

½" to 4" (DN15 to DN100)
LEA31 and LEA33 ANSI Control Valves
Installation and Maintenance Instructions

- 1. Safety*
- 2. Technical details*
- 3. Installation and
commissioning*
- 4. Maintenance*
- 5. Spares*

1. Safety

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 of personal cleanliness by washing hands and removing any PTFE particles lodged under the fingernails.

Laminated gaskets

The metal foil sheet used to reinforce gaskets is very thin and sharp. Care should be taken when handling to avoid the possibility of cuts or lacerations to fingers or hands.

2. Technical details

2.1 Technical data

Plug design	½" to 2½" (DN15 to DN65)	Contoured
	3" and 4" (DN80 and DN100)	Vee port
Leakage	Metal-to-metal seat	ANSI/FCI 70/2 Class IV
	PTFE soft seat	ANSI/FCI 70/2 Class VI
Flow characteristic	LEA valves	Equal percentage
	LFA valves	Fast opening (on/off)
Rangeability	50 to 1	
Travel	½" to 2" (DN15 to DN50)	LEA ¾" (20 mm)
		LFA 9/16" (15 mm)
	2½" to 4" (DN65 and DN100)	LEA 1 3/16" (30 mm)
		LFA ¾" (20 mm)

Three reductions in C_v are available for equal percentage trims.
Further details on available trims are given in 'LEA valve options' TI-P304-03.

2.2 Weights (approximate) in pounds (kg)

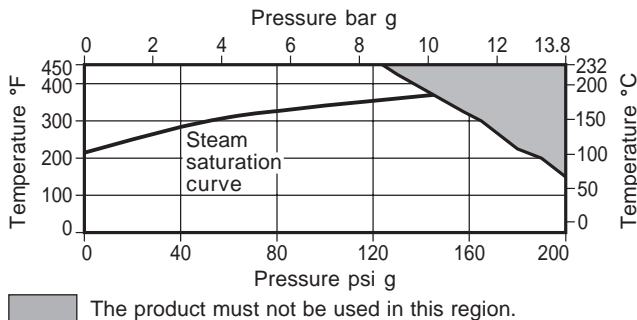
Valve size	LEA31		LEA33	
½" (DN15)	7.7	(3.5)	-	-
¾" (DN20)	8.2	(3.7)	-	-
1" (DN25)	11.3	(5.1)	13.7	(6.2)
1¼" (DN32)	16.0	(7.3)	-	-
1½" (DN40)	17.2	(7.8)	20.3	(9.2)
2" (DN50)	23.0	(10.4)	39.0	(13.0)
2½" (DN65)	-	-	53.0	(24.0)
3" (DN80)	-	-	66.0	(30.0)
4" (DN100)	-	-	97.0	(44.0)

Note: Weights also apply to LEF (fast opening trim) valves.

2.3 Limiting conditions

Body design conditions	ANSI 125	
Maximum design temperature	PTFE chevron gland seals	450°F (232°C)
	Graphite packed gland seals	450°F (232°C)
Minimum design temperature	14°F (-10°C)	
Maximum cold hydraulic test pressure	300 psi g (20.7 bar g)	

2.4 Operating range



— 3. *Installation and commissioning* —

3.1 General

Valves should be installed in a horizontal pipeline so that flow is in the direction indicated by the arrow on the body. Valves should be mounted in the pipeline in accordance with the actuator Installation and Maintenance Instructions.

A suitable strainer should always be fitted upstream of the valve. Additionally on steam installations a separator should be fitted before the valve, plus a steam trap set on applications where condensate may accumulate upstream of the valve.

3.2 Bypass arrangements

It is recommended that isolating valves be fitted upstream and downstream of the control valve together with a manual regulating valve to bypass the group. The process may then be controlled by the bypass valve while the control valve is isolated for maintenance purposes.

3.3 Commissioning

For commissioning instructions refer to the Operation, Installation and Maintenance Instructions, covering Spirax Sarco actuators.

4. *Maintenance*

4.1 Routine maintenance procedures

24 hours operation

After 24 hours service check pipework connections and flange bolts for tightness.

