

# 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.



FM1473  
1222  
Supersedes  
0422

MAIL TO: P.O. BOX 16347 • Louisville, KY 40256-0347  
SHIP TO: 3649 Cane Run Road • Louisville, KY 40211-1961  
Tel: (502) 778-2731 • 1 (800) 928-PUMP

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## INSTALLATION INSTRUCTIONS MODELS 4290 and 4291 Agricultural Pumps

The Model 4290 and 4291 Agricultural Pumps are designed for pumping water containing animal waste with solids up to 1-1/2".

### PREINSTALLATION CHECKLIST - ALL INSTALLATION

- Inspect your pump.** Occasionally, products are damaged during shipment. If the unit is damaged, contact your dealer before using.
- 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>CAUTION</b> SEE BELOW FOR LIST OF CAUTIONS
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- Make sure the terminal or control box** is properly grounded and contains a grounding lug for the pump. All pumps are furnished with provisions for proper grounding to help protect you against the possibility of electrical shock. Outside installation require a NEMA 3R or 4X enclosure per the NEC.
- Make sure the pump electrical supply circuit is equipped with fuses or circuit breakers of proper capacity.** A separate branch circuit is recommended, sized according to the "National Electric Code" for the current shown on the pump name plate.
- For your protection, always disconnect the pump from its power source before handling.**
- Testing for ground. As a safety measure, each electrical outlet should be checked for ground using an Underwriters Laboratory Listed 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.
- Do not use extension cords. If a splice is required, a watertight junction box must be used.
- All single phase and three phase pumps must be wired and grounded in accordance with the National Elec Code and all applicable local codes and ordinances. All three phase pumps require motor starting devices with motor overload protection. See FM1596 for simplex or FM0486 for duplex installations. Agriculture pumps are not to be installed in locations classified as hazardous in accordance with the National Electric Code ANSI/NFPA 70.
- "Risk of electrical shock."** Do not remove power supply cord and strain relief or connect conduit directly to the pump.
- Installation and checking of electrical circuits and hardware should be performed by a qualified licensed electrician.

- Check to be sure your power source is capable of handling the voltage requirements of the motor, as indicated on the pump name plate. (See Fig. 2)
- See DO'S and DON'T'S on last page of installation instruction that will help assure longer pump life.
- If pump is used with variable level float control switch, it is the responsibility of the installing party and care should be taken that tethered float switches will not hang up on the pump apparatus or pit peculiarities and is secured so that the pump will shut off at the proper level.
- Pump should be checked frequently for debris and/or build up of deposits on both the inside and outside of the pump.
- Maximum continuous operating temperature for standard model pumps must not exceed 130°F.
- Pump must operate totally submerged to the top of the motor housing.
- Information - vent hole purpose.** 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 vent hole (approx. 3/16") must be drilled in the discharge pipe below the check valve and pit cover to purge the unit of trapped air. Trapped air is caused by agitation and/or a dry basin. 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 and no inlet carries air to the pump intake. NOTE: THE HOLE MUST ALSO BE BELOW THE BASIN COVER AND CLEANED PERIODICALLY. Water stream will be visible from this hole during pump run periods.

**REFER TO WARRANTY ON PAGE 2.**

## 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 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 feminine sanitary products, 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 Manufacturer at, 3649 Cane Run Road, Louisville, Kentucky 40211, Attention: Customer Service Department 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 states do not allow limitations on the duration of an implied warranty, so the above limitation may not apply to you. Some states 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 state to state.

In instances where property damages are incurred as a result of an alleged product failure, the property owner must retain possession of the product for investigation purpose.

The following will help assure longer pump life. If not completed or checked when pump is installed, the Limited warranty may be affected.

