



TÜV



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Excellent Machine
Mechanism, Material



HR 450

HAMMEROC



Operation Maintenance Manual & Parts List

HAMMEROC Corp.



HR 450 HAMMEROG

Operation Maintenance Manual

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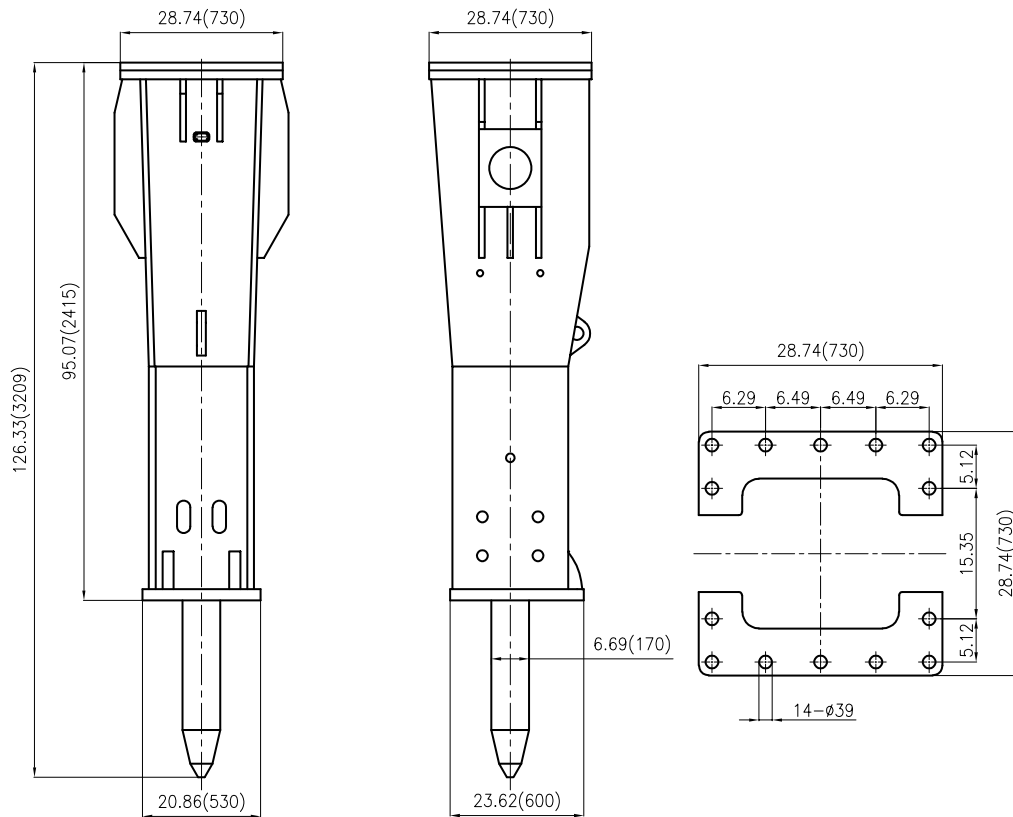
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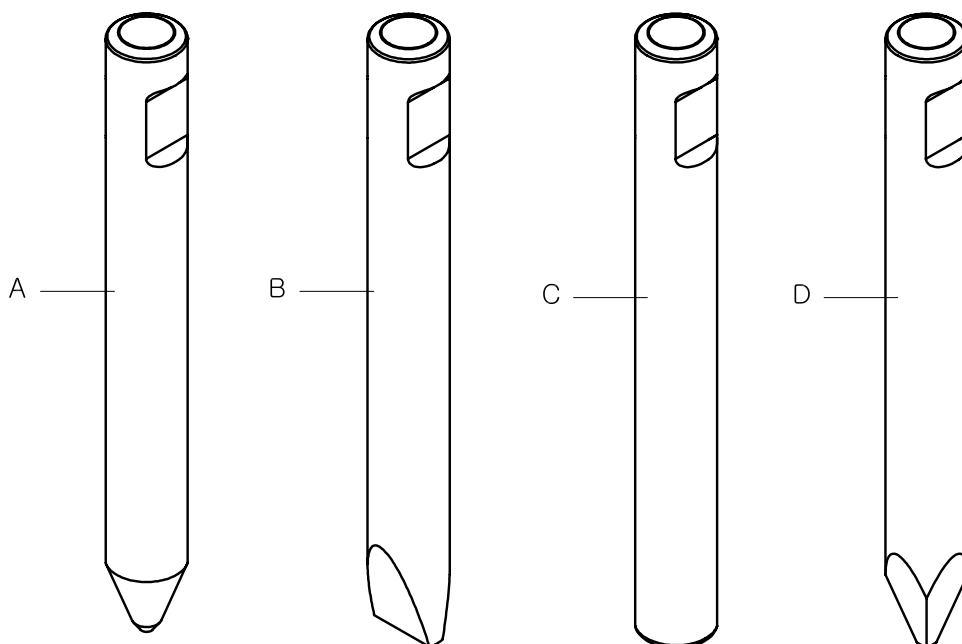
1. SPECIFICATION

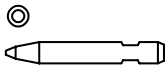
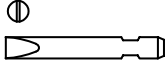
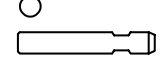
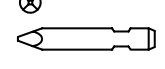
1-1. General specifications



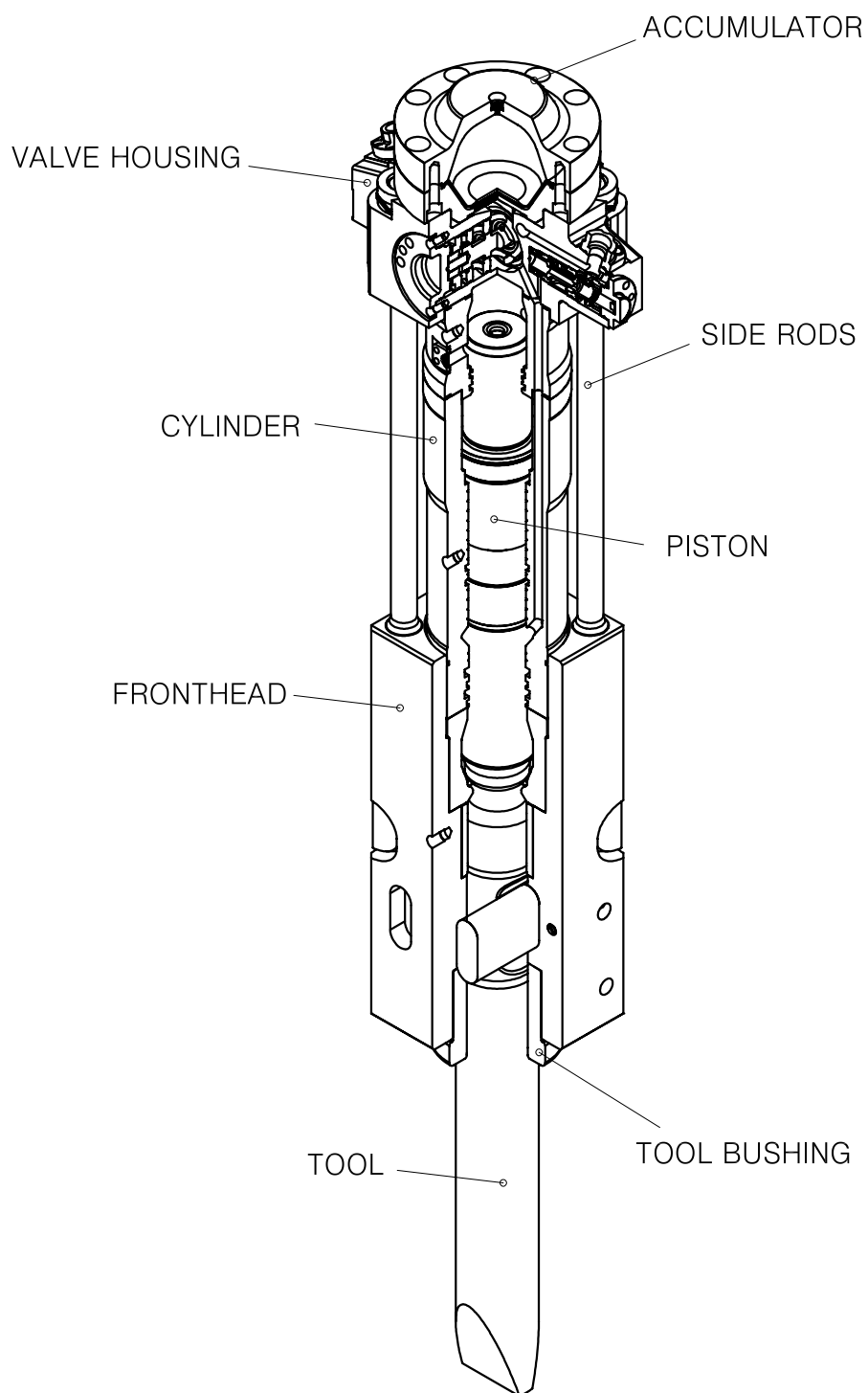
Item	Specification
Working weight	7960 lb (3610 kg)
Impact energy	11000 ft.lb (150000 J)
Impact frequency	320 ~ 510 BPM
Operating pressure	1900 ~ 2180 psi (130 ~ 150 bar)
Relief pressure	2600 ~ 2900 psi (180 ~ 200 bar)
Oil flow	53 ~ 84 g/min (200 ~ 320 l/min)
Back pressure	145 psi (10 bar)
Tool diameter	6.69 in (170 mm)
Oil temperature	-4 ~ +176 °F (-20 ~ +80°C)
Hydraulic oil viscosity	1000 ~15 cSt
Pressure line size	1 in (25 mm)
Return line size	1 1/4 in (32 mm)
Grease	PF 3/8"
Air (underwater)	PF 3/8"
Accumulator pressure	580 psi (40 bar)
Carrier weight	88000 ~ 154000 lb (40 ~ 70 ton)

1-2. Tool specifications



		Name	Length in (mm)	Weight lb (kg)	Diameter in (mm)	Remarks
A		Cone type	57.09 (1450)	495 (225)	6.69 (170)	
B		Chisel type	57.09 (1450)	495 (225)	6.69 (170)	
C		Blunt type	51.18 (1300)	450 (205)	6.69 (170)	
D		Moil type	57.09 (1450)	495 (225)	6.69 (170)	

1-3. Structure Detail

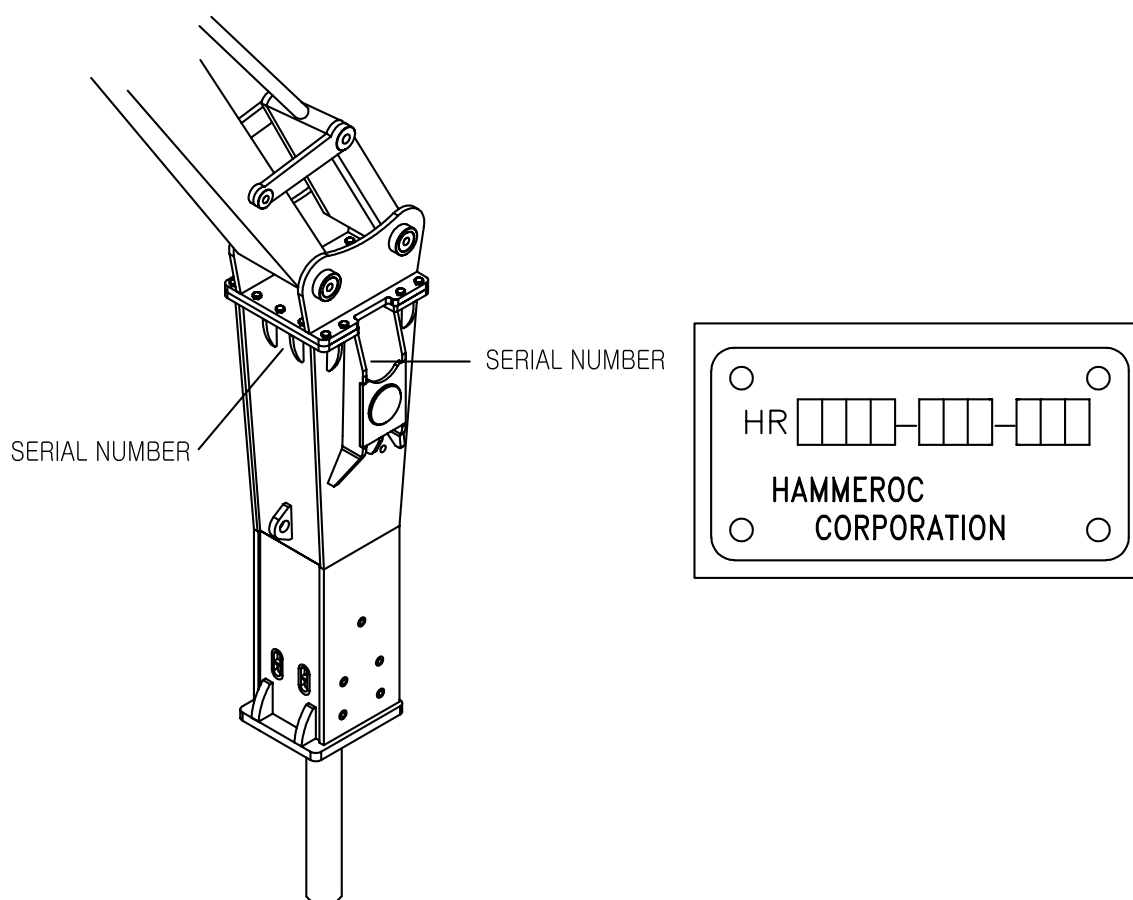


2. OPERATION

2-1. Product numbers

The serial number is stamped on the valve housing and housing.

It is important to make correct reference to the serial number of the attachment when making repairs or ordering spare parts. Identification of the serial number is the only proper means of maintaining and identifying parts for a specific product.



2-2. Selection of tool

HAMMEROC can offer the selection of standard and special tools to suit each application. The correct type of the tool must be selected to get the best possible working result and the longest life time for tool.

1) Blunt

- * For igneous(e.g. granite) and tough metamorphic rock(e.g.gneiss)into which the tool doesn't penetrate.
- * Concrete
- * Breaking boulders.

2) Chisel and cone

- * For sedimentary(e.g.sandstone) and weak metamorphic rock into which the tool penetrates.
- * Concrete
- * Trenching and benching.

2-3. Principle of breaking

- * There are basically two ways of breaking with a hydraulic breaker.

1) Penetrative breaking

In this form of breaking, a hydraulic breaker with a high impact frequency is normally used, as the impact energy is not important.

