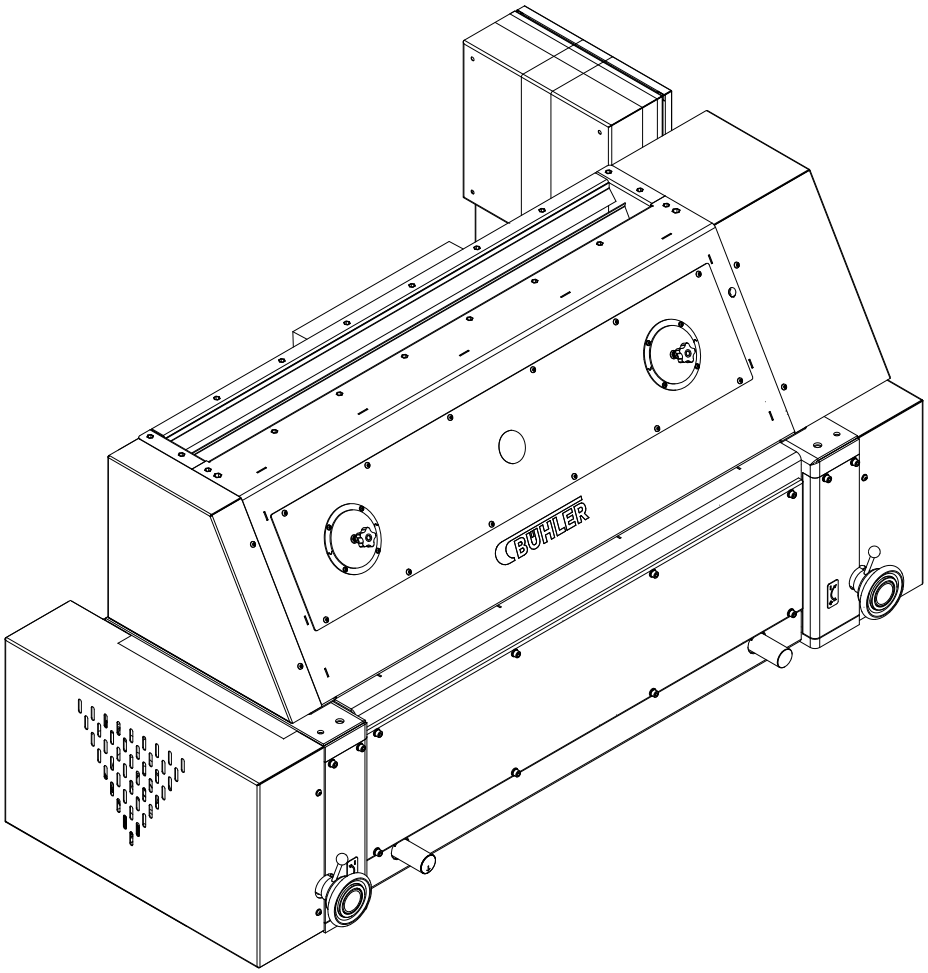
Operating instructions

Cracker
DFZL

Translation of the original operating instructions
DFZL-22925-2-2305-en-US



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1 General

1.1 Availability of the instructions

These instructions constitute part of the product.

1. Retain the instructions and related applicable documents during the entire lifetime of the product and keep them at hand for reference.
2. Pass on the instructions and other applicable documents to the each subsequent owner or operator of the product.

1.2 Scope of validity

The operating instructions are valid for the following machines:

Cracking mill	DFZL-1000
Cracking mill	DFZL-1500

1.3 Related applicable documents

The following documents are part of these instructions:

Designation	Identification number
Operating manual of the machine	DFZL-22050
Circuit diagram	Customer-specific
Additional documentation	See the documentation folder in the switch cabinet.

1.4 Contact

1. In case of any questions, please contact the responsible branch of Bühler Group. See www.buhlergroup.com
2. Keep the instructions ready at hand.
3. Keep the machine number ready at hand.

1.5 Personnel qualification

1.5.1 Operating personnel

Individuals operating the machine must be technically trained on the machine or have undergone training on the machine at Bühler Group.

1.5.2 Mechanics

Personnel who work on mechanical devices must be technically qualified to operate the machine or have attended and passed a training course of Bühler Group.

1.5.3 Electricians

Personnel who work on electrical devices must be technically qualified.

1.5.4 Welders

Personnel who weld on the devices must have specialized training.

1.5.5 Bühler service personnel

Manufacturer's personnel who direct and execute assembly and commissioning tasks, in addition to complex service and maintenance tasks.

1.5.6 Service personnel of the operating company

Personnel who carry out maintenance and repair work must be technically qualified to operate the machine or have attended and passed a training course on the machine offered by Bühler Group.

1.6 Conventions of depiction

1.6.1 Action sequence

Action steps to be carried out are presented in the form of numbered lists. The sequence of action steps must be followed.

1. Action step 1
   - ▶ Subprocess 1
   - ▶ Subprocess 2
2. Action step 2
   - → Interim result of action step 2
3. Action step 3

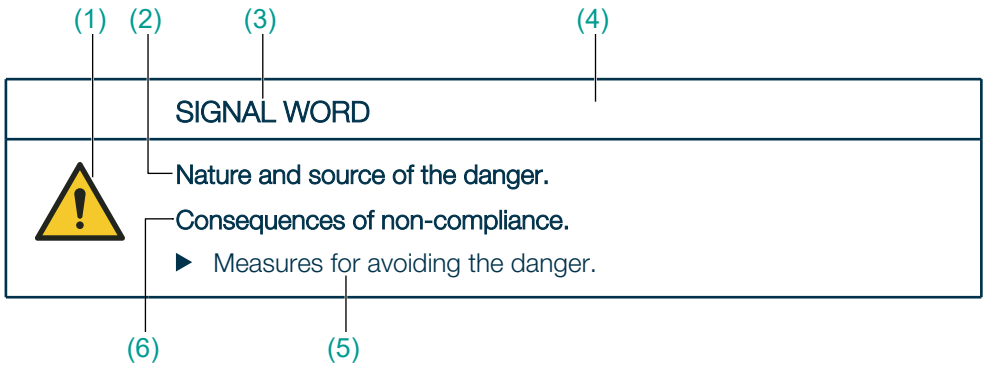
→ Result of entire action step

2 Safety

2.1 Superstructure of the warning messages

The warning messages make staff aware of unavoidable hazards present during the operation of the machine that are inherent to its design. Observe the measures mentioned to avoid these hazards.

General structure of a warning message:



(1) Danger symbol

(2) Indicates the type and source of the danger.

(3) Signal word

(4) Signal color

(5) Lists the measures to avoid the danger.

(6) Indicates the consequences of ignoring the danger.

2.2 Explanation of the warning instructions

DANGER

This message warns against an imminent danger to the human life and health.

▶ Non-compliance with this warning message results in severe or fatal injuries.

WARNING

This message warns against a possibly dangerous situation with respect to human life and health.

▶ Non-compliance with this warning message may result in severe or fatal injuries.

CAUTION

This message warns against a possibly dangerous situation with respect to human health.

▶ Non-compliance with this warning message can result in injuries.

NOTICE

This note warns of possible property damage.

- Failure to observe this warning message may result in property damage.

2.3 Intended use

The machine is intended exclusively for grinding raw goods that are used in the animal feed industry. This includes the following raw goods:

- Individual components for the production of compound feed
- Pelleted compound feed
- Cereals

The machine can be fitted with a Bühler machine control system (optional).

The machine is not intended for independent operation but instead for integration in a production system. Prior to commissioning, the security of the entire plant must be checked and ensured.

- Always use the machine in compliance with its intended use.
- Operate the machine only with input products that are within the specified limit values.
- Operate the machine only in accordance with these operating instructions.

2.4 Product properties of the input product

Designation	Value	Unit
Ignition sources	None	—
Foreign objects	None	—
Product moisture	6 … 15	%
Dust-forming tendency of the product	moderate	—
Dust matter of the bulk material, max.	5,0	%
Minimum ignition energy of the dusts	> 10	mJ
Ignition temperature, min.	300	°C
Smoldering temperature, min.	275	°C

2.5 ATEX marking

ATEX marking (Ex II 2/3D)

The machine contains an internal zone 21 and corresponds internally to device category 2D.

If the machine is identified on the nameplate as a 2/3D device, then it is approved for operation in a hazardous area 22.

- Use only devices without ignition sources or only devices with category 2 or 1 on the inside of the machine.
- Refer to the nameplate.

ATEX marking (Ex II 2/-D)

The machine contains an internal zone 21 and corresponds internally to device category 2D.

- Use only devices without ignition sources or only devices with category 2 or 1 on the inside of the machine.
- Operate the machine only in a zone-free production area.
- Refer to the nameplate.

2.6 Work relevant for ATEX protection

Work relevant for ATEX protection is indicated in these operating instructions by the ATEX marking symbol.

Explosion protection for the machine will no longer be guaranteed if the instructions are not observed.

- Observe the instructions given in these operating instructions.

2.7 Technical state

If the machine is operated in defective condition, the safety, function and availability are impaired.

- Operate the machine only when it is in a technically proper condition.
- Comply with the maintenance schedule.
- Only use the original spare parts listed in the spare parts catalog.
- If the operating behaviour of the machine changes, check the machine for faults.
- Rectify any faults immediately.
- The machine must not be converted or modified without approval from the manufacturer.

2.8 Personnel qualification

Unqualified personnel cannot recognize risks and are thus exposed to greater hazards.

- Assign only technically qualified personnel to perform the activities described in these operating instructions.
- Ensure that personnel comply with the locally valid laws and regulations for safe and hazard-conscious work.
- Define and communicate work responsibilities. Provide keys and passwords to assigned personnel only.

2.9 Personal protective equipment

Personal protective equipment protects people from residual risks associated with working with the machine.

The operating company is responsible for providing personal protective equipment.

- Wear personal protective equipment when working on the machine.
- Keep personal protective equipment fully functional.
- Make sure that the personal protective equipment fits correctly.

2.10 Protective measure to prevent unexpected starting

If the machine starts up unexpectedly, persons working on the machine can be seriously injured.

- Set the maintenance switch to <0> and lock it.
- Remove the key and keep it with you.

2.11 Protective devices

Personnel are endangered when protective devices are not functioning effectively.

- Before operating the machine, ensure that all protective devices are functioning effectively.

2.12 Safety signs

Personnel are endangered if safety signs are not noticeable.

- Replace safety signs that are not noticed.
- Do not remove or cover safety signs.

2.13 Safe work environment

2.13.1 Slipping and tripping hazard

Slippery surfaces and tripping hazards can lead to serious accidents.

- Keep aisles, handles, steps, ladders, platforms and guard-rails free of grease, oil and other dirt accumulations.
- Do not use the machine as a climbing aid or storage area. Use only the steps and platforms provided.
- Wear non-slip safety footwear.

2.14 Fire safety

During operation, an excessively high product temperature or flammable particles can cause a fire.

- Ensure that personnel know the fire prevention measures.
- Prepare a water connection for extinguishing fires.
- Keep a fire extinguisher near the machine.
- Post fire prevention measures where they are clearly visible.

3 Technical data

3.1 Environmental conditions

Designation	Value	Unit
Temperature during operation, without ATEX approval	+5 … +50	°C
Temperature during operation, with ATEX approval	+5 … +40	°C
Temperature during standstill	–10 … +60	°C
Relative humidity of air	0 … 95	%

3.2 Product throughput

Designation	Value	Unit
Product throughput of DFZL-1000	5 … 23	t/h
Product throughput of DFZL-1500	10 … 35	t/h

3.3 Operating supplies

3.3.1 Grease NLGI 2

Designation	Value	Unit
Food-use approved	–	–
Consistency class	NLGI 2	–
Operating temperature range	-20 … +140	°C
Product recommendation	Mobilgrease XHP 222	–

3.3.2 Grease FG-C

Designation	Value	Unit
Food-use approved	NSF H1	–
Operating temperature range	-20 … +160	°C
Dropping point	291	°C
Product recommendation	Great Wall FG-C™ machine grease for food	–

3.3.3 Lubricant filling quantity

Designation	Value	Unit
Bearing, drive side	16	g
Bearing, transmission side	16	g
After exchanging the bearing, drive side	250	g
After bearing replacement, transmission side	250	g

3.4 Consumption details

3.4.1 Aspiration

Designation	Value	Unit
Machine with 1 roller module	5	m^3/min.
Machine with 2 roller modules	7	m^3/min.
Machine with 3 roller modules	9	m^3/min.

3.5 Airborne sound emission

3.5.1 Measured values

The measured values do not take ambient effects into account.

Designation	Value	Unit
Equivalent workplace-related emission value L_{pA}	≤ 70	dB

3.6 Weights

3.6.1 Weight of DFZL-1000

Designation	Value	Unit
Feed system	180	kg
Roller assembly	910	kg
Feed roller	45	kg
1 roller module	1550	kg
Machine with 1 roller module	1730	kg
Machine with 2 roller modules	3280	kg
Machine with 3 roller modules	4830	kg

3.6.2 Weight of DFZL-1500

Designation	Value	Unit
Feed system	230	kg
Roller assembly	1230	kg
Feed roller	61	kg
1 roller module	1900	kg
Machine with 1 roller module	2130	kg
Machine with 2 roller modules	4030	kg
Machine with 3 roller modules	5930	kg

