Operating instructions

VIBRATORY SIEVE SHAKER

ANALYSETTE 3

Valid starting with: 03.X020/2019

Read the instructions prior to performing any task!

Translation of the original operating instructions

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Certifications and CE conformity

Certification

Fritsch GmbH has been certified by the SGS-TÜV Saar GmbH.

An audit certified that Fritsch GmbH conforms to the requirements of the DIN EN ISO 9001:2015.

CE Conformity

The enclosed Conformity Declaration lists the guidelines the FRITSCH instrument conforms to, to be able to bear the CE mark.

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Fig. 1: ANALYSETTE 3 SPARTAN

1 Plexiglas clamping lid
2 Test sieve
3 Belt clamping device
4 Vibratory plate
5 Knurled knob
6 Toothed belt
7 Sieve pan
8 Control panel SPARTAN

Basic structure

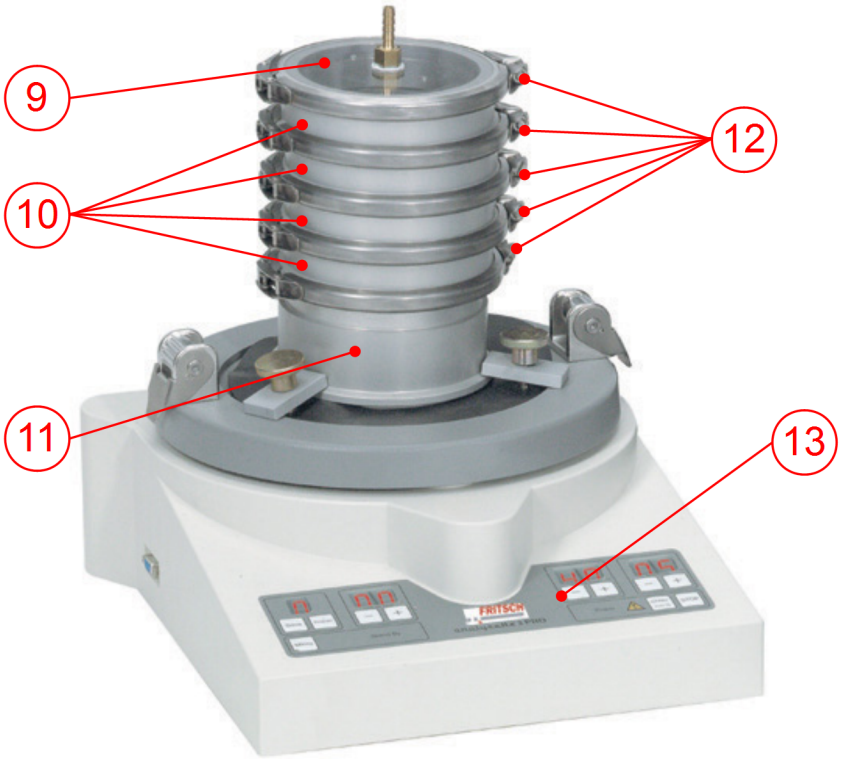

Fig. 2: ANALYSETTE 3 PRO with sieve stack for micro sieving

9 Clamping lid with a nozzle
10 Sieve spacer ring with 2 seals
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13 Control panel PRO

2 Safety information and use

2.1 Requirements for the user

This operating manual is intended for persons assigned with operating and monitoring the Fritsch der ANALYSETTE 3. The operating manual and especially its safety instructions are to be observed by all persons working on or with this device. In addition, the applicable rules and regulations for accident prevention at the installation site are to be observed. Always keep the operating manual at the installation site of the der ANALYSETTE 3.

People with health problems or under the influence of medication, drugs, alcohol or exhaustion must not operate this device.

The der ANALYSETTE 3 may only be operated by authorised persons and serviced or repaired by trained specialists. All commissioning, maintenance and repair work may only be carried out by technically qualified personnel. Qualified personnel are persons who, because of their education, experience and training as well as their knowledge of relevant standards, regulations, accident prevention guidelines and operating conditions, are authorised by those responsible for the safety of the machine to carry out the required work and are able to recognize and avoid possible hazards as defined for skilled workers in IEC 364.

In order to prevent hazards to users, follow the instructions in this manual.

Malfunctions that impair the safety of persons, the der ANALYSETTE 3 or other material property must be rectified immediately. The following information serves both the personal safety of operating personnel as well as the safety of the products described and any devices connected to them: All maintenance and repair work may only be performed by technically qualified personnel.

This operating manual is not a complete technical description. Only the details required for operation and maintaining usability are described.

Fritsch has prepared and reviewed this operating manual with the greatest care. However, no guarantee is made for its completeness or accuracy.

Subject to technical modifications.

2.2 Scope of application

The "ANALYSETTE 3 PRO" is a vertical vibrating laboratory sieve shaker used for the exact separation and classification of grain fractions. Dry bulk solids as well as particle collectives in suspensions can be analysed. Depending on feed quantity and grain size, the test sieves and sieve pans can be clamped with different diameters and heights.

CAUTION!

The conversion of the "ANALYSETTE 3 PRO" to the micro mill "PULVERISETTE 0" cannot be recommended, as the amplitude control is unusable due to the ball collision malfunctions and therefore has no utility value. In this case, the "ANALYSETTE 3" SPARTAN is more suitable.

However if you are using the PRO version with the PULVERISETTE 0 grinding attachment, note that the amplitude must not be set to > 2 mm, as otherwise damage will be caused to the device, for which we accept no responsibility.

The "ANALYSETTE 3 SPARTAN" is equivalent in design to the PRO model, except that the range of functions is limited. The serial interface, electronic amplitude control, amplitude display, interval time specification, micro sieving option as well as the standby function are not included.

2.2.1 Operating principle

The plastic housing contains a solid cast structure with an electronically controlled electromagnet. Three permanently flexible flat springs carry the pole plate of this magnet together with the vibratory plate, which is fastened to it. When the magnet is switched on, the pole plate and vibratory plate are attracted and spring back when it is switched off. The cast structure and magnet on one side and the pole plate, vibratory plate and sieves on the other side form a vibratory system.

The different number of sieves and sieving stocks or grinding attachments changes the natural frequency of the vibratory system. For this reason, it is not always possible to set the amplitude of the sieve shaker optimally e.g. with a constant 50 Hz mains frequency present. The processor-controlled electronics of the ANALYSETTE 3 PRO sieve shaker ensures a precisely adjustable, reproducible sieve amplitude. This is achieved by bringing the frequency to stimulate oscillation closer to the natural frequency of the system or farther away from it. The desired oscillation amplitude of the sieve stack between 0.1 mm and 3.0 mm can always be achieved - and with relatively low energy input. Therefore, continuous operation is possible without heating the sample material and the overall sieve system.

2.2.2 Amplitude control

An electronic control circuit guides the sieve frequency of the ANALYSETTE 3 PRO from a high to a low frequency range. In the meantime, a measuring system records the amplitude and reports it to the control circuit until the preselected amplitude is reached.

This amplitude control takes place at regular intervals during the entire operation. This makes it possible to react to changes in the sieve system.

The amplitude of the ANALYSETTE 3 SPARTAN is set manually with the Plus and Minus key on the control panel and viewed on the lid.

2.3 Obligations of the operator

Before using the der ANALYSETTE 3, this manual is to be carefully read and understood. The use of the der ANALYSETTE 3 requires technical knowledge; only commercial use is permitted.

The operating personnel must be familiar with the content of the operating manual. For this reason, it is very important that these persons actually receive the present operating manual. Ensure that the operating manual is always near the device.

The der ANALYSETTE 3 may exclusively be used within the scope of applications set down in this manual and within the framework of guidelines put forth in this manual. In case of non-compliance or improper use, the customer assumes full liability for the functional capability of the ANALYSETTE 3 and for any damage or injury arising from failure to fulfil this obligation.

