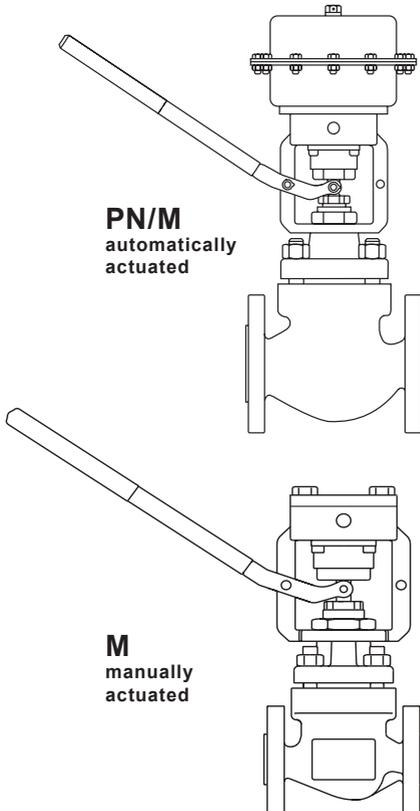


BBV

Automatic or Manually Actuated Boiler Blowdown Valves

Installation and Maintenance Instructions

DN15 - DN50



Contents

1. Safety information	3	4. Maintenance of the actuator	37
2. General product information	9	4.1 Disassembly of the actuated system	
2.1 General description		4.2 Assembly of the actuated system	41
2.2 Size and pipe connections	11	5. Maintenance of the valve	45
2.3 Technical data	11	5.1 General - ASME Class 300 and EN 1092 PN40	
2.4 Materials (Parts 1 to 15)	12	5.2 Removal of valve bonnet	46
2.4 Materials (Parts 16 to 40)	14	5.3 Replacement of PTFE gland packings	47
2.5 Capacities	16	5.4 Replacement of graphite gland packing	48
2.6 BBV43 Pressure/temperature limits - EN 1092	18	5.5 Removal and refitting of the valve plug/stem assembly and seat	49
2.7 BBV43 Pressure/temperature limits - ASME	20	5.6 Refitting the bonnet	50
2.8 BBV43 Pressure/temperature limits - JIS/KS	22	5.7 General - ASME Class 600 and EN 1092 PN100	52
2.9 BBV63 Pressure/temperature limits - EN 1092	24	5.8 Removal of valve bonnet	
2.10 BBV63 Pressure/temperature limits - ASME	26	5.9 Replacement of PTFE gland packings	53
2.11 BBV63 Pressure/temperature limits - JIS/KS	28	5.10 Replacement of graphite gland packing	54
2.12 BBV83 Pressure/temperature limits - EN 1092	30	5.11 Removal and refitting of the valve plug/ stem assembly and seat	55
2.13 BBV83 Pressure/temperature limits - ASME	32	5.12 Refitting the bonnet	56
2.14 BBV83 Pressure/temperature limits - JIS/KS	34	6. Spare parts	58
3. Installation and commissioning	36	Appendix	64

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 - PTFE handling precautions

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.

WARNING:

This product should only be used to purge boiler water containing non-metallic sludge and sediment within the pressure and temperature limits.

For optimum performance, ensure that TDS value is in accordance with the boiler's instructions.

In the event that lever fails to return to the closed position, do not turn the actuator and refer to the maintenance instructions.

If the actuator is turned, the plug will not close properly in the seat and the valve will leak.

The product guarantee invalid if it is dis-assembled before returning.

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.

These products comply with the requirements of the EU Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations, carry the  mark when so required and fall within the Pressure Equipment Directive (PED) categories as stated on page 4.

- i) The products have been specifically designed for use with liquids and gases which are in Group 2 of the above mentioned Pressure Equipment Directive.
- 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.
- vi) Prior to use, the user shall ensure the fluid compatibility with the equipment material.

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.

BBV boiler blowdown valves - PED categories

Product		Group 2 Gases	Group 2 liquids	
BBV43	PN40 JIS 20/KS 20	DN15 - DN25	SEP	SEP
		DN32	SEP	SEP
		DN40 - DN50	1	SEP
	NPT screwed SW	DN15 - DN25	SEP	SEP
		DN32	SEP	SEP
		DN40 - DN50	1	SEP
	ASME 300	DN15 - DN25	SEP	SEP
		DN32	SEP	SEP
		DN40 - DN50	1	SEP
	JIS 20/KS 20	DN15 - DN25	SEP	SEP
		DN32	SEP	SEP
		DN40 - DN50	1	SEP
	ASME 600 PN63/PN100 JIS 30/KS 30 JIS 40/KS 40 BW/SW	DN15 - DN25	SEP	SEP
		DN32	SEP	SEP
		DN40 - DN50	1	SEP
BBV63	BSP screwed	DN15 - DN25	SEP	SEP
		DN32	SEP	SEP
		DN40 - DN50	1	SEP
	PN40 JIS 20/KS 20	DN15 - DN25	SEP	SEP
		DN32	SEP	SEP
		DN40 - DN50	1	SEP
	NPT screwed SW	DN15 - DN25	SEP	SEP
		DN32	SEP	SEP
		DN40 - DN50	1	SEP
	ASME 300	DN15 - DN25	SEP	SEP
		DN32	SEP	SEP
		DN40	1	SEP
		DN50 - DN50	1	SEP
	JIS 20/KS 20	DN15 - DN25	SEP	SEP
		DN32	SEP	SEP
DN40 - DN50		1	SEP	
ASME 600 PN63/PN100 JIS 30/KS 30 JIS 40/KS 40 BW/SW	DN15 - DN25	SEP	SEP	
	DN32	SEP	SEP	
	DN40 - DN50	1	SEP	

BBV Automatic or Manually Actuated Boiler Blowdown Valves

BBV boiler blowdown valves - PED categories

Product		Group 2 Gases	Group 2 liquids
BBV83	ASME 600 PN63/PN100	DN15 - DN25	SEP
	JIS 30/KS 30	DN32	SEP
	JIS 40/KS 40		1
	BW/SW	DN40 - DN50	SEP

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 538 °C (1000 °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 waste.

Please visit the Spirax Sarco product compliance web pages

<https://www.spiraxsarco.com/product-compliance>

for up to date information on any substances of concern that may be contained within this product. Where no additional information is provided on the Spirax Sarco product compliance web page, this product may be safely recycled and/or disposed providing due care is taken. Always check your local recycling and disposal regulations.

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

The BBV is specifically designed for the removal of suspended/deposited solids and water from the bottom of steam boilers.

The BBV is available in air-actuated and manual versions. The air-actuated version is supplied with a manual hand lever. The valve is spring-to-close on power failure and the manual version 'M' can easily be upgraded to an automatic version 'PN/M'.

When used with a Spirax Sarco blowdown controller the automatic version provides timed control of blowdown, ensuring that the recommended blowdown occurs with the minimum of heat loss and avoids duplication and omissions.

The valve can be fitted with a mechanical switchbox. This can be linked to the blowdown controller or a BMS system to indicate when the valve has not closed. An optional 1/4" 3-way solenoid valve may be directly mounted on the side of the actuator.

Warning

This product should only be used to purge boiler water containing non-metallic sludge and sediment within the pressure and temperature limits.

For optimum performance, ensure that TDS value is in accordance with the boiler's instructions.

Available types of boiler blowdown valve*:

Air pneumatically actuated supplied with a manual actuation lever	BBV4_ PN/M	Steel body	
	BBV6_ PN/M	Stainless steel body	
	BBV8_ PN/M	Alloy steel body	
Manually actuated complete with a manual actuation lever	BBV4_ M	Steel body	Please note that all of the 'M' versions can be automated to 'PN/M'.
	BBV6_ M	Stainless steel body	
	BBV8_ M	Alloy steel body	

* **Please note** that the underscore '_' represents either: **1** = Screwed or **3** = Flanged.

Standards

These products comply with the requirements of the EU Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations.

Certification

These products are available with material certification to EN 10204 3.1.

Note: All certification/inspection requirements must be stated at the time of order placement.

Note: For additional product data see the following Technical Information sheet TI-P405-51.

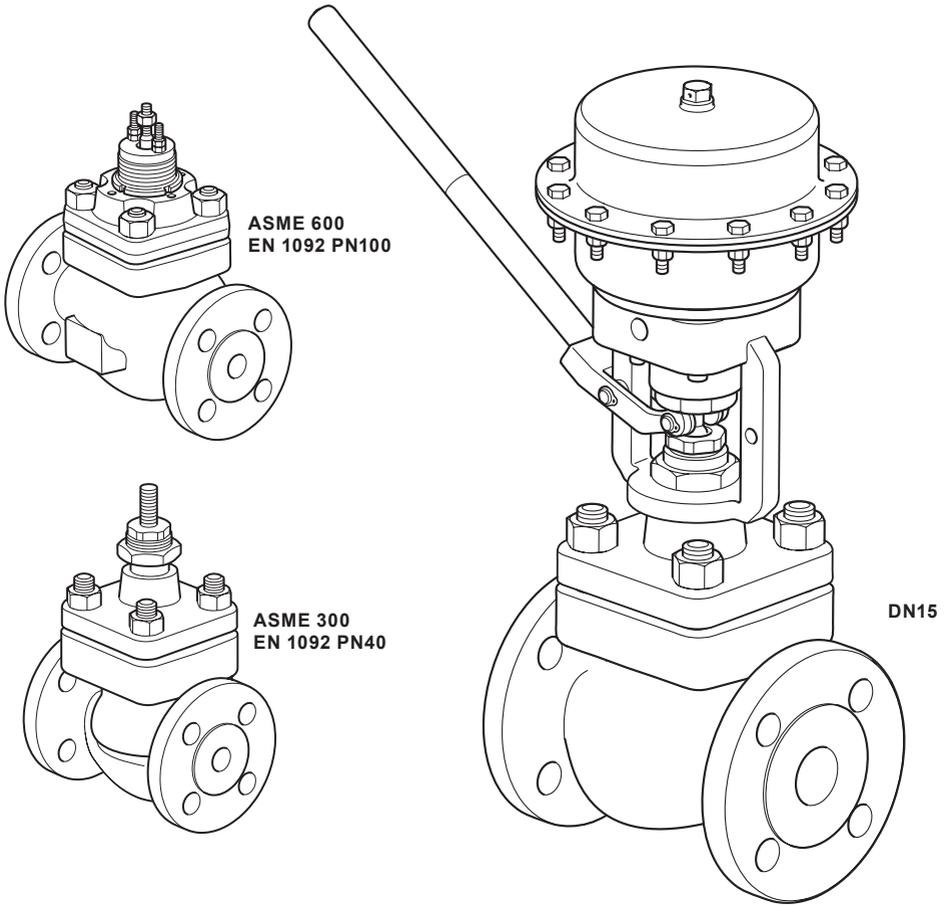


Fig. 1 Typical example of a BBV_3 PN/M automatic boiler blowdown valve

2.2 Size and pipe connections

DN15, DN20, DN25, DN32, DN40 and DN50	Other available options: Butt weld Socket weld JIS/KS 30 and JIS/KS 40 For alternative connections to those stated opposite please contact Spirax Sarco.
1/2", 3/4", 1", 1 1/4", 1 1/2", 2"	
Flanged EN 1092 PN40, PN63 and PN100	
Flanged ASME 300 and ASME 600	

2.3 Technical data

Actuator

Temperature range	-20 °C to +110 °C (-4 °F to 230 °F)	
Maximum operating inlet pressure	6 bar g (87 psi g)	
Air supply connection	1/4" NPT	
Actuator travel	1.0 to 2.0 bar (14.5 to 29 psi)	20 mm (3/16")

Valve

Leakage	Metal-to-metal	10% of standard seat class IV		
Rangeability	Fast	10:1		
Travel	DN15 to DN50 (1/2" to 2")	20 mm (3/16")		
Pressure/temperature limits	ASME Class 300 and EN 1092 PN40	EN	BBV4x BBV6x	Carbon steel Stainless steel
		ASME	BBV4x BBV6x	Carbon steel Stainless steel
	ASME Class 600, EN 1092 PN63 and EN 1092 PN100		BBV4x BBV6x	Carbon steel Stainless steel
			BBV8x	Alloy steel

BBV Automatic or Manually Actuated Boiler Blowdown Valves

2.4 Materials (Parts 1 to 15)

No.	Part	Material	
1	Body	BBV4_	Carbon Steel
		BBV6_	Stainless Steel
		BBV8_	Alloy Steel
2	Plug	Stainless Steel + stellite	
3	Seat	Stainless Steel + stellite	
4	Seat gasket	Reinforced exfoliated graphite	
5	Seat retainer	Stainless Steel	
6	Cover	BBV4_	Carbon Steel
		BBV6_	Stainless Steel
		BBV8_	Alloy Steel
7	Packing	BBV__P	PTFE
		BBV__H	Graphite
8	Cover gasket	Reinforced exfoliated graphite	
9	Bonnet nuts	BBV__H	Stainless Steel
		BBV6_	
		Other	Carbon Steel
10	Bonnet studs	BBV__H	Stainless Steel
		BBV6_	
		Other	Carbon Steel
11	Actuator clamp nut	BBV6_	Stainless Steel
		Other	Carbon Steel
12	Gland nut	Stainless Steel	
13	Scraper ring	PTFE	
14	Yoke	SG Iron	
15	Closed plate	Stainless Steel	

