

## Installation and Operating Instructions

### Inclined Hopper/Belt Feeder Unit

BU-S 25  
BU-S 50  
BU-S 65  
BU-S 100  
BU-S 150  
BU-S 200  
BU-S 250  
BU-S 350  
BU-S 450

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## 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) Hopper/Belt Feeder Unit

Type designation: BU-S

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
2014/30/EU	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,

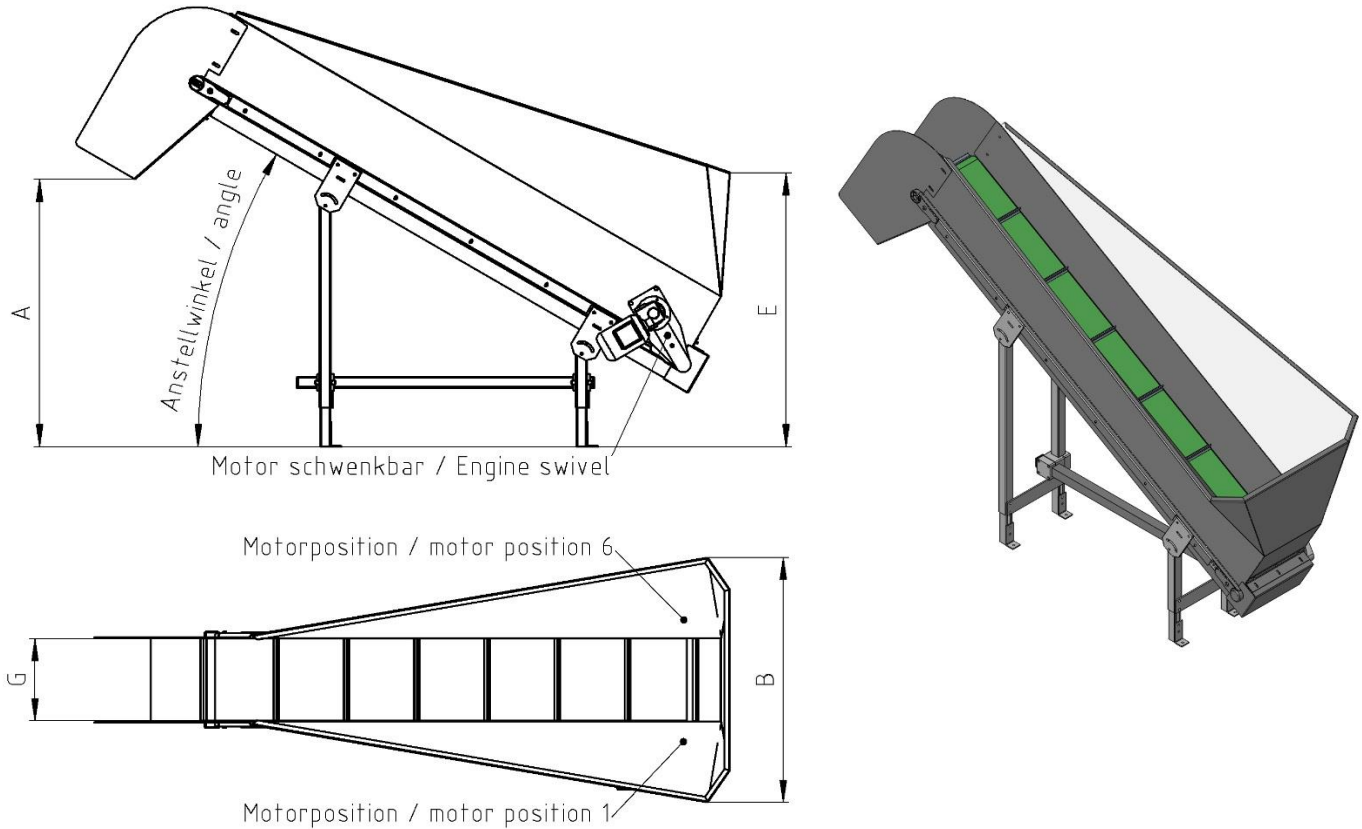
Place and date



Signature

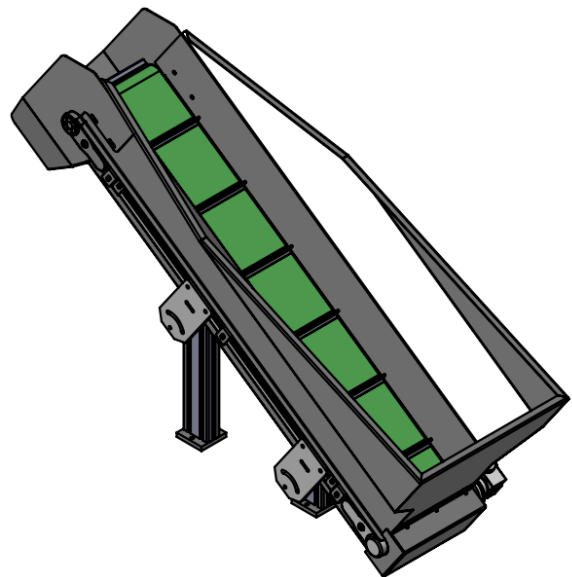
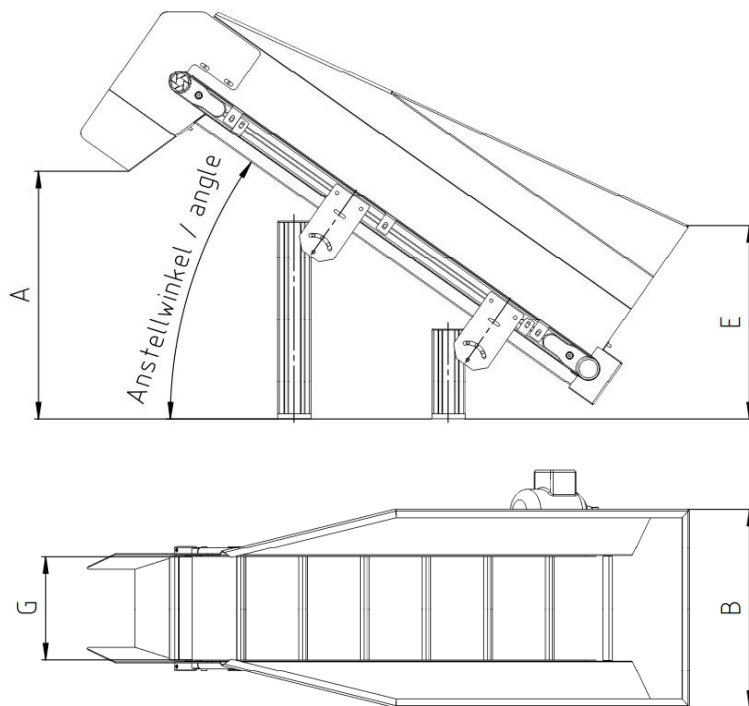
# 1. General

## 1.1. Technical data



	BU-S 65/1	BU-S 100/1.5	BU-S 150/1.5	BU-S 250/1.5	BU-S 200/2	BU-S 250/2	BU-S 350/2	BU-S 200/2.5	BU-S 450/2.5
Volumetric capacity in litres at 30°	65	100	150	250	200	250	350	200	450
Max. filling weight in kg	75	75	75	75	75	75	75	75	75
Hopper width in mm (B)	600	600	780	880	800	900	1000	800	1,000
Min. filling height at 30° in mm (E)	780	750	850	950	65	100	150	840	990
Discharge height at 30° in mm (A)	525	680	680	680	915	915	915	1170	1170
Min. filling height at 40° in mm (E)	700	650	750	850	750	700	950	750	890
Discharge height at 40° in mm (A)	640	880	880	880	1180	1180	1180	1510	1510
Shaft center distance in mm	1,000	1,500	1,500	1,500	2,000	2,000	2,000	2,500	2,500
Belt width in mm (G)	250	300	300	400	300	300	400	300	500
Belt type for >30° inclination	Anti-slip belt or cleated belt with T20 or T30 type cleats (number depending on parts to be handled)								
Belt speed m/min.	1 or 2 (standard 2 m/min)								
Motor	Three-phase or AC motor								
Motor position	Standard is motor position 6 (right side viewed in conveying direction) / alternatively motor position 1 (left side)								

