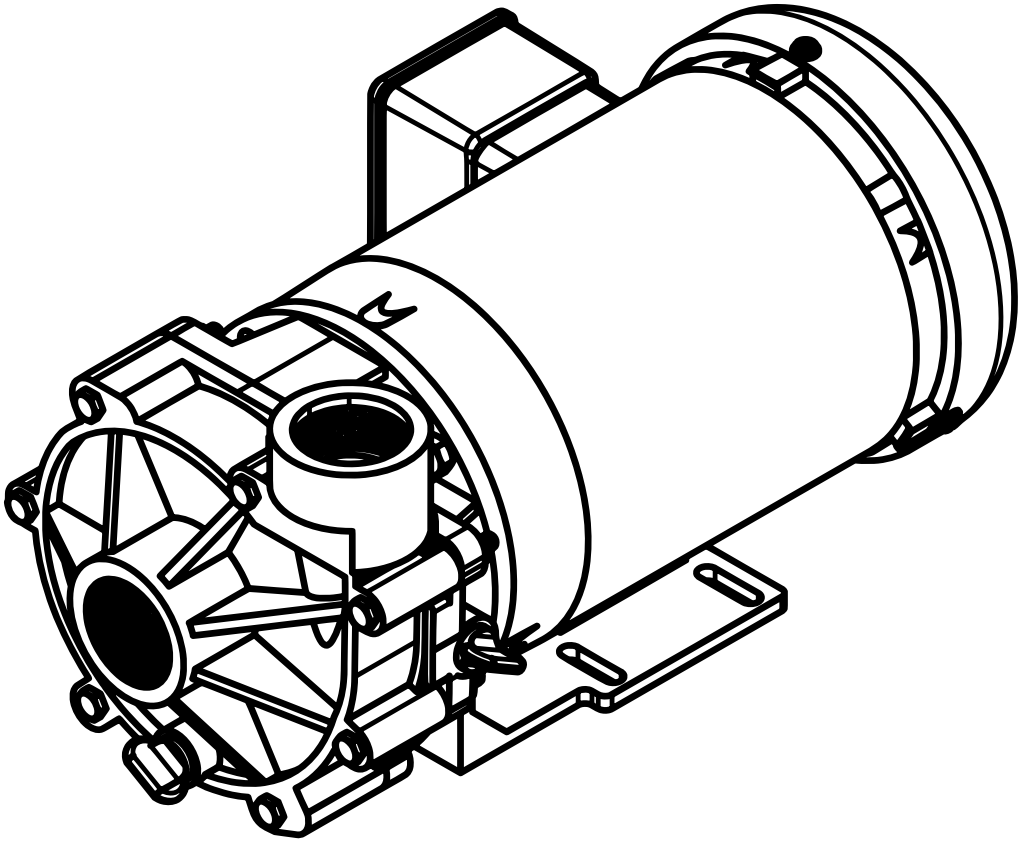
OWNER'S MANUAL

Delta P Series

Flooded Suction Centrifugal Pumps

PL, PF, PH, VP



PUMP MODEL _____

SERIAL NO. _____

DATE PLACED IN SERVICE _____

RETAIN THIS INFORMATION FOR FUTURE REFERENCE.

For questions regarding installation, operation or maintenance, call (503) 356-5888 or email techhelp@performancepropumps.com

PerformancePro

PROUDLY BUILT IN THE USA SINCE 2000 PUMPS

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SECTION 1

Important Safety Instructions

Read all instructions before installing or operating this pump.

Keep this manual with the equipment. It covers installation, operation, maintenance and troubleshooting of the PL, PF, PH, VP series.

Safety Symbols Used in This Manual

⚡	A condition that can damage the pump or cause minor personal injury if not avoided.
⚡ WARNING	A hazard that, if not avoided, can result in serious personal injury or death.

Principal Hazards

⚡ WARNING

Pressure Hazard!

Do not run your pump with discharge ports closed or blocked. Be sure to release system pressure before working on the pump.



⚡ WARNING

Electrical Hazard!

Ground pump before connecting to power supply! Risk of shock, burn or death if not handled properly.



⚡ WARNING

Burn Hazard!

Operating motor can be very hot. Do not touch motor while running. Allow to cool 30 minutes after shut down before handling. Risk of burn.



General Warnings

1. This pump and motor must be installed by a qualified electrician or serviceperson in accordance with all applicable state and local codes and ordinances, and in accordance with the National Electrical Code. Improper installation may create a mechanical or electrical hazard that could cause damage to property and result in serious injury or death.
2. Disconnect and lock out power at the source before servicing the pump.
3. **For three-phase PL, PF and PH models, verify motor rotation before placing the pump in service.** Supply phase sequence determines rotation. A pump running in reverse rotates and moves water but will not develop rated flow, and reverse rotation can loosen the impeller. See Section 4.
4. **Unexpected start and restart hazard.** A stopped motor is not a safe motor. A drive, timer, PLC, float switch or other automatic control can start the pump, and the pump can restart without warning when power is restored after an interruption or when an overload device resets. Disconnect and lock out power at the source before opening, cleaning or servicing the pump.
5. **Rotating parts hazard.** Keep hands, hair, clothing and tools clear of rotating components. Do not operate the motor with guards or the fan cover removed.

