Operating Instructions for Sieving Machine
Type AS 200 control

Retsch®

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Notes on these operating instructions

These operating instructions for the analytical sieving machine type **AS 200 control** give all necessary information on the sections mentioned in the contents.
They give instructions to the target group(s) defined in the respective sections for safe, correct handling of the **AS 200 control.** It is important that each target group or groups is (are) familiar with the relevant section, in order to ensure safe, reliable handling of the machine according to its intended use.
This technical documentation is for use as a reference work and as a learning aid. The individual sections are complete in themselves.
No repair instructions are included in these operating instructions. If repairs are necessary please contact your supplier or Retsch GmbH directly.
Retsch GmbH **www.retsch.com**

Warnings
The following signs are used to warn of hazards:

Personal injuries

Material damage

Repairs
These operating instructions do not contain any repair instructions. In the interests of your own safety, repairs should only performed by Retsch GmbH or an authorised representative (service technician).

In this case, please notify the following:

The local Retsch representative
Your supplier
Retsch GmbH direct

Your address for service:

Safety

Target group:
All persons concerned with the machine in any way.

The AS200 is a modern, highly efficient product of Retsch GmbH, corresponding to state of the art. If the machine is used according to the intended purpose with a knowledge of this technical documentation it is completely safe and reliable to operate.

Safety instructions

As the operating authority it is your duty to ensure that all persons charged with working on the AS200:

- have read and understood all the instructions on safety,
- before beginning work know all the instructions and regulations for the target group relevant to their work,
- have access to the technical documentation for this machine at all times, without problems.
- new personnel should be familiarized with safe, proper handling of the machine before beginning work on the AS200, either by verbal instruction from a competent person or through this technical documentation.
- improper operation can cause injury to persons or damage to the equipment. You are responsible for your own safety and that of your employees.
- ensure that no unauthorised persons have access to the AS200.

For your own protection have your employees confirm that they have been instructed in operation of the AS200. The draft of a suitable form is given at the end of the section on safety.

We exclude claims for damages in any form for damage to persons or property caused through non-observance of the following safety instructions.

Summary of safety instructions – part 1

Safety instructions

We exclude claims for damages in any form for damage to persons or property caused through non-observance of the following safety instructions.

Technical data

Do not make any changes to the machine and use only spare parts and accessories which have been approved by Retsch.
The declaration of conformity to the European directives by Retsch will otherwise lose its validity. Furthermore this will result in the loss of any kind of guarantee claims.

Packing

Please keep the packing material during the guarantee period since, in case of a complaint your guarantee claim will be at risk if the machine is returned in inadequate packing.

Transport

The **AS 200 control** must not be knocked, shaken or thrown during transport, otherwise the electronic and mechanical components may be damaged.

Temperature fluctuations

If subjected to high temperature fluctuations (e.g. during transport by plane) the **AS 200 control** must be protected against condensed water. If not damage to the electronic components may be caused.

Supply schedule

If the delivery is incomplete and/or transport damage has occured, you must notify the transport undertaking and Retsch GmbH immediately (within 24 hrs). It is possible that later complaints may not be considered.

Ambient temperature:

If the ambient temperature is exceeded or drops below the normal value the electrical and mechanical components may become damaged and the performance data can change to an unknown degree.

Atmospheric humidity:

At high atmospheric humidity the electrical and mechanical components may become damaged and the performance data can change to an unknown degree.

Installation / transport protection

If the machine is operated with transport protection devices, or is transported without transport protection, mechanical components may become damaged.

Electrical connection / connecting the mains power supply

If the values given on the type plate are not observed electrical and mechanical components may become damaged.

Distribution of material to be sieved

For sieving processes with only 1 to 3 sieves we recommend that short threaded rods are used – see accessories.
Long, projecting threaded rods disturb distribution of the material to be sieved through their natural vibration characteristics.

Summary of safety regulations – part 2

Wet sieving

	Never operate your **AS 200 control** directly in water. **Danger through current surge.**
	During wet sieving always operate your **AS 200 control** connected to a mains socket which is protected by an FI protective (safety) switch.
	The water quantity added should always be dosed in such a way that the sieve surface is only just wetted.
	Use vent rings. Accumulation of water in the sieve set can cause overloading and therefore damage or destruction of the wire mesh.

Sieving aids

	Make sure that the wire mesh of the sieves is not excessively stretched through overloading with sieving aids, since this will impair the precision of your analytical sieves.

Quantities of material to be sieved

	For sieving processes with only 1 to 3 sieves we recommend that short threaded rods are used – see accessories. Long, projecting threaded rods disturb distribution of the material to be sieved through their natural vibration characteristics.

Cleaning

	Do not clean the **AS 200 control** under running water. **Danger to life through current surge.** Use only a cloth moistened with water; solvents are not allowed.

Wearing parts

	These operating instructions do not include repair instructions. For your own safety repairs should be carried out only by Retsch GmbH or an authorized agency and Retsch service technicians.

Confirmation

I have read and taken note of the sections – preliminary comments and safety

_____
Signature of operator

_____
Signature of service technician

Technical data

Machine type designation:
AS 200 control

Use according to the intended purpose

The **AS 200 control** has been specially designed for analytical sieves of diamter 100 mm to 203 mm.
A further advantage is the very **high addition quantity** of material to be sieved, of up to 3 kg, which can be separated in one operation. For frequently repeated sieving operations under the same conditions the work is made much easier through the possibility of **storing 9 parameter combinations** directly in the sieving apparatus.
For perfect, reproducible sieving results is is also of course possible with the **AS 200 control** to input the **sieve bottom acceleration,** which is **independent of the mains frequency,** instead of the amplitude. All sieving parameters are digitally adjusted, displayed and monitored. The amplitude is controlled by means of a microprocessor-controlled **measurement-control unit** and is automatically readjusted if there are changes in the load or voltage. The **AS 200 control** is of course **calibratable** and therefore suitable for control of testing aids/equipment according to DIN EN ISO 9000.
As with all „control“ equipment the **AS 200 control** is also provided with an **integrated interface.**
With the evaluation software **EasySieve®** the machine can be driven and adjusted via a PC. With EasySieve® all sieving parameters, before and during the sieving operation, are displayed on the monitor.
This apparatus is **not** designed **as a production machine** or for continuous operation, but is intended for use as a laboratory apparatus for 8 hour single-shift operation.
The **AS 200 control** is suitable for dry sieving of free-flowing, dispersed products with a grain size of up to max. 25 mm.

