Hydraulic Breaker

TOKU

TNB-08M	TNB-6M	TNB-190LU2
TNB-1M	TNB-6E	TNB-230LU2
TNB-2M	TNB-7J	TNB-310LU1
TNB-3MB	TNB-110	TNB-400LU2
TNB-4M	TNB-141LU	
TNB-5M	TNB-151LU2	

M A N U A L

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.18

●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 personnel 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 a user.

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●OPERATION

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●SPECIAL APPLICATION

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●AUTHORIZED DISTRIBUTOR'S RECORD

●INTRODUCTION

0-1. SAFETY INFORMATION

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

⚠ **DANGER:** **If not avoided, result in death or serious injury.**

⚠ **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 to the machine

⚠ **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 result could be damages to the machine

★ **NOTICE** This word is used for precautions that must be taken to avoid 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.

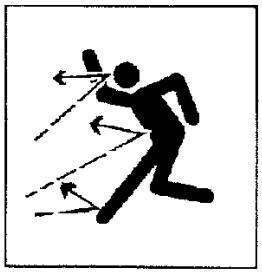
●SAFETY

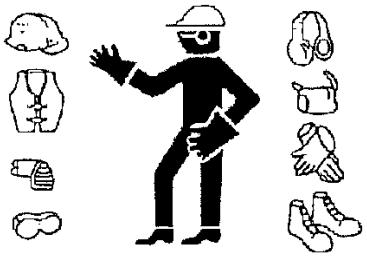
1-1. GENERAL PRECAUTIONS FOR SAFETY

⚠ 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.

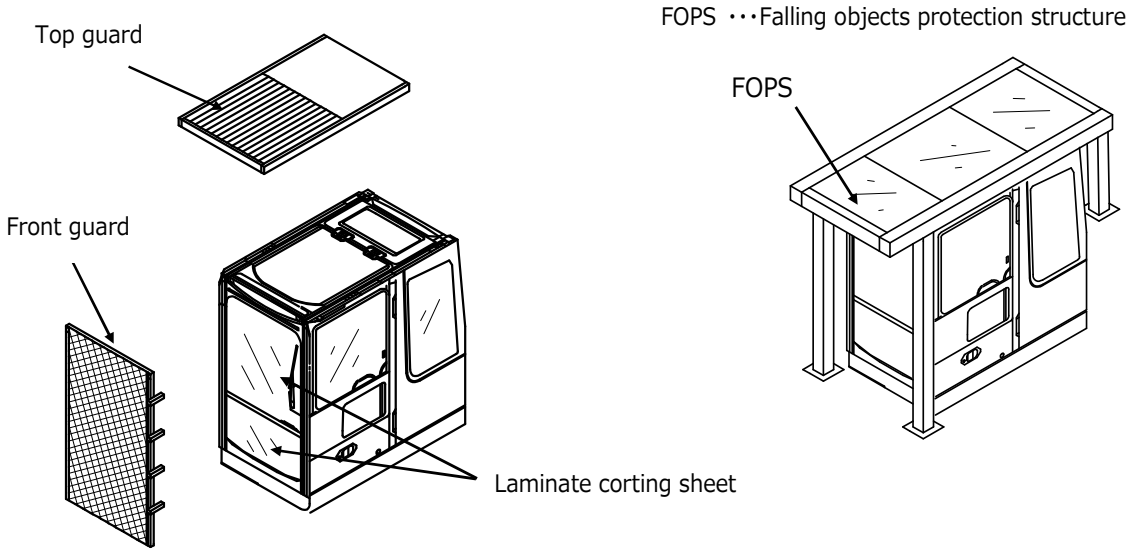
⚠WARNING -CLOTHING AND PERSONAL PROTECTION ITEMS-
● It is essential to wear a hard hat, protective goggles, safety boots, a mask and gloves. Especially when operating a mini-excavator where a cabin is not installed on the machine.





⚠ 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.

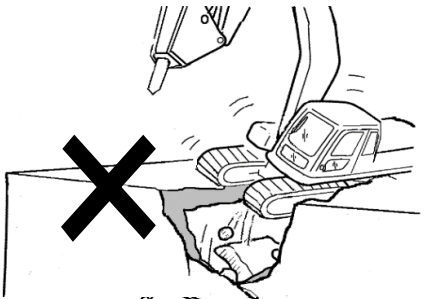
1-2. SAFETY OPERATION

⚠ WARNING Checking work site

When working on embankments or near excavated ditches, 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.

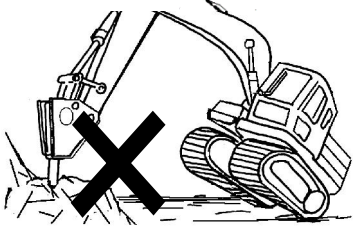
⚠ WARNING Safety secure at work site !

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



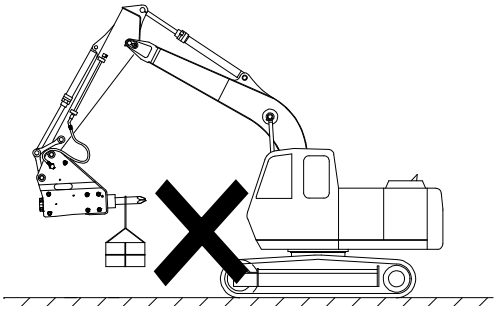
⚠ WARNING

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



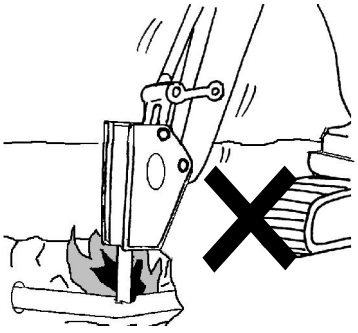
⚠ WARNING

Do not lift materials with the breaker.
This may cause damage to the breaker and breaker bracket and is a dangerous maneuver.
Use a special machine for lifting work.



⚠ WARNING –SAFETY AT JOBSITE-

Before starting operations, thoroughly check the area for any unusual conditions that could be dangerous.
If it is destroyed, there is a risk of electric shock, fire or water infiltration.



- 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 –IF ABNORMALITIES ARE FOUND-

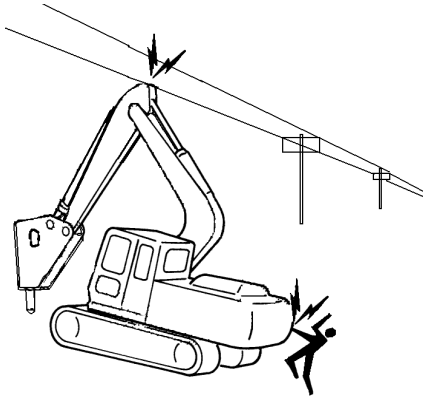
If you find any abnormality in the machine during operation or maintenance (noise, vibration, smell, incorrect gauges, smoke, oil leakage, etc., or any abnormal display on the warning devices or monitor), report to the person in charge and have the necessary action taken. Do not operate the machine until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

- Safty distance to high voltage cables

Voltage of cables	Safty distance
100V、200V	More than 6.6ft (2m)
6,600V	More than 6.6ft (2m)
22,000V	More than 9.8ft (3m)
66,000V	More than 13.1ft (4m)
154,000V	More than 16.4ft (5m)
187,000V	More than 19.7ft (6m)
275,000V	More than 23.0ft (7m)
500,000V	More than 36.1ft (11m)



⚠ 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

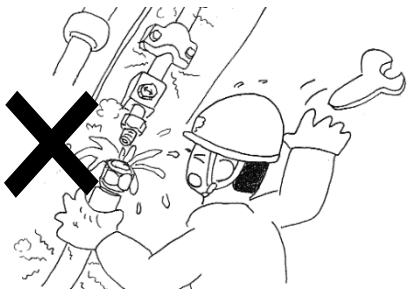
When you leave an abnormal on the hydraulic breaker, it may cause serious injury. Repair immediately when an abnormal is found.

⚠WARNING Use a crane when handling heavy materials

- Carry out maintenance on 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 55 lbs (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 High temperature oil

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



⚠WARNING HIGH PRESSURE OIL

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

⚠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 aligning 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.

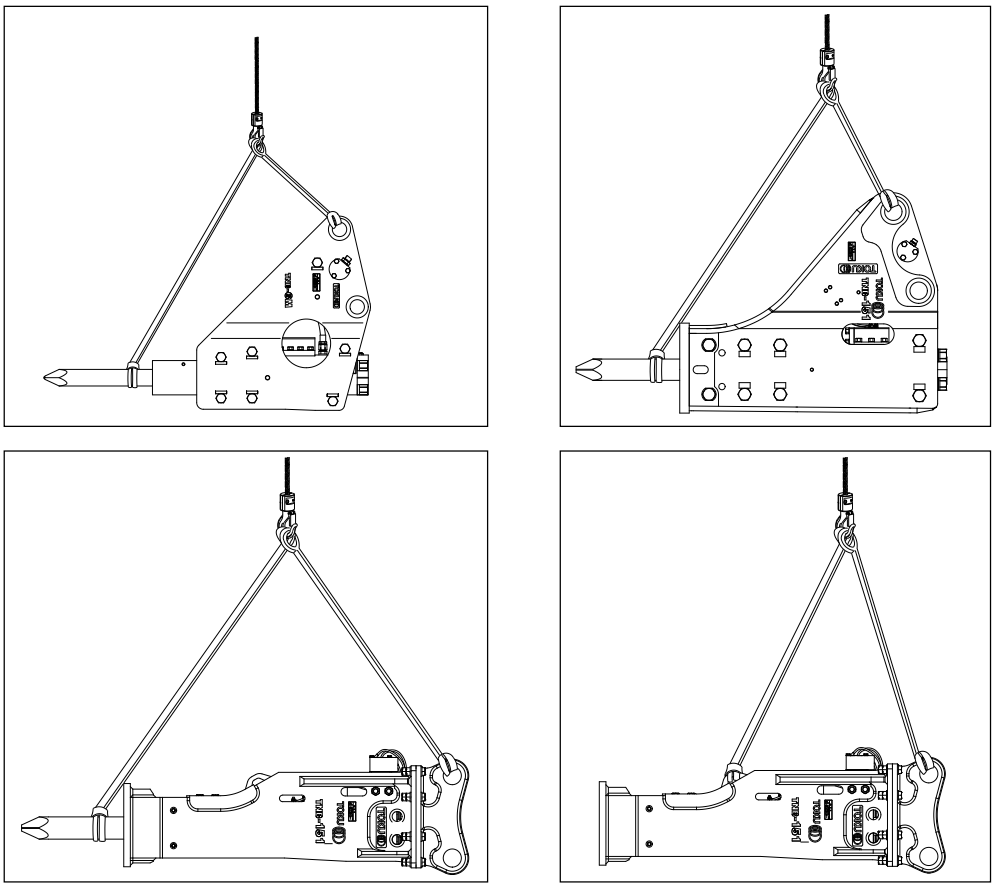
⚠ WARNING
Various parts will be very hot after operation of the engine. Do not change the hydraulic oil immediately. Change the hydraulic oil after the oil and various parts have cooled off.

⚠ 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.

1-4. PRECAUTIONS FOR LIFTING THE HYDRAULIC BREAKER

⚠ WARNING
・ Crane operation qualification is necessary to do lifting work. ・ Do not lift if person is still working on/around the breaker. ・ Use appropriate size/diameter/strength of wire rope per breaker weight/model. ・ Lift slowly and keep the breaker level & horizontally as shown below. ・ Keep away from the lifting area, and Never go underneath the breaker. Lift the breaker properly & safely as shown below. There is a risk of losing the balance of the breaker.

⚠ CAUTION
Lift the breaker properly & safely as shown below. Hydraulic hose can be damaged, if breaker is not properly lifted.



●OPERATION

2-1. SPECIFICATIONS

Model **TNB-**			**08M**	**1M**	**2M**	**3MB**	**4M**
Working Weight	Side Mount Bracket	lbs kg	145 65	190 85	235 105	390 175	520 235
	Top Mount Bracket 1 P C	lbs kg	135 60	190 85	245 110	420 190	485 220
	Top Mount Bracket 2 P C	lbs kg	165 75	225 100	310 140	465 210	565 255
	BOX Bracket	lbs kg	190 85	280 125	375 170	555 250	750 340
	Side Mount Silenced Bracket	lbs kg	-	-	355 160	520 235	630 285
Oil Flow		gpm L/min	5-7 18-25	5-8 20-30	5-9 20-35	7-12 25-45	8-15 30-55
Operating Pressure		psi bar MPa	870-1890 60-130 6-13	1020-2030 70-140 7-14	1160-2180 80-150 8-15	1450-2180 100-150 10-15	1450-2320 100-160 10-16
Line Relief Pressure		psi bar MPa	2610 180 18	2760 190 19	2900 200 20	2900 200 20	3050 210 21
Cracking Pressure(＊1)		psi bar MPa	2030 140 14 at minimum	2180 150 15 at minimum	2320 160 16 at minimum	2320 160 16 at minimum	2470 170 17 at minimum
Impact Rate		bpm	930-1300	700-1200	600-1150	550-1000	580-1060
Tool Diameter		inch mm	φ1.6 φ40	φ1.8 φ45	φ2.0 φ50	φ2.3 φ58	φ2.5 φ64
Hose Size		inch	3/8	1/2	1/2	1/2	1/2
Gas Pressure (＊2)		psi bar MPa	116 8 0.8	116 8 0.8	116 8 0.8	116 8 0.8	116 8 0.8
Base Machine		lb kg	1540-3310 700-1500	2210-4410 1000-2000	3310-5510 1500-2500	5290-8820 2400-4000	6620-9920 3000-4500

NOTE) Working Weight does not include bracket bushings and bracket pins.
Always operate the breaker with proper oil flow and working pressure shown above.

＊1) Cracking pressure means a pressure observed constant flow after the relief valve starts opening by the pressure increased at the inlet port of the relief valve.

＊2) When the Breaker body temperature is 104°F (40℃).

Model **TNB-**			**5M**	**6M**	**6E**	**7J**
Working Weight	Side Mount Bracket	lbs kg	665 300	775 350	950 430	1830 830
	Top Mount Bracket 1 P C	lbs kg	675 305	805 365	895 405	-
	Top Mount Bracket 2 P C	lbs kg	695 315	775 350	1025 465	-
	BOX Bracket	lbs kg	885 400	970 440	1290 585	2100 950
	Side Mount Silennced Bracket	lbs kg	-	915 415	-	2010 910
Oil Flow		gpm L/min	9-16 35-60	11-18 40-70	12-21 45-80	21-32 80-120
Operating Pressure		psi bar MPa	1450-2320 100-160 10-16	1450-2320 100-160 10-16	1450-2320 100-160 10-16	2030-2610 140-180 14-18
Line Relief Pressure		psi bar MPa	3050 210 21	3050 210 21	3050 210 21	3340 230 23
Cracking Pressure(＊1)		psi bar MPa	2470 170 17 at munimum	2470 170 17 at munimum	2470 170 17 at munimum	2760 190 19 at minimum
Impact Rate		bpm	550-1000	600-1050	550-1000	450-720
Tool Diameter		inch mm	φ3.0 φ75	φ3.0 φ75	φ3.7 φ95	φ4.1 φ105
Hose Size		inch	1/2	3/4	3/4	3/4
Gas Pressure (＊2)		psi bar MPa	116 8 0.8	145 10 1.0	116 8 0.8	131 9 0.9
Base Machine		lb kg	8380-13230 3800-6000	12130-17640 5500-8000	13230-24260 6000-11000	17640-30870 8000-14000

NOTE) Working Weight does not include bracket bushings and bracket pins.
Always operate the breaker with proper oil flow and working pressure shown above.

＊1) Cracking pressure means a pressure observed constant flow after the relief valve starts opening by the pressure increased at the inlet port of the relief valve.

＊2) When the Breaker body temperature is 104°F (40℃).

Model **TNB-**			**110**	**141LU**	**151LU2**	**190LU2**
Working Weight	Side Mount Bracket (Short Skirt)	lbs kg	-	3380 1530	3900(3760) 1760(1700)	-
	Top Mount Bracket 1 P C	lbs kg	-	3540 1600	3640 1650	-
	Top Mount Bracket 2 P C	lbs kg	2480 1120	3760 1700	4160 1880	-
	BOX Bracket	lbs kg	2740 1240	4200 1900	3940 1800	4980 2250
	Side Mount Silenced Bracket	lbs kg	-	-	4000 1820	-
Oil Flow		gpm L/min	26-37 100-140	34-45 130-170	42-53 160-200	42-55 160-210
Operating Pressure		psi MPa	1740-2470 12-17	1890-2470 13-17	2030-2610 14-18	2030-2610 14-18
Line Relief Pressure		psi MPa	3190 22	3190 22	3340 23	3340 23
Cracking Pressure(＊1)		psi MPa	2610 18 at minimum	2610 18 at minimum	2760 19 at minimum	2760 19 at minimum
Impact Rate		bpm	430-600	490-650	450-630	370-490
Tool Diameter		inch mm	φ4.5 φ115	φ5.3 φ135	φ5.3 φ135	φ5.5 φ140
Hose Size		inch	3/4 1″(*)	1"	1"	1"
Gas Pressure (＊2)		psi MPa	116 0.8	116 0.8	160 1.1	116 0.8
Base Machine		lb kg	30870-44100 14000-20000	39690-55130 18000-25000	39690-55130 18000-25000	44100-66150 20000-30000

NOTE) Working Weight does not include bracket bushings and bracket pins.
Always operate the breaker with proper oil flow and working pressure shown above.

(*) For North American market

＊1) Cracking pressure means a pressure observed constant flow after the relief valve starts opening by the pressure increased at the inlet port of the relief valve.

＊2) When the Breaker body temperature is 104°F (40℃).

Model **TNB-**			**230LU2**	**310LU1**	**400LU2**
Working Weight	Side Mount Bracket (Short Skirt)	lbs kg	5580(5540) 2540(2510)	7450 3350	-
	Top Mount Bracket 1 P C	lbs kg	-	-	-
	Top Mount Bracket 2 P C	lbs kg	6180 2800	7500 3400	9850 4450
	BOX Bracket	lbs kg	6000 2740	8050 3600	11050 5100
	Side Mount Silenced Bracket	lbs kg	-	-	-
Oil Flow		gpm L/min	48-61 180-230	63-79 240-300	74-103 280-390
Operating Pressure		psi bar MPa	1890-2610 130-180 13-18	2030-2610 140-180 14-18	2030-2610 140-180 14-18
Line Relief Pressure		psi bar MPa	3340 230 23	3340 230 23	3340 230 23
Cracking Pressure(＊1)		psi bar MPa	2760 190 19 at minimum	2760 190 19 at minimum	2760 190 19 at minimum
Impact Rate		bpm	350-450	340-470	310-470
Tool Diameter		inch mm	φ5.7 φ146	φ6.3 φ160	φ7.0 φ178
Hose Size		inch	1"	1"-1/4	1"-1/4
Gas Pressure (＊2)		psi bar MPa	116 8 0.8	116 8 0.8	116 8 0.8
Base Machine		lb kg	59540-88200 27000-40000	83790-110250 38000-50000	99230-154350 45000-70000

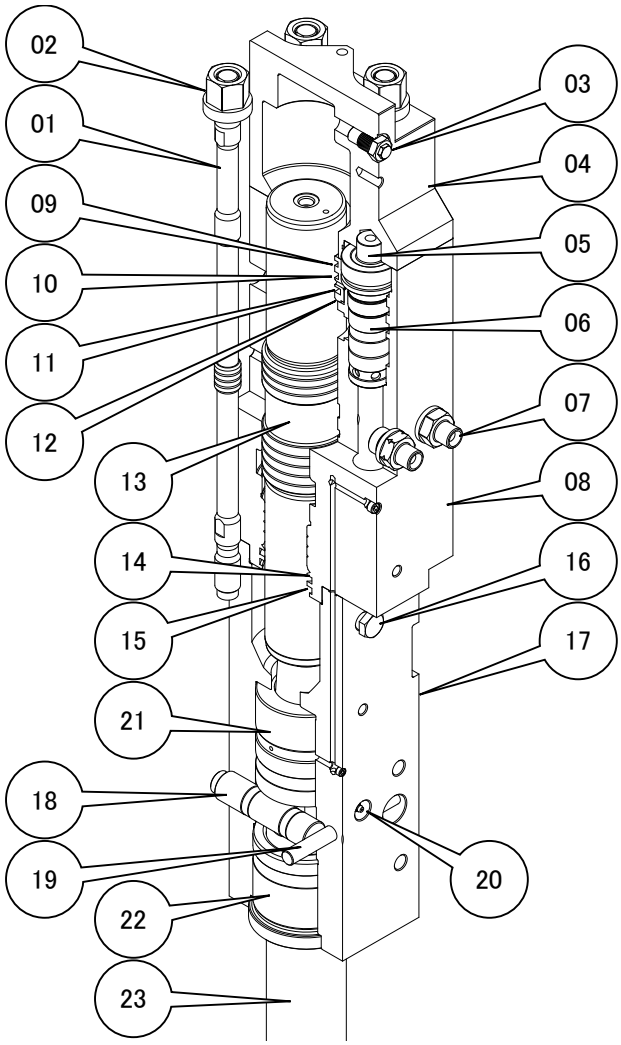
NOTE) Working Weight does not include bracket bushings and bracket pins.
Always operate the breaker with proper oil flow and working pressure shown above.

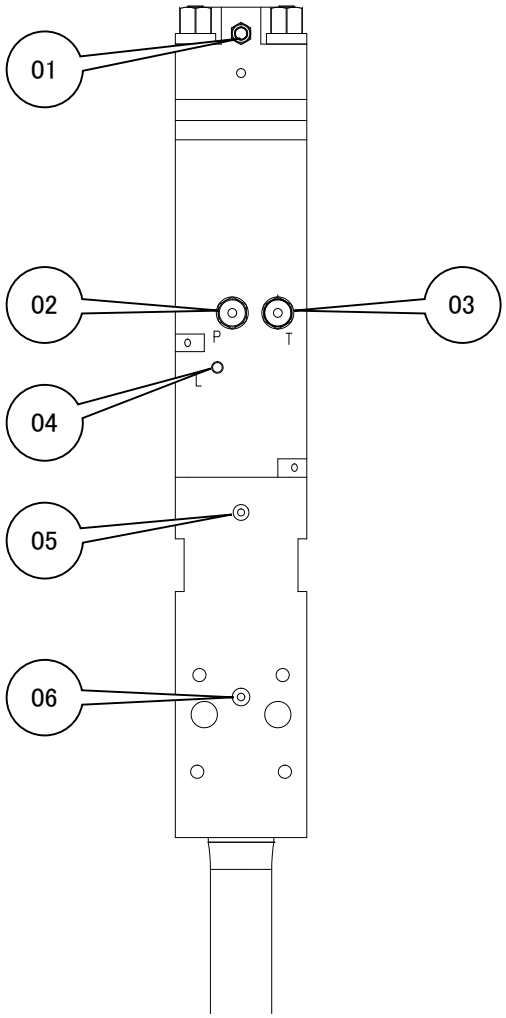
＊1) Cracking pressure means a pressure observed constant flow after the relief valve starts opening by the pressure increased at the inlet port of the relief valve.

＊2) When the Breaker body temperature is 104°F (40℃).

2-2. STRUCTURE

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

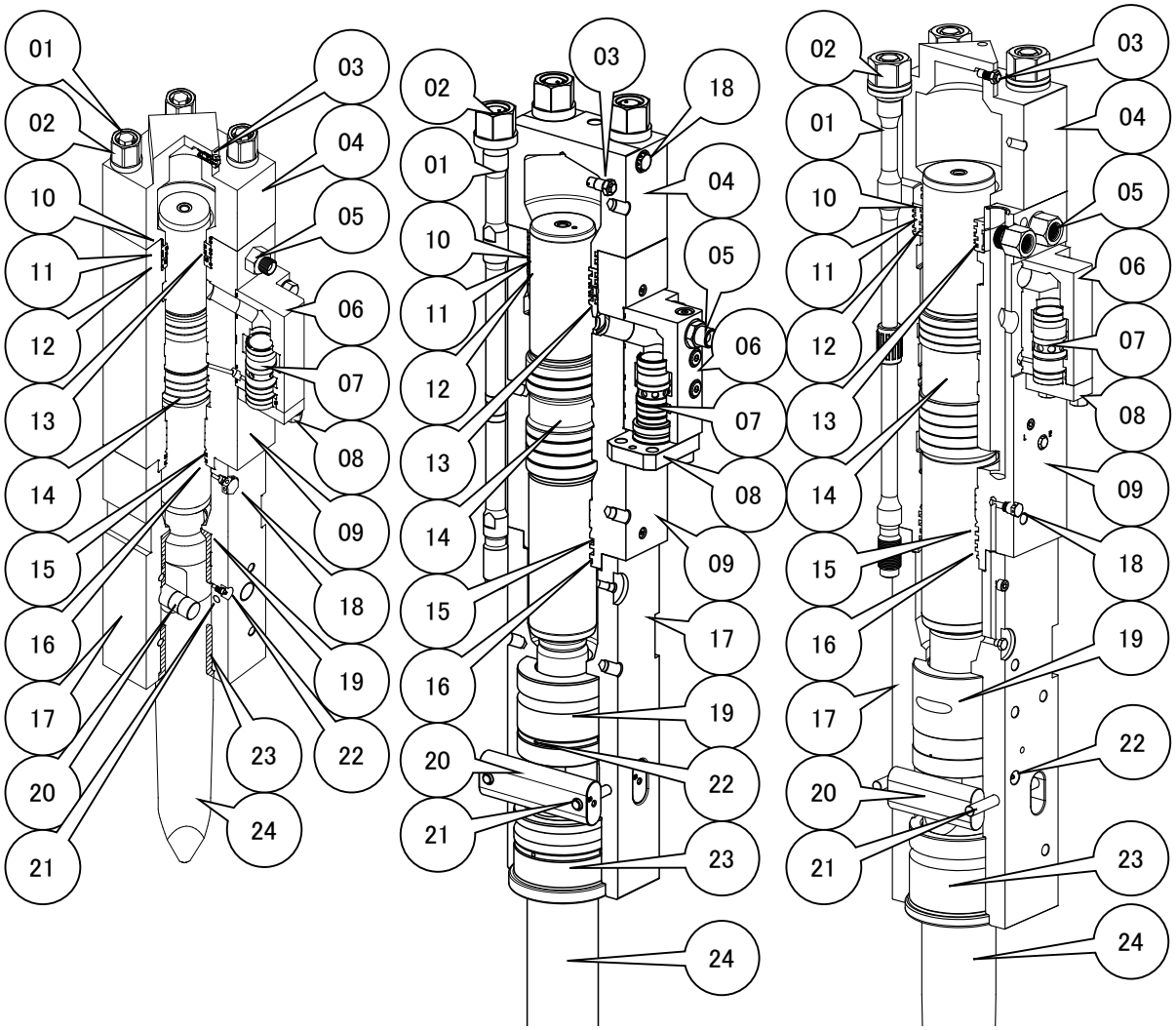




01)	Side Bolt	13)	Piston
02)	Side Bolt Nut	14)	Oil Seal
03)	Gas Valve	15)	Dust Seal
04)	Cylinder Cover	16)	Air Port for Air Supply
05)	Control Valve Cap		(2M,3MB,4M,5M)
06)	Control Valve	17)	Chisel Holder
07)	Hose Adapter	18)	Retainer Pin
08)	Cylinder	19)	Stopper Pin
09)	Gas Seal	20)	Grease Nipple
10)	Oil Seal	21)	Chisel Holder Bushing
11)	Slide Ring	22)	Chisel Bushing
12)	Packing Bushing	23)	Chisel

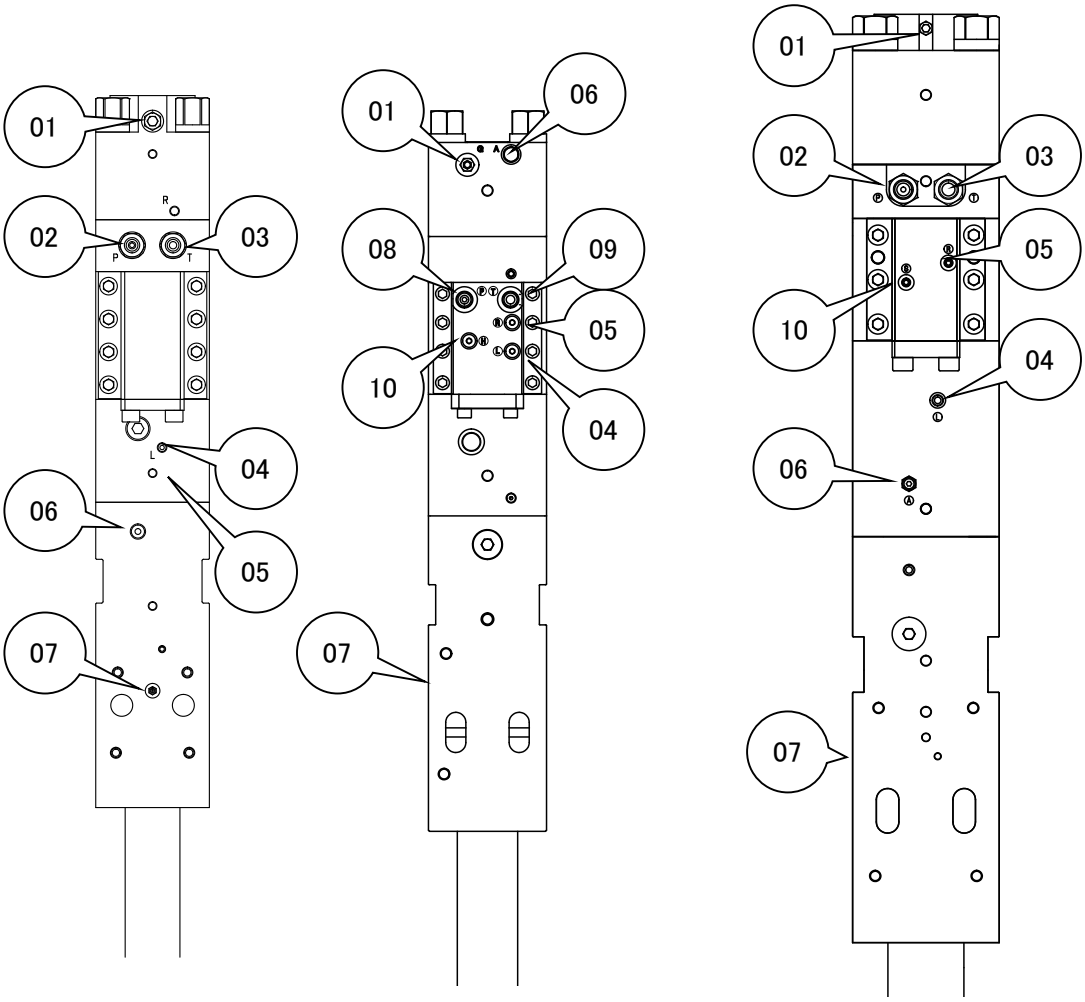
01)	Gas Valve
02)	Hose Adapter IN =“P”
03)	Hose Adapter OUT =“T”
04)	Auto Lubrication Port =“L”
05)	Air Port for Air Supply = "A"
06)	Grease Nipple

TNB-6M,6E **TNB-7J** **TNB-110,141LU,151LU2,190LU2**
230LU2,310LU1,400LU2



01) Side Bolt	13) Packing Bushing
02) Side Bolt Nut	14) Piston
03) Gas Valve	15) Oil Seal
04) Cylinder Cover	16) Dust Seal
05) Hose Adapter	17) Chisel Holder
06) Control Valve Box	18) Air Cap (Over TNB-7 J)
07) Control Valve	19) Chisel Holder Bushing
08) Control Valve Cap	20) Retainer Pin
09) Cylinder	21) Stopper Pin
10) Gas Seal	22) Grease Nipple
11) Oil Seal	23) Chisel Bushing
12) Slide Ring	24) Chisel

TNB-6M,6E **TNB-7J** **TNB-110,141LU,151LU2,190LU2**
230LU2,310LU1,400LU2

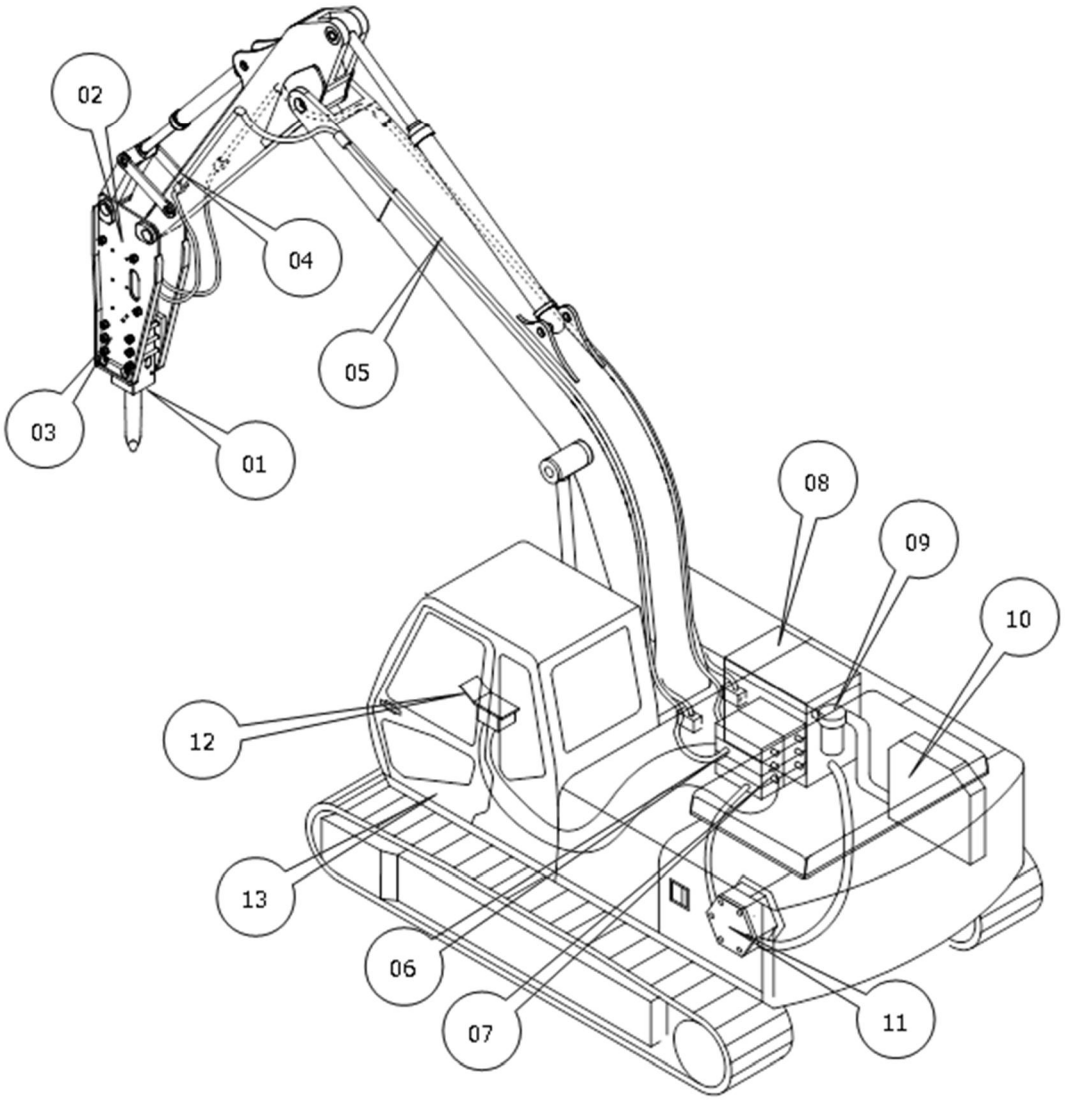


01)	Gas Valve
02)	Hose Adapter IN =“P”
03)	Hose Adapter OUT =“T”
04)	Auto Lubrication Port =“L”
05)	Low Pressure Port = "R"
06)	Air Port for Air Supply = "A"
07)	Grease Nipple
08)	Hose Adapter IN =“ P ”
09)	Hose Adapter OUT =“T”
10)	High Pressure Port =“S”

2-3. 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.