**Parts 16 to 40
continued on the following pages**

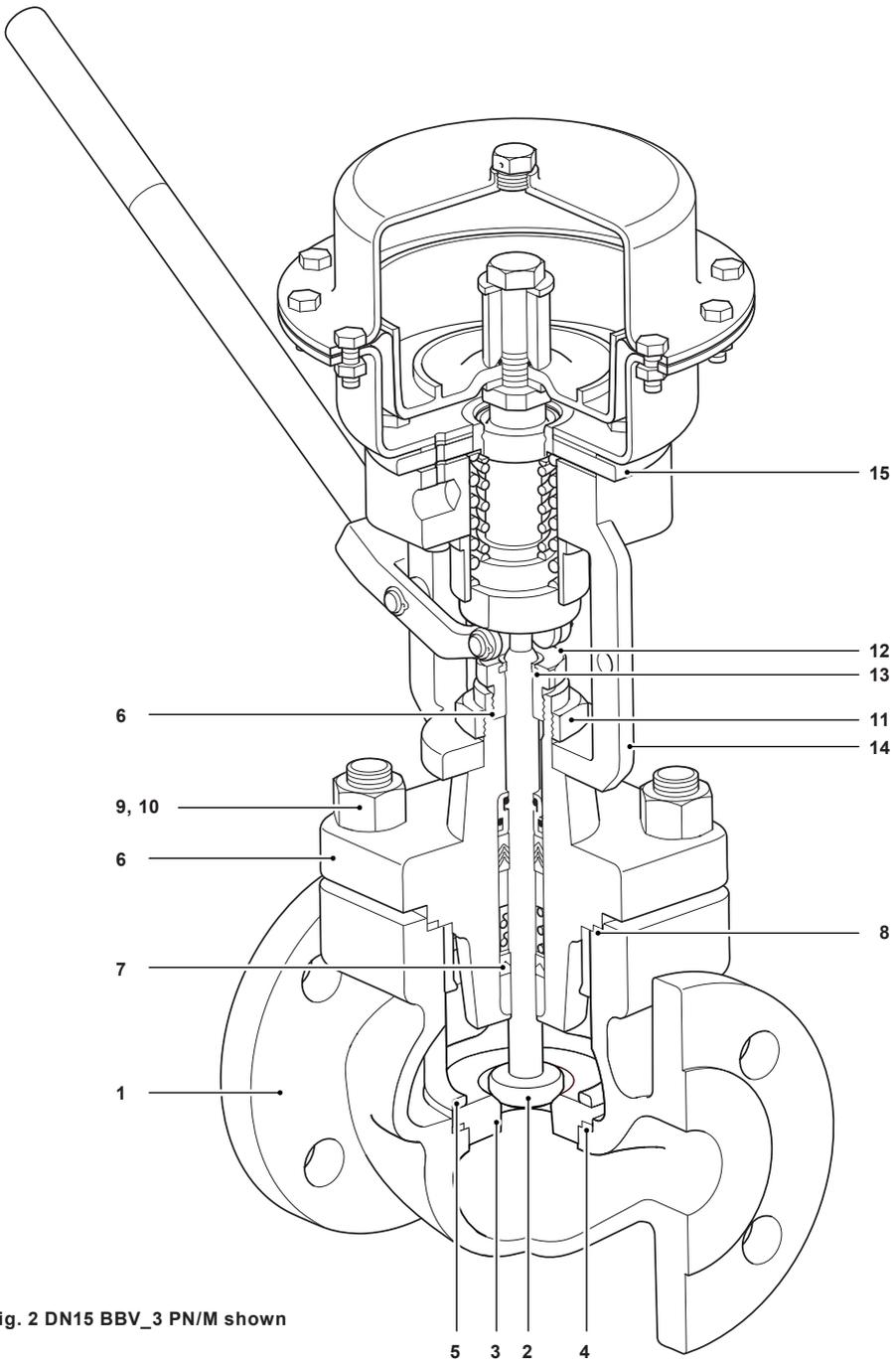


Fig. 2 DN15 BBV_3 PN/M shown

BBV Automatic or Manually Actuated Boiler Blowdown Valves

2.4 Materials (continued) (Parts 16 to 40)

No.	Part	Material
16	Hex. head screw	Carbon Steel
17	Nut	Carbon Steel
18	Upper housing	Carbon Steel
19	Diaphragm	Reinforced NBR
20	Gasket	Reinforced Graphite
21	Vent plug	Brass
22	Bolt	Carbon Steel
23	Diaphragm plate	Aluminium
24	Spindle	Stainless Steel
25	Lever stem	Stainless Steel
26	Screw	Carbon Steel
27	Seal	Polyurethane
28	Spring	Spring Steel
29	Spring guide	Stainless Steel
30	Connector	Stainless Steel
31	Lever	SG Iron
32	Axis	Stainless Steel
33	Roller	Stainless Steel
34	Spring graphite	Spring Steel
35	Elastic ring	Carbon Steel
36	Elastic ring	Carbon Steel
37	Washer	Carbon Steel
38	O'ring	Viton
39	Spacer	Carbon Steel
40	Washer	Carbon Steel

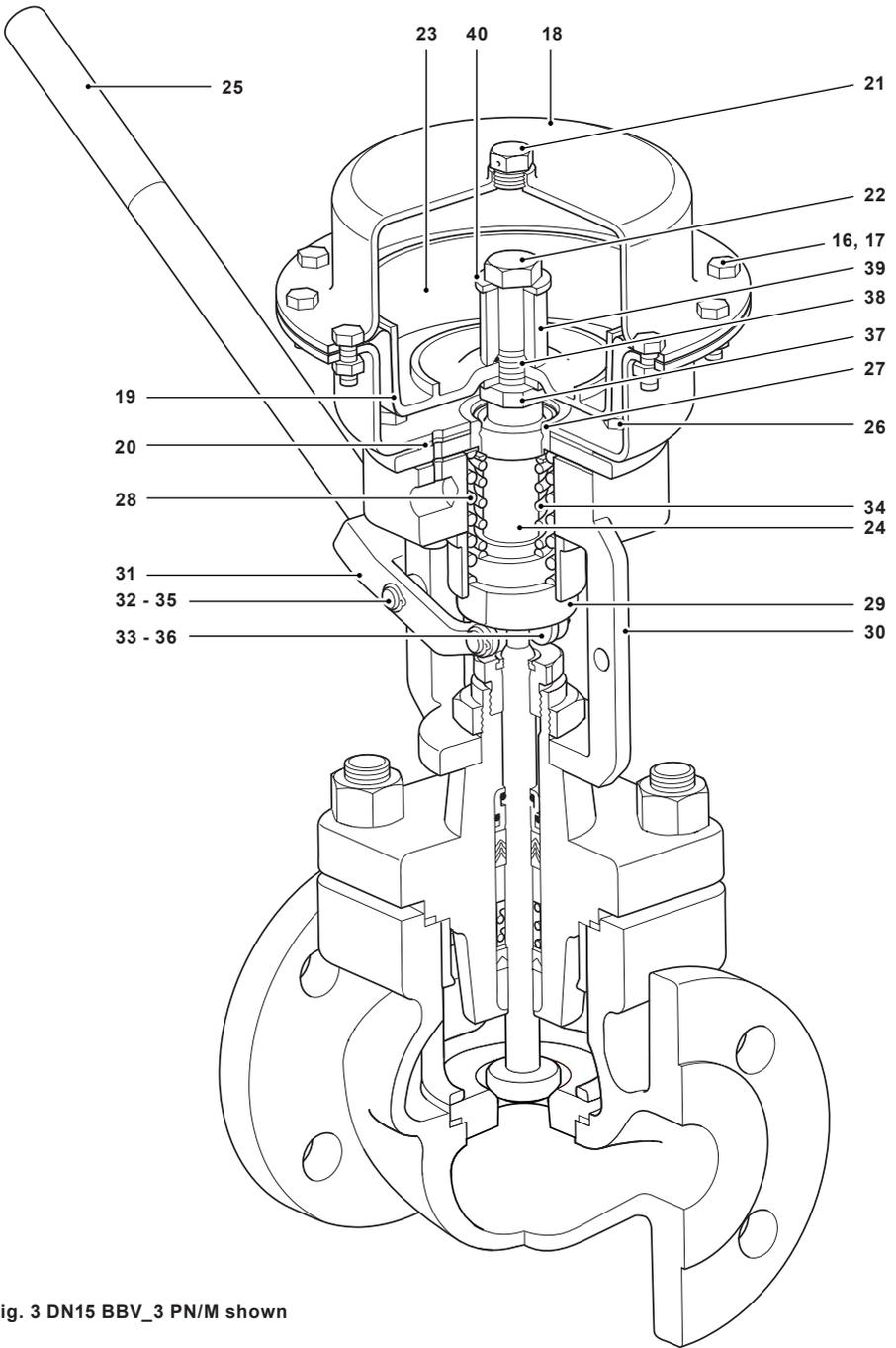
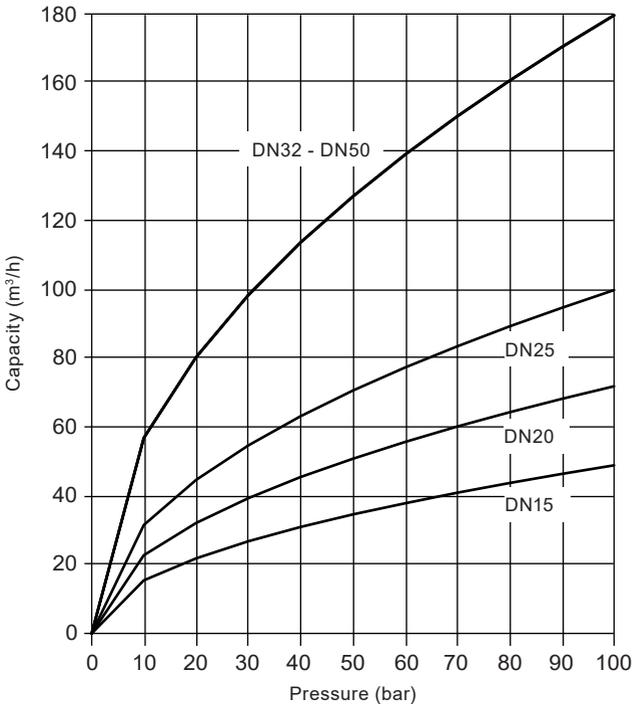


Fig. 3 DN15 BBV_3 PN/M shown

BBV Automatic or Manually Actuated Boiler Blowdown Valves

2.5 Capacities

	Size	DN15	DN20	DN25	DN32	DN40	DN50
	K_v	4.9	7.2	10	18		
	Capacity (m ³ /h)						
Pressure (bar)	0	0.0	0.0	0.0	0.0		
	0.5	3.5	5.1	7.1	12.7		
	1	4.9	7.2	10.0	18.0		
	10	15.5	22.8	31.6	56.9		
	20	21.9	32.2	44.7	80.5		
	30	26.8	39.4	54.8	98.6		
	40	31.0	45.5	63.2	113.8		
	50	34.6	50.9	70.7	127.3		
	60	38.0	55.8	77.5	139.4		
	70	41.0	60.2	83.7	150.6		
	80	43.8	64.4	89.4	161.0		
	90	46.5	68.3	94.9	170.8		
100	49.0	72.0	100.0	180.0			

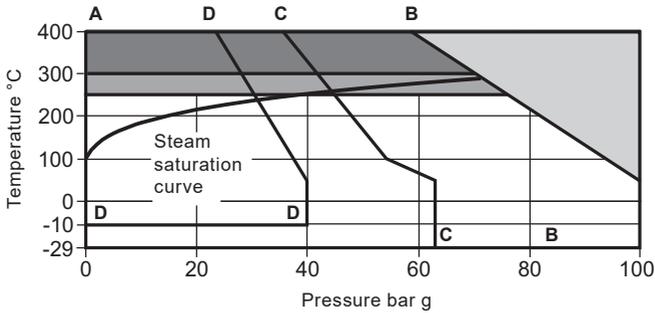


BBV Automatic or Manually Actuated Boiler Blowdown Valves

Pressure/temperature limits

Section		Page
2.6	EN 1092	18
2.7	BBV43 ASME	20
2.8	JIS / KS	22
2.9	EN 1092	24
2.10	BBV63 ASME	26
2.11	JIS / KS	28
2.12	EN 1092	30
2.13	BBV83 ASME	32
2.14	JIS / KS	34

2.6 BBV43 Pressure/temperature limits - EN 1092



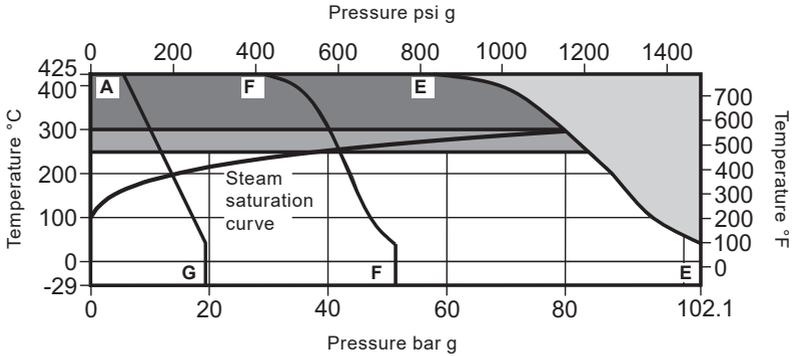
- The product **must not** be used in this region.
- An extended cover is required for use in this region.
- High temperature packing required for use in this region.

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 scaled bonnet, the pressure/temperature limits of the bellows must be read in conjunction with the valve pressure/temperature limits shown in table opposite.

