

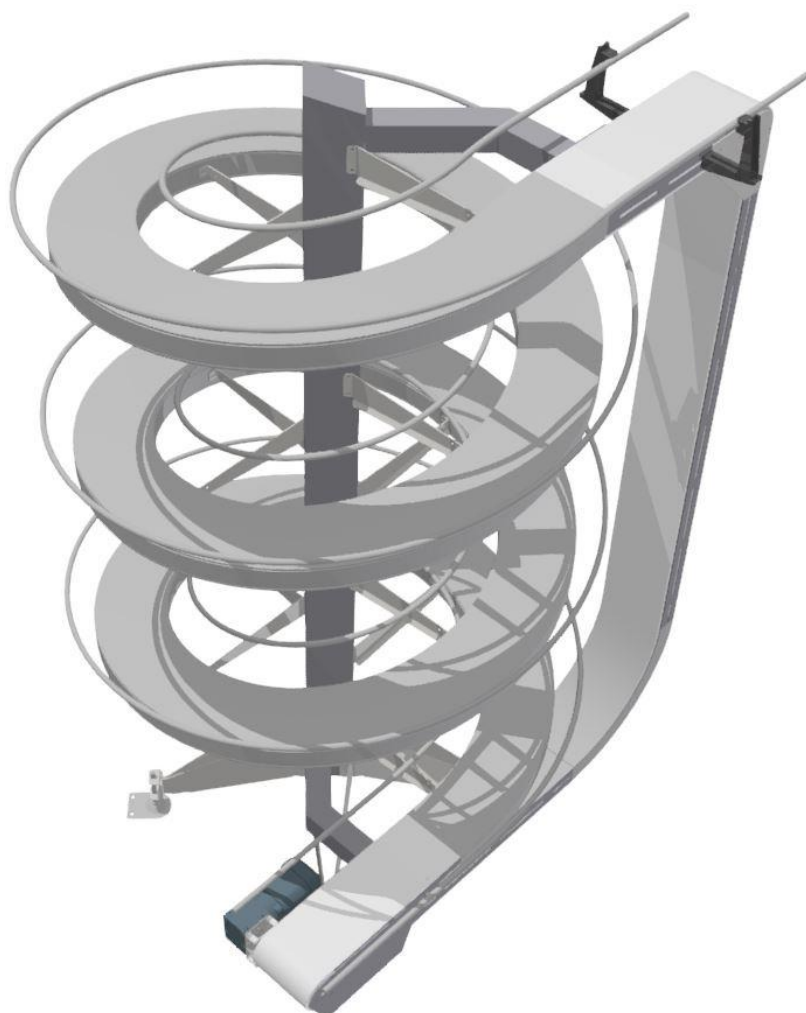


SPIRAL CONVEYOR

S530

S540

S560



Instructions for use
Translation in original

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Appendices

1.	Environmental product declaration	Included in this document
2.	EC Declaration of Conformity	Supplied as a separate document
3.	Remaining hazards/risks to be managed by customer	Supplied as a separate document
4.	Spare parts list	Supplied as a separate document

5. Drawings

Supplied separately

1 General information about this document



NOTE!

Read this document and its appendices carefully

It is important that all personnel working with or nearby equipment are aware of the risks they may be exposed to, and for all such personnel to have read and understood the contents of this document.

This document must be preserved throughout the service life of equipment supplied by Carryline AB.

Carryline AB is not liable for any injury or damage to equipment in cases where these regulations have not been complied with.

1.1 Description of symbols used in this document

The following symbols and warning texts are used in this document together with the descriptions shown below.



WARNING!

Indicates a dangerous situation which, if not avoided, will lead to death or serious injury.



CAUTION!

Indicates a dangerous situation which, if not avoided, may cause minor injuries or damage to equipment.



NOTE!

Indicates the presence of information that requires extra attention and which if ignored, may lead to damage to the machine.

2 General safety instructions



Warning!

Hair and working clothes – Hair must be tied back or restrained by a hairnet, and baggy garments or working clothes must be avoided as they may get caught in the machine.



Warning!

Power supply – Pneumatic or electrical power must be disconnected and a safe procedure applied whenever any form of work on the machine is carried out.



Warning!

Working at height – When working at height, safety procedures according to current regulations must be applied.



Caution!

Pinch or crush injuries – There is a risk of pinch or crush injuries between the conveyor and any built-on accessory.



Caution!

Pinch or crush injuries – Do not touch the conveyor chain during operation with your hands or any object.



Caution!

Pinch or crush injuries – Depending on the type and weight of the products conveyed, there is a risk of pinch or crush injuries between the product and the conveyor.



Caution!

Tripping risk – Support legs and attachment points in the floor present a risk of tripping and falling.



Caution!

Pinch or crush injuries – Risks can occur at pneumatic accessories without covers such as separation stop, pusher and divider.

Symbols that can be found on the machine



Pinch or crush injuries!

Indicates that there is a risk of pinch or crush injury. During operation hands or other objects must not come in contact with equipment marked with the symbol.

A risk analysis for the installation must be done by the responsible installer before work start up.

Make sure that all ergonomic aspects (light, air, safe and clear access etc.) are met during installation, operation and maintenance of the machine.

Tools used for maintenance must be of good quality and selected according to the work. Tools and personal safety equipment must be used according to the tool manufacturer's recommendations.

2.1 Remaining hazards/risks

Remaining risks that must be managed by the customer are described in Appendix 3.

2.2 Important information before use, maintenance and service

- Make sure that all operators (operations, service, maintenance etc.) have read and understood this document and have been properly instructed or trained.
- Before putting the machine into use, make sure that
 - all conveyors are securely anchored to the floor and/or walls,
 - all parts and add-ons are firmly secured to the conveyor, and
 - all installation work has come to an end.
- Keep the machine cleaned and serviced in accordance with this document.
- The user is responsible for such ergonomic aspects as lighting and keeping the machine available for operation and service.
- To reduce the risk of accidents, the user must keep the areas around the machine free of waste and other material that can have a negative effect on safe operation.
- Make sure all electrical and control installations comply with the applicable EU directives. NOTE – Make sure that safety and emergency stops are tested and in full function and that the machine is included in such stops in accordance with this document.
- This machine may not be used for purposes other than those specified in the accompanying EC declaration.

2.3 Safety and function checks

- Regularly check that warning signs are intact and fully visible both after commissioning and during operation.
- Regularly check that all fixed guards are intact and correctly installed, i.e. not dismantled or only partially installed.
- Regularly check that all safety devices are intact and in the event of damage repaired immediately before operation recommences.

