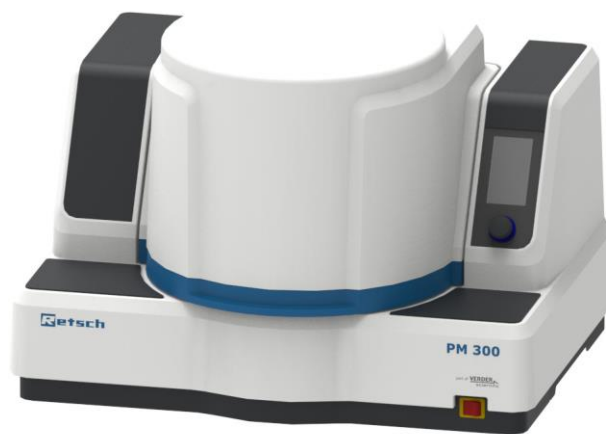


Manual

Planetary Ball Mill PM 300



Translation



Copyright

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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 0000 of the "Planetary Ball Mill PM 300" 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


The following **warnings** in this manual warn of possible risks and damage:


 DANGER	D1.0000
<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	W1.0000
<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	C1.0000
<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	N1.0000
<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.**



2.1 General Safety Instructions

This chapter describes the safety measures and safety devices of the machine. It serves for your orientation in terms of safety matters relating to the use of the machine. Safety instructions are intended for occupational safety and accident prevention. Please follow all safety instructions which are described here in order to minimise any residual risks. It is essential that you read the following safety chapter and the safety instructions contained therein carefully before commissioning and using the machine.

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!**



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!**



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 a damaged power cable or plug!**

⚠ CAUTION

C3.0002

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.**



⚠ CAUTION

C4.0004

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

C5.0005

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

C6.0006

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

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

C7.0044

Hearing damage

A high sound level may be generated depending on the type of material, the grinding set used, the grinding frequency set and the duration of the grinding

- Excessive noise in terms of level and duration can cause impairments or permanent damage to hearing.
- **Ensure that suitable noise protection measures are taken, or wear ear protection.**



⚠ CAUTION

C8.0000

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.**

⚠ CAUTION

C9.0047

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.**

⚠ CAUTION

C10.0000

Unsafe condition of the device

Damaged housing lid

- The device may only be operated with an undamaged housing lid.
- **In the event that there is any mechanical damage on the housing lid, it must be replaced for safety reasons.**

⚠ CAUTION

C11.0001

Ejected objects

Grinding jars that are not clamped

- Grinding jars or clamping devices can be ejected. There is a risk of injury.
- **Never leave the clamping devices loose in the grinding jar support without having the grinding jar clamped.**
- **Please make sure that all the grinding jars are clamped before starting the machine.**
- **Please ensure that the red sleeve of the clamping device is locked in place.**
- **In the event of long-term grinding, please check the tight fit of the grinding jars according to the following schedule:**
- **After 3 minutes, after 1 hour, after 5 hours and then every 10-12 hours.**



⚠ CAUTION

C12.0024

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.**

**Target group:**

The PM 300 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 PM 300 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.

2.2 Intended use of the device

The PM 300 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 8 mm.

As a laboratory machine, the PM 300 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.

Target group: Operators, operating personnel

Machine type designation: PM 300

The Retsch ball mills grind and mix soft, medium-hard to extremely hard, brittle and fibrous materials, whereby dry and wet grinding can be carried out. Grinding with solvents is also permissible. However, it is absolutely essential to observe the supplementary information in the chapter "Wet grinding with highly flammable materials". Minerals, ores, alloys, chemicals, glass, ceramics, plant parts, soils, sewage sludge, domestic and industrial waste as well as many other substances may be ground easily, quickly and without any loss. The ball mills are successfully used in almost all areas of industry and research, especially where there are high demands on purity, speed, fineness and reproducibility.

Only grinding jars in the new design are compatible with the device. Grinding jars in the old design do not fit into the wave-shaped toothing of the grinding jar plate and must not be used.

The grinding jars of the sizes 12 ml and 25 ml can only be used in the device with an adapter. The 50 ml and 80 ml grinding jars can only be used in the device by means of a stacking adapter.

2.3 Improper use

The PM 300 may only be used as intended.

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

The PM 300 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.

2.4 Obligations of the operating company

The user of the machine (the operating company) is responsible for ensuring that every person who works on the machine has been given precise instructions on the basis of this Manual (commissioning, operation, servicing). Training for operators must cover the following points:

- Intended purpose of the machine
- Hazardous areas
- Safety provisions
- You must be satisfied that staff have the requisite qualifications
- General instructions and actions in an emergency
- Applicable accident prevention regulations
- Personal protective clothing required
- Operation of the machine in line with this Manual
- Accepted, applicable rules governing occupational health and safety

Incorporate the PM 300 into your emergency planning:

- Integrate the PM 300 into your operating procedures regulating conduct in emergency situations.
- To prevent accidents during work processes, incorporate the PM 300 into your risk assessment in acc. with the German Ordinance on Industrial Health and Safety (BetrSichV).
- Take into consideration fire-fighting measures, combatting the effect of leaking substances, potential radiation, rescuing people, first-aid measures.

2.4.1 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.

2.4.2 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.

2.4.3 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.

2.4.4 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.

2.4.5 Personal protective equipment (PPE)

Recommendations regarding the personal protective equipment

Work activities /Operational phase	Personal protective equipment (PPE)
Transport Installation	Safety shoes
Commissioning Installation of additional equipment Maintenance	No PPE required
Disposal	Safety shoes
Normal operation (operation and control)	Hearing protection Safety shoes Protective gloves for the removal of grinding material with extreme temperatures.

2.5 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 PM 300 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.

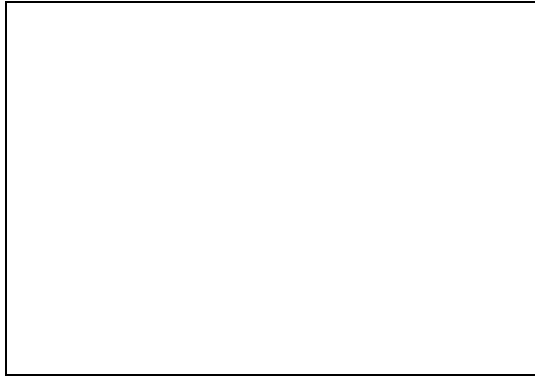
2.6 Repairs

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:



2.7 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.

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.

2.8 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.

2.9 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 Planetary Ball Mill PM 300

The PM 300 is a powerful planetary mill which can be used for dry grinding and wet grinding.

The device enables rapid grinding, mixing and homogenisation of soft, medium-hard, hard, hard-brittle and fibrous materials up to a particle size of 10 mm.

Due to the effective grinding process in a closed system, the PM 300 ensures material-friendly, analysis-appropriate sample preparation in the shortest possible time.

Depending on the properties of the material and the grinding parameters, final finenesses down to 0.1 µm can be achieved.

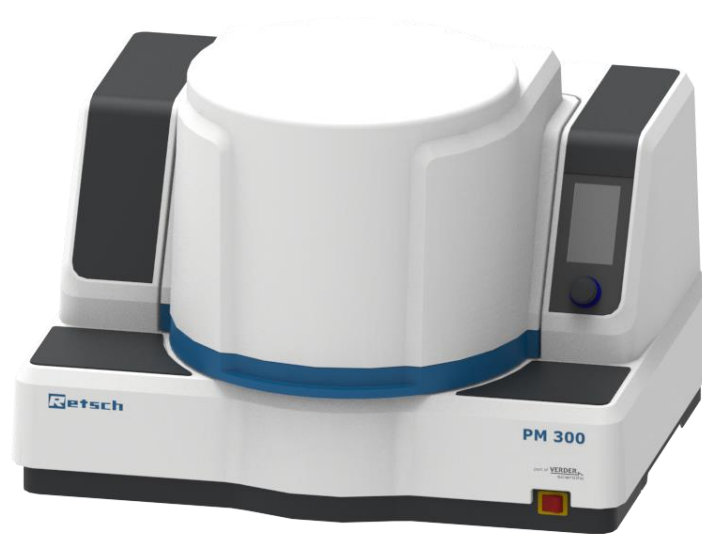


Fig. 1:The Planetary Ball Mill PM 300

NOTICE: This device is not designed as a production machine and for continuous operation, but as a laboratory device, intended for single-shift intermittent periodic operation of 8 hours per day.

3.1 Technical data

General	
Applications	Grinding (dry and wet), mixing, homogenising, colloidgrinding, mechanical alloying, nanogrinding, mechanochemistry
Range of application	Agriculture, biology, chemistry, plastics, building materials, engineering, electrical engineering, environment, food, geology, metallurgy, glass, ceramics, medicine, pharmaceuticals
Feed material	hard, medium-hard, soft, brittle, fibrous

Specification	
Grinding principle	impact, friction
Feed size	≤ 10 mm
Final fineness levels	~ 1 µm, for colloidal grinding ~ 0,1 µm
Batch / feed quantity	Max. 2x 220 ml
Speed setting	50 - 800 rpm
Typical grinding time	30 seconds - 30 minutes
Grinding time setting	Grinding time (from 5 s to max. 99 h) 5 s – 1 min: 5 s steps 1 min – 60 min: 1min steps 1 hour – 5 hours: 15 min steps 5 hours – 10 hours: 30 min steps 10 hours – 99 hours: 1 hoursteps
Max. grinding time	Up to 99 hours
Number of grinding stations	2
Grinding jar sizes	12 ml/ 25 ml/ 50 ml/80 ml/125 ml/250 ml/500 ml
Grinding jars (materials)	Hardened stainless steel, tungsten carbide, zirconium oxide, agate, corundum (Al ₂ O ₃)
Sensors	Temperature (optional), pressure (optional)
Operation	4.3-inch touch display with dial
Storable SOPs (Standard Operating Procedures)	12
Storable cycle programs	4 (up to 99 repetitions)
Communication	MyRetsch Web Portal, Retsch APP
Mains connection	1-phase, 200 - 240 VAC 50/60 Hz
Protection class	IP 20
Electromagnetic compatibility (EMC)	EMC class B pursuant to DIN EN 55011
Apparent power	3335 VA
Current	14,5 A, external fuse min. 16 A
USB interface	SELV 5 V
W x H x D closed	745 x 525 x 580 mm With opened hood: Height = 875 mm
Weight, net	118 kg (without transport straps)

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

C13.0044

Hearing damage

A high sound level may be generated depending on the type of material, the grinding set used, the grinding frequency set and the duration of the grinding

- Excessive noise in terms of level and duration can cause impairments or permanent damage to hearing.
- **Ensure that suitable noise protection measures are taken, or wear ear protection.**

**Noise levels:**

The noise levels are mainly influenced by the machine speed, the size of the grinding jar and the diameter of the grinding balls used.


Example 1	
Container	2 x 500 ml grinding jars; steel
Grinding component	5 balls each Ø 30 mm; steel
Feed material	Quartz sand
Feed quantity	135 g each
Speed	380 rpm

Under these operating conditions, the workplace-related equivalent continuous noise level $L_{pA_{eq}}$ = up to 81 dB(A).

Example 2	
Container	2 x 125 ml grinding jars; steel
Grinding component	270 g balls each Ø 0.5 mm; steel
Feed material	Quartz sand
Feed quantity	25 g and 30 ml water each
Speed	800 rpm

Under these operating conditions, the workplace-related equivalent continuous noise level $L_{pA_{eq}}$ = up to 74dB(A).

3.3 Views of the device

 The numbering of components in the following views of the device is fixed and is used in further figures of components in the Manual.

3.3.1 Front

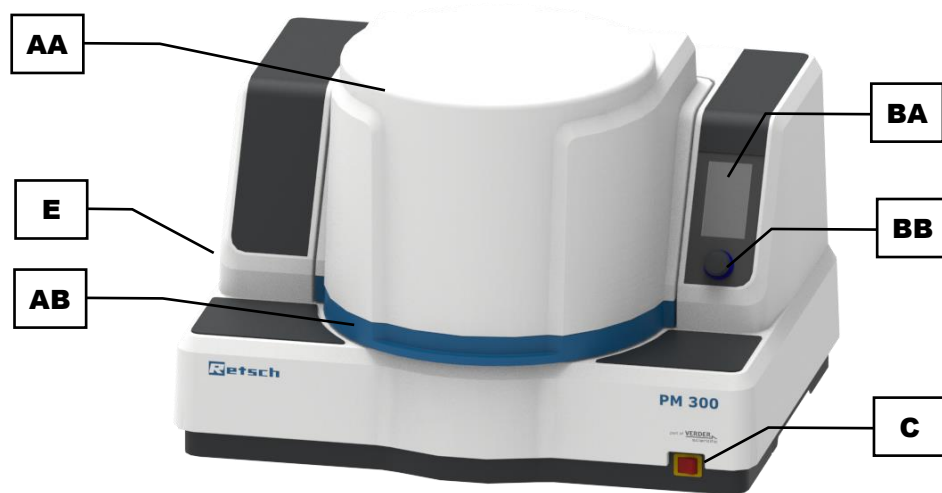


Fig. 2: Device hood closed

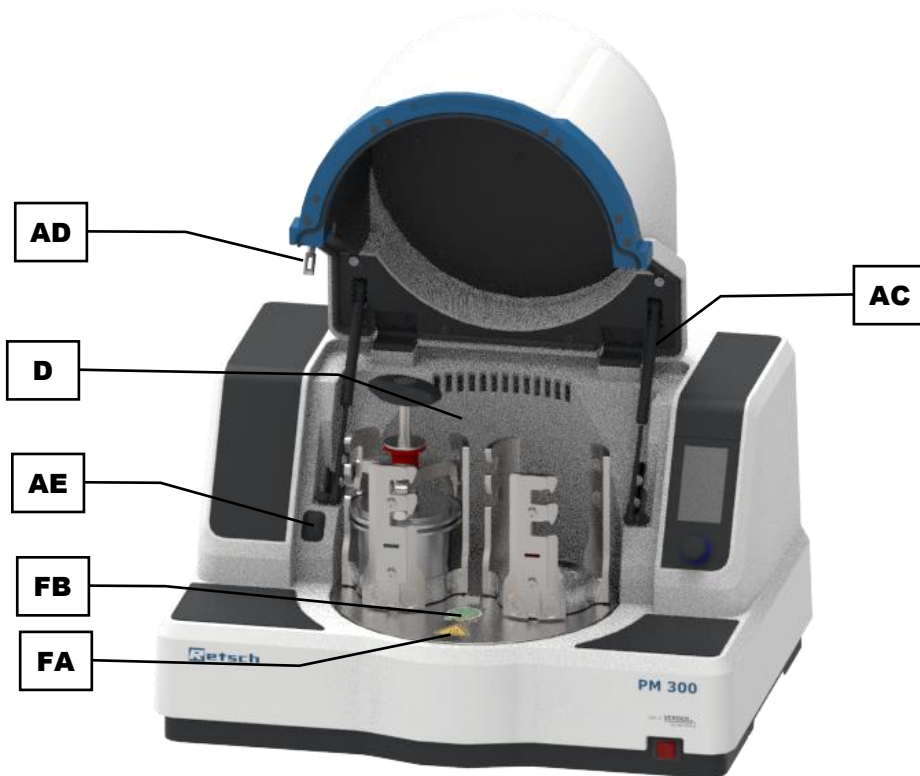


Fig. 3: Device hood open

	Component	Function
AA	Device hood	Closes the interior of the device
AB	Handle of the device hood	Opens the grinding chamber
AC	Damper for the device hood	Secures the hood in the open position
AD	Closing pin	Locks the device hood
AE	Receptacle for the closing pin	Motorised lid lock for locking the device hood in the closed position
BA	Touch display	Touch display to select the functional elements
BB	Rotary knob	For the device control as well as for the selection and configuration of grinding parameters
C	Main switch	Switches the device on or off (including motor protection switch)
D	Grinding chamber	Area for clamping the grinding jars
E	Emergency release opening	For inserting the key for emergency unlocking into the inner chamber
FA	Warning	Caution: Hot surface
FB	Temperature indicator	Change in colour of the temperature indicator depending on the surface temperature

3.3.2 Back

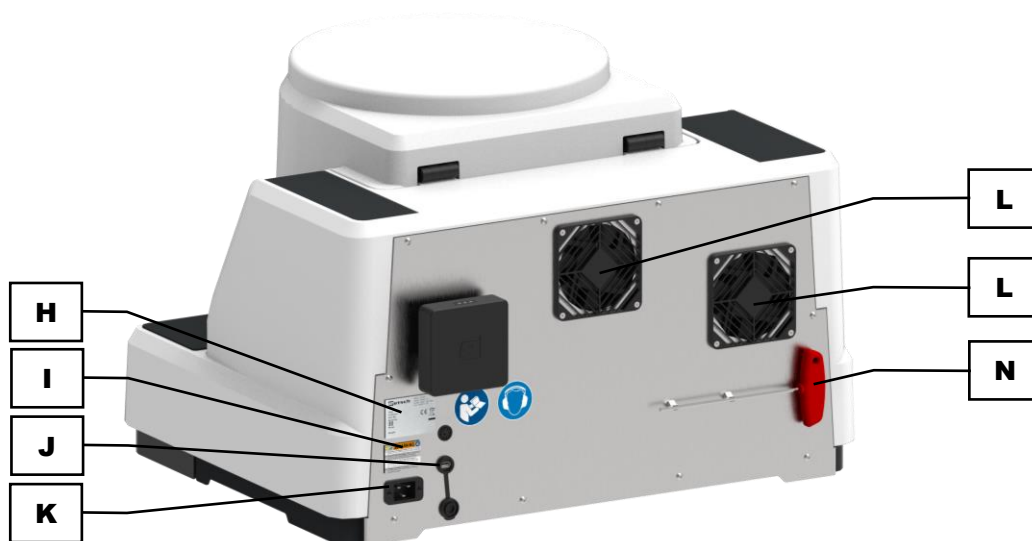


Fig. 4: Rear side of the device

	Component	Function
H	Type plate	Power and connection data of the device
I	Warning	
J	USB interface	To update the operating software
K	Appliance socket	Connection for the mains lead
L	Housing fan	To conduct the waste heat from the inside of the enclosure to the outside
N	Key for emergency release	Tool for the emergency release of the device hood

3.3.3 View of the grinding jar support

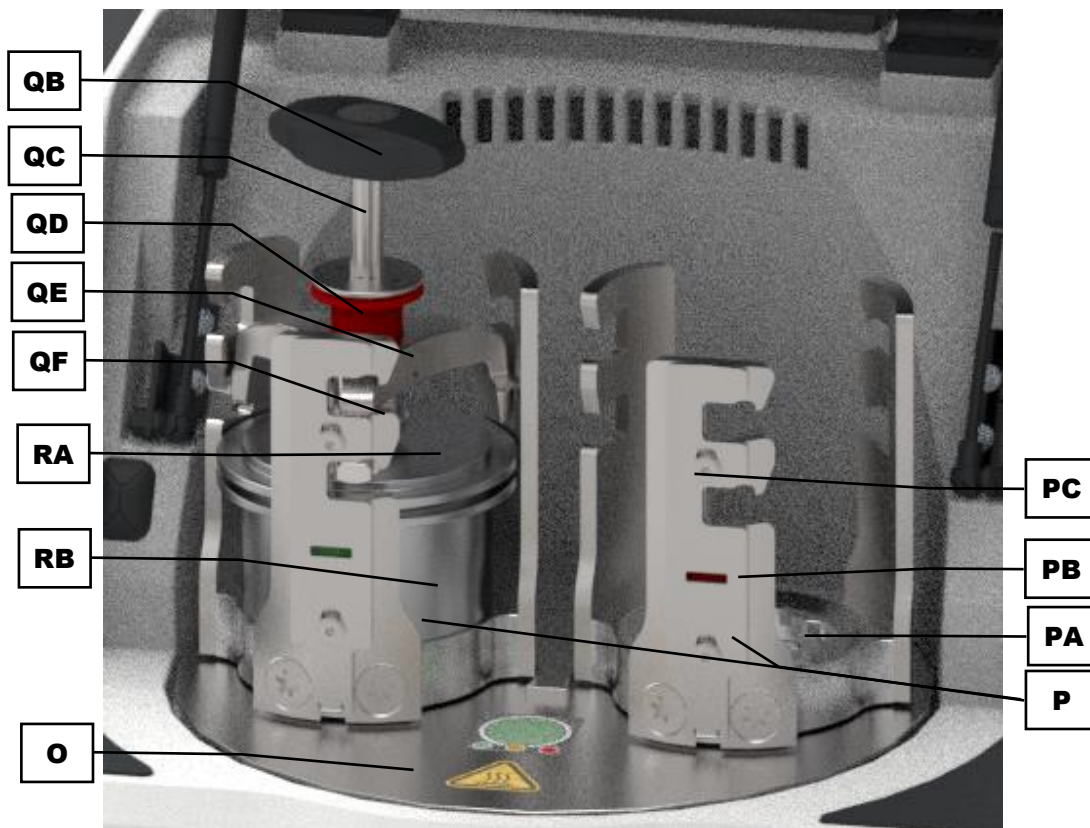


Fig. 5: Grinding stations (P)

	Component	Function
O	Sun wheel	Rotatable motor cover
P	Grinding stations	Position of the clamped grinding jars (2 each)
PA	Grinding jar plate	Grinding jar support
PB	Latching bracket	Clamping unit support
PC	Safety slider	Safety component - checking whether the clamping unit is inserted and clamped
QA	Clamping unit	Clamps the grinding jars into the grinding jar plate at the grinding stations; consisting of the components QB, QC, QD, QE and QF
QB	Twist grip of the clamping unit	Twist grip for clamping the clamping unit
QC	Thread of the clamping unit	Thread of the clamping unit
QD	Locking sleeve of the clamping unit	Secures the twist grip against unintentional turning
QE	Clamp of the clamping unit	Anchors the clamping unit in the latching brackets
QF	Punch of the clamping unit	Secures the grinding jar when the clamping unit is tightened
RA	Grinding jar lid	Locking mechanism for the sample vessel
RB	Grinding jar	Sample vessel

3.3.4 View of control elements and display



Fig. 6: Touch display and rotary knob

	Control element	Function
BA	Touch display	Touch display for the selection of the function elements
BB	Rotary knob	It is used in order to configure the parameters of the grinding process, the programme and cycle programme mode as well as the system settings.

- ① The background of the rotary knob lights up in blue when a function element is selected with the touch display and its value can be changed with the rotary knob. In addition, the section in which the function element is located is highlighted in grey.