Do not make any changes to the machine and use only spare parts and accessories approved by Retsch.

The declaration of conformity to the European directives by Retsch will otherwise lose its validity.

Furthrmore this will result in the loss of any kind of guarantee claims.

Emissions

Noise characteristic values:

Noise measurement is carried out according to DIN 45636-031-01-KL3.

The noise characteristic values depend on the set amplitude or sieve bottom acceleration, the number of sieves mounted and the type of material to be sieved.

Example 1:

Emission value related to workplace LpAeq = 63 dB(A)

Operating conditions:

Material to be sieved = quartz sand, grain size < 1mm, 5 sieves amplitude = 1.5 mm

Example 2:

Emission value related to workplace LpAeq = 67 dB(A)

Operating conditions:

Material to be sieved = quartz sand, grain size < 1mm, 5 sieves amplitude = 3 mm

Maximum loading

max. quantity of material to be sieved = 3 kg
max. weight of sieve set = 6 kg

Types of protection

IP54 or IP20 in the region of the opening in the sieve support

Machine dimensions

Height: up to approx. 850mm, width: 400mm, depth : 350mm
Weight: approx. 33 kg without sieve set and without sieve clamping device

Required installation space

400 mm x 350 mm; no safety margin required.

Transport and installation

Packing

Packing has been adapted to the transport method and conforms to generally applicable packing guidelines.

Please keep the packing material during the guarantee period since, in case of a complaint, your guarantee claim will be at risk if the machine is returned in inadequate packing.

Transport

The **AS 200 control** must not be knocked, shaken or thrown during transport, otherwise the electronic and mechanical components may become damaged.

Temperature fluctuations

If subjected to high temperature fluctuations (e.g. during transport by plane) the **AS 200 control** must be protected against condensed water. If not damage to the electronic components may be caused.

Intermediate storage

Ensure that the **AS 200 control** is kept dry also during intermediate storage.

Supply schedule

- **AS 200 control**
- 2 mains cables, Europe and USA
- 1 serial communication cable PC – AS 200
- 1 set of operating instructions

Check completenss of the delivery items, including individually ordered accessories.

Check perfect functionality of the **AS 200 control** (for this see section – operation).

If the delivery is incomplete and/or transport damage has occurred you must notify the transport undertaking and Retsch GmbH immediately (within 24 hrs). It is possible that later complaints may not be considered.

Parameters for the installation location

Ambient temperature:

5°C bis 40°C

If the ambient temperature is exceeded or drops below the specified value the electrical and mechanical components may become damaged and the performance data can change to an unknown degree.

Atmospheric humidity:

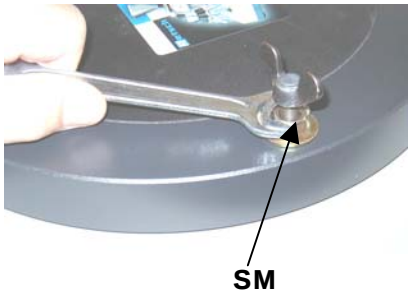
Maximum relative humidity 80% at temperatures up to 31°C, with linear reduction down to 50% relative humidity at 40°C.

At high atmospheric humidity the electrical and mechanical components may become damaged and the performance data can change to an unknown degree.

Installation height:

max. 2000 m above sea level.

Installation / transport protection



Place the **AS 200 control** on a stable laboratory bench, since otherwise unpleasant vibrations will be transmitted.

- Unscrew hexagon nut **SM** with an open-jawed spanner until the sieve plate is movable.
- Unscrew wing screw **A** (transport protection) together with hexagon nut.
- Mount appropriate sieve clamping unit
- Keep wing screw **A** with hexagon nut (transport protection) for possible transport at a later date.

Reusing transport protection device

- Screw hexagon nut completely onto the wing screw.
- Screw wing screw into the casing through the sieve plate.
- Screw hexagon nut downwards and tighten with open-jawed spanner until the sieve plate is no longer movable.

If the machine is operated with transport protection devices or is transported without transport protection mechanical components can become damaged.

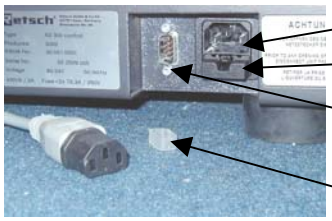
Electrical connection

- The voltage and frequency for the **AS 200 control** is given on the type plate.
- Ensure that the values agree with the existing power supply.
- Connect the **AS 200 control** to the power supply using the connection cable provided.
- When connecting the power cable to the mains external fusing is necessary according to the regulations of the installation location.

If the values given on the type plate are not observed electrical and mechanical components can be damaged.

