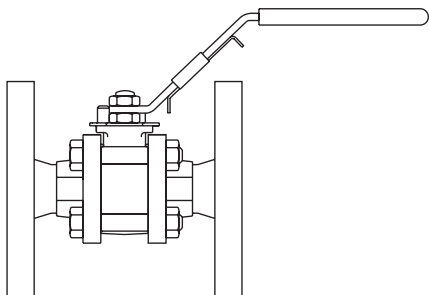


M10 ECFi4 Food+
Ball Valve
Screwed, SW, BW and Flanged versions
Installation and Maintenance Instructions



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

1. Safety information

Safe 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 instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

This product is intended to be connected into a system that can operate an EC 1935 compliant process.

To minimise the risk of non-intentionally added substances in the system, it is essential that an appropriate CIP (cleaning in place) cycle is carried out by the end user prior to first use in a food contact application.

A list of the materials that could come directly or indirectly into contact with foodstuffs can be found in the Declaration of Compliance available for this product.

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.

This product complies with the requirements of the EU Pressure Equipment Directive 2014/68/EU/UK

Pressure Equipment (Safety) Regulations and carries the  mark when so required.

The product falls within the following Pressure Equipment Directive categories:

Product		Group 2 Gases	Group 2 Liquids
M10 ECFi4 and M10 ECFi4 automation	DN8	SEP	SEP
	DN10	SEP	SEP
	DN15	SEP	SEP
	DN20	SEP	SEP
	DN25	SEP	SEP
	DN32	SEP	SEP
	DN40	1	SEP
	DN50	1	SEP
	DN65	1	SEP

- 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.
This product's use on other fluids may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.
- Determine the correct installation situation and direction of fluid flow.
- 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.
- 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.

If parts made from PTFE have been subjected to a temperature approaching 230 °C (446 °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 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 these products may reach temperatures of 230 °C (446 °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.

1.16 Disposal

Recyclable parts

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 disposal:

- 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.

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

1.17 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 M10 ECFi4 three-piece body ball valve has been designed for use as an isolating valve, not a control valve, has a lockable handle as standard and can be serviced without removal from the pipeline (screwed and welded versions only). It was designed and manufactured specially for Steam and Condensate applications. The valve complies with Regulation EC1935/2004 Food Contact Materials and Regulation EC2023/2006 on Good Manufacturing Practice for food-contact materials. The product also meets the requirements of EU 10/2011 for plastic materials intended to come into contact with food.

Nomenclature

After the name M10 ECFi4, the nomenclature will be followed with either FB (full bore) or RB (reduced bore).

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 EU Pressure Equipment Directive 2014/68/EU/UK Pressure Equipment (Safety) Regulations and carries the  mark when so required.

Certification

This product comes as standard with a certification package, which contains the following certificates:

- EN 10204 3.1 material certificates for all wetted parts (including seats and seals).
- EC1935:2004 Declaration of Compliance.
- EC2023:2006 Declaration of Compliance.
- EU 10/2011 Declaration of Compliance
- TSE-BSE Statement
- Typical Test Report

The material for the seals is compliant with:

- FDA CFR Title 21. Paragraph 177. 1550.

Note: All the valves are marked with a serial number and carry a certification pack with the same serial number in it.

Packaging

Each valve is end capped and sealed in a plastic bag to avoid the ingress of dirt and other contaminants and packed in a cardboard box.

2.2 Sizes and pipe connections

Full bore

Screwed and welded

1/4", 3/8", 1/2", 3/4", 1", 1 1/4", 1 1/2" and 2"
BSP (BS21 Rp), BSP (ISO 228 G),
BSPT, NPT, BW, SW

Flanged

DN15 to DN50
ASME Class 150, ASME Class 300, and EN 1092 PN40.

Reduced bore

Screwed and welded

1/2", 3/4", 1", 1 1/4", 1 1/2", 2" and 2 1/2"
BSP (BS21 Rp), BSP (ISO 228 G),
BSPT, NPT, BW, SW

Flanged

DN15 to DN65
ASME Class 150, ASME Class 300, and EN 1092 PN40.

