NON-ELECTRIC CONDENSATE PUMPS

PMP Series

Pressure Motive Pumps

TYPICAL APPLICATIONS

The Watson McDaniel **PMP** Series of **Pressure Motive Pumps** are designed to transfer hot condensate (as well as other liquids) without the use of electrical energy. The primary application for the PMP is pumping condensate from a process application or condensate collection area back to the condensate return system.

Hot Condensate The mechanical seals in standard electric condensate return pumps begin to have difficulty when handling condensate in excess of 195° F. Seal failure is virtually guaranteed when condensate temperatures reach 203° F due to flashing of the condensate across the seal face. It is therefore required to cool condensate in order to prevent seal failure prior to pumping using electric pumps. PMPs do not have seals and therefore will handle condensate well in excess of these temperatures.

TYPICAL CONFIGURATIONS

STAND ALONE UNITS:

All stand alone units are furnished with pump tank, check valves: and internal pumping mechanism.

• PMPC • PMPF • PMPSS • PMPLS • PMPM • PMPBP

PUMPS WITH RECEIVER TANKS:

One or more stand alone pump units connected to an appropriately sized receiver tank mounted on a common base. Additional pumping units can be used for increased capacity or pump redundancy in case of failure.

Simplex: One Pumping unit with check valves and receiver tank, mounted on frame and skid base.

Duplex: Two Pumping units with check valves and receiver tank, mounted on frame and skid base.

Triplex: Three Pumping units with check valves and receiver tank, mounted on frame and skid base.

Quadraplex: Four Pumping units with check valves and receiver tank, mounted on frame and skid base.

PUMP & STEAM TRAP COMBINATIONS:

Stand alone pump combined with Internally or Externally configured Steam Trap.

- PMPT (Internal Steam Trap)
- WPT Series (External Steam Trap)

SUMP DRAINER:

Stand alone Sump Drainer with check valves is designed for pumping water out of low lying areas or pits. Excellent solution where there is no access to electricity.

- PMPSP

CUSTOM CONFIGURATIONS

Watson McDaniel's fully-qualified fabrication facility is ASME code certified. Our engineers can design and build complete custom systems to meet all your requirements.

Several choices of pump body materials, types and configurations are available to meet specific customer applications:

Ductile Iron Tanks Ductile Iron is far superior to cast iron in handling higher pressures and temperatures. Ductile iron is also extremely corrosion resistant to condensate and water and can last in excess of 50 years before tank replacement is required. Our ductile iron tanks can be ASME coded on request.

Fabricated Carbon Steel Carbon steel has a higher pressure and temperature rating than ductile iron. Certain industrial facilities such as chemical and petrochemical refineries request carbon steel only. Our carbon steel tanks are standard ASME coded.

Fabricated Stainless Steel Stainless steel (304L) tanks are the most corrosion resistant and can be used in extremely harsh environments.

Low Profile Low profile tanks are often required when draining condensate from process equipment when positioned close to the ground which limits filling head. Low profile units are available in both fabricated steel and cast iron.

Sump Drainers Sump drainers are similar to the standard PMP models except that they discharge the condensate vertically upwards. This piping configuration allows them to easily fit into below ground sump pits with limited space.

FEATURES

- **Seal-less** – The PMP contains no seals. The weak point in conventional electric pumps is seal failure due to flashing hot condensate across the seal face.
- **Non-Electric** – Since no electricity is required they can be used in remote locations or NEMA 4,7 & 9 hazardous areas. Can operate using steam, air, nitrogen or other pressurized gases as the motive force.
- **Ductile-Iron** – Pump tanks are standard in Ductile Iron which is far superior to Cast Iron for pressure and temperature rating and safety. Can be ASME coded and can last in excess of fifty years prior to replacement.
- **Carbon Steel** – Pump tanks available in ASME coded carbon steel.
- **Stainless Steel** – Pump tank options include 304L for applications in harsh environments.

OPTIONS

- Pump cycle counter used for predicting maintenance intervals as well as calculating the volume of condensate pumped.
- Insulation jackets are available to stop heat losses through the pump body and provide personal protection.
- Sight glass for monitoring liquid level inside pump body.
- Customized systems – ASME code-certified fabrication facility

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NON-ELECTRIC CONDENSATE PUMPS

PMP Series

Pressure Motive Pumps

STAND ALONE UNITS

All stand alone units are furnished with pump tank, check valves and internal pumping mechanism.