	Body design conditions		
	PMA Maximum allowable pressure		100 bar g @ 50 °C
	PMO Maximum operating pressure		
A - B - B	TMA Maximum allowable temperature		400 °C @ 59.5 bar g
PN100	Minimum allowable temperature		-29 °C
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 76.1 bar g
		High temperature packing (H)	400 °C @ 59.5 bar g
	Minimum operating temperature		-29 °C
	Design for a maximum cold hydraulic test pressure of:		156 bar g
	Body design conditions		
	PMA Maximum allowable pressure		63 bar g @ 50 °C
	PMO Maximum operating pressure		
A - C - C	TMA Maximum allowable temperature		400 °C @ 37.5 bar g
PN63	Minimum allowable temperature		-29 °C
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 48.0 bar g
		High temperature packing (H)	400 °C @ 37.5 bar g
	Minimum operating temperature		-29 °C
	Design for a maximum cold hydraulic test pressure of:		94.5 bar g
	Body design conditions		
	PMA Maximum allowable pressure		40 bar g @ 50 °C
	PMO Maximum operating pressure		
A - D - D	TMA Maximum allowable temperature		400 °C @ 23.8 bar g
PN40	Minimum allowable temperature		-29 °C
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 30.4 bar g
		High temperature packing (H)	400 °C @ 23.8 bar g
	Minimum operating temperature		-10 °C
	Design for a maximum cold hydraulic test pressure of:		60 bar g

2.7 BBV43 Pressure/temperature limits - ASME



-  The product **must not** be used in this region.
-  An extended cover is required for use in this region.
-  High temperature packing required for use in this region.

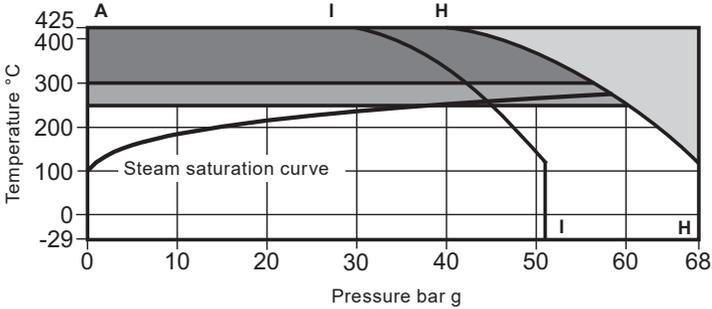
Notes:

1. Where the process fluid temperature is sub-zero and the ambient temperature is below +5 °C (+41 °F), 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 scaled bonnet, the pressure/temperature limits of the bellows must be read in conjunction with the valve pressure/temperature limits shown in table opposite.

	Body design conditions		ASME 600	
ASME 600	PMA Maximum allowable pressure			
		102.1 bar g @ 38 °C	1480 psi g @ 100 °F	
	PMO Maximum operating pressure			
	TMA Maximum allowable temperature		425 °C @ 57.5 bar g	797 °F @ 834 psi g
	Minimum allowable temperature		-29 °C	-20 °F
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 83.6 bar g	482 °F @ 1212 psi g
		High temperature packing (H)	425 °C @ 57.5 bar g	797 °F @ 834 psi g
	Minimum operating temperature		-29 °C	-20 °F
	Design for a maximum cold hydraulic test pressure of:		156 bar g	2 262 psi g
		Body design conditions		ASME 300
ASME 300	PMA Maximum allowable pressure			
		51.1 bar g @ 38 °C	740 psi g @ 100 °F	
	PMO Maximum operating pressure			
	TMA Maximum allowable temperature		425 °C @ 28.8 bar g	797 °F @ 418 psi g
	Minimum allowable temperature		-29 °C	-20 °F
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 41.9 bar g	482 °F @ 608 psi g
		High temperature packing (H)	425 °C @ 28.8 bar g	797 °F @ 418 psi g
	Minimum operating temperature		-29 °C	-20 °F
	Design for a maximum cold hydraulic test pressure of:		77 bar g	1 117 psi g
		Body design conditions		ASME 150
ASME 150	PMA Maximum allowable pressure			
		19.6 bar g @ 38 °C	284 psi g @ 100 °F	
	PMO Maximum operating pressure			
	TMA Maximum allowable temperature		425 °C @ 5.5 bar g	797 °F @ 80 psi g
	Minimum allowable temperature		-29 °C	-20 °F
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 12.1 bar g	482 °F @ 175 psi g
		High temperature packing (H)	425 °C @ 5.5 bar g	797 °F @ 80 psi g
	Minimum operating temperature		-29 °C	-20 °F
	Design for a maximum cold hydraulic test pressure of:		77 bar g	1 117 psi g

BBV Automatic or Manually Actuated Boiler Blowdown Valves

2.8 BBV43 Pressure/temperature limits - JIS/KS



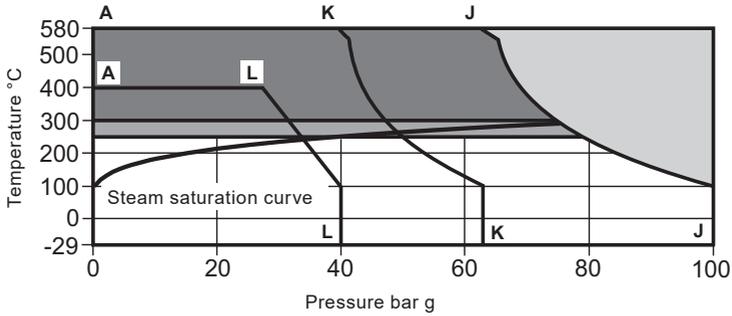
- The product **must not** be used in this region.
- An extended cover is required for use in this region.
- High temperature packing required for use in this region.

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 scaled bonnet, the pressure/temperature limits of the bellows must be read in conjunction with the valve pressure/temperature limits shown in table opposite.

		Body design conditions		
		PMA Maximum allowable pressure	68 bar g @ 120 °C	
		PMO Maximum operating pressure		
A - H - H	JIS/KS 40	TMA Maximum allowable temperature	425 °C @ 40 bar g	
		Minimum allowable temperature	-29 °C	
		TMO Maximum operating temperature	Standard packing PTFE chevron (P) 250 °C @ 60 bar g High temperature packing (H) 425 °C @ 40 bar g	
		Minimum operating temperature	-29 °C	
		Design for a maximum cold hydraulic test pressure of:		156 bar g
		Body design conditions		
				PMA Maximum allowable pressure
		PMO Maximum operating pressure		
A - I - I	JIS/KS 30	TMA Maximum allowable temperature	425 °C @ 30 bar g	
		Minimum allowable temperature	-29 °C	
		TMO Maximum operating temperature	Standard packing PTFE chevron (P) 250 °C @ 45 bar g High temperature packing (H) 425 °C @ 30 bar g	
		Minimum operating temperature	-29 °C	
		Design for a maximum cold hydraulic test pressure of:		156 bar g
		Body design conditions		
				PMA Maximum allowable pressure

2.9 BBV63 Pressure/temperature limits - EN 1092



- The product **must not** be used in this region.
- An extended cover is required for use in this region.
- High temperature packing required for use in this region.

Notes:

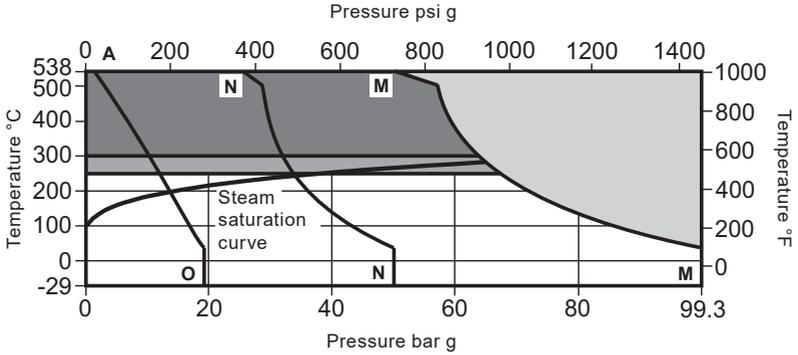
1. Where the process fluid temperature is sub-zero and the ambient temperature is below +5 °C, the external moving parts of the valve and actuator must be heat traced to maintain normal operation.
2. When selecting a valve with a bellows scaled bonnet, the pressure/temperature limits of the bellows must be read in conjunction with the valve pressure/temperature limits shown in table opposite.

A - J - J PN100	Body design conditions		
	PMA Maximum allowable pressure		100 bar g @ 100 °C
	PMO Maximum operating pressure		
	TMA Maximum allowable temperature		580 °C @ 62.7 bar g
	Minimum allowable temperature		-29 °C
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 79.6 bar g
		High temperature packing (H)	580 °C @ 62.7 bar g
	Minimum operating temperature		-29 °C
Design for a maximum cold hydraulic test pressure of:		156 bar g	

A - K - K PN63	Body design conditions		
	PMA Maximum allowable pressure		63 bar g @ 100 °C
	PMO Maximum operating pressure		
	TMA Maximum allowable temperature		580 °C @ 39.5 bar g
	Minimum allowable temperature		-29 °C
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 50.1 bar g
		High temperature packing (H)	580 °C @ 39.5 bar g
	Minimum operating temperature		-29 °C
Design for a maximum cold hydraulic test pressure of:		156 bar g	

A - L - L PN40	Body design conditions		
	PMA Maximum allowable pressure		40 bar g @ 100 °C
	PMO Maximum operating pressure		
	TMA Maximum allowable temperature		400 °C @ 27.4 bar g
	Minimum allowable temperature		-29 °C
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 31.8 bar g
		High temperature packing (H)	400 °C @ 27.4 bar g
	Minimum operating temperature		-29 °C
Design for a maximum cold hydraulic test pressure of:		60 bar g	

2.10 BBV63 Pressure/temperature limits - ASME



- The product **must not** be used in this region.
- An extended cover is required for use in this region.
- High temperature packing required for use in this region.

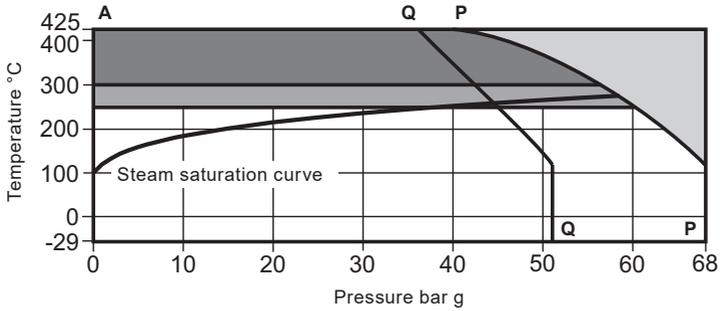
Notes:

1. Where the process fluid temperature is sub-zero and the ambient temperature is below +5 °C (+41 °F), 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 scaled bonnet, the pressure/temperature limits of the bellows must be read in conjunction with the valve pressure/temperature limits shown in table opposite.

	Body design conditions		ASME 600	
	PMA Maximum allowable pressure		99.3 bar g @ 38 °C	1 440 psi g @ 100 °F
	PMO Maximum operating pressure			
	TMA Maximum allowable temperature		538 °C @ 50 bar g	1000 °F @ 725 psi g
A - M - M	Minimum allowable temperature		-29 °C	-20 °F
ASME 600	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 66.8 bar g	482 °F @ 967 psi g
		High temperature packing (H)	538 °C @ 50 bar g	1000 °F @ 725 psi g
	Minimum operating temperature		-29 °C	-20 °F
	Design for a maximum cold hydraulic test pressure of:		156 bar g	2 262 psi g
	Body design conditions		ASME 300	
	PMA Maximum allowable pressure		49.6 bar g @ 38 °C	1 440 psi g @ 100 °F
	PMO Maximum operating pressure			
	TMA Maximum allowable temperature		538 °C @ 25.2 bar g	1000 °F @ 365 psi g
A - N - N	Minimum allowable temperature		-29 °C	-20 °F
ASME 300	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 33.4 bar g	482 °F @ 484 psi g
		High temperature packing (H)	538 °C @ 25.2 bar g	1000 °F @ 365 psi g
	Minimum operating temperature		-29 °C	-20 °F
	Design for a maximum cold hydraulic test pressure of:		75 bar g	1 087 psi g
	Body design conditions		ASME 150	
	PMA Maximum allowable pressure		19 bar g @ 38 °C	275 psi g @ 100 °F
	PMO Maximum operating pressure			
	TMA Maximum allowable temperature		538 °C @ 1.4 bar g	1000 °F @ 20 psi g
A - O	Minimum allowable temperature		-29 °C	-20 °F
ASME 150	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 12.1 bar g	482 °F @ 175 psi g
		High temperature packing (H)	538 °C @ 1.4 bar g	1000 °F @ 20 psi g
	Minimum operating temperature		-29 °C	-20 °F
	Design for a maximum cold hydraulic test pressure of:		29 bar g	2 262 psi g

BBV Automatic or Manually Actuated Boiler Blowdown Valves

2.11 BBV63 Pressure/temperature limits - JIS/KS



- The product **must not** be used in this region.
- An extended cover is required for use in this region.
- High temperature packing required for use in this region.

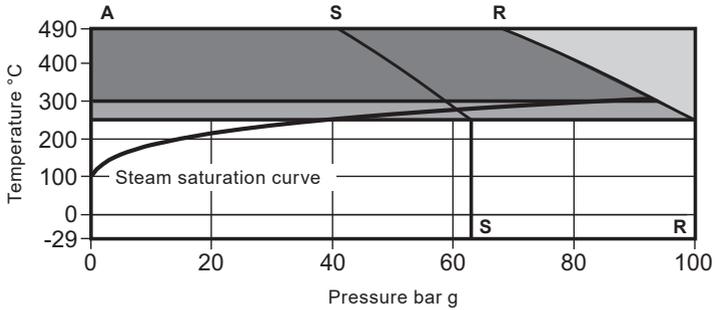
Notes:

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 scaled bonnet, the pressure/temperature limits of the bellows must be read in conjunction with the valve pressure/temperature limits shown in table opposite.

