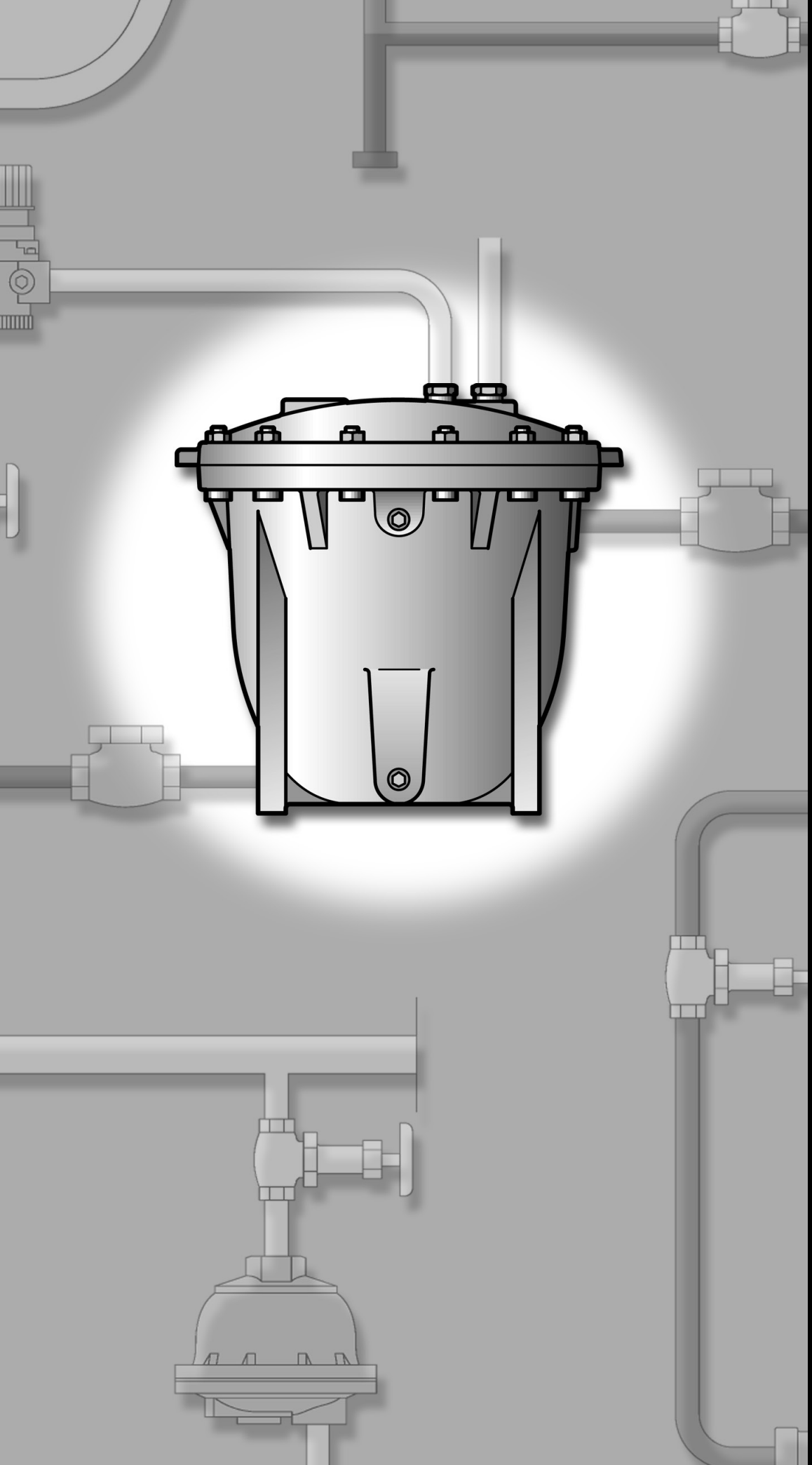


Condensate Recovery Equipment

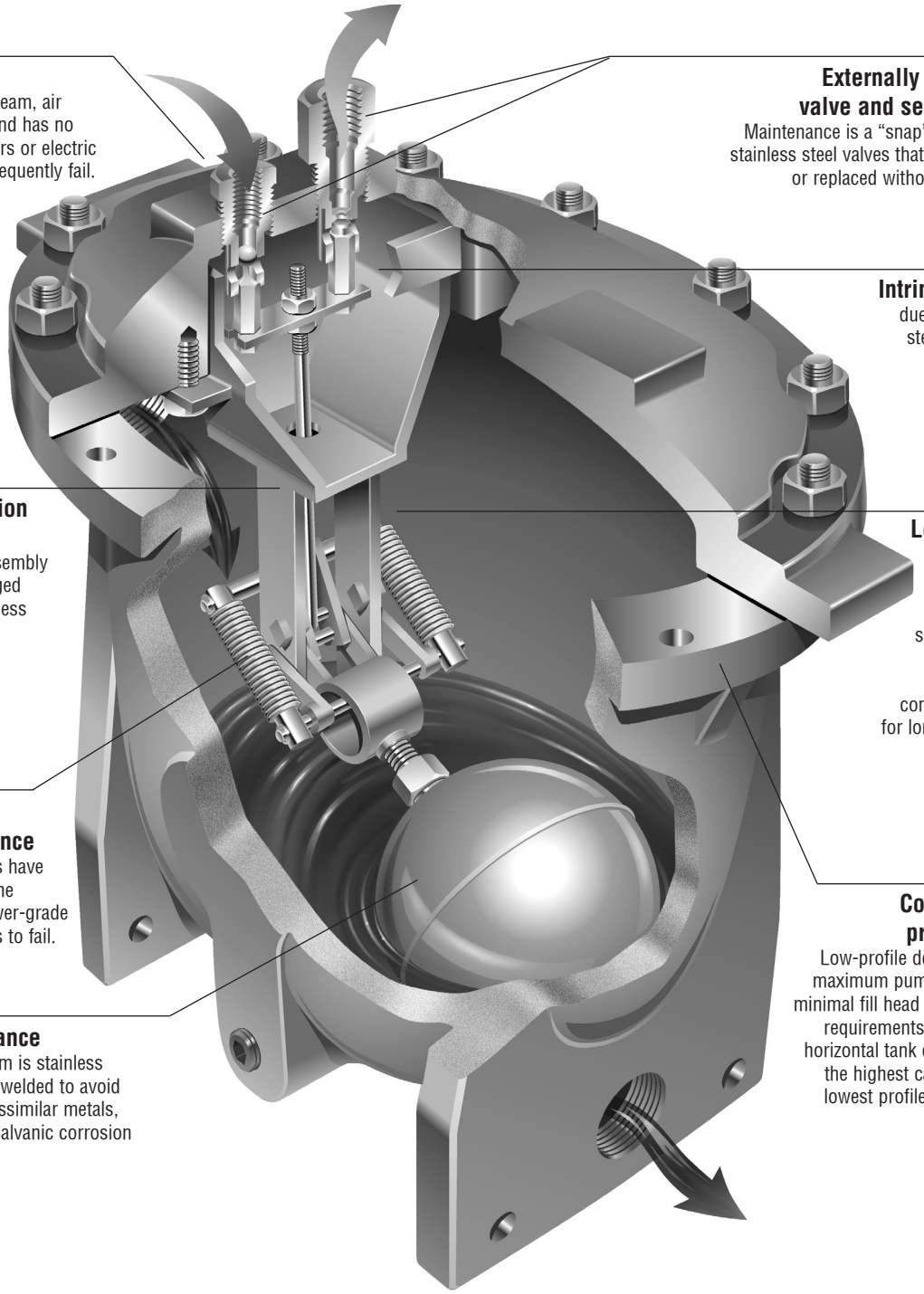
Armstrong

Armstrong®

Inside Advantages

Mechanical condensate pumps operate with a spring-assisted float mechanism, which means the springs themselves are a major wear point. Armstrong pumping traps have large-diameter Inconel X-750 springs, which provide superior corrosion resistance and longer service life than those in competitive models. For other inside advantages, see below.

Notice the difference in spring design from the industry standard spring set (left) and the Armstrong Inconel spring set.



