

spirax sarco

DEP4 Cast Steel Excess Pressure Valve

TI-P206-01
CH Issue 12

Description

The **DEP4** is a cast steel direct acting bellows sealed excess pressure valve. The standard version as an EPDM diaphragm (limited to 125°C) and is suitable for steam and water applications. Also available for oil applications is a Nitrile rubber diaphragm (suffix 'N' i.e. DEP4B1N which is limited to 90°C).

Note: To protect the actuator diaphragm on steam applications a WS4 water seal pot must be installed in the downstream pressure signal line to the actuator. Refer to TI-S12-03 details.

Standards

The products listed below comply with the requirements of the European Pressure Equipment Directive 97/23/EC and carry the **CE** mark when so required.

Certification

This product is available with a manufacturers' Typical Test Report and a certificate of conformity to EN 10204 3.1 as an optional extra. **Note:** All certification/inspection requirements must be stated at the time of order placement.

Available types:

DN15 - DN100 flanged connections having 6 pressure ranges (suffix 1 - 6).

Upstream pressure ranges:

Range	Valve type	Actuator type	Spring colour	Pressure range (bar)			PN Rating
				DN15 - DN40	DN50 - DN80	DN100	
1	DEP4B1	11 or 11N	Yellow	0.1 - 0.5	0.1 - 0.3	0.1 - 0.3	2.5
2	DEP4B2	12 or 12N	Yellow	0.2 - 0.8	0.2 - 0.5	0.2 - 0.5	2.5
3	DEP4B3	13 or 13N	Blue	0.5 - 1.7	0.4 - 1.3	0.4 - 1.0	6
4	DEP4B4	14 or 14N	Blue	1.4 - 3.4	1.0 - 2.6	0.8 - 2.5	16
5	DEP4B5	15 or 15N	Blue	3.2 - 7.5	2.3 - 5.5	2.3 - 5.0	25
6	DEP4B6	15 or 15N	Red	7.0 - 16.0	5.0 - 15.0	4.0 - 10.0	25

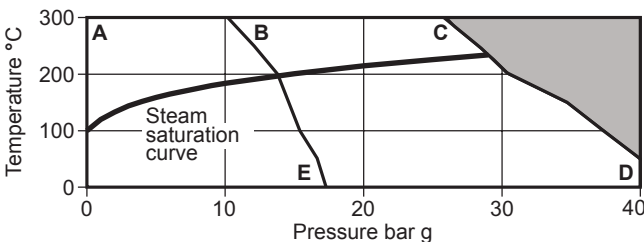
Sizes and pipe connections

DN15, DN20, DN25, DN32, DN40, DN50, DN65, DN80 and DN100

Standard flange: EN 1092 PN40

Flanges available on request: ASME 150, ASME 300 and JIS.

Pressure / temperature limits



The product must not be used in this region.

A-C-D Flanged EN 1092 PN40 and ASME 300

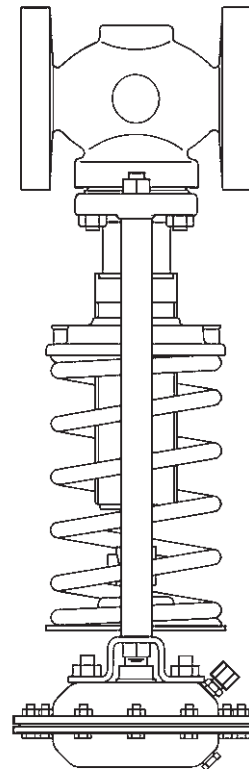
A-B-E Flanged PN16

Note: In the case of liquid service, this product is to be used only on intermittent duty. Applications such as continuous pump recirculation may cause valve and pipework damage due to cavitation which is not covered under the terms of our warranty.

Body design conditions	PN40	
Maximum design pressure	40 bar g @ 50°C	
Maximum design temperature	300°C @ 25.8 bar g	
Minimum design temperature	0°C	
Maximum operating temperature	EPDM diaphragm	125°C
	Nitrile diaphragm	90°C
Minimum operating temperature (ambient)	0°C	
Note: For lower operating temperatures consult Spirax Sarco		
Maximum differential pressure	DN15 - DN50	25 bar
	DN65 - DN100	20 bar

