

Installation Instructions for Belt Feeders

FP 15 E
FP 15 D

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Declaration of Incorporation

according to Machinery Directive 2006/42/EC

We hereby declare that our product is intended to be incorporated into or assembled with other machinery to constitute one machine in terms of the Directive indicated above (or parts thereof) and that it must not be put into operation until the relevant machinery into which it is to be incorporated has been declared to be in conformity with the EC Machinery Directive.

Applied harmonised standards:

DIN EN 60204 T1, DIN EN ISO 12100-2011-03, DIN EN 619, DIN EN 620
DIN EN 1050

Remarks:

This product has been manufactured in accordance with the Low-Voltage Directive 2014/35/EU.
We assume that our product will be incorporated into a stationary machine.

Rhein-Nadel Automation GmbH
Managing Director

Dr. Tobias Hensen



1. Technical data

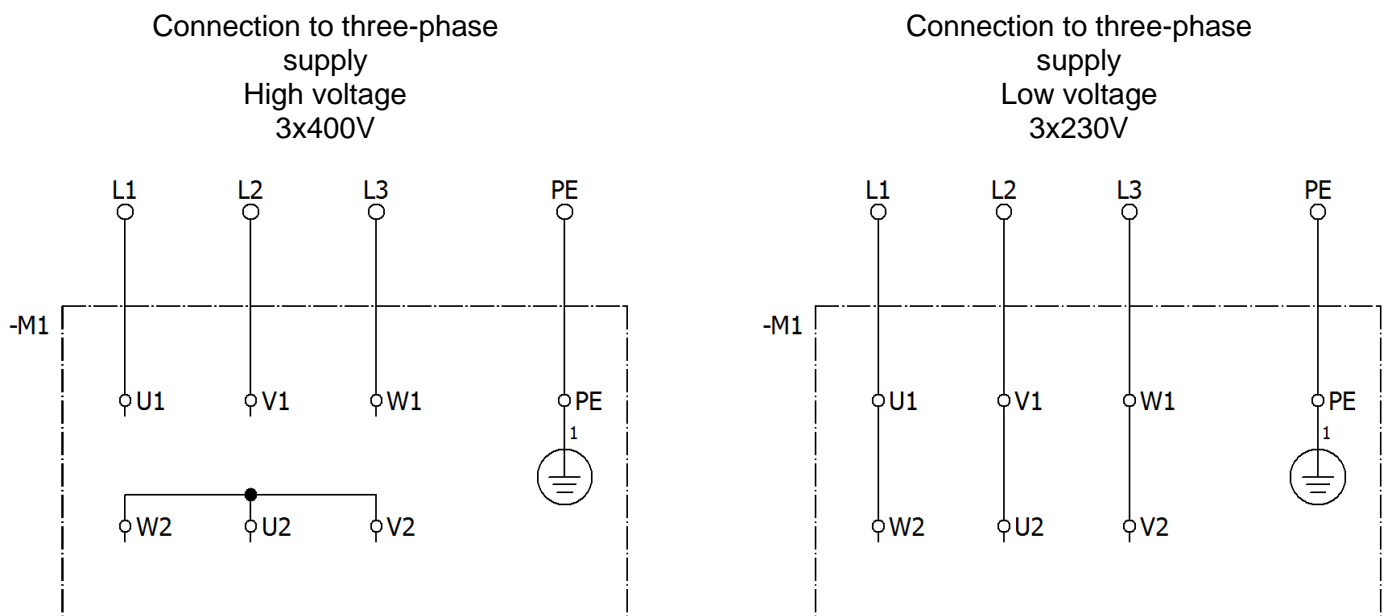
1.1. Table

Belt widths	(mm)	10, 20, 30, 40 and toroidal driving cords Ø3
Belt lengths = shaft center distance	(mm)	200 to 2,000 (greater lengths possible depending on version)
Belt load	(N)	max. 100 total load depending on motor, belt width and mode of operation (conveyance or accumulation) the total load may be much higher
Belt speed +/- 20% constant +/- 10 % variable	(m/min)	Constant (three-phase 230/400V 50Hz): 5, 9, 15, 21, 37 Constant (230V 50Hz alternating current) : 5 9 15 21 Variable: (direct current 24 VDC) 2-13, 3-17, 4-26, 5-30, 6-40
Adjusting range (clearance) for FP15D	mm	0-25 adjustable 20-55 adjustable 50-80 adjustable (others are possible)
Current input		see rating plate
Roller diameter	(mm)	return rollers 30 knife edges 8
Tensioning station		forms part of motor baseplate

