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<td>44</td>
</tr>
</tbody>
</table>
1 Notes on the Manual

This Manual provides technical guidelines for the safe operation of the device. Read this Manual through carefully before installing, putting into service and operating the device. Reading and understanding this Manual is essential for handling the device safely and as intended.

This Manual does not contain any repair instructions. Please contact your supplier or contact Retsch GmbH directly if anything is unclear or you have questions about these guidelines or the device, or in the case of any faults or necessary repairs.

You can find further information about your device at http://www.retsch.com on the pages for the specific device concerned.

Amendment status:
The document amendment 0002 of the "Cutting Mill SM 400" manual has been prepared in accordance with the Machinery Directive 2006/42/EC.

1.1 Disclaimer

This Manual has been prepared with great care. We reserve the right to make technical changes. We assume no liability for personal injuries resulting from the failure to follow the safety information and warnings in this Manual. No liability will be assumed for damage to property resulting from the failure to follow the information in this Manual.

1.2 Copyright

This document or parts of it or its content may not be reproduced, distributed, edited or copied in any form without prior written permission of Retsch GmbH. Damage claims shall be asserted in the case of infringements.
1.3 Explanation of signs and symbols

In this document the following **signs and symbols** are being used:

<table>
<thead>
<tr>
<th>Sign</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚠️</td>
<td>Reference to a recommendation and/or an important information</td>
</tr>
<tr>
<td>➔</td>
<td>Reference to a chapter, table or figure</td>
</tr>
<tr>
<td>🔴</td>
<td>Action instruction</td>
</tr>
<tr>
<td>Name</td>
<td>Software menu function</td>
</tr>
<tr>
<td>[Name]</td>
<td>Software button</td>
</tr>
<tr>
<td>⟨Name⟩</td>
<td>Software checkbox</td>
</tr>
</tbody>
</table>

1.4 Explanations of the Safety Instructions

The following **warnings** in this Manual warn of possible risks and damage:

**DANGER**

Risk of fatal injuries
Source of danger

- Possible consequences if the danger is ignored.
  - Instructions and information on how to avoid the risk.

Fatal or serious injuries may result if the “Danger” sign is disregarded. There is a **very high risk** of a life-threatening accident or lasting personal injury. The signal word **DANGER** is additionally used in the running text or in instructions.

**WARNING**

Risk of life-threatening or serious injuries
Source of danger

- Possible consequences if the danger is ignored.
  - Instructions and information on how to avoid the risk.

Life-threatening or serious injuries may result if the “Warning” sign is disregarded. There is an **increased risk** of a serious accident or of a possibly fatal personal injury. The signal word **WARNING** is additionally used in the running text or in instructions.
1.5 General Safety Instructions

⚠️ CAUTION

Risk of injury
Lack of knowledge of the Manual

- The Manual contains all safety-related information. Disregarding the Manual can therefore lead to injuries.
- **Read the Manual carefully before operating the device.**

Target group
All those operating, cleaning or working with or on the device.

This device is a modern, powerful product from Retsch GmbH and has been developed in line with the state-of-the-art. The device is safe to use when operated correctly and when following the instructions in this manual.

Safety Officer:
The operating company itself must ensure that people authorised to work on the device…

- have read and understood all regulations contained in the chapter on safety;
- are aware before they start work of all instructions and regulations for the target group related to the work;
- have easy access to the technical documentation for this device at all times;
have been familiarised with the safe and correct handling of the device before starting work on it, by means of a verbal introduction by a competent person and/or using this technical documentation.

⚠️ **CAUTION** Improper operation can lead to personal injuries and damage to property. The operating company itself is responsible for its own safety and that of its staff. The operating company itself is responsible for ensuring that no unauthorised persons have access to the device.

⚠️ **CAUTION** People under the influence of intoxicating substances (medications, drugs, alcohol), fatigue or health disorders are not allowed to operate the device.

**Risk of injury**

- Improper modifications to the device can result in injuries.
  - **Do not make any unauthorised changes to the device.**
  - **Only use the spare parts and accessories approved by Retsch GmbH!**

**NOTICE**

- Improper modifications
  - The conformity declared by Retsch GmbH with the European Directives will lose its validity.
  - Any warranty claims will be terminated.
  - **Do not make any modification to the device.**
  - **Use spare parts and accessories that have been approved by Retsch GmbH exclusively.**
1.6 Repairs

This manual does not contain any repair instructions. For safety reasons, repairs may only be carried out by Retsch GmbH or an authorised representative or by qualified service technicians.

In case of repair, please inform...
...the Retsch GmbH representative in your country,
...your supplier, or
...Retsch GmbH directly.