2.4 Transport and arrival checks

- The machine is properly packaged before delivery and upon arrival at the customer, it must be handled with care using suitable lifting equipment.
- Upon arrival, check that the machine is undamaged before installation work is begun.

2.5 Conversion or modification of the machine

- In order for the warranty and the EC declaration to remain valid, no machine modifications or conversions may be performed unless carried out by Carryline AB or other party approved by Carryline AB.
- If modifications are made to the machine, they also affect the contents of this document.

3 Technical specification

	Series	S530	S540	S560
Data				
Chain width		83 mm	140 mm	220 mm
Min radius		400 mm	400 mm	600 mm
Max angle		14°	12°	12°
Max speed		50 m/min*	50 m/min*	40 m/min*
Max simultaneous product weight in spiral		120 kg**	120 kg**	120 kg**
Noise level		<70 dB	<70 dB	<70 dB

*Depends on the number of turns, the radius, weight and design.

**Depends on the number of turns, the radius, speed and design. Distribute weight evenly along the entire spiral conveyor.

The layout and the EC declaration belonging to the machine describe other technical specifications that apply to the relevant delivery and installation.

4 Machine plate(s)

The machine is identified with machine plate(s) as illustrated below.



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Tillverkningsnr.
Manufacturing no.

Tillverkningsdatum
Manufacturing date

5 Installing the spiral conveyor

The spiral conveyor is delivered on pallets with side panels that must be removed to provide good access for lifting equipment etc. Depending on the size of the conveyor, it is stowed upright or horizontally on the pallet.

Lift and set down the machine as close to the installation site as possible.



Warning!

Heavy load – Lifting the spiral conveyor requires preparation, the proper skills and the appropriate equipment. Incorrect handling may result in serious injury.



Warning!

Heavy load – Forklifts must be used and the machine must be secured at the top throughout installation.

Cordon off the area where the spiral conveyor will be lifted and set down so that no unauthorized persons may be present in the area during the work.

5.1 Conveyor stowed horizontally on pallet; handling

1. Fasten one strap in the lifting eye on the upper section and another around one foot on the stand.

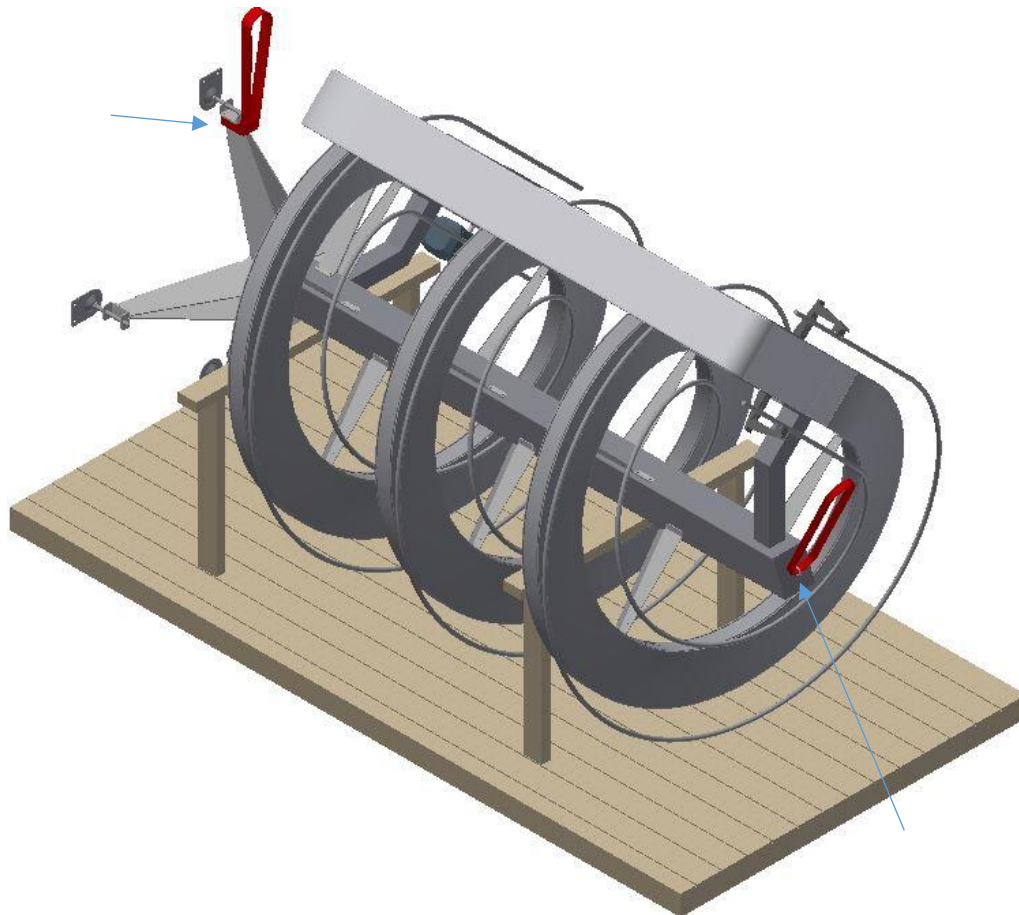


Figure. Highlighted attachment points for lifting straps on the spiral conveyor.

2. Use two (2) forklifts – position one forklift at each end of the pallet and fasten the straps securely to the forks.
3. Release the attachments to the pallet and lift the equipment approx 100 mm and remove or push aside the pallet.

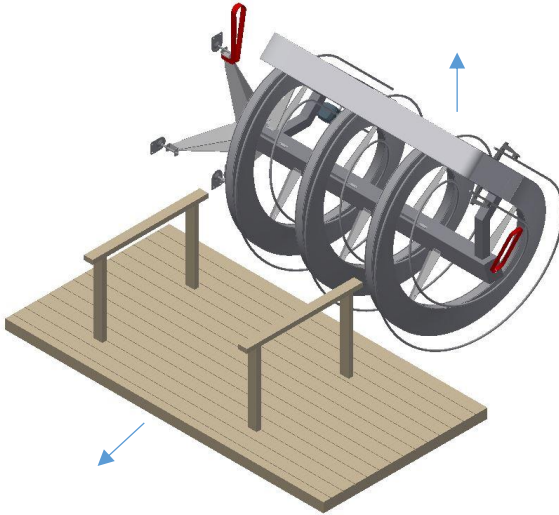


Figure. Removing the pallet.