1.2. Motor connection diagrams

1.2.1. Dunker / Rotek three-phase motor

Connection of Dunker three-phase motors

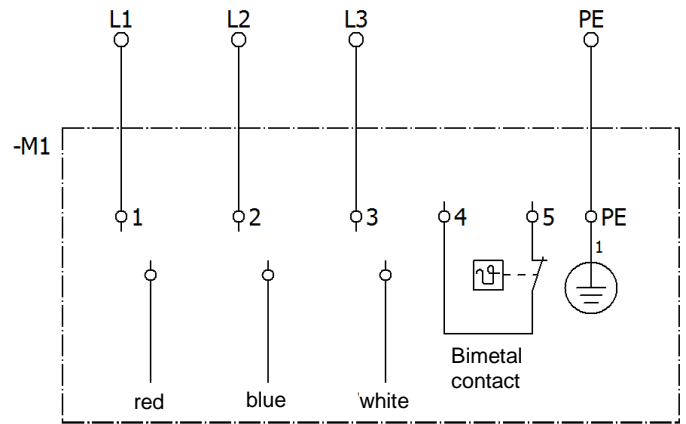
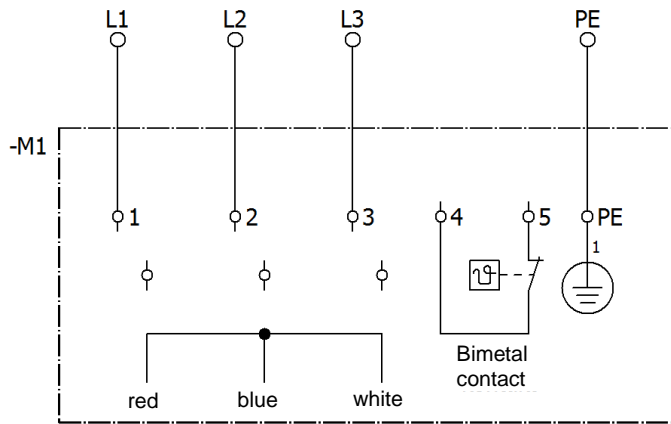


For reversing the sense of rotation change two phases of the supply line

Connection of Rotek three-phase motors

Connection to three-phase supply
High voltage
3x400V

Connection to three-phase supply
Low voltage
3x230V



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

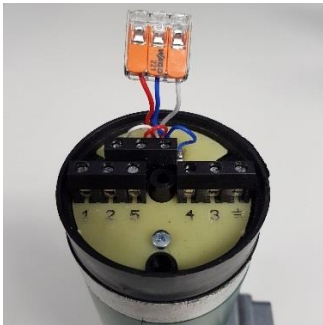


Fig. 1



Fig. 2



Fig. 3



Fig. 4

The protective earth conductor PE is to be connected by user.

A bimetal contact is connected to terminals 4 and 5. (Do not connect supply voltage here!)

Current carrying capacity: 250VAC, 1A or 24VDC, 1A

For changing the connection from star (3x400V) to delta (3x230V) remove the (star point) terminal (Fig. 2).

This terminal (Fig. 2) is not needed for delta connection and should be kept in a safe place.

Connect the free cables in the top triple terminal. Colours (Fig. 3) from left to right: red-blue-white.

Fig. 4 is a view on the triple terminal from the other side showing the colours from right to left: red-blue-white.

The Rotek three-phase motor cannot be changed to an AC motor!

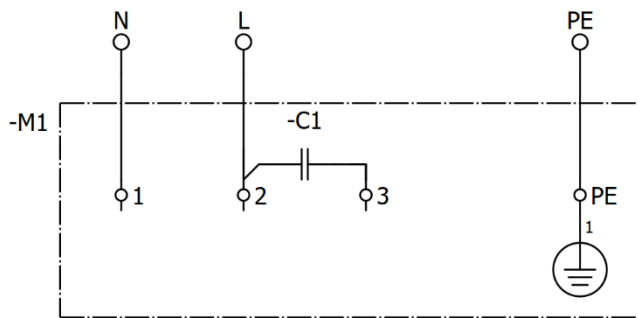
For operation with a variable-frequency drive unit the frequency range should be from 12 to 55 Hz for the Rotek motor and from 17 to 85 Hz for the Dunker motor.

