OPERATOR OVERVIEW GUIDE
FOR THE HYDRAULIC BREAKER

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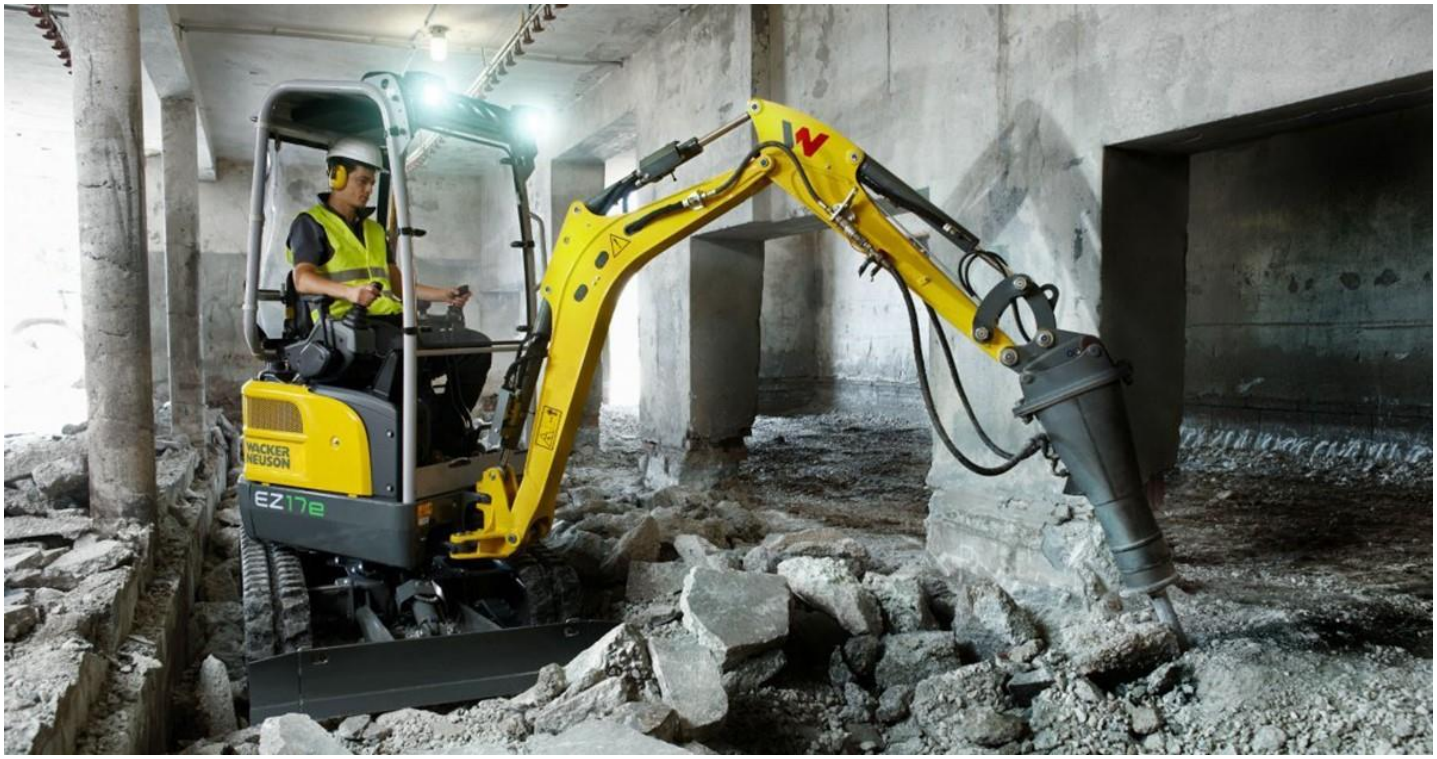
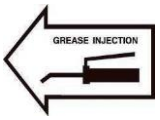


Plates & Decals

Reference	Image Content	Signs
Hearing protection must be worn	Head wearing ear protection	
Consult manual for proper service procedures	Technical Manual	
Vacate work area while the breaker is in operation	A working breaker with diagonal slash	
Inject grease into the hole with grease gun periodically	Grease Gun	
"HIGH PRESSURE" requires dis-charging before disassembly	Accumulator, Back Head	
Caution - the breaker is "HOT"	High Temperature	

SAFETY

All mechanical equipment can be hazardous if operated without due care or correct maintenance. Most accidents during machine operation and maintenance are caused by failure to observe basic safety rules or precautions.

Accidents can often be avoided by recognising potentially hazardous situations before the incident occurs.

Since it is impossible to anticipate every circumstance that might involve a potential hazard, warnings in this guide and on the machine are not all-inclusive. If procedures, tools, working methods or operating techniques not specifically recommended by the manufacturer are used, you must satisfy yourself it is safe both for you and for others. Also ensure the breaker will not be damaged or made unsafe by the chosen method of operation or maintenance procedure.

Safety is not just a matter of responding to warnings. When working with the breaker, always pay attention to potential hazards and how to avoid them. Do not work with this attachment until you are sure you can control it. Do not start any job until you are sure you and those around you will be safe.

WARNING!

Read the following warning messages carefully. They inform you of hazards and how to avoid them. If proper precautions are not taken you or others could be seriously injured.

Operator's Manual

- Read and understand the Operator's Manual.
- The machine operator must be thoroughly familiar with how to operate and maintain the breaker and should preferably undergo training on the breaker.
- The machine operator must follow the rules and recommendations in this manual and the Operator's Manual for the machine, but also pay attention to any statutory and national regulations or specific requirements or risks that apply to the work site.

