



## OPERATING INSTRUCTION MANUAL

# P1A – X Pump Station



### Hallmark Refining Corporation

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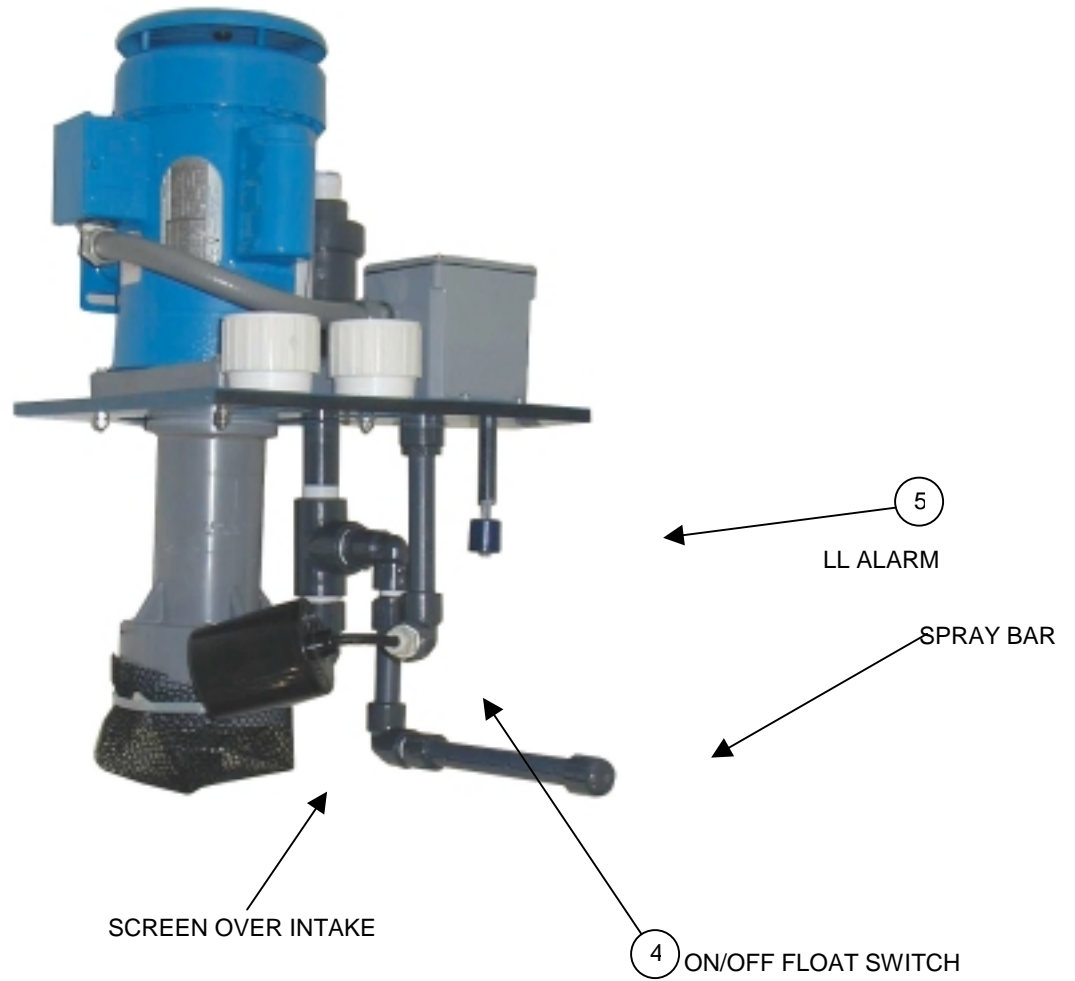
## **Statement of Warranty and Liability**

All equipment manufactured by Hallmark Refining Corporation is guaranteed against defects in material and workmanship for a period of six months from the date of shipment from the factory. Any claimed defects must be reported, and the materials and/or equipment must be returned, freight prepaid, to HRC within the guarantee period. HRC's liability for defects in material and workmanship shall be limited to replacing or repairing (at its option) such defective materials or equipment at no cost to the original purchaser. Any damage or loss occurring during shipment is not covered by the terms of this warranty. Any shipping damage is the responsibility of the carrier(s) and should be reported to the carrier(s) immediately.

