

**Operating Instructions Heavy-Duty Cutting Mill
Type SM2000**

Retsch[®]

Information on these operating instructions

The present operating instructions for the model SM 2000 high-performance cutting mill provide all the necessary information on the topics mentioned in the table of contents.

These instructions will guide the reader to each topic associated with the safe use of the SM 2000, in accordance with the purpose for which the unit is intended. Each target group should be fully familiar with the relevant chapters, as this is essential to safe and proper use of the equipment.

The present technical documentation has been designed for use as both a reference source and learning guide. Each chapter represents a self-contained unit.

These operating instructions do not contain any information on repairs. If repairs should ever become necessary, kindly contact your supplier or the Retsch GmbH.

Information on these operating instructions	2
Safety	4
Safety notes	4
Warnings	5
Repairs	5
Confirmation	5
Technical specifications	6
Utilization in accordance with the intended purpose.....	6
Motor speed.....	6
Capacity.....	6
Noise generation.....	7
Safety concept / Safety equipment.....	7
Rated motor power	7
Unit dimensions (all values are approximate).....	7
Footprint	7
Shipping and installation	8
Packing.....	8
Shipping	8
Intermediate storage	8
Standard equipment.....	8
Requirements for the installation site	9
Setting up the unit.....	9
Electrical connection	10
Operation	11
Control elements and their use.....	11
Schematic view of the operating controls:	11
Summary table	12
Opening and closing the grinder housing.....	13
Opening	13
Closing	13
Switching on and off	14
Interrupting the grinding operation.....	14
Resuming the grinding operation.....	15
Mounting the bottom sieve.....	15
Emergency release.....	15
Rotor application ranges.....	16
Standard rotor (cutting blade rotor)	16
Cutting roller	17
Hopper application ranges	18
Preparations for the grinding operation	18
Standard hopper	18
Feeding the product to be ground when using the standard hopper	18
Long product hopper	19
Feeding the product when using the long product hopper	19
Bulk goods hopper.....	20
Feeding the product when using the bulk goods hopper	20
General	21
Cleaning	21
Inspections	21
Cutting gap	21
Maintenance.....	22
Changing the rotor	22
Copyright.....	23
Modifications	23
Accessories	23
Safety regulations (tabular).....	24
Malfunction reports	25
Troubleshooting table	25
Warranty Conditions	26

Safety

Target group: Everyone who deals with the machine in any manner whatsoever.

The SM 2000 is a modern, high-performance product manufactured by the Retsch GmbH. It incorporates the latest technology. It is entirely safe in operation when used for the intended purpose and in accordance with the present technical documentation.

Safety notes

You, as the owner/operator, must ensure that persons entrusted with the operation of the SM 2000:

- * have read and understood all the regulations included in the chapter on safety,
- * have made themselves familiar, prior to starting work, with all the operating instructions and regulations for the target groups relevant to them,
- * have complete, immediate and unhindered access to the technical literature for this machine,
- * before commencing work, new personnel shall have been made familiar with safe and appropriate use of the SM 2000 before starting work with the machine, through instruction by a qualified person and/or with the help of the present technical documentation.
- * Incorrect operation can result in injuries to persons and damage to property. You bear responsibility for your own safety and for that of your coworkers.
- * Ensure that no unauthorized persons have access to the SM 2000.

For your own protection, have your co-workers certify in writing the fact that they have received instruction in the operation of the SM 2000. A suggestion for a printed form which can be used for this purpose will be found at the end of the chapter on safety.



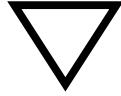
We reject herewith any and all claims in conjunction with personal injury or property damage resulting from failure to observe the following safety instructions.

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 only 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: SM 2000

Utilization in accordance with the intended purpose

The SM 2000 high-performance cutting mill is intended for intermittent (batchwise) or continuous reduction of elastic, hard and brittle, and fibrous products and mixes of products. It is not designed for use in production operations but rather is a laboratory unit, laid out for 8-hour, single-shift operations at 30% duty cycle. Neither is the SM 2000 engineered for grinding wet or moist materials. The special shape of the cutting components, working in conjunction with the drive, effect fast, efficient reduction without any disturbing loading of the product being processed.



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.

Some of this machine's special features are:

- * fast, successive size reduction by way of 18 cutting blades, arranged in a helical pattern along the circumference of the rotor
- * indexable cutting blades made of high-quality materials
- * enhanced operator convenience with central lock and a control console
- * consistent operating safety in all safety-critical control components
- * versatile in use due to a number of design alternatives and a wide range of accessories

Motor speed

approx. 695 r.p.m. at 50 Hz / 835 r.p.m. at 60 Hz

or

approx. 1430 r.p.m. at 50 Hz / 1690 r.p.m. at 60 Hz

Capacity

- * maximum of up to 5000 ml using the standard receiver and depending on the nature of the product being processed and expandable up to a
- * maximum of 30,000 ml using additional components which are available as accessories

Noise generation

Noise level registered at a distance of 1 m:

approx. 66 dB (A) when idling

During operation, depending on the nature of the product being processed:

approx. 75 to 92 dB (A) with peaks of up to 98 dB (A)

Safety concept / Safety equipment

IP53

IP20 with the door opened to trigger safety switch

Feed hopper as per EN 294

Discharge chute as per EN 294

Rated motor power

1500 watts

Unit dimensions (all values are approximate)

Height:	1805 mm	Width:	550 mm
Depth:	600 mm	Weight:	95 to 130 kg

Footprint

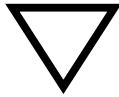
550 mm × 600 mm; no safety clearances required

Shipping and installation

Target group: Owner, freight forwarder, operator

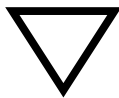
Packing

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



Please retain the packaging for the duration of the guarantee period since, in case a claim arises, your guarantee entitlements will be jeopardized if the unit is returned in unsuitable packaging.

