



Installation Operation & Maintenance Manual



Always use caution near rotating parts.



Do not operate this equipment in excess of its rated capacity, pressure, speed and temperature or other than in accordance with instructions contained in the installation and operating instructions.

Read before starting the pump!

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Continental Pump Distributor:	
Date of Purchase:	
Purchase Order Number:	
Model Number:	
Serial Number:	



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Introduction

Progressive Cavity Pumps have similar characteristics to rotary or reciprocating pumps, such as piston, diaphragm, lobe, and screw pumps. They are also known as an eccentric screw pump due to the motion of the rotor. The one common feature being the sealed cavities with operational similarities like being able to pump at extremely low rates, to even high pressures. The similarity between other pumps and progressive cavity pumps generally ends there. Of all the types of pumps available, progressive cavity pumps are able to handle a wider range of fluid viscosities and properties than any other type of pump. The unique design of the pump makes them useful for a variety of pumping applications, such as transferring and metering shear sensitive, abrasive and viscous fluids.

The rotor seals tightly against the flexible rubber inside the stator as it rotates, forming tightly sealed cavities which carry the liquid toward the discharge port. The liquid does not change in shape or size when pumped due to the tightly sealed cavities. The effect of the progressive cavity design is that the fluid is moved at a very predictable and steady rate. Positive displacement of the pump starts the instant the rotor turns.

Dry friction is harmful to Progressing Cavity Pumps. Do not operate the pump until it is filled with the liquid to be pumped. This liquid serves as a lubricant and as a seal between the rotor and stator and is not a priming operation. Approximately 10% of the pump's displacement rating will satisfy the cooling and lubricant requirements until full displacement capacity is attained.

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Installation

1. Mount the pump on a properly machined and **fabricated steel base** that is anchored with bolts on a level solid foundation.
2. **Alignment of a direct-driven pump**, where a motor and/or a speed reducer directly connects to the pump shaft by a coupling, should be carefully checked after the pump base has been mounted on the foundation. Check the alignment of the coupling halves with a straight edge. Alignment should be checked at least four points 90° around the O.D. of the coupling. A space between the pump and driver shaft ends should be set at no less than 1/8". **NOTE:** Correct alignment is crucial for efficient operation, longevity, and reduced maintenance costs. Misalignment can lead to premature failure of bearings and seals, increased vibration, higher energy consumption, and coupling wear.
3. **Belt driven pumps** should be checked after mounting the pump base on the foundation. Make sure, with the help of a straight edge, that the belts and pulleys are in alignment and that the belts have the proper tension.
4. **Piping** to the pump should always be the same size as the pump inlet port and discharge port openings. **NOTE:** Systems that handle viscous, volatile high pressure or high temperature materials may have to be more appropriately sized.
 - a. All threaded joints should be coated and sealed with a pipe compound.
 - b. Provide for expansion in the piping system to allow for movement and deflection.
 - c. Use pipe supports to keep the weight of the piping system from causing strain on the pump.
 - d. Make all lines as direct and free of fittings as possible. Minimize the suction line by locating the pump below or close to the liquid being pumped.
 - e. It is good practice to consider installing pressure and/or vacuum gauges in both the inlet and outlet pipes to the pump to check that it conforms to your operating specifications.
 - f. Install and properly set relief valve in discharge line. *Pumps are not provided with a relief valve.*
5. Never operate pump without guard(s) in place.



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Operation

The recommended operating direction is clockwise when viewing the pump from the driveshaft end. However, the pump can be operated in either a clockwise or counterclockwise direction. The inlet and discharge ports are related to the rotation of the pump.

Note: This is not recommended for threaded CP, CPM and CPML models as it will unthread the rotor with the counterclockwise rotation.

When the pump is handling abrasive, corrosive liquids, slurries, sludges, cements, adhesives or any liquids that harden, it should be **flushed clean** between cycles. The rotation of the pump can be operated both clockwise and counterclockwise to accomplish this operation most thoroughly.

