

# IKA

designed for scientists

## IKA A11 basic



Operating instructions

EN

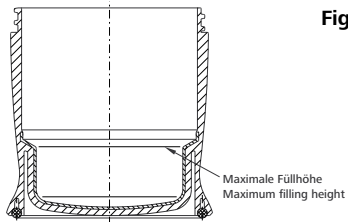


Fig. 1

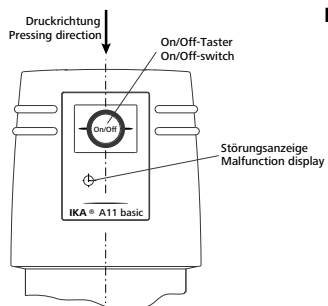


Fig. 2

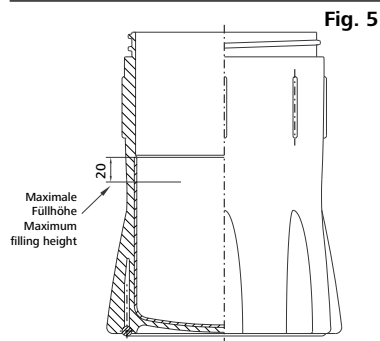


Fig. 5

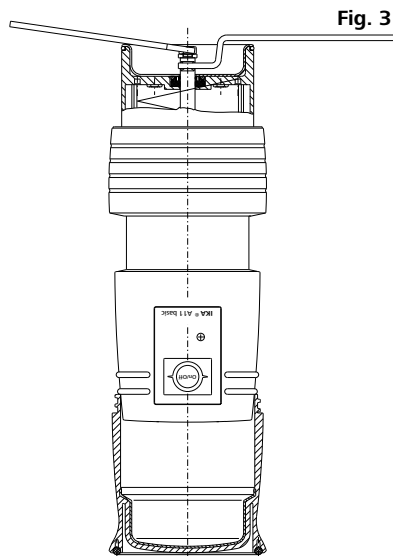
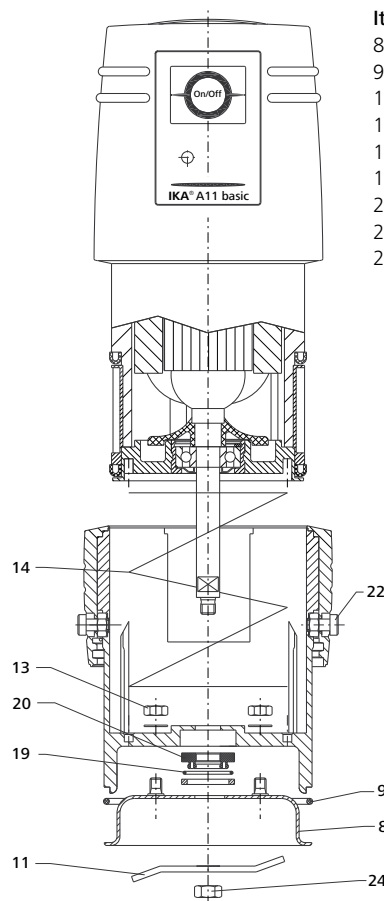


Fig. 3



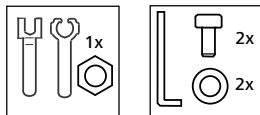
Fig. 6



Item	Designation
8	Guard ring
9	O-ring
11	Beater
13	Hexagonal nut
14	Pressure spring
19	O-ring
20	Seal
22	Guide screw
24	Hexagonal nut

## Note: Prevent damage - keep clean!

### Tools



STEP 1 Check



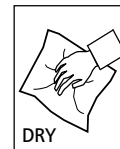
STEP 2 Unscrew



STEP 3 Remove



STEP 4 Clean



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## EU Declaration of conformity

We declare under our sole responsibility that this product corresponds to the directives 2006/95/EC, 2004/108/EC and 2011/65/EU and conforms with the standards or normative documents: EN 61010-1, EN 6010-2-051 and EN 61326-1.

A copy of the complete EU Declaration of Conformity can be requested at [sales@ika.com](mailto:sales@ika.com).

## Explication of warning symbols



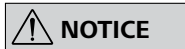
Indicates an imminently hazardous situation, which, if not avoided, will result in death, serious injury.



