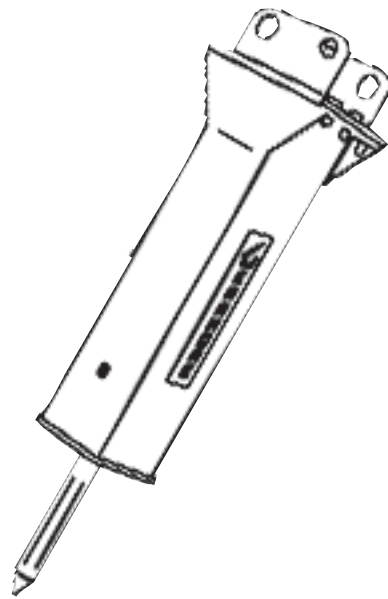




HYDRAULIC BREAKERS



Service Manual
For Models
G10, G20, G30, G40,
G50, & G60

June 2007

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1 INTRODUCTION

This service manual should provide service personnel with instructions necessary for servicing and maintaining Gearmore Hydraulic Breakers.

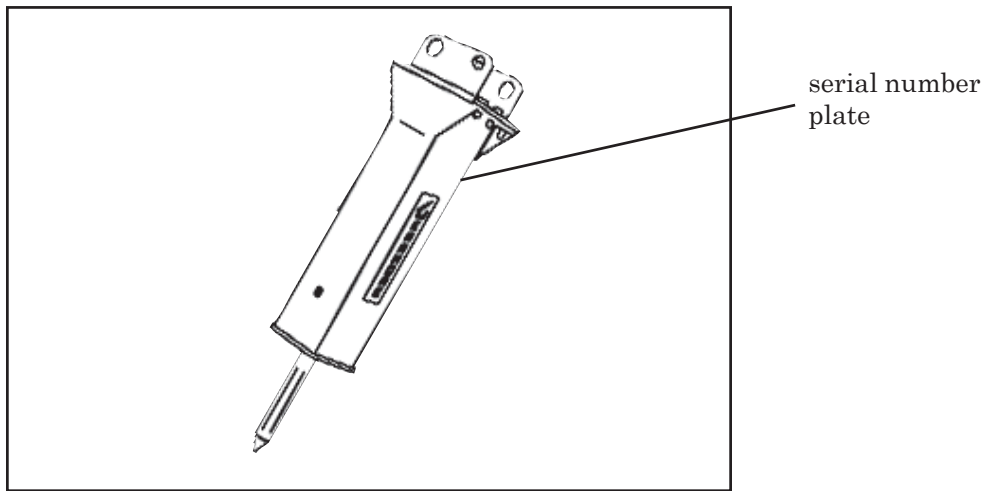
For any additional information or for help with any complicated problems encountered, please contact your nearest authorized Gearmore dealer.

Whenever repairs or replacement of component parts are required only genuine Gearmore parts should be used. Use of non-genuine parts may cause the breaker to work improperly and performance of the machine may be seriously affected. Please note Gearmore will not warrant replacement parts that are not supplied by us.

1.1 SERIAL NUMBER LOCATION

Always give your dealer the serial number of your hydraulic breaker when ordering parts or requesting service or other information.

The serial number plate is located where indicated. Please mark the number in the space provided for easy reference.



DATE OF PURCHASE: _____

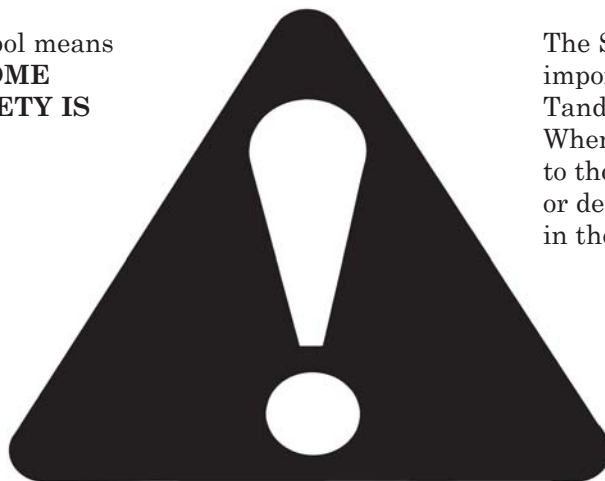
MODEL NUMBER: _____

SERIAL NUMBER: _____

2 SAFETY

SAFETY ALERT SYMBOL

This Safety Alert symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



The Safety Alert symbol identifies important safety messages on the Tandem Discs and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Why is SAFETY important to you?

3 Big Reasons

Accidents Disable and Kill
Accidents Cost
Accidents Can Be Avoided

SIGNAL WORDS:

Note the use of the signal words **DANGER**, **WARNING** and **CAUTION** with the safety messages. The appropriate signal word for each message has been selected using the following guide-lines:

SI NO LEE INGLES, PIDA AYUDA A AIGUIEN QUE SI LO LEA PARA QUE LE TRADUZCA LAS MIDIDAS DE SEGURIDAD.

DANGER - Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations typically for machine components which, for functional purposes, cannot be guarded.

WARNING - Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION - Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

If you have any questions not answered in this manual or require additional copies or the manual is damaged, please contact your dealer.

2.1 GENERAL SAFETY

IMPORTANT SAFETY INFORMATION WHEN USING OUR HYDRAULIC BREAKERS

1. Operators and service personnel must read and thoroughly understand this operators manual before using your Gearmore breaker.
2. Keep all people clear of breaker while in operation.
3. Do not operate the breaker without suitable shielding between the breaker and the operator to protect the operator from flying rock.
4. **TO PREVENT INJURY OR DEATH**, do not disassemble a breaker before discharging the nitrogen gas precharge.
5. Do not hardface or sharpen a tool with a cutting torch. Excessive heat from torching or welding causes embrittlement breakage, and flying pieces. Resharpener only with a lathe or milling machine using sufficient cooling.
6. Fully extend tool while charging the breaker with nitrogen. **STAY CLEAR OF TOOL WHILE CHARGING.**
7. For precharging the Gearmore hydraulic breaker use nitrogen gas only.
8. Do not operate the breaker unless the operator is in full control of the machine. Operate the breaker from the operators seat only.
9. Important safety decals are provided with each breaker. Keep them clean and visible. Gearmore will provide decals *free of charge* as needed.
10. It is very important to have compatibility between the breaker and the machine. Please refer to the *Recommended Machine Weight* section of this manual.
11. Use the proper lifting equipment and tools when handling or servicing the breaker or any of it's components.
12. Wear ear protection if conditions warrant.
13. Service personnel must take care handling pins and bushings when exchanging the bucket for the breaker. The machine operator must move the arm or boom only when directed by service personnel.
14. If it is necessary to hammer the pins in or out, beware of flying metal chips. Eye protection should be worn.
15. Do not make any alterations to the Gearmore breakers. Only trained service personnel must make alterations.
16. Use replacement parts only sold by Gearmore.



