Hydraulic Breaker

TOKU

TNB-08M	TNB-6E	TNB-100
TNB-1M	TNB-6.5E	TNB-150
TNB-2M	TNB-7E	TNB-160
TNB-3M	TNB-14E	TNB-190
TNB-4M		TNB-220
TNB-5M		TNB-230
TNB-6M		TNB-310
		TNB-400

MANUAL

INSTRUCTION MANUAL

Carefully read all instructions before operating or servicing any TOKU tools.

TOKU PNEUMATIC CO.,LTD.

No.1

(1) INTRODUCTION

This instruction manual is a guide book to the TOKU Hydraulic Breaker. This manual gives instructions on how to use the Breaker safely and effectively.
Before operating the Breaker, operators and maintenance personnel should read this manual carefully making sure that they understand the contents.
Keep this manual handy and ensure all personnel read it periodically.

The TOKU breaker is fitted to a hydraulic excavator as an attachment; Therefore, this manual must be kept together with your hydraulic excavator manual.

⚠ WARNING

- Improper operation can be hazardous and could result in serious injury or death.
- Operators and maintenance personnel should read this manual periodically and always keep it handy.
- Do not operate the product unless you understand and comply with the contents of the instruction manual.
- If this manual is lost or becomes dirty, ask for a replacement manual from TOKU Pneumatic Co., Ltd.
- If you transfer the breaker to another source, make sure that you give this manual to the new owners.
- If you hire out the breaker, make sure that you give this manual to the user.

(2) SAFETY INFORMATION

In order to prevent accidents, read, understand and follow all the precautions and warnings in this manual before using the breaker. The following words are used to identify safety messages in the manual.

WARNING; This word is used in safety messages and on safety labels where a potentially dangerous situation could result in serious injury or death of the hazard is not avoided. These safety messages or labels usually describe precautions that must be taken to avoid the hazard.

CAUTION; This word is used in safety messages and on safety labels for hazards which could results in minor or moderate injury if the hazard is not avoided. This word may indicate hazards whose result could be damage to the machine.

(3) INTENDED USE

The TOKU HYDRAULIC BREAKER is designed to be used mainly for the following work.

- Demolition of Concrete and secondary breaking.
- Demolition of Asphalt and secondary breaking.
- Demolition of Rock.
- Secondary demolition of Rock.
- Quarry applications.
- Demolition of Buildings.
- Road Construction.

4) OPERATION AND QUALIFICATIONS

Operators must be trained before operating a TOKU BREAKER and must obey all rules at the worksite and local regulations which affect the operator and equipment.

CONTENTS

⚠ WARNING

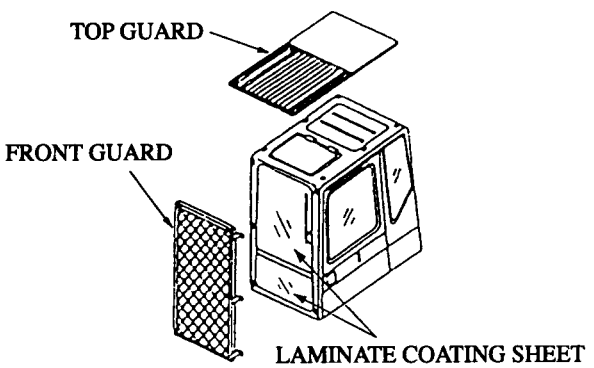
When operating the hydraulic breaker, read the instruction manual for the hydraulic excavator and obey the safety requirements.

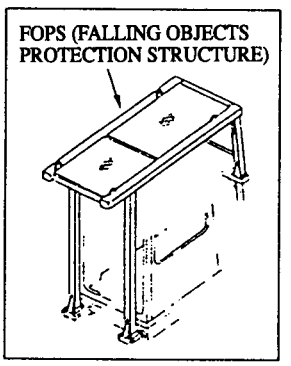
SAFETY RULES AT THE WORK SITE

- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when using the breaker.
- Follow the rules for group work when more than 2 people are working together.

PROTECTION AGAINST FALLING OR FLYING OBJECTS

- When operating a hydraulic breaker, install a front guard on the windscreen. Also place a laminate coating sheet over the windscreen.
- For work in mines, tunnels or other places where there is a danger of falling rocks, fit a FOPS (falling object protective structure). Also place a laminate coating sheet over the windscreen.
- When operating a breaker, make sure that you close the front window.
- During operation, make sure all personnel are out of range of materials which may fly up.

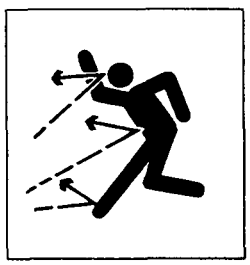




FOPS

CLOTHING AND PERSONAL PROTECTION ITEMS

- Depending on the type of job, do not forget to wear a hard hat, safety goggles, safety boots, mask and gloves. Especially when operating a mini-excavator where a cabin is not installed on the machine, it is essential to wear a hard hat, protective goggles, safety boots, a mask and gloves.



DO NOT DISASSEMBLE

- The hydraulic breaker contains a high volume of pressurized nitrogen gas. It can therefore be dangerous if the breaker is not dismantled correctly. As a result, if the breaker needs service, please contact TOKU or an authorized distributor/service depot.

UNAUTHORIZED MODIFICATION

- Non-approved modifications can cause injury and damage.
- Consult your TOKU dealer for advice before making any modifications. TOKU will not accept responsibility for any injury or damage caused by any unauthorized modifications.

WARNING - HIGH PRESSURE OIL

Do not remove the hydraulic hose immediately after stopping the hydraulic breaker. The oil reaches a very high temperature during operation and may possibly cause burns. Remove hose only when the temperature has dropped.

WARNING - HIGH PRESSURE OIL

The oil pressure in the hydraulic circuit remains high immediately after the hydraulic breaker has been stopped. The oil may spurt out from the hose cap when the hose is removed. Remove the hose only after switching off the engine of the excavator and releasing the pressure in the hydraulic hose.

A CRANE SHOULD BE USED FOR HANDLING HEAVY MATERIAL

- Assembly and disassembly work should be performed in a flat area.
- A signal must be decided in advance for the work if two people are involved.
- Make sure that a crane is used for lifting of the material weight exceeds 25 kg.
- When dismantling heavy parts, support the part as it is removed.
- Do not work on materials that are being lifted by one means or another, put them on a work table.
- When assembling and disassembling the hydraulic breaker, make sure that the breaker is well balanced.
- Never remain under material which is being lifted by a crane.
- Keep away from material which is being lifted.

USE SUITABLE TOOLS

It is very dangerous to use worn and broken tools and to misuse tools. Use the proper tools for maintenance.

POSITION THE HYD. BREAKER

Position the hydraulic breaker in a stable and flat place so as to prevent it from over turning.

(6) SPECIFICATIONS

"M" Series

ITEM	MODEL	TNB-08M	TNB-1M	TNB-2M	TNB-3M	TNB-4M	TNB-5M	TNB-6M
Total Length	Without chisel mm	611	670	716	815	876	945	975
	With chisel mm	896	950	1006	1151	1236	1345	1375
Weight	Breaker including chisel kg	36	50.3	72	110	138	171	191
	Total Weight including bracket kg	56	72	94	164	220	291	318
Chisel	Diameter mm	40	45	50	58	64	75	75
	Weight kg	3.5	4.8	8	12	14	21	21
Operating Specs.	Operating Pressure MPa (Kg/cm^2)	5.9~12.7 (60~130)	6.9~13.7 (70~140)	7.8~14.7 (80~150)	9.8~14.7 (100~150)	9.8~15.7 (100~160)	9.8~15.7 (100~160)	9.8~15.7 (100~160)
	Hydraulic Flow l/min	18~25	20~30	20~35	25~45	30~55	35~60	40~70
	Frequency bpm	930~ 1300	700~ 1200	600~ 1150	550~ 1000	580~ 1060	550~ 1000	600~ 1050
Appropriate Excavator	Weight ton	0.7~	1.0~	1.5~	2.4~	3.0~	4~	5.5~

"E" Series

ITEM	MODEL	TNB-6E	TNB-6.5E	TNB-7E	TNB-14E
Total Length	Without chisel mm	1011	1147	1262	1575
	With chisel mm	1476	1602	1764	2190
Weight	Breaker including chisel kg	249	339	504	850
	Total Weight including bracket kg	391	650	903	1550
Chisel	Diameter mm	95	95	115	135
	Weight kg	36	36	70	115
Operating Specs.	Operating Pressure MPa (Kg/cm^2)	9.8～15.7 (100～160)	10.8～16.7 (110～170)	11.8～16.7 (120～170)	12.7～16.7 (130～170)
	Hydraulic Flow l/min	45～80	70～100	70～110	130～170
	Frequency bpm	550～1000	600～900	450～700	460～600
Appropriate Excavator	Weight ton	6～	7～	10～	18～

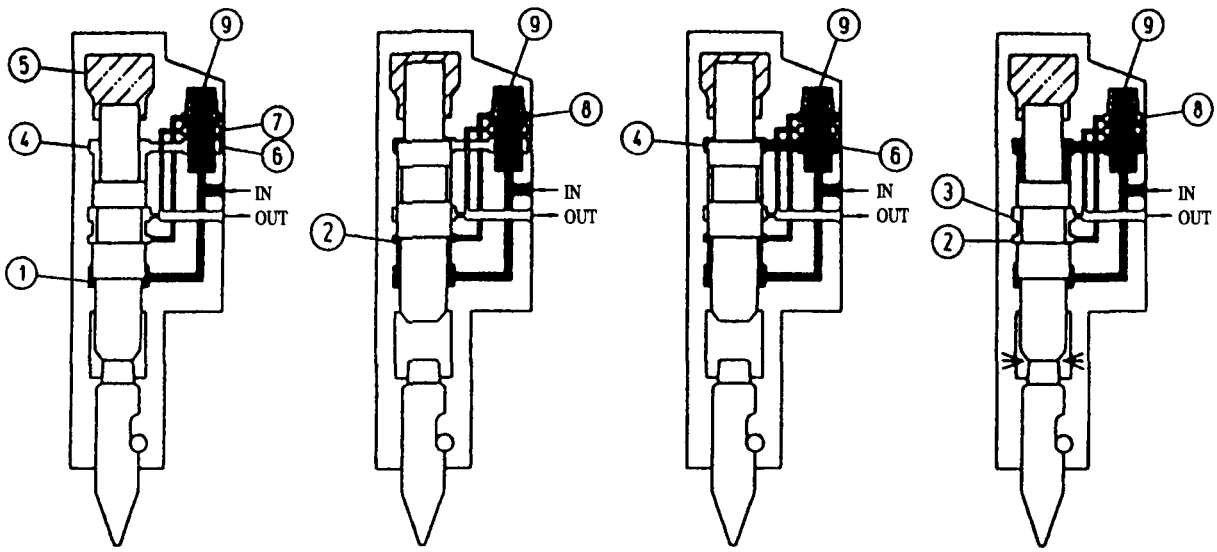
"O" Series

ITEM	MODEL	TNB-100	TNB-150	TNB-160	TNB-190	TNB-220	TNB-230	TNB-310	TNB-400
Total Length	Without chisel mm	1348	1669	1680	1750	1785	1891	2036	2258
	With chisel mm	1850	2284	2295	2375	2397	2503	2746	3074
Weight	Breaker including chisel kg	561	878	957	1057	1181	1251	1696	2258
	Total Weight including bracket kg	1002	1563	1707	1950	2403	2453	3046	4326
Chisel	Diameter mm	115	135	135	140	146	146	160	178
	Weight kg	70	115	115	130	148	148	203	265
Operating Specs.	Operating Pressure MPa (Kg/cm^2)	11.8～16.7 (120～170)	13.7～17.7 (140～180)	12.7～16.7 (130～170)	13.7～17.7 (140～180)	12.7～16.7 (130～170)	12.7～17.7 (130～170)	13.7～17.7 (140～180)	13.7～17.7 (140～180)
	Hydraulic Flow l/min	100～140	160～200	150～200	160～210	180～220	180～230	240～300	280～390
	Frequency bpm	430～600	450～600	440～580	370～490	410～500	380～450	370～470	370～470
Appropriate Excavator	Weight ton	15～	18～	22～	22～	30～	30～	40～	50～

(7) PRINCIPLE OF OPERATION

TNB-08M ~ TNB-5M

(1) Upward movement (2) Reversing (3) Downward movement (4) Impact



(1) Upward movement:

Oil flows into chambers 1 and 9: the control valve is pressed in the downward direction.
The piston moves in the upward direction toward the cushion chamber 5.
Oil in the opposite chamber 4 is discharged through chamber 6 and 7.

(2) Reversing Direction:

When the lower flange fills with oil, it reaches chamber 2. At this point both chambers 8 and 9 exert the same pressure on the flange but the control valve moves in the upward direction due to the area difference between the flanges.

(3) Downward movement:

When the control valve rises and reaches chamber 9, the flow moves through chamber 6 then 4. Due to the difference in area between the piston flange and the force from the cushion chamber pressure, the piston accelerates downwards.

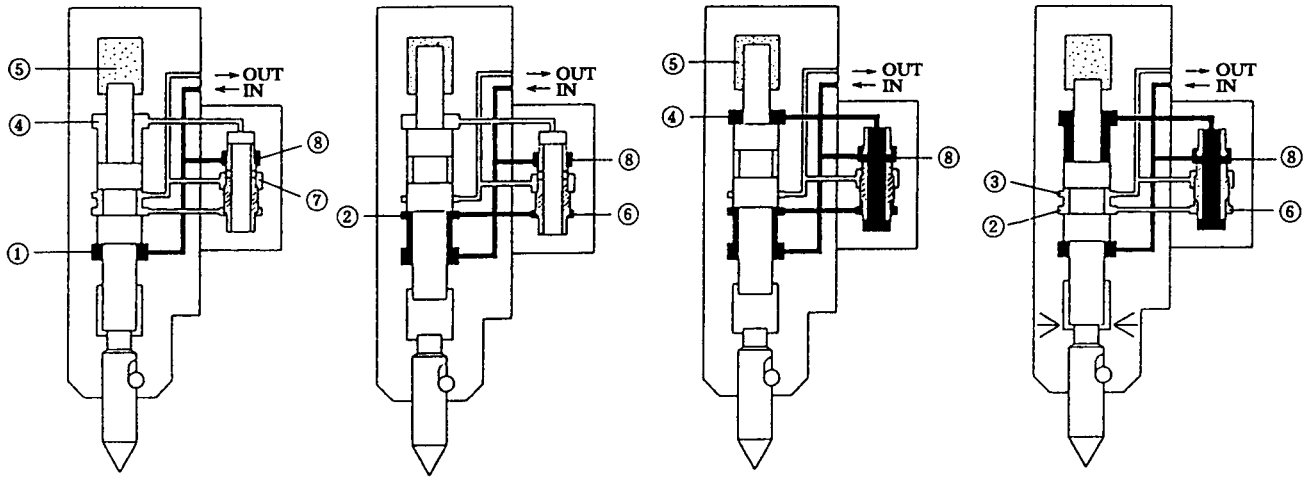
(4) Impact:

The piston hits the chisel. At this point the mid-section of the piston reaches chamber 2 and as a result chamber 8 releases the pressure through chamber 2 and 3.
When chamber 8 is empty, as chamber 9 is constantly pressurized, the valve moves in the downward direction.

Repetition of the cycle mentioned above results in continuous blows.

TNB-6M, "E" Series and "O" Series

(1) Upward movement (2) Reversing (3) Downward movement (4) Impact



(1)Upward movement:

Oil flows into chambers 1 and 8: the control valve is pressed in the downward direction.

The piston moves in the upward direction toward the cushion chamber 5.

Oil in the opposite chamber 4 is discharged through the control valve into chamber 7.

(2)Reversing direction:

When the lower flange fills with oil, it reaches chamber 2. At this point both chambers 6 and 8 exert the same pressure on the flange but the control valve moves in the upward direction due to the area difference between the flanges.

(3)Downward movement:

When the control valve rises and reaches chamber 8, the flow moves through the control valve and reaches chamber 4.

Due to the difference in area between the piston flange and the force from the cushion chamber pressure, the piston accelerates downwards.

