Installation Instructions

Incline Conveyor

STF XX-120
STF XX-250

Table of Contents

Declaration of Incorporation

(according to Annex II B of the Machinery Directive)

We,
Company

Rhein-Nadel Automation GmbH
Reichsweg 19-23
52068 Aachen
Germany

herewith declare under our sole responsibility that with regard to the following product:

Machine designation: (function)	Incline Conveyor
Type designation:	STF
Serial number	10865660 0001 2500000 0001

all relevant essential safety and health requirements of Directive 2006/42/EC have been fulfilled up to the battery limits.

The product to which this declaration refers is furthermore in conformity with following directives and standards or other regulations:

2006/42/EC	Machinery
2006/95/EC	Low Voltage
2004/108/EC	Electromagnetic Compatibility

EN	614-1	2006+A1:2009	EN ISO	13857	2008
EN	619	2002+A1:2010	EN ISO	14120	2015
EN	620	2002+A1:2010	EN	60204-1	2006
EN ISO	12100	2010			

The relevant technical documentation has been compiled in accordance with Annex VII B of the Machinery Directive and on request, such documentation will be transmitted to the competent authorities in hard copy.

Nico Altmeyer, Rhein-Nadel Automation GmbH, Reichsweg 19-23, 52068 Aachen

(Name and address of person authorised to compile the relevant technical documentation)

Notice: This machine must not be put into service until the complete system into which it will be incorporated has been declared to be in conformance with the provisions of the Directive.

