

APT10 and APT14 Automatic Pump Traps

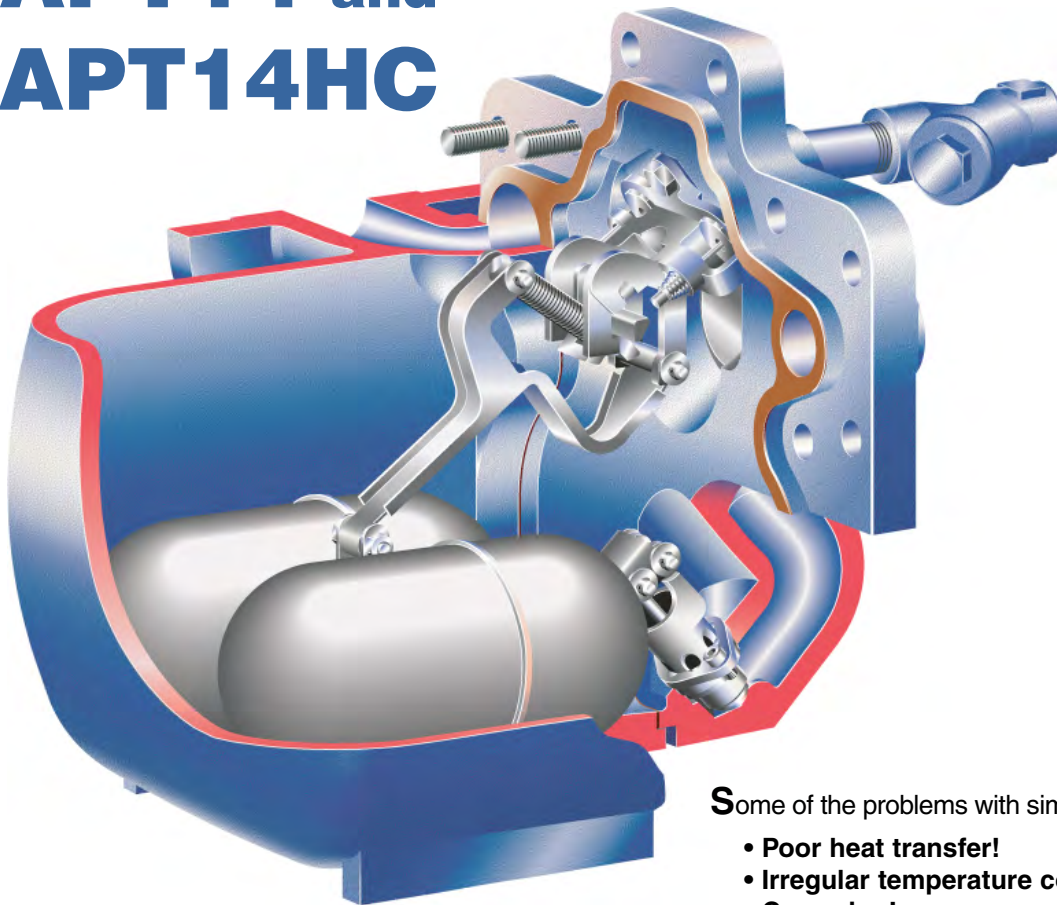
for effective condensate drainage
and removal



spirax
/sarco®

An innovative solution for effective heat

APT14 and APT14HC



User benefits

- Self-contained compact unit.
- Operates with 8" installation head from the base of the pump.
- Convenient installation to low mounted process equipment.
- Removes condensate under all load conditions, even vacuum.
- Requires no electrical power - suitable for hazardous environments.
- High capacity in one simple product package.
- Available with EN 10204 3.1 certification as standard.
- Electroless nickel plated (ENP) versions available.
- Approval to ATEX.
- Spirax Sarco's guarantee of worldwide technical support, knowledge and service.

Some of the problems with simply trapping a heat exchanger

- **Poor heat transfer!**
- **Irregular temperature control!**
- **Corrosion!**
- **Noise and waterhammer!**
- **Tube failure!**
- **High maintenance costs!**

All too often these problems have remained unsolved because no fully engineered compact system was available.

Solution

This product is specifically designed to automatically recover and remove condensate, the instant it forms.

It provides the unique opportunity to solve all condensate handling problems.

The Result

The APT will ensure your equipment operates as efficiently as possible - lowering energy consumption of the plant and allowing the process to run at optimum conditions - resulting in:

- Reduced costs.
- Increased productivity.
- Reduced downtime.
- Quieter equipment operation.

