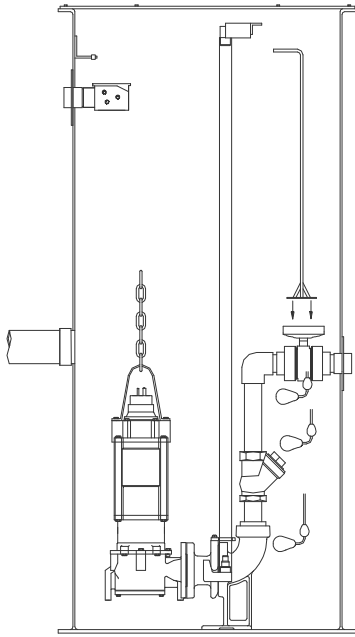


KEEN PUMP CO. Inc.

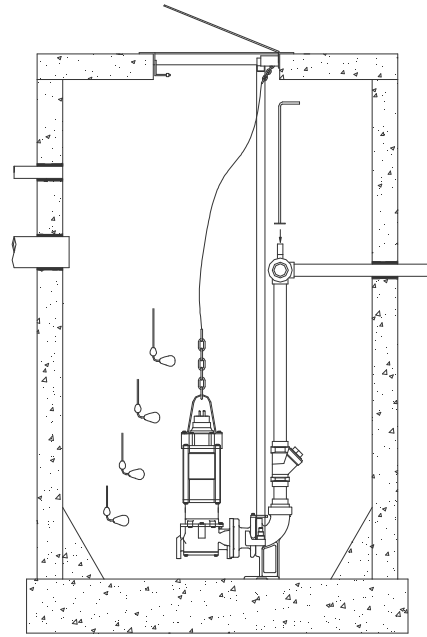
471 E State Route 250 East, Ashland, Ohio 44805

PH: 419-207-9400 FX: 419-207-8031

INSTALLATION AND SERVICE INSTRUCTIONS FOR
3HP THROUGH 7-1/2HP SUBMERSIBLE GRINDER PUMPS
SIMPLEX & DUPLEX
BASIN PACKAGE W/ RAILS



"SIMPLEX" FIBERGLASS SYSTEM



"DUPLEX" CONCRETE SYSTEM

P/N O&M-3HPBASIN

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 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 explosive 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, cuts, 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.

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, valves, 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, state, 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

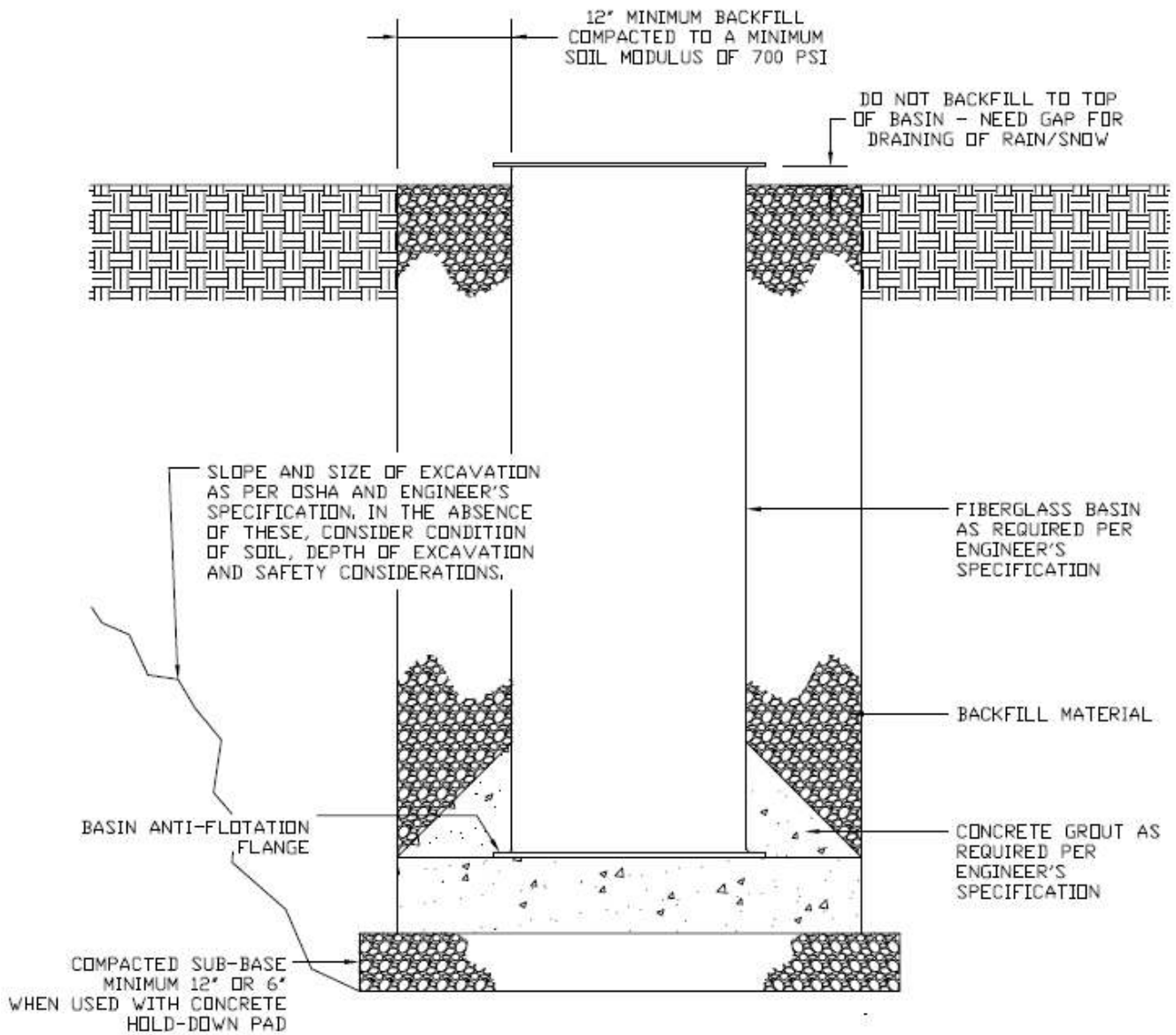
All methods of anchoring basins use the weight of the backfill materials to offset the buoyancy forces. The use of supplemental mechanical anchoring methods (a concrete hold-down pad) increases the amount of backfill ballast, which is mechanically, attached to the basin. The recommended method of attachment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



