Instruction manual

Manual bending machine

TBS

Contents

1 Safety Regulations

This machine has been constructed according to the state of the art and recognized safety regulations.

However, using the machine entails the risk of injury or death and damage to the machine and other property.

Please comply with the safety regulations contained in this chapter in order to use the machine safely and to ensure trouble-free operation.

1.1 Intended Use

The TBS bending machine for industrial and commercial uses is suited and intended for the following applications:

- Producing folds by bending sheets and other materials such as plastics and non-ferrous metal up to the specified working width and bending capacity in accordance with the technical data.
- The materials must not break and the surface coating must not detach.
- Using the machine in enclosed spaces.
- Using the machine on a subsurface having a sufficient footprint and load-bearing capacity.

1.2 Spare Parts and Accessories

Use only original Schechtl Maschinenbau GmbH spare parts and accessories.

If parts are replaced that are safety-relevant, their proper function must subsequently be checked.

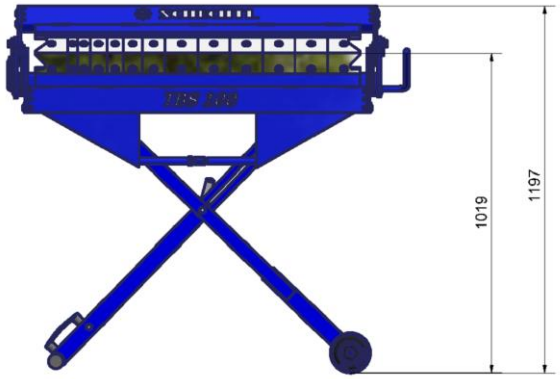
2 Product Description

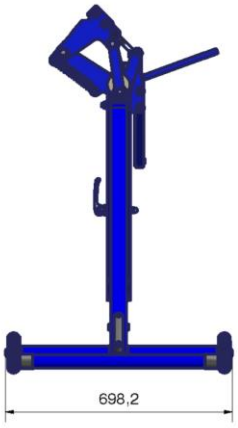
2.1 Delivery Contents

The actual delivery contents may vary, depending on the machine design. See the delivery slip for a detailed listing of the delivery contents.

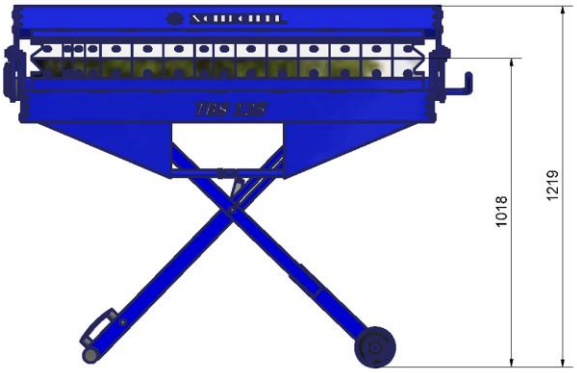
2.2 Technical Data

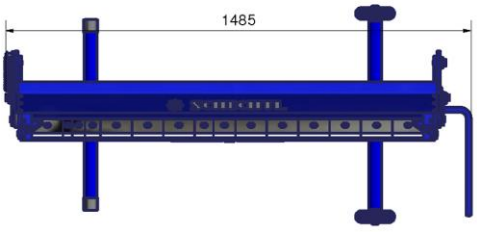
TBS 100





TBS 125





Info

The machine is shipped without an X-frame.

In addition to the X-frame, a large variety of accessories are available for the machine. The accessories can also be further ordered at any time through your country's Schechtl representative.

	Model TBS					
	100	125				
Working width and bending capacity						
Working width (mm)	1000	1250				
Bending capacity (mm)						
■ Steel (400 N/mm^2)	0.63	0.3				
■ Aluminum (250 N/mm^2)	1.0	1.0				
■ Copper (300 N/mm^2)	0.8	0.8				
Segmentation						
	5 x 100 mm			8 x 100 mm		
	2 x corner pieces 100 mm			2 x corner pieces 100 mm		
	1 piece each: 30 mm, 40 mm, 60 mm, 70 mm			1 piece each: 30 mm, 40 mm, 60 mm, 70 mm		
	2 x 50 mm			1 x 50 mm		
Dimensions and weight						
Length (mm)	1250	1500				
Width (mm)	300	300				
Depth, with X-frame (mm)	700	700				

	Model TBS					
	100	125				
Height, with X-frame (mm)	1150	1219				
Weight (kg)	50	85				
Weight of the segments (kg)	approx. 10	12				
Weight of frame feet (kg)	approx. 10	12				
Weight of X-frame (kg)	approx. 17	approx. 17				
Weight of roller shear (kg)	approx. 3	approx. 3				

Operating environmental conditions

Temperature range	5°C – 40°C
Humidity	5% – 80%; non-condensing
Other requirements	Dust- and splash-free environment Ambient air free from aggressive substances (e.g. salt water, abrasive dust, gases, etc.)