Designed for a maximum cold hydraulic test pressure of 60 bar g

Note: With internals fitted, test pressure must not exceed 40 bar g



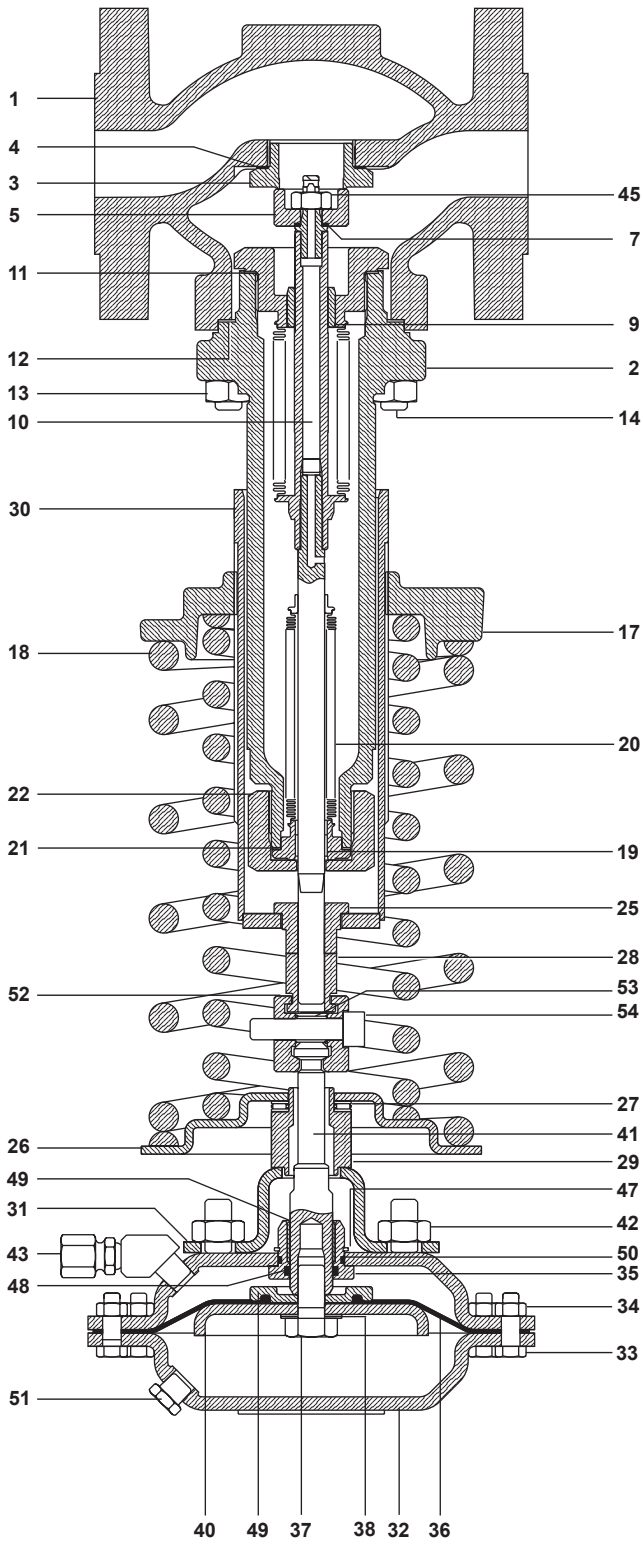
Kvs values

Size DN	15	20	25	32	40	50	65	80	100
Kvs	3.4	6.5	11.4	16.4	24	40	58	92	145

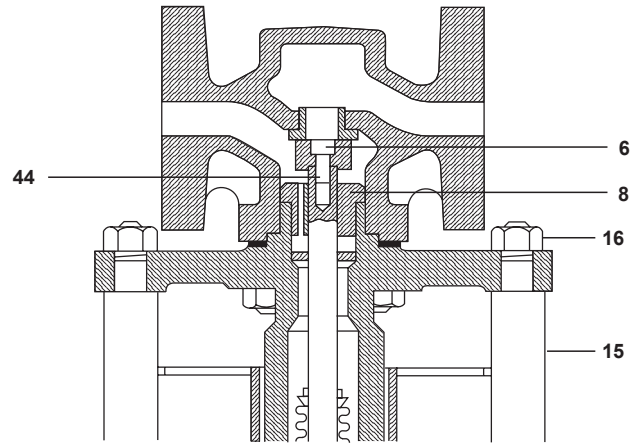
Note: The Kvs values shown above are full capacities and should be used for safety valve sizing purposes where they are required.

