Operating Instructions for Cross-Beater Mill, Type SK 100

Guide to Operating Instructions

The present operating instructions for the SK 100 cross-beater mill give all the necessary information for the areas mentioned in the table of contents.
They give instructions to the target group(s) defined for the respective areas on how to handle the SK 100 in a safe and proper fashion. Knowledge of the relevant chapters is, for the respective target group(s), a prerequisite for safe and proper handling.
The present technical documentation is a work of reference and a training manual. Each of the individual chapters is an independent unit.
These operating instructions do not include any repair instructions. In the case of any necessary instructions, please contact your supplier or Retsch GmbH directly.

Safety

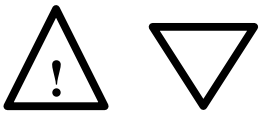
Target group: All persons concerned with the machine in any way.

The SK 100 is an ultra-modern, efficient product from Retsch GmbH. It is state of the art. If the user handles machine in accordance with the material and is familiar with the present technical documentation, it is completely safe operationally.

Safety instructions
You, as the operator, must ensure that the persons instructed to work with the SK 100:

* have noted and understood all the regulations for the safety area,
* know all instructions for action and regulations of the target groups relevant to them before work is commenced,
* have access to the technical documentation at all times and without problem,
* that new personnel is familiarised before commencement of work on the SK 100 with the safe and proper handling either by a verbal introduction from a competent person and/or by means of the present technical documentation.
* Improper operation can result in personal injury and damage to property. You are responsible for your own safety and that of your personnel.
* Ensure that no unauthorised persons have access to the SK 100.

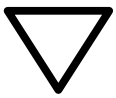
For your own protection, make sure that you are given confirmation that your personnel have received instruction in use of the SK 100. You will find a draft of a related form after the chapter on safety.



We exclude any claims for compensation for material damage and personal injury caused by non-observance of the following safety instructions

Warning signs
We give warnings using the following symbols:

Personal injury



Material damage

Repairs
These operating instructions do not include any repair instructions. For your own safety, repairs may only be carried out by Retsch GmbH or an authorised agent (service technicians).

Should the need arise, please notify:

The Retsch agency in your country
Your supplier
Retsch GmbH directly

Your service address:

_____

_____

_____

_____

_____

Confirmation

I have noted the foreword and the safety chapter.

_____

Operator's signature

_____

Service technician's signature

Technical Data

Machine type designation: SK 100

Application with proper use
SK 100 standard
For uses where primarily the same materials are to be ground in larger quantities and it is not absolutely necessary to open the door after every grinding operation to clean the grinding chamber.

SK 100 comfort
For uses where always different materials are to be ground and it is necessary to open the door after every grinding operation to clean the grinding chamber.

Do not make any modifications to the machine and use only RETSCH a accessories.
Failure to comply will invalidate the CE declaration and guarantee.

This unit is not designed as a production machine, but as as laboratory device intended for 8 hours single shift operation.
Both types crush medium-hard to hard and brittle materials with a hardness of about 6 according to Mohs.
They are conceived especially for crushing the following materials:

ashes	drugs	ores	animal feed
rocks	glass	resins	potassium
coal	coke	grains	artificial resins
minerals	pellets	salts	slags
bricks	bauxite	gypsum	pyrites

and many other, similar materials.
The achievable end fineness depends on the hole width of the bottom sieve and the grinding properties of the material to be ground. In favourable cases, finenesses of <100µm can be achieved.
For further information, our application laboratory is at your disposal.

Drive
SK100 standard
1 and 3 phase AC motor

SK100 comfort
1 and 3 phase AC motor with brake

Speed
2850min^{-1}

Rated power
1100 Watt

Feed grain size
max. 20mm

Collecting vessel capacity
5,000 ml or
30,000ml

Noise emissions
Noise measurement according to DIN 45635-31-01-KL3
Noise data are dependent on the fracturing properties fo the product beeing ground.
Example:
Sound power level: L_{WA} = 95 dB(A)
Workplace-related emission L_{pAeq} = 86 dB(A)
Operating conditions:
Sample material: quartz, grain size < 3 mm
Filling ratio of grinding chamber: feeding quantity each until motor rated power is reached.