Care and Alertness

- Always take care and stay alert when working with the breaker. Always be careful. Always be alert for hazards. The possibility of a serious or even fatal accident is increased when you are under the influence of alcohol or drugs.

Clothing

- Suitable safety clothing should be worn.
- Use a hard hat, safety glasses, protective shoes and gloves and an approved respirator (dust mask) or other protective articles when required.

Training

- You and others can be killed or injured if you perform unfamiliar operations without practicing them first. Practice away from the job site, in a clear area.
- Keep other persons away. Do not perform new operations until you are sure you can do them safely.

Communication

- Bad communication can cause accidents. Keep people around you informed of what you will be doing. If working with other personnel, make sure they understand any verbal or non-verbal signals you will be using.
- Work sites can be noisy. Do not rely only on spoken commands. See the signaling diagram in the Operator's Manual of the machine.

Work Site

- Work sites can be hazardous. Inspect the site before working on it.
- Check for potholes, weak ground, hidden rocks, etc. Check for utilities (electric cables, gas and water pipes, etc.). Mark the positions of underground cables and pipes if you will be breaking the ground.

Banks and Trenches

- Banked material and trenches can collapse. Do not work too close to banks and trenches where there is a danger of collapse.

Safety Barriers

- Unguarded equipment in public places can be dangerous. Place barriers around the machine to signify a safe working area.

Flying Chips of Rock

- Protect yourself and the work area against flying chips of rock. Do not operate the breaker or the machine if someone is too close.
- Keep windows and doors closed during operation. Only machines with enclosed cabs may be used for breaker operation. For skid steers, a special application (demolition door) must be fitted when operating.

Equipment Limits

- Operating the breaker beyond its design limits can cause damage and can also be dangerous - see Specification section.
- Do not try to enhance the performance of the breaker by unapproved modifications.

Equipment Condition

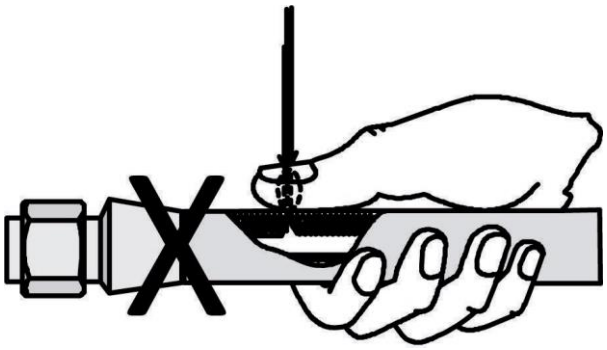
- Defective equipment can injure you and others. Do not operate equipment which is defective or has missing parts.

Hydraulic Pressure

- Hydraulic oil at system pressure can injure you. Before disconnecting or connecting hydraulic hoses, turn off the engine, operate the controls to release pressure trapped in the hoses and wait 10 minutes. During the operation, keep persons away from the hydraulic hoses.

- Fine jets of hydraulic oil at high pressure can penetrate the skin. Do not use your fingers to check for hydraulic leaks. Do not put your face close to suspected leaks. Hold a piece of cardboard close to the suspected leak then inspect it for signs of hydraulic oil. If hydraulic oil has penetrated your skin, seek medical treatment immediately.

- There might be pressurized oil trapped inside a breaker even if it is disconnected from the machine. Be aware of possible blank firing while greasing or removing and installing breaker tools.



Never use your hand when looking for leaks since oil under high pressure may penetrate your skin.

Pressure Accumulators

- The breaker may incorporate one or two pressure accumulators. The accumulators are pressurised even when there is no hydraulic pressure to the breaker.
  Attempting to remove or dismantle the accumulators without first releasing the pressure can cause injury or death. Do not try to dismantle pressure accumulators, contact an authorised dealer.

Lifting Equipment

- You can be injured if you use faulty lifting equipment.
  Make sure that the lifting equipment is in good condition. Make sure that the lifting tackle complies with all local regulations and is suitable for the job. Make sure the lifting equipment is strong enough for the job and you know how to use it.

- Do not use the breaker, or any of its parts, for lifting. Contact an authorised dealer to find out how to lift with your machine.

- Never leave a lifted breaker, or any other lifted load, unattended.
- Follow the Lifting Instructions.

Spare Parts

- Use only genuine spare parts. Use only genuine tools with hydraulic breakers.

- The use of non-genuine or counterfeit parts may damage the breaker.

Metal Splinters

- You can be injured by flying splinters when driving metal pins in and out. Use soft faced breaker or drifts to remove and fit metal pins, such as pivot pins.
- Always wear safety glasses.

Principle of Installation

The breaker is installed on the machine similarly to a bucket or other attachment.

The breaker is connected to the machine hydraulics through a breaker circuit. If the machine is already equipped with such a circuit, only suitable hoses and fittings are required. If the machine does not have a suitable circuit for running the attachment, one must be ordered from your dealer. This may require more complex installation, including new piping and additional valves such as a directional valve and pressure relief valve.

Operating Temperature

The operating temperature is -20°C to +80°C (-4°F to +176°F) for 0060 - 7000. If the temperature is below this range, breaker and tool require preheating before operation. Operating at too low a temperature can damage the accumulator's membrane and tool. During operation they will remain warm.

