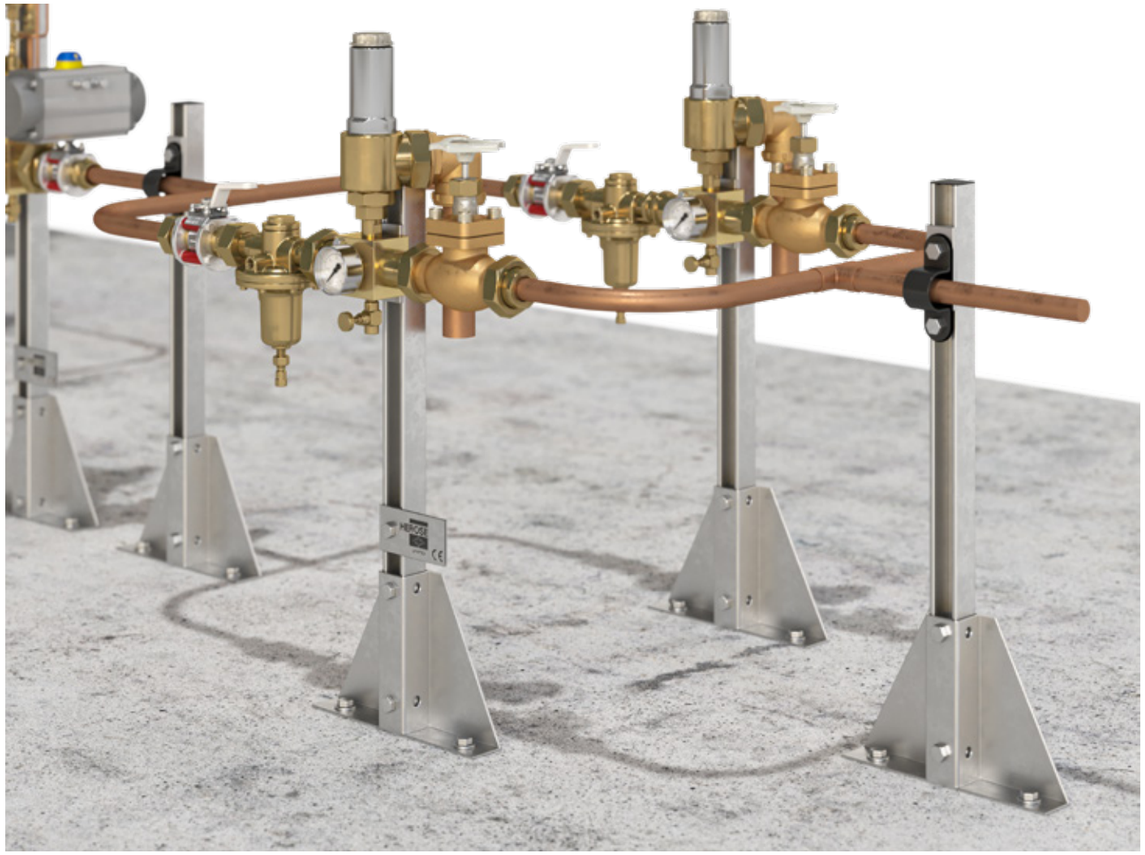
Note 1 – Length dimensions do not include connecting pipe as shown above (see outline sketch).

Note:
Cow horn sets are available for dual regulator installs in copper pipe. Supplied with mating isolation valves on the inlet. Filters are also available as part of the kit for applications where deemed necessary; these can also be supplied with stainless steel connections as required. Contact us for further information.

Low pressure regulating kits with safety valves set at 7 BAR, are available on request.

Interconnecting fittings available to suit all stainless and copper pipe standards.

CE Standard marking according to the PED 2014/68/EU



3D images are representative of the modules – sizes and connections may differ.

SVGC: Safety Valve Module c/w Globe Check Valve

TYPE: SVGC: 25-50
MWP: 40BAR - 580 PSI

Gas line overpressure protection module, bronze, PN40 BAR rated. Protects from over pressure at a desired set point with the globe check function providing back flow protection.

Cleaned and degreased for oxygen service.

Applications:
Provided as a safety device for protection against overpressure and to prevent backflow in stationary vessel-to-customer feed applications. Suitable for use with all air gases including oxygen and CO_2. Supplied to site fully leak tested and complete with declaration of conformity.

Working temperature:
-54˚C / -65˚F up to +50˚C / 122˚F

Installation:
2 x Hilti 12mm anchor studs supplied with each module.