Indicates a potentially hazardous situation, which, if not avoided, can result in death, serious injury.



Indicates a potentially hazardous situation, which, if not avoided, can result in injury.



Indicates practices which, if not avoided, can result in equipment damage.

## Safety instructions

### General information:

- › **Read the operating instructions completely before starting up and follow the safety instructions.**
- › Keep the operating instructions in a place where it can be accessed by everyone.
- › Ensure that only trained staff work with the device.
- › Follow the safety instructions, guidelines, occupational health, safety and accident prevention regulations.
- › The device must only be used in a technically perfect condition.

### **Working with the device:**

#### **DANGER**

- › Do not use the device in explosive atmospheres, it is not EX-protected.
- › With substances capable of forming an explosive mixture, appropriate safety measures must be applied, e.g. working under a fume hood.
- › To avoid body injury and property damage, observe the relevant safety and accident prevention measures when processing hazardous materials.
- › Please observe the relevant safety instructions and guidelines regarding dust explosions.
- › Please follow the relevant safety instructions and guidelines, and occupational health and safety regulations for use in the laboratory. When working with the mill, the user must wear his personal protective equipment. Defective or inappropriate protective equipment can expose the user to the risk of spurring substances.

#### **WARNING**

- › Only process samples that will not react dangerously to the extra energy produced through processing. This also applies to any extra energy produced in other ways, e.g. through light irradiation.
- › Beware of the risk of flammable materials.

#### **CAUTION**

- › Please pay attention to avoiding hand injury when operate the device.
- › Please ensure that there are no parts of the body between the casing parts that move together.
- › Because of a temperature and surface increase during the crushing process, a certain overpressure may arise in the grinding chamber. Let the sample cool down and open the grinding chamber carefully.
- › Always open the chamber carefully after use, as the material in the chamber may heat up due to transfer of energy during operation. Wear gloves if necessary or wait for material to cool down.
- › The device must be operated on flat surface and must not be moved during operation.
- › Please make certain that the mill is not tilted when it is in operation and hold it in place with both hands.

#### **NOTICE**

- › The device is designed for short term operation. The maximum operating time is 1 minutes. After that, it should be switched off for 10 minutes to cool down.
- › Please note that wear debris from the device or rotating accessories can end up in the medium to be processed. Please contact **IKA** should you have any questions in this respect.

### **Working with coolants:**

#### **CAUTION**

- › Ensure that pressure does not build up in the grinding chamber (particularly when using coolants).
- › When using liquid nitrogen, you must only screw on the grinding beaker and begin the grinding process when the liquid nitrogen is completely vaporized.
- › Always wear suitable protective equipment when embrittling the mill feed with coolants (liquid nitrogen or dry ice), (see laboratory guidelines and accident prevention regulations applicable to the laboratory).
- › Device parts may still be extremely cold for some time after cooling with liquid nitrogen and should only be handled whilst wearing protective equipment.

### **Accessories:**

- › Protect the device and accessories from bumping and impacting.
- › Check the device and accessories beforehand for damage each time when you use them. Do not use damaged components.
- › Safe operation is only guaranteed with the accessories described in the "Accessories" section.
- › Disconnect the power plug before attaching or changing any accessories.

### **Power supply / switching off the device:**

- › The voltage stated on the type plate must correspond to the power voltage.
- › The device can only be disconnected from the power supply by pulling out the power plug or the connector plug.
- › The socket for the power cord must be easily accessible.

### **Maintenance:**



- › The device must only be opened by trained specialists, even during repair. The device must be unplugged from the power supply before opening. Live parts inside the device may still be live for some time after unplugging from the power supply.
- › Beware of the sharp edged cutter in particular when changing grinding tool and when cleaning. Always wear your personal protective equipment (protective gloves, etc.).
- › The grinding pot, grinding tool and rotor shaft may be hot after long grinding cycles. Allow the mill to cool down before cleaning or before changing grinding tool.
- › Before removing the grinding beaker, switch off the mill and wait until the motor stops. Risk posed by trailing crushing elements (beaters or cutters).
- › Always switch off the device and disconnect the plug before cleaning or replacing parts.

### **Disposal instructions:**

- › The device, accessories and packaging must be disposed of in accordance with local and national regulations.

## **Intended use**

### **Use:**

The **A 11 basic** analysis mill is a batch mill that allows for two different grinding procedures.

