



Operating Instructions •
BB 100 Jaw Crusher

Retsch®

Information on these operating instructions

The present operating instructions for the Model BB 100 jaw crusher provide all the required information on the topics mentioned in the table of contents.

These guidelines are provided for the use of the group(s) specified in each chapter and will ensure safe operation of the BB 100, for the purpose for which it was intended. Familiarity with the pertinent chapters is a prerequisite for confident, proper utilization by the various persons who will be dealing with the machine.

The present technical manual is designed for use both as a reference work and as a learning guide. Each of the individual chapters is a self-contained unit.

These operating instructions contain no information on repairs. If repairs should ever become necessary, kindly get in touch with your supplier or contact directly the Retsch GmbH.

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Safety

Target group: Anyone who deals with the machine in any capacity whatsoever.

The BB 100 is a modern, high-performance product manufactured by the Retsch GmbH, incorporating state-of-the-art engineering. It is entirely safe in operation, provided that the operator is familiar with the present technical manual and uses the machine for the purpose for which it was intended

Safety notes

You as the owner/operator must ensure that the persons entrusted with the use of the BB 100:

- * have read and understand all the regulations given in the section dealing with safety,
- * have made themselves familiar with all the operating instructions and rules for the particular target group, prior to commencing any work,
- * have complete, immediate and unrestricted access to the technical literature for this machine.
- * New personnel shall have been familiarized with the safe and correct use of the BB 100, prior to beginning the work, by way of instruction given by a qualified person and/or on the basis of the present technical manual.
- * Incorrect operation can result in personal injury and property damage. You are responsible for your own safety and for that of your employees.
- * Ensure that no unauthorized persons have access to the BB 100.

For your own protection, have your workers certify in writing the fact that they have received instruction in the operation of the BB 100. A suggestion for a printed form which can be used for this purpose will be found at the end of the chapter on safety.



We reject herewith any and all claims in conjunction with personal injury or property damage resulting from failure to observe the following safety instructions.

Warnings

The following symbols are used to identify specific hazard potentials:



Personal injury



Property damage

Repairs

These operating instructions do not include any repair instructions. In the interest of your own safety, have repairs made exclusively by the Retsch GmbH or an authorized representative (service technician).

In this case, please notify the following:

Local Retsch representative

Your supplier

The Retsch GmbH

Your address for service:

Confirmation

I have familiarized myself with the foreword to the operating instructions and the chapter on safety.

Owner/operator signature

Service technician's signature

Technical specifications

Machine designation: BB 100

Utilization as per the intended purpose

This unit is not designed as a production machine, but as a laboratory device intended for 8 hours single shift operation.

The BB 100 is suitable for reducing substances of medium to extreme hardness and for brittle and tough materials.

The ultimate fineness can be as little as 1 mm and, depending on the material being processed, may be even less.

Maximum recommended grain size for feedstock product is 50 mm.

The following is a list of some of the materials which can be crushed using the BB 100:

Bakelite // bauxite // concrete // dolomite // ores // feldspar // granite // graywacke // glass // limestone // gravel // coal // coke // corundum // quartz // salts // refractory clay // slag // silicates // silicon // sintered materials // cement clinker, etc.



Do not make any modifications to the machine and use only RETSCH approved spares and accessories.

Failure to comply will invalidate the CE declaration and guarantee.

Gap width adjustment range

From 0 to about 20 mm using a threaded spindle

Throughput rate and ultimate fineness

The performance data, throughput rate and ultimate degree of fineness are functions of the fracture properties and the hardness of the product being crushed and the gap width selected. These values can only be determined empirically.

Receiver drawer nominal volume

approx. 2000 ml

Electrical protection classes

IP 54 for motor and overload switch

IP 65 for limit switch

Rated power

750 watts

Noise emissions

Noise measurements according to DIN 45635-31-01-KL3

Characteristic noise values are dependent on the fracturing properties of the product being ground.

