KEEN PUMP CO.

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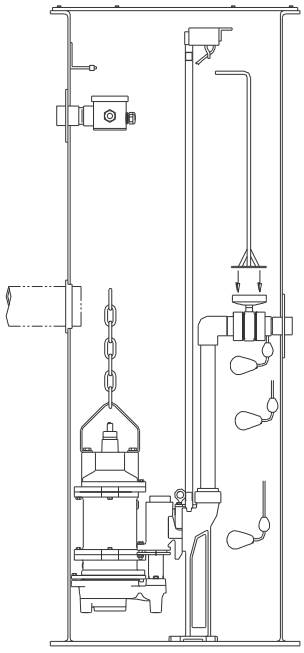
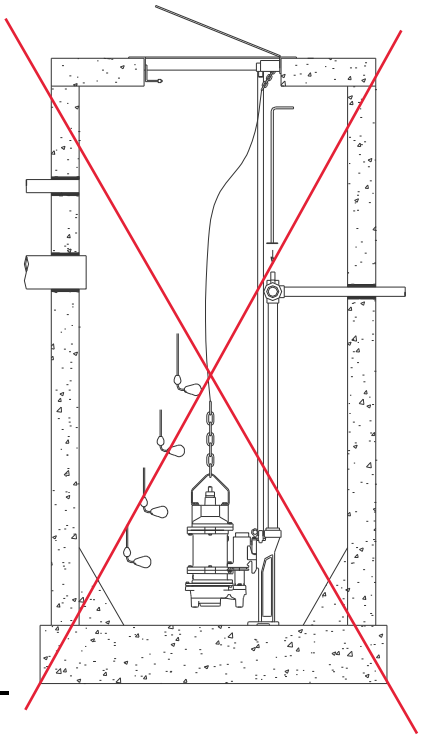
INSTALLATION AND SERVICE INSTRUCTIONS FOR 2HP SUBMERSIBLE GRINDER PUMPS SIMPLEX & DUPLEX

BASIN PACKAGE W/ RAILS



SIMPLEX" & DUPLEX
FIBERGLASS SYSTEM



~~"DUPLEX" CONCRETE SYSTEM~~

P/N O&M-2HPBASIN

Safety Instructions

Read all instructions in this manual before operating pump.

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 orIndicates 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, burnes or death could result.


Extremely hot - Severe burnes 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.

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. 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.

Most accidents can be avoided by using COMMON SENSE.

KEEN PUMP 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.

Safety Instructions (cont'd)

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

BASIN HANDLING

Although the exterior surfaces of our fiberglass reinforced plastic (FRP) sump and sewage basins are designed to withstand normal handling, they can be damaged during transportation and installation. Basins must not be dropped, dragged, or handled with sharp objects and with the exception of the minimal movement involved in a visual inspection, should not be rolled.

If the basin or its shell is damaged, installation should be suspended until Keen Pump Co. or its agent can make a determination of the extent of damage. Any repairs must be first authorized in writing by Keen Pump Co. and then be done in accordance with Keen Pump Co. instructions.

UNLOADING, LIFTING, AND LOWERING

The proper way of moving a basin is by lifting it, using chains or cables with the optional lifting lugs (not more than 30* included angle) or by using a non-marring sling around the basin. Before any attempt is made to move a basin, it should be established that all of the equipment and accessories have sufficient capacity and reach to lift and lower the basins without dragging and/or dropping. Basins should be maneuvered with guide ropes attached to the sides.

WARNING !! Under NO circumstances are the use of chains or cables around the basin shell permitted.

STORAGE

Basins should be stored in a secure, controlled area where the potential for accidental damage or vandalism will be minimized. The storage area should be free from sharp objects, rocks and any other foreign solutions or materials that could cause damage to the basins. Chock the basins until they are needed for installation and if windy conditions are possible, secure the basins with non-marring restraints of a size and number adequate for securing the basin.

PRE-INSTALLATION INSPECTION

Basins, vales, equipment, and piping materials should be physically and visually inspected before installation. Adherence to the project's specifications should also be confirmed before installation. If the basin or any of its internal components are damaged, installation should be suspended until a determination of the extent of damage can be made by Keen Pump Co. or its agent. Any repairs must be first authorized in writing by Keen Pump Co. and then be done in accordance with Keen Pump Co. instructions.

EXCAVATION

The excavation should provide adequate space for the basin, piping, and other buried equipment and for the replacement and compaction of backfill materials particularly around the basin walls. The size, shape and wall slope of the excavation should be determined by soil conditions, depth of excavation, shoring requirements, and if workers are required to enter the excavation, safety considerations and federal, sate, county, and municipal regulations.

WARNING !! Locate all overhead and underground utilities before excavating

LOCATION OF EXCAVATING

Excavation for an underground basin should be made with due care to avoid undermining foundations of existing structures and contact with underground utilities. In the absence of building codes or regulations, maintain a minimum distance of five feet plus a slope or 45* from the bottom of the compacted sub-base to the bottom of the adjacent structures, foundations, footings, and property lines (as shown in the attached illustration). Additional distances may be required to assure that any loading carried or created by the foundations and supports cannot be transferred to the basins.

HANDLING OF EXCAVATED MATERIALS

Excavated materials, which cannot be removed from the jobsite, should be carefully stored as far from the edge of the basin excavation as possible. Unless approved for use as backfill, excavation materials should be securely stored separate from the approved backfill materials.

WORK AREA SAFETY
Safe installation procedures shall be the sole responsibility of the basin installer. Work safety requirements are defined in U.S. Department of Labor 29 CFR part 1926, subpart P, Excavations.

BACKFILLING

Careful selection, placement, and compaction of approved backfill material is critical to a successful basin installation. Among the common problems associated with basin leaks and premature failures are:

- Use of incorrect backfill material
- Inadequate or improper placement or compaction
- Rocks, clods, or debris left in the excavation or basin
- Voids under or around the perimeter of the basin
- Failure to prevent the migration of backfill materials

PLACEMENT OF BASIN
The bottom of the basin excavation should be covered with suitably with graded, leveled, and compacted backfill material to a depth of at least 12 inches (compacted sub-base). If a concrete hold-down/anti-flotation pad is required, this bedding can be reduced to a depth of at least 6 inches. The carefully lower the basin into the excavation and centered on the compacted backfill or concrete pad (see attached).

WARNING !! Placement of a basin on a concrete pad or compacted sub-base smaller than the total basin bottom area or on intermediate supports (saddles) will cause uneven distribution of loads. This may contribute to structural failure, and is never permitted.

BACKFILL MATERIAL
Backfill material should be clean, well granulated, free flowing, non-corrosive, and inert. It should be free of ice, snow, debris, rock, or organic material, all of which could damage the tank and interfere with the compaction of the backfill material. The largest particles should not be larger than 3/4". Not more than 3% (by weight) should pass through a # 8 sieve, and the backfill material should conform to ASTM C-33, Paragraph 9.1 requirements. Approved backfill materials include:

- Pea Gravel, naturally rounded particles with a minimum diameter of 1/8" and a maximum diameter of 3/4".
- Crushed rock, washed and free-flowing angular particles between 1/8" and 1/2" in size.

PLACEMENT AND COMPACTION OF BACKFILL
Compaction of backfill materials should be adequate to ensure the support of the tank, and to prevent movement or settlement. Backfill materials should be placed in 12" lifts and compacted to a minimum soil modulus of 700 pounds per square inch (psi)

SUPPORTING PIPING, EQUIPMENT AND ACCESSORIES
Support for piping, equipment and other accessories must be provided during backfilling. Using the basin to support piping, equipment, cribbing, bracing, or blocking is never permitted. During backfilling, temporary supporting materials must be carefully installed and removed to prevent damage to the basin, piping, or equipment.

WARNING !! Using the basin to support any loading carried or created by piping, equipment, cribbing, bracing, or blocking is never permitted.

ANCHORAGE

When basin installations are located in areas subject to high water tables or flooding, provisions should be made to prevent the basins, either empty or filled, from floating. The buoyancy force to be offset is determined primarily by the volume of the basin. The principle offsetting factors include:

- Backfill materials
- Concrete hold-down pad
- Friction between the tank, backfill materials and the surrounding soil

METHODS OF ANCHORAGE

All methods of anchoring basins use the weight of the backfill materials to offset the buoyancy forces. The use of supplemental mechanical anchoring methods (a concrete hold-down pad) increases the amount of backfill ballast, which is mechanically, attached to the basin. The recommended method of attachment is to pour concrete grout over the basin's anti-floatation flange and concrete grout over the basin's anti-floatation flange and concrete hold-down pad (see attached illustration)

ANCHORAGE REQUIREMENTS

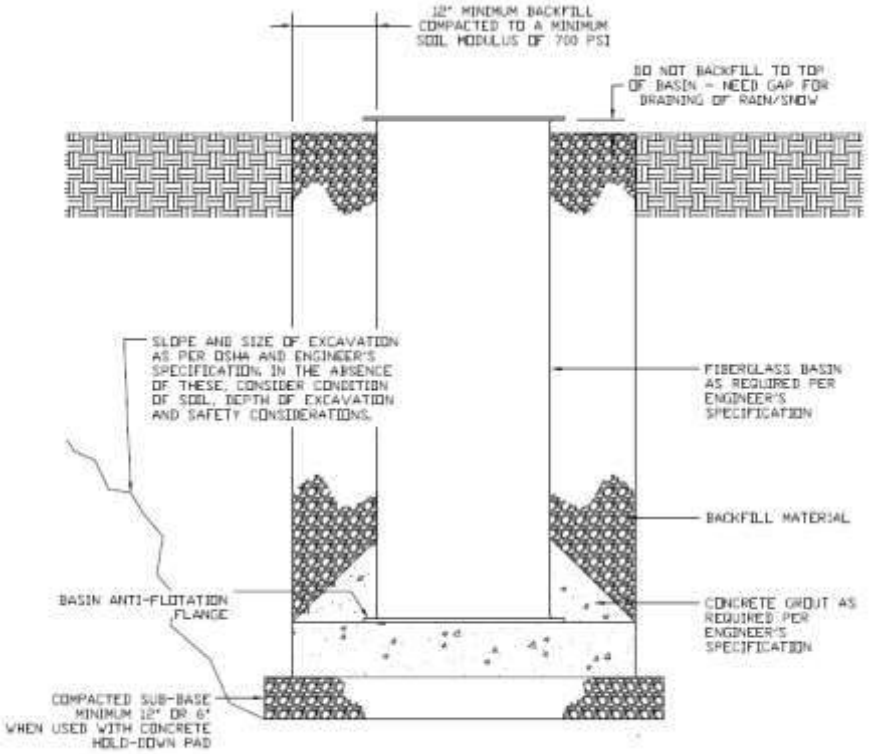
Requirements of anchorage, thickness of concrete hold-down pads, as well as the size of anchors and reinforcement must be calculated for each installation based on the environmental conditions of that specific installation.

WARNING !! Use "submerged" material weights when calculating anchorage requirements. Example: weight of concrete (150 ponds per cubic foot) minus the weight of the water (62.4 pounds per cubic foot) equals a "submerged" weight of 87.6 pounds per cubic foot.

CONCRETE BALLAST REFERENCE GUIDE

Basin Diameter	Cubic feet Concrete required per foot of basin depth
24"	2
30"	3.5
36"	5
48"	8.5

NOTE: If basin is installed in dry ground without surface water, 1/3 of above values may be used. If basin is left in open hole without backfilling for several days, full amount of concrete should be used, due to possible flash rain storms.



SPECIFICATIONS For fiberglass basin package:

NOTE: Pump, lift-out check valve, floats, inlet fitting and control panel are shipped separately.

BASIN – Fiberglass construction w/ cover flange and bottom anti-flotation collar

COVER – Solid Fiberglass, or aluminum with access hatch

DISCHARGE PIPE – 1-1/4" PVC, Schedule 80, or as req'd.

DISCHARGE HUB – 1-1/4" NPT SST (Simplex), 1-1/4", 1-1/2" or 2"NPT SST (Duplex)

RAIL SYSTEM – Keen Pump KL1 or KL1-CV (Check valve), Cast iron, painted
KL1-CV includes ball check valve – Qty. 2 req'd for duplex

RAIL BRACKETS – Upper support and liftout yoke SST

LIFTING APPARATUS - 3/16" Stainless steel chain w/ ¼" shackles

SHUT-OFF VALVE – 1-1/4" Ball Valve, PVC, True Union, Blocked, or 1-1/4" Gate valve, brass

INLET FITTING – 4" or 6" Adaptaflex hub (Sch. 40 Pipe), or as req'd.

JUNCTION BOX – Fiberglass box designed to NEMA 6P standard, includes cord fittings and inlet hub

CONDUIT HUB – 1-1/2" or 2" NPT Plastic

LEVEL CONTROLS – Narrow angle, control duty, mercury, normally open floats, or as req'd.

LEVEL CONTROL BRACKET – SST w/ plastic cord bushing

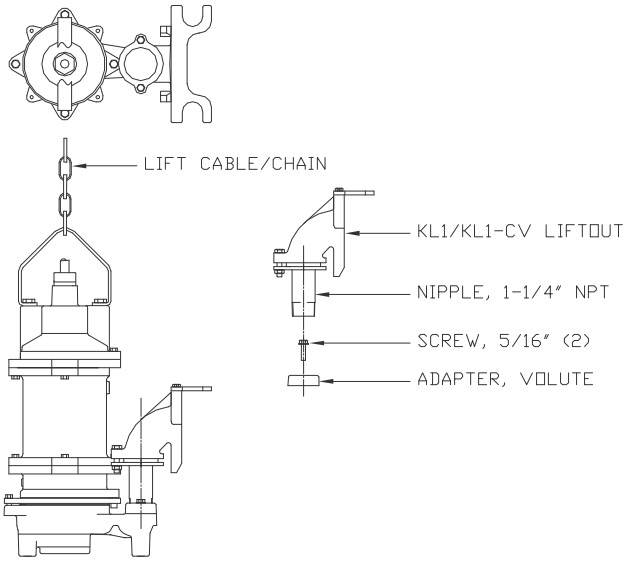
HARDWARE – 300 Series SST

STEPS TO INSTALL A KEEN FACTORY-BUILT BASIN PACKAGE

1. **BASIN INSTALLATION:** The basin is supplied with a standard inlet fitting for connecting a schedule 40 plastic pipe (4.50" OD) incoming sewer (from house). Other inlet types or sizes are optional. Please confirm that you have the pipe that matches the inlet fitting before continuing.
2. **AFTER EXCAVATING** the hole for basin (per above instructions), the basin should be plumb. Fill the basin with water to the invert (bottom of inlet pipe) to prevent basin from shifting as concrete is being poured for ballast.
3. **INLET PIPE:** If installing the standard 4" inlet fitting, a standard 5" diameter pilot hole-saw is required. If installing the 6" inlet fitting, a standard 7" diameter pilot hole-saw is required. The minimum invert level (bottom of inlet pipe) required is 36" (3'-0") from bottom of basin. After drilling hole, remove rough edges of fiberglass – coat with resin if available. Place inlet fitting through hole on outside wall of basin. Cut and

chamfer inlet pipe. Lubricate pipe and inlet fitting with soapy water. Insert inlet pipe into fitting and protrude through basin wall. Pipe must protrude a minimum of 1" past inlet fitting.

4. **DISCHARGE PIPE:** The use of schedule 40 pvc, HDPE (DR), and SDR pipe is recommended. The standard Keen flange connection is 1-1/4" NPT for all simplex basin packages, and 1-1/2" NPT for all duplex basin packages. **IT IS STRONGLY RECOMMENDED TO INSTALL A REDUNDANT CHECK VALVE** between the Keen basin and the street main on all installations.
5. **BACKFILL** using the previous illustration and instructions.
6. **VENTING:** It is unnecessary to vent a Keen Pump basin package as long as the house vent stack is properly vented to the rooftop. A separate 2" mushroom vent is optional and can be included to attach to basin cover if required.
7. **INSTALL PUMP AND LIFTOUT:** (See illustration to attach lift-out to pump volute). Remove (2) two 5/16" bolts from pump volute adapter. Separate threaded pump adapter from volute. Install adapter onto 1-1/4" pipe/lift-out assembly. Reinstall adapter and pipe assembly onto pump. Attach lift cable/chain to pump lift bail. Pump is now ready to install into basin.