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 w/ access hatch

DISCHARGE PIPE – 2” PVC, Schedule 80, or as req’d.

DISCHARGE HUB – 2” NPT SST

RAIL SYSTEM – Keen Pump KL3-H, Cast iron, painted

RAIL BRACKETS – Upper support and liftout yoke SST

LIFTING APPARATUS - 3/16” Stainless steel chain w/ 1/4” shackles

SHUT-OFF VALVE – 2” Ball Valve, PVC, True Union, Blocked or 2” 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 – 2” NPT Plastic or 2” NPT stainless steel

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

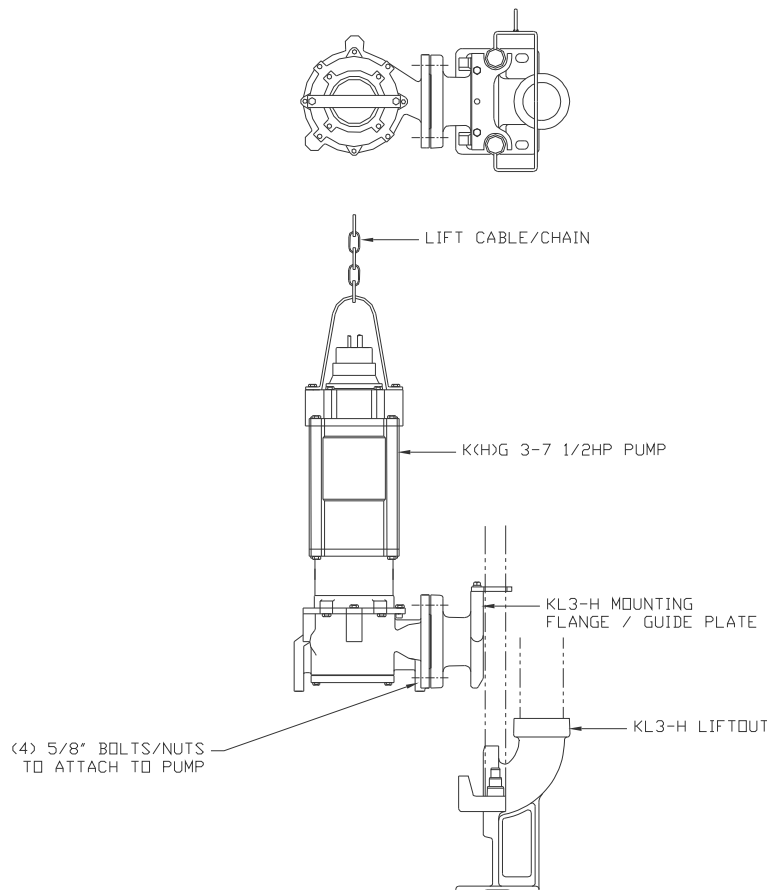
LEVEL CONTROL BRACKET – SST w/ plastic cord bushing