PMPC DUCTILE IRON

The Model **PMPC** pressure motive pump body & cover are manufactured from ductile iron. **ASME "UM" code stamp is available.**

PMPF CARBON STEEL HIGH-PRESSURE

The Model **PMPF** pressure motive pump is designed for high pressure applications. Pump body & cover are manufactured from carbon steel and receive the **ASME "UM" code stamp.**

PMPSS STAINLESS STEEL

The Model **PMPSS** pressure motive pump body & cover are manufactured from 304L stainless steel. These tanks are designed to be used in harsh corrosive environments and receive the **ASME "UM" code stamp.**

PMPBP CARBON STEEL HIGH-CAPACITY

The **PMPBP** is an ***extremely high-capacity*** pressure motive pump for applications requiring large transfer of condensate or other liquids. The internal operating mechanism functions identically to other pumps in the PMP series. **ASME "U" code stamp is available.**

PMPM CAST IRON LOW PROFILE

The Model **PMPM** pressure motive pump has an ***extremely low profile***. These low-profile tanks are required when draining condensate from process equipment positioned close to the ground which limits the filling head of the pump.

PMPLS CARBON STEEL LOW PROFILE

The Model **PMPLS** pressure motive pumps are low profile. These tanks are often required when draining condensate from process equipment positioned close to the ground which limits the filling head of the pump. Pump body & cover are manufactured from carbon steel and receive the **ASME "UM" code stamp.**

PUMP & TRAP COMBINATIONS

with Internal Steam Trap

PMPT

The Model **PMPT low-profile** pressure motive pump comes with an **Internal** Steam Trap. It is an excellent choice for drainage of various modulating process equipment. **The internal steam trap allows condensate discharge under all operating conditions of modulating equipment, including vacuum.**

with External Steam Trap

WPT

The **WPT Series** are stand alone pump units with an appropriately sized **External** Steam Trap preassembled at the factory and mounted on a common base plate, allowing for easy installation. Available in several sizes and capacities. Used when load requirement exceeds that of the PMPT.

PUMPS WITH RECEIVER TANKS

Watson McDaniel manufactures PMPs with receiver tanks. Pumps are available in Ductile Iron, Cast Iron or Fabricated Steel. Receiver tank manufactured from Carbon Steel. Available in Simplex, Duplex, Triplex and Quadraplex.

SUMP DRAINER

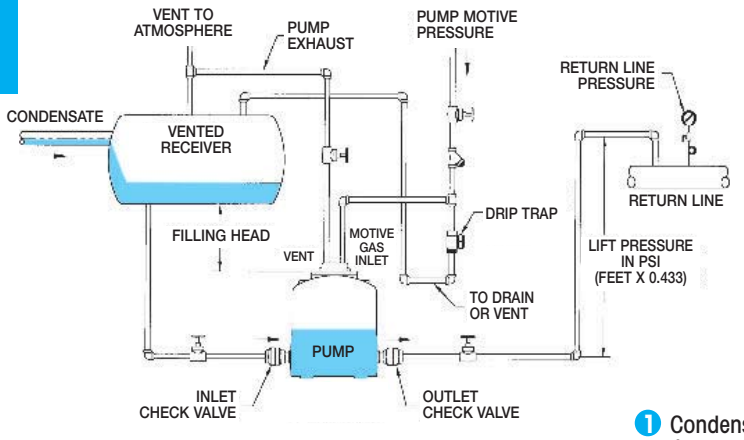
PMPSP

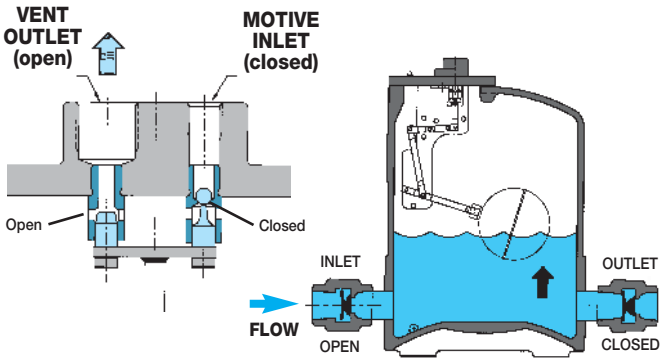
The Model **PMPSP** sump drainer body & cover are manufactured from Carbon Steel. The Model PMPSP Sump Drainer is designed for pumping out and draining pits.