Operation

Operating elements and operation

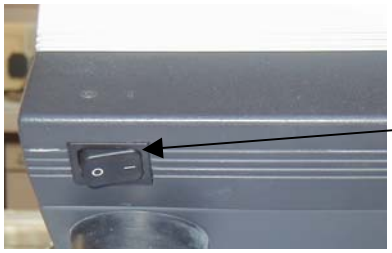


A Cold apparatus plug combination

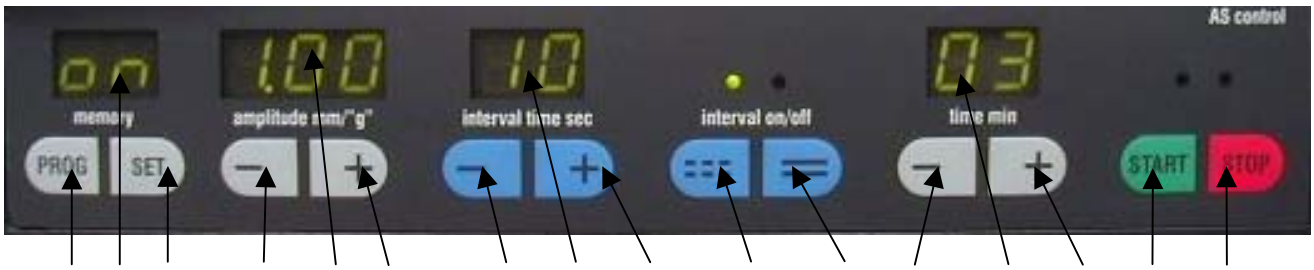
C Fuse compartment with 2 glass fuses

B Serial connection

D Protective cap for serial connection



E Switch **ON / OFF,** bottom left



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

1	**PROG** – button for calling preset sieving parameters **P1-P9** or **on** and for ending programming without storing the parameters.
2	Display **memory** shows the selected programme **P1-P9** or **on**. If the AS 200 is driven by the EasySieve® softwear programme **ES** appears in the display.
3	**SET** – button for activating the setting mode for the preselected programme positions **P1-P9** and for storing the parameters after programming.
4	button reduces the amplitude **0.20 – 3.00mm**, precision **±0.1mm,** or sieve bottom acceleration in **„g“**
5	Display **amplitude** shows the amplitude (2 x amplitude) of **0.20 – 3.00mm** or sieve bottom acceleration in **„g“**.
6	**+** button increases the amplitude, **0.20 – 3.00mm**, precision **±0.1mm,** or sieve bottom acceleration in **„g“.**
7	button reduces the interval time, **10 – 99sec.**
8	Display **interval** shows the preselected interval time, **10 – 99sec**.
9	**+** button increases the interval time, **10 – 99sec**.
10	Button switches interval operation **ON**, left LED lights up.
11	Button switchces interval operation **OFF,** right LED lights up.
12	button reduces the sieving time, **1 – 99min**.
13	Display **time** shows the preselected sieving time, **1 – 99min**.
14	**+** button increases the sieving time, **1 – 99min**.
15	**START** button starts the sieving process and the green LED lights up.
16	**STOP** button stops and ends the sieving process and the red LED lights up.

Insertion and clamping the analytical sieves

The **AS 200 control** is suitable for analytical sieves of outside diameter 100 – 203 mm.
Up to 8 analytical sieves plus the collecting bottom can be clamped in position.
For this purpose various clamping units or clamping covers are available (see accessories).

If the collecting bottom should stick to the smooth surface of the sieve support base when removing the sieve set, we recommend the use of talcum powder.

Shorter threaded rods are available for the sieve clamping unit for clamping max. 5 analytical sieves plus a collecting bottom (see accessories).

Using economy or standard sieve clamping unit

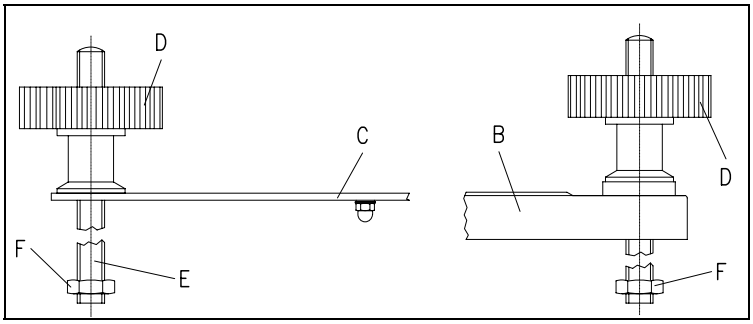
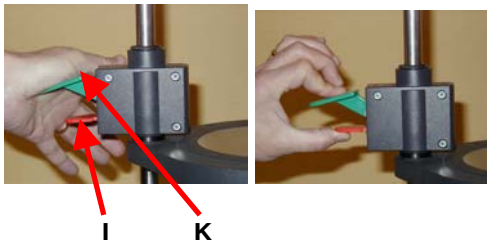


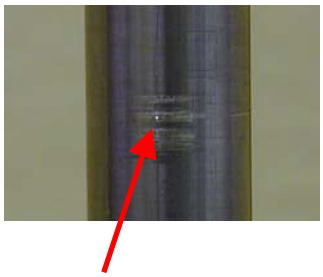
Fig. 3

- Screw threaded rod **E** into the sieve plate and fix with hexagon nuts **F**.
- Place selected sieve set centrally on the sieve plate.
- Place clamping cover – economy **C** or standard **B** **-** over the threaded rods on the top sieve.
- Slide clamping nuts **D** downwards through the inclined positions over the thread of the apparatus support onto the clamping cover and tighten.

Clamping with the clamping unit - comfort



- Screw support rod **H** into the sieve plate and tighten locknut.
- Place selected sieve set centrally on the sieve plate.
- Put the clamping cover – comfort over the support rods, causing the red lever **I** to be pressed upwards; place your index finger and middle finger on the casing. The green lever **K** remains in the upper position.
- Slide the clamping cover up to the top sieve.
- Press the green lever **K** downwards several times; while doing this the lower red lever **I** should not be moved.
- To loosen, press the red lever **I** upwards and the green lever **K** downwards. The sieve cover can then be pushed upwards.