3.4 Type Plate Description

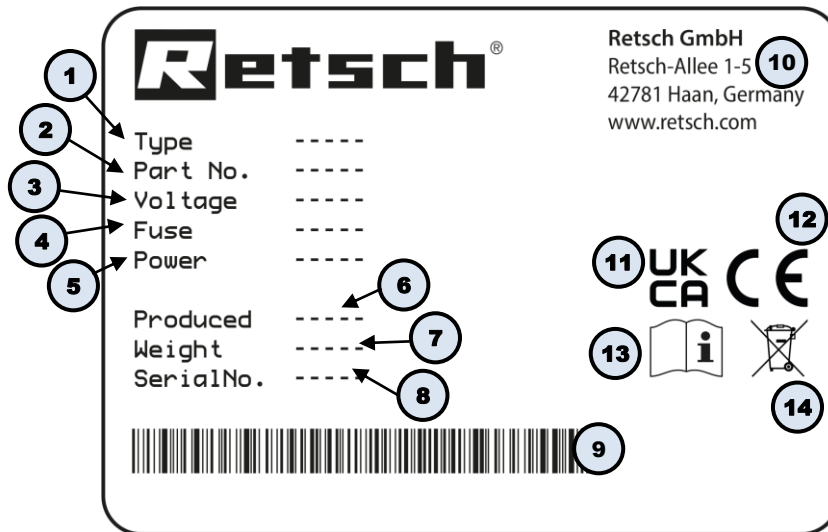


Fig. 7: Type plate

- 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.

3.5 Number of grinding stations

2 grinding stations PM 300

NOTICE The grinding stations must be loaded with identical grinding jars (size and material) and the same sample quantity and number of grinding balls for each grinding process. Operation with uneven loading of the grinding stations may result in damage to the device.

NOTICE

Strong vibration and loud noise

Uneven load

- The device can produce very high levels of vibrations and noise when loading is uneven.
- **Always use 2 grinding jars opposite each other.**
- **The grinding stations must be operated with the identical grinding jars and with the same weight during each grinding process.**
- **Switch the device off immediately if there are high levels of vibration and noise and check the number and gross weight of the jars.**

3.6 Emergency release of the device cover

CAUTION

C14.0009

Risk of injuries

Drive coasting

- In the event of a power failure, the drive on the device continues to coast for a long time, as does the drive on connected device parts. After activating the emergency release, items of clothing and parts of the body can get caught in moving components of the device. This can result in substantial injuries.
- **Disconnect the device from the power supply before activating the emergency release.**
- **Wait until all parts of the device have stopped moving.**



Situations such as a power failure may require the emergency release of the device hood to access the interior of the device.



A key is required for the emergency release of the device hood. It is located on the rear side of the device.



Fig. 8: Rear side – Key storage for emergency release



Fig. 9: Opening of the emergency release

Emergency unlock the device hood as follows:

- Remove the plug from the opening for the emergency release (E).
 - Insert the key (N) into the opening (E).
- In order to unlock the gear, press the key in further with some force.

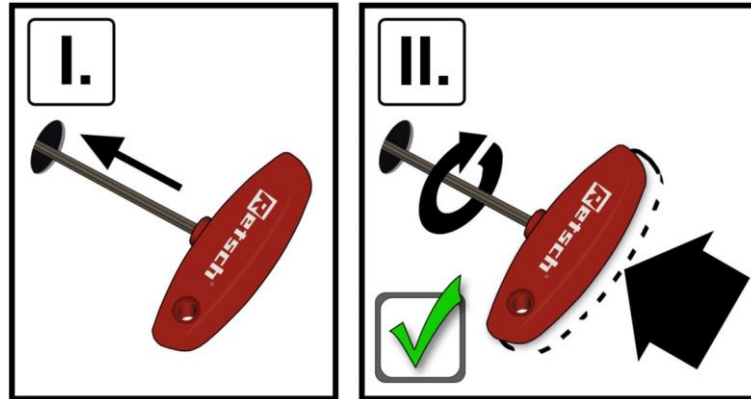


Fig. 10: Emergency unlocking procedure

- While pushing the key (N) into the opening (E), turn it clockwise as far as it will go. The lock is open and the lid can be lifted.

3.7 Receptacle Volume

Up to 220 ml per grinding station, depending on the grinding jar volume.

3.8 Feed Grain Size

Up to <10 mm, however, it depends on the material.

3.9 Rated Power

Power: 2,500 W

Please make sure that the voltage and frequency of your mains connection match the type plate of the device. The mains connection must be fused with at least 16 A.

3.10 Electrical Connection

⚠ 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.

3.11 Required Floor Space

The required floor space for setting up the device is made up of the machine dimension and a safety clearance of 100 mm around the device.

Width: 945 mm

Height: 525 mm

Depth: 680 mm

Height: 875 mm (with open hood)

NOTICE The safety clearance at the rear is required in order to ensure that the fans are able to fulfil their function.

4 Packaging, Transport and Installation

4.1 Accessories included with delivery

PM 300(Article No. 20.570.0001)

6 mm Allen key (Article No. 05.728.0018)

Opening aid (Article No. 02.486.0053)

Opening aid (Article No. 02.486.0055)

Transport brackets (Article No. 02.802.0030)

Mains lead (country-specific)

4.2 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.**

4.3 Transport

WARNING

W6.0005

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

C15.0000

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.**

CAUTION

C16.0000

Risk of injury caused by the device falling

Incorrect transport of the device

- Due to its weight, the device can cause injuries if it falls.
- **Wear safety shoes during transport.**

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.**

4.4 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:

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

4.5 Conditions for the Installation Site

CAUTION

C17.0047

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.**

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.**

The PM 300 makes special demands on the installation site. Please make sure that the device must be placed on a stable surface. The base should support a load of 150 kg without hesitation and be horizontal on all sides without any inclination. Please note that the device must be lifted by at least four people when it is set up. The base should be accessible from all sides so that the device can be lifted in a gentle position.

Required stand space (dimensions of the device with 100 mm safety clearance):

Width: 945 mm

Height: 525 mm

Depth: 680 mm

With the hood open – Height: 875 mm

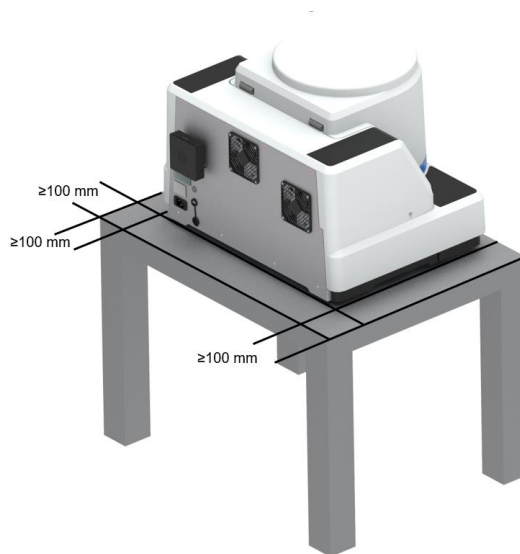


Fig. 11: Installation site requirements

- 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 %

- Installation height: max. 2 000 m above sea level

The PM 300 must be placed on stable and solid ground, because otherwise, the vibrations of the device will be transmitted to the surrounding area during the grinding process.

4.6 Remove packaging

Remove the screws/nails (blue triangles) which fix the box to the pallet.

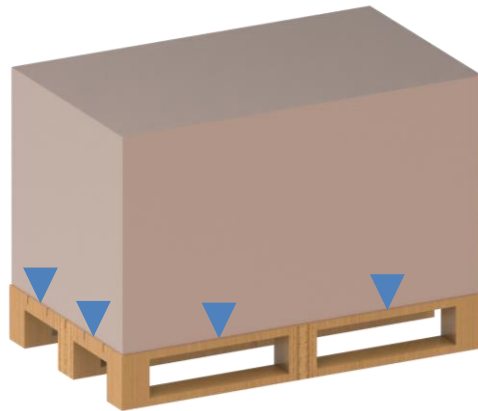


Fig. 12: Removing the screws from the packaging

Carefully lift the packaging carton upwards.

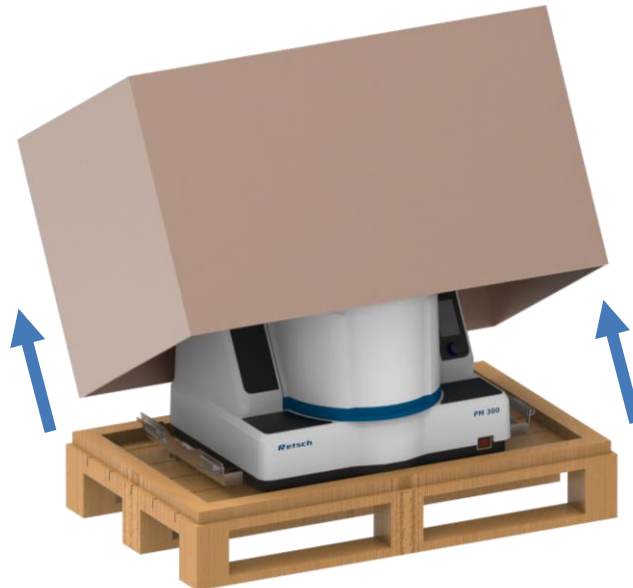




Fig. 13: Lifting off the cardboard box

4.7 Removing the Transportation Lock

 WARNING	W7.0005
<p>Risk of injury due to the device falling down Lifting the device above head height</p> <ul style="list-style-type: none"> – 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.**

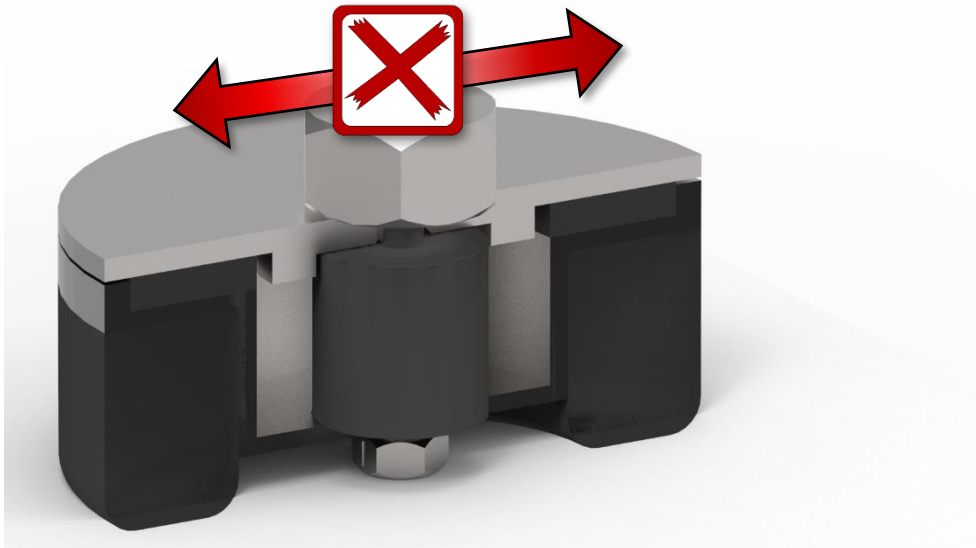


Fig. 14: Free-force compensation sockets: do not push or pull the device

NOTICE

N11.0071

Damage to the free-force compensation sockets

Pushing or pulling the device

- The free-force compensation sockets will be damaged if the device is pulled or pushed across a surface.
- **Do not pull or push the device.**
- **Lift the device to move it.**

The device is secured with two transport locks during the transport on the pallet, whereby there is one on each side of the device.

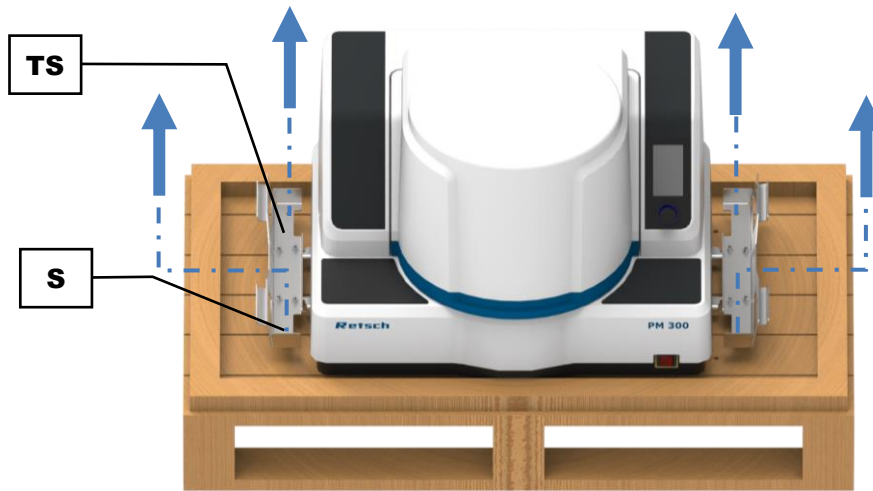


Fig. 15: Loosen the transport lock

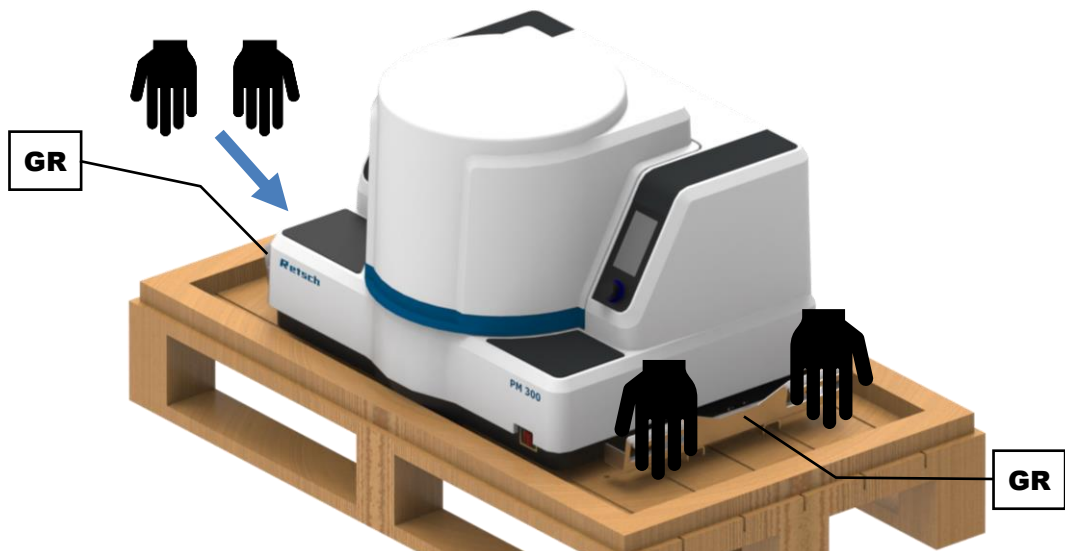


Fig. 16: The device must be carried with four people.

Loosen the transport lock from the pallet and transport the device as follows:

- ⇒ Loosen and remove the four screws (S). There are two on each side of the device.
- ① The transport lock also serves as a transport aid.
- ⇒ Use the transport lock (TS) as a transport aid (TH) and transport the device to the place where it will be used.
- ⇒ Use the handles (GR). Reach through the handle holes in order to lift the device. Do not reach underneath the transport aid.

NOTICE Never push or pull the device over a surface as this may result in damage to the swing feet.

	Component
S	Screw
TS	Transport lock, transport aid
GR	Handle

CAUTION The device has a total weight of approximately 118 kg without the grinding jar. It may only be lifted by at least four people.

Alternatively, the transport aid (**TH**) may also be used to lift the device with a lifting aid (e.g. a crane).

CAUTION Use certified lifting gear for the transport that is suitable for the weight of the machine. Move the machine close to the ground and lift it only high enough to ensure that the installation site (table height) can be reached safely.



Fig. 17: Transport with lifting aid and lifting straps

Transport the unit with a lifting aid as follows:

- ⇒ Follow the instructions for the lifting aid.
- ⇒ Attach the lifting straps to the four handles (**GR**) of the transport aid (**TS**).
- ⇒ Lift the device carefully and transport it to the place of use with the lifting aid.

NOTICE If the lifting straps are too short, the housing may become damaged. The four lifting straps must be long enough to ensure a minimum distance of 100 cm between the device and the lifting aid.

4.8 Removing the Transportation Aid

Remove the transport aid (**TH**) as follows:

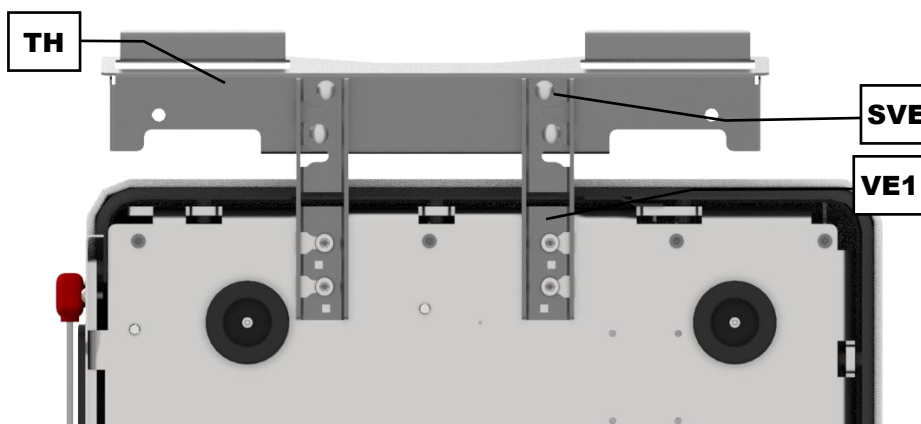


Fig. 18: Mounted transport aid (view from below)

⇒ Loosen the outer screw of the connecting element (**SVE**) on the connecting element (**VE1**). In order to do this, remove the lock nut.



Fig. 19: Transport aid - loosening the locking screw

⇒ Swivel the connecting element (**VE1**) approximately 45° to the side in order to loosen it from the two fixed screws (**FS**) on the bottom side of the device.

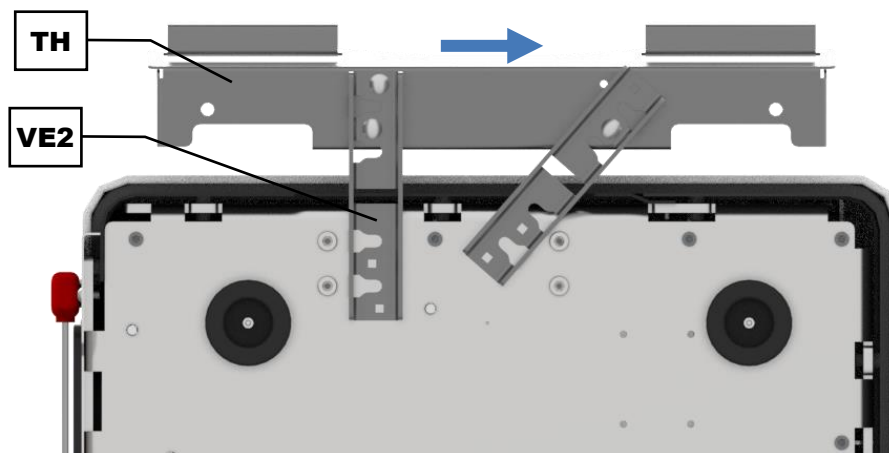


Fig. 20: Transport aid – loosen it from the anchorage

⇒ Move the transport aid (**TH**) parallel to the device in order to loosen the connecting element (**VE2**) from the fixed screws.

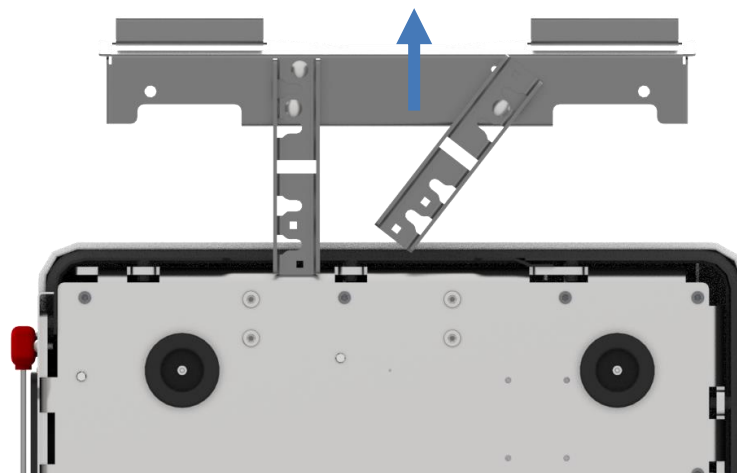


Fig. 21: Removing the transport aid

⇒ Pull the transport aid (TH) out from underneath the device. The transport aid (TH) has now been removed.

	Component
TH	Transport aid
SVE	Screw of the connecting element
VE	Connecting element
FS	Fixed screw

ⓘ Keep the transport aids for the transport of the device at a later point of time.

4.9 Inserting the transport aid

Inserting the transport aid is carried out in reverse order of the steps for removing the transport aid.

⚠ CAUTION Please ensure that all screws are firmly tightened. Only then the safe transport of the device by persons can be guaranteed.

5 First Commissioning

5.1 Conditions for the Installation Site

⚠ CAUTION

C18.0047

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

N12.0004

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.**

The PM 300 makes special demands on the installation site. Please make sure that the device must be placed on a stable surface. The base should support a load of 150 kg without hesitation and be horizontal on all sides without any inclination. Please note that the device must be lifted by at least four people when it is set up. The base should be accessible from all sides so that the device can be lifted in a gentle position.

Required stand space (dimensions of the device with 100 mm safety clearance):

Width: 945 mm

Height: 525 mm

Depth: 680 mm

With the hood open – Height: 875 mm

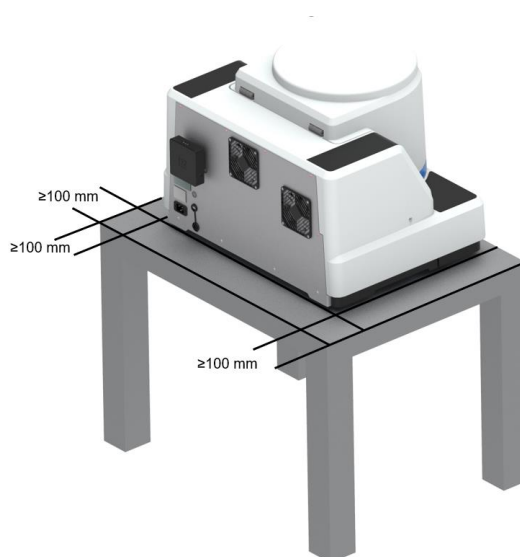



Fig. 22: Installation site requirements

5.2 Electrical Connection

⚠ WARNING W8.0015

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 W9.0002

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 a damaged power cable or plug!**



NOTICE N13.0022

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 PM 300 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.

