



Cert. No. LRQ 0963008

ISO 9001

# spirax sarco

## SPIRA-TROL

1/2" to 4"

TI-P377-01  
CH Issue 3

## ASME (ANSI) Two-port LEA, LFA and LLA Control Valves

### Description

SPIRA-TROL is a range of two-port single seat globe valves with cage retained seats conforming to ASME (ANSI) standards. These valves are available in three body materials in sizes ranging from 1/2" to 4". When used in conjunction with a pneumatic or electric linear actuator they provide modulating control or on/off service.

### SPIRA-TROL valve characteristic - options:

<b>LEA</b>	<b>Equal percentage (E)</b> - Suitable for most modulating process control applications providing good control at all flowrates.
<b>LFA</b>	<b>Fast opening (F)</b> - For on/off applications only.
<b>LLA</b>	<b>Linear (L)</b> - 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 LEA control valve. With the exception of trim type, the LEA, LFA and LLA control valves are identical.

### SPIRA-TROL valve options:

	<b>PTFE chevron seals</b>	Standard
<b>Stem sealing</b>	<b>Bellows / graphite secondary seals (D)</b>	Zero emissions and high temperature applications
	<b>Graphite packing</b>	High temperature applications
	<b>Metal-to-metal</b>	431 stainless steel - standard 316L stainless steel
<b>Seating</b>	<b>Soft seating</b>	Up to 392°F: PTFE for Class VI shut-off Up to 482°F: PEEK for Class VI shut-off
	<b>Hard facing</b>	316L stainless steel with Stellite 6 facing - For more arduous applications
	<b>Bonnet type</b>	<b>Standard bonnet</b> <b>Extended bonnet</b> for large pipe lagging or hot / cold applications
<b>Trim</b>	<b>Standard</b>	
	<b>Low noise</b>	

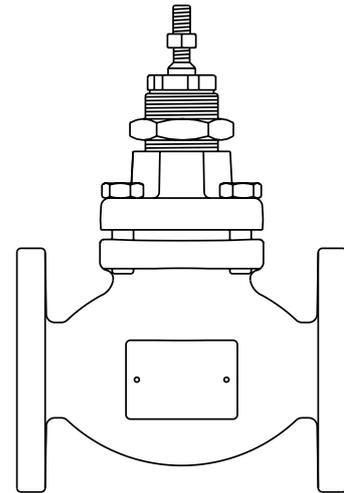
### SPIRA-TROL two-port control valves are compatible with the following actuators and positioners:

<b>Electric</b>	EL3500, EL5600 and EL7200 series
<b>Pneumatic</b>	PN1000 and PN9000 series
<b>Positioners</b>	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.

### Sizes and pipe connections

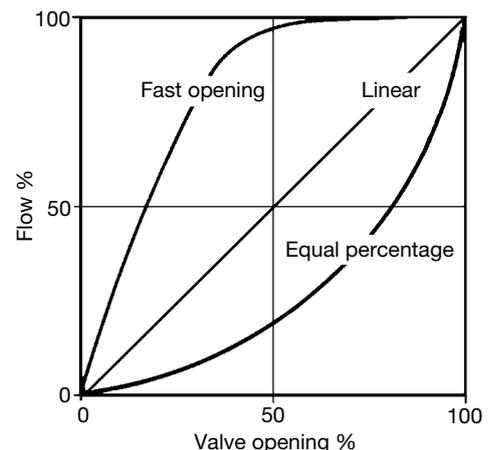
Type	Body material	Connections	Size range
<b>LEA31</b>	Cast iron	Screwed NPT 1/2", 3/4", 1", 1 1/4", 1 1/2" and 2"	
<b>LEA33</b>	Cast iron	Flanged ASME (ANSI) 125, KS 10 and JIS 10	1", 1 1/2", 2", 2 1/2", 3" and 4"
<b>LEA43</b>	Carbon steel	Flanged ASME (ANSI) 150, KS 10 and JIS 10	1/2", 3/4", 1", 1 1/2", 2", 2 1/2", 3" and 4"
<b>LEA63</b>	Stainless steel	Flanged ASME (ANSI) 150, KS 10 and JIS 10	1/2", 3/4", 1", 1 1/2", 2", 2 1/2", 3" and 4"



### Technical data

<b>Plug design</b>	Parabolic	
<b>Leakage</b>	Metal-to-metal	ASME (ANSI) Class IV
	Soft seal	ASME (ANSI) Class VI
<b>Rangeability</b>	Equal % and linear 50:1	
<b>Travel</b>	1/2" to 2"	3/4"
	2 1/2" to 4"	1 3/16"