Service address:
1.7 Responsibility of the operating company

The company operating the machine is responsible for ensuring that every person working with the machine has been given precise instructions on the basis of this manual (commissioning, operation, servicing). Training for operating staff must include the following points:

- Intended use of the machine
- Hazard areas
- Safety regulations
- The company must be satisfied that staff have the required qualifications
- General instructions and what to do in an emergency
- Applicable accident prevention regulations
- Personal protective clothing required
- Operation of the machine according to this manual
- Recognised, applicable rules governing health and safety

Involve SM 400 in your emergency planning:

- Integrate SM 400 in your operating instructions regulating conduct in emergency situations.
- Integrate SM 400 in your risk assessment in acc. with the German Ordinance on Industrial Safety and Health (BetrSichV) to prevent accidents during work processes.
- Consider fire-fighting measures, tackling the effects of leaking substances, possible radiation, rescuing people, first-aid measures.

1.8 Personnel qualification and target group of this manual

This manual is intended for trained assembly personnel, maintenance staff and users. Training must be provided in the language of the personnel concerned so that all instructions are understood. As such the following personnel qualifications are necessary:

| Assembly, commissioning, instruction, troubleshooting, servicing work, as described in this manual | Skilled technical staff as well as external service providers who speak German and the language of the operating personnel. The usual skills communicated during training, e.g. as a plant fitter, mechatronics engineer or toolmaker, are prerequisites for the assembly, commissioning and troubleshooting of the machine. Employees must be able to manage all applicable mechanical tasks and be familiar with and have experience of dealing with these. |
| Operation | Education/training in accordance with the above section, responsibilities of trained employees. |
| Servicing/repairs | They must be experienced, trained professionals, familiar with requirements and guidelines. |
2 Confirmation Form for the Managing Operator

This manual contains essential instructions for operating and maintaining the device which must be strictly observed. It is essential that they be read by the user and by the qualified staff responsible for the device before the device is commissioned. This manual must be available and accessible at the place of use at all times.

The user of the device herewith confirms to the managing operator (owner) that he has received sufficient instructions about the operation and maintenance of the system. The user has received the manual, has read and taken note of its contents and consequently has all the information required for safe operation and is sufficiently familiar with the device.

The managing operator should for legal protection have the user confirm the instruction about the operation of the device.

<table>
<thead>
<tr>
<th>I have read and taken note of the contents of all chapters in this manual as well as all safety instructions and warnings.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User</strong></td>
</tr>
<tr>
<td>Surname, first name (block letters)</td>
</tr>
<tr>
<td>Position in the company</td>
</tr>
<tr>
<td>Place, date and signature</td>
</tr>
<tr>
<td><strong>Managing operator or service technician</strong></td>
</tr>
<tr>
<td>Surname, first name (block letters)</td>
</tr>
<tr>
<td>Position in the company</td>
</tr>
<tr>
<td>Place, date and signature</td>
</tr>
</tbody>
</table>
3 Technical Data

3.1 Protective Equipment

- This device can only be started when the collecting receptacle has been inserted and screwed tight.
- A safety switch on the side of the housing, which is connected to the collecting receptacle, prevents the device starting in an unsafe state.
- Opening the collecting receptacle leads to the motor switching off and so to the immediate stopping of the grinding process.
- The motor protection switch switches the drive motor off if the rotor is blocked.

3.2 Degree of Protection

- IP 54

3.3 Emissions

Noise levels (in accordance with DIN 45635-31-01-KL3):
- When idling at a distance of 1 m: ~ 61.5 dB(A)

The noise levels are influenced by the properties of the sample material.
- ~ 75 to 86 dB(A), peaks of up to 92 dB(A)

Example:
With molasses pellets as sample material, the noise level is 90.8 dB(A).

**CAUTION**

Failure to hear acoustic signals
Loud noises during grinding
- It is possible that acoustic warning signals and voice communication cannot be heard.
- When planning the acoustic signals in the working environment, the volume of noises arising during grinding should be taken into consideration. It may be possible to use additional visual signals.

**CAUTION**

Damage to hearing
A high sound level can arise depending on the type of material, the knife set used and the duration of grinding.
- Excessive noise, in terms of volume and duration, can cause impairments or lasting damage to hearing.
- Suitable noise protection measures must be taken, or hearing protection worn.

3.4 Electromagnetic Compatibility (EMC)

- EMC class in accordance with DIN EN 55011: B
3.5 Rated Power

~ 3 000 W (VA) / 400 V / 16 A

3.6 Motor Rotation Speed

- 280 revolutions per minute (rpm)

3.7 Dimensions and Weight

- Height: ~ 1 768 mm (with standard hopper)
- Width: ~ 695 mm
- Depth: ~ 648 mm (without standard hopper)
- Depth: ~ 692 mm (with standard hopper)
- Weight: ~ 230 kg

3.8 Required Floor Space

- Width of the stand space: 695 mm
- Depth of the stand space: 692 mm

No safety distance is necessary!

Requirements of the location:
This floor model must be placed on an even, firm base.

3.9 Receptacle Volume

- < 5 l

3.10 Feed Grain Size

- Feed size: < 170 x 220 mm
- Final fineness: 1 – 20 mm (depending on the bottom sieve used)
3.11 Installation drawing

![Diagram of SM400 installation](image)
4 Packaging, Transport and Installation

4.1 Packaging

The packaging has been adapted to the mode of transport. It complies with the generally applicable packaging guidelines.

