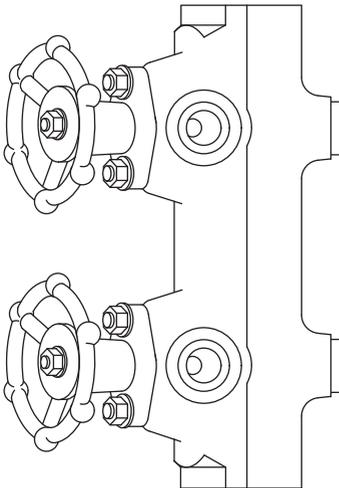

**MSC-P and MSC-N Manifolds
for Steam Distribution and Condensate Collection
Installation and Maintenance Instructions**



MSC04-P shown

- 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.

Warning

The graphite stem sealing rings contain thin stainless steel support rings which may cause physical injury if not handled and disposed of carefully.

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 European Pressure Equipment Directive 97/23/EC and carry the CE mark when so required. The products fall within the following pressure Equipment Directive categories:

Products	Group 2 Gases	Group 2 Liquids
Manifolds MSC04-P, MSC08-P, MSC12-P	1	SEP

Note: MSC04-N, MSC08-N and MSC12-N do NOT comply with the requirements of the European Pressure Equipment Directive 97/23/EC.

- i) The product has been specifically designed for use on steam, air or water/condensate. The products' 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.
- 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 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 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.

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 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 '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 range of forged carbon steel compact manifolds with integral piston type stop valves for steam distribution and condensate collection duty.

MSC-P and MSC-N manifolds can be used for either steam distribution duty or condensate collection duty depending on the way they are installed.

Available types, sizes and connections

MSC-P or N manifolds are available with 4, 8 or 12 connections designated: **MSC04-P** or **N**, **MSC08-P** or **N** and **MSC12-P** or **N** respectively. As standard they are available with the following connections:

Socket weld to ANSI B 16.11 Class 3000.

Screwed BSP or NPT.

The steam main/condensate return connection is 1½" SW.

The tracer line and drain connections are available as ½", ¾" flanged, screwed BSP, NPT and SW to ANSI B 16.11.

Please note: Other connections are available upon request.

Optional extras

The following are available at extra cost:

- Mounting kit comprising of studs, spacers and nuts.
- Insulating jacket for body and flanges.

Standards

The MSC-P fully complies with the requirements of the European Pressure Equipment Directive 97/23/EC.

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.

Note: For further product data see the following Technical Information sheet TI-P117-35.

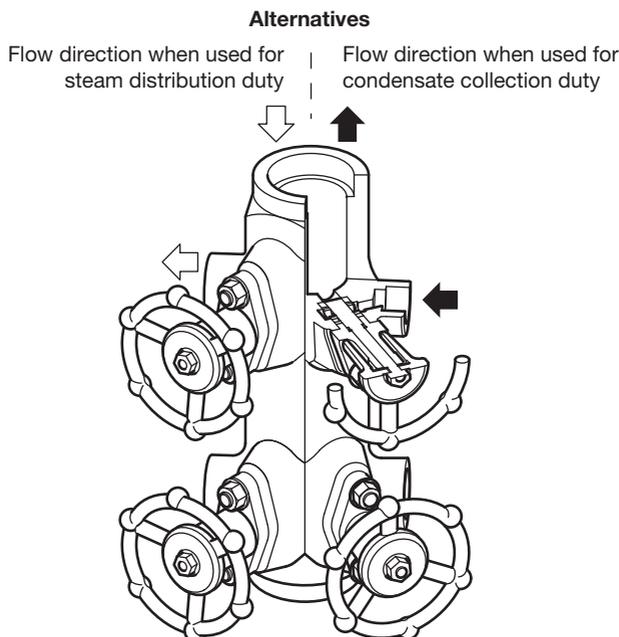
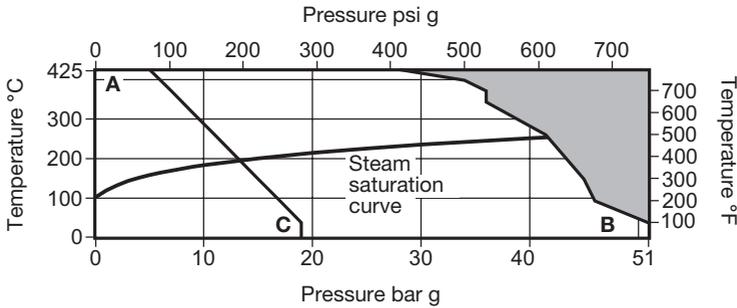


