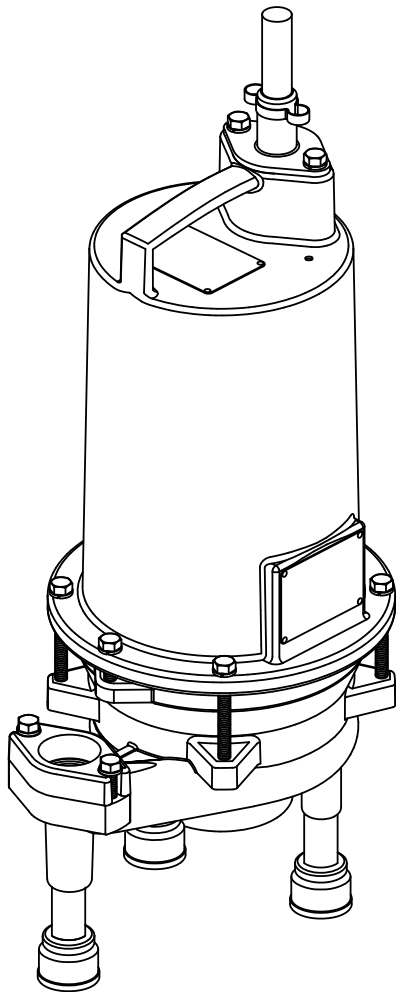


BARNES®

Professional Plumbing

INSTALLATION MANUAL Submersible Grinder Pump



Series: PGPP & PGPH
2 HP, 3450 RPM, 60 Hz.
High-Flow and High-Head

IMPORTANT!

*Read all instructions in this manual before operating pump.
As a result of Crane Pumps & Systems, Inc., constant product improvement program,
product changes may occur. As such Crane Pumps & Systems reserves the right to
change product without prior written notification.*

CRANE

A Crane Co. Company

PUMPS & SYSTEMS

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Piqua, Ohio 45356
Phone: (937) 778-8947
Fax: (937) 773-7157
www.cranepumps.com

83 West Drive, Bramton
Ontario, Canada L6T 2J6
Phone: (905) 457-6223
Fax: (905) 457-2650



SAFETY FIRST!

Please Read This Before Installing Or Operating Pump. This information is provided for **SAFETY and to PREVENT EQUIPMENT PROBLEMS**. To help recognize this information, observe the following symbols:



IMPORTANT! Warns about hazards that can result in personal injury or indicates factors concerned with assembly, installation, operation, or maintenance which could result in damage to the machine or equipment if ignored.

CAUTION ! Warns about hazards that can or will cause minor personal injury or property damage if ignored. Used with symbols below.

WARNING ! Warns about hazards that can or will cause serious personal injury, death, or major property damage if ignored. Used with symbols below.



Hazardous fluids can cause fire or explosions, burns or death could result.



Extremely hot - Severe burns can occur on contact.



Biohazard can cause serious personal injury.



Hazardous fluids can cause hazardous pressure, eruptions or explosions could cause personal injury or property damage.



Rotating machinery Amputation or severe laceration can result.



Hazardous voltage can shock, burn or cause death.

Only qualified personnel should install, operate and repair pump. Any wiring of pumps should be performed by a qualified electrician.



WARNING ! - To reduce risk of electrical shock, pumps and control panels must be properly grounded in accordance with the National Electric Code (NEC) or the Canadian Electrical Code (CEC) and all applicable state, province, local codes and ordinances.

WARNING! - To reduce risk of electrical shock, always disconnect the pump from the power source before handling or servicing. Lock out power and tag.

Prevent large articles of clothing, large amounts of chemicals, other materials or substances such as are uncommon in domestic sewage from entering the system.

During power black-outs, minimize water consumption at the home(s) to prevent sewage from backing up into the house.

Always keep the shut-off valve completely open when system is in operation (unless advised otherwise by the proper authorities). Before removing the pump from the basin, be sure to close the shut-off valve. (This prevents backflow from the pressure sewer.)

Keep the control panel locked or confined to prevent unauthorized access to it.

If the pump is idle for long periods of time, it is advisable to start the pump occasionally by adding water to the basin.



CAUTION! Pumps build up heat and pressure during operation-allow time for pumps to cool before handling or servicing.



WARNING! - **DO NOT** pump hazardous materials (flammable, caustic, etc.) unless the pump is specifically designed and designated to handle them.

Do not block or restrict discharge hose, as discharge hose may whip under pressure.



WARNING! - **DO NOT** wear loose clothing that may become entangled in the impeller or other moving parts.