3.7 Dimensions

3.7.1 Dimensions of DFZL-1000 with 1 roller module

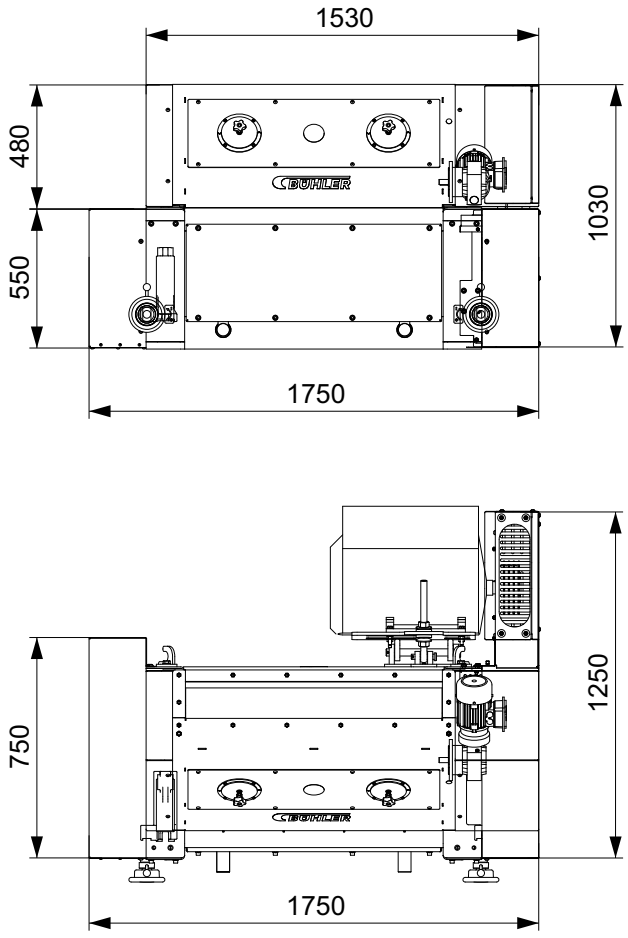


Fig. 3.1 Dimensions of DFZL-1000 with 1 roller module

3.7.2 Dimensions of DFZL-1000 with 2 roller modules

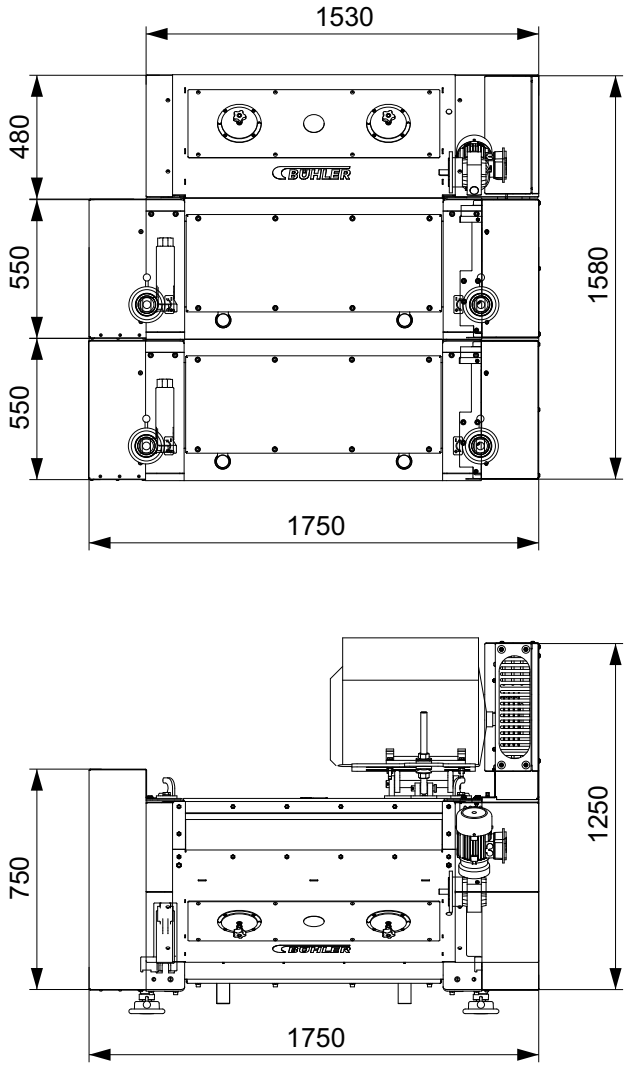


Fig. 3.2 Dimensions of DFZL-1000 with 2 roller modules

3.7.3 Dimensions of DFZL-1000 with 3 roller modules

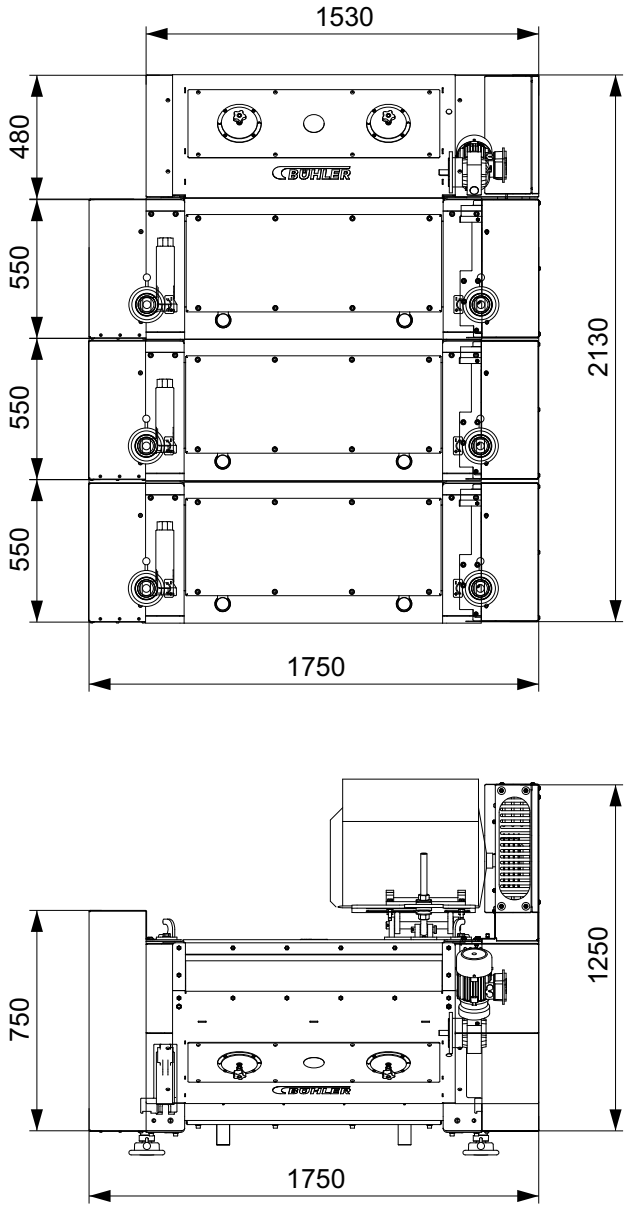


Fig. 3.3 Dimensions of DFZL-1000 with 3 roller modules

3.7.4 Dimensions of DFZL-1500 with 1 roller module

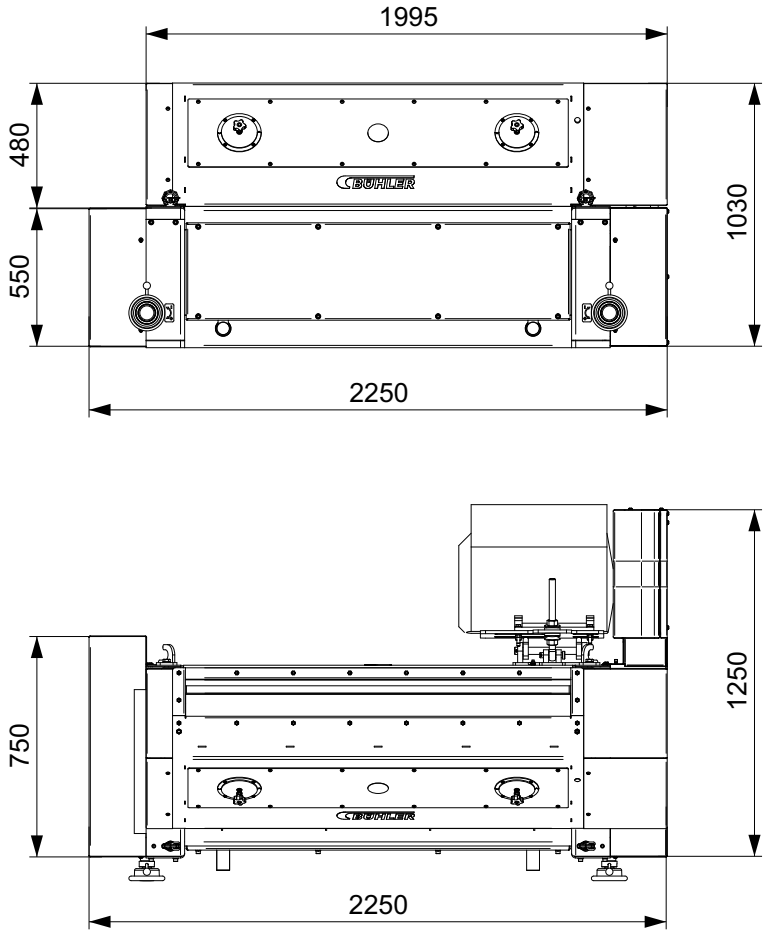


Fig. 3.4 Dimensions of DFZL-1500 with 1 roller module

3.7.5 Dimensions of DFZL-1500 with 2 roller modules

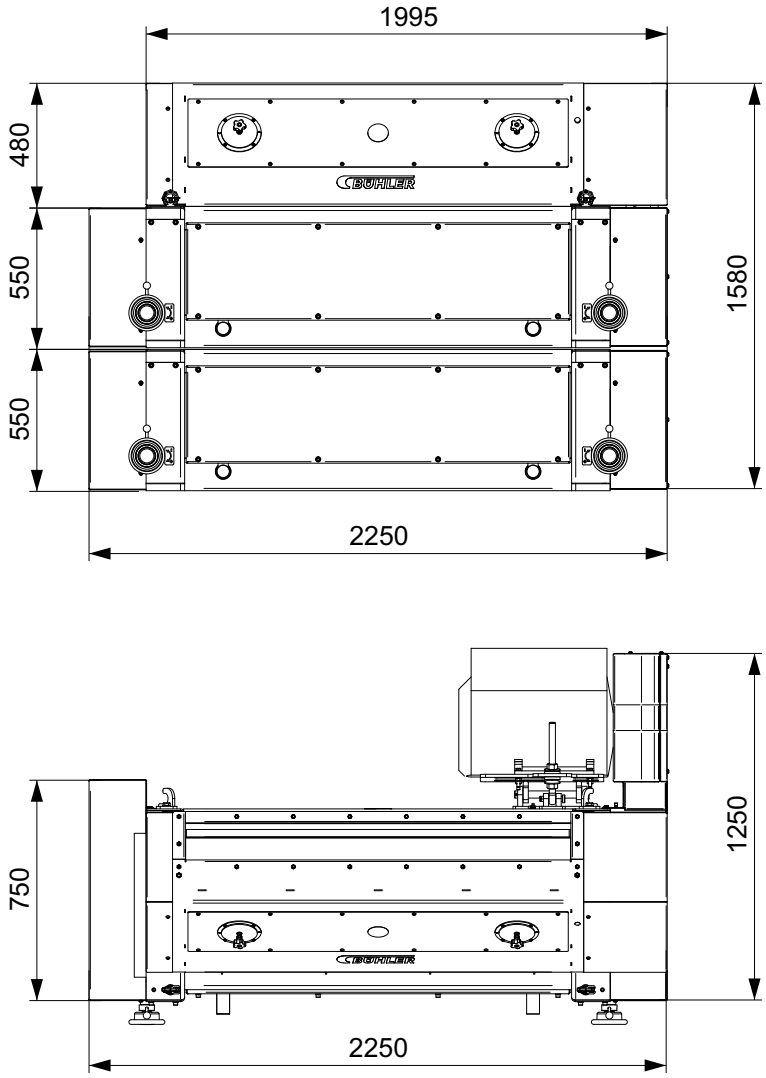


Fig. 3.5 Dimensions of DFZL-1500 with 2 roller modules

3.7.6 Dimensions of DFZL-1500 with 3 roller modules

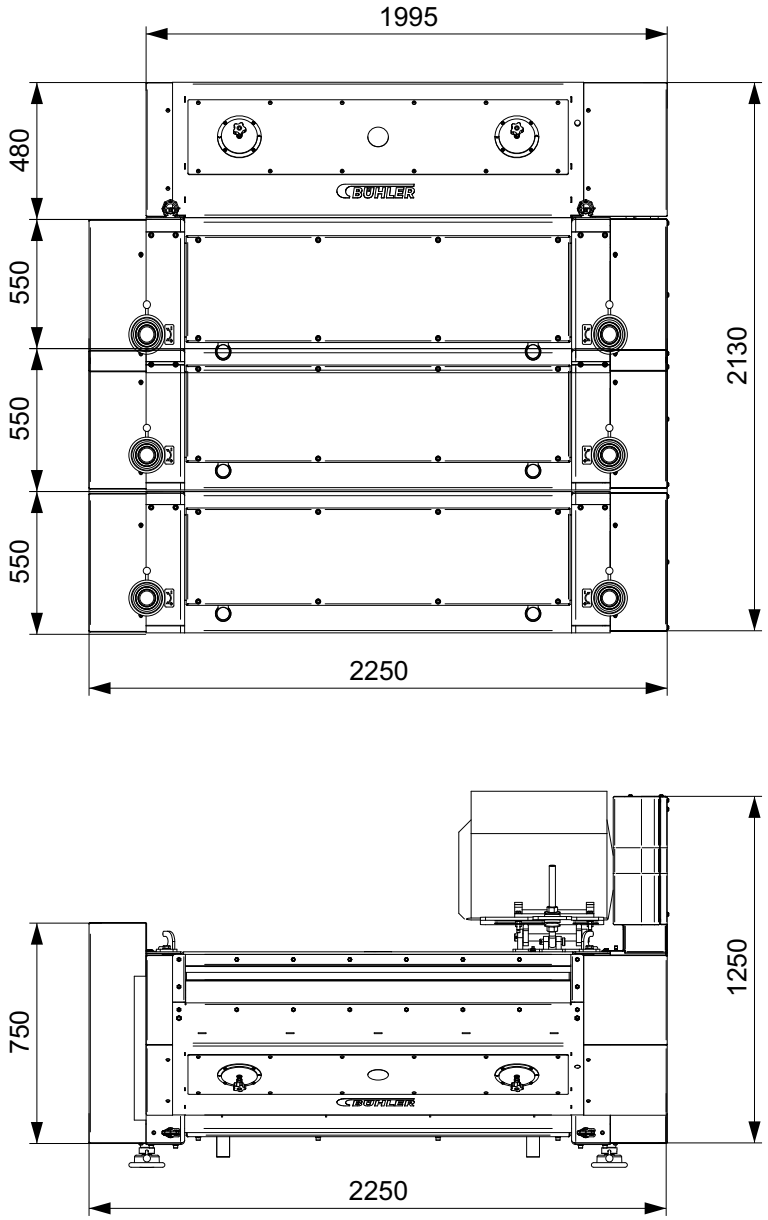


Fig. 3.6 Dimensions of DFZL-1500 with 3 roller modules

3.7.7 Dimensions of the operating element (option)

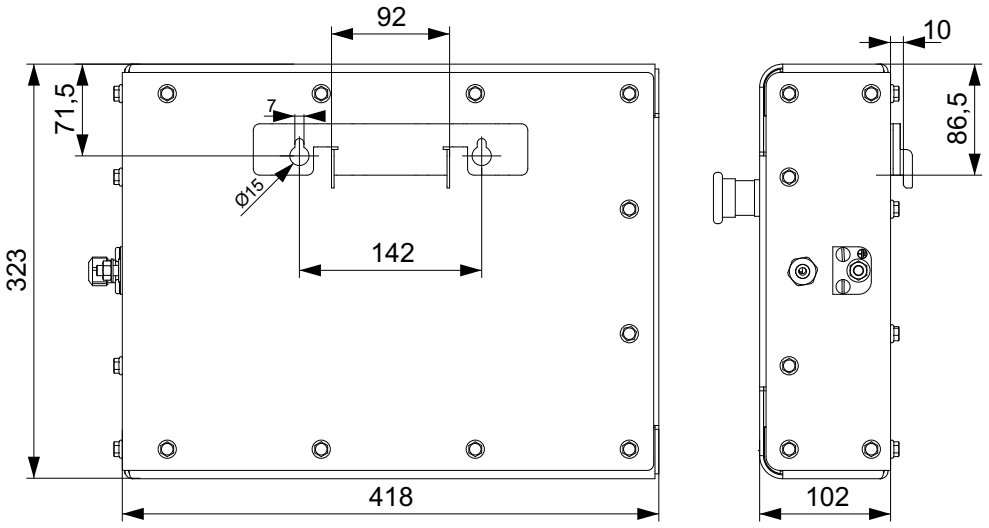


Fig. 3.7 Dimensions of operating element

3.8 Electrical data

3.8.1 Drive, feeder device

Designation	Value	Unit
Drive power	0.37	kW
Speed range	32	rpm

3.8.2 Drive of DFZL-1000

Designation	Value	Unit
Drive power	7.5 … 22	kW
Speed range 50 Hz	1000	rpm
Speed range 60 Hz	1200	rpm

3.8.3 Drive of DFZL-1500

Designation	Value	Unit
Drive power	15 … 37	kW
Speed range 50 Hz	1000	rpm
Speed range 60 Hz	1200	rpm

3.9 Roller gap

Designation	Meaning	Value range	Unit
GAP.#SET	Set roller gap GAP.#SET = GAP.#MIN + range	0.5 … 5	mm
GAP.#MIN	Smallest possible roller gap	0.5 … 2.5	mm

Designation	Meaning	Value range	Unit
range	Adjustable range of the roller gap, starting at GAP.#MIN	0 … 3.5	mm
GAP.#COR	Correction value, in order to compensate for wear	0 … 4.5	mm

To prevent roller contact, no value range may be fallen short of or exceeded.

3.10 Building information

3.10.1 Floor load

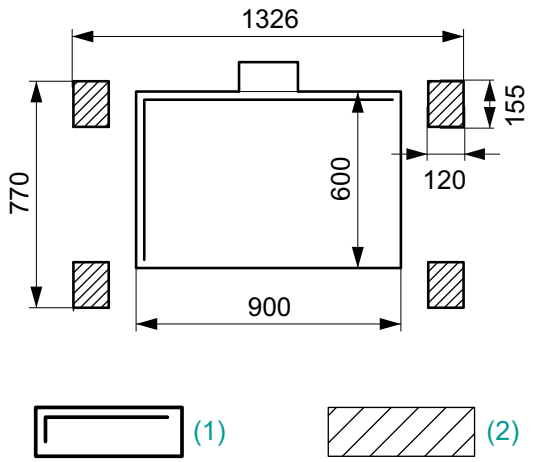


Fig. 3.8 Floor load of DFZL-1000, platform height 200 mm

(1) Floor opening (2) Load area

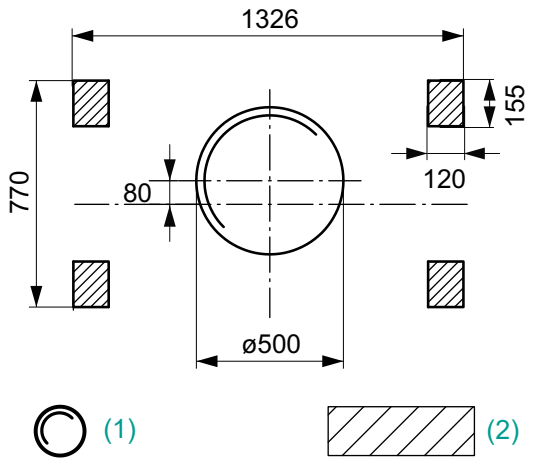


Fig. 3.9 Floor load of DFZL-1000, platform height 500 mm

(1) Floor opening (2) Load area

Designation	Value	Unit
Weight, DFZL 1000 with 1 roller module	20.7	kN
Weight, DFZL 1000 with 2 roller modules	39.3	kN
Weight, DFZL 1000 with 3 roller modules	57.9	kN

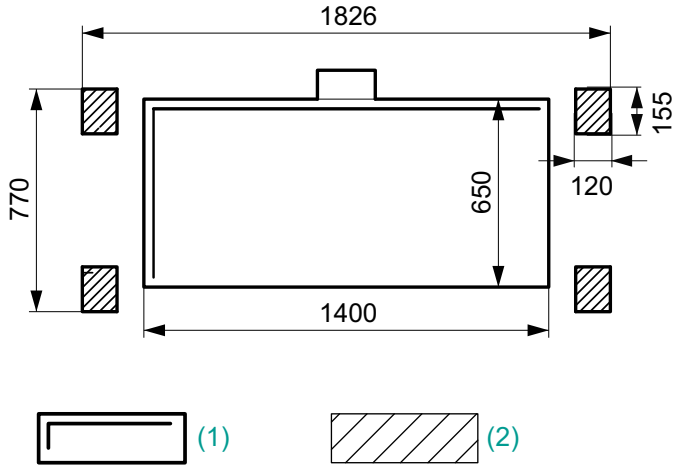


Fig. 3.10 Floor load of DFZL-1500, platform height 200 mm

(1) Floor opening (2) Load area

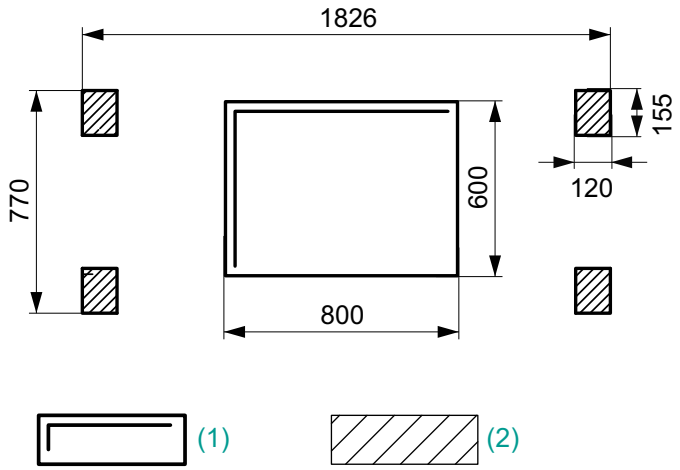
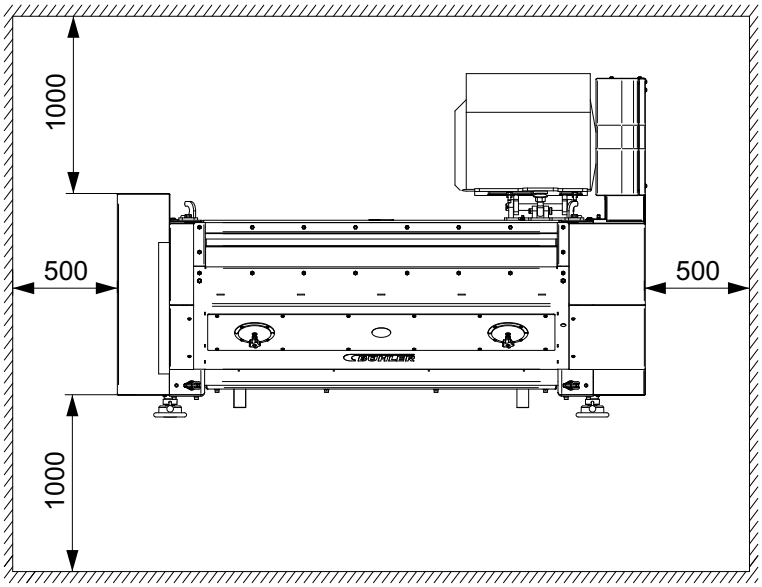


Fig. 3.11 Floor load of DFZL-1500, platform height 500 mm

(1) Floor opening (2) Load area

Designation	Value	Unit
Weight, DFZL 1500 with 1 roller module	25.5	kN
Weight, DFZL 1500 with 2 roller modules	48.3	kN
Weight, DFZL 1500 with 3 roller modules	71.1	kN

3.10.2 Space requirement



4 Description

4.1 Identification

4.1.1 Nameplate

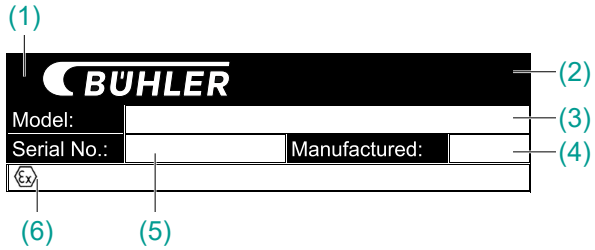


Fig. 4.1 Nameplate

(1) Manufacturer
(2) Manufacturer's address
(3) Machine type
(4) Year of manufacture
(5) Machine number
(6) ATEX marking

4.1.2 Position of the nameplate

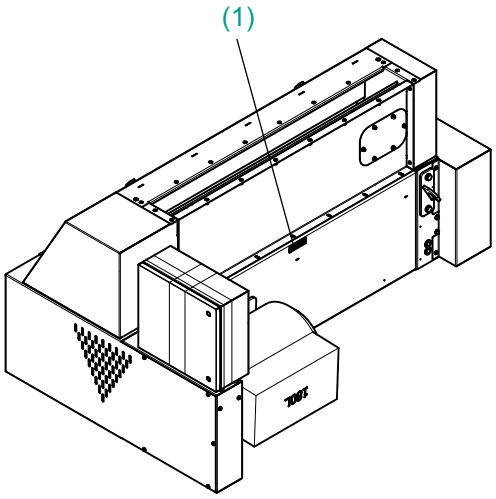


Fig. 4.2 Position of the nameplate

(1) Nameplate

4.1.3 Type code

DFZL -1000 (-ATEX)

DFZL	Machine code
1000	Length of the grinding roller in mm
Ex	Approval for potentially explosive atmosphere

4.1.4 Explanation of ATEX marking

 II 2/3D T135°C X

Marking	Meaning
	ATEX symbol
II	Equipment group
2/...	Internal category 2
.../3	External category 3
D	Dust atmosphere
T	Maximum surface temperature in °C to be expected in normal operation at full load and at a maximum ambient temperature of +40 °C
X	Notes provided in the operating instructions for maintaining the explosion protection are indicated with the symbol  .

4.1.5 Explanation of the ATEX marking for a production area without a hazardous area

 II 2/-D T135°C X

Marking	Meaning
	ATEX symbol
II	Equipment group
2/...	Internal category 2
.../-	Not approved for use in hazardous areas
D	Dust atmosphere
T	Maximum surface temperature in °C to be expected in normal operation at full load and at a maximum ambient temperature of +40 °C
X	Notes provided in the operating instructions for maintaining the explosion protection are indicated with the symbol  .

4.2 General arrangement drawing of the machine

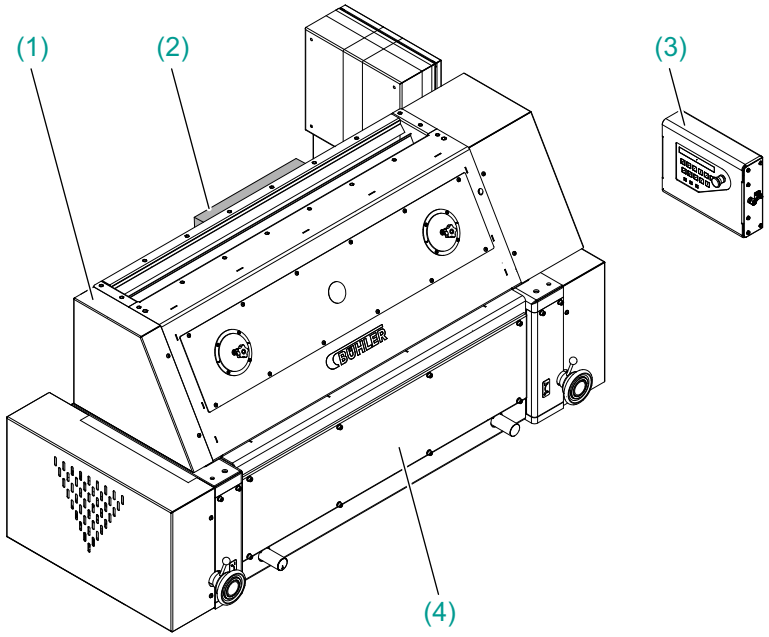


Fig. 4.3 General arrangement drawing

(1) Feed system
(2) Motor
(3) Machine control system (option)
(4) Roller module

4.3 Operating principle

The dosing roller conveys the product evenly to the milling area. The product quantity can be set via the opening width of the dosing gap.

The rollers pull the product into the machine and grind it.

Lateral roller wedges and funnel-shaped product guide sheets prevent unbroken product from slipping through.

Two operating modes can be selected using the plant control system:

– Grinding: To grind pellets or for crushing grain pellets or husks
– Bypass: For whole pellets

4.4 EMERGENCY STOP button

The emergency stop stops the machine in dangerous situations.

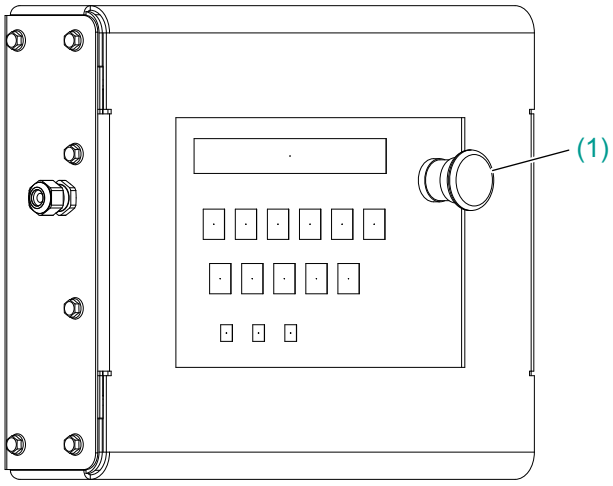


Fig. 4.4 EMERGENCY STOP

(1) EMERGENCY STOP button

The EMERGENCY STOP button is integrated into the plant control system. When the machine stop is triggered, the machine will shut down in a controlled manner.

4.5 Protective devices

The protective devices protect against hazards associated with operating the machine.

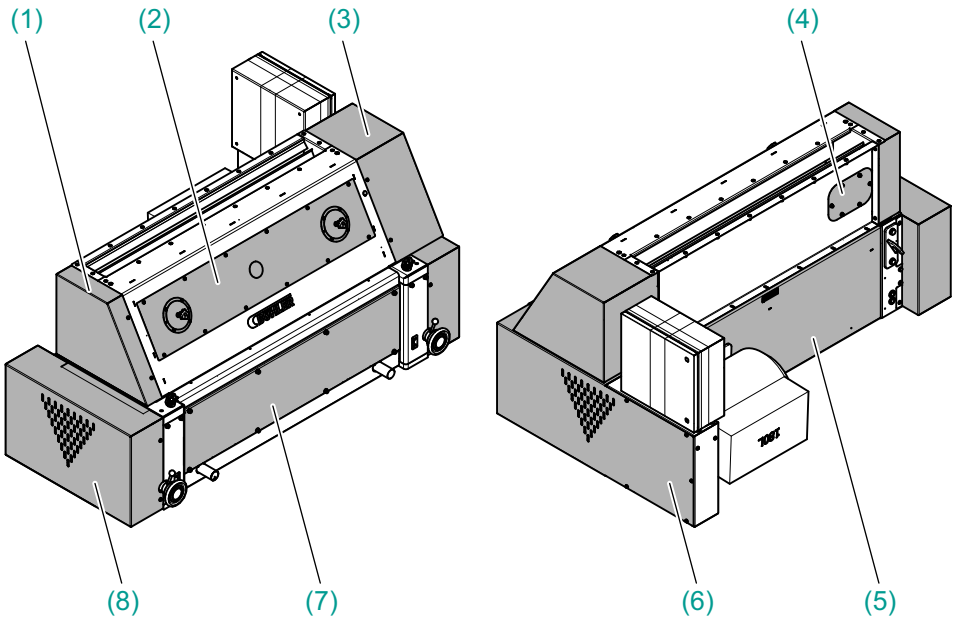


Fig. 4.5 Protective devices

(1) Feeder device cover, left
(2) Feed roller cover
(3) Feeder device motor cover
(4) Feed module cover, rear

(5) Roller module cover, rear
(6) Drive side cover
(7) Grinding chamber cover
(8) Transmission side cover

4.6 Safety signs

Safety signs warn of hazards.

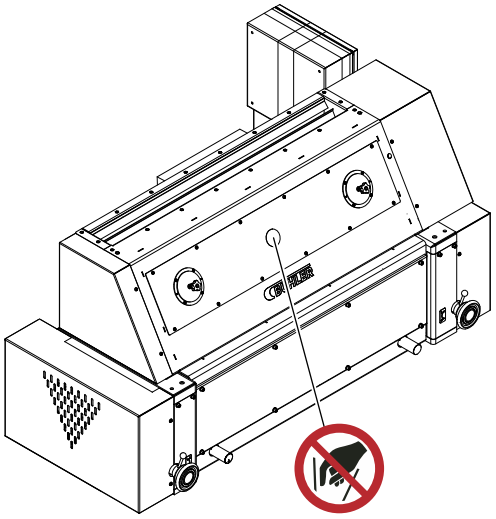


Fig. 4.6 Safety signs on the machine

Safety signs	Meaning
	No reaching in.

4.7 Operating and display elements

The machine is controlled and monitored with the operating and display elements.

The location of the operator device can be freely selected, but it must be placed near the machine. The length of the cable from the machine to the operator device is 15 m. The fastening points for mounting the operator device are located on the rear side.

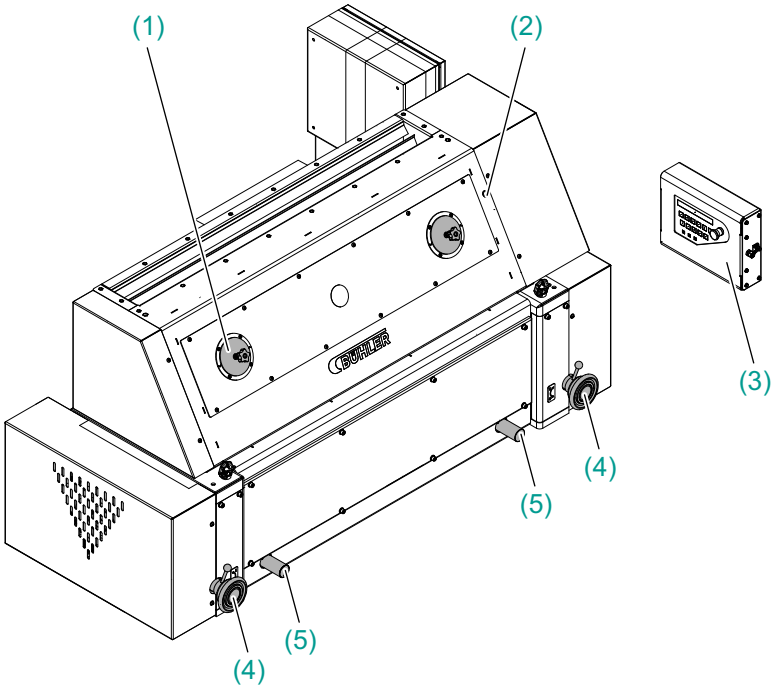


Fig. 4.7 Operating and display elements

(1) Inspection window
(2) Handwheel, feed gate
(3) Machine control system (option)
(4) Handwheel for the roller gap adjuster
(5) Sampler

4.8 Feed system

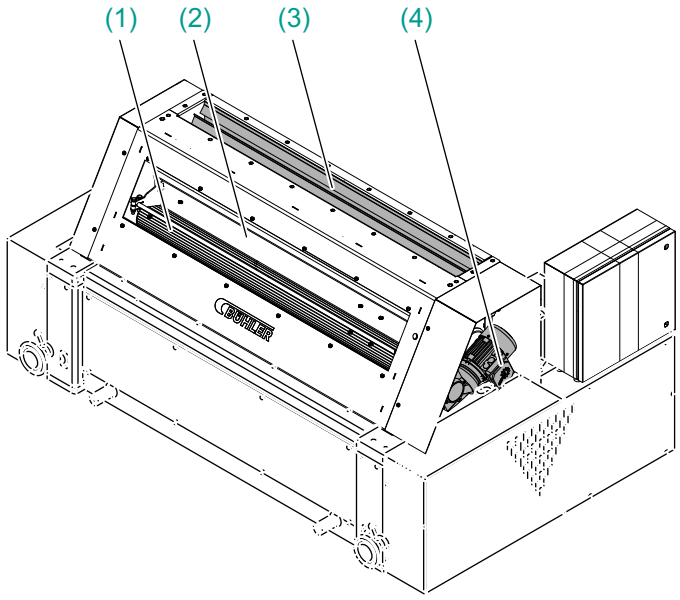


Fig. 4.8 Feed system

(1) Dosing roller
(2) Dosing sheet
(3) Product inlet
(4) Motor, feeder device

4.9 Roller module

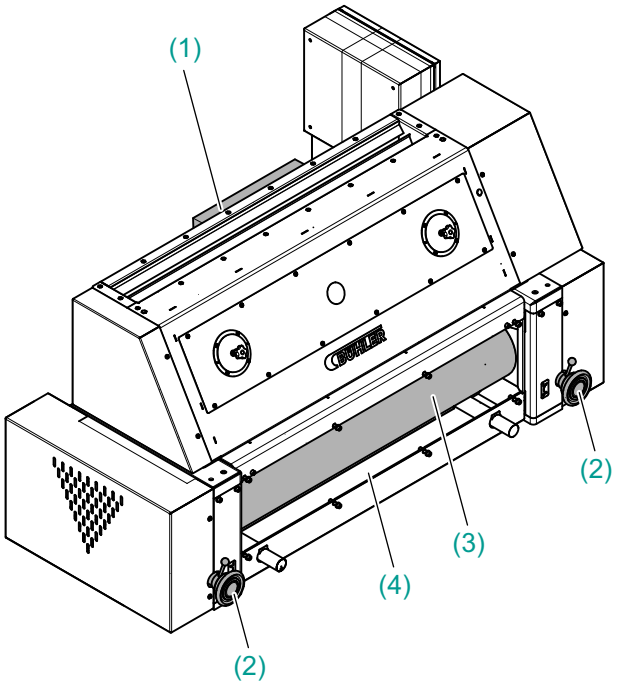


Fig. 4.9 Roller module

(1) Motor

(2) Handwheel for the roller gap adjuster

(3) Roller

(4) Product outlet

4.10 Roller gap

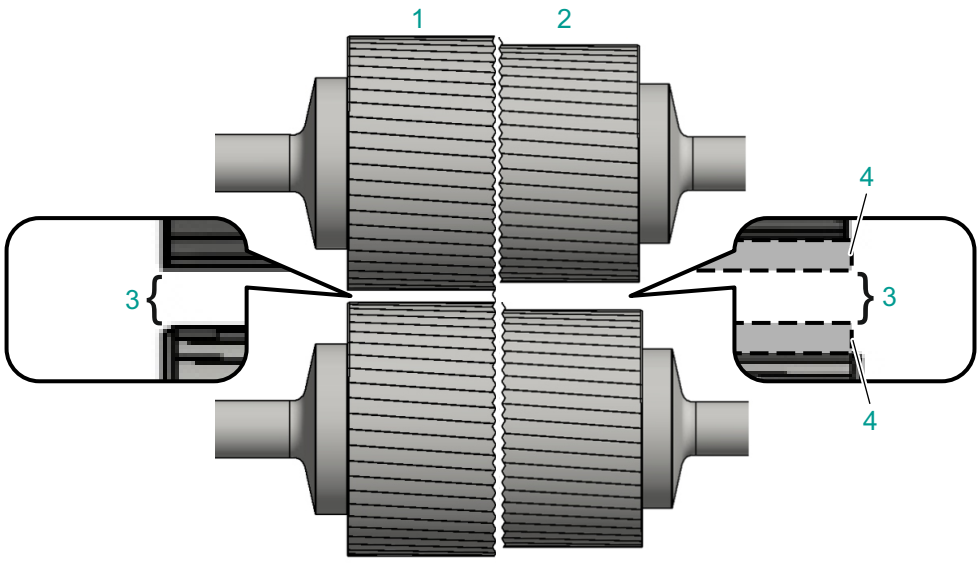


Fig. 4.10 Roller gap in the roller module

(1) Roller gap in the roller module

(2) Worn pair of rollers

(3) Set roller gap

(4) Wear on the roller

"#" refers to the roller module.

