

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.



FM2615
Rev. A
0615
Supersedes
0512

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OWNER'S MANUAL



Certified to CSA Standard C22.2 No. 145

Patent No. 6,364,620

X800 SERIES HAZARDOUS ENVIRONMENT SERIES CLASS I, DIVISION 1, GROUP C & D SUBMERSIBLE GRINDER UNITS

Congratulations on the purchase of a Zoeller submersible grinder pump. **This pump has been constructed in compliance with FM and CSA testing. These requirements enable the unit to be listed as an explosion proof pump rated for use in Class I, Division 1, Group C & D environments.** Since 1939, the name Zoeller has represented the standard for submersible dewatering and sewage pumps. The same high quality workmanship and easy maintenance design has been incorporated into this line of heavy-duty submersible grinder pumps. This Zoeller pump will provide years of trouble-free service when installed according to the manufacturer's recommendations.

This manual incorporates the installation, operation, maintenance, and service instructions into one document to aid in the ownership of a Zoeller submersible wastewater product. Please read and review this manual before installing the product. Follow the steps in this manual for a proper start-up. Many items contained within, when followed correctly, will not only ensure a long and problem-free life for the pump, but also save time and money during installation. Consult factory for replacement parts. Should further assistance be necessary please call our Product Support Department at 1-800-928-7867.

Table of Contents

Safety Instructions	1
Limited Warranty and Application	2
Preinstallation Checklist.....	3
General Information	4
Pump Wiring Instructions.....	5
Typical Outdoor Prepackaged System	6
Outdoor Prepackaged Installation Instructions	7
Electrical Data.....	8
Operation.....	9
Cutter Maintenance	10
Service Checklist.....	11

Owner's Information

Part Number: _____ Date Code: _____

Simplex Duplex

Packaged System Field Assembled System

Job Name: _____

Distributor: _____

Date of Purchase: _____ Zoeller S/O No.: _____

Contractor: _____

Date of Installation: _____

System Readings During Start-up: Voltage _____ Amps _____

Safety Instructions

TO AVOID SERIOUS OR FATAL PERSONAL INJURY OR MAJOR PROPERTY DAMAGE, READ AND FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND ON THE PUMP.

THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT AND MUST BE KEPT WITH THE PUMP.



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.

- ▲ DANGER** Warns of hazards that **WILL** cause serious personal injury, death or major property damage.
- ▲ WARNING** Warns of hazards that **CAN** cause serious personal injury, death or major property damage.
- ▲ CAUTION** Warns of hazards that **CAN** cause personal injury or property damage.
- ▲ NOTICE** INDICATES SPECIAL INSTRUCTIONS WHICH ARE VERY IMPORTANT AND MUST BE FOLLOWED.

THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.

MAINTAIN ALL SAFETY DECALS.

PUMPS WITH THE "UL" MARK AND PUMPS WITH THE "US" MARK ARE TESTED TO UL STANDARD UL778. CSA CERTIFIED PUMPS ARE CERTIFIED TO CSA STANDARD C22.2 NO. 108.

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 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.

Model X840, X841 and X842 Applications

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Zoeller Grinder Pumps are designed for grinding and pumping sanitary sewage from submersible lift stations. The pump is intended to grind and pump reasonable quantities of items normally found in sanitary sewage applications. 2. Zoeller Grinder Pumps can be installed in new applications or as a direct replacement for any grinder application of like size and capacity. Some rail system retrofit kits are available. | <ol style="list-style-type: none"> 3. The can be installed in a Prepackaged Job Ready System or may be used in a Field Assembled basin package. Pages 6 and 8 show a couple of Prepackaged Systems. Field Assembled Systems are discussed on pages 3 and 4. 4. Zoeller Grinder Pumps can be retrofitted to existing positive displacement pump installations. |
|---|---|

Recommended Limits of Application X800 Series Grinder Pumps

These recommended application limits are for pump stations pumping to a gravity main. Low-pressure pipe systems should be designed with a pump located at each house. For applications where a lift station would handle more than 60 homes, a solids handling type pump should be considered.

Model	HP	Simplex Station		Duplex Station	
		Homes	GPD	Homes	GPD
X840 w/o Reversing Control	2	2*	800	10	4,000
X840 w/ Reversing Control	2	2*	800	15	6,000
X841	2	2*	800	10	4,000
X842	2	2*	800	10	4,000

*Zoeller Company does not recommend a simplex station on anything over two homes in order to maintain continuous service during unusual conditions.



