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Multi-Stage Turbine Effluent Pumps

OWNER'S MANUAL

<p>Congratulations on the purchase of the Zoeller Pump Company Turbine Effluent Submersible Pump. High quality workmanship and easy maintenance design has been incorporated into this line of onsite wastewater products. This Zoeller Pump Company product will provide years of trouble-free service when installed according to the manufacturers recommendations.</p>	<p>This manual incorporates the installation, operation, maintenance, and service instructions into one document to aid the owner of a Zoeller Pump Company onsite wastewater product. Please read and review this manual before installing the product. The instructions contained herein, when followed correctly, will not only ensure a long and problem-free life for the system, but will also save time and money during installation. Should further assistance be necessary please call 1-800-928-7867.</p>
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Owner's Information	
Model Number: _____	Date Code: _____
Job Name: _____	
Dealer: _____	
Date of Purchase: _____	
Contractor: _____	
Date of Installation: _____	
System Readings During Operation: Voltage _____ Amps _____	

Safety Instructions	
<p>TO AVOID SERIOUS OR FATAL PERSONAL INJURY OR MAJOR PROPERTY DAMAGE, READ AND FOLLOW ALL SAFETY INSTRUCTIONS IN MANUAL AND ON PUMP.</p> <p>THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT AND MUST BE KEPT WITH THE PUMP.</p>	
	<p>This is a SAFETY ALERT SYMBOL. 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>▲ DANGER</p>	<p>Warns of hazards that WILL cause serious personal injury, death or major property damage.</p>
<p>▲ WARNING</p>	<p>Warns of hazards that CAN cause serious personal injury, death or major property damage.</p>
<p>▲ CAUTION</p>	<p>Warns of hazards that CAN cause personal injury or property damage.</p>
<p>▲ NOTICE</p>	<p>Indicates special instructions which are very important and must be followed.</p>
<p>THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.</p> <p>MAINTAIN ALL SAFETY DECALS.</p>	

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 God; 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 applications other than in raw sewage

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 Support 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.

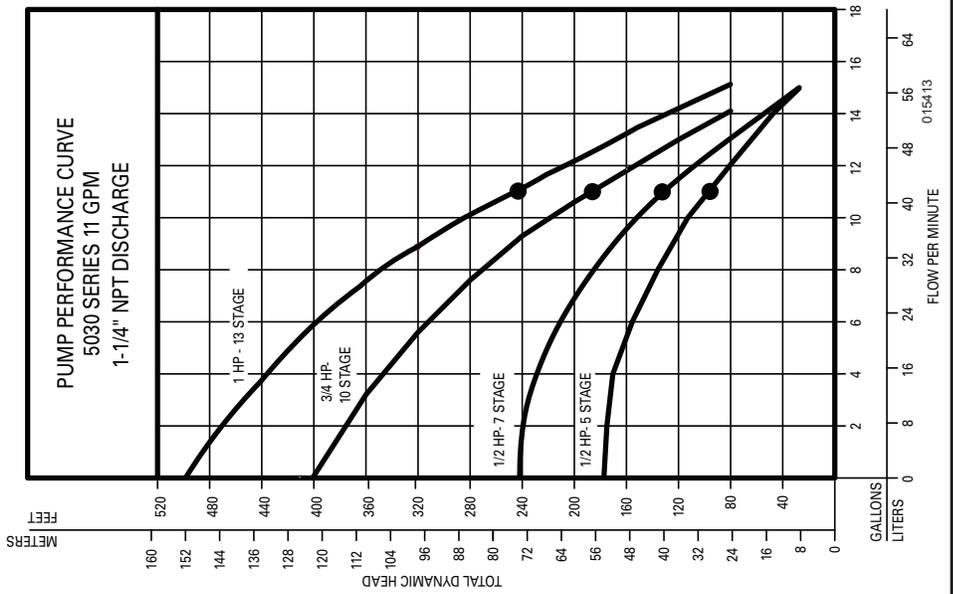
Preinstallation Information

1. **Inspect your unit.** Occasionally, products are damaged during shipment. If the unit is damaged, contact your dealer before using.
2. **Carefully read the literature provided** to familiarize yourself with specific details regarding installation and use. These materials should be retained for future reference.
3.  **WARNING** "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 and licensed electrician.
4.  **WARNING** Do not lift, carry, or hang pump by the electrical cables. Damage to the electrical cables can cause shock, burns or death.
5.  **WARNING** For your protection, make certain the pump ground wire is properly connected to the ground wire with the incoming power line. Test for ground at the junction box using an Underwriters Laboratory listed circuit analyzer which will indicate if the power, neutral and ground wires are correctly connected. If in doubt, call a qualified licensed electrician.
6.  **WARNING** Make certain that the receptacle is within the reach of the pump's power supply cord. **DO NOT USE AN EXTENSION CORD.** Extension cords that are too long or too light do not deliver sufficient voltage to the pump motor. But, more important, they could present a safety hazard if the insulation were to become damaged or the connection end were to get wet.
7.  **WARNING** Make sure the pump electrical supply circuit is equipped with fuses or circuit breakers of proper capacity. A separate branch circuit is recommended, and sized according to the "National Electrical Code" for the current shown on the pump nameplate.
8.  **WARNING** **DO NOT** run the pump dry. **DO NOT** run the pump with a completely closed discharge. **DO NOT** pump chemical or corrosive liquids. Failure to follow above warnings could result in damage to the pump, voiding the warranty and causing personal injury.
9.  **CAUTION** Check to be sure your power source is capable of handling the voltage requirements of the motor, as indicated on the pump nameplate.
10. The installation of pumps using auxiliary variable level float switches is the responsibility of the installing party. Care should be taken such that the tethered float switch will not hang up and are secured so that the pump will turn on and off properly.
11.  **CAUTION** Water hammer creates momentary high pressure surges. These surges can cause severe damage to check valves and the piping system. Consideration for water hammer must be included in the piping system design. Reference ASPE Data Book, Chapter 2.33. Some systems may require external spring or lever weighted check valves or other engineered solutions.
12.  **CAUTION** In cold climates the discharge pipe may be subject to freezing. If the riser on the septic tank is above the frost line, it will be necessary to protect the system from freeze up. The discharge pipe can be insulated or the check valve can be removed. If the check valve is removed, the "on-off" cycle must be adjusted for any back-flow from the discharge line.
13.  **WARNING** Prop65 Warning for California residents: Cancer and reproductive harm- www.P65Warnings.ca.gov.