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 2” NPT for all simplex and 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 below to attach lift-out flange from the Keen “KL3-H” to pump volute). Attach lift cable/chain to pump lift bail. Pump is now ready to install into basin. Use hoist to lower 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). 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 3-7 1/2hp 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:

- 20" from basin bottom to "OFF" setting (Minimum)
- 30" from basin bottom to "ON" setting (Min.)
- 36" from basin bottom to "HWA" setting (Min.)

(4) FLOAT OPERATION – DUPLEX:

- 20" from basin bottom to "OFF" setting (Min.)
- 30" from basin bottom to "LEAD PUMP ON" setting (Min.)
- 36" from basin bottom to "LAG PUMP ON" setting (Min.)
- 38" from basin bottom to "HWA" setting (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 reseal 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 reseal. 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.

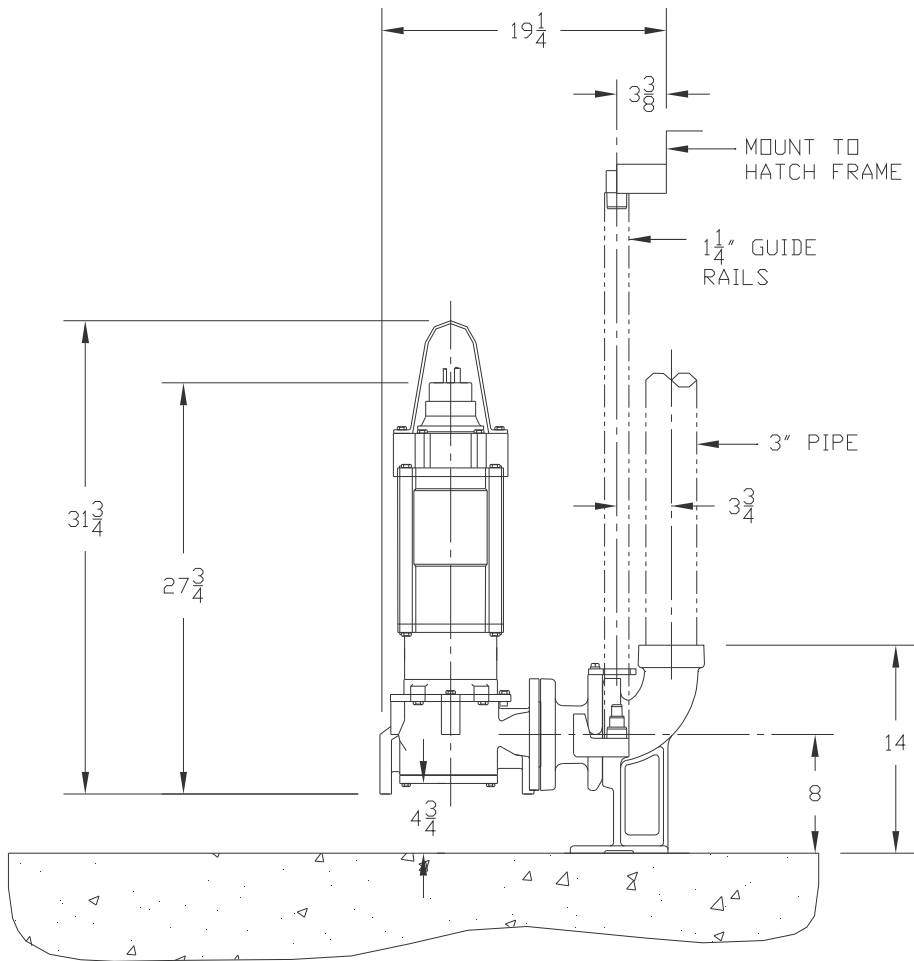
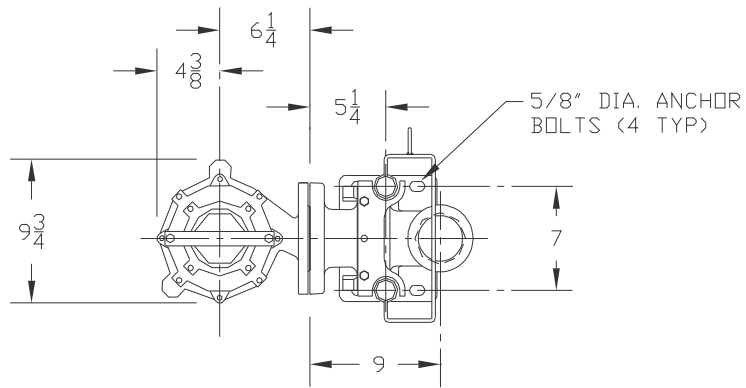
STEPS TO INSTALL A KEEN SYSTEM IN CONCRETE BASIN


