

**Notice to Installer: Instructions must remain with installation.**

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Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

# INSTALLATION INSTRUCTIONS

49 / 70 / 72 / 86 / 87 / 88 / 222 / 422 / 2242

## PREINSTALLATION CHECKLIST - ALL INSTALLATIONS

- Inspect your pump.** Occasionally, products are damaged during shipment. If the unit is damaged, contact your dealer before using. **DO NOT** remove the test plugs in the cover nor the motor housing.
- Carefully read the literature** provided to familiarize yourself with specific details regarding installation and use. These materials should be retained for future reference.

 <b>WARNING</b> SEE BELOW FOR LIST OF WARNINGS	<b>SAFETY INSTRUCTIONS</b>
<ol style="list-style-type: none"> <li>To reduce the risk of electrical shock, a properly grounded receptacle or control box must be installed in accordance with the governing codes. Never remove ground pin from plug.</li> <li>Make certain that the receptacle or control box is within reach of the pump's power supply cord. <b>DO NOT USE AN EXTENSION CORD.</b> Extension cords that are too long or too light do not deliver sufficient voltage to the pump motor, and they could present a safety hazard if the insulation were to become damaged or the connection end were to fall into a damp or wet area.</li> <li>Make sure the pump's electrical supply circuit is equipped with fuses or circuit breakers of proper capacity. A separate branch circuit is recommended, sized according to the governing electrical codes for the current shown on the pump name plate.</li> <li><b>Testing for ground.</b> As a safety measure, each electrical outlet should be checked for ground using a circuit analyzer which will indicate if the power, neutral and ground wires are correctly connected to your outlet. If they are not, call a qualified licensed electrician.</li> <li><b>FOR YOUR PROTECTION, ALWAYS DISCONNECT PUMP FROM ITS POWER SOURCE BEFORE HANDLING.</b> If pump is wired direct, de-energize the circuit at the control box. <b>DO NOT, UNDER ANY CIRCUMSTANCES, REMOVE THE GROUND PIN.</b> Wear insulated protective shoes and do not stand in water. Pumps equipped with a grounded plug are designed to help protect against electrical shock. A properly grounded receptacle or control box must be installed in accordance with governing codes.</li> <li>Installation and servicing of the pump's electrical circuits and hardware should only be performed by a qualified licensed electrician.</li> <li>Installation and maintenance of this appliance is not intended for persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience or knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.</li> <li><b>Risk of electrical shock.</b> Do not remove power supply cord and strain relief or connect conduit directly to the pump. If the supply cable is damaged, it must be replaced by an authorized Zoeller Representative.</li> <li>Pump may contain oil which becomes pressurized and hot when operating. Allow 2-1/2 hours after disconnecting before attempting service.</li> <li>Pump is not intended for potable water due to possible contamination by oil contained in the pump.</li> <li><b>Risk of electrical shock.</b> These pumps have not been investigated for use in swimming pools and marine areas.</li> <li><b>For Added Safety.</b> Use of a residual current device with an operating current no higher than 30 mA is recommended.</li> </ol>	<p><b>TO AVOID SERIOUS OR FATAL PERSONAL INJURY OR MAJOR PROPERTY DAMAGE, READ AND FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND ON THE PUMP.</b></p> <p><b>THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT AND MUST BE KEPT WITH THE PUMP.</b></p> <p> This is a <b>SAFETY ALERT SYMBOL.</b> When you see this symbol on the pump or in the manual look for one of the following signal words and be alert to the potential for personal injury or property damage.</p> <p> <b>WARNING</b> Warns of hazards that <b>CAN</b> cause serious personal injury, death or major property damage.</p> <p> <b>CAUTION</b> Warns of hazards that <b>CAN</b> cause personal injury or property damage.</p> <p> Warns of electrical shock hazards that <b>CAN</b> cause serious personal injury, death or major property damage.</p> <p> Identifies any terminal which is intended for connection to an external conductor for protection against electrical shock in case of a fault, or the terminal of a protective earth (ground) electrode.</p> <p> Read operator's manual.</p> <p><b>THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP. MAINTAIN ALL SAFETY DECALS.</b></p> <p>REFER TO WARRANTY ON PAGE 2.</p>