Materials

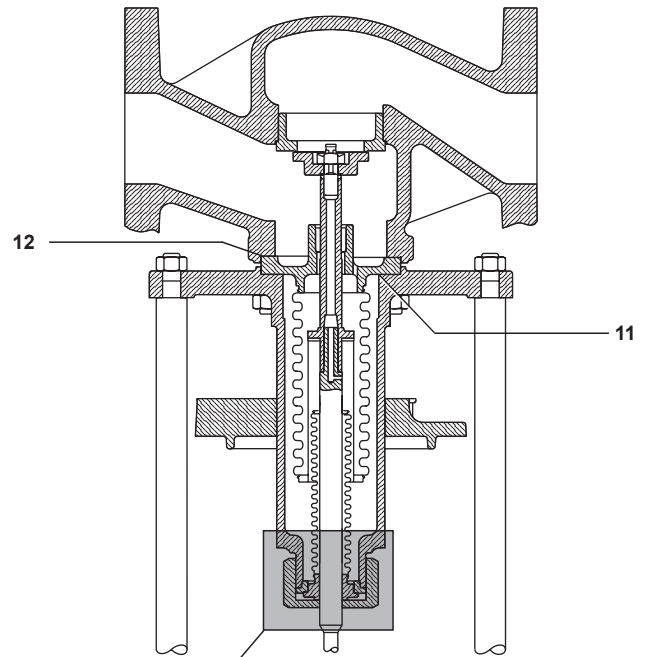
No.	Part		Material	
1	Body		Cast steel	GP 240 GH
2	Bonnet		Cast steel	DIN 17245 GSC25
3	Valve seat		Stainless steel	BS 970 431 S29
4	Valve seat gasket	DN15	Stainless steel	
		DN20 and DN25		Mild steel
		DN32 to DN50	Reinforced exfoliated graphite	
5	Valve head		Stainless steel	BS 970 431 S29
6	Valve head screw	DN15 and DN20	Stainless steel	BS 6105 A2
7	Valve head seal		Arlon 1555	
8	Bush	DN15 and DN20	Stainless steel	BS 970 431 S29
9	Bush (part of item 10)	DN25 to DN100	Stainless steel	BS 970 431 S29
10	Balancing bellows assembly	DN25 to DN100	AISI 316L	
11	Balancing bellows gasket	DN25 to DN100	Reinforced exfoliated graphite	
12	Bonnet gasket		Reinforced exfoliated graphite	
13	Bonnet nuts		Steel	DIN 267 Pt13 Gr. 8
14	Bonnet studs	DN15 to DN40	M10	Steel
		DN50 and DN65	M12	
		DN80 and DN100	M16	
15	Pillars		Zinc plated steel	BS 970 230 M07
16	Pillar nuts		Zinc plated steel	BS 3693 Gr. 8
17	Spring adjuster		Zinc plated cast iron	DIN 1691 GG25
18	Spring(s)		Chrome vanadium	
19	Bearing bush (part of item 20)		PTFE / steel composite	
20	Sealing bellows assembly		Stainless steel	AISI 316L
21	Sealing bellows gasket	DN15 and DN20		Stainless steel 'S' type
		DN25 to DN100	Reinforced exfoliated graphite	
22	Clamp nut	DN25 to DN100	Zinc plated steel	BS 970 230 M07
25	Lock-nut		Zinc plated steel	BS 970 230 M07
26	Spring plate		Zinc plated steel	BS 1449 Pt 1 HR14
27	Needle bearing		Steel	
28	Setting nut		Zinc plated steel	BS 970 230 M07
29	Bearing locator		Zinc plated steel	BS 970 230 M07
30	Adjuster sleeve		Zinc plated steel	
31	Mounting plate		Zinc plated steel	BS 1449 Pt 1 HR14
32	Housing	Types 11(N) to 14(N)	Steel	DIN 1514 St W24
		Type 15(N)	Steel	BS EN 10025 S355 J2G3
33	Housing screws	Types 11(N) to 12(N)	Zinc plated steel	BS 3692 Gr. 5.6
		Types 13(N), 14(N) and 15(N)	Zinc plated steel	BS 3692 Gr. 8.8
34	Housing nuts	Types 11(N) and 12(N)	Zinc plated steel	BS 3692 Gr. 5.6
		Types 13(N), 14(N) and 15(N)	Zinc plated steel	BS 3692 Gr. 8
35	Spindle guide		Stainless steel	BS 970 431 S29
36	Diaphragm		EPDM fabric reinforced or suffix 'N' Nitrile fabric reinforced	
37	Hexagon headed bolt		Stainless steel	BS 6105 A2
38	Sealing washer		Fibre	
39	Diaphragm clamp		Stainless steel	ASTM A351 CF8M
40	Piston		Zinc plated carbon steel	BS 1449 Pt 1 HR14
41	Spindle		Zinc plated carbon steel	BS 970 230 M07
42	Mounting nuts		Zinc plated steel	BS 3692 Gr. 8
43	Coupling		Zinc plated steel	
44	Thread insert	DN15 and DN20	Stainless steel	DTD 734
45	Self-locking nut	DN25 to DN100	Zinc plated steel	BS 1449 CR4
46	Washer	Type 12(N) only	Zinc plated steel	BS 1449 CR4
47	Circlip		Zinc plated steel	
48	Spindle seal 'O' ring		EPDM or suffix 'N' Nitrile	
49	Bearing bush		PTFE / steel composite	
50	Housing seal 'O' ring		EPDM or suffix 'N' Nitrile	
51	Vent plug		Plastic	
52	Coupling clamp		Zinc plated steel	ASTM A216 Gr. WCB
53	Spring		Spring steel	BS 5216 Gr. M4
54	Clamp screw		Zinc plated steel	BS 4168 Gr. 12.9
55	Clamp plate	DN65 to DN100 only	Stainless steel	ASTM A276 316L
56	Clamp plate gasket		Reinforced exfoliated graphite	



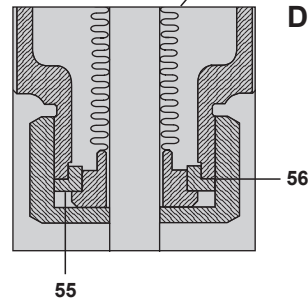
DN25 to DN50 (part 46 is not shown)



DN15 and DN20



DN65 to DN100



Sizing and selection for steam applications

The sizing chart below can be used to determine the K_V value of the valve for steam applications by plotting:

