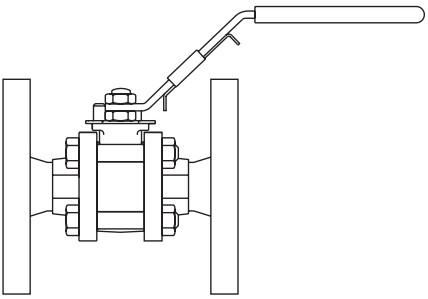
M10Si ISO, M10Si ISO Automation and M10Vi ISO Ball Valves Screwed, SW, BW and Flanged versions

Installation and Maintenance Instructions



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

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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 CE mark when so required. The products fall within the following Pressure Equipment Directive categories:

Product		Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
M10Vi (virgin PTFE seats), **M10Si** (graphite reinforced PTFE seats) and **M10Si automation** (graphite reinforced PTFE seats)	DN8	SEP	SEP	SEP	SEP
	DN10	SEP	SEP	SEP	SEP
	DN15	SEP	SEP	SEP	SEP
	DN20	SEP	SEP	SEP	SEP
	DN25	SEP	SEP	SEP	SEP
	DN32	2	SEP	2	SEP
	DN40	2	1	2	SEP
	DN50	2	1	2	SEP
	DN65	2	1	2	SEP

i) **The product has been specifically designed for use on steam, compressed air,water/condensate and other industrial fluids that are in Group 2 of the above mentioned Pressure Equipment Directive.**

ii) **Determine the correct installation situation and direction of fluid flow.**

iii) **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.**

iv) **Remove protection covers from all connections before installation.**

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.
If parts 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 role to be enforced in all areas where PTFE is stored, handled or processed as persons inhaling the fumes from burning tabacco 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 these products may reach temperatures of 300 °C (572 °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 Safety information - Product specific

Hydraulic locking

Ball valves are prone to lock-up when used on certain heating/cooling applications where both steam and liquid will pass through the valve. This is caused by liquid trapped in the ball during closure being heated to create a high hydraulic pressure inside the ball cavity. To prevent this, during manufacture, a minute hole is drilled in the ball, so, that in the closed position, any excess pressure will be relieved. Spirax Sarco ball valves for these applications are clearly marked to allow the valve to be correctly installed, such that, when closed, the hole is facing the steam source.

Cap gaskets

If the 'O' rings have been subjected to a temperature approaching 315 °C (599 °F) or higher, they may have decomposed and formed hydrofluric acid. Avoid skin contact and inhalation of any fumes as the acid can cause skin burns and damage to the respiratory system.

1.16 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, with the exception of PTFE.

PTFE:

- **Can only be disposed of by approved methods, not incineration.**
- **Keep PTFE waste in a separate container, do not mix it with other rubbish, and consign it to a landfill site.**

1.17 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 M10Si ISO, M10Si ISO Automation and M10Vi ISO are three piece body ball valves designed for steam, process and other industrial fluids for services ranging from vacuum to the higher temperatures and pressures.
They can be serviced without removing the valve from the pipeline (screwed and welded versions only).
A lockable handle is provided as standard on the M10Si ISO and M10Vi ISO.

ISO mounting

The integral ISO body mounting allows the valve to be automated without losing seal integrity, as the body does not require disassembly. Manual to remote control may therefore be easily accomplished by the ISO range of Spirax Sarco ball valves.

Standards

This product complies with the requirements of the Pressure Equipment Directive (PED) and carry the CE mark when so required.

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.

Available types

For further information see Technical Information (TI) sheets below

M10Si2_ _ ISO	Zinc plated carbon steel body		
M10Si3_ _ ISO	Stainless steel body	PDR 0.8 seats	**TI-P133-58**
M10Si4_ _ ISO	Complete stainless steel		
M10Si2_ _ ISO Automation	Zinc plated carbon steel body		
M10Si3_ _ ISO Automation	Stainless steel body	PDR 0.8 seats	**TI-P133-59**
M10Si4_ _ ISO Automation	Complete stainless steel		
M10Vi2_ _ ISO	Zinc plated carbon steel body		
M10Vi3_ _ ISO	Stainless steel body	PTFE seats	**TI-P133-60**
M10Vi4_ _ ISO	Complete stainless steel		

Note: The nomenclature will be followed with either FB (full bore) or RB (reduced bore).