PMP Series

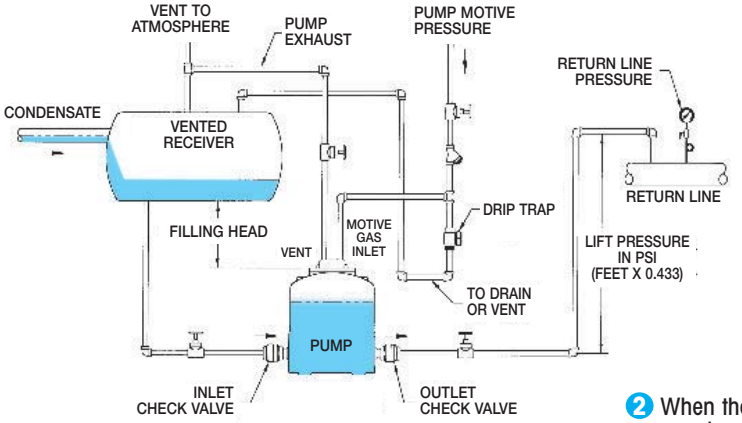
Pressure Motive Pumps

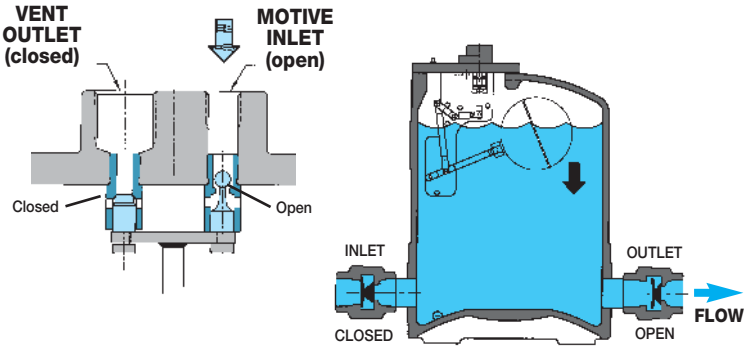
Operation of PMP Pressure Motive Pump



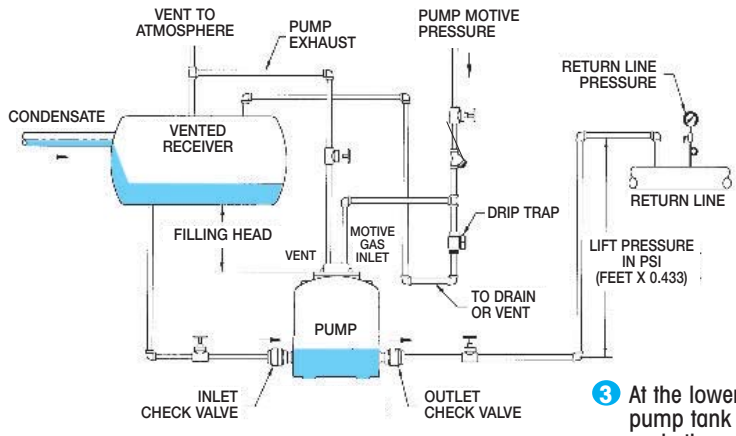


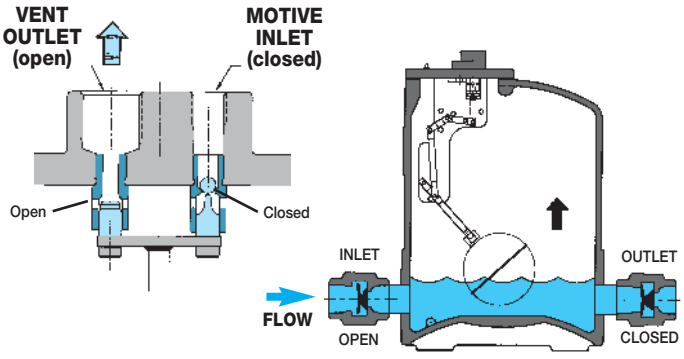
1. Condensate flows from the receiver tank thru the inlet check valve and fills the pump tank. During the filling cycle the float inside the tank rises.





2. When the pump tank has filled to the trip point, the mechanism triggers, opening the motive gas inlet valve and simultaneously closing the vent valve. This allows motive pressure to enter the pump body, which drives the condensate thru the outlet check valve into the condensate return line. During the discharge cycle, the liquid level and the float inside the pump tank drop.





3. At the lower trip point, the mechanism triggers and the motive gas inlet valve to the pump tank closes and simultaneously the vent valve opens. The fill and discharge cycle then repeats itself.