Sound intensity level

Equivalent continuous sound intensity level:	< 70 dB (A) *

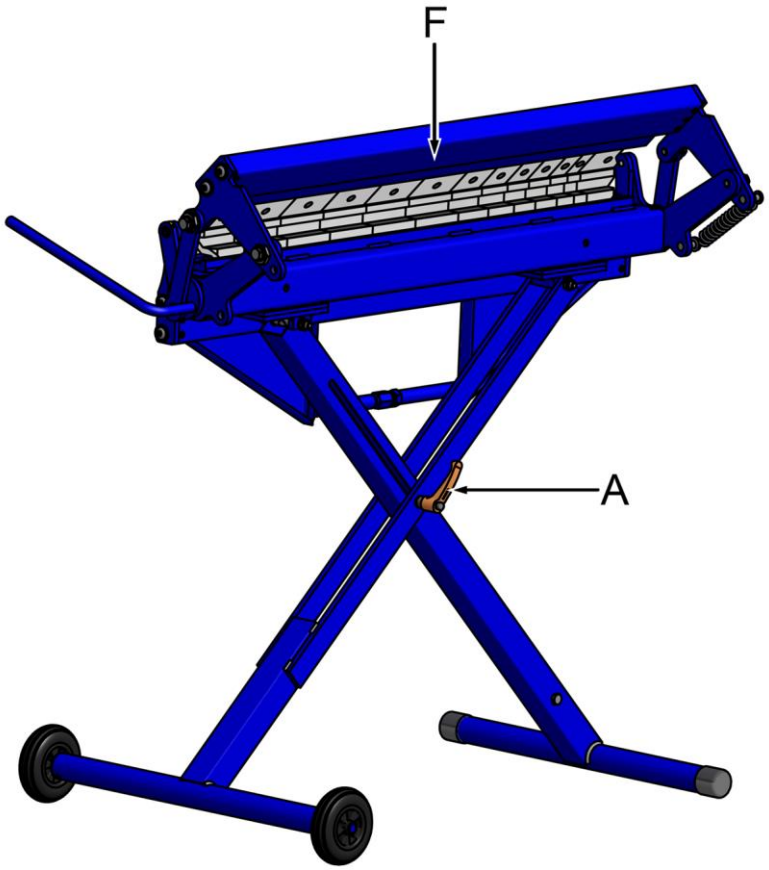
* The specified level may be exceeded if the workpiece to be bent drops onto an undesirable surface. Measure the actual continuous sound intensity level at the machine operation location under the existing conditions. Take protective actions for personnel if needed.

3 Design of the Machine with X-frame

Info

The machine is shipped without an X-frame.

In addition to the X-frame, a large variety of accessories are available for the machine. The accessories can also be further ordered at any time through your country's Schechtl representative.



WARNING

When opening and collapsing the X-frame, crushing and shearing points occur in the lower machine area.

There is a risk of body parts being crushed, possibly causing injuries or property damage.

- Proceed with caution when opening and collapsing the X-frame.
- Do not reach into the X-frame while opening or collapsing it.

Opening up the X-frame

1. Loosen the clamping lever (A) a few turns.
2. Grasp the clamping beam (F) and pull the machine upward.
3. Retighten the clamping lever (A).

Collapsing the X-frame

1. Loosen the clamping lever (A) a few turns.
2. Fold the bending beam upward and press the clamping beam (F) downward.
3. Retighten the clamping lever (A).

4 Operation

4.1 Operational Safety Guidelines

- The machine may be used only for the intended purpose.
- Maintain a minimum distance of 500 mm between the moving machine parts or workpiece(s) and stored material or other constraints. See DIN EN 349.
- Report and repair any defects or damage to the machine or the protective equipment immediately.
- Never perform cleaning or maintenance while the machine is in operation.
- Do not set any objects in areas where they might impede proper machine function.
- Do not perform any activities that might compromise personal safety, affect the environment, or damage the machine.
- Do not use any support materials for bending. Use only Schechtl Maschinenbau GmbH tools.
- Open the clamping beam only as wide as necessary to protect against encroachment into the clamping area.
- Keep hands away from the bending area while the workpiece is being bent.

Personnel operating the machine must:

- wear protective shoes,
- wear protective gloves,
- not wear loose clothing necklaces, neckties, or jewelry.

DANGER

Parts ejected during bending.

During bending, the workpiece may be ejected. Severe injuries to the body and face can occur.

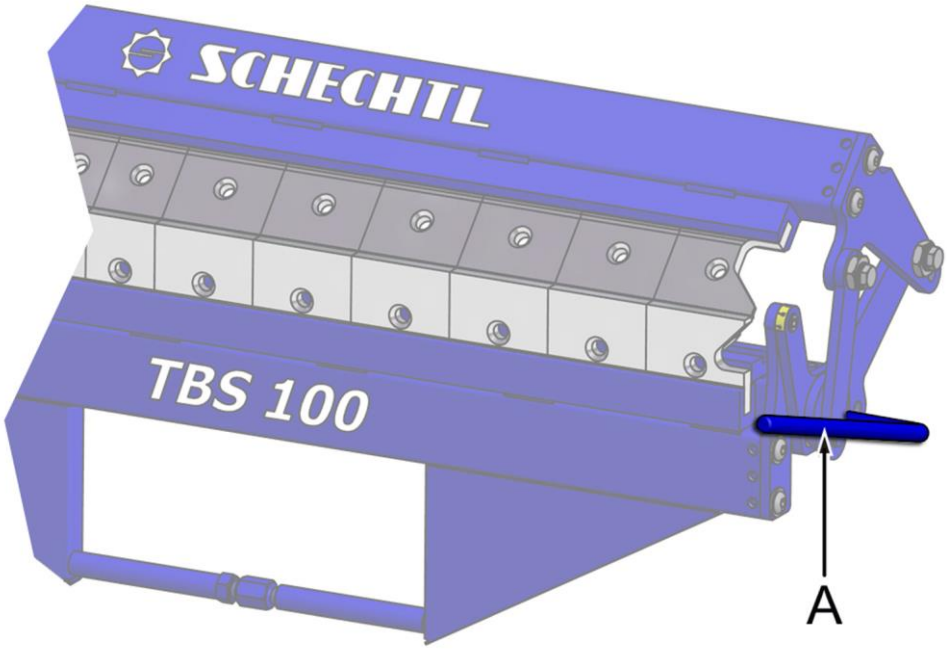
- Always clamp the workpiece properly.
- Work carefully when inserting the workpieces.

4.2 Bending a workpiece

Info

Position workpieces that do not extend over the entire working length in the center of the machine.

For bends up to 90°, always lower the bending beam by at least the material thickness S.



1. Completely open the clamping beam using the operating lever (A).
2. Place the workpiece on the segments of the lower beam.
3. Completely close the clamping beam using the operating lever (A) and bend the workpiece.

