Operating Instructions for the Disk Mill Model DM 200

Retsch®

Information on these Operating Instructions

The present operating instructions for the laboratory model DM200 disk mill provides you with all of the necessary information on the areas specified in the table of contents.
It is an instruction for the target group(s) defined for each of these areas in the safe and intended use of the **DM200**. The prerequisite of each of the target group(s) being able to use it safely and as intended is having a knowledge of the relevant sections.
The present technical documentation is a reference work and instructions for learning and each of the sections is closed in and of itself.
These operating instructions are not instructions for repair. If repairs should be necessary, please consult your vendor or get in contact with Retsch GmbH directly.

Safety

The DM200 laboratory disk mill is a highly modern high-performance product from Retsch GmbH and is state-of-the-art. If the machine is used as intended and if the user has a knowledge of the technical documentation here, it is completely safe when operated.

Safety Information

You as the operator have to ensure that the persons entrusted with working at the **DM200**:

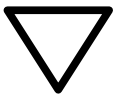
- have taken notice of and understood all of the regulations in the area of safety,
- know all of the instructions for use and regulations of the target group relevant for them before commencing work,
- have access to the technical documentation of this machine at any time and without any problems.

Before work is commenced on the **DM200**, ensure that new personnel has been made familiar with its safe and intended use either by having a competent person introduce it to them orally and / or based upon the present technical documentation.

Improper operation may lead to personal injury, property damage or injury. You are responsible for your own safety and that of your employees.

Ensure that no unauthorised persons have access to the DM200 laboratory disk mill.

For your own protection, have your employees confirm that they have been instructed in the operation of the **DM200**. You will find the draft of the appropriate form after the section on safety.

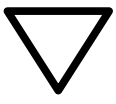


We will not be liable for any claims to compensation whatsoever for property damage or personal injury that were caused by not observing the following safety information.

Warning Signs

we give warnings with the following signs:

personal injury



property damage

Repairs

These operating instructions are not instructions for repair. For your own safety, repairs may only be done by Retsch GmbH or an authorised agency or service technicians.

In this case, please notify:

The Retsch agency in your country
your vendor
Retsch GmbH directly

your service address:

Confirmation

I have taken notice of the foreword and the section on safety.

_____
_____
the signature of the operators

_____
_____
the signature of the service technician

Technical Data

machine model designation: DM200

Use as intended

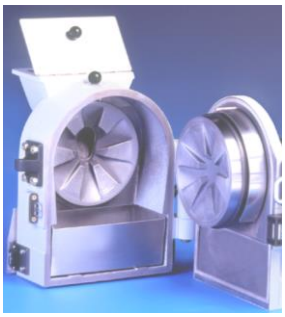
The **DM200** laboratory disk mill is suited for finely milling soft to hard materials (up to 8 Mohs) in sets or continuously from the fields of mining and metallurgy, rocks and earth, the glass industry or soil research.

Our applications laboratory would be glad to give you further information upon request.

The **DM200** is designed for quantities from 20 to approximately 150 Kg/h depending upon the setting of the discharge gap and the piled density and crushing behaviour of the sample. The feed size may not exceed an edge length of a maximum of 20 mm.

⚠	The DM200 is not designed to be explosion protected and therefore it is not suited to milling explosive self-igniting or fire-promoting substances.
⚠	If oxidised materials are milled such as metals, organic materials, wood, plastics, etc., there is the danger of self-ignition (dust explosion) if the proportion of fines exceeds a certain percentage. It is necessary to observe the appropriate safety guidelines when materials such as these are crushed.
▽	Do not modify the machine and only use the spare parts and accessories approved by Retsch. **Otherwise the conformity with European directives declared by Retsch shall be rendered invalid.** **Furthermore, this leads to a loss of all warranty claims.**