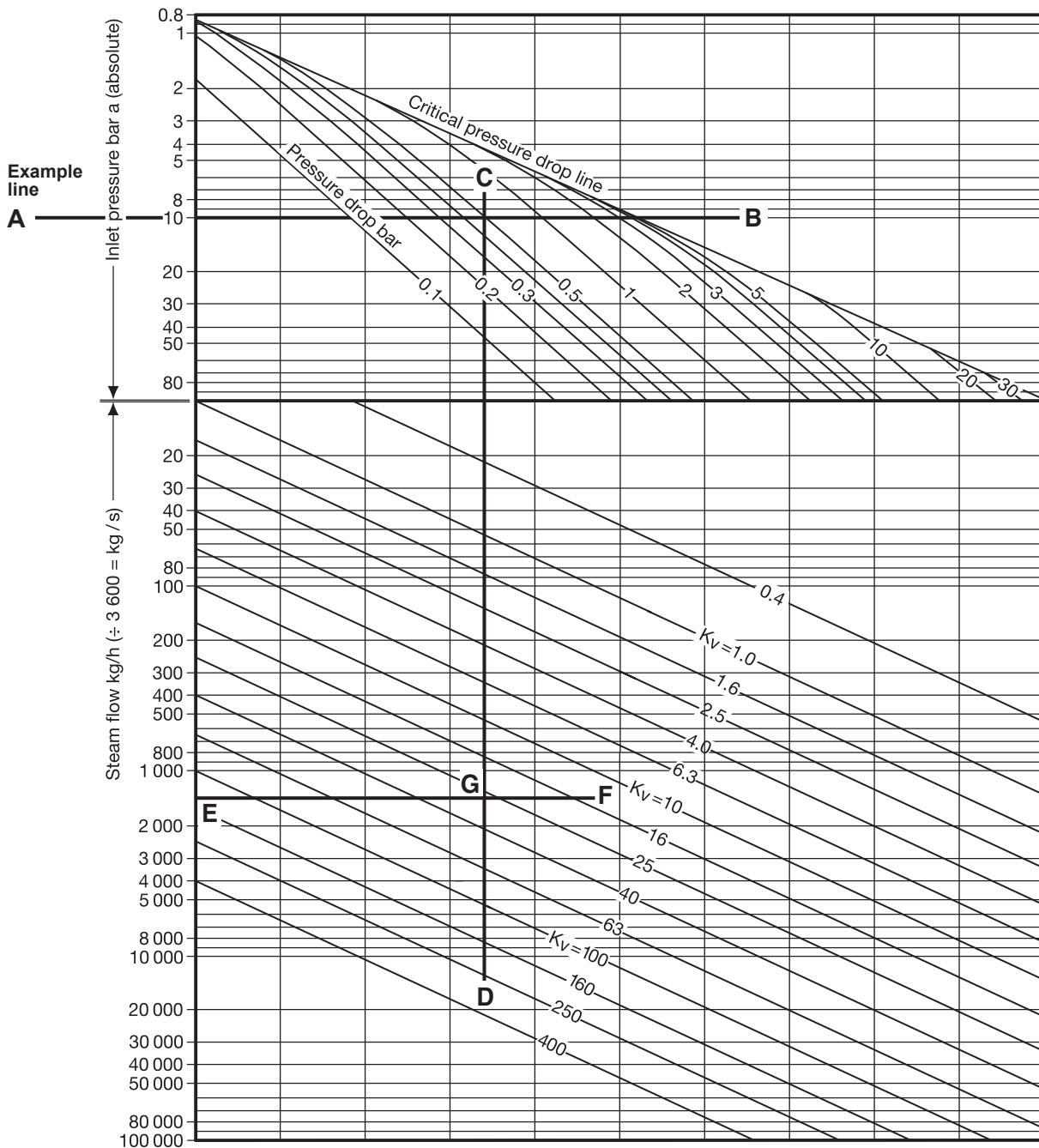
- Upstream pressure.
- Maximum valve pressure drop.
- Maximum steam load.

Where the K_V value is known, the chart can be used to determine pressure drop across the valve for any given flowrate.

K_V sizing example:

Maximum flowrate 1500 kg/h
 Upstream pressure 9 bar g (10 abs)
 Maximum pressure drop 0.5 bar

Draw a horizontal line **A - B** at 10 abs.
 At intersection with 0.5 pressure drop draw a vertical line **C - D**.
 Draw a vertical line **E - F** at 1500 kg/h.
 At intersection **G**, read the required $K_V = 28$.
 Valve size required DN50 having the next highest K_V of 40.



Note: The sizing chart is empirical and should not be used for critical applications.

Sizing and selection for water applications

The sizing chart below can be used to determine the K_V value of the valve for water applications by plotting:

- Maximum flowrate.
- Maximum valve pressure drop.

Where the K_V value is known, the chart can be used to determine pressure drop across the valve for any given flowrate.

K_V sizing example:

Maximum flowrate 10 m³/h.