A - P - P JIS/KS 40	Body design conditions		
	PMA Maximum allowable pressure		68 bar g @ 120 °C
	PMO Maximum operating pressure		
	TMA Maximum allowable temperature		425 °C @ 40 bar g
	Minimum allowable temperature		-29 °C
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 60 bar g
		High temperature packing (H)	425 °C @ 40 bar g
	Minimum operating temperature		-29 °C
Design for a maximum cold hydraulic test pressure of:			156 bar g

A - Q - Q JIS/KS 30	Body design conditions		
	PMA Maximum allowable pressure		51 bar g @ 120 °C
	PMO Maximum operating pressure		
	TMA Maximum allowable temperature		425 °C @ 36 bar g
	Minimum allowable temperature		-29 °C
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 45 bar g
		High temperature packing (H)	425 °C @ 36 bar g
	Minimum operating temperature		-29 °C
Design for a maximum cold hydraulic test pressure of:			156 bar g

2.12 BBV83 Pressure/temperature limits - EN 1092



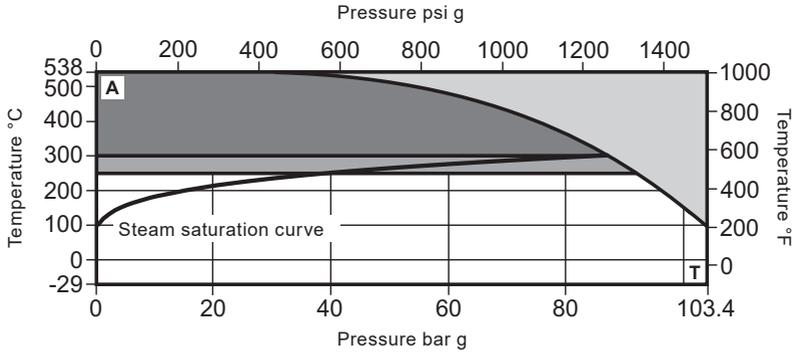
-  The product **must not** be used in this region.
-  An extended cover is required for use in this region.
-  High temperature packing required for use in this region.

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 scaled bonnet, the pressure/temperature limits of the bellows must be read in conjunction with the valve pressure/temperature limits shown in table opposite.

A - R - R PN100	Body design conditions		
	PMA Maximum allowable pressure		100 bar g @ 250 °C
	PMO Maximum operating pressure		
	TMA Maximum allowable temperature		490 °C @ 68 bar g
	Minimum allowable temperature		-29 °C
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 100 bar g
		High temperature packing (H)	490 °C @ 68 bar g
	Minimum operating temperature		-29 °C
	Design for a maximum cold hydraulic test pressure of:		156 bar g
	A - S - S PN63	Body design conditions	
PMA Maximum allowable pressure		63 bar g @ 250 °C	
PMO Maximum operating pressure			
TMA Maximum allowable temperature		490 °C @ 40.9 bar g	
Minimum allowable temperature		-29 °C	
TMO Maximum operating temperature		Standard packing PTFE chevron (P)	250 °C @ 63 bar g
		High temperature packing (H)	490 °C @ 40,9 bar g
Minimum operating temperature		-29 °C	
Design for a maximum cold hydraulic test pressure of:		156 bar g	

2.13 BBV83 Pressure/temperature limits - ASME



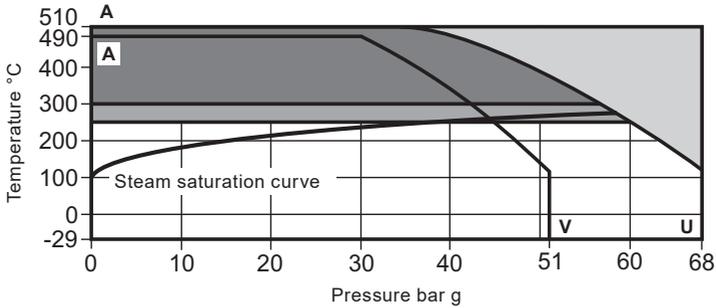
- The product **must not** be used in this region.
- An extended cover is required for use in this region.
- High temperature packing required for use in this region.

Notes:

1. Where the process fluid temperature is sub-zero and the ambient temperature is below +5 °C (+41 °F), 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 scaled bonnet, the pressure/temperature limits of the bellows must be read in conjunction with the valve pressure/temperature limits shown in table opposite.

	Body design conditions		ASME 600
	PMA Maximum allowable pressure	103.4 bar g @ 38 °C	1499 psi g @ 100 °F
	PMO Maximum operating pressure		
	TMA Maximum allowable temperature	538 °C @ 29.8 bar g	1000 °F @ 432 psi g
A - T	Minimum allowable temperature	-29 °C	-20 °F
ASME 600	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 92.7 bar g
		High temperature packing (H)	482 °F @ 1344 psi g
			538 °C @ 29.8 bar g
			1000 °F @ 432 psi g
		Minimum operating temperature	-29 °C
	Design for a maximum cold hydraulic test pressure of:	156 bar g	2262 psi g

2.14 BBV83 Pressure/temperature limits - JIS/KS



- The product **must not** be used in this region.
- An extended cover is required for use in this region.
- High temperature packing 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 scaled bonnet, the pressure/temperature limits of the bellows must be read in conjunction with the valve pressure/temperature limits shown in table opposite.

A - U JIS/KS 40	Body design conditions		
	PMA Maximum allowable pressure		68 bar g @ 120 °C
	PMO Maximum operating pressure		
	TMA Maximum allowable temperature		510 °C @ 36 bar g
	Minimum allowable temperature		-29 °C
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 60 bar g
		High temperature packing (H)	510 °C @ 36 bar g
	Minimum operating temperature		-29 °C
Design for a maximum cold hydraulic test pressure of:		156 bar g	

A - V JIS/KS 30	Body design conditions		
	PMA Maximum allowable pressure		51 bar g @ 120 °C
	PMO Maximum operating pressure		
	TMA Maximum allowable temperature		490 °C @ 30 bar g
	Minimum allowable temperature		-29 °C
	TMO Maximum operating temperature	Standard packing PTFE chevron (P)	250 °C @ 45 bar g
		High temperature packing (H)	490 °C @ 30 bar g
	Minimum operating temperature		-29 °C
Design for a maximum cold hydraulic test pressure of:		156 bar g	

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 4). 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.
- 3.5** Support pipework should be used to prevent stresses being exerted on the valve body.
- 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.
- 3.10** Ensure that the TDS value is in accordance with the boiler recommendation

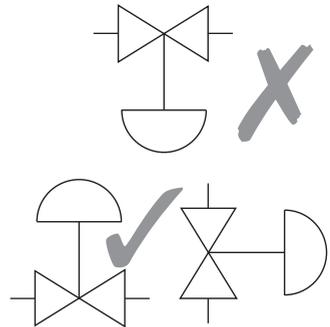


Fig. 4

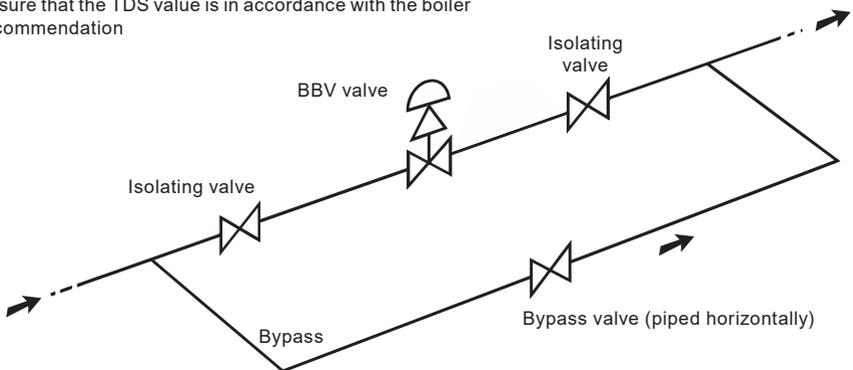


Fig. 5

BBV Automatic or Manually Actuated Boiler Blowdown Valves

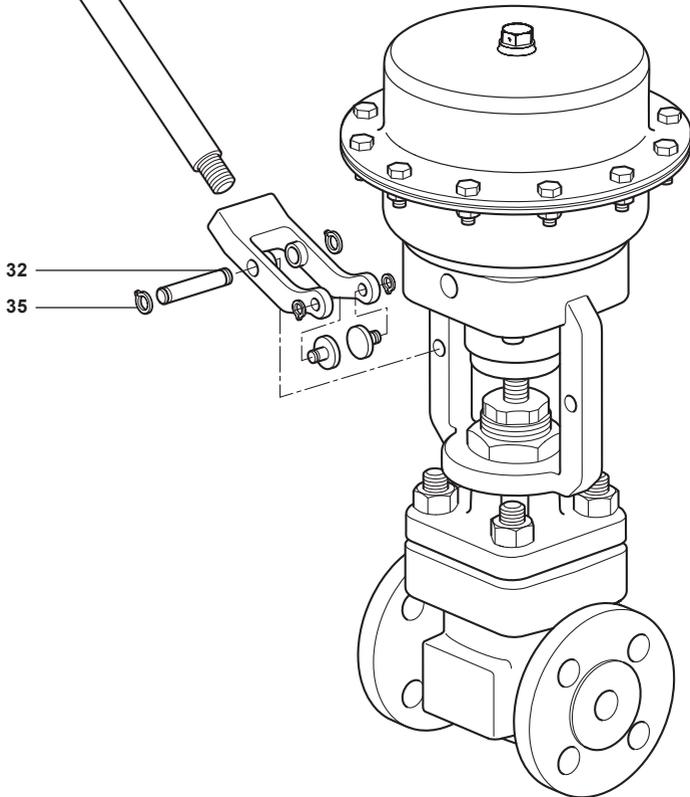
4. Maintenance of the actuator

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

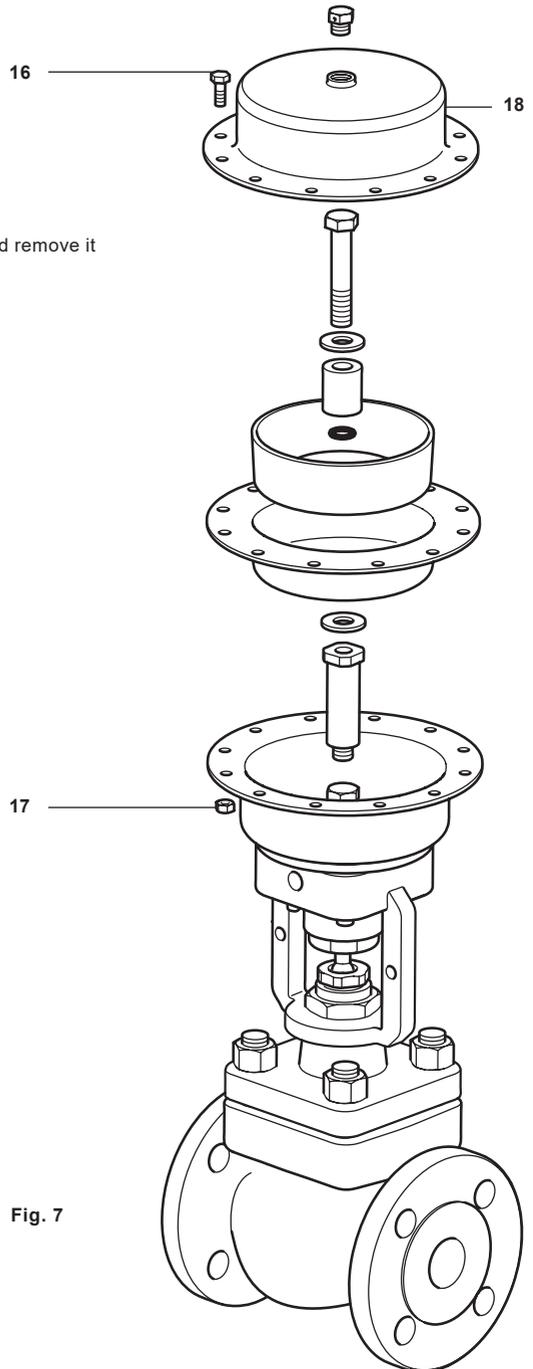
4.1 Disassembly of the actuated system

- Dismantle the lever before removing the actuator assembly. To do this, remove the retaining ring's (35) and remove the axis pin (32). Then remove the lever assembly of the yoke.

Fig. 6



- Unscrew the 12 screw (16) and nut (17) and remove it
- Remove the housing upper (18)
- Unscrew the kit diaphragm and remove it



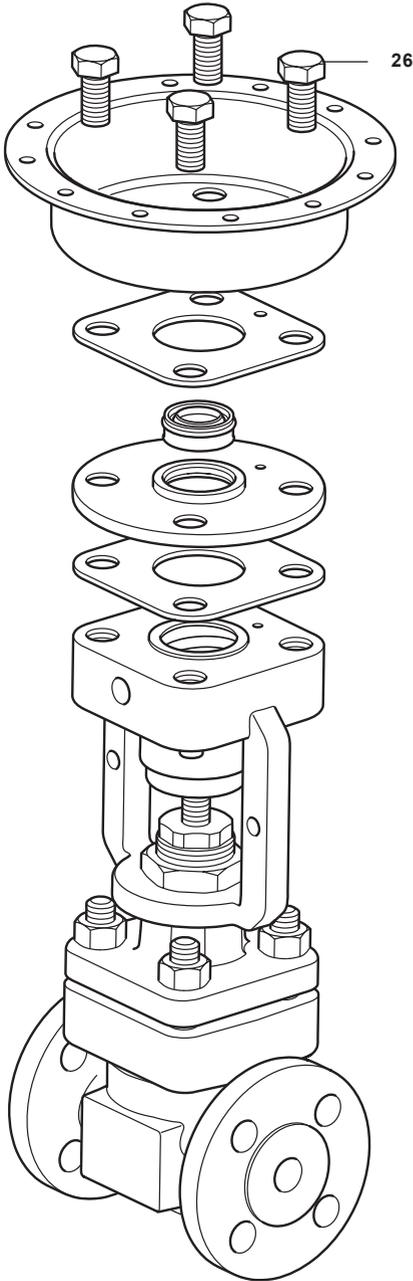


Fig. 8

- **Warning:**
Be careful as the spring is preloaded.

