

Manual
Mixer Mill MM 500 nano



Translation



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Table of Contents

1	Notes on the manual	7
1.1	Disclaimer	7
1.2	Copyright.....	7
1.3	Explanation of signs and symbols	7
1.4	Explanations of the Safety Instructions	8
2	Safety	9
2.1	Intended use of the device.....	9
2.2	Improper use.....	9
2.3	Obligations of the operating company	10
2.3.1	Provisions	10
2.3.2	Personnel.....	10
2.3.3	Workstation and device	10
2.3.4	Qualification of personnel	10
2.3.5	Personal protective equipment (PPE)	11
2.4	Protective Equipment.....	11
2.5	Repairs.....	11
2.6	Preventing risks during normal operation	12
2.7	Preventing damage to equipment.....	13
2.8	Confirmation Form for the Managing Operator.....	13
3	The Mixer Mill MM 500 nano	14
3.1	Technical data	15
3.2	Emissions.....	16
3.3	Views of the device	17
3.3.1	Front.....	17
3.3.2	View of the grinding jar support	18
3.3.3	Back	19
3.4	Signs on the device	20
3.5	Type Plate Description.....	21
4	Packaging, Transport and Installation	22
4.1	Packaging	22
4.2	Transport.....	22
4.3	Temperature Fluctuations and Condensation	23
4.4	Conditions for the Installation Site	23
4.5	Removing the Transportation Lock.....	24
4.6	Removing the Transportation Aid	26
5	First Commissioning	27
5.1	Electrical Connection	27
5.2	Connecting the device to the power supply.....	28
6	Operating the Device	29
6.1	Switching the device on/off.....	30
6.2	Opening and Closing of the Device	31
6.3	Specifications regarding grinding balls and grinding jars	32
6.4	View of grinding jars	33
6.5	Opening aid.....	33
6.5.1	Grinding Jar Identification	34
6.5.2	Ball Sizes and Speeds.....	34
6.5.3	Recommended maximum ball sizes	34
6.5.4	Recommended Grinding Jar Filling	35
6.6	Special grinding methods	36
6.6.1	Cryogenic grinding.....	36
6.6.2	Wet Grinding with Highly Flammable Materials	37
6.7	Preparing the grinding jar	37

6.7.1	Opening the grinding jar	38
6.7.2	Filling the grinding jar	39
6.7.3	Closing the grinding jar	40
6.8	Inserting the Grinding Jar	41
6.8.1	Opening the grinding jar support	42
6.8.2	Inserting the grinding jar	42
6.8.3	Closing the grinding jar support	45
6.9	Grinding process	46
6.9.1	Starting the grinding process	47
6.10	Removing the sample material	47
6.10.1	Pouring aid for Multicavity grinding jar	50
7	Device control	51
7.1	Menu interface on the touchscreen	52
7.2	Function elements	53
7.3	Menu navigation	56
7.4	Main menu	57
7.5	Controlling the grinding process	60
7.6	Starting the grinding process	60
7.7	Pausing the grinding process	60
7.8	Stopping the grinding process	60
7.8.1	Grinding process successfully completed	60
7.9	Program mode	61
7.9.1	Select a Program	63
7.9.2	Edit a Program	66
7.9.3	Save a Programme	67
7.9.4	Delete a Programme	67
7.10	Cycle mode	67
7.10.1	Selecting the cycle	70
7.10.2	Editing the cycle	71
7.10.3	Saving the cycle	72
7.10.4	Deleting the cycle	72
7.11	System settings	73
7.11.1	MyRetsch	75
7.11.2	Signalling device	76
7.11.3	Brightness	76
7.11.4	Date and time	76
7.11.5	Software Version	76
7.11.6	Operating Hours	77
7.11.7	Serial number	77
7.11.8	Software Update	77
7.11.9	Service Environment	77
8	Error Messages and Information Notes	78
8.1	Error Messages	78
8.2	Information Notes	80
9	Servicing	81
9.1	Cleaning	81
9.1.1	Cleaning the outside of the device	82
9.1.2	Cleaning the collecting tray	82
9.1.3	Cleaning the inside	82
9.1.4	Cleaning the filter covers	82
9.1.5	Cleaning the grinding jar	83
9.1.6	Cleaning the grinding balls	83
9.2	Maintenance	83
10	Wear	84

10.1	Returning for repair and maintenance	84
11	Accessories	85
12	Disposal.....	86
13	Index	88

1 Notes on the manual

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

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

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

Amendment status:

The document amendment 0001 of the "Mixer Mill MM 500 nano" manual has been prepared in accordance with the Directive of Machinery 2006/42/EC.

1.1 Disclaimer

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

1.2 Copyright

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

1.3 Explanation of signs and symbols

The following signs and symbols are used in this manual:

Signs and symbols	Meaning
①	Indicates a recommendation and/or important information.
Bold type	Indicates an important term.
<ul style="list-style-type: none"> • < Point 1> • < Point 2> • < Point 3> 	List of equivalent points.
⇒	Steps for following an instruction.

1.4 Explanations of the Safety Instructions

⚠ DANGER	<i>D1.0000</i>
<p>Risk of fatal injuries Source of danger</p> <ul style="list-style-type: none"> – Possible consequences if the danger is ignored. • Instructions and information on how to avoid the risk. 	

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

⚠ WARNING	<i>W1.0000</i>
<p>Risk of life-threatening or serious injuries Source of danger</p> <ul style="list-style-type: none"> – Possible consequences if the danger is ignored. • Instructions and information on how to avoid the risk. 	

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

⚠ CAUTION	<i>C1.0000</i>
<p>Risk of injuries Source of danger</p> <ul style="list-style-type: none"> – Possible consequences if the danger is ignored. • Instructions and information on how to avoid the risk. 	

Average to slight injuries may result if the “Caution” sign is disregarded. There is an average or slight risk of an accident or personal injury. The signal word **⚠ CAUTION** is additionally used in the running text or in instructions.

NOTICE	<i>N1.0000</i>
<p>Type of damage to property Source of the damage to property</p> <ul style="list-style-type: none"> – Possible consequences if the information is ignored. • Instructions and information on how to avoid the damage to property. 	

Damage to property may result if the information is disregarded. The signal word **NOTICE** is additionally used in the running text or in instructions.

2 Safety

CAUTION

C2.0002

Risk of injury

Lack of knowledge of the manual

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



Target group:

The MM 500 nano has been designed for preparing samples in a laboratory environment. This manual is therefore directed at persons who work with this device in a comparable environment and who already have experience with similar equipment.

The MM 500 nano is a modern, efficient, state-of-the-art product from Retsch GmbH. Its reliability is ensured when used as intended and with knowledge of this technical documentation.

2.1 Intended use of the device

The MM 500 nano is designed for the crushing, grinding, mixing and homogenisation of wet and dry soft, medium-hard, fibrous and brittle materials with a particle size of up to 10 mm.

As a laboratory machine, the MM 500 nano may only be used to prepare samples and not as a production machine.

The device has been designed for stationary use in a dry and clean working environment.

The user and operating personnel must have read the manual and be familiarised with the complete functional scope of the device.

2.2 Improper use

The MM 500 nano may only be used as intended.

Any uses other than the described intended use are regarded as improper use.

The MM 500 nano is **not** suitable for processing sample materials that can form explosive air mixtures.

Any form of claims for damage to equipment or personal injury resulting from improper use and/or the failure to comply with the safety instructions shall be ruled out.

2.3 Obligations of the operating company

2.3.1 Provisions

The user bears responsibility for ensuring that people working with the device and the corresponding equipment have taken note of and understood all relevant safety regulations.

2.3.2 Personnel

- Ensure that only trained personnel are deployed whose training and experience enable them to recognise risks and avoid potential hazards.
- Staff should be given regular training on using the device, and in particular regarding sudden events.
- Only allow trainee staff to work on the device when they are being supervised by qualified personnel.
- Check the safety awareness of staff regularly.
- Define staff responsibilities according to qualification and job description.
- Provide staff with personal protective equipment (PPE).
- Ensure that the following conditions have been met:
 - Staff have read and understood this Manual, and in particular the chapter on [Safety](#).
 - Staff are aware and take note of the relevant accident prevention and safety regulations.
 - Staff wear the designated personal protective equipment (PPE) when working with the device.

2.3.3 Workstation and device

- Ensure that there is sufficient lighting and ventilation at the workstation.
- Ensure that the exhaust air is properly conducted outside.
- All signs on the device must be kept in a legible condition.
- Ensure that all inspections and servicing work prescribed in this Manual are carried out.

2.3.4 Qualification of personnel

Work/operating phase	Qualification
Transport Installation Commissioning Operation Controlling Servicing Disposal	Qualified employee who has been trained in the safe use of the device.
Work on the electrical equipment on the device	Electrician who, on the basis of his/her training, knowledge and experience is able to evaluate the work assigned and recognise potential hazards.

2.3.5 Personal protective equipment (PPE)

Work/operating phase	Personal protective equipment (PPE)
Transport Installation	Safety footwear
Commissioning Installation of additional equipment Servicing	No PPE needed.
Disposal	Safety footwear
Normal operation (operation and control)	Hearing protection Possibly protective gloves to remove extremely hot or cold sample material. Protective gloves and goggles for cryogenic grinding using liquid nitrogen.

2.4 Protective Equipment

Emergency stop switch

The device is **not** fitted with an emergency stop switch as standard. In an emergency it must be shut down by pressing the main button or by disconnecting the device from the power supply.

Hood lock

The MM 500 nano is equipped with an automatic hood lock . Once a grinding process has started, a magnetic clamp firmly closes the hood of the device. If the hood is nevertheless opened during a grinding process, the process is interrupted and the device comes to an immediate halt. An appropriate error message is then displayed on the touchscreen.

2.5 Repairs

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

In case of repair, please inform...

- ...the Retsch GmbH representative in your country,
- ...your supplier, or
- ...Retsch GmbH directly.

Service address:

2.6 Preventing risks during normal operation

The failure to comply with the following safety instructions constitutes improper use and presents a risk to personnel and to operational safety.

Transport and installation

- Do not carry the device by yourself during transport and installation.
- Wear safety footwear for transport and installation.
- Only connect the device to sockets with a PE protective conductor.
- When connecting the device, the values on the type plate must correspond to those for the power connection.

Operation

- Read the manual before commissioning the device.
- Only operate the device at a workstation of sufficient size that offers adequate stability.
- Check the mains lead for damage before operating the device.
- Never operate the device if damage is visible or suspected.
- Only operate the device according to the technical application limits.
- During operation, do not wear any jewellery, wear your hair down or wear a tie or similar loose item of clothing.
- Wearing hearing protection during operation.
- Before operating the device, take measures that take account of restricted communication during operation of the device.
- Pay attention to your surroundings during grinding because the noise makes it more difficult to pick up acoustic signals.
- Do not operate the device in potentially explosive atmospheres.
- Take note of the safety data sheets for the samples and follow instructions by taking appropriate measures in advance.
- Do not grind any explosive and/or flammable substances.
- Do not grind any substances that might become explosive and/or flammable during grinding.
- The components that come into contact with sample material can get very hot or cold during operation. Before removing the samples, wait for the temperature to adjust, and wear protective gloves if necessary.
- Always wear protective gloves and goggles when handling liquid nitrogen for cryogenic grinding.
- Under no circumstances fill liquid nitrogen or dry ice into the grinding jar and then close the jar. The high pressure that arises in the jar would burst the grinding jar open.

Servicing and repair

- Before servicing, switch the device off at the main switch.
- Only clean the device with a dry or damp cloth.
- Do not clean the device with compressed air.
- Have all repairs carried out by the device manufacturer or by an authorised agent.

2.7 Preventing damage to equipment

- Protect the device against condensation if large fluctuations in temperature are to be expected (e.g. during air transport).
- Do not knock, shake or throw the device during transport and installation.
- Comply with conditions at the installation site when installing the device.
- Under no circumstances fill liquid nitrogen or dry ice into the grinding jar and then close the jar. The high pressure that arises in the jar would burst the grinding jar open.
- Only clean the device with a dry or damp cloth.
- Do not use any solvent or aggressive detergent for cleaning.
- Only use original spare parts for maintenance work.

2.8 Confirmation Form for the Managing Operator

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

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

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

I have read and taken note of the contents of all chapters in this manual as well as all safety instructions and warnings.

User

Surname, first name (block letters)

Position in the company

Place, date and signature

Managing operator or service technician

Surname, first name (block letters)

Position in the company

Place, date and signature

3 The Mixer Mill MM 500 nano

The MM 500 nano from Retsch GmbH is a laboratory device used to prepare samples.

The device permits the fast grinding, mixing and homogenisation of soft, medium-hard, fibrous and brittle materials with a particle size of up to 10 mm.

Due to the effective grinding process in a closed system, the MM 500 nano guarantees gentle preparation of samples ready for analysis in a very short time.

Depending on the properties of the material and grinding parameters, it is possible to achieve final fineness levels of up to 0.1 µm.

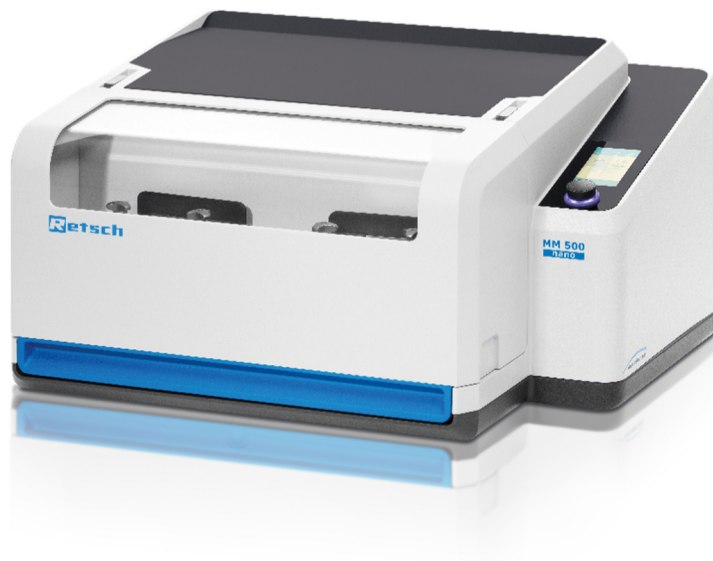


Fig. 1: The Mixer Mill MM 500 nano

3.1 Technical data

General information	
Applications	For (dry and wet) grinding, mixing, homogenisation, cell disruption, cryogenic grinding
Area of application	Agriculture, biology, chemicals, plastics, building materials, engineering, electrical engineering, environment, foodstuffs, geology, metallurgy, glass, ceramics, medicine, pharmaceuticals
Feed material	Hard, medium-hard, soft, brittle, elastic, fibrous
Specifications	
Grinding principle	Impact, friction
Feed size	≤ 10 mm
Final fineness	0.1 µm
Batch / Feed quantity	Max. 2x 45 ml
Vibration frequency setting	Digital, 3 – 35 Hz (180 – 2100 min ⁻¹)
Typical grinding time	30 seconds – 30 minutes
Grinding time setting	Digital, 10 seconds (minimum) to 8 hours (maximum)
Maximum grinding time	Up to 99 hours
Number of grinding stations	2
Grinding jar sizes	50 ml/80 ml/125 ml Multi-cavity jars of 4 x 10 ml and 2 x 25 ml, made of stainless steel, incl. PTFE pouring aids Adapter for 18 x 2 ml safe-lock reaction vials or 9 x 2 ml steel tubes, made of aluminum
Grinding jars (materials)	Hardened steel Stainless steel Tungsten carbide Zirconium oxide
Sensors	Temperature (optional), pressure (optional)
Operation	4.3 inch touchscreen with dial
Storable SOPs (standard operating procedures)	12
Programmable cycles	4 (up to 99 repeats)
Communication	myRetsch Web Portal, Retsch APP
Mains connection	1 phase, 100 – 120 VAC 50/60 Hz, 200 – 230 VAC 50/60 Hz
Protection class	IP 20
Electromagnetic compatibility (EMC)	EMC class in accordance with DIN EN 55011: A
Motor output	750 W (with frequency converter)
W x H x D closed	690 x 375 x 585 mm
Weight, net	60 kg
Conformity	CE

3.2 Emissions

⚠ CAUTION

C.0020

Risk of injury caused by not hearing acoustic signals

Loud grinding noise

- Loud grinding noise may result in not hearing acoustic warning signals, leading to injuries.
- **Take the volume of grinding noise into consideration when designing the acoustic signals in the working environment.**
- **Where necessary, use additional visual signals.**

⚠ CAUTION

C3.0077

Risk of hearing loss

High sound level

- The sound level may be high depending on the type of material, the number of balls used, the set grinding frequency and the grinding time. Excess noise in terms of intensity and duration can lead to impairments or permanent damage to hearing.
- **Ensure you take suitable soundproofing measures.**
- **Wear hearing protection if there is loud or lasting noise.**



Noise levels:

The noise levels will also be influenced by the properties of the sample material.

Example 1	
Receptacle	2 steel grinding jars (125 ml)
Grinding component	18 steel balls each (15 mm)
Feed material	Silica sand (~ 0.5 mm)
Feed quantity	60 ml
Speed	35 Hz

The workplace-related equivalent sound pressure level under these operating conditions $L_{eq} = 77$ dB(A).

Example 2	
Receptacle	2 steel grinding jars (125 ml)
Grinding component	50 steel balls each (10 mm)
Feed material	Silica sand (~ 0.5 mm)
Feed quantity	60 ml
Speed	35 Hz

The workplace-related equivalent sound pressure level under these operating conditions $L_{eq} = 74$ dB(A).

3.3 Views of the device

3.3.1 Front

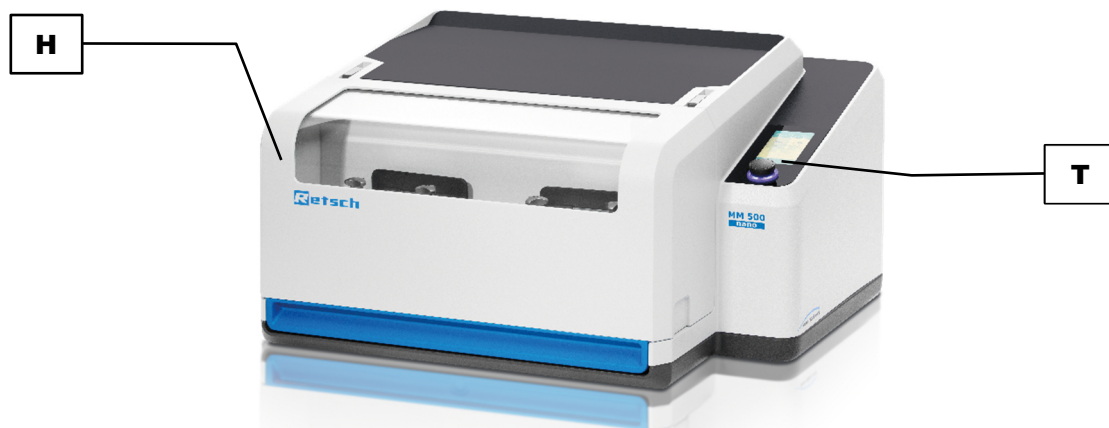


Fig. 2: Device hood closed

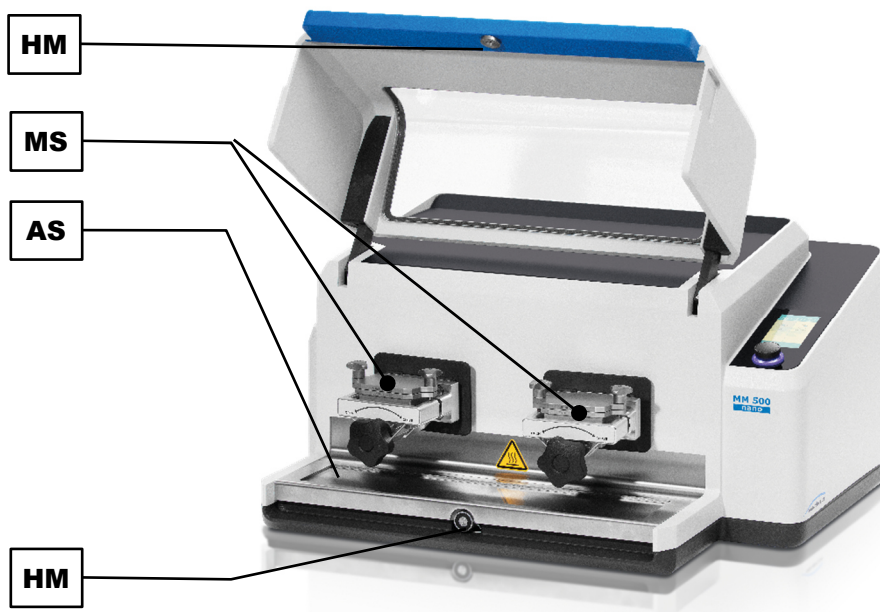


Fig. 3: Device hood open t

	Component	Function
H	Device hood	Closes the inside of the device.
T	Touchscreen with dial	For controlling the device. To select and configure grinding parameters.
HM	Magnetic clamps	To keep the device hood closed while the device is being operated.
MS	Grinding stations	Position of the grinding jar supports to hold the grinding jars.
AS	Collecting dish	Collects sample residue and may be removed for cleaning.