3 SPECIFICATIONS

3.1 RECOMMENDED MACHINE WEIGHTS

Machine weight ranges are intended as a guideline only. Other factors, such as arm length, counterweights, undercarriage, etc., must be taken into consideration.



MOUNTING A BREAKER THAT IS TOO HEAVY FOR THE MACHINE CAN BE DANGEROUS AND DAMAGING.

MOUNTING A BREAKER THAT IS TOO SMALL FOR THE MACHINE CAN DAMAGE THE BREAKER AND VOID THE WARRANTY

BREAKER MODEL	RECOMMENDED MACHINE WEIGHT RANGE
G10	1560 to 2250 lbs.
G20	2250 to 6750 lbs.
G30	4450 to 8890 lbs.
G40	5600 to 11,000 lbs.
G50	8200 to 16,800 lbs.
G60	9000 to 18,700 lbs.

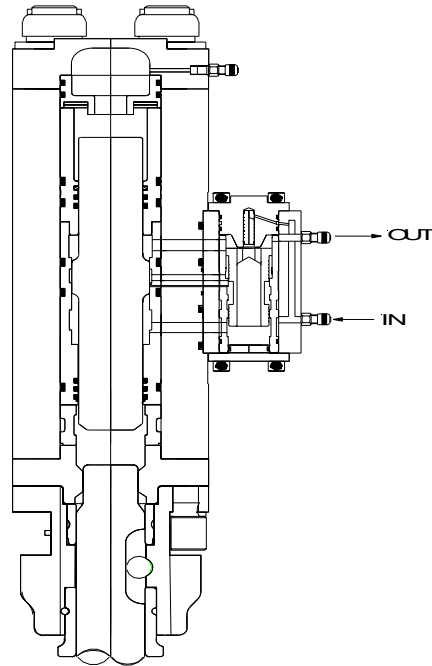
3.2 BREAKER SPECIFICATIONS

Breaker Model	Operating Pressure (psi)	Required Oil Flows (gal / min)	Blows Per Minute (bpm)	Nitrogen Pressure (psi)	Overall Weight (Lbs)	Overall Length (Inches)
G10	1525	4-7	650 - 1100	290	168	42
G20	1350	5-10	650 - 1150	330	220	46
G30	1600	8-13	700 - 1250	330	303	51
G40	1650	8-16	550 - 1250	290	505	57
G50	1700	12-21	650 - 1400	290	575	60
G60	1800	14-26	550 - 1200	360	725	63

Please note working weights may vary with bracket/side plate configuration. *Specifications subject to change without notice.*

4 STRUCTURAL LAYOUT OF GEARMORE BREAKERS

4.1 DESIGN LAYOUT DRAWING



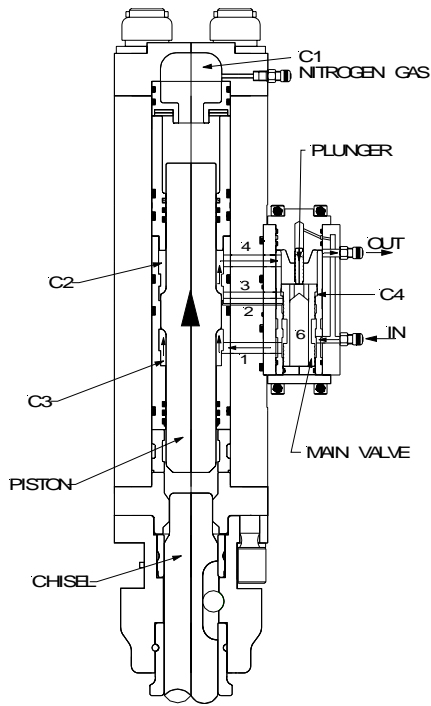
4.2 GENERAL DESCRIPTION

The Gearmore hydraulic breaker consists primarily of the cylinder section and main valve section.

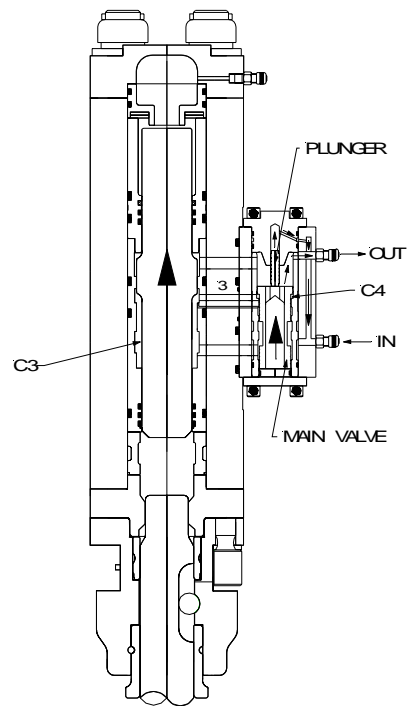
The cylinder section consists of the chisel, chuck housing, tool retainer, impact ring, piston, cylinder bushings, main cylinder body, and head cap. These are secured with tie rods. The piston reciprocates within the cylinder bushing, striking the chisel end. The impact ring fixes the relative position between the piston and chisel. The head cap is charged with nitrogen gas through an adapter.

The valve housing contains the plunger and valve spool and is fixed from both sides with the upper valve end and lower valve end. The plunger reciprocates within the upper valve end, forcing down the main body. The valve spool reciprocates within the valve liner, switching over the oil passages.

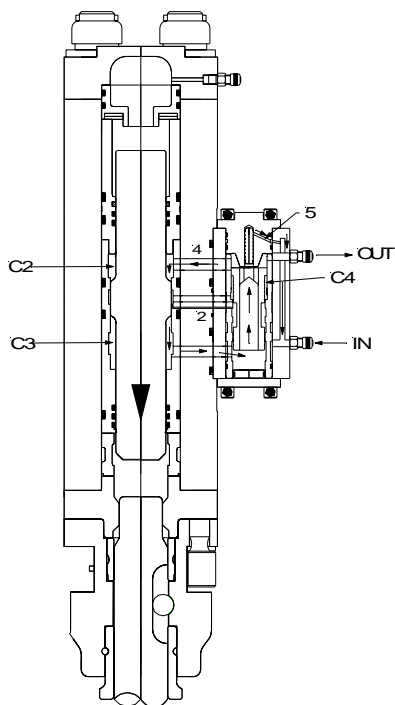
4.3 OPERATING PRINCIPLES OF HYDRAULIC BREAKERS



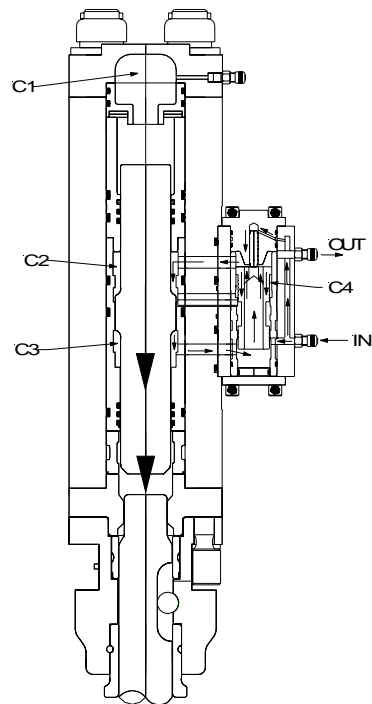
① LIFT STROKE OF PISTON



② LIFT STROKE OF MAIN VALVE



③ IMPACT STROKE



④ DOWN STROKE OF MAIN VALVE

4.3.1 LIFT STROKE OF PISTON

As the control valve is opened, the IN port is opened to allow the high-pressure oil to act on the chamber (C3) and top of the plunger. The action of the plunger forces the valve spool against the bottom plate. Since the plunger cannot move any further the oil can only act on the piston. The piston is forced up, overcoming the nitrogen gas pressure. At this time the oil in the chamber (C2) is forced through the OUT port.