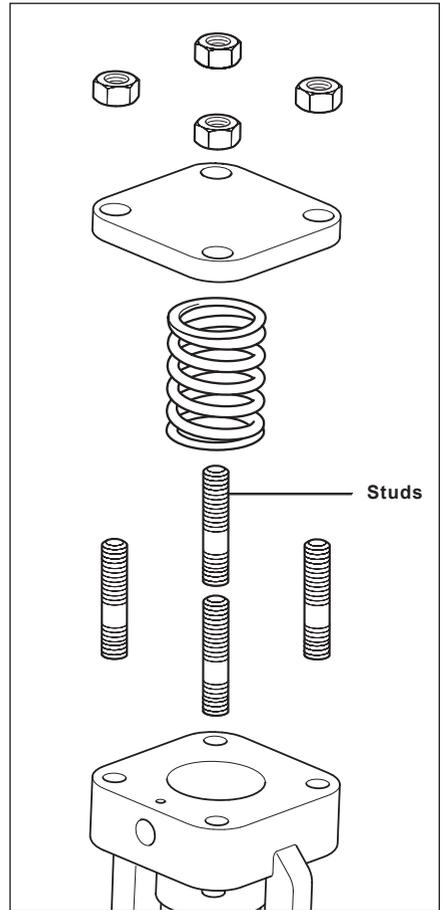


Fig. 9

- Remove the spring (28) and unscrew the connector (30).

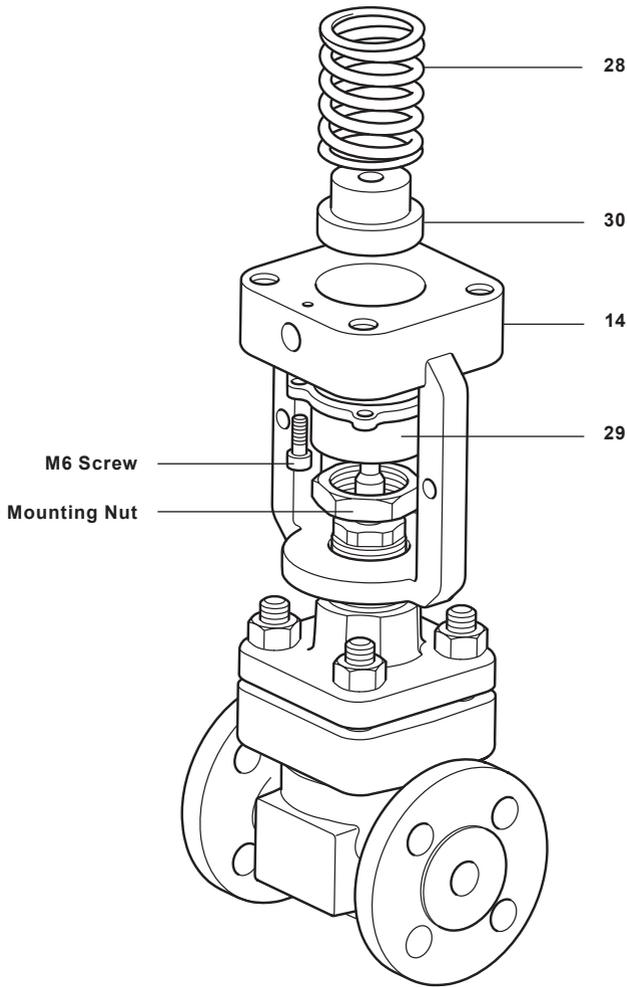


Fig. 10

4.2 Assembly of the actuated system

Note: If the valve is to be serviced, these actions should be completed prior to the actuator being reassembled and fitted

- Fit the yoke (14) and the connector (30) onto the valve.
- Tighten the mounting nut to indicated thread (see the valve instruction).
- Fit the spring guide (29) and fix it into position by hand tightening the M6 screw and then proceed to fit the spring (28).

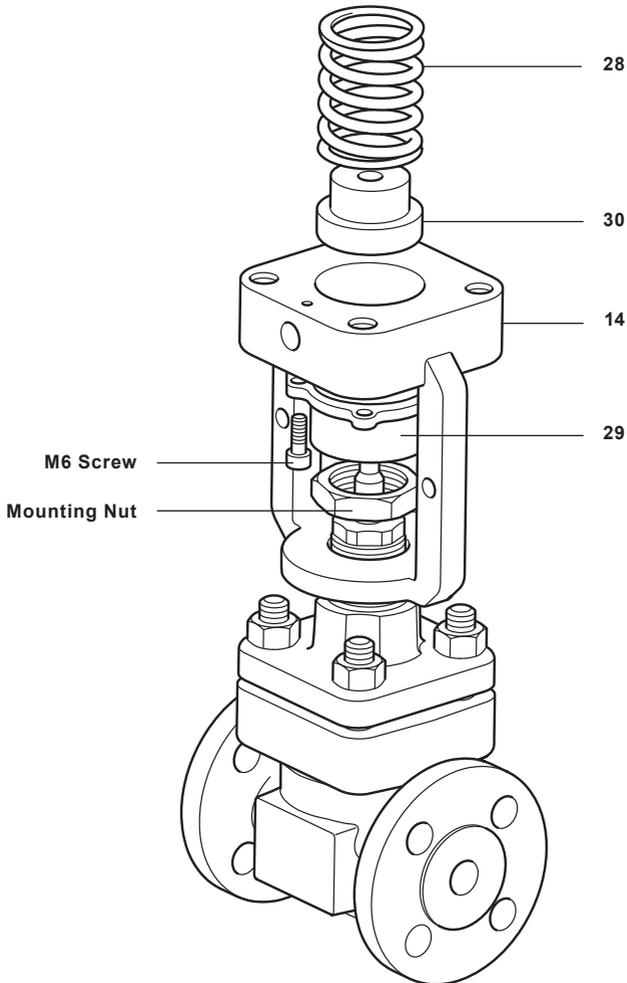


Fig. 11

- Fit the seal (27) into the closed plate (15).
- Fit the gasket (20) onto the yoke and then place the closed plate (15) on to it. Then place the second gasket (20) and the lower housing (34) onto the yoke (14) and fix in place with the screw (26).
- Put loctite glue in the four screws (26).

Note: For the manual version, screw the four studs and press the closed plate. Don't forget to put loctite glue in before screwing.