Fig. 1 Type MSC04-P socket weld version shown

2.2 Pressure/temperature limits



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

A - B Flanged ANSI Class 300, screwed and socket weld.

A - C Flanged ANSI Class 150.

Body design conditions		ANSI Class 300 (PN50)		
PMA	Maximum allowable pressure	51 bar g @ 38°C	(740 psi g @ 100°F)	
TMA	Maximum allowable temperature	425°C @ 28 bar g	(797°F @ 406 psi g)	
Minimum allowable temperature		-29°C	(-20°F)	
PMO	Maximum operating pressure for saturated steam service	ANSI 150	14 bar g	(203 psi g)
		ANSI 300, SW, BSP, NPT	41.5 bar	(602 psi g)
TMO	Maximum operating temperature	ANSI 150	425°C @ 5.5 bar g	(797°F @ 80 psi g)
		ANSI 300, SW, BSP, NPT	425°C @ 28 bar g	(797°F @ 406 psi g)
Minimum operating temperature		0°C	(32°F)	
Note: For lower operating temperatures consult Spirax Sarco.				
Designed for a maximum cold hydraulic test pressure of:		76 bar g	(1102 psi g)	

2.3 K_V values

All sizes K_V 1.8

For conversion: C_V (UK) = $K_V \times 0.963$ C_V (US) = $K_V \times 1.156$

The K_V stated is for each valve rather than the complete manifold.

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 a safety device is included in the system to prevent overpressurisation.
- 3.2** Determine the correct installation situation and the direction of fluid flow.
- 3.3** Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.
- 3.4 General information** - The manifold has been designed for vertical installation. Ensure that there is sufficient access to the handwheel to allow proper operation. The back is provided with M12 threaded connections for attaching to a supporting structure. For ease of insulation it is recommended that spacers are fitted to give the manifold a stand-off of at least 50 mm.

For convenience the following sets of mounting kit are available:

- A single set comprising 2 off each stud, nut and spacer suitable for installing one MSC04-P or N and MSC08-P or N.
- A single set comprising 4 off each stud, nut and spacer suitable for installing one MSC12-P or N.
- A multiple set comprising 12 off each stud, nut and spacer suitable for installing 6 x MSC04-P or N, 6 x MSC08-P or N and 3 x MSC12-P or N.

After installation it is recommended that the manifold is insulated to minimise radiated heat losses and to protect personnel from burn risks. This is most easily done using the optional insulating jacket.

Note: If the trap draining the manifold is to discharge to atmosphere ensure it is to a safe place, the discharging fluid may be at a temperature of 100°C (212°F).

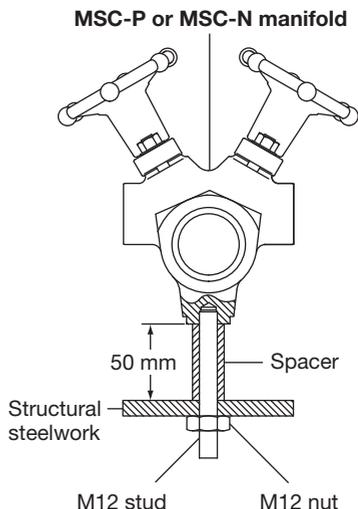


Fig. 2 Installation view

- 3.5 Steam distribution duty** - The recommended installation is with the steam inlet connection at the top of the manifold. A trap set should be fitted to the bottom. The discharge from this trap set should ideally be returned. If it is to be discharged to atmosphere we recommend that a diffuser is fitted.
- 3.6 Condensate collection duty** - The recommended installation is with the condensate outlet at the top. The bottom of the manifold should be fitted with a stop valve for blowdown purposes. Again, we recommend that a diffuser is fitted.
- 3.7 Pipeline welding** - When installing any welding should be carried out to an approved procedure of a recognised standard.

