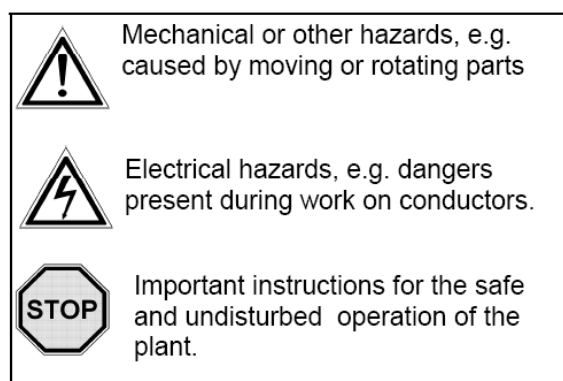


Safety instructions

The operating, assembling and maintenance instructions have to be read attentively prior to any maintenance and repair procedures. All steps are to be followed and applied without the use of undue force.

The safety instructions in combination with the specially indicated warnings are part of the product specific operating, assembling and maintenance instructions and have to be paid special attention to.

The following symbols can be found:



General advice: Moving or rotating parts of this machine represent a danger. In case of incorrect handling, such as faulty operation or insufficient maintenance, this may cause physical or material damage.



Advice: Assembly and maintenance of electrical devices may only be carried out by trained personnel. All conducting parts have to be separated from the power supply before being worked on in order to prevent electrical shocks.

Those persons responsible for the security of the plant have to guarantee that:

- ▶ only qualified persons are to be commissioned for work on the machines.
- ▶ all persons involved in operation, assembly and maintenance of the plant have free access to the operating, assembly and maintenance instructions and are made responsible for the proper application of the given instructions.

Special attention has to be paid to:

- ▶ the given national and regional directives (safety regulations / accident prevention)
- ▶ the local, plant specific directives and requirements
- ▶ the professional use of tools, lifting and transporting devices
- ▶ the use of personal safety equipment

