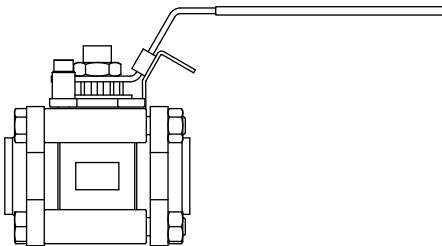


M16Vi ISO
Ball Valve
 $\frac{3}{8}$ " to 2"

Installation and Maintenance Instructions




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

1. Safety information

Safety operation of this product can only be guaranteed if it is properly installed, commissioned, used and maintained by qualified personnel (see section 1.11) in compliance with the operating instructions. General installation and safety instruction for pipeline and plant construction, as 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 intended use/application.

This product fully complies with the requirements of the EU Pressure Equipment Directive (PED) and UK Pressure Equipment (Safety) Regulations (PER) and falls within category SEP and therefore does not carry the  mark.

The product falls within the following Pressure Equipment Directive categories:

Product	Group 2 Gases	Group 2 Liquids
M16Vi	3/8"	SEP
	1/2"	SEP
	3/4"	SEP
	1"	SEP
	1 1/4"	SEP
	1 1/2"	SEP
	2"	SEP

- i. The product has been specifically designed for use on steam, compressed air, water and other industrial fluids that 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 over-temperature 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 minimize 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 depressurized even when the pressure gauge indicates zero.

1.8 Temperature

Allow time for temperature to normalize 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 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 this product may reach temperatures of 165 °C (329 °F).

This product is 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, 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.

1.16 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

The M16Vi ISO ball valve has been designed for use as an isolating valve, has a lockable handle as standard and can be serviced without removal from the pipeline. It can be used for steam and other industrial fluids. As per details in "1.1 Intended use".

2.1.1 ISO mounting

The integral ISO body mounting allows the valve to be automated without losing sealing integrity, as the body does not require disassembly. Manual to remote control may therefore be easily accomplished by the use of ISO range of actuators.

2.1.2 Available types

M16Vi4ISO Stainless steel body, PTFE seat.

2.1.3 Standards

This product fully complies with the requirements of the EU Pressure Equipment Directive (PED) and UK Pressure Equipment (Safety) Regulations (PER).

2.2 Technical data

Flow characteristic	Modified linear
Port	Reduce and full bore versions
Leakage test procedure to ISO 5208 (RATE A) /EN 12266-1(RATE A)	

2.3 Options

Operation by pneumatic actuator BVA300 series for all sizes.

2.4 Size and pipe connections

Screwed BSP and welded BW.

Reduce Bore: ½", ¾", 1", 1¼", 1½" and 2"

Full Bore: ¾", 1", 1¼" and 1½"

BSP, BW

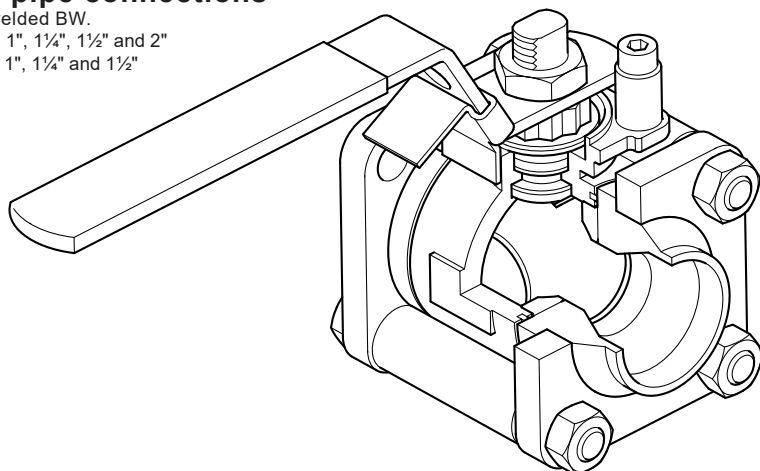
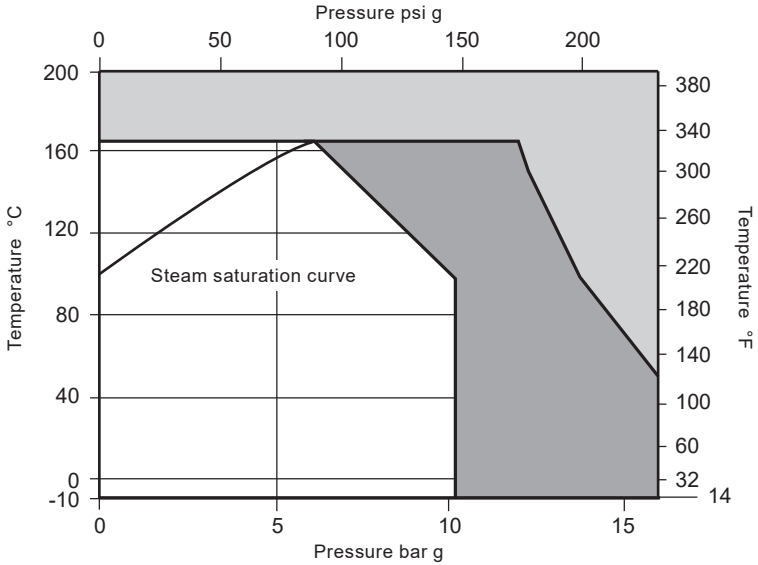


