

Installation and Operating Instructions

Scraper conveyor version K

GB

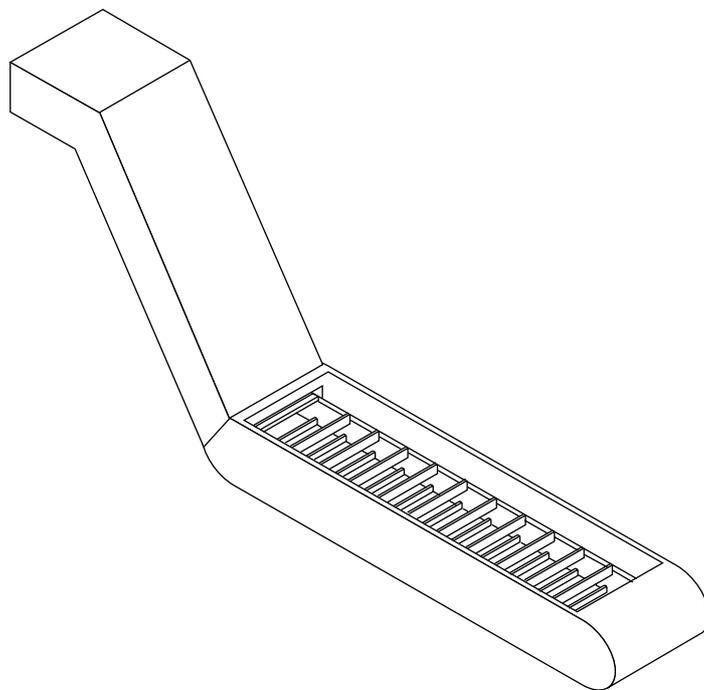


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1 Description of machine and functions

Function

- Conveying metal shavings and small particles
- Purifying the cooling lubricant (for wet processing)

Scope

- Decentral use in single and interlinked machine tools
- Central use for waste disposal from machine groups and entire production areas
- Suitable for the transport of short shavings, needle chips, cast-iron chips and cast-iron dust, dry and wet processing



The length of the chips should not exceed 100 mm because the scraper conveyor is not suitable for higher chip lengths. Large chips might form snarl chips which would not be removed. In that case, a hinge band conveyor must be used.

Mode of operation

- Loose material falls into the feed opening of the scraper conveyor
- Continuous conveyance of the loose material on the container bottom to the discharge opening
- Throwing the loose material from the discharge opening into the container or another conveyor for removal



- **Do not use the plant for other than the intended purposes.**
- **Note the Regulation for the Prevention of Accidents VBG 10 when operating the plant.**
- **The discharge station must be visible during machine controlled operation.**

Noise level: < 70 dB(A)

Optional equipment

- Coolant tank
- Coolant purification systems (e.g. magnetic separator, centrifugal separator, band filter, superfine strainer)
- Low lift and jetting pumps for purification elements and machines
- Support foot
- Chip carriage
- Rotating filter
- Piping with aggregates, valves, etc.

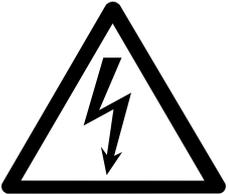
Since nearly every plant is constructed for the special needs of the customer, deviations from the form and position of the parts and structural components described in this documentation may occur. In this case, the operating instructions should be applied analogously.

2 Danger and safety instructions

2.1 General instructions



- Always observe all statements and instructions in the operating instructions delivered with the plant.
- It is forbidden for unqualified persons to work on the plant.
- Observe correct fastening if components are installed by customer.
- Never bypass safety contrivances (e.g. safety clutch).
- The operation of safety contrivances must always be guaranteed.



- Work on the electrical system may only be carried out by qualified personnel.
- Observe the relevant VDE requirements and connection requirements of the responsible Electricity Board.



- Do not stand in or reach into the feed opening.

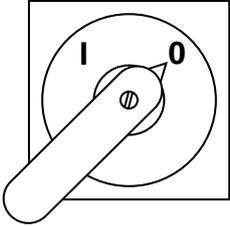


- Do not reach into the discharge opening.

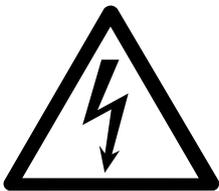


- Cover the scraper belt and all driving elements before starting.
- Do not remove covers while plant is in operation.

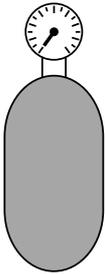
2.2 Instructions for repair and maintenance work and for malfunctions



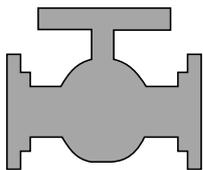
- Set the main switch in the off position.
- Secure the plant against accidental starting.



- Ensure that the plant is at zero voltage.



- Depressurize the plant.



- Close pipe valves.
- Remove all noxious materials.
- Coolants must not enter the environment.



- When handling chips, wear protective clothing, safety boots and protective gloves.

3 Unpacking and transport

3.1 Unpacking



Scraper conveyors over 8 m in length are delivered in several container parts.

For conveyors in several parts, scraper belts are rolled up on separate pallets.

Small parts (screws, sealings etc.) are delivered loose in the scraper conveyor container or in separate packing.

Assembly rails for drawing in the scraper belt are fastened to the scraper belt if required or preassembled on the scraper conveyor and painted red. It is important to **keep the assembly rails**, as it is impossible to draw in the scraper belt without them.

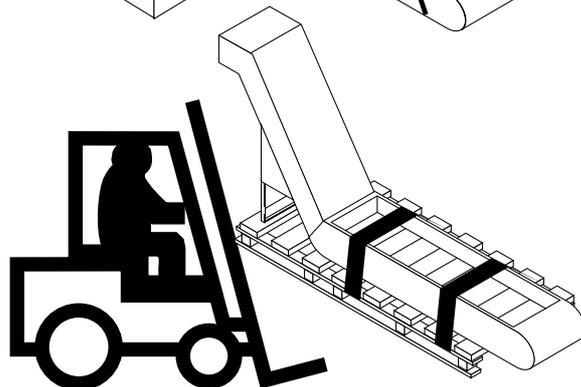
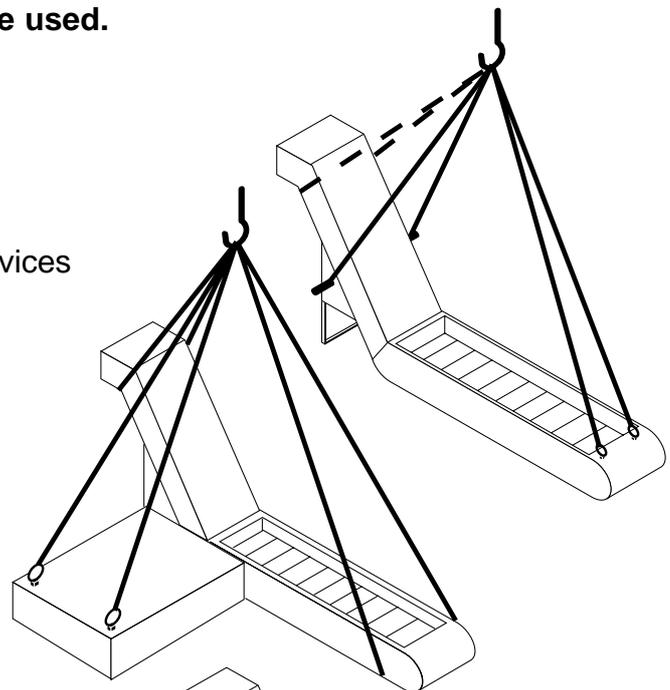
3.2 Transport



- Do not stand under hanging loads!
- Since each conveyor is built according to customer's wishes, the illustrations on this page are to be understood as examples.
- In any case, the suspension appliances fastened to the conveyor (e.g. rings, ring bolts, pipes) must be used.

- **By crane:**
If the device is no longer in the original packing, always use the suspension devices provided (e.g. eye bolts, ring bolts).

- **By stacker truck:**
Only in the original packing and with greatest care



4 Assembly and installation



- Place the plant on a level surface.
- Ensure a firm and secure stand.
- Secure the plant against accidental starting.