4.3.2 LIFT STROKE OF THE VALVE SPOOL

As the piston lifts and the chamber (C3) is opened to the oil passage (3), oil flows into the chamber (C4). Since the sectional area of the chamber (C4) is larger than that of the plunger, the up force overcomes the plunger's down force and the valve spool is moved upwards.

4.3.3 IMPACT STROKE

With the valve spool rising, the oil passage (1) is opened to the oil passage (6) so that the nitrogen gas pressure pushes down the piston. When the oil passage (1) is totally opened to the oil passage (6), the route between the oil passage (1) and the IN port is shut off while the route between the oil passage (2) and IN port is opened. As long as the oil passage (3) is blocked from the chamber (C2), oil is directed to the chamber (C4), keeping the valve spool up. This helps the oil in the chamber (C3) flow out. The oil discharged from the chamber (C3) flows through the oil passages (1), (6), (4), and chamber (C2). Simply, the piston can strike the chisel without being subjected to large resistance by any oil pressure.

4.3.4 DOWN STROKE OF THE VALVE SPOOL

As the oil passage (3) is opened to the chamber (C2) with the lowering of the piston, oil flows from the chamber (C4) to the OUT port. As a result the valve spool is pushed down with the plunger allowing the breaker to begin another cycle.

5 NITROGEN GAS CHARGING

5.1 INSPECTING THE GAS PRESSURE



1. Remove the adapter cap.
2. Turn release valve wheel clockwise until it is tight to prevent gas leakage.



3. Attach the charging valve on to the adapter.
4. Tighten charging valve cap clockwise.
5. Turn the charging valve wheel clockwise to check gas pressure.
6. Turn the charging valve wheel counterclockwise.
7. Turn the release valve wheel counterclockwise to release gas pressure in the charging valve.



CAUTION: Turning the wheel to excess will damage the charging valve. Stop turning the wheel as soon as the gauge gives a reading.

5.2 MAXIMUM NITROGEN GAS PRESSURES

BREAKER MODEL	GAS OPERATING PRESSURE / PSI
G10	290 PSI
G20	330 PSI
G30	330 PSI
G40	290 PSI
G50	290 PSI
G60	365 PSI



IMPORTANT: ALL READINGS SHOULD BE TAKEN AT AMBIENT TEMPERATURE BEFORE OPERATION

If used with pressures higher than the maximum Gas pressure, the breaker tool, piston, or the hydraulic components of the excavator can be damaged. Gearmore does not take any responsibility for failures resulting from neglect of this warning.

As the temperature of the hydraulic breaker rises, the gas pressure increases as well. Nitrogen gas pressure should always be checked when the breaker is cold, which is normally before start up.

5.3 REDUCING THE GAS PRESSURE

1. Follow steps 1 through 5 in the previous section.
2. Turn the release valve wheel slowly counterclockwise paying close attention to the pressure gauge. As soon as the gauge shows the correct nitrogen precharge pressure, turn the release valve wheel clockwise to prevent further loss of gas pressure.

5.4 GAS CHARGING PROCEDURE

1. Check that the nitrogen gas bottle valve is closed.
2. Connect the high pressure hose to the nitrogen gas bottle.
3. Connect the high pressure hose to the charging valve.
4. Carry out steps 1 to 5 from the "*Inspecting the Gas Pressure*" section.
5. Turn the gas bottle valve wheel clockwise to allow gas to enter the hose.
6. Turn the charging valve wheel to allow the gas to pressurize the accumulator chamber.
7. Pay close attention to the gauge so the seals are not stretched by application of excessive gas pressure. **(DO NOT EXCEED THE MAXIMUM GAS PRESSURE DURING CHARGING)**
8. Turn the charging valve wheel counterclockwise to prevent any more gas entering the breaker.
9. Turn the release valve counterclockwise to relieve gas in the high pressure hose.
10. Disconnect the charging valve from adapter.
11. Install adapter cap on to adapter.



6 MAINTENANCE AND INSPECTION

6.1 INSPECTION ITEM LIST

INSPECTION ITEM	COMMENTS
Loose bolts	Retighten all bolts 10 hours after initial use.
Level, contamination and deterioration of hydraulic oil	Change oil every 800 hours
Greasing the chisel	Every 2 hours with 5 shots of grease from gun
Gas pressure of breaker	Before trial operation and thereafter every week
Gas leaks	Every day
Oil leaks	Every day
Clearance between chisel and bushing	Every day
Damage, wear and deformation of chisel	Every day
Damage to the side plates/ attachment plate	Every day
Damage and deformation of retainer pin	Every day

If the breaker is frequently used for long periods then more frequent servicing should be adopted.

6.2 DAILY INSPECTION

Before starting each work shift, be sure to inspect for the following items and apply grease where needed.

6.2.1 LOOSE BOLTS



CAUTION: LOOSE BOLTS WILL CAUSE OIL LEAKS OR MALFUNCTION OF THE BREAKER OR CAUSE DAMAGE TO THE BOLTS. INSPECT THE HYDRAULIC BREAKER, BRACKET, AND TUBING FOR LOOSENESS. RETIGHTEN TO THE SPECIFIED TORQUE WHERE NECESSARY.

6.2.2 DAMAGE OF HYDRAULIC HOSE

Replace a damaged hose with a new one.

6.2.3 WEAR AND DEFORMATION OF BREAKER TOOL

Inspect the breaker tool for severe damage, wear or deformation. If there is excessive wear then, replace the tool with a new one.

6.2.4 LUBRICATION OF THE BREAKER TOOL

Apply grease through the grease nipple located just above the impact ring before operating the breaker. Lubricate the tool every 2-3 hours to prevent unnecessary wear of the tool and tool bushing.



CAUTION: APPLY GREASE TO THE SLIDING SURFACES OF THE TOOL AND TOOL BUSHING WHENEVER THE TWO WORKING SURFACES ARE DRY.

TOO MUCH GREASE WILL CAUSE PROBLEMS IN THE AREA AROUND THE STRIKING ZONE OF THE PISTON. ONLY APPLY GREASE VIA A GREASE GUN THROUGH THE GREASE NIPPLE LOCATED ON THE LOWER SECTION OF THE BREAKER CYLINDER.

