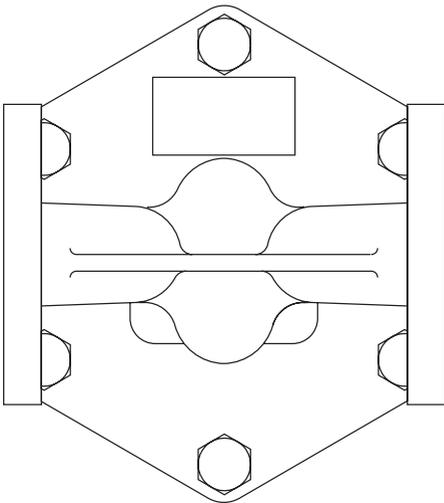


CA44, CA44S, CA46 and CA46S

Air and Gas Traps

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.

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/UK Pressure Equipment (Safety) Regulations and falls within Category 'SEP'.

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

Product	Size	PED category	CE marked
CA44 and CA46	DN15 - DN20	SEP	No
	DN25	2	Yes
CA44S and CA46S	DN15 - DN20	SEP	No
	DN25 - DN50	2	Yes

- i) This product has been specifically designed for use on steam, air or water/condensate which are 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 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.

Viton - CA44 and CA46 main valve cone:

If the the main valve cone (made of Viton) has been subjected to a temperature approaching 315 °C (599 °F) or higher it may have decomposed and formed hydrofluoric acid. Avoid skin contact and inhalation of any fumes as the acid will cause deep skin burns and damage the respiratory system.

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 in excess of 400 °C (752 °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, EXCEPT:

Viton - CA44 and CA46 main valve cone:

- Waste parts can be landfilled, when in compliance with National and Local regulations.
- Waste parts can be incinerated, but a scrubber must be used to remove Hydrogen Fluoride, which is evolved from the product and with compliance to National and Local regulations.
- Parts are insoluble in aquatic media.

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 General description

CA44	DN15 and DN20 Flanged The CA44 is a carbon steel ball float air and gas trap. It is available with a soft valve cone and has horizontal flanged connections. The cover will be drilled and tapped ½" BSP or NPT for the purpose of fitting a balance line. Body and cover castings are produced by a TÜV approved foundry.
CA44S	DN15, DN20, DN25, DN40, DN50 Flanged and 1" screwed / socket weld The CA44S is a carbon steel ball float air and gas trap. It is available with a metal valve cone and has horizontal flanged, screwed or socket weld connections. With exception to the DN40 and DN50, the cover will be drilled and tapped ½" BSP or NPT for the purpose of fitting a balance line (also available for the socket weld version). The cover on the DN40 and DN50 will be drilled and tapped ¾" BSP or NPT. Body and cover castings are produced by a TÜV approved foundry.
CA46	DN15 and DN20 Flanged The CA46 is an austenitic stainless steel ball float air and gas trap. It is available with a soft valve cone and has horizontal flanged connections. The cover will be drilled and tapped ½" BSP or NPT for the purpose of fitting a balance line. Body and cover castings are produced by a TÜV approved foundry.
CA46S	DN15, DN20, DN25, DN40 and DN50 Flanged The CA46S is an austenitic stainless steel ball float air and gas trap. It has a metal valve cone and is available with horizontal flanged connections. With exception to the DN40 and DN50, the cover will be drilled and tapped ½" BSP or NPT for the purpose of fitting a balance line. The cover on the DN40 and DN50 will be drilled and tapped ¾" BSP or NPT. Body and cover castings are produced by a TÜV approved foundry.

Operating media

The CA44 and CA46 are designed for use on air or gases within PED group 2.

Note: The CA44 and CA46 are not suitable for use on PED group 1 liquids or gases.