Preinstallation Information

1. **Inspect your pump.** Occasionally, products are damaged during shipment. If the unit is damaged, contact your distributor before using. **DO NOT** remove the test plugs in the cover nor the motor housing.
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. **National Electrical Code (NEC) articles 500 through 503 explain in detail the requirements for the installation and wiring of electrical equipment in hazardous locations.**



⚠ **WARNING**

SEE BELOW FOR
LIST OF WARNINGS

1.  Not for use in acidic atmospheres.
2. Do not lift, carry, or hang pump by the electrical cables. Damage to the electrical cables can cause shock, burns or death.
3. **Make sure there is a properly grounded connection available.** All pumps are furnished with provisions for proper grounding to help protect you against the possibility of electrical shock.
4. Make certain that the control box 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 fall into the sump.
5. **Make sure the pump electrical supply circuit is equipped with fuses and disconnect or circuit breakers of proper capacity.** A separate branch circuit is recommended, sized according to the "National Electrical Code" for the current shown on the pump nameplate.
6. Risk of electric shock - These pumps have not been investigated for use in swimming pool areas.
7. According to the state of California (Prop 65), this product contains chemicals known to the state of California to cause cancer and birth defects or other reproductive harm.
8. Electrical wiring and protection **must** be in accordance with the National Electrical Code per NEC articles 500 through 503 for installation in Class I, Division 1, Group C & D environments, and any other applicable state and local electrical requirements.
9.  **Do not attempt to turn cutter rotor located on bottom of the unit with fingers.** Use the appropriately sized wrench when checking or removing the cutter.

NOTE: CSA Certified pumps are certified to CSA Standard C22.2 No. 145.

⚠ **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 nameplate.
2. The float switches must be connected to an intrinsically safe circuit in the control panel. The installation of float switches is the responsibility of the installing party and 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. It is recommended that rigid piping and fittings be used and the pit be 36" or larger in diameter.
3. **INFORMATION - VENT HOLE PURPOSE.** It is necessary that all submersible 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. Water stream will be visible from this hole during pump run periods. This vent hole should be checked periodically for clogging and cleaned as necessary. Trapped air is caused by agitation and/or a dry basin.
4. 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.
5. Three phase pumps must be connected for proper rotation, which is counterclockwise looking into impeller inlet. See page 4 for instructions for checking 3 phase rotation.
6. Grinder installations should be checked frequently for debris and/or buildup which may interfere with the "ON"/"OFF" cycles or the positions of variable level float control switches. For repair and service, other than cutter assembly maintenance, contact factory.
7. Care should be taken during the initial installation to be sure that adequate air supply is available whenever any person is in the basin. Always follow OSHA guidelines on confined space requirements.

General Information

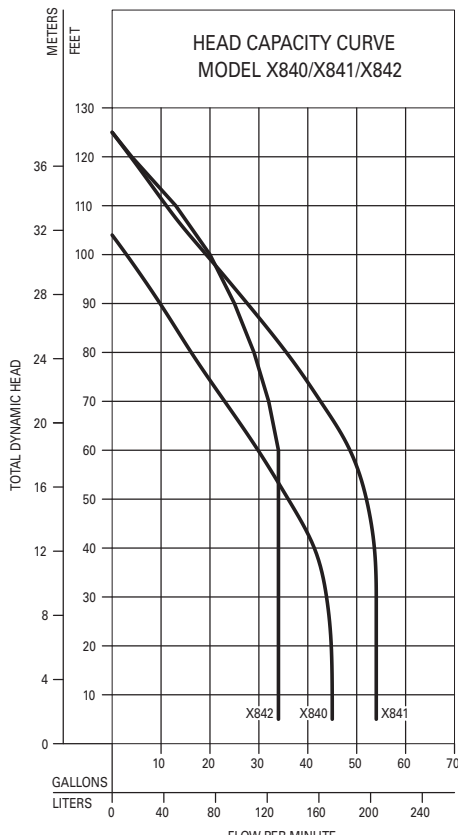
GRINDER PUMP DESCRIPTION

1. Pumps are constructed of class 30 cast iron protected with powder coated epoxy for long life when pumping sewage in submersible applications. The cutter assembly is comprised of stainless steel components hardened to a value of 55-60 on the Rockwell C scale; a star shaped cutter and a precision ground flat disk. Cutting action takes place with the rotation of the star cutter at 3450 RPM against the stationary cutter plate (see page 11).
2. The cutter mechanism on the model X840 is bidirectional, enabling it to cut in either direction. A control panel with the reversing feature will alternate the pump's rotational direction with each duty cycle. The cutter mechanism on the model X842 & X841 is single directional.
3. Pump motors are available in single and three phase design. Single phase motors require a Zoeller approved starting relay, starting capacitor and a run capacitor, which are mounted in a control panel (ref. page 5).
4. The X800 Series Grinder Pumps are dual seal and have seal leak probes. Single phase units have an internal thermal overload. Three phase pumps have a thermal sensor.
5. Three phase pumps require overload protection in the control panel.
6. A Grinder Pump is an intermittent duty pump designed for pumping sanitary sewage. It is not a dewatering or trash pump.