By using the der ANALYSETTE 3 the customer agrees with this and recognizes that defects, malfunctions or errors cannot be completely excluded. To prevent risk of damage to persons or property or of other direct or indirect damage, resulting from this or other causes, the customer must implement sufficient and comprehensive safety measures for working with the der ANALYSETTE 3.

Neither compliance with this manual nor the conditions and methods used during installation, operation, use and maintenance of the der ANALYSETTE 3 can be monitored by Fritsch GmbH. Improper execution of the installation can result in property damage and thus endanger persons. Therefore, we assume absolutely no responsibility or liability for loss, damage or costs that result from errors at installation, improper operation or improper use or improper maintenance or are in any way connected to these.

The applicable accident prevention guidelines must be complied with.

Generally applicable legal and other obligatory regulations regarding environmental protection must be observed.

2.4 Information on hazards and symbols used in this manual

Safety information

Safety information in this manual is designated by symbols. Safety information is introduced by keywords that express the extent of the hazard.

DANGER!

This symbol and keyword combination points out a directly hazardous situation that can result in death or serious injury if not avoided.

Safety information and use

WARNING!
This symbol and keyword combination points out a possibly hazardous situation that can result in death or serious injury if not avoided.

CAUTION!
This symbol and keyword combination points out a possibly hazardous situation that can result in slight or minor injury if not avoided.

NOTICE!
This symbol and keyword combination points out a possibly hazardous situation that can result in property damage if not avoided.

Special safety information

To call attention to specific hazards, the following symbols are used in the safety information:

DANGER!
This symbol and keyword combination points out a directly hazardous situation due to electrical current. Ignoring information with this designation will result in serious or fatal injury.

DANGER!
This symbol and keyword combination designates contents and instructions for proper use of the machine in explosive areas or with explosive substances. Ignoring information with this designation will result in serious or fatal injury.

DANGER!
This symbol and keyword combination designates contents and instructions for proper use of the machine with combustible substances. Ignoring information with this designation will result in serious or fatal injury.

WARNING!

This symbol and keyword combination points out a directly hazardous situation due to movable parts. Ignoring information with this designation can result in hand injuries.

WARNING!

This symbol and keyword combination points out a directly hazardous situation due to hot surfaces. Ignoring information with this designation can result in serious burn injuries due to skin contact with hot surfaces.

Safety information in the procedure instructions

Safety information can refer to specific, individual procedure instructions. Such safety information is embedded in the procedure instructions so that the text can be read without interruption as the procedure is being carried out. The keywords described above are used.

Example:

1. Loosen screw.
2. 

   CAUTION!

   Risk of entrapment at the lid.

   Close the lid carefully.
3. Tighten screw.

Tips and recommendations

This symbol emphasises useful tips and recommendations as wells as information for efficient operation without malfunction.

2.5 Device safety information

Please observe!

- Only use original accessories and original spare parts. Failure to observe this instruction can compromise the safety of the machine.
- Accident-proof conduct is to be strictly followed during all work.
- Comply with all currently applicable national and international accident prevention guidelines.

Safety information and use

CAUTION!

Wear hearing protection!

If a noise level of 85 dB(A) is reached or exceeded, ear protection should be worn to prevent hearing damage.

WARNING!

The maximum accepted concentration (MAC) levels of the relevant safety guidelines must be observed; if necessary, ventilation must be provided or the machine must be operated under an extractor hood.

DANGER!

Explosion hazard!

- When Sieben oxidizable substances, e.g. metals or coal, there is a risk of spontaneous combustion (dust explosion) if the share of fine particles exceeds a certain percentage. When Sieben these kinds of substances, special safety measures must be taken and the work must be supervised from a specialist.
- The high-speed rotor mill is not explosion protected and is not designed to sieve explosive materials.

- Do not remove the information signs.

NOTICE!

Immediately replace damaged or illegible information signs.

- Unauthorised alteration of the der ANALYSETTE 3 will void Fritsch's declaration of conformity to European directives and void the guarantee.
- Only use the der ANALYSETTE 3 when it is in proper working order, as intended and in a safety- and hazard-conscious manner adhering to the operating manual. In particular, immediately rectify any malfunctions that could pose a safety hazard.
- If, after reading the operating manual, there are still questions or problems, please do not hesitate to contact our specialised personnel.

2.6 Protective equipment

Protective equipment is to be used as intended and may not be disabled or removed.

All protective equipment is to be regularly checked for integrity and proper functioning.

NOTICE!

– The toothed belts must only be released or clamped in the switched off state.
– Before switching on again, ensure that the two toothed belts are evenly, tightly clamped using the knurled knobs.

2.7 Hazardous points

- Crushing hazard at the sieve tensioning system
- Crushing hazard between vibratory plate and housing

2.8 Electrical safety

2.8.1 General information

The main switch separates the device from the mains on two poles.

2.8.2 Protection against restart

After switching off at the main switch and switching on again, the START key must be pressed for start-up.

2.8.3 Overload protection

The mains fuse provides overload protection.

3 Technical data

3.1 Dimensions

Without sieve set:

350 x 200 x 400 mm (width x height x depth)

3.2 Weight

Net: 21 kg

Gross: approx. 27 kg

3.3 Operating noise

Emissions value of workplace according to DIN EN ISO 3746:2005 is up to 76.6 dB (A) for sieving gravel. The value fluctuates, depending on frequency, grinding stock and use of sieving aids.

When grinding with the PULVERISETTE 0, the operating noise is greatly reduced by using the sound absorption hood made of plexiglas (order no.: 00.0130.17).

3.4 Voltage

The device can be operated in two voltage ranges:

- Single phase alternating current 115V ± 10% and
- Single phase alternating current 230 V ± 10%.
  (See also *Chapter 4.5 'Electrical connection' on page 19*)
  It is not necessary to change the voltage range manually.

3.5 Current consumption

Depending on the mains voltage, the maximum current consumption is in the ranges:

- 115 V → 0.44 A
- 230 V → 0.22 A

3.6 Power consumption

Depending on the voltage range, the maximum power consumption is approx. 50 W.

3.7 Electrical fuses

- Fuse under mains switch (on the back of the device)
  Replacement: 4 A M micro fuse, 5 x 20 mm

3.8 Load

The maximum load of the ANALYSETTE 3 for the sieve set with sieving stock is up to 3 kg!

3.9 Sieve mesh widths that can be used

- **Dry sieving**
  100 µm to 25 mm (without sieving aids); 32 µm to 25 mm (with sieving aids)
- **Wet sieving**
  20 µm or greater
- **Micro sieving** (PRO version only)
  5 µm to 100 µm

3.10 Protection class

IP 54

4 Installation

4.1 Transport

The device is delivered in a cardboard box. In the case of delivery with several accessories, the device is delivered in a transport crate.

WARNING!

Improper lifting can lead to personal injury or property damage. The machine must only be lifted with suitable equipment by qualified personnel.

The guarantee excludes all claims for damage due to improper transport.

4.2 Unpacking

- In the case of delivery in a crate, pull out the nails that fasten the lid to the surrounding packaging.
- Remove the lid.
- Take out the accessories.
- To remove the device, three hexagon screws under the wooden plate must be unscrewed.
- Compare the contents of the delivery with your order.

Keep the wooden plate, screws and washers, as this transport securing device must be reattached in the case of further transport or return.

4.3 Setting up

- Place the device on a flat, stable surface. It does not have to be fastened to the surface. Leave sufficient space beside the device for placing the accessories used.
- The space behind the device must be freely accessible so that the main switch on the mains connection can be accessed quickly in case of emergency.
- The device rests on three flat coil spring assemblies. Level the sieve shaker:
  - **ANALYSETTE 3:**

    Level the sieve shaker by screwing these feet in or out so that during sieving, the sieving stock is evenly distributed across the entire sieve surface.

4.4 Ambient conditions

WARNING!

Mains voltage!

- The device may only be operated indoors.
- The surrounding air may not carry any electrically conductive dust.
- Maximum relative humidity 80% for temperatures up to 31°C, linearly decreasing down to 50% relative humidity at 40°C.

