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Information on these operating instructions

The present operating instructions for the Ultra Centrifugal Mill of type ZM200 provide all the necessary information on the headings contained in the table of contents. They act as a guide for the target group(s) of readers defined for each topic for the safe use of the ZM200 in accordance with its intended purpose. Familiarity with the relevant chapters on the part of each target group(s) of readers is essential for the safe and proper use of the equipment.

The present technical documentation has been designed both as a source of reference and as a learning tool. Each chapter is a self-contained unit. The operating instructions do not contain any repair instructions. Should repairs ever become necessary, please contact your supplier or talk directly to Retsch GmbH.

http://www.retsch.com

Warnings
The following signs are used to warn of hazards:

- Personal injuries
- Material damage

Repairs
These operating instructions do not contain any repair instructions. In the interests of your own safety, repairs should only be performed by Retsch GmbH, an authorised representative or by Retsch service technicians.

In this case, please notify the following:

- Your local Retsch representative
- Your supplier
- Retsch GmbH direct

Your address for service:
Safety

The ZM200 is a modern, high-performance product manufactured by Retsch GmbH. It incorporates the latest technology. The machine is entirely safe in its operation when used for the intended purpose and in accordance with the present technical documentation.

Safety instructions

You, as the owner/operator, must ensure that the persons who are entrusted to work on the ZM200:

- have read and understood all the regulations contained in the chapter on safety,
- have made themselves familiar, before starting work, with all the operating instructions and regulations relevant to that particular target group,
- have unrestricted access to the technical documentation for this machine at all times,
- new personnel must have familiarised themselves with the safe use of the ZM200 and its intended purpose before starting work with the machine, either through verbal instruction by a competent 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 the responsibility for your own safety and that of your staff.

Ensure that no unauthorised persons have access to the ZM200.

As a precaution, have your staff certify in writing that they have received instruction in the operation of the ZM200. A draft for such a form can be found at the end of the chapter on safety.

We reject herewith any and all claims relating to personal injury or material damage which result from the failure to comply with the following safety instructions.
# Safety directive summarised, part 1

## Safety instructions

We reject herewith any and all claims relating to personal injury or material damage which result from the failure to comply with the following safety instructions.

<table>
<thead>
<tr>
<th>Intended use</th>
<th>Do not make any modifications to the machine and only use Retsch approved spares and accessories. <strong>The conformity to the European guidelines declared by Retsch otherwise loses its validity. It furthermore leads to the loss of all warranty claims.</strong></th>
</tr>
</thead>
</table>

## Packaging

Please retain the packaging for the duration of the warranty since, in case of complaint, returning in unsuitable packaging can jeopardize your warranty claims.

<table>
<thead>
<tr>
<th>Transport</th>
<th>During transportation, do not subject the ZM200 to impacts, jolts or vibrations. The electronic and mechanical components could otherwise be damaged.</th>
</tr>
</thead>
</table>

## Temperature fluctuations

In case of wide temperature fluctuations (during shipment by air, for instance), protect the ZM200 from condensation. The electronic components could otherwise be damaged.

<table>
<thead>
<tr>
<th>Scope of supply</th>
<th>If the shipment is incomplete and / or has suffered transport damage, you must notify the forwarder and Retsch GmbH immediately (within 24 hours). Under certain circumstances, claims lodged at a later date may not be considered valid.</th>
</tr>
</thead>
</table>

## Ambient temperature:

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.

<table>
<thead>
<tr>
<th>Air humidity</th>
<th>At a higher air humidity, the electronic and mechanical components may be damaged, and performance data changed to an unknown extent.</th>
</tr>
</thead>
</table>

## Electrical connection / connecting the power

Failure to observe the values on the data plate can cause damage to electronic and mechanical components.

| Inserting the grinding tools | Set the openings for the torsion lock on the collecting vessel and the ring sieve over the torsion lock pin. **Otherwise the ZM200 cannot be started.**  
When cold grinding, do not forcibly remove the plug-on rotor, which jams easily for physical reasons, but rather wait for the temperature to level out. **Forced removal causes damage to the motor shaft and the rotor.**  
Do not forget to re-install the cassette cover. **Without the cassette cover, the motor is blocked by the thrust pins in the housing cover.** |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|


Safety directive summarised, part 2

Feeding in comminution material

*Do not feed in comminution material until the machine has been started.*

Mechanical components could be damaged when starting from standstill with the comminution material already fed in.

When feeding in comminution material, the anti-rebound fitting must be installed.

Danger that the comminution material will be sprayed about.

Unsuitable comminution material

Some comminution materials form explosive atmospheric mixtures. Check the properties of your comminution material.

**Explosion hazard**

Dusty comminution material can escape through the filling hopper during grinding. Use suction extractors if the comminution material is toxic or otherwise hazardous to health.