(4)Impact:

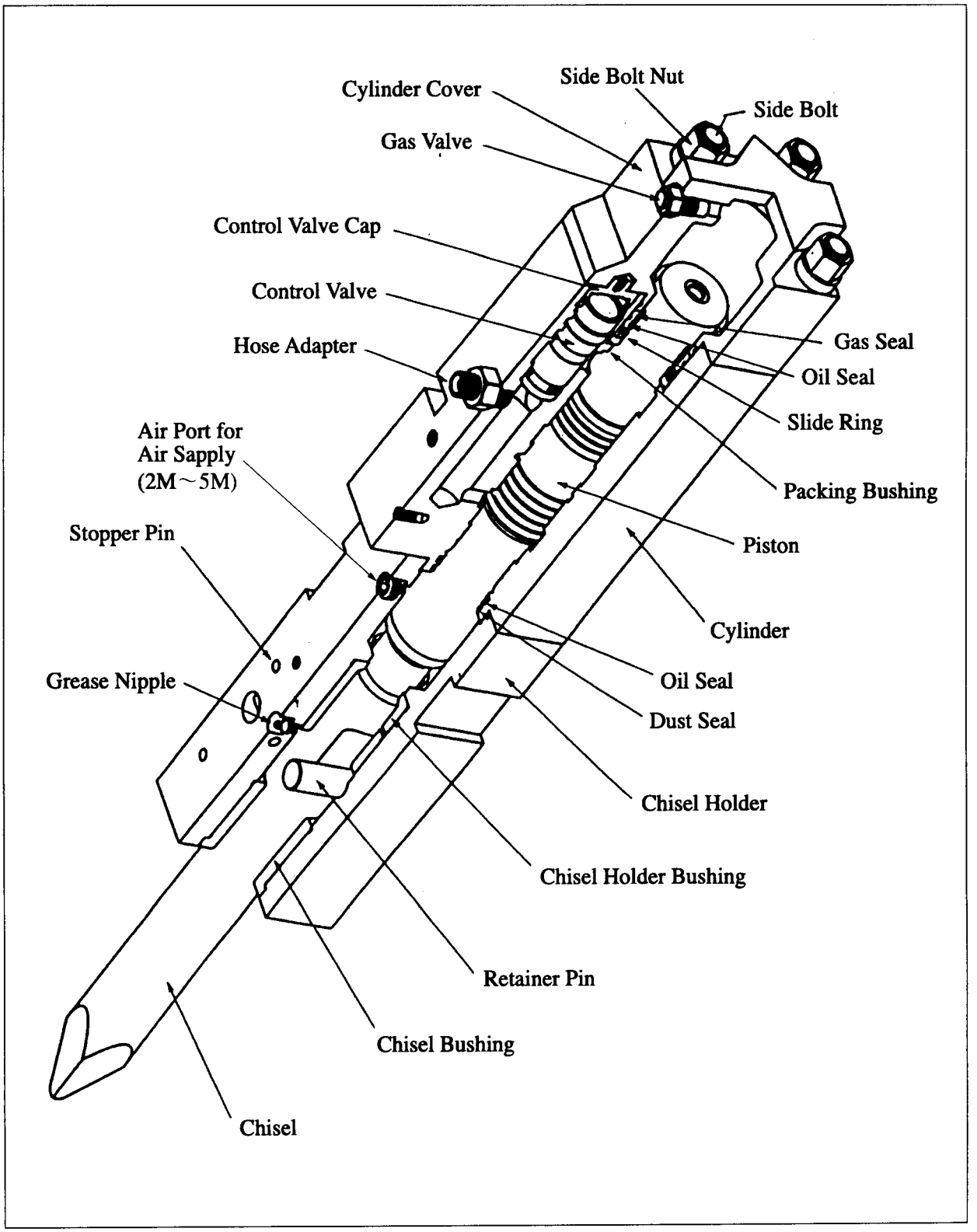
The piston hits the chisel. At this point the mid-section of the piston reaches chamber 2 and as a result chamber 6 releases the pressure through chamber 2 and 3.

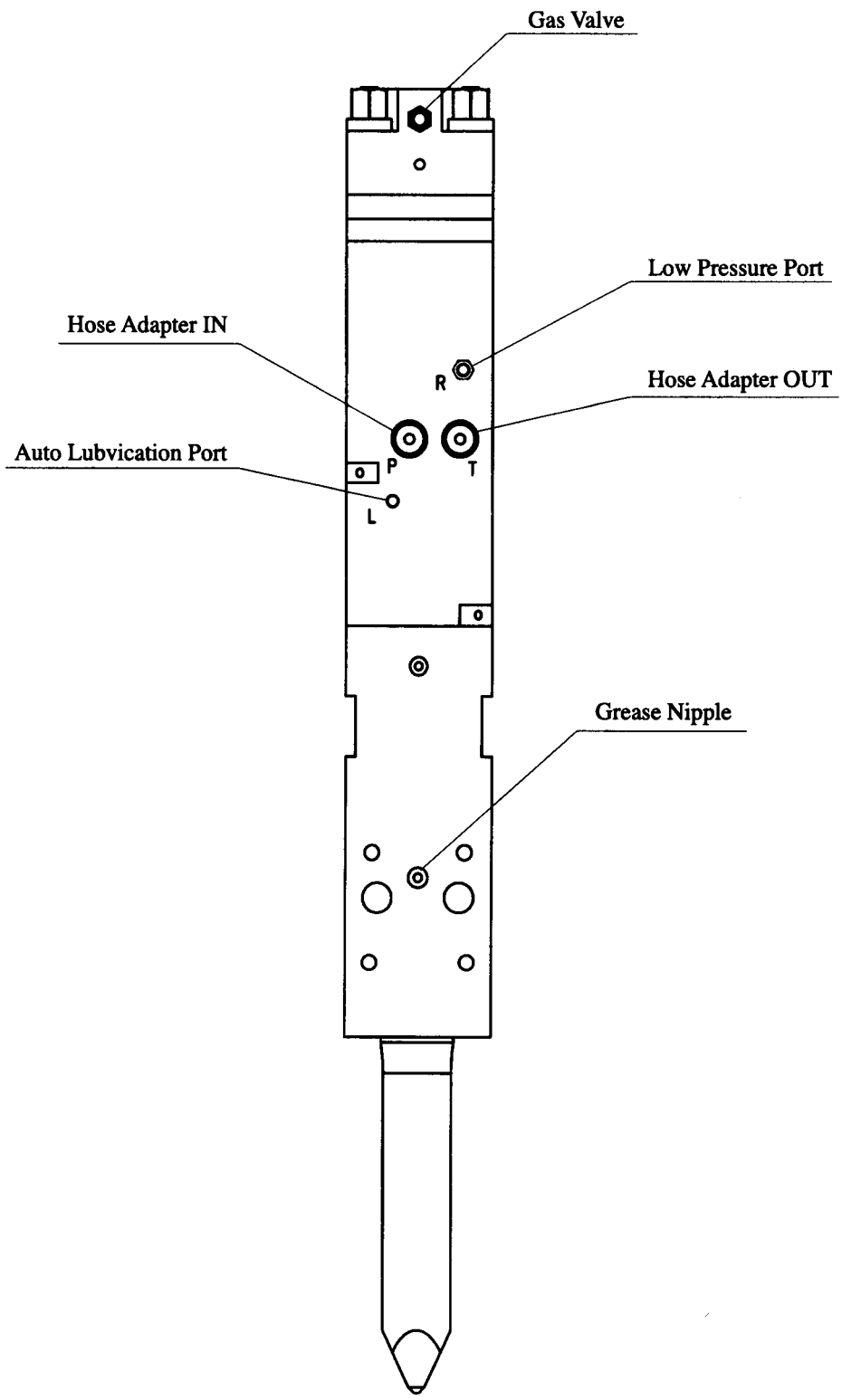
When chamber 6 is empty, as chamber 8 is constantly pressurized, the valve moves in the downward direction.

Repetition of the cycle mentioned above results in continuous blows.

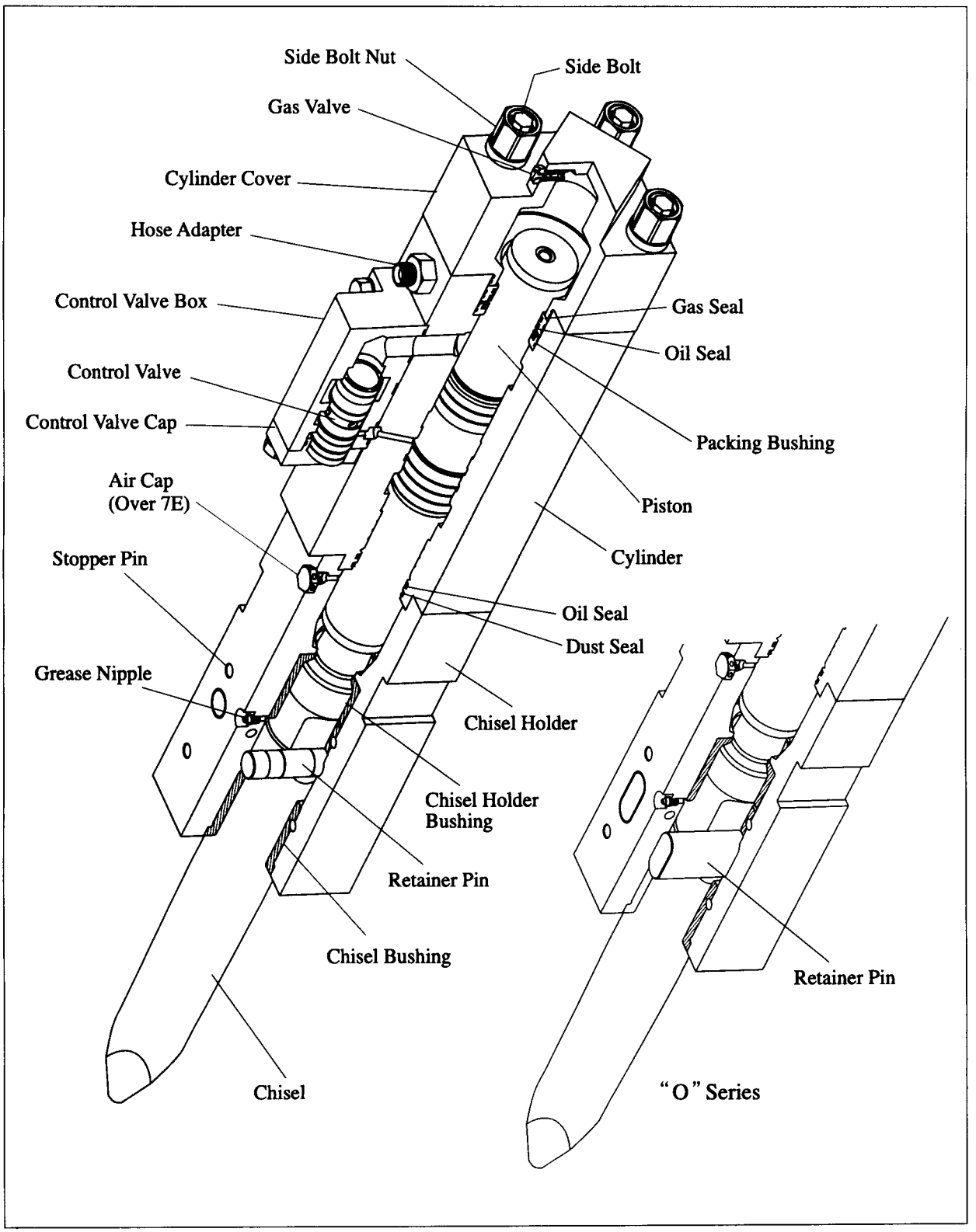
(8) STRUCTURE

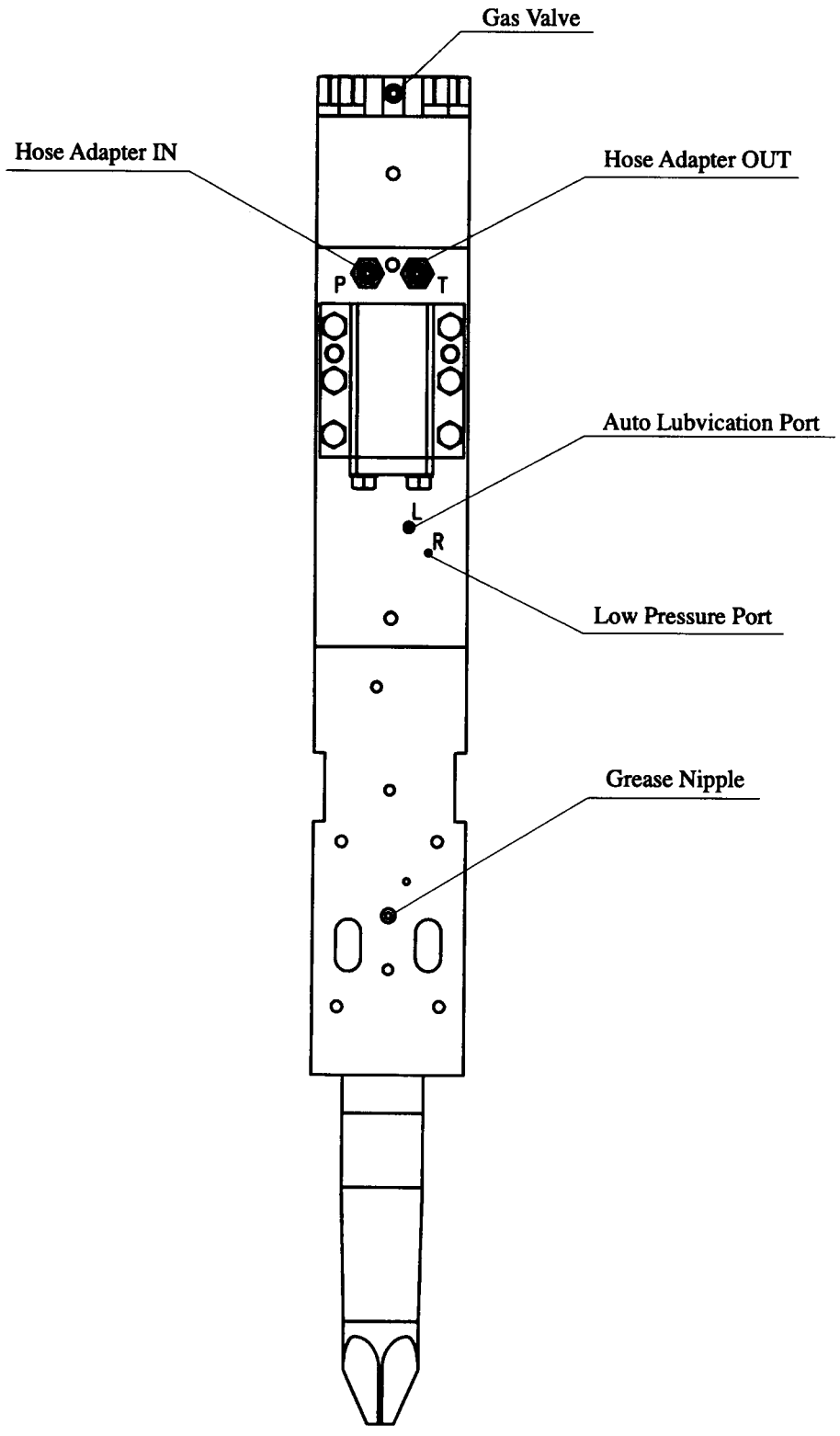
1) TNB-08M ~ 5M




Gas Valve
Low Pressure Port
Hose Adapter IN
R
Hose Adapter OUT
Auto Lubvication Port
P
T
L
Grease Nipple

2) TNB-6M, "E" Series and "O" Series



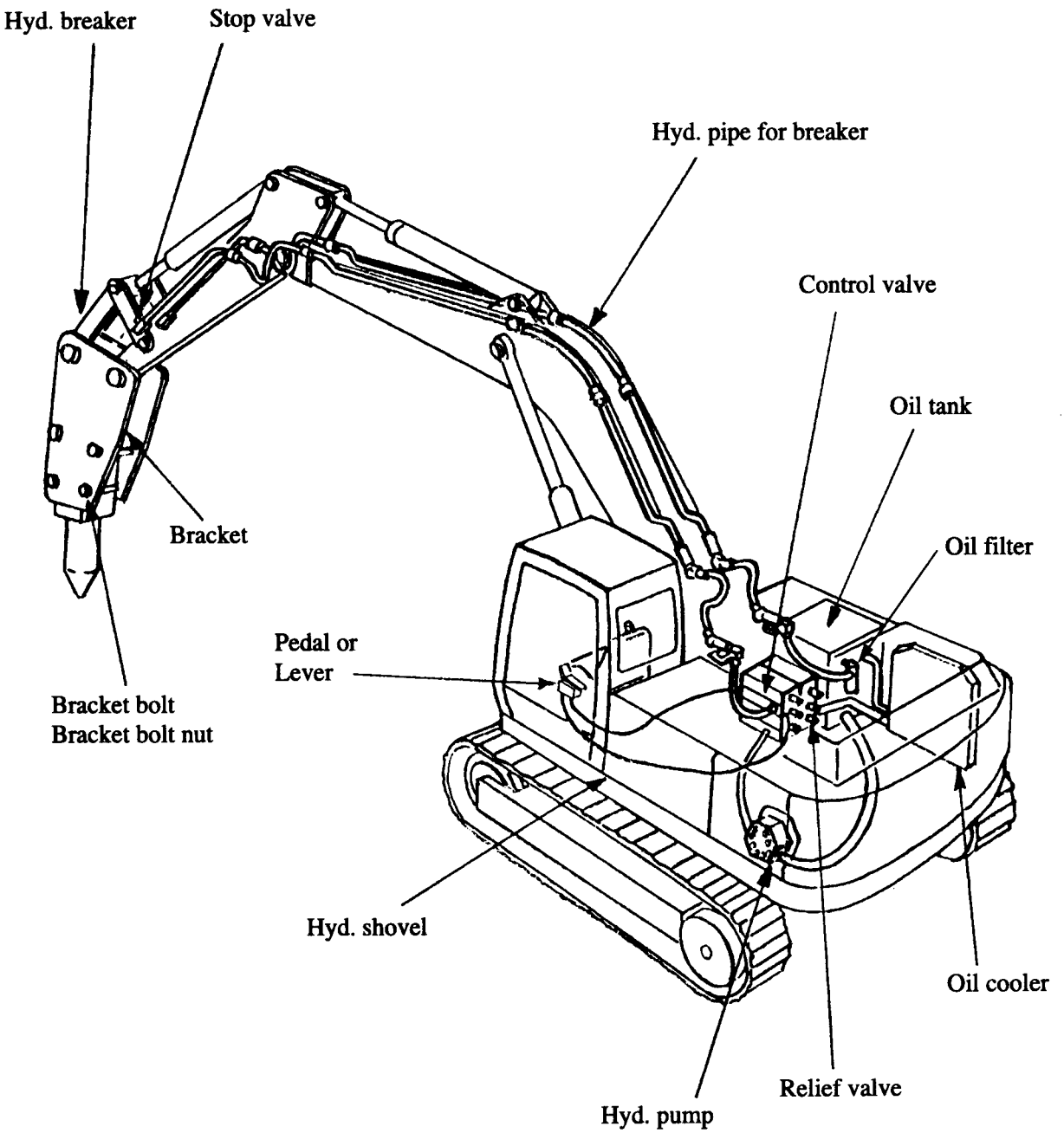

Gas Valve
Hose Adapter IN
Hose Adapter OUT
P
T
Auto Lubvication Port
L
R
Low Pressure Port
Grease Nipple