2.2 Sizes and pipe connections

¼", ⅜", ½", ¾", 1", 1¼", 1½", 2", (2½" only available with reduced bore).
Screwed BSP, BSPT, NPT, BW, SW full bore and reduced bore.
DN15 to DN50 (DN65 only available with reduced bore).
Flanged PN40, ANSI 150 and ANSI 300 full bore and reduced bore.

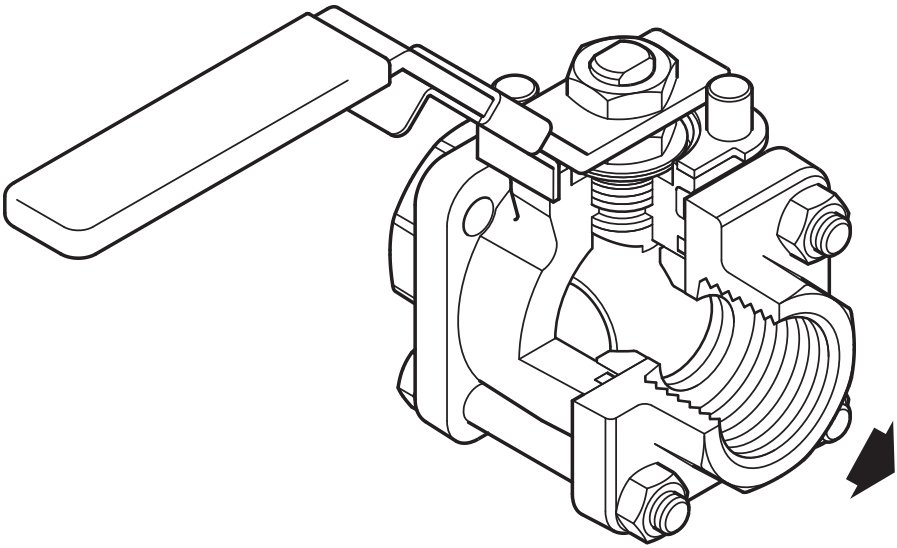


Fig. 1 M10Si and M10Vi screwed version shown

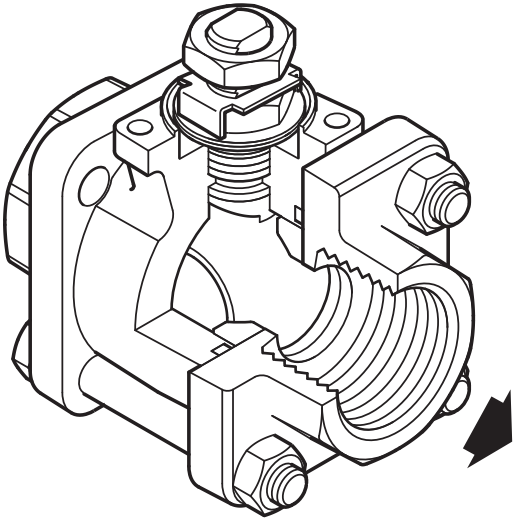


Fig. 2 M10Si automation screwed version shown

3. Installation

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

Although the valve has great structural integrity, severe misalignment and/or the pulling effect of incorrect pipe length will have a detrimental effect on the valve and must be avoided. Particular attention should be paid to correct pipe alignment such that the inlet pipework and valve are all on the same axis.
Valves are for on/off applications and may be operated manually.
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 with the handle in a suitable position. The preferred position is with the spindle vertical. The valve can be installed in any position for gas service (see Fig. 4 below).

When used on steam services:
1. Fit a trapped drain pocket upstream of the valve.
2. Open valve slowly to prevent the risk of waterhammer damage.

Do not mount the valve upside down for liquid service (Fig. 3).

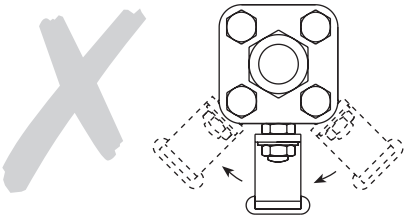


Fig. 3 Incorrect installation for liquid service

Valves should be installed into the pipeline in the fully closed position. **Prior to welding socket an butt weld valves into the pipeline, it will be necessary to:**

1. Dismantle the end caps from the body.
2. Remove the seats and body gasket.
3. Weld each end cap to the pipeline.
4. Replace the seats and body gasket.
5. Reassemble.

Always open valves slowly to avoid system shocks.