Noise data
Workplace-related emission at a distance of 1 m:
72 to 80 dB(A) as a function of the material being ground

Type of protection
IP 54

Unit dimensions

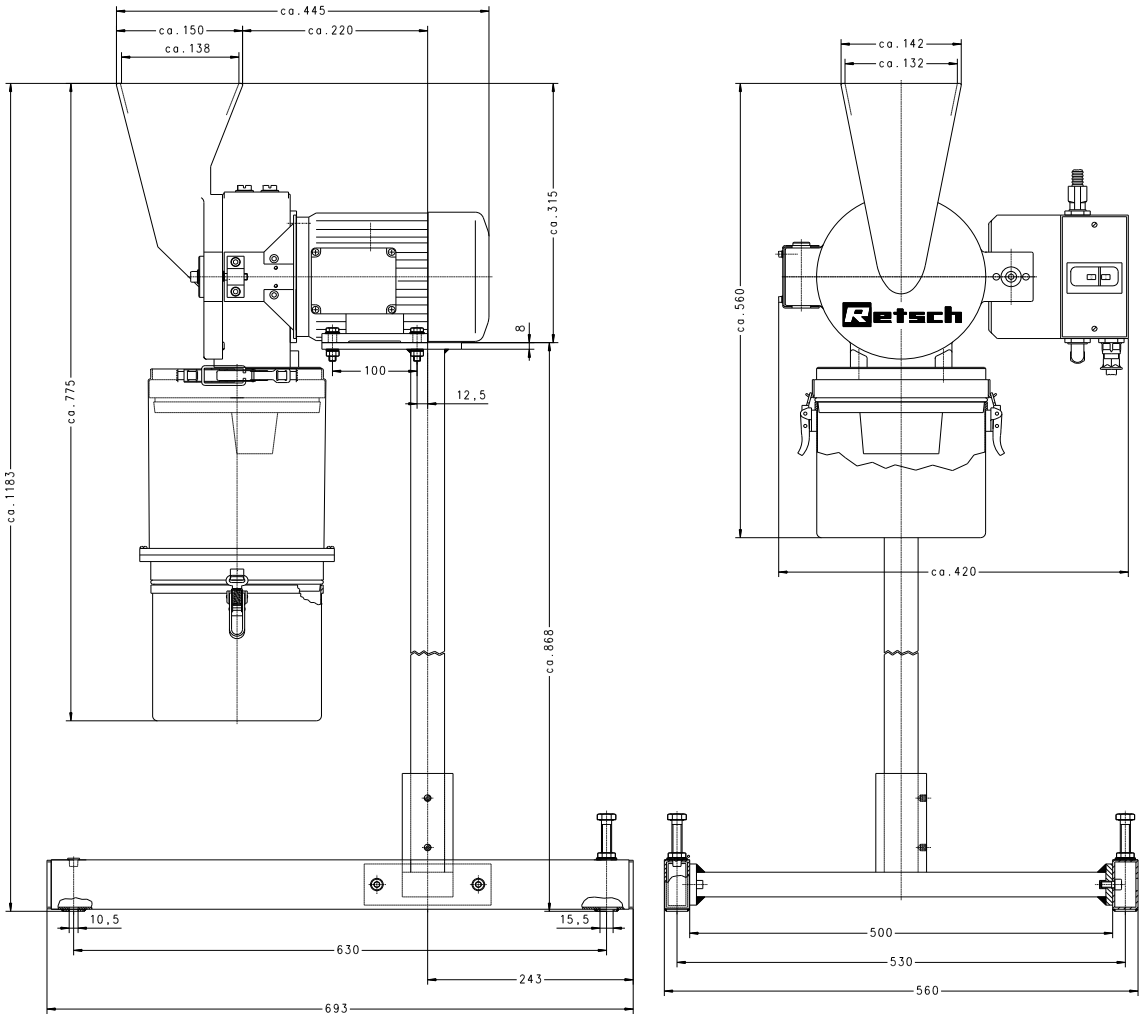
Height approx.560	Width approx.420	Depth approx.445
with base frame		
Height approx.1183	Width approx.560	Depth approx.700
with base frame and DR 100		
Height approx.1443	Width approx.560	Depth approx.700

Unit weights

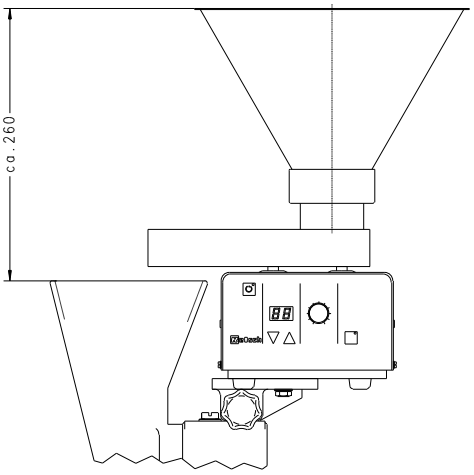
SK 100 standard	net approx. 32kg
with base frame	net approx. 54kg
with base frame and DR 100	net approx. 62kg
SK 100 comfort	net approx. 36kg
with base frame	net approx. 58kg
with base frame and DR 100	net approx. 66kg

Required standing area
700 mm x 560 mm; no safety distances necessary!)