4. Following this, use the forklifts to perform a coordinated lift by raising the upper section of the conveyor while moving the lower section forward. Make sure the feet do not touch the floor.

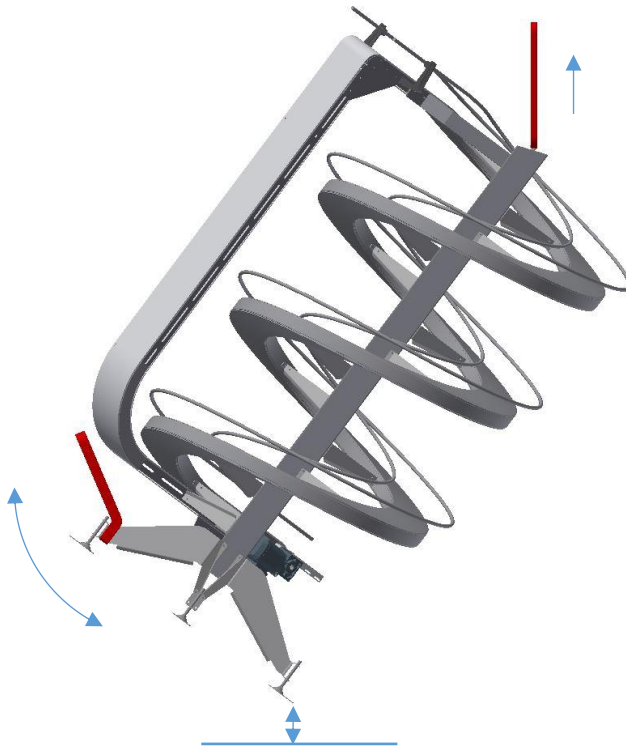


Figure. Raising the spiral conveyor with the aid of two coordinated forklifts – lift without touching the floor.

5. Once the conveyor is upright, the lower restraint can be released/removed.
Laying the conveyor down takes place in reverse order.

5.2 Conveyor stowed upright on pallet; handling

Attach one strap to the lifting eye on the upper section of the stand. Attach the strap securely to the tines of one forklift. Release the conveyor's attachments to the pallet and carefully lift the conveyor from the pallet.

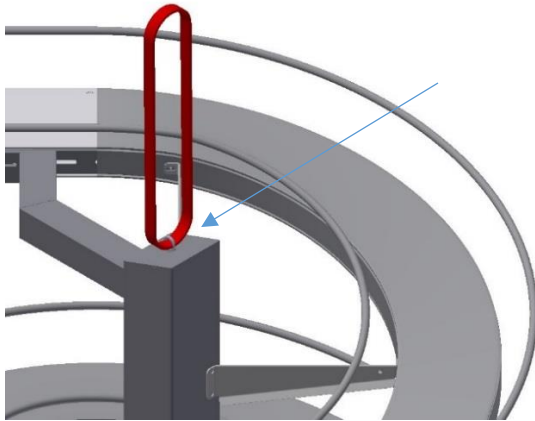


Figure. Highlighted attachment point in the upper section of the stand.

5.3 Mechanical installation

Place the spiral conveyor in its proper place and adjust its height and upright position with the aid of the adjustable feet.

When the spiral conveyor is correctly adjusted, anchor its feet to the floor with suitable fasteners (self-grouting nails, expanders, bolts etc.)

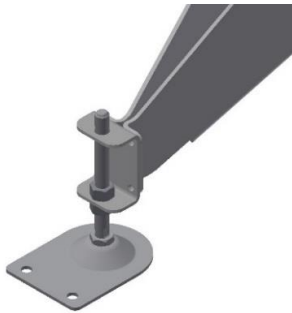


Figure. Spiral conveyor foot.

Also install any extra attachments as described in the layout to ensure stable, safe installation.

The spiral conveyor is now securely anchored, and the upper load restraint can now be removed; the forklift or other lifting equipment can also be removed, as can the security cordon.

5.4 Electrical installation

All electrical installation must be carried out by a qualified electrician. Motors must be connected via a motor protector suitable for the motor concerned and fitted with a safety breaker where required.

The circuit diagram for connecting motors can be found in the relevant motor's terminal box.

6 Start-up



NOTE!

*Upon start up, check that the direction of operation is correct. Switch off **immediately** if it is wrong and reconnect the conveyor to make it run in the right direction.*

Start and run the conveyor without load for approx 5 minutes and check that it runs evenly without jerks or dissonant noises.

As necessary, adjust chain length according to the instructions in section 7 – Service and maintenance.

7 Service and maintenance

Clean the equipment once a week; however, depending on the surroundings it may be necessary to clean it more often. Remove any product residue, adhesive labels etc. and wipe clean with a damp rag and mild detergent. Inspect for damage and replace damaged parts (refer to the spare parts list). For the replacement of chains and slide rails; see 7.3.

7.1 Checking chain tension

Check chain tension after 40 operating hours and then every 160 hours.



Switch off and lock the power supply!

7.1.1 Spiral conveyor with vertical return chain

Check chain tension in the vertical section by making marks on the chain and profile. Pull the chain up by hand and measure the length between marks. Rectify if the slack exceeds 50 mm.