3.3.2 View of the grinding jar support

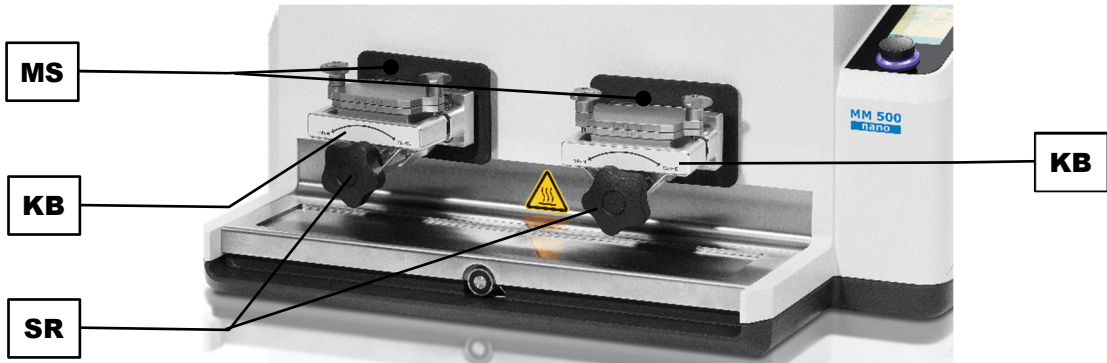


Fig. 4: Grinding stations

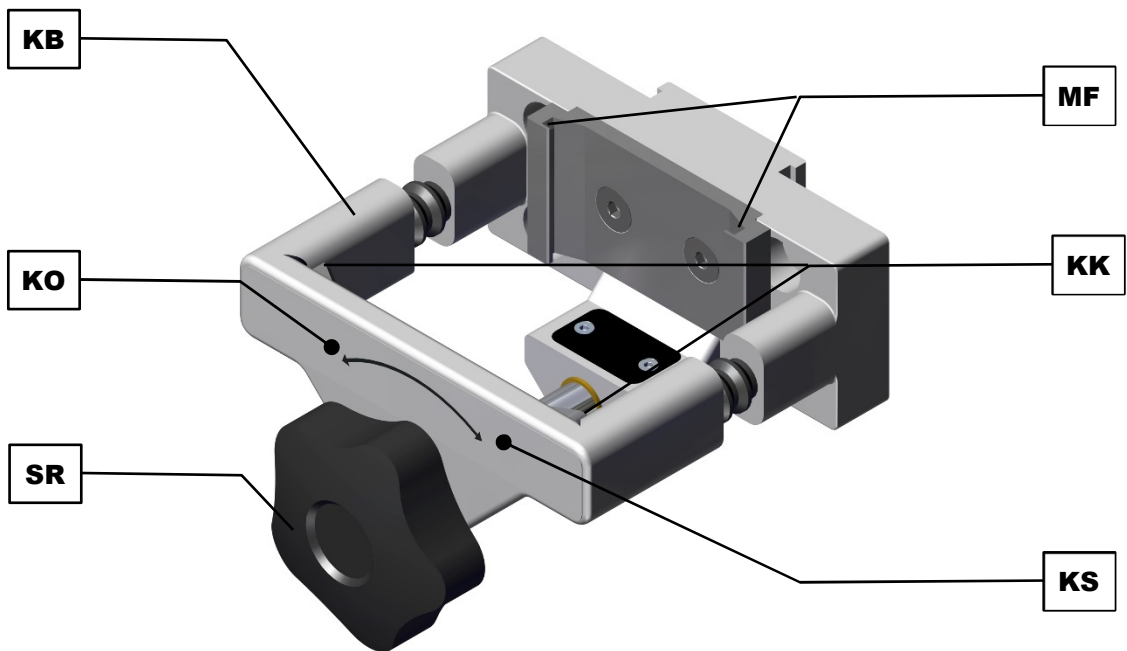


Fig. 5: Grinding jar support

	Component	Function
MS	Grinding stations	Position of the grinding jar supports to hold the grinding jars.
KB	Clamp	For mounting the grinding jars.
SR	Locking wheel	To tighten or loosen the grinding jars in the grinding jar support.
KK	Clamping wedges (Grinding jar support)	To secure the grinding jar after it has been correctly closed using the clamp.
KS	Direction of rotation of the locking wheel: close the clamps	Closes the clamps, thereby securing the grinding jar in the grinding jar support.
MF	Grinding jar guide	For correctly inserting the grinding jar without becoming misaligned.

KO	Direction of rotation of the locking wheel: open the clamps	Opens the clamps, thereby enabling the grinding jar to be removed.
----	--	--

3.3.3 Back



Fig. 6: Back of the device

	Component	Function
K	USB interface	To update the operating software.
I	Main switch	To switch the device on or off using the motor protection circuit breaker.
M	Appliance socket	Connection for the mains lead.
GL	Housing fan, Filter frame	To conduct waste heat. Protects the motor from dust particles.

3.4 Signs on the device



Fig. 7: Signs on the device

No.	Sign	Meaning
HG	Wear hearing protection	Safety warning: We recommend that you wear hearing protection when operating the device for a long period of time.
B	Read the manual	Safety warning: The manual must be read before commissioning and operating the device.
L	Electricity warning	Caution - electric shock! Housing may only be opened by qualified personnel. Pull the plug out before maintenance work!
N	Type plate	Information: Performance and connection data for the device.

3.5 Type Plate Description

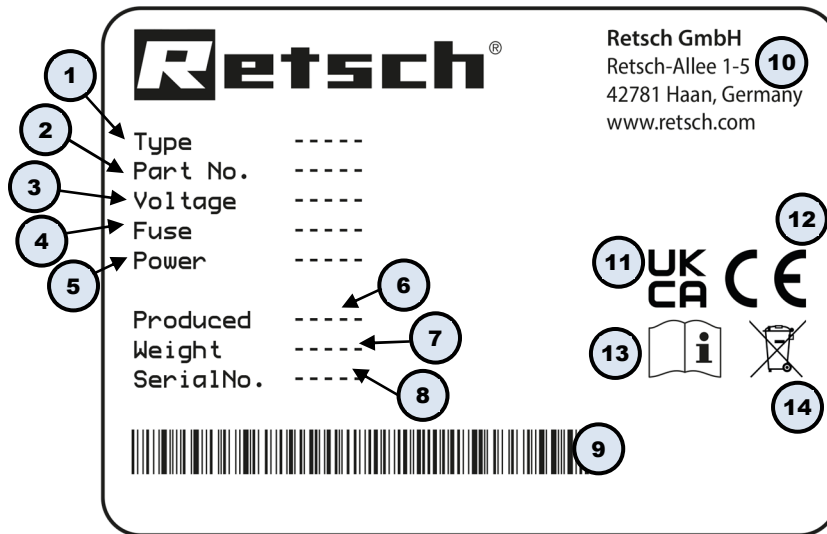


Fig. 8: Type plate

- 1 Device designation
- 2 Part number
- 3 Power version, Mains frequency
- 4 Fuse type and fuse strength
- 5 Capacity, Amperage
- 6 Year of production
- 7 Weight
- 8 Serial number
- 9 Bar code
- 10 Manufacturer's address
- 11 UKCA marking
- 12 CE marking
- 13 Safety warning: Read the manual
- 14 Disposal label

① In the case of queries please provide the device designation (1) or part number (2), as well as the serial number (8) of the device.

4 Packaging, Transport and Installation

4.1 Packaging

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

NOTICE

N2.0001

Complaint or return

Keeping the packaging

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

4.2 Transport

⚠ WARNING

W2.0005

Risk of injury due to the device falling down

Lifting the device above head height

- The device can fall causing serious injuries when lifted above head height.
- **Never lift the device above head height!**



⚠ CAUTION

C4.0000

Risk of injury caused by the device falling down

Incorrect transport of the device

- Due to its weight, the device can cause injuries if it falls down.
- **Do not transport the device by yourself.**

NOTICE

N3.0017

Damage to components

Transport

- Mechanical or electronic components may be damaged during transport. The device must not be knocked, shaken or thrown during transport.
- **Move the device gently during transport.**

NOTICE

N4.0014

Complaints

Incomplete delivery or transport damage

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

4.3 Temperature Fluctuations and Condensation

NOTICE

N5.0016

Damaged components due to condensation

Temperature fluctuations

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

Temporary storage:

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

4.4 Conditions for the Installation Site

CAUTION

C5.0047

Risk of injury caused by the device falling

Incorrect installation of the device

- Due to its weight, the device can cause injuries if it falls.
- **Only operate the device on a sufficiently large, strong and stable workstation.**
- **Ensure that all of the device feet are securely supported.**

NOTICE

N6.0004

Setting up the device

Vibrations during operation

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

NOTICE

N7.0002

Setting up the device

Disconnecting the device from the mains

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

NOTICE

N8.0021

Ambient temperature

Temperatures outside the permitted range

- Electronic and mechanical components may be damaged.
 - The performance data alters to an unknown extent.
 - **Do not exceed or fall below the permitted temperature range (5 °C to 40 °C ambient temperature) of the device.**
- Maximum relative humidity < 80 % (at ambient temperatures ≤ 31 °C)

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

Ambient temperature	Max. rel. humidity
≤ 31 °C	80 %
33 °C	73.3 %
35 °C	66.7 %
37 °C	60 %
39 °C	53.3 %
40 °C	50 %

NOTICE

N9.0015

Humidity

High relative humidity

- Electronic and mechanical components may be damaged.
- The performance data alters to an unknown extent.
- **The relative humidity in the vicinity of the device should be kept as low as possible.**
- Installation height: max. 2 000 m above sea level

The MM 500 nano must be installed on a stable and solid surface. Vibrations from the device will otherwise be transmitted to the surroundings during the grinding process.

4.5 Removing the Transportation Lock

⚠ WARNING

W3.0005

Risk of injury due to the device falling down

Lifting the device above head height

- The device can fall causing serious injuries when lifted above head height.
- **Never lift the device above head height!**



NOTICE

N10.0018

Transportation lock

Transport without transportation lock, or operation with transportation lock

- Mechanical components may be damaged.
- **Only transport the device with mounted transportation lock.**
- **Do not operate the device with built-in transportation lock.**

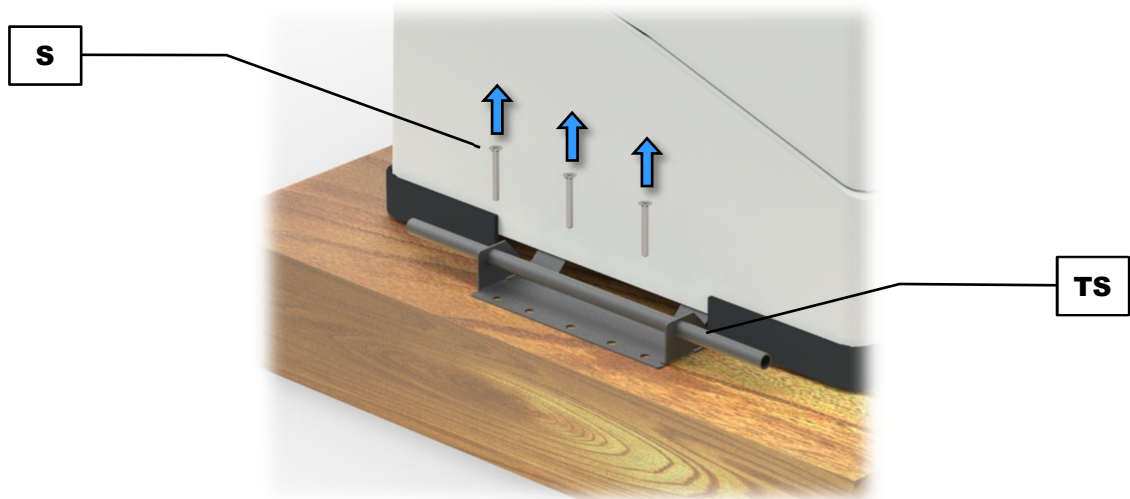


Fig. 9: Unscrewing the transport lock

	Component
S	Screw
TS	Transport lock

Remove the transport lock and transport the device as follows:

- ⇒ Unscrew and remove the six screws (S), three on each side of the device.
- ① The transport lock is simultaneously also a transport aid .
- ⇒ Use the transport lock (TS) as a transport aid when transporting the device to the application site.

CAUTION The weight without grinding jar is approx. 60 kg. The device may only be lifted by two people .

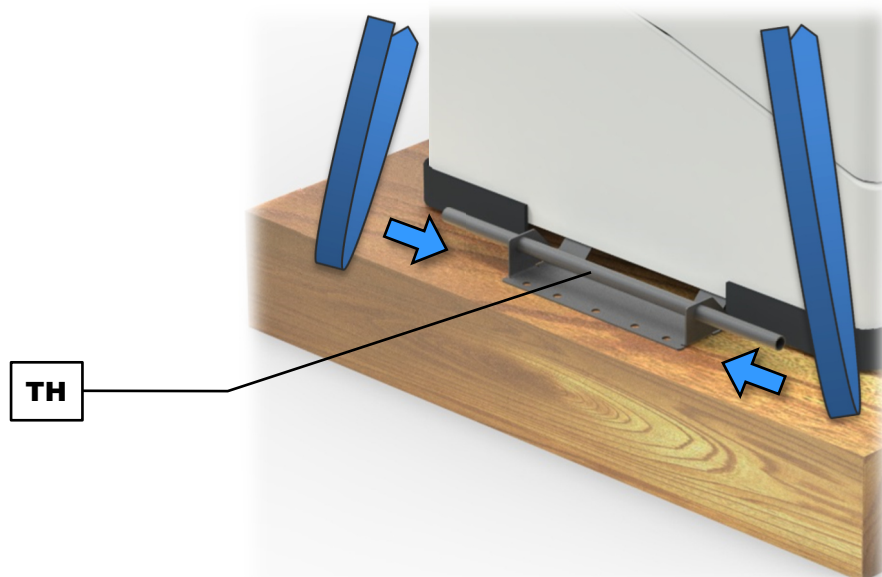


Fig. 10: Attach lifting belts

	Component
TH	Transport aid

The transport aid (TH) can also be used to lift the device by crane.

Transport the device by crane as follows:

- ⇒ Attach lifting belts to both of the transport aids (TH).
- ⇒ Transport the device by crane to the application site.

NOTICE The housing may be damaged if the lifting belts are too short. The four lifting belts must be long enough to ensure a minimum distance of 100 cm between the device and the lifting gear.

4.6 Removing the Transportation Aid

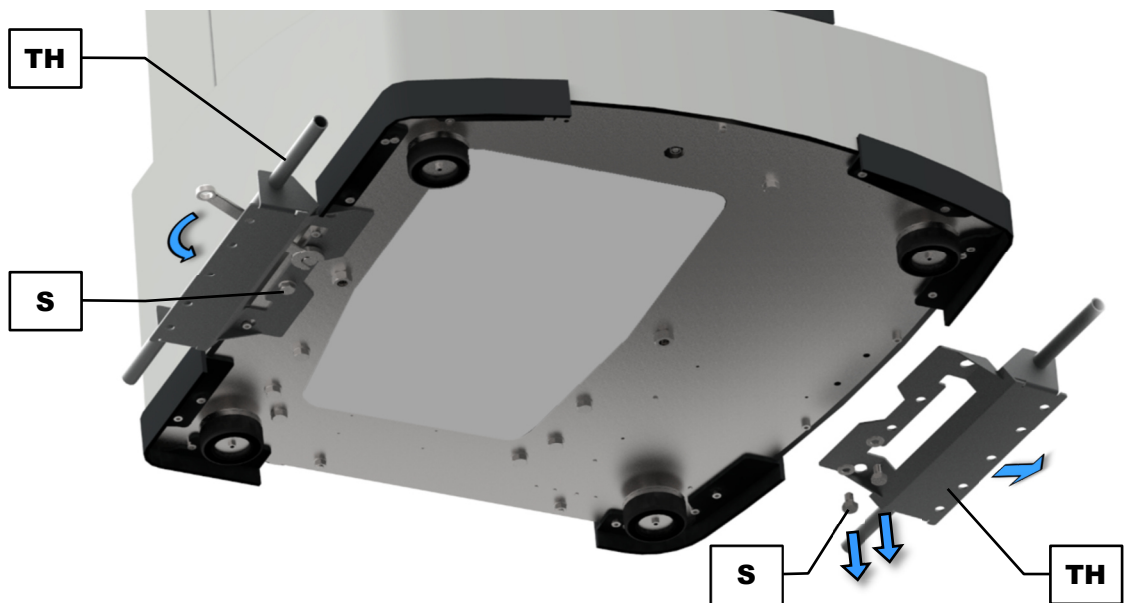


Fig. 11: Removing the transport aid

	Component
TH	Transport aid
S	Screw

Remove the transport aids as follows:

- ⇒ Using a 13 mm open end wrench, loosen and remove the four screws (S), two on each side of the device.
- ⇒ Unscrew and remove the transport aids (TH).

① Keep the transport aids for transporting the device at a later date.

5 First Commissioning

5.1 Electrical Connection

WARNING

W4.0015

Risk to life caused by an electric shock
 Connection to socket without a protective earth conductor

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

WARNING

W5.0002

Danger to life through electric shock
 Damaged power cable

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

NOTICE

N11.0022

Electrical connection
 Failure to observe the values on the type plate

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

⚠ WARNING When connecting the power cable to the mains supply, use an external fuse that complies with the regulations applicable to the place of installation.

- Check the type plate for details on the necessary voltage, frequency, and maximum external current source fuse for the device.
- The listed values must agree with the existing mains supply.
- Only use the supplied power cable to connect the device to the mains supply.

The MM 500 nano must be connected to the power supply on site for initial commissioning.

Ensure the following before connecting the device to the power supply:

- The application site complies with the installation requirements;
- The device is securely and firmly in place;
- The power values for the device (type plate) correspond to the values of the power supply at the site.

5.2 Connecting the device to the power supply



Fig. 12: Connecting to the power supply

	Component
M	Appliance socket
N	Type plate

Connect the device to the power supply as described below:

- ⇒ Compare the voltage and frequency on the type plate (N) of the device to the values on site.
- ⇒ Plug the supplied mains lead into the appliance socket (M).
- ⇒ Plug the other end of the mains lead into a socket at the installation site.
- ⇒ Provide external fusing according to the regulations at the installation site.

6 Operating the Device

WARNING

W6.0002

Danger to life through electric shock
 Damaged power cable

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

CAUTION

C6.0005

Risk of injury
 Potentially explosive atmosphere

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

CAUTION

C7.0077

Risk of hearing loss
 High sound level

- The sound level may be high depending on the type of material, the number of balls used, the set grinding frequency and the grinding time. Excess noise in terms of intensity and duration can lead to impairments or permanent damage to hearing.
- **Ensure you take suitable soundproofing measures.**
- **Wear hearing protection if there is loud or lasting noise.**

6.1 Switching the device on/off



Fig. 13: Main switch

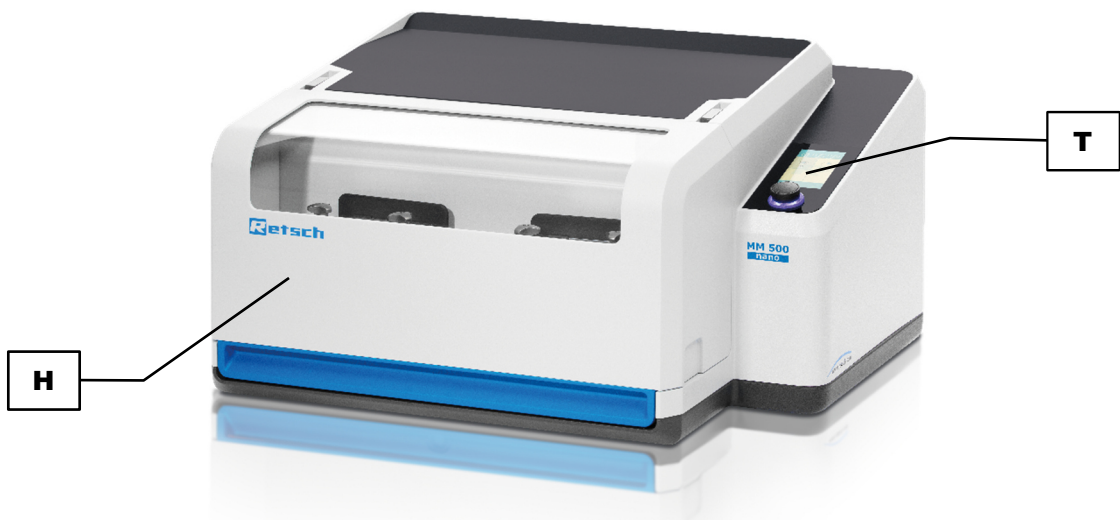


Fig. 14: Front of the device with touchscreen

	Component
I	Main switch
H	Device hood
T	Touchscreen with dial

Switch the device on as follows:

- ⇒ Switch the device on by the main switch (I) on the back of the device.
- ⓘ The opening and closing of the device hood (H) are indicated on the touchscreen (T).

- ⇒ Open the device hood (H) by hand and then close it again. The device is then ready for use.

Switch the device off as follows:

- ⇒ Switch the device off by the main switch (I) on the back of the device when no grinding process is running.

6.2 Opening and Closing of the Device

CAUTION

C8.0008

Risk of pinching and bruising

Device hood closing

- The device hood can trap fingers when closing, thereby causing pinching or bruising.
- **Never allow the device hood to close by itself.**
- **Always hold the device hood firmly when closing it.**

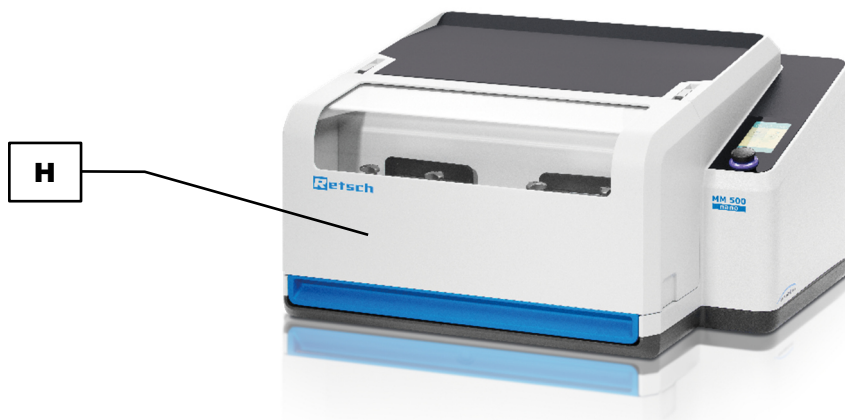


Fig. 15: Device with closed device hood

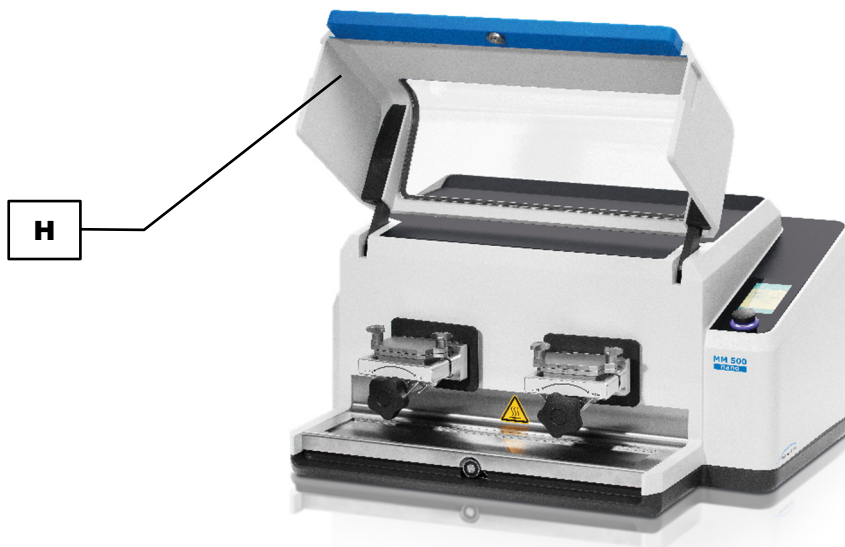


Fig. 16: Device with open device hood

	Component
H	Device hood

Open the device as follows:

- ⇒ Lift the device hood (H) by hand and open it completely.
- ① The device hood is fitted with cushioning. This cushioning ensures that the device hood does not open in an uncontrolled manner. The cushioning on the device takes effect as from an opening angle of approx. 80°.