8. **POSITION PUMP** so the guide rails are located in the slots of the guide plate. Slowly lower the pump down the guide rails to the base. Retain pump cables so they do not drop into the basin. The tapered arms in the base will automatically seal and pull the mating faces together when lowered into place.
9. **FLOATS:** A typical simplex system with control panel will consist of (3) three float control switches (Off, On and High Water Alarm). A typical duplex system will consist of (4) four float control switches (Off, Lead Pump On, Lag Pump On, and High Water Alarm). A system with an automatic pump will be equipped with (2) two float switches (On-Off, and High Water Alarm). All floats will be attached to float bracket, which is installed near the top of the basin. Each float cord will have a cord bushing that fits into the float bracket. The recommended float settings are as follows for KEEN 2hp pump

models: (Note – all settings are activation levels). NO PUMP ON/OFF FLOAT SWITCH SHOULD BE SET THAT WILL EXCEED 10 STARTS PER HOUR PER PUMP.

3 FLOAT OPERATION SIMPLEX:

- 15" from basin bottom to "OFF" setting – KG2/KHGS2/KFG2 (Minimum)
- 18" from basin bottom to "OFF" setting – KHHG2/KHHG2H (Min.)
- 24" from basin bottom to "ON" setting – KG2/KHGS2/KFG2 (Min.)
- 30" from basin bottom to "ON" setting – KHHG2/KHHG2H (Min.)
- 30" from basin bottom to "HWA" setting – KG2/KHGS2/KFG2 (Min.)
- 36" from basin bottom to "HWA" setting – KHHG2/KHHG2H (Min.)

MIN

4 FLOAT OPERATION DUPLEX:

- 15" from basin bottom to "OFF" setting – KG2/KHGS2/KFG2 (Min.)
- 18" from basin bottom to "OFF" setting – KHHG2/KHHG2H (Min.)
- 24" from basin bottom to "LEAD PUMP ON" setting – KG2/KHGS2/KFG2 (Min.)
- 30" from basin bottom to "LEAD PUMP ON" setting – KHHG2/KHHG2H (Min.)
- 30" from basin bottom to "LAG PUMP ON" setting – KG2/KHGS2/KFG2 (Min.)
- 36" from basin bottom to "LAG PUMP ON" setting – KHHG2/KHHG2H (Min.)
- 32" from basin bottom to "HWA" setting – KG2/KHGS2/KFG2 (Min.)
- 38" from basin bottom to "HWA" setting – KHHG2/KHHG2H (Min.)

10. **JUNCTION BOX/ELECTRICAL CONNECTION:** Connect level control and pump power cords to junction box. Make certain that all compression fittings are tight. Install control panel. Run wires to control panel through conduit and connect cords coming into control panel. Mark or trace each incoming wire so that it can be connected to proper cord.

STARTING PUMPS

1. Open shutoff valves on discharge piping.
2. Set pump switches at control panel to "auto" position and turn on power. Fill basin with water until controls start pump. Allow pump to operate until level drops, stopping pump.
3. If system is duplex, turn both pump switches to "off" and fill basin above upper control. Turn both pump switches to "auto" position. Both pumps should run and pump basin down to lower control.
4. Leave both switches in "auto" position and pump is ready for automatic operation.
5. A small weep hole may need to be drilled in the pump volute case or discharge pipe to prevent air-lock, so some water will flow from this hole when pump is operating.

TROUBLESHOOTING

1. Pump runs but does not deliver water.
    a. May be air-locked. Lift pump and reseat onto discharge base.
    b. Discharge shutoff valve may be closed.
    c. If pump is 3-phase, may be running in wrong direction. Pump should be checked before installing in basin for proper rotation. ROTATION: Counterclockwise when looking into pump inlet.

    CAUTION: KEEP HANDS AND FINGERS AWAY FROM GRINDER IMPELLER WHEN MAKING THIS CHECK. If 3-phase rotation is wrong, interchange any two line leads at the control panel to reverse motor. CAUTION: BE SURE CONNECTED POWER AGREES WITH DATA ON PUMP NAMEPLATE.
2. Liftout base flange leaks
    a. O-ring or gasket cut
    b. Trash may be caught under flange. Lift out and reseat. It may be necessary to run pump lifted out of base elbow to flush away trash.
3. Proper setting of level controls. Controls should be set so that pump stops when level is minimum 6 inches above pump inlet. If controls are set too high, trash and grease may accumulate on the surface and may cause clogging.

CAUTION: NEVER WORK ON PUMPS OR CONTROLS UNLESS POWER IS TURNED OFF. IF PUMP IS REMOTE FROM CONTROL PANEL, DISCONNECT WIRES TO PUMPS TO BE CERTAIN POWER CANNOT BE TURNED ON. THIS MEANS ALL WIRES INCLUDING CONTROL WIRES. NEVER PUT HANDS NEAR GRINDER IMPELLER ON ANY RUN CHECKS.

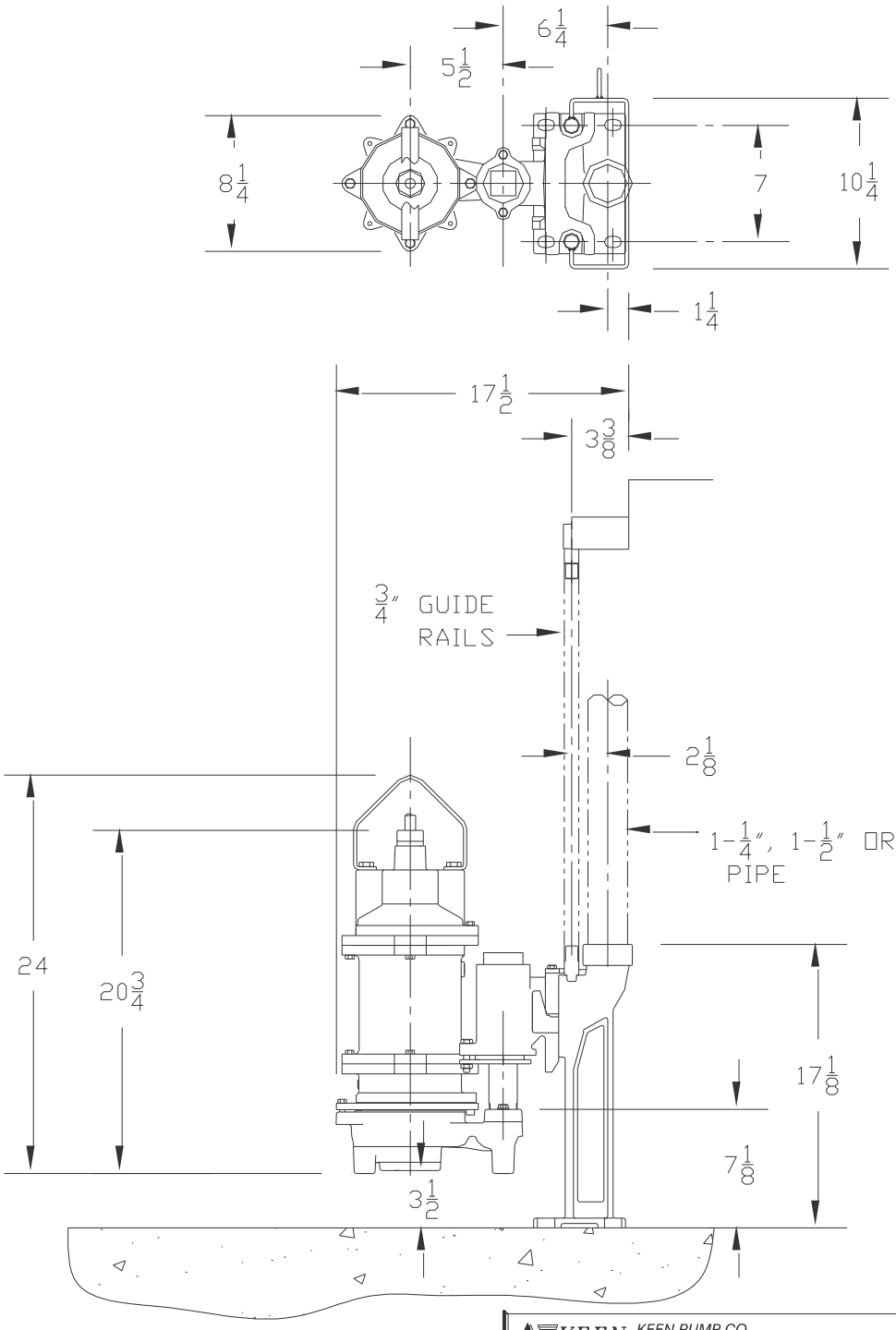
STEPS TO INSTALL A KEEN SYSTEM IN CONCRETE BASIN

1. Clean basin bottom thoroughly before installing the rail system components.
2. Bolt discharge base elbow in place on basin bottom. See typical layout dimensions on following pages or consult factory.
3. Install discharge piping from base elbow complete through basin wall. Cement in place.
4. Keen recommends mounting guide rails to access cover hatch frame. Mount upper rail support onto hatch cover frame per typical layout as follows or consult factory.
5. Install ¾" or 1" guide rails. Schedule 40 stainless steel is recommended. To get proper length, upper rail support must be installed prior to trimming rail pipes. Align rail pipes plumb by using a level in two directions on pipe.
6. Mount level control bracket as shown on typical layout as follows. Set float control heights per instruction above or as required by engineer. Consult factory for special settings required.
7. If control panel is remotely mounted, attach conduit pipe through basin wall and cement in place. See typical layout as follows for placement of conduit.
8. Be certain all inlet and discharge piping is properly connected before backfilling.
9. **INSTALL PUMP AND LIFTOUT:** (See illustration above to attach lift-out flange from the Keen "KL1[CV]" to pump volute). Attach lift cable/chain to pump lift bail. Pump is now ready to install into basin.

TYPICAL INSTALLATIONS AND DIMENSIONS ON PROCEEDING PAGES

1. **KG2 grinder pump with KL1 liftout dimensions**
2. **KG2 grinder pump with KL1CV liftout dimensions**
3. **KHHG2H high head grinder pump with KL1CV liftout dimensions**
4. **Fiberglass basin assembly, 24" Diameter simplex**
5. **Fiberglass basin assembly, 48" Diameter duplex**
6. **Concrete basin assembly, 30" Diameter simplex w/ stud and hatch layout**
7. **Concrete basin assembly, 48" Diameter duplex w/ stud and hatch layout**

NOTE: CONSULT FACTORY IF DIMENSIONS OR LAYOUTS REQUIRED ARE NOT INCLUDED WITH THIS MANUAL.



KEEN PUMP COMPANY
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PUMP W/ LIFTOUT DIMENSIONS

KHGSL2-2401 2HP GRINDER W/KL1CV

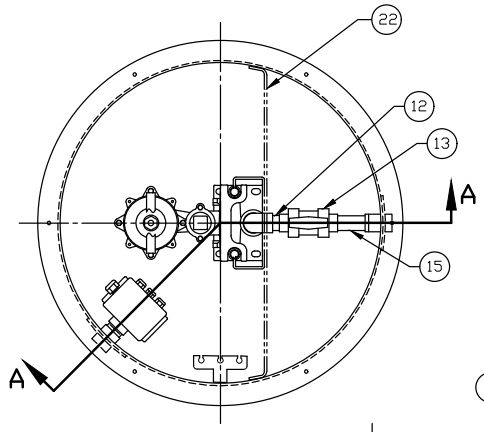
APPROVED BY: _____

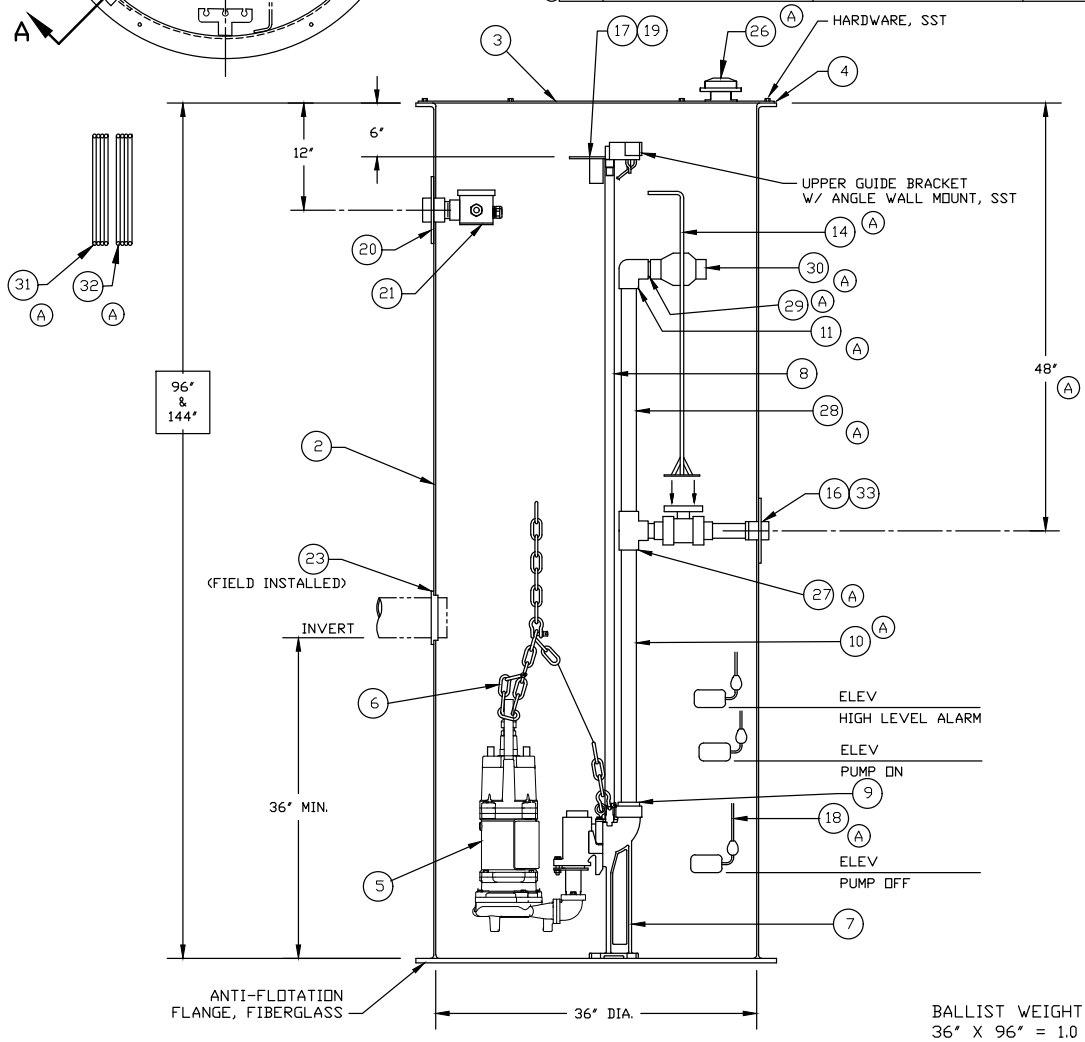
DATE: _____

TO CUSTOMER: EXAMINE THIS DRAWING CAREFULLY. VERIFY ALL DIMENSIONS, LOCATIONS, AND ELEVATIONS FOR ACCURACY. SIGN AND DATE AT LINE. ANY MODIFICATIONS OR CHANGES TO THIS DRAWING OR FINISHED PRODUCT, AFTER IT HAS BEEN SIGNED, MAY RESULT IN ADDITIONAL CHARGES AND SHIPPING DELAYS. NO JOB WILL BE STARTED UNTIL CONFIRMATION THROUGH SIGNATURE. CONFIRMATION THROUGH SIGNATURE RELEASES ORDER FOR PRODUCTION.

