Pressure reducing and surplussing valves

for steam and industrial fluids

spirax sarco

Pressure reducing and surplussing valves

A well designed steam system will produce clean dry steam in the boiler house ready for delivery at high pressure through the distribution network. This maximises the potential to generate and supply saturated steam of the best quality at the lowest overall cost.

The majority of applications however require a reduction in pressure at the point of use, the benefits of this include:

- A reduction in the capital cost of equipment.
- Operating plant costs will decrease by reducing flash steam.
- Saturated steam pressure is directly related to temperature. Controlling the pressure will therefore automatically control the temperature avoiding the need for additional temperature control equipment.
- The flexibility to reduce to various lower pressures through the plant to suit each particular application.

However there are some applications that have a need to sense and control upstream of the valve to maintain or disperse excess pressure in the distribution pipeline in order to safeguard the equipment using it - this requires a pressure surplussing / maintaining valve.

Two main groups of pressure control valve are available for either pressure reduction or surplussing applications:

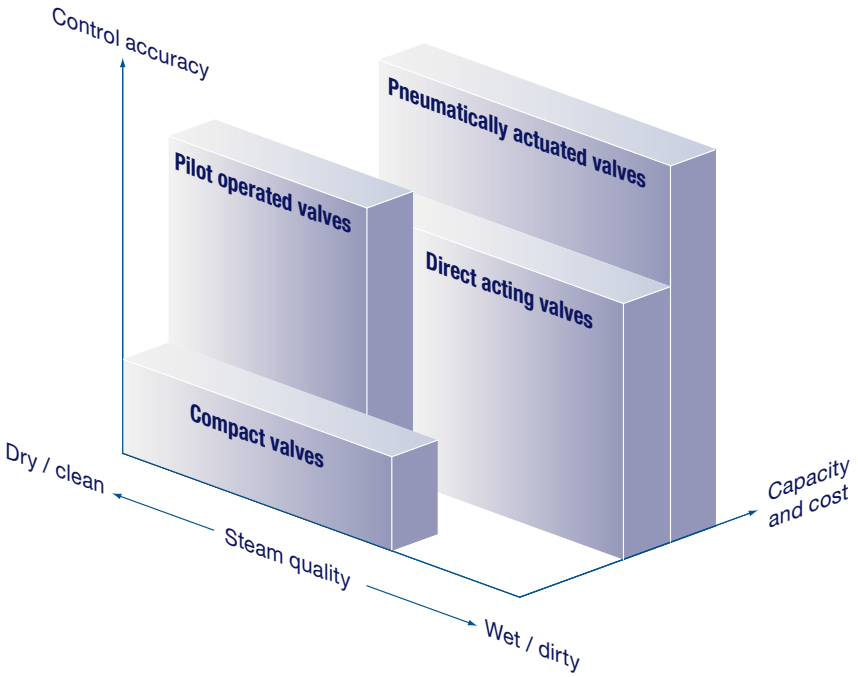
- Self-acting requiring no external power or input.
- Pneumatically actuated with either a pneumatic or electrical control system.

The final selection will depend on the requirements of the application and customer preferences.

Whatever the reason for reducing or maintaining pressure, proper control at any time demands an automatic valve that can reduce or maintain steam pressure accurately, reliably and economically.

Selection chart and product range

The chart gives guidance on choosing the right valve for your application.



Pressure reducing valve station

Separator
This removes water particles and entrained moisture eradicating erosion, corrosion, and waterhammer, and maximising the heat transfer capability of downstream equipment.

Benefit
Guaranteed longer life and maximum plant performance.

Upstream stop valve
This allows the station to be shut down, and is positioned after the separator so that the condensate cannot build-up in the supply line during this period.