The following is an example of roller gap adjuster:

– The minimum gap is set to 1 mm, GAP.# MIN = 1 mm
– The roller gap can therefore be adjusted in the range of 1 … 4.5 mm, GAP.# MAX = GAP # MIN + range.
– The roller gap is set to 2 mm for a recipe, GAP.# SET = 2 mm.

After some time, it may be found that the rollers are worn.

With an electronic roller gap adjuster, the correction value GAP.# COR x can be used for readjustment. The advantage of this is that the roller gap does not need to be readjusted in the saved recipes. The maximum adjustable correction value depends on the minimum gap and the adjusted roller gap.

The following is the example of correction value:

– GAP.# COR MAX = GAP.# SET – GAP.# MIN = 1 mm
– GAP.# COR x = 0.1 mm

4.11 Roller corrugation arrangement

The rollers are aligned cutting edge to cutting edge. This means that the rollers face each other.

Due to the varying speeds of the rollers, the corrugations cut the product.

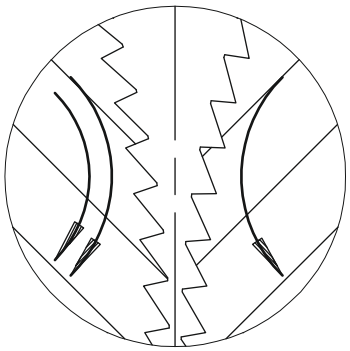


Fig. 4.11 Corrugation arrangement

4.12 Aspiration

Always position the aspiration on the lower surge hopper.

To ensure correct function, a tight connection between the lower surge hopper and aspiration as well as a symmetrical design version of the aspiration is essential.

Note the consumption details of the aspiration. See page 17, Chapter ”Aspiration“.

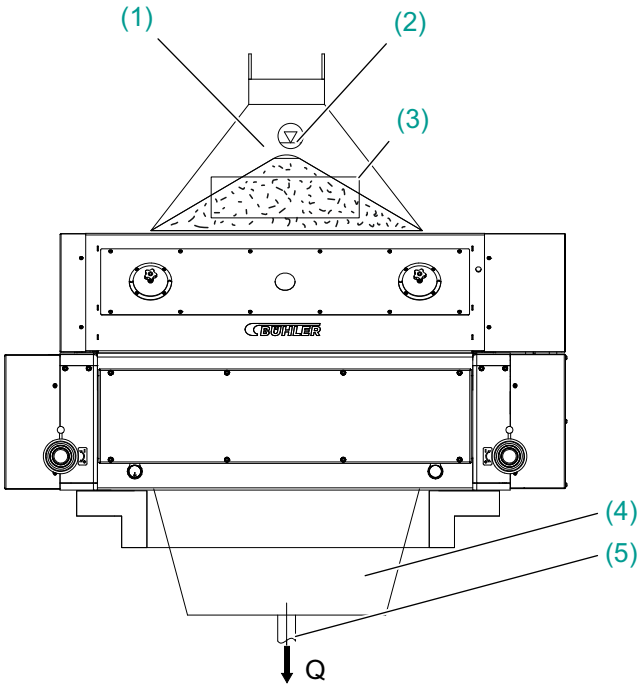


Fig. 4.12 Aspiration (schematic image)

(1) Upper surge hopper
(2) Level probe
(3) Maintenance opening
(4) Lower surge hopper
(5) Symmetrical aspiration (Q)

5 Transportation

5.1 Safety

5.1.1 Suspended load

Falling loads can cause serious injuries.

- Only use undamaged hoisting devices with sufficient lifting capacity.
- Fasten loads in accordance with the regulations.
- Do not step or stand under suspended loads.
- Ensure that there is no one in the hazard zone.

5.2 Packaging symbols

Fig. 5.1 Packaging symbols

(1) Top
(2) Protect from moisture
(3) Fragile
(4) Forklift permitted on this side
(5) Do not roll
(6) Do not stack
(7) Sling here

- Observe the packaging symbols.

5.3 Checking the consignment

1. Check the completeness of the delivery according to the shipping note.
2. Report any missing parts and transport damage. See page 9, Chapter ”Contact“.

5.4 Putting the machine in intermediate storage

1. Observe the packaging symbols.
2. Leave the machine and machine parts in the original packaging until assembly work has started.
3. Do not store the machine and the machine parts outdoors.
4. Protect the machine and the machine parts against the effects of weather.
5. Avoid temperature fluctuations.

5.5 Lifting instructions

5.5.1 Lifting the machine with 1 roller module

Tools required:

– Webbing slings

WARNING

Suspended load.

Serious injuries or death.

- Only use undamaged hoisting devices with sufficient lifting capacity.
- Do not step or stand under suspended loads.
- Ensure that there is no one in the hazard zone.

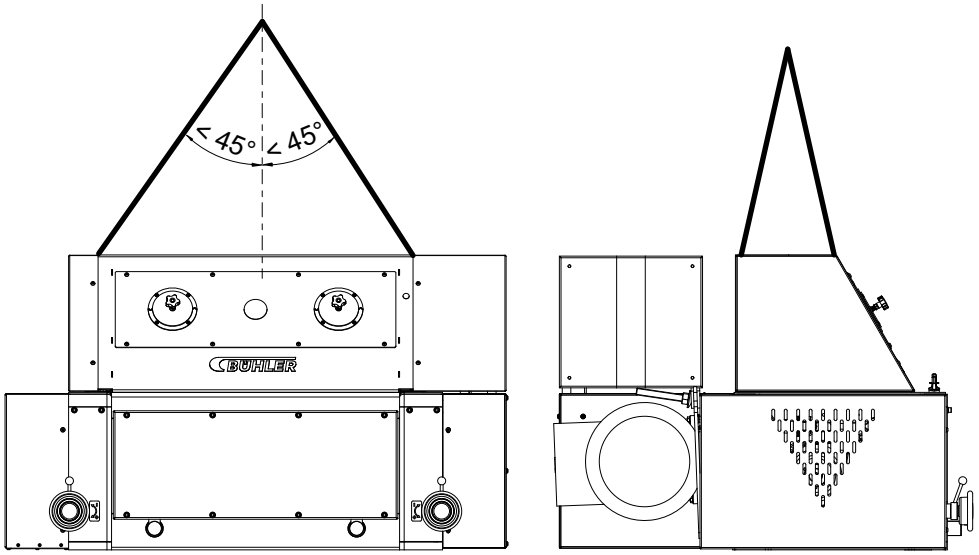


Fig. 5.2 Lifting instructions

1. Check the crane and lifting device for the required design value and permissible load capacity. See page 17, Chapter ”Weights“.
2. Tighten 4 M16 lifting eyebolts.
3. Attach 2 webbing slings to the lifting eyebolts at the top of the machine.
4. Select the length of the lifting device in such a way that the machine is lifted horizontally.
5. Lift the machine and transport it horizontally.
6. Position the machine.
7. Remove the webbing slings and the lifting eyebolts.

5.5.2 Lifting the machine with 2 roller modules

The largest possible transport unit is the feeder device with a roller module.

If the cracking mill consists of 2 roller modules, then the cracking mill must be divided into 2 transport units.

Tools required:

– Webbing slings

WARNING

Suspended load.

Serious injuries or death.

- Only use undamaged hoisting devices with sufficient lifting capacity.
- Do not step or stand under suspended loads.
- Ensure that there is no one in the hazard zone.

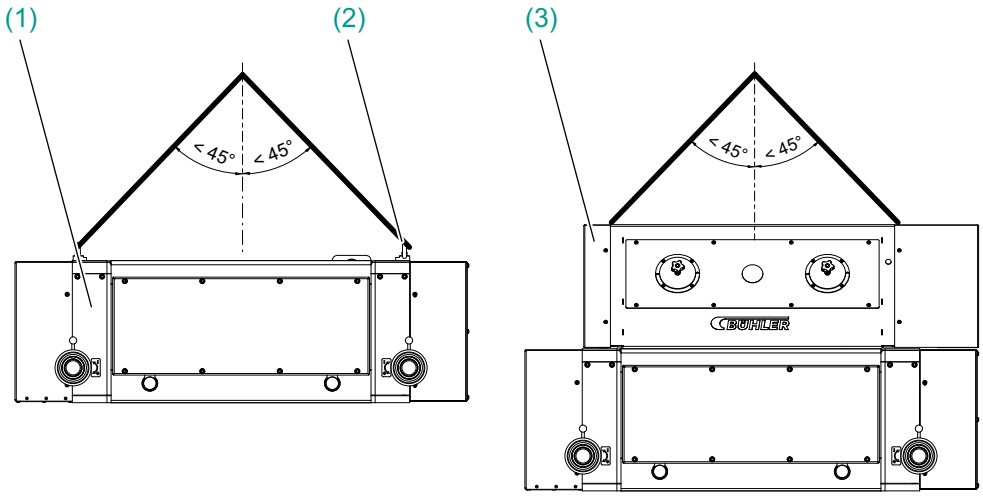


Fig. 5.3 Lifting instructions

(1) Roller module, single
(2) Transport eyelet
(3) Feeder device with roller module

1. Dismount the feeder device with 1 roller module from the roller module underneath it.
2. Check the crane and lifting device for the required design value and permissible load capacity. See page 17, Chapter ”Weights“.
3. Tighten 4 M16 lifting eyebolts.
4. Attach 2 webbing slings to the lifting eyebolts at the top of the machine.
5. Select the length of the lifting device in such a way that the machine is lifted horizontally.
6. Lift the machine and transport it horizontally.
   - Lift the single roller module and transport it horizontally.
   - Lift the feeder device with the roller module and transport it horizontally.
7. Position the machine.
8. Remove the webbing slings and the lifting eyebolts.

5.5.3 Lifting the machine with 3 roller modules

The largest possible transport unit is the feeder device with a roller module.

If the cracking mill consists of 3 roller modules, then the cracking mill must be divided into 3 transport units.

Tools required:

– Webbing slings

WARNING

Suspended load.

Serious injuries or death.

- Only use undamaged hoisting devices with sufficient lifting capacity.
- Do not step or stand under suspended loads.
- Ensure that there is no one in the hazard zone.

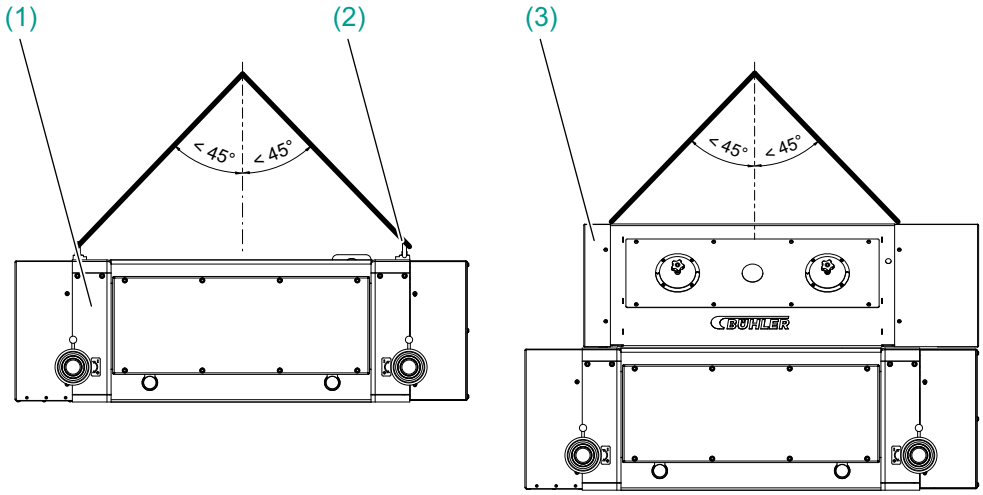


Fig. 5.4 Lifting instructions

(1) Roller module, single
(2) Transport eyelet
(3) Feeder device with roller module

1. Dismount the feeder device with 2 roller modules from the roller module underneath.
2. Check the crane and lifting device for the required design value and permissible load capacity. See page 17, Chapter "Weights".
3. Tighten 4 M16 lifting eyebolts.
4. Attach 2 webbing slings to the lifting eyebolts at the top of the machine.
5. Select the length of the lifting device in such a way that the machine is lifted horizontally.

6. Lift the machine and transport it horizontally.
   - Lift the single roller module and transport it horizontally.
   - Lift the second roller module and transport it horizontally.
   - Lift the feeder device with the roller module and transport it horizontally.
7. Position the machine.
8. Remove the webbing slings and the lifting eyebolts.

6 Mounting

6.1 Preparing the installation site

1. Ensure that the foundation is solid and vibration-free.
2. Ensure that the foundation is horizontal and level.
3. Ensure that there is sufficient space available to meet requirements. See page 28, Chapter ”Space requirement“.
4. Cordon off the assembly area against unauthorized access.
5. Secure the working environment, for example, remove any tripping hazards.
6. Keep enough space free for assembly and adjustment work.
7. Ensure access to the switch cabinet.

6.2 Unpacking the machine

The machine is supplied with 1 roller module fully assembled. For a machine with 2 or 3 roller modules, the additional roller modules are supplied pre-assembled.

The machine is delivered in the following assemblies:

– Feed system
– Roller module
– Switch cabinet (option)

1. Unpack the machine near its installation site.
2. Remove the assemblies from their envelopes and leave them on the transport pads until the machine is assembled.
3. Sort the packaging according to basic materials and dispose of it in compliance with locally applicable laws and regulations.

6.3 Mounting the machine

Prerequisites:

✓ The installation site has been prepared. See page 43, Chapter ”Preparing the installation site“.
✓ The foundation is horizontal and flat.

1. Align the machine.
2. Position the machine at the intended location. See page 39, Chapter ”Lifting instructions“.
3. Level the machine.
   - Level the x-axis. See page 43, Chapter ”Leveling the machine along the x-axis“.
   - Level the y-axis. See page 44, Chapter ”Leveling the machine along the y-axis“.

6.3.1 Leveling the machine along the x-axis

Tools required:

– Shaft spirit level

Material required:

– 200 x 200 mm base plates

Prerequisites:

✓ The cover of the front roller module is removed.

1. Place the spirit level on the roller.
2. Check whether the machine is horizontal.
3. If the machine is not horizontal, raise it slightly with a lifting device and place a base plate underneath it.
4. Repeat steps 1 … 3 until the machine is horizontal.

6.3.2 Leveling the machine along the y-axis

Tools required:

– Shaft spirit level

Material required:

– 200 × 200 mm base plates

Prerequisites:

✓ The cover of the front roller module is removed.

1. Place the spirit level on the frame underneath the roller.
2. Check whether the machine is horizontal.
3. If the machine is not horizontal, raise it slightly with a lifting device and place a base plate underneath it.
4. Repeat steps 1 … 3 until the machine is horizontal.

6.3.3 Checking the level

Tools required:

– Shaft spirit level (not included in the scope of delivery)

Material required:

– 200 x 200 mm base plates

1. Ensure that all base plates are fitted securely.
2. Use a spirit level to ensure that the machine is exactly horizontal in both axes.
3. Dismount the hoisting device.

6.4 Connecting the product connections

6.4.1 Connecting the product inlet

Tools required:

– Acrylic sealant

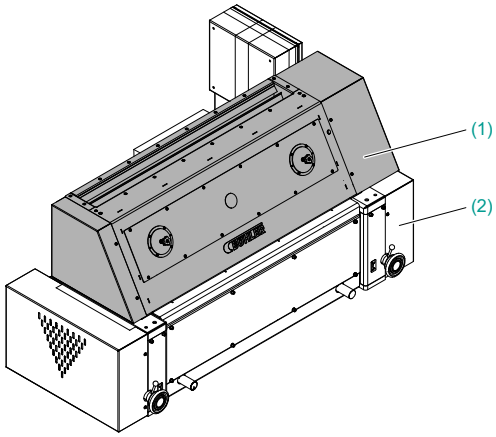


Fig. 6.1 Product inlet

(1) Feed system (2) Roller module

WARNING

Mobile machine parts.

Risk of body parts being drawn in and crushed or severed.

- ▶ Do not reach into the machine openings.
- ▶ The machine openings must meet the safety distance requirements in accordance with DIN EN ISO 13857.

1. Screw the upper surge hopper to the feeder device.
2. Seal the adapters between the roller module and the feeder device with acrylic sealant.
3. Position the level probe.

6.4.2 Connecting the product outlet

Tools required:

– Acrylic sealant

Prerequisites:

✓ It is ensured that there is a level probe in the downstream process (operating company).

WARNING

Mobile machine parts.

Risk of body parts being drawn in and crushed or severed.

- Do not reach into the machine openings.
- The machine openings must meet the safety distance requirements in accordance with DIN EN ISO 13857.

1. Screw the lower surge hopper to the base frame.
2. Seal transitions with acrylic sealant.

6.5 Connecting the utilities

6.5.1 Connecting the electrical installation

Grounding the machine

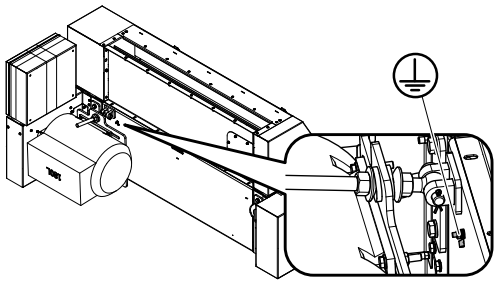


Fig. 6.2 Grounding point

1. Ground the machine via the grounding point.

2. Ensure conductivity at the bolted joints with contact washers or copper strands.

6.6 Checking the mounting

No.	Check
1	There is sufficient space for maintenance and repair at the assembly site.
2	The machine is assembled and leveled correctly.
3	The machine is grounded.
4	The electric supplies are checked in accordance with the circuit diagram.
5	The electrical installation was carried out and checked by authorized and qualified personnel.
6	All of the bolted joints have been tightened.

No.	Check
7	The lines and connections are tight.
8	The product inlet of the machine is connected.
9	The level probe in the product inlet is assembled.
10	Product outlet of the machine is connected.
11	The level probe in the downstream process is assembled (operating company).
12	It is not possible to reach into the hazard zone at the product inlet and outlet. A safety distance in accordance with ISO 13857 is maintained.
13	The product connections are tight.

7 Commissioning

7.1 Checking the direction of rotation of the motor

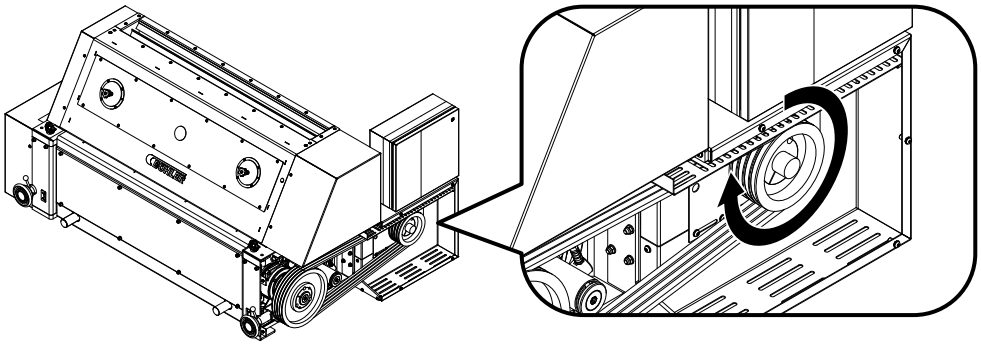


Fig. 7.1 Motor direction of rotation

1. Remove the cover on the drive side. See page 57, Chapter ”Removing the cover on the transmission side“.
2. Check the direction of rotation of the motor.

7.2 Checking the commissioning

No.	Check
1	All transportation aids and assembly fasteners have been removed.
2	The electrical installation was carried out and checked by authorized and qualified personnel.
3	All terminal boxes are closed.
4	The machine is grounded.
5	The direction of rotation of the motors is correct.
6	All operating elements, protective devices and warning systems are functioning correctly.
7	All of the bolted joints have been tightened.
8	There are no foreign objects in the machine.
9	All gearmotors and bearings are filled with lubricant.
10	The filling levels for lubricants are correct.
11	The belt tension is correct.
12	All the supply line connections are tight.

7.3 Checking the protective devices

No.	Check
1	All the protective devices are bolted tightly.
2	The EMERGENCY STOP button stops all safety-relevant drives. The machine does not start after unlocking the EMERGENCY STOP button. The machine must be restarted.

8 Operation

8.1 Starting and stopping the machine

8.1.1 Starting the machine

- Start the machine via the plant control system. See documentation for the plant control system.

8.1.2 Starting the machine after an emergency stop

1. Rectify the cause of the fault.
2. Reset the EMERGENCY STOP button.
3. Start the machine.

8.1.3 Stopping the machine

1. Interrupt the product feed.
2. Run the machine until it is empty.
3. Switch off the machine.

8.2 Setting the roller gap

8.2.1 Setting the roller gap with a manual grinding gap adjuster

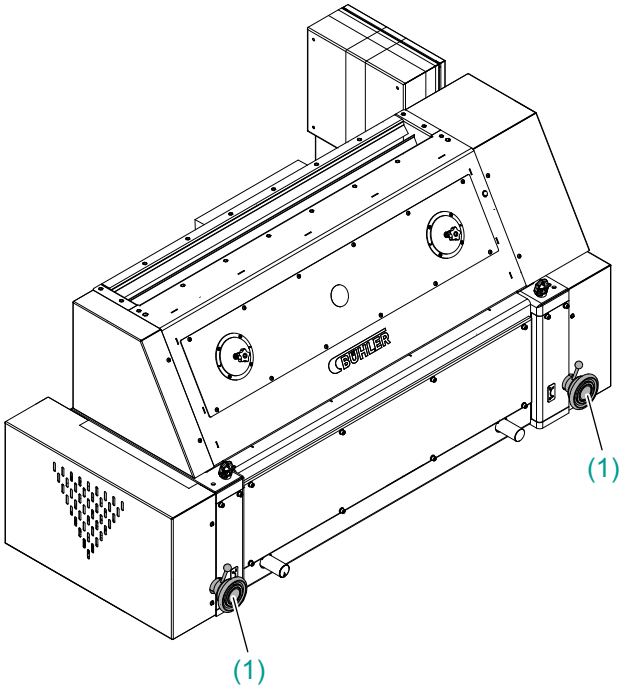


Fig. 8.1 Manual grinding gap adjuster

(1) Handwheel for the roller gap adjuster

NOTICE

Grinding gap too narrow.

Damage to the grinding roller drive.

- Do not go below the minimum roller gap of 0.5 mm (mechanical stopper).

1. Turn both handwheels counterclockwise until the desired readjustment is reached.
   → The grinding gap is increased.
2. Turn both handwheels clockwise until the desired readjustment is reached.
   → The grinding gap is decreased.

8.2.2 Setting the roller gap with an electrical grinding gap adjuster

During operation, it is possible to adjust the roller gap up to a maximum gap dimension [GAP.# MAX] = (minimum gap [GAP.# MIN] + 3.5 mm). For a roller gap outside the set range [GAP.# MAX] … [GAP.# MIN], the minimum gap must first be reset. See page 68, Chapter ”Setting the minimum gap with an automatic grinding gap adjuster“.

If using the roller gap adjuster due to wear of the rollers, the correction value [GAP.# COR.x] can be used. This has the advantage that the set roller gap [GAP.# SET] still matches the actual grinding gap. See the operating manual of the machine..

- Set the electrical grinding gap adjuster [GAP.# SET] in the operating manual of the control system. See the operating manual of the machine.