BILL OF MATERIAL

	ITEM	36" X 144" BASIN BOM	36" X 96" BASIN BOM	DESCRIPTION	QTY
	1	KCGS-18-21S-B-O (NOT SHOWN)	KCGS-18-21S-B-O (NOT SHOWN)	PANEL	1
	2	B36144S	B3696S	BASIN	1
	3	C36F	C36F	COVER	1
	4	GASK-BVCR	GASK-BVCR	BASIN GASKET	10 ft
	5	KHGSL2-2401	KHGSL2-2401	GRINDER PUMP	1
	6	K-12CP-KL1	K-8CP-KL1	CHAIN ASSEMBLY	1
	7	KL1CV	KL1CV	LIFT OUT ASSEMBLY	1
	8	PIPE100A077 (121-1/2" LG)	PIPE100A037 (73-1/2" LG)	PIPE 1" CUT SST	2
	9	B2X125T80	B2X125T80	REDUCING BUSHING	1
A	10	PIPE125A370 (79-3/8" LG)	PIPE125A054 (31-1/2" LG)	PIPE 1-1/4" TOE PVC80	1
	11	90EL125S	90EL125S	ELBOW 1-1/4" 90DEG PVC80	1
	12	PIPE125A186	PIPE125A186	PIPE 1-1/4" X 3-3/4" CUT PVC80	1
	13	BV125P	BV125P	TRUE UNION VALVE 1-1/4" PVC80	1
A	14	EHBVSSA002	EHBVSSA002	EXTENSION HANDLE SST	1
	15	PIPE125A070	PIPE125A070	PIPE 1-1/4" X 6-1/4" TOE PVC80	1
A	16	DF150SS	DF150SS	DISCHARGE FLANGE SST	1
	17	KP-3FB	KP-3FB	FLOAT BRACKET SST	1
A	18	KP-CF30M	KP-CF30M	MECHANICAL CONTROL FLOATS	3
	19	1214	1214	RELIEF BUSHING	3
	20	CF200P	CF200P	CONDUIT HUB 2" NPT PVC	1
	21	SJB-KG2-1-POLY	SJB-KG2-1-POLY	JUNCTION BOX	1
	22	RB36	RB36	RAIL BRACE	1
	23	KP-4ADF	KP-4ADF	FLEX HUB	1
	24	CRADLE (NOT SHOWN)	CRADLE (NOT SHOWN)	CRADLE (TWO IN SET)	1
	25	SEALERRIBBON (NOT SHOWN)	SEALERRIBBON (NOT SHOWN)	RIBBON SEALER	2 ft
A	26	MV2KT	MV2KT	MUSHROOM VENT 2"	1
A	27	TEE125S	TEE125S	TEE 1-1/4" PVC80	1
A	28	PIPE125A066	PIPE125A066	PIPE 1-1/4" X 28" CUT PVC80	1
A	29	PIPE125A210	PIPE125A210	PIPE 1-1/4" X 3-1/4" CUT PVC80	1
A	30	ASV125	ASV125	ANTI-SIPHON 1-1/4" PVC	1
A	31	K0884-1-02	K0884-1-02	WIRE 12/5 DIRECT BURIAL	50 ft
A	32	K0884-1-01	K0884-1-01	WIRE 18/6 DIRECT BURIAL	50 ft
A	33	B150X125T80	B150X125T80	REDUCER BUSHING	1





SECTION A-A

BALLIST WEIGHT REQUIREMENTS:
36" X 96" = 1.0 YARDS OF CONCRETE
36" X 144" = 2.6 YARDS OF CONCRETE

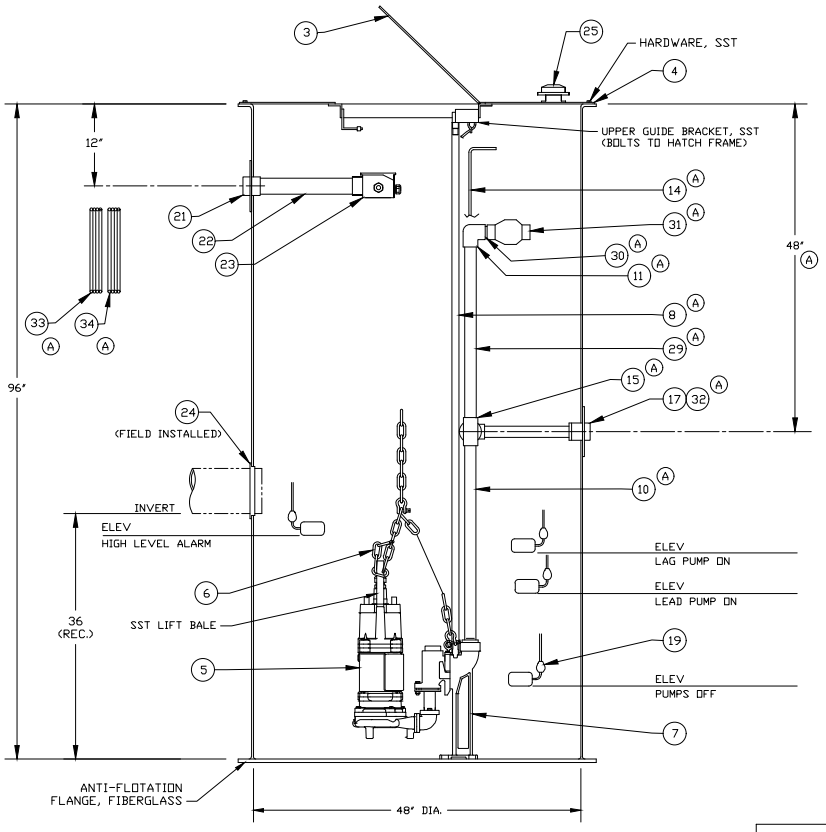
REV	DESCRIPTION	DATE
	NOTE: ALL DIMENSIONS FOR REFERENCE ONLY	
A	ADD ANTI-SIPHON, ADD DIRECT LINE WIRE, CHG DISCH TO 1-1/2", CHG GUIDE TO 1" CHG FLOAT LENGTH TO 30 ft	DLM 06-06-23

KEEN PUMP COMPANY
KEEN PUMP CO.
471E ST. ROUTE 250 EAST
ASHLAND, OHIO 44805
PHONE: 419-207-9400
FAX: 419-207-9031

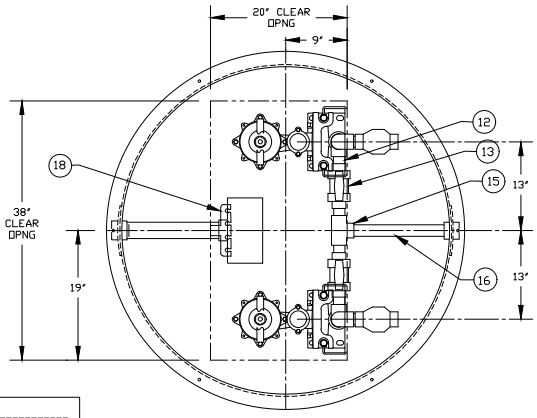
TITLE: BASIN ASSY 36" KHGSL2-2401 SIMPLEX KL1CV FG COVER

SCALE	DWG. #	REV.
NTS	KN-642_37752	A

DWG. BY	DATE
DLM	05-09-23



BILL OF MATERIAL			
1	KCGS-18-21D-B-D	CONTROL PANEL	1
2	B4896SDA	BASIN	1
3	C48HSA-KL1-SAFE-2V	COVER	1
4	GASK-BCVR	BASIN GASKET	13 ft
5	KHGSL2-2401	GRINDER PUMP	2
6	K-8CP-KL1	CHAIN ASSEMBLY	2
7	KL1CV	LIFT-OUT ASSEMBLY	2
A 8	PIPE100A021	PIPE 1" X 78" CUT SST	4
9	B2X125T80	REDUCING BUSHING	2
A 10	PIPE125A054	PIPE 1-1/4" X 31-1/2" TOE PVC80	2
11	90EL125S	ELBOW 1-1/4" PVC	2
12	PIPE125A008	PIPE 1-1/4" X 4" CUT PVC	4
13	BV125P	TRUE UNION 1-1/4" PVC	2
A 14	EHBVSSA014	EXTENSION HANDLE	2
A 15	TEE125S	TEE 1-1/4" PVC	3
16	PIPE125A328	PIPE 1-1/4" X 16-1/8" TOE PVC	1
A 17	DF150SS	DISCHARGE FLANGE SST	1
18	KP-4FB	FLOAT BRACKET SST	1
19	KP-CF30M	CONTROL FLOAT	4
20	1214	RELIEF BUSHING	4
21	CF200P	CONDUIT FLANGE 2" NPT	1
22	PIPE200A198	PIPE 2" X 16-1/2" TOE PVC80	1
23	DJB-KG2-1-PDLY	JUNCTION BOX	1
24	KP-4ADF	FLEX HUB 4"	1
25	MV2KT	MUSHROOM VENT 2"	1
26	SPT-EH-001 (NOT SHOWN)	EXTENSION HANDLE SUPPORT	2
27	CRADLE (NOT SHOWN)	SHIPPING CRADLE (2 IN KIT)	1
28	SEALERRIBBON (NOT SHOWN)	RIBBON SEALER	2 ft
A 29	PIPE125A066	PIPE 1-1/4" X 28" CUT PVC80	2
A 30	PIPE125A210	PIPE 1-1/4" X 3-1/4" CUT PVC80	2
A 31	ASV125	ANTI-SIPHON 1-1/4" PVC	2
A 32	B150X125T80	REDUCER BUSHING	1
A 33	K0884-1-02	WIRE 12/5 DIRECT BURIAL	50 ft
A 34	K0884-1-01	WIRE 18/6 DIRECT BURIAL	50 ft



APPROVED BY: _____

DATE: _____

NOTE: ALL DIMENSIONS FOR REFERENCE ONLY		
A	ADD ANTI-SIPHON, ADD DIRECT LINE WIRE, CHG DISCH TO 1-1/2", CHG GUIDE TO 1"	DLM 06-06-23
REV	DESCRIPTION	DATE

BALLIST WEIGHT REQUIREMENTS:
48" X 96" = 3.1 YARDS OF CONCRETE

TO CUSTOMER: EXAMINE THIS DRAWING CAREFULLY. VERIFY ALL DIMENSIONS, LOCATIONS, AND ELEVATIONS FOR ACCURACY. SIGN AND DATE AT LINE. ANY MODIFICATIONS OR CHANGES TO THIS DRAWING OR FINISHED PRODUCT, AFTER IT HAS BEEN SIGNED, MAY RESULT IN ADDITIONAL CHARGES AND SHIPPING DELAYS. NO JOB WILL BE STARTED UNTIL CONFIRMATION THROUGH SIGNATURE. CONFIRMATION THROUGH SIGNATURE RELEASES ORDER FOR PRODUCTION.

KEEN PUMP COMPANY
KEEN PUMP CO.
471E ST. ROUTE 250 EAST
ASHLAND, OHIO 44805
PHONE: 419-207-9400
FAX: 419-207-8031

TITLE: BASIN ASSY 48" DIA KHGSL2-2401 DUPLEX KL1CV ALUM CVR

SCALE	DWG. #	REV.
NTS	KN-276_37752	A
DWG. BY: DLM	DATE: 05-09-23	

HALIFAX KHGSL2-2401

KEEN PUMP
471 US Hwy 250 East, Ashland, Ohio 44805
PH: 419-207-9400 FX: 419-207-8031

INSTALLATION AND SERVICE INSTRUCTIONS AND REPAIR PARTS LIST FOR 2HP "SEMI-OPEN" K(H)GS2 CENTRIFUGAL SUBMERSIBLE GRINDER SEWAGE PUMPS

P/N O&M-K(H)GS2

MODELS

Standard Flow w/ Radial Cutters					
CATALOG NO.	**HP**	**PH**	**VOLTS**	**CORD**	**DISCH**
KGS2-2001	2	1	208	10-5	1.25
KGS2-2401	2	1	240	10-5	1.25
KGS2-2003	2	3	208	14-7	1.25
KGS2-2303	2	3	230	14-7	1.25
KGS2-4603	2	3	460	14-7	1.25

High Head w/ Radial Cutters					
CATALOG NO.	**HP**	**PH**	**VOLTS**	**CORD**	**DISCH**
KHGS2-2001	2	1	208	10-5	1.25
KHGS2-2401	2	1	240	10-5	1.25
KHGS2-2003	2	3	208	14-7	1.25
KHGS2-2303	2	3	230	14-7	1.25
KHGS2-4603	2	3	460	14-7	1.25

Standard Flow & High Head w/ Radial Cutters INTERNAL CAPACITORS					
CATALOG NO.	**HP**	**PH**	**VOLTS**	**CORD**	**DISCH**
KGS2-2001C	2	1	208	10-3	1.25
KGS2-2401C	2	1	240	10-3	1.25
KHGS2-2001C	2	1	208	10-3	1.25
KHGS2-2401C	2	1	240	10-3	1.25

Standard Flow w/ Axial Slicers					
CATALOG NO.	**HP**	**PH**	**VOLTS**	**CORD**	**DISCH**
KGSL2-2001	2	1	208	10-5	1.25
KGSL2-2401	2	1	240	10-5	1.25
KGSL2-2003	2	3	208	14-7	1.25
KGSL2-2303	2	3	230	14-7	1.25
KGSL2-4603	2	3	460	14-7	1.25

High Head w/ Axial Slicers					
CATALOG NO.	**HP**	**PH**	**VOLTS**	**CORD**	**DISCH**
KHGSL2-2001	2	1	208	10-5	1.25
KHGSL2-2401	2	1	240	12-5	1.25
KHGSL2-2003	2	3	208	14-7	1.25
KHGSL2-2303	2	3	230	14-7	1.25
KHGSL2-4603	2	3	460	14-7	1.25

Standard Flow & High Head w/ Axial Slicers INTERNAL CAPACITORS					
CATALOG NO.	**HP**	**PH**	**VOLTS**	**CORD**	**DISCH**
KGSL2-2001C	2	1	208	10-3	1.25
KGSL2-2401C	2	1	240	10-3	1.25
KHGSL2-2001C	2	1	208	10-3	1.25
KHGSL2-2401C	2	1	240	10-3	1.25

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 orIndicates 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, burnes or death could result.


Extremely hot - Severe burnes 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.

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. 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.

KEEN PUMP 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.

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**

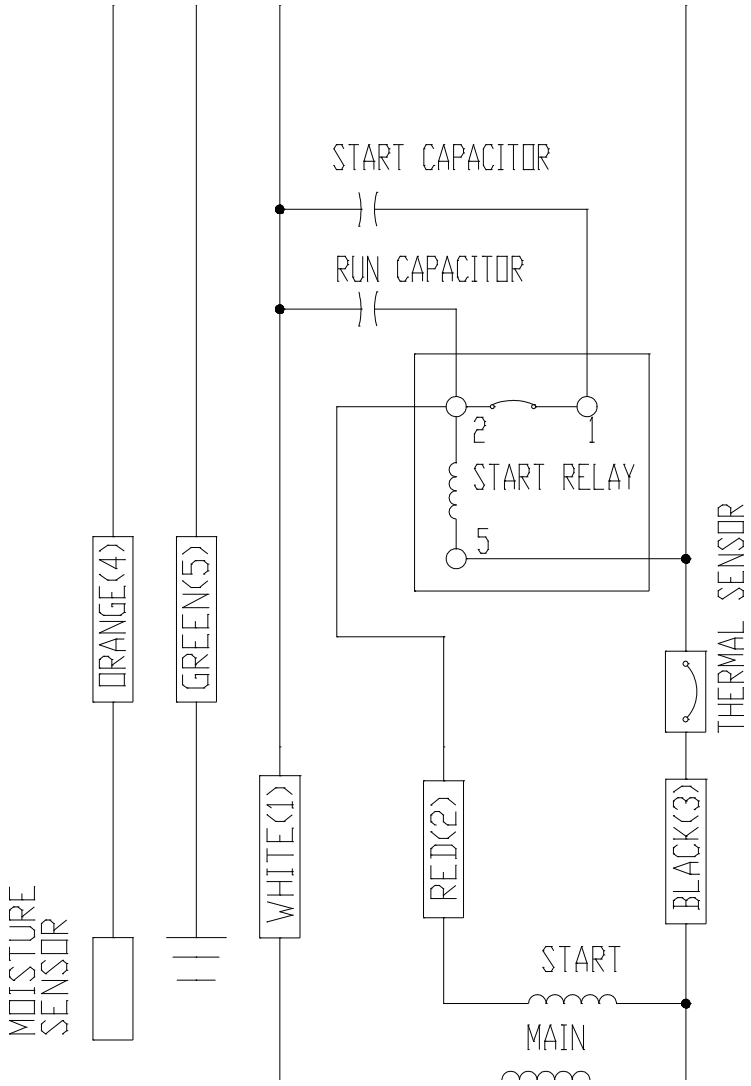
DO NOT pump without safety devices in place.

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

SINGLE PHASE, 208/240V, 12/5 CABLE



WIRES		OHM 208V	OHM 240V
WHITE (1)	BLACK (3)	1.0	1.6
WHITE (1)	RED (2)	6.2	6.8
BLACK (3)	RED (2)	5.2	5.2

PUMP SPECIFICATIONS

DISCHARGE..... 1-1/4" NPT OR 2-Bolt Flange, Vertical
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..... 440C StainlessSteel (Hardened Available)
10 vane, Semi-Open with Pump-out Vanes, Dynamically Balanced

SHREDDING RING (Cutter)..... Hardened 440C Stainless Steel
56-60 Rockwell C
GRINDER IMPELLER (Cutter)..... Hardened 440C Stainless Steel
56-60 Rockwell C

RETAINER PLATE (Slicer)..... Hardened 440C Stainless Steel
56-60 Rockwell C
SLICER IMPELLER (Slicer)..... Hardened 440C Stainless Steel
56-60 Rockwell C

SHAFT..... 416 Stainless Steel

SHAFT SEAL..... Mechanical

	Main (Motor)	Secondary (Pump)
	Silicon Carbide – Rotating Face	Silicon Carbide – Rotating Face
	Silicon Carbide – Stationary Face	Silicon Carbide – Stationary Face

Nitrile - 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

CORD..... 10-3 AWG, Type SOOW ("C" Model)
12-5 AWG, Type SOOW (Single Phase)
14-7 AWG, Type SOOW (Three Phase)
30'Length Standard. Other Lengths Available.