When using the clamping unit **comfort** we recommend that the support rods are cleaned from time to time. Furthermore after a certain time the **comfort** sieve clamping unit produces unavoidable clamping notches **KK** on the support rods. These are produced through the mode of action and can make reliable clamping more difficult.

For this reason it is important to check the support rods for clamping notches **KK** in the clamping region from time to time and, if necessary, to turn them through approx. 90°. For this an open-jawed spanner with an opening of 19 mm is required.

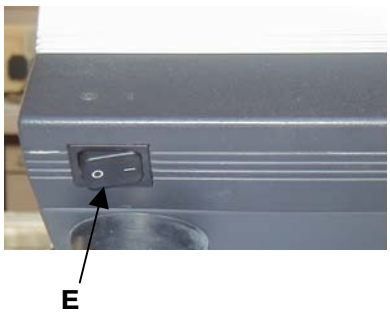
Turning the support rods:

- Unscrew locking nut.
- Turn support rods through approx. 90°.
- Firmly retighten the locking nut.

We recommend that the support rods are replaced when reliable clamping is no longer possible.

Operation of the AS 200 control

Switching on / off

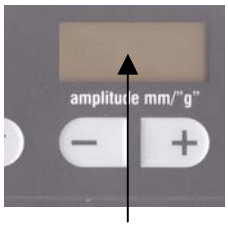


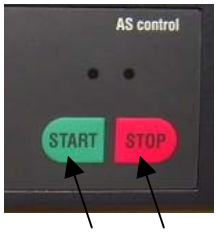
The main switch **E** is located on the front left-hand side of the **AS 200 control** under the control strip.

- Switch on the main switch.
- In the **memory** display **the last used function (on or P1 – P9)** lights up.
- In the **amplitude** display **the last used amplitude** lights up.
- The LED **interval on** or **off** lights up.
- In the **time** display **the last used time** lights up.

The AS 200 control is now immediately ready for operation.

Starting – interruption - stopping





Starting:

Press START / button **15**

- The green LED over button **15** lights up
- Running up the machine to the preselected value can be seen in the display **5.**

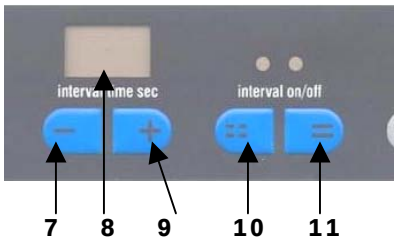
Interruption (pause function) :

- Press STOP / button **16** once
- The red LED over button **16** lights up
- Values remain visible
- Press START / button **15**
- The sieving process is continued

Stopping (standby function):

- Press STOP / button **16** twice
- The red LED over button **16** lights up
- The complete display goes out except “on”
- Activate LED indicators = press button **15** once
- New values can be entered
- Press START / button **15** a second time
- Function is carried out as for **Starting**

Interval – continuous operation



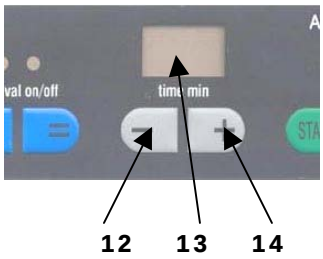
When switching on the **AS 200 control** interval operation is still switched off.

Switching on interval from 10-99 sec.:

- Press button **10**
- LED over button **10** lights up
- Display **8** shows 10 sec.
- Button **9** increases the interval time up to 99 sec. If 99 sec is exceeded the display begins with 10 sec again.
- Button **7** reduces the interval time down to 10 sec. If the value drops below 10 sec the display begins with 99 sec again.

Switching off interval:

- Press button **11**
- LED over button **11** lights up
- Display **8** goes out



Adjusting the time

On switching on the **AS 200 control** the sieving time is undetermined = 2 bars in display **13**.

Switching on the time 1 – 99 min:

- Button **12** reduces the time down to 1 min. If the value drops below this, two bars appear = undetermined sieving time.
- Button **14** increases the time up to 99 min. If this value is exceeded two bars appear = undetermined sieving time.

Memory – storage and calling sieving parameters

The memory function, i.e. storage and calling preselected sieving parameters, can be carried out only in the standby mode. You can change and overwrite the programme positions **P1** to **P9** at any time.

On switching on the **AS 200 control** the indication **„on“** appears in the display **2**.
By pressing the button **PROG** you can go to the next programme position **P1** to **P9**. Following programme position **P9** **„on“** reappears in the display. In the **PROG** mode all buttons except **PROG, START and STOP** are blocked.

- When **on** is displayed
  it is possible to freely adjust the sieving parameters - **5** amplitude / **8** interval time / **10-11** interval on-off and **13** time.
- When **P1** to **P9** is displayed
  Sieving parameters can be stored and called.
- **Start** = the sieving process is started with the selected programme or the freely selected parameters under **“on”.**

Allocation of memory location

- Press button **PROG** once or several times until the required memory location **P1-P9** has been reached.
- Press button **SET** – all displays flash.
- Set sieving parameters - **5** amplitude / **8** interval time / **10-11** interval on-off and **13** time.

The programming mode can be aborted by pressing the **PROG** button – the values are not stored.

- Press **SET** button – the values are stored

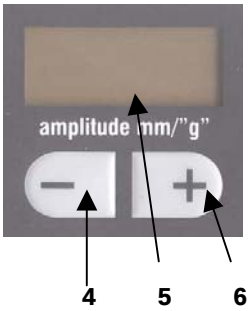
Flashing of the display stops, the adjusting interlock is activated, the sieving parameters are stored.

If the **AS 200 control** is driven by a PC and the “**EasySieve®**“ sieving software the indication **“ES”** appears in the display **2** . In this mode no manual changes in the sieving parameters are possible.

