
SUBMERSIBLE GRINDER SEWAGE PUMPS

Model EBG, EBHG
2HP through 10HP



Installation, Operation and Maintenance Manual



EBARA Fluid Handling

EBARA International Corporation

Operation, Installation and Maintenance

MODELS: 2HP – 10HP EB(H)G Series**EBG-2 Series (2HP High Flow)**

- EBG2-115, 115 Volt, 1- Phase, Internal Capacitor Kit
- EBG2-21C, 200 / 230 Volt, 1- Phase, Internal Capacitor Kit
- EG2-21, 200 / 230 Volt, 1- Phase, External Capacitor Kit
- EBG2-23, 200 / 230 / 460 Volt, 3- Phase

EBG-3 Series (3 HP High Flow)

- EBG-31, 200 / 230 Volt, 1- Phase, External Start Kit
- EBG-33, 200 / 230 / 460 Volt, 3-Phase

EBG-5 Series (5 HP High Flow)

- EBG-51, 200 / 230 Volt, 1- Phase, External Start Kit
- EBG-53, 200 / 230 / 460 Volt, 3-Phase

EBG-2 Series (2HP High Head)

- EBHG2-21C, 200 / 230 Volt, 1- Phase, Internal Capacitor Kit
- EHG2-21, 200 / 230 Volt, 1- Phase, External Capacitor Kit
- EBHG2-23, 200 / 230 / 460 Volt, 3- Phase

EBHG-3 Series (3 HP High Head)

- EBHG-31, 200 / 230 Volt, 1- Phase, External Start Kit
- EBHG-33, 200 / 230 / 460 Volt, 3-Phase

EBHG-5 Series (5 HP High Head)

- EBHG-51, 200 / 230 Volt, 1- Phase, External Start Kit
- EBHG-53, 200 / 230 / 460 Volt, 3-Phase

EBHG-7 Series (7.5 HP High Head)

- EBHG-71, 200 / 230 Volt, 1-Phase, External Start Kit
- EBHG-73, 200 / 230 / 460 Volt, 3-Phase

EBG-103 Series (10 HP High Flow)


- EBG-103, 200 / 230 / 460 Volt, 3-Phase



Operation, Installation and Maintenance

**Read all instructions in this manual before operating pump.
Most accidents can be avoided by using COMMON SENSE.**


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 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.




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.




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



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.



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



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.




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. 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.

EBARA is not responsible for losses, injury or death resulting from a failure to observe these safety precautions, misuse, abuse or misapplication of pumps or equipment.

 **EBARA Fluid Handling**
www.pumpsebara.com
(803) 327-5005 • (803) 327-5097 fax

3
rev. 08/12

Operation, Installation and Maintenance

WARNING!

THE PUMP MUST BE WIRED BY A QUALIFIED ELECTRICIAN, USING AN APPROVED STARTER BOX AND SWITCHING DEVICE.

On 3 phase pumps only, "Motor Protection" must be provided by the installer. All 3 phase pumps must be installed with magnetic starters having 3 leg overload protection in accordance with the NEC (National Electric Code). For duplex installations, both pump motors must have separate overload protection.

Pumps with seal leak detectors must be connected to the proper control circuitry.

DANGER!

HAZARDOUS MOVING PARTS. To reduce risk of injury, disconnect power before servicing. Never put fingers near grinder impeller or in pump inlet when pump cord is connected or pump is operating.

For use with maximum 140 degrees F liquid.

DANGER!

In the initial installation, before sewage is admitted to the basin, there is no danger on entering the basin. **AFTER SEWAGE HAS BEEN IN THE BASIN, THERE IS DANGER.** Sewage water produces methane and hydrogen sulfide gasses, both of which are highly poisonous. A breathing device may be required. Never enter the basin unless cover is open and outside blower is used to force fresh air into the basin. Also the worker in the basin must wear a harness attached to the surface so he can be pulled out in case of asphyxiation. **NEVER WORK ALONE!**

WARNING!

Do not exceed working load limit of lifting chain, cable or rope. Do not use lifting chain, cable or rope where failure could result in loss of life.

Examine all lifting devices, chain, cable or rope for damage before and after each lift. Do not use any lifting devices that are not rated for and designed to lift the weights involved with these pumps. **DO NOT LIFT PUMP BY POWER CORD.**

Do not install or remove pump with person(s) in the basin.

This pump is designed to handle materials which could cause illness or disease through direct exposure. Wear and use protective clothing when working on the pump or piping.

WARNING !

Any wiring to be done on pumps should be done by a qualified electrician.

NEVER operate a pump with a power cord that has frayed or brittle insulation.

NEVER let cords or plugs lay in water.

NEVER handle connected power cords with wet hands.

NEVER be in contact with the liquid being pumped while pump cord is connected to electrical supply.

Only qualified personnel should install, operate or repair pump.

***** **USE AND CARE** *****

DO NOT pump hazardous material not recommended for pump. **NEVER** introduce:

- Explosives
- Flammable Material
- Lubricating Oil and/or Grease
- Chemicals, Solvents, etc.
- Gasoline
- Any Petroleum Product

Regulatory agencies advise that the following items should not be introduced into any sewer:

- Glass
- Metal
- Diapers
- Clothing, socks, rags, etc.
- Plastic objects (toys, utensils, etc.)
- Sanitary napkins or tampons

DO NOT pump without safety devices in place.

For hazardous locations, use pumps listed and classified for such locations.

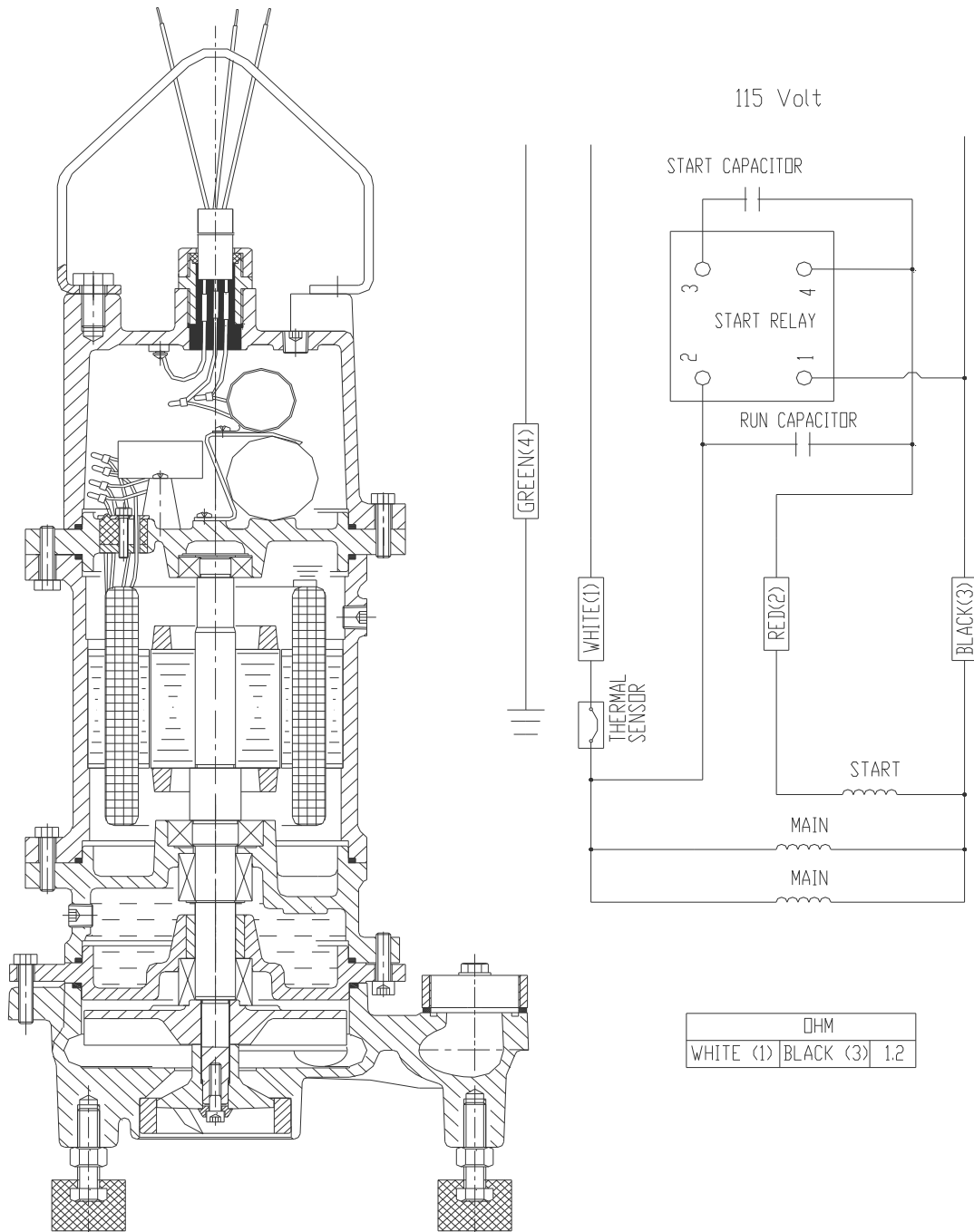
DO NOT use non-explosion rated pumps in locations considered hazardous in accordance with the National Electric Code, ANSI/NFPA 70-1993.

IMPORTANT!

EBARA is not responsible for losses, injury or death resulting from failure to observe these safety precautions.