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 1-1/4" 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 "KL3-H" 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. **KG3, 5 high flow grinder pump with KL3-H liftout dimensions**
2. **KHG3, 5, 7-1/2 high head grinder pump with KL3-H liftout dimensions**
3. **Fiberglass basin assembly, 36" Diameter simplex**
4. **Fiberglass basin assembly, 48" Diameter duplex**
5. **Concrete basin assembly, 36" Diameter simplex w/ stud and hatch layout**
6. **Concrete basin assembly, 48" Diameter duplex w/ stud and hatch layout**

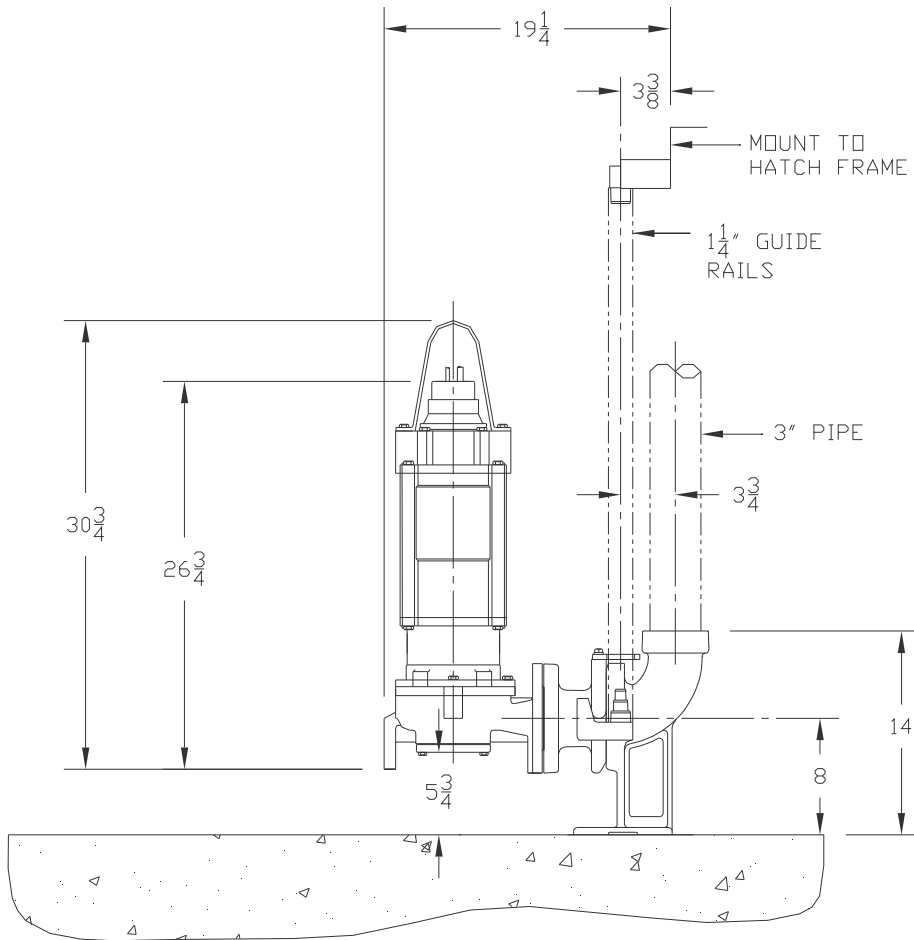
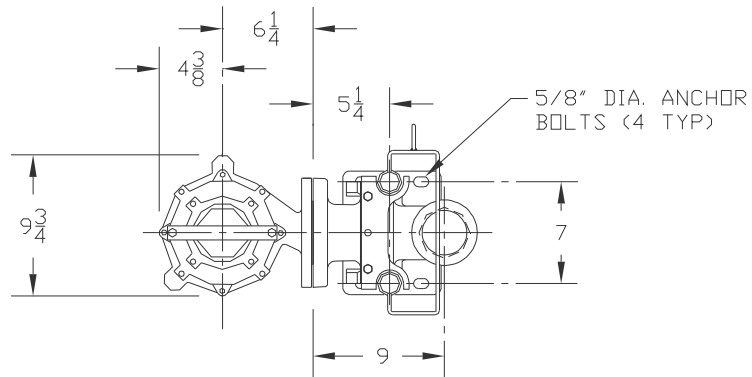
NOTE: CONSULT FACTORY IF DIMENSIONS OR LAYOUTS REQUIRED ARE NOT INCLUDED WITH THIS MANUAL.