	Motors list	i	n motor	v m/min.	VFD mode v min.	VFD mode v max.	Motor current max. mA (50/60Hz)
Dunker	DR62.0X80-4/SG80, i=5:1	5	1200	39.8	13.5	67.7	3~400V: 190/190 3~230V: 290/290
	DR62.0X80-4/SG80, i=10:1	10	1200	19.9	6.8	33.9	
	DR62.0X80-4/SG80, i=15:1	15	1200	13.3	4.5	22.6	
	DR62.0X80-4/SG80, i=24:1	24	1200	8.3	2.8	14.1	
	DR62.0X80-4/SG80, i=38:1	38	1200	5.2	1.8	8.9	
Rotek	DS ROSYNC 84 SN18H 7:1	7	1500	35.6	8.5	39.1	3~400V: 200/175 3~230V: 350/300
	DS ROSYNC 84 SN18H 12:1	12	1500	20.8	5.0	22.8	
	DS ROSYNC 84 SN18H 15:1	15	1500	16.6	4.0	18.3	
	DS ROSYNC 84 SN18H 24:1	24	1500	10.4	2.5	11.4	
	DS ROSYNC 84 SN18H 38:1	38	1500	6.6	1.6	7.2	

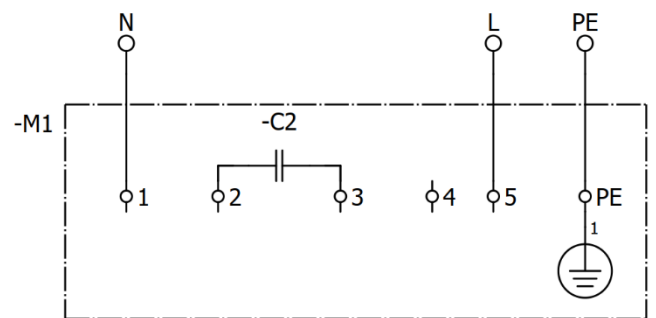
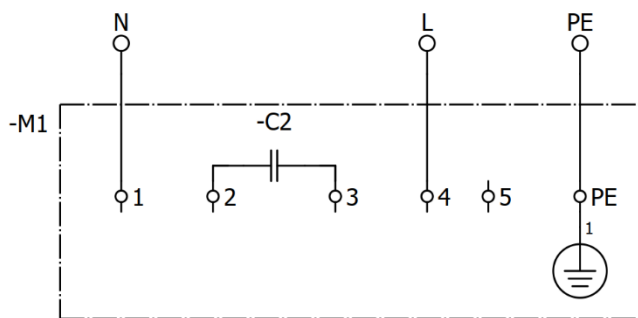
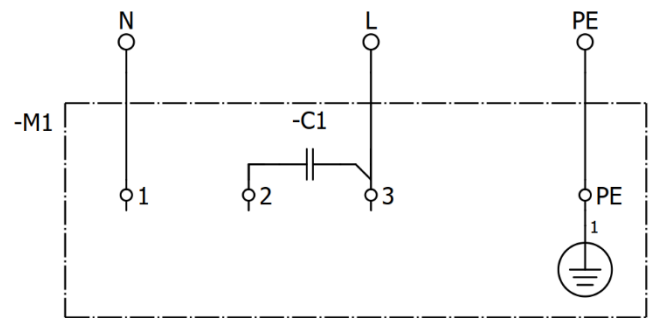
1.2.2. Dunker / Rotek single-phase motor

