Operating instructions for jaw crusher type BB500XL

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Notes on the operating instructions

These operating instructions for the jaw crusher type BB 500 XL provide all the necessary information on the topics listed in the table of contents.

The guide the target group(s) defined for the relevant subjects in safe and proper handling of the BB 500 XL. Knowledge of the relevant chapters by the appropriate target group(s) is essential for safe and proper handling.

This technical documentation comprises a reference work and a training guide. The individual chapters are self-contained units.

These operating instructions do not contain any instructions on repairs. Should any repairs become necessary, please contact your supplier or Retsch GmbH.
Safety

Target group: All persons dealing with the machine in any way

The BB 500 XL is a modern, powerful product from Retsch GmbH. It reflects the state of the art. When the machine is handled correctly by persons familiar with this technical documentation, it is completely safe and reliable in operation.

Notes on safety
You, as the operator, are responsible for ensuring that the persons appointed to work with the BB 500 XL:

- have read and understood all the stipulations of the chapter on safety,
- are familiar before commencing work with all instructions and regulations for the relevant target group,
- have access to the technical documentation for this machine at all times and without difficulty.

Ensure that new staff have been familiarised with the rules for safe and proper handling before commencing work on BB 500 XL either by oral instruction by a competent person and/or by this documentation.

Incorrect operation can lead to damage or injury. You are responsible for your own safety and that of your staff.

Ensure that no unauthorised persons have access to the BB 500 XL.

For your own protection, have your staff confirm that they have been instructed in operation of the BB 500 XL. A draft of an appropriate form can be found at the end of the chapter on safety.

No liability in any form will be accepted for damage or injury resulting from failure to observe the following notes on safety.
Warning symbols
We use the following symbols to warn of:

![Warning symbol]

Personal injury

![Warning symbol]

Damage to property

Repairs
These operating instructions do not contain any instructions on repairs. For your own safety, only have repairs performed by Retsch GmbH or an authorised agent (service technicians).

In such a case, please inform:

<table>
<thead>
<tr>
<th>The Retsch agency in your country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your supplier</td>
</tr>
<tr>
<td>Retsch GmbH direct</td>
</tr>
</tbody>
</table>

Your service address:

_____________________________
_____________________________
_____________________________
_____________________________

Confirmation
I have read and understood the foreword and the chapter on safety.

_____________________________
Signature of the operator

_____________________________
Signature of service technician
Technical data

Target group: Owners, operators

Machine type designation: BB 500 XL

Use for the intended purpose
This machine is not designed as a production machine or for continuous operation, but as a laboratory machine intended for 8 hour single shift operation.
The BB 500 XL is suitable for crushing of medium to extremely hard substances and brittle and hard/tough materials. The achievable final fineness can be up to 5 mm and less, depending on the input material.
The maximum input grain size is <110 mm.
The materials which can be crushed in the BB 500 XL include the following:
concrete // ores // rock // glass // ceramics // coal // minerals // slags // cement clinker etc.
Should you require any further details, the Retsch applications laboratory will be pleased to assist.

Do not modify the machine in any way, and use only spare parts and accessories approved by Retsch.
The conformity with European Directives declared by Retsch will otherwise be invalidated.
Furthermore, this will lead to all warranty claims being rendered null and void.

Gap adjustment
From 0 mm to approx. 11 mm by means of a spindle.

Throughput, final fineness
The performance data, throughput and achievable final fineness are dependent on the breakage behaviour and hardness of the process material and on the gap width set. They can only be determined empirically.

Degree of protection
IP55

Rated power
7500 watts
Noise data
Noise measurement to DIN 45635-31-01-KL3
The noise levels are also decisively influenced by the properties of the material to be ground.

Example 1:
Sound power level $L_{WA} = 109.7 \text{ dB}(A)$
Workplace related emission level $L_{p\text{ eq}} = 98.6 \text{ dB}(A)$

Service conditions:
Input material: Marble pebbles, grain size <90 mm
Gap width set: < 1 mm
Final grain size: < 1 mm
Filling of milling chamber: approx. 65%

Equipment dimensions
Height: approx. 1280 mm  Width: approx. 900 mm
Depth: approx. 980 mm  Weight: approx. 1100 kg net

Mounting surface required
900 mm x 980 mm; no safety clearances necessary!
Transport and installation

Target group: Owners, carriers, operators

Packaging
The packaging is suitable for the mode of transport selected. It complies with the general packaging regulations.

Please keep the packaging for the duration of the guarantee period, as your guarantee claim will be endangered in the case of a complaint or return of the machine in inadequate packaging.

Transport
The BB 500 XL must not be thrown, subjected to impact or shock during transport. The electrical and mechanical components may otherwise be damaged.

