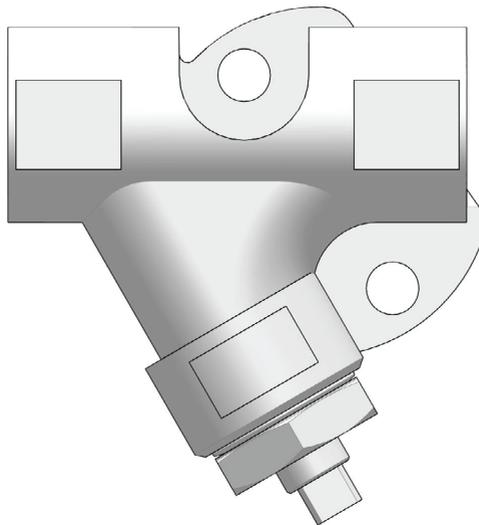


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**PC20, IPC20 and IPC21**  
**Pipeline Connectors**  
Installation and Maintenance Instructions

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**PC20**

# Contents

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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 1.12) 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, product markings and Technical Information Sheet, check that the product is suitable for the intended use/application. These products comply with the requirements of the European Pressure Equipment Directive (PED) and all fall within category 'SEP'.

It should be noted that products within this category are required by the Directive not to carry the  mark.

- i) These products have been specifically designed for use on steam, air or condensate/water, which is in Group 2 of the above mentioned Pressure Equipment Directive. 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 minimise 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 opened and closed progressively to avoid system shocks.

## 1.7 Pressure systems

Before attempting any maintenance of pipeline connectors, ensure that any pressure is isolated and safely vented to atmospheric pressure before attempting any maintenance programme. This is easily achieved by use of the Spirax Sarco depressurisation valves fitted to the assembly (see Section 1.7.1 below and Section 5). Do not assume that the system is depressurised even when a pressure gauge indicates zero.

### 1.7.1 Blowdown and depressurisation valves

Blowdown and depressurisation valves are generally used to depressurise a system/vessel prior to maintenance or removal. Do not assume that the system has depressurised even if a pressure gauge indicates zero. Consider the direction of the depressurised flow and ensure that this will not cause a hazard to yourself or others.

## 1.8 Temperature

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

## 1.9 Isolation

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

## 1.10 Tools and consumables

Before operating valves ensure that you have the correct tools available. Please see reference table for relevant tooling and the correct torque settings prior to attempting and maintenance.

## 1.11 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.

## **1.12 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.

## **1.13 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.

## **1.14 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').

## **1.15 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.

## **1.16 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.

## **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. Description

## 2.1 General

The PC and IPC pipeline connectors are designed for use with swivel connector steam traps. The principle is that the pipeline connector can be fitted into the pipeline, either horizontally or vertically. The steam trap can be fitted afterwards to the connector and can be rotated through 360° to ensure that the trap is in the horizontal plane. The PC20, IPC20 and IPC21 have an integral strainer screen. For available trap types see separate literature.

### 2.1.1 Nomenclature

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**PC20** The PC20 is an austenitic stainless steel pipeline connector with an integral strainer.

**For use with all pipeline connector traps (see TI-P128-15).**

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**IPC20** The IPC20 is an austenitic stainless steel pipeline connector with an integral strainer IPC20 and sensor, for monitoring trap operation.

**For use with UTD and UBP traps only (see TI-P128-17).**

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**IPC21** The IPC21 is an austenitic stainless steel pipeline connector with an integral strainer and sensor, for monitoring trap operation.

**For use with UIB and UFT traps only (see TI-P128-17).**

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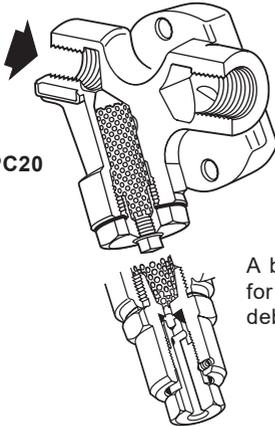


Fig. 1 PC20

**Note:** The integral sensor is supplied as standard with the IPC20 and IPC21 but can be retrofitted to existing PC20 connectors as long as a blowdown valve is not fitted.

A blowdown valve can be supplied as an optional extra for use on the PC20 for periodically removing pipeline debris. **Note:** Not available on IPC20 or IPC21.