6. Do not start the pump while the motor shaft is still turning. Allow the pump to come to a complete stop before restarting.
7. Wire to the schematic on the motor.
8. **This is not a self-priming pump.** The volute and the entire suction line must be filled with liquid before starting. Dry running destroys the mechanical seal and can cause permanent damage to the pump. Dry-running damage is not covered by the warranty.
9. Install a ball or swing check valve where required to prevent reverse flow and reverse rotation after shutdown. Do not use spring loaded check valves.
10. Maintain a minimum flow of two gallons per minute.
11. Inspect the pump and motor weekly. Leakage between the motor and the pump volute indicates mechanical seal failure; replace the seal. Seal faces are a wear item: replace on evidence of leakage, or every three years in fresh water and annually in salt water, whichever occurs first. Abnormal noise requires shutdown. See Section 6.
12. Protect the pump from freezing. Water left in the volute or plumbing can freeze and crack the housing. A freeze-damaged housing can fail when the system is repressurized. Inspect and replace damaged components before returning the pump to service. Freeze damage is not covered by the warranty. See Section 8.

Variable Speed Models APPLIES TO VP ONLY

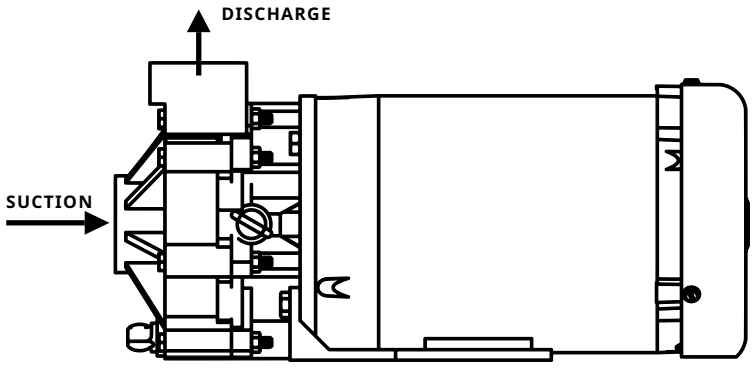
13. Do not lift the motor by the control unit.
14. Shade the motor and control from sun, rain and snow. Provide cross ventilation and protect the ventilation openings from debris.

SECTION 2

Plan the Installation

Siting, pipe sizing and valve selection determine seal life, cavitation margin and energy consumption. The Delta P Series has 1-1/2″ NPT female ports and requires a flooded suction. Establish the layout before plumbing.

How the Pump Works



Water enters the axial suction port on the volute face and leaves through the discharge port on top.

Motor speed determines flow rate. Water enters the volute axially through the suction port, passes into the eye of the impeller, and is accelerated outward by the impeller vanes. The volute converts that velocity into static pressure at the discharge port.

This pump is not self-priming. It cannot draw liquid up into an empty suction line. The volute and the entire suction line must be full of liquid before the pump will move anything, which is why the layout below matters more here than on a self-priming pump.

Any restriction upstream of the impeller reduces output: undersized pipe, excess fittings, a partially closed valve, or a clogged external strainer.

Receiving Inspection

Inspect the pump on receipt for handling damage and verify the product against the order. Report damage to the freight carrier and the vendor. Report order discrepancies to the vendor.

Siting the Pump

Mount the pump below the level of the source liquid. This is the defining requirement of a flooded suction installation. With the pump below the source, the volute and suction line fill by gravity and stay full. A Delta P mounted above the source will not prime and must not be operated.

Position the pump as near the source and as low as practical. This reduces friction loss and cavitation risk.

Mount the motor to a stable base where it will not be submerged. In a vault installation, provide drainage to prevent flooding, mount the pump on a pedestal to raise it clear of the floor, and ventilate the vault.

Locate the motor on a slight elevation so that water does not run or puddle beneath the pump. Avoid splashing or spraying near the motor.

Protecting the Motor

These motors are totally enclosed and fan cooled. The enclosure protects the windings from dust and moisture.

The outer surface of the motor is the cooling surface. Keep the fan cover inlet and the motor exterior clear. Do not stack material against the motor or enclose it. Shade the motor from direct sun and shelter it from rain and snow while maintaining air movement around it. Ambient temperature governs winding temperature: a motor in a still, hot equipment room runs hotter than the same motor in open air.

> **WARNING**
> Protect the motor from dirt, water and foreign matter. Do not operate a flooded motor until an authorized motor technician has inspected it and confirmed it safe to operate. Damage from dirt, moisture, foreign matter or corrosion is not covered by the warranty.

Pipe Sizing and Plumbing

Minimize friction loss. Size pipe diameter to the design flow rate. Keep runs short and minimize elbows and fittings.

Never restrict the intake. Keep the suction line as free of elbows, fittings and valves as possible. Larger diameter pipe reduces friction loss and improves available flow.

The pump ports are 1-1/2″ NPT female on both suction and discharge. Use plastic fittings. **Seal the pipe threads with PTFE paste.** Support and align all plumbing so no load is carried by the volute.

