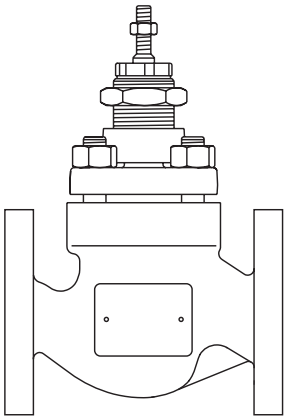
SPIRA-TROL K and L Series Two-port Control Valves

Installation and Maintenance Instructions



1. Safety information

Safe operation of these products can only be guaranteed if they are properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

Safety note - Handling precautions

PTFE

Within its working temperature range PTFE is a completely inert material, but when heated to its sintering temperature it gives rise to gaseous decomposition products or fumes which can produce unpleasant effects if inhaled. The inhalation of these fumes is easily prevented by applying local exhaust ventilation to atmosphere as near to their source as possible.

Smoking should be prohibited in workshops where PTFE is handled because tobacco contaminated with PTFE will during burning give rise to polymer fumes. It is therefore important to avoid contamination of clothing, especially the pockets, with PTFE and to maintain a reasonable standard or personal cleanliness by washing hands and removing any PTFE particles lodged under the fingernails.

1.1 Intended use

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use / application. The products listed on pages 3, 4 and 5 comply with the requirements of the European Pressure Equipment Directive 97/23/EC, carry the CE mark when so required and fall within the Pressure Equipment Directive categories stated.

i) The products have been specifically designed for use on steam, air or condensate which are in Group 2 of the above mentioned Pressure Equipment Directive. It can also be used on propane or methane gases which are in Group 1 of the above mentioned Pressure Equipment Directive. The products' use on other fluids may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.

ii) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.

iii) Determine the correct installation situation and direction of fluid flow.

iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.

v) Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

KE valves

Product			Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
KE43	PN40	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32	2	SEP	SEP	SEP
		DN40 - DN50	2	1	SEP	SEP
		DN65 - DN100	2	1	2	SEP
		DN125	3	2	2	SEP
		DN150	3	2	2	SEP
		DN200	3	2	2	1
	PN25	DN125	2	1	2	SEP
		DN150	3	2	2	SEP
		DN200	3	2	2	1
	PN16	DN125	2	1	2	SEP
		DN150	2	1	2	SEP
		DN200	3	1	2	SEP
	KS 20	DN125	2	1	2	SEP
		DN150	3	2	2	SEP
		DN200	3	2	2	1
	KS 10	DN125	2	1	2	SEP
		DN150	2	1	2	SEP
		DN200	3	1	2	SEP
KE43B	PN40	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32	2	SEP	SEP	SEP
		DN40 - DN50	2	1	SEP	SEP
		DN65 - DN100	2	1	2	SEP
KE61	PN40	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32	2	SEP	SEP	SEP
		DN40 - DN50	2	1	SEP	SEP
KE61B	PN40	DN15 - DN25	SEP	SEP	SEP	SEP

KE valves (continued)

Product			Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
KE63	PN40	DN125	3	2	2	SEP
		DN150	3	2	2	SEP
		DN200	3	2	2	1
	PN25	DN125	2	1	2	SEP
		DN150	3	2	2	SEP
		DN200	3	2	2	1
	PN16	DN125	2	1	2	SEP
		DN150	2	1	2	SEP
		DN200	3	1	2	SEP
	KS 20	DN125	2	1	2	SEP
		DN150	3	2	2	SEP
		DN200	3	2	2	1
	KS 10	DN125	2	1	2	SEP
		DN150	2	1	2	SEP
		DN200	3	1	2	SEP
KE63B	PN40	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32	2	SEP	SEP	SEP
		DN40 - DN50	2	1	SEP	SEP
		DN65 - DN100	2	1	2	SEP
KE71	PN25	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32 - DN40	1	SEP	SEP	SEP
		DN50	2	1	SEP	SEP
KE71B	PN25	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32 - DN40	1	SEP	SEP	SEP
		DN50	2	1	SEP	SEP

KE valves (continued)

Product			Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
KE73	PN25	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32 - DN40	1	SEP	SEP	SEP
		DN50 - DN80	2	1	SEP	SEP
		DN100	2	1	2	SEP
		DN125	2	1	2	SEP
		DN150	3	2	2	SEP
		DN200	3	2	2	1
	PN16	DN65 and DN100	2	1	SEP	SEP
		DN125	2	1	2	SEP
		DN150	2	1	2	SEP
		DN200	3	1	2	SEP
	JIS 20 KS 20	DN125	2	1	2	SEP
		DN150	3	2	2	SEP
		DN200	3	2	2	1
	KS 10	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32 - DN40	1	SEP	SEP	SEP
		DN50 - DN80	2	1	SEP	SEP
		DN100	2	1	2	SEP
		DN125	2	1	2	SEP
		DN150	2	1	2	SEP
		DN200	3	1	2	SEP
KE73B	PN25	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32 - DN40	1	SEP	SEP	SEP
		DN50 - DN80	2	1	SEP	SEP
		DN100	2	1	2	SEP

KEA valves

Product			Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
KEA41	ASME 300	DN15 - DN25	SEP	SEP	SEP	SEP
KEA42		DN32	2	SEP	SEP	SEP
KEA41B		DN40	2	1	2	SEP
KEA42B		DN50	2	1	2	SEP

KEA valves (continued)

Product			Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
KEA43 KEA43B	ASME 150	DN15 - DN25	SEP	SEP	SEP	SEP
		DN40 - DN100	2	1	2	SEP
		DN150	2	1	2	SEP
		DN200	3	2	2	SEP
	ASME 300	DN15 - DN25	SEP	SEP	SEP	SEP
		DN40 - DN100	2	1	2	SEP
		DN150	3	2	2	SEP
		DN200	3	3	2	1
KEA43 KEA63	KS 20	DN32	2	SEP	SEP	SEP
KEA61 KEA62 KEA61B KEA62B	ASME 300	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32	2	SEP	SEP	SEP
		DN40	2	1	2	SEP
		DN50	2	1	2	SEP
KEA63 KEA63B	ASME 150	DN15 - DN25	SEP	SEP	SEP	SEP
		DN40 - DN50	1	SEP	SEP	SEP
		DN65 - DN100	2	1	SEP	SEP
		DN150	2	1	2	SEP
		DN200	3	2	2	SEP
	ASME 300	DN15 - DN25	SEP	SEP	SEP	SEP
		DN40	2	1	SEP	SEP
		DN50 - DN100	2	1	2	SEP
		DN150	3	2	2	SEP
		DN200	3	3	2	1
KEA71 KEA71B	ASME 250	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32	2	SEP	SEP	SEP
		DN40 - DN50	2	1	SEP	SEP
KEA71B	ASME 250	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32	2	SEP	SEP	SEP
KEA73 KEA73B	ASME 125	DN15 - DN25	SEP	SEP	SEP	SEP
		DN40 - DN65	1	SEP	SEP	SEP
		DN80 - DN100	2	1	SEP	SEP
		DN150	2	1	2	SEP
		DN200	2	1	2	SEP
	ASME 250 KS 10	DN15 - DN25	SEP	SEP	SEP	SEP
		DN40 - DN50	2	1	SEP	SEP
		DN65 - DN100	2	1	2	SEP
		DN150	3	2	2	SEP
		DN200	3	3	2	1

LE valves

Product			Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
LE31 LE31B LE33	PN16	DN15 - DN25	SEP	SEP	SEP	SEP
LE33B LE43		DN32 - DN50	1	SEP	SEP	SEP
LE43B LE63 LE63B		DN65 - DN100	2	1	SEP	SEP

LEA valves

Product			Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
LEA31 LEA31B LEA33 LEA33B	ASME 125	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32 - DN65	1	SEP	SEP	SEP
		DN80 - DN100	2	1	SEP	SEP
	KS 10	DN32	1	SEP	SEP	SEP
LEA43 LEA43B LEA63 LEA63B	ASME 125 KS 10 JIS 10	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32 - DN50	1	SEP	SEP	SEP
		DN65 - DN100	2	1	SEP	SEP
LEA43 LEA43B LEA63 LEA63B	ASME 150	DN15 - DN25	SEP	SEP	SEP	SEP
		DN32 - DN50	1	SEP	SEP	SEP
		DN65 - DN100	2	1	SEP	SEP

1.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

1.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

1.4 Hazardous liquids or gases in the pipeline

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

1.5 Hazardous environment around the product

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

1.6 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk?
Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

1.7 Pressure systems

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

1.8 Temperature

Allow time for temperature to normalise after isolation to avoid the danger of burns and consider whether protective clothing (including safety glasses) is required.

PTFE SEALS

If seals made from PTFE have been subjected to a temperature approaching 260°C (500°F) or higher, they will give off toxic fumes, which if inhaled are likely to cause temporary discomfort. It is essential for a no smoking rule to be enforced in all areas where PTFE is stored, handled or processed as persons inhaling the fumes from burning tobacco contaminated with PTFE particles can develop 'polymer fume fever'.

1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high /low temperature, radiation, noise, falling objects, and dangers to eyes and face.

1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.
Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety. Post 'warning notices' if necessary.

1.12 Handling

Manual handling of large and /or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

1.13 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of some products may reach temperatures of 350°C (662°F).
Many products are not self-draining. Take due care when dismantling or removing the product from an installation (refer to 'Maintenance instructions').

1.14 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

1.15 Disposal

Unless otherwise stated in the Installation and Maintenance Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken. However, if the valve is fitted with a Viton or PTFE seat, special care must be taken to avoid potential health hazards associated with decomposition / burning of these seats.

PTFE:
- **Can only be disposed of by approved methods, not incineration.**
- **Keep PTFE waste in a separate container, do not mix it with other rubbish, and consign it to a landfill site.**

1.16 Returning products

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

2. General product information

2.1 General description

SPIRA-TROL is a range of two-port single seat globe valves with cage-retained seats conforming to either EN (DIN) or ASME (ANSI) standards. These valves are available in three body materials in sizes ranging from DN15 to DN100 (½" to 4"), and two materials in sizes DN125 to DN200 (5" to 8"). When used in conjunction with a pneumatic or electric linear actuator they provide modulating control or on / off service.

SPIRA-TROL valve characteristic - options:

KE and **KEA** **LE** and **LEA**	**Equal percentage (E) -** Suitable for most modulating process control applications providing good control at low flowrates.
KF and **KFA**	**Fast opening (F) -** For on/off applications only.
KL and **KLA** **LL** and **LLA**	**Linear (L) -** Primarily for liquid flow control where the differential pressures across the valve is constant.

Important note: Throughout this document, reference has been made to the standard KE, KEA, LE and LEA control valves. With the exception of trim type, all derivatives are identical.

SPIRA-TROL two-port control valves are compatible with the following actuators and positioners:

Electric	DN15 - DN100: EL3500, EL5600 and EL7200
	DN125 - DN200: EL5600
Pneumatic	All sizes: PN1000, PN9000
	DN125 - DN200 : PN1000 , PN9000 and TN2000
Positioners	PP5 (pneumatic) or EP5 (electropneumatic)
	ISP5 (intrinsically safe electropneumatic)
	SP200is, SP400 and SP500 (microprocessor based electropneumatic)
	SP300 (digital communications)

Refer to the relevant Technical Information sheet for further details.

