

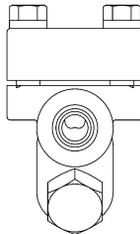
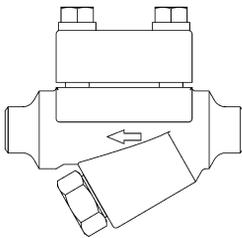


## DT101F and DT102F Thermodynamic Steam Trap Installation and Maintenance Instructions

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The PED Directive 97/23/EC is repealed and replaced by the new  
**PED Directive 2014/68/EU** with effect from 19 July 2016.



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



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# ATTENZIONE

## Lavorare in sicurezza con apparecchiature in ghisa e vapore

### **Working safely with cast iron products on steam**

Informazioni di sicurezza supplementari - *Additional Informations for safety*

#### **Lavorare in sicurezza con prodotti in ghisa per linee vapore**

I prodotti di ghisa sono comunemente presenti in molti sistemi a vapore.

Se installati correttamente, in accordo alle migliori pratiche ingegneristiche, sono dispositivi totalmente sicuri.

Tuttavia la ghisa, a causa delle sue proprietà meccaniche, è meno malleabile di altri materiali come la ghisa sferoidale o l'acciaio al carbonio.

Di seguito sono indicate le migliori pratiche ingegneristiche necessarie per evitare i colpi d'ariete e garantire condizioni di lavoro sicure sui sistemi a vapore.

#### **Movimentazione in sicurezza**

La ghisa è un materiale fragile: in caso di caduta accidentale il prodotto in ghisa non è più utilizzabile. Per informazioni più dettagliate consultare il manuale d'istruzioni del prodotto.

Rimuovere la targhetta prima di effettuare la messa in servizio.

#### **Working safely with cast iron products on steam**

*Cast iron products are commonly found on steam and condensate systems.*

*If installed correctly using good steam engineering practices, it is perfectly safe.*

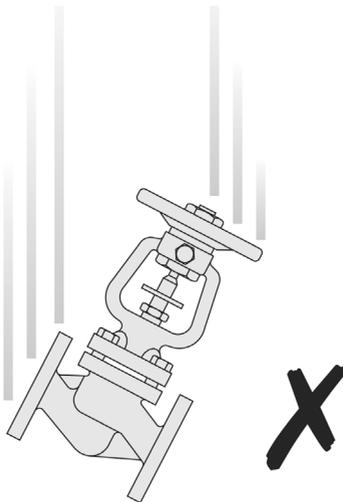
*However, because of its mechanical properties, it is less forgiving compared to other materials such as SG iron or carbon steel.*

*The following are the good engineering practices required to prevent waterhammer and ensure safe working conditions on a steam system.*

#### **Safe Handling**

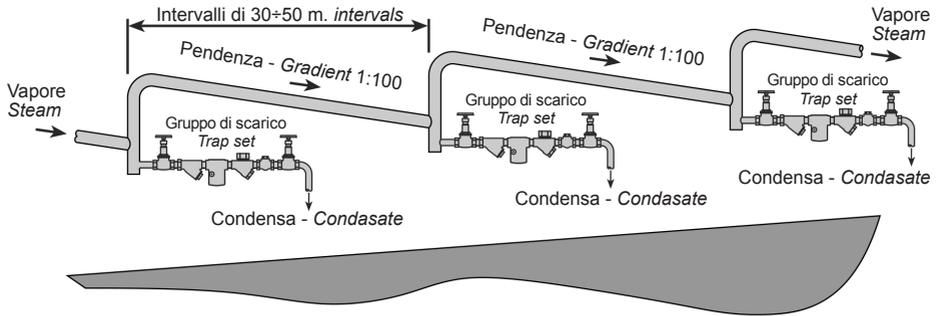
*Cast Iron is a brittle material. If the product is dropped during installation and there is any risk of damage the product should not be used unless it is fully inspected and pressure tested by the manufacturer.*