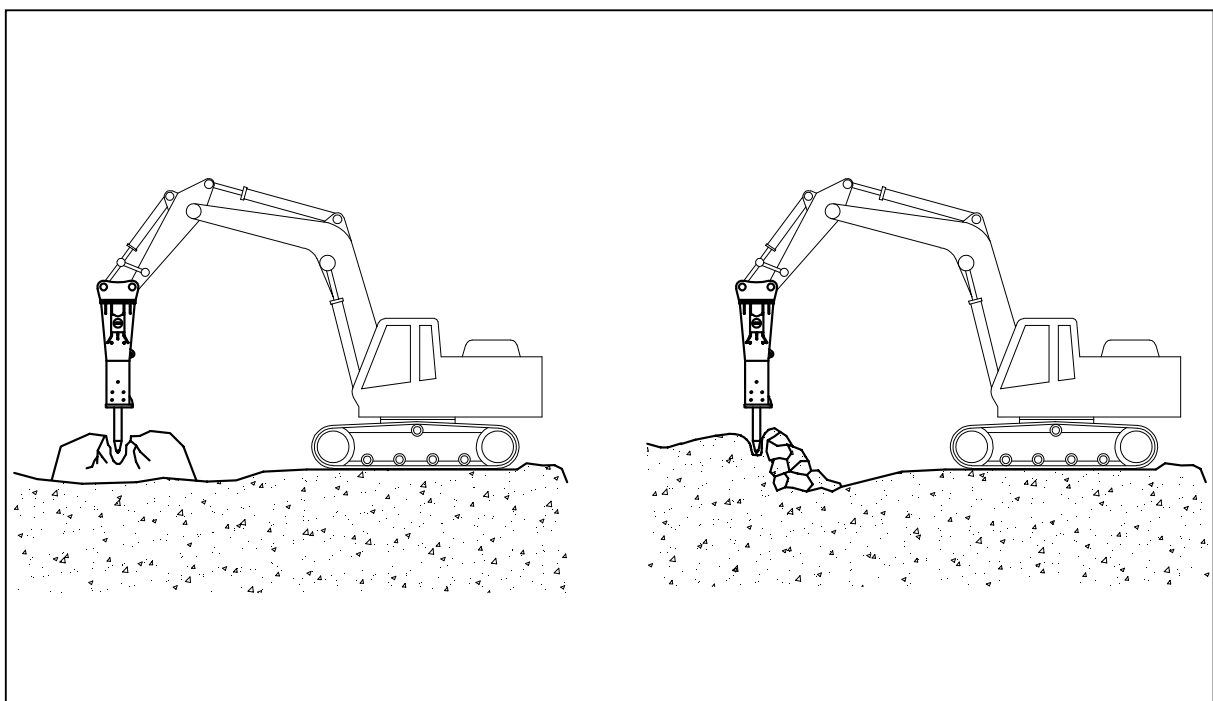
Themoil point or chisel tool is forced into the material causing it to crack and break up.

This method is most effective in soft, layered, low abrasive material such as concrete, asphalt, hard or frozen ground and other similar materials.

2) Impact breaking

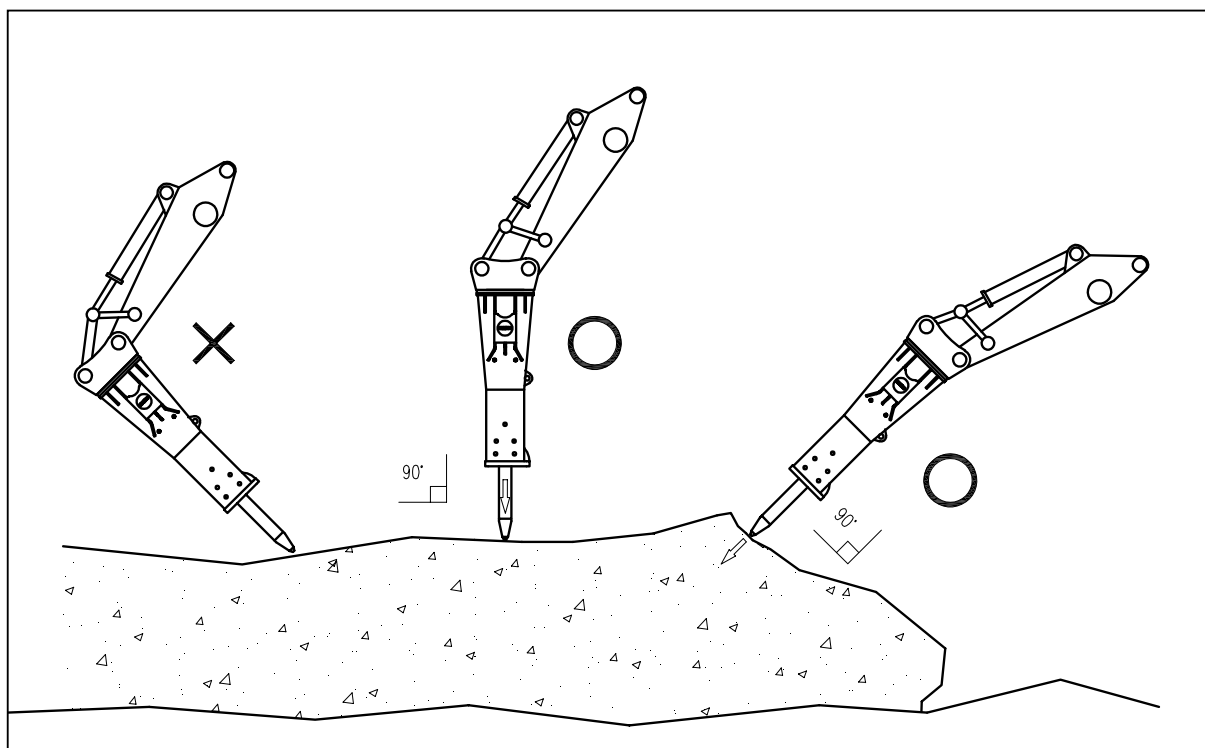
In impact breaking the impact energy of the hydraulic breaker is the most important factor, therefore larger breakers are used.

- * In impact breaking, material is broken by transferring a strong stress wave from the piston via the tool into material to be broken. This stress wave causes the material to disintegrate from inside.
- * Best possible energy transfer between the tool and object is achieved with a blunt tool. Impact breaking is most effective in hard, brittle and very abrasive materials.



2-4. Correct working methods

- 1) Prepare the carrier as for normal excavation work.
 - a. Move the carrier to the required position.
 - b. Engage the parking brake.
 - c. Set the drive to neutral.
 - d. Disengage the boom lock(if fitted).
- 2) Set the engine speed to the recommended engine RPM.
- 3) Place the tool against the object to be broken at 90 degrees.
 - a. Avoid small irregularities on the object which will break easily and cause either idle strokes or incorrect working angle.
 - b. Incorrect working methods may cause failure in the operation of the breaker or housing.
- 4) Use the carrier machine boom to press the breaker firmly against the material to be broken. Do not lift the front of the carrier machine off of the ground. Only apply sufficient down-force to keep the breaker tool against the object to be broken.
 - a. Do not pry the breaker with the boom.
 - b. Do not press too much or too little with the boom.
- 5) Start the breaker.
- 6) Keep the tool firmly against the object all the while that the breaker is operating.
 - * Feed the breaker towards the object all the time with the carrier machine boom.
- 7) Keep the tool at 90 degrees to the object all the times.
 - a. If object moves or its surface breaks, correct the angle immediately.
 - b. Keep force feed and tool aligned.



- 8) Stop the breaker as soon as the object breaks.
 - a. Do not allow the breaker to drop and make idle strokes when the object breaks. Constant idle strokes can damage the breaker.
 - b. If breaker falls down against the broken material, it can cause damage to the housing.
- 9) Do not strike in one spot for more than 15 seconds at a time.
 - * If the object does not break after fifteen seconds, stop the breaker and change the position of the tool. Otherwise the tool will only make an indentation, which will fill with dust. This dampens the impact effect and will cause the tool to overheat.
- 10) When breaking concrete, hard or frozen ground, or any similar material, never strike and bend with the tool at the same time. This could cause the tool to break.

2-5. Operating temperature

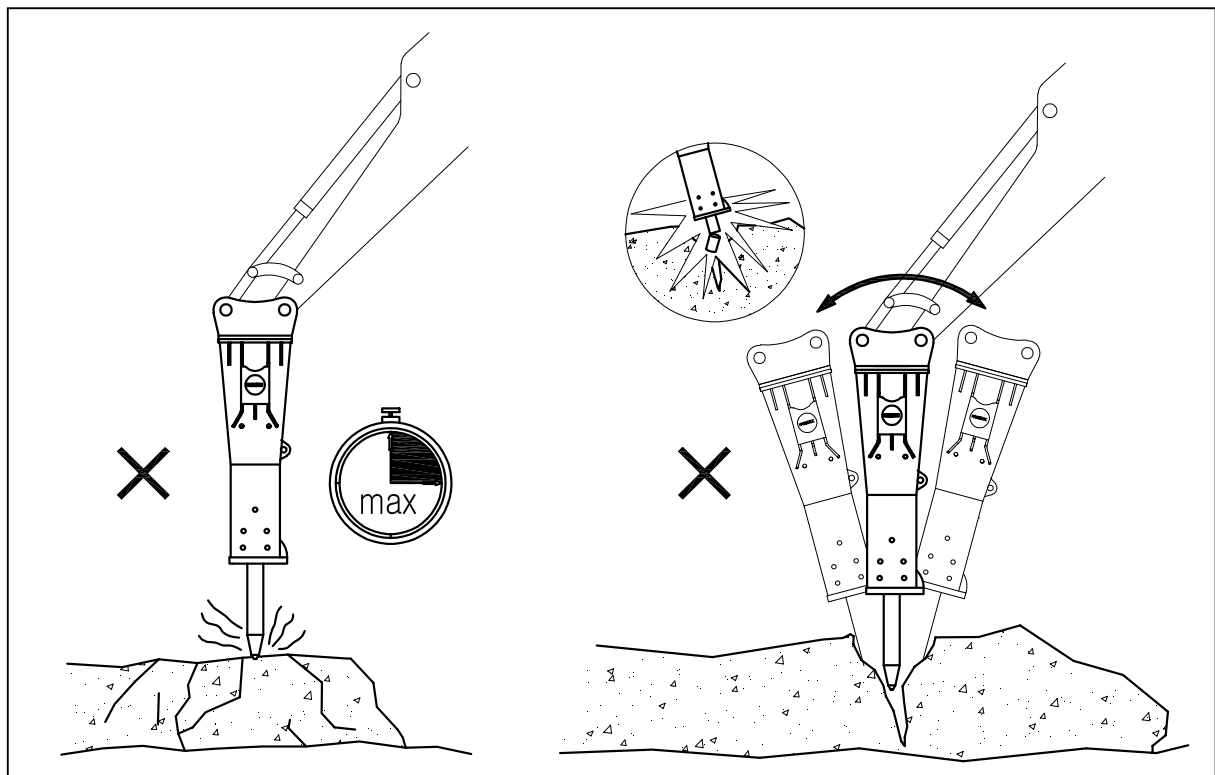
The operating temperature is $-4^{\circ}\text{F} \sim 176^{\circ}\text{F}$ ($-20^{\circ}\text{C} \sim 80^{\circ}\text{C}$).

If the temperature is lower than -4°F (-20°C), the breaker and tool must be preheated before starting the operation in order to avoid breakage of the accumulator membrane and the tool. During operation they will remain warm.

2-6. Other important points

- a. Listen to the breaker's sound while you are using it.
 - * If the sound becomes thinner and the impact less efficient, the tool is not aligned with the material and/or there is not enough "down" force on the tool.
 - * Realign the tool and press the tool firmly against the material.
- b. 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. (Standard hammer)



2-7. Storage

LONG TERM STORAGE

Observe the following points when the hammer is stored. In this way the vital parts of the attachment are protected from rust and the machine is ready to be used whenever necessary.

1. The storage area must be dry.
2. The tool must be removed from the hammer.
3. The lower end of the piston, tool and tool bushing must be well protected with grease in all hydraulic hammers.
4. Connections must be sealed with clean plugs to prevent oil leakage and dirt from getting into components.
5. The product must be stored in the vertical position.
6. Make sure the product can not fall.

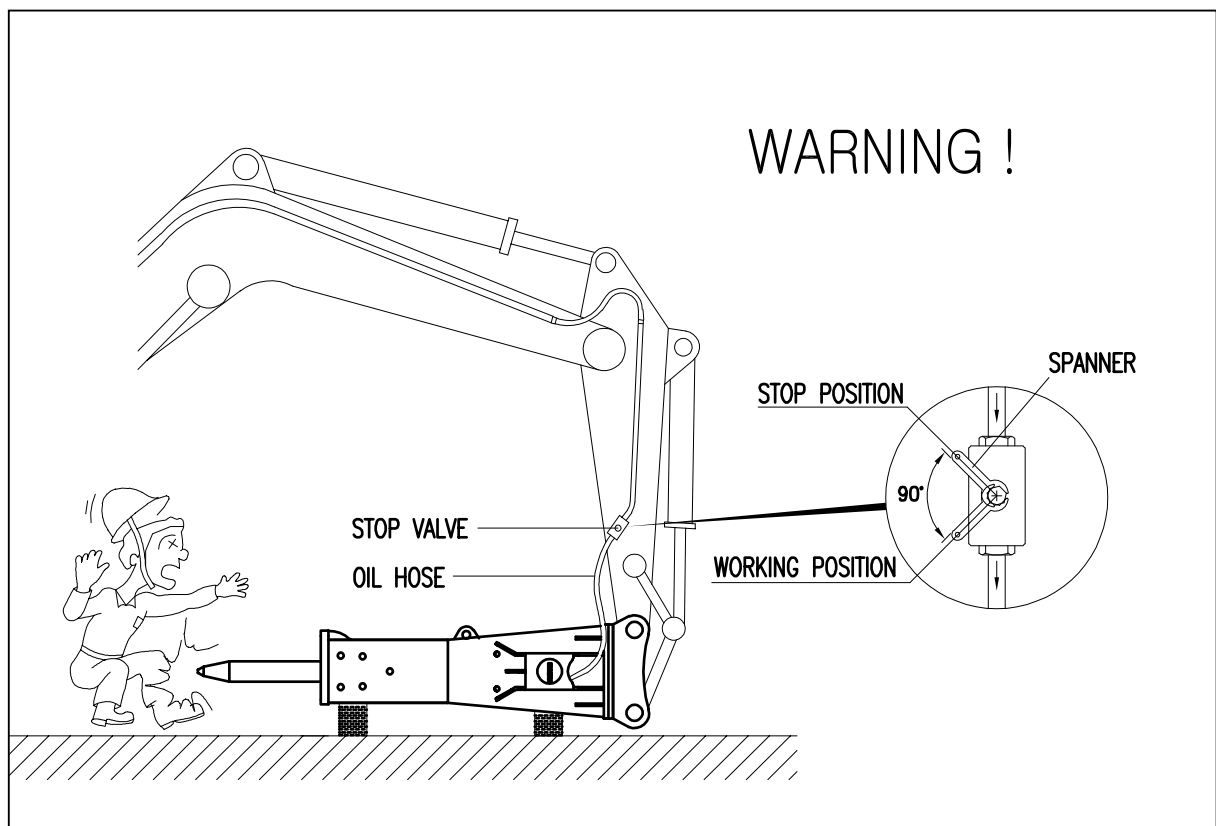
2-8. Mounting and dismounting the Breaker

Removal from carrier

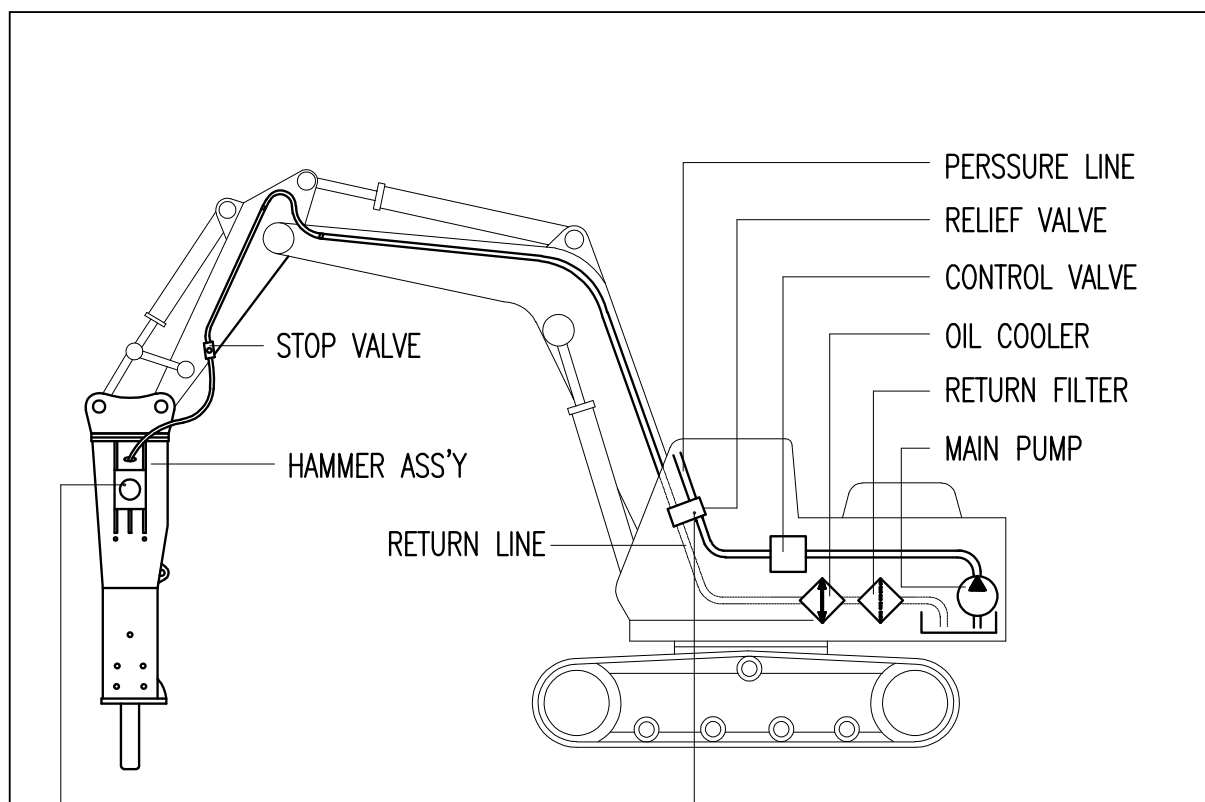
1. Position hammer horizontally on the floor and remove the tool.
2. Stop carrier engine. Operate boom and hammer controls to release pressure trapped inside hoses. Wait ten minutes for oil pressure to drop.
3. Close hammer inlet and outlet lines. If quick couplers are used, disconnection automatically closes lines.
4. Disconnect hoses. Plug the hoses and the hammer inlet and outlet ports.
5. Remove bucket pins and other parts.
6. The carrier can be moved aside.