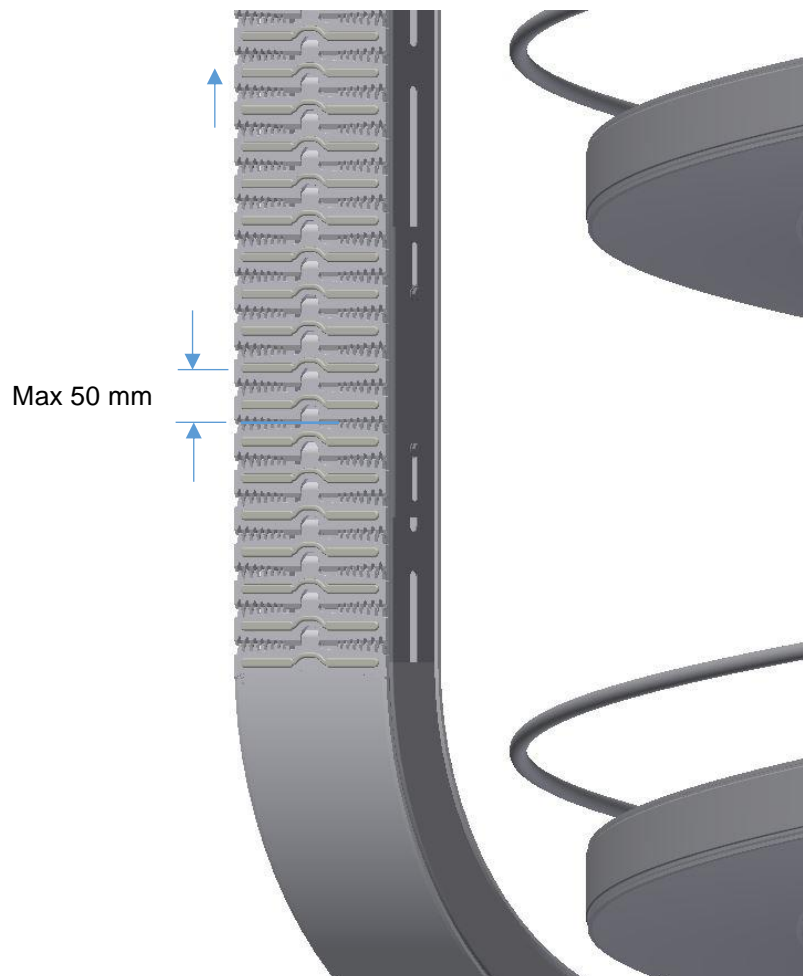


Figure. Checking chain tension.

7.1.2 Spiral conveyor with return chain in spiral part

	<p>Caution! Pinch or crush injuries – Do not touch the conveyor chain during operation with your hands or any object.</p>
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Visually check the underside of the drive unit where the chain may not droop below the side plates during operation. Excessive slack will result in a major risk of crush and pinch injuries and must be rectified immediately.

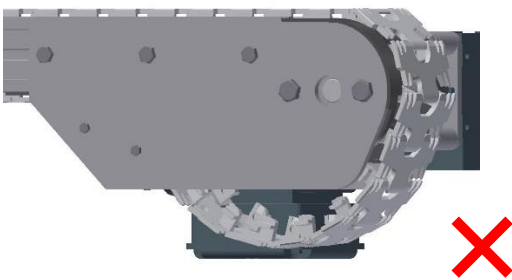


Figure. Chain that must be tensioned.

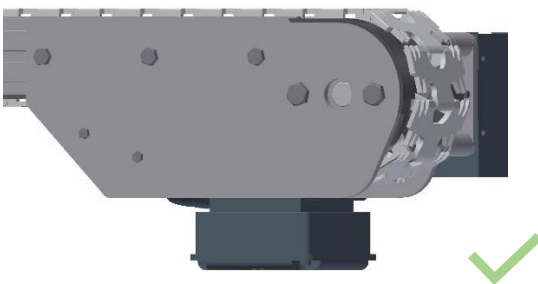


Figure. Chain with the correct tension.

7.2 Adjusting chain tension

Tools required for working with chain equipment:

Chain clamp 17036, Polygrip, spanner 13 mm



7.2.1 For decline conveyor with vertical return chain



Switch off and lock the power supply!

Position the chain clamp above the maintenance hatches and tighten to lock the chain.

Unscrew the 4 xM8 screws for the maintenance hatches and remove the panels.

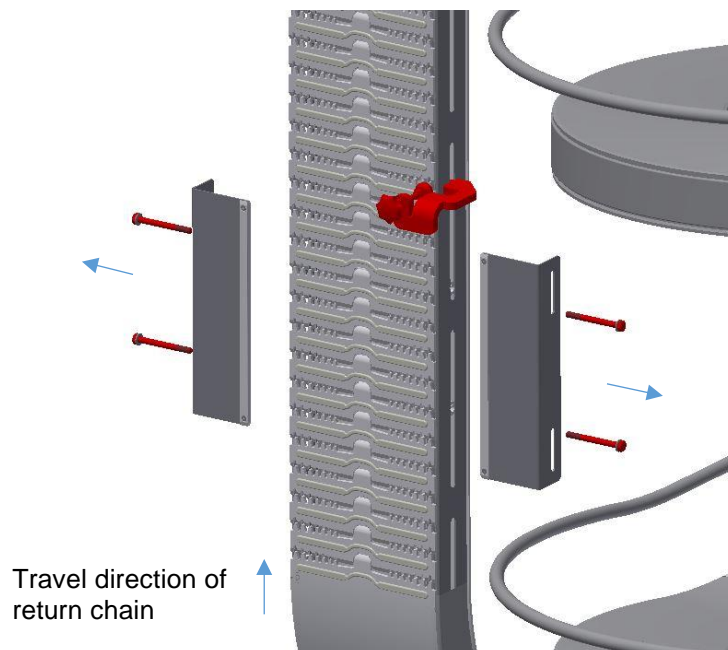


Figure. Location of the chain clamp and removal of the maintenance hatches.

Next, remove the fan cowl on the conveyor motor and manually turn the fan to pull the chain forward to create slack at the maintenance hatches. Split the chain by removing a top flight of the chain with the Polygrip and pressing out a pin.

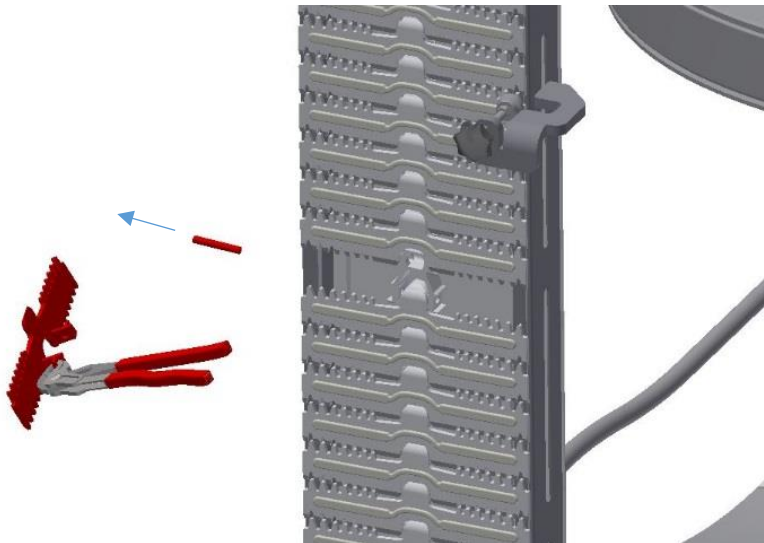


Figure. Removal of a top flight and pin.

Tension the chain between the motor and join by hand and then shorten the chain by removing a suitable number of links. Then reinstall the pin and top flight.