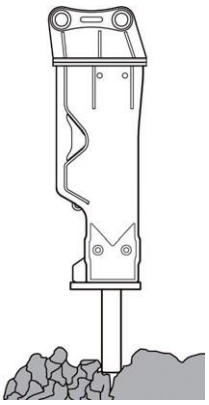
NOTE! The temperature of the hydraulic oil must be monitored. Correct oil grade and temperature will ensure correct oil viscosity.

Principles of Breaking

To increase the working life of the breaker correct working method must be adhered to, and the correct tool chosen for the job. There are essentially two ways of breaking with a hydraulic breaker.

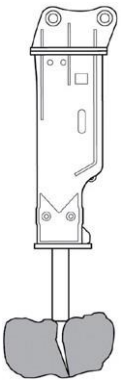
Penetrative Breaking (or Cutting)

In this form of breaking, a moil point or chisel tool is forced into the material. This method is most effective in soft, layered or plastic, low abrasive materials.



Impact Breaking

With impact breaking, the material is broken by transferring very strong mechanical stress waves from the tool into the material. The best possible energy transfer between the tool and the object is achieved with a blunt tool. Impact breaking is most effective in hard, brittle and very abrasive materials. The use of a point tool in hard material will cause the sharp edge to wear very quickly.



Choosing Tools

A selection of standard and special tools are available to suit every application. The correct type of tool is required for optimum possible results and maximum tool life. Choosing the best tool type for an application may require some experimentation. Tool availability depends on breaker model - contact an authorised dealer for more information.

Special Conditions of Use

If the breaker is to be used in special conditions such as;

- tunnel application,
- foundry cleaning,
- underwater operations,
- operations in extremely low or high temperatures,
- use of special hydraulic oils,
- other special conditions,

or for demolition work...etc, it may require modifications, special operating techniques, increased maintenance or special wear items. Contact an authorised dealer for instructions.

IMPORTANT! The breaker as a standard assembly must not be used under water. If water fills the space where the piston strikes the tool, a strong pressure wave is generated and the breaker may be damaged.

1. Safety First

- When parking the carrier, lower the breaker to the ground and turn the engine off.
- Never attach a cable or sling to the breaker to hoist a load. Doing so is extremely dangerous.
- Remove the tool before transporting the breaker.
- Keep all people and equipment away from the breaker during operation. Rocks flying from the breaker can cause serious accident.
- A safety screen is recommended to protect the operator from flying chips of rock. Keep windows and doors closed during operation. Only machines with an enclosed cab may be used for breaker operation. Machines of the canopy version (open cab) should not be used with a breaker.
- Do not use the breaker to sweep the ground of debris. This may damage the breaker and the housing will wear quickly.

2. Prior Inspection

- Check there is sufficient hydraulic oil and that it is not contaminated.
- Check that hoses, bolts and nuts are secure.
- Grease the shank part of the tool - see page 13.

3. Attaching the Breaker

- When attaching the breaker, an assistant is required who must be instructed by an excavator driver. All directions, signals etc. must be agreed on beforehand.
- The breaker should only be attached to an excavator with sufficient load capacity. If the excavator is too light it may become unstable under load and fall over.
- Do not touch any parts when the boom is moving.
- Check the pressure relief valve on the hydraulic system.
- Do not run any hydraulic lines through the driver's cab. These lines may start to leak or even burst. During operation, the hydraulic oil becomes very hot. Never touch the breaker.
- If the breaker is connected to an attachment bracket, special care must be taken to ensure the attachment bracket does not sustain any damage.

Equipment Limits

- Keep personnel away from the risk zone when the breaker is in operation. It is the operator's responsibility to determine the risk zone.
- If the noise level exceeds 90 dB(A), all workers in the immediate area, including the driver of the carrier, must wear hearing protection.
- Stop the breaking immediately if any one moves into the danger area, which is much larger for breaker operation than for excavator operation due to the risk of flying rock splinters.
- Check the oil temperature constantly. Temperature of the hydraulic oil must never exceed 80ºC. If higher temperatures are measured in the tank, an oil cooler must be fitted.
- At temperatures lower than minus 20ºC, the breaker should not be operated with cold hydraulic oil, the seals in the breaker may be damaged. Warm the engine up and move the boom around to raise oil temperature before operating the breaker.
- Only approved hydraulic oils should be used.
- Do not operate the breaker with the hydraulic cylinders fully extended or fully retracted. Damage to the machine may result.
- When operating the breaker, make sure it does not contact the machine or hydraulic lines.
- Apply the correct feed force on the breaker: Too much: Stabilizer leg feet are lifted from the ground or tracks are completely lifted from the ground. Too little: Tool does not stay firmly against material to be broken and machine may start to shake.
- Keep the tool perpendicular to the object at all times. If the object moves or its surface breaks, correct the angle immediately.
- Do not let the tool strike without resistance. Keep the feed force on the breaker steady and aligned with the tool during breaking.
- It is not usually effective to strike in one spot for more than 15 seconds at a time. If the object does not break, or if the tool does not penetrate, stop the breaker and change position of the tool. Working too long in one spot creates stone dust under the tool which dampens the impact effect and produces heat.
- Stop the breaker quickly. Do not allow the breaker to fire with no pressure on the tool (dry fire / blank fire). Frequent idle strokes will damage the breaker.
- To use the breaker most efficiently concentrate on the outer edge of the working area moving towards the middle in small steps
- When breaking hard or frozen ground, use the benching method. Start by clearing a small area from the edge. Then continue by breaking material towards the open area.
- When breaking concrete, hard or frozen ground, never pry with the tool. The tool may break.

Operating

The following precautionary measures should always be taken to rule out the risk of accident.

- Only operate the hydraulic breaker from the driver's seat in the excavator cab.