Amplitude in „mm“

In display **5,** labelled with **amplitude mm/g,** twice the amplitude is shown as measured value. We refer to this measured value as **amplitude** in our further explanations.
On switching on the **AS 200 control** the last used amplitude is displayed.

Adjusting the amplitude from 0.20 – 3.00mm :



Reduction:

- Button **4** reduces the amplitude down to 0.20 mm
- Keep button **4** pressed – after 5 sec fast adjustment is possible. If the value drops below 0.20 mm, 3.00 mm reappears.

Increasing:

- Button **6** increases the amplitude up to 3.00 mm
- Keep button **6** pressed – after 5 sec fast adjustment is possible. If 3.00 mm is exceeded the value 0.20 mm reappears.

Sieve botton acceleration in „g“

- Keep **buttons 4 + 6** pressed simultaneously for **2 sec**.

Changeover to the sieve bottom acceleration mode then takes place.

After changing over display **5** always indicates **01.0** g.
The required sieve bottom acceleration can now be set and the machine started.

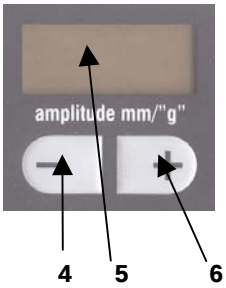
In display **5** , marked with **amplitude mm/g,** a multiple of the acceleration due to gravity „g“ is displayed as measured value

(1g = 9,81m/s^2)

On changing over, the associated values of amplitude and sieve bottom acceleration are converted and displayed only when the machine is running.

Adjusting the sieve bottom acceleration in “g“ from 1 – 20

Your **AS 200 control** can of course only reach the sieve bottom acceleration at which an amplitude of 3.00 mm in relation to the natural frequency is not exceeded. If the maximum amplitude is exceeded the display **amplitude mm/g** flashes uniformly.



Reduction:

- Button **4** reduces the sieve bottom acceleration down to 1g.
- Keep button **4** pressed – after 5 sec fast adjustment is possible.

Increasing:

- Button **6** increases the sieve bottom acceleration up to approx. 18g
- Keep button **6** pressed – after 5 sec fast adjustment is possible.

Acoustic signal for end of sieving

If the sieving process is brought to an end without interruption, the end is signalled by an acoustic signal, which is given 5 times.

Switching off the acoustic signal:

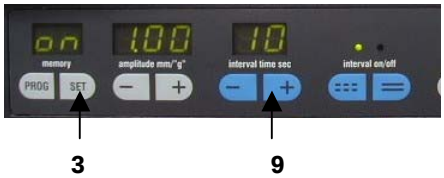
- Press buttons **11** and **16** simultaneously

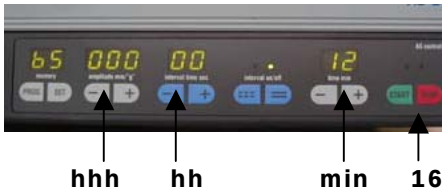
This is confirmed by a signal.

Switching on the acoustic signal:

- Press buttons **11** and **15** simultaneously

This is confirmed by a signal.





Operating hours display

If the buttons described below are pressed, the complete running time of the machine in hours and minutes can be displayed.

Displaying the operating hours:

- Press buttons **3** and **9** simultaneously and keep pressed
  The indication **"bS"** appears in the „**memory**" display.

Passing out of the operating hours:

- Press button **16, STOP.**

Information on "memory" display

The following abbreviations can appear:

Display	Description	Button combinations
on	Normal mode – all parameters can be adjusted – also during sieving.	
P1 – P9	Calling and indication of stored programmes.	Press button „**PROG**"
ES	Operation with software **EasySieve®**	Automatic when starting from **EasySieve®**
bS	Operating hours display	Button combination "SET" and interval time „+"
S	Softwear version display	Button combination "SET" and interval time „ - "

Quantities of material to be sieved

The sieve set is made up of the collecting bottom and the analytical sieves, which are arranged one on top of the other according to increasing mesh size.

In order to guarantee fast fractionating with an exact result, the quantity of material to be sieved should be adapted to the sieve diameter and the nominal mesh sizes.
Guide values for this are given in the respective standards for sieve analysis. According to DIN 22019 / 1 the following maximum quantities of material for sieving are recommended:

Nominal mesh sizes	**Material quantities in dm³ at** 200mm diameter
8	0 , 5 0 0
3 , 1 5	0 , 3 0 0
1	0 , 1 4 0
0 , 5	0 , 1 0 0
0 , 2	0 , 0 6 0
0 , 0 6 3	0 , 0 3 5
0 , 0 2 0	0 , 0 2 0

Distribution of material to be sieved

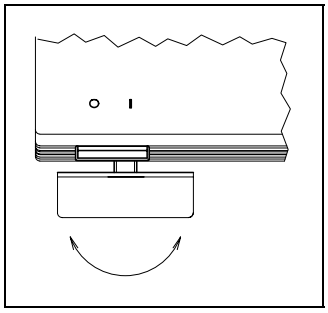


Fig.13

The **AS 200 control** guarantees that the material to be sieved is uniformly distributed over the sieve bottom in all sieving processes. The sieved material undergoes a slow rotating movement in this process, depending on the set amplitude or sieve bottom acceleration.

It is important here that your **AS 200 control** is adjusted horizontally.

The **AS 200 control** can be adjusted by turning the base supports of the casing. **Fig.13**

After making this adjustment it is not necessary to secure the apparatus against further movement.

For sieving processes with only 1 to 3 sieves we recommend that short threaded rods are used (see accessories).
Long, projecting threaded rods disturb distribution of the material to be sieved through their natural vibration characteristics.

Wet sieving

In most cases dry sieving is possible. However, with some materials the adhesive forces between individual particles can cause difficulty. These problems can be overcome by adding a liquid, preferably water, during the sieving process (if the accessories mentioned in the section on sieving aids are not successful). However, wet sieving is possible only if the materials to be sieved do not swell, dissolve or change in any other way in the sieving liquid.