### Typical flow characteristic curves



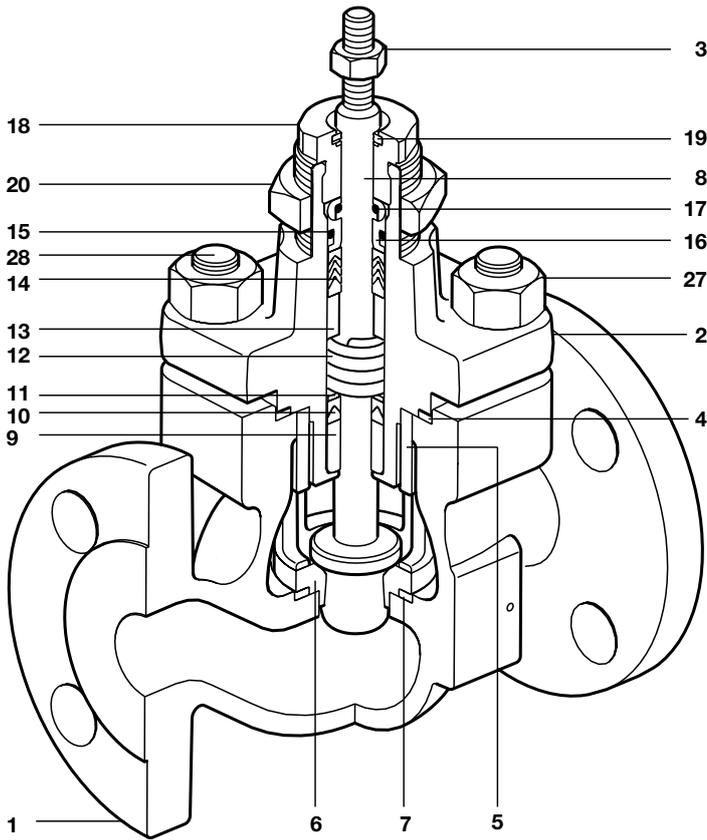
**Materials**

Type	No.	Part	Material
LEA31 LEA33	1	Body	Cast iron ASTM A126B
	2	Bonnet	Ductile iron ASTM A359
	2a	Bonnet extension	Cast steel ASTM A216 WCB
	2b	Bellows	Stainless steel
	3	Stem lock-nut	Stainless steel
LEA43	1	Body	Cast steel ASTM A216 WCB
	2	Bonnet	½" to 2" Forged steel ASTM A105N
	2a	Bonnet extension	2½" to 4" Cast steel ASTM A216 WCB
	2b	Bellows	Stainless steel
	3	Stem lock-nut	Stainless steel
LEA63	1	Body	Stainless steel ASTM A351 CF8M
	2	Bonnet	Stainless steel ASTM A351 CF8M
	2a	Bonnet extension	Stainless steel ASTM A351 CF8M
	2b	Bellows	Stainless steel
	3	Stem lock-nut	Stainless steel
All versions using PTFE seals	2c	Extended bonnet	Stainless steel AISI 316L
	4	Bonnet gasket	Reinforced exfoliated graphite
	5	Seat retainer	Stainless steel 316L
	6	Valve seat ring	Stainless steel (see 'SPIRA-TROL valve options' on page 1)
	7	Seat gasket	Reinforced exfoliated graphite
	8	Valve plug and stem	Stainless steel (see 'SPIRA-TROL valve options' on page 1)
	9 *	Lower stem guide	Glass filled PTFE
	10	Lower stem wiper	PTFE
	11 *	Packing guard washer	Stainless steel 316L
	12 *	Spring	Stainless steel
	13	Packing spacer	Stainless steel 316L
	14 *	Chevron packing set	PTFE
	15 *	Outer 'O' ring	Viton
	16 *	Upper stem guide	Glass filled PTFE
	17 *	Inner 'O' ring	Viton
	18	Gland nut	Stainless steel
	19	Scraper ring	PTFE
	20	Actuator clamp nut	LEA3_ and LEA43 Plated carbon steel LEA63 Stainless steel
	21	Bellows assembly	Stainless steel AISI 316Ti + 316L
	22	Bonnet extension gasket	Reinforced exfoliated graphite
	23	Top plate (used on bonnet extension only)	Stainless steel 316L
	24	Lower spindle bearing housing	Stainless steel 316L
	25	Lower spindle bearing	Stellite 6
	26	Spindle lock and anti-rotation nut	Stainless steel 316L
	27	Bonnet nuts	LEA3_ and LEA43 Steel ASTM A194 Gr. 2H LEA63 Steel ASTM A194 Gr. 8M
	28	Bonnet studs	LEA3_ and LEA43 Steel ASTM A193 Gr. B7 LEA63 Steel ASTM A193 Gr. B8 M2

