Manual

Sieve Shakers AS 450

Translation

Retsch®

1 Notes on the Operating Manual

This operating manual is a technical guide on how to operate the device safely and it contains all the information required for the areas specified in the table of contents. This technical documentation is a reference and instruction manual. The individual chapters are complete in themselves.

Familiarity (of the respective target groups defined according to area) with the relevant chapters is a precondition for the safe and appropriate use of the device.

This operating manual does not contain any repair instructions. If faults arise or repairs are necessary, please contact your supplier or get in touch with Retsch GmbH directly.

Application technology information relating to samples to be processed is not included but can be read on the Internet on the respective device's page at www.retsch.com.

Changes

Subject to technical changes.

1.1 Explanations of the safety warnings

In this Operating Manual we give you the following safety warnings

Serious injury may result from failing to heed these safety warnings. We give you the following warnings and corresponding content.

WARNING

Type of danger / personal injury
Source of danger

– Possible consequences if the dangers are not observed.

• **Instructions on how the dangers are to be avoided.**

We also use the following signal word box in the text or in the instructions on action to be taken:

WARNING

Moderate or mild injury may result from failing to heed these safety warnings. We give you the following warnings and corresponding content.

CAUTION

Type of danger / personal injury
Source of danger

– Possible consequences if the dangers are not observed.

• **Instructions on how the dangers are to be avoided.**

We also use the following signal word box in the text or in the instructions on action to be taken:

CAUTION

In the event of possible **property damage** we inform you with the word “Instructions” and the corresponding content.

NOTICE

Nature of the property damage
Source of property damage

– Possible consequences if the instructions are not observed.

• **Instructions on how the dangers are to be avoided.**

We also use the following signal word in the text or in the instructions on action to be taken:

NOTICE

1.2 General safety instructions

CAUTION

Read the Operating Manual
Non-observance of these operating instructions

– The non-observance of these operating instructions can result in personal injuries.

- **Read the operating manual before using the device.**
- **We use the adjacent symbol to draw attention to the necessity of knowing the contents of this operating manual.**

Target group : All persons concerned with the machine in any form

This machine is a modern, high performance product from Retsch GmbH and complies with the state of the art. Operational safety is given if the machine is handled for the intended purpose and attention is given to this technical documentation.

You, as the owner/managing operator of the machine, must ensure that the people entrusted with working on the machine:

- have noted and understood all the regulations regarding safety,
- are familiar before starting work with all the operating instructions and specifications for the target group relevant for them,
- have easy access always to the technical documentation for this machine,
- and that new personnel before starting work on the machine are familiarised with the safe handling of the machine and its use for its intended purpose, either by verbal instructions from a competent person and/or by means of this technical documentation.

Improper operation can result in personal injuries and material damage. You are responsible for your own safety and that of your employees.
Make sure that no unauthorised person has access to the machine.

CAUTION

Changes to the machine

– Changes to the machine may lead to personal injury.

- **Do not make any change to the machine and use spare parts and accessories that have been approved by Retsch exclusively.**

NOTICE

Changes to the machine

– The conformity declared by Retsch with the European Directives will lose its validity.

– You lose all warranty claims.

- **Do not make any change to the machine and use spare parts and accessories that have been approved by Retsch exclusively.**

1.3 Repairs

This operating manual does not contain any repair instructions. For your own safety, repairs may only be carried out by Retsch GmbH or an authorized representative or by Retsch service engineers.

In that case please inform:

The Retsch representative in your country
Your supplier
Retsch GmbH directly

Your Service Address:

2 Confirmation

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

The user of the device herewith confirms to the managing operator (owner) that (s)he has received sufficient instructions about the operation and maintenance of the system. The user has received the operating manual, has read and taken note of its contents and consequently has all the information required for safe operation and is sufficiently familiar with the device.
As the owner/managing operator you should for your own protection have your employees confirm that they have received the instructions about the operation of the machine.

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

User
Surname, first name (block letters)
Position in the company
Signature

Service technician or operator
Surname, first name (block letters)
Position in the company
Place, date and signature

3 Technical data

3.1 Use of the machine for the intended purpose

Target group: Owner/managing operator, operator

Machine type designation: AS450

The AS 450 is specially designed for test sieves with a diameter of 400 mm to 450 mm and offers a sieving surface that is 4 or 5 times as large as the sieving surface in 200-mm-diameter sieves. Accordingly, the AS 450 reduces sieving times considerably.

The AS 450 is suitable for the dry sieving of free-flowing and dispersed products with a feed grain size up to a max. 125 mm.

A further advantage is the very high feed quantity of up to 25 kg, which depending on the particle size and sieve mesh size can be separated in one operation. Work is also made easier by the possibility of storing up to 9 parameter combinations directly in the sieve shaker for frequently repeated sieving operations under the same conditions.

For perfectly reproducible sieving results it is also possible to input sieve base acceleration, which is independent of power frequency, instead of the amplitude into the AS450.

All sieving parameters are digitally set, displayed and monitored. The amplitude is monitored by means of a microprocessor-controlled measuring and control unit and readjusted automatically if there are changes in load or voltage. Like all Retsch control devices, the AS450 also has an integrated interface.

The device can be driven and set using EasySieve® evaluation software. EasySieve® displays all sieving parameters on the screen before and during the sieving operation.

NOTICE

Area of use of the machine

– This machine is a laboratory machine designed for 8-hour single-shift operation.

• **This machine may not be used as a production machine nor is it intended for continuous operation.**

CAUTION

Changes to the machine

– Changes to the machine may lead to personal injury.

• **Do not make any change to the machine and use spare parts and accessories that have been approved by Retsch exclusively.**

3.2 Emissions

CAUTION

1.V0043

Damage to hearing
A greater sound level may occur depending on the type of material, the sieve column and the set oscillation amplitude or sieve base acceleration.

– Excessive noise in terms of volume and duration can cause impairments or permanent damage to hearing.

• **Ensure there are suitable soundproofing measures or wear hearing protection.**

Noise characteristics:

The noise is measured in conformance to DIN 45635-031-01-KL3.

The noise characteristics depend on the set amplitude or sieve base acceleration, the number of sieves mounted and the type of material being sieved.

Example 1):

Operating conditions:

Sieved material = quartz sand, grain size <1mm, 5 sieves

Amplitude = 1.1 mm

Sound-power/noise level = 69 dB (A)

Example 2):

Operating conditions:

Screening = quartz sand, grain size <1 mm, 5 sieves

Amplitude = 2.2 mm

Sound-power/noise level = 79 dB (A)

CAUTION

Damage to hearing
The level of noise can be high depending on the type of material, the sieve stack used and the set amplitude and/or sieve base acceleration.

- Noise that is excessive in terms of level and duration can cause impairments or permanent damage to hearing.

• **Provide suitable sound proofing measures or wear hearing protection.**

3.3 Maximum Load

Maximum quantity of material to be sieved	= maximum 25 kg
Maximum weight of sieve stack	= 50 kg

3.4 Degree of protection

- IP54 - with connected mains plug
- IP40 control unit

3.5 Dimensions and weight

Height: 435 mm without sieve rods; 1440 mm with sieve rods

Width: 714 mm

Depth: 658 mm

Weight: approx. 200 kg without sieve stack and without clamping device

3.6 Required floor space

714 mm x 685 mm; no need for safety distance

3.7 Rated power

400 Watt

4 Transport, scope of delivery, installation

4.1 Packaging

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

NOTICE

Storage of packaging

– In the event of a complaint or return, your warranty claims may be endangered if the packaging is inadequate or the machine has not been secured correctly.

• **Please keep the packaging for the duration of the warranty period.**

4.2 Transport

NOTICE

Transport

– Mechanical or electronic components may be damaged.

• **The machine may not be knocked, shaken or thrown during transport.**

4.3 Temperature fluctuations and condensed water

NOTICE

Temperature fluctuations

The machine may be subject to strong temperature fluctuations during transport (e.g. aircraft transport)

– The resultant condensed water may damage electronic components.

• **Protect the machine from condensed water.**

4.4 Conditions for the place of installation

NOTICE

Ambient temperature

– Electronic and mechanical components may be damaged and the performance data alter to an unknown extent.

