

Manual No: 506

SCANNED

Machine Type: 0793001 and 0794

Excavator Hammer to suit

Kubota KX41-3
(0779001)



HYDRAULIC HAMMER

INSTRUCTION MANUAL

YC HYDRAULIC HAMMERS

YC 70

YC 110

YC 180

PRECAUTIONS FOR USING HYDRAULIC HAMMER

1. Perform daily inspections.
2. Avoid blank hammering.
3. Do not hammer in the same place for over one minute.
4. Do not use the chisel as a pry bar.
5. Do not let the hammer operate under water.
6. Exercise caution so as not to allow dust and dirt to enter the hydraulic hoses when switching the hydraulic hammer to the bucket or vice versa.
7. Replace the filter element with a new one and change hydraulic oil at the specified intervals.
Filter element every 100 hrs.
Hydraulic oil every 600 hrs.
8. Carefully operate the hydraulic excavator so as not to hit the hammer against other objects.
9. Do not use the hydraulic hammer to move rocks.
10. Do not use the hydraulic hammer with the excavator's cylinder pistons at the stroke end.



FOREWORD

This instruction manual has been written to give the operator instructions necessary for operating, servicing and maintaining the YC hydraulic hammer. To get the most out of the YC hydraulic hammer, read this manual thoroughly and become completely familiar with the machine before using it.

For any additional information or for help with any complicated problem encountered, please contact your dealer.

Whenever repair or replacement of component parts is required, only genuine YC parts should be used. Use of other than YC parts may endanger proper operation and performance of the equipment. YC does not warrant repair or replacement parts, nor failures resulting from the use of parts which are not supplied by a YC dealer.

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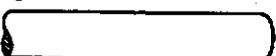
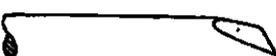
SPECIFICATIONS AND SHAPE OF CHISEL

1. SPECIFICATIONS

SPECIFICATION OF HYDRAULIC HAMMER

Type	Hydraulic Pressure (Bar)	Oil Flow rate (/min)	Number of Blows (bpm)	Gas Pressure (Bar)	Weight w/ chisel (Kgf)	Overall length w/chisel (mm)	Dia. of tubing (inch)
YC 70	80~100	15~25	450~750	25	78	984	1/2
YC 110	90~110	25~35	590~820	20	113	1,150	1/2
YC 180	105~125	30~55	450~825	22	156	1,261	1/2

2. SHAPE OF CHISEL (st'd product)

Chisel	Shape	Applications
Chisel (P)		<ul style="list-style-type: none"> - Crushing of concrete - Crushing of rock bed - Crushing of hard earth bed - Highway construction
Chisel (E)		<ul style="list-style-type: none"> - Secondary crushing of rubbles - Removal of slag
Chisel *(FX) or *(FY)		<ul style="list-style-type: none"> - Trenching - Cutting of gate - Normal crushing

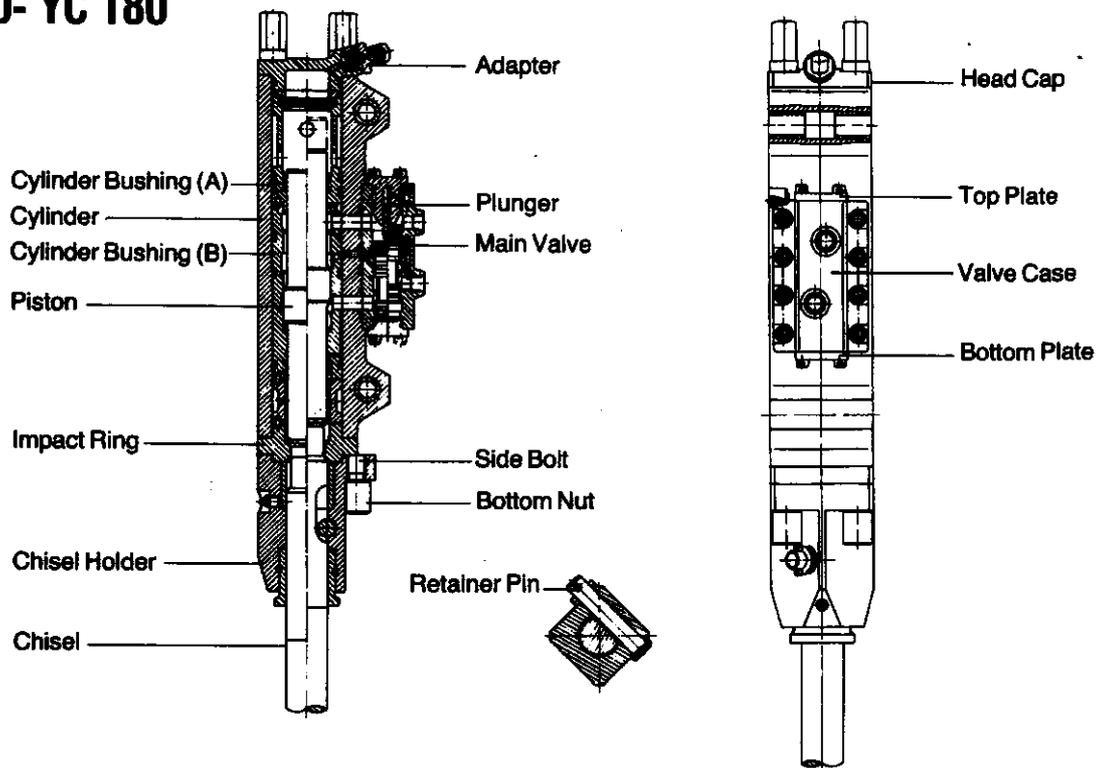
* The cutting edge of FX is parallel to the excavator body and that of FY is longitudinal.



STRUCTURE

1. STRUCTURAL DRAWING

YC 70- YC 180



2. GENERAL DESCRIPTION

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

- Cylinder Section

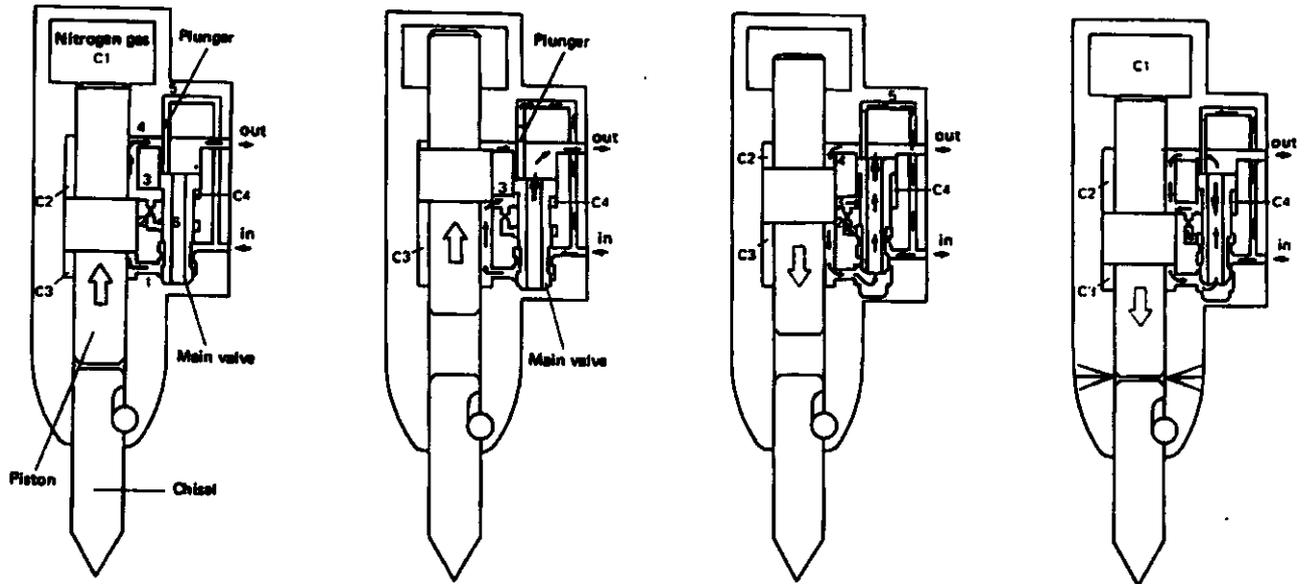
The cylinder section consists of the chisel, chisel holder, retainer pin, impact ring, piston, cylinder bushing, cylinder and head cap. These are secured with side bolts. The piston reciprocates within the cylinder bushing, striking the chisel end. The impact ring fixes the relative position between the piston and chisel. The head cap is charged with nitrogen gas through an adapter.

- Main Valve Section

The valve case contains the plunger and main valve and are fixed from both sides with the top plate and bottom plate. The plunger reciprocates within the top plate, forcing down the main body. The main valve reciprocates within the valve case, switching over the oil passages.



3. OPERATING PRINCIPLE



- C1:** Nitrogen gas chamber above piston
- C2:** Upper chamber at middle area
- C3:** Lower chamber at middle area
- C4:** Chamber at stepped area of main valve

The operation of the hydraulic hammer is as follows:

1. Lift Stroke of Piston

As the control valve is opened, the IN port is opened to the oil passage of high pressure oil discharged from the hydraulic pump. The oil pressure acts on the chamber (C3) and top of the plunger which in turn forces the main valve against the bottom plate. Since the plunger does not move any further, the oil is used only to force the piston up, overcoming the nitrogen gas pressure. At this time the oil in the chamber (C2) is forced out.

2. Lift Stroke of Main Valve

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 push-up force overcomes the plunger's push-down force, thus shifting up the main valve.

3. Impact Stroke

With the main valve rising, the oil passage (1) is opened to the oil passage (6) so that the piston is pushed down by the nitrogen gas pressure. When the oil passage (1) is totally opened to the oil passage (6), the route between the oil passage (1) and 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 main valve up. This helps the oil in the chamber (C3) flow out. The oil discharged from the chamber (C3) flows through oil passages (1), (6), (4) and chamber (C2). In other words, the piston can strike the chisel without being subjected to large resistance.

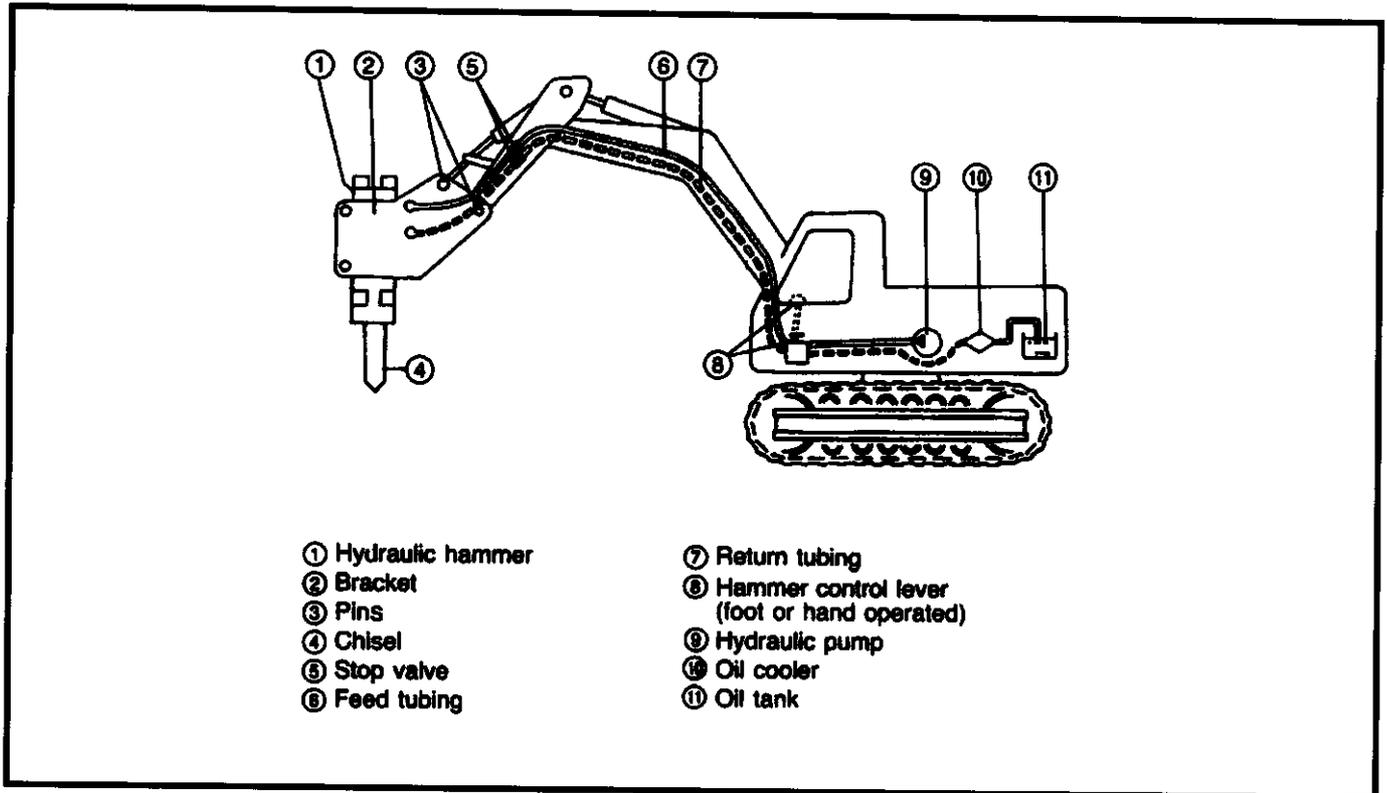
4. Down Stroke of Main Valve

As the oil passage (3) is opened to the chamber (C2) with the lowering of the piston, oil flows from the chamber (C4) to OUT port. The main valve is thus pushed down with the plunger allowing the hydraulic hammer to begin another cycle.