**DO NOT USE FOR PUMPING OILS, GASOLINE OR ANY PETROLEUM BY-PRODUCTS.**

## CAUTION

### SEE BELOW FOR LIST OF CAUTIONS

1. Check to be sure your power source is capable of handling the voltage requirements of the motor, as indicated on the pump name plate.
2. The installation of automatic pumps with variable level float switches or nonautomatic pumps using auxiliary variable level float switches is the responsibility of the installing party. Care should be taken that the tethered float switch will not hang up on the pump apparatus or pit peculiarities and is secured so that the pump will shut off.
3. Vent hole. It is necessary that all submersible sump, effluent and sewage pumps capable of handling various sizes of solid waste be of the bottom intake design to reduce clogging and seal failures. If a check valve is incorporated in the installation, a 5 mm (3/16") vent hole must be drilled in the discharge pipe below the check valve and pit cover to purge the unit of trapped air. Vent hole should be checked periodically for clogging. The vent hole on a High Head application may cause too much turbulence. You may not want to drill one. If you choose not to drill a vent hole, be sure the pump case and impeller is covered with liquid before connecting the pipe to the check valve. **NOTE: THE HOLE MUST BE BELOW THE BASIN COVER AND CLEANED PERIODICALLY.** Water stream will be visible when pump is operating.
4. Pump should be checked frequently for debris and/or build up which may interfere with the float "on" or "off" position. Repair and service should be performed by an authorized Zoeller Company Representative only.
5. Do not operate a pump in an application where the Total Dynamic Head is less than the minimum Total Dynamic Head listed on the Pump Performance Curves.
6. For health reasons, do not unplug, turn off, or disable pump and use pump tank system as a way to fill up a sink or laundry tray, etc.
7. Dewatering and sump pumps (models 49,70,72,86,87,88) are not designed for use in pits handling raw sewage.
8. Maximum operating temperature for standard model pumps must not exceed 104°F (40°C).
9. Pump not intended for continuous run application, misapplication may reduce pump life.
10. Some pumps features an air vent opening in the pump housing to prevent air locking. It is normal for water to flow through this opening. It is not a leak.

## LIMITED WARRANTY

Manufacturer warrants, to the purchaser and subsequent owner during the warranty period, every new product to be free from defects in material and workmanship under normal use and service, when properly used and maintained, for a period of one year from date of purchase by the end user, or 18 months from date of original manufacture of the product, whichever comes first. Parts that fail within the warranty period, one year from date of purchase by the end user, or 18 months from the date of original manufacture of the product, whichever comes first, that inspections determine to be defective in material or workmanship, will be repaired, replaced or remanufactured at Manufacturer's option, provided however, that by so doing we will not be obligated to replace an entire assembly, the entire mechanism or the complete unit. No allowance will be made for shipping charges, damages, labor or other charges that may occur due to product failure, repair or replacement.

This warranty does not apply to and there shall be no warranty for any material or product that has been disassembled without prior approval of Manufacturer, subjected to misuse, misapplication, neglect, alteration, accident or uncontrolled act of nature; that has not been installed, operated or maintained in accordance with Manufacturer's installation instructions; that has been exposed to outside substances including but not limited to the following: sand, gravel, cement, mud,

tar, hydrocarbons, hydrocarbon derivatives (oil, gasoline, solvents, etc.), or other abrasive or corrosive substances, wash towels or any other abusive entity, etc. in all pumping applications. The warranty set out in the paragraph above is in lieu of all other warranties expressed or implied; and we do not authorize any representative or other person to assume for us any other liability in connection with our products. Contact authorized distributors to obtain any needed repair or replacement of part(s) or additional information pertaining to our warranty.

MANUFACTURER EXPRESSLY DISCLAIMS LIABILITY FOR SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES OR BREACH OF EXPRESSED OR IMPLIED WARRANTY; AND ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND OF MERCHANTABILITY SHALL BE LIMITED TO THE DURATION OF THE EXPRESSED WARRANTY.

Some jurisdictions do not allow limitations on the duration of an implied warranty, so the above limitation may not apply to you. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.

**In those instances where damages are incurred as a result of an alleged pump failure, the Homeowner must retain possession of the pump for investigation purposes.**