Not shown

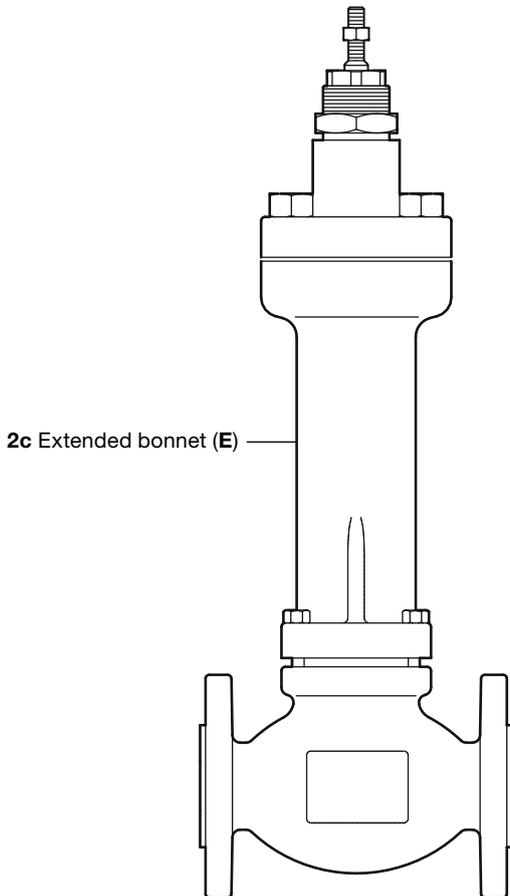
**\* Graphite packing**

High temperature packing	9	Upper and lower stem guide	Stellite 6
	16		
	14	Grafoil packing	Graphite rings
	11	Not used	
	12		
	15		
	17		
19			

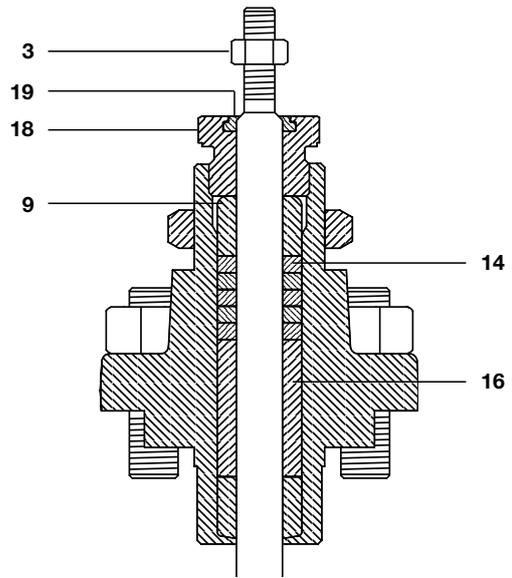


**LEA valve  
with PTFE packing**

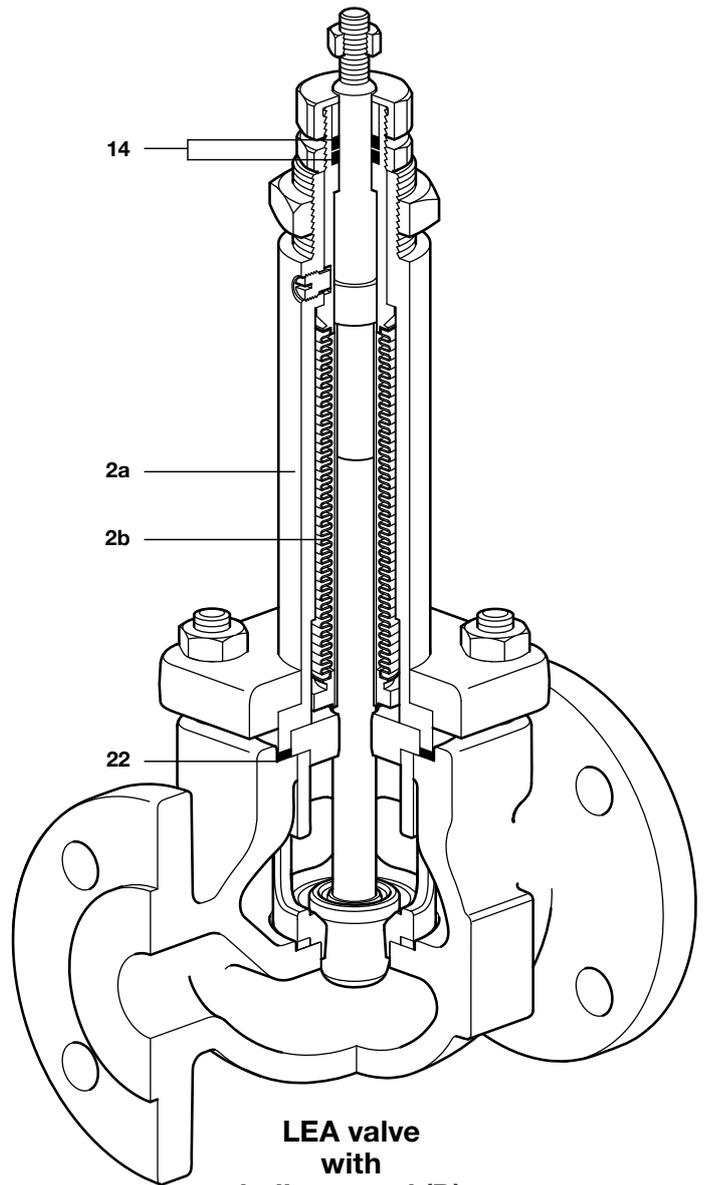
**LEA valve with  
extended bonnet (E)**