*Please remove label before commissioning*

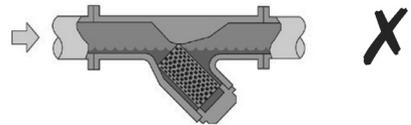
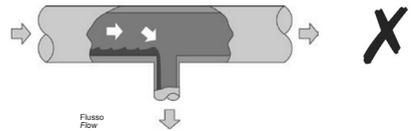
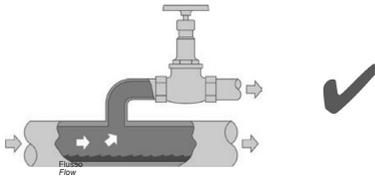
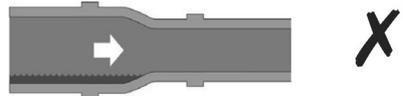
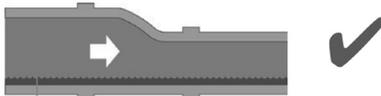
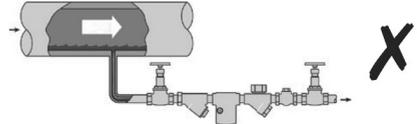
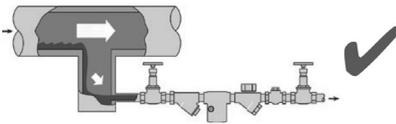


# Prevenzione dai colpi d'ariete - *Prevention of water hammer*

Scarico condensa nelle linee vapore - *Steam trapping on steam mains:*



## Esempi di esecuzioni corrette (✓) ed errate (✗) sulle linee vapore: *Steam Mains - Do's and Don't's:*



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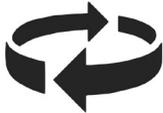
## Prevenzione delle sollecitazioni di trazione

### *Prevention of tensile stressing*

Evitare il disallineamento delle tubazioni - *Pipe misalignment:*

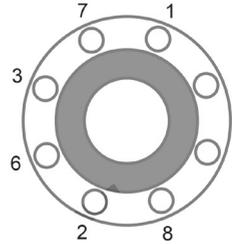
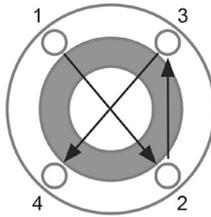
**Installazione dei prodotti o loro rimontaggio post-manutenzione:**

***Installing products or re-assembling after maintenance:***



Evitare l'eccessivo serraggio.  
Utilizzare le coppie di serraggio  
raccomandate.

*Do not over tighten.  
Use correct torque figures.*



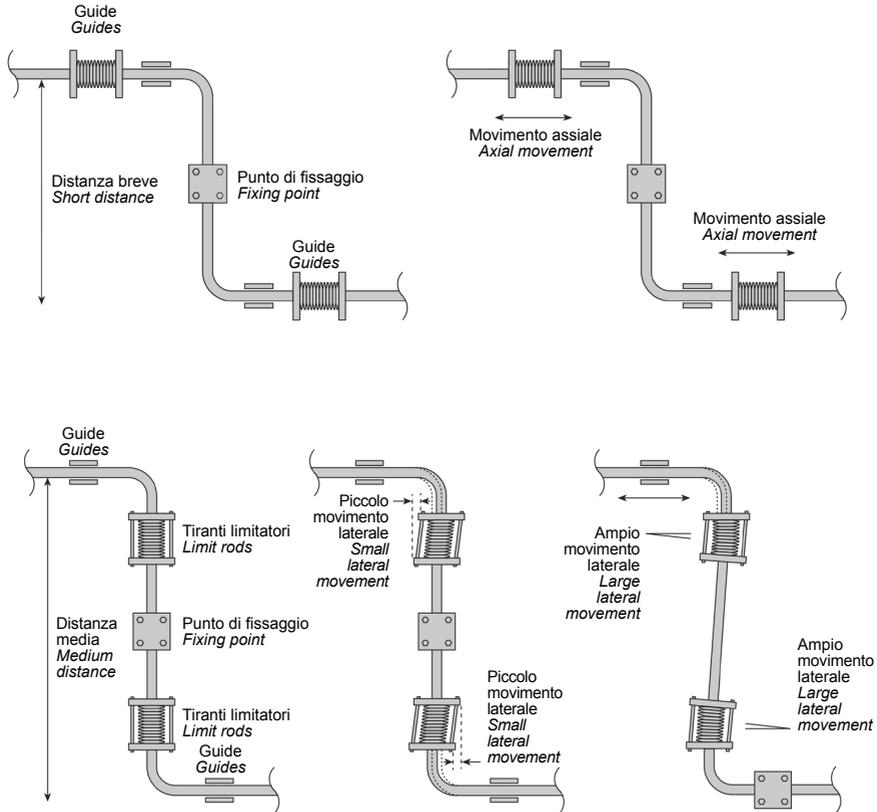
Per garantire l'uniformità del carico e dell'allineamento,  
i bulloni delle flange devono essere serrati in modo  
graduale e in sequenza, come indicato in figura.