The grinding container is airtight. This means that the loss of ground material is equivalent to practically zero.

### **Impact milling:**

For usage with hard, brittle grinding material, dried material or material that is brittle because of cold (for example grain, coffee, etc.).

Here the grinding material is reduced by means of a beating rotor. The grinding material is thus broken. The granularity of the final product is determined by the duration of the grinding, the level to which the container is filled and the physical properties of the material being processed.

### **Cutting milling:**

For usage with soft, fibrous grinding material (for example hay, paper, etc.).

Here the grinding material is cut by means of a rotating blade. In this case as well, the granularity of the final product is determined by the duration of the grinding, the level to which the container is filled and the physical properties of the material being processed. Using the cutting method makes it possible to introduce less energy into the grinding material, which results in less heating up. In this case as well, because of the closed design, the loss of ground material is equivalent to practically zero.

### **Range of use:**

Indoor environments similar to that a laboratory of research, teaching, trade or industry.

The safety of the user cannot be guaranteed:

- › if the device is operated with accessories that are not supplied or recommended by the manufacturer.
- › if the device is operated improperly or contrary to the manufacture's specifications.
- › if the device or the printed circuit board are modified by third parties.

## Unpacking

### Unpacking:

- Please unpack the device carefully.
- Any damage should be notified immediately to the shipping agent (post office, railway network or logistics company).

### Delivery scope:

- **A 11 basic** (with grinding container A 11.5 and beater A 11.1)
- A set of tools
- User guide
- Warranty card.

## Useful information

The analysis mill can be used for a wide range of applications. The list of grinding materials given above is not complete. It is possible to expand the range of application further by means of grinding experiments with corresponding grinding procedures and sample preparations.

### Impact milling:

The **A 11 basic** with a beater reduces soft, medium-hard and brittle materials with a Mohs' hardness of up to 6 (felsite: 6 Mohs; quartz: 7 Mohs). For greater levels of hardness, the wear and tear on the pulverization tool is very high and grinding therefore becomes uneconomical. If the **A 11 basic** is used for grinding materials with hardness greater than 4 Mohs, the A 11.3 beater, which is more resistant to wear and tear, must be used. This prevents the sample from being contaminated by bits of the grinding tool broken off by wear and tear. Everything that breaks, is dry, and does not have a high fat content can be ground.

### Following is a list of substances that can be ground dry:

Grain, barley, corn, malt, pectin, roasted coffee, bark, roots, nutshells, bones, ergot, compressed materials, peat, cellulose, pharmaceutical, artificial, fertilizers, feed materials, spices, resin, potash, seeds, salts, slag.

Tough grinding material must be cooled, for example by adding pulverized dry ice to the grinding container.

The grinding material must be initially broken down into pieces with a diameter of 1 cm (feed granularity 10 mm, the size of a grain of corn is ideal).

### Cutting milling:

The **A 11 basic** with the A 11.2 cutting blade reduces bulky, elastic fibrous and soft materials with high cellulose content. Mixed goods such as trash must be free of iron and non-iron metals. The feed material must not be too moist or fatty. Otherwise the material may adhere to the sides of the grinding container.

### Following is a list of some materials that can be reduced:

Leaves, fibre, spices, grain, hops, cardboard, paper, hay, plastics, tobacco, peat, feed goods, dough and roots.

The feed granularity should be no greater than 10 mm.

For moist and sticky feed material (for example fish, meat), reduction is also possible by adding water. This prevents the grinding material from adhering to the walls of the grinding container, and the blades continue to engage the grinding material.



### NOTICE

If water is added, the grinding container should not be filled to more than 50% capacity. The mill must only be used in an upright position in this case (must not be agitated or turned on its head).



### WARNING

Materials that are not listed above should only be reduced in the **A 11 basic** after confirmation from **IKA**, especially if there is uncertainty about the danger of explosion (dust explosion as a result of electrostatic charge).

### **Working with coolants:**

Please follow the safety instructions.

Crushing causes the mill feed to heat up. This may not always be desirable as the mill feed can change when heated (e.g. increased oxidation, loss of moisture, evaporation of volatile components, etc.).

It may only be possible to crush mill feed which is viscous or has a high fat content by embrittling using coolants.