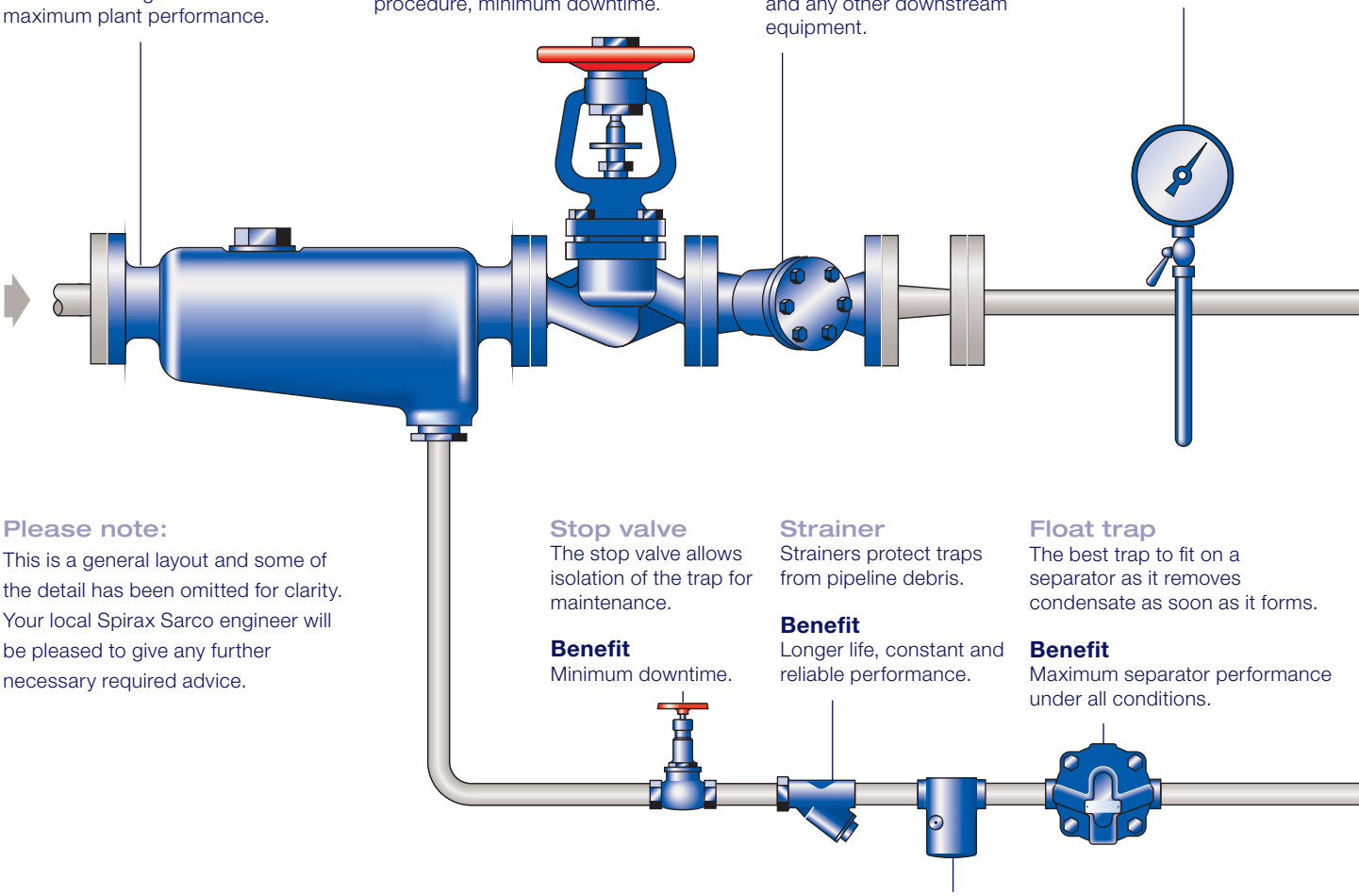
Benefit
Maximum safety during the start-up procedure, minimum downtime.

Strainer
Strainers arrest any dirt before it is able to pass into the pressure reducing valve.

Benefit
Reduced downtime, constant and reliable performance from the pressure reducing valve and any other downstream equipment.

Upstream pressure gauge
This monitors the status of the supply pressure.

Benefit
Immediate indication of any problems associated with the steam supply.



Please note:
This is a general layout and some of the detail has been omitted for clarity. Your local Spirax Sarco engineer will be pleased to give any further necessary required advice.

Stop valve
The stop valve allows isolation of the trap for maintenance.

Benefit
Minimum downtime.

Strainer
Strainers protect traps from pipeline debris.

Benefit
Longer life, constant and reliable performance.

Float trap
The best trap to fit on a separator as it removes condensate as soon as it forms.

Benefit
Maximum separator performance under all conditions.

Spiratec sensor
This enables continuous monitoring of the trap performance.

Benefit
Maximises plant efficiency.

A properly designed system will consist of the equipment shown above

All steam pressure reducing valve stations will benefit from the installation of key items of ancillary equipment. Separators and strainers will keep the steam dry and clean, protecting the pressure reducing valve from wear. Isolating valves and pressure gauges allow easy commissioning and maintenance.

Safety valves are an essential part of those installations where the upstream pressure is higher than the maximum allowable working pressure (MAWP) of any downstream plant.

Surplussing valves are commonly referred to as maintaining, excess pressure or backpressure valves, unlike a pressure reducing valve they will sense upstream pressure and act to maintain a minimum upstream pressure or to disperse an excess pressure. Installation guidelines are similar to a pressure reducing valve but in this type of installation upstream pressure is sensed and a safety valve may not be required.