Note: For additional information see the following Technical Information Sheets:

Product	Sizes and connections	Material	Section	TI reference
CA44	DN15 - DN20 Flanged	Carbon steel	Section 2.2	TI-P148-02
	DN15 - DN25 Flanged	Carbon steel	Section 2.2	TI-P148-02
CA44S	DN40 - DN50 Flanged	Carbon steel	Section 2.2	TI-P148-03
	1" Screwed	Carbon steel	Section 2.2	TI-P148-23
CA46	DN15 - DN20 Flanged	Austenitic stainless steel	Section 2.3	TI-P148-04
	DN15 - DN25 Flanged	Austenitic stainless steel	Section 2.3	TI-P148-04
CA46S	DN40 - DN50 Flanged	Austenitic stainless steel	Section 2.3	TI-P148-07

CA44, CA44S, CA46 and CA46S Air and Gas Traps

2.2 CA44 and CA44S - Carbon steel

Fig. 1
CA44 and CA44S
DN15 and DN20
DIN flange

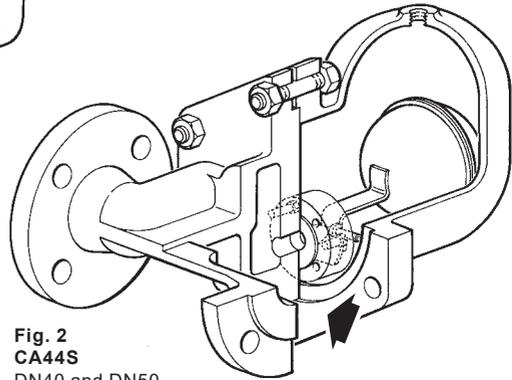
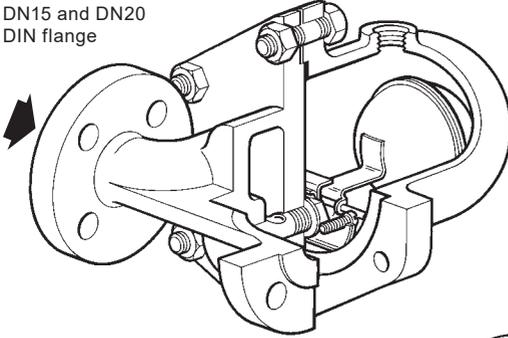


Fig. 2
CA44S
DN40 and DN50
DIN flange

2.2.1 Sizes and pipe connections

CA44

DN15 and DN20 flanged

CA44S

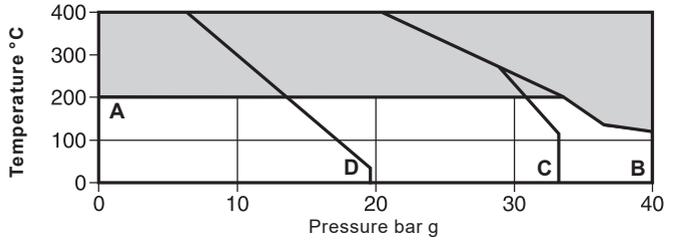
1" screwed BSP or NPT with BSP or NPT balance line.
1" socket weld BS 3799 class 3000 with NPT or socket weld balance line.
DN15, DN20, DN25, DN40 and DN50 flanged

Standard flanges are EN 1092 PN40 with DIN face-to-face dimensions and BS 1560 class ASME 150, ASME 300 and JIS/KS 20K with extended face-to-face dimensions.

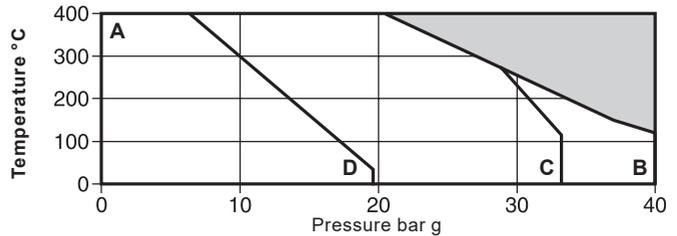
On request ASME 150 and ASME 300 flanges with drilled and tapped bolt holes with DIN face-to-face dimensions can be provided. PN and JIS/KS flanges will be provided with BSP balance line and ASME flanges with an NPT balance line.