6.2.5 INSPECTION OF HYDRAULIC OIL IN TRACTOR

It is essential that regular checks be made on the oil level and state of the oil. To prevent damage to the breaker and/or the machine add or change the oil as is necessary.

If the hydraulic oil has any of the following characteristics then you should change the oil:

- Strong offensive odor
- Discoloration
- Foam or scum forming in the oil
- Lack of viscosity

6.3 POINTS TO NOTE ON THE NITROGEN GAS PRE-CHARGE



IF THE NITROGEN GAS PRESSURE DROPS BY MORE THAN 100-150 PSI PER DAY, THEN THE BREAKER HAS PROBLEMS WITH GAS LEAKAGE.

During operation of the breaker, the oil temperature will rise. Rising oil temperature will cause gas pressure to rise as well. This is normal and there is no cause for concern.



DANGER!

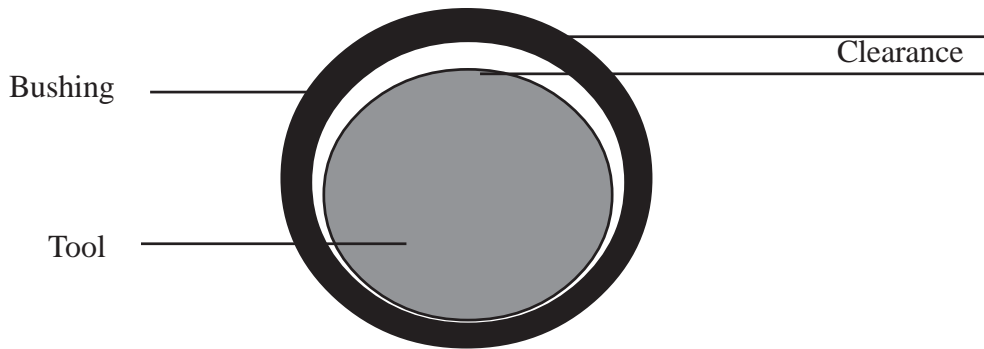
USE ONLY NITROGEN GAS FOR PRE-CHARGING. THE USE OF GASES, OTHER THAN NITROGEN, IS DANGEROUS AND MAY CAUSE AN EXPLOSION

6.4 CLEARANCE LIMITS BETWEEN TOOL AND TOOL BUSHING

Replace the tool bushings when the clearance reaches the maximum limit listed below.

BREAKER MODEL	MAX. CLEARANCE LIMIT inches	MIN. TOOL DIAMETER inches
G10	0.12	1.49
G20	0.10	1.65
G30	0.10	2.00
G40	0.14	2.40
G50	0.12	2.64
G60	0.22	2.80

Replace the breaker tool when the outside diameter is worn to the limit for the minimum tool diameter listed above.



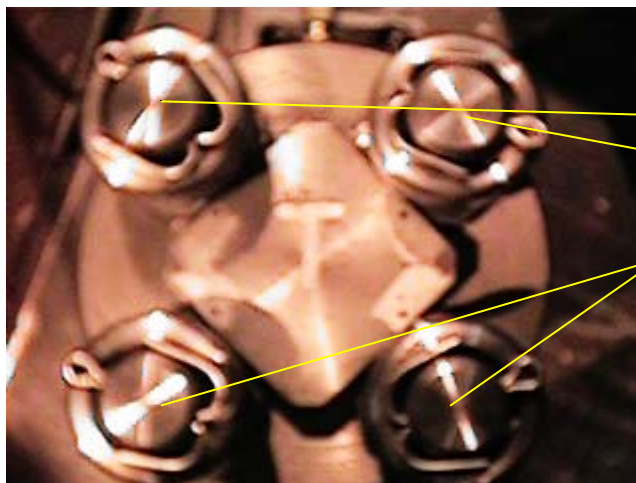
OPERATING THE BREAKER WITH CLEARANCES EXCEEDING THE LIMIT WILL VOID THE WARRANTY.

6.5 RETIGHTENING BOLTS ON OUR HYDRAULIC BREAKERS

6.5.1 RETIGHTENING OF THE TIE RODS



IMPORTANT: FOLLOW TIGHTENING ORDER SHOWN IN THE FIGURE BELOW



TIGHTENING ORDER:

1. A
2. D
3. B
4. C

1. Remove the split pin and the top nut shroud to expose the top nut.
2. Place a spanner on the top nut and tighten nut by turning the spanner 30° from the original point.
3. Replace top nut shroud and split pin to protect the top nut.



IMPORTANT: EVERY TIME YOU DO MAINTENANCE ON YOUR HYDRAULIC BREAKER CHECK THE TIE RODS AND RETIGHTEN AS NECESSARY.

RETIGHTEN ALL BOLTS WHEN THEY ARE LOOSE.

6.5.2 REPLACEMENT OF THE TIE RODS

1. Ensure that the gas in the breaker is totally discharged.
2. Remove the split pin and top nut shroud that protects the top nut.
3. Using a spanner and hammer loosen the top nuts by turning the top nut counterclockwise.
4. Remove the bottom nut.
5. Remove old rod and install the new one. (It is important to have bolt flats facing towards the center of the head cap).
6. Fit the lock washers.
7. Install a second rod (must be diagonally opposite to the first newly installed rod, position A versus D on previous figure) and repeat step 6.
8. Fit bottom nuts to the tie rods.
9. Fit the top nuts to the rods tightening each in the same manner by hand until it is not possible to turn the nuts any further.
10. Fit the remaining two rods as outlined in the previous steps.
11. Once the remaining two rods are fitted, tighten all rods, with a spanner and a hammer, until all of the components of the breaker hold together.
12. After the rods are tightened enough to hold the breaker together, refer to the table below to tighten the rods to the specified torque values.
13. Use torque wrench to complete the installation of the tie rods.

BREAKER TYPE	BOLT DIAMETER	FLAT WIDTH/ mm	TIGHTENING TORQUE FT/LB
G10			
G20 / G30	M20	27	220
G40 / G50	M25	36	365
G60	1 1/8 Inches	41	440

6.6 HYDRAULIC BREAKER

BREAKER TYPE	VALVE HOUSING		UPPER/LOWER VALVE ENDS	
	BOLT	TORQUE FT/LB	BOLT	TORQUE FT/LB
G10	M8	30	M10	50
G20	M8	30	M12	65
G30	M12	65	M16	145
G40	M12	65	M16	145
G50	M20	280	M18	185
G60	M20	280	M20	280

6.7 HYDRAULIC HOSES & FITTINGS

HOSE DIAMETER (Nominal Bore)/IN	HOSE FITTING	SPANNER METRIC	TORQUE FT/LB
1/2	3/4 JIC	27 mm	60
3/4	1 1/16 JIC	36 mm	130
1	1 5/16 JIC	41 mm	145
1 1/4	1 5/8 JIC	50 mm	185

6.8 CHANGING INTERVALS FOR HYDRAULIC OIL

When any hydraulic attachment is used on an excavator/backhoe the hydraulic oil will be put under more stress than if the excavator/backhoe were being used simply with a bucket. For this reason care should be taken to pay close attention to the deterioration of the oil in the hydraulic system.

