

INSTALLATION OPERATION & MAINTENANCE INSTRUCTIONS

FOR YOUR

PENN PUMP & EQUIPMENT COMPANY, INC.

PACKAGED CIRCULATING SYSTEM

This completely assembled, tested, packaged circulating system is of the highest quality and design. To obtain optimum performance from this system, it is important that you read these instructions carefully and pay particular attention to any highlighted instructions. We are confident that you will receive many years of trouble-free service from your **Penn Pumping System**.

www.pennpump.com

I. GENERAL DESCRIPTION

The Penn Pump Packaged Circulating System is completely assembled and consists of one, two, three, or more centrifugal pumps operating in parallel with valves, controls, and piping designed to efficiently circulate heating and chilled water for HVAC or process applications.

II. RECEIVING AND TEMPORARY STORAGE

A. RECEIVING

1. Check circulating system for shortage and damage immediately upon arrival. Pump accessories, when required, are packaged in a separate container and shipped with the unit.
2. If equipment is damaged in transit, promptly report this to the carrier's agent. Make complete notations on the freight bill to speed satisfactory adjustment by the carrier.
3. Unload and handle the unit properly. Do not lift the unit by eye bolts on the motor!

B. TEMPORARY STORAGE

1. If pump is not to be installed and operated soon after arrival, store it in a clean, dry area of moderate ambient temperature – approximately 50°F.
2. Rotate the shaft by hand periodically to coat bearing with lubricant, which will retard oxidation and corrosion.
3. Follow motor manufacturer's storage recommendations where applicable.

III. SETTING IN PLACE

- A. INSTALLATION- install in a location that allows accessibility for maintenance and inspection. Keep the suction piping oversized, simple, and with as few turns as possible. Allow at least 36" of clear space in front of the panel extending down to the floor to comply with the National Electric Code requirements for electric control panels.
- B. ANCHORING- This pumping unit should be leveled and bolted to a firm foundation.
- C. PIPING- System isolation valves should be installed on both the suction and discharge of the packaged system. A customer-installed bypass is also frequently called for to facilitate maintenance. Avoid any points in the piping that might create air pockets and throttle the flow. At no point should the suction piping be smaller than the suction header connection. **DO NOT FORCE PIPING WHEN MAKING CONNECTIONS.** Use pipe hangers or other supports. Both suction and discharge piping should be independently supported and properly aligned so that **NO STRAIN IS TRANSMITTED TO THE UNIT** when the flange bolts are tightened. Install flexible piping connectors to avoid piping stress caused by system or piping movement. Pipe all safety relief valves and thermal safety valves to an adequate drain.

IV. TIGHTENING CONNECTIONS

All piping and wiring is factory tested. Handling during transit, off-loading, and installations can loosen the connections; therefore, tightening some connections may be required.

V. CONNECTING POWER SOURCE

The unit will operate under the following conditions:

- A. The voltage can be 10% (+ / -) of the motor nameplate data

Install electrical wiring in accordance with NEC standards and any local regulations. The line voltage and wire amp capacity must match the voltage and the full load amps of all motors in the system.

CAUTION

ENSURE THAT THE POWER SUPPLY THAT WILL FEED THE PCS SYSTEM CONTROL PANEL IS DISCONNECTED BEFORE PROCEEDING WITH THE FOLLOWING STEPS.

1. Place panel disconnects and H-O-A switches in the off position.
2. Open the panel and visually check components for any shipping damage and verify that all power leads are secure.
3. Connect power supply leads to the main power terminals. The main terminals are located in the enclosure and are identified as L1, L2, L3. Also refer to the wiring diagram inside of the enclosure.
4. The unit must be securely grounded, per National Electric Code.
5. Switch main power supply disconnect to "On". This will provide power to the terminal block of the control panel. Verify that the power supply agrees with the PCS control panel voltage.

NOTE: If not proceeding with start up at this time, disconnect power supply to the panel.

VI. PRE STARTUP REVIEW AND INSPECTION

Before starting the system, it is important to review the submittal data sheets. Each system is custom fabricated, incorporating a variety of components. Review the system construction, options, control sequencing, panel features, and operation of your system. It is essential to have a detailed understanding of the system. After a thorough study of these instructions, a close visual inspection of the system is recommended.

VII. CHECK OUT OF PUMPS, VALVES TANK

- A. Verify that electric power and water are available.
- B. If your system incorporates an expansion tank, refer to the tank information regarding charging.
- C. All isolation valves, including the main suction and discharge valves, must be in the closed position.
- D. Rotate the pumps by hand, if possible. They should turn freely.
- E. Open the main suction valve on the inlet to the system manifold and verify the suction pressure against the specifications.