SVGC – Part numbers

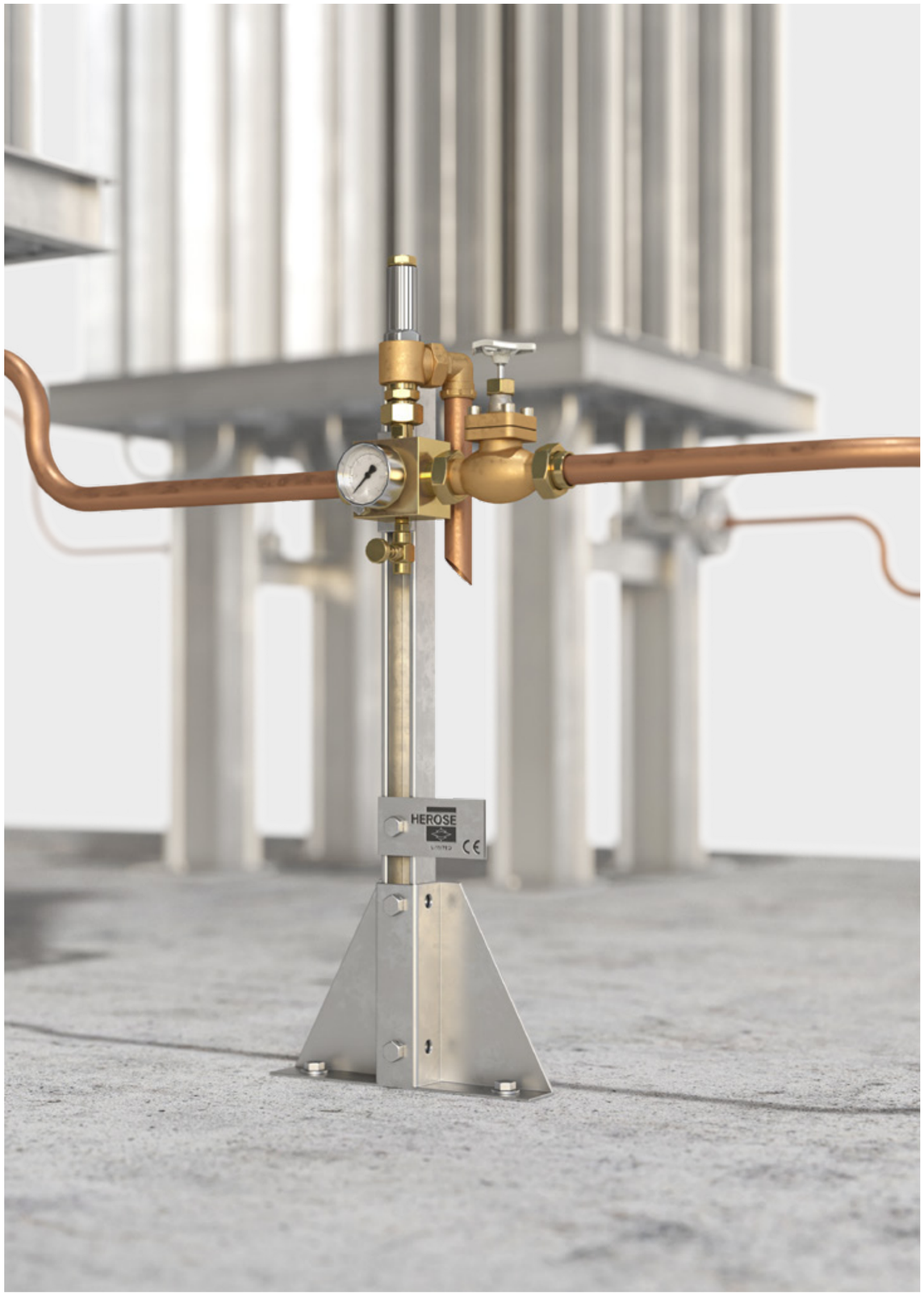
SV set pressure	15.0 BAR	19.0 BAR	26.0 BAR	37.0 BAR
25mm module	19312134	19312135	19312136	19312137
40mm module	19312139	19312140	193121341	19312142
50mm module	19312143	19312144	-	-

Materials	DIN EN
Male nipple	CW614N
Block	CC493K
Bullnose nipple	CW614N
Union nut	CW614N
Safety valve	CC491K
Elbow	CC614N
Vent pipe	17671
Needle valve	CW614N
Pressure gauge	CW614N / stainless case

SVGC - Dimension table

Nominal size	25mm	40mm	50mm
Inlet	1.1/4" MCR	2" MCR	2.1/2" MCR
Outlet	1.1/4" MCR	2" MCR	2.1/2" MCR
Height (mm) o/a	870	920	920
Height (mm) c/l	600	600	600
Length (mm)	250	320	380
Weight (kg)	11	19	24

Interconnecting fittings available to suit all stainless and copper pipe standards.