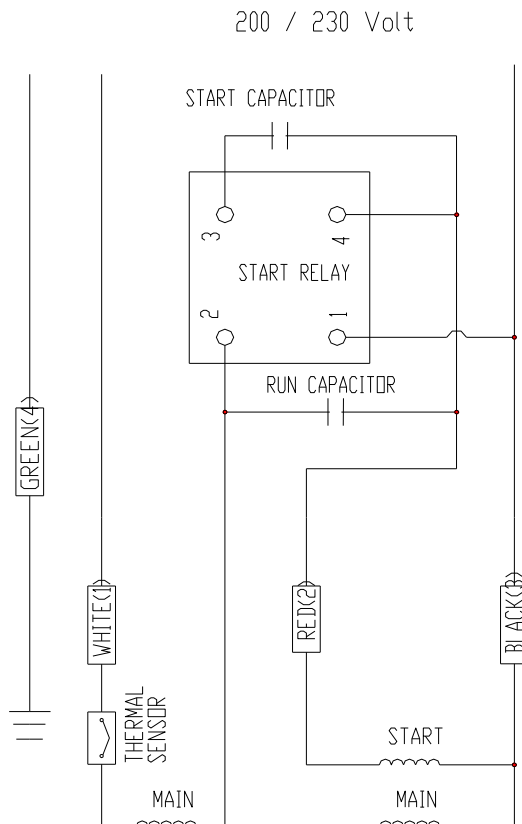
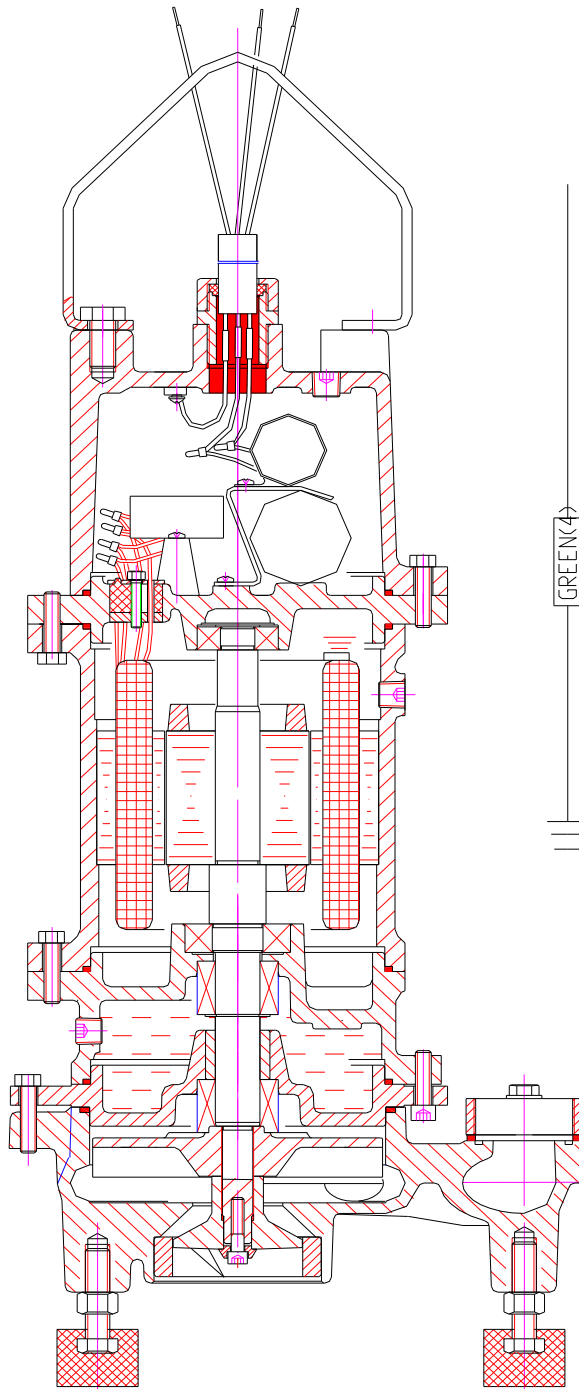
WIRING DIAGRAMS

EBG2-115
2HP, 115 Volt, 1-Phase



EB(H)G2-21C

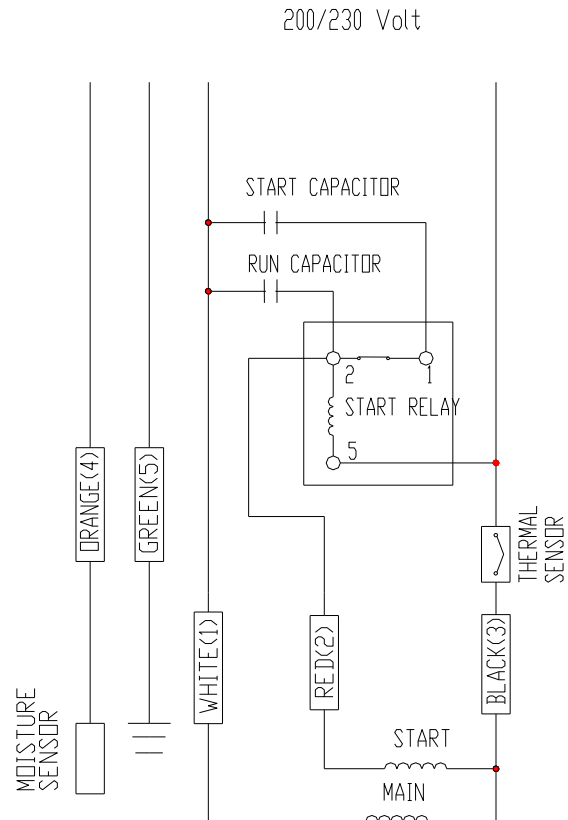
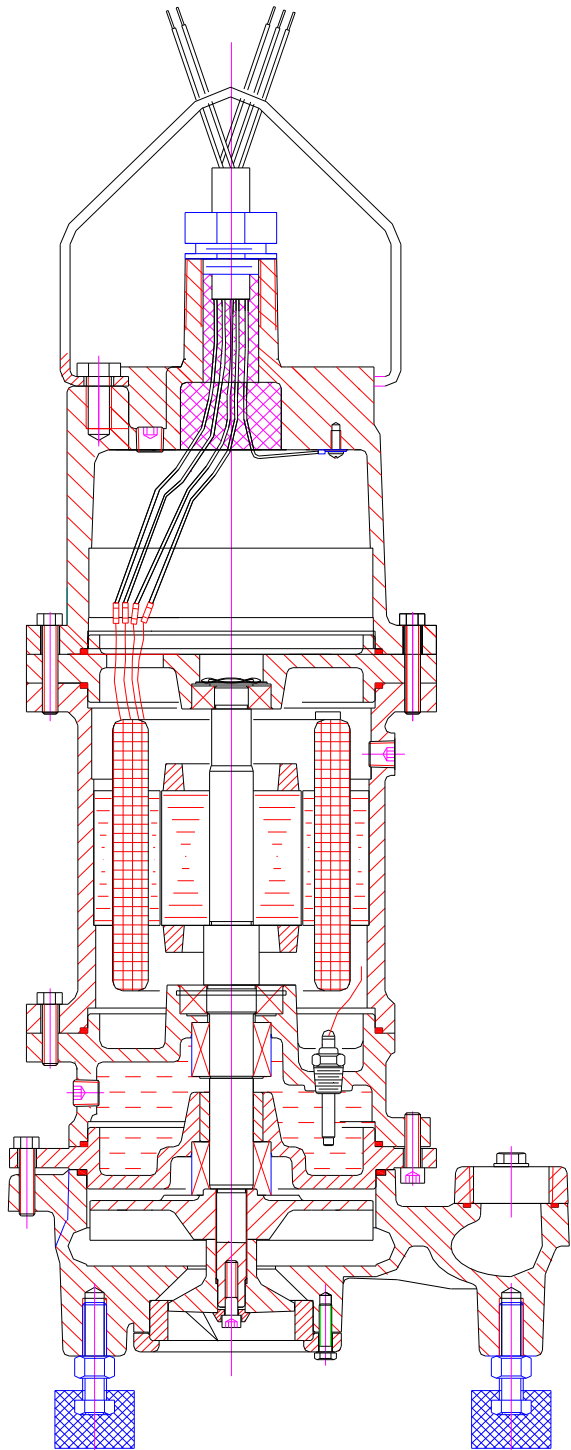
2HP, 200/230 Volt, 1-Phase