Pump Performance Data

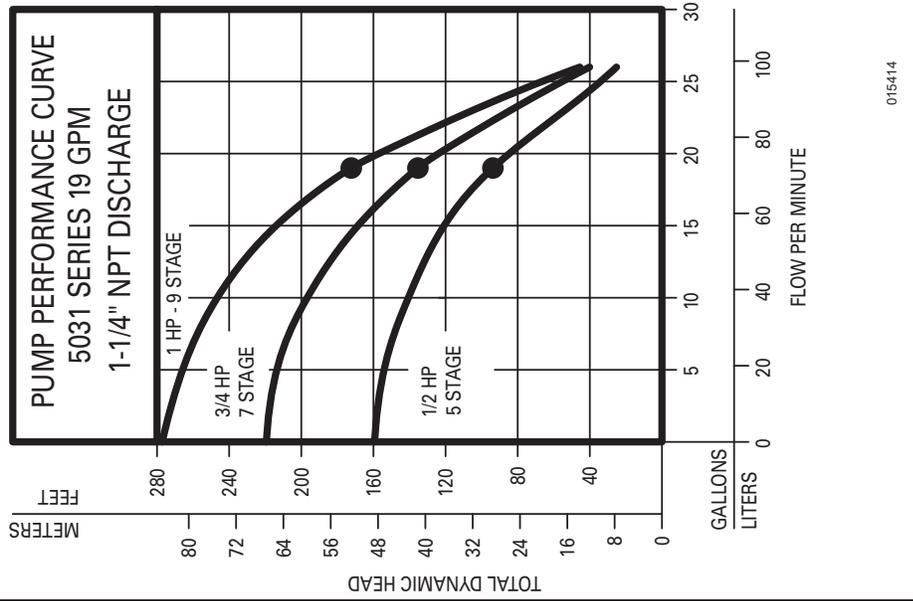
5030 SERIES TOTAL DYNAMIC HEAD/FLOW PER MINUTE EFFLUENT

MODEL	1/2 HP 5 STAGE		3/4 HP 7 STAGE		1 HP 9 STAGE		
	Gal.	Liters	Gal.	Liters	Gal.	Liters	
40	12.2	45.8	14.5	54.9	-	-	
80	24.4	91.6	29.0	109.8	14.6	55.3	
120	36.6	137.4	43.5	164.7	21.9	82.8	
160	48.8	183.2	58.0	219.6	29.2	110.3	
200	61.0	229.0	72.5	274.5	36.5	137.8	
240	73.2	274.8	87.0	329.4	43.8	165.3	
280	85.4	320.6	101.5	384.3	51.1	192.8	
320	97.6	366.4	116.0	439.2	58.4	220.3	
360	109.8	412.2	130.5	494.1	65.7	247.8	
400	121.9	458.0	145.0	549.0	73.0	275.3	
440	134.1	503.8	159.5	603.9	80.3	302.8	
480	146.3	549.6	174.0	658.8	87.6	330.3	
Shut-off Head:		177 ft. (54.0m)	241 ft. (73.5m)	401 ft. (122.2m)	504 ft. (153.6m)		