WARNING! - Keep clear of suction and discharge openings. **DO NOT** insert fingers in pump with power connected.

Make sure lifting handles are securely fastened each time before lifting. Do not operate pump without safety devices in place. Always replace safety devices that have been removed during service or repair.

Do not exceed manufacturers recommendation for maximum performance, as this could cause the motor to overheat.

Secure the pump in its operating position so it can not tip over, fall or slide.

Cable should be protected at all times to avoid punctures, cut, bruises and abrasions - inspect frequently.



Never handle connected power cords with wet hands.

To reduce risk of electrical shock, all wiring and junction connections should be made per the NEC or CEC and applicable state or province and local codes. Requirements may vary depending on usage and location.



Submersible Pumps are not approved for use in swimming pools, recreational water installations, decorative fountains or any installation where human contact with the pumped fluid is common.

Do not remove cord and strain relief. Do not connect conduit to pump.



Products Returned Must Be Cleaned, Sanitized, Or Decontaminated As Necessary Prior To Shipment, To Insure That Employees Will Not Be Exposed To Health Hazards In Handling Said Material. All Applicable Laws And Regulations Shall Apply.

Bronze/brass and bronze/brass fitted pumps may contain lead levels higher than considered safe for potable water systems. Lead is known to cause cancer and birth defects or other reproductive harm. Various government agencies have determined that leaded copper alloys should not be used in potable water applications. For non-leaded copper alloy materials of construction, please contact factory.



IMPORTANT! - Crane Pumps & Systems, Inc. is not responsible for losses, injury, or death resulting from a failure to observe these safety precautions, misuse or abuse of pumps or equipment.

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BARNES®

Professional Plumbing

USER GUIDE

Congratulations on your purchase of a Barnes grinder pump system. With proper care and by following a few simple guidelines your grinder pump will give you many years of dependable service.

Use and Care

The grinder pump station is designed to handle routine, domestic sewage. Solid waste materials should be thrown in the trash. While your station is capable of accepting and pumping a wide range of materials, regulatory agencies advise that the following items should not be introduced into any sewer either directly or through a kitchen waste disposal:

- Glass
- Metal
- Diapers
- Socks, rags or cloth
- Plastic objects (e.g., toys, utensils, etc.)
- Sanitary napkins or tampons

In addition you must **NEVER** introduce into any sewer:

- Explosives
- Flammable Material
- Lubricating Oil and/or Grease
- Strong Chemicals
- Gasoline

General Information

Your home wastewater disposal service is part of a low pressure sewer system. The key element in this system is the Barnes grinder pump station. The basin collects all wastewater from the house. The solids in the sewage are then ground to a small size suitable for pumping in the slurry.

The grinder pump generates sufficient pressure to pump this slurry from your home to the wastewater plant.

Power Failure

Your grinder pump cannot dispose of wastewater or provide an alarm signal without electrical power. If electrical power service is interrupted, keep water usage to a minimum.

Warranty

Your grinder pump is furnished with a warranty against defects in material or workmanship. A properly completed

Start-Up/Warranty Registration form must be on file at the Barnes factory in order to activate your warranty. In addition your pump must be installed in accordance with the installation instructions.

If you have a claim under the provisions of the warranty, contact your local Barnes Distributor.

When contacting your representative for service, please include your station serial number, pump model number, and pump serial number.

For future reference, record the following information:

Station Serial No: _____

Pump Model No: _____

Pump Serial No: _____

Local Distributor: _____

Distributor Telephone: _____

PUMP SPECIFICATIONS:

DISCHARGE 1 1/4" NPT, Vertical, Bolt-on 1 1/4" BAF (CE Only) Flange

LIQUID TEMPERATURE 160°F (71°C) Intermittent

MOTOR HOUSING Cast Iron ASTM A-48, Class 30

VOLUTE Cast Iron ASTM A-48, Class 30

SEAL PLATE Cast Iron ASTM A-48, Class 30

IMPELLER:
Design 12 vane, vortex, with pump out vanes on back side. Dynamically balanced, ISO G6.3
Material Cast Iron

SHREDDING RING Hardened 440C Stainless Steel Rockwell® C-55

CUTTER Hardened 440C Stainless Steel Rockwell® C-55

SHAFT 416 Stainless Steel

SQUARE RINGS Buna-N

HARDWARE 300 Series Stainless Steel

PAINT Air dry enamel, top coat

SEAL *Design* Single Mechanical, oil filled reservoir
Material Rotating Faces - Silicon-Carbide
 Stationary Faces - Silicon-Carbide
 Elastomer - Buna-N
 Hardware - 300 series stainless steel

CORD ENTRY 30 Ft. (9.1m); 15 Ft. (4.5m) Cord on, Compact series (CC, CE, CT), Custom Molded Quick Connected for sealing and strain relief.