Valves and Strainers

Install isolation valves on the suction and discharge. These allow the pump to be shut off and removed for service without draining the system.

Install a ball or swing check valve where required to prevent reverse flow and reverse rotation after shutdown. Do not use spring loaded check valves.

Fit a strainer on the suction side where debris is present. The Delta P has no integral strainer. Strainer basket MPP-10 is available separately. Keep it clean; a loaded strainer starves the pump.

SECTION 3

Mechanical Installation

Mount the pump and connect the plumbing before any wiring.

> **WARNING**
> When replacing an existing pump, disconnect and lock out power at the source before removal. Do not connect power to the new pump until the mechanical installation is complete and Section 4 has been followed.

1. Remove the pump from the box after inspection.
2. Secure the pump on a solid, flat foundation **below the level of the source liquid**. Mount under cover and provide ventilation. See Section 2 for siting and motor protection.
3. Install isolation valves on the suction and discharge for servicing, and a ball or swing check valve where required to prevent reverse flow after shutdown. Do not use spring loaded check valves.
4. Dry fit the plumbing first to confirm fit and alignment.
5. **Seal the 1-1/2″ NPT threads with PTFE paste** and hand tighten into the volute. Do not over tighten; the volute is plastic and will crack. Support the plumbing so no load is carried by the volute.
6. Check the suction and discharge connections for a snug fit. The suction line is under pressure from the source; a loose joint leaks liquid.

Mechanical installation is complete. Wire the pump per Section 4, then fill and start it per Section 5. Do not start the pump before the volute and suction line are full.

SECTION 4

Electrical

> **WARNING**
> Disconnect and lock out power at the source before wiring any part of the motor. Wiring must be performed by a licensed electrician or professional serviceperson.

Before You Wire

1. Verify that the motor is configured for the supply voltage. A mismatch will damage the motor and voids the warranty. *Example: on a 460V circuit, the motor connections must match the 460V wiring diagram on that motor.*
2. Supply voltage must be within ±10% of nameplate, measured at the motor terminals under load. Incorrect voltage can cause fire or motor damage and voids the warranty.

Making the Connections

3. Wire the motor based on the connection diagram located on or near the nameplate of the motor. High and low voltage arrangements differ.
4. Make all connections clean and tight. Ground the motor. The green ground terminal is located inside the motor connection box and must be connected to an electrical service ground.
5. Connect the pump to an adequately sized dedicated circuit. Shared circuits cause voltage drop.

Circuit Protection

Size branch-circuit conductors, branch-circuit short-circuit and ground-fault protection, and motor overload protection in accordance with NEC Article 430 and all applicable local codes. Conductor ampacity depends on insulation rating, ambient temperature, conduit fill, termination temperature rating and the length of the run — none of which can be specified in advance.

Branch-circuit protection is not motor overload protection. These motors have no integral thermal protector, so overload protection must be provided by the overload relay in a motor starter or by a drive.

When operated without a VFD, these motors may be started across the line. Reduced-voltage and wye-delta starting are not required.

Size overload protection from the full-load current stamped on the motor nameplate. The nameplate is the controlling reference.

Provide ground-fault protection as required by the National Electrical Code and all applicable local codes. Installations in or adjacent to ponds, tanks or other bodies of water may be subject to additional requirements; confirm with a qualified electrician. On single-phase models — VP, and single-phase PL, PF and PH — where cord-connected, or where the branch circuit otherwise requires it, supply the pump through a GFCI-protected circuit.

Verify Rotation — PL, PF and PH — Three Phase

> **WARNING**
>
> Do not place the pump in service until rotation has been verified.
>
> Reverse rotation is not only a loss of performance. The impeller is threaded onto the motor shaft and reverse rotation acts against that thread. The impeller can loosen, damaging the impeller, seal and shaft. Reverse rotation damage is not covered by the warranty.

Three-phase motors run in either direction depending on supply phase sequence. The pump is close coupled; the motor cannot be run uncoupled. Verify rotation by either method below.

On a drive. PL, PF and PH are inverter capable. Where a variable frequency drive is available, run the motor at 5 to 10 Hz. The fan turns slowly enough to read directly, and the motor develops only a few percent of rated power. This is the preferred method where a drive is fitted.

Without a drive. Jog the motor as follows.

1. Open the suction valve and confirm the volute is flooded. Do not jog a dry pump.

2. Observe from the opposite drive end, where the fan is visible through the fan cover openings. Keep hands, hair, clothing and tools clear of the fan.
3. Energize the motor for one to two seconds, then cut power. **A jog of this length will not loosen the impeller. Damage results from sustained reverse running, which is why rotation must be confirmed before the pump enters service.**
4. **The motor must turn clockwise viewed from the opposite drive end**, which is counter-clockwise viewed from the shaft end.
5. If rotation is incorrect, disconnect and lock out power, exchange any two motor leads and retest.