• **Do not exceed or fall below the permitted temperature range of the machine (5°C to 40°C / ambient temperature).**

Atmospheric humidity:

Maximum relative humidity 80% at temperatures up to 31°C, decreasing linearly up to 50% relative humidity at 40°C

NOTICE

Atmospheric humidity

– Electronic and mechanical components may be damaged and the performance data alter to an unknown extent.

• **Do not exceed the admissible range for atmospheric humidity.**

4.5 Installation of the machine

Installation height: maximum 2000 m above sea level

NOTE

Installation

– Depending on the operating status of the mill, there may be slight vibrations.

• **Place the mill on an even, flat and balanced supporting surface only. The supporting surface must be stable and must not vibrate.**

4.6 Removing Transport Safeguards

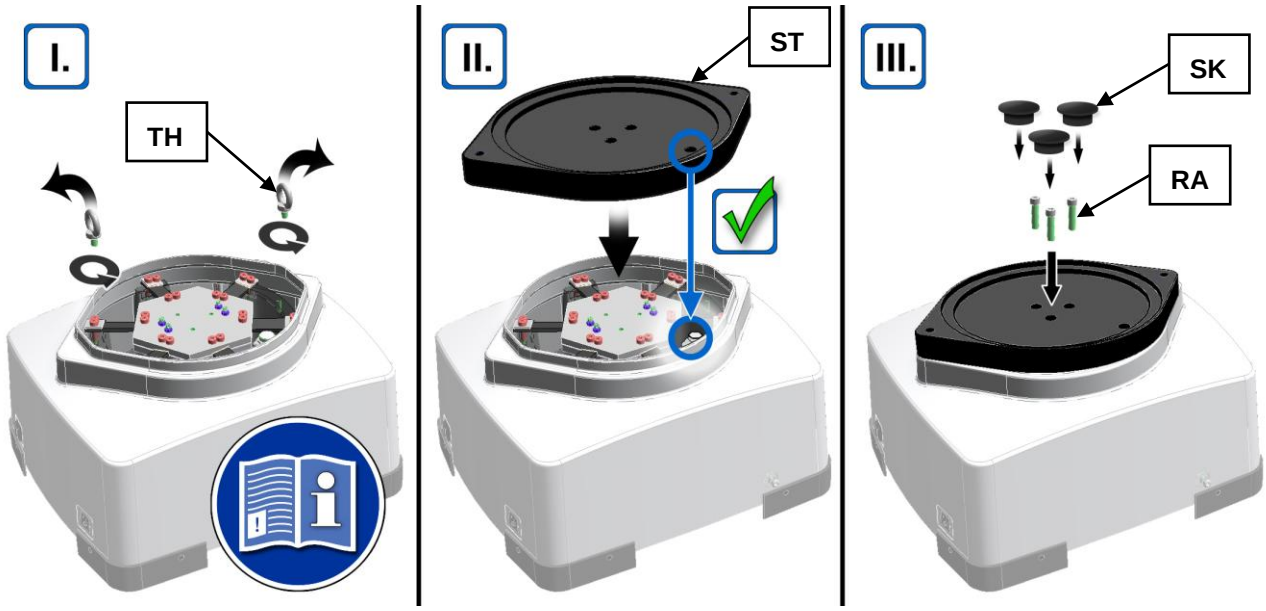

Fig. 1: Removing the transport aids and mounting the sieve plate

- Loosen the two transport aids (**TH**). (**1.**)

  Insert the sieve plate (**ST**) and make sure the alignment is correct. (**2.**)
- Screw the sieve plate on with the three provided screws (**RA**) to finger tightness. The necessary torqueis approx. 40 Nm.

  Then put the three protective caps (**SK**) onto the screws and press the protective caps on securely.

Keep the two transport aids for transport at a later date.

4.7 Using the transport aids again

- Remove the three protective caps (**SK**)
- Loosen the three screws (**RA**) in the centre of the sieve plate.
- Lift the sieve plate (**ST**) off the device.
- Screw the two transport aids (**TH**) into the corresponding threaded bores.

4.8 Connect the control unit

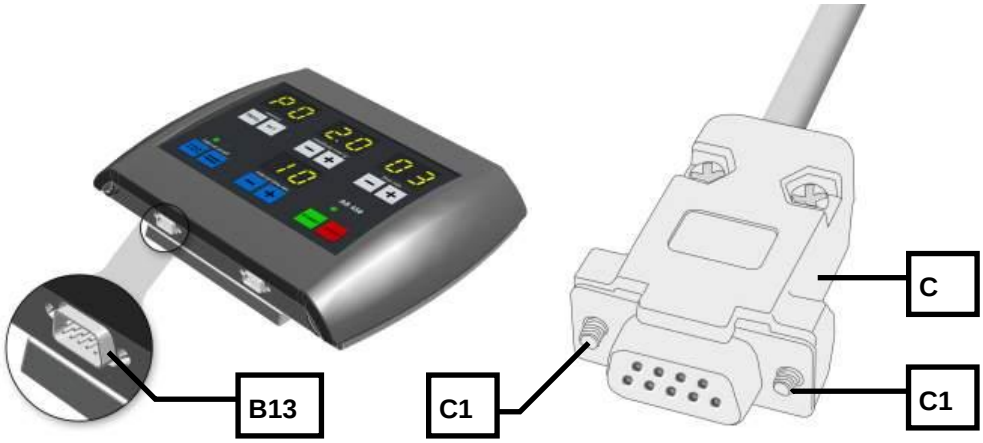

Fig. 2: Connecting the operating unit

- Insert connector **C** into the 9-pin port **B13** on the operating unit.

- Use the two **C1** screws to screw connector **C** to port **B13**.

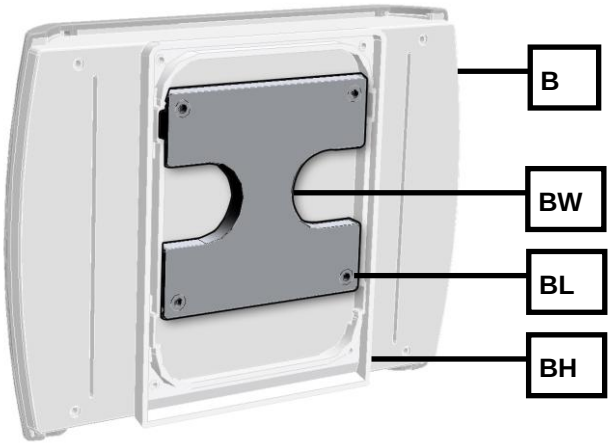

Fig. 3: Wall-mounting of the control panel

On the back of the control panel **B** there is a wall mounting plate **BW.** The wall mounting plate **BW** has an upper and a lower engaging position.

For wall mounting you need 4 screws (maximum diameter 4mm) and 4 corresponding dowels.

- Press the wall mounting plate upwards or downwards depending on the engaging position.
- In the central position, the disengaged wall mounting plate can be taken out of the **BH** holding frame.
- Use the wall mounting plate as a template for marking the four required boreholes.
- Use all four **BL** holes when fastening the wall mounting plate**.**

When screwing on the wall mounting plate, make sure the flat surface is pointing towards the wall.

4.9 Electrical connection

⚠ WARNING 2.W0008

Risk of death through power surge
Mains plug not completely plugged in

– Water can enter the IEC socket if the IEC is not completely plugged in. An electric shock can lead to burns and arrhythmia or to respiratory arrest as well as cardiac arrest.

- **Only operate the device with the IEC fully plugged in.**

⚠ WARNING

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

- Please check the type plate for details on the necessary voltage and frequency for the device.
- Make sure the levels agree with the existing mains power supply.
- Use the supplied connection cable to connect the device to the mains power supply.

The external fuse must be at least T6,3A (230V) T8A (100/120V).