INSTALLATION TO EXCAVATOR

The hydraulic power necessary for operating the hydraulic hammer is taken from the auxiliary attachment control valve of the excavator. It is therefore not necessary to install a new control valve. The hydraulic hammer can be operated by controlling the auxiliary attachment control valve.



TUBING

1. As a typical tubing arrangement, the feed tubing is arranged at the left side of the operators cab and the return tubing at the right side.
2. The feed tubing is connected to the front port (near side of operators cab) of the auxiliary control valve and the return tubing to the rear port (near side of engine)
3. YC hydraulic hammers do not require the installation of any relief valve other than that of the excavator.



OPERATION

1. BEFORE OPERATION

1. Pre-operational Inspection

Before operating the hydraulic hammer, be sure to carry out the specified DAILY INSPECTION. See "2. DAILY INSPECTION" on page 17.

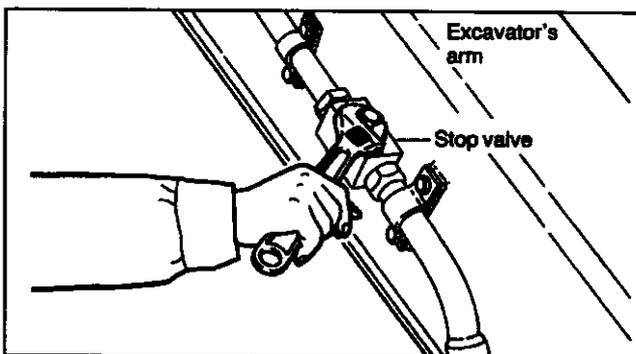
2. Warming-up

Warm up the hydraulic hammer and excavator sufficiently according to the instruction manual of the hydraulic excavator. Especially, the warming-up operation should be performed without fail in winter. Proper operating oil temperature: 50 to 80 degrees celcius.

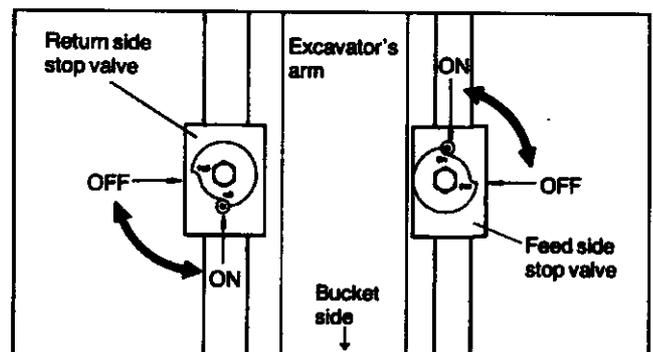
3. Stop Valve

On the hydraulic excavator's arms are two stop valves for feed and return oil. When using the hydraulic hammer, make sure these stop valves are turned ON.

[ON/OFF of stop valve]



[Checking of stop valve]



2. TRIAL OPERATION

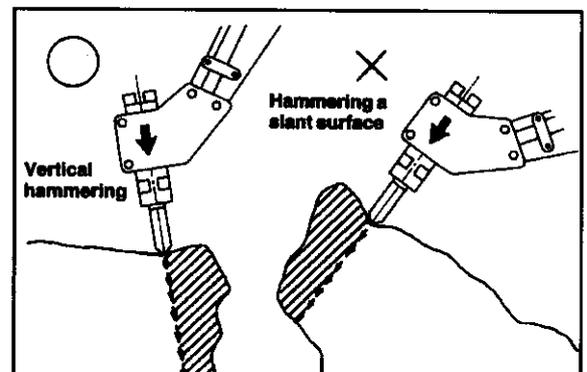
1. Checking Charged Gas Pressure

The charged gas pressure is factory checked before shipment. However, make sure the pressure is proper before using the hydraulic hammer for the first time. For inspecting procedure of the gas pressure, see "3. GAS PRESSURE INSPECTION" pg 18.

2. Trial Operation

Place the hammer upright and operate the hammer for about 1 hour, pressing the control valve lever of engine half way. During trial operation, inspect the following;

- Number of blows
- Excessive Pulsation of hoses
- Oil leaks or loose connections.

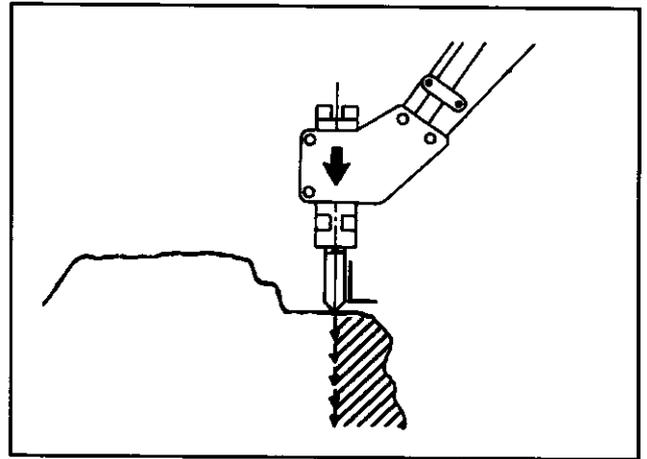


Caution: Do not hammer a slant surface in the trial operation



3. OPERATION

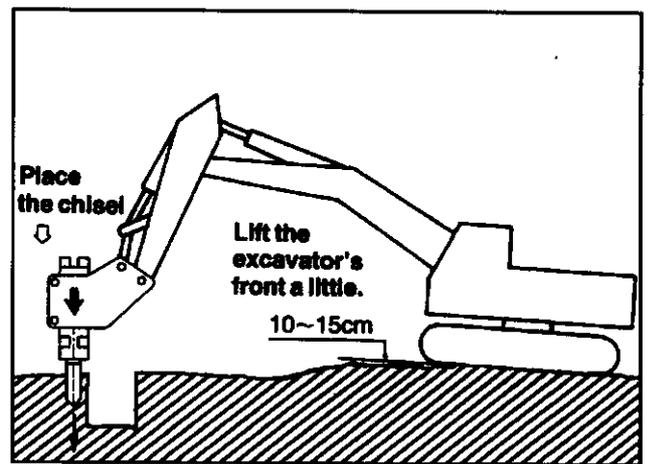
1. Press the chisel end vertically the object to be broken and stabilize it.



2. Jack-up the excavator's front a little to give pressing force in the chisel direction. Manipulate the control lever or press the accelerator pedal to carry out hammering.

Caution:

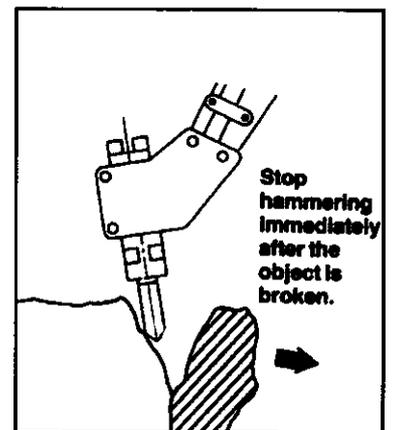
The pressing force applied on the chisel end does not become larger even if the jack-up height is increased. Jacking-up the excavator too high will give the excavator a great jolt when the rock is broken, thus resulting in increased operator fatigue and possible damage to the excavator.



3. As soon as the object is broken, release the control lever or pedal to stop hammering.

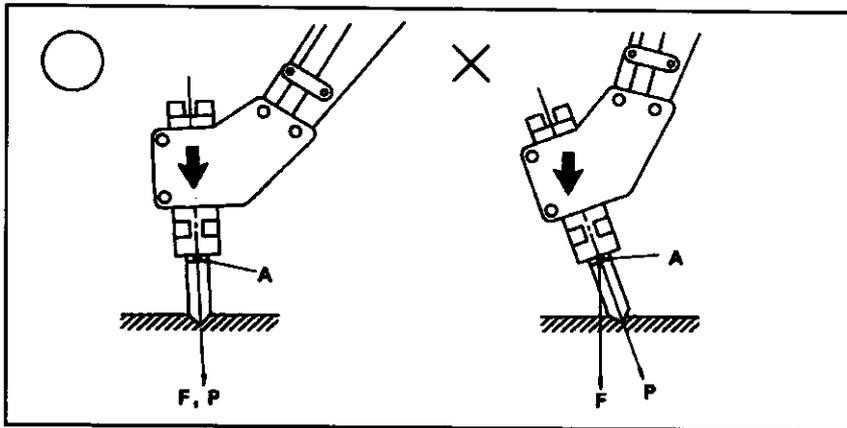
Caution:

Continuing to perform hammering after the object is broken will cause loose or damaged side bolts or cause damage to the front of the excavator.



PRECAUTIONS FOR OPERATION

1. The pressing direction of the hammer should be the same as the direction in which the chisel penetrates.



F: Pressing direction of hammer by excavator (Tangential direction of locus of hammer)
P: Penetration direction of chisel
A: Fulcrum

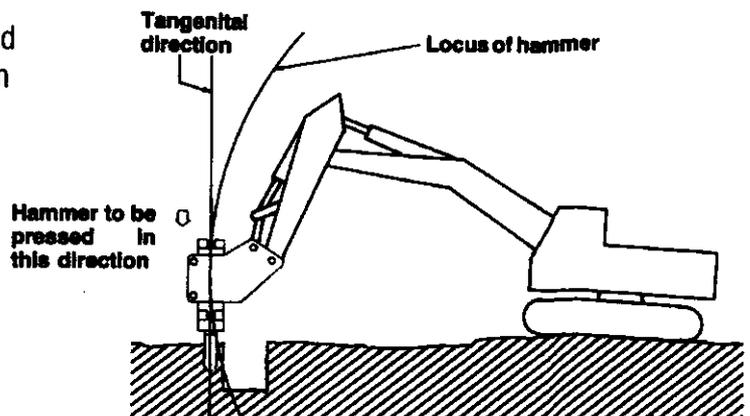
Adjust the pressing direction of the hammer with the boom and arm control lever of the excavator so that the pressing direction (F) of the hammer and the penetration direction (P) of the chisel may point in the same direction. Failure to do so will allow bending stress to act on the chisel, causing the following problems;

- 1) Damage to premature wear of chisel
- 2) Damage to premature wear of bolts
- 3) Damage to premature wear of side bolts

It is possible to know whether or not the pressing direction is correct by listening the hammer sound. When both direction get different from each other, the hitting sound changes.

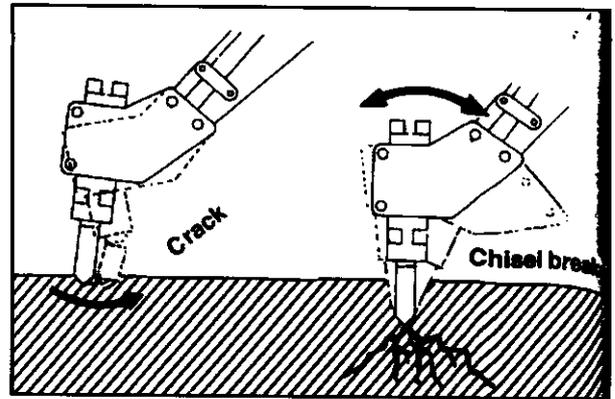
Tangential direction of locus of the hammer

The hammer is usually pressed to the object with the boom cylinder. The hammer is thus draws an arc around the root of the boom as shown on the right figure. When the tangential direction of this locus agrees with the penetration direction of the chisel, the chisel penetrates smoothly into the object to be broken. By keeping both directions always the same, working efficiency can be improved and damage to the chisel due to bending stress prevented.



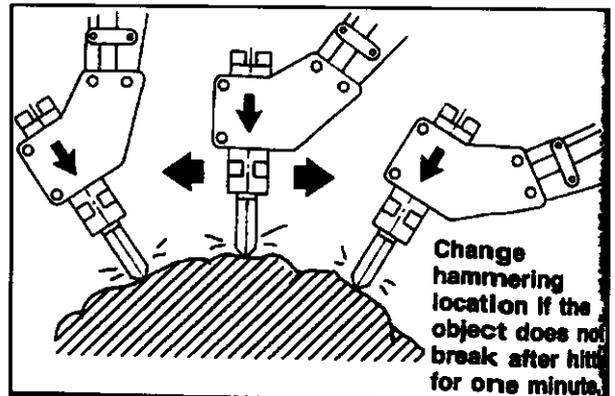
2. Do not use the chisel as a pry bar.