Next, reinstall the motor cover and maintenance hatches and remove the chain clamp.

Now make sure that all tools have been removed.

Next, switch on the power supply and start the conveyor.

Check that the conveyor runs smoothly and without jerks or dissonant noise. Depending on the design of the conveyor, different chain tensions may be necessary for good function. If the chain still does not run smoothly without jerks and dissonant noise, repeat the steps for adjusting chain length until good function is achieved.

7.2.2 For incline conveyor with vertical return chain



Switch off and lock the power supply!

Position the chain clamp below the maintenance hatches and tighten to lock the chain. Unscrew the 4 xM8 screws for the maintenance hatches and remove the panels.

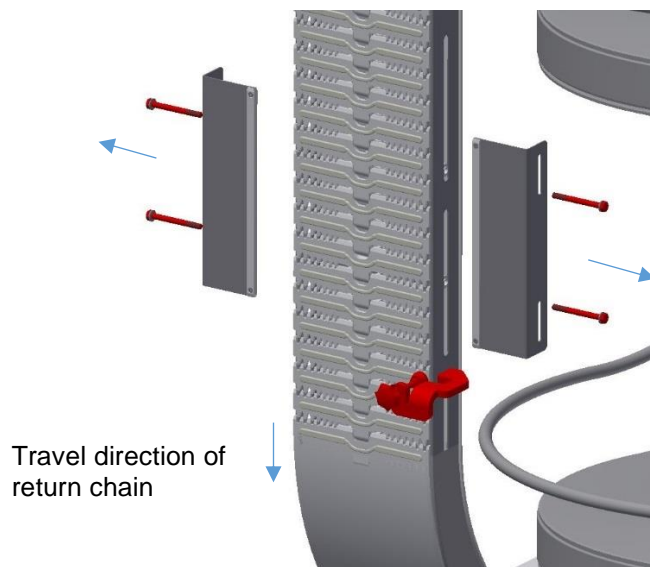


Figure. Location of the chain clamp and removal of the maintenance hatches.

Next, remove the fan cowl on the conveyor motor and manually turn the fan to pull the chain forward to create slack at the maintenance hatches. Split the chain by removing a top flight of the chain and pressing out a pin.

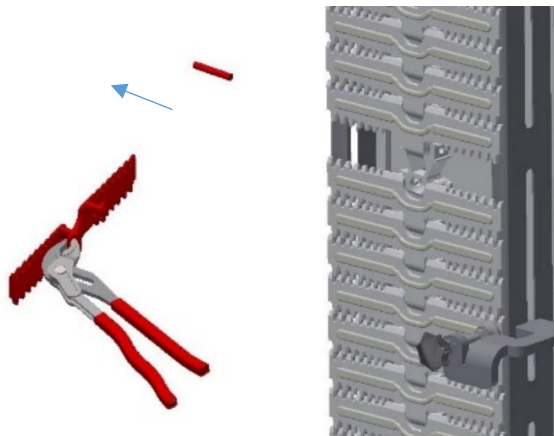


Figure. Removal of a top flight and pin.

Tension the chain between the motor and join by hand and then shorten the chain by removing a suitable number of links. Then reinstall the pin and top flight.

Next, reinstall the motor cover and maintenance hatches and remove the chain clamp.

Now make sure that all tools have been removed.

Next, switch on the power supply and start the conveyor.

Check that the conveyor runs smoothly and without jerks or dissonant noise. Depending on the design of the conveyor, different chain tensions may be necessary for good function. If the chain still does not run smoothly without jerks and dissonant noise, repeat the steps for adjusting chain length until good function is achieved.

7.2.3 For conveyor with return chain in spiral part



Switch off and lock the power supply!

Place the chain clamp in the conveyor at the side of the conveyor and tighten it to securely lock the chain on the underside as close to the drive unit as possible.

Remove the motor fan cowl and rotate the fan by hand clockwise to tension the chain along the top side to create slack below the drive sprocket. Long conveyors often need to be tensioned more than short conveyors.

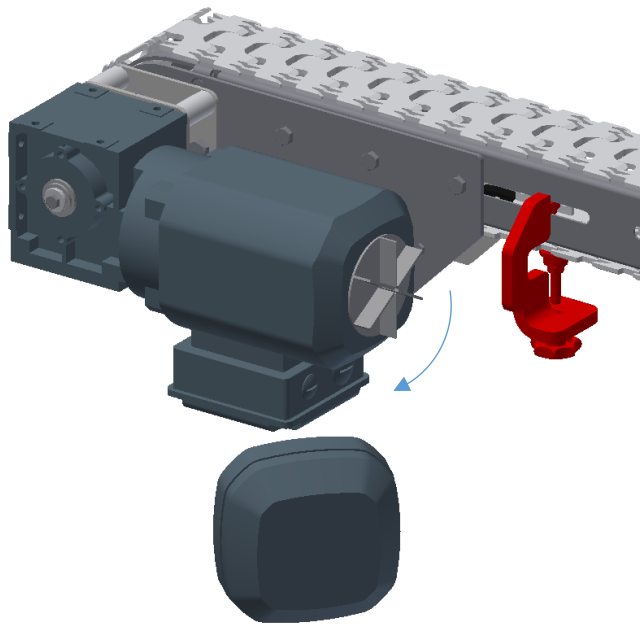


Figure. Locked chain and exposed fan.

Split the chain on the underside where slack is present by first removing a top flight from the chain. Using the Polygrip, carefully bend away the conveyor chain top flight. The exposed pin can now be removed and the chain divided.

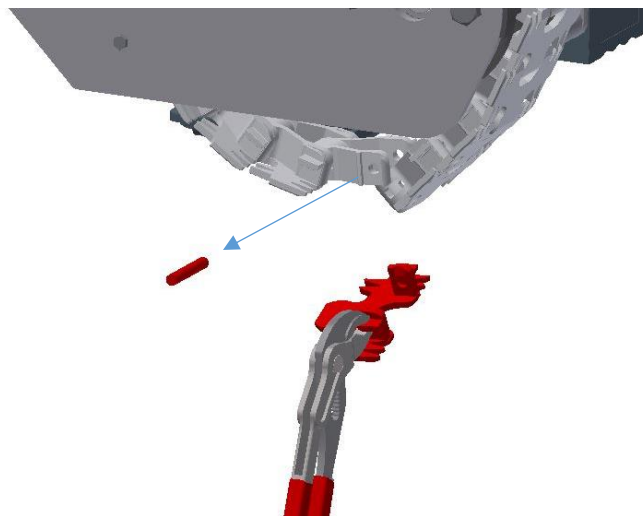


Figure. Chain separation S530, S540, S560.