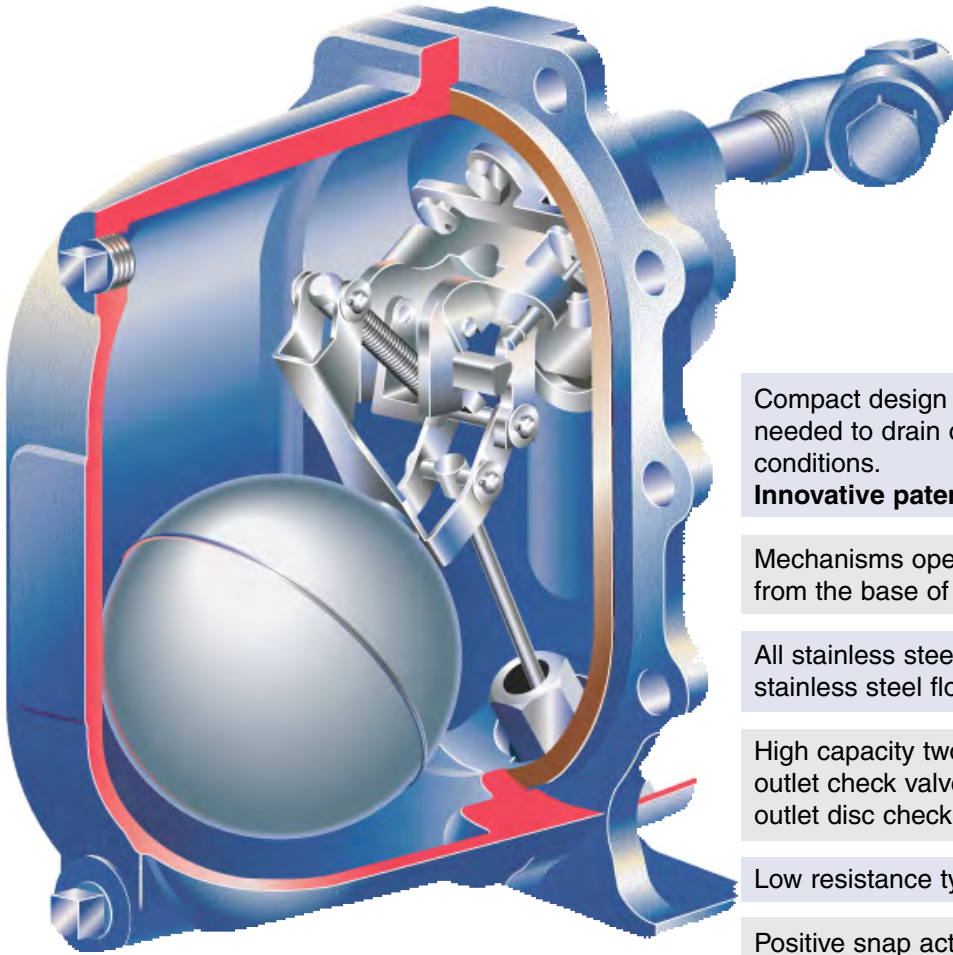
exchanger and heating coil drainage

APT - Automatic pump trap

For over 50 years, Spirax Sarco has been involved with the design and manufacture of products for efficient condensate management. We have now developed a range of compact, condensate drainage systems in simple-to-install products.

The APT has been designed to remove condensate from steam heat exchangers and process plant under all operating conditions, and forms an integral part of the condensate removal process. It is available in two easy-to-specify options:

APT10-4.5 - for loads up to 3,307 lb/hr; and **APT14** or **APT14HC** - for loads up to 19,841 lb/hr.



APT10-4.5

Compactness is the key

The APT's are unique, from their compact size to their approved patent applied mechanisms. No other pressure operated pumps or traps in the world can offer **all** of the benefits shown on these pages.

Compact design which contains all the equipment needed to drain or remove condensate for all load conditions.

Innovative patent applied for low profile mechanism.

Mechanisms operate with as little as 8" installation head from the base of the pump.

All stainless steel internals, with low profile robust stainless steel floats.

High capacity two stage trap module plus precision ball outlet check valve. The HC version has a separate outlet disc check valve.

Low resistance type inlet check valve

Positive snap action pump mechanism with replaceable valves and seats.