CUT HERE

Pressure reducing valve

Depending on the system requirements this can be any of the following:

- Compact valves
- Pilot operated valves
- Direct acting valves
- Pneumatically actuated valves

Benefit

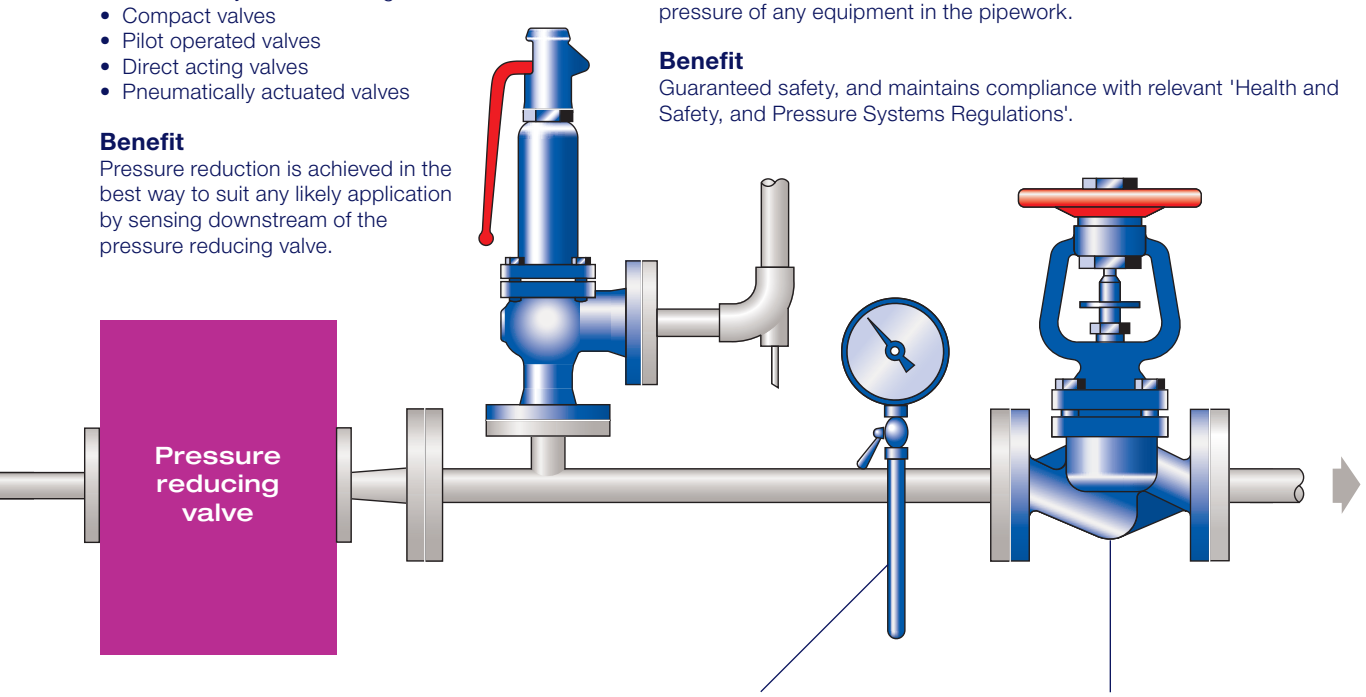
Pressure reduction is achieved in the best way to suit any likely application by sensing downstream of the pressure reducing valve.

Safety valve

This is required by law to ensure the pressure downstream of the pressure reducing valve can never rise above the maximum allowable pressure of any equipment in the pipework.

Benefit

Guaranteed safety, and maintains compliance with relevant 'Health and Safety, and Pressure Systems Regulations'.

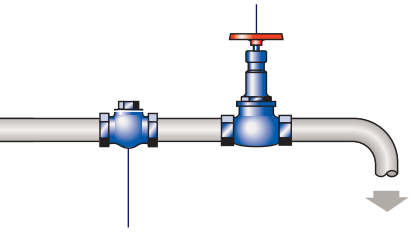


Stop valve

The stop valve allows isolation of the trap for maintenance.

Benefit

Minimum downtime.



Check valve

This prevents reverse flow and protects the trap from waterhammer.

Benefit

Prolongs service life.

Downstream pressure gauge

This monitors the status of the downstream pressure.

Benefit

Immediate indication of abnormal conditions associated with the malfunction of any upstream equipment, and allows a correct commissioning procedure, by monitoring the set pressure during this time.

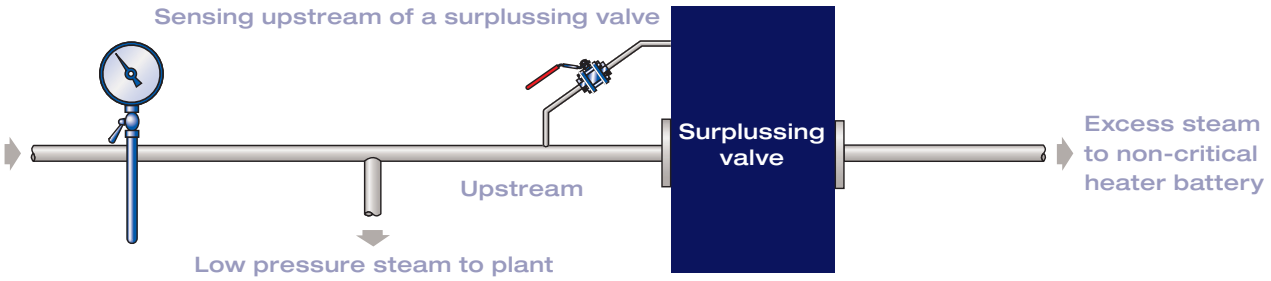
Downstream stop valve

This allows any downstream equipment to be double isolated during maintenance periods, when used in conjunction with the upstream stop valve. It also allows the pressure reducing valve to be correctly adjusted during commissioning by isolating the flow.

