Yamamoto Ultra Large Rock Splitter

HRB-1000

User Manual

YAMAMOTO

Dear Valued Customer

Thank you very much for choosing Yamamoto Rock Machine's product.
We explain the proper way of using this product and the basic maintenances in this manual. Please read very carefully before operating it for the years of trouble free operations and to keep the machine at its optimum condition for your productivity and safety.
We are here to help you in every way we may be able to do so. But please have in your mind that YOU ARE THE KEY FOR YOUR OWN SAFETY AND OF YOUR COLLEAGUES by following the proper and safety instructions. Any operation and/or activities mentioned in this manual could possibly be affected by local, states and/or national law. Consult with your local authority.

THINK SAFETY FIRST!

This manual is intended to give you the basic information of the product. Though the main purpose is to give you the knowledge of how this machine should be operated for the sake of the safety and the best efficiency for your work.
Please read carefully and thoroughly to best understand how this product works and how it should be operated.
DO NOT USE OR WORK ON THIS PRODUCT UNTIL YOU HAVE READ AND UNDERSTOOD THIS MANUAL THOROUGHLY.

LIMITED WARRANTY CONDITIONS

The following points must be met before a claim application can be requested:

1. In order to be processed, a claim must be made within 14 days of the repair being completed at the latest.
2. Yamamoto Rock Machine's limited warranty period for new standard products is 12 months from delivery to end user, or a maximum of 1000 operating hours, whichever occurs first. If the start date is not reported to Yamamoto Rock Machine, the delivery date from Yamamoto Rock Machine's factory applies.
3. Yamamoto Rock Machine's responsibility for claims regarding failures in the design, materials or manufacture are limited to replacement of the faulty component. Where specialist knowledge is not required, Yamamoto Rock Machine has fulfilled its responsibility when the repaired or replaced component is supplied to the purchaser. Under no circumstances is Yamamoto Rock Machine liable for consequential damages whatsoever, including but not limited to loss of time, inconvenience, loss of use of equipment, costs of rentals or replacements, or other commercial loss.
4. If a damaged component can cause further damage to the machine, Yamamoto Rock Machine, or its authorised reseller, must be informed immediately. If this is not done, the limited warranty does not cover any subsequent damage.
5. Yamamoto Rock Machine is only liable for Yamamoto original components. The liability does not cover faults that have occurred due to accidental damage, modifications, misuse or incorrect usage.
6. Yamamoto Rock Machine's responsibility does not cover normal wear or degradation. Yamamoto Rock Machine is not liable for faults or breakdowns caused by incorrect or defective maintenance, incorrect repairs, problems caused by dirt, water or particles in the hydraulic system or insufficient power supply. The equipment must be used and maintained in accordance with the instructions in the Yamamoto manual.
7. Yamamoto Rock Machine's limited warranty for replacement parts applies for 3 months from installation or a maximum of 6 months after delivery from the factory, whichever comes first.
8. Yamamoto Rock Machine's limited warranty does not cover wear parts and consumables. Examples of components that are not normally covered by the limited warranty include, but are not limited to, hoses, counter and centre wedges, rubber bushings, grease, etc.

WARRANTY REGISTRATION

Model : _____

Serial number : _____

Delivery Date : _____

Customer details

Name : _____

Address : _____

City : _____

Country : _____

Installation date : _____

Excavator model : _____

Excavator hours : _____

Maximum pressure : _____

Pre-operation details	Yes	No
Was the end user given instructions in the safety and operation of the ripper?		
Was the end user given instructions in the maintenance and service of the ripper?		
Did the end user receive an Instruction Manual and Parts List?		

End user name : Dealer representative:

Signature end user Signature dealer

This form must be returned to Yamamoto Rock Splitter International within 30 day of the installation date. Original is kept by end user, one copy to be sent to Yamamoto Rock Splitter International and a second copy is to be kept by the dealer.

Yamamoto Ultra Large Rock Splitter

The most efficient and safest way to excavate hard rock!

Why use Yamamoto Ultra Large Rock Splitter?

Explosives and large rock breakers are the common methods for excavation of hard rock. However, restrictions on blasting are increasingly strict and the use of rock breakers is not always feasible due to vibrations, noise restriction or because the rock is too hard. Yamamoto Ultra Large Rock Splitter is the best alternative to efficiently excavate large volumes of hard rock without blasting.

The splitter can be mounted from a crane or a normal excavator for open pits and shafts, or mounted on a customised carrier for horizontal tunnelling.

For large volume rock excavation, there is simply no mechanical method more efficient, safe and quiet than Yamamoto Ultra Large Rock Splitter.

Yamamoto Ultra Large Rock Splitter has been used worldwide in some of the most challenging and important construction and infrastructure projects such as Guangzhou-Hong Kong Express Rail Link in Hong Kong, Ipoh-Padang Besar Electrified Railway Project in Malaysia, West Condominium, New York, USA, Ottawa Main Rehabilitation in Canada, Bangalore Metro Railway Project in India, Akaiwa Tunnel in Japan, Project Tornet in Sweden and many more.

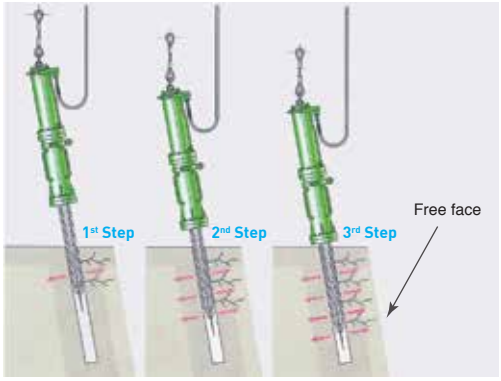
Features of Yamamoto Ultra Large Rock Splitter

Yamamoto Ultra Large Rock Splitter has been developed and refined over the past 30 years to provide superior quality and maximum output. Key features include:

- **SAFETY:** Rock splitting is done without any explosives, pollution or noise, reducing the risk of fly rock.
- **PRODUCTIVITY:** Offers highest possible productivity due to large wedge diameter and very high splitting force.
- **DURABILITY:** Designed with minimal parts and provides precise finishing, ensuring product reliability and durability.
- **ACCURACY:** Direction of splitting and the size of the split can be determined in advanced. Offers more accuracy than explosives.
- **EFFICIENCY:** Due to the absence of fly rock or any other dangers, the splitting process can be done continuously without any evacuations or unnecessary pause.
- **SIMPLE:** Very simple and easy to use; minimises the need for highly experienced operators.
- **ADAPTABILITY:** Can be attached to almost any kind of hydraulic excavator from 12 ton weight class and up.

How does Yamamoto Rock Splitter work?

The working principle of Yamamoto rock splitter is based on two counter wedges inserted in a pre-drilled hole. A hydraulic cylinder pushes out a centre wedge between the counter wedges to spread them apart and the rock is forced to crack.



To maximise the splitter's effectiveness, the 3-step approach below is highly recommended:

1st Step: Insert half of the total length of wedge and operate the Yamamoto splitter to split.

2nd Step: Then insert about ¾ of the total length of the wedge to split again.