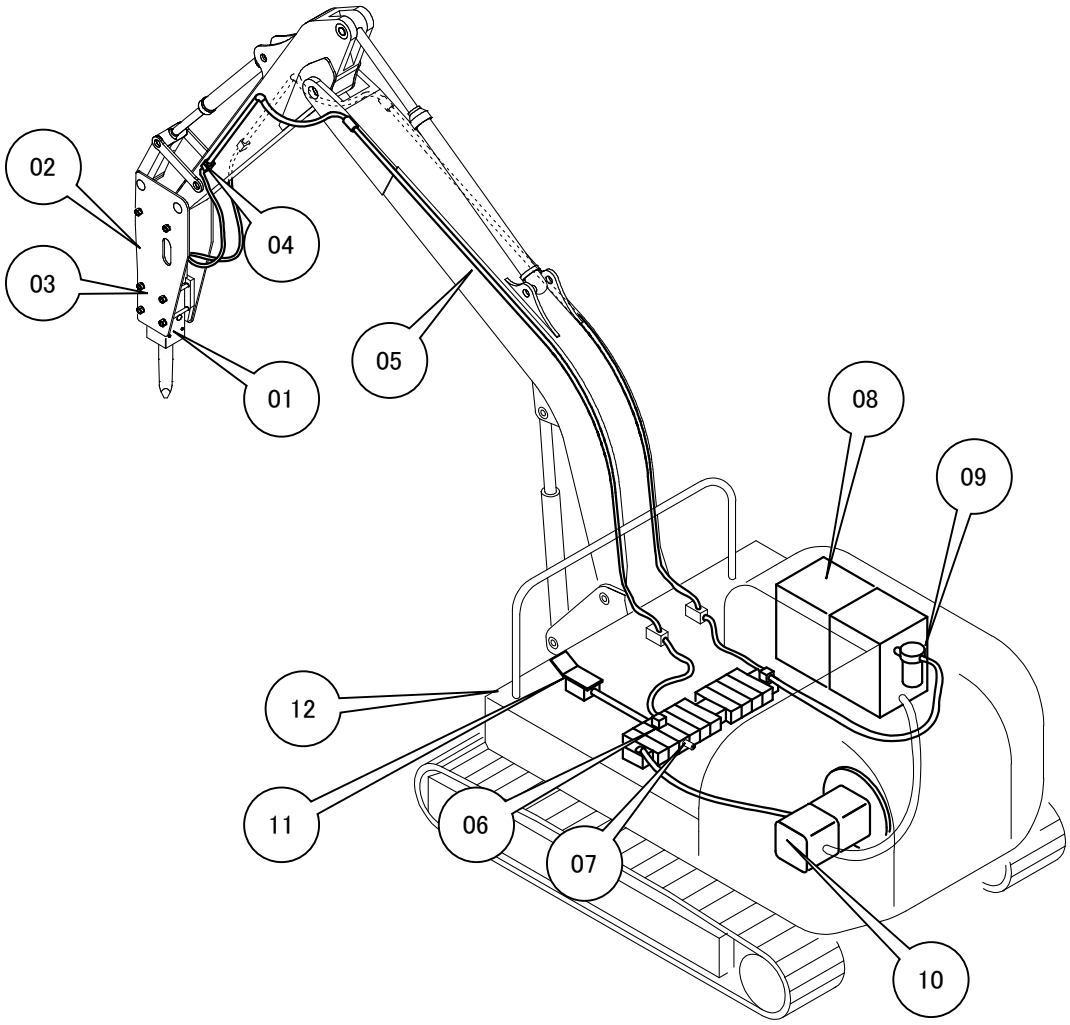
Excavator



01)	Hydraulic Breaker	08)	Oil Tank
02)	Bracket	09)	Oil Filter
03)	Bracket Bolt - Bracket Bolt Nut	10)	Oil Cooler
04)	Stop Valve	11)	Hydraulic Pump
05)	Hydraulic Pipe for Breaker	12)	Pedal or Lever
06)	Control Valve	13)	Hydraulic Excavator
07)	Relief Valve		

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



01)	Hydraulic Breaker	07)	Relief Valve
02)	Bracket	08)	Oil Tank
03)	Bracket Bolt - Bracket Bolt Nut	09)	Oil Filter
04)	Stop Valve	10)	Hydraulic Pump
05)	Hydraulic Pipe for Breaker	11)	Pedal or Lever
06)	Change Valve	12)	Mini Excavator

2-4. GREASE SELECTION AND CONTROL

SELECTION OF GREASE

- Use the inorganic high temparature grease for chisel greasing

Maker	Name of items
Idemitsu Kosan Co.,Ltd.	Daphne Polylex Grease NLGI No.2
Shell Lubricants Japan K. K.	Shell Stamina Grease HDP2
COSMO OIL LUBRICANTS Co.,Ltd.	COSMO TAINETSU GREASE B No.2

⚠ 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 piston.

SELECTION OF HYDRAULIC OIL

⚠ CAUTION

Use the maker of a shovel designated hydraulic oil.

HYDRAULIC OIL TEMPERATURE CONTROL

⚠ CAUTION

Carry out warm-up !

Do not operate immediately after starting engine. Carry out warm-up operation.

Begin the breaker operation after the oil temperature get s 104℉(40℃).

Operate the breaker in the temperature range from 104 to 140 degree Fahrenheit.(40 to 60 degree Celsius)

If the hydraulic oil temperature becomes over 176 degree Fahrenheit (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 176℉(80℃) of oil temperature, it is necessary to check the each seal.

HYDRAULIC OIL CONTAMINATION CONTROL

⚠ CAUTION
If the hydraulic oil is contaminated, it causes operating failures not only to the breaker but also to the excavator. It leads to damages of internal parts. So the oil contamination control is very important. Replace the hydraulic oil within the change interval. Clean the inside of hydraulic tank, cylinders and piping when replacing the oil. Also check the oil condition when changing the filter elements.

- The required cleanness for hyd, oil of a breaker is ※1) NAS 8 class level at particle size 15 microns or more.
  Management of ※2) ISO 4406 poliiution level class of 17/14 or less is desirable.
  If you have any questions about the contamination of hydraulic oil, please contact our designated service shop.

  ※1) N A S (National Aerospace Standard Committee) 1638 : 2001

  ※2) ISO 4406 (International Organization for Standard 4406)
  This is the international norm for hyd, oil contamination.

2-5. 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

When aligning 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.

⚠ CAUTION

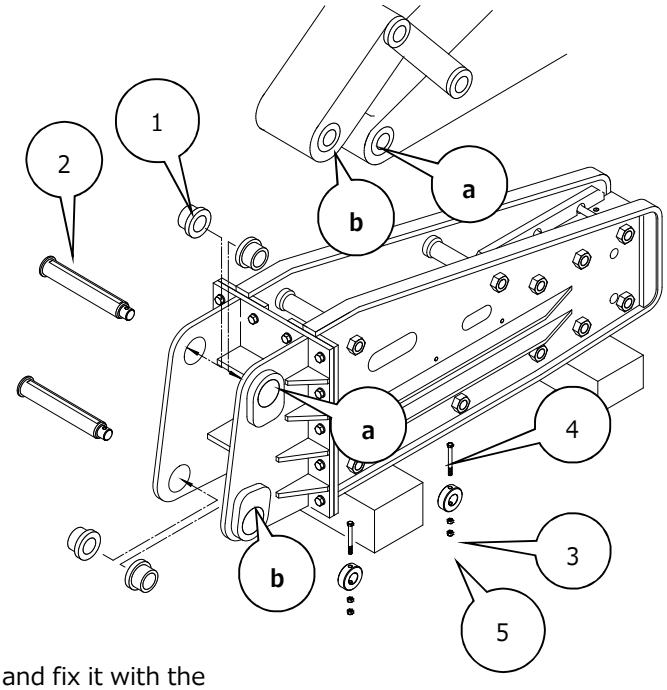
Make sure sand or dust do not get onto the pin or bushing. If this occurs wipe it clean.

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.

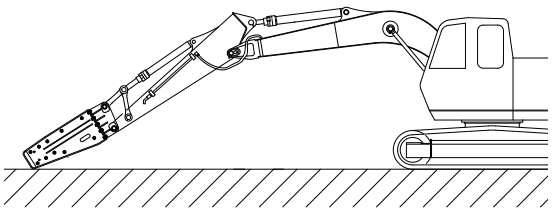
4. Fit the bracket rings (3), bracket ring bolts (4) and bracket ring nuts (5) to hold the pins and apply grease to the pin.



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

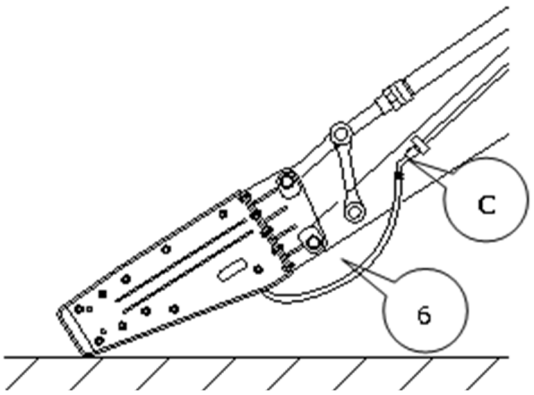
TNB-7J-110	Hex Size mm Torque ft.lbs (N·m)	19 56 (76)
TNB-141LU-190LU2	Hex Size mm Torque ft.lbs (N·m)	24 130 (176)
TNB-230LU2	Hex Size mm Torque ft.lbs (N·m)	30 253 (343)
TNB-310LU1-400LU2	Hex Size mm Torque ft.lbs (N·m)	36 434 (588)

5. Place the breaker on flat ground. Extend the arm and boom and prepare for installation of hydraulic hose. Stop the engine of the excavator.



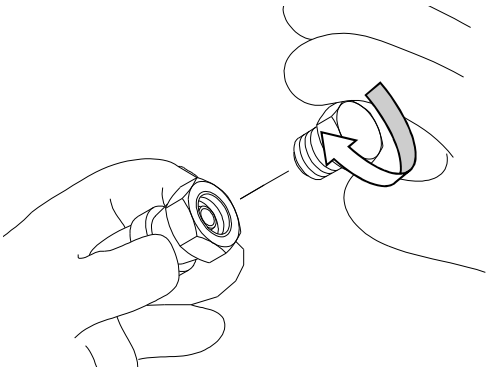
6. Take the inside pressure of hydraulic oil tank out and lock the joystick of arm to avoid free movement. (Refer to the manual of excavator about taking the inside pressure of tank and locking the joy stick)

> **⚠ 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.

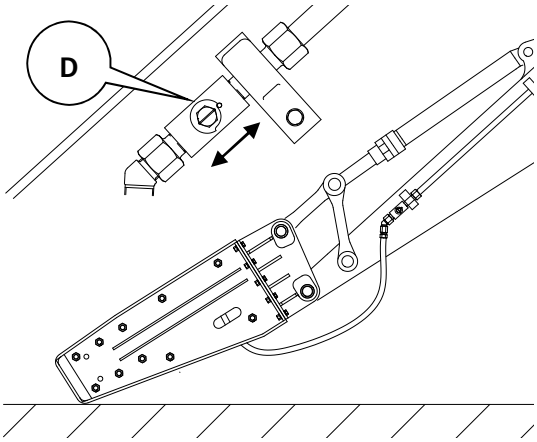
> **⚠ CAUTION**
>
> After removing the hose plugs, make sure dirt or dust do not get on the plugs and store them in the toolbox.



8. Open the stop valve (D).

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

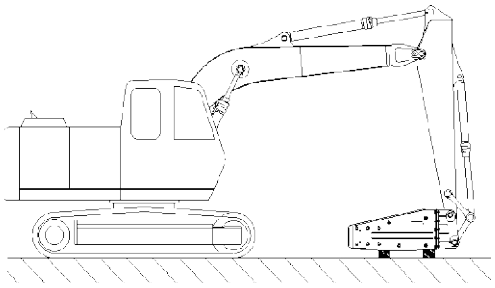
> **⚠ CAUTION**
>
> Avoid any twist or interference on the hydraulic hoses as well as abnormal movement. Abnormality on the hoses can damage the hoses. It may cause bursting of hydraulic hose.



2-6. INSTALLATION OF CHISEL

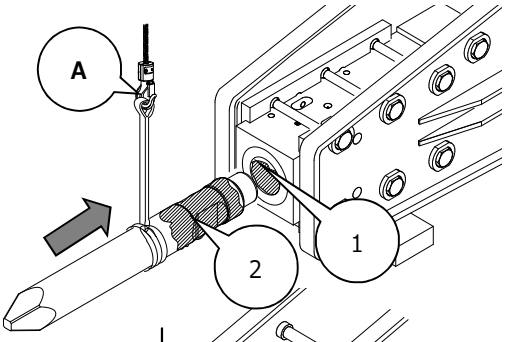
TOP MOUNT BRACKET, SIDE MOUNT BRACKET

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



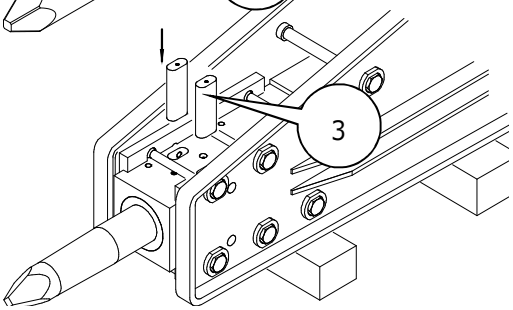
⚠ WARNING
Use a crane (A) when installing the chisel.

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

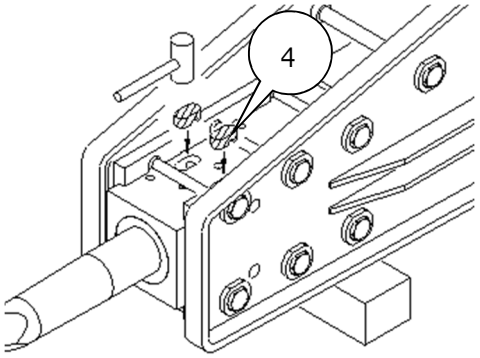


⚠ CAUTION
If the grease is not applied correctly, it may cause a seizure of chisel bushing, chisel holder bushing and chisel.

3. Insert the retainer pins (3).

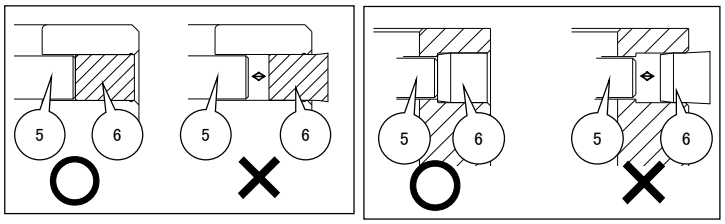


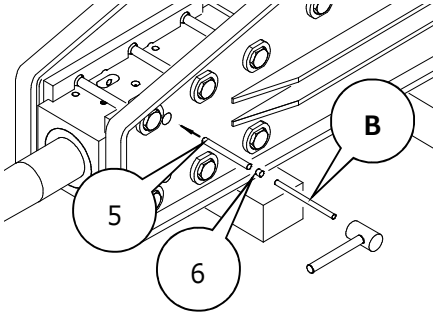
4. Assemble the retainer pin plugs(4). Hammer in plugs after setting notch direction.



⚠ CAUTION
To avoid drop of retainer pin plug(4) and stopper plug(6), make sure to clean the retainer pin plug(4) and its hole, and insert that plug using hammer deep into its position so that surface of that plug(4) get lower than breaker body.

5. Insert the retainer pin stopper pin (5) and retainer pin stopper plug (6) using the hammer and the chisel pin remover (B).

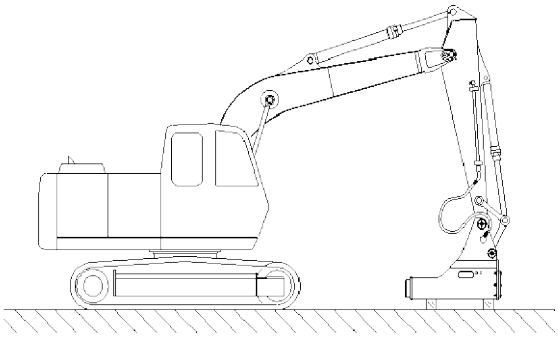




6. After chisel installation, make sure all compornents are installed.

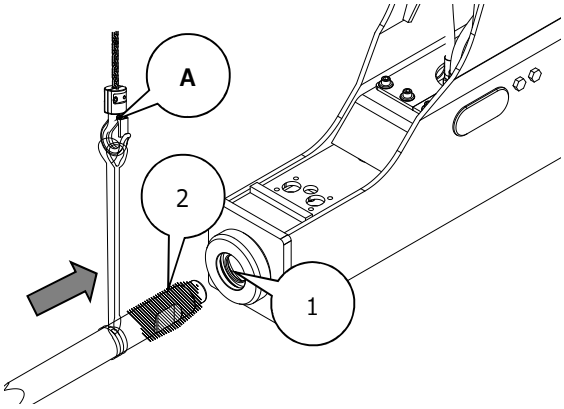
SIDE MOUNT SILENCED BRACKET (TNB-2M,3MB,4M,6M)

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.

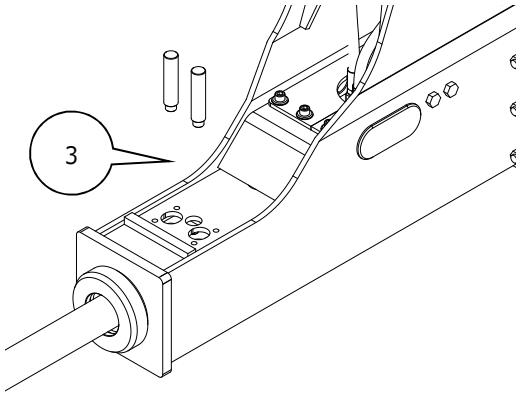
2. Apply grease to the inside of the chisel bushing (1) and the chisel (2), and insert the chisel into the chisel holder along the retainer pin direction.



⚠ CAUTION
The lack of grease may cause a seizure of Chisel bushing and Chisel. The clearance among brand new chisel, brand new chisel bush and chisel holder bush is tight in order to maximize its silencing function. Pay a special attention with above combination.

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

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



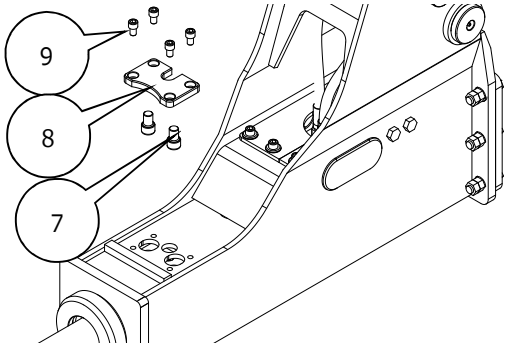
4. Set the retainer isolators (7) onto the retainer cover plate (8) and assemble it with hex cap bolts (9) with below torque.

·TNB-2M

Hex Size mm	8
Torque ft.lbs (N·m)	22 (30)

·TNB-3MB , 4M , 6M

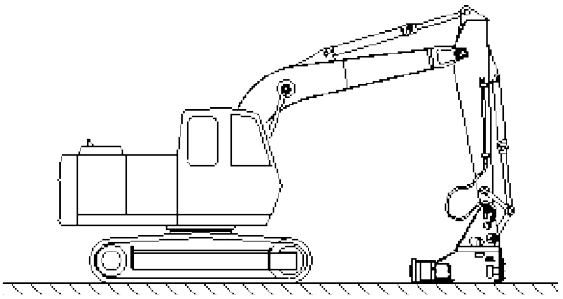
Hex Size mm	10
Torque ft.lbs (N·m)	32 (44)



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

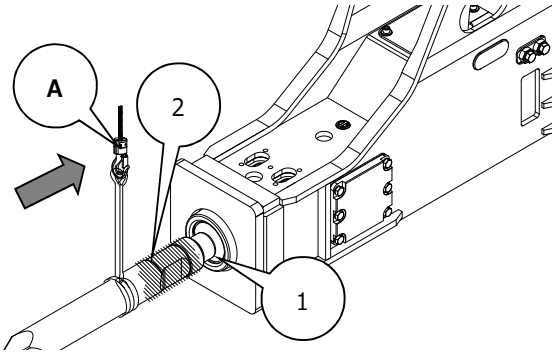
SIDE MOUNTSILENCED BRACKET (TNB-7J,151LU2)

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



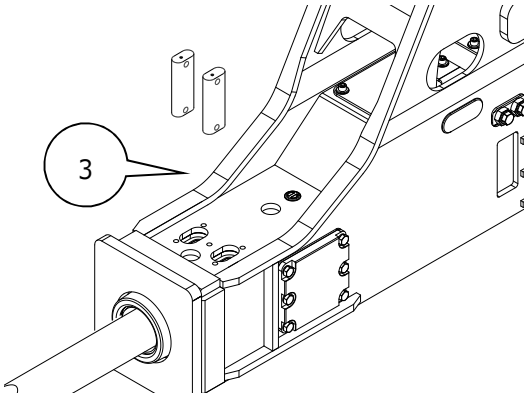
> **⚠ WARNING**
>
> Use a crane (A) when handling the chisel and watch out not to pinch fingers.
> Wear the protection glass, safety shoes and glove as protection gear.

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.



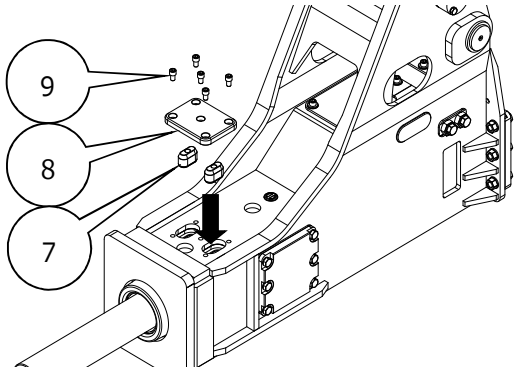
> **⚠ CAUTION**
>
> The lack of grease may cause a seizure of Chisel bushing and Chisel. The clearance among brand new chisel, brand new chisel bush and chisel holder bush is tight in order to maximize its silencing function. Pay a special attention with above combination.

3. Insert the retainer pins (3) into the retainer pin holes.
   ※When assembling the retainer pins, swing the chisel in horizontal 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.

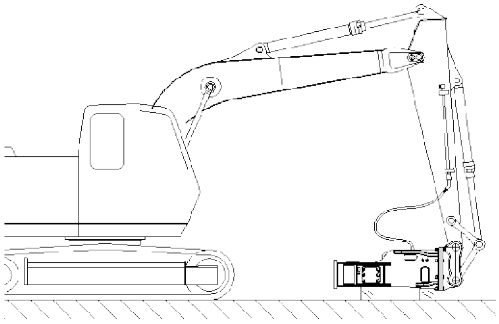
Hex Size mm	14
Torque ft.lbs	140
(N･m)	(190)



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

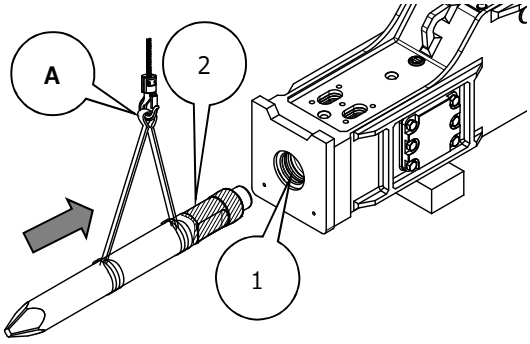
TOP MOUNT SILENCED BRACKET (TNB-7J)

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



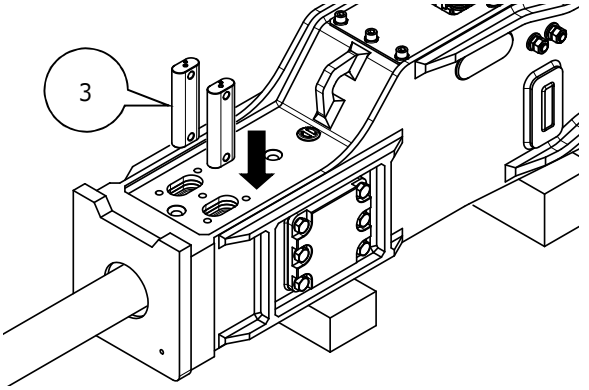
> **⚠ WARNING**
>
> Use a crane (A) when handling the chisel and watch out not to pinch fingers.
> Wear the protection glass, safety shoes and glove as protection gear.

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.



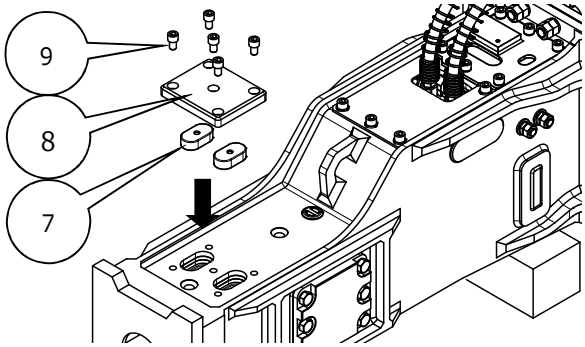
> **⚠ CAUTION**
>
> The lack of grease may cause a seizure of Chisel bushing and Chisel. The clearance among brand new chisel, brand new chisel bush and chisel holder bush is tight in order to maximize its silencing function. Pay a special attention with above combination.

3. Insert the retainer pins (3) into the retainer pin holes.
   ※When assembling the retainer pins, swing the chisel in horizontal 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.

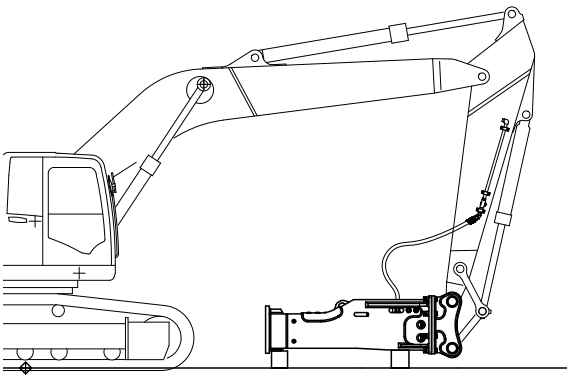
Hex Size mm	14
Torque ft.lbs	140
(N·m)	(190)



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

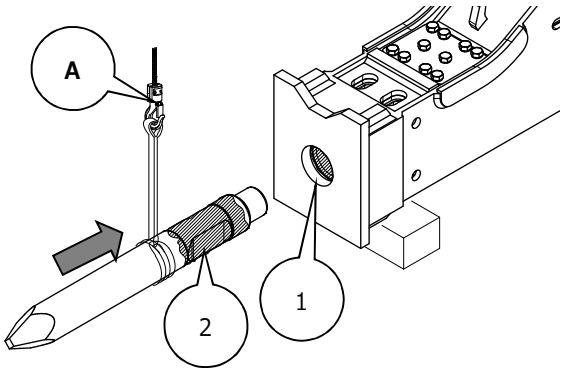
BOX BRACKET

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.

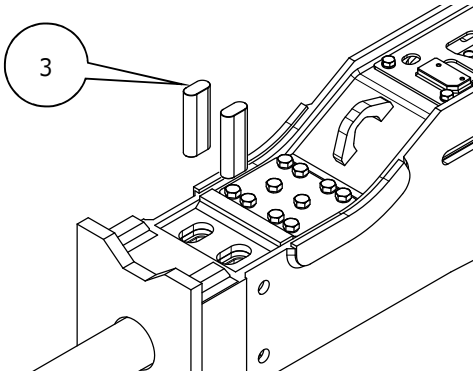
2. Apply grease to the inside of the chisel bushing (1) and the chisel (2), and insert the chisel into the chisel holder along the direction of the retainer pins.



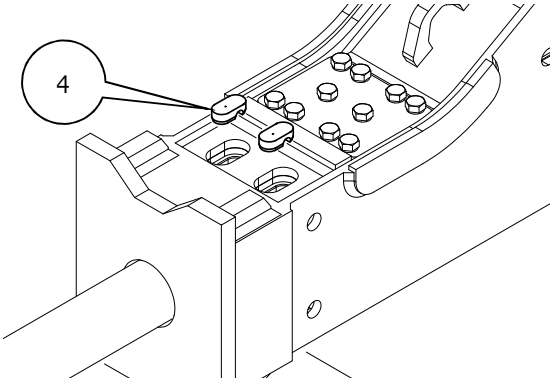
> **⚠ CAUTION**
>
> The lack of grease may cause a seizure of Chisel bushing and Chisel.

3. Insert the retainer pins (3) into the retainer pin holes.

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

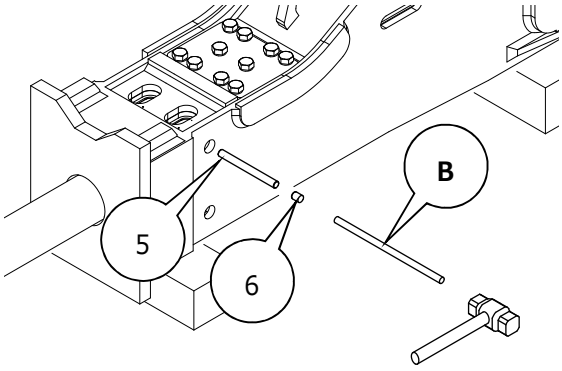


4. Assemble the retainer pin plugs (4). Hammer in plugs after setting notch direction.



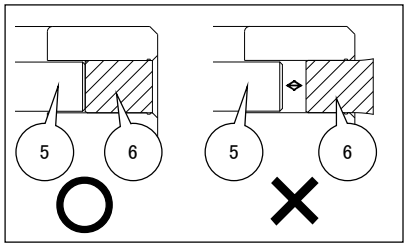
> **⚠ CAUTION**
>
> To avoid drop of retainer pin plug(4), make sure to clean the retainer pin plug(4) and its hole, and insert that plug using hammer deep into its position so that surface of that plug(4) get lower than breaker body.

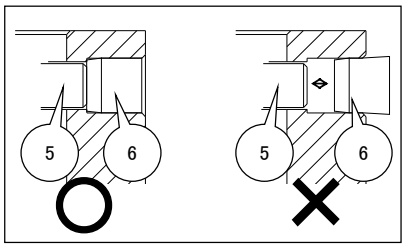
5. Insert the stopper pin (5) and retainer pin stopper plug (6) using the hammer and the chisel pin remover (B).



⚠ CAUTION

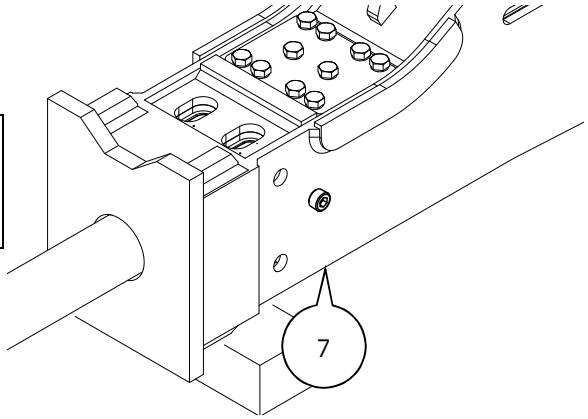
To avoid drop of retainer pin stopper plug(6), make sure to clean the retainer pin stopper plug(6) and its hole, and insert the retainer pin stopper plug(6) using hammer deep into its position so that surface of that plug(6) get lower than breaker body surface.





6. Fit the plug (7) and assemble it with below tighten torque.

Hex Size mm Torque ft.lbs (N·m)	22 108-130 (147-176)



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

2-7 REPLACEMENT OF CHISEL

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.

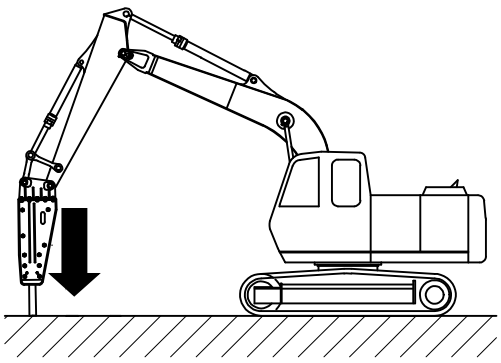
⚠ WARNING

- 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 55 lbs (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.

IMPORTANT

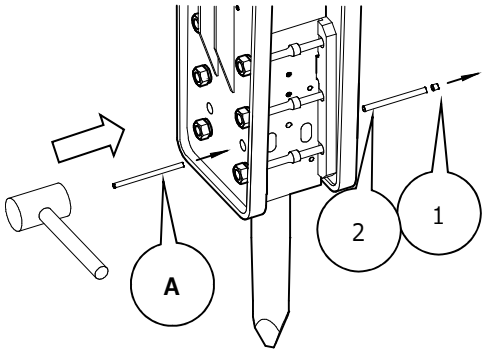
A license is required to operate a crane. Do not operate the crane without a license.

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

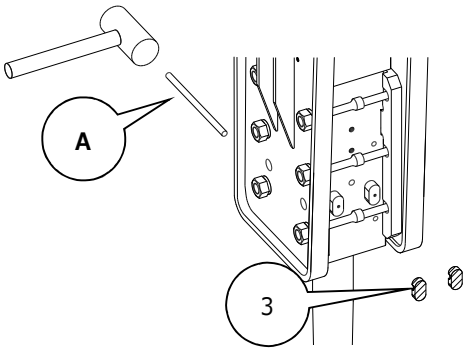


2. Using the hammer and the chisel pin detacher (A), remove the retainer pin stopper plug (1) and retainer pin stopper pin (2).

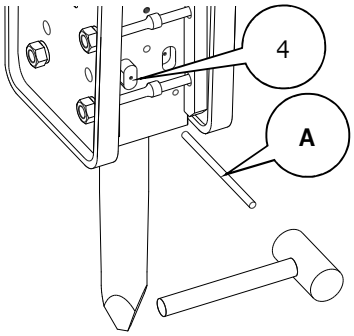
   ◆ For models TNB-08M, 1M, 2M, 3M and 4M, a spring pin is used and they do not use a retainer pin stopper plug (1) and retainer pin stopper pin.



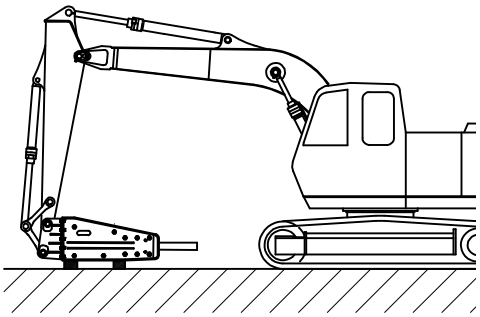
3. From the opposite side of the retainer pin plug (3) using the hammer and the chisel pin remover (A), remove the retainer pin plug.



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.

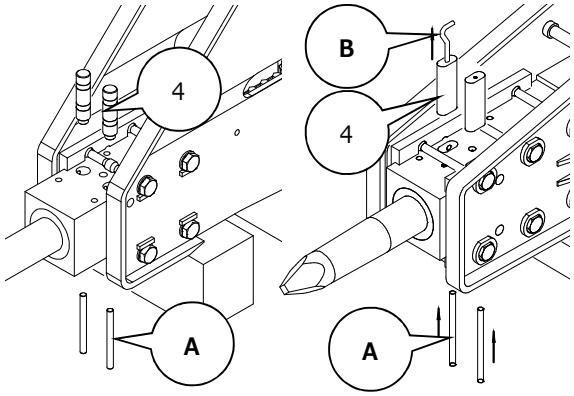


5. Place the breaker in a horizontal position, and lay it down on wooden blocks.
   Stop the excavator engine.



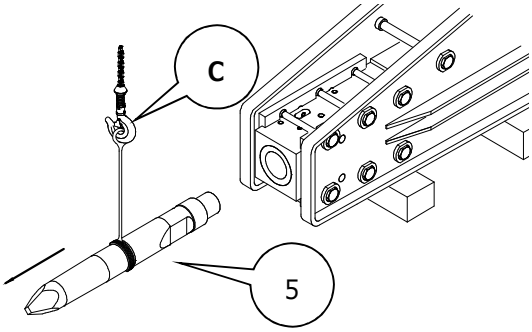
6. Remove theretainer pins (4) up from bottom using the chisel pin remover (A).

◆ TNB-7J, 110, 151LU2, 190LU2 and 230LU2 have M8 tapped holes and the TNB-310LU1 and 400LU2 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.



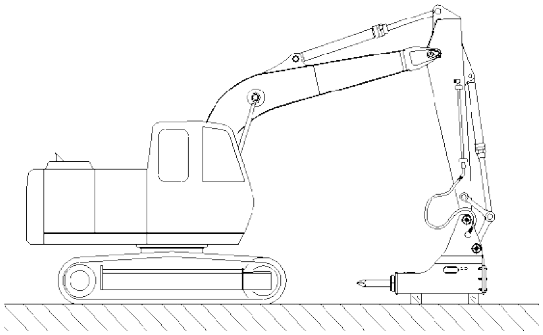
⚠ WARNING
Use a crane(C) when removing the chisel (5). Wear the protection glass, safety shoes and glove as protection gear.

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

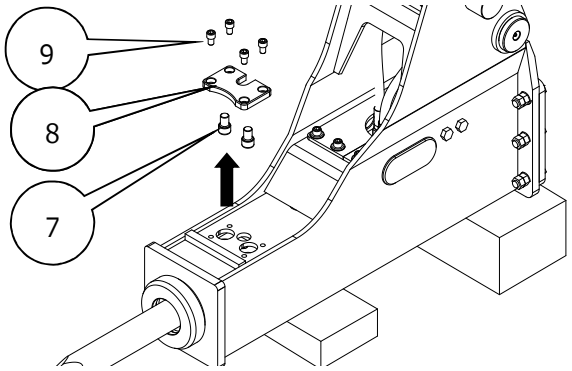


SIDE MOUNT SILENCED BRACKET (TNB-2M,3MB,4M,6M)

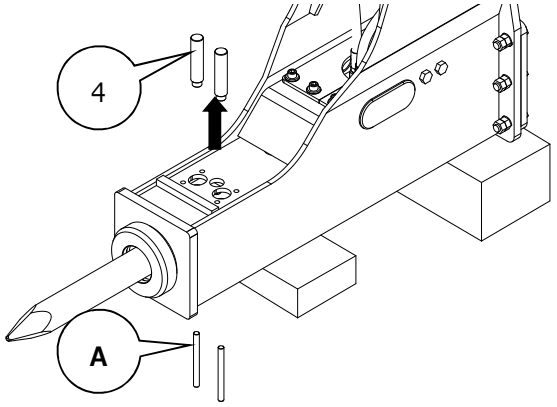
1. Place the breaker in a horizontal position, and lay it down on wooden blocks.
   Stop the excavator engine.



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

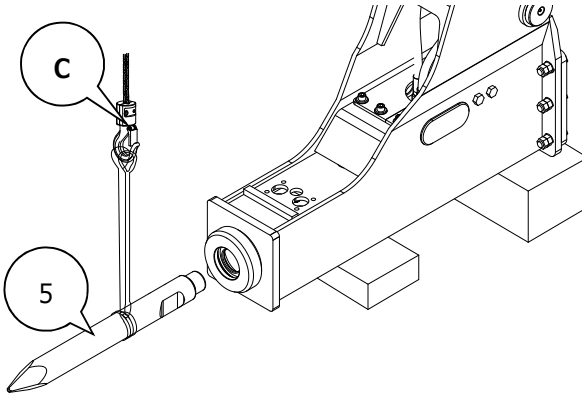


3. Remove the retainer pins (4) up from bottom using the chisel pin remover (A).



⚠ WARNING

Use a crane (C) when handle the chisel (5).
Watch out not to pinch fingers.
Wear the protection glass, safety shoes and glove as protection gear.

