

# HIGH BANKER SLUICE CONVERSION KIT

Keene Engineering has combined all the features of the popular Hand Sluice, Hydraulic Concentrator and Portable dredge into a newly designed "Conversion Kit" that can be expanded from a simple sluice box into a highly efficient gold recovery system. This kit can be purchased as a complete highly portable high banker, or dredge system. The system can also be built up piece by piece as your interest and productivity level grows.

## Assembly

### **Marlex Hopper Kit    Model HBCKH**

Assemble Marlex Hopper Kit to your A-51 or A52 Hand Sluice as per diagram. On the **A51** sluice place the hopper over the sluice box and lower it into the sluice making sure that the front edge of the hopper butts up to the ribbed rubber matting. (note the hopper will overhang the edge of the sluice approximately 2 1/4"). When the hopper is not being used be sure to replace the bolts and nuts to cover the drilled holes. **A52** sluice box uses the extension trough in place of the flare. Attach the extension trough to the A52 sluice with the nuts and bolts provided. Place hopper into extension trough flush with the back of the hopper. Drill designated holes and mount per diagram.

### **Frame Kit            Model HBCKP**

Assemble frame kit as per diagram. The Frame Kit is packaged un-assembled into a series of components for ease of packing and assembly. Once the frame kit is assembled it can be collapsed for ease of transporting without disassembly. The kit contains the following pieces: **4 each** adjustable support legs. **1 each** Adjustable Leg Support frame. **4 each** Adjustable Leg Support Bracket Adjustment Wing Bolts. These support bolts are threaded into the support leg bracket to lower or raise the legs.

### **Dredge Kit            Model HBCDK**

Assemble frame kit as per diagram. The Dredge Kit is packaged un-assembled into a series of components for ease of packing and assembly. The kit consists of **5** major components plus fasteners. **1 each** 2 Inch Suction Nozzle (SN2). **1 each** 2 Inch Suction Hose (SH2 x 10'). **1 each** 2 Inch Suction Hose Adapter Bracket. This bracket must be placed inside the hopper and placed into the 2" hole that is pre-drilled into the hopper.. **2 each** 2 Inch Suction Hose Clamps (SS32).

### **Pump Kit            Model HBCDE**

Assemble pump kit as per diagram. Pump Kit is packaged into a series of **7** components for ease of packing and assembly. **1 each** Engine and Pump (P90G). **1 each** Pump Discharge hose (NH125 x 25') **2 each** Pump Discharge Coupling (PHC125F). **2 each** Pump Discharge Clamp SS16 **1 each** I Each foot Valve and hose Assembly FVA15.

## Operation Instructions

Now that you have completed the assembly of your new machine, you should be ready learn some important aspect about its operation. It is essential that you read these instructions carefully.

Place either or both the sluice box with mounted hopper and leg assembly as close to the area that you are planning to work as possible. If you are using the machine only as a "Highbanker" the material can be transported to the recovery location with the use of a bucket. Also ensure that your machine is within working distance of the length of discharge hose that is provided on the machine. If working location of your sluice is at a greater distance, it may be necessary to add additional lengths of discharge hose.

If you are using the machine as a combination high banker dredge, it is essential that the sluice be place within hose length of the area you plan to dredge. Make sure you have water of the necessary depth to operate the pump. You will need a minimum of 6 inches of water to feed the foot valve on the pump.

It may sometimes be necessary to enlarge a hole where you intend on placing the intake foot valve of the pump. When using the high banker as a dredge it is important to keep the sluice and hopper as close to the water level as possible. If material is being pumped over 12" above the water level, this will substantially reduce the vacuum of the dredge.

## **1. SETTING UP THE SLUICE BOX**

Set the machine firmly on the ground in a level position and adjust the sluice initially to approximately a 10 degree angle. If you have the Frame Kit, set the sluice on the frame and adjust to approximately the same angle by tightening the adjustable wing nut on the support legs. This angle may have to be re-adjusted once the proper flow has been determined. The angle of the sluice to determine the proper flow is generally as close to level position as possible without allowing the gravel to build up over the riffles. If the sluice box is tilted too much the material will flow too fast over the riffle section causing needless loss of values. For a more complete understanding of gold recovery techniques, we recommend that you purchase one of the books offered on the subject of dredging or gold recovery.

## **2. SETTING UP THE PUMP KIT**

Once you have the sluice properly positioned and ready to accept water flow, you are now ready to set up and operate the water pump. If the machine is being used only as a Highbanker, ensure that your pump hose will reach the concentrator easily without any sharp turns in the hose. Too sharp an angle may cause the pump hose to kink and obstruct the water flow. First set the pump in a secure position next to the water and connect the discharge hose from the pump to the sluice hopper. Next, place the foot valve screen in a position you have chosen that will allow ample depth to prevent sucking air into the pump intake. Make sure that all fitting on the intake side of the pump are air tight. If any air is allowed to enter the pump it will cause the pump to lose prime and the water flow will stop. Finally check all fitting to prevent any water or air leaks in the pumping system. **DO NOT RUN PUMP DRY.** See attached engine and pump manual for starting instructions. After reading these instructions start the engine and set the throttle to approximately 3/4th's speed. This speed should be adequate to operate the sluice hopper.

## **3. OPERATION**

Once you have started your pump and now have water delivered to the sluice hopper, it is time to make final adjustments for the particular type of material that you will be processing. It may be necessary to adjust the water flow to the hopper by adjusting the speed of the engine. The jet spray bar in the hopper should be flowing with sufficient velocity to adequately wash and clean the cobbles as they are fed into it. The screen or grizzly bars in the hopper are designed to classify and size the material to approximately to 1/2 inch in size for best recovery. Some care should be taken not to over flow the hopper screen causing material to escape the sluice box. The gravel can be fed into the hopper with a shovel or a bucket. The bucket is necessary in the event material has to be transported to the sluice hopper. A shovel is the best and fastest means to feed the hopper. The water flow in the sluice box should flow adequately to flow the material through the riffle section without losing values. After you have shoveled several loads into the hopper, it is a good idea to check the sluice box to ensure that the material is being processed properly into the riffle section. This is done by reducing the engine speed and the water flow down enough to examine the material that has been trapped into the riffle section. After operating the machine for awhile you will notice a build up of cobbles at the base of the hopper screen. This accumulation of cobbles will have to be removed occasionally to prevent obstructed flow from the hopper grizzly screen.

