

USER MANUAL

AU

Alignment unit



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Please note

GENERAL INFORMATION

Validity of this manual and required compliance

Description of the device

Alignment Unit AU

Contents

This operating manual refers exclusively to the machine types listed above. It is intended to help in proper installation, operation and adjustment of the machine.

For information about the required qualification: See chapter [Information and qualification](#) on page 7.

For technical questions that are not addressed in this operating manual, please contact the manufacturer, NOVEXX Solutions.

Liability

NOVEXX Solutions reserves the right:

- To make changes in design and components, and to use equivalent other parts than those specified in line with technological progress.
- To change information in this manual.

Any obligation to extend these changes to machines previously delivered is excluded.

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Printed in Germany

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How information is represented

Explanation of symbols

To enhance readability and make information easier to find, different types of information are identified:

→ Instruction with no order of tasks assigned

1. Numbered instructions introduced by preceding text
2. The specified order must be followed!

▣→ Special note for action that must be performed!

- Enumeration of features
- Other feature



The Experts symbol identifies activities that are reserved exclusively for qualified and specially trained personnel.



The information symbol identifies notes and recommendations as well as additional information.

Notes about hazards and risks

Important instructions that must absolutely be followed are specially highlighted:



WARNING!

A warning symbol refers to risks that can result in severe or fatal injuries! The note contains safety measures to protect affected persons.

→ Instructions must be followed without exception.

CAUTION!

A caution symbol refers to risks that can result in property damage or personal injury (minor injuries). The note contains instructions for preventing damage.

→ Instructions must be followed without exception.

Illustrations

Illustrations appear in the text where required. References to these illustrations are shown in [square brackets] containing the number of the illustrations. Uppercase letters after an illustration number, for example [12A], refer to the corresponding item within the illustration.

FOR YOUR SAFETY

Intended use

**WARNING!**

Risk of injury due to missing protective equipment.

The alignment unit described here is an “incomplete machine” as defined in the Machinery Directive 2006/42/EC!

→ Put the alignment unit into operation only when you have ascertained that the machine into which the alignment unit is to be installed satisfies the requirements of the Machinery Directive 2006/42/EC, Annex IIA.



Although the alignment unit is an “incomplete machine” in the sense of the Machinery Directive, it is referred to in this operating manual as “machine” or “alignment unit” for reasons of comprehensibility.

The alignment unit is a functional element in the transport system for piece goods. It has an electric drive and is intended for industrial applications. It is intended to align products with an essentially oval base, e.g. shampoo bottles or fish cans, during transport on a belt conveyor in such a way that downline of the alignment unit, the products are lying with their main axis in conveying direction. This enables precise and correct labelling of the flat side(s).

The total weight of the products on the belt conveyor must not exceed 10 kg.

The motor requires the use of an electronic motor controller. Here, the speed can be varied continuously.

Any other type of or more extensive application will be considered non-intended use.

NOVEXX Solutions shall assume no liability for damage resulting from non-intended use of the machine.

Information and qualification

Ensuring the necessary qualification

→ Only fully trained and authorised personnel are permitted to install, connect, operate, adjust and maintain the machine.

→ Service work must only be performed by qualified and appropriately trained technical specialists (service technicians) or the customer service department.

→ Areas of responsibilities for operating and servicing the machine must be clearly defined and consistently observed.

→ Personnel must also be regularly instructed in on-the-job safety and environmental protection.

Qualification for operation

The instruction provided for the operating personnel must ensure:

- that the operating personnel can use the machine independently and without danger.
- that the operating personnel can rectify minor operating faults independently.

→ At least 2 persons should be instructed in operation.

Qualification for system integrators and service technicians



Installation of the machine and service work on the machine require appropriate qualification. Only service personnel with technical training are able to assess the tasks to be performed and recognise potential dangers.

- Knowledge acquired through technical training in mechanics and electronics (for example in Germany the training to become a mechatronics engineer).
- Participation in a technical training course for the corresponding machine offered by the manufacturer.
- The service personnel must be acquainted with the function of the machine.
- The system integrator must be acquainted with the functionality of the system into which the machine is being integrated.

Tasks	System integrator	Operator	Service technician
Install the machine	X		
Connection	X		
Adjust	X		
Switching on/off	X	X	X
Application-related settings	X	X	X
Rectify minor operating faults	X	X	X
Clean the machine		X	X
Rectify major operating faults			X
Settings to the electronics/ mechanics			X
Repairs			X

[Tab. 1] An example of the distribution of tasks among different qualified personnel.

Making note of information



WARNING!

The machine can only be operated safely and efficiently if all the necessary information is observed!

- Before beginning operation, read this operating manual and follow all of the instructions.
- Observe all additional safety and warning information given on the machine.
- Allow only technically qualified persons to operate and adjust the machine.

Any product liability and warranty claims will not be valid unless the machine is operated according to the instructions in the operating manual.

Keeping information available

This operating manual

- must remain readily available for operating personnel at a location near to the machine.
- must be kept in legible condition.
- If the machine is sold, it must be made available to the new owner.
- The safety and warning symbols and messages on the machine must be kept in a clean and legible state. Replace any signs that are damaged or missing.

Operating safety of the machine**Intended use****Installation, repair****WARNING!**

Improper use of the machine can result in accidents, property damage and loss of production!

- Inspect the machine closely for visible transport damage during installation. In the event of damage, notify NOVEXX Solutions immediately.
- Do not install the machine in potentially explosive environments.
- Ensure that the belt conveyor on which the alignment unit is installed cannot tip over.
- Install the belt conveyor in such a way that the products do not fall off at the end of the belt.
- Provide a mains isolation system and emergency stop device during installation.
- Install mains isolation system, emergency stop device and operating elements so that they are easily accessible.
- Use a motor controller that switches off the motor in the event of a fault (e.g. blockage).
- Use connecting leads that comply with the regulations of the country in which the machine is being installed.
- Lay the connection cables so that no one can trip over them.
- Check the effectiveness of all safety functions.
- Operate the machine only when it is in a technically flawless condition.
- Put the machine into operation only after at least one successful test run has been carried out.
- Make changes or modifications to the machine only after consultation with the NOVEXX Solutions Customer Service department.
- Use only OEM spare parts.

