Assembly instructions

TB40 Conveyor

Read this manual prior to performing any task!

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Translation of the original assembly instructions
MA-100182, 1, en_US

Information about this manual

This manual contains important information for the proper use of the TB40 conveyor.

Personnel must have carefully read and understood this manual before starting any work. The basic prerequisite for safe working is compliance with all the safety and handling instructions in this manual.

This manual is an integral part of the conveyor and must be kept in the immediate vicinity of the conveyor and accessible at all times. If the conveyor is transferred to a third party, this manual must be included as well.

Illustrations in this manual are for basic understanding and may differ from the actual design.

Other applicable documents

- Spare parts list for the TB40
- Instructions for performing welding work

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- Improper use
- Use of untrained or inadequately trained personnel
- Maintenance work not carried out or carried out inadequately

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Customer service

Our customer service is available for technical information.

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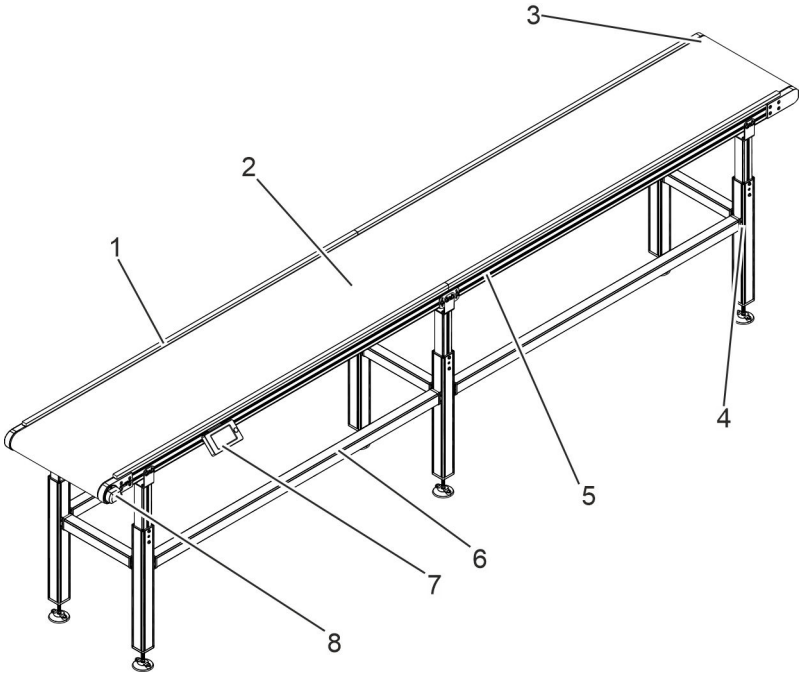

Fig. 1: Overview of the TB40

1 Fixed lateral guide, optional
2 Conveyor belt
3 End section with diverter roller Ø60, optionally with knife edge Ø16
4 Floor stand with adjustable feet, optional (also available with angled adjustable feet, swivel or fixed rollers)
5 Lateral profile
6 Traverse for floor stand
7 MonTouch control unit, optional
8 Drive unit

The TB40 conveyor is used for individual infeed and outfeed conveyors or for linking conveyor systems. The 24 V EC motor is integrated into the drive roller. The TB40 is operated via a programmable logic controller (PLC). The TB40 can optionally be operated via the MonTurn or MonTouch control unit and parameterized via the MonTouch parameterization unit.

1.1 List of essential health and safety requirements

according to Machinery Directive 2006/42/EC, Annex I, Chapter 1

A	For the scope of the partly completed machinery
B	To be fulfilled by the system integrator for the (complete) machine
C	Not relevant for this device

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2 Security

2.1 Symbols in this manual

Safety instructions

Safety instructions are identified by symbols in this manual. The safety instructions are introduced by signal words that express the extent of the hazard.

DANGER!
This combination of symbol and signal word indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

WARNING!
This combination of symbol and signal word indicates a potentially dangerous situation that can lead to death or serious injury if not avoided.

CAUTION!
This combination of symbol and signal word indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

NOTICE!
This combination of symbol and signal word indicates a potentially dangerous situation that can lead to material damage if it is not avoided.

ENVIRONMENT
This combination of symbol and signal word indicates possible hazards for the environment.