**NOTICE**

**Complaint or return**
Keeping the packaging
- Inadequate packaging and insufficient securing of the device can jeopardise the warranty claim in the event of a complaint or return.
- Keep the packaging for the duration of the warranty period.

4.2 Transport

**DANGER**

**Serious personal injury**
Suspension loads
- If dropped, the great weight of the device would result in serious injuries or death.
- People must never stand below suspended loads!

**NOTICE**

**Damage to components**
Transport
- Mechanical or electronic components may be damaged during transport.
- The device must not be knocked, shaken or thrown during transport.

**NOTICE**

**Complaints**
Incomplete delivery or transport damage
- The forwarding agent and Retsch GmbH must be notified immediately in the event of transport damage. It is otherwise possible that subsequent complaints will not be recognised.
- Please check the delivery on receipt of the device for its completeness and intactness.
- Notify your forwarding agent and Retsch GmbH within 24 hours.

**Fig. 1:** Transport with forklift
Packaging, Transport and Installation

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WARNING

Serious personal injury
Excessive weight
  - Due to its very heavy weight of 220 kg, serious personal injuries may result when the device is lifted.
  - The device may only be lifted and transported using lifting apparatus!

CAUTION

Only deploy suitable lifting apparatus that has been approved for the weight of the device.

The SM 400 has a base frame (Z), by which the device can be lifted and transported with the help of lifting apparatus.
astonishing Using lifting apparatus, e.g. a forklift, drive under the base frame (Z).
astonishing Using the lifting apparatus, lift the device slowly and stabilise it to prevent it from overturning.

4.3 Temperature Fluctuations and Condensation

NOTICE

Damaged components due to condensation
Temperature fluctuations
  - The device may be exposed to substantial fluctuations in temperature during transport. The ensuing condensation can damage electronic components.
  - Wait until the device has acclimatised before putting it into service.

Temporary storage:
Also in case of an interim storage the device must be stored dry and within the specified ambient temperature range.

4.4 Conditions for the Installation Site

  - Installation height: max. 2 000 m above sea level
  - Ambient temperature: 5 °C – 40 °C

NOTICE

Ambient temperature
Temperatures outside the permitted range
  - Electronic and mechanical components may be damaged.
  - The performance data alter to an unknown extent.
  - Do not exceed or fall below the permitted temperature range (5 °C to 40 °C ambient temperature) of the device.

  - Maximum relative humidity < 80 % (at ambient temperatures ≤ 31 °C)
For ambient temperatures $U_T$ between 31 °C and 40 °C, the maximum relative humidity value $L_F$ linearly decreases according to $L_F = -(U_T - 55) / 0.3$:

<table>
<thead>
<tr>
<th>Ambient temperature</th>
<th>Max. rel. humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 31 °C</td>
<td>80 %</td>
</tr>
<tr>
<td>33 °C</td>
<td>73.3 %</td>
</tr>
<tr>
<td>35 °C</td>
<td>66.7 %</td>
</tr>
<tr>
<td>37 °C</td>
<td>60 %</td>
</tr>
<tr>
<td>39 °C</td>
<td>53.3 %</td>
</tr>
<tr>
<td>40 °C</td>
<td>50 %</td>
</tr>
</tbody>
</table>

**NOTICE**

Humidity
High relative humidity
- Electronic and mechanical components may be damaged.
- The performance data alter to an unknown extent.
- **The relative humidity in the vicinity of the device should be kept as low as possible.**

### 4.5 Electrical Connection

**WARNING**

Danger to life due to electric shock or fire
Incorrect connection to the power supply may result in parts of the housing or cables being live and in fires starting.
- Serious injuries or death due to an electric shock.
- Serious injuries or death due to fires.
- **The device may only be connected by a qualified electrician.**

**NOTICE**

Electrical connection
Failure to observe the values on the type plate
- Electronic and mechanical components may be damaged.
- **Connect the device only to a mains supply matching the values on the type plate.**

**NOTICE**

Electrical connection
Wrong direction of rotation on drive motor
- Electronic and mechanical components may be damaged.
- Insufficient grinding of the sample material.
- **Before putting into operation for the first time, check whether the direction of rotation of the motor (fan direction of rotation) complies with the direction arrow on the belt cover.**
4.6 Type Plate Description

![Type Plate Diagram]

Fig. 2: Type plate

1. Device designation
2. Year of production
3. Part number
4. Serial number
5. Manufacturer's address
6. CE marking
7. Disposal label
8. Bar code
9. Power version
10. Mains frequency
11. Capacity
12. Amperage
13. Number of fuses
14. Fuse type and fuse strength

⚠️ In the case of queries please provide the device designation (1) or part number (3), as well as the serial number (4) of the device.
5 First Commissioning