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 integral piston valves should be either fully open or fully closed. They are not intended for throttling duties. The rising handwheel of the integral piston valves provides an indication of the amount of valve opening.

During closing operation the piston ensures a permanent seal by means of the handwheel. Therefore during service never remove the handwheel from the piston. Due to the large sealing area of the piston valve, it is not necessary to use a valve key to ensure leaktight shut-off.

During opening operation the piston is stopped when the valve is fully open as its top touches the inside of the bonnet.

Operation of the handwheel should always be by hand, it is not necessary to use a valve key.

6. Maintenance

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

Warning

The graphite stem sealing rings (items 2 and 3) contain thin stainless steel support rings which may cause physical injury if not handled and disposed of carefully.

6.1 Maintenance in service

After the manifold has been in service for 24 hours (when it has been first installed or after maintenance has been carried out) verify the bonnet nuts (10) are tightened to the correct torque with the valve in the closed position. Ensure the bonnet (8) is driven down straight during tightening and that care is taken with the handwheel operation. This operation is to be repeated should any trace of leakage develop. If perfect sealing cannot be achieved in this way, repack the valve following the procedure below.

A small diameter hole evident in the bonnet is primarily to prevent pressurisation within the bonnet, but is useful for observing leaks past the upper sealing ring and for lubrication of the piston (5) when the valve is closed.

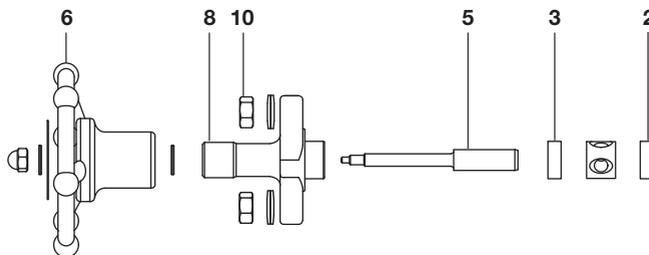
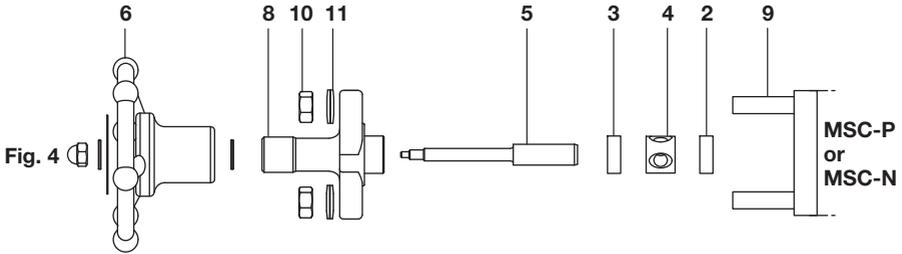


Fig. 3 View showing valve internals

6.2 Preparation of valve dismantling

Before starting work ensure that you have suitable tools and/or consumables available. Before attempting to carry out any maintenance, ensure that the manifold is fully isolated and safely depressurised. Do not assume the system is depressurised even when the pressure gauge indicates zero. If maintenance is being actioned whilst the pipework is hot, wear appropriate protective clothing. Carefully remove insulation if fitted. When using the optional insulation jacket, this is easily removed by undoing the fastenings.