With valves having high temperature graphite packed gland seals the gland nut should be tightened by approximately $\frac{1}{4}$ of a turn taking care not to overtighten as this may cause excessive friction on the valve stem.

3 months operating intervals

After every 3 months normal service visually check gland seals for signs of leakage and if necessary take the following corrective action.

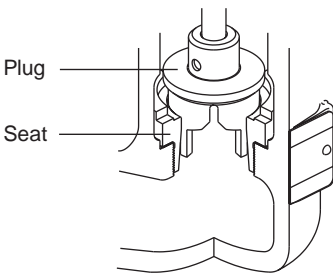
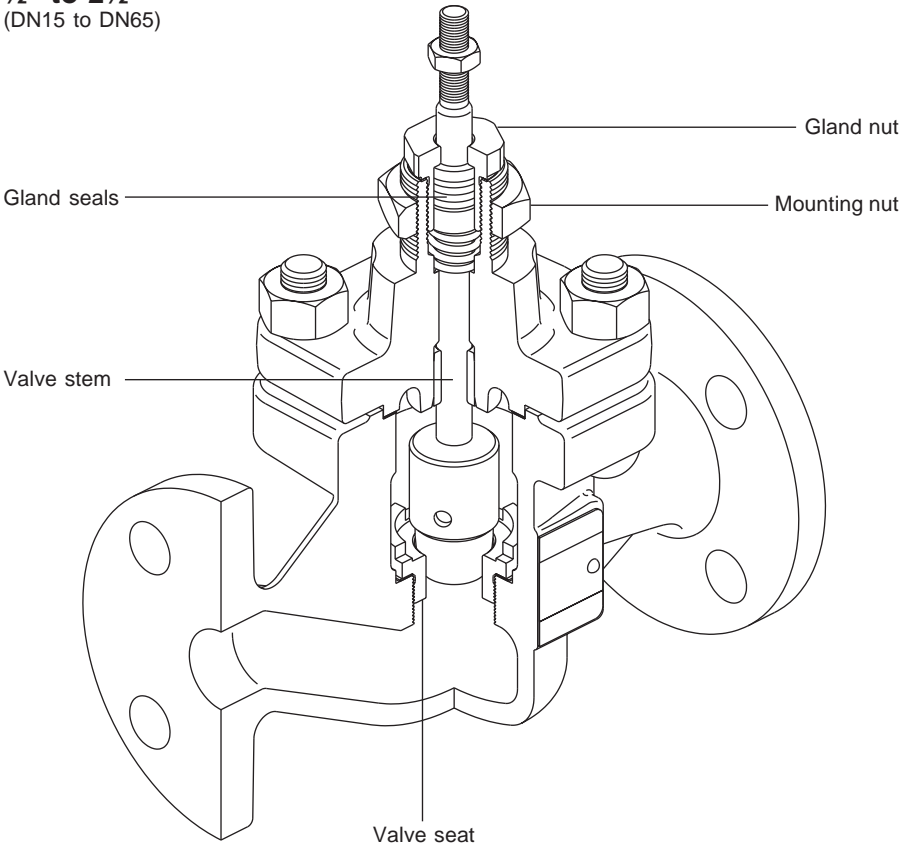
Valves having chevron gland seals remove and replace the PTFE chevron seals (refer to Section 4.3, page 8).

Valves having high temperature graphite packed gland seals tighten gland nut approximately $\frac{1}{4}$ of a turn taking care not to overtighten as this may cause excessive friction on the valve stem. If no adjustment remaining, replace the graphite gland seal (refer to Section 4.4, page 10).

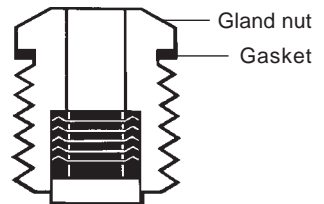
Annually

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 'Spares' Section 5 for 'available spares'. High temperature graphite packed gland seals are subject to wear during normal operation. It is therefore recommended that the graphite packing is replaced during this routine inspection to prevent premature failure of the gland seals during normal operation.