- The room temperature has to stay between 5 - 40°C.
- Altitudes up to 2000 m
- Degree of pollution 2 according to IEC 664.

4.5 Electrical connection

Before establishing the connection, compare the voltage and current values stated on the type plate with the values of the mains system to be used.

CAUTION!

Ignoring the values on the type plate may result in damage to the electrical and mechanical components.

4.5.1 Adjusting the mains voltage

4.5.1.1 Version SPARTAN and PRO (valid till serial number 05727)

CAUTION!

If the value 01 is set at a voltage of 230V~, it will result in a defect in the sieve shaker during operation. Failure to observe this will render void the guarantee, and releases us from liability for any resulting damage to the device.

NOTICE!

Only qualified personnel may change the voltage range on the device!

1. Switch main switch to "0".
2. Switch the device on at the main switch while holding down the Stop key.

   The device is now in "Setup" mode.
3. The "Sieving Time" display now shows the default setting "02" for 230 V, "01" for 115 V.
4. These values can be changed with the "Sieving Time" +/- key and adapted to the mains voltage.

   - 230 V - 02
   - 115 V - 01

   Save the set values by clicking the stop key.
5. After making adjustments, switch on the main switch again.

4.5.1.2 Version PRO (valid from serial number 06000) and Version SPARTAN (valid from serial number 05000)

CAUTION!
If the value 01 is set at a voltage of 230V~, it will result in a defect in the sieve shaker during operation. Failure to observe this will render void the guarantee, and releases us from liability for any resulting damage to the device.

NOTICE!
Only qualified personnel may change the voltage range on the device!

1. Switch main switch to "0".
2. Switch the device on at the main switch while holding down the Stop key.

   The device is now in "Setup" mode.
3. The "Sieving Time" display now shows the default setting "02" for 230 V, "01" for 115 V.
4. These values can be changed with the "Sieving Time" +/- key and adapted to the mains voltage.

   - 230 V - 02
   - 115 V - 01

   Save the set values by clicking the stop key.
5. After making adjustments, switch on the main switch again.

5 Initial start-up

Perform initial start-up only after all work as described in *Chapter 4 'Installation' on page 18* has been carried out.

5.1 Switching on

- The device must be connected to the power supply if this has not been done already.
- Switch on the device with the main switch on the back of the device.
- The POWER lamp on the control panel lights up.
- The displays show the default setting.

5.2 Function check

- Clamp 2 test sieves (2) with clamping lid (1).
- Set the amplitude to 2 mm (See *Chapter 6.7 'Setting the amplitude' on page 31*)
- When everything is correctly clamped, start the function check with "START".

Whether the set amplitude has been reached can be checked on the display or on the amplitude plate on the lid.

5.3 Switching off

- Press the STOP key and switch off the main switch.

6 Using the device

6.1 Sieving with the ANALYSETTE 3

6.1.1 Fitting and clamping the sieves

On the vibratory plate, it is possible to fit up to

- 10 sieves with a height of 50 mm (or 2") or

- 16 sieves with a height of 25 mm (or 1")

between the sieve pan (collecting vessel) and clamping lid. The combination of sieves and sieve pan is called a sieve stack.

Make sure not to clamp more than 6 kg on the ANALYSETTE 3 (sieve stack + sieving stock).

1. The sieves are placed onto the sieve pan (with increasingly larger mesh widths, i.e. finest sieve at the bottom) and loosely inserted into one another with seal rings until the sieve stack is complete.

NOTICE!

The sieve mesh width must increase from the bottom to the top. Information on the appropriate order for staggering the sieve mesh widths and on conducting a sieve analysis can be obtained from:

- the DIN 66 165 standard, Parts 1 and 2,
- the AUTOSIEVE program and / or
- our laboratory for technical applications.

2. Unscrew the knurled knob on the toothed belt as far as possible.

3. Move the clamping lever on the belt clamping device downwards and insert the toothed belt through the holder from the inside to the outside. The teeth of the toothed belt interlock with the teeth of the belt clamping device.

4. Place the sieve stack with the sieve pan centrally on the rubber pad of the vibratory plate.

5. Place the sieving stock into the top sieve.

6. Fit the clamping lid so that the inner rubber surface seals the sieve edge.

7. Attach the knurled knob with the tension belt fitting to the clamping lid.

8. Lightly pull the toothed belt tight and move it upwards until its teeth interlock with the teeth of the belt clamping device.

9. Move the clamping lever upwards.

Make sure that the teeth of the toothed belt interlock with the teeth of the belt clamping device!

10. Then attach the knurled knobs to the holders of the sieve cover!

11. By turning the knurled knobs to the right, tighten the sieve stack evenly until the toothed belts are tightly clamped!

If the two toothed belts are not evenly clamped, it is possible that the sieving stock will not be distributed evenly across the sieve surface.

12. Loosen the sieve tensioning system after sieving:

Unscrew both knurled knobs by turning them to the left in parallel until the knurled knobs can be removed from the holders on the sieve cover. Remove the knurled knobs with tension belt fitting from the clamping lid and place them beside the machine. Take down the sieve stack completely and weigh it.

6.1.2 Multiple sieving

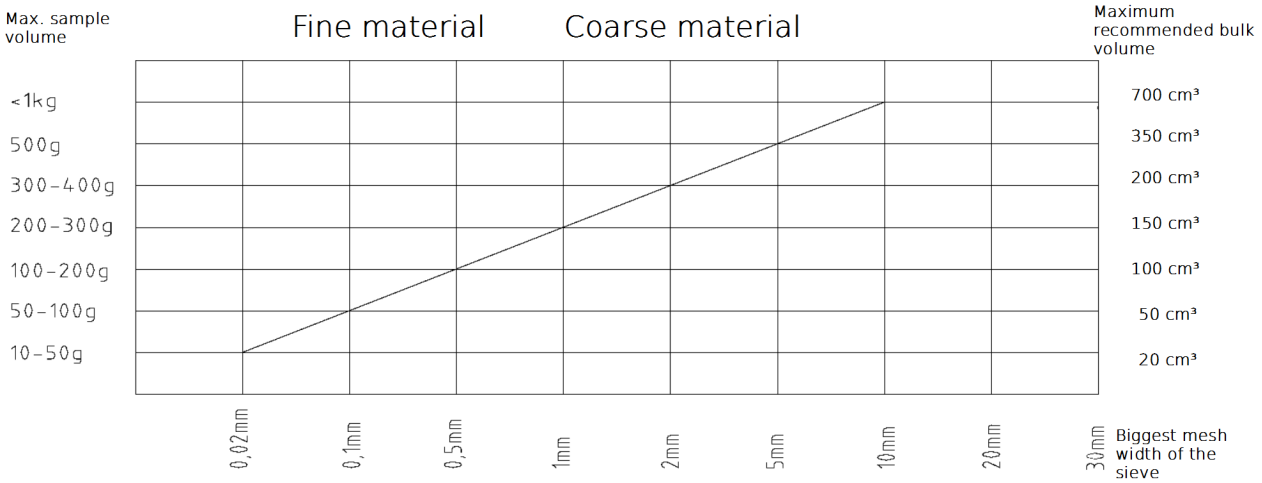
Due to the special shape of the intermediate sieve pan, two or three sievings (two or three sieve sets on top of each other) can be carried out in a single step.

Setup example:

Sieve pan with 2 sieves and sample, intermediate sieve pan with 2 sieves and sample on top of that, the intermediate sieve pan with 2 sieves and sample material on top of that again.

6.1.3 Feed quantity for dry or wet sieving

(Sieves with 200 mm diameter)



Maximum load:

sieving stock < 2 kg depending on the weight of the sieve stack

Sieves and sieving stock < 6 kg

NOTICE!

Depending on the material, a load of 6 kg can lead to a reduction of the amplitude. Continuous operation at reduced amplitude can cause damage to the device. Example: When using 10 sieves with sieve pot and lid, a weight of about 4.5 kg can be reached without sample material. Accordingly the amount of the sieving stock should be reduced so that the maximum weight of 6 kg is not exceeded.

