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## **Operating Instructions Ultra Centrifugal Mill Type ZM 200**

**Retsch®**

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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.de>

## 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:**

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# 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.

### Intended use



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.**

### 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.

### 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.

### Scope of supply



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.

### 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.

### Air humidity :



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

### 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  $-196^{\circ}\text{C}$   
**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.

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Signature of operator/owner

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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  $L_{pAeq}$  = up to 77.5 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](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.

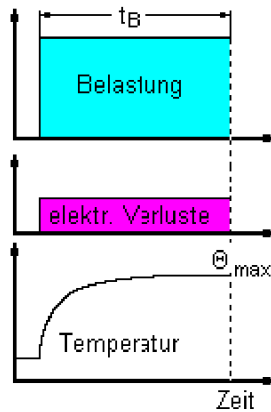
The device cannot be started unless the cover is closed.

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.

## Scope of supply

- ZM200
- Power cable
- 1 copy of the operating instructions

Check the completeness of the delivery, including any accessories ordered in addition.

Check proper functioning of the ZM200 (see the chapter on operation).



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.



**R**

## 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

When installing a cyclone with a 5000ml collecting container, there must be sufficient free space to the left of the ZM200, see figure, because the cyclone's collecting container is located below the feet of the ZM200. This is not necessary for a cyclone with a 3000ml collecting container.

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



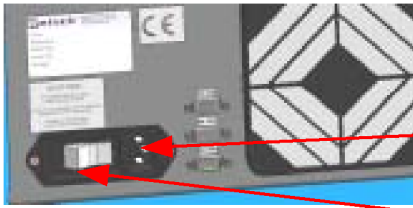
- To connect distributor DR100
- Interface to update the ZM200 software
- Inactive interface for optional data communication with an external device at a later date. Software update required.

## 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 **E**. The selection is confirmed by pressing it and the display shows "**Open cover**".

### Opening / closing / emergency unlocking of the grinding chamber

- Press button **A** - 

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.

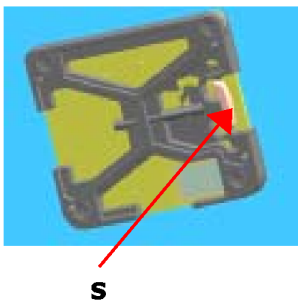
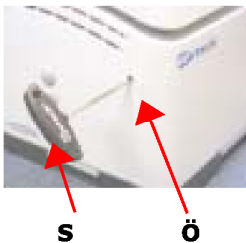
- Lift the unit
- Remove key **S**
- Apply a slotted screwdriver to the indentation in the housing and lever out plastic plug **K**
- Insert key into opening **Ö** in the left side
- Turn the key clockwise (looking at the key) up to the stop

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



**A**



**B**



**C**



**D**

**P**



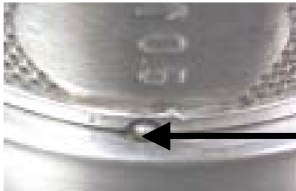
**E**



**F**

No tools are required to insert the grinding tools.

- Open the cover of the grinding chamber housing
- Insert the labyrinth disc, pay attention to the torsion lock
- 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**.



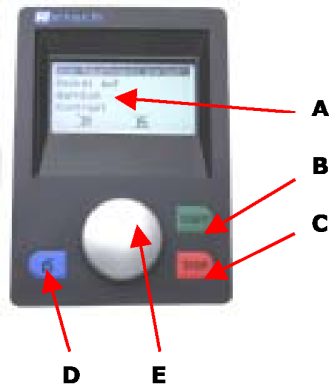
Set the openings for the torsion lock on the collecting vessel and the ring sieve over the torsion lock pin.  
**Otherwise the ZM200 cannot be started.**

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.**







## Operation via the ZM200 display unit

The mills offer new, very user-friendly operating functions. All relevant data can be entered or called up from a graphic display operated with a single button. The menu is multi-lingual.




