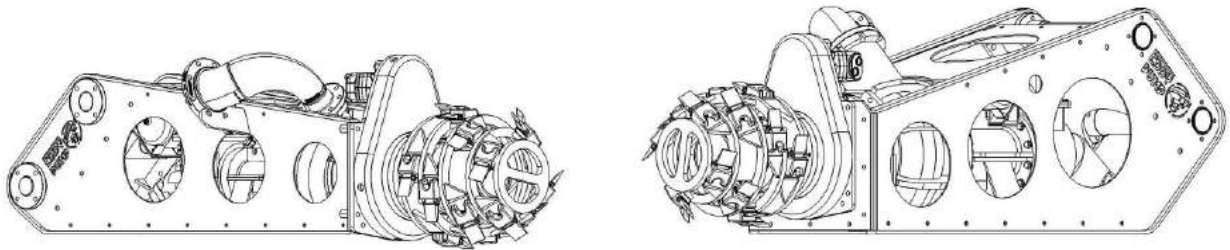


Operation and Maintenance Manual

Excavator Attachments



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Forward

Literature

The information contained herein is as complete as possible at the time of publication. It is subject to change or revision without notice.

Safety

Illustrations or depictions may differ from your product and are meant for illustrative purposes only.



Additional skills and knowledge not contained in this manual will be required to safely install, operate, and service your Eddy Pump product. Failure to follow any and all safety warnings and/or installation and operation instructions will cause damage to the equipment and the potential injury or death of the operator or others.

Safety

Read and understand this manual. Observe all warnings and precautions. Failure to follow these instructions may cause your Eddy Pump products to fail.



WARNING

1. **ALWAYS** disconnect and lock out power to the driver before you perform any installation or maintenance and restrict access to authorized and trained personnel.
2. **DO NOT** install on an excavator that fails to meet the minimum requirements.
3. **NEVER** exceed the maximum speeds or pressures of the cutter head drive or the main Eddy Pump drive. It can cause injury or damage to the equipment.
4. **NEVER** run the Eddy pump in reverse rotation. It will cause the rotor to spin off and cause damage to the seal and pump.
5. **NEVER** run the pump dry or in any way which allows the seal to overheat. Overheating will cause seal failure. Seal and bearing replacement will be required.
6. **NEVER** operate pump without the proper seal support system. Seal failure will result in seal and bearing replacement.
7. **NEVER** use a pry bar or screw driver in such a way as to damage mating surfaces.
8. Ensure correct rotation of the shaft and rotor.
9. Do not allow discharge pressure in the pump to exceed 150psi.

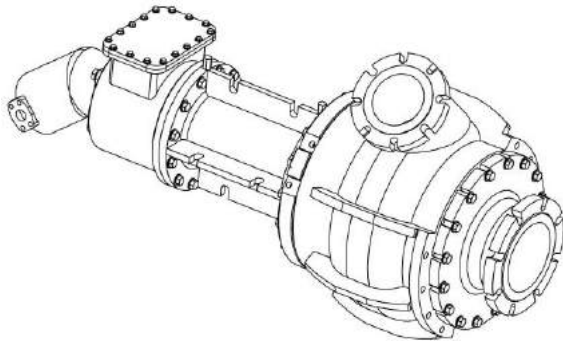
Eddy Pump products are very heavy. You should never work directly under an Eddy Pump or its components. Serious injury or death may result. Take all required precautions associated with rigging heavy objects.

To protect yourself and your equipment during installation and maintenance:

1. Do not drop the pump or drop heavy items on them.
2. Do not over torque the bolts when installing the intake and discharge piping.
3. **Do not run the pump dry.**
4. Do not run the pump with a dead head or a plugged suction.
5. Do not allow the pump to over-heat.
6. Do not operate the pump without seal air pressure.
7. Do not allow reverse flow through the pump.

Product Information

Eddy Pump Systems



The Eddy Pump is uniquely engineered to outperform its competitors. Unlike alternative pumps, the Eddy Pump is optimized for:

- High Production
- High Concentration Solids
- High Viscosity and Specific Gravity Fluids
- High Abrasive and Corrosive Materials
- Low Ownership Cost

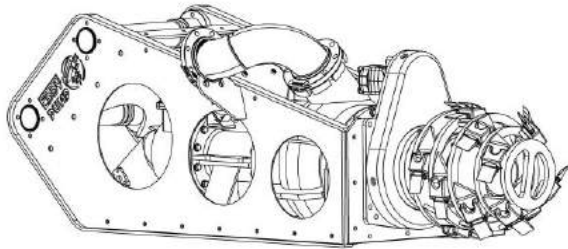
All while featuring a non-clogging design to minimize machine downtime. For a detailed list of additional benefits the Eddy Pump provides, visit www.EddyPump.com.