## **4. CLEAN UP**

Clean up of the machine can often be accomplished at the end of the day's work. More frequent clean up may be required depending on the material being recovered. Occasionally a clean up may be required just to check the results of the ground you are working. Often a spot check of results can be performed by reducing the flow of the water and visually checking the upper riffle section of the sluice box. To properly clean the sluice box, you should slow the water velocity to as slow of flow as possible. Place a pan or bucket at the end of the sluice and pull the riffle locking lever at the end of the sluice box down allowing the riffle tray to lift out. Next carefully lift the screen that is placed over the carpet taking care not to remove any values from the carpet. Next pull the carpet toward you and gently roll the carpet up. Once the carpet is rolled set into a pan or bucket and direct all remaining gravel from the sluice into the pan. Take care to remove all remaining gravel that is left in the sluice, this may be where the majority of all values have collected. Wash the carpet carefully ensuring not to allow any values to spill away and pan the residue. Good luck!

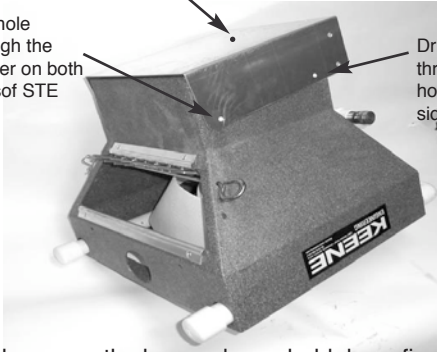
## **5. DREDGING**

If you have purchased the Dredging Kit for your Highbanker Conversion Kit. See attached instruction for dredging. We also recommend that you consider one of the books written on dredging for further techniques on this subject.

# Marlex Hopper Assembly

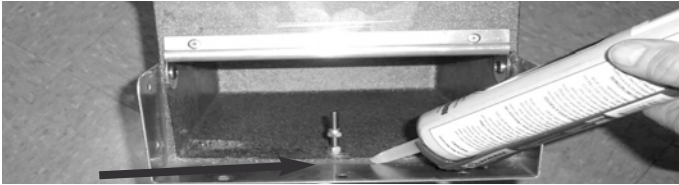
Drill one 1/4 inch hole on bottom through Marlex Hopper using the predrilled STE extension as a template.

Drill hole through the hopper on both sides of STE



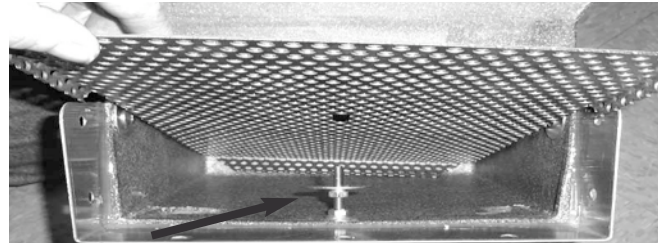
Drill hole through the hopper on both sides of STE

Set STE in place over the hopper base, hold down firmly and drill hole in bottom and two holes in both sides using STE as a template to secure part as pictured above.

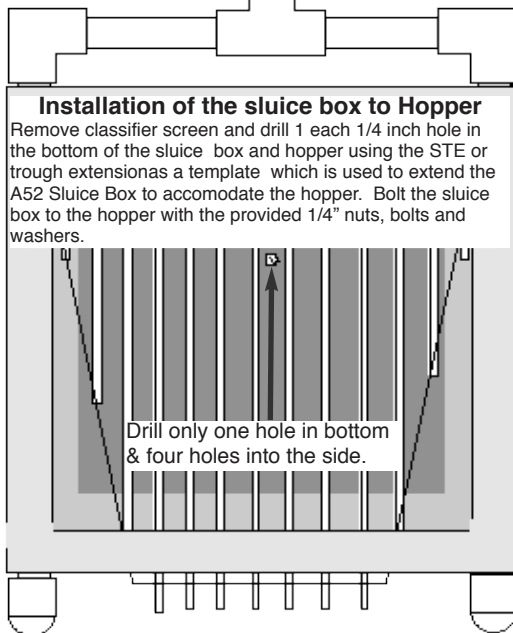
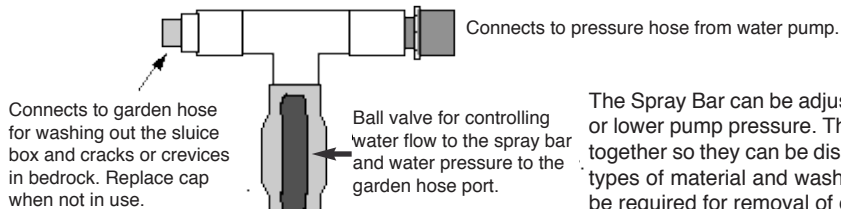
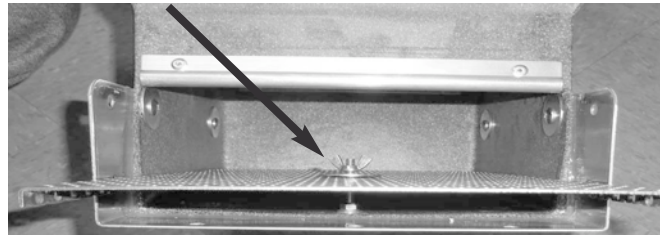


Before attaching hopper to sluice, Insert plated 2" bolt through the bottom hole then place a small washer & locknut and fasten securely. Place the second locknut about one inch from the top of the bolt. Before bolts are installed, place a small line of silicone adhesive on the edge of the hopper. Then attach the STE to seal from warping and providing a positive seal. Then attach hopper to sluice box and secure with bolts as per diagram.