Benefit

Maximum safety during maintenance on the downstream pipework and equipment, and allows the pressure reducing valve to be adjusted correctly.

A typical application utilising a surplussing valve to maintain a minimum upstream pressure is illustrated below. This ensures that at times of peak demand the non-critical heating line can close to maintain a secure supply of steam to the process plant. Note that under normal conditions the complete line would be the same pressure rating, consequently there is no need for a safety valve after the surplussing valve.



4

CUT HERE

Applications and product range

Pressure reducing valves

		Steam applications	Gas applications	Liquid applications	Minimal pipeline space	Minor branch lines	Major branch lines	Steam distribution	Accurate control options	Variety of control options	High capacity	Poor media conditions	Further information
	Pilot operated **DP**	●	●		●	●	●	●	●	●			Page 6
	Pneumatically actuated **SPIRA-TROL**	●	●	●		●	●	●	●	●	●	●	Page 7
	Direct acting - fully balanced **DRV**	●	●	●			●	●			●	●	Page 8
	Direct acting - semi balanced **DLV**	●	●	●	●	●						●	Page 9
	Compact - Direct acting **BRV2**	●	●		●	●						●	Page 10
	Compact - Balanced **BRV7**	●	●		●	●						●	Page 11
	Compact - Stainless steel **SRV2**	●	●		●	●							Page 12
	Compact - For liquids **LRV2**			●	●	●							Page 13

Surplussing valves

	Pilot operated **SDP**	●	●		●	●	●	●	●	●			Page 14
	Direct acting **DEP**	●	●	●			●	●			●	●	Page 15

5

Pilot operated DP

The Spirax Sarco DP series of pressure reducing valves will accurately control downstream pressure, regardless of the upstream pressure, or load variations.

These are recommended for medium duty or process type applications, branch lines to OEM equipment, for accurate process control or where an external interface or remote adjustment is required. This versatile and compact valve will provide an efficient and economic solution to many pressure reduction solutions.

Suitable for steam, air or industrial gases, the DP series offers a wide range of control options.

The DP27 is Spirax Sarco's top selling pilot operated steam pressure reducing valve. It combines high accurate control with increased resilience to harsh operating environments, easier servicing and simpler selection.

Technical specification

Sizes		Screwed	½" to 2"
		Flanged	DN15 to DN80
End connections		Screwed	BSP and NPT
		Flanged	PN16, PN25 and PN40
			ASME (ANSI) 150 and 300
			JIS/KS 10 and JIS/KS 20
Body materials	**DP27**	SG iron	
	DP143	Cast steel	
	DP163	Stainless steel	
Maximum temperature		350°C	
Maximum body design rating		PN40	
Control pressure range		0.2 to 24 bar	
Options	**DP27 DP143 DP163**	Metal-to-metal seat suitable for steam and compressed air	
	DP27E	With electric solenoid for remote on/off control	
	DP27G DP143G DP163G	Soft seat for tight shut-off. Suitable for compressed air and industrial gases (not oxygen)	
	DP143H	High temperature version suitable for temperatures up to 350°C	
	DP27T	With additional temperature control for use with hot water storage calorifiers	
	DP27R	With an air driven pilot remote adjustment of the set point	
	DPP27E	With two pilots and electric solenoid	

For further technical information, **search** our website using product designation **DP27, DP143 or DP163**

Key features

- Simple selection - The DP27 has only one control spring for 0.2 to 17 bar.
- Self-acting using spring and diaphragm operation - no need for electrical supplies.
- Easy to retrofit - The DP27 has the same dimensions as its predecessor, the DP17.
- Fatigue tested diaphragm - no piston, no danger of sticking.
- Higher pressure valves feature a bellows sealed pilot arrangement for leak free operation.
- Extended valve life due to an externally accessible, easily replaced pilot filter.
- Easily serviced using off-the-shelf spares and standard tools.

Pneumatically actuated SPIRA-TROL

For critical process control, which may be subject to high capacities or poor steam conditions or where integration with supervisory control systems is a requirement then a pneumatically actuated valve should be used.

Pneumatic control valves are ideal for pressure control applications where rapid changes in system conditions occur.

The SPIRA-TROL valve is modular in design offering many options within one body envelope, this provides a comprehensive selection of control valve, allowing for pressure control of steam, water, oils and other industrial fluids.

The SPIRA-TROL valve is complemented by the availability of a full range of controllers and transmitters.