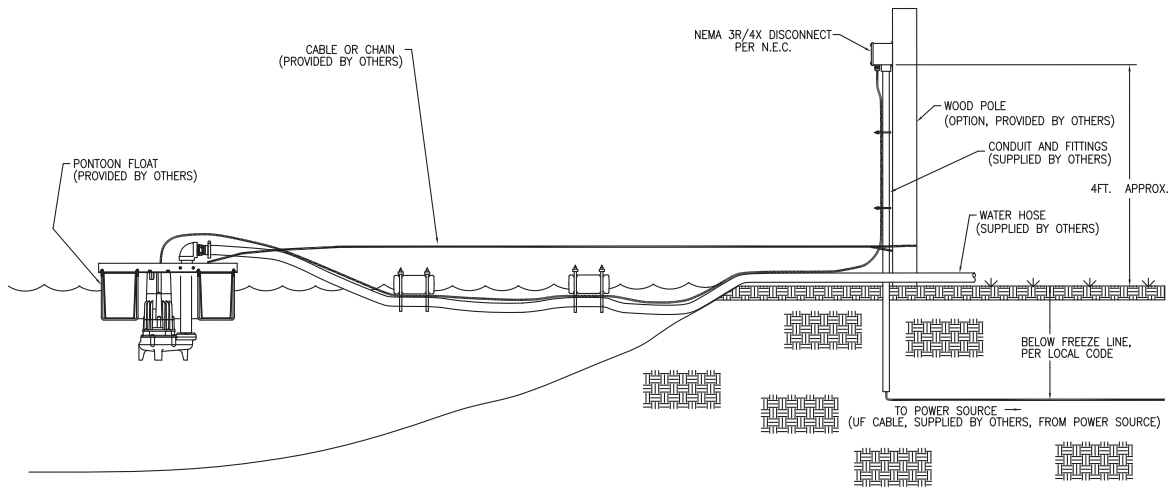
- A. The voltage at the supply cord termination point must be 90% or greater than motor rated voltage when pump is running.
- B. The power cord must be terminated in a NEMA 3R or 4X disconnect box per the NEC.
- C. Pump must be mounted within 10 degrees of vertical.
- D. Pump must be anchored to stop torquing while running, starting or stopping, relative to the float or anchor point.
- E. Pump must be under water at all times and pump fluids with less than 3% solids.
- G. The pump must be maintained on a regular basis. (De-scaled regularly to prevent deposits from stalling unit).

### EASY DO'S & DON'T'S FOR INSTALLING AGRICULTURAL PUMPS

1. **DO** read thoroughly all installation material provided with the pump.
2. **DO** inspect pump for any visible damage caused by shipping. Contact dealer if pump appears to be damaged.
3. **DO** clean all debris from sumps. Be sure that the pump will have a hard, flat surface beneath it.  
**DO NOT** install on sand, gravel or dirt.
4. **DO** be sure that the sump is large enough to allow proper clearance for the level control switch(es) to operate properly.
5. **DO** make certain pump is mounted on pontoon float (provided by others). properly for lagoon applications.
6. **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.  
**DO NOT** carry or lift pump by its power cord.  
**DO NOT** use an extension cord with a submersible pump.
7. **DO** install a check valve and a union in the discharge line for pit applications.  
**DO NOT** use a discharge pipe smaller than the pump discharge.
8. **DO NOT** use a submersible pump as a trench or excavation pump, or for pumping gasoline or other hazardous liquids.
9. **DO** test pump immediately after installation to be sure that the system is working properly.
10. **DO** cover pit with an adequate pit cover.
11. **DO** review all applicable local and national codes and verify that the installation conforms to each of them.
12. **DO** consult manufacturer for clarifications or questions.
13. **DO** consider a Two Pump System with an alarm (See FM0486) where an installation may become overloaded or primary pump failure would result in property damages.



**Fig. 1**



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**TYPICAL LAGOON INSTALLATION**