2.2 Technical data

Plug design			Parabolic
Leakage	Metal-to-metal	KE and LE series	Class IV
		KEA and LEA series	ASME (ANSI) Class IV
	Soft seal	KE and LE series	Class VI
		KEA and LEA series	ASME (ANSI) Class VI
Rangeability			50:1
Travel		DN15 to DN50 (½" to 2")	20 mm (¾")
		DN65 to DN100 (2½" to 4")	30 mm (1 3/16")
		DN125 to DN200 (5" to 8")	70 mm (2¾")
Pressure/temperature limits		KE	See Section 2.3
		LE	See Section 2.4
		KEA	See Section 2.5
		LEA	See Section 2.6

Fig. 1
DN15 to DN100
KE, KEA and LEA valves

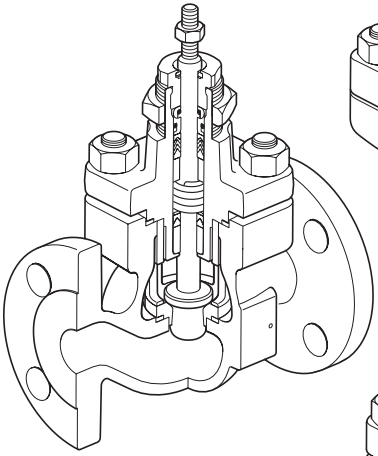


Fig. 2 DN15 - DN100 KE and KEA with bellows seal (B) and (C)

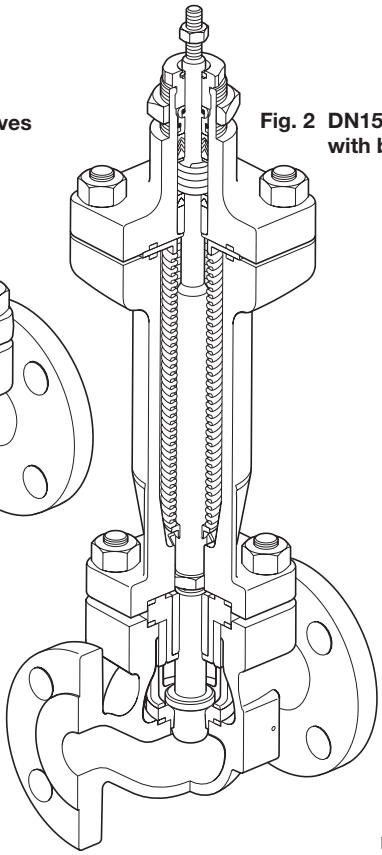
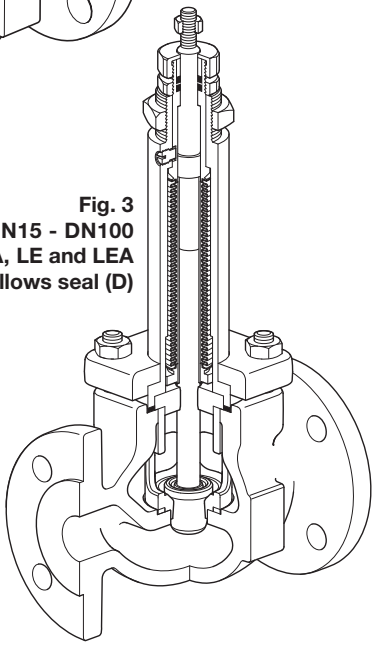


Fig. 3
DN15 - DN100
KE, KEA, LE and LEA
with bellows seal (D)



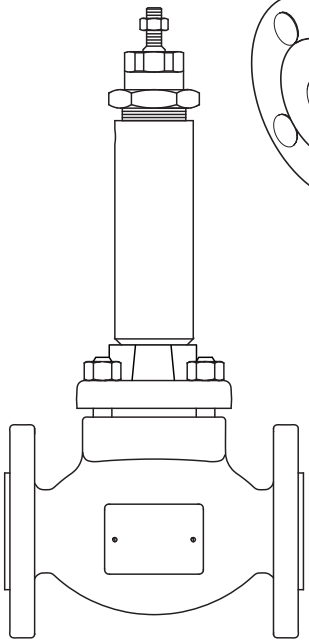


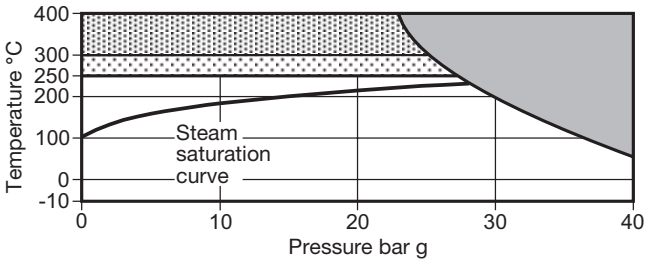
Fig. 4
DN15 - DN100 KE, KEA, LE and LEA
with extended bonnet

2.3 Pressure / temperature limits for the KE valves

Body design conditions	KE4_		PN40
	KE6_		PN40
	KE7_		PN25
Maximum design pressure	KE4_		40 bar g @ 50°C
	KE6_		36.4 bar g @ 50°C
	KE7_		25 bar g @ 120°C
Maximum design temperature	KE4_		400°C
	KE6_		400°C
	KE7_		350°C
Minimum design temperature	KE4		-10°C
	KE6_		-50°C
	KE7_		-10°C
Maximum operating temperature	Standard packing PTFE chevron		250°C
	PTFE soft seat (G)		200°C
	PEEK seat (K)		250°C
	High temperature packing (H)		400°C
	Extended bonnet (E) with PTFE chevron		250°C
	Extended bonnet (E) with graphite packing		400°C
	Bellows (B)		250°C
	Bellows (C)		400°C
	Bellows (D)		400°C
Minimum operating temperature **Note:** For lower operating temperatures consult Spirax Sarco.	KE4		-10°C
	KE6_	PTFE packing	-29°C
		Graphite packing	-50°C
	KE7_		-10°C
Maximum differential pressures:	See relevant actuator Technical Information sheet		
Maximum cold hydraulic test pressure of: **Warning:** If the valve is fitted with a bellows it must be removed if hydraulic testing is to be done.	KE4_		60 bar g
	KE6_		60 bar g
	KE7_		38 bar g

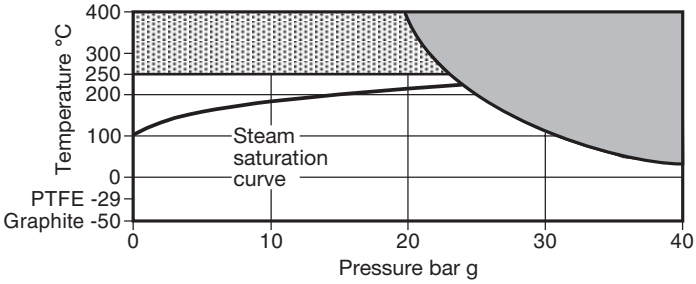
KE43

(Cast steel)



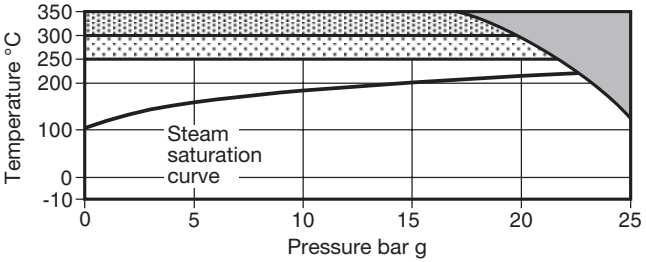
KE61
KE63

(Stainless steel)



KE71
KE73

(SG iron)



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

High temperature packing is required for use in this region.

High temperature bolting and packing is required for use in this region.

Notes: 1. Where the process fluid temperature is sub-zero and the ambient temperature is below +5°C, the external moving parts of the valve and actuator must be heat traced to maintain normal operation.

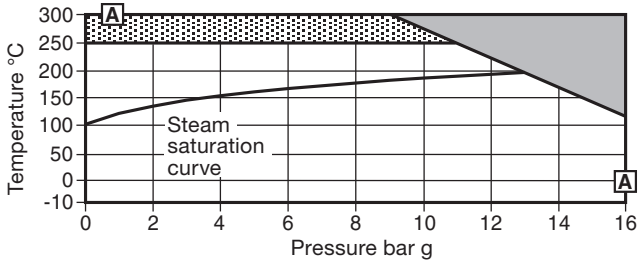
2. When selecting a valve with a bellows sealed bonnet, the pressure / temperature limits of the bellows must be read in conjunction with the valve pressure / temperature limits shown below.

2.4 Pressure / temperature limits for the LE valves

Body design conditions			PN16
Maximum design pressure	LE31		16 bar g @ 120°C
	LE33		16 bar g @ 120°C
	LE43		16 bar g @ 50°C
	LE63		14.6 bar g @ 50°C
Maximum design temperature	LE31		300°C
	LE33		300°C
	LE43		400°C
	LE63		400°C
Minimum design temperature	LE31		-10°C
	LE33		-10°C
	LE43		-10°C
	LE63		-50°C
Maximum operating temperature	Standard packing PTFE chevron		250°C
	PTFE soft seat (G)		200°C
	PEEK seat (K)		250°C
	High temperature packing (H)		400°C
	Extended bonnet (E) with PTFE chevron		250°C
	Extended bonnet (E) with graphite packing		400°C
	Bellows (D)		400°C
Minimum operating temperature **Note:** For lower operating temperatures consult Spirax Sarco.	LE31		-10°C
	LE33		-10°C
	LE43		-10°C
	LE63	PTFE packing	-29°C
		Graphite packing	-50°C
Maximum differential pressures:	See relevant actuator Technical Information sheet		
Maximum cold hydraulic test pressure of: **Warning:** If the valve is fitted with a bellows it must be removed if hydraulic testing is to be done.	LE31		24 bar g
	LE33		24 bar g
	LE43		24 bar g
	LE63		24 bar g

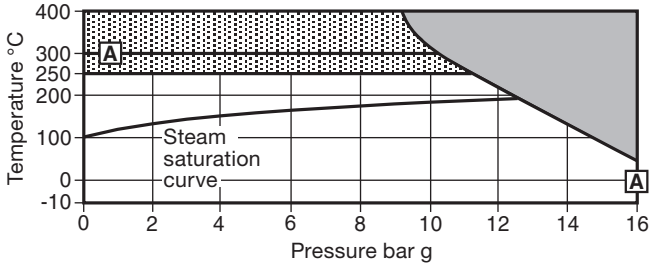
LE31 LE31B
LE33 LE33B

(Cast iron)



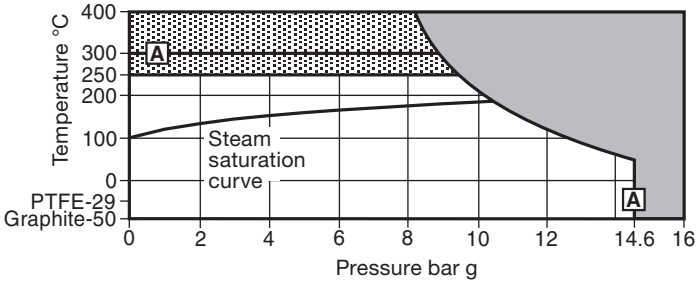
LE43 LE43B

(Carbon steel)



LE63 LE63B

(Stainless steel)



A - A **Please note** - Bellows sealed valves (Option D) are limited to **A** - **A**.

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

High temperature graphite packing is required for use in this region.

