FRITSCH

FRITSCH · JAW CRUSHER

Operating Manual

Translation of the original

PULVERISETTE 1

FRITSCH JAW CRUSHER

FRITSCH

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Fritsch GmbH, has been certified by the
TÜV-Zertifizierungsgemeinschaft e.V.
Certificat registration number 71 100 J 596.

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It was verified through an audit that Fritsch GmbH satisfies the requirements of DIN EN ISO 9001:2008.

The enclosed conformity statement states the directives satisfied by the Jaw Crusher "PULVERISETTE 1″ in order to bear the CE mark.

Instrument number 01.50xx.00
Applies as of serial number 2185

Instrument number 01.70xx.00
Applies as of serial number 2180

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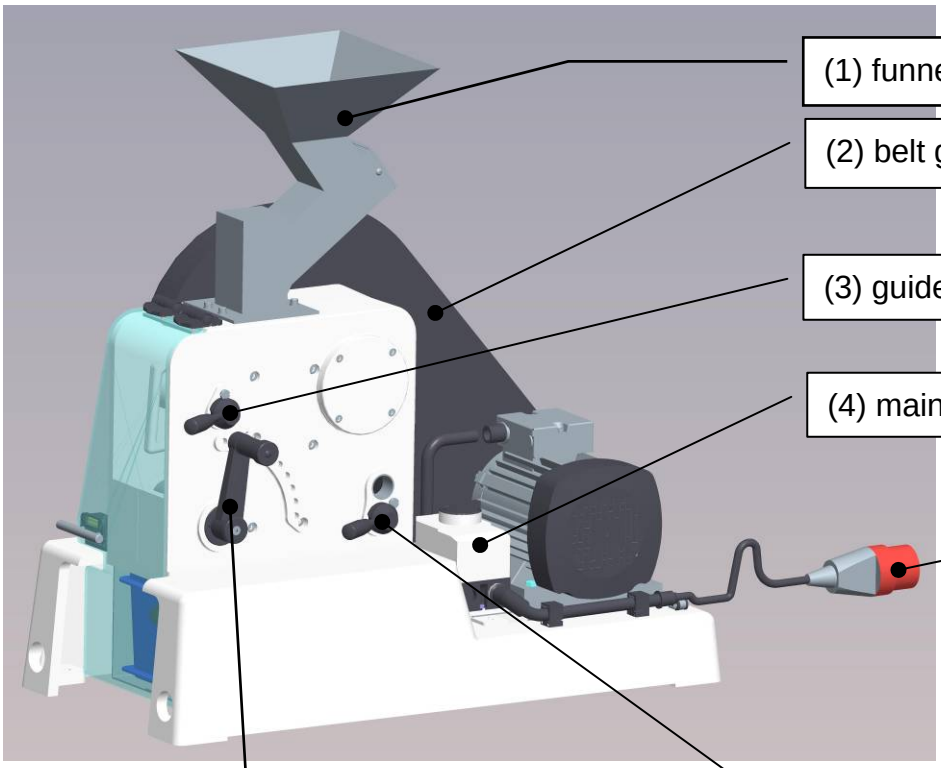
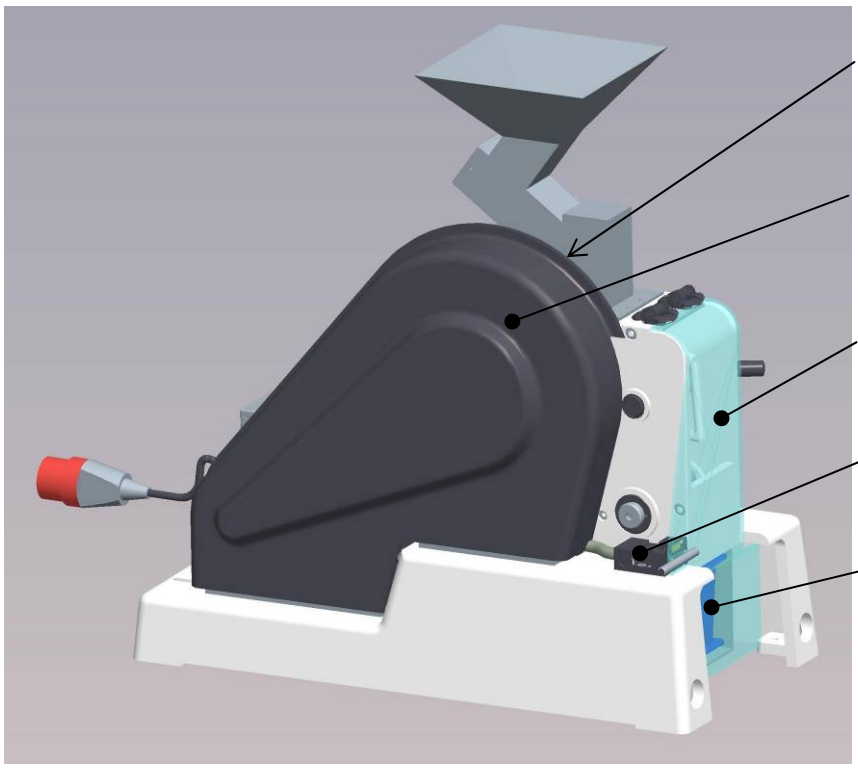
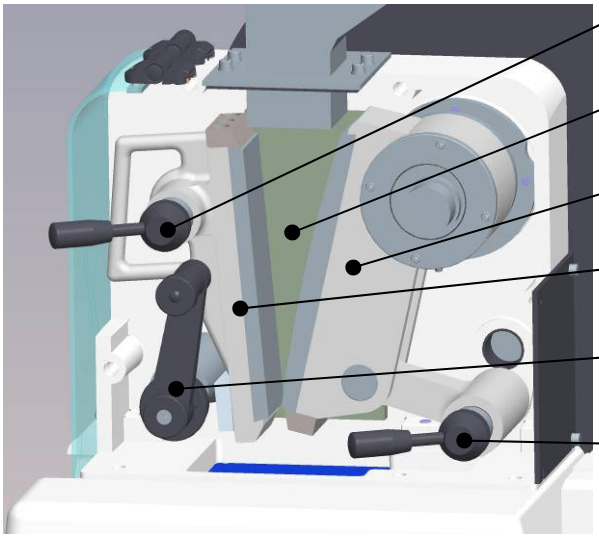
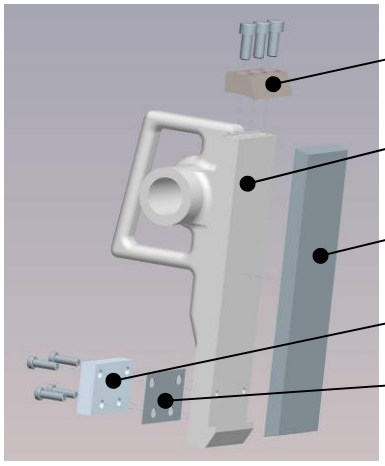
1 Basic Design

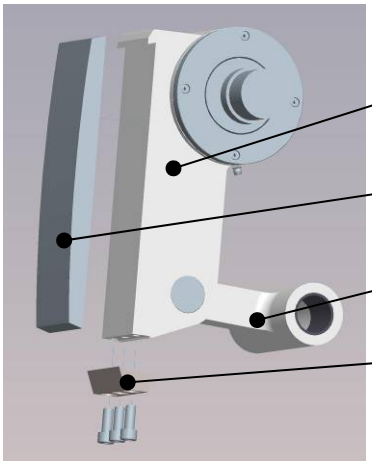
The designations and numbering shown below are used throughout this operating manual.