Pre-Start-Up Checks

1. Read and understand all information furnished with pump.
2. Review operating conditions.
3. Check setting of relief valve in discharge line.
4. Check for the proper position of belt or coupling guards. **Do not operate pump without guard.**
5. Fill the pump with the liquid to be pumped. **Do not operate pump dry.**
6. **Rotate driveshaft** of pump four or five rotations. This creates a seal between the rotor and stator to create pumping action.
7. Make sure the inlet and discharge lines are open.
8. Start the unit.
9. Check to see if the pump is delivering liquid. If it is not, refer to the troubleshooting section.
10. Check for any vibration, excessive heat generation or excessive packing leakage

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Maintenance

- **Always lock out/tag out (LOTO)** before performing any maintenance.
 - Refer to the **OEM maintenance manual** for model-specific instructions and lubrication specs.
 - Keep a **logbook** of weekly maintenance activities.
1. **Bearings** are an anti-friction ball type and should be periodically greased. They are initially packed when assembled at the factory.
 - a. **Do not overlubricate.**
 - b. Use quality anti-friction bearing grease.
 - c. It is recommended that under normal use no lubrication be added for the first 1200 hours of operation unless the bearing housing is radiating heat that is uncomfortable to touch.
 - d. The bearing shaft assembly should be inspected and cleaned after running the pump for approximately 2500 hours.
 - e. All old grease should be removed from the bearing and bearing housing. Inspect bearings for wear and repack the bearings with new grease.
 - f. Add a few drops of oil to bearing seals before reassembling.
 2. **Packing maintenance procedures**
 - a. The packing gland should be firmly tightened to prevent excessive leakage through the packing, but not so tight that it will cause overheating. Always adjust and align the packing gland evenly so it goes into the packing gland cavity of the pump housing.
 - b. Continental Progressing Cavity Pumps are supplied with a **lantern ring** in the midsection of the packing with access to a lubrication fitting on the external surface of the pump body. Lubricating the packing regularly with small amounts of lubricant or flushing with water will extend the life of the packing and help maintain a good seal.
 - c. A scored driveshaft reduces the life of packing and should be replaced.
 - d. When replacing worn packing use standard die-cut formed packing. Do not use one-piece spiral packing. Press into place the die-cut and preformed packing rings and stagger the joints 180° apart.

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- e. After packing is installed, tighten the gland bolts firmly and evenly. The packed stuffing box is designed to control leakage, not to stop it completely. Leakage is necessary to reduce friction and dissipate heat. Bolts should be backed off gradually as the stuffing box warms up, to avoid overheating of the packing area.
- f. A **small amount of leakage** through the packing can be normal and helpful for good operation and easily drained away from the base. A leakage rate of 50-100 drops per minute is expected until the packing has seated and adjusted to the operating temperature (approximately 10-15 minutes). If excessive leakage is present after 15 minutes of operation, tighten the gland bolts 1/6 of a turn. Tighten the bolts another 1/6 of a turn after an additional 15 if necessary and repeat until the desired leakage of 1-2 drops per minute is obtained. **Note:** Do not tighten until zero leakage is obtained. **Over tightening** of the packing gland may result in accelerated wear on the packing and damage to the shaft.

Recommended Spare Parts to Have on Hand

- Rotor and stator
- Shaft seals or packing
- Coupling elements
- Bearings
- Gaskets and O-rings
- Connecting Rod
- Gear Joint Kits & Seal Kits
- Connecting Rod Kits



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Daily Maintenance Checklist

1. Visual Inspection

- **Check for leaks** around the pump casing, seals, and piping connections.
- **Inspect the stator and rotor area** for visible wear or signs of overheating.
- Ensure **couplings, guards, and base** are secure.

2. Lubrication Check

- Verify **oil levels** in gearboxes and grease in bearing housing if applicable.
- Check for **grease fittings** on the motor and coupling—top off if required using manufacturer-recommended grease.

3. Operational Monitoring

- **Listen for abnormal noises** (squealing, knocking, grinding).
- Observe **vibration levels**; excessive vibration can indicate misalignment or worn parts.
- Monitor **pump temperature** (especially the stator area)—overheating may signal dry running or overpressure.

4. Performance Parameters

- Monitor and log:
 - Flow rate
 - Discharge pressure
 - Suction pressure
 - Motor load/current draw

Compare to standard operating values to detect early degradation.

5. Sealing System Check

- Inspect **mechanical seals or packing** for signs of wear, leakage, or overheating.
- Ensure the **seal flush system** (if present) is working properly.

6. Check for Dry Running

Make sure the pump is **primed and not running dry**, which can quickly damage the stator.