Please loop the ropes through both bearing housings on the BB 500 XL. Fig. 1

Interim storage
Also ensure that the BB 500 XL is stored in a dry location for interim periods.

Temperature fluctuations
When there are severe temperature fluctuations (e.g. during air transport) the BB 500 XL is to be protected from condensation. The electrical components may otherwise be damaged.
Parameters for the installation location

**Ambient temperature:**

5°C to 40°C

If the ambient temperature falls below or exceeds the limits specified, the electrical and mechanical components may be damaged or the performance data changed to an unknown extent.

**Humidity:**

Maximum relative humidity 80% at temperatures up to 31°C, decreasing in a straight line to 50% relative humidity at 40°C.

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

**Site altitude:**

max. 2000 m above sea level

**Installation**

A mounting surface of 900 mm in width and 980 mm in depth is required. The mouth of the feed hopper is at a height of approx. 1280 mm.

Install the BB 500 XL on an even, firm surface only. Anchoring is not absolutely necessary, as the free mass momentums induce only hardly perceptible vibrations in the vicinity. It can however be effected using the bores in the feet.

Operation of the BB 500 XL without the feed hopper fitted is impermissible.

Risk of crushing fingers and hands!
Electrical Connection
The electrical connection must be established by a specialist electrician.

- Consult the type plate for the voltage and frequency of the BB 500 XL.
- Ensure that the values are in agreement with the mains power supply. (400V, 32A)
- Connect the BB 500 XL to the mains using the cable supplied.
- The cable is supplied with a built in frequency converter
- Please note that a delay fuse is required

Ensure that there is an external fuse in accordance with the local regulations when connecting the unit to the mains supply.

Failure to observe the values on the type plate can result in damage to electronic or mechanical components.

Prior to initial start-up, check the direction of rotation. See the direction arrow on the motor.
If the direction of rotation is incorrect, crushing performance is inadequate and mechanical components can be damaged.
Operation

Target group: Operators

Controls and operation
Graphical representation of the controls
## Overview table for the graphic

<table>
<thead>
<tr>
<th>Control</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>ON/OFF and motor protection switch</td>
<td>Starts and stops the jaw crusher motor, interrupts the power supply when the motor is overloaded.</td>
</tr>
<tr>
<td>B</td>
<td>Feed hopper</td>
<td>Facilitates material feed, prevents inadvertent reaching into the crusher chamber, prevents ejection of process material.</td>
</tr>
<tr>
<td>C</td>
<td>Collecting bin</td>
<td>9.5L capacity</td>
</tr>
<tr>
<td>D</td>
<td>Collecting bin catch</td>
<td>Prevents the collecting bin from opening of its own accord.</td>
</tr>
<tr>
<td>E</td>
<td>Limit switch</td>
<td>Stops the motor when the collecting bin C is removed.</td>
</tr>
<tr>
<td>F</td>
<td>Pointer</td>
<td>Indicates the gap width in conjunction with scale G</td>
</tr>
<tr>
<td>G</td>
<td>Scale</td>
<td>Indicates the gap width in conjunction with pointer F, adjusts the zero position of the gap width when the jaws are worn.</td>
</tr>
<tr>
<td>H</td>
<td>Lock nut</td>
<td>Locks the spindle I for gap width adjustment.</td>
</tr>
<tr>
<td>I</td>
<td>Spindle</td>
<td>Increases the gap width when turned anti-clockwise, reduces the gap width when turned clockwise.</td>
</tr>
</tbody>
</table>
Starting the BB 500 XL

The BB 500 XL may only be started with the crusher chamber empty. Process material fed into the crusher chamber or feed hopper before starting leads to blockages, and mechanical components may be damaged.

The ON/OFF switch is located on the front left of the BB 500 XL. Fig. 4

- Turn the mainswitch (HS) to the ON position.
- Press the green Button

The motor is started, and the moving crush arm starts to move. The crushing process can only be started when the collecting bin is closed and locked.

When the collecting bin is pulled out, a limit switch prevents the BB 500 XL from starting.

Stopping the BB 500 XL

The ON/OFF and motor protection switch is located on the front left of the BB 500 XL. Fig. 2

- Press the red Button (AS).
- Turn the mainswitch (HS) to the OFF position.
- In case of emergency: Press the emergency switch (NAS) to stop the machine immediately

The motor is disconnected from the power supply and the moving crush arm stops.

Only stop the BB 500 XL when there is no further process material in the crusher chamber. Mechanical components can be damaged if there is blockage.

Setting the gap width

Fig. 5

- Start the BB 500 XL (under no load).
- Release lock nut N (anti-clockwise).
- Turning nut O clockwise reduces the gap.
- Turning nut O anti-clockwise increases the gap.
- Pointer L roughly shows the gap on scale M in mm.
- Re-tighten lock nut N (clockwise)
Do not set the gap width of the BB 500 XL to below 1 mm. Mechanical components can be damaged if there is blockage.

