



## STERI-TROL™ Aseptic Service 'S' series Two-port Pneumatic Control Valves - DN15 (1/2") to DN100 (4")

### Description

STERI-TROL™ 'S' series are two-port control valves manufactured using 316L stainless steel. They are designed for modulating control of clean steam, pure steam and process fluids. The valve is operated by a pneumatic actuator and may be interfaced with a control system using any of the Spirax Sarco range of positioners.

### Available types

**SB** Two-port angle pattern design with aseptic steam sanitized bonnet

**SA** Two port angle pattern design (for chemical free steam)

### Valve characteristics - options:

**SBE Equal percentage (E)** - Suitable for most modulating process control applications good control providing at low flowrates.

**SBL Linear (L)** - Primarily for liquid flow control where the differential pressure across the valve is constant.

### Approvals and certification

Compliant to ASME BPE SF4 2019, internal surface finish 0.375 µm, FDA, and USP 26 Class VI approved sealing materials. EN 10204 type 3.1 certificates supplied as standard. Surface finish certificate supplied as standard.

### Valve seating - options:

**V White Viton** - USP 26 Class VI approved

### Valve stem sealing - options:

**S Metal-to-metal (as standard)** - Stainless steel

### The STERI-TROL™ can be used with the following actuators and positioners:

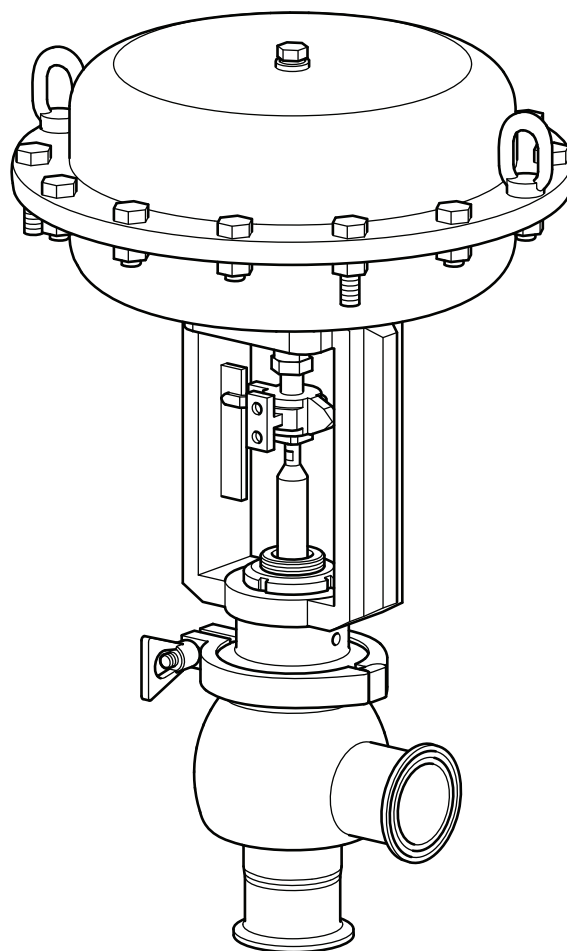
**Pneumatic** PNS3000, PNS4000, PN9000E and PN9000R series

PP5 (pneumatic) or EP500 (electropneumatic)

**Positioners** ISP5 (intrinsically safe electropneumatic)

SP500 (smart electropneumatic)

Refer to the relevant actuator Technical Information sheet for further details.



## Maximum differential pressures for Class IV shut-off SB and SA valves

### PNS4000 spring-to-extend actuators

Valve size				DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
K <sub>v</sub>				4.0	6.3	10	16	25	36	63	100	160
Travel mm				20 mm						30 mm		
Actuator	Spring range	Positioner required	Minimum air pressure	Maximum differential pressure Class IV (bar)								
PNS4220	0.2 - 1.0	Optional	1.4	16.0	14.0	7.1	4.0	2.4				
	0.2 - 1.0	Yes	2.0	16.0	16.0	16.0	15.1	10.2	5.3			
	0.2 - 1.0	Yes	3.0	16.0	16.0	16.0	16.0	16.0	12.7			
	0.2 - 1.0	Yes	4.0	16.0	16.0	16.0	16.0	16.0	16.0			
PNS4320	0.2 - 1.0	Optional	1.4	16.0	16.0	16.0	11.4	7.6	3.8			
	0.2 - 1.0	Yes	2.0	16.0	16.0	16.0	16.0	16.0	12.7			
	0.2 - 1.0	Yes	3.0	16.0	16.0	16.0	16.0	16.0	16.0			
PNS4420	0.2 - 1.0	Optional	1.4			16.0	16.0	16.0	6.8			
	0.2 - 1.0	Yes	2.0			16.0	16.0	16.0	16.0			
	0.2 - 1.0	Yes	3.0			16.0	16.0	16.0	16.0			
PNS4430	0.2 - 1.0	Optional	1.4							3.4	2.0	1.2
	0.2 - 1.0	Yes	2.0							10.7	6.9	4.6
	0.2 - 1.0	Yes	3.0							16.0	15.0	10.2
	0.2 - 1.0	Yes	4.0							16.0	16.0	15.8