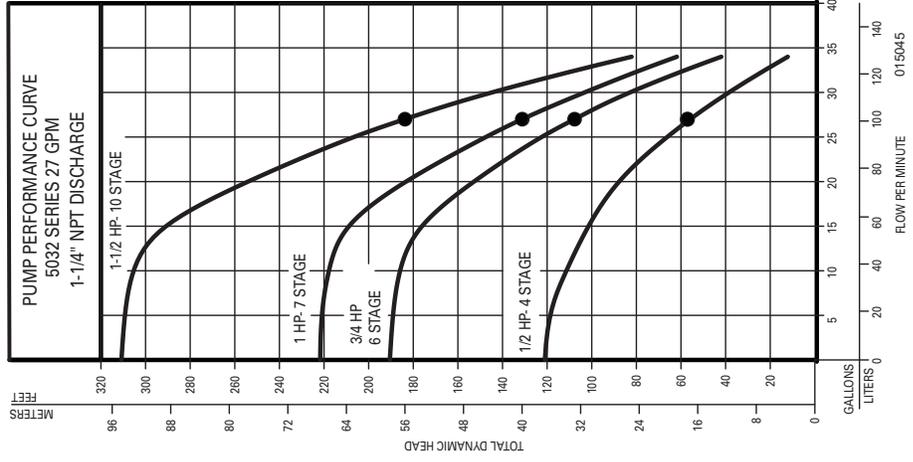
5031 SERIES TOTAL DYNAMIC HEAD/FLOW PER MINUTE EFFLUENT

MODEL	1/2 HP 5 STAGE		3/4 HP 7 STAGE		1 HP 9 STAGE	
	Gal.	Liters	Gal.	Liters	Gal.	Liters
40	12.2	45.8	14.6	55.3	19.9	74.9
80	24.4	91.6	29.2	110.3	39.8	149.8
120	36.6	137.4	43.8	165.3	59.7	224.7
160	48.8	183.2	58.4	219.6	79.6	299.6
200	61.0	229.0	73.0	275.3	99.5	374.5
240	73.2	274.8	87.6	329.4	119.4	449.4
Shut-off Head:		159 ft. (48.5m)	219 ft. (66.8m)	277 ft. (84.4m)		



5032 SERIES TOTAL DYNAMIC HEAD/FLOW PER MINUTE EFFLUENT

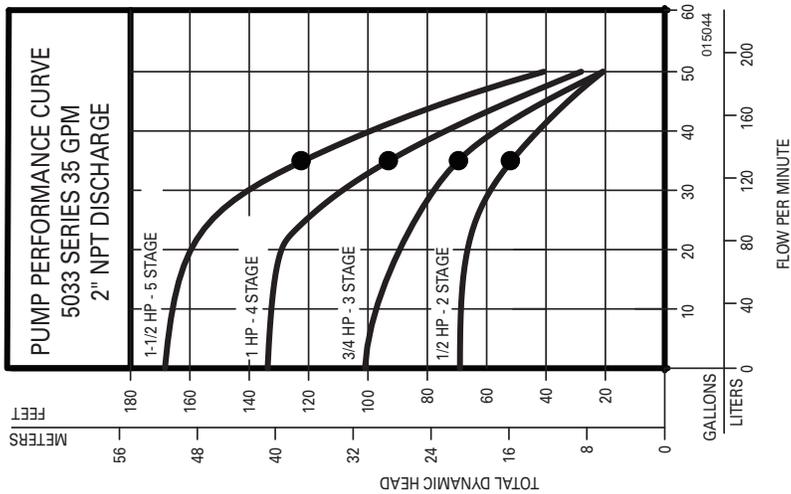
MODEL	1/2 HP 4 STAGE		3/4 HP 6 STAGE		1 HP 7 STAGE		1 1/2 HP 10 STAGE	
	Gal.	Liters	Gal.	Liters	Gal.	Liters	Gal.	Liters
20	6.1	22.9	7.3	27.8	9.5	35.7	11.7	44.5
40	12.2	45.8	14.6	55.3	19.0	71.4	23.4	88.1
60	18.3	68.7	21.9	83.0	28.5	106.8	35.1	132.4
80	24.4	91.6	29.2	110.3	38.0	143.2	46.8	176.0
100	30.5	114.5	37.7	140.4	50.5	190.1	60.4	227.5
120	36.6	137.4	46.4	174.1	63.0	238.0	75.1	283.0
140	42.7	160.3	55.3	207.8	75.5	285.9	89.8	338.5
160	48.8	183.2	64.2	241.5	88.0	333.8	104.5	394.0
180	54.9	206.1	73.1	275.2	100.5	381.7	119.2	449.5
200	61.0	229.0	82.0	309.0	113.0	429.6	133.9	505.0
220	67.1	251.9	90.9	342.7	125.5	477.5	148.6	560.5
240	73.2	274.8	99.8	376.4	138.0	525.4	163.3	616.0
260	79.3	300.7	108.7	410.1	150.5	573.3	178.0	671.5
280	85.4	324.6	117.6	443.8	163.0	621.2	192.7	727.0
300	91.4	348.5	126.5	477.5	175.5	669.1	207.4	782.5
Shut-off Head:		122 Ft. (37.2m)	190 Ft. (57.9m)	222 Ft. (67.7m)	311 Ft. (94.8m)			