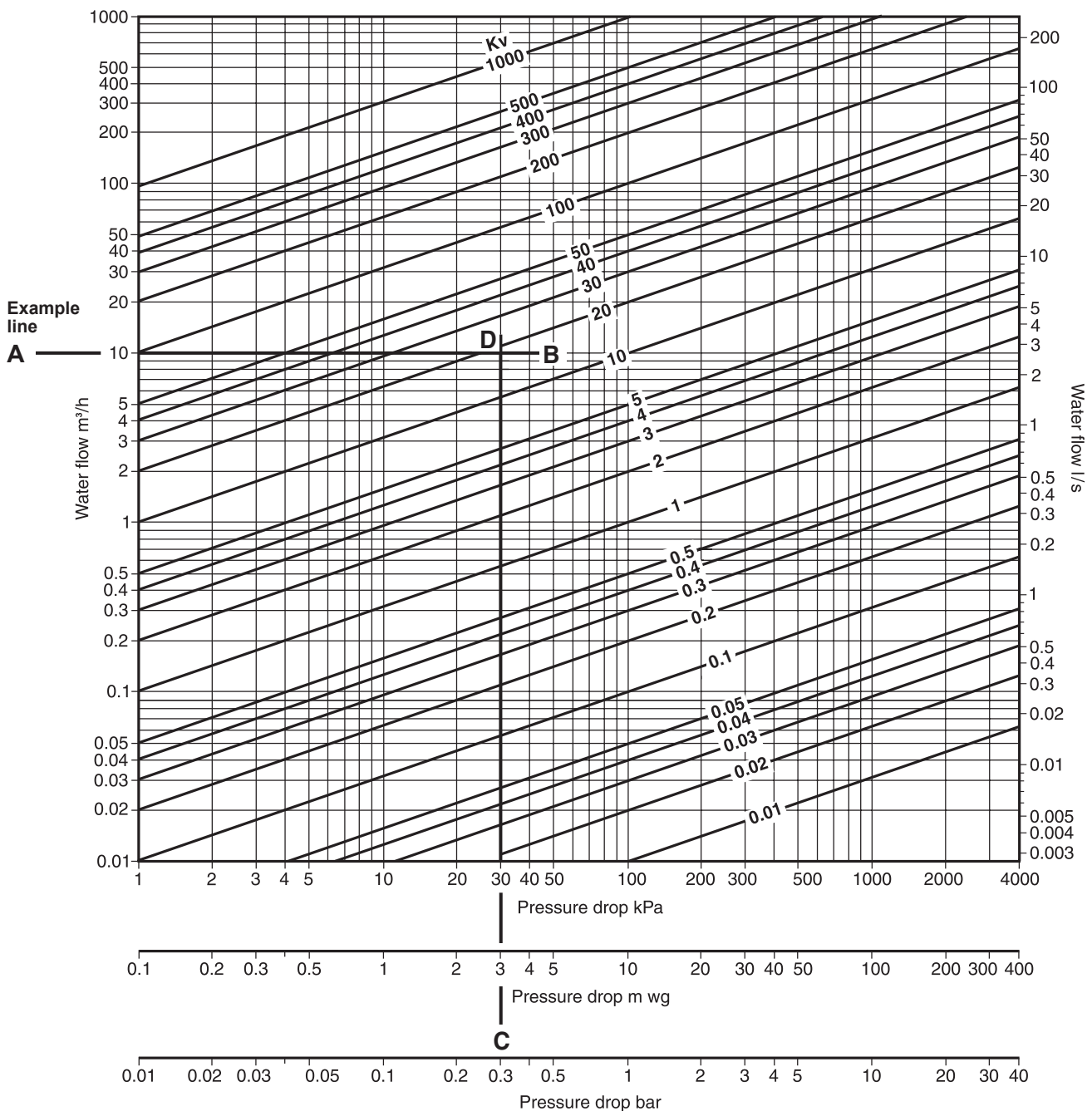
Maximum allowable pressure drop 0.3 bar.

Draw a horizontal line **A - B** at 10 m³/h.

Draw a vertical line **C - D** at 0.3 bar pressure drop.

At intersection **E**, read the required $K_V = 19$.

Valve size required DN40 having the next highest K_V of 24.



Note: The sizing chart is empirical and should not be used for critical applications.

Spare parts for the DN15 and DN20 valves

The spare parts available for sizes DN15 and DN20 valves are detailed below. No other parts for these sizes are supplied as spares.

Available spares

Coupling		A
Diaphragm set	Diaphragm and sealing washer.	B, C
Needle bearing		D
Sealing bellows set	Sealing bellows assembly, sealing bellows gasket, bonnet gasket and head seal.	E, F, G, H
Control spring(s)		I
Seat/head set	Seat, seat gasket, head, bonnet gasket and head seal.	J, K, L, G, H
Gasket set	Sealing bellows gasket, bonnet gasket and seat gasket.	F, G, K
Actuator spindle guide assembly	Spindle guide, bearing bush, spindle seal 'O' ring, housing seal 'O' ring and circlip.	P, R, S, T, V