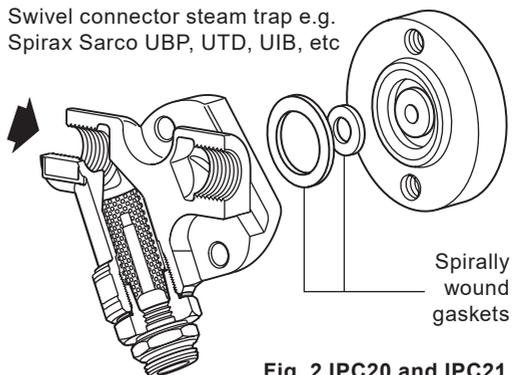
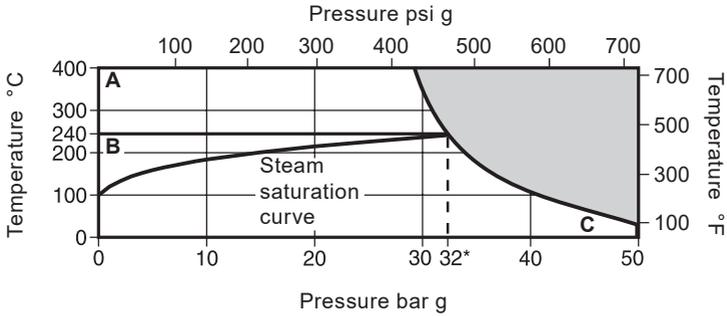


Fig. 2 IPC20 and IPC21

### 2.3 PC20, IPC20 and IPC21 - Pressure / temperature limits



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

**A - C** PC20

**B - C** IPC20 and IPC21

\* PMO Maximum operating pressure recommended for saturated steam service.

|                                                         |                               |                        |                 |
|---------------------------------------------------------|-------------------------------|------------------------|-----------------|
| Body design condition                                   |                               | ANSI Class 300 (PN50)  |                 |
| PMA                                                     | Maximum allowable pressure    | 50 bar g (722 psi g)   |                 |
| TMA                                                     | Maximum allowable temperature | <b>PC20</b>            | 400 °C (752 °F) |
|                                                         |                               | <b>IPC20 and IPC21</b> | 240 °C (464 °F) |
| PMO                                                     | Maximum operating pressure    | 32 bar g (464 psi g)   |                 |
| TMO                                                     | Maximum operating temperature | <b>PC20</b>            | 400 °C (752 °F) |
|                                                         |                               | <b>IPC20 and IPC21</b> | 240 °C (464 °F) |
| Designed for a maximum cold hydraulic test pressure of: |                               | 76 bar g (1098 psi g)  |                 |

# 3. Installation

## Note:

Please read 'Safety information', Section 1, before commissioning.

### 3.1 General

There are two criteria which must be satisfied to ensure that the swivel connector trap will operate correctly and ensure effective condensate removal:

- The PC and IPC should be installed with flow in the direction of the arrow.
- The PC20 can be fitted in a horizontal or vertical lines so long as the steam trap fitted is installed in the correct plane.
- The IPC20 and IPC21 must be fitted in a horizontal line with the sensor at the bottom.
- The connection face for the swivel connector steam trap must always be in the vertical plane.

After installation it is recommended that the pipeline connector is insulated to minimise radiated heat losses and to protect personnel from burns risk.

**Note:** some trap types should not be insulated.

The PC / IPC and trap are joined by a high integrity spirally wound gasketed joint. It is important that no damage is caused, e.g. by weld, weld splatter, knocks, etc. to the trap gasket face.

Hence care must be taken when installing the PC / IPC into the pipework. It is recommended that the trap is installed immediately the PC / IPC is in the pipework. Alternatively, the trap can be joined to the PC prior to installation.

### 3.2 Welding into pipeline of socket weld variants

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.

Welding advice based on British Standards can be provided, contact Spirax Sarco to discuss your welding requirements further. Welding can be carried out to ASME IX or BS EN standards as applicable.

# 4. Maintenance

## Note:

Please read 'Safety information', Section 1, before commissioning.

## 4.1 Introduction

All work must be carried out by a suitably competent person. Before starting work ensure that suitable tools are available. Use only Spirax Sarco replacement parts.

## 4.2 Maintenance

Maintenance can be completed with the connector in the pipeline, once the safety procedures have been observed. It is recommended that new gaskets and spares are used whenever maintenance is undertaken. Ensure that the correct tools and necessary protective equipment are used at all times. When maintenance is complete open isolation valves slowly and check for leaks.

### How to replace the strainer screen

Before starting make sure the pipeline connector is isolated from mains pressure (both steam and condensate) and any residual pressure is vented to atmosphere. Allow to cool before commencing work.