Installation

1. Install hammer in the same manner as mounting a bucket.
Install bucket pins.
2. Connect hoses. Hammer inlet port is marked on the valve housing with "IN" and outlet port with "OUT"
3. Open hammer inlet and outlet lines.



2-9. Setting of operating pressure



MODEL	OPERATING PRESSURE
HR450	1900 ~ 2180 psi (130 ~ 150 bar)

MODEL	RELIEF PRESSURE
HR450	2600 ~ 2900 psi (180 ~ 200 bar)

1) Operating Pressure

- a. Stop the carrier engine.
- b. Assemble the high pressure guage to the high pressure measuring port. Start the engine.
- c. Set the tool of the breaker e.g. on a thick steel plate.
- d. Adjust operating engine revolution and start to operate the breaker.
- e. Read the average pressure from the high pressure gauge operating pressure.
- f. Operating pressure is pre-adjusted at the factory and there should be no reason to adjust it.
- g. Stop the carrier and remove the guage.

- h. Tighten the plug of the pressure measuring point.

2) Relief Valve

- a. The relief valve is a safety device which is used to protect the breaker when the pressure rises in hydraulic circuit.
- b. The operating pressure of the breaker determines the setting of the relief valve in the pressure line.
- c. The relief valve setting should be acceptable as per the specifications of each HAMMERO C models.

2-10. Recommended specs of hoses and pipes for HAMMEROC breakers.

MODEL	HOSE ASSEMBLY			PIPING LINE SIZE	
	IN	OUT	LENGTH	IN	OUT
HR450	PF 1"	PF1-1/4"	1800	PF 1"	PF1-1/4"

2-11. Measuring method for hydraulic oil flow & pressure

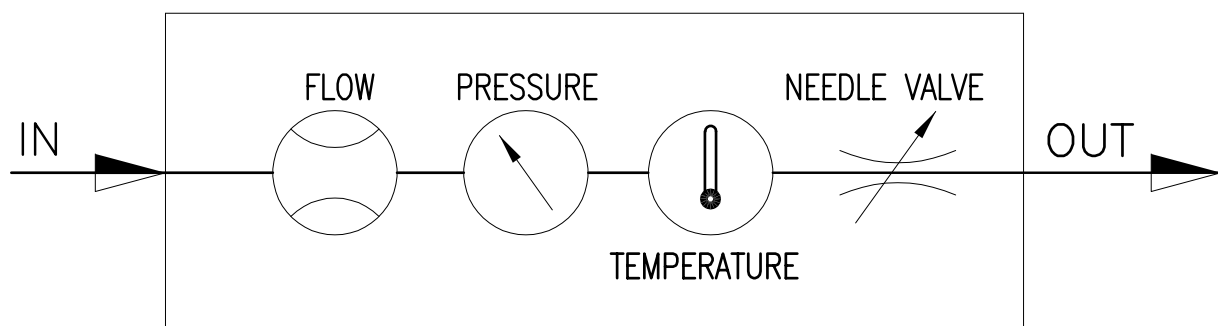
1) Measuring method

PRESSURE	BAR	0	25	50	75	100	125	140	150	175	190	200	210
FLOW	LPM												

SETTING OF SUPPLIED OIL FLOW
(HR180~450)

RELIEF VALVE PRESSURE

2) Basic circuit for measuring oil flow, pressure and temperature



3. LUBRICATION

3-1. Manual Lubrication

Grease Interval

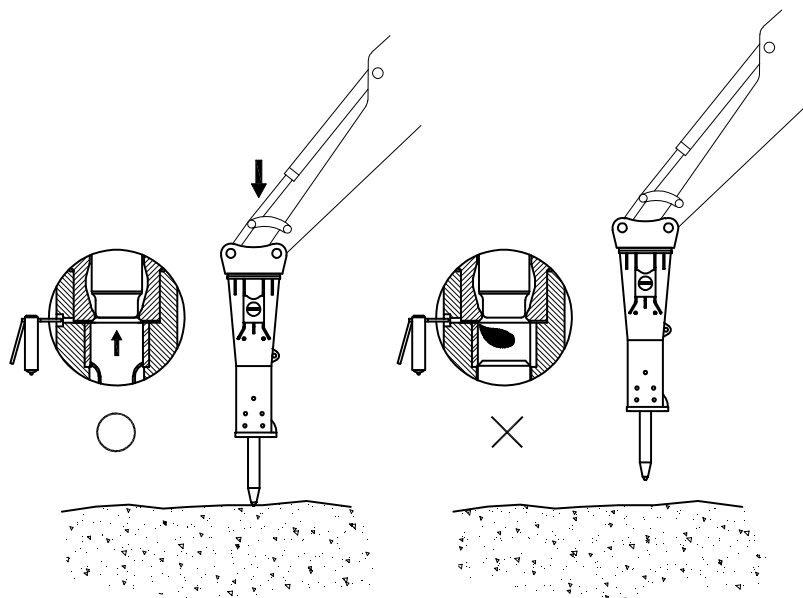
1. Tool shank must be well lubricated before installing tool at regular intervals.
2. 5~10 Strokes from grease gun to tool bushing and tool at regular intervals.
3. Adapt interval and amount of grease to decrease wearing of tool and good working conditions. This should be done every 2 hours.

Insufficient greasing or improper grease may cause :

- Abnormal wear of tool bushing and tool
- Tool breakage

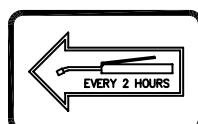
Technical data :

- NLGI grade 2
- Synthetic oil base with aluminium complex soap
- Approximately 15% graphite copper solids to reduce metal to metal contact damage
- Dropping point 500°F (260°C)
- Viscosity 15 cSt
- Temperature range -20°F ~ 450°F (-30°C ~ 230°C)



GREASING POINT

The greasing point on the hammer have been marked with the following sticker.



3-2. Automatic lubrication

Lubrication of the hammer can be made automatically by equipping the carrier with a lubrication pump. The tool grease is supplied from the pump into the hammer by hose.

The advantages of the automatic lubrication system are longer service life for wear parts and a higher utilization rate for the hammer.

3.3 Hydraulic oil

When the breaker is used continuously, the temperature of the hydraulic oil normalize at a certain level depending on conditions and on the carrier. At this temperature, the viscosity of the hydraulic oil should be 20~40cSt (2.90~5.35°E). The HAMMERO hydraulic breaker must not be started if the viscosity of the hydraulic oil is above 1000cSt (131°E) or operated when the viscosity of the hydraulic oil is below 15cSt (2.35°E)

- 1) When the oil is too thick, the following problems may occur;
 - a. Difficult start up.
 - b. Stiff operation.
 - c. The breaker strikes irregularly and slowly.
 - d. Danger of cavitations in the pumps and hydraulic breaker.
 - e. Sticky valves.
 - f. Filter bypass, impurities in oil not removed.

- 2) When the oil is thin, the following problems may occur;
 - a. Efficiency losses (internal leaks).
 - b. Damage to gaskets and seals leaks.
 - c. Accelerated wearing of parts, because of decreased lubrication efficiency.

3) Special oil

In some cases special oil (e.g. biological oil and non-inflammable oil) can be used, please observe following aspects when considering the use of special oil;
the viscosity range in the special oil must be in

the given range of 15~1,000cSt (2.35~131°E)

4) Cleanness of hydraulic oil

- * The hydraulic oil filter of the carrier will clean the oil flowing through the breaker.
- * The purpose of the oil filter is to remove impurities from the hydraulic oil since they cause accelerated component wear, blockages and even seizure.
- * Impurities also cause the oil to overheat and deteriorate.
- * Air and water are also impurities in oil.

5) Oil filter

- * When working with hydraulic breaker, the carrier oil filter must fulfil the following specifications;
 - a. The oil filter must be rated at 25 microns maximum.
 - b. The oil filter must be a standard return line filter rated to maximum working pressure.
 - c. The oil filter must have a volume flow capacity of at least twice the breaker's maximum flow.
 - d. The cooler must withstand a dynamic pressure of 290 psi (20bar).
 - e. If the carrier's oil cooler is too small either the original cooler must be replaced with a larger one or an auxiliary cooler must be installed.

6) The auxiliary hydraulic cooler can be installed;

- a. In front of the radiator, in which case an additional fan is not required, i.e. maximum rise of the cooling air is 40°F (5°C).
- b. Any other suitable place, using a fan either hydraulically or electrically driven.

7) Damage caused by hydraulic oil contamination in the carrier and breaker circuits;

- a. The working life of the pumps is significantly shortened.
 - Premature wear of parts
 - Cavitation
 - Recommended Oil, Temperature, Viscosity
- b. Valves do not function properly.
 - Spools bind
 - Premature wear of parts

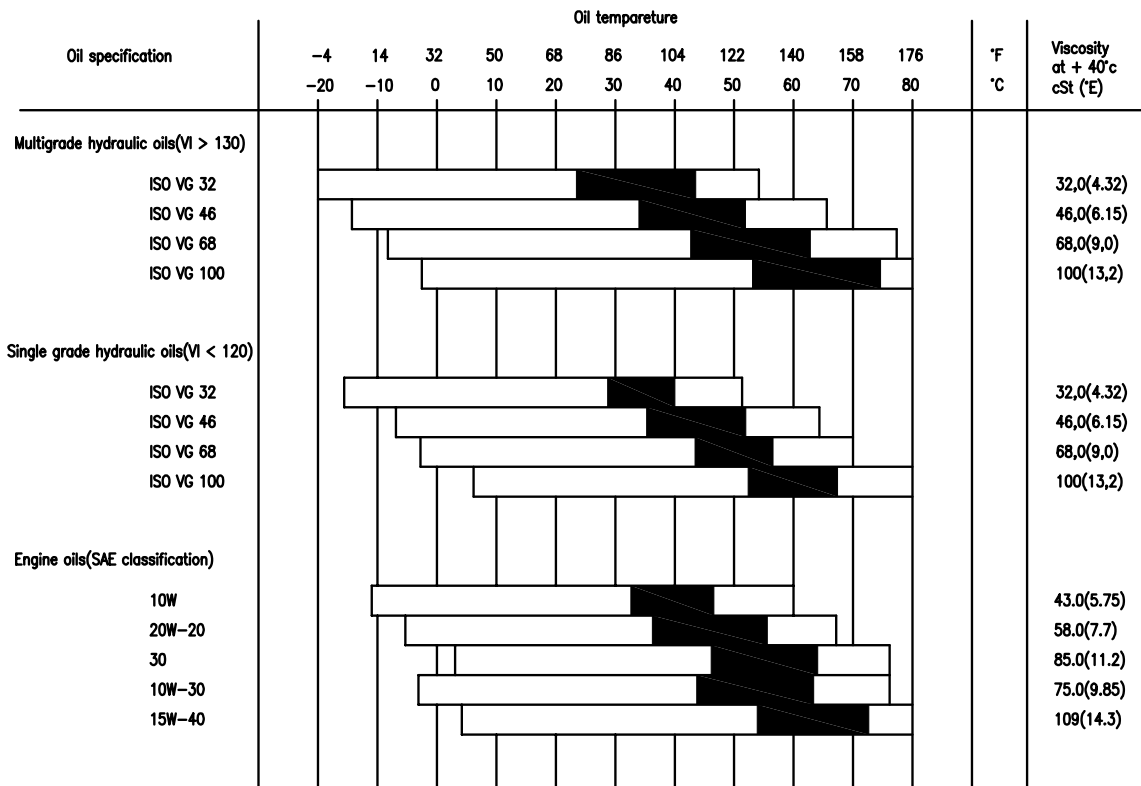
- Blocking of small holes
- c. Wear of cylinders and gaskets.
- d. Reduced breaker efficiency of hydraulic oil.
 - Premature wear of moving parts and seals
 - Danger of piston seizing up
 - Oil overheats
- e. Shorten working life and reduced efficiency of hydraulic oil.
 - Oil overheats
 - Oil quality deterioration
 - Electrochemical changes in hydraulic oil

* Recommended Oil, Temperature, Viscosity

VI=Viscosity Index

□ Permitted oil temperature

■ Recommended oil temperature



4. MAINTENANCE

4-1. Maintenance intervals

- a. Every two hours.
 - Grease the tool shank and the bushing.
 - Observe hydraulic oil temperature, all line and connections as well as impact efficiency of operation.
 - Tighten loose connections.
- b. Every 10 hours at least once a week
 - Remove the bushing pin and tool and check their condition. Grind burrs away if necessary.
 - Check that the tool has received sufficient greasing, grease more frequently, if necessary.
- c. Every 50 hours or at least once a month
 - Check the tool shank and tool bushings for wear.
 - Check the hydraulic hoses, replace if necessary. Do not let dirt get into the hammer or hoses.
- d. Every 600 hours or once a year
 - This service is recommended to be done by your HAMMEROC dealer after 600 operating hours. Neglecting the yearly service can cause severe damage to the hammer.

Your HAMMEROC dealer will reseal the hammer, replace the accumulator membranes.

Contact HAMMEROC dealer will reseal the hammer, replace the accumulator membranes.

Contact your HAMMEROC dealer for more information about yearly service.

- Check all hydraulic connections.
- Check that the hydraulic hoses do not rub against anything in any boom/stick position.
- Replace and inspect the hydraulic oil filters of filters of the carrier.

4.2 Special application

- a. Maintenance intervals in underwater use.

After every half hour operation

- Grease the tool shank and the tool bushings through the grease nipple.
- Check that the hammer moves normally inside the housing and that the buffers are in good conditions.
- Check all hoses and connections.
- Check the operation of the air pressure switch.

Daily maintenance

- Remove the bushing pin and the tool for inspection. Grind the burrs away if necessary.
- Check that the tool has received sufficient grease.
- Service the hammer after underwater jobs.

The hammer must be totally dismantled and serviced after working underwater.