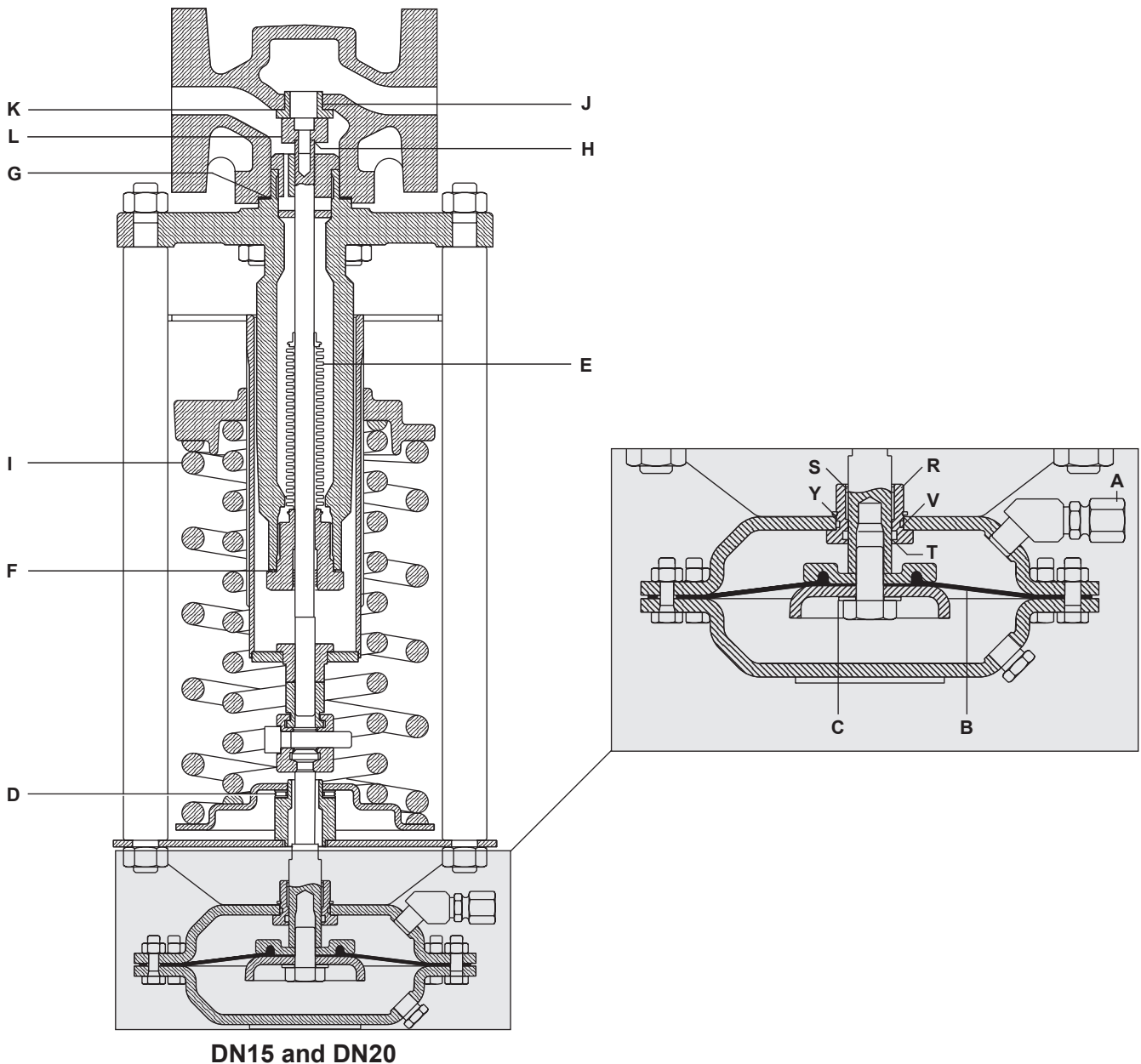
How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and type of valve.

Example: 1 - Gasket set for a Spirax Sarco DN15 DEP4B1 express pressure valve.

How to fit spares

Full fitting instructions are given in the Installation and Maintenance Instructions supplied with the spare(s).



Spare parts for the DN25 to DN100 valves

The spare parts available for sizes DN25 to DN100 valves are detailed below. No other parts for these sizes are supplied as spares.

Available spares

Coupling	A
Diaphragm set	B, C
Diaphragm and sealing washer.	
Needle bearing	D
Sealing bellows set	E, F, X
Sealing bellows assembly, sealing bellows gasket: - Clamp plate gasket DN65 to DN100.	
Control spring(s)	I
Seat/head set DN25 to DN50	J, K, L, W, H, G
Seat, seat gasket, head, self-locking nut, head seal and bonnet gasket.	
Head set DN65 to DN100	L, H, W, G, M
Head, head seal, self-locking nut, bonnet gasket and balancing bellows gasket.	
Balancing bellows set DN25 to DN50	N, M, G, H, F
Balancing bellows assembly, balancing bellows gasket, bonnet gasket, head seal, sealing bellows gasket.	
Balancing bellows set DN65 to DN100	N, M, G, H
Balancing bellows assembly, balancing bellows gasket, bonnet gasket and head seal.	
Gasket set DN25 to DN50	F, G, K, M
Sealing bellows gasket, bonnet gasket, seat gasket, balancing bellows gasket.	
Gasket set DN65 to DN100	F, G, M, X
Sealing bellows gasket, bonnet gasket, balancing bellows gasket and clamp plate gasket.	
Actuator spindle guide assembly	P, R, S, T, V
Spindle guide, bearing bush, spindle seal 'O' ring, housing seal 'O' ring and circlip.	