(3) guide bolt
(13) support wall (both sides)
(14) crusher jaw movable cpl.
(15) crusher jaw fixed cpl.
(7) indexing cranked handles
(6) link pin


(16) clamping block
(17) crusher jaw fixed
(18) crushing plate fixed
(19) pressure plate
(20) compensating plate


(21) crusher jaw movable
(22) crushing plate movable
(23) link plate
(24) clamping block

2 Safety Instructions and Proper Use

2.1 Requirements on the Operator

This operating manual is intended for persons who are assigned the operation and supervision of Fritsch Jaw Crusher.

Persons under the influence of health impairments, medications, drugs, alcohol or excessive fatigue may not operate the instrument.

The instrument may only be operated by authorised persons and may only be maintained and repaired by trained experts. All commissioning, maintenance and repair work may only be performed by qualified personnel!

The instructions of this manual must be heeded in order to avoid danger to the user.

This operating manual is not a complete technical description. Only the details required for operation and preserving the operability of the instrument are described here.

Fritsch created and checked this operating manual with great care. However, no guarantee can be provided with regard to completeness and the absence of errors.

Subject to technical changes.

2.2 Proper use

The „pulverisette 1“ is a laboratory jaw crusher for the pre-crushing of hard-brittle substances especially for the following fields of application: mining and metallurgy, geology and mineralogy, chemistry, glass and ceramics, earths and stones.

The initial feed size is of a maximum

- of 65 mm for the type P1/I
- of 100 mm for the type P1/II

The obtainable final size - depending on the gap setting - is from about 15 mm to 2 mm.

The jaw crusher described here is a tool for use in industrial environments.

The instrument may only be used for this purpose.

2.2.1 Method of Operation

The crushing of the materials is being done within a crushing chamber consisting of two lateral support walls (13), one settable fixed crushing plate (18) and one movable crushing plate (22). The movable crusher jaw (21) is put into an eccentric movement by means of a fly-wheel and a sturdy cam.

Due to its special motion sequence, the materials to be crushed are drawn into the crushing chamber and the blockage of crushed pieces is prevented.

The material drops from the crushing chamber through the adjustable discharge gap into the collecting vessel (12).

2.3 Obligations of the Operator

This manual must be carefully read and understood before using the product. Use of the product requires specialised knowledge and may only be undertaken by commercial users.

The operating personnel must be familiar with the contents of the operating manual. It is therefore very important that this operating manual also actually be provided to these persons. It must be ensured that this operating manual always remains alongside the instrument.

The product may only be used within the scope of possible uses described in this manual and within the framework of the rules and regulations defined in this manual. In the event that these principles are violated or in event of improper use, the customer shall bear the full liability for the functionality of the product or for damages or injuries resulting from failure to heed this obligation.

By using this product, the customer agrees to this and recognises that defects, faults or errors cannot be completely excluded. In order to avoid the risk of damage to property or personnel injuries arising from this or any other circumstance or the risk of other indirect or direct damages, the customer must take sufficient and full safety precautions while working with the products.

Fritsch GmbH is unable to monitor compliance with this manual or the conditions and methods employed during installation, operation, use and maintenance of the product. Improper performance of the installation can result in material damage and subsequently endanger human beings. For this reason, we accept no responsibility or liability whatsoever for losses, damages or costs resulting from or in any way associated with faulty installation, improper operation or incorrect use and maintenance.

The applicable accident prevention regulations must be complied with.

2.4 Warnings Used

The following symbols are used in this description to indicate important information and possible dangers.

For your safety, please heed the warnings.

DANGER 	Indicates a direct danger with high risk that will lead to death or severe physical injury if not avoided.
WARNING 	Indicates a possible danger with moderate risk that could lead to death or (severe) physical injury if not avoided.
CAUTION 	Indicates a danger with low risk that could result in slight or moderate physical injuries or material damages if not avoided.

2.5 Machine safety instructions

We recommend that a safety logbook should be kept in which all work (service, repairs etc.) carried out on the machine should be entered.

Use only original accessories and original spare parts. The safety of the machine is impaired if this instruction is not followed.

Operating personnel must always operate the machine with safety in mind.

Do not run the laboratory jaw crusher unsupervised.

DANGER

Danger of explosion!
The machine is not explosion protected and is not designed to grind explosive materials.

DANGER

Danger of explosion!
When grinding oxidable materials (e.g. metals or coal), there is a risk of instantaneous combustion (dust explosion) if the material exceeds a certain fineness. The fine material can be absorbed through a filter in the back of the machine and could ignite on electric components. It is therefore necessary to take special safety precautions when grinding such material and the work must be supervised by a specialised

DANGER

Do not deactivate safety devices.

DANGER

All threshold limit values according to current safety requirements must be followed; if necessary, a ventilator must be provided or the machine must be operated under an extractor outlet.

CAUTION

- Wear protective glasses!
- Wear ear protection! The noise level is above 93dB(A)
- Do not continue to use damaged accessories.

Unauthorised changes to the machine void the attestation of conformity to European directives by FRITSCH as well as the loss of the warranty.

2.6 Safety equipment

TIP

Safety equipment must be used in accordance with the regulations and must not be rendered inoperative or be removed.
All safety equipment must be checked regularly for completeness and function.

Inside the jaw crusher „pulverisette 1“ several elements independently acting contribute to security:

1. Reaching into the funnel (1) is prevented by the zigzag-shaped material passageway.
2. A safety switch (11) monitors during the operation the closing of the front cover (10) and prevents the operation of the machine after the opening of the cover.

   ⇒ **The switch is in accordance with the regulations for the protection of operators.**

   ⇒ The jaw crusher will not start if the front cover is open.

   ⇒ The jaw crusher will stop if the front cover is opened during operation..

2.7 Hazard points

- Crushing possibility during the closing of the front cover (10)!

2.8 Electrical safety

2.8.1 General

- The main switch (4) disconnects all-phase of the instrument from the mains.
- If the jaw crusher is not in use over a prolonged period of time, for example at night, unplug the jaw crusher from the mains
- The machine has a **motor protection switch** (as per nameplate).matched to the mains voltage
  In the event of overload or a faulty motor or cable, a protection switch automatically interrupts the flow of power. The jaw crusher can be turned back on with the main switch (4) once the malfunction is eliminated.
- The jaw crusher is switched on and off with the main switch (4)
  ⇒ Turn the main switch (4) to the start position [I] → : The jaw crusher starts.
  ⇒ By turning of the main switch (4) to the Stop position [O] →, the jaw crusher: comes to a halt after approx. 3 seconds.
  ⇒ The front cover (10) can now be opened.

2.8.2 Protection against warm restart

In case of **Power failure**, while the machine is in operation, the jaw crusher: comes to a halt after approx. 3 seconds. Once power is restored the jaw crusher will not start back up automatically.

⇒ The jaw crusher is protected against re-start.

⇒ Turning the main switch (4) on start position [I] the jaw crusher will start again.

3 Technical Data

3.1 Dimensions

Model I + II: 72 x 41 x 83 (Höhe x Breite x Tiefe)

3.2 Weight

Model I:	net 177 kg	gross 202 kg
Model II:	net 205 kg	gross 230 kg

3.3 Working noise

The noise level equals up to approx. 93dB (A).

3.4 Voltage, Current consumption, Power consumption

The machine can be operated at two levels of voltage:
Model I:

- single-phase alternating voltage 115V ± 10%, 21A, 1,9kW
- single-phase alternating voltage 230V ± 10%, 9A, 1,57kW
- 3-phase alternating voltage 200V ± 10%, 5,3A, 1,1kW
- 3-phase alternating voltage 400V ± 10%, 2,62A, 1,45kW

Model II:

- 3-phase alternating voltage 230V ± 10%, 9A, 2,78kW
- 3-phase alternating voltage 400V ± 10%, 4,95A, 2,2kW
- 3-phase alternating voltage 500V ± 10%, 5.15A, 3kW
- single-phase alternating voltage 230V ± 10%,13,5A, 2,36kW

Transient excess voltages are permissible in accordance with overload voltage category II.