Tips and recommendations

This symbol highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

Further designations

The following designations are used in this manual to emphasize instructions, results, lists, references and other items:

Designation	Explanation
1., 2., 3. ...	Step-by-step instructions
⇨	Results of action steps
↳	References to sections of this manual and to other applicable documents
■	Listings without a fixed order
[Pushbutton]	Operating elements (e.g., pushbuttons, switches), indicators (e.g., indicator lamps)
“Display”	Screen elements(e.g., buttons, assignment of function keys)

2.2 Intended use

The TB40 conveyor is designed exclusively for the horizontal conveyance of solid bodies or bodies with fixed geometric shapes. The TB40 conveyor can be installed as an incomplete machine in a complete machine or retrofitted to become a complete stand-alone machine.

Foreseeable misuse

Intended use also includes compliance with all information in this manual.

Any use beyond the intended use or any other use is considered misuse.

The conveyor is not suitable for transporting people, bulk goods, sand, granulates, chips and the like. Under no circumstances may the product-specific power specifications listed on the rating plate be exceeded. The motor does not have a holding brake, making the belt unsuitable for inclined transport.

The following uses are considered misuse and must be avoided:

- Transportation of dangerous goods
- Accumulation mode with belts not designed for this purpose and with a thrust of > 150 N

  If the shear force is greater in accumulation mode despite the belts being designed for this and the permissible load, additional measures (guards) must be provided.
- Direct irradiation with light from UV lamps
- Operation in air that contains smoke, dust, water vapor, or solvents
- Use in potentially explosive areas (flammable gases, vapors or dust)
- Use in damp environments (rain or condensation)
- Exceeding the maximum permissible total weight
- Use beyond the specified limits

- Connection and commissioning or maintenance work by unqualified personnel
- Replacement of defective components with unsuitable components
- Use without training
- Use with defective parts or components
- Use with dismantled or deactivated safety devices and covers
- Use in disregard of the safety regulations
- Use without the use of personal protective equipment
- Use in disregard of local accident prevention regulations and industrial safety regulations

2.3 Responsibility of the operator

Operator

The operator is the person who operates the TB40 conveyor for commercial or economic purposes or who allows a third party to use it and who bears legal product responsibility for the protection of personnel or third parties during operation.

Operator's obligations

The TB40 conveyor is used in the commercial sector. The conveyor operator is therefore subject to the legal obligations concerning safety at work.

In addition to the safety instructions in this manual, the safety, occupational health and safety and environmental protection regulations applicable to the area of use of the conveyor must be observed.

The following applies in particular:

- The operator must ensure that the conveyor is only used by authorized and trained persons.
- The operator must ensure that the entire system is only accessible to trained persons.
- The operator must ensure that all persons handling the conveyor are aware of the safety regulations and residual risks.
- The operator must ensure that all access areas to safety devices, the loading point, workstations, passages and maintenance and inspection points are free of obstacles.
- The operator must ensure that the conveyor is loaded evenly and that overloading is avoided.
- The operator must provide the personnel with the required protective equipment and issue binding instructions on wearing the required equipment.
- The operator must ensure that the conveyor's installation site is adequately illuminated.
- The operator must prepare a risk assessment and take appropriate protective measures.
- The operator must install sufficient line protection for the electrical supply line.

- Changes to the design or configuration of the conveyor can lead to new hazards and higher risks that are not sufficiently mitigated by the manufacturer's risk reduction.
- The operator must keep the continuous conveyor in proper condition and maintain it in accordance with the manufacturer's instructions.

2.4 Personnel requirements

Risk of injury if staff are insufficiently qualified

WARNING!

Risk of injury if personnel are insufficiently qualified!

If unqualified personnel carry out work on the conveyor or remain in the danger zone of the conveyor, hazards arise that could cause serious injuries and considerable material damage.

– All work may only be carried out by qualified personnel.
– Keep unqualified personnel away from the danger zones.

List of personnel qualifications

This manual specifies the qualifications of the personnel listed below for the various fields of activity:

Operator
Operators are obliged to read the instructions and observe the information given and must have received all the necessary information through training.

Qualified electrician
Due to their specialist training, knowledge and experience as well as knowledge of the relevant standards and regulations, qualified electricians are able to carry out work on electrical systems and independently recognize and avoid potential hazards.

Specialist staff
Due to their specialized training, knowledge and experience as well as knowledge of the relevant standards and regulations, specialist staff are able to carry out the work assigned to them and to independently recognize possible dangers and avoid hazards.

2.5 Personal protective equipment

Personal protective equipment is used to protect people from health and safety hazards at work.

Personnel must wear personal protective equipment during the various tasks on and with the conveyor, which is referred to separately in the individual sections of this manual.