- Close the front screen / splinter guard on the drivers cab to avoid injury from flying rock splinters.

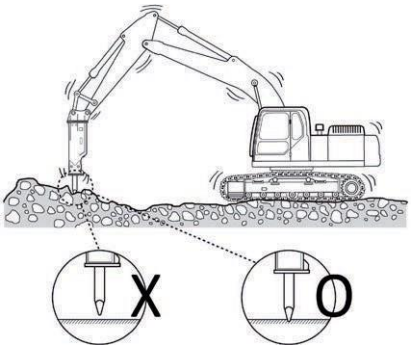
- Wear ear protection to prevent hearing impairment. Anyone in the immediate vicinity of breaker operations should also wear ear protection.

- Switch off the hydraulic breaker immediately if any one moves into the danger zone, which is a radius of at least 7 meters around the hydraulic breaker. Depending on the application greater distances may have to be observed.

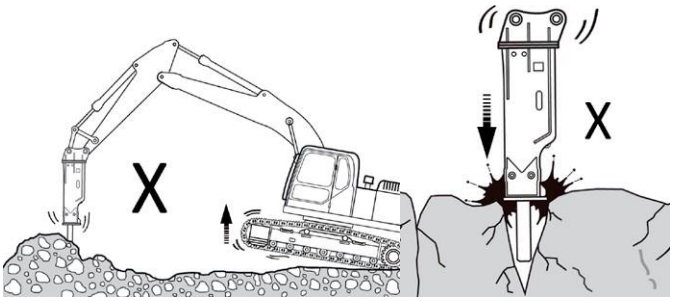
Correct Working Practice

1. Proper Thrust

To break effectively, a proper thrust force must be applied to the breaker. If thrust is too low, impact energy of the piston may not be sufficient to break rocks. Breaking force is transferred to the breaker body, arm and boom resulting in damage of those parts.



Conversely, if thrust is excessive or breaking is performed with boom of the carrier raised as shown below, the machine may suddenly tip toward the movement. The breaker body may strike the broken rocks violently resulting in damage.

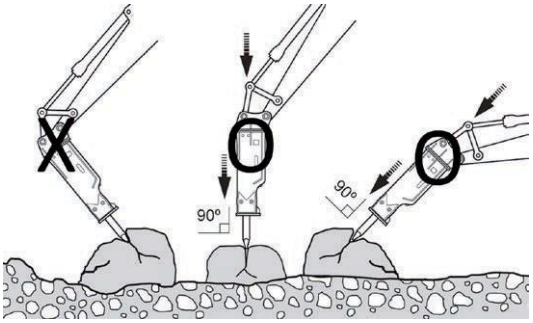


Excessive force as above may also result in vibrations being transmitted to the tracks causing damage.

Care is required to ensure adequate but not excessive force is applied to the breaker in operation.

2. Direction of Thrust

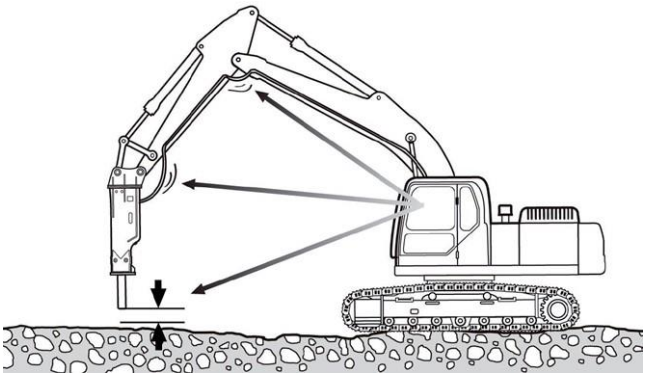
Thrust should be in line with the tool, which should be positioned so the breaking direction is as near vertical as possible. If the direction is oblique, the tool may slip causing tool and piston to be broken or seized. When breaking, ensure machine is in a suitably stable position.



Precaution for Operation

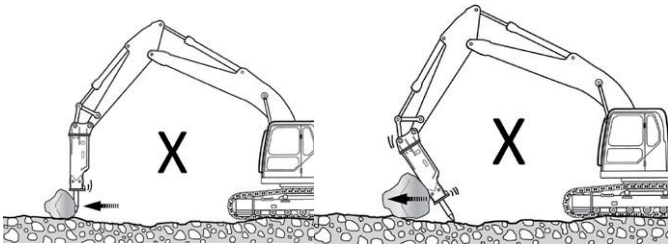
The operator should observe the following instructions;

Stop the operation immediately if hoses vibrate excessively. Violent pulsations of the high / low pressure breaker hoses could indicate an accumulator fault. Check for oil leaks at the hose fitting points retightening as necessary. Should symptoms persist, contact the service shop appointed by the dealer in your territory for repair. An excessive gap between tool and workpiece between strikes (See below) may indicate seizure of the tool in the front head. Disassemble the front head, inspect the components and repair or replace defective parts.

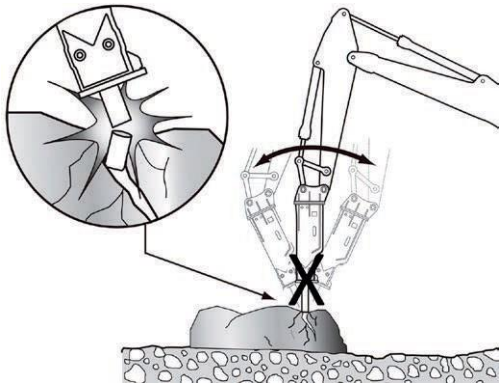


Stop as soon as breaking is completed. As soon as rocks are broken, cease power to the breaker. If idle striking continues the accumulator may be damaged, the bolts loosened or broken and also damage may be caused to the excavator. When a proper thrust is not applied to the breaker or the tool is used as a lever, the state of idle striking will occur. (Idle striking makes a higher pitched ringing sound).

