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FOR NEW OR  
REPLACEMENT  
**SEWAGE PUMPS**

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RECOMMENDED  
INSTALLATION &  
MAINTENANCE

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### **I OBJECTIVE**

These recommendations are intended as a guide to installers, inspectors and users regarding the proper installation and maintenance of sewage pumps. (Refer to Figure 1 for a typical installation drawing.)

### **II PUMP SELECTION**

The pump shall be capable of sufficient capacity, head and solids-handling ability to satisfy anticipated use requirements. Refer to the SSPMA publication "Recommended Guidelines for Sizing a New or Replacement Sewage Pump" and follow the manufacturer's size selection recommendations.

### **III BASIN AND COVER**

The basin shall not be less than 18 inches in diameter and 24 inches deep, unless otherwise specifically recommended by the manufacturer. Larger diameters are advisable in instances of increased pump capacity requirements as shown below:

<b>Required Pump Capacity</b>	<b>Minimum Basin Diameter</b>
up to 35 GPM	18"
over 35 GPM	24"
over 60 GPM	30"
over 100 GPM	36"
over 150 GPM	48"

The basin shall be located such that all sewage flows into the basin due to gravity. Outdoor installations shall be at a sufficient depth to ensure protection from freezing.

The basin shall be watertight and may be constructed of concrete, steel, plastic, fiberglass or other suitable materials as approved by local codes. The basin bottom shall provide a permanent support for the pump. The basin shall be fitted with a removable gas-tight cover, adequate to support

and to meet health and code requirements. The cover shall be accessible for servicing the equipment within the basin.

## **IV INLET CONNECTION**

A 4" or 6" inlet hub (or molded in connection) is generally provided on the side of the basin. The inlet pipe to basin joint shall be watertight in compliance with local codes.

## **V DISCHARGE PIPING**

Position the pump and/or piping to provide adequate clearance for associated controls.

Discharge pipe and fittings size shall not be less than the pump discharge size, but may be larger if the required pump capacity and performance are in excess of the following minimums:

Pipe Size	Minimum Flow
2"	21 GPM
2 1/2"	30 GPM
3"	46 GPM

A union, quick disconnect, or flexible connector shall be installed above the cover to facilitate pump removal if necessary. A full-flow check valve is recommended after the union to prevent backflow after each pumping cycle. (Note: check local codes.) A full-opening shut-off valve shall follow the check valve to allow periodic cleaning of the check valve or removal of the pump. Where codes permit, a section of flexible hose may be installed as a vibration isolator.

The remainder of the discharge line should be as short as possible, with a minimum of turns, to minimize friction head.

## **VI VENT CONNECTION**

It is necessary that the basin be vented to the outside of the building,

either by connection to the existing building vent stack or with its own standpipe. The vent size and connection shall be in accordance with applicable codes.

## **VII ELECTRICAL SERVICE**

The electrical service shall meet the requirements of the National Electrical Code and/or local codes as applicable. A separately protected and properly grounded circuit shall be provided. The receptacle or control panel shall be located within the length limitations of the pump power supply cord and not less than four feet above the floor to avoid possible hazards from flooding. Check to be sure that the power source is properly sized for the voltage and amperage requirements of the pump, as indicated on the pump nameplate.

It is extremely important that the pump be grounded to minimize the possibility of electric shock. Pumps are provided with a plug with ground pin or a power cord with grounding wire. **DO NOT REMOVE THE GROUND PIN OR BYPASS THE GROUNDING WIRE.** Make certain the entire power supply circuit and all electrical components are properly grounded. **DO NOT USE AN EXTENSION CORD.** For added protection a ground fault circuit interrupter is suggested.