Special design	<ul style="list-style-type: none"> <li>• Hopper tray with quick emptying flap</li> <li>• Stainless steel sealing strips on the sides</li> <li>• Direct drive</li> <li>• Heavy-duty drive station</li> <li>• Drive and return rollers of stainless steel</li> <li>• Brackets chemically nickel-plated</li> <li>• Belt speed &gt;2 m/min.</li> </ul>
Accessories	<ul style="list-style-type: none"> <li>• Hinged covers of Makrolon/PET-G (dampers optional)</li> <li>• Hopper tray coatings</li> <li>• Controllers</li> <li>• Level monitors</li> <li>• Floor supports of profiles or fabricated structure (optionally movable)</li> </ul>



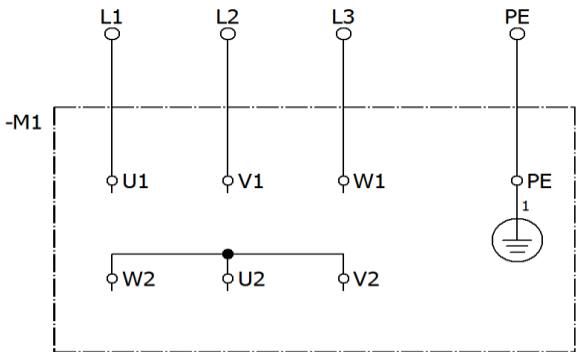
	BU-S 25/0.8	BU-S 25/1.2	BU-S 50/0.8	BU-S 50/1.2
Volumetric capacity in litres at 30°	25	25	50	50
Max. filling weight in kg	50	50	75	75
Hopper width in mm (B)	330	330	480	480
Min. filling height at 30° in mm (E)	400	400	430	440
Discharge height at 30° in mm (A)	250	450	240	450
Min. filling height at 40° in mm (E)	360	350	390	390
Discharge height at 40° in mm (A)	380	630	380	640
Shaft center distance in mm	800	1,200	800	1,200
Belt width in mm (G)	150	150	250	250
Belt type for >30° inclination	Anti-slip belt or cleated belt with T20 or K10 type cleats (number depending on parts to be handled)			
Belt speed m/min.	1 or 2 (standard 1 m/min)			
Motor	Three-phase or AC motor			

Motor position	Standard is motor position 6 (right side viewed in conveying direction) / alternatively motor position 1 (left side)
Special design	<ul style="list-style-type: none"> <li>• Hopper tray with quick emptying flap</li> <li>• POM sealing strips on the sides</li> <li>• Direct drive</li> <li>• Heavy-duty drive station</li> <li>• Drive and return rollers of stainless steel</li> <li>• Brackets chemically nickel-plated</li> <li>• Belt speed &gt;2 m/min.</li> </ul>
Accessories	<ul style="list-style-type: none"> <li>• Hinged covers of Makrolon/PET-G</li> <li>• Hopper tray coatings</li> <li>• Controllers</li> <li>• Level monitors</li> <li>• Table supports made of profiles</li> </ul>