OHM	
WHITE (1)	BLACK (3) 1.2

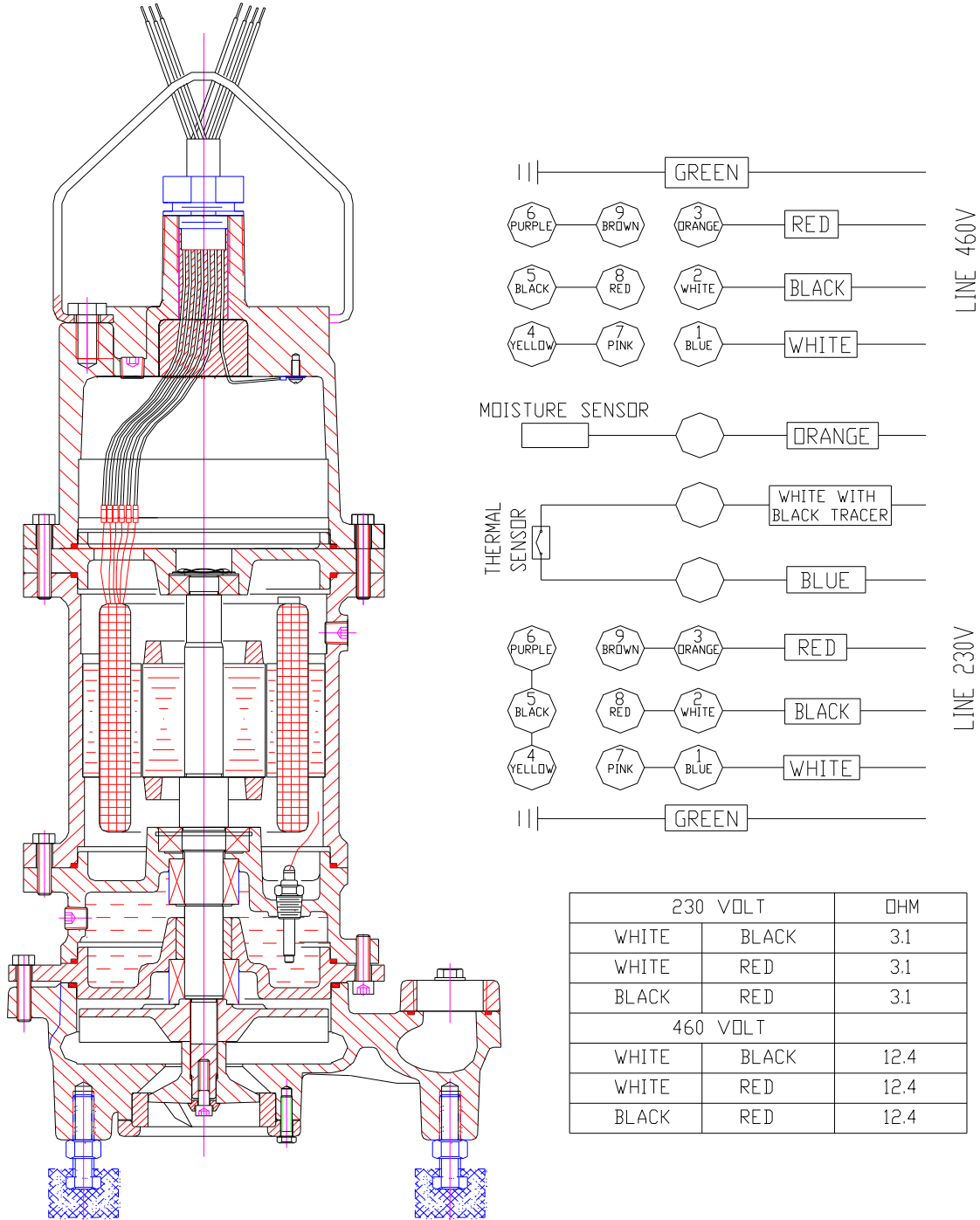
EB(H)G2-21C

2HP, 200/230V, 1-Phase



OHM		
WHITE (1)	BLACK (3)	1.8
WHITE (1)	RED (2)	6.9
BLACK (3)	RED (2)	5.1

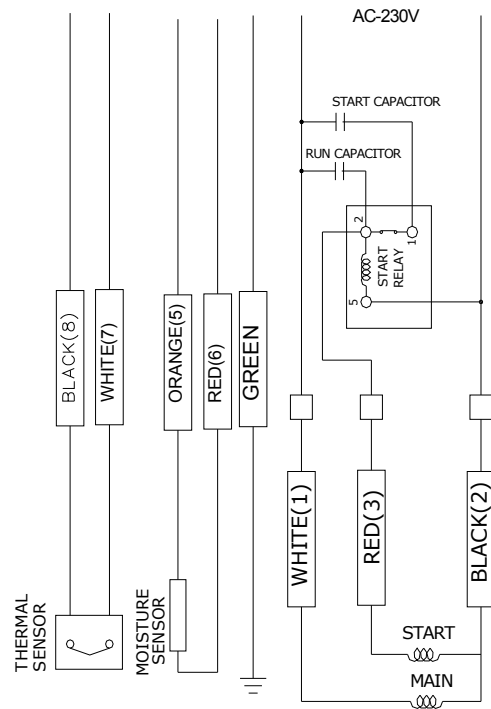
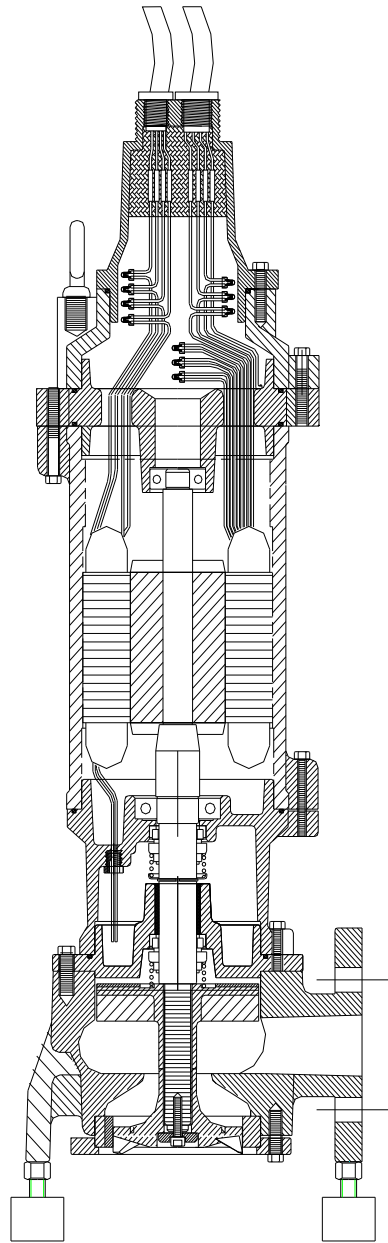
EB(H)G2-23 2HP, 200/230/460 Volt, 3-Phase



WIRING DIAGRAMS

EB(H)G-31, -51, -71

3, 5, 7.5 HP, 200 / 230 VOLT, 1-PHASE

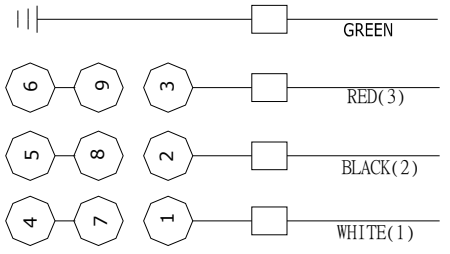
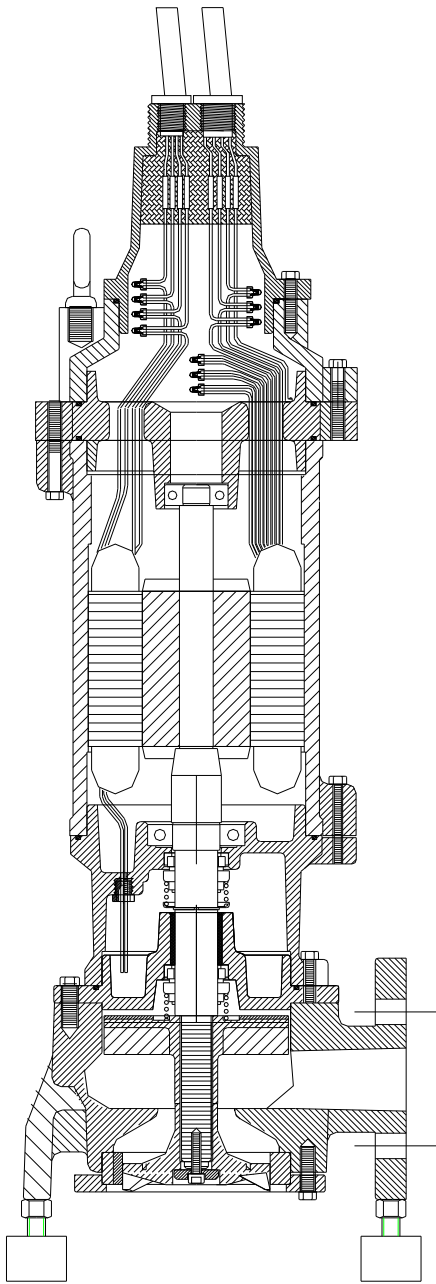


		OHM
WHITE (1)	RED (3)	1.1
WHITE (1)	BLACK (2)	0.8
BLACK (2)	RED (3)	0.3

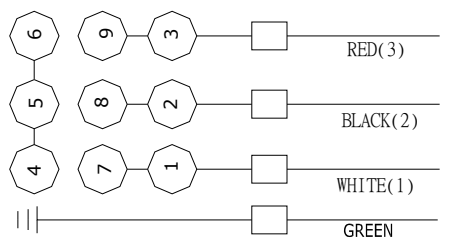
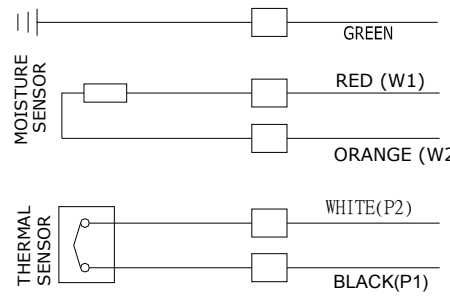


EB(H)G-33, 53, 73, 103

3, 5, 7.5, 10 HP, 200 / 230 / 460 VOLT, 3-PH



LINE 460V



LINE 200/230V

230 VOLT		OHM	
WHITE(1)	BLACK (2)		0.6
WHITE(1)	RED (3)	0.6	
BLACK (2)	RED (3)	0.6	
460 VOLT			
WHITE(1)	BLACK (2)		2.0
WHITE(1)	RED (3)		2.0
BLACK (2)	RED (3)	2.0	

PUMP SPECIFICATIONS

DISCHARGE.....	Horizontal Flange, Combination 2.5" & 3", 150 lb ANSI															
LIQUID TEMPERATURE.....	120 degrees F (Continuous) 140 degrees F. (Intermittent)															
MOTOR HOUSING.....	Cast Iron, ASTM A-48, Class 30															
CORD CAP.....	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.....	Ductile Iron, ASTM A-48, Class 35B 10 vanes, Vortex with Pump-out Vanes, Dynamically Balanced															
SHREDDING RING.....	Hardened 440C Stainless Steel 56-60 Rockwell C															
GRINDER IMPELLER.....	Hardened 440C Stainless Steel 56-60 Rockwell C															
SHAFT.....	416 Stainless Steel															
SHAFT SEAL.....	Mechanical	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Main (Motor)</td> <td style="width: 50%;">Secondary (Pump)</td> </tr> <tr> <td>Carbide – Rotating Face</td> <td>Carbide – Rotating Face</td> </tr> <tr> <td>Silicon– Stationary Face</td> <td>Silicon – Stationary Face</td> </tr> <tr> <td colspan="2">Buna-N Elastomer</td> </tr> <tr> <td colspan="2">300 Series Stainless Steel - Hardware</td> </tr> </table>	Main (Motor)	Secondary (Pump)	Carbide – Rotating Face	Carbide – Rotating Face	Silicon– Stationary Face	Silicon – Stationary Face	Buna-N Elastomer		300 Series Stainless Steel - Hardware					
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Silicon– Stationary Face	Silicon – Stationary Face															
Buna-N Elastomer																
300 Series Stainless Steel - Hardware																
BEARING (UPPER).....	Single Row, Ball, Oil Lubricated															
BEARING (LOWER).....	Single Row, Ball, Oil Lubricated															
SLEEVE BEARING	Bronze with Oil Groove															
HARDWARE.....	300 Series Stainless Steel															
O-RINGS.....	Buna-N															
ELECTRIC CORD.....	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">POWER CORD</td> <td style="width: 50%;">CONTROL CORD</td> </tr> <tr> <td>10 AWG, Type SOW or SOOW</td> <td>18AWG, Type SJOW or SOW</td> </tr> <tr> <td>40' Length Standard</td> <td>40' Length Standard</td> </tr> </table>	POWER CORD	CONTROL CORD	10 AWG, Type SOW or SOOW	18AWG, Type SJOW or SOW	40' Length Standard	40' Length Standard									
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40' Length Standard	40' Length Standard															
CORD ENTRY.....	Triple Sealed Design Compression Grommet – Outer Jacket Seal Epoxy Potted – Inner Conductor Seal Butt Connector – Inner Wire Strand Wicking Blockage															
MOTOR (SINGLE PHASE).....	<table border="0" style="width: 100%;"> <tr> <td colspan="2">3, 5 & 7.5 HP, 3450 RPM, 60 Hz</td> </tr> <tr> <td colspan="2">Dual voltage, 200 / 230 volts</td> </tr> <tr> <td colspan="2">Includes Overload Protection in the Motor.</td> </tr> <tr> <td colspan="2">Oil Filled, Class F</td> </tr> <tr> <td colspan="2">Capacitor Start / Capacitor Run</td> </tr> <tr> <td>Start Capacitor</td> <td>Run Capacitor</td> </tr> <tr> <td>300 mfd, 250 VAC</td> <td>30 mfd, 370 VAC</td> </tr> </table>		3, 5 & 7.5 HP, 3450 RPM, 60 Hz		Dual voltage, 200 / 230 volts		Includes Overload Protection in the Motor.		Oil Filled, Class F		Capacitor Start / Capacitor Run		Start Capacitor	Run Capacitor	300 mfd, 250 VAC	30 mfd, 370 VAC
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MOTOR (THREE PHASE).....	<table border="0" style="width: 100%;"> <tr> <td colspan="2">3, 5, 7.5, & 10 HP, 3450 RPM, 60 Hz</td> </tr> <tr> <td colspan="2">Tri-voltage, 200 / 230 / 460 volts</td> </tr> <tr> <td colspan="2">On-Winding temperature sensor, requires temperature sensor circuitry in control panel</td> </tr> <tr> <td colspan="2">Oil Filled, Class F</td> </tr> </table>		3, 5, 7.5, & 10 HP, 3450 RPM, 60 Hz		Tri-voltage, 200 / 230 / 460 volts		On-Winding temperature sensor, requires temperature sensor circuitry in control panel		Oil Filled, Class F							
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OPTIONAL EQUIPMENT.....	Seal Materials Additional Cable Lengths Impeller Trims															

Installation

USAGE:

The 3, 5, 7.5 & 10 HP grinder pumps are for pumping domestic and light commercial sewage.

These pumps can be used for pumping light commercial or industrial sewage from factories, schools, motels, apartments, etc..

This pump is intended to grind and pump all normal sewage. It will handle reasonable quantities of disposable diapers, sanitary napkins, paper towels, rubber material, wood, cigarette butts, string, plastic and other material not normally found in sewage.

CAUTION!