Close the device as follows:

- ⇒ Press the device hood (H) down by hand and close it completely.
- ① The device hood is fitted with cushioning, which ensures that the device hood does not close in an uncontrolled manner. The cushioning on the device hood takes effect as from an opening angle of 80°.

6.3 Specifications regarding grinding balls and grinding jars

NOTICE

N12.0011

Wear or damage to the grinding balls and grinding jars

Use of different materials

- Greater wear or damage is possible when operating the device with grinding balls and grinding jars whose individual components are made of different materials.
- **Only use grinding balls and grinding jars made of the same material.**

NOTICE

N13.0000

Damage to the grinding jars

Incorrect filling of the grinding jars

- The grinding balls damage the grinding jar and the device if the grinding jars are not filled with any material or with insufficient material.
- **Do not operate the device without material in the grinding jars.**
- **The filling in the grinding jars must not be less than 25 % of the grinding jar volume.**

All grinding jars and the matching grinding jar covers can be identified by a label on the outside. The labeling field provides information in terms of size and material of the grinding jar.

PLEASE NOTE: For grinding that reaches temperatures below 0 °C, grinding sets made of steel should preferably be used!

⚠ CAUTION If you use grinding jars made of other materials for cryogenic applications, they must never become colder than -100 °C!

⚠ CAUTION Damage due to imbalance. Both grinding stations in the machine must always be loaded. When grinding only one sample, an empty grinding jar must be used as counterweight.

6.4 View of grinding jars

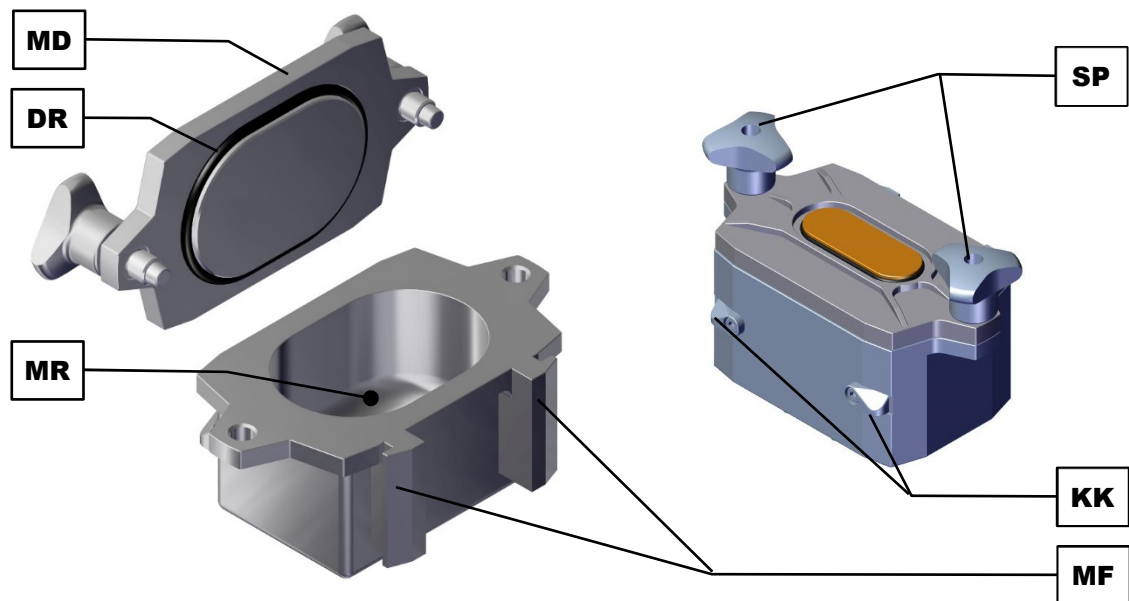


Fig. 17: Grinding jars

	Component	Function
MD	Grinding jar cover	Closes the grinding chamber on the grinding jar.
DR	Sealing ring	For sealing between the grinding jar cover and grinding jar. May be replaced if worn.
MR	Grinding chamber	To accommodate the grinding balls and material.
SP	Clamping screws with guide bolts	To attach and secure the grinding jar cover on the grinding jar. The clamping screws are permanently mounted on the grinding jar cover.
KK	Clamping wedges (grinding jar)	To secure the grinding jar in the grinding jar support after it has been correctly closed using the clamp.
MF	Grinding jar guide	For correctly inserting the grinding jars in the grinding jar support, without becoming misaligned.

6.5 Opening aid

An opening aid is also included with delivery of the MM 500 nano. Both sides of this tool can be used.

The clamping screws on the grinding jar cover can be tightened or loosened using the (ÖS) side. The locking wheels on the grinding jar support are loosened using the (ÖR) side.

- ① It is essential to use the opening aid to close the grinding jars because tightening the clamping screws by hand is not sufficient.
By contrast, manual tightening of the locking wheels without the opening aid is sufficient when clamping the grinding jars in the grinding jar supports.
The opening aid can be used to unscrew the clamping screws on the grinding jar and the locking wheels on the grinding jar support.

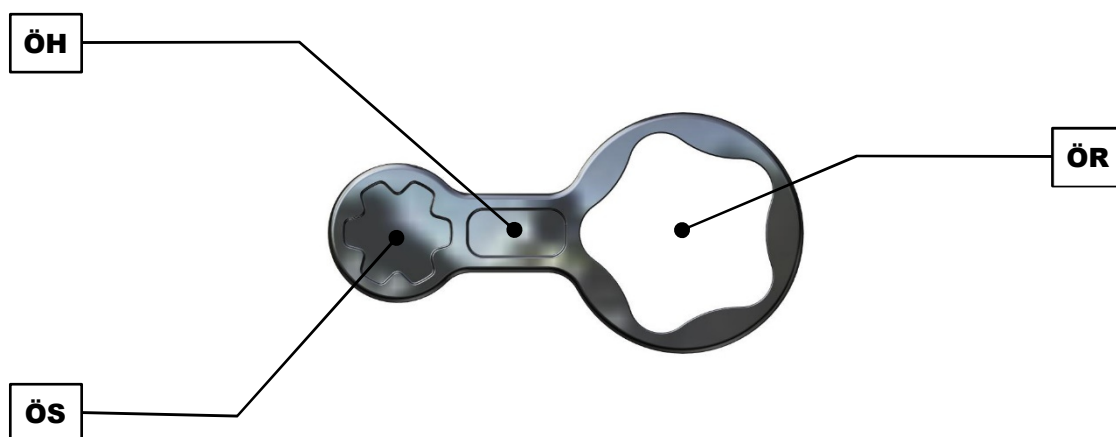


Fig. 18: Opening aid

	Component	Function
ÖH	Opening aid	The clamping screws on the grinding jar cover are tightened using the supplied opening aid. The opening aid can additionally be used to unscrew the clamping screws on the grinding jar and the locking wheels on the grinding jar support.
ÖS	Side for clamping screws	This side is for tightening and unscrewing the clamping screws on the grinding jar cover.
ÖR	Side for locking wheel	This side is for unscrewing the locking wheels on the grinding jar supports.

6.5.1 Grinding Jar Identification

All grinding jars and the corresponding grinding jar covers can be identified by labelling on the outside. The labelling indicates the size and material of the grinding jar.

6.5.2 Ball Sizes and Speeds

A very large amount of energy is applied to the sample material on the MM 500 nano. This large amount of energy also affects the grinding jars and the grinding balls.

Depending on the grinding jar size, the following recommendations therefore apply to the sample volume and ball sizes that can be used.

6.5.3 Recommended maximum ball sizes

Grinding jar size	Ball size
10 ml	15 mm
25 ml	20 mm
50 ml	25 mm
80 ml	25 mm
125 ml	20 mm

6.5.4 Recommended Grinding Jar Filling

In addition to device settings, the fill level of the grinding jars is crucial for the success of grinding in the Mixer Mill. **When grinding bulk materials, a grinding jar filling should consist roughly of one third sample material and one third ball volume.** The remaining third is the empty grinding jar volume that the balls need in order to move. Please pay attention to the maximum permitted ball size for the material in question.

If an increase in volume or decrease in volume is to be expected during grinding, the sample volume can be adjusted in line with the range set out in the table. For example in the case of voluminous sample material such as wool, leaves, grasses etc., an initial material filling of 70 – 80 % is necessary.

The ball filling should comprise 60 % of the grinding jar volume for wet grinding with grinding balls < 3 mm. As with dry grinding, the sample material should fill one third of the grinding jar volume. Wet grinding should be conducted in such a way that the mixture of grinding balls, sample material and liquid achieves a viscous consistency. If the mixture is too viscous, the grinding balls do not move sufficiently. If it is not viscous enough, the grinding results will be poorer and there will be increased wear to the grinding balls and grinding jars.

				Recommended number of grinding balls						
Material	Grinding jar size	Sample volume	Max. feed size	Ø 5 mm	Ø 7 mm	Ø 10 mm	Ø 12 mm	Ø 15 mm	Ø 20 mm	Ø 25 mm
Stainless steel	10 ml	2 - 4 ml	4 mm	32	12	3	1	1	-	-
	25 ml	4 - 10 ml	6 mm	116	35	12	4	2	1	-
	50 ml	5 - 20 ml	8 mm	160	45	16	8 - 12	-	1	1
	80 ml	10 - 32 ml	10 mm	260	70	32	23	12	3	1
	125 ml	15 - 50 ml	10 mm	400	110	50	35	15 - 18	8	-
Hardened steel	50 ml	5 - 20 ml	8 mm	160	45	16	8 - 12	-	1	1
	80 ml	10 - 32 ml	10 mm	260	70	32	23	12	3	1
	125 ml	15 - 50 ml	10 mm	400	110	50	35	15 - 18	8	-
Zirconium oxide	50 ml	5 - 20 ml	8 mm	160	45	16	8 - 12	-	-	-
	80 ml	10 - 32 ml	10 mm	260	75	32	123	12	-	-
	125 ml	15 - 50 ml	10 mm	400	110	50	35	15 - 18	-	-
Tungsten carbide	50 ml	5 - 20 ml	8 mm	160	45	16	8 - 12	-	1	-
	80 ml	10 - 32 ml	10 mm	260	70	32	23	12	3	-

6.6 Special grinding methods

6.6.1 Cryogenic grinding

WARNING

W7.0000

Risk of injury caused by liquid nitrogen
Use of liquid nitrogen during cryogenic grinding

- Liquid nitrogen has a boiling point of – 196 °C and causes burn-like injuries and frostbite if there is skin and eye contact.
- **Take note of the liquid nitrogen safety data sheets.**
- **Always wear goggles and protective gloves when using liquid nitrogen.**

WARNING

W8.0000

Risk of injury caused by liquid nitrogen and dry ice
Use of liquid nitrogen and dry ice in closed grinding jars

- Liquid nitrogen and dry ice expand and generate high pressure in closed receptacles. This high pressure bursts grinding jars and leads to serious injuries.
- **Under no circumstances should you put liquid nitrogen or dry ice into the grinding jar and then close the jar.**
- **Only undertake indirect embrittlement for cryogenic grinding.**

Materials that can only be ground with difficulty or not at all under normal temperatures must be ground cold. Indirect embrittlement with liquid nitrogen (- 196 °C) improves the fracture behaviour of thermoplastics, rubber products, greasy foodstuffs, pharmaceuticals etc.

- ① For cryogenic grinding, Retsch GmbH offers the Cryo Kit (Order Number: 22.354.0003) for cooling the grinding jars with liquid nitrogen.

Carry out the embrittlement of elastic and tough sample material as follows:

⇒ The embrittlement of sample material for grinding must be performed indirectly.

- ① **Only use grinding balls and grinding jars made of stainless steel or hardened steel for cryogenic grinding.**

Grinding balls and grinding jars made of zirconium oxide or tungsten carbide are not suitable for grinding at very low temperatures.

⇒ The sample material must be filled together with the grinding balls (steel) in a grinding jar (steel), and the grinding jar (steel) firmly sealed.

⇒ Using the Cryo Kit tongs, the firmly sealed grinding jar (steel) is then dipped into a bath of liquid nitrogen until this stops bubbling.

⇒ The sample material inside the grinding jar (steel) is then likewise cooled and ready for grinding.

- ① Under no circumstances should you fill liquid nitrogen or dry ice into the grinding jar and then close it. The high pressure generated in the grinding jar would burst it.

6.6.2 Wet Grinding with Highly Flammable Materials

Wet grinding using highly flammable materials is permitted with this device if certain precautionary measures are complied with.

When using highly flammable materials such as hexane, isopropyl, ethanol, benzene etc. as a grinding aid, the inside of the grinding jars should be classed as Zone 0, i.e. as a permanent explosive mixture.

It is therefore necessary to prevent potentially explosive vapours escaping from the clamped grinding jars during a grinding process or being able to reach places which have the necessary ignition energy. These vapours are in particular also pressed outwards by the temperature rise that takes place and by the consequent increase in pressure inside the grinding jar.

For this reason we urgently recommend that the user of the device (the employer) assesses the existing hazards within a coherent explosion protection concept according to local conditions before using such solvents and, where necessary, records supplementary organisational measures in an explosion protection document.

This approach is regulated in the EU under Articles 118 and 118a of EC Directive 89/391/EEC. Account must be taken of corresponding provisions in other countries outside the EU.

6.7 Preparing the grinding jar

NOTICE

N14.0011

Wear or damage to the grinding balls and grinding jars

Use of different materials

- Greater wear or damage is possible when operating the device with grinding balls and grinding jars whose individual components are made of different materials.
- **Only use grinding balls and grinding jars made of the same material.**

NOTICE

N15.0000

Damage to the grinding jars

Incorrect filling of the grinding jars

- The grinding balls damage the grinding jar and the device if the grinding jars are not filled with any material or with insufficient material.
- **Do not operate the device without material in the grinding jars.**
- **The filling in the grinding jars must not be less than 25 % of the grinding jar volume.**

6.7.1 Opening the grinding jar

CAUTION

C9.0024

Risks of burns and scalding

Hot grinding jar and/or sample material

- The sample material and grinding jar can get very hot during the grinding process.
- **After grinding, always wear protective gloves when handling the grinding jar.**
- **Never open hot grinding jars!**
- **Allow grinding jars to cool down to room temperature before opening them.**

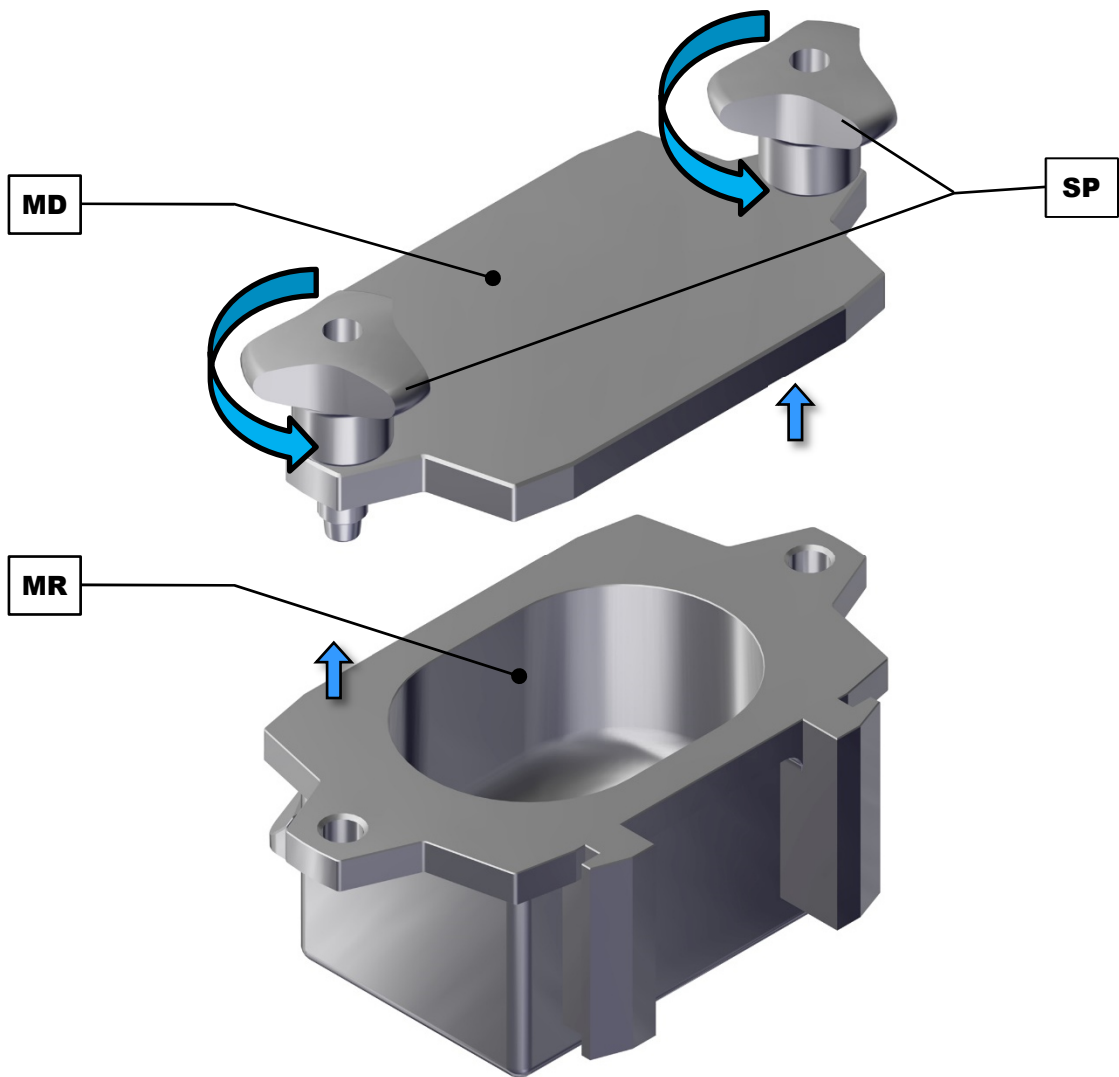


Fig. 19: Opening the grinding jar

	Component
SP	Clamping screws

MD	Grinding jar cover
MR	Grinding chamber

Open the grinding jar as follows:

- ⇒ Loosen both clamping screws (SP) on the grinding jar cover (MD) and unscrew evenly until the grinding jar cover (MD) can be lifted off without becoming misaligned.
- ⓘ If the clamping screws (SP) cannot be unscrewed by hand, use the opening aid to unscrew the clamping screws (SP).
- ⇒ Lift the grinding jar cover (MD) off to open the grinding chamber (MR) of the grinding jar.

6.7.2 Filling the grinding jar

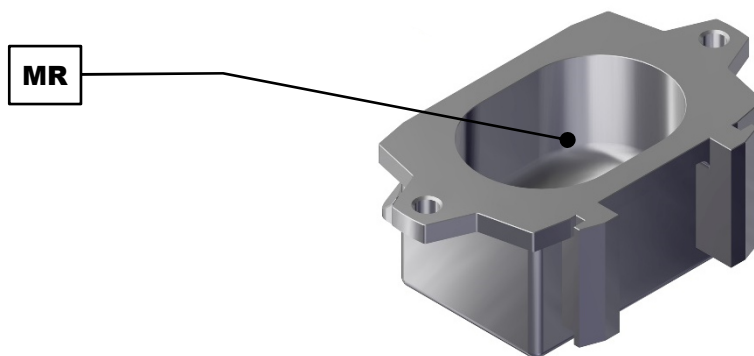


Fig. 20: Filling the grinding jar

Component	
MR	Grinding chamber

Fill the grinding jar as follows:

- ⇒ Fill the right number of grinding balls made of a suitable material into the grinding chamber (MR) of the grinding jar.
- ⇒ Add material for grinding to the grinding balls in the grinding chamber (MR) of the grinding jar.
- ⓘ When filling the grinding jar, take care not to fall below 1/4 of the total volume of the grinding jar.
 The ideal fill quantity in the grinding jar is 1/3 material and 1/3 grinding balls, thus corresponding to 2/3 of the total volume.
 In the case of wet grinding, the ideal fill quantity in the grinding jar is 60 % grinding balls and 1/3 material.