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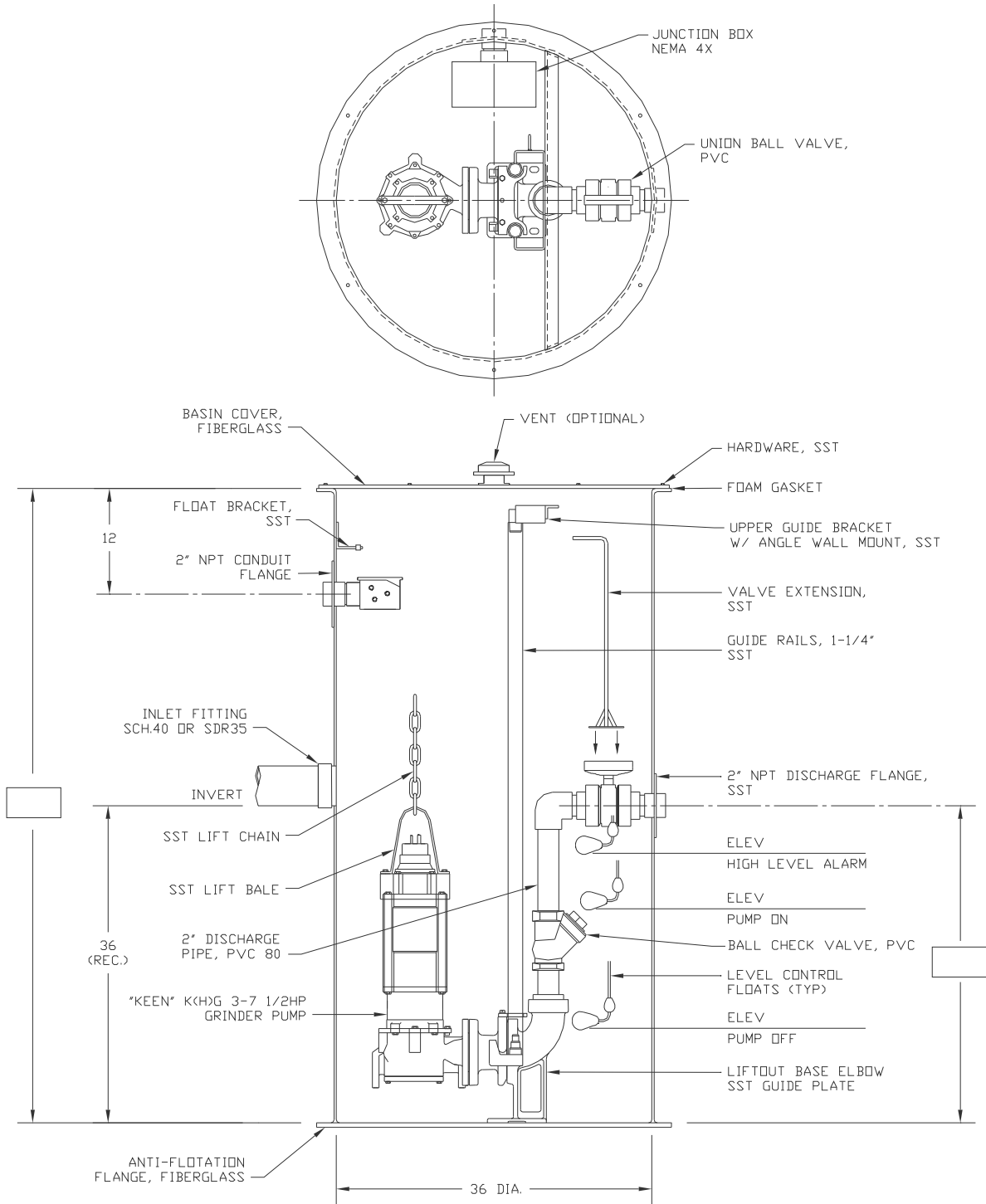
PUMP W/ LIFTOUT DIMENSIONS
 HIGH FLOW KG3,5 GRINDER W/KL3-H