Examples:

Workplace-related emission value $L_{pAeq} = 84 \text{ dB(A)}$

Operating conditions:

Sample material: marble, grain size 40 - 50 mm

Adjusted gap width: < 1 mm

Final grain size: < 5 mm

Filling ratio of grinding chamber: approx. 65 %

or

Sound power level $L_{WA} = 104 \text{ dB(A)}$

Workplace-related emission value $L_{pAeq} = 90 \text{ dB(A)}$

Operating conditions:

Sample material: marble, grain size 40 - 50 mm

Adjusted gap width: < 1 mm

Final grain size: < 5 mm

Filling ratio of grinding chamber: approx. 65 %

Equipment dimensions (approximate)

Height: approx. 960 mm Width: approx. 320 mm

Depth: approx. 800 mm Weight: approx. 137 kg net

Footprint

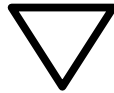
320 mm x 800 mm; no safety clearances required!

Shipping and installation

Target groups: Owner, freight forwarder, operators

Packing

The type of packaging used has been selected in accordance with the shipping mode. It complies with generally accepted packaging guidelines

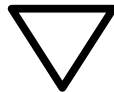


Please retain the packaging for the duration of the guarantee period since, in case of a claim, returning in unsuitable packaging can jeopardize your guarantee entitlements.

Shipping

In preparation for shipping the BB 100, attach lifting tackle only at the eye bolts provided for this purpose.

Refer to the section on operating controls and operation.



The BB 100 shall not be subjected to impact or vibration during transportation; it shall not be thrown. The electronic and mechanical components could otherwise be damaged.

Temperature fluctuations



In case of wide temperature fluctuations (during shipment by air, for instance) the BB 100 will have to be protected against condensation; the electronic components could otherwise be damaged.

Intermediate storage

Also ensure that the BB 100 is stored in a dry place.

Requirements for the installation site

Ambient temperature:

5°C to 40°C



When the ambient temperature exceeds or falls below that specified, the electronic and mechanical components may be damaged, and performance data changed to an unknown extent.

Humidity:

Maximum relative humidity 80% at temperatures up to 31°C; linear decline down to 50% relative humidity at 40°C.



At higher humidity, the electronic and mechanical components may be damaged, and performance data changed to an unknown extent.

Installation site – altitude
max. 2000 m above mean sea level

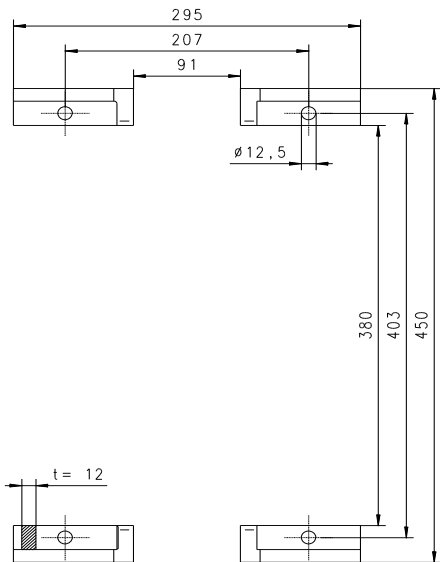


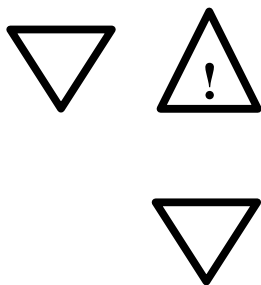
Fig. 1

Installation

Set up the BB 100 only on a solid, level surface. The jaw crusher should be anchored to provide sufficient protection against tipping; use the holes in the feet of the BB 100 for this purpose; see **Fig. 1**. The vibrations transmitted to the environment by the free mass moments in the BB 100 will be only barely perceptible.

Electrical connection

- * Refer to the data plate for information on the voltage and frequency at which the BB 100 is to be operated.
- * Ensure that the values shown there correspond to those for the local power supply.
- * Use the supplied power cord to connect the BB 100 to the power supply.
- * When connecting the power cord to the power source, be sure that the supply circuit is fused in accordance with local codes.