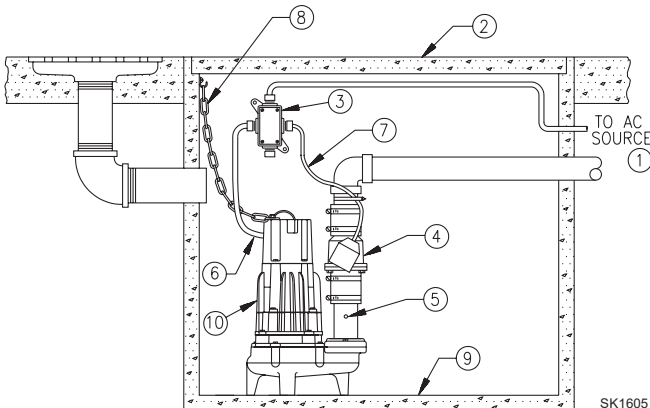
- (1) Electrical wiring and enclosures must be in accordance with the National Electrical Code, and any other applicable state and local electrical requirements.
- (2) Secure power cord on both ends. Tie off at the pontoon float (provided by others) and strap rigidly to the pole support below the wiring enclosure.
- (3) Connect flexible pipe to pump discharge using stainless steel hose clamp. Install pipe floats approximately 10 feet apart to ensure flotation.
- (4) The pipe floats can also be used to support the power cable if the wiring terminal box and discharge pipe connection are located in the same area. If wiring terminal box is located in a different area, separate floats may be required to prevent power cable from drooping and entanglement with lagoon debris.
- (5) Three phase pumps require motor starters. Refer to FM1596 Simplex or FM0486 Duplex.
- (6) Voltage at the terminal point of the power supply line must be 90% or greater than the motor rated voltage when pump is running. Ex. 200/208V pumps must have 180/187V at the termination point (terminal box). 230V pumps must have 207V at the termination point. These voltages are required for proper motor operations and to avoid overheating and motor damage. See Fig. 2 for guide on wire size to avoid excessive voltage drops in the power supply line.
- (7) If the power source for the terminal box connection is located at some distance away, the guideline in Fig. 2 must be followed to help assure the required voltage at the terminal box.
- (8) Do not use plug caps and receptacles. Use rigid connection with proper fuses and/or circuit breakers with strain relief on power cable at entry to the enclosure.
- (9) Pump must be mounted no more than 10 degrees from vertical and secured to prevent torquing. Pontoon provided by others.
- (10) Pump must operate with motor and pump housing totally submerged in the water for adequate cooling. Pontoon (provided by others).
- (11) Do not attempt to locate the pump pontoon (provided by others) by pulling on the power cord. Install a chain, flexible cable or plastic rope for this purpose.
- (12) Agriculture pumps are designed for pumping water with a maximum of 3% solids up to 1-1/2" in particle size. Addition of make up water and lagoon maintenance is required for trouble free pump operation.
- (13) **Agriculture pumps are subject to calcium, lime or salt build up. Pump must be de-scaled on a regular maintenance schedule to prevent clogging and overheating of motors. The addition of chemicals in flush tanks and make up water is essential for controlling the ammonia in the wash down water and subsequent scaling of pumps in the lagoon.**
- (14) First, second and third generation lagoons and lagoons for nurseries and farrowing houses will require different maintenance schedules. Normally pumps will require de-scaling quarterly. This schedule will vary with size of lagoon, make up water and the chemicals used for control. It will be necessary to establish a pump maintenance schedule for each application from observation of scale build up.

Failure to provide this routine maintenance may void pump warranty.

**Fig. 2**

AWG WIRE SIZE	MAXIMUM LENGTH OF WIRE -- FT.				
	PUMP VOLTAGES				
	208V-1PH	230V-1PH	208V-3PH	230V-3PH	460V-3PH
12	120	150	160	220	800
10	210	280	370	400	1500
8	330	450	900	740	---
6	550	620	900	1100	---