Eddy Pumps are offered in either a commercial or heavy duty product class in 2, 3, 4, 6, 8, 10, and 12 inch discharge sizes.

Most Eddy Pumps feature a Plan 54 seal support system. **NEVER** run without the appropriate seal support system coolant.

Eddy Pump Accessories

Excavator Attachment

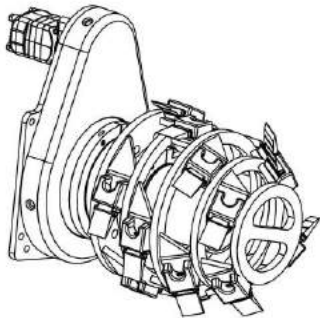


The excavator attachment is the perfect solution for your dredging needs. This excavator frame allows your Eddy Pump to be mounted, powered, and operated on an excavator using the excavator's own auxiliary hydraulics. The excavator frames feature a rotating guard with optional cutting teeth for sediment of higher shear strength.

It is designed to be mounted directly to an excavator and offers the benefits of:

- Continuous material extraction
- High suction and discharge head
- Low maintenance

Rotating Guard and Cutter Head



The rotating guard (or supplied cutter head) was developed for high torque application and offers numerous benefits such as:

- Classifying Material
- Agitating and Suspending Sediment
- Shifting and Crushing Material for Pumping (cutter head option)

The cutter head option is powered by a high torque hydraulic motor. Teeth should be replaced before the holders become at risk of wear.



WARNING

ALWAYS lock out the excavator to avoid activating the guard while being serviced.

Excavator Attachment Installation



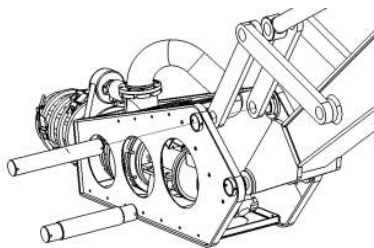
WARNING

- **ALWAYS** disconnect and lock out power to the driver before you perform any installation or maintenance tasks.
- **DO NOT** install on an excavator that fails to meet the minimum requirements.

Fastener Check

Fasteners may have become loose during shipment. It is important to inspect and torque all fasteners prior to any other installation procedures.

Frame

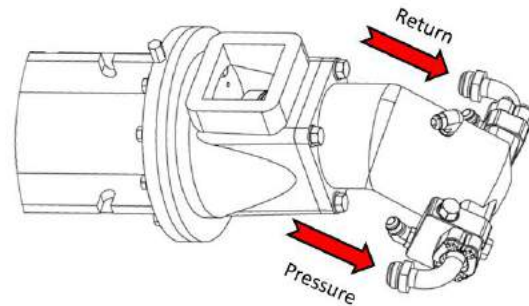


1. Remove the retainer bolts that secure the bucket and stick pins in their respective bushings.
2. Grease pins before installation.
3. With Eddy pump attachment flat on ground, position and align with attachment and install pins

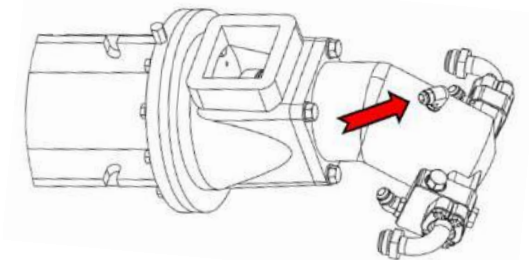
Note: Some excavators require a sleeve that must be installed into the excavator stick first.

Eddy Pump Hydraulics

1. Hook up the hydraulic pressure line to the attachment fitting shown below. Always use a check valve and confirm correct pump rotation. Failure to do so can result in injury and severe damage to the pump.



2. Hook up return line opposite the pressure line.
3. Install the case drain line from tank to main motor as shown below:



WARNING

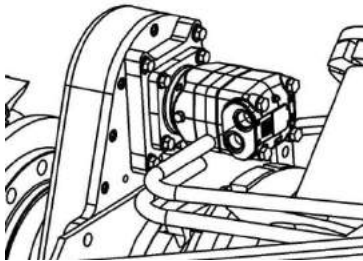
- **NEVER** run the Eddy Pump without case drain hose installed.
- **NEVER** run the Eddy Pump without crossover check valve installed.
- **DO NOT** exceed 40 psi in the case drain.
- Hose fittings can loosen up during operation, periodically check that the fittings are tight.

