IM-P164-03-US
Issue 1

A3S and A3SW
Bellows Sealed Stop Valve
Installation and Maintenance Instructions

A3S
A3SS
Bolted version

A3SW
A3SSW
Welded version

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 fully comply with the requirements of the Pressure Equipment Directive (PED), ATEX Directive (ATEX) and carry the CE and Ex marks when so required.

The products fall within the following Pressure Equipment Directive categories:

Product	Group 2 Gases	Group 2 Liquids
A3S, A3SS, A3SW, A3SSW - ½" - 2"- NPT, SW	2	SEP

Product marking per ATEX Directive 94/9/EC Ex II 2G CT3.

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) **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.**

1.2 Access

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

1.3 Lighting

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

1.4 Hazardous liquids or gases in the pipeline

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

1.5 Hazardous environment around the product

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

1.6 The system

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

1.7 Pressure systems

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

1.8 Temperature

Allow time for temperature to normalise after isolation to avoid danger of burns.

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 and who has had specific training on pressurised systems.
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 these products may reach temperatures of 200 °C (392 °F).

These 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.

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 Description

A screwed and socket weld bellows sealed, in-line stop valve for use on steam, gas, liquid, condensate and water systems.

Standards

This product fully complies with the requirements of the Pressure Equipment Directive (PED).
The valve bellows fatigue life conforms to ISO 15761.

Seat leakage

Disc to seat shut-off conforms to API 598 and DIN 3230 leakage rate B01.

Certification

This product is available with certification to EN 10204 3.1.
Note: All certification/inspection requirements must be stated at the time of order placement.

2.2 Sizes and pipe connections

½", ¾", 1", 1¼", 1½" and 2"
Screwed BSP (BS 21 parallel), NPT
Socket weld to BS 3799/ANSI B 16.11

Model	Bonnet type	Disc material
A3S	Bolted Bonnet	Stainless Steel - ASTM A276 Type 410
A3SS	Bolted Bonnet	Stainless Steel - ASTM A276 Type 410 + stellite Gr. 6
A3SW	Welded Bonnet	Stainless Steel - ASTM A276 Type 410
A3SSW	Welded Bonnet	Stainless Steel - ASTM A276 Type 410 + stellite Gr. 6

A3S
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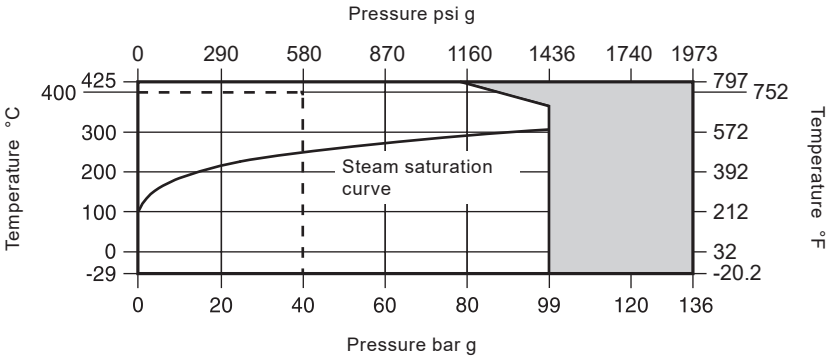
Fig. 1

Pressure/temperature limits (Class 800)



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

Operating restrictions to conform to ISO 15761.

Body design conditions			Class 800
PMA	Maximum allowable pressure	136 bar g	1973 psi g
TMA	Maximum allowable temperature	425 °C	797 °F
Minimum allowable temperature		-29 °C	-20.2 °F
Maximum operating pressure		99 bar g @ 360 °C	1436 psi g @ 680 °F
PMO	Maximum operating pressure for extended bellows life	40 bar g @ 400 °C	580 psi g @ 752 °F
Maximum operating temperature		425 °C	797 °F
TMO	Maximum operating temperature for extended bellows life	400 °C @ 40 bar g	752 °F @ 580 psi g
Minimum operating temperature		-29 °C	-20.2 °F
Without the bellows fitted the unit is designed for a maximum cold hydraulic test pressure of:		212 bar g	3075 psi g

3. Installation

These installation instructions apply to the A3S and A3SW

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

Wherever practicable, valves should be installed where there is adequate space available so that they can be conveniently operated and maintained.

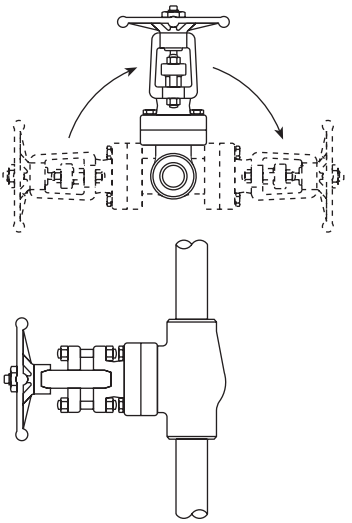
Before installing a valve, check to ensure that size, pressure rating, materials of construction, end connections, etc. are suitable for the service conditions of the particular application.
Care must be taken to ensure that all dirt which may have accumulated in the valve during storage is removed before installation, maintain cleanliness during installation since the introduction of dirt can result in damage to the valve seats and operating mechanism.