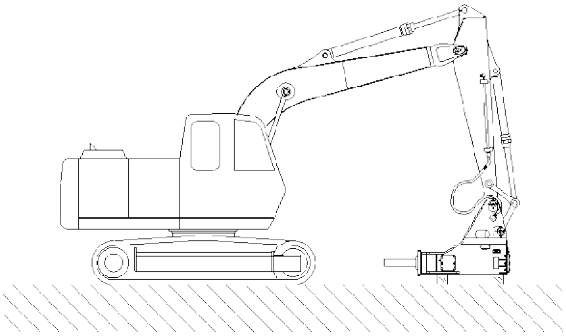


4. Remove the chisel (5) from the chisel holder.

SIDE MOUNT SILENCED BRACKET (TNB-7J,151LU2)

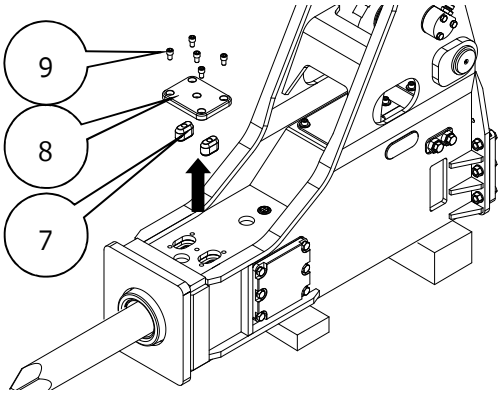
1. Place the breaker in a horizontal position, and lay it down on wooden blocks.

   Stop the excavator engine.

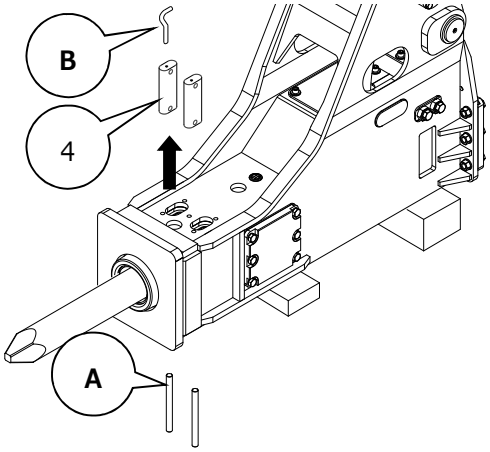


2. Remove the hex cap bolts (9).

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

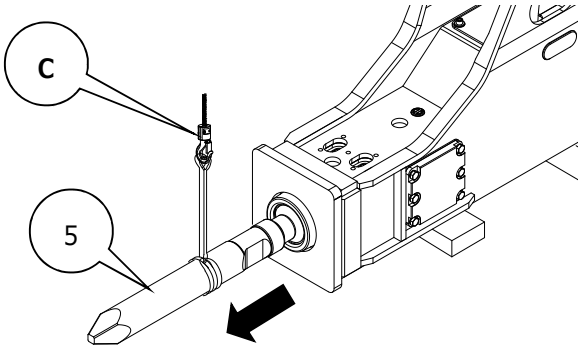


3. M8 thread hole is available on the retainer pin (4) and pull the retainer pins using the retainer pin puller bolt (B) or push it out with the chisel pin remover (A) to take them out.



⚠ WARNING

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

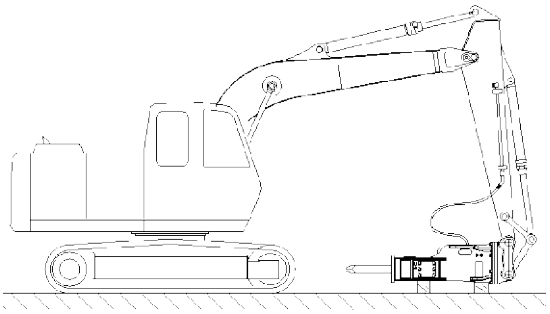


4. Remove the chisel (5) from the chisel holder.

TOP MOUNT SILENCED BRACKET (TNB-7J)

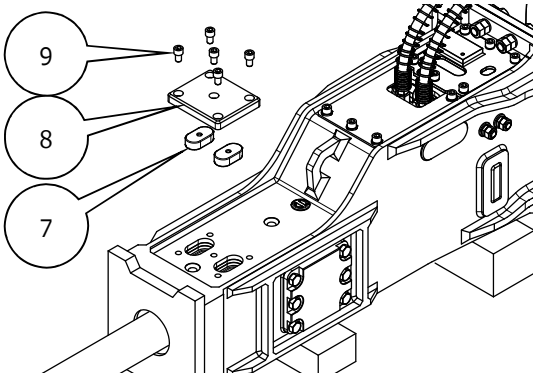
1. Place the breaker in ahorizontal position, and lay it down on wooden blocks.

   Stop the excavator engine.

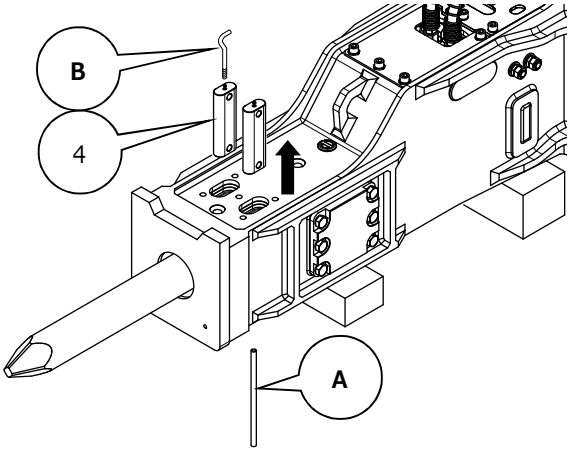


2. Remove the hex cap bolts (9).

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

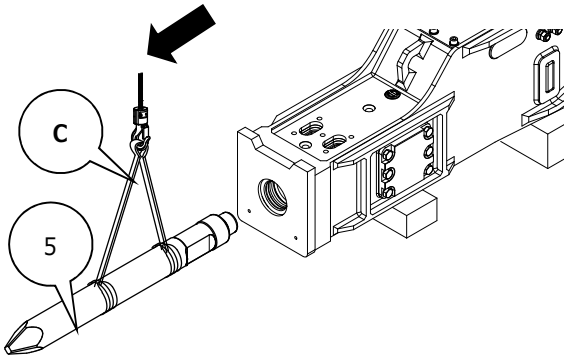


3. M8 thread hole is available on the retainer pin (4) and pull the retainer pins using the retainer pin puller bolt (B) or push it out with the chisel pin puller (A) to take them out.



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

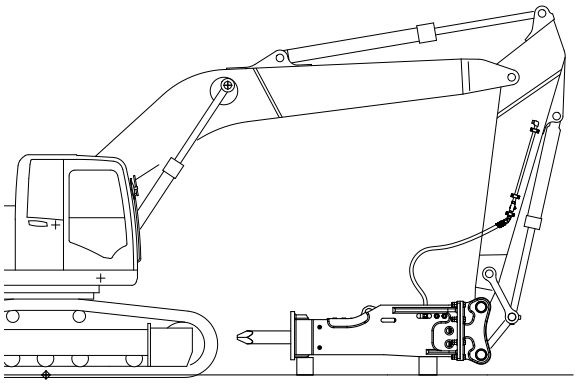
4. Remove the chisel (5) from the chisel holder.



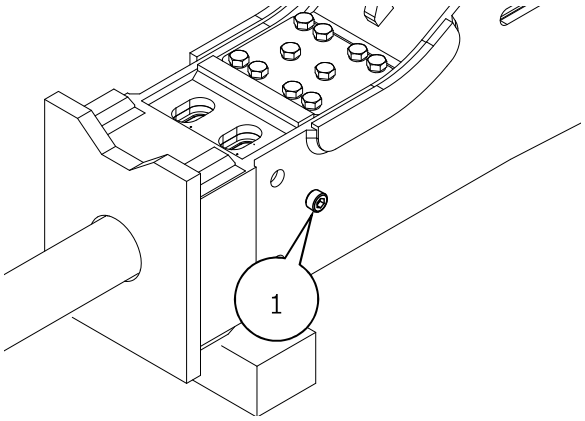
BOX BRACKET

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

   Stop the excavator engine.

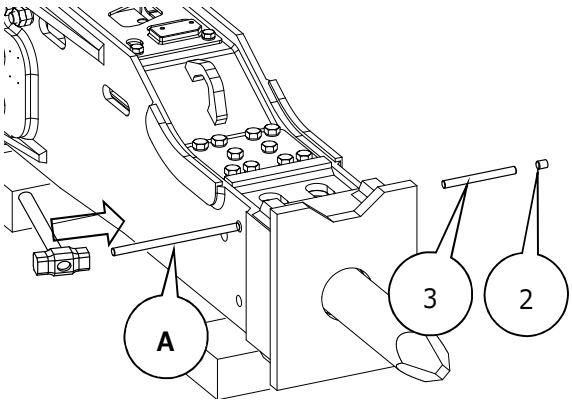


2. Remove the plug (1).

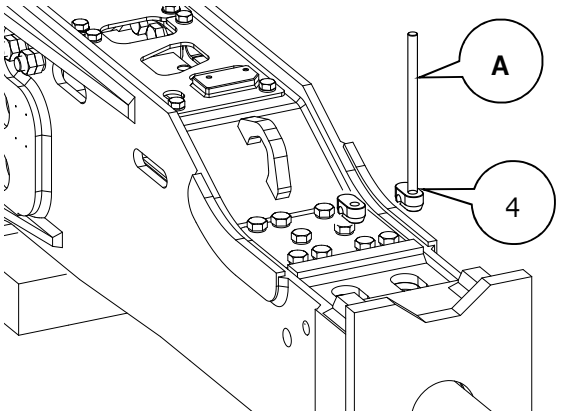


3. Using the hammer and the chisel pin detacher (A), remove the retainer pin stopper plug (2) and retainer pin stopper pin (3).

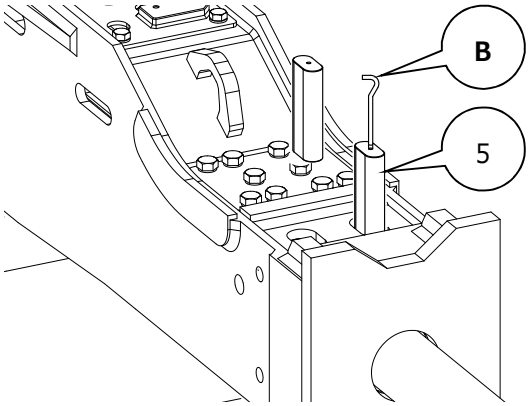
   - For models TNB-08M, 1M, 2M, 3M and 4M, a spring pin is used and they do not use a retainer pin stopper plug (2) and retainer pin stopper pin.



4. Using the chisel pin detacher (A), remove the retainer plug (4).



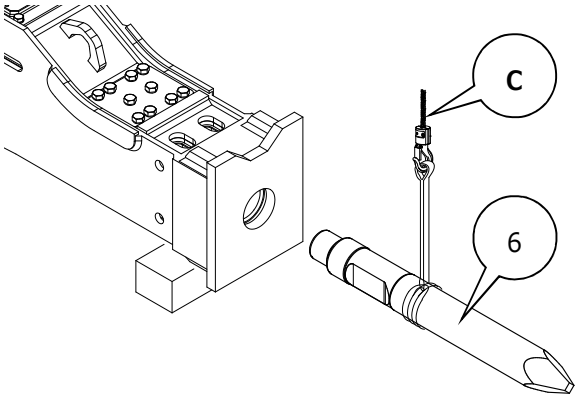
5. Pull the retainer pins (%) using the retainer pinnremover bolt (B).



⚠ WARNING

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

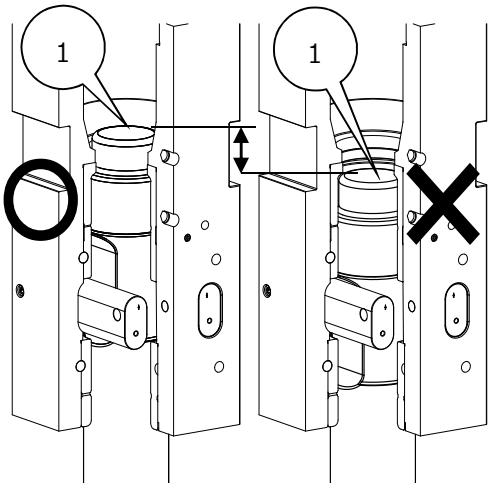
6. Remove the chisel (6) from the chisel holder.



2-8. LUBRICATION OF CHISEL

⚠CAUTION

If the grease is not applied correctly, it may cause a seizure of Chisel bushing and Chisel.



⚠CAUTION

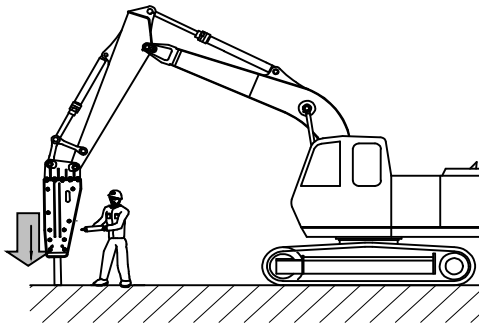
Make sure the chisel is completely in contact with the piston and in the deep position before greasing, otherwise, grease will stay between the chisel and piston and it could cause damage to the hammer.

⚠ CAUTION

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 minutes.

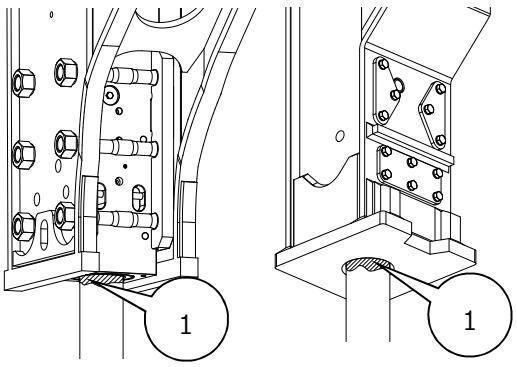
1. Before greasing, place chisel of the hydraulic breaker on the ground, lower the boom of the excavator and press the chisel into the chisel holder.

2. Apply grease to the grease nipple on the chisel holder using a grease gun.



⚠ CAUTION

When the breaker is brand new or right after reassembly, push the chisel into the breaker and grease until the grease comes out from the bottom of chisel bush(1).
When there is no grease between chisel and chisel bush it will cause seizure between the chisel and the bushing.
Please operate the breaker with vertical position for 5 minutes after the grease-up.

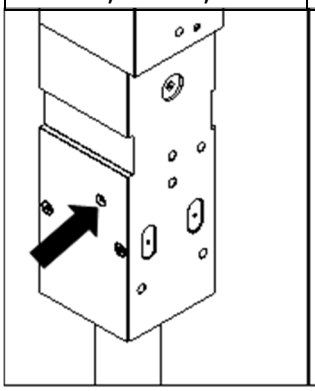
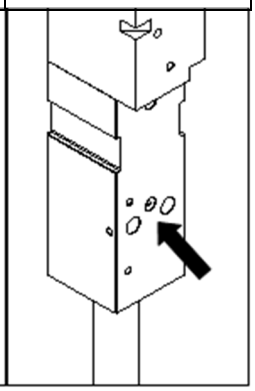


3. Grease in the morning before starting work and grease in the afternoon before starting work. With below amount as bench mark.
   Afterward every 2 hours grease the same amount.

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

Model **TNB-**	Number of times to push the grease gun (oz , gram)
08M	1-2 (0.04-0.07 , 1g-2g)
1M,2M,3MB,4M	2-3 (0.07-0.11 , 2g-3g)
5M,6M	5-6 (0.18-0.21 , 5g-6g)
6E	7-8 (0.25-0.28 , 7g-8g)
7J	8-10 (0.28-0.35 , 8g-10g)
110	10-12 (0.35-0.42 , 10g-12g)
141LU,151LU2	20-22 (0.70-0.77 , 20g-22g)
190LU2	22-24 (0.77-0.85 , 22g-24g)
230LU2	24-26 (0.85-0.92 , 24g-26g)
310LU1	30-35 (1.06-1.23 , 30g-35g)
400LU2	35-40 (1.23-1.41 , 35g-40g)

● **Position of Grease nipple**

TNB- **7J,110,1151LU2,190LU2,** **230LU2,310LU1,400LU2**	**Other Models**
	

2-9. 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
Inspection must be done before operation begins. Lack of inspection before operation causes damage and poor operation of the hydraulic breaker.

2-10. 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.

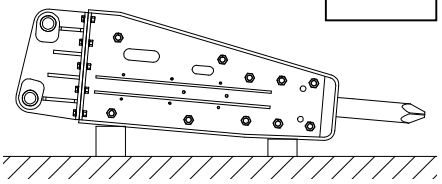
⚠ CAUTION

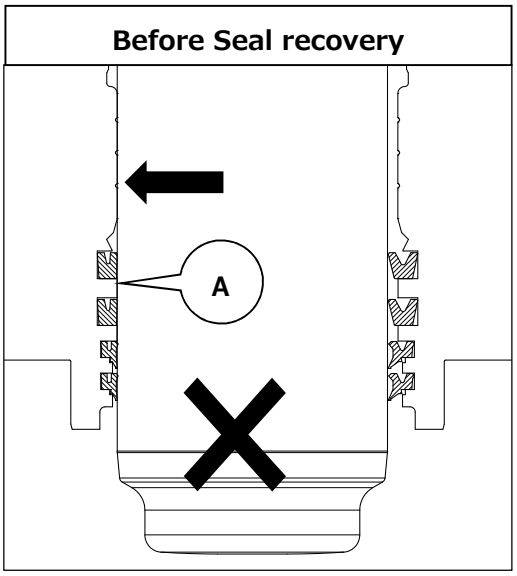
- When operating the hydraulic breaker, ensure to use the piping for the hydraulic breaker.
- If there is a ”Hydraulic Breaker Mode” on the excavator, change to the mode.
- If a piping of the excavator is set up for the hydraulic crusher, 1) the excessive hydraulic oil might be supplied to the hydraulic 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.

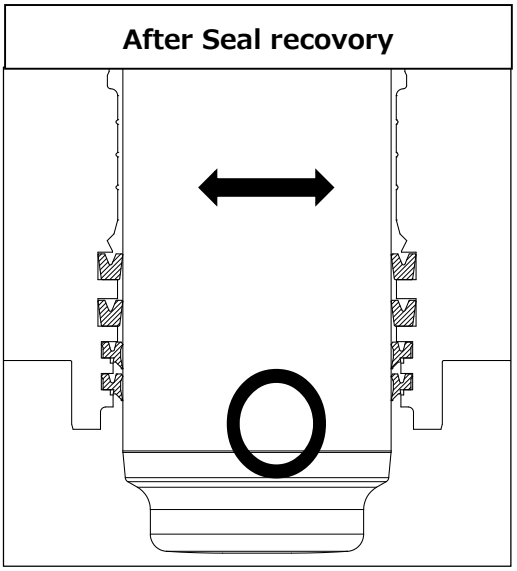
⚠ CAUTION

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

Fig.1







The test run is necessary in the following cases.

- When mount a brand new breaker on the excavator.
- 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 bubbles in side hyd, breaker and to fill up the hyd, oil in the breaker. (Squeeze the throttle and slowly press the operation 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 interference 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 bubbles 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 bubble 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.

		Do not impact		Do not impact		Operation		Operation
(1)Installation of hydraulic breaker	⇒	**(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) and (3)must be perfomed as shownin Fig.2 where the breaker is lifted up and held straight up.

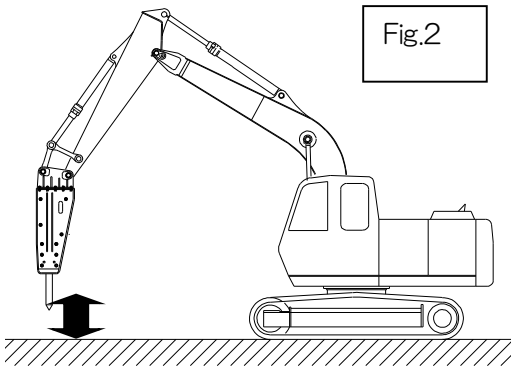


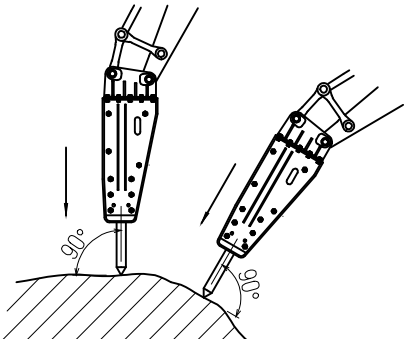
Fig.2

2-11. 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.

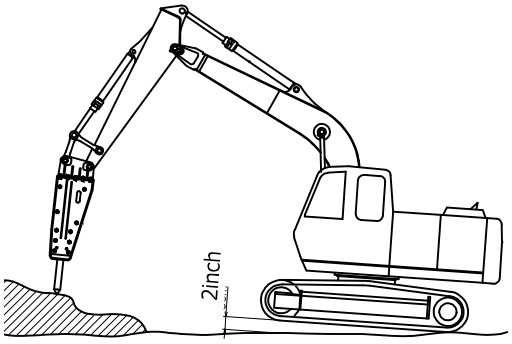
- The hydraulic breaker is an attachment to the hydraulic excavator. Follow the instruction manual for the hydraulic excavator when starting machine.
- Set up the excavator to operate the hydraulic breaker. If there is a “Hydraulic breaker Mode” on the excavator, change to the mode. Position the throttle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



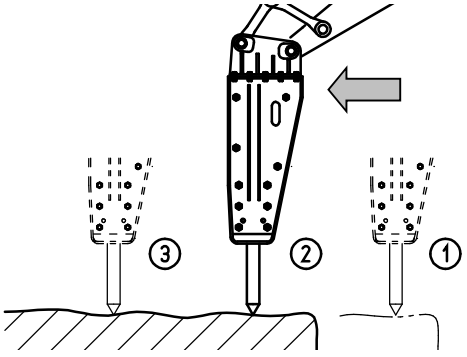
⚠ CAUTION
When the angle is not 90 degree, the breaker will be slipped. It cause the chisel breakage, seizure of bush. Choose stable surface to beating. Avoid any excessive force.

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

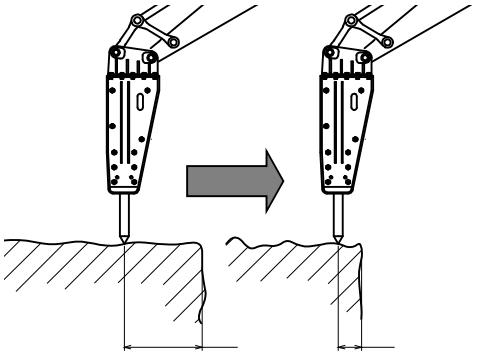


⚠ CAUTION
When pushing force is not enough, it will lead blank blows. Blank blows will give a big impact to the breaker and excavator, and cause serious damage and the breakdown.

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

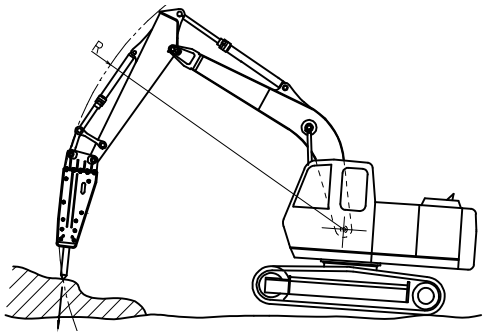


- After striking against the same point continuously for 30 seconds without the rock breaking, change to another area of the rock.

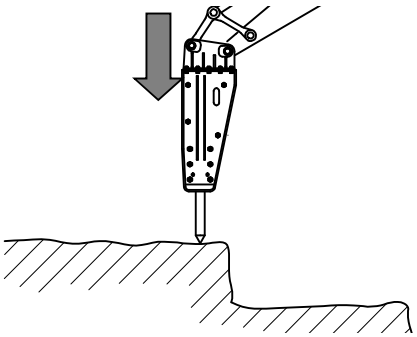


⚠ CAUTION
When continuously hammering the same point 30 seconds over, it causes abnormal wear of the chisel and the bracket parts.

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

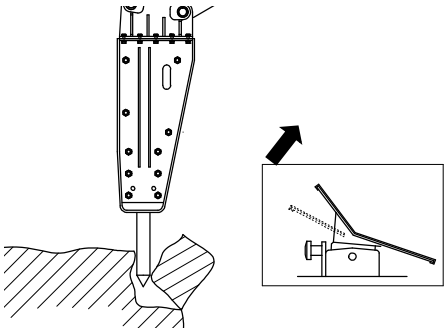


- During impact, prevent blank blows by using the breaker properly. Stop the pedal immediately when the object is broken.



⚠ CAUTION
When pushing force is not enough, it will lead blank blows. Blank blows will give a big impact to the breaker and excavator, and cause serious damage and the breakdown.

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

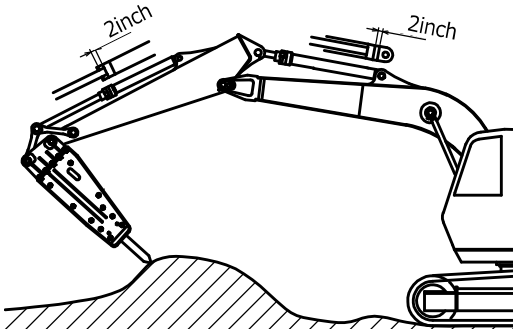


2-12. PRECAUTIONS DURING OPERATION

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

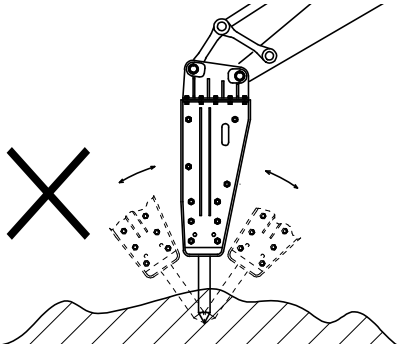
⚠ CAUTION

Do not operate the breaker when the cylinder of the excavator is fully shrunk or extended (stroke-end). Keep the clearance about 2 inch (5 cm) from the cylinder stroke-end. Ignoring this instruction will lead to the hydraulic cylinder, links and arm being damaged.



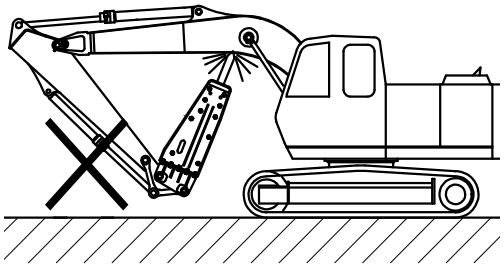
⚠ CAUTION

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.



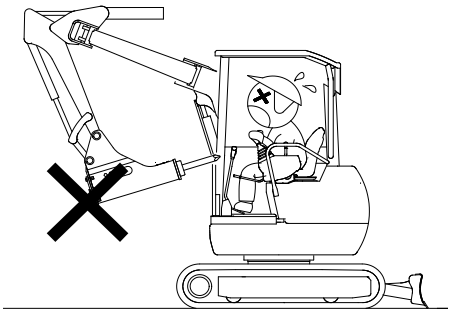
⚠ CAUTION

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.



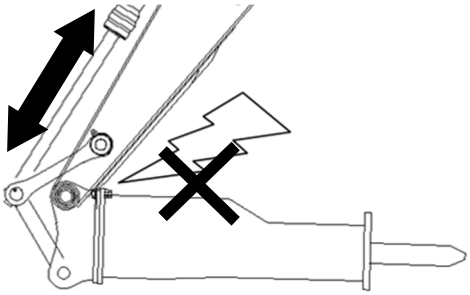
⚠ WARNIG

Operate the breaker carefully so that the chisel cannot hit the cabin.
Careless operation of hydraulic breaker may result in serious injuries or severe damage to the carrier and hydraulic breaker.
*Especially when using with non-standard arms.



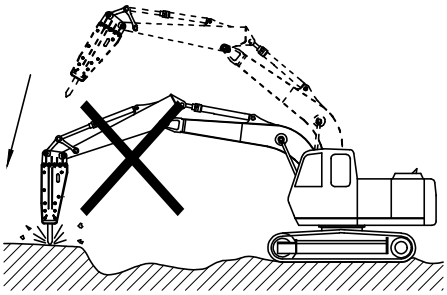
⚠ CAUTION

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.
*Be careful especially to reinforced arm and short arm.



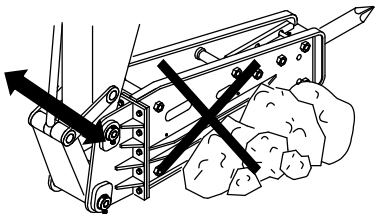
⚠ CAUTION

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.

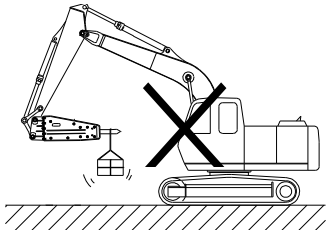


⚠ WARNING

Do not use travering 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.

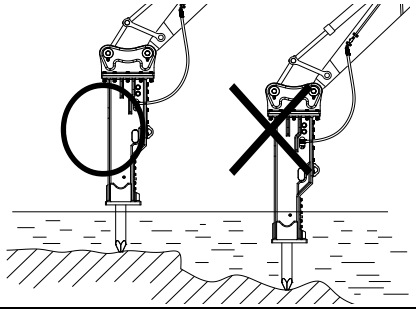


⚠ CAUTION

In case the breaker hose shakes abnormally, stop the operation immediately.
Then contact our customer service.

⚠ 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"

2-13. 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 eyes and cause serious injury.

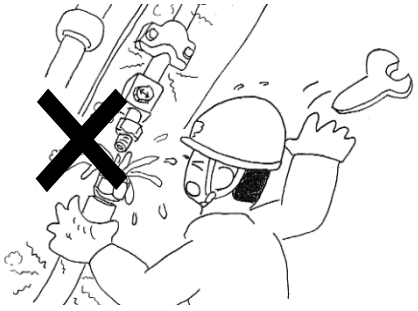
⚠ WARNING
• Assembly and disassembly work should be performed in a flat area. • A signal must be decided in advance for the work if more than two people are involved. • Make sure that a crane is used for lifting if the material weight exceeds 55lb (25kg). • When dismantling heavy parts, support the part 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 material, which is being lifted by crane. • Keep away from material, which is being lifted.

IMPORTANT

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.

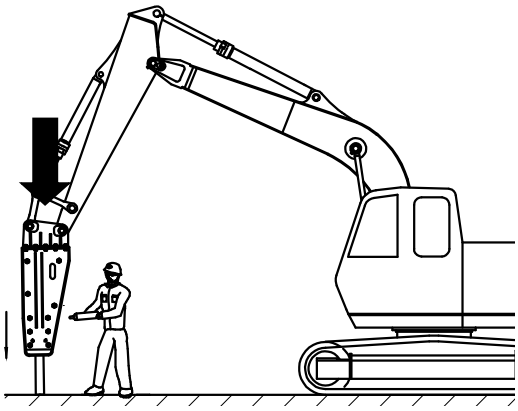
⚠ WARNING
When removing the hydraulic hose, do not remove it immediately after stopping the breaker. The hydraulic oil will still be hot and may cause burns. Remove the hose after the hydraulic oil has had time to cool. Do not remove the hydraulic hose immediately after stopping the breaker as on removing 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.



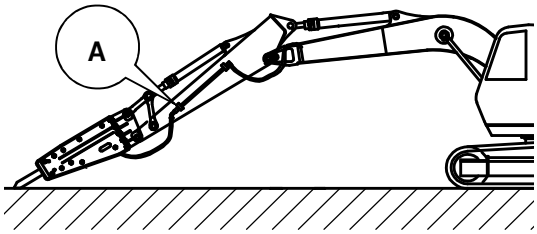
⚠ CAUTION

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.

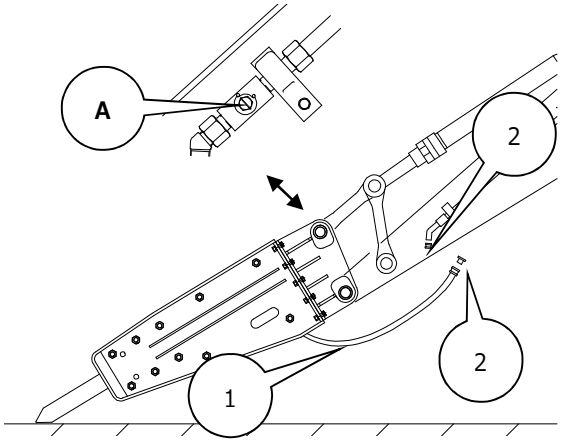


3. Stop the excavator engine and remove the excess pressure in the hose.

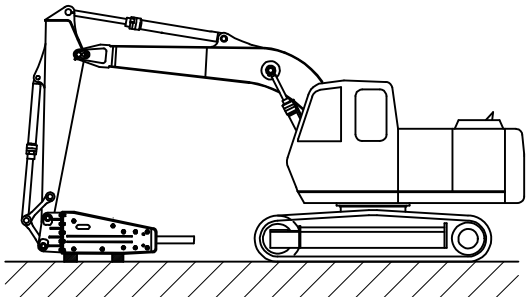
4. Turn the stop valve (A) to the off position.

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.

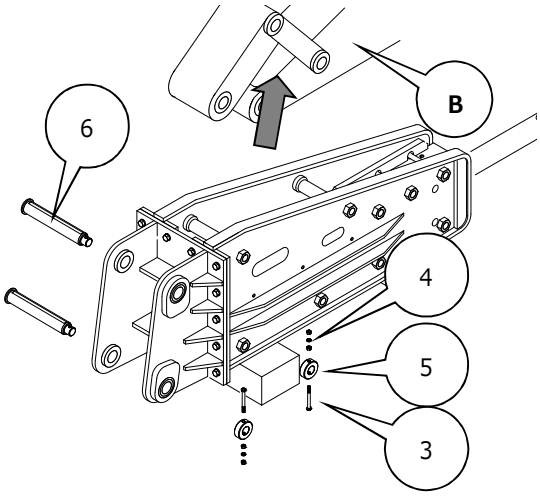


7. Start the excavator engine.



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).



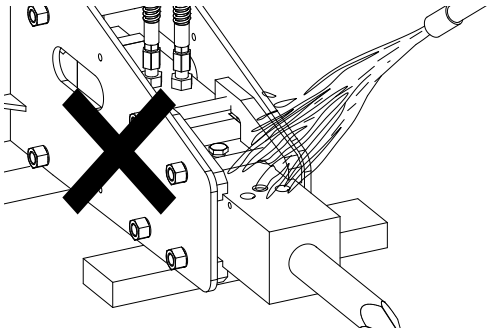
⚠ WARNING
A crane should be used for handling heavy material.

10. Remove the 2 bracket pins (6).

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

2-14. STORAGE OF THE BREAKER

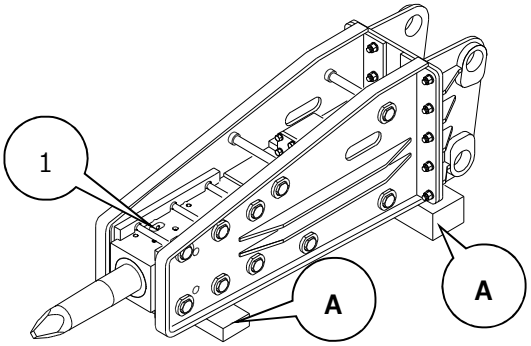
When the hydraulic breaker is not being used for a long period of time, proceed as follows.



⚠ CAUTION
When washing the breaker by high pressure water, make sure that the water does not enter the chisel holder and air cap. The water may accumulate inside the breaker, and cause rust.

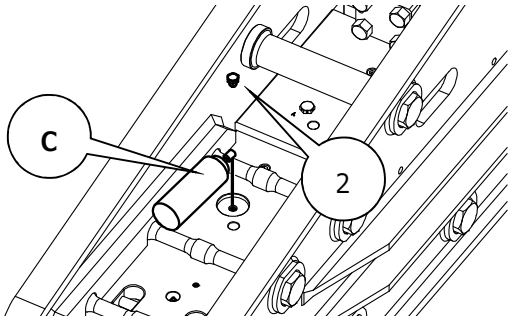
STORAGE FOR ONE MONTH

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

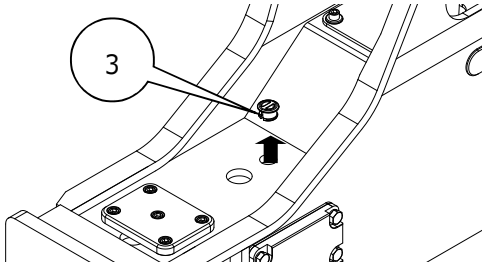


1. Place the breaker on 2 pieces of wood (A).
   NOTE: Lay the breaker down so that the cylinder side is higher than the chisel holder side.

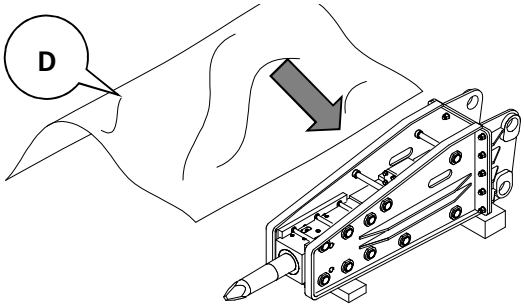
2. Remove the hex plug (2) from the chisel holder. Spray anti-rust spray (C) onto the piston area and replace the hex plug (2) in the chisel holder.



・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.

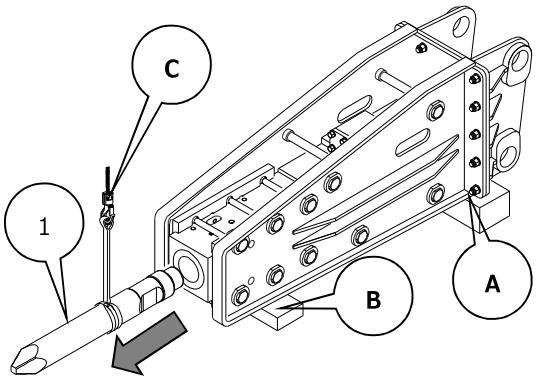


3. Place a sheet (D) over the breaker for storage. In this case the chisel side must be lower to avoid the rain water penetration in the chisel holder.



STORAGE FOR MORE THAN ONE MONTH

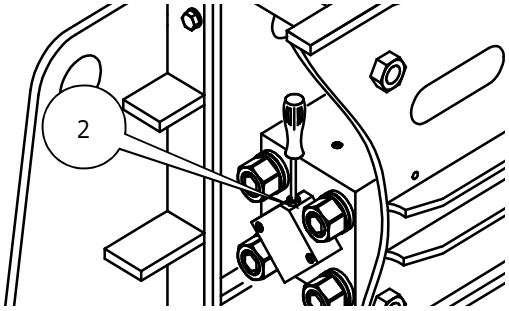
1. Place the breaker on 2 pieces of wood (A), (B). Lay the breaker down so that the cylinder side is higher than the chisel holder side.