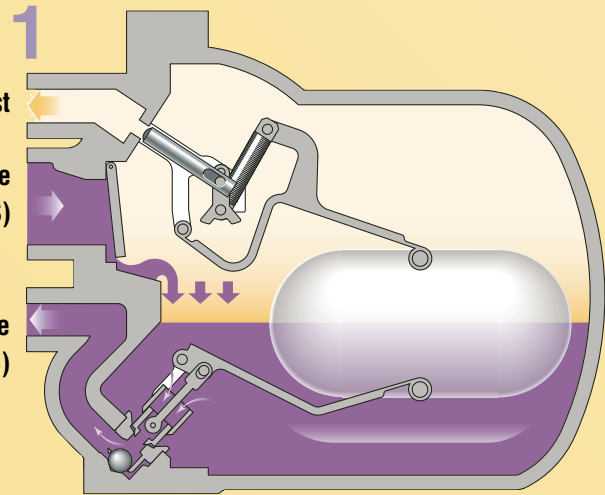
High integrity trapped cover gasket.

SG iron DIN EN JS 1025 (EN GJS 400-18LT) and ASTM A395 body and cover 3.1 certifiable. Designed in accordance with DIN and ASME standards. Optional - The body and cover are available with an electroless nickel plate (ENP) finish.

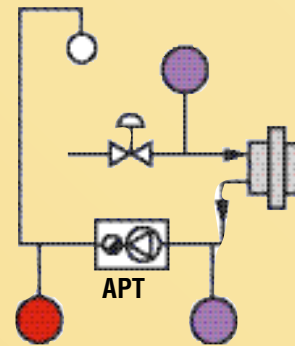
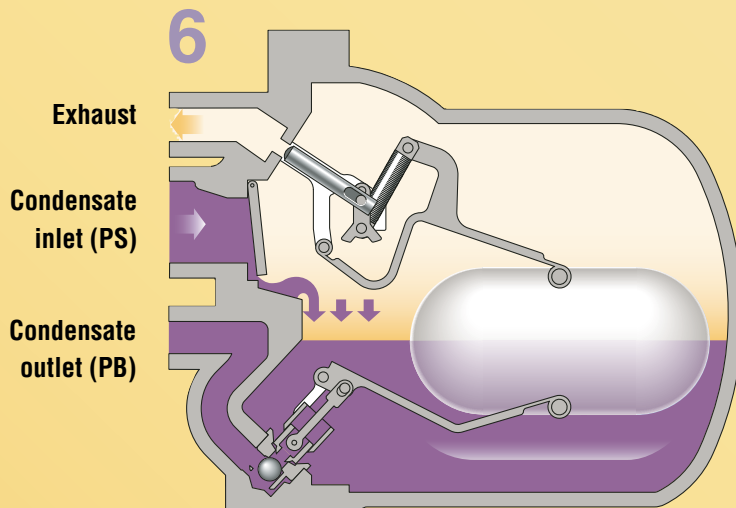
Available connections: APT10-4.5 and APT14 (not HC) Screwed BSP / NPT connections with 1/2" screwed BSP or NPT motive fluid connections. The APT14 and APT14HC. Flanged PN16, ANSI 150, JIS/KS 10, with 1/2" screwed BSP or NPT motive fluid connections.

The working cycle of

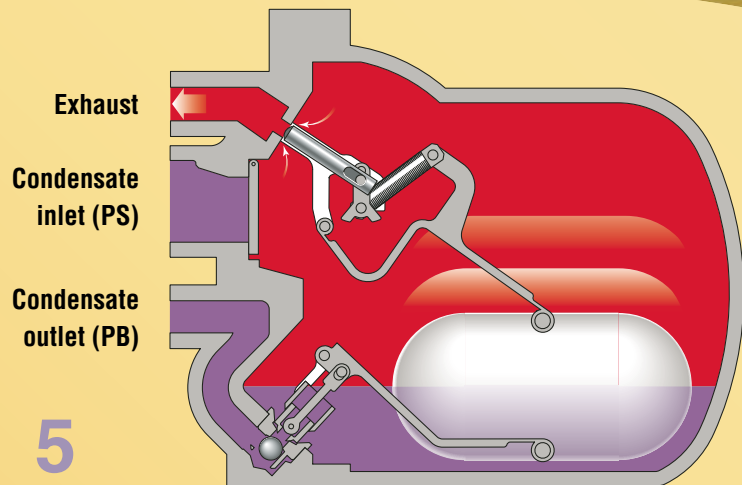
- 1 The APT10-4.5, APT14 and APT14HC automatic pump traps operate on a positive displacement principle. Condensate enters the body through the inlet swing check valve causing the float to rise. The float is connected to the trap mechanism via a multi-link pivot. If the upstream system pressure PS is sufficient to overcome the backpressure PB (see below), the build up of condensate will be discharged through the opening two stage trap mechanism. In this way, the float will automatically modulate according to the rate of condensate entering the APT, controlling the rate of opening and closure of the trap.