2.2.2 Pressure / temperature limits

CA44



CA44S



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

- A - B** Flanged EN 1092 PN40, ASME 300, screwed and socket weld
- A - C** Flanged JIS/KS 20K
- A - D** Flanged ASME 150

Maximum body design conditions		PN40	
PMA	Maximum allowable pressure	40 bar g	(580 psi g)
TMA	Maximum allowable temperature	400 °C	(752 °F)
PMO	Maximum operating pressure	40 bar g	(580 psi g)
TMO	Maximum operating temperature	400 °C	(752 °F)
Δ PMX	Maximum differential pressure	32 bar g	(464 psi g)
		0 °C (32 °F)	
Minimum operating temperature	Screwed	60 bar g	(870 psi g)
	Socket weld	60 bar g	(870 psi g)
Designed for a maximum cold hydraulic test pressure of:	PN40	60 bar g	(870 psi g)
	ASME 300	60 bar g	(870 psi g)
	ASME 150	30 bar g	(435 psi g)
	JIS/KS 20K	60 bar g	(870 psi g)

CA44, CA44S, CA46 and CA46S Air and Gas Traps

Δ PMX - Maximum differential pressure

Depending on the specific gravity of the liquid being drained.

Trap	Specific gravity				
	1.0	0.9	0.8	0.7	0.6
	Maximum differential pressure bar (psi)				
CA44-32	32.0 (464.00)	32.0 (464.00)	29.0 (420.50)	20.0 (290.00)	12.0 (174.00)
CA44S-4.5	4.5 (65.25)	4.5 (65.25)	4.5 (65.25)	3.4 (49.30)	2.0 (29.00)
CA44S-10	10.0 (145.00)	9.5 (137.75)	6.8 (98.60)	5.5 (79.75)	3.4 (49.30)
CA44S-14	14.0 (203.00)	14.0 (203.00)	11.0 (159.50)	8.0 (116.00)	5.0 (72.50)
CA44S-21	21.0 (304.50)	19.0 (275.50)	15.0 (217.50)	10.0 (145.00)	6.5 (94.25)
CA44S-32	32.0 (464.00)	30.0 (435.00)	23.0 (333.50)	16.5 (239.25)	10.0 (145.00)

2.3 CA46 and CA46S - Austenitic stainless steel

Fig. 3
CA46 and CA46S
DN15 and DN20
DIN flange

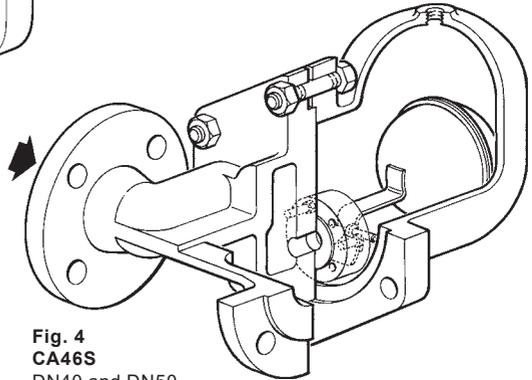
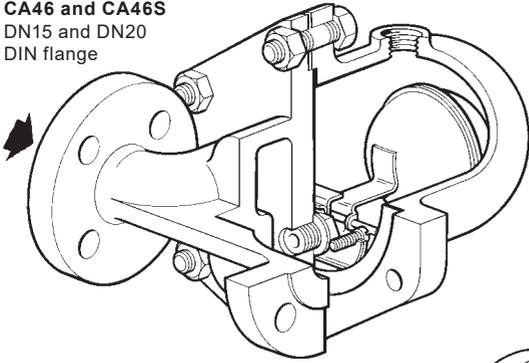