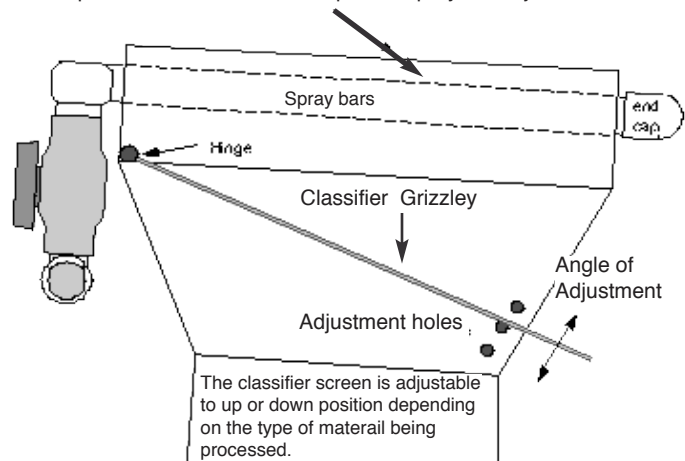
## HOPPER BOLT KIT



After attaching the hopper to the sluice box, place the large washer on top of the lock nut to retain the punch plate then place punch plate and large washer on top with wingnut to secure punch plate as illustrated below.



The Spray Bar can be adjusted to angle of flow to compensate for higher or lower pump pressure. The PVC spray bar and end caps are not glued together so they can be disassembled for cleaning, or rotated for various types of material and wash patterns. A pair of channel locks pliers may be required for removal of end caps and spray bar adjustment.

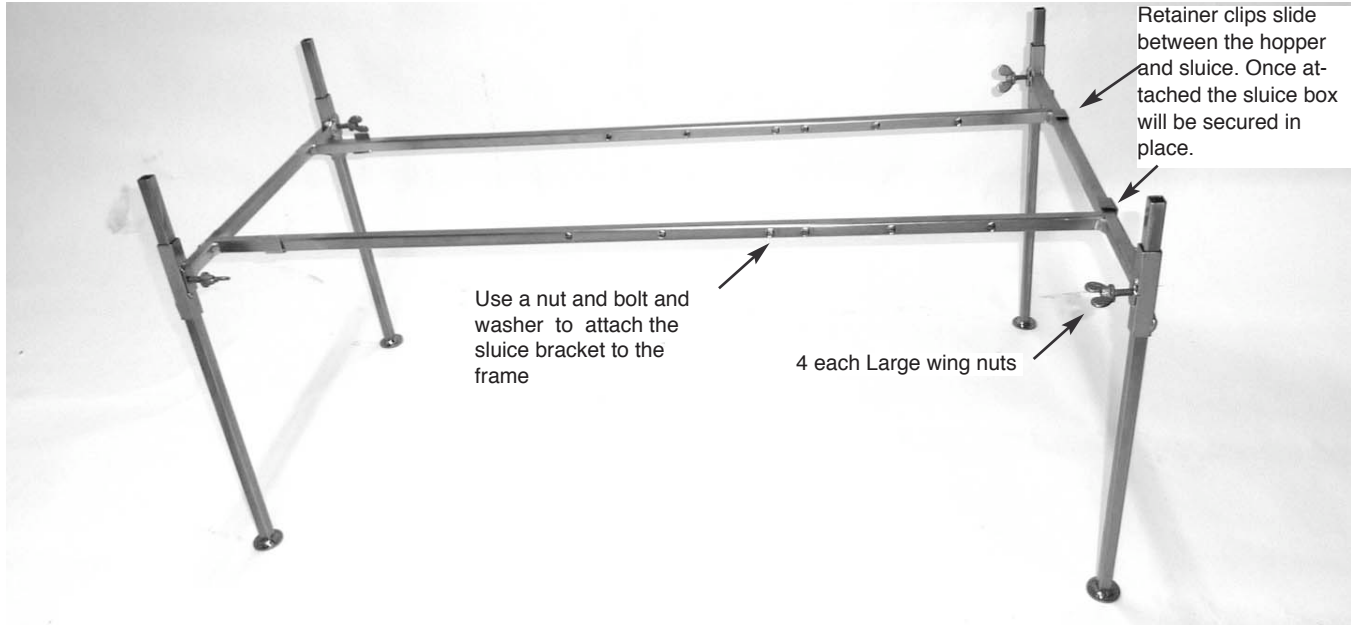


The classifier screen should be adjusted to the upper position for hard pack material or heavy clay. The classifier screen should be tilted as low as possible to maximize production, however you should check the tailings to see if the oversized gravel is free of any fine material.