Required accesories

- Clamping cover with spraying nozzle for the corresponding sieve diameter.
- Intermediate rings with vent holes.
- Collecting bottom container with water outlets for the corresponding sieve diameter.

Preparation

- Position your **AS 200 control** near to a water outlet point.
- Connect the spraying nozzle of the clamping cover to a tap by means of a hose.
- Connect the outlet of the collecting bottom container to the water outlet point or a suitable collecting vessel.

Procedure

- Use the intermediate rings with vents.
- Add the solid material as a suspension.
- Adjust the pressure of the added liquid (water) only to the extent that the sieving surface is completely sprayed.
- It is advisable to use a dispersing agent. This reduces the surface tension of the sieving liquid.
- If it is difficult to form a slurry with the material or to obtain exact separation, the individual fractions should be sprayed one after the other.
- After the sieving process the fractions are transferred from the individual sieves to a suitable filter (e.g. filter paper) and dried in a drying oven at 80°C.
- The sieves are then cleaned in an ultrasonic bath and also dried in a drying oven (without the seals).
  Do not exceed the maximum drying temperature of 80°C.

	Never operate your **AS 200 control** directly in water. **Danger through current surge.**
	During wet sieving always operate your **AS 200 control** connected to a mains socket protected by an FI protective (safety) switch.

	The water quantity added should always be dosed in such a way that the sieve surface is only just wetted.
	Use vent rings Accumulation of water in the sieve set can cause overloading and therefore damage or destruction of the wire mesh. Vent rings are necessary in order to prevent water accumulation.

The **loading diagrams** given in these operating instructions are **not applicable** to wet sieving.

Binding information on wet sieving is not possible owing to the non-definable water quantity in the sieve set.

Information on the sieve bottom acceleration mode

The **AS 200 control** is a throwing-type sieving machine which gives you the possibility of specifying both the **amplitude** and the **sieve bottom acceleration** as sieving parameters.

Throwing-type sieving machines, such as the **AS 200 control,** are usually based on a spring-mass system which is excited by the natural frequency. This means that, in contrast to sieving machines which are excited only by mains frequency, a sieving machine excited by the natural frequency is independent of the voltage supply.

As long as sieve analyses are to be compared or reproduced within the respective natural frequency ranges specifying the same **amplitudes** and sieving times will of course also give comparable results.

As a result of increasing globalisation of product processes throughout the world it is becoming more and more important to compare sieve analyses from sieving machines excited by mains frequencies in both mains frequency ranges 50/60 Hz with each other, and also of course with the results of your **AS 200** control, excited by natural frequency. Even if these sieve analyses are carried out at the same amplitude and the same sieving time, it still cannot be assumed that the results will be comparable, owing to the different sieving frequencies at appropriately short sieving times.

The reason for these differences is the fact that with throwing-type sieve analyses the important parameter is not really the amplitude but the **sieve bottom acceleration.** This, together with the amplitude, is determined mainly by the **frequency.** As long as sieving is carried out only at the same frequency, e.g. at the same mains frequency, variation in the amplitude is of course also the only possibility of varying the **sieve bottom acceleration.**
To take these physical facts into account your new **AS 200 control** now provides you with the possibility of specifying display and control of the **sieve bottom acceleration** in addition to the amplitude. The **sieve bottom acceleration** is indicated as a multiple of the acceleration due to gravity “g” (1 g = 9.81 m/s²). This functional principle is based on our German patent no. 19 625 808.
For more detailed operation instructions see the section “**Operation of the AS 200 control** and the paragraph **“Sieve bottom acceleration”.**

However, comparative sieve analyses in the acceleration mode with direct input presupposes that the **sieve bottom acceleration** of the comparison machine is known (e.g. an AS 200 control or another AS 200 control).

Acceleration guide values

In the technical literature* on plant engineering sieve bottom acceleration in „g“ is designated as the sieve characteristic value **K** , and the relationship between the sieve characterisitc value and sieving effect is described as follows:

K („g“)	Sieved material movement	Sieving evaluation
1,0	No throwing, flowing or sliding movement	Very sluggish sieving effect, sieve bottom is quickly blocked
1,5	Poor lifting of sieved material	Sluggish sieving effect, sieve bottom blocked slowly
1,8	Very flat throwing action	Very gentle sieving for easily sievable material
2,3	Flat to slightly steep throwing action	Gentle sieving for material difficult to sieve
3,5	Steep throwing action	Precise sieving
4	Very steep throwing action	Very precise and loosening sieving action

We have taken the liberty of supplementing the information with the associated amplitudes for the two most common mains frequencies in the world.

These data can be regarded only as guide values for small quantities of sieved material if, owing to its distribution characteristics, the material moves mainly under single grain conditions on the sieve bottom.

However, under the usual thick layer conditions (multiple grain layers) in the laboratory the impulses transmitted from the sieve bottom are damped, and the sieve bottom of the analytical sieve also vibrates. Therefore in laboratory practice higher K-values are necessary than those resulting from individual grain dynamics. In practice this means that the above recommendations should be multiplied by a factor of **1.5 – 2.**

* Höffl, K.

Milling and classifying machines

Springer-Verlag 1986

Retsch Analytical sieves

The highest precision for exact results

The accuracy and the reliability of the analysis result are decisively dependent not only on the sieving machine delivering reproducible results, but also on the quality of the analytical sieves.

Retsch analytical sieves are high quality measuring instruments for which only the fabrics and screens which comply with the relevant standards are used.