In the same way, remove a suitable number of links to obtain the correct chain length. Join the ends and reinsert the pin.

Turn the motor fan anticlockwise to release the energy in the tensioned chain, and then release the chain clamp. Turn the fan until the link without a top flight stops at the bottom of the drive sprocket and then reinstall the top flight using the sprocket as an anvil.

Reinstall the fan cowl.

Make sure that all tools and dismantled components are removed. Next, switch on the power supply and start the conveyor.

Check that the conveyor runs smoothly and without jerks or dissonant noise. Depending on the design of the conveyor, different chain tensions may be necessary for good function. If the chain still does not run smoothly without jerks and dissonant noise, repeat the steps for adjusting chain length until good function is achieved.

7.3 Replacing the chain and slide rail

Required tools:

Power drill, 3.3 mm bit, countersink, Allen key 2.5 mm, secateurs, box cutter, Polygrip, 10 and 13 mm spanners, slide rail tool 17770, and chain clamp 17036.



Switch off and lock the power supply!

Split the chain as described in 7.2

Remove 4 × M6 screws inside the motor plate and 1 × M6 screw on the driveshaft and remove the motor from the driveshaft.

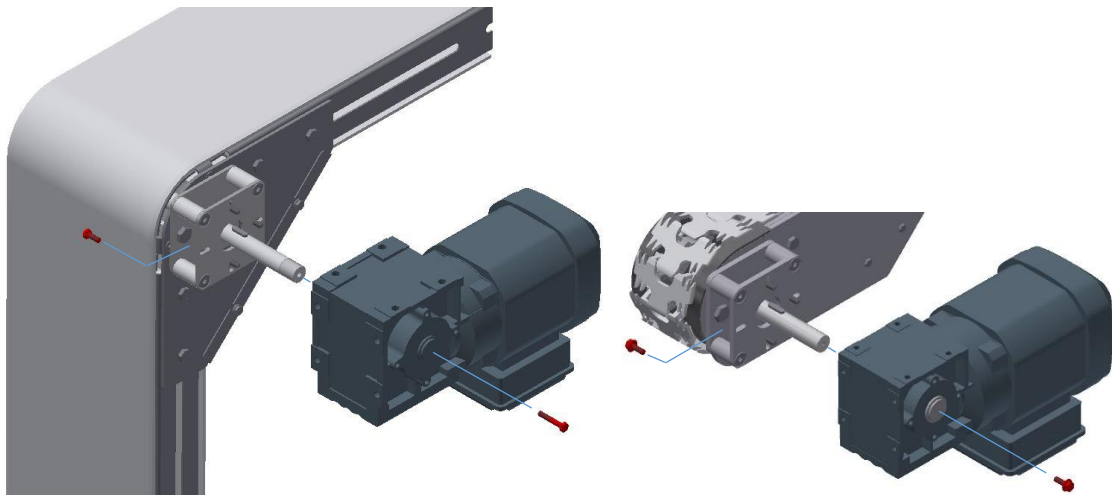



Figure. Removing the motor from the driveshaft.

Release the chain clamp.

The chain can now be removed in the direction of travel through the opening by the maintenance hatches or at the end drive unit.

With the chain removed, first remove the slide rail screws and then remove the slide rail.

NOTE!



Do **not** join new slide rails on the inside at the place where chain bearings run. Join other slide rails as illustrated below.

Begin by installing the new slide rail at the idler unit and then press the slide rail along the profile using the slide rail tool. Max length per joined slide rail is 4 m.

Drill, tap and countersink before installing slide rail screws 500-4100 at the beginning of the slide rail seen from the direction of operation.

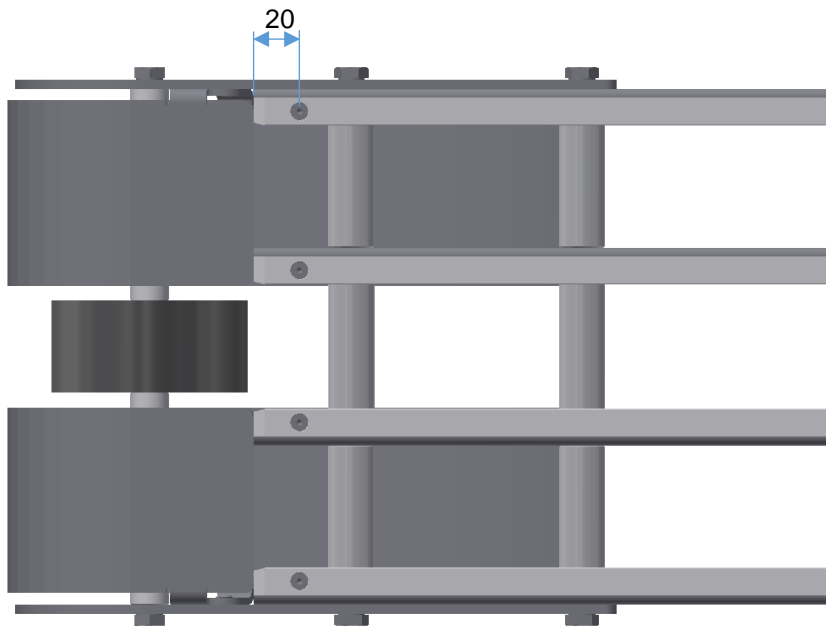


Figure. Location of slide rail screws at the beginning of the new slide rail.

Join and fasten the slide rail on the top side of each series as illustrated below.

S530

Direction of operation

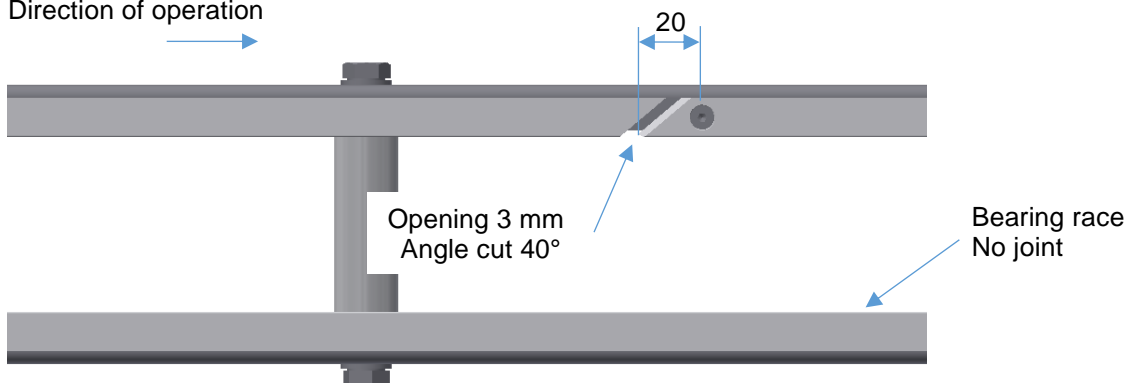


Figure. Location of joint and slide rail screws at the beginning of the next slide rail segment, from above.