FIELD ASSEMBLED INSTALLATION

1. Installation and piping instructions are included with the control panel, rail system and basin instructions. If pump is being retrofitted to an existing rail system, accessory parts may be required. Consult the factory and advise make and model of rail system being used.
2. Refer to the appropriate Indoor/Outdoor prepackaged instructions on pages 6-9 for more information on system installation.
3. All electrical connections including pump to control box and power supply to control panels must comply with the "National Electrical Code" and applicable local codes. Conduit and panel enclosure openings must have a gas and watertight seal. Installation of electrical panels, conduit and connections should be made by a qualified licensed electrician. A UL Listed potting kit, P/N 10-2350, is available from Zoeller Company.
4. A properly sized disconnect switch, supplied by others, shall be installed on the service side of the pump and control panel.
5. When installing a pump with a check valve, or a rail system with a check valve, you must give the pump case time to fill to help prevent air lock when lowering the unit into the liquid. The pump case has an air vent located behind the discharge. This air vent is across the pump housing mounting surface and must be cleaned before each reinstall. An extra air vent hole (3/16") may be drilled in discharge pipe below the check valve to help prevent air lock. This drilled hole must be cleaned before each reinstall. After the pump is installed, run the unit submerged to assure the pump case is filled (Water should come out of 3/16" diameter hole).

FIGURE 1.



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

MODEL		X840		X841		X842	
Feet	Meters	Gal.	Liters	Gal.	Liters	Gal.	Liters
5	1.5	45	170	54	204	34	129
10	3.0	45	170	54	204	34	129
20	6.1	45	170	54	204	34	129
30	9.1	44	167	54	204	34	129
40	12.2	42	159	54	204	34	129
50	15.2	36	136	52	197	34	129
60	18.3	30	114	49	185	34	129
70	21.3	23	87	43	163	32	121
80	24.4	16	61	36	136	29	110
90	27.4	10	38	28	106	25	95
100	30.5	3	11	19	72	20	76
110	33.5	--	--	11	42	13	49
120	36.6	--	--	4	15	4	15
Shut-off Head:		104 ft (31.7 m)		125 ft (38.1 m)		125 ft (38.1 m)	

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Pump Wiring Instructions



▲ WARNING

FOR YOUR PROTECTION, ALWAYS DISCONNECT THE PUMP FROM ITS POWER SOURCE BEFORE HANDLING.



▲ WARNING

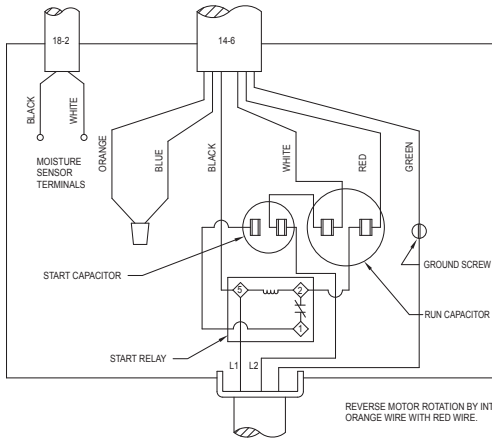
“Risk of electrical shock” Do not remove the power supply cord and strain relief or connect conduit directly to pump.

▲ WARNING

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

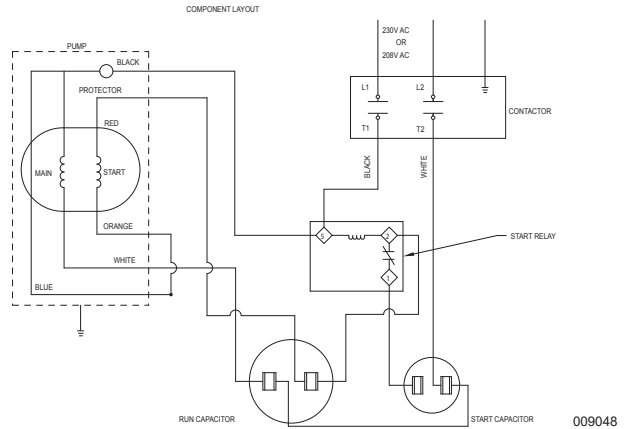
FIGURE 2.