Prying with the chisel could cause breakage of side bolts and chisel or premature wear of bushings

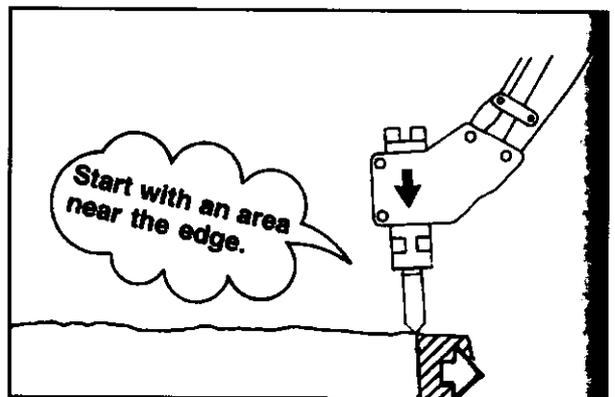


3. Do not perform continuous hammering in the same place for a prolonged time.

If the chisel cannot break or penetrate into the object after hammering the same place for about one minute, change the hammering location. Hammering at the same place for a prolonged time will not only reduce the working efficiency, but cause undue temperature rise of oil or premature wear or deformation of the chisel.

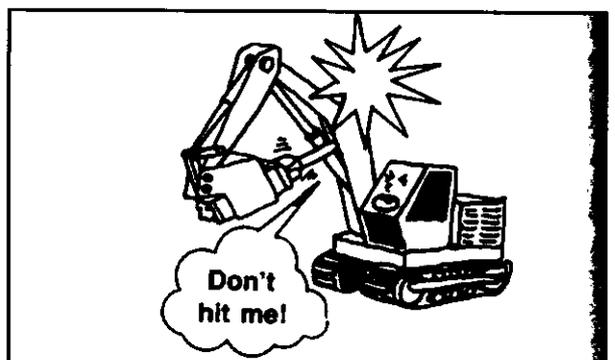


4. When breaking a big, hard object, start with an area near the edge.



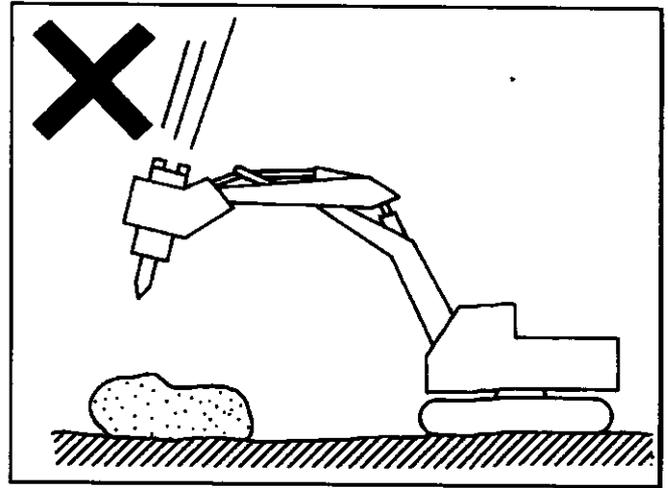
5. Do not allow the chisel to hit the boom.

Use caution so as not to allow the chisel to hit the boom, especially during operation.



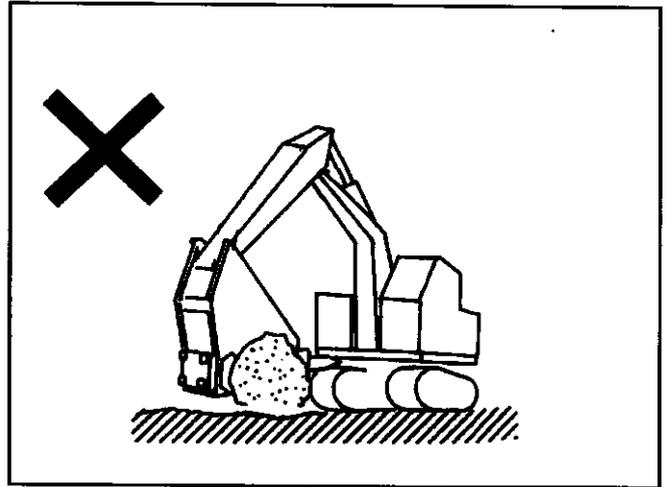
6. Do not let the chisel rapidly drop on to the object.

Remember that the hydraulic hammer is heavier than the bucket. Failure to do so will cause damage to the cushion rubber and bracket of the hammer or the front and swing areas of the excavator.



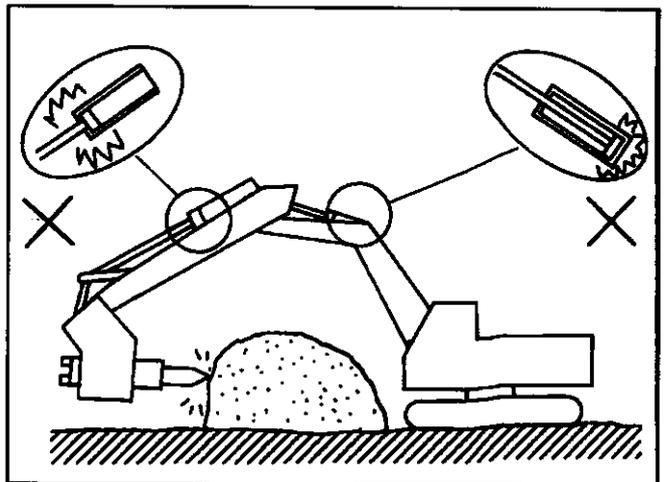
7. Do not use the bracket or hammer to move an object to be broken.

Do not use the bracket or hammer for purposes other than specified. It will cause damage to the bracket or hammer and to the excavator's front and swing areas as well.



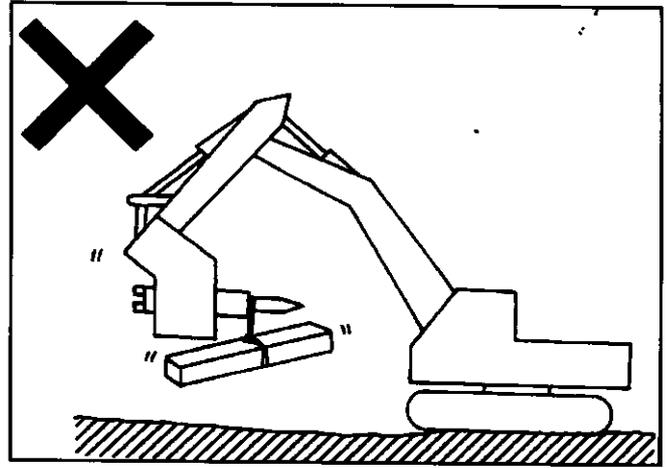
5. Do not operate hammer when the excavator's cylinder pistons at the stroke end.

Make sure that the pistons of the hydraulic cylinders of the excavator are at least 100mm away from stroke end before operating hammer. Failure to do so will cause damage to the hydraulic cylinders.



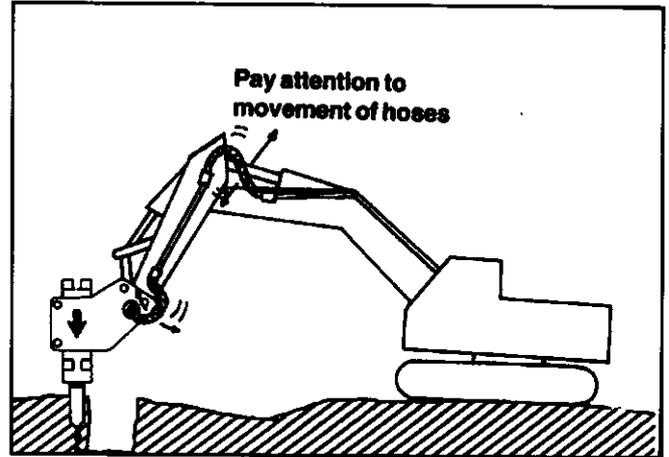
9. Do not use the hammer for hoisting.

The hydraulic hammer is not intended to hoist any object. To do so will cause damage to the hammer or bracket and is dangerous as well.



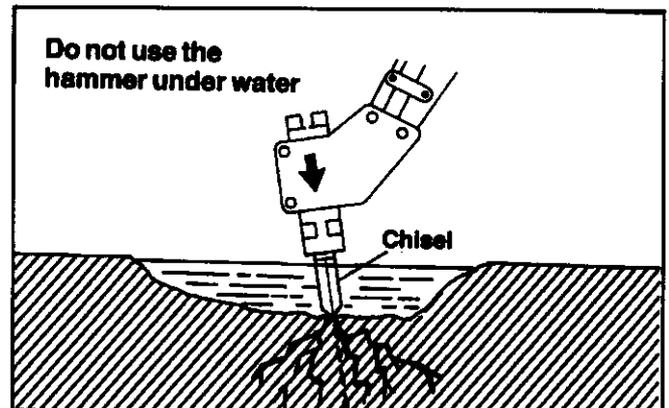
10. Stop operation immediately when you find the hydraulic hoses pulsating abnormally.

The Hydraulic hoses pulsate excessively when the accumulator has an abnormally fluctuating gas pressure or is defective. If ignored, the shocks gradually become greater, adversely affecting the bolts and excavator.



11. Do not use hammer under water.

- Do not allow the parts other than the chisel to be submerged under water. Failure to do so will cause damage to the hydraulic components of the hammer and excavator.
- If you want to use the hammer under water, contact the YC dealer. By modifying part of the bracket, it will be possible for the hammer to be used under water.



12. Do not use the hammer with the oil temperature at more than 80 degrees celcius.

Excessive oil temperature will not only shorten the seal life but also quickly deteriorate the hydraulic oil, causing damage to the hydraulic components of the hammer and excavator.



REMOVAL AND INSTALLATION OF HYDRAULIC HAMMER

1. REMOVAL FROM EXCAVATOR

1. Turn OFF stop valves. With the cushion rubbers up (see illustration), disconnect the hydraulic hoses. See the illustration.
2. Cap the feed and return tubing ends and plug the hydraulic hose ends with the attached caps and plugs.

Caution:

If the caps and plugs are not installed, there is possibly of dust and dirt entering the hydraulic mechanism, resulting in a damaged hydraulic component of the hammer and excavator.

3. Place the hydraulic hammer horizontally on wood blocks. Remove two pins and exchange the hammer with the bucket.

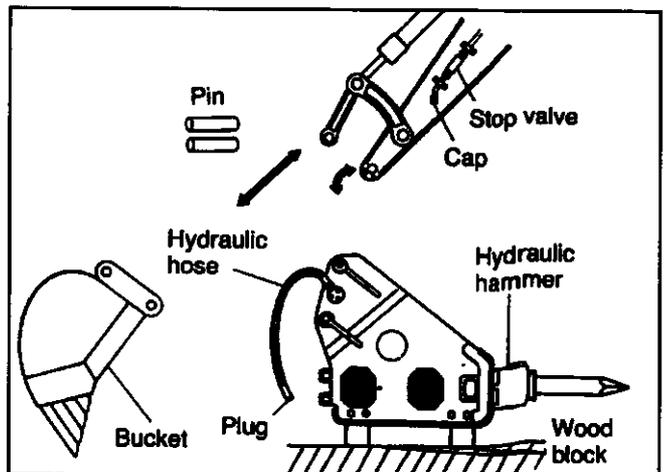
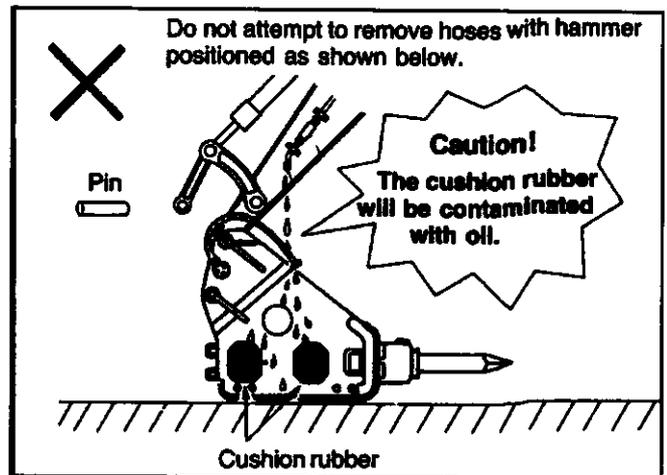
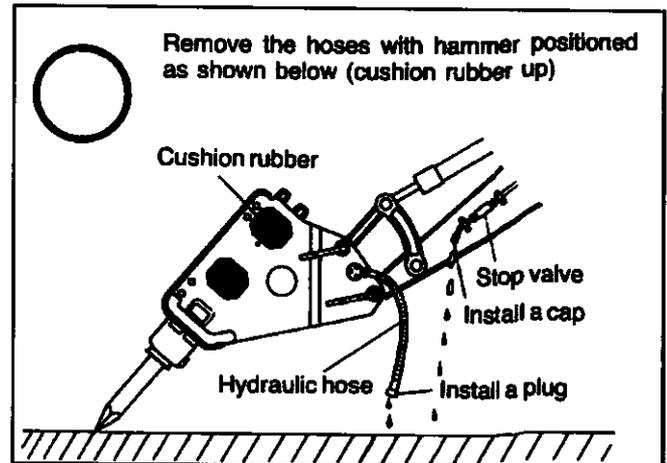
2. INTALLATION TO EXCAVATOR

To install the hammer, use the procedure opposite to removal.