- F. Slowly open the suction valve to one pump at a time and check the pump unit and fittings for leaks.
- G. Vent each pump casing, if applicable, by loosening a pipe plug at the highest point to ensure that no air is trapped, which would cause a seal failure and pump vapor lock.
- H. Slowly open the pump discharge valve one pump at a time. Check fittings for leaks. **DO NOT OPEN MAIN DISCHARGE VALVE OUTLET OF THE SYSTEM MANIFOLD AT THIS TIME.**

VIII. ELECTRICAL CHECK OUT

CAUTION

DO NOT PROCEED UNTIL REQUIREMENTS OF "CONNECTING POWER SOURCE" (ITEM IV) HAVE BEEN COMPLETED.

- A. Confirm that the system is filled, vented, and ready to circulate.
- B. Energize power supply to panel.
- C. Verify pumps are full and completely vented.
- D. Confirm H-O-A selector(s) are in the OFF position.
- E. Turn disconnect(s) only to ON position; door must be closed.
- F. Any alarm conditions during the power activation should be silenced and reset.
- G. Jog each pump by turning the respective H-O-A switches momentarily to the "HAND" position and verify correct rotation. End suction pumps rotate in the clockwise direction when viewed from the motor end. Correct rotational direction for other type pumps is usually indicated with an arrow. Close-coupled pumps usually can be viewed from the motor end to verify rotation. If pump rotation needs to be reversed, correct as follows.

CAUTION

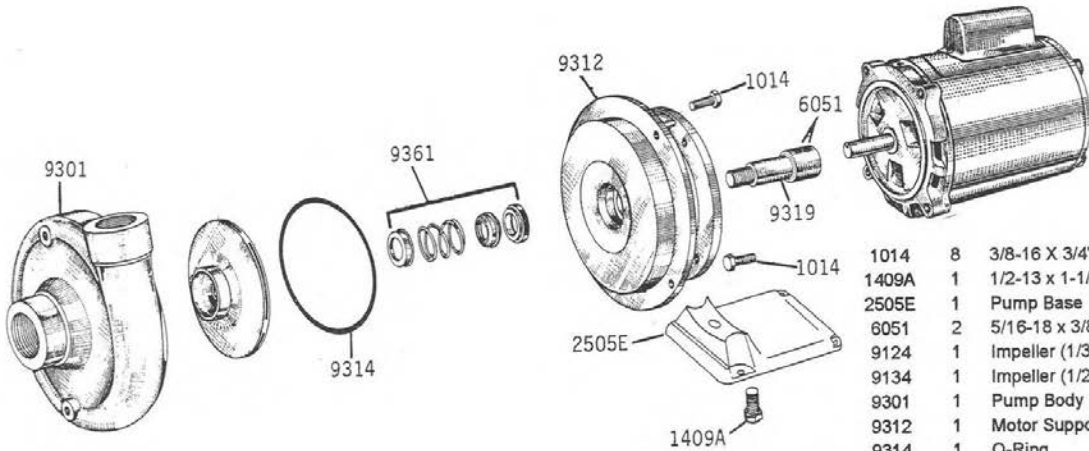
Ensure that power supply to the PCS control panel is disconnected before proceeding with the following steps.

- H. If all motors rotate counterclockwise, swap any two of the three power leads from the VFD to the motor.
- I. If a single motor rotates counterclockwise, swap any two of its motor leads at the motor starter.