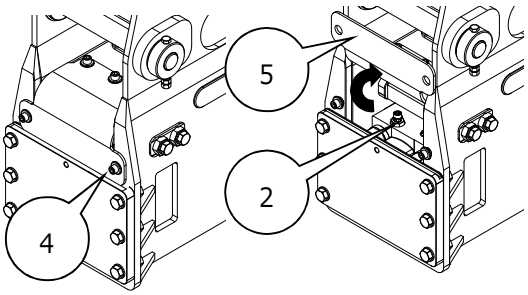
⚠ WARNING
Use a crane(C) when removing the chisel (1).

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).



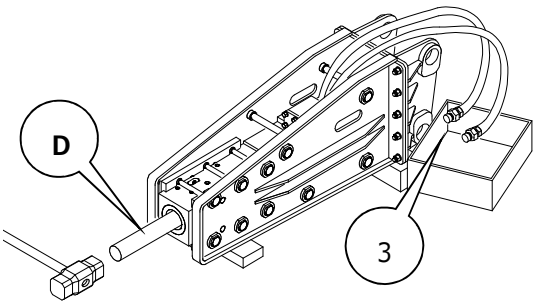
P.S. : In regard of the side mount silenced bracket remove the bolts (4) and flip the cover (5) and continue the work in following 3.



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

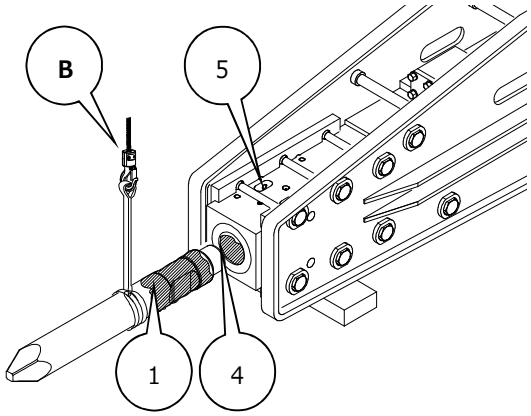
5. From the chisel holder end insert a rod (D) into the piston and hit the rod lightly with a hammer to push it up into the piston. At this moment watch out the oil comes out from the hose.
NOTE: During this procedure release any excess nitrogen gas from the cushion chamber.

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



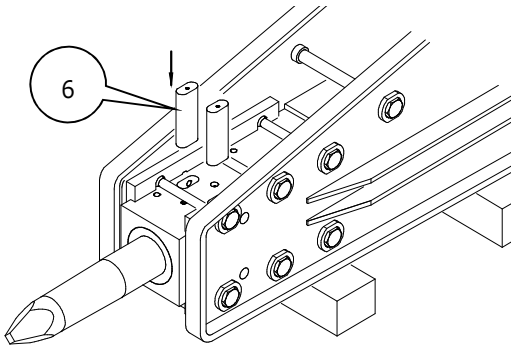
⚠ WARNING
Use a crane (B) when installing the chisel (1).

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).

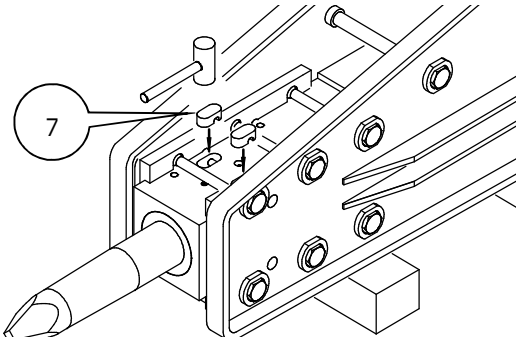


8. Apply grease to the retainer-pin holes.

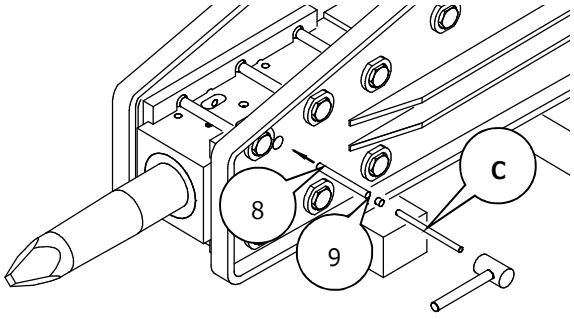
9. Fit the retainer pins (6).



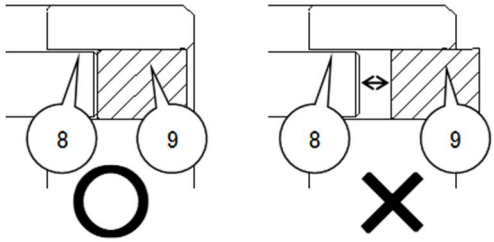
10. Assemble the retainer pin plugs (7) using the hammer.



11. Insert the retainer pin stopper pin (8) and retainer pin stopper plug (9) using the hammer and the chisel pin remover (C).

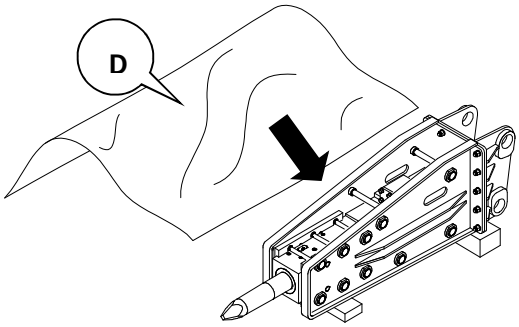


⚠ CAUTION
To avoid drop of retainer pin stopper plug(9), make sure to clean the retainer pin stopper plug(9) and its hole, and insert the retainer stopper plug(9) using hammer deep into its position so that surface of that plug (9) get lower than the breaker body.



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

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



⚠ CAUTION
Failure to keep the above storage manner, it may cause to rust inside the breaker or malfunction at early stage. Operate the breaker with rusty components may cause seal damage or seizure.

⚠ 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"**.

⚠ CAUTION
When using a breaker stored for 1 month or more, the piston and the cylinder may not have the oil film. Please make sure to operate the breaker according to the section **"TEST RUN"**.

●MAINTENANCE AND INSPECTION

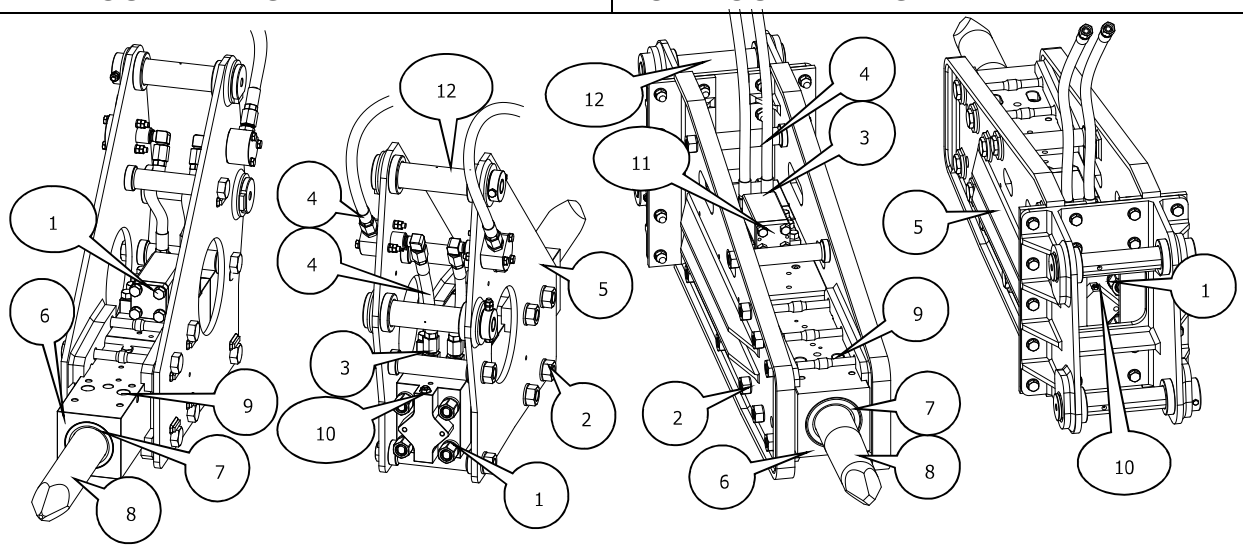
3-1. DAILY CHECK (Pre-start inspection)·PERIODIC INSPECTION·REGULAR MAINTENANCE

DAILY CHECK (pre-start inspection) · PERIODIC INSPECTION

Please check each part according to the inspection table.

Please repair and exchange immediately when abnormality is found.

SIDE MOUNT BRACKET	TOP MOUNT BRACKET



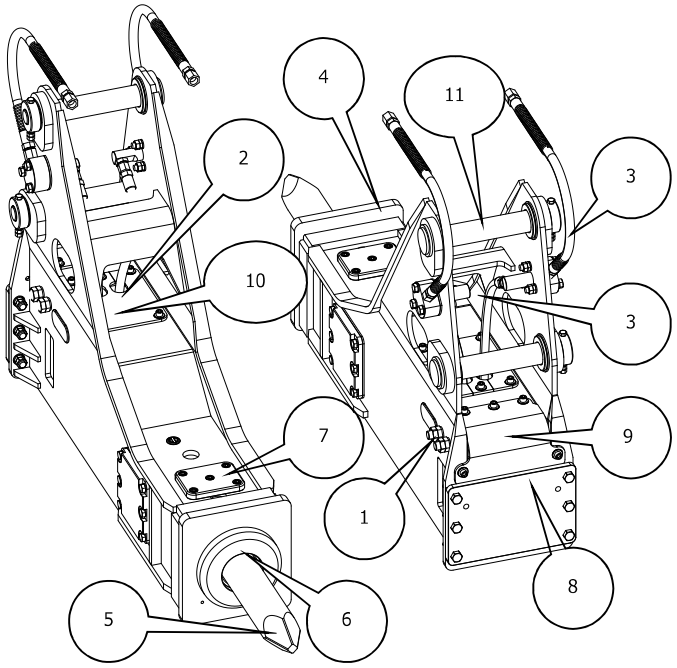
Inspection Items	Substance	Countermeasure	Period
01) Side Bolt Nut	Eye mark gap, clearance and wear	Repair, replacement	Every day
02) Bracket Bolt Nut	Looseness, damage and loss	Retightening, replacement, repair	
03) Hose Adapter	Looseness, damage and oil leakage	Retightening, replacement	
04) Hydraulic Hose	Looseness, damage and oil leakage	Retightening, replacement	
05) Bracket	Wear, damage and crack	Repair, replacement	
06) Chisel Holder	Wear and crack	Replacement	
07) Chisel Bushing	Wear and damage	Replacement	
08) Chisel	Wear of length, damage and oil leakage	Replacement	
Bolts / Nuts	Looseness, damage and loss	Retightening, replacement, repair	
Hydraulic Oil	Shortage, deterioration and contamination	Refill, replacement	
08) Chisel	Wear of outer diameter and striking face crack	Replacement	100 hour or one month
09) Retainer Pin / Stopper Pin	Wear, damage and breakage	Repair, replacement	
10) Gas Valve Body/ Gas Valve Plug	Gas leakage, looseness and damage	Recharge, retightening, replacement	
11) Control Valve Box / Cap Bolt	Looseness and loss	Retightening, repair	
Oil Filter Element (*)	Clogging	Replacement	
12) Bracket Pin	Wear and damage	Replacement	300 hours or 3 months

DAILY CHECK (pre-start inspection) · PERIODIC INSPECTION

Please check each part according to the inspection table.

Please repair and exchange immediately when abnormality is found.

SIDE MOUNT SILENCED BRACKET



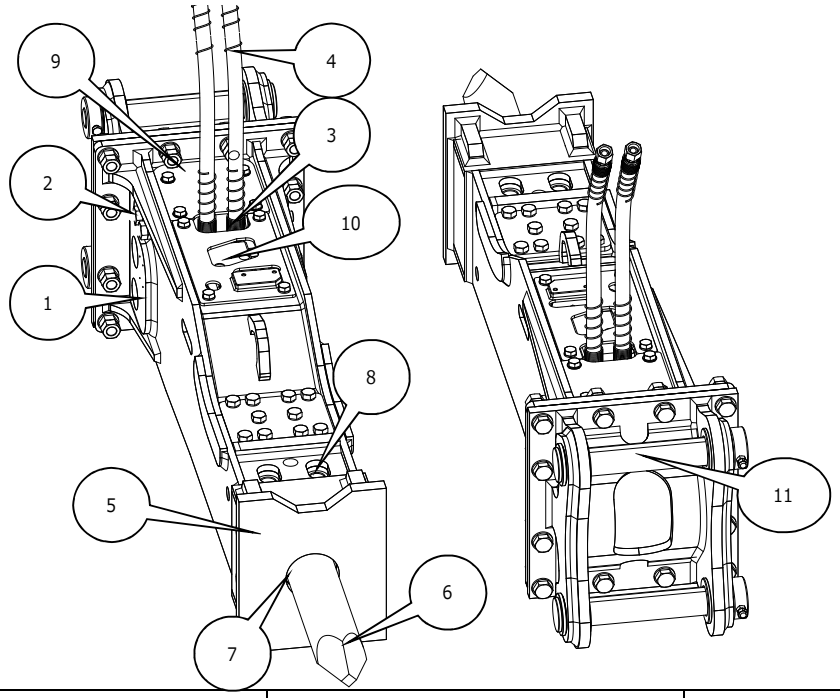
Inspection Items	Substance	Countermeasure	Period
01) Guide Bolt / Nut	Looseness, damage and loss	Retightening, replacement, repair	Every day
02) Hose Adapter	Looseness, damage and oil leakage	Retightening, replacement	
03) Hydraulic Hose	Looseness, damage and oil leakage	Retightening, replacement	
04) Bracket	Wear, damage and crack	Repair, replacement	
05) Chisel	Wear of length, damage and oil leakage	Replacement	
Bolts / Nuts	Looseness, damage and loss	Retightening, replacement, repair	
Hydraulic Oil	Shortage, deterioration and contamination	Refill, replacement	
05) Chisel	Wear of outer diameter and striking face crack	Replacement	100 hour or one month
06) Chisel Bushing	Wear and damage	Replacement	
07) Retainer Pin / Stopper Pin	Wear, damage and breakage	Repair, replacement	
08) Side Bolt Nut	Eye mark gap, clearance and wear	Repair	
09) Gas Valve Body/ Gas Valve Plug	Gas leakage, looseness and damage	Recharge, retightening, replacement	
10) Control Valve Box / Cap Bolt	Looseness and loss	Retightening, repair	
Oil Filter Element (*)	Clogging	Replacement	
11) Bracket Pin	Wear and damage	Replacement	300 hours or 3 months

DAILY CHECK (pre-start inspection) · PERIODIC INSPECTION

Please check each part according to the inspection table.

Please repair and exchange immediately when abnormality is found.

BOX BRACKET

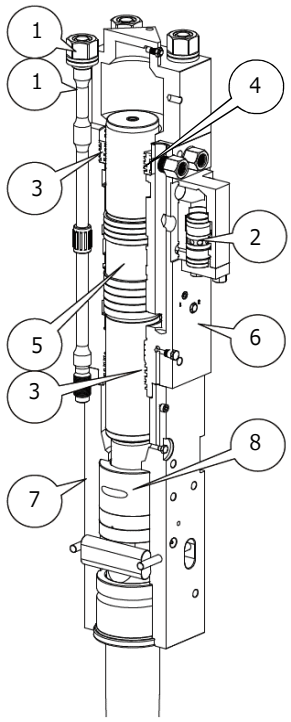


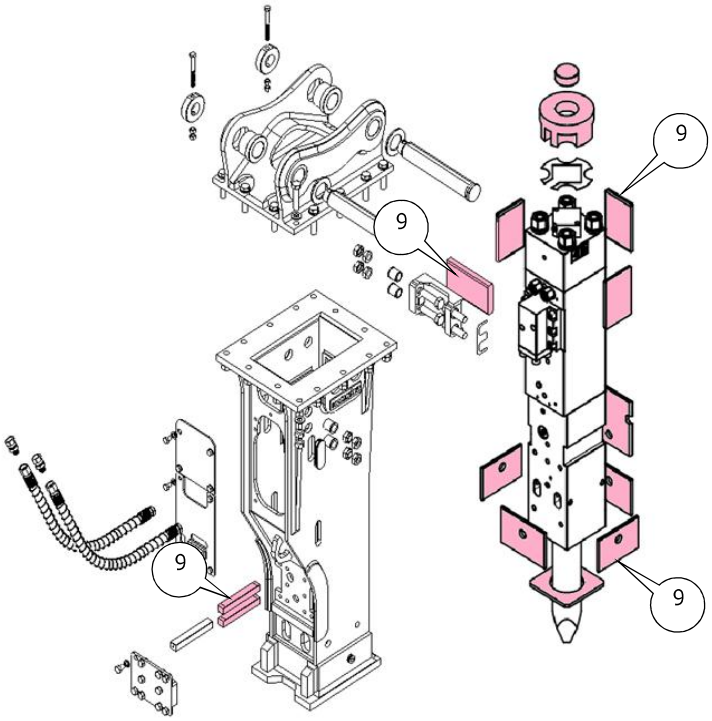
Inspection Items	Substance	Countermeasure	Period
01) Side Bolt Nut	Eye mark gap, clearance and wear	Repair	Every day
02) Guide Bolt / Nut	Looseness, damage and loss	Retightening, replacement, repair	
03) Hose Adapter	Looseness, damage and oil leakage	Retightening, replacement,	
04) Hydraulic Hose	Looseness, damage and oil leakage	Retightening, replacement,	
05) Bracket	Wear, damage and crack	Repair, replacement	
06) Chisel	Wear of length, damage and oil leakage	Replacement	
Bolts / Nuts	Looseness, damage and loss	Retightening, replacement, repair	
Hydraulic Oil	Shortage, deterioration and contamination	Refill, replacement	
06) Chisel	Wear of outer diameter and striking face crack	Replacement	100 hour or one month
07) Chisel Bushing	Wear and damage	Replacement	
08) Retainer Pin / Stopper Pin	Wear, damage and breakage	Repair, replacement	
09) Gas Valve Body/ Gas Valve Plug	Gas leakage, looseness and damage	Recharge, retightening, replacement	
10) Control Valve Box / Cap Bolt	Looseness and loss	Retightening, repair	
Oil Filter Element (*)	Clogging	Replacement	
11) Bracket Pin	Wear and damage	Replacement	300 hours or 3 months

REGULAR MAINTENANCE

Periodic maintenance of each part should be done as early as every 600 hours or every 6 months.

Repair and exchange the parts immediately when abnormality is found.





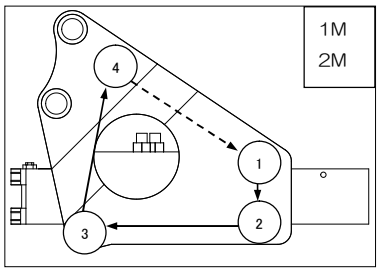
Inspection parts	Substance	Countermeasure	Maintenance interval
01) Side bolt/ nut	Damage and elongation	Replacement	600hr or 6 months
02) Control valve	Seizure, scratch	Repair, replacement	
Valve box/ Cap			
03) Seal Kit	Regular replacement parts	Replacement	
- Gas seal			
- Oil seal			
- Slide ring			
- Dust seal			
- Buffer ring			
- O ring, other seal			
04) Packing bushing	Seizure, scratch	Repair	
05) Piston	Seizure, scratch and wear	Repair, replacement	
06) Cylinder	Seizure, scratch and wear	Repair, replacement	
07) Chisel holder	Wear and crack	Replacement	
	Wear of inner diameter	Replacement	
08) Chisel holder bushing	Wear and damage	Repair	
09) Resin parts	Wear and damage	Replacement	

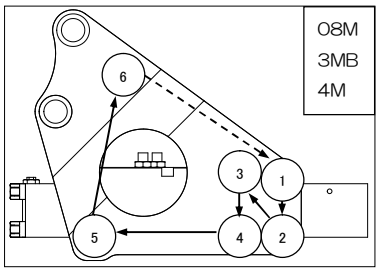
3-2. INSPECTION FOR LOOSENESS AND RETIGHTENING OF BOLTS AND NUTS

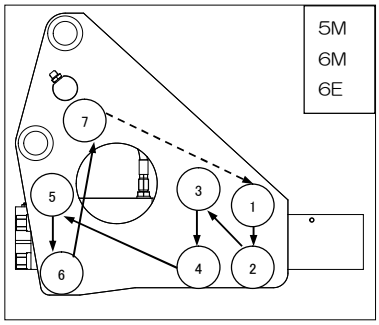
⚠ CAUTION
Check the looseness of every bolt and nut, and retighten them after 10 hours operation for brand-new and repaired (disassembled and assembled) breaker. The torque of bracket bolt possibly falls off due to initial mechanical fit with breaker body. Carry out the retightening maintenance even if the nuts do not turn. **※Especially when the guide bolts and side bolt nuts are loose, tighten them securely.**

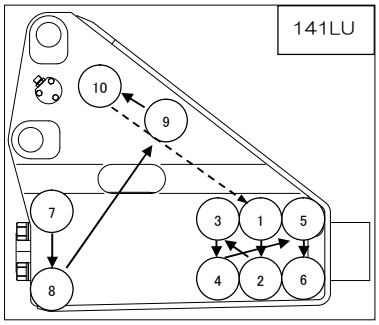
Check the looseness of every bolt and nut on breaker body, bracket, and piping components every day.
When looseness is confirmed, retighten them as per the torque chart in this manual.
At the initial stage, the bracket bolts may loosen their tension as they do not fit in the breaker body yet.
Re-tighten the bracket bolts even if the nuts have not loosened.
Tighten the bolts according to the order shown in the diagram.

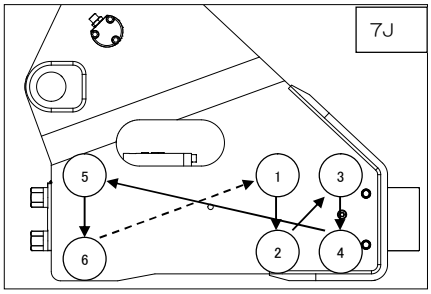
SIDE MOUNT BRACKET

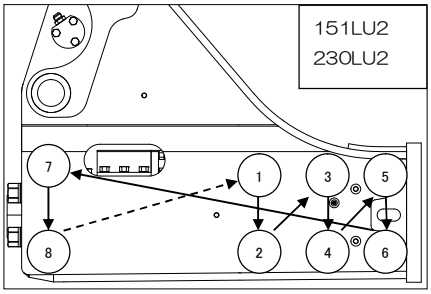


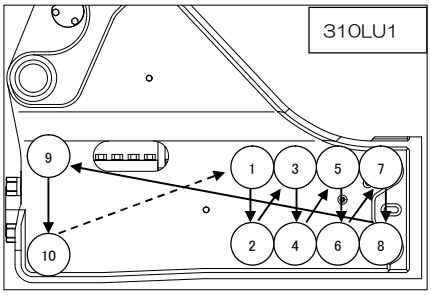






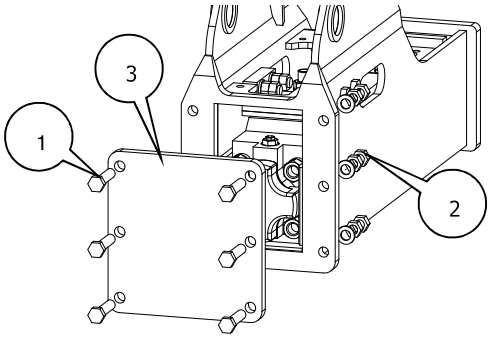






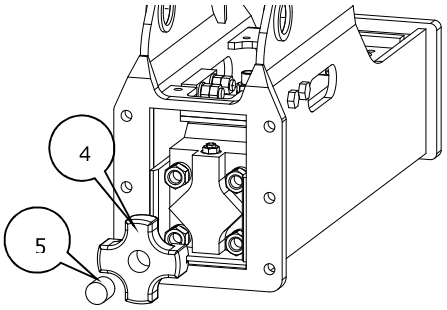
SIDE MOUNT SILENCED BRACKET

1. Remove Bolt (1) and Nut (2).
   Remove Top cover (3).

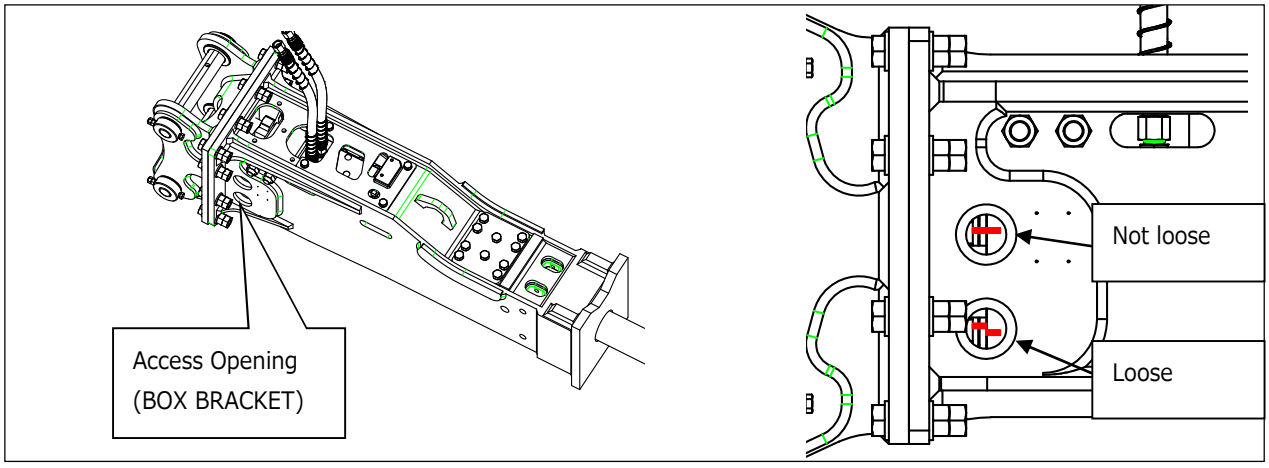


2. Remove Isolator (4) and Stopper (5).
   Make sure the Side bolts are not loose.

3. After checking, assemble in reverse order.

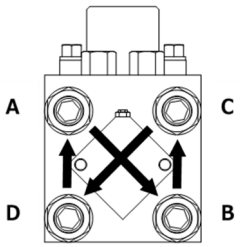


BOX BRACKET



・Since side bolt is long, the position of side bolts but possibly rotates by 0.08inch(2mm) to 0.20inch(5mm) when the breaker is brand new condition. Tighten them when the rotation comes more than 0.20inch(5mm).

Tighten Side bolt nut in the following order as shown in the right drawing (A – B – C – D-A).
Tighten the Side bolt nut diagonally and evenly.



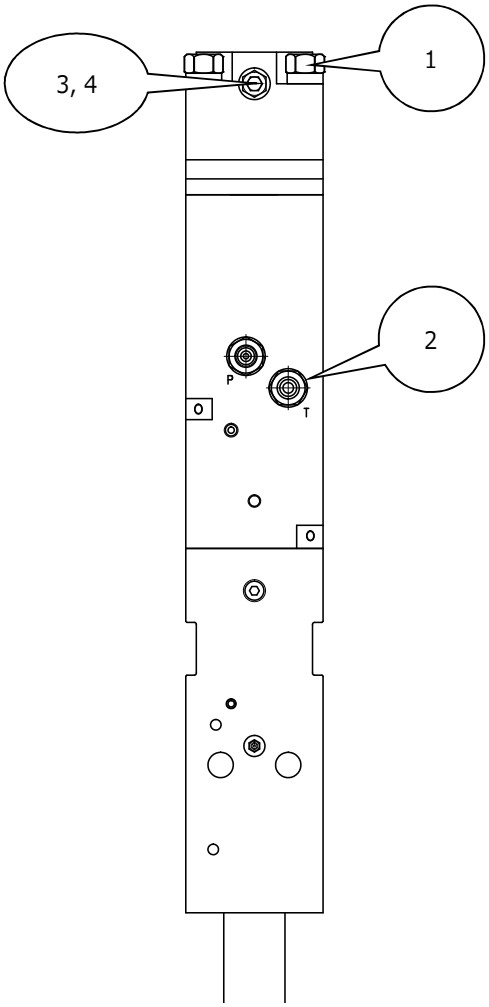
・When oil leaks from hydraulic hose connection area, loosen the hose at first and retighten it at specific torque, in order to avoid the damage to hose and adapters because of excessive tightening torque.

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

TIGHTENING TORQUE SPECIFICATIONS

-BARE BREAKER-

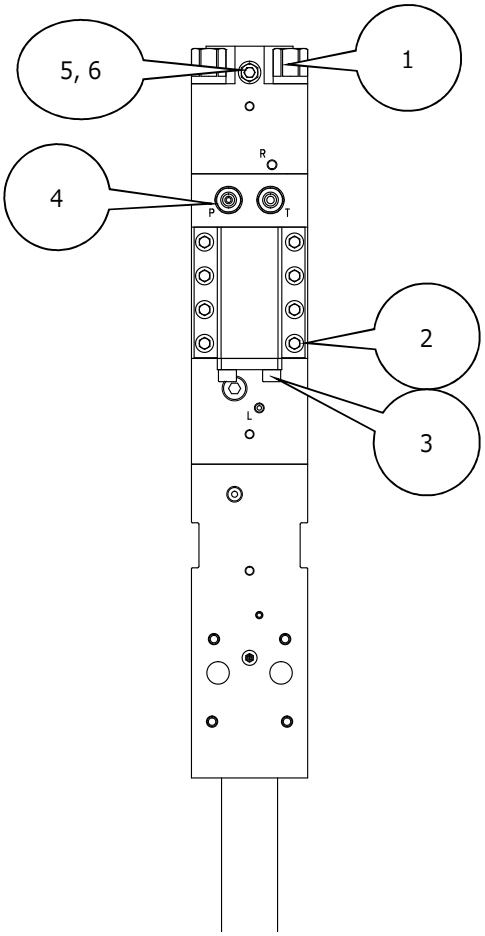
TNB-08M,1M,2M,3MB,4M,5M



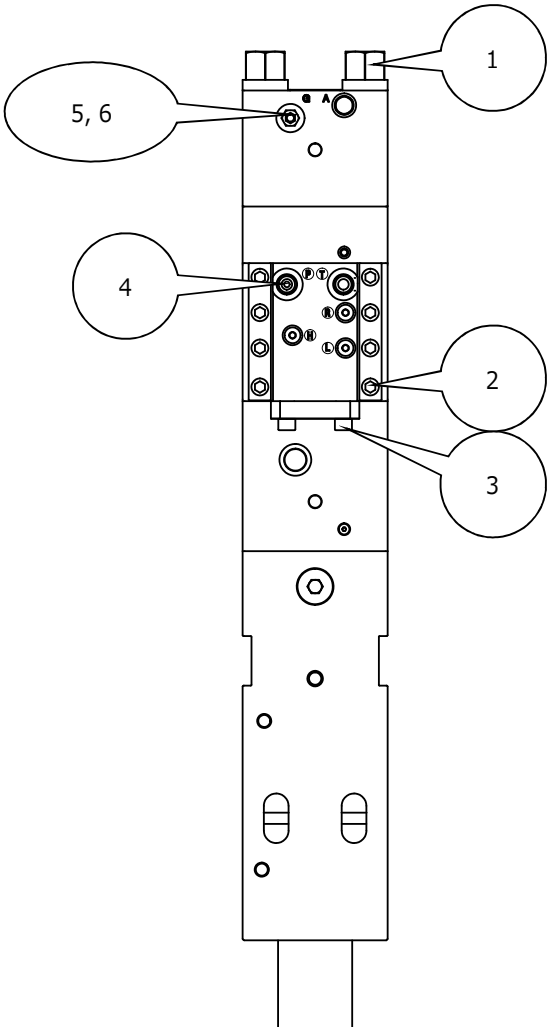
Model **TNB-**		**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
01) Side bolt nut	Hex Size (mm)	24	27	32	32	32	36
	Torque ft.lbs	159	217	325	325	398	470
	(N·m)	(216)	(294)	(441)	(441)	(539)	(637)
02) Hose adapter	Hex Size (mm)	27	32	32	32	32	32
	Torque ft.lbs	181	325	325	325	325	325
	(N·m)	(245)	(441)	(441)	(441)	(441)	(441)
03) Gas valve body	Hex Size (mm)	22	22	22	22	22	22
	Torque ft.lbs	61	61	61	61	61	61
	(N·m)	(83)	(83)	(83)	(83)	(83)	(83)
04) Gas valve plug	Hex Size (mm)	14	14	14	14	14	14
	Torque ft.lbs	9	9	9	9	9	9
	(N·m)	(12)	(12)	(12)	(12)	(12)	(12)

-BARE BREAKER-

TNB-6M,6E



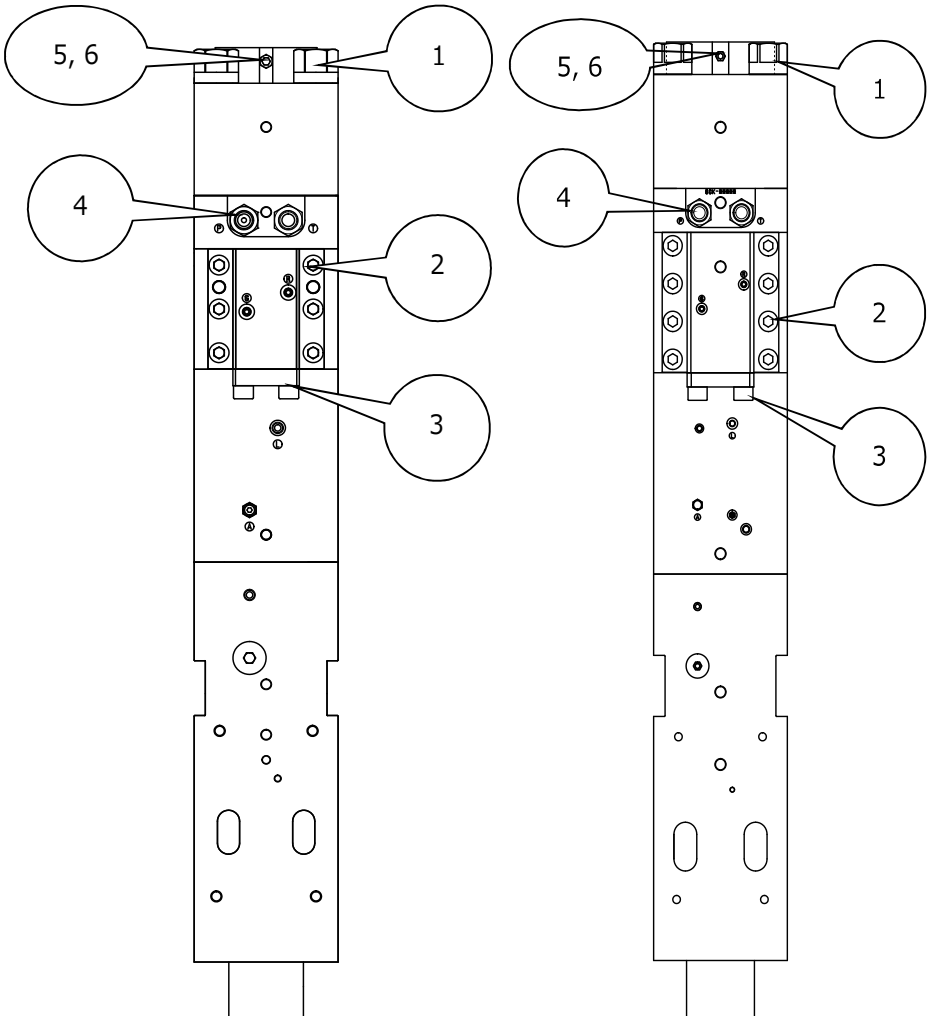
TNB-7J



Model **TNB-**		**6M**	**6E**	**7J**
01) Side bolt nut	Hex Size (mm) Torque ft.lbs (N·m)	41 723 (980)	41 723 (980)	55 1446 (1960)
02) Control valve box bolt	Hex Size (mm) Torque ft.lbs (N·m)	14 202 (274)	5/8inch 325 (441)	14 181 (245)
03) Control valve cap bolt	Hex Size (mm) Torque ft.lbs (N·m)	14 202 (274)	5/8inch 325 (441)	14 181 (245)
04) Hose adapter	Hex Size (mm) Torque ft.lbs (N·m)	32 325 (441)	41 398 (539)	36 325 (441)
05) Gas valve body	Hex Size (mm) Torque ft.lbs (N·m)	22 61 (83)	22 61 (83)	22 61 (83)
06) Gas valve plug	Hex Size (mm) Torque ft.lbs (N·m)	14 9 (12)	14 9 (12)	14 9 (12)

-BARE BREAKER-

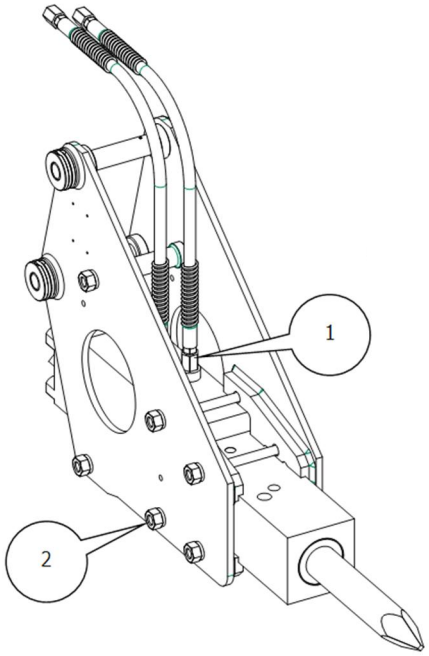
TNB-110,141LU,151LU2,190LU2,230LU2,310LU2,400LU2