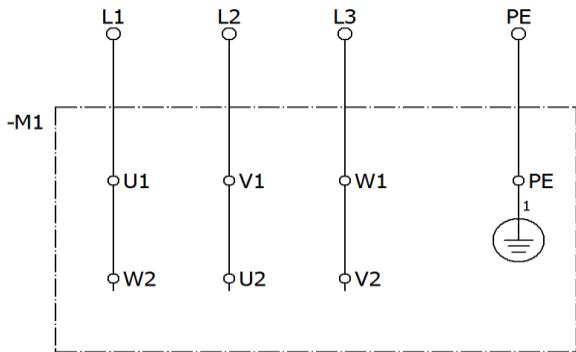
**1.2. Motor connection data**

**Connection diagram for three-phase motor -  
Connection to a 3-wire supply**

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



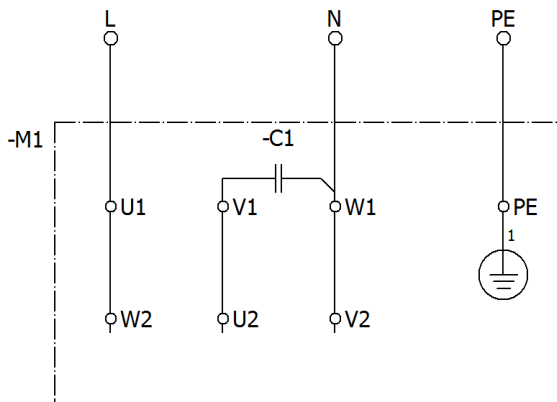
Connection to three-phase supply  
Low voltage (delta connection)  
3x230V



To reverse sense of rotation inter-  
change two of the phase leads

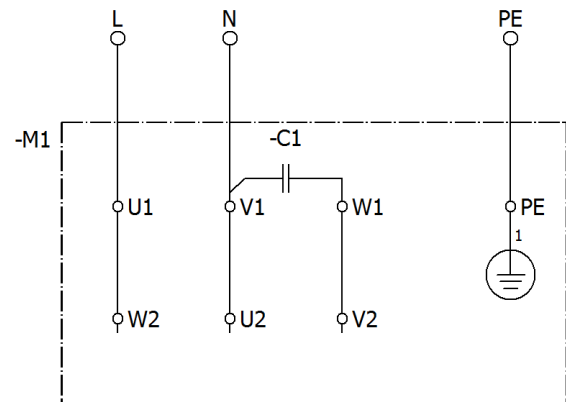
**Connection diagram for capacitor motor -  
Connection to a 2-wire supply**

Connection to AC supply  
1x230V



Clockwise rotation

Connection to AC supply  
1x230V



Counter-clockwise rotation

## 2. Safety Information

We have taken great care in design and manufacture of our belt hoppers 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 symbol indicates useful tips for operation of the belt feeders.

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 belt feeder.

If the belt hopper 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 belt feeder 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!

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- The equipment user and operators shall ensure that only authorized personnel works at the belt feeder.
- Any changes that have occurred on the feeding system affecting safety shall immediately be reported to the user.
- Operate the belt hopper in perfect condition only.
- Use the belt hopper only for its intended use.
- Observe the accident prevention provisions VBG 10 for continuous conveyors and VBG 4 for electrical equipment and components!
- Make sure that protective earthing of the power supply system is in perfect condition.
- Never operate the belt hopper 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 belt hoppers 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 feeder.

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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 belt hoppers 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 in section 1.

### **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 belt feeder. 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 feeder.