Description of personal protective equipment

Personal protective equipment is explained below:

Protective clothing
Protective clothing is close-fitting work clothing with low tear resistance, tight sleeves and no protruding parts.

Protective cover
The protective cover protects the hair from being pulled in by rotating and moving parts.

This must be worn when working on a moving conveyor.

Protective gloves
Protective gloves are used to protect the hands from friction, abrasions, punctures or deeper injuries and from touching hot surfaces.

Safety shoes
Safety shoes protect feet from crushing, falling parts and slipping on slippery surfaces.

2.6 Working and danger areas

Working areas

The manufacturer of the complete machine must define the working and traffic area according to the area of application of the complete machine.

Danger areas

- below and inside the conveyor
- in the area of the diverter and drive rollers

2.7 Safety markings

WARNING!

Risk of injury due to illegible signage!

Over time, stickers and signs can become dirty or otherwise unrecognizable, so that hazards cannot be identified and necessary operating instructions cannot be followed. This poses a risk of injury.

– Keep all safety, warning and operating instructions in a legible condition at all times.
– Replace damaged signs or stickers immediately.

2.8 Residual risks

2.8.1 General hazards in the workplace

Missing fire extinguisher

WARNING!

Hazards if a fire extinguisher is not readily available!

If there is no fire extinguisher ready for use, it will not be possible to respond appropriately to a fire. This can result in serious personal injury and considerable damage to property.

– Use fire extinguishers with suitable extinguishing powder (ABC).
– Have fire extinguishers checked regularly by an authorized agency.
– Train all operators in the use of the fire extinguisher.

Illegible labeling

WARNING!

Risk of injury due to illegible signage!

Over time, stickers and signs can become dirty or otherwise unrecognizable, so that hazards cannot be identified and necessary operating instructions cannot be followed. This poses a risk of injury.

– Keep all safety, warning and operating instructions in a legible condition at all times.
– Replace damaged signs or stickers immediately.

2.8.2 Electrical hazards

NOTICE!

Contact of water with live components!

When cleaning the conveyor, damage may occur if water comes into contact with live parts or enters electrical and electronic components.

– Proceed with caution during cleaning and ensure that no water comes into contact with live parts or splashes into electrical and electronic components or components that must not be exposed to water for safety reasons.
– Clean the relevant areas with a damp cloth only; do not use a high-pressure or steam cleaner.
– Train staff regularly.

2.8.3 Mechanical hazards

Suspended loads

DANGER!

Danger to life from suspended loads!

During lifting operations, loads can swing out and fall. This can cause serious injuries or even death.

– Do not stand under suspended loads or within their swivel range.
– Only use approved and sufficiently dimensioned lifting gear and slings.

Moving components

WARNING!

Risk of injury during all work on the conveyor when it is switched on!

When working on a conveyor that is in operation, there is a risk of injury due to the movement of components, stored energy, and contact with live parts.

– Switch off the conveyor and secure it against being switched on again. The operator must establish a lockout/tagout procedure that reduces or isolates hazardous energy and secures the machine against unintentional restarting.
– Before restarting, ensure that all protective devices are fitted and functional.

WARNING!

Risk of crushing between belt cleats and lateral guide!

Limbs can be crushed between the belt cleats and the lateral guide when the conveyor is running.

– Do not handle the end section while the conveyor is running.
– Work on the conveyor may only be carried out by trained, qualified operators.

WARNING!

Risk of injury when adjusting the conveyor belt while the conveyor is running!

There is a risk of injury from impact, crushing, shearing and drawing in when working on a moving conveyor.

– Work should only be carried out by qualified personnel.
– Take particular care when working near moving parts.
– Wear personal protective equipment.

Incorrect assembly

WARNING!

Risk of injury due to incorrect installation of the conveyor!

Incorrectly mounted parts can cause the structure to break and parts of the conveyor to fall and cause serious injury.

– Fasten all existing screw connections.
– Establish the correct tightening torques.

Tilting the conveyor

WARNING!

Risk of injury due to the conveyor tipping over!

If the conveyor is not attached properly, it may tip over, resulting in injuries due to impact and crushing.

– Align the conveyor on the ground and anchor if necessary.
– Observe the requirements for the installation site.

Sharp corners and edges

CAUTION!

Risk of injury from sharp corners or edges!

Sharp corners or edges may be exposed throughout the machine area during certain activities, which can cause injuries such as cuts, abrasions, or punctures.

– Wear the prescribed personal protective equipment for all work.

2.9 Safety devices

The manufacturer of the complete machine must integrate the conveyor into the safety concept of the complete machine.

