Hydraulic Breaker

TOKU

TNB-08M	**TNB-6M**	**TNB-190LU**
TNB-1M	**TNB-6E**	**TNB-230LU2**
TNB-2M	**TNB-7J**	**TNB-310LU1**
TNB-3MB	**TNB-100**	**TNB-400LU**
TNB-4M	**TNB-141LU**	
TNB-5M	**TNB-151LU1**	

MANUAL

INSTRUCTION MANUAL

WARNING

Unsafe use of this machine may cause serious injury of death. Operators and maintenance personnel must read this manual before operating or maintaining this machine. This manual should be kept near the machine for reference and periodically reviewed by all personnel who will come into contact with it.

TOKU PNEUMATIC CO.,LTD.

No. 11

●FOREWORD

Thank you very much for your purchasing of a Toku hydraulic breaker,

This instruction manual is a guidebook to the TOKU Hydraulic Breaker as well as helps deepen your understanding of Toku hyd, breaker better for those who own a TNB breaker. 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 Hydraulic Breaker is fitted to a hydraulic excavator as an attachment and this manual is considered to be used together with an excavator manual. Therefore this 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 carefully before operating or maintaining this machine and always keep it near the machine. All involved personnels should read it periodically.

●Do not operate the product unless you understand and comply with the contents of the instruction manual.

●Operators and maintenance personnel should read this manual periodically and always keep it handy.

●If this manual is lost or becomes damaged, ask for a manual at TOKU Pneumatic Co., Ltd or a Toku distributor nearby by ordering.

●If you transfer the breaker to another source, make sure that you give this manual to the new owners.

●When you rent this breaker, make sure that this manual must be handed over to an user.

CONTENTS

●INTRODUCTION

0-1	Safety information	·····	1
0-2	Applying works	·····	2
0-3	Operation and qualifications	·····	2

●SAFETY

1-1	General precautions for safety	·····	3
1-2	Safety operation	·····	5
1-3	Precaution for maintenance	·····	8

●OPERATION

2-1	Specifications	·····	11
2-2	Principle operation	·····	15
2-3	Structure	·····	17
2-4	Piping for hydraulic breaker	·····	21
2-5	Grease selection and contorol	·····	23
2-6	Installation of the hydraulic breaker onto the excavator	·····	25
2-7	Installation of Chisel	·····	27
2-8	Replacement of Chisel	·····	31
2-9	Lubrication of Chisel	·····	35
2-10	Inspection prior to operation	·····	37
2-11	Test run	·····	38
2-12	Operation of hydraulic breaker	·····	40
2-13	Precautions during operation	·····	42
2-14	Dismantring the breaker	·····	44
2-15	Storage of the breaker	·····	47

●MAINTENANCE AND INSPECTION

3-1	Periodic inspection	·····	52
3-2	Inspection for looseness and retightening of bolts and nuts	·····	55

3-3 Inspection of retainer pins ····· 71
3-4 Inspection of chisel bushing abrasion ····· 73
3-5 Inspection of chisel abrasion ····· 75
3-6 Inspectiion of chisel holder bushing abrasion ····· 77
3-7 Inspection of nitrogen gas pressure and recharge ····· 79
3-8 Insepction on plastic parts of brackets and its replacement ····· 83
3-9 Replacement of oil filter element ····· 90
3-10 Change the hydraulic oil in the tank ····· 90

●SPECIAL APPLICATION

4-1 Under water application ····· 91
4-2 Tunnel application ····· 91

●TROUBLE SHOOTING GUIDE

5-1 Oil leakage ····· 92
5-2 Nytrogen gas leakage ····· 94
5-3 Poor operation of breaker ····· 95

●ACCESSORY TOOLS

6-1 Accessory tools for top mount bracket ····· 96
6-2 Accessory tools for box bracket ····· 99
6-3 Accessory tools for side mount bracket ····· 102
6-4 Accessory tools for side mount silenced bracket ····· 105
6-5 Optional tools ····· 107

●AUTHORIZED DISTRIBUTOR' S RECORD

7-1 Serial number stamping location on a TNB breaker ····· 109
7-2 Column for service shop recording ····· 109

●INTRODUCTION

0-1. SAFETY INFORMATION

We use our safety messages and lavels in following way in order for you to understand the manual and the safety lavels better.

⚠ DANGER:	If not avoided, result in death or serious
⚠ WARNING:	This word is used on safety messages and safety labels where there is a potentially dangerous situation which could result in serious injury or death if the hazard is not avoided. These safety messages or labels usually describe precautions that must be taken to avoid the hazard. Failure to avoid this hazard may also result in serious damage
⚠ CAUTION:	This word is used on safety messages and safety labels for hazards, which could result in minor or moderate injury if the hazard is not avoid. This word might also be word for hazards where the only
★ NOTICE	This word is used for precautions that must be taken to actions, which could shorten the life of the machine

TOKU cannot predict every circumstance that might involve a potential hazard in operation and maintenance. Therefore the safety message in this manual and on the machine may not include all possible safety precautions.

0-2. APPLYING WORKS

⚠ WARNING
Never use TNB breakers other than applying works

Mainly apply TNB breakers for following works.

- Demolition of Concrete and secondary breaking.
- Demolition of Asphalt and secondary breaking.
- Demolition of Rock.
- Quarry applications.
- Road Construction.
-
- Please consult us in case of tunnel work, under water works, works in extreme heat, cold or dusty environment or any other ” special application.

0-3. OPERATION AND QUALIFICATIONS

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

●SAFETY

1-1. GENERAL PRECAUTIONS FOR SAFETY

⚠ WARNING

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

⚠ WARNING -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.

⚠ WARNING -CLOTHING AND PERSONAL PROTECTION ITEMS-

- It is essential to wear a hard hat, protective goggles, safety boots, a mask and

Especially when operating a mini-excavator where a cabin is not installed on the machine.

⚠ WARNING -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, tunnel 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.

⚠ WARNING DON' T 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.

⚠ WARNING 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.

1-2. SAFETY OPERATION

⚠ WARNING Checking work site

When working on embankments or near excavated diches, there is a hazard that the weight and vibration of the machine will cause the soil to collapse. Before starting operations, take steps to ensure that the ground is safe and to prevent the machine from rolling over falling.

⚠ WARNING Safety secure at work site

When working on the structure, it may happen collapse or floor. Check the strengthen of floor before operation.
Reinforce the floor if it's necessary.

⚠ WARNING

Do not raise up too high.
It may cause damage of excavator or falling accident when excavator becomes unbalance after breaking an object.

⚠ WARNING

Do not lift materials with the breaker.
This may cause damage to the breaker and breaker bracket and is a dangerous maneuver.

⚠ WARNING -IF ABNORMALITIES ARE FOUND-

If you find any abnormality in the machine during operation or maintenance (noise, vibration, smell, incorrect gauges, smoke, oil leakage, etc., or any abnormal display on the warning devices or monitor), report to the person in charge and have the necessary action taken. Do not operate the machine until the abnormality has been corrected.

⚠ WARNING -DISTANCE TO HIGH VOLTAGE CABLES-

Do not travel or operate the machine near electric cables.There is a hazard of electric shock, which may cause seriousinjury or property damage. On jobsites where the machine maygo close to electric cables, always do as follows.Before starting work near electric cables, inform the localpower company of the work to be performed, and ask them totake the necessary action. Even going close to high-voltage cables can cause electricshock, which may cause serious burns or even death.

Always maintain a safe distance (see the table on the right) betweenthemachine and the electric cable. Check with the local powercompany about safe operating procedure before startingoperations.To prepare for any possible emergencies, wear rubber shoesand gloves. Lay a rubber sheet on top of the seat, and becareful not to touch the chassis with any exposed part of yourbody. Use a signalman to give warning if the machine approachestoo close to the electric cables.When carrying out operations near high voltage cables, donot let anyone near the machine.If the machine should come too close or touch the electric cable, to prevent electric shock, the operator shouldnot leave the operator's compartment until it has been confirmed that the electricity has been shut off.Also, donot let anyone near the machine.

Safety distance to high voltage cables

Voltage of cables	Safety distance
0 - 60,000V	more than 3m
66,000V	more than 4m
154,000V	more than 5m
500,000V	more than 11m

⚠ WARNING -SAFETY AT JOBSITE-

Before starting operations, thoroughly check the area for any unusual conditions that could be dangerous.

- When carrying out operations near combustible materials such as thatched roofs, dry leaves or dry grass, there is a hazard of fire, so be careful when operating.
- Check the terrain and condition of the ground at the worksite, and determine the safest method of operation. Do not operate where there is hazard of landslides or falling rocks.

⚠ WARNING -NOISE-

When carrying out maintenance of the breaker and you are exposed to noise for long periods of time, wear ear covers or ear plugs while working.
If the noise from the machine is too loud, it may cause temporary or permanent hearing problems.

1-3. PRECAUTION FOR MAINTENANCE

⚠ WARNING

The hydraulic breaker is an attachment for the hydraulic excavator. Before maintaining the hydraulic breaker, read and understand the manual for the hydraulic excavator.

⚠ WARNING

Always wear protection such as hard hat, safety glasses, safety shoes and mask, and gloves. When tightening the bolt and nut by an impact spanner, debris of metal may fly out or be scattered. It may cause serious injury for eyes.

⚠ WARNING

When you leave an abnormal on the hydraulic breaker, it may cause serious injury. Repair immediately when an abnormal is found.

⚠ WARNING Use a crane when handling heavy materials

- Carry out a flat and solid ground surface.
- When the operation is carried out by two or more workers, choose the leader and follow leaders instructions.
- A crane should be used for handling heavy material (over 25 kg)
- When using a crane, make sure that the material is well balanced.
- Do not work on materials that are being lifted. Put them on a worktable.
- When assembling and disassembling the hydraulic breaker, make sure that the breaker is balanced.
- Never remain under material which is being lifted by crane.
  Keep away from material.

⚠ WARNING

Do not carry out when the hydraulic oil temperature ishigh. After operating the breaker many parts are still hot. If the hose is removed immediately, it may cause serious burn injury.

WARNING High temparature oil

Do not remove the hydraulic hose immediately after stopping the hydraulic breaker. The oil reaches a very hightemperature during operation and may possibly cause burns. Remove hose only when the temperature has dropped. When you leave an abnormal on the hydraulic breaker, it may cause serious injury. Repair immediately when an abnormal is found.

WARNING Using suitable tools

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

WARNING Position of the hydraulic breaker

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

WARNING

When hammering the pin, always wear protective goggles, hard hat, gloves, mask and safety boots due to the possibility that metal chips will fly off and may enter your eye causing serious injury.

WARNING

Do not touch the chisel right after operating the hydraulic breaker.
The chisel becomes very hot during operation and you may get burnt.

WARNING

When alining the pin, do not put your finger or hand into the pin hole. The arm or hydraulic breaker can move and this may lead to loosing your finger or hand.

⚠ WARNING
Do not use any other gas except nitrogen gas. If other gases are used, it may explode and is dangerous.

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

⚠ 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.

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

●OPERATION

2-1. SPECIFICATIONS

MODEL TNB-			08M	1M	2M	3MB	4M
Working Weight	Side Mount Bracket	kg	65	85	105	175	235
	Top Mount Bracket 1PC	kg	75	85	110	190	220
	Top Mount Bracket 2PC	kg	75	100	140	210	255
	BOX Bracket	kg	85	125	170	250	340
	Side Mount Silenced Bracket	kg	-	-	160	235	285
Oil flow		L/min	18～25	20～30	20～35	25～45	30～55
Operating Pressure		MPa	6～13	7～14	8～15	10～15	10～16
Line relief pressure ＊ Incase the pressure gap is 4MPa between set pressure and cracking		MPa	18	19	20	20	21
Impact rate		bpm	930～1300	700～1200	600～1150	550～1000	580～1060
Tool diameter		mm	φ40	φ45	φ50	φ58	φ64
Hose size		inch	3/8	1/2	1/2	1/2	1/2
Gas pressure		MPa	0.8	0.8	0.8	0.8	0.8
Base machine		ton	0.7～1.5	1～2	1.5～2.5	2.4～4	3～4.5

NOTE) Working Weight does not include bracket bushings and bracket pins.

SPECIFICATIONS

MODEL TNB-			5M	6M	6E	7J
Working Weight	Side Mount Bracket	kg	300	335	430	820
	Top Mount Bracket 1PC	kg	305	365	405	-
	Top Mount Bracket 2PC	kg	315	350	465	-
	BOX Bracket	kg	400	410	585	940
	Side Mount Silenced Bracket	kg	-	415	-	910
Oil flow		L/min	35～60	40～70	45～80	80～120
Operating pressure		MPa	10～16	10～16	10～16	14～18
Line relief pressure * Incase the pressure gap is 4MPa between set pressure and cracking		MPa	21	21	21	23
Impact rate		bpm	550～1000	600～1050	550～1000	450～720
Tool diameter		mm	φ75	φ75	φ95	φ105
Hose size		inch	1/2	3/4	3/4	3/4
Gas pressure		MPa	0.8	1	0.8	1.1
Base machine		ton	3.8～6	5.5～8	6～11	8～14

NOTE) Working Weight does not include bracket bushings and bracket pins.