(See also chapter on 4.6 Electrical connection)

3.5 Electric fuses

- The electric fuse is integrated in the protective motor switch, which is integrated in the main switch (4).

3.6 Material

Feed particle size:	Model I:	approx. 60 mm
	Model II:	approx. 95 mm
Throughput:	Model I:	140kg/h
	Model II:	200kg/h

3.7 Final fineness

The final fineness depends on the inserted gap width and is between 1,0 mm and 15,0 mm.

4 Installation

4.1 Transportation

CAUTION

The weight of the laboratory jaw crusher is
Model I: 177 kg
Model II: 205 kg

The laboratory jaw crusher is delivered on a transport pallet with a wooden cover. We recommend using a forklift or pallet truck to transport the packaged instrument.

4.2 Unpacking

- Pull the staples out of the cover with a pulling tool (or pliers).
- Lift it off the transport pallet with the help of a second person.
- Compare the contents of the delivery with your order.

4.3 Setting up

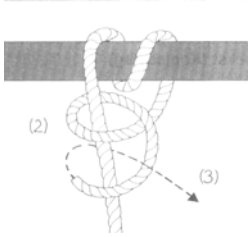
CAUTION

The weight of the laboratory jaw crusher is
Model I: 177 kg
Model II: 217 kg

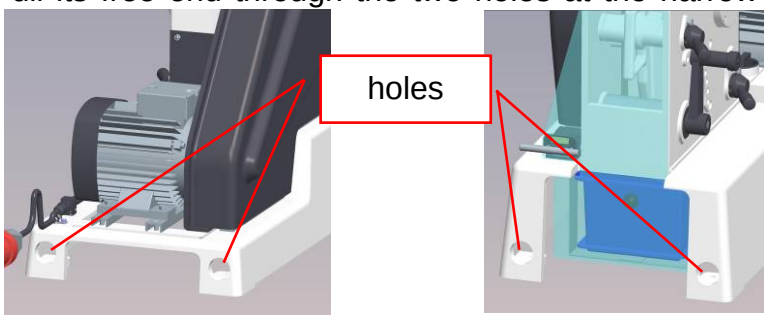
TIP

5 people are required to carry the jaw crusher.

- The jaw crusher is fixed on the pallet with 4 screws. Unscrew the screws with a 17 mm open-end wrench.
- To carry the jaw crusher you need 5 support people:
  1. Fasten a sturdy rope on a ca. 1 m long and 20 mm ∅ iron rod, so that the rope could not slip.



2. Pull its free end through the two holes at the narrow side of the jaw crusher



and fasten it at the rope in the same way you did first.

3. Do the same with a second rod and rope at the opposite side.
4. With the help of the iron rods 4 support people carry the jaw crusher; the fifth one prevent it from swinging during transport.

- The jaw crusher must be placed on an even, stable surface. If you wish, you can also screw it to such a surface or to a ground plate.

4.4 Ambient requirements

WARNING

Voltage!

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

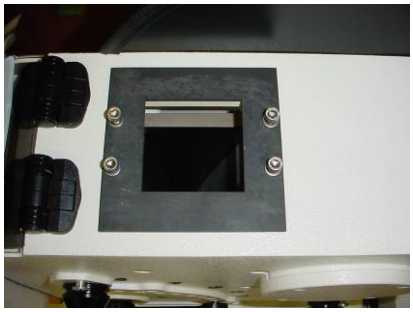
- Room temperature must be between 5 - 40°C.
- Height up to 2000m sea level
- Contamination grade 2 in accordance with IEC 664.

4.5 Assembling the funnel (1)

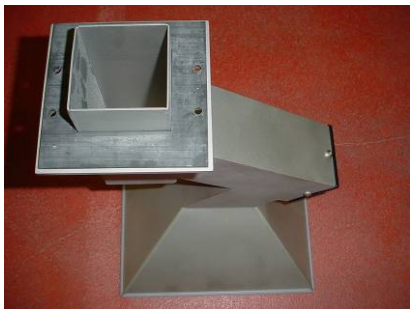
The jaw crusher is **not** delivered with the filling funnel attached. This must be installed before starting the jaw crusher for the first time.

1. Take the funnel (1) and supplied Allen key out of the packaging.

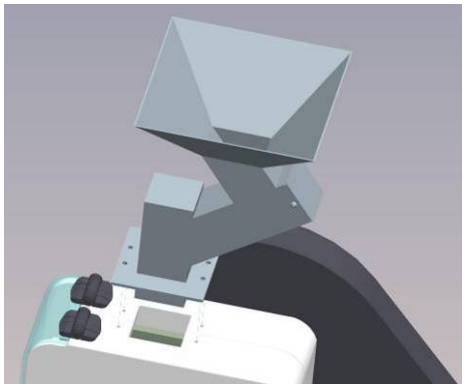
2. Lift off the rubber seal on the funnel opening of the jaw crusher. To do so, remove the 4 cylinder head screws with washers using the Allen key.



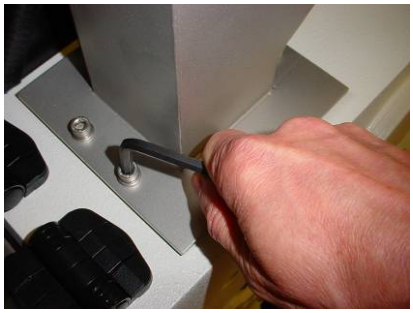
3. Pull the rubber seal over the funnel neck. Take note of the positions of the holes in the filling funnel and rubber seal.



4. Insert the filling funnel into the funnel opening on the top of the laboratory jaw crusher.



5. Screw the filling funnel onto the housing with the 4 previously removed cylinder head screws and washers.



6. The cylinder head screws must be screwed in tightly to ensure that the rubber seal is pressed down and will not leak.

4.6 Electrical connection

CAUTON

Secure the electrical system!
Danger of damage due to short-circuit.
Make certain that the socket is connected to a mains line secured with a residual current circuit breaker.

Kindly compare the tension and current values indicated on the sign with the values of the existing power supply system before connecting the instrument.
(See chapter 3)

4.6.1 Matching the jaw crusher to the mains voltage

DANGER

Voltage!
Only a trained specialist is allowed to convert the supply voltage from 230 to 400 volts and/or to change the power lead.

4.6.2 Drive motor

Drive is a 1~120 V motor or 1~230 V motor or 3~115 / 200 V motor or 3~230 / 400 V motor
The drive motors are A.C. motors. Due to the their high reduction ratio, the jaw crusher comes to a stop in a minimum of time after being shut off.

4.6.3 Direction of rotation of drive motor

(See the arrow on the motor housing)

DANGER

Voltage!
The direction of rotation may only be changed by a trained electrician.

The 3-phase A.C. motor must show left hand rotation when looking onto the motor.
The 1-phase A.C. motor left hand rotation is secured at the factory.
Refer to:

- DIN VDE 0530, Part 8, "Terminal Markings and Direction of Rotation"
- DIN VDE 0530, Part 7 / EN 60 934-7, "Abbreviations for Models"

Make this change in the direction of rotation by interchanging two supply conductors "L1, L2, L3" (or the supply leads "U1, U2, U3" in the socket outlet).