Non-electric
Utilizes inexpensive steam, air or gas for operation and has no seals, motors, impellers or electric components, which frequently fail.

Externally replaceable valve and seat assembly
Maintenance is a "snap" with hardened stainless steel valves that can be cleaned or replaced without cap removal.

Intrinsically safe
due to all-stainless steel construction of mechanism.

Wear and corrosion resistance
Mechanism frame assembly is constructed of rugged investment-cast stainless steel components.

Long life and dependable service
Simple float/spring operation and rugged all-stainless steel construction allow for long, trouble-free service life.

Stress chloride corrosion resistance
Inconel X-750 springs have higher resistance to the stress that causes lower-grade stainless steel springs to fail.

Compact, low-profile design
Low-profile design allows for maximum pump capacity with minimal fill head and floor space requirements. PT-300 Series horizontal tank design provides the highest capacity with the lowest profile on the market.

Corrosion resistance
Entire float mechanism is stainless steel. Float is Heliarc welded to avoid the introduction of dissimilar metals, which could lead to galvanic corrosion and float failure.

Effective Condensate Management = Energy Savings

The most basic part of energy management is utilizing all valuable Btu within the steam system. Depending on the pressure, condensate exiting a trap contains approximately 20% of the heat energy transferred at the boiler in the form of sensible heat. Effective recovery of condensate reduces three tangible costs of producing steam:

- Fuel/energy costs associated with producing steam
- Boiler water make-up and sewage treatment
- Boiler water chemical treatment

These savings can be calculated using the attached savings form. Returning condensate saves money, energy and the environment. Pour money and energy savings back into your plant—not down the drain.

Condensate Recovery Savings Analysis

Location _____ Bldg _____

Energy costs will vary from plant to plant and regions of the world. Values shown are conservative. Complete this form using your facilities' numbers to determine annual savings in your plant by returning condensate. If some costs are not known, use the figures below for conservative estimates.

A) Condensate Load ..... = **8,000 lb/hr**

B) Annual Hours of Operation ..... = **7,200 hrs per year**

C) Total Water and Sewage Cost ..... = **$.005 per gal**
- c1) Untreated water and sewage ..... = **$.002 per gal**
- c2) Water treatment chemicals ..... = **$.003 per gal**

D) Make-Up Water Preheating Requirements = **140 Btu/lb**
- d1) Condensate Return Temperature ..... = **200°F**
- d2) Make-Up Water Temperature ..... = **60°F**

E) Steam Cost ..... = **$ 5.00/1,000 lb**

F) Annual Water Savings ..... = **$ 34,532.00**

$$\frac{(A)8000 \times (B)7200 \times (C).005}{8.34 \text{ lb/gal}}$$

G) Savings for Preheating Make-Up Water ..... = **$ 40,320.00**

$$\frac{(A)8000 \times (B)7200 \times (D)140 \times (E)5.00}{*1000 \times 1000}$$

H) Cost of Steam to Operate†
Armstrong Pump Trap ..... = **$ 864.00**

$$\frac{3 \times (A)8000 \times (B)7200 \times (E)5.00}{1000 \times 1000}$$

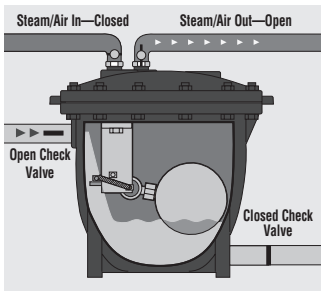
I) Total Dollars Saved Annually (F + G - H) ..... = **$ 73,988.00**

J) Payback Period in Years ..... = **.27 Years**

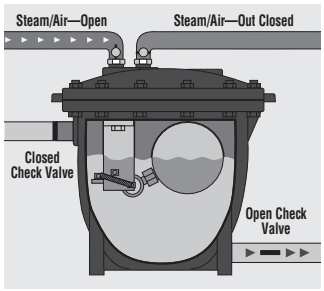
$$\frac{**(\text{cost of equipment/installation}) \$20{,}000}{(I)\ 73{,}988}$$

* Btu/lb from direct steam injection
** Estimated equipment and installation cost
† Cost to operate in example assumes an "open" vented system. If pump trap is used in "closed loop" application, steam operation cost is negligible.