Danger of breathing in dust hazardous to health.

Comminution methods

*Do not pre-grind without the ring sieve.*

The collecting base can suffer serious damage

The rotor can damage the cassette cover.

Comminution by cold grinding

When cold grinding with liquid nitrogen, always fit the anti-rebound fitting X into the filling hopper.

Danger of injuries to eyes and skin from extreme freezing.

Wear safety gloves and goggles, The temperature of the liquid nitrogen is -196°C

Danger of injuries to eyes and skin from extreme freezing.

When cold grinding, do not forcibly remove the plug-on rotor, which jams easily for physical reasons, but rather wait for the temperature to level out.

**Forced removal causes damage to the motor shaft and the rotor.**

Paper filter with retainer

The volume able to be taken up by the paper filter depends on the density of the grinding material and the hole width of the ring sieve.

The paper filter can be destroyed by overfilling and by the weight of the comminution material

Cleaning

Do not clean the ZM200 with flowing water.

**Mortal danger from electric shock**

Only use a cloth dampened with water. solvents are not permitted.

Maintenance

The easy running of roller 1 on the trannion piece is essential for secure closing of the housing cover.

These operating instructions do not contain any repair instructions. In the interests of your own safety, repairs should only be performed by Retsch GmbH, an authorised representative or by Retsch service technicians.
## Confirmation

I have read and understood the chapters Information on these operating instructions and on Safety.

---

Signature of operator/owner

---

Signature of service technician
Technical specifications
Machine type designation: ZM200

Intended use
The Retsch Ultra Centrifugal Mill ZM200 is deployed for rapid fine grinding of soft to medium hard and fibrous materials up to a grain size of 10 mm.

See the section in the chapter on "Operation" below for examples:
"Unsuitable comminution material"
"Suitable comminution material"
"Comminution methods"
"Comminution by cold grinding"

The end fineness achievable is determined by:
- The type of rotor
- The speed of the rotor
- The ring sieve
- The shearing properties of the comminution material

The effective grinding technology and the extensive range of accessories mean that the ZM200 can quickly prepare samples ready for analysis in a way which preserves the material.

It is not designed as a production machine, but rather as a laboratory device intended for single-shift, 8-hour operation.

Do not make any modifications to the machine and only use Retsch approved spares and accessories. The conformity to the European guidelines declared by Retsch otherwise loses its validity. It furthermore leads to the loss of all warranty claims.

Maximum feed quantity
- Max. up to 20 ml with the collection container for minimum quantities
- The max. recommended feed quantity with the standard collection container is 300ml, which corresponds to approx. 1/3 of the cassette’s filling capacity. If more is filled into the cassette, the sample and the appliance may overheat.

Do not fill too much into the collecting container. Do not exceed a max. 1/3 of the filling capacity. Excessive filling can cause overheating and damage to the plastic housing.
- Max. 5000 ml with components obtainable as accessories

Maximal feed grain size
Up to 10 mm

Maximal end fineness achievable
< 40 µm, in dependence on the feed material and ring sieve

Drive output
750 W / power draw approx. 1300 W

Rotor speed
Can be regulated from 6,000 – 18,000 r.p.m.
ZM200 emissions
Noise levels:
Noise measured according to DIN 45635-31-01-KL3
The noise levels are basically influenced by the speed of
the machine, the feed material, the feed grain size, the
rotor used and the ring sieve deployed.
Workplace related emission value $L_{pAeq} = 77.5 \text{ dB(A)}$
Measuring conditions:
Machine speed = 18,000 r.p.m.
Feed material = burnt lime
Feed grain size = <5 mm
Ring sieve deployed = 0.5 mm Conidur perforation
Rotor deployed = 12-tooth rotor

Materials and analyses of the grinding tools
See:
http://www.retsch.de/english/docs/grinding_tools.pdf

Protection systems
IP20

Protective equipment
The ZM200 is equipped with a fixture to automatically close the
cover. This prevents the device being started in an unsafe
state.
The device cannot be started unless the cover is closed.
It is only possible to open the device when the device is at
standstill.

Operating mode
S1
An operating mode with constant loading, the duration of which
suffices to reach the state of thermal rigidity. (DIN VDE 0530 T1)

Device dimensions
Height: Up to approx. 665 mm / Width: 410 mm / Depth: 365
up to 590 mm
Weight: Net approx. 38 kg

Base area required
410 mm x 590 mm;
A safe distance of 200mm is required at the rear to allow the
fan to fulfil its function.
Transport and assembly

Packaging
The packaging has been adapted to the mode of transport. It corresponds to the generally applicable packaging guidelines.

Please retain the packaging for the duration of the warranty since, in case of complaint, returning in unsuitable packaging can jeopardize your warranty claims.