5 Maintenance and Adjustment

5.1 Maintenance and Adjustment Safety Guidelines

- Follow the maintenance intervals as described in the maintenance plan.
- Use only Schechtl Maschinenbau GmbH original spare parts.
- Unauthorized modifications or changes to the machine affect its safety and are not permitted. This also applies to welding on load-bearing parts.
- Use only working materials that meet the requirements of Schechtl Maschinenbau GmbH.
- Secure the working area. Use barrier tape and warning signs.
- Never leave the working area unattended.
- Always tighten loose screw connections.
- Ensure that no tools or other items remain in or on the machine after maintenance work has been completed.
- Ensure that working materials, other materials, and spare parts are disposed of safely and in an environmentally friendly manner.

5.2 Cleaning

Soiling shortens the machine's service life. Clean the machine regularly and properly and keep the working area clean.

5.2.1 Cleaning Agents

CAUTION

Unsuitable cleaning agents may damage the display, cable, and machine surface.

This could cause irreparable machine damage.

Never clean the machine with the following cleaning agents:

- Lyes or acids,
- Abrasive cleaners,
- Glass cleaners,
- Steel wool,
- Volatile solvents (such as benzine),
- Razor blades, scrapers, or other sharp objects.

5.2.2 Cleaning the Machine

Info

Do not use compressed air to remove impurities, as particles will be blown into the guide rails and bearings.

Use a vacuum cleaner instead.

- Keep the rails clean and make sure that they are firmly seated.
- Keep operating elements dry and free from oil and grease.

Cleaning the machine daily

- Remove product residues from the working area.

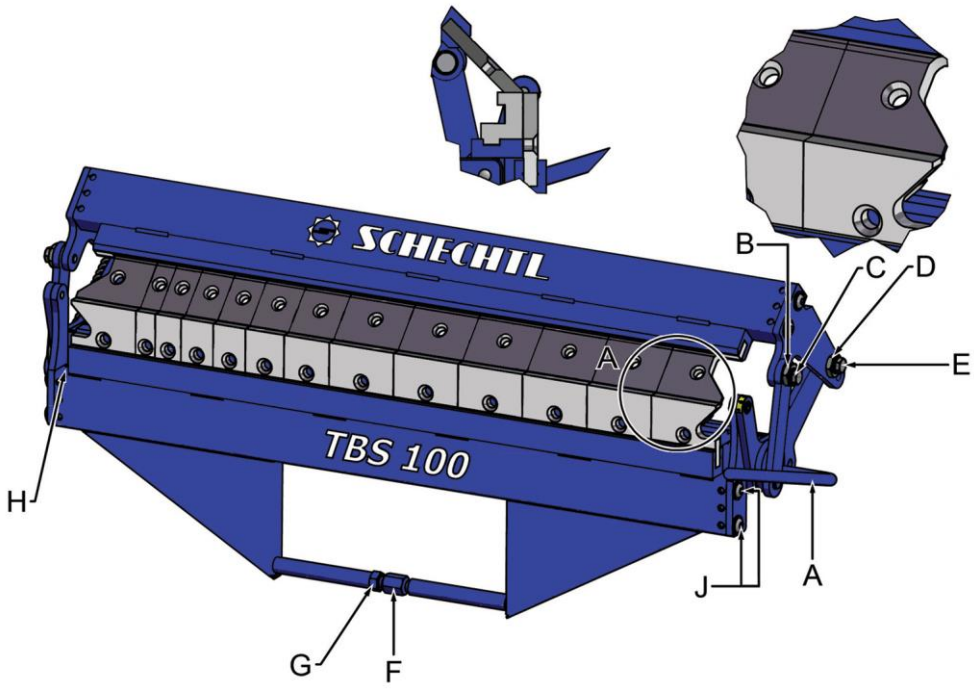
Cleaning the machine monthly

1. Clean the machine thoroughly using a brush and vacuum cleaner.
2. Mix warm water with a small quantity of mild household cleaner. Moisten a clean, soft, fiber-free cleaning cloth with the liquid.
   Use the cloth to clean all machine surfaces.
3. Maintain all metal surfaces using suitable products.

5.2.3 Performing a Simple Check and Visual Inspection

1. Check the cleanliness of the machine and clean it if necessary.
2. Check the machine for damage or changes. Some of these changes may include:
   - Unusual odors,
   - Unusual noises,
   - Unusual vibration,
   - Unusual speed,
   - Change in the appearance of the machine or protective equipment.
3. Report damage or changes immediately to the operating company. Take corrective action and stop the machine if necessary.

5.3 Performing adjustments



A - Operating lever

B - Adjusting cam (wrench size 30 mm)

C - Clamping screw (wrench size 19 mm)

D - Adjusting cam (wrench size 30 mm)

E - Clamping screw (wrench size 19 mm)

F - Crown bolt (wrench size 24 mm)

G - Lock nut

H - Adjustment screw

J - Clamping screw

5.3.1 Inserting segments

Info

All required segments are included in the delivery scope in a separate case.

The segments of the bending have a right-angled work surface.

The segments of the clamping beam have an angled clamping surface, with the bending radius on the front side.

The segments of the bending beam and clamping beam have a handle bore to provide for easy removal.

All handle bores have a chamfer on one side. When inserting the segments, ensure that this chamfer is located on the visible side.

- Insert the segments of the lower beam with the tongue in the lower beam groove.

- Insert the segments of the bending beam and clamping beam with light pressure into the bending beam or, respectively, clamping beam, and safeguard them against falling out with a spring-loaded piece.

5.3.2 Adjusting the Clamping Beam Clamping Pressure

Info

Adjust the clamping beam clamping pressure so that

- the workpiece no longer moves and
- the clamping beam can be easily closed with the operating lever (A).