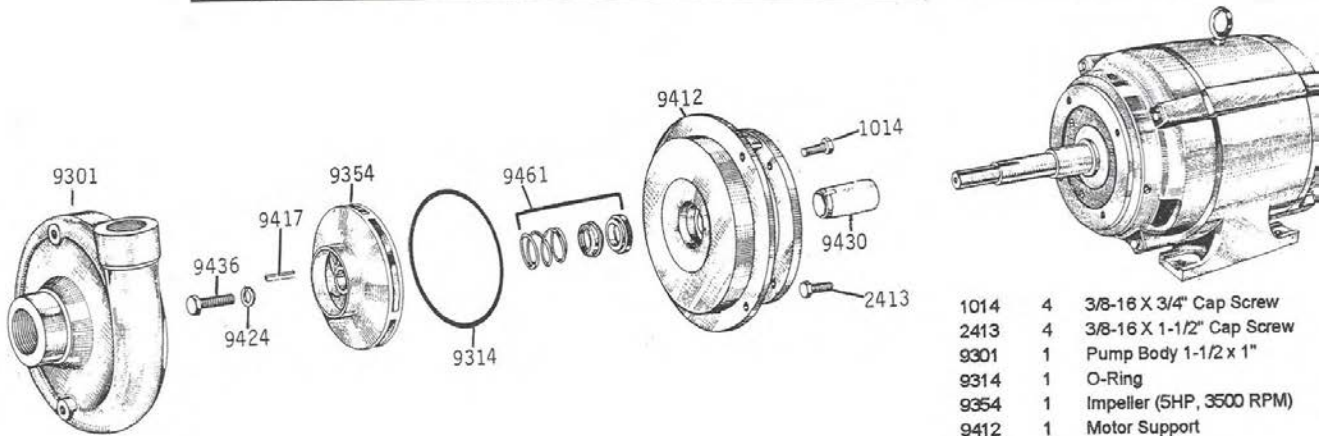
IX. SYSTEM START UP

- A. Verify that the system can be circulated.
- B. Open the main discharge valve on the outlet of the system manifold.
- C. Close each individual pump discharge valve.
- D. Start pump #1 in the "HAND" position.
- E. Slowly open the triple duty valve and balance the unit to design flow range.
- F. Follow the above startup procedures for each of the other pumps, one at a time.
- G. Turn the pump(s) to the "OFF" position.
- H. Check to determine if the system pressure remains stable. Failure to remain stabilized indicates an improperly operating check valve or system leakage.
- I. Once the unit is ready to operate in the auto mode, turn all H-O-A switches to the "AUTO" position. The system is now operating in the fully automatic mode. All control devices should be adjusted to meet field conditions.

PARTS LIST



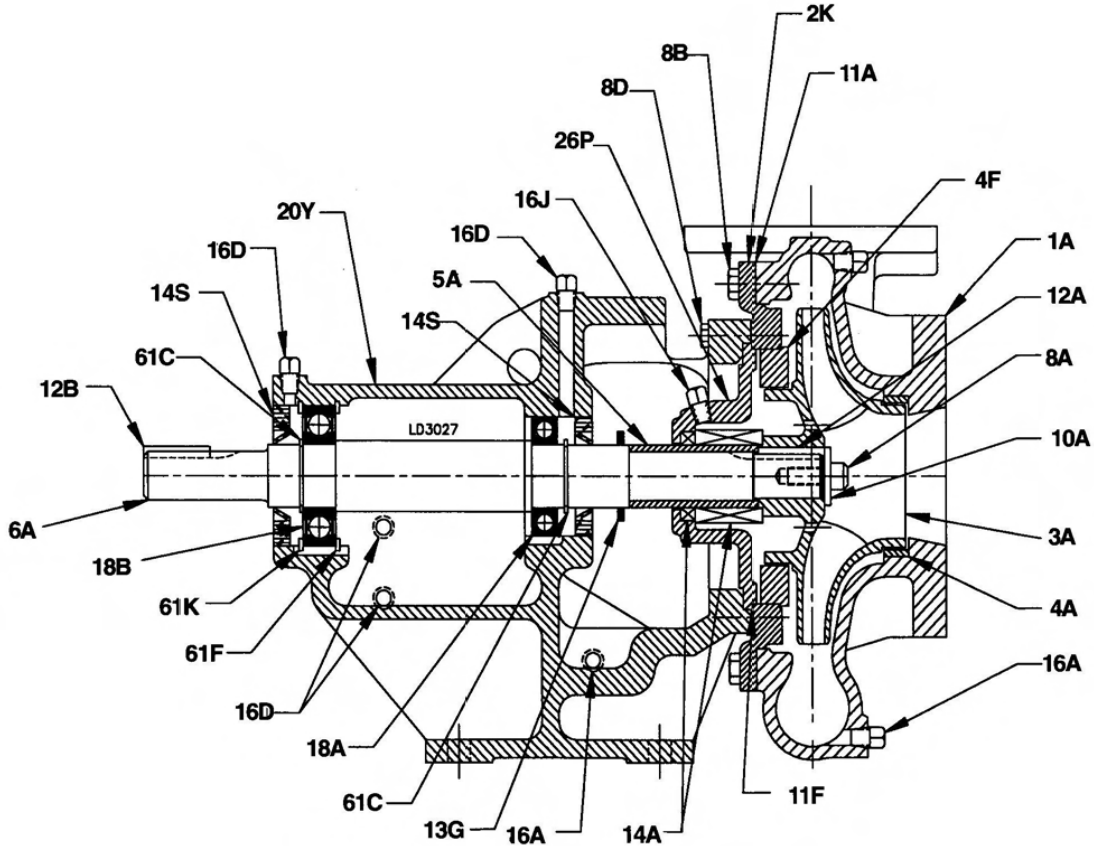
1014	8	3/8-16 X 3/4" Cap Screw
1409A	1	1/2-13 x 1-1/4" Cap Screw
2505E	1	Pump Base
6051	2	5/16-18 x 3/8" Set Screw
9124	1	Impeller (1/3 HP, 1750 RPM)
9134	1	Impeller (1/2 HP, 1750 RPM)
9301	1	Pump Body 1-1/2 x 1"
9312	1	Motor Support
9314	1	O-Ring
9319	1	Pump Shaft
9334	1	Impeller (2 HP, 3500 RPM)
9344	1	Impeller (3 HP, 3500 RPM)
9361	1	Rotary Seal Assy.