5. SERVICE

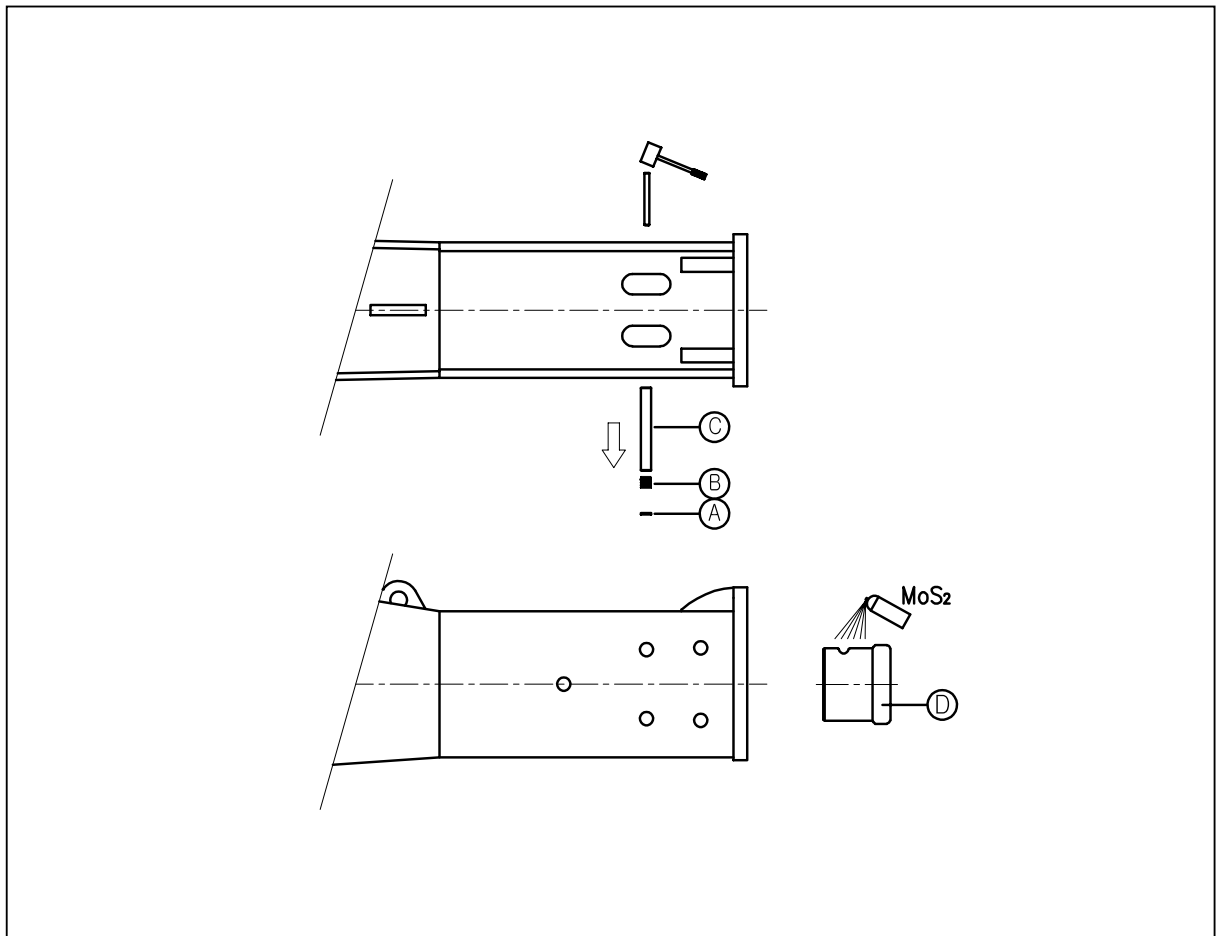
5-1. Changing tool bushing

1) Removal

- a. Place the break on level ground.
- b. Be sure that the carrier's transmission is in neutral and the parking brake is engaged.
- c. Stop the engine.
- d. Remove the tool.
- e. Remove the snap ring A.
- f. Remove the rubber plug B.
- g. Remove the bushing pin C.
- h. Remove the tool bushing D.

2) Installation

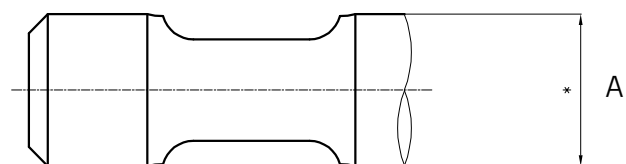
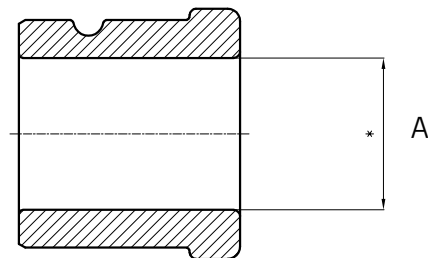
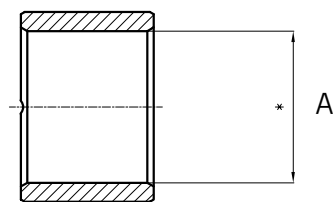
- a. Clean all parts.
- b. Apply MoS₂ spray to the contact surfaces of the tool bushing and the front head.
- c. Install the tool bushing D.
- d. Install the bushing pin C.
- e. Install the rubber plug B.
- f. Install the snap ring A.



5-2. Wear limit for upper bushing and tool bushing and tool

The maximum clearances between the tool bushing and the tool are different for each model.
(see below table.)

Please check the tool bushing once a month.
If the diameter of tool bushing(A) is beyond the wear limit, replace it with the new tool bushing.



in (mm)

	NEW	REJECT	REMARK
UPPER BUSHING	6.69 (170)	6.81 (173)	
TOOL BUSHING	6.69 (170)	6.81 (173)	
TOOL	6.69 (170)	6.57 (167)	

5.3 Removal and installation of breaking mechanism

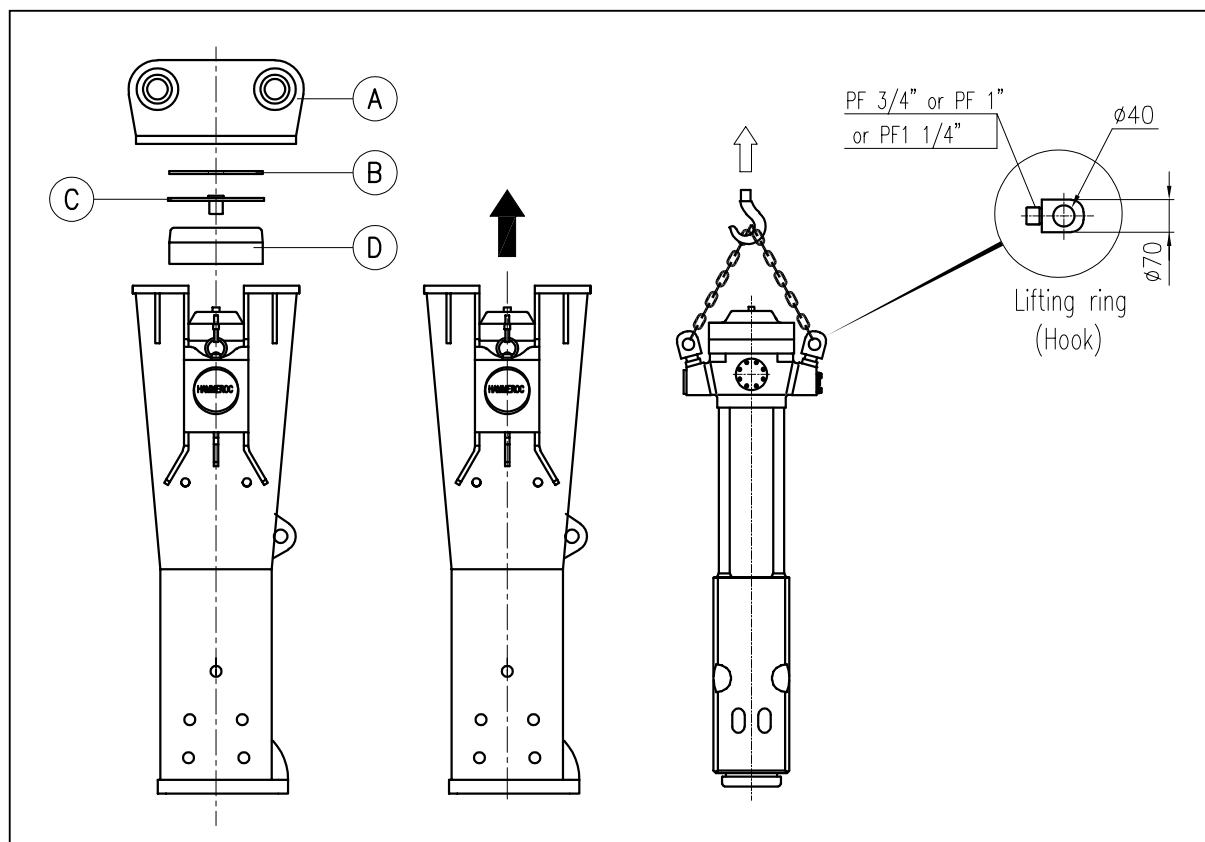
1) Removal

- a. Remove the tool and stand the breaker at a vertical position on the floor and make sure it cannot fall.
- b. Disconnect the hoses and plug them as well as the breaker inlet and outlet ports.
- c. Open the top cover bolts.
- d. Remove the top bracket A.
- e. Remove the top buffer wear plate B and the top buffer plate C.
- f. Remove the top buffer D.
- g. Lift the breaker mechanism so that there is 0.39 inch (10mm) in clearance between the valve housing and the side buffer.
- h. Move the breaker mechanism from side to side, if the breaker mechanism moves more than ± 0.39 inch (10mm) at the level of the check valve, replace the wear plates.

- i. Lift the breaker mechanism out of the housing and if necessary, change the wear plates.

2) Installation

- a. After changing the wear plates, install the breaker mechanism into the housing and check the clearance by moving from side to side the breaker mechanism.
- b. After installing the breaker mechanism into the housing, and the buffer system, hoses and mounting bracket have been refitted. Install the tool.

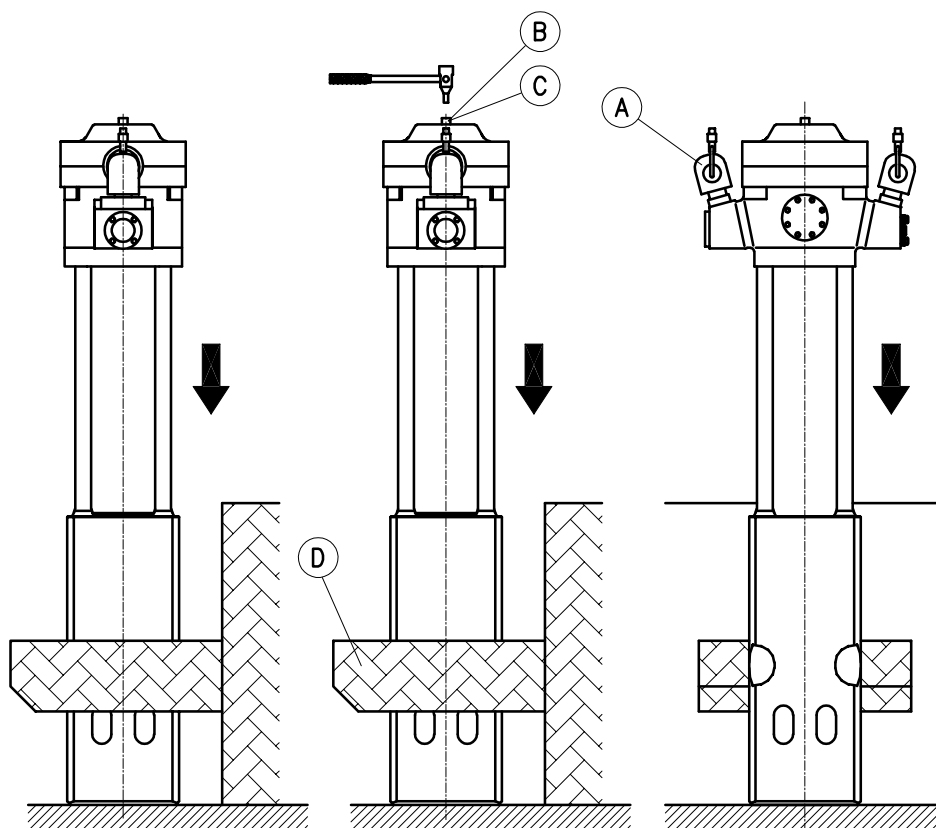


5.4 Assembling and installation of accumulator

- 1) Releasing the pressure from the accumulator.
 - a. Remove the breaker mechanism from the housing.
 - b. Fit the breaker mechanism into the assembly stand E by lifting with a lifting ring A.
 - c. Remove the lifting ring A and the accumulator cap B.
 - d. Carefully open the accumulator gas bolt C to allow the nitrogen to escape. Remove the accumulator gas bolt B and use ring D when all the pressure is released from the accumulator.
 - e. If you have difficulties with this work, please contact your local dealer or the manufacturer.

Warning!

Do not open the accumulator before releasing the 580psi (40bar) nitrogen pressure via the gas bolt.



2) Removal

- Open the bolt D (8pcs)
- Lift the accumulator off of the valve housing and place it on a clean surface.
- Remove the seal E.
- Turn the accumulator upside-down and place it on the assembly stand.
- Open the bolt F (12pcs)
- Remove the accumulator bottom I and membrane H.
- Remove guide pins J.

3) Assembling

- Clean and dry parts carefully.
- Set the accumulator cover C on the assembly stand.
- Install the guide pins J.
- Fit a new membrane H in place. Apply silicon grease on the gas side of the membrane as well as on the accumulator cover C.

- Install accumulator bottom I.

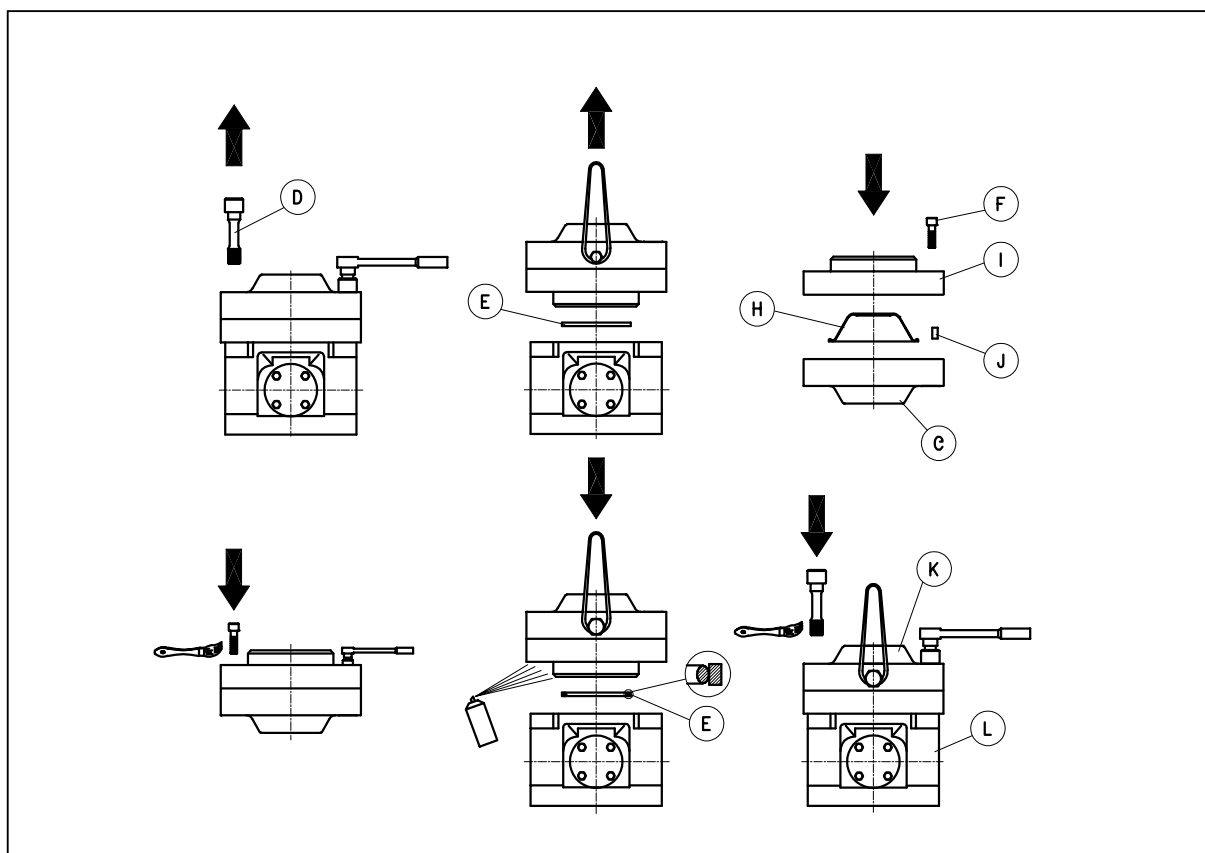
- Apply the thread grease to the thread area and the bolt F (12pcs)

- Install the bolts F.