Caution:

Use care so as not to contaminate the cushion rubber with oil from the hoses when removing or reinstalling the hoses. If the cushion rubber is splashed with oil, wash it off immediately; failure to do so will cause a short cushion rubber life.

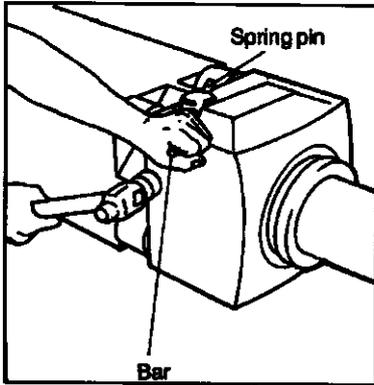
Removal and installation of hydraulic hoses



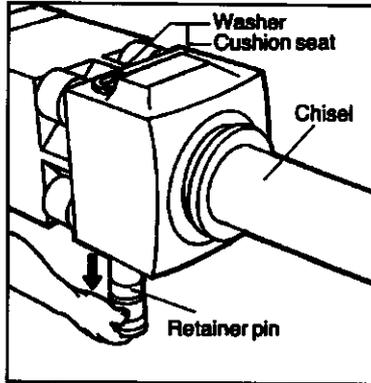
REPLACEMENT OF CHISEL

1. YC 70 thru YC 180

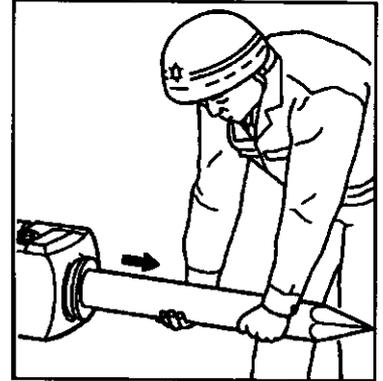
1. With the accessory bar and a hammer, remove the spring pin.



2. Remove the retainer pin.



3. Remove the chisel



(2) Installation

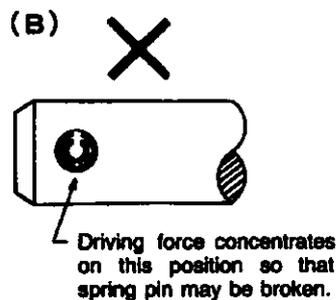
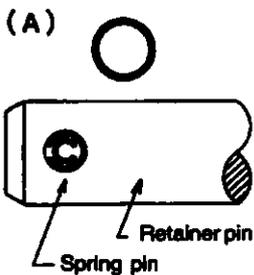
Install a new chisel and install the retainer pin, followed by the cushion seat and stopper washer. Finally install the spring pin.

Caution:

Prior to installing the chisel and retainer pin, apply inorganic, high-temperature grease on the sliding surfaces.

How to drive the spring pin:

When driving the spring pin into the retainer pin, make sure of the direction (A). If the spring pin is driven into the retainer pin with the direction (B), the spring pin could break.



MAINTENANCE AND INSPECTION

1. INSPECTION ITEM LIST

Inspection item	Remarks
Loose bolts	Retighten all bolts 10 hrs. after initial use.
Level, contamination and deterioration of hydraulic oil	Change oil every 600 hrs.
Greasing the chisel	Before each shift
Gas pressure of hammer	Before trial operation and thereafter every two weeks
Gas leaks	Every day
Oil leaks	Every day
Clearance between chisel and bushing	Every day
Damage, wear and deformation of chisel	Every day
Damage and deformation of retainer pin C.P.	Every day
Damage of bracket	Every day
Damage of cushion rubber	Every day
Damage of hydraulic hose	Every day
Clogged filter element	Replace element every 100 hrs
Contamination of oil cooler	100 hrs

If the hydraulic hammer is frequently used for long continuous operations, sooner and more frequent maintenance services are required.



2. DAILY INSPECTION

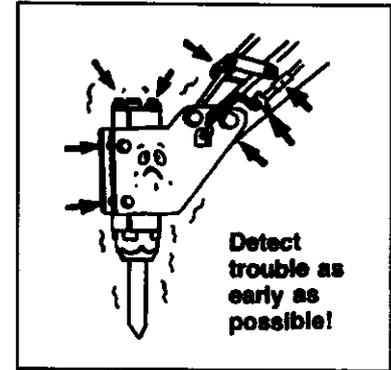
Before starting each work shift, be sure to inspect for the following items and apply grease, where needed.

(1) Loose Bolts

Inspect the hydraulic hammer, bracket, tubing for loose bolts. Retighten to specified torque where necessary.

Retightening

Retighten all bolts at 10 hours of operation after initial use of the hammer. For bolt tightening procedure and specified torque, see page 27.



Caution:

Loose bolts will cause oil leaks or malfunction of the hammer or cause damage to the bolts.

(2) Damage of Hydraulic Hose

Replace a damaged hose with a new one.

(3) Damage, wear and Deformation of Chisel

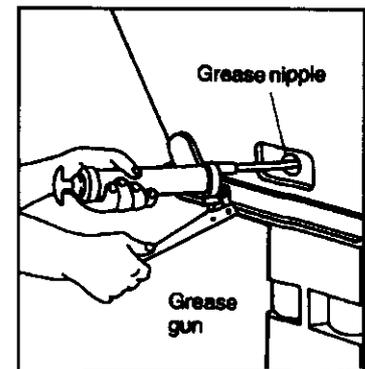
Inspect the chisel end for severe damage, wear or deformation. If unsatisfactory, replace the chisel with a new one or repair.

(4) Greasing the chisel

Apply grease through the grease nipple at the side face of the chisel holder before starting each work shift. Negligence of lubrication will result in premature damage or wear of the chisel or bushings.

Caution:

- Apply grease whenever you find the chisel sliding surface dry, in addition to the pre-operational greasing.
- Excessive application of grease will fill up the space under the piston. The proper amount of grease will be applied by pumping the grease gun 5 to 7 times.



(5) Level, Contamination and Deterioration of Hydraulic Oil

Inspect the oil in the hydraulic oil tank for level, contamination and deterioration. Add oil or change oil if necessary. If neglected, the hammer will break down or the hydraulic components of the excavator will be damaged.

Easy Checking method for contamination and deterioration of hydraulic oil.

- Offensive odor
- No viscosity
- Discoloration
- Foaming

See "11. CONTAMINATION CONTROL OF HYDRAULIC OIL" on page 20.



(6) Oil Leaks

Operate the hydraulic hammer to inspect for oil leaks from the hydraulic hammer or tubing.

Hydraulic Hammer: Perform inspection according to "7. OIL LEAK INSPECTION" on page 22.

Tubing: Inspect for loose bolts..... retighten where necessary.

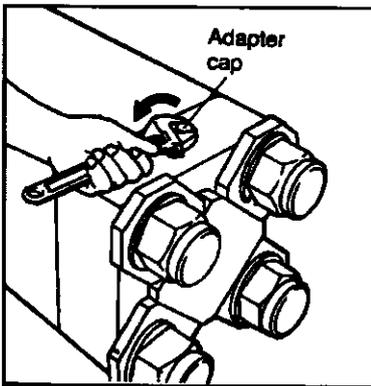
Inspect for damaged or broken parts repair or replace.

3. GAS PRESSURE INSPECTION

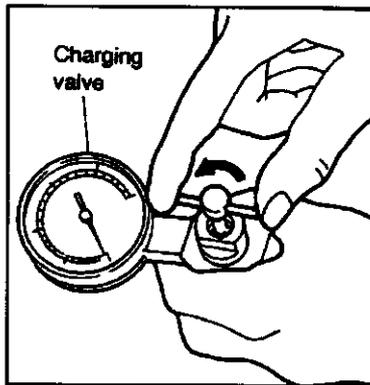
Inspect the gas pressure before trial operation and every two weeks thereafter.

(1) Inspection method

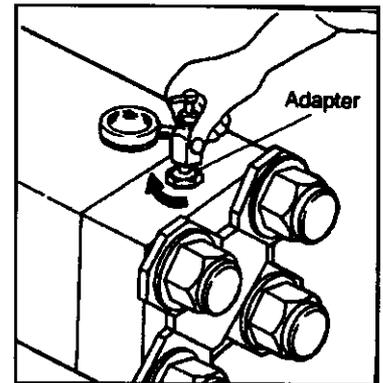
1. Remove the adapter cap



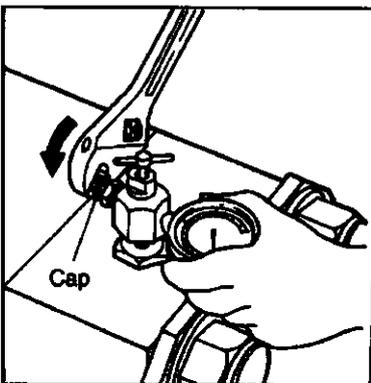
2. Turn the charging valve lever to stop in the direction indicated by the arrow (counter clockwise).



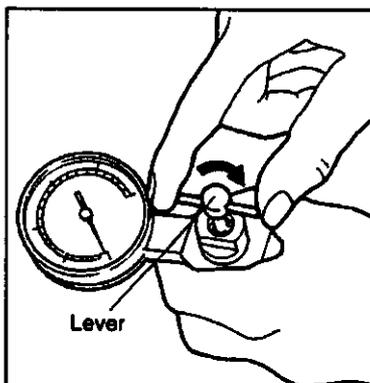
3. Install the charging valve into the adapter.



4. Turn the charging valve cap in the direction indicated by the arrow to lock.



5. As the lever is screwed in, a resistance is encountered at a point. By turning the lever further, the charged pressure is indicated on the pressure gauge.



Caution:

Do not turn the lever excessively. Overturning the lever will damage the charging valve. Stop turning the lever when the pressure gauge pointer begins to swing.

6. Turn the charging valve lever in the direction indicated by the arrow to a stop.
7. Loosen the cap with the adjustable wrench to relieve the nitrogen gas in the charging valve.
8. Remove the pressure regulator from the adapter. Install the adapter cap on the adapter.

- Maximum Gas Pressure.

Type	Max. gas pressure (Bar)
YC 70	25
YC 110	20
YC 180	22

Caution:

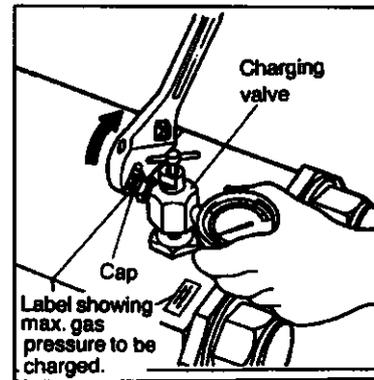
- The gas pressure varies with the protrusion length of the chisel. The gas pressure should be checked with the chisel protruding to the full extended length.
- If the gas pressure is not as specified, adjust properly.
- If used with pressures higher than the max. gas pressure, the chisel, piston or the hydraulic components of the excavator can be damaged. YC does not take any responsibility for failures resulting from neglect of this warning. (The max. gas pressure is indicated on the head cap).

(2) Reducing Gas Pressure

1. After carrying out steps 1 thru 5 under "3. GAS PRESSURE INSPECTION," loosen the cap slowly, and the gas pressure will be decreased gradually. Tighten the cap again when the gas pressure drops to a desired level.
2. Then carry out steps 6 thru 8.

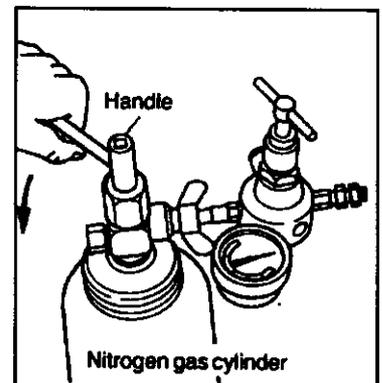
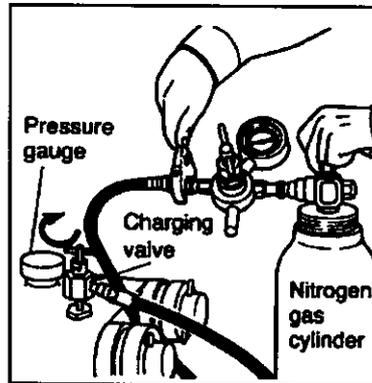
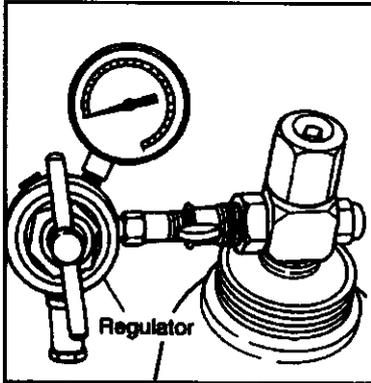
Caution:

The cap should be loosened as slowly as possible.