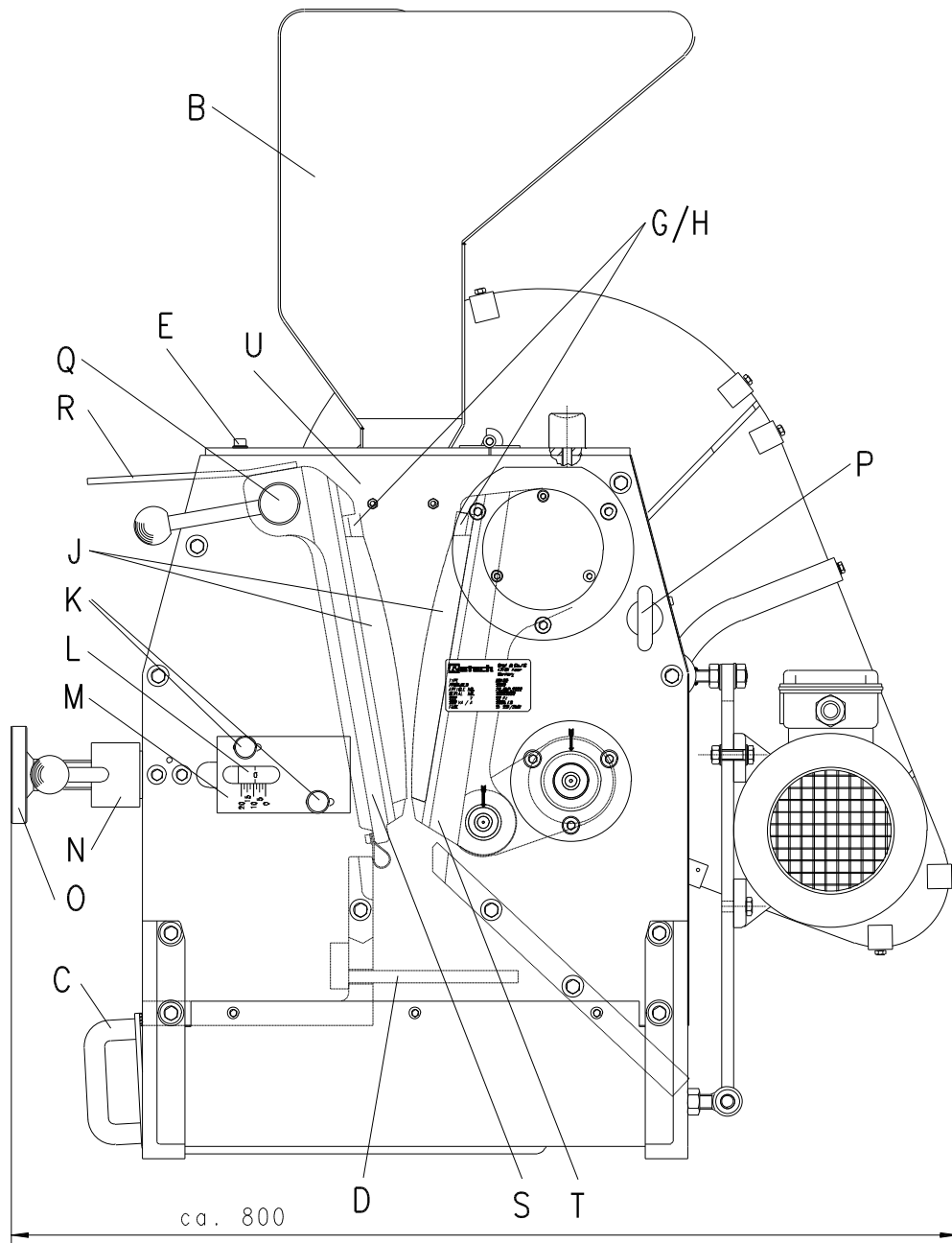
The BB 100 will not exhibit the degree of protection against tipping prescribed in EN 61010 unless it is anchored to the floor.
 Components could be damaged.
Hazard of crushing arms and feet.
 Failure to observe the values on the data plate can cause damage to the electrical or the mechanical components or both.