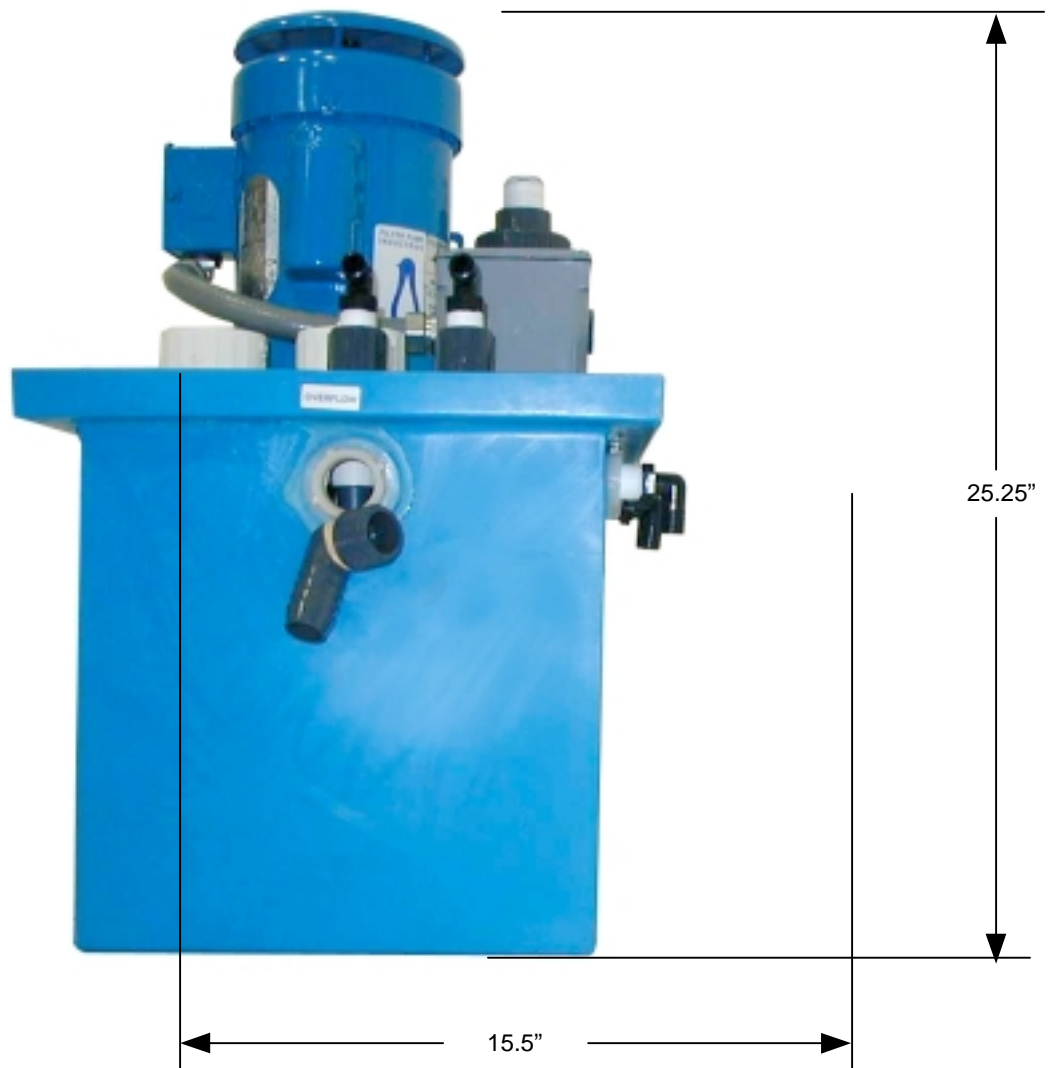
All material and/or equipment furnished by other suppliers are not warranted by GRC and are covered by the suppliers warranty only for defects in material and workmanship. Transportation, handling damage, normal wear and tear and other damage outside the control of HRC are not covered by this warranty. Under no circumstances will HRC be responsible for any of the following: damage, loss or liability of any nature arising out of the installation and/or use of the materials equipment and furnished.

There are no other warranties expressed or implied, except as stated above. This warranty becomes null and void if any devices or accessories other than those distributed or officially recommended by HRC are installed, attached or used in conjunction with this equipment.