### PN9000 spring-to-extend actuators

Valve size				DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
K <sub>v</sub>				4.0	6.3	10	16	25	36	63	100	160
Travel mm				20 mm						30 mm		
Actuator	Spring range	Positioner required		Maximum differential pressure Class IV (bar)								
PN9120R	0.2 - 1.0	Optional		16.0	16.0	16.0	16.0	16.0	16.0			
	0.4 - 1.2	Optional		16.0	16.0	16.0	16.0	16.0	16.0			
PN9126R	1.0 - 2.0	Yes		16.0	16.0	16.0	16.0	16.0	16.0			
PN9123R	2.0 - 4.0	Yes		16.0	16.0	16.0	16.0	16.0	8.0			
PN9220R	0.2 - 1.0	Optional		16.0	16.0	16.0	16.0	16.0	16.0			
	0.4 - 1.2	Optional		16.0	16.0	16.0	16.0	16.0	16.0			
PN9226R	1.0 - 2.0	Yes		16.0	16.0	16.0	16.0	16.0	16.0			
PN9223R	2.0 - 4.0	Yes		16.0	16.0	16.0	16.0	16.0	16.0			
PN9320R	0.2 - 1.0	Optional		16.0	16.0	16.0	16.0	16.0	16.0			
	0.4 - 1.2	Optional		16.0	16.0	16.0	16.0	16.0	16.0			
PN9330R	0.4 - 1.2	Yes								16.0	16.0	16.0
PN9336R	1.0 - 2.0	Yes								16.0	16.0	16.0
PN9337R	2.5 - 3.5	Yes								8.0	5.0	3.0

## Technical data

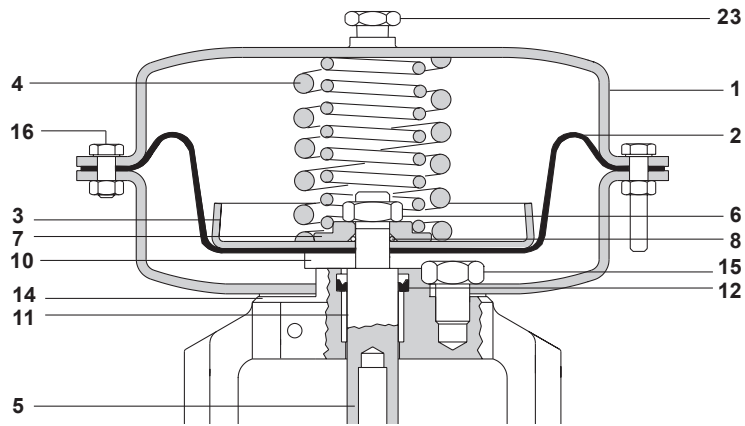
<b>Plug design</b>	DN15 to DN100	Parabolic
<b>Leakage</b>	Metal-to-metal	(0.01% of $K_v$ )
	Soft seal	IEC 534-4 Class VI
<b>Rangeability</b>	Equal percentage	50:1
	Linear	30:1
<b>Travel</b>	DN15 to DN50 (½" to 2")	20 mm
	DN65 to DN100 (2½" to 4")	30 mm
<b>Surface finish</b>	Internal (Mechanical or electro polished)	0.4 $\mu$
	External	< 0.6 $\mu$