Pump is not to be disassembled in the field except at certified service stations or at the factory. Warranty is void if pump is taken apart for any reason other than to replace grinder impeller and grinder ring, which is covered in these instructions.

PACKAGING

Each pump is packaged with 40 feet of power cord in a carton that is marked with the Model Number. Longer cords are available – consult catalog.

INSPECTING PUMP

Before making any piping or electrical connections, check pump for any shipping damage. Turn grinder impeller to be sure it is free. **DO NOT TURN IMPELLER WITH FINGERS AS EDGES ARE SHARP.** Use allen wrench in the impeller screw to turn the impeller.

CAUTION !

No persons should be in the basin when pump is lowered into position ! **DO NOT** lift pump in a manner where failure could result in loss of life.

After pump is installed in basin, **NEVER WORK ON MOTOR OR GRINDER UNIT WITHOUT DISCONNECTING MOTOR LEAD WIRES FROM CONTROL PANEL. DO NOT RELY UPON OPENING THE CIRCUIT BREAKER ONLY !**

ELECTRICAL:

MOTOR OVERLOAD PROTECTION

Single phase motors are provided with an on-winding thermal overload switch. If motor overloads or overheats for any reason, the switch opens, stopping motor. As soon as the motor cools to normal temperature, the switch automatically closes and restarts motor.

MOISTURE DETECTION

All grinder pumps contain an electrode for detecting water within the unit. The electrode is housed within the seal chamber, isolated from the motor chamber by a mechanical seal. If the electrode detects water within the oil-filled housing, it will close the circuit to the red alarm light in the control panel, indicating the motor must be serviced before the upper seal fails.

MOTOR POWER CORD

All pump models have a seal leak detector and use a 4 conductor, #10 gauge cord. The three power conductors are **BLACK, WHITE** and **RED**. The **GREEN** conductor connects to the ground screw inside the cord cap.

For single phase,

BLACK is “Common”

WHITE is “Run”

RED is “Start”.

CONTROL POWER CORD

All pump models use a 5 conductor, #18 gauge cord for thermal and moisture detectors. The **BLACK & WHITE** wires are thermal detection. The **RED & ORANGE** wires are moisture detection. The **GREEN** wire is for ground connection.

IMPORTANT !

Ground wires must be connected in the control box to grounding bar, which is connected to a good suitable ground. **MOTOR IS NOT SAFE UNLESS PROPERLY GROUNDED.**



TROUBLESHOOTING

The troubles listed below are potential problems involving the pump. Other troubles can occur from faulty control box operation. Consult control box instructions for troubleshooting list involving the control box.

PROBLEM

Pump will not run.

Pump runs, but does not pump liquid from basin.

Pump hums, but does not run.

Pump delivers low volume of water.

Pump is noisy.

Pump cycles frequently.

Pump will not turn off.

Grease and solids accumulated in basin and will not pump out.

Red light illuminated at control box.

Circuit breaker trips.

PROBABLE CAUSE

Tripped breaker, blown fuse, poor electrical connection, interruption of power, improper power supply.

Float switch defective or restricted.

On single phase pumps, electronic start switch or capacitors blown.

Overload in motor tripped.

Solid material lodged in pump inlet.

Pump impeller may be air locked. Start and stop pump several times to purge air. Check to ensure vent hole in volute is open and clean.

Lower "OFF" float may be set too low, allowing air into pump.

Pump inlet or valves in discharge pipe may be clogged.

Discharge valve may be closed.

Incorrect voltage.

Pump inlet plugged.

Cutter jammed or loose on shaft, worn or damaged.

Low voltage.

On three phase pumps, motor running backwards.

Discharge restricted.

Check valve stuck closed or installed backwards.

Pump motor damaged / worn.

Pump may be air locked.

Cutter loose or jammed on shaft, worn or damaged.

Grinder impeller may be rubbing against grinder ring due to misalignment, bent shaft or object stuck in impeller.

Grinder assembly may be partially clogged.

Pump cavitation due to low discharge pressure.

Check valve stuck closed or installed backwards.

Ground water entering basin.

Fixtures are leaking.

Float switch defective or movement restricted.

H-O-A switch in panel is in "HAND" position.

Pump may be air locked.

Excessive inflow / pump not sized for the application.

Pump "ON" switch may be set too high.

Debris may have accumulated around lower float weight causing pump to turn off too soon. Clean debris away from weight and cord.

Moisture detection in double seal pumps indicating service is required.

Lower seal has failed. Secondary seal still functioning.

Electrical short to ground.

Check troubleshooting in control panel before pulling pump.

Check all electrical cords for damage.

Pull pump and take resistance readings of motor to determine if problem is in the pump or control box.



REPLACING GRINDER IMPELLER AND SHREDDING RING

Note: This is the only disassembly operation permitted in the field.

All other repairs must be performed at an authorized service center or the factory.

STANDARD TOOLS REQUIRED:

- Standard socket wrench set.
- Standard set of open end wrenches.
- Hammer.
- Vise grip pliers.
- Allen head socket set.
- Screwdrivers.
- Wire brush.

CAUTION – Disconnect all power and control wires to motor at the control panel before starting the disassembly operations. Do not rely upon opening the circuit breaker only.

IMPORTANT – Pump should be sanitized with bleach before starting work.

Pump should be thoroughly cleaned of trash and deposits before starting disassembly operations.

Wear protective gloves and clothing.

Always use a rag on the impeller when turning to prevent cutting hands on the sharp edges of the shredding ring.

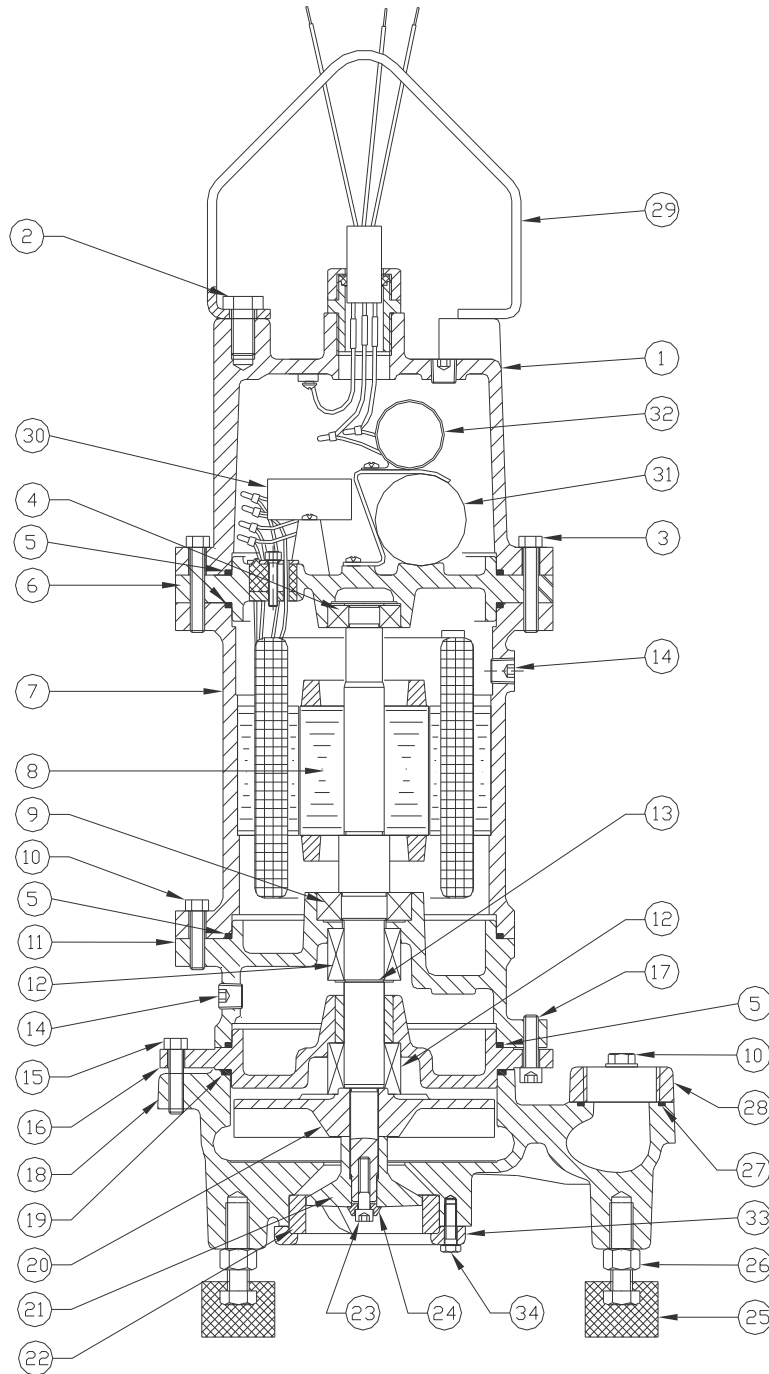
DISASSEMBLY OF SHREDDING RING AND GRINDER IMPELLER

1. Remove 4 bolts from grinder ring flange with socket wrench. The grinder ring is pressed into the flange for convenient removal.
2. Hold the grinder impeller by prying against the impeller cutting bar and remove the allen head cap screw from the end of the shaft.
3. Use a large screwdriver in the slot end of the shaft and tap (counterclockwise) on one of the large cutter vanes with a hammer. Tap in a counterclockwise direction (thread is right hand).
4. If the impeller removes easily, clean and replace if worn.
5. Make sure the pump impeller has not loosened when the grinder impeller was removed. This can be checked on reassembly of grinder impeller and shredding ring. The tips of the impeller cutter vanes should extend 1/8" below the bottom of the shredding ring. If the distance is greater, the pump impeller has loosened. If the distance is less, the shredding ring is not properly seated.
6. After the volute case has been removed, insert screwdriver in slot end of shaft and tap hammer against the outer vane of the ductile iron pump impeller (clockwise) to ensure it is threaded tight against shoulder on shaft.
7. Clean all threads with a wire brush and file smooth any nicked threads. Use NEVER-SEEZE or other graphite compound on threads before replacing grinder impeller.
8. Make sure allen head cap screw in bottom of pump shaft is tight. Make sure the impeller turns freely by hand after reassembly. Some drag will be present due to the shaft seals. There should not be any binding or tight spots when turning the grinder impeller.
9. If there is any rub or drag on the shredding ring, loosen the 4 bolts in the shredding ring plate and tap lightly with a hammer to loosen. Retighten the bolts. Be sure to tighten the bolts evenly, applying pressure on all 4 bolts. **DO NOT TIGHTEN ONE BOLT CLEAR DOWN BEFORE TIGHTENING THE OTHER BOLTS. THIS WILL CAUSE MISALIGNMENT AND LOCKING OF SHREDDING RING AND GRINDER IMPELLER.**