5.3 Connecting the device to the power supply



Fig. 23:Connecting the power supply

	Component
H	Type plate
K	Appliance socket


Connect the device to the power supply as described below:

- ⇒ Match the voltage and frequency on the type plate (**H**) of the device with the values on site.
- ⇒ Plug the enclosed mains lead into the appliance socket (**K**).
- ⇒ Plug the other end of the mains lead into a socket at the installation site.
- ⇒ Provide external fuse protection pursuant to the regulations of the installation site.

6 Operating the Device

6.1 Opening the device

The following steps are necessary in order to be able to insert and clamp the grinding jar.

- Connect the machine to the power supply.
- Turn on the main switch on the rear side.
- Press the  button.

The safety lock opens and the lid can be flipped open.

6.2 Closing the device

CAUTION

C19.0000

Unsafe condition of the device

Damaged housing lid

- The device may only be operated with an undamaged housing lid.
- **In the event that there is any mechanical damage on the housing lid, it must be replaced for safety reasons.**

The grinding chamber can only be locked when the machine is connected to the power supply and the main switch on the rear side of the device is turned on.

- Close the housing lid.
- A sensor detects the closing pin of the housing lid and the motorised lid closing mechanism is switched on.
- The housing lid is automatically locked.

6.3 Inserting the Grinding Jar

WARNING

W10.0000

Risk of suffocation from liquid nitrogen


Use of liquid nitrogen in cold grinding

- There is a risk of suffocation as a result of the normal evaporation of liquid nitrogen due to oxygen deficiency, as the nitrogen displaces the oxygen in the air.
- **Please observe the safety data sheets for the liquid nitrogen.**
- **Ensure permanent ventilation of the room.**
- **The oxygen content of the room must be constantly checked.**
- **Carry an oxygen meter with you.**

⚠ WARNING W11.0000

Risk of injury from liquid nitrogen
Use of liquid nitrogen during cold grinding

- Liquid nitrogen has a boiling temperature of -196°C and causes burn-like injuries and frostbite in case of skin and eye contact.
- **Please observe the safety data sheets of the liquid nitrogen.**
- **Always wear protective goggles and gloves when using liquid nitrogen.**



⚠ WARNING W12.0000


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.**

⚠ CAUTION C20.0001

Ejected objects
Grinding jars that are not clamped


- Grinding jars or clamping devices can be ejected. There is a risk of injury.
- **Never leave the clamping devices loose in the grinding jar support without having the grinding jar clamped.**
- **Please make sure that all the grinding jars are clamped before starting the machine.**
- **Please ensure that the red sleeve of the clamping device is locked in place.**
- **In the event of long-term grinding, please check the tight fit of the grinding jars according to the following schedule:**
- **After 3 minutes, after 1 hour, after 5 hours and then every 10-12 hours.**



⚠ CAUTION C21.0024

Risk of burns and scalds
Heated grinding jars, heated sample material, heated grinding jar holder or cover plate

- During the grinding process, sample material, grinding jar, grinding jar holder or cover plate can become very hot.
- **After the grinding process has been completed, only touch these components with protective gloves.**
- **Never open the hot grinding jars.**
- **Allow the grinding jars, sample material, grinding jar holder or cover plate to cool down to room temperature before opening.**



⚠ CAUTION

C22.0031

Risk of injury to eyes and skin

Ejected particles

- Particles may be ejected from the grinding jar when grinding sample material.
- **Always wear protective goggles when using the machine.**
- **Follow the safety data sheets for the sample material.**



⚠ CAUTION

C23.0006

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

C24.0031

Risk of injury

Falling grinding jars

- When feeding the grinding jars into the interior of the device or when removing them, the grinding jar can be dropped and cause injury to the lower extremities.
- **Wear safety shoes when using grinding jars.**



⚠ CAUTION

C25.0006

Risk of injury

Hazardous material in the grinding jar

- Hazardous material may injure people (illness, contamination)
- **In the case of any hazardous material, please check after closing the grinding jar whether the seal is properly seated and the grinding jar is completely closed.**
- **Suitable personal protective equipment must be worn, if there is any grinding material that is hazardous to health.**
- **Please observe the instructions in the safety data sheets of the sample material and take appropriate measures.**



NOTICE

Strong vibration and loud noise

Uneven load

- The device can produce very high levels of vibrations and noise when loading is uneven.
- **Always use 2 grinding jars opposite each other.**
- **The grinding stations must be operated with the identical grinding jars and with the same weight during each grinding process.**
- **Switch the device off immediately if there are high levels of vibration and noise and check the number and gross weight of the jars.**

NOTICE

Wear or damage to the grinding jars

No filling or insufficient filling quantity

- When operating the grinding jars without any filling or insufficient filling quantity, it could result in increased wear or damage to the grinding jars.
- **The grinding jars must be filled to at least 2/3 of the nominal volume.**

6.3.1 Inserting the grinding jar

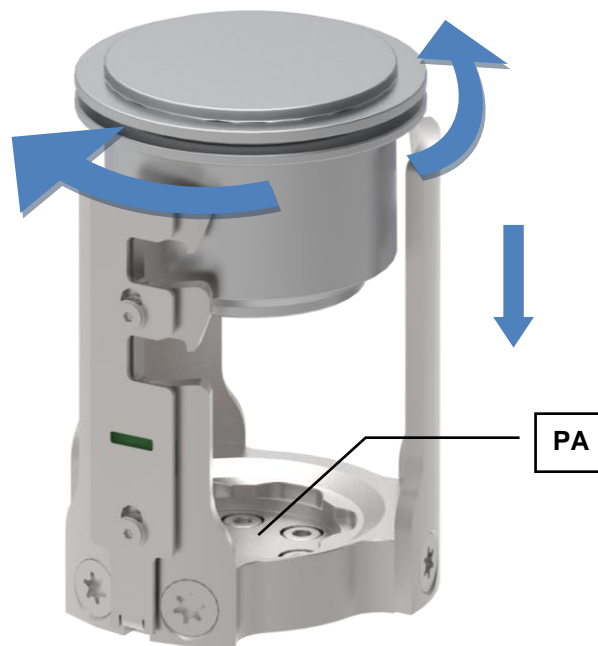


Fig. 24:Inserting the grinding jar

- Clean the grinding jar plate (**PA**) if necessary.
- Insert the grinding jar into the grinding jar support by turning the grinding jar until it slides into the wave-shaped receptacle of the grinding jar plate.

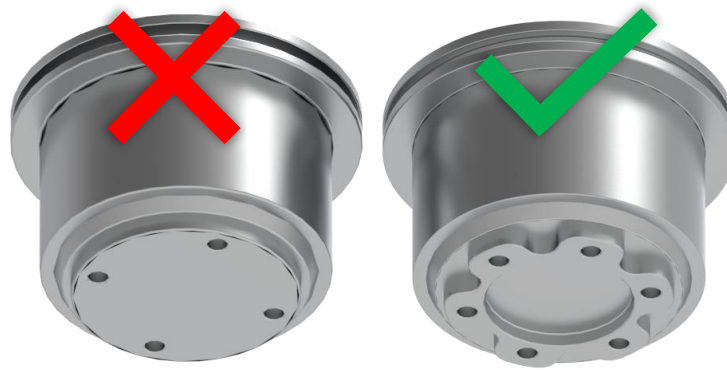


Fig. 25: Grinding jar in comfort design (left) and EasyFit design (right)

NOTICE Only grinding jars with the EasyFit design are compatible with the device. Grinding jars in comfort design do not fit into the wavy teeth of the grinding jar plate and must not be used.

6.3.2 Inserting the clamping unit

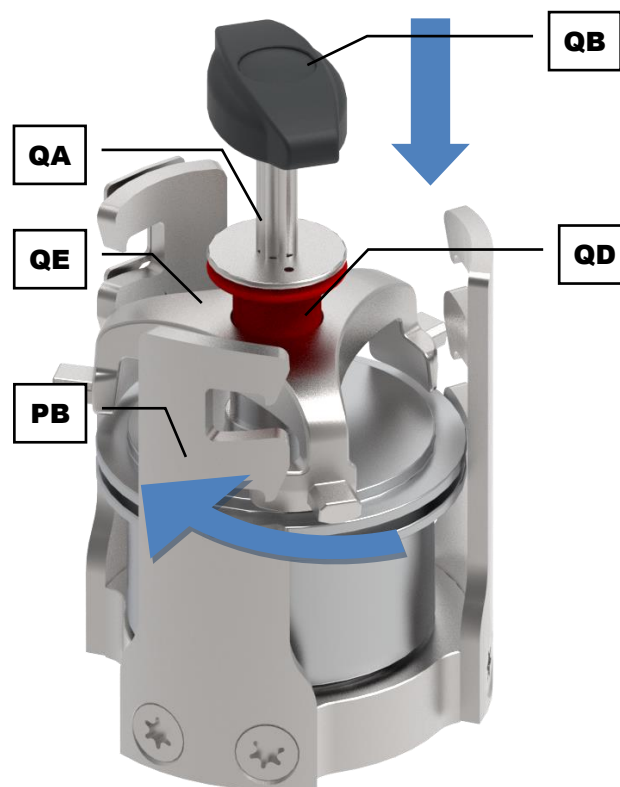


Fig. 26: Inserting the clamping unit

It must be ensured that the grinding jar is correctly inserted into the grinding jar plate.

- Insert the clamping unit (QA) into the three latching brackets (PB). In order to do this, insert the clamping unit between the latching brackets from above. Turn the clamping unit anticlockwise until the three clamps (QE) are completely in the latching brackets.

- Pull the locking sleeve (QD) of the clamping unit upwards. The locking sleeve can be lifted by hand or with the help of the C-piece. Hold this position and hand-tighten the handle (QB) of the clamping unit so that the grinding jar is fastened on the grinding jar plate.

⚠ WARNING The locking sleeve must be pulled up continuously during the tightening process. Only then the clamping unit can be correctly tightened.

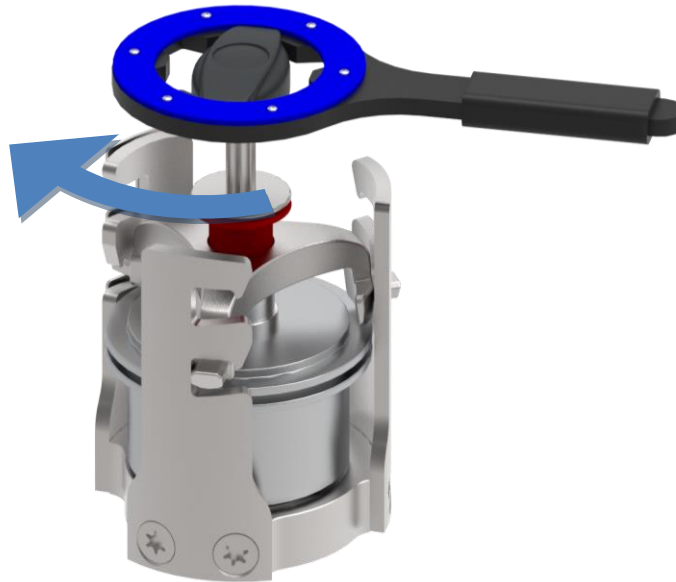



Fig. 27: Tightening the clamping unit with the opening aid

- Use the opening aid to tighten the clamping unit. Place the opening aid on the handle of the clamping unit and tighten everything clockwise. The handle must be tightened to 25 Nm. For the user's orientation, the device emits an acoustic signal in the form of a buzzing sound and shows the message  on the display as soon as the force limit has been reached.

⚠ WARNING The acoustic signal and the message must appear on the display for grinding processes between 600 and 800 rpm. If not, the whole process must be repeated.

- There may be a minimal loss of tightening torque when the opening aid is set down. If the buzzer has sounded or the message has appeared on the display, further tightening is recommended.

NOTICE Depending on the position in which the locking sleeve engages, there may be a clicking noise during the grinding process. In this case, the handle of the clamping unit has to be turned slightly anti-clockwise. The clamping unit must be tightly clamped at all times!

⚠ CAUTION In the event of long-term grinding, please check the tight fit of the grinding jars according to the following schedule: After 3 minutes, after 1 hour, after 5 hours and then every 10-12 hours.

6.3.3 Function of the locking sleeve

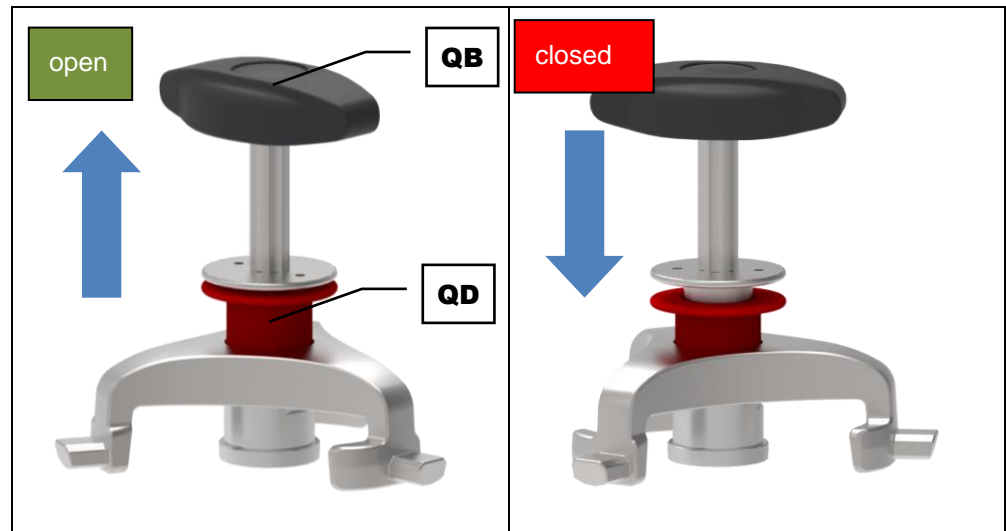


Fig. 28: Function of the locking sleeve

- Pull the locking sleeve (**QD**) upwards and tighten the grinding jar by turning the twist grip (**QB**) to the right.
- Allow the locking sleeve (**QD**) to audibly engage downwards and, if necessary, tighten it slightly at the twist grip (**QB**).
- It must now no longer be possible to turn the twist grip (**QB**).
 - The locking sleeve (**QD**), which is now in the locked position, prevents the threaded spindle from loosening automatically.

6.4 Releasing the grinding jar clamping mechanism

- The device locks the turntable (**O**) and thus also the grinding jar plates (**PA**) in a fixed position for ergonomic loosening and tightening of the clamping device.

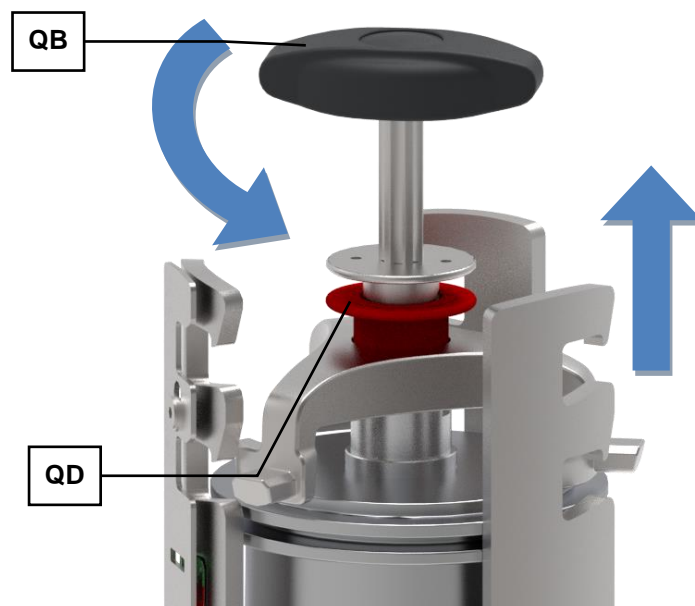


Fig. 29: Loosening the clamping unit of the grinding jar

- Pull the locking sleeve (**QD**) upwards. Use the opening aid, if necessary.
- Turn the twist grip (**QB**) to the left in order to release the grinding jar.
- Turn the twist grip (**QB**) to the left until the clamping unit can be removed.

6.5 Opening the clamping device with the opening aid for the clamping unit

- The device locks the turntable (**O**) and thus also the grinding jars (**PA**) in a fixed position for ergonomic loosening and tightening of the clamping device.
- Pull the locking sleeve (**QD**) upwards.
- Guide the opening aid (**KS**) over the twist grip of the clamping unit (**QB**). Please make sure that the twist grip is fully enclosed.
- Open the clamping unit by turning the opening aid counter-clockwise.

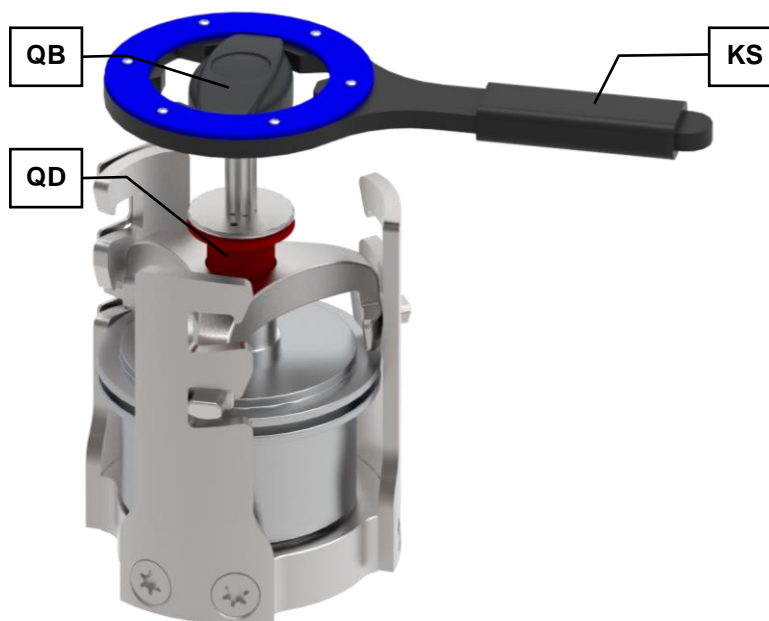


Fig. 30: Using the opening aid for the clamping unit

6.6 Power failure during grinding

If the power fails during grinding, grinding will be interrupted. All parameters are retained, and the remaining grinding time is saved. When the device is switched on again, a corresponding message appears in the display.

You can continue the process by pressing the START button. The automatic saving of the remaining grinding time means the grinding then continues until the end of the originally set grinding time.

For safety reasons the device must be opened and the grinding chamber inspected. Grinding then continues automatically when the lid is closed.

The process is aborted by pressing the STOP button. .

6.7 Grinding Jar Selection for Different Sample Materials

This device is only suitable for grinding jars from the company Retsch GmbH with a nominal volume from 12 ml to 500 ml.

They are available in the following materials:

- Agate
- Sintered corundum
- Zirconium oxide
- Hardened stainless steel
- Tungsten carbide

6.8 Sample quantity

NOTICE If the filling level of the grinding jar is either too high or too low, it impairs the grinding result and may also result in damages to the grinding set (abrasion increase).

The device is only suitable for grinding jars with a nominal volume between 12 ml and 500 ml.

Grinding jar volume	Sample volume	Max. feed size	Ball filling (each)					
			Ø 5 mm	Ø 7 mm	Ø 10 mm	Ø 15 mm	Ø 20 mm	Ø 30 mm
12 ml	≤ 5 ml	< 1 mm	50	15	5	-	-	-
25 ml	≤ 10 ml	< 1 mm	95-100	25-30	10	-	-	-
50 ml	5 - 20 ml	< 3 mm	200	50-70	20	7	3-4	-
80 ml	10 - 35 ml	< 4 mm	250-330	70-120	30-40	12	5	-
125 ml	15 - 50 ml	< 4 mm	500	110-180	50-60	18	7	-
250 ml	25 - 120 ml	< 6 mm	1100-1200	220-350	100-120	35-45	15	5
500 ml	75 - 220 ml	< 10 mm	2000	440-700	200-230	70	25	8

In addition to the instrument settings, the filling level of the grinding jar is also of crucial importance for a successful grinding process in the Planetary Ball Mill of Retsch GmbH. The usable capacity of the grinding bowls depends on the type of material. The specified number of balls is the minimum quantity per grinding bowl. An optimal grinding result is achieved with the larger number of permissible grinding balls, if specified. In exceptional cases, the number of grinding balls can be reduced by up to 15 %, but then increased abrasion of the grinding set must be expected.

When grinding bulk materials, the grinding jar filling should consist of approximately one third of sample and one third of ball quantity. The remaining third is the free grinding jar volume, which is required for the movement of the balls.

If an increase or decrease in sample volume is to be expected during the grinding process, the amount of sample can be adjusted within the range listed in the table. Thus, e.g. for voluminous materials such as wool, leaves, grasses and similar, a material filling level of 70 – 80 % is necessary. For wet grinding with grinding balls < 3 mm, the ball charge should be 60 % of the grinding jar volume.

6.9 Speed limits

The device automatically regulates its maximum speed depending on the individual grinding process (grinding jars and balls, sample material, etc.). The expected maximum speeds for dry grinding processes in steel grinding jars are shown in the table. Please note that grinding processes with materials other than steel (especially with grinding balls > 15 mm in diameter) can lead to increased wear and tear or even damage.