1014	4	3/8-16 X 3/4" Cap Screw
2413	4	3/8-16 X 1-1/2" Cap Screw
9301	1	Pump Body 1-1/2 x 1"
9314	1	O-Ring
9354	1	Impeller (5HP, 3500 RPM)
9412	1	Motor Support
9417	1	Square Key
9424	1	Impeller Washer
9430	1	Rotary Seal Sleeve
9436	1	3/8-16 X 3/4" Cap Screw, SS
9461	1	Rotary Seal Assy.

When ordering parts, always provide the complete pump model number and serial number.

CROSS SECTION AND PARTS LIST



ITEM NO	PART NAME	ITEM NO	PART NAME	ITEM NO	PART NAME
1A	Casing	*10A	Washer, Packing	16L	Plug, Seal Chamber
2K	Backplate	10A	Washer, Impeller	18A	Bearing, Inboard
3A	Enclosed Impeller	11A	Gasket, Casing	18B	Bearing, Outboard
4A	Case Wear Ring	11F	Gasket, Backplate	20Y	Bearing Frame
**4F	Balance Ring	12A	Key, Impeller	*22A	Stud, Packing Gland
5A	Shaft Sleeve	12B	Key, Coupling	26P	Seal Housing
*5L	Lantern Ring	*13A	Packing	*26U	Packing Box
6A	Shaft	13G	Slinger	*35F	Nut, Packing Gland
*7A	Packing Gland	14A	Shaft Seal	61C	Snap Ring
8A	Cap Screw, Impeller	14S	Lip Seal	*61J	Snap Ring
8B	Cap Screw, Casing	16A	Plug, Drain	* Packed Pumps Only	
8D	Cap Screw, Brg. Frame	16D	Plug, Grease/Oil Filler	** If Applicable	

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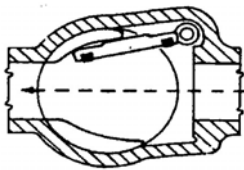
HVAC CIRCULATING SYSTEMS

TRIPLE DUTY VALVE

INSTALLATION & MAINTENANCE INSTRUCTIONS

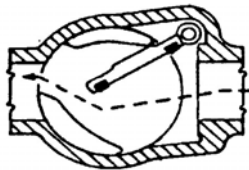
DESIGN AND OPERATION:

- The principle of operation for the triple duty valve is extremely simple. When in the open position, the clapper swings out of the flow. If the flow stops, the spring allows the clapper to close. When closing the valve, a final “bumping” action gives the final positive seal closure.



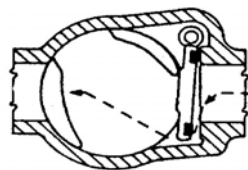
Open Position

With the plug in the open position, the clapper operates as an efficient check valve. The clapper being hinged at an angle provides 90% less dead weight to minimize clapper slam and chatter.



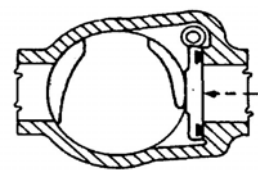
Balancing

The plug holds the clapper at the selected flow requirement for balancing.



Closed Downstream

As the plug is rotated toward the closed position, the downstream part closes first. This equalizes the pressure so the clapper closes with little resistance.



Positive Seal Closure

Final closing is accomplished by the plug camming against the back of the clapper.