SPECIFICATIONS

MODEL TNB-			100	141LU	151LU1	190LU
Working Weight	Side Mount Bracket	kg	1010	1530	1710	2000
	Top Mount Bracket 1PC	kg	1060	1600	1610	2000
	Top Mount Bracket 2PC	kg	1120	1700	1870	2050
	BOX Bracket	kg	1240	1900	1780	2250
	Side Mount Silenced Bracket	kg	-	-	1810	-
Oil flow		L/min	100～140	130～170	160～200	160～210
Operating pressure		MPa	12～17	13～17	14～18	14～18
Line relief pressure ＊Incase the pressure gap is 4MPa between set pressure and cracking		MPa	22	22	23	23
Impact rate		bpm	430～600	490～650	450～630	370～490
Tool diameter		mm	φ115	φ135	φ135	φ140
Hose size		inch	3/4 1"(*1)	1″	1″	1″
Gas pressure		MPa	0.8	0.8	1.1	0.8
Base machine		ton	14～20	18～25	18～25	20～30

NOTE) Working Weight does not include bracket bushings and bracket pins. (*1)

For North American market

SPECIFICATIONS

MODEL TNB-			230LU2	310LU1	400LU
Working Weight	Side Mount Bracket	kg	2530	-	-
	Top Mount Bracket 1PC	kg	2550	-	-
	Top Mount Bracket 2PC	kg	2800	3400	4450
	BOX Bracket	kg	2690	3650	4550
	Side Mount Silenced Bracket	kg	-	-	-
Oil flow		L/min	180～230	240～300	280～390
Operating pressure		MPa	13～18	14～18	14～18
Line relief pressure ＊ Incase the pressure gap is 4MPa between set pressure and cracking		MPa	23	23	23
Impact rate		bpm	350～450	340～470	370～470
Tool diameter		mm	φ146	φ160	φ178
Hose size		inch	1″	1″-1/4	1″-1/4
Gas pressure		MPa	0.8	0.8	0.8
Base machine		ton	27～40	38～50	45～70

NOTE) Working Weight does not include bracket bushings and bracket pins.

2-2. PRINCIPLE OPERATION

TNB-08M, 1M, 2M, 3MB, 4M, 5M

(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 chamber 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 5 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, 6E, 7J, 100, 141LU, 151LU1, 190LU1, 230LU2, 310LU1, 400LU

(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 camber 2. At this point both chamber 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 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.

2-3. STRUCTURE

TNB-08M, 1M, 2M, 3MB, 4M, 5M

(1) Side Bolt
(2) Side bolt Nut
(3) Gas Valve
(4) Cylinder Cover
(5) Control Valve Cap
(6) Control Valve
(7) Hose Adapter
(8) Cylinder
(9) Gas seal
(10) Oil seal
(11) Slide ring
(12) Packing bushing
(13) Piston
(14) Oil seal
(15) Dust seal
(16) Air Port for Air Supply (TNB-2M, 3M, 4M, 5M)
(17) Chisel holder
(18) Retainer Pin
(19) Retainer Pin Stopper Pin
(20) Grease Nipple
(21) Chisel holder bushing
(22) Chisel Bushing
(23) Chisel

TNB-08M, 1M, 2M, 3MB, 4M, 5M

(1) Gas Valve
(2) Hose Adapter IN
(3) Hose Adapter OUT
(4) Auto Lubrication Port (TNB-2M, 3M, 4M, 5M)
(5) Air port for air Supply (TNB-2M, 3M, 4M, 5M)
(6) Grease Nipple

TNB-6M, 6E

TNB-7J

TNB-100, 141LU, 151LU1, 190LU, 230LU2, 310LU1, 400LU

(1) Side Bolt
(2) Side bolt Nut
(3) Gas Valve
(4) Cylinder Cover
(5) Hose Adapter
(6) Control Valve Box
(7) Control Valve
(8) Control Valve Cap
(9) Cylinder
(10) Gas seal
(11) Oil seal
(12) Slide ring
(13) Packing bushing
(14) Piston
(15) Oil seal
(16) Dust seal
(17) Chisel holder
(18) Air Cap (Over TNB-7E)
(19) Chisel holder bushing
(20) Retainer Pin
(21) Retainer Pin Stopper Pin
(22) Grease Nipple
(23) Chisel Bushing
(24) Chisel

TNB-6M, 6E

TNB-7 J

TNB-100, 141LU, 151LU1 190LU, 230LU2, 310LU1, 400LU

(1) Gas Valve
(2) Hose Adapter IN = "P"
(3) Hose Adapter OUT = "T"
(4) Auto Lubrication Port = "L"
(5) Low Pressure Port = "R"
(6) Air port for air Supply = "A"
(7) Grease Nipple
(8) Hose Adapter IN = "P"
(9) Hose Adapter OUT = "T"
(10) High Pressure Port = "S" ,"H"

2-4. 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 Distributor.

Excavator

(1) Hydraulic breaker
(2) Bracket
(3) Bracket bolt - Bracket bolt nut
(4) Stop valve
(5) Hydraulic pipe for breaker
(6) Control valve
(7) Relief valve
(8) Oil tank
(9) Oil filter
(10) Oil cooler
(11) Hydraulic pump
(12) Pedal or Lever
(13) Hydraulic shovel

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 Distributor.

Mini excavator

(1) Hydraulic breaker
(2) Bracket
(3) Bracket bolt - Bracket bolt nut
(4) Stop valve
(5) Hydraulic pipe for breaker
(6) Change valve
(7) Relief valve
(8) Oil tank
(9) Oil filter
(10) Hydraulic pump
(11) Pedal or Lever
(12) Mini Excavator

2-5. GREASE SELECTION AND CONTROL

2-5-1 SELECTION OF GREASE

- Use the inorganic high temparature grease for chisel greasing

Maker	Name of items
Showa Shell Oil	Shell Stamina Grease HDP2
Cosmo Oil	High Temperature grease B2

⚠ CAUTION

Do not use Molybdenum content grease.
In case the Molybdenum composition gets into the hydraulic oil circuit of hyd, breaker through the lower seal section, it can cause the premature wear of pinston.

2-5-2 SELECTION OF HYDRAULIC OIL

⚠ CAUTION

Use the maker of a shovel designated hydraulic oil.

2-5-3 Hydraulic oil temperature control

⚠ CAUTION

Carry out warm-up !

Do not operate immediately after starting engine. Carry out warm-up operation.
Begine the breaker operation after the oil temperature get s 40℃.
Operate the breaker in the temperature range from 40 to 60 degree Celsius.

If the hydraulic oil temperature becomes over 80 degree Celsius, the oil becomes low viscosity. And then it influents the performance of hydraulic breaker, shorten the seal life and deterioration of oil. When the breaker is operated in warm ambient temperature condition, the oil control is very important.
When the breaker is used under more than 80℃ of oil temperature, it is necessary to chek the each seal.

⚠ CAUTION

When the hyd, oil is conterminayted it will cause mal function of not only breaker but also the hyd, components of excavators as well as parts damage. It is very important to have daily control on oil contermination.

Pay careful attention for the contermination hyd, oil on daily base and it is
recommended to change hyd, oil as early as possible. At change of oil, clean the hyd,

- The required cleaness for hyd, oil of a breaker is ※ＮＡＳ 9 class level.
- When you have questions on the hyd, oil contermination, consult with our designated distributors.

※ＮＡＳ (National Aerospace Standard Committee) 1638 This is the international norm for hyd, oil contermination.

2-6. INSTALLATION OF THE HYDRAULIC BREAKER ONTO THE EXCAVATOR

⚠ WARNING

- 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, mask, 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.

⚠ CAUTION

Make sure sand or dust do not get onto the pin or bushing. If this occurs wipe it clean.

⚠ CAUTION

When alining the pin, do not put your finger or hand into the pin hole. The arm or hydraulic breaker can move and this may lead to loosing your finger or hand.

1. Lay the hydraulic breaker in a stable and flat area.
2. Fit the bracket bushing (1) to the inside of the bracket.
3. Position the arm in the hole (a), then places the link in the hole (b).
   Apply grease to the bracket pins (2) and insert them into the holes.
4. Fit the bracket rings (3), bracket ring bolts (4) and bracket ring nuts (5) to hold the pins and apply grease to the pin.

TNB-7J ～100	Hex size mm Torque N·m (kg·m)	19 76 (8)
TNB-141LU ～190LU	Hex size mm Torque N·m (kg·m)	24 176 (18)
TNB-230LU2	Hex size mm Torque N·m (kg·m)	30 343 (35)
TNB-310LU1 ～400LU	Hex size mm Torque N·m (kg·m)	36 588 (60)

For TNB-08M to 6E, fit spring pins tobracket rings and fix it with the O-ring instead of bracket ring bolts and bracket ring nuts.

5. Extend the arm and boom and prepare for installation.

6. Take the inside pressure of hydraulic oil tank out and lock the joystick of arm to avoid free movement.
   (Refer to the manual of excavator about taking the inside pressure of tank and locking the joy stick)

⚠ CAUTION

Make sure dirt or dust do not get in contact with the end of the hose fittings and the arm (C). If dirt or dust enters the hydraulic hoses this will contaminate the hydraulic oil and may damage the hydraulic breaker or excavator.

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

⚠ CAUTION

After removing the hose plugs, make sure dirt or dust do not get on the plugs and store them in the toolbox.

8. Open the stop valve (D).

9. Start the engine with slow speed, and check the hydraulicpipng such as oil leakage.

⚠ CAUTION

Make sure if any twist or interference on the hydraulic hoses as well as abnormal movement.
The abnormality on the hoses can damage the hoses. It may cause bursting of hydraulic hose.

2-7. INSTALLATION OF CHISEL

2-7-1 TOP MOUNT BRACKET, SIDE MOUNT BRACKET

1. Lay the hydraulic breaker on the ground.
   Stop the excavator engine.

⚠ WARNING

Use a crane (A) when installing the chisel for sizes from TNB-6E and up.

2. Apply grease to the inside of the chisel bushing (1) and the chisel (2), and insert the chisel into the chisel holder.

3. Insert the retainer pins (3).

4. Insert the retainer pin stopper pin (4) and retainer pin stopper plug (5) using the hammer and the chisel pin remover (B).

⚠ CAUTION

To avoid drop of retainer pin stopper plug(5), make sure to clean the retainer pin stopper plug(5) and its hole, and insert the retainer pin stopper plug(5) using hammer deep into its position so that surface of that plug(5) get lower than breaker body surface.

5. Assmble the retainer pin plugs(6) using the hammer.

⚠ CAUTION

To avoid drop of retainer pin plug(6), make sure to clean the retainer pin plug(6) and its hole, and insert that plug using hammer deep into its position so that surface of that plug(6) get lower than breaker body.

6. After chisel installation, make sure all components are installed.

2-7-2 SIDE MOUNT SILENCED BRACKET TNB-2M , 3MB , 4M , 6M

1. Lay the hydraulic breaker on the ground. Stop the excavator engine.

⚠ WARNING

Use a crane (A) when handling the chisel of TNB-6M and watch out not to pinch fingers.
Wear the protection glass, safety shoes and glove of protection gear.

2. Apply grease to the inside of the chisel bushing (1) and the chisel (2), and insert the chisel into the chisel holder.along the retainer pin direction.

⚠ CAUTION

The chisel of a brand new breaker is set severly in order to make silent effect sure. As a result take care of it at seembling the chisel.

3. Insert the retainer pins (3) into the retainer pin holes of the chisel holder.

※ When assembling the retainer pins, swing the chisel in holizontal way to ease insertion process.

4. Set the retainer isolators (7) onto the retainer cover plate (8) and assemble it with hex cap bolts (9) with below torque.

・TNB-2M

Hex size mm Torque N·m (kg·m)	#8 30 (3)

・TNB-3MB , 4M , 6M

Hex size mm Torque N·m (kg·m)	#10 44 (4.5)

5. Check if any parts are left and are not assembled after assembling the chisel.

2-7-3 SIDE MOUNT SILENCED BRACKET TNB-7J , 151LU1

1. Lay the hydraulic breaker on the ground. Stop the excavator engine.

> **⚠ WARNING**
>
> Use a crane (A) when handling the chisel and watch out not to pinch fingers.
> Wear the protection glass, safety shoes and glove as protection gear

2. Apply grease to the inside of the chisel bushing (1) and the chisel (2), and insert the chisel into the chisel holder. along the direction of the retainer pins.

> **⚠ CAUTION**
>
> The chisel of a brand new breaker is set severly in order to make silent effect sure. As a result take care of it at seembling the chisel.

3. Insert the retainer pins (3) into the retainer pin holes.
   * When assembling the retainer pins, swing the chisel in holizontal way to ease insertion process.

4. Set the retainer isolators (7) onto the retainer cover plate (8) and assemble it with hex cap bolts (9) with below tighten torque.

Hex size mm Torque N·m (kg·m)	#14 190 (20)

5. Check if any parts are left and are not assembled after assembling the chisel.

2-8. REPLACEMENT OF CHISEL

2-8-1 TOP MOUNT BRACKET, SIDE MOUNT BRACKET

⚠ WARNING

When hammering the pin, always wear protective goggles, hard hat, gloves, mask and safety boots due to the possibility that metal chips will fly off and may enter your eye causing serious injury.