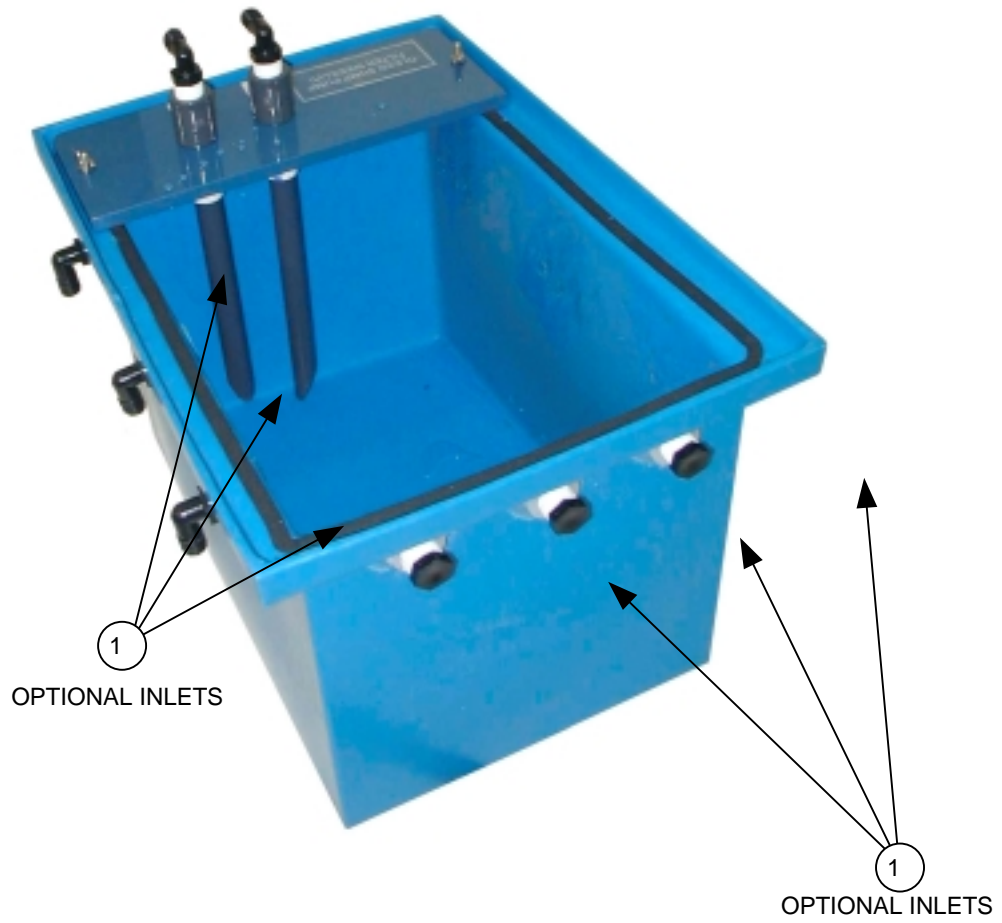
## Wet End Assembly



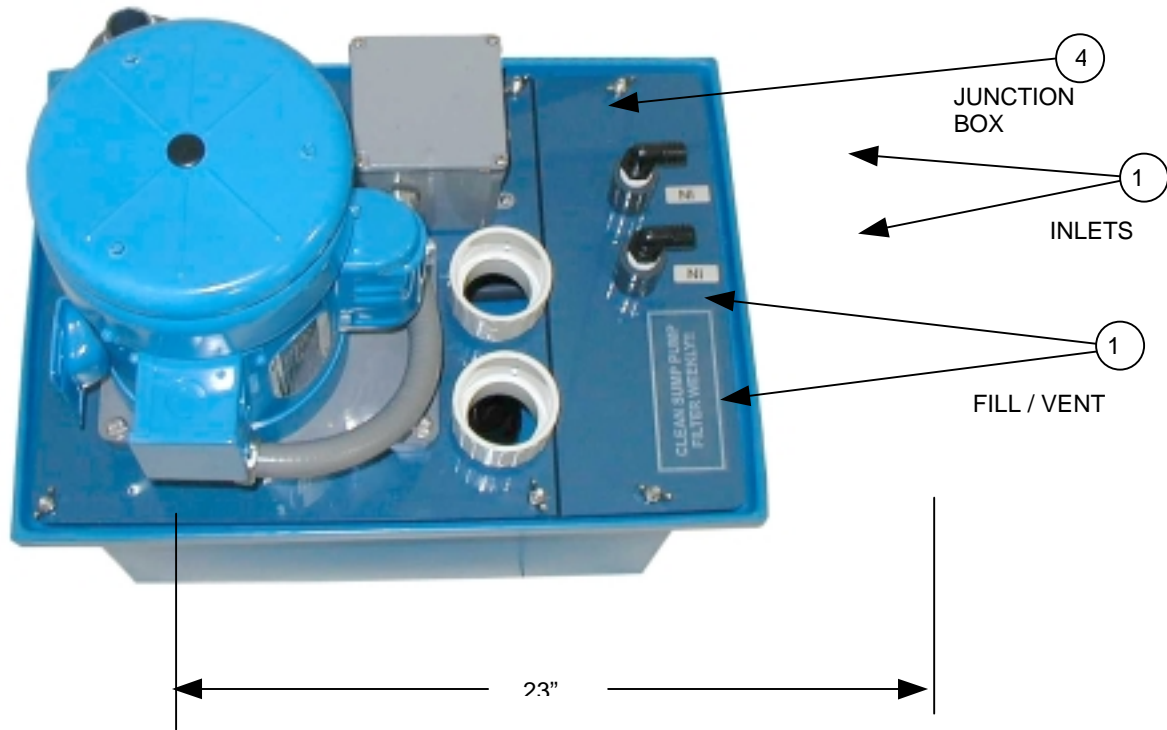
### Side View



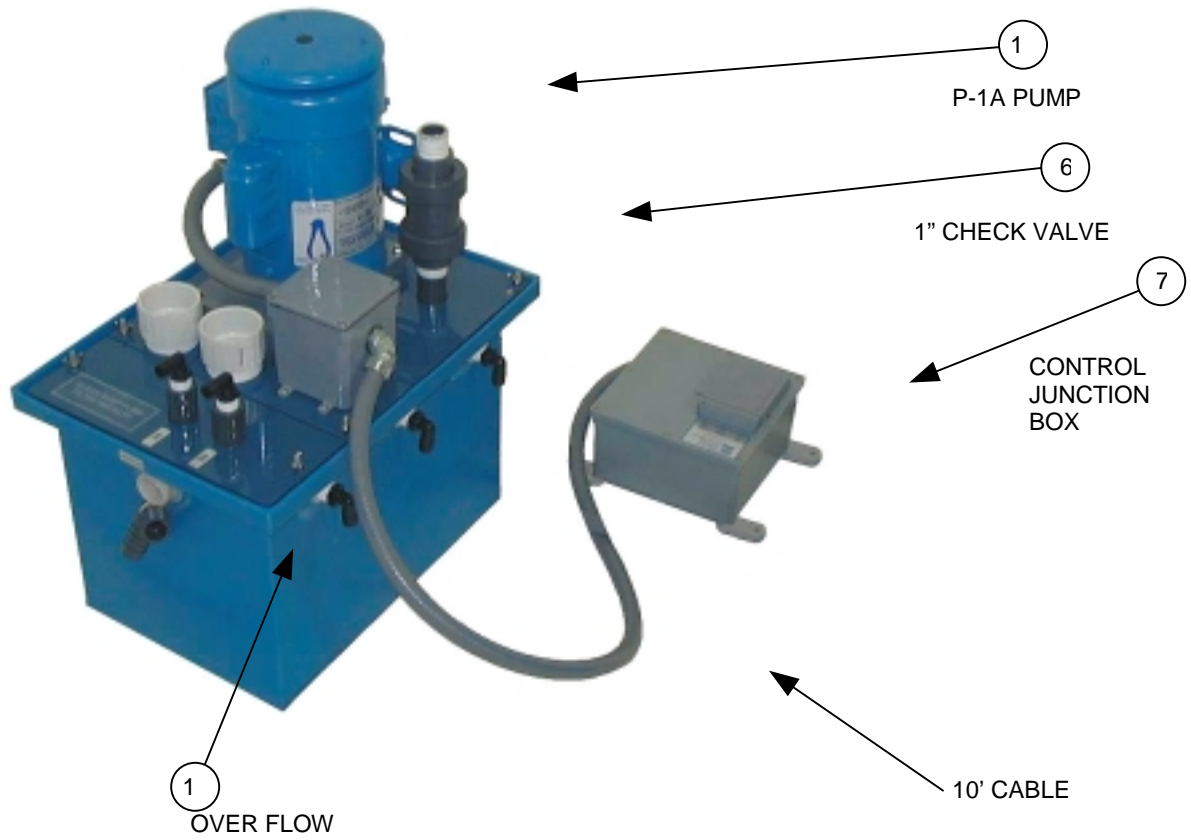
## Inlet Options



### Top View

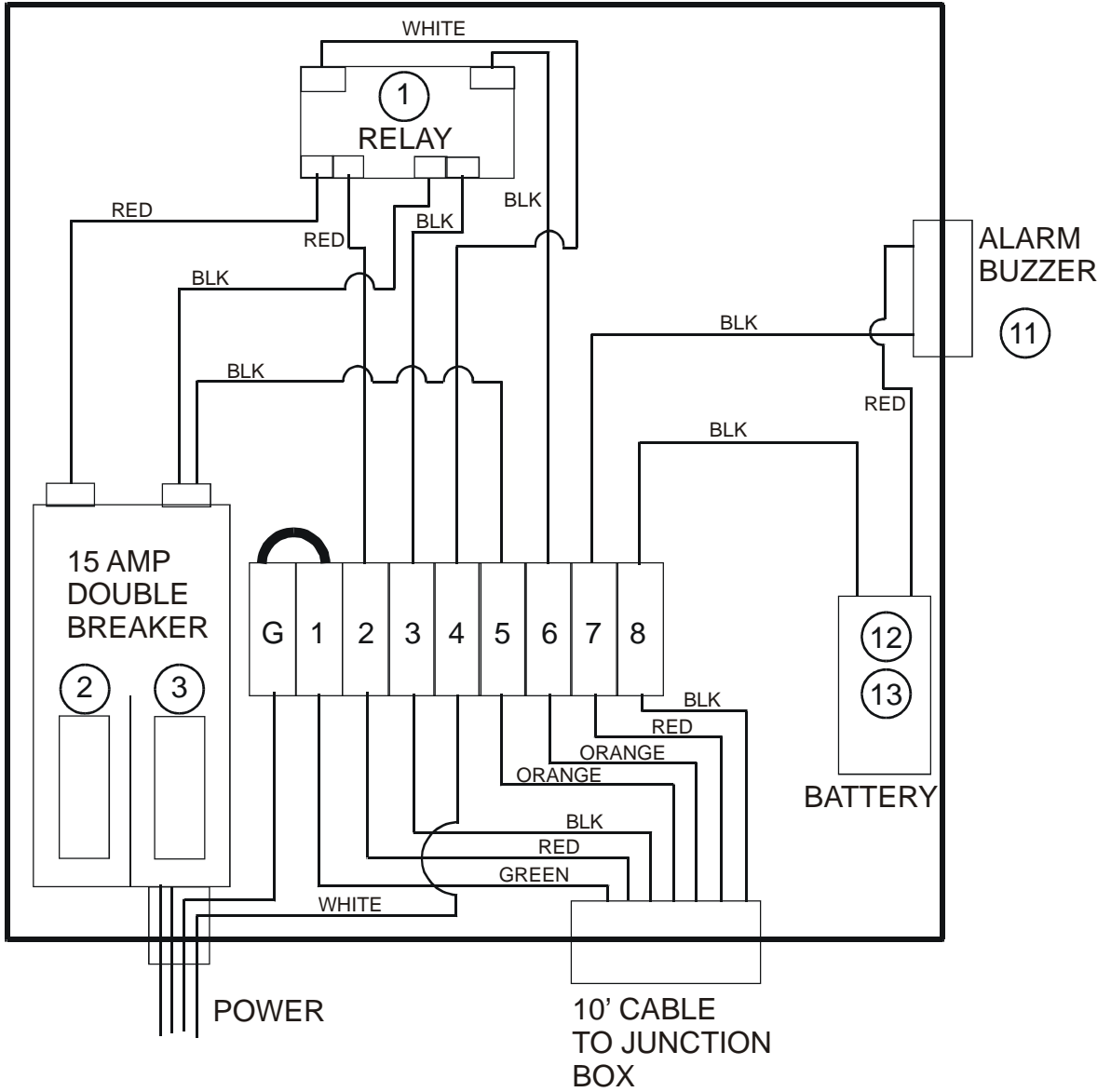


ISO View



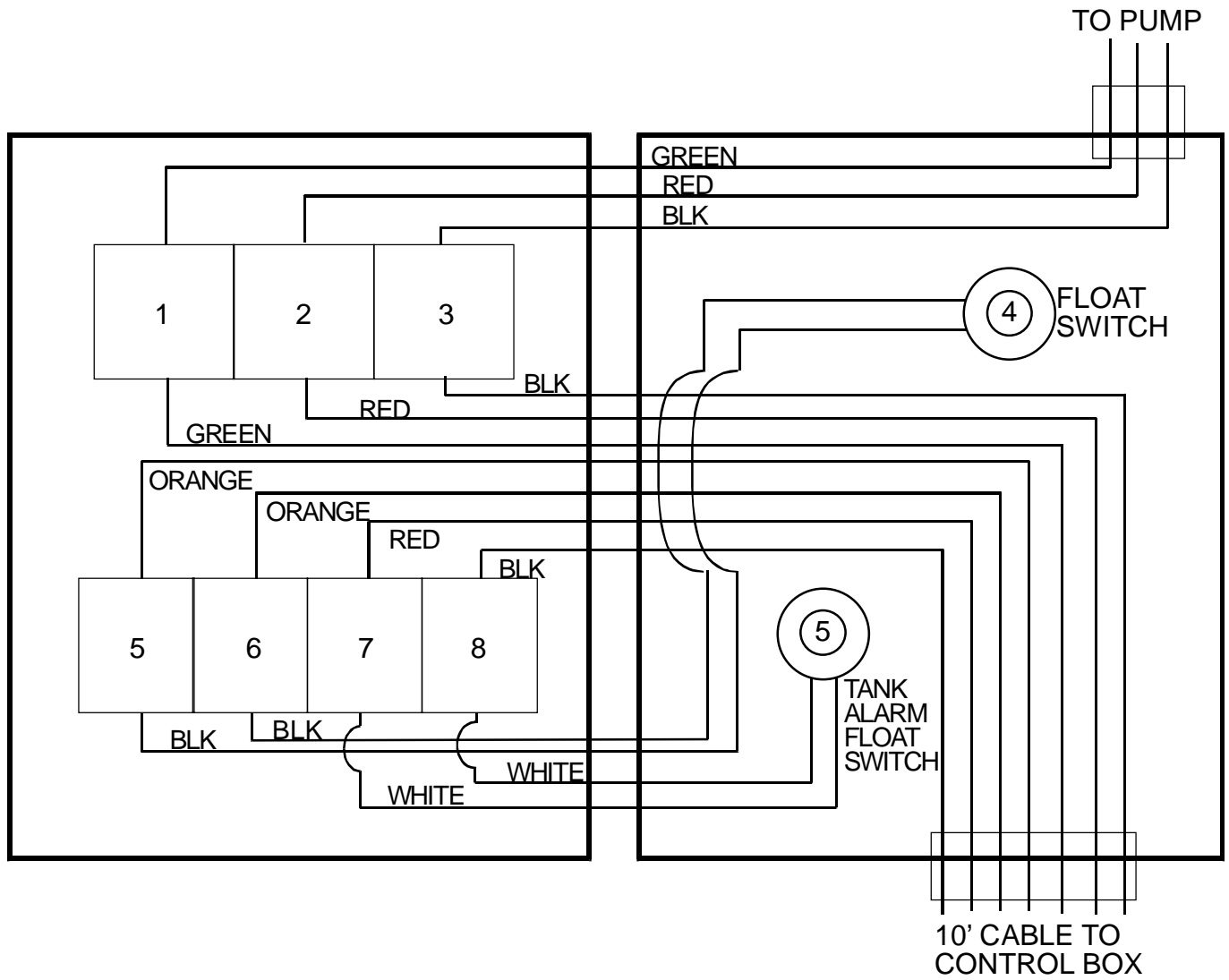
# Control Box Wiring Diagram

Rev. B on 07/13/01





### Junction Box Wiring Diagram



## P1A – X Parts List

Item Number	Part Number	Part Description	Quantity.
1	706-121	110 Volt Relay	1