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1 Total Drawing

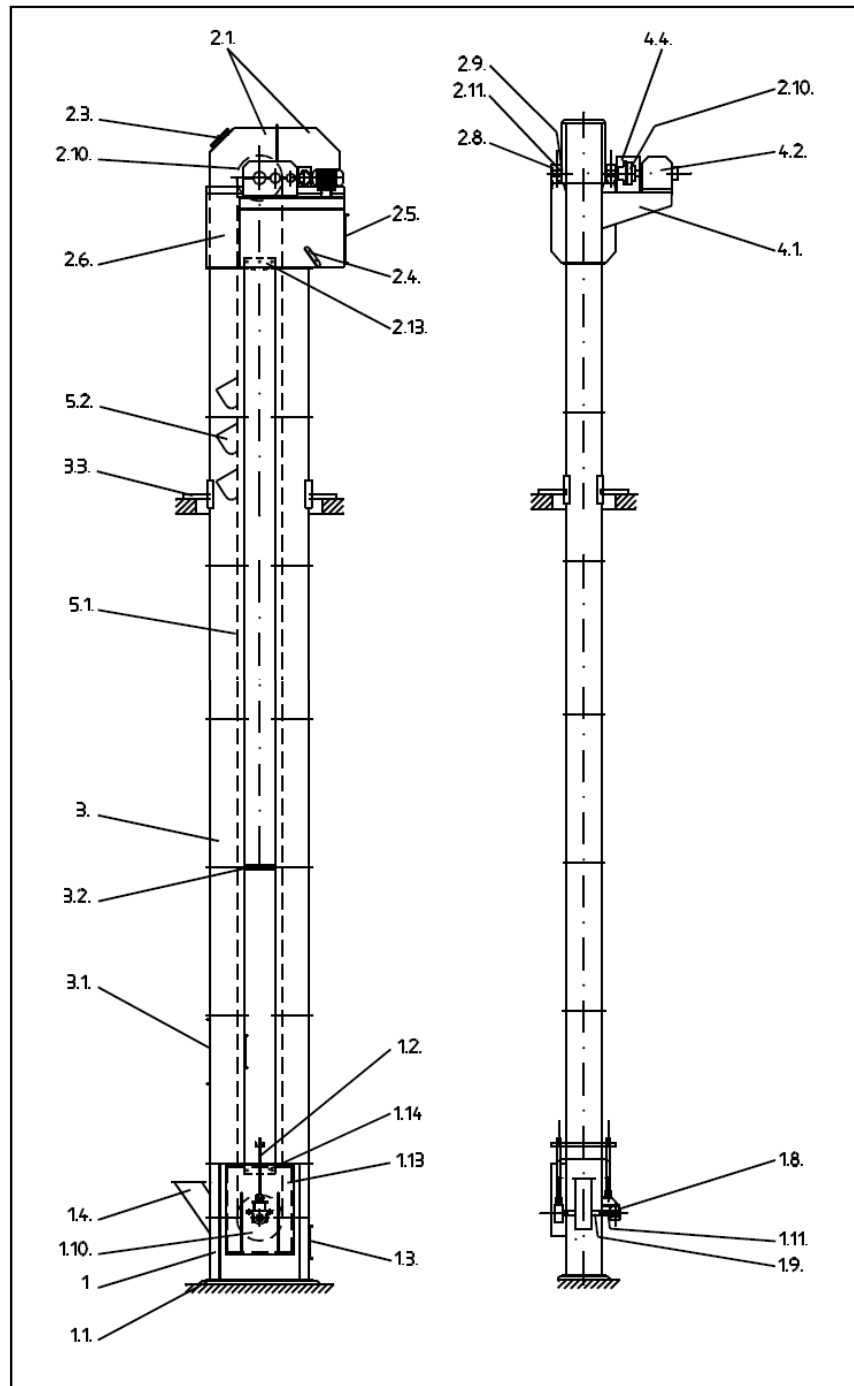


Fig. 1: Total Drawing

2 Safety Instructions



Read these instructions before beginning work on the conveyor.

2.1 Before Assembly, Inspection and Maintenance

Electrical equipment may only be assembled and maintenance work performed by trained and qualified technicians in accordance with current electro-technical regulations. All live lines must be cut from the power supply before beginning work to prevent any electrical shocks.

If the conveyor is charged with hot material, it must first cool down sufficiently before work is started. If the conveyor is used to transport materials which pose a health hazard, you must take the necessary precautions stipulated in the corresponding safety instructions before starting work.

Any upline conveyors should be shut down so that none of the materials being conveyed get into the intake. Before opening the cleaning flap at the feed boot of the bucket elevator, the elevator must be emptied. If this is not possible, then the cleaning flaps/hatches should be opened with great care, since conveying material may come out. Make sure that nobody is at risk of being hit by falling material from the conveyor. In particular, a large quantity of conveying material may fall out if the material has been poured over the bucket elevator.

Welding, firing and grinding work may only be performed in hazardous locations with express approval. Before performing these steps, clear the immediate vicinity of any dust and flammable materials and see to sufficient ventilation.

When using oils, fats and other chemical substances, observe the safety instructions for that product.

Ensure that there is sufficient lighting directly at the location where work is being performed.

2.2 Restarting the Bucket Elevator

Before restarting, all safety devices such as coupling protection, speed monitoring module, fill-height monitoring module etc. must be remounted and reconnected. All assembly and cleaning flaps must be reinstalled on the bucket elevator, i.e., it must be closed completely.

The bucket elevator must be up and running first before any material is loaded.

3 Proper Use

Bucket elevators are continuous conveyors for the conveyance of bulk goods.

The bucket elevator must only be used to convey the bulk good specified in the order confirmation.

4 Workplace of Operating Personnel

Operated personnel may work in the switchboard gallery of the respective installation and/or in the immediate vicinity of the bucket elevator during maintenance work.

5 Set-up and Assembly

This bucket elevator is a self-supporting but not free-standing bucket elevator with round link chains. It is composed of five element groups:

- the feed boot of the bucket elevator (pos. 1, fig.1)
- the flue of the bucket elevator (pos. 3, fig.1)
- the elevator head (pos. 2, fig.1)
- the drive with the drive console (pos. 4, fig.1)
- the bucket line drive (pos. 5, fig.1)

5.1 Setting up the Cage

Assembly begins with the feed boot (pos. 1, fig.1), which is set up horizontally in the desired position and temporarily secured against shifting to the side. The accompanying tools are used to align the feed boot (depending on the type of substructure).

After that, the flues (pos. 3, fig.1) are attached in the order indicated on our plan drawing. After inserting the accompanying Iso-Glass gasket between the flanges, screw them in parallel to one another.

After approx. every 6 m (2 flues), connect the two flue line drives with flue connection plates (pos. 3.2, fig.1) (does not apply to the box flues). Make sure that everything is in parallel from the start.

Then, mount the head (pos. 2, fig.1) and the drive console (pos. 4.1, fig.1). Arrange the drive components on the console to take their weight into account during subsequent alignment work.

Don't mount the 2-piece cover (pos. 2.1, fig.1) until after a test run of the bucket elevator. Only the shaft seals need be installed on the shaft between the chain wheel and pedestal bearing beforehand.

After assembly, align the cage of the bucket elevator axially and perpendicularly and then fix in place. Align the drive shaft at a right angle and centered with respect to the lower piece of the head (pos. 2.6, fig.1) and horizontally by means of the bearing clamp bolts and accompanying material. The drive and tension shafts must be positioned perpendicularly one above the other.

Before retracting the bucket line drive (pos. 5, fig.1), guide the bucket elevator into a suitable position using the accompanying guide plates (pos. 3.3, fig. 2) at intervals of approx. 10 - 15 m, as well as in the immediate vicinity of the elevator head to prevent swaying to the side. Fasten the guide plates (pos. 3.3, fig. 2) to an opening in the ceiling as provided by the circumstances on-site in such a way that the cage can be expanded vertically.

For outside bucket elevators, you should install appropriate side guides to absorb the force of the wind.