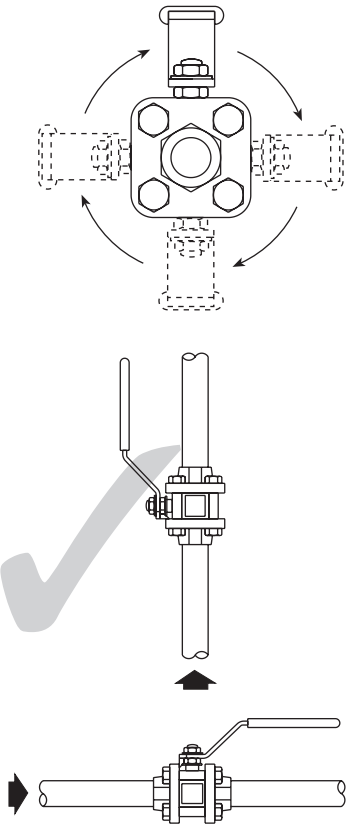


Fig. 4 Correct installation for gas service

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 valve is operated manually by a handle. Special care must be taken to ensure that the movement is made in the correct direction.
The valve can be used as an on/off valve, and can be operated fully open, or fully closed.

6. Maintenance

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

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 General maintenance

Maintenance work can be carried out without removing the complete ball valve from the pipeline. Remove the two upper bolts and nuts (**15 and 16**) and loosen the lower two.
The complete body assembly can then be removed and any new parts fitted.

Flanged valves

To proceed with maintenance work, the complete flanged valve requires removal from the pipeline. Remove the 4 nuts (16), the complete body assembly can now be removed and new parts fitted.

Table 1 Recommended tightening torques

Item no.	Part	Size		N m	(lbf ft)
15 16	Securing bolts Nuts	¼", ⅜", ½" RB		10	7.4
		½" FB	¾" RB	10	7.4
		¾" FB	1" RB	25	18.0
		1" FB	1¼" RB	25	18.0
		1¼" FB	1½" RB	40	30.0
		1½" FB	2" RB	57	42.0
		2" FB	2½" RB	75	55.0
9 11	Nut Stem nut		¼", ⅜" RB	10.8 - 13.5	8 - 10
			½", ¾" RB	10.8 - 13.5	8 - 10
		¾" FB	1" RB	17.5 - 20.3	13 - 15
		1" FB	1¼" RB	17.5 - 20.3	13 - 15
		1¼" FB	1½" RB	17.5 - 20.3	13 - 15
		1½" FB	2" RB	34 - 40	25 - 29.5
		2" FB	2½" RB	40 - 47	29.5 - 34.6

6.3 To replace seats and body gasket

- Remove the body as described in Section 6.2.
- With the body removed, remove the seats (**5**) and body gasket (**19**).
- Fit new seats (5) and body gasket (**19**), pushing them into the body recesses.

6.4 To replace stem seals

- Remove the body as described in Section 6.2.
- Remove the nuts (**9 and 11**), and the two belleville washers (**8**).
- Replace the stem seals (**6 and 22**).

6.5 Reassembly

Reassemble in reverse order to instructions given above. The securing bolts and nuts (**15 and 16**) should be tightened to the recommmended torques shown in Table 1.

After 24 hours in service, retighten body bolts.