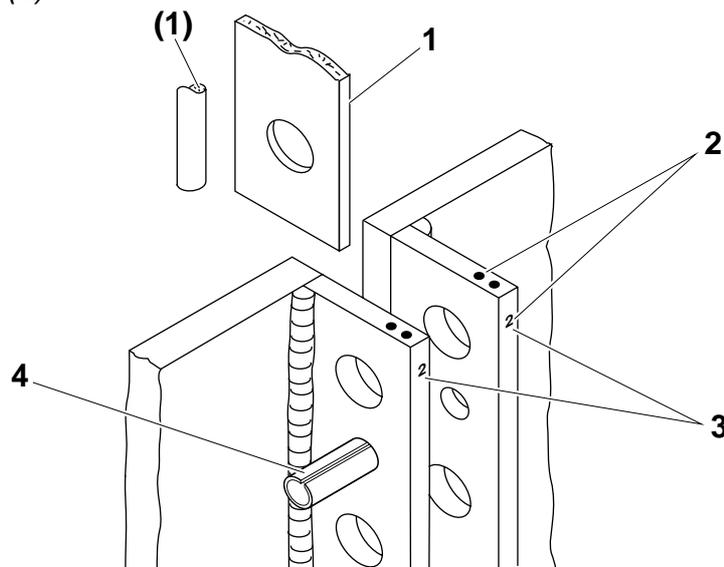
4.1 Screwing together several container parts

- Join container parts at the joint locations and align in parallel.



Note identification markings (2) of the container flanges.

The identification marking (numbers or symbols) must agree with that of the opposite flange (3).



- Insert the sealings supplied (1) and join container parts completely.
- Align the container in such a way that all bore holes of opposite container flanges are in alignment.
- Insert but do not tighten hexagon head screws and hexagon nuts.
- Drive in preassembled rollpin springs (4).
- Tighten hexagon head screws.

4.2 Electrical connection

- Connect power supply to motor(s) and pump(s).
- Observe the correct direction of rotation (see arrow).

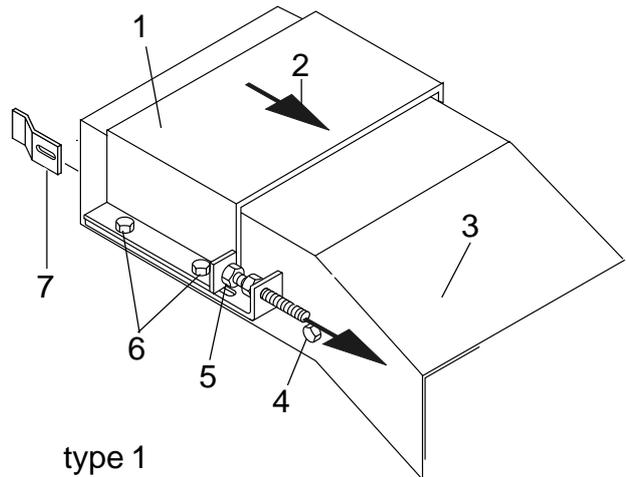
4.3 Drawing in the scraper belt manually



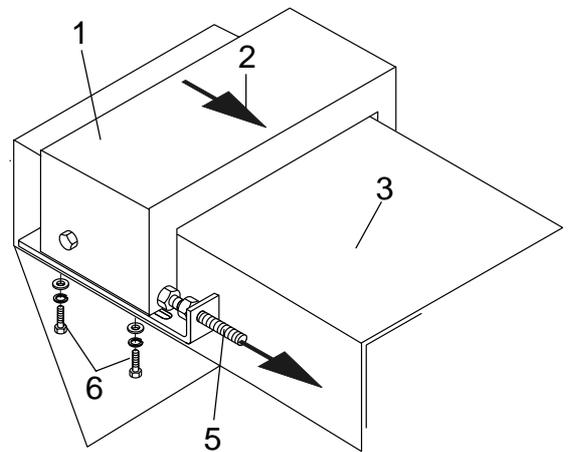
Recommended only for small or short scraper belts.

Two or more persons are required to draw in the scraper belt depending on its size.

- Remove covers (3) on top of the container.
- Loosen the fastening screws (6) on both sides of the gearing end frame, but do not remove completely.
- Loosen the clamping bolts (5) on both sides of the gearing end frame and turn back completely in the direction of the arrow.
- *Loosen the fastening screw (4) on both sides of the chain wheel cover (7).
- If installed: loosen drive shaft cover.
- Push the gearing end frame (1) in the conveying direction to the stop (2).
- Disassemble drive motor, install manual crank (see Chapter 6.3).
- Insert the scraper belt between the guide bars (8) approx. 1 m into the scraper conveyor.



type 1



type 2



The fastening screws (9) of the broach bars must be at the top

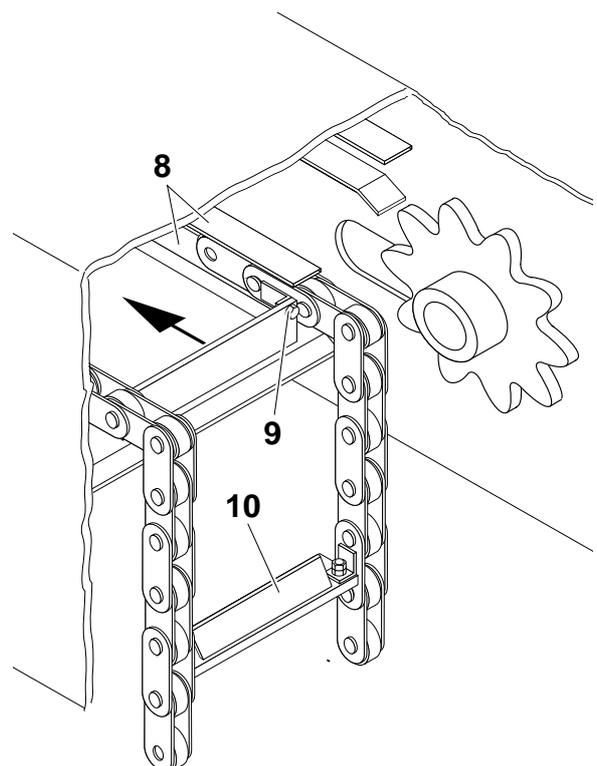
The reinforcing angles (10) of the broach bars are assembled in the direction of the guide sprocket wheel (opposite to the conveying direction)

Feed direction with full intermediate bottom: see Chapter 4.5



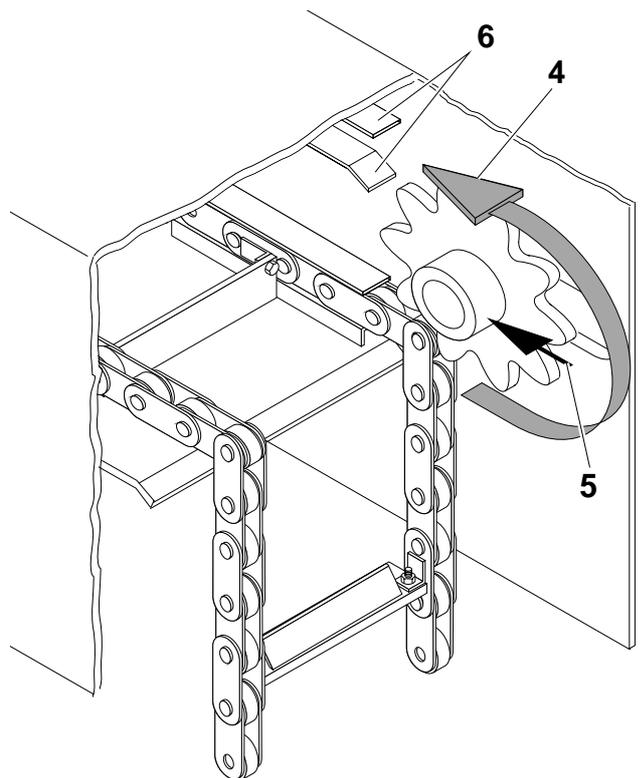
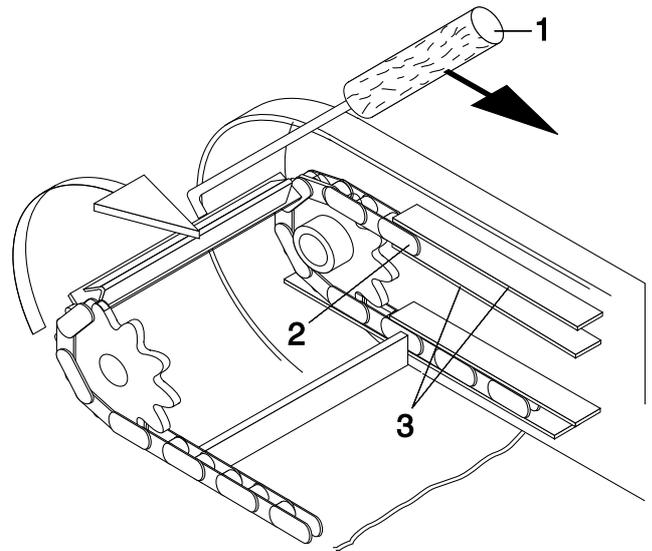
Danger of injury during the feeding process:

- **Never touch movable parts of the scraper conveyor by hand.**
- **Do not pull or push the scraper belt without suitable devices.**



* = required only for type 1

- Draw in scraper belt with hook (1) or suitable device up to the guide sprocket wheel.
- Pull scraper belt around the guide sprocket wheel.
- Draw in scraper belt (2) between the upper guide bars (3) to approx. 1 m before the drive shaft.
- Push the gearing end frame in the direction of the guide bars to the stop (5).
- Insert conveyor chains in tooting of the driving chain wheel (4) and slide the end of the scraper belt between the upper guide bars (6) into the container.