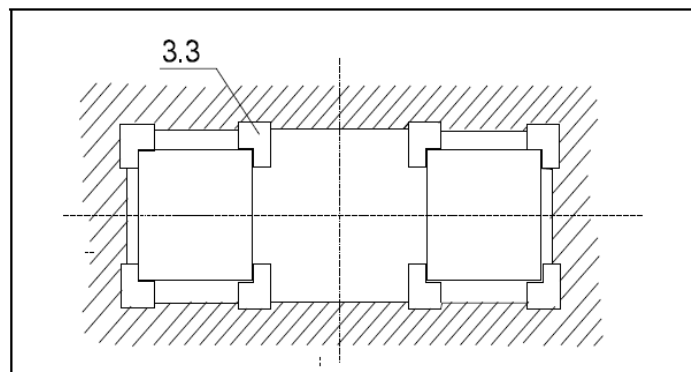


Fig. 2: Guide Plates on the Flue

5.2 Assembly of the Drive Components

Mount the drive components, geared motor or driving gear and motor horizontally and in alignment. Use the accompanying aids to compensate for differences in height. The coupling halves must be mounted parallel to one another.

Make sure there is an air gap between the coupling halves as specified by the manufacturer.

You must observe the accompanying regulations for the drive components.

You must mount the protective covers on the coupling.

Weld the drive console (pos. 4.1, fig. 1) to the lower part of the head (pos. 2.6, fig. 1) after aligning.

5.3 Assembly of the Elevator Line Drive

5.3.1 Assembly of the chain strand with DIN-system chain ends/chain brackets, make RUD

Checking the chain stitch

Before retracting the chains, check the chain stitch (distance from the middle to the middle of the chain) on the chain wheels.

Retracting the chain strands

The ends of the chains must be installed in pairs sorted according to the same length. That's why these components have already been sorted into pairs by the supplier.

Make sure that the welds on the vertically positioned chain links are pointing toward the centre of the wheel when passing over the drive wheels.

Attach a bucket to each chain brackets. Depending on the design of the chain bucket elevator a distance piece is to be provided between the chain bracket and the bucket. When the buckets are fastened make sure that a washer is placed between the inner wall of the bucket and the fixing nuts. It is imperative to lock the double nuts holding the bucket at the bracket.

Before commissioning the chain bucket elevator, you must retighten all mounting nuts.

After 2-weeks of operation time, you should recheck all mounting screws while the equipment is still warm to make sure they are tight, retightening if necessary.

Closing the chain loop

Closing the chain loop to be done when tension shaft is hoisted. Extra chain links, which hang too far down below the deflectors should be burned out of the loop carefully - without warming up the other chain links. Make sure to cover up the neighbouring chain links to prevent burns.

When separating the chain links, make sure that the chain brackets pass over the drive wheels as vertically-oriented links. For this reason, you must separate the second, fourth, sixth, etc. chain link on the chain strand if you have to shorten the loop. You must remove the same number of chain links from each loop.

Setting the deflection wheels

With the chain ends/chain brackets you must pretension the springs according to weight at the deflection station. Enquire at our company about the degree of weight or spring tensioning required if our qualified engineers have not already pretensioned the spring upon assembly.

Also make sure that the deflection wheels are turning during operation to prevent them from wearing out prematurely. For bucket chain elevators used to convey materials having a temperature greater than that of the surroundings, make the settings at maximum temperature.

Setting the springs on the slide plate (only for outside use)

The springs on the slide plate with the consoles of the boot shaft bearing should only be tensioned slightly to enable retensioning with the aid of the tensioning unit. In any case, the spring tension should provide a sufficient seal between the slide plate and boot cage.

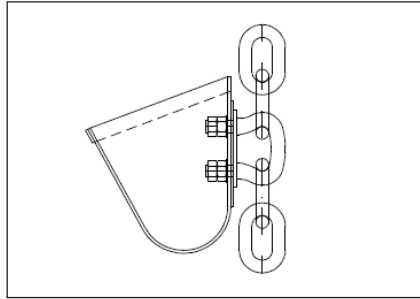


Fig. 3: Bucket fixture with Chain Brackets

5.3.2 Assembly of the bucket chain strand with clamp system, make RUD

Checking the chain stitch

Before retracting the chains, check the chain stitch (distance from the middle to the middle of the chain) on the chain wheels.

Retracting the chain strands

The chain packets (chain strand pairs marked with the same colour) should not be opened until they are ready for direct installation. Then, you must retract the chain strands in such a way that the 2 chain strands from one packet are situated across from another in the loop.

Make sure that the welds of the vertically oriented chain links point toward the centre of the wheel when passing over the drive wheels. You must also make sure to install different coloured pairs of chain strands after another, i.e., if you just installed a red chain strand, then the next one you assemble should be some colour other than red (if there are any other colours).

Assembling the chain couplings

When assembling the chain couplings, it is mandatory that the chain couplings pass over the drive wheels as vertically oriented links.