*Flange bolts should be gradually tightened across  
diameters to ensure even load and alignment.*

## Dilatazioni termiche - *Thermal expansion:*

Gli esempi mostrano l'uso corretto dei compensatori di dilatazione. Si consiglia di richiedere una consulenza specialistica ai tecnici dell'azienda che produce i compensatori di dilatazione.

*Examples showing the use of expansion bellows. It is highly recommended that expert advise is sought from the bellows manufacturer.*



# 1. General safety information

Installation and Maintenance Instructions Safe operation of these products can only be guaranteed if they are properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11 on this document) 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, name-plate 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 97/23/EC and carry the CE mark when so required. It should be noted that product rated as 'SEP' are required by the Directive not to carry the CE mark. The products fall within the following Pressure Equipment Directive categories:

Product	Gruppo 1 Gases	Gruppo 2 Gases	Gruppo 1 Liquids	Gruppo 2 Liquids
DT 101 F DT 102 F	-	*SEP	-	*SEP

\* Products within this category are required by the Directive not to carry the CE 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 before installation.

## 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.

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## 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 of some products may reach temperatures over 500°C. 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 Safety information - Product specific

See the specific details relating to product in the following 'Maintenance' section.

## 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. General product information

### 2.1. General description

Series DT101F and DT102F thermodynamic steam traps are manufactured with carbon steel or alloy steel body and cover; internal components are made from stainless steel. They are equipped with an internal maintainable strainer and are suitable for use with high pressure and high temperature steam.

DT101F and DT102F traps can operate on plants with back pressure up to 50% of the inlet pressure.

#### Standards

These steam traps comply with the requirements of the European Pressure Equipment Directive 97/23/EC and carry the **CE** mark when so required.

#### Certification

The product is available with material certification to EN 10204 2.2 or EN 10204 3.1.

**Note:** Certification and any tests must be specified at the time of order.

#### Available types

**DT101F** with carbon steel body and cover

**DT102F** with alloy steel body and cover

Each type is available in three different executions with differentiated internal mechanism (type A, B, C) and sized in accordance to the discharge capacity requirements.

### 2.2. Pipe connections and sizes

#### Connection types

- Socket weld ends   ANSI B16.11 SW,                   (standard)
- Butt weld ends     ANSI B16.25 BW,                   (standard)
- Screwed            ANSI B1.20.1 NPT (API), (standard)
- Flanged             UNI - DIN PN 100, 160,           (on request)
- Flanged             ANSI B 16.5 class 600, 900, 1500 RF, (on request)

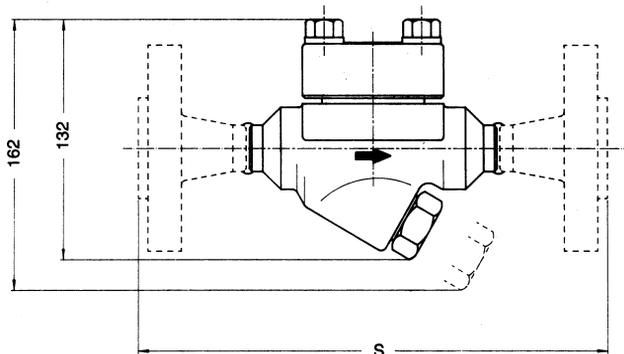
#### Nominal sizes

DN ½", ¾", 1"

DN 15, 20, 25

#### Dimensions / weights (approximate) in mm and kg

DN	½"		¾"		1"	
	S	Kg	S	Kg	S	Kg
Scrd/BW/SW	140	5.0	140	5.0	140	5.0
Flg PN 100/160	235	7.0	250	9.0	260	10.0
Flg ANSI 300	250	7.0	260	7.8	268	8.6
Flg ANSI 600	260	7.8	270	8.6	280	9.6
Flg ANSI 900/1500	277	9.4	296	11.4	303	13.2



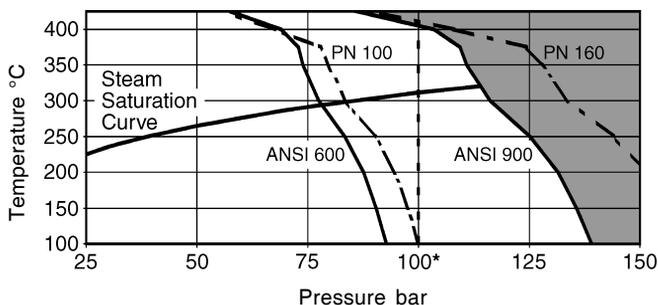
## 2.3 Limiting conditions (ISO 6552)