Fig. 1

M16Vi ISO Ball Valve ¾" to 2"

2.5 Pressure/temperature limits



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

The product should not be used in this region or beyond its operating range as damage to the internals may occur.

Body design conditions		PN16	
PMA	Maximum allowable pressure	16 bar g @ 50 °C	232 psi g @ 122 °F
TMA	Maximum allowable temperature	165 °C @ 6 bar g	329 °F @ 87 psi g
	Minimum allowable temperature	-10 °C	14 °F
PMO		10 bar g @ 100 °C	145 psi g @ 212 °F
	Maximum operating pressure for saturated steam service	6 bar g	87 psi g
TMO	Maximum operating temperature	165 °C @ 6 bar g	329 °F @ 87 psi g
Maximum differential pressure is limited to the PMO			
	Designed for a maximum cold hydraulic test pressure	24 bar g	348 psi g

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 Figure 3).

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 (Figure 2).

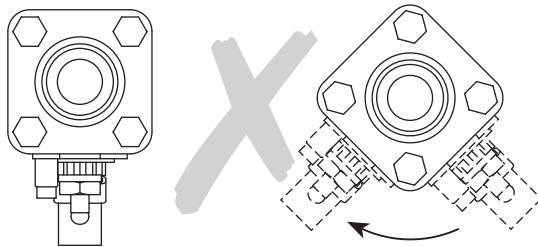


Fig. 2 Incorrect installation for liquid service

Valves should be installed into the pipeline in the fully closed position.

Note: Valves with threaded BSP connections are supplied assembled and ready to install.

Valves with welding BW connections are supplied disassembled (after being tested) in a box.

Valves with supplied in kit form (not assembled) should follow the following assembly instructions:

- 1 Make sure the flange (8) has been inserted into the pipeline before starting any welding operation on the connector (19).
- 2 Weld each end connector (19) to the pipeline.
- 3 Assemble three of the bolts, plastic pipe and nuts.
Note: keep one bolt off to allow enough space for the body to be assembled.
- 4 Before assembly, turn the lever (15) to the closed position, then insert the ball (7) and place the seats (6) in the body (1). Once the ball and seats are in place, turn the lever to the open position to avoid the ball and seats falling off.
- 5 Assemble the body between the two connectors, then fit the last bolt, plastic pipe and nut.
- 6 When all the parts are in the right position, turn the valve to the closed position. This will allow the seats to settle properly over the ball surface. Then tighten the bolts to the recommended torque.
Note: A diagonal sequence for tightening the bolts is recommended.
- 7 Recommended tightening torques refer to Table 1.

Note: Always open valves slowly to avoid system shocks.