REPAIR PARTS LIST

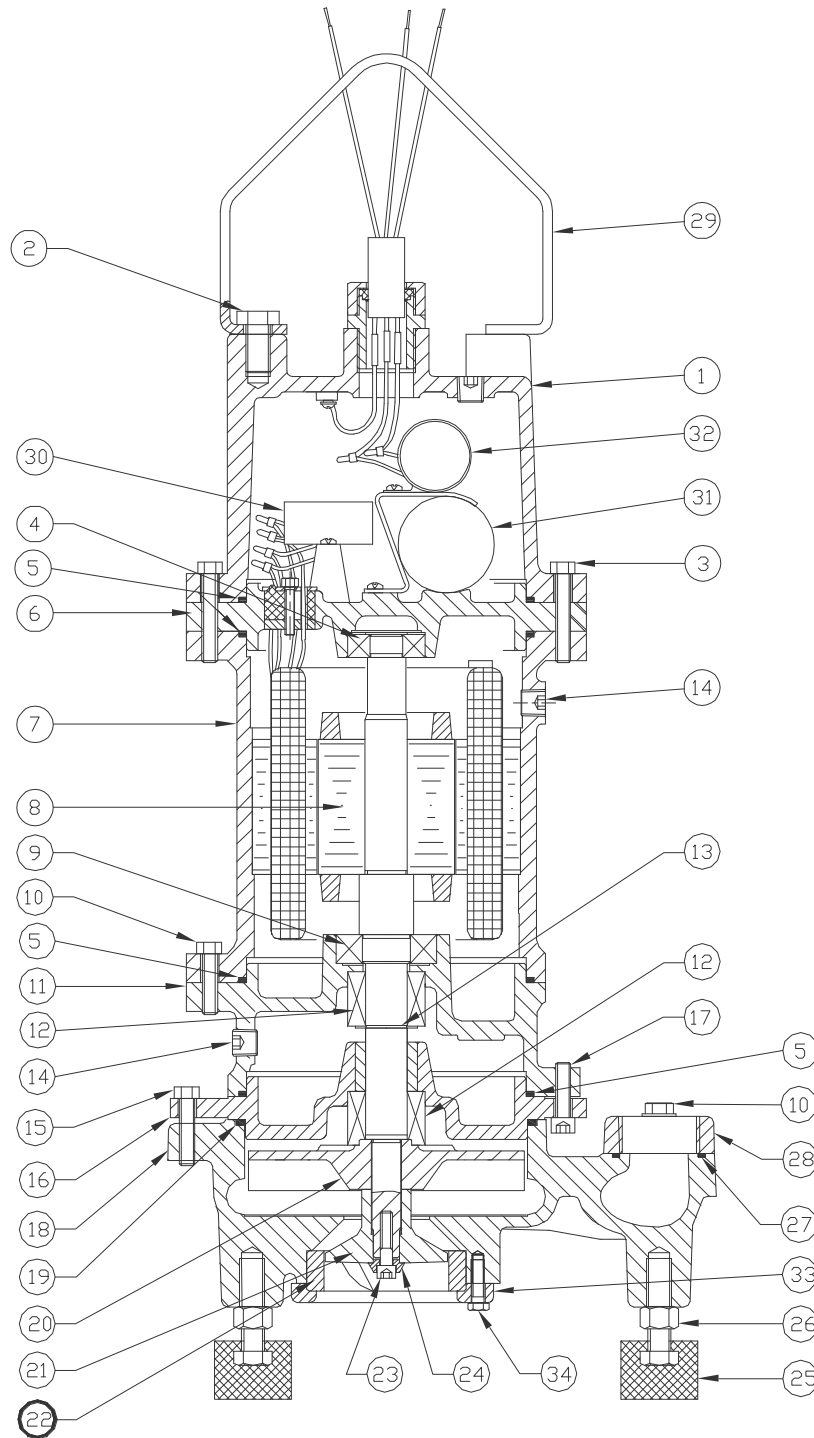
EBG2-2115



EBG2-2115

REF. NO.	DESCRIPTION	QTY.
1	Assy, Cord Cap, 30 Ft. Cords	1
2	Screw, Cap, 1/2-13UNC x 1" LG, SST	2
3	Screw, Cap, 5/16-18UNC x 1-3/4" LG, SST	4
4	Bearing, Upper Ball	1
5	O-Ring, Buna-N	4
6	Bearing Plate, Upper, Cast Iron	1
7	Assembly, Housing & Stator	1
8	Assembly, Rotor with Shaft	1
9	Bearing, Lower Ball	1
10	Screw, Cap, 5/16-18UNC x 1-1/4" LG, SST	6
11	Housing, Lower Bearing, Cast Iron	1
12	Seal, Shaft, Lower and Upper, Sil. Carbide	2
13	Ring, Retaining, SST	1
14	Plug, 1/4" NPT pipe, SST	3
15	Screw, Cap, 5/16-18UNC x 1-3/8" LG, SST	4
16	Seal Plate, Lower, Cast Iron	1
17	Screw, Allen HD, 5/16-18UNC x 1" LG, SST	4
18	Volute Case, Cast Iron	1
19	Ring, Square, Buna-N	1
20	Impeller, Cast Iron	1
21	Impeller, Grinding, SST	1
22	Ring, Grinder, SST	1
23	Screw, Allen HD, 1/4-20UNC x 5/8" LG, SST	1
24	Ring, Retainer, SST	1
25	Assembly, Leg, SST/Buna-N	3
26	Nut, Hex, 1/2-13UNC, SST	3
27	O-Ring, Buna-N	1
28	Adapter, 1-1/4" NPT Discharge	1
29	Handle, Lifting, SST	1
30	Relay	1
31	Capacitor, Start, 200mfd, 125vac	1
32	Capacitor, Run, 70mfd, 250vac	1
33	Flange, Grinder ring, Cast iron	1
34	Screw, Cap, 1/4-20UNC x 1" LG, SST	3

EB(H)G2-21C

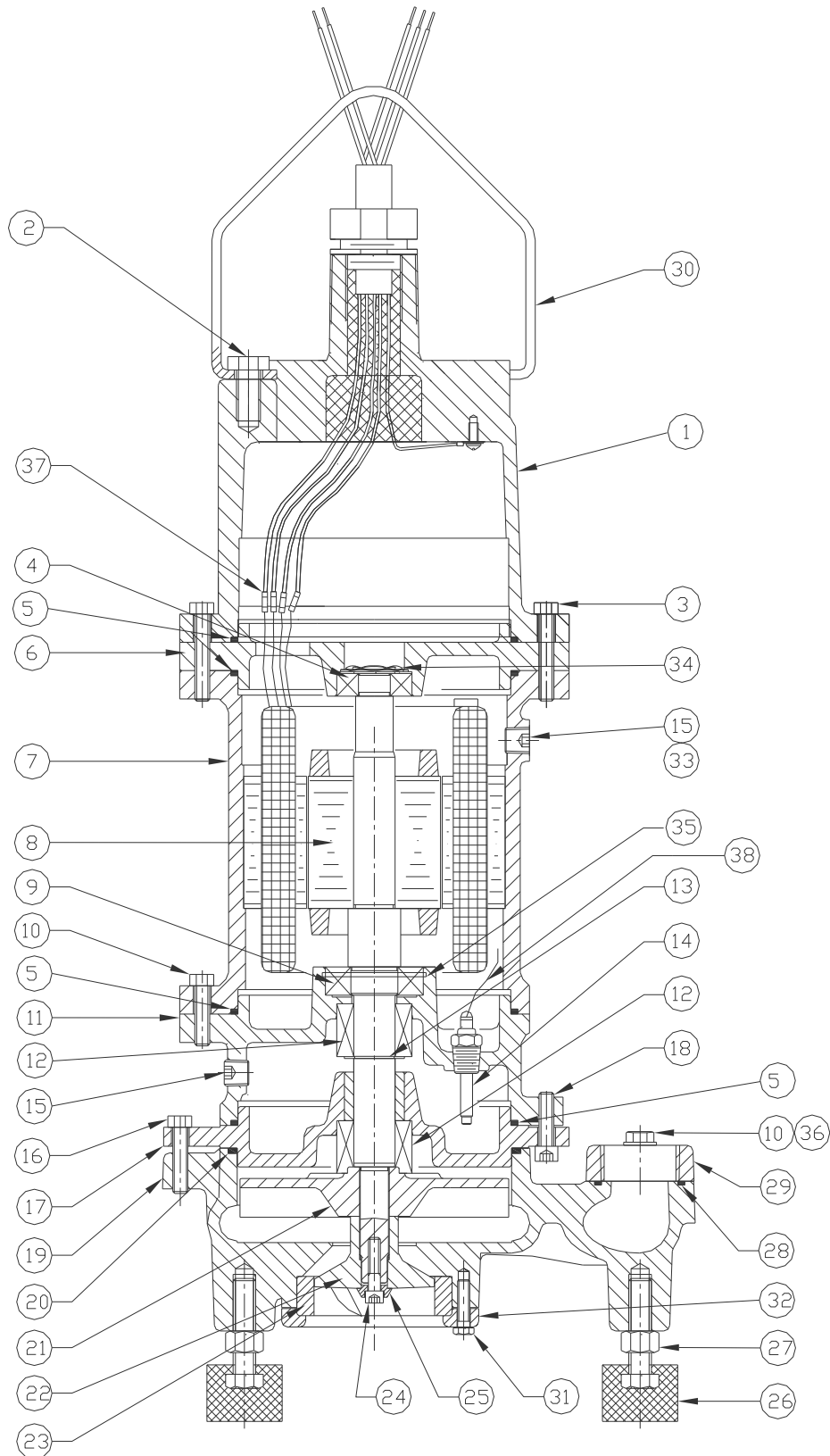


EB(H)G2-21C

REF. NO.	DESCRIPTION	QTY.
1	Assy, Cord Cap, 30 Ft. Cords	1
2	Screw, Cap, 1/2-13UNC x 1" LG, SST	2
3	Screw, Cap, 5/16-18UNC x 1-3/4" LG, SST	4
4	Bearing, Upper Ball	1
5	O-Ring, Buna-N	4
6	Bearing Plate, Upper, Cast Iron	1
7	Assembly, Housing & Stator	1
8	Assembly, Rotor with Shaft	1
9	Bearing, Lower Ball	1
10	Screw, Cap, 5/16-18UNC x 1-1/4" LG, SST	6
11	Housing, Lower Bearing, Cast Iron	1
12	Seal, Shaft, Lower and Upper, Sil. Carbide	2
13	Ring, Retaining, SST	1
14	Plug, 1/4" NPT pipe, SST	3
15	Screw, Cap, 5/16-18UNC x 1-3/8" LG, SST	4
16	Seal Plate, Lower, Cast Iron	1
17	Screw, Allen HD, 5/16-18UNC x 1" LG, SST	4
18	Volute Case, Cast Iron	1
19	Ring, Square, Buna-N	1
20	Impeller, Cast Iron	1
20	Impeller, Cast Iron	1
21	Impeller, Grinding, SST	1
22	Ring, Grinder, SST	1
22	Ring, Grinder, SST	1
23	Screw, Allen HD, 1/4-20UNC x 5/8" LG, SST	1
24	Ring, Retainer, SST	1
25	Assembly, Leg, SST/Buna-N	3
26	Nut, Hex, 1/2-13UNC, SST	3
27	O-Ring, Buna-N	1
28	Adapter, 1-1/4" NPT Discharge	1
29	Handle, Lifting, SST	1
30	Relay	1
31	Start Capacitor, 200 MFD, 250 VAC	1
32	Run Capacitor, 70 MFD, 250 VAC	1
33	Flange, Grinder ring, Cast iron	1
34	Screw, Cap, 1/4-20UNC x 1" LG, SST	3



