

L-27

SAMPLE DIVIDER

READ THE INSTRUCTIONS PRIOR TO PERFORMING ANY TASK!



Valid from serial number 27.1600/00100

Translation of the original operating instructions

Version 01/2026 Index 001



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Certification and CE conformity

Certification

Fritsch GmbH has been certified by TÜV Saarland Certification GmbH.



An audit has proven that Fritsch GmbH meets the requirements of DIN EN ISO 9001:2015 and DIN EN ISO 14001:2015.

CE conformity

The enclosed conformity declaration lists the guidelines to which the FRITSCH instrument conforms in order to bear the CE mark.



1 Basic structure



- 1 Funnel
- 2 Funnel holder
- 3 Dividing head lid
- 4 Dividing head
- 5 Sample bottles
- 6 Control panel



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 L-27. 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 L-27.

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

The L-27 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 L-27 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 L-27 is a Sample Divider for representative division of samples in the laboratory. It divides bulk solids and particle suspensions from the original amount filled into equal parts, whereby each partial amount is representative of the entire collective.

Inorganic and organic samples are prepared for analysis, quality control or material testing in such a way that after the analysis of a single shot, reliable statements can be made about the physical and chemical properties of the entire collective.

2.2.1 Operating principle

In the L-27, two different division principles are combined in one device such that the advantages of both can be optimally used:

The commodity stream - guided by a funnel - impacts on a cone. By sliding off its lateral surface, an initial division into individual streams takes place. This process is known as "coning" and is successfully used mainly when dividing large quantities.

In the case of the L-27, the fanned out commodity stream is led into individual channels at the lower end of the cone surface and collected in glass laboratory bottles.

The relatively high rotational speed of the cone prevents inhomogeneity in the commodity stream and demixing during apportionment. Through rotation of the cone, the probability of falling into a certain bottle is equal for all components of the commodity stream.

Additionally, the divided commodity stream is accelerated outwards through the centrifugal force of rotation and flows more easily through the guide channels into the collection bottles. The guide channels interpenetrate. The commodity stream is divided up and deposits are reduced through the sharp lines of separation between the channels.

The high rotational speed of the turning dividing cone leads to an extremely high division ratio, i.e. each sample consists of a very large number of single shots. A high division ratio is, however, one of the most important prerequisites for a good, representative sample division.

2.3 Obligations of the operator

Before using the L-27, this manual is to be carefully read and understood. The use of the L-27 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 L-27 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 L-27 and for any damage or injury arising from failure to fulfil this obligation.

By using the L-27 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 L-27.

Neither compliance with this manual nor the conditions and methods used during installation, operation, use and maintenance of the L-27 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.

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.

ENVIRONMENT

This symbol and keyword combination points out a possibly hazardous situation that can result in environmental 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 well as information for efficient operation without malfunction.

Further designations

To emphasise procedure instructions, results, lists, references and other elements, the following designations are used in this manual:

Designation	Explanation
 1., 2., 3. ...	Step-by-step procedure instructions
⇒	Results of steps in the procedure
	References to sections in this manual and relevant documentation



Designation	Explanation
	Lists without a specific order
[Button]	Operating elements (e.g. push button, switch), display elements (e.g. signal lamps)
'Display'	Screen elements (e.g. buttons, function key assignment)

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.



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 dividing 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 dividing these kinds of substances, special safety measures must be taken and the work must be supervised from a specialist.
- The L-27 is not explosion protected and is not designed to divide explosive materials.

- Do not remove the information signs.

NOTICE

Immediately replace damaged or illegible information signs.

- Unauthorised alteration of the L-27 will void Fritsch's declaration of conformity to European directives and void the guarantee.
- Only use the L-27 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 Hazardous points

- Only operate the Sample Divider with firmly screwed in bottles or collection vessels!
- Only empty the Sample Divider after it has come to a complete standstill!
- Do not reach into the device when it is running!
- Crushing hazard at the rotating bottles! To avoid this hazard, use the Perspex protective device (Order no.: 27.1500.17)

2.7 Electrical safety

2.7.1 General information

The main switch disconnects the mini-mill from the 24 V external power supply.