4.10 Type plate description

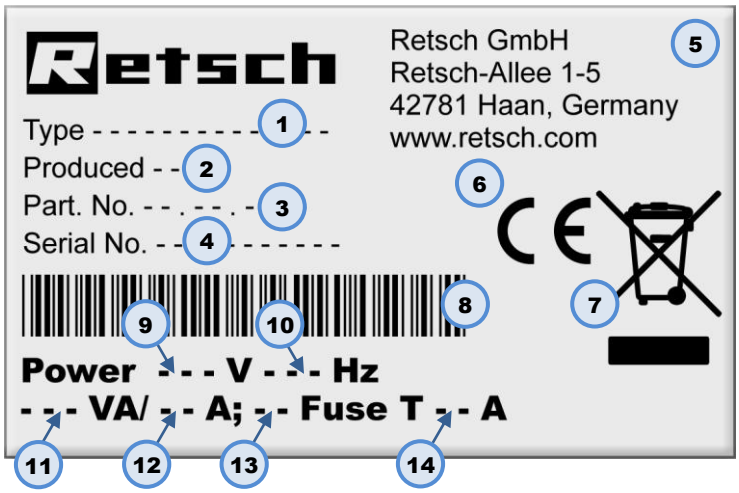

Fig. 4: Type plate lettering

1 Device designation
2 Year of production
3 Part number
4 Serial number
5 Manufacturer's address
6 CE marking
7 Disposal label
8 Bar code
9 Power version
10 Mains frequency
11 Capacity
12 Amperage
13 Number of fuses
14 Fuse type and fuse strength

In the case of questions please provide the device designation (1) or the part number (3) and the serial number (4) of the device.

5 Operating the machine

5.1 Use of the machine for the intended purpose

5.2 Views of the Instrument

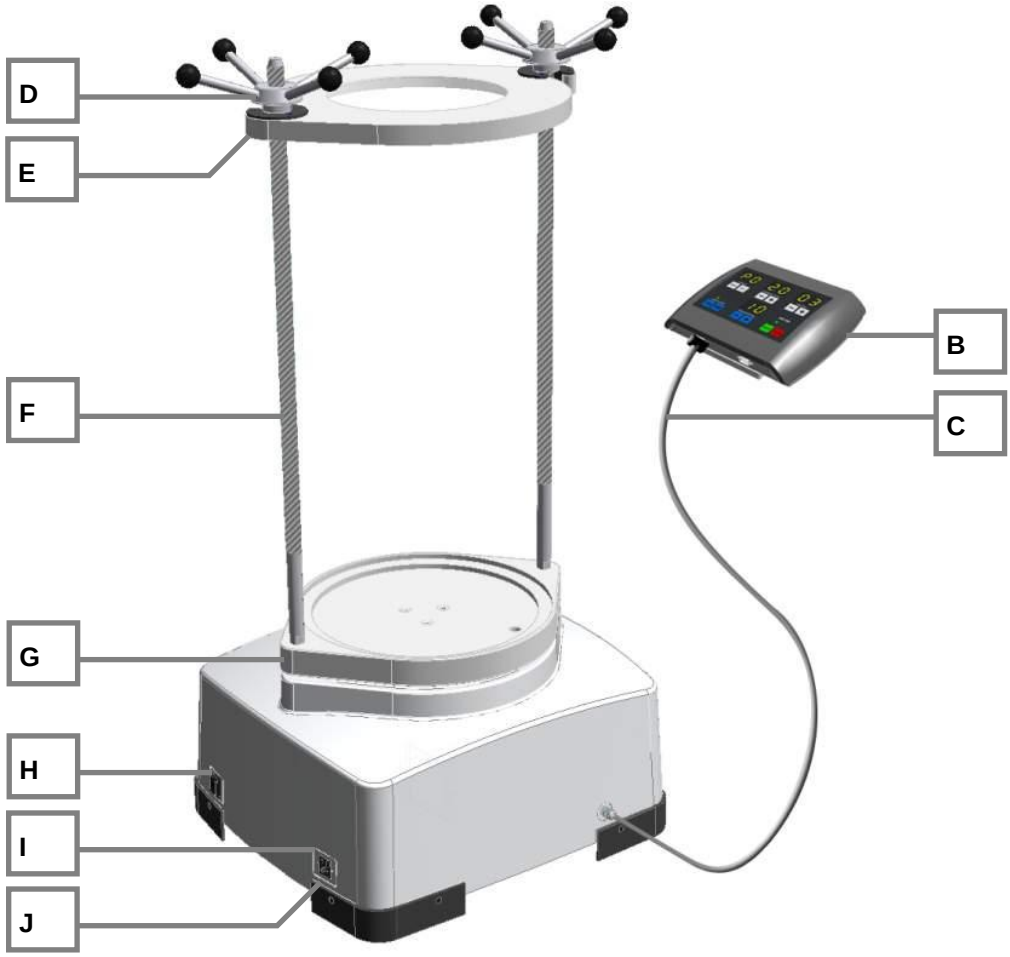

Fig. 5: Diagram of the components

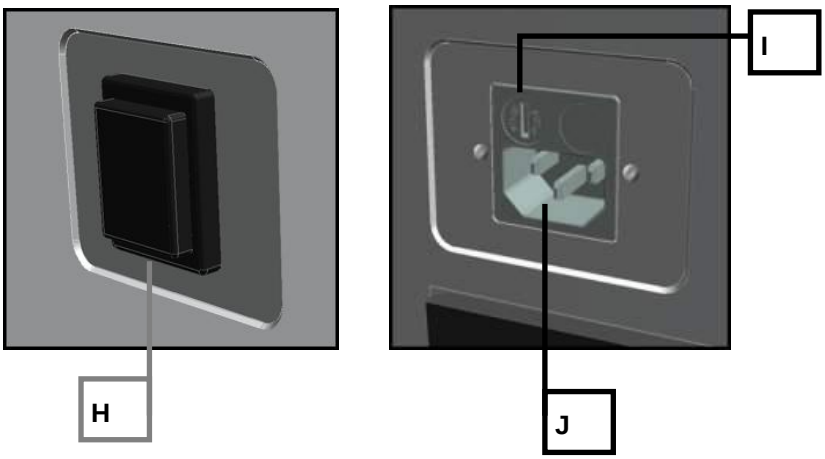

Fig. 6: Detailed views of the parts of the device

5.3 Overview table of the parts of the device

Element	Description	Function
Ai/ Am/ Aa/At B1-B14	Display and operating unit: See below for explanations.	Time selection, frequency presetting and starting/stopping of the machine, program memory, interval

B	Operating unit	Contains the displays and operating elements
C	Cable control section, operating unit	Connects the operating unit to the AS450
D*	Clamping cross M24	Clamps the sieve lid onto the sieve stack
E*	Sieve lid AS450 complete	Covers off the sieve stack
F*	Stand rods M24	Clamps the sieve stack
G	Sieve plate AS450	Holds the sieve stack
H	ON/OFF switch	Disconnects the power supply unit from the mains
I	Fuse links	Accommodate the glass fuses
J	IEC receptacle with line filter including fuse links	Mains power connection

(* = Accessory parts)

