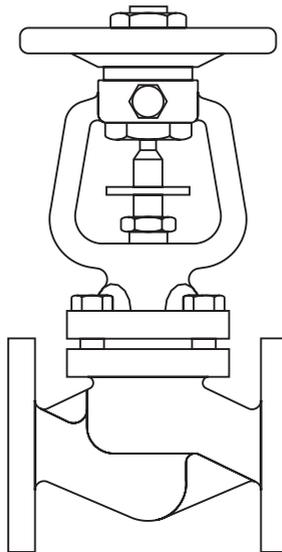


GAV 6

GAV 6-T

Bellows Sealed Stop Valves

- 1 Safety information
- 2 General product information
- 3 Installation
- 4 Commissioning
- 5 Operation
- 6 Maintenance
- 7 Spare parts



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.

1.1 Intended use

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application.

The products listed below comply with the requirements of the Pressure Equipment Directive (PED) and carry the  mark when so required.

The products fall within the following Pressure Equipment Directive (PED) categories:

Product		Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
GAV 63F GAV 63F-T (PN16)	DN15 - DN25	SEP	SEP	SEP	SEP
	DN32 - DN50	1	SEP	SEP	SEP
	DN65 - DN125	2	1	SEP	SEP
	DN150 - DN200	2	1	2	SEP
GAV 64F GAV 64F-T (PN16)	DN15 - DN25	SEP	SEP	SEP	SEP
	DN32 - DN50	1	SEP	SEP	SEP
	DN65 - DN125	2	1	SEP	SEP
	DN150 - DN200	2	1	2	SEP
GAV 65F GAV 65F-T (PN25)	DN15 - DN25	SEP	SEP	SEP	SEP
	DN32 - DN40	1	SEP	SEP	SEP
	DN50 - DN80	2	1	SEP	SEP
	DN100 - DN125	2	1	2	SEP
	DN150 - DN200	3	2	2	SEP
	DN250	3	2	2	1
GAV 66F GAV 66F-T (PN40) GAV 66F-B (this is for the DN200 PN25 only) (PN25)	DN15 - DN25	SEP	SEP	SEP	SEP
	DN32	2	SEP	SEP	SEP
	DN40 - DN50	2	1	SEP	SEP
	DN65 - DN100	2	1	2	SEP
	DN125 - DN150	3	2	2	SEP
	DN200	3	2	2	SEP

Note:

(SEP) **Sound engineering practice** means generally accepted engineering principles or practices.

Product		Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
GAV 66F GAV 66F-T	DN15 - DN25	SEP	SEP	SEP	SEP
	(ASME 150) DN40 - DN50	1	SEP	SEP	SEP
	DN80 - DN100	2	1	SEP	SEP
	DN15 - DN25	SEP	SEP	SEP	SEP
	(ASME 300) DN40 - DN100	2	1	2	SEP
	DN150 - DN200	3	2	2	SEP

- i) The product has been specifically designed for use on steam, compressed air and water/condensate 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) A number of products are supplied for the intention of the end user (or agent thereof) modifying the flange configuration from that supplied. It is the responsibility of the organisation carrying out the modification to do so in accordance with the internationally recognised flange standards and to ensure that the design rating and operation of the product are not compromised. Gestra will not be held responsible for any unapproved modification or consequential liability resulting in failure to observe these requirements.
- iv) Determine the correct installation situation and direction of fluid flow.
- v) Gestra 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.
- vi) Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

Access

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

1.2

Lighting

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

1.3

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.

1.4

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.

1.5

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.

1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Gestra 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 in excess of 425 °C (797 °F).

Many products are not self-draining. Take due care when dismantling or removing the product from an installation (refer to Section 6 'Maintenance').

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.

1.14

Safety information - Product specific

See the relevant sections for specific details relating to these products.

1.15

Warning

The body/bonnet collar gaskets contain a thin stainless steel support ring which may cause physical injury if they are not handled and disposed of carefully.

Care must be taken when opening and closing the handwheel to prevent any possible injury to the hands from the locking screw.

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.

1.16

Returning products

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products 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.

1.17

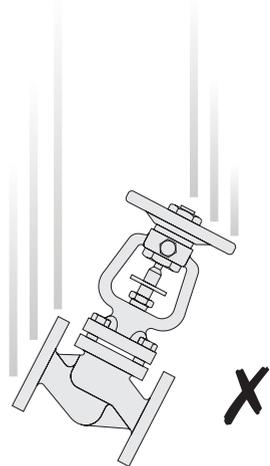
Working safely with cast iron products on steam

Cast iron products are commonly found on steam and condensate systems. If installed correctly using good steam engineering practices, it is perfectly safe. However, because of its mechanical properties, it is less forgiving compared to other materials such as SG iron or carbon steel. The following are the good engineering practices required to prevent waterhammer and ensure safe working conditions on a steam system.

1.18

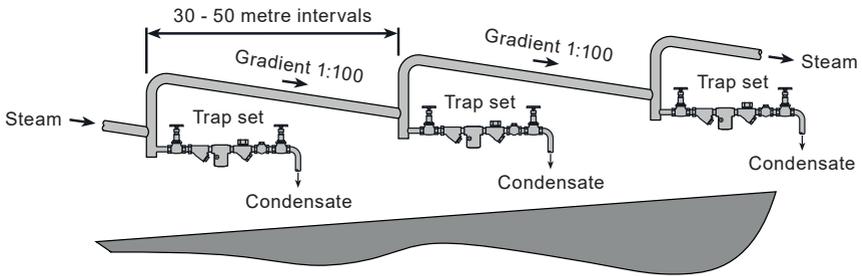
Safe Handling

Cast Iron is a brittle material. If the product is dropped during installation and there is any risk of damage the product should not be used unless it is fully inspected and pressure tested by the manufacturer.

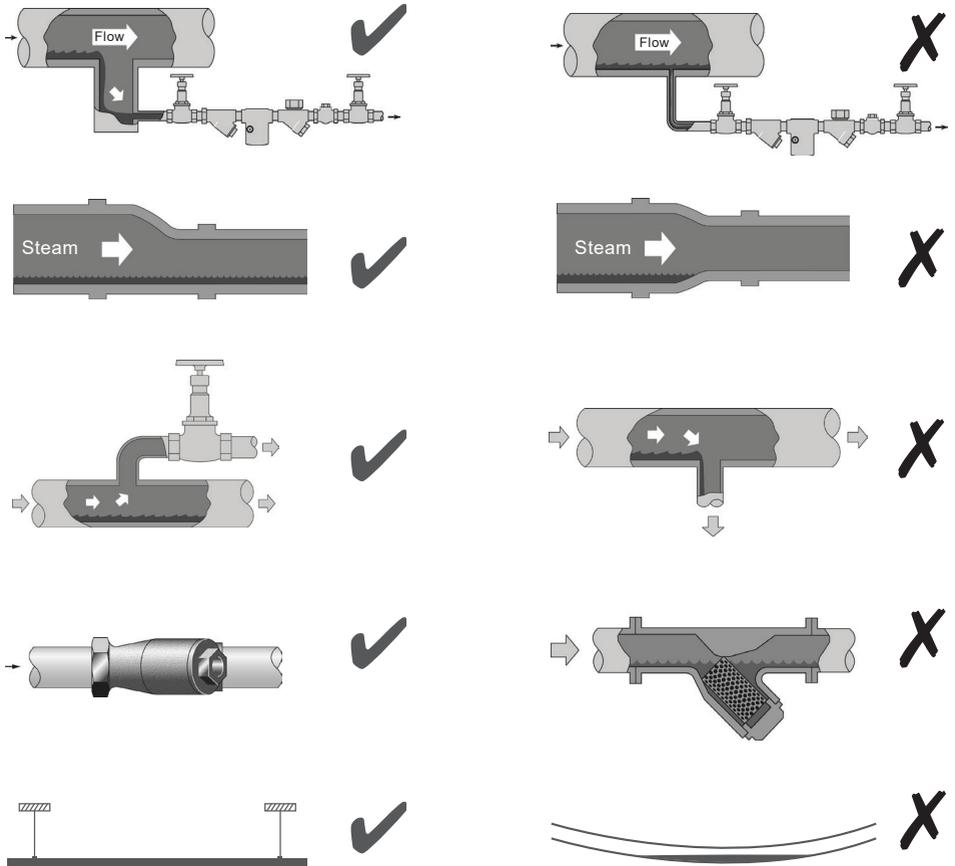


Prevention of waterhammer

Steam trapping on steam mains:

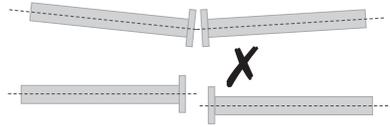
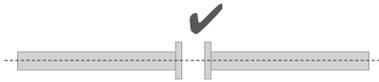


Steam Mains - Do's and Don'ts:



Prevention of tensile stressing

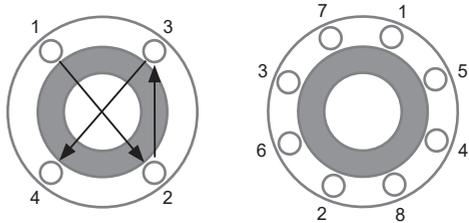
Pipe misalignment:



Installing products or re-assembling after maintenance:

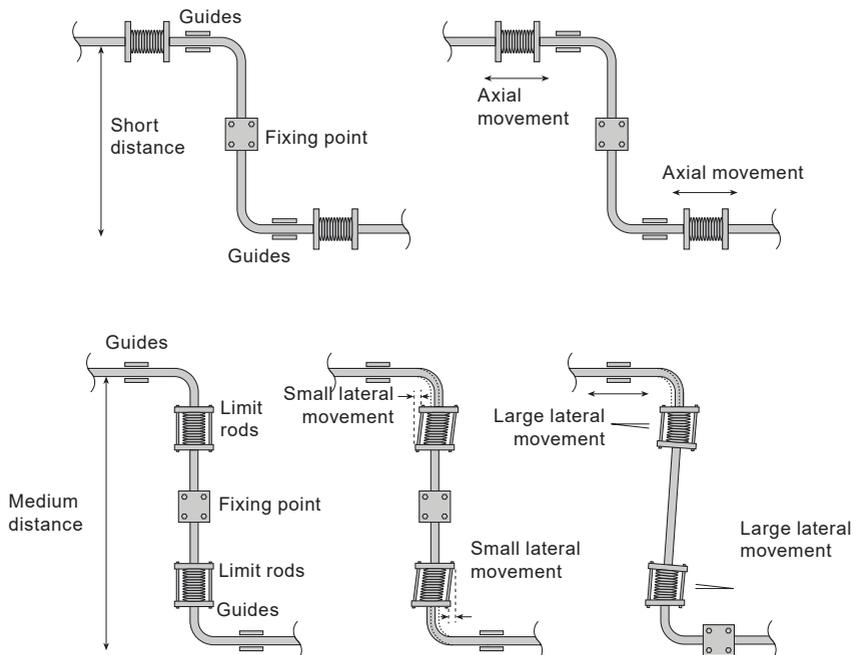


Do not over tighten.
Use correct torque figures.



Flange bolts should be gradually tightened across diameters to ensure even load and alignment.

Thermal expansion:



2 General product information

2.1 General description

A range of bellows sealed, in-line stop valves having flanged PN16, PN25 and PN40 connections for use on steam, gas, liquid, condensate and water systems.

Note: Throttling plugs, balancing discs (DN125 and above) are available for certain applications.

Standards

The product fully complies with the requirements of the Pressure Equipment Directive (PED) and carries

the  mark when so required.

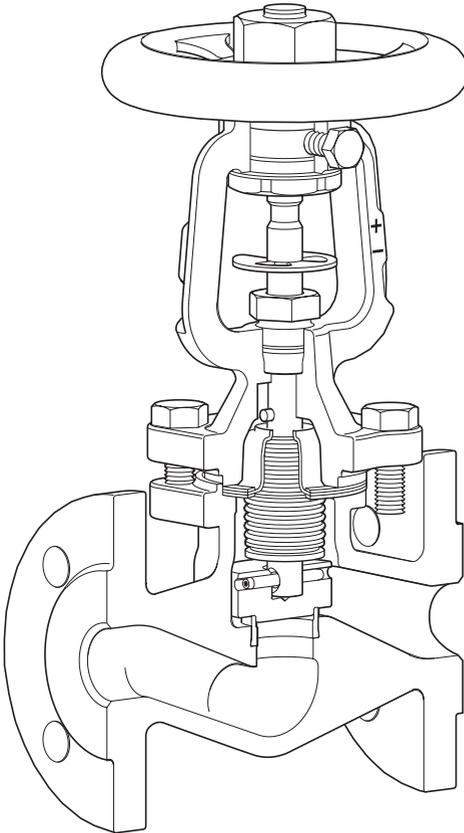


Fig. 1 GAV shown

Available options:

Material and type	
Cast iron	GAV 63F
	GAV 63F-T
SG iron	GAV 64F
	PN16
	GAV 64F-T
	PN25
Cast steel	GAV 65F
	GAV 65F-T
	GAV 66F
GAV 66F-T	
GAV 66F-B	

Certification

The GAV 63F and GAV 63F-T are available with a manufacturer's Typical Test Report.

The GAV 64F, GAV 65F, GAV 64F-T, GAV 65F-T, GAV 66F, GAV 66F-T are available with certification to EN 10204 3.1.

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

Note:

For further technical data regarding these products see the following Technical Information Sheets:

GAV 6 (TI-S22-03).

	Valve trim			Bellows	
	Standard flat disc	Throttling plug and locking device	Balancing disc	Single ply	Twin ply
	●			●	
		●			●
	●			●	
	●†				●
		●			●
		●			●
	●†				●
		●			●
			● *		●

† DN125 and above only.

* DN200 only.

Stroke limiter for throttling versions

The handwheel nut on the **GAV 63F-T**, **GAV 64F-T**, **GAV 65F-T** and **GAV 66F-T** has a threaded hole for provision of a stroke limiter.

Customer to supply standard nuts and bolts as indicated in the table opposite.

Size	Hexagon bolt
DN15 - DN80	M8 x 50 mm
DN100 - DN150	M12 x 75 mm
DN200 - DN250	M12 x 100 mm

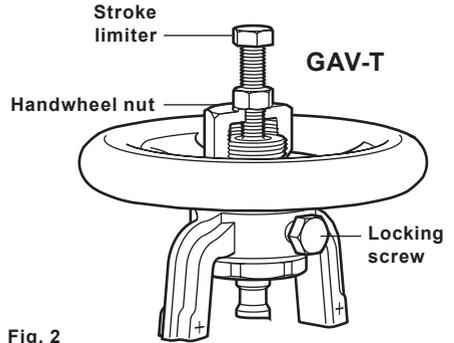


Fig. 2

Optional balancing disc assembly



Fig. 3

DN150 shown

	25 bar ΔP	DN125	
Used above	17 bar ΔP	DN150	6"
	10 bar ΔP	DN200	8"

Sizes and pipe connections

2.2

2.2.1 GAV 63F and GAV 63F-T

DN15, DN20, DN25, DN32, DN40, DN50, DN65, DN80, DN100, DN125, DN150 and DN200
Flanged EN 1092/ISO 7005 PN16 and JIS B 2210/KS B 1511 10K
Face-to-face EN 558