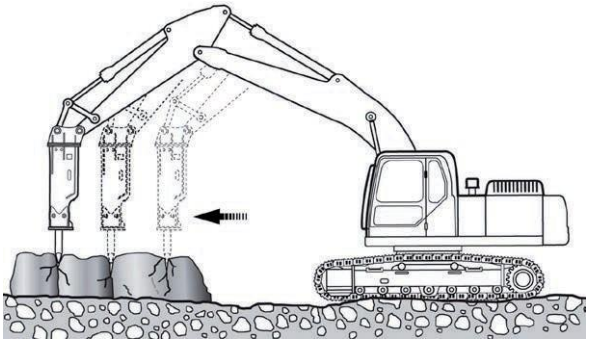
Never use to move rocks. As shown in the picture, do not roll or throw down a rock with the end of the tool or the side of the bracket using the oil pressure for the carrier's boom, arm, bucket, swing or travelling because the bolts of breaker may be broken, the bracket damaged, the tool broken or scuffed, and the boom or arm damaged. Never travel the machine with the tool in a rock.



Never lever with the breaker. Never attempt to use the hydraulic breaker as a crowbar. The breaker is not designed for lateral loads. Both breaker and tool will be damaged.



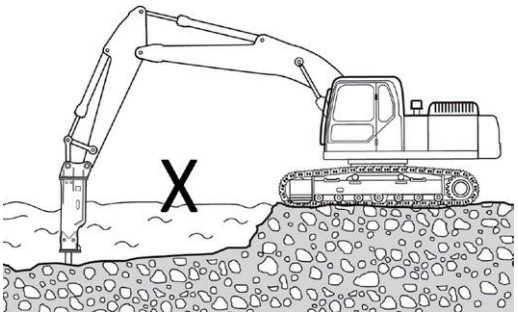
Never strike the same spot for more than 30 seconds. If rocks are especially hard avoid continually striking the same spot for more than 30 seconds. It is better practice to change target periodically which avoids raising the oil temperature. This can result in damage to the accumulator and excessive tool wear.



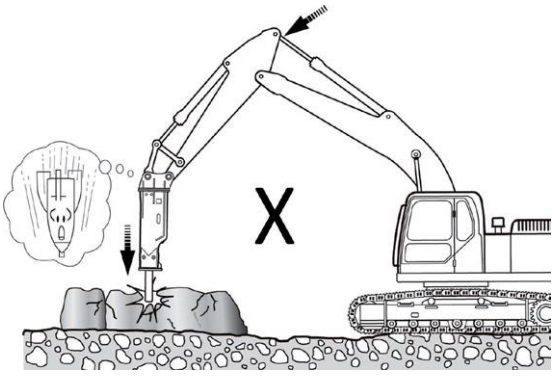
On a hard, large rock, start breaking at the end point. (advance). Begin with a target near the end of a large rock, and advance in small steps. This will enable large rocks to be broken easily. Advancing in large steps will not generally improve efficiency.

Operate the breaker at a proper engine speed. The breaker works at a typical engine speed for the carrier. Increasing to the highest rpm level does not increase the breaking force but raises the oil temperature which results in damage to the internal components of the breaker. To select the optimum engine speed, please refer to Carrier Operator's Manual.

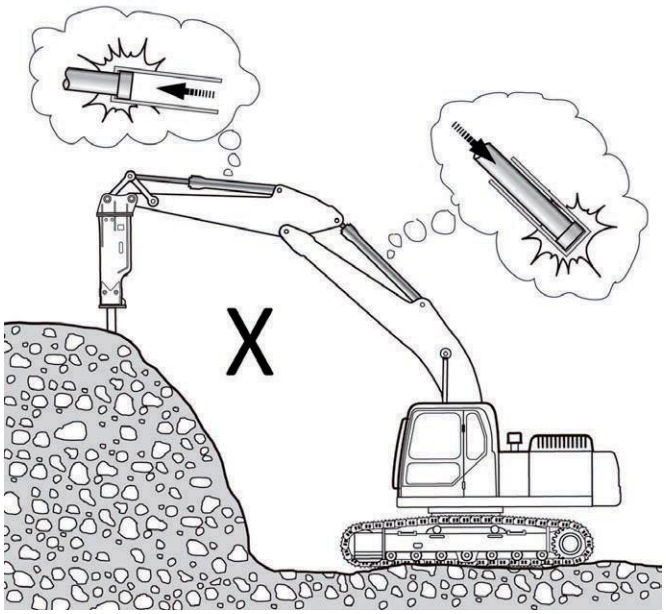
Never use a breaker in or under water or mud without prior conversion. If water is allowed to penetrate the percussion chamber, each blow creates a pressure wave. These pressure waves cause irreparable damage to the stripper and seals of breaker. Also the lower percussion piston zone would rust. Water could also penetrate the carrier's hydraulic system. In order to avoid damage to the hydraulic breaker, a special kit has been developed for under water operation.



Never use the breaker as a sledge hammer. Before starting up, rest the breaker on the ground. Never attempt to use the breaker and excavator boom as a sledge hammer to break material. This will damage parts of the carrier.