CE Standard marking according to the PED 2014/68/EU

3D images are representative of the modules – sizes and connections may differ.

Herose UK
Additional modules

We offer a range of additional modules to meet Linde's global requirements and applications.

Changes to materials and piping sizes can be accommodated to meet your customer installation designs while retaining the module's standard functionality.

- Reduced installation time
- Retained standardisation

CE Standard marking according to the PED 2014/68/EU

7

Laser Pressure Regulating Modules

TYPE: LRK: 15-25
MWP: DN15: Max Pilot Pressure:
31 BAR / 450 PSI
MWP: DN25: Max Working Pressure:
42 BAR / 600 PSI

Applications:
Provided as a pressure control and safety device for high pressure laser installations in stationary vessel to customer feed applications; also provides protection against back flow. Suitable for use with all air gases, including O_2. Supplied to site fully leak tested and complete with declaration of conformity.

Working temperature:
DN15: -34˚C to +50˚C / DN25: -20˚C to +50˚C

Installation:
2 x Hilti 12mm anchor studs supplied with each module.

Interconnecting fittings available to suit all stainless and copper pipe standards.

LRK – Part numbers

SV set / ends	33 BAR	35 BAR	37 BAR	30 BAR	Inlet	Outlet
15mm module	19329493	19329494	X	19329495	3/4" MCR	1.1/4" MCR
25mm module	19330186	19330187	19330188	19330189	1.1/4" MCR	1.1/4" MCR

8

Dome Loaded Regulating Modules

TYPE: DL PREG
Sizes: DN15 to DN50
MWP: 40BAR – 580 PSI

Application:

1" Dome
The 1" dome loaded regulator module is available for customer processes which require highly accurate pressure control and a high flow rate. The module includes inlet strainer, pilot regulator, process regulator, relief valve, non-return valve and outlet isolation ball valve.

All of the components above are 1.5" body size to provide maximum flow capacity, with adaptors used to connect to the 1" regulator body. Flow capacity up to 450 Sm3/hr.

Application:

2" Dome
The 2" dome loaded regulator module is available for customer processes which require highly accurate pressure control and a high flow rate.

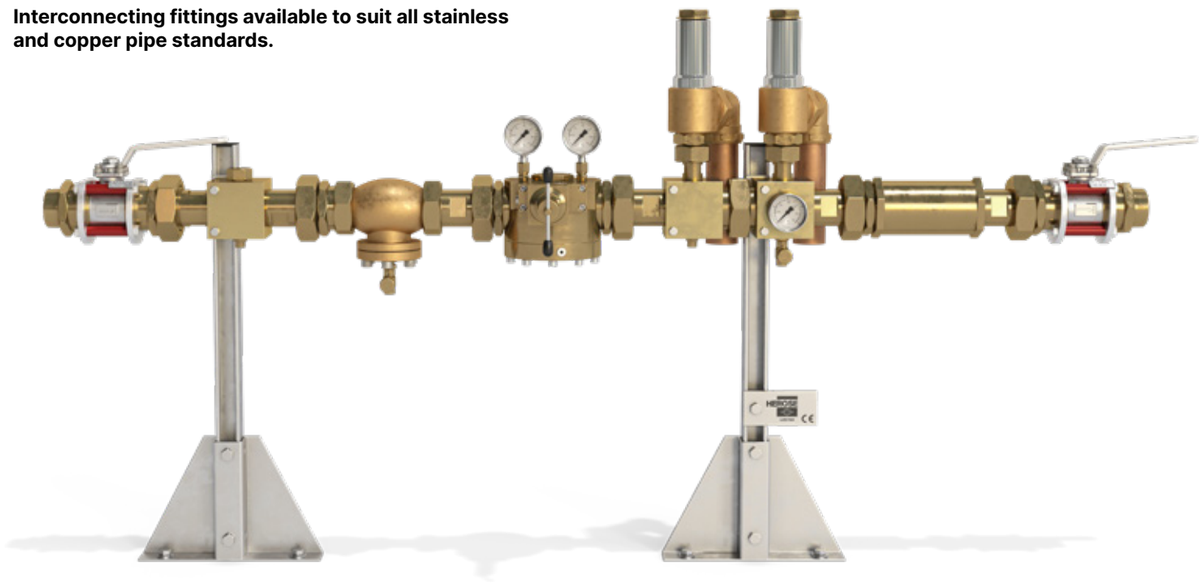
The module includes an inlet ball valve, inlet strainer, dome loaded regulator with integral pilot, relief valves, non-return valve and outlet isolation ball valve.