1. Completely open the clamping beam using the operating lever (A).
2. Place the workpiece on the segments of the lower beam.
3. Completely close the clamping beam using the operating lever (A).
4. If the clamping beam does not close completely, loosen the locking screws (C) on the left and right sides.
5. Adjust the clamping beam clamping pressure on the left and right sides with the adjusting cam (B).
6. After adjusting the clamping beam clamping pressure, tighten the clamping screws (C) on the left and right sides.

5.3.3 Adjusting the lowering of the bending beam

Info

For bends up to 90°, **always** lower the bending beam by at least the material thickness S.

When bending, ensure that the clearance between the segments of the bending beam and the segments of the clamping beam is at a minimum the material thickness S.

The position of the pivot point corresponds to the contact surface of the lower beam segments.

- Loosen the locking screws (J) on the left and right sides.
  - ✔ Turning the adjustment screw (H) clockwise reduces the distance to the pivot point.
  - ✔ Turning the adjustment screw (H) counterclockwise increases the distance to the pivot point.
- After adjusting the bending beam, tighten the two clamping screws (J) on the left and right sides.

5.3.4 Adjusting the clamping beam to the bending beam

Info

For an exact bending result, adjust the segments of the clamping beam to be parallel to the segments of the bending beam.

1. Loosen the locking screws (E) on the left and right sides.
2. Adjust the position of the clamping beam on the left and right sides using the adjusting cam (D).
3. After adjusting the clamping beam to the bending beam, tighten the clamping screws (E) on the left and right sides.

5.3.5 Adjusting the Bending Beam Pretension

The bending beam has an apparatus for adjusting the pretension into the bending beam. The bending result can thus be adjusted to changing material thickness.

CAUTION

Incorrect adjustment may damage the machine.

This could cause irreparable machine damage.

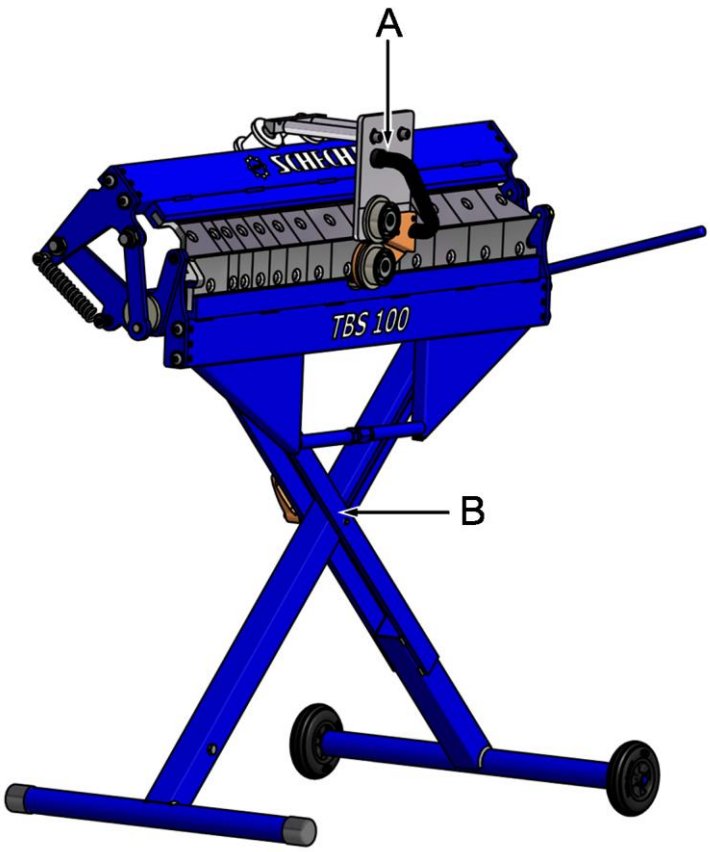
- Do not pretension the bending beam by more than 0.5 mm.
- The bending beam should extend max. 0.5 mm higher in the center than on the outside.

- Loosen the lock nuts (G) on the left and right sides.
  - ✔ Turning the crown bolts (F) clockwise increases the pretensioning.
  - ✔ Turning the crown bolts (F) counterclockwise decreases the pretensioning.

6 Optional Accessories

6.1 Notes

Optional accessories are available for our machine that are not included in the standard machine delivery contents. Items may be listed here that are not part of your machine design. See the bill of delivery for a detailed listing of the delivery contents.



A – Roller shear **B – X-frame**

6.2 Roller shear

Info

When cutting workpieces with the roller shear, material tension develops on the cutting edges, which may cause deformations on the working plate if further work is performed.

This material tension is caused by the cutting procedure with the roller shear, and cannot be avoided.

Maximum cutting capacity:

- 0.8 mm for steel plates,
- 1.0 mm for copper plates,
- 1.0 mm for aluminum plates,
- 0.5 mm for vanadium steel plates.

1. When cutting soft or greasy materials (e.g. copper and aluminum), lubricate the upper and lower blades with petroleum or emulsion lubricant. This prevents residues of these materials from adhering to the cutting edges and damaging them.
2. The blades should overlap by approx. 0.4 mm. This distance can be adjusted using the two shear blade eccentric hubs.
3. Adjust the entire carriage to the correct cutting height using the two elongated holes. The blade cutting height should lie exactly on the centerline of the clamped sheet.
4. If the roller shear moves outward while cutting, the blades must be readjusted. Adjust the blades such that they have a small lead and run inward.
5. When exchanging the blades, make sure that the cutting clearance between the upper and lower blades is exactly 0.15 mm.