8.3 Extracting a product sample

Tools required:

– Sampler blade

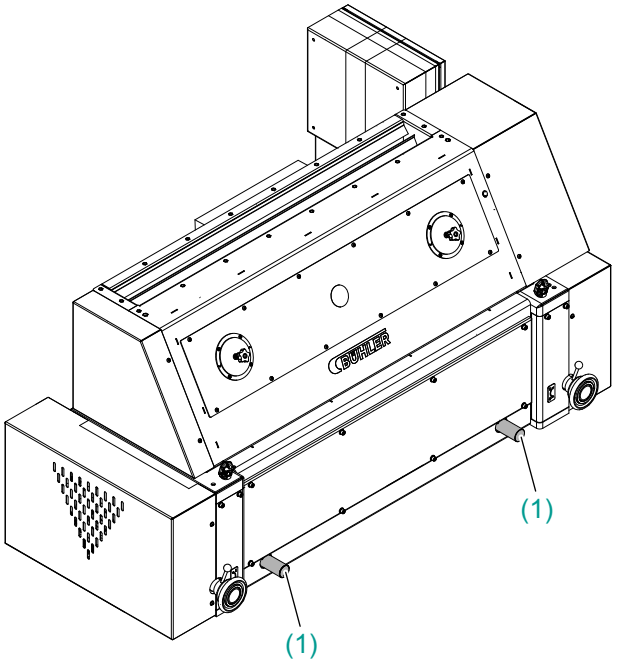


Fig. 8.2 Sampling

(1) Openings for sampling

1. Remove the blind plugs from the sampling openings.
2. Use the sampler blade to remove the product samples through the two openings.

8.4 Changing the product

1. Stop the machine. See page 50, Chapter ”Stopping the machine“.
2. Check for dirt accumulation in the inspection window.
3. If necessary, clean the feeder device and the rollers. See page 61, Chapter ”Cleaning the feeder device“. See page 62, Chapter ”Cleaning the rollers“.
4. Fill the machine with new product.
5. Use the control system to switch on the machine.

8.5 Ending production

1. Stop the machine. See page 50, Chapter ”Stopping the machine“.
2. If necessary, clean the machine.
   - Clean the outside of the machine. See page 61, Chapter ”Cleaning the outside of the machine“.
   - Secure the machine against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.
   - Clean the inside of the machine. See page 61, Chapter ”Cleaning the feeder device“. See page 62, Chapter ”Cleaning the rollers“.

9 Troubleshooting

9.1 Fault messages

Fault message at the operator device

Cause	Correction
Fault	▶ See the control system operating manual.

9.2 Faults

The machine does not start.

Cause	Correction
The master switch is in zero position.	▶ Switch on the master switch.
There are foreign objects between the rollers.	▶ Open the roller gap and run the machine until empty. ▶ If necessary, remove the roller assembly and the foreign bodies. See page 76, Chapter ”Removing the roller assembly“.
The machine does not have any current.	▶ Check the power supply.
Level probe does not transmit a signal.	▶ Check the level probe in the upper surge hopper. ▶ Check the cables.
The control system is not connected.	▶ Check the connection of the control system to the machine control system and the terminal box.

The machine shuts down again after starting

Cause	Correction
The belt tension of the drive belt is too low.	▶ Tension the drive belt. See page 70, Chapter ”Fitting and tensioning the drive belt“.
The slippage monitoring does not detect (option).	▶ The sensor is too far from the pulse disk. Adjust the distance to 4 ± 0.5 mm. ▶ Replace the defective sensor. See page 74, Chapter ”Replacing the slippage monitoring sensor“.
The parameter of the roller speed is set incorrectly (option).	▶ Set the correct parameter value of the speed monitoring. See the operating manual of the control system.

The feeder device conveys the product unevenly

Cause	Correction
There are foreign objects in the feeder device.	▶ Clean the feeder device. See page 61, Chapter "Cleaning the feeder device".
The level probe in the upper surge hopper is positioned incorrectly.	▶ Position the level probe in such a way that it is covered by the product. See page 36, Chapter "Aspiration".
The feed roller is worn.	▶ Replace the feed roller. See page 89, Chapter "Replacing the feed roll".
The rotary dosing valve is set oblique.	▶ Set the rotary dosing valve in parallel. See page 56, Chapter "Adjusting the rotary dosing valve".

Whistling noises occur when idling and during operation.

Cause	Correction
The roller grazes against the product guide sheet.	▶ Set product guide sheet. See page 75, Chapter "Setting product guide sheet".
There are foreign objects between the rollers.	▶ Open the roller gap and run the machine until empty. ▶ If necessary, remove the roller assembly and the foreign bodies. See page 76, Chapter "Removing the roller assembly".
Rollers are axially loose.	▶ Check the bearing cover. ▶ Check whether the bearings are tightened and fit firmly on the bearing journals. ▶ If necessary, tighten the screws on the bearing cover.
Rollers run in contact with one another.	▶ Adjust the minimum gap. See page 68, Chapter "Setting minimum gap".

The product quality is not achieved (granulation)

Cause	Correction
Roller gap is incorrectly set.	▶ Check and adjust the roller gap. See page 50, Chapter "Setting the roller gap".
Roller is heavily worn.	▶ Check the roller corrugation. ▶ If necessary, replace the roller assembly. See page 76, Chapter "Replacing the roller assembly".
The rollers are installed incorrectly.	▶ Align the rollers, cutting edge to cutting edge. Check the product flow while doing so. See page 83, Chapter "Fitting the roller assembly".
The product flows through the bypass flap.	▶ Close the bypass. Press the <Bypass> key on the control system to do this.

The bearing temperature is too high

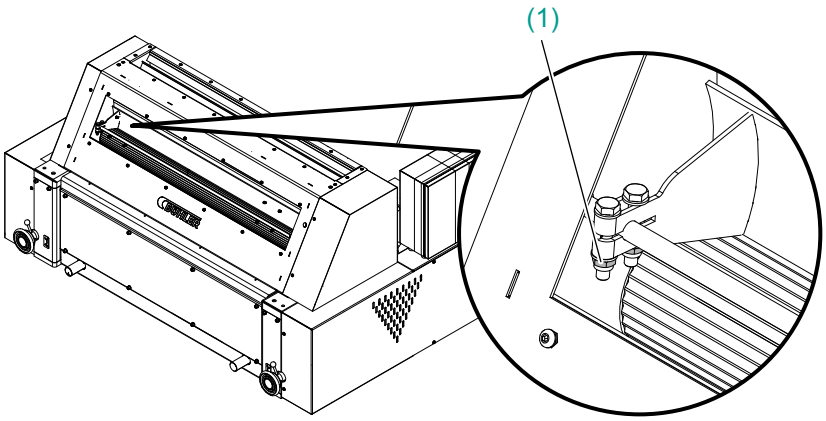
Cause	Correction
Lubrication is not sufficient.	▶ Lubricate the bearings on the drive side. See page 63, Chapter "Lubricating the bearing on the drive side". ▶ Lubricate the bearings on the transmission side. See page 65, Chapter "Lubricating the bearing on the transmission side".
Too much grease in the bearing housing.	▶ Loosen the bearing cover and remove any excess grease.
Belt tension is too high.	▶ Adjust the belt tension on the drive side. See page 70, Chapter "Fitting and tensioning the drive belt". ▶ Adjust the belt tension on the transmission side. See page 72, Chapter "Fitting and tensioning the transmission belt".
Bearing damage.	▶ Replace the defective bearing. Contact Bühler Group.

The motor current causes the machine to stop

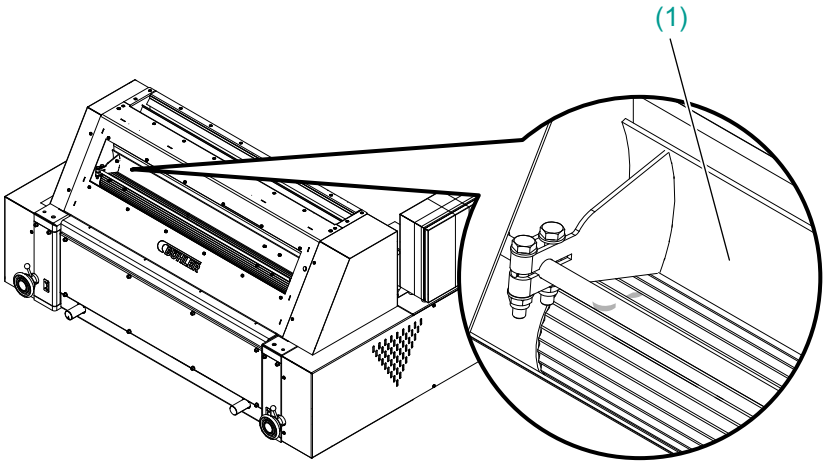
Cause	Correction
Too much product is fed in.	▶ Reduce the supply of product. ▶ Open the roller gap. See page 50, Chapter "Setting the roller gap".
There are foreign objects in the machine.	▶ Check the roller gap and, if necessary, clean it. See page 67, Chapter "Checking the minimum gap". See page 62, Chapter "Cleaning the rollers". ▶ If necessary, remove the roller and any foreign objects. See page 76, Chapter "Removing the roller assembly".

9.3 Adjusting the rotary dosing valve

1. Loosen the 2 nuts (1) on each side. Do not remove the nuts.



2. Set rotary dosing valve (1) in parallel.



3. Tighten the 2 nuts on each side.

10 Maintenance

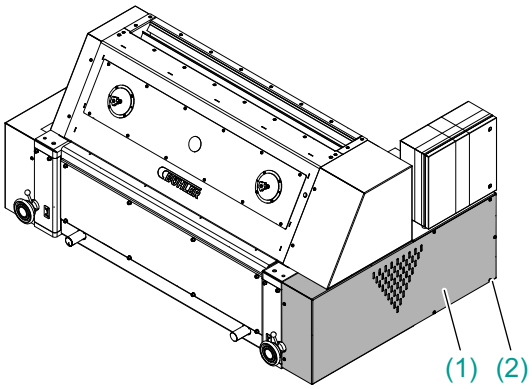
10.1 Removing and fitting the cover on the drive side

10.1.1 Removing the cover on the transmission side

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

▶ Remove the 7 M8×20 socket head cap screws (2) and remove cover (1).

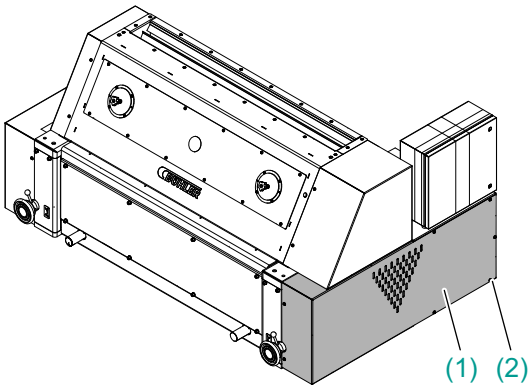


10.1.2 Fitting the cover on the drive side

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

▶ Attach cover (1) and tighten the 7 M8×20 socket head cap screws (2).



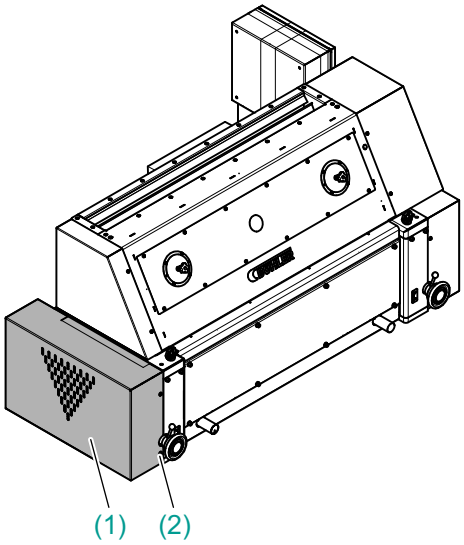
10.2 Removing and fitting the the cover on the transmission side

10.2.1 Removing the cover on the transmission side

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

- Remove the 4 M8×20 socket head cap screws (2) and cover (1).

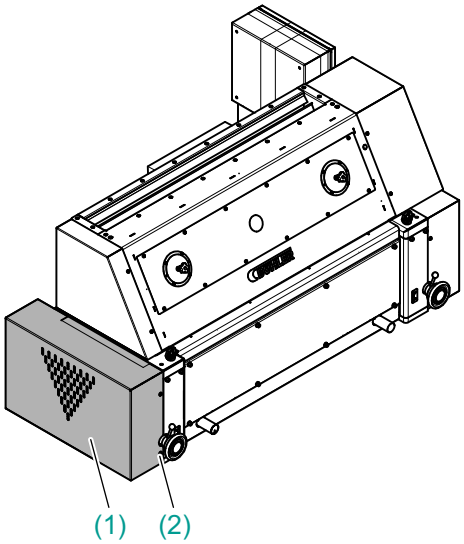


10.2.2 Fitting the cover on the transmission side

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter "Protective measure to prevent unexpected starting".

- Attach cover (1) and tighten the 4 M8×20 socket head cap screws (2).



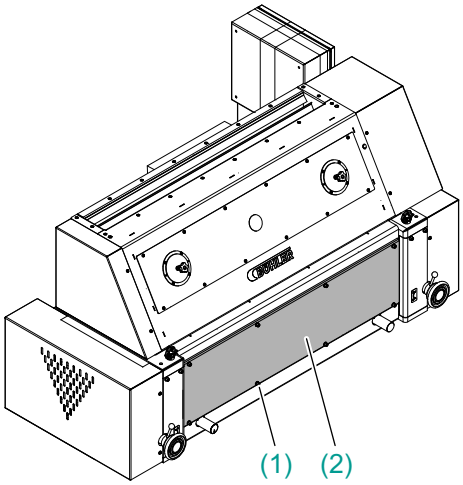
10.3 Removing and fitting the grinding chamber cover

10.3.1 Removing the grinding chamber cover

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter "Protective measure to prevent unexpected starting".

- Remove the grinding chamber cover.



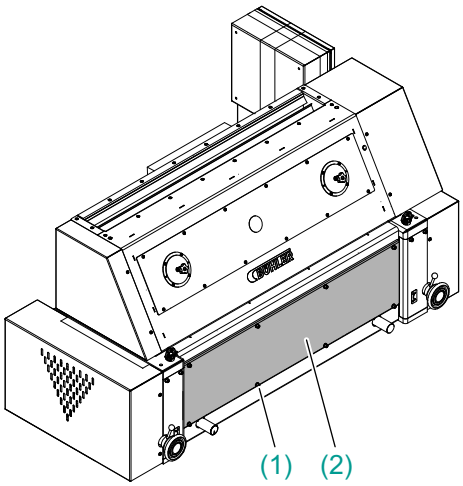
- Loosen the 8 M10×35 socket head cap screws (1).
- Remove the cover (2).

10.3.2 Fitting the grinding chamber cover

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

- Fit the grinding chamber cover.



- Attach cover (2) to the machine.
- Tighten the 8 M10×35 socket head cap screws (1).

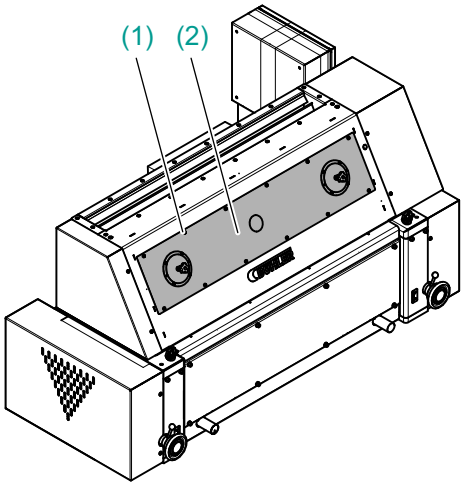
10.4 Removing and fitting the feed roller cover

10.4.1 Removing the feed roller cover

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

- Remove the feed roller cover.



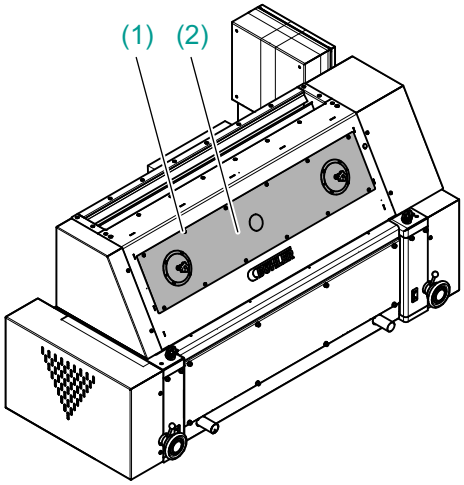
- Loosen the 8 M8×20 socket head cap screws (1).
- Remove feeder device cover (2).

10.4.2 Fitting the feed roller cover

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

- Fit the feed roller cover.



- Attach feeder device cover (2).
- Tighten the 8 M8×20 socket head cap screws (1).

10.5 Cleaning

10.5.1 Cleaning schedule

Interval	Machine part	Measure
24 h/once a day	Feeder unit	▸ Cleaning the feeder device. See page 61.

Interval	Machine part	Measure
120 h/once a week	Machine (outside)	▶ Cleaning the outside of the machine. See page 61.
	Corrugated roller	▶ Cleaning the rollers. See page 62.
1500 h/3 months	Motor	▶ Cleaning the cooling fins of the drive motor. See page 62.

10.5.2 Cleaning the outside of the machine

Tools required:

– Dry cleaning cloth
– Vacuum cleaner with a HEPA filter

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter "Protective measure to prevent unexpected starting".

1. Clean all surfaces with a dry cleaning cloth or a vacuum cleaner.
2. Clean the graphical user interface with a dry cleaning cloth.

10.5.3 Cleaning the feeder device

Required protective equipment:

– Protective gloves

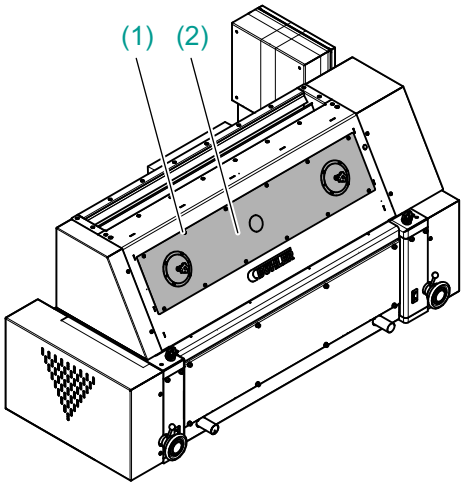
Tools required:

– Brush
– Vacuum cleaner with a HEPA filter

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter "Protective measure to prevent unexpected starting".

1. Remove the feeder device cover.



▶ Loosen the 8 M8×20 socket head cap screws (1).
▶ Remove feeder device cover (2).

WARNING

Sharp feed rollers.

Serious injuries to hands.

- ▶ Wear protective gloves.

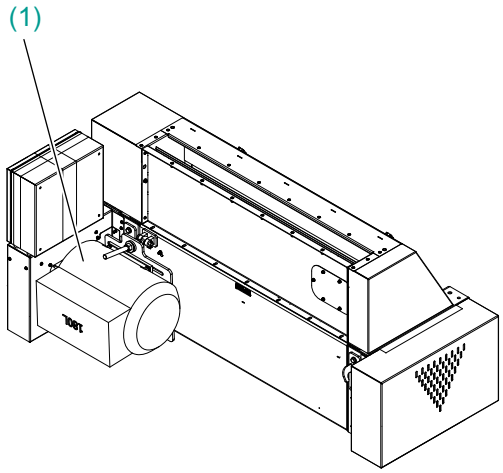
2. Clean the interior of the feeder device with a brush or vacuum cleaner.
3. Fasten the cover of the feeder device with 8 socket-head screws M8×20.

10.5.4 Cleaning the cooling fins of the drive motor

Tools required:

– Vacuum cleaner with a HEPA filter
– Dry cleaning cloth

▶ Clean cooling fins (1) of the drive motor.



10.5.5 Cleaning the rollers

Required protective equipment:

– Protective gloves

Tools required:

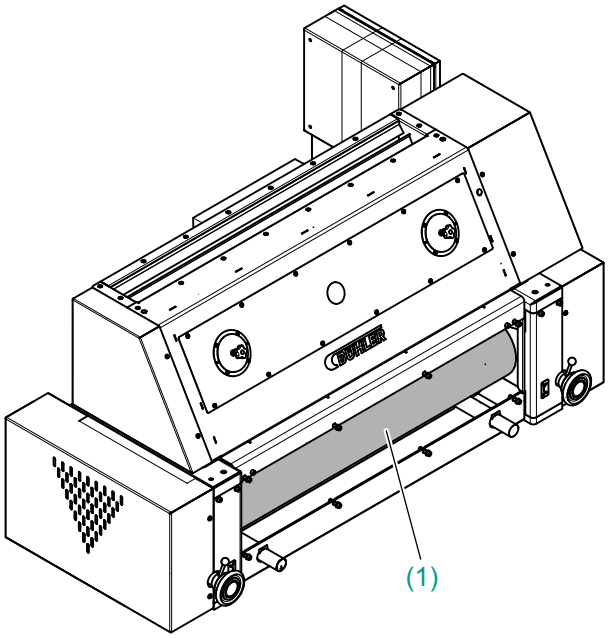
– Vacuum cleaner with a HEPA filter
– Brush

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.
✓ The grinding chamber cover is removed. See page 58, Chapter ”Removing the grinding chamber cover“.

1. Remove the product guide sheet. See page 76, Chapter ”Removing the roller assembly“.

2. Clean rollers (1) with a brush or a vacuum cleaner.



3. Clean product residues between the rollers with a vacuum cleaner.

10.6 Lubrication

10.6.1 Lubrication schedule

Interval	Machine part	Measure
12,000 h/2 years	Bearing, Grinding roller	▶ Lubricating the bearing on the drive side. See page 63.
	Bearing, Grinding roller	▶ Lubricating the bearing on the transmission side. See page 65.
18,000 h/3 years	Motor	▶ Lubricating the drive motor. See page 66.

10.6.2 Lubricating the bearing on the drive side

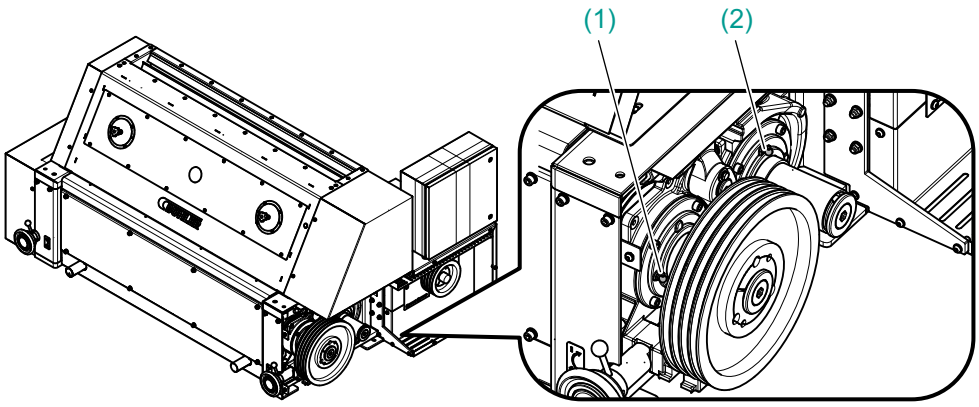


Fig. 10.1 Bearing on drive side

(1) Grease nipple of front roller

(2) Grease nipple of rear roller

Material required:

– Grease
– Lubricant filling quantity. See page 17.

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.
✓ The cover on the drive side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

NOTICE

Various operating supplies.

Damage to parts.

- Do not mix operating supplies from different suppliers.
- When different operating supplies are used, remove the old operating supplies entirely and dispose of them in an environmentally safe way.
- Clean the respective parts.

NOTICE

Too much grease in the bearing housing.

Damage to bearing from increased bearing temperature.

- After re-lubricating 10 times, open the bearing housing and remove the grease filling to be found there.

1. Lubricate the bearings. See page 17, Chapter ”Lubricant filling quantity“.
2. Fit the cover on the drive side. See page 57, Chapter ”Fitting the cover on the drive side“.

10.6.3 Lubricating the bearing on the transmission side

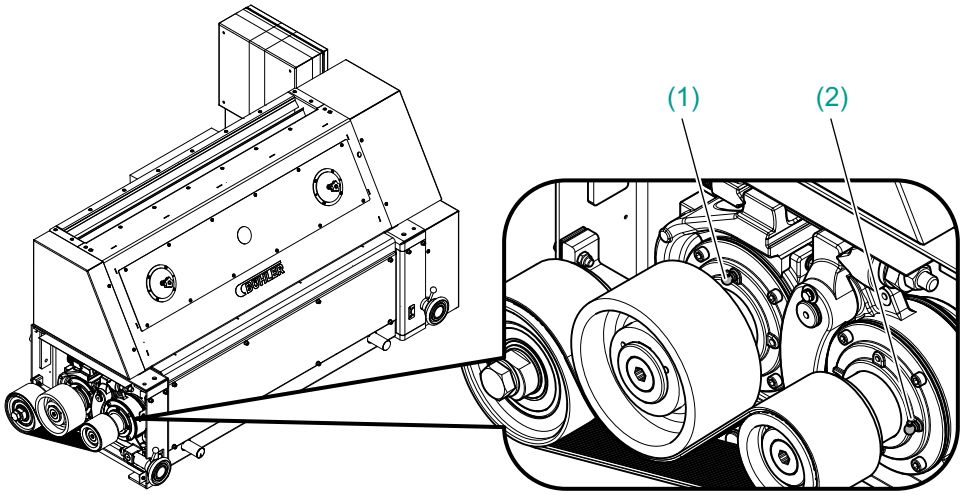


Fig. 10.2 Bearing on the transmission side

(1) Grease nipple of rear roller (2) Grease nipple of front roller

Material required:

– Grease
– Lubricant filling quantity. See page 17.

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.
✓ The cover on the transmission side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

NOTICE

Various operating supplies.

Damage to parts.

- Do not mix operating supplies from different suppliers.
- When different operating supplies are used, remove the old operating supplies entirely and dispose of them in an environmentally safe way.
- Clean the respective parts.

NOTICE

Too much grease in the bearing housing.