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Weekly Maintenance Checklist

1. Visual Inspection

- **Check for leaks** (oil, product, or seal water) around:
 - Stator
 - Rotor
 - Mechanical seals
 - Packing Gland
- Inspect for **abnormal wear or vibration**.
- Verify **alignment** of motor and pump.
- Look for **cracks, rust, or signs of corrosion** on housing or baseplate.

2. Lubrication Check

- Inspect **gearbox oil level**; top off if needed using manufacturer-specified lubricant.
- Check for **water or contamination** in the gearbox oil (milky appearance indicates water).
- **Grease-lubricated bearings**, inspect and re-grease as necessary.

3. Seal and Packing Inspection

- **Mechanical seals**: Look for signs of wear or leakage.
- **Packing gland** (if applicable): Ensure proper compression and drip rate (typically 1–2 drops per second).
- Check flush water supply (if used) is active and within pressure limits.

4. Coupling & Drive Inspection

- Inspect **coupling for wear, misalignment**, or signs of looseness.
- Look for any **unusual noise or vibration** from the drive.

5. Check Performance Parameters

- Monitor **flow rate, pressure, and power draw**.
- Compare normal operating values to detect early signs of wear or clogging.

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6. Pump Cleanliness

- Clean around pump base and remove any product buildup, which can trap heat or cause corrosion.
- Ensure **ventilation** around motor and pump is not obstructed.

7. Rotor/Stator Condition (Non-invasive)

- Listen for **squealing or grinding noises** that could indicate rotor/stator wear.
- If possible, check torque to detect increasing resistance.

8. Instrumentation Check

- Ensure **pressure gauges, flow meters, and temperature sensors** are reading correctly and not blocked or damaged.



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Monthly Maintenance Checklist

1. Visual Inspection

- Check for any visible **leaks** (seal, flange, or connections).
- Look for **unusual vibration** or misalignment of the drive assembly.
- Ensure the **baseplate and mounting bolts** are tight.

2. Lubrication

- **Grease bearings** according to manufacturer specs (usually once a month unless otherwise specified).
- Check **gearbox oil level** and top up or replace if contaminated.

3. Coupling & Alignment

- Inspect **couplings** for wear, looseness, or misalignment.
- Verify that shaft alignment between the motor and pump is within tolerances.

4. Drive and Motor

- Examine the **motor condition**, including temperature and noise.
- Inspect and tighten any **electrical connections**.
- Check **VFD** or control panel for fault codes or unusual readings.

5. Stator and Rotor Check

- Monitor for **excessive temperature** or pressure drop.
- If accessible without full disassembly, inspect for **signs of wear, scoring, or deformation**.
- Ensure **stator swelling** has not occurred (especially in elastomer stators due to chemical exposure).

6. Performance Review

- Record flow rate, pressure, and power draw.
- Compare against baseline to detect early signs of wear or inefficiency.
- Check for **cavitation**, dry running, or air ingress.



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7. Seals and Packing

- Inspect mechanical seals or packing glands for **leaks** or wear.
- Tighten or replace packing as needed.
- If using a **seal flush system**, verify proper flow and pressure.

8. Clean Surroundings

- Clean the pump exterior and surrounding area to avoid contamination buildup.
- Ensure that any **drain lines or relief valves** are clear.



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Quarterly Maintenance Checklist

1. Visual Inspection

- Inspect the pump for leaks, corrosion, and unusual wear.
- Check the stator and rotor for signs of wear or damage.
- Look for oil leaks from the gear reducer (if applicable).
- Inspect mechanical seals or packing for leaks.

2. Lubrication

- Check oil levels in the gear reducer or bearing housing.
- Change oil if dirty or emulsified (consult manufacturer guidelines).
- Lubricate grease fittings (if present) using manufacturer-specified grease.

3. Coupling & Alignment

- Inspect the coupling for wear or misalignment.
- Ensure alignment between motor and pump is still within tolerance.
- Tighten any loose set screws or bolts.

4. Drive System (if belt- or chain-driven)

- Inspect belts or chains for wear, cracking, or stretching.
- Check tension and realign pulleys or sprockets as needed.

5. Pump Performance

- Measure flow rate and pressure; compare with baseline values.
- Listen for unusual noise or vibration during operation.
- Check suction and discharge lines for blockages or restrictions.