Reading the fan direction — use either method:

- **Video.** Record the fan through the cover at 120 or 240 frames per second and review the playback. Direction is unambiguous in slow motion and the fan cover remains fitted. A strip of light-colored tape on one blade provides a reference mark.
- **Coast-down.** Observe the fan as the motor slows. Direction cannot be read at full speed. If the fan cannot be seen through the cover, disconnect and lock out power, remove the cover, mark one blade with light-colored tape, refit the cover, then restore power and jog. **Do not jog or run the motor with the fan cover removed.**

Confirm rotation before running the pump beyond the jog.

PL, PF and PH are supplied three-phase as standard. A single-phase motor has a fixed direction of rotation and does not require the rotation check above.

Variable Speed Models APPLIES TO VP ONLY

VP accepts single-phase supply at 115 or 230 volts and carries an onboard drive. No external drive panel or motor starter is required. The 2.7 HP model is 230V only.

Where a cord is fitted, do not bury it except in certified conduit, and route it to minimize damage. Replace damaged cords. Do not supply the pump through an extension cord.

Fixed-Speed Models on a Customer-Supplied VFD

PL, PF and PH are inverter capable and may be operated from a separately supplied variable frequency drive. Size input conductors to the drive rating and follow the drive manufacturer's instructions. The drive provides motor overload protection in place of a starter.

SECTION 5

Filling & Startup

Fill the volute and the suction line, then bring the pump into service. Do not start the pump until the mechanical installation in Section 3 and the wiring in Section 4 are complete.

Before You Start

- Motor rotation verified on three-phase PL, PF and PH. See Section 4.
- The pump is mounted below the level of the source liquid.
- Suction and discharge isolation valves fitted and operable.
- Suction and discharge connections tight.

Fill the Pump

The volute and the entire suction line must be full of liquid before the pump is started. This pump will not draw liquid into an empty suction line.

Open the suction valve fully and allow the pump to fill by gravity. Open the discharge valve, or crack it, to let displaced air escape. Confirm liquid is present before applying power.

> **WARNING**
> Do not run the pump dry. Dry running destroys the mechanical seal and can cause permanent damage to the pump. Dry-running damage is not covered by the warranty.

Start the Pump

1. With the volute flooded and the suction valve fully open, apply power.
2. Confirm discharge pressure within a few seconds of starting. A flooded pump develops pressure immediately; there is no priming cycle.
3. If no discharge pressure develops, shut the pump down at once. See Section 9.
4. Once flow is established, set the discharge valve to the required duty. Do not throttle the suction valve.

What to Expect at Initial Start-Up

A correctly filled pump develops discharge pressure almost immediately after startup. If pressure is slow to build or fluctuates, the volute or suction line is not full. Shut down and refill before restarting.

Why Flooded Suction

The impeller of a centrifugal pump can move liquid but cannot evacuate air. With air in the volute the impeller spins without developing pressure, the mechanical seal loses its lubricating film, and the faces are damaged within seconds.

Mounting the pump below the source removes that failure mode. The source keeps the suction line and volute full; there is nothing to prime and nothing to hold.

If the Pump Stops Developing Pressure

A pump that was running normally and stops developing pressure is either not full or not turning. Confirm the suction valve is open, the source still provides flooded suction, and the suction line and strainer, where fitted, are clear. If these conditions are correct, inspect the motor and impeller drive.

Shut down and lock out power at the source before investigating. See Section 9.

Motor Speed

PL Series runs at 1725 RPM; PF and PH run at 3450 RPM. On VP, reduce to the operating setpoint once flow is established. Flow must remain above two gallons per minute at all times.

System specific assessments: 503-356-5888, sales@performancepropumps.com.

SECTION 6

Routine Maintenance

Maintenance that does not require disassembly. Disassembly is Section 7.

Inspection Schedule

Weekly	Inspect the pump and motor. Leakage between the motor and the pump housing indicates seal failure; replace the seal. Clean the strainer basket where fitted, more frequently under heavy debris load.
Monthly	Record discharge pressure and motor amp draw. Amp draw must remain at or below the motor nameplate full-load current. A rising trend indicates a developing fault.
Every three years	Replace the mechanical seal. Annually in salt water or poor water quality.

Cleaning the Strainer Basket — Where Fitted

1. Shut down the pump. Disconnect and lock out power at the source and relieve system pressure before opening the strainer.
2. Close the suction and discharge isolation valves.
3. Open the strainer and remove the basket. Clean it with a hose sprayer and brush. Do not strike the basket against a hard surface; this weakens and damages it.
4. Reinstall the basket and close the strainer. Confirm the strainer lid seal is clean and properly seated. Leakage at the lid can allow air into the suction stream or water to escape, depending on the installation.
5. Open the suction valve and allow the pump and suction line to refill by gravity. Confirm the volute is full.
6. Open the discharge valve.
7. Restore power and start the pump. Confirm discharge pressure.

> **WARNING**
> If the pump has run without incoming flow for more than three minutes, shut down and disconnect and lock out power at the source. Allow a hot volute to cool for a minimum of one hour before opening the pump. The volute must be cool to the touch before opening. Risk of burn if opened hot.

Seals and Bearings

Seals and bearings are wear items. The standard mechanical seal is **MPS-564**, a non-metallic seal for salt water service. **MPS-517** is a stainless seal for salt water service. **MPS-513** is a stainless seal for fresh water service.