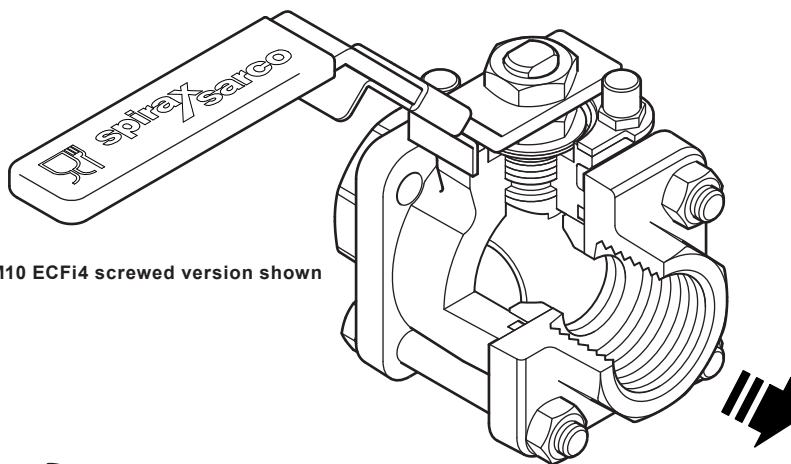


Fig. 1 M10 ECFi4 screwed version shown

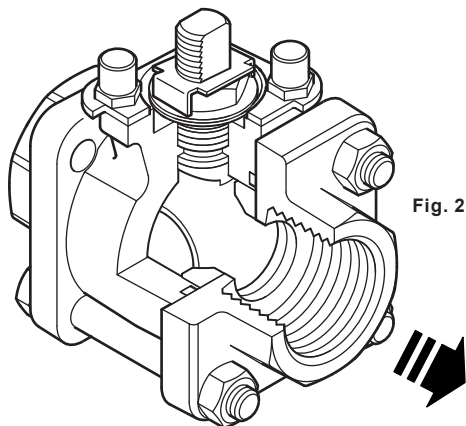
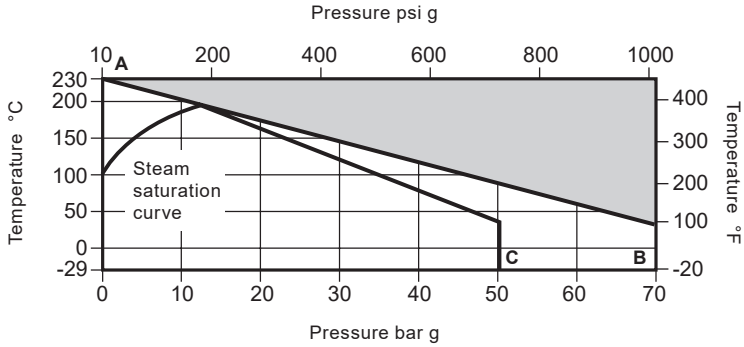


Fig. 2 M10 ECFi4 automation screwed version shown

M10 ECFi4 Food+ Ball Valve Screwed, SW, BW and Flanged versions

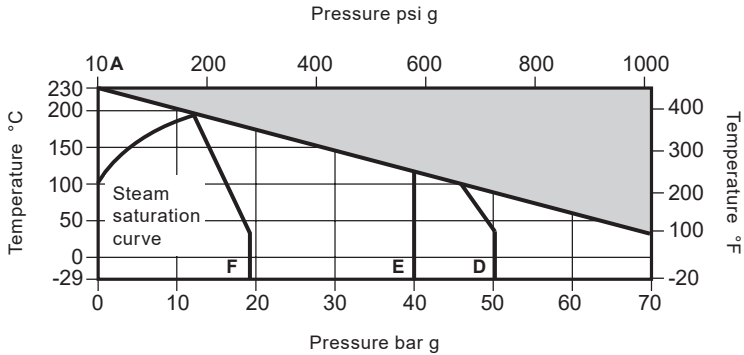
2.3 Pressure/temperature limits



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

A - B Screwed, BW and SW ¼" - 1½" FB and ¼" - 2" RB.

A - C Screwed, BW and SW 2" FB and 2½" RB only.



A - D Flanged ASME 300.

A - E Flanged EN 1092 PN40.

A - F Flanged ASME 150.

Note 1:

In gases applications, the maximum operating pressure is restricted to 40 bar g (580 psi g).

Body design conditions			PN100
PMA	Maximum allowable pressure	70 bar g @ 40 °C	1015 psi g @ 105 °F
TMA	Maximum allowable temperature	230 °C @ 0 bar g	446 °F @ 0 psi g
Minimum allowable temperature		-29 °C	-20 °F
PMO	Maximum operating pressure for saturated steam service	12 bar g	174 psi g
TMO	Maximum operating temperature	230 °C @ 0 bar g	446 °F @ 0 psi g
Minimum operating temperature		-29 °C	-20 °F
Note: For lower operating temperatures consult Spirax Sarco			
PMX	Maximum differential pressure is limited to the PMO		
Designed for a maximum cold hydraulic test pressure of:		105 bar g	1523 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 Fig. 4 opposite).

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).

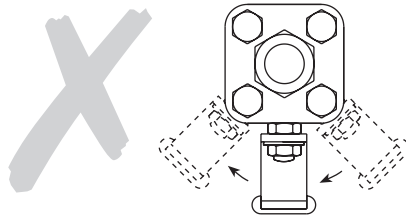


Fig. 3 Incorrect installation for liquid service

Valves should be installed into the pipeline in the fully closed position. **Prior to welding socket and 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.