Operation

Target group: Operators

Control elements and their use

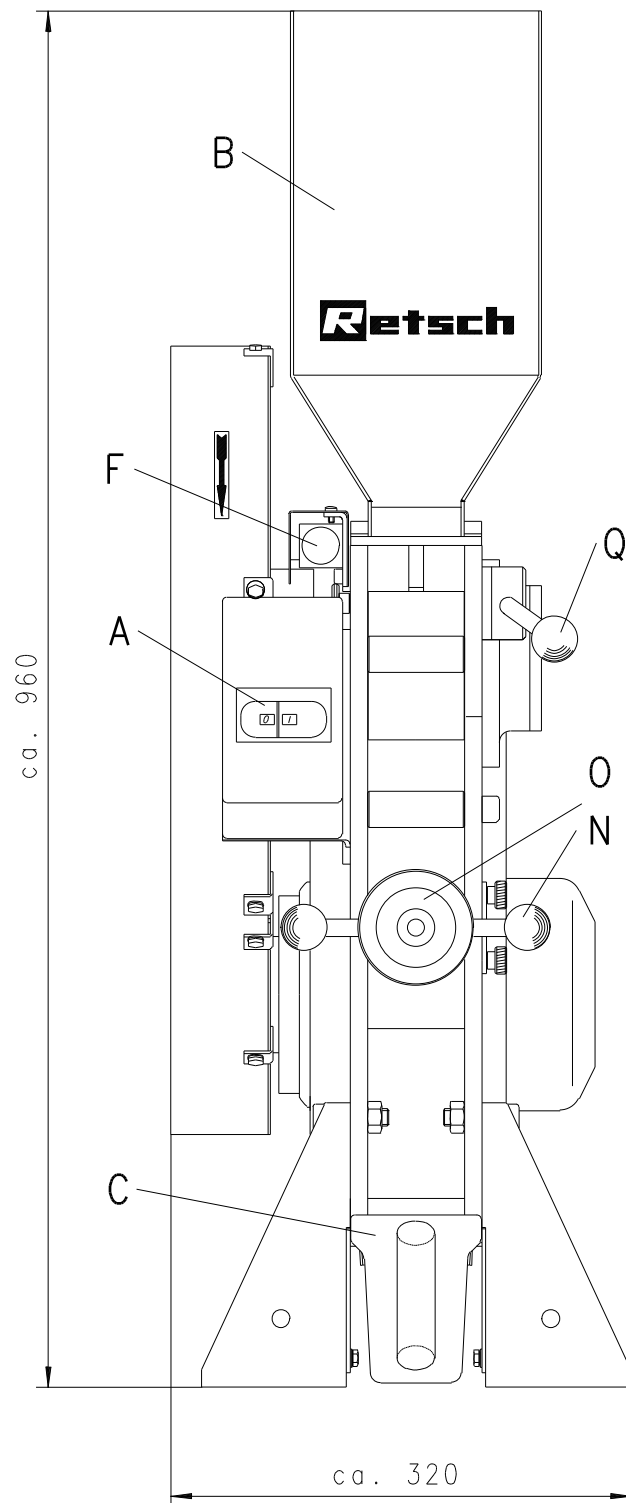
Schematic view of the operating controls , part 1:



Side view

Control elements and their use

Schematic view of the operating controls, part 2:



Front view

The operating controls and their functions
Summary table

Element	Description	Function
A	ON/OFF switch and motor protection (overload) switch	Starts and stops the jaw crusher drive; isolates the motor from the power supply in case of overload.
B	Fill hopper	Allows for the feed of material; prevents unintentionally reaching into the crushing chamber; prevents ejection of the material being processed.
C	Receiver drawer V = 2000 ml	Accepts the crushed sample material.
D	Hand barrier	Prevents unintentionally reaching into the crushing chamber.
E	Two machine screws	The fill hopper B can be swung to the rear once these screws have been removed.
F	Limit switch	Disables the drive (motor) when the fill hopper B is swung to the rear.
G	Clamping shim	Secures the breaker jaws J on the breaker arms S and T .
H	Machine screws	Secure the clamping shims at G .
J	Breaker jaws	The size reduction components.
K	Two machine screws	Secure the scale at M .
L	Pointer	Indicates at scale M the width of the gap, at a tolerance of ± 1 mm.
M	Scale	Indicates, in conjunction with the pointer L , the width of the gap; used to zero the gap width adjustment to accommodate for crusher jaw wear.
N	Lock nut	Locks the threaded spindle O .
O	Threaded spindle	Increases the gap width when turned to the left, decreases when turned to the right.
P	Eye bolts	Attachment points when using lifting tackle to move the device.
Q	Pin	Releases the breaker arm S when the fill hopper B is swung back and the pin is pulled out.
R	Handle	Facilitates removal of the breaker arm S .
S	Breaker arm, stationary	The breaker jaw J is mounted here; adjustment of the gap width can be adjusted with the threaded spindle O .
T	Breaker arm, moving	The breaker jaw J is mounted here; executes the crushing motion required for size reduction without manual effort.
U	Wearing plates in the crushing chamber	Prevent damage to the side components.