## EASY DO'S & DON'T'S FOR INSTALLING UNIT

1. **DO** read all installation material included with the pump.
2. **DO** inspect unit for any visible damage caused by shipping. Contact dealer if unit appears to be damaged.
3. **DO** remove all debris from the basin. Be sure that the pump will have a hard, level surface beneath it. **DO NOT** install on sand, gravel or dirt.
4. **DO** be sure that the area is large enough to allow proper clearance for the level control switch(es) to operate properly.
5. **DO always disconnect pump from power source before handling.** **DO** always connect to a separately protected and properly grounded circuit. **DO NOT** ever cut, splice or damage power cord (only splice in a watertight junction box). **DO NOT** carry or lift pump by its power cord. **DO NOT** use an extension cord.
6. **DO** install a check valve and a union in the discharge line. **DO NOT** use a discharge pipe smaller than the pump discharge size.
7. **DO NOT** utilize this unit for pumping gasoline or other hazardous liquids.
8. **DO** test pump immediately after installation to be sure that the system is working properly.
9. **DO** review all applicable local and national codes and verify that the installation conforms to each of them.
10. **DO** consult manufacturer for clarifications or questions.
11. **DO** consider a D.C. Backup System is necessary for the prevention of property damages from flooding due to A.C. power disruptions, mechanical or electrical problems or system overloading.
12. **DO** inspect and test system for proper operations at least every 3 months.

## General Maintenance

**▲ NOTICE** Repair and service should be performed by a Zoeller Pump Company Authorized Service Station only.

### SAFETY PROCEDURES



**▲ WARNING** For your protection, always disconnect pump and panel from its power source before handling.



**▲ WARNING** Never enter the basin until it has been properly vented and tested. Any person entering a basin should be wearing a harness with safety rope extending to the surface so that they can be pulled out in case of asphyxiation. Sewage water gives off methane and hydrogen sulfide gases, both of which can be highly poisonous.

Installation and checking of electrical circuits and hardware should be performed by a qualified electrician.

Pump is never to be lifted by power cord.



**▲ WARNING** Unit must be cleaned and disinfected, inside the pumping chamber and all exterior surfaces, prior to servicing.

### GENERAL SYSTEM INSPECTION

Before the system is placed into operation, it should be inspected by a qualified technician.



**▲ WARNING** Wiring and grounding must be in accordance with the National Electrical Code and all applicable local codes and ordinances.

### LUBRICATION PROCEDURES

No lubrication is required.

If pumps are to be stored for more than six months, refer to short-term storage procedure in the Operation section.

### PREVENTIVE MAINTENANCE

Preventive maintenance is recommended to ensure a long service life from the product. Provided is a suggested maintenance schedule.

#### Every six months:

- Inspect and test system for proper operation.
- Check for proper and unobstructed float operation.
- Listen for proper check valve operation.

#### Every 5 years or 10,000 hours of operation:

- Remove pump, inspect and service using a Zoeller rebuild kit.
- Flush and clean basin.

### DOUBLE SEAL PUMPS

Double seal pumps offer extra protection when these pumps are supplied with optional moisture sensors, check the control panel's seal failure light for a warning. Whenever the seal leak light is activated, it's indicating that moisture is present, and the pump should be removed and serviced in order to avoid damage to the motor.

## SERVICE CHECKLIST



**▲ WARNING ELECTRICAL PRECAUTIONS-** Before servicing a pump, always shut off the main power breaker and then unplug the pump. "Make sure you are wearing insulated protective sole shoes and not standing in water." Under flooded conditions, contact your local electric company or a qualified licensed electrician for disconnecting electrical service to the pump prior to removal.

**▲ WARNING** Submersible pumps contain oils which become pressurized and hot under operating conditions. **Allow 2-1/2 hours after disconnecting before attempting service.**

CONDITION	COMMON CAUSES
A. Pump will not start or run.	Check fuse, low voltage, overload open, open or incorrect wiring, open switch, impeller or seal bound mechanically, motor or wiring shorted. Float assembly held down. Switch damaged or out of adjustment.
B. Motor overheats and trips overload or blows fuse.	Incorrect voltage, negative head (discharge open lower than normal) impeller or seal bound mechanically, motor shorted.
C. Pump starts and stops too often.	Float switch tether length too short, check valve stuck open, or none installed in long distance line, overload open, bidding, sump pit too small.
D. Pump will not shut off.	Debris under float assembly, float or float rod bound by pit sides or other, switch defective, damaged or out of adjustment.
E. Pump operates but delivers little or no water.	Check inlet, strainer housing, discharge pipe, and vent holes for obstructions. Discharge head exceeds pump capacity. Low or incorrect voltage. Incoming water containing air or causing air to enter pumping chamber. Incorrect motor rotation. (3 phase pumps only.)
F. Drop in head and/or capacity after a period of use.	Increased pipe friction, clogged line or check valve. Abrasive material and adverse chemicals could possibly deteriorate impeller and pump housing. Check line. Remove base and inspect.