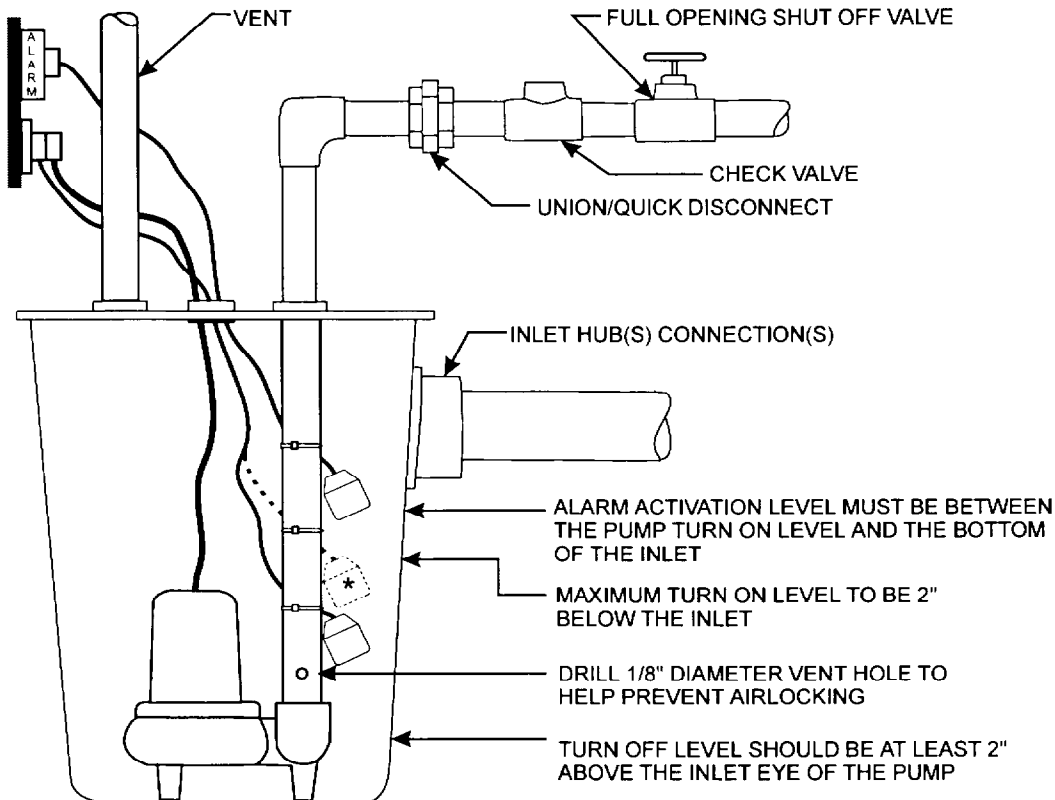
## **VIII ALARM**

An alarm is suggested to warn of high-water condition resulting from control, pump or system malfunction. Alarms may be audible and/or visual, as appropriate for maximum effect. The power supply for the alarm shall be a separate circuit so that circuit interruption to the pump will not affect the alarm circuit. Alarm activation level must be between the pump turn-on level and the bottom of the inlet.

## IX DUPLEX SYSTEMS

Installation of duplex systems is basically the same as the preceding recommendations, but with three additional considerations:

- a.) The basin must be sized to allow sufficient separation and clearance of pumps and controls.
- b.) A check valve, union and full-flow shut-off valve are needed on each discharge line before joining into a common discharge line.
- c.) Duplex controls are suggested for alternation and sequencing of pump operation.



\* CONTROL CAN CONSIST OF ONE FLOAT, OFTEN WITH SERIES (PIGGYBACK) PLUG OR WIRING, OR TWO FLOATS OPERATING A RELAY.