# Assemble Sluice to Frame

## FRAME BOLT KIT

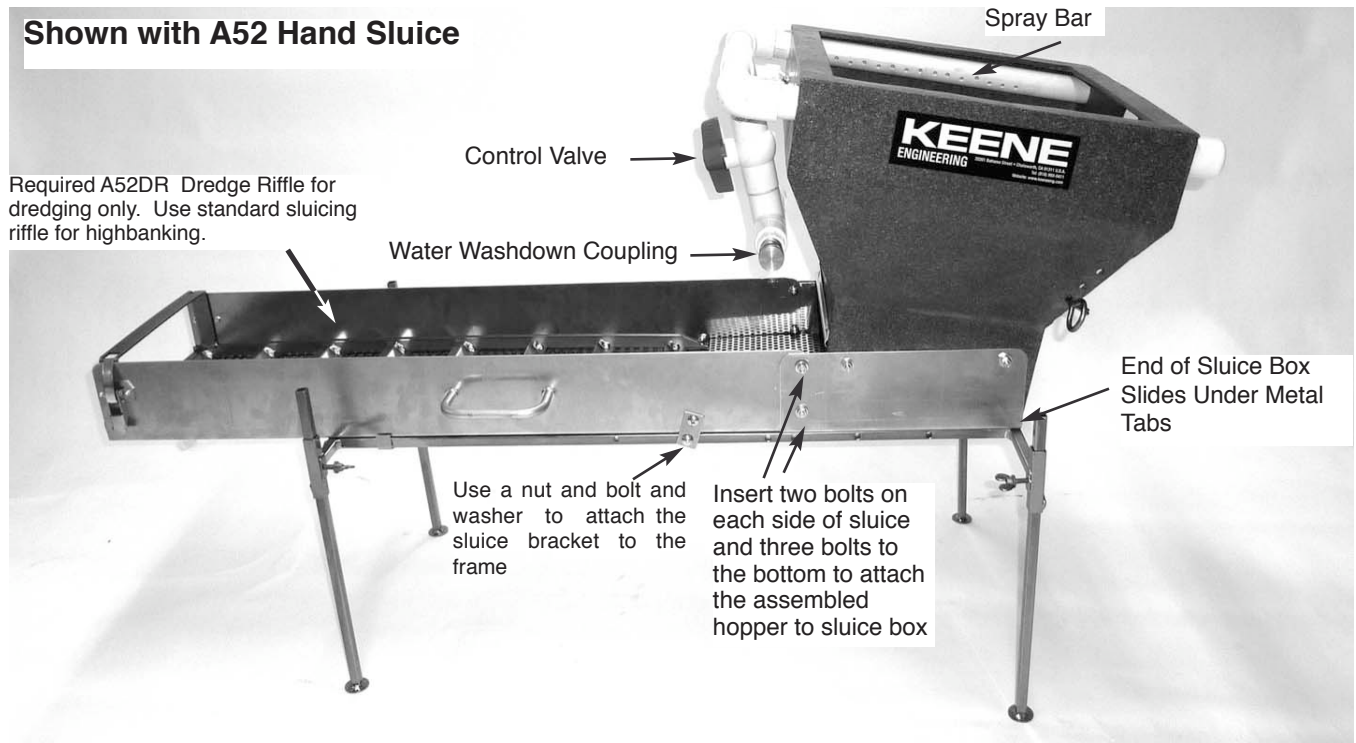
1. 4 each Large Wing Nuts
2. 2 each Frame to Sluice Brackets
3. 2 each 1/4 x 1 1/4 Bolts
4. 2 each 1/4 inch lock nuts
5. 2 each 1/4 inch washers



To assemble the frame insert 4 legs into the four slots at the corners of the frame. The legs slide up and down to accommodate different types of terrain. The legs are secured into place by inserting and tightening the large wing bolts.

**Final assembly of the A52 Hand Sluice Highbankers shown with frame and all connecting hardware required.**

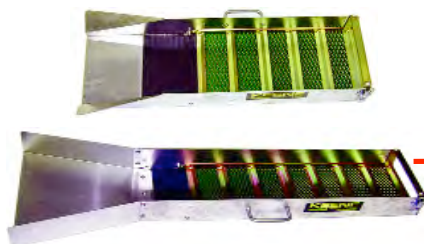
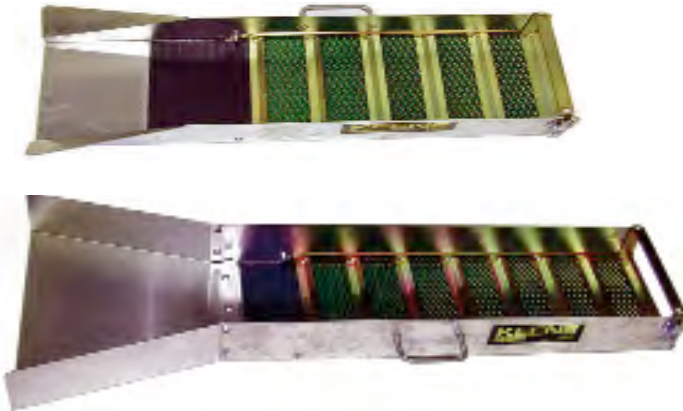
## Shown with A52 Hand Sluice





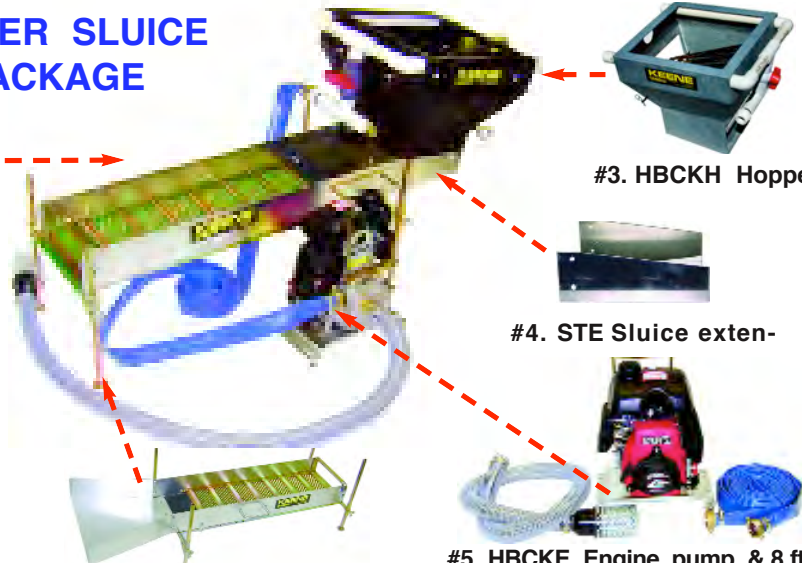
# Convert a Hand Sluice to a Super Lightweight Power Sluice or Dredging System

Add a conversion kit to your sluice and have a highly efficient Power Sluice or Mini Dredge that can increase productivity up to 1000%! If you wish to expand your Hand Sluice into an effective Power Sluice System, your nearly there. Keene Engineering offers complete Power Sluice and Dredge Packages that will enable you to add a few items at your own pace and have a very effective light weight Power sluicing System.



#1. A52 or A51 Hand Sluice

## POWER SLUICE PACKAGE



#3. HBCKH Hopper

#4. STE Sluice extension

#2. HBCKF Frame with adjustable legs

#5. HBCKE Engine, pump, & 8 ft. of intake hose & foot vane assembly & 25 ft. Nulobraid hose coupled.