The safety concept must recognize the possible causes of faults and automatically brings the machine to a safe standstill.

In the event of a fault, the machine can only be restarted after the fault has been rectified and manually acknowledged. The machine may only be restarted by manually selecting the start/restart function.

Emergency stop device

The manufacturer of the complete machine must fit the emergency stop device depending on the area of application and ensure that the conveyor can be stopped at any point in the event of danger, even on longer versions.

When the emergency stop device is actuated, the dangerous movement or action must be stopped with stop category 0. After triggering this safety function, a manual acknowledgement is required. In the event of a fault, the machine can only be restarted after the fault has been rectified and manually acknowledged. The system can then only be restarted by manual selection.

The emergency stop device must be tested regularly.

The emergency stop device may not be used for normal stopping.

Disconnector

A disconnector must be retrofitted by the manufacturer of the complete machine.

Main switch

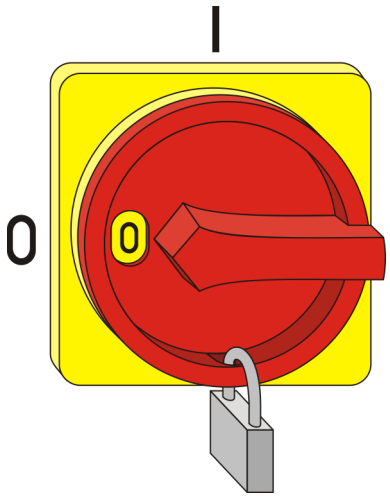


Fig. 2: Main switch

The manufacturer of the complete machine must have a lockable main switch installed by a qualified electrician as a suitable mains isolating device for complete energy isolation of all active conductors.

Turning the main switch to the "0" position switches off the power supply immediately.

The main switch can be padlocked in the "0" position to prevent it from being switched on again so that work on the system can be carried out safely (↳ *Chapter 2.11 “Securing against restarting” on page 23*).

MonTurn start/stop device

Start/stop is activated by a 3-position, latching rotary switch wired into the hardware. If the direction of rotation is left, the start is clockwise (CW). If the direction of rotation is clockwise, the start is counterclockwise (CCW). Stopping occurs in the center position.

MonTouch start/stop device

Starting and stopping are carried out via the graphic touch display, which switches the digital and analog outputs of the MonTouch.

Temperature monitoring

The conveyor is equipped with temperature monitoring (hysteresis: 10 K). The temperature cut-off point is 120 °C. If this temperature is exceeded, the conveyor signals a fault and is de-energized. Once the fault has been rectified and the temperature has cooled down, the fault must be acknowledged.

2.10 Emergency shutdown

The conveyor is not safe when shut down. Stored energy can be released unintentionally or through improper energy separation and dissipation.

Fig. 3: Emergency stop device

The manufacturer of the complete machine must install the emergency stop device depending on the area of application.

When the emergency stop device is activated, the conveyor stops immediately. The emergency stop device must be acknowledged before it can be switched on again. Before switching on again, the cause of the fault must be found and rectified.

2.11 Securing against restarting

WARNING!

Risk of injury during all work on the conveyor when it is switched on!

When working on a conveyor that is in operation, there is a risk of injury due to the movement of components, stored energy, and contact with live parts.

– Switch off the conveyor and secure it against being switched on again. The operator must establish a lockout/tagout procedure that reduces or isolates hazardous energy and secures the machine against unintentional restarting.
– Before restarting, ensure that all protective devices are fitted and functional.

2.12 What to do in the event of an accident

Preventive measures

- Always be prepared for accidents and fire.
- Keep first aid equipment (first aid kit, blankets, etc.) and fire extinguishers in working order and within easy reach.
- Familiarize staff with accident reporting, first aid and rescue facilities.
- Keep access routes clear for emergency vehicles.

Measures in the event of an accident

- Trigger an emergency stop immediately using the emergency stop device.
- Rescue people from the danger zone.
- Initiate first aid measures.
- Alert the emergency services.
- Inform those responsible at the place of use.
- Clear access routes for emergency vehicles.

2.13 Environmental protection

ENVIRONMENT

Danger to the environment due to incorrect handling of environmentally hazardous substances!

Incorrect handling of environmentally hazardous substances, especially incorrect disposal, can cause considerable damage to the environment.

– Always observe the instructions below for handling and disposing of environmentally hazardous substances.
– If environmentally hazardous substances are accidentally released into the environment, take appropriate measures immediately. If in doubt, notify the relevant local authority about the damage and ask what measures should be taken.