Tighten the bolts F with a torque wrench to the value shown in the torque specifications.

4) Fitting the accumulator

- Install the seal E into the groove in the bottom of the accumulator. Use grease to prevent the seal from falling out during mounting.
- Apply MoS₂ spray on the contact surfaces of accumulator K, housing L and guide pin J.
- Lift the accumulator into place on the valve housing.
- Apply the thread grease to the thread area and the bolts D.
- Tighten the bolts with a torque wrench to the value shown in the torque specifications.



5.5. Charging accumulator

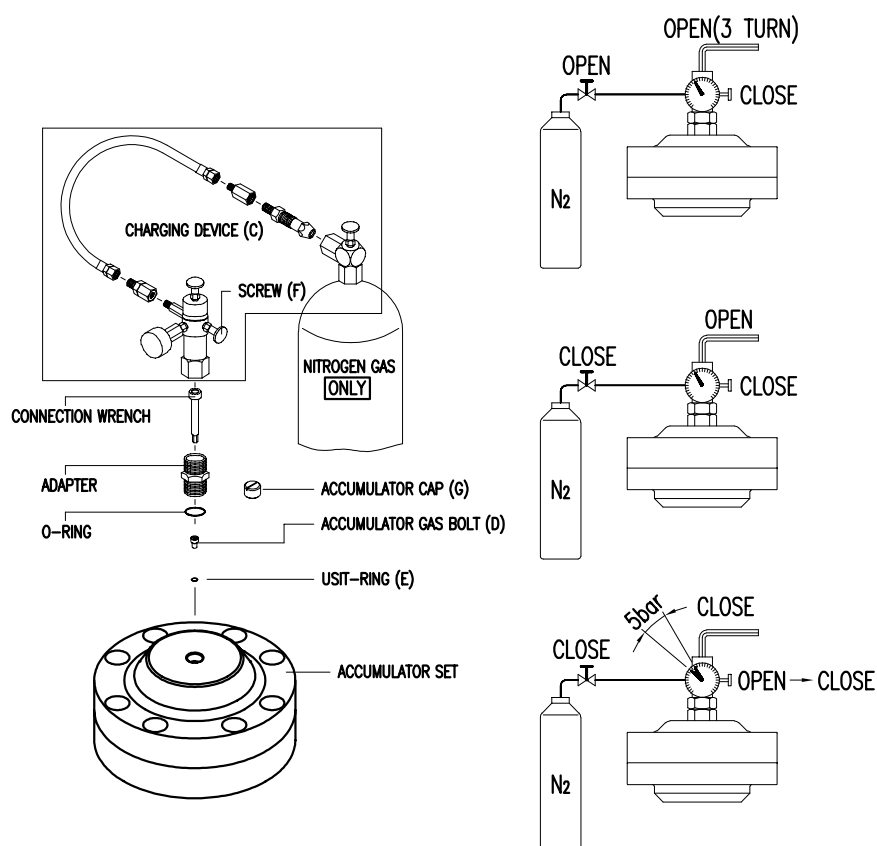
- 1) Furnish the accumulator with a new Usitring E and the accumulator gas bolt(D).
- 2) connect the charging device(C) to the accumulator.
- 3) Open the accumulator gas bolt(D) through the charging device.
- 4) Open the valve of the nitrogen bottle and observe the gauge pressure.
- 5) Set the pressure to that shown in column(A) and shut the bottle valve.
- 6) wait for 2minutes to allow the pressure to stabilize.
- 7) Adjust the pressure to that shown in column(B) by releasing screw(F).
- 8) Shut the accumulator gas bolt(D), tightening torque 20N.M (15ft-lb).
- 9) Release the pressure from the hose and remove the charging device.
- 10) Check for leakage at accumulator gas bolt(D) by dropping a small quantity of oil around the accumulator gas bolt(D).
- 11) Replace the accumulator cap(G).

Warning!

Use only nitrogen gas

SETTING OF NITROGEN GAS PRESSURE.

MODEL	A	B
HR450	650psi (45bar)	580psi (40 bar)



5.6 Removal and installation of main spool

1) Removal

- Loosen the bolts A (12pcs), cover B and C.
- Screw two of the bolts A into the threaded holes in the covers and use them to pull the covers out.
- Push out the spool D. Carefully remove the small spools E and F in the ends of spool D.
- Fasten the extractor in the holes of bolts A of valve housing. Put the flange against the sleeve I and drive the sleeve carefully out.

2) Installation

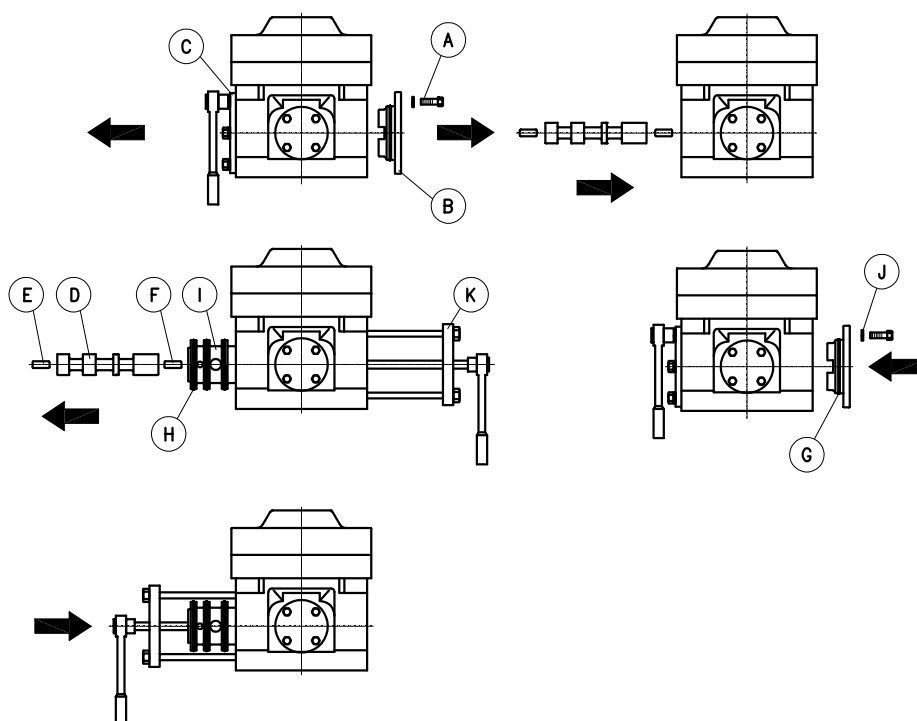
- Check the parts carefully. If necessary use fine emery cloth or grinding agent to remove any scratches or burrs. Clean and oil grease parts.
- Install new O-rings G on the covers B and C.
- Fasten the extractor on the valve housing side marked with X. Install the sleeve so that X on

its end comes to the same side with valve housing X.

- Install the spool D so that X on its end will be again on the X-side of the valve housing. Do not forget the spools E and F. Check that the spools move freely and apply some oil.
- Install the covers B and C (cover marked with X matches with X on the valve housing)
- Apply the thread grease to the thread area and the bolts A.

Install lock washers J (12pcs) and bolts A.

- Tighten the bolts with a torque wrench. Refer to the torque specifications.
- When assembling and disassembling the main spool, the sleeve, the extractor(K) must be used. Remember that you must protect your hands, so as not to injure them. If you do not have protective gloves do not proceed with the removing and installing, please contact your dealer or the manufacturer.



5.7 Removal and installation of operating valve

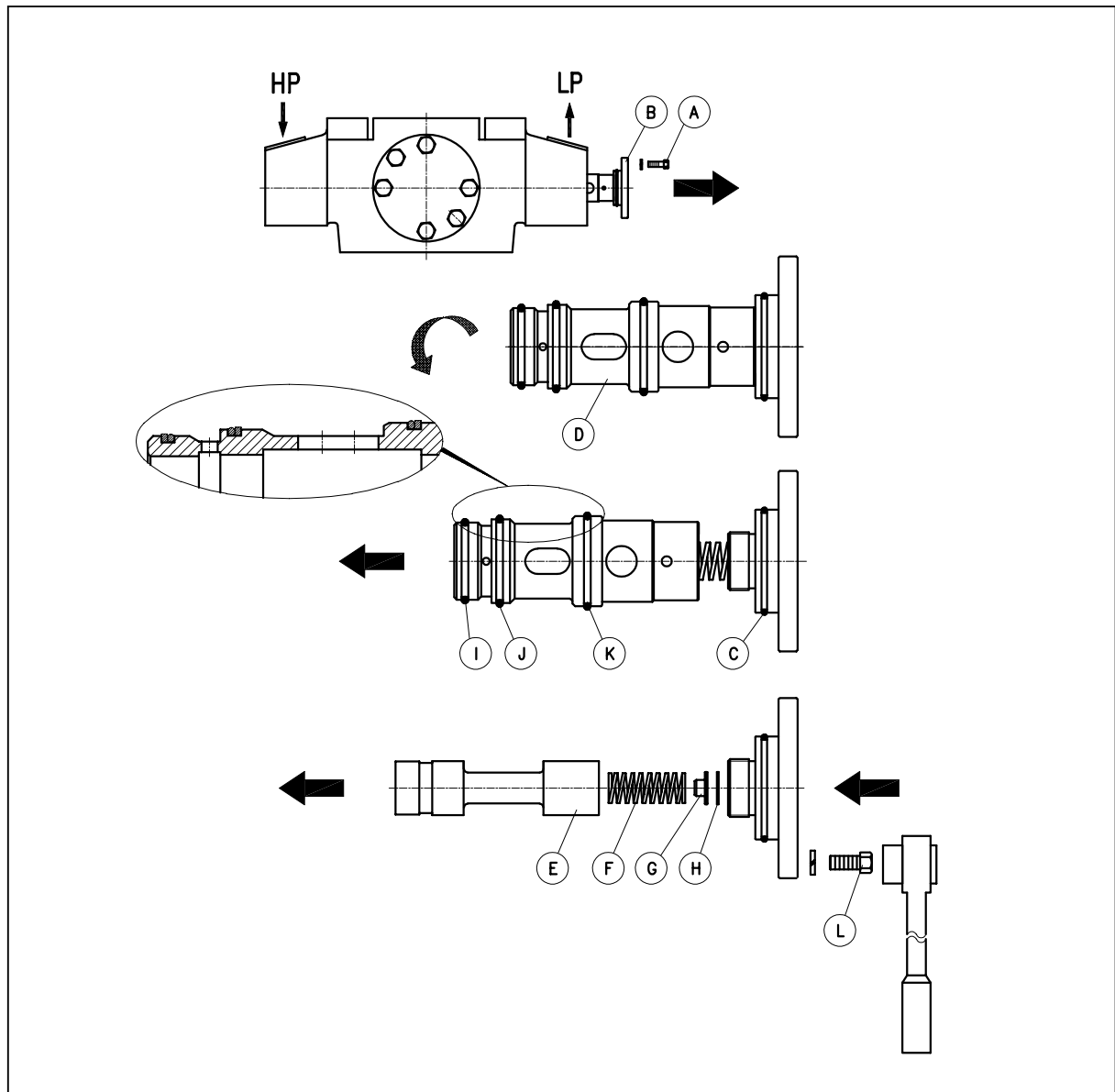
1) Removal

- a. Open the bolts A(4pcs). The operating valve is located in the valve housing, on the return side.

Screw four of the A bolts into the threaded holes in the covers and use them to pull the cover B out.

- b. Use the special pusher device to push the valve out.

- c. Fix the valve cover B in the valve housing or on a bench vise and loosen the guide D.
- d. Remove the spool E, the spring guide G, and the spring F, the pressure adjusting shim(s) H.
- e. Remove the seals I, J, K and the O-ring C.



2) Adjustment

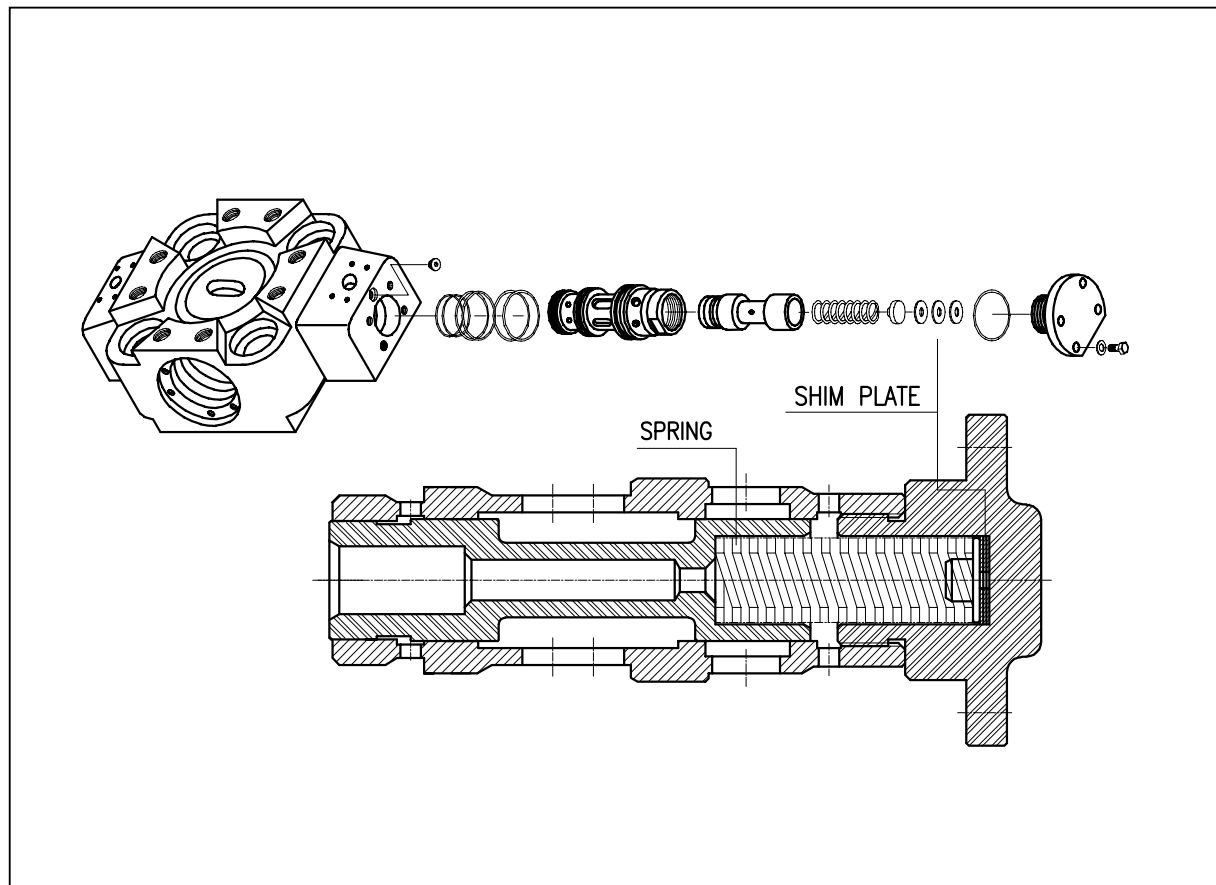
- a. When the pre-loading of the spring changes, the operating pressure changes as well.
- b. The operating pressure of the breaker is adjusted by adding or removing the pressure adjusting shims H between the cover B and spring guide G.