2.2.2 GAV 64F, GAV 65F and GAV 64F-T, GAV 65F-T

DN15, DN20, DN25, DN32, DN40, DN50, DN65, DN80, DN100, DN125, DN150, DN200 and DN250* (*PN25 only)
Flanged EN 1092/ISO 7005 PN16 and PN25
Face-to-face EN 558

2.2.3 GAV 66F and GAV 66F-T (DIN)

DN15, DN20, DN25, DN32, DN40, DN50, DN65, DN80, DN100, DN125, DN150 and DN200
Flanged EN 1092/ISO 7005 PN40 (DN15 - DN150)
Flanged EN 1092/ISO 7005 PN25 (DN200)
Face-to-face EN 558

2.2.4 GAV 66F and GAV 66F-T ASME (ANSI)

Size ½", ¾", 1", 1½", 2", 3", 4", 6" and 8" (*ASME 300 only)
Flanged ASME B 16.5/BS 1560 Class 150 and 300 and JIS B 2210/KS B 1511 20K
Face-to-face ASME B 16.10

Product limitations

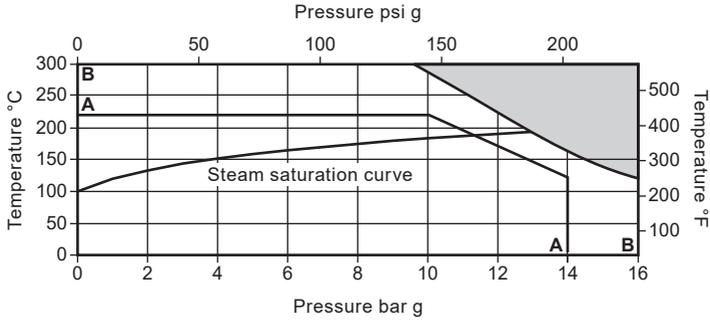
2.3

GAV 63F and GAV 63F-T	see Section 2.4
GAV 64F, GAV 65F and GAV 64F-T, GAV 65F-T	see Section 2.5 and Section 2.6
GAV 66F and GAV 66F-T (DIN)	see Section 2.7 and Section 2.8
GAV 66F and GAV 66F-T (ASME)	see Section 2.9, Section 2.10 and Section 2.11

Note: The maximum permissible differential pressure in throttling function for GAV-T valves:

DN15 - DN80	2.0 bar	(29.00 psi)
DN100 - DN125	1.5 bar	(21.75 psi)
DN150	1.0 bar	(14.50 psi)
DN200 - DN250	0.8 bar	(11.60 psi)

2.4 Pressure/temperature limits - GAV 63F and GAV 63F-T



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

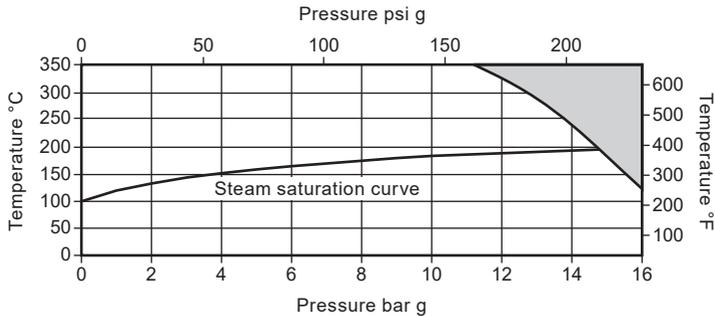
A - B Flanged JIS/KS 10K

B - B Flanged PN16

Body design conditions		PN16	JIS/KS 10K
PMA	Maximum allowable pressure	16 bar g @ 120 °C (232.1 psi g @ 248 °F)	14 bar g @ 120 °C (203.1 psi g @ 248 °F)
TMA	Maximum allowable temperature	300 °C @ 9.6 bar g (572 °F @ 139.2 psi g)	220 °C @ 10 bar g (428 °F @ 145 psi g)
PMO	Maximum operating pressure for saturated steam service	Soft seat	11.8 bar g @ 230 °C (171.1 psi g @ 446 °F)
		Metal seat	13 bar g @ 195 °C (188.5 psi g @ 383 °F)
TMO	Maximum operating temperature	Soft seat	230 °C @ 11.8 bar g (446 °F @ 171.1 psi g)
		Metal seat	220 °C @ 10 bar g (428 °F @ 145 psi g)
Minimum operating temperature		-10 °C (14 °F)	-10 °C (14 °F)
ΔPMX	Maximum differential pressure	GAV 63F Limited to the PMO	
		GAV 63F-T See note in Section 2.3	
Designed for a maximum cold hydraulic test pressure of:		24 bar g (348.1 psi g)	21 bar g (304.6 psi g)

Pressure/temperature limits - GAV 64F, GAV 65F and GAV 64F-T, GAV 65F-T

PN16

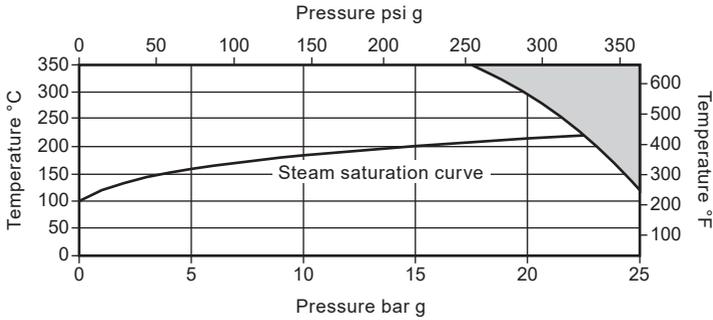


The product **must not** be used in this region.

Body design conditions		PN16	
PMA	Maximum allowable pressure	16 bar g @ 120 °C (232.1 psi g @ 248 °F)	
TMA	Maximum allowable temperature	350 °C @ 11.2 bar g (662 °F @ 162.4 psi g)	
PMO	Maximum operating pressure for saturated steam service	Soft seat	14.2 bar g @ 230 °C (206 psi g @ 446 °F)
		Metal seat	14.7 bar g @ 200 °C (213.2 psi g @ 392 °F)
TMO	Maximum operating temperature	Soft seat	230 °C @ 14.2 bar g (446 °F @ 206 psi g)
		Metal seat	350 °C @ 11.2 bar g (662 °F @ 162.4 psi g)
Minimum operating temperature		-10 °C (14 °F)	
ΔPMX	Maximum differential pressure	GAV 64F, 65F Limited to the PMO	
		GAV 64F-T, 65F-T See note in Section 2.3	
Designed for a maximum cold hydraulic test pressure of:		24 bar g (348.1 psi g)	

2.6 Pressure/temperature limits - GAV 64F, GAV 65F and GAV 64F-T, GAV 65F-T

PN25



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

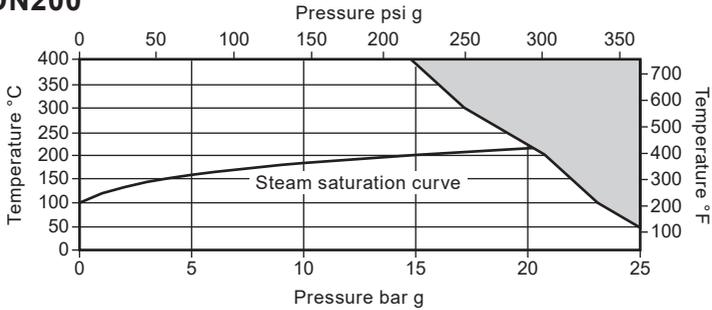
Body design conditions

PN25

PMA	Maximum allowable pressure		25 bar g @ 120 °C (362.6 psi g @ 248 °F)
TMA	Maximum allowable temperature		350 °C @ 17.5 bar g (662 °F @ 253.8 psi g)
PMO	Maximum operating pressure for saturated steam service	Soft seat	22.3 bar g @ 230 °C (323.4 psi g @ 446 °F)
		Metal seat	22.5 bar g @ 221 °C (326.3 psi g @ 429.8 °F)
TMO	Maximum operating temperature	Soft seat	230 °C @ 22.3 bar g (446 °F @ 323.4 psi g)
		Metal seat	350 °C @ 17.5 bar g (662 °F @ 253.8 psi g)
Minimum operating temperature			-10 °C (14 °F)
ΔPMX	Maximum differential pressure	GAV 64F, 65F Limited to the PMO	
		GAV 64F-T, 65F-T See note in Section 2.3	
Designed for a maximum cold hydraulic test pressure of:			37.5 bar g (543.9 psi g)