Remove the strainer cap (or blowdown valve) and separate it from the strainer screen. Once the screen has been cleared or replaced, place it in the recess of the cap with the cap gasket in place and insert into the body. Loosely tighten to ensure the screen and gasket locate correctly.

Tighten to the recommended tightening torque. Always use new gaskets.

### How to blowdown the strainer screen

Periodic blowdown will remove most debris within the strainer screen. Larger debris may require the whole screen to be removed as detailed above. Loosen the small retaining screw by half a turn. Open the valve screw slowly anticlockwise until condensate is discharged.

**Note:** Ensure that the discharge from the blowdown valve blows to a safe place. After a few seconds close the valve screw and tighten to the recommended tightening torque.

At no time must the small locking screw be removed. Always use the correct protective equipment and tools during this procedure.

### How to replace or clean the sensor

Before starting make sure the pipeline connector is isolated from mains pressure (both steam and condensate) and any residual pressure is vented to atmosphere. Allow to cool before commencing work.

If a waterlogging sensor is fitted, it will be necessary to disconnect the wiring at the terminal block.

Remove the sensor from the adaptor. This can be done in line so long as the adaptor is securely held in place. Clean the sensor insulation. If pitting of the insulation occurs, a new sensor should be fitted. Clean or replace the strainer screen (whichever action is appropriate for the condition of the screen). Replace the new sensor and screw into the adaptor, ensuring the gasket and strainer screen are centralised. Tighten to the recommended tightening torque.

Reconnect the waterlogging sensor as described in IM-P087-34.

# 5. Available spares

The spare parts available are detailed below. No other parts are supplied as spares.

## Available spares

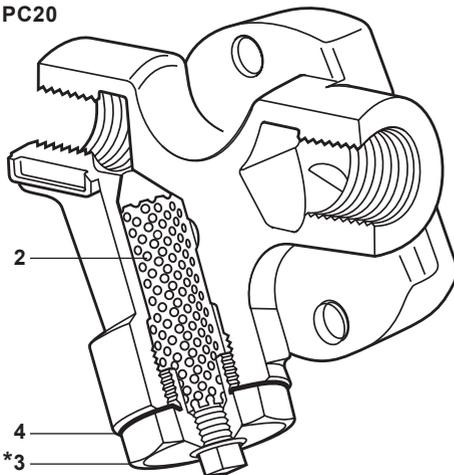
|                            |                                    |      |
|----------------------------|------------------------------------|------|
| Blowdown valve and gasket  |                                    | 4, 5 |
| Strainer screen and gasket |                                    | 2, 4 |
| SS1 for use with IPC20     |                                    | 8, 9 |
|                            | SSL1 for use with IPC21            | 8, 9 |
| Integral sensor and gasket | WLS1 with diode for use with IPC20 | 8, 9 |
|                            | WLS1 with diode for use with IPC21 | 8, 9 |

## How to order spares

Always order spares using the description given in the column headed 'Available spares' and state model number.

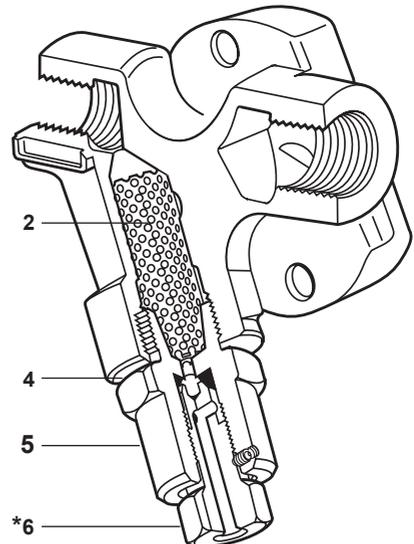
**Example:** 1 - strainer screen and gasket for 1/2" PC20 connector.

PC20



A blowdown valve, item 4, can be supplied as an optional extra for use on the PC20 for periodically removing pipeline debris.

PC20 with blowdown valve



## Recommended tightening torques

| Item |  | or mm |  | N m       | (lbf ft)    |
|------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------|-------------|
| 3    | 32 A/F                                                                            |       | M28 x 1.5P                                                                        | 170 - 190 | (125 - 140) |
| 5    | 32 A/F                                                                            |       | M28 x 1.5P                                                                        | 170 - 190 | (125 - 140) |
| 6    | 19 A/F                                                                            |       |                                                                                   | 45 - 50   | (33 - 36)   |
| 8    | 24 A/F                                                                            |       |                                                                                   | 50 - 55   | (36 - 40)   |

\* **Note:** Items 3 and 6 are not available spares.

### IPC20 and IPC21