Shipping



The SM 2000 may not be subjected to impact or vibration during transportation; it must 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 SM 2000 will have to be protected against condensation; the electronic components could otherwise be damaged.

Intermediate storage

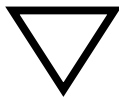
Also ensure that the SM 2000 is stored in a dry place.

Standard equipment

- * SM 2000 with base stand
- * 5-liter receiver
- * Feed hopper
- * Operating instructions

Check to ensure that the shipment is complete and includes any accessories which you may have ordered separately.

Verify that the SM 2000 operates perfectly (see in this regard the chapter on operation).



If the shipment is not complete or is damaged, you must notify the forwarder and Retsch GmbH immediately (within 24 hours). Under certain circumstances compensation cannot be paid for claims which are lodged later.

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

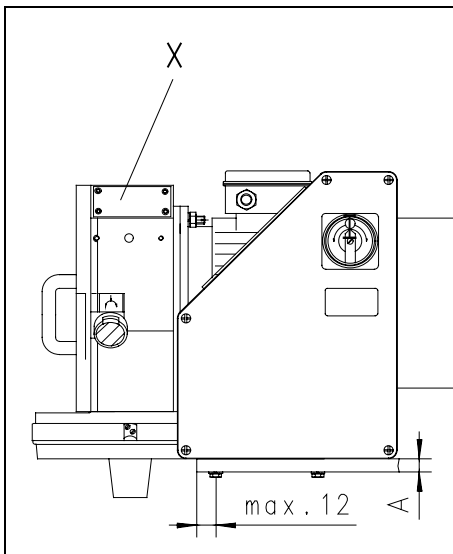


Fig. 1

Setting up the unit

The SM 2000 is bolted to the base stand without the feed hopper being mounted, however.

You will have to replace the shipping plate **X** with the appropriate feed hopper.

The fastening elements for the shipping plate **X** are used to attach the feed hopper. **Fig. 1**

Attachment to a laboratory bench or the like, provided by the owner, is possible whenever desired.

In this case, the following must be observed:

- * The bench must exhibit sufficient strength and stability, and
- * fixing screws appropriate for the thickness of the bench top ($A + 30$ mm) shall be used, and
- * the distance from the edge of the bench top to the front screws shall be a maximum of 12 mm, and
- * once the SM 2000 has been affixed, it must be possible to insert and remove the receiver without difficulty.



Never operate the SM 2000 without either the cover plate **X** or a feed hopper in place.

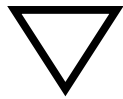
Hazard of injury to the skin and hands.

Electrical connection

The electrical connection shall be made only by a qualified and licensed electrician.

- * The voltage and frequency specifications for the SM 2000 will be found on the data plate.
- * Ensure that the values shown there correspond to those for the local power supply.
- * Use the supplied power cord to connect the SM 2000 to the power source.
- * When connecting the power cord to the line supply, external fusing shall be provided in accordance with local codes.

The controls for the SM 2000 feature a 1 ampere (slow-blow) micro-fuse which, however, protects only the control circuits themselves.



Failure to observe the values on the data plate can cause damage to either the electrical or the mechanical components or both.



Check the motor rotation direction (corresponding to the arrow on the motor) before putting the unit into service for the first time.

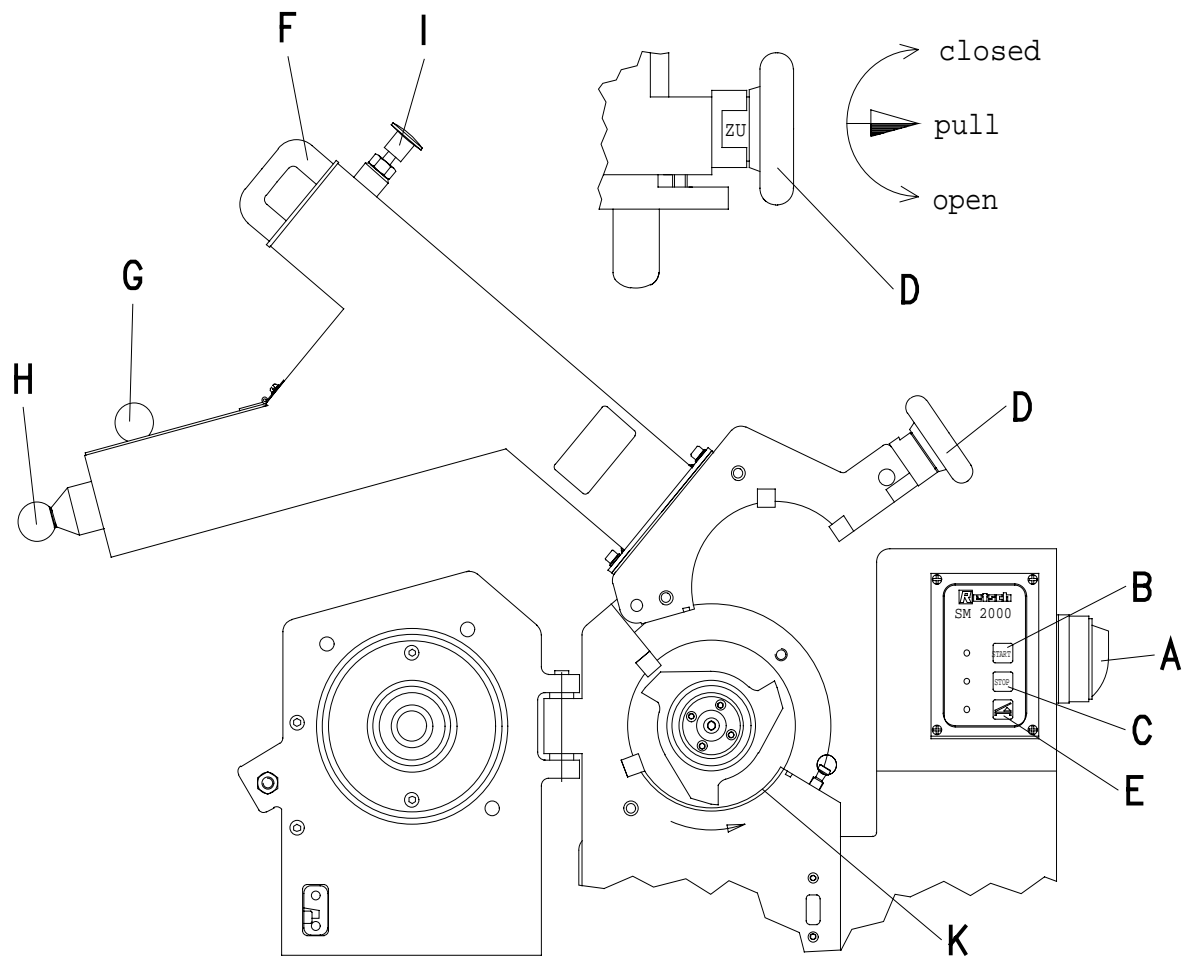
Rotation in the wrong direction will result in insufficient cutting action; mechanical components could be damaged.