KEEN PUMP COMPANY KEEN PUMP CO.
 471 E STATE ROUTE 250 E.
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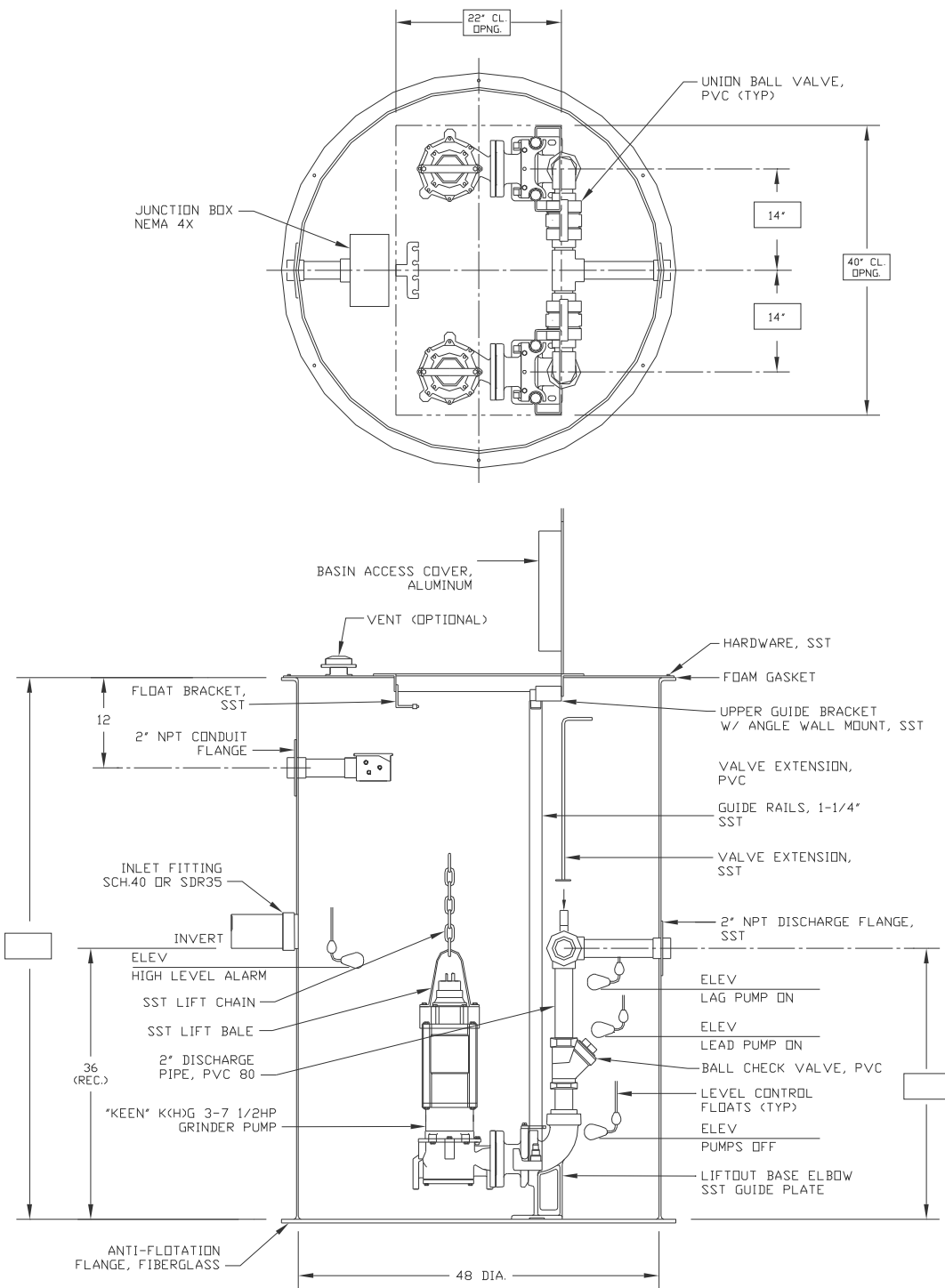
PHONE: 419-207-9400
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PUMP W/ LIFTOUT DIMENSIONS
 HIGH HEAD KHG3,5,7 GRINDER W/KL3-H