5.4 Operating elements and displays

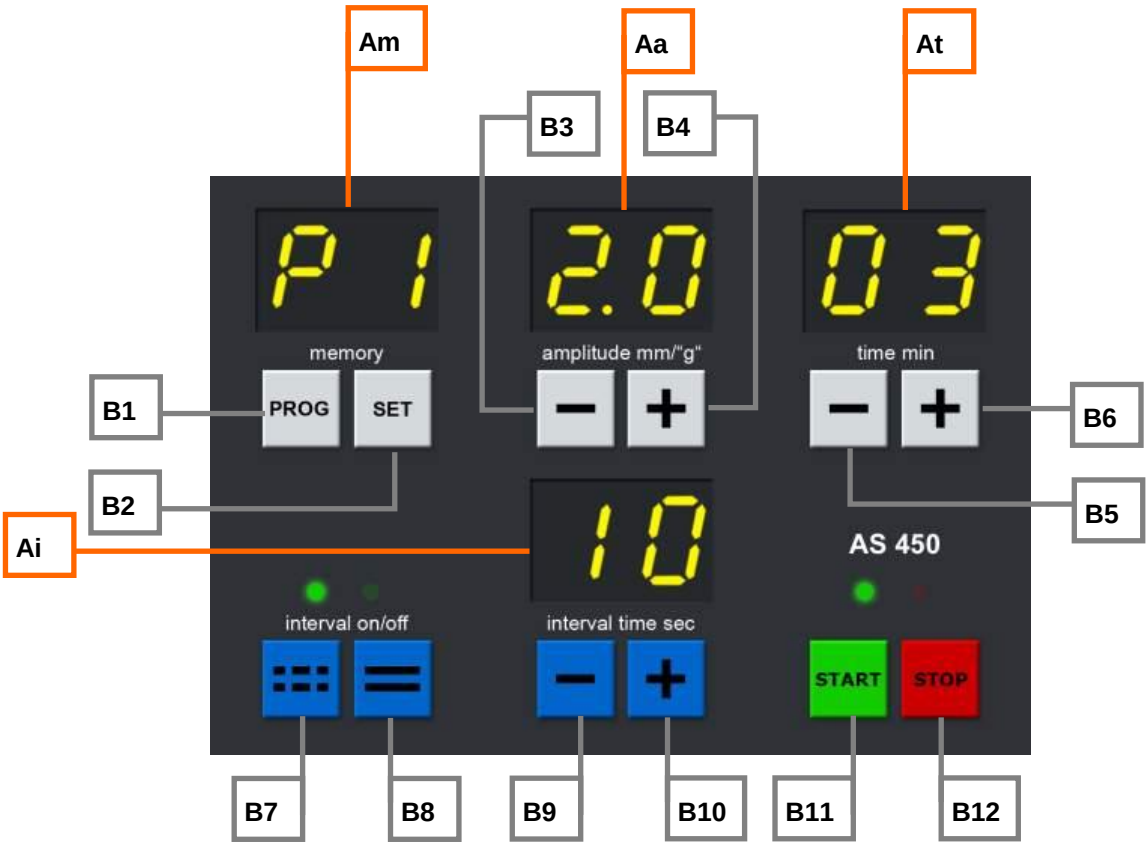

Fig. 7: Graphic Representation of the operating and display elements

Fig. 8: Graphic Representation of the Control Panel Connection

5.5 Overview Table of the Operating Elements and the Display

B1	**PROG** - Key for calling up the preset sieve parameters (**P1-P9** or **on)** and for ending programming without saving the parameters.
Am	**MEMORY** display indicates the selected program **P1-P9** or **on**. When the AS450 is controlled by the EasySieve® software program, **ES** appears in the display.
B2	**SET** - key for activating the adjusting mode for the preselected program places **P1-P9** and storing the parameters after programming.
B3	**—** key reduces the vibration amplitude **(0.2 - 2.2mm)**, accuracy **±0.1 mm** and/or sieve base acceleration in **"g"**
Aa	**Amplitude** display indicates the vibration amplitude and/or sieve bottom acceleration in **"g"**.
B4	**+** key increases the vibration amplitude**, 0.2 - 2.2mm**, accuracy **±0.1 mm** and/or sieve bottom acceleration in **"g"**
B5	**–** key reduces the sieving time, **1 - 99min**.
At	**Time** display shows the preselected sieving time **1 - 99min**.
B6	**+** key increases the sieving time, **1 - 99min**.
B7	Key switches the interval enterprise **ON**, left LED lights up.
B8	Key switches the interval operation **OFF**, right LED lights up
B9	**–** key reduces the interval time, **10 - 99sec.**
Ai	**Interval** display shows the preselected interval time **10 - 99sec**.
B10	**+** key increases the interval time, **10 - 99sec**.
B11	**START** key starts the sieving operation and the green LED lights up.
B12	**STOP** key stops and ends the sieving operation and the red LED lights up.

B13	Connection AS450 - operation panel
B14	Serial connection AS450 - computers

5.6 Inserting and Clamping the Test Sieves

CAUTION

3.V0012

Crushing and bruising
Overturning of the sieve column

– The sieve column can overturn and cause personal injury.

• **Only operate the device with securely clamped sieve column.**

NOTICE

4.H0047

Minimum number of sieves

• At least 3 sieves and one sieve base must be clamped.

The AS450 is suitable for test sieves with an outer diameter of 400 to 450 mm. A minimum of 3 and a maximum of 12 Retch sieves (65mm) + 1 sieve tray or 8 test sieves (100 mm) + 1 sieve tray can be clamped. Clamping units, support rods and clamping covers are available for this (see accessories).

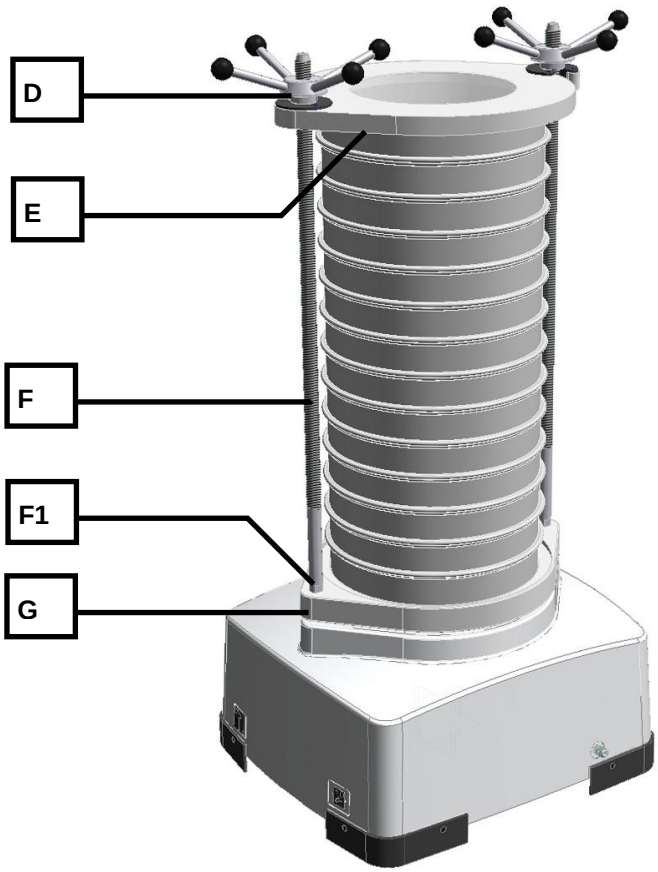

Fig. 9:

Screw the threaded rods (**F**) into the sieve plate (**G**) and secure them to the flat area (**F1**).

NOTICE

The clamping force to secure the sieve rods is approx. 30Nm.

- Place the selected sieve stack centrally on the sieve plate.
- Place the clamping cover (**E**) over the threaded rods on the top sieve.
- Screw both cross braces (**D**) onto the support thread up to the clamping cover.
- Tighten the cross braces using both hands.

We recommend use of talcum if the collecting pan sticks to the smooth surface of the sieve support when removing the sieve stack.

5.7 Using the quick-action clamping device

A quick clamp device is available as accessory for the AS450.

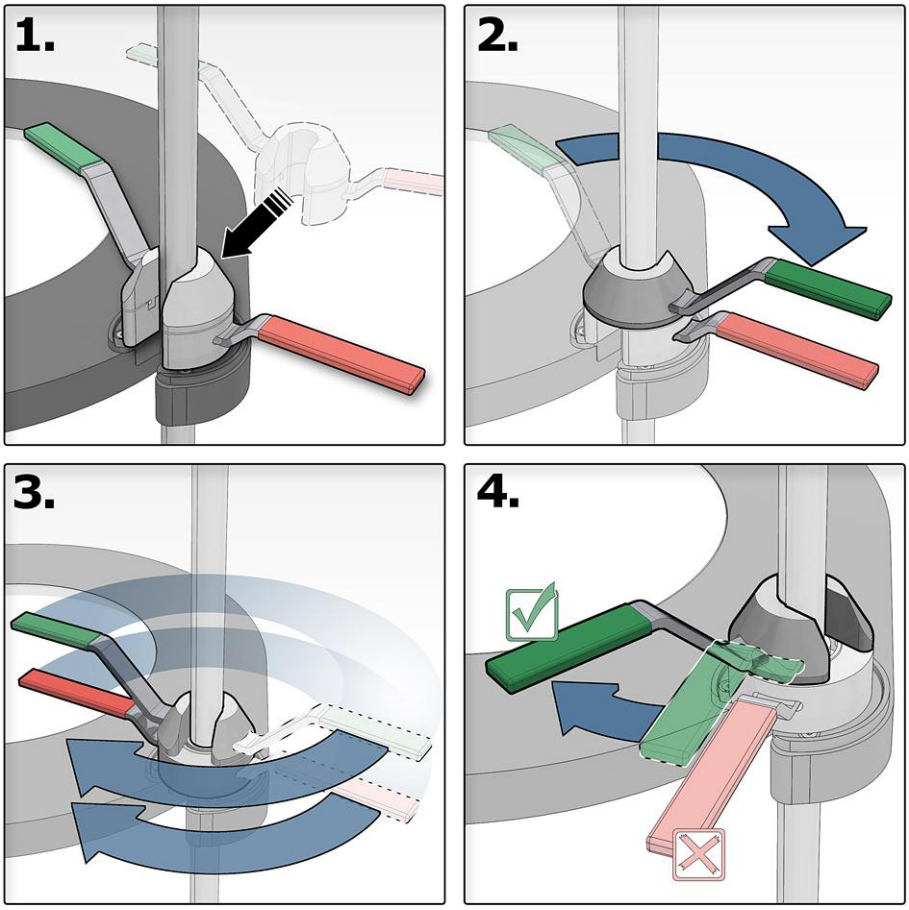

Fig. 10: Inserting and using the quick clamp device

5.7.1 Preparation

- Place the sieve stack on the AS450.
- Place the sieve cover on the sieve stack.
- Twist the sieve cover clockwise until both openings are adjacent to the sieve rods.