2c Extended bonnet (E)



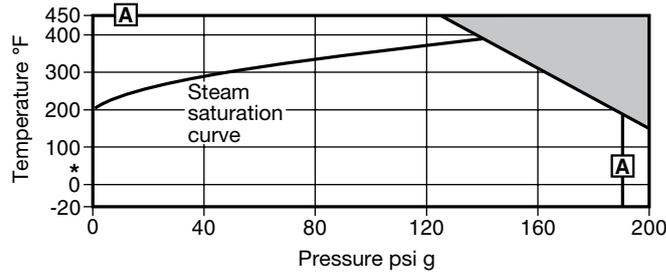
**Bonnet with graphite packing**



**LEA valve  
with  
bellows seal (D)**

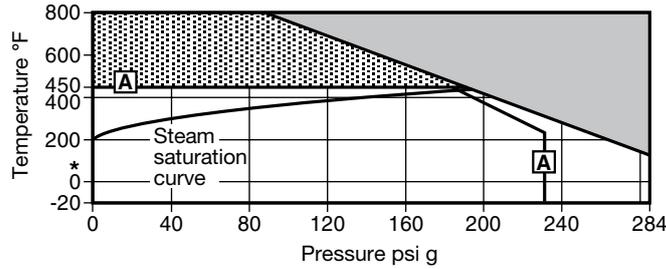
**Pressure/temperature limits**

**LEA31 LEA31B  
LEA33 LEA33B  
(Cast iron)**



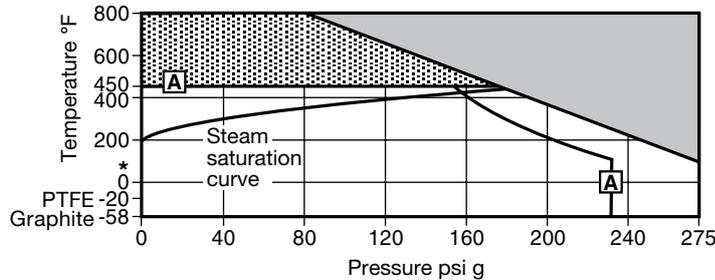
**Please note - Bellows sealed valves (Option D) are limited to A - A.**

**LEA43 LEA43B  
(Carbon steel)**



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

**LEA63 LEA63B  
(Stainless steel)**



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

**\*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**.

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

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

Body design conditions	LEA31	LEA33	LEA43	LEA63	ASME (ANSI) 125
					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 soft seat (K)				482°F
	Graphite packing (H)				450°F
	Extended bonnet (E)				450°F
	Bellows (D)				450°F
Minimum operating temperature	LEA31	LEA33	LEA43		-20°F
<b>Note:</b> For lower operating temperatures consult Spirax Sarco.				LEA63	PTFE packing -20°F
					Graphite packing -58°F
Maximum differential pressures:	See relevant actuator Technical Information sheet				
Maximum cold hydraulic test pressure of:					
<b>Warning:</b> 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