Signatory information

Name: Dr. Hensen

Given name: Tobias

Function: Managing Director

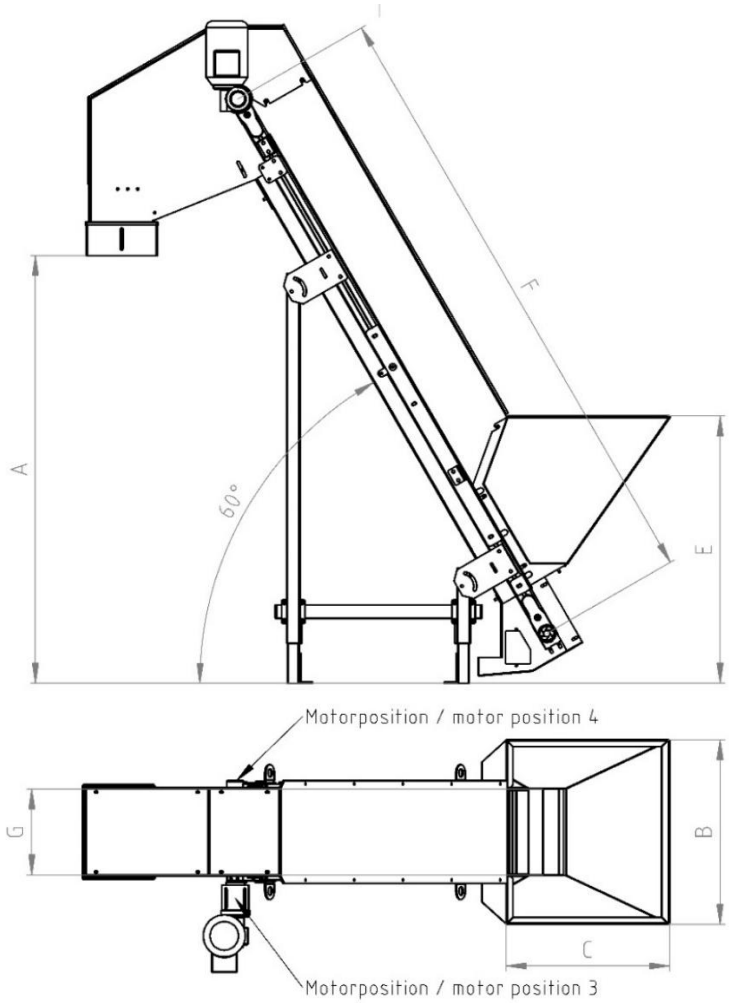
Germany
Aachen,

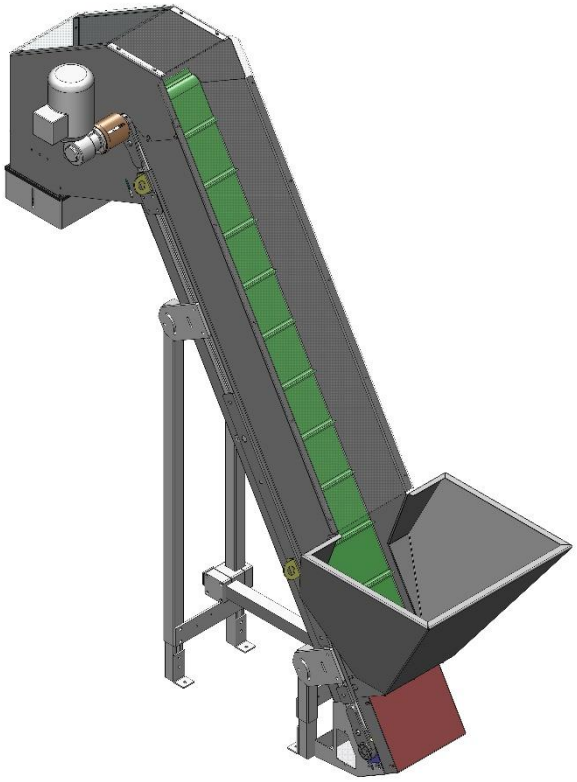
Place and date

Signature

1. General

1.1. Table with technical data





	STF30-120	STF60-120	STF60-250	STF90-250	STF120-250	STF150-250	STF180-250
Volumetric capacity in litres	30	60	60	90	120	150	180
Max. filling weight in kg	50	50	75	75	75	75	75
Discharge height in mm (A)	650-1,950	650-1,950	630-2,280	630-2,280	630-2,280	630-2,280	630-2,280
Hopper width in mm (B)	360	550	550	750	950	1150	1350
Hopper length in mm (C)	340	490	490	550	620	665	700
Min. filling height in mm (E)	approx. 820	approx. 820	approx. 800	approx. 800	approx. 800	approx. 800	approx. 800
Shaft center distance in mm (F)	1,100-2,600	1,100-2,600	1,100-3,000	1,100-3,000	1,100-3,000	1,100-3,000	1,100-3,000
Belt width in mm (G)	120	120	250	250	250	250	250
Belt type	Type-specific cleated belt with T20 or T30 type cleats (number depending on parts to be handled))						
Belt speed m/min.	Standard 1 or 2 m/min (adaptation to required feed rate possible)						
Motor	Three-phase or AC motors						
Motor position	Standard motor position 3 (top left as seen in product flow direction) / alternatively motor position 4 (top right as seen in product flow direction)						
Special design	• Hopper tray with quick emptying flap • POM-C sealing bars on the sides • Direct drive with coupling for higher conveyor speeds • Drive and return rollers of stainless steel • Brackets chemically nickel-plated • Belt speed >2 m/min.						

Accessories	• Chute cover, hinged hopper-lid made of Makrolon/PET-G (dampers optional) • Hopper tray coatings • Control units • Level monitors • Floor supports of profiles or fabricated structure (optionally in stainless steel or movable)

1.2. Connection diagrams for motors

1.2.1. Constant-speed three-phase motor

Connection of three-phase motors

Connection to three-phase supply
High voltage (star connection)
3x400V

Connection to three-phase supply
Low voltage (delta connection)
3x230V

For reversing the sense of rotation change two phases of the supply line

1.2.2. Constant-speed A.C. motor (with capacitor)

Connection of three-phase motors

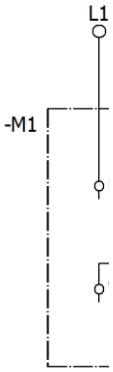
Connection to a.c. supply
1x230V
CW rotation

Connection to a.c. supply
1x230V
CCW rotation

1.2.3. Variable-speed three-phase motor

Connection of variable-speed three-phase motors via variable frequency drive unit

Connection to three-phase supply
High voltage (star connection)
3x400V



Connection to three-phase supply
Low voltage (delta connection)
3x230V

For reversing the sense of rotation change two phases of the supply line

2. Safety directives

We have taken great care in the design and manufacture of our incline conveyors in order to ensure smooth and safe operation. You, too, can make an important contribution towards safety at work. We therefore ask you to read these brief operating instructions completely prior to commissioning the system. Observe the safety directives at all times!

Attention
This warning sign indicates safety directives. Non-observance of such warnings may cause serious injury or even death!

Caution
This warning sign indicates safety directives. Non-observance of this warning may cause minor injury or material damage.

Notice
This hand indicates useful tips for operation of the conveyors.

Make sure that all persons working with or at the equipment also read the following safety directives carefully and follow them!

These Operating Instructions only apply to the equipment types indicated on the cover page.

They must be available at all times at the place of installation of the incline conveyor.

If the incline conveyor is to be used in a humid or wet environment (wet area) make sure that the required degree of protection is provided.

Notice
For comprehensive information on the full range of control devices please refer to the 'Control Units' operating instructions.

Any commissioning, retooling, maintenance and repair work shall be carried out by qualified and authorized personnel only (see also 'Operator's duties' in this section).

For installation, maintenance and repair work all poles of the power supply must be disconnected from the incline conveyor in compliance with VDE provisions.

Any work on the electrical equipment shall be carried out exclusively by a professional electrician, or by instructed persons working under the supervision of a professional electrician, according to electrotechnical rules.

Attention
Risk of injury and electric shock hazard!

- The equipment user and operators shall ensure that only authorized personnel works at the inclined conveyor.
- Any changes that have occurred on the feeding system affecting safety shall immediately be reported to the user.
- Operate the incline conveyor in perfect condition only!
- Use the incline conveyor only for its intended use.
- Observe the accident prevention provisions BGR 500 chapter 2.9 for continuous conveyors and BGV A3 for electrical equipment and components!
- Make sure that protective earthing of the power supply system is in perfect condition.
- Never operate the incline conveyor without chain guards and cover panels in place!
- The gaps at the belt entry points must not be wider than 4 mm to prevent pinch point hazards. If the gap is wider than that after belt tracking adjustments, be sure to readjust the pinch guard.