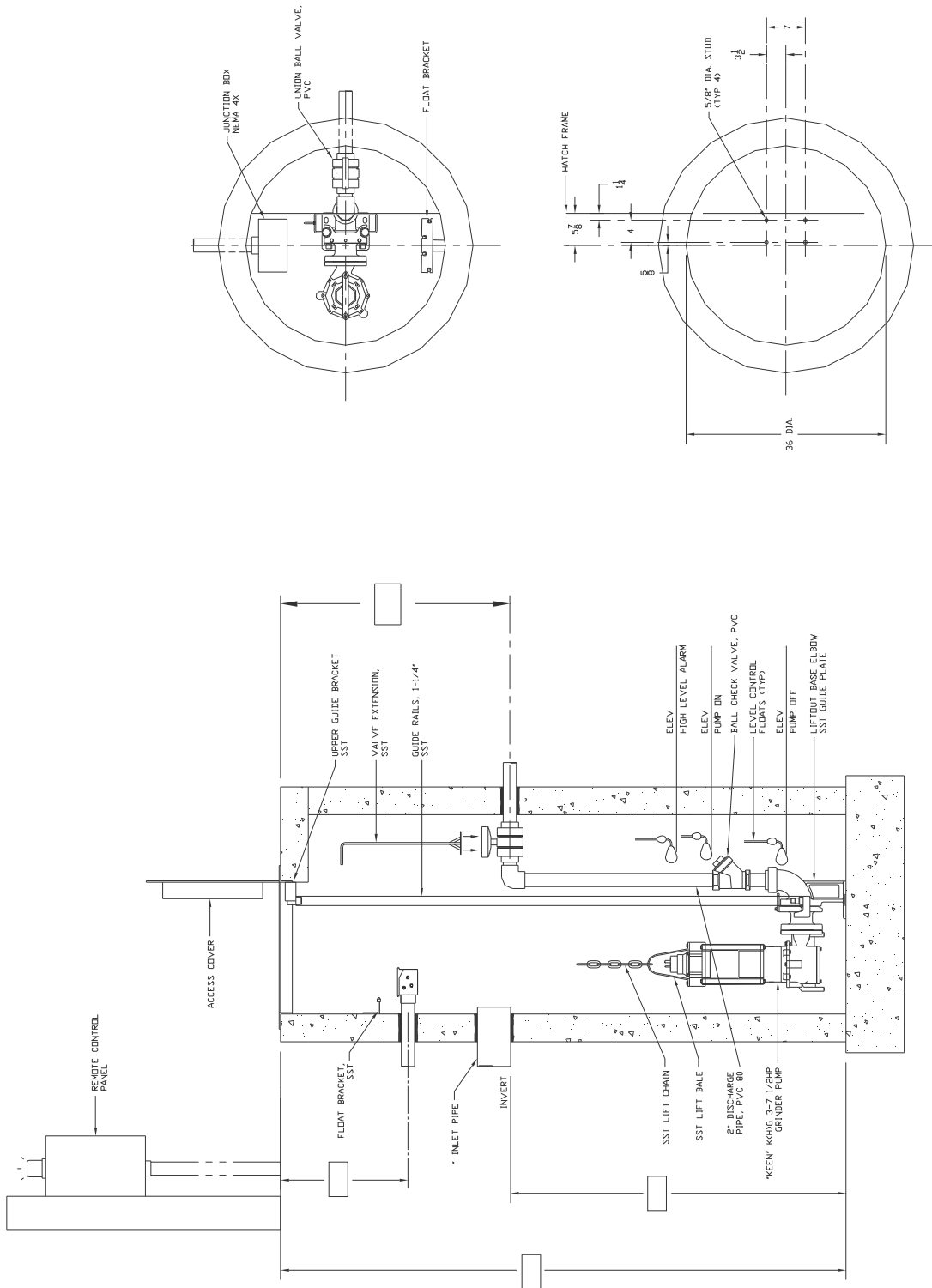

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SIMPLEX, 36" DIA. FIBERGLASS BASIN
 3-7 1/2HP GRINDERS, KL3-H LIFTOUT