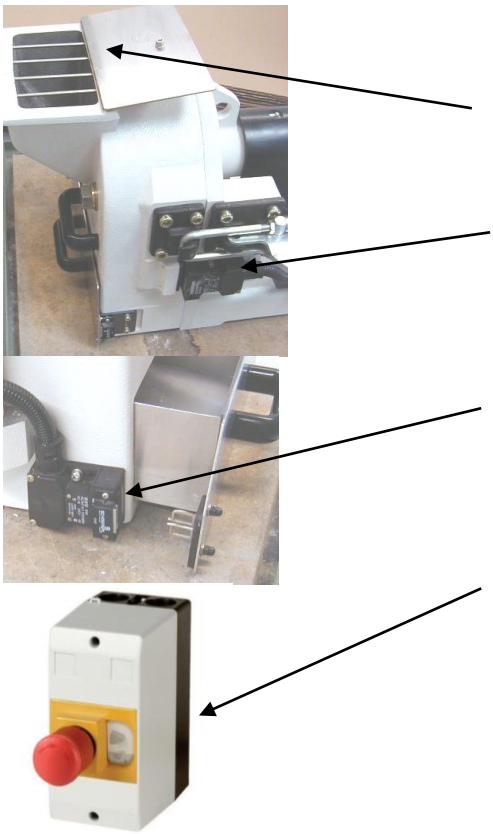
Functional Description



The material sample is crushed by two milling discs coarsely meshed on the inside working against one another in a milling space sealed against dust from the outside. One of these is driven by a powerful and slow moving gear motor.

The material to be milled is filled into the centre of the stationary milling disc through a closable funnel and it escapes from the gap between the two disks after being crushed by compressing and shearing force. The width of the gap can be adjusted and controlled from outside and determines the mean granulation of the material to be milled.

Protective Equipment



The following safety equipment reliably prevents persons from unintentionally putting their hands in the machine when it is running.

- funnel tube.
  This prevents persons from putting their hands into the milling space when the flap is opened.
- safety limit switch.
  This prevents the machine from starting up when the milling space is open.
  It also stops the motor within a safe period of time when the milling space is opened during operation.
- safety limit switch.
  This prevents the machine from starting up when the collecting container is drawn out.
  It also stops the motor within a safe period of time when drawing out the collecting container.
- protective motor switch, ON/OFF switch.
  This switches off the machine automatically if there is a defect or if the motor is overloaded.
  This prevents the machine from starting up independently if there is an electrical defect or power failure.

Drive

standard three-phase gear motor

Motor Output

1,500 Watt

Rated Voltages

3~ 230 V	50 / 60Hz	approx. 5.7 A
3~ 400 V	50 / 60Hz	approx. 3.3 A

Rpm's

50Hz = Rpm's 440 min^{-1}
60Hz = Rpm's 528 min^{-1}

Protective Types

gear motor	IP 55
safety limit switch for the door	IP 67
safety limit switch for the collecting container	IP 67
protective motor switch, ON-OFF switch	IP 55

Emissions

Characteristic Noise Values :
Noise measurement in conformity with DIN 45635-031-01-KL3
The properties of the material to be crushed also has an effect upon the characteristic noise values.
sound level L_{WA} = 81 dB(A)
emission read at the workpiece L_{pAeq} = 69,4 dB(A)

Machine Dimensions

height: 400 mm, 500 mm with the vertical flap on the funnel.
width: 430 mm, 900 mm with door opened at 180°.
depth : 890 mm, 1,000 mm with door opened at 90°

weight: approximately 140 kg

Floor Space Required

430 mm x 1000 mm; a safety distance is not necessary.

Transportation and Installation

Packaging

Packaging is in accordance with the transportation path and satisfies the generally recognised packaging guidelines.

Please store the packaging for the duration of the warranty period because your warranty claim would be endangered if there were a complaint and it were returned in insufficient packaging.

Transportation

In order to be able to transport the **DM200** in a crane of a minimum load-bearing capacity of 250 kp, it should be hoisted with the hoisting equipment as shown in the adjacent figure.

The DM200 may not be shocked, shaken or thrown during transportation. Otherwise, the electronic and mechanical component parts could be damaged.

Temperature Fluctuations

If there are strong temperature fluctuations (for instance, when being transported by aeroplane), the DM200 should be protected from condensation water. Otherwise, there could be damage to the electronic component parts.

Intermediate Storage

Please also ensure that the DM200 is stored dry if it is placed in intermediate storage.

The Parameters for the Place of Installation

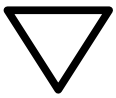
ambient temperature :

5°C to 40°C

If the temperature is above or below the ambient temperature, the electronic and mechanical component parts may be damaged changing the performance data in an unpredictable fashion.

humidity :

The maximum relative humidity is 80% at temperatures up to and including 31°C, decreasing linearly to 50% relative humidity at 40°C



If the humidity is higher, the electronic and mechanical component parts may be damaged changing the performance data in an unpredictable fashion.