Damage to bearing from increased bearing temperature.

- After re-lubricating 10 times, open the bearing housing and remove the grease filling to be found there.

1. Lubricate the bearings. See page 17, Chapter ”Lubricant filling quantity“.
2. Fit the cover on the transmission side.

10.6.4 Lubricating the drive motor

- Lubricate the drive motor. See the documentation provided by the supplier.

10.7 Maintenance

10.7.1 Maintenance schedule

Interval	Machine part	Measure
24 h/once a day	Feed roll	▶ Checking the product flow. See page 66.
120 h/once a week	Bearing	▶ Checking the temperature of the bearings. See page 66.
	Roller assembly	▶ Checking the state of the rollers. See page 66.
500 h/once a month	Roller assembly	▶ Checking the minimum gap. See page 67.
6000 h/once a year	Grounding point	▶ Checking the grounding. See page 67.

10.7.2 Checking the product flow

- Check the product flow in the inspection window while the machine is running.
  - → The product is distributed evenly on the feed roller.

10.7.3 Checking the temperature of the bearings

For machines with bearing temperature monitoring (option), the temperature is checked using the control system.

Prerequisites:

- ✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.
- ✓ The cover on the drive side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.
- ✓ The cover on the transmission side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

1. Check the temperature of the bearings on the roller drive.
2. If necessary, lubricate the bearings of the drive side and transmission side. See page 63, Chapter ”Lubricating the bearing on the drive side“. See page 65, Chapter ”Lubricating the bearing on the transmission side“.

10.7.4 Checking the state of the rollers

Prerequisites:

- ✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.
- ✓ The grinding chamber cover is removed. See page 58, Chapter ”Removing the grinding chamber cover“.

1. Check the corrugated roller for worn corrugations.

2. If necessary, replace the corrugated roller. See page 76, Chapter ”Replacing the roller assembly“.

10.7.5 Checking the minimum gap

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

✓ The grinding chamber cover is removed. See page 58, Chapter ”Removing the grinding chamber cover“.

▶ Check the gap dimension in the grinding chamber with a feeler gauge.

→ The minimum gap is min. 0.5 mm. The minimum gap is OK.

→ The minimum gap is less than 0.5 mm. Adjust the minimum gap. See page 68, Chapter ”Setting minimum gap“.

10.7.6 Checking the grounding

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

▶ Check the bolted joint of the grounding point. See page 46, Chapter ”Grounding the machine“.

11 Repair

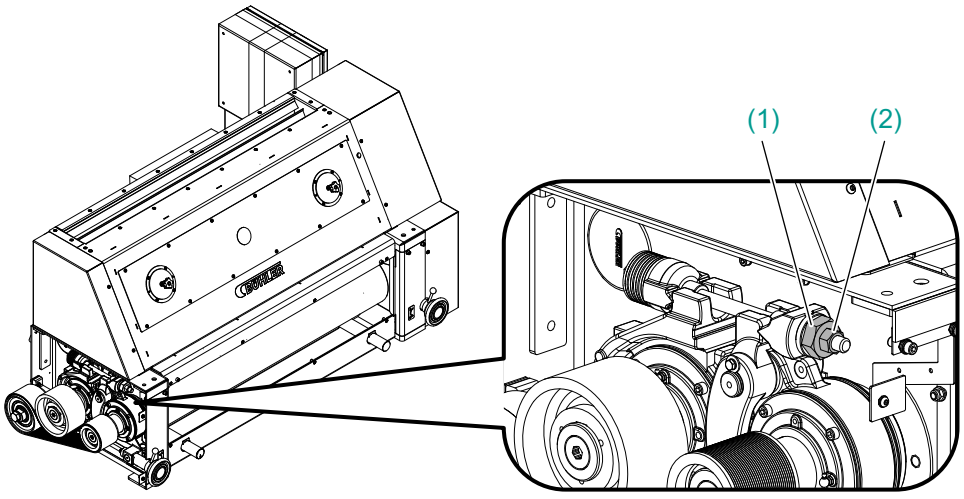
11.1 Setting minimum gap

11.1.1 Setting the minimum gap with an automatic grinding gap adjuster

Tools required:

– Feeler gauge

1. Adjust the [GAP.MODE] to [LOC] or [REM].
2. Set [GAP.# COR.x] to default value [0.0].
3. In order to engage the roller, keep the  button on the machine control system pressed for 5 s.
4. Wait until motors have moved to [GAP.#MIN] and are at a standstill.
5. Remove the cover on the drive side. See page 57, Chapter ”Removing the cover on the transmission side“.
6. Remove the cover on the transmission side. See page 57, Chapter ”Removing the cover on the transmission side“.
7. Remove the grinding chamber cover. See page 58, Chapter ”Removing the grinding chamber cover“.
8. Loosen counternut (2) and set the desired gap dimension by turning adjusting sleeve (1) on both sides.



9. Tighten the counternut and check the gap dimension in the grinding chamber with a feeler gauge. If necessary, repeat step 7.
10. Fit the grinding chamber cover. See page 59, Chapter ”Fitting the grinding chamber cover“.
11. Fit the cover on the transmission side. See page 58, Chapter ”Fitting the cover on the transmission side“.
12. Fit the cover on the drive side. See page 57, Chapter ”Fitting the cover on the drive side“.
13. Set [GAP.# MIN] on the control system to the set gap dimension.

14. To disengage the roller, press and hold the  button down for 2 s.
    → [GAP.#SET] is approached.

11.1.2 Setting the minimum gap with a manual grinding gap adjuster

Tools required:

– Feeler gauge

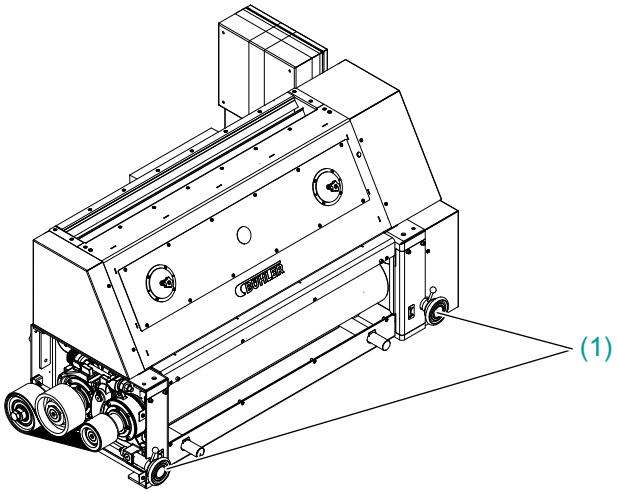
Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

✓ The cover on the transmission side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

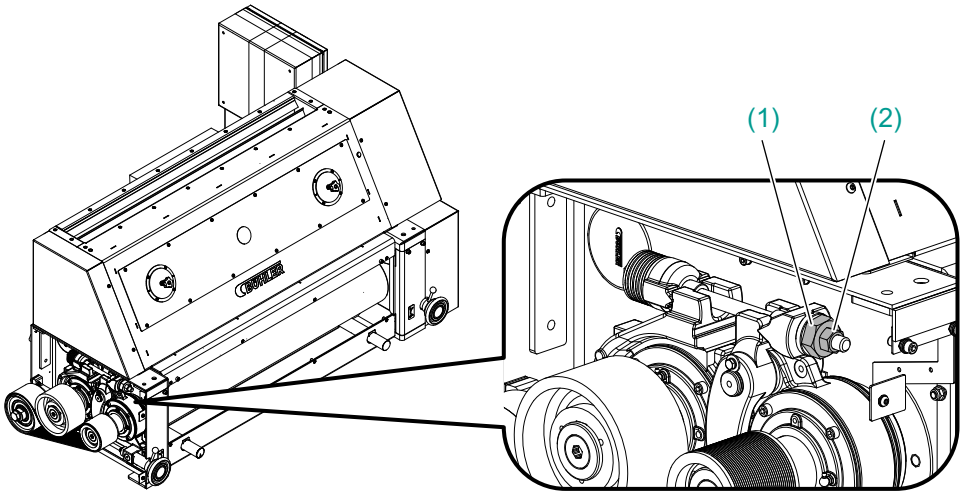
✓ The grinding chamber cover is removed. See page 58, Chapter ”Removing the grinding chamber cover“.

1. Adjust handwheels (1).



- ▶ Turn the handwheels clockwise until the shift lever is at the stopper. The handwheel can no longer be turned.
- ▶ Turn the handwheels counterclockwise by ½ revolution.

2. Loosen counternut (2) and set the desired gap dimension by turning adjusting sleeve (1) on both sides.



3. Tighten the counternut and check the gap dimension in the grinding chamber with a feeler gauge. If necessary, repeat step 2.
4. Fit the grinding chamber cover. See page 59, Chapter ”Fitting the grinding chamber cover“.
5. Fit the cover on the transmission side. See page 58, Chapter ”Fitting the cover on the transmission side“.

11.2 Replacing the drive belt

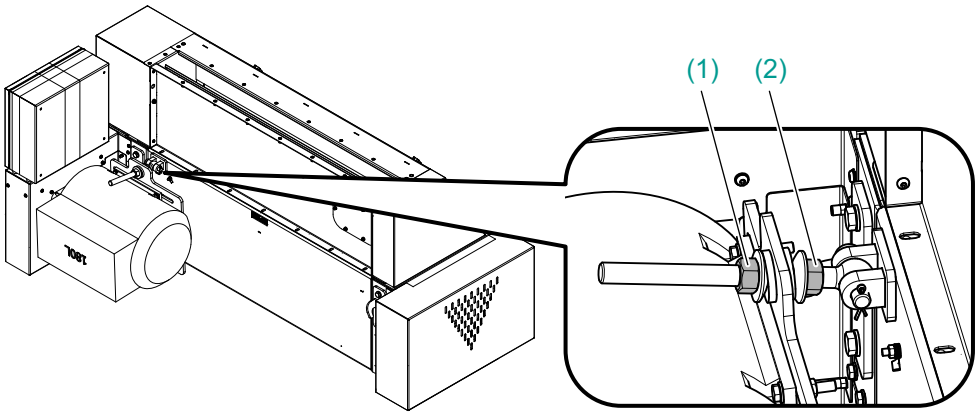
11.2.1 Removing the drive belt

Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

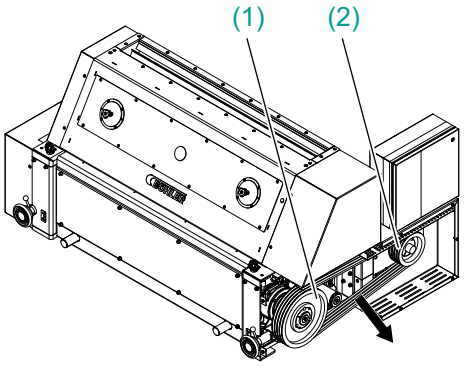
✓ The cover on the drive side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

1. Relieve the drive belt.



- ▶ Loosen the counternut (1).
- ▶ Loosen the M24 nut (2) until the drive belt is slack.

2. First remove the drive belt from the large belt pulley (1) and then from the small pulley (2).



11.2.2 Fitting and tensioning the drive belt

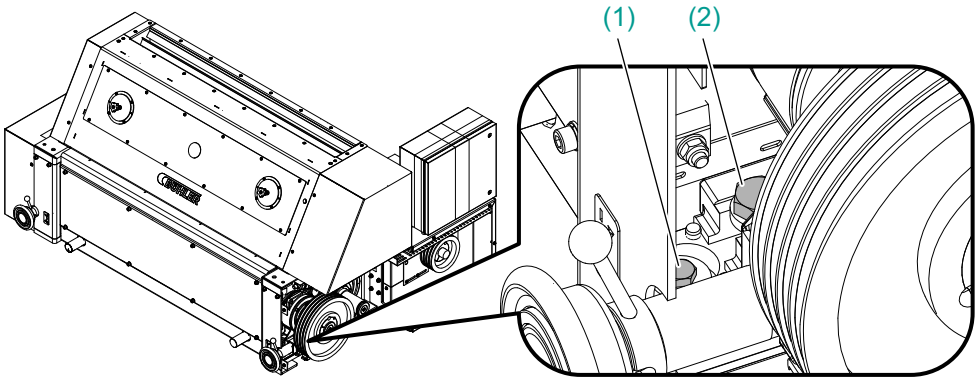
Tools required:

– Frequency meter

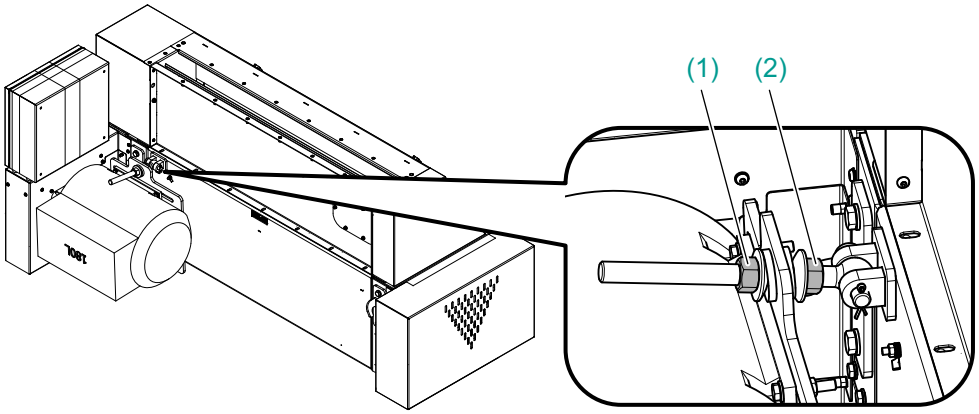
Prerequisites:

- ✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.
- ✓ The cover on the drive side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.
- ✓ Drive belt is removed. See page 70, Chapter ”Removing the drive belt“.

1. Ensure that the M12×85 hexagon head screw (1) and the M12×85 hexagon head screw (2) are tightened.



2. First mount the drive belt on the large belt pulley and then over the small belt pulley.
3. Tension the drive belt.



- ▶ Loosen M24 counternut (1).
- ▶ Tighten M24 nut (2).
- ▶ Check the belt tension with a frequency meter.
- → The belt frequency is 23 … 40 Hz.
- ▶ If necessary, use the M24 nut (2) to correct it.
- ▶ Tighten M24 counternut (1).

4. Fit the cover on the drive side. See page 57, Chapter ”Fitting the cover on the drive side“.

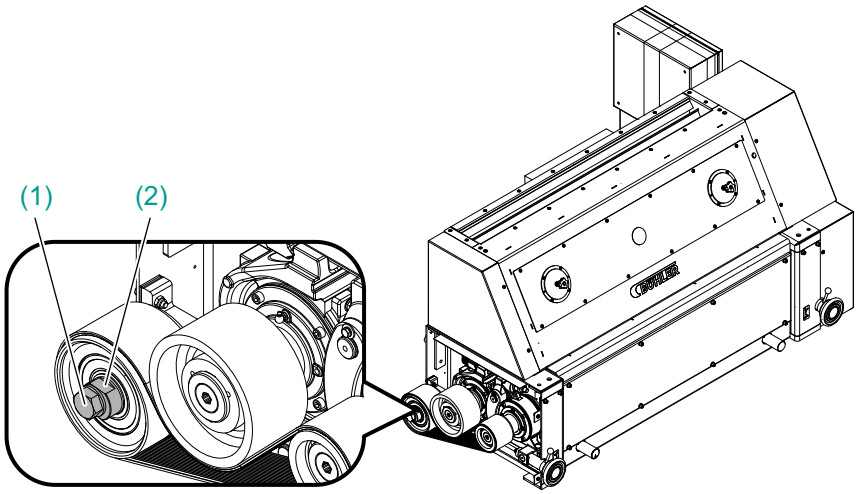
11.3 Replacing the belt on the transmission side

11.3.1 Removing the transmission belt

Prerequisites:

- ✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.
- ✓ The cover on the transmission side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

1. Slacken the transmission belt.



   - ▶ Loosen hexagon head screw (1).
   - ▶ Loosen eccentric bushing (2) clockwise until the drive belt is slack.
2. Remove the drive belt from the belt pulley and return sheave.

11.3.2 Fitting and tensioning the transmission belt

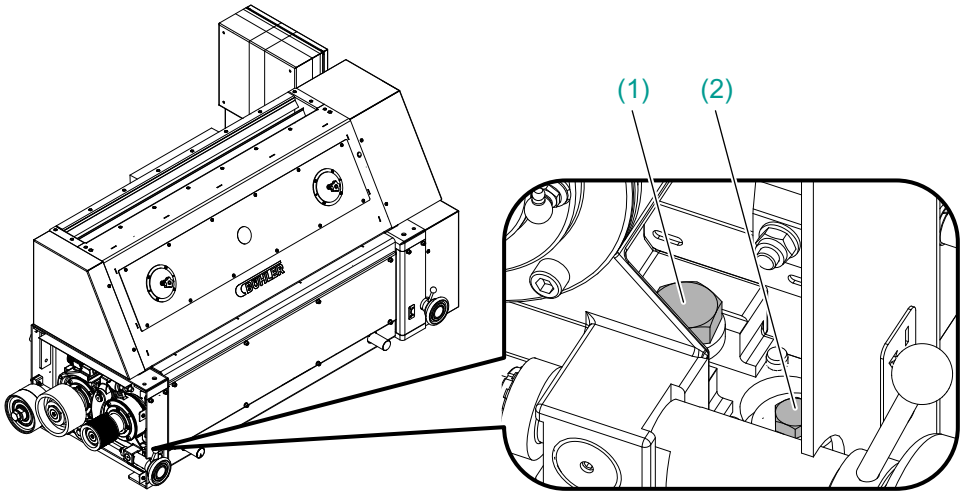
Tools required:

– Frequency meter

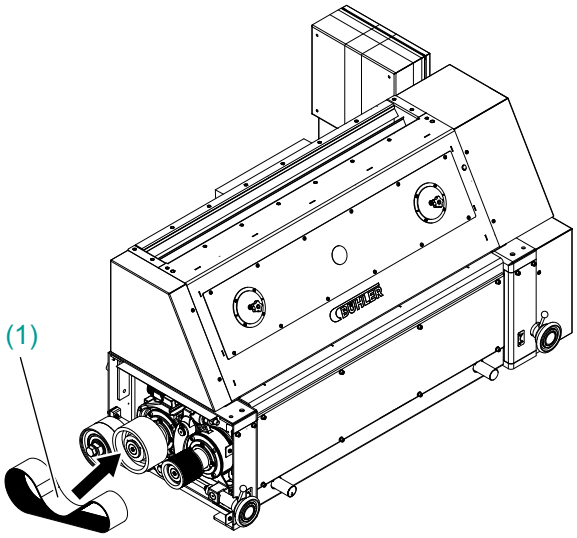
Prerequisites:

- ✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.
- ✓ The cover on the transmission side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.
- ✓ Transmission belt has been removed. See page 72, Chapter ”Removing the transmission belt“.

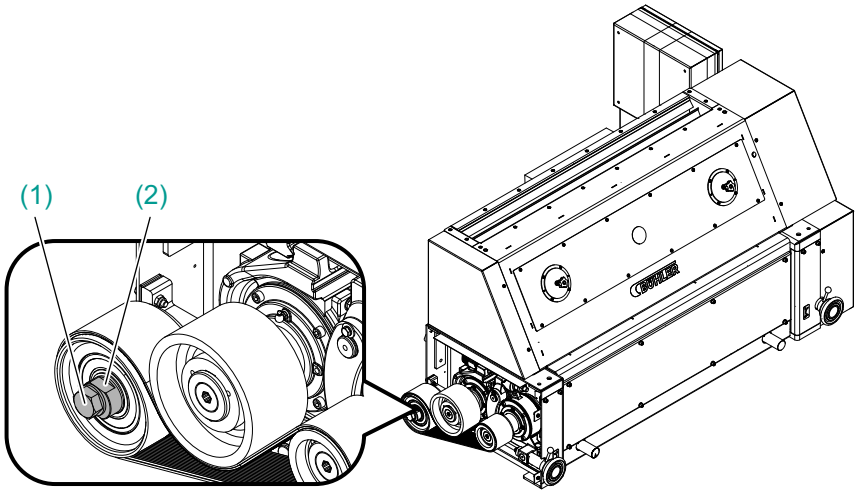
1. Ensure that the M12×85 hexagon head screw (1) and the M12×85 hexagon head screw (2) are tightened.



2. Mount drive belt (1) on the belt pulley and return sheave.



3. Tension the transmission belt.



- ▶ Tighten eccentric bushing (2) counterclockwise until the drive belt is tensioned.
- ▶ Check the belt tension. If necessary, correct it with an eccentric bushing.
- ▶ Tighten hexagon head screw (1).
- → The belt frequency is 45 … 50 Hz.

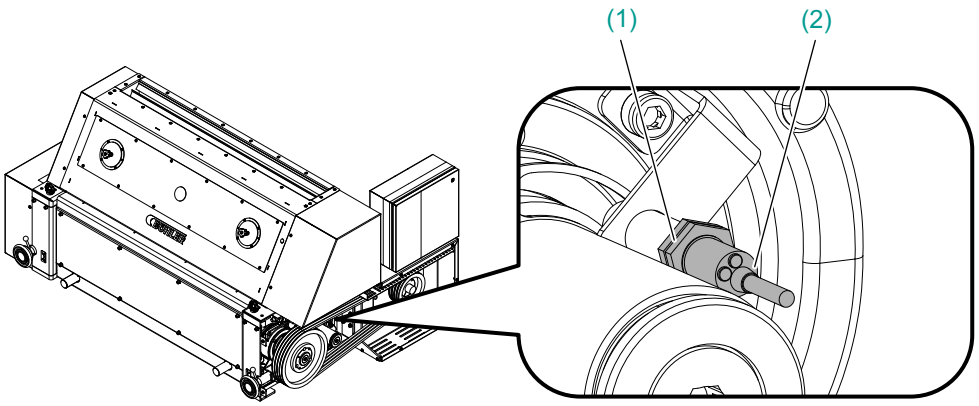
4. Fit the cover on the transmission side. See page 58, Chapter "Fitting the cover on the transmission side".

11.4 Replacing the slippage monitoring sensor

Prerequisites:

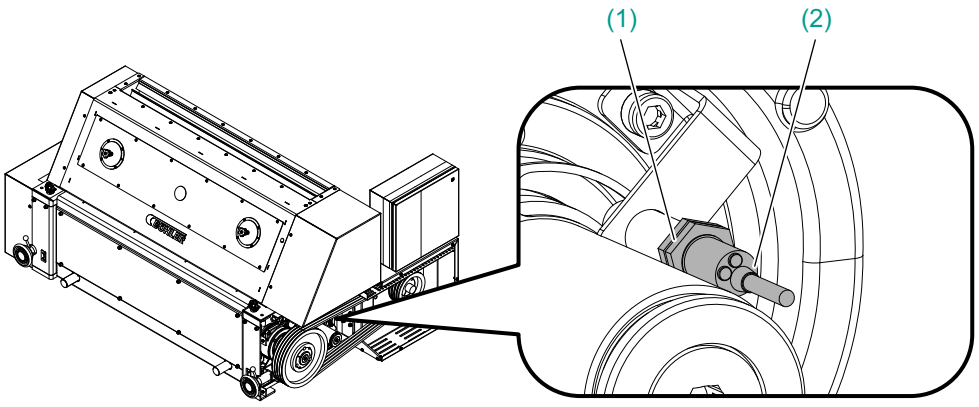
- ✓ The machine is secured against unexpected starting. See page 14, Chapter "Protective measure to prevent unexpected starting".
- ✓ The cover on the drive side is removed. See page 57, Chapter "Removing the cover on the transmission side".

1. Remove the sensor.



- ▶ Loosen 2 nuts (1).
- ▶ Remove sensor (2).
- ▶ Remove the sensor cable from the control system.

2. Fit the sensor.



- Attach sensor (2).
- Adjust the sensor to switching point with nut (1) and fix it with counternut (2).
- Ensure that the switching distance between the sensor and pulse disk is set to 4 ± 0.5 mm.
- Connect the sensor cable to the control system.

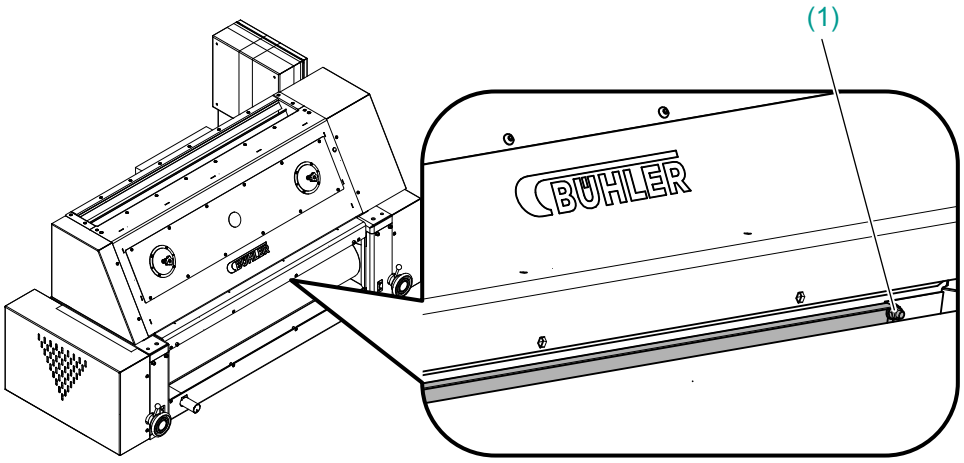
11.5 Setting product guide sheet

Prerequisites:

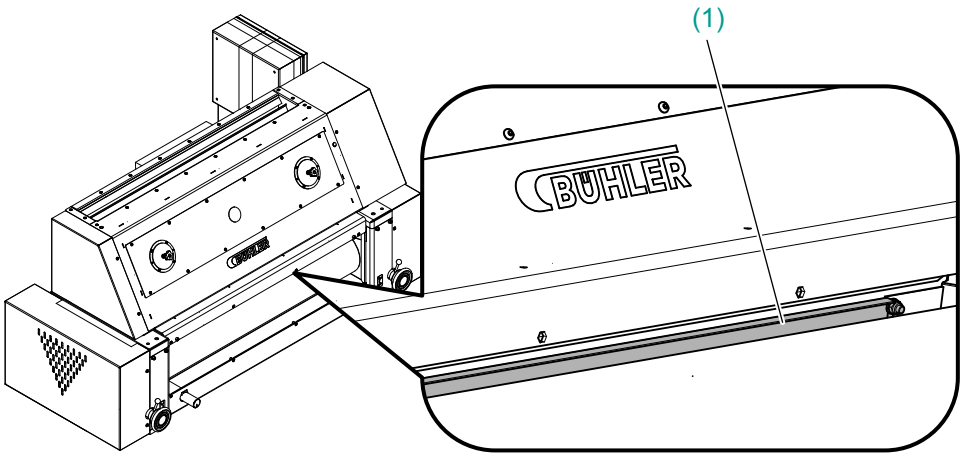
✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

✓ The grinding chamber cover is removed. See page 58, Chapter ”Removing the grinding chamber cover“.