- | | |
|-----------------------------------|--|
| a) RUD space saving coupling (RS) | <ul style="list-style-type: none">■ Hang U-brackets into chain■ Attach coupling shells on the side and screw in place |
| b) RUD flat coupling (FL) | <ul style="list-style-type: none">■ Hang U-brackets into chain■ Hammer the locking bolt into place■ For additionally secure fixation, hammer in the clamping sleeve with the drift approx. 10 mm |

Before commissioning the chain bucket elevator, you must retighten all chain couplings.

After 2-weeks of operation time, you should recheck all screwed connections on the couplings while the equipment is still warm to make sure they are tight, retightening if necessary.

Closing the chain loop

Closing the chain loop to be done when tension shaft is hoisted. Extra chain links, which hang too far down below the deflectors should be burned out of the loop carefully B without warming up the other chain links. Make sure to cover up the neighbouring chain links to prevent burns.

When separating the chain links, make sure that the chain couplings pass over the chain drive wheels as vertically-oriented links. For this reason, you must separate the second, fourth, sixth, etc. chain link on the chain strand if you have to shorten the loop. You must remove the same number of chain links from each loop.

Setting the reversing wheels

With the clamping system, a weight or spring tension on the reversing station is necessary. Enquire at our company about the degree of weight or spring tensioning required if our qualified engineers have not already pretensioned the spring upon assembly.

Also make sure that the deflection wheels are turning during operation to prevent them from wearing out prematurely.

For bucket chain elevators used to convey materials having a temperature greater than that of the surroundings, make the settings at maximum temperature.

Setting the springs on the slide plate (only for outside use)

The springs on the slide plate with the consoles of the boot shaft bearing should only be tensioned slightly to enable retensioning with the aid of the tensioning unit. In any case, the spring tension should provide a sufficient seal between the slide plate and boot cage.

Mounting the buckets

Attach the bucket mounting clamps to the installed chain strand at the specified intervals (see confirmation of order) and fix Allen screws in place with a hex-nut.

Torque values are the same as those for grade 8.8.

Screw the buckets with two mounting nuts per threaded stem onto the bucket mounting clamps and fix the nuts in place with locknuts.

When the buckets are fastened ensure that a washer is placed between the inner walls of the bucket and the fixing nuts.

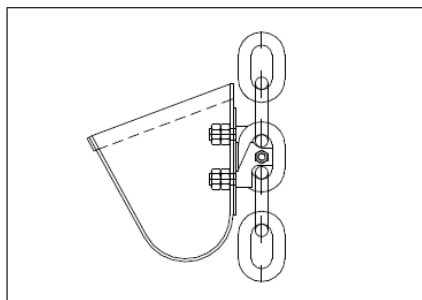


Fig. 4: Bucket Fixture with clamp

5.3.3 Assembly of the bucket chain links wit plug-in attachment system, make RUD

Checking the chain stitch

Before retracting the chains, check the chain stitch (distance from the middle to the middle of the chain) on the chain wheels.

Retracting the chain strands

The chain packets (chain strand pairs marked with the same colour) should not be opened until they are ready for direct installation. Then, you must retract the chain strands in such a way that the 2 chain strands from one packet are situated across from another in the loop.

Make sure that the welds of the vertically oriented chain links point toward the centre of the wheel when passing over the drive wheels. You must also make sure to install different coloured pairs of chain strands after another, i.e., if you just installed a red chain strand, then the next one you assemble should be some colour other than red (if there are any other colours).

Assembling the chain couplings

When assembling the chain couplings, it is mandatory that the chain couplings pass over the toothed drive wheels as vertically oriented links.

- | | |
|------------------------------------|--|
| a) RUD flat coupling (FL) | <ul style="list-style-type: none">■ Hang U-brackets into chain■ Hammer the locking bolt into place■ For additionally secure fixation, hammer in the clamping sleeve with the drift approx. 10 mm |
| b) RUD square shaped coupling (VK) | <ul style="list-style-type: none">■ Hang U-brackets into chain■ Attach coupling shells on the side and screw in place■ Tightening the screwed connections with a torque wrench |

Before commissioning the chain bucket elevator, you must retighten all mounting nuts.

After 2-weeks of operation time, you should recheck all mounting screws while the equipment is still warm to make sure they are tight, retightening if necessary.

Torque values are the same as those for grade 8.8.

Closing the chain loop.

Closing the chain loop to be done when tension shaft is hoisted. Extra chain links, which hang too far down below the deflectors should be burned out of the loop carefully without warming up the other chain links. Make sure to cover up the neighbouring chain links to prevent burns.

When separating the chain links, make sure that the chain couplings pass over the chain drive wheels as vertically-oriented links. For this reason, you must separate the second, fourth, sixth, etc. chain link on the chain strand if you have to shorten the loop. You must remove the same number of chain links from each loop.

Setting the deflection wheels

Thanks to the use of toothed chain drive wheels, the lower deflection portion can be put into normal operation without performing any additional weight or spring tensioning.