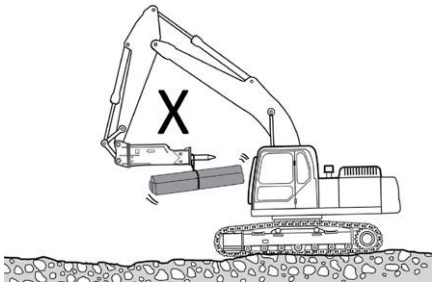


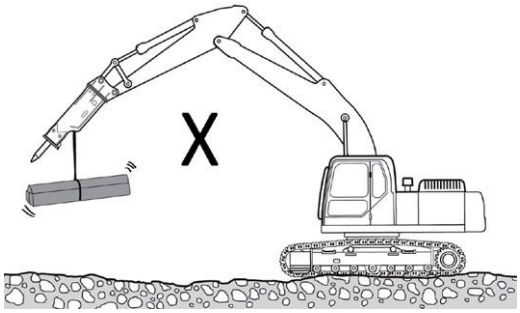
Never strike with the cylinders of carrier extended to the end of stroke. Excavator cylinder damage may be caused if the breaker is operated with the arm fully extended.



Always warm the carrier up in cold conditions. If the breaker is operating with low oil temperature the piston & seals are prone to damage. Warm the carrier up for five to twenty minutes. During this time operate the hydraulics to move the boom. Oil temperature must reach min. 0ºC before operating the breaker. (Please refer to Carrier Operator's Manual).

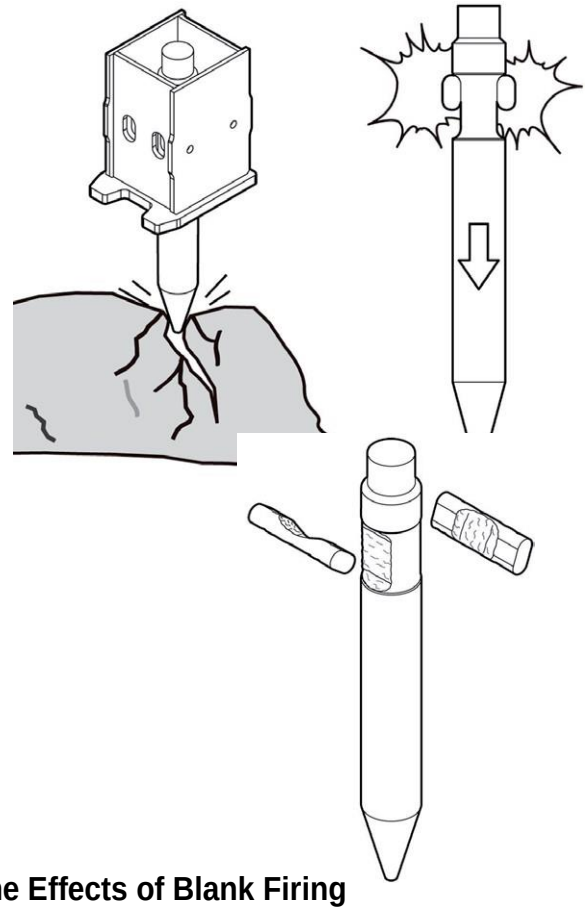
Never use the breaker for lifting. Any use of the breaker for lifting is not permissible and can be very dangerous.





To Prevent Blank Firing:

- NEVER operate the breaker without a tool.
- NEVER operate a breaker unless the tool is pressed against a solid surface.
- ALWAYS stop the breaker as soon as the tool breaks through the material.



The Effects of Blank Firing

If the breaker is operated without being pressed against a solid material (known as 'blank firing') both the breaker and the tool can be damaged. Damage can be caused to the breaker by the internal shocks which develop in the hydraulic components. Blank firing also causes rapid wear to the tool retainer pin and the tool itself. Typically, damage is in the form of heavily burred edges on the tool and retainer pin as shown. Such damage is usually not repairable and therefore adds extra (and unnecessary) costs and delays to the job.

Auto-Stop

Blank firing occurs when an operator continues to press the breaker pedal after the workpiece is completely broken. Surplus striking power is conveyed directly to through bolts, tool pin & other components resulting in damage to these components and other parts.

The auto-stop mode was introduced to stop operation after one extra strike only once the piston extends beyond its working range. High pressure is routed directly to the return line and operation stops immediately.

Efficiency of the auto-stop function has been proven through actual operation at job sites.

Special care must be taken in certain operations including secondary breaking of smaller objects where breaking can be completed in 1-2 strikes. Continued striking becomes a blank firing condition.

In this case to prevent unnecessary breaker and tool damage;

- Use Blunt type breaker tool.
- Release the breaker pedal immediately after the object is broken.

Working in High-Temperature Conditions

The temperature of the hydraulic oil must be monitored to ensure it does not exceed 80ºC. If higher temperatures are measured in the tank, an oil cooler must be fitted. Only use hydraulic oils of sufficient viscosity. In summer and tropical climates, the minimum requirement is a hydraulic oil type ISO VG 68 HV. (Refer to page 13).

Working in Low-Temperature Conditions

For temperatures down to minus 20ºC there are no special regulations, other than warming up the hydraulic oil before operating. This is achieved by:

- Starting up the excavator motor.
- Moving the boom.

This raises the oil temperature. Once it has risen above 0ºC, the hydraulic breaker can be started up. Leave the motor and the pumps of the excavator running during breaker in work.

Please Note:

The hydraulic breaker and excavator do not operate to full capacity until the oil temperature has reached at least 60ºC.