- 6 As the pressure inside the APT equalises with the condensate inlet pressure through the open exhaust valve, condensate re-enters via the inlet swing check valve. At the same time, the outlet ball check valve or the disc check valve (HC) ensures no condensate can drain back into the main chamber and the trapping or pumping cycle begins again.

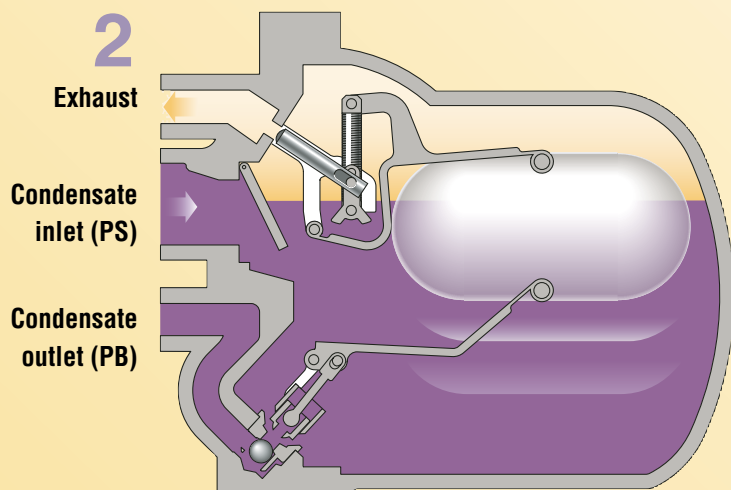


- 5 As the condensate level falls within the main chamber, the float re-engages the change over linkage, causing the motive inlet to close and the exhaust valve to open.

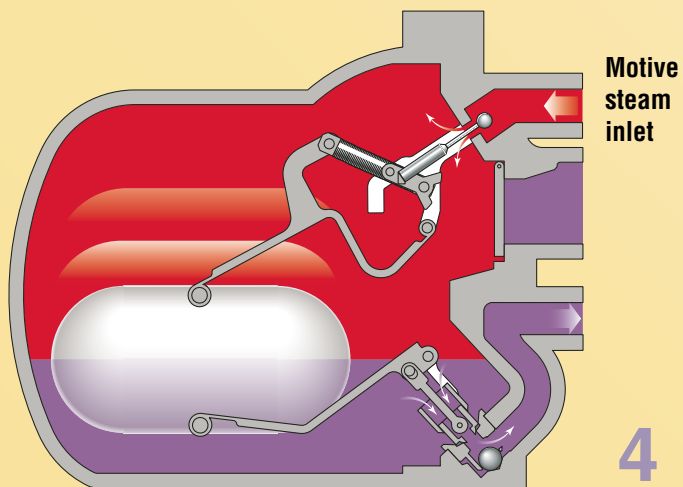
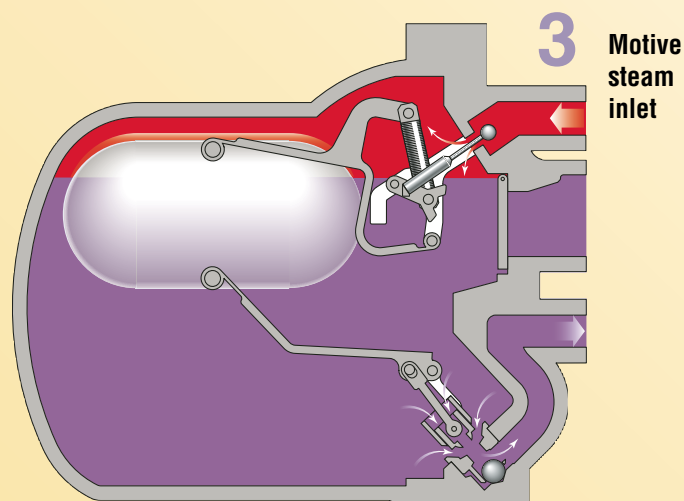
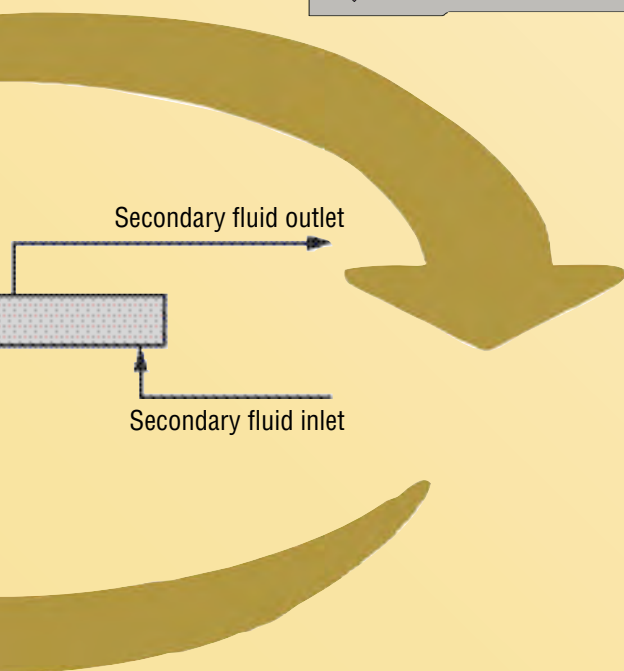