LEAD IDENTIFICATION



**SINGLE PHASE-2 BHP
MODEL X840**

WIRING DIAGRAM

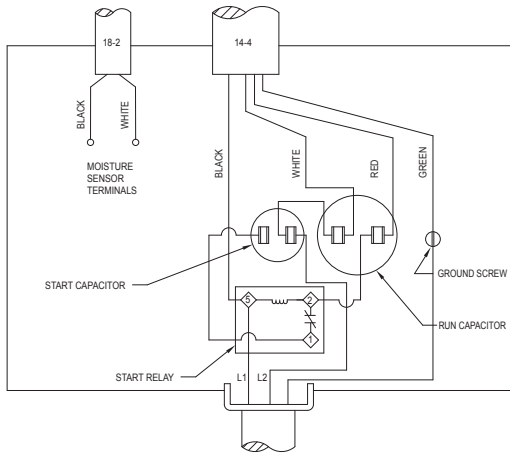


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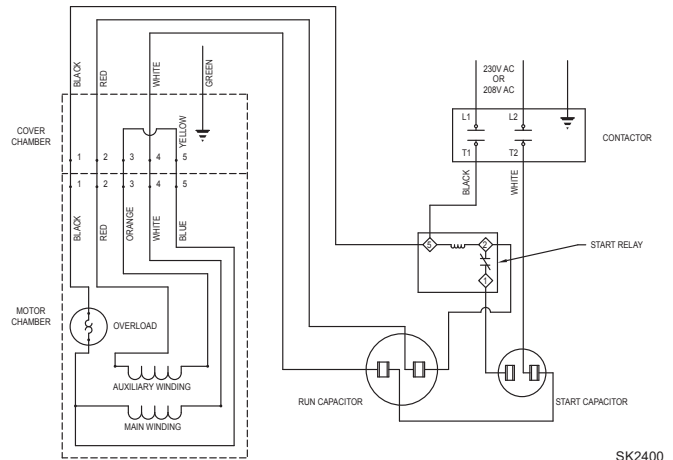
FIGURE 3.

LEAD IDENTIFICATION



**SINGLE PHASE
MODELS X841 & X842**

WIRING DIAGRAM

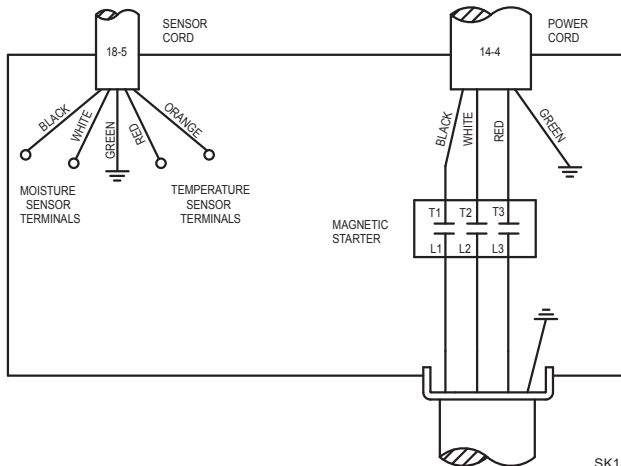


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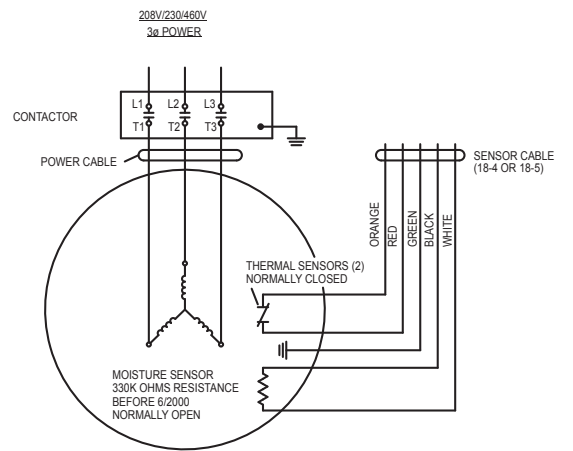
FIGURE 4.