Transport
During transportation, do not subject the ZM200 to impacts, jolts or vibrations. The electronic and mechanical components could otherwise be damaged.

Temperature fluctuations
In case of wide temperature fluctuations (during shipment by air, for instance), protect the ZM200 from condensation. The electronic components could otherwise be damaged.

Intermediate storage
Likewise for intermediate storage, ensure that the ZM200 is stored in a dry place.

If the device is unused for a longer period of time, remove the cassette from the device before closing the cover, in order to minimise wear on the sealing gasket of the cassette.

Assembly
Place the ZM200 on a sturdy laboratory bench. 2 people are required to carry the device. The net weight of the ZM200 is approx. 38 kg

There is the option of compensating for unevenness on the bench by adjusting the left rear foot of the ZM200 by up to 3mm. Turn wheel R on the foot until the ZM200 is standing securely on all feet.
Requirements for the assembly 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.

Air humidity:
Maximum relative humidity 80% at temperatures up to 31°C, declining in linear manner down to 50% relative humidity at 40°C.

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

Assembly height:
Max. 2000 m above sea level

Electrical connection

- The voltage and frequency for the ZM200 are shown on the data plate.
- Ensure that these values agree with those of the mains power supply.
- Connect the ZM200 to the mains power supply with the power cable supplied.
- When connecting the power cable to the mains supply, use an external, delayed-action fuse in accordance with the regulations applicable to the assembly site. We recommend that no further devices be connected to this socket.
- The main switch of the ZM200 is at the rear. This protects the device from overloads without the need to replace a fuse. The ZM200 must solely be allowed to cool down before being switched on again.

Important notes:

1. Electrical connections must use PE conductors!

2. A frequency converter is fitted to the drive unit of your ZM200. In order to fulfil the EMV directive, this is equipped with a mains filter and screened cables to the motor. If your mains power installation for the ZM200 contains a residual-current protective device, then when the frequency converter switched on (switched on each time the grinding chamber hood is closed), its interference suppression circuit can cause spurious tripping of the residual-current protective device, without this being due to a defect in your ZM200 or mains power supply.

The state-of-the-art recommends selective, all-current sensitive residual-current protective devices in such cases. The trip current needs to be sufficiently dimensioned because short-lived, capacitive transient currents generated at switch on (screened cables, mains filter) can easily cause spurious tripping.

Under certain conditions, it may be necessary to operate the ZM200 without a residual-current protective device. It must nevertheless then first be ensured that this does not contradict the regulations of the local electricity supply utility, or those of other institutions or applicable standards.

Failure to observe the values on the data plate can cause damage to electronic and mechanical components.
Serial interfaces

- To connect distributor DR100
- Interface to update the ZM200 software
Operation

Connect the power

Ensure that the voltage and frequency of your mains power supply agrees with the data plate on the ZM200.

- Plug the power cable into the socket at the rear of the unit
- Plug the cable into the mains power socket
- Turn the main switch on

Failure to observe the values on the data plate can cause damage to electronic and mechanical components.

The language menu is displayed the first time the ZM200 is switched on. The language required can be selected here by turning operating button F. The selection is confirmed by pressing it and the display shows "Open cover".

Opening / closing / emergency unlocking of the grinding chamber
The safety lock opens and the cover can be folded back. The grinding chamber is now freely accessible.

**Closing**
The grinding chamber cannot be closed unless the ZM200 is connected to the mains power supply and the main switch at the rear of the device is switched on.

- Pull down the housing cover and press it downwards until the cover closure is activated

A sensor recognises that the housing cover is closed and the motorised cover closure is switched on.

- The housing cover is locked automatically

**Emergency unlocking**
A key is fixed underneath the unit. This can be used to open the ZM200 manually in case of a power failure.

- Lift the unit
- Remove key S
- Apply a slotted screwdriver to the indentation in the housing and lever out plastic plug K
- (I) Insert the (S) key into the (Ö) opening on the right-hand side.
- (II) To unlock the gear, the key must be pushed in further with some degree of force. While pushing the key in, turn it in a clockwise direction as far as it will go.

The cover can now be opened.

- Seal opening Ö again with plastic plug K

Never actuate the emergency unlocking feature whilst the machine is running, only do so with the machine at standstill and the mains power disconnected.

**Considerable danger of injuries from a long drive run-on time without braking.**
Inserting the grinding tools

No tools are required to insert the grinding tools.

- Open the cover of the grinding chamber housing
- Insert the labyrinth L disc, pay attention to the torsion lock V
- Install rotor A
- Insert the collecting vessel (cassette) B, pay attention to the torsion lock
- Insert the ring sieve C, pay attention to the torsion lock
- Ensure that the opening for the torsion lock D below, arrow P to the right, is sitting correctly
- Install cassette cover E
- Close housing cover F.