If the device is going to be out of use for a longer period of time, remove the mains plug from the 24 V power supply.

2.7.2 Protection against restart

The device is safeguarded against restarting after a power failure.

2.7.3 Overload protection

The device has internal excess current protection and switches off in the event of overload.



3 Technical data

3.1 Dimensions

425 x 270 x 450 mm (height x width x depth)

3.2 Weight

Net: 7 kg without dividing head and sample bottles

Gross: 13 - 16 kg depending on the dividing head, includes sample bottles

3.3 Voltage

- 100-240 V/1~, 50 - 60 Hz, 90 W

3.4 Technical design

Depending on the technical design, device parts that come into contact with the commodity stream consist of:

- food-safe, anodised aluminium
- polyoxymethylene (POM)
- polytetrafluoroethylene (PTFE)
- glass

3.5 Speed

Variable speed adjustable in steps of 10 between 80 and 120 rpm.

4 Installation

4.1 Transport

- The device is packaged in a cardboard box. This is additionally packaged in a wooden case with the accessories and any other devices, depending on the scope of the order.

WARNING

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

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

4.2 Unpacking

- It is best to open the wooden case by pulling out the metal clips with pliers.
- Carefully open the cardboard box with a knife (do not cut too deep, as otherwise the contents could become damaged) and remove the packaging material.
- Check the device for possible damage in transit.
- Compare the contents of the delivery with your order.

4.3 Setting up

- Place the Sample Divider on a flat, stable surface.
- Adjust the rubber feet for levelling and to compensate for uneven surfaces.
- It does not have to be fastened to the surface.
- Ensure that the Sample Divider is easily accessible.

4.3.1 Fitting the dividing head



- Place the dividing head onto the drive shaft protruding from the housing.
- Checking: The dividing head must turn freely on the friction clutch by hand.



4.4 Ambient conditions

**WARNING**

**Mains voltage**

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

- The room temperature should be between 5 and 40 °C.
- Altitudes up to 2000 m
- Degree of pollution 2 according to IEC 60664-1:2007.

Storage

When storing the Sample Divider, the specified ambient conditions should be observed and care should be taken to ensure a dry environment.

4.5 Electrical connection



Disconnect the supply voltage prior to maintenance or cleaning work.

Observe the accident prevention and safety regulations which apply to the specific application cases.

Before the initial start-up it should be checked whether the nominal voltage of the device corresponds to the local mains voltage.

Protective conductor connections must be checked for perfect working order before the initial start-up.

Connections may be established only by authorised personnel.



The L-27 is constructed according to the state of the art and in accordance with the EC machinery directive and recognized safety rules. However, the life and limb of the user or third parties may still be endangered or the device or other material assets impaired when using the device.

5 Initial start-up

After the Sample Divider has been set up as described in ➔ *Chapter 4.1 'Installation' on page 13* and the mains plug has been plugged into the mains socket, the device is ready for operation.

5.1 Switching on



Press the 'ON / OFF' button. The Sample Divider is switched on. Use the 'Start' button to have the Sample Divider start approaching the set RPM. To exit, press the 'stop' button.

5.2 Switching off

Press the 'ON/OFF' button to turn off the device.



6 Using the device

! NOTICE

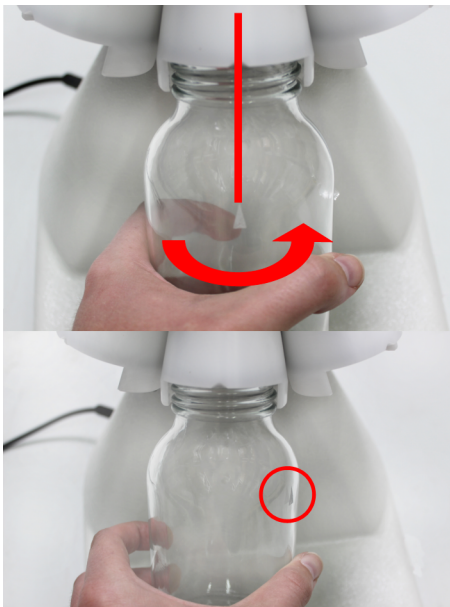
In combination with the L-24, the L-27 should always be stopped using the 'STOP' button. When using the 'ON/OFF' button, the connection to the L-24 is terminated and the conveyance via the feeder is **not** stopped.