Starting the BB 100



The BB 100 may be started only when the crushing chamber and fill hopper are empty. Product which is present in the crushing chamber or fill hopper before starting will cause the machine to block and can cause damage to mechanical components.

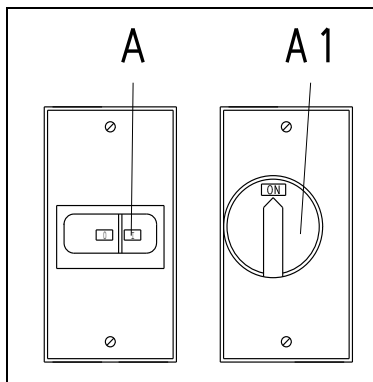


Fig. 2

The ON/OFF and motor protection switch **A/A1** is located on the left, at the front of the BB 100. **Fig. 2**

- * Press button **I**.

The motor starts and the movable arm is set in motion.

The crushing operation can now be started, once the feed hopper is in place.

Stopping the BB 100

The ON/OFF and motor protection switch **A** is located on the left, at the front of the BB 100. **Fig. 2**

- * Press button **0**

The motor is separated from the power supply and the movable breaker arm comes to a stop.



Stop the BB 100 only when the crushing chamber has been cleared of product. Mechanical components could be damaged by blockage.

Empty the receiver drawer

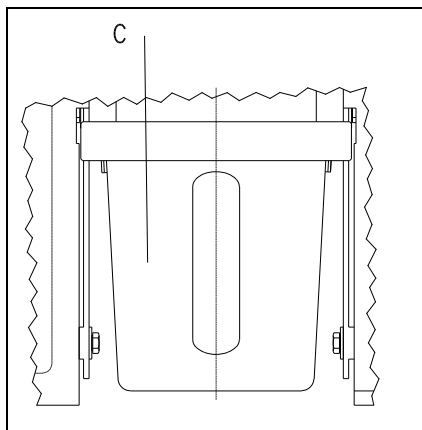


Fig. 3

Since the volume fed through the hopper can be greater than the capacity of the drawer ($V = 2000 \text{ ml}$), the drawer **C** will have to be emptied from time to time.

To achieve the maximum fill level in the drawer, it is necessary to shake it back and forth occasionally, without displacing the drawer by more than 30 mm.

Fig. 3

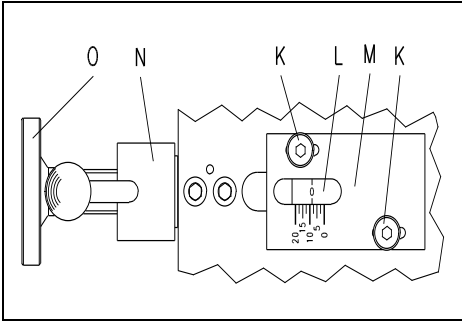


Fig. 4

Adjust the gap width

- * Start the BB 10 (idling, without product).
- * Loosen the lock nut **N** (turn to the left).
- * Turn the spindle **O** to the right to reduce the gap.
- * Turn the spindle **O** to the left to enlarge the gap.
- * The pointer **L** shows the approximate gap width at the scale **M**.
- * Re-tighten the lock nut **N** (turn to the right).

Fig. 4

Adjusting the zero setting for the gap width

- * Start the BB 100 (idling, without product).
- * Loosen the lock nut **N** (turn to the left).
- * Turn the spindle **O** to the right until you hear the two breaker arms make contact.
- * Loosen the machine screws **K** (turn to the right).
- * Slide the **0** mark at the scale **M** to align with the tip of the pointer **L**.
- * Re-tighten the machine screws (turn to the right).

Fig. 4

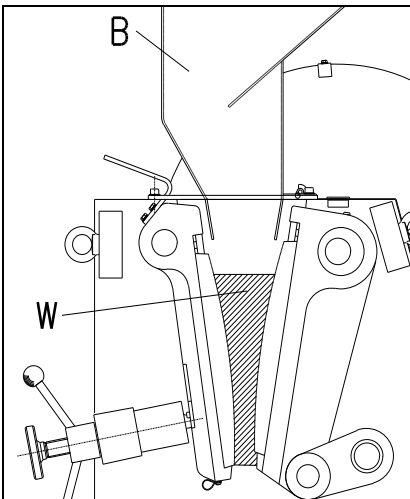


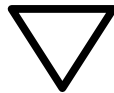
Fig. 5

Fill product to be crushed

The fill hopper **B** and the crushing chamber can accept product at grain size of up to 50 mm. Fill the crushing chamber and the fill hopper only while the machine is running.