4.7 Initial switch-on / performance check

CAUTION

Danger of crushing!
Only start the jaw crusher with the funnel (1) attached!

The machine may be switched on only after all work described in the chapter 4 on Installation has been carried out.
During the first operating hours, it is possible that some grease may escape from the eccentric cam bearing of the movable crushing jaw (see also chapter 8.3). After a few operating hours, the grease will be evenly distributed within the roller bearing space and no additional grease will escape.

TIP

Never switch the crusher on unless crushing plate (18. 22) are installed and fixed!

5 Working with the jaw crusher

CAUTION

A jaw crusher with a 230 V and 110 V 1-phase engine is allowed a maximum of 20 gear changes per hour!

5.1 Selection of crushing plates and lateral support walls

The standard version of the jaw crusher is provided with crushing plates (18, 22) and lateral support walls (13) made of hardened tool steel.
On special request the instrument can be provided or we can later on supply crushing plates and lateral support walls made of the following materials:

Model I		
Material	**Name**	**Order-No.**
tempered steel	fixed crushing plate	43.0010.09
	movable crushing plate	43.0020.09
	1 pair of lateral support walls	43.0070.09
stainless steel	fixed crushing plate	43.0030.10
	movable crushing plate	43.0040.10
	1 pair of lateral support walls	43.0080.10
Hard metal tungsten carbide	fixed crushing plate	43.0050.08
	movable crushing plate	43.0060.08
	1 pair of lateral support walls	43.0090.08
zirconium oxide	fixed crushing plate	43.0100.27
	movable crushing plate	43.0110.27
manganese steel	fixed crushing plate	43.0130.23
	movable crushing plate	43.0140.23

Model II		
Material	**Name**	**Order-No.**
tempered steel	fixed crushing plate	43.3010.09
	movable crushing plate	43.3020.09
	1 pair of support walls	43.3070.09
stainless steel	fixed crushing plate	43.3030.10
	movable crushing plate	43.3040.10
	1 pair of support walls	43.3080.10
Hard metal tungsten carbide	fixed crushing plate	43.3050.08
	movable crushing plate	43.3060.08
	1 pair of support walls	43.3090.08
zirconium oxide	fixed crushing plate	43.3100.27
	movable crushing plate	43.3110.27
manganese steel	fixed crushing plate	43.3130.23
	movable crushing plate	43.3140.23

Zirconium oxide plates must be used only for crushing ceramics and the like - metals are not to be crushed.
Stainless steel plates and walls are recommended if moist/humid materials have to be crushed which would lead to corrosion when using tool steel.
Hard metal tungsten carbide plates and walls are recommended in the case of very hard materials to be crushed or if iron-contamination (from the abrasion of the plates and walls) must be avoided.

5.2 Mounting the crushing plates (18, 22) and lateral support walls (13)

WARNING **Voltage!**

Before starting the installation work, pull the mains plug and secure against unauthorised reactivation!
Announce maintenance work with a warning sign.

When the jaw crusher is supplied, one set of crushing plates (18, 22) and lateral support walls (13) is installed in the instrument. After the electrical connection, the instrument is ready for operation.
The crushing plates (and to a very small extend also the support walls) are subject to abrasion and must eventually be replaced.
(When checking the condition of the plates or if you realise while cleaning the instrument that the plates are only abraded in their lower part, then these must not yet be replaced but can simply be turned upside-down).

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5.2.1 Mounting the crushing plates

TIP

The crushing plates have different shapes.

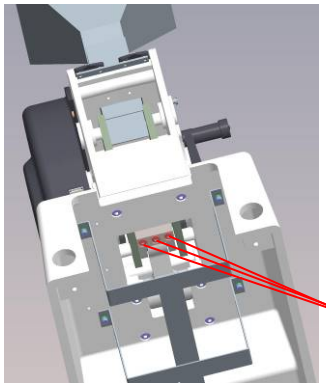
The **fixed** crushing plate (18) has plane parallel surfaces, the **movable** crushing plate (22) is convex on the crushing surface and it is a bit longer.

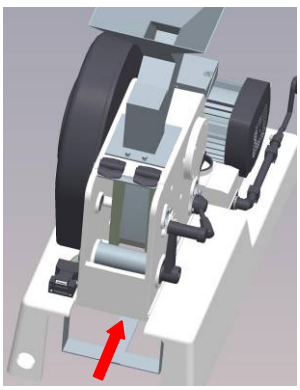


CAUTION

Crushing jaw (15) hold on tight!
Part weighs about 6.5 kg

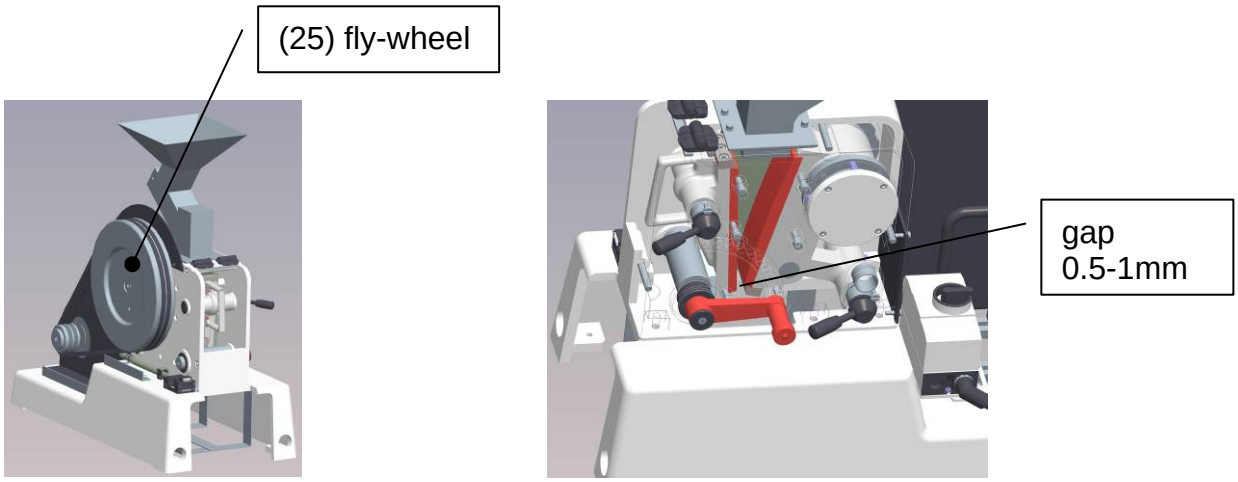
To replace the **fixed** crushing plate (18), remove the guide bolt (3) and take out the crusher jaw (15).
After loosening the clamping block (16) the crushing plate (18) can be removed, the replacement crushing plate can be inserted and the clamping block (16) must be very **firmly** re-screwed.



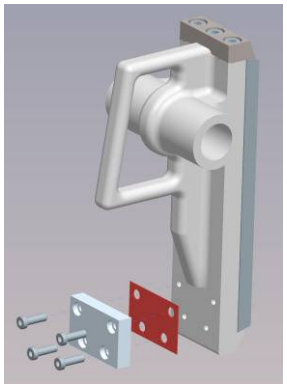



To replace the movable crushing plate (22), pull the collecting vessel (12) out of its mount. The screws of the clamping block (24) are now accessible without removing the movable crusher jaw (21). ***Loosen*** the clamping block (24) and lift out the crushing plate (22). Insert the new plate (or the old turned one) from below and fasten it to the clamping block (24), which must then be screwed in tightly.