Resharpening the roller shear blades

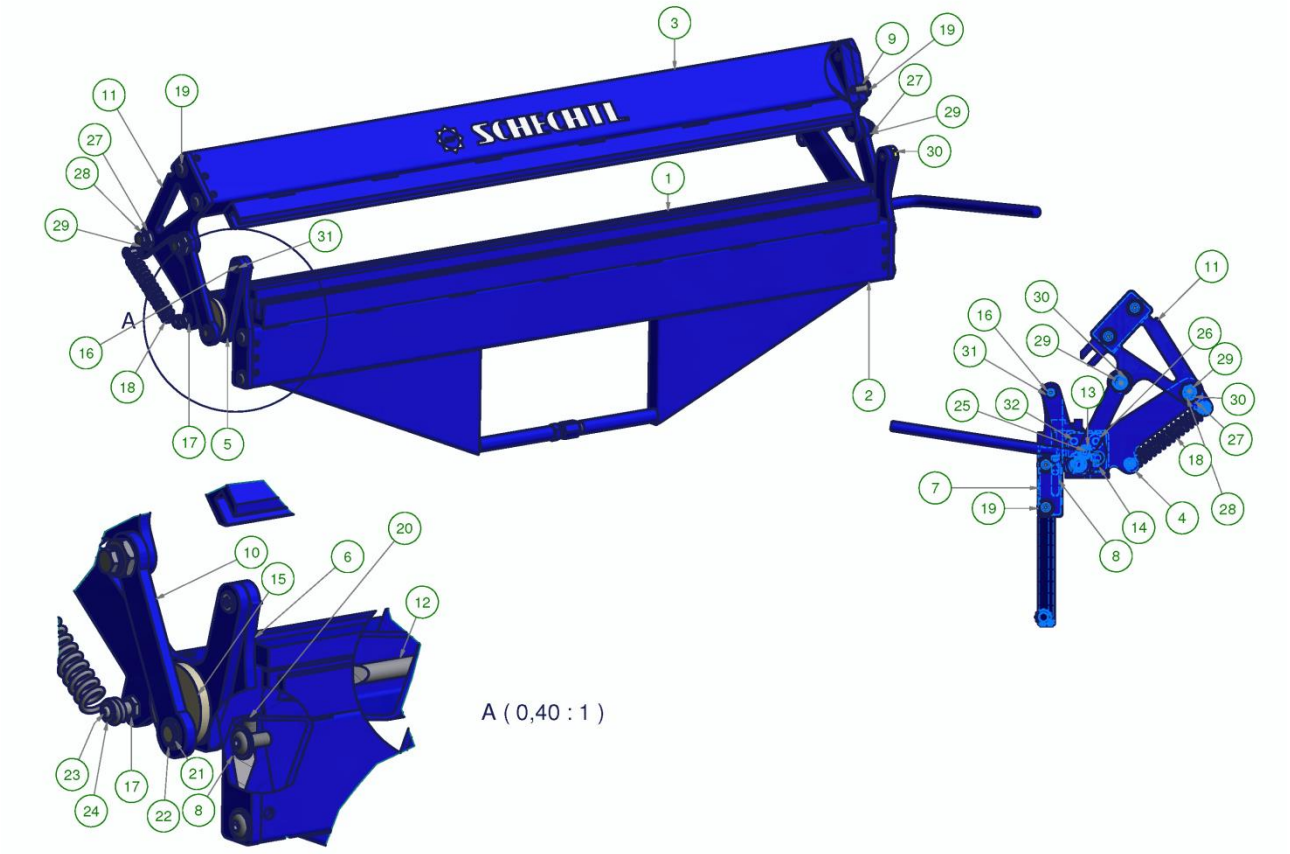
USE CAUTION WHEN SHARPENING THE HIGH-PERFORMANCE CRK 12-QUALITY BLADES!

Improper resharpening reduces the blade life span and diminishes the quality of the cut workpieces.

This may result in irreparable damage to the blades and the workpieces.

- Use only grinding segments or grinding rings with the following specifications: bond: bakelite; grain size: 40 - 60 (special fused alumina); hardness: F-G for CRK 12 quality.
- Grinding segment and cup wheel rotational speeds: 18 - 20 m/sec.
- Table speed: 20 - 25 m/min.
- Roughen the grinding segments or grinding rings regularly.
- Grinding feed 0.01 - 0.02 mm.
- Stop the feed when grinding the blades.
- Apply heavy cooling to the blade grinding area to prevent grinding cracks caused by excessive heat generation (minimum quantity 150 l/min.)
- Do not perform dry grinding!

Mechanical spare parts



Item No.	Quantity	Part No. TBS 100	Part No. TBS 125	Designation
1	1	1110-2070	1112-2070	TBS lower beam
2	1	1110-2060	1112-2060	TBS bending beam
3	1	1110-1080	1112-1080	TBS clamping beam
4	1	1100-2086		TBS support apron, right
5	1	1100-2085		TBS support apron, left
6	1	1110-2065	1112-2065	Bending support apron TBS, left