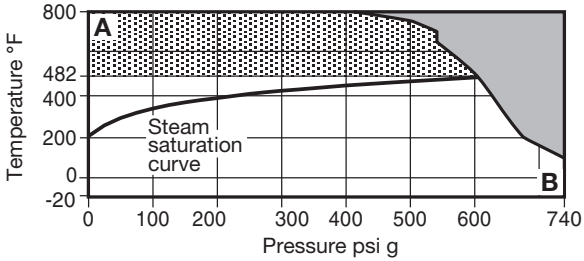
Note: Where the process fluid temperatureis sub-zero and the ambient temperature is below +5°C, the external moving parts of the valve and actuator must be heat traced to maintain normal operation.

2.5 Pressure / temperature limits for the KEA valves

Body design conditions	KEA4_		ASME (ANSI) 150 ASME (ANSI) 300
	KEA6_		ASME (ANSI) 300
	KEA7_		ASME (ANSI) 125 ASME (ANSI) 250
Maximum design pressure	KEA4_	ASME (ANSI) 150	276 psi g @ 100°F
		ASME (ANSI) 300	740 psi g @ 100°F
	KEA6_	ASME (ANSI) 150	275 psi g @ 100°F
		ASME (ANSI) 300	720 psi g @ 100°F
	KEA7_	ASME (ANSI) 125	200 psi g @ 150°F
		ASME (ANSI) 250	500 psi g @ 150°F
Maximum design temperature	KEA4_		800°F
	KEA6_		800°F
	KEA7_		450°F
Minimum design temperature	KEA4_		-20°F
	KEA6_		-58°F
	KEA7_		-20°F
Maximum operating temperature	Standard packing PTFE chevron		482°F
	PTFE soft seat (G)		392°F
	PEEK seat (K)		482°F
	Graphite packing (H)		800°F
	Extended bonnet (E) with PTFE chevron		482°F
	Extended bonnet (E) with graphite packing		800°F
	Bellows (B)		570°F
	Bellows (C)		750°F
	Bellows (D)		570°F
Minimum operating temperature	KEA4_		-20°F
	KEA6_	PTFE packing	-20°F
		Graphite packing	-58°F
	KEA7_		-20°F
Maximum differential pressures:	See relevant actuator Technical Information sheet		
Maximum cold hydraulic test pressure of: **Warning:** If the valve is fitted with a bellows it must be removed if hydraulic testing is to be done.	KEA4_		1100 psi g
	KEA6_		1100 psi g
	KEA7_	ASME (ANSI) 125	300 psi g
		ASME (ANSI) 250	750 psi g

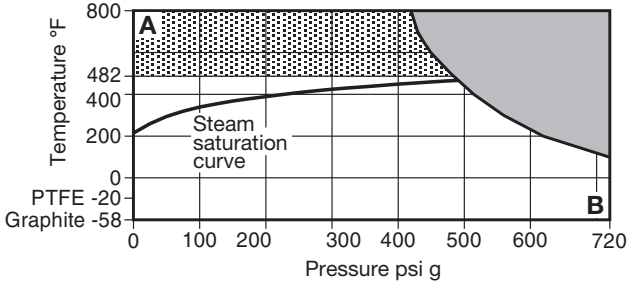
KEA41
KEA42
and
KEA43

(Carbon steel)



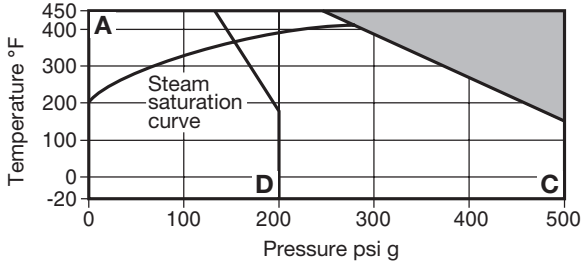
KEA61
KEA62
KEA63

(Stainless steel)



KEA71
and
KEA73

(Ductile iron)



A - B Flanged ASME (ANSI) 300 and screwed NPT and SW

A - C Flanged ASME (ANSI) 250 and screwed NPT and SW

A - D Flanged ASME (ANSI) 125

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

Graphite stem sealing is required for use in this region

Notes: **1.** Where the process fluid temperature is sub-zero and the ambient temperature is below +5°C, the external moving parts of the valve and actuator must be heat traced to maintain normal operation.

2. When selecting a valve with a bellows sealed bonnet, the pressure/temperature limits of the bellows must be read in conjunction with the valve pressure/temperature limits shown above.

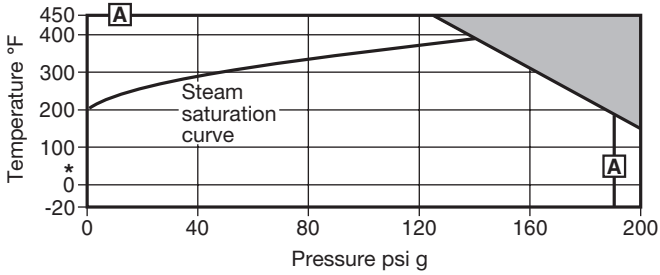
3. As standard the KEA, KFA, KLA series two-port control valves are supplied with the PTFE stem sealing option.

2.6 Pressure / temperature limits for the LEA valves

Body design conditions	LEA31 LEA33		ASME (ANSI) 125
	LEA43 LEA63		ASME (ANSI) 150
Maximum design pressure	LEA31		200 psi g @ 150°F
	LEA43 LEA63		275 psi g @ 120°F
Maximum design temperature	LEA31 LEA33		450°F @ 125 psi g
	LEA43 LEA63		800°F @ 80 psi g
Minimum design temperature	LEA31 LEA33 LEA43		-20°F
	LEA63		-58°F
Maximum operating temperature	Standard packing PTFE chevron		450°F
	PTFE soft seat (G)		392°F
	PEEK seat (K)		482°F
	Graphite packing (H)		450°F
	Extended bonnet (E)		450°F
	Bellows (D)		570°F
Minimum operating temperature **Note:** For lower operating temperatures consult Spirax Sarco.	LEA31 LEA33 LEA43		-20°F
	LEA63	PTFE packing	-20°F
		Graphite packing	-58°F
Maximum differential pressures:	See relevant actuator Technical Information sheet		
Maximum cold hydraulic test pressure of: **Warning:** If the valve is fitted with a bellows it must be removed if hydraulic testing is to be done.	LEA31 LEA33 LEA43 LEA63		300 psi g

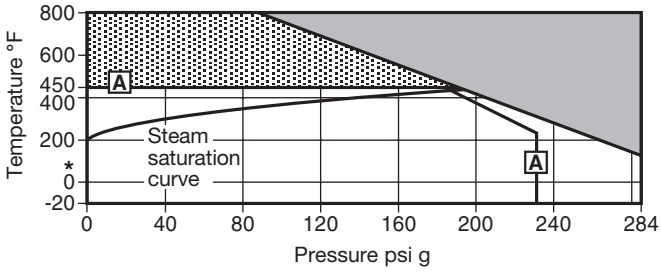
LEA31 LEA31B
LEA33 LEA33B

(Cast iron)



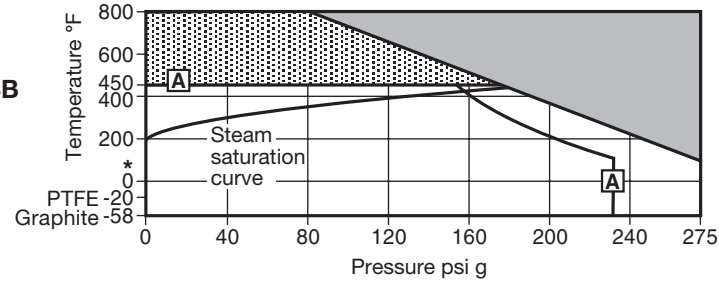
LEA43 LEA43B

(Carbon steel)



LEA63 LEA63B

(Stainless steel)



A - A **Please note** - Bellows sealed valves (Option D) are limited to **A - A**.

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

High temperature graphite packing is required for use in this region.

Notes: Where the process fluid temperature is sub-32°F and the ambient temperature is below +41°F, the external moving parts of the valve and actuator must be heat traced to maintain normal operation.

If the valve required is supplied with a **PTFE soft seat** it will be **limited to** a maximum operating temperature of **392°F**.

3. Installation and commissioning

Note: Before actioning any installation, observe the 'Safety information' in Section 1.

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation:

3.1 Check materials, pressure and temperature and their maximum values. **Do not exceed the performance rating of the valve.** If the maximum operating limit of the product is lower than that of the system in which it is being fitted, ensure that a safety device is included in the system to prevent overpressurisation.

3.2 Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

3.3 Determine the correct installation situation and the direction of fluid flow. The valve should preferably be installed along a horizontal pipeline with the valve mounted above the pipe (see Figure 3). When mounting an actuator to the valve body, the actuator Installation and Maintenance Instructions must be followed.

3.4 **Bypass arrangements** - It is recommended that isolating valves be fitted upstream and downstream of the control valve, together with a manual bypass control valve. This enables the process to be controlled manually using the bypass valve while the pneumatic valve is isolated for maintenance.

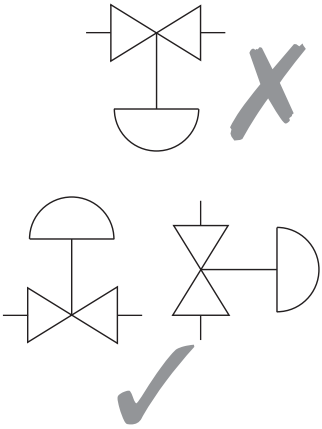


Fig. 3

3.5 Support pipework should be used to prevent stresses being exerted on the valve body. **Note:** If a DN125 to DN200 valve is to be installed in vertical pipework the actuator will require additional support.

3.6 Ensure adequate space is provided for the removal of the actuator from the valve body for maintenance purposes:

3.7 Isolate connecting pipework. Ensure it is clean from dirt, scale etc. Any debris entering the valve may damage the head seal preventing the specified shut off.

3.8 Open isolation valves slowly, until normal operating conditions are achieved.

3.9 Check for leaks and correct operation.

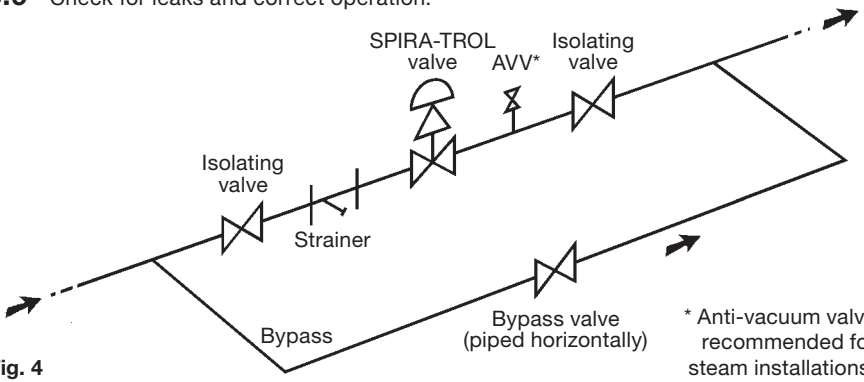


Fig. 4

* Anti-vacuum valve recommended for steam installations.

4. Maintenance DN15 to DN100

Note: Before actioning any installation, observe the 'Safety information' in Section 1.