2	741-015	15 Amp double pole circuit breaker	1
3	741-000	Circuit breaker mounting base	1
4	526-315	Float switch	1
5	524-782	Liquid alarm switch	1
6	502-010	1" Ball check valve	1
7	600-884	Junction box 8" x 8" x 4"	1
8	600-444	Junction box 4" x 4" x 4"	1
9	602-232	Polyethylene holding tank 12" x 18" x 12"	1
10	700-010	Penquin P1A pump	1
11	730-001	Alarm Buzzer	1
12	736-001	9V Battery	1
13	737-001	Battery Retainer	1
14	510-065	5/8" Elbow	5
15	436-020	2" Male Adaptor	2
16	313-012	1 ¼" Elbow	1
17	511-005	½" Plug	6

## Installation and Maintenance of the Pump and Filtering System

**Models:**

P-1/15  
P-1/6  
P-1/4  
P-1/2  
P-1/2-HP  
P-3/4  
P-3/4-HP  
P-1  
P-1 1/2  
P-2  
P-3  
P-5  
P-7 1/2

**Materials:**

A - CPVC  
B - Polypropylene  
C - PVDF

### **Penguin Pump Introduction**

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Penguin pumps are designed to handle a large range of chemicals without difficulty. Completely constructed of CPVC, polypropylene or PVDF, where in contact with the solution being pumped, Series P pumps have an upper working temperature of 200/160/80 degrees respectively, and thus can handle most corrosives, slurries, and abrasive liquids. Series P pumps are easy to install and operate, and are virtually maintenance-free. All pumps have been tested for proper operation before leaving the factory. To obtain optimum service life, please follow all installation and operation instructions.