Connection of Dunker single-phase motors

Connection to a.c. supply
1x230V
CW rotation



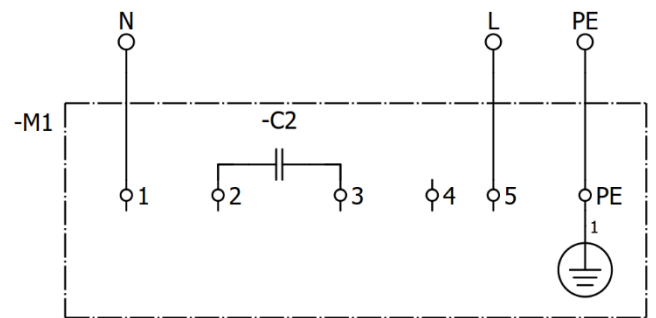
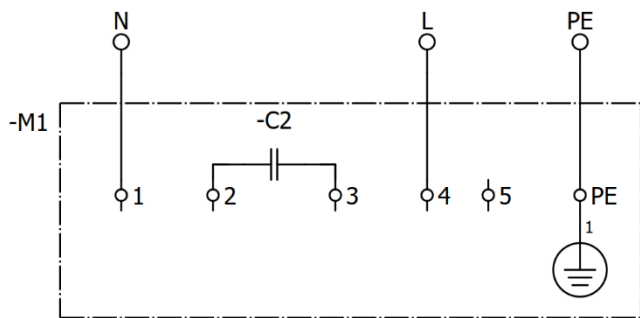
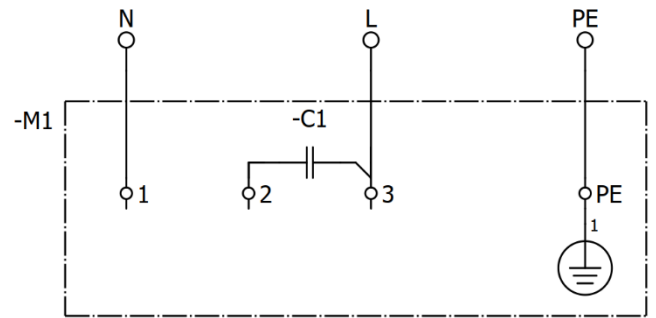
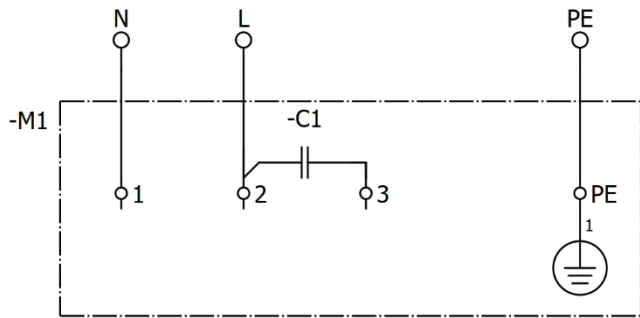
Connection to a.c. supply
1x230V
CCW rotation



Connection of Rotek single-phase motors (Version with 4 or 6 terminals)

Connection to a.c. supply
1x230V
CW rotation

Connection to a.c. supply
1x230V
CCW rotation



The protective earth conductor PE is to be connected by user.

The capacitor capacitance is 2.2 μF for Rotek (use genuine capacitors only) and 3 to 5 μF for Dunker.

The Rotek AC motor (Fig. 5) cannot be changed to a three-phase motor.

6 terminals

4 terminals

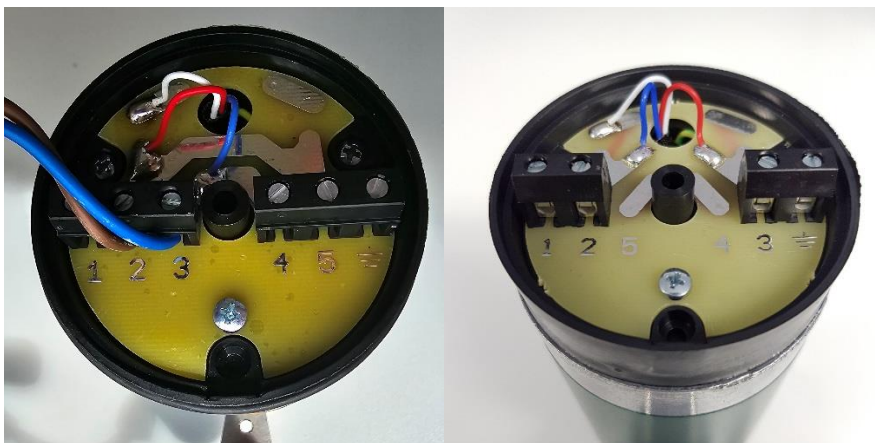
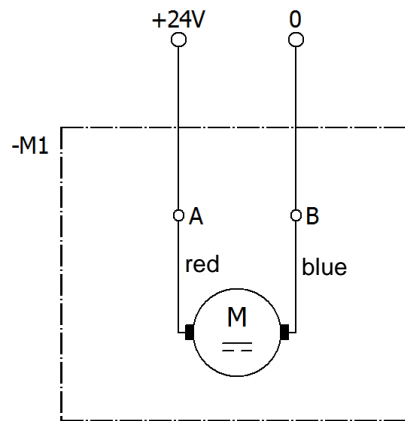


Fig. 5

Connection of Engel direct-current motors



To reverse the sense of rotation change the feeder connection.