Set the openings for the torsion lock on the collecting vessel and the ring sieve over the torsion lock pin.

**Otherwise the ZM200 cannot be started.**

When cold grinding, do not forcibly remove the plug-on rotor, which jams easily for physical reasons, but rather wait for the temperature to level out. **Forced removal causes damage to the motor shaft and the rotor.**

Do not forget to re-install the cassette cover. **Without the cassette cover, the motor is blocked by the thrust pins in the housing cover.**

When the rotor is not in use, take it off the shaft. **Crevice corrosion can occur when the rotor is installed.**
Operation using the display unit of the ZM200

<table>
<thead>
<tr>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Display</td>
<td>Displays the menu, the parameter settings, operating information and error messages.</td>
</tr>
<tr>
<td>B START button</td>
<td>Starts the grinding process</td>
</tr>
<tr>
<td>C STOP button</td>
<td>Stops the grinding process</td>
</tr>
<tr>
<td>D Button</td>
<td>Opens the grinding chamber cover</td>
</tr>
<tr>
<td>F Control knob</td>
<td>All menu items can be selected and parameters set by twisting and pressing the knob.</td>
</tr>
</tbody>
</table>
Display and operation

Symbols in the display unit

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Menu navigation</td>
<td>Switching between manual operating mode and basic settings</td>
</tr>
<tr>
<td>C2</td>
<td>Specification of grinding parameters</td>
<td>Displaying and setting grinding parameters</td>
</tr>
<tr>
<td>C3</td>
<td>Icons for device functions</td>
<td>Displaying the functional statuses of sound and automatic opening</td>
</tr>
<tr>
<td>C4</td>
<td>Icon for scrolling direction</td>
<td>Displays the possible scrolling directions</td>
</tr>
<tr>
<td>C5</td>
<td>Grinding parameters</td>
<td>Display of values</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>![Symbol]</td>
<td>Automatic opening switched on</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>Automatic opening switched off</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>Motor or frequency converter too hot</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td></td>
</tr>
<tr>
<td>![Symbol]</td>
<td>Grinding output display</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>Acoustic warning signal on</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>Acoustic warning signal off</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>Scrolling upwards or downwards possible</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>Only scrolling upwards possible</td>
</tr>
<tr>
<td>![Symbol]</td>
<td>Only scrolling downwards possible</td>
</tr>
</tbody>
</table>
Display unit – operation of the device

This device offers a new, user-friendly user interface. All relevant data can be entered and retrieved using a graphics display with one-button operation. The menu navigation is available in different languages.

Adjustment options using the display menu

The selection bar in the display should be operated as follows:

**Rotating function I)**
- Rotate the operating button to get to the different menu items. The selected menu items are marked using the dark selection bar. Areas that cannot be changed are skipped.

**Rotating function II)**
- Rotate the operating button to change numerical values and decisions in the menu items.

**Press I)**
- Press the operating button to open selected menu items.

**Press II)**
- Press the operating button to confirm settings.

**Press III)**
- Keeping the operating button pressed for longer takes you back to the basic screen (Level 1).

Navigating between operating modes

- Rotate the operating button in a clockwise direction until the dark line cursor is in the navigation menu (C1).
- Press the operating button (F).
  - The icon for the scrolling direction (C4) changes from \[\text{↓} \] to \[\text{↕} \].
  - By rotating the operating button, navigate between manual operation and the basic settings operating modes.
  - Press the operating button (F) to activate the selected operating mode.
  - The icon for the scrolling direction (C4) changes from \[\text{↑} \] to \[\text{↕} \].
  - By rotating the operating button, switch to the sub-items of the selected menu item.

Direct access to the language menu

If you have unintentionally set the wrong language, you can go straight to the language menu by following the following steps.
• Switch the device off at the main switch.
• Switch the device on while simultaneously pressing the buttons **START - STOP – Open cover**.
• After selecting the correct language, switch the device off and then immediately back on.
• Confirm your selection by pressing the operating button.

The device is now set permanently to your language and you are in the main menu.
Menu structure

Complete overview of all menu items:

**MANUAL OPERATING MODE**
- Speed
- Start in:
  - Notice: Is only displayed if a vibratory feeder has been connected and switched on.
  - Screen notice: To cancel press STOP
- Back

**BASIC SETTINGS**
- Automatic opening
- Automatic stop
- Run-on time for operation with DR 100
- Language
- Brightness
- Date
- Time
- Acoustic signal
- Service
- Operating hours
- Software version of display
- Software version of controller
- Update software
- Display
  - Software update will be started automatically
- Controller
  - Software update will be started automatically
- Back

**Operating modes**

You can select the following operating modes using the menu navigation (C1):

**Manual operation**

When this function has been set you can access and change all parameters and functions at any time. This is also possible during grinding.
Basic settings

You can adjust the following device settings in this settings menu:
- Automatic opening
- Automatic stop
- Run-on time for operation with DR 100
- Language
- Brightness
- Date
- Time
- Acoustic warning signal
- Service

NOTICE
No grinding can be started while the basic settings menu is active.