The **A 11 basic** offers two cooling processes:

#### Dry ice cooling (CO<sub>2</sub>): approx. -78 °C:

First put the feed product into the grinding beaker and then add crushed dry ice. Thoroughly mix the dry ice with the mill feed. Only attach the drive once the dry ice is completely vaporized, otherwise high pressure can build up in the grinding chamber.

Please note that the mill feed heats up again extremely quickly during crushing (it may reach room temperature again after approx. 10 seconds of grinding). You may have to repeat the process several times if the product is not adequately crushed after one cooling process.

#### Liquid nitrogen cooling (N<sub>2</sub>): approx. -196 °C:

Please follow the safety instructions for liquid nitrogen cooling in particular and always wear your personal protective equipment (safety goggles, protective gloves, etc.).

Use a beater (A 11.1 or A 11.3) to crush mill feed embrittled with liquid nitrogen. The cutter (A 11.2) is not recommended for this purpose (becomes blunt quickly). Grinding beaker A 11.5 (included in delivery) is made of fluoroplastic (ETFE) with a stainless steel insert.

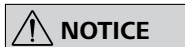
First pour the feed product into the grinding beaker. Pour liquid nitrogen into the grinding beaker using a suitable Dewar vessel, ensuring that the sample is completely covered or swimming in liquid nitrogen. Only attach the drive once the nitrogen is completely vaporized, otherwise high pressure can build up in the grinding chamber.

Please note that the mill feed heats up again extremely quickly during crushing (it may reach room temperature again after approx. 20 seconds of grinding).

If the feed product has a fine fraction or if the same sample is cooled several times, use filling funnel A 11.7 (**IKA** accessories). The funnel is attached to the grinding beaker before filling and prevents fines from the mill feed from swilling out of the grinding beaker when you are pouring in the liquid nitrogen and during vaporization. The funnel's close - meshed stainless steel wire cloth (mesh size 0.063 mm) retains the fine fraction of the sample and allows you to pour in the nitrogen more easily.

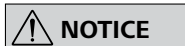


The outer edge of the grinding beaker and filling funnel can also get very cold and must only be handled using personal protective equipment.



Fill liquid nitrogen only into the grinding beaker! Avoid strictly any contact of liquid nitrogen with all other parts!

Please note that the grinding beaker can "ice up", especially in the case of repeated cooling. As a result, it may be difficult or even impossible to screw it on. If so, you will need to "clean" the grinding beaker, i.e. let it thaw out or wash it in a dishwasher. Always dry the grinding beaker before using it again.



Liquid nitrogen cooling is not permitted in grinding beaker A 11.4 (250 ml beaker made of polycarbonate). The beaker would break during cooling.



## Commissioning

Check whether the voltage specified on the type plate matches the mains voltage available.

If these conditions are met, the device is ready to operate after plugging in the mains plug.

If these procedures are not followed, safe operation cannot be guaranteed and / or the equipment may be damaged.

Observe the ambient conditions (temperature, humidity, etc.) listed under "Technical Data".

The grinding container in figure 1 can be unscrewed and removed by rotating it counter-clockwise. The drive section can be put down on the guard ring (item 8).

The grinding container is filled with a suitable material. It is essential at this point not to fill the container higher than the maximum filling height (up to the lower edge in the grinding container, see figure 1). Filling the container to a higher level will result in interfering with the operation, which will overload the mill. The filling quantity can be reduced down to the "uniform grain size" (in other words minimum quantities are also possible).

**Note:** Smaller filling quantities (for example only about 50 - 80% of the maximum filling quantity) can be pulverized more quickly, the final granularity is finer, the range of granularity is smaller and there is less heating up of the grinding materials. It is better to reduce a large quantity of grinding materials in two or three portions. The actual grinding time is only barely longer, but the grinding results are considerably better.

Bulky grinding material (for example hay, etc.) can also be filled up higher than the lower edge, but no more than about 20 mm below the upper edge of the grinding container. The loose grinding material is forced into the grinding zone when the drive is pushed in.

The filling grinding container is screwed in onto the drive up to the stop (you can hear a soft click just before reaching the stop).

When electrical power has been connected, you can begin with the grinding procedure. Grasp the hood with one hand, press the on/off - switch with your thumb (figure 2), and the mill starts. Pressing the drive down softly and slowly in the axial pressing direction forces the pulverization tool into the grinding material (pressing on one side only can tilt the drive, which could result in premature wear and tear on the shaft seal).