! WARNING!

Feeding hydraulic oil to an extremely cold hydraulic breaker will cause internal stresses in the unit resulting in its failure. If the breaker is used without preheating the hydraulic oil, the breaker seals may fracture and the diaphragm in the high-pressure accumulator may tear. (Please observe the excavator manufacturer's regulations.)

Key Points in Tool Usage:

Follow these instructions to avoid unnecessary damage to the tool and holder bush:

- Avoid lifting, twisting and hitting.
- Minimise exposure to water.
- Avoid damage from striking the breaker casing off hard objects.
- Avoid overheating.

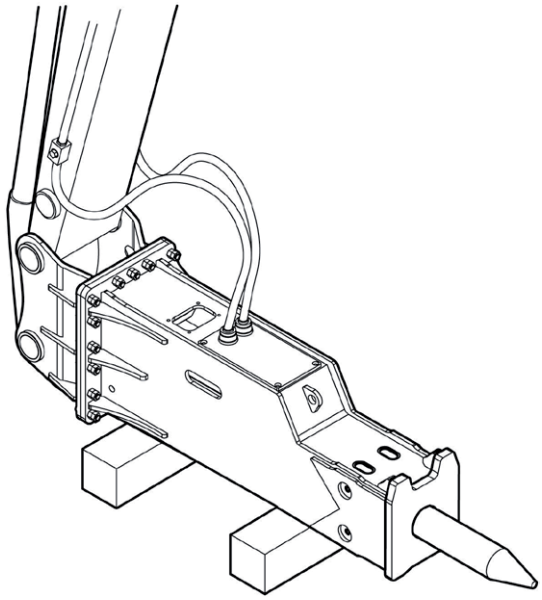
Removal & Installation of the Breaker

! WARNING!

- The assistant must be instructed by the excavator operator and all signals and directions agreed upon beforehand.
- The breaker should only be attached to an excavator with sufficient load capacity. If the excavator is too light, it may become unstable under load and fall over.
- Do not touch any parts when the boom is moving.
- Collect any oil which leaked out and dispose of it correctly.
- Check that the pressure relief valve on the hydraulic system has been approved by the relevant authorities.
- Check that the hydraulic pipe lines which connected on from the carrier to the breaker.

- Do not touch any parts for a while when the hydraulic oil keeps on being hot. It may cause your hands to be burned.

- Never use your fingers to check the alignment of the bores.



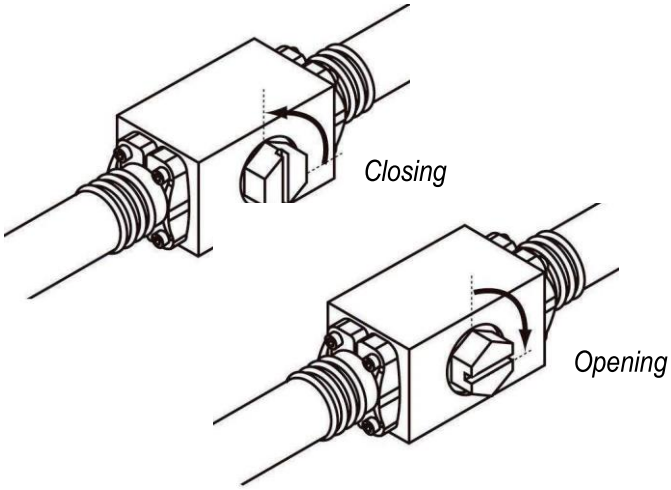
Remove the Breaker

1. Remove the hydraulic hose connected with the stop valve on the boom and the breaker.

2. Close off the hose and the stop valve with caps in the toolbox.

3. Replace the breaker and the bracket by the bucket in the same order of the bucket replacement.

4. Follow the reverse order when installing the breaker.



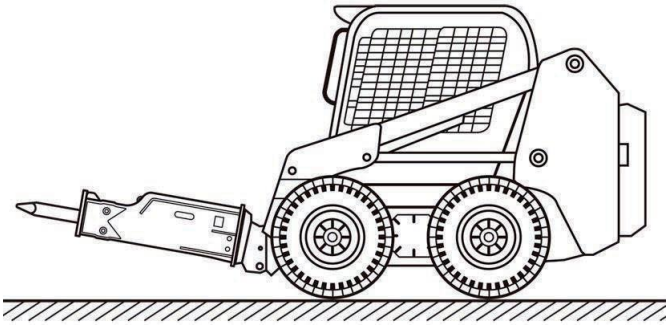
Opening and closing of the stop valve (Split type)

Travelling Position

The travelling positions are shown below. Ensure that the breaker is not too close to the backhoe boom, when travelling with a backhoe loader.

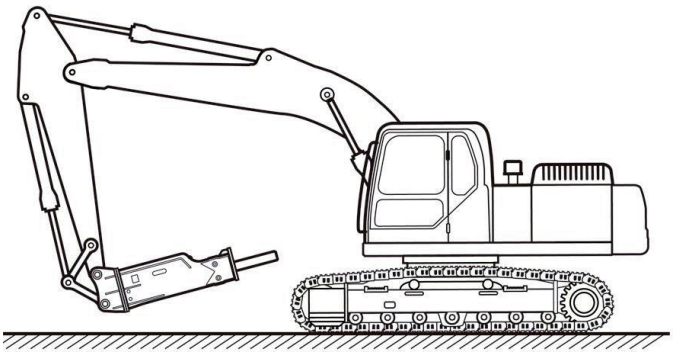
Backhoe Loader with breaker in travelling position

Lower the loader arm and tilt the breaker fully backwards when travelling with a skid steer.