CORD CSA/UL Approved 12/3 & 12/5 Type SOW

SPEED 3450 RPM, 60Hz (nominal)

UPPER BEARING:
Design Single Row, Ball, Oil Lubricated
Load Radial

LOWER BEARING:
Design Single Row, Ball, Oil Lubricated
Load Radial & Thrust

MOTOR: *Design* NEMA L, Single phase, includes overload protection in the motor)
 Oil Filled, Squirrel Cage Induction
Insulation Class F

SINGLE PHASE Capacitor start/capacitor run.

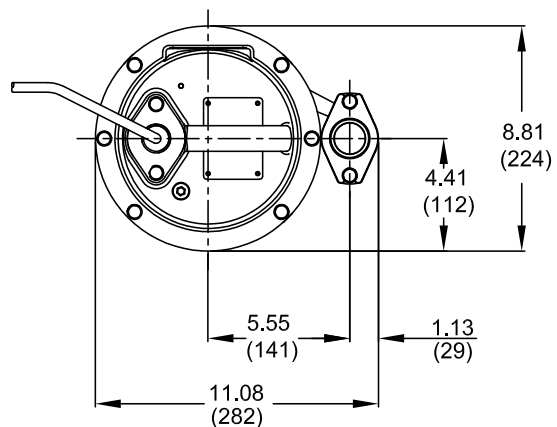
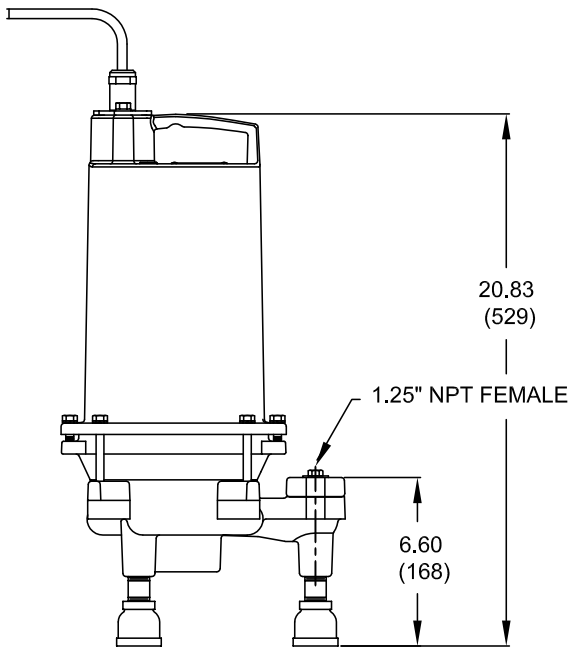
LEVEL CONTROLS: CE
Series **SOLD SEPARATELY.** Model ESPS-150™ or ESPS-150E™ Environmentally sealed pressure switch with CPVC housing, HNBR diaphragm, Custom molded Quick connect for sealing and strain relief.

OPTIONAL EQUIPMENT Seal Material, Additional Cord, Impeller trims, Moveable Fitting

ESPS Level Control Sold Separately

PGPP/PGPH

inches
(mm)

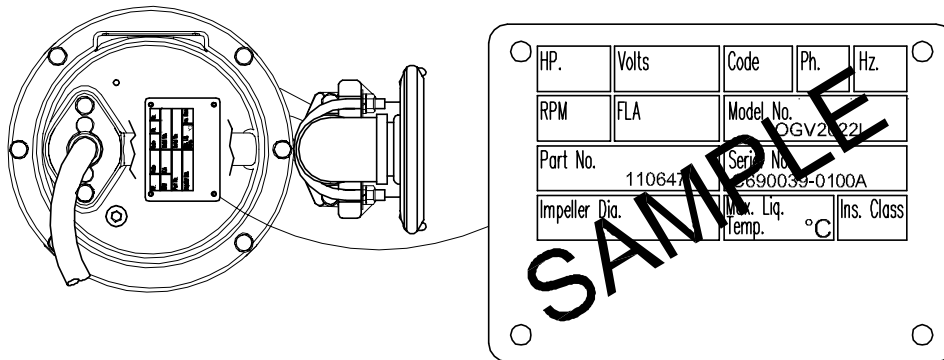


MODEL NO	HP	VOLT	PH/Hz	RPM (Nom)	NEMA START CODE	FULL LOAD AMPS	LOCKED ROTOR AMPS	CORD SIZE	CODE TYPE	CORD O.D. ± .02 (.5) in (mm)	WINDING RESISTANCE MAIN -- START
PGPH2022L	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)	1.5 -- 5.1
PGPP2022L	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)	1.5 -- 5.1

Winding Resistance ± 5%, measured from terminal block. Pump rated for operation at ± 10% voltage at motor.