the APT10-4.5 and APT14

2 With some temperature controlled equipment, it is possible for the system pressure PS to be lower than the backpressure at PB. If this occurs a standard trap will stall allowing the condensate to flood the equipment being drained.

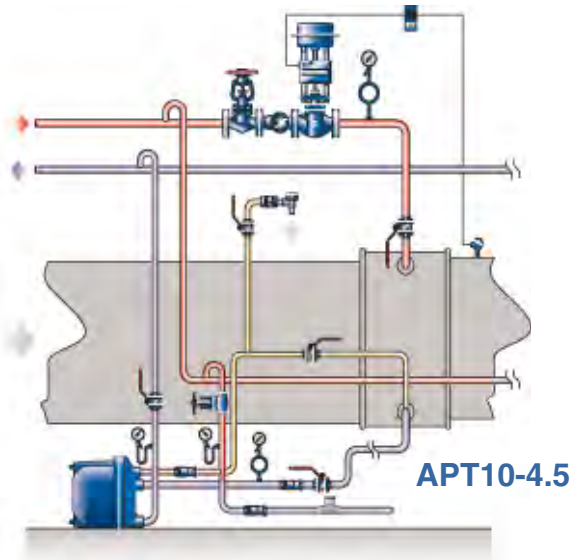


3 However, with the APT, the condensate simply fills the main chamber - lifting the float until the changeover linkage is engaged, opening the motive inlet and closing the exhaust valve.



4 The snap action mechanism ensures a rapid change from the trapping mode to the active pumping mode. With the motive inlet valve open, the pressure in the APT increases above the total back pressure and the condensate is forced out through the trap seat into the plant's return system.

Typical Applications*



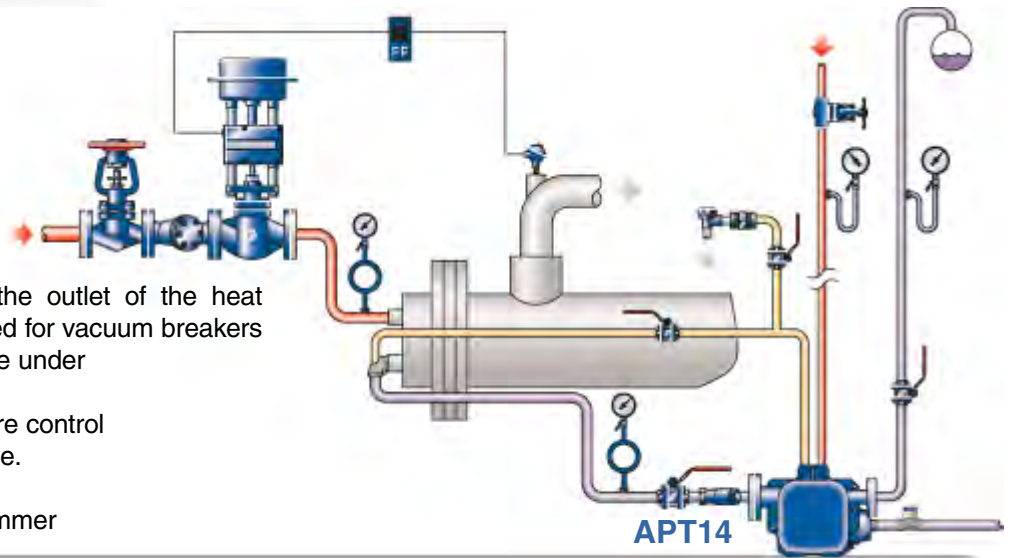
Condensate removal from heater applications (Closed system)

The APT can be used in single or multi-heater installations. Heater coils are particularly prone to corrosion and freezing due to condensate retention. The APT provides the complete solution to traditional Air Handling Unit problems, and is ideal for any installation where head room is at a premium.