EB(H)G2-21



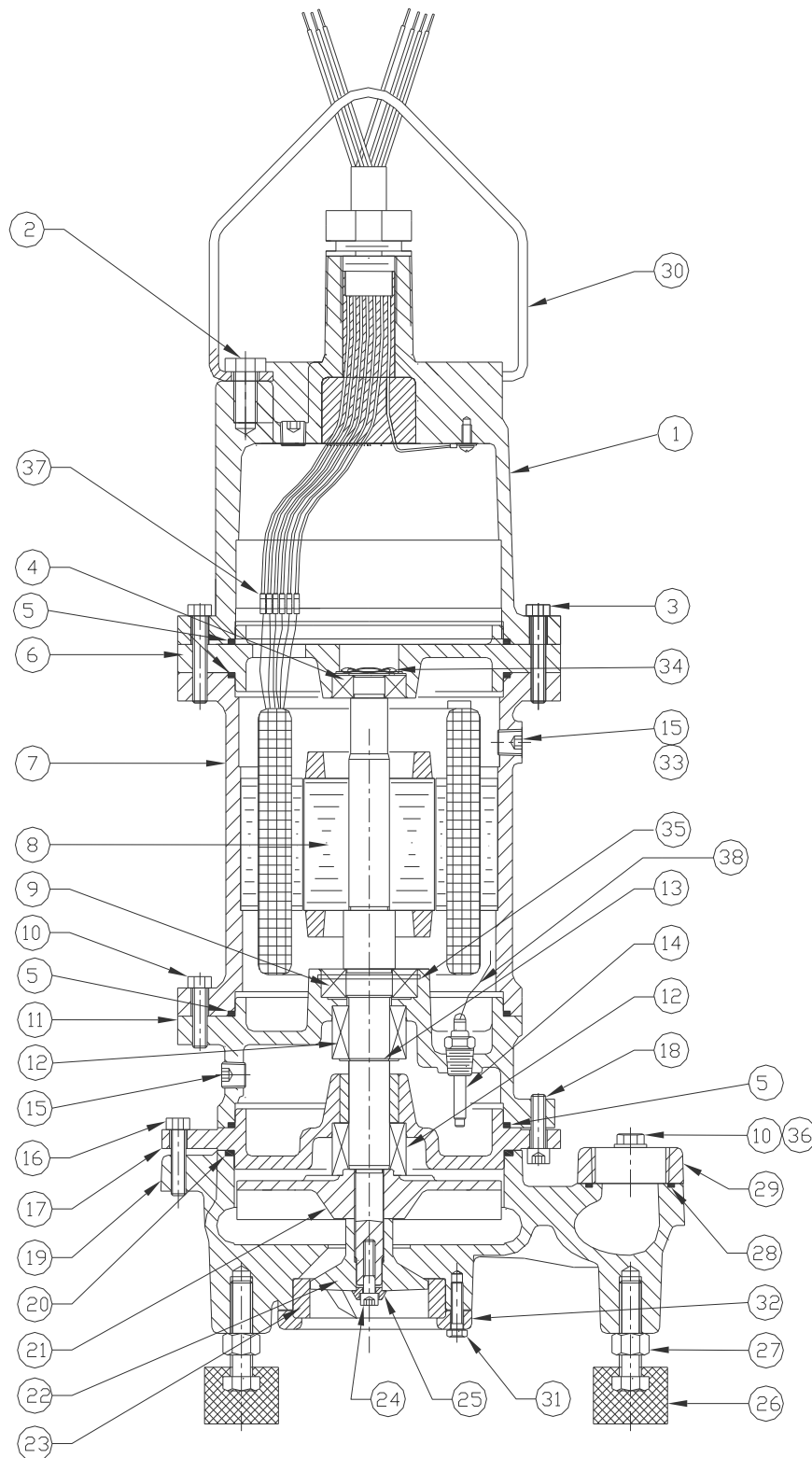
Operation, Installation and Maintenance

EB(H)G2-21

REF. NO.	DESCRIPTION	QTY.
1	Assy, Cord Cap, 2HP Grinder for Cablesub 125, 20 ft. length cord.	1
2	Screw, Cap, 1/2-13UNC x 1" LG, SST	2
3	Screw, Cap, 5/16-18UNC x 1-3/4" LG, SST	4
4	Bearing, Upper Ball	1
5	O-Ring, Buna-N, Motor, Cord Cap, Brg. Hsg.	4
6	Bearing Plate, Upper, Cast Iron	1
7	Assembly, Housing & Stator - 2hp, 1 phase	1
8	Rotor and shaft assembly 2 hp, 1 and 3 phase	1
9	Bearing, Ball, 2hp LOWER, 3-7.5hp UPPER	1
10	Screw, Cap, 5/16-18UNC x 1-1/4" LG, SST	6
11	Housing, Lower Bearing, Cast Iron	1
12	Seal, Shaft, Lower and Upper, Sil. Carbide	2
13	RETAINING RING, Black- Finish Steel, EXTERNAL	1
14	Sensor, Moisture	1
15	Plug, 1/4" NPT pipe, SST	3
16	Screw, Cap, 5/16-18UNC x 1-3/8" LG, SST	4
17	Seal Plate, Lower, Cast Iron	1
18	Screw, Allen HD, 5/16-18UNC x 1" LG, SST	4
19	Volute Case, Cast Iron	1
20	Square ring, Buna N, Volute	1
21	Impeller, Cast Iron	1
21	Impeller, Cast Iron	1
21	Impeller, Cast Iron	1
22	Impeller, Grinding, SST	1
22	Impeller, Grinding, SST	1
23	Ring, Grinder, SST	1
23	Ring, Grinder, SST	1
23	Ring, Grinder, SST	1
24	Screw, Allen HD, 1/4-20UNC x 5/8" LG, SST	1
25	Disc Retainer Ring, 2hp grinder impeller, 304 SST	1
26	Leg Kit, 304 SST/Buna-N (3 Legs)	1
27	Nut, Hex, 1/2-13UNC, SST	3
28	O-Ring, 2hp volute adapter, Buna-N	1
29	Adapter, 1-1/4" NPT Discharge	1
30	Handle, Lifting, SST	1
31	Screw, Cap, 1/4-20UNC x 1" LG, SST	3
32	Flange, Grinder ring, Cast iron	1
33	Oil	68 oz
34	Spring, Disc/Wave steel	1
35	RETAINING RING, Black- Finish Steel, INTERNAL	1
36	Washer, Flat 5/16", 300 series SST	2
37	Pre-insulated Crimp Wire Connector	4
38	Wire Assembly for Moisture Sensor	1



EB(H)G2-23



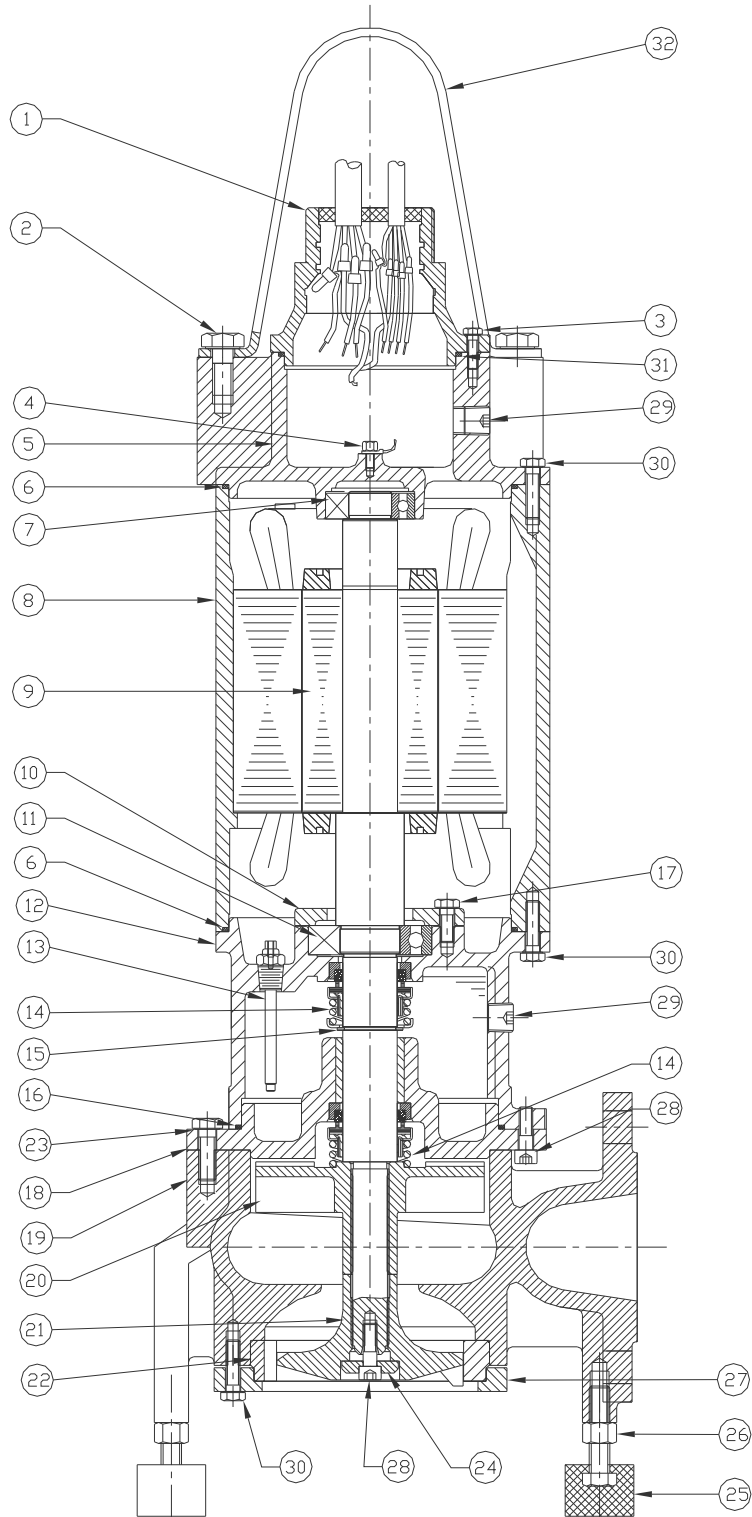
Operation, Installation and Maintenance

EB(H)G2-23

REF. NO.	DESCRIPTION	QTY.
1	Assy, Cord Cap, 2HP Grinder for Cablesub 147, 20 ft. length cord.	1
2	Screw, Cap, 1/2-13UNC x 1" LG, SST	2
3	Screw, Cap, 5/16-18UNC x 1-3/4" LG, SST	4
4	Bearing, Upper Ball	1
5	O-Ring, Buna-N, Motor, Cord Cap, Brg. Hsg.	4
6	Bearing Plate, Upper, Cast Iron	1
7	Assembly, Housing & Stator, 200/230/460V, 3 phase	1
8	Rotor and shaft assembly 2 hp, 1 and 3 phase	1
9	Bearing, Ball, 2hp LOWER, 3-7.5hp UPPER	1
10	Screw, Cap, 5/16-18UNC x 1-1/4" LG, SST	6
11	Housing, Lower Bearing, Cast Iron	1
12	Seal, Shaft, Lower and Upper, Sil. Carbide	2
13	RETAINING RING, Black- Finish Steel, EXTERNAL	1
14	Sensor, Moisture	1
15	Plug, 1/4" NPT pipe, SST	3
16	Screw, Cap, 5/16-18UNC x 1-3/8" LG, SST	4
17	Seal Plate, Lower, Cast Iron	1
18	Screw, Allen HD, 5/16-18UNC x 1" LG, SST	4
19	Volute Case, Cast Iron	1
20	Square ring, Buna N, Volute	1
21	Impeller, Cast Iron	1
21	Impeller, Cast Iron	1
21	Impeller, Cast Iron	1
22	Impeller, Grinding, SST	1
22	Impeller, Grinding, SST	1
23	Ring, Grinder, SST	1
23	Ring, Grinder, SST	1
23	Ring, Grinder, SST	1
24	Screw, Allen HD, 1/4-20UNC x 5/8" LG, SST	1
25	Disc Retainer Ring, 2hp grinder impeller, 304 SST	1
26	Leg Kit, 304 SST/Buna-N (3 Legs)	1
27	Nut, Hex, 1/2-13UNC, SST	3
28	O-Ring, 2hp volute adapter, Buna-N	1
29	Adapter, 1-1/4" NPT Discharge	1
30	Handle, Lifting, SST	1
31	Screw, Cap, 1/4-20UNC x 1" LG, SST	3
32	Flange, Grinder ring, Cast iron	1
33	Oil	68 oz
34	Spring, Disc/Wave steel	1
35	RETAINING RING, Black- Finish Steel, INTERNAL	1
36	Washer, Flat 5/16", 300 series SST	2
37	Pre-insulated Crimp Wire Connector	7
38	Wire Assembly for Moisture Sensor	1