Warning for all stainless steel valves

The 316 type stainless steel used in the construction of these products particularly for screwed or close fitting parts, is very susceptible to galling or cold welding. This is an inherent characterisitic of this type of material and great care should therefore be taken when dismantling or reassembling.
If the application permits, it is recommended that a light smear of a PTFE based grease is applied to any mating parts before reassembly.

4.1 General

Valve parts are subject to normal wear and must be inspected and replaced as necessary. Inspection and maintenance frequency depends on the severity of the service conditions. This section provides instructions on replacement packing, stem, plug and seat and bellows. All maintenance operations can be performed with the valve body in the line.

Annually

The valve should be inspected for wear and tear replacing any worn or damaged parts such as valve plug and stem, valve seat and gland seals, refer to Section 6 'Spare parts'.

Note 1: High temperature graphite packed seals are subject to wear during normal operation. We therefore recommend the graphite packing be replaced during this routine inspection to prevent premature failure of the packing during normal operation.

Note 2: It is recommended that all soft seals and gaskets be replaced whenever the valve is disassembled.

Note 3: Lubrication of the bonnet fastenings: Bonnet threads or bolts should be lubricated prior to re-assembling the bonnet to the valve, (use lubricating oil, grease, with an equivalent coefficient friction of $\mu = 0.165$)

New torque values with lubrication:

The following new torque values should be used with lubricated nuts/bolts:

Table 1 **Recommended tightening torques - Control valve sizes DN15 to DN100**

SPIRA-TROL valve size	Torque (N m) (with oil; $\mu = 0.165$)		
	LE	KE	LEA / KEA
DN15 - DN25	30	30	30
DN32 - DN50	40	55	55
DN65 - DN80	85	85	85
DN100	70	70	70

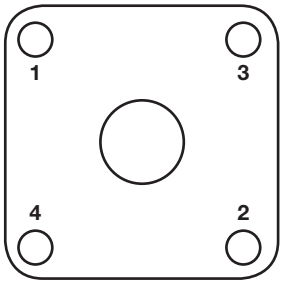


Fig. 5 Bonnet tightening sequence

4.2 Removal of valve bonnet

Note: This procedure is necessary before carrying out any of the maintenance procedures detailed below:

- Ensure that the valve is depressurised and clear of media and isolate it both upstream and downstream.
- **Caution:** care should be taken when disassembling the valve in case of residual pressure being trapped between the isolation points.
- Remove the actuator from the valve. Refer to the Installation and Maintenance Instructions covering Spirax Sarco actuators.
- Unscrew the gland nut (**18**).
- Undo and remove the bonnet nuts (**27**).
- Remove the bonnet (**2**) and plug and stem assembly (**8**).
- Remove and discard the body gasket.

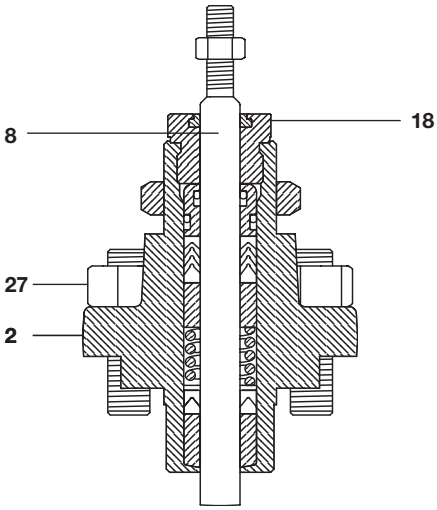


Fig. 6

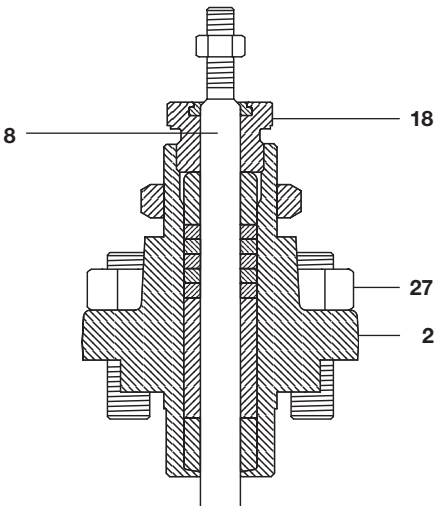


Fig. 7

4.3 Replacement of PTFE gland packings

- Remove the lock-nut (**3**), gland nut (**18**), 'O' rings (**15** and **17**) and scraper ring (**19**) from the gland nut, ensuring that the grooves are clean and undamaged, replace with new items. The use of silicone grease on the 'O' rings is recommended.
- Withdraw the gland components and discard (**9, 10, 12** and **14**).
- Clean the gland cavity and fit new gland components in the order shown in Figure 8. **Note** that the lower bearing must be fitted with the radiused edge downwards. When fitting the chevron seals they should be inserted with correct orientation (see Figure 8), one at a time to ease the assembly process.

- Apply a light smear of anti-seize lubricant to the gland nut threads before screwing it in two or three turns. At this stage the packing must not be significantly compressed.
- Final adjustment of the gland must be carried out after refitting the bonnet as detailed in Section 4.6.

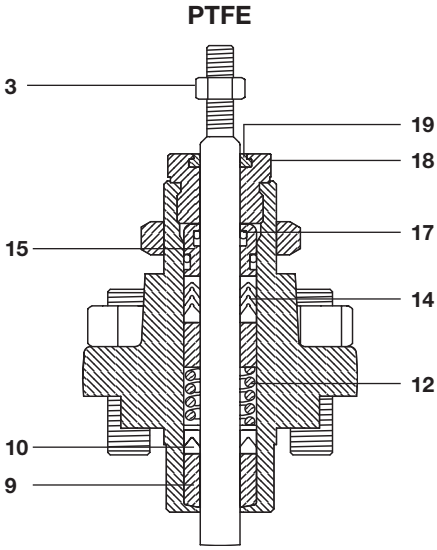


Fig. 8

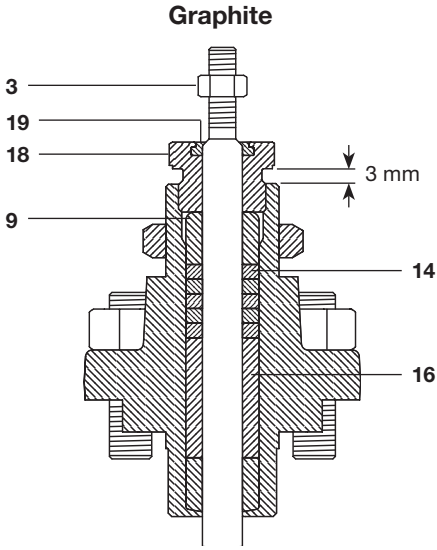
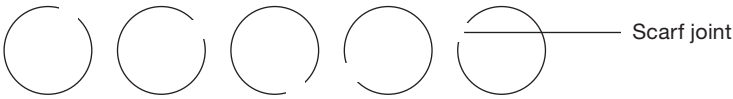


Fig. 9

4.4 Replacement of graphite gland packing

- Remove the lock-nut (**3**), gland nut (**18**) and scraper ring (**19**) from the gland nut, ensuring that the groove is clean and undamaged, replace with new item.
- Remove the upper Stellite bearing (**9**) and retain, withdraw the graphite packing (**14**) and discard. Remove the spacer and lower bearing (**16**). Clean and examine these components and the upper bearing replacing any that show signs of damage or deterioration.
- Clean the gland cavity and reassemble the gland components in the order shown in Figure 9. **Note** that the lower bearing must be fitted with the radiused edge downwards. When fitting the graphite seals, the scarf joints in each seal must be offset from the one below by 90°.

Fig. 10



- Apply a light smear of anti-seize lubricant to the gland nut threads before screwing it in sufficiently to seat and hold the packing without compressing them.
- Final adjustment of the gland must be carried out after refitting the bonnet as detailed in Section 4.6.

4.5 Removal and refitting of the valve plug/stem assembly and seat

- Lift out the seat retaining cage (**5**) followed by the seat (**6**).
- Remove the seat back gasket (**7**) and discard.
- Clean all components, including the seat recess in the valve body.
- Examine the seat and plug/stem assembly for damage or deterioration and renew as necessary.
  Note: Score marks or scaly deposits on the valve stem will lead to early failure of the gland seals and damage to seat and plug sealing faces will result in leakage rates higher than those specified for the valve.
- Fit a new seat gasket (**7**) in the body seat recess followed by the seat (**6**).
- Refit the cage (**5**) ensuring that the flow windows are lower most and that it sits squarely on the seat without impinging on the valve body.

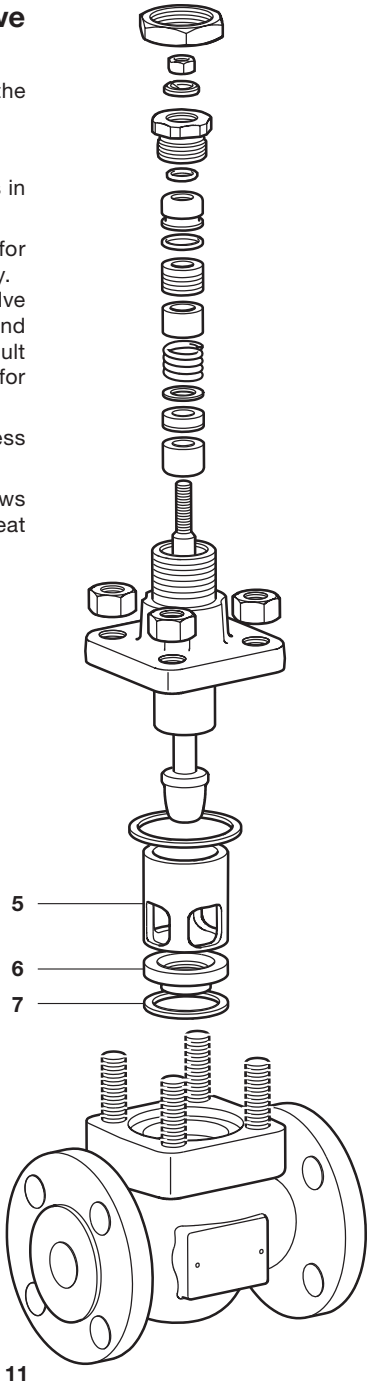


Fig. 11

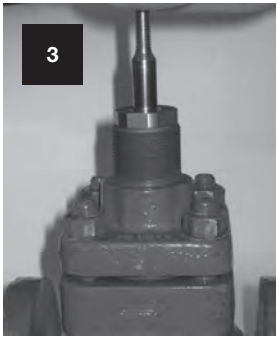
4.6 Refitting the bonnet

Caution: The following must be carefully followed to enable the correct reassembly of the control valve, and the subsequent test that is required to ensure that the plug moves freely inside the valve seat:

- Fit new bonnet gasket.
- Ensure the plug stem is fully extended without the upper stem threads making contact with stem seals on the top of the bonnet.
- Replace the bonnet and stem assembly to the valve body, locating the plug centrally into the seat.
- Holding the Plug in position, push the bonnet down on to the valve body.
- Proceed to tighten the bonnet into position by following Step 1 through to 7:

Fit bonnet nuts.

Finger tighten opposing bonnet nuts or bolts evenly in pairs.

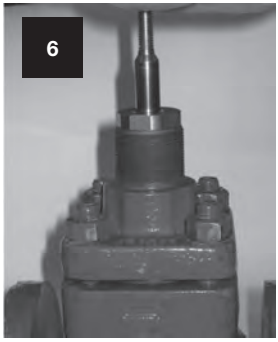


Raise the stem to the highest position.