Condensate removal from process vessels and heat exchangers (Closed system)

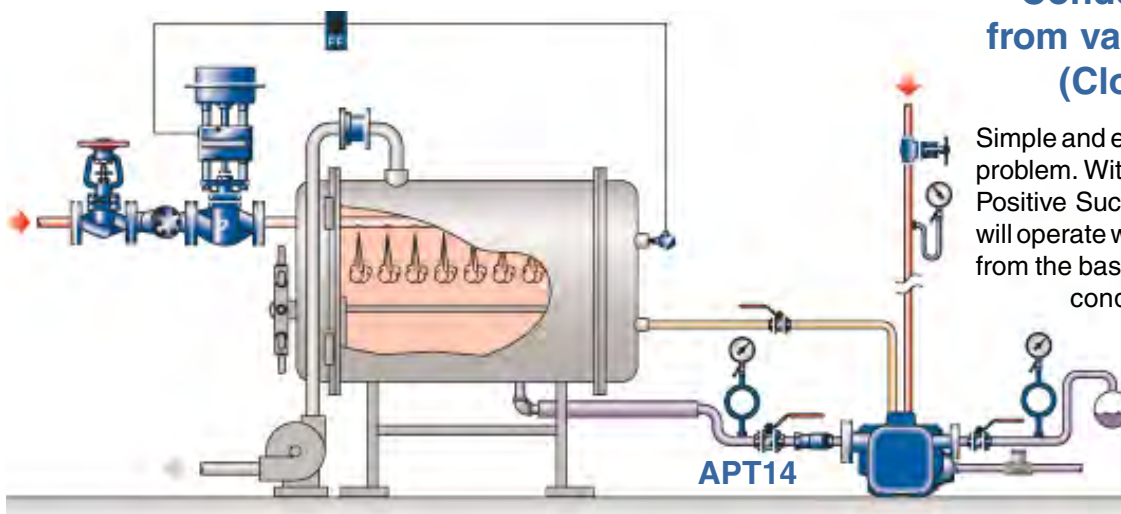
The APT is simply connected to the outlet of the heat exchanger, or process vessel. No need for vacuum breakers

- the APT will drain condensate under all load conditions.
- giving exceptional temperature control at the heat exchange interface.
- reduce tube corrosion.
- eliminate noise and waterhammer
- extend equipment life.



Condensate removal from vacuum equipment (Closed system)

Simple and efficient solution to a difficult problem. Without the need for high Net Positive Suction Head NPSH, the APT will operate with only 8" installation head from the base of the pump, and remove condensate from a vacuum vessel, discharging it to either high or low level condensate return lines.*



* Please note: These are typical applications only and some components have been omitted for clarity. Contact Spirax Sarco for full installation details.

How to size the APT...