When the pulverization tool engages the grinding material, the speed of the motor decreases. The speed decreasing is audible. If the reduction in speed is very pronounced, the speed of the drive should be increased to be able to insert pulverization tool into the grinding material at nominal speed. Depending on the grinding material, it may be necessary to repeat this procedure several times. If the speed remains relatively constant while the pulverization tool is being lowered and raised back up, the grinding procedure is complete.

The grinding time should not exceed 30 seconds. Further grinding will not improve the pulverization of the grinding material, but heating up will increase considerably.

The appliance is designed for short-time operation. Maximum on-time 1 minute, minimum off-time 10 minutes. Increasing the on-time or reducing the off-time can cause the motor to overheat prematurely, which will in turn cause the appliance to switch off (see Faults and Troubleshooting). The appliance is fused to protect it in the case of over-use.

Before the grinding procedure is complete, the drive should be raised completely. Only then should the On/Off - switch be turned off. The advantage of this method is that the pulverization tool cleans itself. Do not unscrew the grinding container until the motor has come to a standstill. Any grinding material that adheres to the guard ring can be swept off on the guard ring into the grinding container with a cleaning brush (no wire brushes!).

Always remove any grinding scrap which gets into the interstice before using the appliance again (see "Maintenance and Cleaning" section).



The grinding tools, the grinding container and the rotor shaft may be hot. Observe the safety instructions.

## Exchanging and replacing the grinding tools



The edges of the blade are sharp. It should only be handled with protective gloves.

Please observe the safety instructions. Note that when changing the tool directly after a grinding procedure, the pulverization tools are hot. The mill must first be allowed to cool off.

Before exchanging the pulverization tools, unplug the power cord.

Rotate the mill drive onto its head and push it into the grinding container with the head down (see figure 3).

Hold the rotor shaft securely in place with the curved single - head wrench by the flattened section underneath the pulverization tool. Loosen and remove the hexagonal nut (item 24) with the second single - head wrench and remove the blade or the beater.

Before assembling a new or another pulverization tool, make certain that all parts are clean. It does not matter which direction beaters and blades are installed in. Due to their double - sided operation, the two pulverization tools have a service life that is twice as long. If one side is dull or worn, you can use the other side by turning the beater or blade around.

After you have set the pulverization tool in place, tighten the hexagonal nut to finger tightness. To do this, use the tools as shown in figure 3.

## Malfunction and eliminating malfunctions

### **Malfunction display:**

The malfunction display lights up if the grinding container has not been screwed in to the stop and the On/Off - switch has been pressed.

The malfunction display also lights up if the motor circuit breaker has been triggered and the On/Off - switch is pressed. The malfunction display alone does not indicate which of the two possible errors has occurred. As a rule, if the motor circuit breaker has been engaged, an elevated temperature has been detected on the mill housing.

### **Temperature and over-current protection:**

The **A 11 basic** mill is protected from overload and / or overheating by a combined temperature and over current switch.

The motor circuit breaker turns itself back off automatically when the temperature of the mill is again in an acceptable range and the On/Off -switch has not been pressed. This may be after only a few seconds in the case of a short-term overload. If the mill has heated up a great deal after an extended period of operation, it may take up to 30 minutes to cool off.

You should not press the On/Off - switch repeatedly during the cooling off - phase, because the motor circuit breaker is equipped with an auto - hold function that prevents the mill from starting up again if the On/Off - switch is pressed repeatedly. To determine whether the mill is ready to start up again, you should press the On/Off - switch at intervals of from 5 to 10 minutes. If the malfunction display lights up again while the grinding container is screwed on, the temperature is still too hot (maximum cooling - off time 30 minutes at an ambient temperature of about 25 °C). The 100-115V version of the A11 basic is additionally equipped with a circuit breaker. This turns the mill in case of sudden overload (motor blocks) from. If the cause of the fault has been eliminated (eg. too large feed size or too much material to be ground in the grinding bowl), the circuit breaker can again be without a waiting period with the supplied reset pin is turned on. For this purpose, the thin end of the pin is inserted into the membrane grommet on the back of the A11 basic (above the power cord) to the stop. (see figure 6)

### **Eliminating malfunctions:**

The mill does not start up:

*Causes:*

- Power cord is not plugged into the socket correctly.
- You did not push the On/Off - switch down far enough.
- The grinding container is not screwed in up to the stop (when you press the On/Off - switch the malfunction display lights up).
- The mill has been heated up by the previous grinding procedure (the malfunction display lights up when you press the On/Off - switch).
- After disassembling the middle section (for example to clean it) the switch block is not completely engaged.
- Circuit breaker tripped (only 100-115V version).