Fig. 4
CA46S
DN40 and DN50
DIN flange

2.3.1 Sizes and pipe connections

CA46

DN15 and DN20 flanged

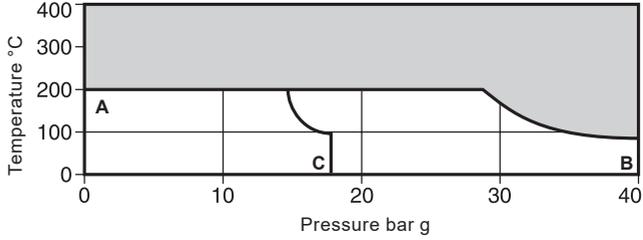
CA46S

DN15, DN20, DN25, DN40 and DN50 flanged

Standard flanges are EN 1092 PN40 with DIN face-to-face dimensions and BS 1560 class ASME 150 and ASME 300 and JIS/KS 20K with drilled and tapped bolt holes with DIN face-to-face dimensions. PN and JIS/KS flanges will be provided with BSP balance line and ASME flanges with an NPT balance line.

2.3.2 Pressure / temperature limits - CA46

CA46
DN15 and DN20 flanged



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

- A - B Flanged EN 1092 PN40 and ASME 300
- A - C Flanged ASME 150 (DN15, DN20 and DN25 only) and JIS/KS 20K
- A - D Flanged ASME 150 (DN40 and DN50 only)

Maximum body design conditions		PN40	
PMA	Maximum allowable pressure	40 bar g	(580 psi g)
TMA	Maximum allowable temperature	400 °C	(752 °F)
PMO	Maximum operating pressure	40 bar g	(580 psi g)
TMO	Maximum operating temperature	400 °C	(752 °F)
ΔPMX	Maximum differential pressure	32 bar g	(464 psi g)
Minimum operating temperature		0 °C	(32 °F)
Designed for a maximum cold hydraulic test pressure of:		PN40	60 bar g (870 psi g)
		ASME 300	60 bar g (870 psi g)
		ASME 150	30 bar g (435 psi g)
		JIS/KS 20K	49 bar g (710.5 psi g)

Δ PMX - Maximum differential pressure
Depending on the specific gravity of the liquid being drained.

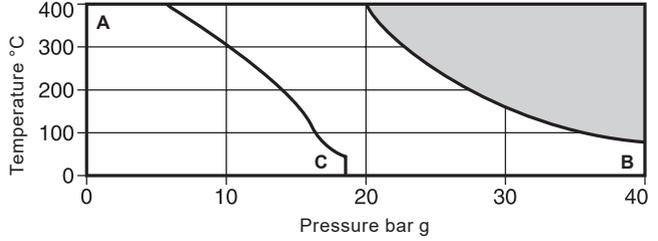
Trap	Specific gravity									
	1.0		0.9		0.8		0.7		0.6	
	Maximum differential pressure bar (psi)									
CA46-32	32.0	(464.00)	32.0	(464.00)	29.0	(420.50)	20.0	(290.00)	12.0	(174.00)
CA46S-4.5	4.5	(65.25)	4.5	(65.25)	4.5	(65.25)	3.4	(49.30)	2.0	(29.00)
CA46S-10	10.0	(145.00)	9.5	(137.75)	6.8	(98.60)	5.5	(79.75)	3.4	(49.30)
CA46S-14	14.0	(203.00)	14.0	(203.00)	11.0	(159.50)	8.0	(116.00)	5.0	(72.50)
CA46S-21	21.0	(304.50)	19.0	(275.50)	15.0	(217.50)	10.0	(145.00)	6.5	(94.25)
CA46S-32	32.0	(464.00)	30.0	(435.00)	23.0	(333.50)	16.5	(239.25)	10.0	(145.00)

CA44, CA44S, CA46 and CA46S Air and Gas Traps

2.3.3 Pressure / temperature limits - CA46S

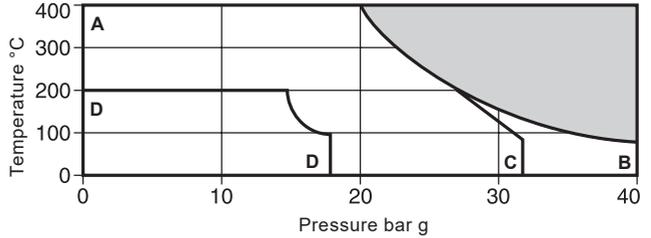
CA46S

DN15, DN20 and DN25 flanged



CA46S

DN40 and DN50 flanged



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

A - B Flanged EN 1092 PN40 and ASME 300

A - C Flanged ASME 150 (DN15, DN20 and DN25 only) and JIS/KS 20K

A - D Flanged ASME 150 (DN40 and DN50 only)