Manual operation

Speed

You can adjust the speed in this menu.
The device is started with the preselected grinding time and at the preselected speed.

Start in

You can adjust a countdown to the starting of the device here.
- Press the STOP button to cancel the countdown.
- This function is only available if a vibratory feeder has been connected.

Automatic opening

In this menu you can set whether the grinding chamber lid opens automatically when grinding has finished or is only opened when the button is pressed.

If the function is switched off, the following pictogram is shown on the display as confirmation.
**Automatic stop**

- Switch the automatic stop on or off.

  The function only operates without errors if the machine load is constant and is not too low, because load is the indicator for automatic stopping. If the device switches off prematurely because the load is too low, it is advisable to work without this function.

  If the automatic stop has been switched on, the run-on time function activates during operation with vibratory feeder.

**Run-on time during operation with vibratory feeder**

00:00:60 to 00:01:59 (hours : minutes : seconds)

When using a vibratory feeder, the run-on time of the device can be set here if the automatic stop is active.

**Language**

You can select the menu language here. After selecting and pressing the control knob, the entire menu structure is displayed in your language.

*NOTICE*

The language menu is displayed when the device is switched on for the first time.

- Select the desired language by turning the control knob.
  - Press to confirm the selection; “open lid” appears on the display.

**Brightness**

The brightness can be adjusted to suit the respective user or environment (sunshine, glare etc.).

**Date**

The current date can be entered here.

The device can be disconnected from the mains for up to 30 days before the settings are lost.

**Time**

The time can be entered here.

The time then appears in the stand-by monitor.

The device can be disconnected from the mains for up to 30 days before the settings are lost.

**Acoustic warning signal**

Error messages indicating incorrect operation can be supported by an acoustic warning signal. The corresponding pictogram appears if the function has been switched off.

**Service**

**Operating hours**

Grinding hours are counted, i.e. the total times between START and STOP. It is not possible to manipulate the times.

**Software version of display**

Shows the software version of the display.
Software version of the controller

Shows the version of the operating software

Update software

The version of the operating software can be queried and updated where applicable. Contact your Retsch distributor where necessary. If you have accessed the menu inadvertently and it is not possible to return to the preceding menu, switch the device off at the main switch and restart it.
Feeding in comminution material
There is the option of feeding in the comminution material manually up to a grain size of 10mm, or automatically with a distributor of type DR 100 (available as an accessory, see chapter "DR100 with tripod") via the filling hopper E.

The anti-rebound fitting X installed in the filling hopper prevents the comminution material from being sprayed back out as it is fed in. This is especially recommendable when grinding brittle materials.

---

Do not feed in comminution material unless the machine is operating. Mechanical components could be damaged when starting from standstill and comminution material has already been fed in.

When feeding in comminution material, the anti-rebound fitting must be installed.

Danger that the comminution material will be sprayed about.

---

Unsuitable comminution material
The Ultra Centrifugal Mill is not suitable for grinding:

- Minerals with a Mohs' hardness >4 e.g. quartz sands, corundum etc.
- Ferro-alloys
- Abrasive agents
- Comminution material which could form explosive atmospheric mixtures

Some comminution materials form explosive atmospheric mixtures. Check the properties of your comminution material.

Explosion hazard

- Toxic or other comminution materials which pose a hazard to health

Dusty comminution material can escape through the filling hopper during grinding. Use suction extractors if the comminution material is toxic or otherwise hazardous to health.

Danger of breathing in dust hazardous to health.

---

We can obviously not discuss every potential problem here. We therefore ask you to get in touch with our application laboratory, our specialist field consultant or one of our representative offices if further questions arise.
Suitable comminution material
The listing below shows which grinding tool you should deploy for which comminution material in order to achieve an optimum result.