Intended use

The intended use of the incline conveyors is the storage and feeding of parts.

The shortest side of such parts must be at least 5 mm long.

Caution
Smaller parts may get under the belt and cause damage or failure of the belt conveyor.

Parts handled with standard belts must be dry, clean and without sharp edges. The handling of sharp-edged, oily, wet or hot (>70°C) parts requires the use of special belts.

The parts must not drop on the conveyor belt from height. The maximum permitted impact energy is 0.1 J.

If in doubt, please contact the manufacturer.

The incline conveyors are designed for horizontal transport of the maximum load of parts. Please consult the manufacturer to determine what is possible for your specific application.

For permitted belt loading see Technical Data (1. General / 1.1. Technical data).

Noise emission

The constant sound pressure level is 70 dB(A) max. Specific part handling applications or belt designs may result in higher noise levels. For such exceptional cases noise abatement options are available from manufacturer.

Equipment user's duties

Commissioning, retooling, maintenance and repair work shall be performed by qualified and authorized personnel only.

We distinguish between four qualification levels:

Qualified personnel

refers to persons who are familiar with installation, start-up and operation of the conveyor. Their qualifications are appropriate for their activities.

Authorized personnel

refers to qualified personnel that has been assigned a clearly defined task by the user of the belt conveyor.

Qualified electrical worker

According to IEC 364 and DIN VDE 0105 Part 1, the term 'qualified electrical worker' refers to persons who, through their professional training, know-how and experience and through their knowledge of applicable standards are able to assess the work assigned to them and to recognize potential hazards.

Instructed person

According to IEC 364 and DIN VDE 0105 Part 1, the term 'instructed person' refers to persons who have been instructed in the tasks assigned to them by a qualified electrical worker. These persons have also been briefed on potential dangers resulting from inappropriate behaviour, and on the requisite guards and precautions to be used/taken.

2.1. Applicable directives and standards

The hopper has been manufactured in accordance with the following directives:

2006/42/EC	Machinery
2006/95/EC	Low Voltage
2004/108/EC	Electromagnetic Compatibility

We assume that our product will be incorporated into a stationary machine. The requirements of the EMC Directive 2014/30/EU must be satisfied by the user.

The applicable standards are specified in the Declaration of Incorporation.

3. Design and functional description of incline conveyors

Notice
For information about the controllers please refer to the separate operating instructions Control units

Our incline conveyors are based on the RNA belt conveyor type FP120 with its body made up of special T-slotted aluminium profiles.

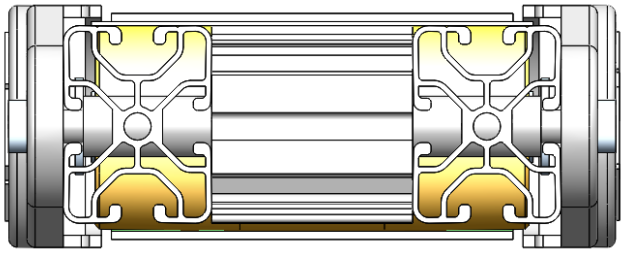


Fig. 1: FP120 profile body

For belt drive a number of motors are available for constant and variable speed. As a rule, the motor is located at the conveyor exit end, can however also be located at the conveyor entry end. Drive stations can be attached to the belt conveyor in different ways. Control of the belt feeder is effected, depending on motor type, by motor protection breaker, electronic control devices or variable-frequency control units.

After loosening the setscrews (see arrow) you can rotate the drives on the driving roller shaft for variable motor positioning. Re-tighten the setscrews to fix it back in place. Adjusting the chain drive may affect chain tension. Therefore be sure to always check and adjust chain tension before commissioning.

Drive with chain	Direct-drive with flexible coupling	Direct-drive station without coupling only for belt speeds up to 2m/min