NOTICE!

Sieving stock with a high density can damage fine-meshed sieves. Observe therefore the specification in the diagram that the sieving stock does not exceed the maximum sample quantity.

6.2 Dry sieving

For dry sieving, use the dry sieve pan (without outlet) and the dry clamping lid (plexiglas clamping lid without nozzles).

6.2.1 Sieving parameters

Parameters	Coarse sample	Fine sample
Sieving time	3...20 min	15....30 min
Amplitude	2.5....3 mm	1.5....2.5 mm

In order to achieve an amplitude set point of 3 mm (full deflection), at least 3 sieves, collecting vessels and clamping lids must be clamped on the sieve shaker. If fewer sieves are clamped, it may not be possible to achieve an amplitude set point of 3 mm.

In this case, the sieve shaker controller can no longer set the optimal working point; the sieve shaker vibrates with a lower amplitude and frequency. The amplitude set point must be reduced accordingly in this case. When the machine has warmed up, the set point can be increased accordingly.

6.2.2 Sieving aids

To shorten the sieving time, sieving aids can be attached in each of the sieves that have mesh widths larger than 32 µm. During sieving, the balls jump on the sieves and accelerate the output of the sieving stock.

The following sieving aids:

- **Agate balls**
  5 mm Ø: 15 pieces per sieve or
- **Agate balls**
  10 mm Ø: 10 pieces per sieve or
- **Rubber balls**
  20 mm Ø: 5 pieces per sieve or

can be used.

6.3 Wet sieving

CAUTION!
Do not use highly flammable and flammable liquids such as ketones and benzines.

For wet sieving, use the wet sieve pan (with outlet and outlet hose) and the wet clamping lid (plexiglas clamping lid with two rotation nozzles).

Place the preferably well-dispersed sieving stock (see *Chapter 6.3.2 'Wetting agents' on page 26*) into the top sieve and clamp the wet clamping lid.

CAUTION!
Do not allow any liquids to flow into the device.

6.3.1 Sieving parameters

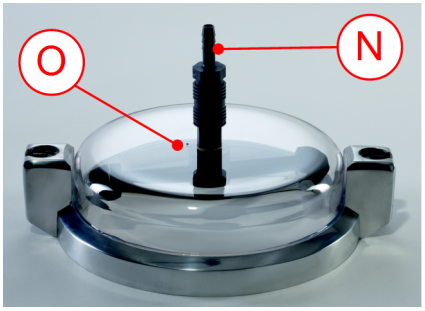
Parameters	Average	High percentage of fine ground material
Sieving time	3...10 min	approx. 15 min
Amplitude	2...2.5 mm	

6.3.2 Wetting agents

Wetting agents improve dispersion.

- Add tensides in liquid form (washing-up liquid, Dusazin etc.) in small amounts only (dropwise), to prevent frothing.
- Add inorganic or organic salts like tetrasodium diphosphate or sodium lauryl sulfate and poly salts in amounts of 0.1 - 0.5 %.

6.3.3 Feeding the rinsing liquid



At the quick-release coupling (N) on the plexiglas clamping lid with 2 rotation nozzles, connect a hose (with hose clamp), through which the rinsing liquid can be fed. Feed just enough water or alcohol (only possible with additional pump) to prevent a backup in the sieve set.

The maximum amount of liquid is determined by 2 rotating nozzles on the clamping lid (approx. 1.5 l/min at approx. 2 bar).

Make sure that the liquid flows evenly out of the wet sieve pan - this is a sign of good distribution of sieving stock and liquid.

If the liquid stops flowing, it indicates that there is a backup in one of the sieves. Close the inlet and check the sieves for a possible backup. The overpressure caused by the backup in the sieve stack can cause irreparable damage to the sieve mesh wire.

If there is a backup in the sieve set, we recommend reducing the sample quantity, switching on the "Interval" mode or using the intermediate sieve ring (see Chapter 6.3.5 'Tips for wet sieving of difficult sieving stock' on page 27).

Make sure that the small opening (O) in the wet clamping lid is open - only then does it prevent overpressure from developing and possible damage to the sieve mesh wire.

Through this opening (O) in the wet clamping lid, it is also possible to refill wetting agent if necessary (e.g. with a pipette), as wetting agent gets washed out during lengthy sieving times.

Before adding wetting agent through the opening (O), please stop the sieve shaker with the Stop key.

6.3.4 Extracting the passing particles

In order to extract the rinsed out fine particles, the outlet hose can be connected e.g. to a suction funnel with filter paper.

Clear liquid flowing from the sieve pan indicates the end of the sieving process.

6.3.5 Tips for wet sieving of difficult sieving stock

- For wet sieving of difficult sieving stock, reduce the feed quantity and choose sieves with closely staggered mesh widths.
- Switch on Interval mode; sieving time: 3...5s (only possible with ANALYSETTE 3 PRO)
- After the top sieve has sieved completely (is free of fine particles) remove the top sieve after taking off the clamping lid and clamp the clamping lid on the next sieve. Now the spray jets work directly on the following fraction. Proceeding in this way makes it possible to sieve each individual sieve of the sieve set directly using spray jets. The spray jets are directed so that the sieving stock is rinsed from the edge of the sieve towards the middle. In the process, the clamping lid (plexiglas lid) is also sprayed and kept free of material.

- When wet sieving difficult sieving stock, insert an intermediate sieve ring (order no.: 31.0240.00) over a lower sieve to avoid a backup on it. After this ring is connected to the hose system, additional liquid is sprayed in through three nozzles and thus counteracts a possible backup. These nozzles are arranged so that the lower as well as the upper sieve surfaces are sprayed. This arrangement also circulates the sieving stock. If necessary, a further intermediate sieve ring can also be mounted above a sieve that is prone to backup.

6.4 Micro-precision sieving with the ANALYSETTE 3 PRO

6.4.1 Sieving parameters

Parameters	1 micro sieve	Max. 4 micro sieves
Sieving time	20...30 min	60 min
Amplitude in "MICRO" operating mode	0.1...0.2 mm	0.5 mm

6.4.2 Feed quantity

Depending on particle size and sieve aperture size, it is possible to sieve a maximum of 200 mg (up to 1 g for coarse sieves of 50 - 100 µm). Determine the suitable feed quantity through experiment.

NOTICE!

The device **must** be in "MICRO" operating mode. The "MICRO" key must light up, otherwise there is a risk of destroying the sieves.

In the "MICRO" operating mode the amplitude is limited, so that only values between 0.1 and 0.5 mm can be selected.

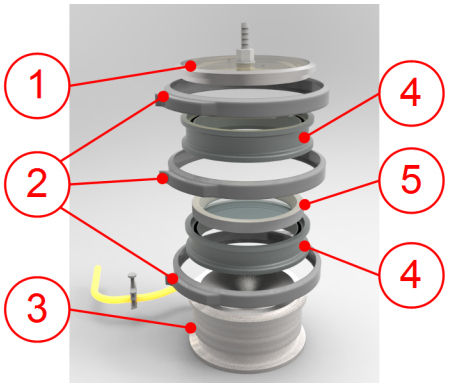
NOTICE!

For sieving with micro-precision sieves, the toothed belts for dry or wet sieving should be removed from the belt clamping device. (See *Chapter 6.1.1 'Fitting and clamping the sieves' on page 22*).

6.4.3 Fitting the micro-precision sieves

NOTICE!

Clamp a maximum of 4 micro-precision sieves!