6.3 Dismantling the valve:

- Using the handwheel (6), fully open the valve.
- Remove the nuts (10) and washers (11) from the studs (9).
- Carefully turn the handwheel in the closing direction to lift the bonnet (8).
- Rotate the bonnet (8) to ensure that the flange bolt holes are misaligned with the studs (9).
- Turn the handwheel in the opening direction to release the piston (5) from the sealing rings (2 and 3) and so release the piston/bonnet sub-assembly from the body.
- Examine the piston (5) for signs of scoring, corrosion etc., which could affect perfect tightness of the valve.
- Check other parts for wear/damage and replace if necessary.

6.4 Repacking the valve:

- With the valve dismantled, insert the valve internals extractor tool (Figure 5) through the sealing rings (2 and 3) and the lantern bush (4).
- Firmly tap to ensure that the tool bottoms out in the bore and with a quarter turn of the handle carefully remove the two sealing rings (2 and 3) and the lantern bush (4).
- Thoroughly clean the sealing ring housing and all the internals.
- Fit new lower sealing ring (2), lantern bush (4) and new upper sealing ring (3), ensuring they fit perfectly. (Note: The lower and upper rings are the same). Use the Insertor tool (Figure 6) for fitting sealing rings.
- Apply a thin layer of graphite based grease to threads only (not to internals and piston).

6.5 Reassembling the valve:

- Take the piston/bonnet sub-assembly and turn the handwheel (6) in the opening direction up to the stop.
- Insert piston (5) into the upper sealing ring and push it down until it is possible to fit washers (11) and screw nuts (10) onto the studs (9) and then hand tighten.
- Shut the valve fully, ensuring that the bonnet (8) is driven down straight, gradually tighten the nuts (10) to the recommended torque (see Table 1).
- Replace any insulation.

Table 1 Recommended tightening torques

Item	 10 A/F	or mm	 M6	N m	(lbf ft)
7	10 A/F		M6	0.1	(0.07)
10	14 A/F		M8	9 - 10	(6.6 - 7.4)