The fill hopper is not intended to store product to be crushed; its sole purpose is to feed the material into the crushing chamber while at the same time keeping the operator from unintentionally reaching into the crushing chamber and at the same time keeping crushed product from being ejected.

Fig. 5



If the crushing chamber **W** is filled with more than $\frac{2}{3}$, then the fill hopper guide plates could be damaged; the moving breaker arm would force the product behind the breaker arm and into the crusher housing.

Working instructions

Target group: Laboratory technicians

General

The BB 100 is a rugged, floor-mounted unit which is used primarily for preliminary crushing in preparation for final size reduction.

Its continuous operating concept also makes the BB 100 suitable for integration into fully automatic and semi-automatic processing lines.

The performance data, throughput rates and ultimate fineness will depend on the fracture properties and hardness of the product and on the gap width which is selected.

Grain size of feedstock product

The maximum grain size is determined by the size of the fill hopper opening; in the BB 100 this is a maximum of 50 mm.

Properties of the product being crushed

Every hard and brittle product, exhibiting a hardness of greater than 3 on the Mohs scale, can as a rule, be reduced with the BB 100.

Wet and oily product and that with a hardness index below 3 (Mohs scale) tend to be compressed and clump in the crushing chamber, this being due to the pressure exerted by the breaker jaws. It is for this reason that pre-crushing such material is hardly possible.

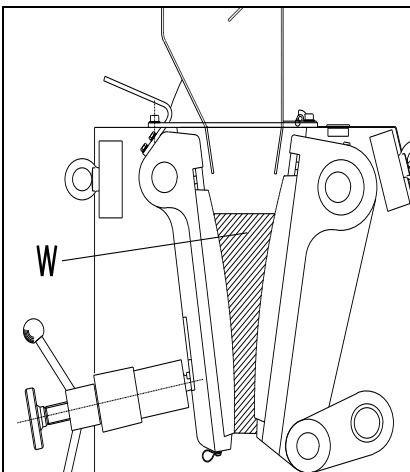
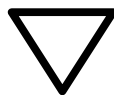


Fig. 6

Fill volume

If the crushing chamber **W** is filled with more than $\frac{2}{3}=300\text{ml}$, then the guide plates of the fill hopper could be damaged and the moving breaker would force the product into the crusher housing, behind the breaker arm. **Fig. 6**

The fill level will also influence the proportion of fine material in the product or specimen after preliminary crushing; the fuller the crushing chamber, the greater the share of fines.



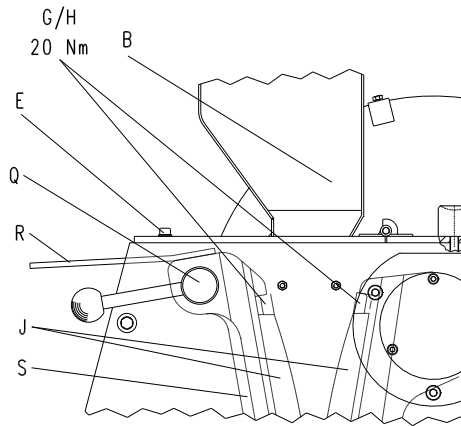
If the crushing chamber **W** is filled with more than $\frac{2}{3}=300\text{ml}$, then the fill hopper guide plates could be damaged; the moving breaker arm would force product behind the breaker arm and into the crusher housing.

General

Cleaning

An industrial vacuum cleaner and a stable, long-handled brush are best suited for cleaning the BB 100.

The stationary breaker arm **S** can also be removed to allow for sufficient cleaning of the crushing chamber. See **Fig. 7**



- * Unscrew the machine screws **E**.
- * Swing back the fill hopper **B**.
- * Grasp the breaker arm **S** at the handle **R** and pull out the pin **Q**.
- * Lift out the breaker arm **S**.

The crushing chamber is now accessible.

Assemble in reverse order.

Fig. 7



The fill hopper may be swung back (by unscrewing the two machine screws) only by trained personnel and only for cleaning purposes. Operating the BB 100 without these machine screws in place and tightened down properly is absolutely prohibited.