MAINTENANCE:

- The triple duty valve requires no day-to-day maintenance or lubrication, but it is suggested that the valve be operated once a month to assure it is in operable condition.
- If at any time it is suspected that a triple duty valve is leaking, either in the plug position or as a check, it is possible that foreign particles are trapped between the mating faces of the seal and seat, and are preventing tight seal action. Cycling the valve from full open to full close causes a jetting action that will wash away foreign particles that may be trapped. Also, cycling the valve will usually squeeze any build-up away from the seat mating faces and allow tight shut-off again.
- It is not uncommon to discover that when a triple duty valve has been reported leaking in the closed portion, the valve is actually not completely closed. The cam-based design of the triple duty valve makes it almost impossible to over-close. The triple duty valve is designed to close at an approximate ninety degree rotation of the plug stem. To close the valve, rotate the stem one quarter turn and tighten.
- The triple duty valve is especially suited for the cam-based design of the triple duty valve to assure a positive closure. The most satisfactory closure is accomplished by turning the plug to a tight fit and then “bumping” the plug lightly using the triple duty valve wrench. The use of cheaters or a hand-wheel should be necessary.
- If these procedures have been completed and a tight seal is still not apparent, the triple duty valve should be disassembled and inspected for damage of the clapper seal and seat face, or for excessive wear of the clapper pin and pin hanger supports.

HVAC CIRCULATING SYSTEMS

SUCTION DIFFUSER

INSTALLATION & MAINTENANCE INSTRUCTIONS

FEATURES:

- Reduces both space and installation costs by replacing an extended entry pipe, a long radius elbow, and a strainer.
- Disposable fine mesh start-up strainer provided on all models guarantees a clean system.
- Stabilizing vanes ensure smooth flow into the pump.
- Drain/Purge plugs routinely remove foreign particles and protect pump and other system components.
- Blowdown tapping supplied complete with magnetic plug protects pump seals from damage by foreign particles.

Installation:

1. Provide the distance necessary for removal of strainer and stabilizing vanes.
2. Mount support leg and foot to body of Suction Diffuser.
3. After piping and initial circulation are complete, remove fine mesh start-up strainer.

Maintenance:

- It is recommended that the stabilizing vanes be periodically inspected and the permanent strainer be periodically cleaned. This will ensure smooth flow into the pump and avoid damage to the pump components.

WARRANTY

The components of each Penn Pump circulating system, when purchased as regular factory selections, are warrantied against failure due to defects in design, material, or construction, from date of factory shipment within the periods and under the conditions noted below:

PUMPS

All Penn Pump pumping assemblies are warrantied against mechanical failure for a period of One (1) year. If any component of the pumping assembly fails within this period, Penn Pump & Equipment Company, Inc., will, at its option, repair or replace the pump assembly on a no-charge exchange basis FOB factory, Hatfield, Pennsylvania.

MOTORS

Motors, when equipped with standard Penn Pump overload protection systems and maintained according to factory instructions, are warrantied for One (1) year. Penn Pump & Equipment Company, Inc., will make, at its option, a no-charge repair or replacement at the factory or at the authorized motor service station.

VALVES

Valves are warrantied for One (1) year. If any mechanical component of the valve fails within this period, Penn Pump & Equipment Company, Inc. will, at its option, repair or replace the valve component parts on a no charge exchange basis FOB factory.

COMPLETE SYSTEM

The complete Penn Pump system as a whole, including all accessories and components not mentioned above, is warrantied functionally and mechanically for a period of One (1) year, when installed, operated, and maintained in accordance with the Company's recommendations.

Penn Pump & Equipment Company, Inc., is responsible only for repairing or replacing its products in accordance with the terms and conditions set forth above. There are no warranties, either expressed or implied, extending beyond those stated on the face hereof, and Penn Pump & Equipment Company, Inc. expressly disclaims all other warranties, including any implied warranties of mechanical ability or fitness for a particular purpose. Penn Pump & Equipment Company, Inc. also disclaims any liability whatsoever for incidental or consequential damages, including damages to property, damages for loss of use, loss of time, loss of profits, loss of income, or any other incidental or consequential damages. Penn Pump & Equipment Company, Inc. neither assumes nor authorizes any other person to furnish any warranties, or assume for it any liability in connections with the sale of its products.

This warranty does not include mechanical seals, gauges, transportation, or labor costs for exchange or installation or repaired or replaced material. Final determination of warranty shall be made only by the factory upon return and inspection of returned material. No material is to be returned without a return of materials authority (RMA) tag which may be obtained by calling or writing the factory, advising what will be shipped and the reason for the return.

SPECIFY WITH CONFIDENCE, SPECIFY PENN PUMP SYSTEMS