## **Instructions for Maintaining the PIA – X Pump Station**

### **Disassembly**

Remove the four (4) snap ring screws, being careful not to lose the O-rings. Now the snap ring can be removed using a screwdriver or a pair of pliers.

Insert the appropriate threaded pipe through the center hole at the end of the housing to remove the head. Pull with a rocking motion to remove. Head O-ring can easily be replaced.

Take the plug out from the back of the fan cover or drip shield. Insert a screwdriver in the slot of the motor shaft and unscrew the impeller counterclockwise using fingers or the handle end of a pair of pliers.

Remove the four (4) motor bolts located beneath the motor bracket. Motor and housing are now separated. Do not try to remove the shaft as this is an integral piece with the motor rotor. Slinger and lip seal can be replaced.

### **Assembly**

With the motor in a vertical position, shaft upwards, place housing over the shaft, lining up motor bolt holes in the mounting bracket with holes in the motor. Be sure the slinger is properly in place. Conduit box should be 180 degrees from the outlet. Screw the motor bolts into the holes beneath the mounting bracket in a diagonal sequence. Be sure motor screws are tight.

Insert the impeller into the housing. With one hand holding a screwdriver in the slot of the motor shaft and the other hand on the impeller, turn the impeller clockwise with fingers or the handle end of a pair of pliers until the impeller bottoms out.

Place the pump upright resting on the motor. Look down into the housing, and while rotating the impeller, check to see that the impeller is centered. The impeller must not be touching the side of the housing.

Replace plug in the back of the fan cover or drip shield. Wet head and head O-ring. Be sure head O-ring is properly in place. Insert the appropriate threaded pipe into head and replace housing. The threaded pipe should be tapped with a mallet, pushing the head into the housing until the snap ring groove is exposed. Remove pipe and replace snap ring. Line up through holes in the snap ring with the threaded holes in the head by rotating the snap rings counterclockwise. Insert and tighten the four (4) snap ring screws.

## Installing and Operating the P1A – X Pump Station

Install the pump as close as possible to the reservoir from which the liquid is being pumped. As more energy is necessary to prime the liquid than to discharge the fluid, make the suction as short as possible.

### Electrical

Models P-1/15 and P 1/6 pumps are supplied only in a single phase, single voltage, 115V or 230V, 50/60c motor. All other models supplied with a single phase are dual voltage, 110/220V or 115/230V motors. The factory wires all dual voltage motors for the lower voltage (115/115V) unless otherwise requested. When changing from 110/115V wiring to 220/230V wiring, follow the motor manufacturer's wiring instructions, which are found in the motor junction box. Be sure to wire the motor for counterclockwise rotation as viewed from the suction entrance of the pump. A power cord and plug are supplied for immediate plug-in operation on motors wired for the lower voltage. These motors have already been wired at the factory for proper rotation. A plug is not supplied on motors wired 220/230V. Epoxied motor housings are not available on either voltage motor of the P-1/15 or P-1/6 pumps. All other motor housings are epoxied standard.

An on/off switch is optional only on Models P-1/4 – P-1 ½ single phase. Motors supplied in three phase are dual voltage, 230/460V, 50/60c, which are not wired at the factory. Since direction of rotation cannot be determined without operating the pump, **the pump head and snap ring must be removed prior to bump starting.** It is imperative that the motor rotation be checked before operation. Attach leads to motor and bump start a maximum of only a couple seconds as if you were turning a light switch on/off as fast as possible. Do not leave motor running. As viewed from the suction entrance of the pump, check for counterclockwise rotation. If clockwise rotation, change any two leads and again check rotation. Replace head and snap ring as described in Assembly. Many options are available on the P Series motors including single phase-50c, explosion proof, larger horsepowers to 7 ½, and 575V motors. If any of these options are required, please check the motors carefully or consult factory.

### Plumbing

If a suction line or suction extension is required, enlarge the suction line/extension by one size larger than the suction entrance. Never reduce plumbing on the suction. Avoid 90-degree elbows and never use a 180-degree elbow. Make sure every suction coupling/connection is airtight. The bottom of the suction extension should always be at least 2 pipe diameters above the bottom of the tank. In either flooded suction or non-flooded suction, the use of a check valve on the discharge of the pump is recommended. In

the case of a non-flooded suction, a flapper check valve on the end of the submerged suction line must be installed. To facilitate priming the pump, install a T-connection with a small valve between pump case and check valve. It is advisable to use a discharge valve after the check valve. All plumbing and accessories must be supported other than by the pump, in order to prevent possible distortion of the pump case. The use of some hose in the discharge plumbing close to the discharge nozzle of the pump will absorb any movement of the solid plumbing if vibrations exist.