(3) Nitrogen Gas Charging Procedure

1. After carrying out steps 1 thru 3, remove the cap.
2. Install the regulator on the nitrogen gas cylinder.
3. Connect the accessory hydraulic hose to the charging valve and to the regulator.
4. Turn the charging valve lever until the pressure gauge pointer begins to swing.
5. Open the nitrogen gas cylinder cock by turning the handle in the counter clockwise direction.



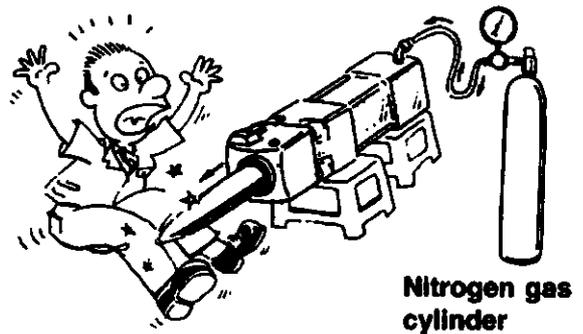
6. The gas pressure is automatically set for the maximum gas pressure since the regulator is set for that pressure.
7. Charge nitrogen gas until the pressure gauge pointer of the charging valve stops moving. Tighten the handle.
8. Thereafter, follow steps 6 thru 8.

For the max. gas pressures, see page 19.

Danger:

- Under any circumstances never use gases other than nitrogen gas.
- As nitrogen gas is charged, the chisel can be forced out abruptly. Do not allow any one to stand close to the chisel during charging.

Do not stand near the chisel when charging with nitrogen gas.



4. HANDLING OF NITROGEN GAS

- If the gas pressure of the hydraulic hammer drops 10 bar or more a day, gas leaks are suspected. Check the hammer according to the procedure indicated in "6. GAS LEAK INSPECTION" on page 22.
- When the oil temperature rises, the gas pressure also tends to increase slightly. This is also to be expected.
- In gas charging operation, if the nitrogen gas cylinder's inner pressure drops to 40 bar, replace the cylinder with a new one or have it recharged.
- The gas cylinder carries "high pressure gas vessel certificate" on it. Do not lose or destroy it. It will be needed when the dealer recharges the cylinder.

Caution:

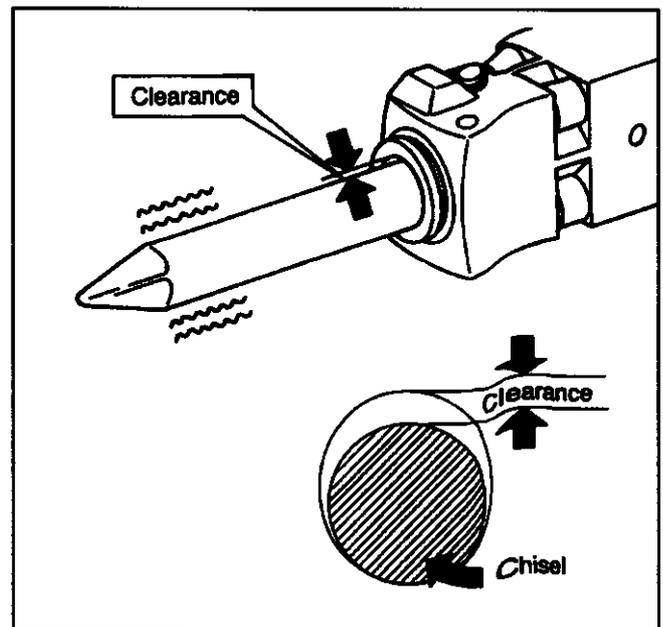
Under any circumstances never use gases other than nitrogen gas.

5. CLEARANCE BETWEEN CHISEL AND BUSHING

1. When the clearance between the chisel and bushing reaches the limit below, replace the holder bushing and round bushing with new ones.
2. When the chisel is worn by 3mm or more, replace it with a new one. Refer to the outer diameters listed below.

- Clearance Limit

Model	Clearance Limit (mm)	Outer Dia. Limit of chisel (mm)
YC 70	5	41.5
YC 110	5	54.5
YC 180	5	61.5

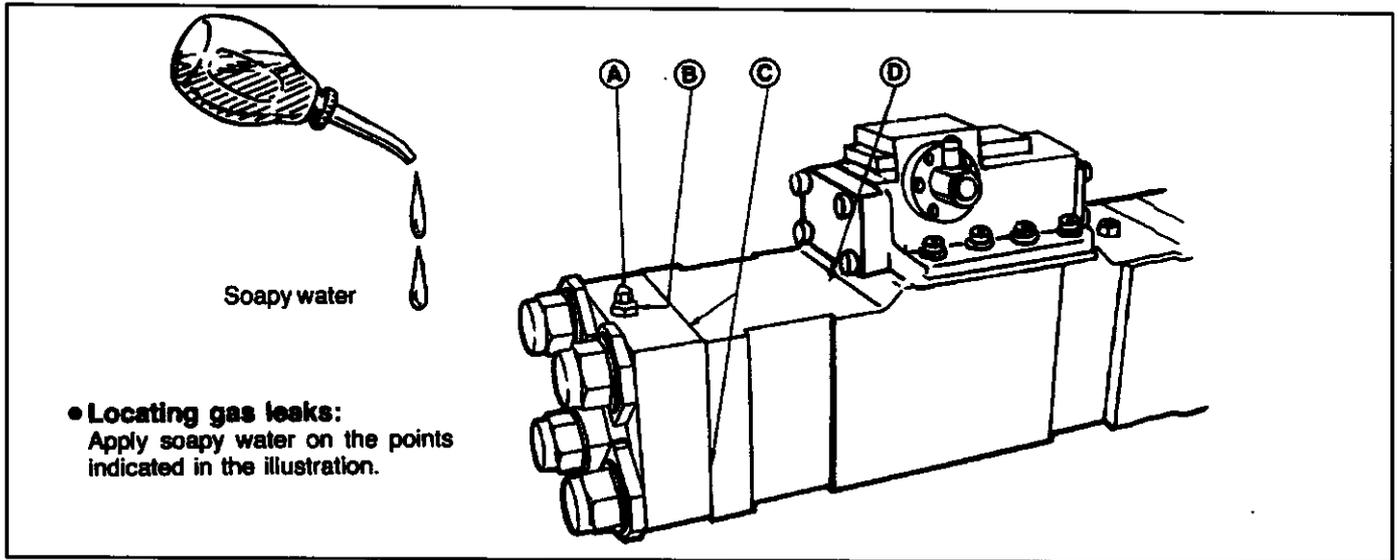


Caution:

- Too large of a clearance will allow the piston to strike the chisel unevenly, resulting in a broken piston or chisel.

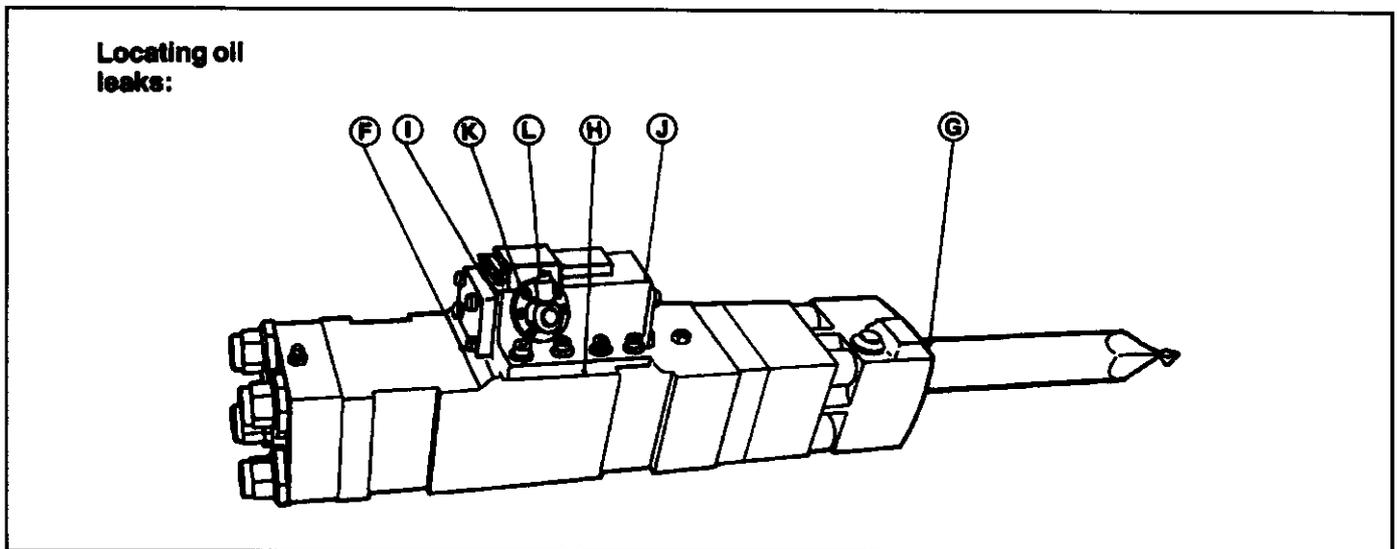


6. GAS LEAK INSPECTION (Gas pressure drops by more than 10 bar per a day.)



Check the cause and take necessary measures referring to “TROUBLESHOOTING GUIDE” on page 33.

7. OIL LEAK INSPECTION



(1) Small Amounts of Oil Leakage

The small amount of oil leaking from between the chisel (G) and holder bushing is not a problem but serves to provide lubrication.

(2) Large Amounts of Oil Leakage

Check the cause and take necessary measures referring to “TROUBLESHOOTING GUIDE” on page 33.

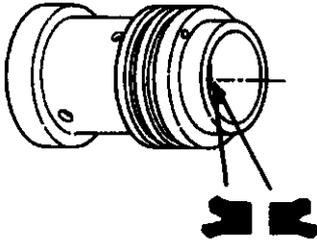
8. REPLACEMENT OF SEALS

If the gas pressure drops more than 10 bar a day or excessive oil leakage is found, replace seal with new ones.

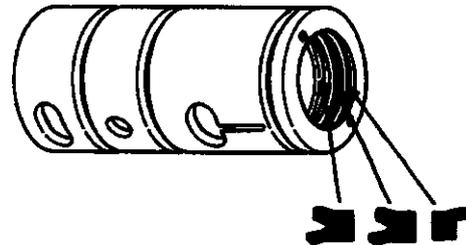
- Check also the seal mounting grooves and sliding areas for damage. Small nicks may be removed with a suitable hone. When large or deep nicks are found, replace the part.

- Cylinder Bushing (A) and (B) YC70 - YC180

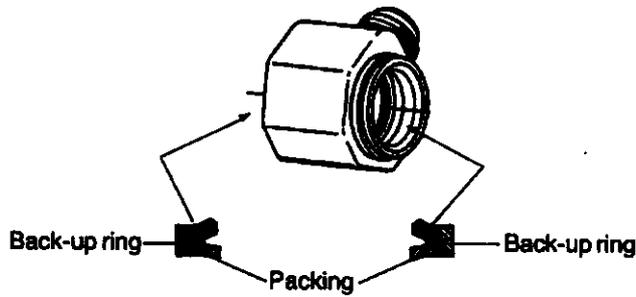
Cylinder bushing (A)



Cylinder bushing (B)

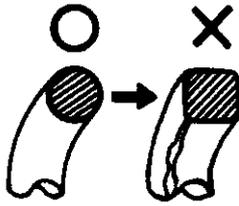


- Swivel adapter

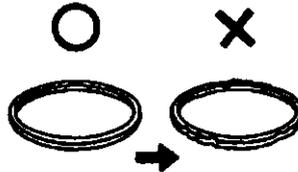


[Defective seals]

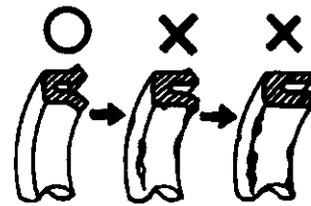
All defective seals should be replaced with new ones.



O-rings deformed, worn, warped, damaged or deteriorated.



Back-up rings worn or deformed.



Packings and dust seals worn or deteriorated.

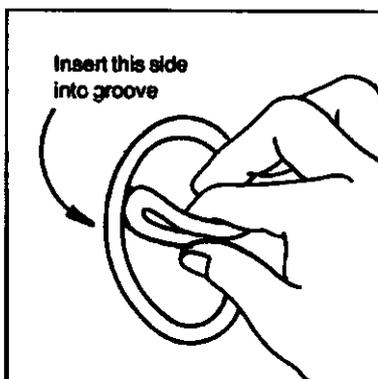
Caution:

Oil leaks may be found for a while after a new oil seal is installed. The oil leak will normally stop when the seal seats with usage.