Use the spindles to set the wheels so that they are just barely touching the chain strand. The wheels are set properly if they are carried along when the machine is running without being lifted vertically. There should be about 5 - 10 mm slack between the chain and the deflection wheel.

Also make sure that the deflection wheels are turning during operation to prevent them from wearing out prematurely.

For bucket chain elevators used to convey materials having a temperature greater than that of the surroundings, make the settings at maximum temperature.

Setting the springs on the slide plate (only for outside use)

The springs on the slide plate with the consoles of the boot shaft bearing should only be tensioned slightly to enable retensioning with the aid of the tensioning unit. In any case, the spring tension should provide a sufficient seal between the slide plate and boot cage.

Mounting the buckets

Hang the buckets with the welded-on flat steel pieces into the chain using the round and flat plug-in carriers at the specified intervals (see confirmation of order) and fix the plug-in carriers in place with clamping sleeves.

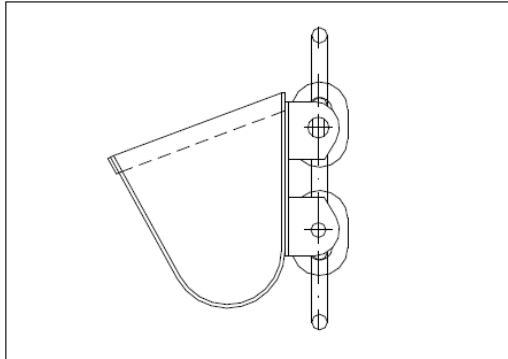


Fig. 5: Bucket Fixture with plug-in carriers

5.3.4 Bucket fixture with RUD-BWA

Checking the chain stitch

Before retracting the chains, check the chain stitch (distance from the middle to the middle of the chain on the chain wheels).

Retracting the chain strands

The chain packets (chain strand pairs marked with the same colour) should not be opened until they are ready for direct installation. Then, you must retract the chain strands in sequence, one by one, so that they are situated across from another chain packet.

Make sure that the welds of the vertically oriented chain links point toward the centre of the wheel when passing over the drive wheels. You must also ensure that the welds of the chain links point toward the centre of the wheel when passing over the idler wheels. When you have retracted a chain strand, then the next one you assemble should be some colour other than red (if there are any other colours).

Assembling the chain couplings

When assembling the chain couplings, it is mandatory that the chain couplings pass over the drive wheels as vertically oriented links.

- | | |
|-----------------------------------|--|
| a) RUD space saving coupling (RS) | <ul style="list-style-type: none">■ Hang U-brackets into chain■ Attach coupling shells on the side and screw in place |
| b) RUD flat coupling (FL) | <ul style="list-style-type: none">■ Hang U-brackets into chain■ Hammer the locking bolt into place■ For additionally secure fixation, hammer in the clamping sleeve with the drift approx. 10 mm |

Before commissioning the chain bucket elevator, you must retighten all chain couplings.

After 2-weeks of operation time, you should recheck all screwed connections on the couplings while the equipment is still warm to make sure they are tight, retightening if necessary.

Closing the chain loop

Closing the chain loop to be done when tension shaft is hoisted. Extra chain links, which hang too far down below the deflectors should be burned out of the loop carefully without warming up the other chain links. Make sure to cover up the neighbouring chain links to prevent burns.

When separating the chain links, make sure that the chain couplings pass over the chain drive wheels as vertically-oriented links. For this reason, you must separate the second, fourth, sixth, etc. chain link on the chain strand if you have to shorten the loop. You must remove the same number of chain links from each loop.

Adjusting the idler pulleys

Depending on whether toothed drive sprockets or toothless chain pulleys are used different kinds of adjustment are necessary.

a) For toothed drive sprockets:

Use the spring preloading device to adjust the chain tension on the drive sprocket under normal operating conditions obtaining the need for additional weight or spring preloading.

Use the spring preloading device to adjust the chain tension on the bucket lines. The adjustment is correct when the bucket lines are on but are no longer lifted in vertical direction. The slack between the chain and the idler pulley should be between 5 and 10 mm.

Use the spring preloading device to adjust the chain tension on the bucket lines to avoid bucket line wear.

b) For toothless chain pulleys:

The use of toothless chain pulleys requires a weight or spring preloading at the reversing point.

To determine the weight or spring preload, you may ask us or it is set by our specialists during assembly.

It is imperative that the idler pulleys rotate during operation to avoid a strong wear of the chain pulleys.

Bucket elevators where the temperature of the material being conveyed is higher than the ambient temperature, should be adjusted at maximum temperature.

Setting the springs on the slide plate (only for outside use)

The springs on the slide plate with the consoles of the boot shaft bearing should only be tensioned slightly to enable retensioning with the aid of the tensioning unit. In any case, the spring tension should provide a sufficient seal between the slide plate and boot cage.

