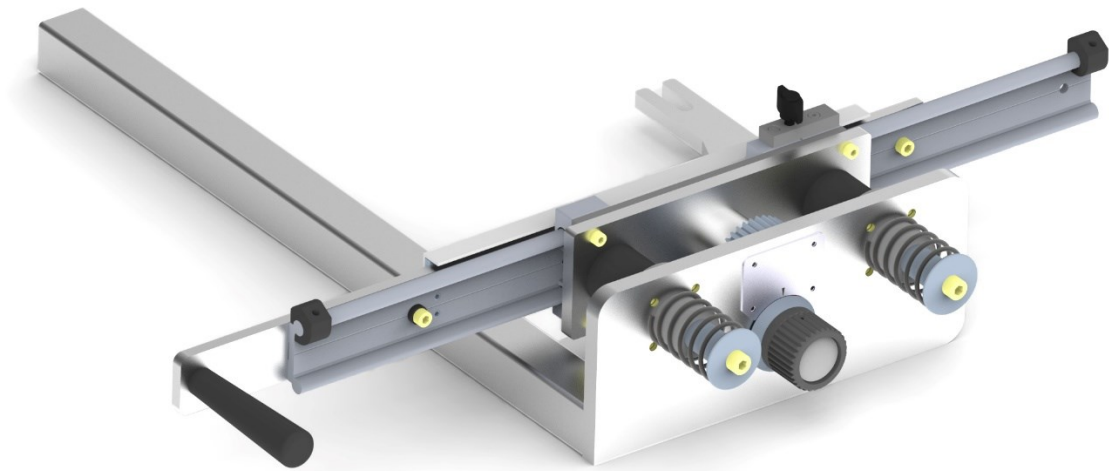


Precision Surface Grinding Attachment

to belt grinder

BS-1



Operators Manual

Version 1.0 (01/2022)

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1 Safety instructions



Before using any attachments, read the operating instructions for the basic machine carefully and follow all the safety instructions given there! Keep all instructions for attachments together with the operating instructions for the basic machine!

ATTENTION: For your own safety, do not attempt to use the machine with these attachments until the machine and attachment are properly installed.

ATTENTION: When using power tools, always follow basic precautions to reduce the risk of fire, electric shock, and personal injury.

1.1 Use personal protective equipment (PPE)



When operating machines, foreign objects can get into your eyes, which can cause serious eye damage. Safety glasses or other suitable eye or face protection must be used at all times.



Use earplugs or ear protection when the machine is in operation.



Non-slip safety shoes are recommended when you operate the machine and handle large workpieces. Be aware that the floor can become wet and slippery when using coolant.



To protect against injury or burns, suitable safety gloves must be worn each time the machine is used.



Use suitable respiratory protective equipment (dust mask, etc.) if dust is generated during processing. Exposure to high concentrations of dust caused by the processing of hardwood, softwood and artificial composite panels can lead to serious damage to health! Find out about the required filter class, depending on the material to be sanded.

1.2 Residual risks

Every machine has residual risks that must be observed for safe operation.

- Risk of injury from hair, jewelry, clothing or parts of the body being trapped between the grinding belt and rollers.
- The running grinding belt can cause injuries and burns if touched!
- Risk of electric shock from touching live parts in the control cabinet!
- Risk of injury from swept away parts and flying sparks!
- Danger of hearing damage from prolonged work without hearing protection!
- Health hazard from dust emissions!
- Risk of injury from incorrectly or insufficiently assembled machine!

These risks can be minimized if all safety regulations are applied, the machine is properly maintained and cared for and the machine is operated as intended and by appropriately trained specialist personnel.

Despite all safety precautions, common sense and your technical suitability / training to operate a machine is the most important safety factor!

2 Technical specifications

Attachment type	Precision surface grinding attachment
Compatible with	BS-1
Workpiece clamping	Permanent magnetic clamping plate, clamping surface 50x300 mm
Grindable surface	50x300 mm
Thickness range for workpiece	0-60 mm
Maximum taper angle	2 mm thickness per 100 mm length (1.1°)
Clamping force of the magnetic chuck	60 kg (full surface and with workpiece thickness > 8 mm)
Permissible grinding belt speed	5-28 m/s
Grinding belt size	50x2000 mm
Main dimensions W x H x D (mm)	670x150x560 mm
Mass	8 kg