*Remedy:*

- If necessary, check the power supply and the power cord.
- Push the On/Off - switch down until a „click“ is audible.
- Reset circuit breaker (only 100-115V version).

*If the malfunction display lights up when you push the On/Off - switch:*

- Screw the grinding container up to the stop (a soft „Click“ is audible) and if necessary remove any dirt from the threading.
- Check to make sure the switch block is engaged in place.
- If the mill has overheated, wait a few minutes for it to cool down.

### **The motor is locked after the On/Off - switch has been pressed, or the mill switches off shortly after it has started.**

*Causes:*

- Too much grinding material in the grinding container (filling height exceeded).
- The feed granularity is too coarse.
- Motor circuit breaker is tripped because of lock (overload).

*Remedy:*

- Release the On/Off - switch and remove the grinding container. If fragments of the grinding material have become stuck between the grinding tool and the guard ring, do not remove them until after you have disconnected the power cord.
- Fill the grinding container with a sufficient amount of pre-reduced grinding material.
- Do not exceed the maximum filling height in any case.
- In the case of hard or tough grinding material, reduce the maximum filling height by 50%.
- If the motor circuit breaker has been tripped, you must wait until it switches back off.
- Wherein the triggered circuit breaker (100-115V version) this will be as described above with no waiting time is reset.

### **The motor speed falls sharply or the mill is locked during operation:**

*Causes:*

- The feed granularity is too coarse,  $\geq 10$  mm.
- There is too much feed material in the grinding container.
- The grinding material is too tough.
- The pulverization tool is being lowered down into the grinding material too quickly.

*Remedy (motor speed falls):*

- The speed can be kept at a constant level if the grinding tool is moved slowly into the grinding material. If the speed drops off, you should not lower the tool any further. Instead you should raise it again and try to move the tool slowly into the grinding material at the nominal motor speed.

*Remedy (locking):*

- Release the On/Off - switch and remove the grinding container. If fragments of the grinding material have become stuck between the grinding tool and the guard ring, do not remove them until after you have disconnected the power cord.



## WARNING

The shaft of the grinding container and the pulverization tools may not be hot. If necessary, allow the mill to cool off.

- Fill the grinding container with a sufficient amount of pre-reduced grinding material.
- Do not exceed the maximum filling height in any case.
- In the case of hard or tough grinding material, reduce the maximum filling height by 50%.
- If you do not release the On/Off - switch and the motor is locked, the motor circuit breaker or the circuit breaker (at 100-115V) will be tripped.
- Before continuing with operation allow the mill to cool off or reset the circuit breaker.

### The drive suddenly cuts out during the grinding procedure:

#### Causes:

- Overheating of the drive (malfunction display lights up when the On/Off - switch is pressed, parts of the housing are warm).
- The grinding container has rotated itself loose and has triggered the circuit breaker (malfunction display lights up when you push the On/Off - switch).
- The power supply has been interrupted.

#### Remedy:

- If the mill has overheated, wait a few minutes.
- Screw in the grinding container up to the stop.
- Check the power supply.

### The lifting motion is blocked:

#### Causes:

- The middle section is dirty.

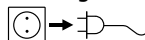
#### Remedy:

- Clean the middle section (see the section entitled „Maintenance and cleaning“).

If this occurs quite often, you should check the seal (item 20), (if necessary, replace the seal as described in the section „Maintenance and cleaning“).

## Maintenance and cleaning

### Cleaning:



Unplug the power cord before all cleaning tasks!

Dirty parts in the pulverization area can be cleaned with a cleaning brush. If there is a heavy accumulation of dirt, the grinding container can be cleaned in a dish-washer. If grinding dust is found in the middle section (the area where pressure spring is located) it can be blown out through the opening with compressed air.

If there is a heavy accumulation of dirt on the guard ring and the middle section can be disassembled as follows (see figure 4).

