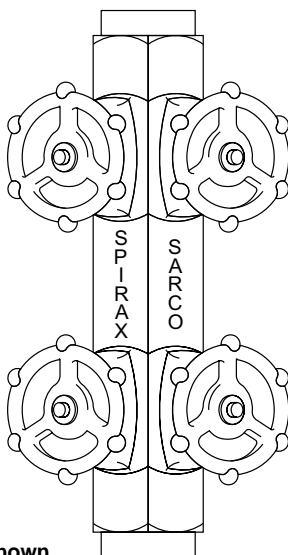


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**MSC Manifolds - ASTM**  
**for Steam Distribution and Condensate Collection**  
**Installation and Maintenance Instructions**

---

**MSC04 shown**

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

# **1. General safety information**

Safe operation of the unit can only be guaranteed if it is properly installed, commissioned and maintained by a qualified person (see Section 11 of the attached Supplementary Safety Information) 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.

## **Isolation**

Consider whether closing isolating valves will put any other part of the system or personnel at risk. Dangers might include; isolation of vents and protective devices or alarms. Ensure isolation valves are turned off in a gradual way to avoid system shocks.

## **Pressure**

Before attempting any maintenance consider what is or may have been in the pipeline. Ensure that any pressure is isolated and safely vented to atmospheric pressure before attempting to maintain the product, this is easily achieved by fitting Spirax Sarco depressurisation valves type DV (see separate literature for details). Do not assume that the system is depressurised even when a pressure gauge indicates zero.

## **Temperature**

Allow time for temperature to normalise after isolation to avoid the danger of burns and consider whether protective clothing (including safety glasses) is required.

## **Disposal**

The product is recyclable. No ecological hazard is anticipated with the disposal of this product providing due care is taken.

## — 2. General product information —

### 2.1 General description

A range of forged carbon steel compact manifolds with integral piston type stop valves for steam distribution and condensate collection duty. MSC manifolds can be used for either steam distribution duty or condensate collection duty depending on the way they are installed. They are supplied with EN 10204 3.1.B certification as standard for the body and yoke.

**Note:** For additional information see the following Technical Information Sheets: TI-P117-02 and TI-P117-23.

### 2.2 Available types, sizes and pipe connections

MSC manifolds are available with 4, 8 or 12 connections designated **MSC04**, **MSC08** and **MSC12** respectively and flanged BS 1560 (ANSI) class 150 or 300 or socket weld to ANSI B 16.11 Class 3000 or screwed BSP or NPT.

The steam main/condensate return connection is **DN40**.

The tracer line and drain connections are available as **DN15**, **DN20** flanged, screwed BSP, NPT and SW to ANSI B 16.11. The **DN25** is available with flanged connections **only**.

### 2.3 Optional extras

The following are available at extra cost:

- Mounting kit comprising of studs, spacers and nuts.
- Insulation jackets for body and flanges.