1/2" to 2 1/2"
(DN15 to DN65)



Plug and seat
3" and 4" (DN80 and DN100)

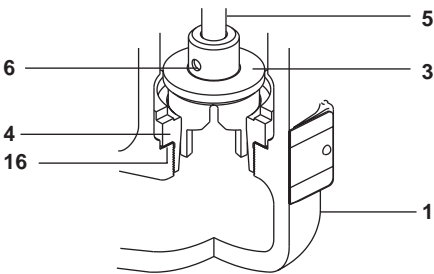
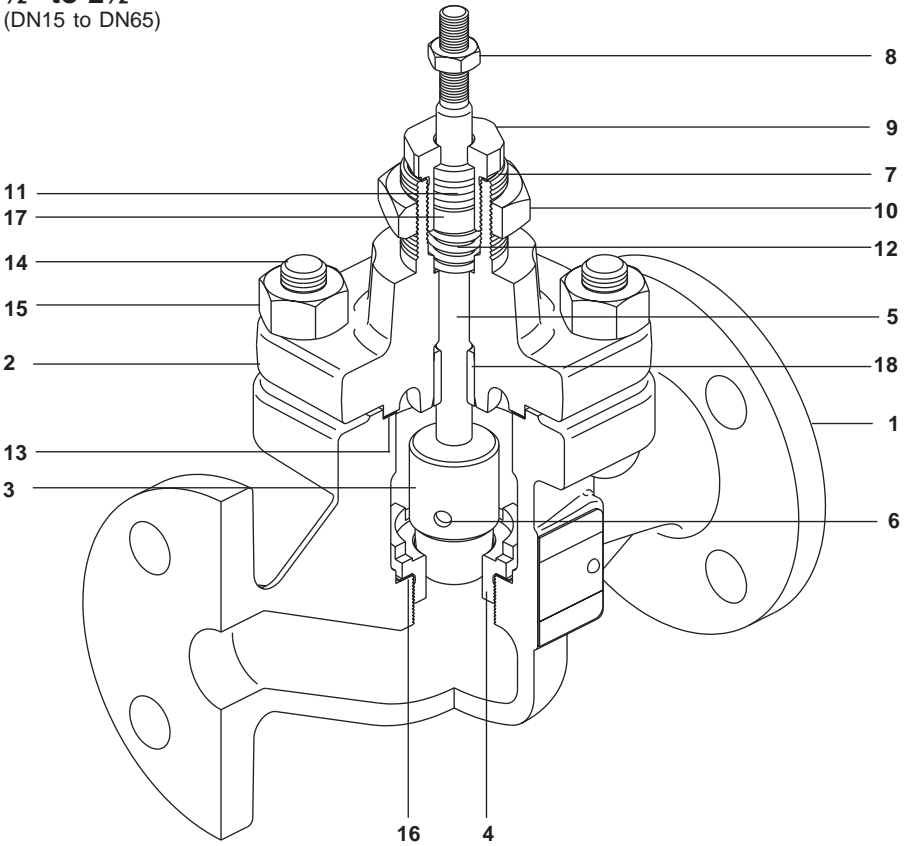


PTFE chevron seals
correct installation

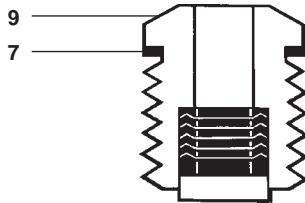
4.2 Part numbers, description and materials