LEAD IDENTIFICATION



**THREE PHASE
MODELS X840, X841 & X842**

WIRING DIAGRAM

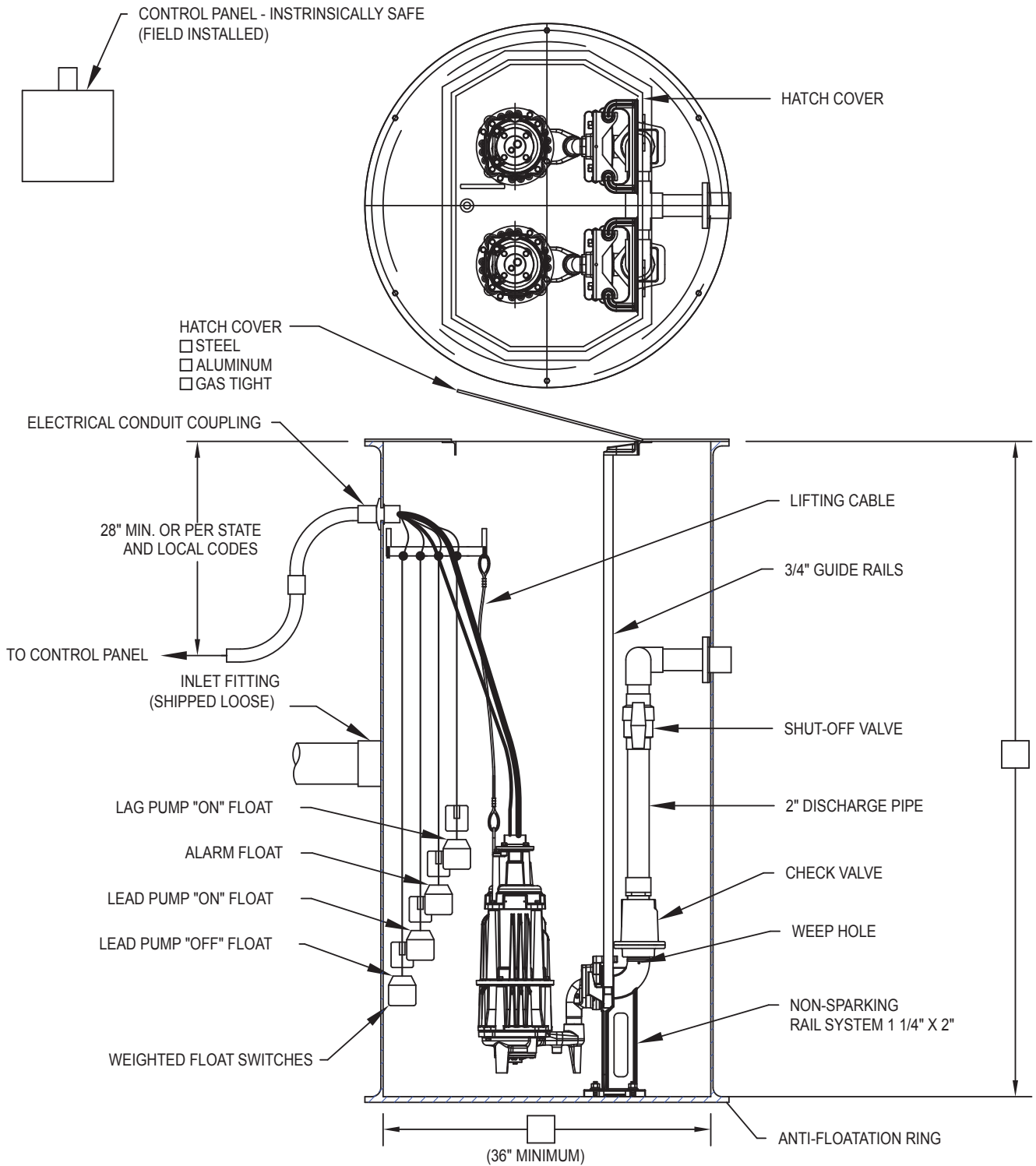


SK1368

SK1370

Typical Packaged Duplex Grinder Pump Station

FIGURE 5.



SK2843

All installations must comply with all applicable electrical and plumbing codes, including but not limited to the National Electrical Code, local, regional and/or state plumbing codes, etc.

Duplex Prepackaged System Installation Instructions

▲ NOTICE This set of instructions is for factory prepackaged outdoor grinder systems only. If this is a field assembled outdoor system you can use these instructions as a guideline. The pump should not be installed in the basin until permanent electrical power is available.