Pump Performance Data

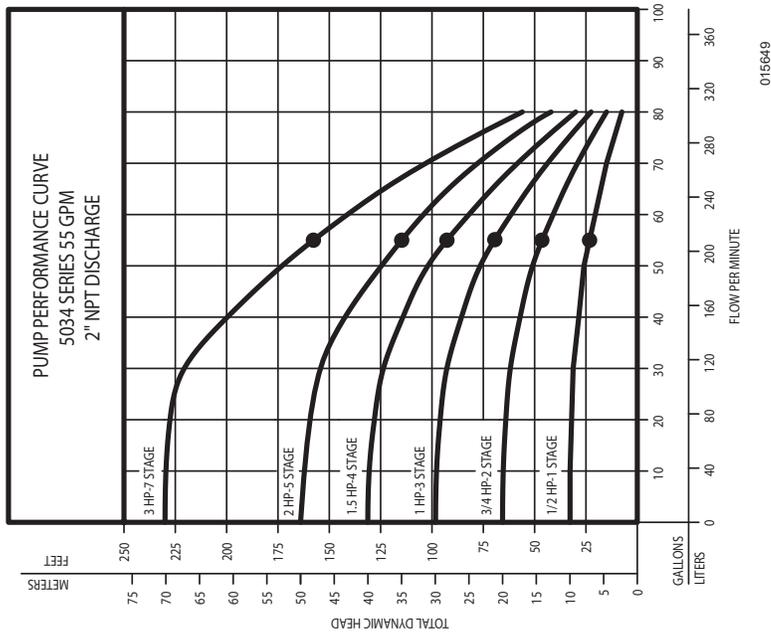
5033 SERIES TOTAL DYNAMIC HEAD / FLOW PER MINUTE EFFLUENT

MODEL	1/2 HP - 2 STAGE		3/4 HP - 3 STAGE		1 HP - 4 STAGE		1-1/2 HP - 5 STAGE	
	Gal.	Liters	Gal.	Liters	Gal.	Liters	Gal.	Liters
20	50.7	196.5	50.7	191.9	51.6	195.3	52.8	199.8
40	12.2	41.9	168.6	45.3	171.5	47.8	180.9	49.9
60	18.3	30.4	115.1	39.5	148.5	43.4	164.3	46.8
80	24.4	--	31.0	117.3	36.6	146.1	42.5	160.9
100	30.5	--	9.5	36.0	32.8	124.2	39.9	151.0
120	36.6	--	--	--	26.4	96.1	35.5	134.4
140	42.7	--	--	--	--	--	30.5	115.4
Shut-off Head:	69 Ft. (21.0m)		101 Ft. (30.7m)		134 Ft. (40.8m)		168 Ft. (51.2m)	



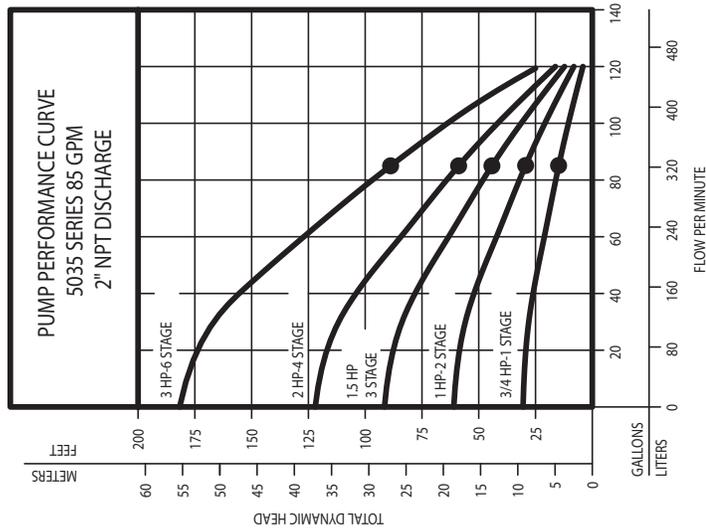
5034 SERIES TOTAL DYNAMIC HEAD/FLOW PER MINUTE EFFLUENT

MODEL	3/4 HP - 2 STAGE		1 HP - 3 STAGE		1.5 HP - 4 STAGE		2 HP - 5 STAGE		3 HP - 7 STAGE	
	Gal.	Liters	Gal.	Liters	Gal.	Liters	Gal.	Liters	Gal.	Liters
35	71.9	271.4	71.9	268.2	71.3	257.1	70.4	254.7	69.1	256.0
50	15.2	56.7	193.8	71.3	193.8	71.3	268.2	70.7	256.0	
75	22.9	85.8	132.1	49.4	132.1	49.4	202.7	202.7	202.7	
100	30.5	115.1	95.5	35.5	95.5	35.5	146.1	146.1	146.1	
125	38.1	143.7	68.8	25.8	68.8	25.8	104.4	104.4	104.4	
150	45.7	171.5	49.4	18.3	49.4	18.3	76.6	76.6	76.6	
175	53.3	200.7	35.5	13.2	35.5	13.2	56.8	56.8	56.8	
200	61.0	229.1	25.8	9.5	25.8	9.5	41.9	41.9	41.9	
225	68.6	257.1	18.3	6.6	18.3	6.6	30.5	30.5	30.5	
Shut-off Head:	33.0 Ft. (10.1m)		65.6 Ft. (20.0m)		99.0 Ft. (30.2m)		132.0 Ft. (40.2m)		164.0 Ft. (50.0m)	



5035 PUMP SERIES TOTAL DYNAMIC HEAD/FLOW PER MINUTE EFFLUENT

MODEL	7/8 HP - 1 STAGE		1 HP - 3 STAGE		1.5 HP - 3 STAGE		3 HP - 4 STAGE		3 HP - 5 STAGE	
	Gal.	Liters	Gal.	Liters	Gal.	Liters	Gal.	Liters	Gal.	Liters
25	76	285	320	1208	320	1208	320	1208	320	1208
35	152	571	168.8	636	168.8	636	168.8	636	168.8	636
50	229	858	115.1	418	115.1	418	115.1	418	115.1	418
75	305	1145	76.6	286	76.6	286	76.6	286	76.6	286
100	381	1432	56.8	211	56.8	211	56.8	211	56.8	211
125	457	1719	41.9	152	41.9	152	41.9	152	41.9	152
150	533	2006	30.5	112	30.5	112	30.5	112	30.5	112
175	609	2293	22.9	83	22.9	83	22.9	83	22.9	83
Shut-off Head:	30.5 Ft. (9.3m)		61.0 Ft. (18.6m)		91.5 Ft. (27.9m)		122 Ft. (37.2m)		181.7 Ft. (55.4m)	