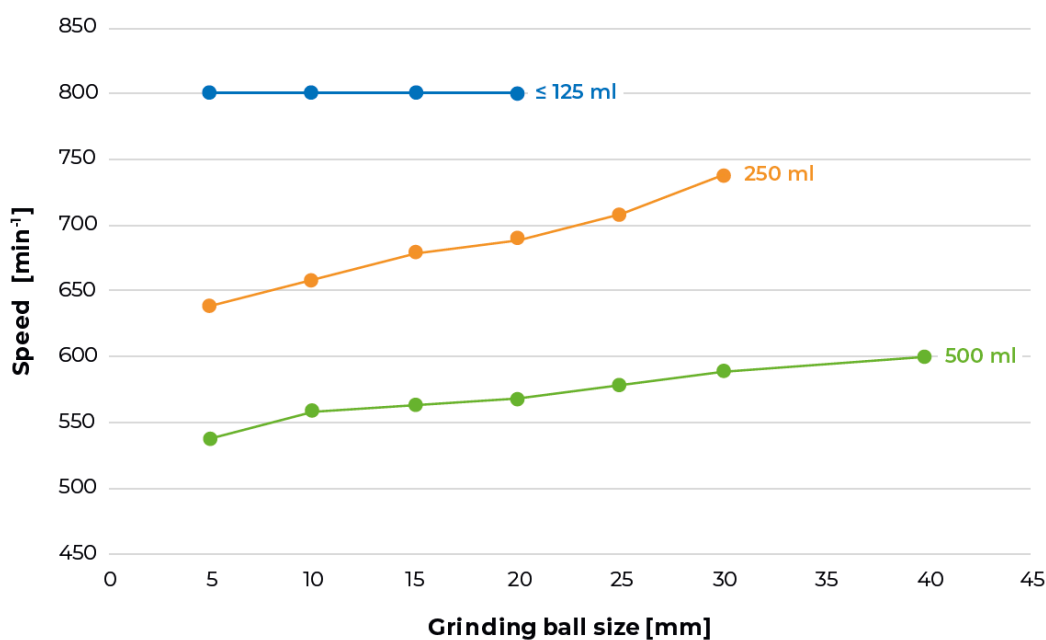


Fig. 1: Maximum speeds to be expected for steel grinding jars

Due to the high energy input of the device into the sample, but also into the grinding jar and grinding balls, the information on speed limits should be observed when working with materials other than steel. It is recommended not to work at too high speeds when using grinding balls larger than Ø 15 mm. This prevents product caking on the jar and the balls during dry grinding. In addition, wear and damage to grinding jar and balls is reduced. In practice, an upper limit of approx. 500 rpm has proven to be favourable for grinding with grinding balls larger than Ø 15 mm. For the natural material agate, even lower speeds are recommended.

6.10 Stacking the grinding jars

It is possible to stack grinding jars in the sizes of 12 ml, 25 ml, 50 ml and 80 ml in the device. A maximum of two grinding jars may be stacked on top of each other. The adapters which are required for inserting and stacking are available as accessories.

6.10.1 Stacking of grinding jars in the size of 50 ml and larger

Grinding jars in the sizes of 50 ml and 80 ml can only be stacked in the clamping unit by using a stacking adapter. If only one grinding jar in the size of 50 ml or larger is used, no adapter is required and the clamping unit is inserted at a lower level.

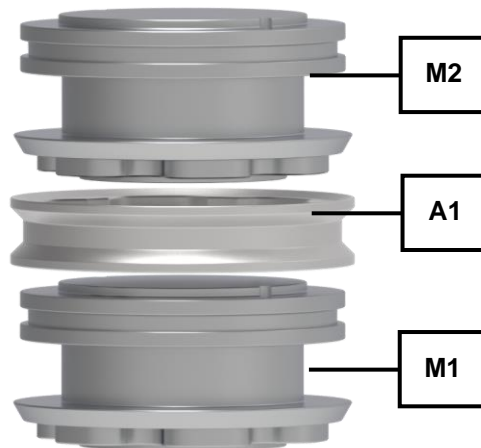


Fig. 31: Stacking of grinding jars with a stacking adapter

Stack the grinding jars and the adapter as follows:

- Place the grinding jar (**M1**) into the grinding jar plate (**PA**). Turn the grinding jar until it locks into place in the grinding jar plate.
- Place the stacking adapter (**A1**) onto the lid of the inserted grinding jar (**M1**). Turn the stacking adapter until it locks into place on the lid.
- Place the grinding jar (**M2**) on the stacking adapter (**A1**). Turn the grinding jar until it locks into place in the stacking adapter.
- Fasten the assembly consisting of grinding jars and stacking adapter with the clamping unit onto the grinding jar plate.

6.10.2 Stacking of grinding jars in the size of 25 ml and smaller

Grinding jars in the sizes of 12 ml and 25 ml can only be inserted into the clamping unit by using an adapter. The shapes of the grinding jars are designed in such a way that these grinding jars can be stacked directly on top of each other. If only one grinding jar is used, it is mandatory to use the adapter in order to ensure proper seating in the grinding jar plate.

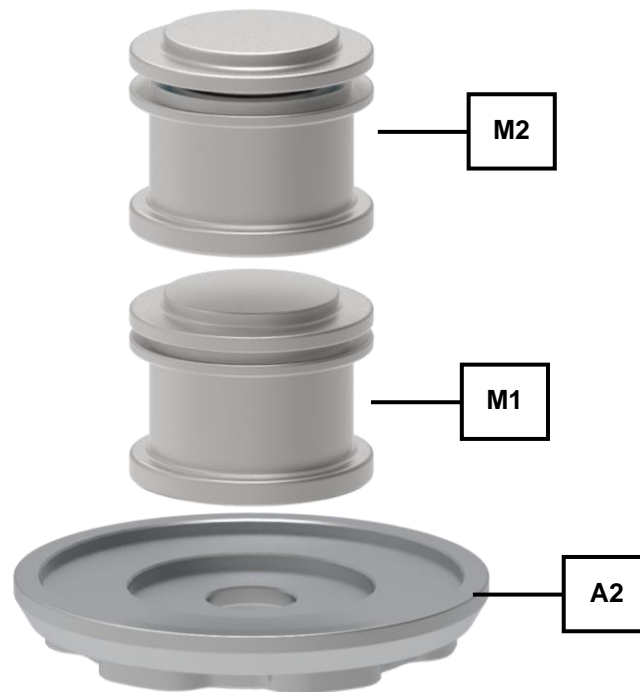


Fig. 32:Stacking of grinding jars with an adapter

Stack the grinding jars and adapter as follows:

- Place the adapter (**A2**) in the grinding jar plate (**PA**). Turn the adapter until it locks into place in the grinding jar plate.
- Place the grinding jar (**M1**) onto the adapter (**A1**).
- Place the grinding jar (**M2**) directly onto the grinding jar (**M1**).
- Fasten the assembly consisting of grinding jars and adapter with the clamping unit onto the grinding jar plate.

6.11 Handling grinding jars

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

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6.11.1 Carrying and gripping

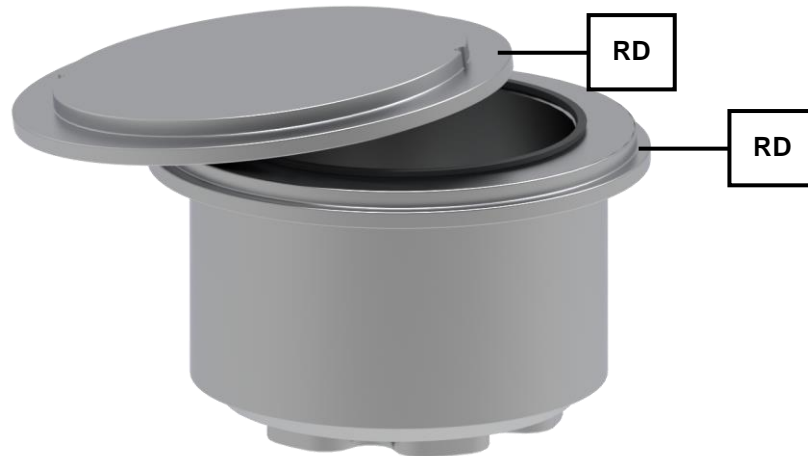


Fig. 33: Gripping flanges of the grinding jar

Gripping flanges (**RD**) on the grinding jar and the lid of the grinding jar enable safe handling.

6.11.2 Heating-up of the grinding jars

Depending on the grinding time and the degree of filling, the grinding jars can heat up to 150°C during the grinding process.

This temperature change causes an increase in pressure inside the grinding jar. When loosening the lid, it is important to note that this overpressure will be released by the suddenly escaping air. Thereby it is possible that particles of the sample material may also be carried away.

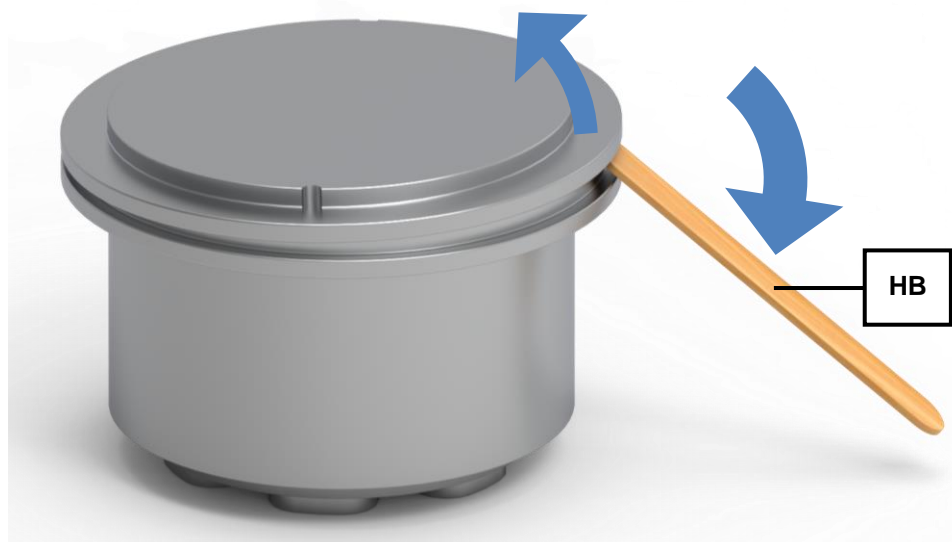


Fig. 34: Pry the lid off the grinding jar

When the grinding jars are set aside to cool down, a negative pressure may be created inside. This can lead to difficulties in opening the grinding jars. The grinding jars can therefore be prised open between the gripping flanges of the lid and the grinding jar, e.g. with a wooden stick (**HB**).

6.12 Grinding jar identification

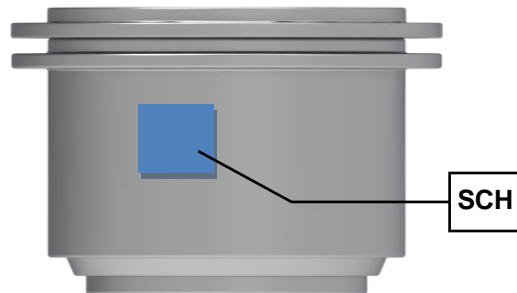


Fig. 35:Grinding jar markings

All grinding jars are identified by a title block that is marked with item number and material (**SCH**).

6.13 Grinding jar cleaning

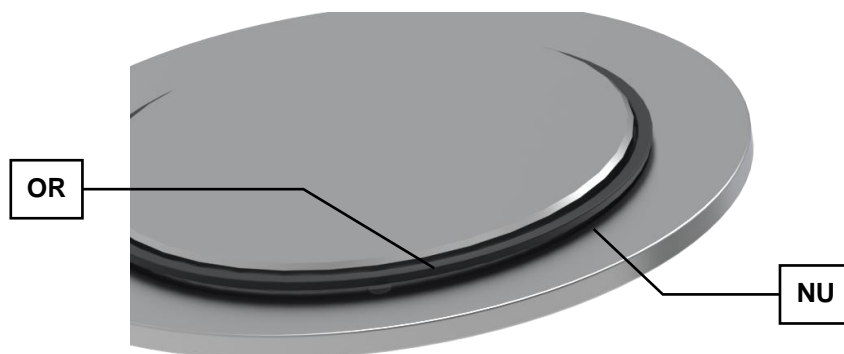


Fig. 36:Remove the O-ring

In order to clean the grinding jar, the O-ring (**OR**) at the groove (**NU**) can be easily levered out on the bottom side of the lid.

NOTICE Use only intact/undamaged O-rings. O-rings must be replaced if they show any signs of wear and tear.

Grinding jars, even those with glued-in ceramic inserts, can be cleaned with alcohol, petrol or normal household washing-up liquid.

NOTICE Do not expose grinding jars with ceramic inserts to sudden temperature differences during the rinsing process.

The ceramic inserts may crack due to sudden temperature changes.

6.13.1 Drying the grinding jars

The grinding jars can be dried after cleaning at any time in the drying cabinet at the temperature indicated below:

Material of the grinding jars	Temperature
Hardened stainless steel	up to 200°C
Tungsten carbide	up to 120°C
Sintered corundum	up to 120°C
Agate	up to 120°C
Zirconium oxide	up to 120°C

6.14 Opening and closing the grinding jars with the closing device

In the case of wet grinding, if pressure increase in the grinding jar is expected or when aeration covers are used, the grinding jar must be locked with a locking mechanism during the grinding process.

NOTICE For wet grinding in this device, only the type of locking mechanism shown below shall be used.

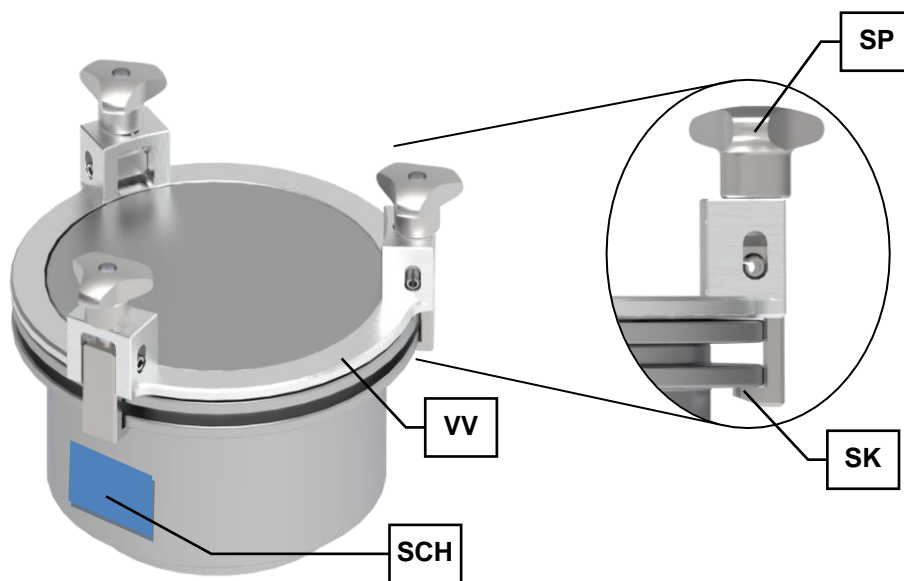


Fig. 37: Locking mechanism

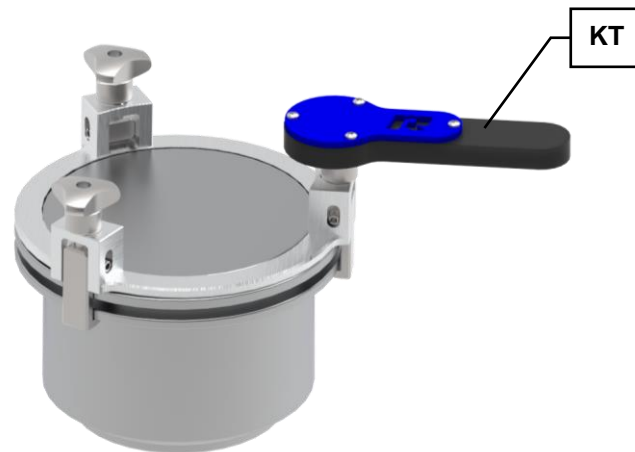


Fig. 38: Tightening the locking mechanism with opening and closing aid

Close the grinding jar with the grinding jar lid and place the locking mechanism (**VV**) centrally on the grinding jar lid. Align the closing device (**VV**) in such a way that one of the safety clips (**SK**) is at the level of the title block (**SCH**) of the grinding jar.

NOTICE The safety clips (**SK**) of the locking mechanism must completely enclose the rim of the grinding jar in order to prevent the grinding jar from opening by itself.

Tighten the three clamping screws (**SP**) of the locking mechanism evenly with the opening and closing aid (**KT**) to at least 8 Nm. Internal pressures of up to a maximum of 5 bar are only permissible with this initial tension.

After tightening the locking mechanism, check whether the three screws of the safety clamps (**SK**) and the closing device (**VV**) are still tight themselves. The lid of the grinding jar must lie on the grinding jar without any gap.

The grinding jars may only be opened in a safe position (suction device) after they have cooled down.

Please note that the grinding jars can heat up to over 100°C depending on the size of the grinding jar, the ball filling, the speed and the grinding time.

The PM 300 is equipped with a fan which extracts the waste heat that is generated during the grinding process directly from the grinding chamber. The extraction volume per hour is greater than 20 times the grinding chamber volume. If necessary, the air flow of the fan shall be diverted into a fume hood during the grinding process.

6.15 Aeration Lid

Instead of the usual grinding jar covers, aeration covers may also be used in the device. These have special connections which enable grinding in a controlled atmosphere. The handling of the aeration cover is identical to the use of the usual grinding jar cover.

In order to ensure that the material of the cover matches the material of the jar, the cover base plate can be exchanged. However, it must be ensured that the correct cover base plate is selected which matches the grinding jar volume. In addition, removing the cover base plate makes it easy to clean the connections. Cover base plates are available at Retsch GmbH in various material types and sizes.

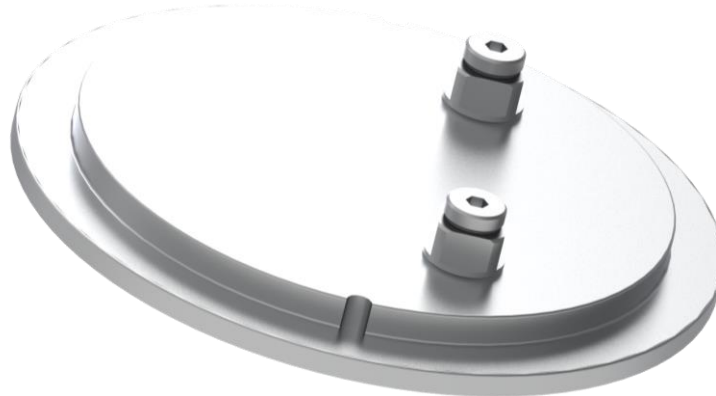


Fig. 39: Aeration cover

The following steps are necessary in order to replace the cover base plate.

- Carefully remove the O-ring (**OR**) from the groove (**NU**) of the cover base plate.
- Carefully remove the cover base plate (**DB**).
- Insert the new cover base plate in such a way that the holes (**BO**) in the cover base plate match the connections (**AN**) in the grinding jar cover.
- Insert the unimpaired O-ring (**OR**) evenly into the groove. Tip: Press the O-ring in crosswise alternately in order to prevent any tension in the material.

The described procedure must also be used for cleaning.

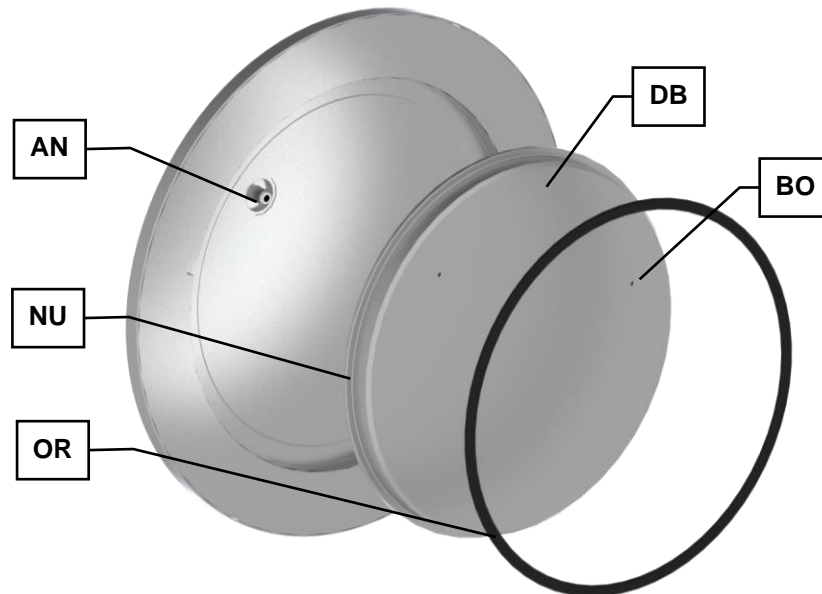


Fig. 40: Replacing the base plate

Only valid for 50-125 ml aeration cover:

The valve adapter (**VA**) of the aeration cover can be unscrewed. Thus, the cavity underneath becomes accessible for cleaning. When screwing in the valve adapter, it must be ensured that the sealing disc (**DS**) is inserted.

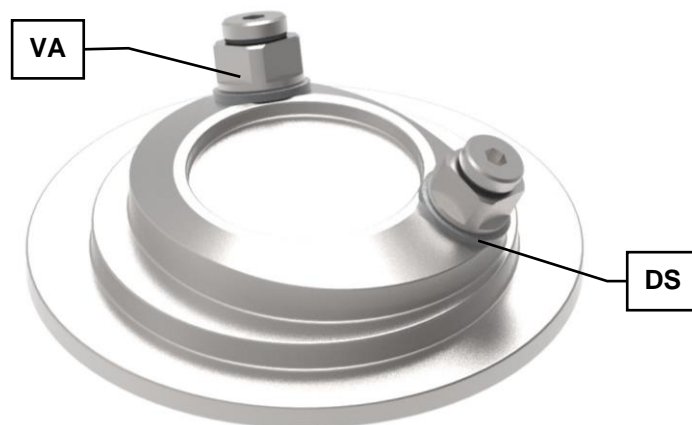


Fig. 41: Aeration cover with removable valve adapter

6.16 Special grinding methods

6.16.1 Wet Grinding with Highly Flammable Materials

NOTICE

N14.0005

Damage to the device caused by liquids

Penetration of liquids into the interior of the device

- Mechanical and electronic components are damaged and the proper function of the device is no longer guaranteed.
- **Make sure that no liquids get into the interior of the device!**

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.

The following must be checked on the device:

- **Only grinding jars with safety closing devices may be used!**
- When choosing the solvents, the resistance of the O-rings (EPDM 75° Shore) must be taken into account and the resistance of the adhesives must be considered when using ceramic inserts.
- The safety closing devices of the grinding jars must all be tightened firmly.
- Please note that the grinding jars may heat up depending on the size of the grinding jar, the ball filling, the speed and the grinding time.
- Before removing the grinding jars, the tight fit of the safety closure devices must be checked once again.