⚠ WARNING

- 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 25kg.
- 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 worktable.
- When assembling and disassembling the hydraulic breaker, make sure that the breaker is well balanced.
- Never remain under the chisel, which is being lifted by crane. Keep away from the chisel, which is being lifted.

REMARK

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

1. Press the chisel into the hydraulic breaker using the excavator.
   During this process, make sure the area is flat and safe.

2. Using the hammer and the chisel pin detacher (A), remove the retainer pin stopper plug (1) and retainer pin stopper pin (2).

   For models TNB-08M, 1M, 2M, 3M and 4M, a spring pin is used and they do not use a retainer pin stopper plug (1) and retainer pin stopper pin.

3. From the opposite side of the retainer pin plug(3) using the hammer and the chisel pin remover(A), removethe retainer pin plug.

4. Although the retainer pin(4) possibly comes out at this moment, put it back into the chisel holder to prevent the chisel from falling out.

5. Place the breaker in a horizontal position, and lay it down on wooden blocks.
Stop the excavator engine.

6. Remove the retainer pins(4) up from bottom using the chisel pin remover(A).

TNB-7J, 100, 151LU1, 190LU, 230LU1 have M8 tapped holes and the TNB-310LU1 and 400LU have M12 tapped holes on their end faces. Using removal bolt, which is included in the accessory tools, screw the bolt into the retainer pin to pull it out.

⚠ WARNING

Use a crane(C) when removing the chisel (5) for size from TNB-6E and up.
Wear the protection glass, safety shoes and glove as protection gear.

7. Remove the chisel (5) from the chisel holder.

2-8-2 SIDE MOUNT SILENCED BRACKET TNB-2M , 3MB , 4M , 6M

1. Place the breaker in a horizontal position, and lay it down on wooden blocks.
   Stop the excavator engine.

2. Remove the hex cap bolts (9) with hex wrench.
   Remove the retainer cover plate (8) and take the retainer isolator (7) out.

3. Remove the retainer pins (4) up from bottom using the chisel pin remover (A).

⚠ WARNING

Use a crane (C) when handle the chisel of TNB-6M.
Watch out not to pinch fingers.
Wear the protection glass, safety shoes and glove as protection gear.

4. Remove the chisel (5) from the chisel holder.

2-8-3 SIDE MOUNT SILENCED BRACKET TNB-7J , 151LU1

1. Place the breaker in a horizontal position, and lay it down on wooden blocks

   Stop the excavator engine.

2. Remove the hex cap bolts (9) with the hex wrench (#14 mm) .

   Remove the retainer cover plate (8) and take the retainer isolators (7) out.

3. M8 thread hole is available on the retainer pin (4) and pull the retainer pins using the retainer pin puller bolt (B) or push it out with the chisel pin puller (A) to take them out.

> ⚠ **WARNING**
>
> Use a crane (C) when removing the chisel (5).
> Pay attention the gravity position and watch out not pinch fingers in the process.

4. Remove the chisel (5) from the chisel holder.

2-9. LUBRICATION OF CHISEL

⚠ WARNING

When greasing, make sure the chisel (1) is firmly pressed into the chisel holder and do not apply the grease excessively. Otherwise, the grease will go into the top of the chisel, which could damage the dust and oil seal installed at the lower cylinder due to its pressurization. This would lead not only a cause for malfunction of the breaker but also contaminate the hydraulic oil and deteriorate the pump performance of an excavator.
After greasing the hammering must be only downward for 5 minuts.

Apply grease to the grease nipple on the chisel holder by using a grease gun every two hours.

Grease in the morning before starting work and grease in the afternoon before starting work. With below amount as bench mark.

Afterward every 2 hrs grease the same amount.

⚠ CAUTION

Do not use Molybdenum content grease.
It may lead the hydraulic breaker, excavator pump and other components failure.

MODEL TNB-	Number of times to push the grease gun (gram)
08M	2～3 (2g～3g)
1M	
2M	
3MB	4～5 (4g～5g)
4M	
5M	5～6 (5g～6g)
6M	
6E	
7J	6～7 (6g～7g)
100	
141LU	7～8 (7g～8g)
151LU1	
190LU	8～9 (8g～9g)
230LU2	
310LU1	9～10 (9g～10g)
400LU	10～11 (10g～11g)

●Position of grease nipple

TNB-7J, 151LU1, 230LU2, 310LU1	Other models

NOTICE

- 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.

2-10. INSPECTION 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 on a hydraulic breaker in accordance to the periodic inspection table shows in the chapter of Inspection and Maintenance.

⚠ CAUTION
Lack of inspection before operation causes damage and poor operation of the hydraulic breaker.

2-11. TEST RUN

⚠ CAUTION

Carry out warm-up!

Make sure if a breaker runs ordinary with carrying out the warming up before opening the throttle maximum. In regard to warming up method refers to the article (4) and (5) of test run chapter.

⚠ WARNING

- When operating the hydraulic breaker, ensure to use the piping for the hydraulic breaker.
- If there is a ”Hydraulic Breaker Mode” on the excavator, change to the mode.
- If a piping of the excavator is set up for the hydraulic crusher, 1) the excessive hydraulic oil might be supplied to the hydraulic breaker. 2) Wrong pedaling creates the high pressure to the low pressure piping of the hydraulic breaker. In both cases, it could cause damage to the hydraulic breaker.

⚠ CAUTION

- After installing the hydraulic breaker to the hydraulic base machine, always perform a test run.
- Especially when storing the breaker for a long time and the seals are deformed as shown in Fig.1, A. The test run must be performed to prevent seizure and oil leakage.

Fig.1

Before Seal recovery

After Seal recovery

The test run is necessary in the following cases.。

- When mount a brand new breaker on the cavator.
- When assemble the connecting hose to an excavator after long term storage of a breaker..
- In case of the repair or over haul of a breaker

① Replenishment the hyd, oil up to the highest level of oil level. (under the condition of the boom of a excavator is lowered.)

② Supply the hyd, oil gradually in order to remove air bubles in side hyd, breaker and to fill up the hyd, oil in the breaker. (Squeeze the throttle and slowly press the opretion pedal of a hyd, breaker5-6 times with half open operation.)

③ Check any looseness on the bolts and nuts of a breaker and of a bracket.

④ Check the abnormal noise, vibration and oil leakage from a breaker.

⑤ Check if any oil leakage from the connecting hose and fittings.

⑥ Check if any irregular movement, twist and interferance of hyd, hose,

⚠ CAUTION

- The air will mix into the hyd, oil circuit of piping and hyd, breaker when assemble the breaker onto an excavator.
  Under this condition start to operating the breaker all of sudden, it results in the oil film cut and can cause the seizure of piston and cylinder.
- Slowly supply the hyd, oil for the shake of removing air bubles and fill in the hyd, oil. (Squeeze the throttle and gradually open the operation pedal of a hyd, breaker in half way)
- Follow the process of air buble removal to warming up in order of (2),(3),(4),(5).
- Test run time of each process are shown below table and keep the time according to below table.

(1)Excavator	(2)Air removal time	(3)Seal recovery time	(4)Preparation time	(5) Preparation time
New unit	More than 5 min.	More than 10 min.	Less than 50% Throttle 10 min.	At 70% Throttle 20 min.
After the hose has been removed				
After the breaker has been repaired	More than 10 min.	More than 15 min.		

⚠ CAUTION

- Process (2) & (3) must be performed as shown in Fig. 2 where the breaker is lifted up and held straight up.
- When performing process (2) & (3) make sure the breaker does not impact by adjusting the operating pedal accordingly.

Fig. 2

2-12. OPERATION OF HYDRAULIC BREAKER

⚠ CAUTION

- When operating the hydraulic breaker, ensure to use the piping for the hydraulic breaker.
- If there is a ”Hydraulic Breaker Mode” on the excavator, change to the mode.
- If a piping of the excavator is set up for the hydraulic crusher, 1) the excessive hydraulic oil might be supplied to the hydraulic breaker. 2) Wrong pedaling creates the high pressure to the low pressure piping of the hydraulic breaker. In both cases, it could cause damage to the hydraulic breaker.

- The hydraulic breaker is an attachment to the hydraulic excavator. Follow the instruction manual for the hydraulic excavator when starting the machine.
- Set up the excavator to operate the hydraulic breaker. If there is a “Hydraulic Breaker Mode” on the excavator, change to the mode. Position the throttle of the excavator (engine RPM) at the mark for the hydraulic breaker.

Then, follow the excavator manual for operation.

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

⚠ CAUTION

When the angle is not 90 degree, the breaker will be slipped. It cause the chisel breakage, seizure of bush. Choose stable surface to beating. Avoid any excessive force.

⚠ CAUTION

Ensure that the front part of the excavator is not raised too high.
After the material is broken, take caution since the balance of the excavator will become unstable.

- When operating the breaker, raise the chisel against the object and the front portion of the excavator about 5 cm (2 inch) from the ground.

⚠ CAUTION

When pushing force is not enough, it will lead shock on the breaker and the excavator. And then it leads failures on them.

- 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.

> **⚠ CAUTION**
>
> When continuously hammering the same point, it causes abnormal wear of chisel.

- When the breaker is set to demolish an object, always set the breaker 90 degrees to the object you are demolishing.

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

> **⚠ CAUTION**
>
> When pushing force is not enough, it will lead shock on the breaker and the excavator. And then it leads failures on them.

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

2-13. 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 (2 inch) of stroke in the cylinder.
Ignoring this instruction will lead to the hydraulic cylinder being damage.

⚠ CAUTION

Do not pry the chisel after it has penetrated into the material.
This will lead to side bolt or chisel breakage. Also premature wear of the chisel bushing may occur.

⚠ CAUTION

Make sure that you do not hit the boom with the chisel during operation.
This will lead to damage to the hydraulic breaker and excavator.

⚠ CAUTION

Operate the breaker so that the bracket does not contact the arm etc.

Do not extend bucket cylinder to the stroke end, the breaker contacts the excavator arm, and causes malfunction of the excavator and the breaker.

⚠ 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 use traveling for moving the material such as large rock.

⚠ 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 hydraulic breaker and excavator.

When using the breaker under water, refer to the instructions for “UNDERWATER APPLICATION”

2-14. DISMANTLING THE BREAKER

⚠ WARNING

When hitting a pin with a hammer, always wear safely 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

- 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 25kg (55lb).
- 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 worktable.
- When assembling and disassembling the hydraulic breaker, make sure that the breaker is well balanced.
- Never remain under material, which is being lifted by crane.
- Keep away from material, which is being lifted.

REMARK

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

⚠ CAUTION

Do not touch the chisel right after operating the hydraulic breaker.
The chisel becomes very hot during operation and you may get burnt.

⚠ WARNING

When removing the hydraulic 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.

⚠ WARNING

When greasing, make sure the chisel is firmly pressed into the chisel holder and do not apply the grease excessively. Otherwise, the grease will go into the top of the chisel, which could damage the dust and oil seal installed at the lower cylinder due to its pressurization. This would lead not only a cause for malfunction of the breaker but also contaminate the hydraulic oil and deteriorate the pump performance.

1. After pushing the chisel into the chisel holder properly, begin greasing this area as specified in this manual.

2. Place the breaker near the ground and locate the top of the arm where the stop valve (A) can be reached.

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

4. Turn the stop valve (A) to the off position.

5. Remove the hydraulic hose (1) from the stop valve.

6. Apply the plugs (2) to the hose adapters to that dirt does not enter the hoses.

7. Start the excavator engine.

8. Operate the excavator and place the hydraulic breaker on the large wood pieces which are located on the flat and firm ground.
   At this moment pay attention the breaker not to fall down.

9. Remove the bolt (3), nut (4) and bracket ring (5) from the bracket pin (6).

⚠ WARNING
A crane should be used for handling heavy material.

10. Remove the 2 bracket pins (6).

11. Lift the arm (B) and remove the hydraulic breaker from the excavator.

2-15. STORAGE OF THE BREAKER

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

⚠ CAUTION

When washing the breaker by high pressure water, make sure that the water does not into chisel holder and air cap. The penetrated water can be accumulated into inside of the breaker, and then it causes rusts inside of the breaker.

2-15-1 STORAGE FOR ONE MONTH

Apply grease to the retainer-pin holes (1).

1. Place the breaker on 2 pieces of wood (A).
   NOTE: Lay the breaker down so that the cylinder side is higher than the chisel holder side.

2. Remove the hex plug (2) from the chisel holder.
   Spray anti-rust spray (C) onto the piston area and replace the hex plug (2) in the chisel holder.

· P.S. : In regard of the models of TNB-7J upward with side mount silenced brackets remove the plug (3) first and follow the work 2 after.

3. Place a sheet (D) over the breaker for storage.
   In this case the chisel side must be lower to avoid the rain water penetration in the chisel holder.

2-15-2 BREAKER STORAGE FOR MORE THAN ONE MONTH

1. Place the breaker on 2 pieces of wood (A), (B).
   Lay the breaker down so that the cylinder side is higher than the chisel holder side.

> ⚠ WARNING
>
> Use a crane(C) when removing the chisel (1) for size from TNB-6E and up.