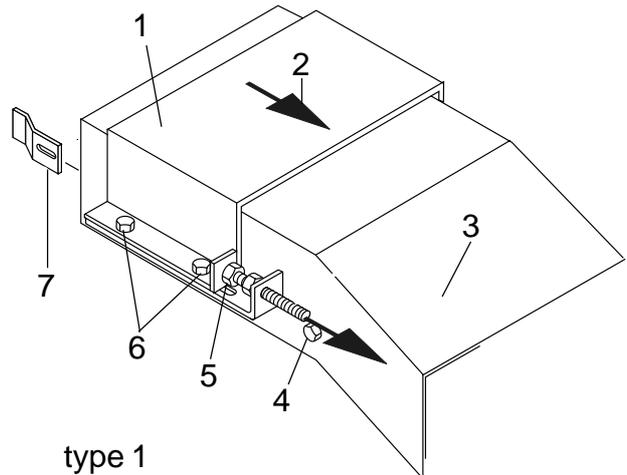
4.4 Drawing in the scraper belt with drive motor or manual crank



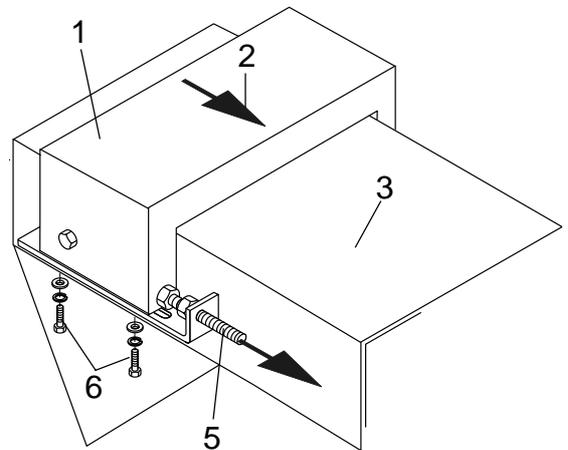
*Necessary for large or long scraper belts
Two or more persons are required for drawing in the scraper belt depending on its size.*

See Chapter 6.3 for attaching the manual crank.

- Remove covers (3) on top of the container.
- Loosen the fastening screws (6) on both sides of the gearing end frame.
- Loosen the clamping bolts (5) on both sides of the gearing end frame and turn them back completely.
- *Loosen the fastening screws (4) on both sides of the chain wheel cover (7).
- If installed: loosen drive shaft cover.
- Push the gearing end frame (1) against the conveying direction to the stop (2) and tighten the fastening screws (6) on the gearing end frame.



type 1



type 2



Danger of injury during the feeding process:

- **Never touch movable parts of the scraper conveyor by hand.**
- **Do not pull or push the scraper belt without suitable devices.**

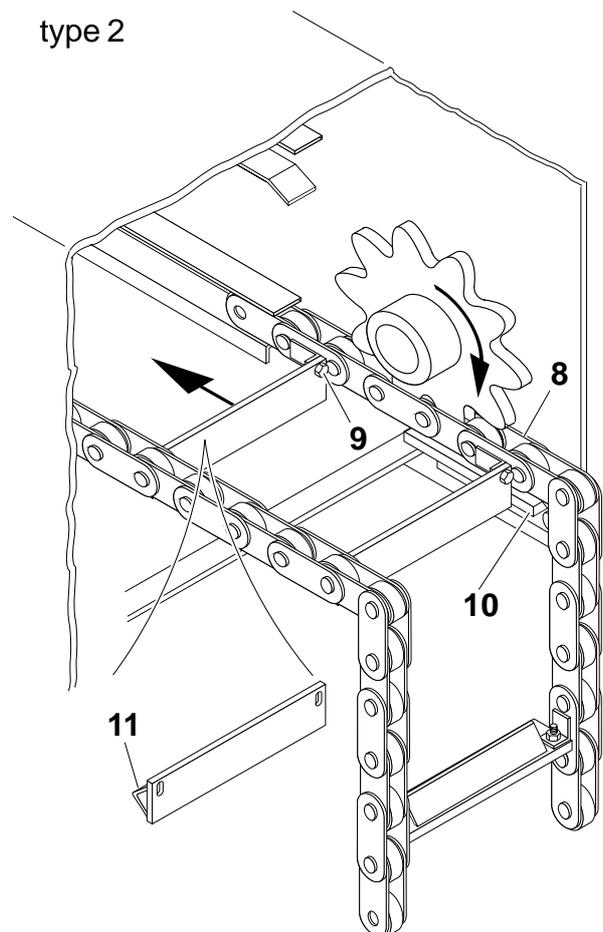
- Assemble the feed bars (10).
- Turn the chain wheels in such a way that the conveying chain (8) can be inserted into the tothing on both sides.



The fastening screws (9) of the broach bars must be at the top.

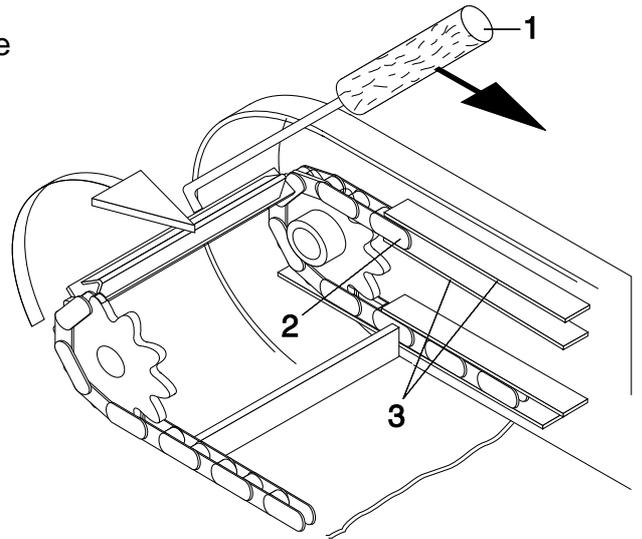
The reinforcing angles (11) of the broach bars are assembled in the direction of the guide sprocket wheel.

Feed direction with continuous intermediate bottom: see Chapter 4.5.



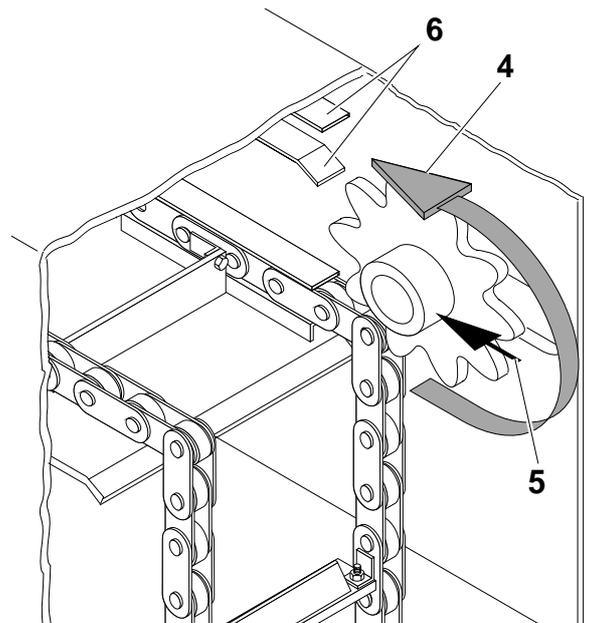
* = required only for type 1

- Switch the driving motor into the inching mode and carefully draw in scraper belt up to the guide sprocket wheel.
- Turn the chain wheels in such a way that the first roll of the bush conveyor chains (2) can be inserted into a tooth space.
- Pull scraper belt with hook (1) or suitable device around the guide sprocket wheel.
- Insert the first member of each bush conveyor chain (2) between the respective upper guide bars (3).



If the scraper belt jams and builds up, switch the driving motor briefly in the opposite direction.

- Draw in scraper belt up to the chain wheel.
- Remove feed bars.
- Insert bush conveyor chains into the tothing of the driving chain wheel (4).
- Slide the end of the scraper belt into the container between the upper guide bars (6).
- Assembly of scraper belt: see Chapter 4.6.