7 Device control

The machine is controlled with the touch display in combination with the dial.

These controls are used to configure the parameter settings for grinding as well as to start, pause and stop the grinding process.

Parameters for recurring grinding processes are configured, saved and recalled as required in the programme and cycle programme mode.

In addition, the system settings of the PM 300 are called up via the main menu and may be changed, if necessary.



Fig. 42: Touch display and dial

	Control element	Function
BA	Touch display	Touch display for selecting the function elements.
BB	Dial	For configuring the parameters of the grinding process, the programme and cycle programme mode and the system settings

- ① The background of the dial lights up in blue when a function element is selected with the touch display and its value can be changed by means of the dial. In addition, the section in which the function element is located is highlighted in grey.

7.1 Menu interface on the touchscreen

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

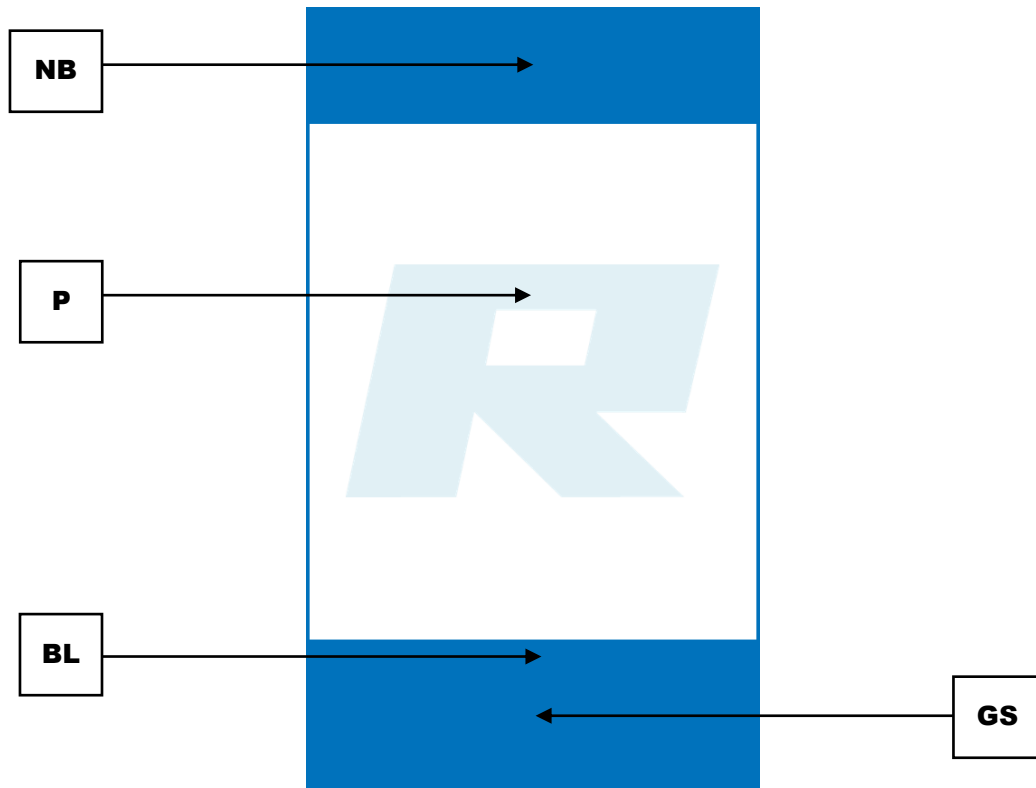











Fig. 43: Menu surface of the touch display










	Area	Function
NB	Navigation area	<p>The following menu views can be called up via the navigation area:</p> <ul style="list-style-type: none"> • Main menu • Programme mode • Cycle programme mode • System settings
P	Parameter settings	<p>The following parameters are configured for the grinding process in this area:</p> <ul style="list-style-type: none"> • Speed • Grinding time • Direction of rotation of the sun wheel • Lead time • Cycle repetitions (sequence of parameter sets with different parameters)
	Parameter displays	<p>After the grinding process has started, the following parameters are displayed in this area:</p> <ul style="list-style-type: none"> • Configured speed • Remaining grinding time • Total duration and progress of the cycle programme
BL	Scroll bar	Indicator for the position of the menu
GS	Device control	<p>The function elements in this area directly control the device.</p> <ul style="list-style-type: none"> • Start, pause and cancel the grinding process • Select, edit, save, delete and start a programme • Select, edit, save, delete and start a cycle programme


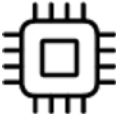






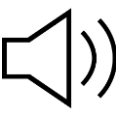




7.2 Function elements


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

- ① Only those function elements are displayed or active which may currently be selected and configured.
The background of the dial lights up in blue when a changeable value is selected.

Element	Description	Function
	Main menu	Call up the main menu. The main menu may be used in order to configure the parameters for the grinding process and to start grinding.
	Opening the device hood	After switching on the device, the touch display shows a prompt to open and close the device hood. ①The machine is ready for operation when the device hood is opened and closed once.
	System settings	Access system settings
	Programme mode	Access the programme mode
	Gallery view	Call up the gallery view. The saved programmes are displayed and may be selected directly.
	Speed per minute	Set speed per minute from 50 - 800 rpm.
	Grinding time	Grinding time for the configuration of the grinding process.
	Cycle programme mode	Access the cycle programme mode
	Editing of programme and cycle programme	This allows new programmes and cycle programmes to be created as well as stored programmes and cycle programmes to be edited.

Element	Description	Function
	Deleting of programme/cycle programme	This deletes a created programme or cycle programme.
	Saving of programme/cycle programme	This saves a created programme or cycle programme.
	Cancel	This cancels any entries / returns to the previous menu.
	Start	This starts the grinding process
	Pause	This pauses the grinding process.
	Continue	The grinding process will continue after the pause has elapsed.
	Stop	This stops the grinding process.
	The grinding process has been successfully completed.	The grinding process has been successfully completed after the time has elapsed.
	Force limit has been reached	The preset force limit for clamping the grinding jars has been reached.
	Safety Slider	Check for the correct position of the lead frame.
	Parking position	After the grinding process has been completed, the turntable will automatically move to the parking position.
	Direction of rotation of the sun wheel	This indicates the set direction of rotation of the sun wheel (clockwise / counterclockwise).
	Lead time	Time until the grinding process starts
	Brightness	Adjusts the brightness of the display

	Date and time	Setting the date and time
	Software version	Display of the installed software version
	Operating hours	This displays the operating hours.
	Serial number	This displays the device serial number.
	Software upgrade (update)	Software upgrade (update) of the device via USB data carrier
	Service environment	Access to the service environment
	Cycle programme mode	Access to the cycle programme mode
	Total duration of the cycle programme	This shows the total duration of the cycle until the grinding process has been completed.
	Signalling device (on/off)	Adjusting the signalling device (on/off).
	AutoUnlock	Automatic opening function. Switches on or off. If the function is switched on, the hood will be opened automatically after the grinding process has been completed.
	Lock drive	The drive moves to the parking position and will be locked.
	Unlock drive	The drive is unlocked in the parking position.
	MyRetsch	This shows the QR code on the display for access to the web portal.

	Service interval	Notification that a service must be carried out at regular intervals.
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7.3 Menu navigation

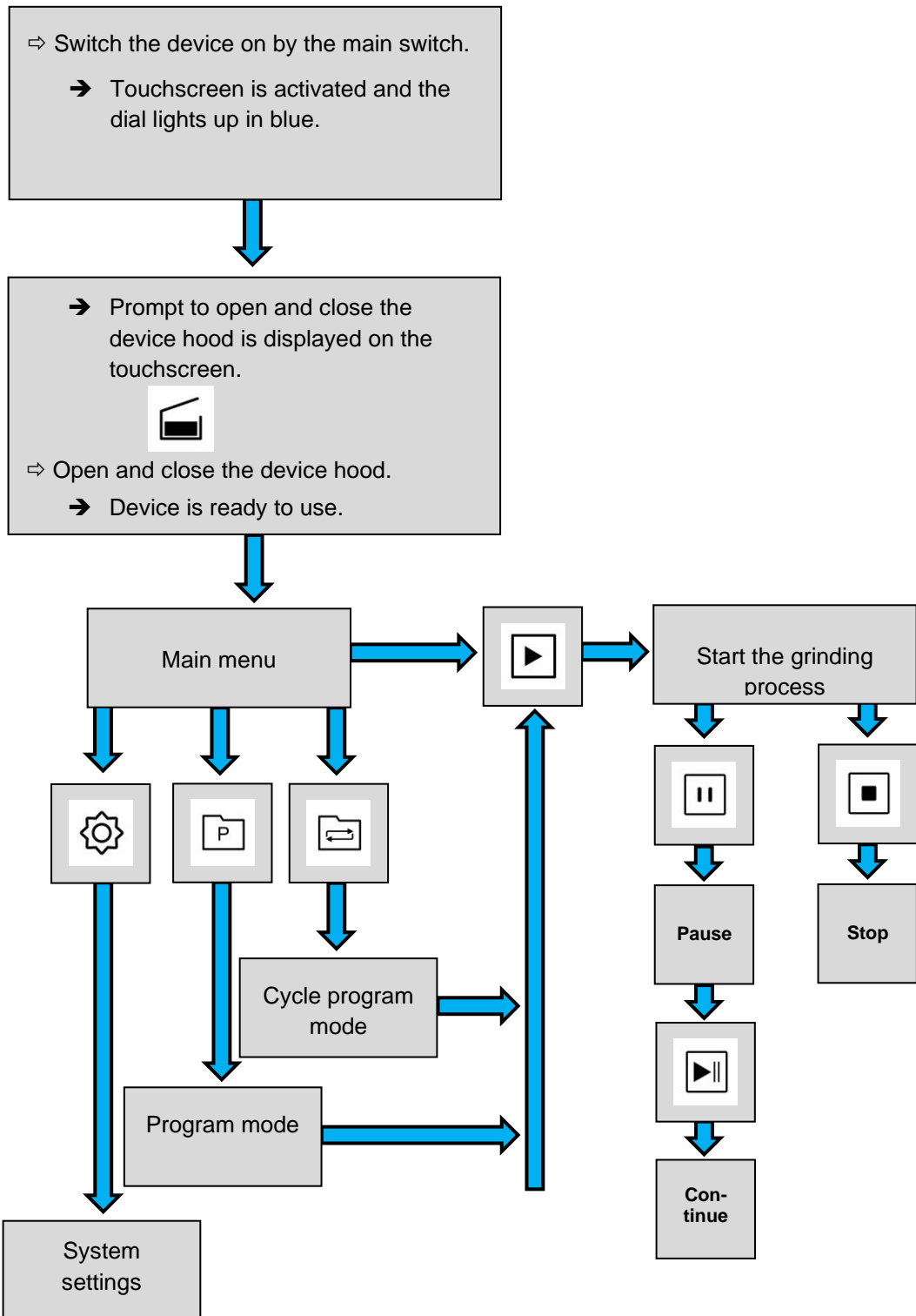


Fig. 44: Diagram of the menu navigation

7.4 Main menu

The main menu can be used in order to call up other menu views, configure parameters for the grinding process and start the actual grinding process.

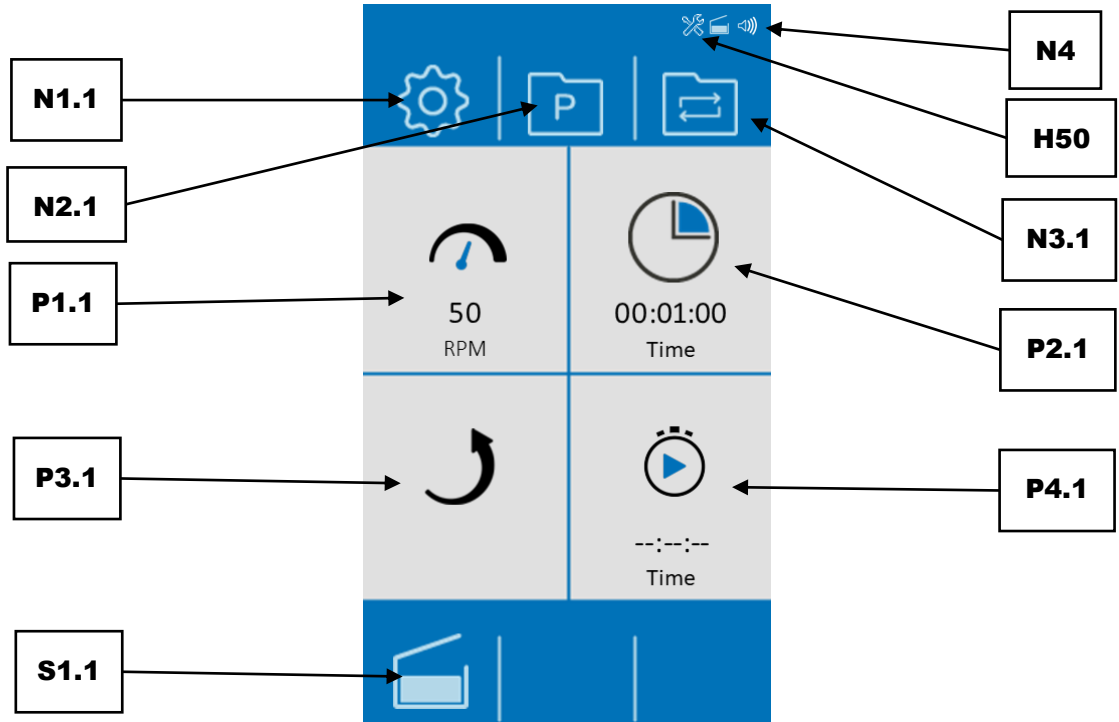


Fig. 45: Main menu (after switching on the device with the lid closed)

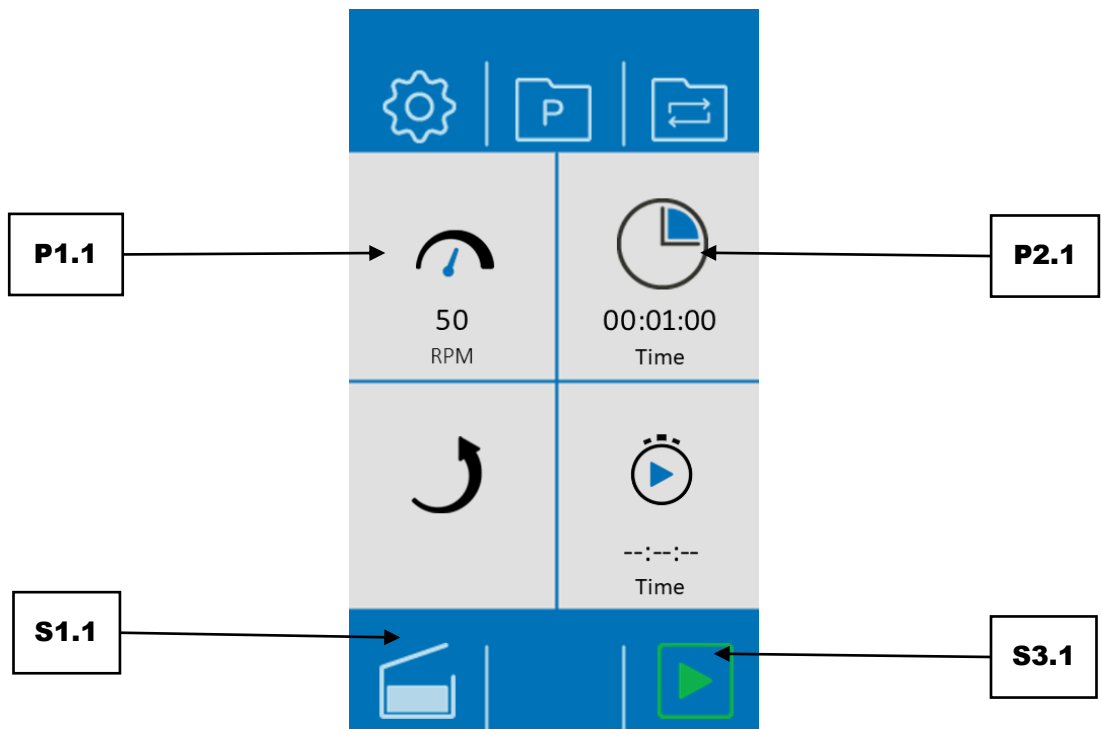


Fig. 46: Menu view prior to the start of the grinding process

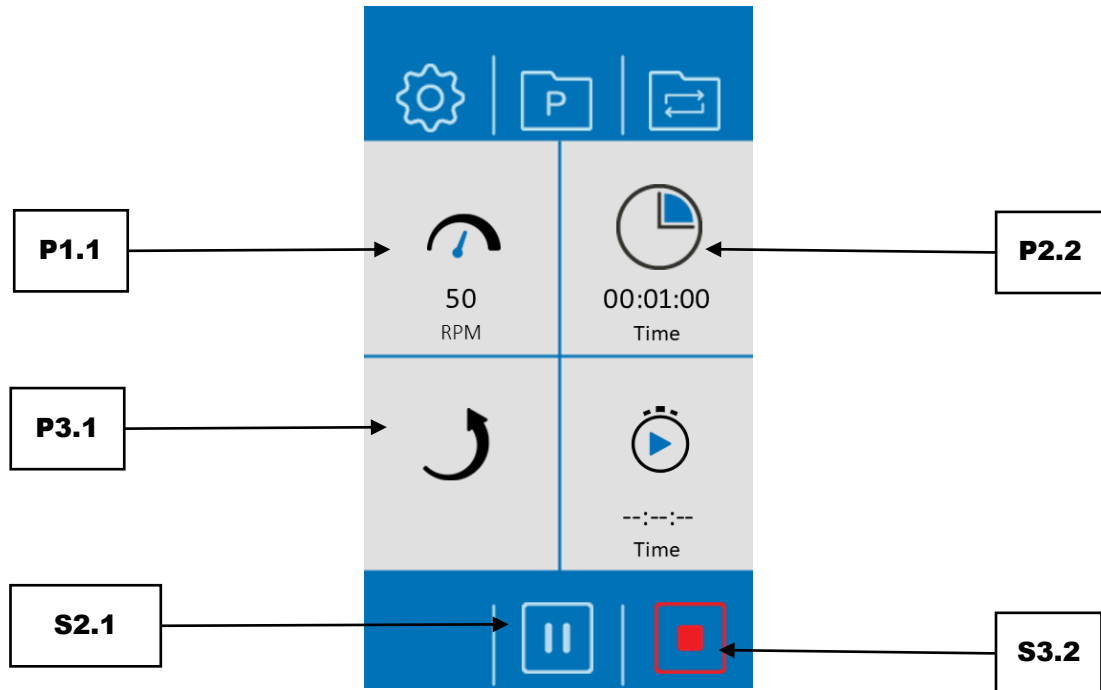






Fig. 47: Menu view during the grinding process




	Element	Function
N1.1	System settings	Call up system settings
N2.1	Programme mode	Access to programme mode
N3.1	Cycle programme mode	Access to cycle programme mode
N4	Acoustic signals on/off	Sound is on when element is visible
H50	Service interval	Note for service interval
P1.1	Speed per minute	After selection has been made with the touch display, the speed per minute can be set with the dial between 50 and 800 rpm.
P2.1	Grinding time	After selection has been made with the touch display, the grinding time can be set from 1 minute to 99 hours with the dial. Grinding times can be set from 5 seconds in 5 second steps and as of 60 seconds in 1 minute steps.
P2.2	Remaining grinding time	The display shows the remaining grinding time of the current grinding process.
P3.1	Direction of sun wheel rotation	Indicates the set rotation direction of the sun wheel (clockwise / counterclockwise)
P4.1	Lead time	Time span until the start of the grinding process
S1.1	Close the housing lid	Prior to the start of a grinding process, the housing lid must be opened once in order to insert the grinding jars. If the housing lid is then closed again, the element disappears.
S2.1	Pause the grinding process	The grinding process will be paused. Pressing it once again will continue the grinding process.
S3.1	Starting the grinding process	Starts the grinding process
S3.2	Stopping the grinding process	Stops the grinding process


7.5 Controlling the grinding process

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





-  Start the grinding process
-  Pause the grinding process
-  Continue the grinding process after the pause has elapsed
-  Stop the grinding process

7.5.1 Starting the grinding process



- ⇒ Press the  button, in order to start grinding.
- ⇒ After starting, the start character  changes to the stop character. .

After starting the grinding process, the Safety Slider starts moving and the symbol  appears in the display. Thereby it is checked whether the lead frame is inserted in the correct position. The grinding time only starts to count down after the drive has been completed.

7.5.2 Pausing the grinding process

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

7.5.3 Stopping the grinding process

The grinding process ends automatically when the set grinding time has elapsed. The device moves the turntable in the grinding chamber to the park position and the symbol  appears in the display. Upon completion of the grinding process, the symbol  will be indicated in the display. This must be confirmed by tapping on it.

The grinding process can also be actively stopped by pressing the stop button.

- ⇒ Press  in order to stop the grinding process.

7.5.4 Automatic speed reduction

The device is equipped with the “Automatic speed reduction” function.

NOTICE If the load limit is exceeded during the grinding process, the device automatically reduces the previously set speed. The new value will be displayed in red. The automatically

reduced speed cannot be increased any further for the remaining duration of the grinding process.

The user shall be informed of this with the message H14 shown in the display of the device after the grinding process has been completed.

For future grinding with similar output parameters, it is recommended to set a lower speed.

NOTICE The maximum speed depends on the size and material of the grinding jars used as well as of the sample and the number of cycles, if they have been set.

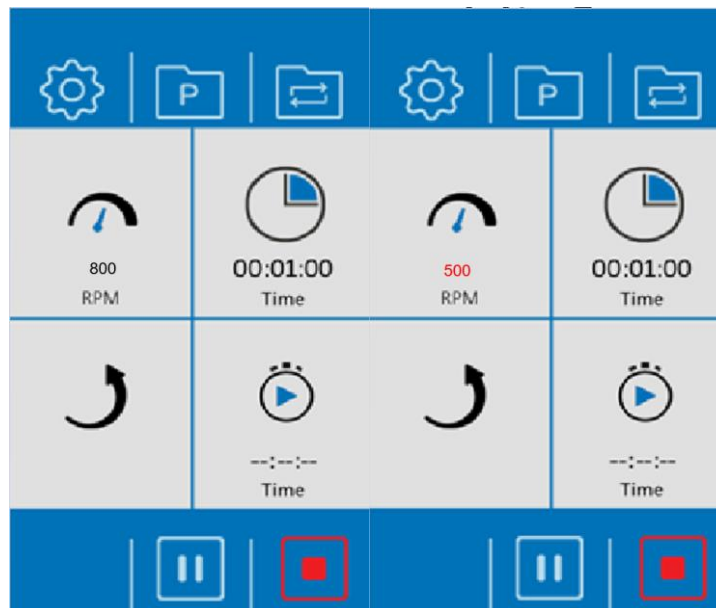



Fig. 48: View during the grinding process (left) and after the speed has been automatically reduced (right)

7.6 Program mode

Press the button  (N2.1) in the main menu in order to switch to the programme mode. The display changes to the current programme.