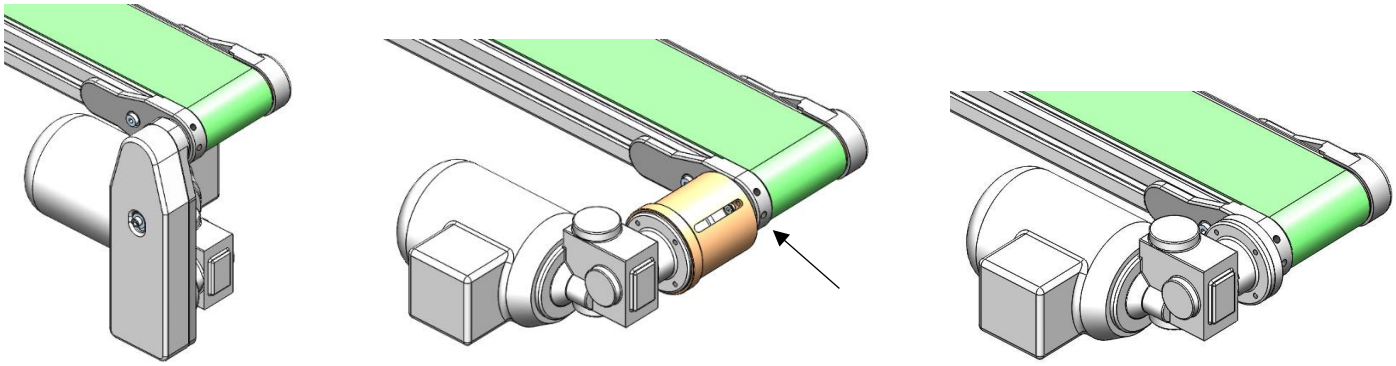


Fig. 2: Drive versions

During incline conveyor operation, the parts to be fed are filled into the funnel (1) and raised by the cleated belt (2). A sealing lip (3) is seated at the bottom of the funnel (1) which is raised by the cleats. If some parts slide past the sealing lip (3), they enter a funnel shaft (4). The major part of them will be returned by the next cleat from the funnel shaft (4) to the funnel. Should this not be the case, they will drop into the collecting bin (5).
At the exit end of the conveyor belt the fed parts fall into a chute (6) and onto a baffle plate (7) . Its angle can be adjusted and adapted to the movement behaviour of the parts to be fed. A sealing lip (8) prevents that parts get between the baffle plate (7) and the return run of the cleated belt (2). If any parts should still slide past the sealing lip (8), they will slide down the cover of the return run (9) and into the collecting bin (5).
As an option, tooling (10) can be installed in the chute to slow down the parts before they leave the chute (6), for gentle transfer to the downstream machine.
A shaft extension (11) is also optional. Its height can be adjusted and can thus provide a seal against the soundproofing enclossure of the downstream equipment.

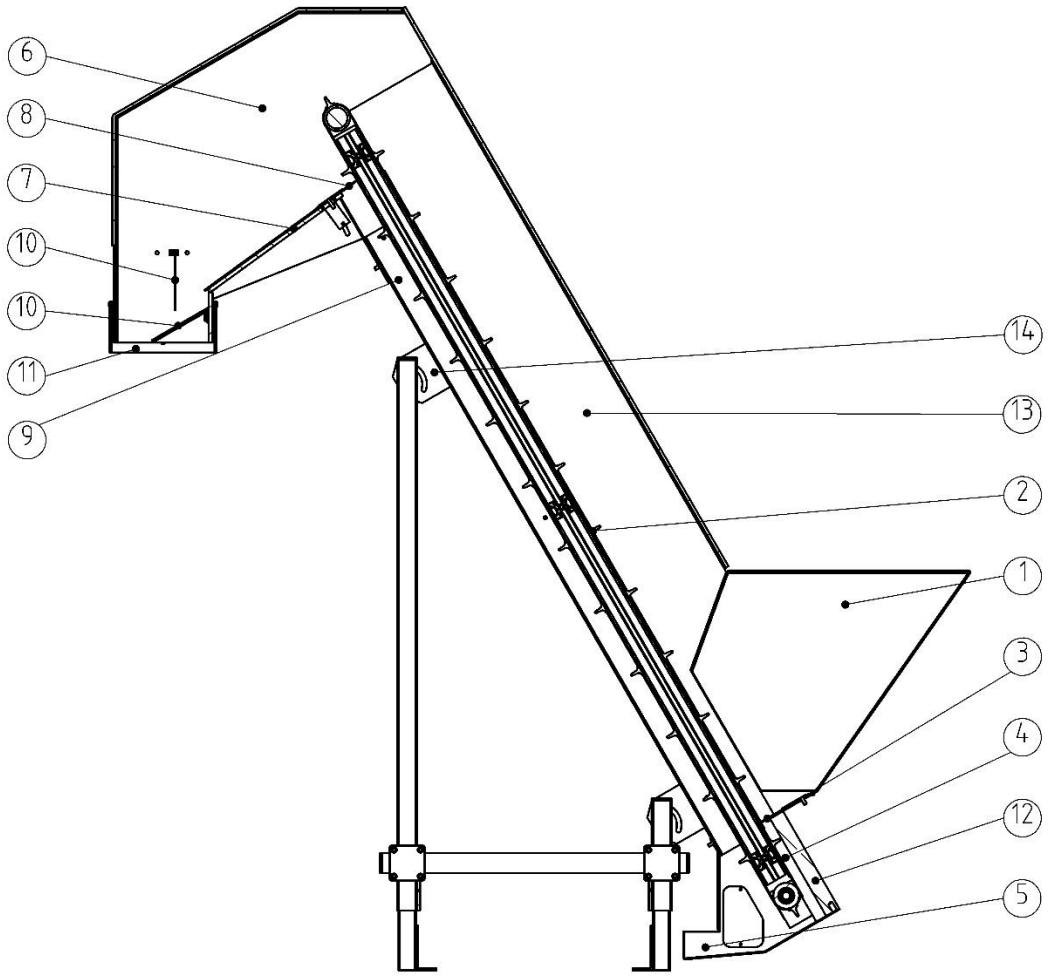


Fig. 3: Incline Conveyor

4. Shipment and installation

4.1. Shipping and handling

Shipment ex works

The incline conveyors are delivered ex works standing or lying flat in a box or on pallets. Use the lifting eyes (1) mounted on the incline conveyor to lift and erect it. The frame beams (2) can be supported by cross-bars or props for handling.