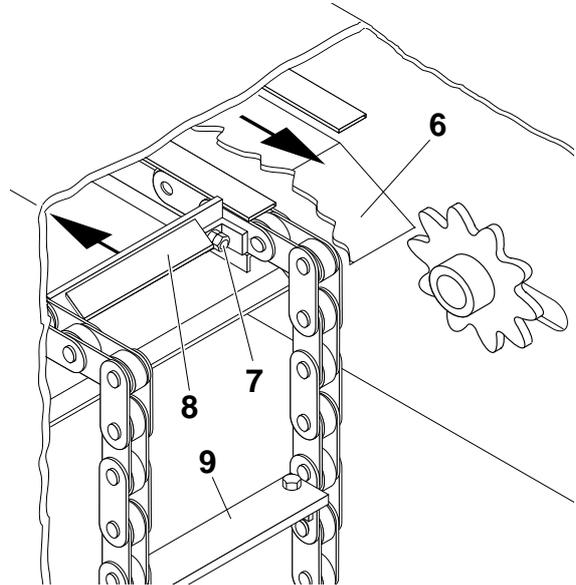
4.5 Drawing in the scraper belt in with full intermediate bottom



Only for scraper conveyors with a full intermediate bottom (6):

The loose material is conveyed on the intermediate bottom, not on the container bottom.

- Install scraper belt at 180° angle to the normal fitting position.
- The fastening screws (7) of the broach bars (9) must be at the bottom.
- The reinforcing angles (8) of the broach bars point in the direction of the drive.
- Further procedures: see Chapters 4.3 and 4.4.



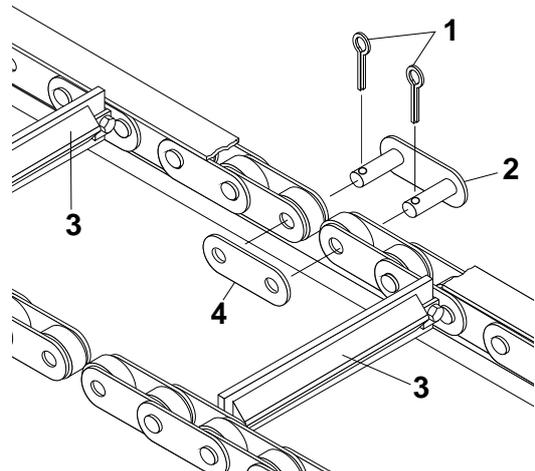
4.6 Assembling the scraper belt

- Connect the ends of the bush conveyor chains by means of shackle type connectors (2).



The pins of the shackle type connectors (2) point to the inside. If necessary, remove the first broach bar (3) to assemble the shackle type connectors (note Chapter 6.2).

- Mount the cover plates (4) on the inserted shackle type connectors.
- Insert the split-pins.

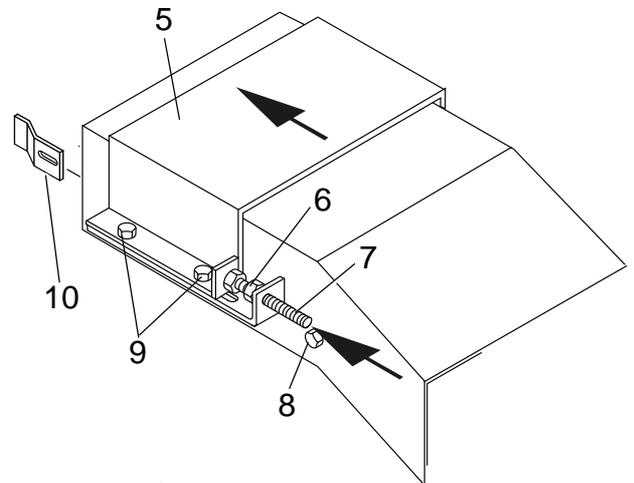


4.7 Tightening the scraper belt

- Loosen the fastening screws (9) on both sides of the gearing end frame (5), but do not remove completely.
- *Loosen the fastening screws (8) on both sides of the chain wheel cover (10).
- On both sides, loosen the lock nuts (6) of the clamping bolts.
- Screw in the clamping bolts (7) evenly in the direction of the arrow on both sides.



*Do not tilt the gearing end frame.
Tighten evenly on both sides!*



type 1

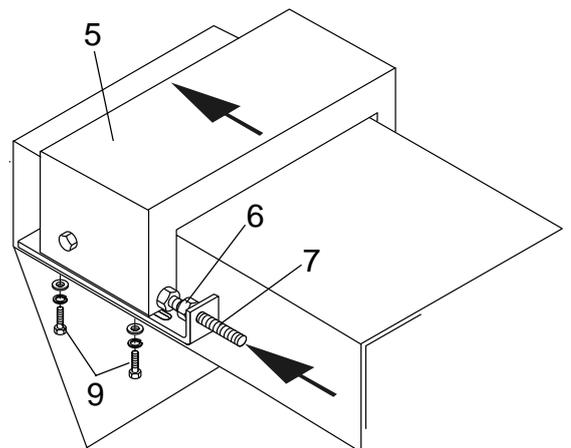
Scraper belt tightening:

Type K-1

- Tighten clamping bolts (7) with 20 Nm, then unscrew clamping bolts by approx. one turn.

Type K-2 / K-3

- Tighten clamping bolts (7) with 25 Nm, then unscrew clamping bolts by approx. one and a half turns.



type 2

- Tighten the lock nuts (6) of the clamping bolts.
- Tighten the fastening screws (9) on the gearing end frame.
- Adjust the covers previously loosened in the same proportion as the gearing end frame and tighten.

* = required only for type 1

5 Switching on and operating

5.1 Before initial operation

- Electrical components must be connected by qualified personnel (note voltage, frequency, intensity of current and direction of rotation).
- Do a leak test on pipings for liquids (possible transport damage).
- Set all switches at "0" or "OFF", respectively"
- Fill up with required liquids (coolants, lubricants, oils, etc.).
- The entire plant must be free from coarse parts (tools etc.) and all accessible danger areas must be secured or covered.

5.2 Switching on



- **Ensure that nobody is in the danger area of the scraper conveyor!**
- **Note the Regulation for the Prevention of Accidents VBG 10 when operating the plant!**
- **The discharge station must be visible during machine controlled operation!**



If a plate-type filter is used, the plant may not be running in the interval mode.

Sequence for switching on:

- Lifting pump(s)*
- Low lift pump(s)*
- Scraper conveyor
- Auxiliary aggregates (swarf mill, sieve drum, magnetic drum etc.)*
- Jetting pump(s)*

5.3 Switching off



Switch off scraper conveyors with coolant system with a time delay of approx. 5 min. to the processing machine (purification of the coolant).

Sequence for switching off:

- Jetting pump(s)*
- Low lift pump(s)*
- Lifting pump(s)*
- Auxiliary aggregates (swarf mill, sieve drum, magnetic drum etc.)*
- Scraper conveyor

*= if supplied with this version

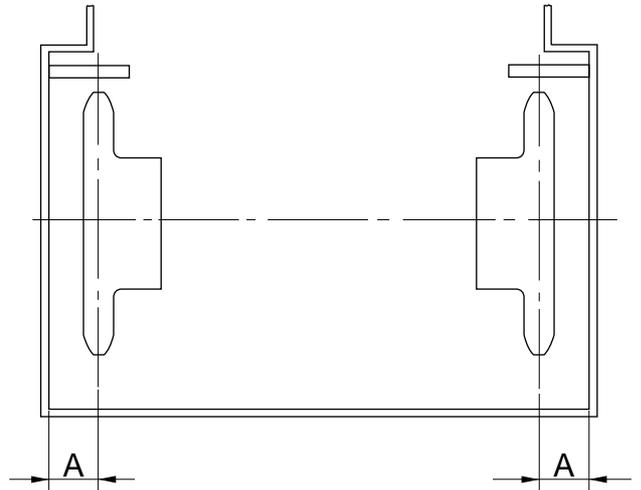
6 Maintenance

6.1 Adjusting the drive shaft



Only necessary if distance "A" is not the same on both sides

- Loosen the axial shaft locks on both sides of the drive shaft bearings.
- Move the chain wheels with the shaft axially until distance "A" is the same on both sides.
- Fasten the axial shaft locks on both sides.