- Place the quick clamp device on the sieve cover so that the sieve rod is enclosed (See Fig. 1).
- Twist the green handle on the quick clamp device until it is located over the red handle (see Fig. 2)

5.7.2 Clamping the Sieve Stack

Using the quick clamp device it is now possible to clamp the sieve cover and thereby the sieves tightly onto the device.

- Repeat these steps with the second quick clamp device.
- Twist both quick clamp devices until the sieves are tightly and securely clamped by the sieve cover.

5.7.3 Securing the Quick Clamp Device (Locking)

Locking secures the quick clamp device on the sieve rod.

- Finally twist only the green handle a little further until the quick clamp device is locked.
- Repeat this step with the second quick clamp device.

5.8 Operating the Device

CAUTION

Danger of personal injury
Dangerous nature of the sample

– Depending on the dangerous nature of your sample, take the necessary measures to rule out any danger to persons.

- **Observe the safety guidelines and datasheets of your sample material.**

5.9 Switching On and Off

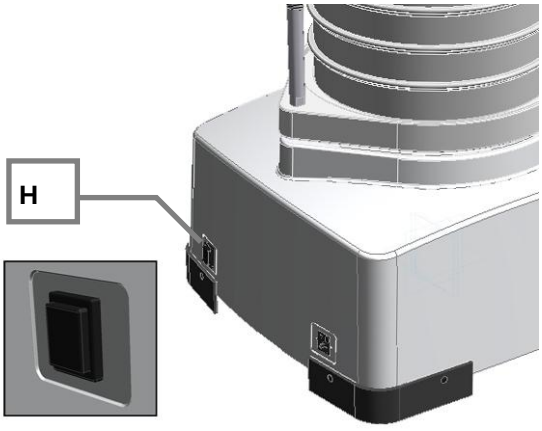

Fig. 11: Switching on/off

The main switch (**H**) is on the left side of the AS450.

- Switch the main switch **on**.

– **on** lights up in the **memory** display**.**
– The last set vibration amplitude, e.g. **1.00.** lights up in the amplitude display

– The **interval off** LED lights up.
– Two bars (**--**)or the last set sieve time light up in the **time** display.

The AS450 is now ready for operation without interval and for continuous operation with a vibration amplitude of 1.0 mm.

5.10 Starting, Interrupting, Stopping

5.10.1 Starting

• Press the (**B11**) start button.
- The LED green over the (**B11**) button lights up.
- The (**Aa**) display shows that the machine is running up to the preset value.
- During the sieving time the amplitude and/or sieve base acceleration are kept at a constant level within the set tolerance.

5.10.2 Interrupting / Pause Function

• Press the STOP/key (**B12**) once.
- The red LED over the (B12) button lights up.
- The set levels remain visible.
- Press the start button (**B11**) to continue the sieving operation.

5.10.3 Stopping / Stand-by Function

• Press the (B12) stop button twice.
- The red LED over the (**B12**) button lights up.
- The entire display turns off.
• Press the (**B11**) start button again to activate the LED displays.

You can now enter new settings.

• Press the (**B11**) start button a second time.

The function runs as during start-up.

5.11 Setting the sieving time

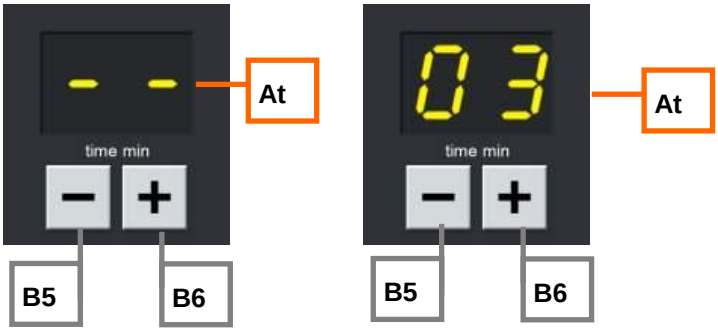

Fig. 12: Setting undefined sieving time/sieving time

When the AS450 is put into operation for the first time, the sieving time is not yet defined.

– -- appears in the display **(At**).

The sieving timecan be set from 1 to 99minutes.

Use the **-** key (**B5**) to reduce the time down to 1 minute.

Use the **+** key (**B6**) to increase the time up to 99 minutes.

5.11.1 Activating the Undefined Sieving time

Two bars appear in the display (**At**) if the time is reduced to less than 1 minute or increased to more than 99 minutes.

The undefined sieving time is activated in this way.

5.12 Switching on interval or continuous mode

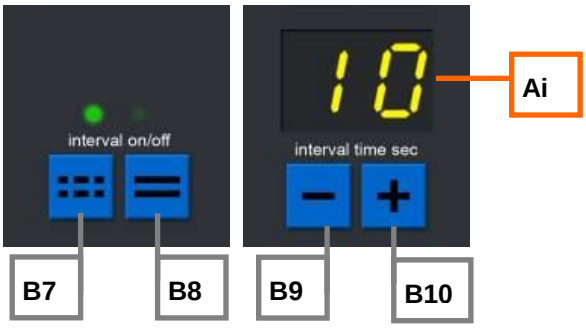

Fig. 13: Interval operation

- Use the (**B7**) key to turn on the interval operation.

– The **interval on** LED lights up over the (**B7**) key.

- Use the + key (**B10**) to increase the interval time up to 99 seconds.

On exceeding 99 seconds, the display starts again at 10 seconds.

- By pressing the - key (**B9**), you can reduce the interval time down as far as10 seconds.

When the time is reduced to less than 10 seconds, the display starts again at 99 seconds.

5.12.1 Switching Off the Interval

- Press the (**B8**) key to switch off the interval operation.

– The **interval off** LED lights up over the (**B8**) key.

– The display (**Ai**) goes out.

5.13 Memory – Saving and calling-up sieving parameters

5.13.1 Starting a saved program

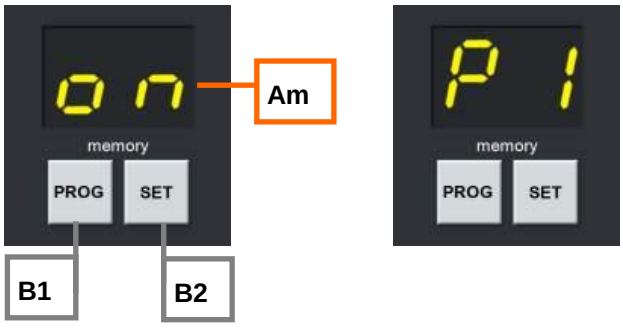

Fig.14: MEMORY display

The MEMORY function, i.e. the storage or retrieval of preselected sieve parameters, can be utilised only in the stand-by mode. You can change and overwrite the P1 to P9 program places at any time.

– “**on”** appears in the display as soon as the AS450 is switched on.

• By pressing the PROG (**B1**) key, you can move to the next program place P1 to P9.

After program place P9, the **on** appears in the display again. In the PROG mode all keys are blocked apart from PROG (**B1**), START (**B11**) and STOP (**B12**).

In the standard mode “on” appears in the (**Am**) display and you can freely adjust all sieve parameters.

In PROG modes P1 to P9 you can save and call up the sieve parameters.

• Press the start key to start the sieving process with the selected program.