To minimise the danger of abrasive particles damaging the seats, pipeline strainers should be fitted upstream of the valves.

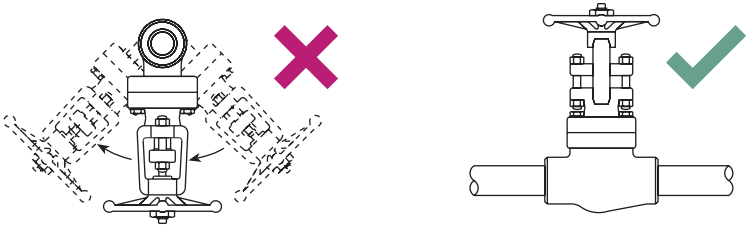
Install the valve in the direction of flow given by the arrow on the body with the handwheel in a suitable position. The preferred position is with the spindle vertical. The valve can be installed from the vertical to the horizontal plane (see Fig. 2 below).

When installed on steam systems a suitable steam trap should be fitted immediately upstream of the isolation valve. 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 (FT) or thermodynamic (TD) type. Correct condensate drainage of all upstream pipework is also vital. Valves should be installed into the line in the fully closed position. If welding into the line care must be taken to ensure that the temperature of the seat zone does not exceed 350 °C - 400 °C (662 °F - 752 °F). Always open the valve to the half open position.

Always open valves slowly to avoid system shocks.



Do not mount the valve upside down.



Incorrect installation **Fig. 2** **Correct installation**

4. Commissioning

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

5. Operation

The A3S and A3SW bellows sealed isolation valve plays an important role in the conservation of energy by eliminating fugitive stem seal emissions.

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 clockwise until the shaft is raised to the maximum position, and then lower the shaft by giving the wheel an ⅛ to ¼ turn anticlockwise 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.

6. Maintenance

The A3SW (welded version) is not serviceable.

Note: Before actioning any maintenance program observe the 'Safety information' in Section 1.

Warning

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

6.1 General information

As with all mechanical devices, regular maintenance is the most efficient means of ensuring continued operational efficiency.
Regular scheduled inspection of all valves is essential especially on valves which are operated only occasionally.

6.2 How to change the bellows assembly and body gaskets:

- Unscrew the 4 body bolts (**8**) and remove the valve bonnet (**2**). The body gasket (**7b**) is immediately accessible and can be replaced without further dismantling.
- Ensure gasket faces are clean (body and upper bellows ring face) before fitting new gasket.
- To replace the bonnet gasket (**7a**) and the bellows assembly (**6**) unscrew the bellowsassembly anticlockwise from the stem (**16**). The bonnet gasket is immediately accessible and can be replaced having ensured the sealing faces are clean.
- Make sure the anti-rotation pin on the stem is still engaged in the groove in the bonnet.
- Now screw the bellows assembly (a new one if required) fully on to the stem in a clockwise direction. Make sure the gaskets are in the correct position.
- Unscrew the bellows ½ to ¾ turn. (This is to give the assembly flexibility).
- Replace the bonnet and tighten the body bolts (**8**) evenly to the recommended torque, see Table 1.

After 24 hours in service, retighten body bolts.