Dimensions sheet



with DR 100/75



Transport and setting up

Target groups: Operators, forwarders, users

Packing

The packing is adjusted to the transport route. It complies with the generally applicable packing regulations.

Please keep the packing for the whole of the guarantee period. If, in the case of a complaint, the unit is returned in inadequate packing, your guarantee rights may be jeopardised.

Transport

Use the ring bolt **H** to transport the SK 100. **Fig.1**

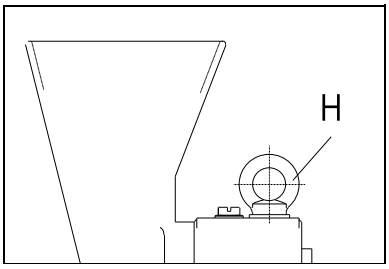


Fig.1

The SK 100 may not be subjected to shocks, shaken or thrown during transport. Otherwise the electrical and mechanical components may be damaged.

Temperature fluctuations

In the case of major temperature fluctuations (e.g. with transportation by air), the SK 100 must be protected against condensation. Otherwise the electronic components may be damaged.

Intermediate storage

Ensure that the SK 100 is also kept dry when subject
to intermediate storage.

Parameters for setting-up location

Ambient temperature

The ambient temperature should be between 5°C and 40°C.

When the ambient temperature exceeds or falls below that specified, the electronic and mechanical components may be damaged, and performance data changed to an unknown extent.

Relative humidity

Maximum relative humidity 80% at temperatures up to 31°C,
falling in linear fashion down to 50% relative humidity at 40°C

At higher humidity, the electronic and mechanical components may be damaged, and performance data changed to an unknown extent.

Setting-up altitude
max. 2000 m above seal level

Setting up with base frame

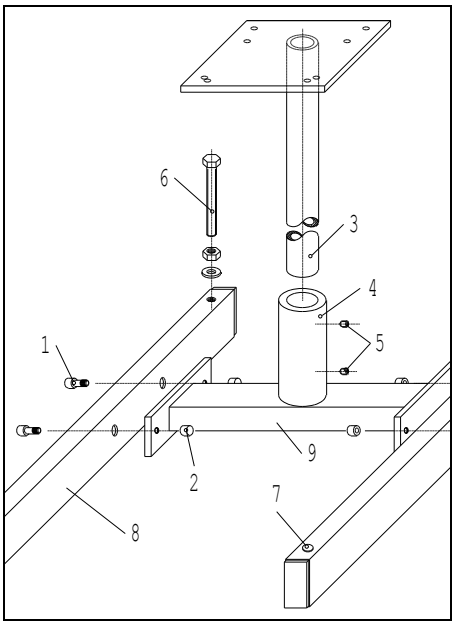


Fig.1

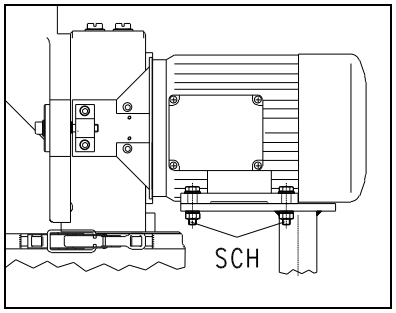


Fig.2

We recommend that the SK 100 be mounted on an base frame which is available as accessory. **Fig.1**

Montage:

* Connect centre cross piece **9** and foot side parts **8** using the cylinder-head screws **1**
* Put covering caps **2** on the projecting thread
* Place stand tube **3** in the sleeve **4** and tighten fast with the headless screws **5**
* If necessary, the base frame can be aligned using the cylinder-head screws **6**

To be able to fasten the base frame with screws, maximum size 10 mm diam. possible, on the bottom, the two setting screws **6** and the front plastic caps **7** must be removed.

* Place SK 100 on the base frame **Fig. 3**
* To fasten the hexagon screws **SCH** M8x35 supplied with the base frame, use spring washers and hexagon nuts

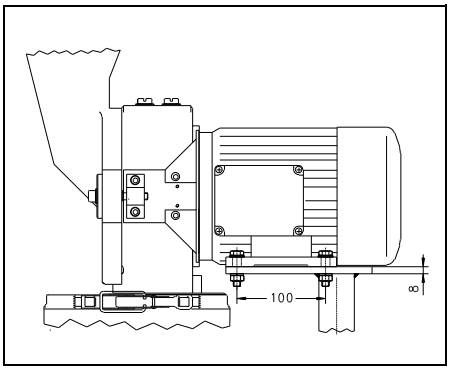


Fig.3

Setting up on a laboratory table

You can mount the SK 100 on your laboratory table. **Fig. 3**

* Measure laboratory table thickness
* Use screws with a maximum diameter of 8mm and a length of the laboratory table thickness + 25 mm
* Stand the SK 100 including collecting vessel on the table
* Mark the holes for the SK 100 for the table with reference to the holes on the motor

The distance between the holes on the front edge of the table must be such that the collecting vessel or filter hose can be mounted and dismounted easily.