Firmly and briskly push the stem fully down.

Repeat Steps 1 to 4 finger tightening bonnet nuts or bolts individually until tight.

Using a spanner lightly and evenly tighten each bolt or nut by 45°, following the sequence illustrated in Figure 5, page 21.



After each tightening sequence lift the stem fully.

Firmly and briskly push the stem fully down.

- Repeat Steps 5, 6 and 7 until the bonnet nuts or bolts have an even tension.
- Continue Steps 5, 6 and 7 but use a torque wrench set at 10% of maximum required torque setting.
- Again, repeat Steps 5, 6 and 7, incrementally increasing the torque value to 20%, 40%, 60%, 80% and finally 100% of the required torque value (as specified in Table 1, page 21).
- Pull the plug off its seat, rotate by 120° and slowly push it back down into the seat checking for any signs of resistance as the plug comes into contact with the seat.
- Repeat the above Step, three more times.
- If any resistance is felt, this can indicate the plug and seat is misaligned and the process will need repeating.
- Tighten the gland nut (**18**) until:
  i) PTFE gland assembly: Metal-to-metal contact with the bonnet is achieved.
  ii) Graphite gland assembly: A gap of 3 mm between the underside of the gland nut and the bonnet is achieved. See Figure 12.
- Refit the lock-nut (**3**).
- Reinstall the actuator.
- Bring the valve back into service.
- Check for leakage at the gland.

Note: Recheck the graphite seals and retighten the gland if necessary after a few hundred cycles as the seals fully bed in.

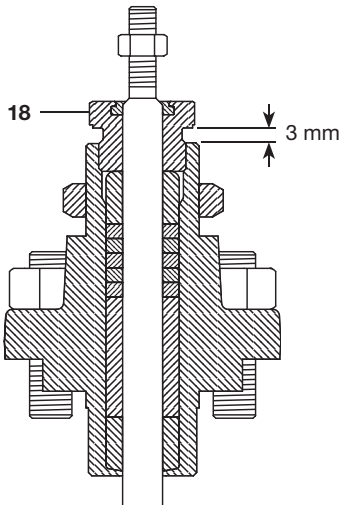


Fig. 12

4.7 Bellows sealed valves

Note: These valves are fitted with a bellows stem seal as the primary seal together with a graphite stem seal. Any leakage from the stem will indicate a failure of the bellows seal.

4.7.1 Procedure for renewing the bellows (B) and (C) assembly:

- Isolate the valve on both sides.
  Caution: care should be taken in removing the valve bonnet since fluid under pressure may be trapped between the two isolating valves.
- Remove the actuator from the valve. Refer to the Installation and Maintenance Instructions covering Spirax Sarco actuators.
- Remove the lock-nut (**3**).
- Loosen the gland nut (**18**).
- Remove the 4 bonnet nuts (**27**).
- Gently remove the bonnet leaving the plug stem exposed.
- Remove the body nuts (**27**) and remove the bellows bonnet from the valve body.
- Grip the stem from the top. Push the stem (**8**) down to expose a lock-nut (**26**). Release the lock-nut and unscrew the plug from the stem.
- Remove and replace the bellows (**21**) from the bellows housing (**29**).
- Grip and push the new stem (**8**) to expose the thread - using Loctite retainer 620, screw in the plug.
- Tighten lock-nut (**26**) to 20 N m.
- Replace seat gasket (see Section 4.2.1) and bonnet gasket (**4**) then re-assemble the bellows housing to the valve body. Finger tighten in sequence, refer to the note under bonnet nut torque setting, (see Table 1, page 21).
- Fit new stem seals in accordance with Section 4.2.
- Slide the bonnet (**2**) over the stem (**8**) and replace the body nuts (**27**) and tighten, in sequence, referring to Table 1 (page 21).
- Bring the valve back into service.
- Check for leakage at the gland.

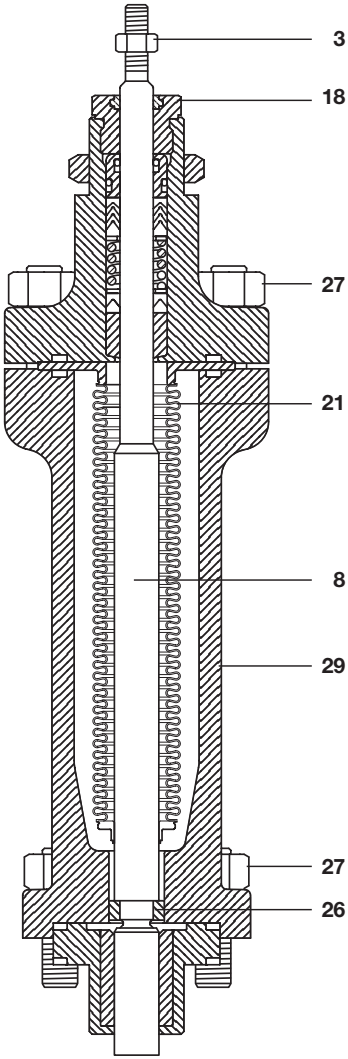


Fig. 13

4.7.2 Procedure for renewing the bellows (D) assembly:

- Isolate the valve on both sides.
- Remove the actuator from the valve. Refer to the Installation and Maintenance Instructions covering Spirax-Sarco actuators.
- Remove in order: lock-nut (**8**), gland nut (**9**), gland nut spacer (**19**), the anti-rotation pin (**16**).
  Caution: care should be taken in removing the valve bonnet since fluid under pressure may be remain inside between the valve body and bellows assembly (**5**).
- Remove the bonnet nuts (**15**) the bellows housing (**2**). Remove bonnet and bellows, alternatively if the bellows are to remain in place then apply pressure to stem and remove bonnet.
- Remove the bellows assembly (**5**), cage (**20**), the seat (**4**) and the gasket (**7**).
- Clean the gasket surfaces (**7**) seat (**4**) bonnet gasket (**12**), then remove graphite packing rings (**17**).
- Re-assemble in order: gasket (**7**), seat (**4**), cage (**20**), bonnet gasket (**12**), bellows assembly (5), the bellows cover gasket (**13**).
- Clean the internals of the bellows housing (**2**) with particular attention to the mating surfaces of the bellows cover gasket.
- Fit the bellows housing (**2**) ensuring that the hole in the anti-rotation pin (**16**) aligns with the milled flat on the bellows assembly (**5**).
- Screw in the anti-rotation pin (**16**) until finger tight, screw the gland nut spacer (**19**) and tighten to the torque indicated in Table 1 (page 21), insert new graphite packing rings (**17**) and screw the gland nut (**9**).
- Push the plug on to the seat to obtain correct alignment of the parts, then tighten in sequence to the torque previewed in Table 1 (page 21). Re-fit bonnet nuts (**15**) and bellows housing (**2**).
- Re-fit the actuator. Refer to the Installation and Maintenance Instructions covering Spirax-Sarco actuators. Attention: In order to avoid damage to the bellows, do not rotate the stem.

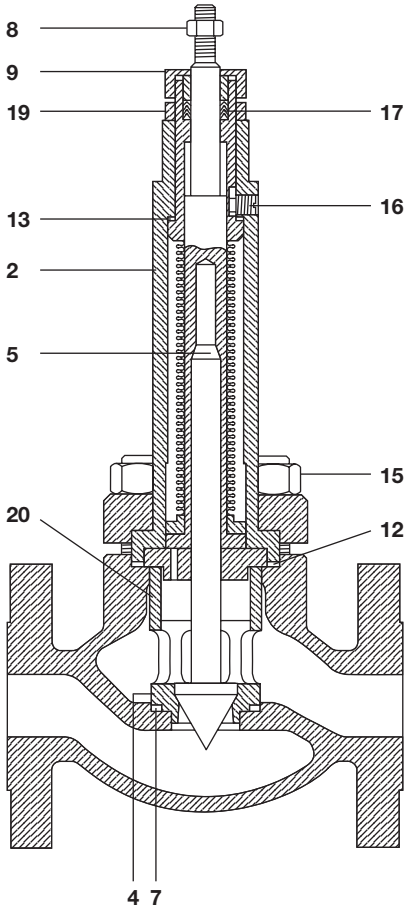


Fig. 14

Important: When ordering spare bellows, ensure that the gaskets are also ordered.

5. Maintenance
DN125 to DN200

Note: Before actioning any installation, observe the 'Safety information' in Section 1.

5.1 General

Valve parts are subject to normal wear and must be inspected and replaced as necessary. Inspection and maintenance frequency depends on the severity of the service conditions. This Section provides instructions on the replacement of the packing, stem, plug and seat. All maintenance operations can be performed with the valve body in the line.
Note: It is recommended that all soft seals and gaskets are replaced whenever the valve is disassembled.

Annually

The valve should be inspected for wear and tear replacing any worn or damaged parts such as valve plug and stem, valve seat and gland seals, refer to Section 6 'Spare parts'.

Note 1: High temperature graphite packed seals are subject to wear during normal operation. We therefore recommend the graphite packing be replaced during this routine inspection to prevent premature failure of the packing during normal operation.

Note 2: It is recommended that all soft seals and gaskets be replaced whenever the valve is disassembled.

Table 2 Recommended tightening torques - Control valve sizes DN125 to DN200

	DN125	DN150	DN200
KE	203 N m	211 N m	265 N m
KEA	-	245 N m	365 N m

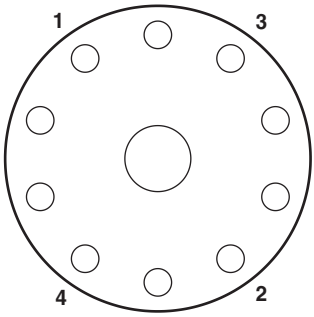


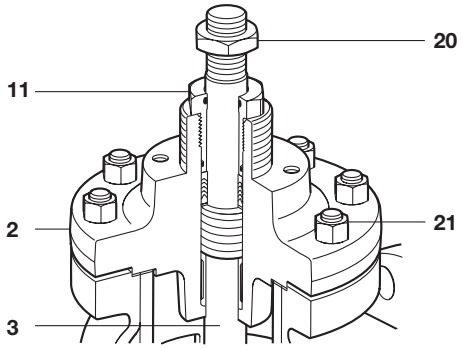
Fig. 15 DN125 to DN200

5.2 Removal of the valve bonnet

Note: This procedure is necessary before carrying out any of the maintenance procedures detailed below:

- Ensure that the valve is depressurised and clear of media and isolate it both upstream and downstream.
  Caution: care should be taken when disassembling the valve in case of residual pressure being trapped between the isolation points.
- Remove the actuator from the valve. Refer to the Installation and Maintenance Instructions covering Spirax Sarco actuators.
- Loosen the gland nut (**11**).
- Undo and remove the bonnet nuts (**21**).
- Using suitable lifting equipment, remove the bonnet (**2**) with the plug and stem assembly (**3**). **Note:** for balanced valves the cage will most likely be attached to the plug (due to the tight fit of the balanced seal).