5.2.2 Checking the gap



After installing the crushing plates (18, 22), you must check the gap between the plates:
To do this, you must remove the belt guard outside (9). The fastening screws of the belt guard outside (9) are located under the edge protection (8). When the belt guard outside (9) is removed, the fly-wheel (25) can be turned by hand. Set the indexing cranked handle (7) to the lowest setting. To do this, unscrew the knurled knob on the cranked handle (7) and set the cranked handle to the required setting. Allow the head to snap correctly back into place – this locks the fixed crushing plate into place. Adjust the movable crusher jaw (21) using the fly-wheel to product the smallest possible gap between the crushing plates (18, 22). This should be between 0.5 – 1 mm. Check the gap with a feeler gauge.



You can adjust the gap by removing or adding a compensating plate (20) under the pressure plate (19) on the fixed crusher jaw (17).

TIP

When operating the jaw crusher, the crushing plates must not touch with the narrowest gap.

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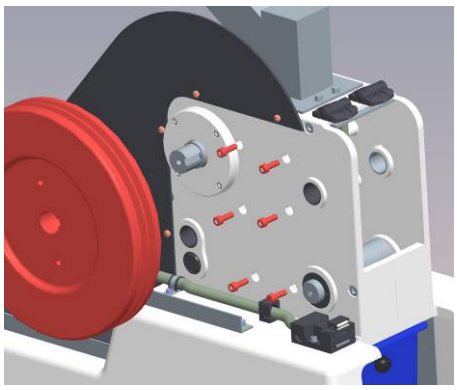
5.2.3 Mounting the support walls

WARNING

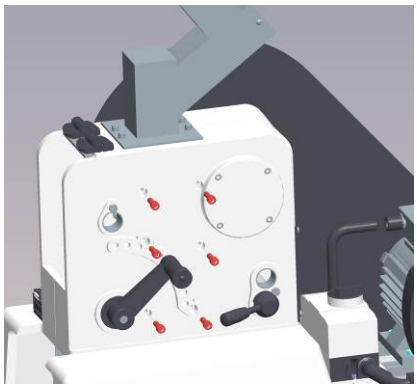
The fly-wheel (25) is very heavy. At least 2 people are required for disassembly.

Replacing the lateral support walls (13) is practically only required if the material of the crushing plates (18. 22) is replaced by another one (i.e. from tool steel to stainless steel) and if even the smallest (P.P.M. range) contamination (abrasion) from the support walls has to be avoided.

First lift out the fixed crusher jaw (17) as described in chapter 5.2.1.



To replace the left support wall (13), unscrew the belt guard outside (9) (chapter 5.2.2), remove the V-belt and pull the fly-wheel (25) off its axle. Then remove the now visible fastening screws of the support wall (13) and lift this out from inside.



The fastening screws of the other support wall can be directly reached. After having unscrewed them, the support wall can also be removed from the inside.
Replacing the support walls is done the opposite way. The fastening screws must be very **firmly** tightened. After the installation of the pulley, you have to bring the v-belt to it's position. Reattach the belt guard (9).

CAUTION

Danger of crushing!
Do not forget to put back the belt guard (9) after having installed the fly-wheel. This is a safety precaution.

5.3 Crushing of material

5.3.1 Setting the jaw gap

The opening of the gap between the crusher plates determines the average grain size of the crushed material. With the indexing cranked handles (7) the opening gap can be selected by steps between about 1 mm and 15 mm. (In the lowest position the gap is the smallest).

To select a different gap, pull out the knurled knob of the indexing cranked handles (7) and insert the indexing cranked handles into the desired position. The indexing cranked handles is fixed when the knurled knob snaps in.

Difficult to crush material (i. e. metal alloys) should first be pre-crushed at a larger gap opening before the final gap setting is selected for a second pass.

If no experience is available regarding the fragility of your material, you should break a test piece carefully in a first stage.

5.3.2 Introducing the material to be crushed

TIP

The instrument must be switched-on/running before filling material into the funnel.

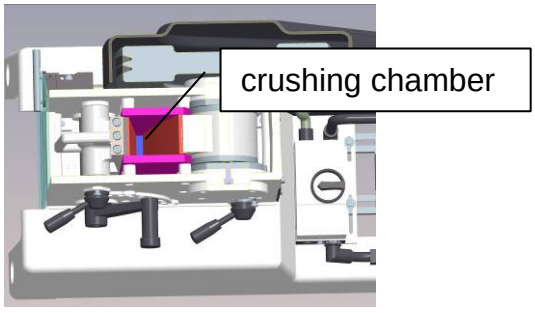
Larger pieces of material

- model I max. edge length 60 mm,
- model II max. edge length 95 mm

should be introduced piece by piece into the funnel.

A new piece of material should not be introduced before the crushing noise has distinctly decreased.

You should never introduce more material to be crushed than the volume of the crushing chamber can accept. The crushing chamber is limited by the upper edge of the lateral support walls (13) and the crushing plates (18, 22).



No material to be crushed should be placed above that limit.

Also when working on a continuous basis, no more material to be crushed must be added than crushed material comes out of the crushing gap.

The feed rate depends on the crushing behaviour of the material. For each new material observe the crushing (crushing noise) and determine the optimum amount of material.

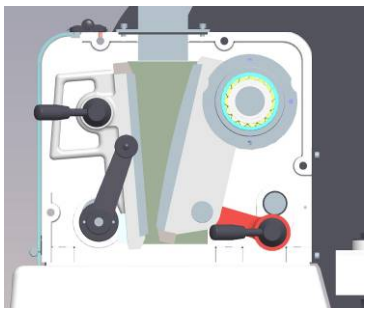
5.3.3 Dust exhaust

When crushing certain materials (e.g. coal, boulders, stones) dust can be generated that collects in the crushing chamber. In order to prevent this spreading, the laboratory jaw crusher can be equipped with a vacuum. See chapter 6.1.

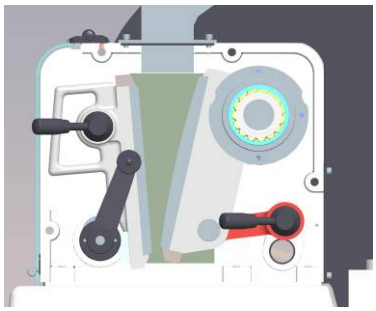
5.3.4 Final size

The obtainable final size depends upon the selected gap setting (about 1 mm to 15 mm). The gap setting determines only one dimension of the crushed material. This means, that for instance flaky shaped material can have a completely different size in another dimension compared with the set gap. If this should be the case, in many cases a second pass of he crushed material through the crusher will considerably reduce the amount of the grains being larger in one dimension.
At the smallest gap setting, the average grain size (d_{50}) of the crushed material is approximately 2 mm.

5.3.5 Setting of the link plate



Normally, the link plate (23) which is hold by the link pin (6) is positioned in the lower position.
In some cases it may be advantageous to crush materials having positioned the link plate and link pin in the upper position.