Electrical connection

* The voltage and frequency of the SK 100 can be found on the nameplate.
* Ensure that the values agree with the power supply available.
* Connect the SK 100 to the power supply using the connecting cable supplied.

The power cable supplied does not have a plug because the type of plug depends on the setting up location and the respective national regulation.

* When connecting the power cable to the power supply, provide an external fuse in accordance with the regulations of the setting-up location.

If the values are not observed, electronic and mechanical components may be damaged.
Before first use, the direction of rotation must be checked, see arrow on motor. If the direction of rotation is incorrect, the grinding will be insufficient and mechanical components may be damaged.

Operation

Target group: Users

Control elements and operation
Graphic view of control elements:

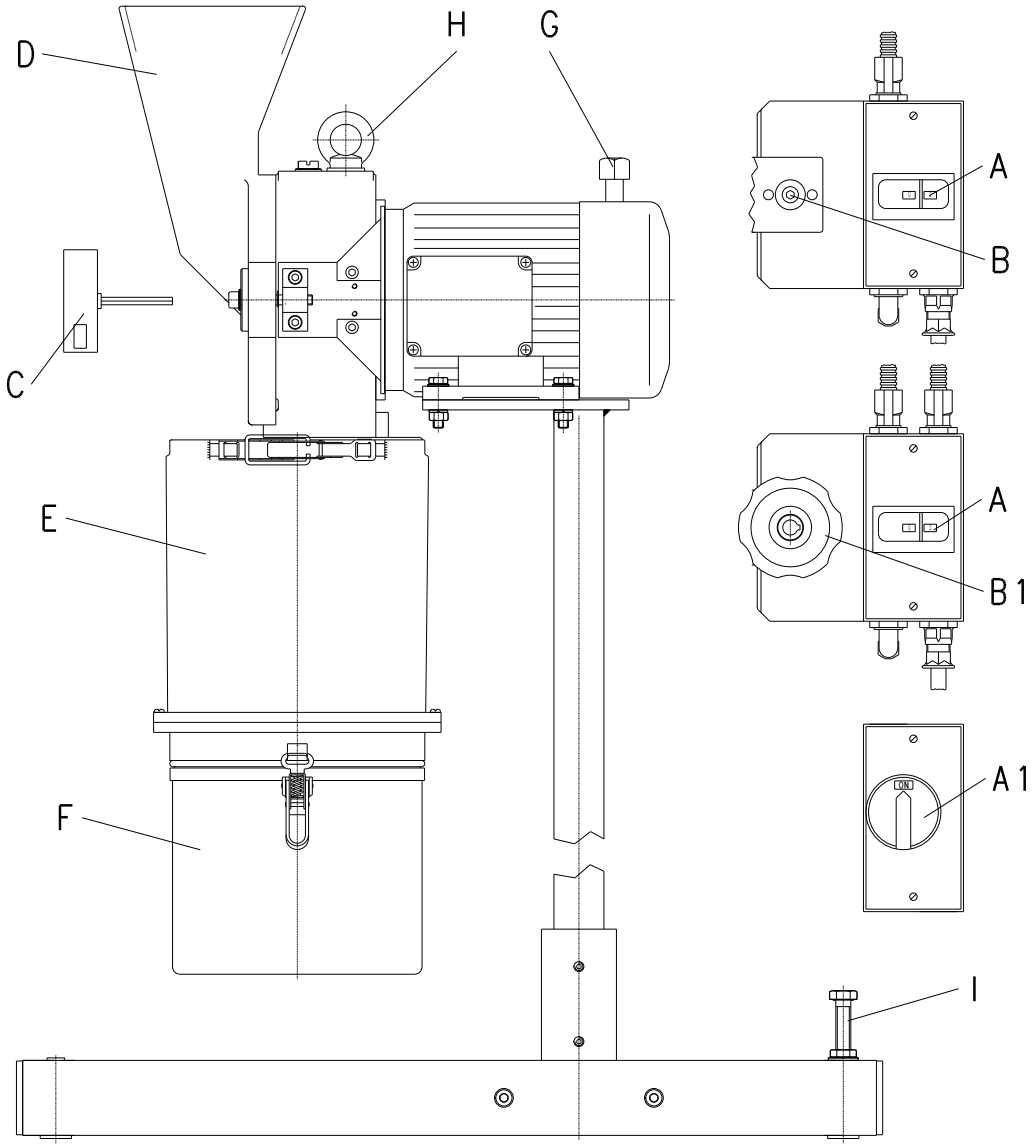
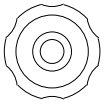
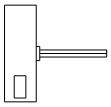
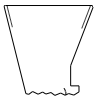
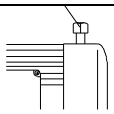
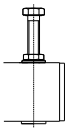