	Designation	Function
A	<b>Display</b>	Displays the menu, the parameter settings, operating information and error messages.
B	<b>START key</b>	Starts the grinding process
C	<b>STOP key</b>	Stops the grinding process
D	<b>Key</b>	Opens the grinding chamber hood
E	<b>Setting button</b>	<p>All menu items can be selected and parameters adjusted by turning and pressing this button.</p> <p><b>Turn 1</b> The different menu items can be selected by turning. Selected menu items are shown inversely.</p> <p><b>Turn 2</b> Adjust parameters in opened menu items (see Press 1)</p> <p><b>Press 1</b> Selected menu items are opened</p> <p><b>Press 2</b> A short press confirms the adjustment of the parameters</p> <p><b>Press 3</b> Return to the 1<sup>st</sup> level menu by continuously pressing the button.</p>

### Symbols in the display unit

- 
  - DR connected
- 
  - Automatic stop
- 
  - Opening mechanism off
- 
  - Alarm off
- 
  - Service due
- 
  - Motor too hot

## Menu structure of the ZM200 display unit

1. Level	2. Level	3. Level	4. Level	5. Level	6. Level
SPEED	xxxxx rpm 6000, 8000, 10000, 12000, 14000, 16000, 18000, MANUAL:				
MENU	SETTINGS	OPENING MECHANISM	OPEN COVER AFTER GRINDING PROCESS YES/NO		
		AUTOMATIC STOP	EXTENDED OPERATION WHEN USING DR100 EXTENDED TIME xxsek/OFF		
		ALARM	ALARM ON/OFF		
		SERVICE	SERVICE HELP	DETAILS IN MANUAL CLEAN AIR FILTER CLEAN MOTOR SHAFT CLEAN AND LUBRICATE LOCK WHEEL	
			SERVICE INTERVAL	SET SERVICE INTERVAL SET TIME xx h REMANING TIMET xx h	
			TOTAL OPERATION HOURS	TOTAL GRINDING TIME:: xxx h	
			SOFTWARE VERSION	SOFTWARE VERSION: V 1.03 SOFTWAREUPDATE? YES/NO	SOFTWAREUPDATE START? YES / CANCEL
DISPLAY	CONTRAST		CONTRAST <-low high->		
	BRIGHTNESS		BRIGHTNESS <-low high->		
	LANGUAGES		DEUTSCH, ENGLISH, NEDERLANDS, FRANCAIS, DANSK, etc.		
DATE	27.03.03	SET			
TIME	11:43:45	SET			
BACK					



**E**

All menu items can be selected and parameters adjusted by turning and pressing the setting button **E**.

**Turn 1**  
The different menu items can be selected by turning.  
Selected menu items are shown inversely.

**Turn 2**  
Adjust parameters in opened menu items (see Press 1)

**Press 1**  
Selected menu items are opened

**Press 2**  
A short press confirms the adjustment of the parameters

**Press 3**  
Return to the 1<sup>st</sup> level menu by continuously pressing the button.

### Adjustment options via the display menu

Please consult the menu structure on this page for the setting options on the display explained below. The selection bar in the display is operated as follows:

- Move vertically through the structure by turning the setting button
- Move horizontally through the menu structure by pressing the setting button
- Adjust numeric values / options by turning the setting button
- Confirm settings by pressing the setting button
- Return to the previous level of the menu structure with "BACK"
- Return to the start screen by prolonged pressing of the setting button






## LANGUAGES

MENU	DISPLAY	LANGUAGES
------	---------	-----------

This allows you to select your language. After making the selection and pressing the setting button the complete menu structure will be displayed in your language.


### Incorrect language selection

If the wrong language has been selected, switch the device off at the main switch.

Hold down the keys    simultaneously and switch the device back on. Once the correct language has been selected, switch the device off and immediately back on again. Confirm your selection by pressing the setting button. The device is now permanently set to your language and you should see the main menu

## Pre-selecting the SPEED

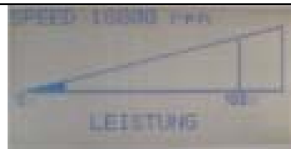
SPEED	18000 rpm	16000 rpm	14000 rpm	12000 rpm	10000 rpm	8000 rpm	6000 rpm	Manual
-------	-----------	-----------	-----------	-----------	-----------	----------	----------	--------

 In **manual** mode, the speed can be set between 6000-18000 rpm in single steps of 50 rpm. The ZM200 is started at the speed which you pre-select, the unit likewise starts at this speed after being turned on at the main switch. A different speed can be set even whilst the device is running by pressing the setting button.