Analytical sieves with 100, 200 and 203mmØ

- Sieve plates, frame and labelling executed in compliance with standards
- Tested 5-times with quality certification to DIN ISO, ASTM, BS
- On request, with an individual test certificate for control of test and measuring equipment as per ISO 9000 ff
- Sieve plates made of non-rusting wire mesh fabric, 20µm to 125mm
- Also available in round or square perforated sheet

Sieve accessories

There are base pans, base pans with discharge, intermediate pans, intermediate rings and sieve covers available which are compatible with the different analytical sieves. Sieving aids and sieve stands complete the range of accessories.

Please refer to our price list for details on how to order the analytical sieves and the other available accessories.

Tested quality – black on white

RETSCH certificates

Before being delivered, each sieve is optically gauged and provided with a **works' certificate**.

On request, you receive a protocol with the **acceptance test certificate** which documents the measurement results in tabular form and in graphics, or a **calibration certificate** with more detailed statistics.

Calibration service

As a special service we offer to calibrate your analytical sieve. In doing so, we record all the relevant information for the sieve according to standardised gauging methods, and confirm these in the requested **certificate**.

Working instructions

Sieving aids

When dealing with material that is difficult to separate, we recommend the additional use of sieving aids in the individual sieve fractions. Depending on the width of the sieve meshing and the preselected vibration intensity, pearls made of agate, rubber, porcelain or nylon bristles and Vulkollan cubes may be used. Also refer to the table below.

Ensure that the fabric of the sieve is not overstretched by overloading with sieving aids as this would have a detrimental effect on the precision of your analytical sieve.

Overview table

Sieving aids	Quantity per sieve or charge	Supplier	Area of use	Caution !!
Rubber pearls	5 pcs, Ø20 mm	RETSCH, Haan	Materials to be screened are fine, dry, difficult to separate and throw sieves are used	When using mechanical sieving aids, there is the danger that soft materials can disintegrate and fine sieve fabrics can be damaged!
Agate pearls	10 pcs, Ø10 mm	RETSCH, Haan		
Hard porcelain pearls	approx. 10gr., Ø2 mm	RETSCH, Haan		
Vulkollan cubes	5 pcs, 12x12	RETSCH, Haan	Planetary sieving machines	
Bristles	3 pcs	RETSCH, Haan		
Plastic rings	3 pcs, various Ø			
Brushes			Manual sieving	
Highly dispersed silicic acids	0.5 to 2%	Degussa, Ffm	Materials to be screened are fine, sticky, fatty and electrostatically charged	Check applicability and compatibility before adding!
- " - Aluminium oxide	0.5 to 1%	Degussa, Ffm		
- " - active carbon				
- " - talcum			Latex and rubber powder	
Remove grease			Materials to be screened are very fatty	The granularity of the material to be screened may not be altered by the solvent used to remove grease or by the temperature and air used in drying.
Dry			Materials to be screened are very wet or damp	
Guide dry, warm air through the sieve set			Hygroscopic materials to be screened	
Cleanse with steam			Materials to be screened are coarse and electrostatically charged	
First sieve of the fine sieve then the coarse sieve			If contamination from other mechanical aids, such as rubber pearls, is to be avoided	The coarse material functions like a mechanical sieving aid (pearls) on the fine sieves.
Intermittent sieving		RETSCH, Haan	Materials to be screened are fine, stick easily, or only fall through the mesh with difficulty	Intermittent switching is built into the majority of throw sieves and can be switched on, if required.

Sieving material quantities

The sieve stack required for sieve analyses is composed of analytical sieves arranged one above the other, with progressively larger holes towards the top, plus the base pan.

To ensure fast separation with exact results, the quantity of the material to be screened should be adapted to the sieve diameter and the nominal size of the openings.
The relevant standards on sieve analysis state guideline values in this context.

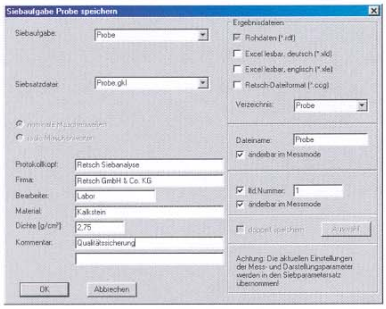
In the case of sieving processes with only 1 to 3 sieves, we recommend the use of short threaded rods (available as accessories).
Overly long, protruding rods interfere with the material to be screened due to their inherent vibration characteristics.

EasySieve ®

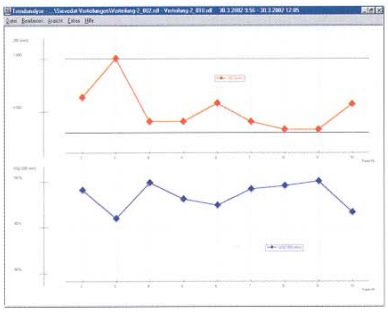
Control, evaluation, documentation.

EasySieve ®, the software package from RETSCH for grain size analysis, is superior to manual evaluation in many respects. This is because the software is able to perform the required measuring and weighing processes automatically – from determining the weights of the sieves to evaluating the data. And in a much more simple and comfortable manner – thus making life easier.

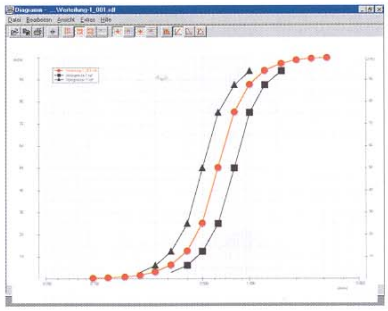
The software is structured in a self-explanatory way and follows the logical chain of events involved in analysing grain sizes. This makes it possible to use it with confidence in a fairly short time. The multiplicity of evaluation options additionally provides the utmost flexibility in adapting to demanding, individual applications.