All of the components above are 2" body size to provide maximum flow capacity. Flow capacity up to 1,500 Sm3/hr.

Working temperature:
-30˚C to +50˚C

Installation:
4 x Hilti 12mm anchor studs supplied with each module

Interconnecting fittings available to suit all stainless and copper pipe standards.



3D images are representative of the modules – sizes and connections may differ.

9

Low Pressure Liquid Control Modules

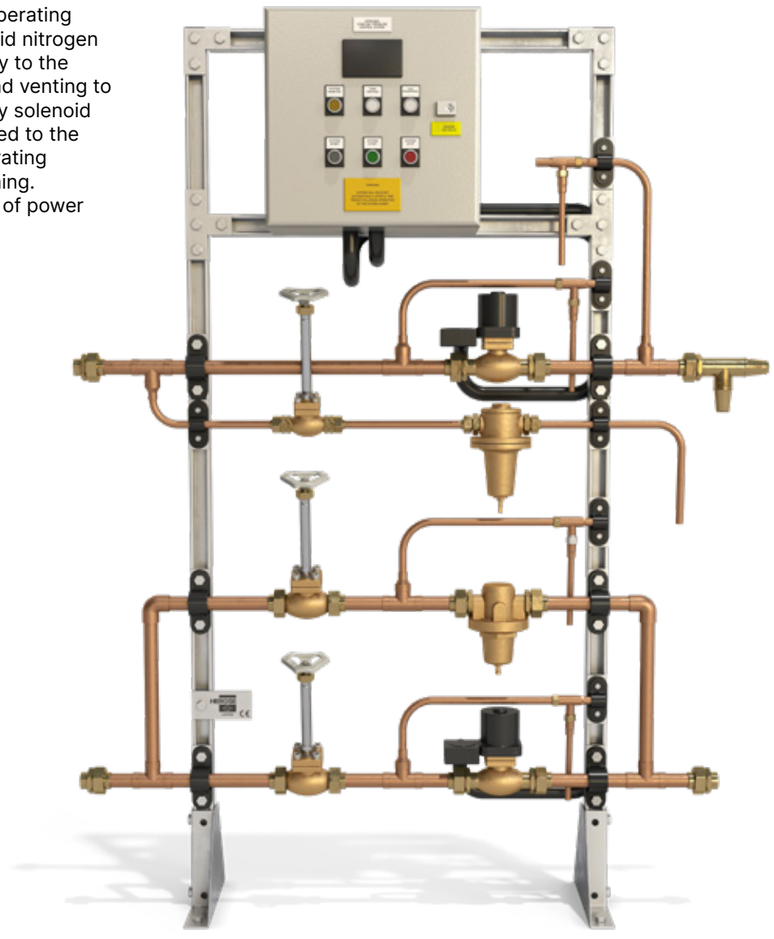
Application:
This module is used to provide accurate operating control of low pressure bulk cryogenic liquid nitrogen vessels, providing a cryogenic liquid supply to the customer process. The pressure raising and venting to atmosphere are electronically controlled by solenoid valves and a pressure transducer connected to the vessel. The electrical panel controller/operating parameters are set during site commissioning.
The solenoid valves will fall closed on loss of power to the control panel.

Working temperature:
-196˚C to +50˚C

Installation:
4 x Hilti 12mm anchor studs supplied with each module.

Interconnecting fittings available to suit all stainless and copper pipe standards.

DN25 Low Pressure Liquid Control Panel



Main panel – Part numbers

SV set / ends	Economiser regulator set at 45 PSI	Main Line regulator set at 30 PSI	Economiser regulator set at 50 PSI	Main Line regulator set at 115 PSI	Inlet	Outlet
Main panel	19332130		19332131		1.1/4" MCR	1.1/4" MCR

ESOV: Liquid Emergency Shut-off Valve
1" and 1.5" Emergency shut-off valve (ESOV) modules are available for installation on cryogenic liquid nitrogen supply customers.

The 1" module is designed for lower, noncontinuous flow rates – as the cryogenic liquid supply will need to be isolated and vented to allow maintenance.