1. Review the drawing in Fig. 5 on page 6 and the actual system to become familiar with the components in the packaged grinder pump system. Review where the unit will be installed. Determine where the power feed, inlet pipe, and discharge pipe will be located.
2. Remove the unit from packing. Prepackaged outdoor systems are preassembled at the Zoeller Company and require a minimum of field assembly work. Float switches are set and tethered for proper operation from the Factory. The alarm switch should be located 3" above the pump "on" level. Three float systems used with a control panel are placed at 27", 24", and 15" from the bottom of the basin. Four float systems used with a control panel are placed at 30", 27", 24", and 15" from the bottom of the basin. If the invert location is at or below the level of the float switches, contact the factory.
3. Float switches are tied in place for shipping purposes on all model prepackaged systems. Cut the cable tie around each float switch bulb or the unit will not operate properly. Verify that where the float switches are set will work for your application. **Verifying that the float switches are set properly and will not hang up inside the basin is the responsibility of the installing contractor.**
4. Dig a hole for the basin. The hole should be at least 24" larger in diameter than the basin diameter to provide 12" of backfill all around and deep enough to provide either 12" of compacted backfill or 6" when a concrete pad is required. **Note: Care must be taken when excavating in order to avoid underground utilities and disturbance of existing structure foundations. The hole should be located at least ten feet from adjacent structures. Additional distance may be required to sufficiently locate the basin outside of the loading area of the adjacent structures.**
5. The location of the inlet hub is determined by the depth of the inlet pipe. The inlet hub must be used with 4" pipe. It is best to install the inlet on the side of the basin opposite the float switches. To install, use a 4" hole saw to drill into the side of the basin at the correct elevation. Center the hub inner diameter with the hole in the basin. Attach the hub to the side of the basin using the sealant and hardware provided.
6. The bottom of the excavation can now be properly backfilled, compacted and leveled. Set basin in hole. Ensure the removable cover extends above the finished grade line and the grade slopes away from the unit. Backfill and subbase should be 1/8" –3/4" pea gravel or 1/8" –1/2" crushed stone. (Reference basin installation instructions included with unit.) Most systems are supplied with a field installed 4" pipe seal inlet fitting. This inlet fitting is installed in the basin's side-wall in a 5" hole drilled with a hole saw at a location lining up with the inlet pipe. Other type fittings and sizes are occasionally provided.
7. Pouring a concrete anchor around system can now be completed. Basin should be filled with water when pouring concrete to minimize movement of the system. Backfill around basin with specified media. Care should be used to avoid damaging components or leaving voids when back filling. Refer to Basin installation reference guide on more specific requirements.
8. PVC or HDPE discharge piping is connected to the 2" threaded fitting located in the basin sidewall. Support discharge piping with sufficient backfill.
9. Connect lift cable to top of pump. Lower the pump into basin ensuring the discharge pipe bracket slides into the disconnect fitting.
10. **Note: The grinder basin is a sewage holding tank. Vent connection should be installed in accordance with all national, state and local plumbing codes.**
11. Dig a trench for the electrical conduit. The conduit should be located below the frost line. Follow all applicable electrical codes.
12. Connect electrical conduit and wiring according to wiring instructions included in this manual.
13. Mount the control panel within sight of the system. Connect float switches and pump cords according to the "Pump Wiring Instructions" found later in this manual and located inside the panel enclosure.
14. Remove any debris from the basin. Using clean water, check the system for proper operation.
15. Seal and secure the lid using the proper bolts and sealant when using a lid without a formed gasket.
16. Test system for leaks and proper pump operation.
17. Record system start up data for future reference.

Additional Installation Notes

- | | |
|---|--|
| <p>(1) Electrical wiring and protection must be in accordance with the National Electrical Code per NEC articles 500 through 503 for installation in Class 1, Division 1, Group C & D environments, and any other applicable state and local electrical requirements.</p> <p>(2) Install proper controls. (Outdoor panels in ventilated areas require NEMA 3R or 4X enclosure) Float switch connections shall be intrinsically safe.</p> <p>(3) Cords must be properly sealed per NEC articles 500 through 503 for installation in Class I, Division 1, Group C & D environments, to prevent moisture and gases from entering the control panel.</p> <p>(4) When check valve is installed, drill a 3/16" diameter hole in the discharge pipe below the check valve even with the top of the pump. <u>NOTE: The hole must be below the basin cover and cleaned periodically.</u> Also a vent hole is drilled in the pump housing. Be sure that this hole is cleared during any servicing.</p> | <p>(5) Vent gases and odors to the atmosphere through vent pipe per local and state codes.</p> <p>(6) Basin must be in accordance with all applicable codes and specifications regarding Class I, Division 1, Group C & D environments. Basin must be sized to allow a minimum 3 minute off-time between starts.</p> <p>(7) The tethered variable level float switches must be free and not hang up on pump or pit peculiarities. Float switch circuits shall be intrinsically safe.</p> <p>(8) If a rail system is used, it should be non-sparking. Discharge elbow must be firmly anchored to the bottom of basin. In fiberglass basin, the bottom will need to be reinforced if the discharge elbow is used.</p> |
|---|--|

Electrical Data

Model	BHP	RPM	Voltage	Phase	Hertz	Amps				KVA Code	Winding Resistance Line-to-Line
						Full Load	In Air	Shut Off	Locked Rotor		
IX840	2	3450	200	1	60	20.0	6.6	12.1	60	H	1.0 / 1.5
EX840	2	3450	230	1	60	17.2	4.0	10.9	56	F	1.3 / 4.0
JX840	2	3450	200	3	60	12.3	3.7	7.7	54	L	1.9
FX840	2	3450	230	3	60	10.8	3.3	6.9	42	K	2.4
GX840	2	3450	460	3	60	5.5	1.6	3.5	21	K	9.7
BAX840	2	3450	575	3	60	4.5	1.0	2.5	11	F	15.3
IX842	2	3450	200	1	60	20.0	6.6	12.1	60	H	1.0 / 1.5
EX842	2	3450	230	1	60	17.2	4.0	10.9	56	F	1.3 / 4.0
JX842	2	3450	200	3	60	12.3	3.7	7.7	54	L	1.9
FX842	2	3450	230	3	60	10.8	3.3	6.9	42	K	2.4
GX842	2	3450	460	3	60	5.5	1.6	3.5	21	K	9.7
BAX842	2	3450	575	3	60	4.5	1.0	2.5	11	F	15.3
IX841	2	3450	200	1	60	20.0	6.6	12.1	60	H	1.0 / 1.5
EX841	2	3450	230	1	60	17.2	4.0	10.9	56	F	1.3 / 4.0
JX841	2	3450	200	3	60	12.3	3.7	7.7	54	L	1.9
FX841	2	3450	230	3	60	10.8	3.3	6.9	42	K	2.4
GX841	2	3450	460	3	60	5.5	1.6	3.5	21	K	9.7
BAX841	2	3450	575	3	60	4.5	1.0	2.5	11	F	15.3

Operation

GENERAL

Zoeller pumps are lubricated and tested at the factory prior to shipment and require minimum pre-start-up maintenance.