## Sizes and end connections

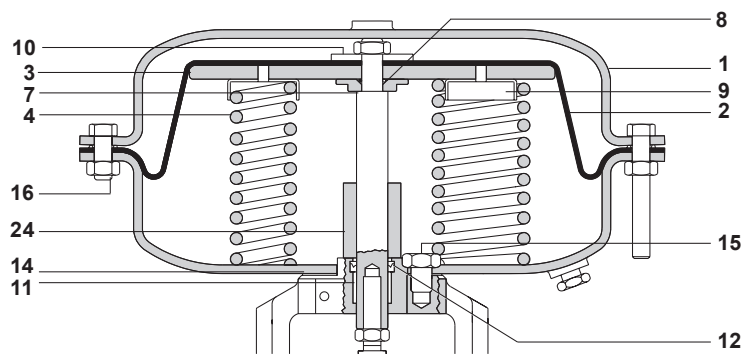
<b>Connections</b>	<b>Size range</b>
Butt weld/tube weld, screwed, flanged and sanitary clamp	DN15, DN20, DN25, DN32, DN40, DN50, DN65, DN80 and DN100 ½", ¾", 1", 1¼", 1½", 2", 2½", 3" and 4"

- Notes:**
- DN15, DN20 and DN32 is not available for certain end connections - see page 10.
  - If you require a pipe end connection which has not been mentioned within this document, please contact Spirax Sarco sales office for further advice and information regarding availability.

## Materials



**PNS3000 series**



**PNS4000 series**

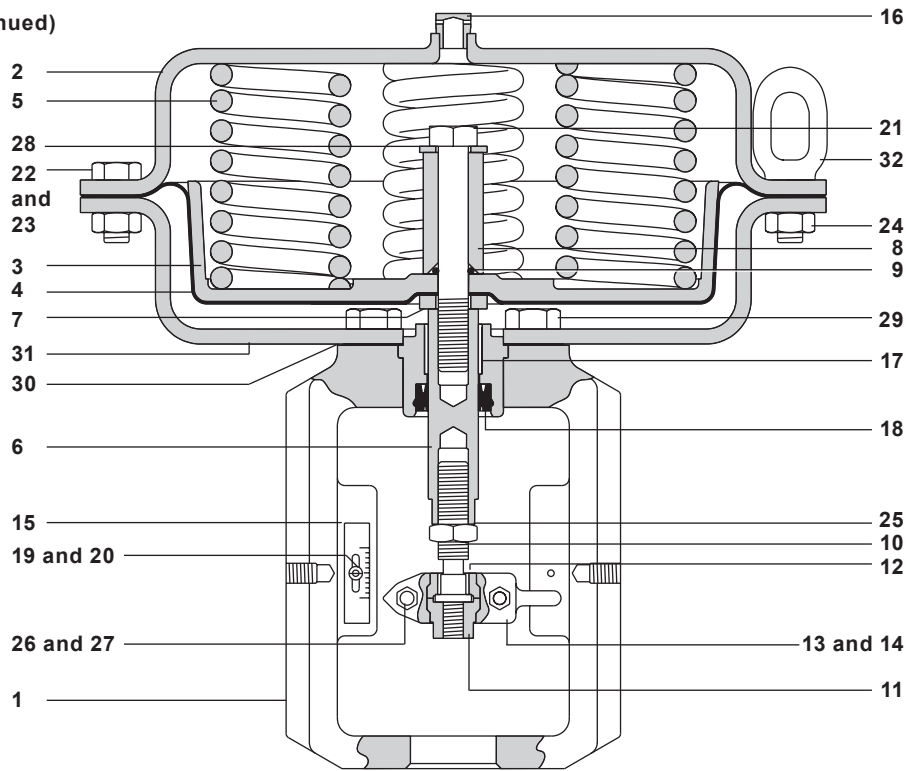
### PNS3000 and PNS4000 series actuators

No. Part	Material
1 Diaphragm housing	Stainless steel 304
2 Diaphragm	Reinforced nitrile rubber
3 Diaphragm plate	Pressed steel
4 Springs	Spring steel
5 Spindle	Stainless steel
6 Lock-nut	Stainless steel
7 Spacer	Zinc plated steel
8 'O' ring	Rubber
9 Spring guide	Zinc plated steel
10 Diaphragm clamp	Zinc plated steel
11 Bearing	Bronze
12 'V' ring	Rubber

No. Part	Material
13 Yoke	Stainless steel 304
14 Gasket	Non asbestos fibre
15 Fixing screwed	Stainless steel
16 Housing bolts and nuts	Stainless steel
17 Top adaptor	Stainless steel
18 Lock-nut	Stainless steel
19 Bottom adaptor	Stainless steel
20 Connectors	Stainless steel
21 Connectors bolts and nuts	Stainless steel
22 Travel indicator	Aluminium
23 Cap (with vent hole)	Nickel plated brass
24 Spacer	Zinc plated steel