Fig.4

Control elements and their function

Overview Fig.4

Item	Element	Symbol	Function
A	Power switch with ON/OFF button		Isolates the SK 100 from and connects it with the power supply **I** pressed = SK 100 is switched on **0** pressed = SK 100 is switched off
A1	Power switch with knob		Isolates the SK 100 from and connects it with the power supply **ON** = SK 100 is switched on **OFF** = SK 100 is switched off
B	Door seal cylinder-head screw only with SK 100 standard		Opens and seals the door of the SK 100 standard, tensions the door seal clockwise = seals the door anticlockwise = opens the door Tool needed = Spanner **C**
B1	Door seal handwheel only with SK 100 comfort		Opens and seals the door of the SK 100 comfort, tensions the door seal Pressed in and turned clockwise = seals the door Pressed in and turned anticlockwise = opens the door
C	Key for door seal **B,** only with SK 100 standard		Is needed to open and close the door seal with the cylinder head screw on the SK 100 standard
D	Filling funnel at door		Takes the material to be crushed with a maximum grain size of 20mm; does not serve to store material; Reliably prevents material being crushed from flying out.
E	Filter hose	o. Fig.	Prevents build-up of the air pressure caused by rotating cross beater and thus accelerates material throughput.
F	Collecting vessel 5l	o. Fig.	Takes crushed material.
G	Release lever for motor brake only with SK 100 comfort		When pushed back, makes it possible to release the motor brake and thereby allows manual turning of the cross beater for cleaning purposes.
H	Transport bolt		Prevents damage to mechanical and electrical components during transport
I	Adjusting screws on base frame		Make it possible to align the base frame on uneven floor When screwed out, they expose the openings which permit fastening of the base frame to the floor, Ø10mm

Opening and closing of the mill housing

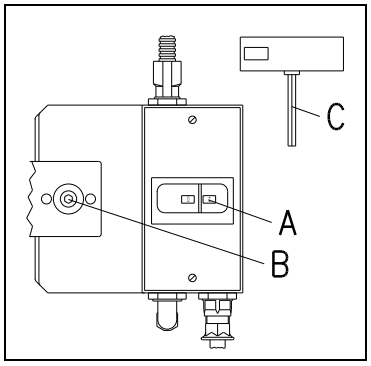


Fig.5

SK 100 standard

Only open with the SK 100 disconnected, even if a limit switch on the left hand side of the mill housing switches the SK 100 off when the door is opened.

* Press the button **O** at the main switch **A** or turn to **OFF** position **Fig. 5**
* Put key **C** in screw **B**
* When the key is turned in clockwise direction, the housing is opened
* Close in reverse order

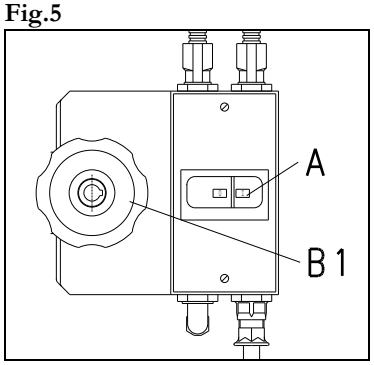


Fig.6

SK 100 comfort

Only open with the SK100 disconnected.

* Press the button **O** at the main switch or turn to **OFF** position **Fig. 6**
* Push handwheel **B1** and turn in anti-clockwise direction
* Handwheel latches into end position
* Close in reverse order

Only close the door if the contact surfaces are absolutely free of material being crushed or other contaminants. **Mechanical components and the seal may be damaged.**
Do not open the SK 100 with the motor running. When crushing toxic or otherwise health-impairing materials, there is a danger that health-hazardous particles may be inhaled.
Do not open the SK 100 and the motor brake simultaneously. **Danger of injury from unbraked cross beater.**

Insert bottom sieve

Bottom sieves **BS** of stainless steel with Conidur or round holes are available for selection as accessories. **Fig. 7**

Conidur 0.12/0.20/0.50/0.75/1.0/1.5/2.0mm
Round hole 3.0/4.0/5.0/6.0/8.0/10.0mm

* Stop SK 100
* Open mill housing
* Push in bottom sieve **BS**
* Close mill housing

Ensure that the collecting vessel has been mounted.