The following environmentally hazardous substances are used:

Cleaning fluids

Solvent-based cleaning agents contain toxic substances. They must not be released into the environment. Disposal must be carried out by a specialist disposal company.

3 Structure and function

3.1 Assemblies

3.1.1 Drive unit

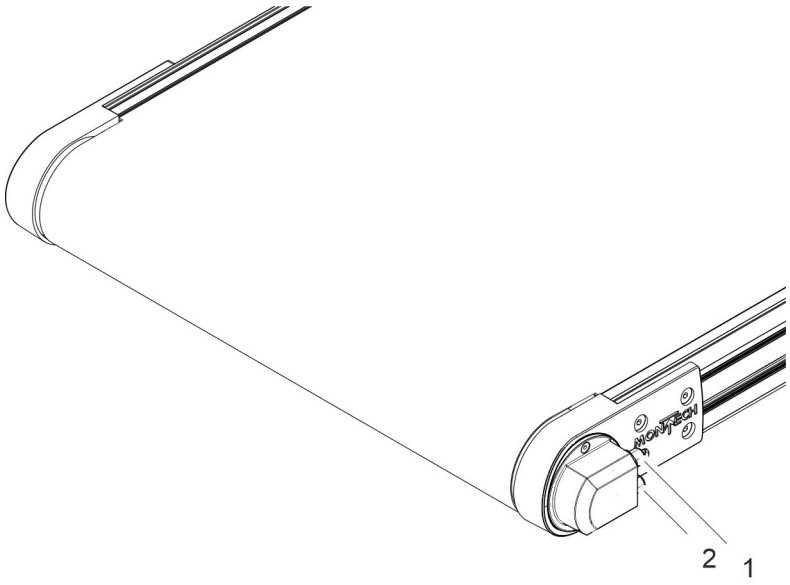


Fig. 4: Drive unit, right-hand version

1 Signal cable connection
2 Power cable connection

Drive unit, left-hand version
In the left-hand version, the signal cable is located at the bottom (Fig. 4/1) and the power cable at the top (Fig. 4/2).

Differentiation between power and signal cables
The signal cable (Fig. 4/1) has 12 pins.

The power cable (Fig. 4/2) has 4 pins.

The conveyor is connected to the power supply via the drive unit and optionally to a control unit.

A 24 V motor is integrated into the drive roller, which drives the conveyor belt.

The drive unit is available in a right-hand and a left-hand version.

3.1.2 Belt infeed

The belt infeed is located opposite the drive unit.

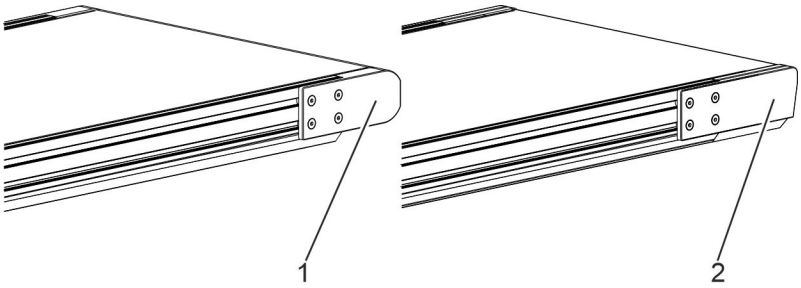


Fig. 5: Belt infeed

The belt infeed is available in two versions:

- Diverter roller Ø60 mm (Fig. 5/1)
- Knife edge Ø16 mm (Fig. 5/2)

Knife edges reduce the gap between two conveyors. Knife edges are particularly suitable for transferring small products.

3.1.3 Conveyor belt

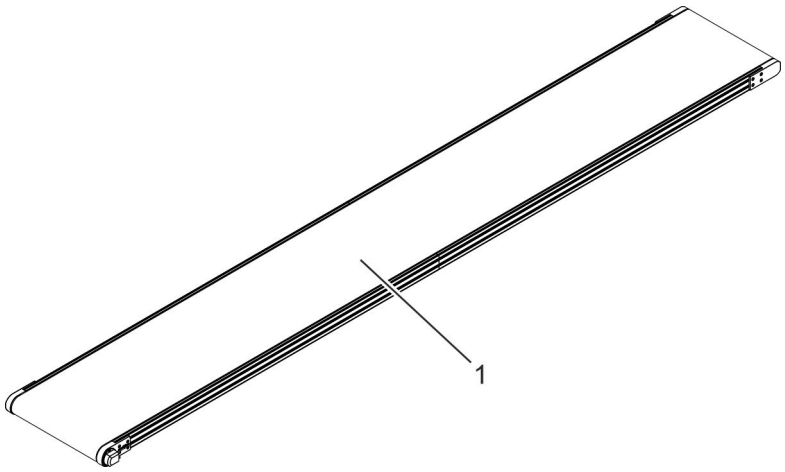


Fig. 6: Conveyor belt

The conveyor belt (Fig. 6/1) is driven by the drive roller with integrated motor and transports the products along the conveyor.