Replace the mechanical seal on evidence of leakage, or every three years in fresh water and annually in salt water, whichever occurs first. Interval depends on environment and water quality.

This interval is planned wear maintenance, separate from the seal warranty period. Periodic maintenance is not covered by the warranty. See Warranty.

Premature seal failure is commonly caused by dry running, cavitation, abrasives, or loss of flooded suction. The weekly inspection governs; the replacement interval is a backstop. On any evidence of leakage, see Section 9.

Abnormal noise indicates failing bearings. Shut down and contact support.

Repair Options

1. Obtain a return authorization from PerformancePro Pumps and ship the pump for repair.
2. Request a list of authorized motor repair centers from PerformancePro Pumps. Repairs performed outside the factory may void the warranty.
3. Order bearings and a seal kit from PerformancePro Pumps and perform the repair on site. See Section 7.

Parts and Service Department — (503) 356-5888, techhelp@performancepropumps.com

SECTION 7

Service & Parts

Work requiring disassembly: mechanical seal, impeller and bearing replacement. Maintenance that does not require disassembly is in Section 6.

Item numbers refer to the exploded view and the parts list at the end of this section.

> **WARNING**
> Disconnect and lock out power at the source and relieve all system pressure before beginning. Protect the polished and lapped seal faces from damage during handling. Do not run the pump dry; it must be filled and sealed before starting.

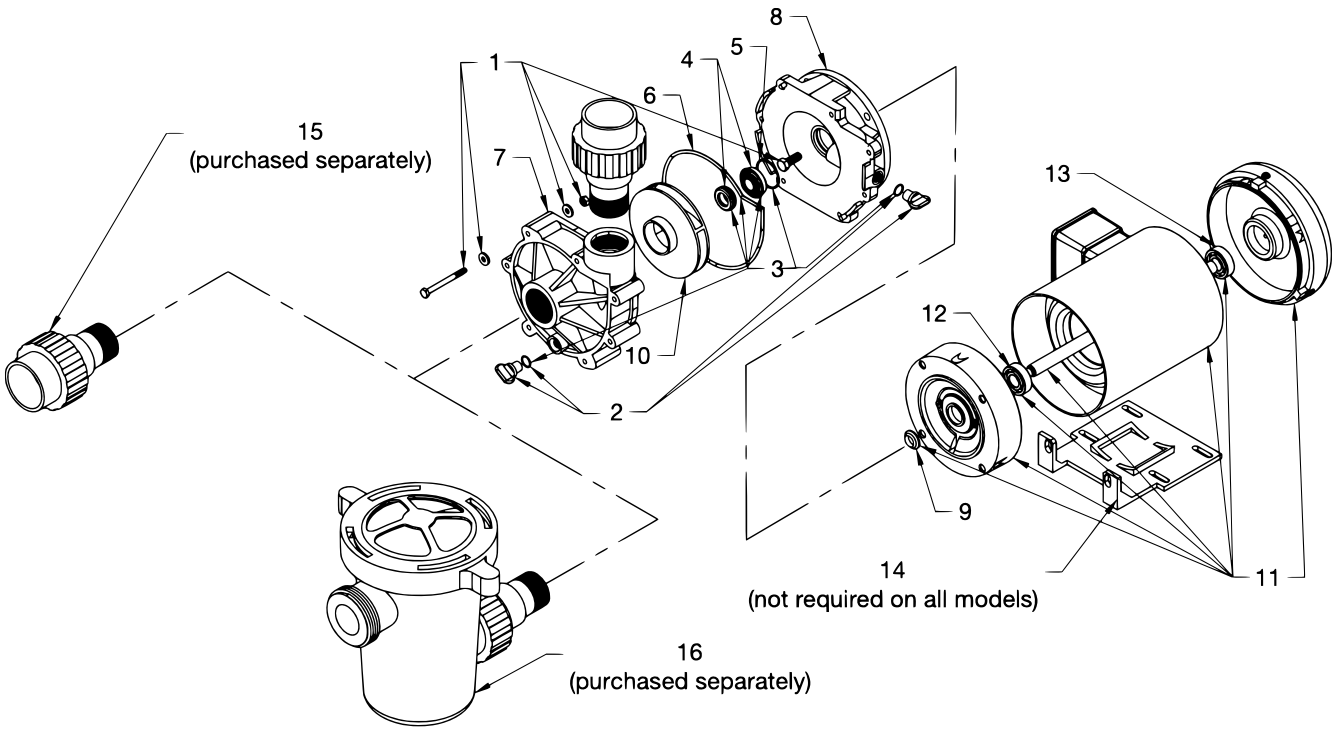
Tools Required

- 7/16 inch socket or open end wrench
- 9/16 inch open end wrench
- Small and large flathead screwdrivers
- Emery cloth

Seal Kit Contents

Seal kit **P-SK1-P** (non-metallic, standard), **P-SK1-S** (stainless, salt water) or **P-SK1** (stainless, fresh water) contains the mechanical seal, seal plate bore o-ring, volute o-ring and two drain plug o-rings.