Installation Altitude:
a maximum of 2,000 m above sea level

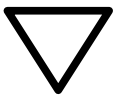
Installation

Only place the DM200 on a solid and sturdy foundation.

Electrical Connection

The mains fusing should be designed as follows:
at 3~ 230 and 3~ 400V = 16A

- you may find the voltage and frequency of the **DM200** on the nameplate.
- please ensure that the values agree with the existing power mains.
- only connect the DM200 to the power mains with the aid of the cable connector supplied.



Electrical and mechanical component parts may be damaged if the values on the nameplate are not complied with.

Modifications or rebuilding it to a supply voltage other than stated on the machine nameplate should only be done by an electrician.

Danger of Current Surge!

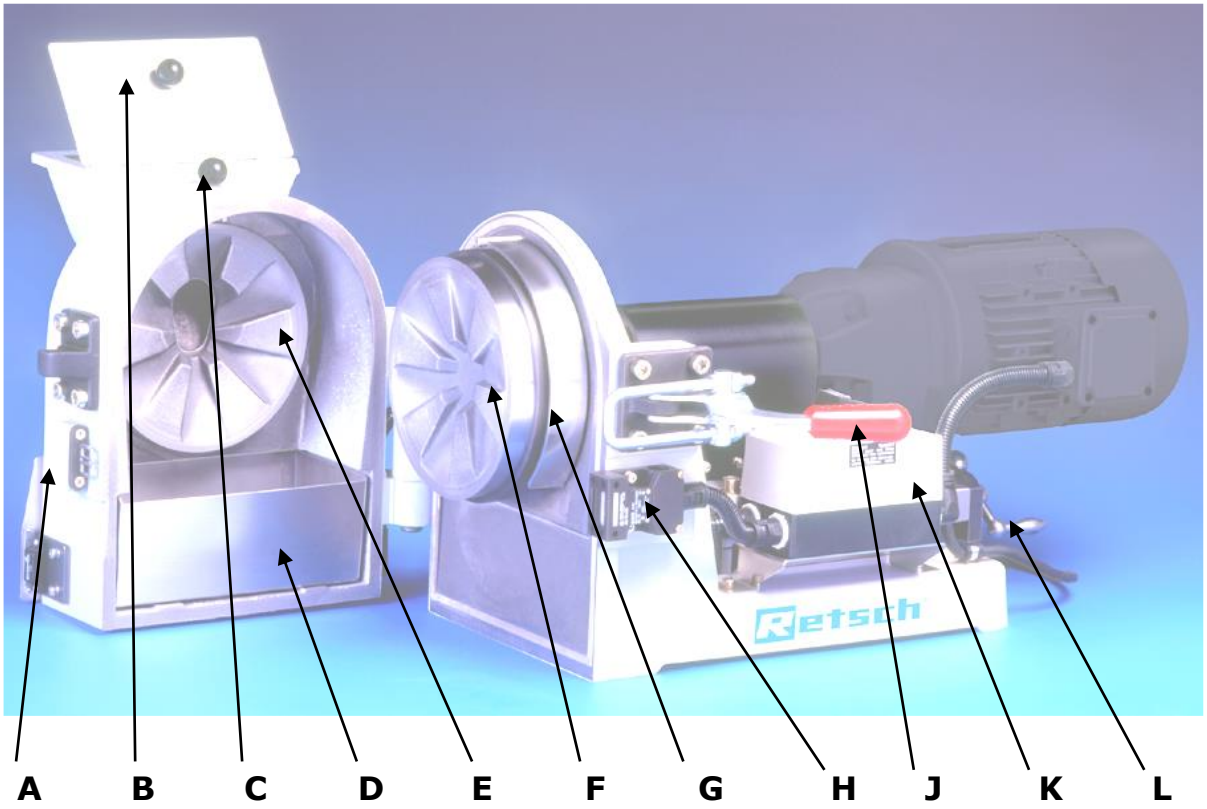
In order to avoid having to call in a qualified electrician once again, you can have the connection fitted directly with a direction of rotation changeover switch. This has the advantage that the grinding disc teeth can be used from both sides, as described in Section "Changing the direction of rotation".

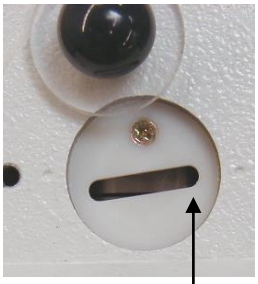
Any modifications or conversions to the appliance may only be carried out by a qualified electrician.