Hazard of crushing fingers and hands!!



Do not use running water to clean the BB 100.

Hazard of fatal electrical shock.

Using solvents is prohibited since the felt seals at the sides of the breaker arms could be damaged and/or grease packings could be washed out.

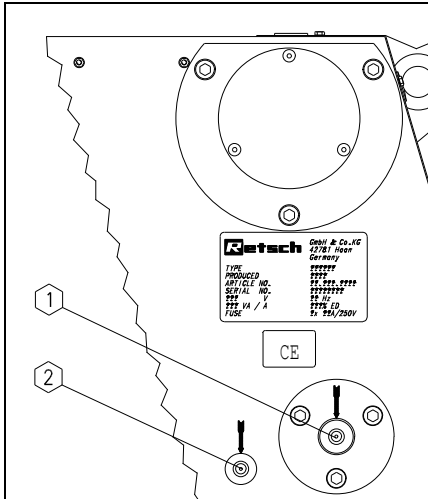


Fig. 8

Maintenance

The BB 100 is to be lubricated from time to time.

Fig. 8

Kindly refer to the table below for the quantities of grease and the lubrication intervals.

The lubrication points are marked with red dots on the unit.

No.	Quan. in kg	Interval, hours of operation
1	0.005	50
2	0.003	50

Use the grease gun supplied with the BB 100 for lubrication purposes.

Ordinary multi-purpose greases can be used as lubricant, e.g. EP 4685 by ESSO / SHELL or BP.

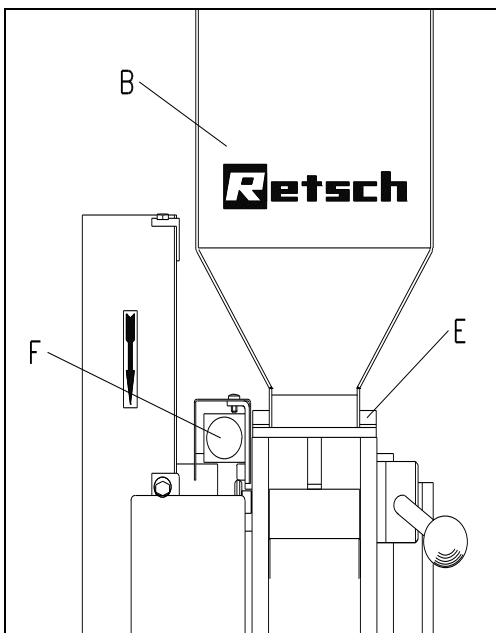


Fig. 9

Functional inspections

The limit switch at the fill hopper is to be checked semiannually for proper functioning. **Fig. 9**

- * Unscrew the two cap screws **E** in front of the fill hopper **B**.
- * Swing the fill hopper to the rear.
- * The BB 100 comes to a stop
- * Close the fill hopper **B**.
- * The BB 100 must not restart.
- * Screw in the machine screws **E**.
- * Start the BB 100.

Replacing the breaker jaws

The stationary breaker arm **S** can be removed to provide sufficient space for dismantling the machine.

Fig. 10

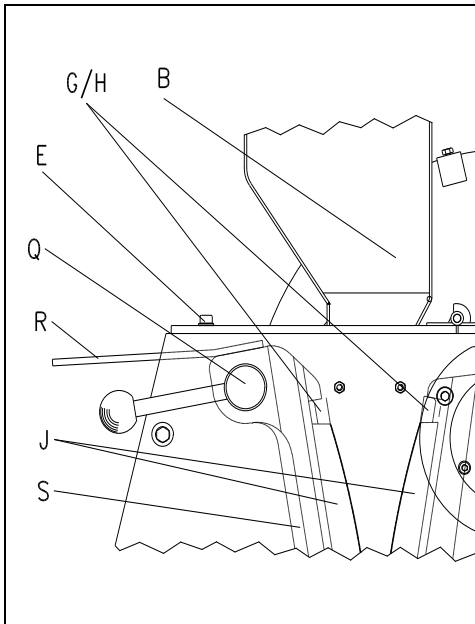


Fig. 10

- * Unscrew the machine screws **E**.
- * Swing back the fill hopper **B**.
- * Grasp the breaker arm **S** at the handle **R** and pull out the pin **Q**.
- * Lift out the breaker arm **S**.
- * Unscrew the machine screws **H**.
- * Remove the clamping shims **G**.
- * Replace the breaker jaws **J**.
- * Assemble in reverse order.
- * Set the gap width as described in this instruction manual.