Operation

Target group: Operators

Control elements and their use

Schematic view of the operating controls:



The standard feed hopper shown above is an accessory item; please also refer to the chapter on “feed hopper application ranges”.

The operating controls and their functions
Summary table

Element	Description	Function
A	Main switch Main power disconnect, right-hand side	Connects and isolates the SM 2000 from the line supply. ON = The STOP and OPEN DOOR LEDs light OFF = all LEDs go out
B	Start button green, top right	Switches on the drive. STOP and OPEN DOOR LEDs go out. LED in button B lights.
C	Stop button red, top center	Switches off the drive. The OPEN DOOR LED lights after a delay. LED in button C lights.
D	Central lock Handwheel	Locks and unlocks the doors together with the lower and upper housing sections. Makes it possible to open the door, using the blue button E , when in the open position. * Closing Pull the handwheel out to the stop and turn <u>clockwise</u> to the stop; let the handwheel snap back into place. * Opening Pull the handwheel out to the stop and turn <u>counter-clockwise</u> to the stop; let the handwheel snap back into place.
E	OPEN DOOR button blue, bottom right	Unlocks the safety switch once the drive has come to a full stop. LED is off = Drive is still moving LED lit = Door can be opened
F	Fill plunger Standard version made of wood. Special version made of plastic.	Clears the product feed opening when withdrawn. Pushes product against the rotor.
G	Fill flap	Opens and closes the feed chute. Allows user to fill the product to be ground and prevents reaching into the grinding chamber.
H	Metering plunger	Moves product into the feed chute area of the feed plunger F . * When pulled out: Fill flap G can be opened; product to ground can be filled. * When pushed in: Fill flap G cannot be opened; product being ground remains in the area of the fill plunger F .
I	Detent pin	Prevents pulling out; blocks or releases the fill plunger F . * When pulled out: Fill plunger F can be moved as desired. * When released: Fill plunger F is held in the uppermost position.
K	Bottom sieve	Influences the ultimate fineness of the product being ground, depending on the size and shape of the perforations.

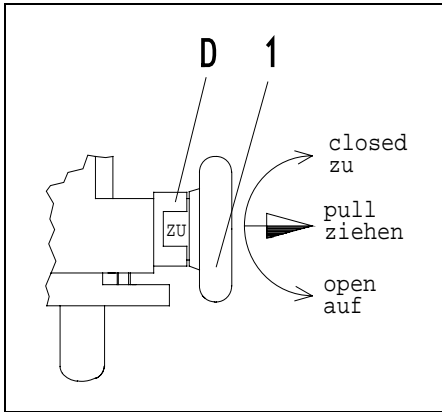


Fig. 2

Opening and closing the grinder housing

The following requirements must be met to open the cutter housing:

- * voltage must be supplied to the controls;
- * the motor has come to a full and complete stop.

The latter is indicated, once stop button **C** has been pressed, by the LED lighting next to button **E**. Fig. 3

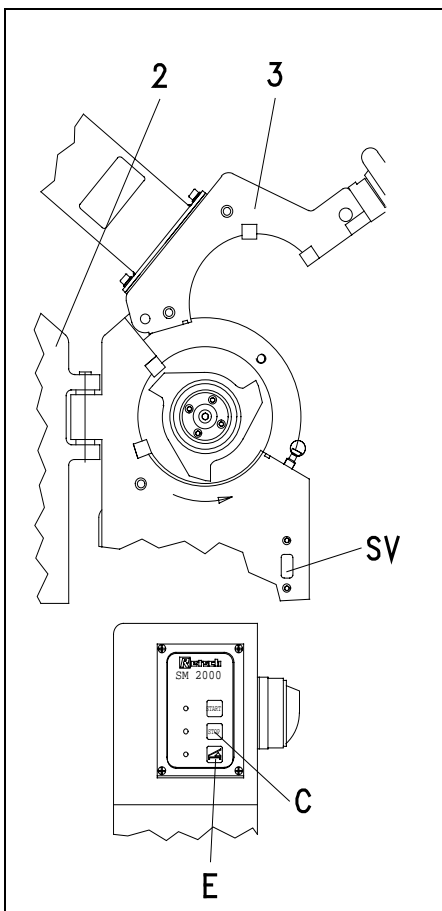


Fig. 3

Opening

- * Releasing the central lock **D**:

To do so, pull the handwheel **1** out to the stop and turn **counterclockwise** all the way to the stop. Fig. 2

- * Opening the door **2**:

To do this, press the blue button **E** in order to unlock the safety latch **SV**. The LED next to the button **E** goes out and the door can be opened. Fig. 2/3

- * Swing away the upper housing section **3**:

To simplify cleaning the rotor and the cutting chamber, the upper housing section **3** can be swung away when the door **2** is open. In this situation the door **2** cannot be closed. Fig. 3

Closing

- * Closing the upper housing section **3** and the door **2**:

Ensure, before attempting to close the housing and the door, that the mating surfaces and the centering bores are free of product and grime. Fig. 3

- * Engage the central lock **D**.

To do so, pull the handwheel **1** out to the stop and turn **clockwise** to the stop. Fig. 2



Close the upper housing section and the door only if the mating surfaces and the centering bores are absolutely free of product and other contaminants.

Mechanical components could be damaged.

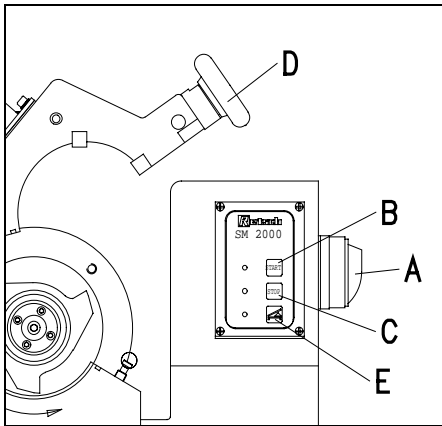


Fig. 4

Switching on and off

The main switch **A** is located on the right-hand side of the SM 2000. Fig. 4

- * Turn on the main switch **A**.

The SM 2000 will now conduct a safety check, indicated by the LED blinking sequence: **B/C/E**.

The conclusion of the internal safety check is indicated by LEDs **C/E** lighting.

To be able to start the SM 2000 it will, however, be necessary to open and close the door once so that the safety check is completed.

Open central lock **D**.

- * Press button **E**.

- * LED **E** goes out
- * LED **C** lights

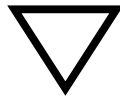
Close doors and central lock

- * LED **E** lights
- * LED **C** lights

The SM 2000 can now be started.

- * Press button **B**.

- * LEDs **C/E** go out
- * LED **B** lights



The manually operated central lock **D** is to be kept closed at all times, without fail, during the grinding operation. Fig. 4
Mechanical components could be damaged.

Interrupting the grinding operation

The grinding operation can be interrupted by pressing the STOP button **C**. Fig. 4

Once the motor has come to a complete stop it is possible, by pressing button **E**, to release the safety latch.

The manual central lock **D** can now be used to open both the doors and the grinding chamber. Fig. 4



Do not use the main switch **A** to interrupt the grinding operation. Fig. 4
If this switch is used, then it will be impossible to open the door and the grinding chamber.

Resuming the grinding operation

Fig. 5

The grinding operation **cannot** be restarted unless the door has been opened once.

- * Once the grinding operation has been interrupted:
- * Press the START button **B**.
- * LED **E** blinks; starting is impossible.
- * Press the STOP button **C** and OPEN door button **E**.
- * Open the door and close it again.
- * LEDs **E** and **C** light.
- * Press button **B**; the SM 2000 starts.

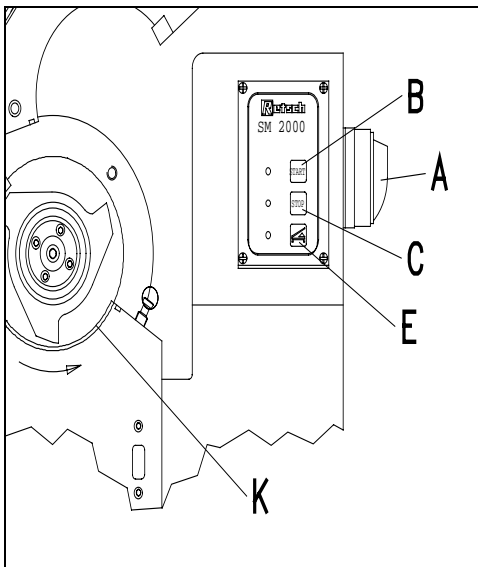


Fig. 5

Mounting the bottom sieve

It is also possible to work without the bottom sieve **K**, where only coarse, preliminary shredding is desired.

- * Select the appropriate bottom sieve
- * Open the grinding chamber
- * Slide the bottom sieve **K** of your choice into the SM 2000,

Fig. 5

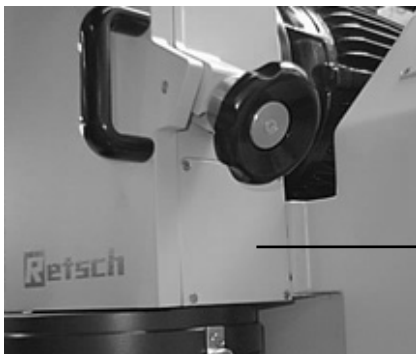


Fig.6

Emergency release

An emergency release is necessary in the event of failure of the power supply to the SM 2000 (eg. blown fuse or defective controller)

Fig. 6 and 7

- Unscrew cover **A**.
- Slide rib **R** backwards using a screwdriver.