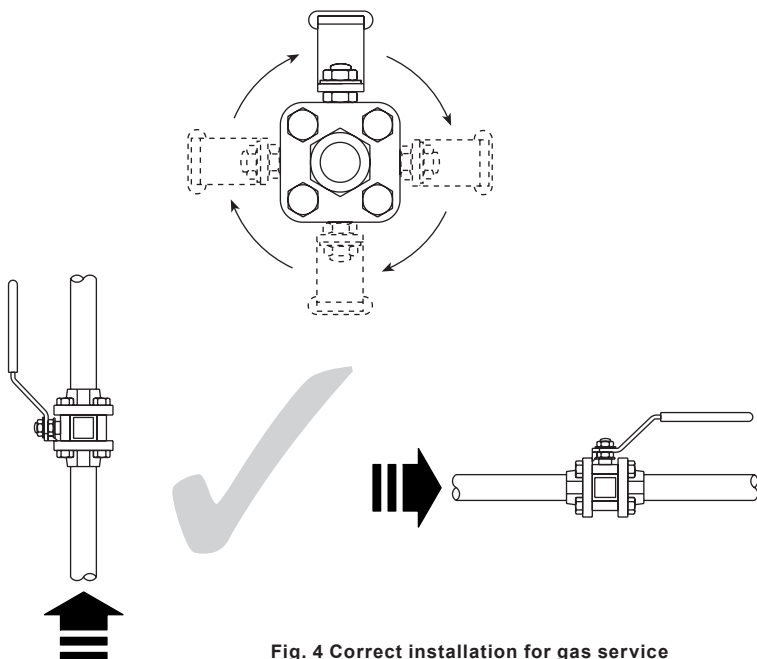


Fig. 4 Correct installation for gas service

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 (**13 and 14**) 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 eight nuts (**14**) and withdraw the four studs (**15**). The complete body assembly can then be removed and new parts fitted.

Table 1 Recommended tightening torques

Item no.	Part	Size		N m	(lbf ft)
13	Securing bolts	¼", ⅜" FB	½" RB	10	7.4
		½" FB	¾" RB	10	7.4
		¾" FB	1" RB	25	19
		1" FB	1¼" RB	25	19
14	Nuts	1¼" FB	1½" RB	40	30
		1½" FB	2" RB	57	42
		2" FB	2½" RB	75	55
9	Nut	¼", ⅜" FB	½" RB	10.8 - 13.5	8 - 10
		½" FB	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
10	Stem nut	1¼" FB	1½" RB	17.5 - 20.3	13 - 15
		1½" FB	2" RB	34 - 40	25 - 30
		2" FB	2½" RB	40 - 47	30 - 35

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 (17).
- Fit new seats (5) and body gasket (17), pushing them into the body recesses.

6.4 To replace stem seals

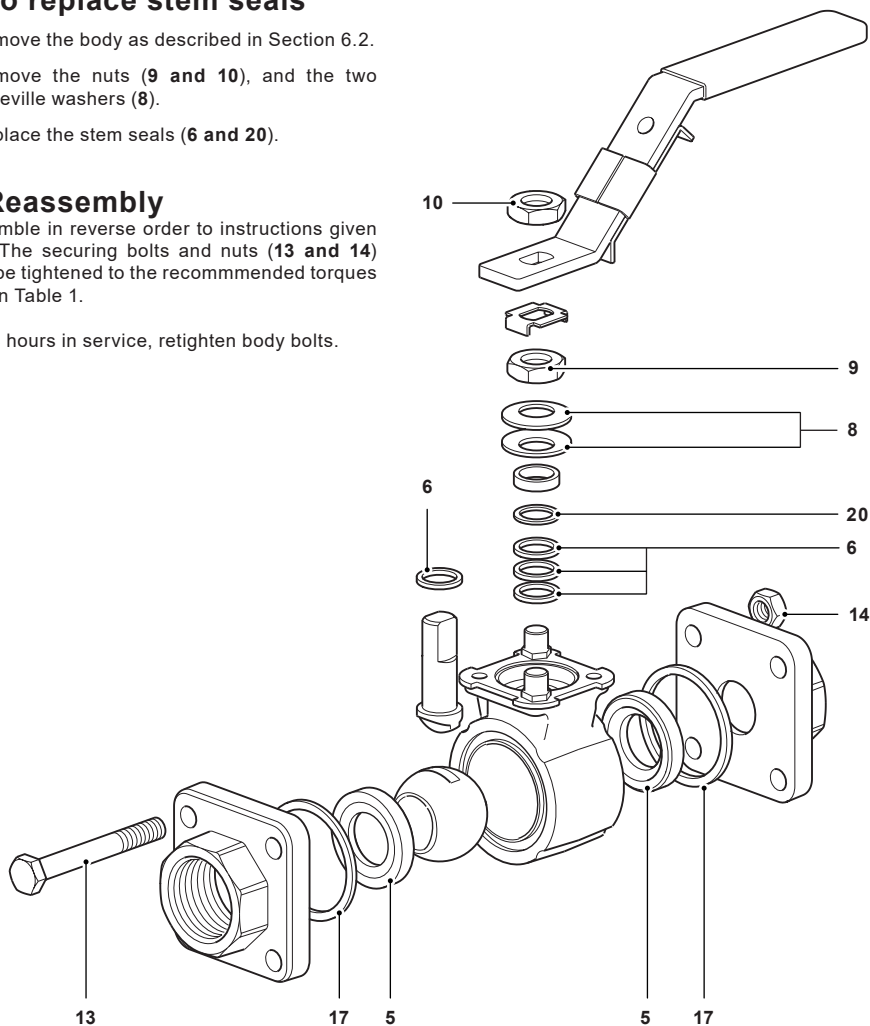
- Remove the body as described in Section 6.2.
- Remove the nuts (9 and 10), and the two belleville washers (8).
- Replace the stem seals (6 and 20).