No	Part	Material	
1	Body	Cast iron	ASTM A126 Class B
2	Bonnet	Ductile iron	ASTM A359
3	Plug	Stainless steel	ASTM A276 Gr. 431
4	Seat	Stainless steel	ASTM A276 Gr. 431
5	Stem	Stainless steel	ASTM A276 Gr. 431
6	Pin	Stainless steel	AISI 302
7	Gland nut gasket	Semi-rigid graphite laminated	
8	Lock-nut	Stainless steel	
9	Gland nut	Stainless steel	ASTM A276 Gr. 431
10	Mounting nut	Mild steel zinc plated	
11	Gland seals	PTFE chevrons	
12	Gland spring	Stainless steel	
13	Bonnet gasket	Semi-rigid graphite laminated	
14	Bonnet studs	Steel	ASTM A193 B7
15	Bonnet nuts	Steel	ASTM A194 2H
		1/2" to 3/4" (DN15 and DN20)	3/8" UNC
		1" to 2" (DN25 to DN50)	1/2" UNC
		2 1/2" to 4" (DN65 to DN100)	5/8" UNC
16	Seat gasket	Semi-rigid graphite laminated	
17	Guide bush	Glass reinforced PTFE	
18	Bonnet guide	Stainless steel	AISI 440B Hardened

1/2" to 2 1/2"
(DN15 to DN65)



Plug and seat
3" and 4" (DN80 and DN100)



PTFE chevron seals
correct installation

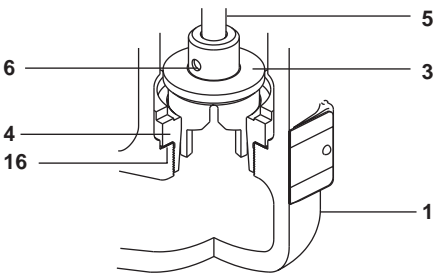
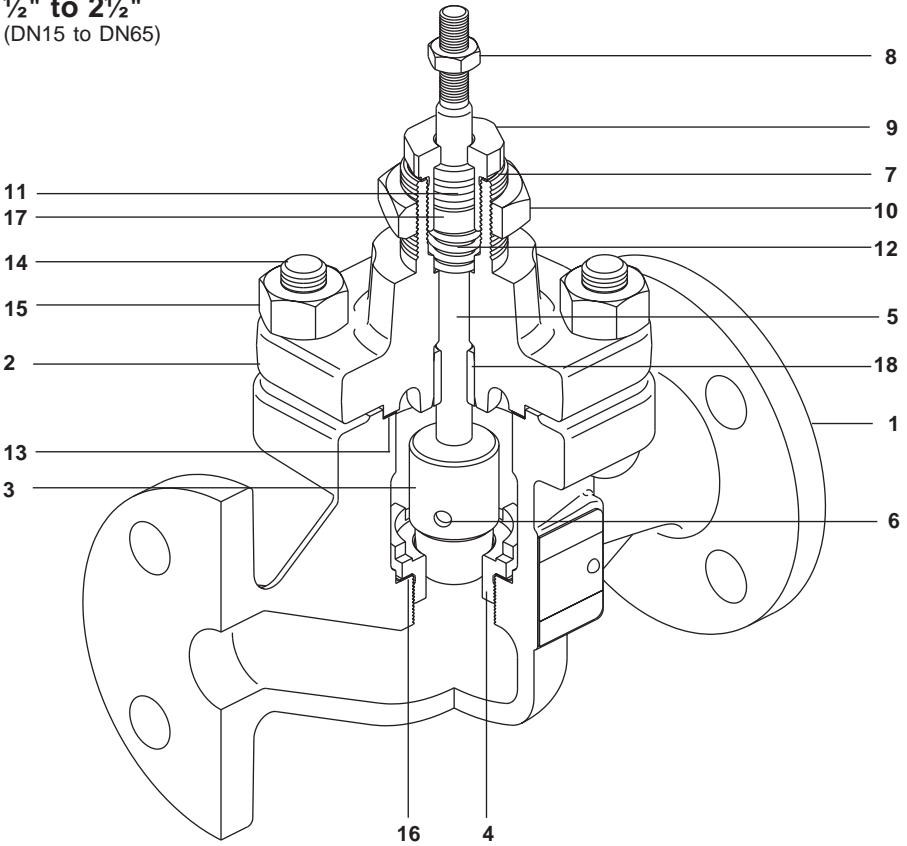
4.3 Procedure for renewing chevron gland seals

- a) Isolate valve on both sides.
- b) Remove actuator from valve. Refer to Installation and Maintenance Instructions covering Spirax Sarco actuators.
- c) Unscrew the four nuts (15) securing the bonnet to the body and remove the bonnet (2) complete with stem and plug (3 + 5).