CORD ENTRY..... Watertight Sealed Design
Agency-Approved, Watertight Strain Relief Cord Grip – Outer Jacket Seal
Epoxy Potted – Inner Conductor Seal

MOTOR (SINGLE PHASE)..... 2 HP, 3450 RPM, 60 Hz
208 or 240 volts Available
Includes Overload Protection in the Motor.
Oil Filled, Class F
Capacitor Start / Capacitor Run

	Start Capacitor	Run Capacitor
208 & 240 Volt Models.....	216-259 mfd, 250 VAC	50 mfd, 370 VAC

MOTOR (THREE PHASE)……. 2 HP, 3450 RPM, 60 Hz
Tri-voltage, 208 / 230 / 460 volts
On-Winding temperature sensor, requires temperature sensor circuitry in control panel
Oil Filled, Class F

OPTIONAL EQUIPMENT……. Seal Materials
Additional Cable Lengths
Impeller Trims

Installation

USAGE:
The 2 HP grinder pumps are for pumping domestic sewage. One pump can handle the sewage from a maximum of 2 homes.

These pumps are not to be used for pumping commercial or industrial sewage from factories, schools, motels, apartments, etc..

This pump is intended to grind and pump all normal sewage for home use. 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 30 feet of power cord in a carton that is marked with the Model Number. Longer cords are available – consult factory.

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 2 HP, dual seal grinder pumps with external start kit or 3-phase, contain an electrode for detecting water within the unit. The electrode is housed within the secondary seal chamber, isolated from the motor chamber. 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 pump must be serviced before the upper seal fails.

MOTOR POWER CORDS

Pump models with seal leak detector, single phase use a 10AWG-5C cord, three phase use a 14AWG-7C cord. Models without seal leak use a 10AWG-3C cord. The three power conductors are BLACK, WHITE and RED. The ORANGE conductor connects to the seal leak probe and GREEN conductor connects to the ground screw inside the cord cap.
For single phase,
BLACK is "Common"
WHITE is "Run"
RED is "Start".

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.

IMPELLER ROTATION: When looking at the bottom of the pump and through the inlet of the volute, rotation of the impeller is COUNTER-CLOCKWISE.

TROUBLESHOOTING

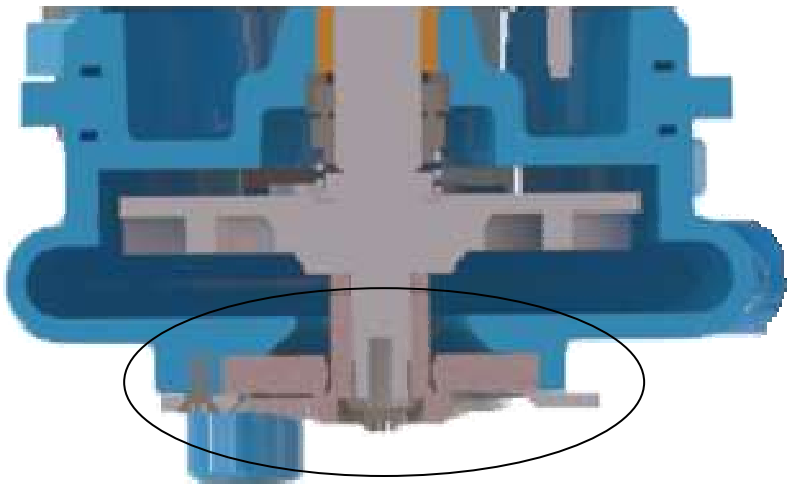
The troubles listed below are potential problems involving the pump. Other troubles can occur from faulty control box operation. Consult control box instructions for troubleshooting list involving the control box.

PROBLEM	PROBABLE CAUSE
Pump will not run.	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 runs, but does not pump liquid from basin.	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.
Pump hums, but does not run.	Incorrect voltage. Pump inlet plugged. Cutter jammed or loose on shaft, worn or damaged.
Pump delivers low volume of water.	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.
Pump is noisy.	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.
Pump cycles frequently.	Check valve stuck closed or installed backwards. Ground water entering basin. Fixtures are leaking.
Pump will not turn off.	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.
Grease and solids accumulated in basin and will not pump out.	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.
Red light illuminated at control box.	Moisture detection in double seal pumps indicating service is required. Lower seal has failed. Secondary seal still functioning.
Circuit breaker trips.	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.

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.

REPLACING IMPELLER AND RETAINER PLATE "AXIAL SLICERS"

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.
- Ball-peen Hammer.
- Feeler Gauges (minimum range .008-.012 inches)
- 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.

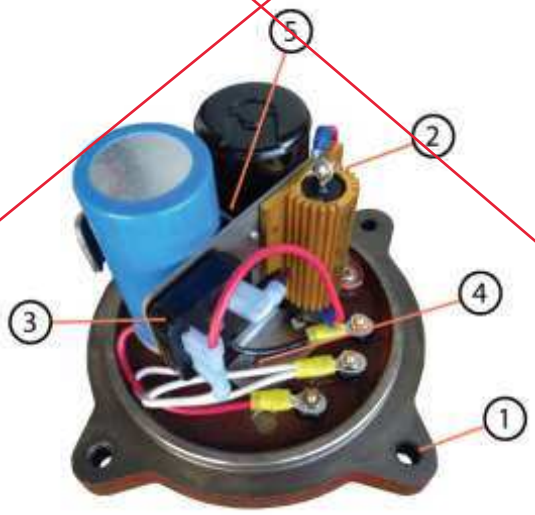
IMPORTANT – Pump should be sanitized with bleach before starting work.
Pump should be thoroughly cleaned of trash and deposits before starting disassembly operations.
Wear protective gloves and clothing.
Always use a rag on the impeller when turning to prevent cutting hands on the sharp edges of the impeller and slicer plate.

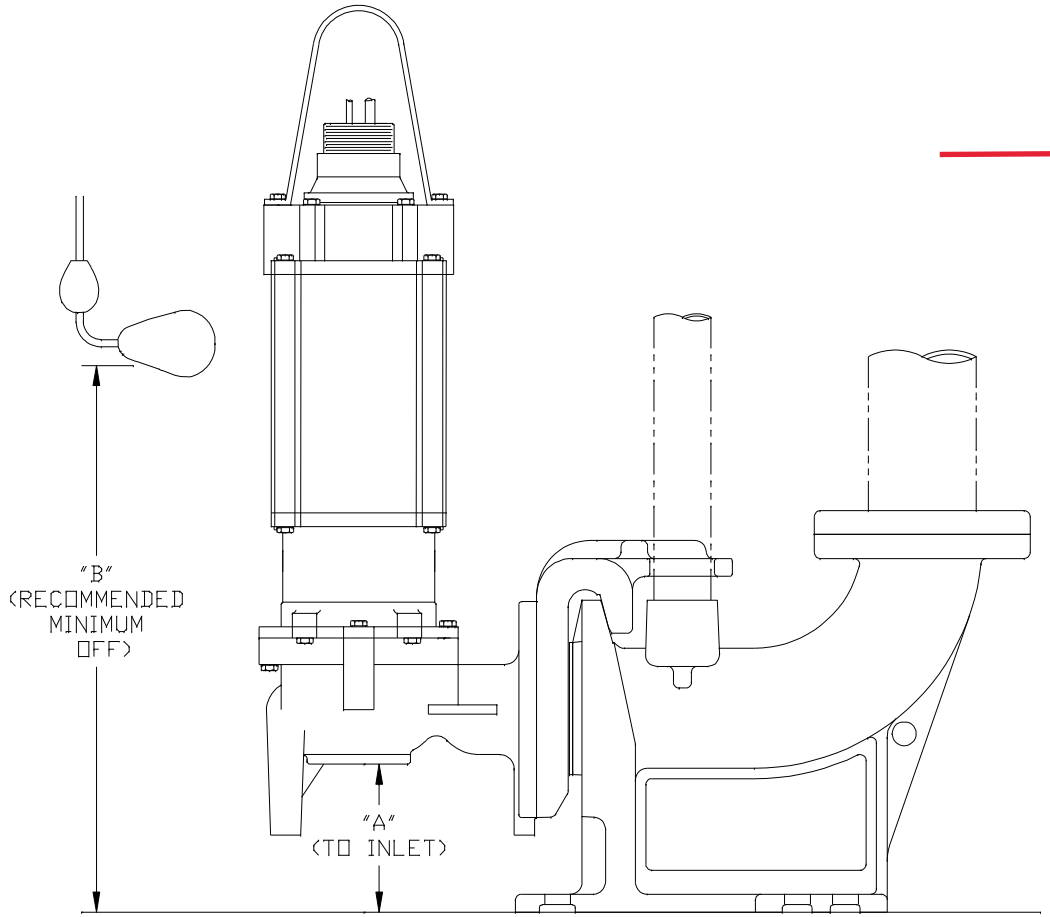
DISASSEMBLY OR REPLACING OF SLICER PLATE AND SLICER IMPELLER

1. Remove Slicer retainer (3 bolts).
2. Use a ball-peen hammer to tap onto (3 blade) rotary slicer impeller. Tap in a counterclockwise direction (thread is right hand).
3. Remove “disk-shaped” slicer plate. May have to pry with screwdriver.
4. Once slicer plate is removed, shims will be visible on threaded shaft.
5. Slicer parts can now be cleaned and reassembled or replaced.
6. If discarding all shims, you must use new shims from shim kit.
7. Place (Qty:2) .01 inch shims onto threaded shaft, making certain to align keyway of stock with shaft.
8. Place new or cleaned slicer plate onto threaded shaft, making sure shims stay in place along keyway.
9. Place new or cleaned rotary (3 blade) slicer impeller onto threaded shaft, turning (Clockwise).
10. Rotate onto shaft with hands until snug. Use ball-peen hammer to lock onto shaft.
11. **IMPORTANT: USING FEELER GAUGES, CHECK DISTANCE BETWEEN SLICER PLATE AND SLICER IMPELLER. DISTANCE TOLERANCE (.008-.012 INCHES).**
12. If tolerance is satisfactory, go to step 13. If tolerance is beyond or under range, go back to step 7.
13. Place new or cleaned slicer retainer onto volute bottom.
14. 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 slicer impeller.

START KIT REPLACEMENT “C” MODEL

1. Place pump in upright position.
2. Loosen cord cap retaining bolts (1). Keen recommends that a rag or towel be wrapped around the joint where the cord cap and bearing housing meet.
3. Slowly move cord cap upward until any pressure that may be present is released, remove the retaining bolts and lift off cord cap.
4. Remove resistor mounting screws (2) and replace resistor as required. Wire per attached diagram and reinstall.
5. Remove start switch (3) mounting screw and replace start switch as required. Wire per attached diagram and reinstall.
6. Remove bracket mounting screws (4) as required, to lift entire assembly from casting.
7. Remove capacitor screw from backside of dual bracket (5) and replace start/run capacitors as required.
8. Clean mating surfaces and inspect O-Ring for cuts or damage (replace if necessary). Reinstall cord cap.
9. Check power cord at plug with ohm meter for shorts to ground.





SUBMERGENCE LEVELS - RAIL MOUNTED PUMPS

PUMP	LIFTOUT MODEL	A BOTTOM OF WELL TO INLET	B "KEEN" RECOMMENDED MINIMUM SUBMERGENCE LEVEL
KE102/103	KL2	3-1/2"	15"
K(F/H)G2	KL1(CV)	3-1/2"	15"
KPCG	KL1(CV)	3-3/4"	19"
K(H)GS2	KL1(CV)	3-3/8"	15"
KHHG2	KL1(CV)	3-1/2"	21"
KHHG2H	KL1(CV)	3-1/2"	21"
KG3,5,7,103	KL3H	4-3/4"	22"
KHG3,5,7	KL3H	5-3/4"	22"
KGP75-150	KL3H	4-3/4"	28"
K3RN	KL3H	5-3/4"	28"
K3VN	KL3H	4-1/2"	27"
K3RH	KL3H	5-3/4"	23"
K4RH	KL4	6-1/4"	24"
K4RN (3450)	KL4	6-1/4"	28"
K4RN (1150/1750)	KL4	5-1/8"	28"
K4VN	KL4	5-1/8"	27"
K4RP (3450)	KL4	5-1/2"	28"
K4RP (1150/1750)	KL4	7-1/2"	32"
K4VP	KL4	7-1/2"	30"
K4RB (3450)	KL4	9-1/8"	36"
K4RB (1750)	KL4	8-1/2"	36"
K4VB	KL4	7-1/2"	35"
K4VK	KL4	6-1/2"	42"
K6VB	KL6	8-3/8"	38"
K8VK	KL8	16"	52"
K12VK	KL12	15-1/2"	61"
K14VK	KL14	15-1/2"	61"

NOTE: ALL DIMENSIONS FOR REFERENCE ONLY

REV	INITIALS	DATE
B	SE	10/09/2015
A	SE	03/16/2015

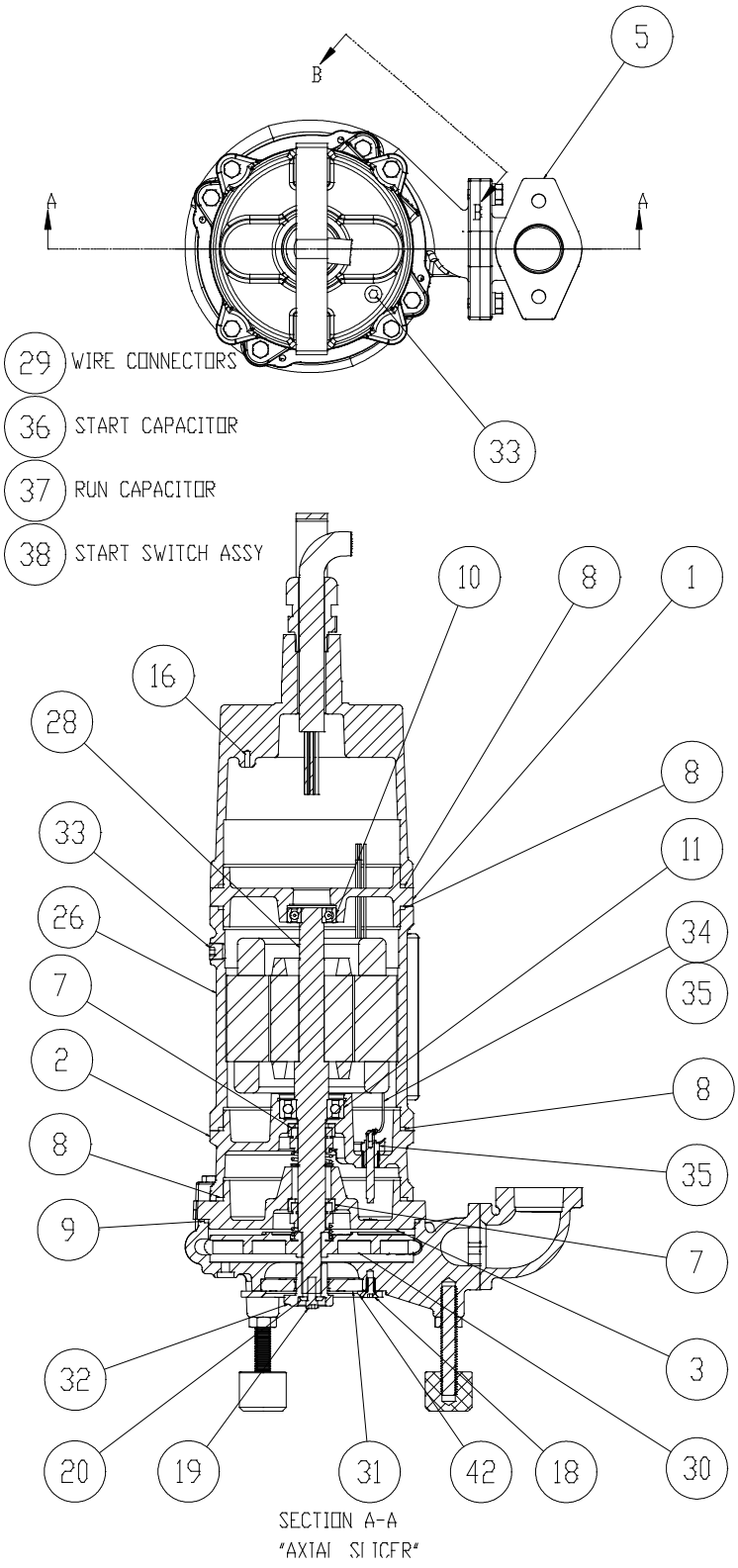
471 US HWY 250 EAST
ASHLAND, OHIO 44805
PHONE: 419-207-9400
FAX: 419-207-8031