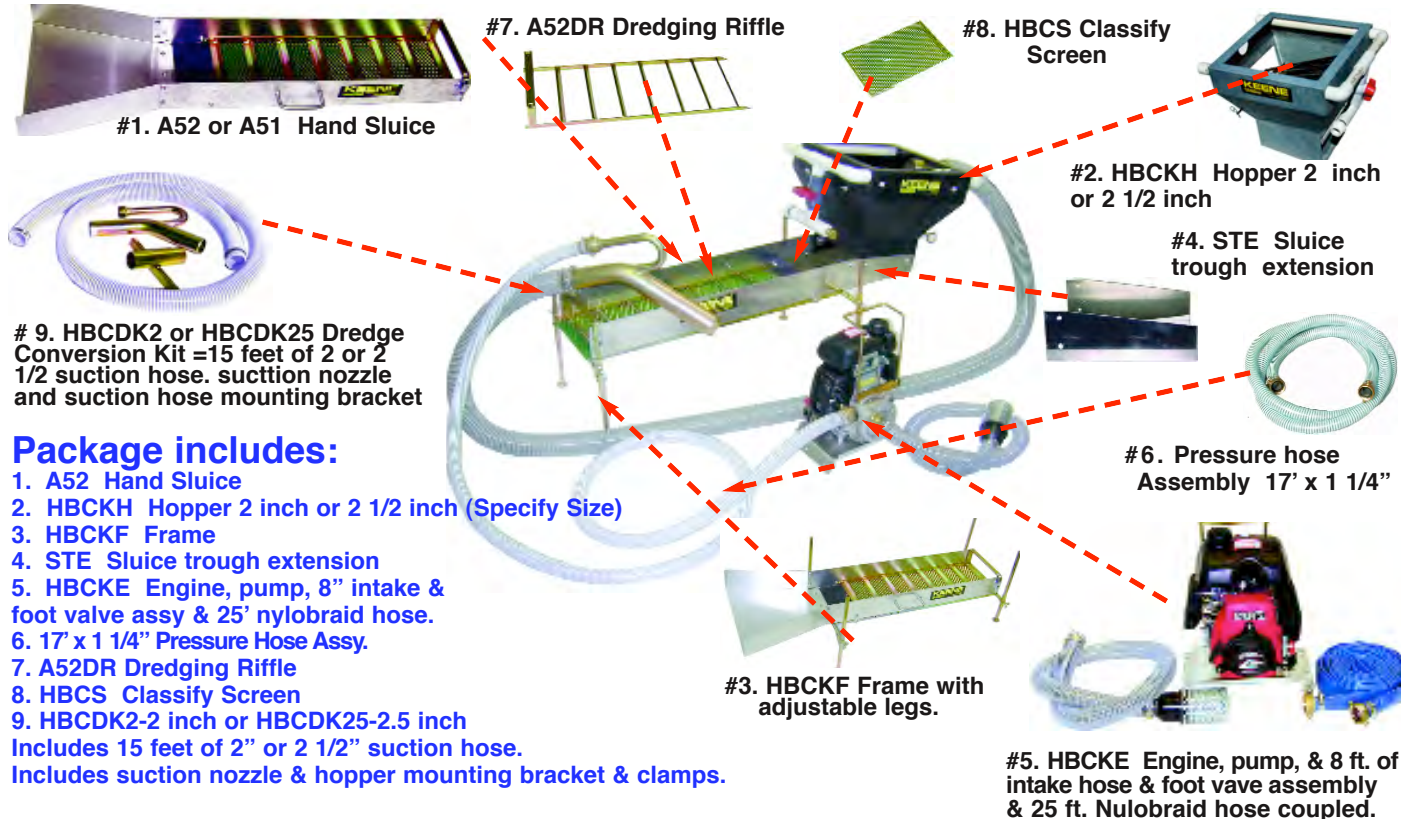
## PACKAGE INCLUDES:

1. A52 Hand Sluice
2. HBCKF Frame
3. HBCKH Hopper
4. STE Sluice Extension
5. HBCKE Engine, pump, intake assembly and 25 feet nylabraid hose
6. Classifier Screen