Pressure/temperature limits - GAV 66F and GAV 66F-T (DIN)

PN25, DN200

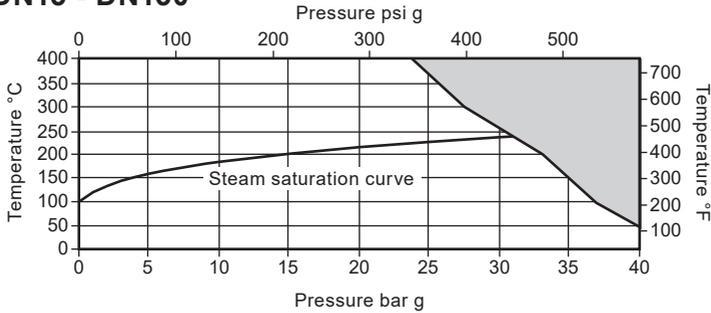


The product **must not** be used in this region.

Body design conditions		PN25 DN200
PMA	Maximum allowable pressure	25 bar g @ 50 °C (362.6 psi g @ 122 °F)
TMA	Maximum allowable temperature	400 °C @ 14.8 bar g (752 °F @ 214.7 psi g)
PMO	Maximum operating pressure for saturated steam service	Soft seat: 19.7 bar g @ 230 °C (285.7 psi g @ 446 °F)
		Metal seat: 20.3 bar g @ 215 °C (294.4 psi g @ 419 °F)
TMO	Maximum operating temperature	Soft seat: 230 °C @ 19.7 bar g (446 °F @ 285.7 psi g)
		Metal seat: 400 °C @ 14.8 bar g (752 °F @ 214.7 psi g)
Minimum operating temperature		-10 °C (14 °F)
ΔPMX	Maximum differential pressure	GAV 66F Limited to the PMO
		GAV 66F-T See note in Section 2.3
Designed for a maximum cold hydraulic test pressure of:		37.5 bar g (543.9 psi g)

2.8 Pressure/temperature limits - GAV 66F and GAV 66F-T (DIN)

PN40, DN15 - DN150

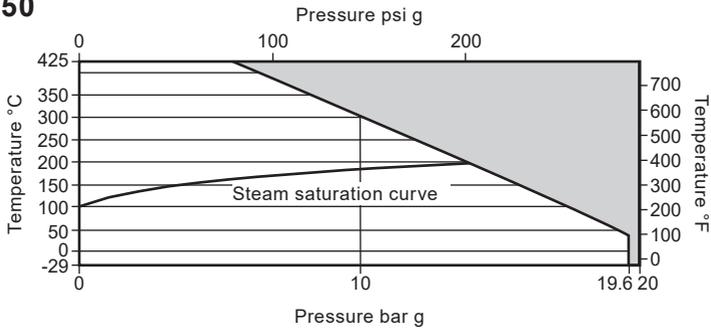


The product **must not** be used in this region.

Body design conditions		PN40 DN15-DN150	
PMA	Maximum allowable pressure	40 bar g @ 50 °C (580 psi g @ 122 °F)	
TMA	Maximum allowable temperature	400 °C @ 23.8 bar g (752 °F @ 345.2 psi g)	
PMO	Maximum operating pressure for saturated steam service	Soft seat	27 bar g @ 230 °C (391.6 psi g @ 446 °F)
		Metal seat	31.1 bar g @ 238 °C (451.1 psi g @ 460.4 °F)
TMO	Maximum operating temperature	Soft seat	230 °C @ 27 bar g (446 °F @ 391.6 psi g)
		Metal seat	400 °C @ 23.8 bar g (752 °F @ 345.2 psi g)
Minimum operating temperature		-10 °C (14 °F)	
ΔPMX	Maximum differential pressure	GAV 66F Limited to the PMO	
		GAV 66F-T See note in Section 2.3	
Designed for a maximum cold hydraulic test pressure of:		60 bar g (870.2 psi g)	

Pressure/temperature limits - GAV 66F and GAV 66F-T (ASME/ANSI)

ASME 150

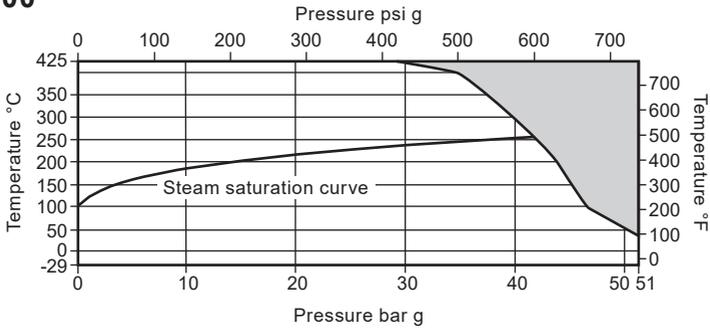


The product **must not** be used in this region.

Body design conditions		ASME 150
PMA	Maximum allowable pressure	19.6 bar g @ 38 °C (284.3 psi g @ 100.4 °F)
TMA	Maximum allowable temperature	425 °C @ 5.5 bar g (797 °F @ 79.8 psi g)
PMO	Maximum operating pressure for saturated steam service	Soft seat 12.8 bar g @ 230 °C (185.6 psi g @ 446 °F)
		Metal seat 13.6 bar g @ 198 °C (197.3 psi g @ 338.4 °F)
TMO	Maximum operating temperature	Soft seat 230 °C @ 12.8 bar g (446 °F @ 185.6 psi g)
		Metal seat 425 °C @ 5.5 bar g (797 °F @ 79.8 psi g)
Minimum operating temperature		-29 °C (-20.2 °F)
ΔPMX	Maximum differential pressure	GAV 66F Limited to the PMO
		GAV 66F-T See note in Section 2.3
Designed for a maximum cold hydraulic test pressure of:		30 bar g (435.1 psi g)

2.10 Pressure/temperature limits - GAV 66F and GAV 66F-T (ASME/ANSI)

ASME 300

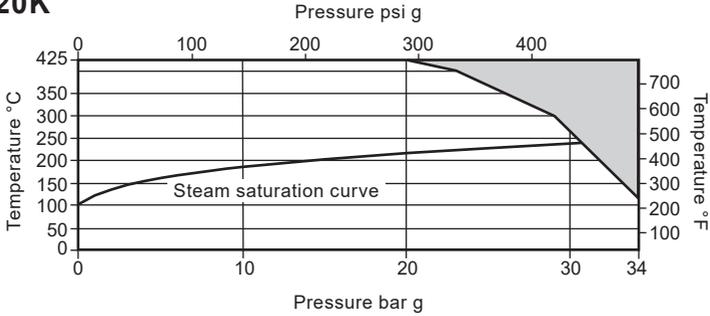


The product **must not** be used in this region.