Electrical Data for Zoeller Pump Company 3 Phase Turbine Effluent Pumps

HP	Volts	Phase	Hz	S.F.	Maximum		Locked Rotor Amps	KVA Code	Fuse/Circuit Breaker Amps		Winding Resistance Line to Line
					Amps	Watts			Std.	Delay	
1/2	115	1	60	1.6	12	960	64	R	30	20	1.1-1.4
1/2	230	1	60	1.6	6	960	32	R	15	10	4.1-5.3
3/4	230	1	60	1.5	8	1350	40	N	20	15	2.9-3.7
1	230	1	60	1.4	10.4	1800	48	N	30	20	2.2-2.8
1-1/2	230	1	60	1.3	13.1	2390	65.5	M	30	20	1.6-2.0
2	230	1	60	1.25	Y 13.2	2800	50	G	30	20	1.8-2.5M
											5.4-7.0A
3	230	1	60	1.15	Y17.0	3400	83.4	H	45	20	1.1-1.4 M
					B12.6						4.0-4.8 A
					R6.0						
3	460	3	60	1.15	5.5	3360	31	K	15	9	7.2-8.8

Major Components

1. **Submersible Turbine Effluent Pump** - A submersible turbine effluent pump is a multistage centrifugal design pump. Each stage consists of an impeller and diffuser. Water pressure increases in equal amounts as it passes from stage to stage. The more stages, the higher the pressure the pump will develop.

To correctly select a pump for a specific application, the following information must be known:

- The amount of discharge required in GPM or LPM
- The total dynamic head required in feet or meters

Use this information along with the performance data found on the previous page to make your selection.

2. **Controls** - Submersible turbine effluent pumps require the use of an above ground control panel or junction box with a pump control switch for proper operation. Operation of these pumps without a control panel or junction box with a pump control switch can result in failure of the pump and void the warranty. At least three elevations must be determined to control a pump within a given tank or basin: pump on level, pump off level and high water alarm level.

3. **Piping** - The submersible turbine effluent pump can be installed with schedule 40 PVC pipe. The pipe size should be 1-1/4" diameter for the 11 GPM to 27 GPM pump series and 2" diameter for the 35-85 GPM pump series.

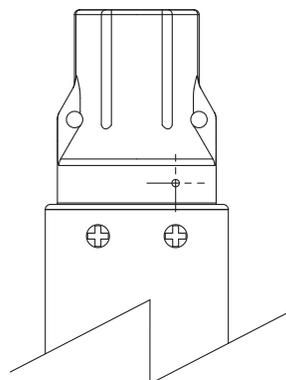
General piping from the pump to a splitter, distribution box, drain field etc., should be the same diameter as stated above. For long pipe runs consult friction loss tables for correct pipe sizing.

4. **Check Valve** - A check valve is required in all duplex systems. It is also required when a large amount of effluent can backflush into the system causing rapid cycling of the pump.

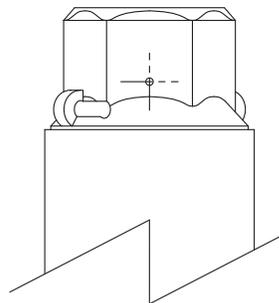
When using a check valve for 11-27 gallons per minute pumps, drill 1/8" diameter weep hole 3/4" maximum depth in discharge 3/4" directly above either shell screw. For 35-85 gallons per minute pumps, drill 1/8" diameter weep hole 3/4" maximum depth 1 1/4" from top of discharge (see below drawing for hole locations).

5. 2 HP and 3 HP single phase pumps in 5034 and 5035 series include a capacitor box.