2. Following the chapter of "Replacement of Chisel" remove the chisel (1) from the breaker.

3. Take out the nitrogen gas from the cylinder cover completely through the gas valve (2).

P.S. : In regard of the side mount silenced bracket remove the bolts (4) and flip the cover (5) and continue the work in following 3.

4. Loosen the hose plug (3) on the hose.

5. From the chisel holder end insert a rod (D) into the piston and hit the rod lightly with a hammer to push it up into the piston. At this moment watch out the oil comes out from the hose.
   NOTE: During this procedure release any excess nitrogen gas from the cushion chamber.

6. Mount the hose plug (3) to hose joint.

⚠ WARNING

Use a crane (B) when installing the chisel
(1) for sizes above TNB-6E.

7. Apply a sufficient amount of grease to the chisel (1) and inside of the chisel bushing (4), and insert the chisel into the chisel holder (5).

8. Apply grease to the retainer-pin holes.

9. Fit the retainer pins (6).

10. Insert the retainer pin stopper pin (7) and retainer pin stopper plug (8) using the hammer and the chisel pin remover (C).

⚠ CAUTION

To avoid drop of retainer pin stopper plug(8), make sure to clean the retainer pin stopper plug(8) and its hole, and insert the retainer stopper plug(8) using hammer deep into its position so that surface of that plug
(8) get lower than the breaker body.

11. Assemble the retainer pin plugs (9) using the hammer.

12. Use canvas sheet (D) to cover the breaker.

Lower the chisel side to avoid the rain water penetration into the chisel holder.

⚠ CAUTION

After a long period of storage, replace the gas when using the breaker again.
In regard to the recharge of the nitrogen gas refer to the chapter of "INSPECTION OF NITROGEN GAS PRESSURE AND RECHARGE".

● 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.

3-1. PERIODIC INSPECTION

The Inspection part is distinguished by the intervals 。 Inspect according to the periodic inspection table.

Should have found the failure, repair it immediately.

TOP MOUNT BRACKET	BOX BRACKET

Inspection Items	Substance	Countermeasure	Period
(01) Side bolt nut	Looseness	Retightening	Every day
(02) Control valve box bolt	Looseness	Retightening	Every day
(03) Control valve cap bolt	Looseness	Retightening	Every day
(04) Hose adapter	Looseness	Retightening	Every day
(05) Hydraulic hose	Looseness, damage, Oilleakage	Retightening, replacement	Every day
(06) Gas valve body/ Gas valve plug	Looseness	Retightening	Every day
(07) H.T bolt / nut	Looseness , damage	Retightening, replacement	Every day
(08) Bracket pin bolt / nut	Looseness	Retightening	Every day
(09) Bracket bolt nut	Looseness , damage	Retightening, replacement	Every day
(10) Guide bolt / nut	Looseness , damage	Retightening, replacement	Every day
(11) Retainer pin / Retainer pin stopper pin	Abrasion, damage	Repair, replacement	Every day
(12) Chisel bushing	Abrasion, damage	Replacement	Every day
(13) Chisel	Abrasion, damage	Replacement	Every day
(14) Bracket	Abrasion, damage,Crack	Repair, replacement	Every day
Hydraulic oil	Level, deterioration, contamination	Add, replacement	Every day

PERIODIC INSPECTION

Inspection parts are distinguished by the intervals. Follow the inspection according to the periodic inspection table.

Immediately repair as soon as the abnormality was found.

SIDE MOUNT BRACKET	SIDE MOUNT SILENCED BRACKET

Inspection Items	Substance	Countermeasure	Period
(01) Side bolt nut	Looseness	Retightening	Every day
(02) Control valve box bolt	Looseness	Retightening	Every day
(03) Control valve cap bolt	Looseness	Retightening	Every day
(04) Hose adapter	Looseness	Retightening	Every day
(05) Hydraulic hose	Looseness, damage, Oilleakage	Retightening, replacement	Every day
(06) Gas valve body/ Gas valve plug	Looseness	Retightening	Every day
(07) H.T bolt / nut	Looseness , damage	Retightening, replacement	Every day
(08) Port joint bolt / nut	Looseness	Retightening	Every day
(09) Bracket pin bolt / nut	Looseness	Retightening	Every day
(10) Bracket bolt nut	Looseness , damage	Retightening, replacement	Every day
(11) Hex cap bolt	Looseness, damage	Retightening, replacement	Every day
(12) Guide bolt / nut	Looseness , damage	Retightening, replacement	Every day
(13) Retainer pin / Retainer pin stopper pin	Abrasion, damage	Repair, replacement	Every day
(14) Chisel bushing	Abrasion, damage	Replacement	Every day
(15) Chisel	Abrasion, damage	Replacement	Every day
(16) Bracket	Abrasion, damage,Crack	Repair, replacement	Every day
Hydraulic oil	Level, deterioration, contamination	Add, replacement	Every day

PERIODIC INSPECTION

Inspection Items	Substance	Countermeasure	Period
N_2 gas pressure	N_2 gas pressure	Recharge	100hr
Oil filter element (*)	Clogging	Replacement	100hr

Inspection Items	Substance	Countermeasure	Period
Gas seal	Wear, damage and harden	Replacement	600hr
Oil seal	Wear, damage and harden	Replacement	600hr
Dust seal	Wear, damage and harden	Replacement	600hr
Buffer ring	Wear, damage and harden	Replacement	600hr
O Ring	Wear, damage and harden	Replacement	600hr
Chisel holder bushing	Wear and damage	Replacement	600hr
Piston	Seizure, pick up marks and wear	Repair, replacement	600hr
Control valve	Seizure, pick up marks	Repair, replacement	600hr
Packing bushing	Seizure, pick up marks	Repair	600hr

3-2. INSPECTION FOR LOOSENESS AND RETIGHTNING OF BOLT/NUT

⚠ CAUTION

Check the looseness of every bolt and nut, and retighten them after 10 hours operation for brand-new and repaired (disassembled and assembled) breaker. The torque of bracket bolt possibly falls off due to initial mechanical fit with breaker body. Carry out the retightening maintenance even if the nuts do not turn.

Check the looseness of every bolt and nut on breaker body, bracket, and piping compornents. When looseness is confirmed, retighten them as per the torque chart in this manual.

・Since side bolt is long, the position of side bolt nut possibly moves by 2mm to 5mm when the breakeris brand-new condition. However that is not decline of the torque. Refer to the following permissible level for move of side bolt nut.

Model TNB-	(mm)
08M	1.5
1M	
2M	
3MB	

Model TNB-	(mm)
4M	2
5M	
6M	
6E	

Model TNB-	(mm)
7J	3
100	
141LU	4
151LU1	

Model TNB-	(mm)
190LU	4
230LU2	5
310LU1	
400LU	

・When oil leaks from hydraulic hose connection area, loosen the hose at first and retighten it at specific torque, in order to avoid the damage to hose and adapters because of excessive tightening torque.

⚠ CAUTION

If the breaker is used with loose comprnents, it might cause bolt breakage, bracket crack, oil leakage, and damage and malfunction of breaker.

TIGHTENING TORQUE SPECIFICATIONS -BARE BREAKER-

ＴＮＢ-０８Ｍ，1Ｍ，２Ｍ，３ＭＢ，４Ｍ，５Ｍ

Torque:N·m (kg·m)

Model TNB-		08M	1M	2M	3MB	4M	5M
(01) Side bolt nut	Hex Size mm Torque	24 216 (22)	27 294 (30)	32 441 (45)	32 441 (45)	32 539 (55)	36 637 (65)
(02) Hose adapter	Hex Size mm Torque	27 245 (25)	32 441 (45)	32 441 (45)	32 441 (45)	32 441 (45)	32 441 (45)
(03) Gas valve body	Hex Size mm Torque	22 83 (8.5)	22 83 (8.5)	22 83 (8.5)	22 83 (8.5)	22 83 (8.5)	22 83 (8.5)
(04) Gas valve plug	Hex Size mm Torque	14 12 (1.2)	14 12 (1.2)	14 12 (1.2)	14 12 (1.2)	14 12 (1.2)	14 12 (1.2)

TIGHTENING TORQUE SPECIFICATIONS -BARE BREAKER-

ＴＮＢ-６Ｍ ，
６Ｅ

ＴＮＢ-７Ｊ

Torque:N·m (kg·m)

Model TNB-		6M	6E	7J
(01) Side bolt nut	Hex Size mm Torque	41 980 (100)	41 980 (100)	55 1960 (200)
(02) Control valve box bolt	Hex Size mm Torque	22 274 (28)	27 441 (45)	#14 245(25)
(03) Control valve cap bolt	Hex Size mm Torque	22 274 (28)	27 441 (45)	#14 245(25)
(04) Hose adapter	Hex Size mm Torque	32 441 (45)	41 539 (55)	36 441(45)
(05) Gas valve body	Hex Size mm Torque	22 83 (8.5)	22 83 (8.5)	22 83 (8.5)
(06) Gas valve plug	Hex Size mm Torque	14 12 (1.2)	14 12 (1.2)	14 12 (1.2)

TIGHTENING TORQUE SPECIFICATIONS -BARE BREAKER-

ＴＮＢ-１００ ， １４１ＬＵ ， １５１ＬＵ１

Torque:N·m (kg·m)

Model TNB-		100	141LU	151LU1
(01) Side bolt nut	Hex Size mm Torque	55 1960 (200)	70 2254 (230)	70 2254 (230)
(02) Control valve box bolt	Hex Size mm Torque	32 735 (75)	32 735 (75)	32 735 (75)
(03) Control valve cap bolt	Hex Size mm Torque	32 735 (75)	32 735 (75)	32 735 (75)
(04) Hose adapter	Hex Size mm Torque	41 539 (55)	50 588 (60)	50 588 (60)
(05) Gas valve body	Hex Size mm Torque	22 83 (8.5)	22 83 (8.5)	22 83 (8.5)
(06) Gas valve plug	Hex Size mm Torque	14 12 (1.2)	14 12 (1.2)	14 12 (1.2)

TIGHTENING TORQUE SPECIFICATIONS -BARE BREAKER-

ＴＮＢ-１９０ＬＵ，２３０ＬＵ２，３１０ＬＵ１，　４００ＬＵ

Torque:N·m (kg·m)

Model TNB-		190LU	230LU2	310LU1	400LU
(01) Side bolt nut	Hex Size mm Torque	75 2842 (290)	80 3528 (360)	80 3528 (360)	90 5684 (580)
(02) Control valve box bolt	Hex Size mm Torque	41 882 (90)	41 882 (90)	46 1274 (130)	46 1274 (130)
(03) Control valve cap bolt	Hex Size mm Torque	41 882 (90)	41 882 (90)	46 1274 (130)	46 1274 (130)
(04) Hose adapter	Hex Size mm Torque	50 588 (60)	50 588 (60)	60 637 (65)	60 637 (65)
(05) Gas valve body	Hex Size mm Torque	22 83 (8.5)	22 83 (8.5)	22 83 (8.5)	22 83 (8.5)
(06) Gas valve plug	Hex Size mm Torque	14 12 (1.2)	14 12 (1.2)	14 12 (1.2)	14 12 (1.2)

TIGHTENING TORQUE SPECIFICATIONS -TOP MOUNT BRACKET-

ＴＮＢ-０８Ｍ， １Ｍ， ２Ｍ， ３Ｍ， ４Ｍ， ５Ｍ

Torque:N·m (kg·m)

Model TNB-		08M	1M	2M	3MB	4M	5M
(01) Hydraulic hose	Hex Size mm Torque	22 39～59 (4～6)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)
(02) H.T bolt / nut	Hex Size mm Torque	24 190 (20)	24 190 (20)	24 190 (20)	24 190 (20)	24 190 (20)	24 190 (20)
(03)Bracket bolt nut	Hex Size mm Torque	24 176 (18)	27 255(26)	30 343 (35)	30 343 (35)	32 412 (42)	36 588 (60)

TIGHTENING TORQUE SPECIFICATIONS -TOP MOUNT BRACKET-

ＴＮＢ-６Ｍ，６Ｅ，１００，１４１ＬＵ，１５１ＬＵ１

Torque:N·m (kg·m)

Model TNB-		6M	6E	100	141LU	151LU1
(01) Hydraulic hose	Hex Size mm Torque	内 27 外 36 内 84～132 (8.5～13.5) 外 128～186 (13～19)	36 128～186 (13～19)	36 128～186 (13～19)	41 177～245 (18～25)	41 177～245 (18～25)
(02)H.T bolt / nut	Hex Size mm Torque	30 370 (38)	30 370 (38)	30 370 (38)	36 650 (67)	36 650 (67)
(03)Bracket pin bolt / nut	Hex Size mm Torque	-	-	19 76 (8)	24 176 (18)	24 176 (18)
(04)Bracket bolt nut	Hex Size mm Torque	41 882 (90)	46 980 (100)	55 1372 (140)	60 1617 (165)	60 1617 (165)

TIGHTENING TORQUE SPECIFICATIONS -TOP MOUNT BRACKET-

ＴＮＢ-１９０ＬＵ，２３０ＬＵ，３１０ＬＵ，　４００ＬＵ

Torque:N·m (kg·m)