Maximum operating temperature of pump liquid for explosion proof grinder pumps must not exceed 104°F (40°C).

These units are designed for intermittent duty sanitary sewage applications. If pump is used to dewater areas or pump liquids with heavy or abrasive materials, the warranty will be voided.

NAMEPLATE DATA

The nameplate, located on the side of the pump, indicates specific information about the construction of the pump. The model number and date code information should be recorded on the front page in the "Owner's Information" section of this manual.

SHORT TERM STORAGE

Do not install pump until electrical power is available and system is operational. When not in use, the pump should be stored and the following is advised:

- Store pump inside whenever possible or cover with some type of protective covering.
- Tape or seal in plastic bag the terminal ends of wire leads.
- Spray coat unpainted surfaces with rust inhibiting oil.
- The impeller should be rotated every six months in order to keep the seals lubricated and not develop a permanent set.

If panel is to be stored, the following is advised:

- Store the panel inside whenever possible and leave in the shipping box.
- All openings shall be sealed.
- Store in an upright position.
- Do not stack anything on top of panel.

START-UP PROCEDURE

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

- Clean pit.
- Pump, float switches and electrical cables are dry and properly installed.
- Electrical boxes dry, sealed and securely installed.

- Floats positioned properly.
- Discharge valves open.
- 3/16" vent hole drilled in pipe between check valve and pump.

Once the above has been verified proceed with the following checks:

- Pump power cables and control floats properly installed and voltage verified.
- Conduit connections to panel are properly sealed.
- 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 with the pump running. Record these readings in the space provided in the "Owner's Information" section on page 1 of this manual for future reference.

ADJUSTMENT PROCEDURE

Pumps: No adjustments are required.

Floats: Refer to the system drawing or to the panel wiring schematic for the desired location of each float switch setting.

Valves: Discharge valves should be placed in the fully open position. Systems should not be operated for extended periods of time with the discharge valves partially closed due to damaging the valve.

SHUTDOWN PROCEDURES

If a system is shutdown for more than six months, the following is recommended:

Pumps: If pit is to remain dry, then the pump can remain in the pit. With the pump in the pit, it should be operated for five minutes once every three months. If the pit is to remain wet, the pump should be removed and stored as noted above.

Panels: The panel should have all openings sealed to prevent moisture and dust from entering the enclosure. Prior to restarting system, the panel should be inspected for presence of moisture and any loose connections.

Valves: Consult the valve/actuator supplier for information concerning these systems components.

Cutter Maintenance

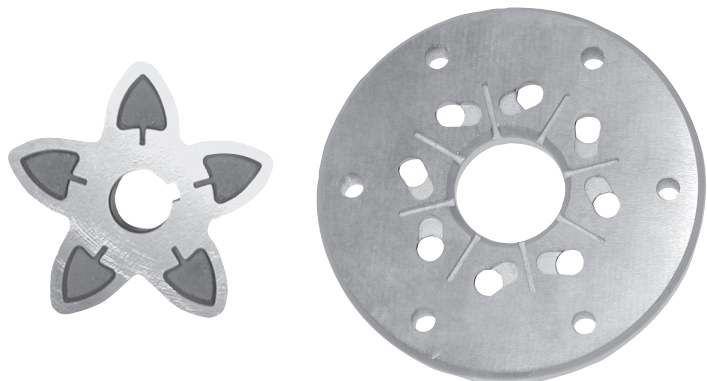
1. **All power circuits must be disconnected and locked out before any attempts are made at servicing.** The star cutter and disc can be removed and sharpened by grinding the cutting faces. Both star cutter and disc must be removed from the pump. Removal of these parts can be accomplished in the field by removing pump from the sump and positioning horizontally to access the intake of the pump. If seals or other repairs are required, the pump must be totally removed and serviced in a shop by a qualified pump technician or authorized service center.
2. Remove the three countersunk screws on the plastic guard ring and remove the ring.
3. Thoroughly clean the star cutter and disc assembly. Tilt pump back to the vertical position to make certain the end play has been removed. Check and record the clearance between the star cutter and disc with a feeler gage. The correct running clearance is between 0.004" and 0.008".
4. With pump in horizontal position, heat the hex head bolt in the center of the star cutter with a propane torch. The bolt must be heated to 350°F to soften the thread lock sealer on the bolt for ease of removal. Remove the bolt by turning in a counterclockwise rotation. It will be necessary to use a wood block to prevent the star cutter from turning while removing the bolt. Pull star cutter from the shaft and remove the spacer shims located behind the star cutter.
5. Remove the three cap screws holding the disc and remove disc from the pump.
6. The disc and star cutter can be replaced with new service parts or resurfaced by grinding. Resurfacing is accomplished by surface grinding both disc and star cutter to a 32 micro finish. Do not attempt grinding in the field. Send parts to a qualified machine shop or return to the factory for repair. The disc, star cutter and shims are a matched set. Keep parts together. Measure disc before and after resurfacing with micrometer and record measurements.
7. After resurfacing, the disc and star cutter must be flat within 0.001". If the disc has been surface ground, it will be necessary to remove shims to compensate for the material removed from the disc. As a starting point, remove shims of the same thickness as the amount machined from the cutter disc (step 6 above). Final running clearance must be between 0.004" and 0.008". Be sure pump is in vertical position and all end play has been removed before measuring.
8. Clean bottom of pump where disc is located and replace disc and retainer screws. Torque to 63-67 in.-lbs. Replace star cutter with the correct shims. Install washer and torque hex head bolt to 71-75 in.-lbs. apply Loctite 262 thread-lock sealant or equal to bolt threads prior to insertion. Check running clearance with pump in vertical position to remove end play. Clearance must be between 0.004" and 0.008" to obtain efficient grinding when pump is put back in service.
9. Replace plastic guard ring and its three screws.
10. Check the oil in the motor housing before reinstalling. Contact the factory if the oil has a milky appearance or burnt smell. The level should be even with the fill plug when pump is in the upright position. Add oil if required. Use insulating oil supplied by the factory.