### **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 belt hoppers**

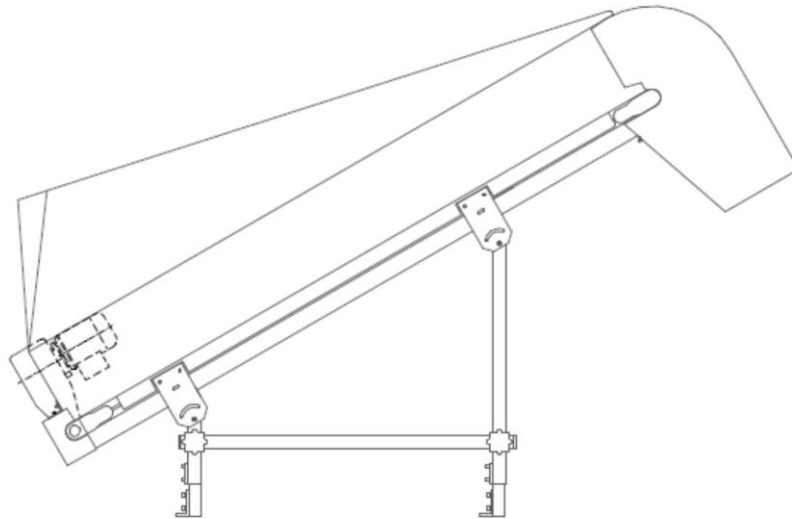
Our belt hoppers are based on the RNA belt conveyor type FP120 with its body made up of special T-slotted aluminium profiles. The motor may be of the three-phase or AC type and can be arranged at the left or right-hand side of the conveyor starting end.



### **Notice**

For information on the control devices please refer to the separate 'Control Units' operating instructions.

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## 4. Shipment and installation

### 4.1. Shipping and handling

#### 4.1.1. Shipment ex works

The hopper/belt feeder units are delivered ex works in cardboard or box packaging.

#### 4.1.2. On-site moving

The weight of the hopper/belt feeder unit 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**

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



#### **Attention**

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



#### **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.



#### **Warning**

Warning against suspended loads

### 4.2. Installation

The hopper/belt feeder unit is delivered fully assembled. It can be installed on the RNA supports using an adapter plate or on 40x40 profiles using slot nuts.



#### **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.

#### 4.2.1. Belts



##### Notice

The standard belts are fabricated with finger joints 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.

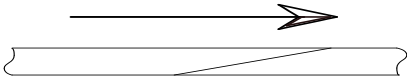


Fig. 2: Choice of conveying direction

Use of the belt for accumulation of parts is an exception. In this case, turn the belt.

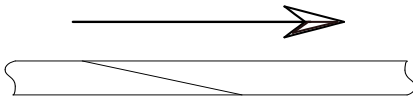


Fig. 3: Accumulation belt conveying direction

#### 4.2.2. Roller alignment

Align the drive and return rollers relative to one another and to the conveyor body (Fig. 3).

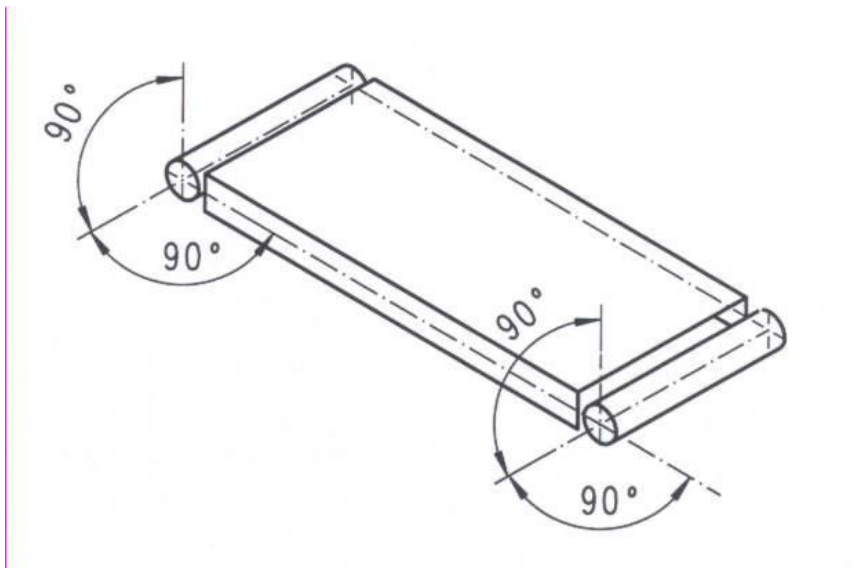


Fig. 3: Roller alignment

#### 4.2.3. Drive system (belt hoppers 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 motor characteristics are specified on the motor rating plate!