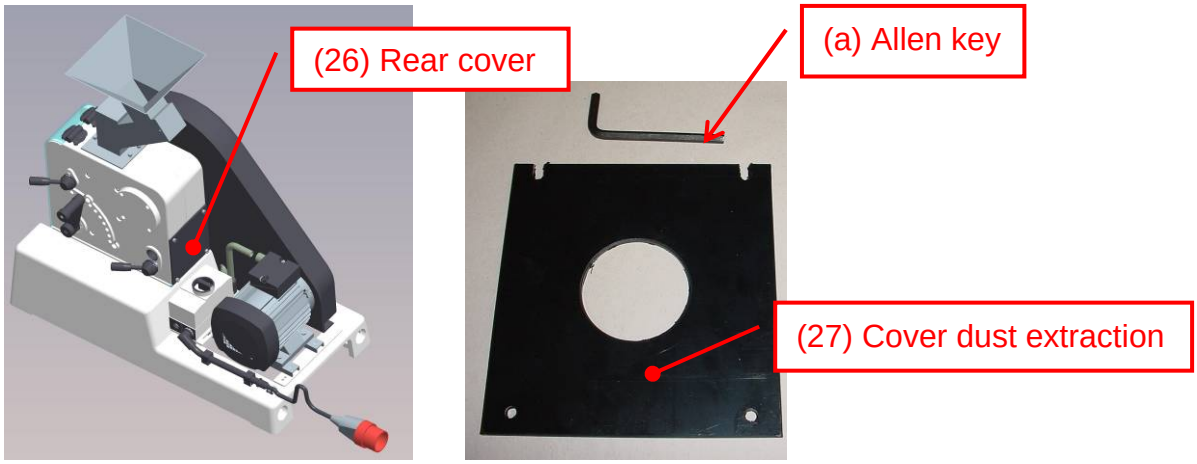


Because of the fact that such a position reduces the gap opening between the jaws, the particle size distribution of the crushed material is narrower respectively the particle size is more uniform. However, this leads to a slightly longer crushing time. This position can not be selected for materials like slades, coal, coke and somewhat sticky materials. It can only be selected for easy to break/crush samples. In some cases it can be of advantage to pre-crush the material in the lower position and to finally crush it to a small size in the upper position.

6 Accessories

6.1 Dust extraction

- 43.9050.00 Dust extraction device
- 43.9051.00 Polyester filter set (2-pack)
- 43.9052.00 Plastic bag (5-pack)



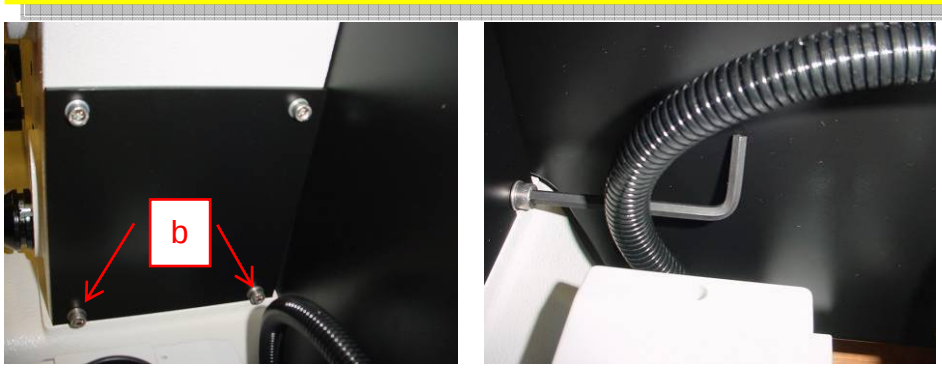
Der Labor-Backenbrecher wird ohne Absaugöffnung ausgeliefert. Um eine Staubabsaugvorrichtung benutzen zu können, muss die rear cover (26) durch eine spezielle cover dust extraction (27) ersetzt werden.

On delivery, this is found with the required Allen key (a) in the collecting vessel (12) of the instrument.

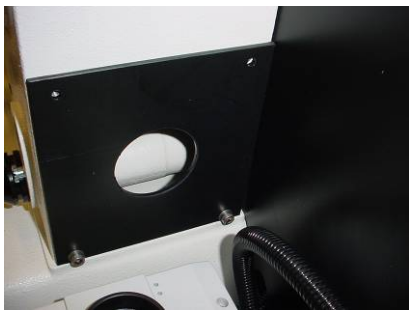
6.1.1 Converting for dust extraction

WARNING

Voltage!
The power plug must be pulled before starting the installation work.
The installation work may only be performed by authorised persons.



1. Loosen the lower hex socket screws (b) of the rear cover (26) with the provided Allen key a). Only unscrew these two screws one turn. The two upper screws must be unscrewed entirely.

2. Pull up the rear cover (26) and slide the cover dust extraction (27) with the oblong holes onto the screws. Make certain that the washers are positioned under the screw heads. Screw in both upper screws and retighten the lower screws.

3. The following accessories are included with the dust extractor: Vacuum hose (c), reducing adapter (d) and 2 rubber collars of different sizes (e,f). The rubber collar 84.4345.15 (f) with the larger outside diameter is required.



4. Slide the rubber collar (f) into the hole in the cover dust extraction (27). One end of the vacuum hose (c) is locked on place at the collection container of the dust extractor, a reducing adapter (d) is mounted to the other end.

5. Then insert the reducing adapter (d) into the rubber collar (f) of the cover dust extraction (27).

6.2 Conversion set for iron-free preliminary grinding

6.2.1 Model I

- 01.5410.00 Funnel PVC incl. clamping block
- 43.0100.27 Fixed crushing plates of zirconium oxide
- 43.0110.27 Movable crushing plates of zirconium oxide
- 43.0160.27 pair supporting walls of zirconium oxide

or

- 43.0150.13 1 pair supporting walls of aluminium

6.2.2 Model II

- 01.7410.00 Funnel PVC incl. clamping block
- 43.3100.27 Fixed crushing plates of zirconium oxide
- 43.3110.27 Movable crushing plates of zirconium oxide
- 43.3160.27 1 pair supporting walls of zirconium oxide

or

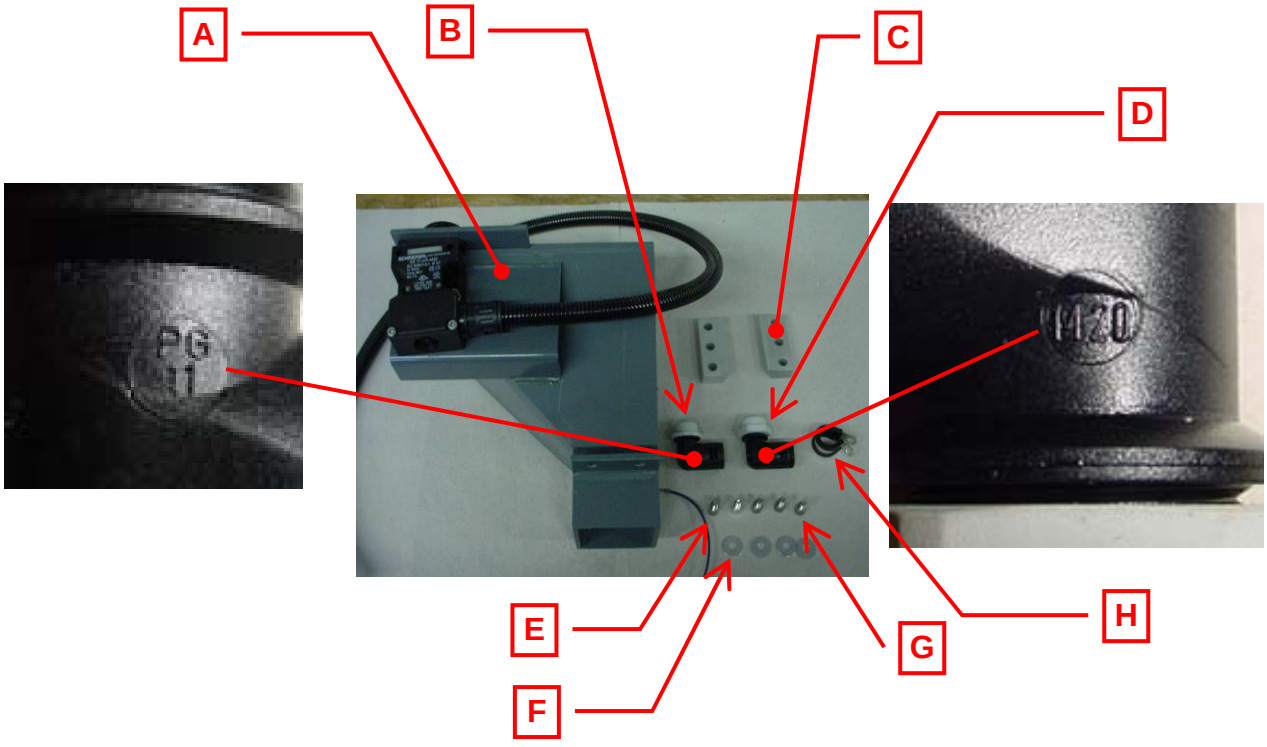
- 43.3150.13 1 pair supporting walls of aluminium

6.2.3 Changing the funnel

DANGER

Mains voltage!
The device must be disconnected from the mains network before starting the assembly (pull the mains plug out of the socket).
The installation work may only be performed by a person with appropriate electrical training.