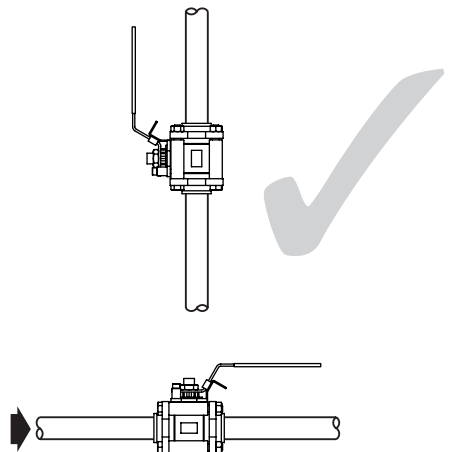
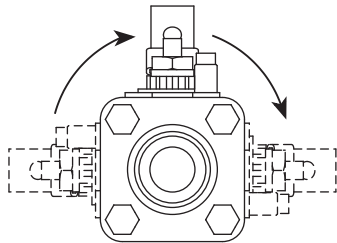


Fig. 3 Correct installation for gas service

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 lever, or automatically by an actuator. 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 control 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.

Please refer to Figure. 5, for proper part identification."

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 (**10** and **11**) and then loosen the two lower bolts.
- The complete body assembly can then be removed and any new parts fitted.

6.3 To replace seats (6) and flange seal rings (18):

- Remove the body as described in Section 6.2.
- With the body removed, remove the seats (**6**) and seal rings (**18**).
- Fit new seats (**6**) pushing them into the body chamber.
- Fit new flange seal rings (**18**).

6.4 To replace stem packing (4) and stem gasket (2)

- Remove the body as described in Section 6.2.
- Remove the nuts (**12**), the spring washers (**5**) and gland ring (**13**).
- Replace the stem packings (**4**) and stem gasket (**2**).

6.5 Reassembly

Reassemble in reverse order to instructions given above. The bolts and nuts (**10** and **11**) should be tightened to the torques shown in Table 1 below.

After 24 hours in service, retighten the body studs and nuts.

Note: Bolt and nut (**10** and **11**) need to be lubricated when tightened.

Table 1 Tightening torques

Size		3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Bolts (10) and Nut (11)	Nm	5	5	5	14	14	28	28
Nut (12)	Nm	4	4	4	8	8	20	20