The L-27 can be controlled externally via an RS232 cable. (e.g. PC, PLC) To obtain the corresponding protocol, contact Fritsch Service.

6.1 General preparations

6.1.1 Screwing the glass laboratory bottles onto the 1:8 or 1:10 dividing head



1. → Align the mark on the glass bottle with the mark on the bottle holder.
2. → Press the bottle into the recess in the bottle holder.
3. → Screw the bottle firmly into the holder with approx. 1/4 turn in the direction of the arrow.



After completion of the sample division, unscrew and remove the glass bottles in the reverse order.



The sample bottles are screwed into the holders as for a normal screw thread!

6.1.2 Division ratios

Dividing head with division ratio	Maximum fill quantity for one cycle	Maximum permitted particle size	Partial amount per bottle
1 : 8	4000 ml	10 mm	12.5 %
1 : 10	2500 ml	10 mm	10 %
1 : 30	300 ml	2.5 mm	3.3 %

6.1.2.1 Division in the ratio 1 : 8



- Screw eight glass laboratory bottles into the dividing head (eight 250 mL or 500 mL bottles with GL55 glass screw thread, depending on sample quantity).
- Place the lid on the dividing head.
- Insert a suitable funnel.



Insert a funnel suitable for the sample. The diameter of the funnel neck should be at least twice the particle size of the sample.

6.1.2.2 Division in the ratio 1 : 10



- Screw 10 glass laboratory bottles into the dividing head (10 250 mL bottles with GL55 glass screw thread, depending on sample quantity).
- Place the lid on the dividing head.
- Insert a suitable funnel.
- 500 mL glass bottles cannot be used.

6.1.2.3 Sample vessel 32 ml



The sample container for small quantities up to 32 ml are used for 1 : 10 and 1 : 8 sample division. The 32 ml sample containers are inserted into the sample vials. The 250 ml and 500 ml sample vials can then be inserted into the divider head as described in ➔ Chapter 6.1.1 'Screwing the glass laboratory bottles onto the 1:8 or 1:10 dividing head' on page 16.

6.1.2.4 Division in the ratio 1 : 30



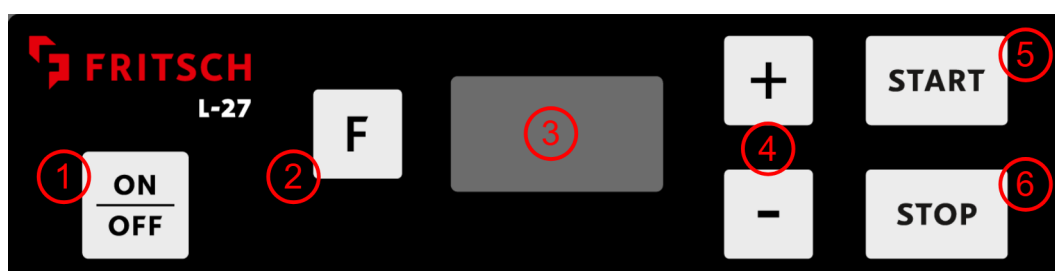
- Screw three sample bottles into the dividing head (three 15 mL, 20 mL or 30 mL bottles, depending on sample quantity).
- Insert and lock in place three collection pans (pull pin down, insert pan and release pin) (see ➔ Chapter 6.5 'Taking samples' on page 21).
- The collection pans collect from 9 sample channels each with approx. 30 % of the fill amount.
- Place the lid on the dividing head.
- Insert a suitable funnel.