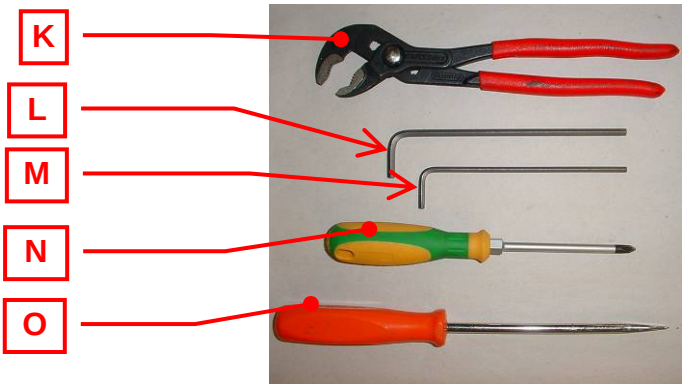
6.2.3.1 Conversion set



Funnel (A) with safety switch	
4x cylinder head screws M6x12 (E) 4x washers (F)	Funnel fastener
1x cylinder head screw M6x12 (G) 1x cable clamp (H)	Cable conduit fastener
1x angled screw coupling with thread PG11 (B) 1x angle screw coupling with thread M20 (D)	(The standard for cable screw connections was changed during the manufacturing period of the device.)
2x clamping blocks (C) of anodised aluminium	Crushing plate fastener

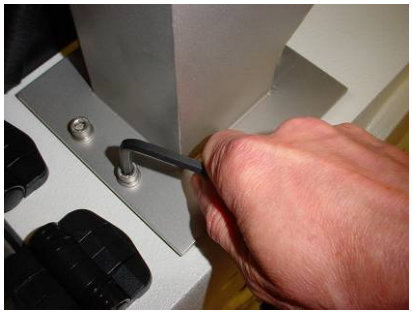
6.2.3.2 Tools

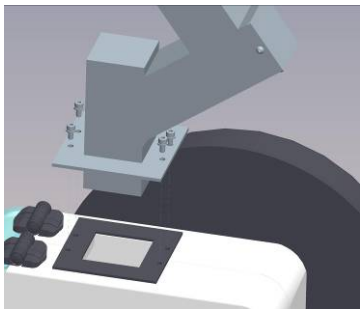
These tools are required for the assembly:



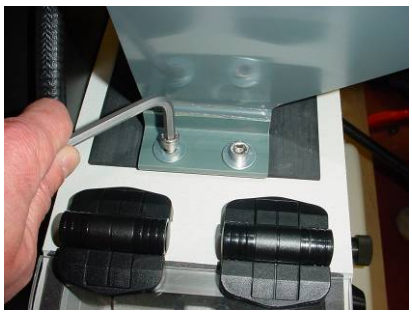
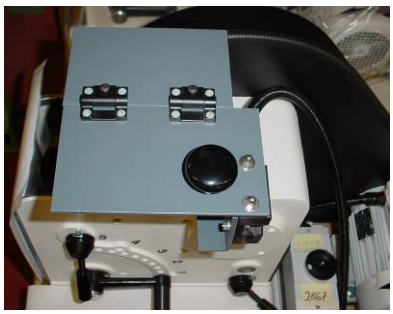
- Pipe wrench (K)
- Hex socket screw size 5 (L)
- Hex socket screw size 4 (M)
- Phillips screwdriver (N)
- Flathead driver (O)

6.2.3.3 Assembly





1. Remove the filling funnel (1) by unscrewing the 4 cylinder head screws using the supplied Allen key (a). Please store the screws and washers with the filling funnel (1) for subsequent reinstallation. The rubber seal remains on the housing.

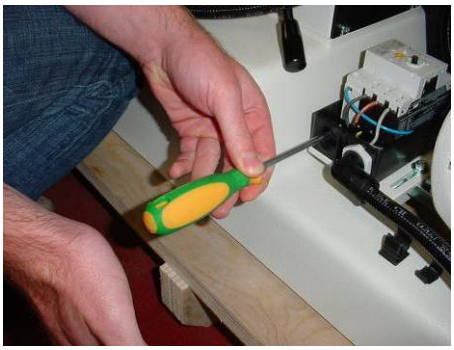



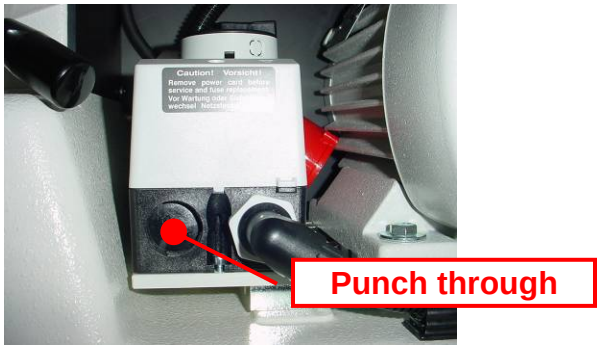
2. Mount the funnel (A) in the position shown above with the 4 cylinder head screws M6x12 (E) and the 4 washers (F).

3. Select the angled screw coupling (B or D) with the correct thread (PG11 or M20). To do this, check the housing of the main switch (4) to see which thread matches.

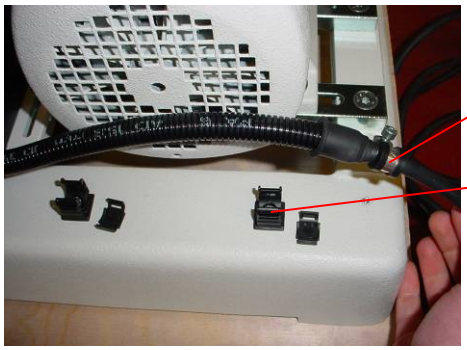

4. Then press the collar piece out of the angled screw coupling (B or D) as shown above.


5. Unscrew and open the housing of the main switch (4) with the Phillips screwdriver (N). The blue cable link (X) can be seen running from the upper left to the lower right.

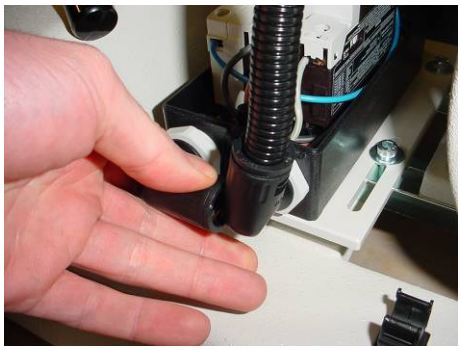


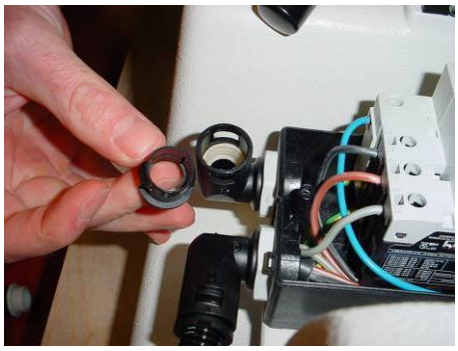


6. Use a sharp object (Phillips screwdriver) to punch through the housing of the main switch (4) in the threaded hole for the angled screw coupling so that the cable of the funnel (A) can be run through.