It is this highly flexible system which allows one valve to satisfy the needs of numerous industrial requirements.

Technical specification

Sizes		Screwed	½" to 2"
		Socket weld	½" to 2"
		Flanged	DN15 to DN200
End connections		Screwed	BSP and NPT
		Socket weld	
		Flanged	PN16, PN25 and PN40
			ASME (ANSI) 125, 150 and 300
			JIS / KS 10 and JIS / KS 20
Body materials		Cast iron	
		SG iron	
		Carbon steel	
		Stainless steel	
		NACE	
Maximum temperature		400°C	
Maximum body design rating		PN40 and ASME (ANSI) 300	
Control pressure range		0 to 40 bar	
Options	**Flow characteristics**	Equal percentage	
		Linear	
		Fast opening	
		Reduced flow including microflute characteristics	
	Special trims	Low noise	
		Soft seal	
		Hard facing	
	Stem seals	Spring loaded chevron and 'O' ring	
		Graphite	
		Bellows	
		Bonnet extension	
	Actuation	Pneumatic	
		Electric	
		Modulating	
		On / Off	

For further technical information,
search our website using product designation **SPIRA-TROL**

Key features

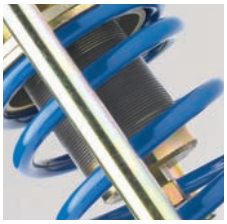
- Wide range of body materials to suit most applications.
- Designed using computational fluid dynamics to optimise flow paths.
- Easily interfaced with a control system, using a double mount actuator yoke and a valve interface device such as a smart communicating positioner.
- High performance long life valve internals and seal.
- Trim options available including 'low noise'.
- Quick and easy maintenance using standard fixings and self-aligning clamp-in-place internals.
- Sizing and selection software to determine the most suitable valve configuration.

Direct acting DRV

The DRV is a fully balanced direct acting reducing valve suitable for general service applications including for use on steam, air, industrial gases and liquids and will operate at pressures up to 40 bar inlet and temperatures up to 300°C. It is designed to reduce from very high to very low pressures and is ideal for higher capacities, where loads are fairly constant it will give very consistent, reliable and accurate control even under the most arduous working conditions, such as wet and dirty steam.

Technical specification

Sizes	**DRV4**	Flanged	DN15 to DN100
	DRV7	Screwed	½" to 2"
		Flanged	DN15 to DN100
End connections		Screwed	BSP and NPT
		Flanged	PN16, PN25 and PN40
			ASME (ANSI) 150 and 300
			JIS/KS 10 and JIS/KS 20
Body materials	**DRV4**	Cast steel	
	DRV7	SG iron	
Maximum temperature		300°C	
Maximum body design rating		PN40	
Control pressure range		0.1 to 20 bar	
Options		EPDM diaphragm to suit application	
		Nitrile diaphragm to suit application	
		Soft seat for bubble tight shut-off	



Key features

- Robust operation allowing you to fit and forget.
- Fully balanced valve ensuring stable and accurate control under most arduous conditions.
- 316 stainless steel stem sealing for long, maintenance free life.
- Different diaphragm materials are available to suit different applications.
- Water seal pot available to protect the actuator diaphragm on applications where temperatures exceeds 125°C.

For further technical information,
search our website using product designation **DRV**

Direct acting DLV

The DLV is a semi balanced direct acting reducing valve suitable for general service applications including steam, air, industrial gases and liquids and will operate at pressures up to 19 bar inlet and temperatures up to 250°C. The simple design of the DLV makes it extremely reliable, using stainless steel bellows that provides both stem sealing and pressure balancing functions. It is the ideal solution for trouble free and consistent pressure control.

Technical specification

Sizes	**DLV7**	Flanged	DN15 to DN100
End connections		PN16 and PN25	
Body material		SG iron	
Maximum temperature		250°C	
Maximum body design rating		PN25	
Control pressure range		0.2 to 13 bar	
Options		EPDM diaphragm to suit application	
		Nitrile diaphragm to suit application	

Key features

- Competitive, simple and reliable design allowing you to fit and forget.
- Semi balanced valve providing stable and consistent control.
- 316 stainless steel stem sealing for long, maintenance free life.
- One control spring covering all pressure ranges with only three actuators.
- Water seal pot available to protect the actuator diaphragm on applications where temperatures exceeds 125°C.
- Different diaphragm materials available to suit different applications.

For further technical information,
search our website using product designation **DLV**

Compact - Direct acting BRV2

The Spirax Sarco compact direct acting pressure reducing valve is designed for use with steam, compressed air and other gases and is perfectly suited for light duty, simple OEM applications and where ultimate control is not important.

The compact design makes it ideal for point of use installations, providing accurate pressure control under stable load conditions. It offers a cost effective alternative to more sophisticated valves.

Advanced manufacturing technology has been used to produce a highly durable pressure reducing valve, with all stainless steel internals to meet the needs of most industrial applications.