Maximum body design conditions		PN40	
PMA	Maximum allowable pressure	40 bar g	(580 psi g)
TMA	Maximum allowable temperature	400 °C	(752 °F)
PMO	Maximum operating pressure	40 bar g	(580 psi g)
TMO	Maximum operating temperature	400 °C	(752 °F)
ΔPMX	Maximum differential pressure	32 bar g	(464 psi g)
Minimum operating temperature		0 °C	(32 °F)
Designed for a maximum cold hydraulic test pressure of:		PN40	60 bar g (870 psi g)
		ASME 300	60 bar g (870 psi g)
		ASME 150	30 bar g (435 psi g)
		JIS/KS 20K	49 bar g (710.5 psi g)

Δ PMX - Maximum differential pressure

Depending on the specific gravity of the liquid being drained.

Trap	Specific gravity									
	1.0		0.9		0.8		0.7		0.6	
	Maximum differential pressure bar (psi)									
CA46S-4.5	4.5	(65.25)	4.5	(65.25)	4.5	(65.25)	3.4	(49.30)	2.0	(29.00)
CA46S-10	10.0	(145.00)	9.5	(137.75)	6.8	(98.60)	5.5	(79.75)	3.4	(49.30)
CA46S-14	14.0	(203.00)	14.0	(203.00)	11.0	(159.50)	8.0	(116.00)	5.0	(72.50)
CA46S-21	21.0	(304.50)	19.0	(275.50)	15.0	(217.50)	10.0	(145.00)	6.5	(94.25)
CA46S-32	32.0	(464.00)	30.0	(435.00)	23.0	(333.50)	16.5	(239.25)	10.0	(145.00)

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 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.
- 3.4** The trap should be fitted in the horizontal plane with the inlet at the top so that the float mechanism is free to rise and fall in a vertical plane.
The trap must be fitted below what it is draining. Point the arrow on the name-plate downwards. One of the advantages of the float trap for draining air systems is that no air bleed is required for satisfactory operation. However, because the trap has no air bleed it could under some circumstances become air or gas locked.
Make sure that the balance line is piped back to the upstream side.
A balance line is essential for the correct operation of this product.
For convenience of maintenance it is recommended that a union is fitted in the balance line near to the trap cover.

Note: If the trap 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).

4. Commissioning

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

5. Operation

The CA44(S) and CA46(S) float traps are continuous discharge traps, removing liquid from air and gas systems. As soon as liquid enters the main chamber of the trap, the float rises and the lever mechanism attached to it opens the main valve - keeping the system drained of liquid at all times. When air or gas arrives, the float drops and shuts the main valve tightly against the seat. The balance line is necessary to prevent the trap from becoming air locked. Float traps are renowned for their instantaneous load handling capability, clean tight shut-off and resistance to waterhammer and vibration.