**C<sub>v</sub> values**

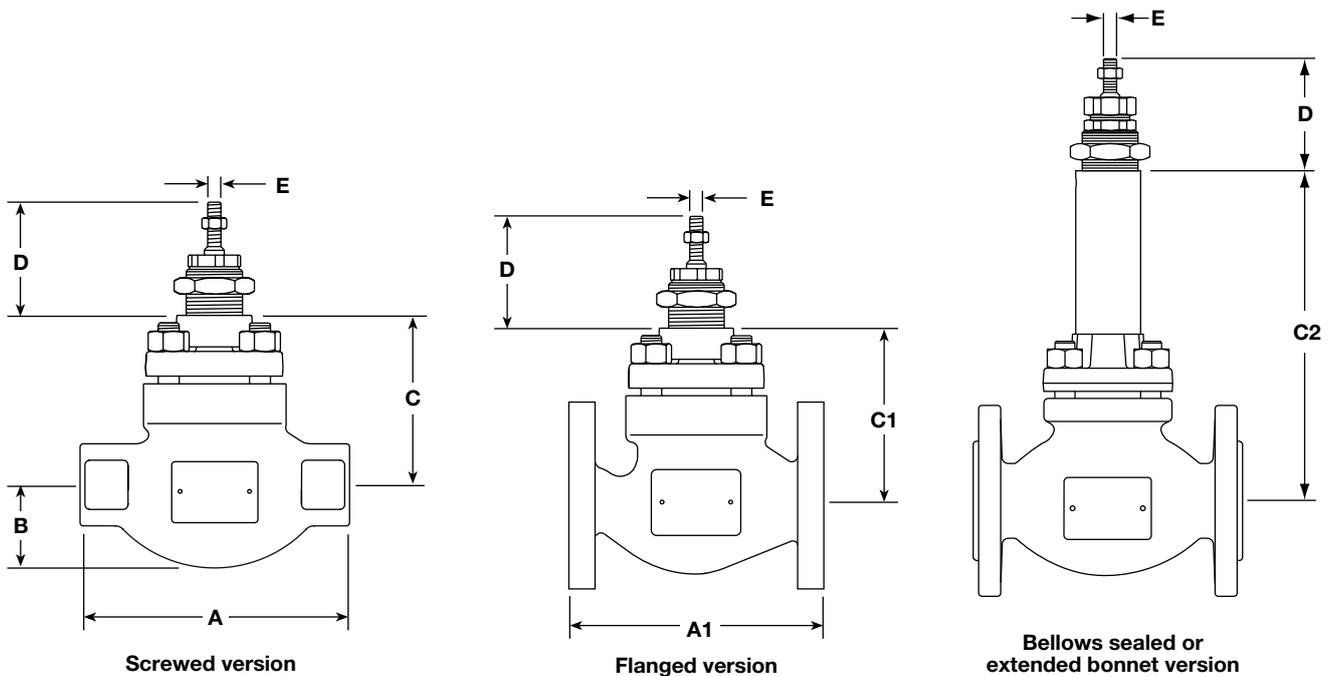
Size			Nominal size									
			½"	¾"	1"	1¼"	1½"	2"	2½"	3"	4"	
<b>Travel</b>			¾"					1⅜"				
<b>Standard trims</b>	Full port	Equal %	5.0	7.5	12.0	16.0	30	45	75	120	190	
		Linear										
		Fast opening	5.0	7.5	12.0	16.0	32	50	88	136	210	
	Reductions	Trim 1	Equal %	2.5	5.5	8.5	18.0	16	33	48	85	130
			Linear									
		Trim 2	Equal %	1.8	2.5	6.0	8.5	13	18	36	50	90
			Linear									
		Trim 3	Equal %	1.0	1.8	3.0	6.0	9.0	14	18	38	53
			Linear									
<b>Micro flute</b>			0.5	0.5	0.5	-	-	-	-	-	-	
			0.2	0.2	0.2	-	-	-	-	-	-	
			0.1	0.1	0.1	-	-	-	-	-	-	

<b>Travel</b>			¾"					1⅜"				
<b>Low noise trim</b>	Full port	Equal %	4.6	7.0	9.3	14.0	23	31.0	64.0	73.0	104.5	
		Linear										
	Reductions	Trim 1	Equal %	4.0	5.8	7.0	11.5	15	17.5	40.5	46.5	69.5
			Linear									
		Trim 2	Equal %	3.4	4.6	5.2	8.0	8.5	9.0	34.5	38.0	46.5
			Linear									

**Dimensions for the SPIRA-TROL (approximate) in inches**

Valve size	A	A1	B	C	C1	C2		D	E
	Screwed NPT and SW	Flanged ASME KS 10 JIS 10	Screwed NPT and SW	Screwed NPT and SW	Flanged	Extended bonnet*	Bellows sealed bonnet		
1/2"	6 1/2"	7 1/4"	1 3/4"	4"	4"	9 5/16"	9 5/16"	2 3/4"	M8
3/4"	6 1/2"	7 1/4"	1 3/4"	4"	4"	9 5/16"	9 5/16"		
1"	7 3/4"	7 1/4"	2 1/4"	4"	4"	9 5/16"	9 5/16"		
1 1/4"	8 1/2"	8 3/4"	2 1/4"	5 3/16"	-	10 1/2"	10 1/2"		
1 1/2"	9 1/4"	8 3/4"	2 1/2"	5 3/16"	5 3/16"	10 1/2"	10 1/2"		
2"	10 1/2"	10"	3"	5 3/16"	5 3/16"	10 1/2"	10 1/2"		
2 1/2"	-	10 1/2"	-	-	7 7/8"	14 1/8"	14 1/2"	3 3/16"	M12
3"	-	11 3/4"	-	-	7 7/8"	14 1/8"	14 1/2"		
4"	-	13 3/4"	-	-	8 1/2"	14 3/4"	15"		

\*Note: see item 2c, page 3 for actual outline view of extended bonnet.