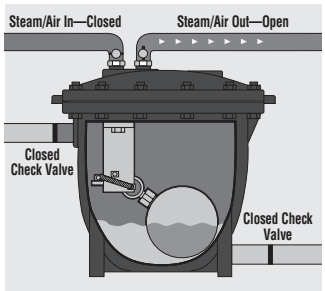
Pumping Trap Operation



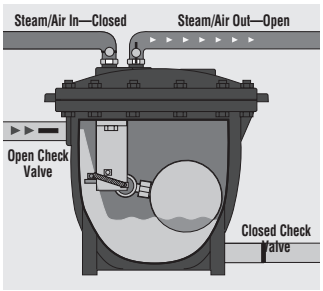
Filling
1. During filling, the steam, air or inert gas inlet and check valve on pumping trap outlet are closed. The vent and check valve on the inlet are open.



Begin Pumping
2. Float rises with level of condensate until it passes trip point, and then snap action reverses the internal valve positions shown in step one.

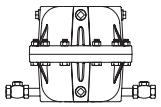
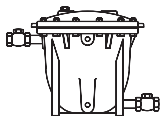
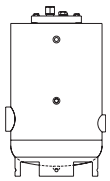
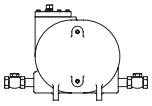
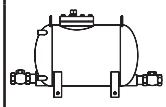
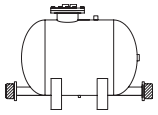
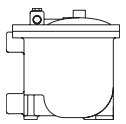
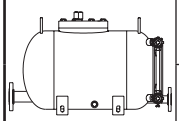
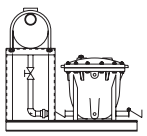


End Pumping
3. Float is lowered as level of condensate falls until snap action again reverses the internal valve positions.



Repeat Filling
4. Steam, air or inert gas inlet and trap outlet are again closed while vent and condensate inlet are open. Cycle begins anew.

Pumping Trap ID Charts

Illustration	Type	Connection Type	Max. Allow. Press. psig	TMA °F	Body Material	Mechanism Material	Model	Max. Oper. Press. psig	Capacity Range lb/hr	Connection Size				Located on Page
										1"	1-1/2"	2"	3" x 2"	
	**Series PT-100**	Screwed	150	450	ASTM A48 Class 30 Cast Iron	Stainless Steel with Inconel X-750 Spring	PT-104	100	1,800	●				210
	**Series PT-200**	Screwed	150	450	ASTM A48 Class 30 Cast Iron	Stainless Steel with Inconel X-750 Spring	PT-204 PT-206	125	2,400 3,700	● 	 ●			212
	**Series PT-400**	**Screwed	150	*650	**Fabricated Steel 150 psi ASME Sec. VIII Design "U" Stamped	Stainless Steel with Inconel X-750 Spring	PT-404 PT-406 PT-408 PT-412	125	3,600 5,500 7,400 12,200	●	●			214
	Series PT-400LL	**150# ANSI Flanged										●	●	225
	**Series PT-3500**	Screwed	150	450	ASTM A48 Class 30 Cast Iron	Stainless Steel with Inconel X-750 Spring	PT-3508 PT-3512	125	9,900 14,500			●	 ●	216
	**Series PT-300** **Series PT-300LL**	Screwed **150# ANSI Flanged **300# ANSI Flanged	150	*650 550	**Fabricated Steel 150 psi ASME Sec. VIII Design "U" Stamped	Stainless Steel with Inconel X-750 Spring	PT-308 PT-312	125	11,600 16,600			●	 ●	218 225
	**Series PT-500**	**150# ANSI Flanged	150	500	**Fabricated Steel 150 psi ASME Sec. VIII Design "U" Stamped	Stainless Steel with Inconel X-750 Spring	PT-516	150	80,000	4" x 4"				222
	**Double Duty® 4**	Screwed	72	320	Ductile Iron	Stainless Steel	Simplex Duplex	72	up to 350	1" x 1"				226
	**Double Duty® 6**	**150# ANSI Flanged	200	400	Carbon Steel	Stainless Steel with Inconel X-750 Spring	Simplex Duplex Triplex Quadplex	200	up to 4,800	1-1/2" x 1"				228
	Double Duty® 12								up to 19,900	3" x 3"				230
	**Series 100, 200, 300, 3500 Low Boy™ Packages**	For detailed information, regarding Armstrong pre-piped pump packages, please contact the factory or visit our website at **armstrong**international.com												