(9) PIPING FOR THE HYDRAULIC BREAKER

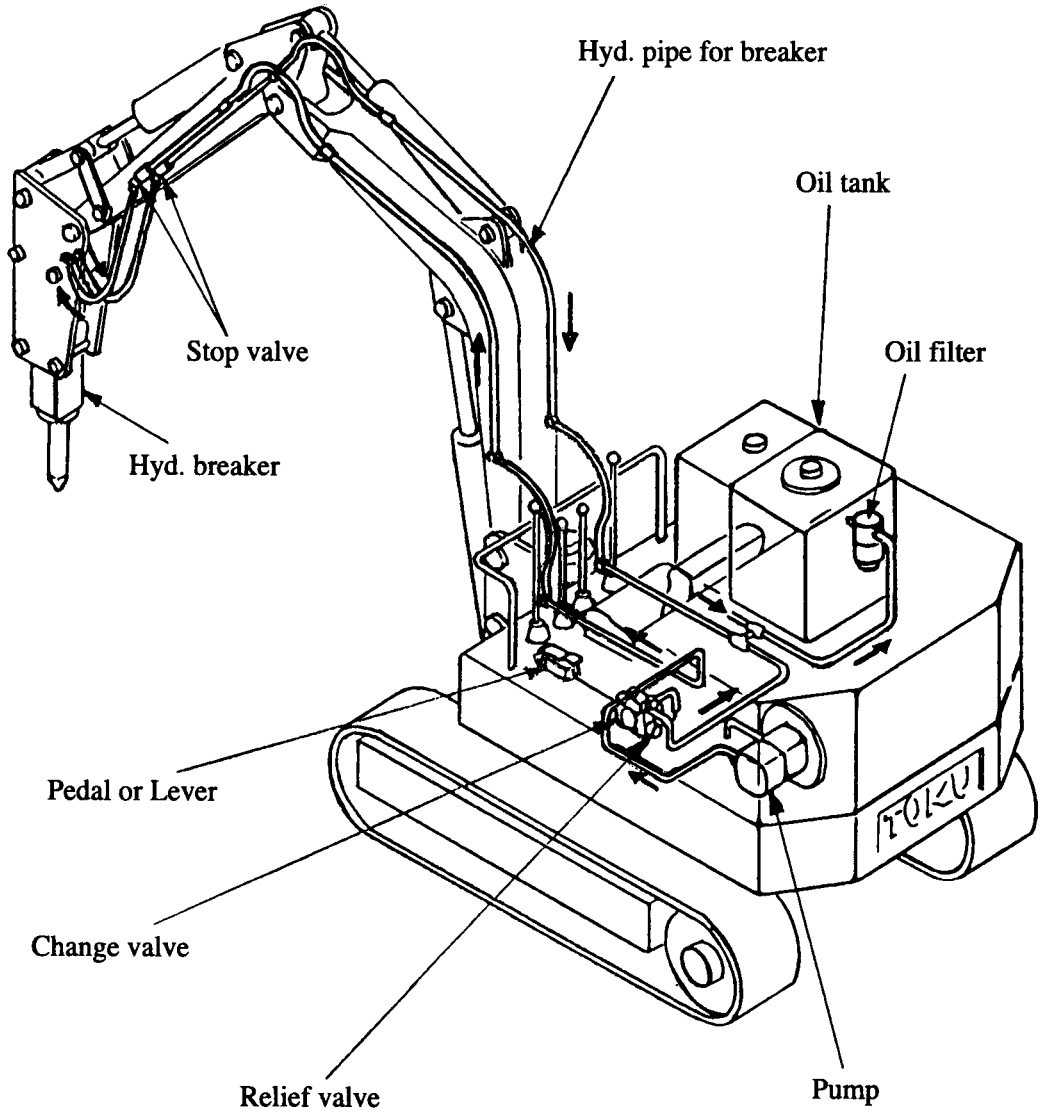
In order to install the hydraulic breaker, piping for the hydraulic breaker is required as shown in the diagram below.

Check whether piping for the hydraulic breaker is installed.

If piping for the hydraulic breaker is not installed, consult with our dealer.



● Mini Excavator



(10) INSTALLATION OF THE HYDRAULIC BREAKER ONTO THE EXCAVATOR

⚠ CAUTION !

When hammering the pin, metal chips fly off and may enter your eye causing serious injury. Always wear a hard hat, protective goggles, safety boots, gloves and other protective equipment during operation.

Work should be performed in a stable and flat area.

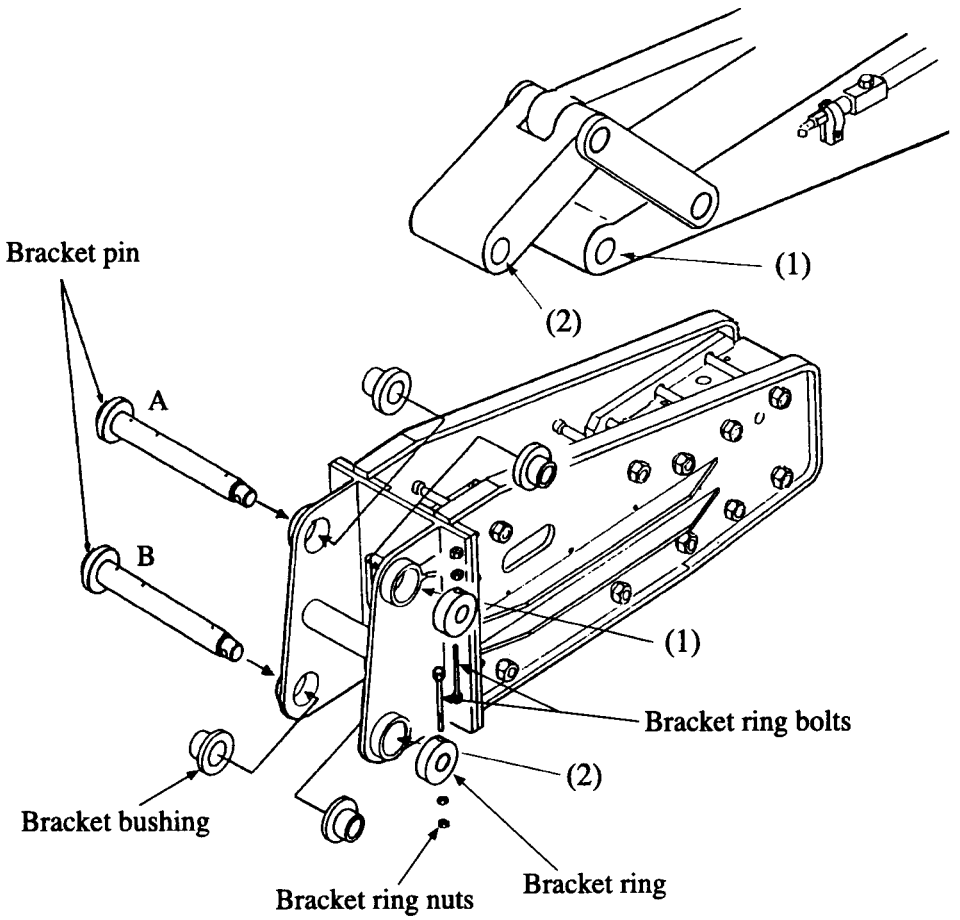
Read the manual for the hydraulic excavator carefully and remove the attachment which is installed on the excavator.

① Lie the hydraulic breaker in a stable and flat area.

② Fit the bracket bushing to the inside of the bracket.

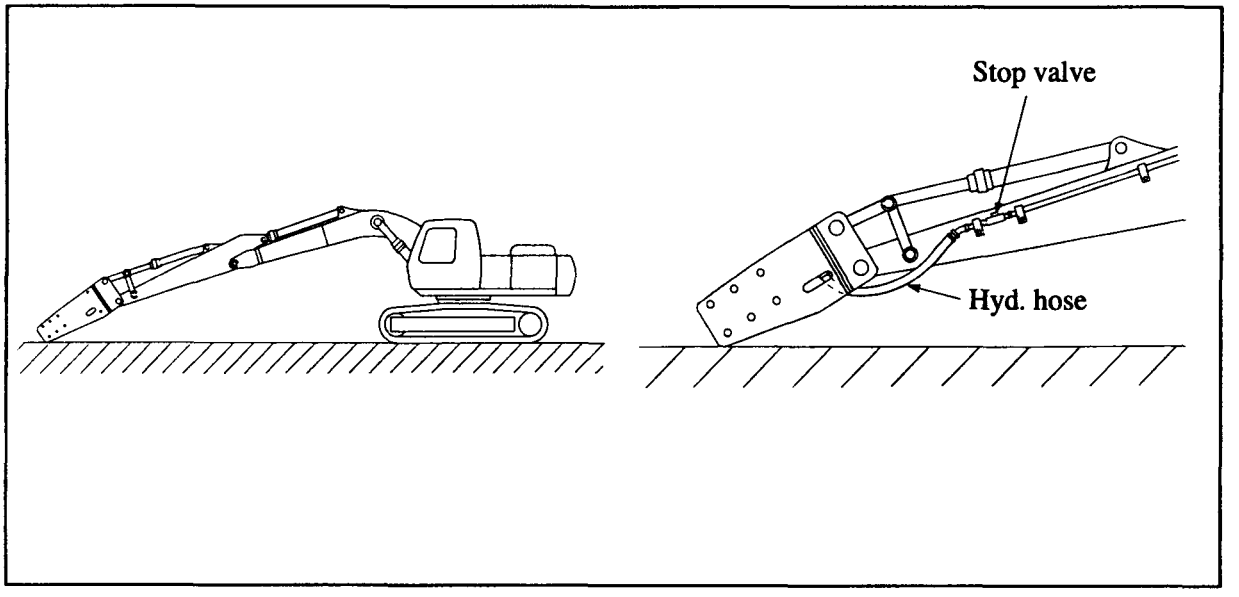
③ Position the arm in the hole (1), then place the link in the hole (2).
Apply grease to pins A & B and insert them into the holes.

④ Fit the nuts and bolts to hold the pins and apply grease to the pin.

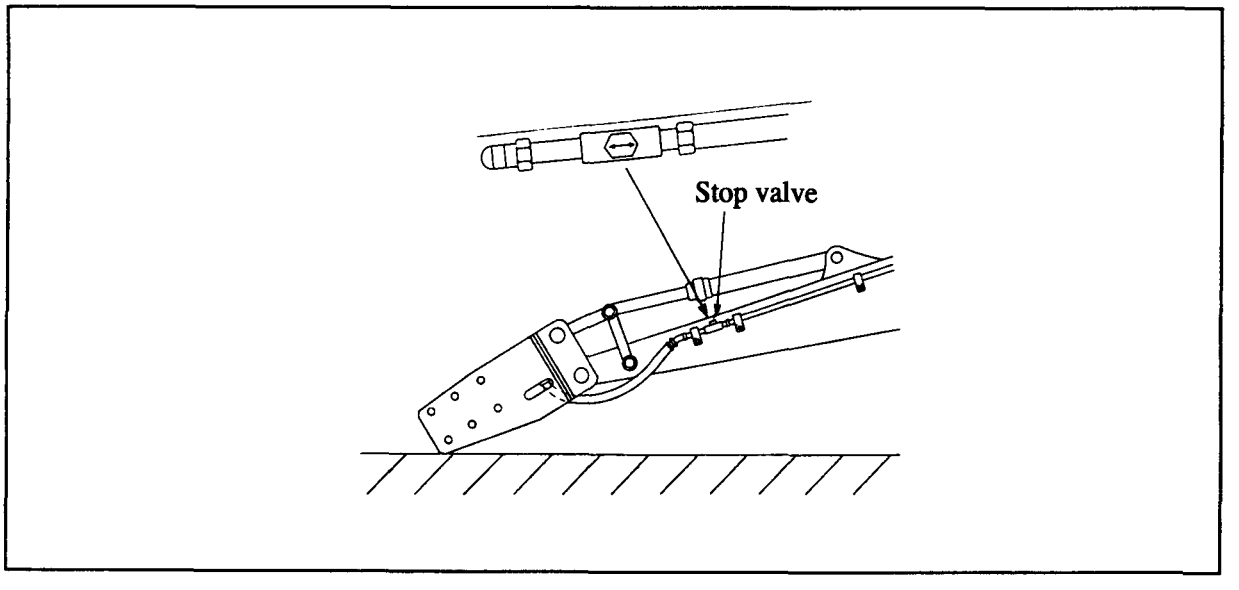


⑤ Extend the arm and boom and prepare for installation.

⑥ Attach the hydraulic hose to the piping on the arm of the breaker.

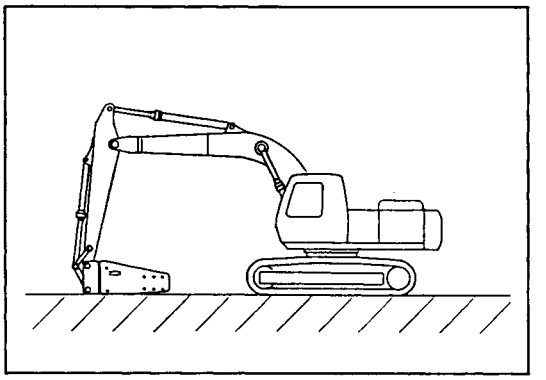


⑦ Open the stop valve.



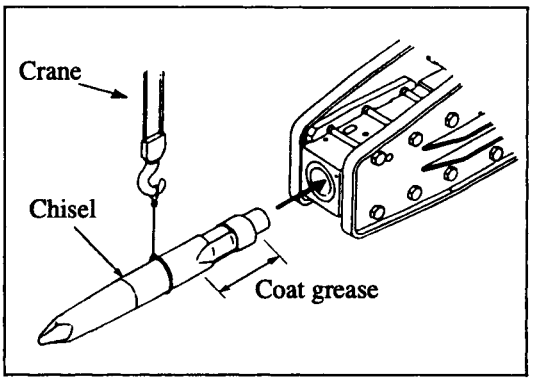
(11)INSTALLATION OF THE CHISEL

① Lie the hydraulic breaker on the ground.

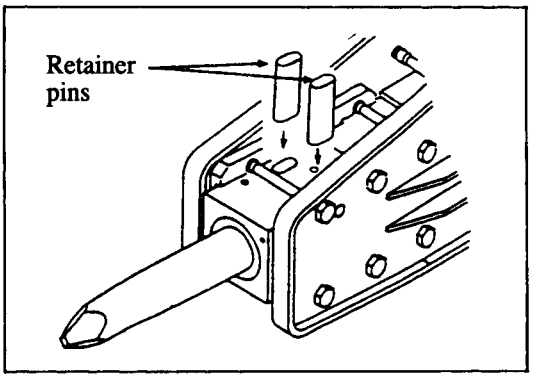


② Apply grease to the inside of the chisel bushing and chisel, and insert the chisel into the chisel holder.

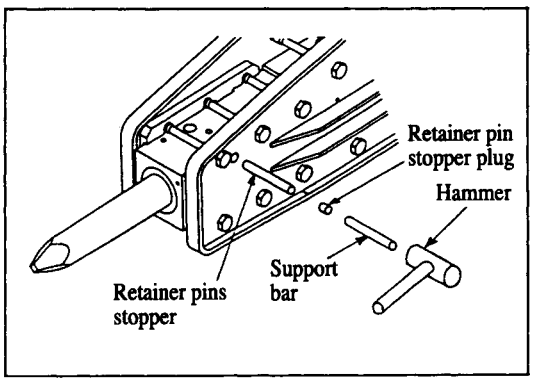
*Use a crane when installing the chisel for sizes above TNB-6E.



③ Insert the retainer pins.



④ Insert the retainer pin stopper and hammer in the retainer pin stopper plug.