* Start the SK 100

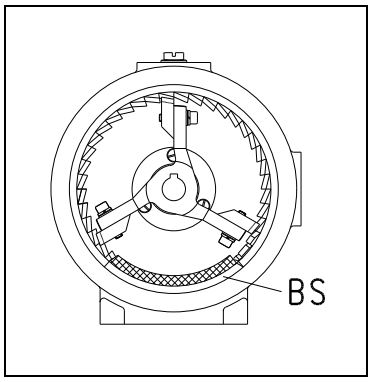


Fig.7

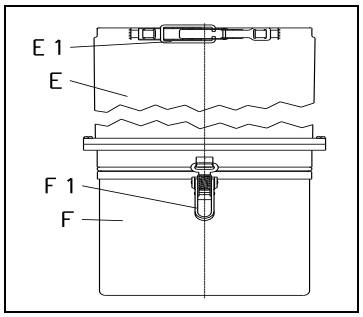


Fig.8

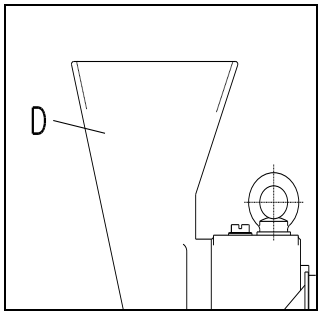


Fig.9

Filter hose and collecting vessel

With the use of a fabric filter hose between the SK 100 and collecting vessel, the air stream arising due to the rotating cross beater is taken off and this prevents a jam. Furthermore, it speeds up the material throughput and ensures a gentle crushing process.

* Push filter hose **E** over the flange and at the same time hold the clamping clip at an angle
* Clamp seal **E1**
* Hang in collecting vessel **F**
* Clamp seals **F1**

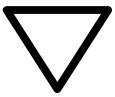
If the collecting vessel is mounted without filter hose, it must be expected that dust will be emitted from the filling funnel **D**.

Feed material to be crushed

The maximum feed grain size should not exceed 20mm.
For batch or continuous operation, the SK 100 can be retrofitted with a 30 l plastic container and a DR 100/75 vibratory feeder as accessories.

* Feed material slowly into the filling funnel **D Fig. 9**

A rebound safety device fitted in the filling funnel prevents the material being crushed from being thrown back.

	Feed material slowly and continuously into the filling funnel. **An excessive feed quantity may force the SK 100 to come to a standstill and mechanical components may be damaged.**
	During crushing, material in dust form may escape from the filling funnel. In the case of toxic and otherwise health-impairing materials, use an extractor. **Danger if health-hazardous dust is inhaled.**
	Some materials form explosive mixtures. Check the material properties of your crushing device. **Danger of explosion.**

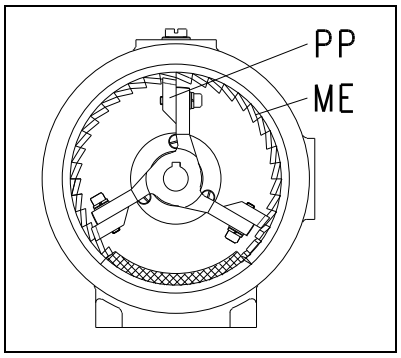


Fig.10

Reset impact gap

From time to time the gap between the grinding insert and the impact plates of the cross beater should be checked.

Fig. 10

* Pull out mains plug
* Open mill housing
* Check gap between the grinding insert **ME** and the impact plate **PP** using a leaf gauge **= required ~1 mm**, the gap leading to the bottom sieve should not be <1 mm.
* If necessary reset impact plates using SW5 socket spanner

Mounting a vibratory feeder

When feeding larger quantities, it is advisable in general to feed the material to be crushed evenly using a feed device. This largely prevents any unnecessary load on the grinding tools and reduces possible friction heat. A suitable means of providing an even material feed is the DR 100/75 vibratory feeder available as accessories.