Model TNB-		190LU	230LU	310LU	400LU
(01) Hydraulic hose	Hex Size mm Torque	41 177～245 (18～25)	41 177～245 (18～25	50 197～294 (20～30)	50 197～294 (20～30)
(02) H.T bolt / nut	Hex Size mm Torque	46 1260 (128)	46 1260 (128)	60 2900 (295)	60 2900 (295)
(03) Bracket pin bolt / nut	Hex Size mm Torque	24 176 (18)	30 343 (35)	36 588 (60)	36 588 (60)
(04) Bracket bolt nut	Hex Size mm Torque	65 1960 (200)	75 2745 (280)	75 2745 (280)	90 4900 (500)

TIGHTENING TORQUE SPECIFICATIONS -BOX BRACKET-

ＴＮＢ-０８Ｍ，1Ｍ，２Ｍ，３ＭＢ，４Ｍ，５Ｍ

Torque:N·m (kg·m)

Model TNB-		08M	1M	2M	3MB	4M	5M
(01)Hydraulic hose	Hex Size mm Torque	22 39～59 (4～6)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)
(02)H.T bolt / nut	Hex Size mm Torque	24 190 (20)	24 190 (20)	24 190 (20)	24 190 (20)	24 190 (20)	24 190 (20)
(03)H.T bolt / nut	Hex Size mm Torque	17 44 (4.5)	17 44 (4.5)	19 76 (8)	19 76 (8)	19 76 (8)	19 76 (8)
(04)Guide bolt / nut	Hex Size mm Torque	19 76(8)	24 190 (20)	24 190 (20)	24 190 (20)	24 190 (20)	24 190 (20)

TIGHTENING TORQUE SPECIFICATIONS -BOX BRACKET-

ＴＮＢ-６Ｅ ，１００ ，１９０ＬＵ１ ＴＮＢ-７Ｊ

Torque:N·m (kg·m)

Model TNB-		6E	7J	100	190LU
(01) Hydraulic hose	Hex Size mm Torque	36 128～186 (13～19)	36 128～186 (13～19)	36 128～186 (13～19)	41 177～245 (18～25)
(02) H.T bolt / nut	Hex Size mm Torque	30 370 (38)	36 650 (66)	30 370 (38)	46 1260 (128)
(03) Bracket pin bolt / nut	Hex Size mm Torque	-	19 76 (8)	19 76 (8)	24 176 (18)
(04) H.T bolt	Hex Size mm Torque	24 190 (20)	30 370 (38)	24 190 (20)	24 190 (20)
(05) H.T bolt	Hex Size mm Torque	17 44 (4.5)	-	19 76 (8)	19 76 (8)
(06) Guide bolt / nut	Hex Size mm Torque Lock Nut	30 370 (38) -	36 650 (67) 300 (31)	30 370 (38) -	46 1260 (128) -
(07)Hex socket bolt	Hex Size mm Torque	-	#14 190 (20)	-	-
(08) Hex socket bolt	Hex Size mm Torque	-	#14 190 (20)	-	-

TIGHTENING TORQUE SPECIFICATIONS -BOX BRACKET-

ＴＮＢ-１５１ＬＵ１ ,２３０ＬＵ2, ３１０ＬＵ１ , ４００ＬＵ

Torque:N·m (kg·m)

Model TNB-		151LU1	230LU2	310LU1	400LU
(01) Hydraulic hose	Hex Size mm Torque	41 177～245 (18～25)	41 177～245 (18～25)	50 197～294 (20～30)	50 197～294 (20～30)
(02) H.T bolt / nut	Hex Size mm Torque	46 1260 (128)	46 1260 (128)	60 2900 (295)	60 2900 (295)
(03)Bracket pin bolt / nut	Hex Size mm Torque	24 176 (18)	30 343 (35)	36 588 (60)	36 588 (60)
(04) H.T bolt	Hex Size mm Torque	30 370 (38)	30 370 (38)	30 370 (38)	30 370 (38)
(05) H.T bolt	Hex Size mm Torque	30 370 (38)	30 370 (38)	30 370 (38)	19 76 (8)
(06) Guide bolt / nut	Hex Size mm Torque Lock Nut	46 1260 (128) 350 (36)	55 2000 (204) 450 (46)	55 2000 (204) 450 (46)	46 1260 (128) -
(07) H.T bolt	Hex Size mm Torque	36 650 (66)	36 650 (66)	36 650 (66)	-

TIGHTENING TORQUE SPECIFICATIONS -SIDE MOUNT BRACKET-

ＴＮＢ-０８Ｍ，1Ｍ，２Ｍ，３ＭＢ，４Ｍ，５Ｍ

Torque:N·m (kg·m)

Model TNB-		08M	1M	2M	3MB	4M	5M
(01)Hydraulic hose	Hex Size mm Torque	22 39～59 (4～6)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)
(02)Bracket bolt nut	Hex Size mm Torque	24 176 (18)	27 255(26)	30 343 (35)	30 343 (35)	32 412 (42)	36 588 (60)

TIGHTENING TORQUE SPECIFICATIONS -SIDE MOUNT BRACKET-

ＴＮＢ-６Ｍ ， ６Ｅ ， １００ ， １４１ＬＵ

Torque:N·m (kg·m)

Model TNB-		6M	6E	100	141LU
(01) Hydraulic hose	Hex Size mm Torque	36 128～186 (13～19)	36 128～186 (13～19)	36 128～186 (13～19)	41 177～245 (18～25)
(02) Hydraulic hose	Hex Size mm Torque	27 84～132 (8.5～13.5)	36 128～186 (13～19)-	36 128～186 (13～19)	41 177～245 (18～25)
(03) Port joint bolt nut	Hex Size mm Torque Lock Nut	19 108 (11) -	19 108 (11) -	19 108 (11) -	24 245 (25) 100(11)
(04)Bracket pin bolt / nut	Hex Size mm Torque	-	-	19 76 (8)	24 176 (18)
(05) Bracket bolt nut	Hex Size mm Torque	41 882 (90)	46 980 (100)	55 1372 (140)	60 1617 (165)

TIGHTENING TORQUE SPECIFICATIONS -SIDE MOUNT BRACKET-

ＴＮＢ-７Ｊ　　ＴＮＢ-１５１ＬＵ１ ， ２３０ＬＵ２，３１０ＬＵ１

Torque:N·m (kg·m)

Model TNB-		7J	151LU1	230LU2	310LU1
(01) Hydraulic hose	Hex Size mm Torque	36 128～186 (13～19)	41 177～245 (18～25)	41 177～245 (18～25)	50 197～294 (20～30)
(02) Port joint bolt nut	Hex Size mm Torque Lock Nut	#14 245 (25) 100(11)	30 490 (50) 200(20)	30 490 (50) 200(20)	30 490 (50) 200(20)
(03)Bracket pin bolt / nut	Hex Size mm Torque	19 76 (8)	24 176 (18)	30 343 (35)	36 588 (60)
(04) Bracket bolt nut	Hex Size mm Torque	55 1372 (140)	75 3400 (340)	85 4200 (428)	85 4200 (428)

TIGHTENING TORQUE SPECIFICATIONS -SIDE MOUNT SILENCED BRACKET-

ＴＮＢ-２Ｍ ， ３ＭＢ ， ４Ｍ

ＴＮＢ-６Ｍ

Torque:N·m (kg·m)

Model TNB-		2M	3MB	4M	6M
(01) Hydraulic hose	Hex Size mm Torque	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)	27 84～132 (8.5～13.5)	36 128～186 (13～19)
(02) H.T bolt / nut	Hex Size mm Torque	24 190 (20)	24 190 (20)	24 190 (20)	24 190 (20)
(03) Guide bolt / nut	Hex Size mm Torque	24 190 (20)	24 190 (20)	24 190 (20)	24 190 (20)
(04) Hex socket bolt	Hex Size mm Torque	#10 44 (4.5)	#10 44 (4.5)	#10 44 (4.5)	#10 44 (4.5)
(05) Hex socket bolt	Hex Size mm Torque	#8 30 (3)	#10 44 (4.5)	#10 44 (4.5)	#10 44 (4.5)
(06) Port joint bolt nut	Hex Size mm Torque	-	-	-	19 108 (11)

TIGHTENING TORQUE SPECIFICATIONS -SIDE MOUNT SILENCED BRACKET-

ＴＮＢ-７Ｊ ， １５１ＬＵ１

Torque:N·m (kg·m)

Model TNB-		7J	151LU1
(01) Hydraulic hose	Hex Size mm Torque	36 128～186 (13～19)	41 177～245 (18～25)
(02) H.T bolt / nut	Hex Size mm Torque Lock Nut	36 650 (66) 300 (31)	36 650 (66) 300 (31)
(03) Port joint bolt nut	Hex Size mm Torque Lock Nut	#14 245 (25) 100(11)	24 245 (25) 100(11)
(04) Bracket pin bolt / nut	Hex Size mm Torque	19 76 (8)	24 176 (18)
(05) Guide bolt / nut	Hex Size mm Torque Lock Nut	36 650 (67) 300 (31)	46 1260 (128) 350 (36)
(06) H.T bolt	Hex Size mm Torque	30 370 (38)	30 370 (38)
(07)Hex socket bolt	Hex Size mm Torque	#14 190 (20)	#14 190 (20)
(08) Hex socket bolt	Hex Size mm Torque	#14 190 (20)	#14 190 (20)

3-3. INSPECTION OF RETAINER PINS

- Inspect the wear of the retainer pins everyday.

⚠ WARNING

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

1. For removing the chisel, refer to the chapter of "REMOVING THE CHISEL"

⚠ CAUTION

It is essential to change the Retainer Pin if the values are less than the serviceability limit shown in the table.
If is breaks, this will lead to damage of the hydraulic breaker and is dangerous.

2. Repair the excess bulge build-up from around the retainer pins (3) by using a grinder (B).

3. Insert the retainer pin into the retainer-pin holes.

   The retainer pins have 4 surfaces that can be used so that the wear is equally distributed.

4. For installing chisel, refer to the chapter of "INSTALLATION OF THE CHISEL"

INSPECTION OF RETAINER PINS

TNB-08M, 1M, 2M, 3MB, 4M

NOTE: Measure at contact area with chisel.

Model TNB-	08M	1M	2M	3MB	4M
Brand New O.D A (mm)	Φ16	Φ18	Φ20	Φ24	Φ26
Serviceability limit O.D A (mm)	Φ14.5	Φ16.5	Φ18	Φ22	Φ24

TNB-5M, 6M, 6E, 141LU

NOTE: Measure at contact area (Middle Dia.) with chisel

型式 TNB-	5M	6M	6E	141LU
Brand New O.D A (mm)	Φ29.5	Φ29.5	Φ31.5	Φ49.5
Serviceability limit O.D A (mm)	Φ27.5	Φ27.5	Φ29.5	Φ46.5

TNB-7 J, 100, 151LU1, 190LU, 230LU2, 310LU1, 400LU

NOTE: Measure at contact area with chisel.

REMARK
It is essential to change the retainer pin if the values are less than the service ability limit shown in the table

型式 TNB-	7J	100	151LU1	190LU	230LU2
Brand New length AxB (mm)	35 x 70	35 x 70	40 x 80	46 x 92	50 x 100
Serviceability limit length AxB (mm)	32 x 67	32 x 67	37 x 77	43 x 89	47 x 97

型式 TNB-	310LU1	400LU
Brand New length AxB (mm) (inch)	55 x 110	60 x 120
Serviceability limit length AxB (mm) (inch)	51 x 106	56 x 116

3-4. INSPECTION OF CHISEL BUSHING ABRASION

- Inspect the wear of the chisel bushing everyday.

1. Lay the hydraulic breaker on the ground horizontally.
   Stop the excavator engine.

2. Insert brand new chisel (1).

3. Measure the clearance (C) between the chisel bushing (2) and chisel (1); Check whether the clearance is within the permitted values shown in the table below.

4. 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 Distributor.

Model TNB-	08M	1M	2M	3MB	4M	5M
Clearance (C) (mm)	4	4	4	4	4	4

Model TNB-	6M	6E	7J	100	141LU	151LU1
Clearance (C) (mm)	4	6	7	7	8	8

Model TNB-	190LU	230LU2	310LU1	400LU
Clearance (C) (mm)	8	10	10	12

5. Or measure chisel bushing if the I.D. (A) after removing the chisel.

6. It is essential to change the chisel bushing if the I.D. (A) is beyond the permitted values shown in the table below. As regards to changing the chisel bushing, please contact TOKU Distributor.

NOTE: Measure I.D. at 10mm (0.39inch) depth from the edge.

Model TNB-	08M	1M	2M	3MB	4M	5M
Brand-new I.D (mm)	φ40	φ45	φ50.3	φ58	φ64	φ75
Service ability limit I.D(mm)	φ44	φ49	φ54.3	φ62	φ68	φ79

Model TNB-	6M	6E	7J	100	141LU	151LU1
Brand-new I.D (mm)	φ75	φ95	φ105	φ115	φ135	φ135
Service ability limit I.D(mm)	φ79	φ101	φ112	φ122	φ143	φ143

Model TNB-	190LU	230LU2	310LU1	400LU
Brand-new I.D (mm)	φ140	φ146	φ160	φ178
Service ability limit I.D(mm)	φ148	φ156	φ170	φ190

3-5. INSPECTION OF CHISEL ABRASION

- Inspect the wear of the chisel every day.