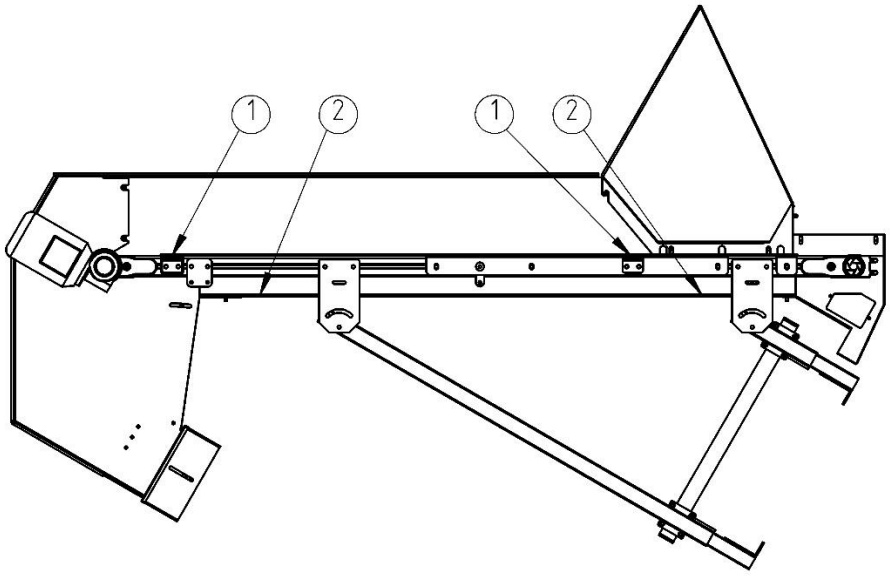


Fig. 4: Machine transport

On-site moving

The incline conveyor weight depends on its dimensions and motor rating. Please refer to the shipping documents for the weight of your specific equipment.

Attention
Check all guards when unpacking. Replace any damaged parts before commissioning!

Attention
One-piece incline conveyors can be moved to their place of installation on a sufficiently strong trolley or cart.

Attention
For lifting the conveyors be sure to use only sufficiently dimensioned vehicles, ropes, chains and sling gear.

Gefahr

Attention
Check all guards when unpacking. Replace any damaged parts before commissioning!

Gefahr

Attention
Handling operations to be carried out only by employees who are capable of performing such work due to their own knowledge and experience in this field.

Gefahr

Warning
Warning against suspended loads

4.2. Installation

The incline conveyor is delivered fully assembled and mounted on a supporting structure.

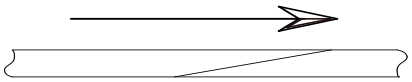
Attention
The machine is intended to complete / to be incorporated into a complete system. Do not operate the machine before safe completion/incorporation by the user.

Attention
Be sure to anchor the supporting substructure to the foundation.
Operation of unanchored equipment is not permitted!

4.2.1. Belts

Notice
The standard belts are mechanically jointed to create a continuous belt. For such belts the conveying direction can be chosen freely.

For belts with overlap joints the conveying direction should be as shown below.



The mechanical joint enables you to replace the belt quickly without having to dismount any components.
Be advised that it is imperative to perform the belt tracking adjustment procedure after every belt replacement. (see chapter 5.1 Belt tracking adjustment)

4.2.2. Roller alignment

Align the drive and return rollers relative to one another and to the conveyor body (Fig. 5).

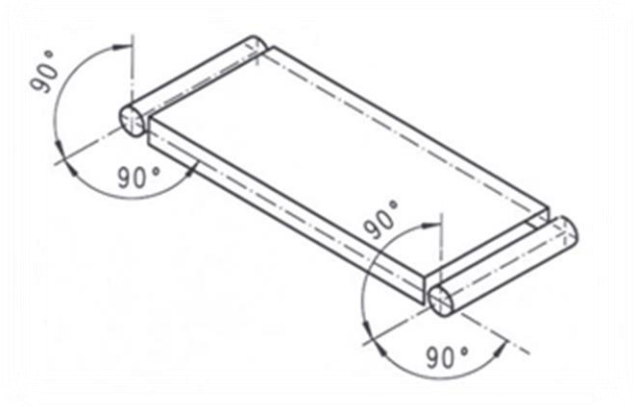


Fig. 5: Roller alignment

4.2.3. Drive system (incline conveyors without RNA control units)

Have a professional electrician connect the motor in accordance with the circuit diagram (see chapter 1). After that, check the sense of rotation.

Attention
Provide suitable overload protection for the motor. The characteristics of the motor can be found on its rating plate.

Caution
Motor protection breakers supplied unfitted must not be installed upside down as this would disable their protective function. Be sure to install the circuit-breakers in the specified orientation.

5. Commissioning

Attention
Electrical connection of the incline conveyor must be made by trained professional electricians only!
When making any change to the electrical connection be sure to observe the operating instructions for the motor circuit-breaker / control unit.

For starting and stopping the incline conveyor use the motor protection breaker fitted beside the motor.