REPAIR PARTS LIST

EBG-31/51

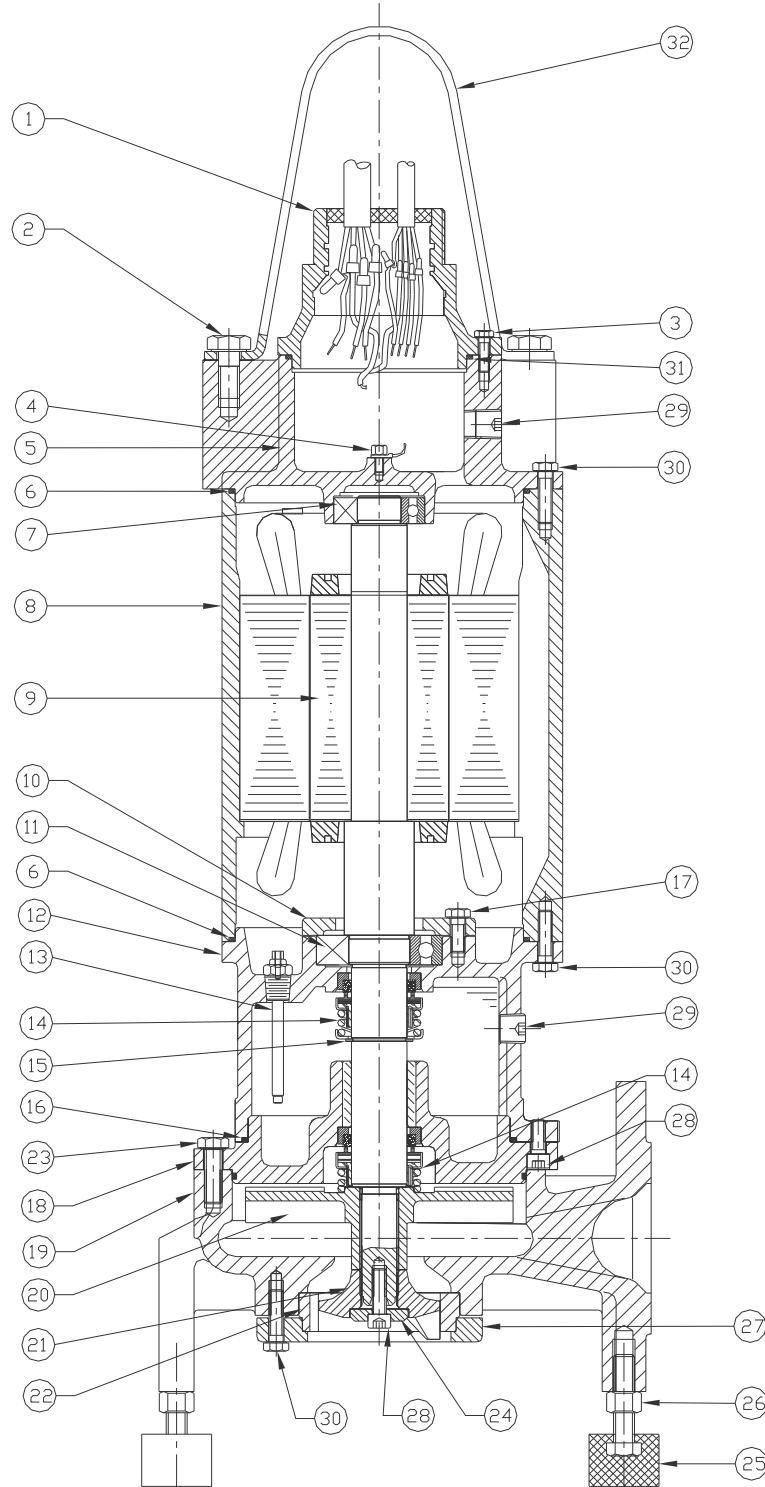


EBG-31/51

REF. NO.	DESCRIPTION	QTY.
1	Assy, Cord Cap, 40 FT. Cords	1
2	Screw, Cap, 1/2-13UNC x 1" LG, SST	2
3	Screw, Cap, 1/4-20UNC x 7/8" LG, SST	4
4	Screw, M4 x .70 x 7/16" LG, SST	1
5	Bearing Plate, Upper, Cast Iron	1
6	O-Ring, Buna-N	2
7	Bearing, Upper Ball	1
8	Assembly, Housing & Stator, 3hp, 1 phase	1
8	Assembly, Housing & Stator, 5hp, 1 phase	1
9	Assembly, Rotor with Shaft, 1 phase	1
10	Plate, Lower Bearing, Cast Iron	1
11	Bearing, Lower Ball	1
12	Housing, Lower Bearing, Cast Iron	1
13	Sensor, Moisture	2
14	Seal, Lower and Upper Shaft, Silicon Carbide	2
15	Ring, Retaining, SST	1
16	O-Ring, Buna-N	1
17	Screw, Cap, 5/16-18UNC x 1" LG, SST	2
18	Plate, Lower Seal, Cast Iron	1
19	Case, Volute, Cast Iron	1
20	Impeller, Ductile Iron	1
21	Impeller, Grinding, SST	1
22	Ring, Grinder, SST	1
23	Screw, Cap, 3/8-16UNC x 1-1/4" LG, SST	4
24	Retaining, Ring, SST	1
25	Assembly, Leg, SST/Buna-N	3
26	Nut, Hex, 1/2-13UNC, SST	3
27	Flange, Grinder Shredding, Cast Iron	1
28	Screw, Allen head, 5/16-18UNC x 1" LG, SST	5
29	Plug, 3/8" NPT pipe, SST	2
30	Screw, Cap, 5/16-18UNC x 1-1/4" LG, SST	12
31	O-Ring, Buna-N	1
32	Bale, Lifting, SST	1