Fixing the buckets

The BWA components for bucket assembly at the bucket line are supplied in two versions (preassembled, unassembled). 2 BWA each are used to fix the buckets. Every BWA consists of:

- 2 brackets
- 2 stud bolts
- 1 shaft
- 2 washers
- 2 fixing nuts or 2 lock nuts (or 2 self-retaining nuts)

Version: unassembled

- Screw 2 stud bolts into the 2 brackets (Fig. 6).
- Insert shaft in first bracket (Fig. 6).
- Place the second bracket on the shaft, observing the bucket distance prescribed (see order confirmation) (Fig. 7).
- Fit on the second preassembled bracket using the shaft (Fig. 7).
- Slip the bucket onto the stud bolts, place the washer and screw it tight using two fixing nuts for each stud bolt and lock (or use self-retaining nuts).
For a total friction coefficient of $\mu_{ges} = 0.14$ we recommend the following fastening torques:

Chain Ø 19 x 75 mm	-	293 Nm
Chain Ø 22 x 86 mm	-	506 Nm
Chain Ø 26 x 100 mm	-	506 Nm
Chain Ø 30 x 120 mm	-	1.000 Nm
Chain Ø 34 x 136 mm	-	1.700 Nm

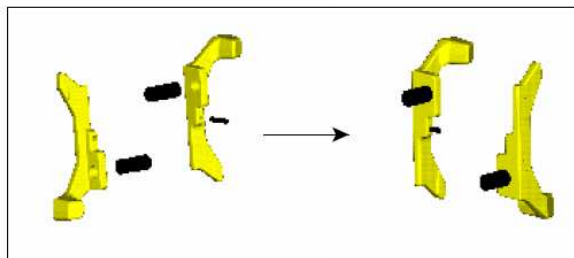


Fig. 6: BWA (unassembled delivery)

Version b) preassembled:

- Place the bracket with the shaft preassembled into the bucket line observing the bucket distance prescribed (see order confirmation) (Fig. 7).
- Slip on the second preassembled bracket using the shaft (Fig. 7).
- Rotate the two brackets against each other (Fig. 7).
- Slip the buckets onto the stud bolts, place the washer and screw it tight using two fixing nuts for each stud bolt and lock (or use self-retaining nuts).
For a total friction coefficient of $\mu_{ges} = 0,14$ we recommend the following fastening torques:

Chain Ø 19 x 75 mm	-	293 Nm
Chain Ø 22 x 86 mm	-	506 Nm
Chain Ø 25 x 100 mm	-	700 Nm
Chain Ø 30 x 125 mm	-	1.000 Nm
Chain Ø 34 x 136 mm	-	1.700 Nm

*If you have purchased
the RUD Twin (BWA) System,
see our maintenance
instructions F80551 and F80553.*



Fig. 7: BWA (preassembled delivery)

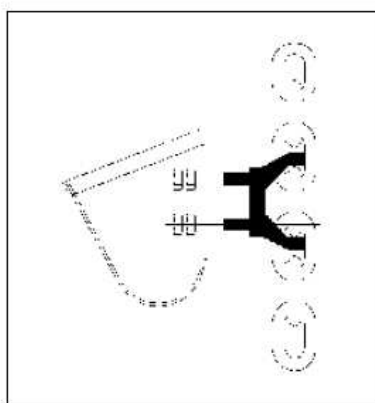


Fig. 8: Fixing of buckets with BWA

5.4 Assembling the Cover Pieces on the Head

After mounting the cover pieces (pos. 2.1, fig. 1), make sure that the sealing rings on the shaft openings are centred with regard to the shaft.

5.5 Installing the Guide Plate

Install the guide plate (pos. 2.4, fig. 1) in the spout of the elevator head (pos. 2, fig. 1) after retracting the elevator line close to the edge of the bucket so that the material being conveyed can run off and does not fall back into the flue.

Check the spacing between the guide plate (pos. 2.4, fig. 1) and the edge of the buckets in a test run to make sure that the buckets do not hit up against anything.

The guide plate and outside edge of the buckets should be spaced approx. 10 - 15 mm apart.

6 Starting the Elevator

Before starting the elevator, you must perform the following steps:

- Check the stop direction of the return stop on the geared motor or driving gear (pos. 4.2, fig. 1) and change it if necessary. Make sure the driving motor is revolving in the right direction.
- Check the level of lubricant / oil for the geared motor and/or driving gear.
- Lubricate shaft seals and pedestal bearings.
- Mount all protective covers.
- Pretension the tensioning unit (pos. 1.2, fig. 1) sufficiently to ensure that the tail pulley always engages. Refer to Section 5.3 for information on setting the tensioning unit for the respective chain system.

In this connection we make reference to the fact that the geared motors, gearboxes and hydraulic starting couplings are provided with the correct type of lubricants and lubricant quantities.

Nevertheless, this condition has to be checked prior to commissioning because other conditions may apply due to handling instructions and contract specifications.

Before turning on the motor, make sure that the protective covers and flaps of all moving parts are mounted in place.

The bucket chain elevator must be completely closed off and all intakes and discharges connected with other units with conveyor chutes in such a way that it is absolutely impossible to reach into the elevator.

When starting a new elevator for the first time, observe the chain while it is idling and retension it if necessary (weight tensioning / spring spindle tensioning). Refer to Section 5.3 for information on setting the tensioning unit for the respective chain system.