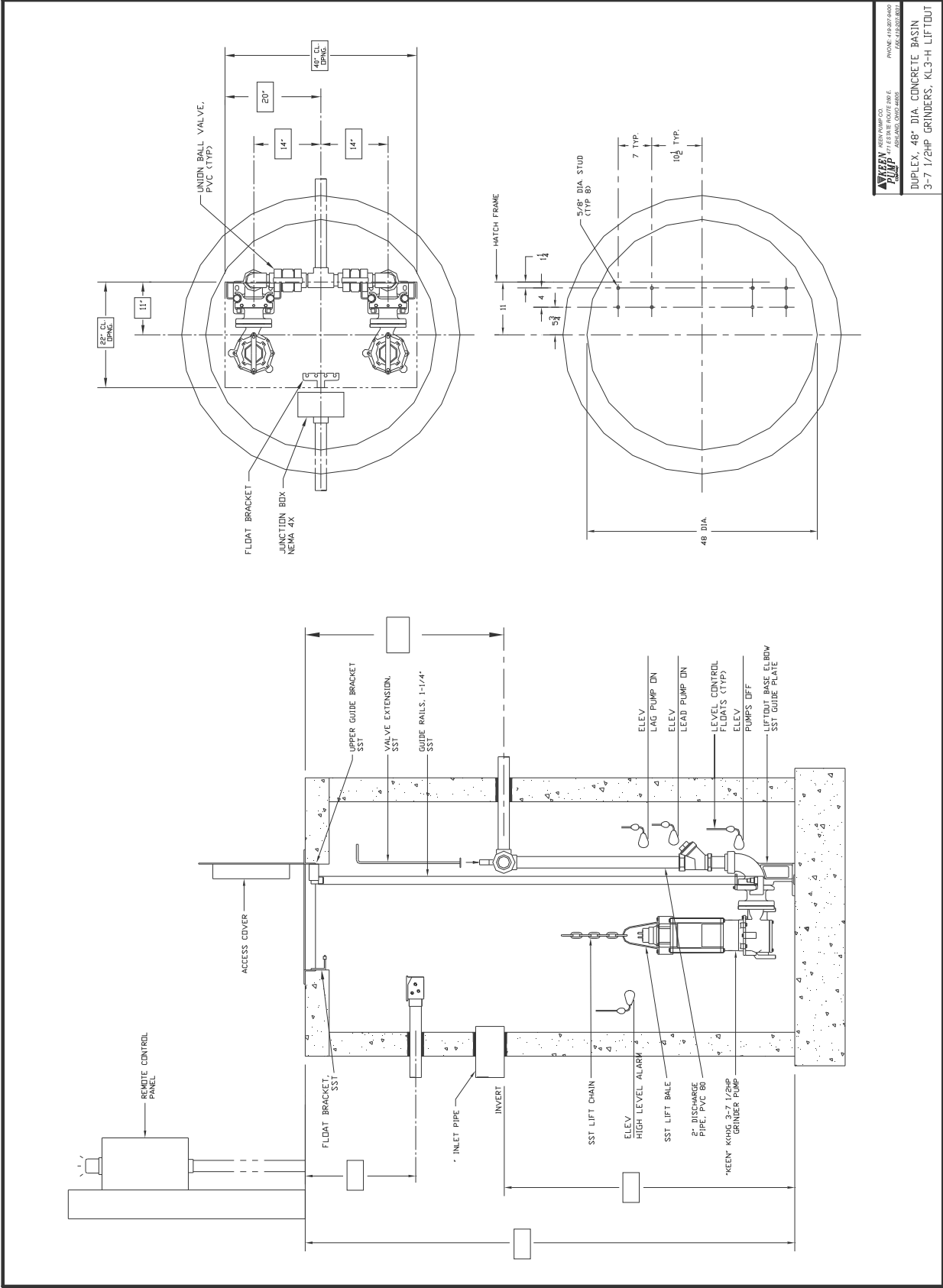

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DUPLEX, 48" DIA. FIBERGLASS BASIN
 3-7 1/2HP GRINDERS, KL3-H LIFTOUT



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 WASHINGTON, MISSOURI 63090
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 FAX: 636-207-6601

SIMPLEX, 36" DIA. CONCRETE BASIN
 3-7 1/2HP GRINDERS, KL3-H LIFTOUT



KEEN PUMP
 171 E. W. FOSTER RD. E.
 AKRON, OHIO 44308
 PHONE 419-307-6600
 FAX 419-307-8001

DUPLEX, 48" DIA. CONCRETE BASIN
3-7 1/2HP GRINDERS, KL3-H LIFTOUT