3) Installation

- a. Check parts carefully.
If necessary, use fine emery cloth or grinding agent to remove any scratches or burrs. Clean and oil/grease parts.

4) Structure of operating valve

- b. Fit a new O-ring C on the valve cover B.
- c. Fix the valve cover B in a bench vise and insert the operating valve shim(s) H, spring guide G and spring F.
- d. Install the spool E.
- e. Fasten the valve guide D to the cover B.
- f. Install the seals I, J, K.
- g. Push the operating valve into the valve housing with the special pusher device. Grease the tab area, bolts and screws.
- h. Install locking washers L(4pcs) and bolts A.
- i. Tighten the bolts A with a torque wrench. Refer to the torque specifications.



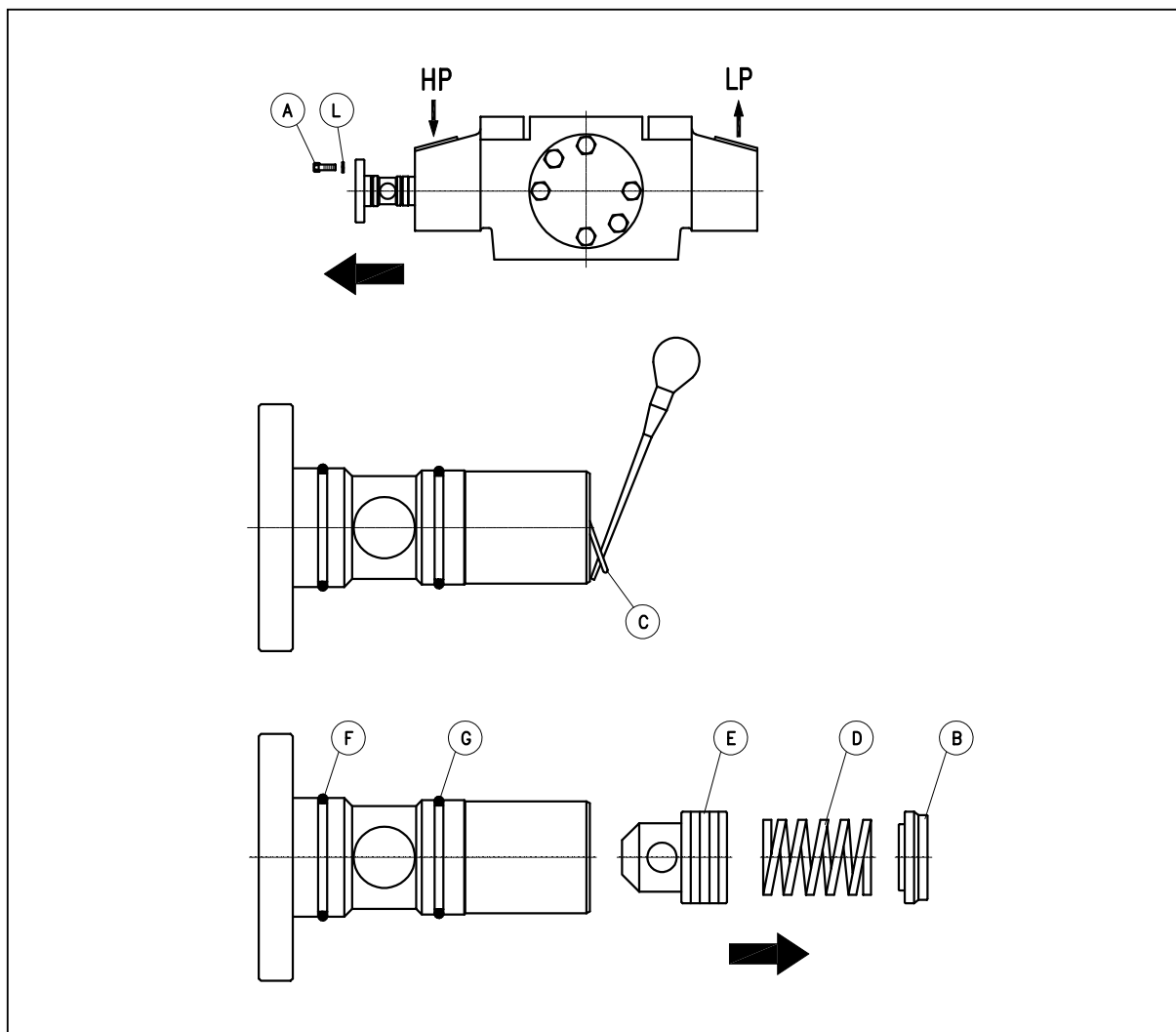
5.8 Removal and installation of check valve

1) Removal

- a. Undo the bolts A(4pcs) and remove the valve by screwing to of the bolts into the threaded holes in the valve cover. The check valve is located in the valve housing on the pressure side.
- b. Push the spring guide B in with a screwdriver.
- c. Pull out the lock ring C with a screwdriver.
- d. Remove the spring guide B.
Remove the spring D.
Remove the spool E.
Remove the O-ring F and G.

2) Installation

- a. If necessary use fine clean cloth or grinding agent to remove any scratches or burrs.
- b. Install new O-ring F and G.
Install the spool E, the spring D and the spring guide B.
- c. Install the lock ring C.
Check that the spool moves properly.
- d. Install the check valve into the valve housing, fit the bolts A and the locking washer L(4pcs).
- e. Tighten the bolts A with a torque wrench.
Refer to the torque specifications.



5.9 Loosening and tightening side rods

1) Loosening

- Remove the accumulator.
- Remove the rubber rings A(4pcs) and the lock washer B(8pcs).
- Mark each side rod C and its nut D as pairs.
- Heat the side rods with propane flame to loosen the side rods(max. temperature 392°F, 200°C)
- Remove the nuts D. Do not turn the nuts D upside down.

2) Tightening

- Use the crack detecting equipment to check if there are any cracks in the side rods.
- Clean the side rods and grease the screw threads and the contact surface of the rods

and the valve housing.

- Install the side rods C.

Check that each side rod has the correct nut as its pair.

Do not turn the nuts upside down.

- Using a torque wrench tighten the side bolts in three steps.

Refer to the torque specifications for side rods.

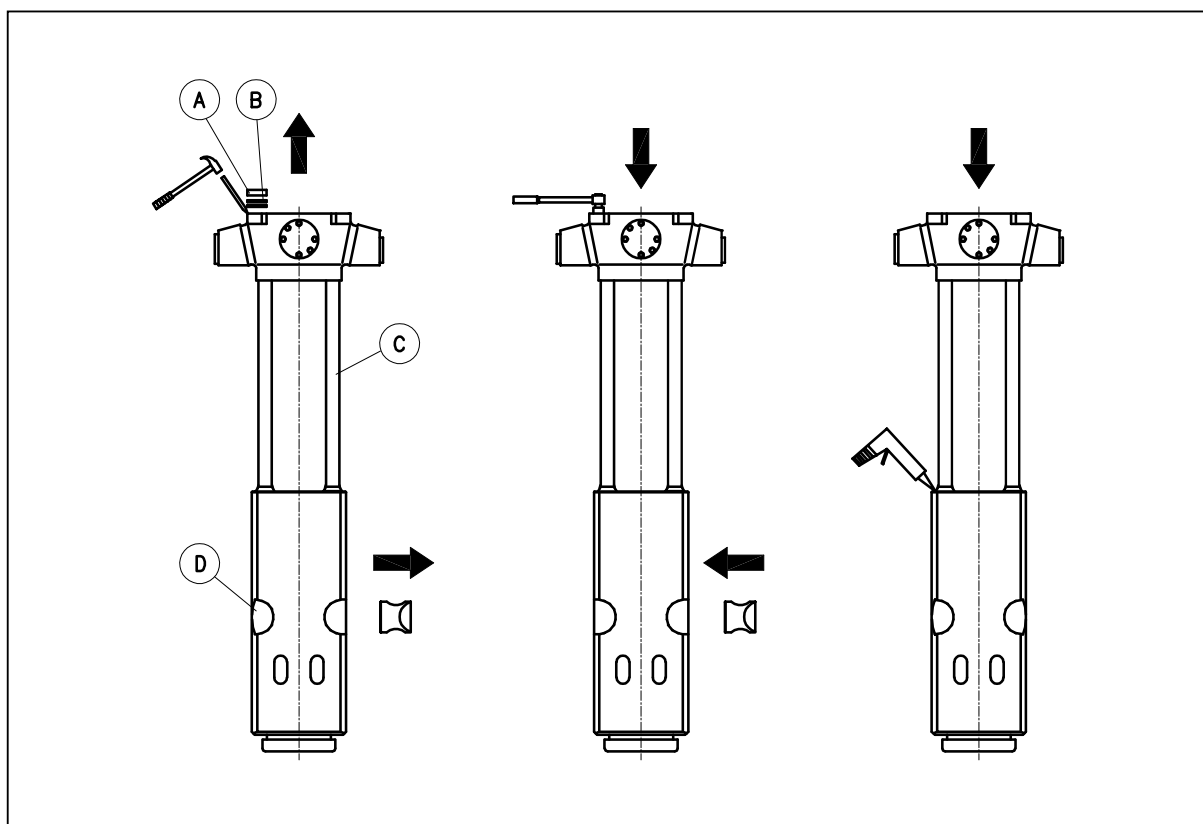
- Heat the side rods with propane gas flame (max. temperature 392°F, 200°C) and tighten side rods to final setting.

- Install the lock washer B so that the side rods can not become loose. Install the rubber rings A.

- Fill the groove between the side rods and the front head with silicon compound.

HYDRAULIC HAMMER SIDE ROD TIGHTENING TORQUES (Nm) (mm)

TORQUE MODEL	1ST	2ND	3RD	4TH	5TH	HEATING TEMPERATURE	SOCKET SIZE
HR450	300	500	700	700	+120°	MAX. 200°C	60



5.10 Disassembling and assembling cylinder

1) Disassembling

- a. Remove the accumulator and the side rods.
- b. Remove the valve housing.
- c. Screw M24 lifting eyes(2pcs) into the seal housing A and lift out the seal housing.
- d. Screw M24 lifting eye into the piston I and lift it carefully out.
- e. Install M24 lifting eyes in the holes of the cylinder and carefully remove the cylinder from the front head.
- f. Remove the seals B, C, E and wiper F, O-ring M.
- g. Remove from the cylinder, the guide pin G, the seal H, the wiper J and the O-ring K.

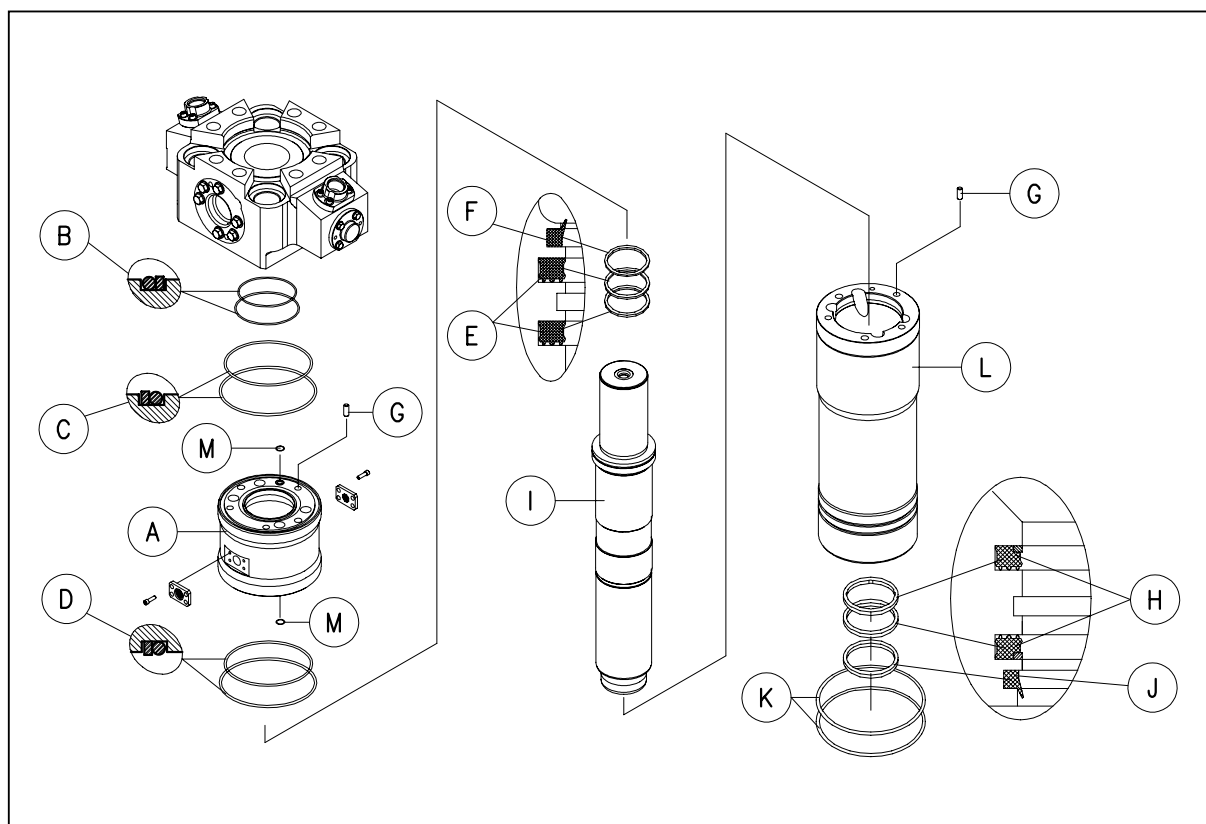
2) Assembling

- a. Check the condition of the cylinder L, the seal housing A, and the front head.

If necessary, use fine emery cloth or grinding agent to remove any scratches or burrs. Clean and oil parts carefully.

- b. Install the seal H and the wiper J into the cylinder.
 - c. Install the M24 lifting eyes into the holes of the cylinder and insert it into the front head. Fit the guide pin G in place.
 - d. Install the seal B, C, D, E and wiper F, and O-ring M of the seal housing A into the cylinder.
 - e. Lift the seal housing into place so that guide pin on the cylinder fits in the corresponding hole of the seal housing.
- Fit the seal housing carefully in its place.
- f. Check that opposite surfaces are clean. Put the guide pin G into place in the seal housing.
 - g. Lift the valve housing onto the seal housing using a lifting cable.

- h. Install the side rods and the accumulator.