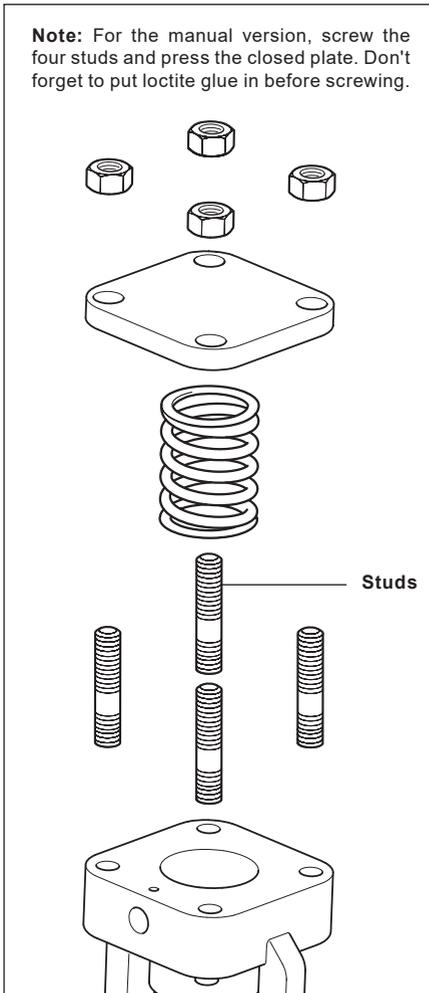


Fig. 12

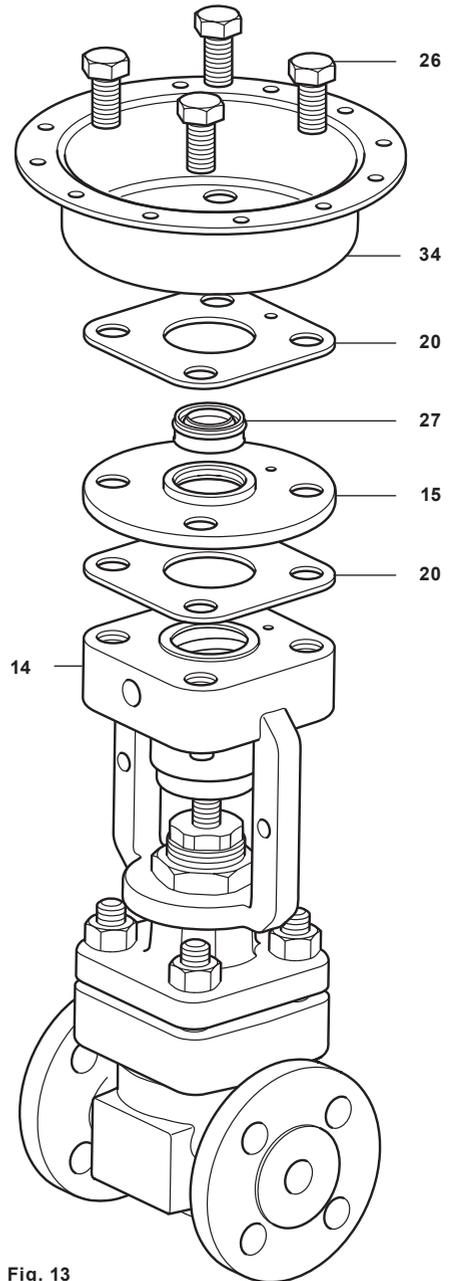


Fig. 13

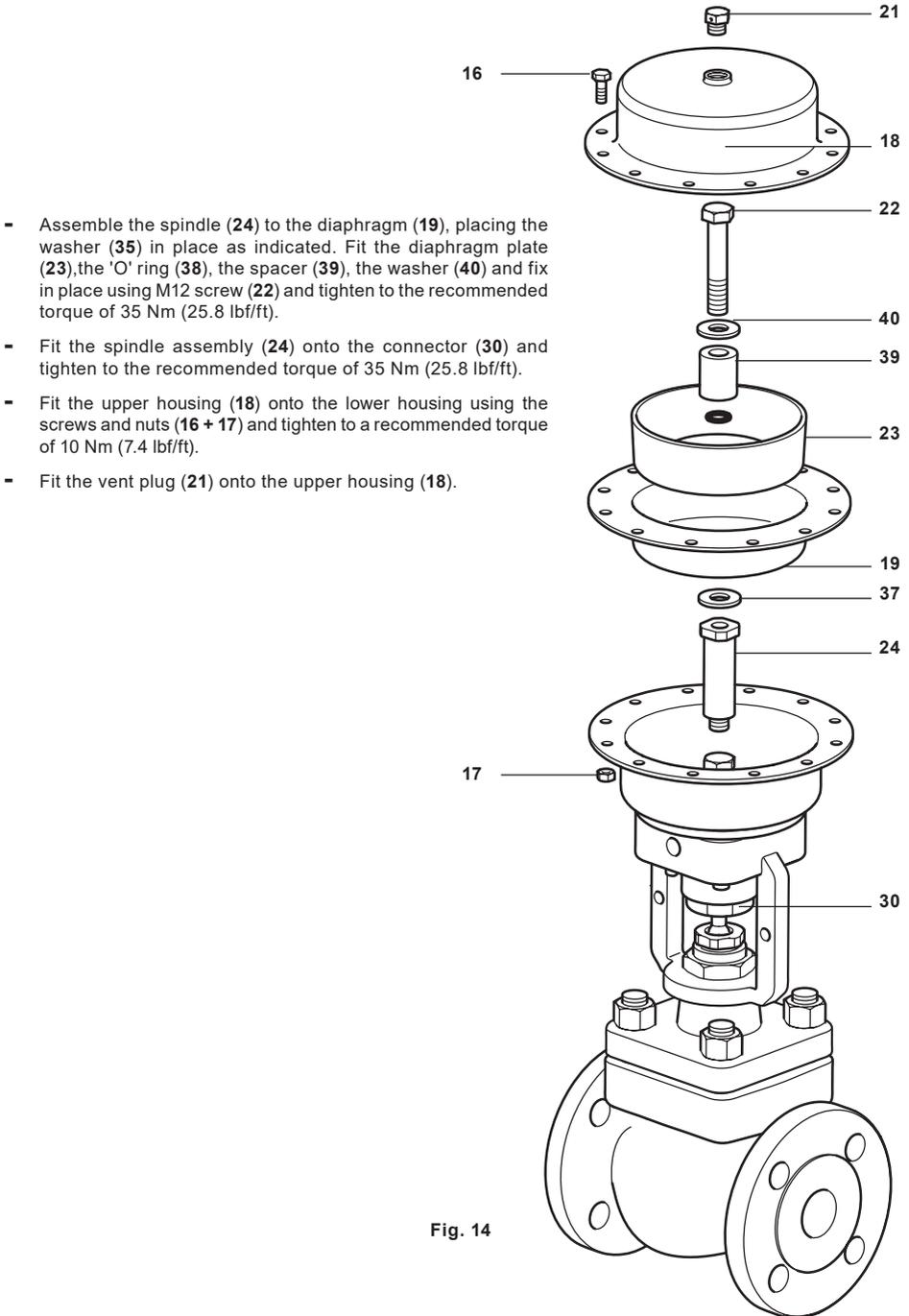


Fig. 14

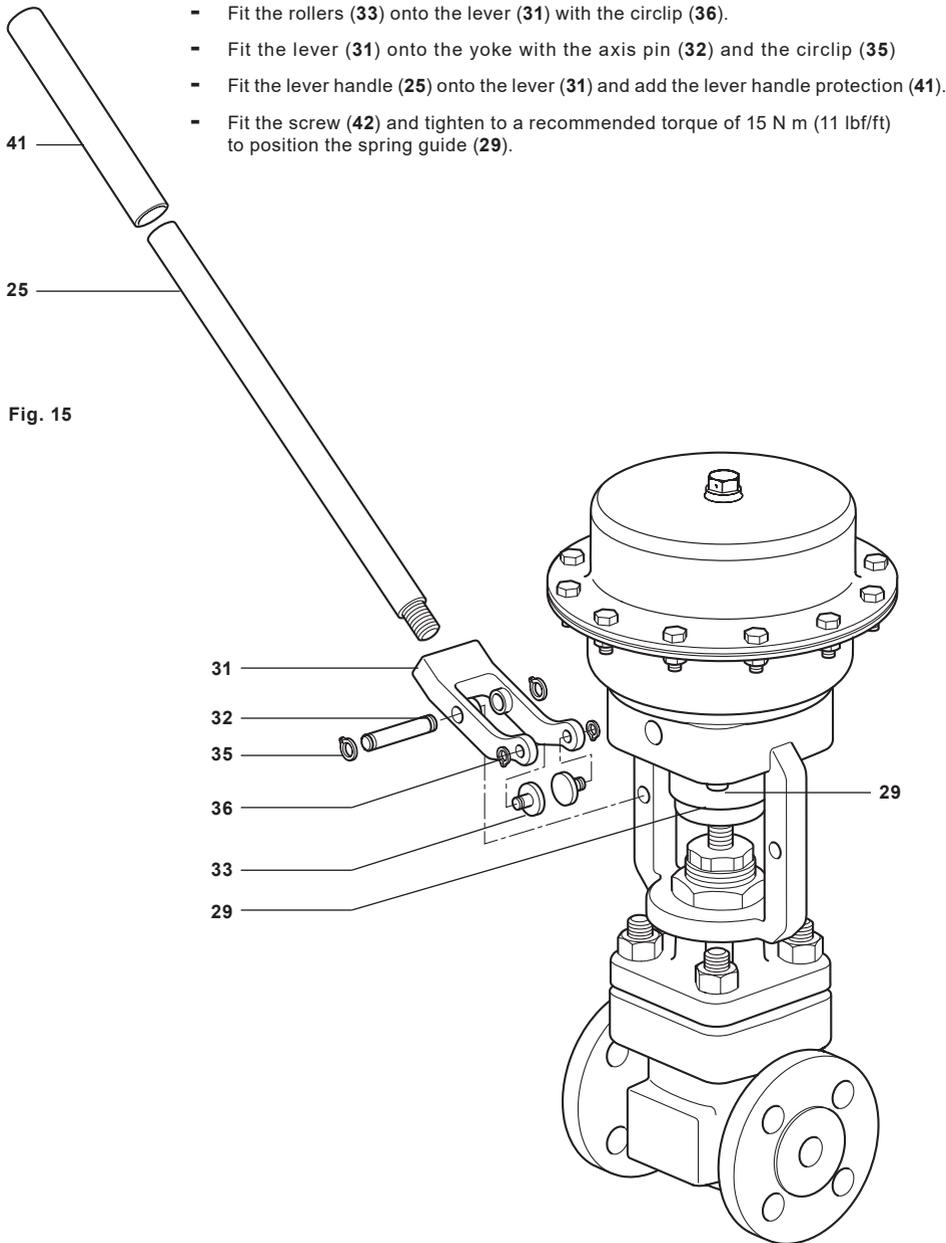


Fig. 15

5. Maintenance of the valve

ASME Class 300 and EN 1092 PN40
Pages 45 to 51

ASME Class 600 and EN 1092 PN100
Pages 52 to 57

ASME Class 300 and EN 1092 PN40

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 characteristic 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.

5.1 General - ASME Class 300 and EN 1092 PN40

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.

Table 1 Recommended tightening torques

BBV valve size	Torque (N m)
DN15 - DN25	50
DN32 - DN50	70

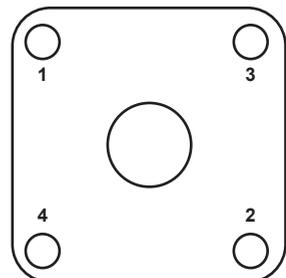


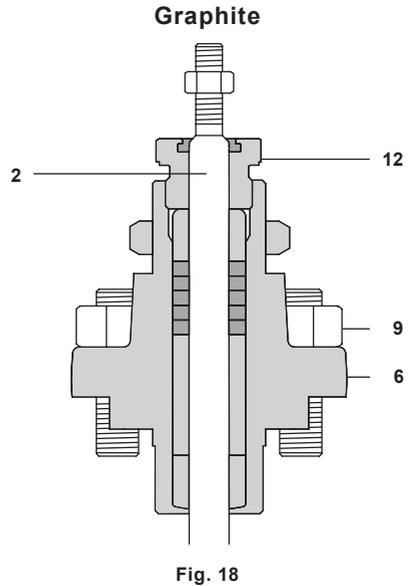
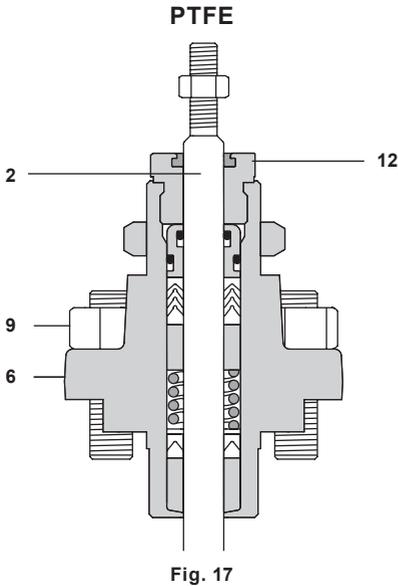
Fig. 16
Bonnet tightening sequence

BBV Automatic or Manually Actuated Boiler Blowdown Valves

5.2 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 actuated system from the valve before removing the valve bonnet. Refer to Section 4.2
- Unscrew the gland nut (12).
- Undo and remove the bonnet nuts (9) or the bolt if it is the LE valve.
- Remove the cover (6) and plug (2).
- Remove and discard the body gasket.



5.3 Replacement of PTFE gland packings (reference Figure 18)

- Remove the lock-nut (34), gland nut (18), 'O' rings (7a and 7b) and scraper ring (13) 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 (7c,7d,7e and 7f).
- Clean the gland cavity and fit new gland components in the order shown in Figure 16.

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 16), 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.

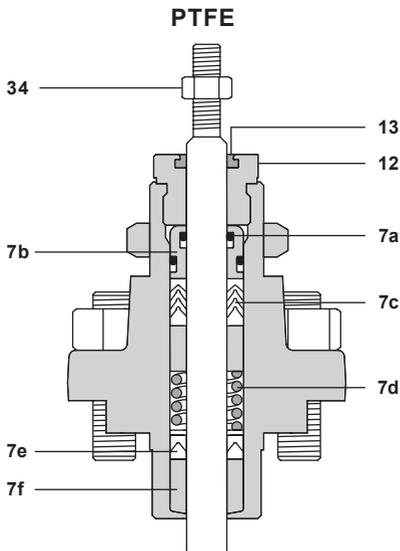


Fig. 19

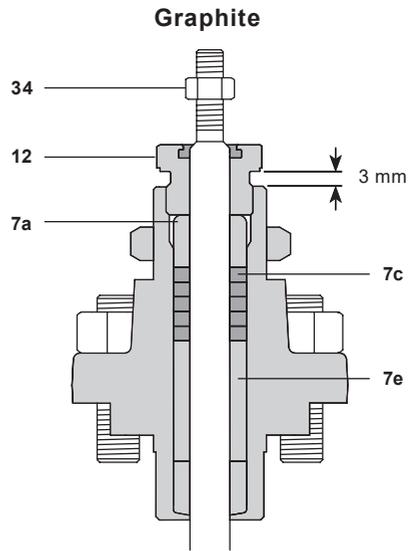
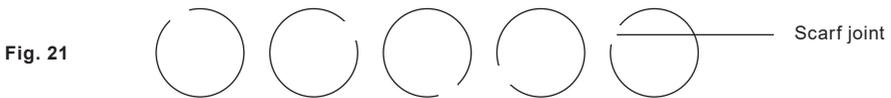


Fig. 20

5.4 Replacement of graphite gland packing (reference Figure 19)

- Remove the lock-nut (34), gland nut (12) from the gland nut, ensuring that the groove is clean and undamaged, replace with new item.
- Remove the upper Stellite bearing (7a) and retain, withdraw the graphite packing (7c) and discard. Remove the spacer and lower bearing (7e). 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 19.
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°.
- 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.



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

- Lift out the seat retaining cage (5) followed by the seat (3).
- Remove the seat back gasket (4) 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 (4) in the body seat recess followed by the seat (3).
- 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.

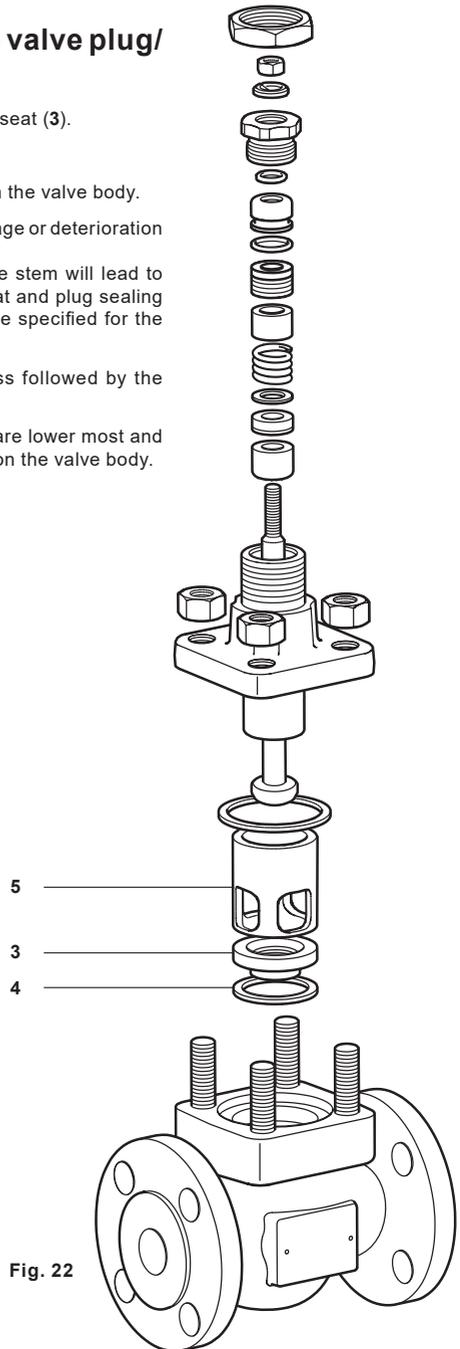


Fig. 22

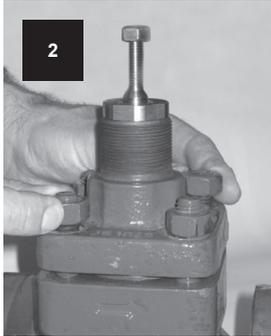
5.6 Refitting the bonnet

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:

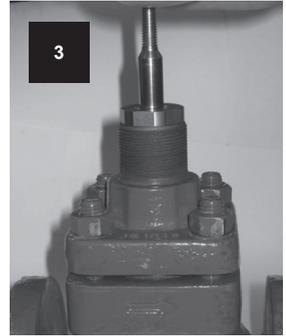
- Fit new bonnet gasket.
- Ensure the plug stem is fully extended without the upper stem threads making contact with stem seals on the top of the bonnet.
- Replace the bonnet and stem assembly to the valve body, locating the plug centrally into the seat.
- Holding the Plug in position, push the bonnet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



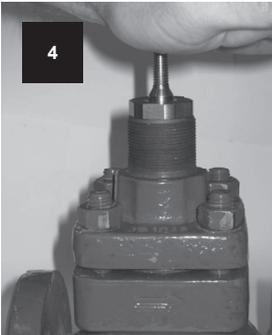
Fit bonnet nuts (9).



Finger tighten opposing bonnet nuts or bolts (10) evenly in pairs.

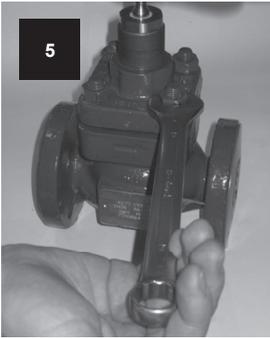


Raise the stem to the highest position.

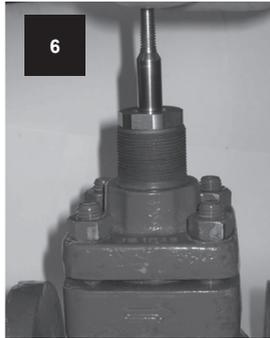


Firmly and briskly push the stem fully down.

Repeat Steps 1 to 4 finger tightening bonnet nuts (9) or bolts (10) individually until tight.



Using a spanner lightly and evenly tighten each bolt or nut by 45°, following the sequence illustrated in Figure 5, page 40.



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 40).
- 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 (12) 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.
- Refit the lock-nut (34).
- 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.