6.1.3 Setting up the "L-24" sample feeder



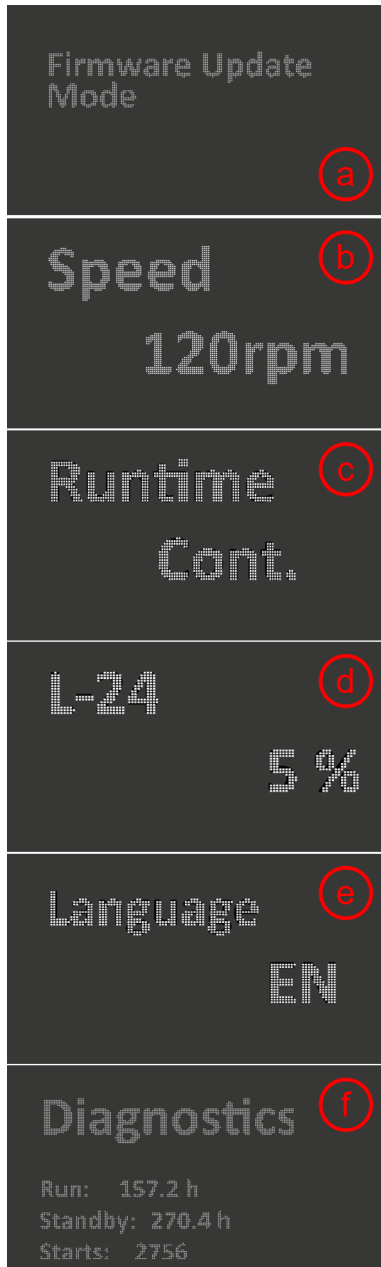
- Connect the control unit of the L-24 to the L-27 using the included Sub-D 9-pin cable.
- Place the feeder with V channel onto the stand such that the rubber feet are located in the recesses (1) of the base plate provided for them.
- Adjust the height of the tripod (4) so that the feeder channel is only a few millimetres above the hopper and can be swung out and in horizontally. The tripod is unlocked with the bolt (3) for this purpose.
- Position the feeder and tripod so that the material flow is conveyed to the centre of the hopper (2).
- Adjust the quantity of material flowing from the funnel into the feed channel by adjusting the height of the funnel on the support column (5).

6.2 Control panel



- 1 ON / OFF - Button
- 2 F - Button
- 3 Screen
- 4 + / - Button
- 5 START - Button
- 6 STOP - Button

6.2.1 Settings on the control panel



Revolutions

Time

You have the following adjustment options on the control panel of the L-27:

■ ON / OFF - Button

Turning the device on and off

■ F button

- After power on, press and hold to enter firmware mode. (a)
 - Short press to switch between the menu items 'Rotations (b), Timer (c) and L-24 (d).'
 - If you press it for a long time while switched on, you get to a hidden menu. Here you have the option to change the language (e). START saves the language and 'STOP' discards the setting. In both cases, the hidden menu is exited.
- You can also display the 'diagnostic' menu (f). Here you will find information about the runtime, standby time and start-up processes. You will also see information about the firmware status.

■ + / - Buttons

Parameters in the menu items 'Revolutions, Timer, L-24' and 'Languages' can be changed with these buttons.

■ START - Button

- From any menu item, this button can be used to start the splitting process.
- In the hidden menu, the language selection can be saved by pressing the 'START button'.

■ STOP button

- During the division, the process is stopped.
- In the hidden menu, the language selection can be left by pressing the 'STOP button' without saving.

1. → The revolutions can be adjusted in steps of 10 between 80 and 120 rpm.

2. → The time is adjustable between one second and 60 minutes. You can set permanent operation by setting the time to a value under one second or over 60 minutes.

When setting a certain time, it is counted down on the screen after reaching the set revolutions.

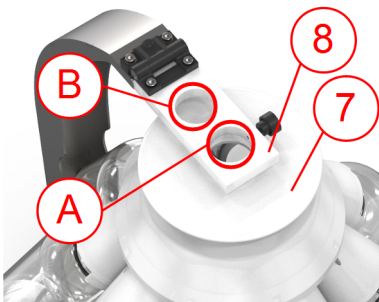
L-24

3. → If you operate an L-24 directly via the L-27, the L-24 will be started as soon as the set speed of the L-27 has been reached. The feed rate of the L-24 can be changed during the division process using the plus and minus buttons. If division is terminated with the 'Stop' button, the feeder immediately stops and the rotation of the L-27 gradually slows down.