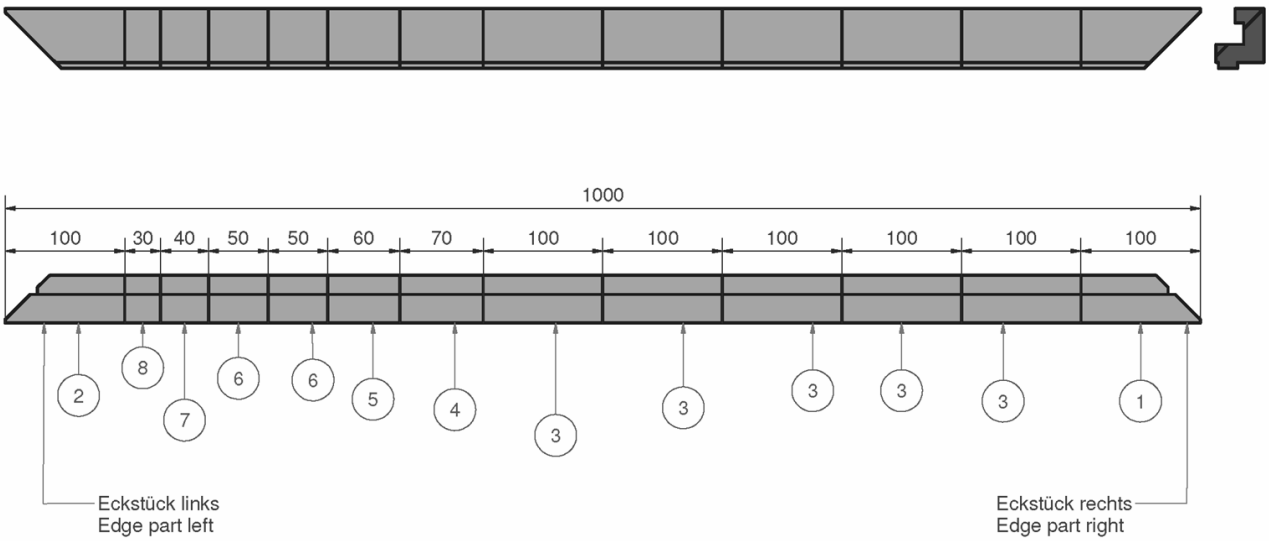
Item No.	Quantity	Part No. TBS 100	Part No. TBS 125	Designation
7	1	1110-2064	1112-2064	Bending support apron TBS, right
8	2	1110-2078		TBS bending support stabilizer
9	4	1110-2067		Fixing sleeve TBS
10	2	1110-2077		Clamping beam pull rod TBS
11	2	1100-2088	1112-2088	TBS upper support apron
12	1	1110-2013	1112-2013	Eccentric shaft TBX
13	2	0220-1612		Collared bushing BB1612DU
14	1	1110-2115		Eccentric disk, right TBX kp.
15	1	1110-2114		Eccentric disk, left kp.
16	2	0002-1212		Bending beam bolt M12x11
17	2	1100-2091		TBS spring bolt
18	1	1110-2044		Clamping beam tension spring
19	8	0067-1225		Hex socket round head bolt
20	2	0044-1225		Hex socket grub screw with frustum
21	2	0163-1610		Retaining ring DIN 471 -D16x10
22	2	0147-1605		Shim, d26xd16x0.50
23	2	0067-0610		Hex socket round head bolt
24	2	0144-0616		Washer Ø6
25	1	0028-0816		Countersunk screw ISK,DIN 7991 - M8x16
26	4	0028-1220		Hex socket head screw with countersunk head

Item No.	Quantity	Part No. TBS 100	Part No. TBS 125	Designation
27	4	1110-2025		Cam 2 mm, model TBX
28	4	0140-1325		Disk
29	4	0034-1235		Hex-head bolt, DIN 933 - M12 x 35
30	4	0220-2010		Plain bearing socket DU 2010 - 23/20/10
31	4	0220-1610		Plain bearing socket 1610 DU- 18/16/10
32	4	0101-1225		Cylinder pin

TBS 100

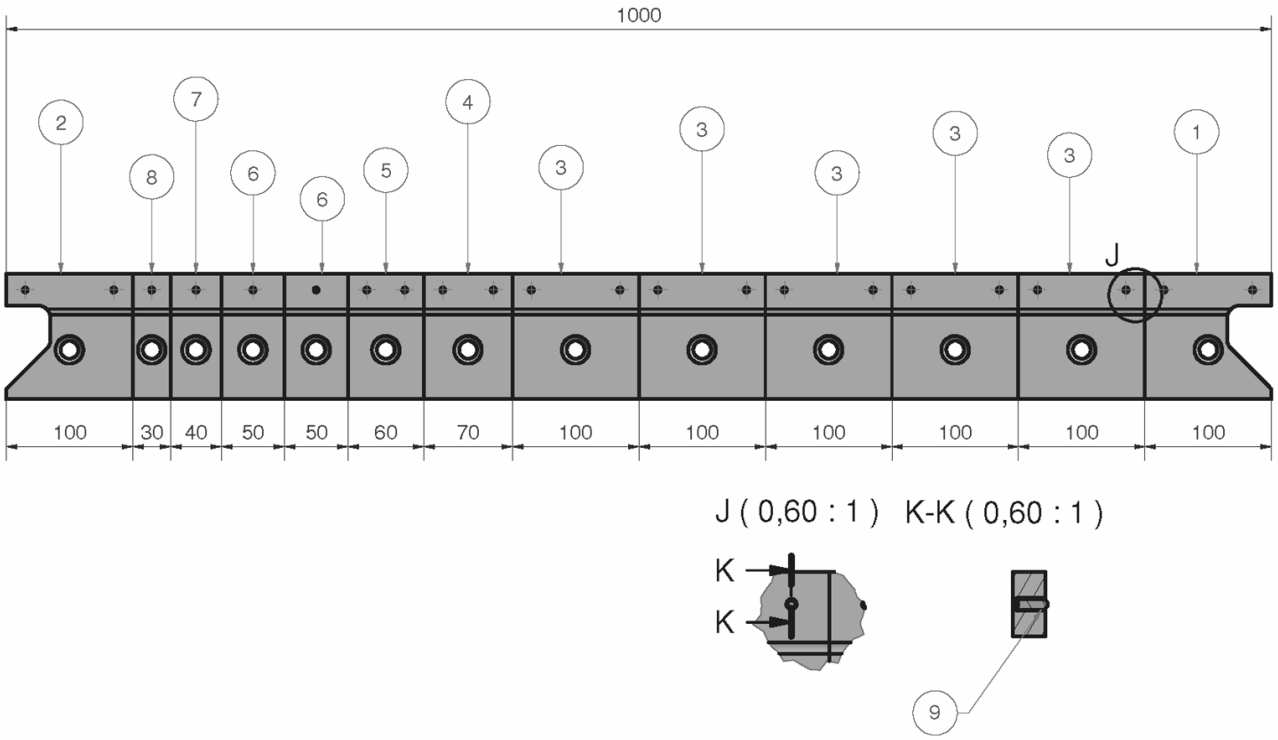
Part No. of all 3 segment sets, complete in the transport case = 1110-2999