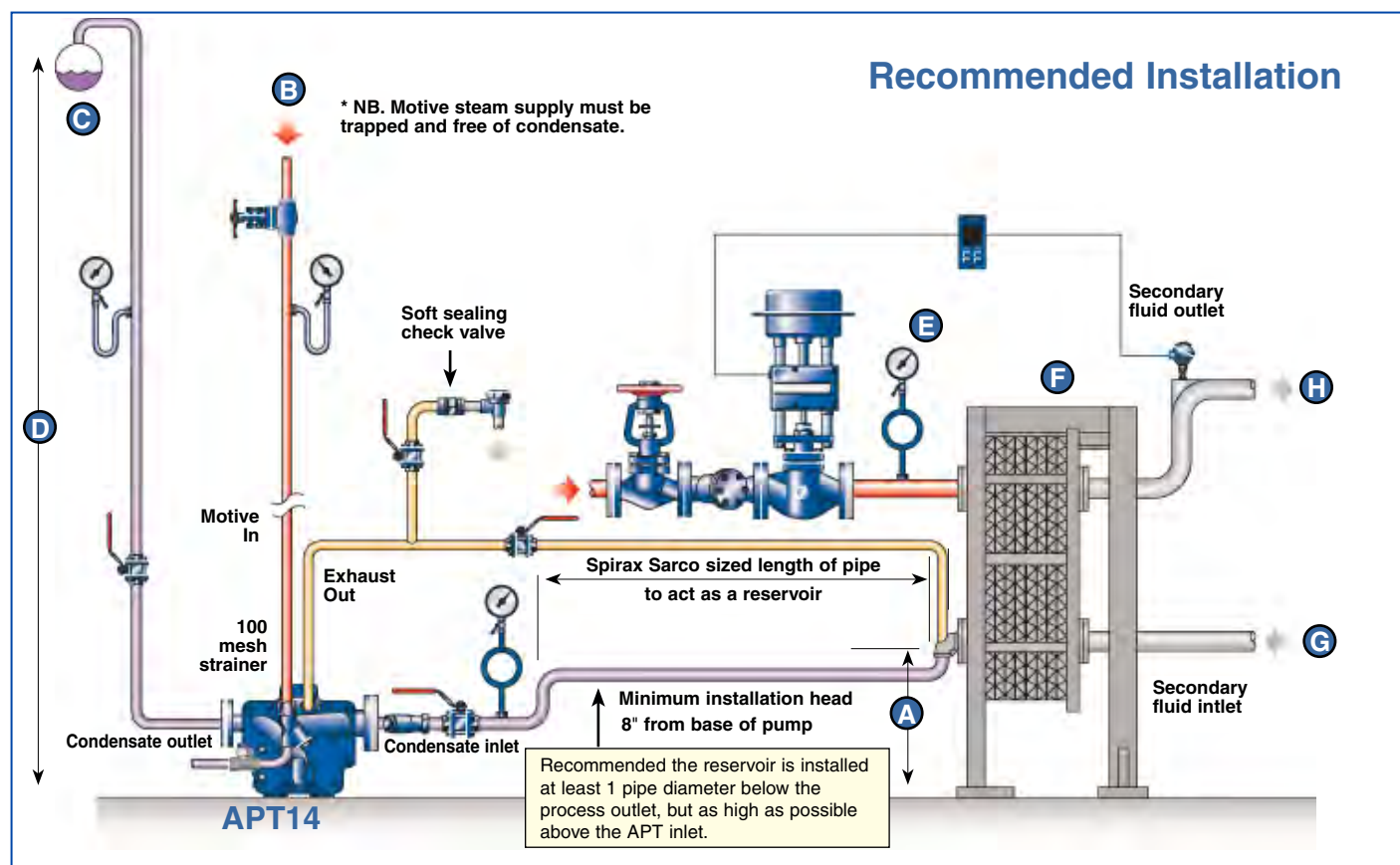
Simply contact your Spirax Sarco representative who can size an APT for your specific needs.

Spirax Sarco will ensure that the APT is accurately matched to your process and will provide you with a detailed sizing chart, tailored to your specific application.

Providing the information below is known, we can even provide you with confirmation over the telephone and fax you your specific chart.

Alternatively arrange a visit for your local Spirax Sarco representative who can provide detailed APT sizing information for all your specific needs.

To help us size the APT for your application, simply provide us with the following information:



- A** Installation head available from the base of the pump to the centreline of the heat exchanger/ process condensate outlet.
- B** Motive steam pressure available to power the pump trap.
- C** Pressure in the condensate return system.
- D** Height of condensate return from floor level.
- E** Heat exchanger full load operating pressure.
- F** Maximum steam load on the heat exchanger.
- G** Minimum secondary fluid temperature.
- H** Maximum controlled temperature of secondary fluid.

ft

psig

psig

ft

psig

lb/hr

°F

°F

Range and options

Automatic pump trap	Type	APT10-4.5	APT14 and APT14HC
Body material		SG iron EN JS 1025 or ASTM A395	SG iron EN JS 1025 or ASTM A395
Body design rating		PN10	PN16
Nominal size		¾" (DN20)	1" (DN25)
Inlet / outlet	APT10-4.5 and APT14	Inlet / outlet ¾" (DN20)	Inlet 1½" (DN40) / outlet 1" (DN25)
connections	APT14HC	-	2" x 1½" (DN50 x DN40)
	Screwed	BSP, NPT	BSP, NPT
	Flanged	-	PN16, ANSI 150, JIS / KS10
Motive fluid connections	Screwed	Motive inlet / exhaust ½" (DN15)	Motive inlet / exhaust ½" (DN15)
		BSP, NPT	BSP, NPT
Self-contained stainless steel pump mechanism		Minimum installation head from base of the pump 8" (0.2 m)	
Self-contained stainless steel trap mechanism		Float operated single stage	Float operated twin stage
Self-contained stainless steel check valves	APT10-4.5 and APT14	Inlet - swing check valve, outlet - ball check valve	Inlet - swing check valve, outlet - ball check valve
	APT14HC	-	Inlet - swing check valve, outlet - external disc check valve
Maximum operating pressure		65 psig (4.5 barg)	200 psig (13.8 barg)
Maximum backpressure		58 psig (4.0 barg)	73 psig (5.0 barg)
Maximum operating temperature		311°F (155°C)	388°F (198°C)