Fig. 16



5.3 Replacement of PTFE gland packings (reference Figure 18)

- Remove the lock-nut from the stem (**20**), and withdraw the plug stem assembly (with cage on balanced versions).
- Remove the 'O' rings (**17** and **18**) from the gland nut, ensuring that the grooves are clean and undamaged, replace with new items. The use of silicone grease on the 'O' rings is recommended.
- Withdraw the PTFE packing (**12**) and discard. Remove all metal components, washer (**14**), spring (**8**), bearing (**9**) and spacers (**10**) carefully noting how many components have been removed as it will differ on each valve size. Clean and examine these components replacing any that show signs of damage or deterioration.
- Clean the gland cavity and reassemble the gland components in the order shown in Figure 17.
  Note that the lower bearing must be fitted with the radius edge downwards. When fitting the chevron seals they should be inserted one at a time (see Figure 19). It may be necessary to compress the spring and seat using the gland nut after fitting two or three chevrons and to repeat this at similar intervals until all PTFE components are in place.
- Apply a light smear of anti-seize lubricant to the gland nut threads before screwing it two or three turns. At this stage the packing must not be significantly compressed.
- Final adjustment of the gland must be carried out after refitting the bonnet as detailed in Section 5.6.

5.4 Replacement of graphite gland packings (reference Figure 20)

- Remove the lock-nut from the stem (**20**), and withdraw the plug stem assembly (with cage on balanced versions).
- Withdraw the graphite packing (**26**) and discard. Remove all metal components, washer (**14**) and spacers (**10**) carefully noting how many components have been removed as it will differ on each valve size. Clean and examine these components replacing any that show signs of damage or deterioration.
- Clean the gland cavity and reassemble the gland components in the order shown in Figure 17. **Note** that the lower bearing must be fitted with the radiused edge downwards. When fitting the graphite seals, the scarf joints in each seal must be offset from the one below by 90°.

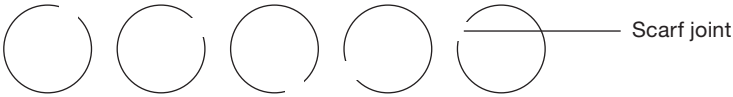


Fig. 17

- Apply a light smear of anti-seize lubricant to the gland nut threads before screwing it in sufficiently to seat and hold the packing without compressing it.
- Final adjustment of the gland must be carried out after refitting the bonnet as detailed in Section 5.6.

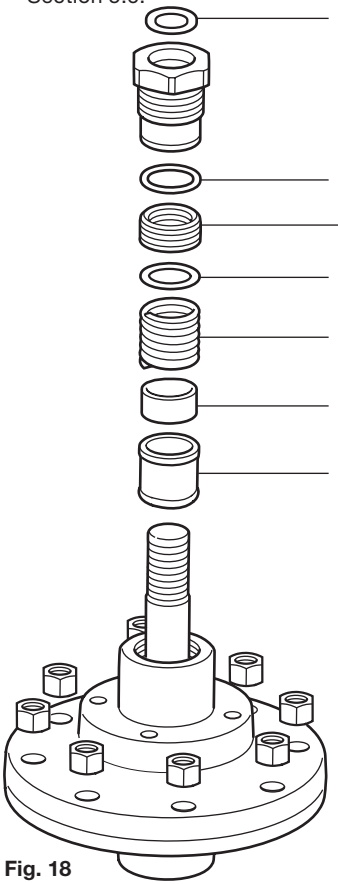


Fig. 18

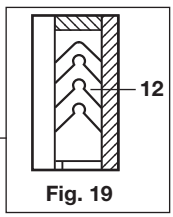


Fig. 19

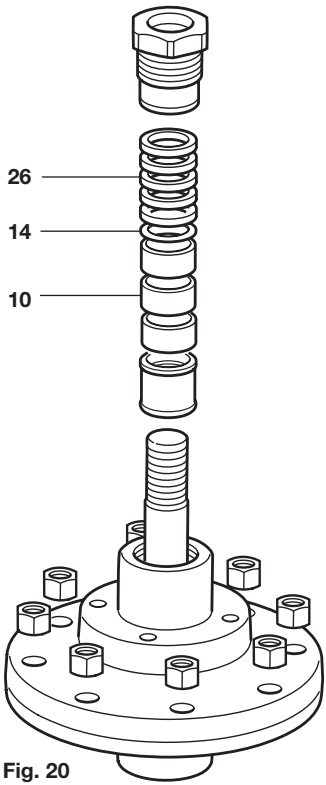


Fig. 20

5.5 Procedure for removal and refitting of valve plug /stem assembly and seat

5.5.1 Unbalanced valves

- Using lifting equipment as appropriate, withdraw the plug/stem assembly (**3**).
- Lift out the cage (**4**) followed by the seat (**6**).
- Remove the seat back gasket (**16**) and discard.
- Clean all the components, including the seat recess in the valve body.
- Examine the seat and plug/stem assembly for damage or deterioration and renew as necessary.
  Note: Score marks or scaly deposits on the valve stem will lead to early failure of the gland seals and damage to seat and plug sealing faces will result in leakage rates higher than those specified for the valve.
- Fit a new seat gasket (**16**) in the body seat recess followed by the seat (**6**).
- Refit the cage (**4**) ensuring that the flow windows are lower most and that it sits squarely on the seat without impinging on the valve body.
- Lower the plug/stem assembly squarely onto the seat ring ensuring that the stem is left vertical.

5.5.2 Balanced valves

- Using lifting equipment as appropriate, withdraw the plug / stem assembly (**3**) taking care not to let the cage fall back into the valve body.
- Remove and discard the upper cage seal (**19**).
- Remove and discard the balance seal (**31**).
- Lift out the seat (**6**).
- Remove the seat gasket (**16**) and discard.
- Clean all the components, including the seat recess in the valve body.
- Examine the cage, seat and plug/stem assembly for damage or deterioration and renew as necessary. **Note:** Score marks or scaly deposits on the cage internal surface or valve stem will lead to early failure of the seals and damage to the seat and plug sealing faces will result in leakage rates higher than those specified for the valve.
- Fit a new seat gasket (**16**) in the body seat recess followed by the seat (6).
- Refit the cage (**4**) ensuring that the flow windows are lower most and that it sits squarely on the seat without impinging on the valve body.
- Fit a new balance seal (**31**) into the plug groove.
- Refit the plug /stem into the cage ensuring that the balanced seal is not damaged during this process - **Note:** a light smear of silicone grease on the inner surface of the cage will aid fitting. The plug /stem assembly should easily move up and down in the cage, using moderate hand force, until it is located in the seat.
- Fit a new upper cage seal (**19**).

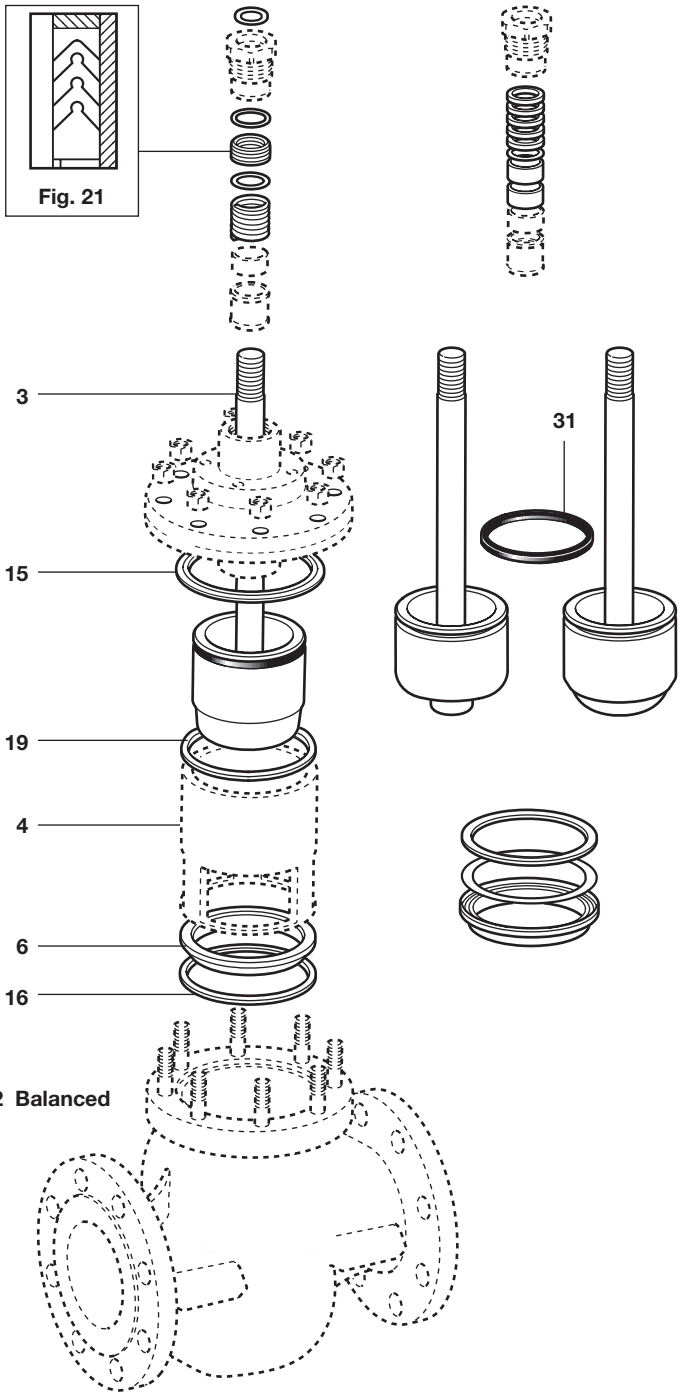


Fig. 22 Balanced

5.6 Refitting the bonnet

- Fit a new bonnet gasket (**15**).
- Using appropriate lifting equipment, carefully lower the bonnet into place over the valve stem. Care must be taken not to damage the new gland packing at this stage. **Note:** that the actuator mounting hole orientation should be in line with the valve flow axis.
- By hand tightening only, refit the bonnet nuts (**21**) to secure the bonnet in place.
- Raise the plug and stem assembly fully and forcefully push it back into the seat to align the internal components. Repeat a further two times. Re-tighten all bonnet nuts, hand tight.
- Apply a load to the stem (preferably replace the actuator), then re-tighten the bonnet nuts in sequence (see Figure 15 and Table 2) page 29.
- Tighten the bonnet nuts to 30% of required torque setting following a diametrically opposed sequence (see Figure 15 and Table 2) page 29.
- Repeat the above, using 60% of the required torque.
- Repeat the above, apply maximum torque value for the appropriate valve size.
- Raise the plug and stem assembly fully and forcefully push it back into the seat, repeat a further two times.
- Tighten the gland nut (**11**) until:
  i) PTFE gland assembly: metal-to-metal contact with the bonnet is achieved.
  ii) Graphite gland assembly: a gap of 3 mm between the underside of the gland nut and the bonnet is achieved. See Figure 23.

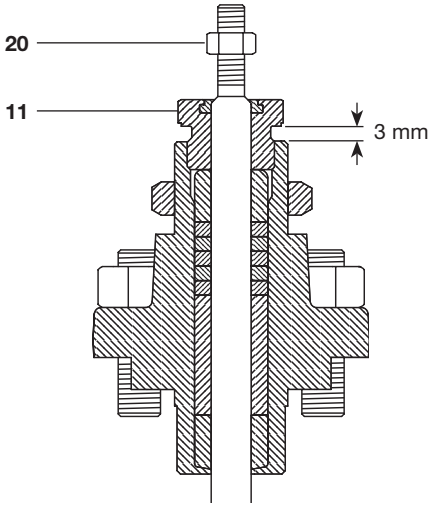


Fig. 23

- Refit the lock-nut (**20**).
- Reinstall the actuator.
- Bring the valve back into service.
- Check for leakage at the gland.