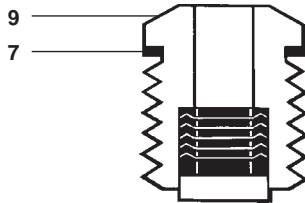
Caution: Care should be taken in removing the bonnet since fluid under pressure may be trapped between the isolating valves.

- d) Remove lock-nut (8).
- e) Unscrew gland nut (9), withdraw valve stem and plug, remove and discard the gland seal set (11 + 12 + 17) and gland nut gasket (7).
- f) Examine parts for signs of damage or deterioration and renew as necessary. Note that score marks or scaly deposits on valve stem (5) will lead to early failure of the seals.
- g) Clean parts taking care to avoid scratching stem or bore of gland nut. Refit valve stem and plug.
- h) Using new bonnet gasket (13) refit the bonnet (2) on the valve body, leaving the stem protruding.
Replace the four nuts (15) and tighten to the correct torque (see Table 1, page 12), ensuring valve plug is on its seat.
- i) To replace new gland seal assembly, firstly fit gland spring (12) over valve stem (5) and replace gland nut gasket (7). New chevron gland seals should be firmly inserted into the gland nut (9), care being taken to avoid damage to the sealing edges. Fit new guide bush (17). Refit gland nut (9) over the valve stem (5), screwing down to ensure the gasket is bedded down onto the bonnet (2).
Chevron seals should be fitted into gland nut (9) as shown on page 9.
- j) Ensure that the stem (5) moves freely.
- k) Refit valve lock-nut (8).
- l) Refit actuator, clamping nut (10) and connect actuator to valve stem.
- m) Bring valve back into service.
- n) Check for leakage at gland.

1/2" to 2 1/2"
(DN15 to DN65)



Plug and seat
3" and 4" (DN80 and DN100)



PTFE chevron seals
correct installation

4.4 Procedure for renewing graphite gland seals

- a) Isolate valve on both sides.
- b) Remove actuator from valve. Refer to Installation and Maintenance Instructions covering Spirax Sarco actuators.
- c) Unscrew the four nuts (15) securing the bonnet to the body and remove the bonnet (2) complete with stem and plug (3 + 5).

Caution: Care should be taken in removing the bonnet since fluid under pressure may be trapped between the isolating valves.

- d) Remove lock-nut (8).
- e) Unscrew gland nut (9). Withdraw stem and plug (3), remove and discard gland seal set (11 + 12 + 17), and gasket from the bonnet.
- f) Examine parts for signs of damage or deterioration and renew as necessary. Note that score marks or scaly deposits on valve stem (5) will lead to early failure of the seals.
- g) Clean parts taking care to avoid scratching stem or bore of gland nut.