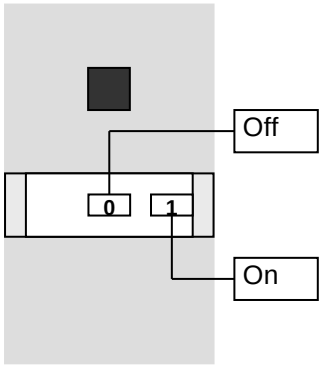


Fig. 6: Motor protection breaker

For incline conveyors with other control units please refer to the separate user's manual of the control unit.

5.1. Belt tracking adjustment

Motor and belt have undergone a trial run and final inspection in the factory. Due to re-installation of the incline conveyor and running-in of the belt it may be necessary to re-adjust belt tracking. Take care that the ends of the cross cleats do not hit anything and run freely, else this may cause damage to the belt. This fine tuning of the belt is made with the aid of setscrews fitted in the belt return station.
The adjusting procedure is described in the following.

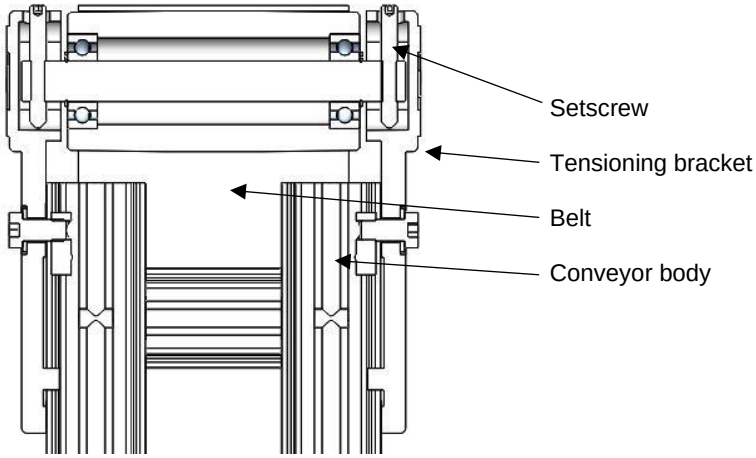


Fig. 7: Belt return station

If the belt runs off-centre after starting of the motor, first make the adjustment in the belt return station. If this is not enough, make the adjustment in the drive station.

5.2. Adjustment of belt return station

Tighten the setscrew on that side towards which the belt is running (increasing belt tension) or slacken the setscrew on the opposite side (decreasing belt tension).

Caution
Too high belt tension may overload both the belt and the motor. After precise adjustment, measure the current drawn by the motor. If it is higher than the value shown on the rating plate, slacken the setscrews uniformly.

5.3. Adjusting at the head drive station **(reserved only for exceptional situations)**

- Increase belt tension on the side towards which the belt moves by slackening the drive bracket and moving it horizontally, or

- decrease belt tension accordingly on the opposite side.
- Then re-tighten the bracket.

After adjustment is completed a trial run over several hours is mandatory. During the first running hours check that the belt runs on line centre at short intervals of time (about 2 to 3 times a day).

6. Maintenance

Attention
For installation, maintenance and repair work all poles of the power supply must be disconnected from the incline conveyor in compliance with VDE provisions. Any work on electrical equipment of the incline conveyor shall be carried out exclusively by a professional electrician, or by instructed persons (see chapter 2) working under the direction and supervision of a professional electrician, according to electrotechnical rules.

6.1. BeltCleaning

Clean soiled belt with spirit and a clean non-linting cloth. Where belts are used for food applications use an approved substitute for the spirit.

Attention
Take care to provide sufficient ventilation! Wear protective clothing.

Attention
Be careful when working on motors! They get hot during operation. Therefore let motors cool down before working on them. If this is not possible, take suitable protective measures such as the use of gloves.

Attention
If any guards have been removed, be sure to fit them back in place!

6.2. Belt replacement

Attention
For installation, maintenance and repair work all poles of the power supply must be disconnected from the belt conveyor in compliance with VDE provisions. Any work on electrical equipment of the belt conveyor shall be carried out exclusively by a professional electrician, or by instructed persons (see chapter 2) working under the direction and supervision of a professional electrician, according to electrotechnical rules.

- Should a belt change be required, it can be replaced by a belt with stranded connecting wires as necessary. To replace it, the existing belt can be cut open and the new belt can be pulled in without major assembly work. Whether the replacement with strand connections makes sense depends on the parts to be fed or the gap dimensions of the optional sealing bars. The strand connection is usually a little bit thicker than the belt and narrower than the belt width at the ends.
- To prepare a belt change with an endless belt, it is necessary to dismount some components. To do so, it is helpful to disconnect the incline conveyor from the downstream machine to get better access.
- Be sure to dismount the chute (6), the funnel (1) and the collecting bin (5) first.
- Then dismount the funnel shaft cover (12). Be sure to mark the height position for later re-assembly.
- Then dismount the shaft plate (13) on the opposite side of the drive. Here too it is helpful to mark the position for later re-assembly.
- Now you can dismount the cover of the bottom run (9).
- The belt is now accessible for replacement.
- Slacken the setscrews in the tensioning station on both sides of the conveyor such that the journals touch the ends of the oblong guide holes.
- Measure the distance between tensioning station and conveyor body. Slacken the screws of the tensioning station brackets and slide the tensioning station towards the conveyor body.
- Dismount the support brackets (14) on the side towards which you want to dismount the belt.
- Pull the belt off the conveyor towards one side, and put on the new belt.