Technical specification

Sizes	Screwed	½" to 1"
	Flanged	DN15 to DN25
End connections	Screwed	BSP and NPT
	Flanged	PN25
Body materials	SG iron	
	Bronze	
Maximum temperature	210°C	
Maximum body design rating	PN25	
Control pressure range	0.14 to 8.6 bar	
Options	Phosphor bronze control bellows for systems with halide contamination	
	Downstream pressure sensing connection for enchanced stability	

Key features

- Compact size, with a single spring mechanism ideal for small processes.
- Stainless steel valve and seat assembly provides high wear resistance under low load conditions.
- Anti-vibration adjustment handwheel with colour indication of control spring range.
- Alloy spring housing with 4 bolts for easy in-line removal giving access to all internals.
- A bronze bellows version is available for special applications where Halide contamination may exist.

For further technical information, **search** our website using product designation **BRV2**

Compact - Balanced BRV7

The BRV7 utilises a fully balanced design using high specification stainless steel bellows and extends the BRV family up to DN50 (2"). It is extremely compact in size and maintains the same common control elements as the BRV2 with the added benefit of enhanced resistance to pressure and load fluctuations.

BRV7 valves are designed for use with steam, compressed air and other gases and are ideal for point of use installations, offering a cost effective alternative to more sophisticated valves.

Advanced manufacturing technology has been used to produce a highly durable pressure reducing valve, with all stainless steel internals to meet the needs of most industrial applications.

Technical specification

Sizes	Screwed	1" to 2"
	Flanged	DN25 to DN50
End connections	Screwed	BSP and NPT
	Flanged	PN25
		ASME (ANSI) 150
		JIS/KS 10
Body material	SG iron	
Maximum temperature	210°C	
Maximum body design rating	PN25	
Control pressure range	0.14 bar to 9 bar	

Key features

- Compact size with a single spring mechanism ideal for small processes.
- Stainless steel valve and seat assembly provides high wear resistance under low load conditions.
- Anti-vibration adjustment handwheel with colour identification of control spring range.
- Stainless steel control and balancing bellows assemblies offer high fatigue life and stable control.

For further technical information,
search our website using product designation **BRV7**

Compact - Stainless steel SRV2

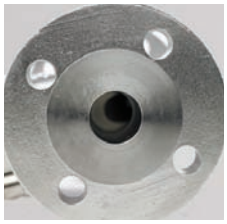
The SRV2 is an all stainless steel version of the BRV2 - a compact direct acting pressure reducing valve designed for use with steam, compressed air and other gases and benefits from having all 316 stainless steel wetted parts.

The compact design makes it ideal for OEM and point of use installations, providing accurate pressure control under stable load conditions. It offers a cost effective alternative to more sophisticated pilot or piston operated valves for clean steam service.

Advanced manufacturing technology has been used to produce a highly durable pressure reducing valve, with all stainless steel internals to meet the needs of most industrial applications.

Technical specification

Sizes	Screwed	½" to 1"
	Flanged	DN15 to DN25
End connections	Screwed	BSP and NPT
	Flanged	PN25
		ASME (ANSI) 150
Body material	316 grade stainless steel	
Maximum temperature	212°C	
Maximum body design rating	PN25	
Control pressure range	0.14 to 8.6 bar	



Key features

- Compact size with a single spring mechanism ideal for small processes.
- Electropolished body.
- Stainless steel valve and seat assembly provides high wear resistance under low load conditions.
- All wetted parts benefit from having 316 grade stainless steel.
- Anti-vibration adjustment handwheel with colour identification of control spring range.

For further technical information, **search** our website using product designation **SRV2**

Compact - For liquids LRV2

The LRV2 is a direct acting pressure reducing valve intended for use on liquids. The compact design makes it ideal for point of use applications, and the pressure balanced head enables accurate and stable control of pressure under all load conditions.

Advanced manufacturing technology has been used to produce a highly durable pressure reducing valve, with all stainless steel internals to meet the needs of most liquid applications.

Technical specification

Sizes	½" to 1"
End connections	Screwed BSP or NPT
Body material	Bronze
Maximum temperature	75°C
Maximum body design rating	PN25
Control pressure range	0.35 to 8.6 bar

Key features

- Compact size with a single spring mechanism ideal for small processes and OEM applications.
- Bronze body and phosphor bronze pressure control bellows providing reliable and corrosion free operation on water systems.
- Nitrile faced pressure balanced head provides stable liquid control and a bubble tight shut-off.
- Anti-vibration adjustment handwheel with colour identification of control spring range.

For further technical information,
search our website using product designation **LRV2**

Pilot operated SDP

The SDP surplussing valve is particularly suited to steam and industrial gas applications providing minimum upstream pressure control.

The SDP control system monitors upstream pressure. Should this pressure fall as a result of an overload, the SDP closes, reducing the flow to maintain the supply.