6.7.3 Closing the grinding jar

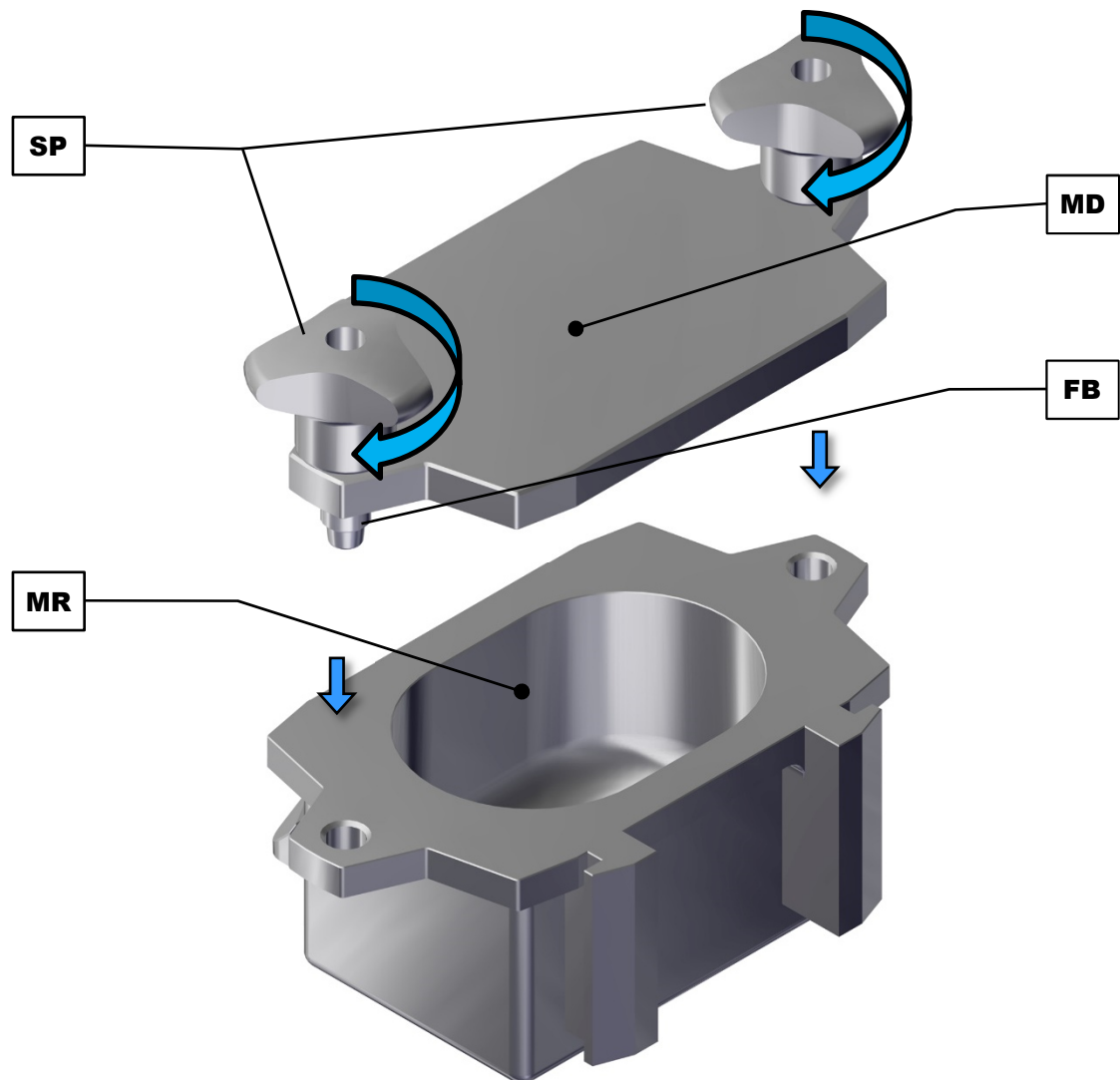


Fig. 21: Closing the grinding jar

	Component
MD	Grinding jar cover
FB	Guide bolts
MR	Grinding chamber
SP	Clamping screws

Close the grinding jar as follows:

- ⇒ Place the grinding jar cover (MD) suitably onto the two guide bolts (FB) of the grinding jar and close the grinding chamber (MR).
- ⇒ Tighten both clamping screws (SP) on the grinding jar cover (MD) evenly to prevent misalignment and to close the grinding chamber (MR).
- ⓘ Use the opening aid for a tight seal when tightening the clamping screws.

Tightening the clamping screws by hand is not sufficient to completely seal the grinding jar. The clamping screws may break off, however, if too much force is exerted with the opening aid.

6.8 Inserting the Grinding Jar

NOTICE

N16.0067

Strong vibrations and loud noise

Uneven loading

- The device can generate particularly strong vibrations and loud noise if loaded unevenly.
- **Always insert two grinding jars of equal size, even if you only want to grind one sample. In this case leave the second grinding jar empty (no grinding balls, no sample material)!**
- **Switch the device off immediately if it is vibrating strongly and making a loud noise, and check the number, the gross weight and correct position of the grinding jars.**

NOTICE

N17.0011

Wear or damage to the grinding balls and grinding jars

Use of different materials

- Greater wear or damage is possible when operating the device with grinding balls and grinding jars whose individual components are made of different materials.
- **Only use grinding balls and grinding jars made of the same material.**

NOTICE

N18.0000

Damage to the device

Grinding jars incorrectly inserted

- In order to prevent damage to the device during grinding, the grinding jars must be correctly and firmly positioned in the guide of the grinding jar supports when inserted.
- **When inserting the grinding jars, ensure that the grinding jars do not become misaligned, but are positioned firmly and correctly in the grinding jar guide.**
- **Use the opening aid to clamp the grinding jars firmly in the grinding jar supports.**

6.8.1 Opening the grinding jar support

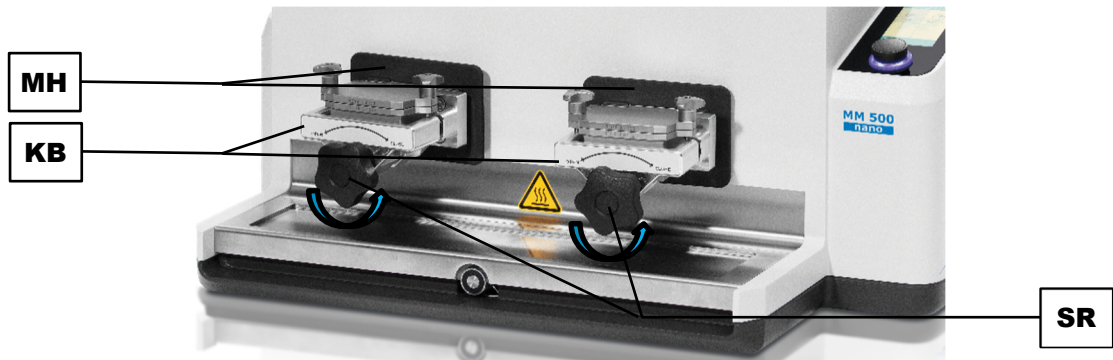


Fig. 22: Opening the grinding jar support

	Component
MH	Grinding jar support
KB	Clamp
SR	Locking wheel

Open the grinding jar support as follows:

- ⇒ Twist the locking wheel (SR) on the grinding jar support (MH) in an anticlockwise direction to open the clamp (KB).
- ⓘ If the locking wheel (SR) cannot be twisted by hand, use the opening aid to unscrew the locking wheel (SR).
- ⇒ Twist the locking wheel (SR) as far as it will go so that the clamp (KB) on the grinding jar support (MH) is open as far as possible.

6.8.2 Inserting the grinding jar

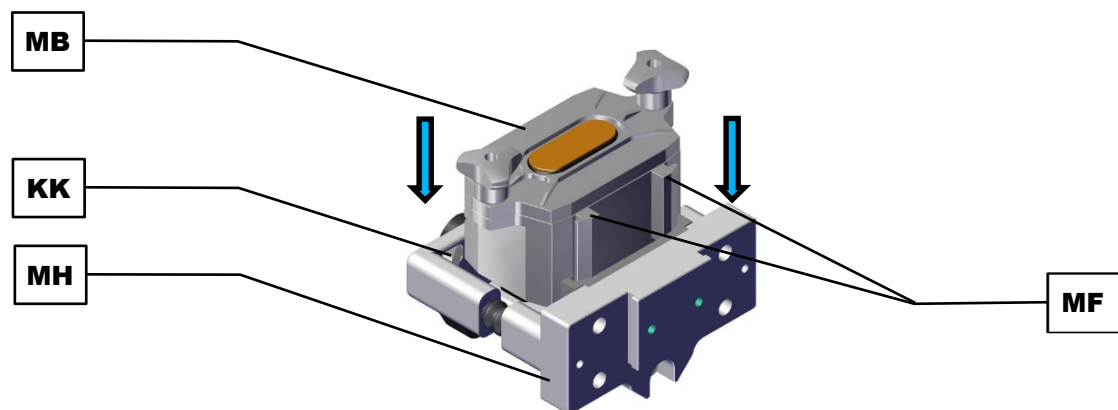


Fig. 23: Inserting the grinding jar

	Component
MB	Grinding jar
MH	Grinding jar support
KK	Clamping wedge (Grinding jar support)
MF	Grinding jar guide

Insert the grinding jar in the grinding jar support as follows:

- ⇒ Insert the grinding jar (MB) correctly into the grinding jar support (MH). Ensure that the grinding jar guide (MF) is positioned correctly in the grinding jar support (MH).
- ⇒ Push the grinding jar (MB) down as far as it will go.
- ⓘ The grinding jar (MB) must be correctly positioned in the grinding jar support and must not become misaligned when inserted. The edges of the grinding jar guide (MF) and of the grinding jar support (MH) must close almost flush.

NOTICE The grinding jars must be correctly inserted in the grinding jar support and be clamped firmly using the clamp. To this end, the grinding jar must be pushed as far as possible into the grinding jar support without becoming misaligned. The clamping wedges on the grinding jar support must lie above those on the grinding jar. The edges of the grinding jar guide and of the grinding jar support must close almost flush.

Never operate the MM 500 nano with a grinding jar that has become misaligned when inserted!

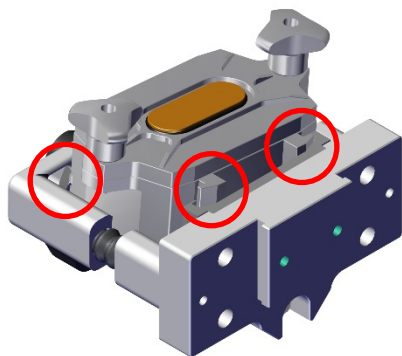
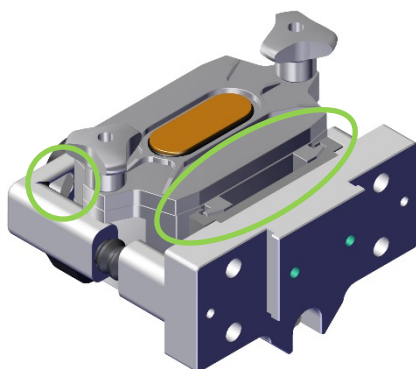


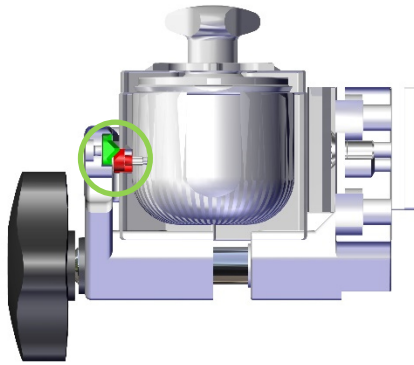
Fig. 24: Grinding jar misaligned



Incorrect: The grinding jars have **not** been inserted correctly. The grinding jar guide is misaligned in the grinding jar support. The clamping wedges on the grinding jar are higher than those on the grinding jar support. The clamps cannot therefore be closed correctly.



Correct: The grinding jar guide and grinding jar support close almost flush.

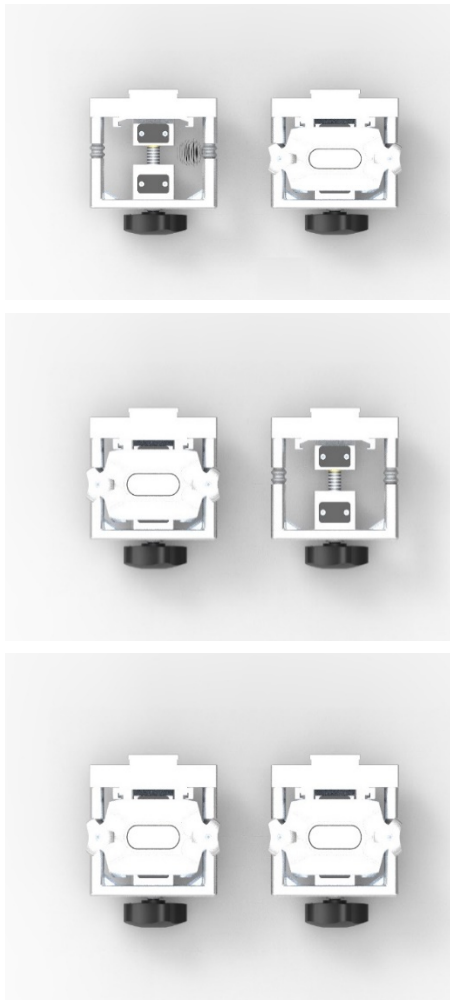


The clamping wedges on the grinding jar support lie above those on the grinding jar. The clamps can therefore be closed correctly.

Fig. 25: Grinding jar flush with grinding jar support

NOTICE Both grinding stations must always be loaded. If only one grinding jar is required, the second grinding jar must be inserted **empty** (without grinding balls, without sample material) as a counterweight.

Never operate the MM 500 nano without grinding jars!



Incorrectly loading the grinding stations with grinding jars.

Incorrectly loading the grinding stations with grinding jars.

Correctly loading the grinding stations with grinding jars.

Fig. 26: Loading the grinding stations

6.8.3 Closing the grinding jar support

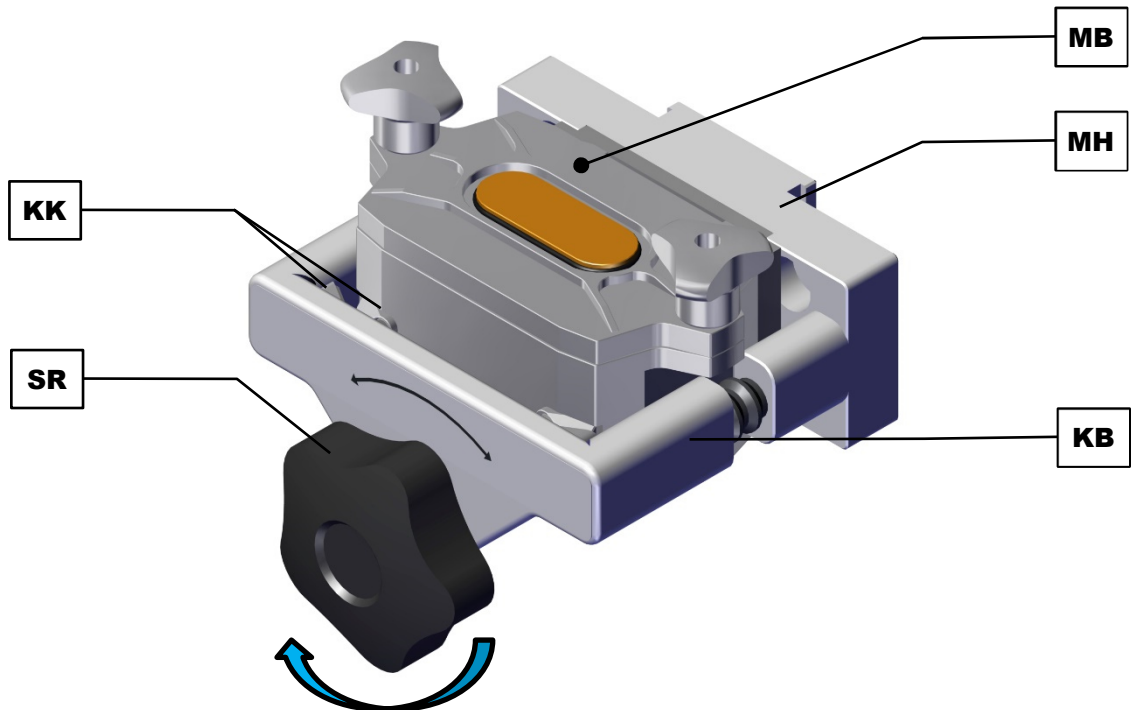


Fig. 27: Clamping the grinding jar



Fig. 28: Device with loaded grinding stations

	Component
SR	Locking wheel

MH	Grinding jar support
KB	Clamp
MB	Grinding jar
KK	Clamping wedges (Grinding jar and grinding jar support)

Close the grinding jar support as follows:

- ⇒ Turn the locking wheel (SR) on the grinding jar support (MH) clockwise to close the clamp (KB) and to firmly clamp the grinding jar (MB).
- ① The clamping wedges of the grinding jar must lie below those of the grinding jar support.

6.9 Grinding process

CAUTION

C10.0004

Risk of injury

Explosive or flammable samples

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



CAUTION

C11.0006

Risk of injury

Sample material that is harmful to health

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



CAUTION

C12.0010

Risk of burns or poisoning

Varying sample properties

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






6.9.1 Starting the grinding process



Fig. 29: Starting the grinding process

	Component
H	Device hood
T	Touchscreen
DK	Dial

Start the grinding process as follows:

- ⇒ Close the device hood (H) by hand.
- ⇒ Configure the parameters for grinding on the touchscreen (T) and using the dial (DK).
- ⇒ Press  on the touchscreen (T) to start the grinding process.
- ⓘ The grinding process can only be started by pressing  if this symbol is displayed on the touchscreen.
 - If  is not displayed on the touchscreen, the parameters for grinding have possibly not been completely configured or the device hood has not been closed properly.
- ⇒ Wait for the end of the grinding process before finally removing the sample material.

6.10 Removing the sample material

CAUTION

Risks of burns and scalding

Hot grinding jar and/or sample material

- The sample material and grinding jar can get very hot during the grinding process.
- **After grinding, always wear protective gloves when handling the grinding jar.**
- **Never open hot grinding jars!**

C13.0024



- Allow grinding jars to cool down to room temperature before opening them.

NOTICE

N19.0007

Handling foodstuffs, pharmaceuticals and cosmetic products

Products processed

- Foodstuffs, pharmaceuticals and cosmetic products that have been processed on the device may no longer be eaten, used or put into circulation,.
- **Dispose of these substances according to applicable directives.**



Fig. 30: Removing the sample material

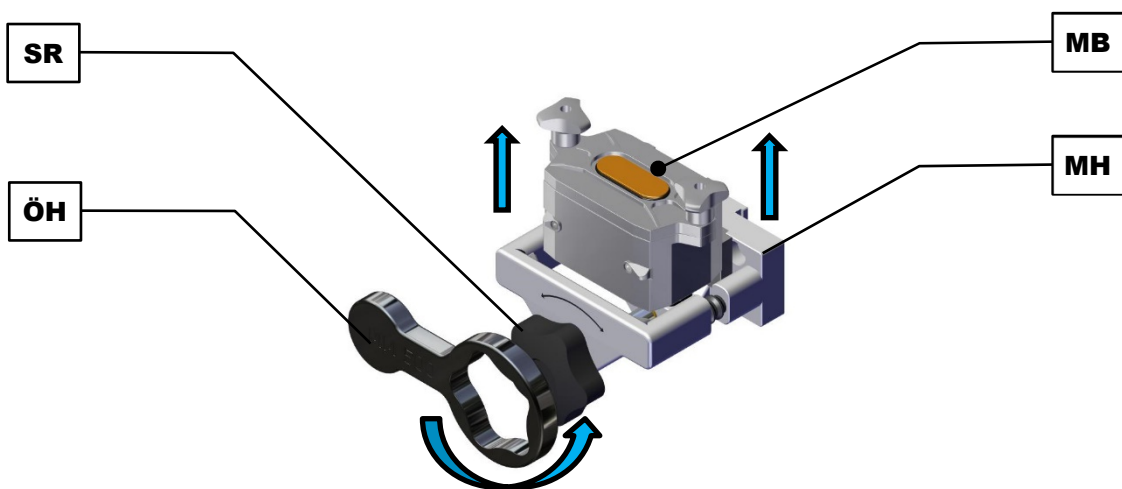


Fig. 31: Removing the grinding jar

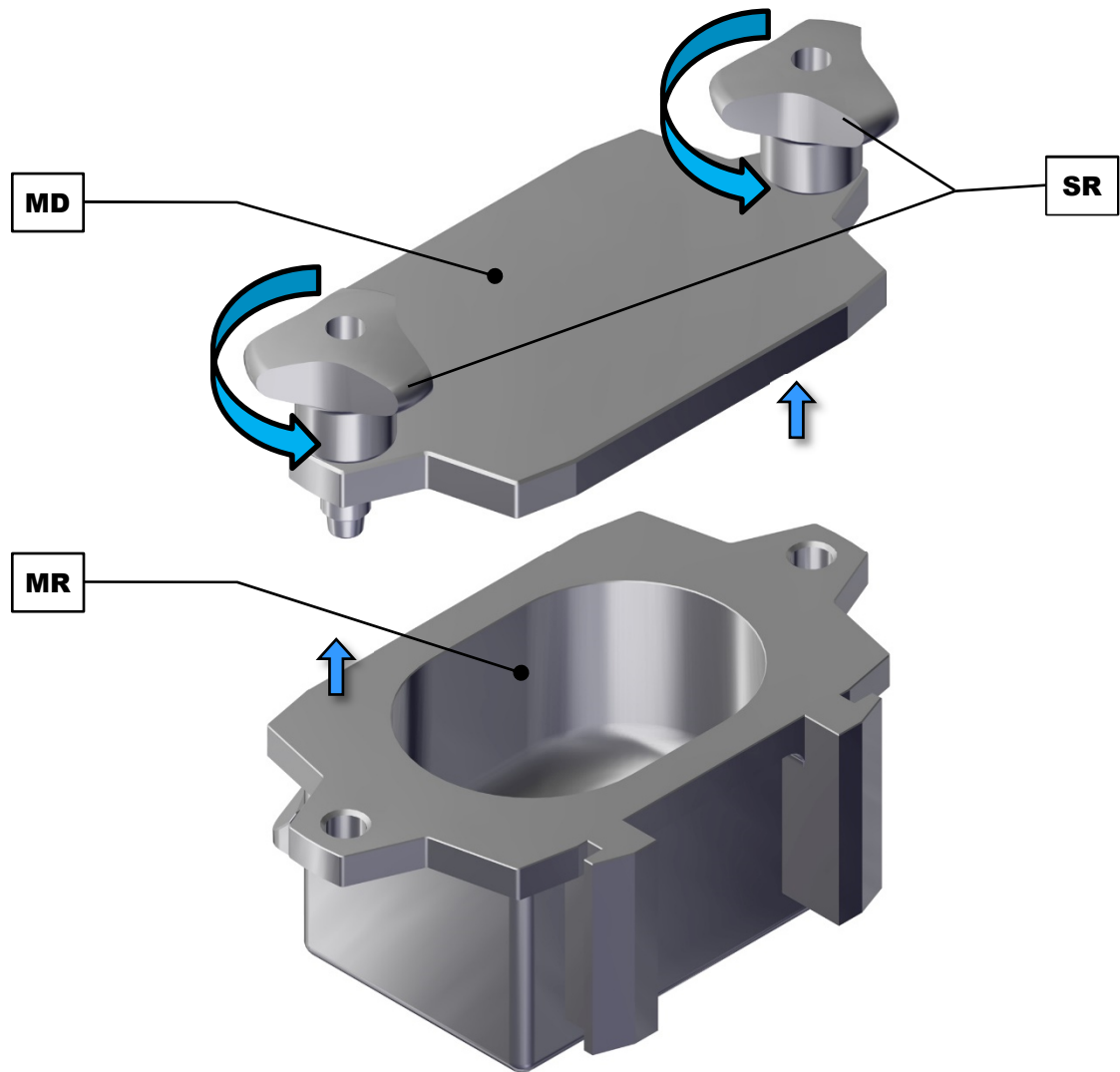


Fig. 32: Opening the grinding jar for emptying

	Component
H	Device hood
SR	Locking wheel
MH	Grinding jar support
ÖH	Opening aid
MB	Grinding jar
SP	Clamping screws
MD	Grinding jar cover
MR	Grinding chamber

Remove the sample material as follows:

- ⇒ Wait for the end of the grinding process.
- ⇒ Open the device hood (H).
- ⇒ Open the locking wheel (SR) on the grinding jar support (MH) by hand or using the appropriate side of the Opening aid (ÖH) if necessary.
- ⇒ Remove the grinding jar (MB) by pulling it up and out of the grinding jar support (MH).