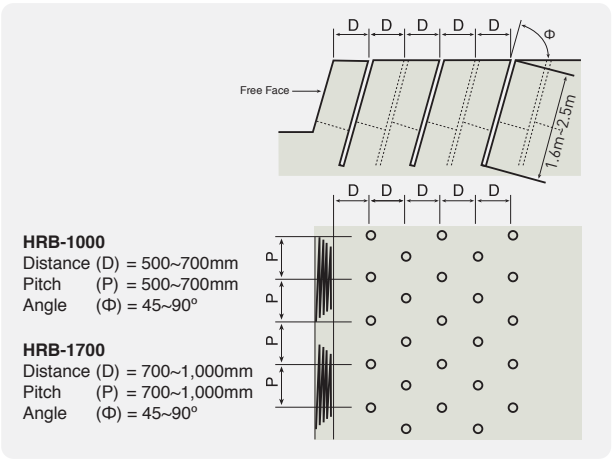
3rd Step: Finally, insert the total length of the wedge and split to complete.

HRR-1000 HRR-1700 YTR-1120

Work process - Vertical applications

1. Drilling

Drill the holes of Ø102 mm X 1.6 m depth for Yamamoto HRB-1000 splitter, or Ø127 mm X 2.5 m depth for HRB-1700 splitter using a large size hydraulic crawler drill or jumbo drill rig. We recommend drilling in a staggered pattern with 500 - 700 mm of spacing between holes for the HRB-1000 and 700 - 1000 mm for the HRB-1700, as illustrated in the diagram.



HRB-1000
Distance (D) = 500~700mm
Pitch (P) = 500~700mm
Angle (Φ) = 45~90°

HRB-1700
Distance (D) = 700~1,000mm
Pitch (P) = 700~1,000mm
Angle (Φ) = 45~90°

2. Splitting

Insert the wedge into the hole and split the rock. Position the wedge so that it is splitting towards the free face. To maximise the splitter's productivity, it is very important that the splitter is splitting towards a free face.

3. Secondary breaking

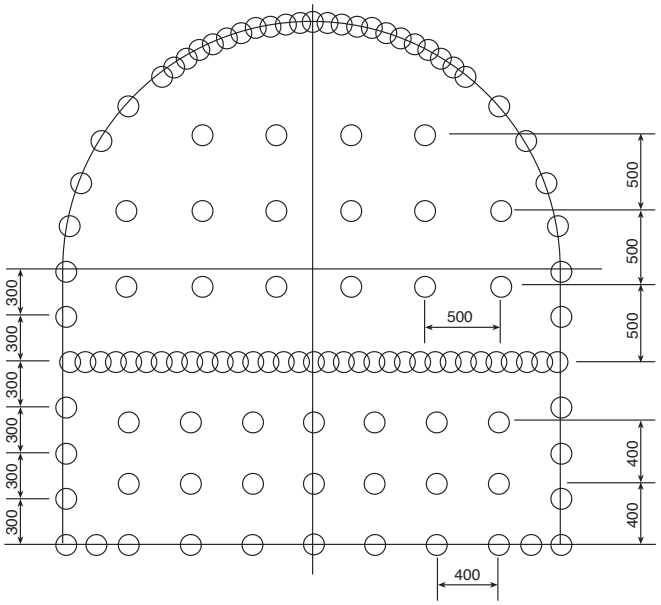
Break the already split rock into smaller pieces and remove it with a conventional excavator with a rock breaker. Removing the broken rock will keep the free face close to where the splitter is working. Secondary breaking and splitting can be conducted simultaneously.

4. Mucking

Remove the muck using a hydraulic excavator, wheel loader or similar machine.

1. Drilling

Create a free face by drilling slots in the centre, bottom or periphery. Then drill split holes for the Yamamoto Splitter between the slots. Proper slot drilling involves drilling overlapping holes as bridges between the to holes to allow the rock to maintain its structural integrity. A special attachment on the jumbo boom may be required for slot drilling. The photo and drawing below exemplify some recommended drilling patterns.



2. Splitting

Use a splitter mounted on a customised carrier equipped with telescopic boom and rotator. Start splitting the holes closest to the free face and aim at working from the bottom and up to allow support from gravity. Split in three steps by first inserting half of the total length of the wedge and split, then ¾ of the total length and split and finally the full length of the splitter.

3. Secondary breaking

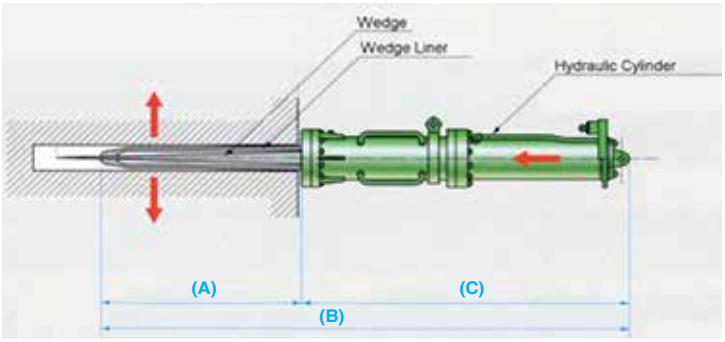
Break out the cracked rock into smaller pieces using a hydraulic breaker mounted on a conventional excavator. Work along the cracks caused by the Yamamoto Splitter.

4. Mucking

Use a mucking method that suits each project, typically done with a standard excavator.

Technical specifications

Model	HRB-1000	HRB-1700
Weight	650 kg	1,500 kg
Drill hole diameter	Ø102 mm	Ø127 mm
Drill hole depth	1,600 mm	2,500 mm
Splitting force	22 MN (2,250 ton)	34 MN (3,500 ton)
Splitting distance	25 mm	30 mm
Wedge diameter	Ø95 mm to 110 mm	Ø120 mm to 160 mm
Wedge length (A)	1,150 mm	1,850 mm
Splitter length (B)	3,000 mm	4,300 mm
Cylinder length (C)	1,850 mm	2,450 mm
Hydraulic pressure (min/max)	320/500 bar	320/500 bar
Split hole spacing	500-700mm	700-1,000mm



YTB-1120:
Total solution for horizontal application

YTB-1120 seamlessly integrates HRB-1000 with customised Hitachi EX120 that includes shorter arm, telescopic boom, side-angling, rotator and extra hydraulic function. The telescopic boom makes it easier to insert wedge set into splitting hole horizontally, while the rotator enables control of splitting direction.

1, Safety information

To help you understand better the type of risk you are facing, the safety alert symbols and messages are distinguished as shown below. (ANSI Z535)

危　　険

DANGER

THE WORD DANGER INDICATES AN INMINENT HAZARD WHICH WILL RESULT IN HIGHLLY SERIOUS INJURY OR DEATH

警　　告

WARNING

THE WORD WARNING IS USED TO ALERT YOU OF A PROCEDURE THAT IF NOT PERFORMED PROPERLY MAY CAUSE PERSONNEL INJURY OR DEATH

注　　意

CAUTION

THE WORD CAUTION IS USED TO ALERT YOU OF A PROCEDURE THAT IF NOT PERFORMED PROPERLY MAY CAUSE PERSONNEL INJURY AND/OR MACHINE DAMAGE

The alert symbols and messages contain safety tips to help you avoid the risks.

Unfortunately, we are not able to list all of the risks which may rise while operating, inspecting, repairing, transporting, and/or any other situation involved with this product. Do not use this product for other than specified.

2, OUTLINE

2-1 Brief Introduction

This machine was designed for mechanical excavation of the hard rocks. The principle is same as the traditional rock splitting by wedge. But in this case, the wedge is pushed by hydraulic cylinder into the drilled hole instead of using a wedge and a hammer.
For a vertical application, HRB-1000/1700 is attached to a hydraulic excavator with a swivel and/or steel wires.