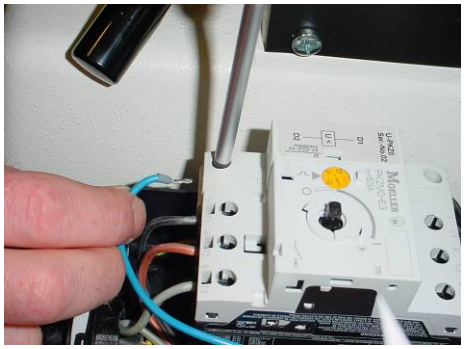


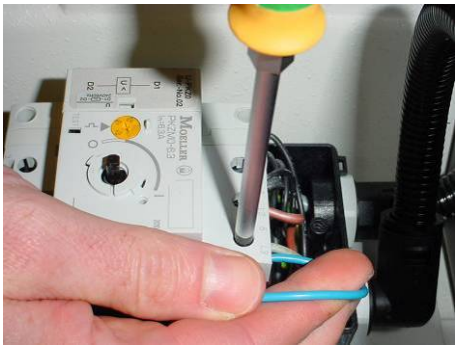
7. Open the clip (Q) of the mains cable (5) and screw off the cable clamps (P).





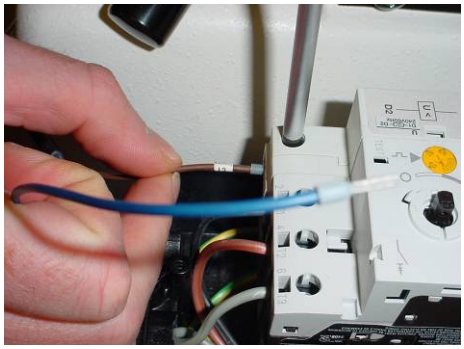
8. Position the mains cable (5) vertically and screw in the angled screw coupling (B or D). Because there is very little space here for screwing, it may be necessary to move the mains cable (5). Screw in the angled screw coupling (B or D) firmly until it stands vertically. Then press the removed collar back onto the coupling.





9. Loosen and remove the blue cable link (X) with a Phillips screwdriver.

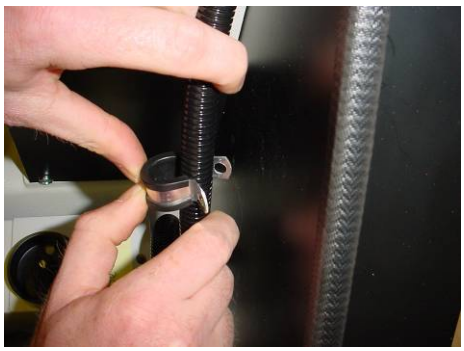
10. Then run the cable of the safety switch of the funnel (A) into the angled screw coupling (B or D) and into the housing.



11. Screw on the short brown cable on the upper left and the long blue cable on the lower right (where the blue cable link (X) was previously connected).

12. Then close the main switch (4) housing again.

13. Fasten the cable conduit of the funnel (A) to the rear cover (26) of the jaw crusher. To do this, remove the screw on the upper right with a Phillips screwdriver (N).



14. Slide the cable clamp (H) onto the funnel cable.

15. Then screw on the cable clamp (H) at this position with the cylinder head screw M6x12 (G).

6.3 Crushing and comminuting to the fineness of a disk mill

Coarse material can be comminuted to the fineness of the disk mill in one pass by combining it with the disk mill „pulverisette 13“.
The fragmentation is performed with this combination in **a single pass** from 95 mm (or 65 mm) input size to an average grain size (d_{50}) of 0.1 mm.
Install the jaw crusher over the disk mill in a mounting rack (order no. 43.5100.00). The preground material from the jaw breaker slides down a special chute directly into the hopper of the disk mill.

7 Cleaning

WARNING

Before starting the cleaning work, pull the mains plug and secure the instrument against unauthorised reactivation!
Announce cleaning work with a warning sign.

7.1 Cleaning the grinding chamber



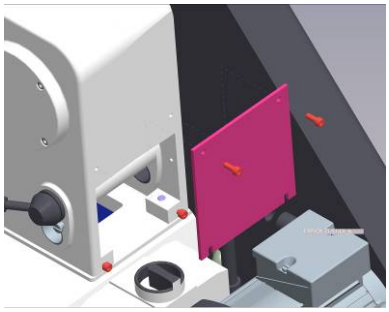
In order to access the grinding chamber, first remove the fixed crushing jaw (15), therefore open the front cover (10). The actual dismantling: Pull the guide bolt (3) off and lift the crushing jaw (15) in an upward motion.

CAUTION

Hold the crushing plate firmly!
The part weighs approx. 6.5 kg.

The grinding chamber can be sucked out with a vacuum cleaner and brush or blown out with compressed air (Pay attention to the mill feed that may fly around). Stubborn residues can be removed with a wire brush. Subsequently, wipe out the grinding chamber with a damp cloth and then with alcohol (corrosion protection).

7.2 Cleaning the intake



Loosen the 4 screws of the cover on the back of the grinding chamber (26 or 27 see chapter 6.1). Remove the cover and vacuum the hollow area behind it.

8 Maintenance

WARNING

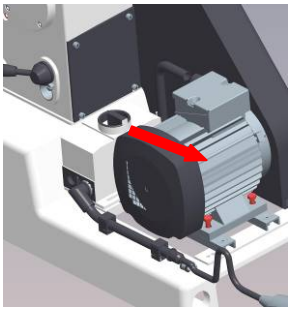
Before you begin with the maintenance work, you have to pull the mains plug and make sure that the machine is save against unintended starting.
Maintenance work have to be marked by a danger sign.

8.1 Crushing plate

Depending on the materials to be crushed, crushing jaws are subject to abrasion. They should be checked within certain intervals and should be eventually turned upside-down or be replaced (see chapter 5.2).

8.2 V-belts

To re-tighten the V-belts, the fastening screws (4 pieces) of the motor on its rail are loosened, the motor is pushed to the back and the screws are firmly re-tightened.
To replace the V-belts, the belt guard (9) must be removed. Loosen the motor and replace the V-belts (Order-No. 82.0170.00). Then push back the motor and re-tighten the 4 screws as mentioned above.



CAUTION

Danger of crushing!
Do not forget to put back and fasten the fly-wheel guard.
This is a safety precaution.

8.3 Greasing the bearings

The guide bolt (3) and the link pin (6) should after approximately 500 working hours be cleaned and greased with machine oil. Two grease nipples are located on the movable crushing jaw (21) for greasing of the bearings of the main shaft. These bearings have to be greased after approximately 500 working hours with roller bearing grease (i. e. as to DIN 5l806). All other bearings are coated with a permanent lubricant.

9 Warranty

The warranty card enclosed with the machine upon delivery must be completely filled out and returned to the delivering factory so that the warranty can enter into effect.
Online registration is also possible. More information can be found on your warranty card or on our website http://www.fritsch.de
The company Fritsch GmbH in Idar-Oberstein and your "Technical Application Laboratory" or the corresponding national representatives would be happy to provide you with advice and assistance.
Please include the serial number given on the type plate along with any questions.

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