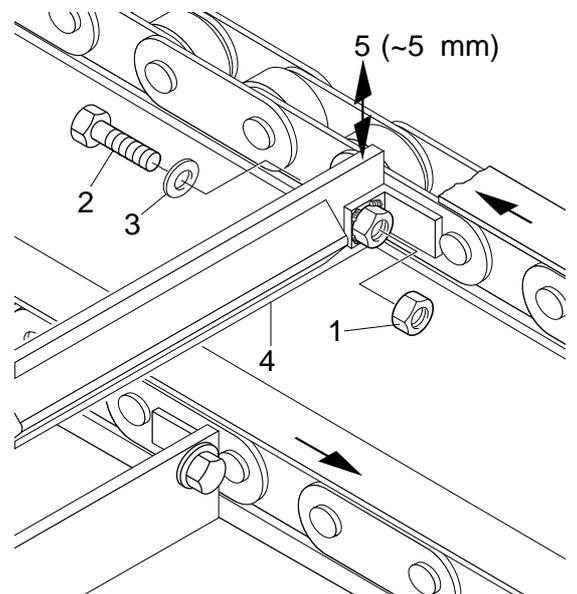
6.2 Changing the broach bars

- Loosen and remove the lock nuts (1) on both sides.
- Remove the hexagon head screws (2) on both sides.
- Remove the broach bar (4).
- Insert the new broach bar. Observe the direction of installation.
- Screw in the hexagon head screw.
- Loosen the hexagon head screw by 1/2 turn and fasten it in this position.
- Install and tighten lock nut (1).



Do not tighten the broach bar at the holding angle.

The broach bar must be movable by approx. 5 mm in the oblong holes (5).

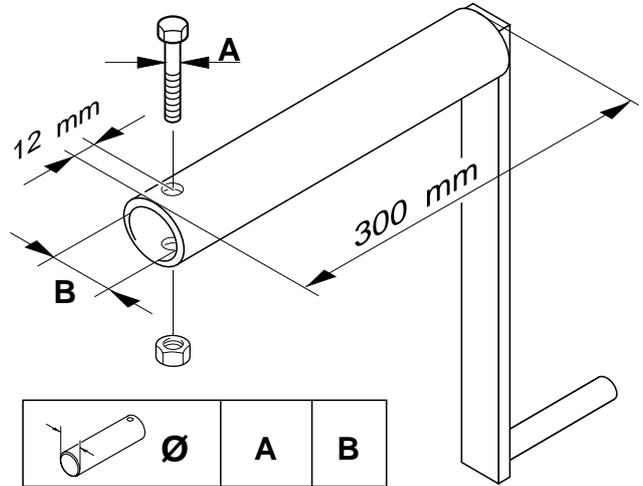


6.3 Attaching the manual crank



Examples of application for the manual crank:

- Moving the scraper belt to disassemble individual parts such as broach bars etc.
- Loosening coarse parts which block the scraper belt.
- Drawing in the scraper belt.
- Reversing operation when not possible with drive motor.



 Ø	A	B
25	M8	26
35	M10	36

- Loosen connection between drive motor and safety clutch. If necessary, remove drive motor.
- Expel the rollpin spring of the safety clutch.
- Remove the safety clutch from the drive shaft.
- Attach the manual crank to the drive shaft and install hexagon head screw. If necessary, fabricate manual crank as illustrated.

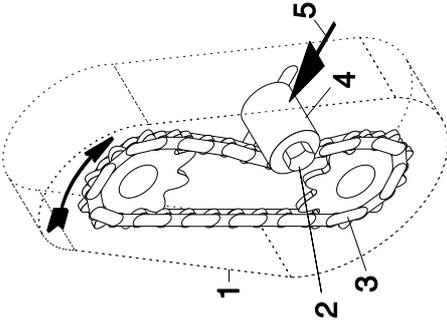
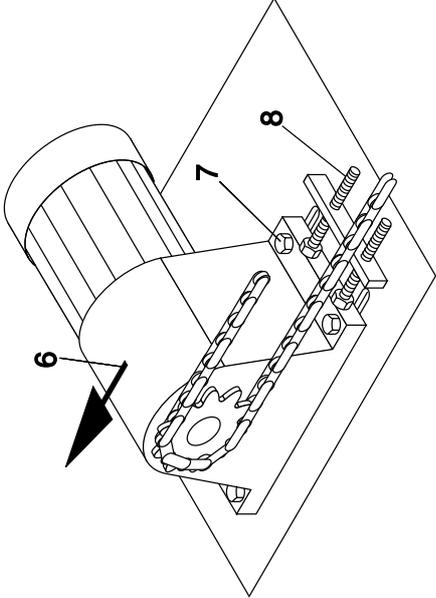
7 Information on coolants / tanks

- Circulate coolants continuously (weekend circulation recommended).
- Do not feed any organic matter.
- Avoid foreign oil charge.
- Temperature should be below 25°C for emulsion, if possible.
- pH-value should be within neutral range
- Hardness of the initial water should not exceed 15° dH
- Hardness due to upgrading must not exceed 20° dH.

Cleaning the coolant tanks

- Cleaning intervals greatly depend upon the kind of processing, material, coolant and working hours; no general interval can therefore be specified.
A cleaning interval between four and eight weeks is recommended as standard value.

8 Maintenance table

Assembly/ component	Interval	Maintenance work	Safety instructions/ note
Drive - Driving chain (only for version flange bearing with chain drive)	3 months	Check tension and adjust if necessary; oil driving chain 	Sequence of operation: - Remove protective cover (1) - Loosen hexagon head screw (2) - Press take-up pulley (4) in direction of the arrow (5) against the driving chain (3) (force of pressure approx. 20 N) - Tighten hexagon head screw (2) - Replace protective cover
- Driving chain (only for version pedestal bearing with chain drive)	3 months	Check tension and adjust if necessary; oil driving chain 	- Remove protective cover - Loosen hexagon head screws (7) - Unscrew the hexagon head screws (8) evenly in the direction of the arrow (6) until the tension in the driving chain is approx. 20 N - Tighten hexagon head screws (7) - Replace protective cover

Assembly/ component	Interval	Maintenance work	Safety instructions/ note
- Bearing of drive shaft and guide axis, chain wheels	---	Check for wear and smooth running	Check when changing scraper belt; replace if necessary
Scraper belt	3 months	Check tension and adjust, if necessary	Adjustment see Chapter 4.7
	3 months	Check for damage	Replace damaged parts
Electrical equipment	---	See manufacturer's operating instructions	
- Motor(s)	---		
- Wiring	3 months	Check for rupture and damage	Replace defective wires
- Level switch	3 months	Check functioning, clean	Exceed both switch points by manual operation
- Protective devices	3 months	Check functioning, clean	
Strainer basket	---	Empty and clean	At intervals depending on amount of chips produced
Pumps	---	See manufacturer's operating instructions	
Container	6 months	Check for tightness, damage and corrosion	Substances hazardous to the environment must not escape under any circumstances
	6 months	Check security of position	Container must be securely and firmly anchored
	---	Check guide rails for wear	

Assembly/ component	Interval	Maintenance work	Safety instructions/ note
Plate-type filter	Daily	In order to align the brush segments of the brushing band and gain optimum flow rates, the conveyor should run backwards at the end of shift for approx. 10 minutes.	During this time, no chips may enter the conveyor.
	3 months	Check for contamination; if necessary, disassemble and clean	
Brushing band	3 months	Check for contamination and wear, clean or replace, if necessary.	
Piping	1 year	Disassemble, clean and check (wear) flap traps/ shutting flaps and valves. Clean pipeline dirt pan with strainer basket.	Switch plant off Release pressure in piping Drain cooling lubricant from piping, actuate the shut-off valve, if necessary. Replace defective parts.
Coolant tanks	500 working hours	Check for contamination (sludge deposits) and clean, if need be.	Depending on the tooling method, the interval may be greatly shortened. Coolant tanks are special accessories and are therefore not installed in every plant.

