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Our dedication to quality guarantees the utmost in performance, equipment uptime and product durability ensuring your complete satisfaction through a quick return on your investment.

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DON'T LET YOUR BREAKER BREAK YOU

- Silenced with Box Housing design
- High efficiency with "optimal" control valve system
- High impact energy delivered by gas-hydraulic mechanism
- Breaking hard rock, reinforced concrete and metallurgic slag with ease



*- How to increase your
hammer's useful life*



Along with your newly acquired hydraulic hammer comes its reputation for shaking the life out of the base machine. It is this myth that will often be at the root of an owner's decision to mount his new investment on the oldest excavator in the fleet. Hardly seems a logical path to a good return on investment does it?

Enter into the equation an operator who was trained primarily to dig with a bucket and you can actually watch the useful lifespan of your hammer deteriorate.

The good news is that current technologies make the use of hydraulic hammers much easier on the base machine and the proper training of operators will significantly increase the productivity of not only your breaker, but your other equipment as well.

Your first challenge is to ensure that you properly match the hydraulic hammer to the machine. Relative weights and leverages of both the excavator and the breaker are critical components in the determination of a suitable match. Ultimately, the pairing of machine and hammer should yield optimal performance and minimal collateral damage.



Vulcan Attachments Inc. offers a charge kit you can use to check the pressure and refill gas supplies when necessary. As the chamber holds only a small volume of gas, frequent pressure checks are not recommended as each test releases a small amount of the gas and can over time, cause a significant drop in chamber pressure. The charge should only be tested when breaker behaviour warrants.

Basic Troubleshooting Guide

If your breaker stops functioning suddenly and inexplicably, ensure:

- it is connected properly (hoses were hooked up incorrectly)
- proper tool is installed
- down force was applied to the tool
- none of the supply valves have been closed or tampered with

If it still refuses to start, you will need to provide the following information to Vulcan Attachment Inc.'s technical support department:

- flow rate in the pressure line at operating temp
- pressure reading at the breaker inlet
- back pressure reading in the return line
- Gas pressure in the back head



Managing Your Assets

With the introduction of scheduled maintenance programs, equipment condition and life expectancies have improved and increased. With the migration to *preventative maintenance* programs, many businesses are experiencing a significant cost benefit and an increase in equipment uptime. Ensuring that your operators understand not only the actual value of your equipment, but the earning potential of your equipment is vital in gaining their co-operation in a maintenance/inspection program. Breaker maintenance tends to get overlooked simply because of their appearance. As they are subjected to the extreme conditions of the industry, their appearance alone can discourage maintenance. Vulcan Attachments Inc. suggests that hammers be repainted and/or re-decaled whenever their overall appearance deteriorates.

Nitrogen Gas Powers Your Hydraulic Breaker

Hydraulic pressure pushes up the hammer's piston into a sealed chamber of nitrogen gas. When the pressure switches at the top of the stroke to power the down stroke, the pressurized nitrogen gas reverses the piston's upward thrust and adds its energy to the breaking stroke.



The following formula is an invaluable resource in this pairing process:

$$0.30 < \frac{A \times X}{B \times Y} < 0.50$$

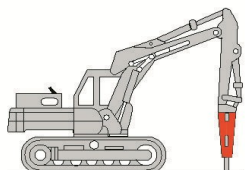
A =	Machine's maximum reach
B =	Half the length of the wheelbase
X =	Weight of hammer
Y =	Weight of machine

If your end product is a ratio of greater than 0.50, then the breaker is too heavy for the machine. Conversely, a ratio of less than 0.30 is an indicator that you will need a larger breaker to achieve peak performance with your machine.

Vulcan Attachments Inc. also suggests that testing the machine's flow rate and pressure before putting your hammer into service will aid in extending its useful life. Pumps may need an upgrade to original specifications before an older machine will effectively fire a hammer. In addition,, you will need to ensure the hydraulic flow and pressure are set to properly support the use of the hammer.



What your operators should know



It is your operators who control the machine's hydraulic power application to the hammer.

The excavator your hammer is mounted on is by design manufactured to deliver breakout force to a *bucket*. With your breaker mounted, an unskilled operator can easily turn the force generated into a destructive, rather than productive power.

Operators should pay close attention to the difference between an empty blow and a solid one. A trained operator will be attune to the hollow, ringing sound of a blank blow. Repeatedly firing vacant blows can damage components such as pins, tools and other internal parts of the breaker. Bending stresses that result from prying with the tool can damage bushings and actually bend the hammer's outer housing and cause undue stress on the side rods.