**WARNING!**

Risk of shearing and crushing between product and alignment unit!

- Prevent access to the machine during operation by installation of higher-level protective equipment ^a.

a) Movable, separating protective device in accordance with EN 953

After all maintenance and repair work**WARNING!**

Risk of accidents from moving or loose parts!

- Install all covers and protective equipment again.
- Check all bolted connections loosened or removed during work for tightness again.
- Remove all tools and other equipment used for the maintenance or repair work from the working area of the machine.
- Check the effectiveness of all safety functions.

**WARNING!**

Contacting electrically live components can cause lethal electrical shocks and burns!

- After assembly, check the machine according to the applicable regulations of the relevant country^a.

a) For Germany: DIN VDE 701-702 "Recurrent test and test after repair and modification of electrical equipment"

Warning of injuries due to electrical shock**WARNING!**

Contacting electrically live components can cause lethal electrical shocks and burns.

- Only operate the machine when the enclosure is properly installed.
- The machine must only be connected by an authorised technician who is acquainted with the associated dangers.
- Switch the machine off before cleaning and servicing.
- Keep the machine dry.
- If a liquid gets into the machine, switch off the machine immediately. Notify a service technician.
- Keep the machine's On/Off switch accessible.
- In case of emergency switch off the machine.

CAUTION!

If the supply voltage is too high or too low, the machine may be damaged.

- Operate the machine only at the mains voltage given on the type plate.

Warning of injury hazards from mechanical components**WARNING!**

Danger of injury due to moving and rapidly rotating parts!

- Maintain a safety clearance from the machine when it is in operation.
- Never reach into a machine that is running.
- Switch off the machine before making any mechanical adjustments.
- Keep clear of the area around moving parts even when the machine is stopped if there is any possibility of the machine starting up.

**WARNING!**

Entanglement hazard!

- Do not wear ties, loose clothing, jewellery, wrist watches or similar objects when working in the vicinity of the running machine, especially when inspecting the belt conveyor.
- Long hair must be kept in a hair net and must not be worn loose.

**WARNING!**

Crushing hazard at the belt due to products on the conveyor equipment!

- Never reach between the product and the belt when the machine is running or ready for operation.
- Never remove or bypass the protective equipment to prevent reaching in while the machine is in operation.

Every time before starting production**Due diligence of the operator and service personnel**

→ Ensure that the following requirements are met in accordance with the details specified in the operating manual:

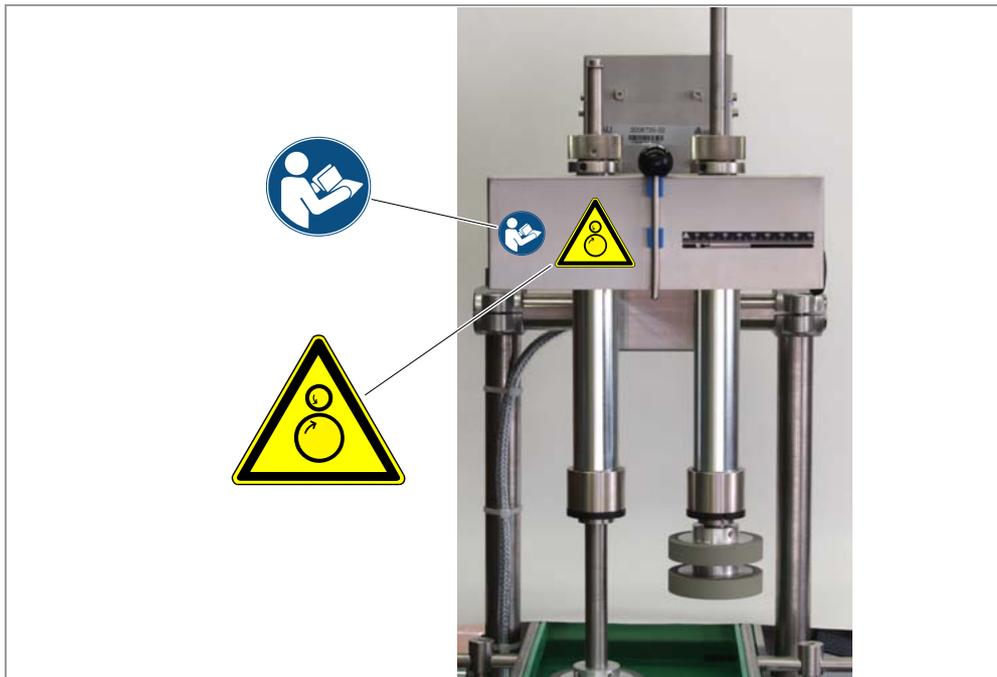
- The machine must be set up and configured to meet applicable requirements.
- All necessary safety equipment must be installed.
- The machine must have successfully completed at least one test run.
- The machine must be connected to the energy supply.

→ The operating personnel is provided with the necessary personal protective equipment, e.g. hair net. Ensure that the protective equipment is used for its intended purpose.

Due diligence of the operating personnel

- Check the safety equipment to ensure it is working correctly.
- Check the machine for visible damage. Report defects that are discovered immediately.
- Use personal protective equipment properly, for example wearing a hair net.
- Remove material and objects that are not required from the working area of the machine.
- Ensure that only authorised persons remain in the working area of the machine.
- Ensure that no one can be endangered by the machine starting up.
- Ensure that the emergency stop device is freely accessible.

Warning symbols on the machine



[1] Warning symbols on the alignment unit



CAUTION!

Warning symbols on the machine provide important information for the operating personnel.

- Do not remove warning symbols.
- Replace missing or illegible warning symbols.