Technical specification

Sizes	DN15 to DN80	
End connections	Flanged	PN40
		ASME (ANSI) 150 and 300
		JIS/KS 20
Body materials	Steel	
	Stainless steel	
Maximum temperature	300°C	
Maximum body design rating	PN40	
Control pressure range	0.2 to 24 bar	

Key features

- Simple selection, one control spring covers a range of 0.2 to 17 bar.
- Self-acting, no external power required.
- Reliable and easy to service, most components are common with the DP type of pressure reducing valves.
- Fatigue tested diaphragm, no piston, no danger of sticking.
- Bellows sealed pilot arrangement for leak free operation.

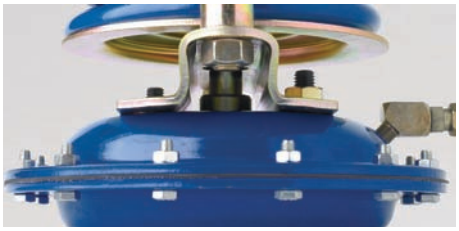
For further technical information,
search our website using product designation **SDP**

Direct acting DEP

The DEP excess pressure valve (also referred to as a maintaining, backpressure or surplussing valve) is suited to steam, industrial gas and liquid applications. The product terminology reflects its suitability for use on liquid applications a common example of which is pressure overspill on pumped systems. The DEP control system monitors upstream pressure. Should this pressure fall as a result of an overload, the DEP closes, reducing the flow to maintain the supply.

Technical specification

Sizes	DN15 to DN100	
End connections	Screwed	BSP and NPT
	Flanged	PN16, PN25 and PN40
		ASME (ANSI) 150 and 300
		JIS/KS 10 and JIS/KS 20
Body materials	SG iron	
	Steel	
Maximum temperature	300°C	
Maximum body design rating	PN40	
Control pressure range	0.1 to 16 bar	
Options	EPDM diaphragm to suit application	
	Nitrile diaphragm to suit application	
	Soft seat for bubble tight shut-off	



Key features

- Resistant to wet and dirty steam conditions plus its robust operation, allows you to fit-and-forget.
- Fully balanced valve increases the stability and consistency of control.
- 316 stainless steel stem sealing bellows for a long, maintenance free life.
- Soft seal option available for bubble tight shut-off on gas and liquid applications.
- Choice of diaphragm material, either Nitrile or EPDM to suit different applications ensuring good control whatever the fluid.
- Water seal pot available to protect the actuator diaphragm on applications where the temperature exceeds 125°C.

For further technical information,
search our website using product designation **DEP**

Our commitment to you

Manufacturing and quality

Spirax Sarco controls are designed and manufactured by Spirax Sarco in one of 15 manufacturing plants located around the world. We also have dedicated fabrication facilities so we can build compact, high performance, skid mounted solutions tailored to your specific requirements.

All Spirax Sarco facilities employ the latest in technology and production best practice, to ensure we have direct control over our product and service quality.

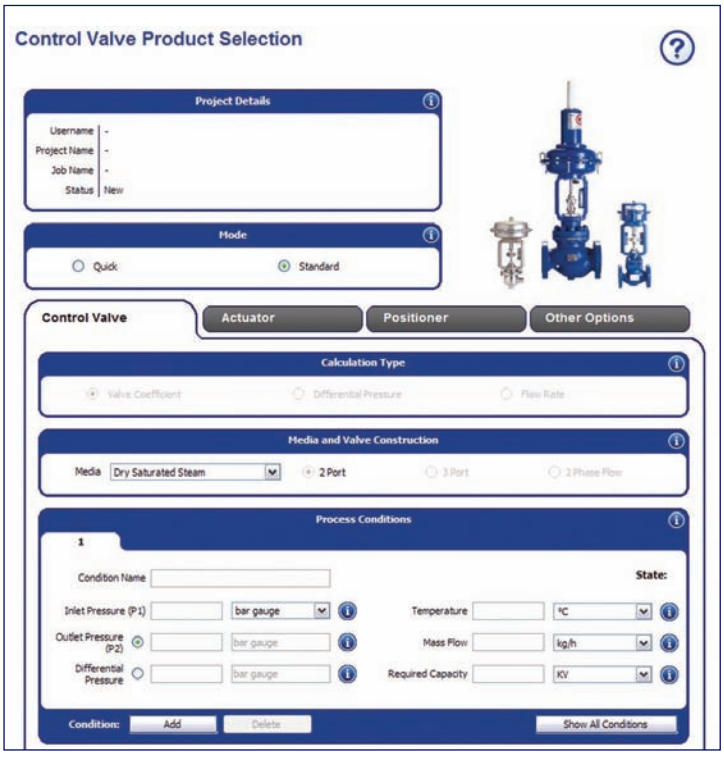
Product quality

Assembly is automated, testing is computerised and every controls product and system is set using skilled personnel to ensure a consistently high quality. For example every Spirax Sarco control valve receives a computerised hydraulic pressure test at 1.5 times the nominal rating of the valve,
and the shut-off is tested to ensure it complies with the class specified. Over 100 separate checks are carried out on a control valve assembly before it is despatched.