FIGURE 7.

To remove star cutter: Remove guard ring then heat the center bolt to 350°F to loosen Loctite® thread sealant.



(Model X840 components shown)



Grind the Star Cutter and Disc seen here to a 32 microfinish. Surfaces must be flat to within 0.001" T.I.R. Gap must be between 0.004" and 0.008" on these parts.

General Maintenance

▲ NOTICE Repair and service must be performed by a firm approved by Zoeller Company. To repair a pump with an explosion-proof motor in accordance to the guidelines listed in Policy FM0212-3d, contact the Zoeller Product Support Department for additional information.

▲ NOTICE If the motor housing, seal cavity or cord cap is disassembled or repaired by a firm not approved to work on explosion proof motors, the explosion proof rating is void and the FM CSA approval tags **MUST BE REMOVED FROM THE PUMP.**



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 month:

- Check for proper and unobstructed float operation.
- Listen for proper check valve operation.
- Duplex Units - Check for even operating times. Uneven times indicate a defective unit, float switch or control.
- Inspect the panel for any presence of moisture in enclosure, loose connections, and general component condition. check out location and condition of float switches.

Every year:

- In addition to the monthly checks, the basin should be inspected and cleaned. Any defective components should be replaced. Inspect and remove any sand, debris, or mud present in the pump basin assembly.

Every two years:

- Inspect power cables and cap assembly for damage or wear. Replace immediately if damage or wear is detected by an approved Service Station. Replace if damage or wear has significantly altered the impeller's geometry.
- Inspect impeller for damage or wear.

Service Checklist



▲ WARNING Electrical precautions. Before servicing a grinder pump, always shut off the main power circuit. 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 Grinder pumps contain oil which becomes pressurized and hot under operating conditions. Allow 2½ hours after shut down before servicing pump.

Condition	Common Causes
A. Pump will not start or run.	Blown panel or circuit breaker fuse, low voltage, thermal overload open, defective capacitor circuit, cutter or impeller clogged, float switch held down or defective, incorrect wiring in control panel, water in cap assembly.
B. Motor overheats and trips on overload.	Incorrect voltage, impeller or cutter blocked, negative head (discharge lower than intake of pump). Defective "off" float. Pump runs continuously at low water level. Low oil level in motor shell.
C. Pump will not shut off.	Air lock, debris under float assembly, defective switch, incoming sewage exceeds capacity of pump.
D. Pump operates but delivers little or no water.	Intake clogged with grease or sludge, pump air locked (clear vent hole), low or incorrect voltage, clogged discharge line, operating near shut-off head.
E. Pump starts and stops too often.	Check valve stuck open or defective. Sump pit too small to handle incoming sewage. Level control out of adjustment. Thermal overload tripping.
F. Large red flashing light comes on at control box.	High water in pit. Check pump for clogging, or overload trip. On single phase pumps, check the start capacitor in the control panel. See "A" and "D" above.
G. Grease and solids accumulate in pit around pump.	Break up solids and run pump with water running into the pit. Allow level to lower to the pump intake. Continue until solids are cleared from the pit. Do not drain kitchen grease down the sink.



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