1) TOP MOUNT BRACKET SIDE MOUNT BRACKET

Press the Chisel into the Chisel holder before measuring.

Model TNB-	08M	1M	2M	3MB	4M	5M
Brand-new length A (mm)	285	290	295	346	360	490
Service ability limit length B (mm)	180	180	200	220	240	250

Model TNB-	6M	6E	7J	100	141LU	151LU1
Brand-new length A (mm)	490	565	664	622	675	675
Service ability limit length B (mm)	250	300	350	350	400	400

Model TNB-	190LU	230LU2	310LU1	400LU
Brand-new length A (mm)	625	782	850	976
Service ability limit length B (mm)	400	400	450	500

2) BOX BRACKET

Press the Chisel into the Chisel holder before measuring.

Model TNB-	08M	1M	2M	3MB	4M	5M
Brand-new length A (mm)	255	250	355	401	410	535
Service ability limit length B (mm)	180	180	200	220	240	250

Model TNB-	6M	6E	7J	100	151LU1
Brand-new length A (mm)	540	595	598	560	620
Service ability limit length B (mm)	250	300	350	350	400

Model TNB-	190LU	230LU2	310LU1	400LU
Brand-new length A (mm)	554	722	780	891
Service ability limit length B (mm)	400	400	450	500

3) SIDE MOUNT SILENCED BRACKET

Press the Chisel into the Chisel holder before measuring.

Model TNB-	2M	3MB	4M	6M	7J	151LU1
Brand-new length A (mm)	331	374	389	506	598	553
Service ability limit length B (mm)	178	193	219	269	350	340

3-6. INSPECTION OF CHISEL HOLDER BUSHING ABRASION

- Inspect the wear of the chisel holder bushing every 600 hours.

1. Remove the chisel Inspection table for wear measurement of the chisel holder bushing.

2. It is essential to change the chisel holder bushing if the I.D. isnot within the permitted values shown in the table below. As regards to changing the chisel holder bushing, please contact TOKU Distributor.

Measure I.D at the back of center.

Model TNB-	08M	1M	2M	3MB	4M	5M
Brand-new I.D (mm)	φ40 (＊)	φ45	φ50.3	φ58	φ64	φ75
Service ability limit I.D(mm)	φ41.5 (＊)	φ46.5	φ51.8	φ59.5	φ66	φ77

Model TNB-	6M	6E	7J	100	141LU	151LU1
Brand-new I.D (mm)	φ75	φ95	φ105	φ115	φ135	φ135
Service ability limit I.D(mm)	φ77	φ97.5	φ108	φ118.5	φ139	φ139

Model TNB-	190LU	230LU2	310LU1	400LU
Brand-new I.D (mm)	φ140	φ146	φ160	φ178
Service ability limit I.D(mm)	φ144	φ151	φ165	φ184

(＊) As for the TNB-08M, this number would be the measurement of the CHISEL HOLDER.

★NOTICE

In below case, make sure to change the chisel holder bushing, even if the value of I.D is within the serviceability limit.

The wear on the chisel holder bushing is application dependent.

As a general rule, the chisel holder bushing is replaced every second time the chisel bushing is replaced.

WEAR OF THE SHOULDER PART OF THE CHISEL HOLDER BUSHING

型式　TNB-	08M	1M	2M	3MB	4M	5M
Brand-new length A　(mm)	135　(＊)	160	175	218	238	250
Service ability limit length B　(mm)	138　(＊)	163	178	221	241	253

型式　TNB-	6M	6E	7J	100	141LU	151LU1
Brand-new length A　(mm)	250	280	330	360	457	457
Service ability limit length B　(mm)	253	283	333	363	460	460

型式　TNB-	190LU	230LU2	310LU1	400LU
Brand-new length A　(mm)	455	468	535	600
Service ability limit length B　(mm)	458	471	538	603

(＊) As for the TNB-08M, this number would be the measurement of the CHISEL HOLDER.

3-7. INSPECTION OF NITROGEN GAS PRESSURE AND RECHARGE

- Inspect the nitrogen gas pressure every 100 hrs.

⚠ WARNING

Do not use any other gas except nitrogen gas.
If other gases are used, it may explode and is dangerous.

⚠ 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 low, fill the cushion chamber with nitrogen gas according to the following procedures

3-7-1 NITROGEN GAS CHARGING PRESSURE IN A CORRELATION WITH ATMOSPHERIC TEMPERATURE

3-7-2 INSPECTION OF NITROGEN GAS PRESSURE

⚠ CAUTION

When checking the nitrogen gas pressure, make sure the hydraulic breaker is cooled off.

1. Place the hydraulic breaker about 50cm (1.64ft) from the ground in a horizontal position for easy access.
   Stop the excavator engine.

2. Remove the gas valve plug (1) from the cylinder cover.

P.S : In regard to the side mount silenced bracket remove the bolt (4) and turn over the cover (5) and continue the work process of 2.

3. Insert a pressure gauge (A) into the gas valve (2) and measure the nitrogen gas pressure

Filling nitrogen gas pressure at usual atmosphere temperature (20℃)

◆Refer to the attached graph when the outside temperature is extremely high or low.

Model TNB-	08M	1M	2M	3MB	4M	5M
Nitrogen gas pressure MPa (kg/cm^2)	0.8 (8)	0.8 (8)	0.8 (8)	0.8 (8)	0.8 (8)	0.8 (8)

Model TNB-	6M	6E	7J	100	141LU	151LU1
Nitrogen gas pressure MPa (kg/cm^2)	1.0 (10)	0.8 (8)	0.9 (9)	0.8 (8)	0.8 (8)	1.1 (11)

Model TNB-	190LU	230LU2	310LU1	400LU
Nitrogen gas pressure MPa (kg/cm^2)	0.8 (8)	0.8 (8)	0.8 (8)	0.8 (8)

3-7-3 REFILLING OF NITROGEN GAS

WARNING

Do not use any other gas except nitrogen gas.
In other gases are used, it may explode and is dangerous.

CAUTION

When refilling the nitrogen gas, make sure the hydraulic breaker is cooled off.

CAUTION

Make sure the pressure regulator handle (A) is loosened.

1. Fit a pressure regulator (2) and hose (3) onto the nitrogen gas cylinder (1)

2. Fit a filling adapter (4) to the end of the hose and insert the adapter into the gas valve

3. Open the regulator valve (B) of the nitrogen gas cylinder

4. Turn the handle (A) of the pressure regulator (2) 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 (A) 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 (B) of the nitrogen gas cylinder

7. Remove the adapter (4) inserted in the gas valve.

8. Insert a pressure gauge (5) 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 (6) onto the gas value 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 toolbox

In regard to parts for measuring the nitrogen gas pressure and for gas filling consult with TOKU and Toku's designated distributors.

3-8. INSPECTION ON THE PLASTIC PARTS OF BRACKETS AND SERVICEABILITY LIMIT

- Inspect the wear of plastic parts every 100 hours.

3-8-1. SIDE MOUNT SILENCED BRACKET ISOLATOR

2M	3MB, 4M, 6M	7J	151LU1

Model TNB-	2M	3MB	4M	6M	7 J	151LU1
Brand new A (mm)	39.5	37	40	64	80	145
Serviceability limit	37.5	35	38	62	77	137

ISOLATOR UD

2M, 3MB, 4M, 6M, 151LU1

PROTECTOR F

7 J

Model TNB-	2M	3MB	4M	6M	7 J	151LU1
Brand new A (mm)	51.5	59	59	68	31	96
Serviceability limit	49.5	57	57	66	29	94

In regard to the plastic parts of isolators and spacers they are to be replaced at the breakage in no relation to wear dimensions.

SIDE MOUNT SILENCED BRACKET

STOPPER

Model TNB-	6M
Brand new A (mm)	57
Serviceability limit B (mm)	56

GUIDE SPACER

2M, 3MB, 4M, 6M

ISOLATOR TFR

7J, 151LU1

Model TNB-	2M	3MB	4M	6M	7 J	151LU1
Brand new A (mm)	10	10	10	10	35	38
Serviceability limit	8	8	8	8	33	36

ISOLATOR SLR

※Exchange left and right at the same time.

Replace it when either A or B is at serviceability limit.

Model TNB-	7 J	151LU1
Brand new AxB (mm)	40x95	42X137
Serviceability limit CxD (mm)	38x93	40X135

ISOLATOR ULR

※Exchange left and right at the same time.

Replace it when either A or B is at serviceability limit.

Model TNB-	7 J	151LU1
Brand new AxB (mm)	42x52	49x57
Serviceability limit	40x50	47x55

In regard to the plastic parts of isolators and spacers they are to be replaced at the breakage in no relation to wear dimensions.

SIDE MOUNT SILENCED BRACKET

ISOLATOR TLR

Model TNB-	7 J
Brand new A (mm)	43.5
Serviceability limit B (mm)	41.5

RETAINER ISOLATOR

RETAINER ISOLATOR A

2M, 3MB, 4M, 6M	7J	151LU1

Model TNB-	2M	3MB	4M	6M	7 J	151LU1
Brand new A (mm)	39	42	43	50	25	80
Serviceability limit	37	40	41	48	23	77

RETAINER ISOLATOR B

7J

Model TNB-	7 J
Brand new A (mm)	35
Serviceability limit B (mm)	33

ISOLATOR F R

Model TNB-	7J	151LU1
Brand new A (mm)	10	5
Serviceability limit B (mm)	9	4

In regard to the plastic parts of isolators and spacers they are to be replaced at the breakage in no relation to wear dimensions.

SIDE MOUNT SILENCED BRACKET

SPACER F	SPACER F R
2M, 3MB, 4M, 6M	7J, 151LU1

Model TNB-	2M	3MB	4M	6M	7 J	151LU1
Brand new Thickness T x Deform H (mm)	10x0	10x0	10x0	10x0	10x0	15x0
Serviceability limit Thickness T x Deform H( )	9.5x10	9.5x10	9.5x10	9.5x10	9.5x5	14.5x5

In regard to the plastic parts of isolators and spacers they are to be replaced at the breakage in no relation to wear dimensions.

3-8-2 BOX BRACKET

TOP RUBBER	TOP RUBBER	ISOLATOR	ISOLATOR T
08M, 1M, 2M	3MB, 4M, 5M, 6E	7J	151LU1, 230LU2 310LU1

Model TNB-	08M	1M	2M	3MB	4M	5M
Brand new A (mm)	47(22)	47(23)	47(23)	47	52+(60)	54+(25)
Serviceability limit B (mm)	45(21)	45(22)	45(22)	45	51+(59)	53+(24)

型式 TNB-	6E	7J	151LU1	230LU2	310LU1
Brand new A (mm)	66	80	122(52)	157(78)	157(78)
Serviceability limit B (mm)	64	77	117(48)	152(74)	152(74)

GUIDE SPACER	ISOLATOR TFR	ISOLATOR TF
08M, 1M, 2M, 3MB, 4M, 5M, 6E	7J	151LU1, 230LU2, 310LU1

Model TNB-	08M	1M	2M	3MB	4M	5M
Brand new A (mm)	10	10	10	10	10	10
Serviceability limit B (mm)	8	8	8	8	8	8

Model TNB-	6E	7J	151LU1	230LU2	310LU1
Brand new A (mm)	15	35	30	40	45
Serviceability limit B (mm)	13	33	28	38	43

In regard to the plastic parts of isolators and spacers they are to be replaced at the breakage in no relation to wear dimensions.

BOX BRACKET

ISOLATOR SLR

※Exchange left and right at the same time.

Replace it when either A or B is at serviceability limit.

Model TNB-	7 J
Brand new AxB (mm)	40x95
Serviceability limit CxD (mm)	38x93

ISOLATOR ULR

※Exchange left and right at the same time.

Replace it when either A or B is at serviceability limit.

Model TNB-	7 J
Brand new AxB (mm)	42x52
Serviceability limit CxD (mm)	40x50

ISOLATOR TLR

Model TNB-	7 J
Brand new A (mm)	43.5
Serviceability limit B (mm)	41.5

ISOLATOR KLR

※Replace 4 of them at the same time.

Model TNB-	151LU1	230LU2	310LU1
Brand new A (mm)	30	40	40
Serviceability limit	29	39	39

STOPPER

Model TNB-	151LU1	230LU2	310LU1
Brand new A (mm)	45	72	72
Serviceability limit	44	71	71

In regard to the plastic parts of isolators and spacers they are to be replaced at the breakage in no relation to wear dimensions

BOX BRACKET

SPACER F

08M, 1M, 2M, 3MB, 4M, 5M, 6E

SPACER FR

7J, 151LU1, 230LU2, 310LU1

Model TNB-	08M	1M	2M	3MB	4M	5M
Brand new Thickness Tx Deform H(mm)	10x0	10x0	10x0	10x0	10x0	10x0
Serviceability limit Thickness Tx Deform H(mm)	9.5x10	9.5x10	9.5x10	9.5x10	9.5x5	9.5x5

Model TNB-	6E	7J	151LU1	230LU2	310LU1
Brand new Thickness Tx Deform H(mm)	15x0	10x0	15x0	20x0	20x0
Serviceability limit Thickness Tx Deform H(mm)	14.5x5	9.5x5	14.5x5	19.5x5	19.5x5

The serviceability limit dimensions of other spacers for BOX BRACKET and SIDE MOUNT SILENCED BRACKET are -0.5mm from the thickness of brand new.