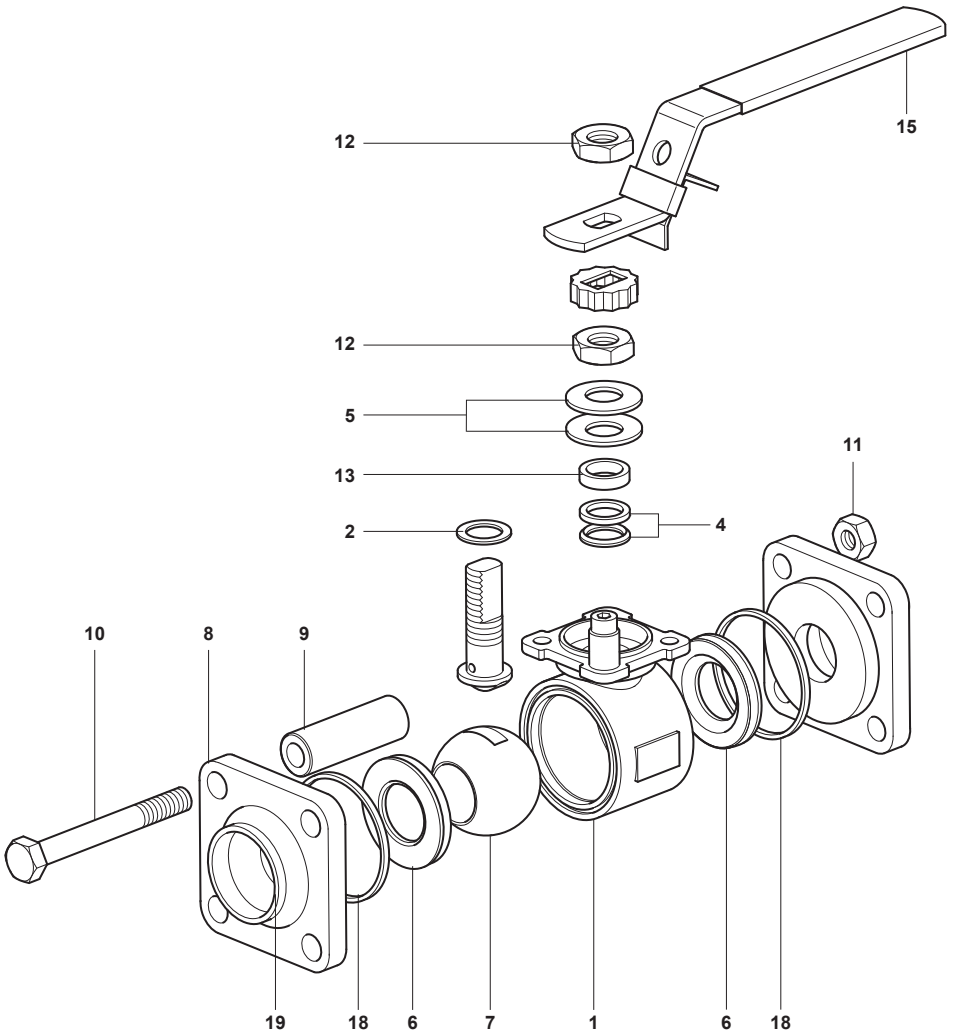


Fig. 5

M16Vi ISO Ball Valve $\frac{3}{8}$ " to 2"

7. Spare parts

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

Available spares

Stem gasket, packing, seat and flange seal ring and plastic pipe

2,4,6,9 and 18

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 ball valve.

Example: Spare parts kit for a Spirax Sarco 1" M16Vi4 RB ISO ball valve.

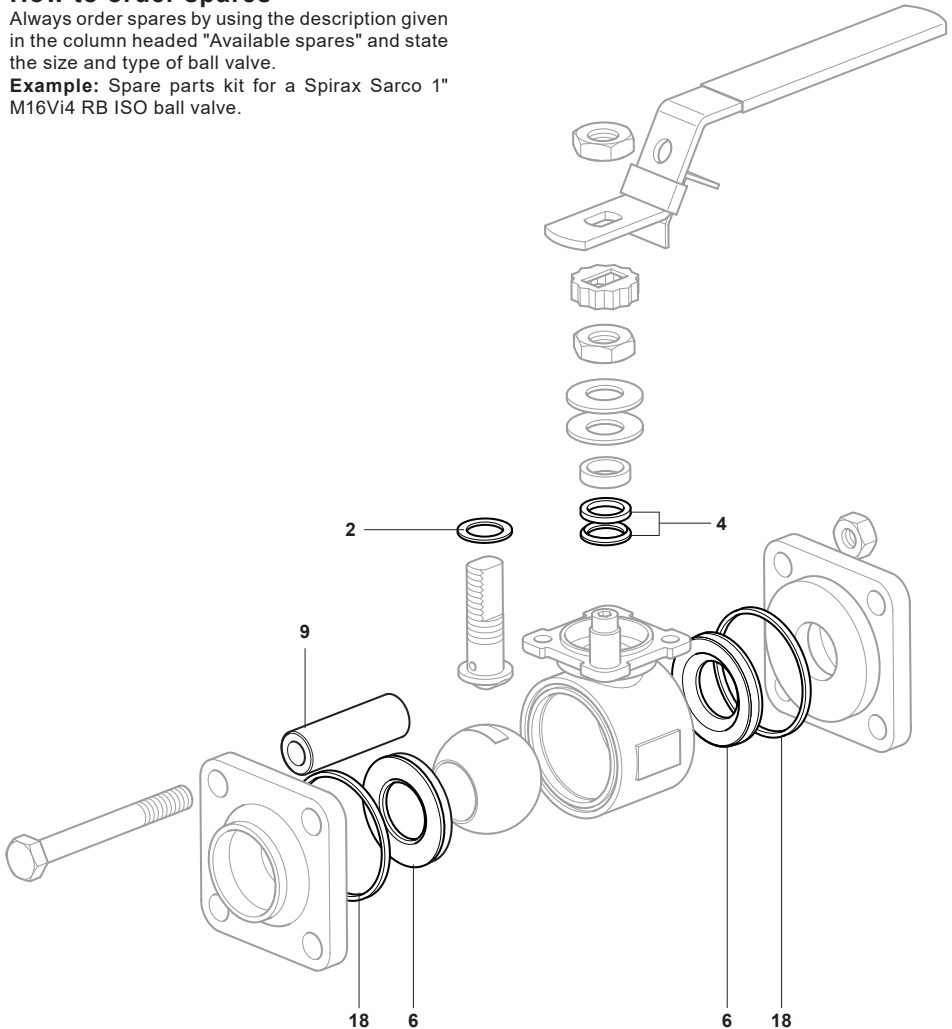


Fig. 6

M16Vi ISO Ball Valve 3/8" to 2"