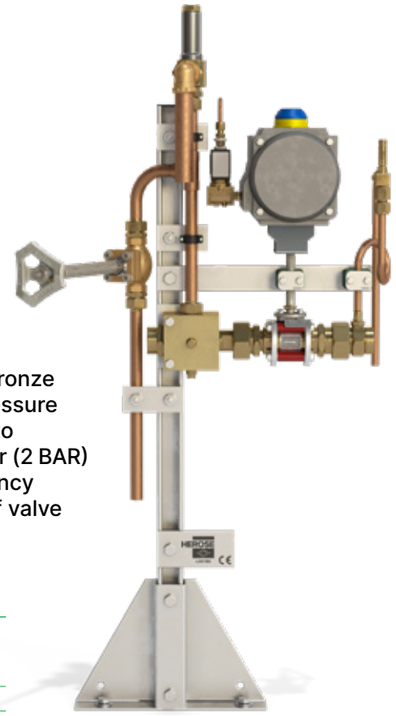
The 1.5" module is designed for higher, continuous flow rates – for customer sites which are in constant operation.

Working temperature:
-196˚C to +50˚C

Installation:
2 x Hilti 12mm anchor studs supplied with each module.

Interconnecting fittings available to suit all stainless and copper pipe standards.

DN25 Bronze Low Pressure supply to activator (2 BAR) emergency shut-off valve



ESOV – Part numbers

SV set / ends	Safety valve set at 4.75 BAR	Relief valve set at 10 BAR	Safety valve set at 8 BAR	Relief valve set at 10 BAR	Inlet	Outlet
DN25	19329660		19329661		1.1/4" MCR	1.1/4" MCR

VIT Inlet Filter
VIT inlet filter assembly is fitted to the inlet of a low pressure cryogenic liquid nitrogen vessel, providing a delivery tanker hose connection point. A 100 micron strainer is included, as well as a vent valve to allow hose purge before completing cryogenic liquid delivery.

Working temperature:
-196˚C to +50˚C

Installation:
4 x Hilti 12mm anchor studs supplied with each module.

Interconnecting fittings available to suit all stainless and copper pipe standards.

VIT – Part numbers

SV set / ends	Filter 100 micron	Inlet	Outlet
VIT filter	19332140	EIGA fill coupling	2" MCR

DN40 Bronze Filter Inlet Assembly

CE Standard marking according to the PED 2014/68/EU

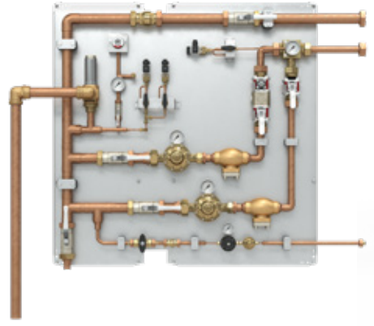
3D images are representative of the modules – sizes and connections may differ.

Medical Panels

- Panel designs are fully compliant with HTM02-01
- Panel ‘A’ connects to primary supply liquid oxygen vessel/vaporisers
- Panel ‘B’ connects to secondary supply liquid oxygen vessel/vaporiser(s)
- Panels designed to be integrated with standardisation vaporiser skids
- GEM10 analysis point included for hospital pharmacists/gas testing
- Tapping to allow supply pressure monitoring included
- Emergency tie-in 1.5” ball valve (capped) included
- No power supplies required for panel ‘A’ or ‘B’
- 24v IP66 panel for hospital alarms interface provided
- Panels are 23.5 BAR, -20˚C to + 50˚C rated
- Dimensions (including frame) - 1,800mm(H) x 1,420mm(W) x 450mm(D) - doors closed
- Weight of panel including frame ~192kg, frame 34kg
- Design flow 1 to 3,000 litres/min or 180 Sm^3/hr at 4 BAR
- Design flow 2 to 5,000 litres/min or 300 Sm^3/hr at 4 BAR
- Flow testing completed 17.09.2020 at BOC Leyland to confirm performance
- Restrictors fitted on 3,000 & 5,000 litres/min panels, to reduce likelihood of large overdraw of ambient process vaporisers (125 to 150% vapsizing)
- Flat face fittings used to allow easy regulator inspection/replacement
- Spare 1.5” connection to allow temporary system connection
- IP66 alarms terminal box removed for clarity (24v)

Alarm switches:
- 9 BAR falling pressure alarm on inlet
- 4.9 BAR high pressure alarm (supply line)
- 3.75 BAR low pressure alarm (supply line)

*Note: It is the customer’s responsibility to provide the third source of supply in line with HTM02-01.



Medical Panels B c/w economiser shown in images.

CE Standard marking according to the PED 2014/68/EU

3D images are representative of the modules – sizes and connections may differ.

BOC, supported by Herose UK, wins Royal Academy of Engineering Award

BOC — a member of the Linde Group — were the recent recipients of an award from the Royal Academy of Engineering.