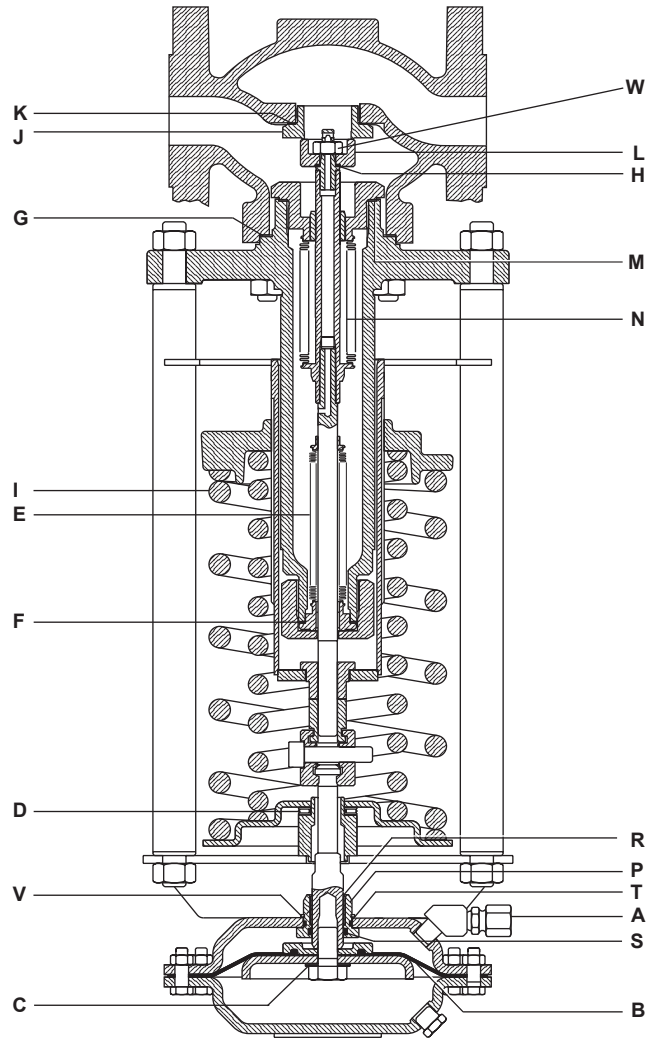
How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and type of valve.

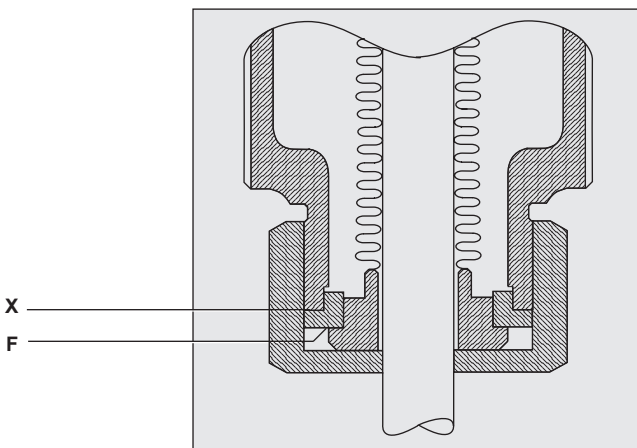
Example: 1 - Gasket set for a DN25 DEP4B1 excess pressure valve.

How to fit spares

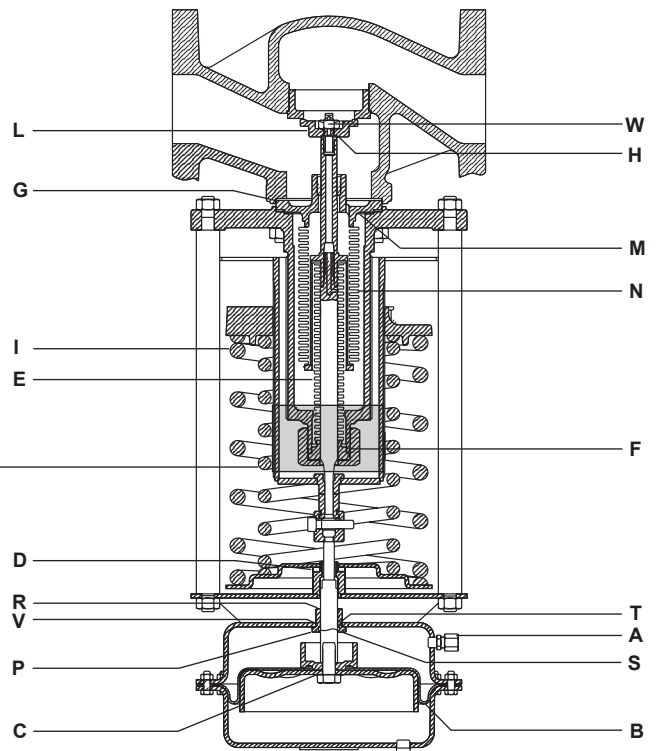
For full fitting instructions see the Installation and Maintenance Instructions supplied with the spare(s).