The conveyor belt (Fig. 6/1) is optionally available with cleats. Cleats are available in different versions.

The choice of belt type depends on the area of application.

3.1.4 Substructure

Floor stand

Floor stands are available in two versions for the conveyor:

- fixed
- height-adjustable

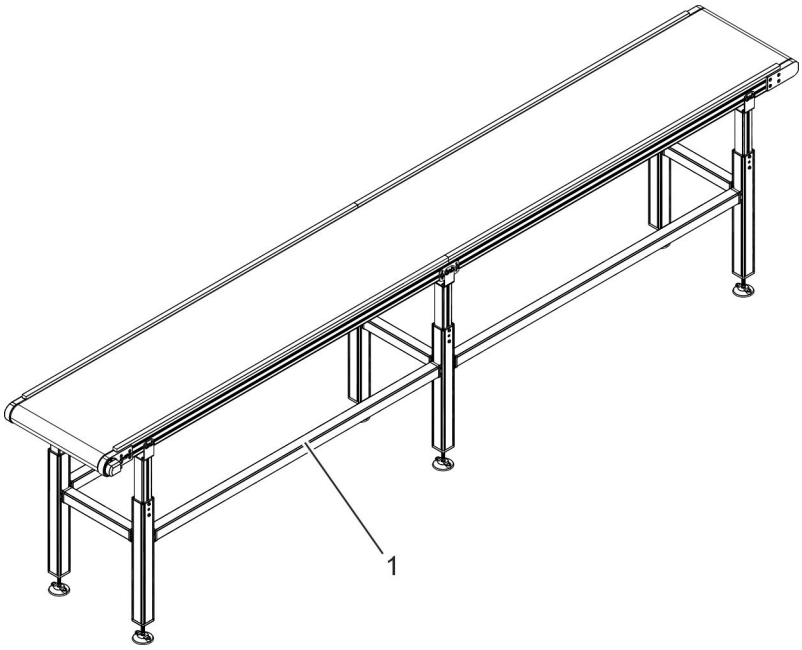


Fig. 7: Height-adjustable floor stand with double traverse

To additionally reinforce the floor stands, the floor stands must be connected to traverses (Fig. 7/1).

Traverses are available in two versions:

- Single traverses
- Double traverses

> ***Design of the traverses***
> *The double traverse is used for floor stands with swivel/fixed rollers, for start/stop operation and for stopping heavy loads.*

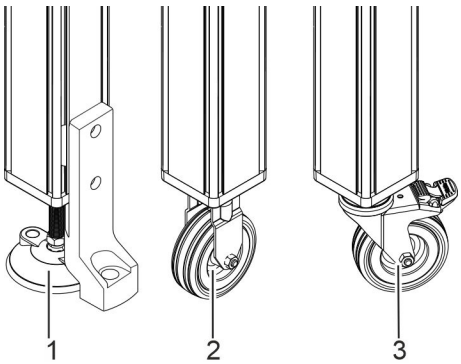


Fig. 8: Adjustable feet and rollers

1 Adjustable foot (with angled adjustable foot as accessory)
2 Fixed roller
3 Swivel castor with locking device

If the conveyor is to have a fixed location, the floor stand can be anchored to the floor using adjustable feet with angled adjustable feet and segment anchors.

If the conveyor is to be used for mobile applications, swivel castors with locking device or fixed rollers can be selected for the floor stand.