**Materials (continued)**

**PN9000**



**PN 9000 series actuators**

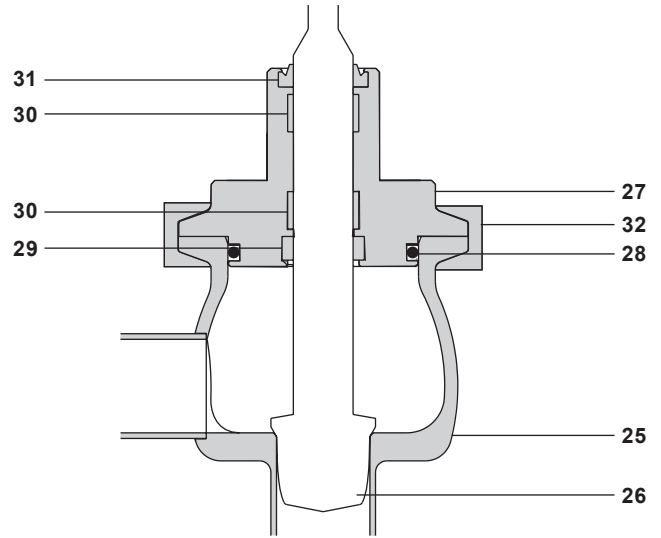
No.	Part	Material
1	Yoke	SG iron
2	Upper diaphragm housing	Carbon steel (plated)
3	Diaphragm plate	Aluminium
4	Diaphragm	Reinforced NBR
5	Spring	Spring steel
6	Spindle	Stainless steel
7	Washer	Carbon steel (plated)
8	Spacer	Carbon steel (plated)
9	'O' ring	Viton
10	Connector	Carbon steel (plated)
11	Adaptor	Carbon steel (plated)
12	Collar	Carbon steel (plated)
13	Clamp front	Stainless steel
14	Clamp rear	Stainless steel
15	Scale	Stainless steel
16	Vent plug	Brass
17	Bearing	PTFE/steel composite

No.	Part	Material
18	Seal	Polyurethane
19	Pan head screw	Carbon steel (plated)
20	Nyloc nut	Carbon steel (plated)
21	Bolt	Carbon steel (plated) Gr. 8.8
22	Hex. head screw (short)	Carbon steel (plated) Gr. 8.8
23	Hex. head screw (long)	Carbon steel (plated) Gr. 8.8
24	Nut	Carbon steel (plated) Gr. 8.8
25	Lock-nut	Carbon steel (plated)
26	Socket head screw	Carbon steel (plated) Gr. 8.8
27	Nut	Carbon steel (plated) Gr. 8.8
28	Washer	Carbon steel (plated)
29	Screw	Carbon steel (plated) Gr. 8.8
30	Gasket	Reinforced graphite
31	Lower diaphragm housing	Carbon steel (plated)
32	Lifting eye	Cast steel

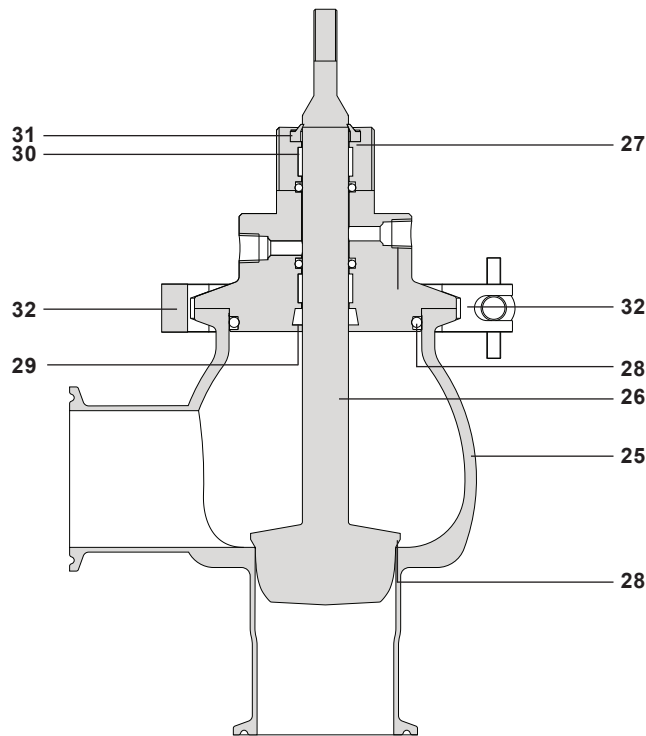
**Materials** (continued)