Feeding in process material

The feed hopper B can accept process material with grain sizes up to 110 mm. Only fill the feed hopper and the crusher chamber when the machine is running.

The feed hopper is not however intended for storage of process material: its function is solely that of feeding material into the crusher chamber. It also prevents inadvertent reaching into the crusher chamber, and stops process material from being ejected.

Fig.6

If the crusher chamber is filled more than 2/3 (3500ml), the guide plates on the feed hopper can be damaged and process material conveyed by the moving crusher arm into the crusher casing behind the crusher arm.
Notes on working procedures  
**Target group:** Laboratory technicians

**General**
The BB 500 XL is a robust free-standing machine which can predominantly be used for preliminary pulverisation of hard or brittle materials. The performance data, throughput and achievable final fineness are dependent on the breakage behaviour and hardness of the process material, and on the gap width set.

**Input grain size**
The maximum input grain size is determined by the size of the intake opening, and is max. 110mm on the BB 500 XL.

**Quality of process material**
In principle, any hard and brittle process material with a Mohs hardness $>3$ can be crushed in the BB 500 XL. Moist or greasy process material with a Mohs hardness $<3$ tends merely to compact or cake in the crusher chamber as a result of the pressure applied by the crusher jaws. Crushing is hardly possible in such cases.

**Capacity**
If the crusher chamber is filled more than $2/3$ (3500ml), the guide plates on the feed hopper can be damaged and process material conveyed by the moving crusher arm into the crusher casing behind the crusher arm. 

The quantity of material in the machine also influences the proportion of fines in the pre-pulverised sample material. The more material in the crusher chamber, the higher the proportion of fines can be.

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If the crusher chamber is filled more than $2/3$ (3500ml), the guide plates on the feed hopper can be damaged and process material conveyed by the moving crusher arm into the crusher casing behind the crusher arm.
General

Cleaning
Cleaning of the BB 500 XL is best effected with an industrial vacuum cleaner and a robust, long-handled brush.

![Warning]
The feed hopper may only be dismantled by trained specialists, by removing the four hexagon screws, for cleaning purposes. Operation of the BB 500 XL with the feed hopper removed is impermissible. **Risk of crushing fingers and hands!**

![Warning]
Do not clean the BB 500 XL with running water. **Lethal hazard of electric shock** Solvents must not be used, as the felt seals on the sides of the crusher arms would be destroyed, and grease packing washed out.

Maintenance
The BB 500 XL requires relubrication from time to time. Please consult the table below for quantities of lubricant and intervals. The positions of the lubrication points are marked by red arrows on the machine.

Only use lithium-based grease (graphite free) i.e. Shell Gadus S2 V220 2 or BP Energrease LS-EP 2.

<table>
<thead>
<tr>
<th>No.</th>
<th>Amount in g</th>
<th>Intervall in operating hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>7</td>
<td>60</td>
</tr>
<tr>
<td>2)</td>
<td>7</td>
<td>60</td>
</tr>
<tr>
<td>3)</td>
<td>7</td>
<td>60</td>
</tr>
<tr>
<td>4-6)</td>
<td>7</td>
<td>60</td>
</tr>
<tr>
<td>7)</td>
<td>7</td>
<td>60</td>
</tr>
<tr>
<td>8)</td>
<td>4</td>
<td>60</td>
</tr>
<tr>
<td>9)</td>
<td>4</td>
<td>60</td>
</tr>
</tbody>
</table>

Tab. 1)
To get access to all lubrication points, you need to remove the covers shown in the pictures below:

Fig. BB 500 left side

Fig. BB 500 right side

Fig. BB 500 view from above
Overview
Detailed view (ref. Tab. 1)
Tests
The function of the limit switch on the collecting bin is to be tested every six months. Fig.9

- Start the BB 500 XL.
- Pull out the collecting pan.
- Limit switch E must operate, and the BB 500 XL stop.
- Insert collecting pan.
- The BB 500 XL must not start.
- Start the BB 500 XL.
Replacing crusher jaws

- Disconnect the mains plug.
- Remove the feed hopper.
- Set the gap width to maximum.
- Remove clamps.
- Remove cheese head screws.
- Replace crusher jaws.

A detailed description of the process can be found on following pages.

After replacing the crusher jaws, always remember to re-tighten cheese head screws well and refit plugs.

- Fit the feed hopper and fasten it with the four hexagon screws.

The feed hopper may only be dismantled by trained specialists, by removing the four hexagon screws, for cleaning purposes. Operation of the BB 500 XL with the feed hopper removed is impermissible.

Risk of crushing fingers and hands!