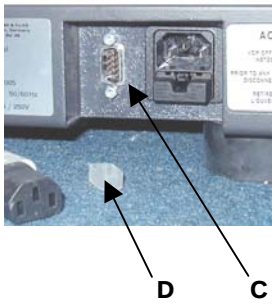
Parameter input specification limits



Trend analysis of product processes



Comparison with



Serial PC connection

The **AS 200 control** can be connected to the serial interface of a personal computer for the purpose and transmitting and receiving data. This is done with the normal 9 pole RS232 cable supplied as standard with the **AS 200 control**. This makes it possible to communicate with the **EasySieve ®** evaluation software available as an accessory.

- Remove cap **D**, if the port is not used, this protects it from dust and moisture
- Connect one end of the serial cable to **C** and the other to the PC

General

Cleaning

For thorough, gentle and time-saving cleaning of your analytical sieves we recommend Retsch ultrasonic baths.
Please send for our special leaflet „Care and cleaning of analytical sieves".

Do not clean the **AS 200 control** under running water.
Danger to life through current surge.

Use only a cloth moistened with water.
Solvents are not allowed.

Maintenance

If your **AS 200 control** is used for quality control it should be calibrated regulalrly according to DIN EN ISO 9000. Please contact your dealer or Retsch GmbH directly.
Otherwise the **AS 200 control** is practically maintenance-free.

Replacing fuses

B

Two glass fuses SPT 6.3A (5x20mm) are required.

- Remove mains plug
- Pull out fuse holder **B**
- Replace fuses
- Insert fuse holder **B**

Accessories

- Sieve clamping unit - economy
- Sieve clamping unit - standard
- Sieve clamping unit – comfort (fast clamping action)
- Universal clamping cover – economy/standard
  for sieves 100 / 150 / 200 / 203mm
- Universal clamping cover – comfort (fast clamping action)
  for sieves 100 / 150 / 200 / 203mm
- Universal wet sieving clamping cover – economy/standard
  for sieves 100 / 150 / 200 / 203mm
- Universal wet sieving clamping cover - comfort
  for sieves 100 / 150 / 200 / 203mm
- Short threaded rods for small sieve sets
  max. 5 analytical sieves, height 50mm
- Additional weight of 2100 grams
- Cover for dust-free storage of complete sieve sets
- Intermediate rings for increasing the height of the sieve frame – used for coarse grained sieving material
- Intermediate bottom for carrying out several sieving sections in one operation
- Software EasySieve

Wearing parts

Item11 / Art. No. 03.243.0052
1x rubber ring

Item 37 / Art. No. 05.699.0075
2x fuse cartridges

Item 701.2 / Art. No. 03.070.0029
2x adjusting nuts M12

No repair instructions are included in these operating instructions. For your own safety repairs should be carried out only by Retsch GmbH or an authorized agency and service technicians.

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Changes

Technical data subject to change without notice.

Warranty conditions

1. In the case of justified complaints, we will remedy the defect or replace the goods free of charge.

   The purchaser only has a right to rescind the contract or reduce the purchase price if we have decided that it is not possible or justifiable to remedy the defect, or a replacement delivery cannot be made or the deadline for this cannot be met, or a reasonable period of grace of at least six weeks set by the customer has expired fruitlessly due to our culpability.

   If the remedial work or the replacement delivery ultimately fail, the customer can demand a reduction in the purchase price or rescind the contract at its discretion. Further-going claims, in particular claims for damages not incurred on the object itself, such as lost production, are excluded insofar as we have been guilty of neither malice aforethought nor negligence. In the case of goods produced by third parties, we pass liability on to the manufacturer(s).

2. We shall bear the direct costs incurred by remedial work or replacement deliveries on the condition that the complaint turns out to be justified. This also applies to the freight costs as well as the costs, within reason, of disassembly and re-assembly. The customer is nevertheless obliged to bear the costs, within reason, of providing its own technicians and assistants on site. If our customer operates abroad, then in deviation to this, we are entitled to pay the costs incurred by the remedial work, in particular costs of transport, tolls and materials, ex German border.

3. The warranty term for newly manufactured goods is two years, for used it is one year.

   The guarantee refers to deployment in a laboratory in 1-shift operation. In case of multi-shift operation or other areas of application, the guarantee term is shortened accordingly.

   No warranty is given for parts subject to wear and tear.

4. We guarantee that our goods are free from manufacturing defects. The suitability, classification and function of our goods are determined exclusively on the basis of the performance data specified in the confirmation of order, even if these differ from the order. Should this be the case, the customer may, within two weeks of receiving the order confirmation, notify us of any differences to the order and come to an agreement on these with us. If the customer raises no objections to the specifications in the order confirmation, these are then deemed to have been accepted.

   Unless an agreement has been made to the contrary, we are not liable for the suitability of the object of delivery for the use to which the customer intends to put them. The same applies to performance data expected by the customer, unless we have been able to carry out appropriate practical laboratory trials in advance, and have declared in writing in our order confirmation that such performance data are binding.

5. Our warranty is also invalidated if persons other than those commissioned by us perform repair work or in any other way interfere with or make alterations to the goods delivered by us, or do not use suitable accessories, insofar as the cause of a defected is connected to these. A further pre-condition for our warranty is compliance with our instructions of operation and use.

6. If the customer installs the goods and/or connects, attaches or incorporates these to other systems or production plant without our prior approval, our warranty is then exclusively restricted to the parts delivered by us.

7. Remedial work on or replacement of defective parts shall take place, at our discretion, either at the place where the object of purchase is installed, or at our company's headquarters. If remedial work is performed on site, the customer shall ensure that our staff has access, unlimited either in time or space, to the object of purchase. In addition, the customer can only demand that the warranty work be performed during normal local business hours. If the customer requests that warranty work be carried out at times outside our normal business hours, it shall then bear the additional costs. If the customer requests other particular services which go beyond the warranty work, these costs are then payable at our current rates.