The President's Special Awards for Pandemic service was given to BOC for their critical work during the early stages of the COVID-19 pandemic. As doctors and scientists raced to learn more about the COVID-19 virus, and government regulations were put in place to try and contain it, BOC's Customer Engineering Services (CES) worked tirelessly to support oxygen supply schemes in hospitals around the country.

Patients who are seriously ill with COVID-19 require oxygen in volumes delivered at three to 10 times higher than the average patient standard flow. Many hospitals quickly found their oxygen systems stretched as more and more patients required oxygen as part of their treatment. BOC engineers were also responsible for installing oxygen systems across six Nightingale centres including ExCeL London; the size of 14 typical hospitals, the ExCeL Nightingale hospital required a bespoke oxygen system — the largest ever designed — and was installed in record time.

As a major supplier of oxygen modular packages to BOC, Herose UK had a pivotal role in the success of this project during uniquely challenging times.

Barry Stewart, General Manager of Herose UK says: "The work that was done by BOC during the pandemic was phenomenal — and the rate at which it was completed seems inconceivable now. There was a huge amount of work completed, not only at the ExCeL centre, but at established hospitals that quickly needed to upgrade the supply that they could provide.

"We're extremely proud of our working relationship with BOC and the part our team played supplying the equipment they needed to support frontline NHS workers and meet operational demand."

Tim Mottershead of BOC says: "Herose UK were one of our key suppliers, working to help us face this challenge to increase oxygen supply to meet demand; not just for the first wave, but the potential of ones to come. The modular assemblies that Herose UK supply helped support rapid upgrades of existing hospital systems as well as the Nightingale hospitals. Working closely with Barry at Herose UK, we were able to develop a very high flow system to be able to feed oxygen to the hospital on the ExCeL Centre within days. Herose UK were incredibly proactive and one of the suppliers that were pivotal in our work, which resulted in this award from the Royal Academy of Engineering."

The lasting impact of this project will continue beyond the award; today, Herose UK is working with BOC to upgrade medical panel systems in hospitals across the UK.

Keith Stewart of Herose UK says: "This award has been given by the Royal Academy of Engineering for what has been achieved so far; but it's important to us that our investment and effort goes into ensuring that we can respond to similar improvements in the future. He adds: "We're 100 percent committed on the development of these products as part of this project with BOC, and continuing to support their work as this pandemic evolves.'"

The medical module packages supplied to BOC for this project are just one of the many exceptional engineered solutions that Herose UK can provide to the Linde Group worldwide.

11

Stainless Steel Modules

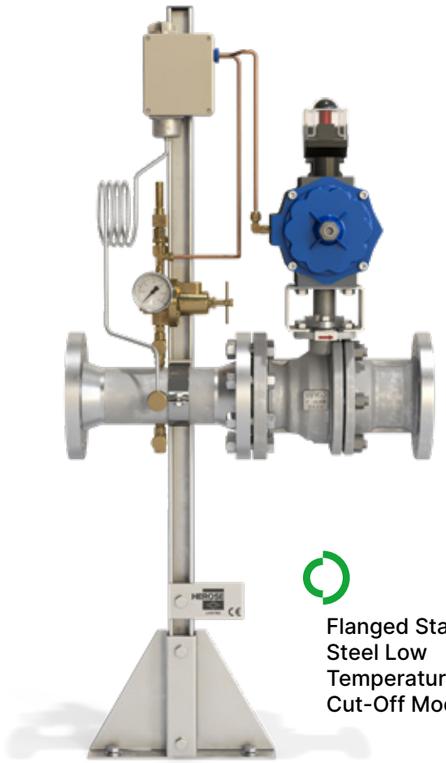
Application:
We have a range of stainless steel timed changeover and low temperature protection modules available. Suitable for all air gases and Co_2. Functions provided are as per the standard modules. These are supplied to site fully leak tested and with declaration of conformity.