Cutter Head Hydraulics

Connect hoses to cutter head motor. Always use a check valve and confirm correct rotation of cutter teeth.

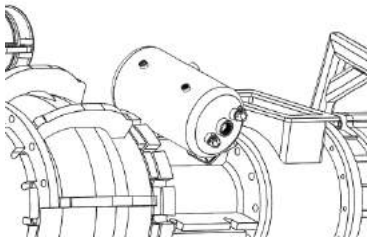
Note: The hoses **MUST** be located and secured in a way that allows for full freedom of movement of the attachment during operation.

Note: The cutter head is designed to rotate in the same direction as the pump's rotor.



Seal Support System

1. Remove seal support cap.
2. Fill the seal support tank with coolant (50/50 Glycol-water mixture) about 2/3 full.
3. Re-install seal support cap using thread sealant.
4. Pressurize tank between 25 - 35 psi using a standard bicycle hand pump or air compressor. Take caution to not over pressurize the vessel, this can and will damage the seal.
5. Ensure the tank is holding pressure by checking the pressure gauge reads between 25 – 35 psi. Make sure to close the valve after filling and/or checking the gauge.



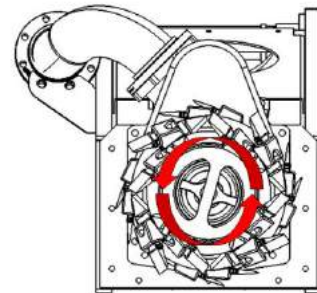
Pump Rotation

At this stage, it is necessary to ensure the proper rotational direction of the rotor. If the pump rotation is wrong, the rotor **WILL** loosen and damage the equipment. There are two options to verify the correct rotation of the rotor:

Option 1:

1. Look through the cutter head with a light so that the rotor is clearly visible.
2. Slowly power on the motor.
3. Ensure the rotor is spinning counter-clockwise.

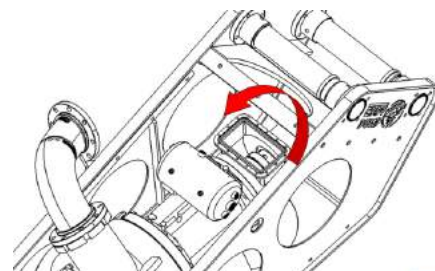
Note: If the rotor is not spinning in the correct direction, you must switch the hydraulic lines making sure that the check valve is oriented correctly. If it is connected backwards the pump rotor will not turn.



Option 2:

1. Remove top plate on the excavator frame. Then remove the connection housing plate, as to see the shaft and coupling rotation. Take caution to not damage and dirty the o-ring in place.
2. Slowly power on the motor.
3. Facing the cutter head, ensure the shaft is rotating counterclockwise.

Note: If the rotor is not spinning in the correct direction, you must switch the hydraulic lines making sure that the check valve is oriented correctly. If it is connected backwards the pump rotor will not turn.



Cutter Head Rotation

Ensure the cutter head rotates in the same direction as the pump (counterclockwise). If the cutter head is not spinning in the correct direction, you must switch the hydraulic lines making sure that the check valve is oriented correctly. If it is connected backwards the cutter head will not turn.

Table 1: Recommended Hydraulic Flow and Pressure Settings

	Hydraulic Motor Size	Recommended Flow / Speed			Maximum Flow / Speed			Maximum Pressure	
		GPM	lpm	RPM	GPM	lpm	RPM	psi	bar
Cutter Head	315cc	10	38	40	13	49	50	3000	207
4" Eddy Pump									
10" Rotor	55cc	22	82	1500	25	95	1750	5000	345
12" Rotor	75cc	30	114	1500	35	132	1750	5000	345
6" Eddy Pump									
12" Rotor	108cc	34	129	1200	50	189	1750	5000	345
14" Rotor	160cc	51	193	1200	74	280	1750	5000	345
16" Rotor	180cc	57	216	1200	83	314	1750	5000	345

DO NOT EXCEED the following settings. Operating outside these ranges may cause injury and may damage the equipment.

Operation



WARNING

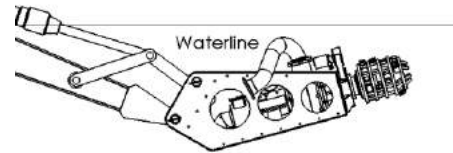
- **ALWAYS** disconnect and lock out power to the driver before you perform any installation or maintenance tasks.
- **NEVER** run the Eddy pump in reverse rotation. It will cause the rotor to spin off and cause damage to the seal.
- **NEVER** run the pump dry. The single seal requires process fluid for cooling and will be damaged if ran dry.
- **ALWAYS** bleed off any stored up hydraulic pressure when pump is not in use.