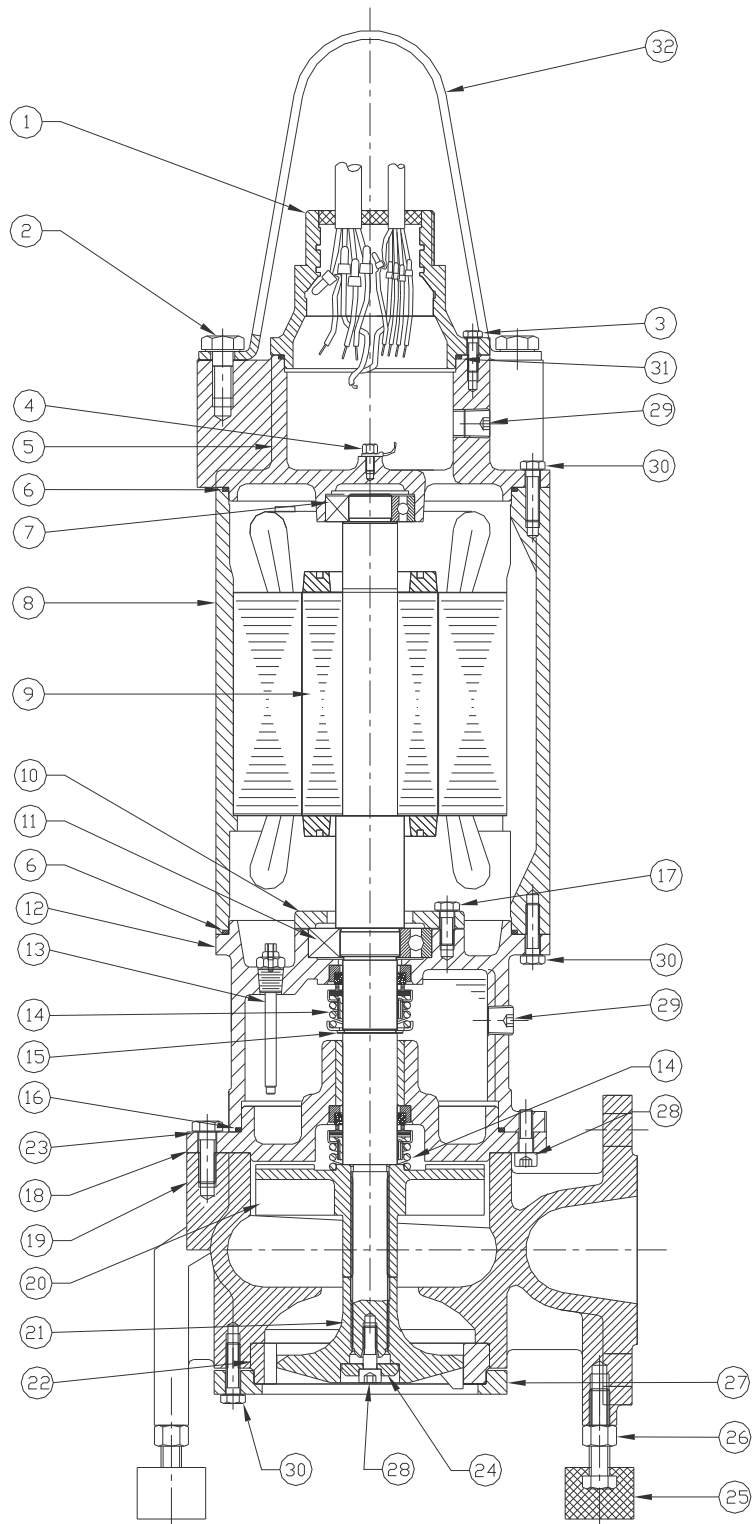
EBHG-31/51/71



EBHG-31/51/71

REF. NO.	DESCRIPTION	QTY.
1	Assy, Cord Cap, 40 FT. Cords	1
2	Screw, Cap, 1/2-13UNC x 1" LG, SST	2
3	Screw, Cap, 1/4-20UNC x 7/8" LG, SST	4
4	Screw, M4 x .70 x 7/16" LG, SST	1
5	Bearing Plate, Upper, Cast Iron	1
6	O-Ring, Buna-N	2
7	Bearing, Upper Ball	1
8	Assembly, Housing & Stator, 3hp, 1 phase	1
8	Assembly, Housing & Stator, 5hp, 1 phase	1
8	Assembly, Housing & Stator, 7.5hp, 1 phase	1
9	Assembly, Rotor with Shaft, 1 phase	1
10	Plate, Lower Bearing, Cast Iron	1
11	Bearing, Lower Ball	1
12	Housing, Lower Bearing, Cast Iron	1
13	Sensor, Moisture	2
14	Seal, Lower and Upper Shaft, Silicon Carbide	2
15	Ring, Retaining, SST	1
16	O-Ring, Buna-N	1
17	Screw, Cap, 5/16-18UNC x 1" LG, SST	2
18	Plate, Lower Seal, Cast Iron	1
19	Case, Volute, Cast Iron	1
20	Impeller, Ductile Iron	1
21	Impeller, Grinding, SST	1
22	Ring, Grinder, SST	1
23	Screw, Cap, 3/8-16UNC x 1-1/4" LG, SST	4
24	Retaining, Ring, SST	1
25	Assembly, Leg, SST/Buna-N	3
26	Nut, Hex, 1/2-13UNC, SST	3
27	Flange, Grinder Shredding, Cast Iron	1
28	Screw, Allen head, 5/16-18UNC x 1" LG, SST	5
29	Plug, 3/8" NPT pipe, SST	2
30	Screw, Cap, 5/16-18UNC x 1-1/4" LG, SST	12
31	O-Ring, Buna-N	1
32	Bale, Lifting, SST	1

EBG-33/53/103

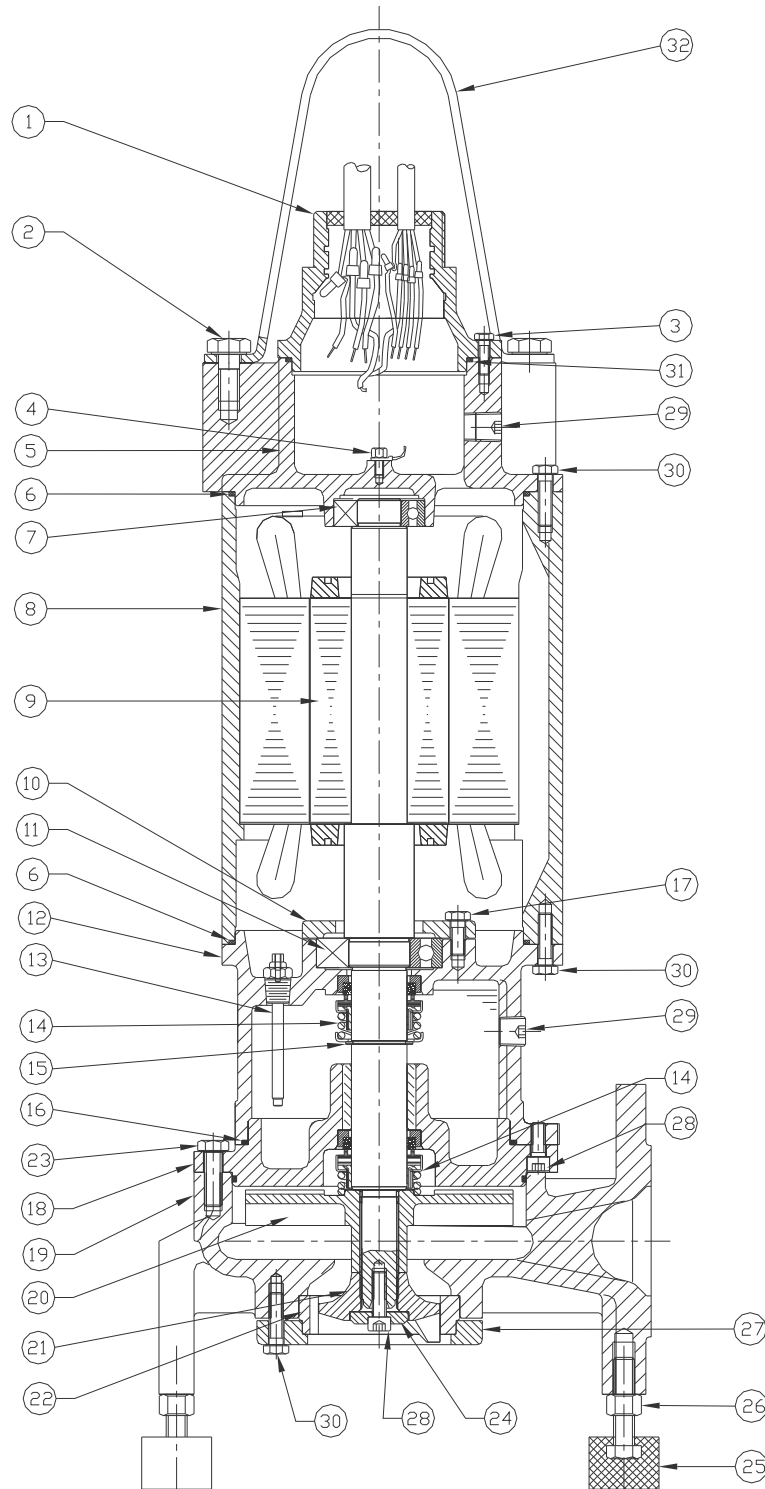


EBG-33/53/103

REF. NO.	DESCRIPTION	QTY.
1	Assy, Cord Cap, 40 FT. Cords	1
2	Screw, Cap, 1/2-13UNC x 1" LG, SST	2
3	Screw, Cap, 1/4-20UNC x 7/8" LG, SST	4
4	Screw, M4 x .70 x 7/16" LG, SST	1
5	Bearing Plate, Upper, Cast Iron	1
6	O-Ring, Buna-N	2
7	Bearing, Upper Ball	1
8	Housing & Stator - 3hp, 3 phase	1
8	Housing & Stator - 5hp, 3 phase	1
8	Housing & Stator - 10hp, 3 phase	1
9	Rotor w/shaft 3/5hp, 3 phase	1
9	Rotor w/shaft 10hp, 3 phase	1
10	Plate, Lower Bearing, Cast Iron	1
11	Bearing, Lower Ball	1
12	Housing, Lower Bearing, Cast Iron	1
13	Sensor, Moisture	2
14	Seal, Lower and Upper Shaft, Silicon Carbide	2
15	Ring, Retaining, SST	1
16	O-Ring, Buna-N	1
17	Screw, Cap, 5/16-18UNC x 1" LG, SST	2
18	Plate, Lower Seal, Cast Iron	1
19	Case, Volute, Cast Iron, 3 & 5HP	1
19	Case, Volute, Cast Iron, 10 HP	1
20	Impeller, Ductile Iron, 3 & 5 HP	1
20	Impeller, Ductile Iron, 10 HP	1
21	Impeller, Grinding, SST	1
22	Ring, Grinder, SST	1
23	Screw, Cap, 3/8-16UNC x 1-1/4" LG, SST	4
24	Retaining, Ring, SST	1
25	Assembly, Leg, SST/Buna-N	3
26	Nut, Hex, 1/2-13UNC, SST	3
27	Flange, Grinder Shredding, Cast Iron	1
28	Screw, Allen head, 5/16-18UNC x 1" LG, SST	5
29	Plug, 3/8" NPT pipe, SST	2
30	Screw, Cap, 5/16-18UNC x 1-1/4" LG, SST	12
31	O-Ring, Buna-N	1
32	Bale, Lifting, SST	1



EBHG-33/53/73



EBHG-33/53/73

REF. NO.	DESCRIPTION	QTY.
1	Assy, Cord Cap, 40 FT. Cords	1
2	Screw, Cap, 1/2-13UNC x 1" LG, SST	2
3	Screw, Cap, 1/4-20UNC x 7/8" LG, SST	4
4	Screw, M4 x .70 x 7/16" LG, SST	1
5	Bearing Plate, Upper, Cast Iron	1
6	O-Ring, Buna-N	2
7	Bearing, Upper Ball	1
8	Assembly, Housing & Stator, 3hp, 3 phase	1
8	Assembly, Housing & Stator, 5hp, 3 phase	1
8	Assembly, Housing & Stator, 7.5hp, 3 phase	1
9	Assembly, Rotor with Shaft, 3 phase	1
10	Plate, Lower Bearing, Cast Iron	1
11	Bearing, Lower Ball	1
12	Housing, Lower Bearing, Cast Iron	1
13	Sensor, Moisture	2
14	Seal, Lower and Upper Shaft, Silicon Carbide	2
15	Ring, Retaining, SST	1
16	O-Ring, Buna-N	1
17	Screw, Cap, 5/16-18UNC x 1" LG, SST	2
18	Plate, Lower Seal, Cast Iron	1
19	Case, Volute, Cast Iron	1
20	Impeller, Ductile Iron	1
21	Impeller, Grinding, SST	1
22	Ring, Grinder, SST	1
23	Screw, Cap, 3/8-16UNC x 1-1/4" LG, SST	4
24	Retaining, Ring, SST	1
25	Assembly, Leg, SST/Buna-N	3
26	Nut, Hex, 1/2-13UNC, SST	3
27	Flange, Grinder Shredding, Cast Iron	1
28	Screw, Allen head, 5/16-18UNC x 1" LG, SST	5
29	Plug, 3/8" NPT pipe, SST	2
30	Screw, Cap, 5/16-18UNC x 1-1/4" LG, SST	12
31	O-Ring, Buna-N	1
32	Bale, Lifting, SST	1



Operation, Installation and Maintenance

Limited Warranty**1. All specifications subject to change without notice****2. Limited warranty:**

EIC warrants for a period of twelve months from the date of initial startup or eighteen months from the date of shipment, whichever shall first occur (the "Warranty Period") the EIC Products to be delivered hereunder against defects in material and workmanship, under normal use and service when installed, used and maintained in accordance with instructions supplied by EIC. This is EIC's sole and exclusive warranty. It applies only to EIC Products and specifically excludes Other Equipment, whether or not such Other Equipment is included in EIC's scope of supply hereunder. Such Other Equipment is warranted only by its manufacturer. If such a defect appears in EIC Products within the Warranty Period and Purchaser has given EIC immediate written notice of same, EIC will either repair the part, or at its option replace the part, by shipping a similar part F.O.B. EIC's shipping point, or at its option refund an equitable portion of the purchase price. EIC may require the return of the defective part, transportation prepaid, to establish the claim. All costs of removal, reinstallation, field labor and transportation shall be borne by the Purchaser. No allowance will be made for repairs without EIC's written consent or approval, and the Warranty Period shall not be suspended upon stopping operation for warranty repairs, nor recommence upon completion of the warranty repairs, but shall run continuously from commencement until normal expiration. Repair parts shall carry no greater warranty than the remaining balance of the underlying EIC Product into which they may be installed, expiring at the same time as said underlying warranty.

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