Body design conditions		ASME 300	
PMA	Maximum allowable pressure	51.1 bar g @ 38 °C (741.1 psi g @ 100.4 °F)	
TMA	Maximum allowable temperature	425 °C @ 28.8 bar g (797 °F @ 417.7 psi g)	
PMO	Maximum operating pressure for saturated steam service	Soft seat	27 bar g @ 230 °C (391.6 psi g @ 446 °F)
		Metal seat	41.7 bar g @ 254 °C (604.8 psi g @ 489.2 °F)
TMO	Maximum operating temperature	Soft seat	230 °C @ 27 bar g (446 °F @ 391.6 psi g)
		Metal seat	425 °C @ 28.8 bar g (797 °F @ 417.7 psi g)
Minimum operating temperature		-29 °C (-20.2 °F)	
ΔPMX	Maximum differential pressure	GAV 66F Limited to the PMO	
		GAV 66F-T See note in Section 2.3	
Designed for a maximum cold hydraulic test pressure of:		77 bar g (1116.8 psi g)	

Pressure/temperature limits - GAV 66F and GAV 66F-T (ASME/ANSI)

JIS/KS 20K



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

Body design conditions		JIS/KS 20K
PMA	Maximum allowable pressure	34 bar g @ 120 °C (493.1 psi g @ 248 °F)
TMA	Maximum allowable temperature	425 °C @ 20 bar g (797 °F @ 290.1 psi g)
PMO	Maximum operating pressure for saturated steam service	Soft seat 27 bar g @ 230 °C (391.6 psi g @ 446 °F)
		Metal seat 30.6 bar g @ 237 °C (443.8 psi g @ 458.6 °F)
TMO	Maximum operating temperature	Soft seat 230 °C @ 27 bar g (446 °F @ 391.6 psi g)
		Metal seat 425 °C @ 20 bar g (797 °F @ 290.1 psi g)
Minimum operating temperature		0 °C (32 °F)
ΔPMX	Maximum differential pressure	GAV 66F Limited to the PMO
		GAV 66F-T See note in Section 2.3
Designed for a maximum cold hydraulic test pressure of:		51 bar g (739.7 psi g)

3 Installation

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. 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 the protective covers from all connections.
- 3.3** Install the valve in the direction of flow given by the arrow on the body. The preferred position is with the spindle vertical. The valve can be installed from the vertical to the horizontal plane (see Figure 5).
- 3.4** **Important note:** When a balancing disc is installed, the valve body should be mounted with the upstream fluid flowing into the upper valve chamber first, so the fluid pressure acts on top of the balancing disc. This is opposite to normal installation. If a balancing disc is upgrading or replacing a standard disc, the original valve body must be turned around in the pipeline and permanently marked with a new flow arrow indicating the changed direction of flow.

Do not mount the valve upside down.

What is a balancing plug, how does it work and why use it?

- A balancing plug is a two stage on/off mechanism.
- (See Figure 4) The pre-lifting plug (A) acts as a pilot valve and is opened first, allowing the medium to pass through at a controlled rate. The differential pressure then reduces across the valve - allowing the main valve plug (B) to be easily lifted off its seat. To assist closing the valve the flowing medium must enter on the 'Bellows' side, this is the opposite to normal installation.
- This device is fitted in the first instance to allow easy closure of the larger valves. In normal flow conditions it is impossible on large valves and high differential pressure to close the valve. By reversing the flow and installing a pilot valve, this problem is overcome.

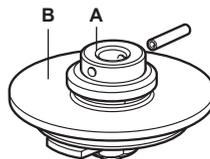


Fig. 4 DN125 shown

Should the differential pressure exceed those listed against the respective sizes in the table below then please remember 'Balancing plugs' must be used in all the valves.

Size	Differential pressure (bar)
DN125	25.0
DN150	17.0
DN200	10.0

When installed on steam systems a suitable steam trap should be fitted immediately upstream of the isolation valve to drain condensate. This will ensure drainage of the pipe when the valve is closed, and will prevent damage of the valve due to waterhammer. The drain trap should be either a ball float or thermodynamic type. Correct condensate drainage of all upstream pipework is also vital.

3.5

Always open isolation valves slowly to avoid system shocks.

3.6

Note: It is advisable that when work is being carried out downstream of a valve installation, double isolation (block and bleed) should be fitted. In addition when installed as the final valve in a pipeline, as a safety precaution, a blanking plate or blank flange must be fitted to the outlet flange of the valve.

3.7

Commissioning 4

After installation or maintenance ensure that the system is fully functioning. Carry out tests on any alarms or protective devices.

5 Operation

- 5.1** The bellows sealed isolation valve plays an important role in the conservation of energy by eliminating fugitive stem seal emissions.
- 5.2** The valve is operated manually by a handwheel. Special care must be taken to ensure that the movement is made in the correct direction.
To open the valve fully, it is recommended to turn the handwheel until the shaft is raised to the maximum position, indicated by the (+) on the bonnet, then turn the handwheel clockwise by 1 to ¼ turns to remove any backlash. This is to prevent the possibility of attempting to force open a valve, which is already fully open, resulting in damage to the stem, bellows unit or other components. Gestra GAV valves are fitted with a position indicator which can be found on the stem, and should align with the (+) or (-) on the bonnet support pillars. (+ = fully open/- = fully closed).
- 5.3** If valve 'keys' are used care must be taken not to use excessive force when opening or closing the valve.
- 5.4** GAV-T valves are fitted with a throttling valve plug to allow close control when opening the valve. The number of turns open will affect the flowrate through the valve. Once correct flowrate is obtained ensure the locking screw and stroke limiter (see Fig. 6) are tightened. This will minimise any vibration. The effect of valve opening for each valve size can be seen in the chart, opposite.

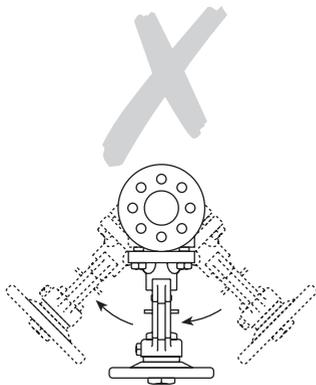
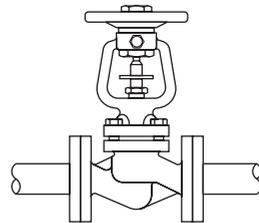
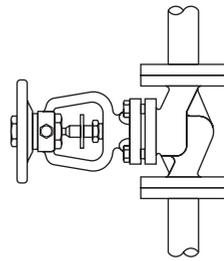
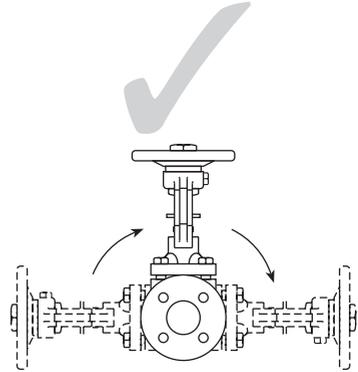