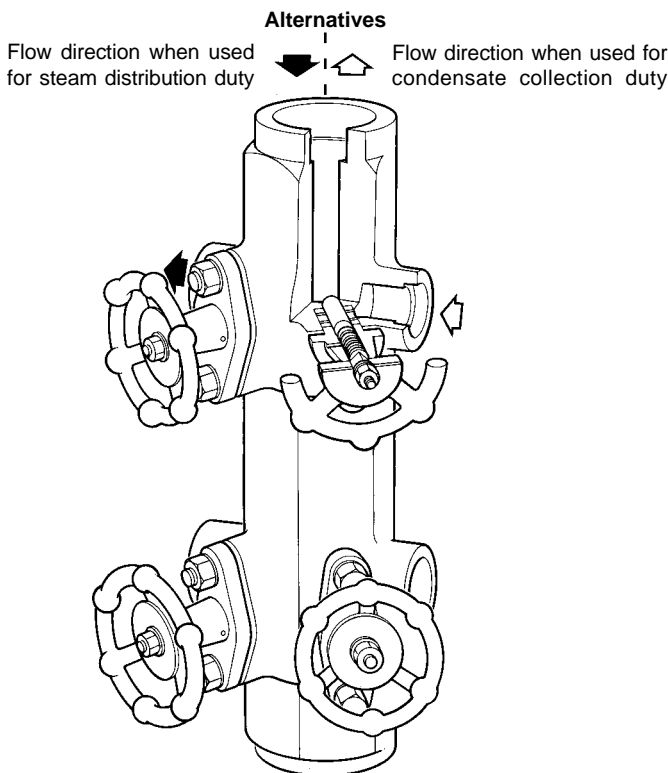
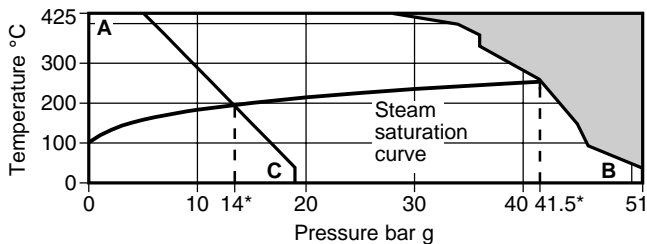



Fig. 1 Type MSC04 socket weld version shown

## 2.4 Limiting conditions

|                                  |                |          |               |
|----------------------------------|----------------|----------|---------------|
| Body design conditions           | ANSI Class 300 | ISO PN50 |               |
| Design for a maximum             | ANSI Class 150 | 30 bar g | (435 psi g)   |
| cold hydraulic test pressure of: | ANSI Class 300 | 76 bar g | (1 102 psi g) |

## 2.5 Operating range



 The product must not be used in this region.

\* PMO Maximum operating pressure for steam service.

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

**A - C** Flanged ANSI Class 150.

# 3. Installation

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

Referring to the Installation and Maintenance Instruction, 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 that 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 protective covers from all connections.

**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).

## 3.4 General information

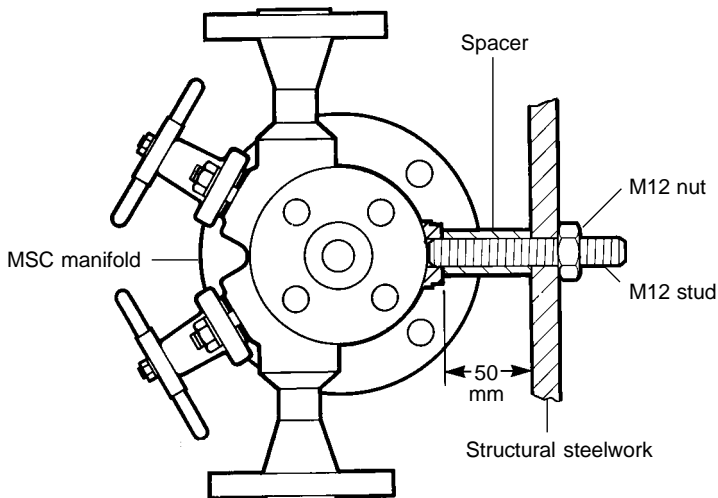
The manifold has been designed for vertical installation. Ensure that there is sufficient access to the handwheel to allow proper operation. The back is provided with threaded connections M12 for attaching to a supporting structure.

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

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.