2. Safety Information

We have taken great care in design and manufacture of our belt feeders 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 feeder 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!

- 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 feeder in perfect condition only.
- Use the belt feeder only for its intended use.
- Observe the accident prevention provisions VBG 10 for continuous conveyors and VBG 4 for electrical equipment and components!

Machine hazards

- If the belt feeder comes into contact with moisture or liquids there is danger of electric shock.
- Make sure that protective earthing of the power supply system is in perfect condition.
- Never operate the belt feeder without guards and cover panels in place!

Intended use

The intended use of the belt feeder is the feeding of parts.

The shortest side of such parts must be at least 5 mm long. Special versions or accessory equipment are available to modify the belt feeder for use with parts having smaller side lengths (> 0.5 mm). If necessary, please contact the manufacturer.



Caution

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

Parts handled with standard belts must be dry, clean and without sharp edges.



Caution

If the parts to be handled are that may fall over, roll or slide, sufficiently dimensioned side guards must be selected from our range of accessories.

The belt feeders are designed for horizontal transport at maximum loading. A slight inclination of the feeder is possible in some cases. 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 belt feeder has been manufactured in accordance with following directives:

- EC Machinery Directive 2006/42/EC
- EC Low-Voltage Directive 2014/35/EU
- Electromagnetic Compatibility Directive 2014/30/EU

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

The applicable standards are specified in the Declaration of Incorporation.

3. Design and functional description of belt feeders

The belt feeders are made up of a special T-slotted aluminium profiles. For belt drive a number of motors are available for constant and variable speed. The motor may be arranged at the entry or exit end of the belt or in the middle. Control of the belt feeder is effected by motor protection breaker or electronic control devices, depending on motor type.



Notice

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

FP15E with knife edge
with three-phase/single-phase drive motor
with drive roller Ø52