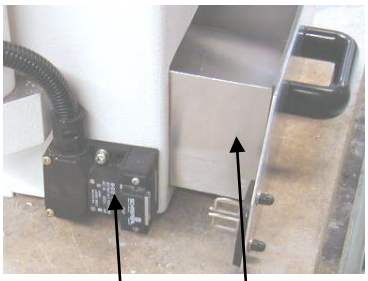
Electric shocks can cause serious injuries or even death!

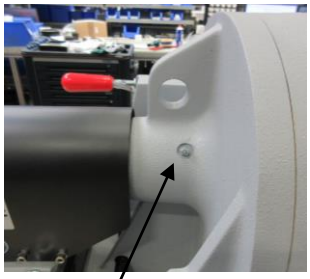
Operation

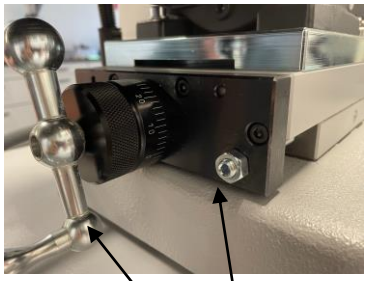
The Operating Elements and Operation











item	element	function
A	door	seals the milling space dustproof
B	funnel tube	receives the material to be milled
C	window milling gap	enables you to check the milling gap by means of blade gauge
D	collecting container	receives the crushed material to be milled
E	milling disc doors	crushes the material to be milled fed into it together with **F**
F	milling disc housing	crushes the material to be milled fed into it together with **E**
G	contact protection	Swivelling sheet metal which protects the user from reaching behind the grinding disc inside the device
H	safety switch for the door	prevents the machine from starting up when the door is open
I	lubrication point	enables you to relubricate the coupling
J	door lock	enables you to open and safely close the doors
K	protective motor switch, ON-OFF switch, Emergency stop switch	disconnect the motor from the mains if there is an overload

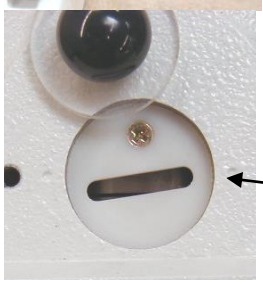
L	gap adjustment crank	enables you to adjust the gap together with **C** graduation line = 0.01 mm
M	safety switch for the collecting container	prevents the machine from starting up when the collecting container is drawn out
N	Stop screw	Limits the minimum gap setting. The factory-set gap setting is 0.1 mm

Adjusting the Gap Width

You may adjust the gap width between the milling disc in the housing and in the door just by adjusting the graduated rotating crank mounted below the motor. 1 graduation line = 0.01 mm.
A gap setting of 0.05 to approx. 5 mm is possible for grinding discs made of manganese steel and hardened steel.
A gap setting of 0.1 to approx. 5 mm is possible for grinding discs made of tungsten carbide and zirconium oxide.
The device is supplied from the factory with the stop screw set to prevent gap settings smaller than 0.1 mm. If smaller gap dimensions are required, the stop screw must be adjusted. In order to do this, remove the cover cap and loosen the lock nut. Turn the stop screw backwards by turning it anti-clockwise.

- **Rotating Crank**

Caution! Do not go below the minimum gap width of 0.05 mm.
You may control check the gap width setting through a window behind the funnel tube by means of a sensing gauge.
The device must be switched off during the measurement!
The feeler gauge must not be jammed during the measurement, but it must just be able to be pulled out between the grinding discs.



- **Window**

Material that is difficult to mill should be milled at least twice. Select a larger gap width as pre-crushing for the first pass and then you achieve the desired final fineness with the small gap in the second milling pass.

Caution !
The smallest gap width is 0.05 mm for grinding discs made of manganese steel and hardened steel.
The smallest gap width of 0.1 mm is possible for grinding discs made of tungsten carbide and zirconium oxide.
The milling discs may not touch one another because otherwise this could damage the milling discs.

Starting the Machine

It is only possible to start the DM200 when the door is closed and the collecting container has been inserted.
The ON-OFF switch is on the right-hand side of the **DM200**.

- **ON-OFF switch, Emergency stop switch**

In order to switch on the device, please proceed as follows:

- Check whether the device is correctly connected to the power supply.
- Release emergency stop switch by turning it clockwise.
- Start the device by pressing the adjacent ON-switch.