(1) Installing the Seals

- Packing and Dust Seal

1. When installing a new packing or dust seal, immerse it in hydraulic oil prior to installation.
2. Install them referring to the illustration below.



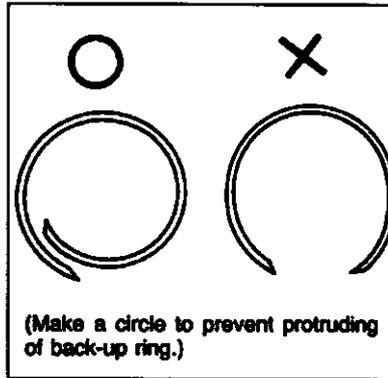
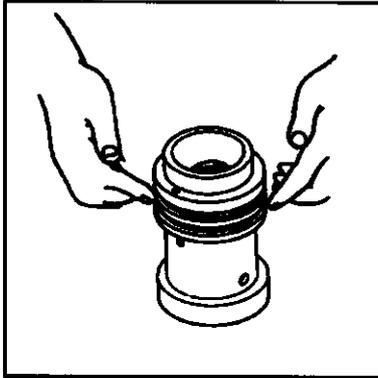
[How to hold packing]



3. When installing both a back-up ring and packing, the packing must go in first
4. Installation should be performed quickly, taking care they are facing in the proper direction. Taking excess time might deform the seal.
5. Care should be exercised so as not to damage the lip when installing the seal. Installation of a damaged seal will cause oil leaks.

- O-Ring and Back-up Ring

1. After installing the O-ring, apply a thin coat of grease on it.
2. Curl the back-up ring and apply a thin film of grease on it before installing.
3. After installing, hold the back-up ring so it will not slip out of the groove.



Caution:

Take care when installing so that the O-ring or back-up ring is in the proper position and that the packing or dust seal is facing in the correct direction.

9. RETIGHTENING THE BOLTS

(1) Side Bolts

Below are the procedures for re-tightening and replacing the side bolts.

- Retightening Procedures

1. Using the lock ring puller tool, remove the lock ring.
2. Remove the stopper
3. Install the striking spanner on the top nut and tighten top nut by hammering it (tightening angle: about 30 degrees)
4. Install the stopper
5. Install the lock ring
 - About at 10 hours of operation after the hydraulic hammer is used for the first time, re-tighten the side bolts.
 - Re-tighten the side bolts whenever you find them loose.

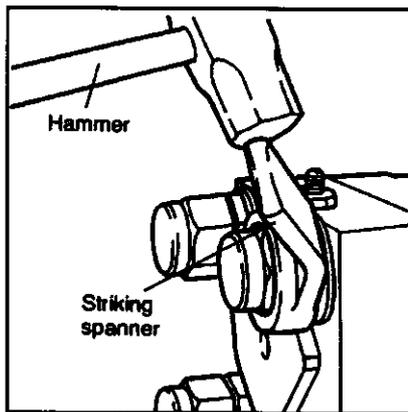
- Replacement Procedure

1. Relieve the nitrogen gas completely according to "(2)Reducing gas pressure" on page 19.
2. Using a suitable jig, remove the lock ring.
3. Remove the stopper.

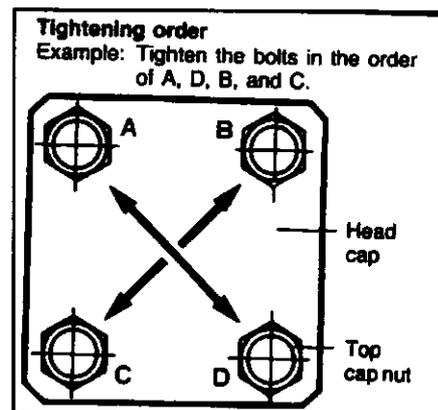


4. Using the striking spanner, loosen the 4 top caps nuts.
5. Turn the bolt to be replaced counterclockwise using the spanner and remove the bottom cap nut.
6. Remove the above bolt and install a new bolt (with opposite flat faces rearward)
7. Apply molybdenum disulfide on the ends and threaded area of the above bottom cap nut. Put the specified area and turn the bolt clockwise to a stop with a spanner.
8. Install the lock washer and apply the molybdenum disulfide on the lock washer ends and bolts threaded area.
9. Install two top cap nuts diagonally and tighten uniformly by hand until it wont turn any further. Then install the remaining two bolts and tighten in the same way.
10. Using the striking spanner, tighten until the head cap, cylinder, impact ring and chisel holder are held together securely.

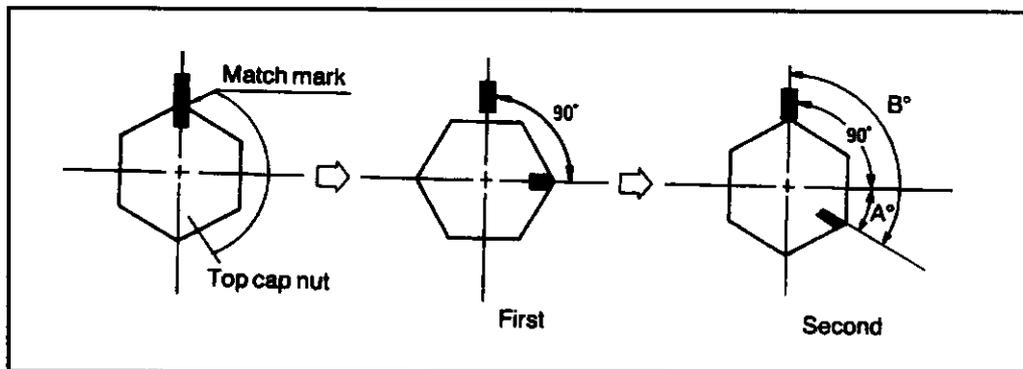
(Precaution on tightening the bolts)



Tighten the 4 bolts uniformly until the head cap bottoms out on the cylinder.



- Tighten the bolts lightly at first diagonally.
- Tighten all bolts evenly in diagonal order to the specified torque.



11. After making sure the head cap, cylinder, impact ring and chisel holder are held together, put a match mark on the head cap and nut with chalk.
12. Turn the 4 bolts by the "first" angle evenly.
13. Turn the 4 bolts by the "second" angle evenly. This procedure will give the 4 bolts proper mounting torque.



[Turn-of-nut angle]

Model	First Turn (Degrees)	Second Turn A (Degrees)	Total B (Degrees)
YC 70	90	90	180
YC 110	90	60	150
YC 180	90	90	150

[TSpecified tightning torque]

Model	Bolt Dia.	Width across flats (mm)	Tightning torque (kg-m)	Turn-of-nut angle
YC 70	M20	27	30	180
YC 110	7/8 inch	32	40	150
YC 180	M25	36	50	150

Note: The bolt tightening torque is expressed by torque. For instance, when turning one end of a spanner measuring 1m long by a force of 12kg, a torque of $1\text{m} \times 12\text{kg} = 12\text{kg-m}$ is produced at the other end. To produce the same 12kg-m torque with a spanner measuring 25cm long, a force of $12/0.25 = 48\text{kg}$ is needed based on the formula $0.25\text{m} \times (\quad)\text{kg} = 12\text{kg}$.



(2) Hydraulic Hammer and bracket

Bolts requiring a large torque should be tightened with an accessory extension pipe.

Specified tightening torque

Model	Valve Case		Top / Bottom Plate		Swivel Flange		Front Bolt		Cushion Rubber	
	Bolt Dia.	Torque (kg-m)	Bolt Dia.	Torque (kg-m)	Bolt Dia.	Torque (kg-m)	Bolt Dia.	Torque (kg-m)	Bolt Dia.	Torque (kg-m)
YC 70	M12	9.0	M10	6.5	-	-	1 in	30.0	-	-
YC 110	M12	9.0	M10	6.5	-	-	1 in	30.0	-	-
YC 180	M12	9.0	M12	9.0	-	-	1 in	30.0	-	-

(3) Tubing components

- Hydraulic hose.

Hydraulic hose dia. (In)	Hose fitting	Spanner to be use (mm)	Tightening torqu ^e (kg-m)
$\frac{3}{16}$	$\frac{3}{16}$ - 20UN	16	2
$\frac{1}{4}$	PF $\frac{1}{4}$	19	2.5
$\frac{3}{8}$	PF $\frac{3}{8}$	22	5
$\frac{1}{2}$	$\frac{3}{4}$ - 16UN	27	8
$\frac{3}{4}$	$1\frac{1}{16}$ - 12UN	36	18
1	$1\frac{5}{16}$ - 12UN	41	20
$1\frac{1}{4}$	$1\frac{5}{8}$ - 12UN	50	25

- Bolts (for pipe support)

Bolt dia.	Spanner to be used (mm)	Tightening torqu ^e (kg-m)
M10	17	6.5
M12	19	9.0

10. REPLACEMENT PARTS

The following parts are replacement parts. Replace them accordingly to their condition of wear and damage.

- 1) Chisel
- 2) Holder bushing and round bushing
- 3) Retainer pin CP
- 4) Bolts
- 5) Seals
- 6) Hydraulic hoses
- 7) Cushion rubber

It is recommended to have spare chisel, retainer pin CP, side bolt CP and Hydraulic hose at all times.



10. CONTAMINATION CONTROL OF HYDRAULIC OIL

1. The excavator uses hydraulic oil more severely when equipped with the bucket so that the oil is apt to deteriorate and be contaminated sooner. Neglect of contaminated oil will, however, not only damage the hydraulic hammer but also cause malfunction of the excavator, resulting in damaged components. Due care should be taken to check for contamination of the oil and change the oil if it is found contaminated.
 - When the hydraulic oil does not have enough viscosity and shows bubbles, this indicates that the oil is deteriorated. If the oil is dark brown and gives off offensive odor, it is severely deteriorated. Change the oil immediately.
 - When the oil is turbid or the oil filter often becomes clogged, it indicates that the oil is contaminated. Change the oil.
 - To change the contaminated hydraulic oil, drain off the oil from the oil tank and hydraulic cylinder completely and clean their inside. Do not mix a new oil with the old one. Drain off the old oil completely.
2. Do not allow any foreign matter to mix with the oil. Especially, take care to prevent foreign material from entering the hydraulic system through the hose or pipe end when changing the hydraulic hammer with the bucket. For example, sand in the hydraulic system will cause fatal damage to the components. The oil filter should be cleaned or replaced as necessary.
3. Low oil level will cause heat build up, resulting in deteriorated oil. Also it may cause cavitation due to mixing of air, leading to a damaged hydraulic hammer. Keep a proper oil level at all times.
4. Do not use the hydraulic at the operating temperature higher than 80 degrees celsius. The proper operating oil temperature range is between 50 degrees celsius and 80 degrees celsius. Since a contaminated cooler fin causes reduced efficiency of the cooler, keep the cooler fin free of clogging and clean at ll times.
5. Water in the hydraulic oil will lead to a damaged hydraulic hammer. When out of service, the hydraulic hammer should be stored indoors. Drain off water and foreign matter from the tank at specified intervals.

- Change of Filter Element and Hydraulic Oil

Change filter element and hydraulic oil at the following intervals according to the procedures described in the operation manual of the excavator.

Filter element:	every 100 hrs.
Hydraulic oil:	every 600 hrs.



12. RECOMMENDED HYDRAULIC OIL AND GREASE

(1) Hydraulic Oil

Use the hydraulic oil recommended by the excavator manufacturer.

(for assembling the hydraulic hammer, an oil equivalent in quality may be used.)

- If the hammer is to be used in an extreme cold or hot region, contact YC or your dealer.

(2) Grease

Use the two kinds of grease given below according to your applications.

- Assembling of hydraulic hammer

We recommend use of lithium based general purpose grease (NLGI No. 2)

- Greasing of chisel

We recommend use of inorganic (bentonite base) high temperature grease (NLGI No.2).