Pre-Startup Procedure

1. Always inspect discharge hose and ensure the system has been thoroughly flushed (as to remove dirt or debris in the pipe system) to prevent failure at initial pump start-up (typically done during pump shutdown).
2. Grease bearings using water resistant bearing grease like Mobil 462 or Frontier IMG 124 through both zerk fittings on the bearing housing. Use 2 to 3 strokes. Make sure to close valve on zerk fitting after greasing.
3. Check the fluid level and pressure of the seal support system.
4. Check the oil level of the hydraulic system
5. Check for any visible damage, hydraulic leaks, hose condition, and hydraulic fluid level.

Note: Replace hydraulic lines that show exposed steel core immediately.

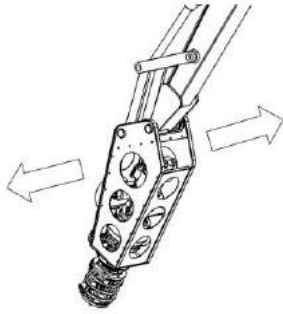
Startup Procedure



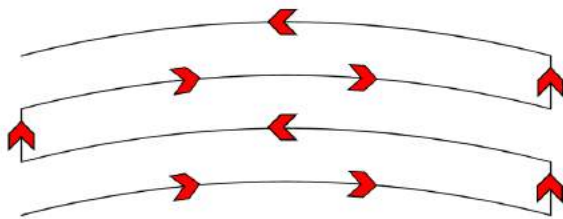
1. Submerge the pump in a horizontal position just below the water and allow the air to evacuate from the pump case (commonly referred to as “burping the pump”).
2. Start pump.
3. Bring the hydraulic motor to the rated speed as quickly as possible.
4. If instrumentation is available verify flow rate and pipeline pressure:
5. Begin dredging.

Note: Performance can vary greatly with sediment type and discharge setup.

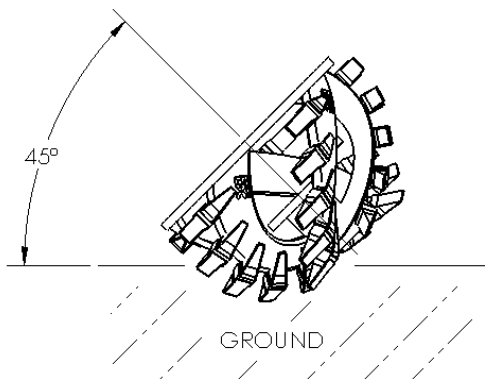
Standard Operation



In ideal conditions, the dredging motion should follow a path, as shown below, such that the excavator swings left to right, advances forward, then swings right to left. **NEVER** expose the suction to the air or raise the pump above the water level during operation. Engage the rotating guard or cutter head as required.



The Eddy Pump's cutter head should meet the dredging material at approximately 45 degrees to maximize production.



It is **HIGHLY RECOMMENDED** to monitor production through the excavator cabin via a pressure gauge and flow meter installed in-line with the discharge plumbing and pressure gauges in-line with the hydraulic cutter and pump motors. This feedback system will optimize the system for stable flow and aid in maximizing production while preventing downtime caused by clogged pipelines.

If installed, the operator should **ALWAYS** be verifying flow rate, pipeline pressure, hydraulic pressure to motors, and seal support pressure while operating.

Minimize the use of the excavators stick and boom hydraulic circuits while operating the pump. These hydraulic circuits can exceed the rated load capacity of the excavator attachment.

DO NOT apply more force than required on the excavator attachment. Brute force is not a substitute for proper dredging techniques and can damage the equipment. Contact Eddy Pump directly for specialized dredging operation questions.

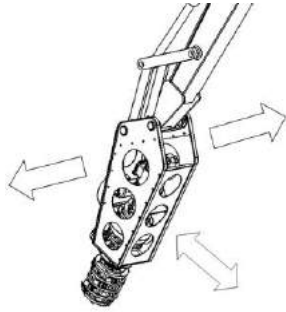
NEVER apply enough down force to lift the excavator off its tracks using the Eddy Pump attachment.

If the Eddy Pump is running off the excavator's auxiliary hydraulics, the use of other hydraulic circuits can drastically slow production of the Eddy Pump, especially the stick, boom, and track circuits. The operator should operate primarily the swing and bucket hydraulic circuits during dredging. Excessive use of other hydraulic circuits can subject the equipment to unnecessary abuse caused by the lack of hydraulic power available to the cutter head and drive motors.