In the programme mode, programmes can be selected, edited, saved, deleted and started.

If sample materials are frequently ground with the same parameters, these parameters can be stored in programme presets and, if required, recalled as standard operating procedures (SOP). Up to twelve programme presets are available.

The following parameters can be stored in the individual programmes:

- Speed
- Grinding time
- Direction of rotation
- Lead time

- ⓘ When starting a grinding process via a programme, the grinding parameters cannot be changed during this process.

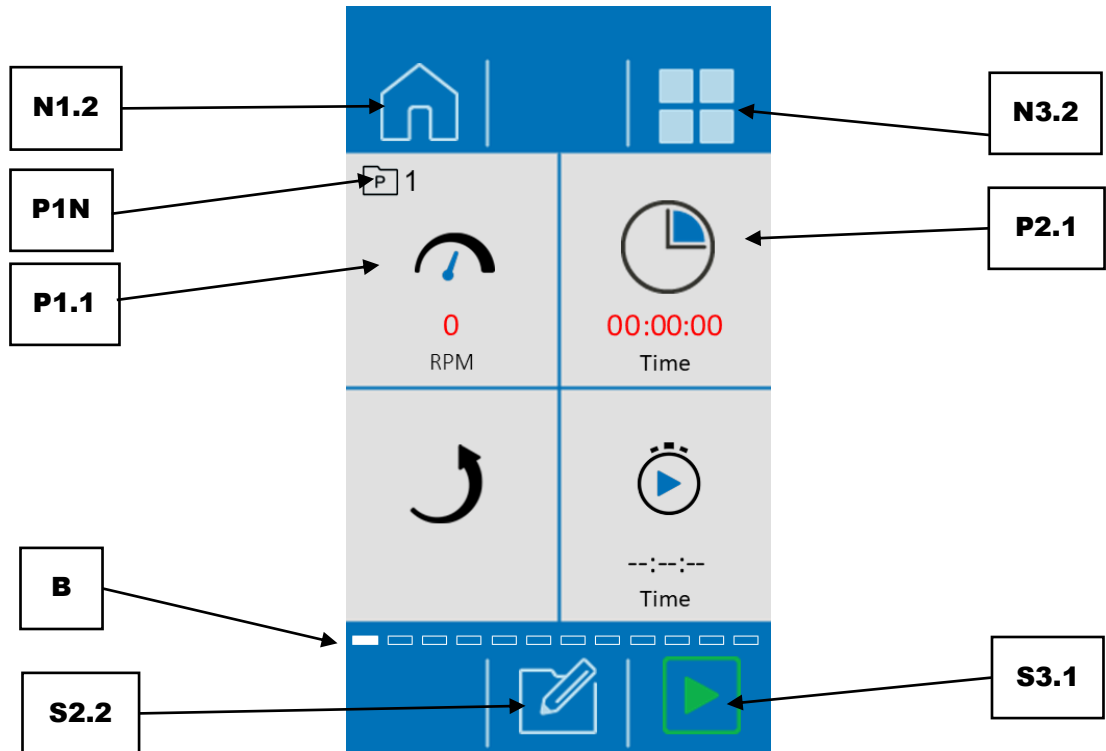


Fig. 49: Programme mode

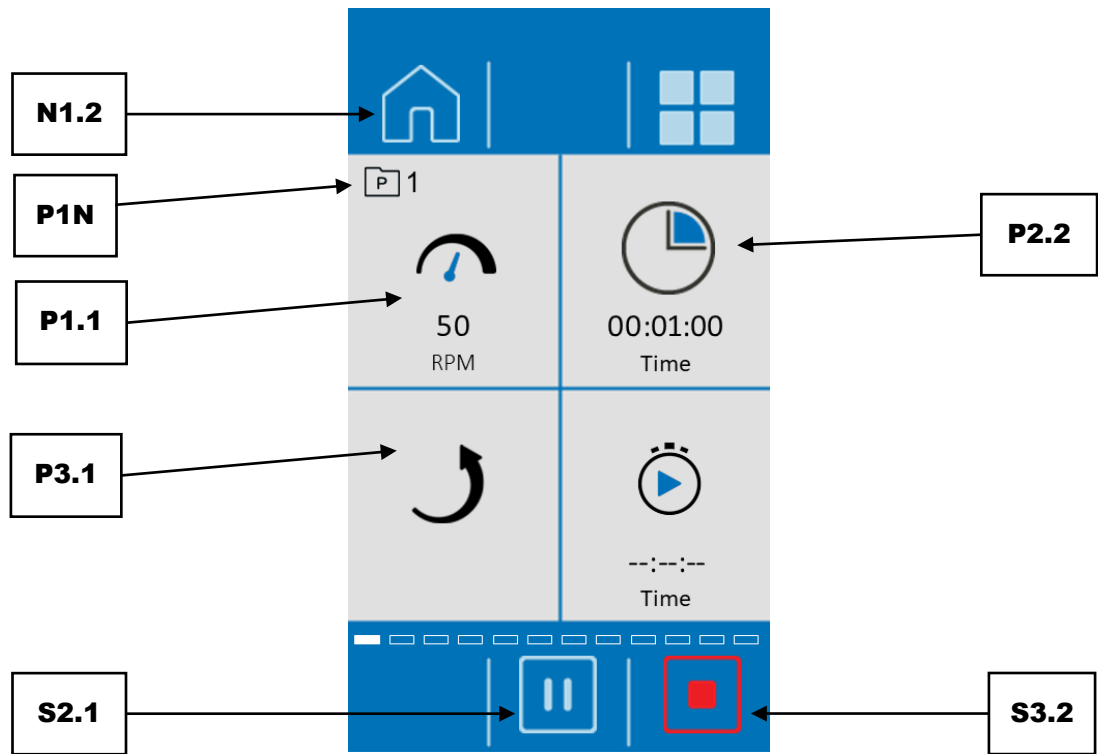


Fig. 50: Programme mode after the grinding process has started

	Element	Function
N1.2	Main menu	Opening the main menu
N2.1	Programme mode	Accessing the programme mode
N3.2	Gallery view	This opens the gallery view of the programmes or the available programme presets
N4	Acoustic signals on/off	When the element is visible, the sound is turned on.
P1N	Programme number	Number of the selected programme
P1.1	Speed per minute	After selection with the touch display, the speed per minute can be set between 50 and 800 rpm with the dial.
P2.1	Grinding time	After selection with the touch display, the grinding time can be set between 1 minute and 99 hours with the dial (invalid values are shown in red). The grinding times can be set from 5 seconds in 5 second steps and from 60 seconds in 1 minute steps.
P2.2	Remaining grinding time	Displays the remaining grinding time of the current grinding process
P3.1	Direction of sun wheel rotation	Indicates the set direction of rotation of the sun wheel (clockwise / counterclockwise)
B	Scroll bar	Indicator for the position of the menu
S2.1	Pauses the grinding process	By pressing this button, the grinding process will be paused. By pressing it again, the grinding process will continue.
S2.2	Editor mode	Opens the programme editor
S3.1	Starting the grinding process	(This button is only visible after setting valid parameters.)
S3.2	Stopping the grinding process	By pressing this button, the grinding process will be stopped.

7.6.1 Select a Program

Programmes with preset parameters for the grinding process may be selected in the programme mode. In order to select a programme, press the button (N2.1) in the main menu. The respective programme number is displayed next to the symbol (N1P). After starting the PM 300, the programme view always opens with programme 1 in single view.

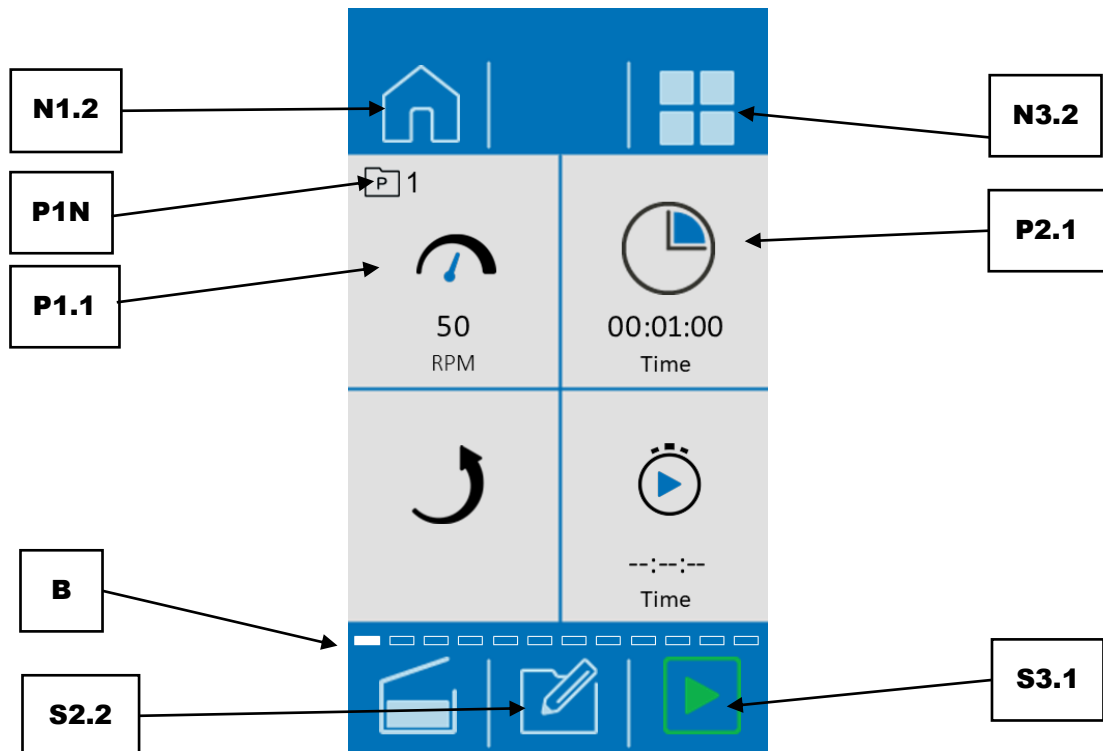


Fig. 51: Programme mode

- ① You can change the programme by swiping to the right or left on the touch display. The scroll bar (B) will provide you with a visual overview of your position within the programmes.

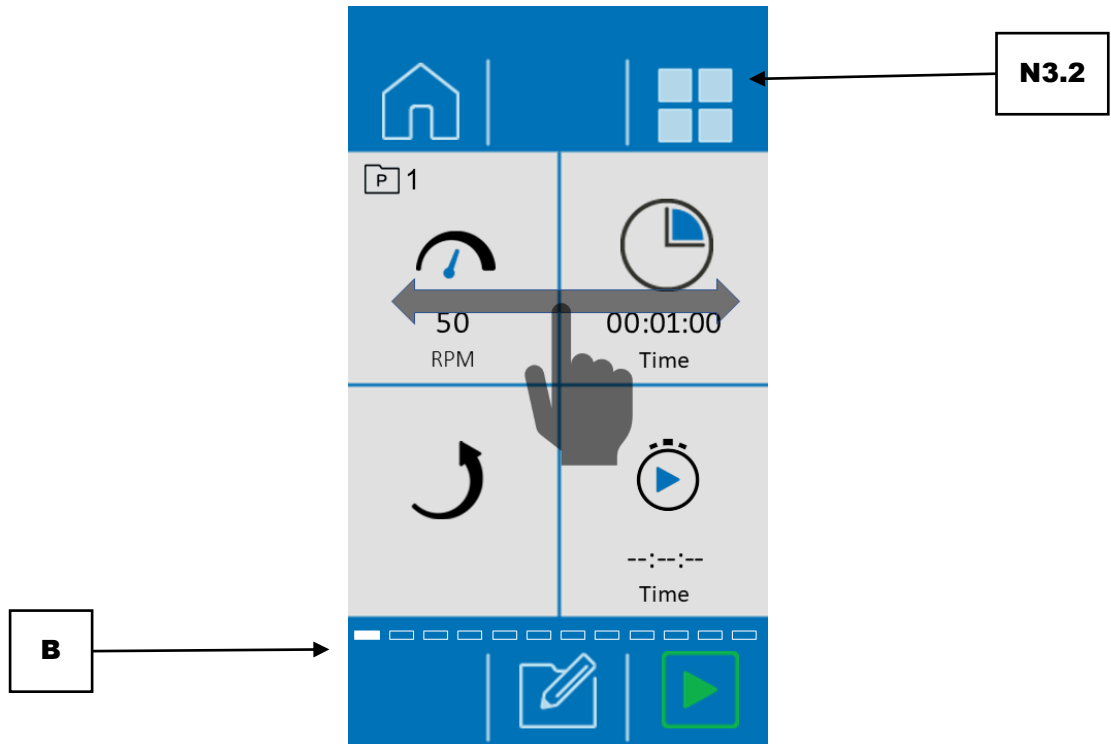



Fig. 52: Programme view

Alternatively, you can switch to gallery view by pressing the button  (N3.2). From now on, four programmes will be always displayed with the set parameters.

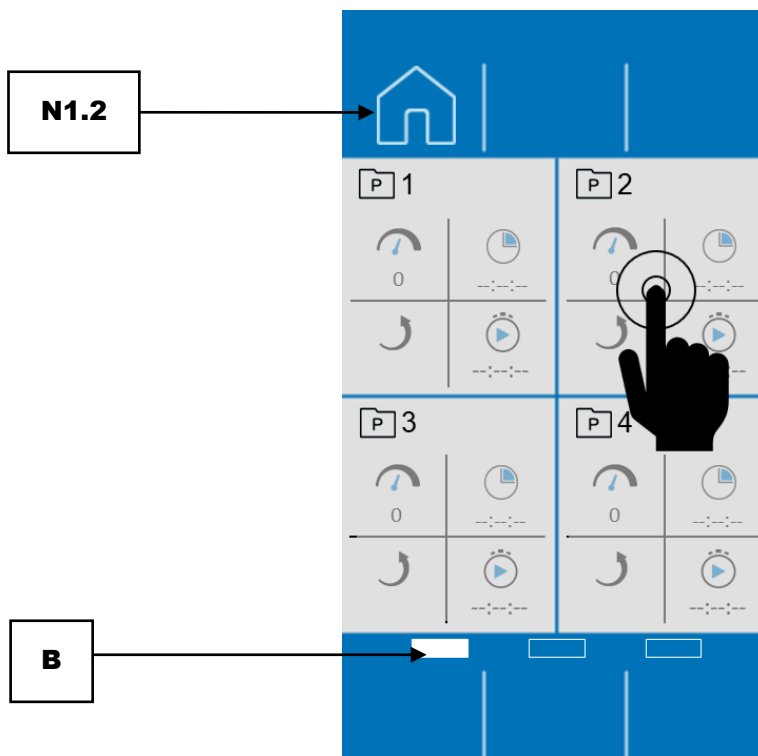




Fig. 53: Gallery view

- ⇒ Swipe across the display in order to switch between programme group 1 to 4, 5 to 8 and 9 to 12. The scroll bar (B) will provide you with a visual overview of your position within the gallery view.
- ⇒ In order to activate a programme, tap on the required programme section.

	Element	Function
N1.2	Main menu	Opening the main menu
N3.2	Gallery view	This opens the gallery view of the programmes or the available programme preset.
N4	Acoustic signals on/off	If the element is visible, the sound is switched on.
P1N	Programme number	Number of the selected programme
P1.1	Speed	After selection has been made via the touch display, the speed per minute can be set from 50 - 800 rpm with the dial.
P2.1	Grinding time	The grinding times can be set from 5 seconds in 5 second steps and from 60 seconds in 1 minute steps
B	Scroll bar	Indicator for the position of the menu
S2.2	Editor mode	This opens the programme editor.
S3.1	Starting of the grinding process	This will start the grinding process.

- ⇒ In order to exit the programme mode and to return to the main menu, please press  (N1.2).

7.6.2 Edit a Program

Open the programme editor in the programme mode, by pressing the button  (S2.2).

In the programme editor, programmes can be created, edited, saved and deleted.

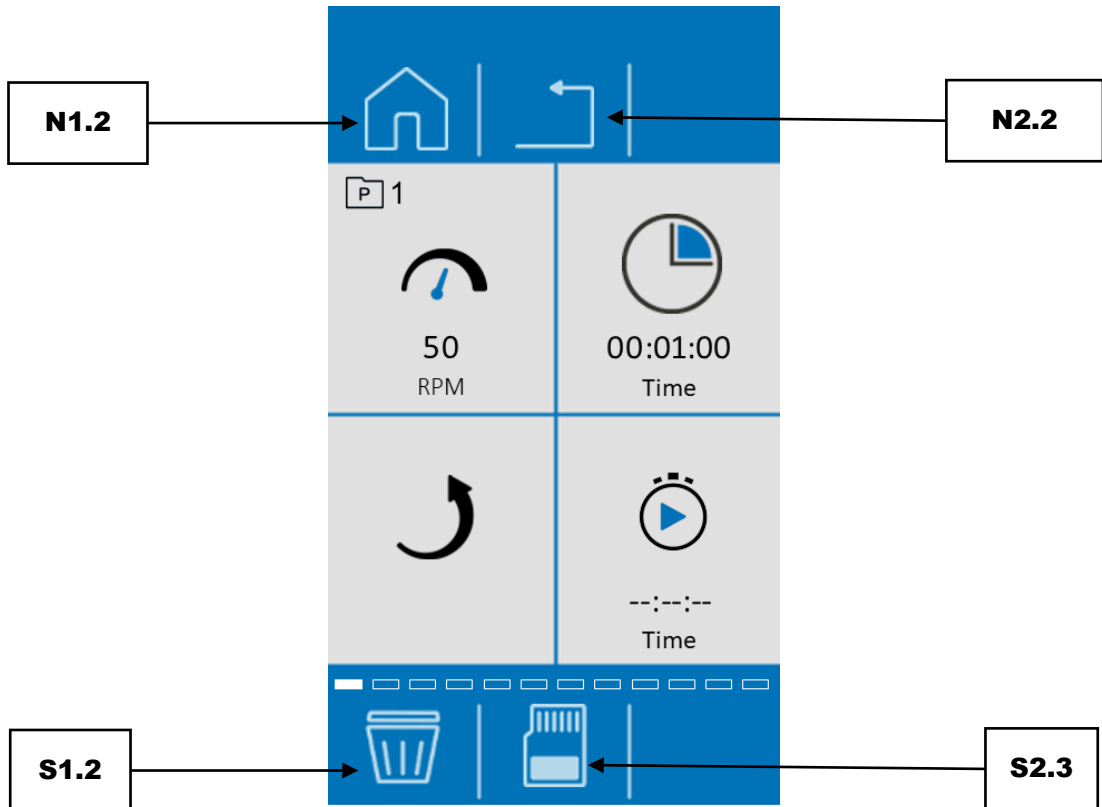



Fig. 54:Programme editor



	Element	Function
S1.2	Main menu	This open the main menu.
N2.2	Cancel	To cancel the current operation and returns to the superior menu
S1.2	Delete	To delete all parameters of the programme
S2.3	Save	To save the programme

① Editing can be cancelled by pressing the button  (N2.2). All settings which have been made are then discarded.

Changing the programme:


- ⇒ Press on the parameter to be edited.
- ⇒ Turn the dial until the required value is displayed.
- ⇒ Press the parameter once again or select another parameter so that the set value is accepted.

Deleting a programme:

- ⇒ Tap the button (S1.2) in order to delete all parameters of a programme.
- ⇒ Confirm the deletion by tapping the button  (S2.2).
- ⇒ Cancel with the button  (N2.2).



7.6.3 Save a Programme

In order to save the configured parameters in a programme storage location, please proceed as follows:


- ⇒ Press  in order to save the configured parameters in the selected programme storage location.

7.6.4 Delete a Programme

Deleting a programme:

- ⇒ Tap the button  (S1.2) in order to delete all parameters of a programme.
- ⇒ Confirm the deletion by tapping the button  (S2.2).

7.7 Cycle programme mode

Press the button  in the main menu in order to switch to cycle programme mode. The display changes to cycle programme 1 after being switched on; otherwise it changes to the last cycle programme which has been used.

Cycle programmes can be selected, edited, saved, deleted and started in cycle programme mode.

If sample materials are frequently ground with the same parameters, these parameters can be stored in cycle programme presets and recalled as standard operating procedures (SOP), if required.

Up to four presets are available for cycle programmes.

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

- Speed
- Grinding time
- Direction of rotation
- Cycle repetitions (repetitions of speed, grinding time and direction of rotation)
- Lead time

A cycle comprises two parameter sets (A and B). The speed, grinding time and direction of rotation can be freely selected for each parameter set. The complete cycle programme consists of the two parameter sets (A and B) and the preset repetitions.

- ⓘ The grinding parameters cannot be changed during the grinding process if it has been started via a cycle programme.