**Fig. 2** Installation view from underneath

### 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

A universal weld procedure covering the requirements of different National and International Standards and practices is difficult to provide - specifically regarding the welding procedure, welding conditions (run number, consumable size, current, voltage, polarity), storage of consumables and make/type of consumables due to the abundance of appropriate consumable suppliers. Therefore, this is only advice based on British Standards to be used for guidance on the essential requirements of welding socket weld manifolds into the pipeline. This will allow a user to select an appropriate weld procedure from those available to that user. **This advice is not intended to be a substitute for a weld procedure: it is for guidance only.**

#### The welding of manifold DN15, DN20 and DN40 socket weld to 15 mm, 20 mm and 40 mm Schedule 80 pipe

#### Parent material(s)

##### Description

Carbon steel with minimum tensile strength up to and including 430 N/mm<sup>2</sup>

##### Specification(s)

ASTM A105N (MSC)

ASTM A106 Gr. B (Pipe)

##### Material group(s)

A1

#### Parent material(s) dimensions

|                | DN15  |       | DN20  |       | DN40 |      |
|----------------|-------|-------|-------|-------|------|------|
|                | MSC   | Pipe  | MSC   | Pipe  | MSC  | Pipe |
| Thickness (mm) | 8.25  | 3.73  | 5.50  | 3.91  | 7.0  | 5.0  |
| O/D (mm)       | 35.50 | 21.30 | 35.50 | 26.70 | 65.0 | 48.3 |

Pipe is to be BS 1600 Schedule 80

#### Joint type ANSI B 16.11

Socket joint to Class 3000 lb (this is equivalent to BS 3799)

#### Welding process

Manual Metal Arc (MMA)

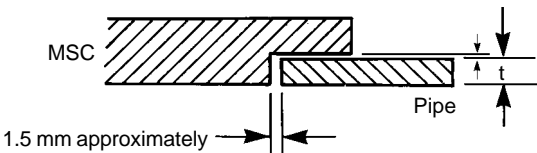
#### Welding position(s)

All: Site welded

#### Weld preparation

##### Dimensioned sketch

Diametrical clearance 1.0 mm maximum



Reference - BS 2633: 1987: Section 3.1 and Fig. 9

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## 4. Commissioning

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

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## 5. Operation

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The integral piston valves should be either fully open or fully closed. They are not intended for throttling duties. The rising stem 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 spindle. 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 light.**

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## 6. Maintenance

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

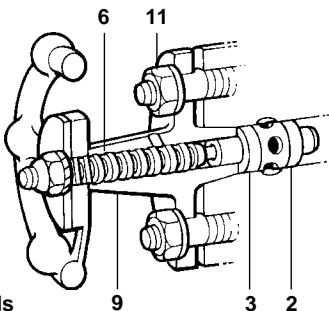
### Warning

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 is first put into service or after a change of sealing rings (2 and 3), the yoke nuts (11) should be lightly followed up with the valve in the closed position. Ensure the yoke (9) 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 valve yoke is primarily to prevent pressurisation within the yoke, but is useful for observing leaks past the upper sealing ring and for lubrication of the spindle (6) 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 performing maintenance 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 (7), fully open the valve.
- Remove the yoke nuts (11) and washers (12) from studs (10).
- Carefully turn the handwheel in the closing direction to lift the yoke (9).
- Rotate the yoke (9) to ensure that the flange bolt holes are misaligned with the studs (10).
- Turn the handwheel in the opening direction to release the piston (5) from the sealing rings (2 and 3) and so release piston/yoke sub-assembly from the body.
- The piston (5) is attached to the spindle (6) using a ball and socket joint as supplied, therefore they should never be separated.
- 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 through the sealing rings (2 and 3) and 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).
- Apply a thin layer of graphite based grease to threads only (not to internals and piston).

## 6.5 Reassembling the valve:

- Take the piston/yoke sub-assembly and turn the handwheel (7) 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 (12) and screw yoke nuts (11) onto the studs (10) and then hand tighten.
- Shut the valve fully, ensuring that the yoke (9) is driven down straight, gradually tighten the yoke nuts (11) to the recommended torque (see Table 1).
- Replace any insulation.