 Once the STOP key has been activated, START can be pressed again immediately!

## STARTING the ZM200


The device is ready to start after the speed has been selected and the housing cover closed. The rotor starts after the green START button has been pressed and the performance screen appears on the display.





The current speed of the rotor is displayed in the top left. The performance screen shows the performance range the machine is operating in. During grinding, the 100% range on the right should be avoided because the device is overloaded in this performance range and reproducibility of grinding is no longer possible!

## OPENING MECHANISM

MENU	SETTINGS	OPENING MECHANISM
------	----------	-------------------

This allows you to pre-select whether the grinding chamber cover should be raised automatically after grinding has ended or may only be opened after pressing the button. If the function is switched off, the pictogram  appears on the display for confirmation.

When a distributor is used, two pictograms   appear on the display: one is for the distributor and the other to show that the opening mechanism function is switched off. The latter is prevent the grinding chamber cover impacting against the duct during automatic opening. Please move the distributor to the side before actuating the OPEN key!

## AUTOMATIC STOP

MENU	SETTINGS	AUTOMATIC STOP
------	----------	----------------

If a distributor is deployed, the run-on time for the ZM200 can be set here. This is the time after which the device is stopped automatically when grinding has ended and the distributor emptied.

If this function is set, the appropriate pictogram appears on the display. 

The function does not work properly unless the machine loading is constant, and not too low, because the indicator for automatic stop is the loading. Should the device switch off prematurely due to too low loading, it is advisable to work without the function.

## ALARM

<b>MENU</b>	<b>SETTINGS</b>	<b>ALARM</b>
-------------	-----------------	--------------

The error messages generated by false operation can be acoustically supported by an alarm.

If the function is switched off, the appropriate pictogram appears



## SERVICE

<b>MENU</b>	<b>SETTINGS</b>	<b>SERVICE</b>
-------------	-----------------	----------------

The service menu is sub-divided into four sub-menus:

- **SERVICE HELP**  
Service help is stored here in the form of a check list. This is intended to make effective and regular service work easier and increase the operational reliability of the unit. Also refer to the chapter General/Maintenance!
- **SERVICE INTERVAL**  
An individual service interval – after which the operator is informed that service work is required - can be set here to take account of the prevailing conditions. The time set refers to the sum of the grinding times (times between START and STOP) and can be set between 1-99 hours. The default setting is 20 hours. If the ambient conditions are particularly rough, we recommend reducing the default setting.
- **TOTAL OPERATION HOURS**  
This counts the number of grinding hours, thus the sum of the times between START and STOP. The times cannot be manipulated.
- **SOFTWARE VERSION**  
The version of the operating software can be called up and updated as required. If necessary, get in touch with your Retsch distributor.  
Should you have reached this menu by mistake and cannot return to the previous menu, switch the device off at the main switch and re-start it.

## CONTRAST/BRIGHTNESS

<b>MENU</b>	<b>DISPLAY</b>	<b>CONTRAST</b>
		<b>BRIGHTNESS</b>

The contrast and brightness can be adapted to the particular user or ambient conditions (sunlight, glare etc.).

If the contrast or brightness has been incorrectly set (the display can no longer be read), switch the device off at the main switch, simultaneously hold down the START, STOP and COVER OPEN keys and switch it on again. You will now see the language menu and the values for CONTRAST and BRIGHTNESS have returned to the default settings.

## DATE / TIME

<b>MENU</b>	<b>DATE</b>
	<b>TIME</b>

The current data and time can be entered here.

The time then appears on the stand-by monitor.

The power to the device can be turned off for up to 30 days without losing the settings.

### Stand-by monitor

The stand-by monitor switches on automatically after the device has been inactive for 15 minutes (timed from a STOP command).

The stand-by monitor disappears after a key is pressed or the setting button activated without executing the command issued.