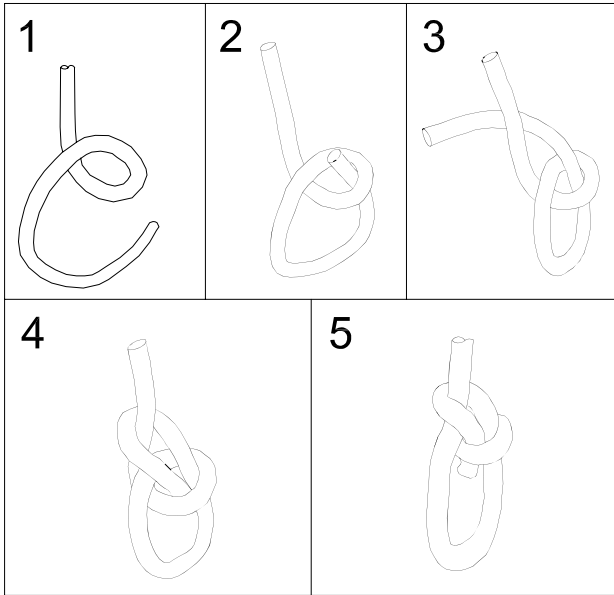
Recommended Breaker & Heater Sizes				
Pump Model	HP	Phase	Volts	Breaker Size
All PGP Series Pumps	2	1	240	25 AMP

The nameplate is located on top of the pump. This contains the pumps part number, horsepower voltage, phase, and serial number, as well as other information. The start-up form located in the back of this manual contains a place to record this data. The information should be recorded now so the pump does not have to be pulled again later. The start-up form can be left in the control panel until station start-up is completed later.



NAMEPLATE - Record data on START-UP report and User Guide before installing

Tie the bowline knot where shown per the directions provided (Steps 1 through 5). On the CT (Not Shown) series tie bowline knot on the eyebolt. On the L and AUE series tie bowline knot on the lifting handle. (See Fig 1).



LIFTING DEVICE !
Attach lifting device.
CAUTION! NEVER
LOWER OR RAISE
PUMP BY CORD.

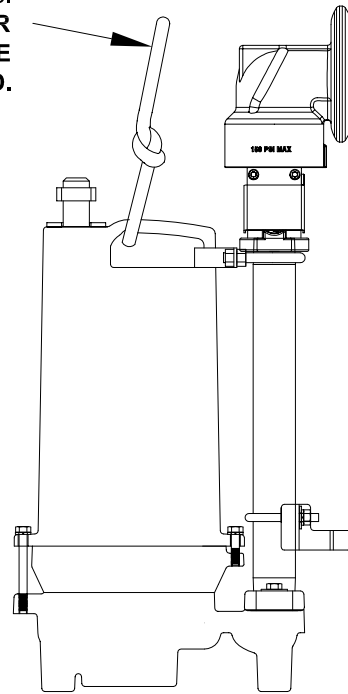


FIGURE 1

RECEIVING/UNPACKING:

Upon receiving the pump, it should be inspected for damage or shortages. If damage has occurred, file a claim immediately with the company that delivered the pump. Unpack pump and record pump serial and model number before installing. If the manual is removed from the packaging, do not lose or misplace.

STORAGE:

Short Term- For best results, pumps can be retained in storage, as factory assembled, in a dry atmosphere with constant temperatures for up to six (6) months.

Long Term- Any length of time exceeding six (6) months, but not more than twenty-four (24) months. The units should be stored in a temperature controlled area, a roofed over walled enclosure that provides protection from the elements (rain, snow, wind-blown dust, etc.), and whose temperature can be maintained between +40 deg. F and +120 deg. F. If extended high humidity is expected to be a problem, all exposed parts should be inspected before storage and all surfaces that have the paint scratched, damaged, or worn should be recoated with a air dry enamel paint. All surfaces should then be sprayed with a rust-inhibiting oil.

Pump should be stored in its original shipping container. On initial start up, rotate shaft by hand to assure seal and motor rotate freely. If it is required that the pump be installed and tested before the long term storage begins, such installation will be allowed provided:

- 1.) The pump is not installed under water for more than one (1) month.
- 2.) Immediately upon satisfactory completion of the test, the pump is removed, thoroughly dried, repacked in the original shipping container, and placed in a temperature controlled storage area.
- 3.) Before placing pump into service, pump should be brought to operational temperature range. Excessive or direct heating or cooling should **NOT** be used.