9 Eliminating malfunctions

Disturbance	Possible causes	Remedy
<p>Drive motor races, scraper belt does not move</p>	<p>Driving chain broken (on chain drive version)</p> <p>Rollpin spring of safety clutch on driving gear shorn off</p> <p>Scraper belt blocked by large parts, safety clutch has released</p>	<p>Replace driving chain</p> <p>Drive in new rollpin spring</p> <p>Remove parts If necessary, turn scraper belt in opposite direction (see Chapter 6.3). After re-activation, the safety clutch automatically locks into place and continues to work.</p>
<p>Scraper belt does not run in the center (grazes handguard on one side)</p>	<p>Safety clutch defective (loud rattling)</p> <p>Axial shaft lock loose</p>	<p>Switch off swarf conveyor immediately Inform after-sales service fitter or replace safety clutch entirely. Do not bypass safety clutch or change adjustment under any circumstances.</p> <p>Adjust drive shaft (see Chapter 6.1).</p>

10 Accessories

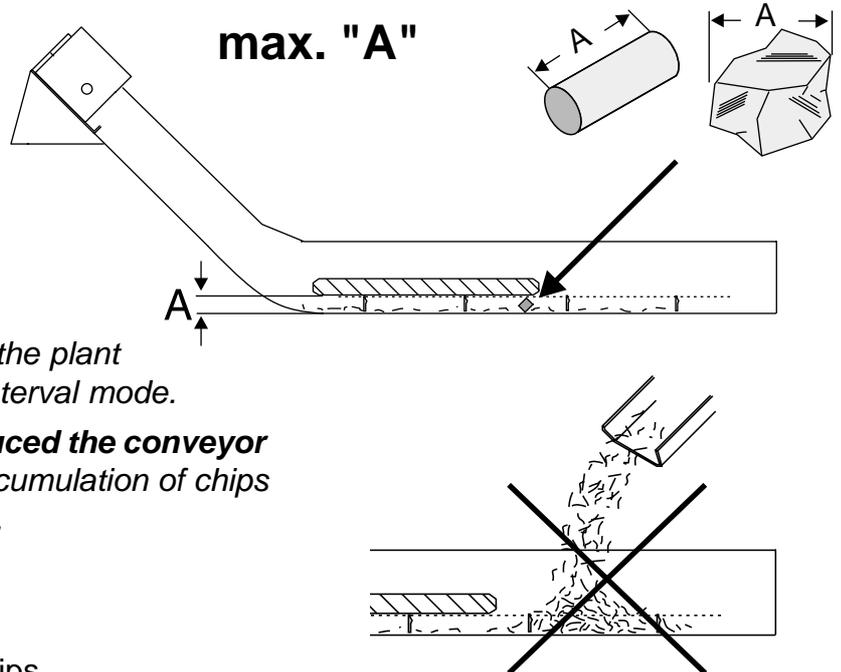
10.1 Plate-type filter

Description of functions plate-type filter



If a plate-type filter is used, the plant may not be running in the interval mode.

As long as chips are produced the conveyor has to run steadily! Big accumulation of chips might block the scraper belt.



Functions

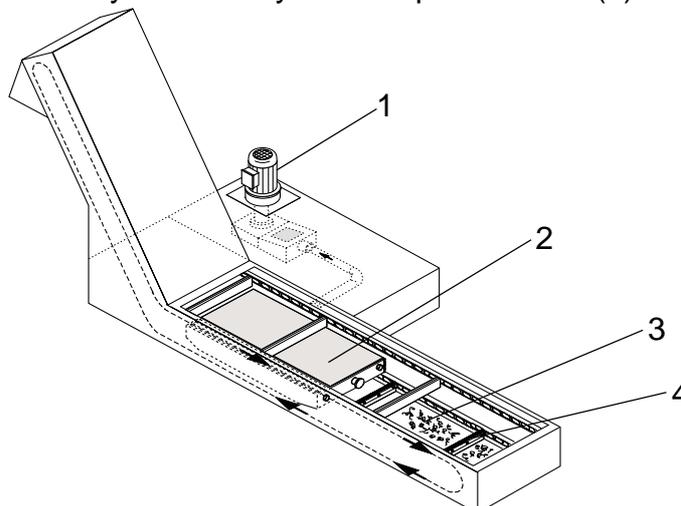
- preliminary separation of short chips
- pre-cleaning of the cooling lubricant

Scope of application

- in machine groups with low coolant reserves
- in case of large coolant amounts
- suitable for short chips, needle chips, wet processing

Method of Functioning

- Loose material and cooling lubricant flow from the processing machine to the scraper conveyor.
- The feed pump (1) aspirates coolant from the interior of the plate-type filter (2).
- Due to the vacuum produced, cooling lubricant flows in from the outside through the plate-type filter.
- Chips (3) are continually delivered from the delivery bottom of the scraper conveyor in the direction of the ejection opening.
- The plate-type filter is continually cleaned by the scraper brushes (4).



Disassembly of the plate-type filter



Risk of injuries!

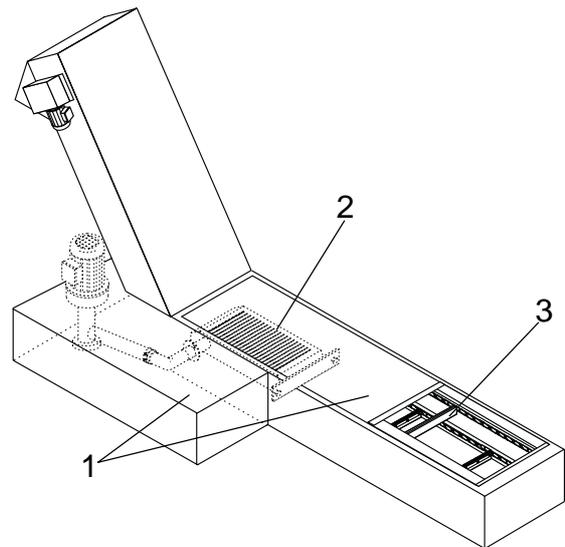
For all work carried out on the scraper conveyor:

- Do not stand on or reach into the scraper conveyor while it is in operation!
- Disconnect main switch!
- Secure scraper conveyor against accidental start-up!

- Remove cover plates (1) and extract coolant.
- Remove the broaching rails (3) for making the edge filter box (2) accessible from above

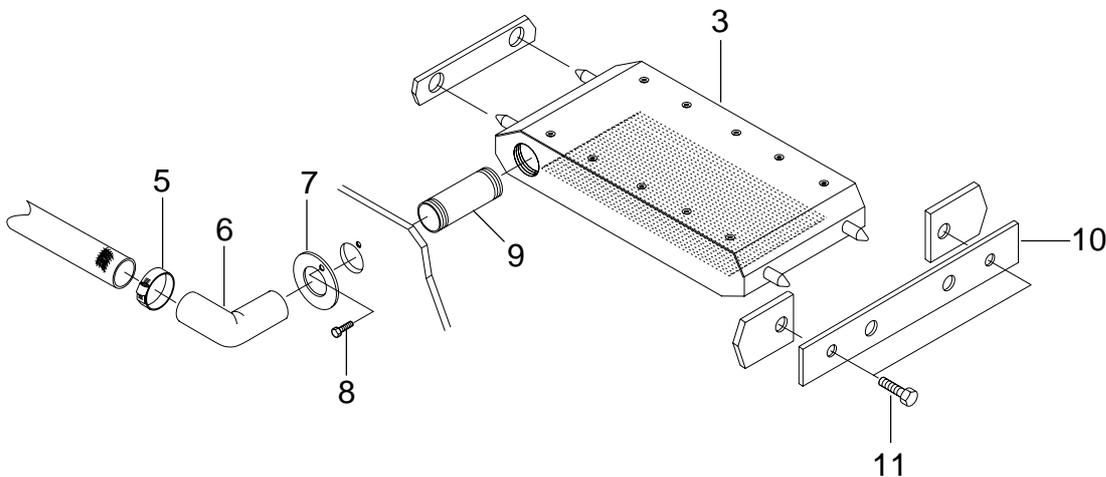


According to the individual versions, a removal of the box lid of the edge filter might be necessary for dismounting.



Type 1

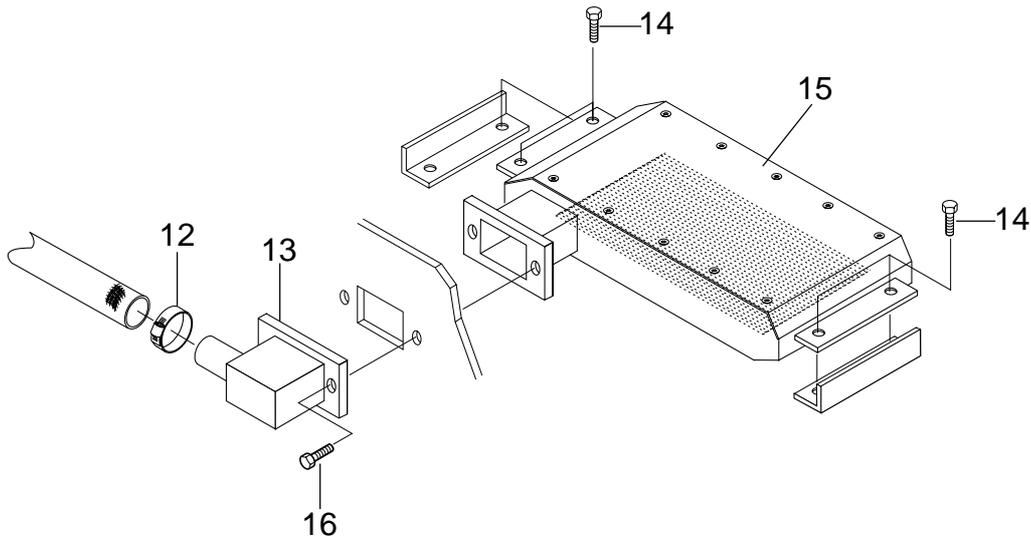
- release the hose band clip (5) lösen
- remove the hexagon head screw (8) from the sealing plate (7)
- disassemble the connecting tube (9) from the elbow socket (6) to the plate-type filter (3)
- remove the hexagon head screws (11) from the holding device (10)
- draw the plate-type filter (3) out of the holding devices against the conveying direction and remove it upwards
- assembly in reverse order



With types 1 and 2, the plate-type filter inserts are welded to the plate-type filter (3) and cannot be replaced separately.