**WARNING**

Danger to life through electric shock
Damaged power cable

- Operating the device with a damaged power cable or plug can lead to life-threatening injuries caused by an electric shock.
- **Before operating the device, check the power cable and plug for damage.**
- **Never operate the device with damaged power cable or plug!**

**WARNING**

Danger to life due to electric shock
Electrically conductive parts of the housing due to contact with live cables inside the housing

- An electric shock can result in burns, cardiac arrhythmia, respiratory arrest and cardiac arrest.
- **Always operate the device using a mains socket protected by a residual current circuit breaker (RCCB).**

**NOTICE**

Setting up the device
Disconnecting the device from the mains

- A separation of the device from the mains must be possible at any time.
- **Set up the device in such a way, that the connection for the power cable is always easily accessible.**

**NOTICE**

Setting up the device
Vibrations during operation

- Depending on the operating mode of the device, slight vibrations may occur.
- **Set up the device only on a vibration-free, plane and stable surface.**

5.1 Installation of the Device

![Securing on the transport pallet](image)

Fig. 3: Securing on the transport pallet

On delivery, the device is screwed tight onto the transport pallet.

- Remove the four hexagon screws (SC) from the transport pallet.
- Using a forklift, lift the SM 400
- Secure the four device feet supplied (vibration dampers) to the base frame.
Place the SM 400 onto the designated installation surface.

If the device is erected without the feet (vibration dampers), it must be screwed to an even, firm base.

Using four suitable hexagon screws, screw the SM 400 tightly to the base.

**Fig. 4:** Device feet: do not push or pull device

---

**NOTICE**

**Damage to the device feet**

Pushing or pulling the device

- If the device is pushed or pulled across a surface, this can damage the device feet (vibration dampers).
- **Do not pull or push the device.**
- **Lift the device if you need to move it.**

5.2 Installing the fill hopper

**Fig. 5:** Installing the feed hopper: cover plate and open grinding chamber

**NOTICE** On delivery, the grinding chamber with the sharp rotor cutting bars (Q) is sealed by a cover plate for your safety. Before using for the first time, you must remove the cover plate (Y) and install the feed hopper (D). Standard delivery includes a universal hopper.

**Removing the cover plate**

- Unscrew the M6 Allen screws (DS).
- Remove the cover plate (Y) from the grinding chamber.

**Installing the feed hopper**

- Place the feed hopper (D) onto the grinding chamber, with the handle pointing to the front.
- Secure the feed hopper (D) using the M6 Allen screws (DS).
Fig. 6: Universal hopper

Fig. 7: Option: Long product hopper
6 Operating the Device

6.1 Use of the Device for the Intended Purpose

**CAUTION**

Risk of injury
Potentially explosive atmosphere
- The device is not suitable for use in potentially explosive atmospheres. Operating the device in a potentially explosive atmosphere can lead to injuries caused by an explosion or fire.
- **Never operate the device in a potentially explosive atmosphere!**

**CAUTION**

Risk of injury
Sample material that is harmful to health
- Sample material that is harmful to health can injure people (illness, contamination).
- **Use suitable extraction systems with sample material that is harmful to health.**
- **Use suitable personal protective equipment with sample material that is harmful to health.**
- **Take note of the safety data sheets for the sample material.**

**CAUTION**

Risk of burns or poisoning
Varying sample properties
- The properties and therefore also the chemical reactivity of the sample can change during the grinding process and can cause burns or poisoning as a result.
- **Do not process any substances in this device whose chemical reactivity is so changed by grinding that there is a risk of explosion or poisoning.**
- **Take note of the safety data sheets for the sample material.**

**CAUTION**

Risk of injury
Explosive or flammable samples
- Samples can explode or catch fire during the grinding process.
- **Do not use any samples in this device that carry a risk of explosion or fire.**
- **Take note of the safety data sheets for the sample material.**
**NOTICE**

**Range of application of the device**

Long-term operation

- This laboratory device is designed for eight-hour single-shift operation with a duty cycle of 30%.
- **This device may not be used as a production machine nor is it intended for continuous operation.**

The Cutting Mill SM 400 is suitable for grinding soft, medium-hard, tough, elastic, fibrous and heterogeneous material mixtures, for example waste, lignite, film, animal feed pellets, spices, rubber, resins, hay, wood, cable, bone, plastics, foodstuffs, leather, material mixtures, paper, cardboard, PET preforms, parts of plants, pharmaceutical products, plastic toys, polymers, secondary fuels, straw, textiles, animal feed etc.

The Cutting Mill SM 400 is suitable for the preliminary crushing of large pieces of sample material, but depending on the application, frequently achieves the desired final fineness in a single step. The sample material is only slightly warmed in the process, so that the mill is also suitable for temperature-sensitive samples. The large surface of the 240 mm x 240 mm bottom sieve permits the grinding of larger quantities of sample, and therefore an increased throughput. The maximum feed size is 170 x 220 mm. The final fineness that can be achieved is defined by different hole widths in the bottom sieve, which range from 1 to 20 mm.