1. Loosen the 2 nuts (1) slightly on the product guide sheet, do not remove them.



2. Slide product guide sheet (1) max. 0.5 mm onto the roller.



3. Fix the product guide sheet with the 2 nuts.
   → Make sure that the product guide sheet does not touch the roller.
4. Fit the grinding chamber cover. See page 59, Chapter ”Fitting the grinding chamber cover“.

11.6 Replacing the roller assembly

11.6.1 Removing the roller assembly

Required protective equipment:

– Protective gloves

Prerequisites:

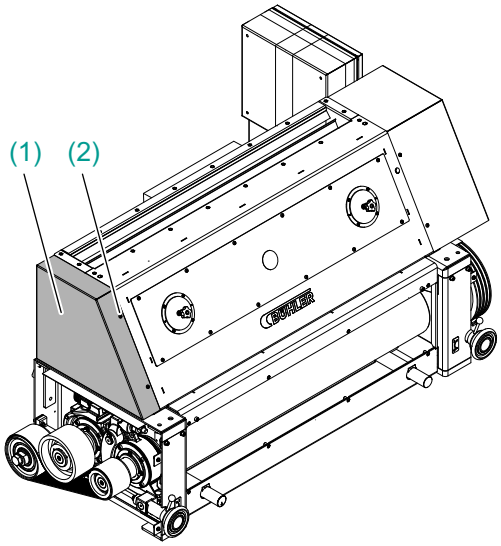
✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

✓ The cover on the drive side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

✓ The cover on the transmission side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

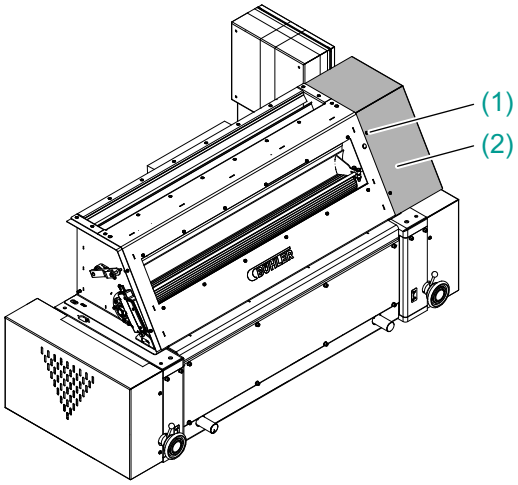
✓ The grinding chamber cover is removed. See page 58, Chapter ”Removing the grinding chamber cover“.

1. Remove the cover hood of the feeder device on the left.



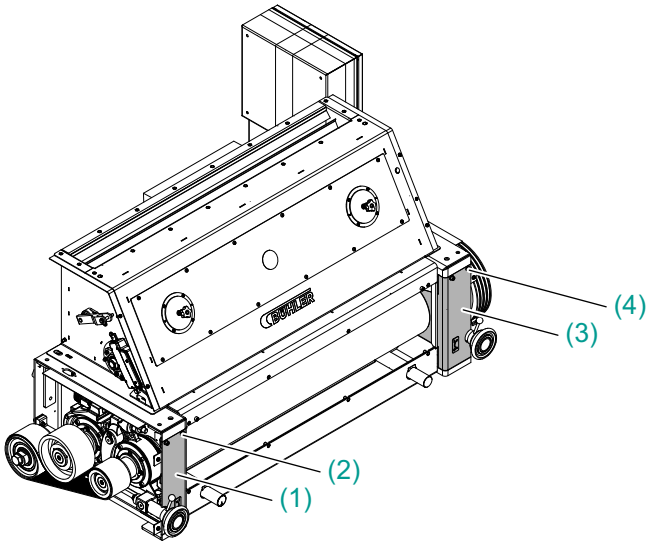
   - Loosen the 2 M8×20 socket head cap screws (2).
   - Remove the cover hood of the feeder device on the left (1).

2. Remove the cover hood of the feeder device on the right.



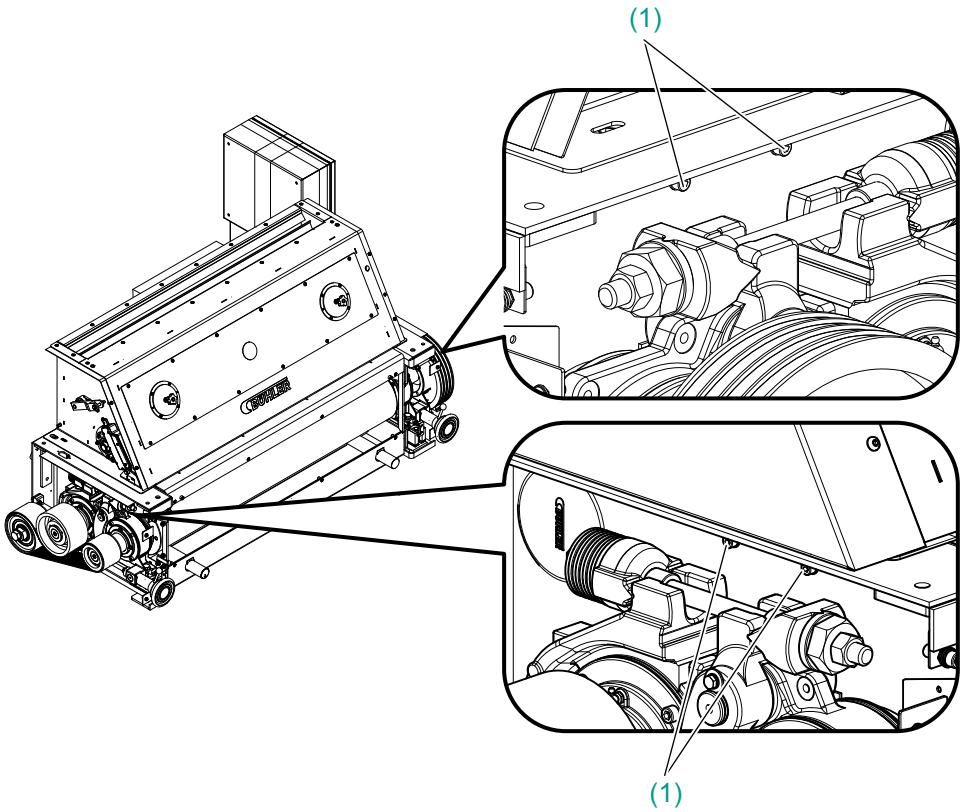
   - Loosen the 2 M8×20 socket head cap screws (1).
   - Remove the cover hood of the feeder device on the right (2).

3. Remove the side parts on the roller module.

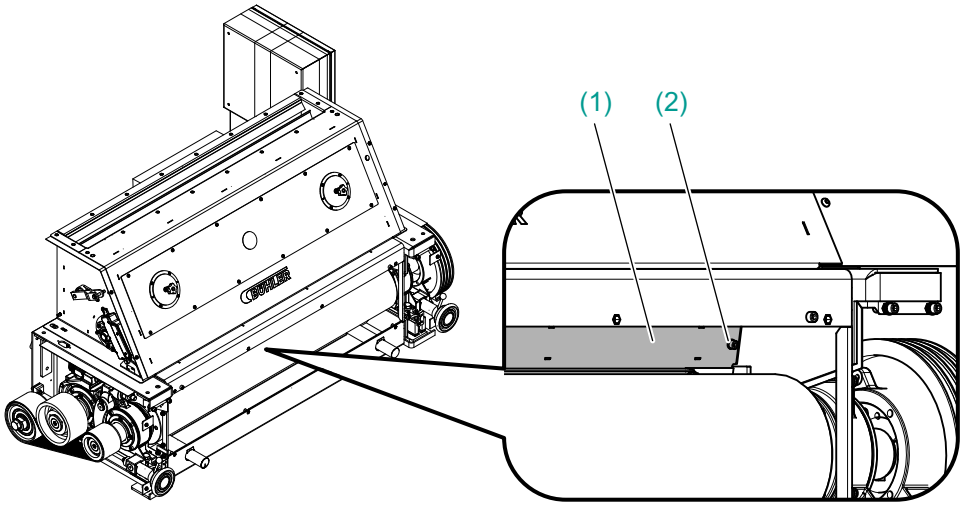


- Loosen the 2 M10×30 socket head cap screws (2) and remove the side part on the left (1).
- Loosen the 2 M10×30 socket head cap screws (4) and remove the side part on the right (3).

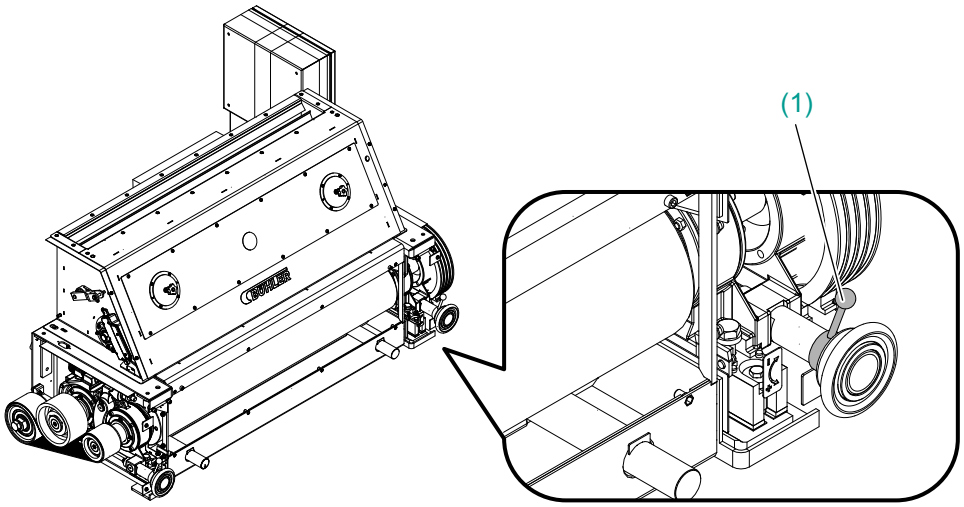
4. Loosen the 2 M8×16 socket head cap screws (1) on both sides.



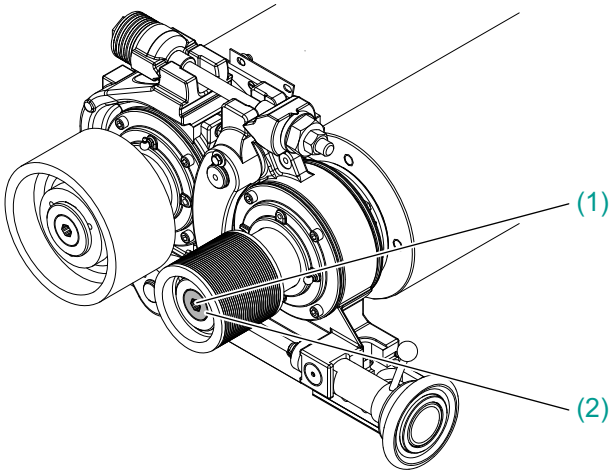
5. Loosen the 4 screws (2) and remove product guide sheet (1).



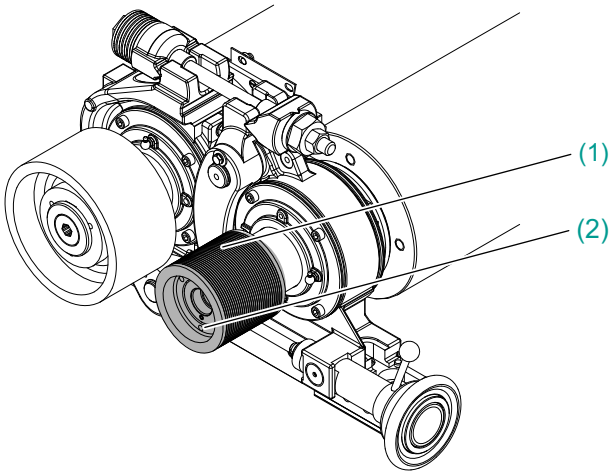
6. Remove the side wedges in the grinding chamber.
7. Loosen ball knob (1) on both sides.



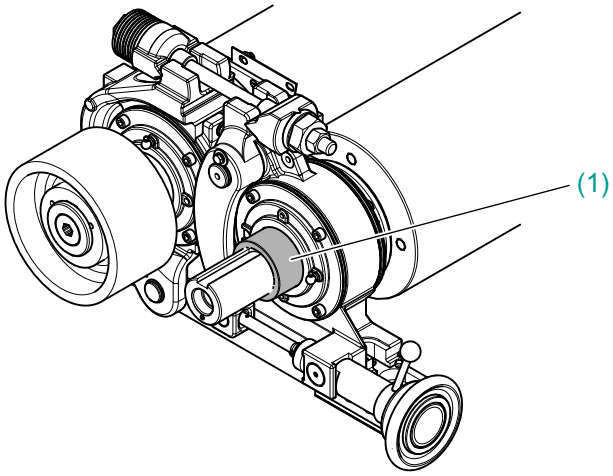
8. Remove the belt pulleys on the transmission side.
9. Loosen socket head cap screw (1) and remove plug (2).



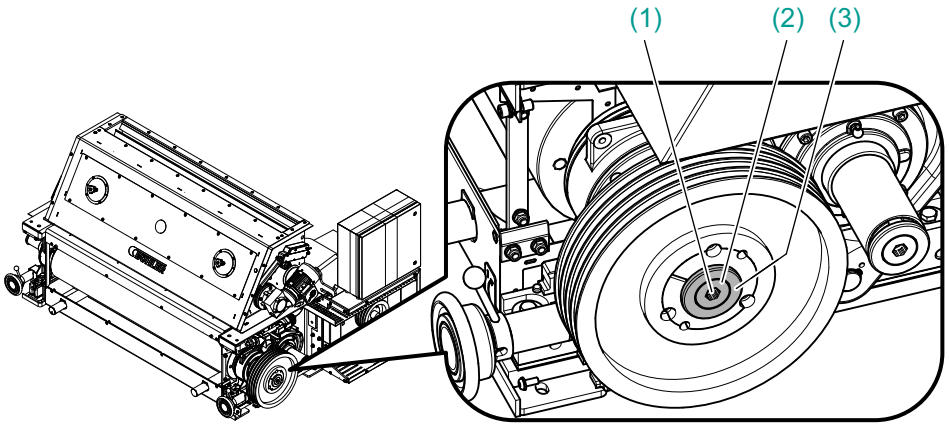
10. Loosen the 3 socket head cap screws (2) and pull off belt pulley (1).



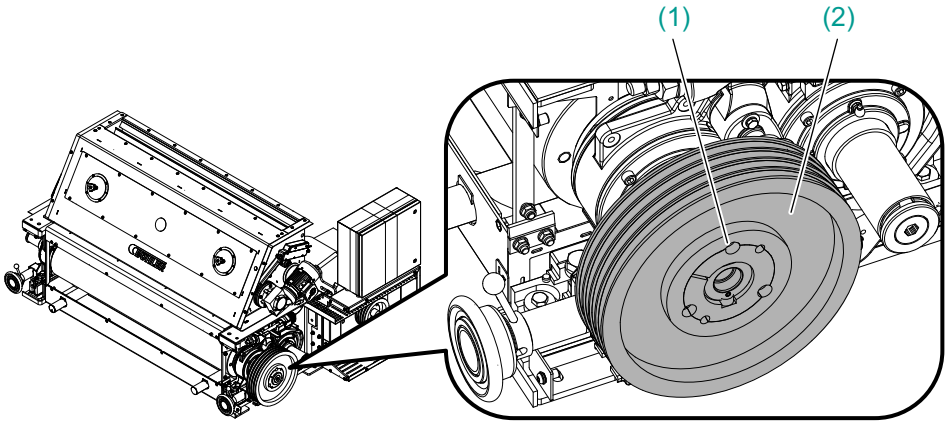
11. Pull off spacer sleeve (1).



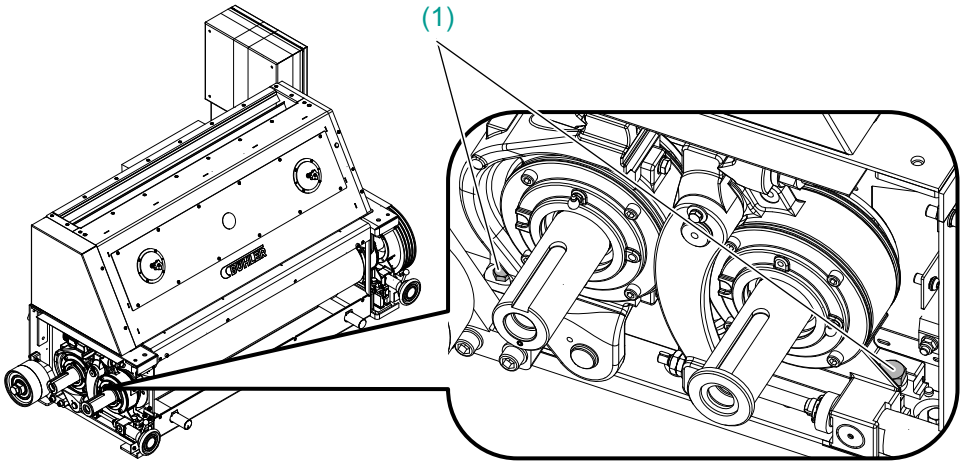
12. Remove the belt pulley on the drive side.
13. Loosen socket head cap screw (1) and remove plug (2) and shaft end washer (3).



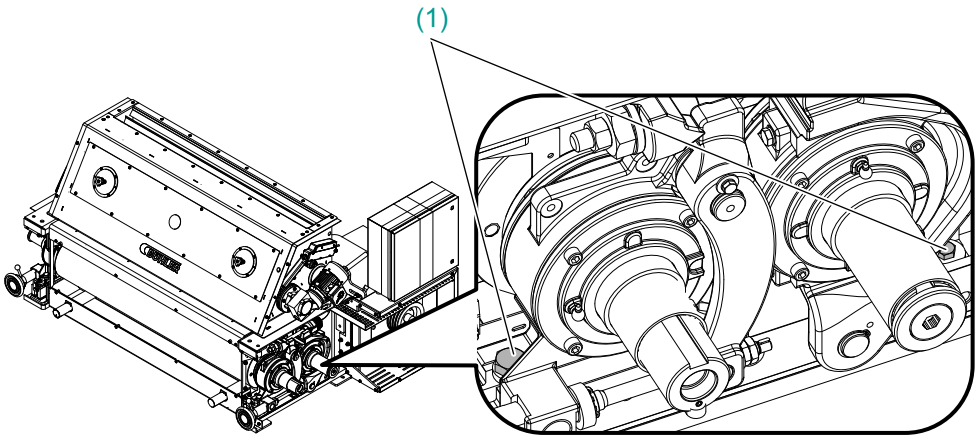
14. Loosen the 3 socket head cap screws (1) and pull off belt pulley (2).



15. Loosen the roller assembly on both sides.
16. Loosen the 2 M12×85 hexagon head screws (1) on the transmission side.

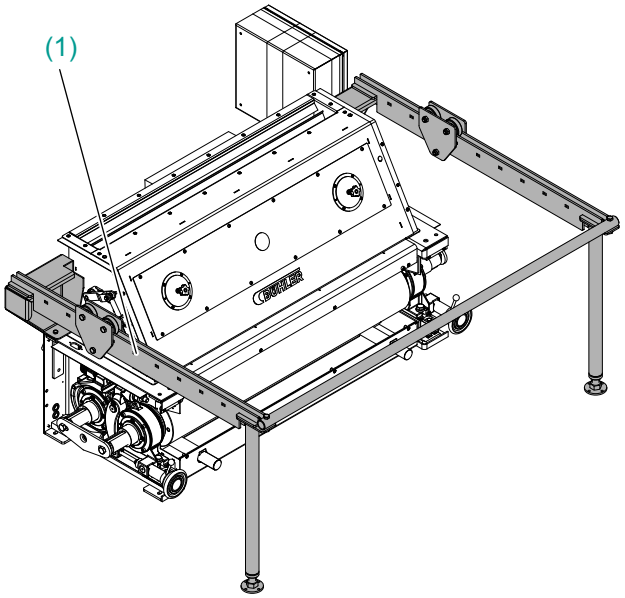


17. Loosen the 2 M12×85 hexagon head screws (1) on the drive side.

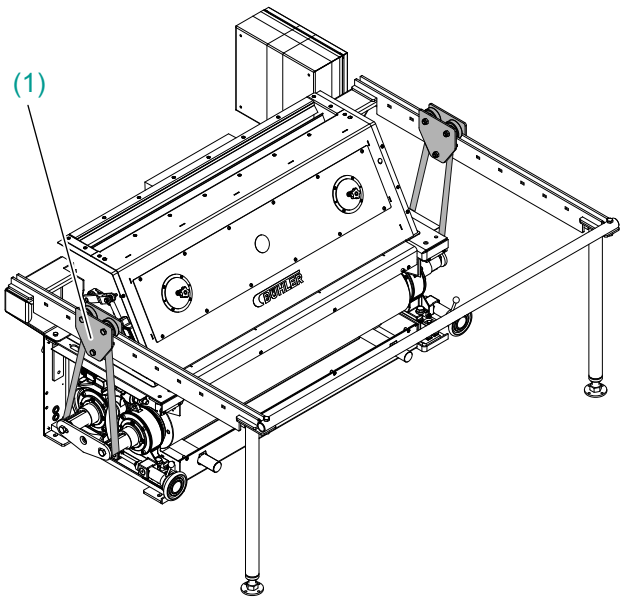


→ The roller assembly is loosened.

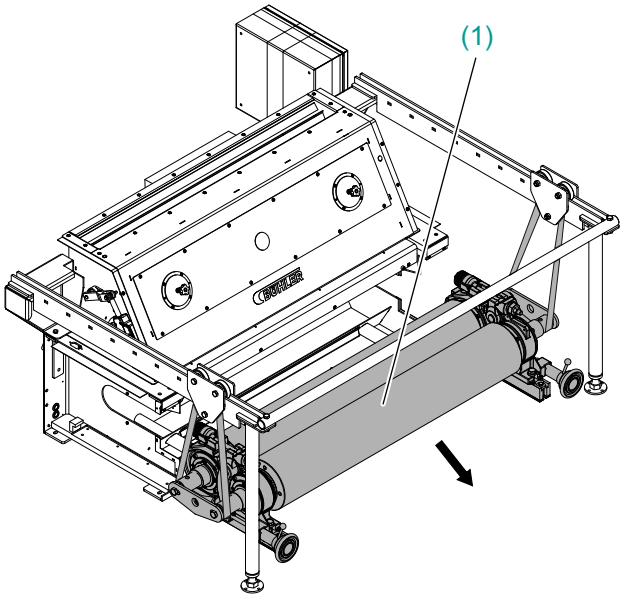
18. Fit the roller removing device (option) (1) on the machine.



19. Attach the lifting device to the roller assembly and to lifting device (1).



20. Lift roller assembly (1) and move it out of the machine.



11.6.2 Fitting the roller assembly

Required protective equipment:

– Protective gloves

Prerequisites:

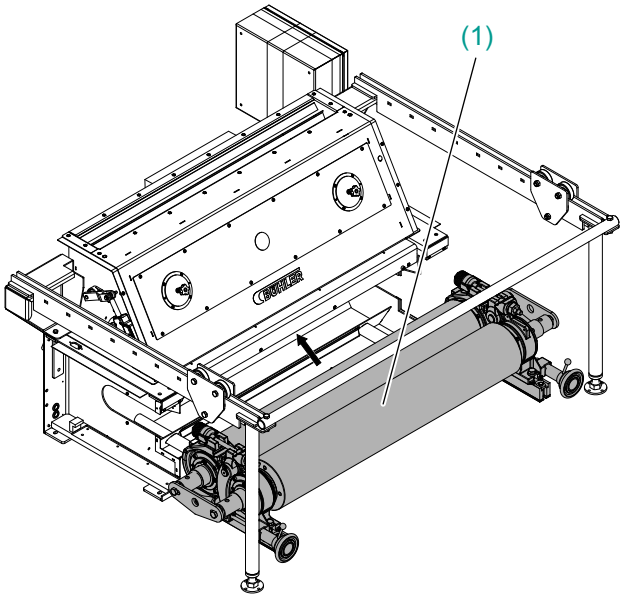
✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

✓ The cover on the drive side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

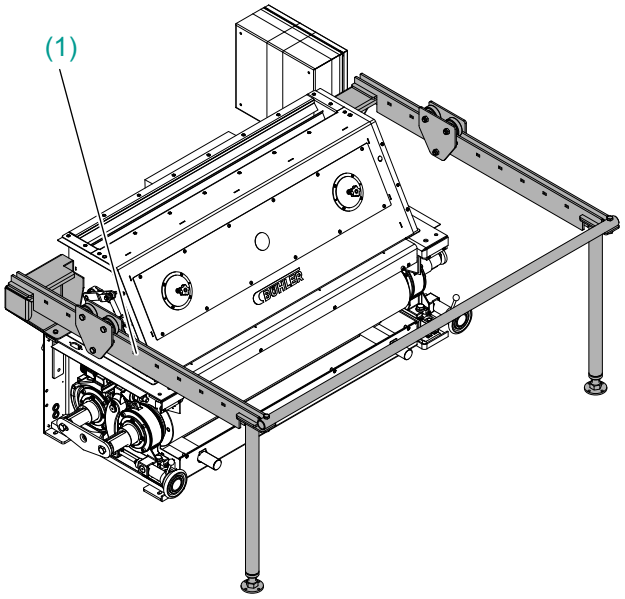
✓ The cover on the transmission side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

✓ The grinding chamber cover is removed. See page 58, Chapter ”Removing the grinding chamber cover“.