Working temperature:
-40˚C to +50˚C

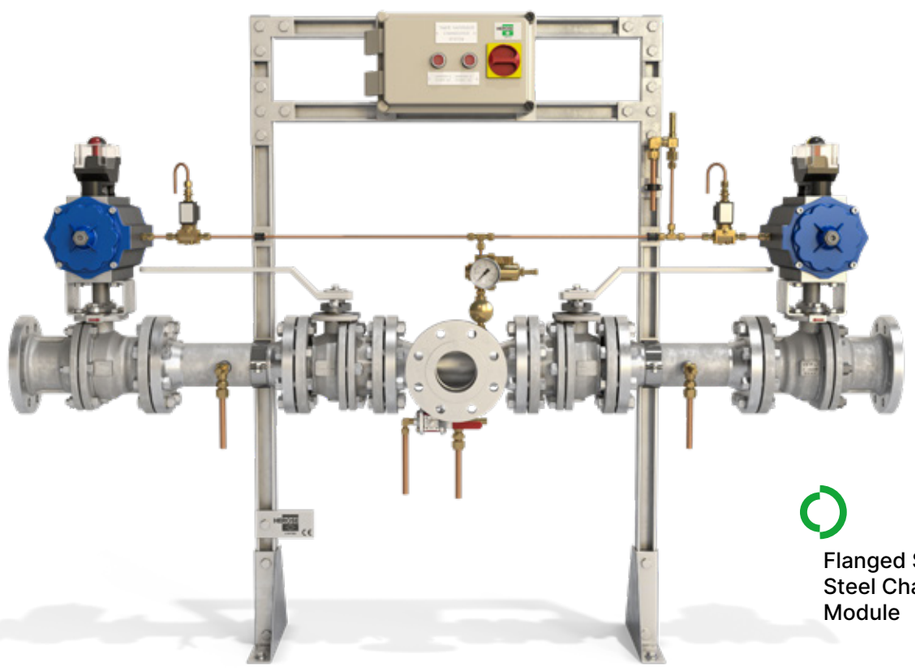
Installation:
4 x Hilti 12mm anchor studs supplied with each module.

Interconnecting fittings available to suit all stainless and copper pipe standards.

Notes:
Range of steel LTCO and TCO available from DN40 to DN100. ANSI or PN flanged or ATEX available for LNG.



Flanged Stainless Steel Low Temperature Cut-Off Module



Flanged Stainless Steel Changeover Module

CE Standard marking according to the PED 2014/68/EU

12

Liquid CO_2 Regulating Modules

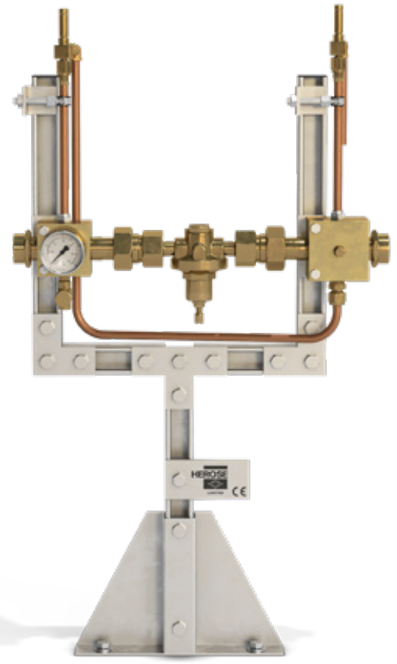
TYPE: LCO2 REG
Sizes: DN15 to Reg G 1.1/4” In/Out
MWP: 40BAR – 580PSI

Application:
0.5” liquid CO_2 regulator module is available for installation on the cryogenic liquid side of bulk CO_2 installations.

Working temperature:
-196˚C to +50˚C

Installation:
2 x Hilti 12mm anchor studs supplied with each module.

Interconnecting fittings available to suit all stainless and copper pipe standards.

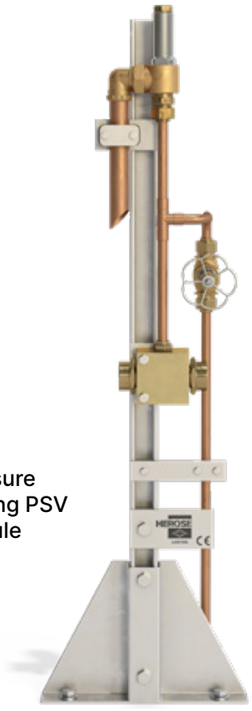


13

Other standard module sets

This group of modules allows the Linde Group to complete their application needs while maintaining standard designs within existing packages.

Mechanical Low Temperature Cut-off Module



Pressure Raising PSV Module

Refurbished modules — After an installation has been removed from site the modules can be removed as a unit (similar to vessel and vaporiser) and returned to Herose UK and fully refurbished at a fraction of the cost.

3D images are representative of the modules – sizes and connections may differ.

14

Vaporiser Skid

The Linde CES EMEA team have further enhanced the CES Standardisation journey by developing the ambient process vaporiser skid.

This is designed for standard installations of continuous use.

Three skid sizes are available, based on flowrates of 100 Sm^3/hr, 200 Sm^3/hr and 400 Sm^3/hr. The pre-fabricated equipment is simply lifted by a lorry mounted crane (or transport vehicle and 2 cranes), onto a flat concrete surface.

The skid will be piped to a vessel size, selected on usage requirements. Typically between 3,000 litre to 60,000 litre capacity.