<table>
<thead>
<tr>
<th>Comminution materials</th>
<th>Grinding tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fodder pellets</td>
<td>6-tooth rotor</td>
</tr>
<tr>
<td>Drugs</td>
<td>Adapt the ring sieve to the desired end fineness</td>
</tr>
<tr>
<td>Straw</td>
<td>For preparation of bulky, fibrous comminution material</td>
</tr>
<tr>
<td>Dog cake</td>
<td></td>
</tr>
<tr>
<td>Spices</td>
<td></td>
</tr>
<tr>
<td>Grasses</td>
<td></td>
</tr>
<tr>
<td>Paper cellulose</td>
<td></td>
</tr>
<tr>
<td>Cereals</td>
<td>12-tooth rotor</td>
</tr>
<tr>
<td>Maize</td>
<td>Adapt the ring sieve to the desired end fineness</td>
</tr>
<tr>
<td>Tablets</td>
<td>For preparation of fibrous, brittle comminution material</td>
</tr>
<tr>
<td>Fibrous foodstuffs</td>
<td></td>
</tr>
<tr>
<td>Dragees</td>
<td></td>
</tr>
<tr>
<td>Confectionery</td>
<td></td>
</tr>
<tr>
<td>Dolomite</td>
<td>24-tooth rotor</td>
</tr>
<tr>
<td>Talcum</td>
<td>Adapt the ring sieve to the desired end fineness</td>
</tr>
<tr>
<td>Gypsum</td>
<td>For preparation of medium-hard, brittle comminution material</td>
</tr>
<tr>
<td>Activated carbon</td>
<td></td>
</tr>
<tr>
<td>Wood/brown coal</td>
<td></td>
</tr>
<tr>
<td>Dry, non-hygroscopic chemicals</td>
<td></td>
</tr>
<tr>
<td>Ion exchanger</td>
<td></td>
</tr>
<tr>
<td>Sugar beet/cane</td>
<td></td>
</tr>
<tr>
<td>Minerals with a Mohs' hardness to 4</td>
<td>Wear-proof coated rotors</td>
</tr>
<tr>
<td>Ductile metal powder</td>
<td>Adapt the ring sieve to the desired end fineness</td>
</tr>
<tr>
<td>Compost</td>
<td>They can be deployed if it is possible that wear on the standard rotor could have a disturbing influence on the subsequent analysis.</td>
</tr>
<tr>
<td>Garbage mixtures</td>
<td></td>
</tr>
<tr>
<td>Fluorspar/feldspar</td>
<td></td>
</tr>
<tr>
<td>Biological products</td>
<td>Titanium rotors (free of heavy metals)</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>Adapt the titanium ring sieves to the desired end hardness.</td>
</tr>
<tr>
<td>Foodstuffs of all types</td>
<td>They can be deployed whenever heavy metal contamination is inadmissible. Titanium rotors and ring sieves should not be used for hard, abrasive mixtures, but only for soft to medium-hard products.</td>
</tr>
<tr>
<td>Biological research</td>
<td></td>
</tr>
</tbody>
</table>

Comminution methods

Ultra-fine grinding with Conidur ring sieves
This process is deployed to exploit the high shearing power of Retsch-Conidur sieves.

Select the perforation width of the ring sieves in dependence on the desired end fineness and on the feed material. For the majority of materials, the fineness achieved is around 80% smaller than half the perforation size of the sieves deployed.

Pre-comminution with round hole ring sieves
This process is deployed to pre-grind material such as fodder pellets, tablets etc..

Never pre-grind without a ring sieve.
The collecting base can suffer serious damage.
The rotor can damage the cassette cover.
Comminution by cold grinding

Material that cannot be ground at normal room temperatures, or not at all, must be cold ground. Prior embrittlement with liquid nitrogen (−196°C) improves the breakage behaviour of materials such as thermoplastics, rubber products, fatty foodstuffs, pharmaceuticals etc.

Embrittlement with liquid nitrogen is not necessary in the majority of cases. Mixing with dry ice also produces good results, as does storing the comminution material in a freezer for 24 hours at a temperature of least -19°C.

When cold grinding with liquid nitrogen, always install the anti-rebound fitting X in the filling hopper.

**Danger of injuries to eyes and skin from extreme freezing.**

Wear safety gloves and goggles. Temperature of the liquid nitrogen -196°C

**Danger of injuries to eyes and skin from extreme freezing.**

When cold grinding, do not forcibly remove the plug-on rotor, which jams easily for physical reasons, but rather wait for the temperature to level out.

**Forced removal causes damage to the motor shaft and the rotor.**

Comminution with distance ring sieves

The deployment of distance ring sieves is recommendable when materials with a low melting point are to be ground, or wherever the rise in temperature caused by comminution needs to be kept as low as physically possible.

The ring sieve's low friction quotient due to the larger distance to the rotor means that the grinding result will be slightly coarser than if a standard ring sieve of the same hole size is used.

Comminution of extremely small volumes

Grinding tools made of corrosion-resistant steel 1.4404 (316L) are available for grinding small sample volumes of up to 50 ml.

The figure on the left shows the collecting vessel, ring sieve and rotor for extremely small volumes.