The door is now open, affording free access to the grinding chamber.

- Screw cover **A** back on.



Fig.7

Rotor application ranges

(Without any claim to completeness)

Target group: Laboratory personnel

Standard rotor (cutting blade rotor)

Fig. 8

Applications for the SM 2000 operating at 1430 to 1690 r.p.m.

- * Biological products
- * Sorted domestic and residential refuse
- * Plastic or nonferrous metal drilling and milling chips
- * Materials which have been treated to make them brittle
- * products insensitive to thermal strain

Applications for the SM 2000 operating at 750 to 835 r.p.m.

- * Plastic films and textiles
- * Rubber and toxic wastes
- * Moulded plastic components
- * Electronic scrap without ferrous or steel components
- * Beverage cans, carpet wastes
- * Plastic granulates

Our applications laboratory will be happy to provide additional information and support where required.

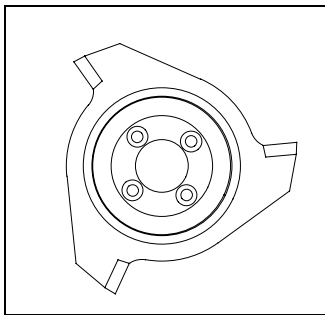


Fig. 8



The abrasive laminates contained in some electronic scrap may cause a considerable reduction in the service life of the cutting components.

When feeding large-grained, tougher product, the high pulling power of the **standard rotors** can cause blockages typical for cutting mills.

Mechanical components could be damaged.

Using the “**cutting roller** “ offers an interesting expansion of the applications here.

Cutting roller

Max. permissible feed size: 80 mm. (diagonal measurement) Fig. 9
Can be used only with the SM 2000 running at 750 to 835 r.p.m.

- * Thick-walled moulded plastic parts
- * Thick-walled plastic wastes
- * Drilling cores made of wood or plastic
- * Every type of thick-walled electronic components, not containing ferrous metals or steel

The experts at our applications laboratory are available to provide additional information.

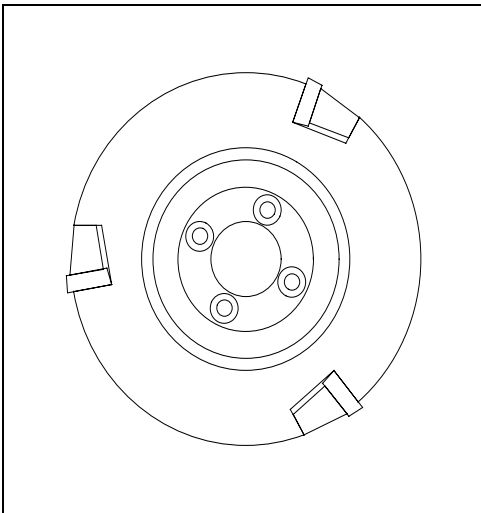


Fig. 9



The abrasive laminates contained in some electronic scrap may cause a considerable reduction in the service life of the cutting components.

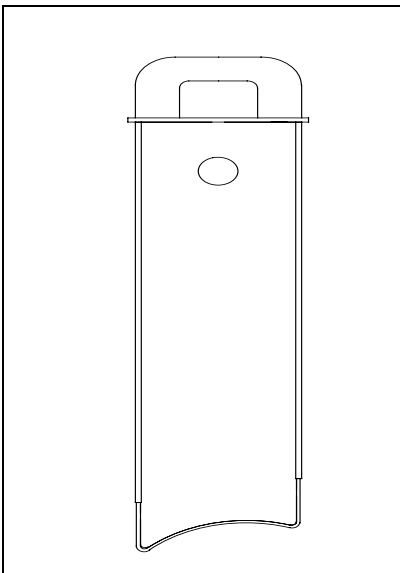


Fig. 10

Thanks to the cylindrical shape of the basic body for the cutting roller, only very thin chips will be generated, similar to those in milling processes.

As a result, the self-feeding capacities of the cutting roller are reduced to the point that the product will now have to be pushed with the feed plunger.

To do so, use the extended-length, sheet metal jacketed feed plunger supplied with the cutting roller. Fig. 10



Where the grain sizes exceed 20 mm, the feed plunger can be forced back with a jerk.

Injuries and bruises to the hand are possible.



When dealing with hard, tough products, always conduct preliminary trials with pieces smaller than 20 mm in size.

Blockages can damage mechanical components.



Pre-grind electronic boards using bottom sieves with openings greater than 4 mm.

Blockages can damage mechanical components.

Hopper application ranges

(Without claim to completeness)

Target group: Laboratory personnel

Preparations for the grinding operation

- * Insert the bottom sieve of your choice.
- * Close the housing and the door.
- * Attach the receiver at the discharge chute.
- * Switch on the SM 2000.



Feed product to be ground only when the SM 2000 is running.
Blockages could damage mechanical components.

Standard hopper

Fig. 9

This all-purpose hopper can be used in most cases.
It is suitable, for example, for the following:

- * Rubber and toxic wastes
- * Moulded plastic parts
- * Electronic scrap without larger metal components
- * Beverage cans
- * Leather scraps

Our applications laboratory will help you with further support and assistance.