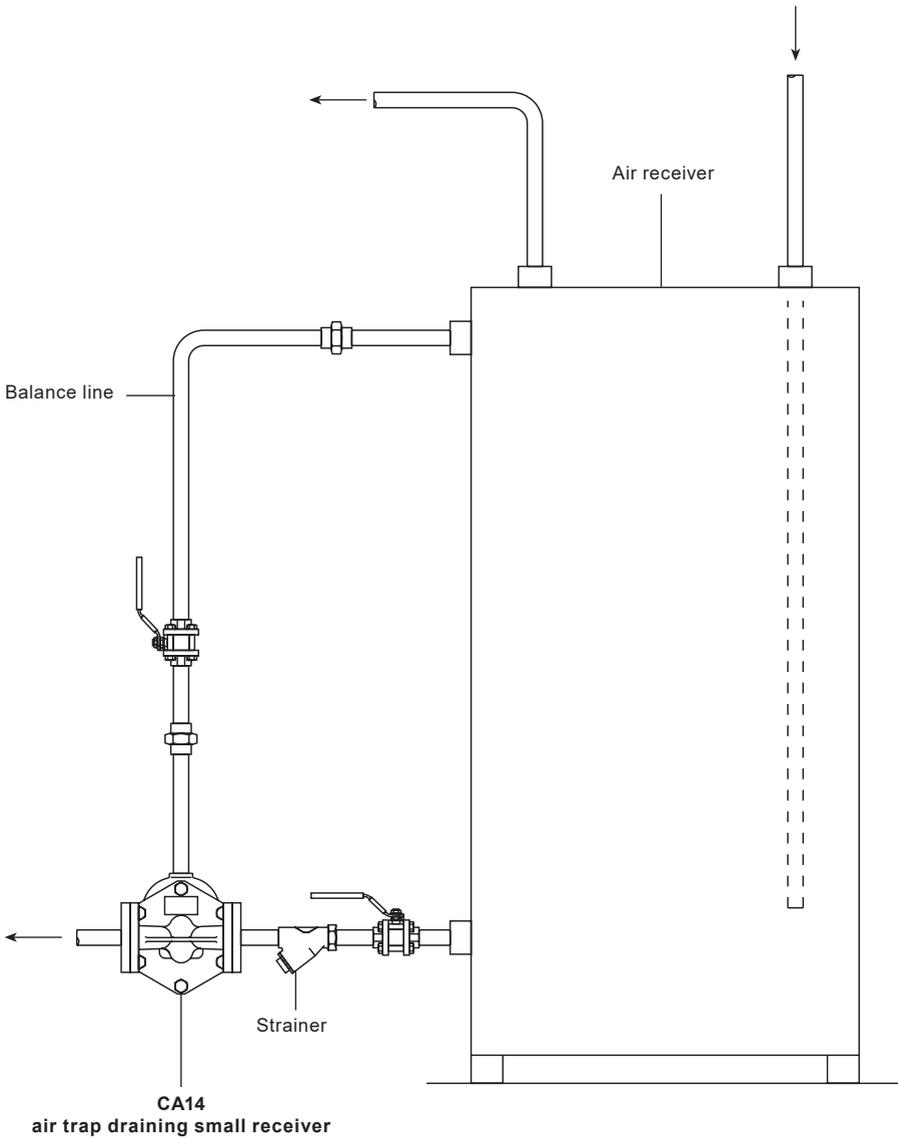


Fig. 5 Installation with balance line arrangement

6. Maintenance

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

Warning

The cover gasket and the main valve gasket (DN40 and DN50) contains a thin stainless steel support ring which may cause physical injury if not handled and disposed of carefully.

Servicing:

- With suitable isolation, repairs can be carried out with the trap in the pipeline.
- When reassembling, make sure that all joint faces are clean and the dowel locates in the cover.

How to fit the main valve assembly (CA44S and CA46S):

- Undo the cover bolts (2) and lift off the cover.
- Remove the float assembly (8 + 9 CA44 and CA46 only) by extracting the pivot pin (16).
- Remove the support (14), pivot frame (15) and the valve seat (5) by unscrewing the set screws (7).
- Ensure seat/gasket faces are clean and dry.
- Fit a new valve seat (5) into the body using a new gasket (6).
- Attach the support frame (14) and pivot frame (15) to body with assembly set screws (7) but do not tighten.
- Fit the float arm (8) to the pivot frame (15) using the pin (16) and by moving the complete assembly, centre the valve head (9) onto the seat orifice.
- Tighten the assembly set screws (7) to the recommended torque (see Table 1).
- Check the operation by raising and lowering the float (8) several times making sure that the valve head is centering properly on the seat (5).
- Make sure that all joint faces are clean and refit the cover, ensuring the dowel locates in the cover, by using a new gasket (3) and apply a thin coating of an anti-seize compound to the cover bolts (2).
- Tighten the cover bolts (2) uniformly to the recommended torques (see Table 1).
- Open up the isolating valve slowly until the full system pressure is achieved.
- Check for leaks.