3 Description of the attachment

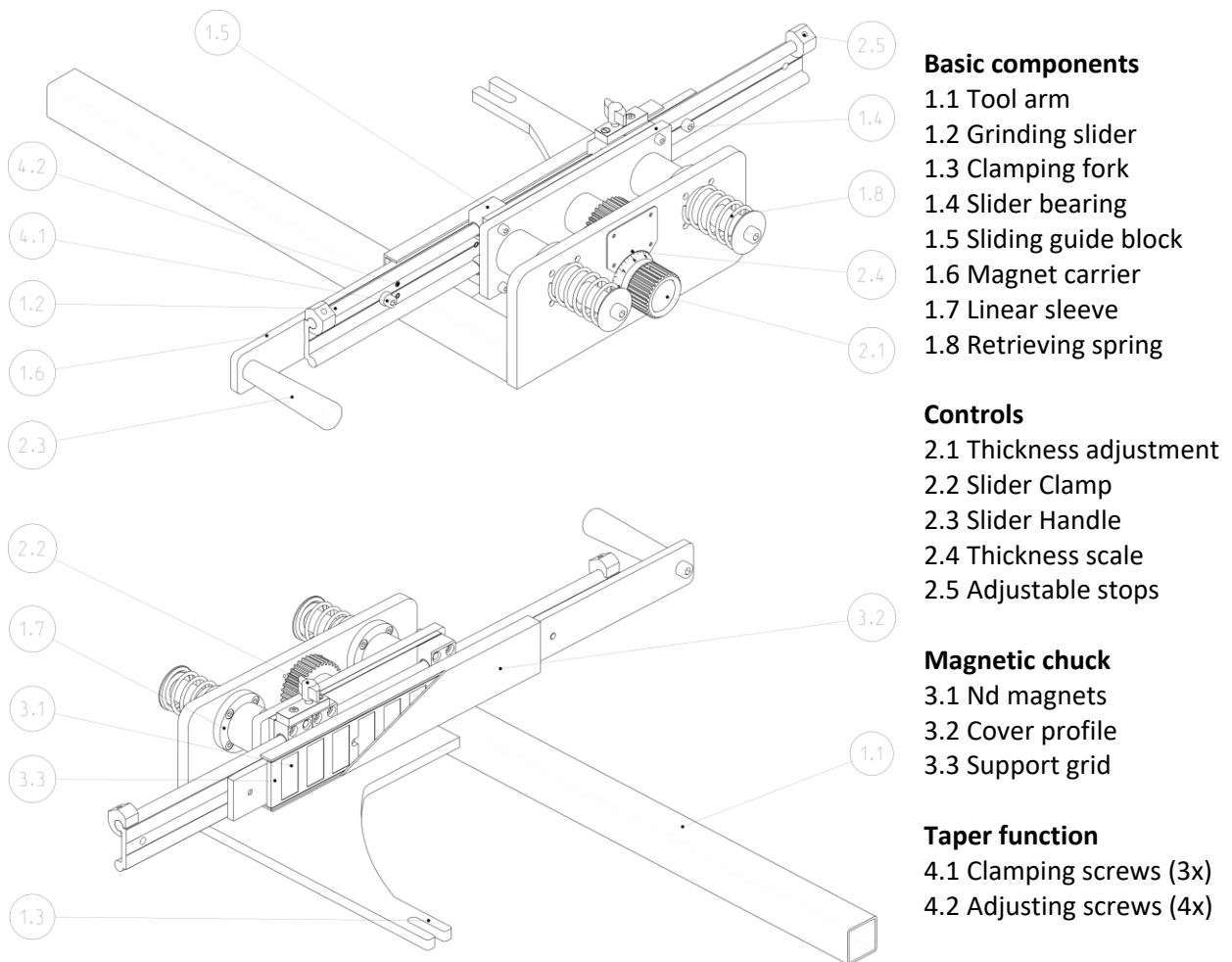
The precision surface grinding device allows workpieces to be processed in a guided manner in order to produce exactly flat and parallel surfaces. A freely movable linear slide and a spindle-equipped thickness feed are available as a guide. The workpieces are clamped using a magnetic clamping plate consisting of permanent magnets behind an aluminum cover. The processing of non-ferromagnetic workpieces is not permitted. A taper function allows blade geometries to be thinned out.

For surface grinding, the device is mounted on the BS-1 belt grinder, which is tilted to the side, using the tilt mechanism. The grinding wheel engaged is the 250mm contact wheel on the machine's motor shaft. In this operating mode, the highest grinding precision is guaranteed.

In addition, the precision surface grinding device can be mounted on the vertical machine and combined with the surface grinding plate and the radius grinder for guided grinding.

Table 1 names the most important components of the device.