The cassette cover, which is included in the scope of supply, is not depicted here.
Assembly of accessories

Larger volumes of material are often ground in a single work process by continuously feeding in the material to be comminuted. The standard collecting vessel has a limited capacity, so that it is necessary to use a larger collecting vessel. Retsch offers the option of increasing the take-up capacity and the feed quality by fitting accessories.

- Paper filter with retainer and throughput vessel
- Cyclone separator with collecting container and throughput vessel V=3000ml or V=5000ml
- Distributor of type DR100 with tripod

Paper filter with retainer

Your ZM200 can be retrofitted with a throughput vessel with an outlet instead of the standard, closed collecting vessel. This throughput vessel is part of the scope of supply for the paper filter with retainer.

Installation procedure

- Remove the cylinder screw with Inbus key IS
- Remove cover GA
- Insert throughput vessel DG instead of the standard collecting vessel with ring sieve and cassette cover
- Pull rubber sleeve GM halfway over retainer PH
- Fold back the other half of rubber sleeve GM
- Push the pipe socket of retainer PH over the pipe socket of throughput vessel DG
- Fold rubber sleeve GM over the pipe socket of throughput vessel DG
- Slide paper filter PF onto retainer PH
- Fasten the paper filter with clip PS.

The volume able to be taken up by the paper filter depends on the density of the grinding material and the hole width of the ring sieve.
The paper filter can be destroyed by overfilling and by the weight of the comminution material
Cyclone separator with collecting container

In the case of large volumes of grinding material, the cyclone separator permits material discharge of up to 5000ml in a collecting receptacle. It is also available with a 3000ml collecting receptacle.

The air throughput created in the ZM200 during the grinding process causes the grinding material to be transported into the collecting receptacle. The air throughput depends on the mesh size of the ring sieve.

Installation procedure

- Place a slotted screwdriver on the housing recesses and remove the two plastic plugs KS
- Screw in 2x retaining bolts HB using an SW19 open end wrench
- Position the support and secure with 2x screws SC
- Insert cassette with outlet DG in place of the standard collecting receptacle with ring sieve and cassette lid
- Close housing lid GD of the ZM200
- Place the cyclone ZK in the shaft
- Connect the cyclone and the cassette with outlet to the coupling KP
- Where necessary unscrew screws SC again and adjust the height by moving the support. The cyclone adapter and the collecting receptacle should be aligned.
- Secure the collecting receptacle AB to the cyclone
- Slide the hopper TR with the filter sack FS into the cyclone

The height adjustment of the hopper TR influences the degree of separation of the solid material/air mixture. The best position in each case should be determined empirically. The fact that the pipe end RE of the hopper TR ends somewhat below the adapter ST for the material entry into the cyclone may serve as a guide.

The ZM200 can now be started at the speed still to be selected by you.
Distributor DR100 with tripod

The distributor of type DR 100 allows larger volumes with a grain size <8mm to be fed in evenly via the filling hopper of the ZM200.

The distribution of the feed material is regulated proportionally via an interface cable in dependence on the ZM200's motor loading. This ensures that the ZM200's motor is not overloaded. Manual adjustments are no longer required.

The ZM200 and the DR100 each require a power socket with the same phase position to supply the appropriate voltage and frequency, see the data plates on the devices. It is best to connect both devices to a multi-distributor power socket. No further devices should be connected to this distributor socket.

Assembly procedure

- Take the supplied tripod apart into its single parts
- Apply a slotted screwdriver to the indentations in the housing and remove plastic plug 1
- Insert tripod rod 2 vertically, screw in and tighten with an open-jaw spanner size 19
- Press the neck of sleeve 3 into the plastic housing, install washer 4 and tighten with an Inbuss key size 2.5, the pin in the washer must be seated on the right-hand side
- Remove transport lock 5 underneath the DR100 (arrow)
- Unscrew the 2 rear rubber feet 6 on the DR100
- Fix retainer 8 to the DR100 with screws and washers 7 using the boreholes in the rear where rubber feet 6 have been removed and the longitudinal holes in retainer 8. Precise positioning is left until the end.
- Place the DR100 with retainer onto the ZM200’s tripod
- Align the DR100 duct over the ZM200’s filling hopper
- Tighten toggle screw 9
- Turn switch 10 on the DR100 to "standard"
- Connect the DR100 at 11 and ZM200 at 12 with the connecting cable

See the DR100 operating instructions for further operation of the DR100.

- Switch the DR100 and ZM200 on, pictogram 13 appears on the left of the ZM200’s display. The DR100 has been automatically recognised and the opening mechanism of the housing cover is switched off, this is displayed by pictogram 14. This ensures that the housing cover does not impact against the DR100. Move the DR100 to the side before opening the housing cover.

The DR100 can be moved aside by undoing toggle screw 9, after which the filling hopper and cover of the ZM200 are easily accessible.
General points

Cleaning

Do not clean the ZM200 with flowing water.