Fig. 14

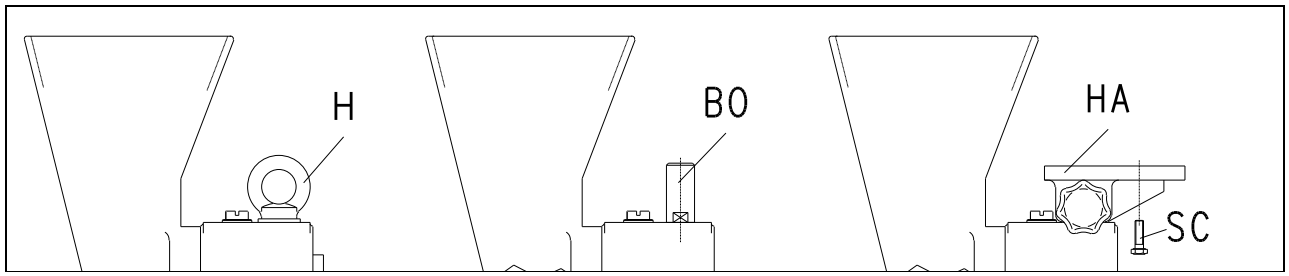


Fig.11 **Fig.12** **Fig.13**

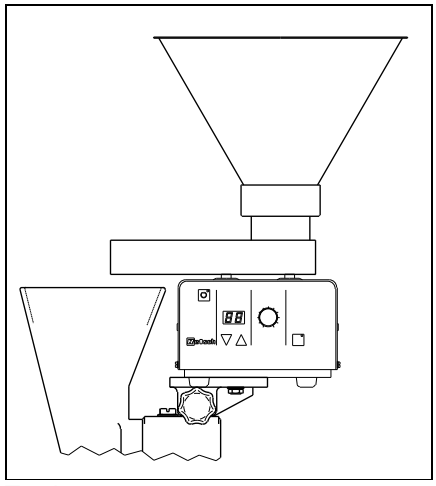


Fig.14

Prepare the DR 100/75 for feed operation in accordance with your operating instructions.

Mounting :

* Screw out ring bolt **H**, **Fig.11**
* Screw in bolts **BO**, **Fig.12**
* Push on fixture **HA** with T screw, **Fig.13**
* Tighten T screw
* Mount and align DR 100/75
* Fasten with the two hexagon screws **SC** M6x20 DIN933, **Fig.13**
* Plug power connection cable of the DR 100/75 in a socket outlet with earthing contact
* You will find the voltage and frequency of the DR100/75 indicated on the nameplate

If the values on the nameplate are not adhered to, electronic and mechanical components may be damaged.

Working instructions

Target group: Laboratory personnel

General
The SK 100 is a highly modern, efficient product from Retsch GmbH.
Thanks to a large selection of accessories, the SK 100 is a unit with versatile practical possibilities mainly in the chemical and ceramic fields, in mining and in metallurgy, as well as in the preparation of soil samples etc. in laboratories and in industry.
The SK 100 is mainly used for the precrushing and fine crushing of medium-hard to hard and brittle materials to approx. 6 according to Mohs.

End fineness
The achievable end fineness depends on the hole width of the bottom sieve and the crushing properties of the material. In favourable cases, finenesses of < 100µm are possible.

The SK 100's mode of working
Crushing in the SK 100 cross beater mill takes place through beating, impact and shearing action.
Once the material as been fed into the feeding funnel, it passes into the grinding chamber, where the crushing process takes place between the cross beater, the grinding insert and the bottom sieve.
As soon as the material being crushed has reached the relevant end fineness, it passes through the bottom sieve and into the collecting vessel.
With the use of a fabric filter hose between the SK 100 and the collecting vessel, any build-up of the air flow caused by the rotating cross beater is prevented and the material throughput is partly accelerated.
This ensures a gentle crushing process.

General

Cleaning

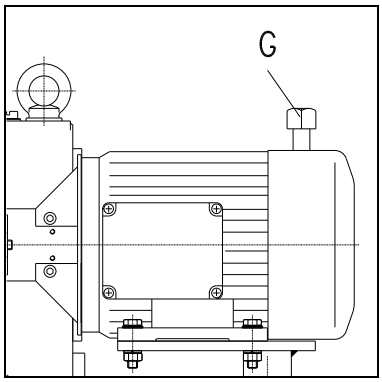


Fig.15

The SK 100 can be cleaned with normal brushes, paintbrushes and possibly an industrial vacuum cleaner, as well as compressed air.

To clean the grinding chamber of the SK 100 comfort the motor brake can be released at lever **G** (**Fig.15**). The cross beater can now be easily turned and this facilitates cleaning.

The type of protection for the SK 100 is IP54.

Do not clean SK 100 with flowing water.
Danger of fatal electric shock

Servicing
The SK 100 is largely maintenance-free.