Exploded View



Delta P Series exploded view. Item numbers match the parts list at the end of this section.

Disassembly

1. Disconnect and lock out power at the source.
2. Close the suction and discharge isolation valves and drain the pump by removing both drain plugs **(2)**.
3. Remove the seven 1/4-20 × 2-3/4″ hex bolts **(1)** that hold the volute **(7)** to the seal plate **(8)**. The volute may be left in line with the plumbing.
4. Withdraw the seal plate and motor assembly from the volute.
5. Remove the cap at the opposite drive end of the motor and hold the shaft stationary with a large screwdriver or wrench, then unscrew the impeller **(10)** counter-clockwise.
6. Remove the rotating half of the seal from the impeller hub.
7. Remove the four 3/8″ hex bolts **(1)** that hold the seal plate **(8)** to the motor C-face and slide the seal plate forward, away from the motor.
8. Press the stationary seat **(4)** out of the seal plate from the back. **Do not pry it out from the front.**
9. Clean the seal plate, seal bore and motor shaft. If the shaft has corrosion build-up, clean it with emery cloth. Remove the slinger **(9)** if replacing bearings **(12, 13)**.

Reassembly

1. Check all pump parts and clean as needed.
2. Install the bore o-ring **(5)** into the o-ring gland in the seal plate bore.

3. Press the stationary seat **(4)** into the seal plate bore. Moisten the rubber boot with water first. **Press only on the stainless steel or polypropylene shell, never on the seal face. The seat must sit flat. If one side is higher than the other the seal will leak.** The polished face must be exposed.
4. Install the slinger **(9)** onto the motor shaft.
5. Mount the seal plate **(8)** onto the motor C-face with the four 3/8″ hex bolts **(1)** and tighten snugly.
6. Fit the rotating half of the seal into the impeller hub, polished face outward toward the seat. Moisten the elastomer with water first and press it in squarely.
7. Thread the impeller **(10)** clockwise onto the motor shaft and tighten, holding the shaft stationary at the opposite drive end.
8. Place the volute o-ring **(6)** in the groove in the volute. It is easiest to lay the volute suction side down, place the o-ring in the groove, and lower the seal plate and motor assembly onto it so the o-ring cannot fall out.
9. Install the seven 1/4-20 × 2-3/4″ hex bolts **(1)** with washers and tighten in a cross pattern until reasonably snug. Do not overtighten; the volute is plastic.
10. Fit both drain plugs **(2)** with their o-rings and tighten.
11. Open the suction valve and allow the volute and suction line to refill by gravity. Confirm the volute is full, open the discharge valve, restore power and start the pump. **Confirm discharge pressure within a few seconds. If none develops, shut down immediately.** Contact PerformancePro Pumps.

Parts List

ITEM	DESCRIPTION	REPLACEMENT PART OR KIT
1	Pump Hardware Kit	MPH-20
2	Drain Plug Kit	PPD-10
3	Delta P Seal Kit	P-SK1-P (non-metallic, standard), P-SK1-S (stainless, salt water), or P-SK1 (stainless, fresh water)
4	Mechanical Seal*	MPS-564 (non-metallic, standard), MPS-517 (stainless, salt water), or MPS-513 (stainless, fresh water)*
5	Seal Plate Bore O-ring*	PBO-10*
6	Volute O-ring*	PVO-10*
7	Pump Volute	PPV-15
8	Seal Plate	PPB-10
9	Motor Shaft Slinger	PMP-12
10	Impeller	Contact factory
11	Motor	Contact factory
12	Motor DE Bearing	Contact factory
13	Motor ODE Bearing	Contact factory
14	Pump Motor Base	MPB-48 or MPB-56
15	Union Assembly — purchased separately	MPF-215
16	Strainer Basket — purchased separately	MPP-10

Kit Contents

KIT NAME	PART NUMBER	CONTENTS
Pump Hardware Kit	MPH-20	(7) 1/4-20 × 2-3/4″ SS hex bolts, (4) 3/8-16 × 1″ SS hex bolts, (7) 1/4″ SS nuts, (14) 1/4″ SS washers
Drain Plug Kit	PPD-10	(2) poly drain plugs, (2) o-rings
Delta P Seal Kit	P-SK1-P (standard), P-SK1-S or P-SK1	(1) mechanical seal, (1) seal plate bore o-ring, (1) volute o-ring, (2) drain plug o-rings

Items marked * are not available for individual sale; use the kit.

SECTION 8

Extended Shutdown

Prepare the pump for any extended period out of service. Required where freezing temperatures occur for extended periods; recommended wherever freezing is possible.

> **WARNING**
> Water expands on freezing and can damage the pump, plumbing and connected components. A freeze-damaged housing can fail when the system is repressurized. Inspect and replace damaged components before returning the pump to service.

Full Disconnection Method

For pumps installed outdoors without the protection of a building or vault.