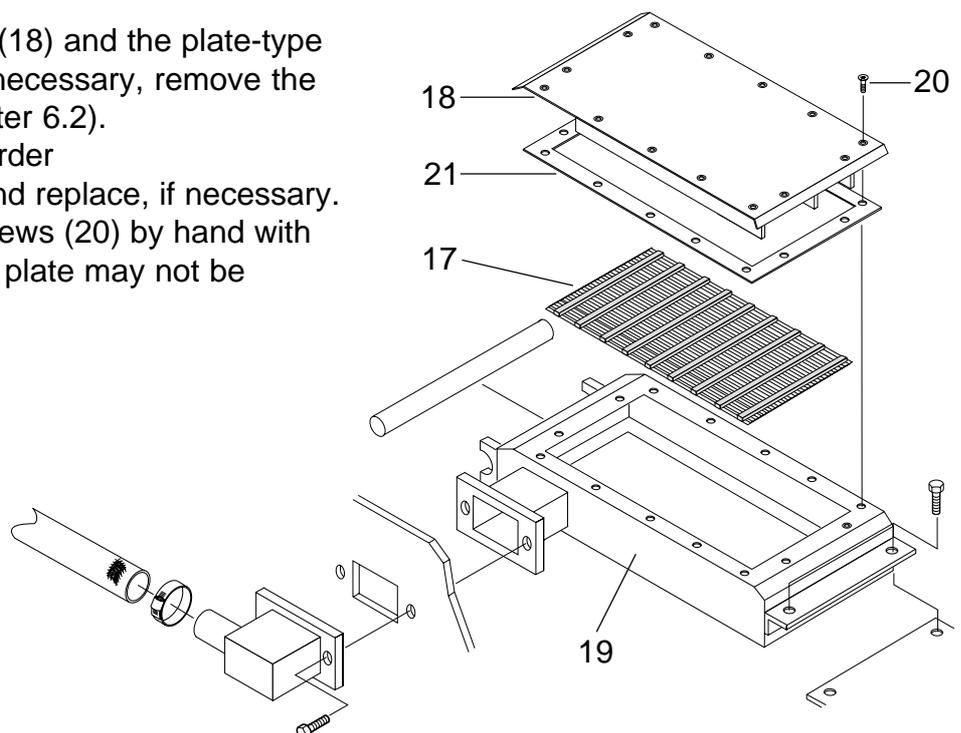
Type 2

- release the hose band clip (12)
- remove the hexagon head screws (16) of the suction box (13)
- remove the hexagon head screws (14) of the plate-type filter (15)
- remove the plate-type filter (15) upwards
- assembly in reverse order



Type 3

- For disassembly of the entire plate-type filter, see type 2.
- In addition, the plate-type filter (17) can be replaced for cleaning and maintenance work by removal of the cover plate (18) without disassembly of the plate-type filter box (19) (possible only with type 3).
- Remove screws (20).
- Remove the covering (18) and the plate-type filter (17) upwards (if necessary, remove the broach bar; see Chapter 6.2).
- assembly in reverse order
- Check the seal (21) and replace, if necessary.
- Slightly tighten the screws (20) by hand with **max. 5 nm** (the cover plate may not be deformed).



10.2 Instructions for fixing brushing band



Risk of injuries!

For all work carried out on the scraper conveyor:

- Do not stand on or reach into the scraper conveyor while it is in operation!
- Disconnect the main switch!
- Secure scraper conveyor against accidental start-up!

- Mount brush-off bar (fig. 4) with hexagon head screw (fig. 2) and disk (fig. 3).
- Loosen hexagon head screw (fig. 2) by turning approx. 180° and fix it in this position.
- Mount counter nut (fig. 1) and tighten it.



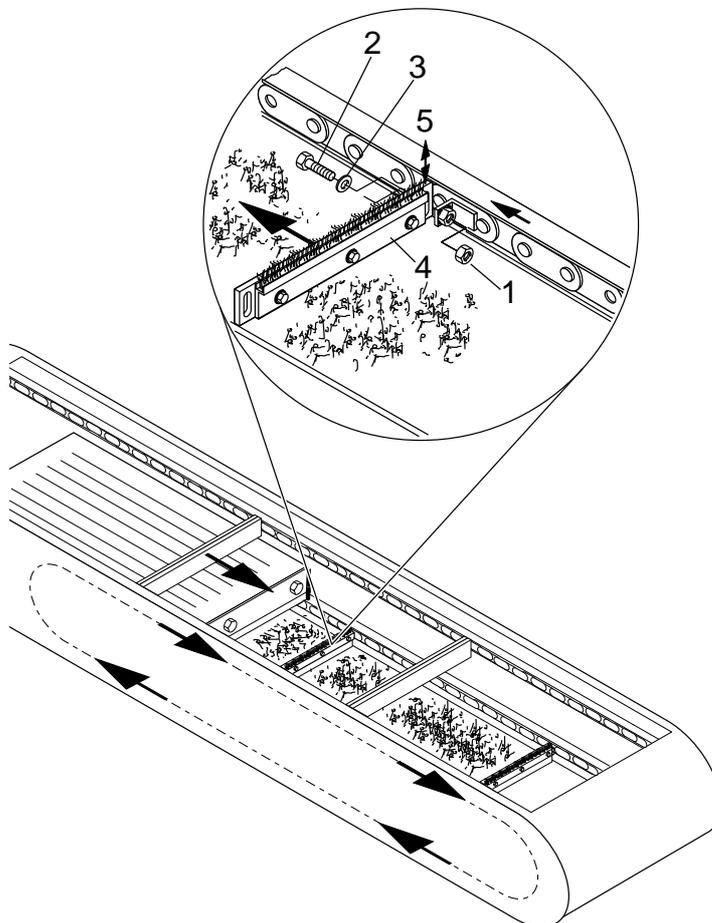
Do not tighten brush-off bar at the holding angle.

The brush-off bar must be movable in the slotted holes (fig. 5).



- Please observe fitting position under all circumstances!

- Wrong position leads to damage on scraper and equipment!



10.3 Setting instructions for scrapers



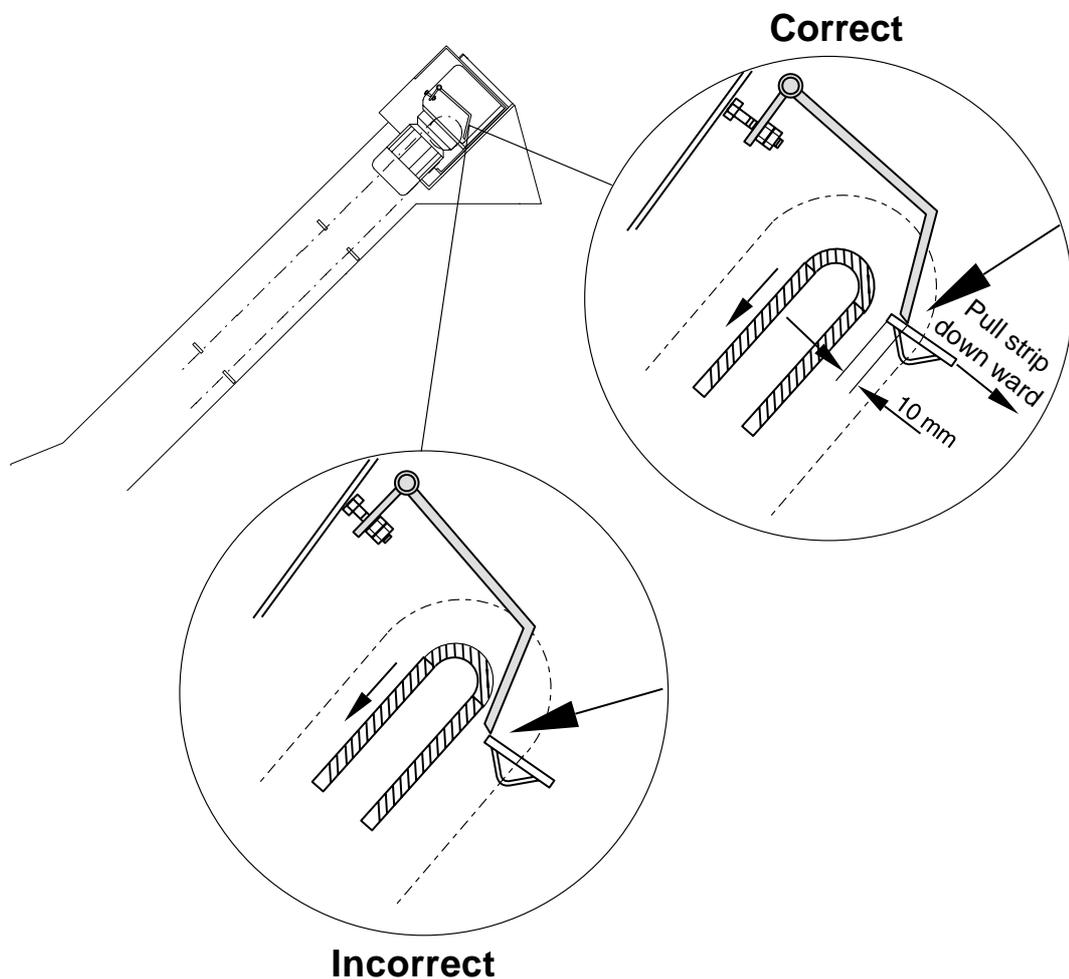
Risk of injuries!