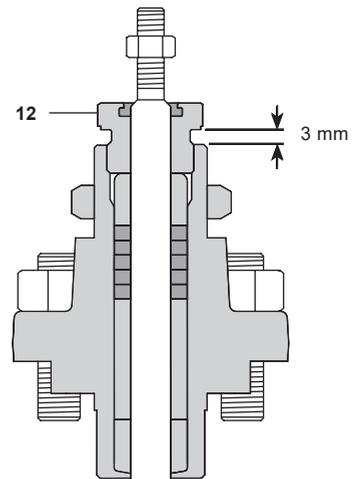


Fig. 23

ASME Class 600 and EN 1092 PN100

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 characteristic 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.

5.7 General - ASME Class 600 and EN 1092 PN100

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.

New torque values with lubrication:

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

Table 2 Recommended tightening torques

BBV valve size	Torque (N m)
DN15 - DN25	100
DN32 - DN50	130

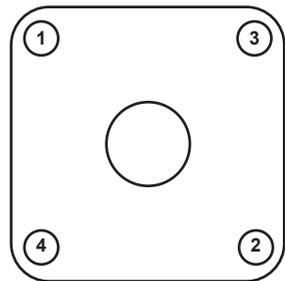
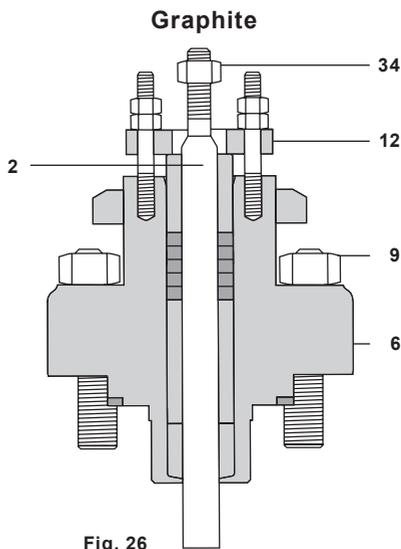
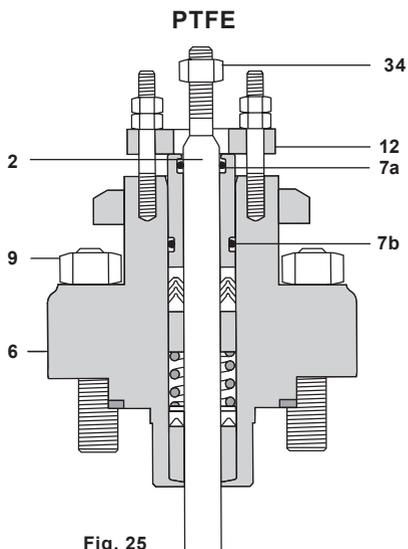


Fig. 24
DN15 - DN50 bonnet tightening sequence

5.8 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 actuated system from the valve before removing the valve bonnet. Refer to Section 5.2
- Unscrew the stuffing box nuts (12).
- Undo and remove the bonnet nuts (9).
- Remove the bonnet (6) and plug and stem assembly (2).
- Remove and discard the body gasket.



5.9 Replacement of PTFE gland packings

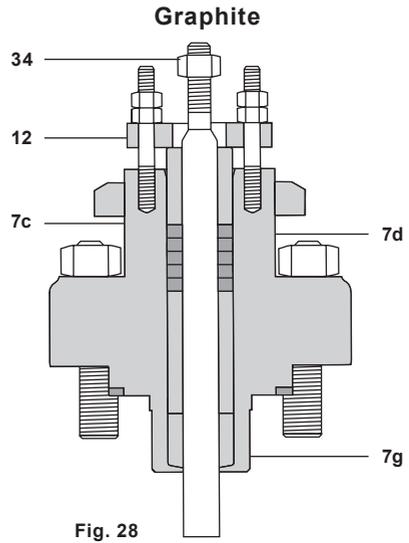
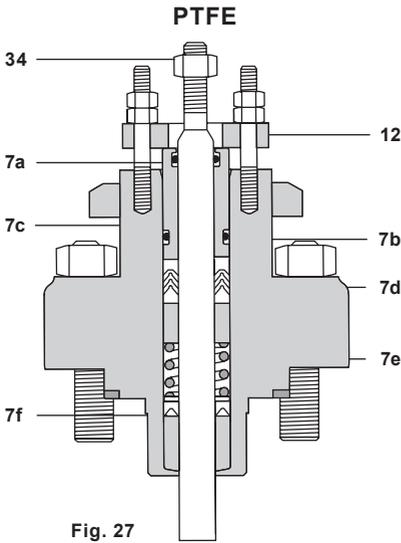
- Remove the lock-nut (34), stuffing box nuts, gland flange and gland follower (12), 'O' rings (7a and 7b) and replace with new items. The use of silicone grease on the 'O' rings is recommended.
- Withdraw the gland components and discard (7c, 7d, 7e and 7f).
- Clean the gland cavity and fit new gland components in the order shown in Figure 27. **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, one at a time to ease the assembly process - See the adjacent illustration:
- Fit the packing follower and stuffing box ring into position. Lubricate the stuffing box nuts. Install and tighten the packing flange nuts finger tight. 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 4.12.



Correct orientation of the chevron seals

5.10 Replacement of graphite gland packing

- Remove the lock-nut (34), stuffing box nuts, gland flange and gland follower (12), ensuring that the groove is clean and undamaged, replace with new item.
- Remove the gland follower (7c) and retain, withdraw the graphite packing (7d) and discard. Remove the spacer and lower bearing (7g). 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 27. **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° as shown in Figure 29:
- Fit the packing follower and stuffing box ring into position. Lubricate the stuffing box nuts. Install and tighten the packing flange nuts finger tight and hold the packing without compressing them.
- Final adjustment of the gland must be carried out after refitting the bonnet as detailed in Section 4.12.



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

- Lift out the seat retaining cage (5) followed by the seat (3).
- Remove the seat back gasket (4) 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 (4) in the body seat recess followed by the seat (3).
- 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

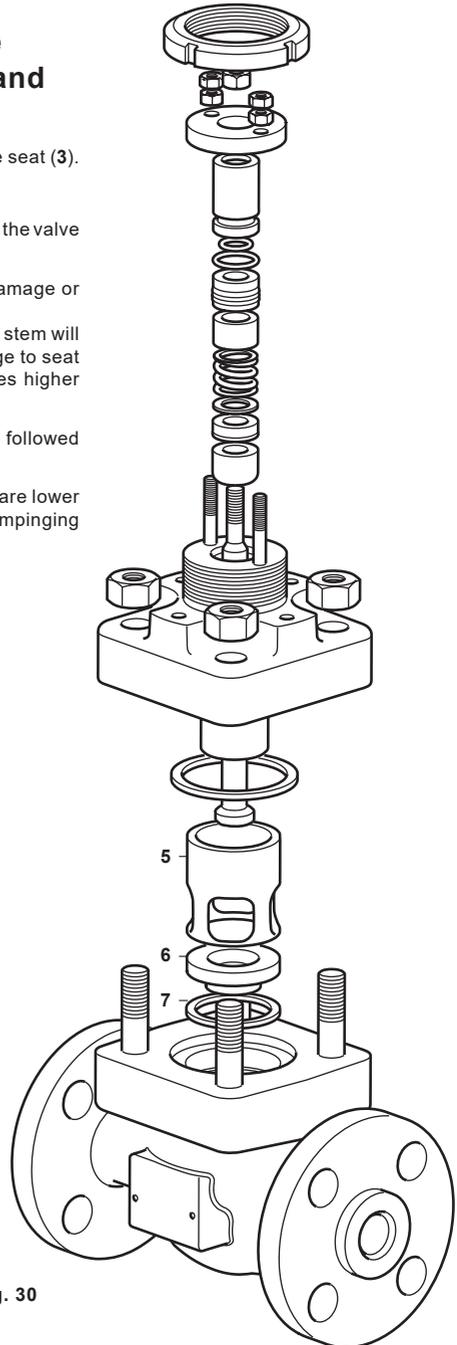
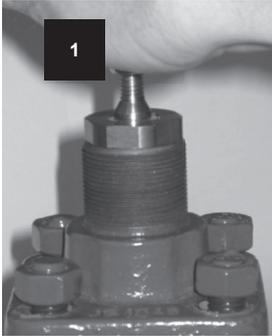


Fig. 30

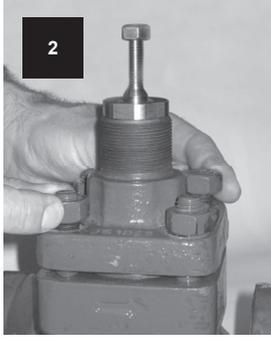
5.12 Refitting the bonnet

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:

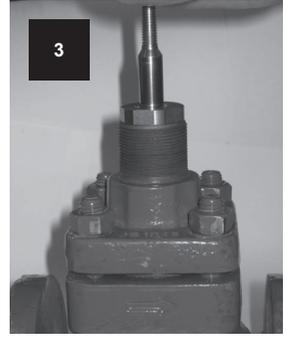
- Fit new bonnet gasket.
- Ensure the plug stem is fully extended without the upper stem threads making contact with stem seals on the top of the bonnet.
- Replace the bonnet and stem assembly to the valve body, locating the plug centrally into the seat.
- Holding the Plug in position, push the bonnet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



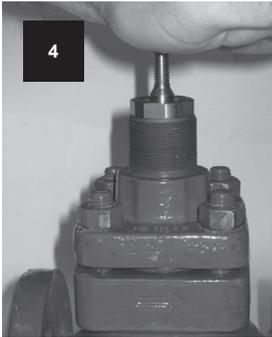
Fit bonnet nuts (9).



Finger tighten opposing bonnet nuts or bolts (10) evenly in pairs.

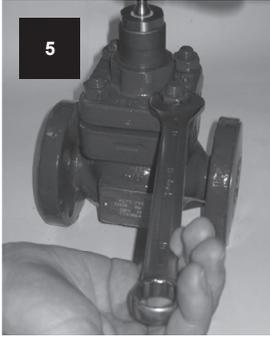


Raise the stem to the highest position.

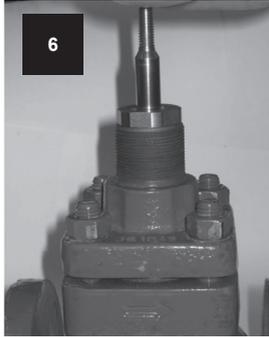


Firmly and briskly push the stem fully down.

Repeat Steps 1 to 4 finger tightening bonnet nuts (9) or bolts (10) individually until tight.



Using a torque wrench lightly and evenly tighten each bolt or nut by 45°, following the sequence illustrated in Figure 24, page 48.



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 2, page 40).
- 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 the stuffing box nuts (12) until:
 - i) PTFE gland assembly: A gap of 10 mm between the underside of the gland flange and the bonnet is achieved.
 - ii) Graphite gland assembly: A gap of 12 mm between the underside of the gland flange and the bonnet is achieved. See Figure 30.
- Refit the lock-nut (34).
- 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.

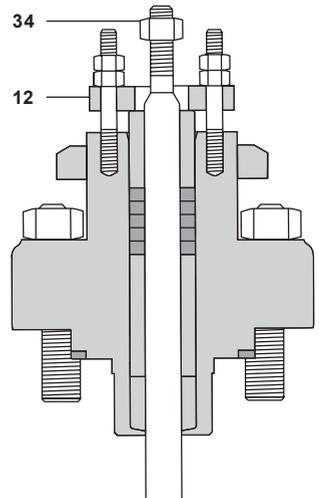


Fig. 31

6. Spare parts

ASME Class 300 and EN 1092 PN40 Pages 54 to 55	ASME Class 600 and EN 1092 PN100 Pages 56 to 57	Actuator Page 56 to 57
---	--	----------------------------------

ASME Class 300 and EN 1092 PN40

6.1 Spare parts

The spare parts available are shown in solid outline. Parts drawn in a grey 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 - ASME Class 300 and EN 1092 PN40

Actuator clamping nut		11
Gasket set		4, 8
Stem seal kits	PTFE chevrons and gasket set	7c
	Graphite packing and gasket set	7c2
PTFE to Graphite conversion kit		7c1
Plug stem	Fast opening trim and seat kit (No gaskets supplied)	2, E
		4, 8, 7c
Stem packing and gasket		4, 8, 7c1
		4, 8, 7c2

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 BBV ASME Class 300 boiler blowdown valve.