- Remount the support brackets (14).
- Slide the tensioning station back into its previous position and re-tighten the screws of the brackets. Make sure that the top of the return roller is level with the skid plate.
- Re-tighten the setscrews uniformly (count the revolutions!) until the belt is slightly taut.
- Start the motor. Continue to tighten the setscrews evenly until the the driving roller engages the belt.
- Adjust belt tracking as described in section 5.
- Re-mount the removed components in reverse order on the incline conveyor.
- Take care that the gap between collecting bin gates and tensioning bracket is smaller than 4mm.
- Start the motor and check the belt tracking. Make corrections to the belt tracking if necessary. Continue to tighten the setscrews of the tensioning station evenly until the drive roller drives the belt without slippage at nominal load conditions.

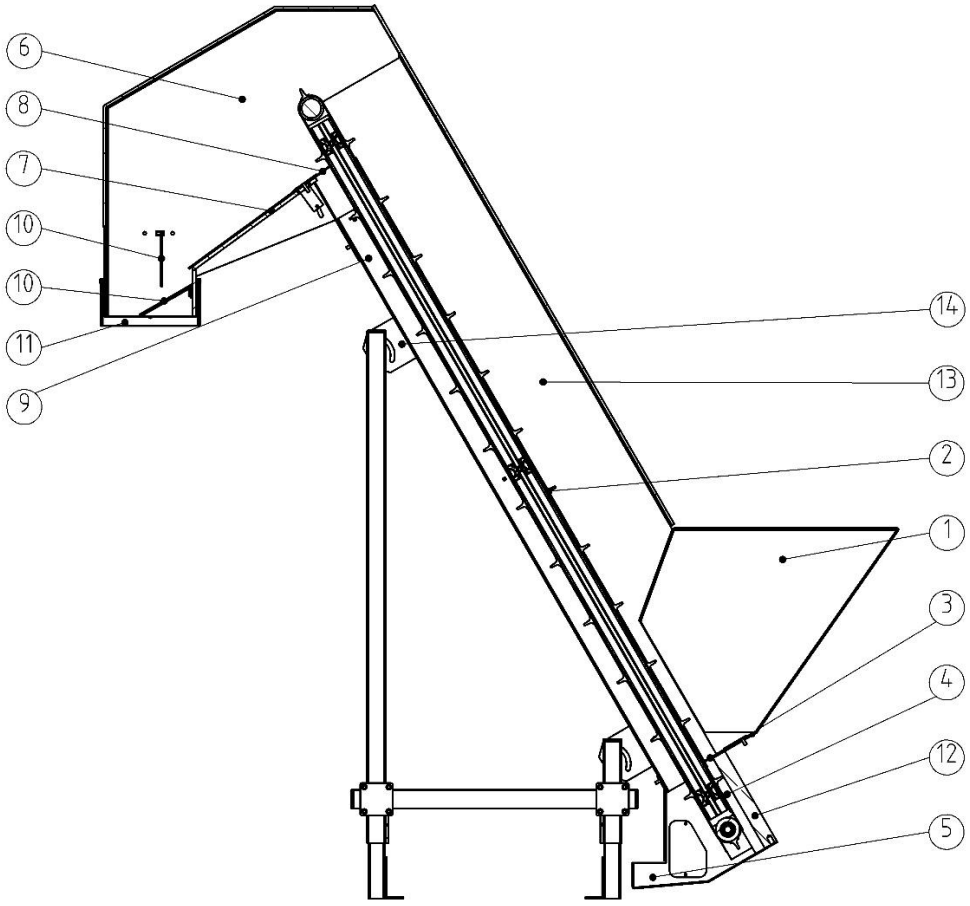


Fig. 8: Incline conveyor belt change.