The HRB-1000 is a hydraulic splitter composed of a hydraulic cylinder and the wedges. The wedges are set up in 3 pieces and the center wedges is driven forward by a powerful hydraulic cylinder to enlarge the total diameter of the wedges to split the rock.
The telescopic arm swings 30 degrees to both right and left. Therefore the splitter can be positioned perpendicular to the face even when base machine is approaching to the drilled hole from side. The stroke of the slide arm is 1,150mm.
By using the rotation unit, operator can control the direction of splitting by rotating the HRB-1000.

Note) Please read carefully Section 5 before using this product.

> ⚠ **WARNING**
>
> DO NOT USE THIS PRODUCT FOR OTHER APPLICATION.

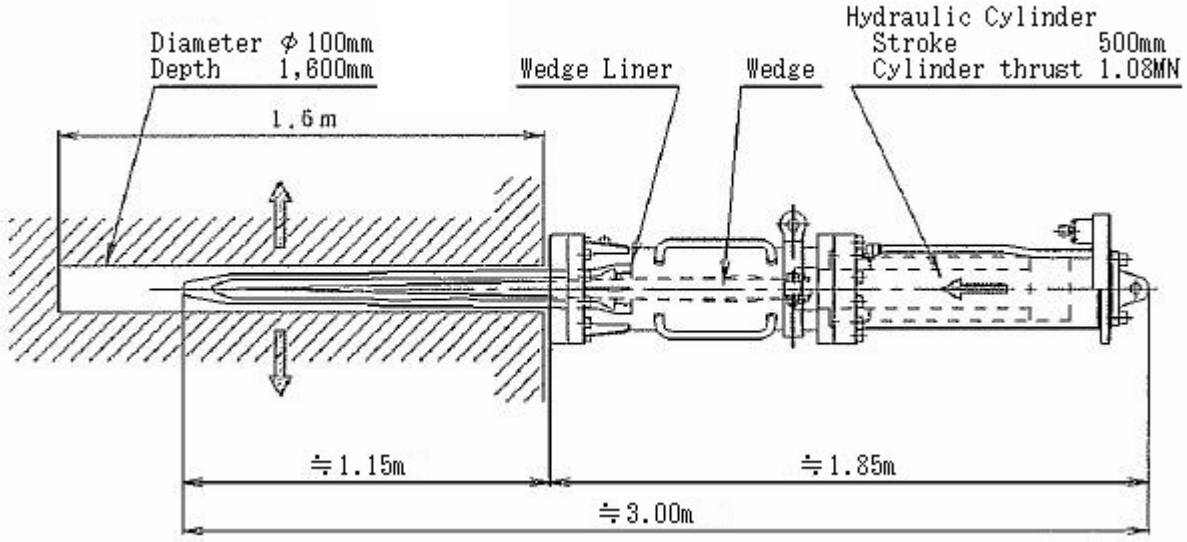
2-2 APPLICATION

First, plan a drilling pattern on the face. Then drill the holes with diameter of 102mm and minimum depth of 1,500mm, recommended depth of 1,600mm according to the plan. Once your drilling cycle is finished and ready to split, insert the wedges of the HRB-1000 into the drilled hole. DO NOT drive or swing the base machine meanwhile.

2-3 DIMENSIONS AND COMPONENTS OF HRB-1000

Roughly, HRB-1000 is composed of a hydraulic cylinder, a centre wedge and the outer feathers. By activating the hydraulic cylinder with maximum hydraulic pressure of 34.3 MPa, the center wedge is pushed forward. As the wedge moves forward it will push the wedge liners aside to split the rock.

The maximum crack gap possible is 35mm but the wedge has a unique shape that the diameter varies depending on the part of the wedges to give maximum performance and easiness when inserting. It is designed to complete the splitting work in 3 steps since it is designed to work on long hole unlike other splitters. The diameter of each of 3 splitting position is 95mm, 105mm and 110mm.



2-4 SPLITTING FORCE OF HRB-1000

Splitting force of HRB-1000 is calculated as follows:

-Cylinder force (F)

$$F = \frac{\pi \times D^2 \times P}{4} = 1.08[MN]$$

D:Cylinder bore:0.2〔m〕

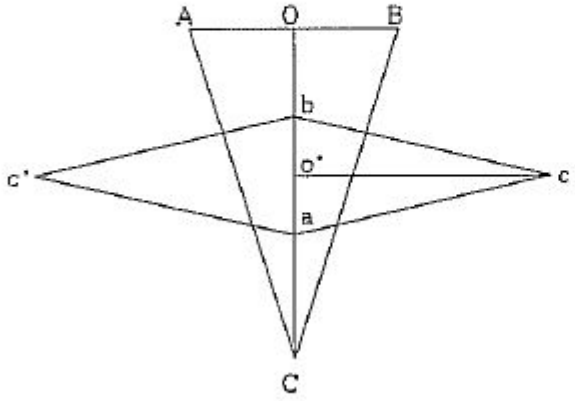
P: Hydraulic cylinder pressure:34.3〔MPa〕

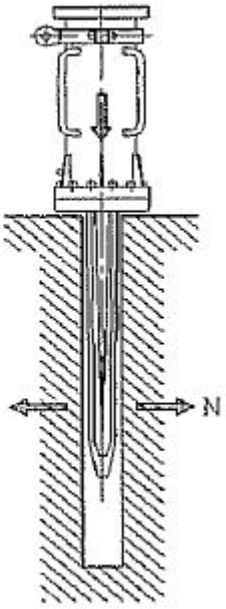
-Splitting Force (N)

$$F = \frac{\pi \times D^2 \times P}{4} = 1.08[MN]$$

OC/AB=20.0

o' c = 1.08 x 20.0 = 21.6 (MN)





2-5 ROCK SPLITTING WITH HRB-1000

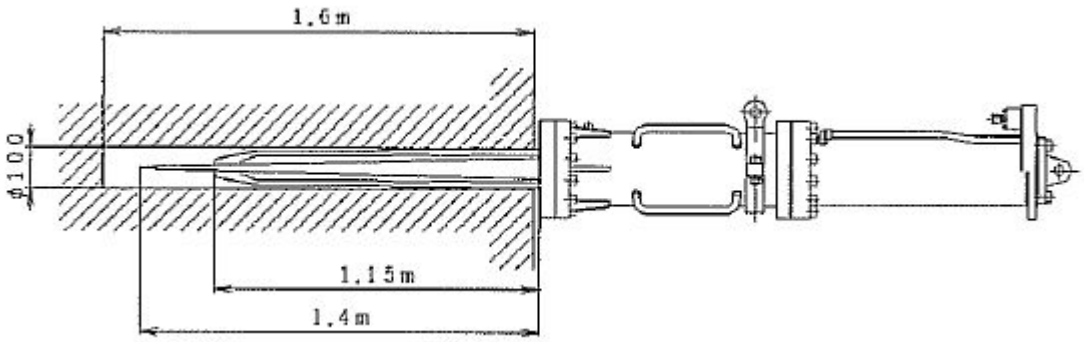
- Making Free Face

A free face is absolutely necessary for effective rock splitting. In case of splitting a bed rock, you must plan to make a free face.

- Drilling a Hole

The basic dimension of HRB-1000 is diameter of 100mm and 1,150mm of length. But when the center wedge is pushed out all the way, it reaches up to 1,450mm. Therefore, you must drill a splitting hole with length of 1,600mm. The gap of 150mm is to avoid breaking the front-end of the center wedge from damage as some fragments of the rocks may fall into the hole as you carry out the splitting process.