1. Disconnect and lock out power at the source. These motors are hardwired: either have a qualified electrician disconnect the supply, or leave the motor connected and separate the pump end per Section 7, then insulate and cover the motor.
2. Close the suction and discharge valves and drain the pump by removing both drain plugs **(2)**.
3. Where a separate strainer is installed, open or vent the strainer as needed to allow the system to drain completely.
4. Where union assemblies are installed, disconnect the suction and discharge plumbing by loosening the union nuts. Otherwise break the threaded connections at the pump.
5. Remove the pump. Store fully drained with the drain plugs out, in a dry, heated location.

Note: Drain the system plumbing and connected components.

Connected Method

For pumps in a vault, shed or other covered outdoor location where removal is impractical.

1. Disconnect and lock out power at the source. Close the suction and discharge isolation valves. Remove both drain plugs **(2)** and allow the pump to drain completely. Where a separate strainer is installed, drain it as well.
2. Drain all system plumbing.
3. Insulate the pump and exposed pipes, covering them fully against moisture intrusion and freezing. **Do not cover directly with plastic sheeting**; it creates condensation.

SECTION 9

Troubleshooting

Common faults and corrective action. Error codes on VP models are listed in the motor manual supplied with the pump. Technical support: 503-356-5888, techhelp@performancepropumps.com.

> **WARNING**
>
> Electrical troubleshooting involving energized circuits, voltage measurements, breakers, motor terminals or electrical panels must be performed by a qualified electrician or serviceperson.
>
> Disconnect and lock out power at the source before mechanical troubleshooting or touching pump components. Relieve system pressure before opening or disassembling the pump or plumbing.

PROBLEM	KNOWN ISSUE	TRY THIS
No flow or no discharge pressure	Volute or suction line not full	■ Open the suction valve and allow the pump to fill by gravity. Confirm liquid is present before restarting.
	Suction valve closed or restricted	■ Confirm the suction isolation valve is fully open and the suction line is clear. Clean the suction strainer, where fitted.
	Source level below the pump	■ The pump must sit below the source liquid level. See Section 2.
Low or intermittent flow	Flow has slowed or is intermittent	■ Clean the suction strainer, where fitted. ■ Inspect the impeller for obstruction. See Section 7. ■ Inspect the volute and connections for leaks. ■ Clear any obstruction in the plumbing.
	Reverse rotation	■ On three-phase PL, PF and PH, a pump in reverse rotation develops substantially less head and draws less current. Discharge pressure well below the published curve with amp draw well below the motor nameplate full-load current indicates reverse rotation. See Section 4.
	Cavitation	■ Noise like gravel in the pump with fluctuating discharge pressure indicates cavitation. Reduce suction-side restriction: remove unnecessary fittings, increase suction pipe diameter, or clean the strainer where one is fitted.
Motor will not start	Circuit breaker tripped, or no power	■ Reset the circuit breaker. ■ Have a qualified electrician investigate repeated breaker trips. ■ Verify supply voltage is present. Test at a second location to confirm.
	Incorrect voltage	■ Verify supply voltage against the nameplate. ■ Verify all connections are secure.
	Bearing seized	■ Disconnect and lock out power at the source, then rotate the motor shaft by hand at the opposite drive end. Replace the bearings if the shaft does not turn freely.
Motor stalls during operation	Motor overloaded	■ With power disconnected and locked out, confirm the motor turns freely by hand. ■ Inspect the impeller and volute for obstruction.
	Low voltage	■ Have a qualified electrician measure voltage under load at the connection terminals. Must be within ±10% of nameplate.
	Tripping breaker	■ Repeated tripping indicates a circuit overload beyond the breaker rating. Refer to an electrician.
Motor overheating	Overly hot, shutting down or cycling on and off	■ Incorrect wiring. Refer to an electrician. ■ Have a qualified electrician test the breaker and replace it if faulty. ■ Clear any airflow restriction. Keep the fan cover inlet and motor exterior clear. ■ Provide vented shade where the pump is in direct sunlight.

PROBLEM	KNOWN ISSUE	TRY THIS
Motor vibrates or is excessively noisy	Motor base	■ Inspect the motor base for cracks. Confirm mounting bolts are tight.
	Pump	■ Disconnect and lock out power. Confirm the impeller is seated on the shaft. Inspect for impeller damage and obstruction.
	Bearings	■ Abnormal noise indicates failing bearings. Shut down and contact support. See Section 6.
Pump is leaking	Leakage between the motor and the volute	■ Replace the mechanical seal **(4)** and the seal plate bore o-ring **(5)**.
	Leakage at the volute joint	■ Inspect the volute o-ring **(6)** for cracking or flat spots and replace as required. Check the seven hex bolts **(1)** for even tension.
	Leakage at a threaded connection	■ Reseal the NPT threads with PTFE paste. Do not over tighten; the volute is plastic.