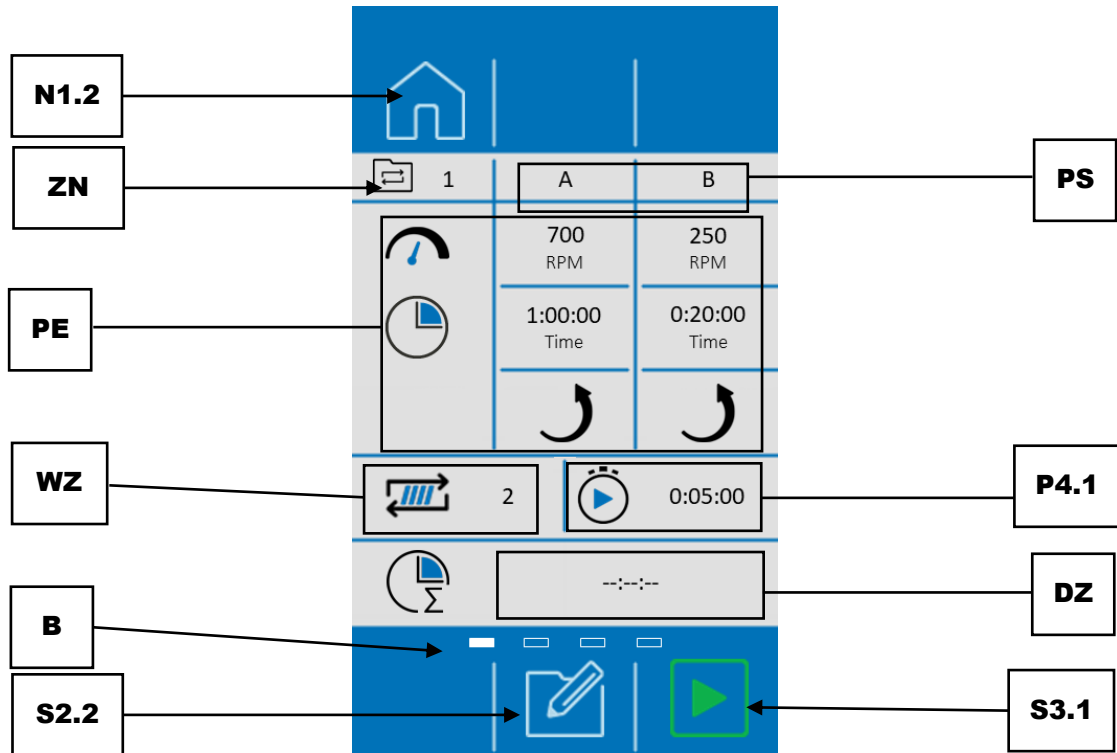


Fig. 55: Cycle programme mode

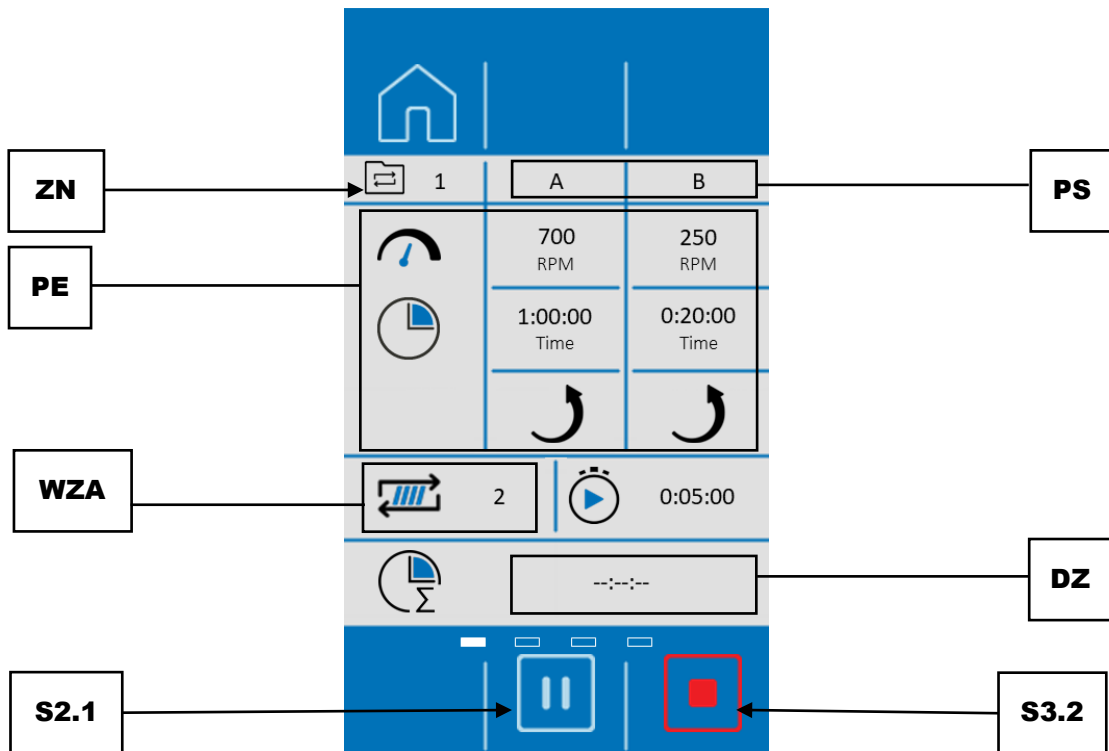




Fig. 56: Cycle programme mode after starting the grinding process

	Element	Function
N1.2	Main menu	Opening the main menu
ZN	Cycle programme number	This displays the number of the current cycle.
PS	Parameter sets (A/B)	A cycle is divided into the parameter sets A and B.
PE	Parameter settings	It displays the parameters of the active cycle (speed, grinding time and direction of rotation).
P4.1	Lead time	Time span until the cycle programme is started
WZ	Cycle repetitions	It shows how often the configured cycle will be repeated until the grinding process is completed.
WZA	Repetitions of the current cycle	After the grinding process has been started, the current cycle status will be displayed here.
B	Scroll bar	Indicator for the position of the cycle
DZ	Total duration of the cycle programme	It displays the total duration of the cycle programme 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 programme is limited to 99 hours.
S2.1	Pausing the cycle programme	This pauses the current cycle programme
S2.2	Editor mode	This opens the cycle programme editor.
S3.1	Starting the cycle programme	This starts the grinding process or the cycle programme.
S3.2	Stopping the cycle programme	This stops the current cycle programme.

7.7.1 Selecting the cycle programme

In cycle programme mode, cycles with preset parameters can be selected for the grinding process.

In order to select a cycle programme, press the button  in the main menu. The respective cycle programme number is displayed next to the symbol .

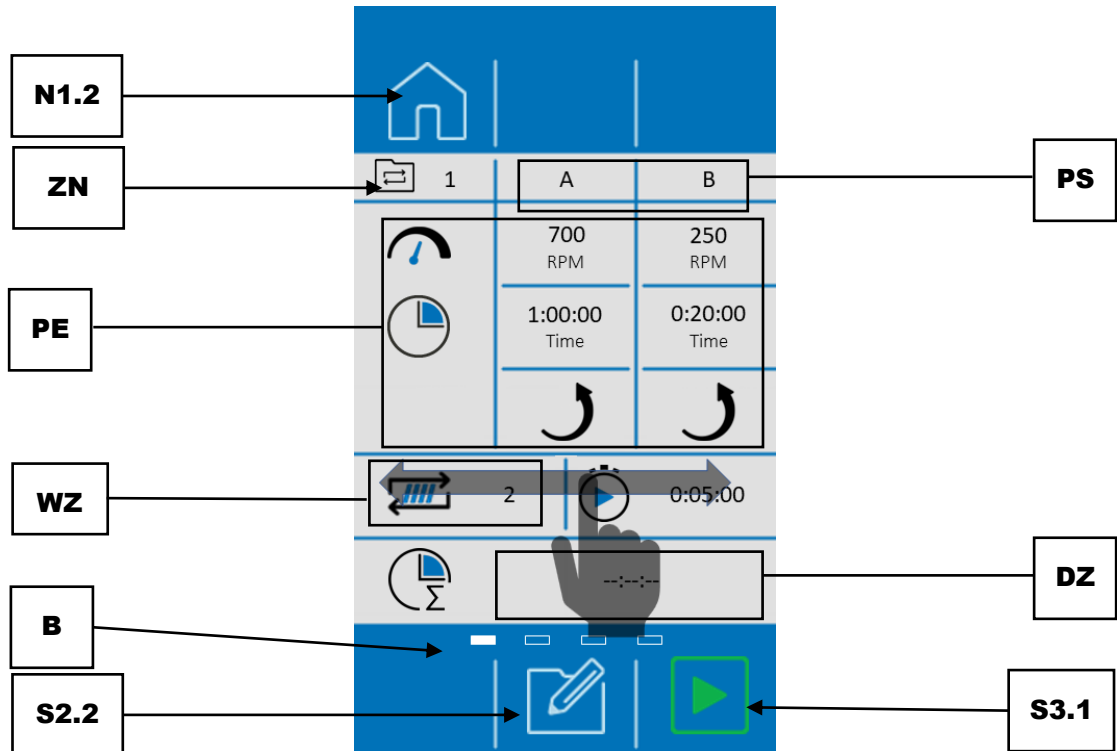



Fig. 57: Selecting a cycle programme

	Element	Function
N1.2	Main menu	Opening the main menu
ZN	Cycle programme number	It displays the number of the current cycle programme
PS	Parameter sets (A/B)	A cycle programme is divided into parameter sets A and B
PE	Parameter settings	It displays the parameters of the active cycle programme (speed, grinding time and direction of rotation)
WZ	Cycle repetitions	It displays how often the configured cycle will be repeated until the grinding process is completed.
B	Scroll bar	Indicator for the position of the cycle programme
DZ	Total duration of the cycle programme	It displays the total duration of the cycle programme until the grinding process is completed (The total duration is made up of the two parameter sets (A/B) and the repetitions). ①The total duration of a cycle programme is limited to 99 hours.
S2.2	Editor mode	This opens the cycle programme editor
S3.1	Starting the cycle programme	It starts the grinding process or cycle programme

- ⇒ Swipe the display from right to left or from left to right in order to navigate through the cycle programmes. The position of the cycle programme is shown in the scroll bar.
- ⇒ Press the button  in order to start the selected cycle programme and the grinding process.

⇒ In order to exit the cycle programme mode and return to the main menu, press the button .

7.7.2 Editing the cycle programme

Cycle programmes can be created, edited, saved and deleted in the cycle programme editor.

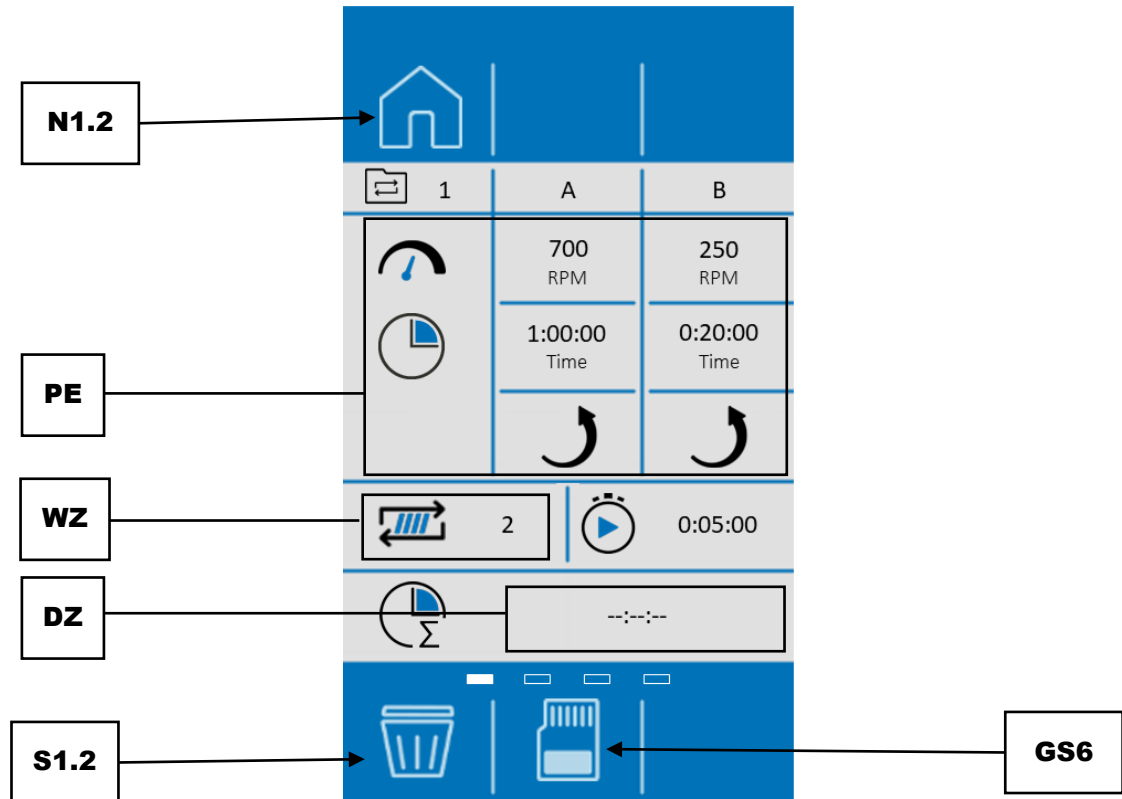




Fig. 58: Cycle programme editor

	Element	Function
N1.2	Main menu	Opening the main menu
PE	Parameter settings	It displays the parameters which are configured for the active cycle.
DZ	Total duration of the cycle programme	It displays the total duration of the cycle programme (The total duration is made up of the two parameter sets (A/B) and the repetitions.). ⓘ The total duration of a cycle programme is limited to 99 hours.
S1.2	Delete	It deletes all parameters of the cycle programme
S2.3	Save	It saves the cycle programme
WZ	Cycle repetitions	It shows how often the configured cycle will be repeated until the grinding process is completed.


⇒ Press in the cycle programme mode in order to enter the cycle editor and edit the activated cycle programme.

- ① The total duration of a cycle programme 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 which have already been made are then discarded.

- ① The parameters may only be changed in the cycle programme mode, if editing is activated via the button .
- ⇒ Press the parameter which shall be edited.
- ⇒ Turn the dial until the required value is displayed.
- ⇒ Press the parameter again or select another parameter so that the set value is accepted.

7.7.3 Saving the cycle programme


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

7.7.4 Deleting the cycle programme

- ⇒ Tap the button  (S1.2) in order to delete all parameters of a cycle programme.
- ⇒ Confirm the deletion by tapping the button .
- ⇒ Cancel with the button .

7.8 System settings

The system settings can be accessed from the main menu.

- ⇒ Press the symbol .
- ⇒ Swipe from right to left or from left to right in order to access the three different windows of the system settings.
- ⇒ Subsequently, press the required section in order to view or configure the settings.

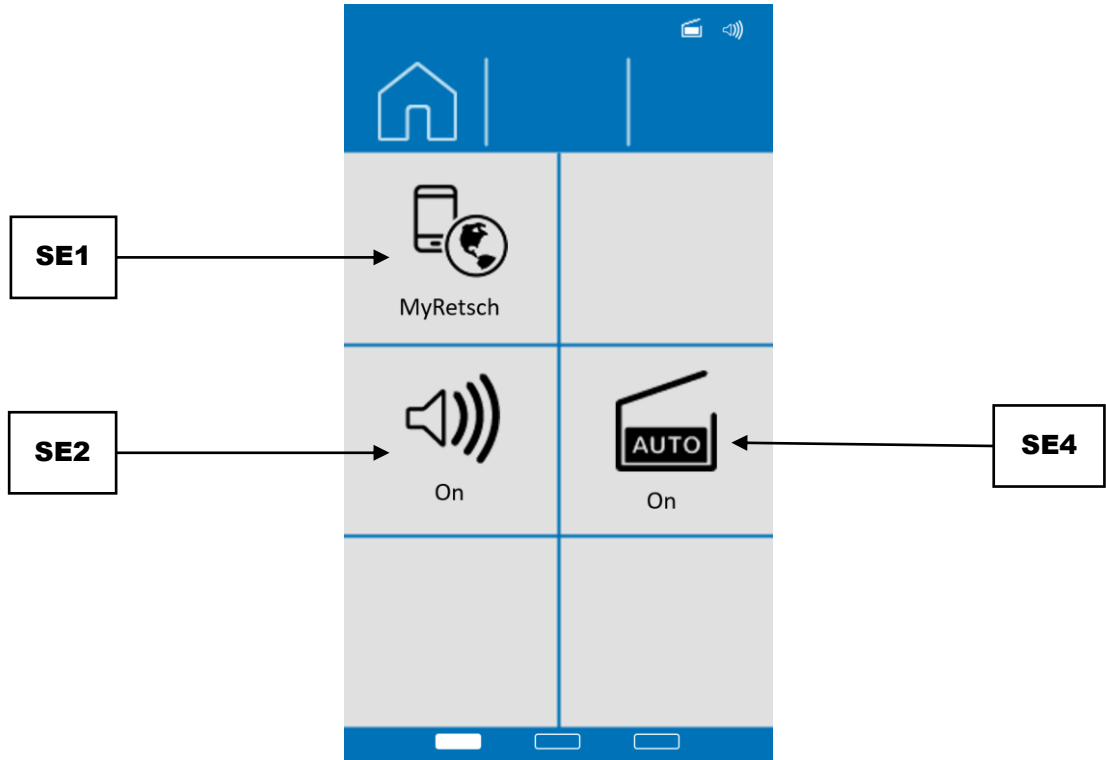


Fig. 59: System settings – 1st window

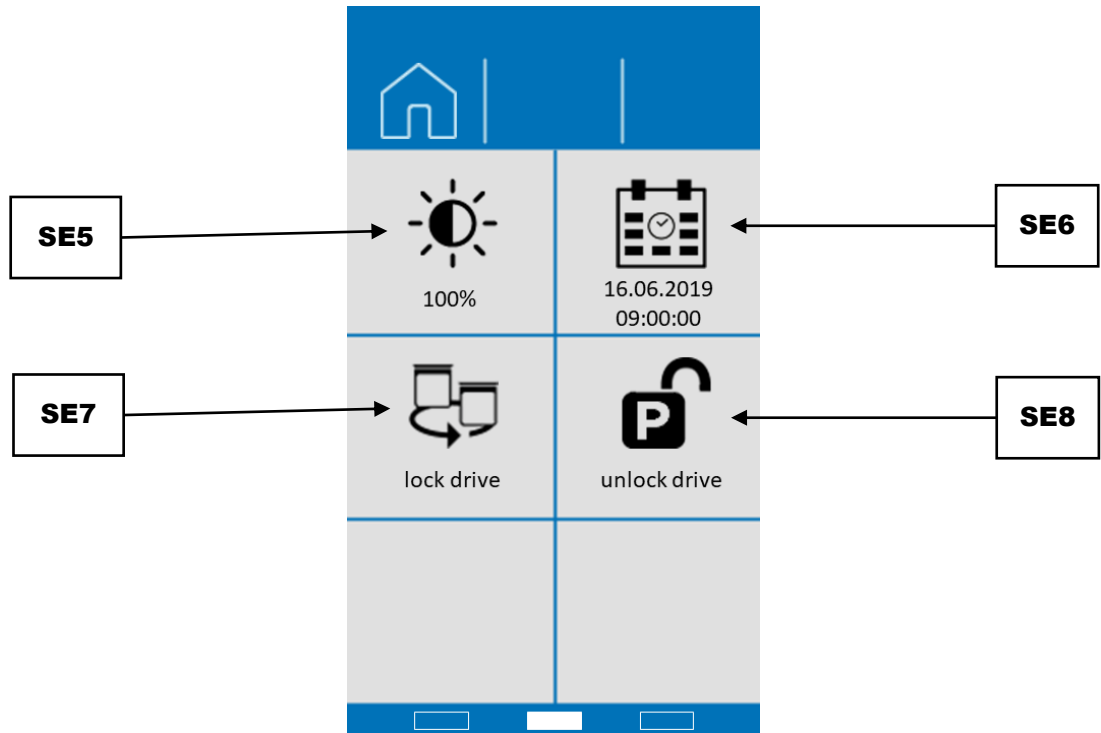


Fig. 60: System settings – 2nd window

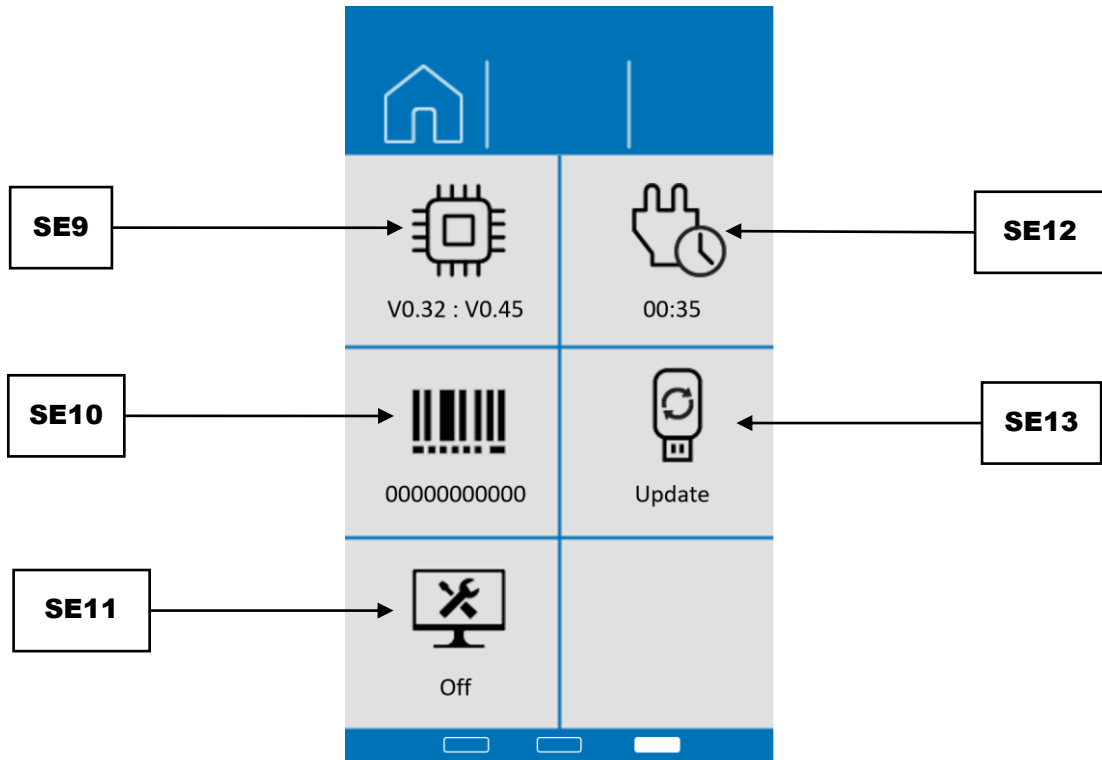


Fig. 61:System settings – 3rd window

	Element	Function
SE1	„MyRetsch“	Shows QR code in the display. Please see chapter “MyRetsch”.
SE2	Signalling device (on/off)	The signalling device of the unit can be switched on or off from here.
SE4	Auto unlock	This can be used in order to switch the automatic opening function on or off. If the function is switched on, the hood is opened automatically after a grinding process has been completed.
SE5	Brightness	Adjusting the brightness of the display
SE6	Date and time	Setting the date and time.
SE7	Lock drive	The drive moves to the parking position and is locked.
SE8	Unlock drive	The drive is unlocked in the park position.
SE9	Software version	Display of the software version. Display (programme control): Firmware (device control)
SE10	Serial number	This is where the serial number of the device is displayed.
SE11	Service environment	Allows a service technician to access the service environment
SE12	Operating hours	Display of the operating hours
SE13	Software update	Software update of the device via USB data carrier

7.8.1 MyRetsch

This section allows access to the web portal of the Retsch GmbH via a QR code. This can be read with a smartphone which is equipped with the appropriate software and an internet connection. Subsequently, additional information, such as tips and tricks and an application database can then be accessed.