Note: Recheck the graphite seals and retighten the gland if necessary after a few hundred cycles as the seals fully bed in.

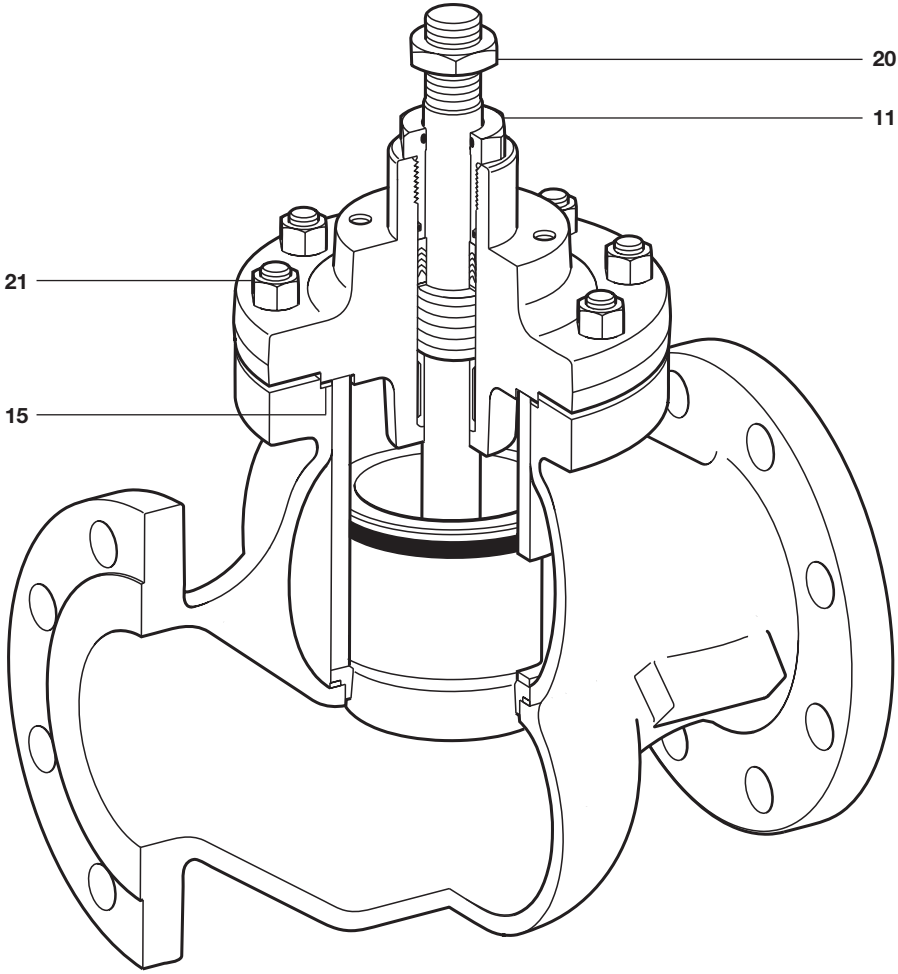


Fig. 24 Balanced valve shown

6.1 Spare parts

DN15 to DN100 SPIRA-TROL

The spare parts available are shown in solid outline. Parts drawn in broken line are not supplied as spares.

Note: When placing an order for spare parts please specify clearly the full product description as found on the label of the valve body, as this will ensure that the correct spare parts are supplied.

Available spares - K and L series

Actuator clamping nut		**A**
Gasket set (Non-bellows sealed)		**B, G**
Stem seal kits	**PTFE** chevrons and gasket set	**C**
	Graphite packing and gasket set	**C2**
PTFE to Graphite conversion kit		**C1**
Plug stem	* **Equal percentage trim** (No gaskets supplied)	**D, E**
	Fast opening trim and seat kit (No gaskets supplied)	**D1, E**
	Linear trim (No gaskets supplied)	**D2, E**
	PTFE or **PEEK** soft seat seal	**H**

* Specify if reduced trim.

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 including the full product description of the product.

Example: 1 - PTFE stem seal kit for a Spirax Sarco 1" SPIRA-TROL two-port LEA31 PTSUSS.2 C_V 12 control valve.

How to fit spares

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

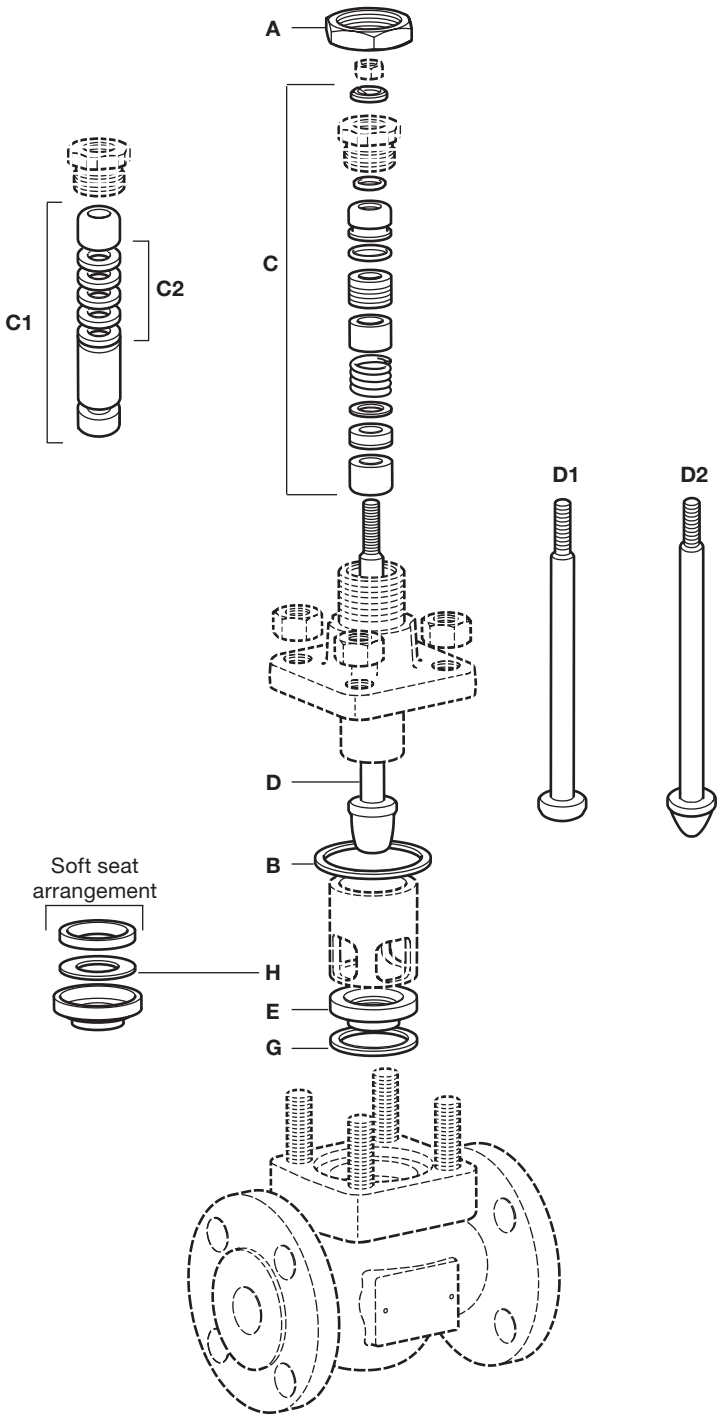


Fig. 25

6.2 Spare parts

DN15 to DN100 SPIRA-TROL with bellows seal (B and C)

The spare parts available are shown in solid outline. Parts drawn in broken line are not supplied as spares.

Note: When placing an order for spare parts please specify clearly the full product description as found on the label of the valve body, as this will ensure that the correct spare parts are supplied.

Available spares - KE and KEA

Actuator clamping nut			**A**
Gasket set (Bellows sealed)			**B, G**
Stem seal kit		**Graphite** packing and gasket set	**C2**
PTFE to Graphite conversion kit			**C1**
Plug stem and seat kit	*	**Equal percentage trim** (No gaskets supplied)	**D3, E**
		Fast opening trim (No gaskets supplied)	**D4, E**
		Linear trim (No gaskets supplied)	**D5, E**
Bellows seal assembly			**F**
PTFE or **PEEK** soft seat seal			**H**

* Specify if reduced trim.

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 including the full product description of the product.

Example: 1 - PTFE stem seal kit for a Spirax Sarco 1" SPIRA-TROL two-port KEA31B TSUSS.2 C_V 12 control valve.

How to fit spares

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

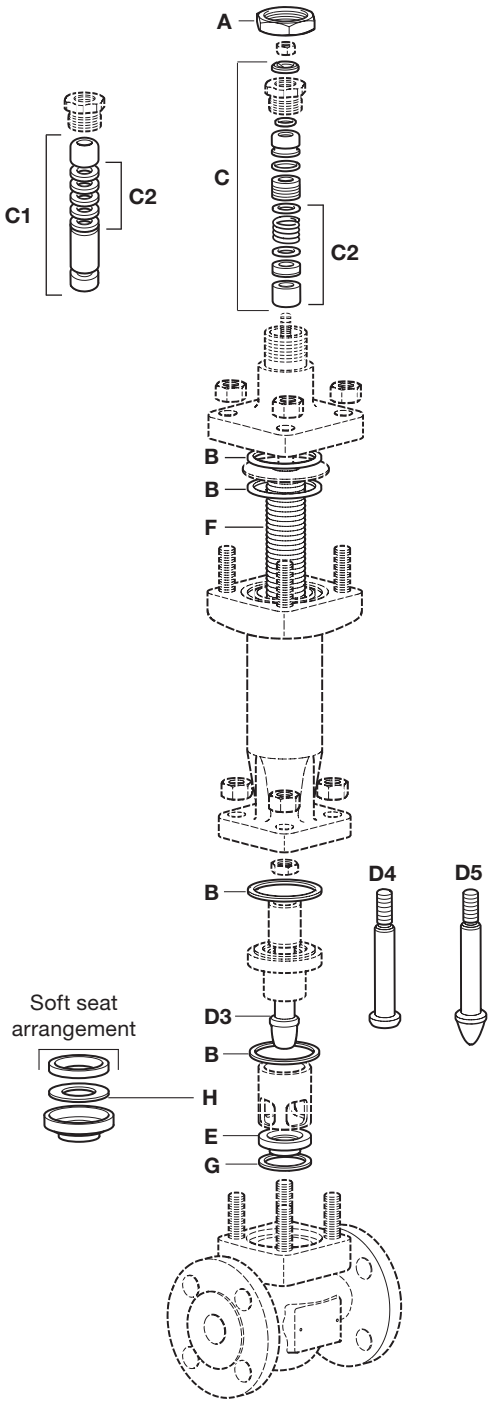


Fig. 26

6.3 Spare parts

SPIRA-TROL with bellows seal (D)

The spare parts available are shown in solid outline. Parts drawn in broken line are not supplied as spares.

Note: When placing an order for spare parts please specify clearly the full product description as found on the label of the valve body, as this will ensure that the correct spare parts are supplied.