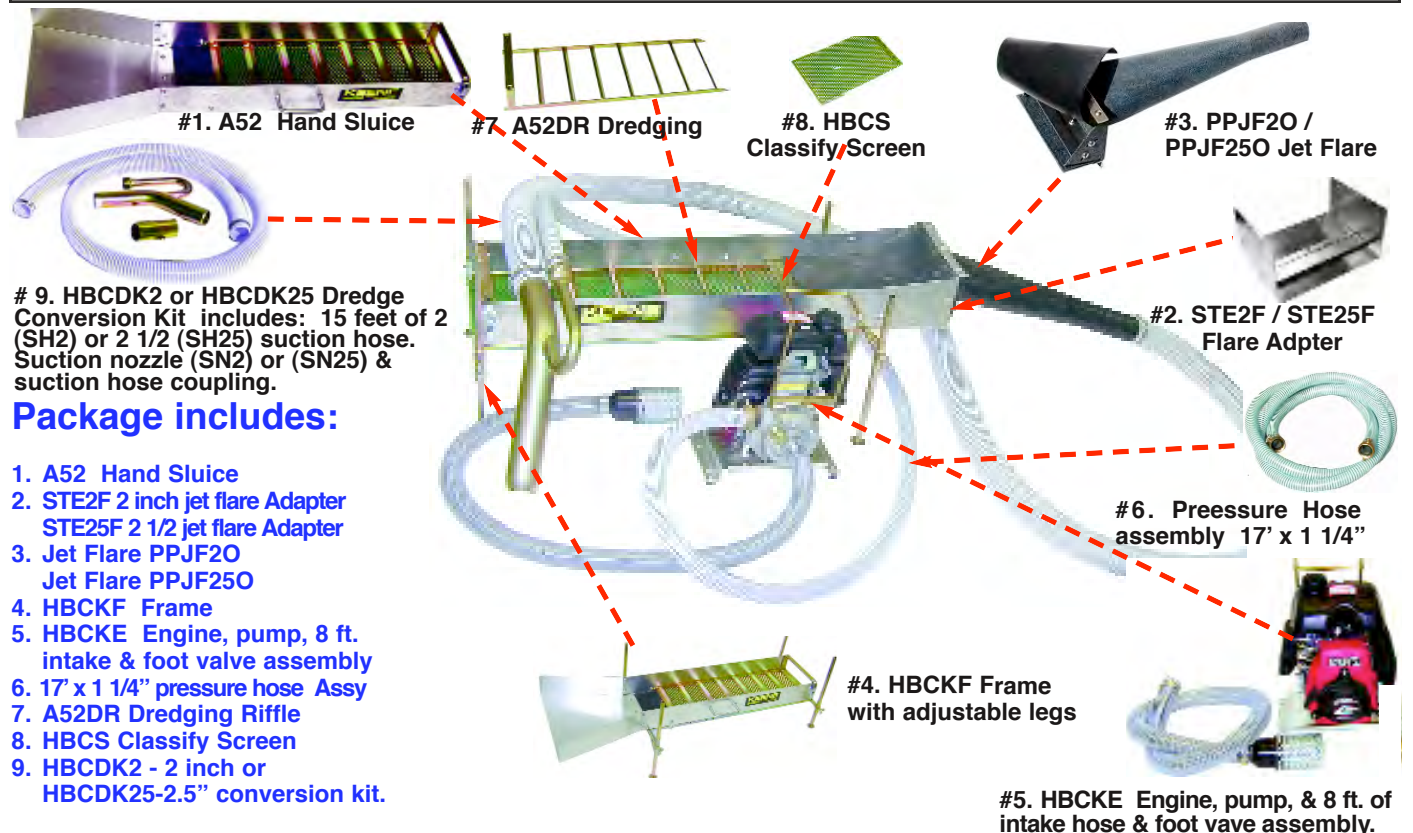


## Combination Power Sluice & Dredge

To determine size you must specify either 2 or 2 1/2 inch conversion on all models.



## Combination Suction Nozzle Dredge



## GENERAL OPERATING INSTRUCTIONS

### **THE FOLLOWING INFORMATION SHOULD ENABLE YOU TO UNDERSTAND THE BASIC THEORY OF OPERATION OF A PORTABLE DREDGE.**

For more complete understanding on this subject, we recommend you read any one of a variety of books available through the Keene Library of Books, such as The Gold Miners Handbook, Dredging for Gold or Advanced Dredging Techniques. The vacuum on a portable dredge is created by a "venturi principal". A volume of water is pumped through a tapered orifice (jet), by a special designed water pump. A high velocity jet stream is created within the jet tube producing a powerful vacuum. As indicated in the diagram gravel is dredged into the suction hose and is delivered to the sluice jet flare. As a slurry of water and gravel enters the jet flare and is spread evenly over a classifier screen. The smaller and heavier particles drop below the classifier screen into an area of less velocity, allowing a slower and more selective classification of values. Often values are recovered and easily observed before they even enter the riffle section. The lighter non bearing values and larger aggregate are returned back into the water. The riffles, or gold traps in the sluice box are best described as "Hungarian Riffles". This type of riffle has proven to be the most efficient gold recovery system. As material flows over the riffles, a vortex, or eddy current is formed between each riffle opening. This force allows the heavier material to settle out of suspension and the lighter, non value bearing material to be washed away. This continuous self cleaning principal allows a dredge to be operated for prolonged periods of time. Normal conditions require a sluice box to be cleaned only once or twice a day.

#### **PRIMING THE PUMP**

Before starting the engine, the pump must be fully primed. This means the pump must be full of water and all air removed. All jetting pumps provided with our dredges have a mechanical water pump seal. Without the presence of water in the pump, friction could cause a seal to overheat and require replacement. Priming the pump on some of the smaller models is accomplished by thrusting the foot valve back and forth under the surface of the water in a reciprocating motion. This will pump water into the foot valve assembly and into the pump. A pump is fully primed when water is observed flowing out of the discharge end of the pump. It may sometimes become necessary to hold the discharge hose above the level of the pump to complete the priming operation. The larger dredges that have a rigid foot valve, are easily primed by removing the cap provided on the foot valve and filling, until water overflows. Caution must be exercised to prevent sand from entering the foot valve or intake portion of the pump. Excess amounts of sand could damage the water pump seal, or pump impeller. It is recommended that the intake portion of the foot valve be placed in a sand free environment underwater, such as a small bucket or pan.

#### **PRIMING THE SUCTION HOSE**

Priming the suction hose need not be of concern in most dredging operations, but is important to understand the principal. When the tip of the suction hose is taken out of the water during operation air will enter the suction system and cause the suction power to cease temporarily, until submerged again. The suction will commence as soon as the air has passed through the system. It is important to ensure that no air leaks occur in the suction system.

#### **SUCTION SYSTEM OBSTRUCTIONS**

The suction system can become jammed while dredging. This can be caused by dredging an excess of sand, causing the suction hose to load up, or a rock that has become stuck in the suction system. Rock jams generally occur in the jet, or just before entry into the jet. This can easily be cleared by removed by flipping the rubber damper back over the jet flare and thrusting the probe rod down through the jet flare and jet in an effort to strike the obstructed area. It may occasionally be necessary to remove the suction hose to remove an obstruction. If this is not successful, it may be necessary to locate the blockage in the transparent hose and dislodge it by a striking the obstruction, taking care not to damage the hose.

#### **SOLID CONTENT**

Care must be exercised to prevent dredging excess amounts of sand. A solid to water balance must be maintained. The solid content being dredged should never exceed 10%. If a suction tip is buried in the sand and not metered properly the solid content could cause the suction hose to become overloaded with solids and suction will cease, this will also cause the sluice box to become overloaded with solid content, resulting in a loss of values.