Table 1: Parts of the attachment



4 Setup (surface grinding)

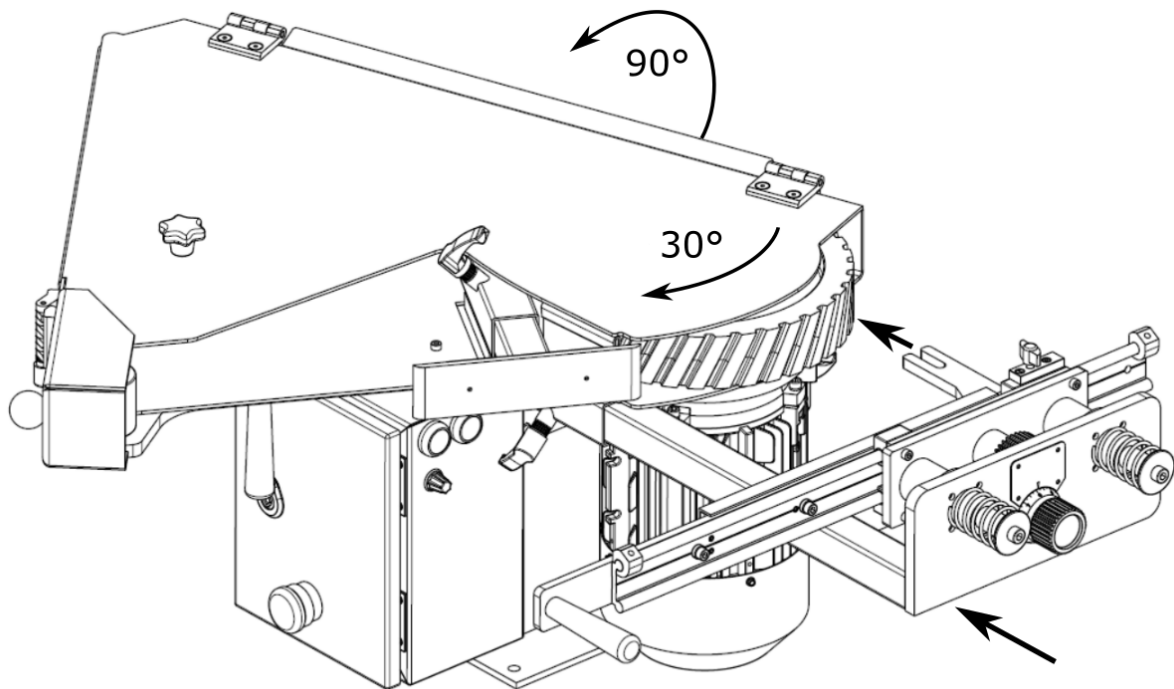
ATTENTION: Before installing the attachment, familiarize yourself with the parts of the basic machine listed in chapter 3 of the operating instructions for the belt grinder BS-1!

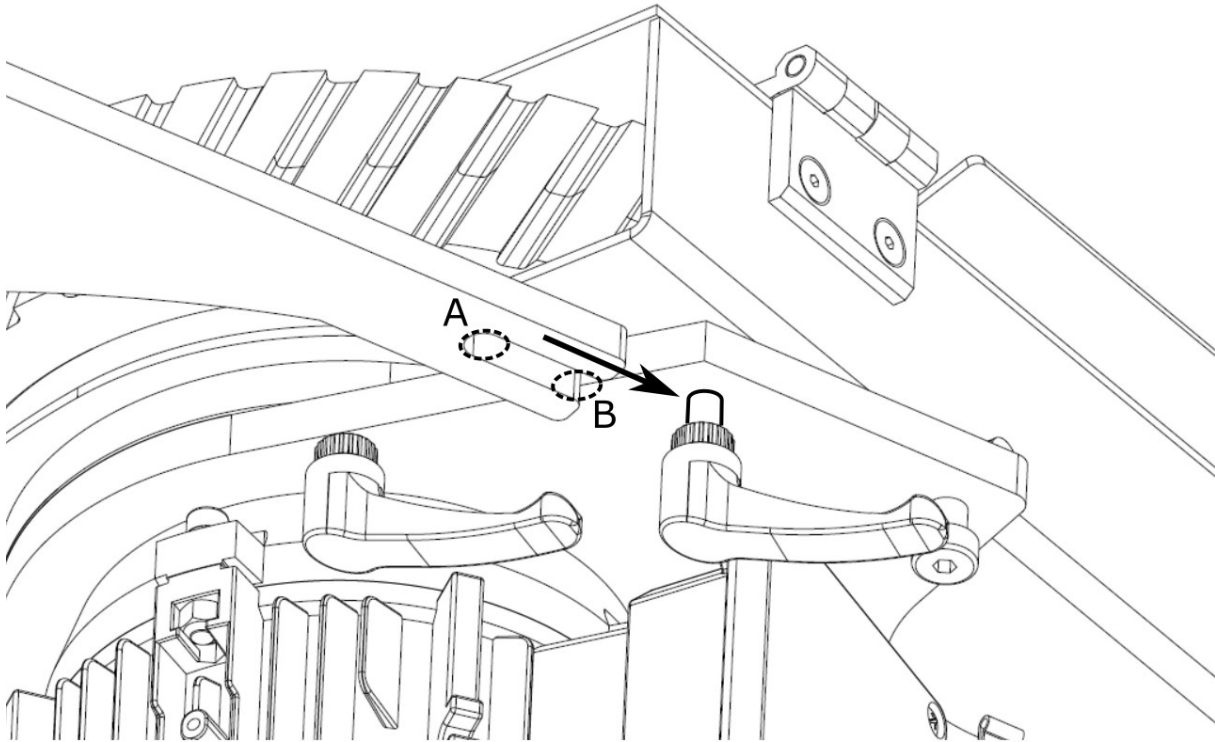
CAUTION! Before installing the attachment, familiarize yourself with its components, which are described in chapter 3!

CAUTION! Only make the following settings when the machine is switched off!

Use the angle adjustment of the BS-1 belt grinder to set the grinding arm to an angle of 30° . Then, turn the machine to the side, using the tilt frame. Clamp the adjustments levers securely.