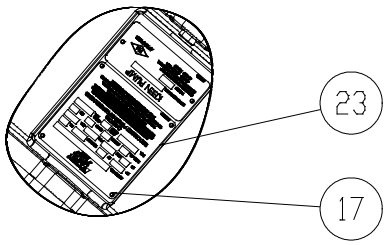
TITLE: SUBMERGENCE LEVELS - WASTEWATER PUMPS

SCALE	DWG. #	REV.
NTS	KN-903	B

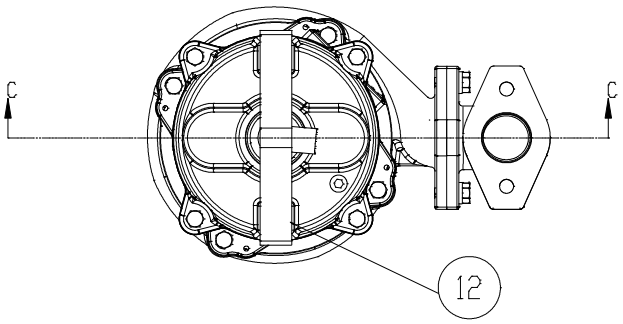
DWG. BY	DATE
SE	9/24/2014

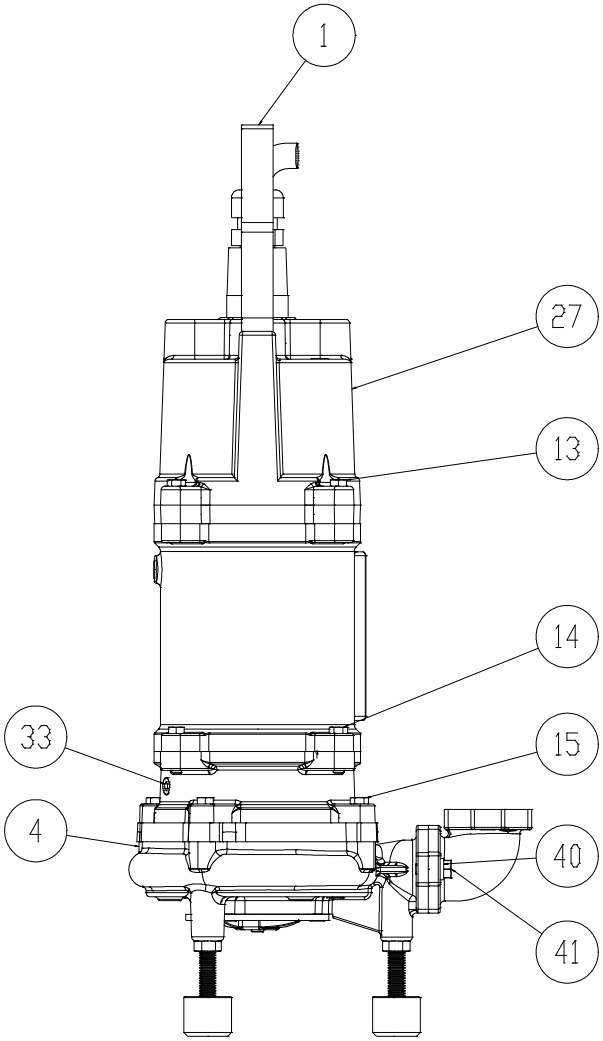
REPAIR PARTS LIST

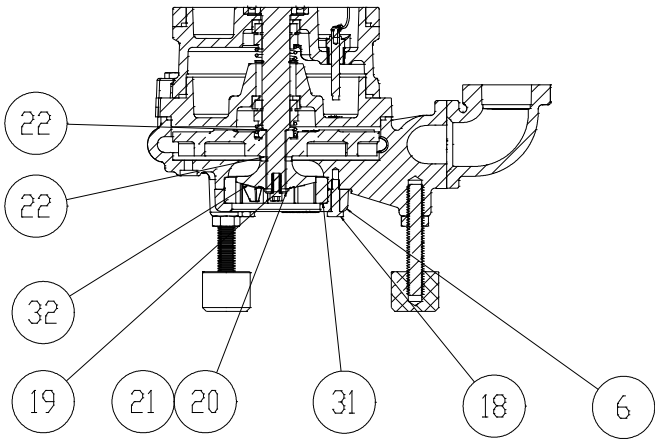




SECTION B-B







SECTION C-C
"RADIAL CUTTER"

	Pump Model Numbers w/ Axial Slicers	KGSL2-2001/2301/2401(C) KHGSL2-2001/2301/2401(C)		KGSL2-2003/2303/4603 KHGSL2-2003/2303/4603	
REF. #	DESCRIPTION	QTY.	PART NUMBER	QTY.	PART NUMBER
	Castings				
1	Bearing Plate, Upper, Cast Iron	1	KGX2004	1	KGX2004
1	Assembly, Upper Bearing Plate "C" Models	1	KGA2070-5-03	-	-
2	Housing, Lower Bearing, Cast Iron	1	K0467-2-01X	1	K0467-2-01X
3	Seal Plate, Lower, Cast Iron (w/ bushing)	1	K0447-5-01X	1	K0447-5-01X
4	Volute Case, Cast Iron	1	K0444-2-01	1	K0444-2-01
5	Adapter, Discharge, Vertical, 1-1/4" NPT, Cast iron	1	K0448-2-01	1	K0448-2-01
	Repair parts				
7	Seal, Shaft, Lower and Upper, Sil. Carbide, Type 21	2	KG2172	2	KG2172
8	O-Ring, Buna-N, Motor, Cord Cap, Brg. Hsg.,5-7/8 OD	4	KG2010	4	KG2010
9	O-Ring, volute adapter, Buna-N, 6.234 ID	1	K0166-1-08	1	K0166-1-08
10	Bearing, Ball, Upper Ball, 1.575OD	1	KG2003	1	KG2003
11	Bearing, Ball, LOWER, 2.047OD	1	KG2009	1	KG2009
	Hardware & Miscellanies parts				
12	Screw, Cap, 1/2-13UNC x 1" LG, SST	2	CS1/2X1SS	2	CS1/2X1SS
13	Screw, Cap, 5/16-18UNC x 1-3/4" LG, SST	4	CS5/16X1-3/4SS	4	CS5/16X1-3/4SS
14	Screw, Cap, 5/16-18UNC x 1-1/4" LG, SST	4	CS5/16X1-1/4SS	4	CS5/16X1-1/4SS
15	Screw, Cap, 5/16-18UNC x 1-1/2" LG, SST	4	CS5/16X1-1/2SS	4	CS5/16X1-1/2SS
16	Screw, Cap, 10-32UNC x 5/8" LG, SST	1	CS10X5/8SS	1	CS10X5/8SS
17	Screw, RD Head, Drive, #4-7UNC x 1/4 " LG, SST	4	DS4X1/4SS	4	DS4X1/4SS
18	Screw, Cap, C-sunk, 1/4-20UNC x 5/8" LG, SST	3	K0317-1-02	3	K0317-1-02
19	Screw, Skt Hd, (Allen) 1/4 -20UNC x 3/4 " LG, SST	1	SCS1/4X3/4SS	1	SCS1/4X3/4SS
20	Washer, Impeller, KGS series	1	K0451-1-01	1	K0451-1-01
22	Shim, 5/8" ID x 1.00" OD x .005, SST	2	K0458-1-01	2	K0458-1-01
23	Nameplate, FM	1	KNP0001	1	KNP0001
24	Handle, Lifting, SST	1	KG2017	1	KG2017
25	Oil, KEEN I.C.E. Dielectric	68 oz	K0181-1-01	68 oz	K0181-1-01
26	**Assembly, Housing & Stator 208 Volt 1 ph**	**1**	**KGA2097-5-200**	**-**	**-**
26	**Assembly, Housing & Stator 240 Volt 1 ph**	**1**	**KGA2097-5-100**	**-**	**-**
26	**Assembly, Housing & Stator 208/230/460 Volt 3 ph**	**-**	**-**	**1**	**KGX2098**
	Housing, motor, Cast iron	1	KGX2006	1	KGX2006
	Stator 208 Volt 1 ph	1	KG2007	-	-
	Stator 240 Volt 1 ph	1	K0477-1	-	-
	Stator 208/230/460 Volt 3 ph	-	-	1	KG2013
27	**Assy, Cord Cap, 30 ft. length cord. 12/5**	**1**	**KGX2099-10630**	**-**	**-**
27	**Assy, Cord Cap, 30 ft. length cord. 10/3 "C" Model**	**1**	**KGX2099-103**	**-**	**-**
27	**Assy, Cord Cap, 30 ft. length cord. 14/8**	**1**	**-**	**1**	**K0133-5-30**
28	Rotor and shaft assembly, 1 & 3 phase , Hazloc	1	KGX2096	1	KGX2096
29	Pre-insulated Crimp Wire Connector 6LU61	6	WC2-10	8	WC2-10
30	Impeller, SST, High Flow, 5.50" Dia.	1	K0464-2-02	1	K0464-2-02
30	Impeller, SST, High Head, 6.50" Dia.	1	K0464-2-01	1	K0464-2-01
31	Plate, Slicer, SST, High Flow	1	K0452-2-01	1	K0452-2-01
31	Plate, Slicer, SST, High Head	1	K0452-2-200	1	K0452-2-200
32	Impeller, Slicer, 3-Blade, SST	1	K0454-2-100	1	K0454-2-100
33	Plug, 1/4" NPT pipe, SST	3	PLUG1/4	3	PLUG1/4
34	Assy, Wire, Moisture Detector w/ resistor	1	K0138-1-01	1	K0138-1-01
35	Resistor, 330k ohm	1	K0381-1-01	1	K0381-1-01
35	Sensor, Moisture	1	KG2160	1	KG2160
36	Capacitor, Start, 216-259 Mfd, 250 VAC	1	K0408-1-02	-	-
37	Capacitor, Run, 50 Mfd, 370 VAC	1	K0341-1-01	-	-

38	Assembly, Start switch (230V)	1	K0653-5-01	-	-
40	Washer, Lock, 3/8" SST	2	LWASH3/8SS	2	LWASH3/8SS
41	Screw, Cap, 3/8-16UNC x 1" LG, SST	2	CS3/8X1SS	2	CS3/8X1SS
42	Plate, Slicer retainer, SST	1	K0453-1-01	1	K0453-1-01

	Pump Model Numbers w/ Radial Cutters	**KGS2-2001/2301/2401(C) KHGS2-2001/2301/2401(C)**		**KGS2-2003/2303/4603 KHGS2-2003/2303/4603**	
REF. #	**DESCRIPTION**	**QTY.**	**PART NUMBER**	**QTY.**	**PART NUMBER**
	Castings				
1	Bearing Plate, Upper, Cast Iron	1	KGX2004	1	KGX2004
1	Assembly, Upper Bearing Plate "C" Models	1	KGA2070-5-03	-	-
2	Housing, Lower Bearing, Cast Iron	1	K0467-2-01X	1	K0467-2-01X
3	Seal Plate, Lower, w/ Bushing, Cast Iron	1	K0447-5-01X	1	K0447-5-01X
4	Volute Case, Cast Iron	1	K0444-2-01	1	K0444-2-01
5	Adapter, Discharge, Vertical, 1-1/4" NPT, Cast iron	1	K0448-2-01	1	K0448-2-01
	Repair parts				
7	Seal, Shaft, Lower and Upper, Sil. Carbide, Type 21	2	KG2172	2	KG2172
8	O-Ring, Buna-N, Motor, Cord Cap, Brg. Hsg.,5-7/8 OD	4	KG2010	4	KG2010
9	O-Ring, volute adapter, Buna-N, 6.234 ID	1	K0166-1-08	1	K0166-1-08
10	Bearing, Ball, Upper Ball, 1.575OD	1	KG2003	1	KG2003
11	Bearing, Ball, LOWER, 2.047OD	1	KG2009	1	KG2009
	Hardware & Miscellanies parts				
12	Screw, Cap, 1/2-13UNC x 1" LG, SST	2	CS1/2X1SS	2	CS1/2X1SS
13	Screw, Cap, 5/16-18UNC x 1-3/4" LG, SST	4	CS5/16X1-3/4SS	4	CS5/16X1-3/4SS
14	Screw, Cap, 5/16-18UNC x 1-1/4" LG, SST	4	CS5/16X1-1/4SS	4	CS5/16X1-1/4SS
15	Screw, Cap, 5/16-18UNC x 1-1/2" LG, SST	4	CS5/16X1-1/2SS	4	CS5/16X1-1/2SS
16	Screw, Cap, 10-32UNC x 5/8" LG, SST	1	CS10X5/8SS	1	CS10X5/8SS
17	Screw, RD Head, Drive, #4-7UNC x 1/4 " LG, SST	4	DS4X1/4SS	4	DS4X1/4SS
18	Screw, Cap, 1/4-20UNC x 1" LG, SST	3	CS1/4X1SS	3	CS1/4X1SS
19	Screw, Skt Hd, (Allen) 1/4 -20UNC x 3/4 " LG, SST	1	SCS1/4X3/4SS	1	SCS1/4X3/4SS
20	Washer, Impeller, KGS series	1	K0451-1-01	1	K0451-1-01
21	Retaining Ring, Disc, 2hp slicer impeller, SST	1	K0558-3-01	1	K0558-3-01
22	Shim, 5/8" ID x 1.00" OD x .005, SST	2	K0458-1-01	2	K0458-1-01
23	Nameplate, FM	1	KNP0001	1	KNP0001
24	Handle, Lifting, SST	1	KG2017	1	KG2017
25	Oil, KEEN I.C.E. Dielectric	68 oz	K0181-1-01	68 oz	K0181-1-01
26	**Assembly, Housing & Stator 208 Volt 1 ph**	**1**	**KGA2097-5-200**	**-**	**-**
26	**Assembly, Housing & Stator 240 Volt 1 ph**	**1**	**KGA2097-5-100**	**-**	**-**
26	**Assembly, Housing & Stator 208/230/460 Volt 3 ph**	**-**	**-**	**1**	**KGX2098**
	Housing, motor, Cast iron	1	KGX2006	1	KGX2006
	Stator 208 Volt 1 ph	1	KG2007	-	-
	Stator 240 Volt 1 ph	1	K0477-1	-	-
	Stator 208/230/460 Volt 3 ph	-	-	1	KG2013
27	**Assy, Cord Cap, 30 ft. length cord. 12/5**	**1**	**KGX2099-10630**	**-**	**-**
27	**Assy, Cord Cap, 30 ft. length cord. 10/3 "C" Model**	**1**	**KGX2099-103**	**-**	**-**
27	**Assy, Cord Cap, 30 ft. length cord. 14/8**	**1**	**-**	**1**	**K0133-5-30**
28	Rotor and shaft assembly, 1 & 3 phase , Hazloc	1	KGX2096	1	KGX2096
29	Pre-insulated Crimp Wire Connector 6LU61	6	WC2-10	8	WC2-10
30	Impeller, SST, High Flow, 5.50" Dia.	1	K0464-2-02	1	K0464-2-02
30	Impeller, SST, High Head, 6.50" Dia.	1	K0464-2-01	1	K0464-2-01
31	Ring, Grinder, SST, High Flow	1	KG2149-2-01	1	KG2149-2-01

31	Ring, Grinder, SST, High Head	1	KG2072-2-01	1	KG2072-2-01
32	Impeller, Grinding, SST	1	KG2150-2-01	1	KG2150-2-01
33	Plug, 1/4" NPT pipe, SST	3	PLUG1/4	3	PLUG1/4
34	Assy, Wire, Moisture Detector w/ resistor	1	K0138-1-01	1	K0138-1-01
35	Resistor, 330k ohm	1	K0381-1-01	1	K0381-1-01
35	Sensor, Moisture	1	KG2160	1	KG2160
36	Capacitor, Start, 216-259 Mfd, 250 VAC	1	K0408-1-02	-	-
37	Capacitor, Run, 50 Mfd, 370 VAC	1	K0341-1-01	-	-
38	Assembly, Start switch (230V)	1	K0653-5-01	-	-
40	Washer, Lock, 3/8” SST	2	LWASH3/8SS	2	LWASH3/8SS
41	Screw, Cap, 3/8-16UNC x 1” LG, SST	2	CS3/8X1SS	2	CS3/8X1SS

HALIFAX SIMPLEX
CONTROL PANEL

OPERATIONS

SPECIAL NOTES:

- **The alarm test switch (Mounted internally) labeled "ON-OFF-TEST", allows personnel to test the audible and visual exterior alarms when the switch is placed in the "TEST" position.**
- **If Seal Leak Light is illuminated the Pump Seal has allowed water contamination to enter the pump, service should be contacted.**

MOTOR CONTROL:

Manual Mode:

- **Place the "Hand-Off-Auto" selector switch (Mounted internally) in the "Hand" position to test the pump motor will run & check for Rotation at start up.**

Auto Mode:

- **Place the "Hand-Off-Auto" selector switch in the "Auto" position.**
- **When the liquid level in the wet well rises to the "off" and "on" levels, the lead pump will run.**
- **The pump will stop when the liquid level drops below the "off" level.**

Alarm:

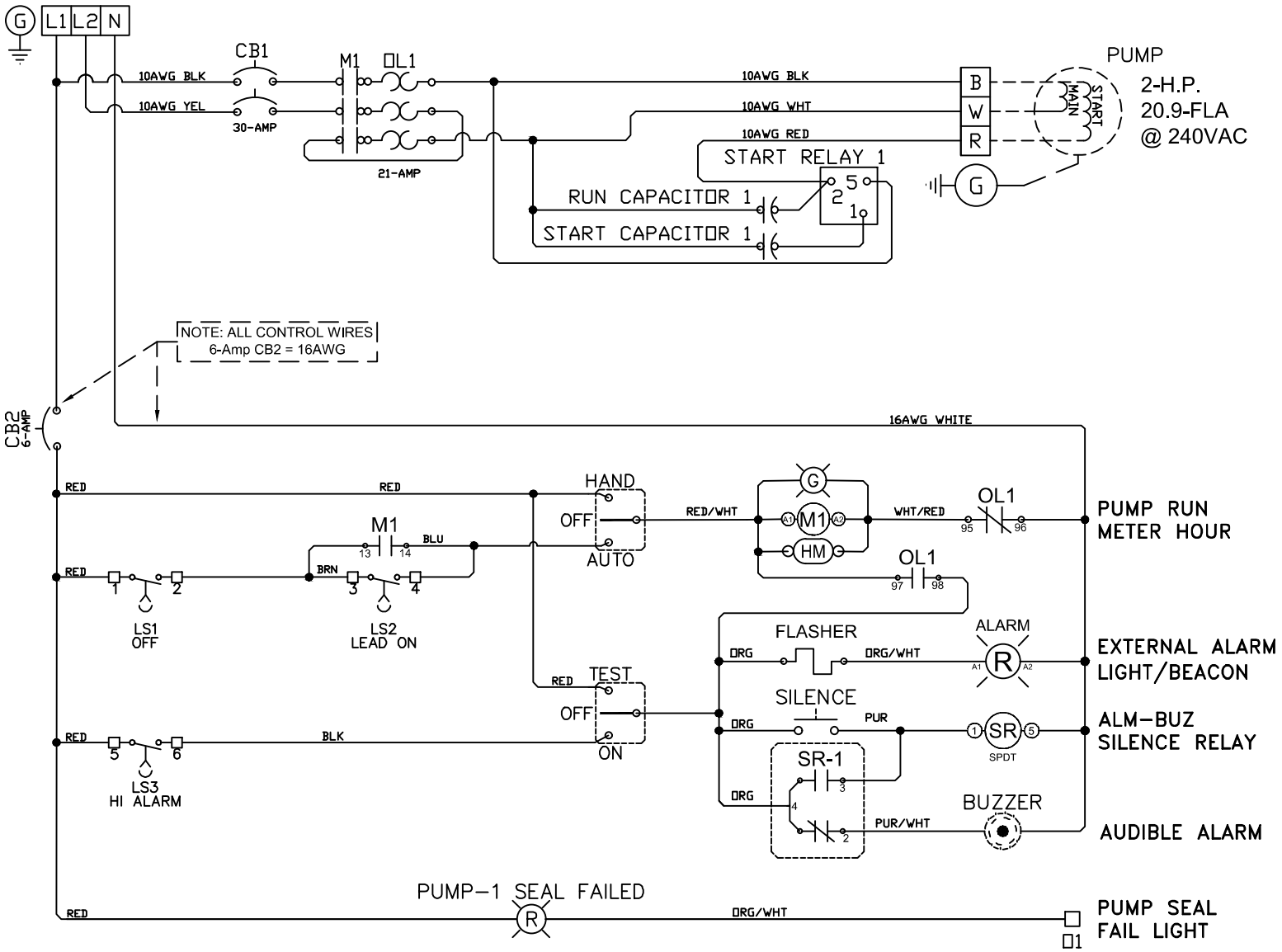
High Level: The liquid rises above the "high" level.

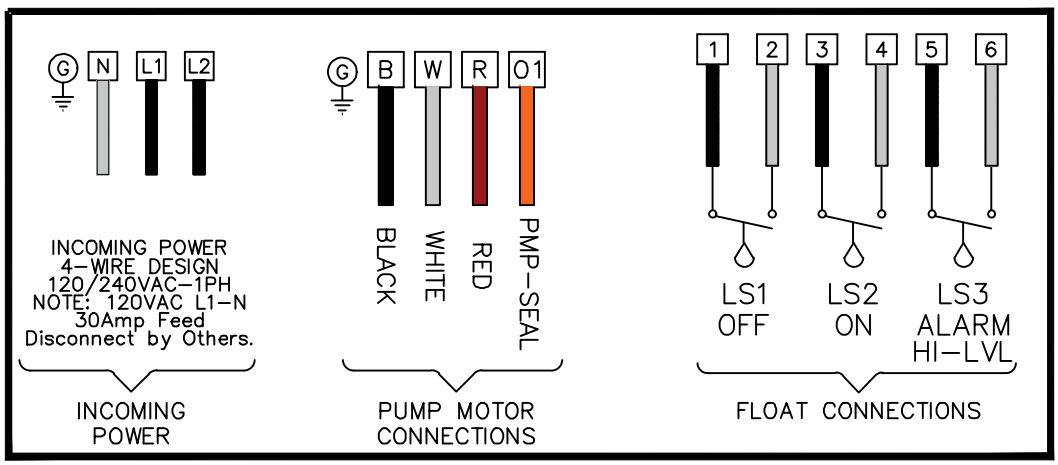
- **The audible exterior alarm will sound and can be shut off by pressing the silence button.**
- **The visual exterior alarm light will indicate alarm even when Silence Button has been depressed.**
- **The audible and visual alarm will reset automatically when the liquid level falls below the "high alarm" level.**

KCG-18-21S-B-O

PAGE 1

120/240V–1ø–4 WIRE
SERVICE @ 30–AMPS
DISCONECT BY OTHERS.





Install in accordance with the National Electrical Code (NEC) or Canadian Electrical Code (CEC), and any applicable local codes, based on the installation location.

NOTES:
1.) Float Switches MUST be rated to a minimum of 2 AMPS at 115 Volts.
2.) TORQUE ALL WHITE #8 Wiring Terminals 18~20in/lbs.
3.) TORQUE ALL BLACK Terminal Blocks to 16 in/lbs.
4.) TORQUE ALL Aluminum 2"x#8 Ground Terminals as follows Torque to 20 in/lbs. and 4~6AWG to 31in/lbs.
5.) USE 60C COPPER WIRE ONLY MINIMUM FOR LESS THAN 100 AMPS. USE 70°C COPPER WIRE FOR MINIMUM FOR 100 AMPS OR GREATER.
6.) —— LINES INDICATE NOT SUPPLIED IN PANEL.
7.) ALL PENETRATIONS MUST MEET THE ENCLOSURE TYPE RATING INDICATED ON THE "UL" LABEL.

KEEN PUMP CO.
471 US HWY. 250 East
ASHLAND, OH. 44805
(419) 207-9400
Fax 419-903-8031

CHANGES		TOLERANCES	DRAWN BY	WIRED BY	DATE
A	–	DECIMALS	MEM		15-Jun-23
B	–	.XXX = ± 0.005			
C	–	.XX = ± 0.010	MATERIAL SPECIFICATIONS:		
D	–	FRACTIONAL	AS NOTED;		
E	–	X/X = ± 1/64			
F	–	ANGLES			
		X° = ± 1/2°			

SCHEMATIC, ELECTRICAL
120/240-VAC, 1- Phase, 4 Wire
30-Amp Feed,
2-HP Simplex Pump

SCALE	DRAWING NUMBER
FULL	KCG-18-21S-B-O

SHEET 1 OF 2

BOM for KCG-18-21S-B-O after 5/10/23 (230 Volt 1-Phase 4 Wire SIMPLEX - 3 Float Design panel) With "Options -B, -O" RELEASED 5/10/23 MEM

Quantity	KEEN Pump DESC.	Part Number	Description		
1	BOX	CP-A1816-CSS	Control Box; STAINLESS STEEL ~ 18x16x8	Built in China w Shawn Help	
1	BOX-PNL	K0778-1-??	Aluminum Back Panel; 16.5x13 Control Box, Duplex	Built in China w Shawn Help	
1	BRKT	K0778-1-10	4-HOLE; TOGGLE/LIGHT BRAKET MOUNT	Built in China w Shawn Help	
1	GND	KCPP-029	TERMINAL, GROUND 4-14AWG 7-HOLE WITH 5 CIRCUITS	NSI 4-14-717	https://nsi-sales.com/mc.htm
1	CAP/CB BRKT	K0778-1-04	Mounting Bracket, CIRCUIT-BREAKER ABOVE Capacitors	Built in China w Shawn Help	
1	CAP	K0778-1-06	Capacitor Mounting Bracket	Built in China w Shawn Help	
1	RELAY CAPs	K0569-1-01	RELAY, START, COIL VOLTAGE 502, PICKUP MIN/MAX: 325/345, DROP OUT MAX 135V	Electrica RVA6AQ3D or MARS II 168 (19168)	https://www.marsdelivers.com/item/19168/MARS-168-RELAY/
1	START CAPs	K0408-1-02	CAPACITOR, START 216-259 MFD, 250V	BMI 092A216B250BD4A	https://www.amazon.com/250-Grainger-Capacitor-Replacement-092A216B250CD6A/dp/B00TQZ8NUE
1	RUN CAPs	K0341-1-01	CAPACITOR, RUN, 50 MFD, 370 VAC	MARS CAPACITOR 12225	https://www.marsdelivers.com/item/12225/50-MFD-370V-ROUND/
1	CB1	KCPP-200	25A, 2-Pole, 415Vac, Circuit Breaker. DIN MOUNT S.E. D-Curve, UL489	S.E. M9F43225	https://www.se.com/us/en/product/M9F43225/
1	CB2	KCPP-201	6A, 1-Pole, 120/240 Vac, Miniature Breaker; DIN MOUNT UL489	S.E. M9F43106	https://www.se.com/us/en/product/M9F43106/
1	Mx	KCPP-021	Contactor, IEC, 32-Amp, 2Aux (1NO - 1NC) 120v coil	S.E. LC1D32G7	https://www.se.com/us/en/product/LC1D32G7/
1	Olx	KCPP-006S	Overload Relay with 1-Phase Sensitivity 12 - 18A; class-10 SET @ 18Amps	S.E. LRD21	https://www.se.com/us/en/product/LRD21
1	HM	K0778-1-28	BRACKET, DUPLEX ETM/HOUR METER MOUNTING "Option B"	Built in China w Shawn Help	
1	HM	KCP-083	METER, ELAPSED TIME, Mount in D-F Door "Option B"	TRU-METER 722-0004	https://us.rs-online.com/product/trumeter/722-0004/70115355/?keyword=722-0004
2	TOGGLE SWITCHES	KCPP-030	TOGGLE SWITCH; (MOMENTARY "TEST-HAND" / OFF / AUTO) (UL Listed)	INGRAM EZ-03-79652-L-1D	https://www.ingramproducts.com/products/alarms/alarm-lights/toggle-switch-ez-03-79652
1	Red "SEAL FAIL" Lights	KCPP-044	RED - Snap-fit Neon-Incandescent Panel Mounted light 1/4" tab (UL Listed)	Solico 3050-4-11-38310	https://spemco.com/3050-3-11-38310-125-volt-neon-red-round-solico-indicator-light/
1	Green "RUN" Lights	KCPP-045	GREEN - Snap-fit Neon-Incandescent Panel Mounted light 1/4" tab (UL Listed)	Solico 3050-4-11-38340	https://spemco.com/3039-3-11-38340-solico-28-volt-green-incandescent-round-indicator-light-spade-terminals/
1	FLASHER	KCPP-031	FLASHER; 120VAC / 75FPM	ingram SSF150	https://us.rs-online.com/product/ssac-symcom-inc/fs126rc/70067719/
1	EXTERNAL ALARM Light	R15-SM	LIGHT, RED ALARM, 15W MED. (INCLUDES LENS, 15W BULB, GASKET AND SOCKET) (UL Listed)		
1	SILENCE	KCPP-063	22mm Flush Push Button, Non-Illuminated, FULL PB, (UL Listed)	RS-Pro 71266239	https://us.rs-online.com/product/rs-pro/1450612/71266239/?keyword=71266239
1	SR	KCPP-041	RELAY, SR RJ2S-C-A120 120VAC 12A 9K401 (SOCKET SJ1S-05B)	IDEC RJ2S-C-A120	https://us.rs-online.com/product/idec-corporation/rj2s-c-a120/70172782
1	SR	KCPP-041S	SOCKET, RELAY SJ2S-05BW 120VAC 12A 9K401 (RELAY RJ1S-CA120)	IDEC SJ2S-05BW	https://us.rs-online.com/product/idec-corporation/sj2s-05bw/70229911/
1	ALM-BUZ	ALM-BUZ	ALARM-BUZZER PEIZO (UL Listed, IP65 & 95db or better.)		https://www.ingramproducts.com/products/floyd-bell-120vac-continuous
1	Term-Block	KCPP-146	13 pcs set - Sectional Terminal Block black		
0.2	WW	KCP-139-3	Wire Way	RS-Pro 71768629	https://us.rs-online.com/product/rs-pro/1369152/71768629/?keyword=71768629
2	DIN-CLAMP	KCPP-112	Clamp, DIN RAIL, Plastic Screw Down for DIN Rail.	S.E. 9080MHA10	https://www.se.com/us/en/product/9080MHA10/terminal-block-linergy-screw-down-end-clamp-for-35-mm-din-mounting-track/
0.2	DIN-Rail	KCPP-087	2m / 78.74" Length, 35mm DIN Rail, Galvanized Steel, Pre-punched/Perf.	Standard DIN Rail Perf 35mm x 7.5mm	https://us.rs-online.com/product/altech-corp/2511120-1m/70077221/

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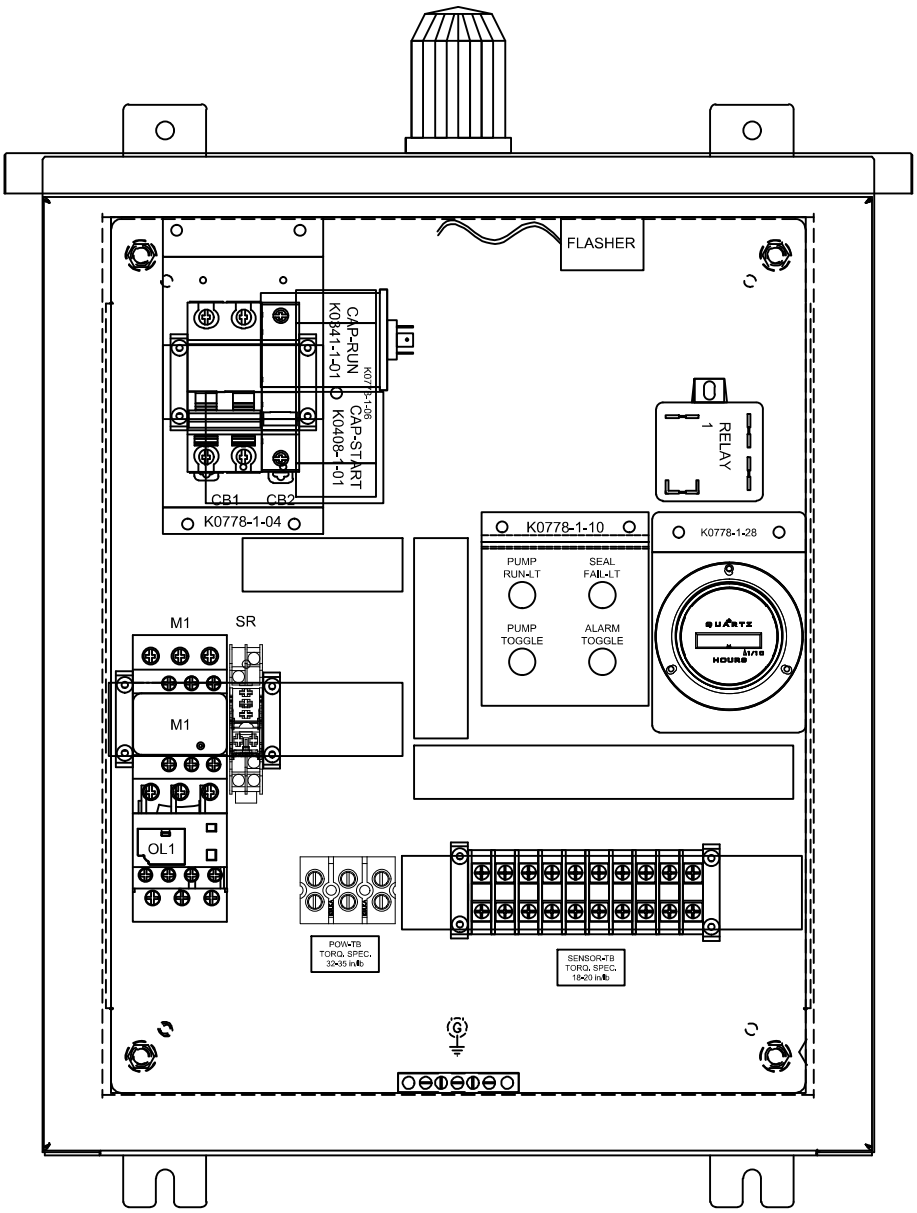
CHANGES		TOLERANCES	DRAWN BY	WIRED BY	DATE
A	–	DECIMALS	MEM		15-Jun-23
B	–	.XXX = ± 0.005			
C	–	.XX = ± 0.010	MATERIAL SPECIFICATIONS:		
D	–	FRACTIONAL	AS NOTED;		
E	–	X/X = ± 1/64			
F	–	ANGLES			
		X° = ± 1/2°			