6.3 Dividing solid materials



Start feeding the material only when the Sample Divider is switched on!



- Hinge the funnel holder (8) upwards
- Place the lid (7) on the dividing head.
- Insert the funnel in position A (for solid materials).
- Switch the Sample Divider on.
(Final rotational speed of 100 rpm after approx. 10 seconds)
- Manual feed:
 - Feed the sample slowly and evenly into the funnel.
- Material feed using the "L-24" vibratory feeder:
 - Fill sample into the funnel of the feeder
 - Adjust the feed rate (speed of material flow) on the control device (6).

6.3.1 Example of highly adhesive powder



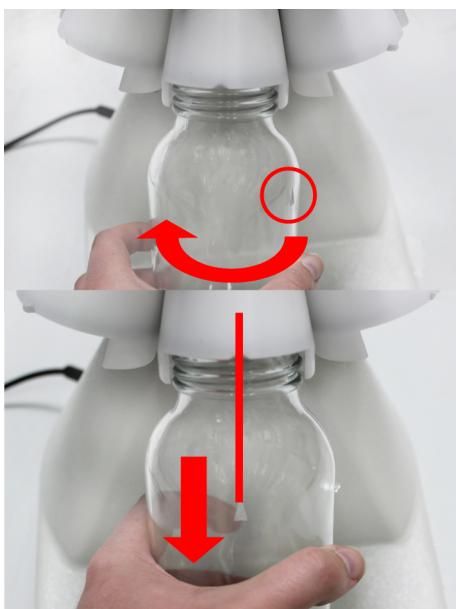
Powder with a high static charge or which is strongly adhesive should be fed through position B on the L-27. (See → Chapter 6.4 'Dividing suspensions and highly adhesive materials' on page 21!)

6.4 Dividing suspensions and highly adhesive materials

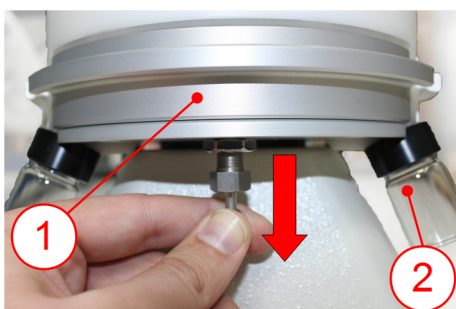


- Remove the lid and insert the hopper in position B (for eccentric division). (See ➔ Chapter 6.3 'Dividing solid materials' on page 20)
- Turn on the Sample Divider.
- Slowly and evenly feed the powder into the hopper.
- Dispense the suspension sample through a separating funnel, for example, or feed it slowly and evenly by hand from a vessel.

6.5 Taking samples



- After completion of the division, switch the device off.
- Unscrew the glass bottles and remove the divided samples.



- 1 Collection pan
- 2 Sample bottles

- Additionally for division in the ratio 1 : 30:
 - Unscrew the sample bottles and remove the divided samples.
 - Remove and empty the three collection pans (pull the pin downwards, pull the pan out).



7 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 if the device has been set up in a dusty environment or if processing grinding stock that produces dust.

- If necessary, lift the dividing head from the drive shaft (sliding disc is glued to the dividing head).
- Keep the motor drive shaft dust-free
- Do not use force when fitting the dividing head.
- Remove material from the funnel, dividing head and sample bottles using a vacuum cleaner.
- After wet cleaning, rinse the funnel, dividing head and sample bottles with alcohol (ethanol) and air dry.

8 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 13 'Safety logbook' on page 30, where all work (maintenance, repairs.....) performed on the device is entered.



The most important element of maintenance is regular cleaning!

- Moisten the drive shaft monthly with machine oil
- The ball bearings are permanently lubricated and are therefore maintenance-free



9 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.

No.	Fault description	Cause	Remedy
1	Device switches off after start-up.	Encoder/rotational speed is not recognised.	Contact Fritsch Service!

10 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.



11 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.

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.

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.



12 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.

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13 Safety logbook

Date	Maintenance / Repair	Name	Signature

Date	Maintenance / Repair	Name	Signature



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