Mortal danger from electric shock

Only use a cloth dampened with water.

Solvents are not permitted.

Maintenance

The following service work should be performed from time to time, although at the latest once per month, in order to guarantee the operational reliability of your ZM200:

- Check roller 1 of the trannion piece for easy movement and oil, if necessary, e.g. with sewing machine oil
- Clean magnets 2 on the trannion piece
- Clean pressure pieces 3 in the cover
- Clean motor shaft 4 under the labyrinth disc but do not use compressed air. We recommend using a suitable brush.
- Replace air filter 5 at the rear.
- Remove any dirt that has accumulated in the space under the perforated sheet 6 on the bottom of the device, unscrew perforated sheet 6 for this purpose

The secure closing of the ZM200 housing cover depends on the easy movement of roller 1 on the trannion piece.

These operating instructions do not contain any repair instructions. In the interests of your own safety, repairs should only be performed by Retsch GmbH, an authorised representative or by Retsch service technicians.
Adjusting the lock if the cassette cover leaks

The lock in the housing cover can be subsequently adjusted to rectify leaks in the cassette cover.

- Apply open-jaw spanner 1 size 30, not contained in the scope of supply
- Undo lock nut 2 by turning it to the left
- Turn counter nut 3 by hand in ¼ turns so that the distance between lock roller 4 and lock nut 2 becomes smaller
- Repeat the steps above until the cassette cover is sealed again
- CAUTION!
- Once the adjustment work has been completed, retighten lock nut 2, lock roller 4 should then be parallel to the edge of housing cover 5

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Changes
Technical changes are reserved.
## Error Messages and Information Notes

### Error Messages

<table>
<thead>
<tr>
<th>Error code</th>
<th>(FEHLER) BESCHREIBUNG</th>
<th>DEFECT DESCRIPTION TRANSLATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>E10</td>
<td>ANTRIEB ÜBERLASTET</td>
<td>DRIVE OVERLOAD</td>
</tr>
<tr>
<td>E11</td>
<td>FEHLER ANTRIEB/MOTOR</td>
<td>FAILURE DRIVE/MOTOR</td>
</tr>
<tr>
<td>E20</td>
<td>FEHLER STEUERUNG</td>
<td>FAILURE MAIN BOARD</td>
</tr>
<tr>
<td>E23</td>
<td>FEHRL LÜFTER</td>
<td>FAILURE FAN</td>
</tr>
<tr>
<td>E26</td>
<td>FEHLER FREQUENZUMRICHTER</td>
<td>FAILURE FREQUENCY CONVERTER</td>
</tr>
<tr>
<td>E41</td>
<td>FEHLER DREHZAHLSENSOR</td>
<td>FAILURE SPEED SENSOR</td>
</tr>
<tr>
<td>E50</td>
<td>FEHLER SICHERHEITSKREIS</td>
<td>FAILURE IN SAFETY CIRCUIT</td>
</tr>
<tr>
<td>E51</td>
<td>FEHLER SICHERHEITSSCHALTER</td>
<td>SAFETY SWITCH DEFECTIVE</td>
</tr>
</tbody>
</table>

### Information Notes

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>H10</td>
<td>ANTRIEB ABKÜHLEN LASSEN!</td>
<td>ALLOW DRIVE TO COOL DOWN</td>
</tr>
<tr>
<td>H11</td>
<td>ANTRIEB BLOCKIERT</td>
<td>DRIVE BLOCKED</td>
</tr>
<tr>
<td>H12</td>
<td>ANTRIEB BREMST</td>
<td>DECELERATING</td>
</tr>
<tr>
<td>H40</td>
<td>MASCHINE SCHLIESSEN</td>
<td>CLOSE MACHINE</td>
</tr>
<tr>
<td>H42</td>
<td>DECKEL/HAUBE ÖFFNEN UND SCHLIESSEN</td>
<td>OPEN AND CLOSE LID/COVER</td>
</tr>
</tbody>
</table>
ULTRA CENTRIFUGAL MILL

ZM 200 | 20.823.xxxxx

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
DIN 45635-31 Measurement of airborne noise emitted by machines; enveloping surface method, comminuting machines

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
DIN EN 61000-3-2 Electromagnetic compatibility (EMC)
DIN EN 61000-3-3 Electromagnetic compatibility (EMC)
DIN EN 61000-6-1 Electromagnetic compatibility (EMC)
DIN EN 61000-6-3 Electromagnetic compatibility (EMC)
DIN EN 61326-1 Electrical equipment for measurement, control and laboratory use - EMC requirements

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 B 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, 05/2016

Dr. Ing. Frank Janetta, Team Leader R&D Department

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www.retsch.com • e-mail: info@retsch.com • phone: +49 2104 2333-100