6.5 Reassembly

Reassemble in reverse order to instructions given above. The securing bolts and nuts (13 and 14) should be tightened to the recommended 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, 17, 20

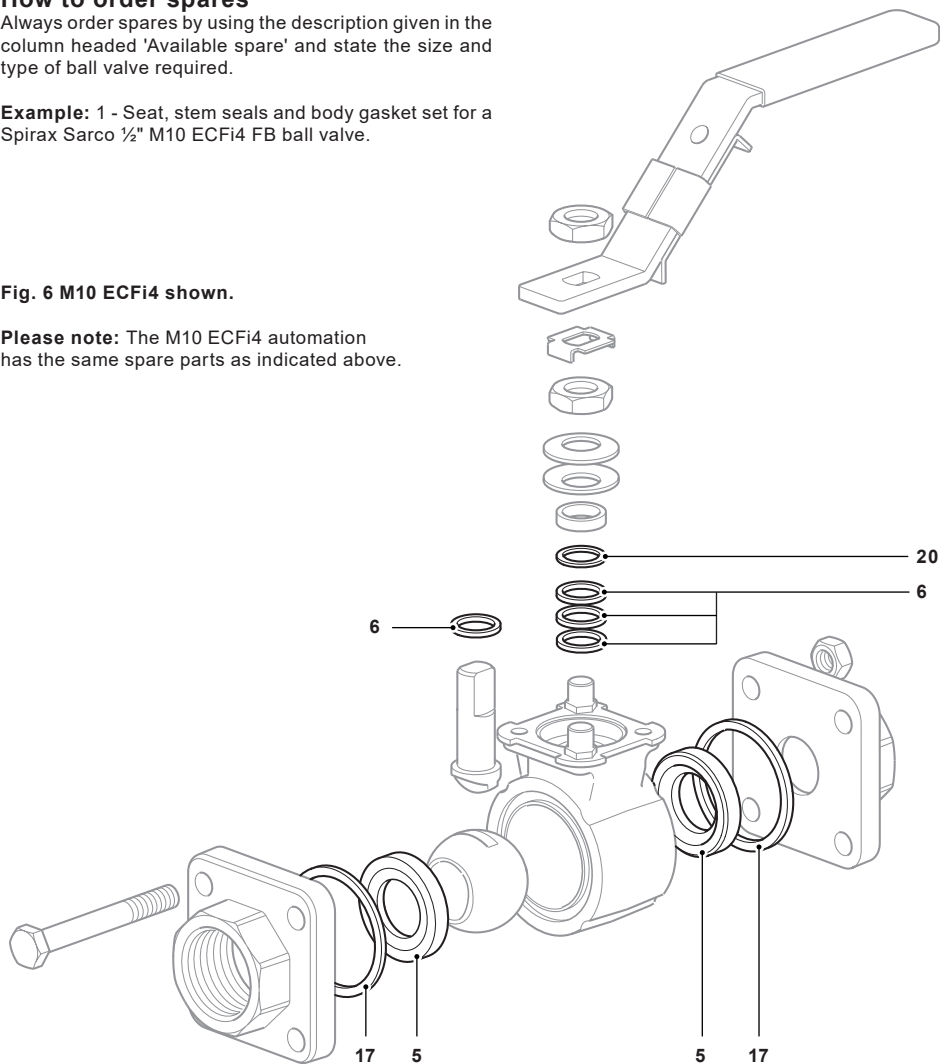
How to order spares

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" M10 ECFi4 FB ball valve.

Fig. 6 M10 ECFi4 shown.

Please note: The M10 ECFi4 automation has the same spare parts as indicated above.



M10 ECFi4 Food+ Ball Valve Screwed, SW, BW and Flanged versions