The hole must be straight and have at least 100mm in diameter in order to insert the wedges smoothly and to avoid unnecessary wear of the wedges. Check the condition of the drill bit for effective drilling and correct diameter.



-Drilling Pattern of the Holes

The drilling pattern varies upon hardness and condition of the rock. The length between the drilled holes has great influence on production rate. Longer the distance between the holes, more production rate will be achieved. Shorter the distance, less production rate is achieved. But the hardness of the rock is the critical factor for the distance between the holes. Therefore, as higher is the hardness of the rock, the distance between the holes has to be shortened.

You must consider these two factors to design a drilling pattern to achieve your production rate.

-Splitting

① Always make sure that the hole has at least 1.6 m in depth.

② Turn the splitter to the direction desired before inserting into a hole.

③ Try to align the center line of the wedges with the center of the hole diameter when inserting. First, insert 1/3 of the total length of the wedges.

④ As the center wedges moves forward, correct the position of the splitter to be aligned with the hole.

⑤ Once crack is produced, retrieve the center wedge.

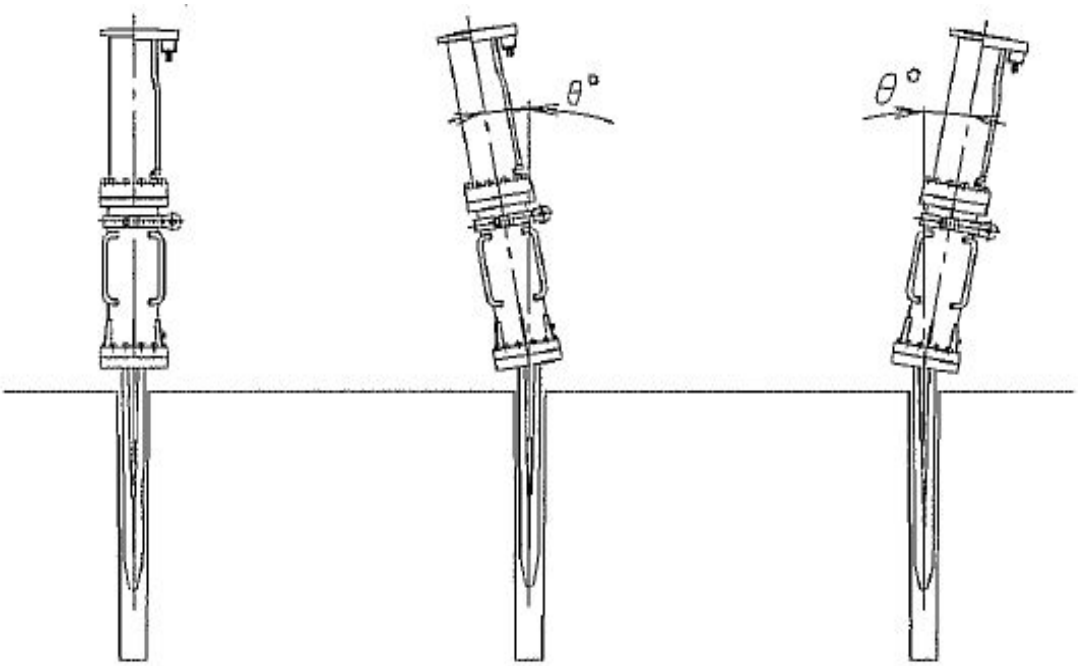
⑥ Now insert about half the length of the wedges repeating the ③~⑤.

⑦ HRB-1000 is designed to complete the splitting process in 3 splitting work as mentioned above. As you see the wedge liners, there are 3 humps where diameter is slightly larger, and these are the point to be used for splitting.

CORRECT: Hole and the splitter is aligned.

INCORRECT: not aligned.

INCORRECT: not aligned.



3, Operation Process

3-1 Drilling

Drill the holes of 102mm in diameter × 1,600mm or more in depth according to your drilling plan. When drilling a hole for splitting, a hole must be horizontal and perpendicular to the face.

Free face is absolutely necessary. Most common way of making a free face in tunneling is slit drilling. Drill the holes right next to each hole until horizontal slit is made across the face of tunnel.

We offer an accessory to attach on the jumbo to make slit making easier. Please contact our distributor for information.

WARNING

- The diameter of a drilled hole must be 100mm or 102mm. A smaller diameter will cause unnecessary excessive wear of the wedge liners, and difficulty when inserting. A larger diameter will cause loss of effectiveness of splitting since the crack will be smaller.
- The depth of a drilled hole must be 1,600mm or more. The total length of the wedges becomes 1,400mm when the center wedge is pushed out all the way. Therefore, it will get damaged if any fragments of rocks are in the bottom of the hole.
- Drill a round and straight hole. Otherwise it will cause difficulty when inserting or damage to the wedges.
- Trying to split a bed rock with no free face definitely will not only cause excessive load on the splitter but serious damage to the splitter.
- Always wear protective gear as hard hat, goggle, steel toe boots, ear plugs, protective gloves, reflective and impact proof wear etc in the work field.

3-2 SPLITTING

Preparation

Apply Bigger Grease thoroughly between the center wedge and the wedge liners. You must repeat this process every 3 ~ 4 holes usually. Shorten the frequency of grease applying if rock is harder. If you notice lack of grease by its sound, stop the process immediately and apply extra grease.

 DANGER

- Never touch the wedges right after splitting as it gets extremely hot after splitting.
- Never put the hand between the wedges at all time, specially, when applying grease.

 WARNING

- For lubrication, use only Bigger Grease. There is no any grease qualified for HRB series rock splitter in the market. Using any grease other than Bigger Grease will not only void the warranty but will damage the wedges.
- When there is a lack of lubrication between the wedges, you will hear a scraping-a-metal like noise from the wedges. If so, stop splitting immediately.
- Always use protective gears such as hard hat, steel toe boots, goggles, ear plugs, protective gloves, anti-impact vest etc when working.

 CAUTION

- Remove all the foreign objects (small rocks, dirt etc) from the surface of the wedges before applying grease.

Splitting

1. Before inserting the wedges, make sure the hole has 1,600mm in depth.
2. The wedges must be perpendicular to the face. Use any movements to adjust the position.
3. Make sure of the positioning of the base machine for safety operation.
4. Then insert the wedges up to selected splitting position by lowering the arm/boom. Make sure that the wedges are parallel with the hole.
5. Once splitter being at desired position, start splitting by pushing out the center wedge.
6. The rock should start making a cracking noise when pressure gauges is showing the pressure between 19.6 ~ 34.3MPa. If the pressure gauge is showing 34.3MPa constantly, then the cylinder has reached its stroke-end so start retrieving the center wedge. The pressure shown on the gauge shall drop.
7. When center wedge reaches its starting position (rear-end of the cylinder), the pressure gauge shall show, once again, 34.4MPa constantly. Leave the lever for center wedge at its neutral position. Then use telescopic to insert the splitter even deeper and repeat the same process for splitting.
8. Should this process be repeated three times per drilled hole. In the final step, the splitter should be inserted barely all the way in to the hole.
9. Once all the steps are taken and splitting is finished, retrieve the center wedge and retrieve the splitter by telescopic function. Before retrieve the splitter completely from the hole, raise the splitter approximately 10 degrees with boom so that it won't drop due to free movement.
10. Take above steps for all the holes drilled for splitting.