Place the surface grinding device with the tool arm (>1.1 in Table 1) into the clamping tube for attachments. At the same time, the clamping fork (>1.3) should slide into the clamping lever on the underside of the machine. If the clamping screw hits the base of the clamping fork (position A), a thickness range of 0-30 mm is available for grinding. If the device is positioned so that the clamping screw sits at the beginning of the clamping fork (position B), a thickness range of 30-60 mm is available for grinding. After inserting the device to the desired position, fix both the clamping fork and the tool arm with the clamp levers.





5 Commissioning and use (surface grinding)

5.1 Attaching and detaching the workpiece

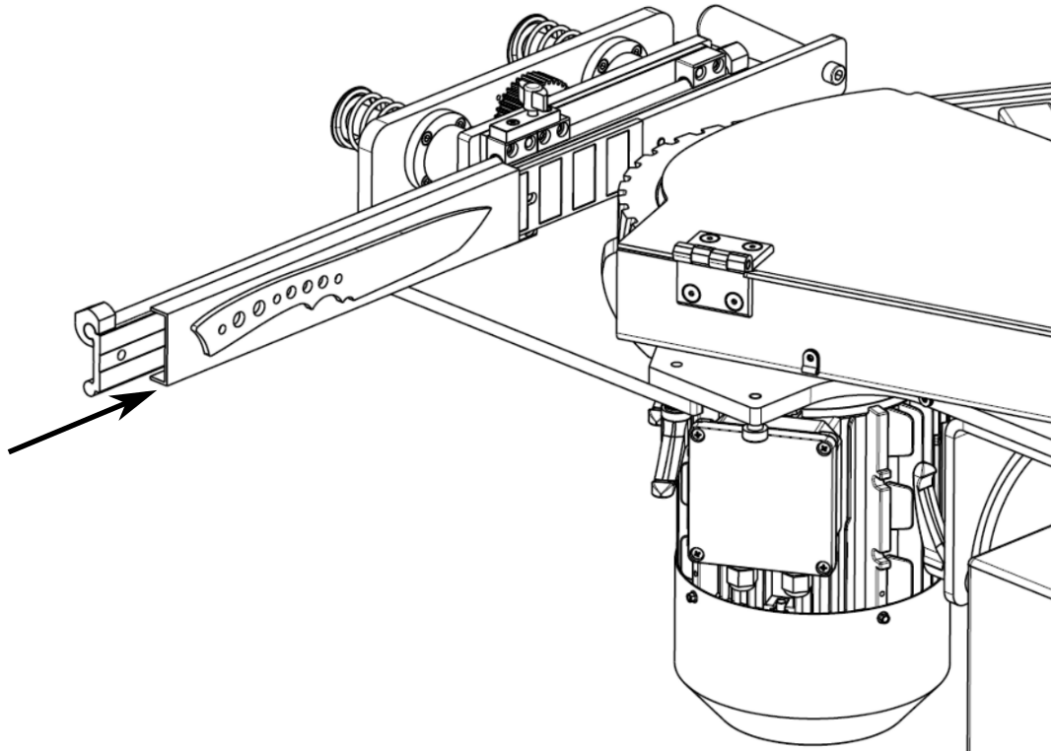
CAUTION! Only make the following settings when the machine is switched off!

CAUTION! For small workpieces or uneven surfaces, the holding force of the magnet can be only a fraction of the nominal force. Only grind workpieces that are securely held on the magnetic chuck. There is a risk of injury from workpieces being carried along!

CAUTION! There is a risk of injury from crushing body parts between the magnetic chuck and steel parts that are suddenly attracted by it! Only use the following procedure to attach or remove the workpiece to or from the magnetic chuck in a controlled manner.

- 1) Clamp the grinding carriage (>1.2) with the carriage clamp provided (>2.2).
- 2) Remove the aluminum cover profile (>3.2).
- 3) Clean the exposed magnets and the support grid (>3.3) from sanding dust.
- 4) Place the workpiece on the cover profile where it is later to be placed on the magnetic chuck.
- 5) Slide the workpiece and cover profile onto the support grid until the support grid is completely covered by the cover profile (see figure).
- 6) Make sure the workpiece is firmly seated on the chuck.
- 7) Release the slide clamp.

To remove the workpiece, proceed in reverse order. Before doing so, remove as much as possible of the sanding dust on the surface of the cover profile in order to avoid excessive contamination of the magnets and the other components of the device.