For all work carried out on the scraper conveyor:

- Do not stand on or reach into the scraper conveyor while it is in operation!
 - Disconnect main switch!
 - Secure scraper conveyor against accidental start-up!
-
- Switch equipment on until the conveying strip is located approx. 20 mm before the scraper.
 - Switch equipment off and secure against accidental start-up.
 - Adjust scraper with the adjusting screw; loosen lock nut beforehand.
 - Set scraper at a distance of 10 mm from the edge of the strip!



- Incorrect settings will cause damage to the scraper and to the equipment!
- The equipment can be blocked!



10.4 Reverse flow filter

Description of operation reverse flow filter

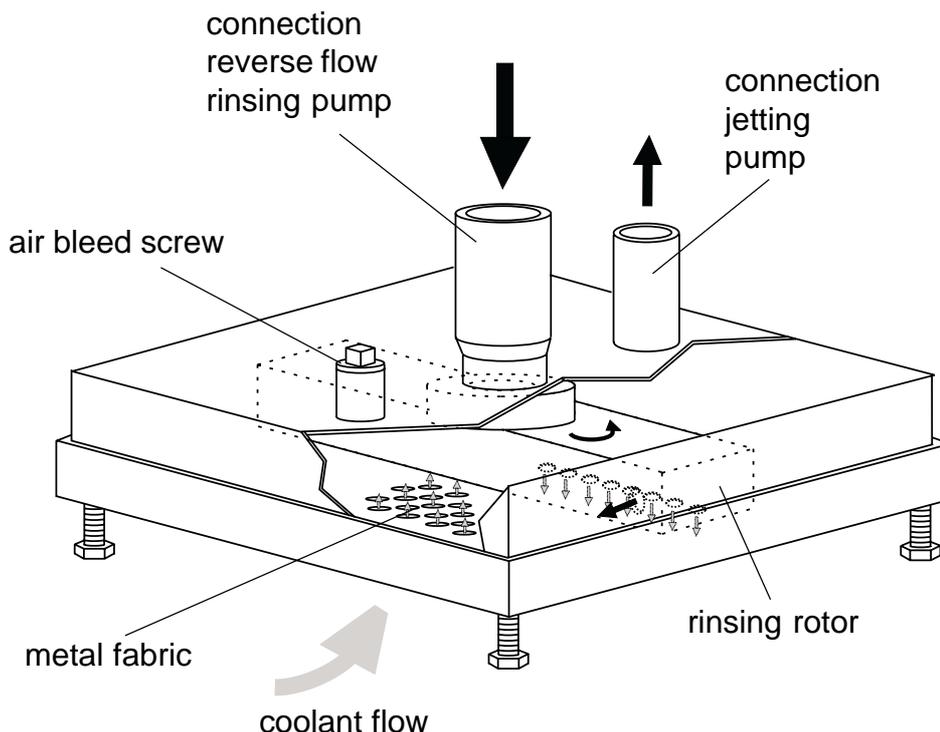
- Via the jetting pump, the cooling water is taken in through the metal fabric and then cleaned. Because the metal fabric is clogged by the aspirated dirt, it is cleaned by means of interval reverse flow.

Reverse flow periods:

- **RSF 65/100**
After a jetting pump running time of approx. 3 minutes, rinse filter through for approx. 7 seconds.
- The reverse flow is carried out via the rinsing rotor situated closely above the fabric. In this manner, the metal fabric is rinsed through by means of the nozzles fitted into the rotor. The rinsing pump has a higher volume flow than the jetting pump. Both pumps can be in operation during the rinsing procedure. The operation of the system is not interrupted, while the cleaning is nevertheless guaranteed.



Check coolant tank for contamination every 500 working hours and clean, if necessary. Depending on the tooling method, the interval may be significantly shortened.



Assembly and disassembly of the reverse flow filter



Danger! Risk of injury!

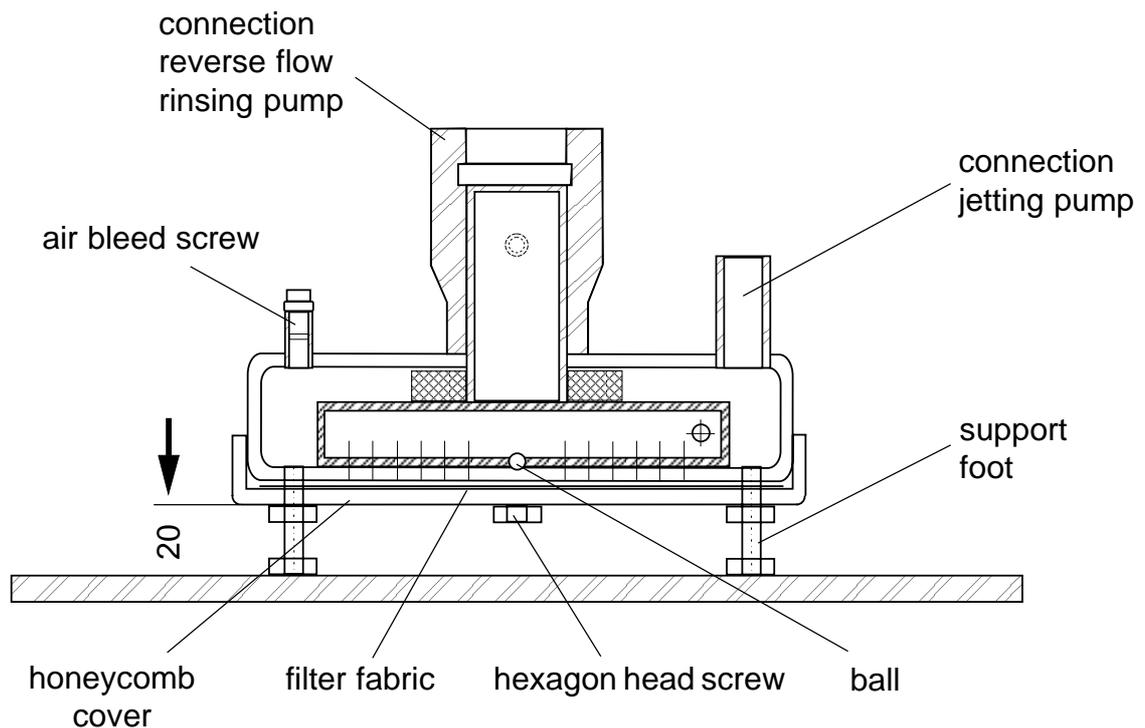
For all operations on the coolant cleaning system

- **Switch off main switch**
- **Secure coolant cleaning system against unintentional start-up**

- Remove cover plates and suck off cooling lubricant
- Disassemble tail pipe and ascending pipe from the reverse flow filter
- Lift reverse flow filter out of the coolant tank and clean it or, if necessary, replace filter insert
- Clean coolant tank

Cleaning/replacing filter insert

- Disconnect hexagon head screws and support feet from reverse flow filter.
- Remove honeycomb cover without damaging the seal.
- Clean or replace filter insert.
- Assembly in reversed order
- Adjust support feet to equal clearance (approx. 20 mm from the container bottom).
- Refill evacuated coolant.
- Start the system and check piping for tightness.



KNOLL Coolant cleaning systems
Swarf conveying systems
Low lift and jetting pumps

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