5.13.2 Saving programs

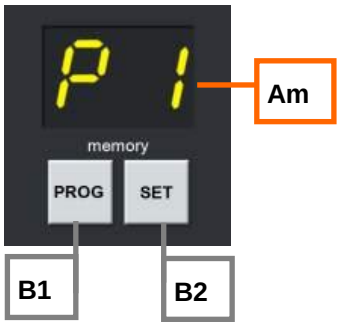

Fig. 15: Saving Programs

• Press the PROG (**B1**) key until the desired memory location P1-P9 is reached.

• Press the SET key (**B2**).

– All displays flash.

• Set the **amplitude mm/”g”**, **time min** and **interval time sec** sieving parameters.

The programming modecan be stopped by pressing the PROG (**B1**) key and the values will not be saved then.

• Press the key SET (**B2**) to save the entered values.

The display flashing stops, the adjustment lockis activated and the sieving parameters are saved.

If the AS450 is controlled by a PC and the “Easy Sieve® “ sieve software, “ES” appears in display 2.

In this mode it is not possible to make any manual changes to the sieving parameters.

5.14 Setting the amplitude

5.14.1 Amplitude “mm”

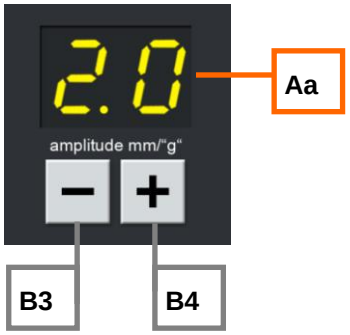

Fig. 16: **amplitude mm/"g"** display

In the display marked **amplitude mm/"g"** the double amplitude is shown as the measured value. Hereinafter this measurement will be referred to as amplitude.

When the AS450 is switched on, the amplitude is pre-set to the last amplitude used.

5.14.1.1 Setting the amplitude

reducing

- Press the **-** key (**B3**) to reduce the amplitude down to 0.2 mm.

Keep the keys pressed down for 5 seconds for fast adjustment.
If the level drops below 0.2 mm, 2.2 mm will appear again.

increasing

- Press the **+**key (**B4**) to increase the amplitude to 2.2 mm.

Keep the keys pressed for 5 seconds for fast adjustment.
If 2.2 mm is exceeded, 0.2 mm will appear again.

5.15 Sieve bottom acceleration in "g"

When switching the AS450 on, the amplitude is pre-set to the last amplitude used and can be switched to the sieve bottom acceleration mode.

- Keep the + and - keys (**B3** and **B4**) pressed simultaneously for 2 seconds.

The display does not show any measurements straightaway after the switch-over; the START key must be pressed first before the measurements are displayed.

In the display (**Aa**) marked **amplitude mm/"g"** a multiple of the **"g"** gravitational acceleration is displayed as a measurement.

(1g = 9.81m/s ^{2})

5.15.1 Setting sieve bottom acceleration in "g"

from 0.7 – approx. 7 g

Your AS450 can of course only reach the sieve bottom acceleration at which an amplitude of 2.2 mm is not exceeded in relation to the natural frequency.

reduce:

– button (**B3**) reduces the sieve bottom acceleration down to 0.7g.

– keep button (**B3**) pressed – after 5 seconds fast adjustment is possible

increase:

– button (**B4**) increases the sieve bottom acceleration up to approx. 7g.

– keep button (**B4**) pressed – after 5 seconds fast adjustment is possible

5.16 Acoustic Signal

If the sieving operation is conducted to the end without interruption, the end is signalled by an acoustic signal sounded 5 times .

Switching off the Acoustic Signal:

- Press the (**B8**) and (**B12**) keys simultaneously.

– This is confirmed by a signal.

Switching on the Acoustic Signal:

- Press the (**B8**) and (**B11**) keys simultaneously.

– confirmed by a signal.

5.17 Operating hours display

If the keys described below are pressed, the shaker's total running time can be displayed in hours and minutes.

Operating hours:

- Press and hold the (**B2**) and (**B10**) keys together.

– "bS" appears in the "MEMORY" (**Am**) display.

– In the display (**Aa**), (**At**) and **interval time** the operating hours are shown in the format hh hh mm .

Exiting Operating Hours:

- Press STOP (B12).

5.18 Abbreviations in the Display

The following abbreviations can appear:

Display (**Am**)	**Description**	**Key Combinations**
On	Normal mode and all parameters can be adjusted during the sieving process.	
P1 - P9	Call-up and display of the saved programs.	Press the "PROG" key
ES	Operation with **EasySieve®** evaluation software.	Automatic when starting from **EasySieve®**
bS	Operating hours display	Combination of "SET"and interval time "**+**" keys
S	Software version display	Combination "SET" and "-" interval time"

5.19 Information on the sieve bottom acceleration mode

The AS450 is a projection sieve shaker which allows you to enter both the amplitude and the sieve bottom acceleration as sieving parameters.

In contrast to appliances that are energised at mains frequency and will always oscillate at the mains frequency of 50 or 60 Hz, projection sieve shakers such as the AS450 are usually based on a spring mass system excited by a frequency of 40Hz independently of the mains frequency and accordingly different frequencies arise depending on the different number of sieves or different sieve weights in the loading.

As long as sieve analyses are to be compared with each other or reproduced within the respective frequency ranges, setting the same amplitudes and sieving times will of course produce comparable results.

As a result of the increasing globalisation of production processes throughout the world, it is becoming more and more necessary to compare sieve analyses from both frequency ranges 50HZ/60Hz with each other and of course with the results of your AS450 operating on 40Hz. Due to the different sieving frequencies at correspondingly short sieving times, it is in no way possible to assume that the results will be comparable even if these sieving analyses are conducted with the same amplitude and the same sieving time.

These differences are due to the fact that the important parameter in the shaker sieving analyses is not actually the amplitude but the sieve bottom acceleration, which in addition to the amplitude is mainly determined by the frequency. As long as the sieving analysis is conducted at just the same frequency, e.g. at the same mains frequency, variation in amplitude is the only way to vary the sieve bottom acceleration!

To allow for these physical conditions, your new AS450 permits you to set not only the amplitude but also the display and regulation of the sieve bottom acceleration. The sieve bottom acceleration is displayed as a multiple of the gravitational acceleration **“g”** (1g = 9.81 m/s²). The functional principle is based on our German patent no.19 522 987.

For more detailed operating instructions, see the chapter on “Operation of the AS450” and the paragraph on “sieve bottom acceleration”.

In order to be able to compare sieving analyses in the acceleration mode with direct input, it is necessary to know the sieve bottom acceleration of the comparison machine (e.g. an AS200 or another AS450).

6 Retsch test sieves

6.1 The highest precision for exact results

The accuracy and reliability of the analysis result are decided not only by the ability of a shaker to deliver reproducible results but by the quality of the test sieve .

Retsch test sieves are high-quality measuring instruments for which only meshes and perforated sieves that comply with the respective standard are used

6.1.1 Test Sieves with 400-mm and 450-mm Diameters

- standards-compliant production of sieve pans, frame and labelling
- tested 5 times with quality certification
- in conformance to DIN ISO, ASTM, BS
- on request with an individual test certificate for inspection equipment monitoring in compliance with ISO 9000ff
- Sieve pans made of stainless wire sieve mesh, 20µm to 125mm

- also available in round or square perforated sheeting

Fig. 17: Test sieves

6.2 Sieve accessories

Suitable collecting pans, collecting pans with outlets, intermediate pans, intermediate rings and sieve covers are available. The range of accessories is rounded off by sieving aids and sieve stands.

Please refer to our price list for the precise order data for the test sieves and the available accessories.

6.3 Tested quality – black on white

6.3.1 RETSCH Certificates

Before delivery each sieve is gauged optically and provided with a works certificate .

On request you will receive a log with the inspection certificate in which the measuring results are documented in a table and graph or in a calibration certificatewith more detailed statistics.

6.3.2 Calibration Service

As a special service we offer to recalibrate your test sieves, whereby after conducting the measurements in accordance with standards, all the relevant information is recorded and confirmed in the required certificate.

7 Working instructions

7.1 Sieving aids

For goods that are difficult to separate, we recommend the additional use of sieving aids in the individual sieve fractions. Depending on the aperture size of the sieve and the preselected oscillation intensity, it is possible to use balls made of agate, rubber, or porcelain or nylon brushes and Vulkollan® for this purpose.