Meaning of the warning symbols:

Warning symbol	Meaning	Order No.
	The warning symbol "Entanglement hazard" warns of dangerous movements of the machine that could lead to entanglement.	A5346
	This symbol prompts you to read and observe the operating manual.	A5331

[Tab. 2] Meaning of the warning symbols

Product Description

TECHNICAL DATA

Dimensions



[2] Dimensions of the alignment unit

Weight

12 kg

Electrical connection

Supply voltage

170 V DC

Nominal current

0.29 A (current limited by controller installed by operating company)

Connection

Switch cabinet with power supply and control modules necessary

Ambient conditions

Installation location

- Inside buildings
- Protected from water and wind
- Dry
- Non-explosive atmosphere
- Operation to max. 2000 m above sea level

Operating temperature

+5 to +40°C

Storage temperature

0 to +70°C

Relative humidity

30 to 80% RH (non-condensing)

Noise emissions

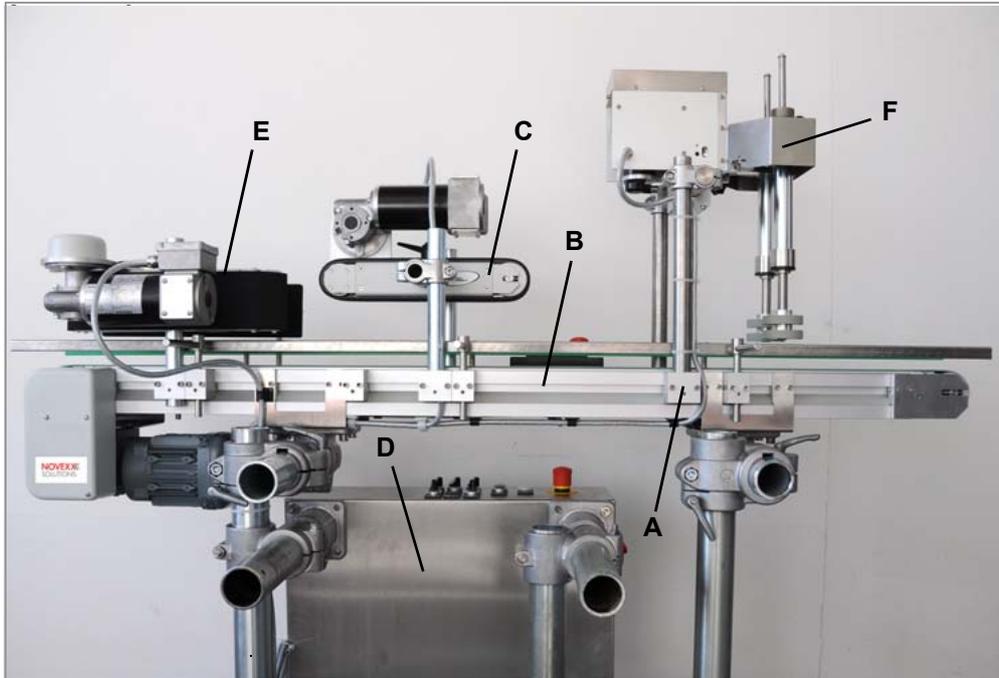
< 70 dB(A)

OVERVIEW

Designs of the alignment unit

Designs

The alignment unit is available in only one size.



- [3] Accessories
- A Holder
 - B NOVEXX Solutions belt conveyor system
 - C Hold down conveyor
 - D Control enclosure
 - E Alignment belt
 - F Alignment unit

The alignment unit is normally installed on a NOVEXX Solutions belt conveyor unit using special holders and operated together with a hold down conveyor.

Functionality

Products with an elliptical base can be aligned using the alignment unit. The halves of the ellipse have to be symmetrical for this. The alignment unit is installed on a NOVEXX Solutions belt conveyor unit and can be used in combination with a hold down conveyor.

During the transport of the products on the belt conveyor, a typical application comprises the following steps [4]:

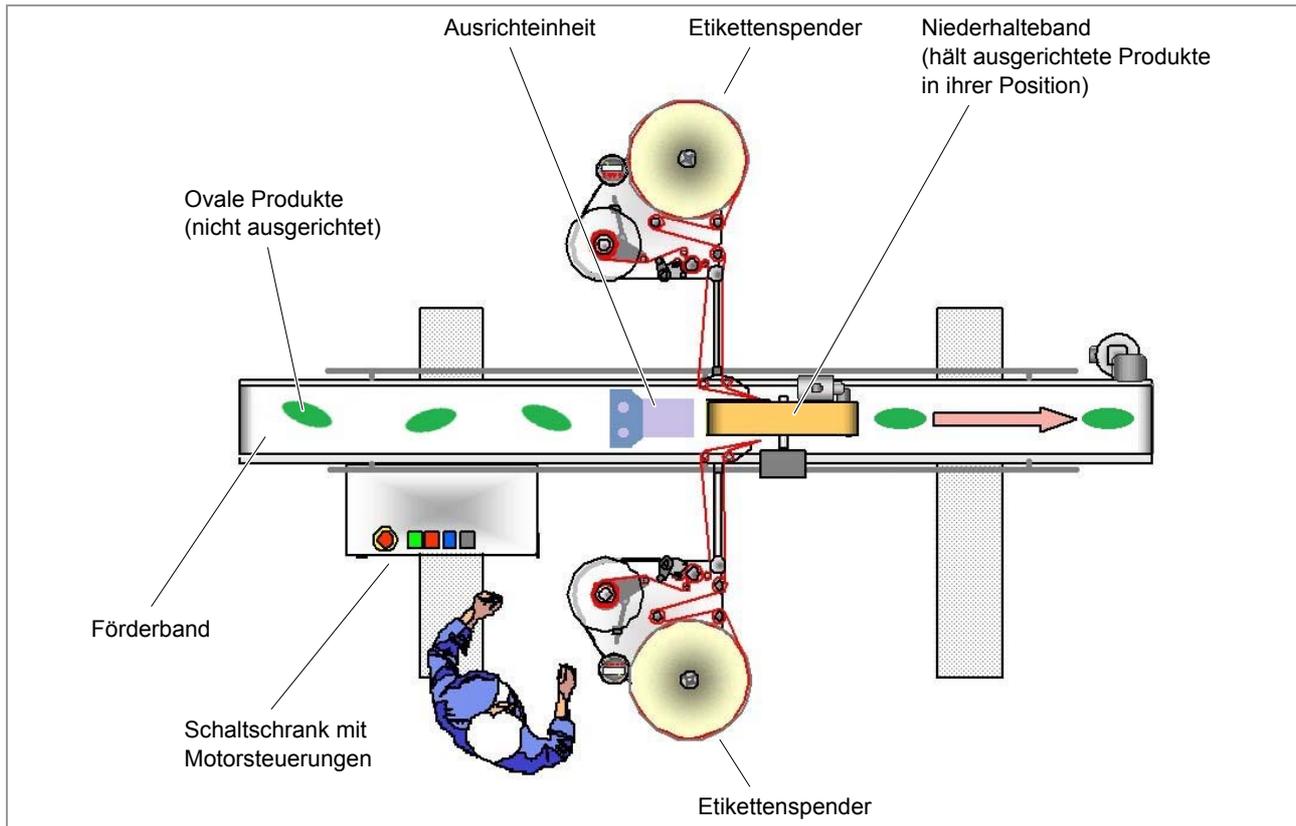
1. The product is placed in the middle of the belt conveyor (e.g. by guide rails)
2. The product contacts the alignment unit and aligned.
3. The aligned product is pressed down onto the belt conveyor from above by a hold down conveyor so that it remains in the desired position.
4. Labels are applied to one or both sides of the product.
5. The product is released by the hold down conveyor.