Storing

1. When splitting cycle is completed, repeat the steps of 5-2.
2. Move the base machine to its stand-by or retrieving position.
3. Lower the boom and arm. Place a support wood block below the front end of an arm so the weight of boom/arm is not supported by the splitter.

Secondary Crushing

Use a hydraulic breaker to carry out secondary crushing.

 DANGER

- Never get close to the face while splitting and/or after splitting. A corruption of the drilling face may cause death or severe injure.
- Absolutely no personnel shall stand within the operating range of the machine. The accident with heavy equipment may cause death or severe injury.

 WARNING

- Always wear safety gear at the work site. A hard hat, steel toe boots, goggle, ear plugs and gloves are most basic and the must safety gears.
- If the center wedge gets stuck while splitting due to overload. Do not try to remove the wedges using neither undercarriage nor telescopic function. In case the wedges get stuck in a hole, use a hydraulic breaker to help release the wedges from the hole. Using undercarriage and/or telescopic function to remove the wedges will definitely damage the splitter and its components.
- Some drilled holes may become shorter in depth due to the effect of splitting work in surrounding holes. Take extreme caution before inserting the wedges on each hole.
- Never use rotator once the wedges are inserted in a drilled hole. If you wish to change the direction of the wedges, retrieve the wedges from the hole first, then rotate and insert again.
- Do not start splitting until approximately, half length of the wedges are inserted in the drilled hole.

 CAUTION

- Do not insert the wedges into a hole which has been already split. It will damage the wedges with fragments of the rocks.
- If you notice excess in load for splitting, the distance between the holes must be shortened. Also, try other approach like splitting in 4 steps instead of 3.
- Do not use the wedges to push or move the muck. The wedges are extremely delicate.
- The rotator can rotate infinitely. Therefore you must be aware of the hydraulic hoses.

4, Maintenance

4-1 Daily Check UP

Check the following every day before starting operation.

ENGINE

1. Quantity and condition of lubricants and coolant.
2. Any leakage of hydraulic oil, coolant, water. And any damage on piping and connection.
3. Any damage or abnormality on the radiator, oil cooler etc.
4. The sound of ignition, the color of exhaust gas, abnormal engine noise.
5. Damage and/or loosen bolt/nut.

Upper Body

1. Fuel tank, fuel leak, fuel filter.
2. Hydraulic oil tank, oil leak, oil filter.
3. Correct function of the levers.
4. Function of hydraulic components, its piping and hoses. And its damages.
5. Any damage, deformation and abnormal noises.
6. Any missing and loosen bolt/nut.
7. Washer fluid.

Undercarriage

1. Wear an damage on crawler shoe.
2. Oil leak on the rollers and idlers.
3. Any missing and loosen bolt/nut.

Splitter, Rotator, Telescopic Arm and Boom

1. Hydraulic cylinders, piping, hoses for any leak and/or damage.
2. Lubrication.
3. Stopper pins, snap rings, bolt/nut.
4. Rotator unit.
5. Lubrication on the wedges.
6. Any damage and/or bent of the wedges.

Others

1. Warning signals (horn and lights), switches, illumination.
2. Any damage and/or deformation of the cabin.
3. Any abnormality in its appearance.

 DANGER

1. Do not park this machine on unstable ground.
2. Use any wedge shaped object to lock the splitter to keep away from rolling when carrying out maintenance work.
3. Always make sure of that all the bolts and nuts are securely fastened. Heave equipment may cause death or severe injury in case of fall off.
4. The engine must be turned off while carrying out any type of maintenance work.

 WARNING

1. Put “IN SERVICE” sign on the door of the operator cabin and/or on the levers to avoid turning the machine on accidentally. A sudden movement of the machine may cause death or severe injury of personnel.
2. Do not place any flammable substance near the machine. Fire or explosion may cause death or severe injury.
3. Do not let occur any sparks or fire near a battery. The gas produced from a battery may explode.
4. Disconnect “−” negative terminal of the battery before carrying out any maintenance work on electronic components.
5. Do not try to modify. Any incident, serious failure, overhaul and or modification become necessary, please contact your local dealer or service agent. Any unauthorized modification will void the warranty.
6. Do not use any hydraulic hose if you find any damage, even a small damage. All of the hydraulic hoses suffer very high pressure.
7. Air must be bled from hydraulic circuit after disconnecting/connecting hydraulic hoses.

 CAUTION

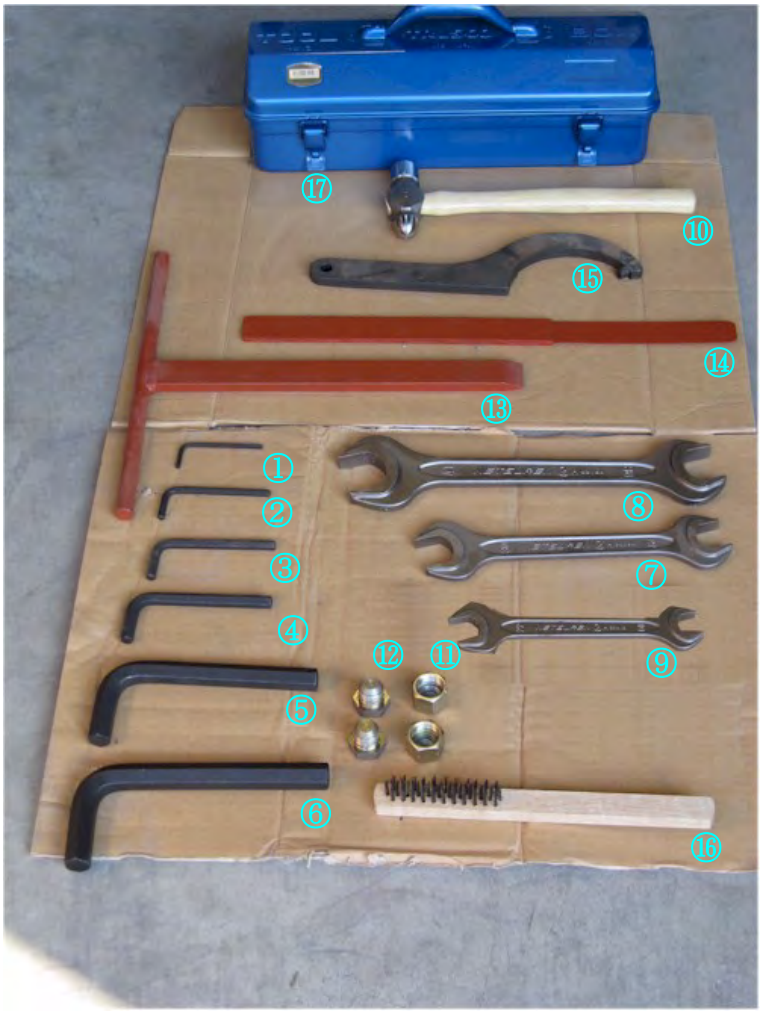
1. Always make sure of that all the connections and hoses are not damaged or loose. Hydraulic oil can cause fire and is harmful for environment.
2. Take extreme caution not to let any foreign object gets into hydraulic circuit. Clean thoroughly before installing any new hydraulic components.
3. Always be aware of hydraulic hose and connections before, during and after an operation.