Skid Steer Loader with breaker in travelling position

Ensure that the breaker is not too close to the cab window and that it does not point at it when travelling with an excavator.



Excavator / Compact excavator with breaker in travelling position

Note:

1. Please replace the parts at operating hours or months whichever comes first.
2. * Please replace the parts according to the wear limit guide.
3. ** Check the hose condition and replace if necessary.
4. Hours: Breaker operating hours. (The operating hours are excavator's operating hours that include breaker's installation and operating hours.)

2. It is recommended the user stocks wear parts as follows; Breaker tool, Bottom bush and Upper bush, Tool pins / stopper pin / rubber plug, Hydraulic seals, Through bolts, Hydraulic hoses

3. The above chart is intended as a guideline only and varies according to the carrier's condition, the operator's skill and the work environment.

Service Intervals in Special Applications

The service interval is considerably shorter in special applications such as: tunneling, scaling, foundry cleaning, underwater use, etc. In special applications contact a dealer for the correct service intervals.

Washing the Attachment

When using the breaker, dirt (mud, rock powder, etc.) can become attached to it. Wash the outside of the breaker with a steam washer before sending it to the workshop. Otherwise, dirt can cause difficulties in disassembly and assembly.

IMPORTANT! Plug the pressure and return line before washing the product to prevent dirt and water ingress.

Oil & Lubrication

Breakers require the correct viscosity of hydraulic oil & grease. The table below specifies grades for extremely cold or hot weather. Grease the contact faces in the lower breaker parts between the working tool and the wear bushes.

Hydraulic Oil		Grease
High Temperature	Low Temperature	NLGI No. 2 (265 -295) *Please use MOS2 grease inclusive of molybdenum
ISO VG 68 HV (61.2 - 74.8 cst)	ISO VG 46 HV (41.4 - 51.6 cst)	

Problems due to incorrect hydraulic oil viscosity in the breaker: Oil too thick

- Difficult start up.
- Stiff operation.
- Breaker strikes slowly.
- Risk of cavitation in pumps and in the hydraulic breaker.
- Sticky valves.
- Filter bypass opens, impurities in the oil are not removed.

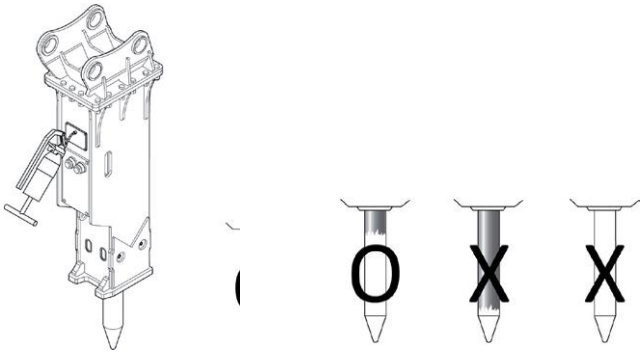
Oil too thin

- Efficiency losses (internal leaks).
- Damage to gaskets and seals, leaks.
- Accelerated wearing of parts, because of decreased lubrication efficiency.
- Breaker strikes irregularly and slowly.
- Risk of cavitation in pumps and in the hydraulic breaker.

Correct Greasing

While greasing, the breaker must be standing upright and resting on the tool to ensure that the grease will penetrate downwards between the tool and the bushes. Turn off the engine and wait 10 minutes for the oil pressure to drop inside the breaker.

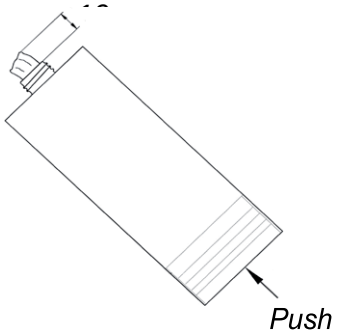
IMPORTANT! Do not fill the space between the piston and the tool with grease. A lower piston seal failure can result and the breaker will subsequently leak oil.



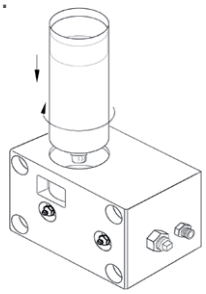
Cartridge Setting

1. Push the cartridge piston cartridge spout grease about 10mm.

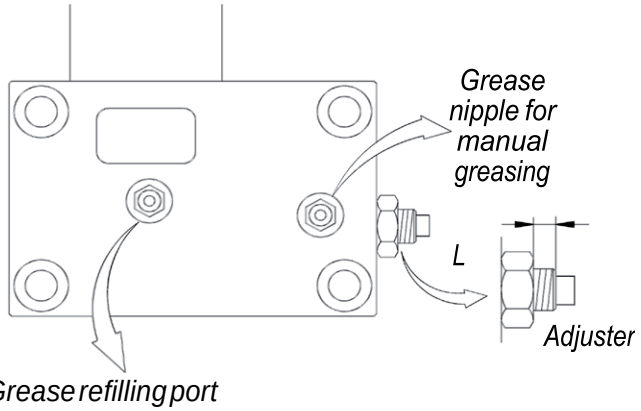
VERY IMPORTANT!



2. Insert the cartridge and turn clockwise to hand tightness only.



Adjustment & Manual Greasing



For hire and service enquiries

Call 01534 744744

Not all products are available in all markets. Under our policy of continuous improvement, we reserve the right to change specifications and design without prior notice. The illustrations do not necessarily show the standard version of the breaker.