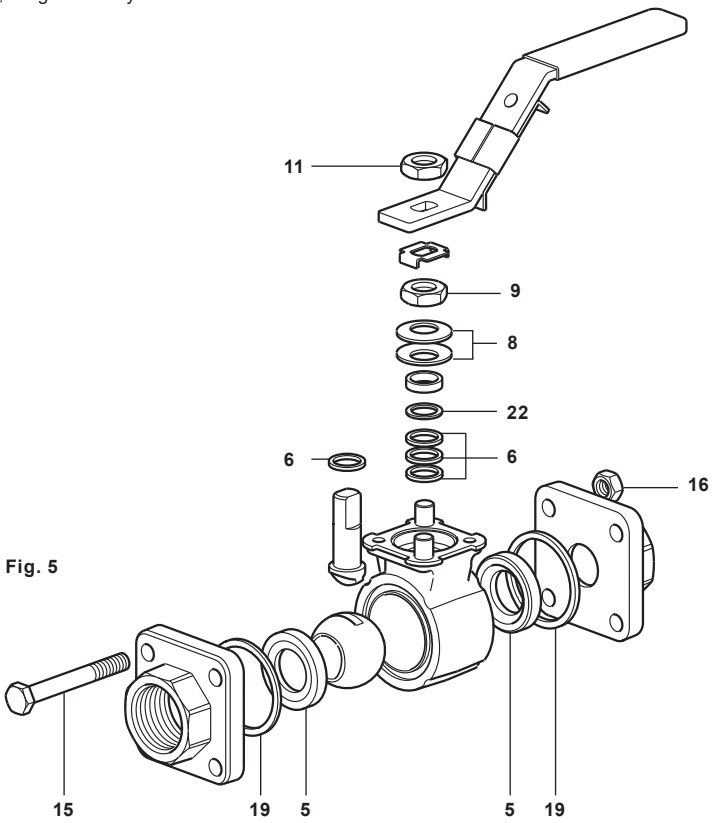


Fig. 5

7. Spare parts

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

Available spare

Seat, stem seals and body gasket set	**5, 6, 19, 22**

How to order spares

Always order spares by using the description given in the column headed 'Available spare' and state the size and type of ball valve required.

Example: 1 - Seat, stem seals and body gasket set for a Spirax Sarco ½" M10Si2FB ISO ball valve.

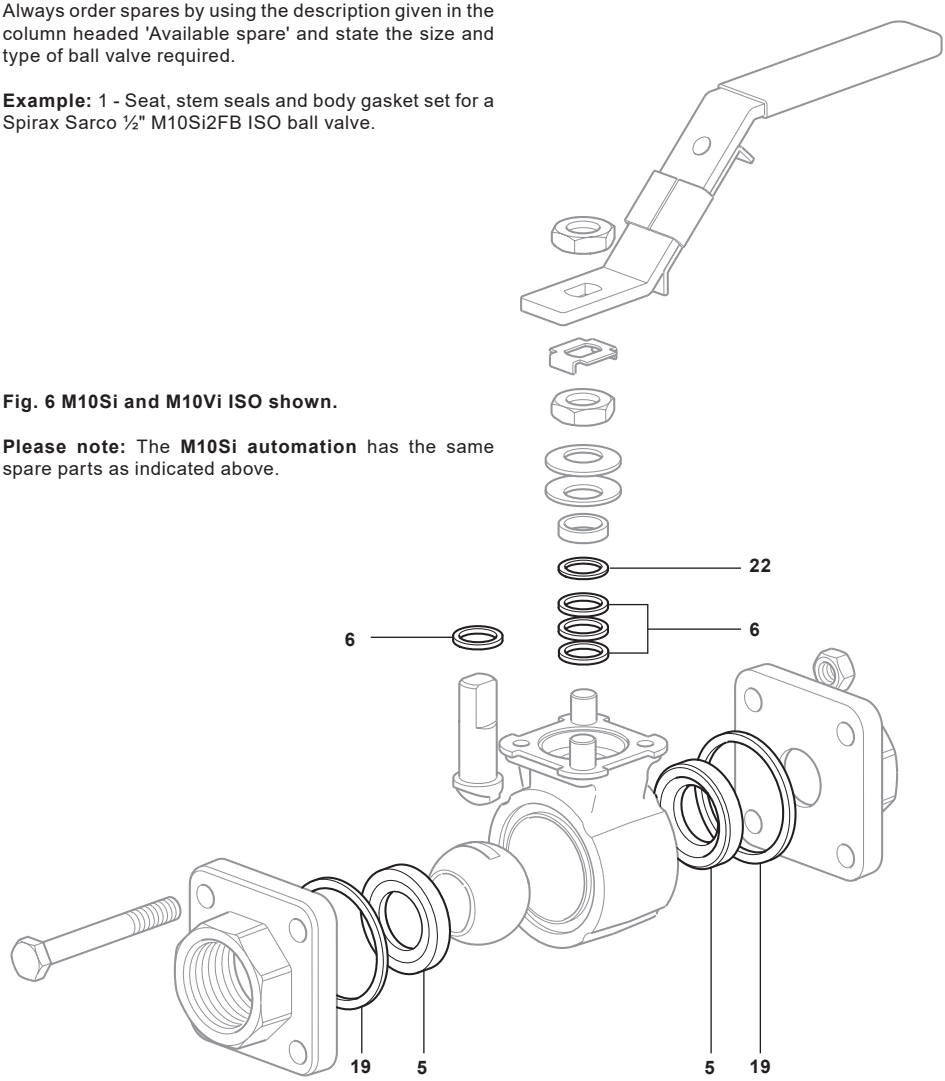


Fig. 6 M10Si and M10Vi ISO shown.

Please note: The **M10Si automation** has the same spare parts as indicated above.