NEGLECTING THE HYDRAULIC OIL WILL DAMAGE BOTH THE BREAKER AND THE MACHINE.

CHANGE THE HYDRAULIC OIL WHEN:

- The oil loses its viscosity properties
- The oil becomes discolored
- The odor of the oil becomes offensive / foul
- The oil has foreign bodies in it or has become "dirty"



WARNING!

AS SOON AS THE OIL DISPLAYS ANY OF THE SYMPTOMS LISTED ABOVE CHANGE THE OIL IMMEDIATELY. GEARMORE WILL NOT WARRANT BREAKERS THAT ARE OPERATED WITH SUB STANDARD HYDRAULIC OIL.

REMEMBER IF IN DOUBT, CHANGE THE OIL IN THE MACHINE

Change the filter element as indicated by the intervals given below:

Filter Element -----Every 100 hours
Hydraulic Oil -----Every 800 hours

6.9 RECOMMENDED HYDRAULIC OIL AND GREASE

6.9.1 HYDRAULIC OIL

Use the hydraulic oil recommended by the excavator manufacturer. (For assembling the hydraulic breaker, equivalent oil should be used.) If the breaker is to be used in extreme cold or hot, contact your authorized Gearmore dealer for oil to be used.

6.9.2 GREASE

Use only high content molybdenum-based grease during repair and installation of new parts and as a lubricant between the sliding surfaces of the breaker tool and tool bushing.

6.10 PROTECTIVE STORAGE OF THE SEAL KITS

To prevent premature failure of the seals, o-rings, and packing, it is essential the seal kits are stored as follows:

- In a closed container
- In a cool, dark place
- Do not expose them to direct sunlight
- Do not use seals that are too old, discard any seals that you have stored for one year

6.11 STORING OF GEARMORE HYDRAULIC BREAKERS

When storing your breaker, be sure to follow the steps outlines below:

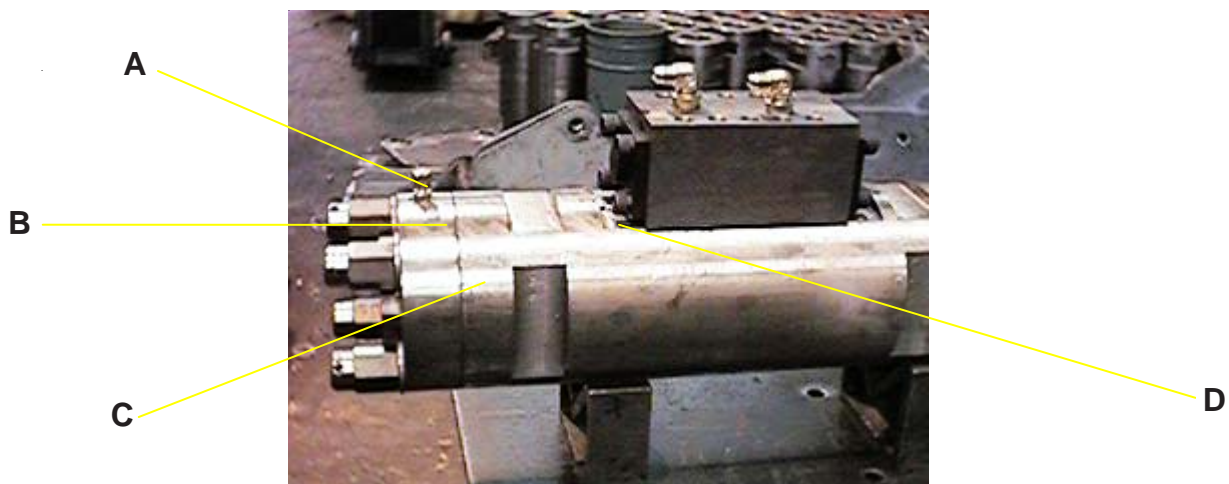
1. Do not expose the breaker to rain. Store the breaker indoors. If the breaker must be stored outdoors, place it on stable wood blocks and cover with a waterproof canvas.
2. Apply grease generously to the tool and tool bushing. (If the breaker is out of service for an extended period, longer than one or two weeks, remove the chisel and push the piston up the cylinder to prevent rust formation).
3. For extended periods of storage, it is necessary to discharge the nitrogen gas from the breaker.
4. Plug the hose ends.
5. When storing the breaker for long periods, **store in a vertical position**, as it takes the side pressure off the piston seals.

7 TROUBLESHOOTING GUIDE

7.1 GAS LEAKS

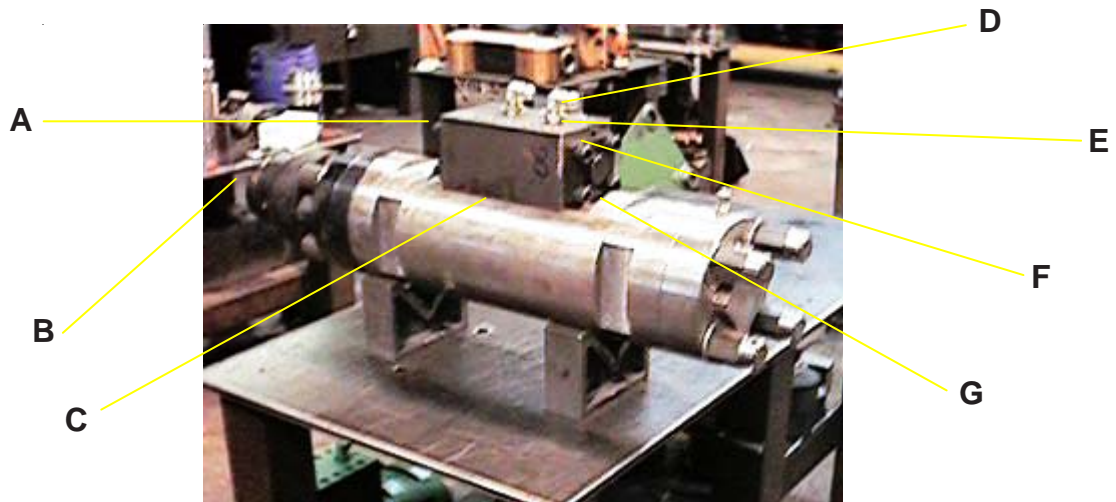
The breaker can be said to have a gas leakage problem **if there is a loss of 100-150 PSI per day**. If there is a minimal loss of 15-30 PSI over a period of a few days then there is no cause for concern. Simply recharge to the correct pressure before operating the breaker.

To detect gas leaks apply a solution of soap and water to the areas indicated in the figure below.