Body design conditions			ANSI 900
PMA - Maximum allowable pressure		@ 20°C	155 bar g
TMA - Maximum allowable temperature	DT101F	@ 105 bar g	425°C
	DT102F	@ 48 bar g	560°C
Minimum allowable temperature			-10°C
PMO - Maximum operating suggested pressure			100 bar g*
TMO - Maximum operating temperature	DT101F		425°C
	DT102F		510°C
Maximum operating back pressure as percentage of upstream pressure			50%
Minimum differential pressure for satisfactory performance			8 bar g
Design for a maximum cold hydraulic test pressure of			232 bar g

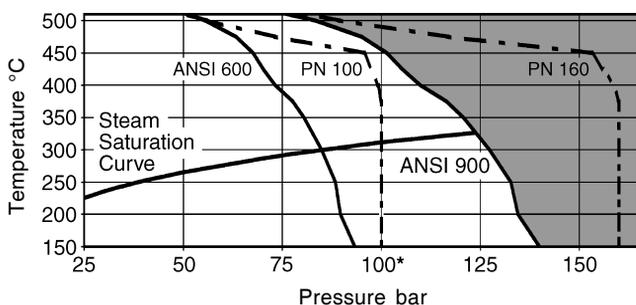
These values can be limited by the rating of the flanges installed

### Pressure - temperature range

#### Type DT101F



#### Type DT102F



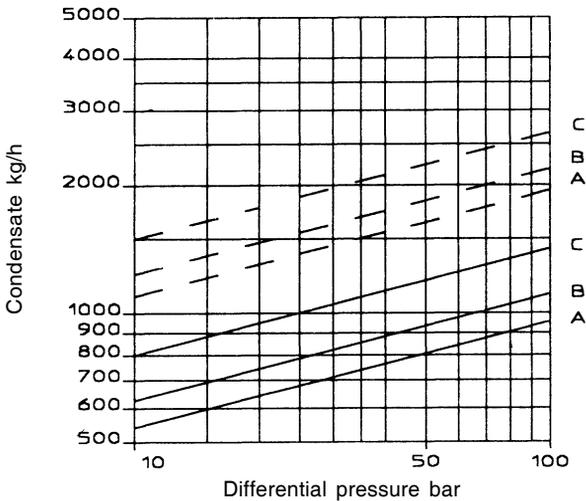
 The product must not be used in this region

## 2.4 Materials

Part		Material	Designation
Body	DT101F	Carbon steel	ASTM A 105
	DT102F	Alloy steel	ASTM A 182 F 22
Cover	DT101F	Carbon steel	ASTM A 105
	DT102F	Alloy steel	ASTM A 182 F 22
Body gasket		Stainless steel	AISI 304
Cover screws		Steel	ASTM A 193 B 16
Trim set		Stainless steel	AISI S 400
Strainer screen		Stainless steel	AISI 316
Strainer cap		Stainless steel	AISI 316

## 2.5 Capacities

The condensate discharge capacities can be deduced by the diagram below shown.