#### **SLUICE BOX ADJUSTMENT**

Most models have a slight adjustment to raise or lower the sluice box. The proper sluice box adjustment can effect the recovery of values. If the sluice does not have enough angle, the sluice box will "load up" causing the riffle openings to fill with unwanted excess material. Too much angle will cause the material to flow too fast, resulting in loss of values, evidenced by the riffles running too clean. The optimum adjustment of a properly working sluice box is evident by only a portion of the riffle is visible while operating. A loss of values can also occur if the solid content of the suction discharge is too heavy in solid content. Remember, the solid content should not exceed 10 %. A normal sluice box tilt is approximately 3/4" inch to the running foot. A four foot sluice box should have an approximate tilt of 3"

#### **CLEANING THE SLUICE BOX**

Before attempting to clean the sluice box, it should be allowed to run with only water for a few minutes in order to wash

**KEENE ENGINEERING**  
**8940 Lurline Ave. Chatsworth California 91311**  
**Tel. (818)-993-0411 Fax. (818)-993-0447**  
**E-mail: Sales@Keeneeng.com**  
**Web site www.keeneeng.com**

**INSTALLATION & REPLACEMENT OF A PUMP SEAL, MARLEX PUMP  
COUPLER & A COMPRESSOR DRIVE ASSEMBLY**

The water pump seal must be replaced if water is observed leaking between the engine and pump adapter or around the engine shaft,. To replace a seal or to install a compressor drive assembly (engine shaft pulley and drive belt), the pump must first be removed from the engine.

**INSTRUCTIONS TO REMOVE THE PUMP FROM THE ENGINE:**

Note: If the pump has been in use for a year or more, we suggest that you apply a penetrant such as "WD-40" to the engine shaft threads and allow it to penetrate the threads of the engine shaft. Saturate for 24 hours before attempting to remove the impeller from the engine shaft!

1. Remove the four housing bolts and remove the pump housing. If the housing does not pull off easily, gently pry it off with a screwdriver. Inspect the housing gasket and replace if necessary.
2. The impeller is directly mounted to the engine shaft and will unscrew in a counter clockwise direction. Before attempting to remove the impeller the engine shaft must be locked in a fixed position to prevent it from turning. A simple way of locking the shaft is to insert a pointed tool such as a screwdriver or an awl through one of the many holes in the starter assembly and turning the engine over until the tool is firmly locked in place by the starter housing cover.

**IMPORTANT:** Always disconnect the spark plug wire before attempting any repairs or service on your pump or engine. Once the engine shaft is locked into position, there are two methods that can be used to remove the impeller.

Method #1. Use a block of wood, such as a 2x4 and place one corner of it into one of the impeller vanes on the left side of the impeller and strike the block of wood sharply with a hammer. This should loosen the impeller and enable it to be unscrewed in a counter clock-wise direction.

Method #2. If the above is not successful, use a thin breaker bar or a heavy duty screw driver. Insert the blade into one of the impeller vanes towards the left side and try to unscrew the impeller by applying a downward pressure. If this still does not work carefully strike the end of the bar with a hammer until the impeller loosens from the shaft. If this still does not work, strike gently with a hammer. This method may cause a chip in the vane of the impeller. Depending on the size break of the corner of the impeller, it may or may not have adverse effects on the performance of the pump. So be careful!

**SEAL REMOVAL AND INSTALLATION:**

1. All of our pumps use a two piece seal assembly, with the exception of some older models (P-50 and P-60). One half of the seal located in the backside of the impeller is called the "seat", or ceramic portion. The other side of the seal is shrouded in a brass encasement, encasing a hardened material that rests against the ceramic portion of the seal. Always replace both sides of the seal. Remove the ceramic portion with a sharp object similar to a screwdriver and press the new seat into place by hand. Always inspect the seal to note that it is not cracked. Always place the smooth surface of the seal to the outside.



2. Remove the pump adapter from the engine and press the brass portion of the seal towards the outside from the back of the adapter. If it cannot be pressed out easily, place a screwdriver handle on the seal and gently tap it out. When replacing, it is suggested that a small amount of silicone sealant be placed on the brass portion that fits into the adapter to ensure that it will not leak. Be careful not to get any sealant on the face of the seal. Position the seal in the center of the hole and press gently by hand into the cavity as far as possible. Use a screwdriver or a blunt instrument and tap the seal gently around the edge of the seal in a circular motion until the seal is firmly fitted into place. Wipe off seal facing with a clean cloth before reassembling.

3. After both sides of the seals is installed, replace the pump adapter onto the engine and carefully tighten. Thread the impeller onto the engine shaft until the impeller is hand tight. Install the housing and use care not to over tighten the bolts to avoid stripping the threads as they are a soft alloy aluminum.