(12)INSPECTION AND LUBRICATION PRIOR TO OPERATION

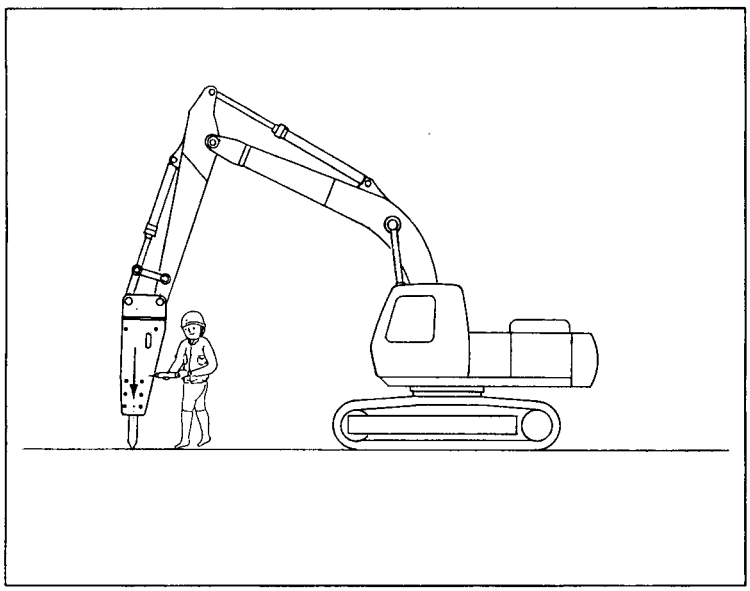
The hydraulic breaker is an attachment to the hydraulic excavator. Read the instruction manual for the hydraulic excavator carefully and carry out an inspection prior to operation. Also carry out the inspection and lubrication of the hydraulic breaker as specified below.

12-1 INSPECTION PRIOR TO OPERATION

Check for loose bolts and nuts and oil leakage from the hydraulic breaker bracket as well as the piping of the hydraulic breaker. Repair if required.

12-2 LUBRICATION OF CHISEL

Before greasing, firmly press the chisel into the chisel holder. Apply grease to the grease nipple on the chisel holder by using a grease gun every three hours.



MODEL	Number of timmes to push the grease gun
TNB-08M	2~3
TNB-1M	2~3
TNB-2M	2~3
TNB-3M	4~5
TNB-4M	4~5
TNB-5M	5~6
TNB-6E	5~6
TNB-6.5E	6~7
TNB-7E	6~7
TNB-100	7~8
TNB-14E	7~8
TNB-150	7~8
TNB-160	8~9
TNB-190	8~9
TNB-220	8~9
TNB-230	8~9
TNB-310	9~10
TNB-400	10~11

*Note:

Make sure the chisel is completely in contact with the piston and in the deep back position before greasing, otherwise, grease will stay between the chisel and the piston and it could cause damage to the hammer.

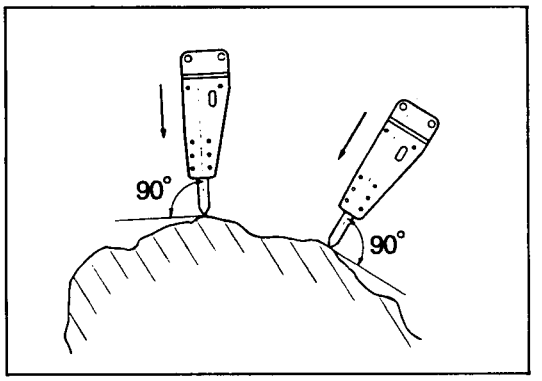
Before greasing, place chisel of the hydraulic breaker on the ground, lower the boom of the excavator and press the chisel into the chisel holder.

(13) OPERATING THE BREAKER

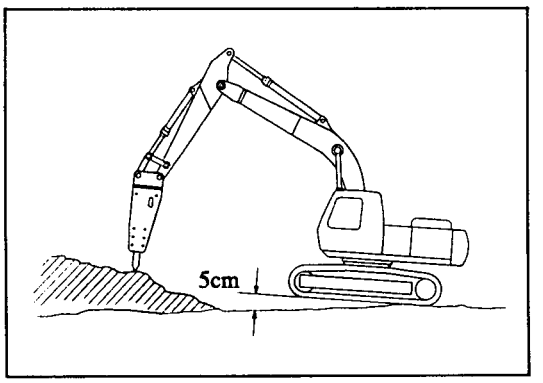
The hydraulic breaker is an attachment to the hydraulic excavator. Follow the instruction manual for the hydraulic excavator when starting the machine and position the throttle of the excavator at the mark for the hydraulic breaker. Then, follow the excavator manual for operation.

13-1 OPERATION OF HYDRAULIC BREAKER

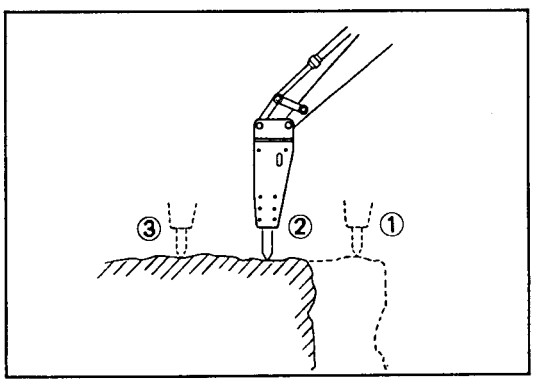
Place the breaker against the object at a 90 degree angle.



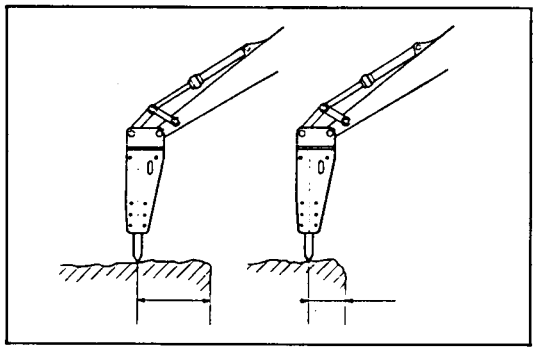
When operating the breaker, raise the chisel against the object and the front portion of the excavator about 5 cm from the ground.
Ensure that the front part of the excavator is not raised too high.



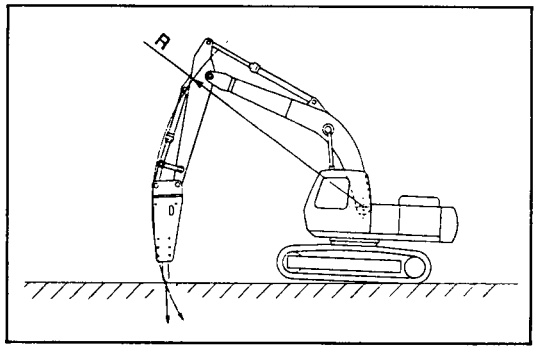
When breaking up an object which is large and hard, start where the rock can be easily broken.



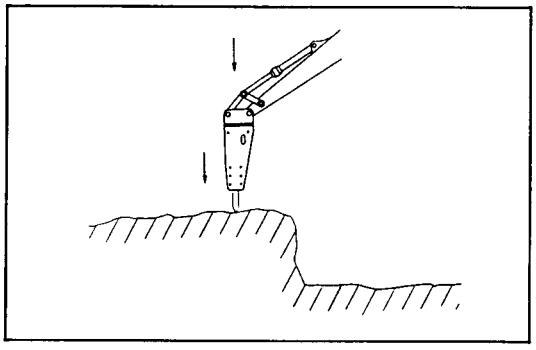
After striking against the same point continuously for 1 minute without the rock breaking, change to another area of the rock.



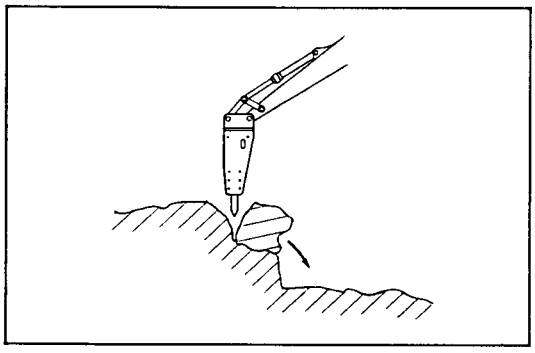
When the breaker is set to demolish an object, the impact angle changes slightly during operation. Constantly adjust the angle using the bucket cylinder of the excavator.



During impact, prevent blank blows by using the breaker properly.



As soon as the material has broken, immediately remove your foot from the operating pedal to stop striking the material.



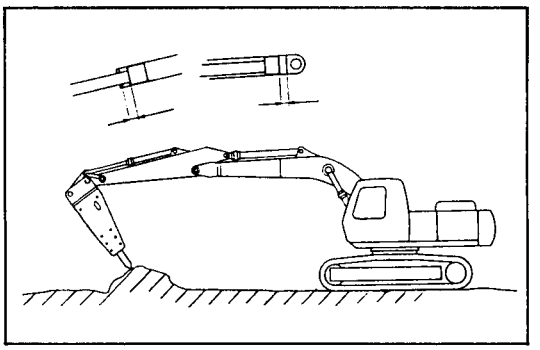
13-2 PRECAUTIONS DURING OPERATION

Do not use the breaker in the following manner since this will reduce the life of the breaker and may result in reduced safety.

CAUTION

Do not operate the breaker when the cylinder on the excavator is fully extended (stroke-end). It is essential to have about 5 cm of stroke in the cylinder.

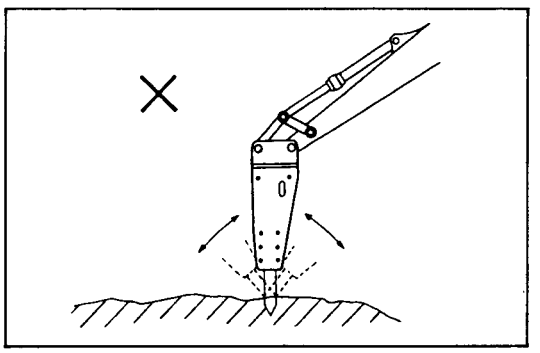
Ignoring this instruction will lead to the hydraulic cylinder being damaged.



CAUTION

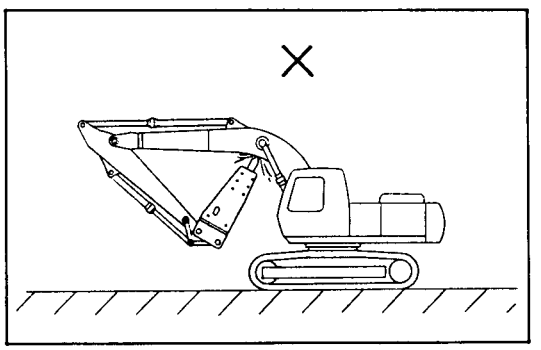
Do not jiggle the chisel when it has been hammered into the material.

This will lead to side bolt or chisel breaking or premature wearing of the chisel bushing.



CAUTION

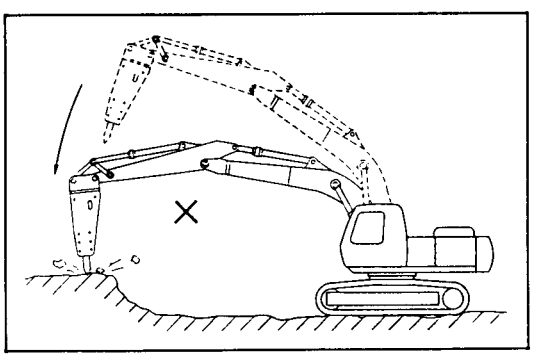
Make sure that you do not hit the boom with the chisel during operation.



CAUTION

Avoid hitting the material abruptly with the chisel.

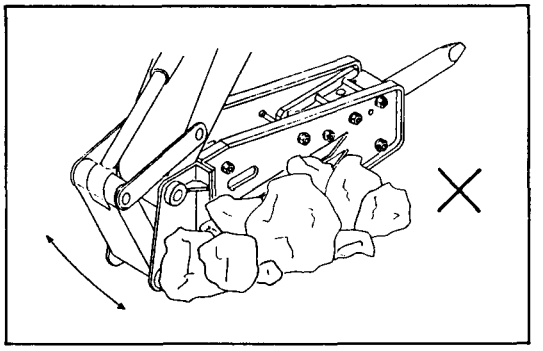
This can cause damage to the breaker, bracket, boom and swing parts on the excavator.



CAUTION

Do not use the breaker to move material.

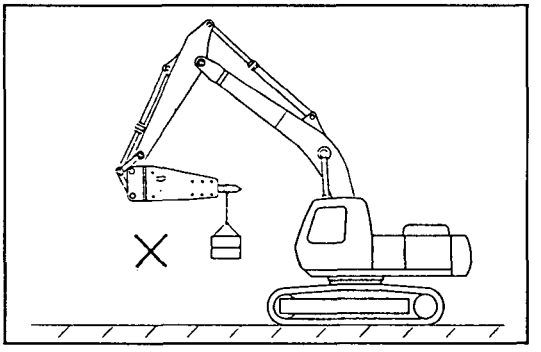
This can cause damage to the breaker, breaker bracket, excavator boom, arm and swing parts.



CAUTION

Do not lift materials with the breaker.

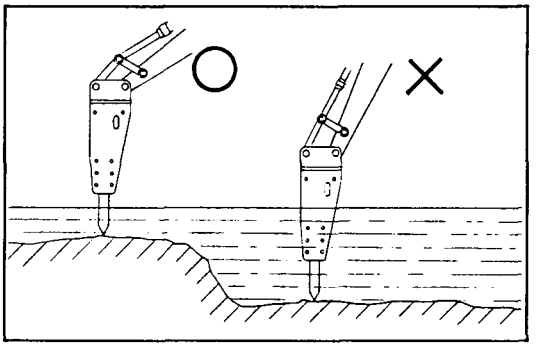
This will cause damage to the breaker and breaker bracket and is a dangerous maneuver.



CAUTION

Do not operate the breaker under water.
Do not put any part of the breaker into water except for the chisel.

This may cause damage to the hyd. breaker and excavator.



When using the breaker under water, refer to the instructions for underwater application on page 39 and 40.

(14)REPLACEMENT OF CHISEL

⚠ WARNING

When hitting a pin with a hammer, always wear safety goggles, hard hat, heavy-duty gloves, mask and safety boots due to the possibility of bits of material flying off which could enter your eye and cause serious injury.

⚠ WARNING

A crane should be used for handling heavy materials.

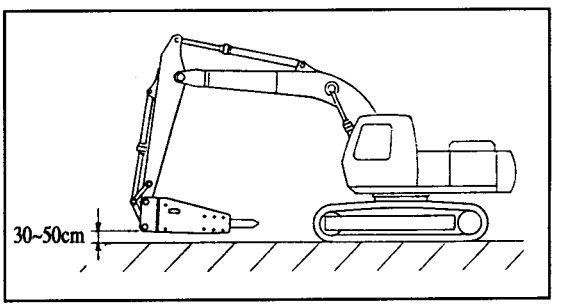
- Assembly and disassembly work should be performed in a flat area.
- A signal must be decided in advance for the work if more than two people are involved.
- Make sure that a crane is used for lifting if the material weight exceeds 25 kg.
- When dismantling heavy parts, support the part as it is removed.
- Do not work on materials that are being lifted by one means or another: put them on a work table.
- When assembling and disassembling the hydraulic breaker, make sure that the breaker is well balanced.
- Never remain under material which is being lifted by a crane.
  Keep away from material which is being lifted.

IMPORTANT

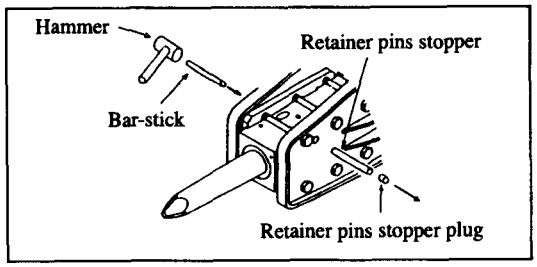
A licence is required to operate a crane. Do not operate the crane without a licence.

14-1 REMOVING THE CHISEL

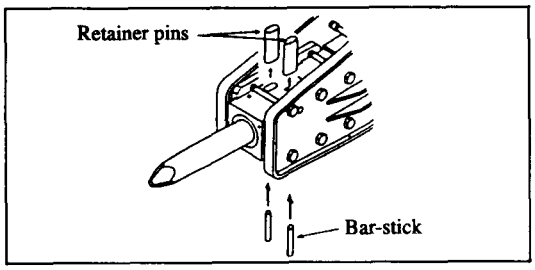
① Place the breaker in a horizontal position, about 30~50 cm above the ground.



② Remove the plug using a retainer pin detacher. This should be removed from the opposite side using a hammer.



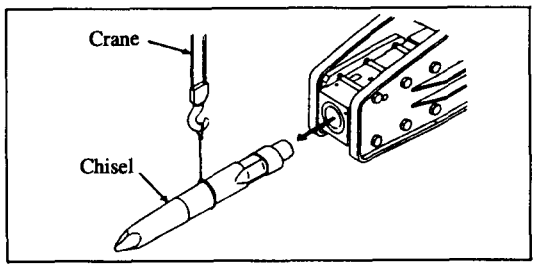
③ Push the retainer pin up from the bottom using a bar-stick.