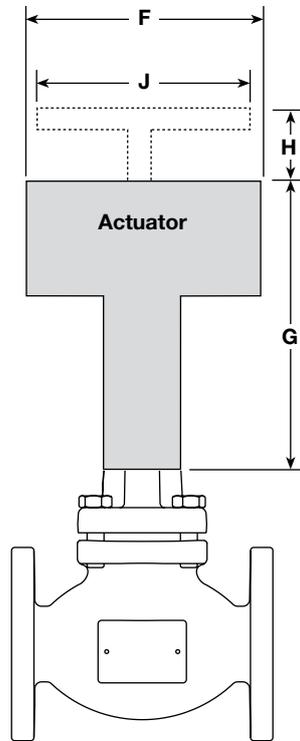


**Weights for the SPIRA-TROL (approximate) in lbs**

Valve size	LEA41 and LEA42 LEA61 and LEA62 LEA71	LEA43	LEA63	LEA73	Additional bellows and extended bonnet
1/2"	16	16	16	16	10
3/4"	16	18	18	18	10
1"	22	20	20	20	10
1 1/4"	25	31	31	29	12
1 1/2"	31	36	36	31	12
2"	33	38	38	38	12
2 1/2"	-	78	78	84	21
3"	-	86	89	91	21
4"	-	124	124	132	28

**Dimensions / weights for the PN actuator range (approximate) in ins and lbs**

Actuator range	F	G	H	J	Weight	
					Actuator	With handwheel
PN1500 and PN2500	16"	46"	-	-	121.00	-
PN1600 and PN2600	18 <sup>5</sup> / <sub>16</sub> "	46"	-	-	154.00	-
PN9100E and variants	10 <sup>7</sup> / <sub>8</sub> "	6 <sup>11</sup> / <sub>16</sub> "	2 <sup>3</sup> / <sub>16</sub> "	8 <sup>7</sup> / <sub>8</sub> "	13.25	+ 13.00
PN9100R and variants	10 <sup>7</sup> / <sub>8</sub> "	6 <sup>11</sup> / <sub>16</sub> "	5 <sup>1</sup> / <sub>2</sub> "	8 <sup>7</sup> / <sub>8</sub> "	13.25	+ 5.50
PN9200E and variants	11 <sup>7</sup> / <sub>8</sub> "	11 <sup>7</sup> / <sub>8</sub> "	2 <sup>3</sup> / <sub>16</sub> "	8 <sup>7</sup> / <sub>8</sub> "	37.50	+ 15.75
PN9200R and variants	11 <sup>7</sup> / <sub>8</sub> "	11 <sup>7</sup> / <sub>8</sub> "	5 <sup>1</sup> / <sub>2</sub> "	8 <sup>7</sup> / <sub>8</sub> "	37.50	+ 8.50
PN9320E and variants	12 <sup>7</sup> / <sub>8</sub> "	15 <sup>9</sup> / <sub>16</sub> "	2 <sup>9</sup> / <sub>16</sub> "	13 <sup>3</sup> / <sub>4</sub> "	59.50	+ 15.75
PN9320R and variants	12 <sup>7</sup> / <sub>8</sub> "	15 <sup>9</sup> / <sub>16</sub> "	15 <sup>7</sup> / <sub>8</sub> "	13 <sup>3</sup> / <sub>4</sub> "	59.50	+ 8.50
PN9330E and variants	13 <sup>3</sup> / <sub>8</sub> "	15 <sup>9</sup> / <sub>16</sub> "	2 <sup>9</sup> / <sub>16</sub> "	13 <sup>3</sup> / <sub>4</sub> "	59.50	+ 15.75
PN9330R and variants	13 <sup>3</sup> / <sub>8</sub> "	15 <sup>9</sup> / <sub>16</sub> "	15 <sup>7</sup> / <sub>8</sub> "	13 <sup>3</sup> / <sub>4</sub> "	59.50	+ 8.50