Available spares - LEA_D, LFA_D and LLA_D

Actuator clamping nut		**A**
Gasket set (Bellows sealed)		**B, G**
Stem seal kitGraphite packing and gasket set		**C2**
Plug stem and seat kit	* **Equal percentage trim** (No gaskets supplied)	**D3, E**
	Fast opening trim (No gaskets supplied)	**D4, E**
	Linear trim (No gaskets supplied)	**D5, E**
Bellows seal assembly		**F**
PTFE or **PEEK** soft seat seal		**H**

* Specify if reduced trim.

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 including the full product description of the product.

Example: 1 - PTFE stem seal kit for a Spirax Sarco 1" SPIRA-TROL two-port LEA31B TSUSS.2 C_V 12 control valve.

How to fit spares

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

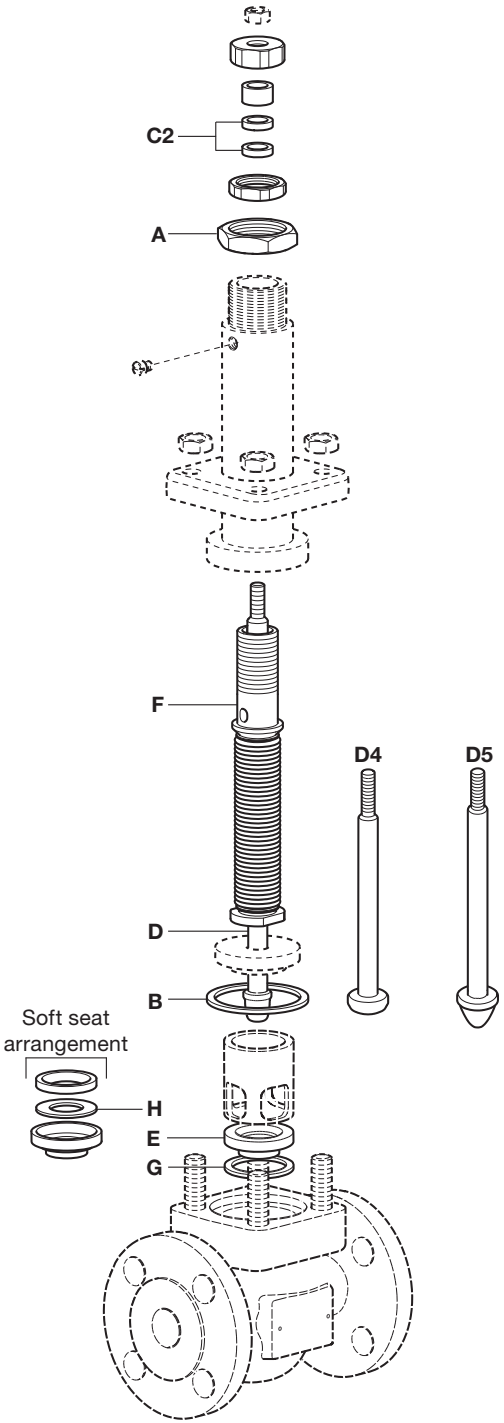


Fig. 27

6.4 Spare parts

DN125 to DN200 SPIRA-TROL unbalanced valve

The spare parts available are shown in solid outline. Parts drawn in broken line are not supplied as spares.

Note: When placing an order for spare parts please specify clearly the full product description as found on the label of the valve body, as this will ensure that the correct spare parts are supplied.

Available spares - K series only

Gasket set		**B, G**
Stem seal kits	**PTFE** chevrons	**C**
	Graphite packing	**C2**
PTFE to Graphite conversion kit		**C1**
Plug stem	* **Equal percentage trim** (No gaskets supplied)	**D, E**
	Fast opening trim and seat kit (No gaskets supplied)	**D1, E**
	Linear trim (No gaskets supplied)	**D2, E**
PTFE or **PEEK** soft seat seal		**H**
Soft seat conversion kit (Metal to PTFE or metal to PEEK)		**J**

* Specify if reduced trim.

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 including the full product description of the product.

Example: 1 - PTFE stem seal kit for a Spirax Sarco DN150 SPIRA-TROL two-port PTSUSS.2 K_V 370 control valve.

How to fit spares

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

Total number of spacers	
PTFE sealed valves	**DN125** valves = 0 spacer
	DN150 valves = 1 spacer
	DN200 valves = 4 spacers
Graphite sealed valves	**DN125** valves = 2 spacers
	DN150 valves = 3 spacers
	DN200 valves = 6 spacers

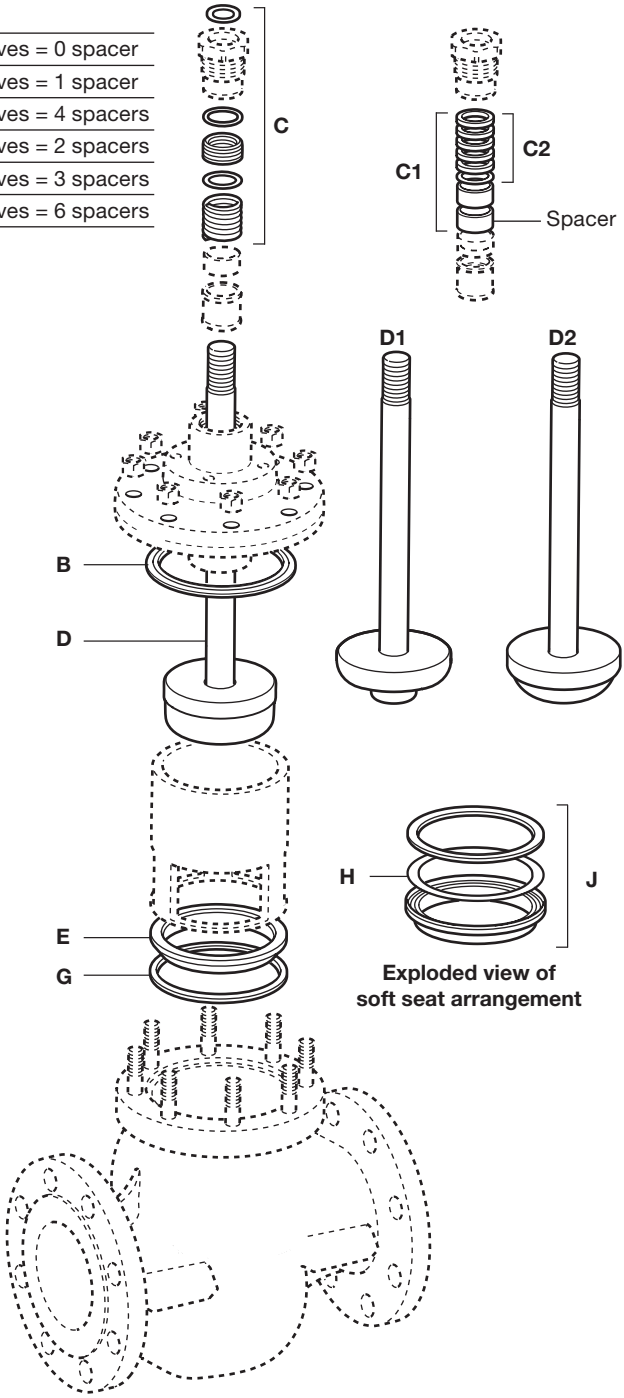


Fig. 28 Unbalanced

6.5 Spare parts

DN125 to DN200 SPIRA-TROL balanced

The spare parts available are shown in solid outline. Parts drawn in broken line are not supplied as spares.

Note: When placing an order for spare parts please specify clearly the full product description as found on the label of the valve body, as this will ensure that the correct spare parts are supplied.

Available spares - K series only

Gasket set		**A, B, G, F**
Stem seal kits	**PTFE** chevrons	**C**
	Graphite packing	**C2**
PTFE to Graphite conversion kit		**C1**
Plug stem and seat kit	* **Balanced equal percentage trim** (No gaskets supplied)	**A, D, E**
	Balanced fast opening trim (No gaskets supplied)	**A, D1, E**
	Balanced linear trim (No gaskets supplied)	**A, D2, E**
PTFE soft seat seal		**H**
Soft seat conversion kit		**J**

* Specify if reduced trim.

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 including the full product description of the product.

Example: 1 - PTFE stem seal kit for a Spirax Sarco DN150 SPIRA-TROL two-port KE43 PTSBSS.2 Kv 370 control valve.

How to fit spares

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

Total number of spacers	
PTFE packing	**DN125** valves = 0 spacer
	DN150 valves = 1 spacer
	DN200 valves = 4 spacers
Graphite packing	**DN125** valves = 2 spacers
	DN150 valves = 3 spacers
	DN200 valves = 6 spacers

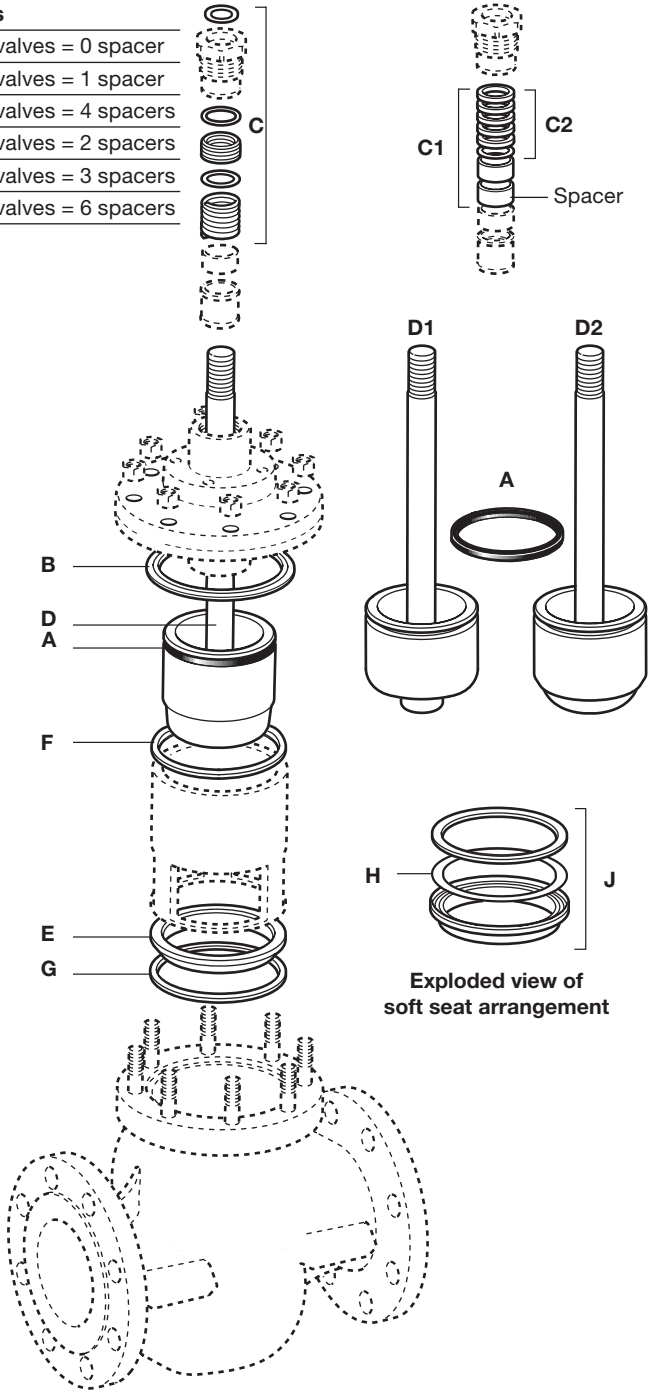


Fig. 29 Balanced