DN25 to DN50



DN65 to DN100

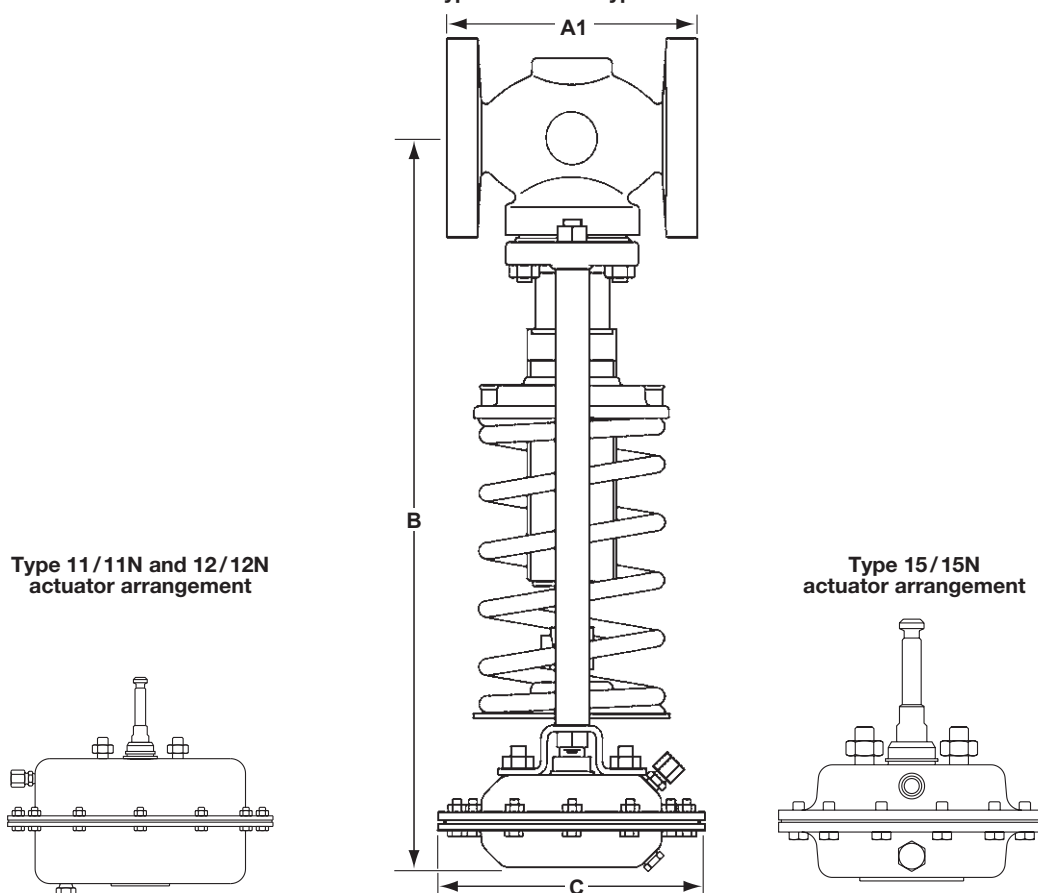


DN65 to DN100

Dimensions (approximate) in millimetres

Size	Flanged			Downstream pressure range											
	EN 1092 PN40 A1	ASME 300 A1	ASME 150 A1	1		2		3		4		5 + 6			
				B	C	B	C	B	C	B	C	B	C		
DN15	130	130	127	553	305	516	250	459	208	459	168	459	143		
DN20	150	150	143	553	305	516	250	459	208	459	168	459	143		
DN25	160	162	153	562	305	525	250	468	208	458	168	468	143		
DN32	180	181	176	632	305	595	250	538	208	538	168	538	143		
DN40	200	203	198	632	305	595	250	538	208	538	168	538	143		
DN50	230	233	229	635	305	598	250	541	208	541	168	541	143		
DN65	290	297	295	635	305	598	250	541	208	541	168	541	143		
DN80	310	319	314	637	305	600	250	543	208	543	168	543	143		
DN100	350	366	350	744	305	707	250	650	208	650	168	650	143		

DEP with Type 13/13N or Type 14/14 actuator



Valve weight (kg)

Valve size		DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
Weight	Yellow spring	11.6	13.3	16.7	21.4	23.7	26.3	37.7	46.0	69.8
	Blue spring	11.6	13.3	16.7	21.4	23.7	26.3	37.7	46.0	69.8
	Red spring	13.6	14.8	18.2	22.9	25.2	27.8	39.4	47.7	72.5

Actuator weight (kg)

Actuator type	1 or 1N	2 or 2N	3 or 3N	4 or 4N	5 or 5N
Weight	12.3	6.5	4.0	2.6	2.7

Note:
To calculate the total product weight add the valve and actuator weights together.

Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions (IM-S12-10) supplied with the product.

Installation note:

Caution - To protect the actuator diaphragm on steam applications a WS4 series water seal pot must be installed in the upstream pressure signal line to the actuator. Refer to TI-S12-03 for details.

The valve should be mounted vertically downwards in a horizontal pipeline with the direction of flow as indicated by the arrow on the valve body. For applications with downstream temperatures below 125°C the valve can alternatively be mounted vertically upwards.

How to order

Example: 1 off Spirax Sarco DN40 DEP4B3 direct acting excess pressure valve having flanged PN40 connections.

Note: Add suffix 'N' if the Nitrile rubber diaphragm is required. i.e. DEP4B3N.