Fig. 5

Incorrect installation



Correct installation

GAV-T flow data - The effect of valve opening for each valve size

Size DN	15	20	25	32	40	50	65	80	100	125	150	200	250
Handwheel rotations	Kv values for given handwheel rotations tested to EN 60534-2-3 Water at 20 °C												
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.5	1.2	1.2	1.4	2.2	4.4	4.1	5.6	10.4	12.0	21	28	66	110
1	1.7	1.7	2.0	3.7	5.0	5.0	7.0	11.5	14.3	23	30	81	140
1.5	2.7	2.9	2.9	5.0	5.5	6.0	9.2	13.6	24.5	26	33	97	150
2	3.6	4.0	4.6	7.9	7.6	7.2	11.6	16.3	34.1	42	46	111	165
2.5	4.4	5.3	6.4	10.6	11.0	9.7	12.4	18.5	59.6	67	65	149	190
3	5.4	6.6	8.5	13.8	14.7	14.1	13.0	21.1	86.2	94	90	199	225
4			10.6	17.0	22.6	24.4	25.2	24.5	123.0	140	152	302	330
4.5			11.2	18.3	24.4	29.4	32.5	29.0	139.0	181	177	355	451
5			11.9	19.6	27.2	37.0	43.6	39.1	164.1	185	216	403	460
6					28.9	46.2	60.2	61.0	179.0	220	264	455	600
6.5					29.1	47.0	63.0	69.0	186.0	230	288	480	641
6.7					29.3	47.2	64.3	73.0		235	293	487	656
7							65.9	78.0		241	305	495	678
8							71.2	90.0		259	337	507	738
8.5							74.6	92.0			348	522	760
9.5								99.0			369		793
10								101.6					805
10.7													827

Stroke limiter for throttling versions

The handwheel nut on the **GAV 63F-T**, **GAV 64-T**, **GAV 65-T** and **GAV 66F-T** has a threaded hole for the provision of a stroke limiter. Customer to supply standard nuts and bolts as indicated in the table below:

Size	Hexagon bolt
DN15 - DN80	M8 x 50 mm
DN100 - DN150	M12 x 75 mm
DN200 - DN250	M12 x 100 mm

Note: The maximum permissible differential pressure in throttling function:

DN15 - DN80	2.0 bar
DN100 - DN125	1.5 bar
DN150	1.0 bar
DN200 - DN250	0.8 bar

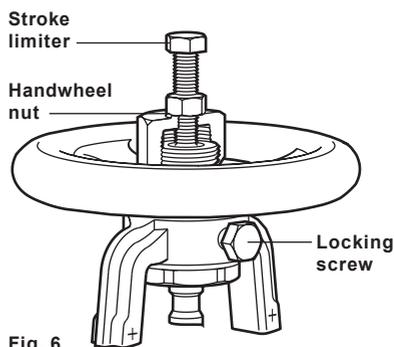


Fig. 6

6 Maintenance

All the internals of the bellows sealed valve can be replaced (See Section 7, Spare parts).

Note: Before actioning any maintenance programme observe the data in Section 1 - 'Safety information'.

Warning

The body/bonnet collar gaskets (10a and 10b) contain a thin stainless steel support ring which may cause physical injury if they are not handled and disposed of carefully.

6.1 Before undertaking any maintenance on the valve, ensure that any pressure is isolated and safely vented to atmospheric pressure. The valve should then be allowed to cool. When reassembling, ensure that all joint faces are clean.

6.2 How to fit the body/bonnet gaskets

This can be carried out whilst the valve is connected in the pipeline. Remove the valve bonnet (2) from the body (1) by unscrewing bonnet studs/nuts (9). The body gasket (10b) is now visible and can quickly be replaced. Ensure the gasket face in the body (1) is clean before fitting a replacement.

To replace the second gasket (10a) which is situated between the bonnet (2) and the stainless steel bellows support collar, firstly remove the clip-on position indicator, remove the locking screw (GAV-T versions only). Rotate the handwheel (7) in a clockwise direction. This pushes the main stem (6) downwards and creates a gap between the bellows support collar and the bonnet (2). If the support collar remains attached to the bonnet (2), gently prise the collar away from the bonnet being careful not to damage the collar.

Do not allow the bellows to stretch as this can reduce the bellows life.

By continually rotating the handwheel (7) in a clockwise direction, the stem (6) can be unscrewed from the bonnet bush. When the stem (6) is disconnected from the bonnet bush, unscrew the gland nut (unbolt the gland flange if fitted) and remove both this and the gland washer (or gland follower if fitted). Keep these parts safe as they are not supplied as spares. The stem/bellows assembly (6, 5) can now be withdrawn out of the bonnet (2). The second bellows collar gasket (10a) can now be replaced - ensuring both the bellows support collar surface and bonnet surface are clean and the gasket is accurately located. Before the stem/bellows assembly (6, 5) is reassembled into the bonnet (2), the stem packing ring (8) should be replaced (see Section 6.3).

6.3 How to fit the stem packing

By following through Section 6.2 it is now possible to replace the stem packing ring (8). Two of these rings are provided in the spares kit but only one is required. Ensure all of the old stem packing material is removed from the bonnet cavity and all locating surfaces are clean. Valve assembly is the opposite to removal - remembering to fit a bellows collar gasket between the collar and the valve bonnet. Ensure the solid stem pin (which is pressed into the stem) is aligned with the slot inside the bonnet. Before screwing the end of the stem into the bonnet bush remember to fit a new stem packing ring (8), the original gland washer (or gland follower) and gland nut (or gland flange) over the stem. **Do not allow the stem thread to damage the inner surface of the gland packing ring.** Carefully slide the new packing ring down the stem into the cavity and slide the original gland washer (or gland follower if fitted) on top of the packing ring. Remember to tighten the gland packing ring after the valve has been fully assembled.