5, Maintenance

5-1 How to Replace the Center Wedge and the Wedge Liners

Removing the Feathers (wedge and wedge liners)

＜1＞



TOOLS

1. 4H Hex Key Wrench
2. 6H Hex Key Wrench
3. 8H Hex Key Wrench
4. 10H Hex Key Wrench
5. 17H Hex Key Wrench
6. 19H Hex Key Wrench
7. 27×30 Open-End Wrench
8. 32×36 Open-End Wrench
9. 17×19 Open-End Wrench
10. Hammer
11. Hydraulic Hose Caps F
12. Hydraulic Hose Caps M
13. Grease Application Tool
14. Grease Applicator
15. Hook Wrench
16. Metal Brush
17. Tool Box

＜1－1＞  	TOOLS 1．Steel pipe (about 1m) 2．Steel pipe. 3．Flat-end steel bar. 4．Sling belt. 5．Small pieces of timber. 6．Ratchet lever chain hoist. 7．Rope. 8．Grinding machine.
＜2＞ 	Hang it with a shackle to keep it in its position.
＜3＞ 	Use a grinding machine to flatten the side of the wedge ㊷ and the feathers ㊸ , due to that they have to be pulled out from the feather holder and the rubber washer plate.

＜4＞ 	Remove all the hex socket cap screws ㉜ (M24×80) by using the hex key wrench (19H).
＜5＞ 	Remove the front cover ㉖
＜5－2＞ 	Follow the same step for the other front cover.

＜6＞ 	Remove the hex socket cap screw ㉘(M20) by using the hex key wrench(17H) and a steel pipe.
＜7＞ 	Remove all the hex socket cap screws ⑪(M24) by using the hex key wrench (19H) and a steel pipe.
＜7－2＞ 	

＜7－3＞ 	
＜8＞ 	Hang it as shown on the picture and slightly pull it forward.
＜8－2＞ 	When the front body ⑳ and the cylinder ⑨ separate a bit, insert a flat head steel bar between them to help them separate. ※ In case of the difficulty, insert 2 or 3 hex socket cap

	screws ⑪ (M24×115) about a half way. Then give some impact with a hammer. Have an extreme caution not to damage the screws.
＜8－3＞ 	Pull the front body ⑳ out.
＜9＞ 	When the front body is removed from the cylinder, place it on the ground and place the sling belt on the centre of the feathers ㉞. Then pull it forward.

＜９－２＞ 	
＜１０＞ 	Pull out the feathers ㉞ from the feather holder ㉗.
＜１１＞ 	Remove the hex socket screw plug ㊲ with a hex key wrench (10H).

＜１２＞ 	Remove the rubber plug ㊸ and then turn the wedge holder until the steel balls ㊱ start to coming out from the wedge holder (there are 14 balls inside). ※The steel balls will not come out if the grease is stiff. You may use a rock drill oil or similar to soften the grease.
＜１４＞ 	After removing all of the steel balls ㊱, the wedge ㉝ can be removed from the wedge holder.

7-2 Setting Up New Set of Wedge and Wedge Liners

Replacing the wedge and the feathers step by step.

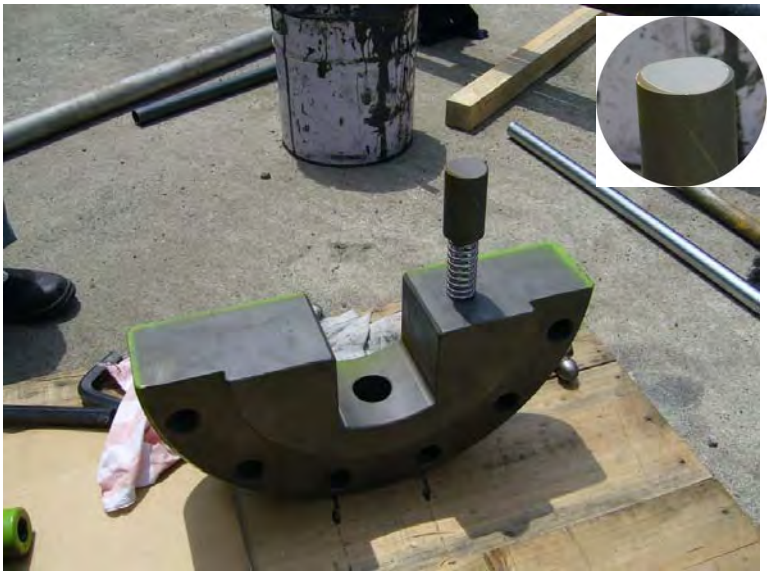
How to install the wedge and the feathers.

＜1＞ 	Apply bigger grease thoroughly where the wedge goes into. Insert the wedge ㉝ into the wedge holder ㉟ . Drop all of the 14 steel balls ㊱ in as shown in the picture. Then insert the rubber plug ㊸ and close it with hex socket screw plug ㊲.
＜2＞ 	Apply bigger grease on the front body ⑳ as shown in the picture, where the feather liner holder fits.

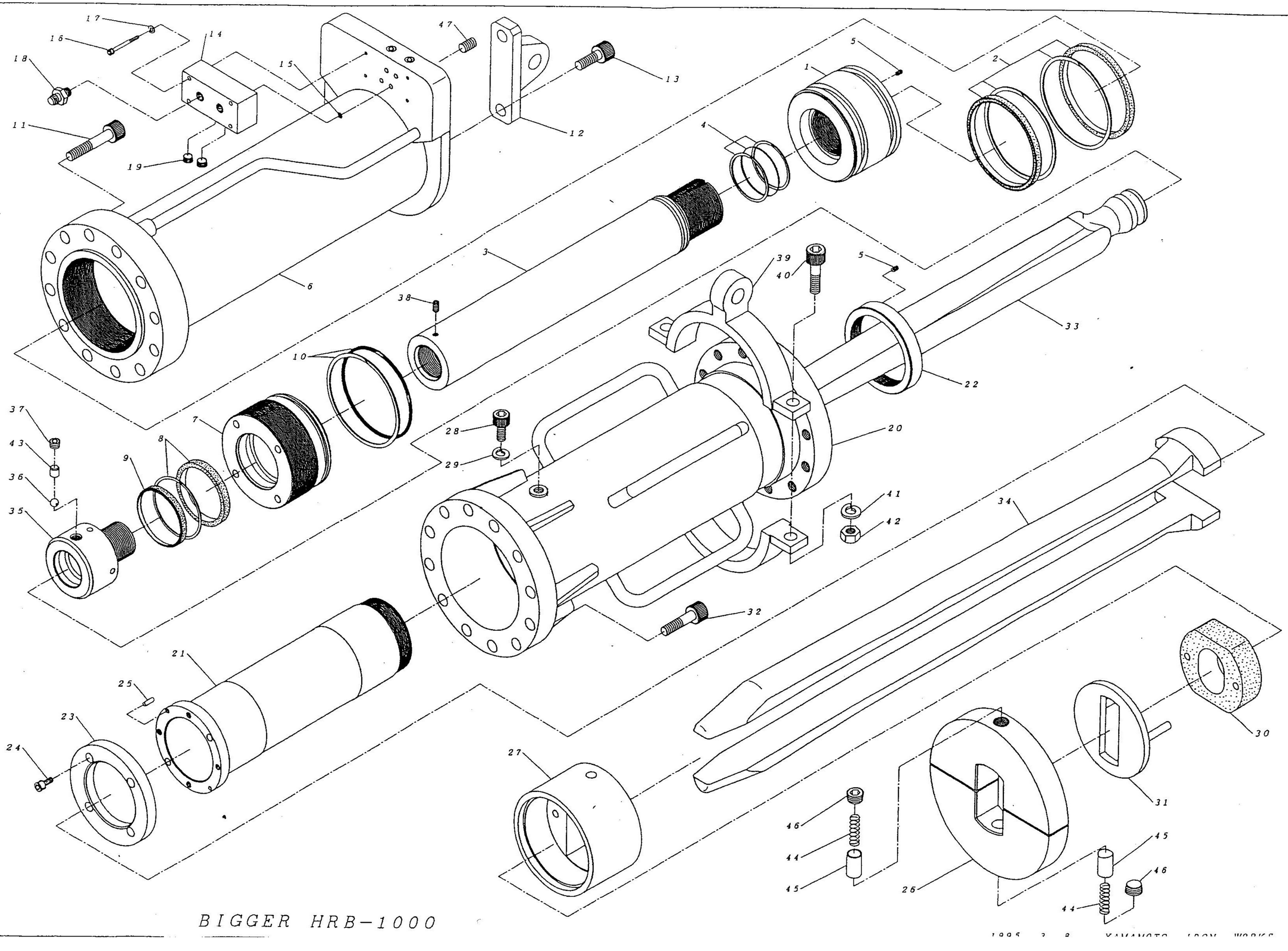
＜２－２＞ 	
＜３＞ 	Set up the feather holder with rubber plug and the rubber plug holder. Insert both of the feathers into the feather holder.
＜４＞ 	Insert the feather holder and the feathers into the front body ⑳.