The Cutting Mill SM 400 is ideal for sample preparation in the laboratory. Grinding tools made of two different materials make it possible to adapt to different sample properties (e.g. very hard materials). Only grinding tools from Retsch GmbH may be deployed.

### 6.2 Principle of Operation

The Cutting Mill SM 400 is used for the batch-wise or continuous grinding of elastic, hard-ductile and fibrous products and product mixtures. The special design of the cutting tools, in conjunction with the drive, bring about fast, efficient grinding without damaging the material being ground.

The high torque of the 3 kW drive with additional flywheel mass permits the extremely effective preliminary crushing of heterogeneous material mixtures. Analysis fineness is usually achieved in a single step. The Cutting Mill is also successfully deployed with many other materials. The sample material is only slightly warmed in the process, so that the Cutting Mill is also suitable for temperature-sensitive materials. The SM 400 has, however, fundamentally not been designed for grinding wet or damp materials.

The wide selection of sieves, hoppers and collecting vessels makes it possible to adapt to individual tasks.
6.3 Views of the Instrument

6.3.1 Front

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>On switch</td>
<td>Switching the device on</td>
</tr>
<tr>
<td>B</td>
<td>Off switch /Emergency stop</td>
<td>Switching the device off</td>
</tr>
<tr>
<td>C</td>
<td>Collecting receptacle</td>
<td>Receives the crushed sample material and closes the grinding chamber</td>
</tr>
<tr>
<td>D</td>
<td>Feed hopper</td>
<td>Hopper with hand protection for feeding the sample material</td>
</tr>
<tr>
<td>E</td>
<td>Collecting receptacle handle</td>
<td>Handle on the collecting receptacle C</td>
</tr>
<tr>
<td>F</td>
<td>Hopper handle</td>
<td>Handle on feed hopper D</td>
</tr>
<tr>
<td>G</td>
<td>Locking screw</td>
<td>Locks the collecting receptacle C (drawer)</td>
</tr>
</tbody>
</table>
6.3.2 Side view

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Lock</td>
<td>Locks the collecting receptacle (drawer)</td>
</tr>
<tr>
<td>I</td>
<td>Locking bolt</td>
<td>Secures the bottom sieve support</td>
</tr>
<tr>
<td>M</td>
<td>Tilt joint</td>
<td>Tilt joint on the tipping mechanism</td>
</tr>
<tr>
<td>N</td>
<td>Pneumatic spring</td>
<td>Pneumatic spring on the tipping mechanism</td>
</tr>
</tbody>
</table>
### 6.3.3 Interior view

![Diagram](image)

**Fig. 10:** Grinding chamber: bottom sieve and sealing lip

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Locking bolt</td>
<td>Secures the support of the bottom sieve to prevent it falling</td>
</tr>
<tr>
<td>L</td>
<td>Mounting screws tipping mechanism</td>
<td>Secures the tipping mechanism and the bottom sieve</td>
</tr>
<tr>
<td>O</td>
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Fig. 11: Grinding chamber: bottom sieve folded down

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<td>Screw to adjust the stator cutting bar ( R ) and for adjusting the cutting gap</td>
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6.4 Switching On / Off

**WARNING**

Risk to life caused by an electric shock

Connection to socket without a protective earth conductor

- Connecting the device to sockets without a protective earth conductor can lead to life-threatening injuries caused by an electric shock.
- **Always operate the device using sockets with a protective earth conductor (PE).**

**NOTICE**
The off button (\( B \)) is also used as the emergency stop button. Release the emergency stop button before restarting.

➢ Switch the SM 400 on using the on button (\( A \)) on the front of the device.
➢ Switch the SM 400 off using the off button (\( B \)) on the front of the device.

Once the device has been switched off, it is completely disconnected from the power supply.
6.5 Opening and Closing of the Device

Fig. 12: Safety switch between housing and collecting receptacle

**NOTICE** At the side of the housing there is a safety switch (J) connected to the collecting receptacle (C), which stops the drive motor (H) for safety reasons when the collecting receptacle (C) is removed.

**WARNING**

Risk of injury caused by rotating rotor
Operation without safety equipment
- If the device is operated without safety equipment (splash-back protection or fill hopper), items of clothing or parts of the body can get into the grinding chamber. The rotating rotor can then cause injuries.
- **Never operate the device without the safety equipment.**

**CAUTION**

Cuts Sharp cutting edges
- The sharp cutting edges of the rotor cutting bars in the grinding chamber and of the stator cutting bars can leads to cuts on hands.
- **Do not touch the rotor cutting bars and the stator cutting bars by the sharp cutting edges.**
- **Wear cut-resistant protective gloves.**

Fig. 13: Opening and closing the device

**Opening the device**
- Switch the SM 400 off.
- Unscrew the locking screw (G).
- Using the handle (E), pull the collecting receptacle (C) forwards out of the device.
Unscrew the two mounting screws (L) of the tipping mechanism.

Hold the feed hopper (D) tightly by the handle (F) and press it backwards.

Closing the device

Hold the feed hopper (D) tightly by the handle (F) and pull it forwards.