**SA and SB control valves**

No.	Part	Material
25	Body	Stainless steel ASTM A479-316L
26	Valve plug, stem and soft seal	Stainless steel ASTM A479-316L
		Stainless steel 316L
27	Bonnet	Stainless steel ASTM A479-316L
28	Body seal	Viton (FKM)
29	Stem seal	Viton (FKM)
30	Stem bushes	PTFE-FC
31	Seal washer	White Viton or EPDM
32	Body clamp	Stainless steel 304

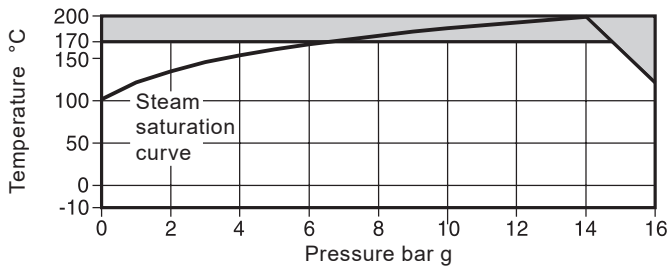


**SA 2-port control valve**



**SB 2-Port control valve with aseptic steam sanitized bonnet (Provided as standard)**

## Pressure/temperature limits



The product **must not** be used in this region.

**Viton (V)** stem seals must be selected for use in this region.

Body design conditions	PN16
Maximum design pressure	16 bar g @ 120 °C
Maximum design temperature	200 °C @ 14 bar g
Minimum design temperature	-20 °C
Maximum operating temperature	Viton (FKM) (V) 170 °C
Minimum operating temperature	-10 °C
<b>Note:</b> For lower operating temperatures consult Spirax Sarco.	
Maximum differential pressure	See pages 7 to 12
Designed for a maximum cold hydraulic test pressure of:	24 bar g

## K<sub>v</sub> values (SB and SA models)

Flow characteristic	Valve size	K <sub>v</sub> by valve size and trim reduction								
		DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
	Travel	20 mm					30 mm			
Equal percentage and linear	Standard	4	6.3	10	16	25	36	63	100	160
	Reduction 1	-	4	6.3	10	16	25	36	63	100
	Reduction 2	-	-	4	6.3	10	16	25	36	63
	Reduction 3	-	-	-	4	6.3	10	16	25	36

## Micro-flow trim for all valves ≤ DN25

Micro-flow trim	Travel	20 mm				
		Trim size	1/8"	3/16"	1/4"	3/8"
Linear characteristic	K <sub>v</sub>	0.4	0.63	1.0	1.6	2.5

For conversion:  $K_v = C_v (US) \times 0.855$      $C_v (UK) = C_v (US) \times 0.833$

## Maximum differential pressures for Class IV shut-off SB and SA valves

### PNS3000 spring-to-extend actuators

Valve size			DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100	
K <sub>v</sub>			4.0	6.3	10	16	25	36	63	100	160	
Travel mm			20 mm						30 mm			
Actuator	Spring range	Positioner required	Maximum differential pressure Class IV (bar)									
PNS3220	0.2 - 1.0	Optional	8.3	4.1	1.4							
	0.4 - 1.2	Optional	16.0	14.0	7.1	4.0	2.4					
PNS3320	0.2 - 1.0	Optional	16.0	16.0	16.0	4.0	2.4					
	0.4 - 1.2	Optional	16.0	16.0	16.0	11.4	7.6	3.8				
PNS3326	1.0 - 3.0	Yes	16.0	16.0	12.8	16.0	16.0	12.7				
PNS3420	0.2 - 1.0	Optional	16.0	16.0	16.0	7.7	5.0	2.3				
	0.4 - 1.2	Optional	16.0	16.0	16.0	16.0	12.8	6.8				
PNS3426	1.0 - 3.0	Yes			16.0	16.0	16.0	16.0				
PNS3430	0.4 - 1.2	Optional							3.4	2.0	1.2	
PNS3436	1.0 - 3.0	Yes							10.7	6.9	4.6	