Mounting bracket

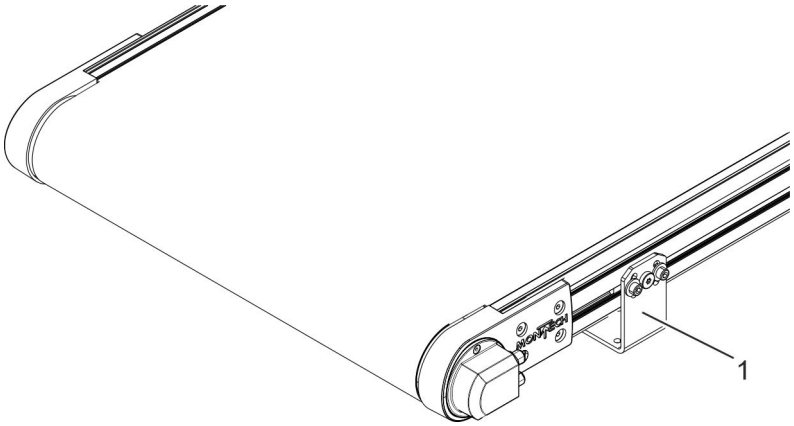


Fig. 9: Mounting bracket

For use with tabletop installations, mounting brackets (Fig. 9/1) are available as accessories for the conveyor.

The mounting brackets are available in various versions.

3.1.5 Lateral guide

The optional lateral guide ensures that the conveyed goods are guided and prevents them from falling over the side of the conveyor.

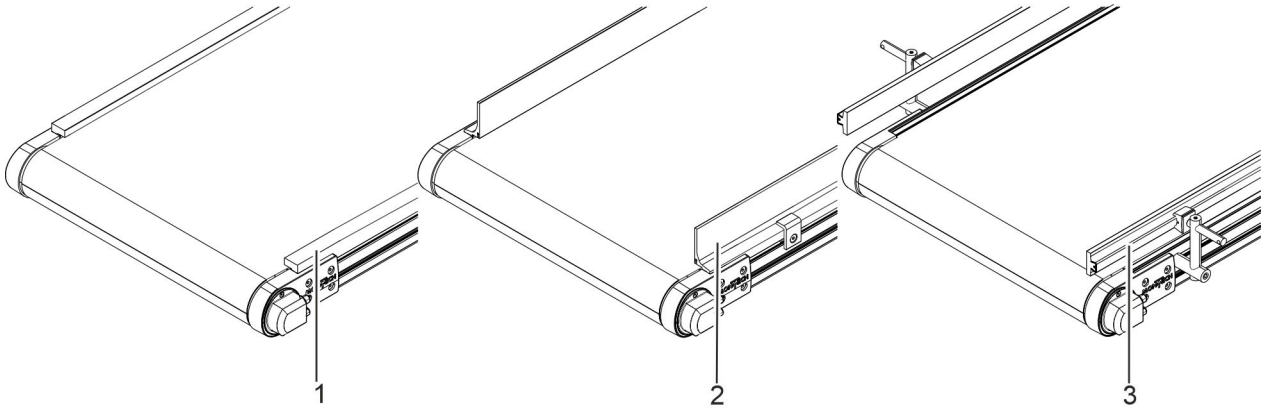


Fig. 10: Lateral guides

The lateral guide is available in the following versions:

- Fixed lateral guide (Fig. 10/1)
- Aluminum lateral guide with or without strip brush (Fig. 10/2)
- Adjustable lateral guide type A: antistatic or non-antistatic
- Adjustable lateral guide type B: antistatic or non-antistatic
- Adjustable lateral guide type C: antistatic or non-antistatic (Fig. 10/3)

The adjustable lateral guides can be adjusted horizontally and vertically. This allows adjustment for the desired conveyor width and the height at which the product is to be guided.

3.1.6 Conveyor control

About the PLC

The conveyor is supplied with "PLC speed mode" as standard. In this operating mode, the conveyor is operated via digital and analog inputs on the motor using a PLC. Either the three stored speeds can be controlled or an analog speed setpoint can be specified.

MonTurn control unit

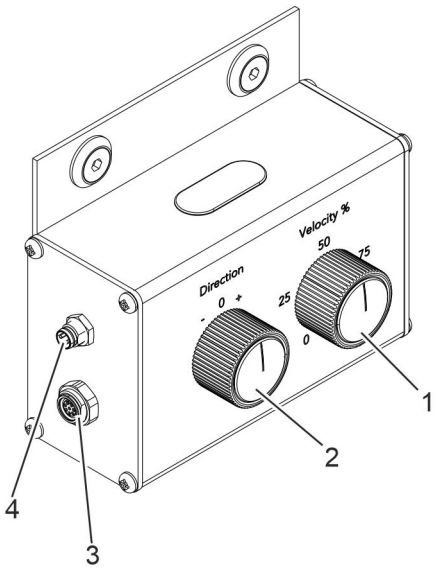


Fig. 11: MonTurn control unit

1 Rotary potentiometer for conveyor speed
2 Rotary switch for start/stop/conveying direction
3 Signal cable connection
4 Power supply cable connection

The MonTurn control unit can be used to trigger the start/stop in the corresponding conveying direction and to adjust the belt speed continuously from 0–100%. The conveyor does not require additional controls.