Should you be in a sub-menu when the stand-by monitor is activated, you will be returned automatically to this selection window.

The stand-by monitor cannot be adjusted, it therefore cannot be switched off.



E



X

### 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.

Comminution materials	Grinding tools
Fodder pellets Drugs Straw Dog cake Spices Grasses Paper cellulose	6-tooth rotor Adapt the ring sieve to the desired end fineness For preparation of bulky, fibrous comminution material
Cereals Maize Tablets Fibrous foodstuffs Dragees Confectionery	12-tooth rotor Adapt the ring sieve to the desired end fineness For preparation of fibrous, brittle comminution material
Dolomite Talcum Gypsum Activated carbon Wood/brown coal Dry, non-hygroscopic chemicals Ion exchanger Sugar beet/cane	24-tooth rotor Adapt the ring sieve to the desired end fineness For preparation of medium-hard, brittle comminution material
Minerals with a Mohs' hardness to 4 Ductile metal powder Compost Garbage mixtures Fluorspar/feldspar	Wear-proof coated rotors Adapt the ring sieve to the desired end fineness They can be deployed if it is possible that wear on the standard rotor could have a disturbing influence on the subsequent analysis.
Biological products Pharmaceuticals Foodstuffs of all types Biological research	Titanium rotors (free of heavy metals) Adapt the titanium ring sieves to the desired end hardness. 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.

## 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.**



**X**

### 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 with cutting hole ring sieves

Deployment of the new ring sieves with cutting holes allows many plastics to be ground, even with prior embrittlement. A special rotor is required for this.

### 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.



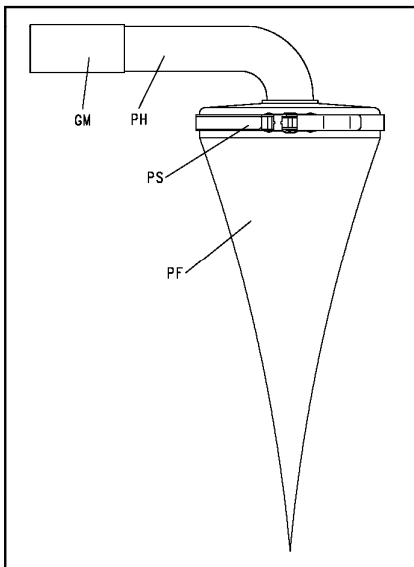
## Assembly of accessories

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



**KS**



**HB**



**SC**



**FS**

**DG**



**AB**

**ZK**

**TR**

**KP**

**GD**



**RE**

**TR**

**ST**

If large amounts of material are to be ground, the cyclone separator allows up to 5000ml of material to be discharged into its collecting container. For this purpose, there must be sufficient space on the left-hand side of the table underneath the ZM200 because the 5000ml collecting container ends lower than the surface of the table.

However, it is also available with a 3000ml collecting container if there is no space below on the left-hand side at the point of assembly.

The air throughput generated in the ZM200 during the grinding process serves to transport the comminution material into the collecting container.

The air throughput depends upon the hole width of the ring sieve.

### Assembly procedure

- Apply a slotted screwdriver to the indentations in the housing and remove both plastic plugs **KS**
- Screw in 2x retainer bolts **HB** with an open-jaw spanner size 19
- Install the retainer and fix with 2x screws **SC**
- Install throughput vessel **DG** instead of the standard collecting vessel with ring sieve and cassette cover
- Close housing cover **GD** of the ZM200
- Place cyclone **ZK** in the fork
- Connect the cyclone and the throughput vessel with coupling **KP**
- If necessary, loosen screws **SC** again and adjust the height by moving the retainer. The nozzles of the cyclone and of the collecting vessel should be flush.
- Fasten collecting container **AB** to the cyclone
- Slide hopper **TR** with filter sack **FS** into the cyclone

The height adjustment of hopper **TR** influences the degree of solid/air mixture separation.

The optimum position should be determined empirically in each case. As a rough guide, pipe end **RE** of hopper **TR** should end slightly below the nozzle **ST** for feeding material into the cyclone.

The ZM200 can now be started at the speed you pre-selected.