The fill hopper **B** may be swung back (by unscrewing the two machine screws **E**) only by trained personnel and only for cleaning purposes. Operating the BB 100 without these machine screws **E** in place and tightened down properly is absolutely prohibited.

Hazard of crushing fingers and hands!!

Copyright

Reproducing or distributing this manual, utilizing or distributing the contents is permitted only with the express consent of Retsch GmbH.

Non-compliance will subject violators to claims for damages.

Modifications

Subject to modification without prior notice.

Safety instructions (table)

for the BB 100 taken from the chapters

Procedure	Action	Dangers
Safety	Not paying attention to the safety instructions can lead to damage to people and property.	Claims for damage are excluded in whatever form.
Packaging	Please retain the packaging for the duration of the guarantee period.	In the case of complaint your warranty rights can be endangered if the item is returned insufficiently packaged
Transport	During transportation the BB 100 should not be knocked, shaken or thrown.	Electronic and mechanical components can become damaged.
Temperature variations	With severe variations in temperature, the BB 100 must be protected from condensation.	Electronic components can become damaged.
Scope of delivery	In the case of the delivery being incomplete and/or transport damage, you must inform the carrier and Retsch GmbH immediately (within 24 h).	Later complaints can under certain circumstances no longer be considered.
Environmental temperature	Drops below 5°C Rises above 40°C	Electronic and mechanical components can become damaged. Performance data change by an unknown extent.
Air humidity	Rises above 80% at temperatures up to 31%	Electronic and mechanical components can become damaged. Performance data change by an unknown extent.
Setting-up	Set the BB 100 up only on a level, secure surface. Anchoring should, in order to satisfactorily guarantee that the jaw crusher cannot overturn, be carried out making use of the holes in the feet of the BB 100.	Without being secured to the floor, the BB 100 cannot achieve the level of security against overturning required by EN 61010. Components can become damaged. Danger of crushing for arms and feet.
Electrical connection	Mains supply does not match the values given on the type plate.	Electronic components can become damaged.
Operation	During starting, stopping and disconnection, there must be no material for grinding in the crushing chamber or in the feed hopper.	Mechanical components can possibly become damaged via a blockage.
	The crushing chamber is not be filled by more than 2/3.	Otherwise the guide plates of the feed hopper can becoming damaged and the material for grinding will be delivered by the breaking arm into the crusher housing behind the arm.
Cleaning	Each time before cleaning, pull out the mains plug.	Danger of death by electrocution.
	Do not clean with running water.	Danger of death by electrocution.
	Solvents are not permitted.	Since they would damage the felt seals on the sides of the breaking arms or wash out the grease filling.
	The filling hopper may be swung back for cleaning, by unscrewing the two socket screws, only by assigned, trained personnel. Operation of the BB 100 without screwed-in socket screws and without the filling hopper is not permitted.	Danger of crushing for fingers and hands.

JAW CRUSHER

BB 100 20.052.xxxx

Certificate of CE-Conformity according to:

EC Mechanical Engineering Directive 2006/42/EC

Applied harmonized standards, in particular:
DIN EN ISO 12100 Security of machines

EC Directive Electromagnetic Compatibility 2014/30/EU

Applied standards, in particular:

DIN EN 50081 Generic standard interference emission - living areas - in conjunction with
EN 55022 and EN 60555
DIN EN 50082 Generic standard interference resistance - living areas

Additional applied standards, in particular

DIN EN 61010 Safety prescriptions concerning measuring-, operating-, controlling- and
laboratory equipment

Authorized person for the compilation of technical documents:

Dr. Loredana Di Labio (technical documentation)

The following records are held by Retsch GmbH in the form of Technical Documentation:

Detailed records of engineering development, construction plans, study (analysis) of the measures required for conformity assurance, analysis of the residual risks involved and operating instructions in due form according to the approved regulations for preparation of user information data.

The CE-conformity of the Retsch Jaw Crusher BB 100 is assured herewith.

In case of a modification to the machine not previously agreed with us as well as the use of not licensed spare parts and accessories this certificate will lose its validity.

Retsch GmbH

Haan, April 2016



Dr.-Ing. Frank Janetta
Manager Development





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