6. Rotor-Stator Fit

- Measure pump torque (if possible) to detect changes in rotor-stator interference.
- Replace stator if swelling or wear is causing performance loss.
- **Disassemble and inspect** stator/rotor if performance has degraded.
- **Replace stator or rotor** if wear exceeds limits.



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7. Clean & Tighten

- Clean the pump exterior.
- Tighten all accessible bolts and mounting hardware.



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Installation Operation & Maintenance Manual Annual Maintenance Checklist for Progressive Cavity Pump

1. Visual Inspection

- Inspect the **pump body**, **stator**, and **rotor** for signs of wear, corrosion, or damage.
- Check for **leaks** (seals, gaskets, and joints).
- Inspect **drive coupling** and **alignment**.
- Examine **pipework** and flanges for strain or misalignment.

2. Check & Replace Worn Components

- **Rotor & Stator:** Measure and assess for wear. Replace if there's loss of performance or visible wear.
- **Seals and Gaskets:** Replace mechanical seals, O-rings, or packing if they show wear or leaks.
- **Couplings & Bearings:** Check for wear or misalignment; replace if necessary.
- Check **suction and discharge valves** (if present).

3. Lubrication

- Drain and **replace gearbox oil** (if applicable).
- Lubricate **bearings**, **drive shafts**, and **couplings** per the manufacturer's specifications.

4. Performance Test

- Measure **flow rate**, **pressure**, and **amp draw** under normal operating conditions.
- Compare to original specs to assess efficiency.
- Identify any **pulsation** or vibration indicating imbalance.

5. Alignment Check

- Verify **motor-to-pump shaft alignment**.
- Re-align if necessary using laser or dial indicators.

6. Control & Electrical System Inspection

- Inspect **electrical connections** for wear or corrosion.
- Test and calibrate **instrumentation**, such as pressure/flow sensors and safety interlocks.

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7. Clean and Paint (Optional)

- Clean external surfaces and **repaint** if necessary to prevent corrosion (especially in outdoor or corrosive environments).

Notes:

- Always follow **OEM (Original Equipment Manufacturer)** recommendations for torque values, tolerances, and part replacement intervals.
- Keep detailed **maintenance logs**.
- Consider **vibration and oil analysis** as predictive maintenance tools if pump is critical to operations.



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Storage

General Storage Guidelines

- Loosen packing gland to decompress packing set.
- Base units that will be stored for long periods can be rotated every 6 months or remove the stator and belts. If they cannot be removed seal the discharge port. **Do not use oil on natural rubber.**
- Rotate shaft manually up to 360° every 3 months.
- Spray unprotected metals with a good rust preventative and re-inspect every 3 months.
- It is best to store in warm, dry area with low humidity. Inside is preferred, but if stored outside wrap tightly with a weatherproof cover.

Start-up after storage

- Fill with fluid
- Check packing. Tighten or replace if necessary.

Refer to Pre-Start-Up Checks for procedures on page 4.



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Troubleshooting

Troubleshooting Pump Performance

A summary of possible causes of improper performance of Progressing Cavity Pumps:

No liquid delivered

- Pump rotating in the wrong direction
- Suction lift too high
- Clogged suction line
- Air pockets or vapor lock
- Air leaks in suction line
- Faulty relief valve in system
- Pump not properly primed
- Suction line not submerged in product
- Worn pump

Pump Takes Too Much Power

- Speed too high
- Liquid more viscous than anticipated
- Operating pressure is higher than specified. Check this with gauge at the pump outlet
- Outlet line obstructed
- Mechanical defects, such as bent shaft, tight packing gland, or misalignment of piping
- Relief valve in system not operating properly

Insufficient Liquid Delivered

- Air leaks in suction line
- Air leaks in through packing
- Speed too low
- Suction lift too high
- Partial air pockets or vapor lock
- Restricted suction line
- Faulty relief valve in system
- Worn pump

Excessive Noise

- Starved pump, liquid not getting into pump
- Air leaks in suction line
- Air or gases in liquid
- Pump speed is too high
- Improper mounting, check alignment thoroughly
- Excessive discharge pressure

Rapid Wear of Stator

- Pump ran dry
- Grit or dirt in liquid
- Pump is running too fast
- Excessive pressure
- Corrosion



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Loss of Suction after Start-up

- Pump not properly primed
- Suction piping not submerged
- Suction piping too small
- Air leaks in suction
- Insufficient liquid supply