10-27 GPM MODELS



35-85 GPM MODELS



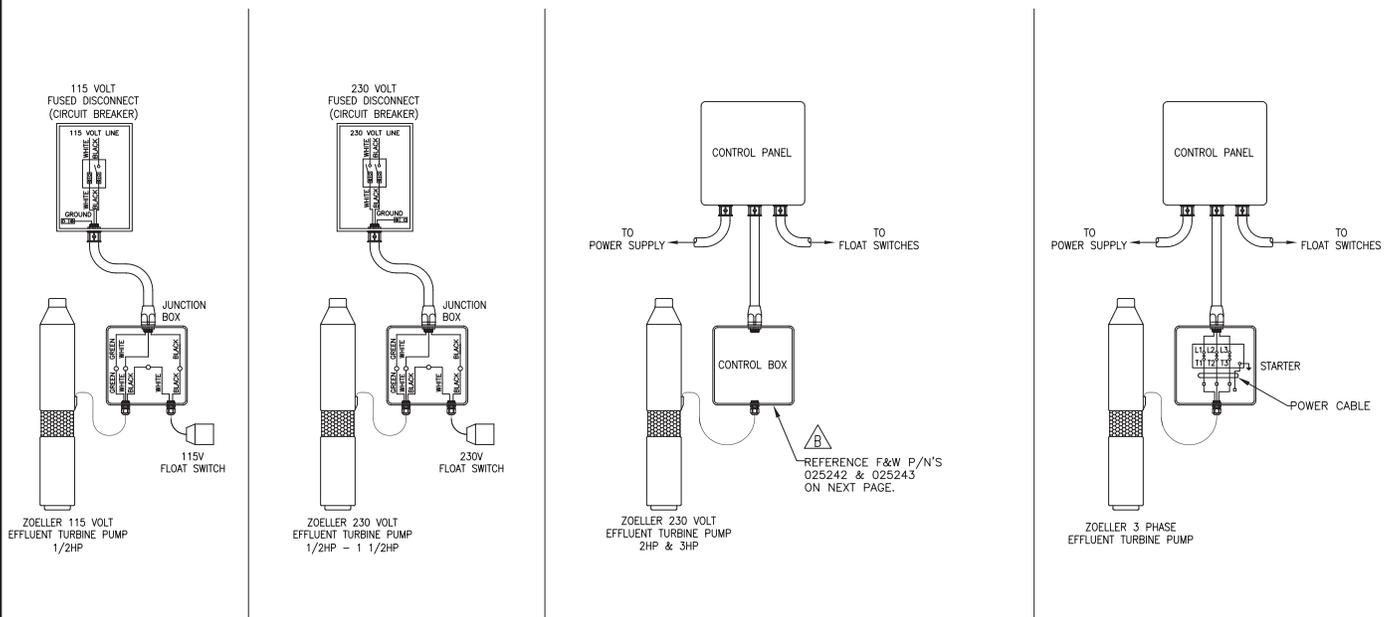
SK2222

Pump Installation and Wiring Diagram

1. Submersible turbine effluent pumps may be installed in any application where relatively clear effluent, such as from a dosing tank or high head STEP system etc., is being pumped.
2. Pumps should always be installed vertically. Pumps should never be installed horizontally.
3. Because of their low temperature rise, pumps under 2 HP do not require a flow inducer sleeve.
4. Mount the junction box, if applicable, in its permanent position and run prewired conduit, or equivalent submersible cable from the junction box to a fused disconnect or, if applicable, the control panel.
5. Feed the pump power cord and float switch cords into the junction box, or alternately to the panel if longer cords are used.
6. If a junction box is used, make the connections in the junction box using the wiring diagrams below. If you are using a control panel or a filtered STEP system, follow the wiring diagrams and instructions included with them.
7. An alarm should be used with any system using a pump. Follow the wiring diagram with the alarm for installation and check your local codes.
8. Run the appropriate power to the control panel from a fused (circuit breaker) disconnect. The appropriate power supply information may be found on the pump nameplate.
9. To provide a suitable ground, a separate ground wire (green or bare) at least as large as the line conductors is required. It is connected from the electrical disconnect box to the control panel, to the junction box, capacitor box or starter and to the green ground wire of the submersible motor lead.
10. Always disconnect all power when installing or servicing the pump.
11. Please note that if using a 230V 2 or 3 HP pump with capacitor box, make sure a jumper wire is used from SW to L2.

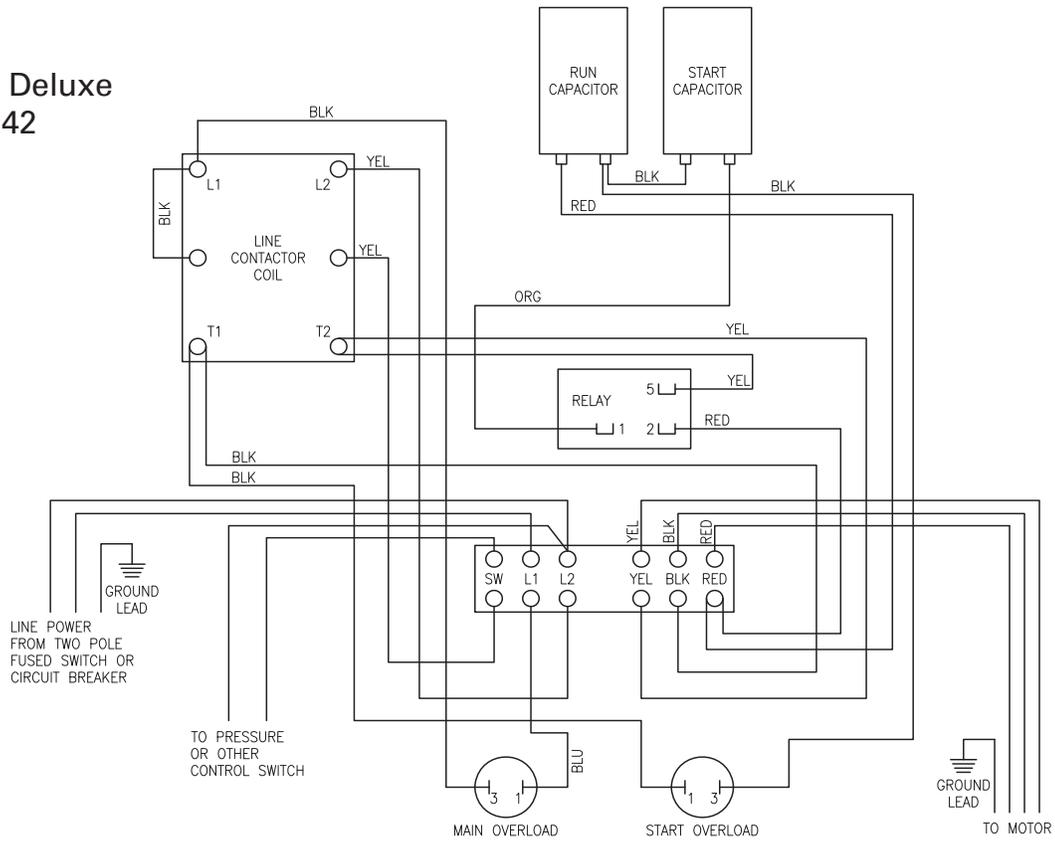
Splicing Underground Wires

Splicing of wires to be buried must be done according to the National Electrical Code. Wire connectors or splicing agents installed on conductors for direct burial shall be listed for such use.