Supplier	Name of lubricant
Kyodo Oil	Kyoseki Thermonix Grease EP-2
Cosmo Oil	High-temperature Grease B2M
Nippon Oil	Dablex 251, 252
Mobil Oil	Mobil Temp 78
Shell	Aeroshell #17

13. STORING OF SEALS

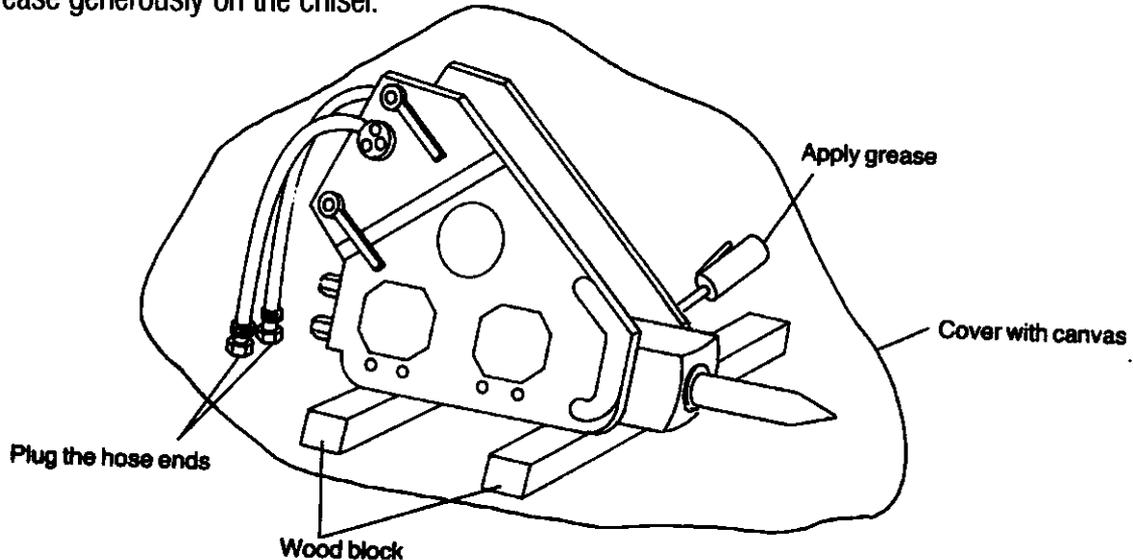
When storing packings, O-rings, and back-up rings, be sure to observe the following conditions.

- (1) Use a closed container. As a simple method, store flat in sealed or tied closed polyethylene bags.
- (2) Use a cool, dark place.
- (3) Do not allow them to be exposed to direct sunlight no hang them on nails.
- (4) In general, do not use packings, O-rings, or back-up rings stored on a shelf for over one year.



14. STORING OF HYDRAULIC HAMMER

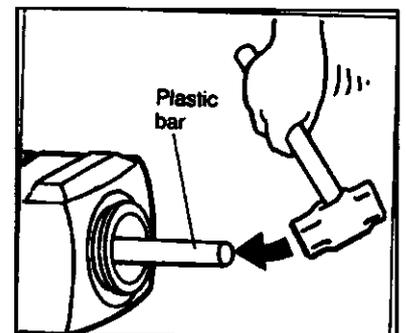
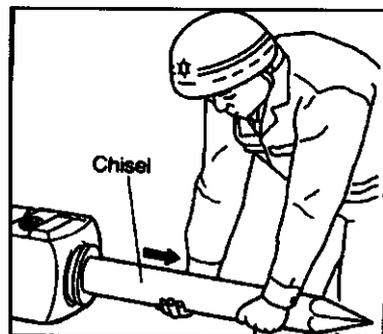
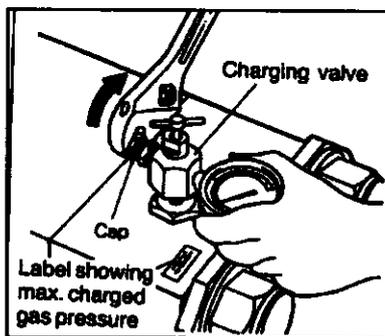
- (1) When storing the hydraulic hammer, be sure to remove it from the excavator and plug the hydraulic hose ends.
- (2) Do not expose the hydraulic hammer to rain. Store the hammer indoors. If the hammer must be stored outdoors, place it on stable wood blocks and cover with canvas.
- (3) Apply grease generously on the chisel.



- When the hydraulic hammer will be out of service for over one week.

When the hydraulic hammer is to be out of service for over one week, additional measures will be needed.

1. Relieve nitrogen gas completely according to the procedure described in "REDUCING GAS PRESSURE" page 19.
2. Remove the chisel according to the procedure described in "REPLACEMENT OF CHISEL" page 14.
3. Push up the piston with the plastic bar and a hammer.



4. Apply hydraulic oil on the lower area of the piston.
5. Apply grease on the chisel shank.

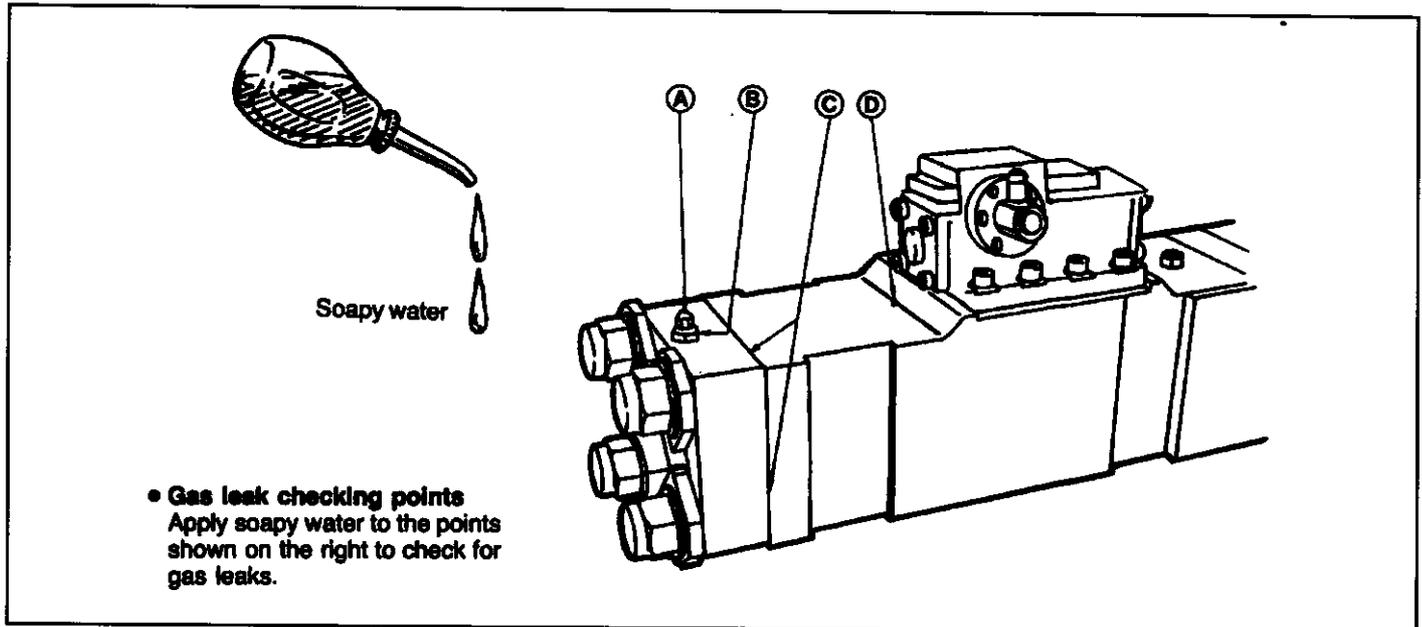
Caution:

- If the above measures are not taken, the piston will rust, causing malfunction of the hydraulic hammer.
- When using the hammer again, charge nitrogen gas according to the procedure described on page 20.



TROUBLESHOOTING GUIDE

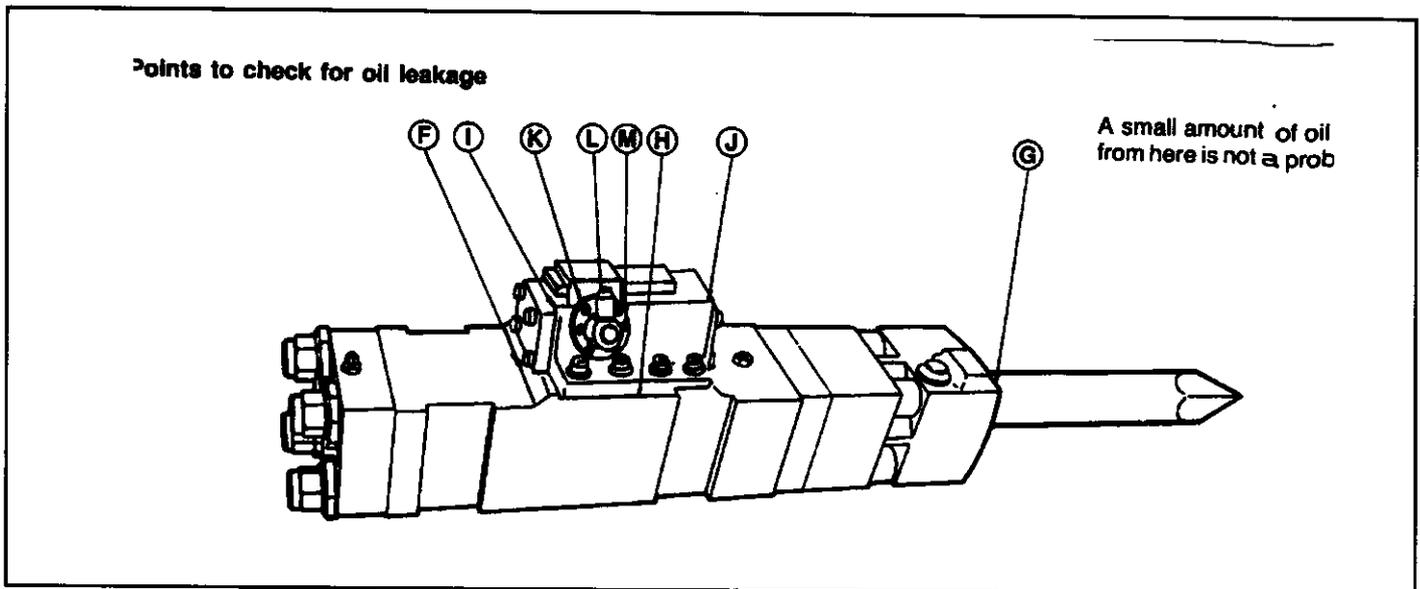
1. GAS LEAKS (When the gas pressure drops excessively more than 10 bar a day).



TROUBLE	CAUSE	REMEDY
Ⓐ Gas leakage from top of adapter	Defective O-ring in check valve	Replace
	Defective or damaged check valve or adapter	Repair or replace
Ⓑ Gas leakage between adapter and head cap	Defective O-ring in adapter	Replace
	Loose adapter	Retighten
Ⓒ Gas leakage between cylinder and head cap	Defective O-ring in head cap	Replace
Ⓓ Gas leakage from drain plug hole	Defective O-ring in cylinder bushing (A)	Replace
	Defective packing in cylinder bushing (A)	Replace
	Seizing of piston and cylinder bushing (A)	Repair or replace cylinder bushing (A) and piston. (When repaired replace packing)
	Damaged cylinder	Repair



2. OIL LEAKS (When large amounts of oil leaks).

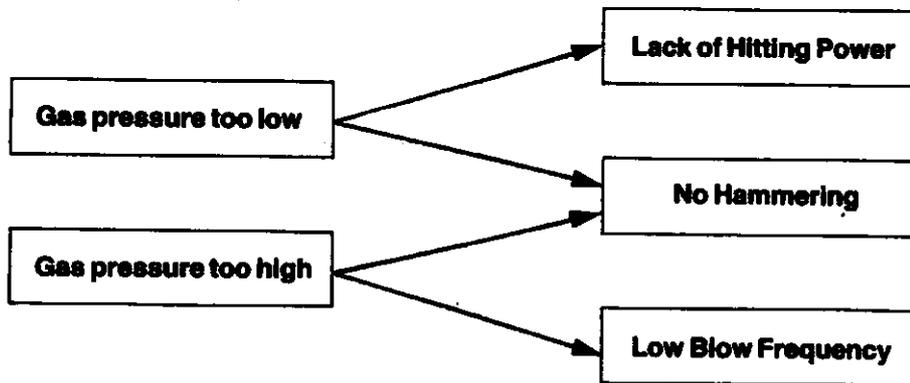


TROUBLE	CAUSE	REMEDY
Ⓕ Oil leakage from drain hole	Defective O-ring or back-up ring in cylinder bushing (A)	Replace
	Defective packing in cylinder bushing (A)	Replace
	Seizing of piston and cylinder bushing (A)	Repair or replace Replace packing too.
Ⓖ Oil leakage between chisel and holder bushing	Defective O-ring or back-up ring in cylinder bushing (B)	Replace
	Defective packing in cylinder bushing (B)	Replace (Replace dust seal too.)
	Seizing of piston and cylinder bushing (B)	Repair or replace. Replace also packing and dust seal.
Ⓗ Oil leakage between cylinder and valve case	Defective O-ring between cylinder and valve case	Replace
	Valve case mounting bolts loose	Retighten
Ⓘ Oil leakage between valve case and top plate	Defective O-ring or back-up ring	Replace
	Valve case top plate bolts loose	Retighten
Ⓙ Oil leakage between valve case and bottom plate	Defective O-ring or back-up ring	Replace
	Bottom plate bolts loose	Retighten
Ⓚ Oil leakage between valve case and swivel flange	Defective O-ring or back-up ring of swivel flange	Replace
Ⓛ Oil leakage between hose fitting and swivel adapter	Loose fit of threaded area or seat damaged.	Retighten or replace
Ⓜ Oil leakage between swivel flange and swivel adapter	Packing or back up ring defective	Replace