If moist or damp product is to be processed, the wooden plunger is to be pulled out of the hopper, all the way to the uppermost position, so that it can dry.
The plunger swells when moist and will stick inside the hopper.

Feeding the product to be ground when using the standard hopper

Fig. 11

- * Switch on the SM 2000.
- * Pull the feed plunger **F** and metering plunger **H**.
- * Open the feed flap **G** and feed the product to be ground.
- * Close the feed flap **G** and, if necessary, use the metering plunger **H** to push down the product to be ground.
- * Grasp the feed plunger **F** at the handle.
- * Pull the detent pin **I** and slowly press the feed plunger **F** downward.

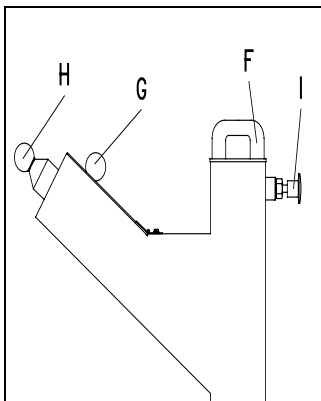


Fig. 11



Do not apply excessive force when pressing the feed plunger downward.
Blockages can damage mechanical components.

In most cases the feed plunger's own weight will be sufficient to press the product into the grinding chamber.
If this should not be the case, then the feed plunger can be used to press the product gently into the feed hopper, being careful not to overload the SM 2000.

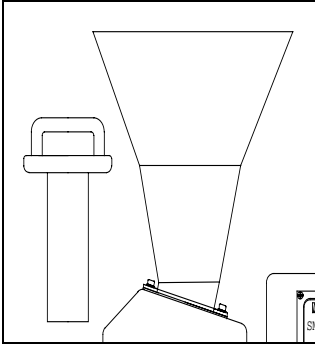


Fig. 12

Long product hopper

Fig. 12

This hopper is suitable for feeding product which is long. It can be used, for example, for:

- * Cable scraps
- * Carpet wastes
- * Straw, grass and the like
- * Branches, twigs and the like

Our application laboratory will help you to provide additional information and support.

Feeding the product when using the long product hopper

Fig. 10

- * Switch on the SM 2000.
- * Insert the product into the hopper
- * Feed the product by hand
- * Use the wooden plunger to push the product over the protective wedge located inside the hopper.



Be sure to use protective gloves when dealing with long product since the SM 2000 will pull the product forcefully into the cutting chamber.

Injuries to the skin and hands would otherwise be possible.



Push the product beyond the protective wedge located inside the hopper only with the wooden plunger delivered with the hopper.

Mechanical components can be damaged if other aids are used.



Do not feed any product which is in pieces.

Hazard of injury if the product is ejected from the hopper.

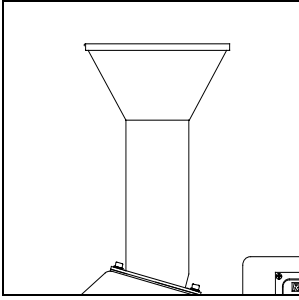


Fig. 13

Bulk goods hopper

Fig. 13

This hopper is used whenever largely bulk and pourable goods have to be processed.

Examples would include:

- * All pourable bulk goods
- * Fodder pellets

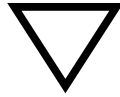
Our application laboratory would be happy to provide additional information and support where required.

Feeding the product when using the bulk goods hopper

Fig. 13

- * Switch on the SM 2000.
- * Slowly pour the product into the funnel.

The kickback baffles located inside the hopper keep the product from being ejected from the hopper.



Feed the product slowly and carefully, since the rotor can block if overloaded.

Mechanical components could be damaged.

General

Cleaning

Use only a dry or slightly moistened cloth, brush or compressed air to clean the SM 2000.



Do not use running water or spray to clean the SM 2000.

Fatal electrical shock hazard.

Solvents may not be used as they could damage the gaskets and seals in the SM 2000.

Inspections

Cutting gap

Fig. 14

The quality of the size reduction process will be determined to a critical extent by the size of the cutting gap, the properties of the bottom sieve and the distance between the indexable cutting blades and the cutting strip.

For this reason the cutting strips are designed so that they can be shifted to set cutting gap width.

Adjustment procedure:

- * Stop the SM 2000.
- * Open the central lock.
- * Open the doors and mill housing.
- * Use a feeler gauge to check the cutting gap.
- * It should be ≥ 0.3 mm.
- * Loosen screw 86.
- * Turning grub screws 83 to the right will narrow the cutting gap.
- * Set the cutting gap to ≥ 0.3 mm.
- * Re-tighten the screw 86 with a max. of 7 Nm

Dulled cutting strips 421 can be turned around (180°) and re-used.

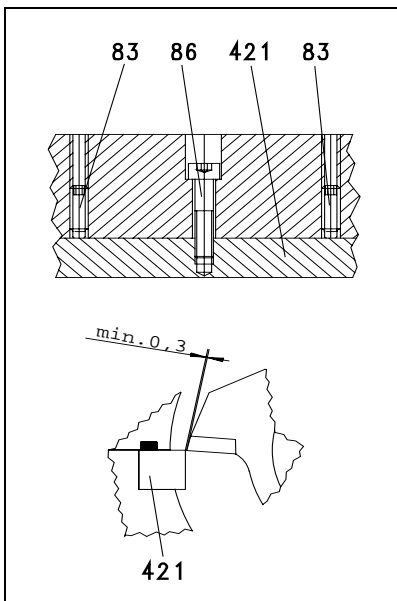
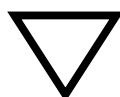


Fig. 14



Never set the cutting gap for a value less than 0.3 mm.