**Table 1 Recommended tightening torques**

| Item |  or<br>mm |  | N m  | (lbf ft) |
|------|--|---|------|----------|
| 8    | 8 A/F  | M5  | 0.1  | (0.07)   |
| 11   | 14 A/F   |   | 10.0 | (7.50)   |



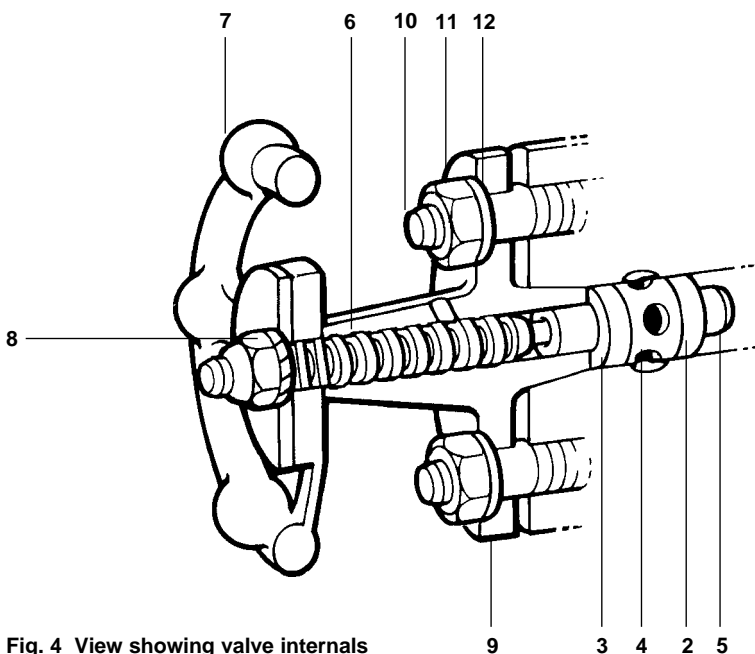


Fig. 4 View showing valve internals

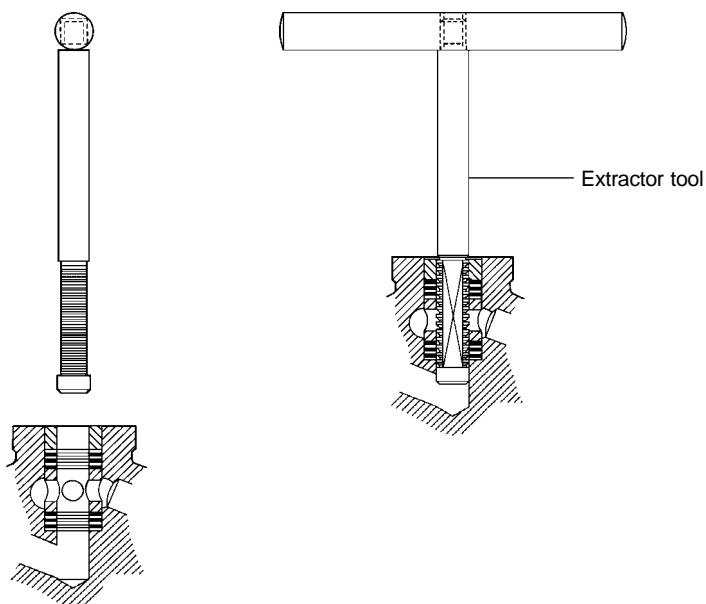


Fig. 5 View showing valve internals extractor tool

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## 7. Spare parts

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

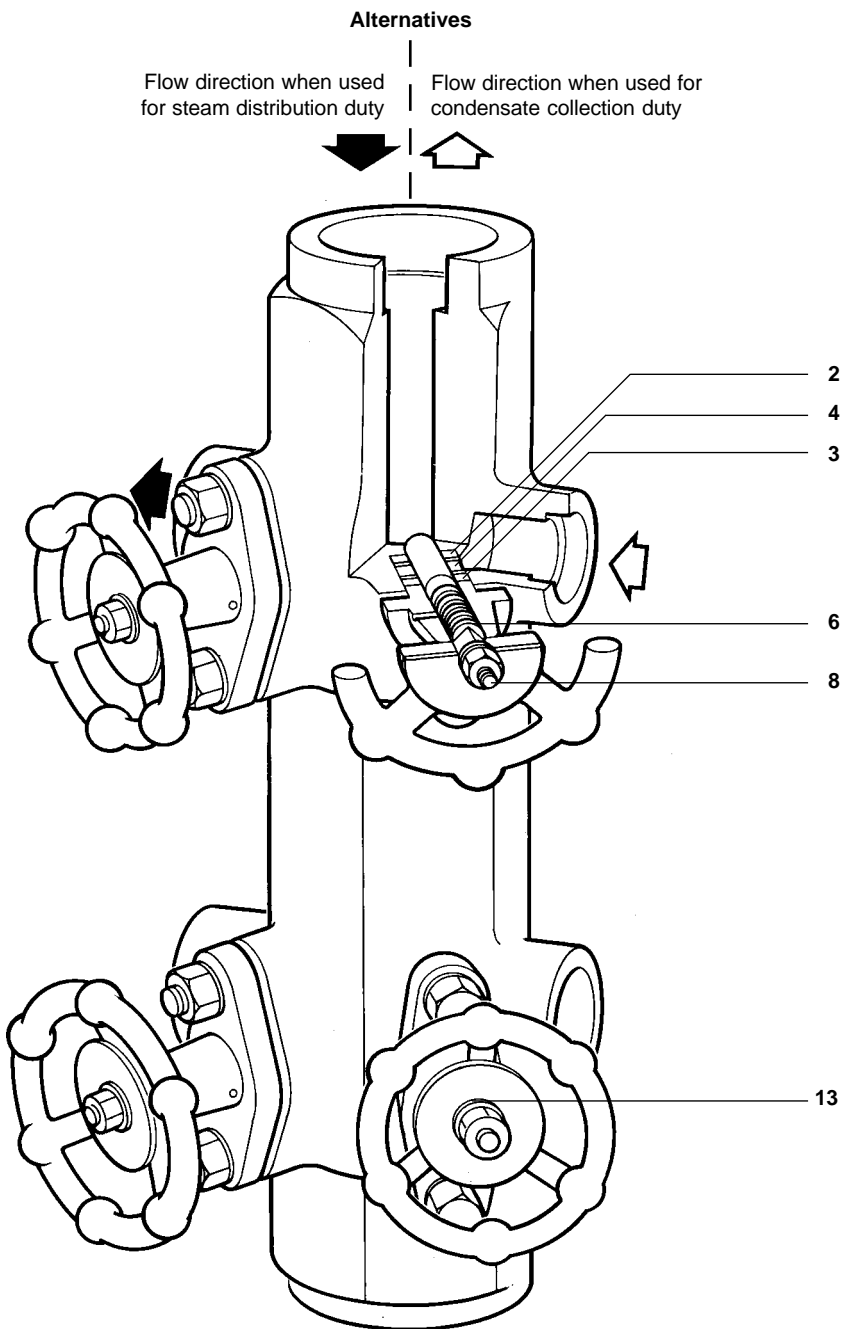
### Available spares

|                                     |                                |
|-------------------------------------|--------------------------------|
| Sealing ring set                    | <b>2, 3</b>                    |
| Sealing ring set                    | <b>2, 3</b>                    |
| Lantern bush                        | <b>4</b>                       |
| Valve internals set, consisting of: | <b>5, 6</b>                    |
| Piston with spindle                 | <b>8</b>                       |
| Handwheel nut                       | <b>13</b>                      |
| Washer                              | <b>13</b>                      |
| Extractor tool                      | <b>see Fig. 5, page 9</b>      |
| Mounting kit                        | <b>see Section 3.4, page 5</b> |

### 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 manifold.

**Example:** 1 - Sealing ring set for an integral piston valve on a carbon steel manifold MSC04 DN15 socket weld.



**Fig. 6 Type MSC04 with socket weld connections shown**