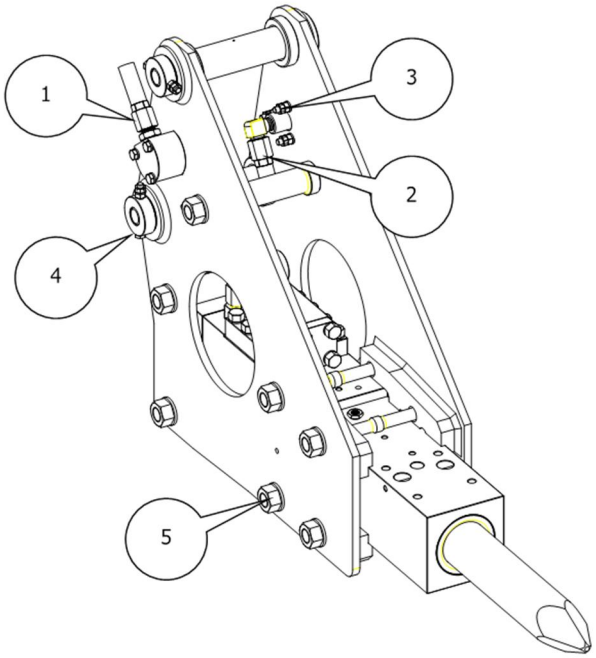
Model **TNB-**		**110**	**141LU**	**151LU2**	**190LU2**	**230LU2**	**310LU1**	**400LU2**
01) Side bolt nut	Hex Size (mm)	55	70	70	75	80	80	90
	Torque ft.lbs	1446	1663	1663	2097	2604	2604	4195
	(N·m)	(1960)	(2254)	(2254)	(2842)	(3528)	(3528)	(5684)
02) Control valve box bolt	Hex Size (mm)	19	19	19	22	22	24	24
	Torque ft.lbs	542	542	542	651	651	940	940
	(N·m)	(735)	(735)	(735)	(882)	(882)	(1274)	(1274)
03) Control valve cap bolt	Hex Size (mm)	19	19	19	22	22	24	24
	Torque ft.lbs	542	542	542	651	651	940	940
	(N·m)	(735)	(735)	(735)	(882)	(882)	(1274)	(1274)
04) Hose adapter	Hex Size (mm)	41	50	50	50	50	60	60
	Torque ft.lbs	398	434	434	434	434	470	470
	(N·m)	(539)	(588)	(588)	(588)	(588)	(637)	(637)
05) Gas valve body	Hex Size (mm)	22	22	22	22	22	22	22
	Torque ft.lbs	61	61	61	61	61	61	61
	(N·m)	(83)	(83)	(83)	(83)	(83)	(83)	(83)
06) Gas valve plug	Hex Size (mm)	14	14	14	14	14	14	14
	Torque ft.lbs	9	9	9	9	9	9	9
	(N·m)	(12)	(12)	(12)	(12)	(12)	(12)	(12)

SIDE MOUNT BRACKET

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



TNB-6M,6E,141LU

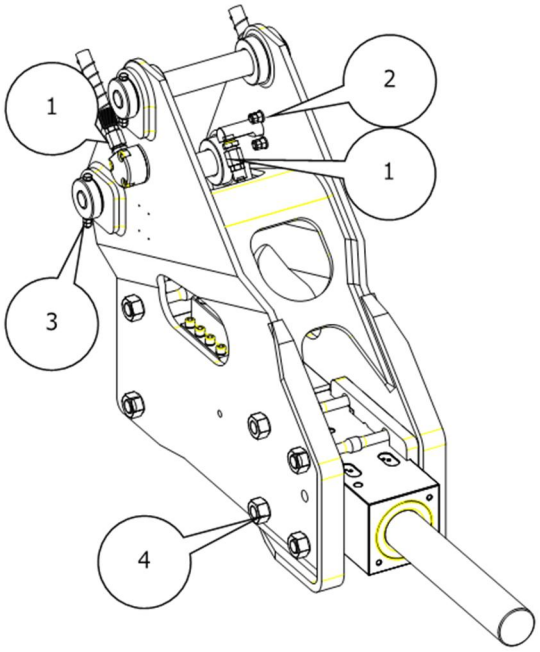


Model **TNB-**		**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
01) Hydraulic hose	Hex Size (mm) Torque ft.lbs (N·m)	22 29-44 (39-59)	27 62-97 (84-132)	27 62-97 (84-132)	27 62-97 (84-132)	27 62-97 (84-132)	27 62-97 (84-132)
02) Bracket bolt nut	Hex Size (mm) Torque ft.lbs (N·m)	24 130 (176)	27 188 (255)	30 253 (343)	30 253 (343)	32 304 (412)	36 434 (588)

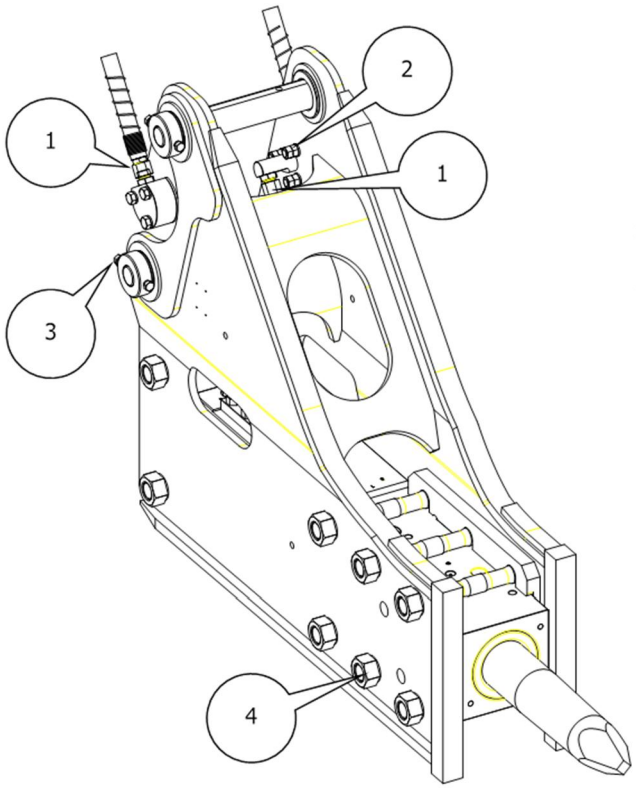
Model **TNB-**		**6M**	**6E**	**141LU**
01) Hydraulic hose	Hex Size (mm) Torque ft.lbs (N·m)	36 94-137 (128-186)	36 94-137 (128-186)	41 131-181 (177-245)
02) Hydraulic hose	Hex Size (mm) Torque ft.lbs (N·m)	27 62-97 (84-132)	36 94-137 (128-186)	41 131-181 (177-245)
03) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m) Lock nut ft.lbs (N·m)	19 80 (108) - -	19 80 (108) - -	24 181 (245) 74 (100)
04) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m)	-	-	24 130 (176)
05) Bracket bolt nut	Hex Size (mm) Torque ft.lbs (N·m)	41 651 (882)	46 723 (980)	60 1193 (1617)

SIDE MOUNT BRACKET

TNB-7J



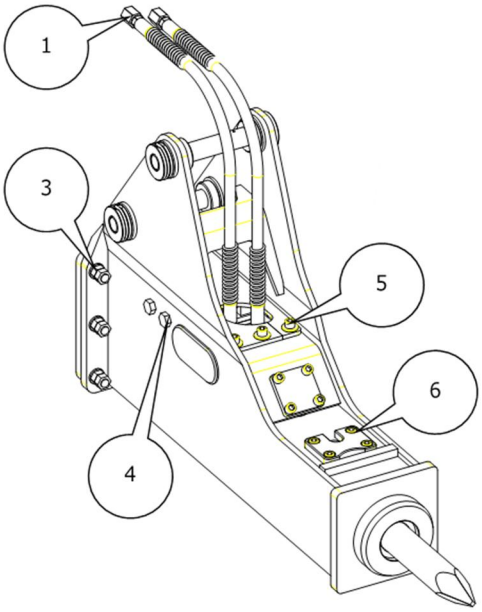
TNB-151LU2,230LU2,310LU1



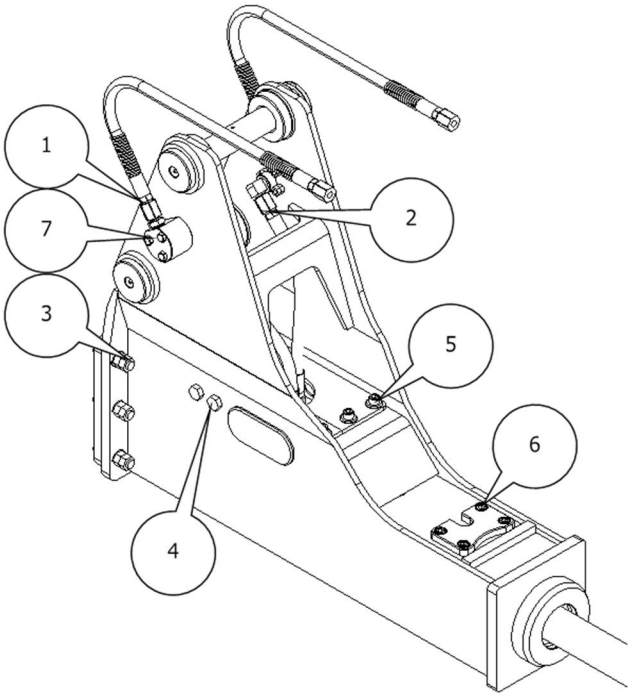
Model **TNB-**		**7J**	**151LU2**	**230LU2**	**310LU1**
01) Hydraulic hose	Hex Size (mm) Torque ft.lbs (N·m)	36 94-137 (128-186)	41 131-181 (177-245)	41 131-181 (177-245)	50 145-217 (197-294)
02) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m) Lock nut ft.lbs (N·m)	14 181 (245) 74 (100)	30 362 (490) 148 (200)	30 362 (490) 148 (200)	30 362 (490) 148 (200)
03) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m)	19 56 (76)	24 130 (176)	12 97 (132)	36 434 (588)
04) Brackt bolt nut	Hex Size (mm) Torque ft.lbs (N·m)	55 1013 (1372)	75 2509 (3400)	85 3100 (4200)	85 3100 (4200)

SIDE MOUNT SILENCED BRACKET

TNB-2M,3MB,4M



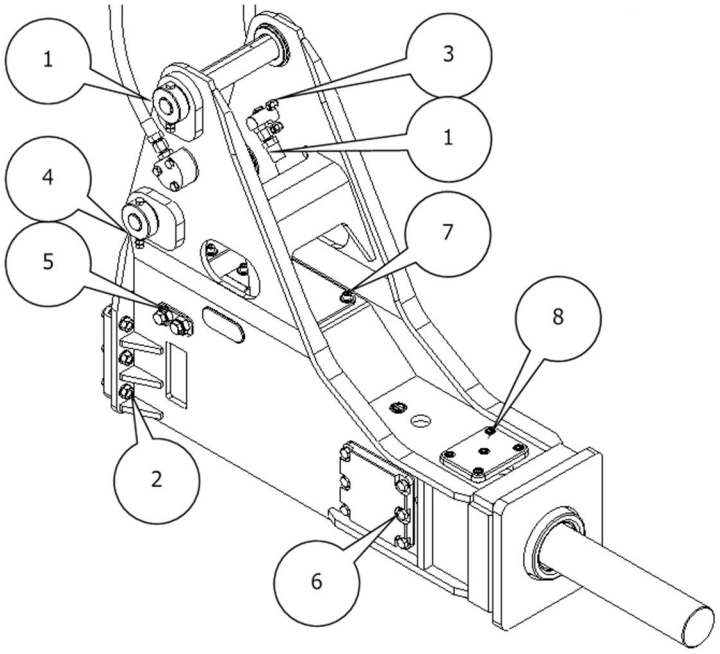
TNB-6M



Model **TNB-**		**2M**	**3MB**	**4M**	**6M**
01) Hydraulic hose	Hex Size (mm) Torque ft.lbs (N·m)	27 62-97 (84-132)	27 62-97 (84-132)	27 62-97 (84-132)	36 94-137 (128-186)
02) Hydraulic hose	Hex Size (mm) Torque ft.lbs (N·m)	- - -	- - -	- - -	27 62-97 (84-132)
03) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m)	24 140 (190)	24 140 (190)	24 140 (190)	24 140 (190)
04) Guide bolt / nut	Hex Size (mm) Torque ft.lbs (N·m)	24 140 (190)	24 140 (190)	24 140 (190)	24 140 (190)
05) Bolts	Hex Size (mm) Torque ft.lbs (N·m)	10 32 (44)	10 32 (44)	10 32 (44)	10 32 (44)
06) Bolts	Hex Size (mm) Torque ft.lbs (N·m)	8 22 (30)	10 32 (44)	10 32 (44)	10 32 (44)
07) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m)	- - -	- - -	- - -	19 80 (108)

SIDE MOUNT SILENCED BRACKET

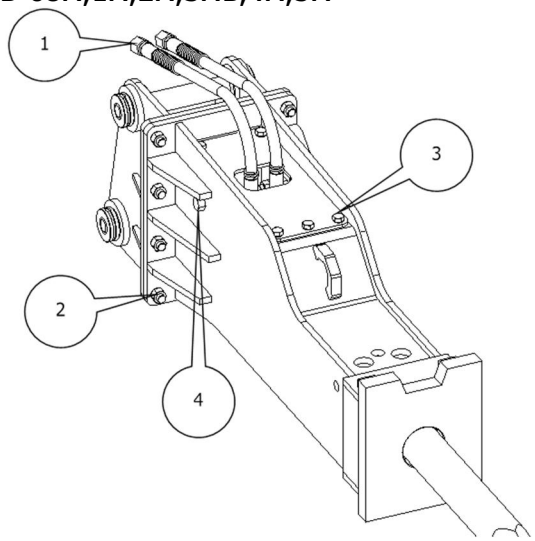
TNB-7J,151LU2



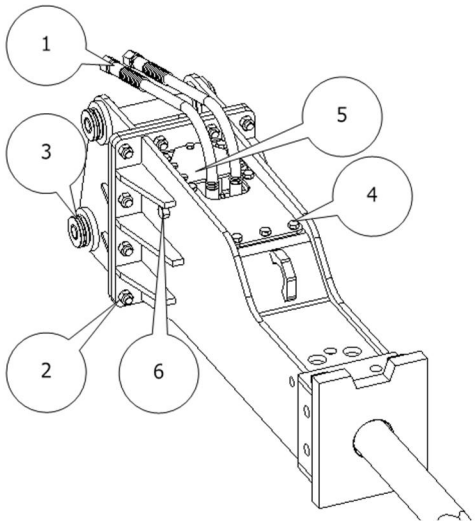
Model **TNB-**		**7J**	**151LU2**
01) Hydraulic hose	Hex Size (mm) Torque ft.lbs (N·m)	36 94-137 (128-186)	41 131-181 (177-245)
02) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m) Lock nut ft.lbs (N·m)	36 480 (650) 221 (300)	36 480 (650) 221 (300)
03) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m) Lock nut ft.lbs (N·m)	14 181 (245) 74 (100)	30 362 (490) 148 (200)
04) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m)	19 56 (76)	24 130 (176)
05) Guide bolt / nut	Hex Size (mm) Torque ft.lbs (N·m) Lock nut ft.lbs (N·m)	30 362 (490) 148 (200)	46 930 (1260) 258 (350)
06) Bolts	Hex Size (mm) Torque ft.lbs (N·m)	30 273 (370)	30 273 (370)
07) Bolts	Hex Size (mm) Torque ft.lbs (N·m)	14 140 (190)	14 140 (190)
08) Bolts	Hex Size (mm) Torque ft.lbs (N·m)	14 140 (190)	14 140 (190)

BOX BRACKET

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



TNB-6M,6E

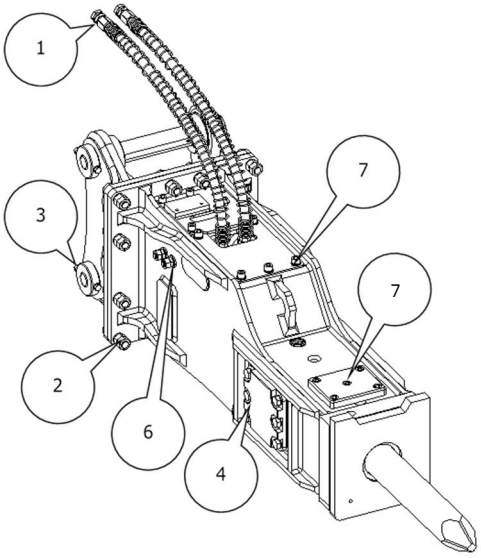


Model **TNB-**		**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
01) Hydraulic hose	Hex Size (mm)	22	27	27	27	27	27
	Torque ft.lbs	29-44	62-97	62-97	62-97	62-97	62-97
	(N·m)	(39-59)	(84-132)	(84-132)	(84-132)	(84-132)	(84-132)
02) Bolts / Nuts	Hex Size (mm)	24	24	24	24	24	24
	Torque ft.lbs	140	140	140	140	140	140
	(N·m)	(190)	(190)	(190)	(190)	(190)	(190)
03) Bolts	Hex Size (mm)	17	17	19	19	19	19
	Torque ft.lbs	32	32	56	56	56	56
	(N·m)	(44)	(44)	(76)	(76)	(76)	(76)
04) Guide bolt /nut	Hex Size (mm)	24	24	24	24	24	24
	Torque ft.lbs	140	140	140	140	140	140
	(N·m)	(190)	(190)	(190)	(190)	(190)	(190)

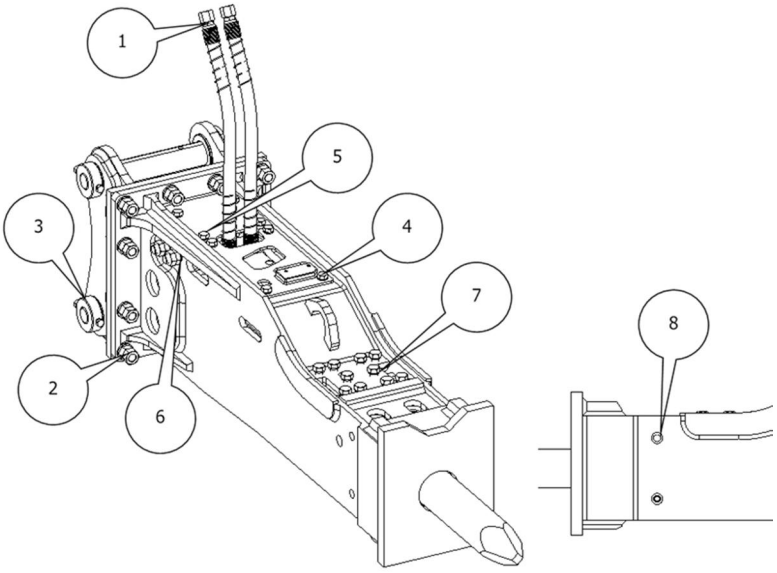
Model **TNB-**		**6M**	**6E**
01) Hydraulic hose	Hex Size (mm)	36	36
	Torque ft.lbs	94-137	94-137
	(N·m)	(128-186)	(128-186)
02) Bolts / Nuts	Hex Size (mm)	30	30
	Torque ft.lbs	273	273
	(N·m)	(370)	(370)
03) Bolts / Nuts	Hex Size (mm)		
	Torque ft.lbs	-	-
	(N·m)		
04) bolts	Hex Size (mm)	24	24
	Torque ft.lbs	140	140
	(N·m)	(190)	(190)
05) Bolts	Hex Size (mm)		17
	Torque ft.lbs	-	32
	(N·m)		(44)
06) Guide bolt / nut	Hex Size (mm)	24	30
	Torque ft.lbs	140	273
	(N·m)	(190)	(370)

BOX BRACKET

TNB-7J



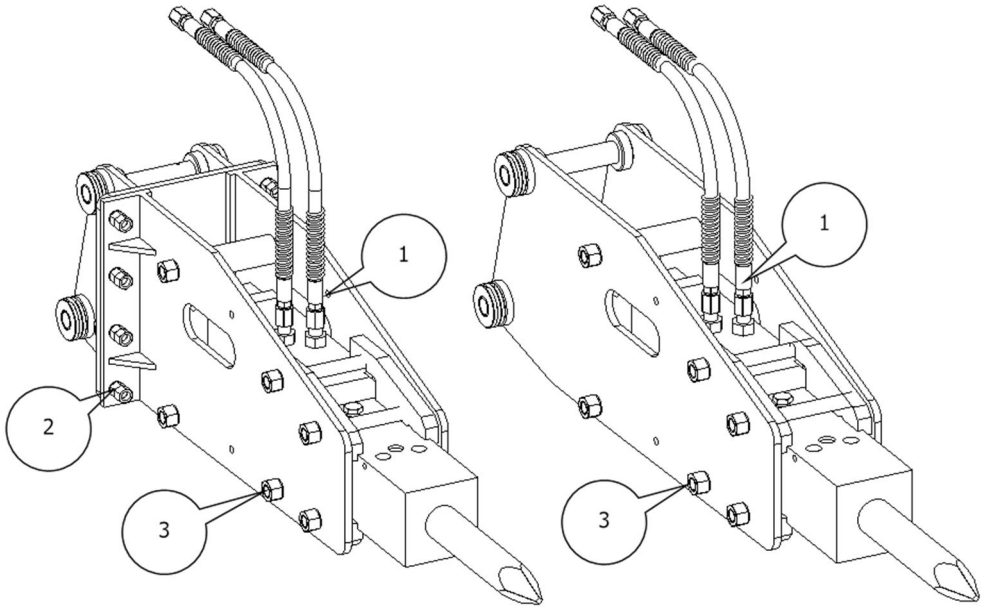
TNB-110,151LU2,190LU2,230LU2,310LU1,400LU2



Model **TNB-**		**7J**	**110**	**151LU2**	**190LU2**	**230LU2**	**310LU1**	**400LU2**
01) Hydraulic hose	Hex Size (mm) Torque ft.lbs (N·m)	36 94-137 (128-186)	36 94-137 (128-186)	41 131-181 (177-245)	41 131-181 (177-245)	41 131-181 (177-245)	50 145-217 (197-294)	50 145-217 (197-294)
02) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m)	36 480 (650)	30 273 (370)	46 930 (1260)	46 930 (1260)	46 930 (1260)	60 2140 (2900)	60 2140 (2900)
03) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m)	19 56 (76)	19 56 (76)	24 130 (176)	24 130 (176)	30 253 (343)	36 434 (588)	36 434 (588)
04) Bolts	Hex Size (mm) Torque ft.lbs (N·m)	30 273 (370)	24 140 (190)	30 273 (370)	24 140 (190)	30 273 (370)	30 273 (370)	30 273 (370)
05) Bolts	Hex Size (mm) Torque ft.lbs (N·m)	-	19 56 (76)	30 273 (370)	24 140 (190)	30 273 (370)	30 273 (370)	30 273 (370)
06) Guide bolt /nut	Hex Size (mm) Torque ft.lbs (N·m) Lock nut ft.lbs (N·m)	30 362 (490) 148 (200)	30 273 (370) - -	46 930 (1260) 258 (350)	46 930 (1260) - -	55 1476 (2000) 332 (450)	55 1476 (2000) 332 (450)	46 930 (1260) - -
07) Bolts	Hex Size (mm) Torque ft.lbs (N·m)	14 140 (190)	24 140 (190)	36 480 (650)	30 273 (370)	36 480 (650)	36 480 (650)	36 480 (650)
08) Plug	Hex Size (mm) Torque ft.lbs (N·m)	-	22 108-130 (147-176)	22 108-130 (147-176)	22 108-130 (147-176)	22 108-130 (147-176)	22 108-130 (147-176)	22 108-130 (147-176)

TOP MOUNT BRACKET

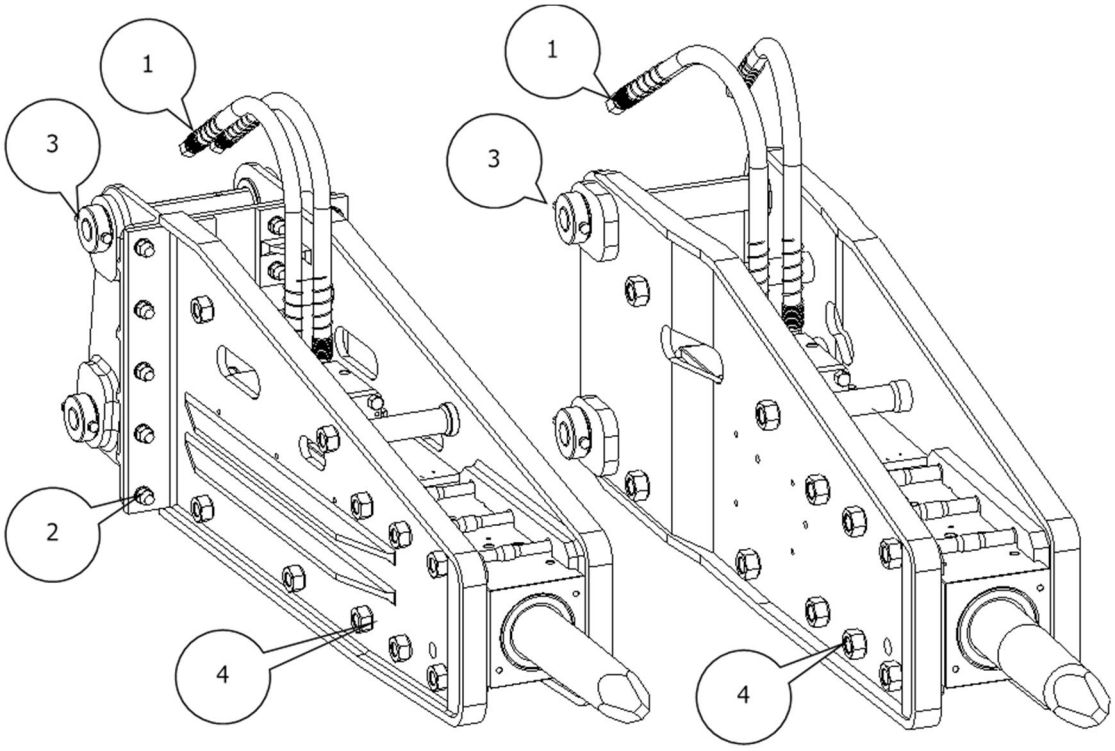
TNB-08M,1M,2M,3MB,4M,5M



Model **TNB-**		**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
01) Hydraulic hose	Hex Size (mm) Torque ft.lbs (N·m)	22 29-44 (39-59)	27 62-97 (84-132)	27 62-97 (84-132)	27 62-97 (84-132)	27 62-97 (84-132)	27 62-97 (84-132)
02) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m)	24 140 (190)	24 140 (190)	24 140 (190)	24 140 (190)	24 140 (190)	24 140 (190)
03) Bracket bolt nut	Hex Size (mm) Torque ft.lbs (N·m)	24 130 (176)	27 188 (255)	30 253 (343)	30 253 (343)	32 304 (412)	36 434 (588)

TOP MOUNT BRACKET

TNB-6M,6E,141LU,151LU2,230LU2,400LU2



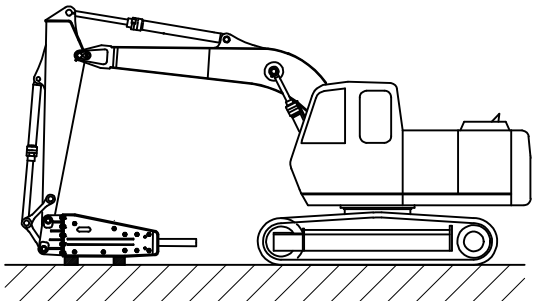
Model **TNB-**		**6M**	**6E**	**141LU**	**151LU2**	**230LU2**	**400LU2**
01) Hydraulic hose	Hex Size (mm) Torque ft.lbs (N·m)	36 94-137 (128-186)	36 94-137 (128-186)	41 131-181 (177-245)	41 131-181 (177-245)	41 131-181 (177-245)	50 145-217 (197-294)
02) Bolts / Nuts	Hex Size (mm) Torque ft.lbs (N·m)	30 273 (370)	30 273 (370)	36 480 (650)	36 480 (650)	46 930 (1260)	60 2140 (2900)
03) Bolts /Nuts	Hex Size (mm) Torque ft.lbs (N·m)	-	-	24 130 (176)	24 130 (176)	30 253 (343)	36 434 (588)
04) Bracket bot nut	Hex Size (mm) Torque ft.lbs (N·m)	41 651 (882)	46 723 (980)	60 1193 (1617)	60 1193 (1617)	75 2026 (2745)	90 3616 (4900)

3-3. INSPECTION OF CHISEL BUSHING

SIDE MOUNT BRACKET / TOP MOUNT BRACKET

- Inspect the wear of the chisel bushing every day.

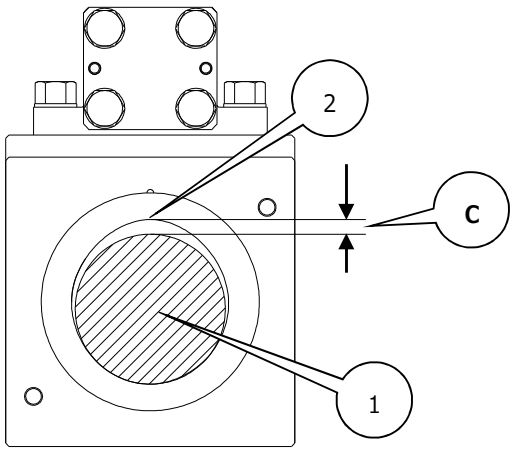
1. Lay the hydraulic breaker on the ground horizontally.
   Stop the excavator engine.



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.



The serviceability limit for Chisel Bushing (Clearance)

Model **TNB-**	**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
Clearance(C) inch (mm)	0.16 (4)	0.16 (4)	0.16 (4)	0.16 (4)	0.16 (4)	0.16 (4)

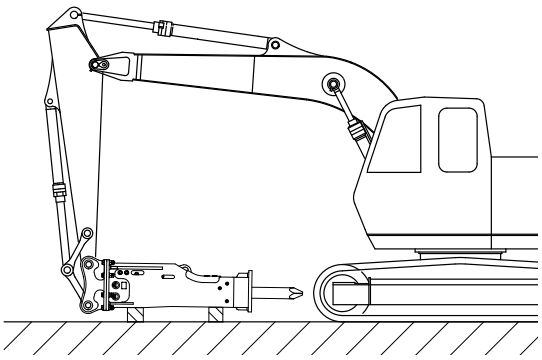
Model **TNB-**	**6M**	**6E**	**7J**	**110**	**141LU**	**151LU2**
Clearance(C) inch (mm)	0.16 (4)	0.24 (6)	0.28 (7)	0.28 (7)	0.31 (8)	0.31 (8)

Model **TNB-**	**190LU2**	**230LU2**	**310LU1**	**400LU2**
Clearance(C) inch (mm)	0.31 (8)	0.39 (10)	0.39 (10)	0.47 (12)

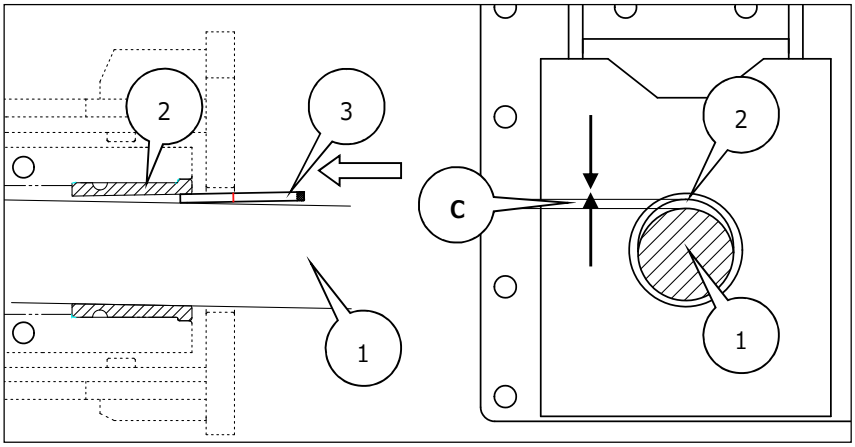
BOX BRACKET

- Inspect the wear of the chisel bushing everyday.

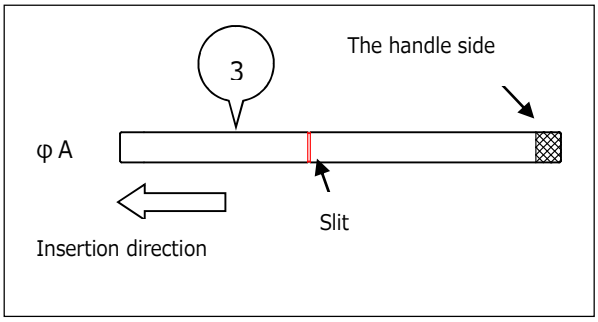
1. Lay the hydraulic breaker on the ground horizontally.
   Stop the excavator engine.



2. Insert a Gap pin gauge (3) in the gap of the Chisel (1) and the Chisel bushing (2).



3. If the Gap pin gauge (3) enters to the slit position in the gap (C), it requires the replacement of the Chisel bushing.
   As regards to changing the Chisel bushing, please contact TOKU Distributor.



Gap pin gauge size (Optional tool)

Model **TNB-**		**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
φA	inch (mm)	0.16 (4)	0.16 (4)	0.16 (4)	0.16 (4)	0.16 (4)	0.16 (4)

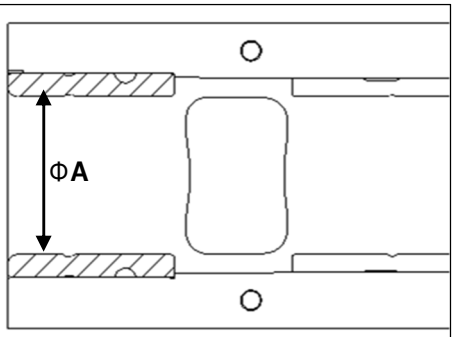
Model **TNB-**		**6M**	**6E**	**110**	**141LU**	**151LU2**	**190LU2**
φA	inch (mm)	0.16 (4)	0.24 (6)	0.28 (7)	0.31 (8)	0.31 (8)	0.31 (8)

Model **TNB-**		**230LU2**	**310LU1**	**400LU2**
φA	inch (mm)	0.39 (10)	0.39 (10)	0.47 (12)

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

5. It is essential to change the chisel bushing if the I.D. (A) is beyond the permitted values shown in the table below.
   If it is used beyond the limit below, that may cause the trouble on thje breaker.

   As regards to changing the chisel bushing, please contact TOKU Distributor.



Measure I.D. at 10mm depth from the edge

The serviceability limit for Chisel bushing (Inner Diameter)

Model **TNB-**	**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
Brand-New I.D. φA inch (mm)	1.57 (40)	1.77 (45)	1.98 (50.3)	2.28 (58)	2.52 (64)	2.95 (75)
Serviceability limit inch (mm)	1.73 (44)	1.93 (49)	2.14 (54.3)	2.44 (62)	2.68 (68)	3.11 (79)

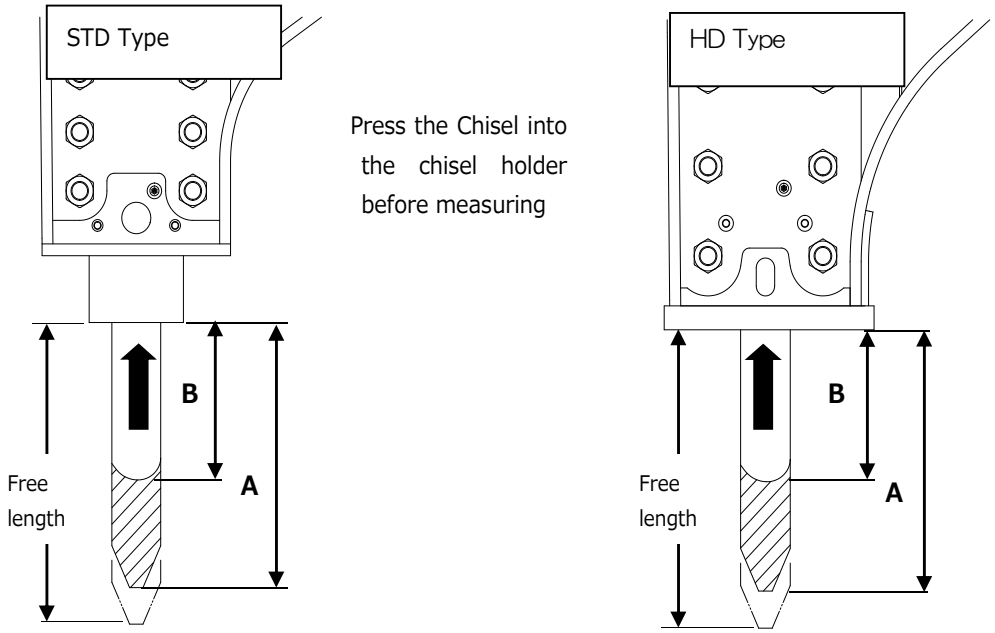
Model **TNB-**	**6M**	**6E**	**7J**	**11O**	**141LU**	**151LU2**
Brand-New I.D. φA inch (mm)	2.95 (75)	3.74 (95)	4.13 (105)	4.53 (115)	5.31 (135)	5.31 (135)
Serviceability limit inch (mm)	3.11 (79)	3.98 (101)	4.41 (112)	4.80 (122)	5.63 (143)	5.63 (143)

Model **TNB-**	**190LU2**	**230LU2**	**310LU1**	**400LU2**
Brand-New I.D. φA inch (mm)	5.51 (140)	5.75 (146)	6.30 (160)	7.01 (178)
Serviceability limit inch (mm)	5.83 (148)	6.14 (156)	6.69 (170)	7.48 (190)

6. Right after Chisel Bushing is replaced, if the maximum clearance between Chisel (1) and Chisel Bushing (2) is larger than the limit below, replace Chisel (1) to prevent it from wearing faster.

3-4. INSPECTION OF CHISEL

- Please check the wear condition of the chisel length daily.