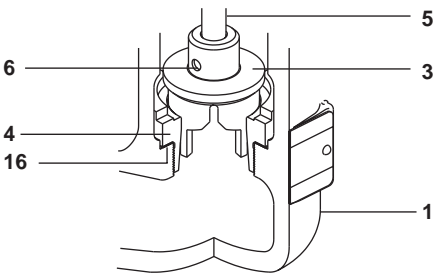
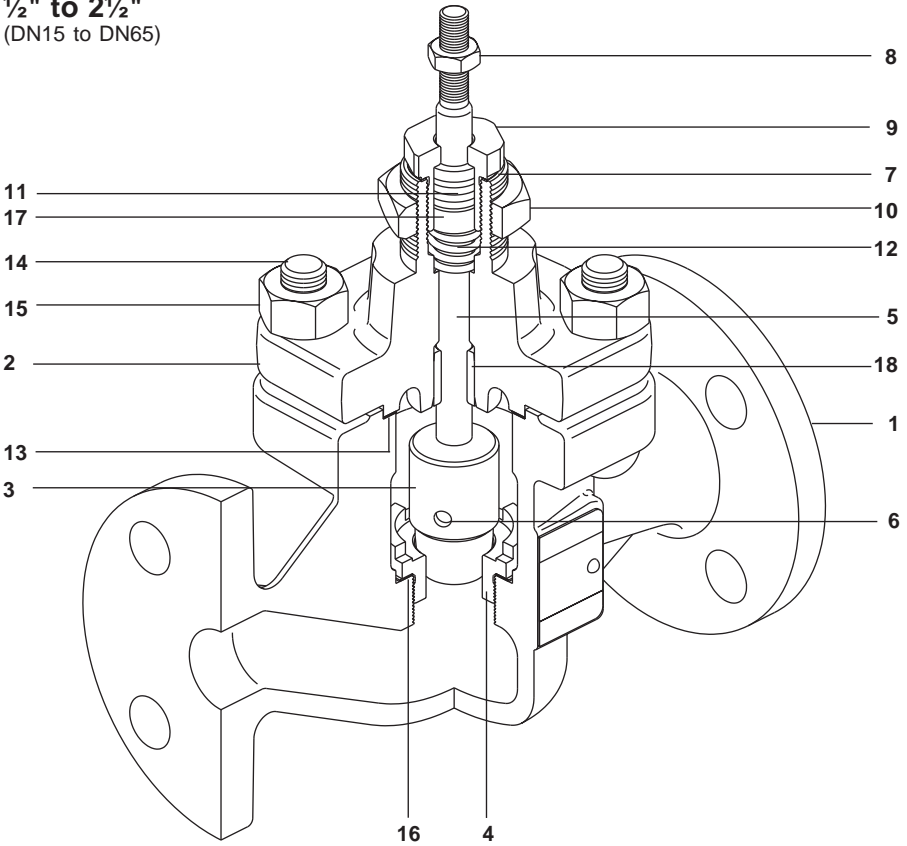
- h) The replacement graphite gland seal should now be fitted. Note that the gland seal set contains a top and bottom support ring and a graphite pack. During fitting the order of the graphite pack should be maintained as supplied.

Place the bottom support ring into the bonnet. One by one add the graphite rings and each time use the gland nut (9) to drive down into the bonnet. Ensuring the junction of the ring ends are rotated by 90°. Leave the gland nut loosely assembled so that the seals are not compressed.

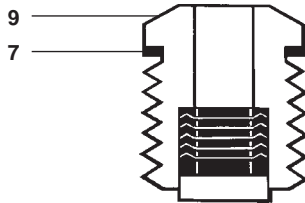


- i) Refit the valve stem and plug assembly by carefully sliding the valve stem in order to pass through the seals.
- j) Using new bonnet gasket (13) refit the bonnet (2) on the valve body, ensuring the plug is on the valve seat, and replace the nuts and tighten to the correct torque (see Table 1, page 12).
- k) Screw down the gland nut until it just starts to compress the packing. Compress the gland seal packing by tightening the gland nut (9) by 1½ turns.
Raise and lower the valve stem after each tightening of the gland nut to encourage the seals to bed down correctly.
- l) Refit the actuator using clamping nut (10) and connect the actuator to the valve stem.
- m) Allow the new gland seals to bed in by moving the valve stem full travel a minimum of five times.
- n) Tighten the gland nut (9) by ¼ of a turn for ½" to 2" (DN15 to DN50) valves and ½ a turn for 2½" to 4" (DN65 to DN100) valves.
- o) Commission the actuator according to the appropriate Installation and Maintenance Instructions.
- p) Bring the valve back into service.
- q) Should there be a small amount of seepage from the valve stem, this may be stopped by carefully tightening the gland nut. Care should be taken not to overtighten as this may cause the spindle to lock-up.

1/2" to 2 1/2"
(DN15 to DN65)



Plug and seat
3" and 4" (DN80 and DN100)



PTFE chevron seals
correct installation

4.5 Procedure for renewing valve plug and seat

- a) Isolate valve on both sides.
- b) Remove actuator from valve. Refer to Installation and Maintenance Instructions covering Spirax Sarco actuators.
- c) Unscrew the four nuts (15) securing the bonnet to the body and remove the bonnet (2) complete with stem and plug (3 + 5).