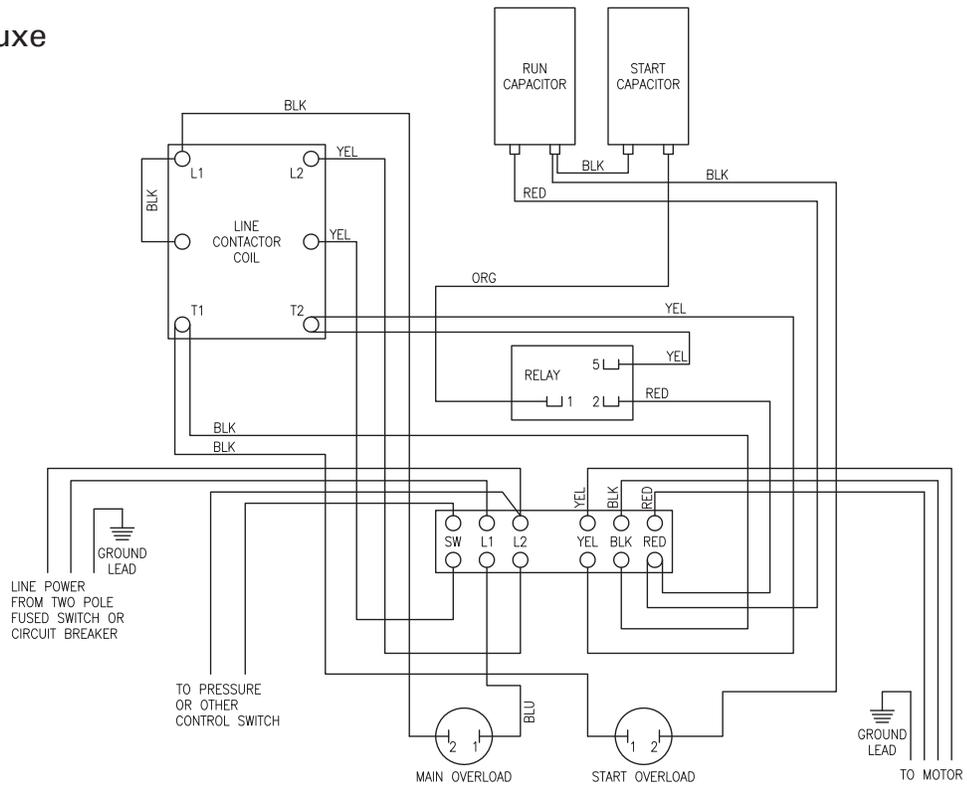


SK3442

**2 HP Deluxe
025242**

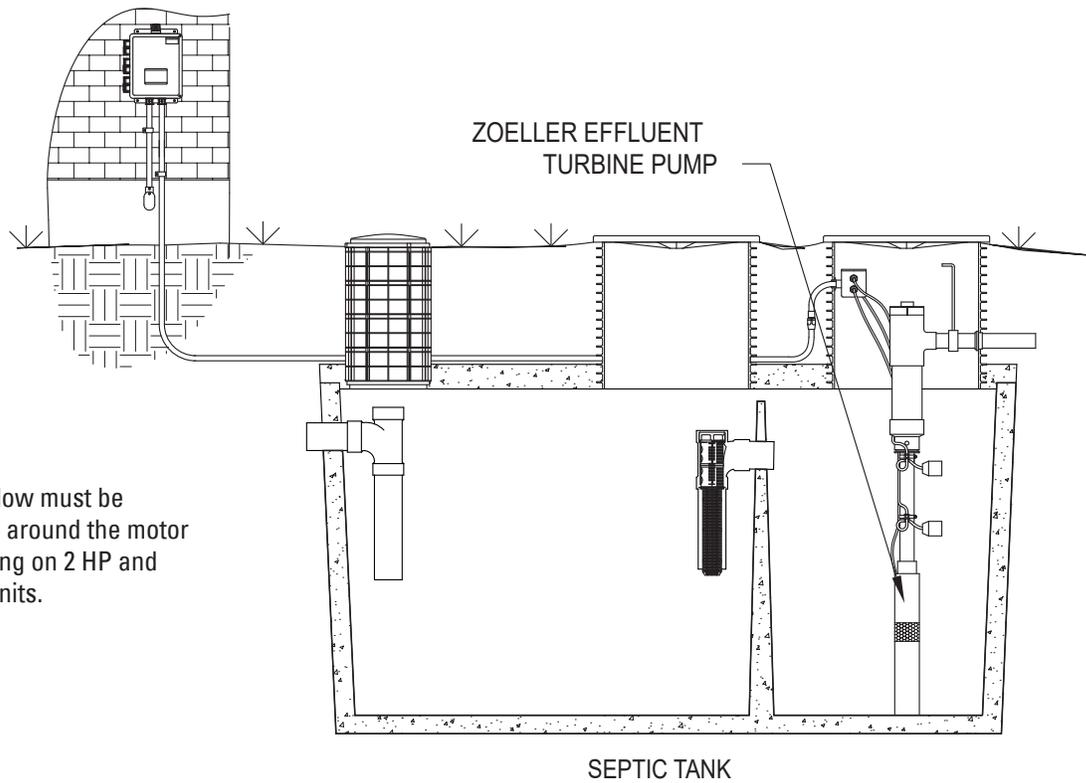


**3 HP Deluxe
025243**

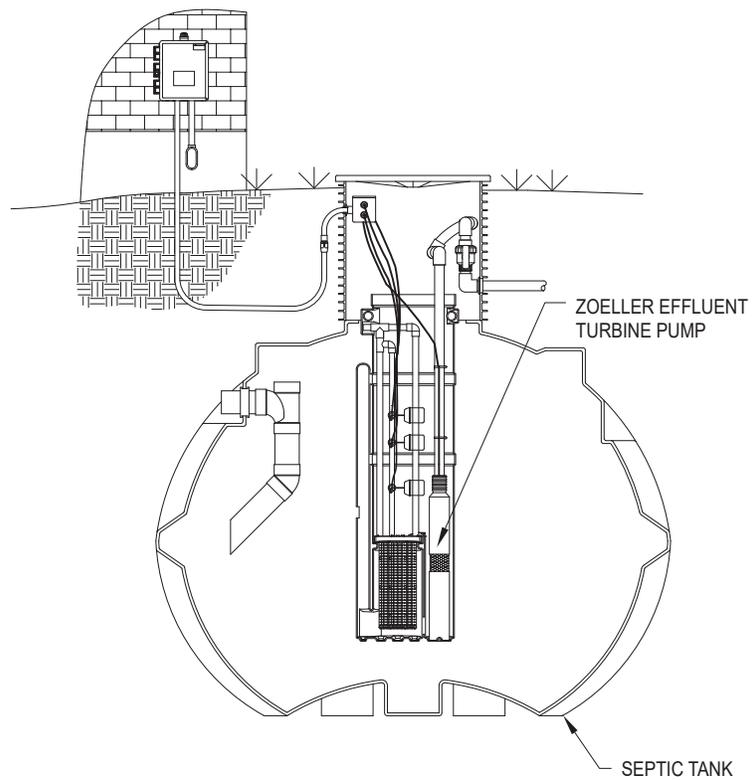


Typical Installations

ALL INSTALLATIONS REQUIRE A FILTER BEFORE THE PUMP.



SK2220



SK2219

Start-up and Maintenance

Before placing the equipment into operation the following must be checked:

- Septic tank and/or pump chamber should be pumped and cleaned prior to installation in existing system.
- Septic tank and/or pump chamber must be watertight.
- Installation needs to be according to instructions.
- Installation should include an easy access riser and tamper resistant lid.
- Filter assembly needs to be in place and secure.
- Float tree needs to be in place, secure and adjusted for proper cycling.
- Make sure float switches are free to move within the basin.
- Be sure electrical connections are watertight and conform to the Uniform Building Code and the National Electrical Code (NEC).
- Fill the septic tank and/or pump chamber with water and check the system for operation.

After installing the pump into the containment area with adequate submergence, open the discharge valve fully. Start the unit using manual controls. If flow is appreciably less than rated performance, pump may be air locked. To expel trapped air, jog the unit several times, using the manual controls.

Have a qualified electrician take voltage and current measurements on the black wire of single phase. Record these readings in the space provided in the "Owner's Information" section on the front this manual for future reference.

Be sure to complete all items such as installing the lid on the riser, securely closing the control panel, and checking the system operation before placing the system into service.

Routine maintenance should include:

- Service filter in STEP system and/or septic tank.
- Clean pump screen.