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

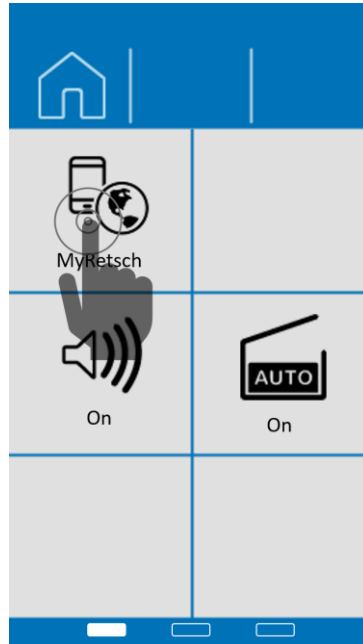


Fig. 62: MyRetsch

QR code for accessing the web portal:



Fig. 63: QR code

7.8.2 Signalling device

The unit's signalling device can be switched on or off with this section.

The signalling device produces an acoustic signal as soon as a grinding process has been completed.

7.8.3 Brightness

In order to adjust the brightness of the touch display, please proceed as follows:

- ⇒ Press the respective section.
- ⇒ Turn the dial until the desired brightness of the display has been reached.
- ⇒ The set value is adopted as soon as this section or another section is pressed once again or as soon as the system settings are exited.

7.8.4 Date and time

In order to adjust the date and time, please proceed as follows:

- ⇒ Press the respective section.
- ⇒ Use the dial to make the required settings.
- ⇒ The set values are adopted as soon as this section or another section is pressed once again or as soon as the system settings are exited.

7.8.5 Software Version

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

- Firmware (device control)
- Display (programme control)

- ① The current software versions are listed one after the other, whereby the firmware is listed first.

7.8.6 Operating Hours

This section displays the operating hours of the device in hours and minutes (hh:mm).

The process times are counted, i.e. the sum of those times between the start and the stop of a grinding process. The time cannot be manipulated.

7.8.7 Serial number


This section can be used in order to display the serial number of the device.

7.8.8 Software Update

This section can be used in order to update the software.



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

In order to update the software, please proceed as follows:

- ⇒ Insert the USB data carrier with the current software into the USB interface.
- ⇒ Press the symbol  in order to start the update.
- ⇒ Wait until transfer and installation have been completed.
- ① The background of the dial flashes blue until the touch display has been restarted. This may take a few seconds.

7.8.9 Service Environment



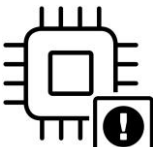

The service environment can be accessed from this section. The service environment is only accessible to service technicians who are authorised by the Retsch GmbH.

- ① If the service environment is selected, the USB interface is activated and “On” will be displayed below the symbol . However, no additional functions will be executed.
- ⇒ Deactivate the service environment by pressing the section or exit the “System settings” menu via the button .
- ① As long as the service environment is activated, all other functions remain deactivated.

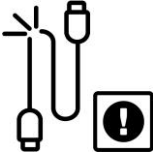
8 Error Messages and Information Notes

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 	Drive overload	The drive can withstand short-term overload. In case of long-lasting overload, the self-protection becomes active. This can occur especially with high loads (heavy grinding jars, hard sample, large balls or high speed). <ul style="list-style-type: none"> • Check whether the load of the machine is too high. • Check whether there are any foreign bodies in the interior. • Check whether the grinding process can be carried out at reduced speed. • Leave the machine switched on until the cool down timer has expired.
E11 	Failure – Drive / motor	The drive is blocked. <ul style="list-style-type: none"> • Turn off the main switch and wait for 30 seconds before turning the device on again. • If none of the abovementioned causes exist, please contact the service department of Retsch GmbH.
E20 	Failure – Control unit	The communication to the control unit is interrupted or faulty. <ul style="list-style-type: none"> • Turn off the main switch and wait for 30 seconds before turning the device on again. • If none of the abovementioned causes exist, please contact the service department of Retsch GmbH.
E23 	Failure – Fan	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 and wait for 30 seconds before turning the device on again. • If none of the abovementioned causes exist, please contact the service department of Retsch GmbH.



Error code	Description	Measures
<p>E25</p>	Failure – Display	<p>The connection to the display is interrupted.</p> <ul style="list-style-type: none"> • Turn off the main switch and wait for 30 seconds before turning the device on again. • Remove any foreign objects from the inside of the device. • If the error persists, please contact the service department of Retsch GmbH.
<p>E26</p>	Failure – Frequency converter	<p>The communication with the frequency converter is interrupted or faulty.</p> <ul style="list-style-type: none"> • Turn off the main switch and wait for 30 seconds before turning the device on again. • If the error persists, please contact the service department of Retsch GmbH.
<p>E27</p>	Failure – Solenoid	<p>There is an error in the solenoid.</p> <ul style="list-style-type: none"> • Turn off the main switch and wait for 30 seconds before turning the device on again. • If the error persists, please contact the service department of Retsch GmbH.
<p>E41</p>	Failure – Speed sensor	<p>Speed setpoint and actual drive speed deviate from each other.</p> <ul style="list-style-type: none"> • Turn off the main switch and wait for 30 seconds before turning the device on again. • Remove any foreign objects from the inside of the device. • If the error persists, please contact the service department of Retsch GmbH.
<p>E47</p>	Failure – imbalance sensor	<p>An unbalance has been detected during the operation.</p> <ul style="list-style-type: none"> • Turn off the main switch and wait for 30 seconds before turning the device on again. • Check whether the grinding points are evenly loaded. • If the error persists, please contact the service department of Retsch GmbH.
<p>E50</p>	Failure – safety circuit	<p>A safety function has been interrupted.</p> <ul style="list-style-type: none"> • Turn off the main switch and wait for 30 seconds before turning the device on again. • Remove any foreign objects from the inside of the device. • If the error persists, please contact the service department of Retsch GmbH.

Error code	Description	Measures
E80 	Failure – USB interface	An update was carried out via the settings menu. No USB stick is connected or the USB stick does not contain any information. <ul style="list-style-type: none"> • Turn off the main switch and wait for 30 seconds before turning the device on again. • If the error persists, please contact the service department 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.

Notice code	Description	Measures
H10 	Motor is overheated	The drive can withstand short-term overload. In case of long-lasting overload, the self-protection becomes active. This can happen especially with high loads (heavy grinding jars, hard sample material, large balls or high speed). <ul style="list-style-type: none"> • Check whether the load of the machine is too high. • Check whether there are any foreign bodies in the interior. • Check whether the grinding process can be carried out at reduced speed. • Leave the machine switched on until the cool down timer has expired.
H11 	Safety Slider not inserted	Before the grinding process is started, the machine automatically checks whether the Safety Slider is inserted. <ul style="list-style-type: none"> • Check whether there are any foreign objects inside. • Check if the Safety Slider is correctly inserted.
H14 	Load limit exceeded. Speed has been reduced	If the load limit of the device is exceeded during the grinding process, the device automatically reduces the speed and continues the grinding process at reduced speed. <ul style="list-style-type: none"> • Reduce the speed for future grindings with similar parameters.

Notice code	Description	Measures
<p>H45</p> 	<p>Power failure</p>	<p>A power failure was detected during the last grinding process, so that this grinding process was not completed successfully.</p> <ul style="list-style-type: none"> <li>• Confirm this message. The device is operational again.
<p>H50</p> 	<p>Service interval</p>	<p>It is recommended to have the device checked by the service department of company Retsch GmbH at regular intervals. In addition, the device issues a message by sending the “service” icon onto the display.</p> <ul style="list-style-type: none"> <li>• When the service interval is indicated, the icon must be acknowledged. This message appears each time the device is restarted. <li>• Please contact the service department of company Retsch GmbH. <li>• If no service is carried out, the icon will be permanently displayed in the upper part of the navigation area. <li>• The operation of the device may be continued for the time being.

9 Installing additional equipment

By means of the Retsch additional equipment, the planetary ball mills PM 100, PM 300 and PM 400 can be flexibly adapted to different working conditions.

The following additional equipment is available for the Retsch planetary ball mills PM 100, PM 300 and PM 400:

- Adapter for 24 x 1.5 ml glass vials
- Adapter for 7 x 20 ml glass vials

⚠ CAUTION If the additional equipment is loaded incorrectly, the grinding vessels may splinter during the grinding process. Please observe the specifications regarding the sizes of the grinding balls and the maximum permitted speeds.

9.1 Adapter for glass vials

NOTICE

Strong vibration and loud noise

Uneven load

- The device can produce very high levels of vibrations and noise when loading is uneven.
- **Always use 2 grinding jars opposite each other.**
- **The grinding stations must be operated with the identical grinding jars and with the same weight during each grinding process.**
- **Switch the device off immediately if there are high levels of vibration and noise and check the number and gross weight of the jars.**

The device can be equipped with an adapter for glass vials. The adapters enable the simultaneous use of up to 24 x 1.5 ml or 7 x 20 ml samples in the respective vials.

Mount the adapter as follows:

NOTICE Always fit the adapter in a symmetrical arrangement. Otherwise, the grinding jar lid may tilt and the adapter may not be clamped properly.

⇒ Insert the compressure spring into the desired opening of the adapter.

⇒ Place the loaded and closed glass vial on the compressure spring with the lid facing upwards. The tension of the spring pushes the vial upwards.

⇒ Insert the loaded adapter into the grinding jar support of the desired device.

Close the adapter with the lid and secure it with the clamping unit. It must be ensured that the lid sits straight and is firmly clamped in place.

⚠ WARNING Please observe the instructions in the operating instructions for your device regarding the safe handling of the clamping unit. The lid must close the adapter flush and must not rest at an angle!

⇒ Alternatively, the lid of the adapter can also be secured with the safety locking device for grinding jars. In such a case, load the adapter as described above, put on the lid and tighten the safety locking device. Subsequently, insert the closed adapter into the grinding jar support.

NOTICE In order to reduce wear and tear on the compressure springs, it is recommended that only springs are inserted into the openings of the adapter which are loaded with vials.

⚠ CAUTION The clamping force of the compressure springs pushes the inserted vials out of the adapter. Therefore, transport the adapter which is loaded with vials without the lid. Alternatively, secure the lid with the safety locking device.



Fig. 64: Exploded view of the adapter with compression spring and 1.5 ml vial



Fig. 65: Permissible arrangement of the glass vials in the adapter

⚠ CAUTION Glass vials are not suitable for grinding hard-brittle materials. These are disposable glass vials which must not be used more than once. Please observe the maximum speed specifications.

⚠ CAUTION Glass vials can break and cause cuts!

The filling of the vials deviates specifically from the 1/3 rule in terms of application and filling:

Example 1 (1.5 ml)	
Grinding balls	2 – 4 x 3 mm grinding balls, stainless steel
Sample material/ Mixture of reactants	20 % filling volume of the vial, top up with a few µl of solvent

Example 2 (1.5 ml)	
Grinding balls	approx. 1/3 of the glass vial with 3 mm grinding balls, stainless steel
Sample material/ Mixture of reactants	max. 20 % filling volume of the vial, top up with a few µl of solvent

Example 3 (20 ml)	
Grinding balls	approx. 1/4 of the glass vial with 3 mm grinding balls (stainless steel, zirconium oxide, agate)
Sample material/ Mixture of reactants	50 % filling volume of the vial, top up with a few µl of solvent

9.1.1 Speed limits

Due to the high energy input of the device, strong forces act on the glass vials. The maximum speed specifications must be adhered to in order to prevent any damage to the adapter and the vials.

Device	Maximum speed	
	Adapter for 24 x 1.5 ml glass vials	Adapter for 7 x 20 ml glass vials
PM 100	550 rpm	350 rpm
PM 300	500 rpm	300 rpm
PM 400	400 rpm	250 rpm

9.1.2 Energy input

The energy input of the device to the glass vials in the adapter differs depending on the arrangement of the openings on the inner or outer diameter. The force applied to the inner diameter is comparable with 50 - 125 ml grinding jars. The force applied to the outer diameter is comparable with 250 - 500 ml grinding jars.

Green: Inner diameter, 50 - 125 ml grinding jars

Red: Outer diameter, 250 - 500 ml grinding jars

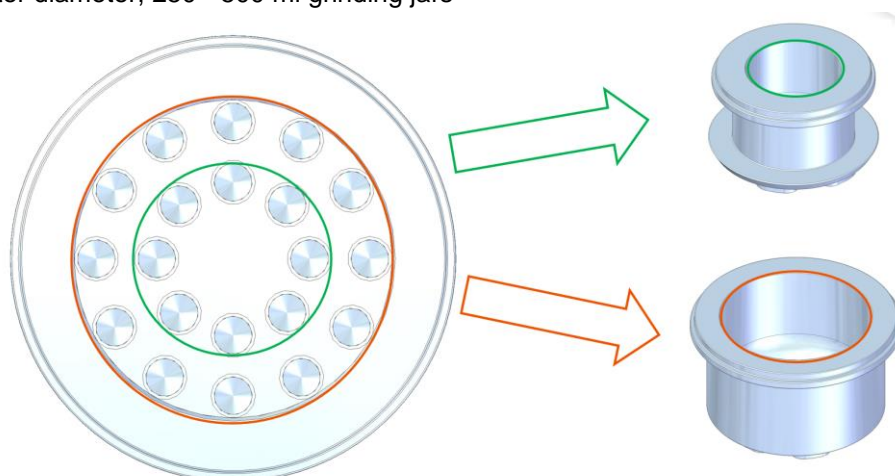


Fig. 66: Energy input as a function of diameter

10 Cleaning, Wear and Maintenance

This chapter includes descriptions about the cleaning and maintenance of the PM 300.

CAUTION

C27.0013

Risk of injury

Improper repairs

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

10.1 Cleaning

In order to ensure reliability and operational safety of the PM 300, cleaning work must be carried out as required and at least on a monthly basis.

WARNING

W13.0003

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

W14.0008

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

C28.0031

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.**



10.1.1 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.

10.1.2 Cleaning the inside

Clean the interior of the device with a vacuum cleaner or a damp cloth and a household cleaning agent, if necessary.
It must be ensured that no water or cleaning agent gets into the interior of the device.

10.1.3 Cleaning the grinding jar

All grinding jars, including those with glued-in ceramic inserts, can be cleaned with alcohol, petroleum ether or normal household washing-up liquid.

- ① Cleaning in a household dishwasher is also possible.

10.1.4 Cleaning the grinding balls

All grinding balls can be cleaned with alcohol, petroleum ether or normal household washing-up liquid.

- ① Cleaning in a household dishwasher is also possible.

10.2 Maintenance

CAUTION

C29.0015

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!**

10.2.1 Maintenance of the closing pin

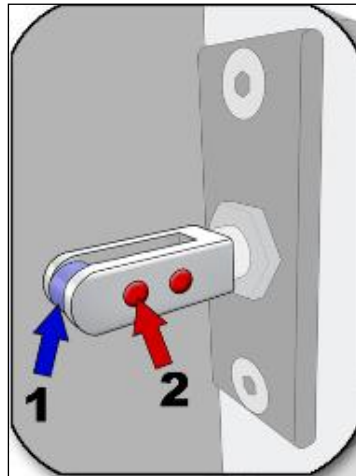


Fig. 67: Maintenance of the closing pin

In order to ensure the operational safety of the device, the following maintenance work should be carried out from time to time, however, at least on a monthly basis:

- Check the roller (1) of the closing pin for ease of movement and lubricate, if necessary, e.g. with sewing machine oil.
- Clean the magnets (2) on the closing pin.

The smooth running of the roller (1) on the closing pin is a prerequisite for the safe closing of the housing lid.

10.2.2 Maintenance of the clamping unit

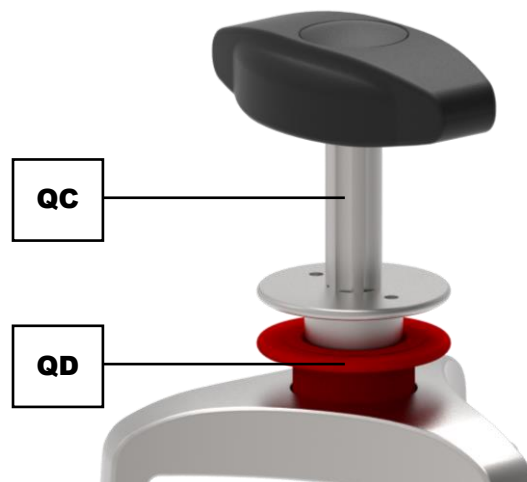


Fig. 68: Maintenance of the clamping unit

- Check the threaded spindle (QC) and the locking sleeve (QD) for smooth running.
- In most cases a drop of oil shall help.

The smooth running of the threaded spindle and the locking sleeve is a prerequisite for the safe clamping of the grinding jars.

Any locking sleeves which do not slide down automatically due to the spring force may not be able to safely prevent the threaded spindle from loosening. The grinding jars may potentially be thrown out.

10.2.3 Maintenance of the damper



Fig. 69: Maintenance of the damper in the housing lid

- Regularly check the condition of the dampers (**AC**) around the device hood (**AA**) for any wear and tear (at least on a monthly basis).
- The device hood must not lower on its own after opening to the uppermost position.
- When closing under its own weight, the device hood must not close completely.
- If the device hood should lower or fall completely under its own weight in the dampers, these must be replaced. In such a case, please contact the Retsch GmbH representative in your country or Retsch GmbH directly.

10.3 Wear

⚠ CAUTION

C30.0015

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!**

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.

10.3.1 Feet / Clamping unit / Wear and tear

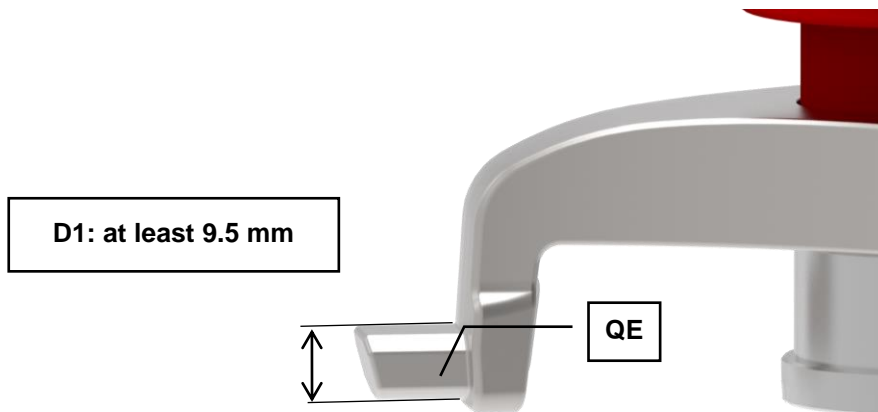


Fig. 70:Wear and tear on the feet of the clamping unit

- Check the thickness (**D1**) of the three clamps (**QE**) on the clamping unit on a regular basis (at the latest once a month) in terms of any wear and tear.
- The thickness (**D1**) of the three feet of the lead frame must not be less than 9.5°mm.
- If the thickness (**D1**) falls below this value, the operational safety is no longer ensured. The grinding jars can be thrown out.

10.3.2 Latching bracket / Wear and tear

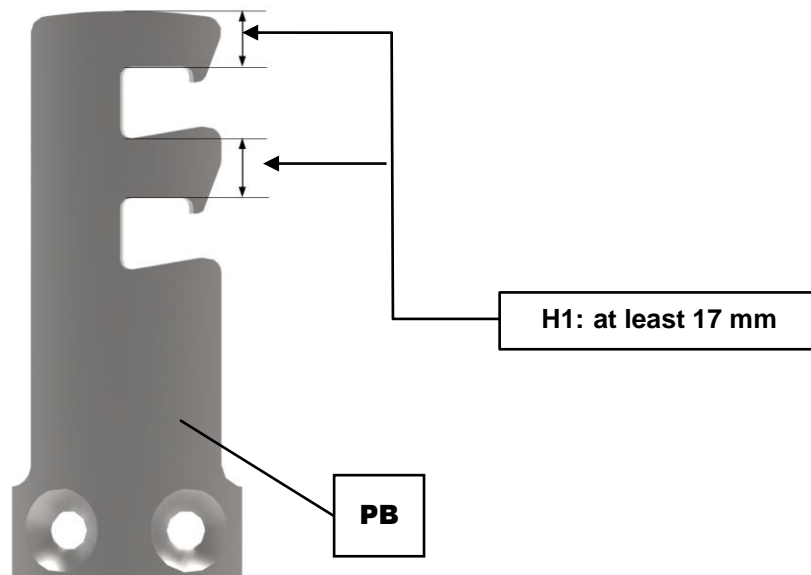


Fig. 71:Wear and tear on the latching bracket

- Check the thickness (**H1**) of the latching brackets (**PB**) on a regular basis (at the latest once a month) in terms of any wear and tear.
- The thickness (**H1**) of the latching brackets (**PB**) must not be less than 17°mm.
- If the thickness (**H1**) falls below this value, operational safety is no longer ensured. The grinding bowls can be thrown out.

10.4 Returning for repair and maintenance



Fig. 72: 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.

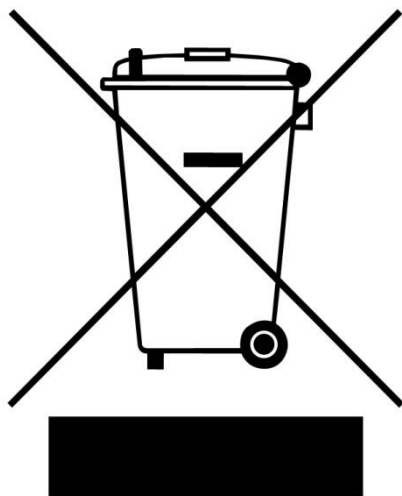


Fig. 73: Disposal label

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.

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PLANETARY BALL MILL

PM 300 | 20.570.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 13849-1	Safety of machinery - Safety-related parts of control systems
DIN EN 61010-1	Safety Regulations for Electrical Measurement, Control, Regulation and Laboratory Devices

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

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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