The alignment unit has a DC brush motor with flange-mounted gearbox that drives two counter-rotating rollers via a differential gearbox. These should run preferably at the same speed as the belt conveyor. The shafts of these rollers are pivoted and drawn together by spring force. The rollers are thus pressed uniformly against the product and follow the product contour.

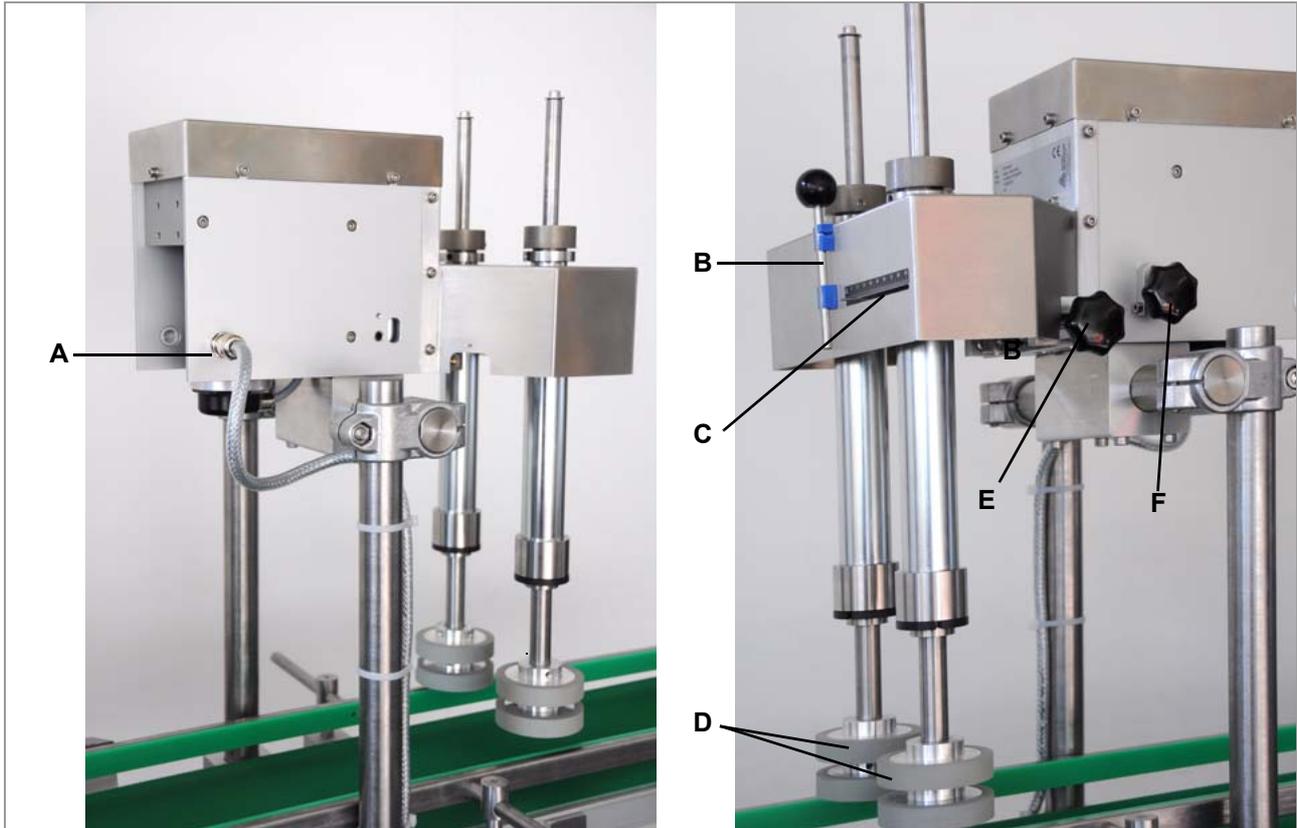
The power supply and control must be provided by an external controller supplied by the operating company. NOVEXX Solutions offers switch cabinets for the control of complete belt units.

The alignment is performed by two driven roll pairs. The height, opening distance, speed and contact pressure of the rolls can be adjusted.

The speed of the rolls is synchronised with the belt conveyor speed and hold down conveyor speed.



[4] Function of the alignment unit (schematic)



- [5] Functional elements of the alignment unit
- A Drive motor
 - B Auxiliary lever for height adjustment of the friction rollers
 - C Scale for setting the opening angle
 - D Friction roller pairs
 - E Handwheel for setting the spring force
 - F Handwheel for setting the opening angle

Switching on/off

The ON/OFF switch is installed by the operating company.

The switch is normally located on the switch cabinet of the motor controller [6A].



- [6] ON/OFF switch (A) on the switch cabinet of the motor controller (Example: NOVEXX Solutions, AMC Series).