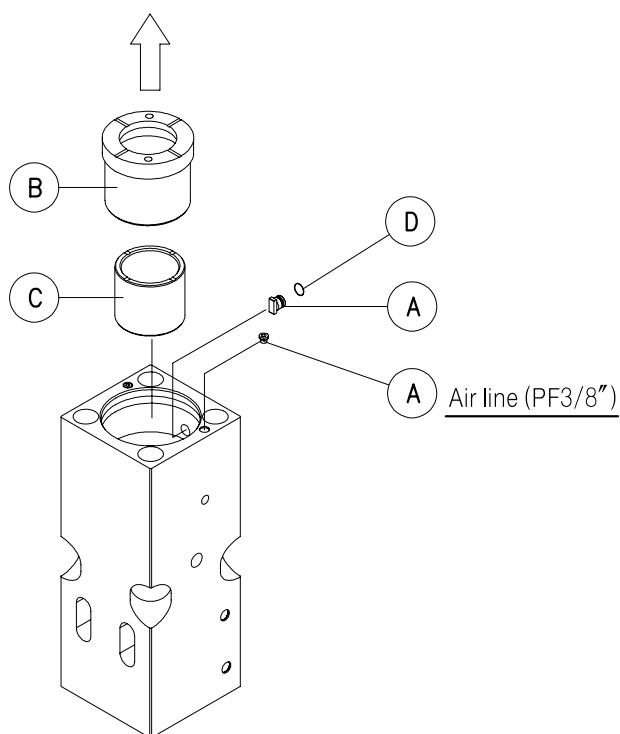
5.11 Disassembling and assembling front head

1) Disassembling

- a. Remove the cylinder, the piston, the seal housing, distributor, the valve housing, the side rods and the accumulator.
- b. Remove the wedge A and the thrust ring B and the upper bushing C.
Using the sleeve extractor, pull the bushing out.
If the bushing is tight, warm the under part of the front head. If there is a steel upper bushing, check it for wear and if necessary replace it.

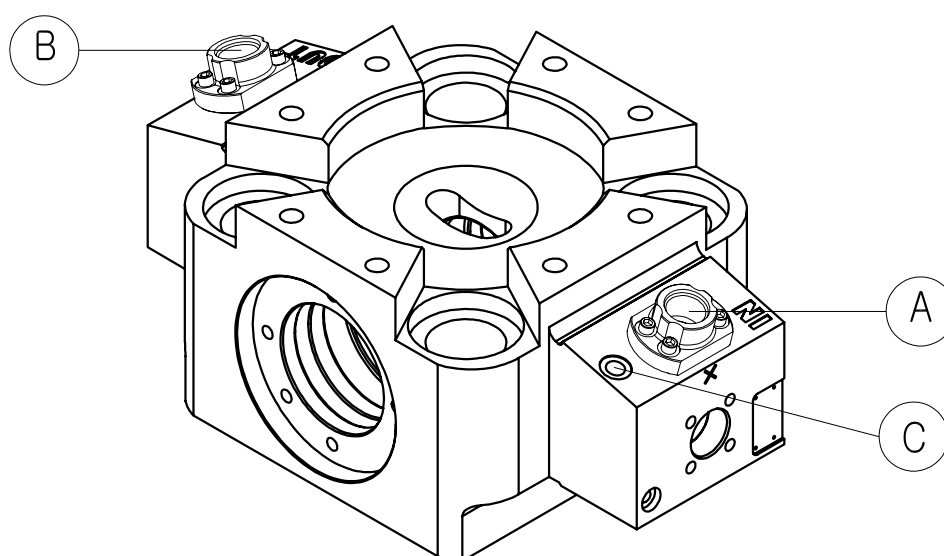
2) Assembling

- a. Check the parts carefully. If necessary, use fine emery cloth or grinding agent to remove any scratches or burrs.
Clean and oil/grease parts.
- b. For the steel upper bushing, heat the front head with propane flame and assemble the steel upper bushing.
- c. Install the thrust ring B.
- d. Install the wedge A complete with the O-ring.
- e. Install the cylinder, the piston, the seal housing, the valve housing, the side rods and the accumulator.

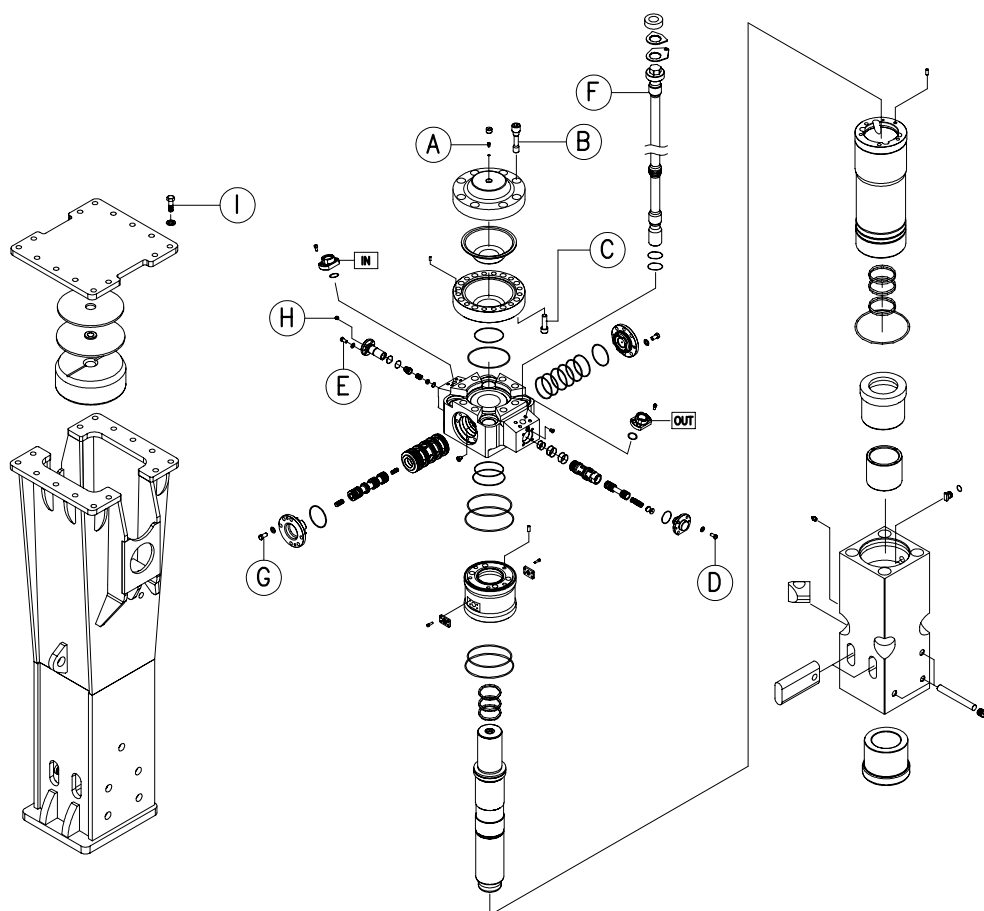


5.12 Connections

Item	Remarks	Specification
A	IN-port	PF 1"
B	OUT-port	PF 1 1/4"
C	Grease	PF 3/8"



5.13 Torques



ITEM	Nm	kg.m	ft.lb	Remarks	Q'ty
A	20	2	15	Accumulator gas bolt	1
B	900	90	655	Accumulator cover bolt	8
C	500	50	365	Accumulator bottom bolt	12
D	260	26	190	Operating valve cover bolt	4
E	260	26	190	Check valve cover bolt	4
F	700	70	510	Siderod tighten further 120°	4
G	500	50	365	Sleeve cover bolt	12
H	33	3.3	24	Plug	1
I	900	90	655	Top cover bolt	14

5.14 HR 450 tool list

Parts name	Space	Q'ty	Remarks
N ₂ GAS CHARGING DEVICE	N ₂ GAS	1	ACCUMULATOR
ADAPTER	-	1	
CONNECTION WRENCH	-	1	
O-RING	1BP18	1	
TORQUE WRENCH	100 ~ 800 Nm	1	
	300 ~ 1000 Nm	1	
PRESSURE GAUGE	100 BAR	1	
	250 BAR	1	
LIFTING CHAIN BLOCK	3 ton	1	
WORKING TABLE	-	1	
GREASE GUN	-	1	
Parts name	Specification	Q'ty	Remarks
L-WRENCH	6mm	1	
	8mm	1	
	10mm	1	
	12mm	1	
	17mm	1	
	19mm	1	
	24mm	1	
SPANNER	19mm	1	
	24mm	1	
	30mm	1	
	38mm	1	
	41mm	1	
	55mm	1	
	60mm	1	
EYE BOLT	M16 × 2.0p	1	
	M24 × 3.0p	2	
HOOK	PF 1"	1	
	PF1-1/4"	1	
HEX. SOCKET	19mm	1	
	24mm	1	
	30mm	1	
	41mm	1	
	55mm	1	
	60mm	1	

6. TROUBLE SHOOTING

6-1. Hammer does not start

PISTON IS IN ITS LOWER HYDRAULIC BRAKE

-Keep the hammer control valve open and force the tool against to the object.
The tool head will push the piston out of its area.

HAMMER CONTROL VALVE DOES NOT OPEN

-When operating the hammer control valve, check that the pressure line pulsation this indicates the hammer control valve is opened. If the valve does not operate, check the operating means : mechanical connections, pilot pressure or electrical control.

RELIEF VALVE IN HYDRAULIC CIRCUIT IS OPENED AT A LOW PRESSURE

-Check the installation. Check the relief valve operation. Adjust the relief valve in hydraulic circuit. Measure the high pressure in the hammer inlet line.

LEAKAGE FROM RETURN LINE IN CARRIER HYDRAULIC CIRCUIT

-Check the installation. Check the pump and the other hydraulic components.

PRESSURE AND RETURN HOSES INSTALLED BACKWARDS

-Change the pressure and return hoses.

FAILURE IN HAMMER VALVE OPERATION

-The hammer must be serviced in an authorized HAMMEROCC service shop.

PISTON FAILURE

-The hammer must be serviced in an authorized HAMMEROCC service shop.

6-2. THE HAMMER OPERATES IRREGULARLY BUT THE BLOW HAS FULL POWER

RELIEF VALVE IN HYDRAULIC CIRCUIT OPENS AT A LOW PRESSURE. HAMMER OPERATING PRESSURE IS NOT REACHED

-Check the installation. Check the relief valve operation. Adjust the relief valve in hydraulic circuit. Measure the high pressure in the hammer inlet line.

FAILURE IN HAMMER VALVE OPERATION

-The hammer must be serviced in an authorized HAMMEROCC service shop.

NOT ENOUGH FEED FORCE FROM THE CARRIER

-Refer to correct working methods.

6-3. HAMMER OPERATES POORLY AND BLOW HAS NO POWER

RELIEF VALVE IN HYDRAULIC CIRCUIT OPENS AT A LOW PRESSURE. HAMMER OPERATING PRESSURE IS NOT OPENED

-Check the installation. Check the relief valve operation. Adjust the relief valve in hydraulic circuit. Measure the high pressure in the hammer inlet line.

PRESSURE LOSS IN THE ACCUMULATOR

-The hammer must be serviced in an authorized HAMMEROCC service shop.

THE WORKING METHOD IS NOT CORRECT

-Refer to correct working methods.

PRESSURE CONTROL VALVE SETTING IS INCORRECT

-The hammer must be serviced in an authorized HAMMEROCC service shop.

6-4. IMPACT RATE SLOWS DOWN

OIL OVERHEATED (over 176°F / 80°C)

-Check for a fault in the oil cooling system or an internal leakage in the hammer. Check the hydraulic circuit of the carrier. Check the relief valve operation in the carrier. Check the line size. Assemble an extra oil cooler.

RELIEF VALVE IN HYDRAULIC CIRCUIT OPENS AT A LOW PRESSURE.

HAMMER OPERATING PRESSURE IS NOT REACHED

-Check the installation. Check the relief valve operation. Adjust the relief valve in hydraulic circuit. Measure the high pressure in the hammer inlet line.

LEAKAGE FROM RETURN LINE IN CARRIER HYDRAULIC CIRCUIT

-Check the installation. Check the pump and the other hydraulic components.

PRESSURE LOSS IN THE ACCUMULATOR

-The hammer must be serviced in an authorized HAMMEROCC service shop.

FAILURE IN HAMMER VALVE OPERATION

-The hammer must be serviced in an authorized HAMMEROCC service shop.

HYDRAULIC VISCOSITY IS TOO LOW

-Check hydraulic oil.

6-5. OIL OVERHEATS

RELIEF VALVE IN HYDRAULIC CIRCUIT OPENS AT A LOW PRESSURE.

HAMMER OPERATING PRESSURE IS NOT REACHED

-Check the installation. Check the relief valve operation. Adjust the relief valve in hydraulic circuit. Measure the high pressure in the hammer inlet line.

LEAKAGE FROM RETURN LINE IN CARRIER HYDRAULIC CIRCUIT

-Check the installation. Check the pump and the other hydraulic components.

INTERNAL OIL LEAK IN THE HAMMER

-The hammer must be serviced in an authorized HAMMEROC service shop.

HYDRAULIC VISCOSITY IS TOO LOW

-Check hydraulic oil.

COOLING CAPACITY OF THE FACTORY OIL COOLER IS TOO LOW

-Assemble an extra oil cooler.

7. GENERAL AND SAFETY INFORMATION

7-1. General

Do not use or install the breaker until you can use the carrier. Do not rush the job of learning. Take your time and learn safety.

- * If there is anything you do not understand, ask your HAMMEROC service centre for advice.
- * The breaker serial number is stamped on a metal plate, which is on the fronthead.
- * Correct reference to the serial number of the breaker is important in case of repairs or ordering spare parts. Identifying parts for specific breaker is possible only through serial number.

7-2. Safety

1) Manuals

- a. Read this manual before installing, operating or maintaining the breaker. If there is anything you don't understand, ask your employer or your HAMMEROC dealer to explain it.
- b. Keep this manual in good condition.

2) Clothing

- a. You can be injured if you do not wear proper clothing. Loose clothing can get caught in the machinery. Wear protective clothing to suit the job.
Examples are : a safety helmet, safety shoes, safety glasses, well-fitting overalls, ear-protectors and industrial gloves.
Keep cuffs fastened.

3) Work site

- a. Inspect the site before working on it.
- b. Check for potholes, weak ground, hidden rocks etc.
- c. Check for utilities (electric cables, gas and water pipes etc.).

4) Metal splinters

- a. You can be injured by flying splinters when driving metal pins in and out.
- b. Always wear safety glasses.

5) Accumulator

- a. The accumulator is pressurized even when there is no hydraulic pressure in the breaker.
- b. Attempting to dismantle the accumulator without first releasing the pressure can cause serious injury.

- c. Do not try to dismantle pressure accumulator, contact your HAMMEROC service centre first.

6) Hydraulic pressure

- a. Hydraulic fluid at system pressure is dangerous.
- b. Before disconnecting or connecting hydraulic hoses, stop the carrier engine and operate the controls to release pressure trapped in the hoses.
- c. Keep people away from the hydraulic hoses during breaker operation.

Regulations and laws

- Observe all laws, work-site and local regulations which affect you and your equipment.

Practice

- You and others can be seriously injured if you carry out unfamiliar operations without practicing them first.
- Practice away from job-site, on a clear area.
- Keep other people away.
- Do not perform new operations until you are sure you can do them safely.

Equipment condition

- Defective equipment can injure you or others. Do not operate equipment which is defective or has missing parts.
- Make sure the maintenance procedures in this manual are completed before using the equipment.

Equipment limits

- Operating the equipment beyond its design limits can cause damage. It can also be dangerous.
- Do not operate the equipment beyond its limits.
- Do not try to upgrade the equipment's performance by non-approved modifications.