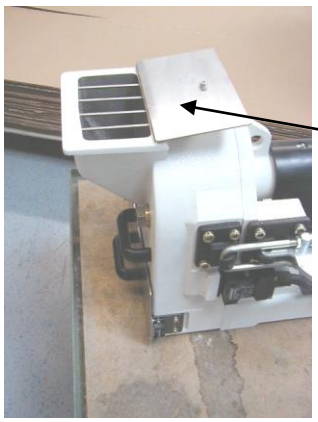
In order to switch off the device, please proceed as follows:

NOTICE: The device must not be switched off until there is no longer any sample material in the grinding chamber that needs to be grinded.

- Switch off the device by pressing the emergency stop switch.

The ON-OFF switch also acts as a protective motor switch.
If the motor is overloaded or if there is another electrical fault, this switch disconnects the DM200 from the mains.

The **DM200** can only start up when the **DM200** is manually started with the ON-OFF switch.



Feeding the Material to be Crushed

After the gap has been set and the DM200 has been started, you commence material feed. Do not exceed a maximum edge length 20 mm. Open the lid of the funnel tube for this purpose.

- **the lid of the funnel tube**

When feeding the material to be crushed, please ensure that the funnel tube lid is closed because otherwise the material to be crushed could fall back.
Furthermore, the quantity of fed material to be crushed depends upon its millability. Therefore, note the decreasing intensity of the milling sound to ascertain the optimum feed quantity.

Caution!
Only feed the material to be crushed after having started the DM200.
If the **DM200** starts up filled with material to be crushed, this may lead to damage in the mechanical component parts.

Changing the direction of rotation

The grinding discs are subject to natural wear and tear after prolonged use.
However, before they have to be replaced with new ones, you can change the direction of rotation of the motor in order to utilise the opposite side of the toothing. In this

way, the service life of the grinding discs will be extended.

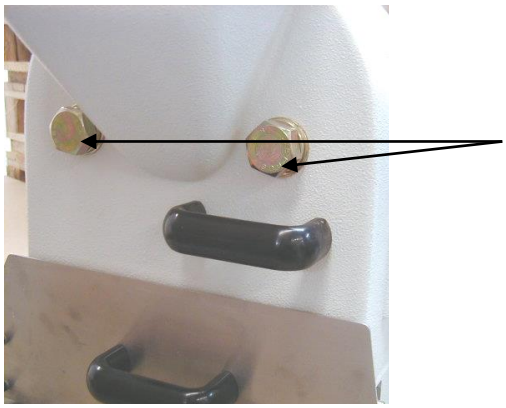
The direction of rotation of the motor can be changed by switching the phases on the power supply. Due to the fact that this requires intervention on the electrical connection cables of the DM 200, the direction of rotation may only be changed by a qualified electrician.
However, you can also have a direction of rotation change-over switch installed when you initially connect the device to the mains supply. In this way, an intervention of a qualified electrician is no longer required when the direction of rotation is changed again.

Any modifications or conversions to the appliance may only be carried out by a qualified electrician.

Electric shocks can cause serious injuries or even death!

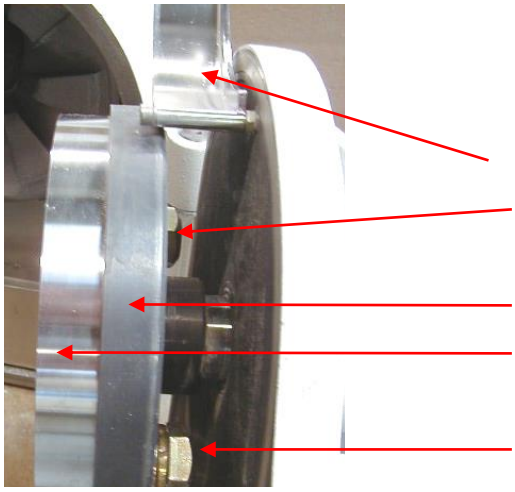
Replacing the milling disks

The milling disks are subject to natural wear after use over a long period.