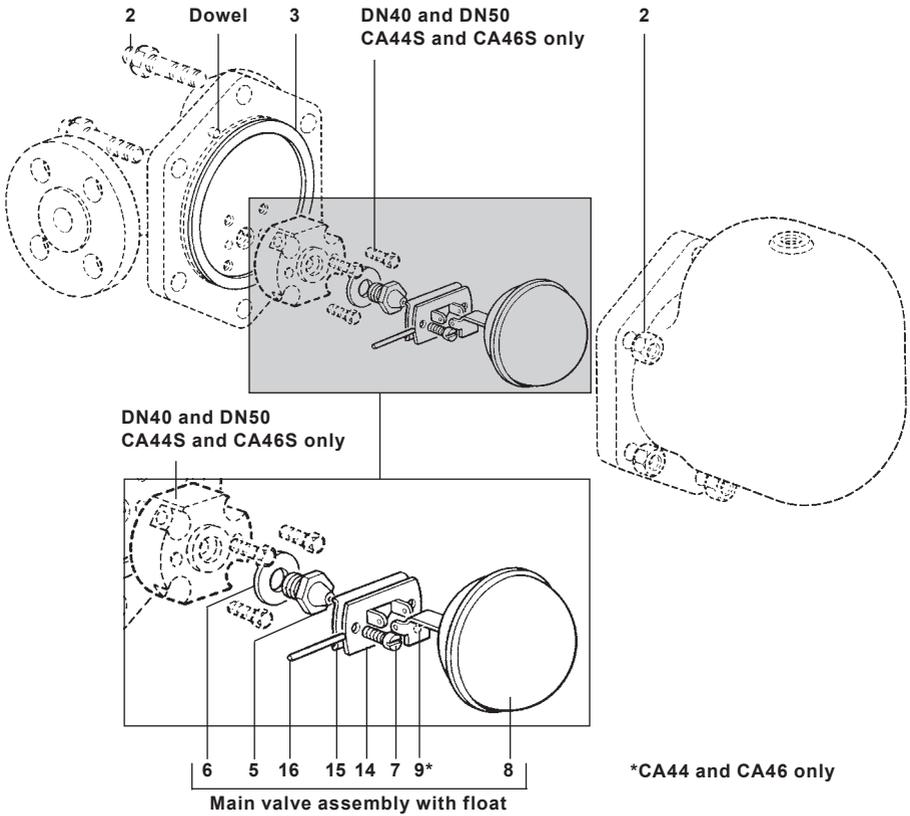


Fig. 6 CA44S and CA46S DN40 and DN50

Note: The trap shown is the DN40 and DN50 CA44S/CA46S. However the type of internals and the method of maintenance is no different from that used in the smaller sizes of CA44(S) and CA46 (S).

For Recommended tightening torques, see next page

How to fit valve cone (CA44 and CA46):

- Withdraw the pivot pin (6) to release the float and lever. Push out the soft valve cone (9) and replace with a new one.
- Reassemble the float and lever into the pivot frame (15) and replace the pin (16).
- Check the operation by raising and lowering the float (8) several times making sure that the valve head is centering properly on the seat (5).
- Make sure that all joint faces are clean and refit the cover, ensuring the dowel locates in the cover, by using a new gasket (3) and apply a thin coating of an anti-seize compound to the cover bolts (2).
- Tighten the cover bolts (2) uniformly to the recommended torques (see Table 1).
- Open up the isolating valve slowly until the full system pressure is achieved.
- Check for leaks.