TOP MOUNT BRACKET, SIDE MOUNT BRACKET

WEAR LIMIT OF CHISEL effective length (free length)

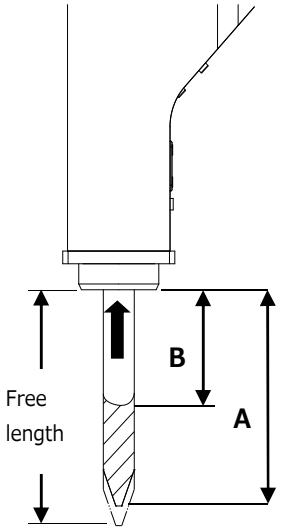
Model **TNB-**	**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
Brand-New length A inch(free length) mm(free length)	11.2(12.5) 285(317)	11.4(12.8) 290(325)	11.6(12.8) 295(325)	13.6(15.0) 346(380)	14.2(16.0) 360(406)	19.3(21.3) 490(540)
Serviceability limit B inch(free length) mm(free length)	7.1(8.3) 180(210)	7.1(8.5) 180(215)	7.9(9.1) 200(230)	8.7(10.0) 220(255)	9.4(11.2) 240(285)	9.8(11.8) 250(300)

Model **TNB-**	**6M**	**6E**	**7J**	**110**	**141LU**
Brand-New length A inch(free length) mm(free length)	19.3(21.3) 490(540)	22.2(24.2) 565(615)	26.1(28.4) 664(722)	31.6(34.1) 802(867)	26.6(30.2) 675(768)
Serviceability limit B inch(free length) mm(free length)	9.8(11.8) 250(300)	11.8(13.8) 300(350)	13.8(16.1) 350(410)	13.8(16.3) 350(415)	15.7(19.3) 400(490)

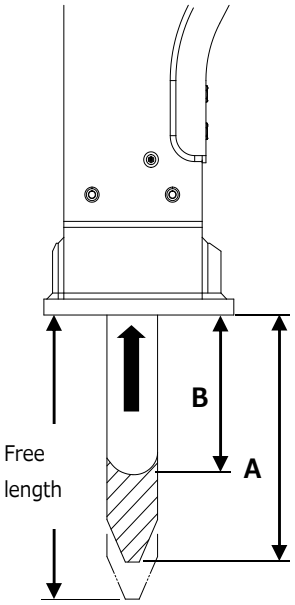
Model **TNB-**	**151LU2**	**190LU2**	**230LU2**	**310LU1**	**400LU2**
Brand-New length A inch(free length) mm(free length)	26.6(30.2) [25.8(29.4)] 675(768) [655(748)]	37.2(40.6) 945(1030)	30.8(34.1) [30.2(33.5)] 782(867) [767(852)]	33.5(37.8) [33.1(37.4)] 850(960) [840(950)]	38.4(43.3) 976(1101)
Serviceability limit B inch(free length) mm(free length)	15.7(19.3) 400(490)	15.7(19.1) 400(485)	15.7(19.1) 400(485)	17.7(22.0) 450(560)	19.7(24.6) 500(625)

＊[ ] HD Type

- Please check the wear condition of the chisel length daily.



Press the Chisel into the chisel holder before measuring



BOX BRACKET

WEAR LIMIT OF CHISEL effective length (free length)

Model **TNB-**	**08M**	**1M**	**2M**	**3MB**	**4M**
Brand-New length A inch(free length) mm(free length)	10.0(11.3) 255(287)	9.8(11.2) 250(285)	14.0(11.2) 355(285)	15.8(17.1) 401(435)	16.1(18.0) 410(456)
Serviceability limit B inch(free length) mm(free length)	7.1(8.3) 180(210)	7.1(8.5) 180(215)	7.9(9.1) 200(230)	8.7(10.0) 220(255)	9.4(11.2) 240(285)

Model **TNB-**	**5M**	**6M**	**6E**	**7J**	**110**
Brand-New length A inch(free length) mm(free length)	21.1(23.0) 535(585)	21.1(23.0) 535(585)	23.4(25.4) 595(645)	23.5(25.8) 598(656)	29.4(32.0) 747(812)
Serviceability limit B inch(free length) mm(free length)	9.8(11.8) 250(300)	9.8(11.8) 250(300)	11.8(13.8) 300(350)	13.8(16.1) 350(410)	13.8(16.3) 350(415)

Model **TNB-**	**151LU2**	**190LU2**	**230LU2**	**310LU1**	**400LU2**
Brand-New length A inch(free length) mm(free length)	24.4(28.1) 620(713)	34.8(38.2) 885(970)	28.4(31.8) 722(807)	30.7(35.0) 780(890)	34.5(39.4) 876(1001)
Serviceability limit B inch(free length) mm(free length)	15.7(19.3) 400(490)	15.7(19.1) 400(485)	15.7(19.1) 400(485)	17.7(22.0) 450(560)	19.7(24.6) 500(625)

SIDE MOUNT SILENCED BRACKET

WEAR LIMIT OF CHISEL effective length (free length)

Model **TNB**	**2M**	**3MB**	**4M**	**6M**	**7J**	**151LU2**
Brand-New length A inch(free length) mm(free length)	13.0(14.2) 331(361)	14.7(16.1) 374(408)	15.3(17.1) 389(435)	19.9(21.9) 506(556)	23.5(25.8) 598(656)	21.8(25.4) 553(646)
Serviceability limit B inch(free length) mm(free length)	7.9(9.1) 200(230)	8.7(10.0) 220(255)	9.4(11.2) 240(285)	9.8(11.8) 250(300)	13.8(16.1) 350(410)	15.7(19.3) 400(490)

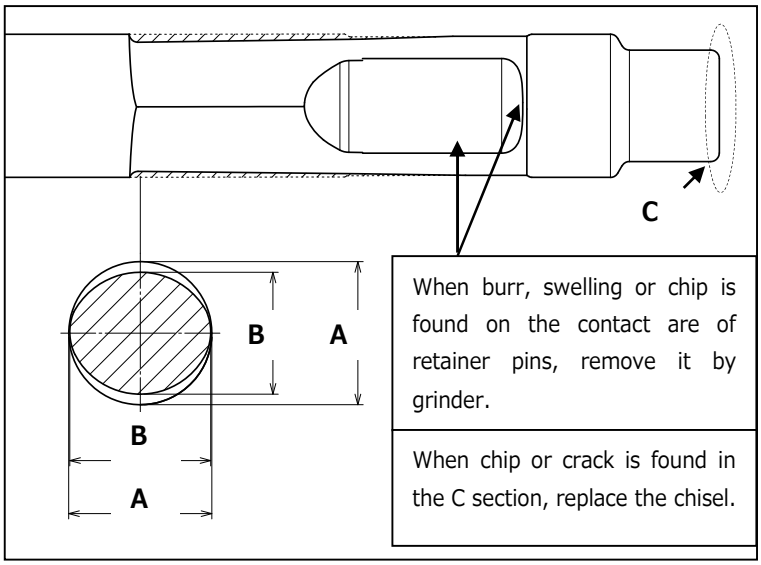
- Check wear, deformation or crack of the chisel every 100 hours usage or 1 month whichever comes first.

⚠ CAUTION

When wear of the chisel exceeds the limit value, replace the chisel. It causes breakage of the breaker and the chisel.

⚠ CAUTION

When wear exceeds the limit value, replace the chisel. It causes chisel breakage.



When burr, swelling or chip is found on the contact are of retainer pins, remove it by grinder.

When chip or crack is found in the C section, replace the chisel.

WEAR LIMIT OF CHISEL outer diameter

Model **TNB-**	**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
Brand-New O.D A inch (mm)	1.57 (40)	1.77 (45)	1.97 (50)	2.28 (58)	2.52 (64)	2.95 (75)
Serviceability limit B inch (mm)	1.54 (39)	1.73 (44)	1.91 (48.5)	2.22 (56.5)	2.46 (62.5)	2.87 (73)

Model **TNB-**	**6M**	**6E**	**7J**	**110**	**141LU**	**151LU2**
Brand-New O.D A inch (mm)	2.95 (75)	3.74 (95)	4.13 (105)	4.53 (115)	5.31 (135)	5.31 (135)
Serviceability limit B inch (mm)	2.87 (73)	3.64 (92.5)	4.02 (102)	4.39 (111.5)	5.16 (131)	5.16 (131)

Model **TNB-**	**190LU2**	**230LU2**	**310LU1**	**400LU2**
Brand-New O.D A inch (mm)	5.51 (140)	5.75 (146)	6.30 (160)	7.01 (178)
Serviceability limit B inch (mm)	5.35 (136)	5.57 (141.5)	6.10 (155)	6.81 (173)

● Chisel guarantee

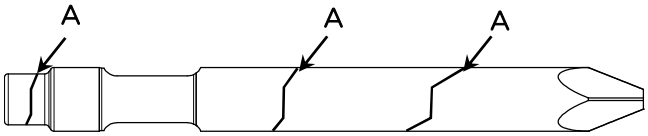
Life of chisel is greatly affected by the operator's skills.
In particular, bending, twisting and blank firing must be taken care.
These actions cause breakage or chipping off.
"Item" shown below are a guide only, but there are exceptions.

Cases covered by warranty

1. If breakage occurs by tissue defects of the material.
2. If there is a manufacturing defects of dimensions or form.

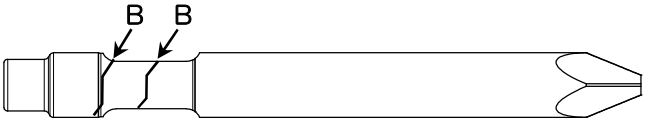
Cases not covered by warranty

1. Broken at the middle of chisel with step. (A)

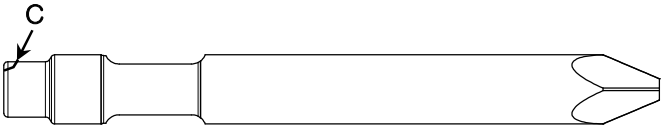


2. Chip-off of two side cut part of chisel (B)

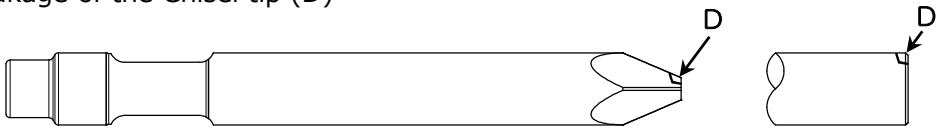
   If blank firing is repeated or to keep using bushing exceeds wear limit, it causes chip-off at the two side cut part of chisel.



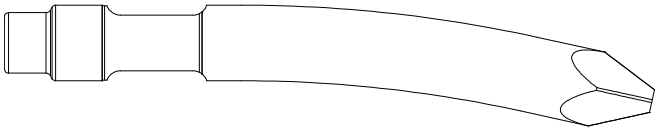
3. Breakage of Chisel head （C）



4. Breakage of the Chisel tip (D)



5. Curved chisel



6. Breakage from fatigue fracture surface by dent, indentation or rust
7. Those used at high temperatures
8. That has been subjected to a heat treatment and re-heating and welding repair rework after delivery.
9. Other than genuine ones
10. Due to the improper use or irrelevant maintenance and inspection.

3-5. INSPECTION OF RETAINER PINS

- Check the wear of the Retainer pin at an early time every 100 hours or every month.

⚠ WARNING

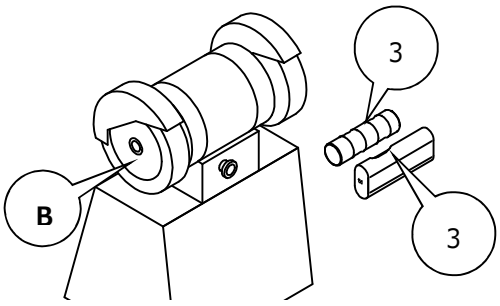
When hammering the pin or retainer pin using a grinder, metal chips may fly off and may enter your eye causing serious injury. Always wear a hard hat, protective goggles, safety boots, mask, gloves and other protective equipment during operation.

1. For removing the retainer pin, 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 it is damaged, this will lead to damage of the hydraulic breaker and is dangerous.

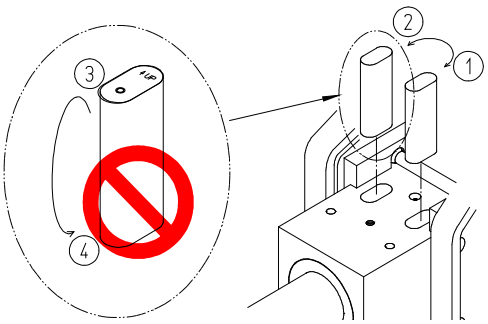
2. Replace Retainer Pins (3) if any damages or heavy wear is found.
3. Repair the excess bulge build-up from around the retainer pins (3) by using a grinder (B).



4. Insert the retainer pin into the retainer-pin holes. Please perform periodic inspection.
   If light wear is found, switch places of left and right Retainer Pins①②.

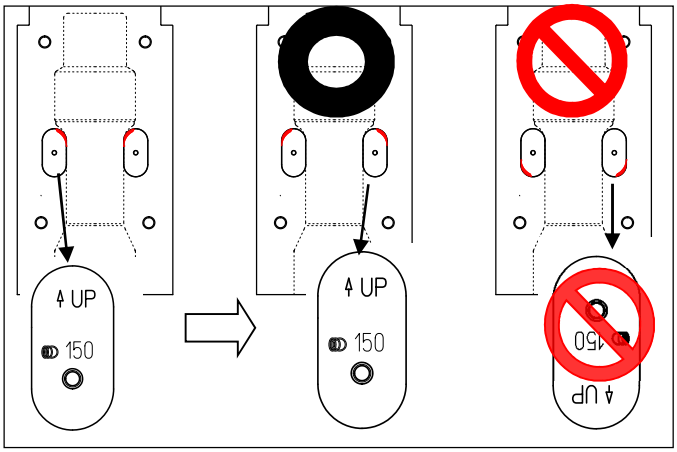
   During replacement and exchange, it should be carefully cleaned the Retainer pin and Pin hole.

   To avoid blank blows leads longer Retainer pin life. As soon as the object is demolished, release the foot pedal.



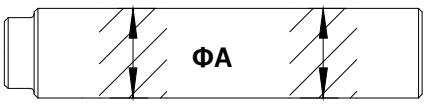
⚠ CAUTION

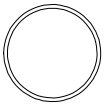
Do not insert Retainer pins up side down ③④. Backlash may increase and cause damage to the Pins. Always keep "↑ **UP**" side on top.



SERVICEABILITY LIMIT OF RETAINER PINS

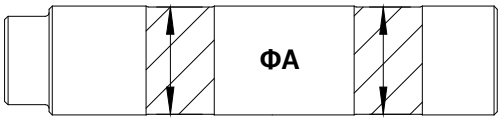
Measure at contact area with chisel.

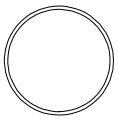




Model **TNB-**	**08M**	**1M**	**2M**	**3MB**	**4M**
Brand-New O.D φA inch (mm)	0.63 (16)	0.71 (18)	0.79 (20)	0.94 (24)	1.02 (26)
Serviceability limit O.D φA inch (mm)	0.57 (14.5)	0.65 (16.5)	0.71 (18)	0.87 (22)	0.94 (24)

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

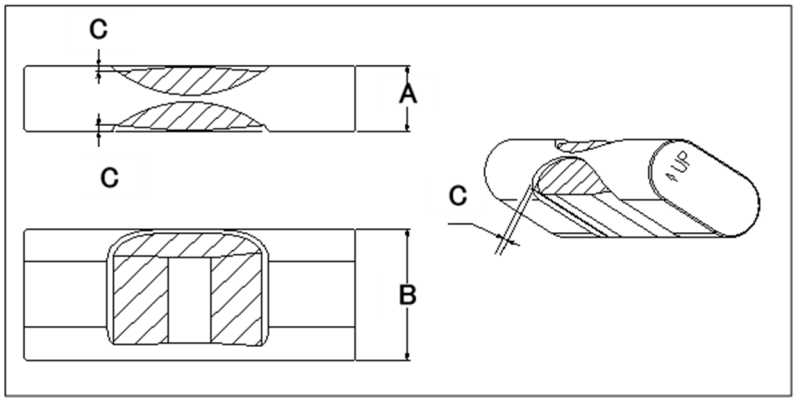




Model **TNB-**	**5M**	**6M**	**6E**	**141LU**
Brand-New O.D φA inch (mm)	1.16 (29.5)	1.16 (29.5)	1.24 (31.5)	1.95 (49.5)
Serviceability limit O.D φA inch (mm)	1.08 (27.5)	1.08 (27.5)	1.16 (29.5)	1.83 (46.5)

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



Model **TNB-**	**7J**	**110**	**151LU2**	**190LU2**	**230LU2**
Brand New Length AxB inch (mm)	1.38x2.76 (35 x 70)	1.38x2.76 (35 x 70)	1.57x3.15 (40 x 80)	1.81x3.62 (46 x 92)	1.97x3.94 (50 x 100)
Serviceability Limit C inch (mm)	0.12 (3)	0.12 (3)	0.12 (3)	0.12 (3)	0.12 (3)

Model **TNB-**	**310LU1**	**400LU2**
Brand New Length AxB inch (mm)	2.17x4.33 (55 x 110)	2.36x4.72 (60 x 120)
Serviceability Limit C inch (mm)	0.16 (4)	0.16 (4)

3-6. INSPECTION OF NITROGEN GAS PRESSURE AND RECHARGE

⚠ WARNING
Do not work immediately after operation. Each part is hot and burns. Be sure to work after the hydraulic oil and all parts have cooled.

⚠ CAUTION
Check the nitrogen gas pressure when the hydraulic breaker is cold.

⚠ 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.

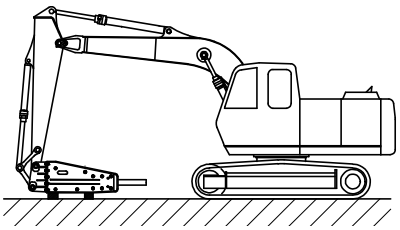
- Nitrogen gas is contained inside the cylinder cover of the hydraulic breaker. The impact force will decrease if the gas pressure reduces.
  If the gas pressure low, fill the cushion chamber with nitrogen gas according to the following procedures.

⚠ CAUTION
Do not charge nitrogen gas pressure more than specified. It will shorten the life of the seal and cause malfunction.

INSPECTION OF NITROGEN GAS PRESSURE

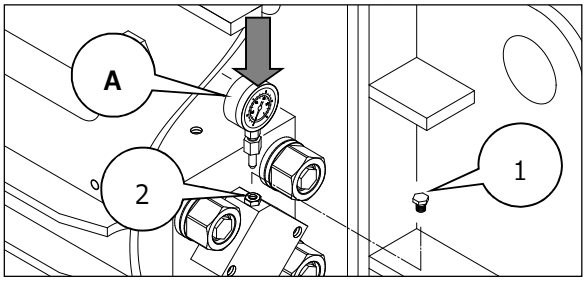
- Inspect the nitrogen gas pressure every 100 hours or 1 month.

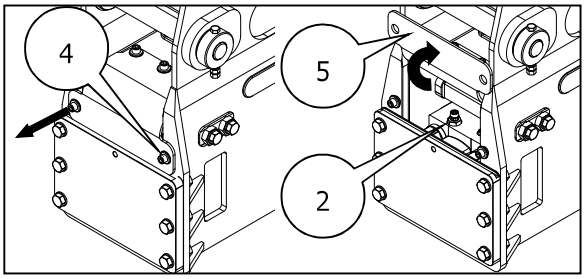
⚠ CAUTION
When checking the nitrogen gas pressure, make sure the hydraulic breaker is cooled off.



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

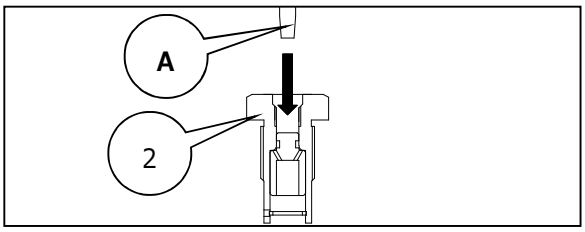
2. Remove the gas valve plug (1) from the cylinder cover.





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 104°F (40℃).

◆Refer to the attached graph when the breaker body temperature is lower than 104°F (40℃).

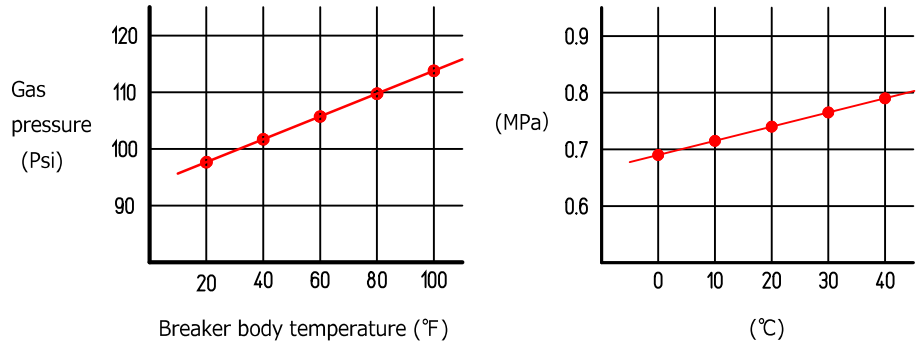
Model **TNB-**	**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
Nitrogen Gas Pressure psi (MPa)	109-116 (0.75-0.8)	109-116 (0.75-0.8)	109-116 (0.75-0.8)	109-116 (0.75-0.8)	109-116 (0.75-0.8)	109-116 (0.75-0.8)

Model **TNB-**	**6M**	**6E**	**7J**	**110**	**141LU**	**151LU2**
Nitrogen Gas Pressure psi (MPa)	138-145 (0.95-1.0)	109-116 (0.75-0.8)	123-131 (0.85-0.9)	109-116 (0.75-0.8)	109-116 (0.75-0.8)	151-160 (1.04-1.1)

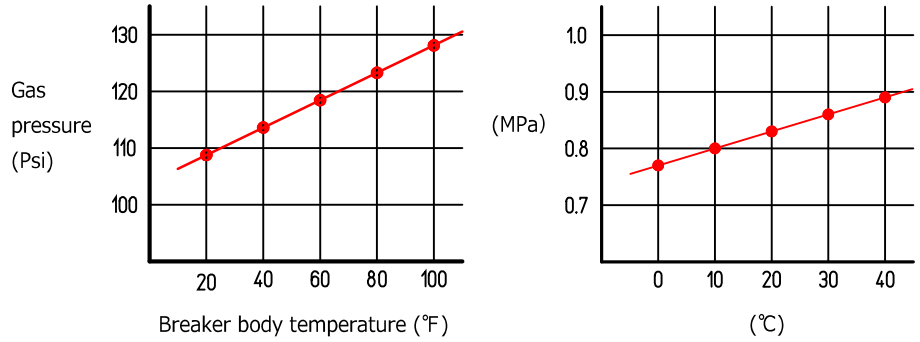
Model **TNB-**	**190LU2**	**230LU2**	**310LU1**	**400LU2**
Nitrogen Gas Pressure psi (MPa)	109-116 (0.75-0.8)	109-116 (0.75-0.8)	109-116 (0.75-0.8)	109-116 (0.75-0.8)

NITROGEN GAS CHARGING PRESSURE IN A CORRELATION WITH BREAKER BODY TEMPERATURE

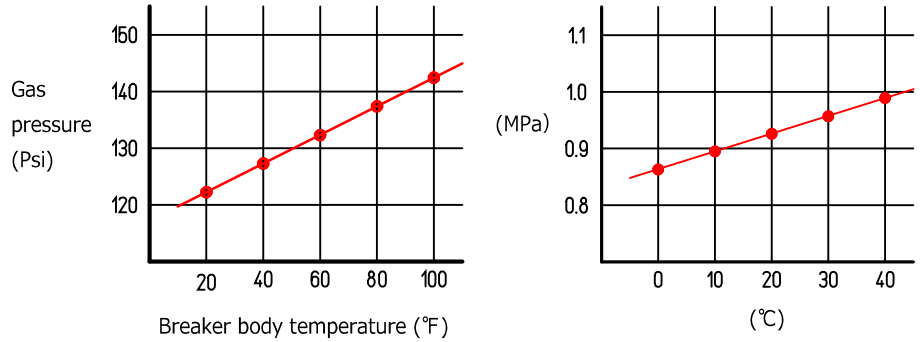
TNB-08M,1M,2M,3MB
4M,5M,6E,110
190LU2,230LU2
310LU1,400LU2



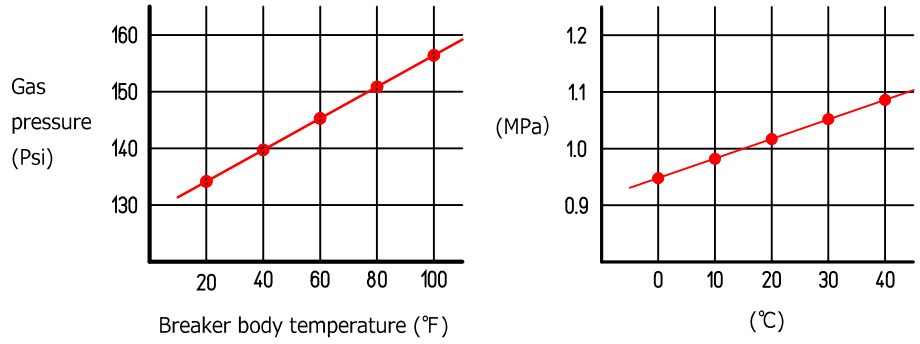
TNB-7J



TNB-6M



TNB-151LU2



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.

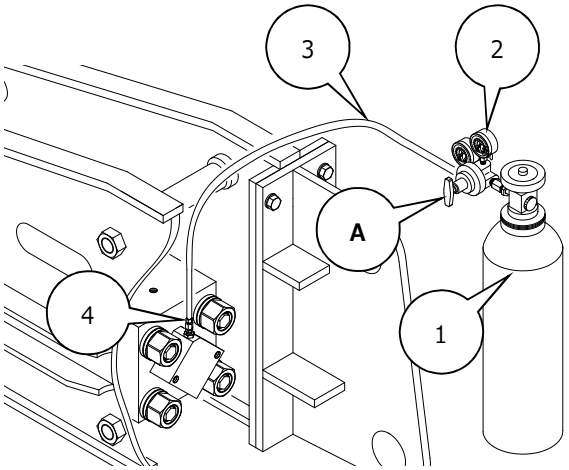
⚠ WARNING
It does not perform the replenishment of nitrogen gas immediately after operation. Since each unit is hot, it is possible to burn. Please perform the work from the cold is always oil and various parts.

⚠ WARNING
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)

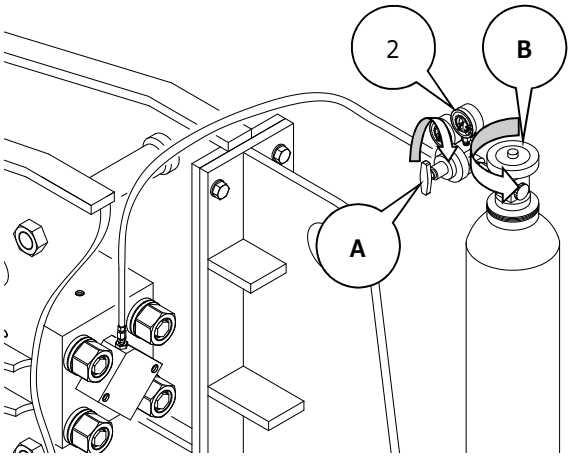
2. Fit a filling adapter (4) to the end of the hose and insert the adapter into the gas valve



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

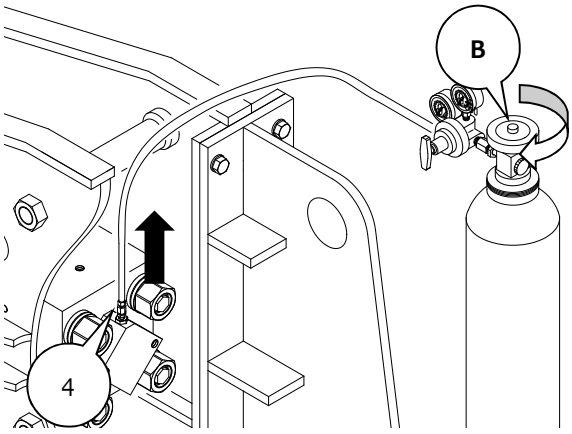
4. Turn the handle (A) of the pressure regulator (2) while reading the pressure gauge of the regulator. Fill with nitrogen gas up to the pressure shown in the table

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.



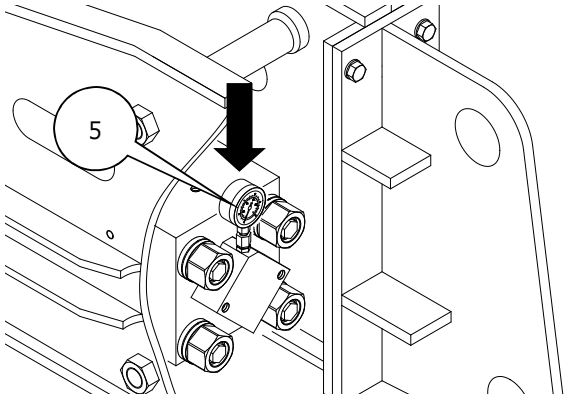
6. Close the regulator valve (B) of the nitrogen gas cylinder

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

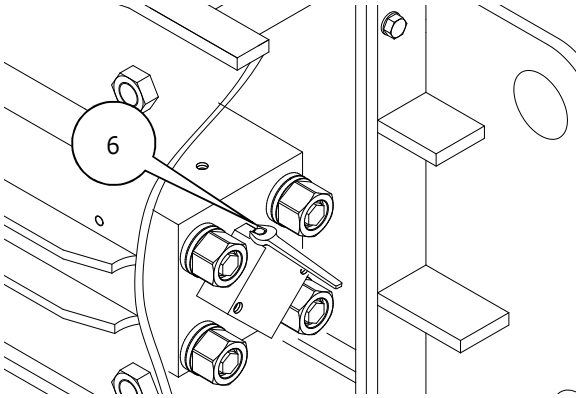


8. Insert a pressure gauge (5) into the gas valve and check the gas pressure

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.

3-7. INSPECTION OF CHISEL HOLDER BUSHING

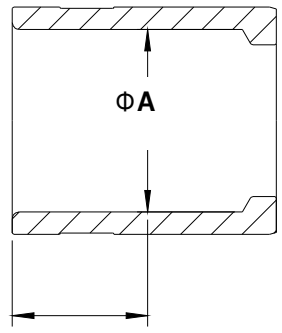
- Inspect the wear of the chisel holder bushing every 600 hours or 6 months.

1. Remove the chisel.

2. It is essential to change the chisel holder bushing if the I.D. is not within the permitted values shown in the table below.

If it is not replaced, that may cause troubles on the breaker.

CAUTION- In case that Chisel bushing has serious wear, replace it regardless to the inspection cycle above.



Measure I.D. at the back of center

As regards to changing the chisel holder bushing, please contact TOKU Distributor.

The serviceability limit for Chisel holder bushing

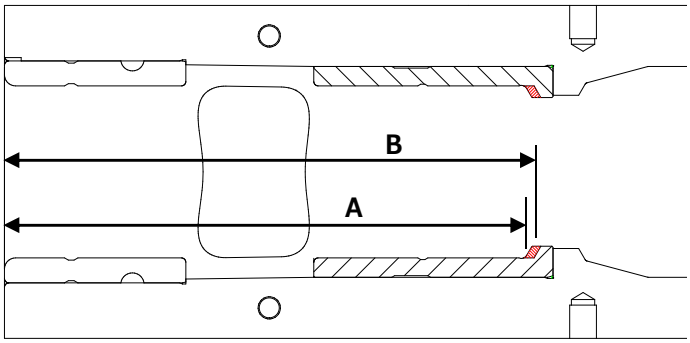
Model **TNB-**		**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
Brand-New I.D. A	inch	1.57	1.77	1.98	2.28	2.52	2.95
	(mm)	(40 (＊))	(45)	(50.3)	(58)	(64)	(75)
Serviceability limit	inch	1.63	1.83	2.04	2.34	2.60	3.03
	(mm)	(41.5(＊))	(46.5)	(51.8)	(59.5)	(66)	(77)

Model **TNB-**		**6M**	**6E**	**7J**	**110**	**141LU**	**151LU2**
Brand-New I.D. A	inch	2.95	3.74	4.13	4.53	5.31	5.31
	(mm)	(75)	(95)	(105)	(115)	(135)	(135)
Serviceability limit	inch	3.03	3.84	4.25	4.67	5.47	5.47
	(mm)	(77)	(97.5)	(108)	(118.5)	(139)	(139)

Model **TNB-**		**190LU2**	**230LU2**	**310LU1**	**400LU2**
Brand-New I.D. A	inch	5.51	5.75	6.30	7.01
	(mm)	(140)	(146)	(160)	(178)
Serviceability limit	inch	5.67	5.94	6.50	7.24
	(mm)	(144)	(151)	(165)	(184)

（＊） 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

Model **TNB-**		**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
Brand-New length A	inch (mm)	5.31 (135(*))	6.30 (160)	6.89 (175)	8.58 (218)	9.37 (238)	9.84 (250)
Serviceability limit length B	inch (mm)	5.43 (138(*))	6.42 (163)	7.01 (178)	8.70 (221)	9.49 (241)	9.96 (253)

Model **TNB-**		**6M**	**6E**	**7J**	**110**	**141LU**	**151LU2**
Brand-New length A	inch (mm)	9.84 (250)	11.02 (280)	12.99 (330)	14.17 (360)	17.99 (457)	17.99 (457)
Serviceability limit length B	inch (mm)	9.96 (253)	11.14 (283)	13.11 (333)	14.29 (363)	18.11 (460)	18.11 (460)

Model **TNB-**		**190LU2**	**230LU2**	**310LU1**	**400LU2**
Brand-New length A	inch (mm)	17.91 (455)	18.43 (468)	21.06 (535)	23.62 (600)
Serviceability limit length B	inch (mm)	18.03 (458)	18.54 (471)	21.18 (538)	23.74 (603)

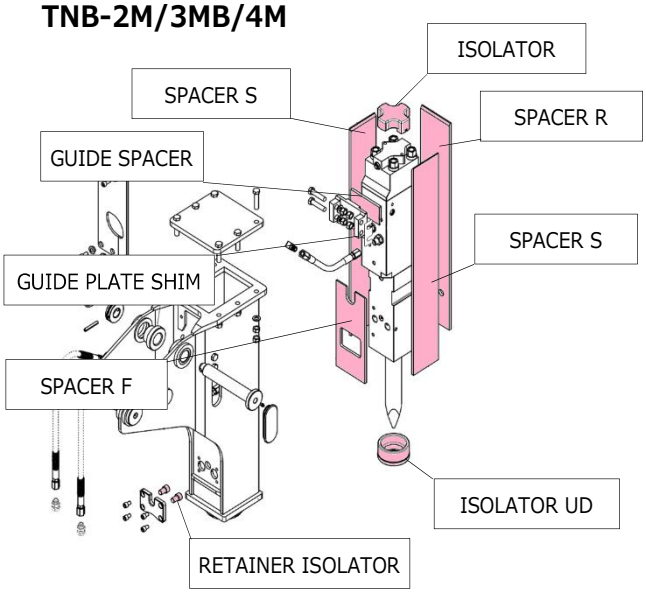
(*) As for the TNB-08M, this number would be the measurement of the CHISEL HOLDER.

3-8. INSPECTION AND MAINTENANCE OF THE BRACKET PLASTIC AND RESIN PARTS

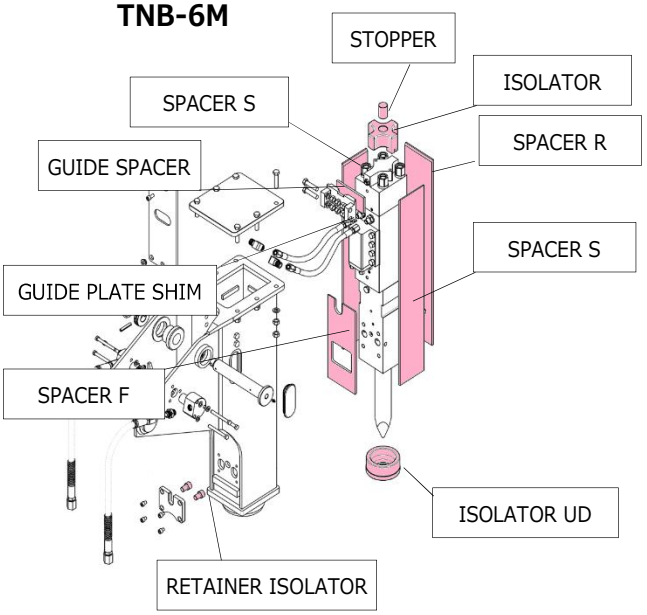
- Inspection and maintenance of plastic and resin parts should be done as early as every 600 hours or every 6 months.