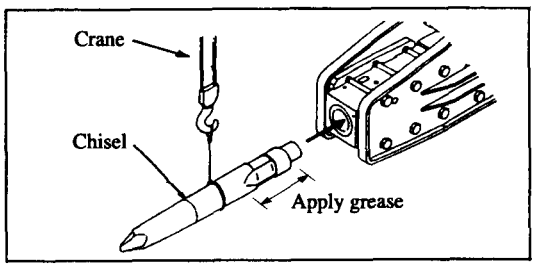
④ Place the breaker on the ground.

⑤ Remove the chisel from the chisel holder.

*NOTE : Use a crane when removing the chisel for sizes above TNB-6E

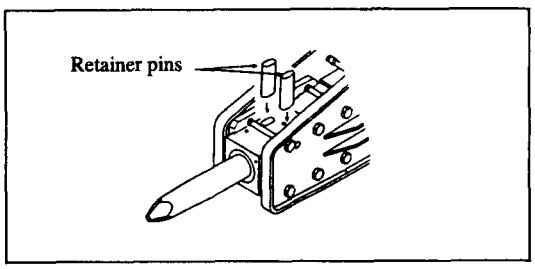


14-2 INSERTING THE CHISEL



① Place the breaker on the ground and stop the engine of the excavator.

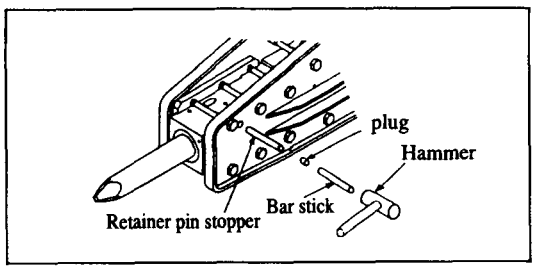
② Apply a sufficient amount of grease to the chisel and insert the chisel into the chisel holder.



*NOTE : Use a crane when fitting the chisel for sizes above TNB-6E

③ Fit the retainer pins.

④ Insert the retainer pin stopper and plug using the retainer pin stopper plug.



(15)DISMANTLING THE BREAKER

⚠ WARNING

When hitting a pin with a hammer, always wear safety goggles, hard hat, heavy-duty gloves, mask and safety boots due to the possibility of bits of material flying off which could enter your eye and cause serious injury.

⚠ WARNING

A crane should be used for handling heavy materials.

- Assembly and disassembly work should be performed in a flat area.
- A signal must be decided in advance for the work if more than two people are involved.
- Make sure that a crane is used for lifting if the material weight exceeds 25 kg.
- When dismantling heavy parts, support the part as it is removed.
- Do not work on materials that are being lifted by one means or another: put them on a work table.
- When assembling and disassembling the hydraulic breaker, make sure that the breaker is well balanced.
- Never remain under material which is being lifted by a crane.
- Keep away from material which is being lifted.

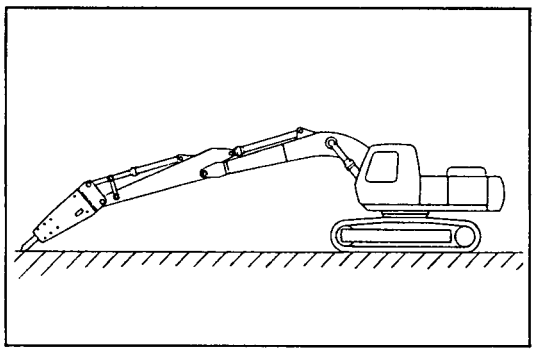
IMPORTANT:

A licence is required to operate a crane. Do not operate the crane without a licence.

⚠ WARNING

When removing the hyd. hose, do not remove it immediately after stopping the breaker. The hydraulic oil will still be hot and may cause burns. Remove the hose after the hydraulic oil has had time to cool. Do not remove the hydraulic hose immediately after stopping the breaker as on removing the hose, high pressure oil may squirt out. Stop the engine of the excavator and remove the excess pressure in the line before removing the hose.

① Place the breaker near the ground and locate the top of the arm where the stop valve can be reached.

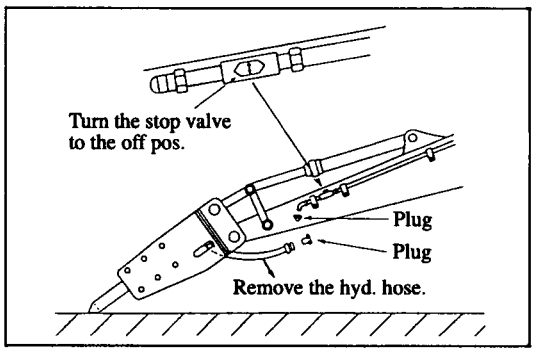


② Stop the excavator engine and remove the excess pressure in the hose.

③ Turn the stop valve to the off position.

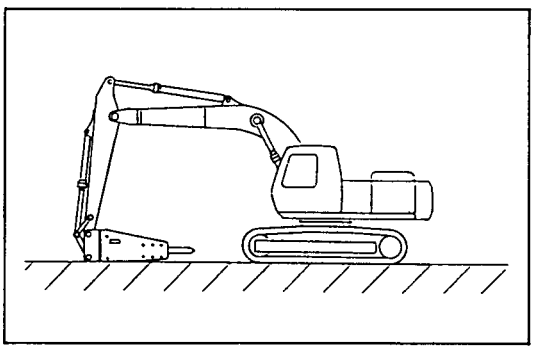
④ Remove the hyd. hose from the stop valve.

⑤ Do not allow any foreign matter to enter the hose and hose adapter.



⑥ Start the excavator engine.

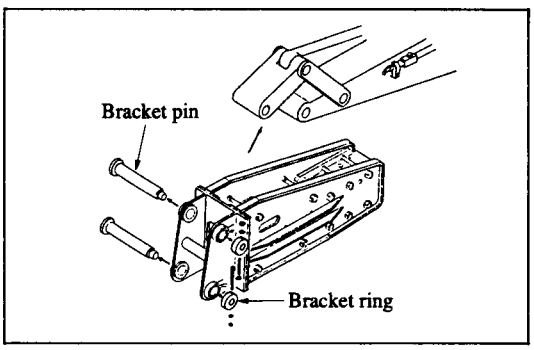
⑦ Operate the excavator and place the hydraulic breaker in a flat and stable place.



⑧ Remove the bolt and nut from the bracket pin.

⑨ Remove the 2 bracket pins.

⑩ Lift the arm and remove the hyd. breaker from the excavator.



(16)LONG-TERM STORAGE OF THE BREAKER

When the hydraulic breaker is not being used for a long period of time, proceed as follows:

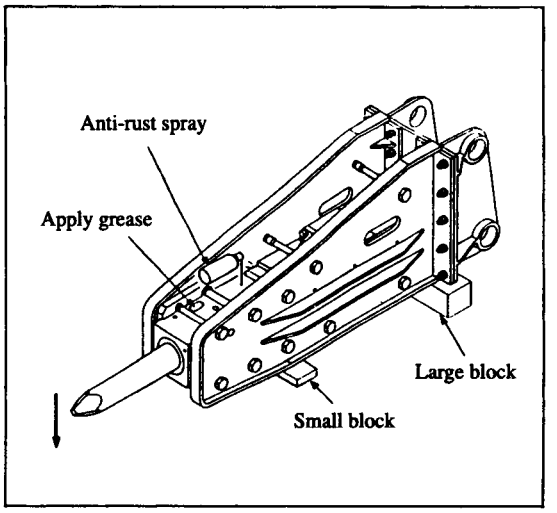
16.1 STORAGE FOR ONE MONTH

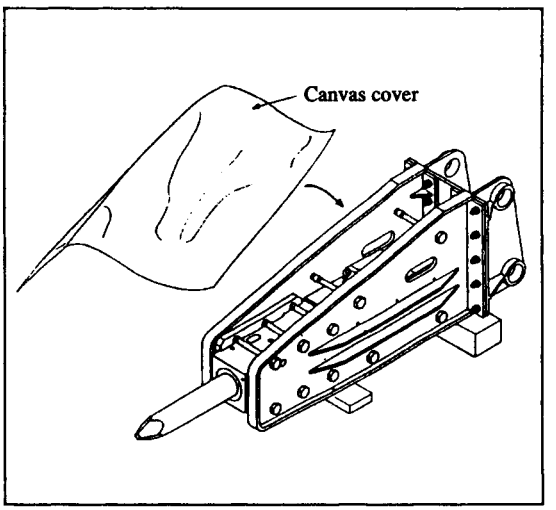
① Apply a sufficient amount of grease to the chisel and chisel bushing part of the retainer pin.

② Place the breaker on 2 pieces of wood.
Note : Lie the breaker down so that the cylinder side is higher than the chisel holder side.

③ Remove the hex plug from the chisel holder. Spray anti-rust spray onto the piston area and replace the hex plug in the chisel holder.

④ Place a canvas cover over the breaker for storage.





16.2 BREAKER STORAGE FOR MORE THAN ONE MONTH

① Place the breaker on 2 pieces of wood. Lie the breaker down so that the cylinder side is higher than the chisel holder side.

② Remove the chisel from the breaker.

③ Remove the nitrogen gas from the cylinder cover through the gas valve.

④ Loosen the cap plugs on the hose.

⑤ From the chisel holder end insert a rod into the piston and hit the stick lightly with a hammer to push it up into the piston.
Note : During this procedure release any excess N^2 from the cushion chamber.

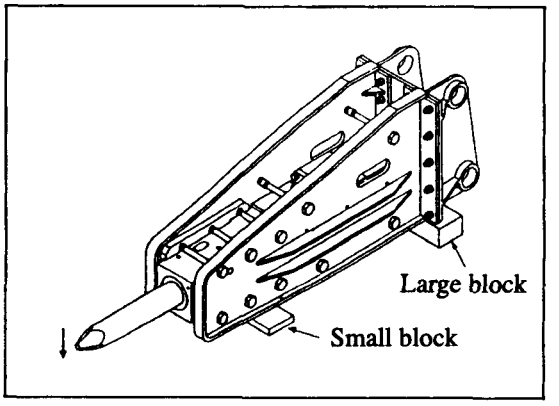
⑥ Mount blind plug to hose joint.

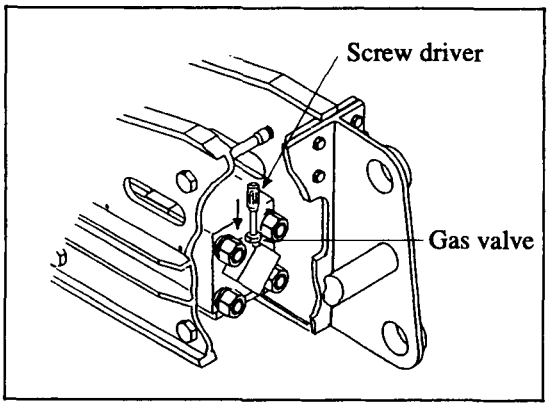
⑦ Apply a sufficient amount of grease to the inside of the chisel bushing and chisel and fit chisel into the chisel holder.

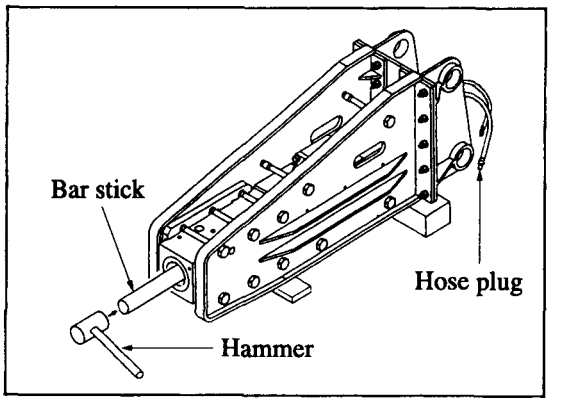
⑧ Apply grease to the retainer pin holes.

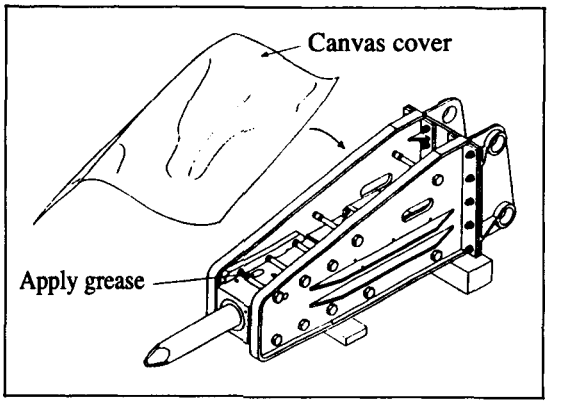
⑨ Use a canvas sheet to cover the breaker.

☆ After a long period of storage, if the N^2 gas was removed from the gas chamber, replace the gas when using the breaker again.









(17)MAINTENANCE AND INSPECTION

⚠ WARNING!

The TNB hydraulic breaker is an attachment for a hydraulically operated excavator. All maintenance and service personnel should carefully read the instruction manual for the hydraulically operated excavator before carrying out maintenance and inspection of the TNB hydraulic breaker.

⚠ WARNING!

The metal chips produced when hitting a pin into a hole using a hammer may fly off and enter your eye resulting in serious injury. Always wear a hard hat, protective goggles, safety boots, mask, gloves and other protective equipment during operation.

17-1 ADJUSTMENT AFTER THE FIRST 20 HOURS OF OPERATION AND AFTER EVERY 200 HOURS OF OPERATION.

Checking and retightening loose bolts and nuts;

Check for any loose bolts and nuts on the hydraulic breaker, bracket and piping. Retighten again on the basis of the torque table shown below if any looseness is found.

Torque Chart TORQUE: N·m(kg·m)

ITEM	TNB-08M	TNB-1M	TNB-2M	TNB-3M	TNB-4M	TNB-5M	TNB-6M
Bracket bolt nut	176 (18)	255 (26)	343 (35)	343 (35)	412 (42)	588 (60)	882 (90)
Port joint bolt nut	–	–	–	–	–	–	–
Hydraulic hose	49 (5)	59 (6)	59 (6)	59 (6)	59 (6)	59 (6)	118 (12)
Side bolt nut	216 (22)	294 (30)	441 (45)	441 (45)	539 (55)	637 (65)	980 (100)
Control valve box bolt	–	–	–	–	–	–	274 (28)
Control valve cap bolt	–	–	–	–	–	–	274 (28)
Hose adaptor	245 (25)	441 (45)	441 (45)	441 (45)	441 (45)	441 (45)	441 (45)
Gas valve body	83 (8.5)	83 (8.5)	83 (8.5)	83 (8.5)	83 (8.5)	83 (8.5)	83 (8.5)
Gas valve plug	12 (1.2)	12 (1.2)	12 (1.2)	12 (1.2)	12 (1.2)	12 (1.2)	12 (1.2)
Choke plug	98 (10)	98 (10)	98 (10)	98 (10)	98 (10)	108 (16)	196 (20)

Torque Chart TORQUE: N·m(kg·m)

ITEM	TNB-6E	TNB-6.5E	TNB-7E	TNB-14E
Bracket bolt nut	980 (100)	980 (100)	1372 (140)	1617 (165)
Port joint bolt nut	108 (11)	108 (11)	108 (11)	245 (25)
Hydraulic hose	118 (12)	118 (12)	118 (12)	137 (14)
Side bolt nut	980 (100)	1274 (130)	1960 (200)	2254 (230)
Control valve box bolt	441 (45)	441 (45)	441 (45)	735 (75)
Control valve cap bolt	441 (45)	441 (45)	441 (45)	735 (75)
Hose adaptor	539 (55)	539 (55)	539 (55)	588 (60)
Gas valve body	83 (8.5)	83 (8.5)	83 (8.5)	83 (8.5)
Gas valve plug	12 (1.2)	12 (1.2)	12 (1.2)	12 (1.2)
Choke plug	196 (20)	196 (20)	196 (20)	294 (30)

Torque Chart

TORQUE: N·m(kg·m)

ITEM	TNB-100	TNB-150	TNB-160	TNB-190	TNB-220	TNB-230	TNB-310	TNB-400
Bracket bolt nut	1372 (140)	1617 (165)	1617 (165)	1960 (200)	2744 (280)	2744 (280)	2744 (280)	4900 (500)
Port joint bolt nut	108 (11)	245 (25)	245 (25)	245 (25)	245 (25)	245 (25)	490 (50)	490 (50)
Hydraulic hose	118 (12)	137 (14)	137 (14)	137 (14)	137 (14)	137 (14)	167 (17)	167 (17)
Side bolt nut	1960 (200)	2254 (230)	2254 (230)	2842 (290)	3528 (360)	3528 (360)	3528 (360)	5684 (580)
Control valve box bolt	735 (75)	735 (75)	882 (90)	882 (90)	882 (90)	882 (90)	1274 (130)	1274 (130)
Control valve cap bolt	735 (75)	735 (75)	882 (90)	882 (90)	882 (90)	882 (90)	1274 (130)	1274 (130)
Hose adaptor	539 (55)	588 (60)	588 (60)	588 (60)	588 (60)	588 (60)	637 (65)	637 (65)
Gas valve body	83 (8.5)	83 (8.5)	83 (8.5)	83 (8.5)	83 (8.5)	83 (8.5)	83 (8.5)	83 (8.5)
Gas valve plug	12 (1.2)	12 (1.2)	12 (1.2)	12 (1.2)	12 (1.2)	12 (1.2)	12 (1.2)	12 (1.2)
Choke plug	294 (30)	294 (30)	294 (30)	294 (30)	294 (30)	294 (30)	392 (40)	392 (40)

17-2 MAINTENANCE AFTER EVERY 100 HOURS OF OPERATION

17-2-1 CHANGING THE OIL FILTER ELEMENT

* Where there is no filter in the piping of the hydraulically operated excavator, change the element of the oil filter in or near the hydraulic oil tank of the excavator after every 100 hours of operation.