One of the most common issues with hammers lies in the removal process. It is simply vital the inlet and outlet hoses are coupled together or capped. A careless operator can simply leave them to fall in the dirt without realizing the potential damage this may cause. This can be fatal. Just imagine the impact of particulate and other debris on internal components. The induction of such foreign materials will quickly put an end to your breaker's useful life.

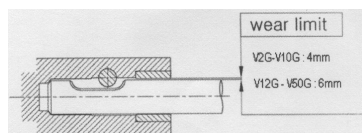
Caps are available to cover hose and tube ends disconnected from the system. Connectors should be wiped clean with a cloth before plugging/capping them.

Your hammer should be stored in its stand. Alternatively, it can be stored on a raised, flat surface with the tool tilted downward so that water is not able to collect. Your breaker should be housed away from dust, standing water and dirt. A tarp or plastic cover is also suggested when storing your breaker to protect it from environmental influences.



Vulcan Attachments Inc. recommends a thorough inspection at regular intervals in order to assess how well your hammer is wearing. Regular inspections will also reveal whether or not regular maintenance is being performed. Each user will implement their own personalized maintenance regimen based on their own experience and specific use of their breaker.

- Proper training of operators is critical in extending the life of your hydraulic breaker
- Remove the tool and wipe away excess grease from housing. Visually inspect for wear, notches, or cracks in the bushings or pin surfaces.
- Worn pins should be replaced prior to putting the hammer back into service.
- Severely damaged surfaces are indicative of lubrication starvation, improper grease type or unsuitable application.
- Wear charts are available that outline minimum acceptable dimensions for the tool and bushing and most include specifications for bolt torques to hold the breaker's components in alignment. See example below.



The following information is provided by Vulcan Attachments Inc. as a guideline of basics for your operators to follow:

- Operators should be provided a copy of the instruction manual
- Hammer should be utilized at a 90° angle to the material, this will protect the hammer during use.
- When breaking horizontal material, apply enough downward force with the boom control to *feel like* the base machine may lift off the ground
- Ensure proper load to the tool. Too light a load and some breaking force can be transmitted to the hammer, the boom and the base unit. Too heavy a load can result in elevating the base unit. A sudden drop will likely result in damage to the tool.
- When breaking concrete, start at a crack or joint to avoid binding the tool.
- Daily operating maintenance schedules should be tightly adhered to. Your breaker if not equipped with an automatic greaser should be greased hourly. A visual inspection should also be made by the operator regularly to check for fluids dripping from the tool or bushing area.
- Operators should ensure an impact resistant shield or cab window is in place to protect them from flying debris.
- Avoid overheating the tool tip by not striking the same spot for more than 15 consecutive seconds.



The following is a brief overview of a pre-operation inspection that should be conducted by the operator prior to every use of your hydraulic hammer.

- Look for hydraulic fluid dripping from the tool or bushing, this can signal a lower seal leak.
- Check hoses and fittings for appropriate torque.
- Ensure suspension and shock absorbing system of the base unit is in good operating condition
- Side rod bolts should be tight
- An inspection of equipment mounts, boom pins and bushings for wear and cracks should be conducted prior to every use.
- A visual inspection of the tool at the bushing for obvious signs of wear should also be part of your pre-start inspection routine.

Safety First

Your operators are an invaluable resource who's safety is always first. Before allowing an operator to put into use any hydraulic attachment, they should be provided a copy of the manufacturer's safety instructions and operating manual.



Maintenance and Wear



How you grease your hammer is almost as important as how often. If your hammer is not equipped with an Automatic Lubrication System, you will need to manually grease it. The tool must be pressed against a hard surface until it stops inside the hammer. This ensures proper distribution of grease and reduces the chance of the hammer's first loaded stroke forcing grease past the lower seals into the cylinder.

Greasing at regular intervals is crucial to getting the most life from the tool and tool bushings. The amount of grease and the interval will vary from job to job and hammer to hammer but as a rule of thumb, the hammer should be greased at the beginning of the job and typically every hour of use after that.

Lubrication is critical to the proper function of your hammer. A good quality high temperature EP2 multi-purpose lithium based grease with molybdenum (moly) or other anti-wear additives should be used. This type of grease adheres well to metal, is non-corrosive and is designed to handle heavy loads. It is also resistant to moisture.