The elevator must be set so that it starts running before the feeder kicks in and stops running after the feeder shuts down. This prevents the feed boot of the elevator (pos. 1, fig. 1) from filling up and avoids excessive peak loads when the installation starts running.

If there is still some conveying material in the feed boot, you can remove it through the cleaning hatches (pos. 1.3, fig. 1).

Please Note: Special Instruction for Elevators for Conveying Beets

Elevators which convey beets should be run without pretensioning the tensioning unit. The entire weight of the deflection unit, consisting of the bucket trough, deflection chain wheels, deflection shaft and rolling bearings, should hang into the chain loop.

In this case, the spindles on the bearing consoles are only used to lift the deflection unit for repairs and inspection.

7 Operating

You can observe the flow of material through the viewing hatch (pos. 2.3, fig. 1) in the head.

For conveying material having a tendency to cake, there is a risk that the buckets might cake up. Check the buckets every once and a while for caking and clean them if necessary.

Check on a regular basis whether there is a residual tension in the feed boot shaft. Please note the information in Item 5.3 regarding setting the tensioning unit for the respective chain system.

Listen for any unusual sounds during operation.

Make absolutely sure that nothing can penetrate into the danger zone of the elevator during operation. To prevent accidents from happening, all opening must be closed tightly.

8 Shut-Down

Before shutting down the installation, it is best to run the elevator until it is empty so that it does not have to be restarted under a load, thereby risking an overload of the motor.

During repair work or inspections, make sure that no moisture can get into the elevator.

9 Detailed Description for Special Equipment

Refer to the appendices for driving components, the coupling and electrical monitoring devices.

10 Spot Checks during Operation

Listen for any unusual sounds during operation.

Make absolutely sure that nothing can penetrate into the danger zone of the elevator during operation.

To prevent accidents from happening, all opening must be closed tightly.

11 Monitoring Devices

11.1 Speed Governor

The speed governor checks the speed of the deflection shaft. If the precalculated speed is not attained, the main drive of the elevator shuts down.

Please refer to the accompanying operating instructions for speed governor for more details on this and a description of the function.

11.2 Material Level Indicator

It involves a paddle switch, vibration limit switch or diaphragm switch which is installed in the elevator boot.

It is designed to send a signal when the elevator is overflowing and activate an interruption in the feed of material (refer to the separate operating instructions).

12 Preventative Maintenance, Inspection and Operating Material

The chain strands must be checked on a regular basis. If after extended operation, the chain is worn down so far that the deflection shaft is in the lowest position, you must shorten the chain by removing some links. To do this, refer to the directions in Section 5.3.



The mounting screws on the chain brackets, chain lock und bucket fixings should be checked on every 6 months to make sure they are fixed firmly in place. Retighten the screws if necessary.

Lubricate the sealing rings (pos. 2.11, fig. 1) on the head shaft (pos. 2.9, fig. 1) every three months.

You should retension the external components of the glands (pos. 1.11, fig. 1), which serve to seal the feed boot shaft (pos. 1.9, fig. 1), uniformly on a monthly basis if the installation is operated daily. This is not necessary in the case of elevators with inside bearings.

You should clean the rolling bearings after approx. 10.000 hours of operation using a detergent, e.g., petroleum, and then fill with lubricant. Refer to the lubrication lists for the type and quantity of lubricant to use and the intervals at which to lubricate.

For elevators with inside bearings in the feed boot shaft, check the oil level at the oil peephole on a regular basis and change the oil according to the lubrication intervals.

Please refer to the notes in the operating instructions for oil-tight inside bearings.

13 Possible Problems and Troubleshooting Tips

13.1 The Elevator does not attain the specified Conveying Capacity

Possible sources of problem:

- The guide plate (pos. 2.4, fig. 1) is not positioned close enough to the buckets.
- The bucket line drive is slipping.
- The bulk weight of the conveyed material is too low.
- The contents of the buckets is reduced due to caked material.

13.2 The Elevator is making unusual Noises

a) at the elevator head

Possible sources of problem:

- The guide plate (pos. 2.4, fig. 1) is positioned too close, the buckets (pos. 5.2, fig. 1) are hitting up against it.
- Some buckets are deformed.
- The coupling gaskets (pos. 4.3.1, fig. 10) are worn out.

b) at the elevator feed boot

Possible sources of problem:

- The sliding plates do not slide any more, the springs have been stretched too far.
- The tension station can not readjust itself on its own because the chain has been stretched too far in length.

13.3 The elevator is running backwards

Possible sources of problem:

- The return stop or the brake is defective.

14 Repair work



Attention: Please note the safety instructions on page 1! When working on the installation, take all necessary precautions to ensure it can not be started unintentionally!

14.1 Replacing the Gland Gasket

- Loosen the front part (pos. 1.11.3, fig. 9) of the gland and slide it on the shaft in the direction of the pedestal bearing.
- Change the gasket (pos. 1.11.1, fig. 9).
- Slide the front part onto the gasket. Press the front part against the gasket by tightening the nuts uniformly
- Fix the nuts in place using locknuts (pos. 1.11.4, fig. 9).