Screw the two mounting screws (L) for the tipping mechanism tight.

Slide the collecting receptacle (C) into the device.

Tighten the locking screw (G).

6.6 Operation

6.6.1 Starting the grinding process

The job of the feed hopper (D) is to feed the sample material to the grinding chamber, contain any grinding material that splashes back and to prevent contact with the grinding chamber. Feed larger pieces of sample material individually into the feed hopper (D).

NOTICE A long product hopper with wooden slide is available as an option for longer pieces of sample material.

Fig. 14: Tilting the feed hopper

Fig. 15: Option: Long product hopper
6.6.2 Adding sample material

**CAUTION**

Damage to hearing
A high sound level can arise depending on the type of material, the knife set used and the duration of grinding.

- Excessive noise, in terms of volume and duration, can cause impairments or lasting damage to hearing.
- **Suitable noise protection measures must be taken, or hearing protection worn.**

**NOTICE**

Damage to mechanical components
Rotor blockage due to sample material

- Depending on the properties of the material, the rotor may become blocked when feeding the sample material.
- Mechanical components may be damaged by a rotor blockage.
- **Only fill sample material while the device is running.**
- **Dose the addition of sample material according to the material properties.**
- **Do not fill more sample material than the collecting receptacle can hold.**

**NOTICE** First start the SM 400 before you begin adding sample material! The SM 400 can only be started when a collecting receptacle has been inserted and screwed tight. The maximum feed size must not exceed 170 mm x 220 mm.

- Fill the sample material slowly and continuously into the feed hopper (D) **while the device is running.** This ensures more effective and faster grinding.
- During the grinding process, pay attention to the quantity of sample material in the collecting receptacle (C). The collecting receptacle (C) must be emptied as soon as the fill volume has reached 90% of its volume.

6.6.3 Removing sample material after grinding

**Removing the sample material**

- Switch the SM 400 off.
- Unscrew the locking screw (G) of the collecting receptacle (C).
- Using the handle (E), pull the collecting receptacle (C) forwards out of the device.
**NOTICE** When doing so, hold the top of the collecting receptacle (C) with your other hand to prevent it tilting forwards and the sample material falling out.

⇒ Remove the ground material from the collecting receptacle (C).

**Closing the device**

⇒ Slide the collecting receptacle (C) into the device.
⇒ Tighten the locking screw (G).

**NOTICE**

**Damage to mechanical components**

Cutting mill blockage with motor switch-off

− The high feeding capacity of the rotor can result in blockages that are typical with cutting mills when large quantities of big pieces of solid sample material are fed.
− If the device is not switched off in time in the case of blockages, a motor overload switch turns the overloaded drive motor off.

• Switch the device off immediately in the event of a blockage and remove the sample material causing the blockage.
• Reduce the feed of sample material into the feed hopper.
• Fill larger and more solid sample material into the feed hopper slowly and gradually.
• Where necessary, pre-grind larger and more solid sample material.

6.6.4 Stopping the grinding process

**Fig. 17:** Emergency stop button

**NOTICE** The SM 400 may only be stopped when there is no longer any sample material in the grinding chamber. The rotor can get blocked and mechanical components may be damaged.

⇒ Press the emergency stop button (B) on the front of the device. The emergency stop button (B) engages and prevents an unintentional restart.
⇒ Turn the emergency stop button (B) to the right to release it and to start the SM 400 again using the on button (A).
6.7 Replacing the bottom sieve

CAUTION

Cuts
Sharp edges
- The sharp edges of the bottom sieve can lead to cuts on hands.
- Do not touch the sharp edges of the bottom sieve.
- Wear cut-resistant protective gloves.

Removing the bottom sieve
- Switch the SM 400 off.
- Unscrew the locking screw (G).
- Pull the collecting receptacle (C) forwards out of the device.
- Unscrew the locking screws (G) of the tipping mechanism.
- Pull out the locking bolt (I), while simultaneously holding the support (P) of the bottom sieve (O) tight.
- Fold and guide the support (P) of the ground sieve (O) downwards.
- Remove the bottom sieve (O) from the support (P).

Notice Due to a cut-out (U) on the side, bottom sieves can only be inserted in one direction.

Inserting the bottom sieve
- Insert the bottom sieve (O) of your choice into the support (P).
- Fold the support (P) together with the bottom sieve (O) upwards.
- Position the support (P) using the locking bolt (I).
Secure the support (P) of the tipping mechanism using the locking screws (G).

Push the collecting receptacle (C) into the device.

Tighten the locking screw (G).
7 Cleaning, Wear and Maintenance

**CAUTION**

**Risk of injury**

**Improper repairs**

- Unauthorised and improper repairs can cause injuries.
- Repairs to the device may only be carried out by the Retsch GmbH, an authorised representative or by qualified service technicians.
- Do not carry out any unauthorised or improper repairs to the device!