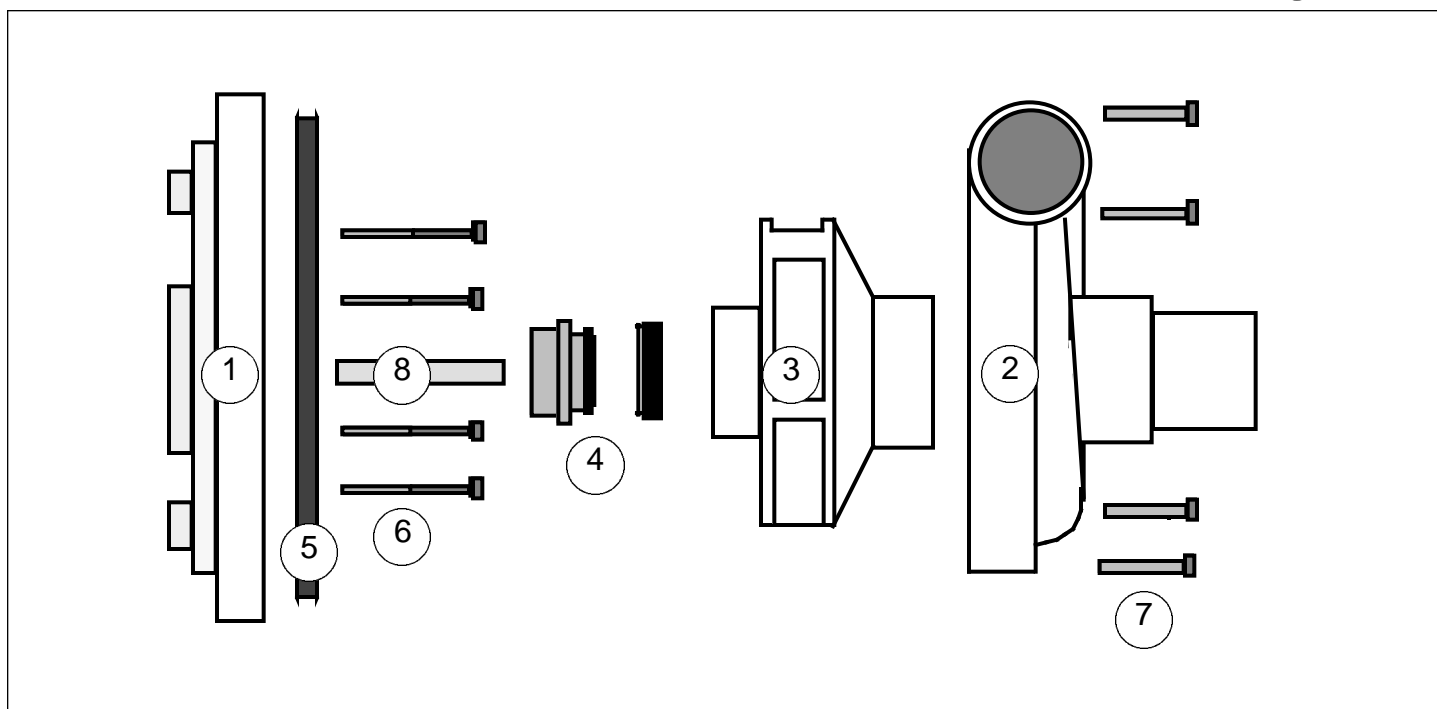
**HOW TO INSTALL THE HOSE ADAPTOR PUMP INTAKE COUPLER:** (For all models except the P-50 and P-300 Series).

The tolerance of the Hose Adapter is critical for proper pump performance. The hose Adapter should be installed as close as possible to the intake portion of the impeller. Center the adapter into the housing opening and press in by hand to locate it into place and place a wooden block against the outside of the adapter and gently tap until the adapter is firmly seated against the face of the impeller. Pull the starter rope until the engine turns. When the coupler is properly seated, the engine should be somewhat difficult to turn over, making sure that the adapter is against the face of the impeller.

**COMPRESSOR DRIVE INSTALLATION:**

To install the shaft pulley and belt for a compressor adaptation, the pump must be completely removed from the engine. For larger engines to include the 8 HP through 18 HP engines, slide the pulley to the back of the engine shaft and tighten the set screw. To install the engine pulley on smaller engines to include the 3HP to 5HP Engines, the furnished bushing should be pressed onto the pulley at the factory to ensure proper alignment and spacing. If you choose to install it yourself, this can be accomplished by placing the pulley on a flat surface, center the bushing in the hole of the pulley and gently drive it through by tapping it with a hammer taking care not to damage the bushing. The bushing should be pressed or driven through the pulley, in a flush position to the other side of the pulley. It should not extend though the other side. Then install the V Belt before placing the pulley and bushing over the engine shaft. After the pump is installed and secured, mount the compressor and compressor pulley. Install the V Belt to compressor and make sure that the alignment is correct. You can compensate for some misalignment by adjusting the compressor pulley on the compressor shaft. Tighten firmly the set screw and all bolt and check for any misalignment before starting.

# P90 Pump Breakdown Assembly



Component Number	Quantity Used	Part Number	Description
1	1	903	P90 PUMP MOUNTING PLATE
2	1	951	P90 PUMP HOUSING
3	1	952	P90 PUMP IMPELLER
4	1	WPS2	PUMP SEAL 2.5/3.5/5HP
5	1	953	P-90 CORK GASKET
6	4	AHSFH250281000	Flat Head allen head bolt 1/4\"-28x1"
7	4	AHS250201250	1/4\"-20 X 1 1/4\" ALLEN HEAD BOLT
8	1	954	1/4 28 x 1 Full Thread Stud
9	1	P90H (Not Shown)	New Handle for P90GH 2.5 Honda

## SEAL REMOVAL AND INSTALLATION

1. Remove the four housing bolts and remove the pump housing. 2 The impeller is directly mounted to the engine shaft. Unscrew in a counter clockwise direction. Lock the shaft in a fixed position to prevent it from turning. Insert a simple a pointed tool such as a screwdriver or an awl through starter housing cover, locking the flywheel into place. Rotate the pump impeller counterclockwise until it breaks loose. Unscrew the impeller until it comes off. All of our pumps use a two piece seal assembly. The ceramic side of the seal fits in side the back of the (3) P90 PUMP IMPELLER. . The rubber side goes against the impeller. The spring loaded side is pressed inside the (1) P90 PUMP MOUNTING PLATE. The spring side of the seal should be pressed in with a thin bead of silicon sealant. We recommend that the seal be pressed in with or pump setting tool WPK2 Pump Seal Kit. Thread the impeller onto the engine shaft until the impeller is hand tight. Install the housing and use care not to over tighten the bolts to avoid stripping the threads as they are a soft alloy aluminum.

**ALWAYS REMEMBER THAT RUNNING YOUR PUMP DRY WILL LEAD TO POSSIBLE DAMAGE AND DESTRUCTION OF THE WATER PUMP SEALS. IT IS RECOMMENDED TO KEEP A SPARE WATER PUMP SEAL KIT (WPK2) AND ONE ADDITIONAL WATER PUMP SEAL (WPK2) WHEN WORKING IN AN ISOLATED AREA.**

See "INSTALLATION & REPLACEMENT OF A PUMP SEAL, HOSE COUPLER & COMPRESSOR DRIVE ASSEMBLY" For further details on pump repair.