Limited Warranty

PerformancePro Pumps
Delta P Series
LIMITED WARRANTY

This Delta P Series product is warranted to the Purchaser (defined herein as the original end user) to be free of defects in construction and workmanship at the time of purchase. Fixed speed models are warranted for three years from the date of purchase for fresh water use, or one year for use with salt water or other suitable fluids. Variable speed models are warranted for one year from the date of purchase, regardless of fluid. In the event this product malfunctions within the applicable period the sole obligation of PerformancePro Pumps will be to replace or make this product capable of being operated according to the original product description without charges for labor or parts to the Purchaser, and are subject to the following conditions:

1. The malfunction is proved attributable to a defect in construction or workmanship, including repairs performed under this warranty. Malfunction for any other reason — including but not limited to misuse, abuse, negligence, accident, corrosion or salt build up, incorrect wiring or electrical supply, tampering with parts, or improper installation — will not be remedied under this warranty. Problems or damage from failure to comply with instructions in the owner's manual, improper plumbing and positioning, flooding, incompatibility with fluid chemistry and running the unit dry are not covered under this warranty.
2. PerformancePro Pumps must perform all warranty repairs. Purchaser must retain the purchase receipt and present it with this certificate as proof of ownership and entitlement to warranty repairs. The cost of unauthorized repairs will not be reimbursed to Purchaser by PerformancePro Pumps, and are not the responsibility of PerformancePro Pumps. If repairs by Purchaser or a third party damage the product, such damage is not remediable under this warranty.
3. Purchaser shall bear all shipping, packing, and insurance costs and all other costs, excluding labor and parts necessary to effectuate repairs under this warranty. Purchaser will pay for return freight.
4. For applications that involve fluids other than water, the Purchaser shall retain and present to PerformancePro Pumps evidence of purchaser's compatibility tests under actual operating conditions. Any problems caused by a chemical incompatibility of the fluid with the pump materials, are expressly not covered by this warranty.
5. Periodic check-ups and/or maintenance are not covered by this warranty.
6. For all sales in the State of Oregon this is the sole and exclusive manufacturer's warranty. There are no warranties which extend beyond the warranty set forth herein, and in accord with Oregon Revised Statutes ORS 72.3160 any and all implied warranties, including any warranties of merchantability and fitness for particular purpose, are disclaimed and excluded. Some States do not allow disclaimers/exclusions of, or limitations on how long an implied warranty lasts, so in such States, and except as is otherwise provided by applicable law of said States, no action on a warranty implied at law shall be commenced more than one year following the date of purchase. No action shall be brought for breach of any express warranty subsequent to the expiration of the express written warranty.
7. Incidental and consequential damages (specifically including, but not limited to, damages for loss of profits or damages relating to down time of personnel, equipment, or facilities) caused by malfunction, defect, or otherwise, whether alleged to be the result of breach of any express or implied warranty, or the negligence, willful misconduct or other act of PerformancePro Pumps are not the responsibility of PerformancePro Pumps, and to the extent permitted by law, are hereby excluded, including, but not limited to property damage, and to the extent not prohibited by applicable law, personal injury or death and Purchaser hereby agrees to expressly waive any claim for all such damages. If a final determination is made in a court of competent jurisdiction that any one or more of the damages which are disclaimed, excluded and/or waived under this paragraph are not allowed under public policy or applicable law, then the disclaimer, exclusion and waiver of all of the other damages not prohibited by public policy or applicable law shall continue to apply.
8. This warranty does not apply to any malfunction arising out of any application of this product other than in a use compatible with the manufacturer's product description, unless such application is, upon request, specifically approved in writing by PerformancePro Pumps.
9. The provisions of this warranty are severable and if any provision shall be deemed invalid, the remaining provisions shall remain in full force and effect.
10. This limited warranty extends only to the original Purchaser (end user) and does not extend to transferee or purchaser from the original Purchaser. Any purported assignment without the consent of PerformancePro Pumps shall be null and void.
11. No warranty whatsoever of chemical compatibility or application suitability is given. It is the sole responsibility of the Purchaser to determine if the merchandise purchased is suitable for Purchaser's specific application. PerformancePro Pumps strongly advises that the customer perform any and all tests necessary to determine material compatibility and product suitability for customer's specific conditions and needs.
12. This contract shall be governed by and in accordance with the laws of the State of Oregon. Purchaser agrees that proper jurisdiction and venue for any claim brought hereunder is in Washington County, Oregon.
13. This limited warranty is incorporated by reference into the contract of purchase for the products supplied by PerformancePro Pumps to Purchaser under said contract.

QUICK REFERENCE

Important Numbers

Suction requirement	Flooded — pump below the source level
Pump ports	1-1/2 in NPT female, suction and discharge
Thread sealing	PTFE paste
Minimum flow	2 GPM at all times
Supply voltage	Within ±10% of nameplate, measured under load
Before first start	Verify rotation, three-phase PL, PF and PH — Section 4
Before every start	Confirm the volute and suction line are full
At start	Discharge pressure within a few seconds
Loss of pressure	Shut down immediately
Weekly	Inspect for leakage; clean the strainer where fitted
Mechanical seal	3 years fresh water, 1 year salt, or on leakage

Do not run the pump dry.

Keep This Manual With the Pump

Technical support	(503) 356-5888
Email	techhelp@performancepropumps.com
Parts and service	Return authorization required before shipping

Service Record

Record all service performed on this pump. Seal replacement intervals in Section 6 are measured from the last replacement, not from the date of purchase.

DATE	OPERATING HOURS	WORK PERFORMED	BY

PerformancePro

PROUDLY BUILT IN THE USA SINCE 2000 PUMPS

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