SIDE MOUNT SILENCED BRACKET

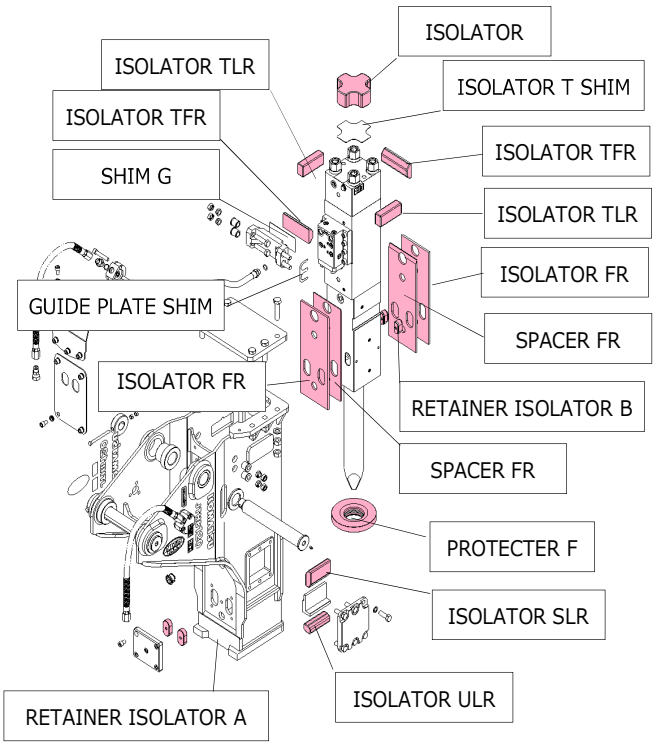
TNB-2M/3MB/4M



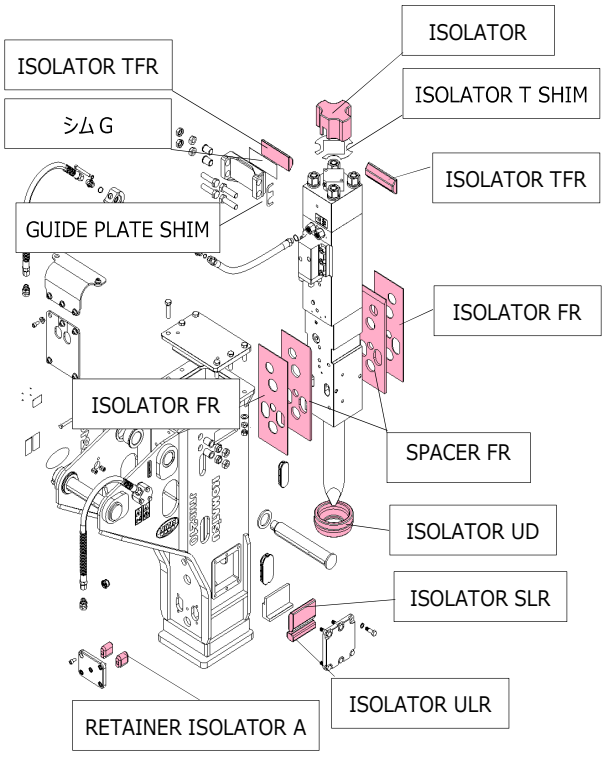
TNB-6M



TNB-7J

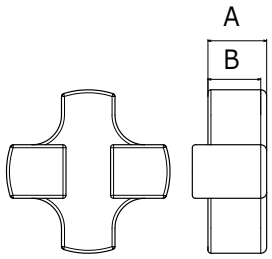
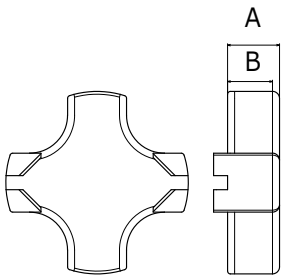
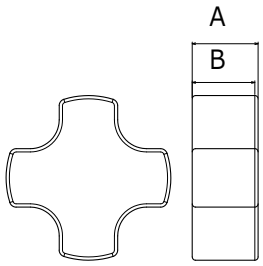
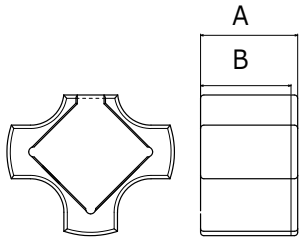


TNB-151LU2



SIDE MOUNT SILENCED BRACKET

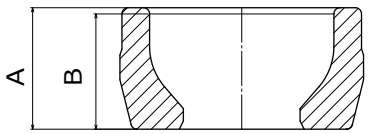
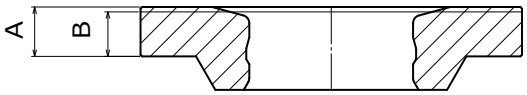
ISOLATOR

2M	3MB, 4M, 6M	7J	151LU2
			

Model **TNB-**		**2M**	**3MB**	**4M**	**6M**	**7J**	**151LU2**
Brand New A	inch	1.56	1.46	1.57	2.52	3.15	5.71
	(mm)	(39.5)	(37)	(40)	(64)	(80)	(145)
Serviceability Limit B	inch	1.48	1.38	1.5	2.44	3.03	5.39
	(mm)	(37.5)	(35)	(38)	(62)	(77)	(137)

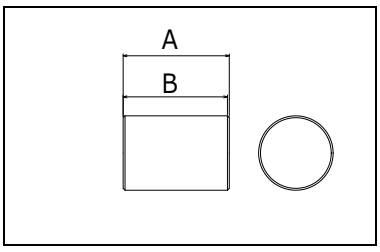
ISOLATOR U D

PROTECTOR F

2M, 3MB, 4M, 6M, 151LU2	7J
	

Model **TNB-**		**2M**	**3MB**	**4M**	**6M**	**7J**	**151LU2**
Brand New A	inch	2.03	2.32	2.32	2.68	1.22	3.78
	(mm)	(51.5)	(59)	(59)	(68)	(31)	(96)
Serviceability Limit B	inch	1.95	2.24	2.24	2.60	1.18	3.70
	(mm)	(49.5)	(57)	(57)	(66)	(30)	(94)

STOPPER

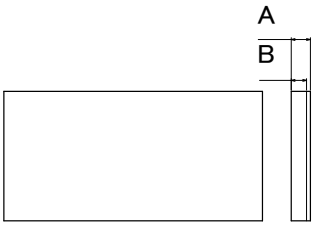
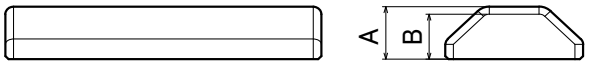


Model **TNB-**		**6M**
Brand New A	inch	2.24
	(mm)	(57)
Serviceability Limit B	inch	2.20
	(mm)	(56)

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

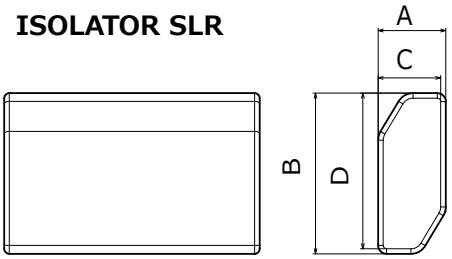
SIDE MOUNT SILENCED BRACKET

GUIDE SPACER **ISOLATOR TFR**

2M, 3MB, 4M, 6M	7J, 151LU2
	

Model **TNB-**		**2M**	**3MB**	**4M**	**6M**	**7J**	**151LU2**
Brand New A	inch (mm)	0.39 (10)	0.39 (10)	0.39 (10)	0.39 (10)	1.38 (35)	1.50 (38)
Serviceability Limit B	inch (mm)	0.31 (8)	0.31 (8)	0.31 (8)	0.31 (8)	1.30 (33)	1.42 (36)

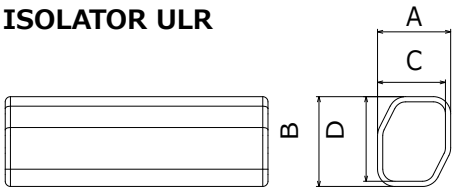
ISOLATOR SLR



Model **TNB-**		**7J**	**151LU2**
Brand New A x B	inch (mm)	1.57x3.74 (40x95)	1.65x5.39 (42X137)
Serviceability Limit CxD	inch (mm)	1.50x3.66 (38x93)	1.57x5.31 (40X135)

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

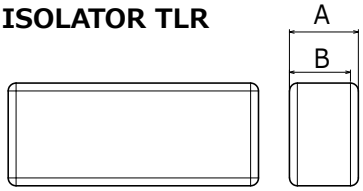
ISOLATOR ULR



Model **TNB-**		**7J**	**151LU2**
Brand New A x B	inch (mm)	1.65x2.05 (42x52)	1.93x2.24 (49x57)
Serviceability Limit CxD	inch (mm)	1.57x1.97 (40x50)	1.85x2.17 (47x55)

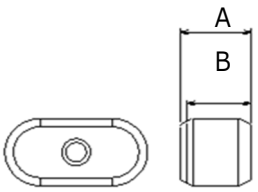
Replace it when either A or B is at serviceability limit.

ISOLATOR TLR



Model **TNB-**		**7J**
Brand New A	inch (mm)	1.71 (43.5)
Serviceability Limit B	inch (mm)	1.63 (41.5)

RETAINER ISOLATOR B

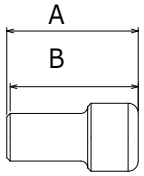
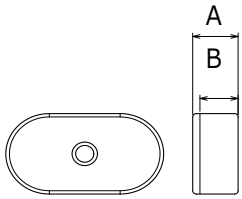
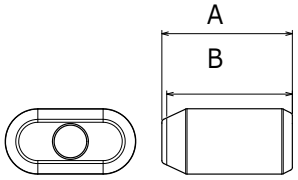


Model **TNB-**		**7J**
Brand New A	inch (mm)	1.38 (35)
Serviceability Limit B	inch (mm)	1.30 (33)

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

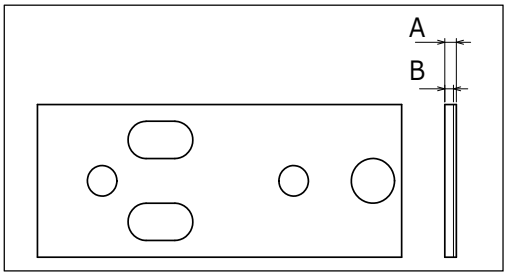
SIDE MOUNT SILENCED BRACKET

RETAINER ISOLATOR **RETAINER ISOLATOR A**

2M, 3MB, 4M, 6M	7J	151LU2
		

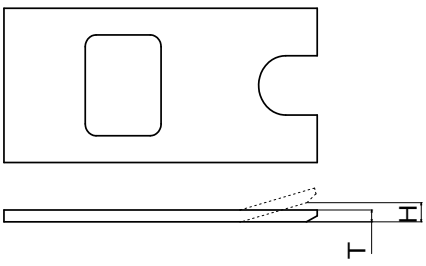
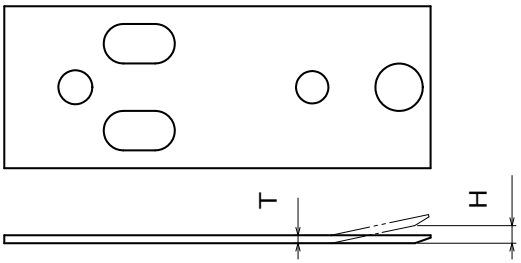
Model **TNB-**		**2M**	**3MB**	**4M**	**6M**	**7J**	**151LU2**
Brand New A	inch (mm)	1.54 (39)	1.65 (42)	1.69 (43)	1.97 (50)	0.98 (25)	3.15 (80)
Serviceability Limit B	inch (mm)	1.46 (37)	1.57 (40)	1.61 (41)	1.89 (48)	0.91 (23)	3.03 (77)

ISOLATOR FR



Model **TNB-**		**7J**	**151LU2**
Brand New A	inch (mm)	0.39 (10)	0.20 (5)
Serviceability Limit B	inch (mm)	0.35 (9)	0.16 (4)

SPACER F **SPACER FR**

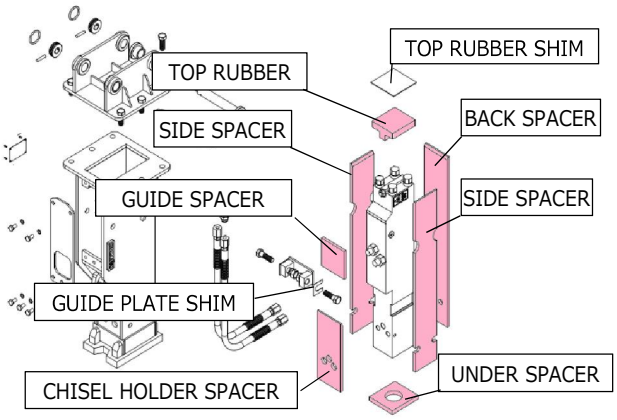
2M, 3MB, 4M, 6M	7J, 151LU2
	

Model **TNB-**		**2M**	**3MB**	**4M**	**6M**	**7J**	**151LU2**
Brand New Thickness T x Deform H	inch (mm)	0.39x0 (10x0)	0.39x0 (10x0)	0.39x0 (10x0)	0.39x0 (10x0)	0.39x0 (10x0)	0.59x0 (15x0)
Serviceability Limit T x H	inch (mm)	0.33x0.39 (8.5x10)	0.33x0.39 (8.5x10)	0.33x0.39 (8.5x10)	0.33x0.39 (8.5x10)	0.35x0.20 (9x5)	0.55x0.20 (14x5)

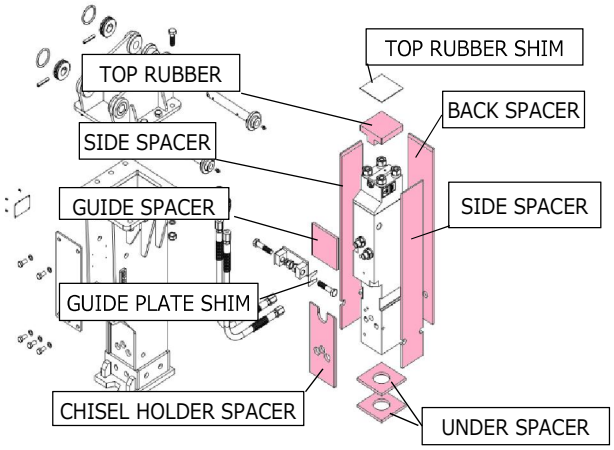
In regard to the plastic parts of isolators and spacers they are to be replaced at the breakage in no relation to wear dimensions.

BOX BRACKET

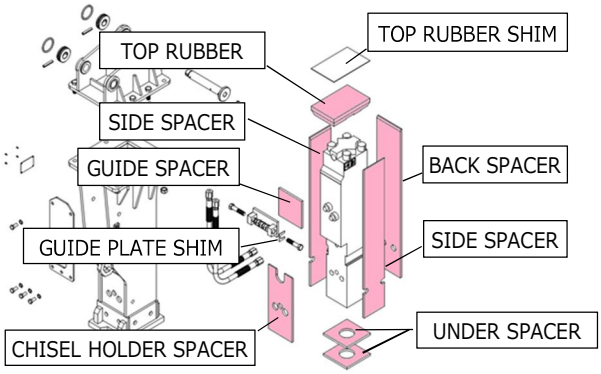
TNB-08M/1M



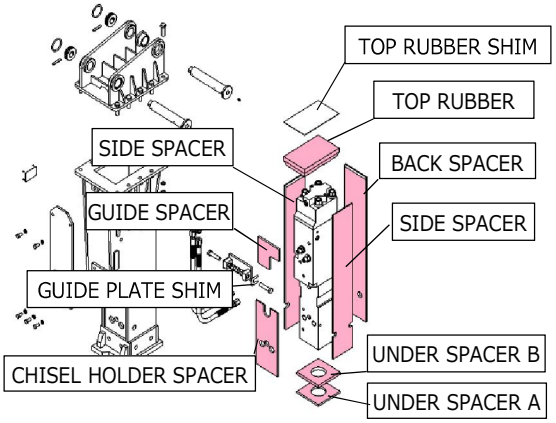
TNB-2M



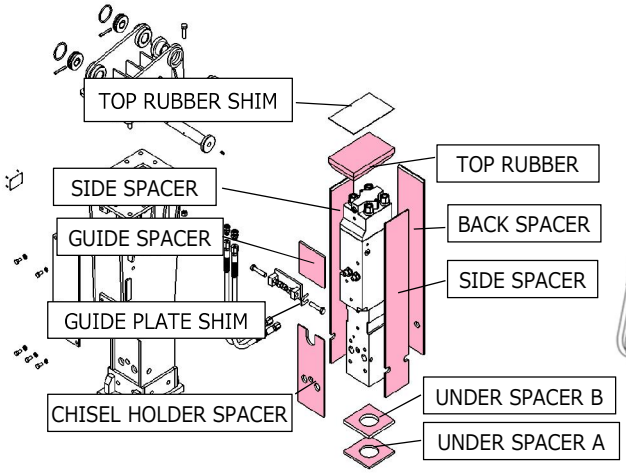
TNB-3MB



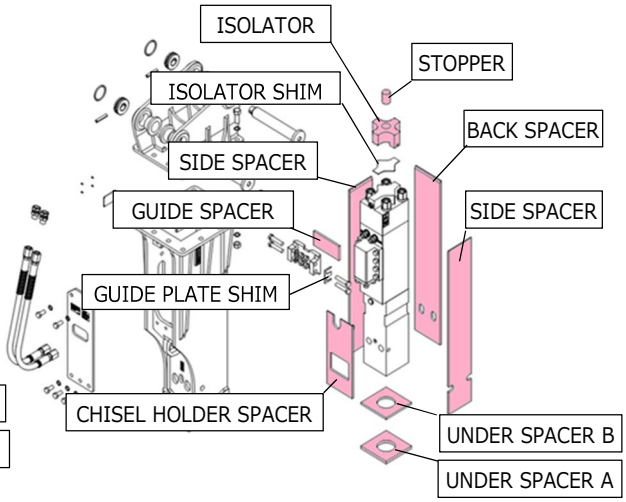
TNB-4M



TNB-5M

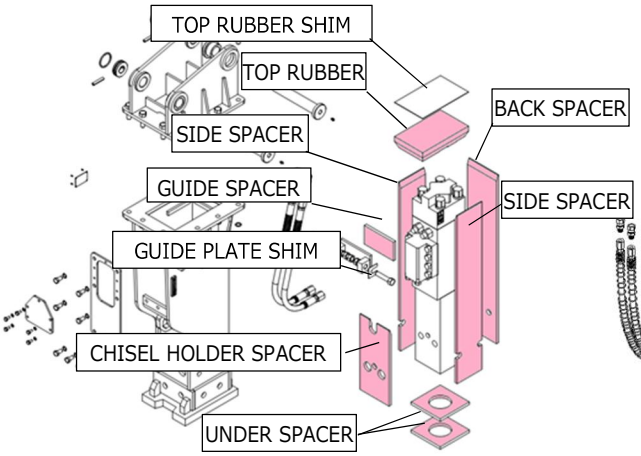


TNB-6M

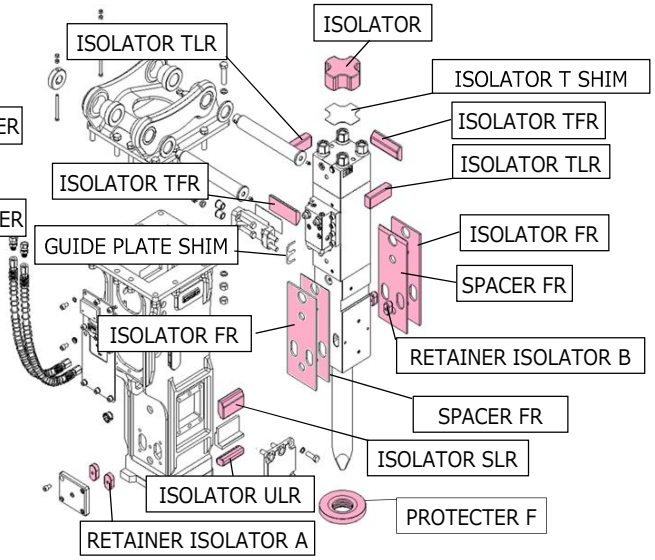


BOX BRACKET

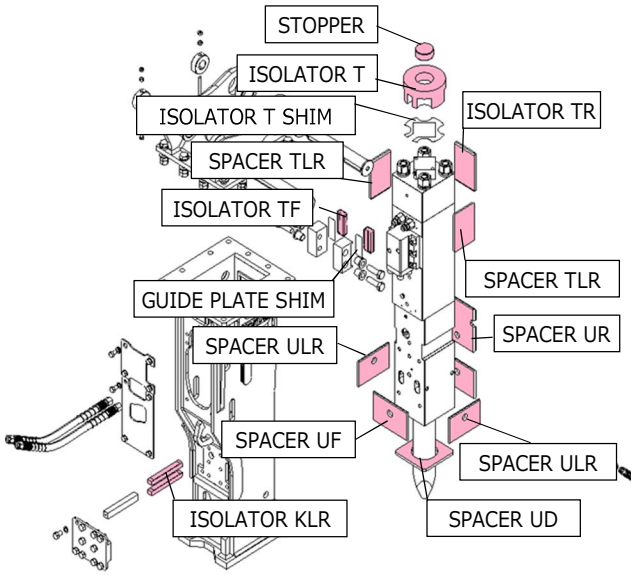
TNB-6E



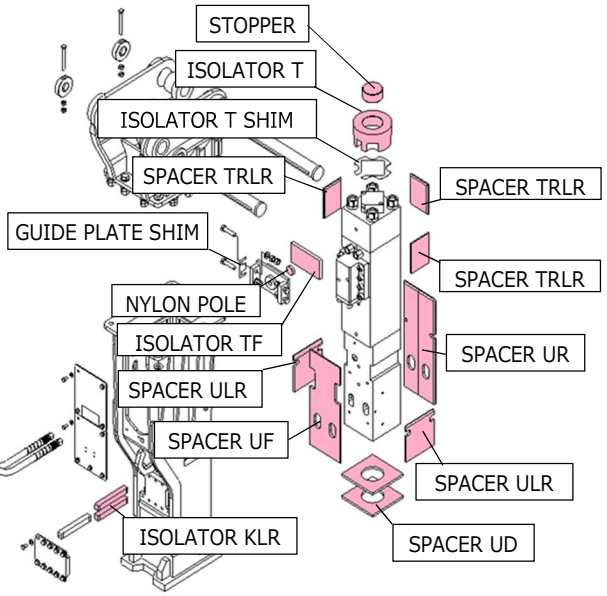
TNB-7J



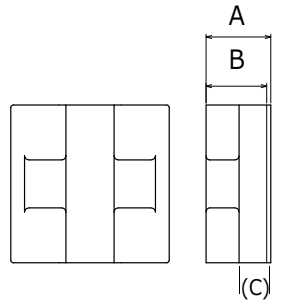
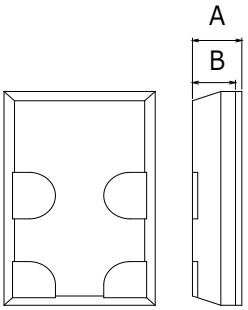
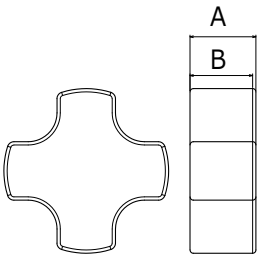
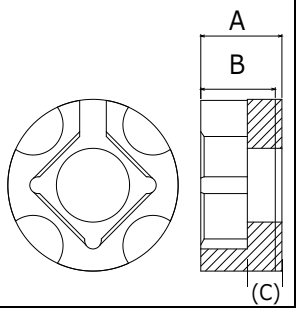
TNB-151LU2/230LU2/310LU2



TNB-110/400LU2



BOX BRACKET

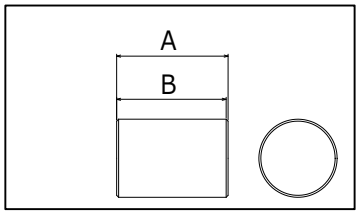
TOP RUBBER	TOP RUBBER	ISOLATOR	ISOLATOR T
08M,1M,2M	**3MB, 4M, 5M, 6E**	**6M, 7J**	**110, 151LU2 190LU2, 230LU2 310LU1, 400LU2**
			

Model **TNB-**		**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
Brand New A(C)	inch	1.85(0.87)	1.85(0.91)	1.85(0.91)	1.85	2.05	2.13
	(mm)	(47(22))	(47(23))	(47(23))	(47)	(52)	(54)
Serviceability Limit B(C)	inch	1.77(0.83)	1.77(0.87)	1.77(0.87)	1.77	2.01	2.09
	(mm)	(45(21))	(45(22))	(45(22))	(45)	(50)	(52)

Model **TNB-**		**6M**	**6E**	**7J**	**110**	**151LU2**	**190LU2**
Brand New A(C)	inch	2.52	2.60	3.15	5.12(2.64)	4.80(2.05)	5.94(2.99)
	(mm)	(64)	(66)	(80)	(130(67))	(122(52))	(151(76))
Serviceability Limit B(C)	inch	2.44	2.52	3.03	5.00(2.56)	4.69(1.97)	5.79(2.91)
	(mm)	(62)	(64)	(77)	(127(65))	(119(50))	(147(74))

Model **TNB-**		**230LU2**	**310LU1**	**400LU2**
Brand New A(C)	inch	6.18(3.07)	6.18(3.07)	6.97(3.62)
	(mm)	(157(78))	(157(78))	(177(92))
Serviceability Limit B(C)	inch	6.06(2.99)	6.06(2.99)	6.81(3.54)
	(mm)	(154(76))	(154(76))	(173(90))

STOPPER

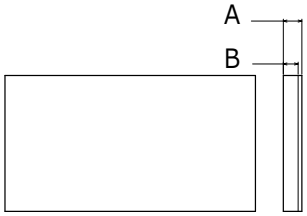
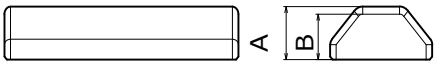
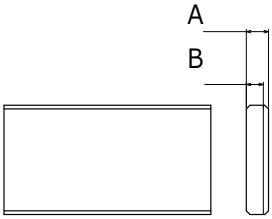


Model **TNB-**		**6M**	**110**	**151LU2**	**190LU2**	**230LU2**	**310LU1**	**400LU2**
Brand New A	inch	2.24	2.48	1.77	2.87	2.83	2.83	3.35
	(mm)	(57)	(63)	(45)	(73)	(72)	(72)	(85)
Serviceability Limit B	inch	2.20	2.44	1.73	2.83	2.80	2.80	3.31
	(mm)	(56)	(62)	(44)	(72)	(71)	(71)	(84)

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

GUIDE SPACER **ISOLATOR TFR** **ISOLATOR TF**

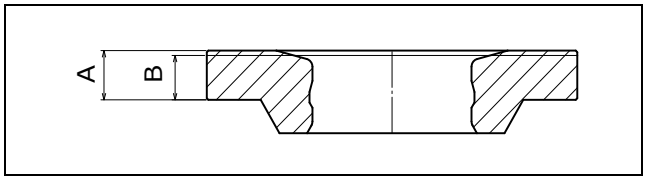
08M, 1M, 2M, 3MB, 4M, 5M, 6M, 6E	7J	110, 151LU2, 190LU2, 230LU2, 310LU2, 400LU2
		

Model **TNB-**		08M	1M	2M	3MB	4M	5M
Brand New A	inch (mm)	0.39 (10)	0.39 (10)	0.39 (10)	0.39 (10)	0.39 (10)	0.39 (10)
Serviceability Limit B	inch (mm)	0.31 (8)	0.31 (8)	0.31 (8)	0.31 (8)	0.31 (8)	0.31 (8)

Model **TNB-**		6M	6E	7J	110	151LU2	190LU2
Brand New A	inch (mm)	0.39 (10)	0.59 (15)	1.38 (35)	1.18 (30)	1.18 (30)	1.18 (30)
Serviceability Limit B	inch (mm)	0.31 (8)	0.51 (13)	1.30 (33)	1.10 (28)	1.10 (28)	1.10 (28)

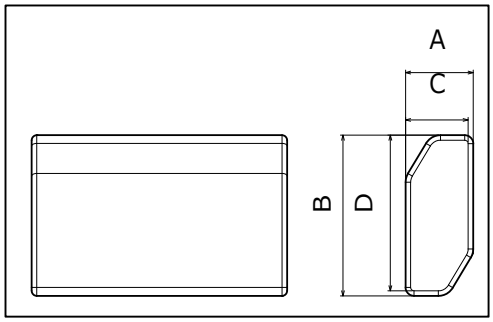
Model **TNB-**		230LU2	310LU1	400LU2
Brand New A	inch (mm)	1.57 (40)	1.77 (45)	1.18 (30)
Serviceability Limit B	inch (mm)	1.50 (38)	1.69 (43)	1.10 (28)

PROTECTOR F



Model **TNB-**		7J
Brand New A	inch (mm)	1.22 (31)
Serviceability Limit B	inch (mm)	1.18 (30)

ISOLATOR SLR



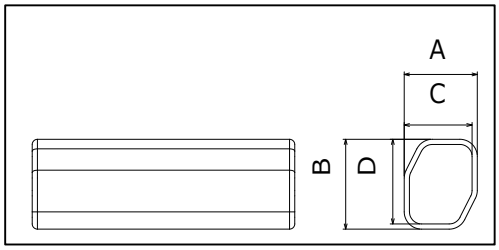
Model **TNB-**		7J
Brand New AxB	inch (mm)	1.57x3.74 (40x95)
Serviceability Limit CxD	inch (mm)	1.50x3.66 (38x93)

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

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

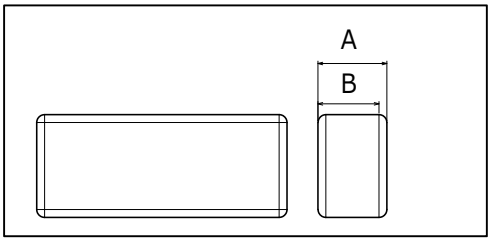
ISOLATOR ULR



Model **TNB-**		**7J**
Brand New Ax B	inch (mm)	1.65x2.05 (42x52)
Serviceability Limit CxD	inch (mm)	1.57x1.97 (40x50)

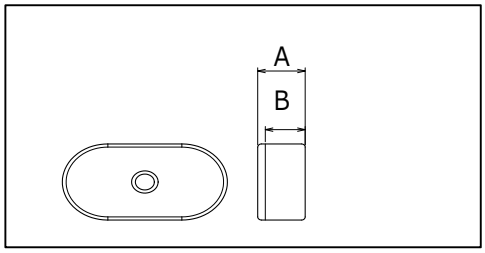
Replace it when either A or B is at serviceability limit.

ISOLATOR TLR



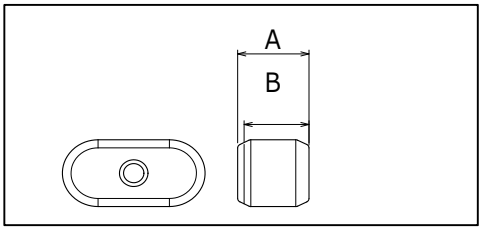
Model **TNB-**		**7J**
Brand New A	inch (mm)	1.71 (43.5)
Serviceability Limit B	inch (mm)	1.63 (41.5)

RETAINER ISOLATOR A



Model **TNB-**		**7J**
Brand New A	inch (mm)	0.98 (25)
Serviceability Limit B	inch (mm)	0.91 (23)

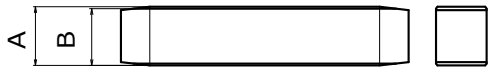
RETAINER ISOLATOR B



Model **TNB-**		**7J**
Brand New A	inch (mm)	1.38 (35)
Serviceability Limit B	inch (mm)	1.30 (33)

ISOLATOR KLR

※Replace 4of them at the same time.

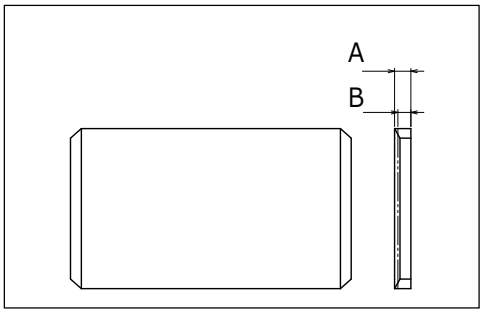


Model **TNB-**		**110**	**151LU2**	**190LU2**	**230LU2**	**310LU1**	**400LU2**
Brand New A	inch (mm)	1.18 (30)	1.18 (30)	1.57 (40)	1.57 (40)	1.57 (40)	1.97 (50)
Serviceability Limit B	inch (mm)	1.14 (29)	1.14 (29)	1.54 (39)	1.54 (39)	1.54 (39)	1.93 (49)

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

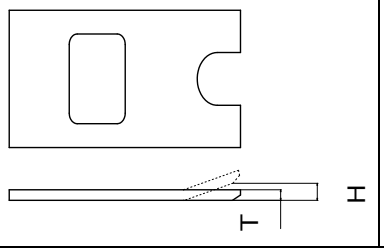
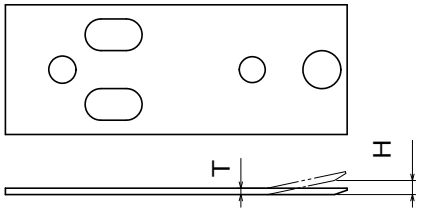
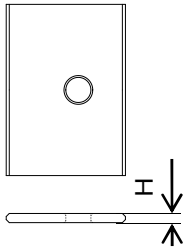
BOX BRACKET

ISOLATOR TR



Model **TNB-**		**151LU2**	**230LU2**	**310LU1**
Brand New A	inch (mm)	0.59 (15)	0.79 (20)	0.79 (20)
Serviceability Limit B	inch (mm)	0.53 (13.5)	0.71 (18)	0.71 (18)

SPACER F **SPACER FR / UF / UR** **SPACER UF / UR**

08M, 1M, 2M, 3MB, 4M, 5M, 6M, 6E	**7J, 110, 190LU2, 400LU2**	**151LU2, 230LU2, 310LU1**
		

Model **TNB-**		**08M**	**1M**	**2M**	**3MB**	**4M**	**5M**
Brand New Thickness T x Deform H	inch (mm)	0.39x0 (10x0)	0.39x0 (10x0)	0.39x0 (10x0)	0.39x0 (10x0)	0.39x0 (10x0)	0.39x0 (10x0)
Serviceability Limit T x H	inch (mm)	0.33x0.39 (8.5x10)	0.33x0.39 (8.5x10)	0.33x0.39 (8.5x10)	0.33x0.39 (8.5x10)	0.33x0.39 (8.5x10)	0.33x0.39 (8.5x10)

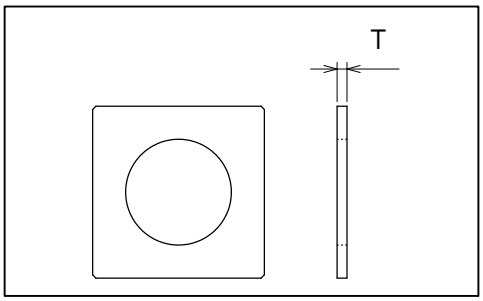
Model **TNB-**		**6M**	**6E**	**7J**	**110**	**190LU2**	**400LU2**
Brand New Thickness T x Deform H	inch (mm)	0.39x0 (10x0)	0.59x0 (15x0)	0.39x0 (10x0)	0.59x0 (15x0)	0.79x0 (20x0)	0.79x0 (20x0)
Serviceability Limit T x H	inch (mm)	0.33x0.20 (8.5x5)	0.53x0.20 (13.5x5)	0.35x0.20 (9x5)	0.53x0.20 (13.5x5)	0.71x0.20 (18x5)	0.71x0.20 (18x5)

Model **TNB-**		**151LU2**	**230LU2**	**310LU1**
Brand New Thickness T	inch (mm)	0.59 (15)	0.79 (20)	0.79 (20)
Serviceability Limit T	inch (mm)	0.53 (13.5)	0.71 (18)	0.71 (18)

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

UNDER SPACER / SPACER UD



Model **TNB-**		**08M**	**1M**	**2M**	**3MB**	**4M**
Brand New Thickness T	inch (mm)	0.39 (10)	0.59 (15)	0.39 (10)	0.39 (10)	0.39+(0.59) (10+(15))
Serviceability Limit T	inch (mm)	0.35 (9)	0.55 (14)	0.35 (9)	0.35 (9)	0.35+(0.55) (9+(14))

Model **TNB-**		**5M**	**6M**	**6E**	**110**	**151LU2**
Brand New Thickness T	inch (mm)	0.39+(0.59) (10+(15))	0.39+(0.59) (10+(15))	0.59 (15)	0.59 (15)	0.59 (15)
Serviceability Limit T	inch (mm)	0.35+(0.55) (9+(14))	0.35+(0.55) (9+(14))	0.55 (14)	0.51 (13)	0.49 (12.5)

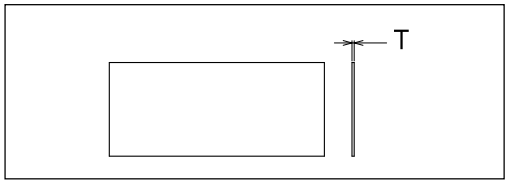
Model **TNB-**		**190LU2**	**230LU2**	**310LU1**	**400LU2**
Brand New Thickness T	inch (mm)	0.79 (20)	0.79 (20)	0.79 (20)	0.79 (20)
Serviceability Limit T	inch (mm)	0.67 (17)	0.65 (16.5)	0.63 (16)	0.63 (16)

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

The serviceability limit dimensions of other spacers for BOX BRACKET and SIDE MOUNT SILENCED BRACKET are -0.06 inch (-1.5 mm) from the thickness of brand new.

BOX BRACKET

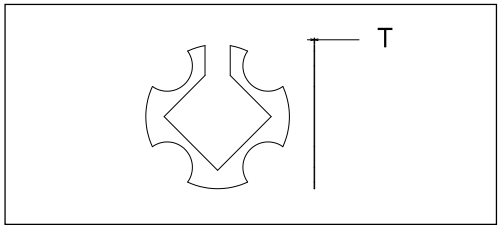
TOP RUBBER SHIM



Model **TNB-**		**08M,1M,2M,3MB,4M,5M,6E**
Thickness T	inch (mm)	0.08 (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 top rubber with new one.

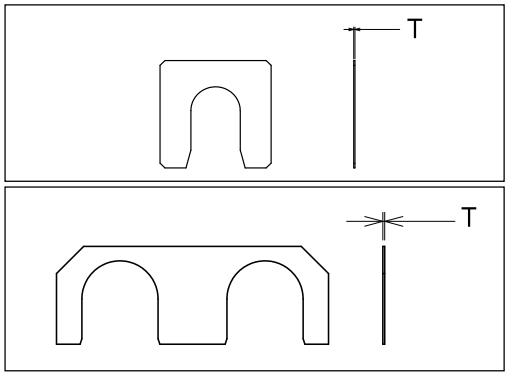
ISOLATOR SHIM T



Model **TNB-**		**6M,7J,110,151LU2,190LU2 230LU2,310LU1,400LU2**
Thickness T	inch (mm)	0.04 (1)
Thickness T	inch (mm)	0.08 (2)

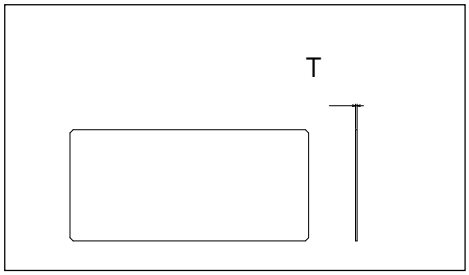
※ In case of using the shim as counter measure to the serviceability limit it must be applied only one time. From the 2'nd time later replace the top rubber with new one.