**Dimensions / weights for the EL actuator range (approximate) in ins and lbs**

Actuator range	F	G	Weight
EL3500	5 <sup>1</sup> / <sub>4</sub> " x 6 <sup>1</sup> / <sub>4</sub> "	9 <sup>1</sup> / <sub>2</sub> "	3
EL3500 SE	5 <sup>1</sup> / <sub>4</sub> " x 6 <sup>1</sup> / <sub>4</sub> "	11"	6
EL3500 SR	5 <sup>1</sup> / <sub>4</sub> " x 6 <sup>1</sup> / <sub>4</sub> "	11"	6
EL560_	7"	18"	10
EL561_	7"	18"	11
EL562_	7"	18"	12
EL563_	7"	20"	15
EL564_	8 <sup>3</sup> / <sub>4</sub> "	22 <sup>1</sup> / <sub>2</sub> "	22
EL565_	8 <sup>3</sup> / <sub>4</sub> "	31 <sup>3</sup> / <sub>4</sub> "	44
EL506_	6 <sup>1</sup> / <sub>4</sub> "	17 <sup>1</sup> / <sub>2</sub> "	19
EL7200 series	4 <sup>1</sup> / <sub>4</sub> "	10"	3

**Spare parts - 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 - LEA, LFA and LLA**

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

\* Specify if reduced trim.

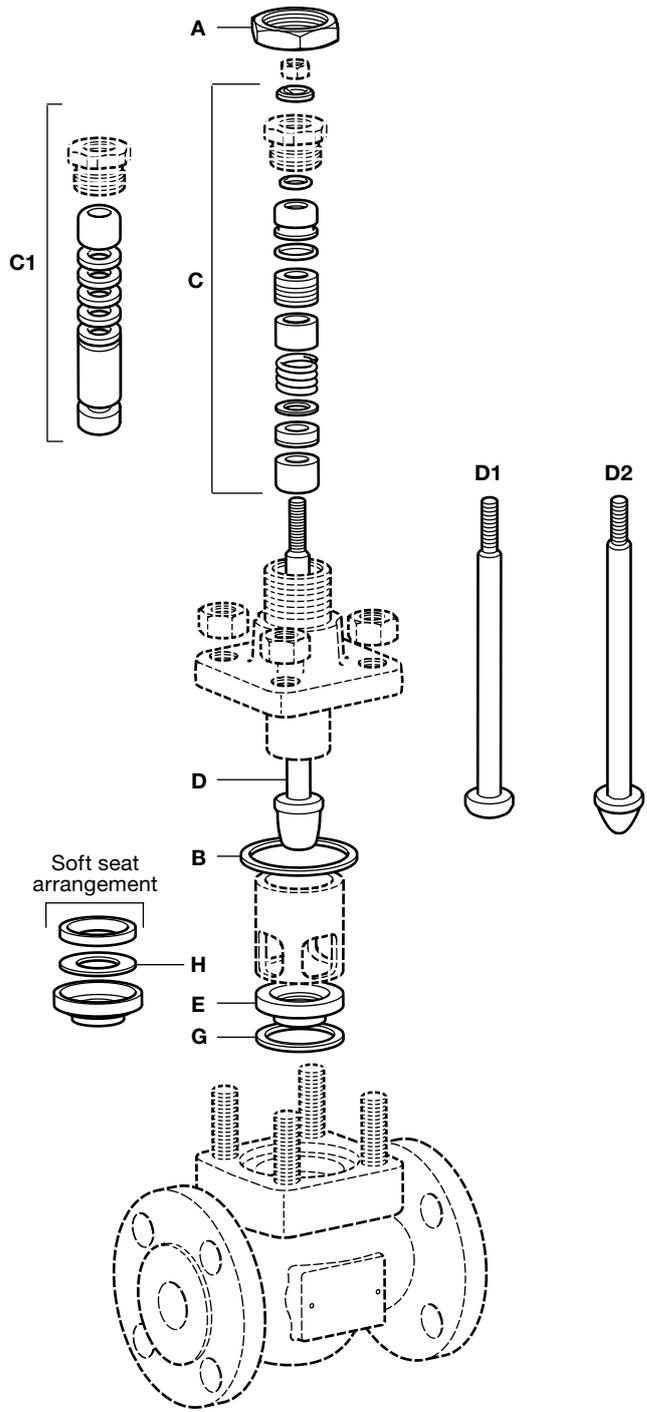
**How to order spares**

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 Cv 12 control valve.

**How to fit spares**

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



**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\_B, LFA\_B and LLA\_B**

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

\* Specify if reduced trim.