The belt hopper motor position is steplessly adjustable. To do so, slacken the fixing screws of the motor flange and move the motor into the required position (see Fig. 4).

Swing the motor into the position required and re-tighten the fixing screws.

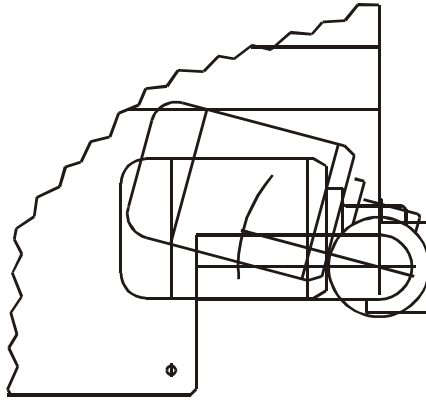


Fig. 4: Steplessly adjustable motor



**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 hopper/belt feeder unit 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 hopper/belt feeder unit use the motor protection breaker fitted beside the motor.

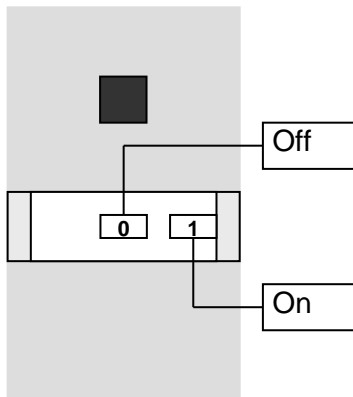


Fig. 5: Motor protection breaker

For hopper/belt feeder units equipped 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 on site and running-in of the belt it may be necessary to re-adjust belt tracking. This fine tuning is made with the aid of setscrews fitted in the belt return station.

Details of the return station are illustrated below:

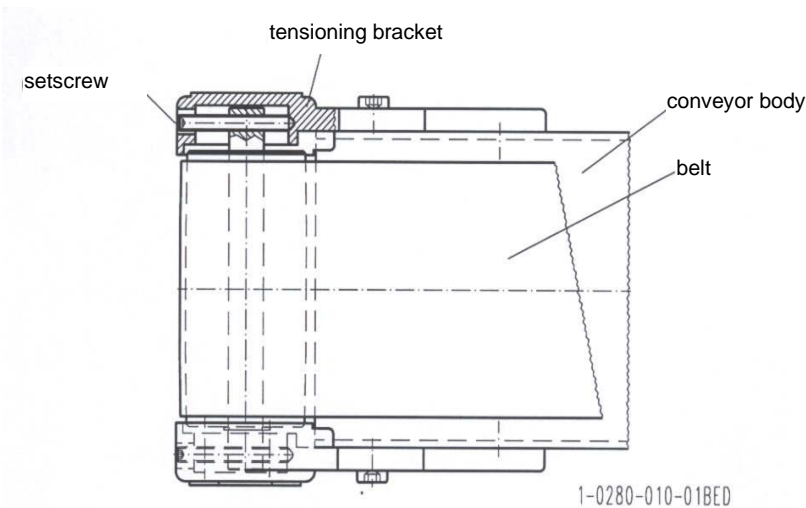


Fig. 6: Belt return station

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.

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 hopper/belt feeder unit in compliance with VDE provisions. Any work on electrical equipment of the hopper/belt feeder unit 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.



### 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!

## 6.1. Belt

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



### Attention

Take care to provide sufficient ventilation! Wear protective clothing.

## 6.2. 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.

## 6.3. 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.

## 6.4. 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.

## 6.5. 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.

## 6.6. Environmental effects

When positioning the belt feeders take care that the belts are not exposed 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 feeders.

## 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.



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### Further manufacturing sites of the RNA Group

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