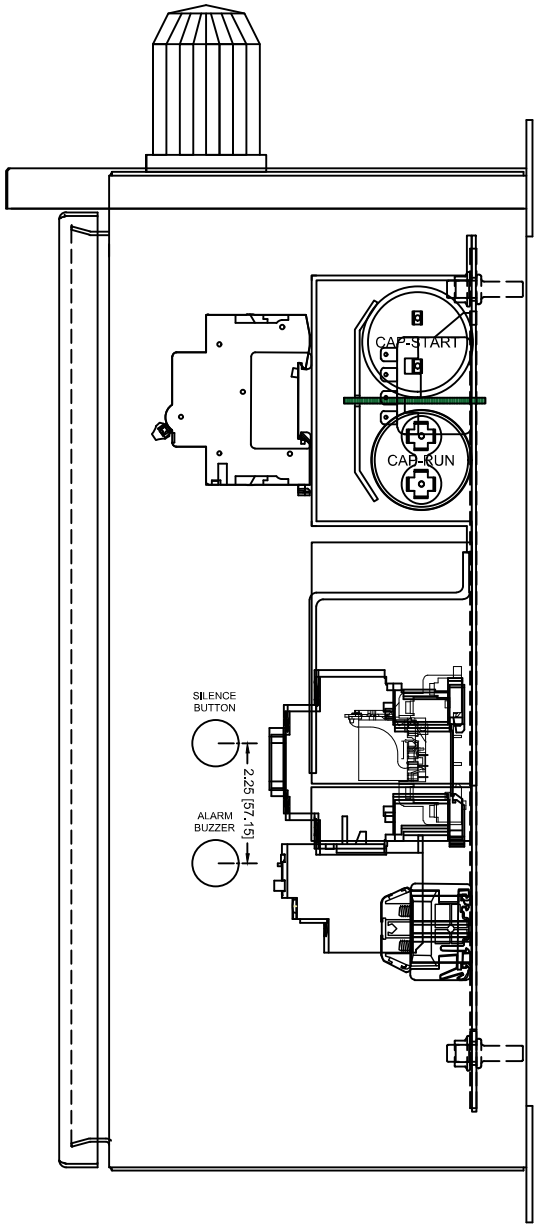
SCHEMATIC, ELECTRICAL

BOM for
2-HP Simplex Pumps

SCALE	DRAWING NUMBER
FULL	KCG-18-21S-B-O

KCG-18-21S-B-O





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Panel Dimensions are +.5" -0".

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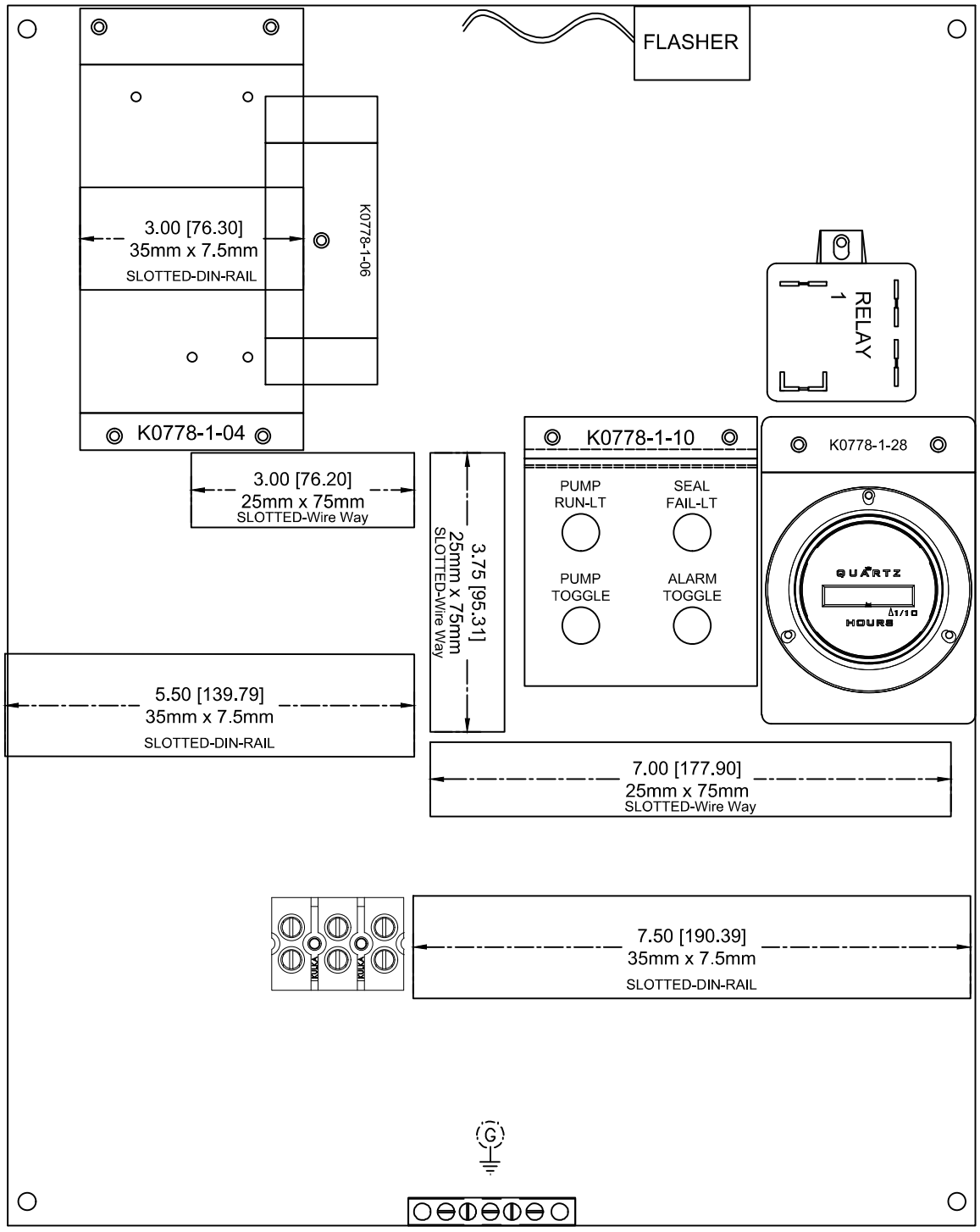
CHANGES		TOLERANCES	DRAWN BY	WIRED BY	DATE
A	–	DECIMALS	MEM		15-Jun-23
B	–	.XXX = ± 0.005	MATERIAL SPECIFICATIONS:		
C	–	.XX = ± 0.010	AS NOTED;		
D	–	FRACTIONAL X/X = ± 1/64			
E	–	ANGLES X° = ± 1/2°			
F	–				

SCHEMATIC, ELECTRICAL
120/240-VAC, 1- Phase, 4 Wire
BOX LAYOUT
2-HP Simplex Pump

SCALE: FULL

DRAWING NUMBER: KCG-18-21D-B-O



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CHANGES		TOLERANCES	DRAWN BY	WIRED BY	DATE
A	–	DECIMALS	MEM		15-Jun-23
B	–	.XXX = ± 0.005	MATERIAL SPECIFICATIONS:		
C	–	.XX = ± 0.010	AS NOTED;		
D	–	FRACTIONAL X/X = ± 1/64			
E	–	ANGLES X° = ± 1/2°			
F	–				

SCHEMATIC, ELECTRICAL
120/240-VAC, 1- Phase, 4 Wire
2-HP Simplex Pump BACK PANEL

SCALE	DRAWING NUMBER
FULL	KCG-18-21S-B-O

HALIFAX DUPLEX
CONTROL PANEL

OPERATIONS

SPECIAL NOTES:

- The lead pump selector switch, located on the alternator, allows personnel to choose which pump is to be used as “lead” and “lag”, or to allow the pumps to alternate as “lead” and “lag”.
- The alarm test switch (Mounted internally) labeled “ON-OFF-TEST”, allows personnel to test the audible and visual exterior alarms when the switch is placed in the “TEST” position.
- If Seal Leak Light is illuminated the Pump Seal has allowed water contamination to enter the pump, service should be contacted.

MOTOR CONTROL:

Manual Mode:

- Place the “Hand-Off-Auto” selector switch (Mounted internally) in the “Hand” position to test the pump motor will run & Rotation at start up.

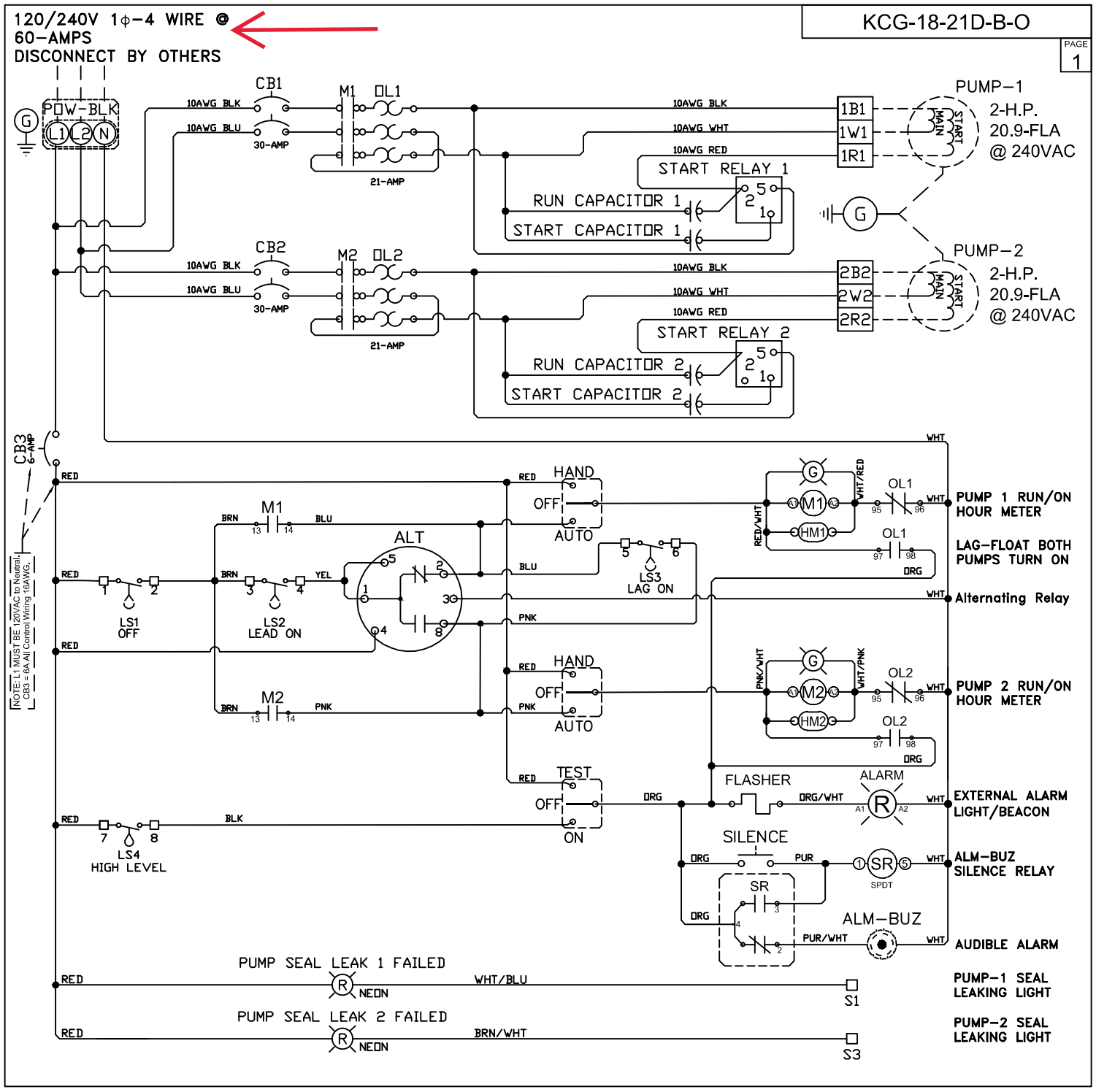
Auto Mode:

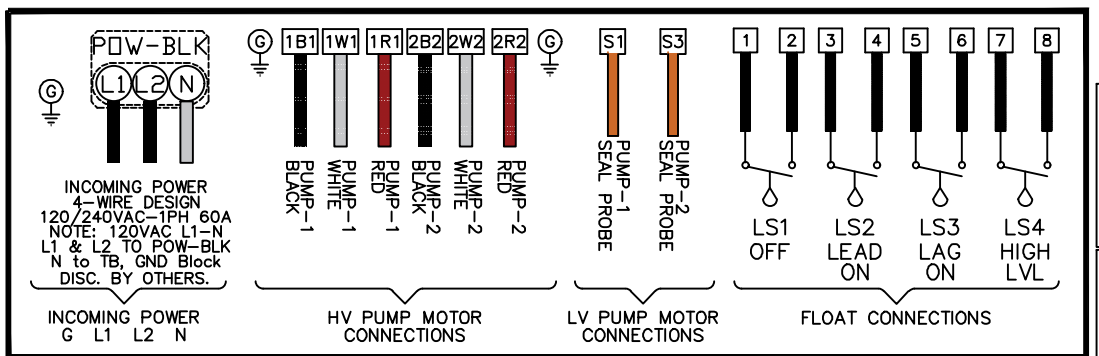
- Place the “Hand-Off-Auto” selector switch in the “Auto” position.
- When the liquid level in the wet well rises to the “off” and “on” levels, the lead pump will run.
- The pump will stop when the liquid level drops below the “off” level.
- The alternating relay will index to choose the next pump as lead on the next cycle.
- If the lead pump is either running / or not, and the liquid level continues to rise to the “lag” level, the lag pump will run along with the lead pump, until the level drops below the “off” level.

Alarm:

High Level: The liquid rises above the “high” level.

- The audible exterior alarm will sound and can be shut off by pressing the silence button.
- The visual exterior alarm light will indicate alarm even when Silence Button has been depressed.
- The audible and visual alarm will reset automatically when the liquid level falls below the “high alarm” level.





NOTES:
1.) Float Switches MUST be rated to a minimum of 2 AMPS at 115 Volts.
2.) TORQUE ALL WHITE #8 Wiring Terminals 18~20in/lbs.
3.) TORQUE ALL BLACK Terminal Blocks to 16 in/lbs.
4.) TORQUE ALL Aluminum 2"x#8 Ground Terminals as follows Torque to 20 in/lbs. and 4~6AWG to 31in/lbs.
5.) USE 60C COPPER WIRE ONLY MINIMUM FOR LESS THAN 100 AMPS, USE 70°C COPPER WIRE FOR MINIMUM FOR 100 AMPS OR GREATER.
6.) ----- LINES INDICATE NOT SUPPLIED IN PANEL.
7.) ALL PENETRATIONS MUST MEET THE ENCLOSURE TYPE RATING INDICATED ON THE "UL" LABEL.