- ⇒ Open the clamping screws (SP) on the grinding jar (MB) using the appropriate side of the opening aid (ÖH).
- ⇒ Lift the grinding jar cover (MD) off.
- ⇒ Remove the sample material from the grinding chamber (MR).

6.10.1 Pouring aid for Multicavity grinding jar



Fig. 33: Multi-cavity jars, made of stainless steel, incl. PTFE pouring aids

Multicavity grinding jars are suitable for grinding smaller sample quantities. In order to pour out the ground samples separately after the grinding process has been completed, the oval cavities can be closed with the pouring aids.

Use the pouring aid as described below:

- ⇒ Remove the lid of the grinding jar. Press the pouring aid into the oval cavities whose contents shall not to be transferred.
- ⇒ Empty the open cavities by tilting the grinding jar until the sample flows out. Remove the pouring aids.
- ⇒ Repeat the process until all samples have been taken out.

7 Device control

The device is controlled using the touchscreen in combination with the dial .

These control elements are used to configure parameter settings for grinding and to start, pause and end the grinding process.

Parameters for recurring grinding processes are configured, stored and selected as necessary in the program and cycle mode.

The system settings for the MM 500 nano are also selected from the main menu and can be changed where necessary.



Fig. 34: Touchscreen and dial

	Control element	Function
T	Touchscreen	Touchscreen for selecting the function elements.
DK	Dial	To configure the parameters for the grinding process, the program and cycle mode and the system settings.

- ⓘ The dial lights up in blue when a function element whose value can be changed by the dial is selected on the touchscreen. The section containing the function element is additionally highlighted in grey.

7.1 Menu interface on the touchscreen

The menu surface of the touch display is divided into the following areas:

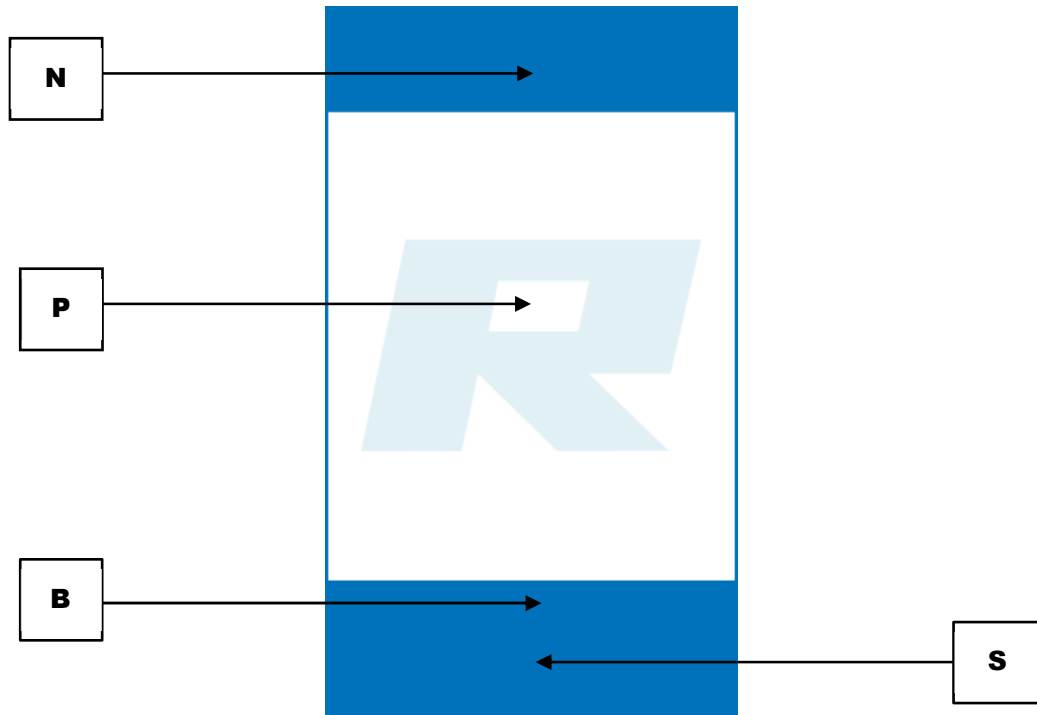


Fig. 35: Menu surface of the touch display








	Area	Function
N	Navigation area	The following menu views can be called up via the navigation area: <ul style="list-style-type: none"> • Main menu • Program mode • Cycle program mode • System settings
P	Parameter settings	The following grinding parameters are configured in this area: <ul style="list-style-type: none"> • Vibration frequency • Grinding time • Cycle program (sequence of parameter sets with different parameters)
	Parameter displays	After the grinding process has started, the following parameters are displayed in this area: <ul style="list-style-type: none"> • Configured vibration frequency • Remaining grinding time • Total duration and progress of the cycle program



B	Scroll bar	Indicator for the position of the menu.
S	Control	<p>The device is controlled directly with the functional elements in this area.</p> <ul style="list-style-type: none"> • Start, pause and cancel the grinding process • Select, edit, save, delete and start the selected program • Select, edit, save, delete and start the selected cycle program

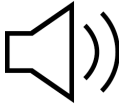


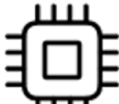




7.2 Function elements

Functional elements are selected on the touch display and configured with the rotary knob.

- ① Only the functional elements that may currently be selected and configured are displayed or active.
The background of the rotary knob lights up blue when an editable value is selected.

Element	Description	Function
	Main menu	Call up the main menu. The parameters for the grinding process can be configured and grinding started via the main menu.
	Open the hood of the device	After switching on the device, the request to open and close the device hood appears on the touch display. ① The device is ready for operation by opening and closing the device cover once.
	System settings	Go to system settings.
	Programme mode	Access to programme mode.
	Gallery view	Go to gallery view. The saved programmes are displayed and may be selected directly.
	Vibration frequency	Vibration frequency for configuration of the grinding process.
	Grinding time	Grinding time for configuration of the grinding process.

Element	Description	Function
	Cycle programme mode	Access to cycle programme mode.
	Edit programme and cycle programme	This can be used to create new programmes and cycle programmes and edit saved programmes and cycle programmes.
	Delete programme/ cycle programme	Deletes a created programme or a cycle programme.
	Save programme/ cycle programme	Saves a created programme or a cycle programme.
	Abort	Cancel entry / return to previous menu.
	Start	Start grinding process
	Pause	Pause grinding process
	Continue	Continue grinding process after pause.
	Stop	Stop grinding process
	Grinding completed successfully	The grinding process was completed successfully after the specified time has elapsed.
	Repetitions cycle programme	Number of cycles in cycle programme mode
	Total running time	Remaining milling time until the milling process is completed.
	MyRetsch	Displays QR code to access the web portal.

	Beeper (on/off)	Setting the beeper (on/off)
	Brightness	Setting the display brightness.
	Calendar	Setting the date and time.
	Software version	Display of the installed software.
	Running time	Display of the previous running time.
	Serial number	Display of the device serial number.
	Software update	Software update of the device via USB data medium.
	Service environment	Access to service environment for service technicians.

7.3 Menu navigation

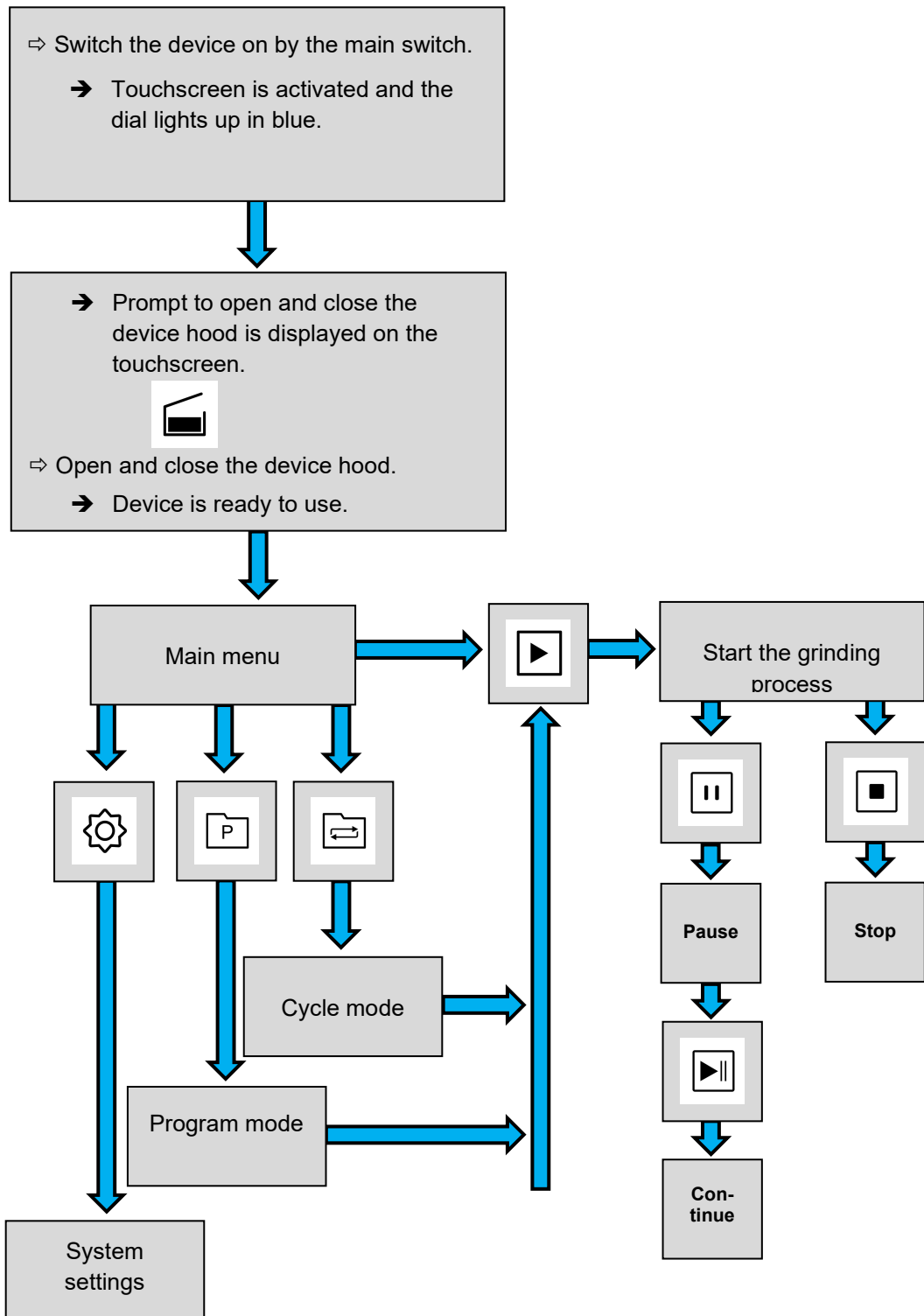


Fig. 36: Diagram of the menu navigation

7.4 Main menu

Additional menu views can be called up via the Main menu. Parameters for the grinding process can be configured and the grinding can also be started.

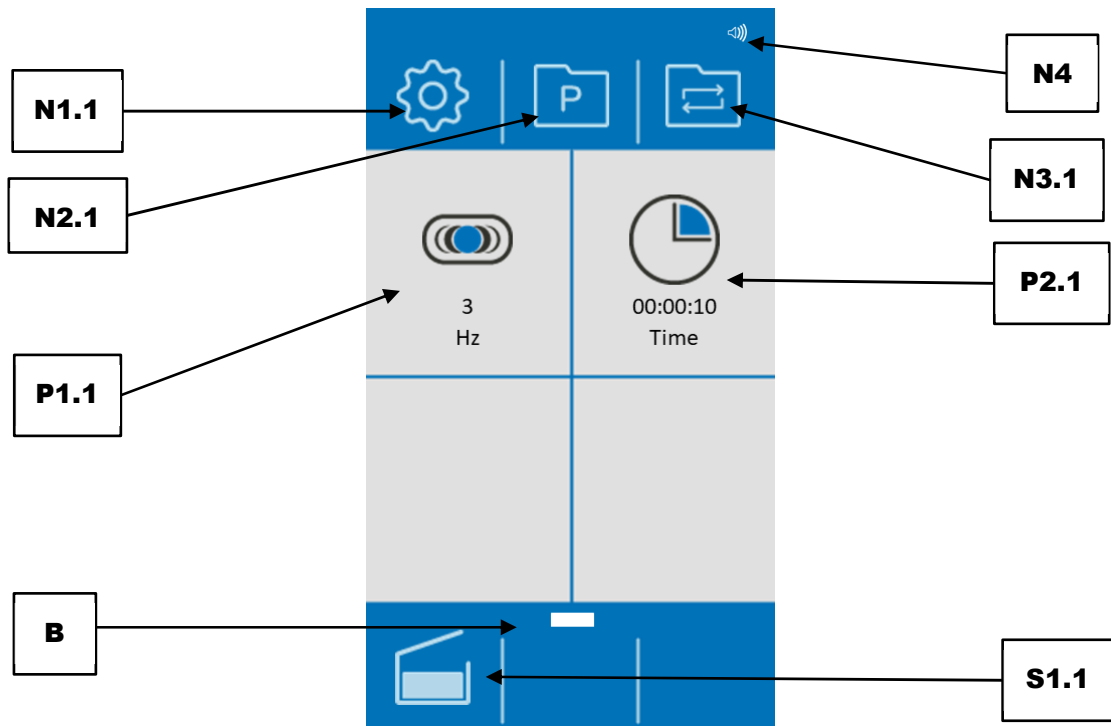


Fig. 37: Main menu (after being switched on with closed cover)

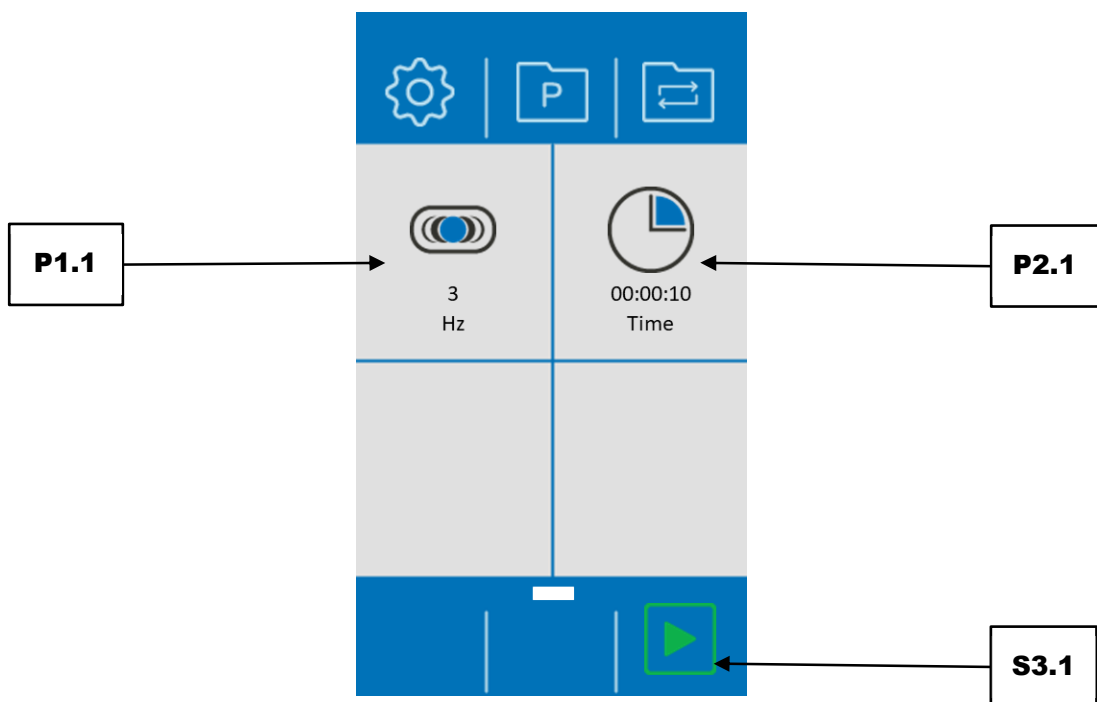


Fig. 38: Menu view before starting the grinding process

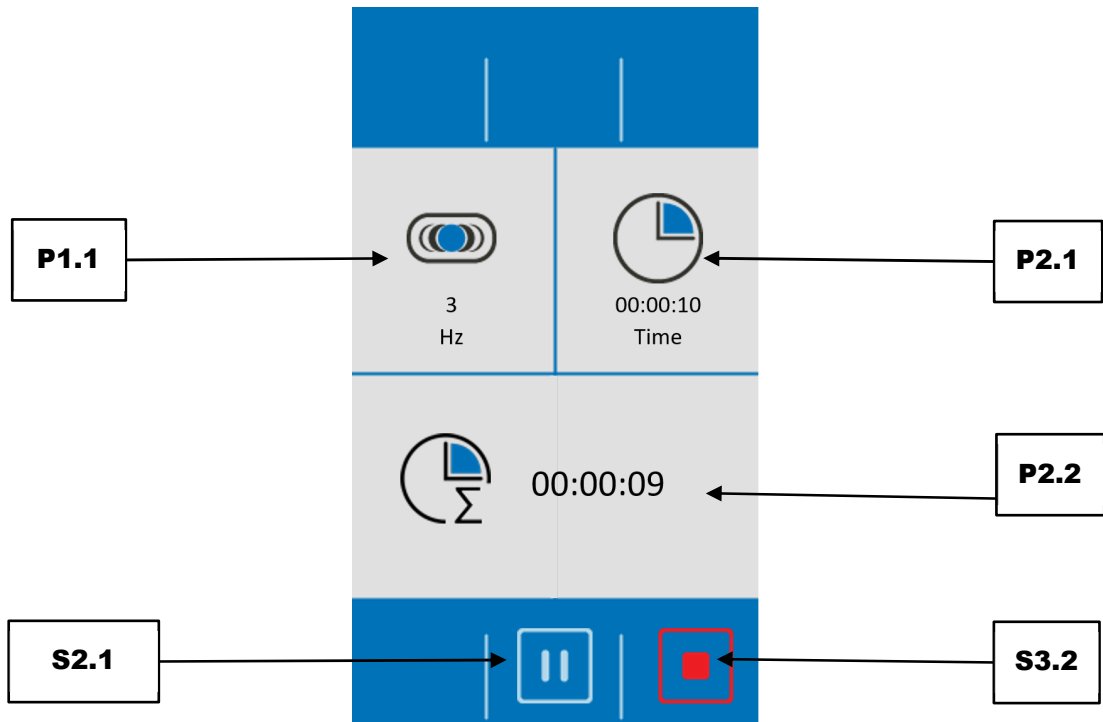


Fig. 39: Menu view during the grinding process

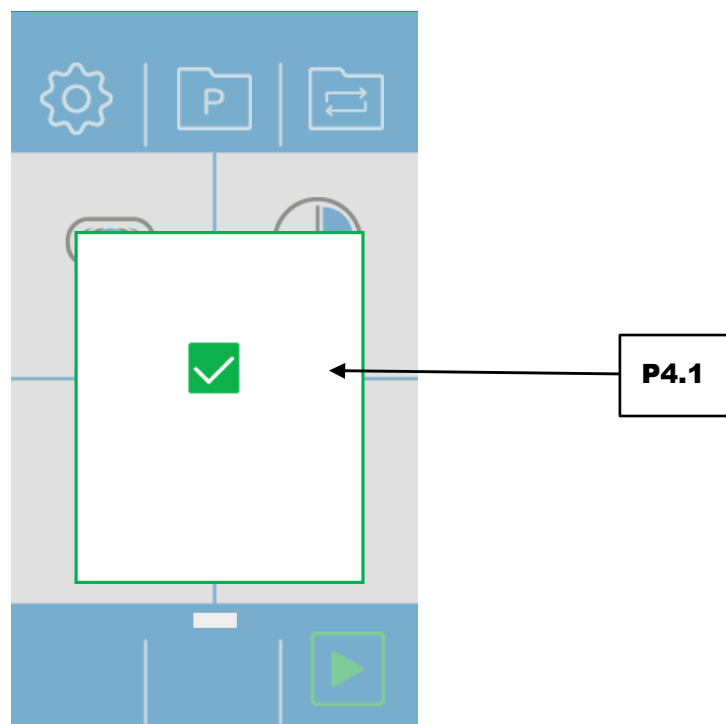






Fig. 40: Menu view after successfully completed grinding process




	Element	Function
N1.1	System settings	Call up system settings
N2.1	Program mode	Access to program mode
N3.1	Cycle program mode	Access to cycle program mode
N4	Acoustic signals on / off	The sound is switched on when the element is visible.
P1.1	Vibration frequency	After selection with the touch display, the vibration frequency can be set from 3 - 35 Hz with the dial
P2.1	Grinding time	After selection with the touch display, the grinding time can be set from 10 seconds to 8 hours with the dial.
P2.2	Remaining grinding time	Displays the remaining grinding time of the current grinding process
P4.1	Grinding process successfully completed	Grinding process is successfully completed.
B	Scroll bar	Indicator for the position of the menu
S1.1	Close device cover	Before starting a grinding process, the device cover must be opened once to insert the grinding jars. If the device cover is then closed again, the indicated element disappears.
S2.1	Pause grinding process	Stops the grinding process. Pressing it again continues the grinding process.
S3.1	Start grinding process	Starts the grinding process
S3.2	Stop grinding process	Stops the grinding process

7.5 Controlling the grinding process





The grinding process can be controlled from the main menu, from the program and the cycle mode using the function elements.