How to fit spares

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

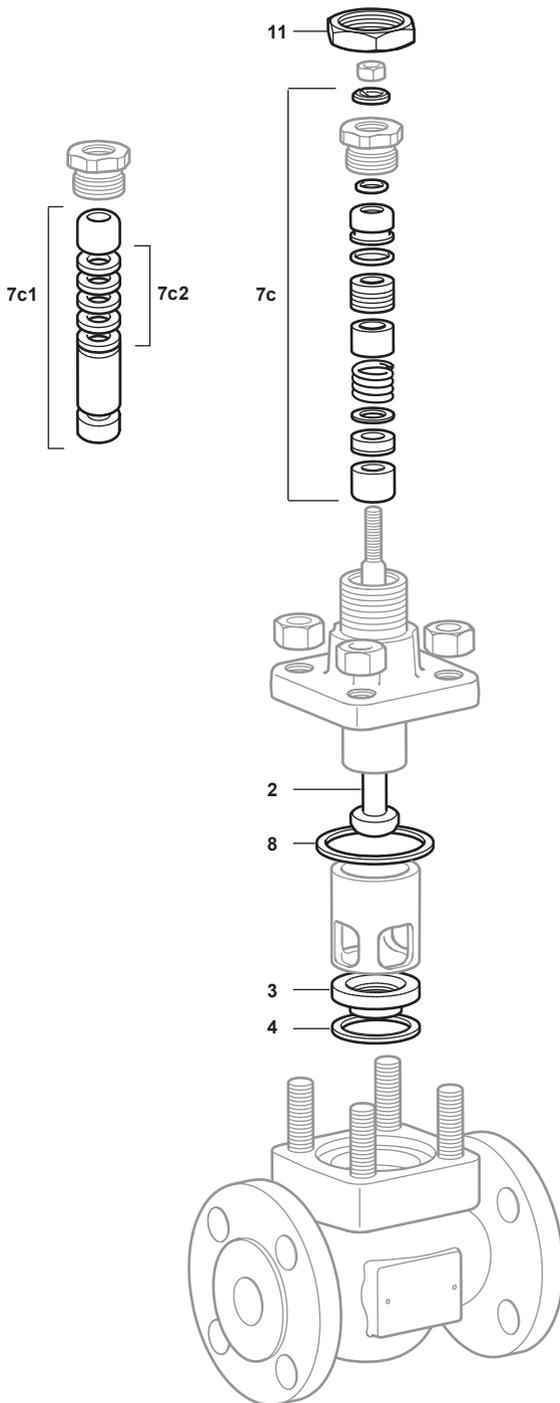


Fig. 32

BBV Automatic or Manually Actuated Boiler Blowdown Valves

ASME Class 600 and EN 1092 PN100

6.2 Spare parts

The spare parts available are shown in solid outline. Parts drawn in a grey 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 - ASME Class 600 and EN 1092 PN100

Actuator clamping nut		11
Gasket set		4, 8
Stem seal kits	PTFE chevrons	7c
	Graphite packing	7c1
Plug stem and seat kit	Fast opening trim (No gaskets supplied)	2, 3

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 BBV ASME Class 300 boiler blowdown valve.

How to fit spares

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

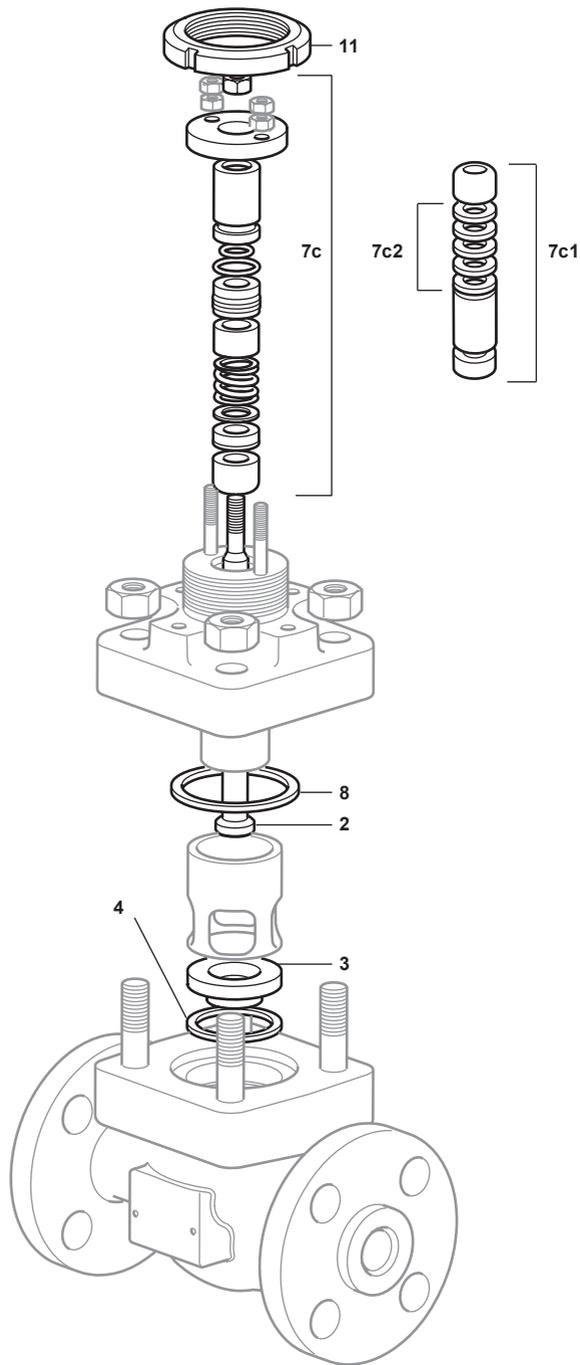


Fig. 33

BBV actuator

6.3 Spare parts

The spare parts are available as indicated in the table below and Figure 34. No other parts are 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 for the BBV actuator

Stem seal kit	27
Connector and guide	29 and 30
Spring	28
Diaphragm kit	19

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 actuator including the full product description of the valve.

Example: 1 - Stem seal kit for a Spirax Sarco BBV actuator for use on a BBV boiler blowdown valve.

How to fit spares

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

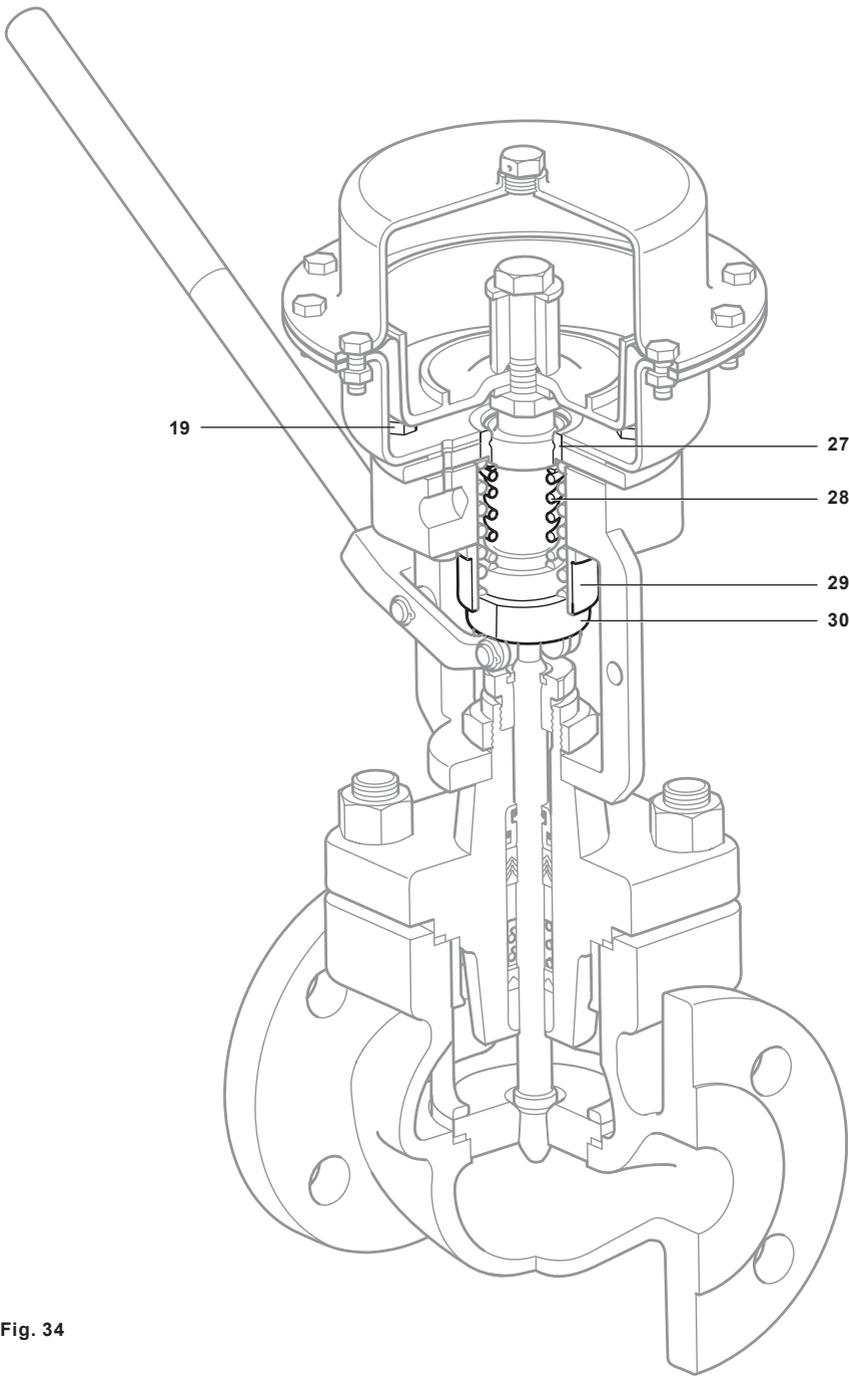
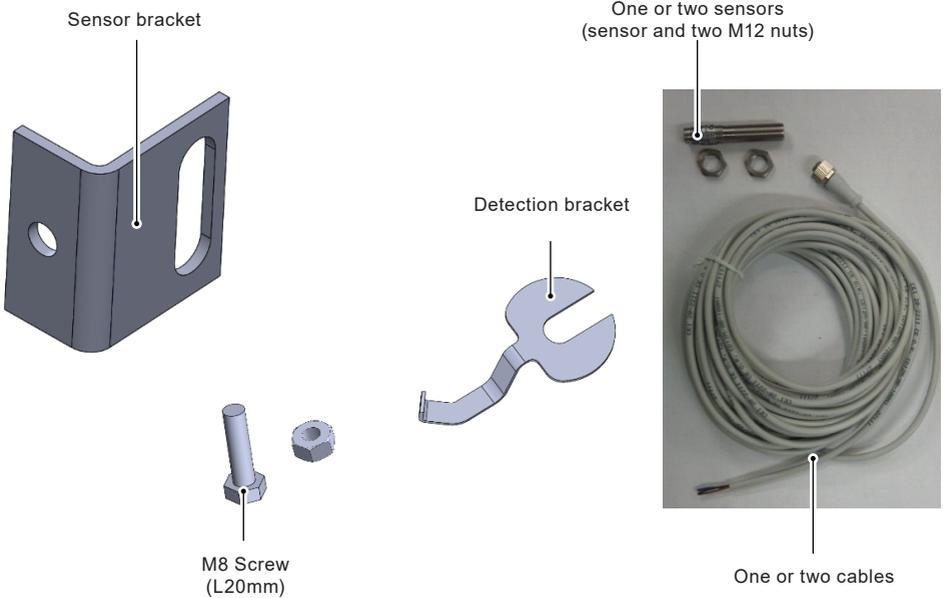


Fig. 34

Appendix

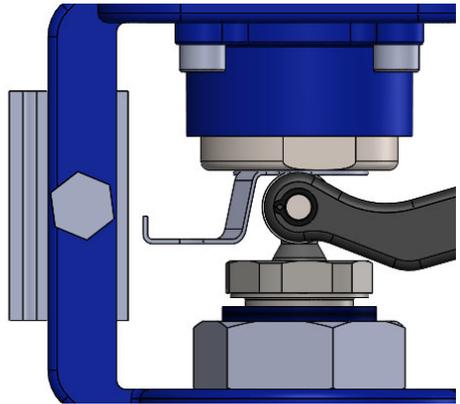
The mounting of the end stroke switch for BBV: SLI 2 (inductive sensors)

Parts list



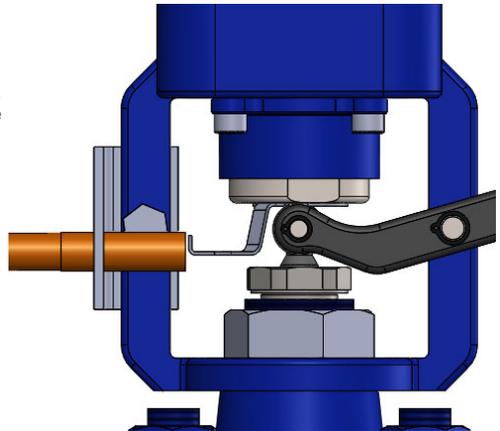
1

- Apply pressure in the actuator to drive until its middle stroke.
- Untighten the locking nut of the valve stem.
- Slip the bracket around the stem.
Caution: item has an 8 mm groove (DN15 to DN50) and 12 mm groove (DN65 to DN100)
- Tighten the locking nut.



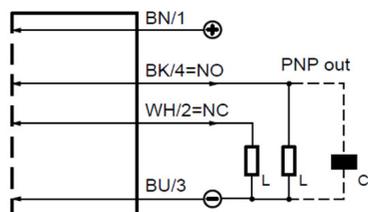
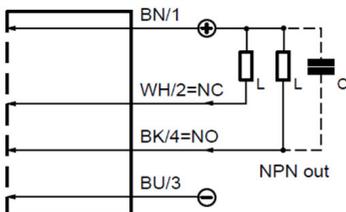
2

- Fit the bracket on the yoke.
- Fit one or two sensors and the two locking nuts. The spacing between the sensor and the Detection bracket must be approx. 1 mm.



- Look at the type of sensor and connect the power supply and output as indicated in the wiring diagram.

Caution: you must isolate the output.

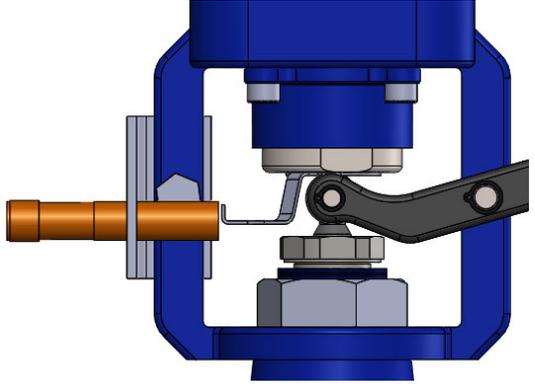


Adjust the sensor

Valve closed:

If you start with the sensor in the down position, when you move it you can see the light illuminated.

Fix the sensor 1 mm above with the two locking nuts.



Valve opened:

You must check that the light is switched off.