PROBLEM	CAUSE	SOLUTION
(A) Gas leaking from gas charge valve	Defective o-ring in valve	Replace o-ring
	Defective or damaged valve	Replace gas charge valve
(B) Gas leaking between cylinder head and gas charge valve	Defective o-ring in valve	Replace o-ring
	Loose valve	Tighten valve
(C) Gas leaking between cylinder head and main cylinder body	Defective o-ring in cylinder head	Replace o-ring
(D) Gas leaks from inspection hole	Defective o-ring in upper cylinder liner	Replace o-ring
	Defective packing in upper cylinder liner	Replace packing
	Seizure of piston and upper cylinder liner	Repair or replace liner and piston (as well as any damaged packing or o-rings)
	Damaged cylinder	Repair cylinder

7.2 OIL LEAKS



PROBLEM	CAUSE	SOLUTION
(A) Oil leaks between valve housing and lower valve end	Defective o-ring or back up ring	Replace
	Lower valve end bolts loose	Retighten
(B) Oil leaks between chisel and chuck housing bush	Defective o-ring or back up ring in center cylinder liner	Replace
	Defective packing in center cylinder liner	Replace
	Seizing of piston and center cylinder liner	Repair or replace. Check and replace packing and seals as well
(C) Oil leaks between main cylinder body and valve housing	Defective o-ring between main cylinder body and valve housing	Replace
	Valve housing mounting bolts loose	Retighten
(D) Oil leaks between inlet/outlet and valve housing	Damage to the thread on hose	Replace hose fitting
	Damage to the thread on inlet/outlet	Replace inlet/outlet
	Loose connection of fitting and inlet/outlet	Retighten
(E) Oil leaks between inlet/outlet and valve housing	Loose inlet/outlet or defective o-ring	Replace o-ring and retighten as necessary
(F) Oil leaks between valve housing and upper valve end	Defective o-ring or back up ring	Replace
	Upper valve end bolts loose	Retighten
(G) Oil leaks from inspection hole	Defective o-ring or back up ring in upper cylinder liner	Replace
	Defective packing in upper cylinder liner	Replace
	Seizing of piston and upper cylinder liner	Repair or replace. Check and replace packing and seals as well

7.3 COMMON BREAKER PROBLEMS

PROBLEM	CAUSE	SOLUTION
Diminished breaking power	Gas pressure low	Recharge nitrogen chamber
Blow frequency has decreased	Excavator oil flow valve not fully open	Open oil flow valve fully
	Gas pressure is too high	Adjust gas pressure as necessary
	Problem with the excavator hydraulic pump and/or relief valve	Have pump and relief valve checked by authorized excavator dealer
	Hot hydraulic oil (over 176°F)	Clean existing or install new oil cooler
	Low hydraulic oil	Add more hydraulic oil
Irregular hammering	Piston or cylinder liners defective	Repair or replace
	Problem with the excavator hydraulic pump and/or relief valve	Have pump and relief valve checked by authorized excavator dealer
Breaker does not work	Oil flow valve in the OFF position	Open oil flow valve fully
	Low or no nitrogen in breaker gas chamber	Recharge and check for any leaks
	Low hydraulic oil level	Add more hydraulic oil
	Hoses incorrectly fitted to inlet/outlet	Swap hoses over and try to operate the breaker
	Problem with the excavator hydraulic pump and/or relief valve	Have pump and relief valve checked by authorized excavator dealer

8 REPLACING BREAKER SEALS

Periodically the seals will have to be replaced as all seals will either degrade over time or become damaged.

If the breaker is losing 100-150 PSI per day, or there is excessive oil leakage, then it is time to change the seals in the breaker.

Trained personnel or preferably an authorized Gearmore dealer should carry out the replacement of seals.

When installing the new seals, pay particular attention to the orientation and direction of the seals as indicated in the parts manual.

IMPORTANT!



- BEFORE PERFORMING DISASSEMBLY AND REASSEMBLY OF THE HYDRAULIC BREAKER, READ THROUGH THIS SERVICE MANUAL
- DUST WILL SERIOUSLY DAMAGE THE INTERNAL COMPONENTS OF THE BREAKER! PERFORM ALL MAINTENANCE IN A CLEAN ENVIRONMENT

9 REBUILDING YOUR GEARMORE HYDRAULIC BREAKER

9.1 ASSEMBLING THE MAIN CYLINDER BODY

1. Fit the o-rings and seals to the center cylinder liner.



REMEMBER:

BEFORE INSTALLATION OF ANY SEALS THERE MUST BE WORKING OIL APPLIED TO EACH SEAL.

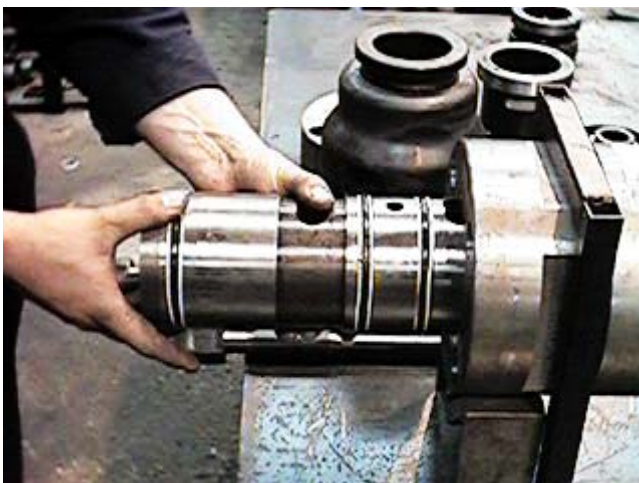
PAY ATTENTION TO THE ORIENTATION OF THE SEALS TO BE INSTALLED (REFER TO THE SEAL DETAILS SCHEMATIC DIAGRAM IN THE PARTS MANUAL).

IMPORTANT:

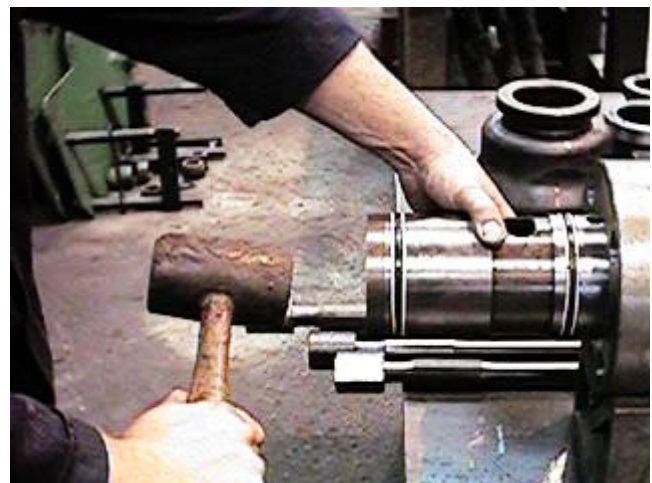
ALL INTERNAL PARTS SHOULD HAVE WORKING OIL APPLIED TO THEM BEFORE INSTALLATION.

ALL PARTS NEED TO BE CLEAN TO AVOID DAMAGE TO THE BREAKER.

2. Install the center cylinder liner into the main cylinder body. (This should be installed from the top of the main cylinder body)



Please be careful not to insert the center cylinder liner the wrong way around. The oil flow holes should enter the body first.