Commissioning

SAFETY

The wrap around conveyor may only be installed or serviced by qualified, authorised service personnel, see chapter **Information and qualification**  auf Seite 7.



WARNING!

Improper use of the machine can result in accidents, property damage and loss of production!

- Inspect the machine closely for visible transport damage during installation. In the event of damage, notify NOVEXX Solutions immediately.
- Do not install the machine in potentially explosive environments.
- Ensure that the belt conveyor on which the wrap around conveyor is installed cannot tip over.
- Install the belt conveyor in such a way that the products do not fall off at the end of the belt.
- Provide a mains isolation system and emergency stop device during installation.
- Install mains isolation system, emergency stop device and operating elements so that they are easily accessible.
- Use a motor controller that switches off the motor in the event of a fault (e.g. blockage).
- Use connecting leads that comply with the regulations of the country in which the machine is being installed.
- Lay the connection cables so that no one can trip over them.
- Check the effectiveness of all safety functions.
- Operate the machine only when it is in a technically flawless condition.
- Put the machine into operation only after at least one successful test run has been carried out.
- Make changes or modifications to the machine only after consultation with the NOVEXX Solutions Customer Service department.
- Use only OEM spare parts.



WARNING!

Risk of shearing and crushing between product and machine!

- Prevent access to the machine during operation by installation of higher-level protective equipment ^a.

a) Movable, separating protective device in accordance with EN 953

INSTALLATION

Install the motor

If the wrap around conveyor was supplied without motor (option), a motor first has to be installed.

The motor must satisfy the following requirements:

- Torque: max. 2.0Nm
- Speed: max. 300rpm
- Shaft diameter ¹⁾: 8_{f7}
- Bores for flange according to drawing [7]

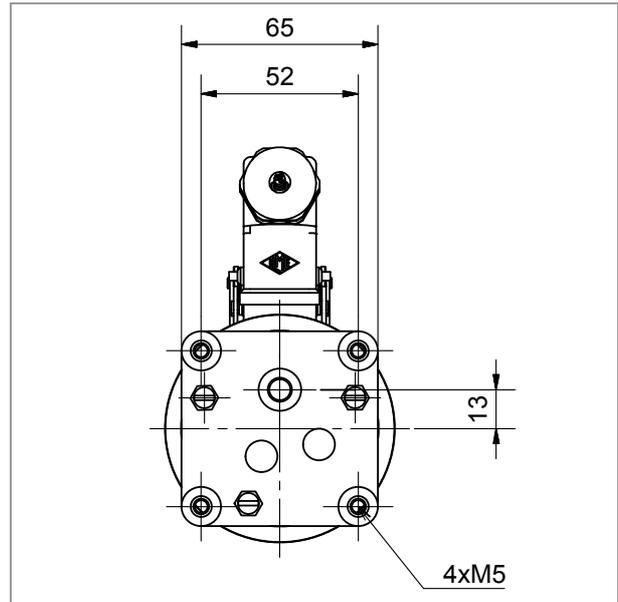
Tools

Allen key 2 / 3 / 4 mm

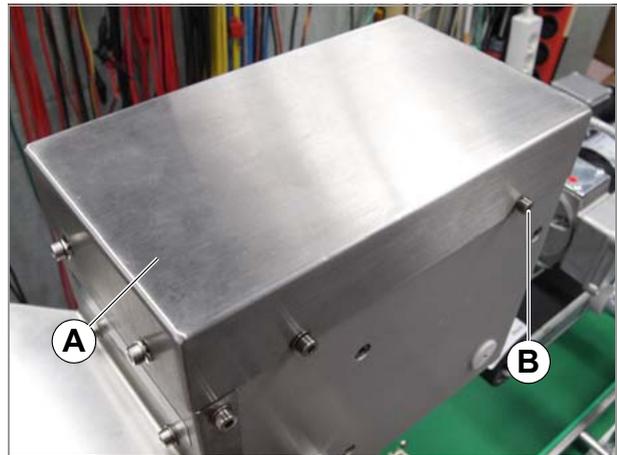
The following description assumes that the motor supplied ex works is to be installed. If a different motor is used, it is possible that parts of the description do not apply.

To perform

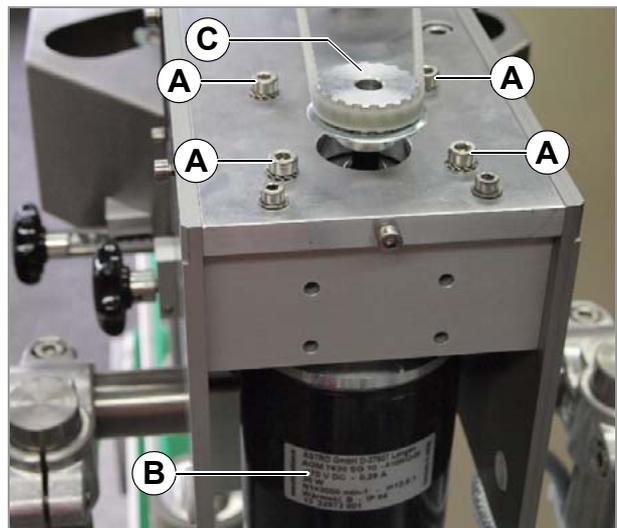
1. Remove the toothed belt cover [8A]. Loosen the 8 bolts [8B] around the edge of the cover and lift off the cover.
 - ▮ The bolts do not have to be screwed out completely.
2. Hold the motor against the carrier plate from below and bolt on from above (4 bolts [9A]).
 - ▮ Pay attention to the eccentric position of the motor shaft.
 - ▮ Lock the bolts with serrated lock washers.
3. Push tooth wheel [9C] onto the motor shaft, align and secure with two grub screws.
 - ▮ The collar of the tooth wheel is facing towards the motor.
 - ▮ Adjust the distance between tooth wheel and carrier plate at the second tooth wheel.
4. Loosen the mounting bolts of the motor again.
5. Fit the toothed belt over both tooth wheels.
6. Push the motor to the side to tension the toothed belt, tightening the bolts [9A] at the same time.
7. Install the toothed belt cover again.
 - ▮ Ensure that the washers are on the outside of the cover.