OPERATION TEMPERATURE RANGE: +35°F (2°C) to 104°F (40°C).

SERVICE CENTERS:

For the location of the nearest Barnes Service Center, check your Barnes representative or Crane Pumps & Systems, Inc., Service Department in Piqua, Ohio, telephone (937) 778-8947 or in Brampton, Ontario, Canada (905) 457-6223.

INSTALLATION:

Location - The pump is designed with pipe legs to keep a minimum of 3 inch clearance. **THIS PUMP MUST BE INSTALLED WITH A MINIMUM OF 3 INCHES CLEARANCE UNDER THE PUMP FOR THE ENTRANCE OF SEWAGE SOLIDS.**

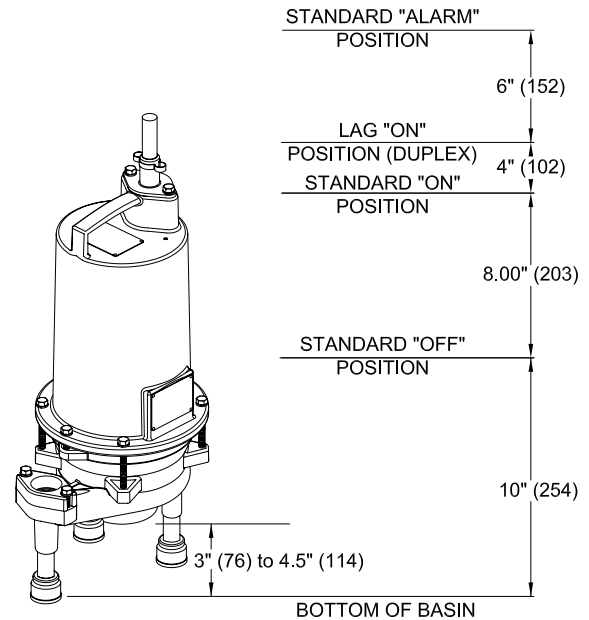


FIGURE 3 - L Series (For Automatic see Level Control manual)

Discharge - Assemble discharge piping or hose assembly (whichever is required by your application), to the pump. Discharge piping should be as short as possible. Both a check valve and a shut-off valve are required for each pump being used. The check valve is used to prevent backflow into the sump. Excessive backflow can cause flooding and/or damage to the pump. The shut-off valve is used to stop system flow during pump or check valve servicing. If pump is installed with a discharge hose rather than a moveable fitting assembly, make sure the discharge pipe has a 1/8" dia. hole approx. 5" from end nearest volute and oriented towards the pump body.

ELECTRICAL CONNECTIONS:

Pump Cords - The quick connect cord assembly mounted to the pump must **NOT** be modified in any way except for shortening to a specific application. Any supply cables connections between the pump and the control panel must be made in accordance with the National Electric Code or the Canadian Electric Code and all applicable state, province and local electric codes. It is recommended that a junction box, be mounted outside the sump or be of at least Nema 4 (EEMAC-4) construction if located within the wet well.

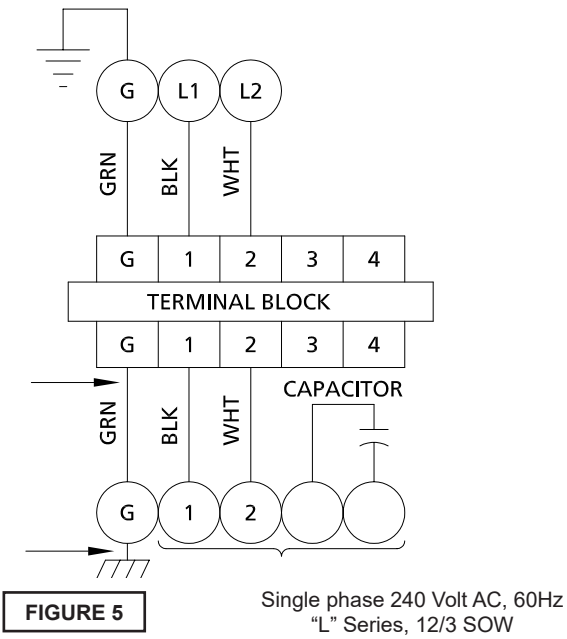
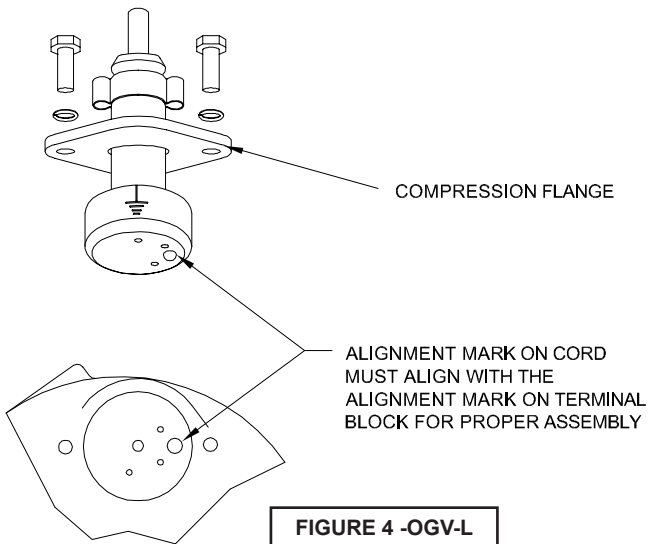
DO NOT USE THE POWER OR CONTROL CABLES TO LIFT PUMP!