### PN9000 spring-to-extend actuators

Valve size			DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100	
K <sub>v</sub>			4.0	6.3	10	16	25	36	63	100	160	
Travel mm			20 mm						30 mm			
Actuator	Spring range	Positioner required	Maximum differential pressure Class IV (bar)									
PN9120E	0.4 - 1.2	Optional	14.0	8.0	4.0	2.0	1.0	-				
PN9126E	1.0 - 2.0	Yes	16.0	16.0	15.0	9.0	6.0	3.0				
PN9123E	2.0 - 4.0	Yes	16.0	16.0	16.0	16.0	15.0	8.0				
PN9220E	0.2 - 1.0	Optional	16.0	16.0	10.0	6.0	3.0	1.0				
	0.4 - 1.2	Optional	16.0	16.0	16.0	15.0	10.0	5.0				
PN9226E	1.0 - 2.0	Yes	16.0	16.0	16.0	16.0	16.0	16.0				
PN9223E	2.0 - 4.0	Yes	16.0	16.0	16.0	16.0	16.0	16.0				
PN9320E	0.2 - 1.0	Optional	16.0	16.0	16.0	14.0	10.0	5.0				
	0.4 - 1.2	Optional	16.0	16.0	16.0	16.0	16.0	12.0				
PN9330E	0.4 - 1.2	Yes							6.0	4.0	3.0	
PN9336E	1.0 - 2.0	Yes							16.0	12.0	8.0	
PN9337E	2.5 - 3.5	Yes							16.0	16.0	16.0	



## Valve dimensions (approximate in mm)

Valve Size	Connection and Dimensions								
	Tube end		Threaded	Sanitary clamp	Flanged	Dimensions common to all connections			
	A	B	A and B	A and B	A and B	B1	C	D	E
DN15	70	24	-	42.0	90	14	64	43	56
DN20	70	26	-	44.0	95	16	64	43	56
DN25	70	40	55	60.3	100	20	73	57	80
DN32	70	43	66	64.5	105	23	75	57	84
DN40	70	49	70	69.9	115	27	80	57	94
DN50	85	54	82	88.9	125	32	91	65	116
DN65	105	68	105	88.9	145	43	95	85	114
DN80	105	83	110	95.3	155	52	121	85	166
DN100	130	96	150	114.3	175	60	133	97	180

## Valve weights (kg)

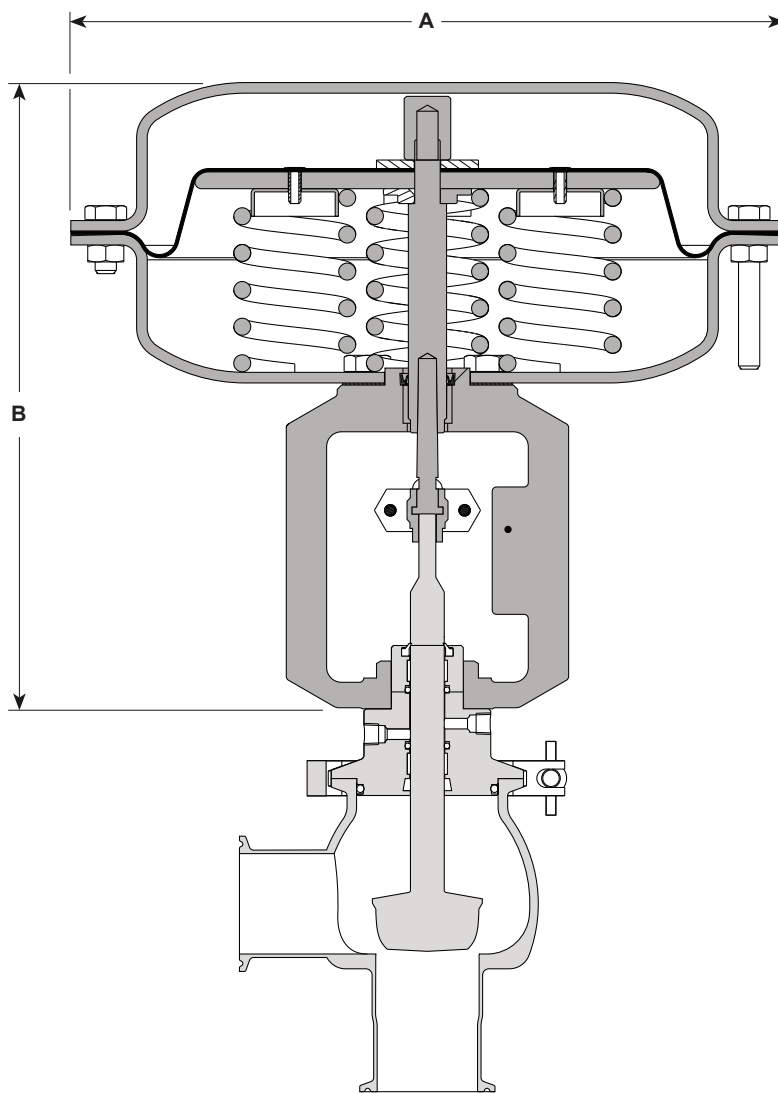
Valve size	Model SB, SA	
	Sanitary clamp and screwed	Tube end
DN15	1.5	1.0
DN20	1.5	1.0
DN25	2.5	2.0
DN32	3.0	2.0
DN40	3.0	2.5
DN50	4.0	3.0
DN65	6.5	5.5
DN80	8.0	7.0
DN100	11.0	10.0