S540

Direction of operation →

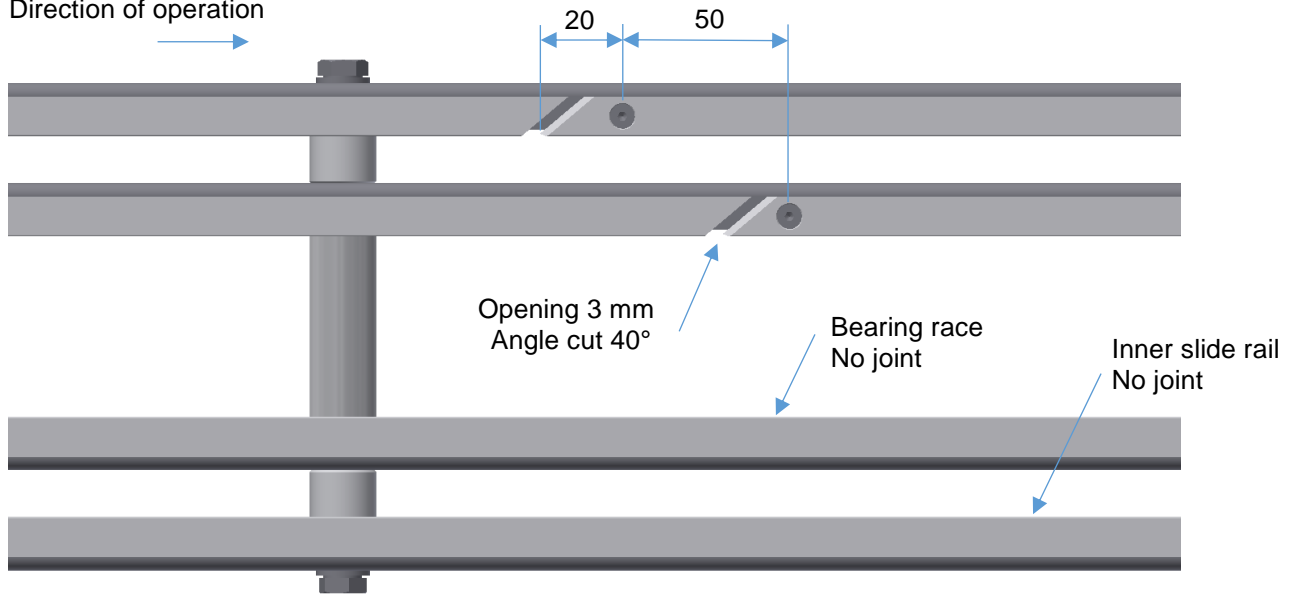


Figure. Location of joints and slide rail screws at the beginning of the next slide rail segment, from above.

S560

Direction of operation →

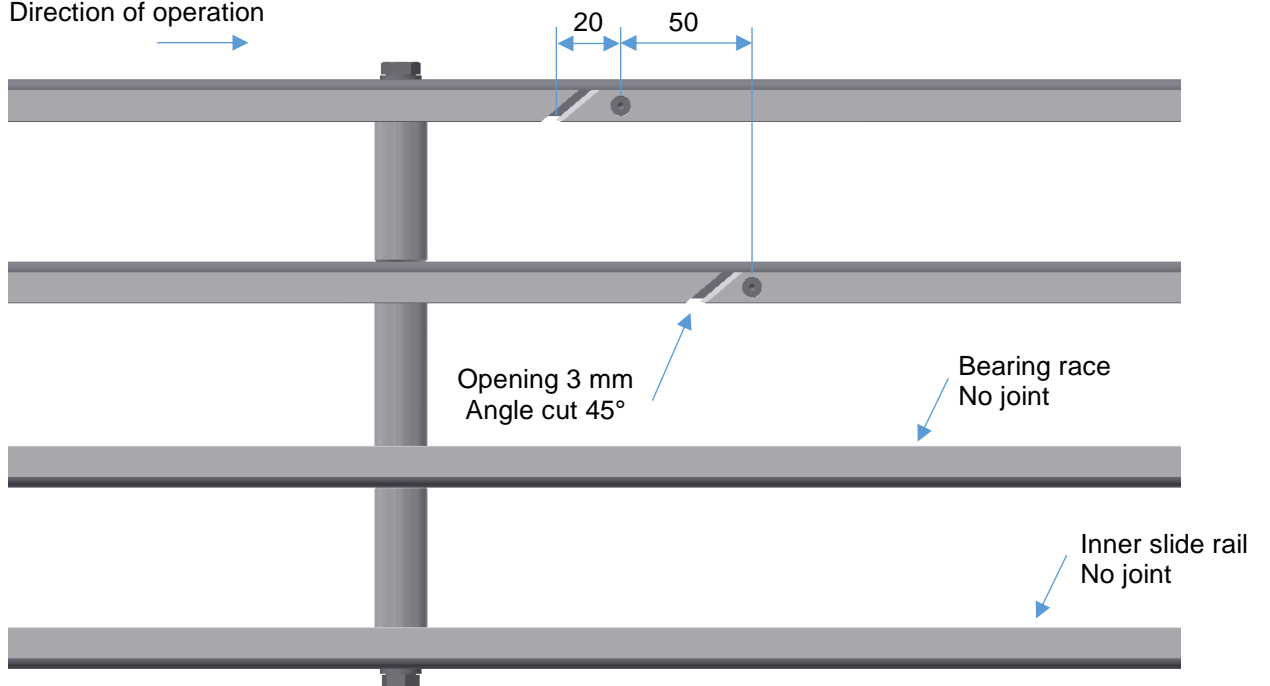


Figure. Location of joints and slide rail screws at the beginning of the next slide rail segment, from above.