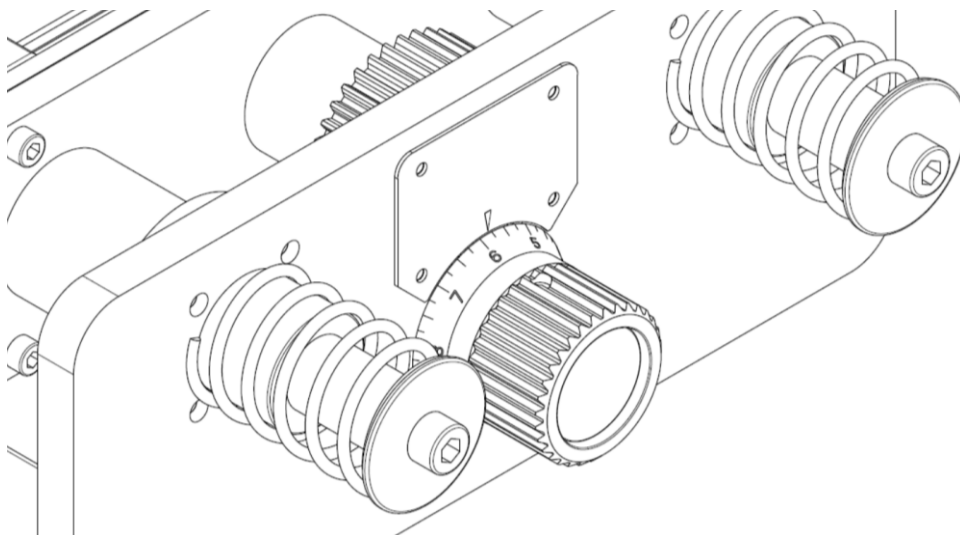


TIP: In order to additionally secure a smaller workpiece, it can be advisable to place (slightly thinner) steel strips next to the workpiece to provide additional support.

5.2 Adjusting the stops

Two stops (>2.5) can be set to limit the slide movement. Set the stops so that there is at least 2 cm clearance on each side of the workpiece during work.

5.3 Thickness adjustment



The thickness adjustment (>2.1) widens or narrows the gap between the workpiece and the grinding belt. One clockwise rotation corresponds to a 1 mm reduction in thickness. A rotation between two numbers on the thickness scale (>2.4) results in a thickness change of 0.1 mm.

5.4 During grinding

CAUTION! Before grinding, make sure that the workpiece is firmly held on the magnetic chuck and that there are no flammable objects in the direction of the sparks!

During grinding, the workpiece is continuously moved past the contact wheel using the slider handle (>2.3), while the thickness adjustment is used to feed it step by step in the thickness direction. Note the following information:

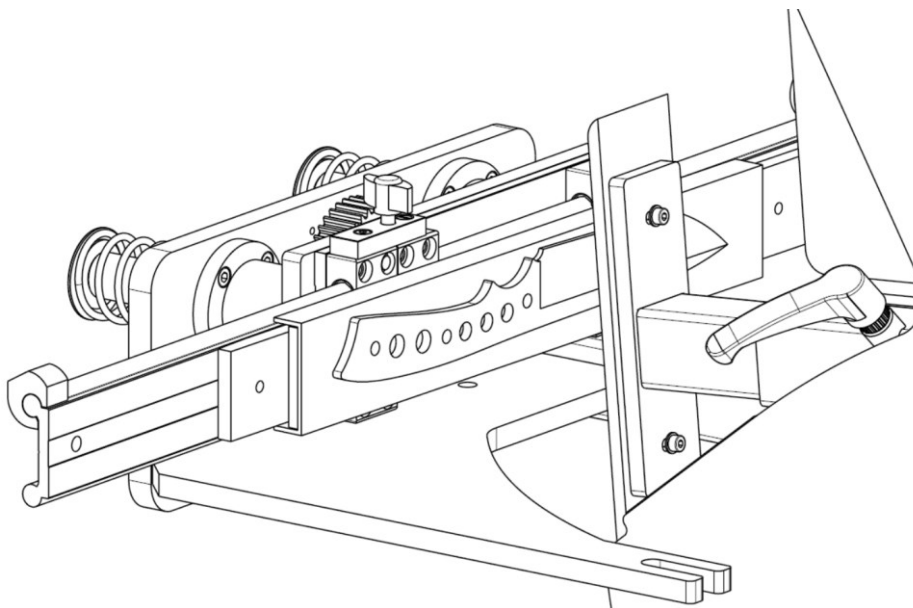
- 1) The sharper, stiffer and coarser the sanding belt, the greater the precision that can be achieved.
- 2) Both the Nd permanent magnets and the holding grid are temperature-sensitive and can be damaged above 80°C. There is excessive heat and grinding pressure when using dull belts. In addition to poor grinding results, overheating can also damage the magnetic chuck. Therefore, only use the device with sharp, fresh belts!
- 3) The thickness reduction per stroke depends on the abrasive used, but should never exceed 0.1 mm.
- 4) At the end of the grinding process, a higher surface quality is produced by "sparking out", i.e. by further grinding without thickness change.

6 Other possible uses

The precision flat grinding device can also be used in other machine configurations for guided grinding. The rules in chapter 5 apply unchanged.

CAUTION! Only make the following settings when the machine is switched off!