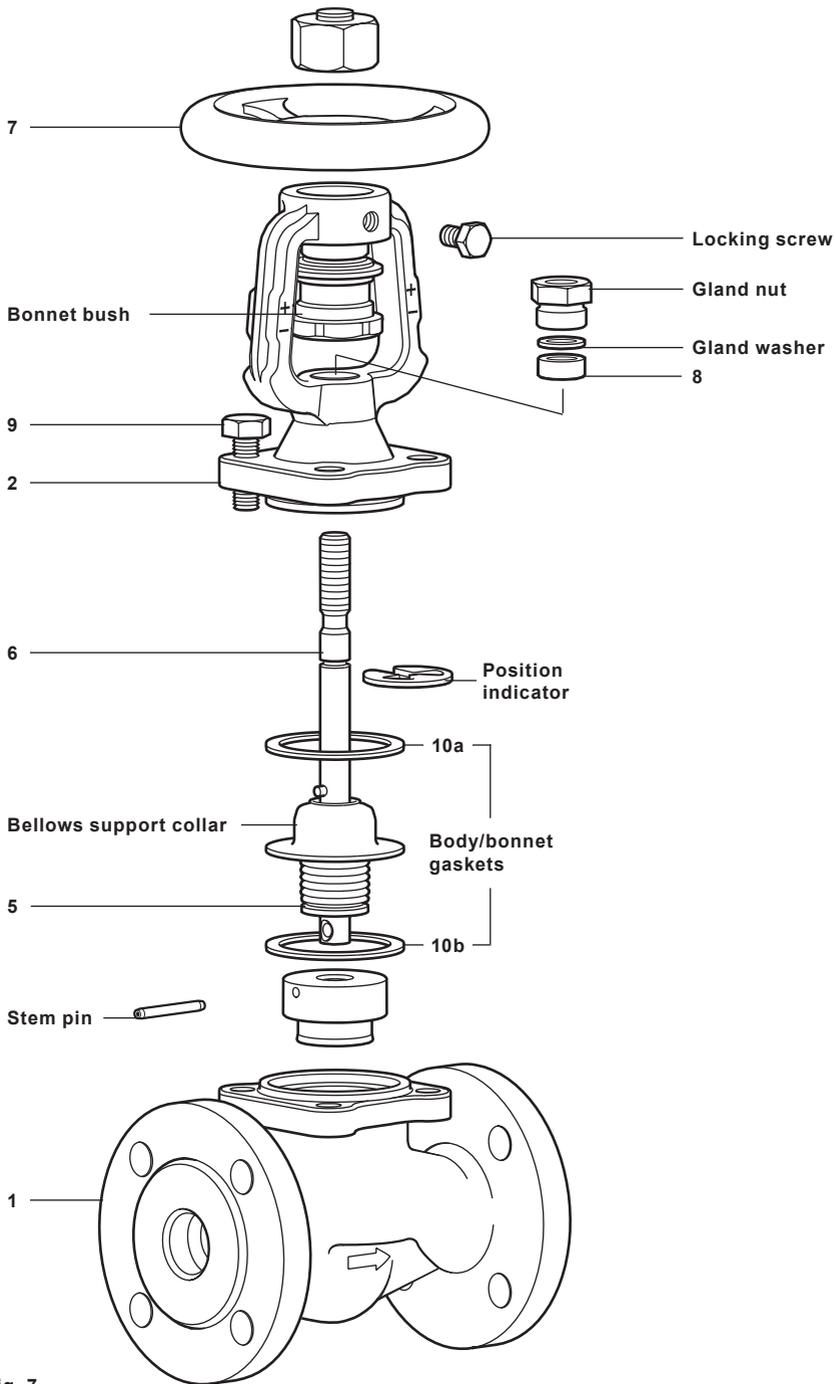


Fig. 7

6.4 How to fit the stem and bellows assembly

By following through Section 6.2 it is now possible to fit a new stem/bellows assembly (6, 5). Fitting this is opposite to removal - remembering to fit a bellows collar gasket (10a) between the bellows support collar and valve bonnet (2). Ensure the bellows collar gasket (10a) is accurately located. Before fitting the new stem/bellows assembly (6, 5) into the bonnet (2), apply a small amount of lubricating compound such as Gulf Sovereign LC grease to the end of the stem pin (which is pressed into the stem). Ensure the stem pin is aligned with the slot inside the bonnet. Carefully slide the stem up through the bonnet. Before screwing the end of the stem into the bonnet bush remember to fit a new stem packing ring (8) (see Section 6.3), the original gland washer (or gland follower) and gland nut (or gland flange) over the stem (6). **Do not allow the stem thread to damage the inner surface of the gland packing ring.** Carefully slide the new packing ring down the stem into the cavity and slide the original gland washer (or gland follower if fitted) on top of the packing ring (8). Remember to tighten the gland packing ring after the valve has been fully assembled.

6.5 How to fit the disc

By following through Section 6.2 it is now possible to replace the valve's disc. To replace the disc (4) (or balancing disc assembly*) simply remove the old stem pin and replace the disc (4). Attach the new disc with the new stem pin (supplied). Where the disc (4) is attached using a retaining nut and collet arrangement, simply prise the crimped skirt away from the retaining nut and unscrew. Remove the collets remembering to save these and the retaining nut as they are not supplied as spares. Fitting is the opposite to removal but ensure the collets and threads are lightly greased with lubricating compound such as Molybdenum Sulphide. If a new disc is being fitted then crimp the collet retaining nut securely across two corners by deforming the disc's thin metal skirt. If the original disc is being fitted then re-crimp using a fresh part of the skirt.

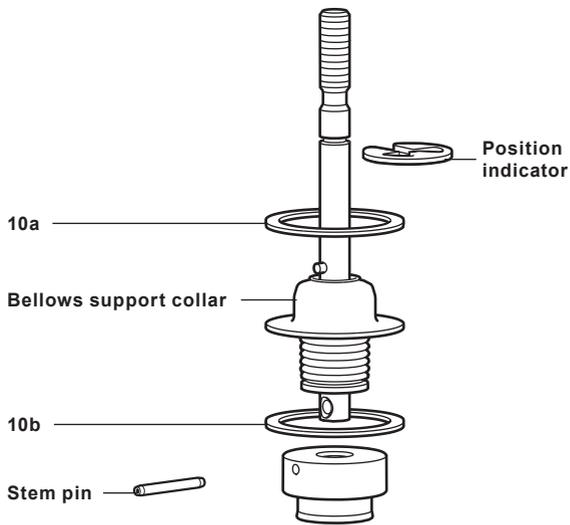
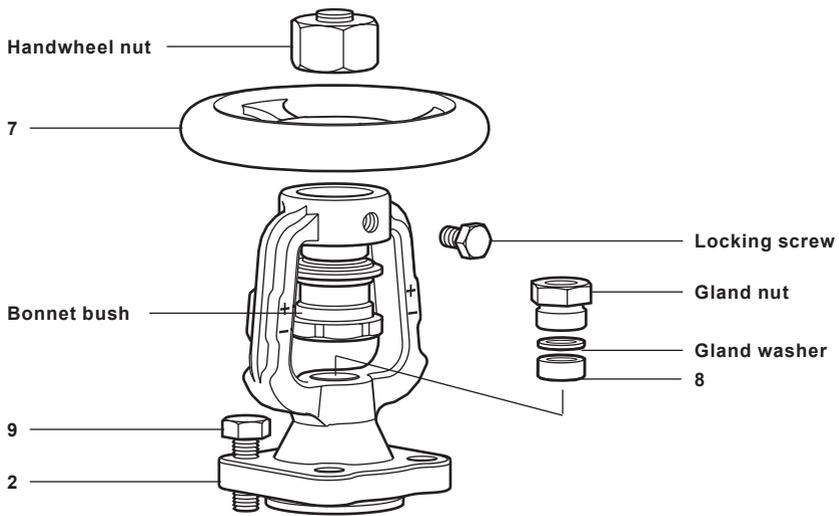
*Important note

When a balancing disc is installed, the valve body should be mounted with the upstream fluid flowing into the upper valve chamber first, so the fluid pressure acts on top of the balancing disc. This is opposite to normal installation. If a balancing disc is upgrading or replacing a standard disc, the original valve body must be turned around in the pipeline and permanently marked with a new flow arrow indicating the changed direction of flow. See Section 3.4 for additional information.

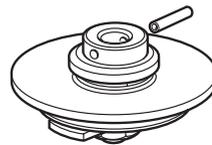
6.6 Final assembly

Ensure the bellows support collar and gaskets (10a, 10b) are accurately aligned with the bonnet (2) before final assembly into the body (1).

Tighten the bonnet bolts/nuts (9) evenly to the recommended tightening torque (See Table 1).



Optional balancing disc assembly



DN125
shown

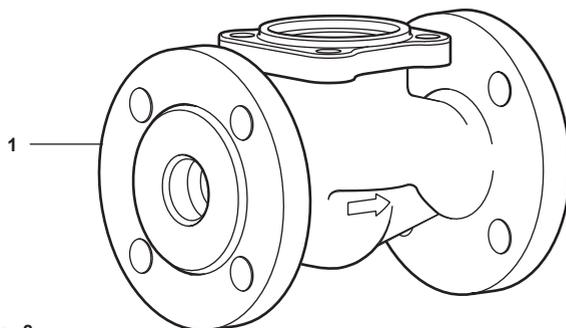


Fig. 8

Handwheel

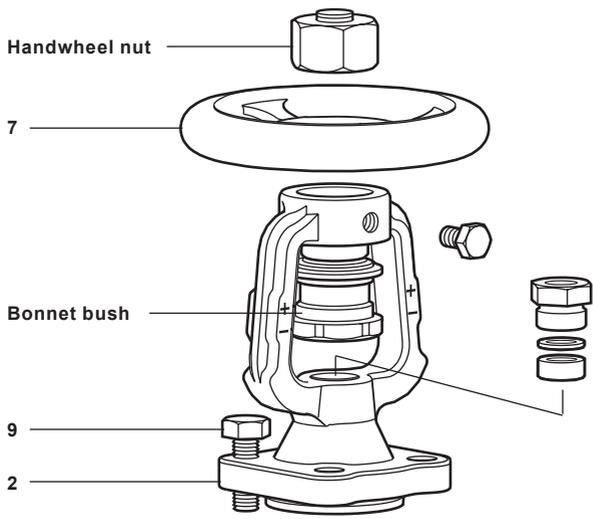
The handwheel (7) is not supplied as a spare part. However, to remove the handwheel unscrew the main handwheel nut in a **clockwise** direction.