**If the above checklist does not reveal the problem, consult the factory. Do not attempt to service or otherwise disassemble pump. Service must be performed by an authorized Zoeller Company representative.**

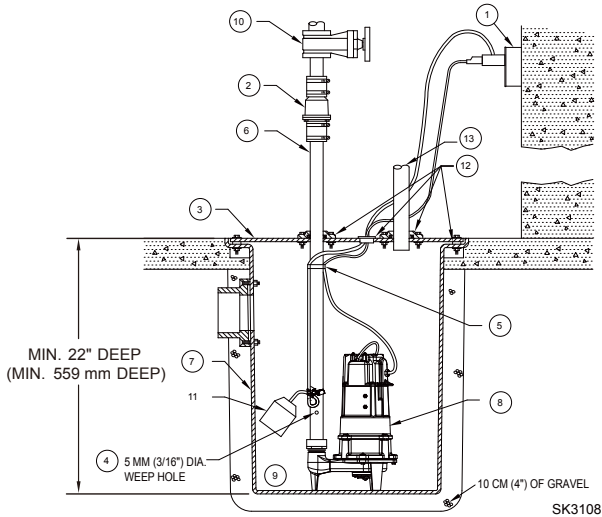
## PERFORMANCE

Your pump will operate effectively pumping clear storm and drain waters. Although it will usually pass small particles suspended in water - grass, heavy mud, sand or gravel can clog the pump and reduce the pump's performance. This can usually be cleaned out by back-flushing on pump side of check valve with a garden hose through the discharge (Model 222, 422, 2242 is not applied).

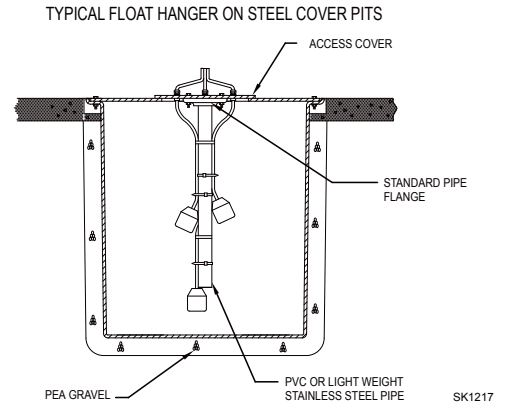
## RECOMMENDED INSTALLATION FOR ALL APPLICATIONS

- (1) Electrical wiring and protection must be in accordance with National Electrical Code and any other applicable state and local electrical requirements.
- (2) Install proper Zoeller unichek (combination union and check valve), preferably just above the basin (indoor installations) to allow easy removal of the pump for cleaning or repair. If high head or below cover installation is required use 30-0164 on 1-1/2" (DN40) pipe, 30-0152 on 2" (DN50) pipe and 30-0160 on 3" (DN80) pipe.
- (3) All installations require a basin cover to prevent debris from falling into the basin and to prevent accidental injury.
- (4) When a Unichek is installed, drill a 5 mm (3/16") dia. hole in the discharge pipe even with the top of the pump. **NOTE: THE HOLE MUST ALSO BE BELOW THE BASIN COVER AND CLEANED PERIODICALLY.** (High Head unit see #3 under "Caution" on front page). Water stream will be visible from this hole during pump run periods.
- (5) Securely tape or clamp power cord to discharge pipe, clear of the float mechanism(s).
- (6) Use full-size discharge pipe.
- (7) Basin must be in accordance with applicable codes and specifications.
- (8) Pump must be level and float mechanism(s) clear of sides of basin before starting pump.
- (9) Basin must be clean and free of debris after installation.
- (10) Gate Valve or Ball Valve to be supplied by installer and installed according to any and all codes.
- (11) For nonautomatic pumps, locate float switches as shown in sketches. The best place for the "off" point is above the motor housing and positioned 180° from the inlet. Never put "off" point below discharge on pump.
- (12) Gas tight seals required to contain gases and odors.
- (13) Vent gases and odors to the atmosphere through vent pipe.

## INSTALLATION SKETCHES



All installations must comply with all applicable electrical and plumbing codes.



On some installations it may be desirable to install an independent hanger for the level control switches to avoid possible hang ups on the pumps, piping, valves, etc. Float hangers are available from Zoeller Company on Catalog Sheet FM0526 or can be fabricated from standard pipe and fittings.

### MIN. PIT DIA.

Switch Type	Pump Model				
	49 / 70	86 / 87 / 88	222	422	2242
Tethered	12" (305 mm)	18" (457 mm)	18" (457 mm)	18" (457 mm)	30" (762 mm)
Vertical	12" (305 mm)	10" (254 mm)	10" (254 mm)	10" (254 mm)	24" (610 mm)

## 2242 WIRING DIAGRAM