-  Start grinding process
-  Pause grinding process
-  Continue grinding process after a pause
-  Stop grinding process

7.6 Starting the grinding process

- ⇒ Press  to start the grinding.
- ⇒ After starting, the start sign  changes to the stop sign .


7.7 Pausing the grinding process

- ⇒ Press the character  in order to pause the grinding.
- ⇒ The pause character  changes to the continue character .
- ⇒ Press  in order to continue the grinding process.

7.8 Stopping the grinding process


The grinding process is stopped automatically once a defined grinding time has expired.


Grinding can also be actively stopped by pressing the stop button.

- ⇒ Press  to stop the grinding.


7.8.1 Grinding process successfully completed

The grinding process is automatically stopped once a specified grinding time has elapsed.

When the grinding process has been successfully completed,  is displayed.

- ⇒ Press  to acknowledge that the grinding process has been successfully completed.

7.9 Program mode

Press the button  (N2.1) in the Main menu to switch to the Program mode. The display changes to the current program.


Individual programs can be selected, edited, saved, deleted and started in the Program mode.

If sample materials are frequently ground with the same parameters, these parameters can be stored in program memory locations and called up as Standard Operating Procedures (SOP), whenever required.

Up to twelve program memory locations are available.

The following parameters can be stored in the individual programs:

- Vibration frequency
- Grinding time

 When starting a grinding via a program, the grinding parameters cannot be changed during the grinding process.

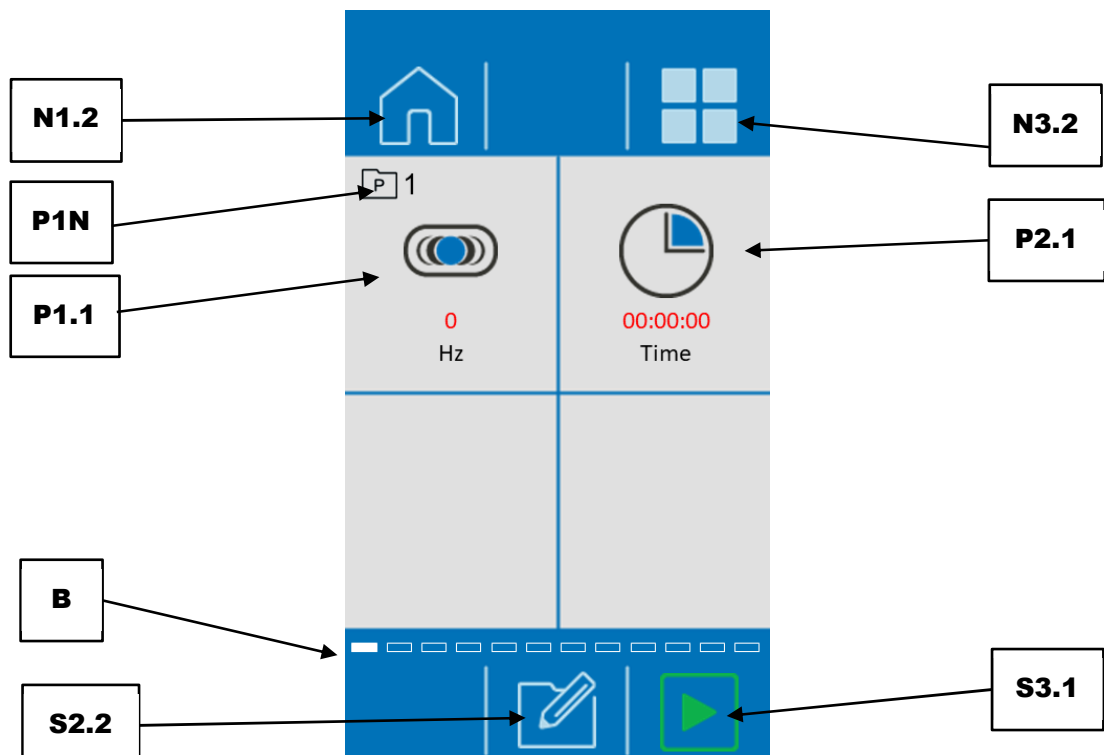


Fig. 41: Program mode

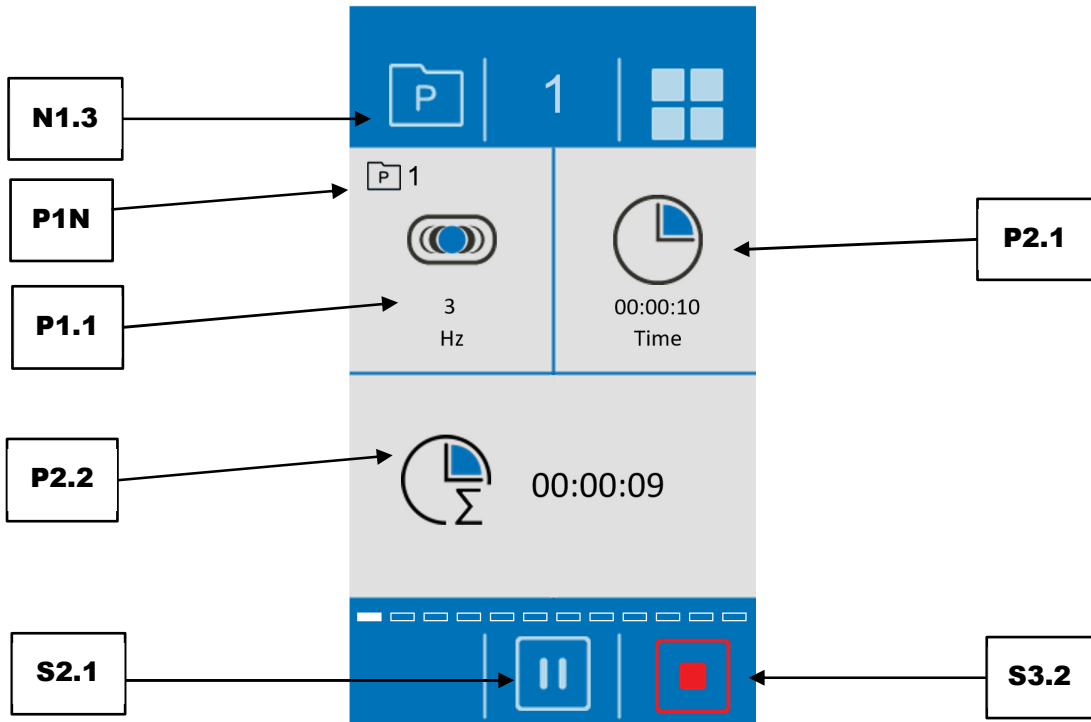


Fig. 42: Program mode after starting the grinding process

	Element	Function
N1.2	Main menu	Opens the Main menu
N1.3	Program mode	Access to program mode
N3.2	Gallery view	Opens the gallery view of the programs or the available program memory locations
P1N	Program number	Number of the selected program
P1.1	Vibration frequency	After selection with the touch display, the vibration frequency can be set from 3 - 35 Hz with the dial (invalid values are displayed in red)
P2.1	Grinding time	After selection with the touch display, the grinding time can be set from 10 seconds to 8 hours with the dial (invalid values are displayed in red)
P2.2	Remaining grinding time	Displays the remaining grinding time of the current grinding process
B	Scroll bar	Indicator for the position of the menu
S2.1	Pause grinding process	Stops the grinding process. Pressing it again continues the grinding process.
S2.2	Editor mode	Opens the "Editor" program
S3.1	Start grinding process	Starts the grinding process (This button is only visible after setting valid parameters.)
S3.2	Stop grinding process	Stops the grinding process

7.9.1 Select a Program

Programs with preset parameters for the grinding process can be selected in the Program mode. In order to select a program, press the button (N2.1) in the Main menu. The respective program number is displayed next to the symbol (P1N). After starting the device, the program view always opens with program 1 in the single view.

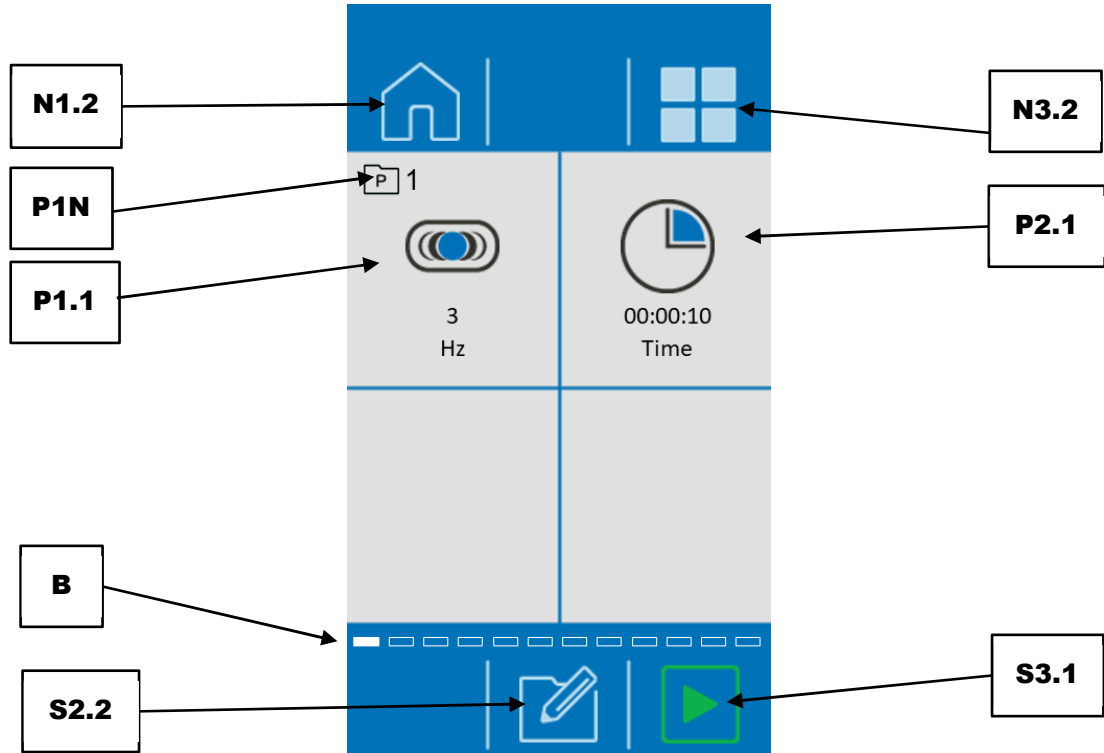


Fig. 43: Program mode

- ① You can change the program by swiping to the right or left on the touch display. The scroll bar (B) gives you a visual overview of your position within the individual programs.

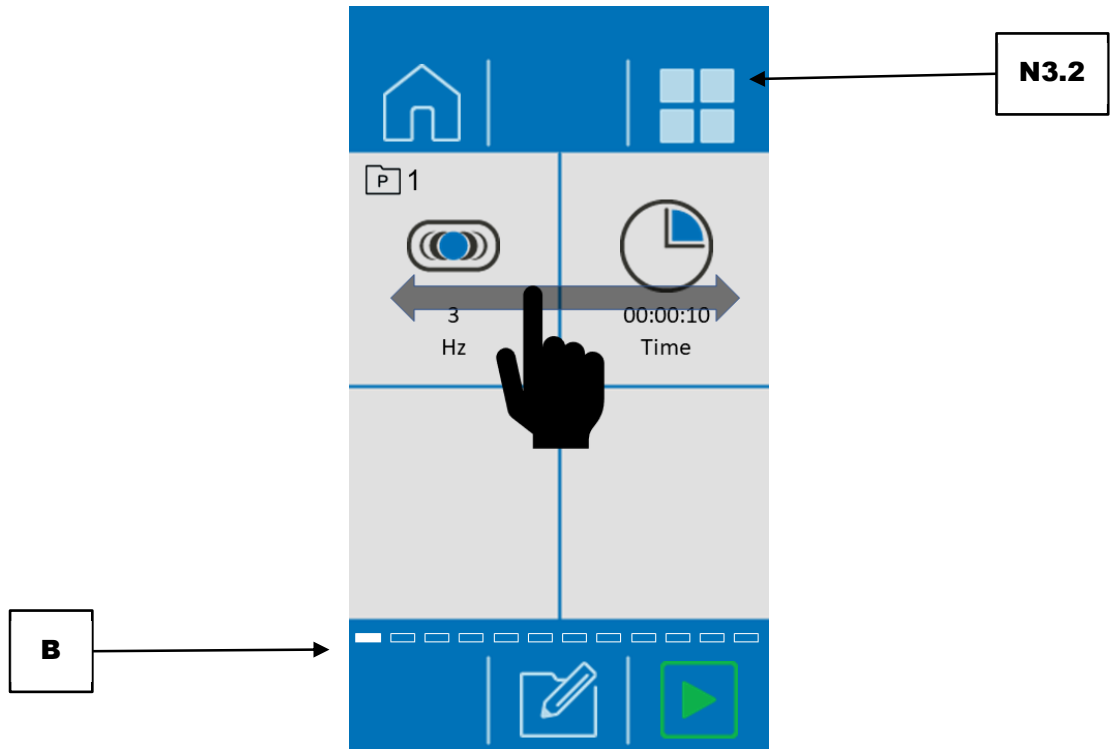



Fig. 44: Program view

Alternatively, you can use the  (N3.2) button to switch to the gallery view. Now, four programs are always displayed with the set parameters.

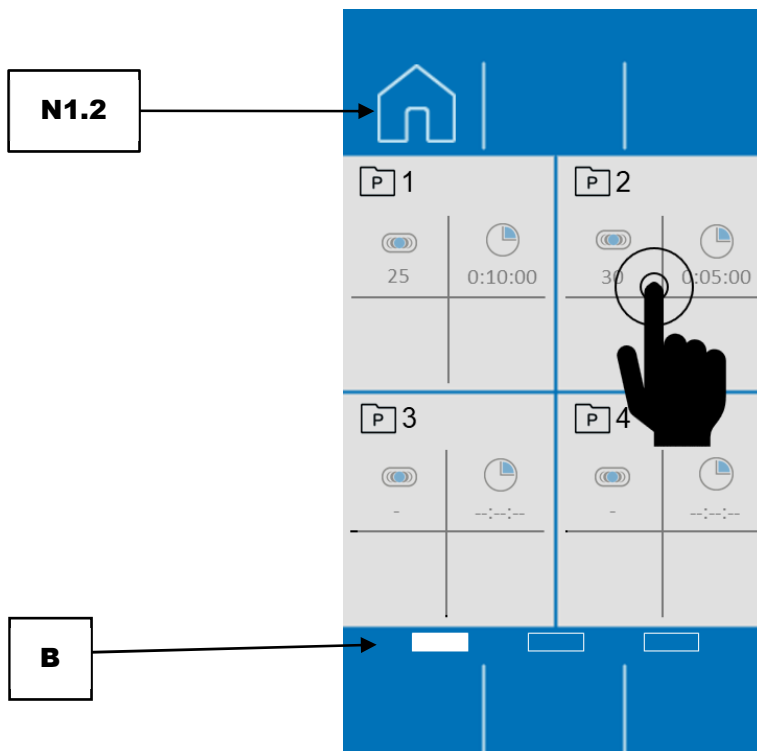




Fig. 45: Gallery view

- ⇒ Swipe across the display to switch between program group 1 to 4, 5 to 8 and 9 to 12. The scroll bar (B) gives you a visual overview of your position within the gallery view.
- ⇒ To activate a program, tap the desired program section.

	Element	Function
N1.2	Main menu	Opens the Main menu
N3.2	Gallery view	Opens the gallery view of the programs or the available program memory locations
P1N	Program number	Number of the selected program
P1.1	Vibration frequency	After selection with the touch display, the vibration frequency can be set from 3 - 35 Hz with the dial
P2.1	Grinding time	After selection with the touch display, the grinding time can be set from 10 seconds to 8 hours with the dial
B	Scroll bar	Indicator for the position of the menu
S2.2	Editor mode	Opens the "Editor" program
S3.1	Start grinding process	Start grinding process

- ⇒ In order to exit the Program mode and to return to the Main menu, press  (N1.2).

7.9.2 Edit a Program

Open the program editor in the Program mode by pressing the button  (S2.2).

A program can be created, edited, saved and deleted in the program editor.

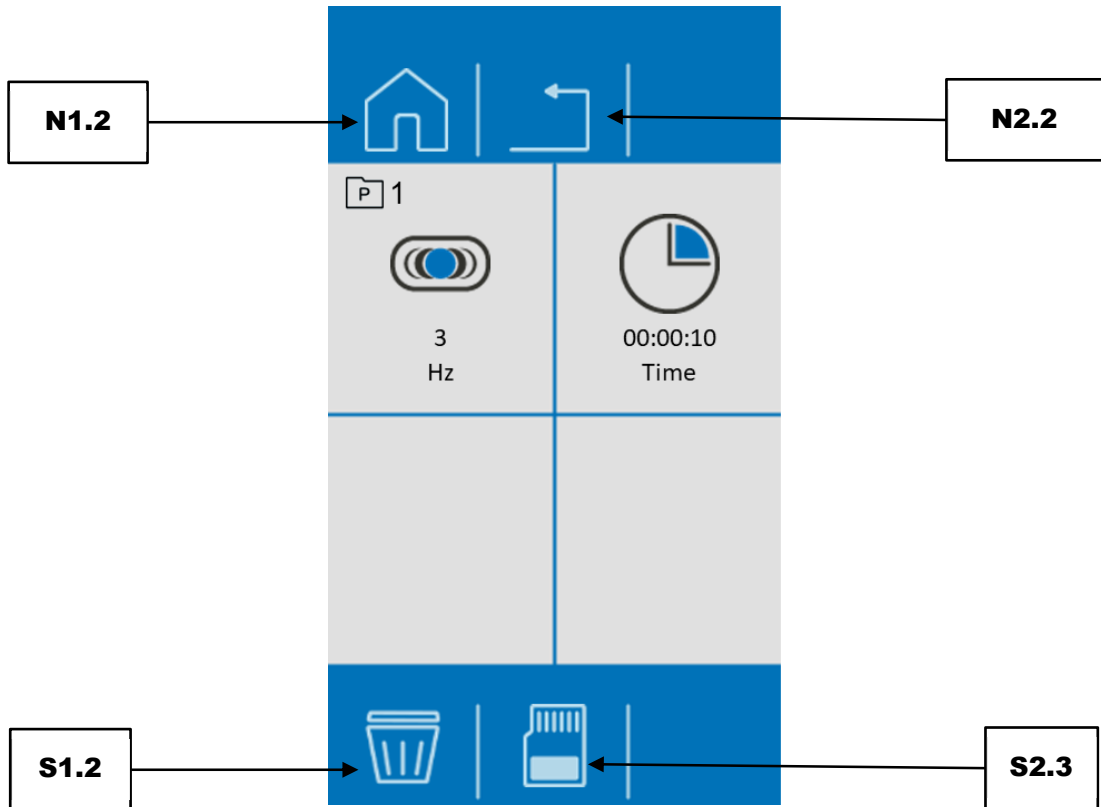




Fig. 46: Program editor

	Element	Funktion
N1.2	Main menu	Opens the Main menu
N2.2	Cancel	Cancels the current process and returns to the next higher menu level
S1.2	Delete	Deletes all parameters of the program
S2.3	Save	Saves the program

① Editing can be cancelled by pressing the button  (N2.2). All settings made will then be discarded.




- ⇒ Press on the parameter which needs to be edited.
- ⇒ Turn the rotary knob until the requested value is displayed.
- ⇒ Press the parameter again or select another parameter in order that the set value is accepted.
- ⇒ To save the parameters press  (S2.3).

7.9.3 Save a Programme


Proceed as follows to save the configured parameters in a program preset:

- ⇒ Press  to save the configured parameters in the selected program preset.

7.9.4 Delete a Programme

- ⇒ To delete all parameters of a programme, tap on the  button (S1.2).
- ⇒ Confirm the deletion by tapping on the  button (S2.2).
- ⇒ Abort with the  button (N2.2).

7.10 Cycle mode

Press the button  in the Main menu to switch to the Cycle program mode. After switching on the mill, the display changes to Cycle program 1; otherwise to the last cycle program which has been used.

In the Cycle program mode, cycle programs can be selected, edited, saved, deleted and started.

If sample materials are frequently ground with the same parameters, these parameters can be stored in cycle program memory locations and called up as Standard Operating Procedures (SOP), whenever required.

Up to four memory locations are available for cycle programs.

The following parameters can be stored in the individual cycle programs:

- Vibration frequency
- Grinding time
- Cycles (repetitions of grinding time and vibration frequency)

A cycle comprises of two parameter sets (A and B). The vibration frequency and the grinding time can be freely selected for each parameter set. The complete cycle program consists of the two parameter sets (A and B) and the selected repetitions.

- ⓘ When starting grinding via a cycle program, the parameters of the grinding cannot be changed during the grinding process.