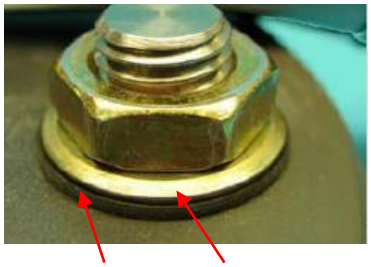
Replacing the milling disk in the door:

- Disconnect the mains plug
- Remove the collecting vessel
- Keep the door closed
- Slightly unscrew the hexagon bolts or hexagon nuts with an open-jawed spanner
- Open the door
- Keep a firm hold on the milling disk while unscrewing both hexagon bolts with washers
- Remove the milling disk
- Clean the mounting of the milling disk in the door
- Insert a new milling disk so that its contact surface is level
- Screw in the hexagon bolts again – for zirconium oxide hexagon nuts are used



Replacing the milling disk in the housing:

- Disconnect the mains plug
- Remove the collecting vessel
- Open the door
- Lift up the cover
- Unscrew the hexagon bolts or hexagon nuts with an SW 30 open-jawed spanner
- Remove the milling disk
- Clean the mounting of the milling disk
- Place a new milling disk in position
- The milling disk must have a level contact surface
- Screw in the hexagon bolts with washers – for zirconium oxide hexagon nuts are used.



GS **SS**

Caution

It is essential that the milling disks have a level contact surface.

There should be no unevenness or other components under the milling disk.

For zirconium oxide disks it is absolutely necessary that the rubber washer **GS** is placed under the steel washer **SS**.

Caution

Milling disks of zirconium oxide should be tightened with a torque of only 20-30 Nm. Do not forget the rubber washer **GS**.

Milling disks of steel and tungsten carbide are tightened with a torque of 50-100 Nm.

General Information

Accessories

Cleaning

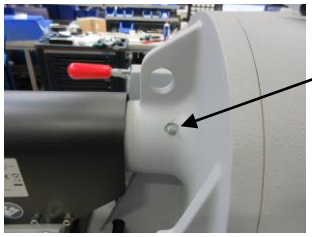
You may pull out the collecting container for cleaning purposes.
Open the door to clean the milling discs, the milling space and the funnel tube.
You may now conveniently clean the entire area that has come into contact with the material to be crushed with the aid of a brush or vacuum cleaner.

Alternatively, an adapter for a dust extraction system is included in the scope of delivery. For this, remove the cover of the window (checking the gap width) and the blind plugs located next to it. Mount the adapter by using the enclosed screws. Connect the hose of the vacuum cleaner (not included in the scope of delivery) to the adapter.
Do not carry out any dust extraction during the grinding progress, as high sample losses are to be expected especially with fine grinding.

Do not clean the DM200 with flowing water.
Danger from Current Surge
Only use moistened rags.
Solvents are not permitted.

The protection type of **DM200** is IP 55

Service



The DM200 does not require service, although it should be relubricated on the lubricating nipple of the shifting sled.

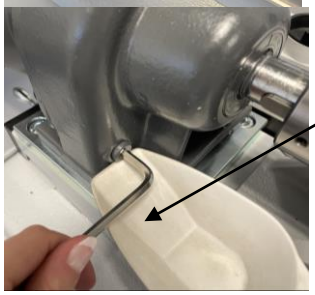
Conventional lubricating grease may be used for this purpose.

A grease gun is also available as an accessory under the order no. 05.185.0006.

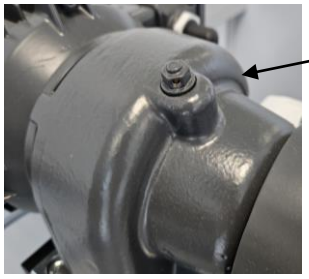
Changing the gearbox oil

The oil in the gearbox of the motor gearbox must be changed as required or approx. every 5 years. ISO VG 220 can be used for the filling.
In order to change the oil, the device has to be switched on for approx. 15 minutes so that the oil warms up. Subsequently, the device has to be switched off and disconnected from the power supply.
Loosen the screw connection of the coupling cover (by using an Allen key no. 4) and remove the coupling cover.

Loosen and remove the fastening screw of the motor (by using an Allen key no. 6).



Hold a collecting vessel/spoon underneath the drain plug and loosen the drain plug (by using an Allen key no. 5). The screw must not be removed completely in order to avoid any uncontrolled oil drainage! Collect the leaking oil and, if necessary, pour it into a larger container (max. 250 ml).
As soon as no more oil escapes, the oil drain plug, including the sealing disc, must be tightened and the coupling cover has to be mounted.