Caution: Care should be taken in removing the bonnet since fluid under pressure may be trapped between the isolating valves.

- d) Remove lock-nut (8).
- e) Unscrew gland nut (9), withdraw stem and plug (3 + 5) and remove and discard the gland seals (11) and gasket from the bonnet. Clean bonnet then replace new stem and plug.
- f) Unscrew and remove valve seat (4). Remove seat gasket (16) and replace with new seat gasket.

Note: to remove and replace the valve seat a special tool is required which can be obtained from Spirax Sarco by quoting the valve size and type.

- g) Lightly smear the threads of the new seat (4) with silicon grease and screw it into the body. Tighten to the correct torque (see Table 1, below) ensuring valve plug is on its seat.
- h) Using a new gasket (13) refit the bonnet (2) on the valve body. Replace the four nuts (15) and tighten to the correct torque (see Table 1, below).
- i) Fit new chevron gland seal assembly and gasket (See 'PTFE chevron seals, correct installation; opposite) as described in Section 4.3, page 8. If graphite seals are used refer to Section 4.4, page 10). Ensure the valve stem (5) moves freely after assembly.
- j) Refit actuator, clamping nut (10) and connect actuator to valve stem.
- k) Bring valve back into service.
- L) Check for leakage at gland.

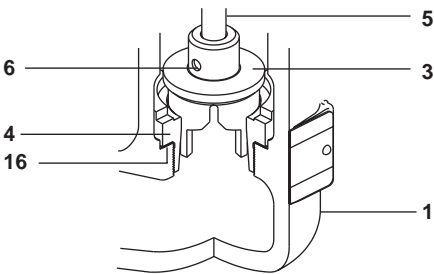
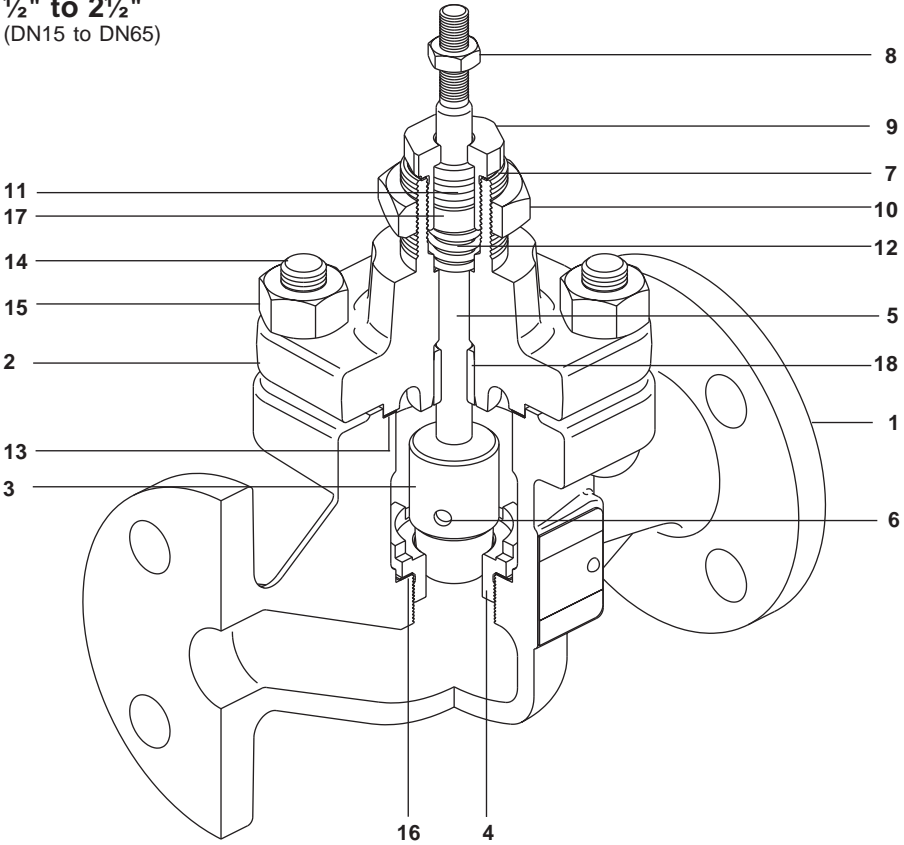
Table 1 Recommended tightening torques lbf ft (N m)