⚠ WARNING

Various parts will be very hot after operation of the engine. Do not change the filter element immediately. Change the element after the hydraulic oil and various parts have cooled off.

17-2-2 INSPECTION AND FILLING OF NITROGEN GAS

⚠ WARNING

Do not use any other gas except nitrogen.

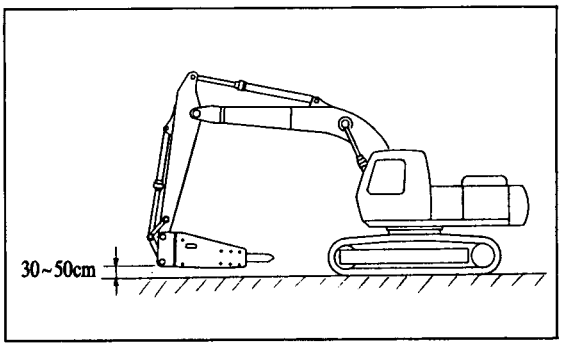
⚠ WARNING

When filling nitrogen gas, the chisel may suddenly come out. Therefore, keep away from the chisel when refilling with nitrogen gas.

Nitrogen gas is contained inside the cylinder cover of the hydraulic breaker.The impact force will decrease if the gas pressure reduces. Check the gas pressure after every 100 hours of operation. If the gas pressure is low, fill the cushion chamber with nitrogen gas according to the following procedures.

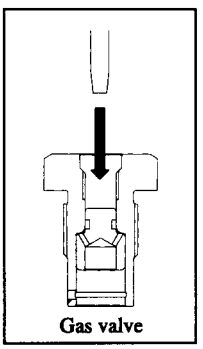
17-2-2-1 CHECKING THE GAS PRESSURE

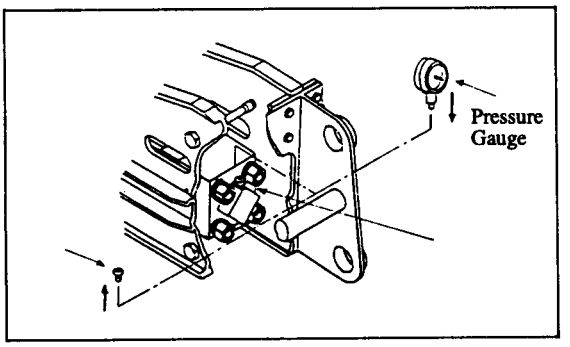
① Place the hydraulic breaker about 30~50 cm from the ground in a horizontal position for easy access.



② Remove the gas valve plug from the cylinder cover.

③ Insert a pressure gauge into the valve and measure the nitrogen gas pressure.





NITROGEN GAS PRESSURE CHART : PRESSURE: MPa (kgf/cm²)

MODEL	TNB-08M	TNB-1M	TNB-2M	TNB-3M	TNB-4M	TNB-5M	TNB-6M
NITROGEN GAS PRESSURE	0.8 (8)	0.8 (8)	0.8 (8)	0.8 (8)	0.8 (8)	0.8 (8)	1.0 (10)

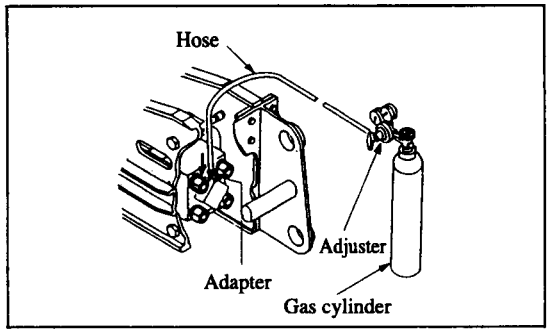
MODEL	TNB-6E	TNB-6.5E	TNB-7E	TNB-14E
NITROGEN GAS PRESSURE	0.8 (8)	0.8 (8)	0.8 (8)	0.8 (8)

MODEL	TNB-100	TNB-150	TNB-160	TNB-190	TNB-220	TNB-230	TNB-310	TNB-400
NITROGEN GAS PRESSURE	0.8 (8)	1.1 (11)	0.8 (8)	0.8 (8)	0.8 (8)	0.8 (8)	0.8 (8)	0.8 (8)

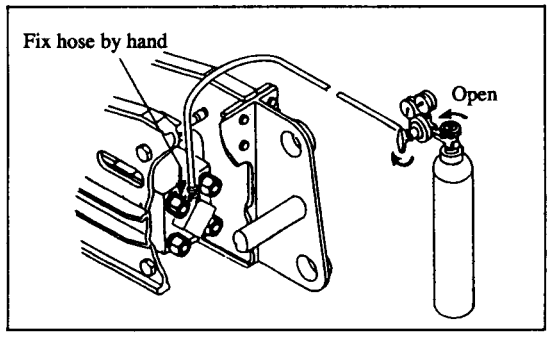
17-2-2-2 REFILLING THE NITROGEN GAS

① Fit a pressure regulator and hose onto the nitrogen gas cylinder.

② Fit a filling adapter to the end of the hose and insert the adapter into the gas valve.

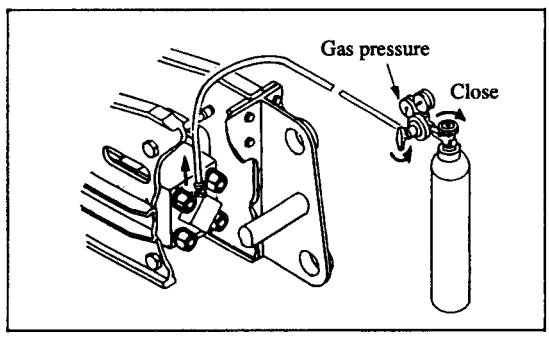


③ Open the regulator valve of the nitrogen gas cylinder.



④ Turn the handle of the pressure regulator while reading the pressure gauge of the regulator. Fill with nitrogen gas up to the pressure shown in the table.

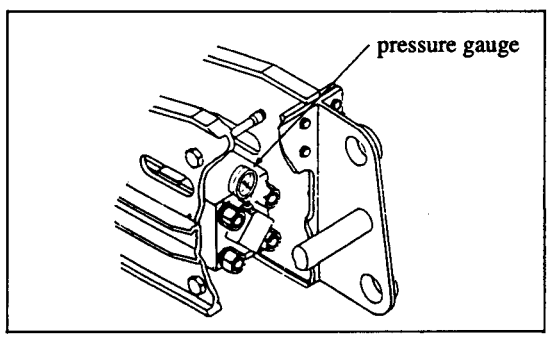
⑤ Stop turning the handle after the gas pressure reaches the correct value shown in the table and keep it there for about 10 seconds.



⑥ Close the regulator valve of the nitrogen gas cylinder.

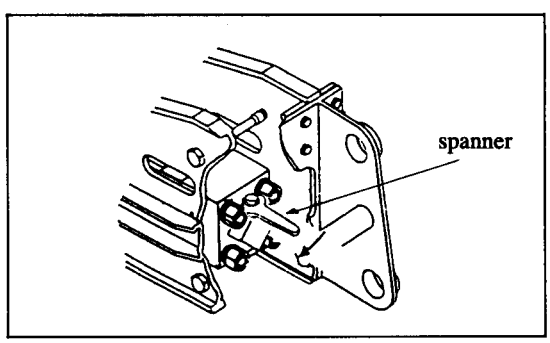
⑦ Remove the adapter inserted in the gas valve.

⑧ Insert a pressure gauge into the gas valve and check the gas pressure.



⑨ Adjust the gas pressure down to the correct value using the nitrogen gas pressure gauge if the gas pressure value is higher than the correct value shown in the table.

⑩ Fit the plug onto the gas valve and tighten it to the prescribed torque value.



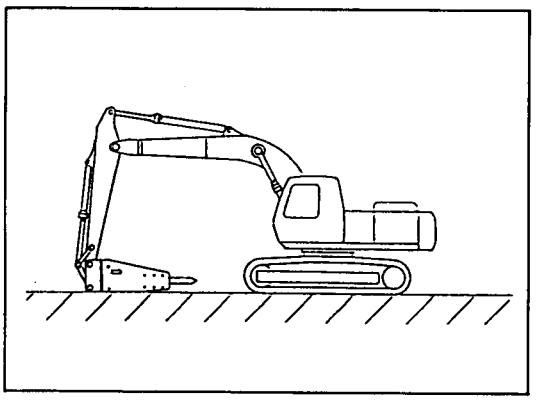
⑪ Remove the hose and the pressure regulator attached to the nitrogen gas cylinder and store them in the tool box.

parts for measuring the nitrogen gas pressure and for gas filling are available from TOKU or service stations specified TOKU in accordance with the parts numbers listed on page 50.

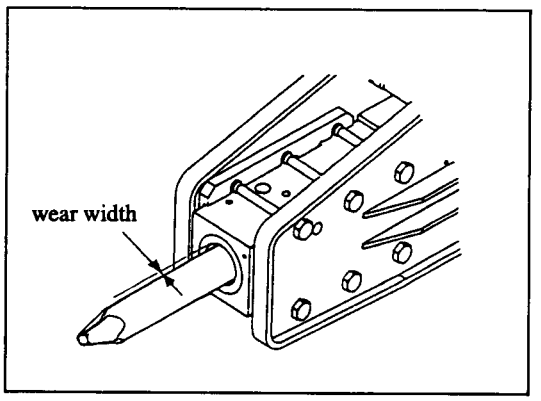
17-2-3 INSPECTION OF CHISEL BUSHING WEAR

Inspect the wear of the chisel bushing after every 100 hours of operation.

① Lie the hydraulic breaker on the ground horizontally.



② Measure the clearance between the Chisel bushing and chisel; Check whether the clearance is within the permitted values shown in the table below.



③ It is essential to change the chisel bushing if the clearance is not within the permitted values shown in the table below.
As regards to changing the chisel bushing, please contact TOKU or the service stations specified by TOKU.

MODEL	TNB-08M	TNB-1M	TNB-2M	TNB-3M	TNB-4M	TNB-5M	TNB-6M
WEAR WIDTH (mm)	4	4	4	4	4	4	4

MODEL	TNB-6E	TNB-6.5E	TNB-7E	TNB-14E
WEAR WIDTH (mm)	6	6	7	8

MODEL	TNB-100	TNB-150	TNB-160	TNB-190	TNB-220	TNB-230	TNB-310	TNB-400
WEAR WIDTH (mm)	7	8	8	8	10	10	10	12

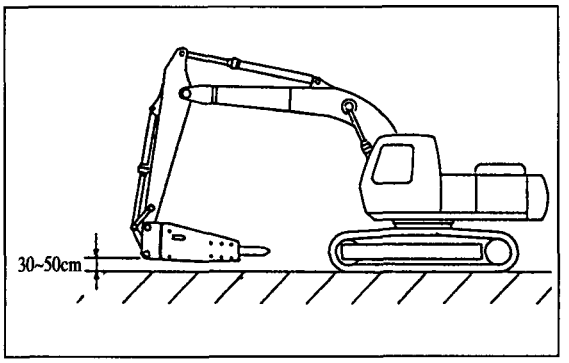
17-2-4 INSPECTION OF RETAINER PINS

Inspect the retainer pins after every 100 hours of use.

> **⚠ WARNING**
>
> When hammering the pin or repairing the retainer pin using a grinder, metal chips may fly off and enter your eye resulting in serious injury. Always wear a hard hat, protective goggles, safety boots, mask, gloves and other protective equipment during operation.

"M" Series and "E" Series

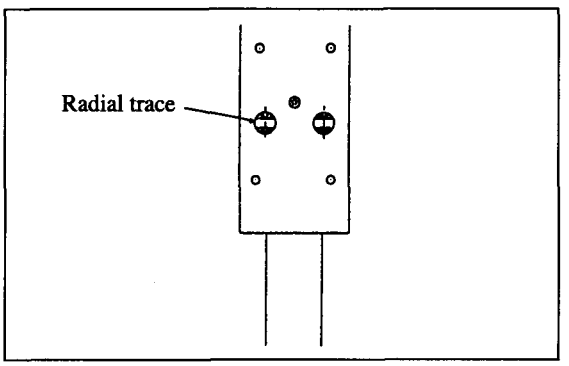
① Place the hydraulic breaker parallel to the ground in a horizontal position, about 30~50 cm above the ground.



② Check to see if there is a Radial Trace on the retainer pin.

③ A Radial Trace shows that everything is normal.

④ If a Radial Trace cannot be seen, this means the retainer pin is not rotating properly. If this is the case, remove the retainer pin stopper by using a retainer pin remover.

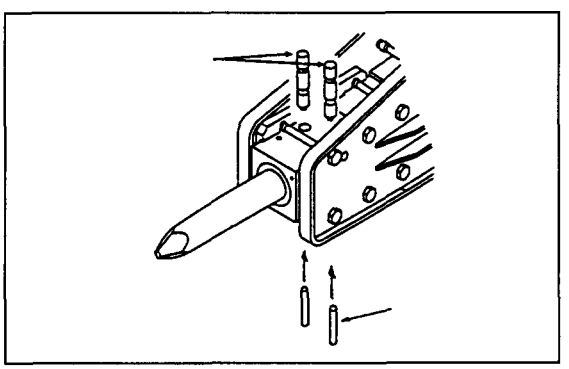


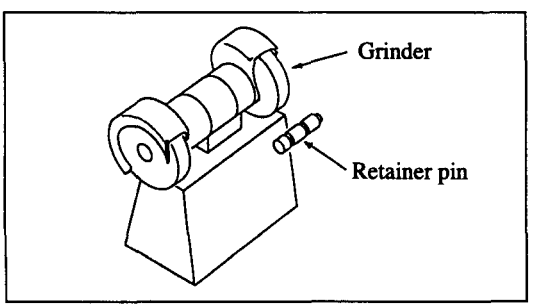
⑤ Remove the retainer pin by using a chisel pin remover from the lower side of the retainer pin.

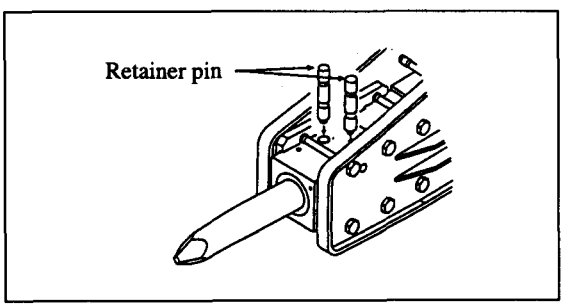
⑥ Remove any steel build-up from around the retainer pin by using a grinder.

⑦ Insert the retainer pin in to the retainer pin hole.

⑧ Insert the retainer pin stopper and assemble the retainer pin stopper plug.

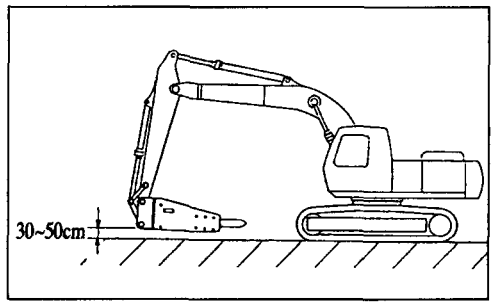






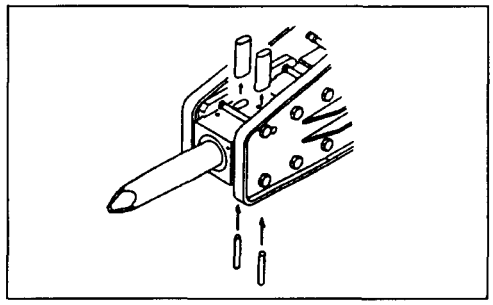
"O" Series

① Position the Hydraulic breaker horizontal to the ground about 30~50cm. Turn the Excavator engine off.



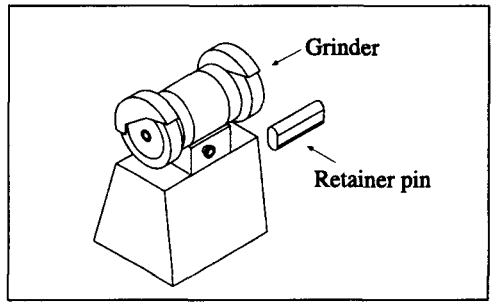
② After about 150-200 operating hours, inspect the retainer pins.

③ Remove the retainer pin stopper and retainer pin stopper plug from the opposite side by knocking it out using the chisel pin removal tool.