FIGURE 1. Typical Installation

## **Recommended Sewage Pump Installation And Maintenance**

### **X MAINTENANCE AND TROUBLE-SHOOTING**

**CAUTION: ALWAYS DISCONNECT THE PUMP FROM THE ELECTRICAL POWER SOURCE BEFORE HANDLING.**

All maintenance recommended by the manufacturer of the equipment shall be performed. If the system fails to operate

properly, carefully reread the manufacturer's instructions and these recommendations to see that they have been correctly followed. If operating problems persist, the following chart may be of assistance in identifying and correcting them: **Match "Cause" number with correlating "Correction" number.**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>CORRECTION</b>
Pump will not run.	<ol style="list-style-type: none"> <li>1. Poor electrical connection, blown fuse, tripped breaker or other interruption of power; improper power supply.</li> <li>2. Motor or switch inoperative (to isolate cause, refer to manufacturer's instructions for possible manual operation of pump).                             <ol style="list-style-type: none"> <li>a. Float movement restricted.</li> <li>b. Switch will not activate pump or is defective.</li> <li>c. Defective motor.</li> </ol> </li> <li>3. Insufficient liquid level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check all electrical connections for security. Have electrician check power supply and all wiring for correct voltage, phase and current as indicated on pump nameplate.</li> <li>2a. Reposition pump or clean basin as required to provide adequate clearance for float.</li> <li>2b.&amp;c. Refer to pump or control manufacturer's manual for detailed servicing instructions.</li> <li>3. Make sure liquid level is at least equal to manufacturer's suggested turn-on point.</li> <li>4. Recheck all sizing calculations to determine proper pump size.</li> <li>5. Check discharge line for restriction, including ice if line passes through or into cold areas.</li> <li>6. Remove and examine check valve for proper installation and freedom of operation.</li> <li>7. Open valve.</li> <li>8. Check impeller for freedom of operation, security and condition. Clean impeller cavity and inlet of any obstruction.</li> <li>9. Loosen union slightly to allow trapped air to escape. Verify that turn-off level of switch is set so that impeller cavity is always flooded. Clean vent hole (see Figure 1).</li> <li>10. Check rotation. If power supply is three-phase, have an electrician reverse any two of three power supply leads to ensure proper impeller rotation.</li> <li>11. Repair fixtures as required to eliminate leakage.</li> <li>12. Check pump manual for temperature limits.</li> <li>13. Replace portion of discharge pipe with flexible connector.</li> <li>14. Check vent line for restriction.</li> <li>15. Remove cover and flanges. Clean all sealing surfaces. Replace foam gaskets and lightly grease O-rings and grommets. Reassemble.</li> </ol>
Pump will not turn off.	<ol style="list-style-type: none"> <li>2a. Float switch movement restricted.</li> <li>b. Switch will not de-activate pump or is defective.</li> <li>4. Excessive inflow or pump not properly sized for application.</li> </ol>	
Pump runs or hums but does not pump (or delivers insufficient capacity).	<ol style="list-style-type: none"> <li>1. Incorrect voltage.</li> <li>4. Pump not properly sized for application.</li> <li>5. Discharge restricted.</li> <li>6. Check valve stuck closed or installed backwards.</li> <li>7. Shut-off valve closed.</li> <li>8. Impeller jammed or loose on shaft, or impeller cavity or inlet plugged.</li> <li>9. Pump airlocked.</li> <li>10. Pump running backwards.</li> </ol>	
Pump cycles too frequently or runs periodically when fixtures are not in use.	<ol style="list-style-type: none"> <li>6. Check valve not installed, or leaking.</li> <li>11. Fixtures are leaking.</li> </ol>	
Pump shuts off and turns on independent of switch (trips thermal overload protector). <b>CAUTION: Pump may start unexpectedly. Disconnect power supply</b>	<ol style="list-style-type: none"> <li>1. Improper wiring or power supply.</li> <li>4. Discharge head less than manufacturer's minimum.</li> <li>8. Impeller jammed or rubbing.</li> <li>12. Excessive water temperature (internal protection only).</li> </ol>	
Pump operates noisily or vibrates excessively.	<ol style="list-style-type: none"> <li>2c. Worn bearings.</li> <li>8. Debris in impeller cavity or broken impeller,</li> <li>13. Piping attachments to building structure too rigid or too loose.</li> </ol>	
Smell sewer gas.	<ol style="list-style-type: none"> <li>14. Incorrect venting or plugged vent.</li> <li>15. Improper gaskets/seals.</li> </ol>	

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