

October 2024

## Spence Condensate Recovery Pump Trap



### WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire and/or chemical contamination causing property damage and personal injury or death.

Condensate Recovery Pump Trap must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and Emerson instructions.

If leak develops in the system, service to the unit may be required. Failure to correct trouble could result in a hazardous condition.

Installation, operation and maintenance procedures performed by unqualified personnel may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Only a qualified person shall install or service the Condensate Recovery Pump Trap.

### Introduction

#### Scope of the Manual

This manual provides instructions for installation, maintenance and parts information for the Condensate Recovery Pump Trap.

#### Product Description

Condensate Recovery Pump Trap is a pressure operated pump primarily intended to trap or pump condensate depending on pipeline conditions without the use of electricity, that makes it the preferred choice for remote or hazardous locations.

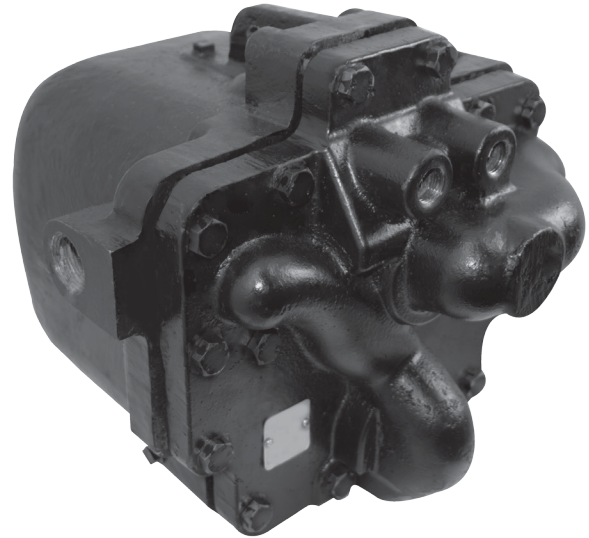


Figure 1. Pump Trap

Required suction head is negligible as optimal performance is achieved at only 8 in. / 203 mm. The stainless steel snap acting mechanism in continuous compression is unaffected by turbulence and the single spring assures long service life without adjustment or maintenance. Self centering supply and exhaust valves provide reliable performance and are lapped for tight shutoff.

The Condensate Recovery Pump Trap removes condensate as well as acids and other process fluids that may be incompatible with conventional pumps. It performs well with high back pressure, low pressure and vacuum systems and can be used in a sump or other submerged application.

The Condensate Recovery Pump Trap is used in different applications. This pump can be used with a vented receiver, with an inlet receiver, in a submerged application or in a skid mounted system.

# Condensate Recovery Pump Trap

## Specifications

The Specifications section gives some general specifications for the Condensate Recovery Pump Trap.

### Body Sizes

NPS 1-1/2 x 1 / DN 40 x 25

### End Connection Style

NPT and BSPT

### Maximum Allowable Pressure<sup>(1)</sup>

250 psig / 17.2 bar

### Maximum Operating Pressure<sup>(1)</sup>

200 psig / 13.8 bar

### Maximum Allowable Temperature<sup>(1)</sup>

570°F / 300°C

### Maximum Operating Temperature<sup>(1)</sup>

435°F / 225°C

### Pump Discharge

1.3 gal / 5.0 L

### Construction Materials

**Body and Cover:** SG Iron

**Gasket:** AF-159

**Inlet Check Valve:** 304 Stainless steel

**Exhaust and Motive Supply:** 440 Stainless steel

**Pump, Trap Outlet, Float and Lever:** Stainless steel

1. The pressure/temperature limits in this Instruction Manual and any applicable standard or code limitation should not be exceeded.

## Principle of Operation

The pump operates on a positive displacement principle. Condensate enters the body through the inlet check valve causing the float to rise. The float is connected to the trap mechanism via a pivot. If the upstream system pressure is sufficient to overcome the backpressure, the build up of condensate will be discharged through the opening two stage trap mechanism. In this way, the float will modulate according to the rate of condensate entering the unit, controlling the rate of opening and closure of the trap. 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 increases above the total backpressure and the condensate is forced out through the trap seat into the plant's return system.

## Installation



### WARNING

**Personal injury or system damage may result if this equipment is installed where service conditions could exceed the limits given in the Specifications section.**

1. Ensure that the inlet pipe is sufficiently sized to accumulate condensate during the pump's discharge cycle in order to prevent condensate from backing up into the equipment being drained.
2. Generally, a length and diameter of a pipe is sufficient to accommodate the condensate capacity of 1.1 gal / 4.2 L
3. Ensure that the condensate reservoir is situated at least 1 pipe diameter below the process outlet but as high as possible above the inlet up to 40 in. / 1016 mm and installation head of minimum 8 in. / 203 mm from the base of the unit.