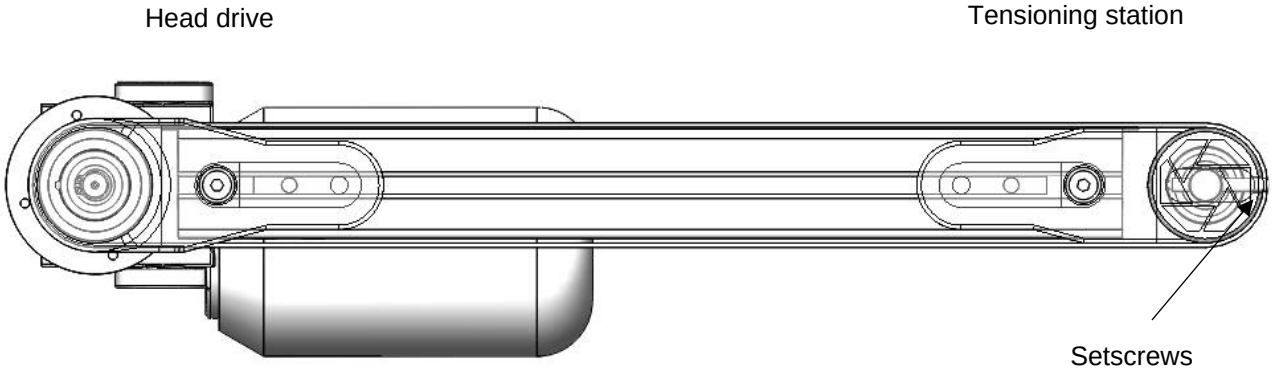


Fig. 9: Replacing a belt with head drive station

Notice
If belt slipping occurs under operational load conditions, uniformly (count the turns!) tighten the tensioning screws until the drive shaft pulls the belt without slip.

6.3. Motor

For DC motors it is necessary to change the carbon brushes after 2000 hours run. After that, clean the surrounding area thoroughly.

For the rest, geared motors require no maintenance for 10,000 operating hours.

Depending on dust accumulation, clean the motor fan cowl, the motor itself and the gearbox housing. This helps to ensure proper cooling of the motor.

6.4. Gearbox

The gearboxes are delivered ready-for-operation with gear oil and grease. This ensures long-life lubrication of all moving components.

No need for dismounting, cleaning and grease change.

6.5. Chain drive system

Check the tension of the drive chain at regular intervals depending on load conditions. Re-grease the chain at regular intervals.
Use a commercially available chain grease.

Notice
Check chain tension at regular intervals.

Remove the chain guard and clean the sprockets and chain of dirt and lubricant residue. Take care to remount the chain guard.

Caution
Be sure to check correct mounting of the chain guard before restarting the unit.

6.6. Return, drive and supporting rollers

Clean soiled rollers with spirit and a clean non-linting cloth. Where belts are used for food applications use an approved substitute for the spirit.

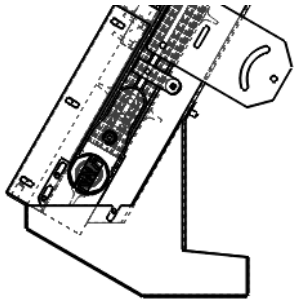
Caution
Take care to provide sufficient ventilation! Wear protective clothing.

6.7. Environmental effects

When positioning the belt conveyors take care that belts are not subjected to strong heat radiation. Observe the admissible belt temperatures (see brochure). Otherwise the belts may expand and slip over the drive roller.
Keep oil, chips etc. away from belt conveyors.

6.8. Collecting bin

During production operation, parts may stick to the returning belt run. These parts will drop onto the floor or be collected in a bin. These parts must be removed from the collecting bin at regular interfals. If you fail to remove these parts, they will cause malfunctions and and damages.



7. Spare parts and customer service

For an overview of genuine spare parts available please refer to the separate spare parts list.

In order to make sure that your order is processed swiftly and correctly please specify the device type (see rating plate), the quantity required, the spare part designation and the spare part number.

For a list of Service Center addresses refer to the back cover page of this manual.

Headquarters

Rhein-Nadel Automation GmbH
Reichsweg 19-23
D-52068 Aachen
Phone: +49 (0)241-5109-0
E-mail: vertrieb@RNA.de
www.RNA.de

Further RNA group companies:

PSA Zuführtechnik GmbH
Steinäckerstraße 7
D-74549 Wolpertshausen
Phone: +49 (0)7904-94336-0
E-mail: info@psa-zt.de
www.psa-zt.de

RNA Automation Ltd.
Unit C Castle Bromwich Business Park
Tameside Drive Birmingham B35 7AG
Great Britain
Phone: +44 (0)121-749-2566
E-Mail: sales@rnaautomation.com
www.rnaautomation.com

HSH Handling Systems AG
Wangenstraße 96
3360 Herzogenbuchsee
Switzerland
Phone: +41 (0)62-956 10-00
E-mail: info@handling-systems.ch
www.handling-systems.ch

RNA Vibrant S.A.
Carrer de l'Energia
08940 Cornellà de Llobregat (Barcelona)
Spain
Phone: +34 (0)93-377-7300
E-mail: info@vibrant-RNA.com
www.vibrant-RNA.com

RNA Digital Solutions GmbH
Reichsweg 19-23
D-52068 Aachen
Phone: +49 (0)1515-99 28 255
E-mail: kontakt@rnadigital.de
www.designforfeeding.com
www.rnadigital.de

Further manufacturing sites of the RNA Group

Lüdenscheid site

Rhein-Nadel Automation GmbH
Nottebohmstraße 57
D-58511 Lüdenscheid
Phone: +49 (0)2351-41744
E-mail: werk.luedenscheid@RNA.de

Ergolding site

Rhein-Nadel Automation GmbH
Ahornstraße 122
D-84030 Ergolding
Phone: +49 (0)871-72812
E-mail: werk.ergolding@RNA.de

Remchingen site

Rhein-Nadel Automation GmbH
Im Hölderle 3
D-75196 Remchingen-Wilferdingen
Phone: +49 (0)7232-7355-558
E-mail: werk.remchingen@RNA.de