Table 1 Recommended tightening torques

Item	Size	 or  mm		N m	(lbf ft)
2	DN15 to DN25	17 A/F	M10 x 60	19 - 22	(14 - 16)
	DN40	24 A/F	M16 x 85	60 - 66	(44 - 48)
	DN50 (CA44S and CA46S)	24 A/F	M16 x 85	80 - 88	(56 - 65)
5		17 A/F	M12 x 8	50 - 55	(37 - 40)
7		Cheesehead	M5 x 20	2.5 - 2.8	(1.8 - 2.1)
19	DN40	10 A/F	M6 x 20	10 - 12	(7 - 9)
	DN50	13 A/F	M8 x 20	20 - 24	(15 - 17)

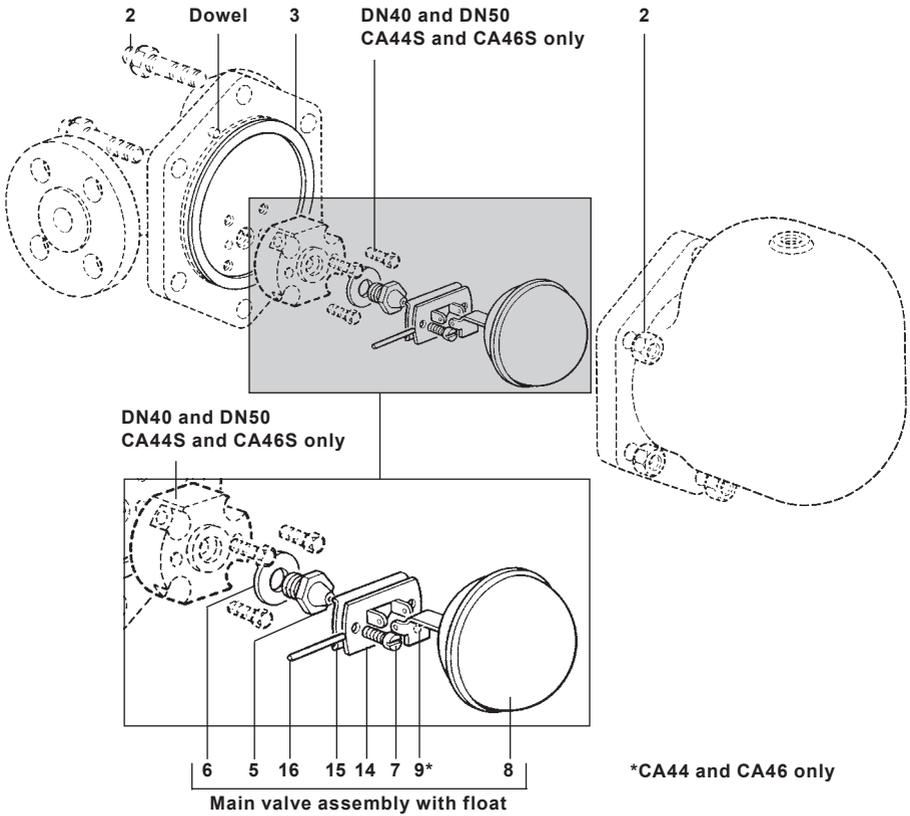


Fig. 7 CA44S and CA46S DN40 and DN50

Note: The trap shown is the DN40 and DN50 CA44S/CA46S. However the type of internals and the method of maintenance is no different from that used in the smaller sizes of CA44(S) and CA46 (S).

7. Spare parts

The spare parts available are shown in heavy outline. Parts drawn in broken line are not supplied as spares.

Available spares

Soft valve cone	CA44 and CA46	(packet of 3)	9
Main valve assembly with float*	CA44 and CA46		5, 6, 7, 8+9, 14, 15, 16
	CA44S and CA46S		5, 6, 7, 8, 14, 15, 16
Complete set of gaskets		(packet of 3 sets)	3, 6

*The CA44 and CA46 use a soft Viton valve head, where as the CA44S and CA46S use a stainless steel valve head.

Note: The trap shown is the DN40 and DN50 CA44S/CA46S. However the type of internals and the method of maintenance is no different from that used in the smaller sizes of CA44(S) and CA46 (S).

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 trap.

Example: 1 - Main valve assembly for a Spirax Sarco DN25, CA46S-32 air and gas trap.