First, the pulverization tool must be disassembled. (See “Exchanging and replacing the grinding tools”). Then the mill should be placed on the guard ring (item 8) and the two guide screws (item 22) should be opened with a hexagonal socket head wrench.

**Note:** The mill must be held in place by the drive section during the opening process, since the middle section and the drive section are under spring tension as a result of the pressure spring. When both screws have been opened, the drive section can be pulled away from the middle section. The switch block (item 15) remains on the drive section.

The middle section and if necessary the pressure spring can be cleaned in a dishwasher.

The drive section should simply be wiped clean with a moist cloth. Never clean in water or in a dishwasher.

Use only cleaning agents which have been approved by **IKA** to clean the device: Water containing surfactant / isopropyl alcohol.

- Wear protective gloves while cleaning the devices.
- Electrical devices may not be placed in the cleansing agent for the purpose of cleaning.
- Do not allow moisture to get into the device when cleaning.
- If a different cleaning or decontamination method than the method defined by **IKA** is planned, the user must ascertain with **IKA** that this method does not damage the device.

### **Assembly:**

The pressure spring should be inserted into the middle section so that it is held into the guide groove. The guide screws should be screwed in until just after they no longer protrude into the internal diameter of the middle section.

Now the drive section should be set in place so that at first the spring is held in the guide groove and the switch block snaps into the matching opening in the middle section.

For the switch block to engage completely in place, the drive section must be pushed into the middle section up to the lower stop. While the drive sections is inserted about half way into the middle section, the guide screws should be tightened.

**Note:** The switch block must engage flush in the middle section in the assembled state. This should always be checked and if necessary corrected. Finally the desired pulverization tool is assembled.

### **Maintenance:**

If beaters or blades wear out over the course of time, especially as a result of constant grinding of very hard materials, so that rapid grinding with the appropriate quality is no longer possible, you need to replace the worn - out parts. Blades can be resharpened with standard commercially available sharpeners.

**Note:** If blades are sharpened with a grinding machine (wet grinding only is permissible). you should make certain that the same amount of material is removed on all sides. Otherwise the blades will become unbalanced.

If more grinding dust settles into the middle section over the course of time, the seal (item 20) must be replaced.

To do this, you must follow this procedure (see figure 4):

- Disassemble the middle section as described under „Cleaning and maintenance“
- Loosen the three nuts (item 13) with a socket wrench.
- Take out the guard ring (item 8) and remove the seal from the plastic section.

**NOTE:** Before installing the new seal, make certain, that the seal seat is clean and free of dust.

To perform the assembly, place the middle section on its head.

- Insert the seal. Make certain as you do this that you install it in the correct direction
- Now set the O-ring (item 19) in place. Always use a new O-ring.
- Then place the O-ring (item 9) in place, set the guard ring in place and screw it until it is tight.

### **Spare parts order:**

When ordering spare parts, please give:

- Machine type
- Serial number, see type plate.
- Item and designation of the spare parts, see **www.ika.com**.

### **Repair:**

**Please send in device for repair only after it has been cleaned and is free from any materials which may constitute a health hazard.**

For repair, please request the “**Decontamination Clearance Certificate**” from **IKA**, or download printout of it from the **IKA** website **www.ika.com**.

If you require servicing, return the device in its original packaging. Storage packaging is not sufficient. Please also use suitable transport packaging.

## Accessories

A 11.1	Beater 1.4034)	A 11.5	Grinding container 80 ml
A 11.2	Cutting blade (1.4112)	A 11.6	Double beater
A 11.3	Beater (1.4112)	A 11.7	Filling funnel
A 11.4	Grinding container 250 ml		

### Note on grinding beaker A 11.5:

Grinding cup made of Tefzel (ETFE). This fluorine plastic (similar to Teflon) possesses excellent resistance to chemicals and is temperature-resistant from -200°C to +150°C (ideal for direct cooling with liquid nitrogen).

Color and structure flaws on the outside of the beaker are due to manufacturing and do not affect the quality of the beaker.

### The following instructions must be observed when using the large grinding container A 11.4 (effective volume 250 ml):

Use double beater A 11.6 for crushing in grinding beaker A 11.4.