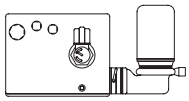
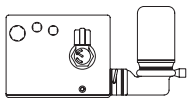
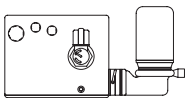
**Other connection type, receiver pressure vessel ratings and material type available upon request—consult factory.

*Standard mechanism: Maximim motive 125 psi; maximum allowable pressure 150 psi (vessel rating); maximum temperature 480°F (vessel rating).

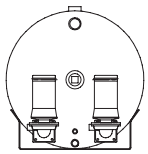
Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit armstronginternational.com for up-to-date information.

Pumping Trap ID Charts

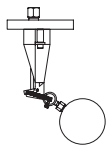
Electric Centrifugal Condensate Pump ID Chart

Illustration	Type	Sq. Ft. EDR	Pump Capacity GPM	Pump Disch. Press.	Motor HP	RPM	Disch. Size Inches	Inlet Size Inches	Receiver Cap. Gallons	Locate Page for Sizing
	**FHS Series** **FHC Series** **Simplex or Duplex**	8,000 thru 20,000	12 thru 30	Max. 20 psig	Simplex 1/3, 1/2, 3/4 Duplex 1/2 or 3/4	3,500 RPM Only Single Phase Only	3/4"	2" thru 3"	FHS Series 8 - 30 (Steel) FHC Series 15 - 36 (Cast Iron)	240
	**AFH-4100** **4200** **4300** **3500** **Simplex or Duplex**	2,000 thru 50,000	*3 thru 75	*20 thru 50	*1/3 thru 5	1,750 and 3,500 Single or Three Phase	3/4" thru 1-1/2"	2" thru 4"	AFH-4100/4300 8 - 120 (Steel/SS) AFH-4200 6 - 120 (Cast Iron)	243 thru 252
	**AFH-4400 Simplex or Duplex**	4,000 thru 60,000	6 thru 90	*10 thru 50	1/3 thru 1-1/2"	3500 RPM	3/4" thru 1-1/2"	2" thru 2-1/2"	12 - 100	253

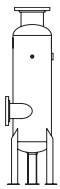
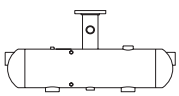
Boiler Feed Condensate Pump ID Chart

Illustration	Type	Boiler HP BHP	Pump Capacity GPM	Pump Disch. Press.	Motor HP	RPM	Disch. Size Inches	Inlet Size Inches	Receiver Cap. Gallons	Locate Page for Sizing
	**AFH-4100** **4200** **4300** ****3500** **5000**	15 to 700	*3 to 140	*20 to 50	1/3 to 7-1/2	1,750 and 3,500 Single or Three Phase	Consult Factory		30 to 714	243

Rescue Cap® Non-Electric Steam/Air Powered Pump Retrofit Assembly ID Chart

Illustration	Fits Competitors' Mechanical Pumps Listed Below							Page
	Spirax Sarco Models PPC & PPF PTC & PTF	Watson McDaniel Models PMPC & PMP	Spence & Nicholson Condensate Commanders	KADANT-Johnson Corporation	ITT Hoffman PCS	Yarway Series 65 Steel	Clark Reliance	238

Flash Tank ID Chart

	Type	Connections	Size	Pressure Rating	Sparge Pipe	Body Material	Page
	**VAFT Vertical Flash Tanks**	NPT Flanged	6" 8" 12" 16"	***150 psig	N/A	Carbon Steel	259
	**HAFT Horizontal Flash Tanks**	NPT Flanged	4" thru 30"				261

*Other capacities, discharge pressures and HP available - consult factory.
**3500 Series has elevated tank as standard.
***Other pressure ratings available upon request.