**Fig. 3**

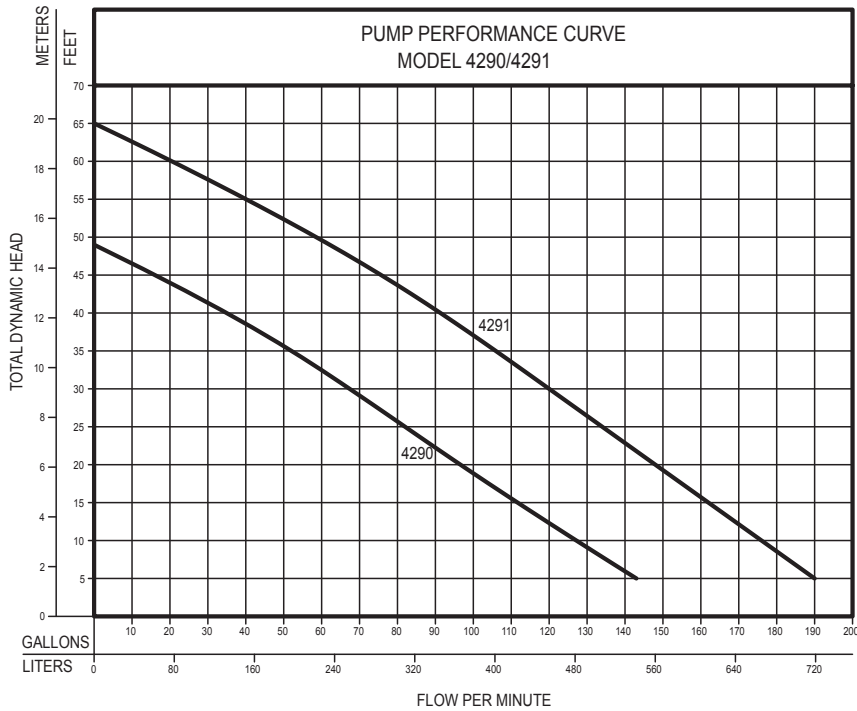


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**PIT SYSTEMS**

- (1) Electric wiring and protection must be in accordance with the National Electric code and any other applicable state and local electrical codes.
- (2) All installations require a basin cover to prevent debris from falling into the basin and to minimize the possibility of accidental injury.
- (3) Wire pump to power source through a Zoeller J-Box P/N 10-0777 or 10-0778, watertight junction box in accordance with the National Electrical code. (See FM1597)
- (4) Install 2" full flow check valve. (See FM0217)
- (5) When check valve is installed, drill a 3/16" diameter hole in the discharge pipe below the check valve. The hole is necessary to avoid air lock of the pump on start-up.
- (6) Secure power cord to avoid entanglement with the float switch.
- (7) Pump must be level and the tethered float switch must be free and not held up on the pump apparatus or pit peculiarities and is secured so that the pump will shut off at the proper level.
- (8) Chain or cable should be installed for removing pump from the pit.
- (9) Basin should be clean and free of scale after installation.
- (10) **Pump must be de-scaled when used for pumping water containing animal waste. A regular maintenance schedule, minimum of three months, is required based on condition of water and chemical used for controlling the build up of ammonia.**

Failure to provide this routine maintenance may void pump warranty.



**TOTAL DYNAMIC HEAD/FLOW  
PER MINUTE  
SEWAGE AND DEWATERING**

MODEL	4290		4291		
Feet	Meters	Gal.	Liters	Gal.	Liters
5	1.5	143	541	190	719
10	3.0	127	481	176	666
20	6.1	96	363	148	560
30	9.1	68	257	120	454
40	12.2	37	140	92	348
50	15.2	--	--	60	227
60	18.3	--	--	21	79
Shut-off Head:		49 ft.(14.9m)		65 ft.(19.8m)	

010652B

010652A

**SERVICE CHECK LIST**

**⚠ WARNING ELECTRICAL PRECAUTION-** Before servicing a pump, always shut off the main power breaker and then unplug the pump - making 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 prior to pump removal.

**⚠ CAUTION** Submersible pumps contain oil which becomes 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/circuit breakers overload activated, impeller or seal build up from scale or debris, or a defective capacitor. Float switch is out of adjustment.

**B. Motor overheats and trips overload or blows fuse/circuit breaker.**

Incorrect or low voltage. Impeller or seal bound up from scale or debris, defective capacitor, relay or motor shorted out.

**C. Pump starts and stops too often or will not shut off (Pit installations).**

Float not tethered correctly, check valve stuck, or none installed in long distance line. Pit is too small for application. Defective switch or debris in pit blocking float switch.

**D. Pump operates but delivers little or no water or loss of discharge pressure after a period of use.**

Check discharge pipe and pump intake for scale. Remove base and inspect. Vent hole is plugged and pump is air locking, low voltage, incorrect motor rotation (3 phase pumps) check base and impeller for deterioration and wear.

If the above check list does not uncover the problem, consult the factory - Do not attempt to service or otherwise disassemble the pump. Service by Zoeller Authorized Service and Warranty Center (ASWC) required for warranty.