1 Clamping lid with a nozzle
2 Clamping ring with fast locking clamp
3 Sieve pan (with funnel)
4 Sieve spacer ring with 2 seals
5 Micro-precision sieve

- Turn the rubber pad on the vibratory plate until three caps can be seen; there are three threaded bore holes under the caps.
- Take off the caps and screw the sieve pan (with funnel) (3) onto the centre of the vibratory plate using the clamping elements and knurled screws. The three clamping elements are now lying on the lower edge of the sieve pan and the vibratory plate.
- Close the hose with a hose clamp.
- Switch on the sieve shaker in "MICRO" operating mode.
- Fasten the first spacer ring onto the sieve pan (3) using the clamping ring (2).
- Then, fill the sieve pan with the funnel (3) and the spacer ring (4) with liquid up to the seal ring.
- Fit the first sieve (5) - sieve foil at the bottom - tilted at first so that the air under the sieve can escape.
- Lower the sieve slowly. The liquid now rises above the sieve foil.
- Place another spacer ring (4) on the sieve and fasten both spacer rings to one another with a clamping ring (2).

- If several sieves are used in the sieve stack, attach the subsequent sieves in the same manner.
- Fill every sieve with liquid before fitting the next sieve.
- Fasten the sieve cover (1) on the top spacer ring using a clamping ring (2).
- Connect a hose (with hose clamps) to the coupling on the sieve cover, through which water can be fed.

6.4.4 Wet sieving with micro-precision sieves

Remove the lid and pour the sieving stock in suspensions onto the top sieve. Liquid can be sprayed in through the nozzle in the lid. Keep in mind, however, that consumption can be considerably reduced by the time sieving is finished; it is therefore necessary to adjust the quantity of liquid.

Introducing the liquid (water or alcohols) using a spray bottle has proven successful. It makes it possible to disperse the sieving stock in a targeted manner and accelerate sieving progress (=sieving without sieve cover).

When sieving in the top sieve is finished, lower the liquid level to the height of the sieve foil, close the outlet again and reduce the amplitude to 0.1 - 0.2 mm. Then remove the sieve cover, spacer ring and the sieve.

Do not switch off the device during this work. When the device is switched off, the sample material can stick or glue to the sieves.

Transfer (rinse) the sieve residue into weighed bottles and dry it.

Now the lower sieves can be sieved further. Continue dismantling as described above.

NOTICE!

The sieve stack must remain filled with liquid during the entire sieving process.

The sieve foils must not run dry!

That can cause irreparable damage to the sieves.

Torn sieve foils can be soldered with soft solder, point by point from underneath.

6.5 Standby

If the device is not operated for approx. one hour, it switches to energy-saving mode (STANDBY). Only the STANDBY lamp lights up.

The device is switched to normal mode by pressing the START key. The POWER lamp lights up, the STANDBY lamp goes out.

6.6 Setting the sieving time

If you press the STOP button during Siebung, the Siebung is paused and can be resumed with START. If you want to start Siebung from the beginning, press and hold the STOP button for 2 seconds after pausing. The timer is reseted. The timer display flashes 2 times with '00' to confirm.

The sieving time can be set in increments of minutes using the +/- keys. Values between 1 and 99 minutes are possible; after a sieving time of 1 hour, let the device cool down.

Continuous operation is set by holding down the "-" key until "P" or "00" appears on the display.

6.7 Setting the amplitude

Selecting the amplitude:

- The vertical oscillation amplitude can be set in 0.1 mm steps using the + / - keys. Values between 0.1 and 3 mm can be set with the ANALYSETTE 3 PRO.

  If the MICRO key is pressed (MICRO lights up), an amplitude between 0.1 and 0.5 mm can be set. (ANALYSETTE 3 PRO only!)

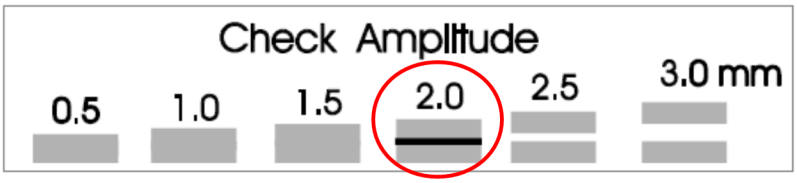
6.7.1 Displaying the amplitude

After ANALYSETTE 3 PRO is started, the display above the amplitude setting indicates the actual amplitude.

When the sieving or grinding process is finished the display shows the selected amplitude.

The amplitude can also be checked on the amplitude plate on the clamping lid. (ANALYSETTE 3 SPARTAN) The lines that appear to touch one another display the set amplitude. The principle is based on the persistence of vision of the human eye.

Example for 2 mm amplitude:



The amplitude in the ANALYSETTE 3 PRO is measured in regular intervals by the device and readjusted if necessary.

6.8 Interval time

Application:

For sieving bulky material with a low density, to shorten the sieving time and in case of a backup during sieving.

The length of the sieving interval can be selected in increments of seconds using the + / - keys. The pause interval is basically 1 second long for sieving times between 1 - 30 seconds.

Continuous operation is set by holding down the "-" key until "P" or "00" appears on the display.

When sieving particularly light sieving stock (e.g grains or plastic), the sieving pauses speed up the sieving process considerably, since the light sieving stock in the sieving pause can fall through the moving mesh wire of the sieve onto the next finest sieve fraction.

6.9 Saving and invoking the settings

It is possible to save the amplitude settings: sieving time/grinding duration, interval length and MICRO on/off. There are 9 memory locations provided for this.

- Save settings: Press SAVE key
- Invoke settings: Press PROGRAM key

When the PROGRAM key is pressed, the 9 memory locations appear in turn and the settings are displayed.

6.10 Micro sieving

After pressing the MICRO key, a control lamp in the key lights up and the amplitude is set to 0.1 mm. Now an amplitude of max. 0.5 mm can be selected. Pressing the MICRO key again switches off the limit.

If the device is in operation, it cannot be switched to "MICRO" operating mode.

If the device is operated with the settings of a memory location 1-9, no settings can be changed during operation. If program 0 is displayed on the display, settings can also be changed during operation.

7 Accessories

7.1 AUTOSIEVE program

Together with the AUTOSIEVE program package, the serial interface makes it possible to control all functions of the sieve shaker using a computer and to ensure the reproducibility of the sieving processes.

The automatic evaluation of sieving results has also reduced the workload. With the help of the AUTOSIEVE program package and scales, sieving results can be displayed and saved in different forms after weighing the individual fractions.

7.2 Connecting the PRO sieve shaker to the serial interface

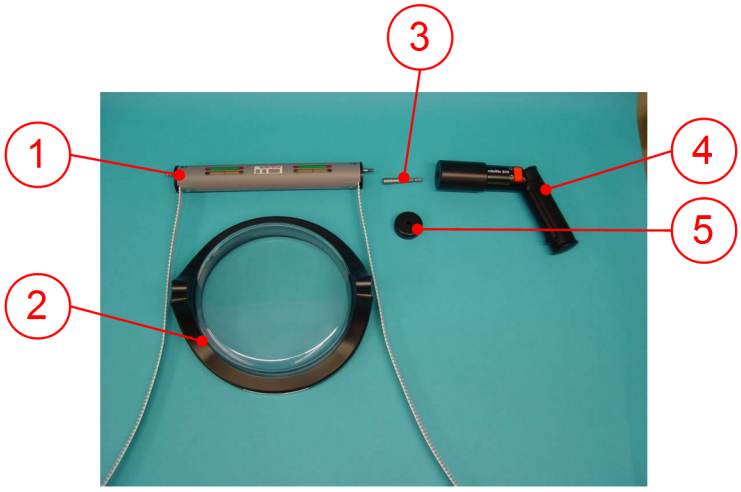
Screw the 9-pin D-SUB socket of the connecting cable included with the AUTOSIEVE program to the D-SUB multi-pin connector of the sieve shaker using its screw connection. Plug the other end of the connecting cable into the serial interface of the computer using the 9-pin plug.

7.3 Sound absorption hood

In order to reduce the operating noise of the micro mill a sound absorption hood (Art. no. 00.0130.17) is available.

7.4 TorqueMaster

As an alternative to standard clamping devices, the TorqueMaster can be used for faster and more accurate clamping.