Overload Protection - The type of in-winding overload protector used is referred to as an inherent overheating protector and operates on the combined effect of temperature and current. This means that the overload protector will trip out and shut the pump off if the windings become too hot, or the load current passing through them becomes too high. It will then automatically reset and start the pump up after the motor cools to a safe temperature. In the event of an overload, the source of this condition should be determined and rectified immediately. **DO NOT LET THE PUMP CYCLE OR RUN IF AN OVERLOAD CONDITION OCCURS !**

Wire Size - If additional cord is required consult a qualified electrician for proper wire size.

CORD CONNECTIONS:

Power/Control Cord- Insert female end of cord plug into housing bore aligning alignment mark with hole in terminal block see Figure 4. Tighten bolts on compression flange until flush with motor housing.



TROUBLE SHOOTING

CAUTION ! Always disconnect the pump from the electrical power source before handling.
 If the system fails to operate properly, carefully read instructions and perform maintenance recommendations.
 If operating problems persist, the following chart may be of assistance in identifying and correcting them:
MATCH "CAUSE" NUMBER WITH CORRELATING "CORRECTION" NUMBER.

NOTE: Not all problems and corrections will apply to each pump model.

PROBLEM	CAUSE	CORRECTION
Pump will not run	1. Poor electrical connection, blown fuse, tripped breaker or other interruption of power, improper power supply. 2. Motor or switch inoperative (to isolate cause, go to manual operation of pump). 2a. Float movement restricted. 2b. Switch will not activate pump or is defective. 3a. Insufficient liquid level. 3b. Switch is unable to activate	1. Check all electrical connections for security. Have electrician measure current in motor leads, if current is within $\pm 20\%$ of locked rotor Amps, impeller is probably locked. If current is 0, overload may be tripped. Remove power, allow pump to cool, then recheck current. 2a. Reposition pump or clean basin as required to provide adequate clearance for float.
Pump will not turn off	2a. Float movement restricted. 2b. Switch will not activate pump or is defective. 4. Excessive inflow or pump not properly sized for application. 9. Pump may be airlocked. 14. H-O-A switch on panel is in "HAND" position	2b. Disconnect level control. Set ohmmeter for a low range, such as 100 ohms full scale and connect to level control leads. Actuate level control manually and check to see that ohmmeter shows zero ohms for closed switch and full scale for open switch. (Float Switch). 3a. Make sure liquid level is at least equal to suggested turn-on point. 3b. Rotate ESPS level control in horizontal position.
Pump hums but does not run	1. Incorrect voltage 8. Cutter jammed or loose on shaft, worn or damaged, inlet plugged.	4. Recheck all sizing calculations to determine proper pump size.
Pump delivers insufficient capacity	1. Incorrect voltage. 4. Excessive inflow or pump not properly sized for application. 5. Discharge restricted. 6. Check valve stuck closed or installed backwards. 7. Shut-off valve closed. 8. Cutter jammed or loose on shaft, worn or damaged, inlet plugged. 9. Pump may be airlocked. 10. Pump stator damaged/torn.	5. Check discharge line for restrictions, including ice if line passes through or into cold areas. 6. Remove and examine check valve for proper installation and freedom of operation. 7. Open valve. 8. Check cutter for freedom of operation, security and condition. Clean cutter and inlet of any obstruction. 9. Loosen union slightly to allow trapped air to escape. Verify that turn-off level of switch is set so that the suction is always flooded. Clean vent hole.
Pump cycles too frequently or runs periodically when fixtures are not in use	6. Check valve stuck closed or installed backwards. 11. Fixtures are leaking. 15. Ground water entering basin.	10. Remove & examine for damage. Replace pump stator if required. 11. Repair fixtures as required to eliminate leakage.
Pump shuts off and turns on independent of switch, (trips thermal overload protector). CAUTION! Pump may start unexpectedly. Disconnect power supply.	1. Incorrect voltage. 4. Excessive inflow or pump not properly sized for application. 8. Cutter jammed, loose on shaft, worn or damaged, inlet plugged. 12. Excessive water temperature.	12. Check pump temperature limits & fluid temperature. 13. Replace portion of discharge pipe with flexible connector. 14. Turn to automatic position.
Pump operates noisily or vibrates excessively	4. Operating at too high a pressure. 5. Discharge restricted. 8. Cutter broken. 13. Piping attachments to building structure too rigid or too loose.	15. Check for leaks around basin inlet and outlets.