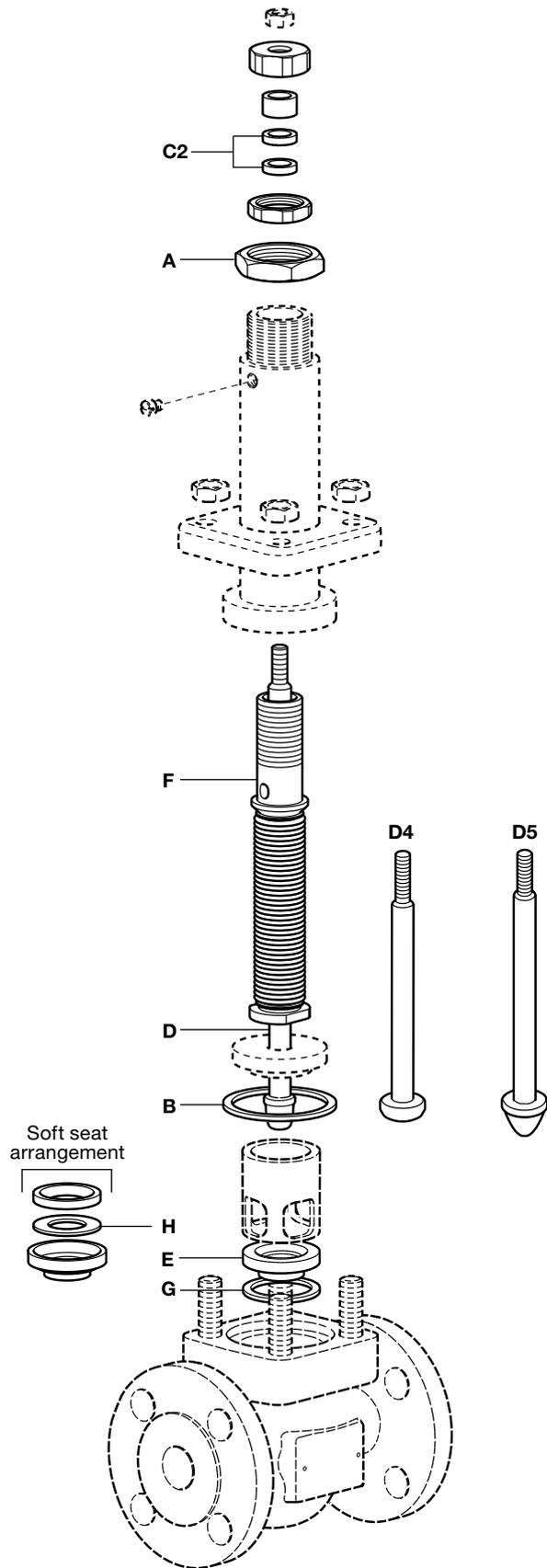
**How to order spares**

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 Cv 12 control valve.

**How to fit spares**

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



**SPIRA-TROL selection guide:**

<b>Valve size</b>	1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2", 3" and 4"	<b>1"</b>
<b>Valve series</b>	L = L series 2-port control valve	<b>L</b>
	E = Equal percentage	
<b>Valve characteristic</b>	F = Fast opening	<b>E</b>
	L = Linear	
<b>Design code</b>	A = ASME (ANSI)	<b>A</b>
<b>Flow direction</b>	Blank = Flow under plug	
	T = Flow over plug (Not available for low noise trim)	
	3 = Cast iron	
<b>Body material</b>	4 = Carbon steel	<b>4</b>
	6 = Stainless steel	
	1 = Screwed (NPT)	<b>3</b>
<b>Connections</b>	3 = Flanged	
	P = PTFE	
<b>Stem sealing</b>	D = Bellows / Graphite seals	<b>P</b>
	H = Graphite	
	T = AISI 431 stainless steel	
	G = PTFE soft seat	
<b>Seating</b>	K = PEEK soft seat	<b>T</b>
	S = 316L stainless steel	
	W = 316L with stellite 6 facing	
<b>Type of trim</b>	S = Standard	<b>S</b>
	P = Low noise	
<b>Trim balancing</b>	U = Unbalanced	<b>U</b>
<b>Bonnet type</b>	S = Standard	<b>S</b>
	E = Extended (not available if bellows seal selected)	
<b>Bolting</b>	S = Standard	<b>S</b>
<b>External finish</b>	Blank = Standard paint	
	N = Electroless nickel plated	
<b>Series</b>	2 = .2	<b>.2</b>
<b>C<sub>v</sub></b>	To be specified	<b>C<sub>v</sub> 10</b>
<b>Connection type</b>	To be specified	<b>Flanged ASME 150</b>

**Selection example:**

1"	-	L	E	A		4	3	P	T	S	U	S	S		.2	-	C <sub>v</sub> 10	-	Flanged ASME 150
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**How to order**

**Example:** 1 off Spirax Sarco 1" SPIRA-TROL LEA43PTSUSS.2 C<sub>v</sub> 10 two-port control valve having flanged ASME 150 connections.