1. Retract roller assembly (1) into the machine with the roller removing device (option) or alternative lifting device.

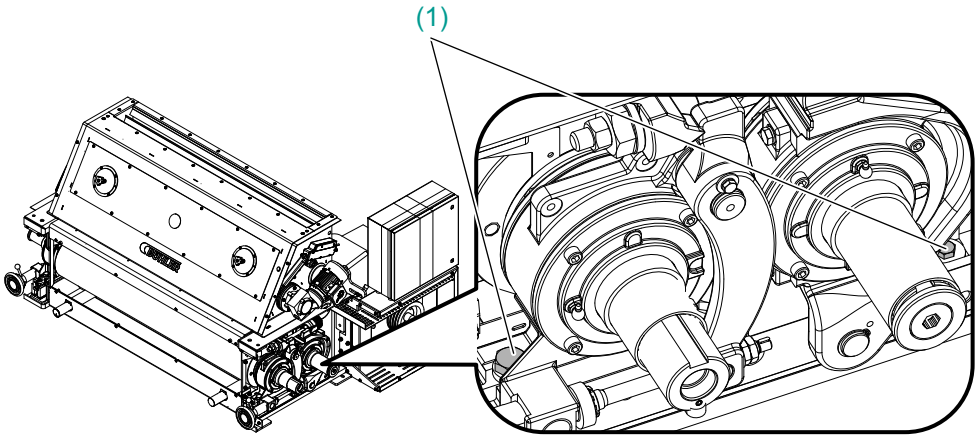


2. Remove roller removing device (1).

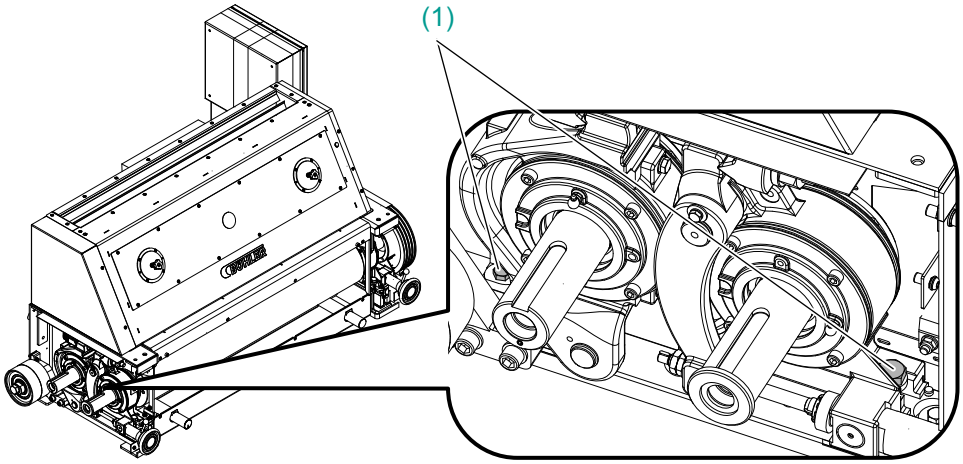


3. Fix the roller assembly on both sides.

4. Fix the roller assembly with 2 rubber buffers and 2 M12×85 hexagon head screws (1) on the drive side.



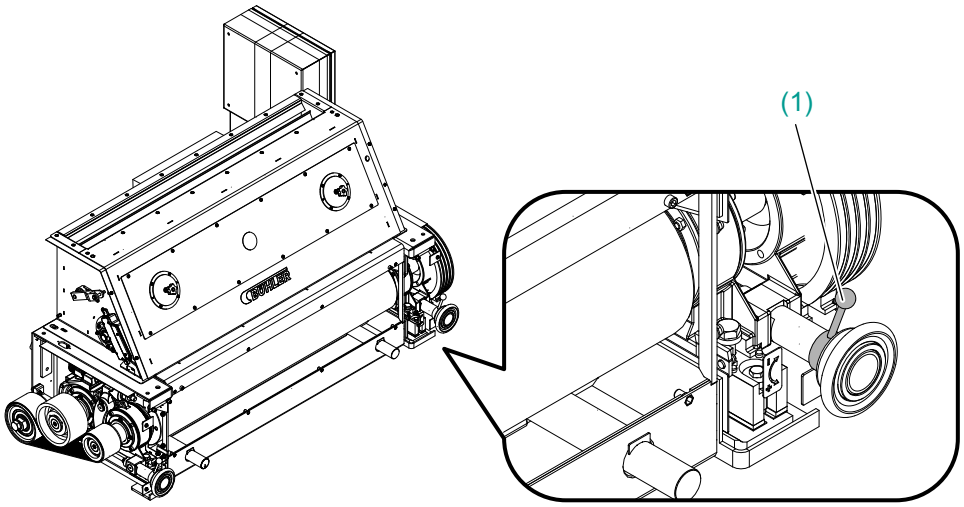
5. Fix the roller assembly with 2 rubber buffers and 2 M12×85 hexagon head screws (1) on the transmission side.



➞ The roller assembly is fixed.

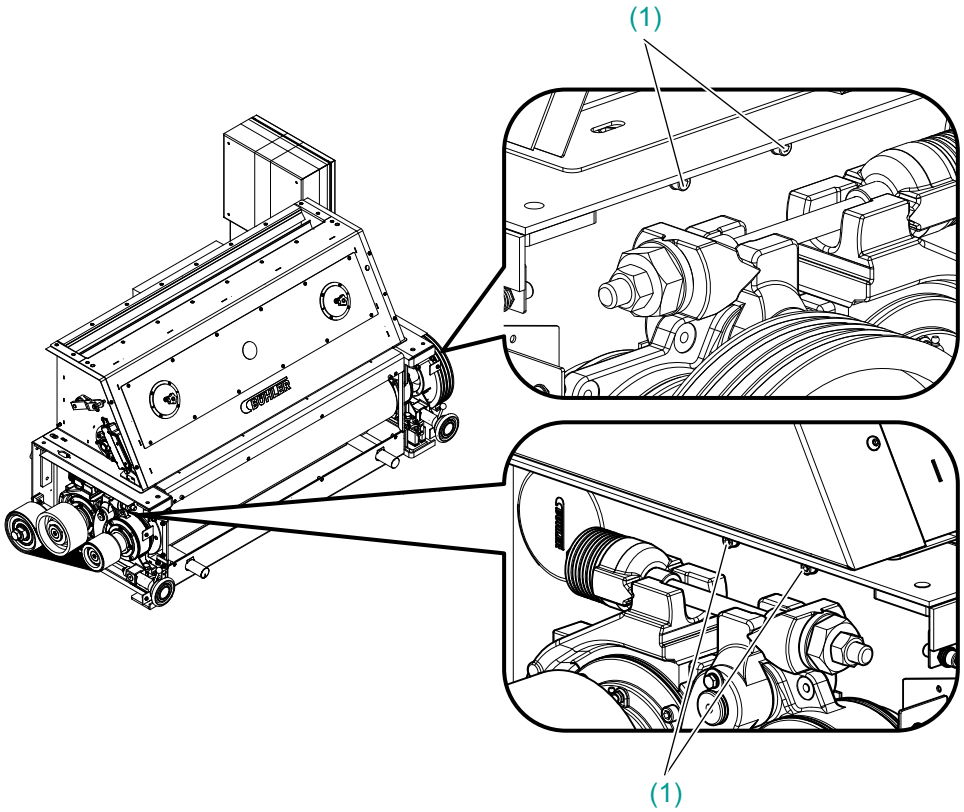
6. Fit the belt pulleys.
7. Fit the drive belt. See page 70, Chapter ”Fitting and tensioning the drive belt“.

8. Fit transmission belt. See page 72, Chapter "Fitting and tensioning the transmission belt".
9. Tighten ball knob (1) on both sides.

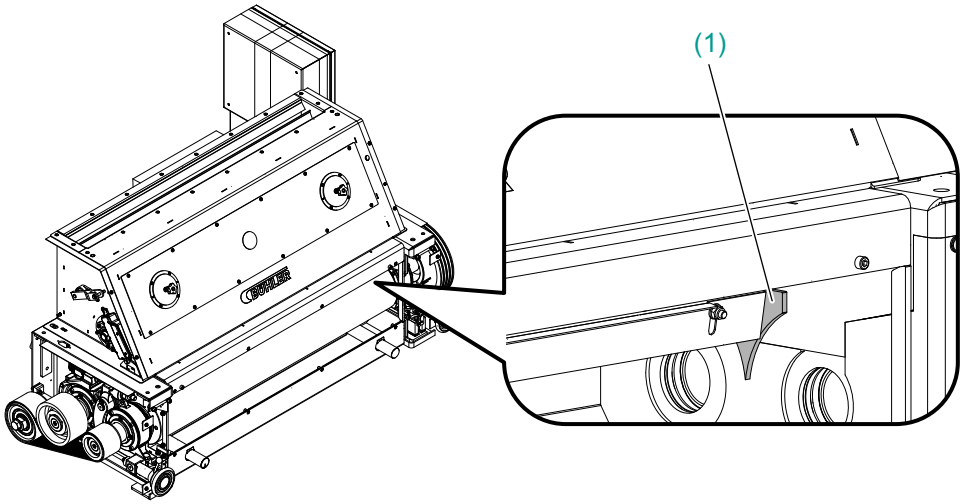


➞ The handwheel is fixed.

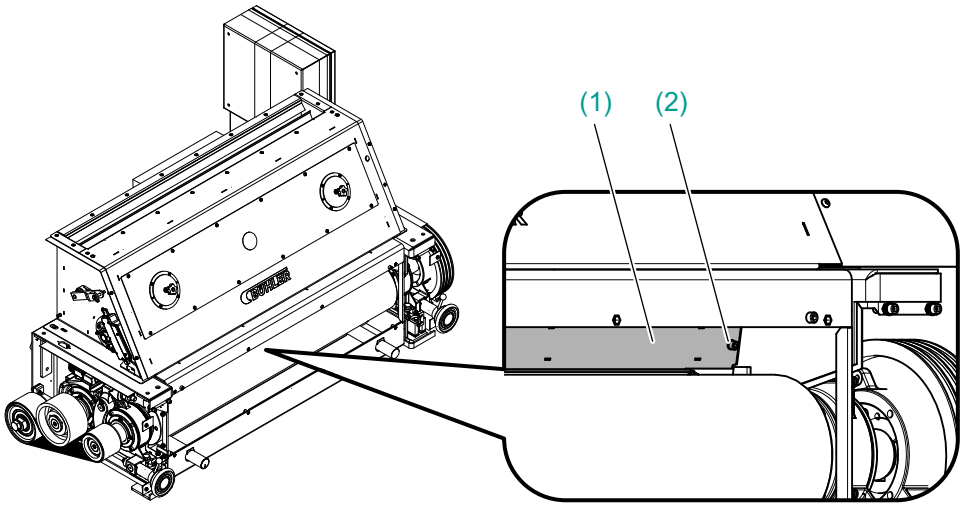
10. Fit the product guide sheet.
11. Tighten the 2 M8×16 socket head cap screws (1) on both sides.



12. Install 2 side wedges (1). Do not tighten screws.

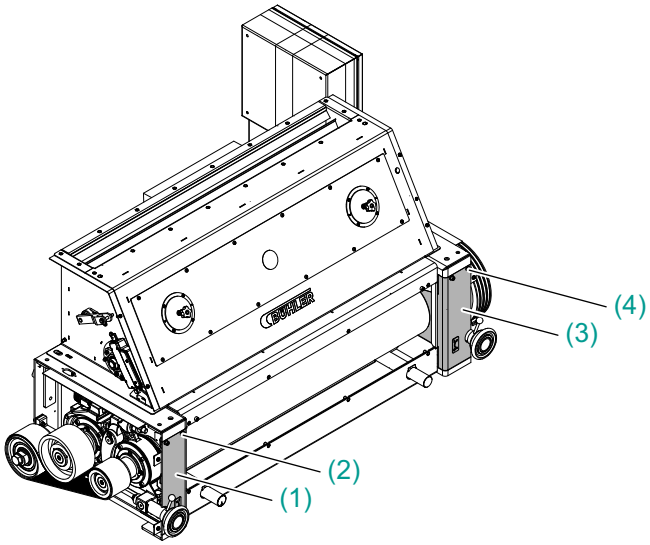


13. Attach product guide sheet (1) and tighten it with 2 nuts (2).



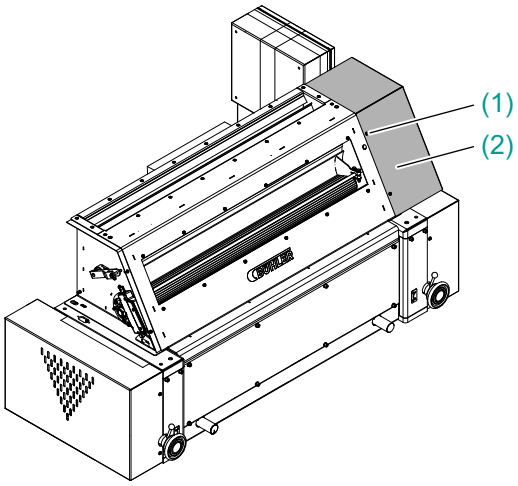
- Ensure that the product guide sheet is parallel to the roller. If necessary, correct the product guide sheet and side wedges.
- Set product guide sheet. See page 75, Chapter ”Setting product guide sheet“.
- Tighten the screws on the side wedges.

14. Fit the side parts on the roller module.



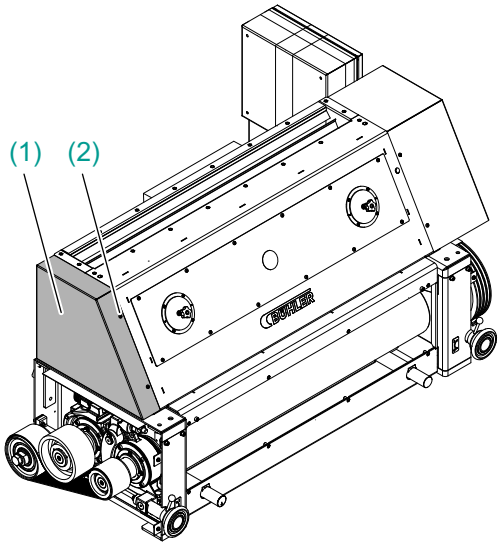
- Attach the left side part (1) and tighten it with 2 M10×30 socket head cap screws (2).
- Attach the right side part (3) and tighten it with 2 M10×30 socket head cap screws (4)

15. Install the cover hood of the feeder device on the right.



- Attach the cover hood of the feeder device on the right (2).
- Tighten the 2 M8×20 socket head cap screws (1).

16. Fit the cover hood of the feeder device on the left.



- ▶ Attach the cover hood of the feeder device on the left (1).
- ▶ Tighten the 2 M8×20 socket head cap screws (2).

17. Fit the grinding chamber cover. See page 59, Chapter ”Fitting the grinding chamber cover“.
18. Fit the cover on the drive side. See page 57, Chapter ”Fitting the cover on the drive side“.
19. Fit the cover on the transmission side. See page 58, Chapter ”Fitting the cover on the transmission side“.

11.7 Replacing the feed roll

11.7.1 Removing the feed roller

Required protective equipment:

– Protective gloves

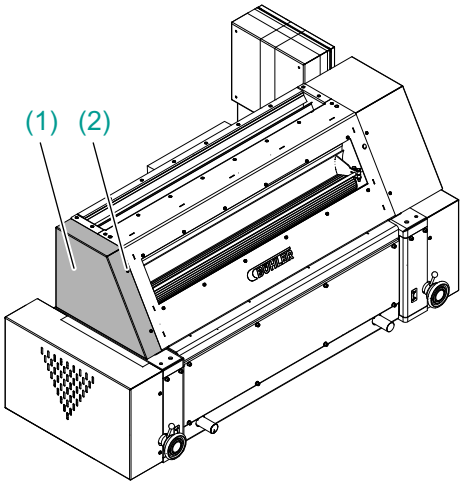
Tools required:

– M8 wrench
– Allen wrench
– Lifting device

Prerequisites:

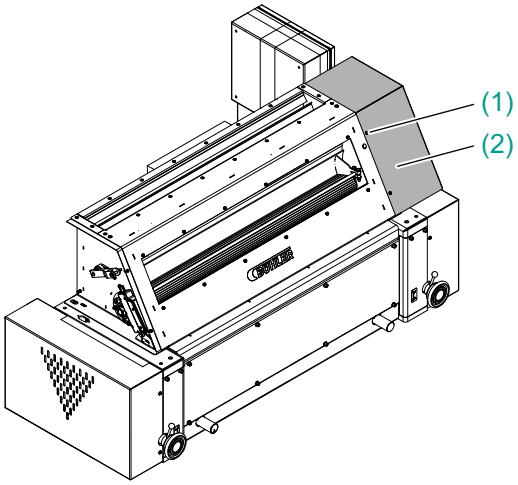
✓ The machine side is run empty.
✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.
✓ The feed roller cover is removed. See page 59, Chapter ”Removing the feed roller cover“.

1. Remove the cover hood of the feeder device on the left.



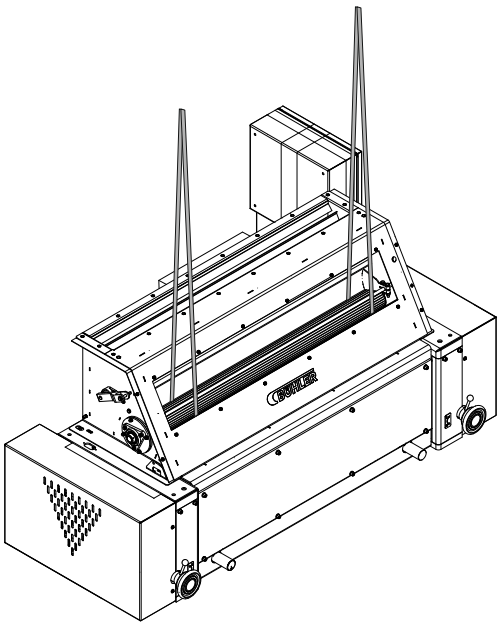
   - Loosen the 2 M8×20 socket head cap screws (2).
   - Remove the cover hood of the feeder device on the left (1).

2. Remove the cover hood of the feeder device on the right.

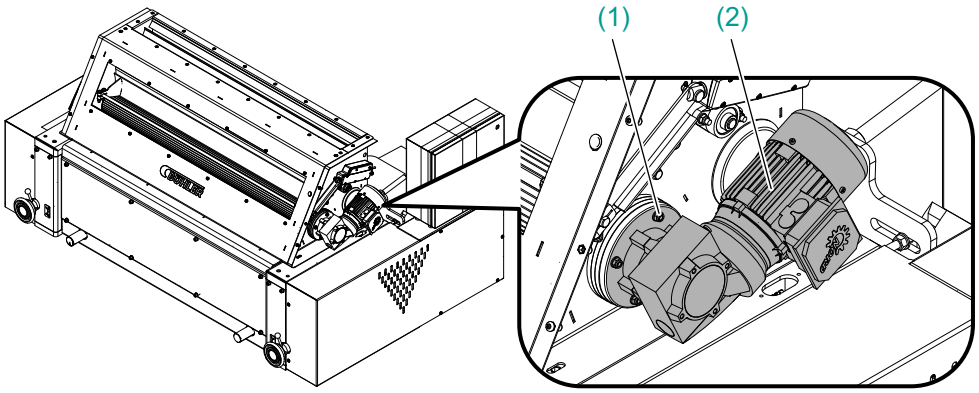


   - Loosen the 2 M8×20 socket head cap screws (1).
   - Remove the cover hood of the feeder device on the right (2).

3. Secure the feed roller with the webbing slings. See page 17, Chapter ”Weights“.

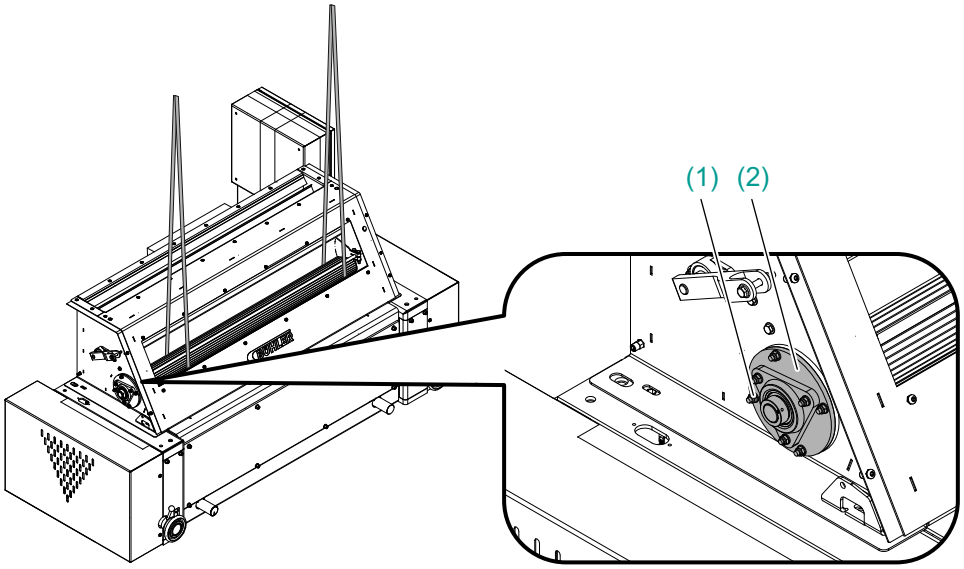


4. Remove the gearmotor.



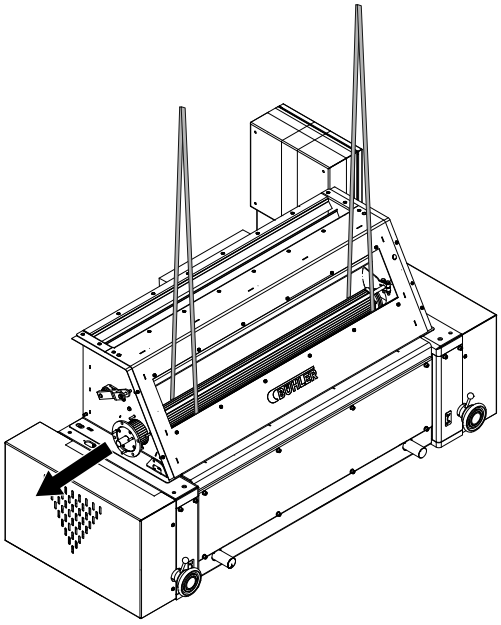
- Secure gearmotor (2) with a hoisting device.
  See the documentation provided by the supplier.
- Loosen the 4 M8 nuts (1).
- Remove the gearmotor.

5. Remove the outer flange.



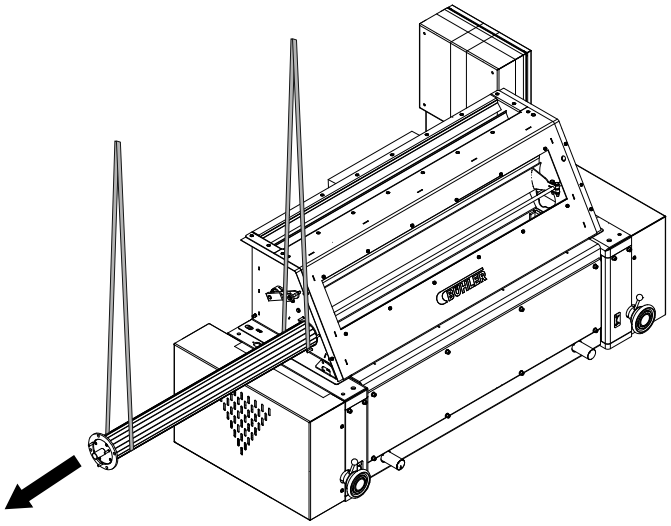
- Disengage 4 screws (1).
- Remove outer flange (2) from the feed roller.

6. Remove the feed roll.



- Pull out the feed roller sideways until the webbing sling is on the housing of the feeder device.
- Attach the additional webbing sling to the feed roller outside the feeder device.
- Remove the middle webbing sling.
- Pull out the feed roller sideways until the webbing sling is on the housing of the feeder device.