See also the following table.e

7.2 Overview Table

Sieving aids	Quantity for each sieve / material to be sieved	Supplier	Area of Application	Note!!
Rubber balls	5 pcs., Ø20 mm	RETSCH, Haan	with fine, dry materials that are difficult to separate and the use of projection sieve shakers	When mechanical sieving aids are used, there is a danger that soft materials may disintegrate and damage can occur to fine sieve meshes!
Agate balls	10 pcs., Ø10 mm	RETSCH, Haan		
Hard porcelain balls	approx. 10gr., Ø2 mm	RETSCH, Haan		
Vulkollan® cube	5 pcs., 12x12	RETSCH, Haan	when using planetary sieve shakers	
Brushes	3 pcs.	RETSCH, Haan		
Plastic rings	3 pcs., various diameters			
Small brush			in manual sieving	
highly dispersed silicic acid	0.5 to 2%	Degussa, Frankfurt-on-Main	with fine, sticky materials that contain fat and are electrostatically charged	Before adding, check usability and compatibility!
- " - Aluminium oxide	0.5 to 1%	Degussa, Frankfurt-on-Main		
- " – activated carbon				
- ″ - talcum			with crude rubber and rubber powder	
Degreasing			When the material being sieved is very greasy	The material being sieved and the grain size must not be changed by the solvent during degreasing or by the temperature and air during drying.
Drying			When the material being sieved is very wet/very damp	
Guide dry, warm air through the sieve stack			When the material being sieved is hygroscopic	
Send water vapour through the material			When the material being sieved is coarse and electrostatically charged	
First screen with the fine sieve and then with the coarse sieve.			If it is important to prevent contamination from other mechanical aids, such as e.g. rubber balls.	The coarse material works like a mechanical sieving aid (balls) on the fine sieves.
Intermittent sieving		RETSCH, Haan	for fine materials that stick easily and drop only with difficulty through the shaker.	Intermittent switching is built into most projection sieve shakers and can be switched on as required.

7.3 Sieving Sample Quantities

The stack of sieves required for the sieve analyses consists of test sieves arranged one on top of the other in ascending order of aperture size as well as the collecting pan.

To ensure quick fractioning with an exact result, the quantity of the material being sieved must be adapted to suit the sieve diameter as well as the nominal diameter of the openings. Guidelines are obtained in the respective standards for the sieve analyses.

8 Wet sieving

WARNING 5.W0001

Danger from electric shock

– An electric shock can result in burns and arrhythmia or to respiratory arrest as well as cardiac arrest.

- **Never operate your AS450 in a water basin.**
- **Always operate your AS450 using a mains socket with an RCD circuit breaker.**

WARNING 6.W0009

Danger to life from electric shock

– The control panel has safety class IP40.

An electric shock can result in burns and arrhythmia or to respiratory arrest as well as cardiac arrest.

- **Ensure that the control panel does not come into contact with water.**

NB 7.H0048

Wet sieving

– Observe the following instructions for successful wet sieving :

- The hose inner diameter of the water supply to the spray nozzle must be 13mm.
- During the wet sieving a water pressure of between 2 bar and 5 bar is recommended at the sieve cover entry (approx. 2 liters/min – 4 liters/min). These values depend on the sieve mesh size used, sieve material and collecting pan loading
- Use ventilation bases between the sieves.
- The water outlet from the drain hose must be positioned below the water sieve outlet (W1).
- The distance between the water outlet of the drain hose and the water sieve outlet should not be too great. (W2)
- The inner diameter of the water drain hose must be sufficiently dimensioned. (Hose inner diameter 20mm)
- Used sieves must be cleaned immediately after sieving. Depending on the sieved material, surface rust may develop in the sieve mesh.

NOTICE 8.H0049

Damage to the sieve mesh

– A build-up of water in the sieve column can lead to overloading and thus to damage or irreparable damage to the sieve mesh.

- **Always dose the volume of water applied in a way that ensures there is no build-up of water**

NB 9.H0050

Load diagrams

– Binding information on wet sieving is not possible because it is not possible to define the volume of water in the sieve column.

• **The load diagrams in these operating instructions do not apply to wet sieving.**

Dry sieve analyses are possible in most applications. However, there are materials for which the adhesive force between the individual particles causes difficulties. These problems can be eliminated by adding liquids, preferably water, during the sieving operation (if the additives specified in the chapter on sieving aids have not helped). However, wet sieving is only possible if the materials to be sieved do not swell, dissolve or change in any other way in the sieving liquid.

8.1 Required accessories

- Clamping cover with spraying nozzle for the corresponding sieve diameter.
- Collecting bottom container with water outlet point for the corresponding sieve diameters.

8.1.1 Preparing the Wet Sieving

WARNING

Risk of electrocution

– An electric shock can cause injuries in the form of burns and cardiac arrhythmia, respiratory arrest and cardiac arrest.

• **Never operate your AS450 in a water outlet basin.**

• **Always operate your AS450 connected to a mains socket protected by an RCD circuit-breaker.**

CAUTION

Risk of electrocution

– The operation panel has the IP40 safety class.

– **Make sure the operation panel does not come in contact with water.**

- Use a hose to connect the clamping cover's spraying nozzle to a water tap.
- Connect the drain from the collecting panto the water drain point or an appropriate collection container.

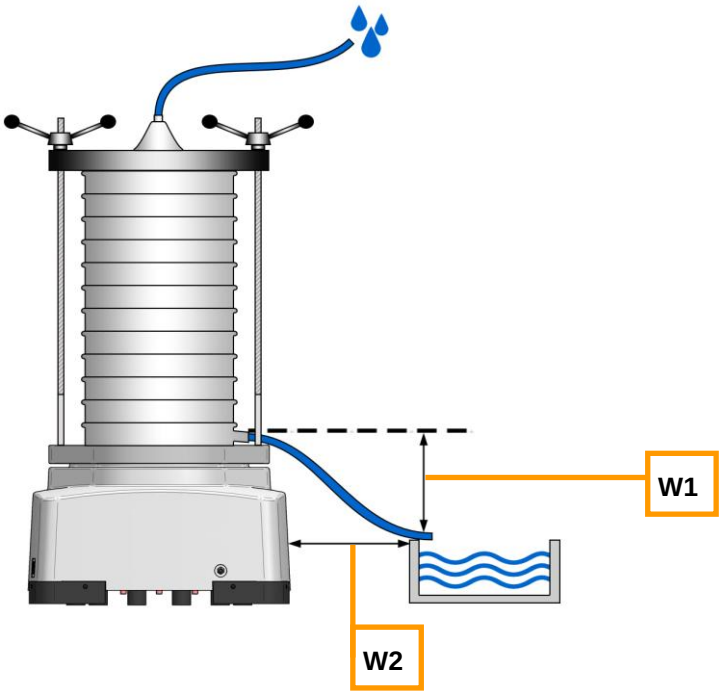

Fig. 18: Arrangement of the water system

NOTE

Wet sieving

– For wet sieving to be successful, please observe the following instructions :

- The inside diameter of the water supply hose to the spraying nozzle must be 13 mm.
- During the wet sieving a water pressure of between 2 bar and 5 bar is recommended at the sieve cover entry (approx. 2 litres/min – 4 litres/min). These values depend on the sieve mesh size used, sieve material and collecting pan loading.
- Use ventilation bases between the sieves.
- The water outlet from the drain hose must be below the water sieve outlet (W1).
- The spacing between the water outlet from the drain hose and the water sieve outlet should not be too large. (W2)
- The inside diameter of the water drain hose must be sufficiently large. (Inside diameter of hose is 20 mm)
- Used sieves must be cleaned immediately after the sieving process. Depending on the material being sieved, a rust film can form in the sieve mesh.

8.1.2 Performing Wet Sieving

- Add the solid material as a suspension .

NOTE

Damage to the sieve mesh

– An excessive accumulation of water in the sieve stack can lead to overloading and subsequently damage or destroy the sieve mesh.

• **Always restrict the dosage of water to quantities that will prevent too much water building up** .