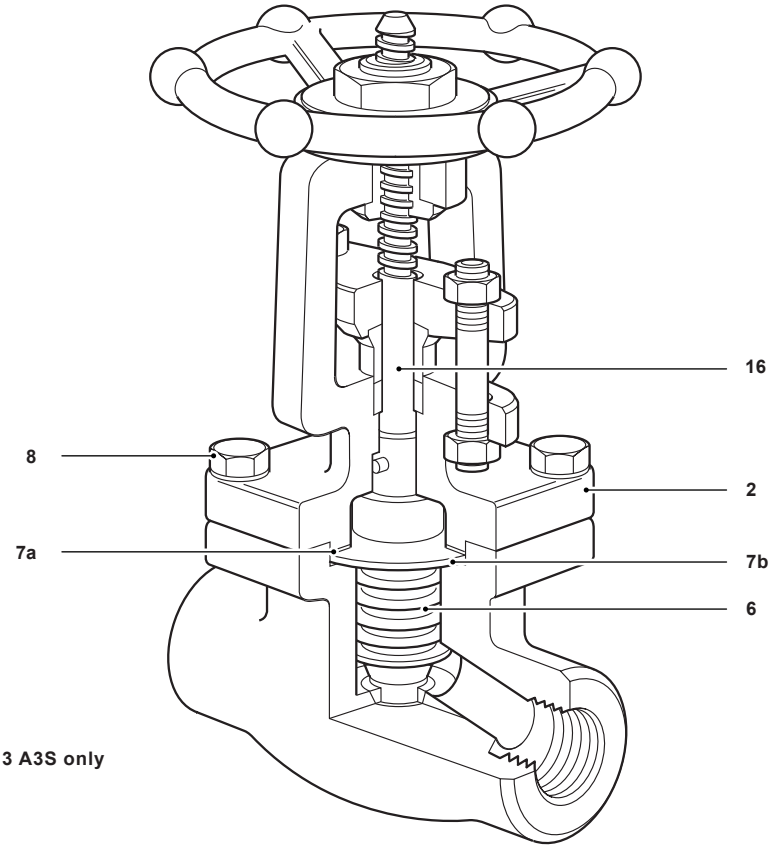


Fig. 3 A3S only

Recommended tightening torques

Item	Part		or mm		N m	(lbf ft)
8	Body bolt	½"	17 A/F	M10	40 - 50	(30 - 37)
		¾"	17 A/F	M10	40 - 50	(30 - 37)
		1"	19 A/F	M12	70 - 90	(52 - 66)
		1¼"	19 A/F	M12	70 - 90	(52 - 66)
		1½"	22 A/F	M14	110 - 130	(82 - 96)
		2"	24 A/F	M16	160 - 190	(118 - 140)

7. Spare parts

Spare parts - A3S and A3SS

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

Spare parts - A3SW and A3SSW

No Spare parts available for Welded Bonnet options

Available spares

Set of body gaskets	**7**
Maintenance kit (Disc and bellows assembly + body gaskets)	**5, 6, 7**

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.

Example: 1 off Maintenance kit plus 1 - Set of body gaskets for a 1" Spirax Sarco type A3S bellows sealed stop valve having screwed BSP connections.

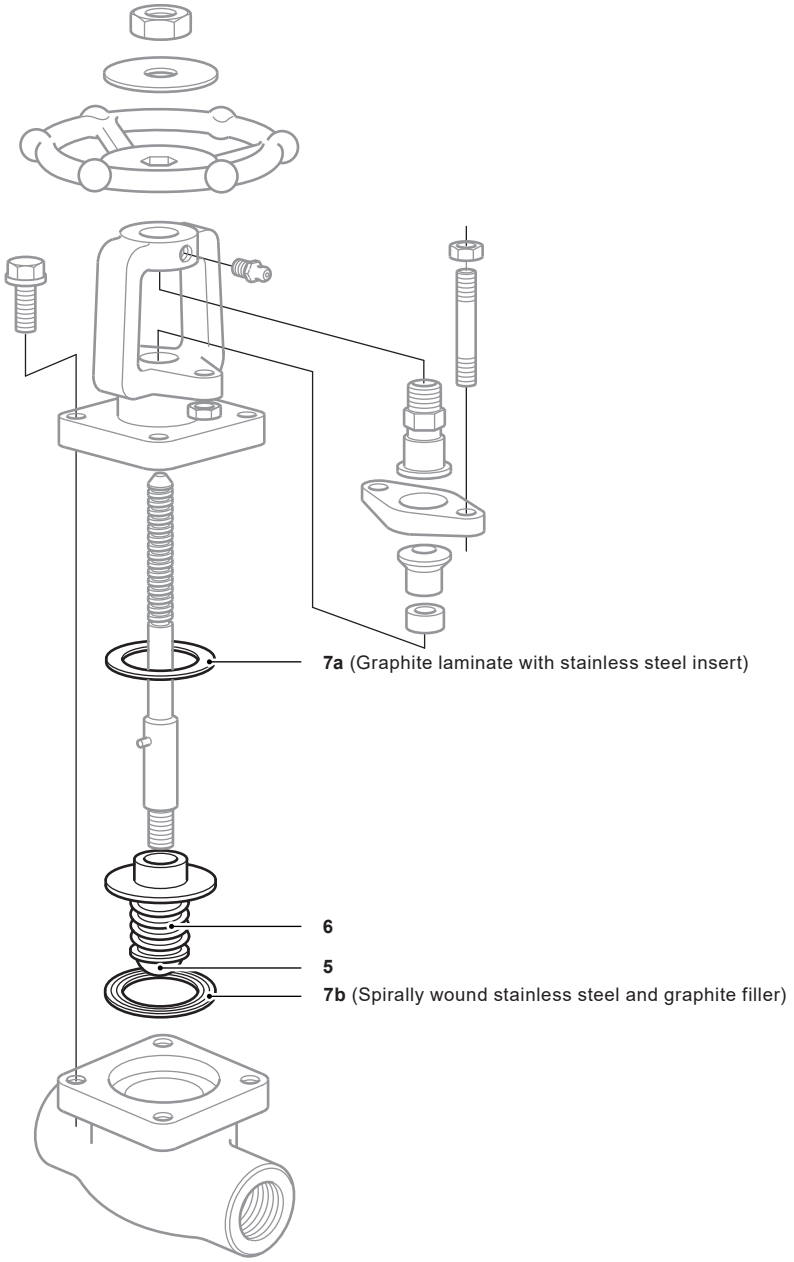

7a (Graphite laminate with stainless steel insert)
6
5
7b (Spirally wound stainless steel and graphite filler)

Fig. 4