In regard to the plastic parts of isolators and spacers they have to be replaced at the breakage in no relation to dimensions.

ISOLATOR SHIM T for BOX BRACKET and SIDE MOUNT SILENCED BRACKET

Model TNB-	151LU1
Thickness T (mm)	1
Thickness T (mm)	2

* In case of using the shim as counter measure to the serviceability limit it must be applied only one time. From the 2' nd time later replace the isolator/isolator T with new one.

SHIM G for BOX BRACKET and SIDE MOUNT SILENCED BRACKET

型式 TNB-	7J	151LU1
Thickness T (mm)	2	2

* In case of using the shim as counter measure to the serviceability limit it must be applied only one time. From the 2' nd time later replace the isolatorTF/isolator TFR with new one.

3-9. REPLACEMENT OF OIL FILTER ELEMENT

⚠ 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.

- Replace the filter element of the oil filter, which is located on the breaker piping line every 100 hrs. In case it is not available on the breaker piping line replace the filter element of the filter every 100 hrs in the tank or close to the tank.

3-10. CHANGE THE HYDRAULIC OIL IN THE TANK

⚠ WARNING
Various parts will be very hot after operation of the engine. Do not change the hydraulic oil immediately. You can get burn. Change the oil after the hydraulic oil and various parts have cooled off.

- Carefully read the manual of the excavator and change the hydraulic oil every 600 hrs in the tank of an excavator.

- As the hydraulic oil is constantly under the harsh conditions such as high temperature and high pressure it deteriorates along with time. The designated periodic oil change is obliged even though it is not contaminated.
- The hydraulic oil is like the blood of human being for machines, therefore it must pay attention not to get mix the impure substance like water, metal particle and dirt into the oil.
- Fill the oil at designated amount. The oil amount should be exact; otherwise the excessive or less oil amount causes the failure of a breaker and an excavator.

● SPECIAL APPLICATION

4-1. UNDER WATER APPLICATION

Underwater operation, it is an extremely hard job condition for a hydraulic breaker.
The standard specification of a hydraulic breaker will have water penetration inside of the breaker body and not only get the cause of failure of the breaker but also give the cause of serious damage to the excavator when it is used underwater without the underwater specialized equipment. Hence it is ″must” to have the underwater specialized equipment on a standard hydraulic breaker when it is used under water.

⚠ CAUTION
A standard specification TNB hydraulic breaker cannot be operated underwater. Before operating the hydraulic breaker underwater, make sure the hydraulic breaker is set up for underwater usage.

⚠ CAUTION
Consult with TOKU or TOKU's designated distributor about underwater application.

4-2. TUNNEL APPLICATION

Tunnel operation, it is an extremely hard job condition for a hydraulic breaker.
The standard specification of a hydraulic breaker will have dirt, sand, clay and water mixed penetration inside the impact chamber since the breaker will be often operated side-way or upward position to the work object and not only get the cause of failure of the breaker but also cause the contamination and deterioration of the hydraulic oil and drastically lowering the pump performance of an excavator when it is used in a tunnel without the tunnel specialized equipment. Hence it is ″must ” to have the tunnel specialized equipment on a standard hydraulic breaker when it is used in a tunnel.

⚠ CAUTION
A standard specification TNB hydraulic breaker cannot be operated in the tunnel. Before operating the hydraulic breaker in the tunnel, make sure the hydraulic breaker is set up for tunnel usage.

⚠ CAUTION
Consult with TOKU or TOKU's designated distributor about tunnel application.

● TROUBLE SHOOTING GUIDE

5-1. 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 diagram) between the chisel and chisel bushing, this oil is for lubrication purposes and is normal.

TNB-08M, 1M, 2M, 3M, 4M, 5M

	Oil leakage location	Cause	Countermeasure
A	Opening between the and chisel the chisel bushing	Wear or damage of oil seal.	(*) Replacement
		Seizure of piston & cylinder.	(*) Repair or replacement
B	Between the cylinder cover and cylinder.	Wear or damage of O-ring or back up ring.	(*) Replacement
		Looseness of the side bolt nut.	Retighten the side bolt nut with the specified torque.
C	Between the cylinder and the chalk plug	Wear or damage of O-ring	(*) Replacement.
		Looseness of the chalk plug	Retightening the chalk plug with the specified torque.
D	Between the cylinder and the hose adapter	Wear or damage of O-ring	(*) Replacement.
		Looseness of the hose adapter	Retightening the hose adapter with the specified torque.

NOTE: (*) It is necessary to disassemble the hydraulic breaker in order to repair.

Please contact TOKU or TOKU's Distributor and ask for repair.

OIL LEAKAGE

TNB-6M, 6E, 7J, 100, 141LU, 151LU1, 190LU, 230LU2, 310LU1, 400LU

	Oil leakage location	Cause	Countermeasure
A	Opening between chisel bush and chisel	Wear or damage of oil seals	(*) Replacement
		Seizure on piston and cylinder	(*) Repair or replacement
B	Connecting face between cylinder and cylinder cover	Wear or damage of O-ring or back up ring.	(*) Replacement
		Loosening of the side bolt nut.	Retighten the side bolt nut to the specified torque.
C	Between the cylinder and the control valve box	Wear or damage of O-ring or back up ring.	(*) Replacement.
		Loosening of the bolts	Retightening the bolts by the specified torque.
D	Between the control valve box and the control valve cap	Wear or damage of O-ring or back up ring.	(*) Replacement.
		Loosening of the bolts	Retightening the bolts by the specified torque.
E	Between Cylinder and hose adapter	Wear or damage of O-ring	(*) Replacement.
		Looseness of the hose adapter	Retightening the hose adapter with the specified torque.

NOTE: (*) It is necessary to disassemble the hydraulic breaker in order to repair.

Please contact TOKU or TOKU's Distributor and ask for repair.

5-2. NYTROGEN GAS LEAKAGE

＊ It is abnormal for the nitrogen gas to leak more than 0.3MPa (43 PSI)per 100 hours from the cylinder cover. Check the areas as shown in the chart for repairs.
Inspect the areas as shown in the following diagram.

NOTE: (*) It is necessary to disassemble the hydraulic breaker in order to repair.
Please contact TOKU or TOKU's Distributor and ask for repair.

TNB-08M, 1M, 2M, 3M, 4M, 5M

TNB-6M, 6E, 7J, 100, 141LU, 151LU1, 190LU, 230LU2, 310LU1, 400LU

	Gas leakage position	Cause	Countermeasure
F	Gas leakage from Gas valve plug.	Wear or damage of O-ring	Replacement
		Damage of gas valve piston	Replacement
G	Gas leakage from Gas valve body.	Wear or damage of O-ring	Replacement
H	Gas leakage from between the cylinder and the cylinder	Wear or damage of O-ring	Replacement
I	In case of gas leakage did not find at gas valve plug, gas valve body and connecting face of cylinder and cylinder cover.	Wear or damage of gas seals	Replacement
		Wear or damage of O-ring	Replacement
		Seizure of piston and packing bush	Repair or replacement

5-3. POOR OPERATION OF BREAKER

Condition	Cause	Countermeasure
Does not impact	Temperature of the hydraulic oil is too low.	Warm up the hydraulic excavator.
	Nitrogen gas pressure in the cylinder cover is too high or low.	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 on the excavator.	(*) 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 blow erratic and stop.).	Seizure of control valve.	(*) Repair or replace control valve
	Seizure of piston and cylinder.	(*) Repair or replace piston and 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 on the excavator.	(*) 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 or low.	Adjust the nitrogen gas to the correct pressure
Lack of Power	Nitrogen gas pressure in the cylinder cover is too low	Fill the nitrogen gas to the correct pressure
Decrease of blows.	Shortage of hydraulic oil	Fill the hydraulic oil to the designated volume
	Nitrogen gas pressure in the cylinder cover is too high or low.	Adjust the nitrogen gas to the correct pressure
	Lack of down force on the chisel.	アーム・バケットの操作でうまく押し込む
	Pressure setting for the relief valve is too low.	Operate the arm bucket so that the down force on the chisel is rightly applied l.
	Poor performance of the hydraulic pump on the excavator.	(*) Reset the relief valve to the correct pressure
	Backpressure is too high due to clogging hydraulic piping.	(*) Have the hydraulic excavator manufacturer to check the pump performance. If the performance is poor, repair or replace

(*) marked work is necessary to disassemble a breaker and repair as well as special tools and equipment is necessary.

Contact TOKU or TOKU's designated distributor.

● ACCESSORY TOOLS

6-1. TOP MOUNT BRACKET ACCESSORY TOOLS

No.	Model TNB-	08M		1M		2M		3MB		4M	
	Item	Size	Qt	Size	Qt	Size	Qt	Size	Qt	Size	Qt
1	Spanner Spanner	22mm	1	24mm	1	24mm	1	24mm	1	24mm	1
2	Spanner Spanner	24mm	1	27mm	1	27mm	1	27mm	1	27mm	1
3	Monkey wrench	27mm	1	32mm	1	30mm	1	30mm	1	32mm	1
4	Hammer	–		–		32mm	1	32mm	1	–	
5	Eye bolt	200mm	1	200mm	1	200mm	1	200mm	1	200mm	1
6	Eye bolt	#1	1	#1	1	#1	1	#1	1	#1	1
7	Chisel pin remover	M8	2	M8	2	M8	2	M12	2	M12	2
8	Hose plug	–		–		–		M8	1	M8	1
9	Hose adapter plug	7mm	1	7mm	1	9.8mm	1	9.8mm	1	9.8mm	1
10	Seal tape	PF3/8	2	PF1/2	2	PF1/2	2	PF1/2	2	PF1/2	2
11	Tool box	PF3/8	2	PF1/2	2	PF1/2	2	PF1/2	2	PF1/2	2
12		○	1	○	1	○	1	○	1	○	1
13		○	1	○	1	○	1	○	1	○	1

TOP MOUNT BRACKET ACCESSORY TOOLS

No.	Model TNB-	5M		6M		6E		100		141LU	
	Item	Size	Qt	Size	Qt	Size	Qt	Size	Qt	Size	Qt
1	Spanner	24mm	1	24mm	1	30mm	1	19mm	1	24mm	1
2	Spanner	27mm	1	32mm	1	36mm	1	36mm	1	36mm	1
3	Spanner	32mm	1	36mm	1	41mm	1	41mm	1	41mm	1
4	Spanner	36mm	1	–		–		–		50mm	1
5	Impact spanner	–		41mm	1	41mm	1	55mm	1	60mm	1
6	Impact spanner	–		–		46mm	1	–		70mm	1
7	Ring spanner	–		22mm	1	27mm	1	32mm	1	32mm	1
8	Monkey wrench	200mm	1	200mm	1	200mm	1	250mm	1	250mm	1
9	Hammer	#1	1	#1	1	#1	1	#2	1	#2	1
10	Eye bolt	M12	2	M12	2	M12	2	M20	2	M20	2
11	Hex bolt	–		M8	2	M8	2	M10	2	M10	2
12	Chisel pin remover	9.8mm	1	9.8mm	1	9.8mm	1	12.8mm	1	15.8mm	1
13	Hose plug	PF1/2	2	PF3/4	2	PF3/4	2	PF3/4	2	PF1”	2
14	Hose adapter plug	PF1/2	2	PF3/4	2	PF3/4	2	PF3/4	2	PF1”	2
15	Seal tape	○	1	○	1	○	1	○	1	○	1
16	Foundation bolt	–		–		–		M8-150	1	–	
17	Tool box	○	1	○	1	○	1	○	1	○	1

TOP MOUNT BRACKET ACCESSORY TOOLS

No.	Model TNB-	151LU1		190LU		230LU		310LU		400LU	
	Item	Size	Qt	Size	Qt	Size	Qt	Size	Qt	Size	Qt
1	Spanner	24mm	1	24mm	1	30mm	1	36mm	1	36mm	1
2	Spanner	36mm	1	41mm	1	41mm	1	50mm	1	50mm	1
3	Spanner	41mm	1	46mm	1	50mm	1	60mm	1	60mm	1
4	Spanner	50mm	1	50mm	1	–		–		–	
5	Impact spanner	60mm	1	65mm	1	75mm	1	75mm	1	90mm	1
6	Impact spanner	70mm	1	75mm	1	85mm	1	80mm	1	–	
7	Ring spanner	32mm	1	–		–		46mm	1	46mm	1
8	Socket	–		41mm	1	41mm	1	–		–	
9	Monkey wrench	250mm	1	300mm	1	300mm	1	300mm	1	300mm	1
10	Hammer	#2	1	#2	1	#2	1	#2	1	#2	1
11	Eye bolt	M20	2	M24	2	M24	2	M30	2	M30	2
12	Hex bolt	M10	2	M12	2	M12	2	M16	2	M16	2
13	Chisel pin remover	15.8mm	1	15.8mm	1	15.8mm	1	15.8mm	1	15.8mm	1
14	Hose plug	PF1”	2	PF1”	2	PF1”	2	PF1-1/4	2	PF1-1/4	2
15	Hose adapter plug	PF1”	2	PF1”	2	PF1”	2	PF1-1/4	2	PF1-1/4	2
16	Seal tape	○	1	○	1	○	1	○	1	○	1
18	Foundation bolt	M8-150	1	M8-150	1	M8-150	1	M12-150	1	M12-150	1
19	Tool box	○	1	○	1	○	1	○	1	○	1