Nominal capacities

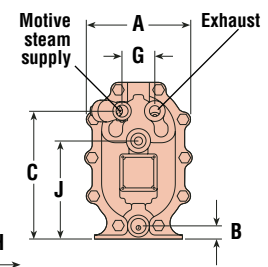
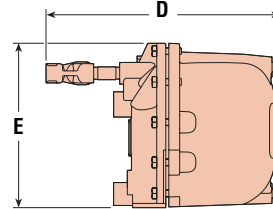
	APT10-4.5	APT14	APT14HC
Pump discharge / cycle	0.6 Gals. (2.1 litres)	1.3 Gals. (5.0 litres)	2.1 Gals. (8.0 litres)
Maximum trapping capacity	3307 lb/hr (1 500 kg/h)	8818 lb/hr (4 000 kg/h)	19841 lb/hr (9 000 kg/h)
Maximum pumping capacity	1268 lb/hr (575 kg/h)	2425 lb/hr (1 100 kg/h)	6173 lb/hr (2 800 kg/h)
Reference conditions	<ul style="list-style-type: none"> Total backpressure Motive pressure Installation head 	36 psig (2.5 barg) 65 psig (4.5 barg) 39" (1m)	14.5 psig (1.0 barg) 73 psig (5.0 barg) 39" (1m)

Dimensions / weights

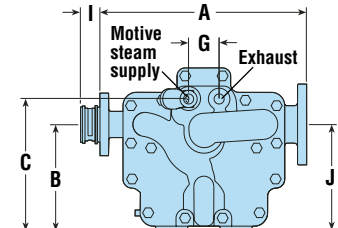
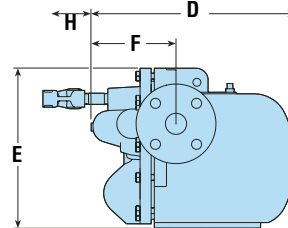
(approximate) in inches (mm) and lbs (kg)

Type	APT10-4.5 Screwed Inches-lbs	APT14 Screwed Inches-lbs	APT14 Flanged	APT14HC Flanged
A	7.3 (187)	13.8 (350)	15.3 (389)	18.7 (476)
B	0.9 (23)	7.8 (198)	7.8 (198)	7.8 (198)
C	8.8 (223)	9.7 (246)	9.7 (246)	10.6 (270)
D	10.9 (277)	15.2 (385)	15.2 (385)	15.7 (400)
E	10.7 (273)	12.0 (304)	12.0 (304)	13.2 (335)
F	-	10.2 (258)	10.2 (258)	9.3 (235)
G	2.2 (57)	2.2 (57)	2.2 (57)	2.2 (57)
H	5.3 (135)	9.8 (250)	9.8 (250)	10.8 (275)
I	PN16	-	-	1.2 (31.5)
J	ANSI	-	-	1.8 (45)
Weight	31 (14)	99 (45)	99 (45)	143 (65)

APT10-4.5



APT14 / APT14HC



Typical specification

APT10-4.5 - The pump trap shall be a Spirax Sarco automatic pump trap type APT10-4.5 operated by steam to 65 psig. No electrical energy shall be required. Body construction from SG iron (EN JS 1025 or ASTM A395) with a swing type inlet check valve and ball type outlet check valve. The internal trap mechanism shall contain a stainless steel float connected to a single stage trap, while the pump mechanism shall be a stainless steel single tension spring snap-action device. The pump, trap, and check valve mechanisms shall be incorporated into the same body envelope with no external seals or glands and shall be capable of operating with a minimum of 8 inches installation head from the base of the unit.

APT14 and APT14HC - The pump trap shall be a Spirax Sarco automatic pump trap type APT14 operated by steam to 200 psig. No electrical energy shall be required. Body construction from SG iron (EN JS 1025 or ASTM A395) with a swing type inlet check valve and outlet check valve. The internal trap mechanism shall contain dual stainless steel floats connected with a two stage trap, while the internal pump mechanism shall be a stainless steel single tension spring snap-action device. The pump and trap mechanisms shall be incorporated within the same body envelope with no external seals or glands and shall be capable of operating with a minimum of 8 inches installation head from the base of the unit.

Some of the products may not be available in certain markets.

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Printed in USA

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