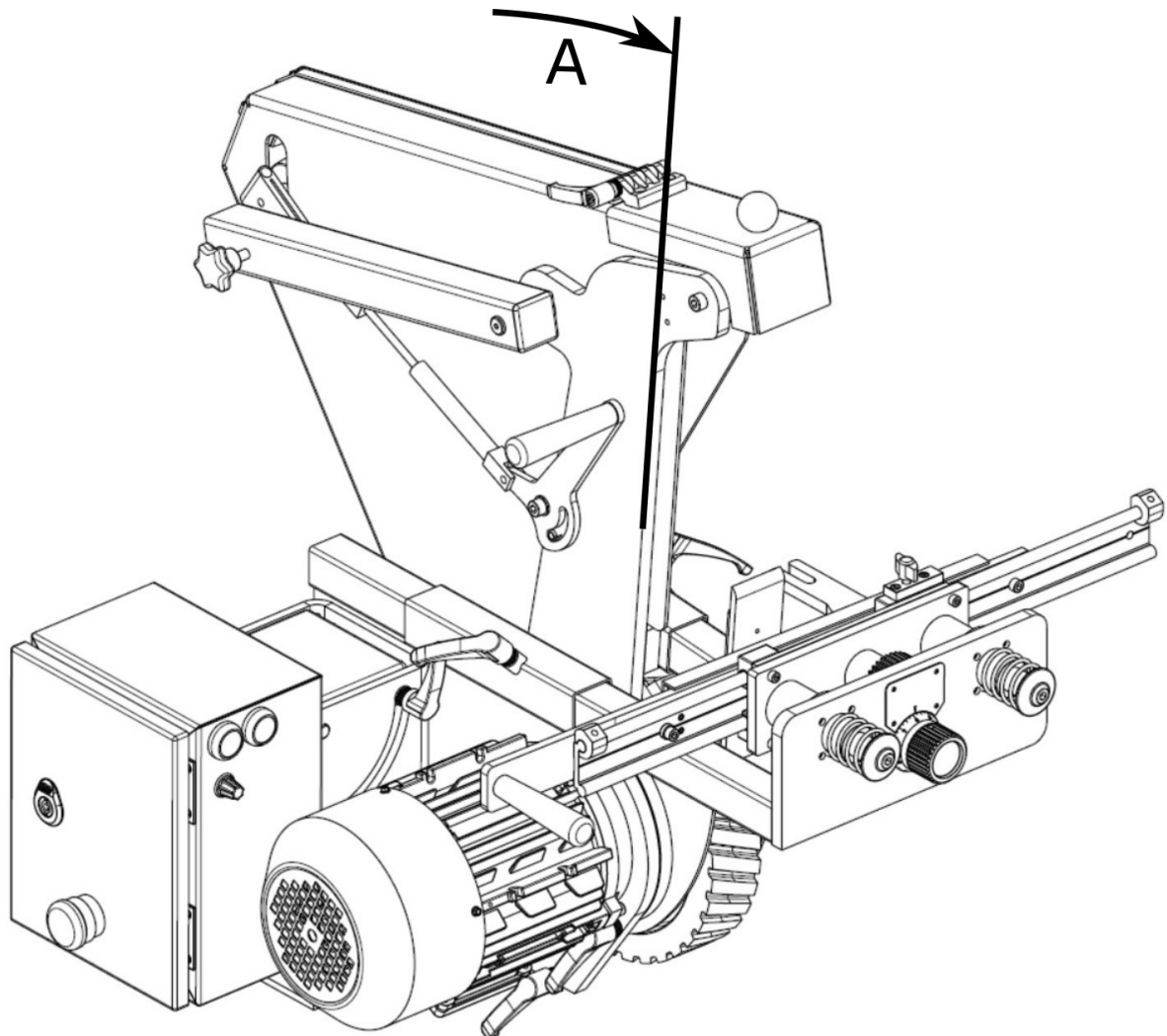
6.1 Combination with surface grinding plate



The combination with the surface grinding plate allows guided bevel grinding of blades using the angle adjustment of the belt grinding machine BS-1. Proceed as shown below. First set the desired bevel angle A using the angle adjustment. Insert the surface grinding attachment as shown. Since the

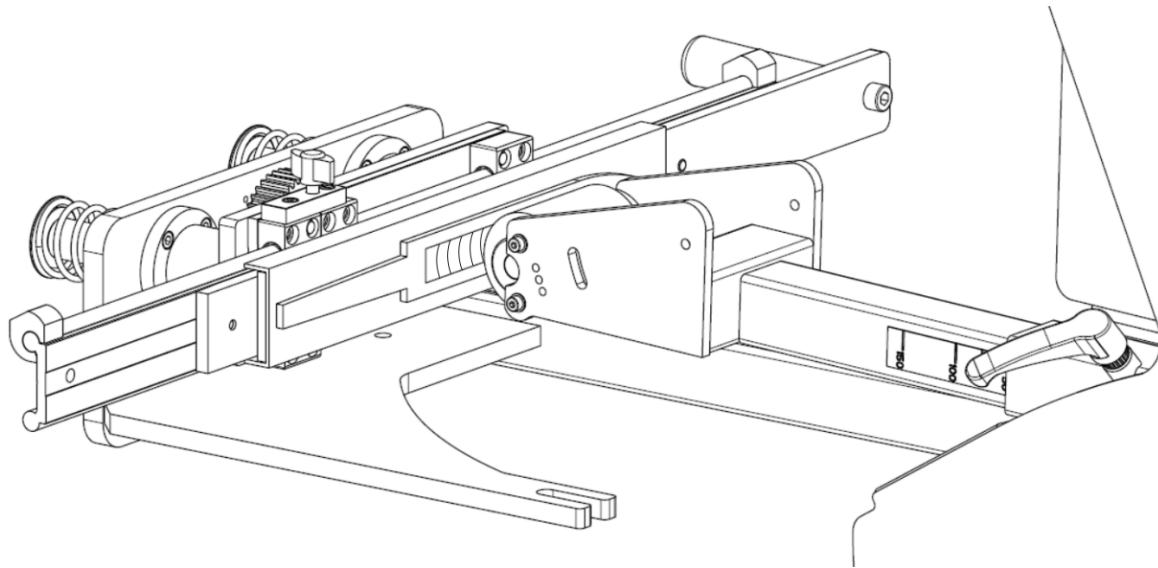
clamping fork of the device is not fastened, the use of the device in this position is less precise and only small infeeds (< 0.05 mm per stroke) should be used.