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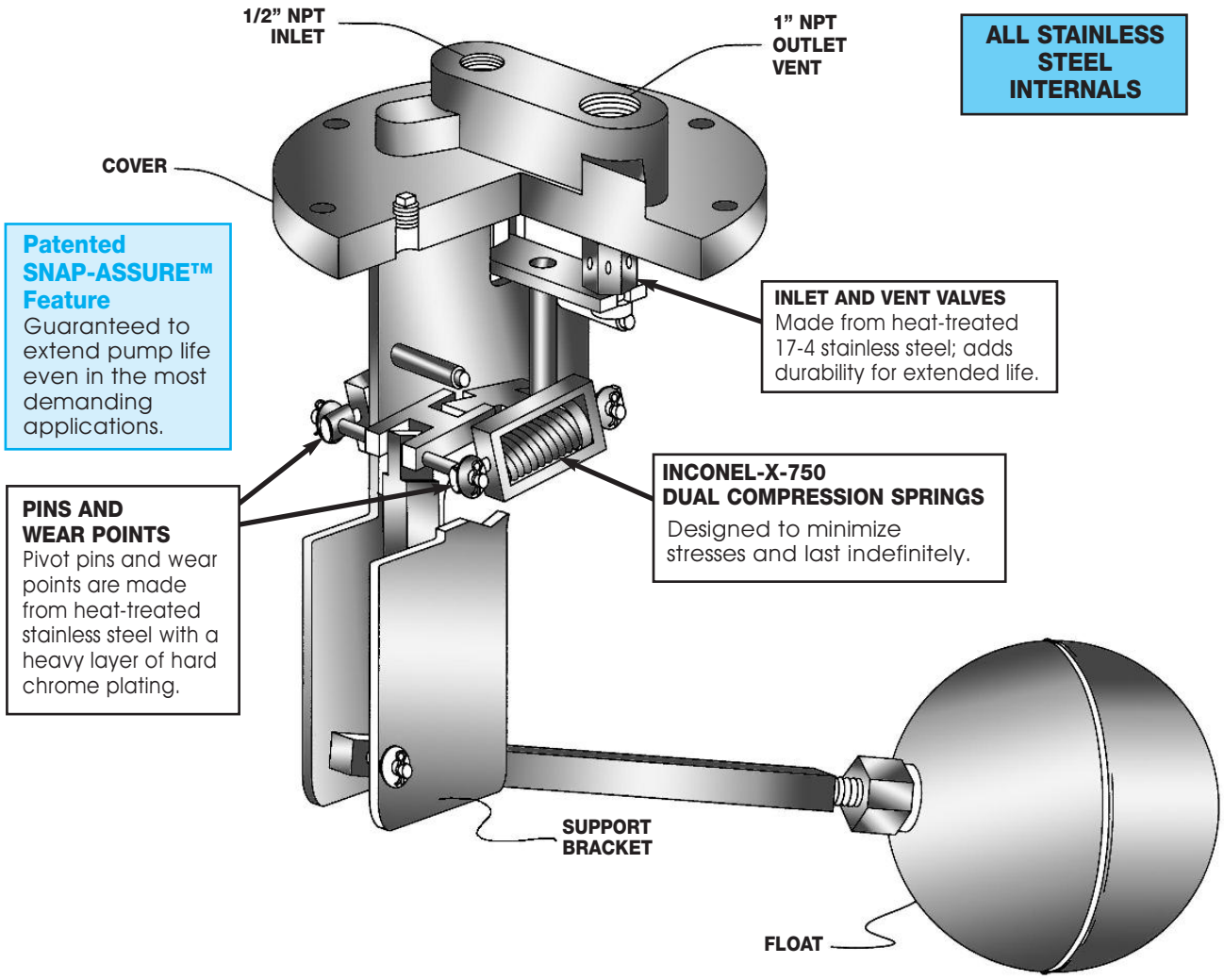
PMP Series

Pressure Motive Pump Internal Mechanism



INTERNAL MECHANISM FEATURES

- **Equipped with our Patented "Snap-Assure" feature, found only on Watson McDaniel's mechanisms. "Snap-Assure" extends the useful life of the pump by assuring that the internal toggle action triggers at every fill and discharge cycle**
- **All Stainless Steel components eliminate corrosion and rusting**
- **Hard chrome-plated pivot pins and wear points substantially reduce the rate of wear on critical components**
- **17-4 heat-treated stainless steel inlet and vent valve (Hardened seats have proven themselves to last years longer in service)**
- **Dual compression springs made from Inconel-X-750 minimize stress and corrosion and are designed to last indefinitely**
- **Precision manufactured mechanisms never require field adjustments**
- **Watson McDaniel "Snap-Assure" mechanisms can be purchased separately and will fit other manufacturers' pump tanks**

INTERNAL MECHANISM MATERIALS

Cover	Material for cover same as tank material
Cover Gasket	Garlock / Grafoil
Cover Bolts	Grade B5
Inlet Valve	Hardened Stainless Steel, Rc 40
Vent Valve	Hardened Stainless Steel, Rc 40
Mechanism Yoke	304 Stainless Steel
Ball Float	Stainless Steel
Springs	Inconel-X-750
Other Internal Parts	Stainless Steel

Snap-Assure Patent No. 6572340