Join and fasten two slide rails on the underside for all series as illustrated below:

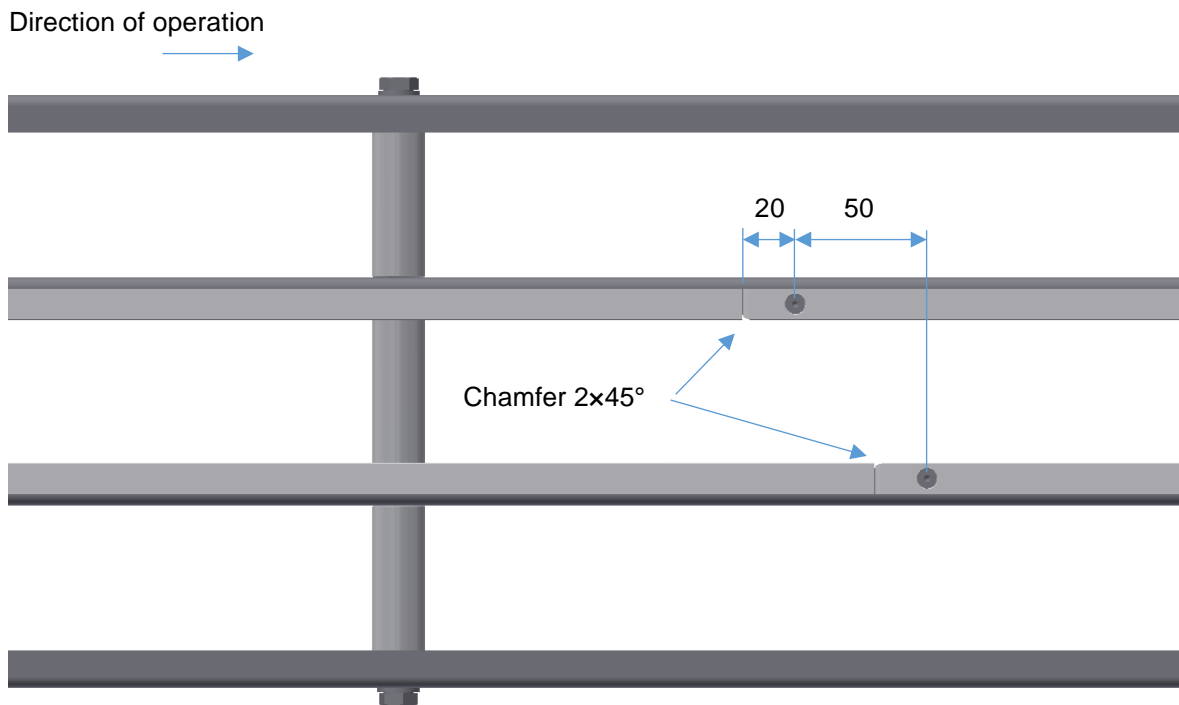


Figure. Location of joints and slide rail screws on the next slide rail segment, underside.

Once all slide rails are installed, check them by running a piece of chain approx 0.5 m by hand along the conveyor. Pull it in the direction of operation and check that it runs freely and that the joints feel even.

Reinstall the old chain or a new one by inserting it in the opening for the maintenance hatches.

Reinstalling the motor; see 7.3

Next, adjust chain tension by following the steps under 7.2

Make sure that all tools and replaced components are removed. Next, switch on the power supply. Start the conveyor and check that it runs smoothly without jerks or dissonant noise.

8 Dismantling the machine



Switch off and lock the power supply!

Dismantle the machine by following the instructions in Chapter 5 in reverse order.

9 Removing the machine



Switch off and lock the power supply!

Removal of the machine means that it must be disposed of and scrapped. In order for disposal and scrapping to take place properly, make sure that

- the machine is dismantled correctly and safely; see Chapter 8.
- that the machine's various components are broken down into the material fractions as used by Carryline AB and described in Appendix 1.
- that the various material fractions are sent for recovery according to local regulations.

10 Troubleshooting

Motor overheats

Check power supply (A) and compare with the motor rating plate.

Cause	Action
Excessive product weight on the conveyor.	Remove products and test without load. Check current product weight and compare with specification.
Damaged conveyor, chain runs slowly	Remove the chain and replace the damaged parts.
Dirt or fluids on the conveyor.	Clean with a damp rag and a mild detergent.
Oil leak in gearbox.	Replace motor/gearbox.

Chain runs unevenly or jerkily

Cause	Action
Damaged or poorly installed slide rail.	Check and replace damaged slide rail.
Damaged conveyor.	Remove the chain and replace the damaged parts.
Dirt or fluids on the conveyor.	Clean with a damp rag and a mild detergent.
Chain too tightly or loosely tensioned.	Adjust chain tension.

Abnormal wear

Cause	Action
Excessive product weight on the conveyor.	Check current product weight and compare with specification.
Speed too high.	Check current speed and compare with specification.
Dirt on the conveyor.	Clean with a damp rag and a mild detergent.
Corrosive chemicals in contact with plastic parts.	Contact Carryline AB for information about approved chemicals.
Chain too tightly or loosely tensioned.	Adjust chain tension.

Dissonant noise

Cause	Action
Speed too high.	Check current speed. Compare with specification and adjust to correct value as necessary.
Worn or damaged driveshaft bearing.	Replace the bearing and driveshaft.
Worn or damaged slide rail and/or chain.	Replace the slide rail, and if necessary the chain.
Corrosive chemicals in contact with plastic parts.	Contact Carryline AB for information about approved chemicals.
Chain too tightly or loosely tensioned.	Adjust chain tension.

For other queries, contact


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Appendices

Appendix 1 – Environmental product declaration



Declaration of Environment

Carryline AB manufactures and supplies the market with chain conveyers in plastic with a main beam in aluminium or in stainless steel.

The conveyer system contain of a profile in aluminium or stainless steel, acetal- and nylon plastic, split pin in stainless, galvanized or stainless steel screw union and an electrical engine and gearbox.

All material is recyclable after dismantling.

Electronics in the system handle according to the regulation about producers responsibility for electronics.

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Carryline AB manufactures and markets chain-driven conveyors whose materials break down into the following fractions:

- Corrugated cardboard
- Aluminium
- Stainless steel
- Metals
- Chemicals (hazardous waste)
- Electronics
- Flammable waste
- Plastic (packaging)

All materials are recyclable after removal.

Also, Carryline AB has an internal recycling system for plastic granulate used in the manufacture of plastic links.