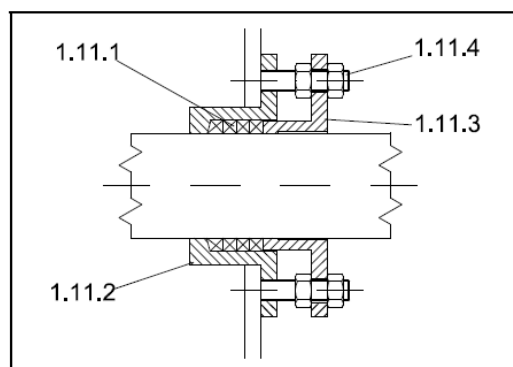


Fig. 9: Gland

14.2 Replacing the Coupling Gasket

- Screw off the coupling protection.
- Loosen the mounting screws on the drive (pos. 4.2, fig. 10), slide back the drive and the one half of the coupling.
- Replace the coupling gasket (pos. 4.3.1, fig. 10).
- Slide the drive and the one half of the coupling back in place; make sure to retain the necessary air gap between the two halves of the coupling. You must precisely align the shafts of the drive and elevator head.
- Retighten the screws on the drive
- Mount the coupling protection.



Attention: The coupling protection must be remounted.

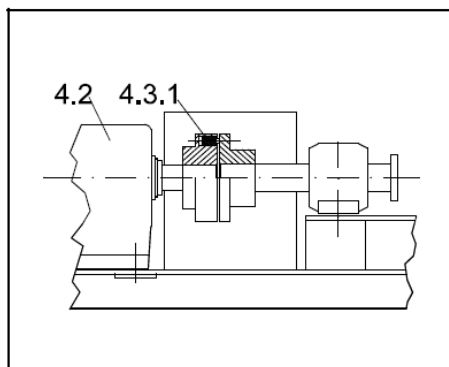


Fig. 10: Coupling

14.3 Chain Wheels-Segments, individual Teeth and Tread Segments

The chain wheels-segment, individual teeth and tread segments should be disassembled and replaced in the following order:

14.3.1 Head Shaft

- a) Remove head cover (pos. 2.1, fig. 1).
- b) Hold onto chain strand and open it.
- c) Loosen mounting screws and remove chain wheels-segments, individual teeth or tread segments.
- d) Replace chain wheels-segments, individual teeth or tread segments.
- e) Retighten the mounting screws and fix in place.
- f) Close the chain strand.
- g) Replace the head cover (pos. 2.1, fig. 1).

14.3.2 Boot Shaft

14.3.2.1 Boot Shaft with Outside Bearings

- a) Relieve the load on the chain strand.
- b) Loosen the cover of the pedestal bearing and the clamping sleeves of the self-aligning bearing.
- c) Loosen glands (pos. 1.11, fig. 1).
- d) Unmount one side flap (pos. 1.13, fig. 1) from the boot.
- e) Secure the chain strand from above, open and lower using the lifting mechanism and pulley.
- f) Remove the boot shaft with chain wheels.
- g) Replace the chain wheels-segments, individual teeth or tread segments exactly as described in Section 14.3.1.
- h) Reassemble the deflection shaft in the reverse order.

14.3.2.2 Boot Shaft with Inside Bearings

- a) Relieve the load on the chain strand.
- b) Unmount one side flap (pos. 1.13, fig. 1) from the boot.
- c) Secure the chain strand from above, open and lower using the lifting mechanism and pulley.
- d) Remove the boot shaft with chain wheels.
- e) Replace the chain wheels-segments, individual teeth or tread segments exactly as described in Section 14.3.1.
- f) Reassemble the deflection shaft in the reverse order.

14.4 Buckets

If a bucket (pos. 5.2, fig. 1) needs to be replaced, refer to the disassembly and assembly instructions in Section 5.3.

14.5 Chain Components

14.5.1 Chain components of DIN-system chain ends/chain brackets, make RUD

To replace worn chain ends (pos. 5.2, fig. 1), you must relieve the load on the chain strand by pushing the chain together with the lifting mechanism and pulley, while making sure that the chain strand does not fall down.

In the unloaded segment of the chain, you can replace the worn chain elements.

Refer to the instructions in Section 5.3. for information on assembling the chain strands.

14.5.2 Chain components of clamp system, make RUD

In this system, you must generally replace the entire chain strand.

Refer to the instructions in Section 5.3. for information on assembling the chain strands.

14.5.3 Chain components of plug-in attachment system, make RUD

In this system, you must generally replace the entire chain strand.

Refer to the instructions in Section 5.3. for information on assembling the chain strands.

14.5.4 Chain parts of RUD-BWA system

In this system, you must generally replace the entire chain strand.

Refer to the instructions in Section 5.3. for information on assembling the chain strands.

15 Noise Emission

The band elevator attains a sound pressure level of 80 dB(A) in the working area.