Accessories

Copyright

This documentation may only be duplicated or passed on to third parties, its contents passed on or otherwise used with the express approval of Retsch GmbH. Violators will be liable for damages.

Modifications

We reserve the right to make technical modifications without notice.
**Instruction for replacing the breaking jaws / wearing plates**

Step 1:
Remove the infeed hopper by loosening the screws and adjust the gap to the maximum.

Fig. 10: BB 500 infeed hopper

Step 2:
Remove the cover plate (P) by loosening the two screws (S).

Fig. 11: cover plate
Step 3:
Loosen the fixing screws (FS) of the breaking jaws. Should the breaking jaw not slide down as shown in the following picture, you can help out by tapping on the surface.

Caution: Be careful when unscrewing the screws (FS) holding the clamping piece (KS) on the lower sides of the breaking jaws. Do not loosen them until it drops, because the breaking jaws will fall through the grinding chamber of the machine. Risk of injury!
Step 4:
Remove the breaking jaws by means of the carrying aid (TH) which is included in delivery.

**Caution:** If the gap is not set to the maximum, the breaking jaws may be blocking each other.

![Breaking jaws removal](image)

Fig. 14: pulling out the breaking jaws

The removed or new breaking jaws can now be applied in the reverse order.
Removing the wearing plates

To remove the wearing plates, you need to remove the infeed hopper. Wearing plates are not fixed so you can pull them out as shown in the picture below.

Fig. 15: pulling out the wearing plates
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Action</th>
<th>Dangers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Not paying attention to the safety instructions can lead to damage to people and property.</td>
<td>Claims for damage are excluded in whatever form.</td>
</tr>
<tr>
<td>Packaging</td>
<td>Please retain the packaging for the duration of the guarantee period.</td>
<td>In the case of complaint your warranty rights can be endangered if the item is returned insufficiently packaged</td>
</tr>
<tr>
<td>Transport</td>
<td>During transportation the BB 500 XL should not be knocked, shaken or thrown.</td>
<td>Electronic and mechanical components can become damaged.</td>
</tr>
<tr>
<td>Temperature variations</td>
<td>With severe variations in temperature, the BB 500 XL must be protected from condensation.</td>
<td>Electronic components can become damaged.</td>
</tr>
<tr>
<td>Scope of delivery</td>
<td>In the case of the delivery being incomplete and/or transport damage, you must inform the carrier and Retsch GmbH immediately (within 24 h).</td>
<td>Later complaints can under certain circumstances no longer be considered.</td>
</tr>
<tr>
<td>Environmental temperature</td>
<td>Drops below 5°C. Rises above 40°C.</td>
<td>Electronic and mechanical components can become damaged. Performance data change by an unknown extent.</td>
</tr>
<tr>
<td>Air humidity</td>
<td>Rises above 80% at temperatures up to 31%</td>
<td>Electronic and mechanical components can become damaged. Performance data change by an unknown extent.</td>
</tr>
<tr>
<td>Mounting the hopper</td>
<td>It is not permissible to run the BB 500 XL without a filling hopper mounted.</td>
<td>Danger of crushing for fingers and hands.</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Mains supply does not match the values given on the type plate. Before initial operation, the direction of rotation is to be checked, see rotation direction arrow on the motor.</td>
<td>Electronic components can become damaged.</td>
</tr>
<tr>
<td>Operation</td>
<td>During starting, stopping and disconnection, there must be no material for grinding in the crushing chamber or in the feed hopper.</td>
<td>Mechanical components can possibly become damaged via a blockage.</td>
</tr>
<tr>
<td></td>
<td>Do not set gap width below 1 mm.</td>
<td>Mechanical components can possibly become damaged via a blockage.</td>
</tr>
<tr>
<td></td>
<td>The crushing chamber is not be filled by more than 2/3.</td>
<td>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.</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Each time before cleaning, pull out the mains plug.</td>
<td>Danger of death by electrocution.</td>
</tr>
<tr>
<td></td>
<td>Do not clean with running water.</td>
<td>Danger of death by electrocution.</td>
</tr>
<tr>
<td></td>
<td>Solvents are not permitted.</td>
<td>Since they would damage the felt seals on the sides of the breaking arms or wash out the grease filling.</td>
</tr>
<tr>
<td></td>
<td>The filling hopper may be swung back for cleaning, by unscrewing the two socket screws, only by assigned, trained personnel. Operation of the BB 500 XL without screwed-in socket screws and without the filling hopper is not permitted.</td>
<td>Danger of crushing for fingers and hands.</td>
</tr>
</tbody>
</table>
JAW CRUSHER
BB 500 XL

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

Authorized person for the compilation of technical documents:
H. Neumann (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 Type BB 500 XL 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

Holger Neumann
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