Potential contact between the indexable cutting blades and the cutting strip could cause damage to mechanical components.

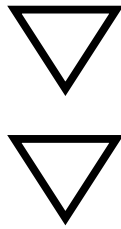


Do not surpass the tightening torque of 7 Nm for screw 86.

Otherwise the cutting bars could break.

Maintenance

If wet or moist product is being processed, then the SM 2000 will have to be thoroughly cleaned and dried. When working under such conditions it will also be necessary to remove the rotor and lubricate the motor shaft at regular intervals.



Examine the motor shaft and the rotor regularly for signs of corrosion.

Otherwise it will not be possible to remove the rotor without excessive effort.

When the product being ground is largely moist, a plastic plunger is available as an accessory for use with the standard hopper.

It prevents sticking as a result of swelling.

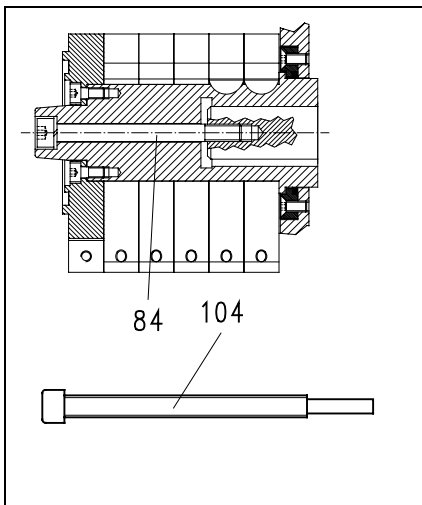


Fig. 15

Changing the rotor

Pull the rotors as shown in Fig. 15.

- * Stop the SM 2000.
 - * Open the door and swing the housing upward.
 - * Unscrew the machine screw **84** (M8 × 85).
 - * Turn down the machine screw **104** (M10 × 130).
- The rotor is slowly pulled forward when this is done.
- * Clean and lubricate the motor shaft and the rotor.
 - * Plunger the rotor onto the motor shaft.
 - * Reinstall the machine screw **84** (M8 × 85) together with the lock washer.

Otherwise SM 2000 is largely maintenance-free.

We do recommend, however, doing the following at least **once a month**, depending on how often the machine is used:

- * Examine the cutting components.
- * Check the door bearing, the housing hinges and the central lock for ease of use; clean if necessary.

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Modifications

Subject to modification without prior notice.

Accessories

(Without any claim to completeness)

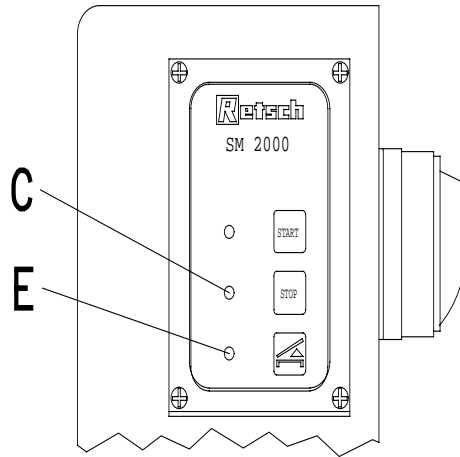
- * Various bottom sieves
- * Cutting roller with wooden plunger
- * Parallel cutting rotor
- * Standard hopper with wooden plunger
- * Plastic plunger for standard hopper
- * Long product hopper
- * Bulk good hopper
- * Accessories box
- * 30-liter receiver, made of plastic
- * Filter hose for 30-liter receiver
- * Filter unit for 5-liter receiver
- * Grime catch bowl
- * Various base stands

Subject	Action	Hazard
Safety	Personal injury and property damage due to not observing the safety notes.	Any and all claims for compensation are expressly excluded.
Packing	Please retain the packaging for the duration of the guarantee period.	Returning equipment in insufficient packaging can jeopardize guarantee entitlements.
Shipping	The SM 2000 is not to be subjected to impact or vibration during shipment; do not throw the package.	Electronic and mechanical components could be damaged.
Temperature fluctuations	In case of temperature fluctuations, protect the SM 2000 against condensation.	Electronic components could be damaged.
Scope of supply	If the shipment is not complete or is damaged, you must notify the forwarder and Retsch GmbH immediately (within 24 hours).	Under certain circumstances compensation cannot be paid for claims which are lodged later.
Ambient temperature	Temperature below 5° C Temperature above 40° C	Electronic and mechanical components could be damaged. Performance data could change to an unpredictable extent.
Humidity	Exceeding 80% relative humidity at temperatures of up to 31° C.	Electronic and mechanical components could be damaged. Performance data could change to an unpredictable extent.
Installation	Never operate the SM 2000 without a feed hopper.	Hazard of injury to the skin and hands.
Electrical connection	Local power supply does not correspond to the values given on the data plate.	Electronic components could be damaged.
Closing the SM 2000	Close the upper housing section and the door only if the mating surfaces and centering bores are free of grime.	Mechanical components could be damaged.
Switching on and off	The manually operated central lock is without fail to be closed before switching on the machine.	Mechanical components could be damaged.
Interrupting the grinding operation	Do not use the main switch to interrupt the grinding operation.	If the main switch is used, it will be impossible to open the door and the grinding chamber.
Standard rotor	Blockages typical of cutting mills may be encountered.	Mechanical components could be damaged.
Cutting roller	Where the piece sizes exceed 20 mm, the feed plunger can be forced back with a jerk.	Injuries and bruises to the hand are possible.
	When dealing with hard, tough product, always conduct preliminary trials with pieces smaller than 20 mm in size.	Blockages can damage mechanical components.
	Pre-grind electronic boards using bottom sieves with openings larger than 4 mm.	Blockages can damage mechanical components.
Standard hopper	Always thoroughly clean and dry the SM 2000 and the wooden plunger after grinding wet or moist product.	Mechanical components can be damaged. The wooden plunger will swell due to moisture and will stick in the hopper.
	Do not apply excessive force when pressing the feed plunger downward.	Blockages can damage mechanical components.
Long product hopper	Wear protective gloves.	Injuries to the skin and hands are possible.
	Always use the wooden plunger to push down product being ground.	Other aids could cause damage to mechanical components.
Bulk goods hopper	Feed product slowly and carefully.	Blockages can damage mechanical components.
Cleaning	Always disconnect the line cord before starting any cleaning operation.	Fatal electrical shock hazard.
	Do not clean with running water or spray.	Fatal electrical shock hazard.
Cutting gap	Never set the cutting gap width for less than <0,3 mm.	Potential contact between the indexable cutting blades and the cutting strips could damage mechanical components.
Maintenance	Regularly inspect the motor shaft and the rotor for signs of corrosion.	Otherwise it will not be possible to remove the rotor without excessive effort.