7.1 Cleaning

**WARNING**

**Risk to life caused by an electric shock**

**Cleaning live parts with water**

- Cleaning the device with water can lead to life-threatening injuries caused by an electric shock if the device has not been disconnected from the power supply.
- Only carry out cleaning work on the device when it has been disconnected from the power supply.
- Use a cloth moistened with water for cleaning.
- Do not clean the device under running water!

**CAUTION**

**Risk of injury**

**Cleaning with compressed air**

- When using compressed air for cleaning purposes dust and remnant of the sample material can be flung around and injure eyes.
- Always wear safety glasses when cleaning with compressed air.
- Observe the material safety data sheets of the sample material.

**NOTICE**

**Damage to the housing and device**

**Use of organic solvents**

- Organic solvents may damage plastic parts and the coating.
- The use of organic solvents is not permitted.

Clean the housing of the device with a damp cloth and if necessary, with a household cleaning agent. Pay attention that no water or cleaning agent enters the interior of the device.
Cleaning, Wear and Maintenance

## CAUTION

### Cuts

Sharp cutting edges
- The sharp cutting edges of the rotor cutting bars in the grinding chamber and of the stator cutting bars can leads to cuts on hands.
- **Do not touch the rotor cutting bars and the stator cutting bars by the sharp cutting edges.**
- **Wear cut-resistant protective gloves.**

⇒ Clean the grinding chamber, the cutting bars and the bottom sieve with a brush and use an industrial vacuum cleaner to remove the loose material residue.
⇒ Alternatively, the grinding chamber can be cleaned using compressed air.

### 7.1.1 Removing and installing the feed hopper

## WARNING

### Risk of injury caused by rotating rotor

Operation without safety equipment
- If the device is operated without safety equipment (splash-back protection or fill hopper), items of clothing or parts of the body can get into the grinding chamber. The rotating rotor can then cause injuries.
- **Never operate the device without the safety equipment.**

![Fig. 20: Removing and installing the feed hopper](image)

**Removing the feed hopper**
- Switch the SM 400 off.
- Disconnect the SM 400 from the power supply and secure to prevent it restarting.
- Unscrew the four M6 Allen screws (DS).
- Lift the feed hopper (D) off upwards.

**Installing the feed hopper**
- Place the feed hopper (D) from above onto the SM 400.
- Secure the feed hopper (D) using the four M6 Allen screws (DS).
7.1.2 Cleaning the feed hopper

**WARNING**

Risk of injury caused by rotating rotor
Operation without safety equipment

- If the device is operated without safety equipment (splash-back protection or fill hopper), items of clothing or parts of the body can get into the grinding chamber. The rotating rotor can then cause injuries.
- Never operate the device without the safety equipment.

![Cleaning the feed hopper](image)

**Removing the feed hopper**
- Switch the SM 400 off.
- Disconnect the SM 400 from the power supply and secure to prevent it restarting.
- Remove the four M6 Allen screws (DS).
- Lift the feed hopper (D) off upwards.
- Clean the feed hopper (D) using compressed air.
- The feed hopper (D) can also be wiped clean using normal household detergent.

**Installing the feed hopper**
- Place the feed hopper (D) onto the grinding chamber with the handle (F) pointing forwards.
- Secure the feed hopper (D) using the four M6 Allen screws (DS).

7.2 Wear

Rotors and stator cutting bars can wear according to the frequency of grinding operations and the nature of the sample material. The rotor cutting bars (Q) and the stator cutting bars (R) should be checked regularly for wear and replaced as necessary.
7.2.1 Replacing the cutting bars

**CAUTION**

**Cuts**

Sharp cutting edges
- The sharp cutting edges of the rotor cutting bars in the grinding chamber and of the stator cutting bars can lead to cuts on hands.
- Do not touch the rotor cutting bars and the stator cutting bars by the sharp cutting edges.
- Wear cut-resistant protective gloves.

![Fig. 22: Replacing the cutting bars](image)

Switch the SM 400 off.
Disconnect the SM 400 from the power supply and secure to prevent it restarting.
Open the SM 400.
Tilt the feed hopper backwards.

**Replacing the rotor cutting bars**
- Unscrew the M12x25 Allen screws (QS) on the rotor cutting bar (Q).
- Carefully remove the rotor cutting bar (Q) from the rotor.
- Place the new rotor cutting bar (Q) on the rotor.
- Secure the new rotor cutting bar (Q) on the rotor using the M12x25 Allen screws (QS). The tightening torque is 15 Nm.
- Turn the rotor to replace the other two rotor cutting bars (Q).

**Replacing the stator cutting bars**
- Unscrew the M10x25 hexagon screws (RS) on the stator cutting bars (R).
- Remove the stator cutting bars (R) from the grinding chamber.
- Place the stator cutting bars (R) in the grinding chamber.
- Secure the stator cutting bars (R) loosely with the M10x25 hexagon screws (RS).
- Using the adjusting screws (T), adjust the cutting gap to at least 0.3 mm.
- Secure the stator cutting bars (R) tightly using the M10x25 hexagon screws (RS). The tightening torque is 15 Nm.
- Tilt the feed hopper forwards.
- Close the SM 400.
7.3 Maintenance

7.3.1 Adjusting the cutting bars

**CAUTION**

Cuts
Sharp cutting edges

- The sharp cutting edges of the rotor cutting bars in the grinding chamber and of the stator cutting bars can lead to cuts on hands.
- Do not touch the rotor cutting bars and the stator cutting bars by the sharp cutting edges.
- Wear cut-resistant protective gloves.