Carefully tap the center cylinder liner into the main cylinder body with a rubber or hide hammer. **DO NOT FORCE THE LINER!**

3. Install the lower cylinder liner (This should be installed from the bottom of the main cylinder body).
(Please note some models do not have a lower cylinder liner)



Insert the locator keys that are used to align the cylinder liners.

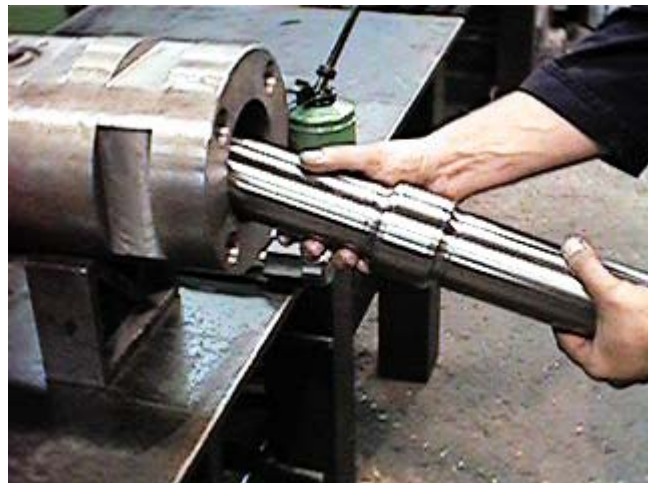


Carefully tap the lower cylinder liner into the main cylinder with a rubber or hide hammer.

4. Install piston.



Apply working oil to the piston.



Insert the piston into center cylinder liner. The piston may need to lift slightly to ensure that it fits properly

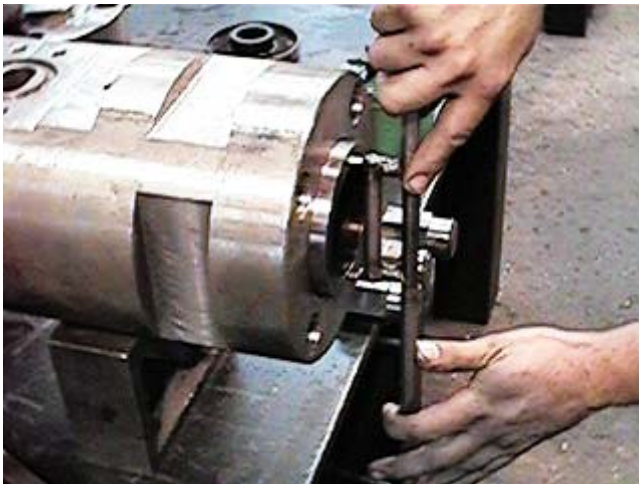
5. Install upper cylinder liner (This should be installed from the top of the main cylinder body).



Insert locator keys into center cylinder liner.



Install the seals and packing to the upper cylinder liner. Align the upper and center cylinder liners then use rubber or hide hammer to install the upper liner.



Align the cylinder liners with the IN and OUT holes on the top of main cylinder body where the valve housing will be located. (This tool can be purchased through an authorized Gearmore dealer).

6. Install the spacer and spring disc washers.

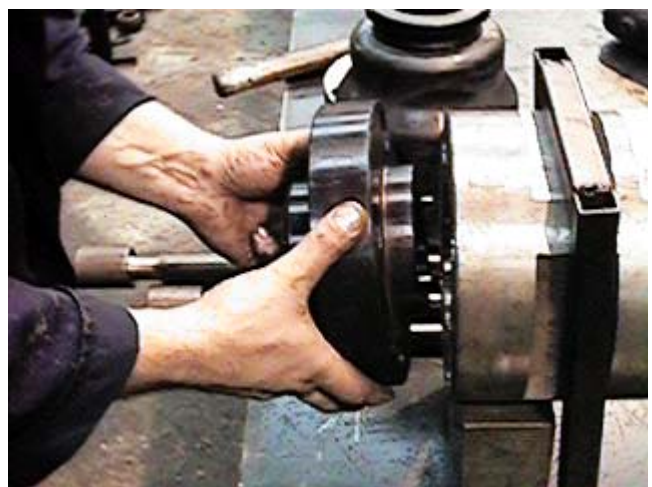


Ensure that the upper cylinder liner is correctly seated in the main body cylinder. (The upper liner should be 1.15 inches inside the main cylinder body). Insert the spring disc washers into the spacer and fit spacer into the top of the upper cylinder liner.

7. Install the impact ring.



Install locator keys as shown.

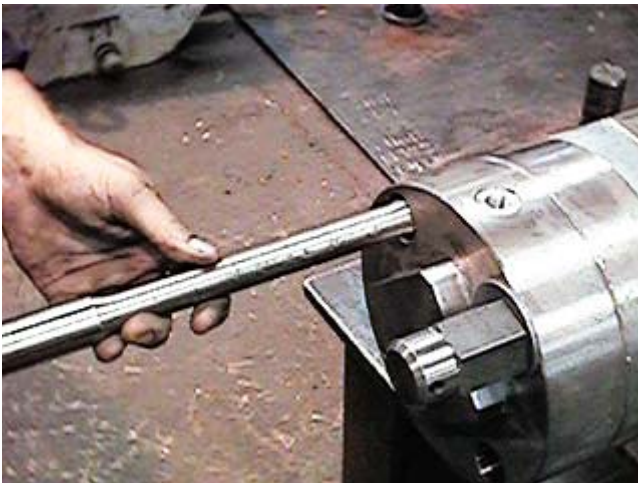


Fit the impact ring to the main cylinder body. Before installation of the impact ring, check that the alignment of the cylinder liners is correct. The impact ring should fit tightly against the main body, if this is not the case, then the locator keys may not be in line with the cylinder liners.

8. Install cylinder head and tie rods.

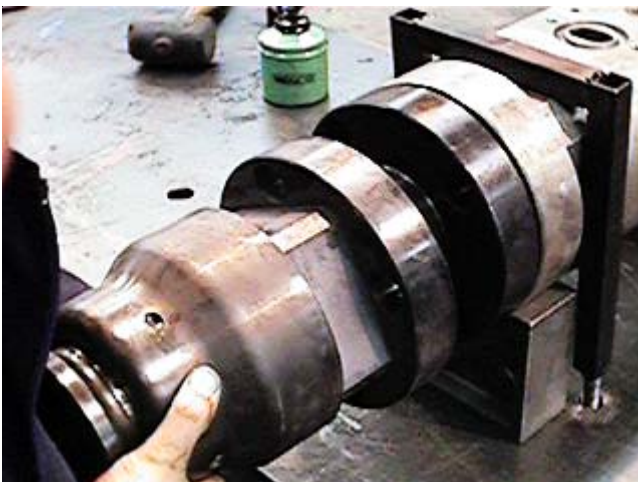


Push the cylinder head on to the spacer. The cylinder head should hold in place without having to hold it in position.