## Liquid Level

The correct liquid level is very important. A liquid level which is too high could cause motor damage. **CHECK THE LIQUID LEVEL.** The correct liquid level is halfway between the bunghole and the centerline of the discharge nozzle.

## Priming

Under flooded conditions, open all the valves in the suction and discharge lines. Wait a few minutes to let entrapped air out. Close all valves on the discharge line. Leave suction valves wide open. A closed suction valve could cause damage to the impeller and the shaft. Start the pump and crack discharge valves open to let out any additional entrapped air. Then open valve to desired flow. Under non-flooded conditions, fill up the pump slowly from the T-connection and valve. Then close all valves in the discharge line. Start the pump and continue as flooded conditions.

## Recommendations

Always make sure there is enough liquid in the reservoir and the level is high enough, considering the capacity of the pump unit. Inadequate liquid will cause vortex in the reservoir. A vortex occurs when air mixes from the surface into the fluid, which can disturb the flow and also prevents the pump from priming. In cases where the pump is installed outside the reservoir, do not run against a closed discharge valve for more than 5 minutes. This will cause overheating of the fluid in the pump and will damage the CPVC parts. Temperature in this case will increase up to 220 degrees. If the pump is being run against a closed discharge valve for a long duration of time, install a small bleed line back into the reservoir before the discharge valve of the pump. If the line is small, there is a minimum pressure loss. This prevents overheating by recirculating the fluid.

## Spare Parts List

Item	Description	P-1 Part No.
1	Motor/Shaft Ass'y	
	Phase-Voltage-Cycle	
	1 115 50/60	
	1 230 50/60	
	1 110/220 50/60	
	1 115/230 60	P-100-0103
	w/ titanium shaft	P-100-0103-T
	1 115/230 50/60	P-100-2103
	w/ titanium shaft	P-100-2103-T
	3 230/460 50/60	P-100-3103
	w/ titanium shaft	P-100-3103-T
1BS	Bearing Set	P-120-01BS
1EF	External Fan w/Set Screw	P-120-01EF
1FC	Fan Cover (w/Drip Shield except P-1/15, P-1/6)	P-120-01FC
2	Motor Screw/Bolts/ Washer Ass'y	P-120-05 (4)
3	Slinger	P-120-02
4A	Mounting Bracket - CPVC (A-A/A-S)	
5	Mounting Bracket Screw	
6	Chamber Mounting Screw (A-A/A-S/A-AL)	
7A	Pump Housing Ass'y - CPVC	P-100-07A
7AL	Mounting Bracket - CPVC (A-AL)	
7B	Pump Housing Ass'y - Polypro	P-100-07B
7C	Pump Housing Ass'y - PVDF	P-100-07C
8A	Impeller - CPVC	P-100-08A
8AT	w/ titanium insert	
8B	Impeller - Polypro	P-100-08B
8C	Impeller - PVDF	P-100-08C
8CT	w/ titanium insert	

Item	Description	P-1 Part No.
9E	Head O-Ring - EPR	P-100-09E
9V	Head O-Ring - Viton	P-100-09V
10A	Head - CPVC	P-100-10A
10B	Head - Polypro	P-100-10B
10C	Head - PVDF	P-100-10C
11V	Lip Seal Ass'y - Viton	P-120-11V
12A	Snap Ring - CPVC	P-100-11A
12B	Snap Ring - Polypro	P-100-11B
12C	Snap Ring - PVDF	P-100-11C
13V	Impeller Nut O-Ring - Viton	
14A	Impeller Nut Ass'y - CPVC	
14AT	w/ titanium insert	
14C	Impeller Nut Ass'y - PVDF	
14CT	w/ titanium insert	
15T	Shaft Key - Titanium	
16A	Snap Ring Screw - CPVC	P-100-16A*
16B	Snap Ring Screw - Polypro	P-100-16B*
16C	Snap Ring Screw - PVDF	P-100-16C*
17A	Pump Head Ass'y - CPVC	P-100-13A
17AT	w/ titanium	
17B	Pump Head Ass'y - Polypro	P-100-13B
17BT	w/ titanium	
17C	Pump Head Ass'y - PVDF	P-100-13C
17CT	w/ titanium	

\* Includes viton O-ring

### P-1 Pump Parts