[7] Dimensions of the motor flange.



[8] Toothed belt cover (A) of the AU.



[9] AU with installed motor (B).

1) If the tooth wheel supplied is to be used.

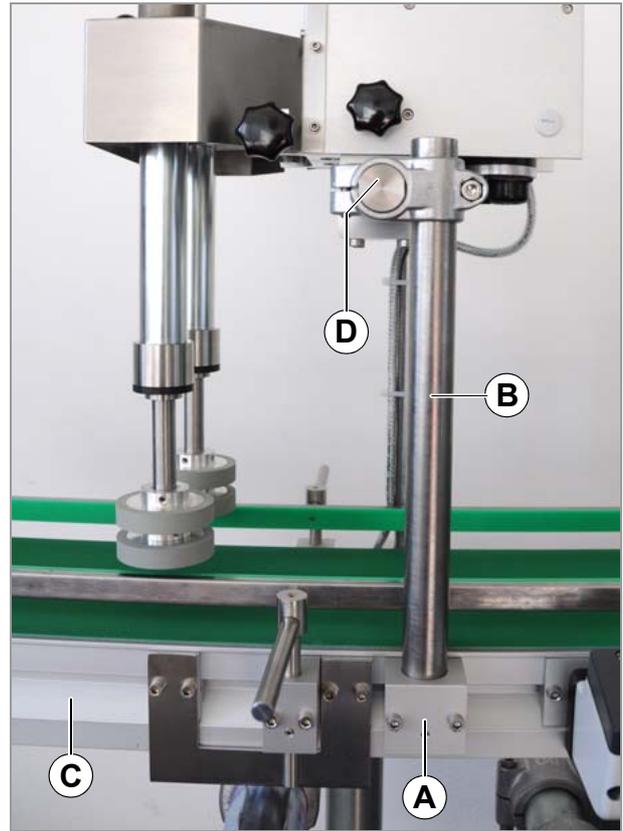
Installing AU

The alignment unit is normally installed using system components from Novexx Solutions. The alignment unit is installed on a belt conveyor unit.

Use only system components from Novexx Solutions for installation, as these are optimised for sturdy installation and optimum alignment.

Pay attention during alignment that the alignment unit is installed perpendicularly to the belt conveyor unit. If it is not aligned perpendicularly, the product will be lifted off the belt conveyor or pressed onto the belt conveyor.

Alignment is performed with the two clamps on the mounting pillars.



[10] Installation position of the alignment unit

- A Holder (accessory).
- B Mounting pillars.
- C Novexx Solutions belt conveyor (accessory).
- D Clamp for vertical alignment.

Electrical connection

The electrical connection is made to a switch cabinet provided by the operating company. Novexx Solutions offers switch cabinets for control of up to three belts at the same time (AMC Series). It must be possible to synchronise the speed of belt conveyor and alignment unit.

The electrical connection of the drive motor is made on the motor side using a special connecting plug.

i An electronic motor controller ¹ together with electric switches, emergency stop switches, fuses and interference suppression filters is required for operation of the wrap around conveyor.

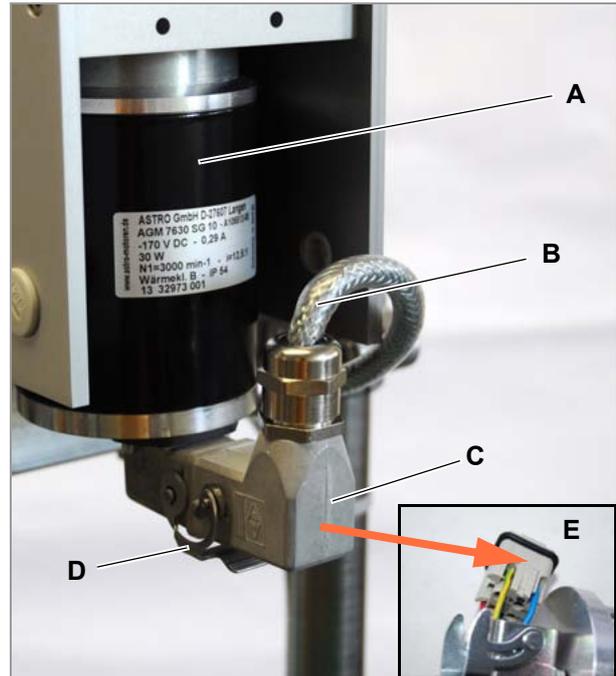
Pin assignment

The plug must be connected to the power cable according to the following diagram:

- Pin 1 = Plus pole (red)
- Pin 2 = not occupied
- Pin 3 = Minus pole (blue)
- Pin 4 = PE (yellow-green)

Securing the plug

Secure the inserted connecting plug using the safety bracket [11D].



[11] Electrical connection of the alignment unit

- A Drive motor.
- B Power cable.
- C Connecting plug.
- D Safety bracket.
- E Connection of the plug (see below).

1) Recommended: Lenze 532; The motor controller must be able to switch off the motor in the event of a fault.

SETTINGS

Set opening distance

The opening distance between the friction rollers is set by adjusting the opening angle [12] of the two mounting arms for the roller holders.

The opening distance has to be determined individually for each different product. The products must pass reliably between the rollers and be aligned straight. The setting scale [13B] aids reproducibility of the distance at product changes.

1. Adjust the opening distance with setting screw [13A] until the product is aligned as required.
2. Note the value on the scale [13B] for reproducibility of the setting.