Contact the Linde CES EMEA team for further information.

CE Standard marking according to the PED 2014/68/EU

3D images are representative of the modules – sizes and connections may differ.

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We provide best-in-class products to the world's leading gas companies. With three decades in the business, we are proud to set an industry standard of excellence alongside a seamless experience for our customers.

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Through pioneering design and engineering, we help our customers to reduce their costs, installation time, lead time and stock outlay; other benefits include a more simplified purchasing process, easy identification and maintenance.

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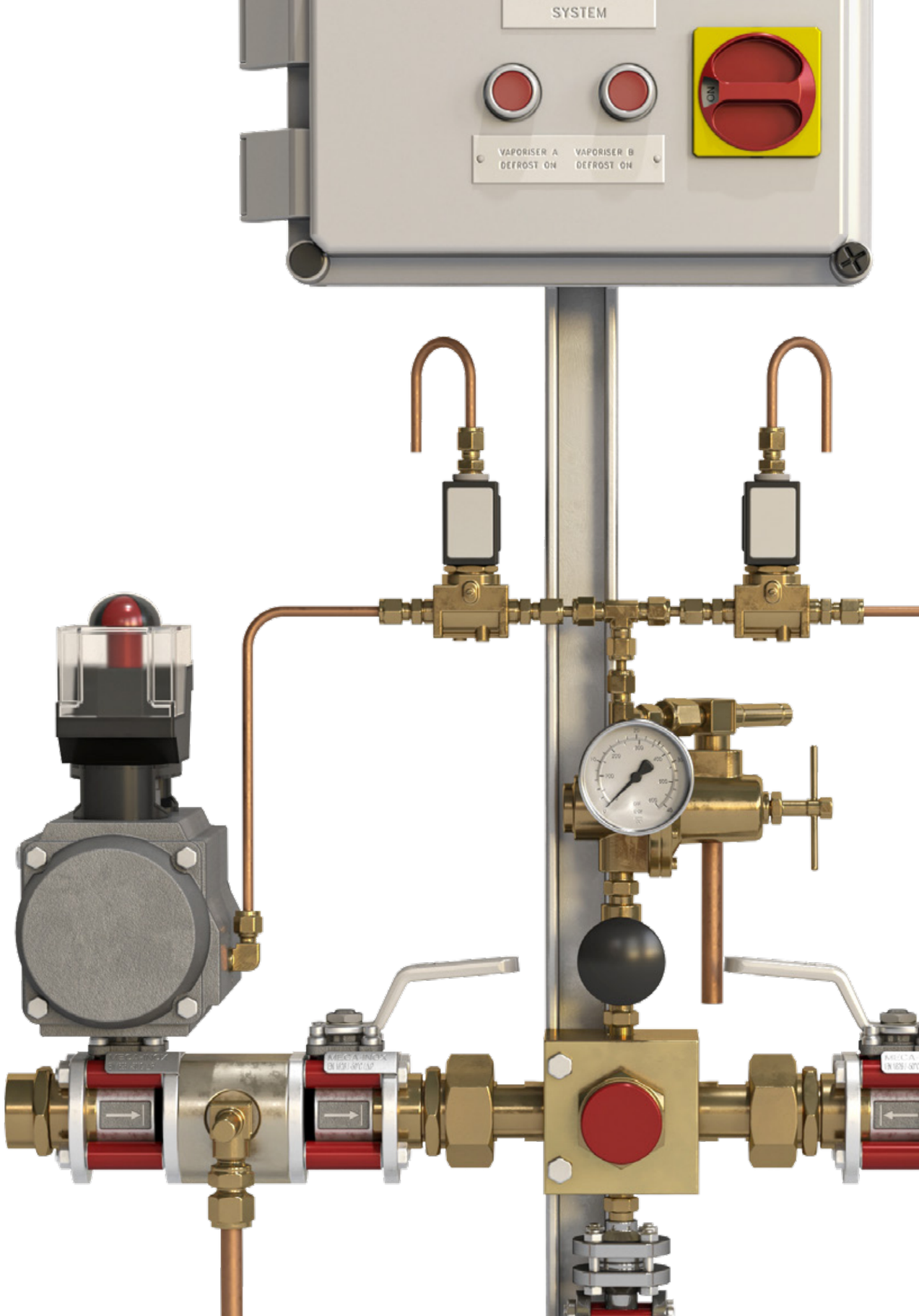
We offer comprehensive valve and module packages available to suit every client's specific requirements. With an evolving product range and an unrivalled safety-record, we create fit-for-purpose solutions with efficient and proven results.



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