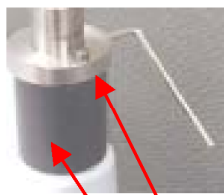
## Distributor DR100 with tripod



1



2



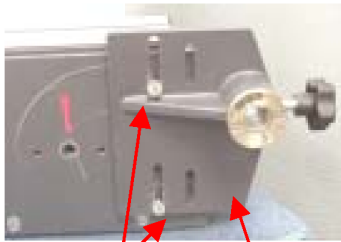
3

4



5

6



7

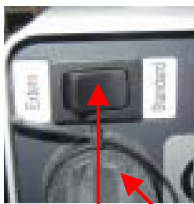
8



DR100



9

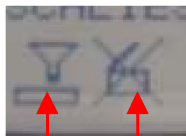


10

11



12



13

14

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 Inbus 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



1



2



3



4



5



6

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  $\frac{1}{4}$  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 on the display

## F03 to F12

The display shows F03	The display shows F04
<b>PROBLEM WITH THE INTERLOCK</b>  <b>SERVICE REQUIRED!</b>	<b>CLOSE OR OPEN COVER, SHOULD PROBLEM REMAIN THEN INTERLOCK FAULTY</b>  <b>SERVICE REQUIRED!</b>
The error appears when the cover is closed and the interlock is faulty. <ul style="list-style-type: none"> <li>Turn the device off at the main switch and then turn on again.</li> </ul> If the error reappears, there is a safety problem and servicing is required.	The error appears when the cover is closed and the interlock is faulty. <ul style="list-style-type: none"> <li>Turn the device off at the main switch and then turn on again.</li> </ul> If the error reappears, there is a safety problem and servicing is required.

F05	F06
The display shows	The display shows
<b>CLOSE COVER</b>	<b>OPEN COVER</b>

The display shows F07
<b>FAULTY MOTOR CONTROL</b>  <b>SERVICE REQUIRED!</b>

The display shows F09	The display shows F10
<b>COOLING FAN IS OFF</b>  <b>SERVICE REQUIRED!</b>	<b>ROTOR DOES NOT ROTATE BLOCKED ?</b>  <b>CASSETTE COVER MISSING ?</b>
	The error appears if the rotor is unable to turn. Possible causes may be a missing cassette cover, material between the rotor and ring sieve or the motor is defective.

F12
The display shows
<b>YOUR SERVICE INTERVAL HAS EXPIRED</b>  <b>PLEASE SERVICE UNIT CONTINUE WITH 'STOP'</b>
The error appears when the service interval programmed by the customer has expired.

**F13 to F26**

<b>The display shows</b> <b>F13</b>  <b>MOTOR IS COMING</b> <b>TO A STAND STILL</b>	<b>The display shows</b> <b>F14</b>  <b>FAULT SPEED SENSOR</b>  <b>SERVICE REQUIRED!</b>
---	---

<b>The display shows</b> <b>F15</b>  <b>PROBLEM WITH</b> <b>THE FREQUENCY</b> <b>CONVERTER</b>  <b>SERVICE REQUIRED!</b>	<b>F16</b> <b>The display shows</b>  <b>MOTOR HAS OVERHEATED</b> <b>NO START POSSIBLE</b>  <b>LET MOTOR COOL DOWN</b>
---	---

The error appears when the unit has overheated and yet START is pressed.

<b>The display shows</b> <b>F17</b>  <b>MOTOR HAS OVERHEATED</b> <b>WAS SWITCHED OFF</b> <b>LET MOTOR COOL DOWN</b>  <b>CONTINUE WITH STOP</b>	<b>The display shows</b> <b>F18</b>  <b>PROBLEM</b> <b>WITH THE</b> <b>TRANSFORMER</b>  <b>SERVICE REQUIRED!</b>
---	---

The error appears when the critical motor temperature is reached during grinding.

<b>F26</b> <b>The display shows</b>  <b>FREQUENCY CONVERTER</b> <b>HAS OVERHEATED</b>  <b>NO START POSSIBLE</b> <b>ALLOW TO COOL DOWN</b>
--

The error appears when the frequency converter has overheated and yet START is pressed.

# 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.

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