![Image](image_url)

**Fig. 23:** Adjusting the stator cutting bars

- Switch the SM 400 off.
- Disconnect the SM 400 from the power supply and secure to prevent it restarting.
- Open the SM 400.
- Tilt the feed hopper backwards.

**NOTICE** The three rotor cutting bars (Q) and the two stator cutting bars (R) are now freely accessible.

Using a screw pitch gauge, check the cutting gap between the three rotor cutting bars (Q) and the two stator cutting bars (R) across the entire length. The cutting gap should be **0.3 mm** wide. Adjust the stator cutting bars (R) as follows:

**Adjusting the stator cutting bars**

- Loosen the M10x25 hexagon screws (RS) on the stator cutting bar (R).
- Slide the stator cutting bar (R) with the adjustment screw (T) in the direction of the rotor.
- Do not adjust the cutting gap to less than 0.3 mm.
- Secure the stator cutting bar (R) using the M10x25 hexagon screws (RS). The tightening torque is **15 Nm**.
- Tilt the feed hopper forwards.
- Close the SM 400.
7.3.2 Checking the safety switch

![Fig. 24: Checking the safety switch](image)

**NOTICE** The function of the safety switch (J) must be checked regularly every 6 months.

**Carrying out the safety switch check**
- Switch the SM 400 on (idling).
- Unscrew the locking screw (G) of the collecting receptacle (C).

Result: The safety switch (J) **must turn off** the drive motor (H).
- Tighten the locking screw (G) of the collecting receptacle (C).

Result: the drive motor (H) **does not start**. Restarting is only possible using the on button.
- Switch the SM 400 on using the on button.
7.4 Return for Service and Maintenance

![Return form](image)

**Fig. 25:** Return form

The acceptance of devices and accessories of the Retsch GmbH for repair, maintenance or calibration can only be effected, if the return form including the decontamination declaration service has been correctly and fully completed.

- Download the return form located in the download section "Miscellaneous" on the Retsch GmbH homepage (http://www.retsch.com/downloads/miscellaneous/).
- When returning a device, attach the return form to the outside of the packaging.

In order to eliminate any health risk to the service technicians, Retsch GmbH reserves the right to refuse the acceptance and to return the respective delivery at the expense of the sender.
8 Accessories

Information on available accessories as well as the respective manuals are accessible directly on the Retsch GmbH homepage (http://www.retsch.com) under the heading "Downloads" of the device.

Information on wear parts and small accessories can be found in the Retsch GmbH general catalogue also available on the homepage.

In case of any questions concerning spare parts please contact the Retsch GmbH representative in your country, or Retsch GmbH directly.
9 Disposal

In the case of a disposal, the respective statutory requirements must be observed. In the following, information on the disposal of electrical and electronic devices in the European Community are given.

Within the European Community the disposal of electrically operated devices is regulated by national provisions that are based on the EU Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE).

Accordingly, all devices supplied after August 13th 2005 in the business-to-business area, to which this product is classified, may no longer be disposed of with municipal or household waste. To document this, the devices are provided with the disposal label.

![Disposal label](image)

Fig. 17: Disposal label

Since the disposal regulations worldwide and also within the EU may differ from country to country, the supplier of the device should be consulted directly in case of need.

This labelling obligation is applied in Germany since March 23rd 2006. From this date on, the manufacturer must provide an adequate possibility of returning all devices delivered since August 13th 2005. For all devices delivered before August 13th 2005 the end user is responsible for the proper disposal.
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SM 400 | 21.010.xxxx

EU DECLARATION OF CONFORMITY

Herewith we declare, represented by the signatory, that the above mentioned device complies with the following directives and harmonized standards:

Machinery Directive 2006/42/EC
Applied standards, in particular:
DIN EN ISO 12100 Safety of machinery

EMC Directive 2014/30/EU
Applied standards, in particular:
DIN EN 55011 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

Low Voltage Directive 2014/35/EU
Applied standards, in particular:
DIN EN 61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use

Authorized person for the compilation of technical documents:
Dr. Loredana Di Labio (technical documentation)

Furthermore, we declare that the relevant technical documentation for the above mentioned device has been compiled according to Annex VII Part A of the Machinery Directive, and we undertake to submit this documentation on request to the market surveillance authorities.

In case of a modification of the device not previously agreed with Retsch GmbH, as well as the use of unauthorised spare parts or accessories, this declaration will lose its validity.

Retsch GmbH
Haan, 10/2018

Dr. Alexander Mühlig, Technical Director

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