Hot water capacity —————

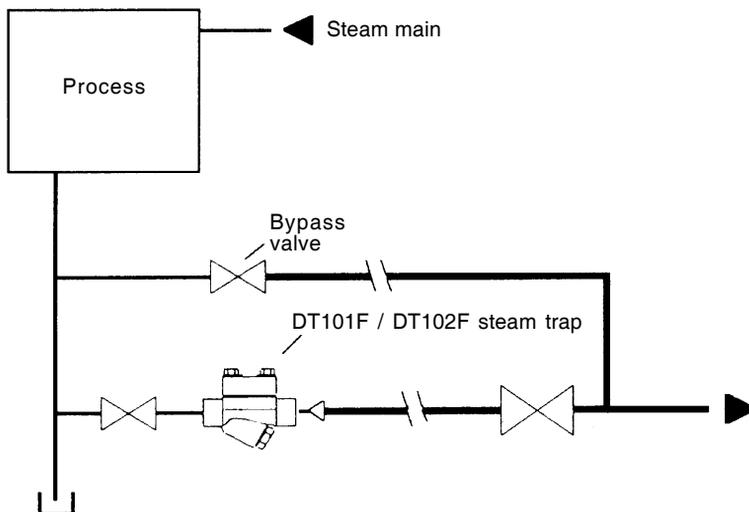
Cold water capacity - - - - -

### 3. Installation

**Note:** Before actioning any installation, observe the “General 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** The preferred installation is in a horizontal pipe as shown in the illustration, with the jutting part of the strainer beneath.
- 3.2** The inlet pipe should have a drop leg of at least 20 cm before the trap and continue vertically for a further 10 cm to create a small well to collect any impurities, better still with an exhaust valve fitted to manually blow-off the well.
- 3.3** The outlet pipe must be of appropriate diameter to support the considerable steam flashing that is caused with a very high differential pressure.
- 3.4** With a piped discharge to recovery system, the pipe should be sized with a maximum flash steam speed of 20 - 25 m/s.
- 3.5** Do not install the stop valve at less than 2-3 meters downstream from the trap.
- 3.6** If continuous operations are required or for easier maintenance work, a stop valve can be installed upstream, one downstream and another in bypass (see fig. 1).
- 3.7** When starting up, in order to ensure better exhaust of the air and uncondensed gas and to speed the warm up, open the bypass valve and then close it as soon as the bypass line reaches a temperature close to that of the saturated steam.
- 3.8** The welding of the steam trap to the pipes must conform to national and international standards. The user must ensure that the correct welding procedure is used.



**Fig. 1 - Process drain with discharge piped to recovery**

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## 4. Commissioning

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After installation or maintenance, check that the system works correctly and test all the alarms and protection devices.

After 24 hours from the start up it is advisable to check the cover screws tightening acting with a torque of 50 N m.

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## 5. Operation

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The thermodynamic steam trap discharges condensation with a blast at a very high temperature; if the trap is to discharge to atmosphere ensure it is piped to a protected and safe place.

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## 6. Maintenance

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**Note: Before actioning any maintenance program observe the “General safety information” in Section 1.**

### 6.1. General Information

Due to the specific set-up of the trap, no special maintenance is required.

The trap operates correctly when the condensation is discharged in blasts, with a time interval between discharges during which the trap must be perfectly sealed. Inspect and clean the strainer ensuring that it is not blocked by any deposits or scaling, and replace if needed.

### 6.2. Replacing internal parts

**Warning: before to undertaking any maintenance on the trap it must be isolated from both the supply line and return line and any pressure allowed to safely normalise to the atmosphere. The trap should then be allowed to cool.**

- 1 - Open the trap by unscrewing the four screws using a 19 mm spanner.
- 2 - Dismantle the trim set using the following spanners:

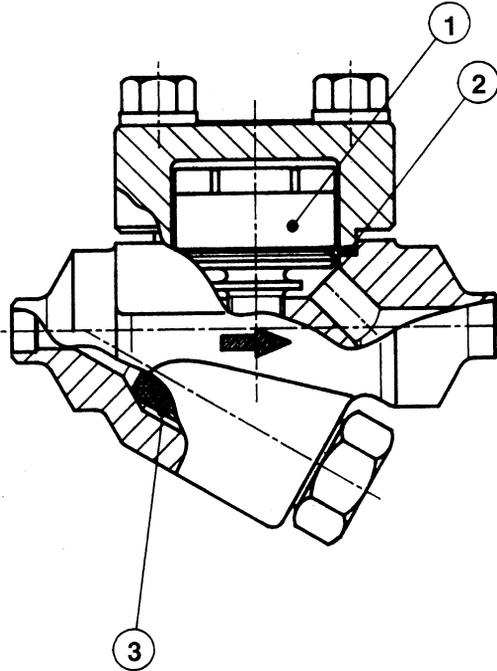
Trim set A	32 mm spanner
Trim set B	36 mm spanner
Trim set C	41 mm spanner
- 3 - After cleaning all joint faces, fit the new unit and tighten with a torque of about 140 N m.
- 4 - Clean the gasket faces and close the unit, replacing the gasket if it is damaged and tighten in a crossed sequence.
- 5 - To replace the strainer, unscrew the strainer cap using a 32 mm spanner, withdraw the screen and clean it or, if damaged, replace with a new one. For the reassembling there is no need of gasket; it is advisable to use a little anti-seize compound on the thread. Insert the screen in the cap slot and assemble tightening with a recommended torque of 200 N m.

## 7. Spare parts

The spare parts available are shown in the units given in the table. No other parts are available as spares.

### Available spares

Internal trim set	1 - 2
Body gaskets set (3 off)	2
Strainer screen (1 off)	3



### How to order spares

Always order spares by using the description given in the table stating the type and DN of the trap.

**Example:** Trim set for DT101F/B DN 1" steam trap.



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#### **REPAIRS**

Please contact our nearest Branch Office or Agent, or directly Spirax Sarco S.r.l.  
Via per Cinisello 18 - 20834 Nova Milanese (MB) - Tel. +39 0362 49 17.1 - Fax. +39 0362.49 17 307

#### **LOSS OF WARRANTY**

**Total or partial disregard of above instructions involves loss of any right to guarantee.**