6-2. BOX BRACKET ACCESSORY TOOLS

No.	Model TNB-	08M		1M		2M		3MB		4M	
	Item	Size	Qt	Size	Qt	Size	Qt	Size	Qt	Size	Qt
1	Spanner Spanner	22mm	1	24mm	1	24mm	1	24mm	1	24mm	1
2	Spanner Monkey	24mm	1	27mm	1	27mm	1	27mm	1	27mm	1
3	wrench Hammer	27mm	1	32mm	1	32mm	1	32mm	1	32mm	1
4	Eye bolt	200mm	1	200mm	1	200mm	1	200mm	1	200mm	1
5	Eye bolt	#1	1	#1	1	#1	1	#1	1	#1	1
6	Chisel pin remover	M8	2	M8	2	M8	2	M12	2	M12	2
7	Hose plug	-		-		-		M8	1	M8	1
8	Hose adapter plug	7mm	1	7mm	1	9.8mm	1	9.8mm	1	9.8mm	1
9	Seal tape	PF3/8	2	PF1/2	2	PF1/2	2	PF1/2	2	PF1/2	2
10	Tool box	PF3/8	2	PF1/2	2	PF1/2	2	PF1/2	2	PF1/2	2
11		○	1	○	1	○	1	○	1	○	1
12		○	1	○	1	○	1	○	1	○	1

BOX BRACKET ACCESSORY TOOLS

No.	Model TNB-	5M		6M		6E		7J	
	Item	Size	Qt	Size	Qt	Size	Qt	Size	Qt
1	Spanner	24mm	1	24mm	1	24mm	1	19mm	1
2	Spanner	27mm	1	30mm	1	30mm	1	30mm	1
3	Spanner	32mm	1	32mm	1	36mm	1	36mm	1
4	Spanner	36mm	1	36mm	1	41mm	1	–	
5	Impact spanner	–		41mm	1	41mm	1	55mm	1
6	Ring spanner	–		22mm	1	27mm	1	–	
7	Socket	–		–		–		30mm	1
8	Hexagon wrench	–		–		–		14mm	1
9	Monkey wrench	200mm	1	200mm	1	200mm	1	250mm	1
10	Hammer	#1	1	#1	1	#1	1	#2	1
11	Eye bolt	M12	2	M12	2	M12	2	M20	2
12	Hex bolt	–		M8	2	M8	2	M10	2
13	Chisel pin remover	9.8mm	1	9.8mm	1	9.8mm	1	9.8mm	1
14	Hose plug	PF1/2	2	PF3/4	2	PF3/4	2	PF3/4	2
15	Hose adapter plug	PF1/2	2	PF3/4	2	PF3/4	2	PF3/4	2
16	Seal tape	○	1	○	1	○	1	○	1
17	Foundation bolt	–		–		–		M8-150	1
18	Pliers	–		–		–		200mm	1
19	Tool box	○	1	○	1	○	1	○	1

BOX BRACKET ACCESSORY TOOLS

No.	Model TNB-	151LU1		230LU2		310LU1			
	Item	Size	Qt	Size	Qt	Size	Qt	Size	Qt
1	Spanner	24mm	1	30mm	1	30mm	1		
2	Spanner	30mm	1	36mm	1	36mm	1		
3	Spanner	36mm	1	41mm	1	50mm	1		
4	Spanner	41mm	1	46mm	1	55mm	1		
5	Spanner	46mm	1	50mm	1	60mm	1		
6	Spanner	50mm	1	55mm	1	_			
7	Impact spanner	70mm	1	80mm	1	80mm	1		
8	Ring spanner	32mm	1	-		46mm	1		
9	Socket	-		41mm	1	_			
10	Hexagon wrench	22mm	1	22mm	1	22mm	1		
11	Monkey wrench	250mm	1	300mm	1	300mm	1		
12	Hammer	#2	1	#2	1	#2	1		
13	Eye bolt	M20	2	M24	2	M30	2		
14	Hex bolt	M10	2	M12	2	M16	2		
15	Chisel pin remover	15.8mm	1	15.8mm	1	15.8mm	1		
16	Hose plug	PF1”	2	PF1”	2	PF1-1/4	2		
17	Hose adapter plug	PF1”	2	PF1”	2	PF1-1/4	2		
18	Seal tape	○	1	○	1	○	1		
19	Foundation bolt	M8-150	1	M8-150	1	M12-150	1		
20	Tool box	○	1	○	1	○	1		

6-3. SIDE MOUNT BRACKET ACCESSORY TOOLS

No.	Model TNB-	08M		1M		2M		3MB		4M	
	Item	Size	Qt	Size	Qt	Size	Qt	Size	Qt	Size	Qt
1	Spanner Spanner	22mm	1	27mm	1	27mm	1	27mm	1	27mm	1
2	Spanner Monkey	24mm	1	32mm	1	30mm	1	30mm	1	32mm	1
3	wrench Hammer	27mm	1	_		32mm	1	32mm	1	_	
4	Eye bolt	200mm	1	200mm	1	200mm	1	200mm	1	200mm	1
5	Eye bolt	#1	1	#1	1	#1	1	#1	1	#1	1
6	Chisel pin remover	M8	2	M8	2	M8	2	M12	2	M12	2
7	Hose plug	-		-		-		M8	1	M8	1
8	Hose adapter plug	7mm	1	7mm	1	9.8mm	1	9.8mm	1	9.8mm	1
9	Seal tape	PF3/8	2	PF1/2	2	PF1/2	2	PF1/2	2	PF1/2	2
10	Tool box	PF3/8	2	PF1/2	2	PF1/2	2	PF1/2	2	PF1/2	2
11		○	1	○	1	○	1	○	1	○	1
12		○	1	○	1	○	1	○	1	○	1

SIDE MOUNT BRACKET ACCESSORY TOOLS

No.	Model TNB-	5M		6M		6E		7J		100	
	Item	Size	Qt	Size	Qt	Size	Qt	Size	Qt	Size	Qt
1	Spanner	27mm	1	32mm	1	36mm	1	19mm	1	19mm	1
2	Spanner	32mm	1	36mm	1	41mm	1	36mm	1	36mm	1
3	Spanner	36mm	1	–		–		–		41mm	1
4	Impact spanner	–		41mm	1	41mm	1	55mm	1	55mm	1
5	Impact spanner	–		–		46mm	1	–		–	
6	Ring spanner	–		22mm	1	27mm	1	–	1	32mm	1
7	Monkey wrench	200mm	1	200mm	1	200mm	1	250mm	1	250mm	1
8	Hammer	#1	1	#1	1	#1	1	#2	1	#2	1
9	Eye bolt	M12	2	M12	2	M12	2	M20	2	M20	2
10	Hex bolt	–		M8	2	M8	2	M10	2	M10	2
11	Chisel pin remover	9.8mm	1	9.8mm	1	9.8mm	1	12.8mm	1	12.8mm	1
12	Hose plug	PF1/2	2	PF3/4	2	PF3/4	2	PF3/4	2	PF3/4	2
13	Hose adapter plug	PF1/2	2	PF3/4	2	PF3/4	2	PF3/4	2	PF3/4	2
14	Seal tape	○	1	○	1	○	1	○	1	○	1
15	Foundation bolt	–		–		–		M8-150	1	M8-150	1
16	Hexagon wrench Tool	–		–		–		14mm	1	–	
17	box	○	1	○	1	○	1	○	1	○	1

SIDE MOUNT BRACKET ACCESSORY TOOLS

No.	Model TNB-	141LU		151LU1		190LU		230LU2		310LU1	
	Item	Size	Qt	Size	Qt	Size	Qt	Size	Qt	Size	Qt
1	Spanner	24mm	1	24mm	1	24mm	1	30mm	1	30mm	1
2	Spanner	41mm	1	30mm	1	41mm	1	41mm	1	36mm	1
3	Spanner	50mm	1	41mm	1	50mm	1	50mm	1	50mm	1
4	Spanner	–		50mm	1	–		–		60mm	1
5	Impact spanner	60mm	1	70mm	1	65mm	1	80mm	1	80mm	1
6	Impact spanner	70mm	1	75mm	1	75mm	1	85mm	1	85mm	1
7	Ring spanner	32mm	1	32mm	1	–		–		46mm	1
8	Socket	–		–		41mm	1	41mm	1	–	
9	Monkey wrench	250mm	1	250mm	1	300mm	1	300mm	1	300mm	1
10	Hammer	#2	1	#2	1	#2	1	#2	1	#2	1
11	Eye bolt	M20	2	M20	2	M24	2	M24	2	M30	2
12	Hex bolt	M10	2	M10	2	M12	2	M12	2	M16	2
13	Chisel pin remover	15.8mm	1	15.8mm	1	15.8mm	1	15.8mm	1	15.8mm	1
14	Hose plug	PF1”	2	PF1”	2	PF1”	2	PF1”	2	PF1-1/4	2
15	Hose adapter plug	PF1”	2	PF1”	2	PF1”	2	PF1”	2	PF1-1/4	2
16	Seal tape	○	1	○	1	○	1	○	1	○	1
17	Foundation bolt	–		M8-150	1	M8-150	1	M8-150	1	M12-150	1
18	Tool box	○	1	○	1	○	1	○	1	○	1

6-4. SIDE MOUNT SILENCED BRACKET ACCESSORY TOOLS

No.	Model TNB-	2M		3MB		4M		6M	
	Item	Size	Qt	Size	Qt	Size	Qt	Size	Qt
1	Spanner	24mm	1	24mm	1	24mm	1	24mm	1
2	Spanner	27mm	1	27mm	1	27mm	1	27mm	1
3	Spanner	32mm	1	32mm	1	32mm	1	32mm	1
4	Spanner	–		–		–		36mm	1
5	Impact spanner	–		–		–		41mm	1
6	Ring spanner	–		–		–		22mm	1
7	Hexagon wrench	8mm 10mm	1	10mm	1	10mm	1	10mm	1
8	Hexagon wrench	200mm	1	–		–		–	
9	Monkey wrench	#1	1	200mm	1	200mm	1	200mm	1
10	Hammer	M8	1	#1	1	#1	1	#1	1
11	Eye bolt	–	2	M12	2	M12	2	M12	2
12	Eye bolt	–		M8	1	M8	1	–	
13	Hex bolt	9.8mm		–		–		M8	2
14	Chisel pin remover	PF1/2	1	9.8mm	1	9.8mm	1	9.8mm	1
15	Hose plug	PF1/2	2	PF1/2	2	PF1/2	2	PF3/4	2
16	Hose adapter plug	○	2	PF1/2	2	PF1/2	2	PF3/4	2
17	Seal tape	–	1	○	1	○	1	○	1
18	Foundation bolt	○		–		–		–	
19	Tool box		1	○	1	○	1	○	1

SIDE MOUNT SILENCED BRACKET ACCESSORY TOOLS

No.	Model TNB-	7J		151LU1	
	Item	Size	Qt	Size	Qt
1	Spanner	19mm	1	24mm	1
2	Spanner	30mm	1	36mm	1
3	Spanner	36mm	1	41mm	1
4	Spanner	_		46mm	1
5	Spanner	_		50mm	1
6	Socket	30mm	1	30mm	1
7	Impact spanner	55mm	1	70mm	1
8	Ring spanner			32mm	1
9	Hexagon wrench	14mm	1	14mm	1
10	Monkey wrench	250mm	1	250mm	1
11	Hammer	#2	1	#2	1
12	Eye bolt	M20	2	M20	2
13	Hex bolt	M10	2	M10	2
14	Chisel pin remover	9.8mm	1	15.8mm	1
15	Hose plug	PF3/4	2	PF1”	2
16	Hose adapter plug	PF3/4	2	PF1”	2
17	Seal tape	○	1	○	1
18	Foundation bolt	M8-150	1	M8-150	1
19	Pliers	200mm	1	200mm	1
20	Tool box	◠	1	○	1

6-5. OPTIONAL TOOLS

	Item	Part code	Qt	Remark
1	Gas pressure gauge 2MPa	41518691A	1	
2	Socket	182127208	1	
3	Hose	1817V2050	1	
4	Charging socket	41514192A	1	
5	Nitrogen gas hose	137206020	1	
6	Pressure regulator	135506006	1	
7	Nitrogen gas cylinder	137506010	1	
8	Tool box	137507360	1	
9	Oil flow meter	137506031	1	
10	Pressure gauge 35MPa	137506032	1	

	Item	Part code	Qt	Remark
11	Gas gauge KIT	A01016060	1	

AUTHORIZED DISTRIBUTOR' S RECORD

7-1. MANUFACTURING SERIAL NO. STAMPING LOCATION

The manufacturing Serial No. stamping can be found on the top part of the cylinder near the hose adapter.

7-2. AUTHORIZED DISTRIBUTOR' S RECORD

Model TNB-	Name of authorized distributor Address
Ser.No.	
Delivery date	e-mail: Tel:

Issued on 9 April 2015 BIME No.11

HYDRAULIC BREAKER
INSTRUCTION MANUAL

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