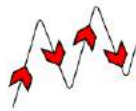
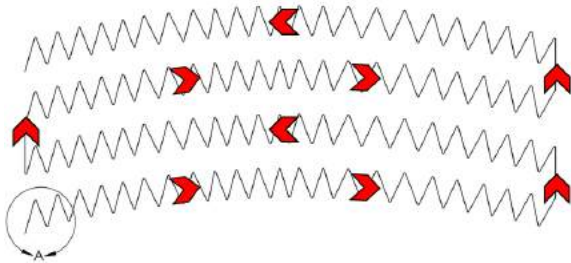
Generally, improper operation can be noticed by:

1. Low production (discharge flow and pressure)
2. Stalling of cutter head / pump under minimal loads
3. Excessive vibration
4. Excessive flow
5. Cavitation (sound of small marbles, air bubbles, within the volute when rocks are not present)

Advanced Operation

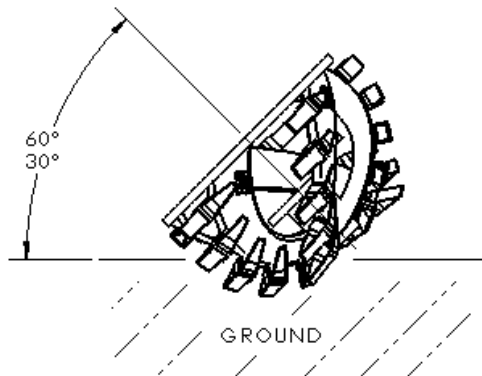


For more consolidated material, the dredging motion should simulate the digging motion of the excavator (using the bucket's hydraulic circuit) while swinging the excavator. This motion should resemble the path shown below.



DETAIL A

For maximum production, the cutter head should not vary more than 30 to 60 degrees relative to the dredging material.



Balance the Load

Running the Eddy Pump at higher than necessary flow rates may result in cavitation and will result in unnecessary wear of the pumping systems. It is recommended that the user operate the pump in its predetermined range. See Table 1 on page 9.

Shutdown Procedure

1. While pumping, raise pump in a horizontal position just below the water.
2. While the pump is running, allow the hose to pump open water for 5-7 minutes or until solids are flushed from discharge pipeline.
3. Shutdown the pump.
4. Raise the pump above the water.
5. Bleed off any stored up hydraulic pressure.

Maintenance

Bearing Grease

Every 10 Hours

Using a grease gun, regularly fill the bearing housing with 2-3 pumps of grease. Bearing housing should be greased every 10 hours of operation or after periods of prolonged inactivity. Always use water resistant bearing grease like Mobil 462 or Frontier IMG 124 to avoid corrosion of the bearings.

Seal Support Coolant

As-Needed Maintenance

Regularly inspect the fluid level of the seal support system looking through the eyeglass window. Fill using only 50/50 glycol/water-based coolant by:

1. Depressurizing Tank by pushing in the Schrader valve.
2. Unscrew cap.
3. Fill the tank about 2/3rds with coolant by viewing the eye glass.
4. Reinstall cap using thread sealant.
5. Pressurize tank using a standard bicycle hand pump or air compressor to 25-35 psi.

Chain Box Oil

Every 500 Hours or Annually

After every 500 hours of operation or once per year, inspect the oil level of the chain box.

1. Raise the excavator attachment so the chain box is near vertical
2. Remove both the top and bottom NPT plug, old oil may discharge from bottom NPT plug.
3. Fill with Chevron Clarity or comparable 30W oil until oil begins discharging from the bottom NPT plug.
4. Reinstall the NPT plugs using thread sealant.

Cutter Teeth Replacement

As-Needed Maintenance

Once cutter teeth become worn, replace with appropriate teeth (see parts manual). They are held by friction alone. Simply, pry off worn teeth and hammer on replacements.

O-ring Inspection

As-Needed Maintenance

Whenever servicing the excavator attachment, it is good practice to inspect and re-lubricate o-rings you come into contact with. It is recommended to use a standard and clean grease.

Mechanical Face Seal Inspection

As-Needed Maintenance

If any of the mechanical face seals require inspection or reinstallation simply:

1. Confirm it is clean and free of damage.
2. Prior to installing a new seal, the shaft should be checked for surface imperfections that would damage the seal o-rings. Do not tamper with factory alignment or shims. If disassembly is necessary, consult the factory.
3. Follow manufacturers seal installation procedure precisely.

Note: These seals are very fragile and very sensitive to dirt and debris. Handle with care.