Please note that due to the absence of the clamping surface, it is not possible to produce a spine-high blade grind on both sides of the blade.



6.2 Combination with the radius grinder

Similarly, the device can be combined with the radius grinder and allows the guided production of fullers. The angular adjustment of the basic machine BS-1 can be used to adjust the height of the radius roller relative to the clamped workpiece.



7 Taper function

With the integrated taper function, blades or other objects can be thinned out along the longitudinal axis, for example to reduce weight or optimize geometry. To do this, an angle is set between the grinding slide (>1.2 in Table 1) and the magnet carrier (>1.6), which is then transferred to the workpiece during subsequent grinding.

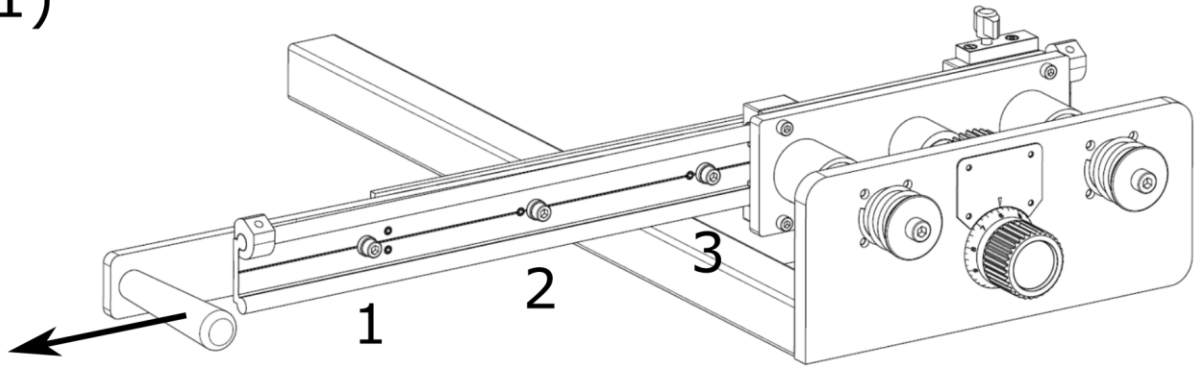
7.1 Setting a taper angle

CAUTION! Only make the following settings when the machine is switched off!

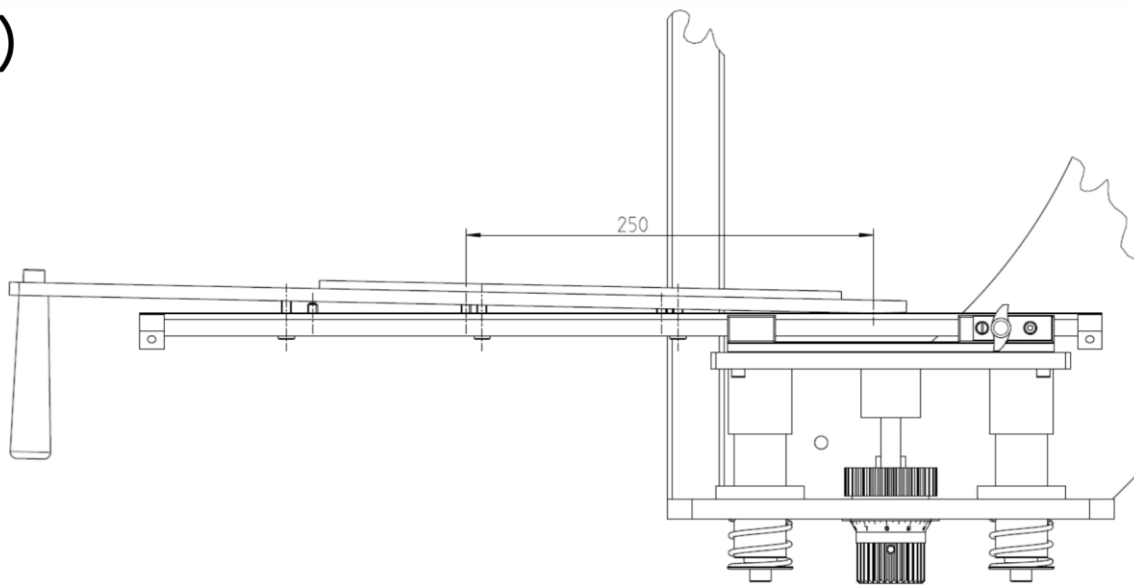
First remove all workpieces from the magnetic chuck and remove the cover profile (>3.2). Clean the grinding carriage if grinding dust has settled. Now follow the steps as per the image below.