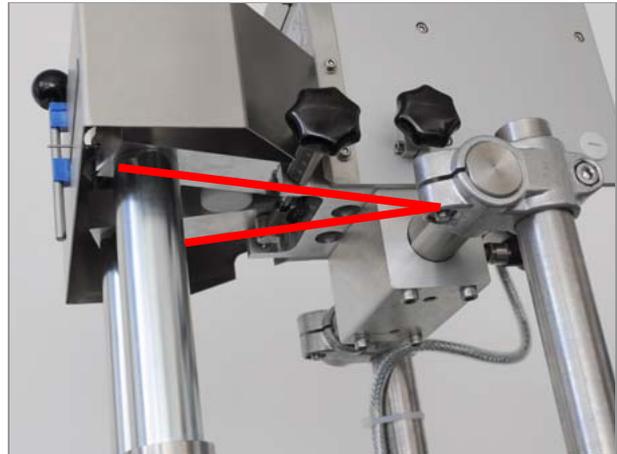
Notes on setting

Place the new product into the alignment unit so that the centerlines of the friction rollers and of the product are in a line [14A].

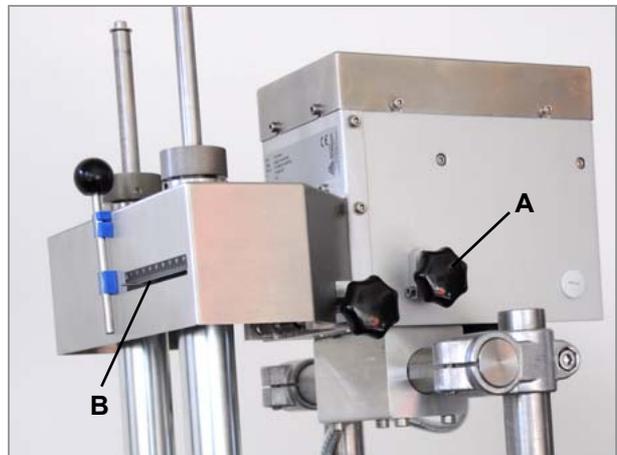
Adjust the opening distance using the setting screw [13A] so that the friction rollers are just touching the product.

Read off the value from the scale [13B] and subtract 5 units from this value. Then set this value on the scale. For products that are more round than elliptical, subtract 7.5 units.

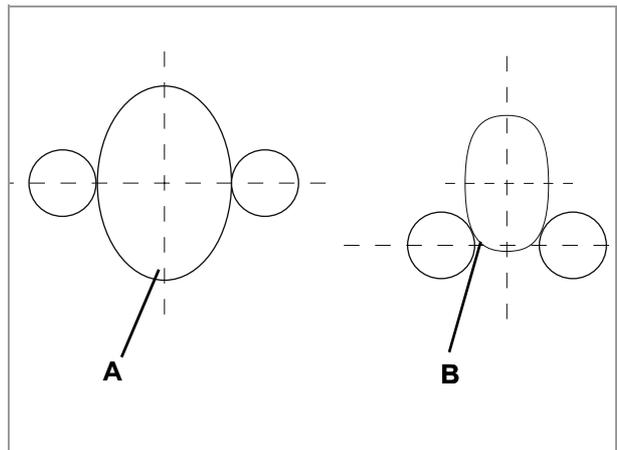
For products with curved side surfaces, the friction rollers must be set so that the rollers contact only the side surfaces [14B].



[12] Opening angle



[13] Scale and opening distance setting screw.



[14] Different product geometries.

Setting the spring force

When the opening distance has been set, the spring force has to be set.

The contact pressure of the friction rollers on the product is set by adjusting the spring force.

The spring force has to be determined individually for each different product. The products must pass reliably between the rollers and be aligned straight. The setting scale [16A] aids reproducibility of the spring force at product changes.

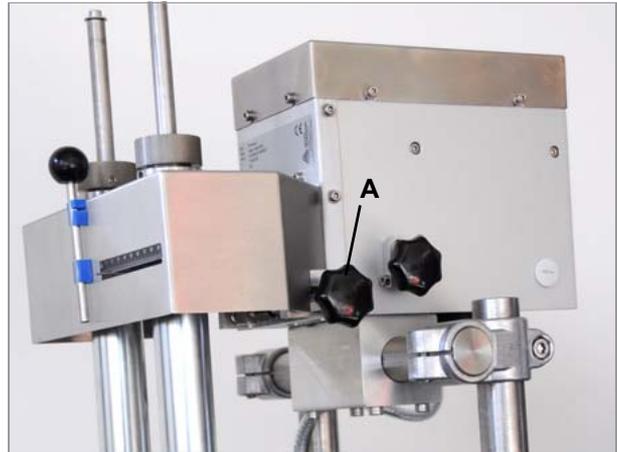
1. Adjust the spring force using setting screw [15A].
2. Note the value on the scale [16A] for reproducibility of the setting.

Notes on setting

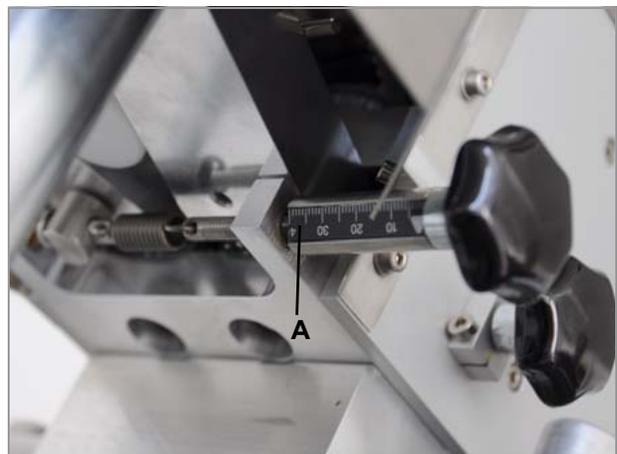
Place the product between the friction rollers and turn the setting screw until the spring force is just effective, then note the scale value [16A].

For hard and rigid plastics, add 15 units to this value; for soft and easily deformable plastics, add 9 units.

Set the calculated value on the scale.



[15] Spring force setting screw



[16] Spring force scale.