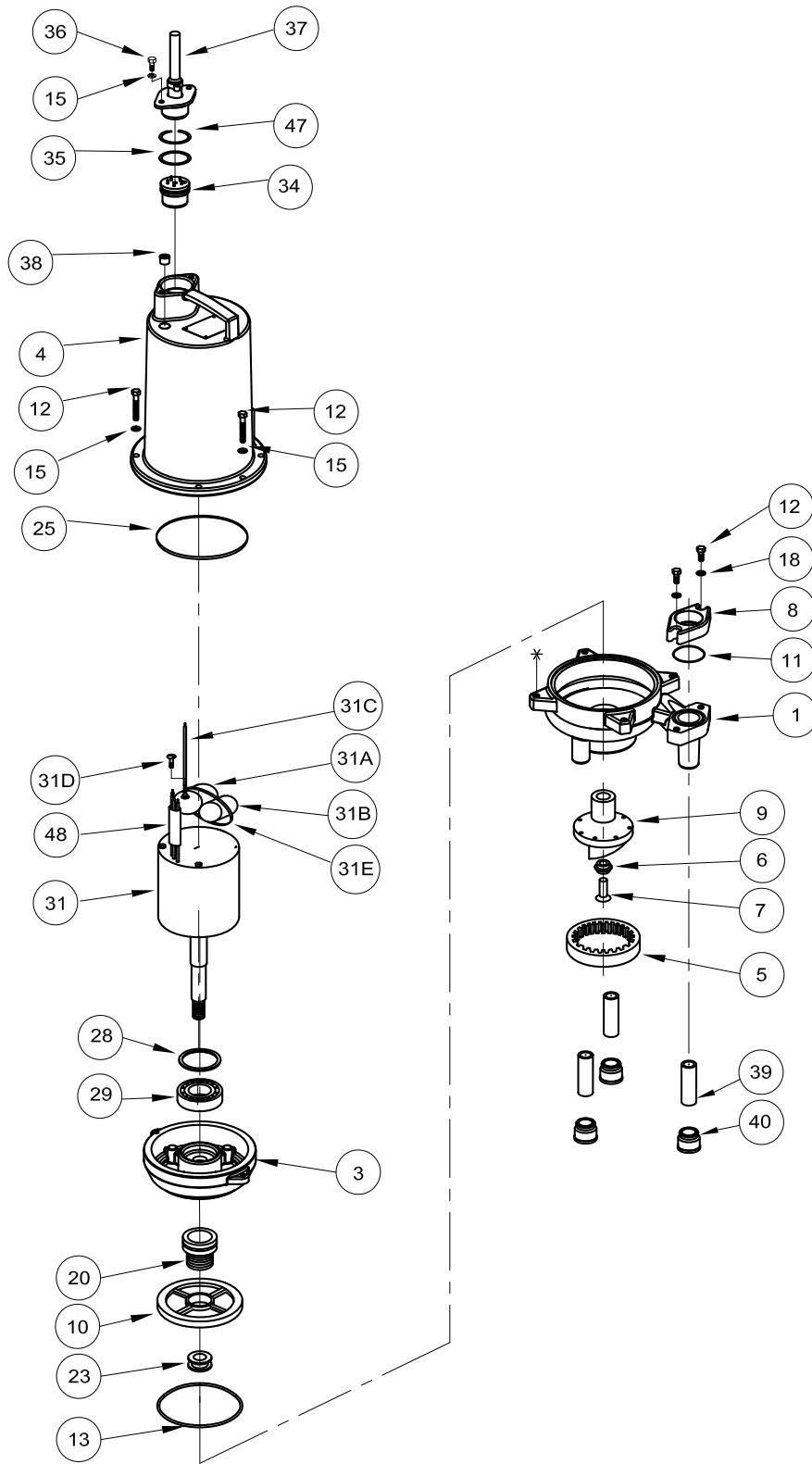


FIGURE 6

PARTS KITS

Seal Repair Kit.....P/N: 108303
Overhaul Kit P/N: 127238
Cutter Kit - PGPPP/N: 108330
Cutter Kit - PGPHP/N: 108330A