TÜV



ISO 9001



Excellent Machine
Mechanism, Material



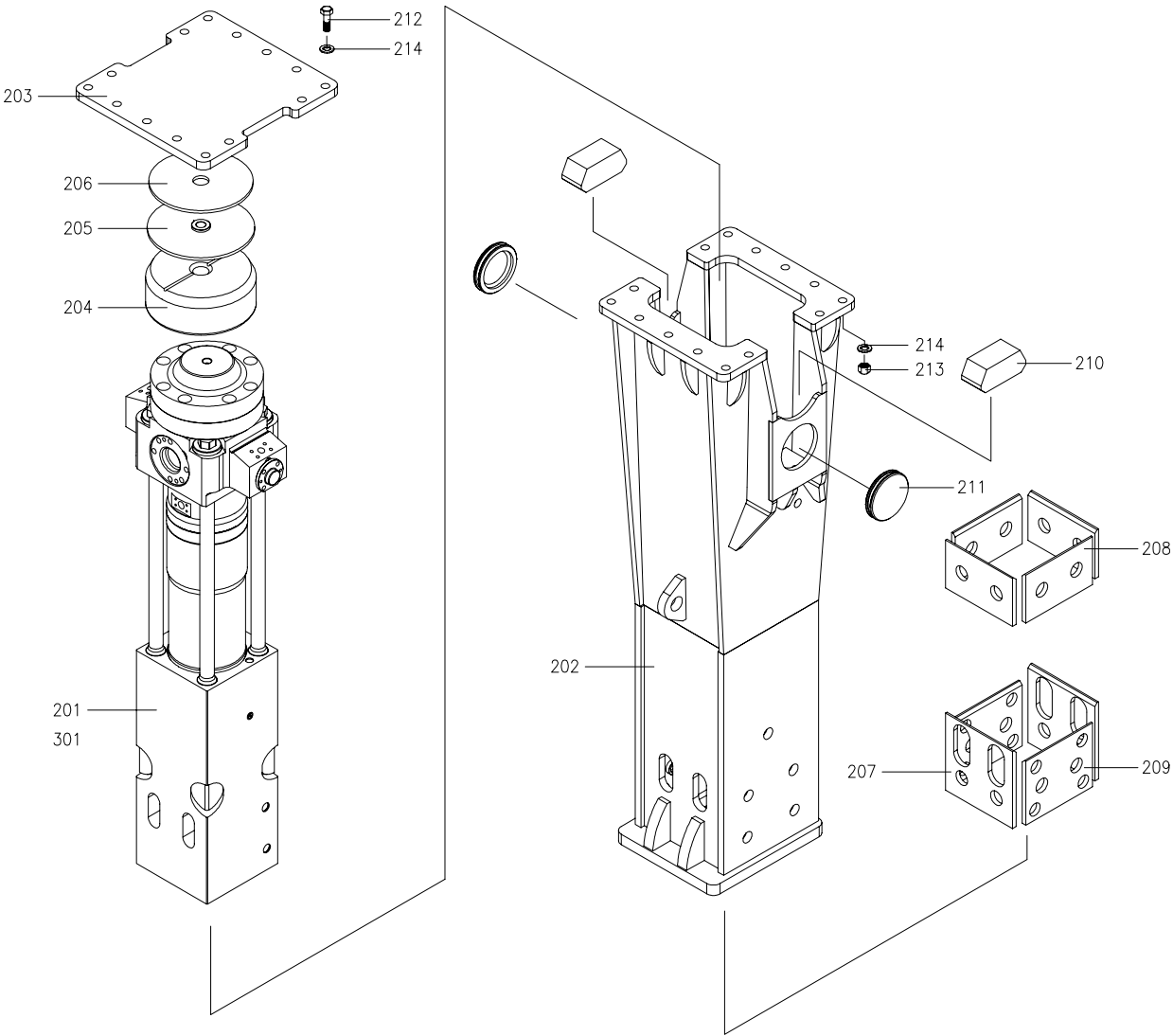
HR 450 HAMMEROG

Operation Maintenance Parts List

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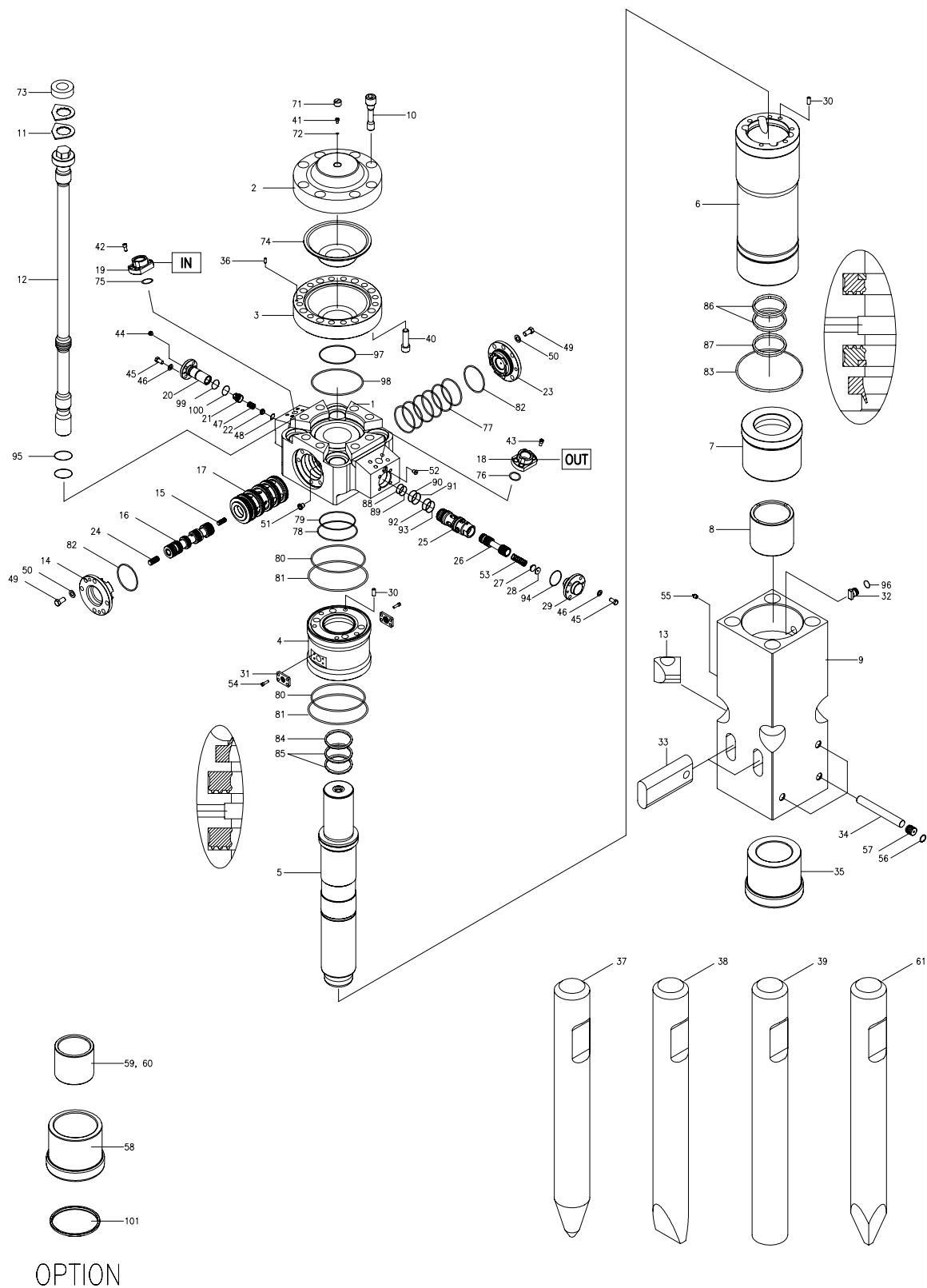
1. HR 450 Housing



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2. HR 450 Hammer

2.1 Manual lubrication type (Standard)

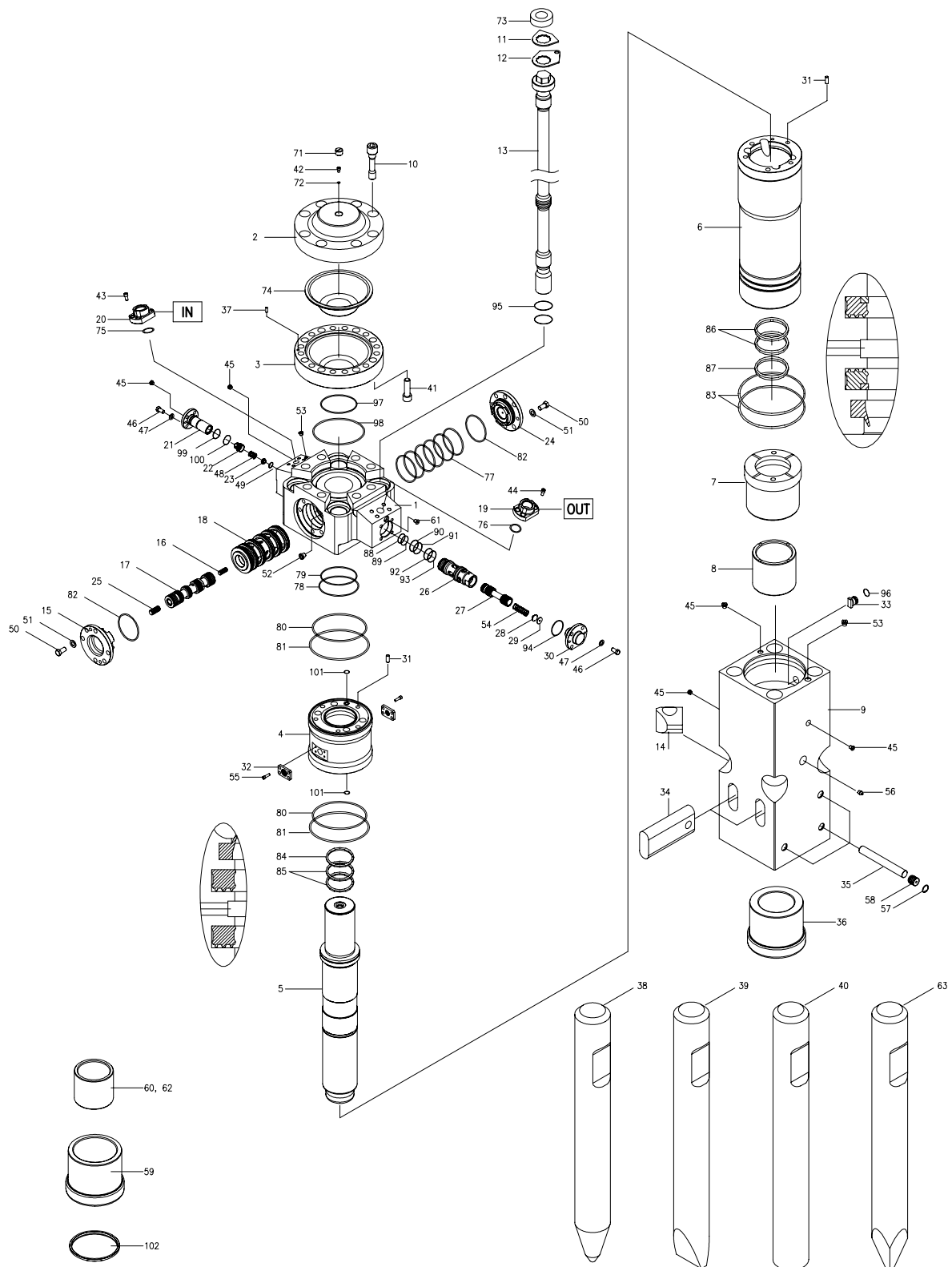


MODEL		HR 450		
NO	PART NO.	PART NAME	Q'TY	REMARK
1	B4006010	V/V HOUSING	1	
2	B4006020	ACCUMULATOR COVER	1	
3	B4006030	ACCUMULATOR BOTTOM	1	
4	B4006040	SEAL HOUSING	1	
5	B4006050	PISTON	1	
6	B4006060	CYLINDER	1	
7	B4006070	THRUST RING	1	
8	B4006080	UPPER BUSHING	1	
9	B4006090	FRONT HEAD	1	
10	B4006100	ACC. COVER BOLT	8	
11	B4006110	LOCK WASHER	7	
12	B4006130	SIDE ROD	4	
13	B4006140	SIDE ROD NUT	4	
14	B4006150	SLEEVE COVER 1.	1	
15	B4006160	SPOOL 2.	1	
16	B4006170	MAIN SPOOL	1	
17	B4006180	SLEEVE	1	
18	B4006190	FLANGE (PT1-1/4") OUT	1	
19	B4006200	FLANGE (PT1") IN	1	
20	B4006210	CHECK V/V HOUSING	1	
21	B4006220	CHECK V/V SPOOL	1	
22	B4006230	CHECK V/V SPRING GUIDE	1	
23	B4006240	SLEEVE COVER 2.	1	
24	B4006250	SPOOL 1.	1	
25	B4006260	OPER. V/V GUIDE	1	
26	B4006270	OPER. V/V SPOOL	1	
27	B4006280	OPER. V/V SPRING GUIDE	1	
28	B4006290	OPER. V/V SHIM PLATE	1	
29	B4006300	OPER. V/V COVER	1	
30	B4006310	GUIDE PIN	2	
31	B4006320	AIR BREATHER COVER	2	
32	B4006330	WEDGE	1	
33	B4006340	TOOL PIN	2	
34	B4006350	BUSHING PIN	3	
35	B4006360	TOOL BUSHING	1	
36	B4006370	ACC. GUIDE PIN	1	
37	B4006380	TOOL (CONE)	1	
38	B4006390	TOOL (CHISEL)	1	
39	B4006400	TOOL (BLUNT)	1	
40	SB2420090	ACC. BOTTOM BOLT	12	
41	B4006420	ACC. GAS BOLT	1	
42	SB1217540	FLANGE BOLT (IN)	4	
43	SB1420040	FLANGE BOLT (OUT)	4	
44	B4006450	HEX. SOCKET PLUG	1	
45	HB1620040	OPER. V/V COVER BOLT	8	
46	CW160000	LOCK WASHER	8	

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2.2 Automatic lubrication type (option)



OPTION

MODEL		HR 450		
NO	PART NO.	PART NAME	Q'TY	REMARK
1	B4006700	V/V HOUSING	1	
2	B4006020	ACCUMULATOR COVER	1	
3	B4006030	ACCUMULATOR BOTTOM	1	
4	B4006710	SEAL HOUSING	1	
5	B4006050	PISTON	1	
6	B4006720	CYLINDER	1	
7	B4006730	THRUST RING	1	
8	B4006080	UPPER BUSHING	1	
9	B4006740	FRONT HEAD	1	
10	B4006100	ACC. COVER BOLT	8	
11	B4006110	LOCK WASHER	7	
12	B4006120	LOCK WASHER	1	
13	B4006130	SIDE ROD	4	
14	B4006140	SIDE ROD NUT	4	
15	B4006150	SLEEVE COVER 1.	1	
16	B4006160	SPOOL 2.	1	
17	B4006170	MAIN SPOOL	1	
18	B4006180	SLEEVE	1	
19	B4006190	FLANGE PT 1-1/4" OUT	1	
20	B4006200	FLANGE PT 1" IN	1	
21	B4006210	CHECK V/V HOUSING	1	
22	B4006220	CHECK V/V SPOOL	1	
23	B4006230	CHECK V/V SPRING GUIDE	1	
24	B4006240	SLEEVE COVER 2.	1	
25	B4006250	SPOOL 1.	1	
26	B4006260	OPER. V/V GUIDE	1	
27	B4006270	OPER. V/V SPOOL	1	
28	B4006280	OPER. V/V SPRING GUIDE	1	
29	B4006290	OPER. V/V SHIM PLATE	1	
30	B4006300	OPER. V/V COVER	1	
31	B4006310	GUIDE PIN	2	
32	B4006320	AIR BREATHER COVER	2	
33	B4006330	WEDGE	1	
34	B4006340	TOOL PIN	2	
35	B4006350	BUSHING PIN	3	
36	B4006360	TOOL BUSHING	1	
37	B4006370	ACC. GUIDE PIN	1	
38	B4006380	TOOL (CONE)	1	
39	B4006390	TOOL (CHISEL)	1	
40	B4006400	TOOL (BLUNT)	1	
41	SB2420090	ACC. BOTTOM BOLT	12	
42	B4006420	ACC. GAS BOLT	1	
43	SB1217540	FLANGE BOLT (IN)	4	
44	SB1420040	FLANGE BOLT (OUT)	4	
45	B4006450	HEX. SOCKET PLUG	5	
46	HB1620040	OPER. V/V COVER BOLT	8	

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