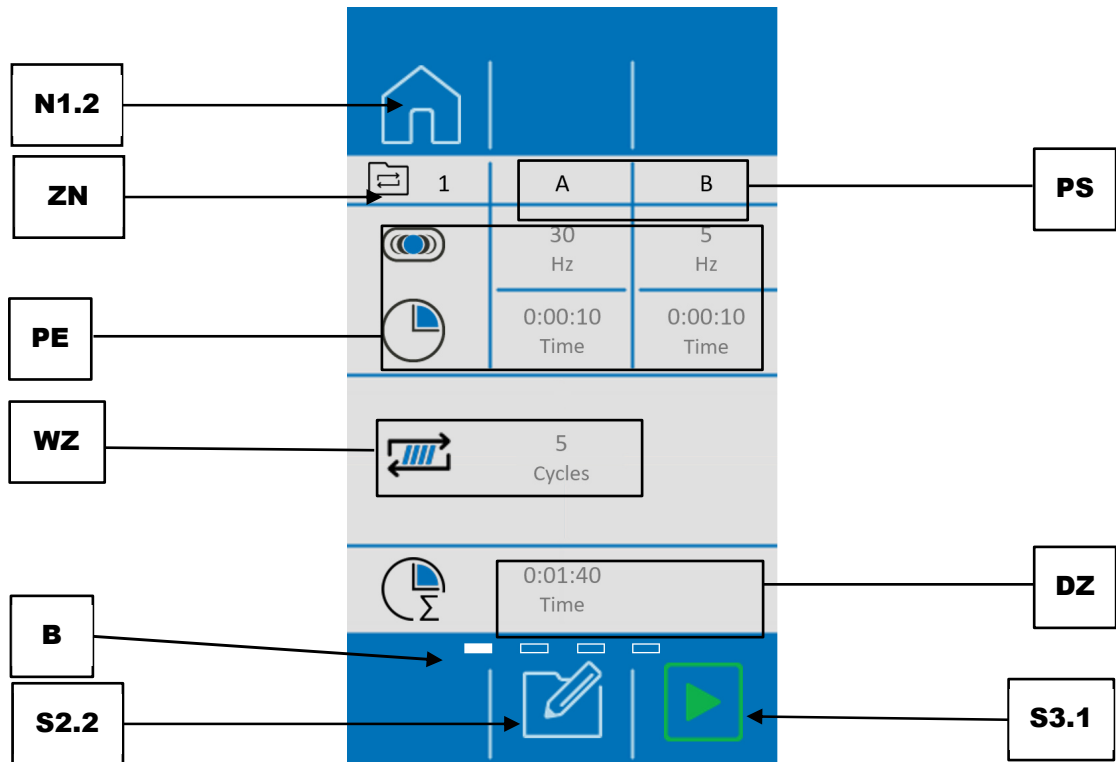


Fig 47: Cycle program mode

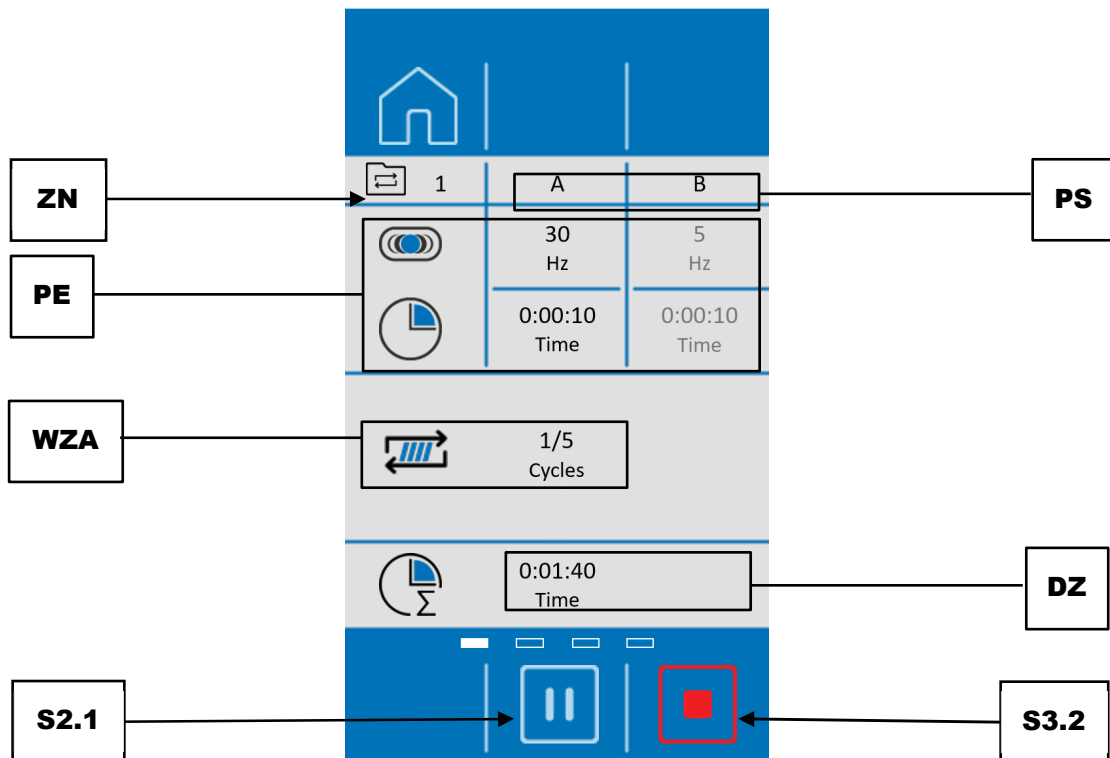




Fig. 48: Cycle program mode after starting the grinding process

	Element	Function
N1.2	Main menu	Opens the Main menu
ZN	Number of the cycle program	Displays the number of the current cycle program
PS	Parameter sets (A/B)	A cycle program is divided into parameter sets A and B.
PE	Parameter settings	Displays the parameters of the active cycle program (vibration frequency or grinding time)
WZ	Repetitions of the cycle program	Indicates how often the configured cycle program is repeated until the grinding process is completed.
WZA	Repetitions of the current cycle	After the grinding process has started, the current cycle status is displayed here
B	Scroll bar	Indicator for the position of the cycle program
DZ	Total duration of the cycle program	Shows the total duration of the cycle program until the grinding process is completed (The total duration is made up of the two parameter sets (A/B) and the repetitions.). ⓘ The total duration of a cycle program is limited to 99 hours.
S2.1	Pause cycle program	Pauses the current cycle program
S2.2	Editor mode	Opens the editor of the cycle program
S3.1	Start cycle program	Starts the grinding process or the cycle program
S3.2	Stop cycle program	Stops the current cycle program

7.10.1 Selecting the cycle

In the cycle program mode, cycle programs with preset parameters for the grinding process can be selected. In order to select a cycle program, press the button  in the Main menu. The respective number of the cycle program is displayed next to the symbol .

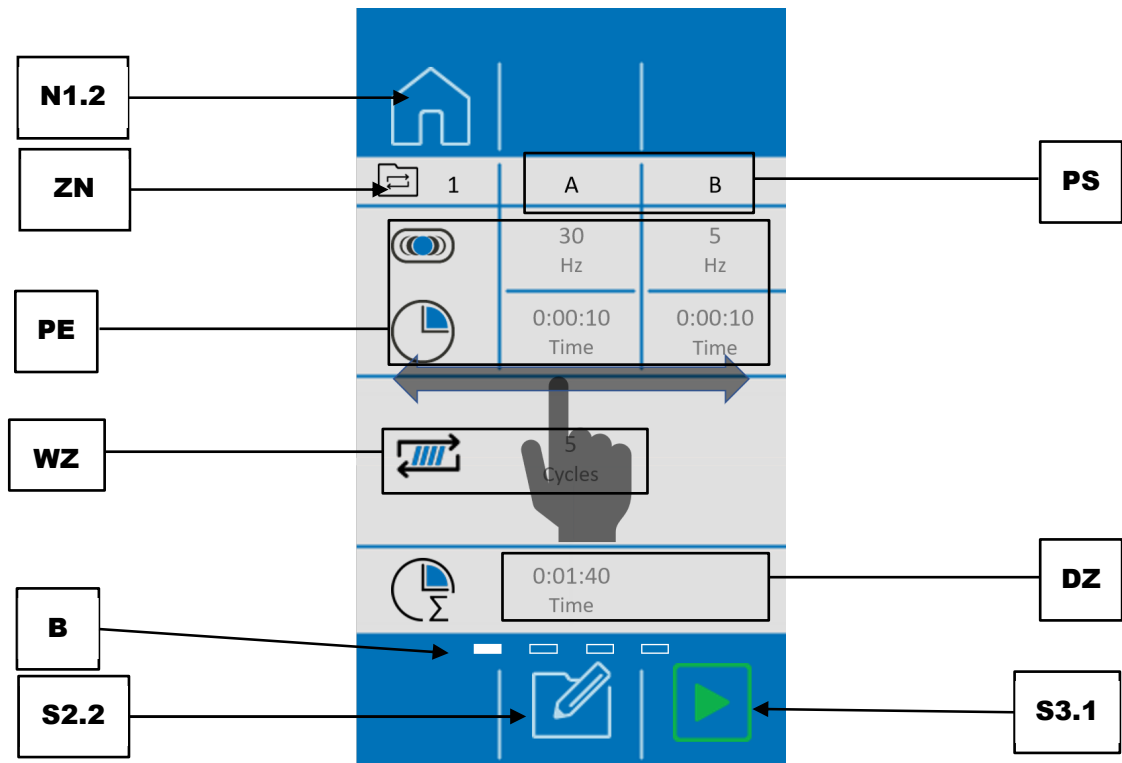


Fig. 49: Selecting a cycle

	Element	Function
N1.2	Main menu	Opens the Main menu
ZN	Number of the cycle program	Displays the number of the current cycle program
PS	Parameter sets (A/B)	A cycle program is divided into parameter sets A and B.
PE	Parameter settings	Displays the parameters of the active cycle program (vibration frequency or grinding time)
WZ	Repetitions of the cycle program	Indicates how often the configured cycle program is repeated until the grinding process is completed.
B	Scroll bar	Indicator for the position of the cycle program
DZ	Total duration of the cycle program	Shows the total duration of the cycle program until the grinding process is completed (The total duration is made up of the two parameter sets (A/B) and the repetitions.). ⓘ The total duration of a cycle program is limited to 99 hours.
S2.2	Editor mode	Opens the editor of the cycle program
S3.1	Start cycle program	Starts the grinding process or the cycle program

⇒ Swipe the display from right to left or from left to right to navigate through the cycle programs. The position of the cycle program is shown in the scroll bar.

- ⇒ Press the symbol to start the selected cycle program and the grinding process.
- ⇒ Press the symbol in order to exit the cycle program mode and return to the Main menu.

7.10.2 Editing the cycle

Cycle programs can be created, edited, saved and deleted in the editor of the cycle program.

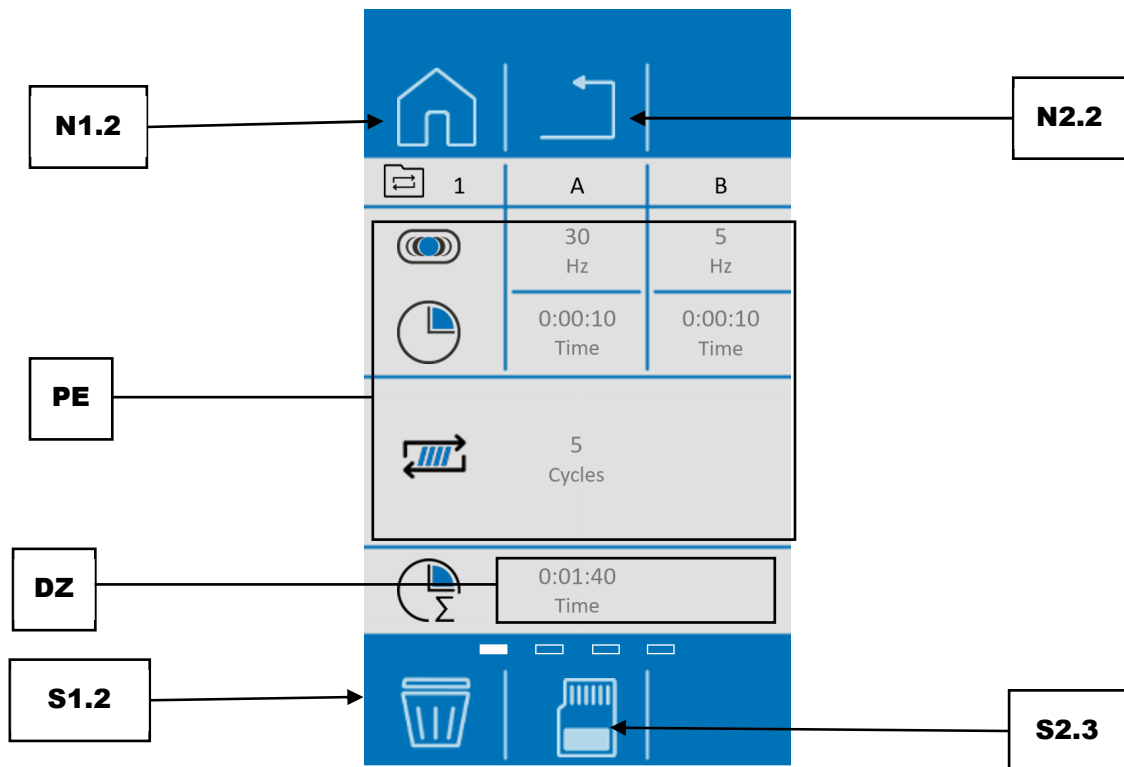




Fig. 50: Editor of the cycle program

	Element	Function
N1.2	Main menu	Opens the main menu
N2.2	Cancel	Cancels the current process and returns to the next higher-level menu
PE	Parameter settings	Displays the parameters which are configured for the active cycle program
DZ	Total duration of the cycle program	Shows the total duration of the cycle program (The total duration is made up of the two parameter sets (A/B) and the repetitions.). ① The total duration of a cycle program is limited to 99 hours.
S1.2	Delete	Deletes all parameters of the cycle program
S2.3	Save	Saves the cycle program

- ⇒ Press in the cycle program mode to call up the editor of the cycle program in order to edit the activated cycle program.

- ① The total duration of a cycle program must not exceed 99 hours. A total duration of more than 99 hours cannot be saved and is marked in red.




The process can be cancelled by pressing the button .
All settings made will then be discarded.

- ① The parameters can only be changed In the Cycle program mode, if editing is activated via the button .
- ⇒ Press the parameter which needs to be edited.
- ⇒ Turn the rotary knob until the required value is displayed.
- ⇒ Press the parameter again or select another parameter to ensure that the set value is accepted.

7.10.3 Saving the cycle


- ⇒ Press  to save the set parameters in the selected cycle preset.

7.10.4 Deleting the cycle

- ⇒ Tap the button  (S1.2) in order to delete all parameters of a cycle programme.
- ⇒ Confirm the deletion by tapping the button  (S2.2).
- ⇒ The process will be cancelled by pressing the button  (N2.2).

7.11 System settings

The system settings can be accessed from the main menu.

- ⇒ Press the symbol .
- ⇒ Swipe from right to left or left to right to access the three different system settings windows.
- ⇒ Then press the desired section to view or configure settings.

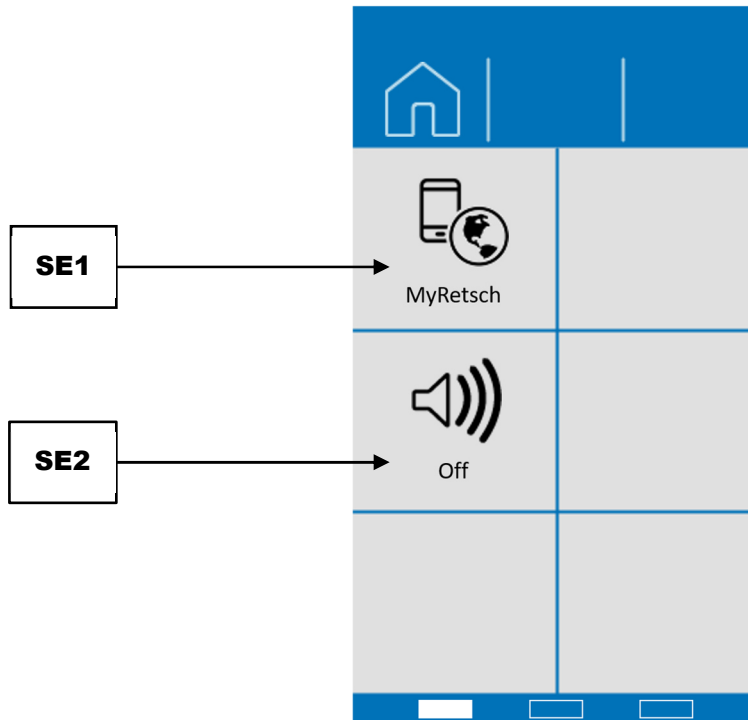


Fig. 51: System settings Page 1

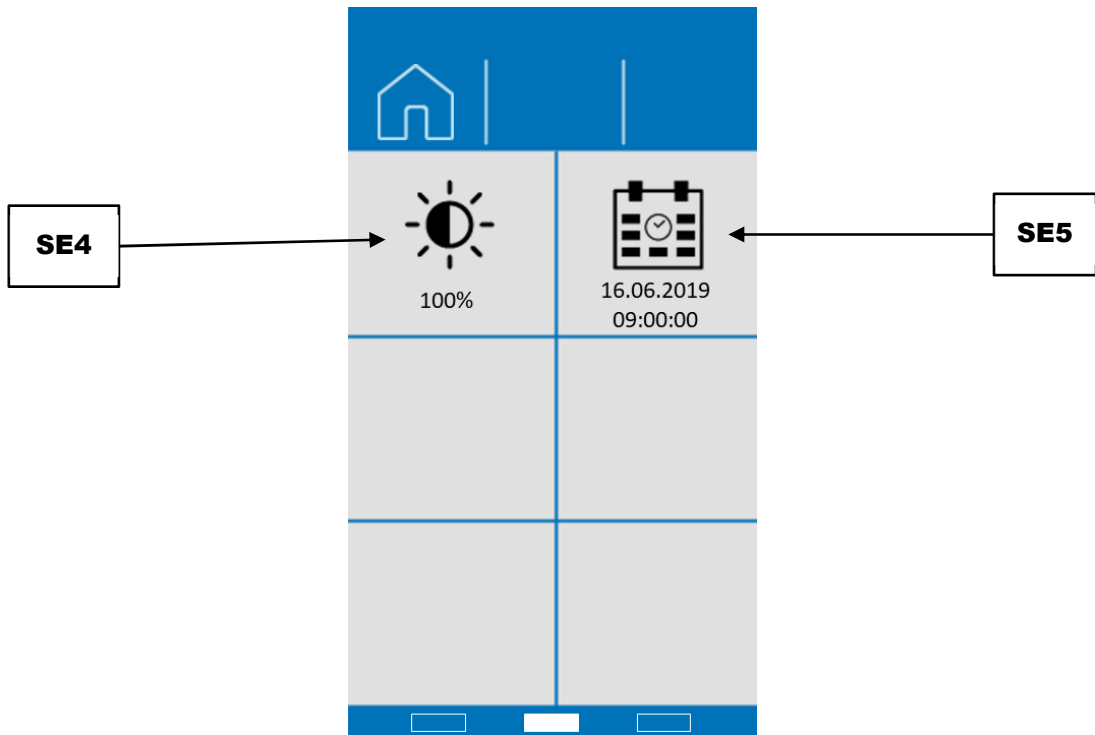


Fig. 52: System settings Page 2

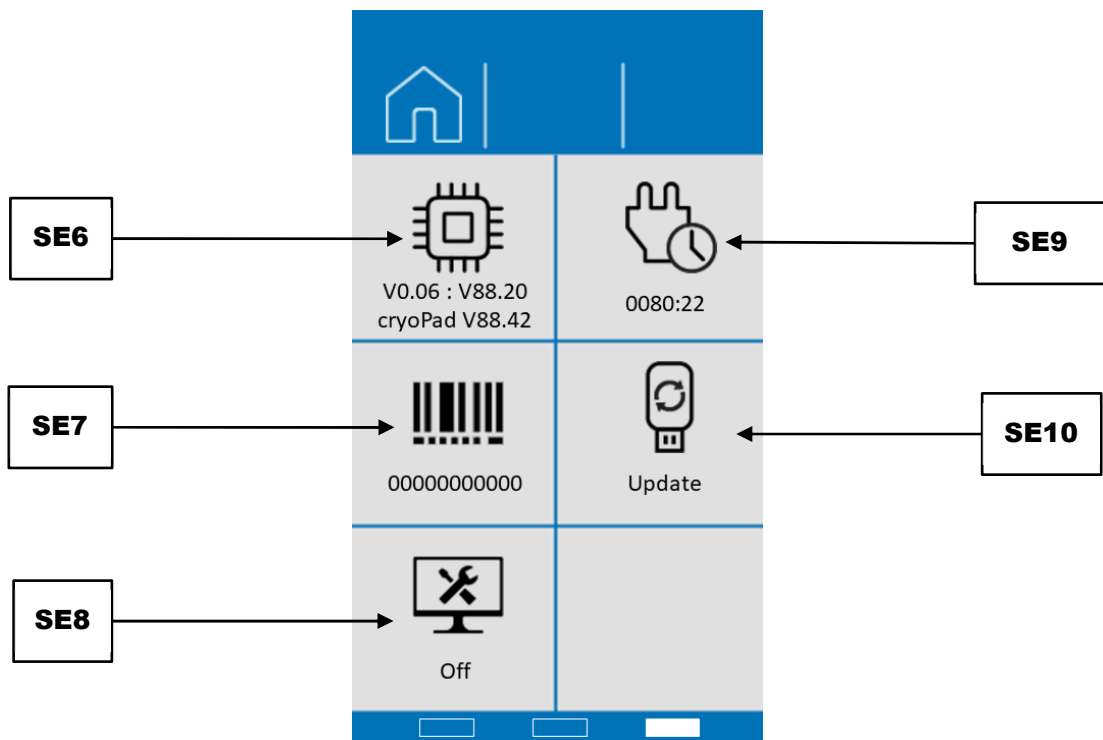


Fig. 53: System settings Page 3

	Element	Function
SE1	"MyRetsch"	Shows QR code in the display. See chapter "MyRetsch".
SE2	Signaling device (on/off)	This can be used in order to switch the signaling device on or off.
SE4	Brightness	Adjusting the display brightness.
SE5	Date and time	Setting of date and time.
SE6	Software version	Display of software version. Display (program control): Firmware (device control).
SE7	Serial number	The serial number of the device is displayed here.
SE8	Service environment	Enables a service technician to access the service environment.
SE9	Operating hours	Display of the operating hours.
SE10	Software update	Software update of the device via USB data carrier

7.11.1 MyRetsch

This section gives access to the Retsch GmbH web portal via a QR code. This may be read using a smartphone with the appropriate software and an internet connection. Additional information such as tips and tricks and an application database can be accessed.