FP15E without knife edge
with d.c. drive motor
with drive roller Ø32

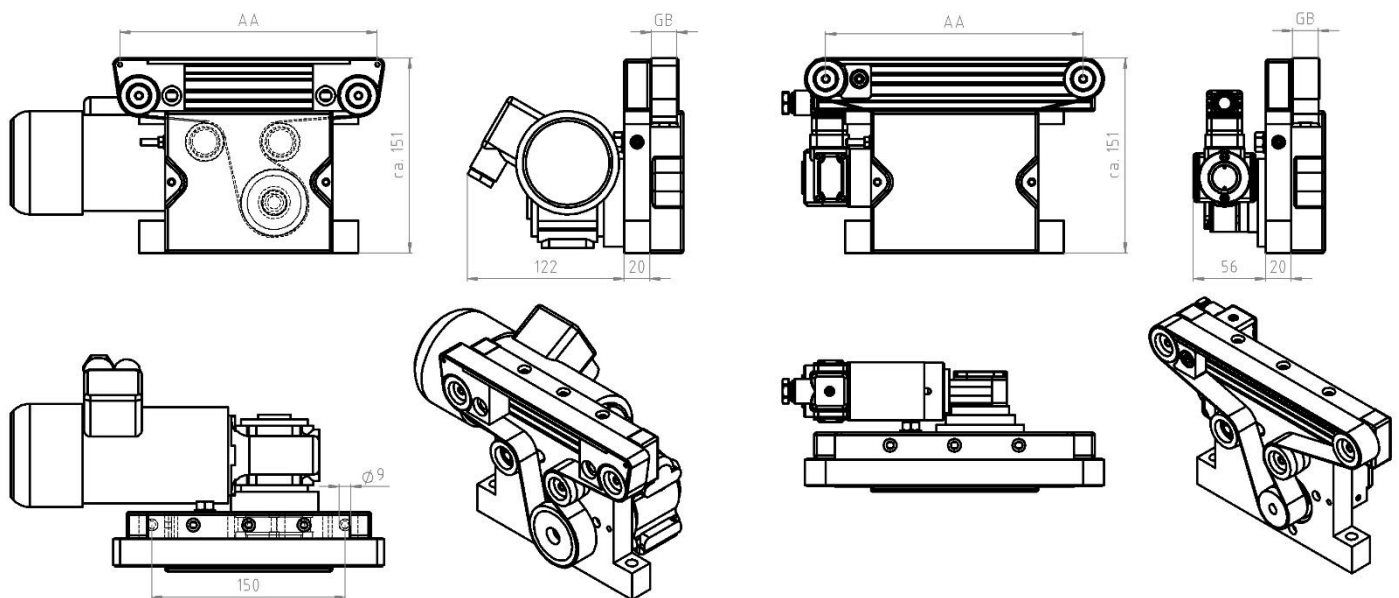


Fig. 1: Belt feeder configurations

4. Shipment and installation

4.1. Shipping and handling

4.1.1. Shipment ex works

The belt feeders are delivered ex works in cardboard or box packaging.

4.1.2. On-site moving

The weight of the belt feeder 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!

4.2. Connecting the motor

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!



Attention

Be sure to check correct mounting of the guard hood before starting-up.



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.

4.3. Installation on supports

If the belt feeder is mounted on a machine table take care to ensure that the support feet are firmly bolted to the table.



Attention

Unauthorized operation is not permitted!

If the belt feeder is mounted on a support structure make sure that the support feet are additionally dowelled to the foundation.

5. Commissioning



Attention

Electrical connection of the belt feeder 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.

The belt feeder is started and stopped via the motor protection breaker.

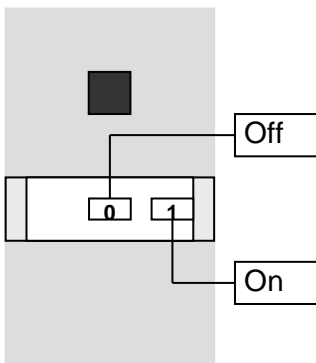


Fig. 2: Motor protection breaker

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

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 the belt tension.



Caution

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

Adjusting belt tension

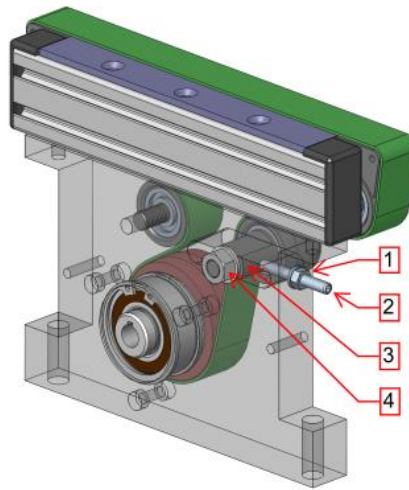


Fig. 3: Drive station

The motor baseplate has an integrated tensioning device for adjustment of belt tension. To adjust belt tension slightly loosen fixing nut (4) of the tensioning roller. Now loosen locking nut (1) and turn setscrew (2) with an Allen key.

This action shifts the position of belt tensioning roller (3). After adjusting belt tension remember to re-tighten fixing nut (4) and locking nut (1).

Move tensioning roller towards drive roller to increase belt tension

Move tensioning roller away from drive roller to decrease belt tension

Correct belt tension is obtained when the belt conveys a load of 5 to 10 kg (depending on belt width) without slipping. In case of higher loads, tension the belt at nominal load conditions until the drive roller drives the belt without slippage.



Caution

Too high belt tension may overload both the belt and the motor. After adjusting belt tension measure the current drawn by the motor. Be sure to slacken the belt if the rated data as shown on the nameplate are exceeded.

Changing the sense of rotation

With the motors used it is basically possible to change the sense of rotation. However, as for any change to the as-supplied condition, it is mandatory in all cases to observe the Equipment Safety Act and the regulations for the prevention of accidents.



Caution

Changing the direction of belt travel may render guard covers ineffective. Do not re-start before you have established compliance with the Equipment Safety Act and the regulations for the prevention of accidents.

6. Maintenance



Attention

For installation, maintenance and repair work all poles of the power supply must be disconnected from the belt feeder in compliance with VDE safety provisions. Any work on electrical equipment of the belt feeder 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 around the drives! They can get hot during operation. Therefore let components cool down before working on them. If this is not possible, take suitable protective measures such as the use of gloves.

6.1. Belt

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.

6.2. Motor

For DC motors it is necessary to change the carbon brushes after 2000 hours run in normal operation. 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. 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.

6.5. 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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