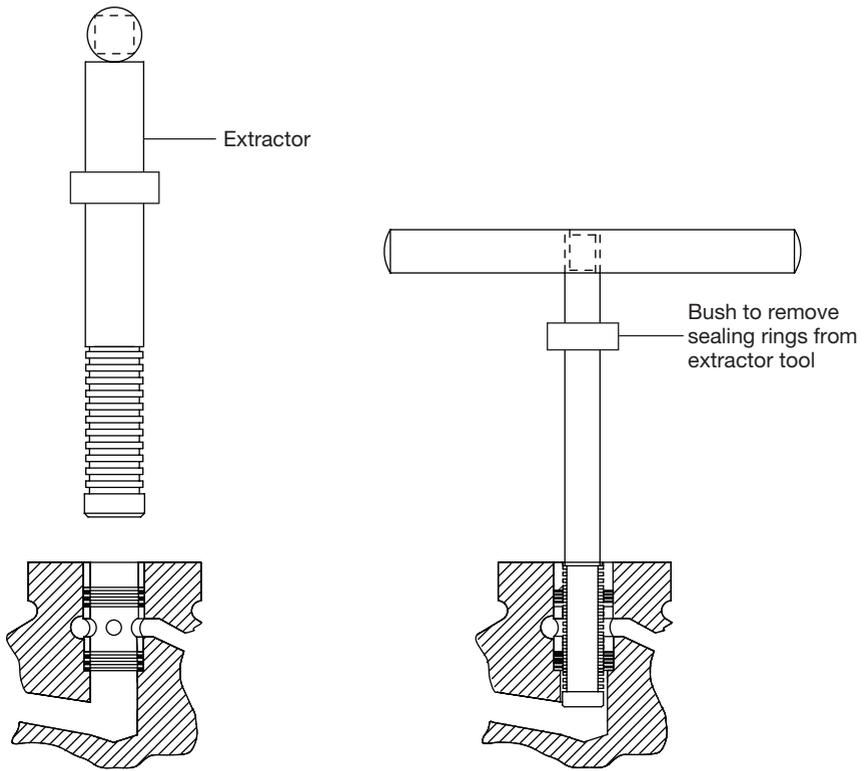


Fig. 5 View showing valve extractor tool

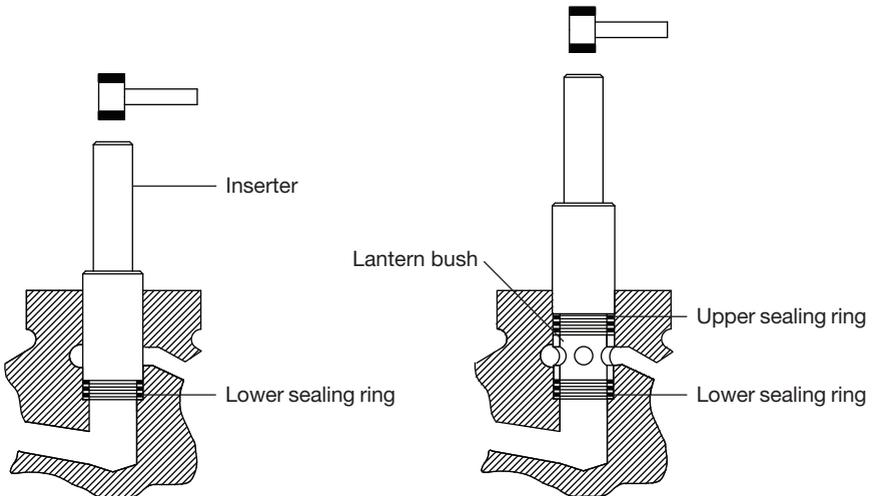


Fig. 6 View showing valve inserter tool

7. Spare parts

The spare parts available are detailed below. For ease of replacement an extractor tool and inserter tool are available for removing and replacing the sealing rings respectively.

Available spares

Sealing ring set (set of 10 rings)	2, 3
	Sealing ring set (set of 2 rings) 2, 3
	Lantern bush 4
Valve internals set, consisting of:	Piston 5
	Handwheel nut 7
	Washer (2 off) 12
Extractor tool & Inserter tool	See Figures 5 and 6, page 11
Mounting kit	See Section 3.4, page 8

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the type and size of manifold.

Example: 1 off Sealing ring set for an integral piston valves on a carbon steel manifold MSC04-P ½" socket weld.

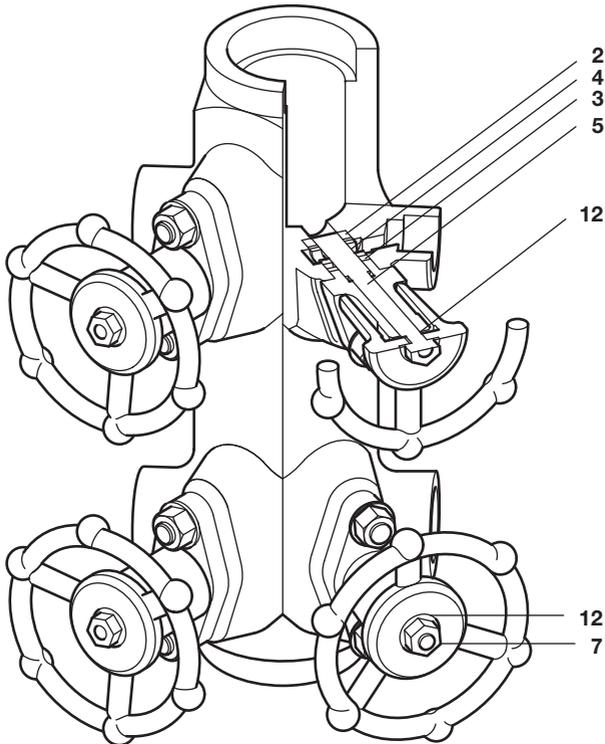


Fig. 7 Type MSC04-P socket weld connections shown