⇒ Tap on the MyRetsch section to display the QR code.



Image 54: MyRetsch

QR code to access the web portal:



MM 500 nano

MyRetsch



<http://retsch.info/g20765>

Image 55: QR code

7.11.2 Signalling device

The signalling device on the device can be switched on or off using this section.
The signalling device generates an acoustic signal as soon as a grinding process finishes.

7.11.3 Brightness

Proceed as follows to adjust the brightness level on the touchscreen:

- ⇒ Press the section.
- ⇒ Turn the dial until the desired level of brightness has been reached on the display.
- ⇒ The set value will be accepted as soon as you press this section again or on another section, or as soon as you exit system settings.

7.11.4 Date and time

Proceed as follows to adjust the date and time:

- ⇒ Press the section.
- ⇒ Select the desired settings using the dial.
- ⇒ The set values will be accepted as soon as you press this section again or on another section, or as soon as you exit system settings.

7.11.5 Software Version

The following two software versions of the device can be viewed in this section:

- Firmware (device control)
 - Display (program control)
- ① The current software versions are specified in turn, whereby the firmware is listed first.

7.11.6 Operating Hours

The operating hours of the device in hours and minutes (hh:mm) are displayed in this section. The process times are counted, i.e. the total times between starting and stopping a grinding process. The time cannot be manipulated.

7.11.7 Serial number


The serial number of the device can be displayed in this section.

7.11.8 Software Update

The software can be updated using this section.



- ① There must be a suitable USB data carrier in the USB interface.
 - The USB data carrier must be formatted to the FAT32 file system.
 - USB 3.0 data carriers are not supported.
 - Only the software to be installed may be located in the main directory. The device then automatically detects the new software.

Proceed as follows to update the software:

- ⇒ Press the  symbol to perform an update.
- ⇒ Wait until the transfer and installation have finished.
- ① The dial flashes blue until the touchscreen is restarted. This may take a few seconds.

7.11.9 Service Environment


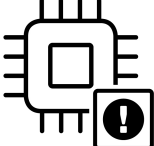
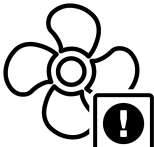
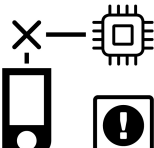
The service environment can be accessed using this section. The service environment can only be accessed by service technicians who have been authorised by Retsch GmbH.

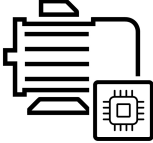


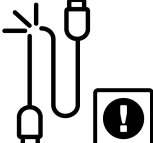
- ① If the service environment is selected, the USB interface is activated and "On" displayed beneath the  symbol. No other functions will be executed, however.
- ⇒ Deactivate the service environment by pressing on the section or exit the "System settings" menu by pressing the  button.
- ① All other functions remain deactivated while the service environment is activated.

8 Error Messages and Information Notes

8.1 Error Messages



Error messages inform the user about detected device or programme errors. In the event of an error message, a fault has occurred, in which the operation of the device or the programme is automatically interrupted. Such faults must be resolved before next startup.

Error code	Description	Measures
E10 	Overload	The drive can withstand short-term overload. However, in the event of a prolonged overload, the self-protection becomes active. This can happen especially with high loads (heavy grinding jars, hard samples, large balls, high frequency). <ul style="list-style-type: none"> • Check whether the load of the machine is too high. • Check whether there are any foreign bodies present in the interior. • Check whether the arms can be moved easily by hand. • Check whether the grinding process can be carried out with reduced frequency. Leave the machine switched on until the Cool Down Timer has expired.
E20 	Error – Control	<ul style="list-style-type: none"> • Turn off the main switch and wait 30 sec. before turning on the device again. • If the error persists, please contact the service of Retsch GmbH.
E23 	Error – Ventilation	The fan is blocked and does not start. <ul style="list-style-type: none"> • Check whether the fan is blocked by a foreign object. • Turn off the main switch of the device and restart the process. • If none of the above-mentioned causes are present, please contact the service of Retsch GmbH.
E25 	Error – Display	The connection to the display is interrupted. <ul style="list-style-type: none"> • Turn off the main switch and wait 30 sec. before switching the device on again. • If necessary, remove any foreign objects from the interior of the device. • If the error persists, please contact the service of Retsch GmbH.

Error code	Description	Measures
<p data-bbox="363 248 419 277">E26</p> 	<p data-bbox="496 248 719 315">Error – Frequency converter</p>	<p data-bbox="839 248 1420 315">The communication with the frequency converter is interrupted or faulty.</p> <ul data-bbox="887 331 1420 465" style="list-style-type: none"> <li data-bbox="887 331 1420 398">• Turn off the main switch and wait 30 sec. before switching the device on again. <li data-bbox="887 398 1420 465">• If the error persists, please contact the service of Retsch GmbH.
<p data-bbox="363 479 419 508">E41</p> 	<p data-bbox="496 479 756 508">Error – Speed sensor</p>	<p data-bbox="839 479 1382 546">The set rotation speed and the actual rotation speed of the drive differ from one another.</p> <ul data-bbox="887 562 1420 763" style="list-style-type: none"> <li data-bbox="887 562 1420 629">• Turn off the main switch and wait 30 sec. before switching the device on again. <li data-bbox="887 629 1420 696">• If necessary, remove any foreign objects from the interior of the device. <li data-bbox="887 696 1420 763">• If the error persists, please contact the service of Retsch GmbH.
<p data-bbox="363 786 419 815">E50</p> 	<p data-bbox="496 786 745 815">Error – Safety circuit</p>	<p data-bbox="839 786 1302 815">A safety function has been interrupted.</p> <ul data-bbox="887 831 1420 1032" style="list-style-type: none"> <li data-bbox="887 831 1420 898">• Turn off the main switch and wait 30 sec. before switching the device on again. <li data-bbox="887 898 1420 965">• If necessary, remove any foreign objects from the interior of the device. <li data-bbox="887 965 1420 1032">• If the error persists, please contact the service of Retsch GmbH.
<p data-bbox="363 1055 419 1084">E80</p> 	<p data-bbox="496 1055 756 1084">Error – USB interface</p>	<p data-bbox="839 1055 1420 1155">An update was carried out via the Settings menu. No USB stick is connected or the USB stick does not contain any information.</p> <ul data-bbox="887 1171 1420 1305" style="list-style-type: none"> <li data-bbox="887 1171 1420 1238">• Turn off the main switch and wait 30 sec. before switching the device on again. <li data-bbox="887 1238 1420 1305">• If the error persists, please contact the service of Retsch GmbH.

8.2 Information Notes

Notices inform the user on specific device or programme processes. The operation of the device or programme may be interrupted briefly, but there is no fault. The information notice must be acknowledged by the user to continue the process. Information notices provide additional information for the user as an aid, but do not represent any device or programme errors.

Information code	Description	Measures
<p>H10</p> 	<p>Motor is overheated</p>	<p>The drive can withstand short-term overload. However, in the event of a prolonged overload, the self-protection becomes active. This can happen especially with high loads (heavy grinding jars, hard samples, large balls, high frequency).</p> <ul style="list-style-type: none"> • Check whether the load of the machine is too high. • Check whether there are any foreign bodies present in the interior. • Check whether the arms can be moved easily by hand. • Check whether the grinding process can be carried out with reduced frequency. <p>Leave the machine switched on until the Cool Down Timer has expired.</p>
<p>H42</p> 	<p>Safety check after commissioning the device</p>	<ul style="list-style-type: none"> • Open the device cover and close it again.

9 Servicing

This chapter contains descriptions on cleaning and maintaining the MM 500 nano.

CAUTION

C14.0013

Risk of injury

Improper repairs

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

9.1 Cleaning

Cleaning must be performed when necessary and at least monthly to ensure the reliability and operational safety of the MM 500 nano.

WARNING

W9.0003

Risk to life caused by an electric shock

Cleaning live parts with water

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



WARNING

W10.0008

Risk of death caused by an electric shock

Penetration of water if the mains plug is not fully plugged in

- If the IEC connector is not fully plugged in to the IEC appliance socket, water may enter the socket causing an electric shock.
- **Only operate the device with the IEC connector fully plugged in.**



CAUTION

C15.0031

Risk of injury

Cleaning with compressed air

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



9.1.1 Cleaning the outside of the device

- ⇒ Clean the housing of the device with a damp cloth and, if necessary, a household cleaning agent. Make sure that no water or cleaning agent gets into the interior of the device.
- ⇒ Only use neutral cleaning agents. Do not use solvent-based cleaners! Acetone is not permitted!
Test cleaning products on an inconspicuous spot.

9.1.2 Cleaning the collecting tray

Clean the collecting tray using a damp cloth and a standard household cleaning agent if necessary.

9.1.3 Cleaning the inside

Clean the inside of the device using a vacuum cleaner or a damp cloth and a standard household cleaning agent if necessary.
During cleaning, the collecting receptacle underneath the grinding stations can be removed and cleaned separately.
Ensure that no water or detergent gets inside the device.

9.1.4 Cleaning the filter covers



Fig. 56: Rear

	Component
I	Main switch
GL	Housing fan, Filter frame
GL.1	Filter protection grid
GL.2	Filter mat

Clean the filter cover as follows:

- ⇒ Switch off the device with the main switch (I) at the rear of the device.
- ⓘ Touch display goes out. Device is switched off.
- ⇒ Remove the filter frame (GL) on the back of the device by releasing it with a screwdriver.
- ⇒ Clean the filter frame, filter protection grid and filter mat (GL/GL.1/GL.2) with a vacuum cleaner.
- ⇒ Fit the complete filter (GL/GL.1/GL.2) again and snap it into place.
- ⇒ The filter is cleaned.

9.1.5 Cleaning the grinding jar

All grinding jars, including those with glued-in ceramic inserts , can be cleaned using alcohol, benzine or normal household detergent.

- ⓘ Cleaning in a dishwasher is also possible.

After cleaning, the grinding jars can be dried in the drying cabinet at the following temperatures:

Grinding jar material	Temperature
Hardened steel	Up to 200 °C
Stainless steel	Up to 200 °C
Tungsten carbide(TC)	Up to 150 °C
Zirconium oxide	Up to 120 °C

9.1.6 Cleaning the grinding balls

All grinding balls can be cleaned using alcohol, benzine or normal household detergent.

- ⓘ Cleaning in a dishwasher is also possible.

9.2 Maintenance

The MM 500 nano is maintenance-free.

No maintenance work needs to be carried out if the device is used as intended.

CAUTION

C16.0015

Risk of injury

Improper modifications to the device

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

10 Wear

⚠ CAUTION

C17.0013

Risk of injury

Improper repairs

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

The grinding tools may become worn, depending on the frequency of the grinding operation and the sample material. The grinding jars and, depending on the presence, the grinding balls or grinding set should be regularly checked for wear and replaced if necessary.

Likewise, all existing sealing gaskets (of grinding tools and in the device) should be checked for wear regularly and replaced if necessary.

10.1 Returning for repair and maintenance



Fig. 57: Return form

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

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

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

11 Accessories

Information about available accessories and the corresponding manuals can be found directly on the Retsch GmbH (<https://www.retsch.com>) website under the "Downloads" section for the device.

Information about parts subject to wear and tear and small accessories can be found in the complete catalogue for the Retsch GmbH, likewise available on the website.

In the event of questions about spare parts, please contact the representative for Retsch GmbH in your country or contact Retsch GmbH directly.

12 Disposal

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

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

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

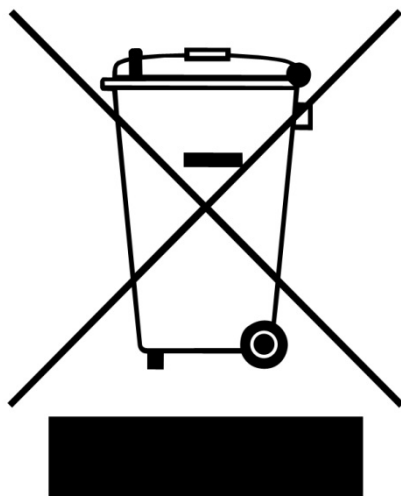


Fig. 58: Disposal label

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

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

13 Index

A

Accessories	85
Ambient temperature	23
Amendment status	7
Amount of energy	34
Amperage	21
Appliance socket	19
Applications	15
Area of application	15

B

Back	19
Back of the device	19
Ball size	34
Bar code	21
Batch	15
Brightness	76

C

Calibration	84
Capacity	21
CE	15
CE marking	21
Clamp	18, 42, 43, 46
Clamping screws	33, 34, 38, 39, 40, 49, 50
clamping wedges	46
Clamping wedges	18, 33, 46
Clamps	18, 19, 43, 44
Cleaning	81
Cleaning the collecting tray	82
Cleaning the filter covers	82
Cleaning the grinding balls	83
Cleaning the grinding jar	83
Cleaning the inside	82
Cleaning the outside of the device	82
Close device cover	59
Closing the grinding jar	40
Closing the grinding jar support	45
Collecting dish	17
Communication	15
Complaints	22
Condensation	23
Confirmation form for the managing operator	13
Conformity	15
Connecting the device to the power supply	28
Connecting to the power supply	28
Controlling the grinding process	60
Copyright	7
Cryogenic grinding	36
Cycle mode	67
cycle program	67
Cycle program mode	68

D

Date	75, 76
Date and time	76
Delete	71

Deleting the cycle	72
Device	
close	31
open	31
Device control	51, 76
Device designation	21
device hood	47
Device hood	17, 30, 31, 32, 47, 49
Device with loaded grinding stations	45
Diagram of the menu navigation	56
dial	51
Dial	30, 47, 51, 76
Dial	76
Disclaimer	7
Disconnection from the mains	23
Display	
software	76
Disposal	86
label	86
regulations	86
Disposal label	21
Drehknopf	66

E

Editing the cycle	71
Editor mode	62, 65, 69, 70
Editor of the cycle	71
Electrical connection	27
Electricity warning	20
Electromagnetic compatibility	15
Embrittlement	36
EMC	15
Emergency stop switch	11
Emissions	16
Equivalent sound pressure level	16
Equivalent sound pressure level	16

Error

E10	78
E20	78
E23	78
E25	78
E26	79
E41	79
E50	79
E80	79

Error messages	78
Explanations of the safety instructions	8
External fuse	27

F

Feed material	15
Feed quantity	15
Feed size	15, 35
Filling the grinding jar	39
Filter frame	19, 82
Filter mat	82

Filter protection grid	82
Final fineness	15
Firmware	76
First commissioning	27
Frequency	27
Front.....	17
Front of the device with touchscreen.....	30
Function elements	51, 53
Fuse strength.....	21
Fuse type	21

G

Gallery view	62, 64
Grinding aid	37
Grinding ball size	34
Grinding chamber	33, 39, 40, 49, 50
grinding jar	45
Grinding jar	33, 43, 44, 46, 49, 50
fill level.....	35
identification	34
inserting.....	41, 42
material.....	34, 83
size	34
Grinding jar cover	33, 34, 39, 40, 49, 50
Grinding jar guide	18, 33, 43
Grinding jar size.....	34, 35
Grinding jar support .	18, 33, 34, 42, 43, 44, 46, 49
Grinding jar support	18
Grinding jars	15, 33, 43, 44
Grinding noise.....	16
Grinding principle.....	15
Grinding process.....	46
Grinding process successfully completed	59
Grinding stations	17, 18, 44
Grinding time	59
Grinding time setting.....	15
Guide bolts.....	33, 40

H

Hardened steel	35, 83
Hearing loss	16, 29
Hood lock	11
Housing fan.....	19, 82
Humidity	24

I

Improper use.....	9
Information code	
H10.....	80
H42.....	80
Information notes	78, 80
Inserting the grinding jar	42
Installation.....	22
Installation height.....	24
Installation site	
conditions	23
Intended use	9
Intended use of the device	9
IP 20.....	15

L

Leq.....	16
Lifting belts.....	25, 26
Lifting the device	25, 26
Loading the grinding stations.....	44
Loading the grinding stations.....	44
Loading the grinding stations.....	44
Locking wheel	18, 34, 42, 45, 46, 49
Locking wheels	33, 34

M

Magnetic clamps	17
Main menu	57
Main switch	19
Main switch	30
Mains connection	15
Mains frequency.....	21
Mains supply	27
Maintenance	13, 83, 84
Manual	7, 9, 13
Manufacturer's address	21
Material	35
Maximum grinding time.....	15
Maximum relative humidity	23
Menu navigation.....	56
Menu surface of the touch display	52
Motor output.....	15
myRetsch	15
MyRetsch	75

N

Navigation area	52
Noise levels.....	16
Notes on the manual.....	7
Number of grinding stations	15

O

Obligations of the operating company	10
Opening aid.....	49
Opening aid.....	33, 34
Opening the grinding jar	38
Opening the grinding jar for emptying.....	49
Opening the grinding jar support	42
Operating hours	75, 77
Operating instructions	13
Operating the device.....	29
Operation	15, 24

P

Packaging	22
Parameter sets.....	69, 70
Parameter settings.....	52, 70, 71
Parametereinstellungen	69
Part number	21
Parts subject to wear and tear	85
Pausing the grinding process	60
Personal protective equipment	11
Personnel.....	10
Pouring aid for Multicavity grinding jar.....	50
Power version	21
PPE.....	11

Preparing the grinding jar	37	version	76
Preventing damage to equipment.....	13	Software update	75
Preventing risks during normal operation	12	Software version	75, 76
Program		Sound level	16, 29
editing	66	Spare parts	85
selecting	63	Special grinding methods	36
Program control	76	Specifications regarding grinding balls and grinding jars	32
Program editor	66	Speed.....	34
Program mode	61, 63	Stainless steel.....	35, 83
Program preset	67	Standard operating procedures	15
Program view	64	Start cycle program.....	69
Programm mode	61, 62	Start grinding process	59, 62
Programmable cycles	15	Starting the grinding process	47
Programme		Starting the grinding process	60
deleting	67	Stop cycle program	69
saving	67	Stop grinding process	59, 62
Protection class	15	Stopping the grinding process	60
Protective equipment	11	Switching the device on/off	30
Provisions	10	Symbols	7
Q		system settings	73, 76
QR-Code.....	76	system settings	73
Qualification of personnel	10	System settings.....	59, 73, 76
R		T	
Recommended ball sizes.....	34	Target group	9
Recommended grinding jar filling	35	TC	83
Recommended number of grinding balls.....	35	Technical data.....	15
Remaining grinding time	59	Temperature	83
Removing the grinding jar.....	48	Temperature fluctuations	23
Removing the sample material	47	Temperature range	23
Repair	11, 81, 84	Temporary storage.....	23
Repair instructions	11	The MM 500.....	14
Repetitions of the cycle program	69, 70	Time	75, 76
Retsch APP	15	Total duration of the cycle program	69, 70, 71
Return	22	Touchscreen	17, 30, 47, 51
Return device.....	86	Touchscreen and dial.....	51
Return form.....	84	Transport.....	22, 24
Returning for repair and maintenance	84	Transport aid	25, 26
S		removing.....	26
Safety	9	Transport damage.....	22
Sample volume	35	Transport lock	25
Saving the cycle.....	72	unscrewing	25
Screw	25, 26	Transportation aid	
Sealing ring.....	33	removing.....	26
Selecting a cycle	70	Transportation lock	24
Selecting the cycle	70	removing.....	24
Sensors.....	15	Tungsten carbide	35, 83
Serial number	21, 75, 77	Type plate	20, 21, 27
Service address	11	description	21
Service environment	75, 77	Typical grinding time	15
Servicing	81	U	
Signaling device.....	75	UKCA marking	21
Signalling device	76	USB data carrier	77
Signs	7	USB interface	19, 77
Signs on the device	20	V	
Signs on the device	20	Vibration frequency	59
Small accessories	85	Vibration frequency setting	15
Software	77		
update	77		

Vibrations	23, 41
Views of the device	17
Voltage	27
Volume decrease during grinding	35
Volume increase during grinding	35

W

Warning	
Information	8
Warranty claim	22
Wear	84

Weight	15, 21, 25
Wet grinding	37
with highly flammable materials	37
Workplace-related emission value	16

Y

Year of production	21
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Z

Zirconium oxide	35, 83
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MIXER MILL

MM 500 nano | 20.765.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 ISO 14123-1	Machine Safety - Reducing Health Risks Related to Hazardous Emissions from Machinery
DIN EN ISO 14120	Safety of machinery - Guards
DIN EN ISO 14119	Safety of machinery - Interlocking devices associated with guards
DIN EN ISO 14118	Safety of machinery - Prevention of unexpected start-up
DIN EN ISO 13857	Machine Safety - Safety Distances to Avoid Reaching Hazardous Areas With Upper and Lower Limbs
DIN EN ISO 13854	Machine Safety - Minimum Distances to Avoid Crushing of Body Parts
DIN EN ISO 13849-1	Safety of machinery - Safety-related parts of control systems
DIN EN 60204-1	Safety of machinery – Electrical equipment of machines
DIN EN 1005-3	Machine Safety - Human Physical Performance

Electromagnetic compatibility 2014/30/EU (tested at 230 V, 50 Hz)

Applied standards, in particular:

EN 55011	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
DIN EN 61326-1	Electrical equipment for measurement, control and laboratory use - EMC requirements

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

Applied standards, in particular:

DIN EN IEC 63000	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
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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





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