4. Install a throttling isolation valve to reduce the filling pressure. There are four connection ports; inlet (1-1/2 in. / DN 40), outlet (1 in. / DN 25), motive supply (1/2 in. / DN 15) and exhaust (1/2 in. / DN 15).
5. Connect the inlet port to the outlet of the equipment being drained.
6. Connect the outlet port to the condensate return line and size it correctly to prevent excessive backpressure on the unit. Flow arrows indicates the correct direction of flow.
7. Connect the 1/2 in. / DN 15 port marked S to a trapped motive steam supply.
8. The 1/2 in. / DN 15 port marked E should be balanced back as close as possible to the condensate outlet of the equipment.
9. Ensure that the system pressure gauges are fitted to the motive supply, condensate inlet and outlet.
10. Ensure that the motive pressure does not exceed 40 to 60 psi / 2.8 to 4.1 bar above the backpressure applied to the pump and must be drained by a suitable steam trap to ensure the motive steam is dry.

## Startup

1. Ensure the inlet and outlet pipe connections, motive and exhaust connections are coupled in accordance.
2. Slowly open the motive steam inlet line to supply pressure.
3. Ensure the exhaust line is open and not restricted in any way.
4. Slowly open the isolation valves in the condensate inlet and discharge lines allowing the condensate to fill the body.

# Condensate Recovery Pump Trap

**Table 1. Troubleshooting**

WHEN THIS HAPPENS	HERE IS WHERE THE TROUBLE MAY BE	AND HERE IS WHAT TO DO
Fails to operate in start-up	No motive pressure	a. Motive supply pressure exceeds total backpressure. Check supply is not isolated by manual or fail safe valve. b. Check reason for fail safe valve closure. c. Ensure reason resolved and reset valve to open position.
	Inlet isolation valve maybe closed	Check if the inlet pipe is free from obstructions and isolation valve is open.
	Motive inlet and exhaust lines incorrectly connected	Check Motive (S), Exhaust (E)
	The rate of condensate produced by the process maybe very low, causing the pump to cycle slowly.	Check if the process being drained is operating correctly.
Equipment flooded but the pump appears to cycle normally	The pump is undersized for the application.	Check system parameters agree with the sizing graph.
Equipment flooded and has stopped cycling	Blocked exhaust line	Check if balance line is free from obstruction and is not waterlogged
	Blocked condensate inlet line	Inspect, check for blockage and clean.
	Blocked condensate outlet line	Inspect, check for blockage and clean.
	Damaged mechanism	Check mechanism if operating properly or replace parts.
	No motive steam available	a. Check if steam supply to pump is available and at the correct pressure. Motive pressure must exceed total back-pressure. b. Ensure motive supply is clear of debris. Clean or replace as necessary.
	Leaking motive inlet valve	a. If the pump body is hot, this indicated the pump mechanism is stuck on the discharge cycle. Check mechanism for excessive friction. b. Check motive inlet valve and spring for correct operation - replace component as necessary.
	Broken spring	If the pump body is cold this indicates the mechanism is stuck on the filling cycle. Check pump mechanism spring - replace components as necessary
Chattering or banging of the unit during cold start-up	Blocked condensate inlet line	Inspect and clean the filter, check for blockages.
	Hydraulic pulsing of the inlet valve	Reduce installation head to pump - install throttling valve on the pump condensate inlet.
Chattering or banging in the return line after pump discharge	Live steam entering discharge line	Ensure steam traps draining the motive supply line are discharging to a non-flooded condensate return and the condensate return is adequately sized.

## Maintenance



### WARNING

**To avoid personal injury, property damage or equipment damage caused by sudden release of pressure or explosion of accumulated gas, do not attempt any maintenance or disassembly without first isolating the pump from system pressure and return lines. Relieve all internal pressure from the pump prior to any maintenance.**

**Pumps that have been disassembled for repair must be tested for proper operation before being returned to service. Only parts manufactured by Emerson should be used for repairing this pump.**

Before any installation or maintenance procedure always ensure that all steam or condensate lines are isolated. Ensure any residual internal pressure in the product or connecting lines is carefully relieved. Ensure any hot parts have cooled to prevent risk of injury. The unit should be inspected periodically, intervals dependent on application.

1. Remove the cover assembly by disconnecting all connections to the cover using the correct size socket. Visually inspect the mechanism for obvious damage. Check that it is free of dirt and scale and operates freely when the floats are moved up and down. Visually inspect the spring assembly and floats ensuring they are undamaged.
2. Ensure the gasket is clean and free from debris in replacing the cover assembly. Carefully slide the cover assembly into the existing body while ensuring the gasket is carefully aligned with the gasket faces and no parts of it are trapped outside the sealing areas.
3. Refit the cover bolts ensuring they are sequentially tightened in opposing pairs, gradually increasing torque to 46 ft-lbs / 62 N•m.
4. Reconnect the motive steam supply and the exhaust lines to the connections marked and follow the start-up procedures to bring it back into operation.

# Condensate Recovery Pump Trap

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## Parts Ordering

When corresponding with your local Sales Office about Condensate Recovery Pump Trap, always reference the assembly number.

## Parts List

Key	Description	Part Number
	Parts Kit	
	Cover Assembly	ERAA58130A0
	Cover Gasket	ERAA58131A0
	Inlet Check Valve	ERAA58132A0
	Spring and Actuator Arm	ERAA58133A0
	Float	ERAA58134A0
	Trap and Outlet Check Valve	ERAA58135A0
	Inlet/Exhaust Valve and Seat	ERAA58136A0
1	Condensate Pump Trap Assembly	
	NPT	CPT-D1G9
	BSPT	CPT-D1GB

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