Item #'s 6,7,12,13,15,20,25,26,35,36,47
 108303 & Item #'s 9, 18, 28, 29, 31A, 31B, 31C, 31D, 38
 Item #'s 5, 6, 7, 9, 15, 23, 26
 Item #'s 5, 6, 7, 9, 15, 23, 26

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	1	108344 118246	Volute Volute (CE)
2	1	110331	Handle (AU model)
3	1	108343	Seal Plate
4	1	108342 110328	Motor Housing (STD) Motor Housing (AU model)
5	1	082085A 082085B	Shredding Ring (OGVF) Shredding Ring (OGVH)
6	1	067556	Washer
7	1	070704	Skhd Screw, 1/4-20 x .75" SS
8	1	108369 †	Discharge Flange 1-1/4" NPT
9	1	082088	Radial Cutter
10	1	109026B 109026BTD	Impeller, 5.62" Dia. (OGVH) Impeller, 5.13" Dia. (OGVF)
11	1	625-01558	O-Ring (-223)
12	4	1-131-1 †	Screw, 5/16-18 x 1.25" SS
13	1	067564	Square Ring
15	14	026322	Lockwasher, 5/16" SS
16	A/R	-----	LOCTITE™ RC609
17	A/R	-----	LOCTITE 242
18	2	062941 †	5/16" Flatwasher
20	1	110395SD	Seal, outer Silicon-Carbide (STD)
22	A/R	-----	Permatex Sealent 2C
23	1	016079	Shim set
24	3 Qts.	029034	Cooling Oil - Mtr. Housing
25	1	095368	Square Ring
26	4	1-300-1	Screw, 5/16-18 x 1.25", SS

ITEM	QTY	PART NO.	DESCRIPTION
28	1	061143	Retaining Ring
29	1	Q10-36-E4	Ball Bearing, Lower
31	1	108368A	Motor, 2HP, 240 Volt, 1 Phase w/capacitors & Ground wire (Supplied with Upper Bearing)
31A	1	115327A-RC	Capacitor, Run
31B	1	115327A-SC	Capacitor, Start
31C	1	105111B	Ground wire
31D	1	016660	Screw, Self-Tap #8-32 x .31"
31E	6	039462	Cable tie strap
34	1	103760	Terminal Block, Power, Manual
35	1	2-31051-224	O-Ring
36	2	1-156-1	Screw, 5/16-18 x 1.00" SS
37	1	109498XC 109498	12/3 Cord Set, 30 Ft 15Ft Cord on CC, CE, CT
38	1	014270	Pipe Plug, C'sunk, 3/8" NPT
39	3	110660	1/2" x 2-1/2" Nipple
40	3	111328	1/2" x 1" Reducer
47	1	105197	Retaining Ring
48	1	625-02117	Sleeving

Contact your local Distributor or the Factory for other impeller sizes, seal materials, cord lengths and other optional equipment.

(*) AUE - ESPS Level Control

(**) Items 31A thru 31E are included with item 31 motor.

(†) L Series Only. NOT USED ON CC, CE, CT.

Order Online: www.PumpCatalog.com

**IMPORTANT!
WARRANTY REGISTRATION**

Your product is covered by a warranty:

www.cranepumps.com/downloadables/CATALOGS_OIPMs/Warranty/24MonthWarranty.pdf

If you have a claim under the provisions of the warranty, contact your local
Crane Pumps & Systems, Inc. Distributor.

RETURNED GOODS

**RETURN OF MERCHANDISE REQUIRES A "RETURNED GOODS AUTHORIZATION".
CONTACT YOUR LOCAL CRANE PUMPS & SYSTEMS, INC. DISTRIBUTOR.**



**Products Returned Must Be Cleaned, Sanitized,
Or Decontaminated As Necessary Prior To Shipment,
To Insure That Employees Will Not Be Exposed To Health
Hazards In Handling Said Material. All Applicable Laws
And Regulations Shall Apply.**

Order Online: www.PumpCatalog.com