- The use of dispersing agents is recommendable. They reduce the surface tension in the sieve fluids.
- When working with materials that are difficult to form into a slurry or separate accurately, spray the individual fractions one after another.
- After the sieving process, the fractions are transferred from the individual sieves to appropriate filters (paper filter) and dried in the drying ovenat 80° C.
- Clean the sieves in the ultrasonic bath then and dry in the drying cabinet also (without sealing).
- Do not exceed the maximum drying temperatureof 80°C.

NOTE

Loading diagrams

– Due to the undefinable volume of water in the sieve stack , it is not possible to provide binding information on wet sieving.

• **The loading diagrams in these operating instructions do not apply to wet sieving.**

9 EasySieve®

9.1 Control, evaluation, documentation

EasySieve®, the software package from RETSCH for grain size analyses, 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.

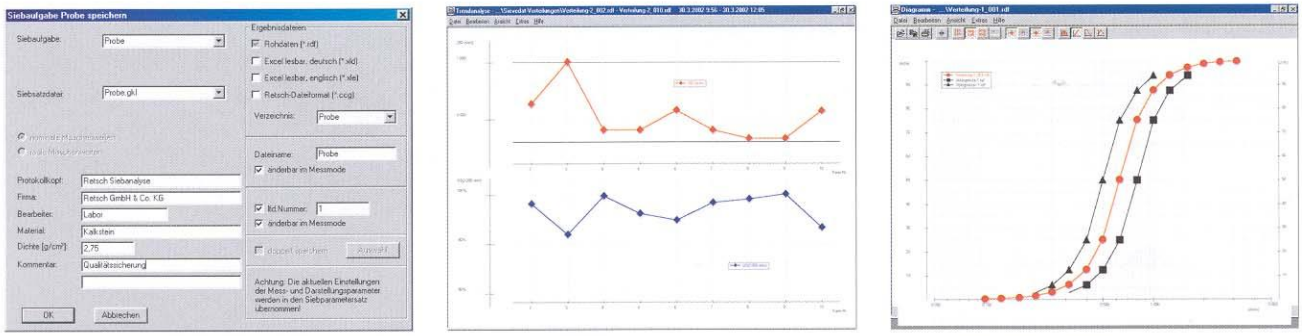

Abb. 19: Parameter input – Trend analysis of product processes - Comparison with specification limits

9.2 Serial PC connection

The AS450 can be connected serially to a personal computer, for data transfer in either direction. For this purpose a commercially available 9-pin RS232 cable is included with the AS450.

This allows communication with the EasySieve® sieve analysis evaluation software, which is available as an accessory.

Fig. 20: Serial connection

- Take the protective cap off the **B14** port. This cap protects the port from dust and humidity when it is not in use.
- Use the serial cable to connect port **B14** to the PC.

10 Cleaning and service

10.1 Cleaning

WARNING

Risk of a fatal electric shock

- An electric shock can cause injuries in the form of burns and cardiac arrhythmia, respiratory arrest or cardiac arrest.

- **Do not clean the blender under running water. Use only a cloth dampened with water.**
- **Disconnect the power supply plug before cleaning the blender.**

NOTICE

Damage to the machine through solvents

– Solvents may damage plastic parts and the paint finish.

• **It is not allowed to use solvents.**

We recommend Retsch ultrasonic baths for a thorough but gentle time-saving cleaning of your test sieves.

Please ask for our free special leaflet on the “Care and Cleaning of test sieves” also.

10.2 Service

If your AS450 is used forquality control, then it should be calibrated regularly in conformance to DIN EN ISO9000 ff. Please contact your dealer or Retsch GmbH directly.

Otherwise, the AS450 is essentially maintenance-free..

10.3 Replacing the machine fuses

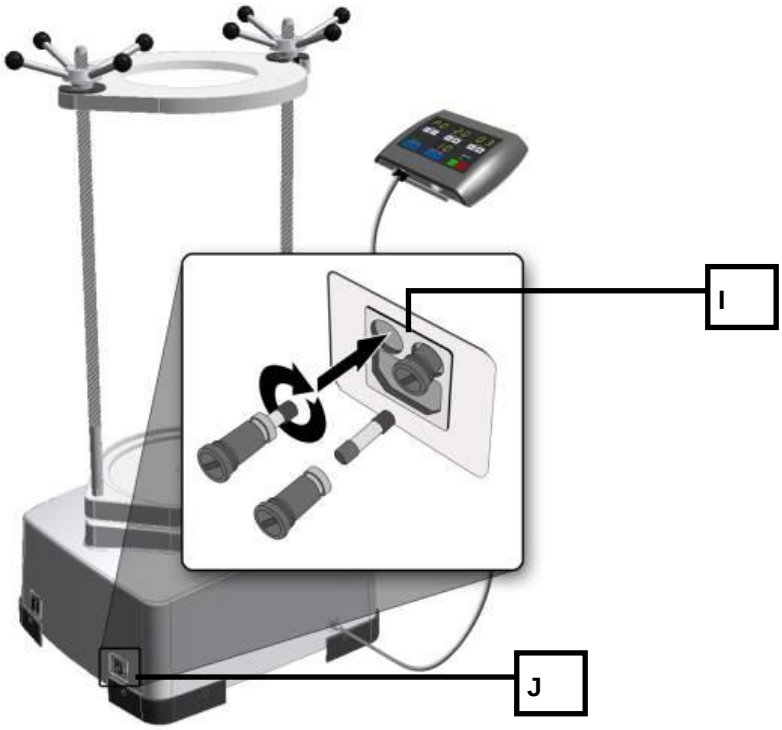

Fig. 21: Replacing the Fuses

The AS450 is protected by twodevice fuses.

- Switch off the device and disconnect the mains plug from the IEC C14 appliance inlet **J.**
- Unscrew the two fuse inserts**I** and take out the fuses.
- Put the new fuses into the fuse inserts.

- Screw in the two fuse inserts **I** again.

230 V- Fuse6.3A

100/120 V- Fuse 8A

11 Safety functions and fault display

11.1 Fault messages

F36	Fault fan: frequency generator fan not moving	Service necessary
F01	Overload fault: frequency generator switched off because of overload.	Reduce or increase amplitude. Alternatively, the loading can be reduced too.
F35	Sieve plate is not installed.	Install sieve plate. (See chapter on the removal of transport safeguards)
	Sensor fault or control fault	Reduce or increase amplitude. Alternatively, the load can be reduced or increased.
		Service necessary

12 Accessories

AS450 sieve clamping units

		Test sieves	Article no.
Sieve clamping unit	“standard”	400/450 mm Ø	32.662.0015
Sieve clamping unit	“comfort”	400/450 mm Ø	32.662.0016
Wet sieve clamping unit	“standard”	400/450 mm Ø	32.662.0017
Wet sieve clamping unit	“comfort”	400/450 mm Ø	32.662.0018

You will find further accessories, such as test sieves, sieve bases, sieve aids etc. in the RETSCH price list.

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CERTIFICATE OF CE-CONFORMITY

Translation

SIEVE SHAKER

AS450 control 30.026.xxxx

Certificate of CE-Conformity according to:

EC Mechanical Engineering Directive 2006/42/EC

Applied harmonized standards, in particular:

DIN EN ISO 12100	Security of machines

EC Directive Electromagnetic Compatibility 2014/30/EU

Applied standards, in particular:

EN 61000-3-2/-3	Electromagnetic compatibility (EMC)
EN 61326	Electrical measuring, operating, controlling and laboratory equipment – EMC-requirements in conjunction with EN 61000
EN 55011	Limit values and measuring procedures for noise suppression of industrial, scientific and medical high frequency devices

Additional applied standards, in particular

DIN EN 61010-1	Safety prescriptions concerning measuring-, operating-, controlling- and laboratory equipment

Authorized person for the compilation of technical documents:
Dr. Loredana Di Labio (technical documentation)

The following records are held by Retsch GmbH in the form of Technical Documentation:
Detailed records of engineering development, construction plans, study (analysis) of the measures required for conformity assurance, analysis of the residual risks involved and operating instructions in due form according to the approved regulations for preparation of user information data.

The CE-conformity of the Retsch Analytical Sieve Shaker Type AS 450 control is assured herewith.

In case of a modification to the machine not previously agreed with us as well as the use of not licensed spare parts and accessories this certificate will lose its validity.

Retsch GmbH

Haan, April 2016

Dr.-Ing. Frank Janetta
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