GUIDE PLATE SHIM



Model **TNB-**		**08M,1M,2M,3MB,4M,5M,6M 6E,110,190LU2,400LU2**
Thickness T	inch (mm)	0.02 (0.5)
Thickness T	inch (mm)	0.04 (1)

GUIDE PLATE SHIM / SHIM G



Model **TNB-**		**151LU2,230LU2,310LU1**
Thickness T	inch (mm)	0.04 (1)

※ In case of using the shim as counter measure to the serviceability limit it must be applied only 2 times. From the 3'rd time later replace the ISOLATOR TF 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 hours. In case it is not available on the breaker piping line replace the filter element of the filter every 100 hours 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 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 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.

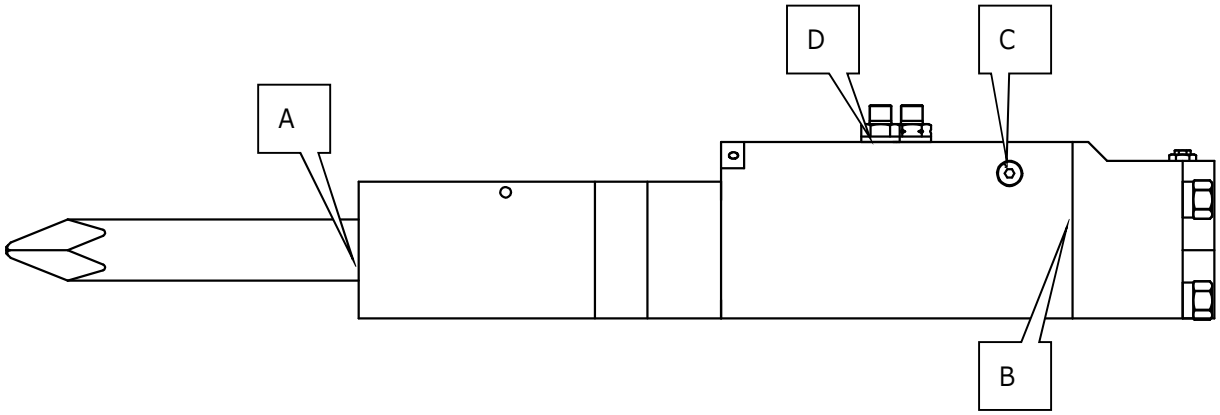
⚠ CAUTION
Consult with TOKU or TOKU's designated distributor about tunnel application.

● 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,3MB,4M,5M

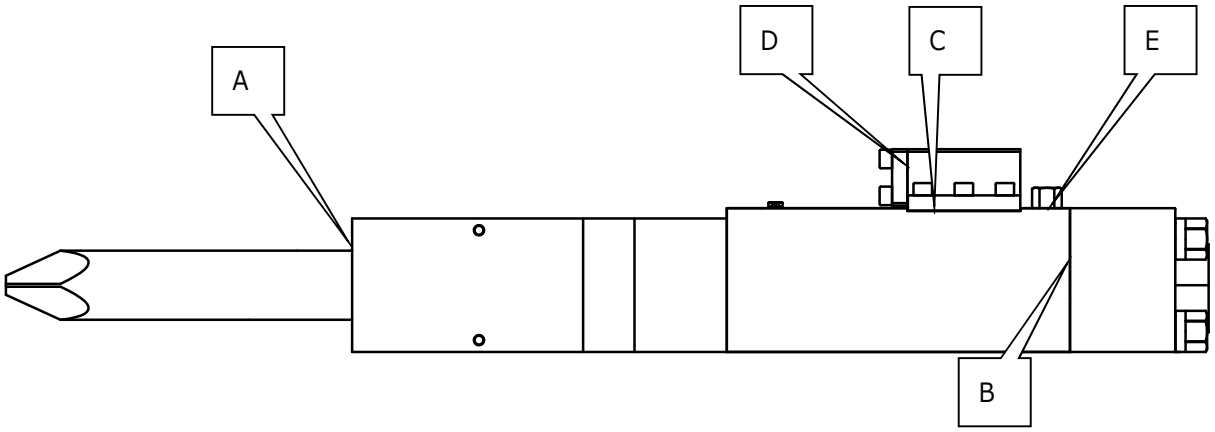


	Oil Leakage Location	Cause	Countermeasure
A	Opening between the chisel and the chisel bushing	Wear or damage of oil seal.	(*) Replacement
		Seizure of piston & cylinder.	(*) Repair or replacement
B	Between the cylinder cover and cylinder.	Wear or damage of O-ring or back up ring.	(*) Replacement
		Looseness 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,110,141LU,151LU2,190LU2,230LU2,310LU1,400LU2



	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.

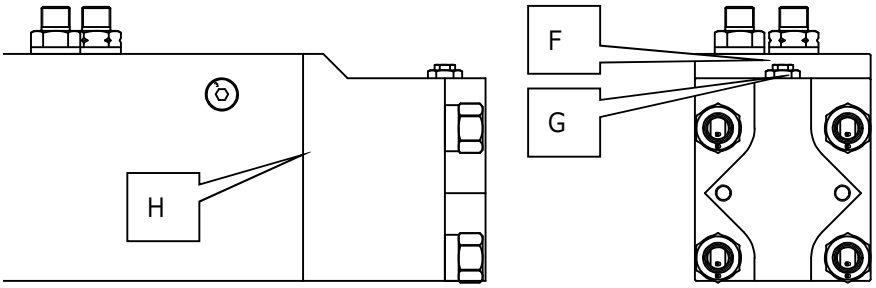
NOTE: (*) It is necessary to disassemble the hydraulic breaker in order to repair.
Please contact TOKU or TOKU's Distributor and ask for repair.

5-2. NITROGEN GAS LEAKAGE

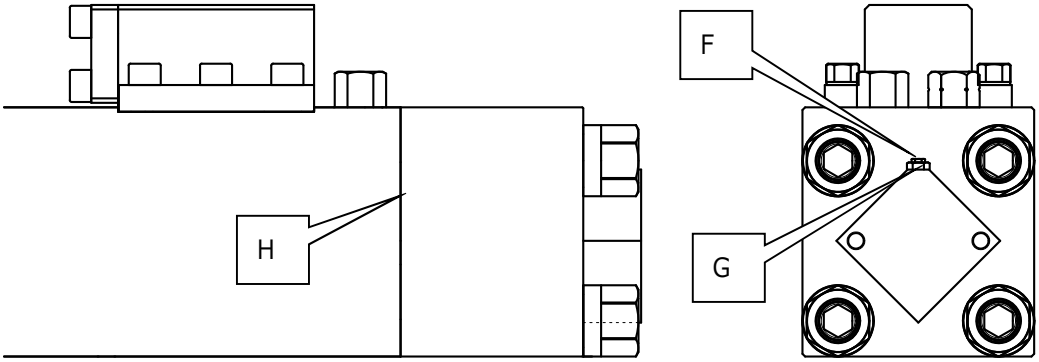
※ It is abnormal for the nitrogen gas to leak more than 43 PSI (0.3MPa) per 100 hours from the cylinder cover. Check the areas as shown in the chart for repairs.
Inspect the areas as shown in the following diagram.

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,3MB,4M,5M



TNB-6M,6E,7J,110,141LU,151LU2,190LU2,230LU2,310LU1,400LU2



	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 cover.	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
	The hose connection, IN and OUT is inverse.	Connect the hose properly
	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.).	Lack of down pressure onto the chisel.	Operate the arm and bucket so that pressure is applied to the chisel
	The operating mode is not set to B mode.	Switch to B mode.
	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
	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.	Operate the arm bucket so that the down force on the chisel is rightly applied l.
	Pressure setting for the relief valve is too low.	(*) Reset the relief valve to the correct pressure
	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
	Backpressure is too high due to clogging hydraulic piping.	(*) 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. ACCESSORY TOOLS

TNB-08M

No.	DESCRIPTION		Code No.	SIDE MOUNT	BOX	TOP MOUNT
1	Spanner	HEX 22	134005122	1	1	1
2	Spanner	HEX 24	134005124	1	1	1
3	Spanner	HEX 27	134005127	1	1	1
4	Monkey Wrench	200mm	134006200	1	1	1
5	Hammer 1		133906001	1	1	1
6	Tool Box	T-2	137507355	1	1	1
7	Eye Bolt	M8	131601008	2	2	2
8	Seal Tape		137509001	1	1	1
9	Chisel Pin Remover	7X130	415105820	1	1	1
10	Hose Plug	PF3/8	182138067	2	-	2
11	Hose Plug	9/16-18UNF	182138U04	-	2	-
12	Hose Adapter Plug	PF3/8	182017008	2	-	2
13	Hose Adapter Plug	9/16-18UNF	182017U04	-	2	-
14	Gas Gauge Kit		A01016060	-	1	-

INCLUDED ITEM

No.	DESCRIPTION	Code No.	SIDE MOUNT	BOX	TOP MOUNT
1	Spring Pin	130608080	1	1	1

(※) Type of plug (#10 - #13) differs in each market.
Please check and select proper type of plug.

TNB-1M

No.	DESCRIPTION		Code No.	SIDE MOUNT	BOX	TOP MOUNT
1	Spanner	HEX 24	134005124	-	1	1
2	Spanner	HEX 27	134005127	1	1	1
3	Spanner	HEX 32	134005132	1	1	1
4	Monkey Wrench	200mm	134006200	1	1	1
5	Hammer 1		133906001	1	1	1
6	Tool Box	T-2	137507355	1	1	1
7	Eye Bolt	M8	131601008	2	2	2
8	Seal Tape		137509001	1	1	1
9	Chisel Pin Remover	7X130	415105820	1	1	1
10	Hose Plug	PF1/2	182138068	2		2
11	Hose Plug	3/4-16UNF	182138U06	-	2	-
12	Hose Adapter Plug	PF1/2	182017010	2	-	2
13	Hose Adapter Plug	3/4-16UNF	182017U06	-	2	-
14	Gas Gauge Kit		A01016060	-	1	-

INCLUDED ITEM

No.	DESCRIPTION	Code No.	SIDE MOUNT	BOX	TOP MOUNT
1	Spring Pin	130608090	1	1	1

(※) Type of plug (#10 - #13) differs in each market.
Please check and select proper type of plug.

TNB-2M

No.	DESCRIPTION		Code No.	SIDE MOUNT	US	BOX	TOP MOUNT
1	Spanner	HEX 24	134005124	-	1	1	1
2	Spanner	HEX 27	134005127	1	1	1	1
3	Spanner	HEX 30	134005130	1	-	-	1
4	Spanner	HEX 32	134005132	1	1	1	1
5	Monkey Wrench	200mm	134006200	1	1	1	1
6	Hammer 1		133906001	1	1	1	1
7	Tool Box	T-2	137507355	1	1	1	1
8	Eye Bolt	M8	131601008	2	2	2	2
9	Seal Tape		137509001	1	1	1	1
10	Chisel Pin Remover	9.8x210	415127820	1	1	1	1
11	Hose Plug	G1/2	182138068	2	2	-	2
12	Hose Plug	3/4-16UNF	182138U06	-	-	2	-
13	Hose Adapter Plug	G1/2	182017010	2	2	-	2
14	Hose Adapter Plug	3/4-16UNF	182017U06	-	-	2	-
15	Hexagon Wrench	HEX 8	134001008	-	1	-	-
16	Hexagon Wrench	HEX 10	134001010	-	1	-	-
17	Gas Gauge Kit		A01016060	-	-	1	-

INCLUDED ITEM

No.	DESCRIPTION	Code No.	SIDE MOUNT	US	BOX	TOP MOUNT
1	Spring Pin	130610110	1	-	1	1

(※) Type of plug (#11 - #14) differs in each market.
Please check and select proper type of plug.

TNB-3MB

No.	DESCRIPTION		Code No.	SIDE MOUNT	US	BOX	TOP MOUNT
1	Spanner	HEX 24	134005124	-	1	1	1
2	Spanner	HEX 27	134005127	1	1	1	1
3	Spanner	HEX 30	134005130	1	-	-	1
4	Spanner	HEX 32	134005132	1	1	1	1
5	Monkey Wrench	200mm	134006200	1	1	1	1
6	Hammer 1		133906001	1	1	1	1
7	Tool Box	T-2	137507355	1	1	1	1
8	Eye Bolt	M8	131601008	1	1	1	1
9	Eye Bolt	M12	131601012	2	2	2	2
10	Seal Tape		137509001	1	1	1	1
11	Chisel Pin Remover	9.8x210	415127820	1	1	1	1
12	Hose Plug	G1/2	182138068	2	2	-	2
13	Hose Plug	3/4-16UNF	182138U06	-	-	2	-
14	Hose Adapter Plug	G1/2	182017010	2	2	-	2
15	Hose Adapter Plug	3/4-16UNF	182017U06	-	-	2	-
16	Hexagon Wrench	HEX 10	134001010	-	1	-	-
17	Gas Gauge Kit		A01016060	-	-	1	-

INCLUDED ITEM

No.	DESCRIPTION	Code No.	SIDE MOUNT	US	BOX	TOP MOUNT
1	Spring Pin	130610130	1	-	1	1

(※) Type of plug (#12 - #15) differs in each market.
Please check and select proper type of plug.

TNB-4M

No.	DESCRIPTION		Code No.	SIDE MOUNT	US	BOX	TOP MOUNT
1	Spanner	HEX 24	134005124	-	1	1	1
2	Spanner	HEX 27	134005127	1	1	1	1
3	Spanner	HEX 32	134005132	1	1	1	1
4	Monkey Wrench	200mm	134006200	1	1	1	1
5	Hammer 1		133906001	1	1	1	1
6	Tool Box	T-2	137507355	1	1	1	1
7	Eye Bolt	M8	131601008	1	1	1	1
8	Eye Bolt	M12	131601012	2	2	2	2
9	Seal Tape		137509001	1	1	1	1
10	Chisel Pin Remover	9.8x210	415127820	1	1	1	1
11	Hose Plug	G1/2	182138068	2	2	-	2
12	Hose Plug	3/4-16UNF	182138U06	-	-	2	-
13	Hose Adapter Plug	G1/2	182017010	2	2	-	2
14	Hose Adapter Plug	3/4-16UNF	182017U06	-	-	2	-
15	Hexagon Wrench	HEX 10	134001010	-	1	-	-
16	Gas Gauge Kit		A01016060	-	-	1	-

INCLUDED ITEM

No.	DESCRIPTION	Code No.	SIDE MOUNT	US	BOX	TOP MOUNT
1	Spring Pin	130610140	1	-	1	1

(※) Type of plug (#11 - #14) differs in each market.
Please check and select proper type of plug.

TNB-5M

No.	DESCRIPTION		Code No.	SIDE MOUNT	BOX	TOP MOUNT
1	Spanner	HEX 24	134005124	-	1	1
2	Spanner	HEX 27	134005127	1	1	1
3	Spanner	HEX 32	134005132	1	1	1
4	Spanner	HEX 36	134005136	1	1	1
5	Monkey Wrench	200mm	134006200	1	1	1
6	Hammer 1		133906001	1	1	1
7	Tool Box	T-2	137507355	1	1	1
8	Eye Bolt	M12	131601012	2	2	2
9	Seal Tape		137509001	1	1	1
10	Chisel Pin Remover	9.8x210	415127820	1	1	1
11	Hose Plug	G1/2	182138068	2	-	2
12	Hose Plug	3/4-16UNF	182138U06	-	2	-
13	Hose Adapter Plug	G1/2	182017010	2	-	2
14	Hose Adapter Plug	3/4-16UNF	182017U06	-	2	-
15	Gas Gauge Kit		A01016060	-	1	-

INCLUDED ITEMS

No.	DESCRIPTION	Code No.	SIDE MOUNT	BOX	TOP MOUNT
1	Plug	136402012	1	1	1
2	Stopper Pin	415118110	1	1	1

(※) Type of plug (#11 - #14) differs in each market.
Please check and select proper type of plug.

TNB-6M

No.	DESCRIPTION		Code No.	SIDE MOUNT	US	BOX	TOP MOUNT
1	Spanner	HEX 24	134005124	-	1	1	-
2	Spanner	HEX 27	134005127	1	1	-	1
3	Spanner	HEX 30	134005130	-	-	1	-
4	Spanner	HEX 32	134005132	1	1	1	1
5	Spanner	HEX 36	134005136	1	1	1	1
6	Socket □3/4	HEX 41	136096224	1	1	1	1
7	Hexagon Wrench	HEX 14	134001014	1	1	1	1
8	Monkey Wrench	200mm	134006200	1	1	1	1
9	Hammer 1		133906001	1	1	1	1
10	Tool Box	T-2	137507355	1	1	1	1
11	Eye Bolt	M12	131601012	2	2	2	2
12	Hex Bolt	M8	131608340	2	2	2	2
13	Seal Tape		137509001	1	1	1	1
14	Chisel Pin Remover	9.8x210	415127820	1	1	1	1
15	Hose Plug	G3/4	182138069	2	2	-	2
16	Hose Plug	1-1/16-12UNF	182138U11	-	-	2	-
17	Hose Adapter Plug	G3/4	182017014	2	2	-	2
18	Hose Adapter Plug	1-1/16-12UNF	182017U11	-	-	2	-
19	Hexagon Wrench	HEX 10	134001010	-	1	-	-
20	Gas Gauge Kit		A01016060	-	-	1	-

INCLUDED ITEMS

No.	DESCRIPTION	Code No.	SIDE MOUNT	US	BOX	TOP MOUNT
1	Plug	136402012	1	-	1	1
2	Stopper Pin	415118110	1	-	1	1

(※) Type of plug (#15 - #18) differs in each market.
Please check and select proper type of plug.

TNB-6E

No.	DESCRIPTION		Code No.	SIDE MOUNT	BOX	TOP MOUNT
1	Spanner HEX 24	HEX 24	134005124	-	1	-
2	Spanner HEX 30	HEX 30	134005130	-	1	-
3	Spanner HEX 36	HEX 36	134005136	1	1	1
4	Spanner HEX 41	HEX 41	134005141	1	1	1
5	Socket □3/4	HEX 41	136096224	1	1	1
6	Socket □3/4	HEX 46	136096225	1	-	1
7	Hexagon Wrench	HEX 5/8	134002016	1	1	1
8	Monkey Wrench	200mm	134006200	1	1	1
9	Hammer 1		133906001	1	1	1
10	Tool Box	T-2	137507355	1	1	1
11	Eye Bolt	M12	131601012	2	2	2
12	Hex Bolt	M8	131608340	2	2	2
13	Seal Tape		137509001	1	1	1
14	Chisel Pin Remover	9.8x210	415127820	1	1	1
15	Hose Plug	G3/4	182138069	2	-	2
16	Hose Plug	1-1/16-12UNF	182138U11	-	2	-
17	Hose Adapter Plug	G3/4	182017014	2	-	2
18	Hose Adapter Plug	1-1/16-12UNF	182017U11	-	2	-
19	Gas Gauge Kit		A01016060	-	1	-

INCLUDED ITEMS

No.	DESCRIPTION	Code No.	SIDE MOUNT	BOX	TOP MOUNT
1	Plug	136402012	1	1	1
2	Stopper Pin	415121110	1	1	1

(※) Type of plug (#15 - #18) differs in each market.
Please check and select proper type of plug.

TNB-7J

No.	DESCRIPTION		Code No.	KB	US	BOX
1	Spanner	HEX 19	134005119	1	1	1
2	Spanner	HEX 30	134005130	-	1	1
3	Spanner	HEX 36	134005136	1	1	1
4	Socket □3/4	HEX 30	134008030	-	1	1
5	Socket □1"	HEX 55	136096226	1	1	1
6	Monkey Wrench	250mm	134006250	1	1	1
7	Hammer 2		133906002	1	1	1
8	Tool Box	TY-5	137507535	1	1	1
9	Eye Bolt	M20	131601020	2	2	2
10	Seal Tape		137509001	1	1	1
11	Chisel Pin Remover	12.8x320	415182821	1	1	1
12	Hose Plug	G3/4	182138069	2	2	-
13	Hose Plug	1-1/16-12UNF	182138U11	-	-	2
14	Hose Adapter Plug	G3/4	182017014	2	2	-
15	Hose Adapter Plug	1-1/16-12UNF	182017U11	-	-	2
16	Hexagon Wrench	HEX 14	134001014	1	1	1
17	Retainer Pin Remover	M8x150	133109008	1	1	1
18	Pliers	200mm	134102200	-	1	1
19	Gas Gauge Kit		A01016060	-	-	1

INCLUDED ITEMS

No.	DESCRIPTION	Code No.	KB	US	BOX
1	Plug	136402014	2	-	-
2	Stopper Pin	415620271	2	-	-
3	Retainer Pin	415620100	2	-	-

(※) Type of plug (#12 - #15) differs in each market.
Please check and select proper type of plug.

TNB-110

No.	DESCRIPTION		Code No.	SIDE MOUNT	BOX
1	Spanner	HEX 19	134005119	1	1
2	Spanner	HEX 24	134005124	-	1
3	Spanner	HEX 30	134005130	-	1
4	Spanner	HEX 36	134005136	1	1
5	Spanner	HEX 41	134005141	1	1
6	Socket □1"	HEX 55	136096226	1	1
7	Hexagon Wrench	HEX 19	134001019	1	1
8	Monkey Wrench	250mm	134006250	1	1
9	Hammer 2		133906002	1	1
10	Tool Box	TY-5	137507535	1	1
11	Eye Bolt	M20	131601020	2	2
12	Seal Tape		137509001	1	1
13	Chisel Pin Remover	12.8x320	415182821	1	1
14	Hose Plug	G3/4	182138069	2	-
15	Hose Plug	1-1/16-12UNF	182138U11	-	2
16	Hose Adapter Plug	G3/4	182017014	2	-
17	Hose Adapter Plug	1-1/16-12UNF	182017U11	-	2
18	Hexagon Wrench	HEX 22	134001122	-	1
19	Retainer Pin Remover	M8x150	133109008	1	1
20	Gas Gauge Kit		A01016060	-	1

INCLUDED ITEMS

No.	DESCRIPTION	Code No.	SIDE MOUNT	BOX
1	Plug	136402015	1	1
2	Stopper Pin	415182270	1	1

(※) Type of plug (#14 - #17) differs in each market.
Please check and select proper type of plug.

TNB-141LU

No.	DESCRIPTION		Code No.	SIDE MOUNT
1	Spanner	HEX 24	134005124	1
2	Spanner	HEX 41	134005141	1
3	Spanner	HEX 50	134005150	1
4	Socket □1"	HEX 60	136096289	1
5	Socket □1"	HEX 70	136096227	1
6	Hexagon Wrench	HEX 19	134001019	1
7	Monkey Wrench	250mm	134006250	1
8	Hammer 2		133906002	1
9	Tool Box	TY-5	137507535	1
10	Eye Bolt	M20	131601020	2
11	Seal Tape		137509001	1
12	Chisel Pin Remover	15.8x320	415141820	1
13	Hose Plug	G1.	182138070	2
14	Hose Plug	1-5/16-12UNF	182138U15	-
15	Hose Adapter Plug	G1.	182017016	2
16	Hose Adapter Plug	1-5/16-12UNF	182017U15	-

INCLUDED ITEMS

No.	DESCRIPTION	Code No.	SIDE MOUNT
1	Plug	136402015	1
2	Stopper Pin	415148251	1

(※) Type of plug (#13 - #16) differs in each market.
Please check and select proper type of plug.

TNB-151LU2

No.	DESCRIPTION		Code No.	KB	US	BOX
1	Spanner	HEX 24	134005124	1	1	1
2	Spanner	HEX 30	134005130	1	1	1
3	Spanner	HEX 36	134005136	-	1	1
4	Spanner	HEX 41	134005141	1	1	1
5	Spanner	HEX 46	134005146	-	1	1
6	Spanner	HEX 50	134005150	1	1	1
7	Socket □3/4	HEX 30	134008030	-	1	-
8	Socket □1"	HEX 70	136096227	1	1	1
9	Socket □1.1/2	HEX 75	136096228	1	-	-
10	Hexagon Wrench	HEX 19	134001019	1	1	1
11	Monkey Wrench	250mm	134006250	1	1	1
12	Hammer 2		133906002	1	1	1
13	Tool Box	TY-5	137507535	1	1	1
14	Eye Bolt	M20	131601020	2	2	2
15	Seal Tape		137509001	1	1	1
16	Chisel Pin Remover	15.8x320	415141820	1	1	1
17	Hose Plug	G1.	182138070	2	2	-
18	Hose Plug	1-5/16-12UNF	182138U15	-	-	2
19	Hose Adapter Plug	G1.	182017016	2	2	-
20	Hose Adapter Plug	1-5/16-12UNF	182017U15	-	-	2
21	Hexagon Wrench	HEX 14	134001014	-	1	-
22	Hexagon Wrench	HEX 22	134001122	-	-	1
23	Retainer Pin Remover	M8x150	133109008	1	1	1
24	Pliers	200mm	134102200	-	1	-
25	Gas Gauge Kit		A01016060	-	-	1

INCLUDED ITEMS

No.	DESCRIPTION	Code No.	KB	US	BOX
1	Plug	136402015	1	-	1
2	Stopper Pin	415148251	1	-	1

(※) Type of plug (#17 - #20) differs in each market.
Please check and select proper type of plug.

TNB-190LU2

No.	DESCRIPTION		Code No.	SIDE MOUNT	BOX
1	Spanner	HEX 24	134005124	1	1
2	Spanner	HEX 30	134005130	-	1
3	Spanner	HEX 36	134005136	-	1
4	Spanner	HEX 41	134005141	1	1
5	Spanner	HEX 46	134005146	-	1
6	Spanner	HEX 50	134005150	1	-
7	Hexagon Wrench	HEX 22	134001022	1	1
8	Socket □1"	HEX 65	136096290	1	-
9	Socket □1.1/2	HEX 75	136096228	1	1
10	Monkey Wrench	250mm	134006250	1	1
11	Hammer 2		133906002	1	1
12	Tool Box	TY-5	137507535	1	1
13	Eye Bolt	M24	131601024	2	2
14	Seal Tape		137509001	1	1
15	Chisel Pin Remover	15.8x320	415141820	1	1
16	Hose Plug	G1.	182138070	2	-
17	Hose Plug	1-5/16-12UNF	182138U15	-	2
18	Hose Adapter Plug	G1.	182017016	2	-
19	Hose Adapter Plug	1-5/16-12UNF	182017U15	-	2
20	Hexagon Wrench	HEX 22	134001122	-	1
21	Retainer Pin Remover	M8x150	133109008	1	1
22	Gas Gauge Kit		A01016060	-	1

INCLUDED ITEMS

No.	DESCRIPTION	Code No.	SIDE MOUNT	BOX
1	Plug	136402015	1	1
2	Stopper Pin	415189251	1	1

(※) Type of plug (#16 - #19) differs in each market.
Please check and select proper type of plug.

TNB-230LU2

No.	DESCRIPTION		Code No.	KB	BOX	TOP MOUNT
1	Spanner	HEX 30	134005130	1	1	1
2	Spanner	HEX 36	134005136	-	1	-
3	Spanner	HEX 41	134005141	1	1	1
4	Spanner	HEX 46	134005146	-	1	1
5	Spanner	HEX 50	134005150	1	1	1
6	Spanner	HEX 55	134005155	-	1	-
7	Hexagon Wrench	HEX 12	134001012	1	-	-
8	Hexagon Wrench	HEX 22	134001022	1	-	1
9	Socket □1.1/2	HEX 75	136096228	-	-	1
10	Socket □1.1/2	HEX 80	136096229	1	1	1
11	Socket □1.1/2	HEX 85	136096230	1	-	-
12	Monkey Wrench	300mm	134006301	1	1	1
13	Hammer 2		133906002	1	1	1
14	Tool Box	TY-5	137507535	1	1	1
15	Eye Bolt	M24	131601024	2	2	2
16	Seal Tape		137509001	1	1	1
17	Chisel Pin Remover	15.8x400	415151820	1	1	1
18	Hose Plug	G1.	182138070	2	-	2
19	Hose Plug	1-5/16-12UNF	182138U15	-	2	-
20	Hose Adapter Plug	G1.	182017016	2	-	2
21	Hose Adapter Plug	1-5/16-12UNF	182017U15	-	2	-
22	Hexagon Wrench	HEX 22	134001122	-	1	-
23	Retainer Pin Remover	M8x150	133109008	1	1	1
24	Gas Gauge Kit		A01016060	-	1	-

INCLUDED ITEMS

No.	DESCRIPTION	Code No.	KB	BOX	TOP MOUNT
1	Plug	136402015	1	1	1
2	Stopper Pin	415192251	1	1	1

(※) Type of plug (#18 - #21) differs in each market.
Please check and select proper type of plug.

TNB-310LU1

No.	DESCRIPTION		Code No.	KB	BOX
1	Spanner	HEX 30	134005130	1	1
2	Spanner	HEX 36	134005136	1	1
3	Spanner	HEX 50	134005150	1	1
4	Spanner	HEX 55	134005155	-	1
5	Spanner	HEX 60	134005160	1	1
6	Socket □1.1/2	HEX 80	136096229	1	1
7	Socket □1.1/2	HEX 85	136096230	1	-
8	Hexagon Wrench	HEX 24	134001024	1	1
9	Monkey Wrench	300mm	134006301	1	1
10	Hammer 2		133906002	1	1
11	Tool Box	TY-5	137507535	1	1
12	Eye Bolt	M30	131601030	2	2
13	Seal Tape		137509001	1	1
14	Chisel Pin Remover	15.8x400	415151820	1	1
15	Hose Plug	G1-1/4	182138071	2	-
16	Hose Plug	1-5/8-12UNF	182138U17	-	2
17	Hose Adapter Plug	G1-1/4	182017018	2	-
18	Hose Adapter Plug	1-5/8-12UNF	182017U17	-	2
19	Hexagon Wrench	HEX 22	134001122	-	1
20	Retainer Pin Remover	M12x150	133109012	1	1
21	Gas Gauge Kit		A01016060	-	1

INCLUDED ITEMS

No.	DESCRIPTION	Code No.	KB	BOX
1	Plug	136402015	1	1
2	Stopper Pin	415159251	1	1

(※) Type of plug (#15 - #18) differs in each market.
Please check and select proper type of plug.

TNB-400LU2

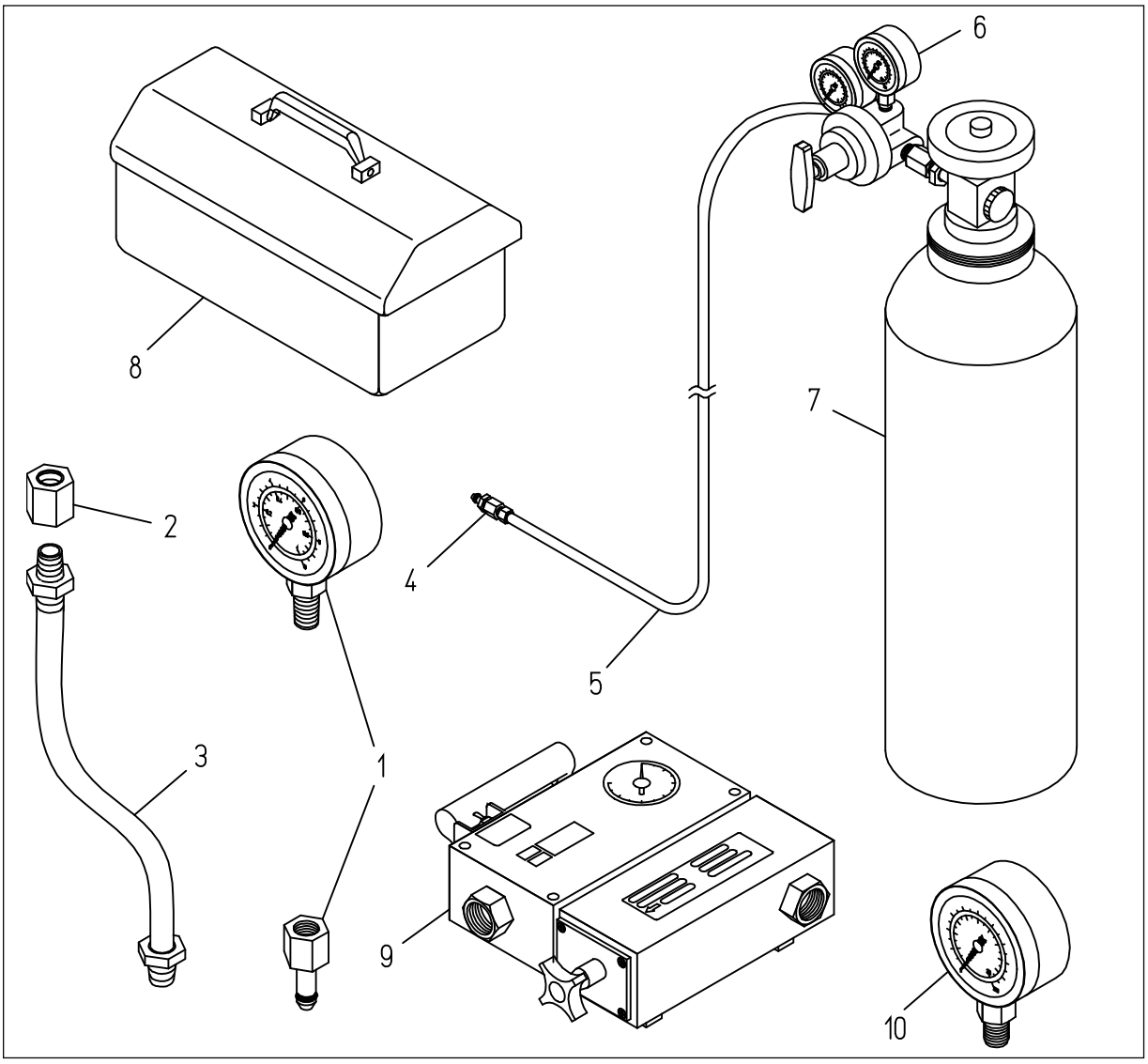
No.	DESCRIPTION		Code No.	**BOX**
1	Spanner	HEX 30	134005130	1
2	Spanner	HEX 36	134005136	1
3	Spanner	HEX 46	134005146	1
4	Spanner	HEX 50	134005150	1
5	Spanner	HEX 55	134005155	1
6	Spanner	HEX 60	134005160	1
7	Socket □1.1/2	HEX 90	136096231	1
8	Monkey Wrench	300mm	134006301	1
9	Hammer 2		133906002	1
10	Hexagon Wrench	HEX 24	134001024	1
11	Tool Box	TY-5	137507535	1
12	Eye Bolt	M30	131601030	2
13	Seal Tape		137509001	1
14	Chisel Pin Remover	15.8x400	415151820	1
15	Hose Plug	G1-1/4	182138071	-
16	Hose Plug	1-5/8-12UNF	182138U17	2
17	Hose Adapter Plug	G1-1/4	182017018	-
18	Hose Adapter Plug	1-5/8-12UNF	182017U17	2
19	Hexagon Wrench	HEX 22	134001122	1
20	Retainer Pin Remover	M12x150	133109012	1
21	Gas Gauge Kit		A01016060	1

INCLUDED ITEMS

No.	DESCRIPTION	Code No.	**BOX**
1	Plug	136402015	1
2	Stopper Pin	415161251	1

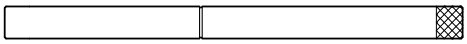
(※) Type of plug (#15 - #18) differs in each market.
Please check and select proper type of plug.

6-2. 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	-	-	
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	

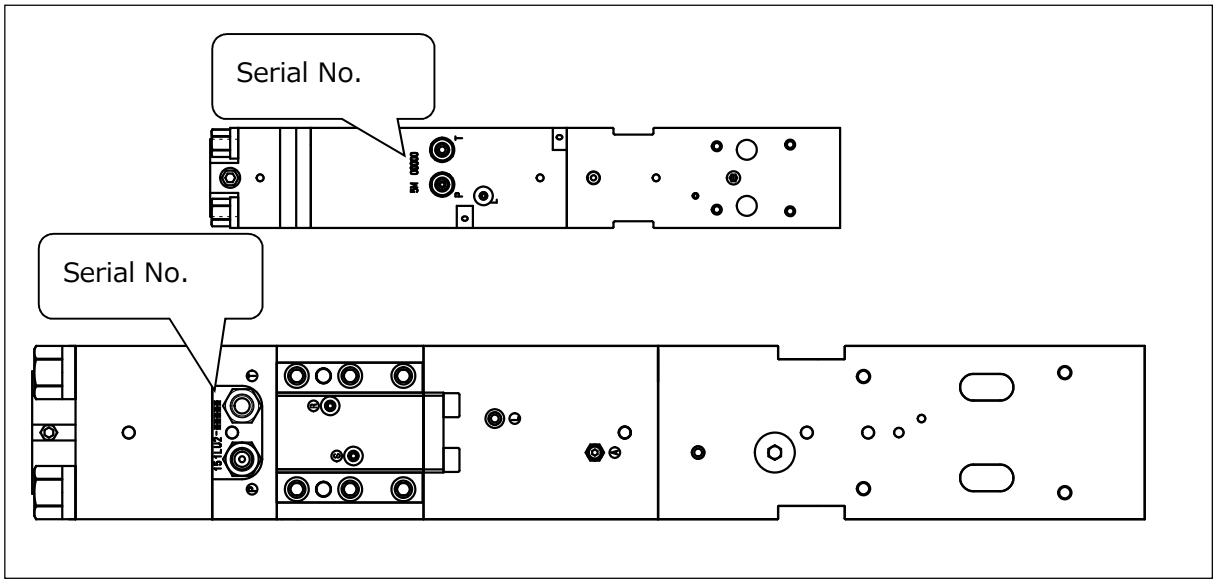


	Description	Part code	Qt	Model
12	Gap pin gauge (For BOX BRACKET)	415136K00	1	TNB-08M
		415137K00	1	TNB-1M/2M
		415635K00	1	TNB-3MB
		415116K00	1	TNB-4M/6M
		415117K00	1	TNB-5M
		415127K00	1	TNB-6E
		415634K00	1	TNB-16K/110
		415618K00	1	TNB-151LU2
		415628K00	1	TNB-27K/190LU2
		415615K00	1	TNB-230LU2
		415608K00	1	TNB-310LU1
		415631K00	1	TNB-60K/400LU2

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
Ser.No.	Address
Delivery Date	e-mail: Tel:

Issued Aug, 8, 2020 BIME No.18

HYDRAULIC BREAKER
INSTRUCTION MANUAL

TOKU Pneumatic Co.,Ltd

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