Part numbers - lower beam segments (Part No. 1100-2699 = kp. set)



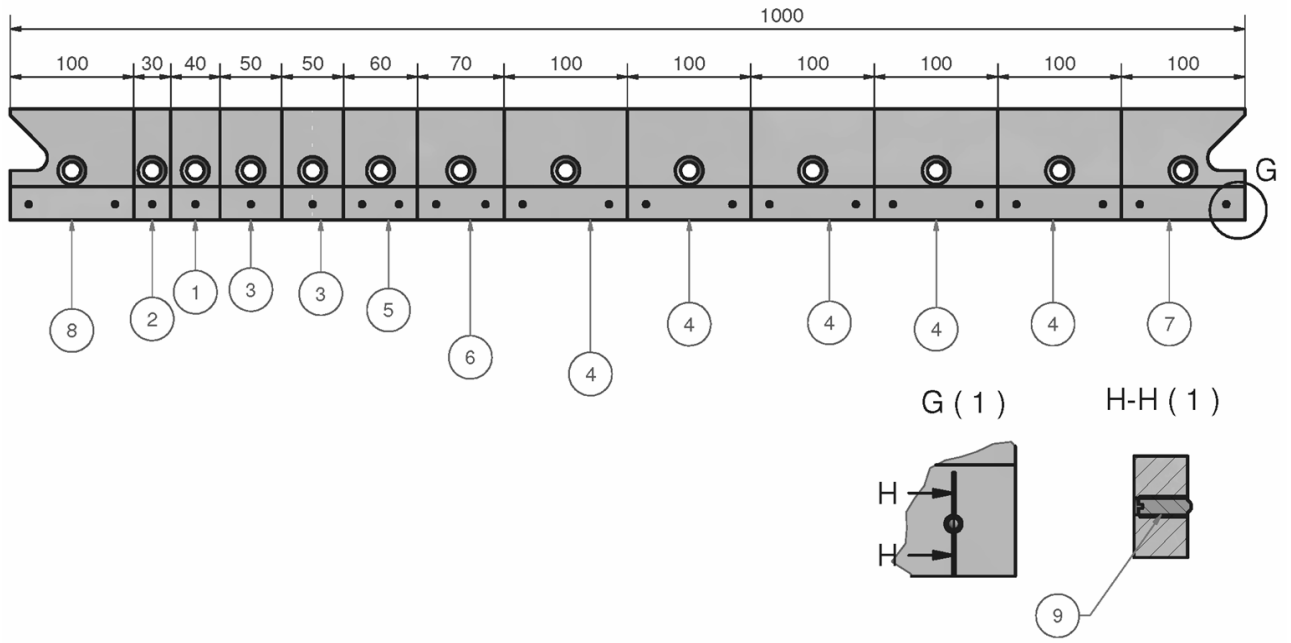
Item No.	Quantity	Part No.
1	1	1100-2612
2	1	1100-2611
3	5	1100-2610
4	1	1100-2607
5	1	1100-2606
6	2	1100-2605
7	1	1100-2604
8	1	1100-2603

Part numbers - clamping beam segments (Part No. 1100-2599 = kp. set)



Item No.	Quantity	Part No.
1	1	1100-2512
2	1	1100-2511
3	5	1100-2510
4	1	1100-2507
5	1	1100-2506
6	2	1100-2505
7	1	1100-2504
8	1	1100-2503
9	-	1100-0512

Part numbers - bending beam segments (Part No. 1110-2899 = kp. set)

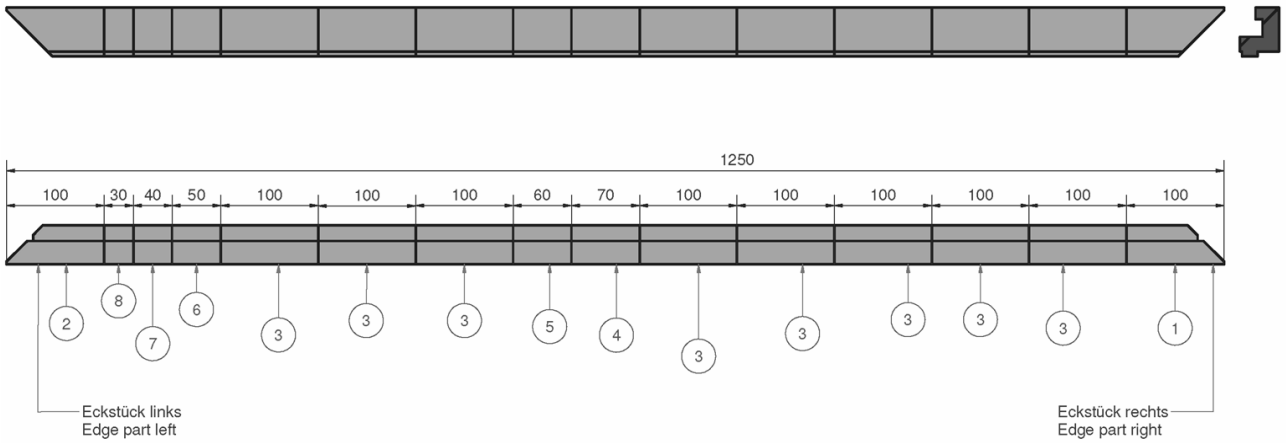


Item No.	Quantity	Part No.
1	1	1100-2804
2	1	1100-2803
3	2	1100-2805
4	5	1100-2810
5	1	1100-2806
6	1	1100-2807
7	1	1100-2811
8	1	1100-2812
9	-	-