- Make sure the check valve is functioning properly.
- Check wire connections.
- Make sure the weep hole is clear.
- Make sure the float switches are free to move within the basin.
- Make sure there are no leaks in the plumbing.
- Make sure there is no excessive noise while the pump is running.

Troubleshooting and Service Checklist



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

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, defective capacitor or relay when used, motor or wiring shorted. Float assembly held down. Switch defective, damaged, or out of adjustment. Make sure a jumper wire is added between SW and L2 on capacitor box.
B. Motor overheats and trips overload or blows fuse.	Incorrect voltage, negative head (discharge open lower than normal), impeller or seal bound mechanically, or relay, motor shorted.
C. Pump starts and stops too often.	Check valve stuck or none installed in long distance line, overload open, level switch(es) defective, sump pit too small, leak in the system.
D. Pump will not shut off.	Debris under float assembly bound by pit sides or other, switch defective, damaged or out of adjustment, leak in the system.
E. Pump operates but delivers little or no water.	Check strainer housing, discharge pipe, or if check valve is used vent hole must be clear. Discharge head exceeds pump capacity. Low or incorrect voltage. Incorrect motor rotation. Capacitor defective. Incoming water containing air or causing air to enter pumping chamber.
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 unit and inspect.

If the above chart does not uncover the problem, consult Zoeller Pump Company - Do not attempt to service or otherwise disassemble unit.

All Zoeller Pump Company products must be installed and maintained in accordance with all applicable codes.

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



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