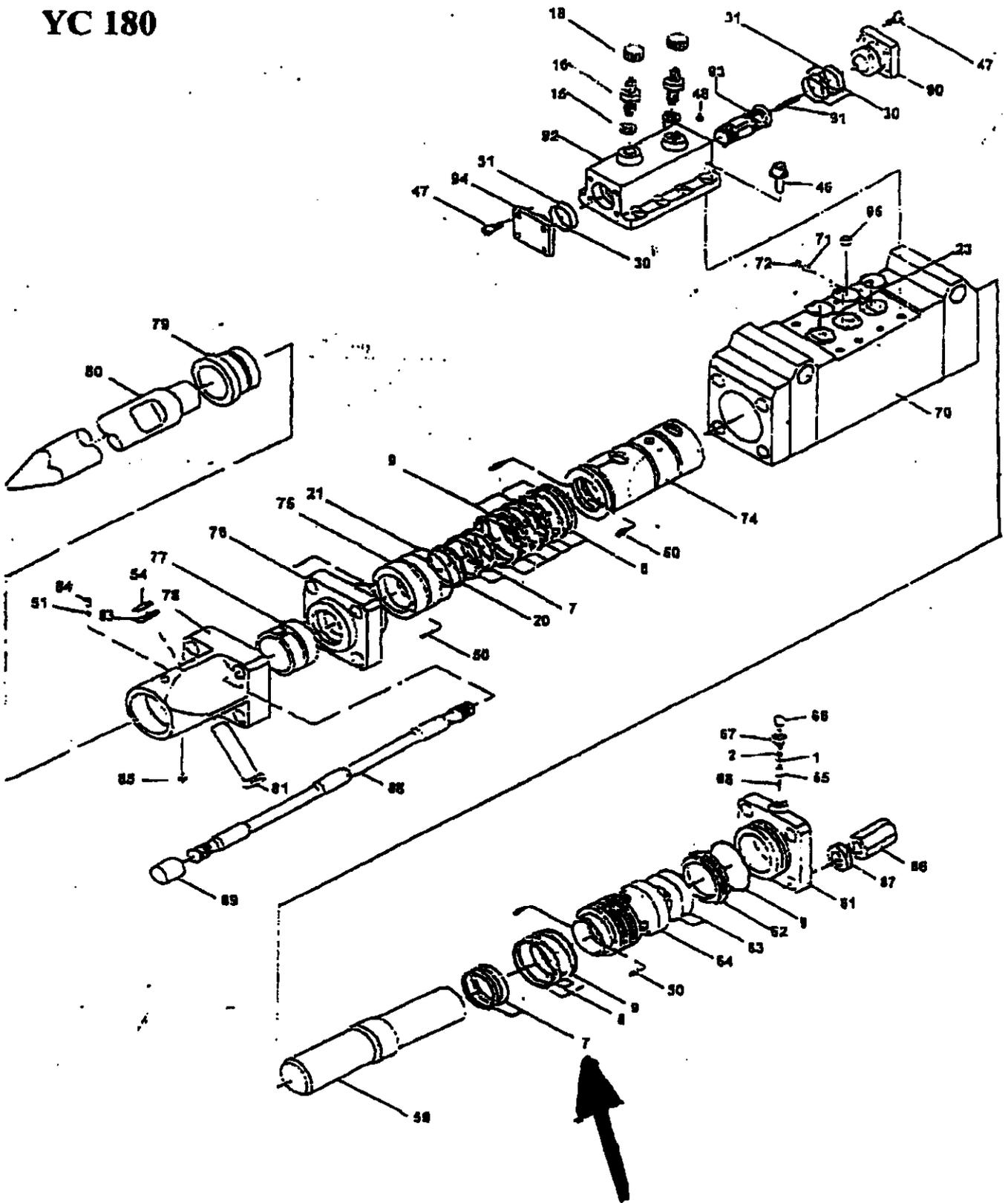
3. MALFUNCTION OF HYDRAULIC HAMMER

TROUBLE	CAUSE	REMEDY
Lack of impacting power	Gas pressure low	Recharge nitrogen gas
Low blow frequency	• Stop valve half open	Full open
	• Gas pressure too high	Correct gas pressure
	• Performance drop of the hydraulic pump and relief valve of excavator	Have the dealer of the excavator check and repair the hydraulic pump and relief valve
	• Too high hydraulic oil (more than 80°C)	Clean oil cooler cooling surface or install a new oil cooler.
	• Low level of hydraulic oil of the excavator	Add oil
Irregular hammering	• Piston or cylinder bushing defective	Repair or replace.
	• Poor performance of the hydraulic pump and relief valve of excavator	Have the dealer of the excavator check and repair the hydraulic pump and relief valve
Hammer does not run	• Stop valve OFF	Turn it ON
	• Reduced or zero nitrogen gas pressure	Recharge gas and check for gas leakage
	• Piping direction is wrong	Correct
	• Gas pressure too high	Check and correct gas pressure
	• Performance drop of the hydraulic pump and relief valve of excavator	Have the dealer of the excavator check and repair the hydraulic pump and relief valve
	• Hydraulic oil insufficient	Replenish oil

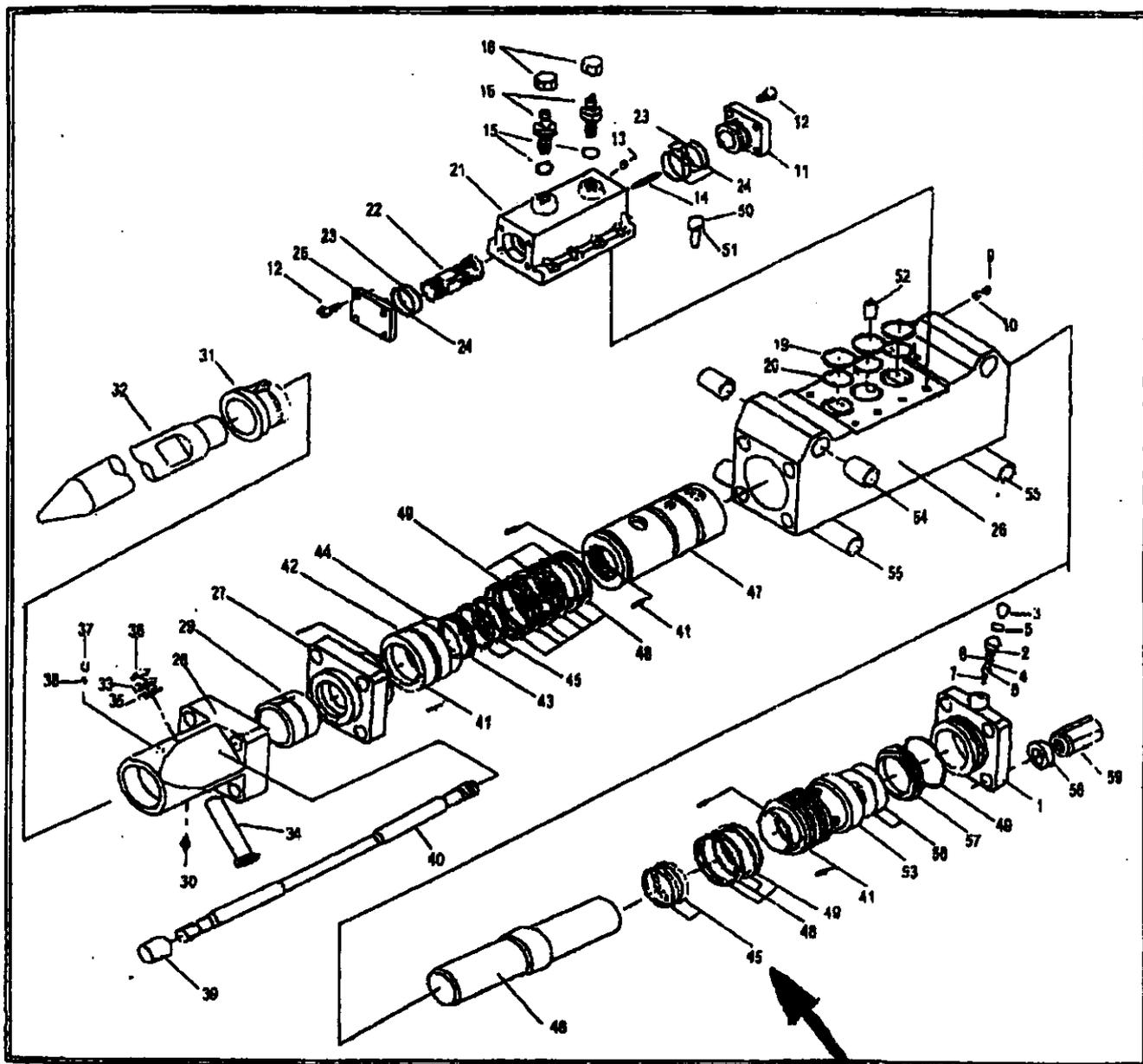
4. RELATION OF GAS PRESSURE, HITTING POWER AND FREQUENCY

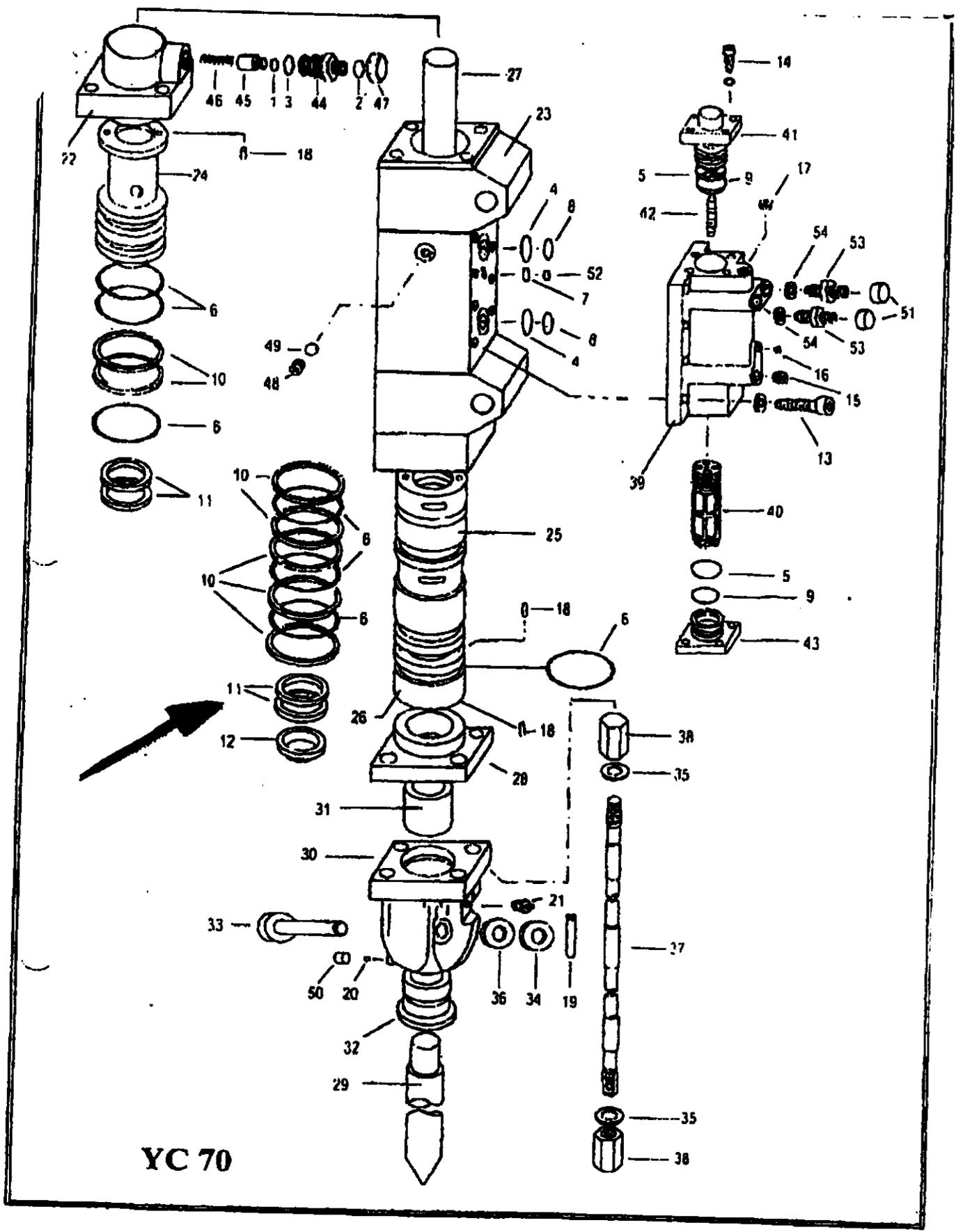


YC 180



YC 110





YC 70

AUSTRALIAN
HAMMER
 SUPPLIES