The double beater is screwed onto the drive shaft. Hold the drive shaft in place using a single head wrench a/f 7. Using another single head wrench a/f 7, which is attached to the two flats of the double beater shaft, screw the double beater until it is hand - tight.

Please ensure that the off - drive shaft in the thread area is free from dust and mill feed deposits.

### Filling height:

The maximum filling height, shown in figure 5, must not be exceeded (about 20 mm below the stainless steel upper edge). Otherwise the drive may overheat.

Furthermore, good grinding results cannot be expected (a wide range of granularity). What has been said before also applies here: (for example, only 50 - 80% of the normally filling quantity) are reduced more quickly, the granularity of the final product is finer, the range of granularity is smaller and the heating up of the grinding material is reduced.

### Grinding process:

As the double beater is already immersed in the mill feed when the grinding beaker is being screwed on, it is important that the sample is well shredded (maximum particle size  $\varnothing$  7 mm) so that the grinding beaker can be screwed on properly.

The hardness of the feed product must not exceed 3 Mohs (medium hardness, e.g. calcite), otherwise this will put too much strain on the beater, causing it to wear out quickly.

When you switch on the appliance at the On/Off button, the drive will be pushed down slowly (see section on starting up). Once the grinding process is complete (usually after approx. 30 seconds), raise the drive and switch off the appliance at the On/Off button.



### CAUTION

Wait until the motor stops before unscrewing the grinding beaker.

Do not use liquid nitrogen to cool the sample in grinding beaker A 11.4. You can use dry ice for cooling purposes, however, please ensure that the cooled mill feed does not clump together (this is likely to happen with moist mill feed in particular).

**Note:** If you do not adhere to the maximum fill level and maximum mill feed hardness, the high starting torque of the grinding beaker may cause the grinding beaker to open by up to half a revolution and the analytical mill will switch off automatically.

## Technical data

Design voltage	<b>VAC</b>	220 ... 230 ± 10% 100 ... 115 ± 10%
Frequency	<b>Hz</b>	50 / 60
Power consumption	<b>W</b>	160
Output power	<b>W</b>	100
Motor speed: Idle Under load	<b>rpm</b>	28000 25000
<u>Circumference speed:</u> Idle Under load	<b>m/s</b>	76 53
<u>Effective volume:</u> Grinding container A 11.5 Grinding container A 11.4	<b>ml</b>	80 250
Working time: Short-time operation	<b>min</b>	1 / 10 (1 min. ON / 10 min. OFF)
Safety		Safety switch on the grinding container, temperature limiter in the motor.
Malfunction display		Orange-red glow lights, display of over- temperature and grinding area not closed
Drive		Universal motor

<u>Parts in contact with product:</u> Grinding beaker A 11.5 (80 ml)		Stainless steel 1.4571 (outer shell fluoroplastic ETFE)
Grinding beaker A 11.4 (250 ml)		Stainless steel 1.4571 (outer shell polycarbonate PC)
Rotor shaft		Stainless steel 1.4571
Beater A 11.1		Stainless steel 1.4034 (hardness approx. 52 HRC)
Cutter A 11.2		Stainless steel 1.4112 (hardness approx. 55 HRC)
Beater A 11.3		Stainless steel 1.4112, wolfram - carbide coated (core hardness approx. 58 HRC, surface
Double beater A 11.6		Titanium (plasma nitrited, surface hardness 1200 HV)
Filling funnel A 11.7		Stainless steel 1.4571/PTFE
Permitted ambient temperature	<b>°C</b>	+ 5 ... + 40
Permitted relative humidity	<b>%</b>	80
IP code according to EN 60 529		IP 43
Protection class		II
Excess voltage category		II
Contamination level		2
Noise level	<b>dB</b>	max. 85
Operation at a terrestrial altitude	<b>m</b>	max. 2000
Dimensions (W x D x H)	<b>mm</b>	85 x 85 x 240
Weight	<b>kg</b>	1.5

*Subject to technical changes!*

## Warranty

In accordance with **IKA** warranty conditions, the warranty period is 24 months. For claims under the warranty please contact your local dealer. You may also send the machine direct to our factory, enclosing the delivery invoice and giving reasons for the claim. You will be liable for freight costs.

The warranty does not cover worn out parts, nor does it apply to faults resulting from improper use, insufficient care or maintenance not carried out in accordance with the instructions in this operating manual.