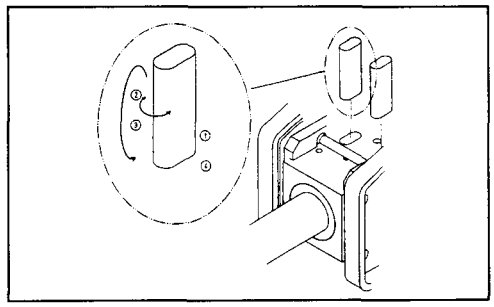


④ Remove the retainer pins by pushing up using the chisel pin removal tool.

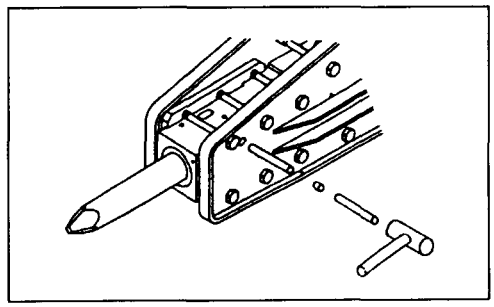
⑤ Repair the excess bulge buildup around the retainer pins using a grinder.



⑥ Insert retainer pins back into the retainer pin holes. The retainer pins have 4 surfaces that can be used so that the wear is equally distributed.



⑦ Insert the retainer pin stopper and plug back into the breaker.



17-3 MAINTENANCE AT EVERY 600 HOURS OF OPERATION

17-3-1 HYDRAULIC OIL CHANGE

⚠ WARNING

After operating the hydraulic excavator many parts are still hot. Do not change the hydraulic oil until the hydraulic oil and parts have cooled.

Read the Instruction Manual for the hydraulic excavator fully and change the oil for the excavator every 600 hours.

(18) UNDERWATER APPLICATION

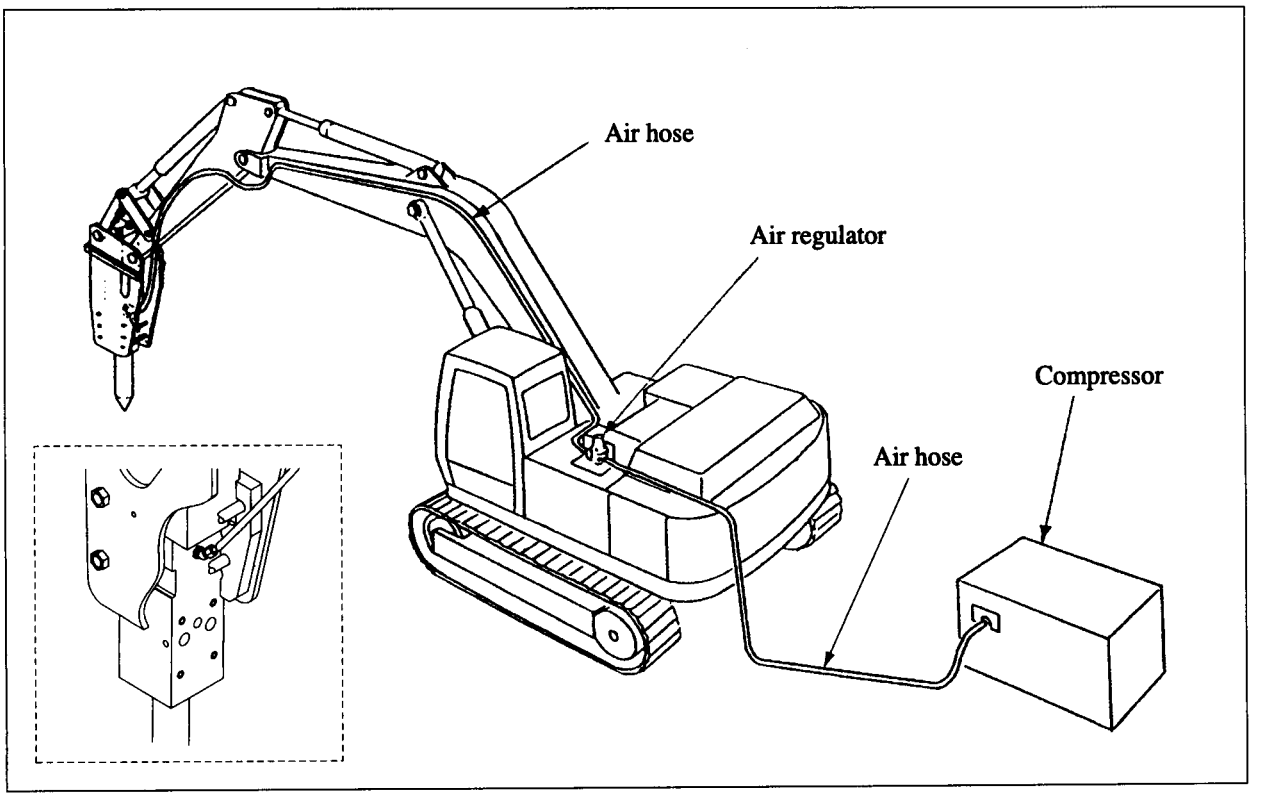
⚠ WARNING

A standard specification TNB hydraulic breaker cannot be operated underwater.

When using the hydraulic breaker underwater, use the underwater specifications.

① Prepare a 5-10 HP compressor.

② Arrange the following piping as shown in the diagram below.



Regarding the air supply piping, please consult TOKU or your nearest TOKU distributor.

③ Before operating the compressor, read the instruction manual for the compressor carefully.

④ Make sure the air pressure is in accordance with the following chart.

Depth in Water (m)	Air Pressure (MPa kg/cm2)
3	0.15 (1.5)
5	0.18 (1.8)
10	0.22 (2.3)

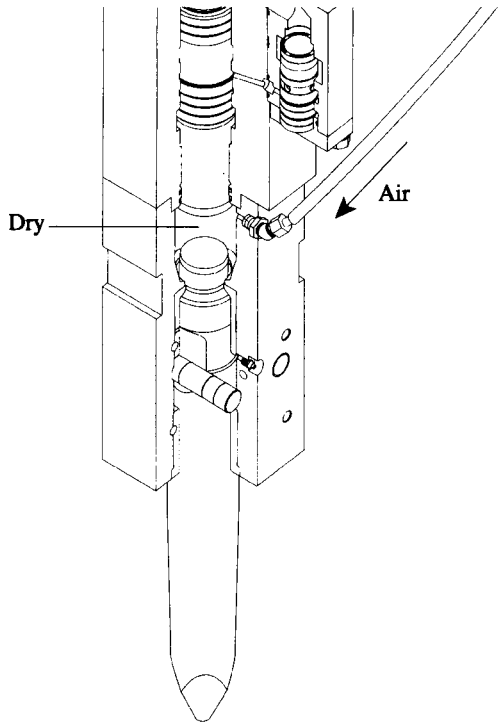
⑤ Supply air to the hydraulic breaker and start operation.
*Make sure air is being supplied to the hydraulic breaker before it is put into the water and continue until it is removed from the water.

⑥ After completing the underwater application, bring the breaker out of of the water onto land and then stop the compressor.

⑦ Continue to operate the breaker for about 10 minutes out of the water with supplying air, in order to dry the blow chamber.

⑧ Grease the chisel with the chisel pressed into the breaker.

Piping materials for underwater application are available from TOKU or service stations specified TOKU in accordance with the part numbers listed on page 46.

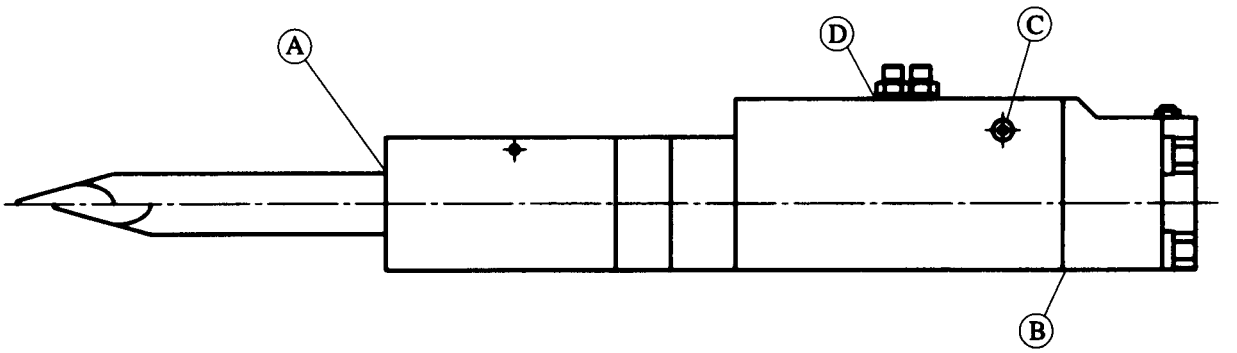


(19)TROUBLE SHOOTING GUIDE

19-1 OIL LEAKAGE

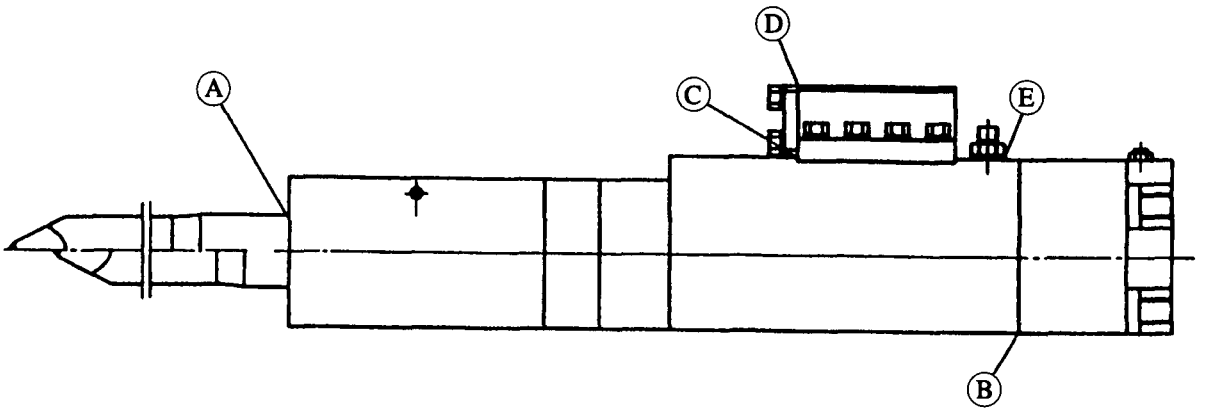
By referring to the following chart, when oil leakage occurs, investigate the cause and repair accordingly. After fitting the hydraulic breaker on the excavator, sometimes you may see oil ooze from the breaker. This is grease which is used in assembly and may continue for up to 5 hours, but will stop eventually. But please note, oil coming from section A (See sketch) between the chisel and chisel bushing, this oil is for lubrication purposes and is normal.

19-1-1 TNB-08M ~ 5M



Sym	Oil leakage from	Cause	Countermeasure
A	Opening between the chisel and chisel bushing	Wear or damage of oil seal	* replace oil seal
		Seizure of piston & cylinder	* Repair or replace
B	Between the cylinder cover and cylinder.	Wear or damage of o-ring or back up ring	* Replace o-ring and back up ring
		Loosening of the side bolt nut	Retighten to the specified torque
C	Between the cylinder and the Choke plug. (TNB-08M - 5M)	Wear or damage of the o-ring	* Replace o-ring
		Loosening of the choke plug	Retighten the choke plug to the specified torque
D	Between the cylinder and hose adapter.	Wear or damage of the o-ring	* Replace o-ring
		Loosening of the Hose adapter	Retighten the hose adapter to the specified torque

19-1-2 TNB-6M, "E" Series and "O" Series



Sym	Oil leakage from	Cause	Countermeasure
A	Opening between the chisel and chisel bushing.	Wear or damage of oil seal	* Replace oil seal
		Seizure of piston & cylinder	* Repair or replace
B	Between the cylinder cover and cylinder.	Wear or damage of o-ring or back up ring	* Replace o-ring and back up ring
		Loosening of the side bolt nut	Retighten to the specified torque
C	Between the cylinder and the control valve box.	Wear or damage of o-ring or back up ring	* Replace o-ring and back up ring
		Loosening of the bolts on the control valve box	Retighten bolts to the specified torque
D	Between the control valve box and the control valve cap.	Wear or damage of o-ring or back up ring	* Replace o-ring and back up ring
		Loosening of the bolts on the control valve cap	Retighten the bolts for the control valve cap to the specified torque.
E	Between the cylinder and hose adapter.	Wear or damage of o-ring	* Replace o-ring
		Loosening of the Hose adapter	Retighten the hose adapter to the specified torque.

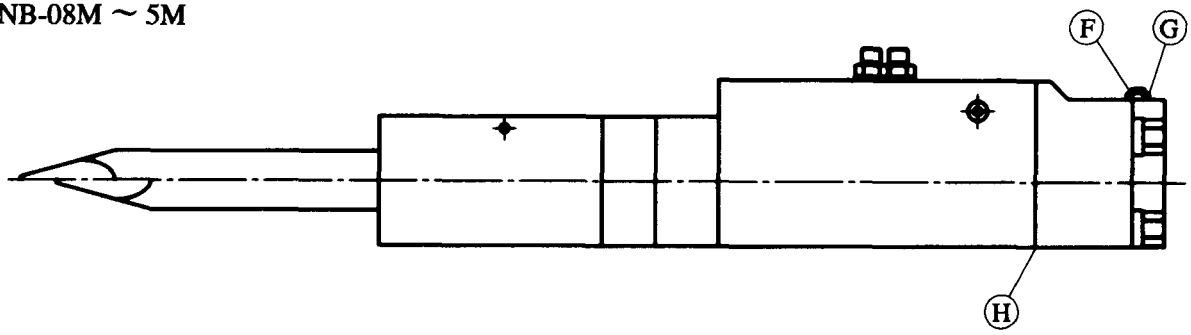
Note: "*"It is necessary to disassemble the hydraulic breaker in order to repair.
Please contact TOKU or your nearest TOKU distributor.

19-2 GAS LEAKAGE

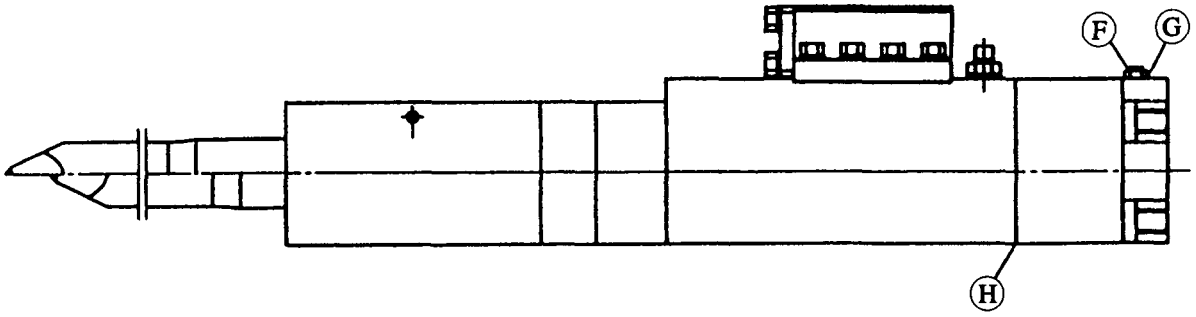
It is abnormal for the nitrogen gas to leak more than 3kg/cm² per day. Check the areas as shown in the chart for repairs.

*In this case, it is necessary to disassemble the breaker in order to perform repairs.
Please contact TOKU or an authorized TOKU distributor or dealer.