Fit the top nut and washer to the tie rod and feed to the tie rod through the length of the breaker. It is important to grease the threads of the top nuts and tie rods.

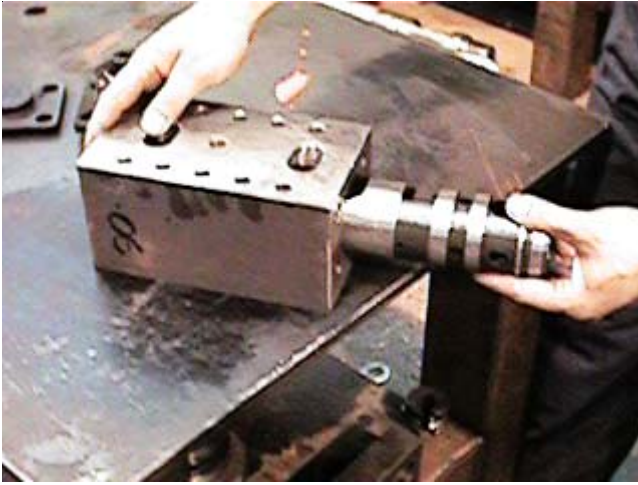
9. Fit chuck housing and tighten tie rods.



Push the chuck housing so it holds in place; the tie rods are completely passed through the length of the breaker. Locate the bottom nut and hold the nut while the thread of the tie rod is fed into the bottom nut. Tighten the tie rod (with a spanner on the top nut) until the breaker is held together by the tension of the rods. When all four tie rods are installed refer back to the section on the tightening procedure for the tie rods. (Apply grease to the threads before tightening).

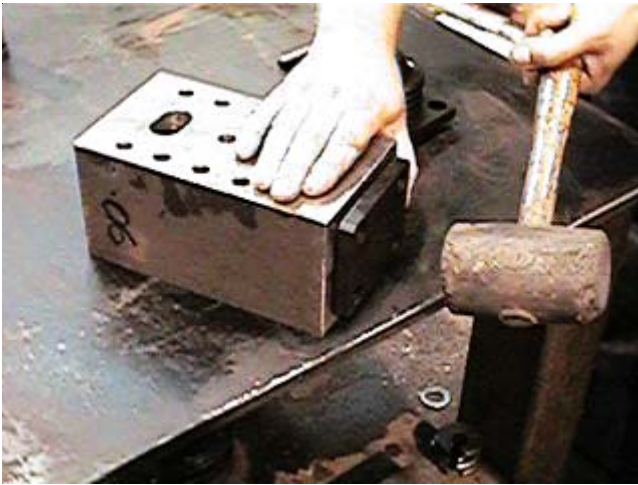
9.2 ASSEMBLING THE VALVE HOUSING

1. Install the valve liner.



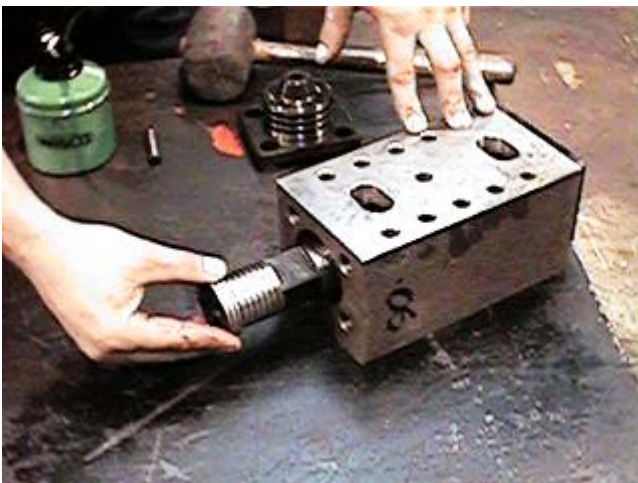
The valve housing should be turned upside down, insert the valve liner. It is important to align the holes of the valve housing and liner at this stage. Install the liner from the bottom of the housing. Be careful not to damage seals on the valve liner.

2. Install the lower valve end.



Push the lower valve end into the bottom end of the valve housing. To ensure the lower valve end fits tightly a rubber or hide hammer should be used to secure the lower valve end.

3. Install the valve spool.



Insert the valve spool into the valve housing from the top end of the housing.

4. Install the plunger and upper valve end.



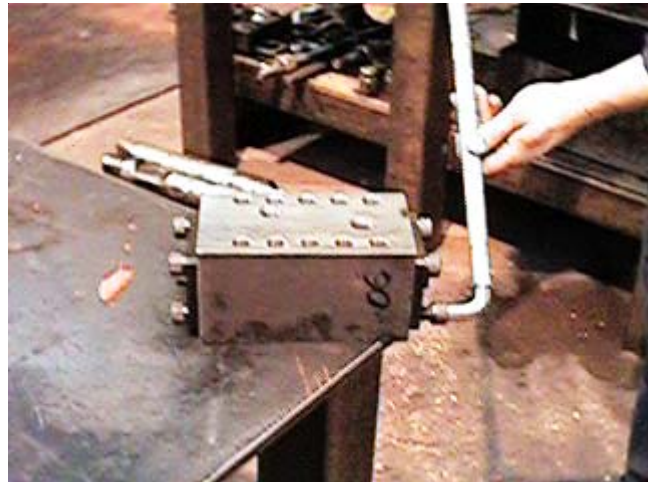
Apply working oil to the upper valve end.



Insert plunger into the upper valve end. Check that the plunger moves freely as the breaker will not operate correctly if the plunger fits tightly.



Tap the upper valve end with a hammer to hold it in place.



Turn the valve housing over and screw the cap screws into each end of the valve body.

5. Install the hydraulic oil inlet and outlet.



Take the hydraulic oil inlet and outlet fittings and tighten. Refer to the relevant section to find the correct torque setting.

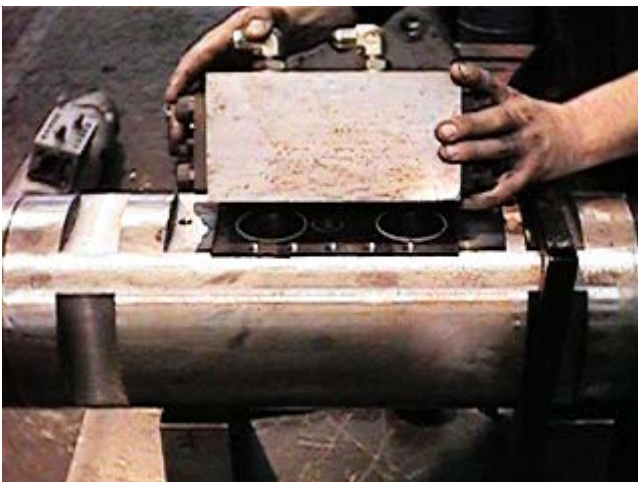
6. Fit valve housing to the main cylinder body.



Install o-rings and packing around the cylinder body oil ports as shown.



Apply working grease to the seals.



Locate valve housing and tighten down valve housing bolts to the specified torque settings.