Remove the filling plug (by using an Allen key no. 11). If required, use a funnel and pour in 0.22 litres of gear oil. Tightly screw in the filling plug, including the sealing ring.

Necessary Safety Tests

The safety limit switches on the door and the collecting container should be checked on a monthly basis to see if they are in perfect working order:

- open the door:

It may not be possible to switch on the DM200 any more with the ON/OFF switch.

- close the door:

It must be possible to start the DM200 with the ON/OFF switch again.

- pull out the collecting container:

It may not be possible to switch on the DM200 any more with the ON/OFF switch.

- push in the collecting container:

It must be possible to start the DM200 with the ON/OFF switch again.

If the machine is not functioning properly, do not continue to operate it and get in contact with our customer service.

Copyright

Modifications

We reserve the right to make technical modifications.

Safety Regulations (Table) for the **DM200** from the sections

process	action	hazards
safety information	property damage and personal injury may be incurred if the safety information is not observed.	no claims to compensation for damage shall be accepted whatsoever
intended use	do not mill any explosive self-igniting or fire-promoting materials	danger to life and limb because of explosion because the DM200 is not designed to be explosion protected.
	do not mill materials whose fine proportion at a certain percentage may lead to an explosion.	danger to life and limb because of explosion because the DM200 is not designed to be explosion protected.
	do not modify the machine and only use the spare parts and accessories approved by Retsch.	otherwise the conformity with European directives declared by Retsch shall be rendered invalid. Furthermore, this leads to the loss of all warranty claims.
packaging	please store the packaging for the warranty period.	if there is a complaint and it is returned in insufficient packaging, this may jeopardise your warranty claims.
temperature fluctuations	protect the DM200 from condensate water forming if there are temperature fluctuations.	electronic component parts may be damaged.
transportation	do not shock, shake or throw the DM200 during transportation	electronic and mechanical component parts may be damaged.
scope of delivery	if the delivery is incomplete and / or if there is damage from transportation, you have to inform the transporter and Retsch GmbH without delay (within 24h).	under certain circumstances later complaints may not be recognised.
ambient temperature	should not fall below 5°C should not go above 40°C	electronic and mechanical component parts may be damaged and performance data may change unpredictably.
humidity	do not exceed a relative humidity of 80% at 31°C or 50% (descending linearly) at 40°C.	higher humidity may damage the electronic and mechanical component parts and performance data may change unpredictably.
electrical connection	the network does not agree with the values on the nameplate.	electronic and mechanical component parts may be damaged.
adjusting the gap width	The smallest gap width is 0.05 mm for grinding discs made of manganese steel and hardened steel. The smallest gap width of 0.1 mm is possible for grinding discs made of tungsten carbide and zirconium oxide.	if the milling discs come into contact with one another, they may be damaged.
feeding the material to be crushed	only feed material to be crushed when the **DM200** is operating.	if the **DM200** starts up filled with material to be crushed, this may damage the mechanical component parts.
cleaning	do not clean the DM200 with flowing water.	danger from current surge. the protection type of the **DM200** is IP55
safety tests	get in contact with customer service if the safety equipment functions improperly.	if defects are improperly repaired, this may lead to danger to life and limb.

EU Declaration of Conformity

Translation

DISK MILL

DM 200 | 20.740.xxxx

EU DECLARATION OF CONFORMITY

We, represented by the undersigned, hereby declare that the above device complies with the following directives and harmonised standards:

Machinery Directive 2006/42/EC

Applied standards, in particular:

DIN EN ISO 12100	Machine Safety - General Design Principles
DIN EN 61010-1	Safety Regulations for Electrical Measurement, Control, Regulation and Laboratory Devices

Electromagnetic compatibility 2014/30/EU

Applied standards, in particular:

EN 55011	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

Restriction of hazardous substances (RoHS) 2011/65/EU

Applied standards, in particular:

DIN EN 50581	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Authorised person for compilation of the technical documentation:

Julia Kürten (Technical Documentation)

Furthermore, we declare that the relevant technical documentation for the above device has been prepared in accordance with Annex VII Part A of the Machinery Directive and we undertake to submit the documentation to the market surveillance authorities on request.

In the event of a modification of the device not agreed on by Retsch GmbH, as well as the use of non-approved spare parts or accessories, this declaration loses its validity.

Retsch GmbH

Haan, 09/2023

Dr. Stefan Mähler, Technical Manager

CE

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