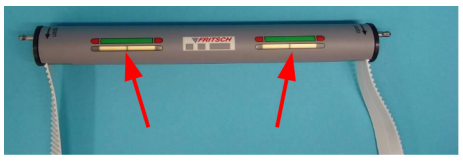
1 TorqueMaster clamping unit with toothed belt
2 Clamping lid
3 Hexagon socket bit (5.5)
4 Cordless screwdriver (with battery and charger)
5 Unclamping aid

NOTICE!

The unclamping aid included is to be used exclusively for releasing a clamped sieve stack (in case of malfunction of the cordless screwdriver). The unclamping aid has no torque limitation, and if it is used for clamping, prevention of operating errors and possible irreparable damage to the clamping unit can therefore not be guaranteed.

7.4.1 Fitting the TorqueMaster clamping device

The sieves are fitted as described in *Chapter 6.1.1 'Fitting and clamping the sieves' on page 22*. To clamp using the TorqueMaster proceed as follows:



1. The starting position of the clamping system is the position at which both indicators are roughly in the centre of the respective display range.

   This position later ensures that sieve stacks of various heights can be clamped easily, or that there is sufficient space to release the system, remove it from the sieve stack and place it behind the device.

2. Insert the toothed belt in the belt clamping device as described in *Chapter 6.1.1 'Fitting and clamping the sieves' on page 22*.
3. Insert the sieve set and pour in the sieving stock.
4. Fit the TorqueMaster clamping lid.
5. Place the clamping unit on the clamping lid. The clamping unit must be fitted as centrally as possible.

> **NOTICE!**
> This symmetry is ensured by correctly adjusting and securing the toothed belt.

6. Lightly tighten the toothed belts on both sides and move the clamping lever upwards, as described in *Chapter 6.1.1 'Fitting and clamping the sieves' on page 22* under point 9.

> *Make sure that both indicators remain in their central position.*

7. The clamping system can now be clamped using the cordless screwdriver.

7.4.2 Clamping the TorqueMaster

Clamping with a cordless screwdriver until it disengages applies a reproducible force of ~ 1 kN to the sieve cover.

Clamping processes during which the friction clutch of the cordless screwdriver does not disengage (e.g. due to defect, dead battery or operating error) do not provide the desired clamping force.

> *The correct clamping force is only achieved if the friction clutch of the cordless screwdriver triggers during the clamping process.*

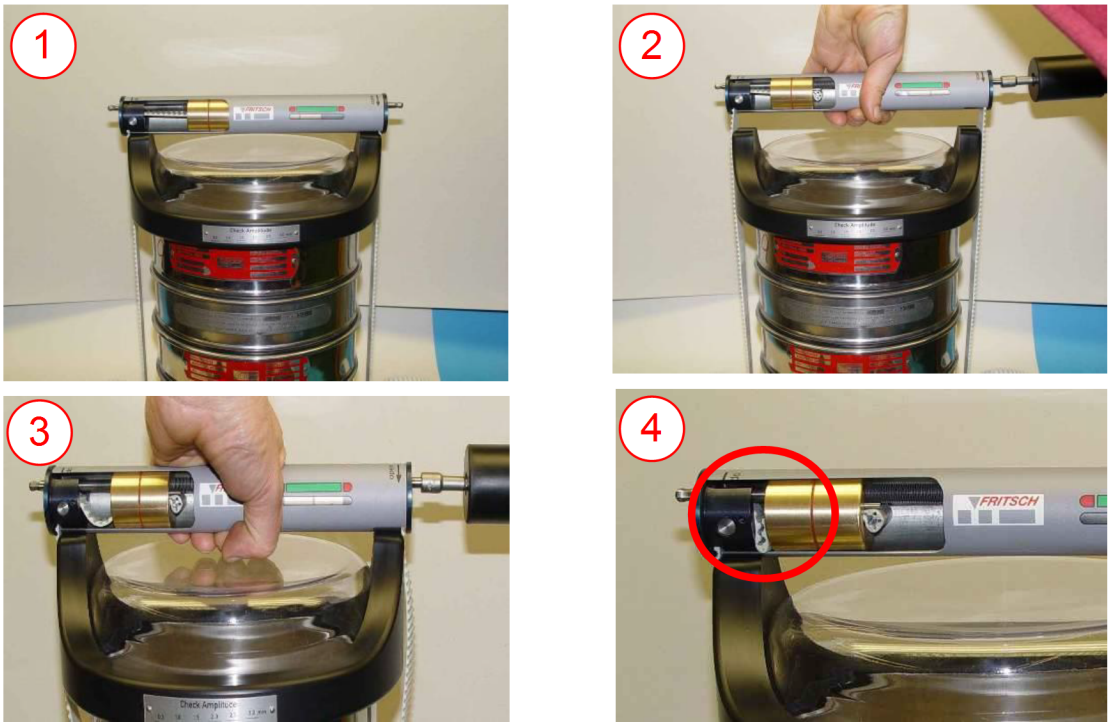
The clamping unit must be operated with the defined disengagement torque of the control element (cordless screwdriver). This disengagement torque must be set by the clamping system manufacturer. Thus other cordless screwdrivers, which were not set by Fritsch, must not be used. If cordless screwdrivers with too high a torque are used, it will cause irreparable damage to the clamping system for which no liability can be assumed.

The use of cordless screwdrivers that merely have a lower torque will result in the sieve stack being clamped with an insufficient clamping force.

CAUTION!

Follow the separate operating instructions of the cordless screwdriver manufacturer. These are included with the device.

When clamping, make sure to lift the TorqueMaster slightly (illustration 1 + 2). If the toothed belt is not slightly tensioned, it will be crushed in the TorqueMaster (illustration 3 + 4).



7.4.3 Releasing the TorqueMaster

The TorqueMaster clamping device is also released with the cordless screwdriver.

The clamping unit is released far enough so that it can be placed behind the device without changing the toothed belt clamp in the belt clamping device.

The clamped toothed belts on the belt clamping device is only released or adjusted, when the number or height of the sieves in the sieve stack changes.

7.4.4 TorqueMaster malfunctions

For all functions, the two indicators of the clamping unit must be in the green area. If one or both indicators are in the red area, proceed according to the following table.

Malfunction	Possible causes	Rectify fault
Both indicators in outer red area	Clamping unit open too much	Open the clamping unit to a lesser degree, the toothed belt clamp is possibly too tight and must be loosened by one tooth at the belt clamping device on both sides.
	Clamping unit must be opened far enough to allow it to be deposited / clamping unit not attached according to instructions	Attach according to instructions.
Both indicators in inner red area respectively	Clamping unit closed too much / clamping unit not attached according to instructions	Attach according to instructions.
An indicator in red area on one side	Clamping system attached "very" asymmetrically	Attach according to instructions. Make sure that the toothed belt is fastened symmetrically in the belt clamping device.

7.4.5 Compatibility

The TorqueMaster must be used with the toothed belt clamping device (03.3120.00). The design and proper use of this combination will rule out any damage to the toothed belt.

Generally, the TorqueMaster can also be used with the older belt clamping device (03.1210.00). However, this combination leads to increased wear and is therefore not recommended.

7.5 Conversion to vibratory sieve shaker PULVERISETTE 0

The ANALYSETTE 3 can also be used as a vibratory micro mill PULVERISETTE 0 by using a mortar and the corresponding grinding ball.

The "vibratory" micro mill PULVERISETTE 0" is used for fine comminution of dry laboratory sample material or suspensions. For homogenising emulsions or pastes.

7.5.1 Conducting a grinding operation

7.5.1.1 Fitting and clamping the mortar

1. Move the clamping lever on the belt clamping device downwards and insert the toothed belt through the holder from the inside to the outside. (See *Chapter 6.1.1 'Fitting and clamping the sieves' on page 22*).
2. Place the mortar and the ball on the vibratory plate. The mortar must be positioned in the round gap of the vibratory plate without being wedged.
3. Unscrew the knurled knob on the toothed belt as far as possible.
4. Pour in the grinding stock.
5. Put on the clamping lid.
6. Attach the knurled knob to the lid
7. Lightly pull the toothed belt tight and move it upwards until its teeth interlock with the teeth of the belt clamping device.
8. Move the clamping lever upwards.