- 1) Move the grinding carriage to the leftmost position. It may be necessary to move the adjustable stop. Note that in this position the taper adjustment screws will appear. At positions 1, 2 and 3 there are clamping screws (cylinder head screws, >4.1) and adjusting screws (grub screws, >4.2).
- 2) Loosen the clamping screws at all 3 positions. To set the taper angle:
 - a. Use the adjusting screw in position 2 to push the magnet carrier off the grinding carriage. Make sure that the clamping screws are loosened enough to allow the adjustment without tension.
 - b. The adjusting screw sits 250mm from the pivot point. For example, if you want to set a taper angle of 1 mm per 100 mm, turn the adjustment screw by 2.5 mm or 2.5 turns. The distance can also be measured with a caliper, for example.
 - c. Tighten the clamping screw at position 2 very slightly, without deforming the magnet carrier and grinding slider.
 - d. Now screw in the adjusting screws in positions 1 and 3 until they touch the magnet carrier, but do not deform it any further. There are two adjusting screws at position 1 to additionally stabilize the connection between the magnet carrier and grinding carriage and to prevent twisting.
 - e. At positions 1-3, tighten the terminal screws. Avoid excessive tightening torque.

1)



2)



7.2 Resetting the taper angle

First remove all workpieces from the magnetic chuck and remove the cover profile (>3.2). Clean the grinding carriage if grinding dust has settled. Check the gap between the magnet carrier and the grinding carriage for accumulations of grinding dust and remove them if necessary. Now follow the steps below:

- 1) Open the terminal screws at positions 1-3.
- 2) Back out the adjustment screws at positions 1-3 until they are countersunk in the sanding carriage.
- 3) Tighten the terminal screws at positions 1-3.
- 4) Turn the adjustment screws at positions 1-3 slightly against the magnet carrier to secure the screws from losing.

8 Maintenance and cleaning

The precision flat grinder is maintenance free when cleaned regularly and following the procedures in this manual. The sliding guides (>1.5 in Table 1) are designed for dry running and must not be lubricated with grease or oil, as these lubricants would bind dust and clump together. The same applies to the thickness adjustment gears. Dry cleaning or blowing off with compressed air is permissible.

Make sure that no sanding dust remains under the cover profile of the magnetic chuck and between the magnet carrier and slide guide (e.g. after using the taper device), as this can lead to a reduction in clamping force or a loss of accuracy.

9 Troubleshooting

The following always applies: In the event of faults that pose an immediate danger to people, property or operational safety, stop the machine immediately with the main switch (=emergency stop) and disconnect it from the power supply. Only then try to analyze the problem and, if necessary, contact the manufacturer of the machine. Do not use the machine again until the fault has been rectified.

The following list is to be seen as an attachment-specific supplement to the fault cases in the operating instructions for the basic machine.

Mechanical disturbances	Reason	Solution
Strong heating of the cover profile	Dull abrasives	Only use sharp grinding belts
	High work pressure	Lower thickness reduction per stroke, but faster strokes
No plane-parallel surfaces	Taper device not reset	Reset taper device, if necessary, check for contamination
	Dull abrasives	Only use sharp grinding belts
	Abrasive belt too flexible	Use stiff grinding belt (polyester fabric) for maximum accuracy
	Contamination between magnet and cover profile	Clean, re-clamp the workpiece
Strong chatter marks on the workpiece surface	Contamination between cover profile and workpiece	Clean, re-clamp the workpiece
	The belt joint sticks out	Dull or damaged sanding belt - change belt
Slight chatter marks	Imbalance / runout of the contact wheel	Check wheel, replace if necessary
	Belt joint	Normal, perform out-sparking

Grinding slider moves hardly	<p data-bbox="531 210 643 239">pollution</p> <p data-bbox="531 351 794 380">Slide clamp tightened</p> <p data-bbox="531 425 879 524">Taper device is set under tension, the grinding slider is bent</p>	<p data-bbox="959 210 1385 309">Disassemble the carriage (remove one of the end stops) and dry clean the guide blocks</p> <p data-bbox="959 351 1134 380">Release clamp</p> <p data-bbox="959 425 1366 490">Set up the taper device according to the operating instructions.</p>
vibrations	<p data-bbox="531 560 842 624">Imbalance / runout of the contact wheel</p> <p data-bbox="531 667 692 696">Clamps loose</p>	<p data-bbox="959 560 1366 589">Check wheel, replace if necessary</p> <p data-bbox="959 667 1139 696">tighten clamps</p>

If errors other than those described here occur, please contact the manufacturer! In the event of electrical faults, do not open the control cabinet, there is a risk of fatal injury from electric shock! Maintenance work on electrical components may only be carried out by qualified specialists!