TBS 125

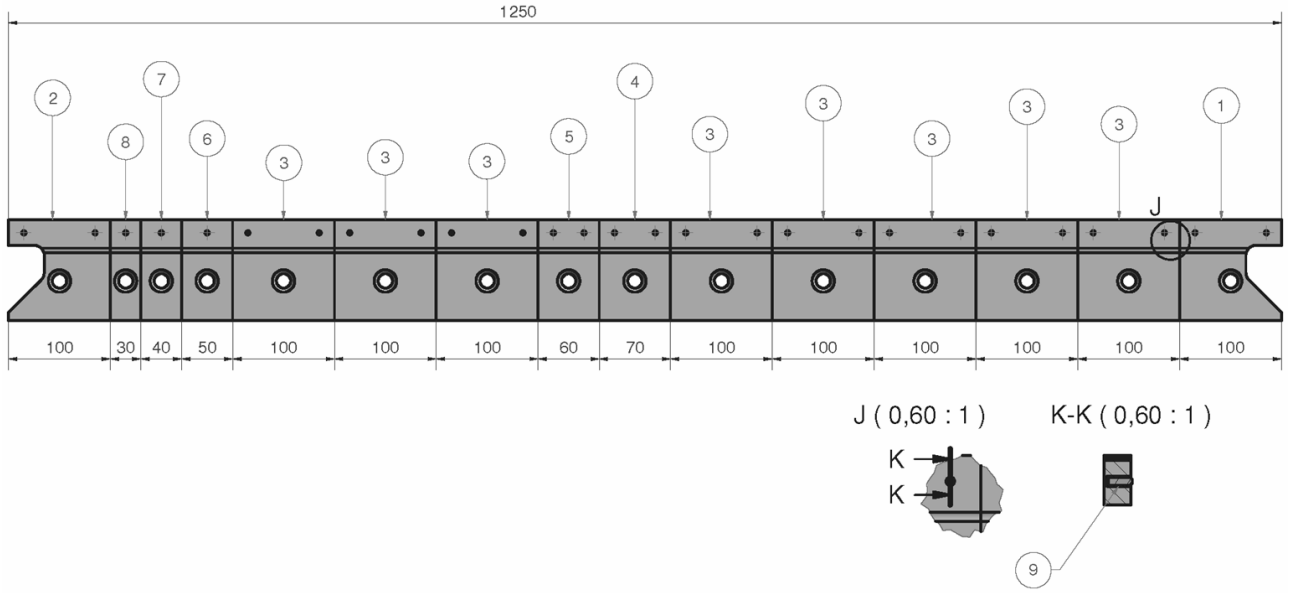
Part No. of all 3 segment sets, complete in the transport case = 1112-2999

Part numbers - lower beam segments (Part No. 1102-2699 = kp. set)



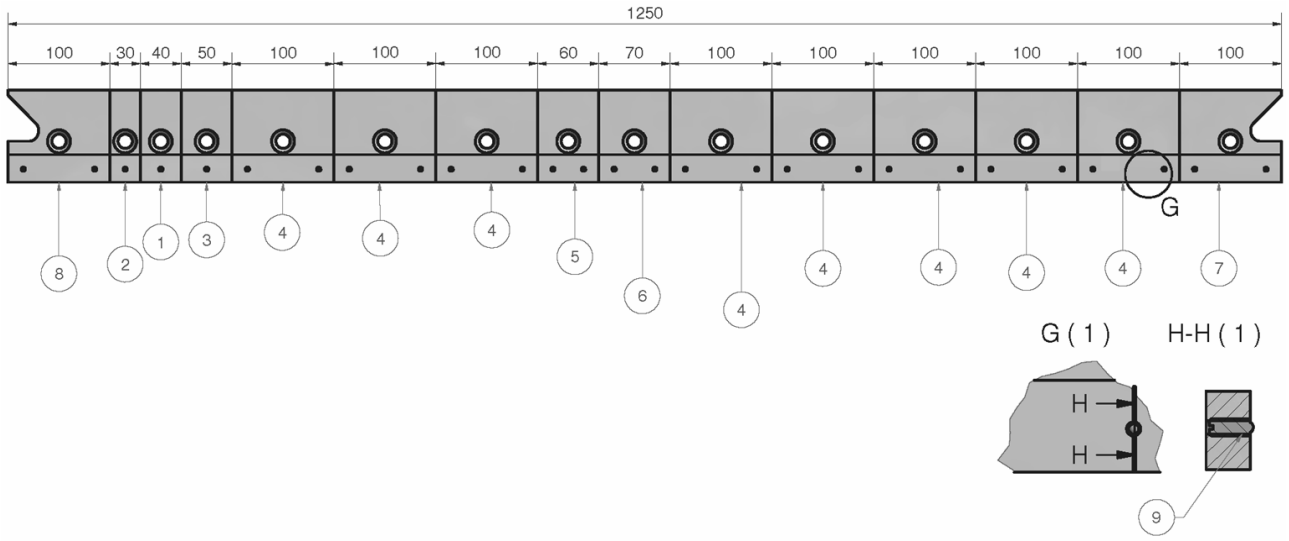
Item No.	Quantity	Part No.
1	1	1100-2612
2	1	1100-2611
3	8	1100-2610
4	1	1100-2607
5	1	1100-2606
6	1	1100-2605
7	1	1100-2604
8	1	1100-2603

Part numbers - clamping beam segments (Part No. 1112-2599 = kp. set)



Item No.	Quantity	Part No.
1	1	1100-2512
2	1	1100-2511
3	8	1100-2510
4	1	1100-2507
5	1	1100-2506
6	1	1100-2505
7	1	1100-2504
8	1	1100-2503
9	-	1100-0512

Part numbers - bending beam segments (Part No. 1110-2899 = kp. set)



Item No.	Quantity	Part No.
1	1	1100-2804
2	1	1100-2803
3	1	1100-2805
4	8	1100-2810
5	1	1100-2806
6	1	1100-2807
7	1	1100-2811
8	1	1100-2812
9	-	-