7. Attach the additional webbing sling to the feed roller outside the feeder device.



8. Pull out the feed roller completely.

11.7.2 Fitting the feed roller

Required protective equipment:

– Protective gloves

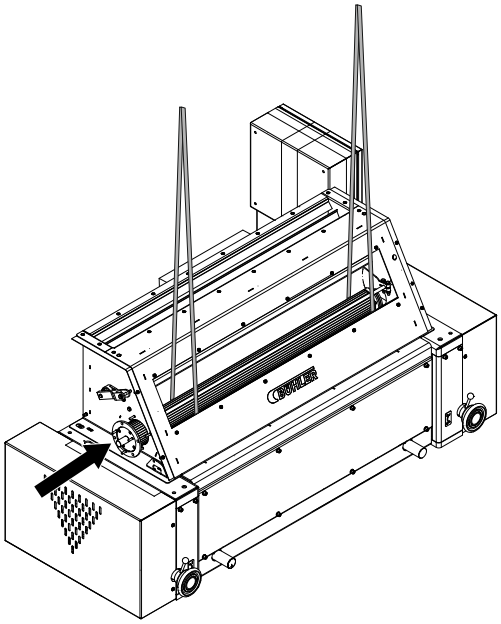
Tools required:

– M8 wrench
– Allen wrench
– Lifting device

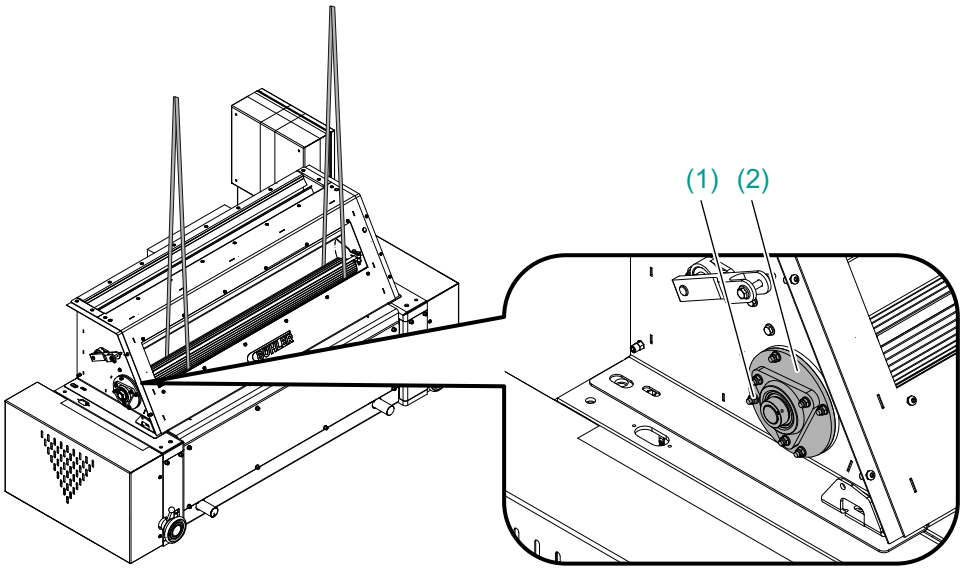
Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

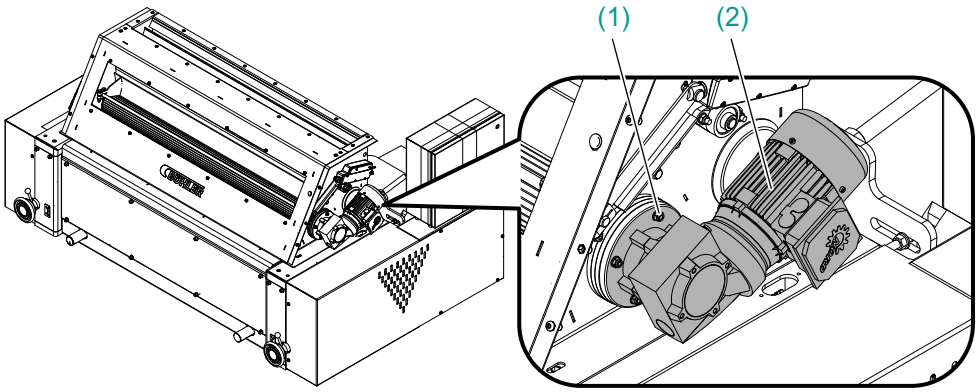
1. Retract the feed roller.



   - Attach the webbing slings to the feed roller. See page 17, Chapter ”Weights“.
   - Lift the feed roller.
   - Retract the feed roller sideways into the feeder device.
2. Mount outer flange (2) and tighten it with 4 screws (1).

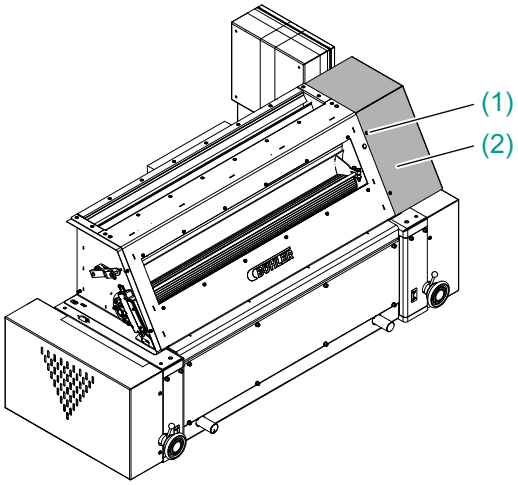


3. Install the gearmotor.



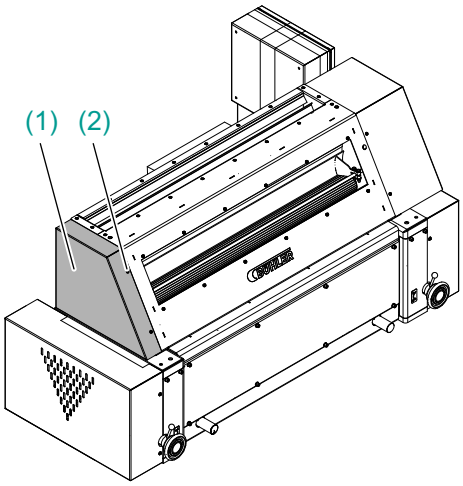
   - Attach gearmotor (2).
   - Tighten the 4 M8 nuts (1).

4. Remove the webbing slings.
5. Install the cover hood of the feeder device on the right.



   - Attach the cover hood of the feeder device on the right (2).
   - Tighten the 2 M8×20 socket head cap screws (1).

6. Fit the cover hood of the feeder device on the left.



   - Attach the cover hood of the feeder device on the left (1).
   - Tighten the 2 M8×20 socket head cap screws (2).

7. Fit the feed roller cover. See page 60, Chapter ”Fitting the feed roller cover“.

11.8 Replacing self-aligning roller bearings

11.8.1 Removing self-aligning roller bearings

The self-aligning roller bearings are located on both sides of the roller assembly.

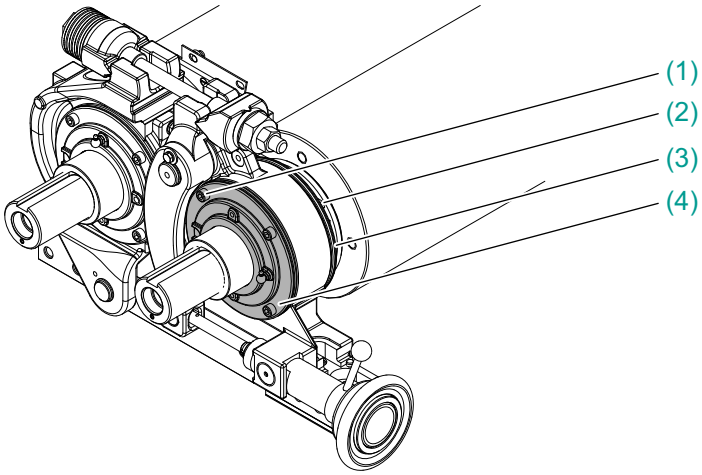
Tools required:

– Allen wrench
– MDDK-82616-810 pulling-off device
– Pipe wrench

Prerequisites:

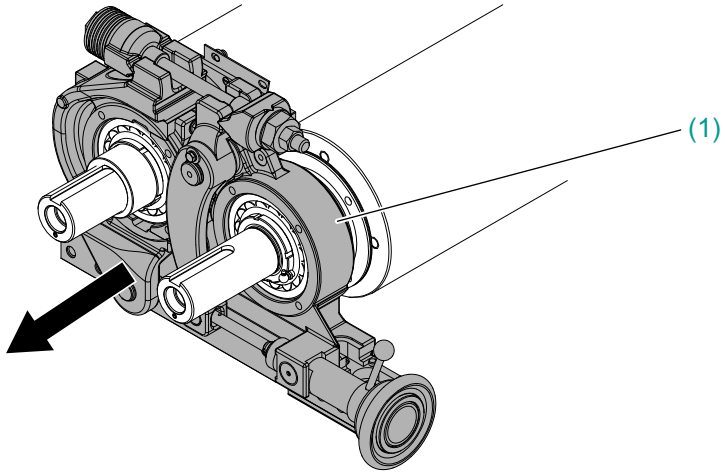
✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.
✓ The roller assembly is removed. See page 76, Chapter ”Removing the roller assembly“.

1. Remove the bearing cover.

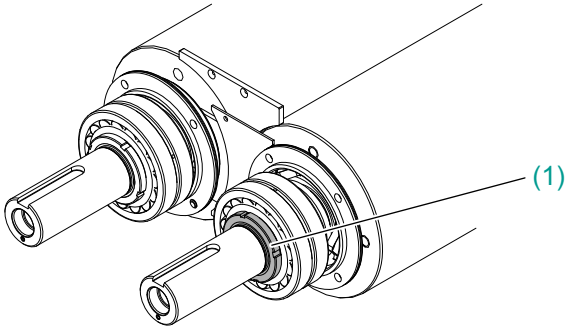


- Loosen the 4 socket head cap screw (1) on the front bearing cover.
- Remove bearing cover (4).
- Loosen the 4 socket head cap screw (2) on the rear bearing cover.
- Slide bearing cover (3) to the roller.

2. Remove bearing housing (1).

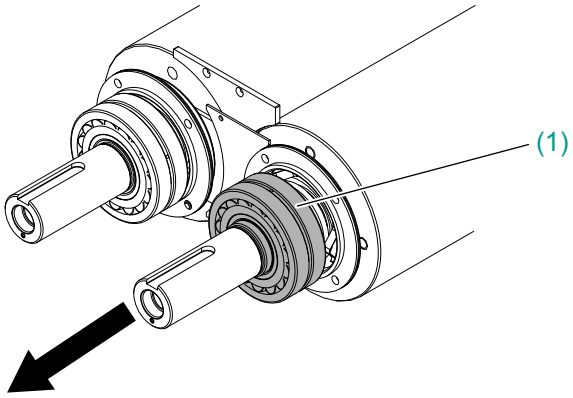


3. Remove shaft nut (1).



- Loosen the shaft nut with a tubular wrench.
- Pull off the shaft nut from the shaft.

4. Use a pulling-off device to pull off self-aligning ball bearing (1).



5. Clean the bearing housing and the felt seals.

11.8.2 Installing self-aligning roller bearings

The self-aligning roller bearings are located on both sides of the roller assembly.

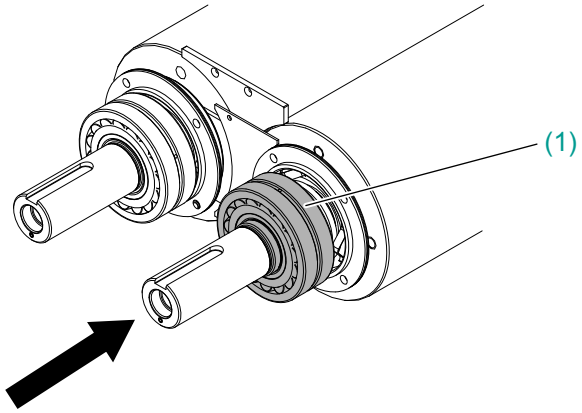
Tools required:

– Allen wrench
– MDDT-80653-810 mounting device
– Pipe wrench

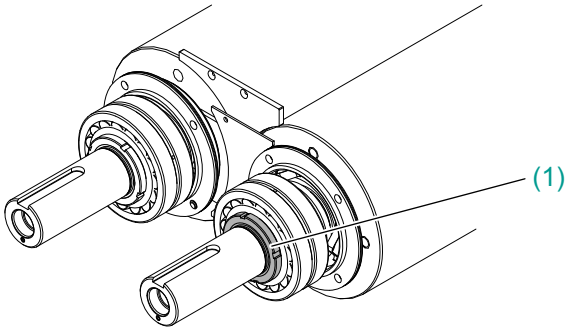
Prerequisites:

- ✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.
- ✓ The roller assembly is removed. See page 76, Chapter ”Removing the roller assembly“.
- ✓ The bearing housings and felt seals on both sides are cleaned.

1. Grease the bearing housings and felt seals. See page 16, Chapter ”Operating supplies“.
2. Fit the self-aligning ball bearing.

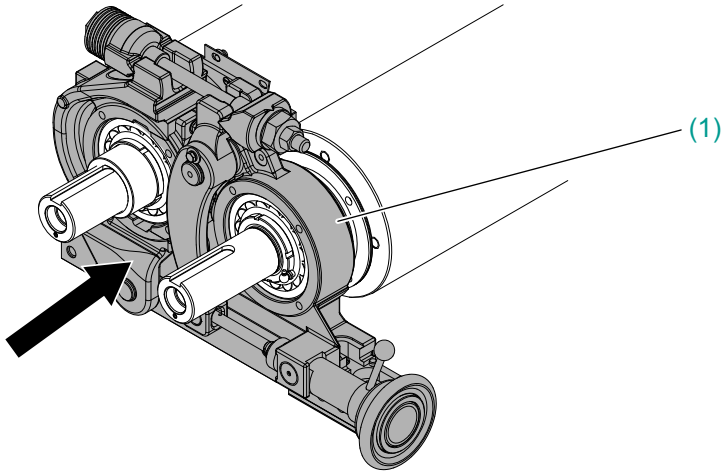


   - ▶ Fit self-aligning ball bearing (1) onto the shaft using the mounting device (option).
   - ▶ Check the bearing clearance. If necessary, move the self-aligning ball bearing.
3. Fit shaft nut (1).

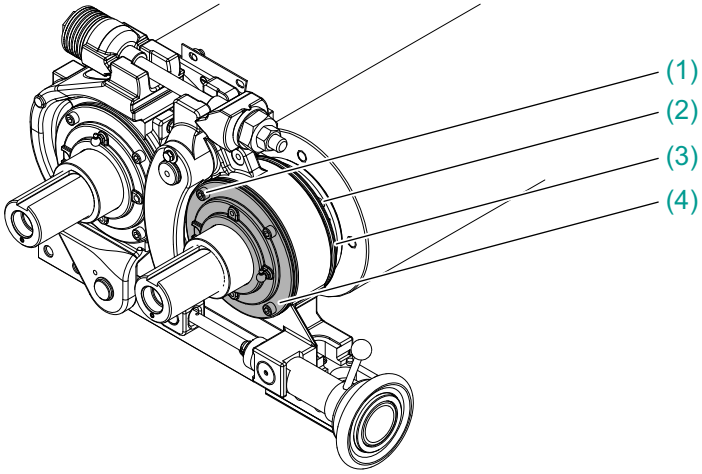


   - ▶ Slide the shaft nut onto the shaft.
   - ▶ Use the tubular wrench to tighten the shaft nut.
   - ▶ Bend the tab washer behind the shaft nut.

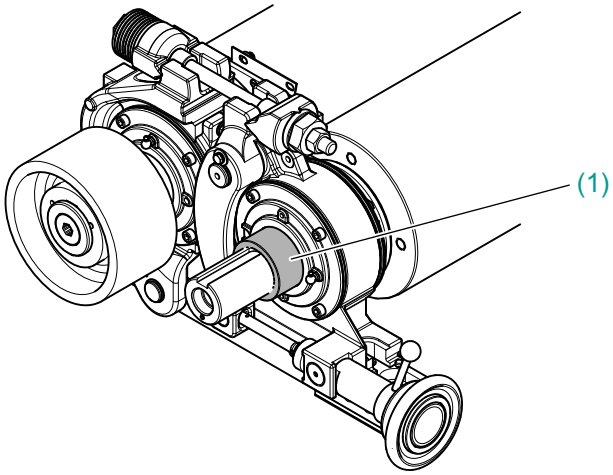
4. Fit the bearing housing (1).



5. Fit bearing cover (2) and tighten it with 4 socket-head screws (1).

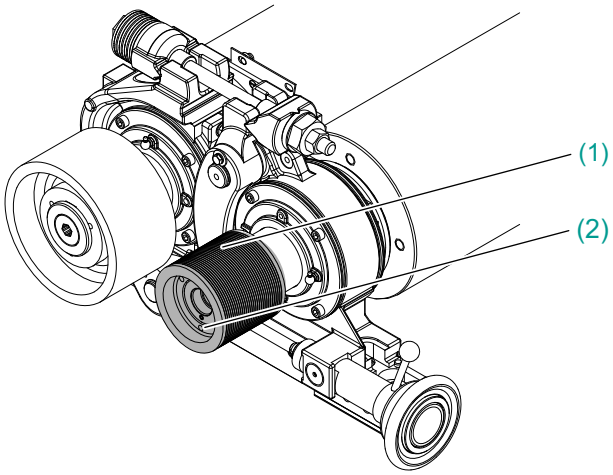


6. Slide spacer sleeve (1) onto the shaft.

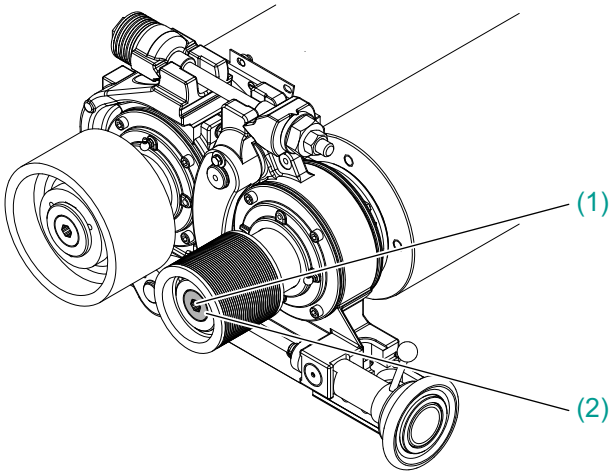


7. Install the belt pulley.

8. Slide belt pulley (1) onto the shaft and tighten it with 3 socket head cap screws (2).



9. Fit plug (2) and tighten socket head cap screw (1).



11.9 Replacing the electric motor

11.9.1 Removing the electric motor

Tools required:

– Allen wrench

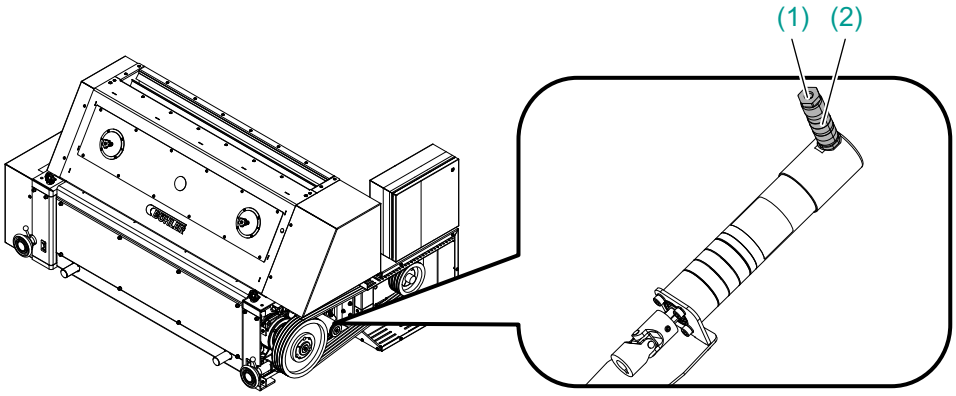
Prerequisites:

✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

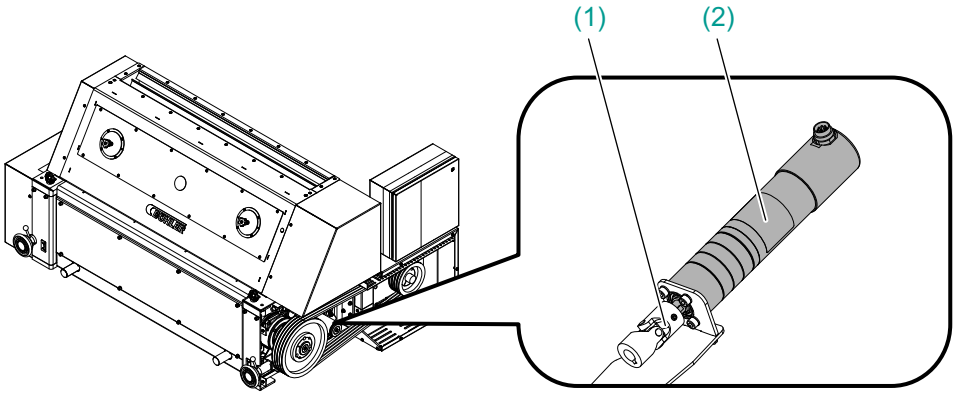
✓ The cover on the drive side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

✓ The cover on the transmission side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

1. Loosen nut (1) and remove plug from connection (2).



2. Loosen socket head cap screw (1) by half a revolution and remove electric motor (2).



11.9.2 Fitting the electric motor

Tools required:

– Allen wrench

Prerequisites:

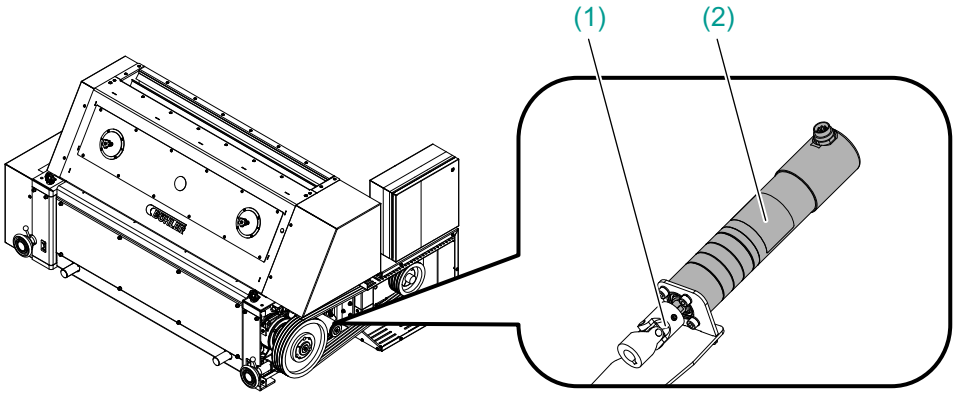
✓ The machine is secured against unexpected starting. See page 14, Chapter ”Protective measure to prevent unexpected starting“.

✓ The cover on the drive side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

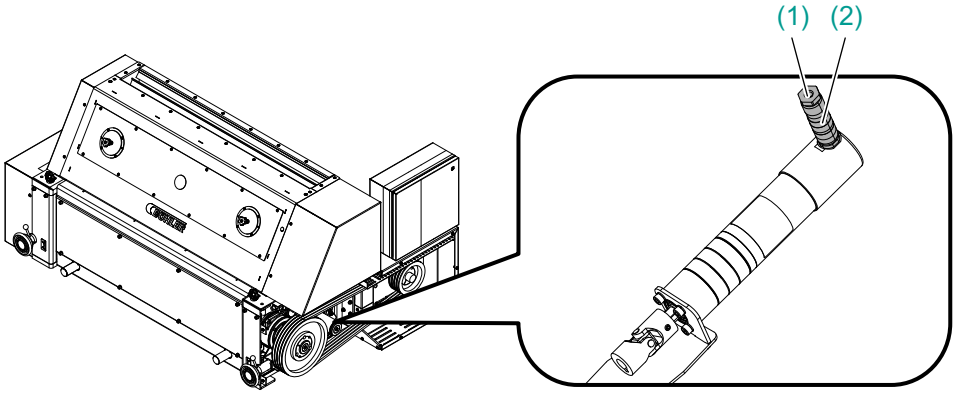
✓ The cover on the transmission side is removed. See page 57, Chapter ”Removing the cover on the transmission side“.

✓ Electric motor has been removed. See page 100, Chapter ”Removing the electric motor“.

1. Attach electric motor (2) to the shaft and tighten socket head cap screw (1).



2. Attach the plug to connection (2) and tighten nut (1).



11.10 Initializing the electric motors for the roller gap adjuster

The electric motors of the roller gap adjuster are initialized at the factory.

If the motor for the roller gap adjuster has been replaced, then the electric motor must be initialized.

The addresses of the motors must be taken from the circuit diagram of the machine. See the documentation provided by the supplier.

1. Write down the value [GAP.#MIN].
2. Adjust the [GAP.MODE] to [LOC] or [REM].
3. In order to engage the roller, keep the button on the machine control system pressed for 5 s.
   - → [GAP.#MIN] is approached.
   - → The mobile roller is disengaged pneumatically.
4. Set [GAP.MODE] to [MAN].
5. Adjust the handwheel of the replaced electric motor.
   - ▶ Turn the handwheel clockwise until it is at the stopper. The handwheel can no longer be turned.
   - ▶ Turn the handwheel counterclockwise by ½ revolution.

6. Select [GAP.#SET] and press and hold the button down for 5 s.
   - → The [SET ZERO] short message is displayed.
   - → [GAP.#MIN] is set to 0.5 mm.
7. Adjust the [GAP.#MIN] to the noted value.
8. Set [GAP.MODE] to [LOC] or [REM].
9. To disengage the roller, press and hold the button down for 2 s.
   - → [GAP.#SET] is approached.
   - → The mobile roller is disengaged pneumatically.

12 Decommissioning

12.1 Dismounting the machine

When work on the machine is complete (reconditioning, removal or disposal), the machine is dismounted in reverse order to the assembly process.

- The machine may be dismounted only in accordance with all the accident prevention measures and only by trained personnel. This personnel must be familiar with the safety precautions.

12.2 Storing the machine

NOTICE

Freezing liquids.

Frost damage.

- Completely drain liquids.

1. Do not store the machine outdoors.
2. Protect the machine from the effects of weather.
3. Avoid temperature fluctuations, as they can lead to corrosion caused by condensed water.
4. Protect bright metal parts of the machine against corrosion.

12.3 Disposal

12.3.1 Disposal of operating supplies

- Remove operating supplies completely from the machine and dispose of them in accordance with the locally applicable laws and regulations.

12.3.2 Disposal of the machine

1. Disassemble the machine into its component parts.
2. Sort the component parts by basic materials and dispose of them in compliance with the local laws and regulations.

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