＜4－2＞ 	
＜5＞ 	Put a piece of lumber between the feathers about 30cm from the front end of the front body to facilitate the penetration of the wedge.
＜6＞ 	Set the M20 Hex socket cap screw ㉘ and tighten it securely.

＜7＞ 	Hang the front body then slowly move it toward the cylinder putting the wedge through it carefully.
＜7－2＞ 	
＜7－3＞ 	Tightening.

＜8＞ 	Put the front-end covers and the body handles back on. Insert the spring and the spring cap into the hole of the front-end cap.
＜8－2＞ 	Install the front covers.
＜9＞ 	Tightening.

＜１０＞ 	Apply bigger grease thoroughly between the wedge and the feathers.
＜１１＞ 	Finished. Recommended replacing parts. ㊺Steel ball x14 ㊻Rubber Plug x1 ㊼Hex socket screw plug x1 ㉝Rubber Washer x1 ※If broken.

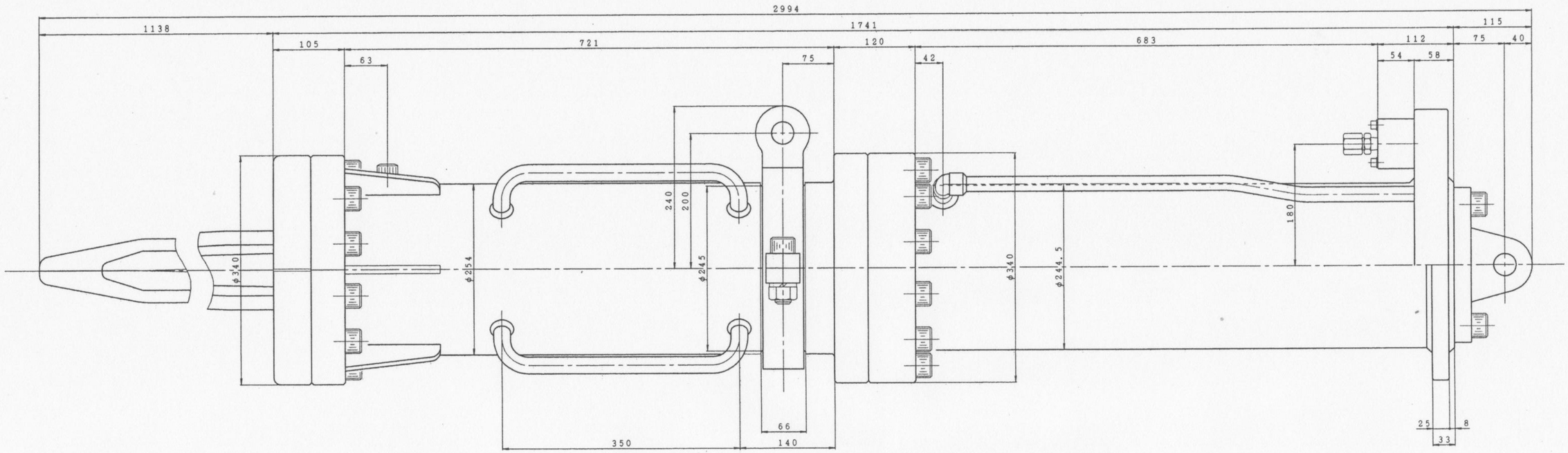


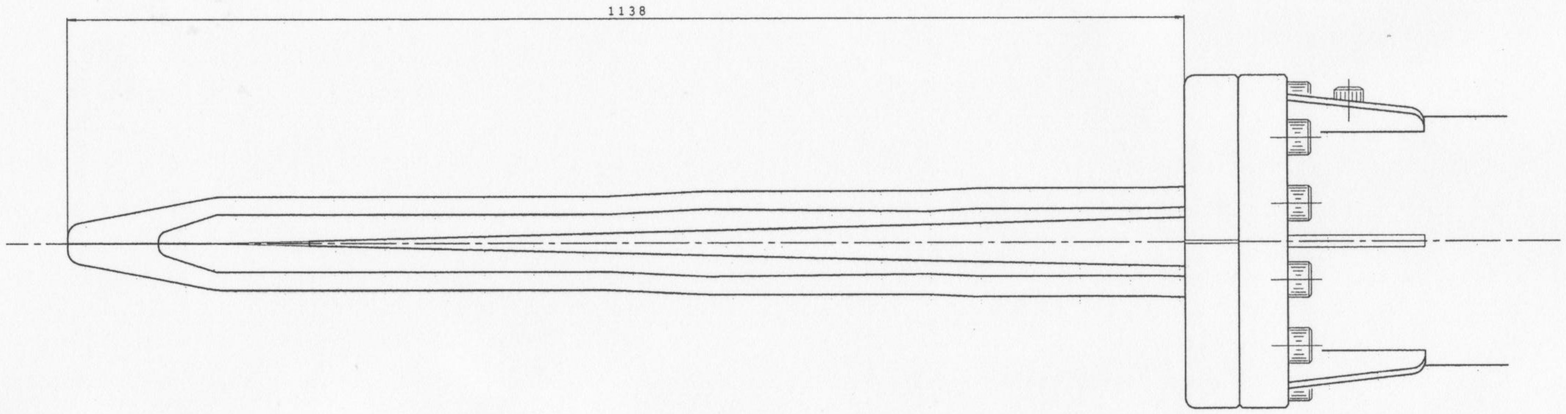
BIGGER HRB-1000

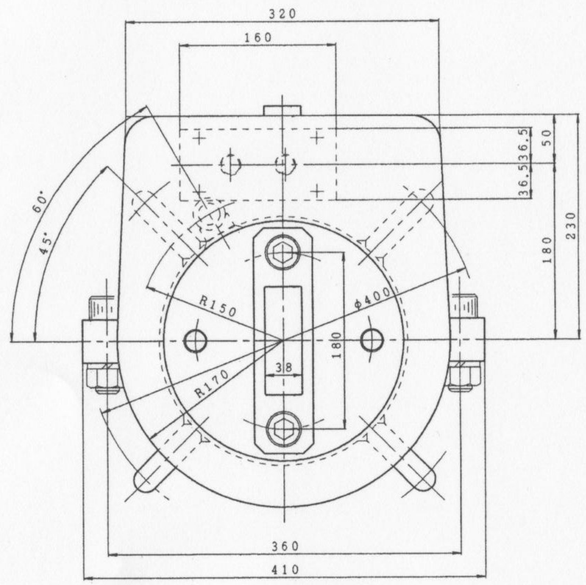
HRB-1000 Parts List

#	Parts Name	Parts Code	QTY.	Note
1	Piston	HRB-1	1	
2	Piston Packing Seal (BUR)	HRB-2	2	※
3	Piston Rod	HRB-3	1	
4	O-Ring (BUR)	HRB-4	1	※
5	M8 Set Screw	M8-12	3	
6	Cylinder	HRB-5	1	
7	Piston Rod Liner	HRB-6	1	
8	Rod Packing Sel (BUR)	HRB-7	1	※
9	Dust Seal	HRB-8	1	
10	O-Ring (BUR)	HRB-9	1	※
11	M24 Hex Socket Cap Screw	M24-110	12	
12	Hook (A)	HRB-10	1	
13	M24 Hex Socket Cap Screw	M24-55	2	
14	Valve Plate	HRB-11	1	
15	O-Ring	HRB-27	2	
16	M8 Hex Socket Cap Screw	M8-70	4	
17	M8 Lock Washer	M8SW	4	
18	MM Adapter	HRB-28	2	
19	Screw Plug	HRB-29	2	
20	Body	HRB-14	1	
21	Liner	HRB-15	1	
22	Liner Nut	HRB-16	1	
23	Outer Feather Support	HRB-17	1	
24	M12 Hex Socket Cap Screw	M12-25	4	
25	Knock Pin	8-25	2	