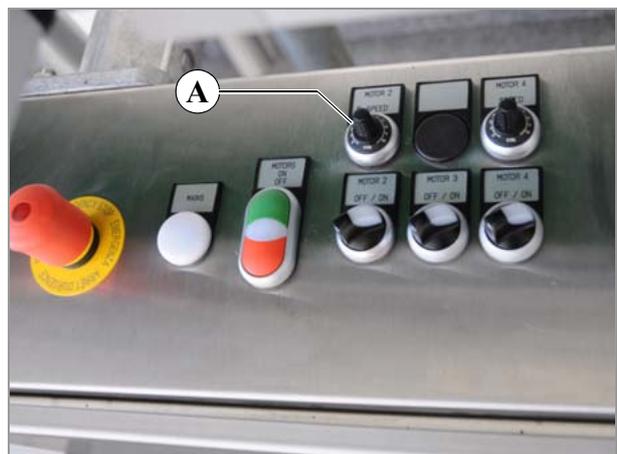
Setting the speed

The control element for setting the speed of the friction rollers is installed by the operating company.

The speed is normally set using a potentiometer that is installed on the switch cabinet of the motor controller [17A].

→ Set the speed so that the circumferential speed of the friction rollers corresponds to the transport speed of the belt conveyor unit.

▮▮▮ Measurement of the speed, e.g. using a friction roller rev counter.



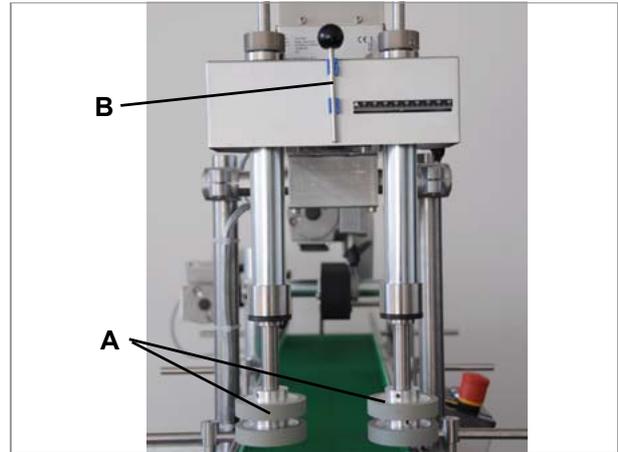
[17] Potentiometer (A) on the switch cabinet of the motor controller (example: NOVEXX Solutions, AMC Series).

Height adjustment of the friction rollers

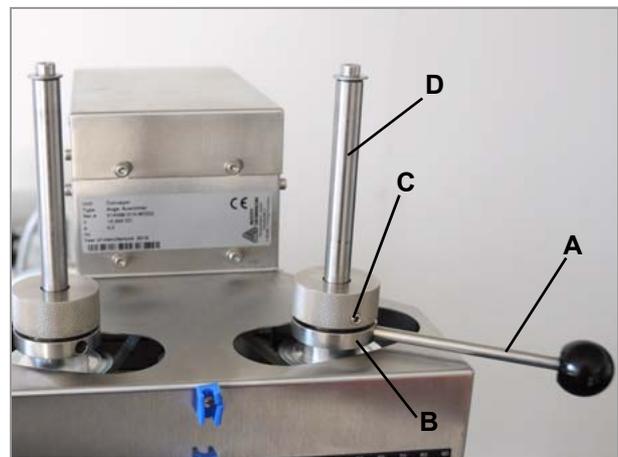
The height of the friction rollers [18A] has to be determined and set individually for each different product. The products must pass reliably between the rollers.

Use auxiliary lever [18B] for the height adjustment.

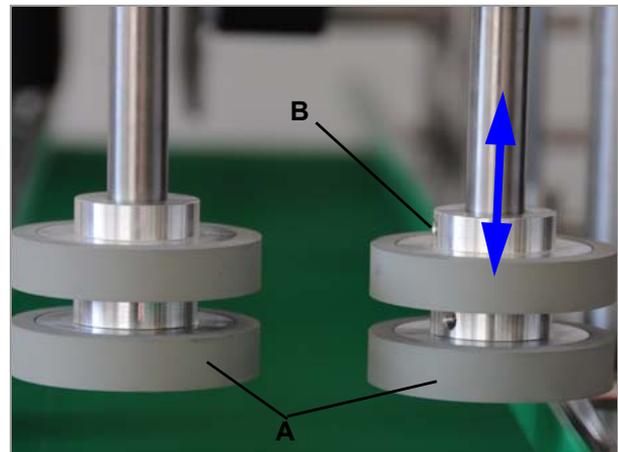
1. Insert auxiliary lever [19A] into the bore of the disc under knurled nut [19B].
2. Loosen clamping screw [19C] in the knurled nut and loosen the knurled nut.
3. Hold auxiliary lever [19A] firmly and turn friction roller shaft [19D] to the desired height.
4. Tighten the knurled nut and lock it again with the clamping screw.
5. Adjust the second friction roller shaft in the same way. The two lower friction rollers [20A] must be at the same height.
6. To adjust the two upper friction rollers, loosen the clamping screws [20B] and move the friction rollers on the shaft. Then tighten the clamping screws again.



[18] Friction rollers and auxiliary lever



[19] Setting with auxiliary lever.



[20] Adjust the friction rollers.

Cleaning

CLEANING INSTRUCTIONS

Safety



WARNING!

Dangerous situations may arise during maintenance and cleaning work. Accidents may occur due to mechanical or electrical effects if the relevant safety instructions are not observed!

- Switch off the machine before starting cleaning or maintenance work!
- Never allow liquid to get into the machine!
- Do not spray the machine with spray bottles or sprays! Use a cloth wetted with cleaning agent!
- Repairs to the machine must only be made by trained service technicians!

Cleaning agent

CAUTION!

Strong cleaning agents may damage the wrap around conveyor.

- Do not use cleaning agents that could damage or destroy the wrap around conveyor.
- Do not use any scouring cleaning agents or any cleaning agents that could dissolve plastic.
- Do not use acid or alkaline solutions.

Part to be cleaned	Cleaning agent
Housing	Commercially available neutral cleaning agent
Belt	Cleaning solvent, alcohol, isopropyl alcohol

[Tab. 3] Recommended cleaning agents

Cleaning interval

→ Clean the machine regularly.

The frequency depends on the following factors:

- Operating conditions
- Daily operating duration

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