Malfunction reports

Your SM 2000 is fitted with a malfunction diagnostics and display system which is unique among laboratory grinding mills.

The SM 2000 uses the blinking sequences at the LEDs **E** and **E & C** to indicate both operating and component errors.



Troubleshooting table

Blinking sequence for LED E	Problem	Remedy
Blinking at uniform intervals	Safety check not yet completed	Open and close the door
Blinks twice, with pause	Motor standstill monitoring unit defective	Call customer service
Blinks 3 times, with pause	Door interlock switch defective	Call customer service
Blinks 4 times, with pause	Watchdog defective	Call customer service
Blinking sequence for LEDs E & C	Problem	Remedy
Blinks 11 times, with pause	Master stop T1 defective	Call customer service
Blinks 12 times, with pause	Motor relay T2 defective	Call customer service
Blinks 13 times, with pause	Door not locked	Close door, engage central lock
Blinks 14 times, with pause	Motor too hot	Wait for motor to cool down; if necessary, switch off the SM 2000 and then switch it on again.
Blinks 15 times, with pause	EPROM defective	Call customer service
Blinks 16 times, with pause	RAM defective	Call customer service
Blinks 17 times, with pause	Software error	Call customer service

Warranty Conditions

1. If legitimate claims are made we shall remedy the defect or replace the goods free of charge.

The purchaser shall only have a right to rescind the contract or reduce the purchase price if we have decided that it is not possible to remedy the defect and a replacement delivery cannot be made or the time limit therefore cannot be complied with or if a reasonable additional time limit of six weeks granted by the customer has not been complied with due to our fault.

If the remedy or replacement delivery in fact fails the customer shall have the right to reduce the price or rescind the contract at his discretion. Further claims, in particular for damages in relation to damage not caused to the goods themselves, such as lost production, are excluded in so far as we have not acted wilfully or negligently. For goods produced by third parties we pass on the liability of the manufacturer.

2. We shall bear the costs directly incurred through the remedying of defects or the replacement delivery on the condition that claim is found to be legitimate. This also applies to the freight costs as well as the reasonable costs of removal and installation. The customer, however, undertakes to bear the reasonable costs of providing his own technicians and assistants on site.

If our customer carries on business overseas, however, we shall be entitled to pay the costs, in particular costs of transport, tolls, wages and materials, ex German border.

3. The warranty term for newly manufactured goods is two years, for used it is one year.

The guarantee refers to deployment in a laboratory in 1-shift operation. In case of multi-shift operation or other areas of application, the guarantee term is shortened accordingly.

No warranty is given for parts subject to wear and tear.

4. We warrant that our goods are free from manufacturing defects. The suitability, classification and function of our goods are determined exclusively on the basis of the performance descriptions contained in the order confirmation even if these differ from the order. In the latter event the customer may, within two weeks after receipt of the order confirmation, draw any possible difference from the order to our attention and come to an agreement on these with us. If the customer does not object to the specifications in the order confirmation then these shall be deemed to have been accepted.

Unless an agreement to the contrary has been reached, we shall not be held liable for the suitability of the goods delivered for the use to which the customer intends to put them. The same applies to performance figures expected by the customer unless we have been able to carry out appropriate preliminary practical experiments and have, in our order confirmation, declared in writing that these performance figures shall be binding.

5. Our warranty shall also become invalid if persons other than those employed by us carry out repairs or in any other way interfere with or make alterations to the goods delivered by us or do not use suitable parts to the extent that the defect is causally connected thereto. In addition, it is a condition of our warranty that our directions for use and operation be followed.
6. If, without a release having first been obtained from us, the goods are installed in and /or connected to, attached to or incorporated in other systems or production plants then our guarantee is limited exclusively to the parts delivered by us.
7. The remedying of defects or replacement of defective parts shall, at our discretion, be carried out on site or at the seat of our company. If the repair is carried out on site, the customer shall ensure that our employee has access, unlimited in either time or space, to the purchased item. In addition, the customer may only demand that work necessary in order to fulfil warranty obligations be carried out during the normal local business hours. If such work is carried out outside our normal business hours on request, the customer shall bear the additional costs. If he wishes to have other particular work performed which goes beyond the work warranted then these costs shall be payable at the actual valid price.