Note: The thread in the handwheel nut is left handed, so it must be unscrewed in a clockwise direction. Place a suitable spanner (a detailed drawing is available from Gestra) across the flats of the bonnet bush (2) and unscrew the handwheel in the normal way.

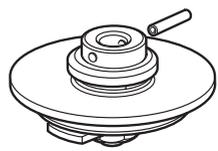
Note: the handwheel maybe firmly secured on the bonnet bush (2). Refitting the handwheel is the opposite to removal. Apply Loctite 638 to the threads of the handwheel boss and tighten to 50 N m (36 lbf ft). Remember to tighten the handwheel nut to 40 N m (29 lbf ft) in an **anticlockwise** direction.

Table 1 Recommended bonnet tightening torques N m (lbf ft)

Size	mm	GAV 63F/GAV 63F-T	GAV 64F, GAV 65F and GAV 64F-T, GAV 65F-T	GAV 66F and GAV 66F-T	
		PN16 JIS/KS 10K	PN16/PN25	PN40	ASME 150/300 JIS/KS 20K
DN15 - DN32	17 A/F	20 - 25 (15 - 18)	35 - 40 (26 - 29)	35 - 40 (26 - 29)	50 - 55 (36 - 40)
DN40 - DN65	19 A/F	40 - 45 (29 - 33)	55 - 60 (40 - 44)	55 - 60 (40 - 44)	85 - 90 (63 - 66)
DN80 - DN150	24 A/F	70 - 80 (51 - 59)	130 - 140 (95 - 103)	130 - 140 (95 - 103)	190 - 200 (140 - 147)
DN200	30 A/F	180 - 200 (132 - 147)	260 - 280 (191 - 206)	260 - 280 (191 - 206)	300 - 320 (220 - 235)
DN250	36 A/F		480 - 520 (352 - 382)		



Optional balancing disc assembly



DN125 shown

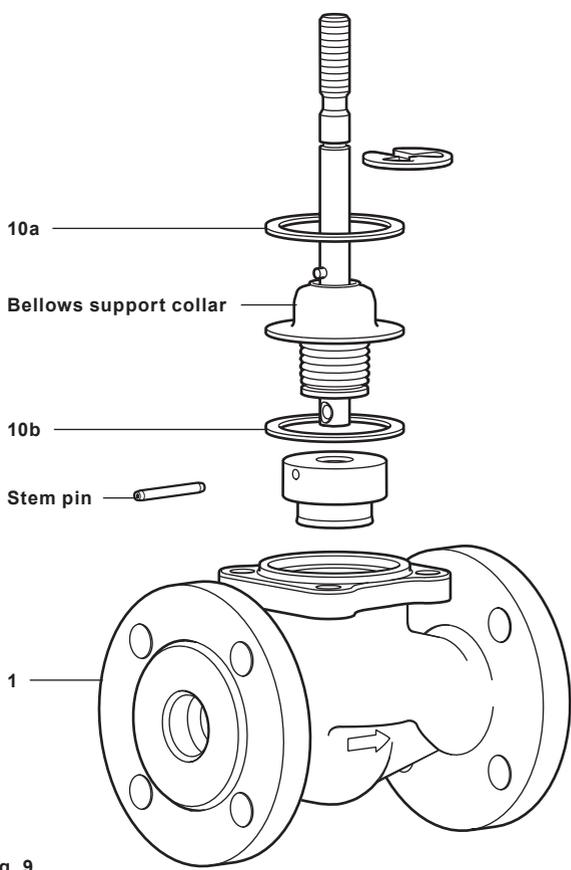


Fig. 9

7 Spare parts

The spare parts available are shown in heavy outline. Parts drawn in a grey line are not supplied as spares.

Available spares

Body/bonnet gasket and stem packing	10a, 10b, 8 (2 off)
Stem and bellows assembly (state if GAV or GAV-T)	6, 5
Disc (and optional disc where fitted) - state full description of the valve	4

How to order spares

Please note: for customer convenience spares are supplied in kits to ensure all the appropriate replacement parts are supplied to carry out a specific maintenance task. e.g. when a stem/bellows assembly is ordered, parts (**10a** and **10b**), (**8**) and (**6, 5**) will be included in the kit.

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

Example: 1 - Body/bonnet gasket and stem packing for a DN15 Gestra GAV 64F PN16 bellows sealed stop valve.

Note: The gaskets contain sharp metal reinforcement, please handle with care.

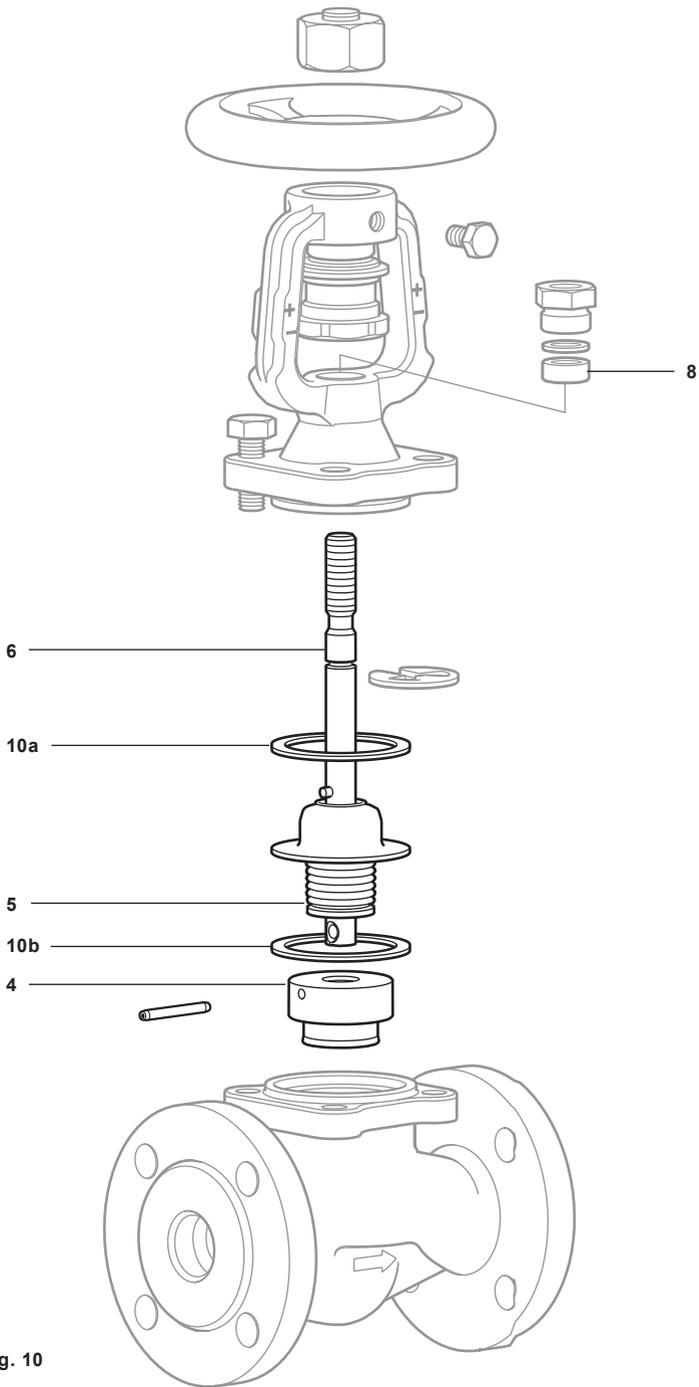


Fig. 10



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