TNB-08M ~ 5M



TNB-6M, "E" Series and "O" Series



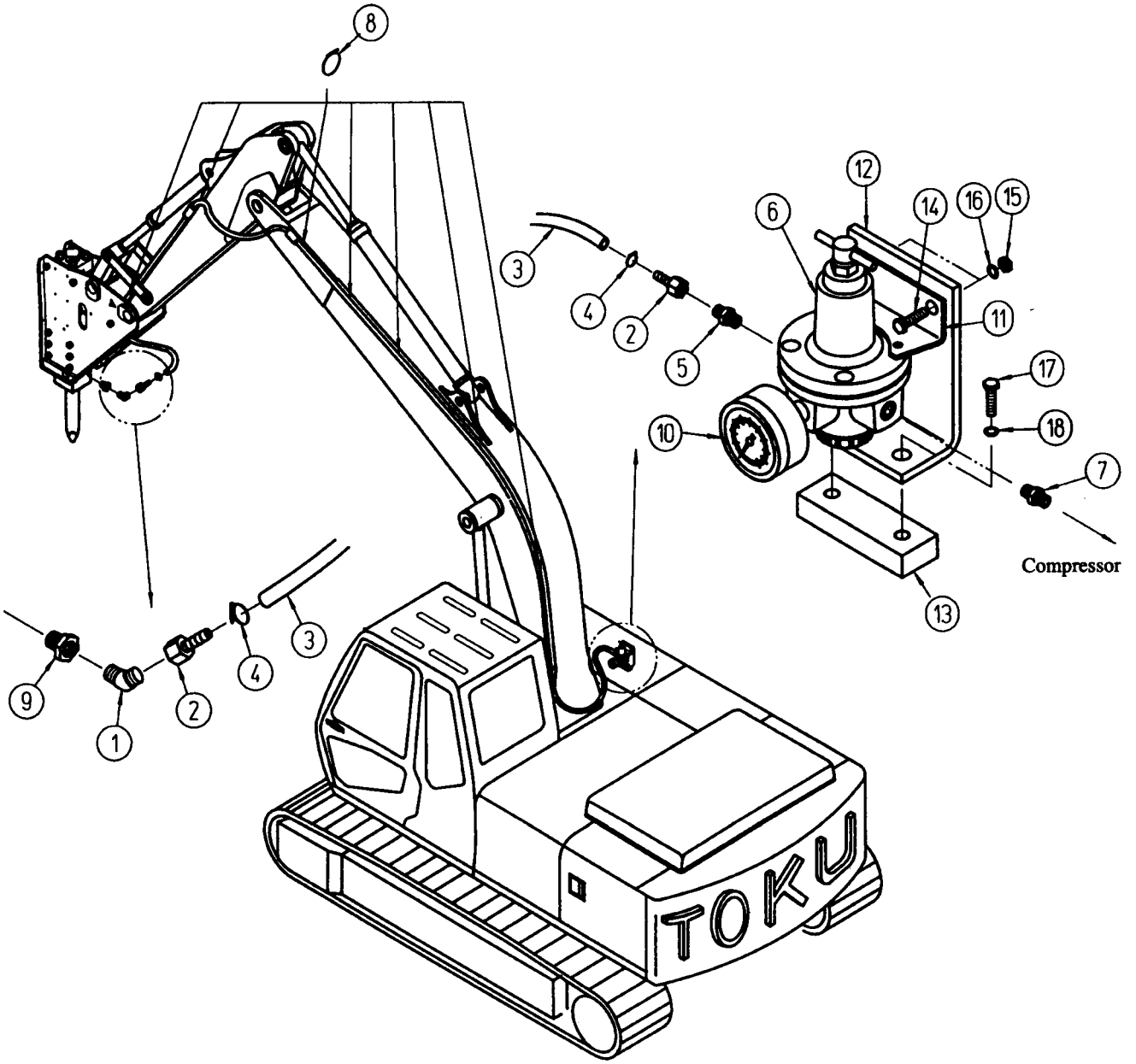
	AREA OF GAS LEAKAGE	CAUSE	COUNTERMEASURE
F	Gas leakage from the gas valve plug.	Wear or damage of o-ring	Replace o-ring
		Damage of the gas valve piston	Replace gas valve
G	Gas leakage from the gas valve body.	Wear or damage of o-ring	Replace o-ring
H	Gas leakage from between the cylinder and cylinder cover.	Wear or damage of o-ring	Replace o-ring
I	If gas leakage cannot be found from the above areas.	Wear or damage of the gas seal.	Replace gas seal
		Wear or damage of o-ring	Replace o-ring
		Seizure of piston and packing bushing	Replace or repair.

19-3 POOR OPERATION OF BREAKER

CONDITION	CAUSE	COUNTERMEASURE
Does not Impact.	Temperature of the hydraulic oil is too low.	Warm up the hydraulic excavator.
	The nitrogen gas pressure in the cushion chamber is too high.	Adjust the nitrogen gas to the correct pressure.
	Stop valve is closed.	Open the stop valve.
	Pressure setting for the relief valve is too low.	* Set the relief valve to the correct pressure setting.
	Poor performance of the hydraulic pump.	* Have the hydraulic excavator manufacturer to check the pump performance. If the performance is poor, repair or replace.
Erratic Blows (At the beginning breaker Operates normally but later blows are erratic).	Seizure of control valve	* Repair or replace control valve
	Seizure of piston and cylinder	* Repair or replace piston, cylinder
	Relief valve for the excavator is set too low.	* Set the relief valve to the correct pressure setting.
	Poor performance of the hydraulic pump.	* Have the hydraulic excavator manufacturer to check the pump performance. If the performance is poor, repair or replace.
	Lack of down pressure onto the chisel	Operate the arm and bucket so that pressure is applied to the chisel .
	Nitrogen gas pressure in the cylinder cover is too high.	Adjust the nitrogen gas to the correct setting.
Lack of Power	Nitrogen gas pressure in the cylinder cover is too low.	Adjust the nitrogen gas to the correct setting.
Lack of Blows	Nitrogen gas pressure in the cylinder cover is too high.	Adjust the nitrogen gas to the correct setting.
	Lack of down pressure onto the chisel	Operate the arm and bucket so that pressure is applied to the chisel .
	Pressure setting for the relief valve if the excavator is too low.	* Adjust the relief valve to the correct setting.
	Poor performance of the hydraulic pump on the excavator.	* Have the hydraulic excavator manufacturer to check the pump performance. If the performance is poor, repair or replace.
	Back pressure developing due to blocked hydraulic piping.	* Investigate the blocked area of the piping and repair or replace the piping.

Note: "*"It is necessary to disassemble the hydraulic breaker in order to repair.
Please contact TOKU or your nearest TOKU Dealer.

(20) PARTS LIST FOR UNDER WATER APPLICATION



Under Water Application List For Piping Material

		"M" Series and "E" Series TNB-100, 150, 160, 190, 220, 230		TNB-310, 400	
Sym	Part Code	Description	Q'ty	Description	Q'ty
1	45° Elbow	18−20−13−309	1	18−20−13−412	1
2	Hose Nipple	13−50−09−009	2	13−50−09−012	2
3	Air Hose	13−72−02−013	1	13−72−02−016	1
4	ABA Hose Clip	13−75−06−115	2	13−75−06−115	2
5	Hose Adaptor	18−20−04−309	1	18−20−04−412	1
6	Deduction Valve	13−55−06−001	1	13−55−06−005	1
7	Nipple	18−21−26−310	1	18−21−26−415	1
8	ABA Hose Clip	13−75−06−144	7	13−75−06−144	7
9	Bushing	18−21−30−410	1	−	
10	Deduction Valve Gauge	13−75−06−030	1	13−75−06−030	1
11	Wall Bracket	13−75−06−021	1	13−75−06−033	1
12	Deduction Valve Bracket	41−51−47−B40	1	41−51−47−B40	1
13	Deduction Valve Bracket Base	41−51−47−B50	1	41−51−47−B50	1
14	Hex Bolt	13−16−08−020	2	13−16−08−020	2
15	Hex Nut	13−44−01−008	2	13−44−01−008	2
16	Spring Washer	13−13−01−008	2	13−13−01−008	2
17	High Tension Bolt	13−16−60−020	2	13−16−60−020	2
18	Spring Washer	13−13−01−010	2	13−13−01−010	2

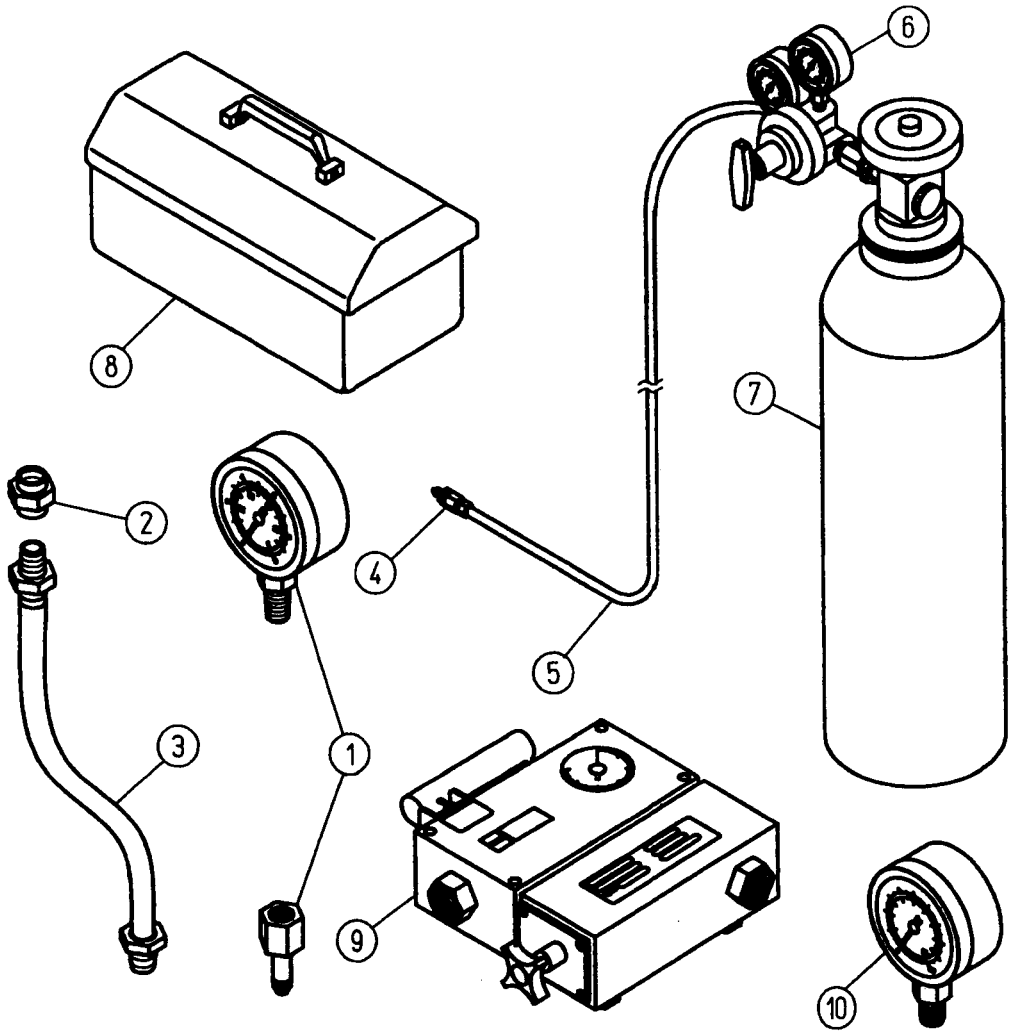
(21) ACCESSORY TOOLS

No.	Model / Description	TNB－08M		TNB－1M		TNB－2M		TNB－3M		TNB－4M		TNB－5M		TNB－6M	
		Size	Qt	Size	Qt	Size	Qt	Size	Qt	Size	Qt	Size	Qt	Size	Qt
1	Spanner	22mm	1	27mm	1	27mm	1	27mm	1	27mm	1	27mm	1	32mm	1
2	Spanner	24mm		32mm	1	30mm	1	30mm	1	32mm	1	32mm	1	36mm	1
3	Spanner	27mm	1	－		32mm	1	32mm	1	－		36mm	1	－	
4	Impact Spanner	－		－		－		－		－		－		41mm	1
5	Wrench	－		－		－		－		－		－		22mm	1
6	Monkey Wrench	200mm	1	200mm	1	200mm	1	200mm	1	200mm	1	200mm	1	200mm	1
7	Hammer	#1	1	#1	1	#1	1	#1	1	#1	1	#1	1	#1	1
8	Hexagon Wrench	8mm	1	8mm	1	8mm	1	8mm	1	8mm	1	10mm	1	－	
9	Eyebolt	M8	2	M8	2	M8	2	M12	2	M12	2	M12	2	M12	2
10	Eyebolt	－		－		－		M8	1	M8	1	－		－	
11	Hex Bolt	－		－		－		－		－		－		M8	2
12	Chisel pin remover	7mm	1	7mm	1	9.5mm	1	9.5mm	1	9.5mm	1	9.5mm	1	9.5mm	1
13	Hose plug	PF3/8	2	PF1/2	2	PF1/2	2	PF1/2	2	PF1/2	2	PF1/2	2	PF3/4	2
14	Adapter plug	PF3/8	2	PF1/2	2	PF1/2	2	PF1/2	2	PF1/2	2	PF1/2	2	PF3/4	2
15	Retainer pin Stopper Plug	－		－		－		－		－			1		1
16	Seal Tape		1		1		1		1		1		1		1
17	Tool Box		1		1		1		1		1		1		1

No.	Model / Description	TNB－6E		TNB－6.5E		TNB－7E		TNB－14E	
		Size	Q'ty	Size	Q'ty	Size	Q'ty	Size	Q'ty
1	Spanner	36mm	1	19mm	1	19mm	1	24mm	1
2	Spanner	41mm	1	36mm	1	36mm	1	41mm	1
3	Spanner	－		41mm	1	41mm	1	50mm	1
4	Impact Spanner	41mm	1	46mm	1	55mm	1	60mm	1
5	Impact Spanner	46mm	1	－		－		70mm	1
6	Ring Spanner	27mm	1	27mm	1	27mm	1	32mm	1
7	Monkey Wrench	200mm	1	200mm	1	250mm	1	250mm	1
8	Hammer	#1	1	#1	1	#2	1	#2	1
9	Eye Bolt	M12	2	M20	2	M20	2	M20	2
10	Hex Bolt	M8	2	M8	2	M8	2	M10	2
11	Chisel Pin Remover	9.5mm	1	9.5mm	1	15.8mm	1	15.8mm	1
12	Hose Plug	PF3／4	2	PF3／4	2	PF3／4	2	PF1	2
13	Adapter Plug	PF3／4	2	PF3／4	2	PF3／4	2	PF1	2
14	Retainer Pin Stopper Plug		1		1		1		1
15	Seal Tape		1		1		1		1
16	Tool Box		1		1		1		1

No.	Model / Description	TNB－100		TNB－150		TNB－160		TNB－190		TNB－220·230		TNB－310		TNB－400	
		Size	Q'ty	Size	Q'ty	Size	Q'ty	Size	Q'ty	Size	Q'ty	Size	Q'ty	Size	Q'ty
1	Spanner	19mm	1	24mm	1	24mm	1	24mm	1	30mm	1	36mm	1	36mm	1
2	Spanner	36mm	1	41mm	1	41mm	1	41mm	1	41mm	1	50mm	1	50mm	1
3	Spanner	41mm	1	50mm	1	50mm	1	50mm	1	50mm		55mm	1	55mm	1
4	Impact Spanner	55mm	1	60mm	1	60mm	1	65mm	1	75mm	1	75mm	1	90mm	1
5	Impact Spanner	－		70mm	1	70mm	1	75mm	1	80mm	1	80mm	1	－	
6	Ring Spanner	32mm	1	32mm	1	－		－		－		－		－	
7	Socket	－		－		41mm	1	41mm	1	41mm	1	46mm	1	46mm	1
8	Monkey Wrench	250mm	1	250mm	1	300mm	1	300mm	1	300mm	1	300mm	1	300mm	1
9	Hammer	#2	1	#2	1	#2	1	#2	1	#2	1	#2	1	#2	1
10	Eye Bolt	M20	2	M20	2	M24	2	M24	2	M24	2	M30	2	M30	2
11	Hex Bolt	M10	2	M10	2	M12	2	M12	2	M12	2	M16	2	M16	2
12	Chisel Pin Remover	12.8mm	1	15.8mm	1	15.8mm	1	15.8mm	1	15.8mm	1	15.8mm	1	15.8mm	1
13	Hose Plug	PF3／4	2	PF1	2	PF1	2	PF1	2	PF1	2	PF1-1/4	2	PF1-1/4	2
14	Adapter Plug	PF3／4	2	PF1	2	PF1	2	PF1	2	PF1	2	PF1-1/4	2	PF1-1/4	2
15	Retainer Pin Stopper Plug		1		1		1		1		1		1		1
16	Seal Tape		1		1		1		1		1		1		1
17	Tool Box		1		1		1		1		1		1		1

(22) OPTIONAL TOOL



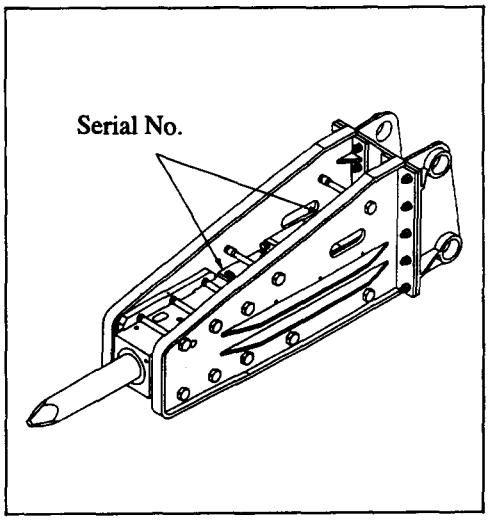
List For Optional Tool

Sym	Part No.	Description	Quantity	Remark
1	41−51−86−91A	Gas Pressure Gauge 2MPa	1	
2	18−21−27−208	Add. Socket	1	
3	18−17−V2−050	Add. Hose	1	
4	41−51−41−92A	Filling Adaptor	1	
5	13−72−06−020	Nitrogen Gas Hose	1	
6	13−55−06−006	Pressure Regulator	1	
7	13−75−06−010	Nitrogen Gas Cylinder	1	
8	13−75−07−360	Tool Box	1	
9	13−75−06−031	Oil Flow Meter	1	
10	13−75−06−032	Pressure Gauge 35MPa	1	

(23) AUTHORIZED DISTRIBUTORS RECORD

23-1 LOCATION OF SERIAL NUMBER ON THE HYDRAULIC BREAKER.

The serial number is located at the lower point
of the cylinder below the control valve,
or at the upper point of the hose adaptor.



23-2 AUTHORIZED DISTRIBUTORS RECORD

Model TNB-	Distributor Address
Serial Number	
Delivery Date	Tel;