26	Cover	HRB-18	2	
27	Outer Feather Holder	HRB-19	1	
28	M20 Hex Socket Cap Screw	M20-40	1	
29	M20 Lock Washer	M20SW	1	
30	Rubber Washer	HRB-20	1	
31	Rubber Washer Plate	HRB-21	1	
32	M24 Hex Socket Cap Screw	M24-80	1	
33	Wedge	HRB-22	1	
34	Outer Feather	HRB-23	2	
35	Wedge Holder	HRB-24	1	
36	Steel Ball	HRB-25	14	
37	Screw Plug	HRB-30	1	
38	M12 Set Screw	M12-20	1	
39	Hook (B)	HRB-26	1	
40	M24 Hex Socket Cap Screw	M24-75	2	
41	M24 Lock Washer	M24SW	2	
42	M24 Nut	M24N	2	
43	Rubber Plug	HRB-31	1	
44	Liner Spring Cap	HRB-32	2	
45	Liner Spring	HRB-33	2	
46	Screw Plug	HRB-34	2	
47	M24 Set Screw	M24-30	6	
	※BUR=Back-Up Ring			

HRB−1000　BIGGER







YAMAMOTO ROCK MACHINE
1996. 8. 21

ＨＲＢ－１０００　ビッカー
ウエッジ、ウエッジライナー部品交換基準寸法

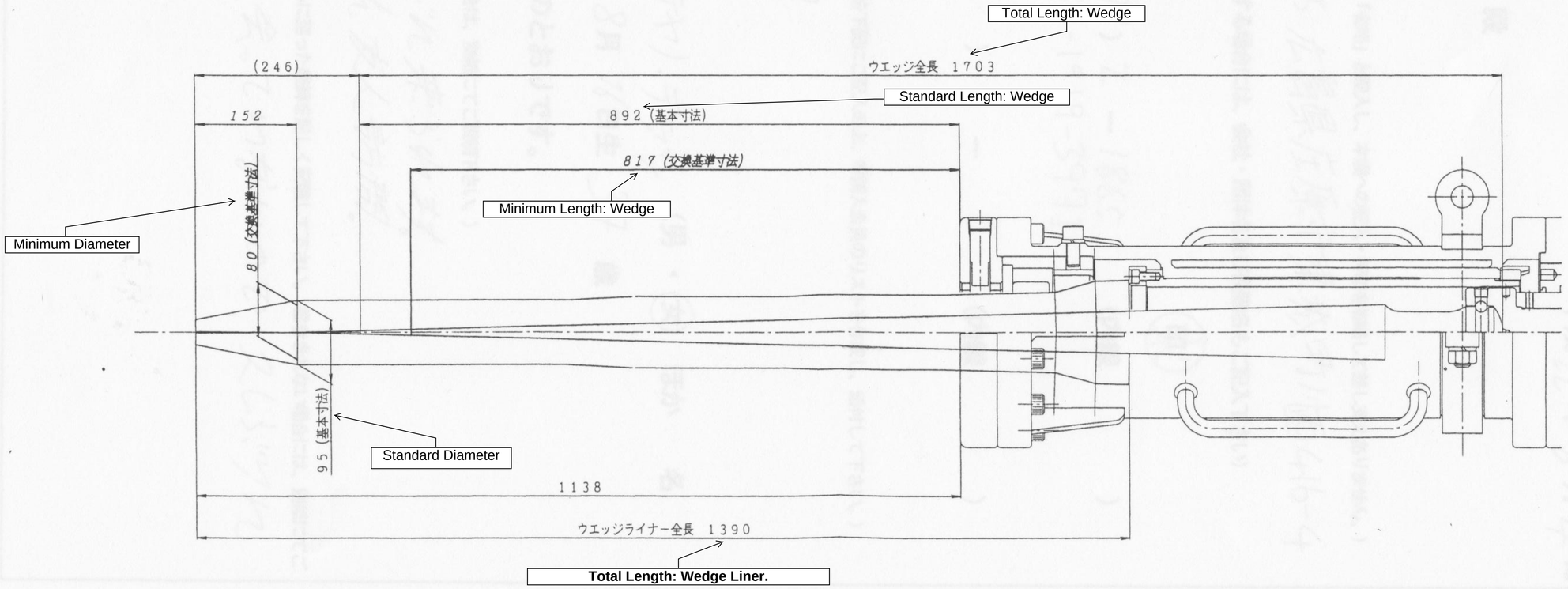
ウエッジライナー寸法採り方法
１）長さ方向は面直角
２）外径寸法は交点を定めＲ取り後実寸法
３）ウエッジは、最後部まで下がった寸法で測定

HRB-1000 HYDRAULIC ROCK SPLITTER

Recommended Dimension for Dispose of the Wedges

Wedge Liners
-Replace if the dimension is less than the minimum dimensions shown below.

Wedge
-Total length measured in its total.
-Standard and minimum lengths are measured from the front cover when the wedge is fully retrieved.



※We recommend to replace the wedge and the wedge liners if actual measurements become less than the minimum measurement shown above. However, you maybe able to continue using worn wedges with smaller holes but the productivity will be reduced as it will affect the activity of secondary crushing due to smaller cracks.

承認	検図	設計	製図	機械名称	HRB－１０００	
			小俣	部品名称	部品交換基準寸法	
尺度	数量	材質		作図年月日	'03. 11. 29	重量
1/5				図面番号		
				ヤマモトロックマシン株式会社		