Make sure that the teeth of the toothed belt interlock with the teeth of the belt clamping device!

9. By turning the knurled knobs to the right, tighten the mortar evenly until the toothed belts are tightly clamped!

If the two toothed belts are not evenly clamped, it is possible that the grinding stock will escape from the mortar.

Select an amplitude for grinding at which the ball vibrates. The best grinding results can be achieved at a medium amplitude (1 mm to max. 2 mm), as the impact frequency of the grinding ball is then highest.

Similar to the ANALYSETTE 3 SPARTAN, the amplitude is set manually with the Plus and Minus key on the control panel and viewed on the lid. (See *Chapter 6.7.1 'Displaying the amplitude' on page 31*).

NOTICE!

Do not allow the grinding balls to jump too high. This can cause damage to the lid!

Start grinding at low a amplitude and increase it slowly - do not select an amplitude that is too high! (≤ 2 mm)

There is a risk of the grinding ball destroying the lid. The grinding stock can be added to the mortar bowl either dry or in suspension.

CAUTION!
Do not allow any liquids to flow into the device.

To reduce the grinding noise, we recommend using a sound absorption hood (order no. 00.0130.17).

7.5.1.2 Parameters

Grinding duration	10 ... 30 min (average)
Amplitude	1 ... 2 mm (max.)
Feed quantity	Max. 10 ml (particle feed size $\leq$ 5 mm)

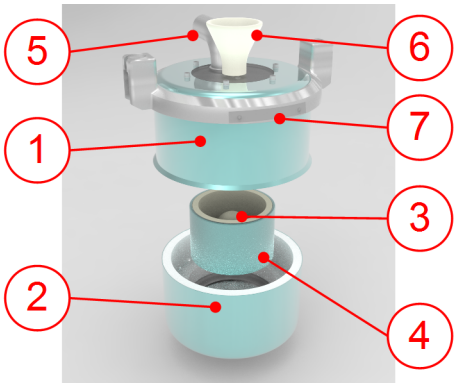
7.5.1.3 Grinding with liquid nitrogen

CAUTION!
Only use grinding vessels and grinding balls made of stainless steel, tungsten carbide or zirconium oxide for grinding with liquid nitrogen.

The device for grinding in liquid nitrogen (no. 00.2000.00) should be used to embrittle the grinding stock in liquid nitrogen. In this thermally-insulated cryo-box, the grinding vessel and the grinding ball can be cooled down considerably, and only small amounts of liquid nitrogen must be refilled during grinding.

CAUTION!
When handling liquid nitrogen, the Guidelines for Laboratories, BGR 120, in particular Chapter 5.4.6, must be observed as well as the other relevant guidelines and codes of practice.

Suitable protective clothing, particularly safety goggles and heat-resistant gloves must be worn. Only the smallest possible amounts should be handled. Make sure that the laboratory is adequately ventilated.



1 Upper part
2 Lower part
3 Grinding ball 50 mm
4 Mortar
5 Bent tube ventilation
6 Funnel for liquid nitrogen
7 Amplitude display

The lower part (2) is placed on the vibratory plate and the mortar with ball (3) and grinding stock is placed into the plastic surround. Then the upper part (1) is placed on the lower part, so that the seal ring in the upper part is resting on the mortar edge and the bent ventilation tube (5) is facing backwards and the amplitude display (7) is facing forwards. The device is then clamped like a normal sieve set.

Liquid nitrogen is then poured in carefully through the funnel (6); it evaporates immediately and escapes through the bent ventilation tube. The boiling nitrogen can be observed through the transparent Makrolon screen. Nitrogen is added until the amount of vapour escaping decreases. The grinding elements can then be cooled down enough for grinding to begin. The same must be observed as for normal grinding with the PULVERISETTE 0 as described above. (See ↬ *Chapter 7.5.1.1 'Fitting and clamping the mortar' on page 38*).

During grinding, refill the same amount of nitrogen that evaporates.

7.5.1.4 Final fineness of a grinding process with the PULVERISETTE 0

The achievable final fineness (PULVERISETTE 0) of the grinding stock is approx. 10 µm. (Depending on the grindability of the sample and the grinding duration)

7.5.1.5 Cleaning grinding elements

Clean the mortar bowl and grinding balls after every use; e.g. under running water using a brush and a commercially available cleaning agent.

Cleaning with an ultrasonic cleaner is permitted.

NOTICE!

Cool grinding elements made of agate, sintered corundum and zirconium oxide slowly and carefully.

Do not heat agate elements in a microwave under any circumstances (heating is too fast).

They must never be exposed to thermal shocks as this could cause irreparable damage to the parts → They will burst apart like in an explosion.

NOTICE!

The plexiglas lid must not be cleaned with alcohol or organic solvents.

8 Cleaning

DANGER!

Mains voltage!

- Before beginning with cleaning work, disconnect the mains plug and protect the device against being unintentionally switched back on!
- Do not allow any liquids to flow into the device.
- Indicate cleaning work with warning signs.
- Put safety equipment back into operation after cleaning work.

When cleaning the entire device, adhere to the guidelines of the Accident Prevention Regulation (BGV A3) - especially when the device has been set up in a dusty environment or when the grinding stock processed produces dust.

8.1 Cleaning the device

The device can be wiped down with a damp cloth.

NOTICE!

Do not allow any liquids to flow into the device.

8.2 Cleaning the test sieves (mesh wire sieves)

We recommend using the "LABORETTE 17" ultrasonic cleaner to clean the test sieves. More powerful ultrasonic cleaners can destroy the mesh wire. Place the sieves vertically or with the sieve mesh wire facing upwards into the cleaning fluid.

NOTICE!

Use of a brush can destroy the fine mesh wire of the sieve! Only use mechanical aids for coarse sieves.

With small mesh widths, there is the danger that the sieve will no longer have the correct mesh width if the position of the mesh wire is shifted.

As far as possible, clean the sieves after every use. The sieves can be dried in a drying cabinet at a maximum of 95 °C (rinsing with alcohol reduces the drying time).

NOTICE!

The sieve and grinding covers of accessories with plexiglas insert may only be heated to max. 60 °C.

NOTICE!

The plexiglas lid must not be cleaned with alcohol or organic solvents.

9 Maintenance

DANGER!

Mains voltage

- Before beginning with maintenance work, unplug the mains plug and protect the device against being unintentionally switched back on again!
- Indicate maintenance work with warning signs.
- Maintenance work may only be performed by specialised personnel.
- Put safety equipment back into operation after maintenance or repair work

We recommend keeping a safety logbook ↪ Chapter 14 'Safety logbook' on page 51, where all work (maintenance, repairs.....) performed on the device is entered.

The most important element of maintenance is regular cleaning!

9.1 Maintenance of the TorqueMaster clamping device

The clamping unit is largely maintenance-free. Cleaning with standard solvent-free cleaning agents is permissible.

The clamping unit is closed to a large extent. Make sure that as little liquid, dust, dirt or other foreign bodies as possible enters the clamping unit through the outlets for the toothed belts.

10 Repairs

DANGER!

Mains voltage!

- Before beginning with repair work, unplug the mains plug and protect the device against being unintentionally switched back on.
- Indicate repair work with warning signs.
- Repair work may only be performed by specialised personnel.
- Put safety equipment back into operation after maintenance work.