## Actuator dimensions and weights (approximate) in mm and kg

Actuator type	F	G	H	Weight
PNS3200 and PNS4200 series	209	240	N/A	7.2
PNS3300 and PNS4300 series	285	264	113	11.2
PNS3420 and PNS4420 series	336	263	113	20.0
PNS3430 and PNS4430 series	336	328	157	20.0
PNS3530 series	405	367	157	22.6
PNS3630 series	465	400	157	38.0

**Dimensions/weights (approximate) in mm and kg**

Actuator range	A	B	Weight
PN9100E and variants	275	170	6
PN9100R and variants	275	170	6
PN9200E and variants	300	300	17
PN9200R and variants	300	300	17
PN9320E and variants	325	390	27
PN9320R and variants	325	390	27
PN9330E and variants	335	390	27
PN9330R and variants	335	390	27

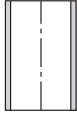

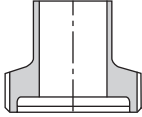


**Actuator and SB valve**

## Connection codes

The codes specified below represent a small selection of pipe end connections that are available. If the connection required is not specified below please contact Spirax Sarco.

Note: All sizes are available for each connection/specification unless otherwise stated.

Connection		Specification	Code
Butt weld and Tube weld		DIN 11850 (Series 2)	OO
		ASME BPE (Not available for size DN32)	OD
Sanitary clamp		ASME BPE (Tri-clamp®) (Not available for size DN32)	AO
Aseptic-thread (fitted on pipe)		DIN 11864 T1 Form A	GS
		DIN 11864 T1 Form B	GT
		DIN 11887 (11851)	GU
		SMS 1146 (Not available for the DN15 and DN20 sizes)	GV

## How to order

### Ordering a control valve

<b>Valve size</b>	DN15, DN20, DN25, DN32, DN40, DN50, DN65, DN80 and DN100 <b>Note:</b> DN15, DN20 and DN32 is not available for certain end connections - see page 14.	<b>DN15</b>
<b>Valve series</b>	SB = Two-port angle pattern design with Aseptic Steam Sanitized Bonnet SA = Two-port angle pattern design	<b>SB</b>
<b>Valve characteristic</b>	E = Equal percentage L = Linear	<b>E</b>
<b>Body material</b>	6 = 316L stainless steel	<b>6</b>
<b>Connection standard</b>	To be specified - See page 14	<b>OO</b>
<b>Seating option</b>	S = Stainless steel	<b>S</b>
<b>Stem and body sealing option</b>	V = White Viton (FDA, USP 26 Class VI approved)	<b>V</b>
<b>Internal surface finish</b>	0 = Standard 0.375 µm mechanical polishing (ASME BPE SFV4)	<b>0</b>
<b>K<sub>v</sub></b>	To be specified	<b>4</b>

### Ordering a PNS, PN or PNP pneumatic actuator

<b>Type</b>	<b>PNS pneumatic actuator</b> <b>PN or PNP pneumatic actuator</b>	PNS = Pneumatic stainless steel PN = Pneumatic epoxy coated PNP = Pneumatic electroless nickel plated (ENP)	<b>PN</b>
<b>Series and action</b>	<b>PNS pneumatic actuator</b> <b>PN or PNP pneumatic actuator</b>	3 = 3000 multi-spring (spring-to-extend) 4 = 4000 multi-spring (spring-to-retract) 9 = 9000 series	<b>3</b>
<b>Diaphragm area</b>	<b>PNS pneumatic actuator</b> <b>PN or PNP pneumatic actuator</b>	2 = 310 cm <sup>2</sup> 3 = 490 cm <sup>2</sup> 4 = 710 cm <sup>2</sup> 1 = 100 cm <sup>2</sup> 2 = 340 cm <sup>2</sup> 3 = 670 cm <sup>2</sup>	<b>1</b>
<b>Travel</b>	<b>PNS pneumatic actuator</b> <b>PN or PNP pneumatic actuator</b>	2 = 20mm 3 = 30mm 2 = 20mm 3 = 30mm	<b>2</b>
<b>Spring range</b>	<b>PNS pneumatic actuator</b> <b>PN or PNP pneumatic actuator</b>	0 = 0.2 to 1.0 bar (0.4 to 1.2 bar) 6 = 1.0 to 3.0 bar 0 = 0.2 to 1.0 bar (0.4 to 1.2 bar) 3 = 2.0 to 4.0 bar 6 = 1.0 to 2.0 bar 7 = 2.5 to 3.5 bar	<b>0</b>
<b>Travel</b>		E = Spring to extend R = Spring to retract	<b>E</b>