Sizing and selection software

Correct product selection and system design is key to achieving good performance and long service life. Depending on the process conditions this can be a complex decision.

In order to allow our engineers to make these decisions quickly and reliably Spirax Sarco has developed its own software systems to ensure you achieve the best price performance from your investment.

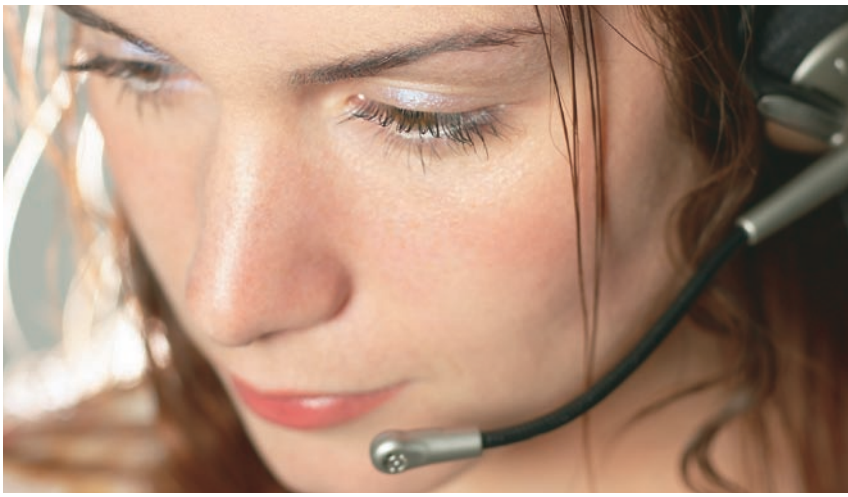


Documentation

Spirax Sarco has ISO accreditation and complies to all leading standards, such as PED, NACE, ATEX and Lloyds Register.

QA systems, health and safety requirements, insurance needs, environmental policies and an increasing risk of litigation, have all increased the amount of documentation needed to support our products and services.

Spirax Sarco understands this need and provides the documentation required for each customer situation, from simple certificates of conformity through to full manufacturing documentation dossiers.



Local stocks and settings

Certainty in delivery and a quick response to last minute changes are frequently the key to the successful implementation of a project. In order to meet customer's delivery requirements Spirax Sarco locally stocks and sets control products in each of its worldwide companies, and through its network of distribution and service partners.

High levels of personal service

Our dedicated and highly trained service personnel have knowledge second to none in the industry.
And with over 1,200 direct sales engineers around the world, controls specialists in 34 countries and a network of approved valve repair partners, you can be assured of receiving the highest quality of service.

Spirax Sarco, a supplier you can trust

- Spirax Sarco direct design and manufacture to international standards
- Employing the latest in technology and best practice
- 100% test and inspection before despatch
- Comprehensive documentation
- Local stocks and setting
- 1,200 direct sales engineers worldwide
- Controls specialists in 34 countries
- Highly trained worldwide network of direct service engineers and service partners

Group companies

Africa

South Africa

Americas

Argentina
Brazil
Canada
Mexico
USA

Asia

China
India
Japan
Korea
Malaysia
Singapore
Taiwan
Thailand

Australasia

Australia
New Zealand

Europe

Austria
Belgium
Czech Republic
Denmark
Finland
France
Germany
Italy
Norway
Poland
Portugal
Russia
Slovak Republic
Spain
Sweden
Switzerland
Turkey
UK

Sales offices

Africa

Egypt
Kenya
Nigeria

Americas

Colombia
Venezuela

Asia

Hong Kong
Indonesia
Pakistan
Philippines
Vietnam

Europe

Austria
Hungary
Ireland

Middle East

UAE

Distributors

Africa

Algeria
Cameroon
Ethiopia
Ghana
Ivory Coast
Libya
Malawi
Mauritius
Morocco
Namibia
Senegal
Sudan
Tanzania
Tunisia
Uganda
Zambia
Zimbabwe

Americas

Bolivia
Chile
Colombia
Costa Rica
Dominican Republic
Ecuador
El Salvador
Guatemala
Honduras
Jamaica
Nicaragua
Panama
Paraguay
Peru
Trinidad and Tobago
Uruguay
Venezuela

Asia

Bangladesh

Australasia

Fiji

Europe

Bulgaria
Croatia
Cyprus
Estonia
Greece
Iceland
Latvia
Lithuania
Malta
Netherlands
Romania
Slovenia

Middle East

Bahrain
Iran
Israel
Jordan
Kuwait
Lebanon
Oman
Qatar
Saudi Arabia
Syria

Some products, services or solutions may not be available in certain markets

Spirax-Sarco Limited
Cheltenham UK
GL53 8ER
t: +44 (0)1242 521361
f: +44 (0)1242 573342
e: controls@uk.spiraxsarco.com
www.spiraxsarco.com /controls

spirax sarco