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CHANGES		TOLERANCES	DRAWN BY	WIRED BY	DATE
A	–	DECIMALS .XXX = ± 0.005 .XX = ± 0.010 FRACTIONAL X/X = ± 1/64 ANGLES X° = ± 1/2°	MEM		19-Jun-23
B	–		MATERIAL SPECIFICATIONS: AS NOTED;		
C	–				
D	–				
E	–				
F	–				

SCHEMATIC, ELECTRICAL
120/240-VAC, 1- Phase, 4 Wire
60-Amp Feed,
2-HP Duplex Pump

SCALE	DRAWING NUMBER
FULL	KCG-18-21D-B-O

SHEET 1 OF 2

BOM for KCG-18-21D-B-O after 5/9/23 (230 Volt 1-Phase 4 Wire DUPLEX - 4 Float Design panel) With "Options -B, -O" RELEASED 5/9/23 MEM					
Quantity	**KEEN Pump DESC.**	**Part Number**	**Description**	**part number, mfg & where**	**links to the components**
1	BOX	CP-A2016-CSS	Control Box; S.S. W Rain Hood - 20x16x7	Built in China w Shawn Help	
1	BOX-PNL	K0778-1-12-CSS	Back Panel; 20x16 Control Box, Duplex, SS Panel	Built in China w Shawn Help	
1	BRKT	K0778-1-13	7-HOLE; TOGGLE/LIGHT BRAKET MOUNT	Built in China w Shawn Help	
1	POW-TBs	KCPP-056	85A black TERM BLOCK, (POW, N, & MOTOR TBs)	Marathon 985GP03	https://us.rs-online.com/product/marathon-special-products/985gp03/70676258/
1	BRKT	K0778-1-08	BRACKET, CIRCUIT BREAKER MOUNTING, DUPLEX (KCG-16-21D)	Built in China w Shawn Help	
2	CAP	K0778-1-06	Capacitor Mounting Bracket	Built in China w Shawn Help	
2	RELAY CAPs	K0569-1-01	RELAY, START, COIL VOLTAGE 502, PICKUP MIN/MAX: 325/345, DROP OUT MAX 135V	Electrica RVA6AQ3D or MARS II 168 (19168)	https://www.marsdelivers.com/item/19168/MARS-168-RELAY/
2	START CAPs	K0408-1-02	CAPACITOR, START 216-259 MFD, 250V	BMI 092A216B250BD4A	https://www.amazon.com/250-Grainger-Capacitor-Replacement-092A216B250CD6A/dp/B00TQZ8NUE
2	RUN CAPs	K0341-1-01	CAPACITOR, RUN, 50 MFD, 370 VAC	MARS CAPACITOR 12225	https://www.marsdelivers.com/item/12225/50-MFD-370V-ROUND/
2	CB1 & CB2	KCPP-200	30A, 2-Pole, 415Vac, Circuit Breaker. DIN MOUNT S.E. D-Curve, UL489	S.E. M9F43230	https://www.se.com/us/en/product/M9F43230/
1	CB3	KCPP-201	6A, 1-Pole, 120/240 Vac, Miniature Breaker; DIN MOUNT UL489	S.E. M9F43106	https://www.se.com/us/en/product/M9F43106/
2	Mx	KCPP-021	Contactor, IEC, 32-Amp, 2Aux (1NO - 1NC) 120v coil	S.E. LC1D32G7	https://www.se.com/us/en/product/LC1D32G7/
2	Olx	KCPP-006S	Overload Relay with 1-Phase Sensitivity 12 - 18A; class-10 SET @ 18Amps	S.E. LRD21	https://www.se.com/us/en/product/LRD21
1	HMx	K0778-1-21	BRACKET, DUPLEX ETM/HOUR METER MOUNTING "Option B"	Built in China w Shawn Help	
2	HMx	KCP-083	METER, ELAPSED TIME, Mount in D-F Door "Option B"	TRU-METER 722-0004	https://us.rs-online.com/product/trumeter/722-0004/70115355/?keyword=722-0004
1	ALT	KCPP-022	Alternating Relay; DUPLEX OPERATION	Macromatic ARP120A6R	https://www.macromatic.com/products/alternating-relay/arp-series-duplex?v=27
1	ALT	KCPP-022S	SOCKET for Alternating Relay; 8-pin Octal	Macromatic 70169D	https://www.macromatic.com/products/accessories/70169-d
3	TOGGLE SWITCHES	KCPP-030	TOGGLE SWITCH; (MOMENTARY "TEST-HAND" / OFF / AUTO) (UL Listed)	INGRAM EZ-03-79652-L-1D	https://www.ingramproducts.com/products/alarms/alarm-lights/toggle-switch-ez-03-79652
2	Red "SEAL FAIL" Lights	KCPP-044	RED - Snap-fit Neon-Incandescent Panel Mounted light 1/4" tab (UL Listed)	Solico 3050-4-11-38310	https://spemco.com/3050-3-11-38310-125-volt-neon-red-round-solico-indicator-light/
2	Green "RUN" Lights	KCPP-045	GREEN - Snap-fit Neon-Incandescent Panel Mounted light 1/4" tab (UL Listed)	Solico 3050-4-11-38340	https://spemco.com/3039-3-11-38340-solico-28-volt-green-incandescent-round-indicator-light-spade-terminals/
1	FLASHER	KCPP-031	FLASHER; 120VAC / 75FPM	ingram SSF150	https://us.rs-online.com/product/ssac-symcom-inc/fs126rc/70067719/?referrer=search
1	EXTERNAL ALARM Light	R15-SM	LIGHT, RED ALARM, 15W MED. (INCLUDES LENS, 15W BULB, GASKET AND SOCKET) (UL Listed)		
1	SILENCE	KCPP-063	22mm Flush Push Button, Non-Illuminated, FULL PB, (UL Listed)	RS-Pro 71266239	https://us.rs-online.com/product/rs-pro/1450612/71266239/?keyword=71266239
1	SR	KCPP-043	RELAY, SR RJ2S-C-A120 120VAC 12A 9K401 (SOCKET SJ1S-05B)	IDEC RJ2S-C-A120	https://us.rs-online.com/product/idec-corporation/rj2s-c-a120/70172782
1	SR	KCPP-043S	SOCKET, RELAY SJ2S-05BW 120VAC 12A 9K401 (RELAY RJ1S-CA120)	IDEC SJ2S-05BW	https://us.rs-online.com/product/idec-corporation/sj2s-05bw/70229911/
1	ALM-BUZ	ALM-BUZ	ALARM-BUZZER PEIZO (UL Listed, IP65 & 95db or better.)		https://www.ingramproducts.com/products/floyd-bell-120vac-continuous
1	Term-Block	KCPP-146	16 pcs set - Sectional Terminal Block black	Built in China w Shawn Help	
4	DIN-CLAMP	KCPP-112	Clamp, DIN RAIL, Plastic Screw Down for DIN Rail.	S.E. 9080MHA10	https://www.se.com/us/en/product/9080MHA10/terminal-block-linergy-screw-down-end-clamp-for-35-mm-din-mounting-track/
1	GND	KCPP-029	GROUND BLOCK	NSI 4-14-717	https://nsi-sales.com/mc.htm
0.2	DIN-Rail	KCPP-087	2m / 78.74" Length, 35mm DIN Rail, Galvanized Steel, Pre-punched	Standard DIN Rail Perf 35mm x 7.5mm	https://us.rs-online.com/product/altech-corp/2511120-1m/70077221/
0.2	W-W	KCPP-139-3	Wire Way	RS-Pro 71768629	https://us.rs-online.com/product/rs-pro/1369152/71768629/?keyword=71768629

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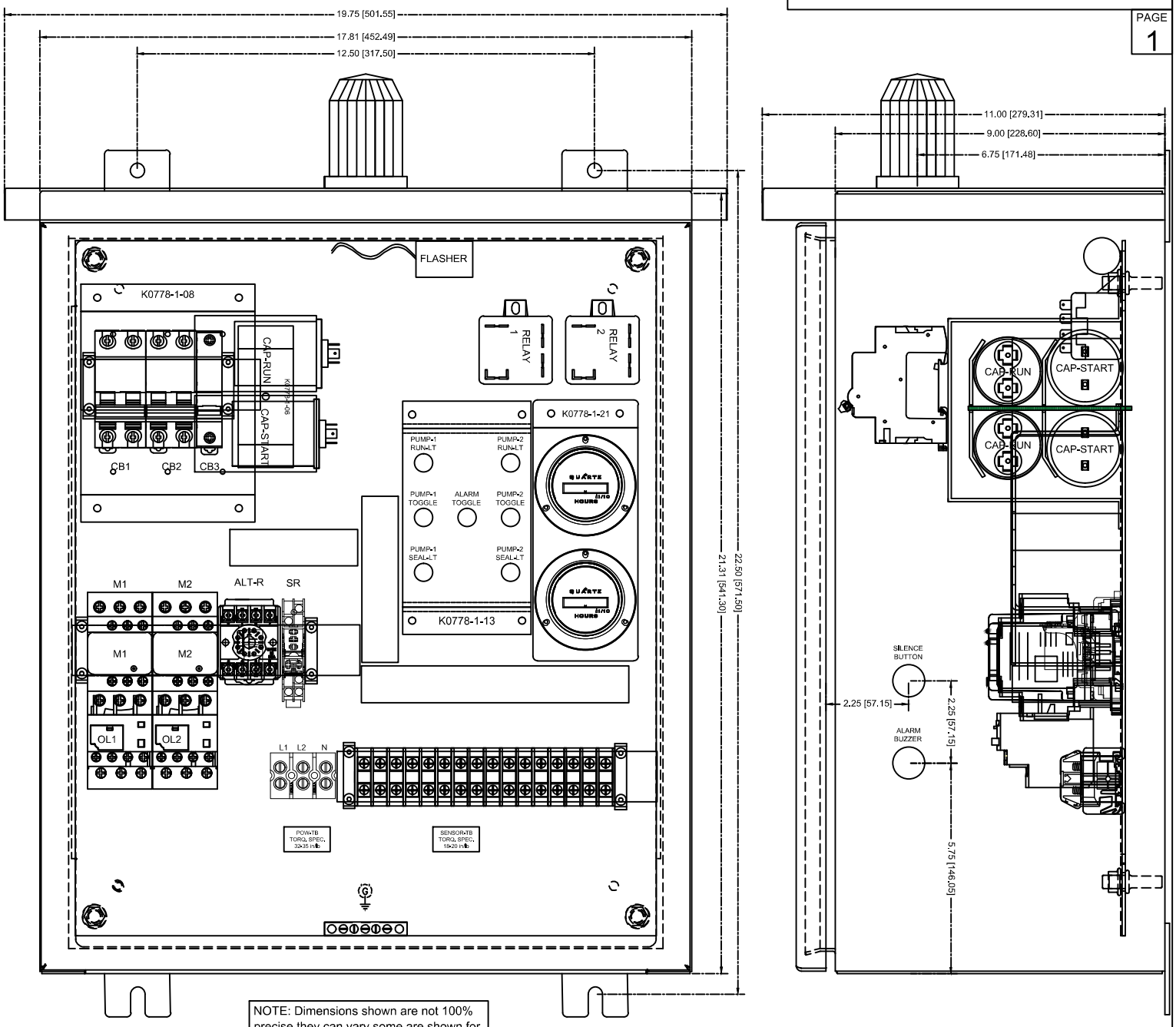
A	–	DECIMALS .XXX = ± 0.005 .XX = ± 0.010 FRACTIONAL X/X = ± 1/64 ANGLES X° = ± ½°	MEM		19-Jun-23
B	–		MATERIAL SPECIFICATIONS:		
C	–		AS NOTED;		
D	–				
E	–				
F	–				

SCHEMATIC, ELECTRICAL
120/240-VAC, 1- Phase, 4 Wire
60-Amp Feed,
2-HP Duplex Pump BOM

SCALE	DRAWING NUMBER
FULL	KCG-18-21D-B-O

SHEET 2 OF 2

KCG-18-21D-B-O



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C	–	.XX = ± 0.010	MATERIAL SPECIFICATIONS:		
D	–	FRACTIONAL	AS NOTED;		
E	–	X/X = ± 1/64			
F	–	ANGLES			
		X° = ± 1/2°			

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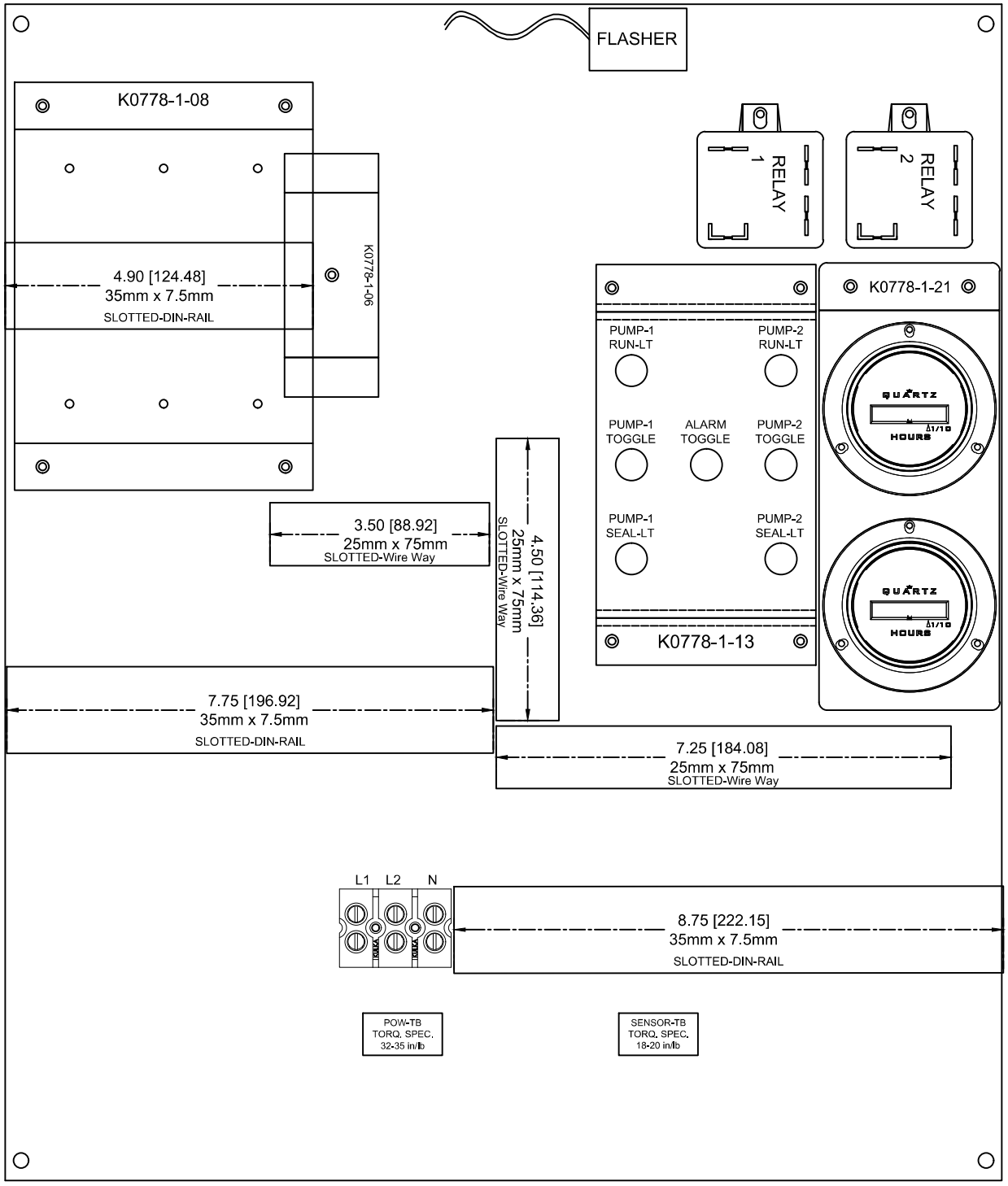
SCHEMATIC, ELECTRICAL
120/208-VAC, 3- Phase, 5 Wire
BOX LAYOUT
2-HP Duplex Pump

SCALE	DRAWING NUMBER
FULL	KCG-18-21D-B-O



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D	–	FRACTIONAL			
E	–	X/X = ± 1/64			
F	–	ANGLES			
		X° = ± 1/2°			

SCHEMATIC, ELECTRICAL
120/208-VAC, 3- Phase, 5 Wire
2-HP Duplex Pump BACK PNL
LAYOUT

SCALE	DRAWING NUMBER
FULL	KCG-18-21D-B-O