### Ordering example:

1 off Spirax Sarco Steri-trol type DN15 SBE6OOSV04 and 1 pneumatic actuator type PNS3320. Having a spring range of 0.4 to 1.2 bar.

## Spare parts

The available spares are identified by the part numbers listed below. When placing an order for spare parts, always specify the actuator or the valve model (shown on the data plate) and the name of the part as described below.

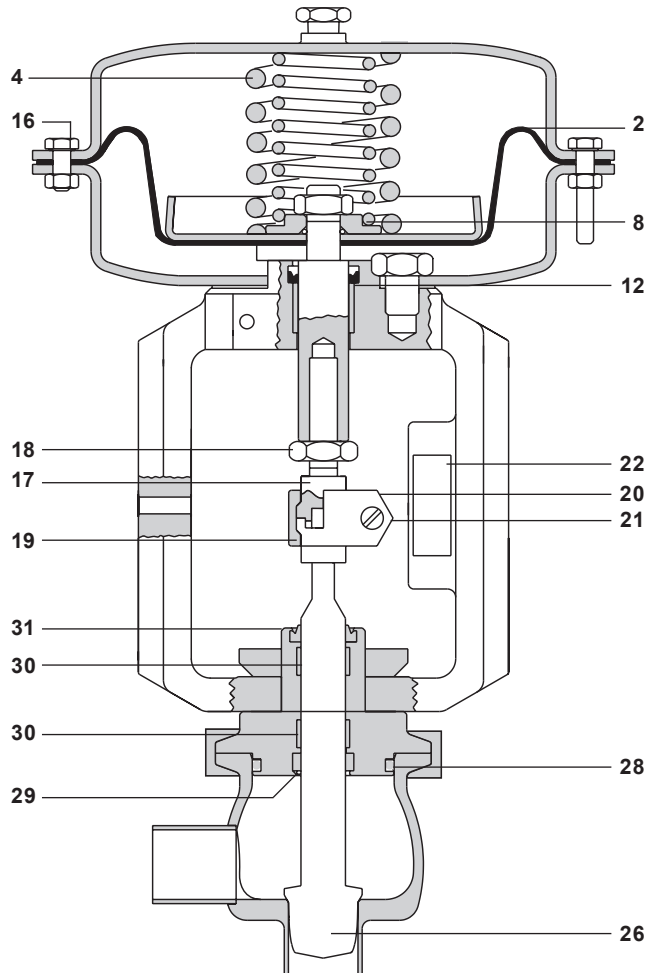
### Available spares for the SA and SB control valves and the PNS3000 and PNS4000 series actuators

Description		Part number
Stem seal kit	('O' ring and 'V' ring)	8 and 12
Diaphragm kit	(diaphragm, 'O' ring and 'V' ring)	2, 8 and 12
<b>Actuator</b>	Travel indicator	22
	Spring kit (set of springs, included 3 off longer hex, head bolts and nut on some spring range)	4 and 16
	Linkage kit (lock-nut, top adaptor connectors, bolts and nuts)	17, 18, 19, 20 and 21
	Valve stem seal set (excluding bonnet seal)	29, 30 and 31
<b>Valve</b>	SA and SB models	Bonnet seal Viton (packet of 3) 28
		Plug and stem (Equal percentage or Linear) 26

### Spare parts ordering example:

1 off Valve stem seal set for a STERI-TROL™ DN15 SBE6OOSV04 two-port control valve.

1 off Stem seal kit for a type PNS3320 pneumatic actuator having a spring range 0.4 to 1.2 bar.



Actuator and SA valve

**Note:** For PN9000 actuator spares please refer to TI-P357-30