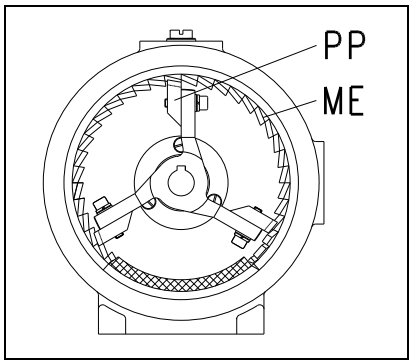


Fig.10

From time to time the gap between the grinding insert and the impact plates of the cross beater should be checked.
Fig.10

* Pull out mains plug
* Open mill housing
* Check gap between grinding insert **ME** and impact plate **PP** using a leaf gauge = **required 1mm**
  The split to the bottom sieve never < 1mm puts in.
* If necessary reset impact plates using a socket spanner SW5

Necessary tests
Every six months the limit switches and the motor brake should be checked with proper regard to.

SK 100 standard
Limit switch to the left on the door hinge

* With an opening gap of 3mm max. the limit switch must cause the motor to cut out

SK 100 comfort
Limit switch to the left on the door hinge

* With an opening gap of 3mm max. the limit switch must cause the motor to cut out

Limit switch to the right on quick-acting closure

* When the handwheel is turned a maximum of 45° the motor brake must be activated.

Motor brake

* Start SK 100
* Stop SK 100
* Measure the braking time using a stopwatch
* Should the braking time exceed 0.5 seconds, contact the service technicians

Accessories
* Base frame
* Collecting vessel 30l
* Filter hose for 30l vessel
* Stand for DR 100/75 vibratory feeder
* DR 100/75 vibratory feeder
* Dirt collecting pan of plastic
* Conidur bottom sieve from 0.12 to 2.0mm
* Round hole bottom sieves 3.0 to 10mm

Changes
We reserve the right to make technical changes.

Safety instructions (table) for the SK 100 taken from the chapters

Procedure	Action	Dangers
Safety	Not paying attention to the safety instructions can lead to damage to people and property.	Claims for damage are excluded in whatever form.
Packaging	Please retain the packaging for the duration of the guarantee period.	In the case of complaint your warrantee rights can be endangered if the item is returned insufficiently packaged
Transport	During transportation the SK 100 should not be knocked, shaken or thrown.	Electronic and mechanical components can become damaged.
Temperature variations	With severe variations in temperature, the SK 100 must be protected from condensation.	Electronic components can become damaged.
Scope of delivery	In the case of the delivery being incomplete and/or transport damage, you must inform the carrier and Retsch GmbH immediately (within 24 h).	Later complaints can under certain circumstances no longer be considered.
Environmental temperature	Drops below 5°C Rises above 40°C	Electronic and mechanical components can become damaged. Performance data change by an unknown extent.
Air humidity	Rises above 80% at temperatures up to 31%	Electronic and mechanical components can become damaged. Performance data change by an unknown extent.
Electrical connection	Mains supply does not match the values given on the type plate.	Electronic components can become damaged.
	Before initial operation, the direction of rotation is to be checked, see rotation direction arrow on the motor	If the direction of rotation is wrong, no satisfactory milling will take place and mechanical components can become damaged.
Opening and closing of the mill's casing	Only close the door when the contacting surfaces are absolutely free of material for grinding or other contamination.	Mechanical components and the sealing can become damaged.
	Do not open the SK 100 when the motor is running.	When milling toxic or other materials harmful to health, there is a danger of inhaling dust hazardous to health.
	Do not open the SK 100 and at the same time bleed the motor brakes.	Danger of injury from the unbraked cross-beater.
Feeding of material for grinding	Feed the material for grinding slowly and continuously into the feed hopper.	A too great a rate of feeding can force the SK 100 into stopping and mechanical components can become damaged.
	During milling, dust can rise from the material in the feed hopper. With toxic or other materials that are harmful to health, use a extractor appliance.	**Danger of inhaling dust hazardous to health.**
	Some materials can form an explosive mixture with air. Check the properties of the material you wish to grind.	**Danger of explosion.**
Installation of a vibratory feeder	Pay attention to the details on the type plate.	If attention is not paid to the values on the type plate, electronic and mechanical components can become damaged.
Cleaning	Each time before cleaning, pull out the mains plug.	**Danger of death by electrocution.**
	Do not clean with running water.	**Danger of death by electrocution.**

CERTIFICATE OF CE-CONFORMITY

Translation

CROSS BEATER MILL

SK 100

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 2004/108/EC

Applied standards, in particular:

DIN EN 50081	Generic standard interference emission - living areas - in conjunction with EN 55022 and EN 60555
DIN EN 50082	Generic standard interference resistance - living areas

Additional applied standards, in particular

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

Authorized person for the compilation of technical documents:
J. Bunke (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 Cross Beater Mill Type SK 100 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, January 2010

Dr. Stefan Mähler
Manager technical services

CE

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