10.1 Checklist for troubleshooting

Fault description	Cause	Remedy
POWER light does not light up	No mains connection	Plug in mains plug
	Main switch not switched on	Switch on main switch
	Mains fuse blown	Replace mains fuse
	Line fuse of mains socket	Switch on or change the fuse in the fuse box
Rattling noises	Tension belt loose	Tighten tension belt
	Amplitude larger than 3 mm	Set amplitude to less than 3 mm
Large control fluctuations around set point	Sieve stack loose	Tighten toothed belt
	Screws of laminated spring assembly loose	Re-tighten the screws (8Nm)
	Flat springs defective	Check flat springs for tears, replace laminated spring assembly if necessary
	Flat springs too warm	Allow to cool down
Sieving stock not dispersed evenly on the sieve surface	Toothed belt tightened unevenly	Tighten toothed belt evenly
	The device is not level	Level the device again by turning the feet
	Sieves too old and mesh wire deformed (mesh wire has no tension)	Replace sieve

11 Disposal

It is hereby confirmed that FRITSCH has implemented the directive 2002/95/EC of the European Parliament and Council from 27th January 2003 for the limitation of the use of certain dangerous substances in electrical and electronic devices.

FRITSCH has registered the following categories according to the German electrical and electronic equipment act, section 6, paragraph 1, clause 1 and section 17, paragraphs 1 and 2:

Mills and devices for the preparation of samples have been registered under category 6 for electrical and electronic tools (except for large stationary industrial tools).

Analytical devices have been registered under category 9, monitoring and control instruments.

It has been accepted that FRITSCH is operating only in the business-to-business area. The German registration number for FRITSCH is WEEE reg. no. DE 60198769

FRITSCH WEEE coverage

Since the registration of FRITSCH is classified for bilateral transactions, no legal recycling or disposal process is described. FRITSCH is not obliged to take back used FRITSCH devices.

FRITSCH declares it is prepared to take back used FRITSCH devices for recycling or disposal free of charge whenever a new device is purchased. The used FRITSCH device must be delivered free of charge to a FRITSCH establishment.

In all other cases FRITSCH takes back used FRITSCH devices for recycling or disposal only against payment.

12 Guarantee terms

Guarantee period

As manufacturer, FRITSCH GmbH provides – above and beyond any guarantee claims against the seller – a guaranty valid for the duration of two years from the date of issue of the guarantee certificate supplied with the device.

Within this guarantee period, we shall remedy all deficiencies due to material or manufacturing defects free of charge. Rectification may take the form of either repair or replacement of the device, at our sole discretion. The guarantee may be redeemed in all countries in which this FRITSCH device is sold with our authorisation.

Conditions for claims against the guarantee

This guarantee is subject to the condition that the device is operated according to the instructions for use / operating manual and its intended use.

Claims against the guarantee must include presentation of the original receipt, stating the date of purchase and name of the dealer, together with the complete device type and serial number.

For this guarantee to take effect, the answer card entitled "Securing of Guarantee" (enclosed with the device) must be properly filled out and despatched without delay after receipt of the device and be received by us within three weeks or alternatively, *online registration* must be carried out with the above-mentioned information.

Reasons for loss of the guarantee

The guarantee will not be granted in cases where:

- Damage has arisen due to normal wear and tear, especially for wear parts, such as: Crushing jaws, support walls, grinding bowls, grinding balls, sieve plates, brush strips, grinding sets, grinding disks, rotors, sieve rings, pin inserts, conversion kits, sieve inserts, bottom sieves, grinding inserts, cutting tools, sieve cassettes, sieve and measuring cell glasses.
- Repairs, adaptations or modifications were made to the device by unauthorized persons or companies.
- The device was not used in a laboratory environment and/or has been used in continuous operation.
- Damage is present due to external factors (lightning, water, fire or similar) or improper handling.
- Damage is present that only insubstantially affects the value or proper functioning of the device.
- The device type or serial number on the device has been changed, deleted, removed or in any other way rendered illegible
- The above-mentioned documents have been changed in any way or rendered illegible.

Guarantee terms

Costs not covered by the guarantee

This guarantee excludes any costs for transport, packaging or travel that accrue in the event the product must be sent to us or in the event that one of our specialist technicians is required to come to your site. Any servicing done by persons not authorised by us and any use of parts that are not original FRITSCH accessories and spare parts will void the guarantee.

Further information about the guarantee

The guarantee period will neither extend nor will a new period of guarantee begin in the event that a claim is placed against the guarantee.

Please provide a detailed description of the type of error or the complaint. If no error description is enclosed, we shall interpret the shipment as an assignment to remedy all recognisable errors or faults, including those not covered by the guarantee. Errors or faults not covered by the guarantee shall in this case be rectified at cost.

We recommend reading the operating manual before contacting us or your dealer, in order to avoid unnecessary inconvenience.

Ownership of defective parts is transferred to us with the delivery of the replacement part; the defective part shall be returned to us at buyer's expense.

NOTICE!

Please note that in the event that the device must be returned, the device must be shipped in the original Fritsch packaging. Fritsch GmbH denies all liability for any damage due to improper packaging (packaging not from Fritsch).

Any enquiries must include a reference to the serial number imprinted on the type plate.

13 Exclusion of liability

Before using the product, be sure to have read and understood this operating manual.

The use of the product requires technical knowledge; only commercial use is permitted.

The product may be used exclusively within the scope of applications set down in this operating manual and within the framework of guidelines put forth in this operating manual and must be subject to regular maintenance. In case of non-compliance, improper use or improper maintenance, the customer assumes full liability for the functional capability of the product and for damage or injury arising from violating these obligations.

This operating manual has been prepared to the best of our knowledge and checked for accuracy at the time of printing. FRITSCH GMBH assumes no guarantee or liability whatsoever for the accuracy or completeness of the contents of this operating manual, including but not limited to the implied warranties of merchantability and fitness for a particular purpose, unless liability is expressly prescribed by applicable laws or jurisprudence.

FRITSCH GMBH expressly reserves the right to modify and/or update this operating manual without prior notice. The same applies to modifications and improvements to the products described in this operating manual. It is the responsibility of the user to ensure that they have the current version of this operating manual. For more information, please contact your local FRITSCH GMBH distributor or Fritsch GmbH, Industriestr. 8, D-55473 Idar-Oberstein.

Not all parts shown here are necessarily installed in the product. The buyer is not entitled to delivery of these parts. If interested, please contact your local FRITSCH GMBH distributor or Fritsch GmbH, Industriestr. 8, D-55743 Idar-Oberstein.

FRITSCH GMBH takes the greatest care to ensure that the quality, reliability and safety of your products are continuously improved and adapted to the state of the art. The supplied products as well as this operating manual conform to the current state of the art when they leave the sphere of influence of FRITSCH GMBH.

By using the product the customer agrees with this and recognizes that defects, malfunctions or errors cannot be completely excluded. To prevent risk of damage to persons or property or of other direct or indirect damage, resulting from this or other causes, the customer must implement sufficient and comprehensive safety measures for working with the product.

Exclusion of liability

Fritsch GmbH excludes any liability, warranty, or other obligation to compensate for damages, regardless of whether this liability, warranty, or other obligation is explicit or implicit, contractual or arising from unlawful acts or prescribed contractually, by law, or otherwise. In no event shall the buyer be entitled to any compensation from Fritsch GmbH for any special, direct, indirect, coincidental or consequential damage, including but not limited to lost profits, lost savings, lost sales or financial loss of any kind or for compensation of third parties, for downtimes, for lost goodwill, for damage to or replacement of equipment and property, for costs or restoration of materials or goods related to the product or the use of our products, for other damage or injury to persons (including fatal injuries) or similar. The above exclusion of liability is limited by mandatory liability as prescribed by laws or jurisprudence. Liability for negligence is excluded in all cases.

No permission is given expressly, implicitly or otherwise for the use of patents, brands or other copyrights. We also assume no liability for copyright infringements or infringements of the rights of third parties arising from the use of this product.

Neither compliance with this operating manual nor the conditions and methods used during installation, operation, use and maintenance of the product can be monitored by Fritsch GmbH. Improper execution of the installation can result in property damage and thus endanger persons. Therefore, we assume absolutely no responsibility or liability for loss, damage or costs that result from errors at installation, improper operation or improper use or improper maintenance or are in any way connected to these.

14 Safety logbook

Date	Maintenance / Repair	Name	Signature

Safety logbook

Date	Maintenance / Repair	Name	Signature

15 Index

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