Size	Seat (4)		Bonnet nuts (15)		Gland nut (chevron seals) (9)	
½" (DN15)	30 ± 3.7	(40 ± 5)	22 ± 1	(30 ± 1.5)	18 - 22	(25 - 30)
¾" (DN20)	39 ± 2.2	(53 ± 3)	22 ± 1	(30 ± 1.5)	18 - 22	(25 - 30)
1" (DN25)	59 ± 3.7	(80 ± 5)	29 ± 1.5	(40 ± 2)	18 - 22	(25 - 30)
1¼" (DN32)	96 ± 3.7	(130 ± 5)	33 ± 1.5	(45 ± 2)	18 - 22	(25 - 30)
1½" (DN40)	163 ± 3.7	(220 ± 5)	33 ± 1.5	(45 ± 2)	18 - 22	(25 - 30)
2" (DN50)	111 ± 3.7	(150 ± 5)	48 ± 2.5	(65 ± 3)	18 - 22	(25 - 30)
2½" (DN65)	211 ± 8.8	(300 ± 12)	48 ± 2.5	(65 ± 3)	24 - 28	(32 - 38)
3" (DN80)	295 ± 11.8	(400 ± 16)	44 ± 2	(60 ± 3)	24 - 28	(32 - 38)
4" (DN100)	442 ± 17.7	(600 ± 24)	44 ± 2	(60 ± 3)	24 - 28	(32 - 38)

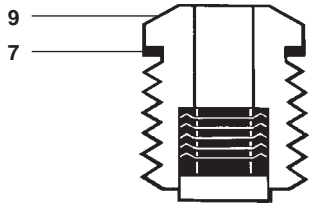
Attention should be given to leaking glands immediately. If left, the valve spindle may be damaged by scoring.

Note: To avoid damage to gland seals the valve stem (5) should be correctly fitted within the bonnet before replacing gland nut (9) chevron seal assembly.

1/2" to 2 1/2"
(DN15 to DN65)



Plug and seat
3" and 4" (DN80 and DN100)



PTFE chevron seals
correct installation

5. Spares

Note: When placing an order for spares please indicate clearly the product date code (found on the label of the valve body i.e. F9) to ensure that the order is processed quickly, efficiently and correctly.

Spare parts

The spare parts available are in heavy outline. Parts drawn in broken line are not supplied as spares. These spares are for sizes ½" to 4" (DN15 to DN100).

Available spare

Actuator clamping nut	A
Gland seal kit (spring, chevrons and gasket)	B
Graphite gland seal kit (seal rings, support rings)	C
Stem, plug and bonnet gasket	D, E
Bonnet gasket (packet of 3)	E
Seat, seat gasket and bonnet gasket	F, G, E

How to order spares

Always order spares by using the description given in the column headed 'Available spare', stating the following information and the date code of the product.

Valve size	½" to 4" (DN15 to DN100)	1"
Valve series	L series - 2 port	L
Valve characteristic	E = Equal percentage F = Fast opening	E
Design series	A = ANSI/ASTM	A
Body material	3 = Cast iron	3
Connections	1 = Screwed NPT 3 = Flanged ANSI 125	3
Stem sealing option	H = High temperature packing	
Sealing option	G = Soft seal (PTFE)	
C_v	To be specified	C _v 11.7
Connection type	To be specified	ANSI 125
Date code	Found on the label of the valve body	F9

Example: 1 - Gland seal kit for 1" LEA33 C_v 11.7 flanged to ANSI 125. Date code F9.