MonTouch control unit

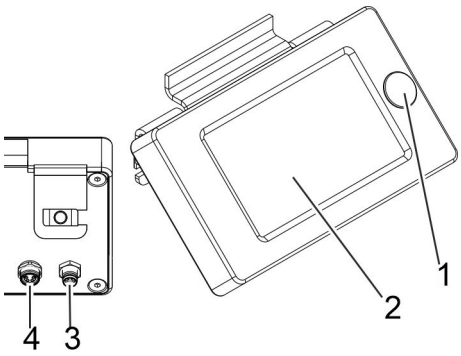


Fig. 12: MonTouch control unit

1 *“QUICK STOP”* button
2 Display
3 Supply cable connection (power supply for electronics)
4 Signal cable connection

The MonTouch control unit enables the conveyor to be operated via an HMI. In addition, the motor parameters and thus the behavior of the conveyor can be freely adjusted.

The MonTouch control unit has a red STOP button (Fig. 12/1). This is used to stop the conveyor, e.g., when the screen is not active.

The conveyor stops as soon as the button is pressed. A message appears on the display indicating that Quick Stop mode is activated. When the button is pressed again, Quick Stop mode is deactivated and the conveyor starts up again. The display shows the home screen again.

This button does not replace an emergency-off switch.

3.2 Operating modes

PLC speed mode (default setting)

In PLC speed mode, a PLC is used to operate the conveyor via digital and analog inputs on the motor. Either the three stored speeds can be controlled or an analog speed setpoint can be specified.

The following functions can be performed:

- Start/stop
- Conveying direction CW/CCW
- Execution of the analog speed setpoint
- Execution of three stored fixed speeds
- Stopping the conveyor with a defined overrun distance

PLC position mode (positioning mode)

In PLC position mode, a PLC is used to operate the conveyor via digital and analog inputs on the motor. The analog setpoint specifies the speed for the conveyor operation. In positioning mode, a defined distance is traveled. When a pulse is given, the distance is traveled once.

The following functions can be performed:

- Start/stop
- Conveying direction CW/CCW
- Execution of the analog speed setpoint
- Execution of a defined route

MonTurn manual operation with the MonTurn control panel

The following functions can be performed:

- Start in positive conveying direction, start in negative conveying direction, and stop via a 3-step rotary switch.
- Stepless speed adjustment via rotary potentiometer

MonTouch Speed mode with the MonTouch control panel

The set values for speeds v1, v2 and v3, acceleration, and deceleration can be specified via the MonTouch control panel.

The following functions can be performed:

- Start/stop in positive conveying direction with conveying speed v1, v2 or v3
- Start/stop in negative conveying direction with conveying speed v1, v2 or v3

MonTouch position mode with the MonTouch control panel

The set values for travel distance, cycle time, travel speed and standstill time can be specified.

The following functions can be performed:

- Start/stop of a one-time movement sequence with a specified distance in positive or negative conveying direction.
- Start/stop of a repetitive motion sequence with a specified distance in positive or negative conveying direction.
- Start/stop of a repetitive motion sequence with a specified distance in reversing conveying direction.

3.3 Parameterization

MonTouch as a parameterization unit for the TB40 conveyor

The following parameters can be set:

- MonTouch mode parameterization
  - Total gear ratio
  - Restart behavior
- MonTurn mode parameterization
  - Total gear ratio
- PLC speed mode parameterization
  - Total gear ratio
  - Fixed speeds v1, v2, v3
  - Restart behavior
  - Correction factor
  - Acceleration and deceleration ramps
  - Overrun distance, cw or ccw
  - Output messages for Out1, Out2, Out3
    - A track encoder
    - B track encoder
    - Speed alert threshold
    - Current alert threshold
    - Message window in position
    - Temperature alert threshold
- PLC position mode parameterization
  - Total gear ratio
  - Travel distance per pulse
  - Belt speed
  - Positioning window
  - Acceleration and deceleration ramps
  - Overrun distance, cw or ccw
  - Restart behavior
  - Correction factor
  - Output messages for Out1, Out2, Out3.
    - A track encoder
    - B track encoder
    - Speed alert threshold
    - Current alert threshold
    - Message window in position
    - Temperature alert threshold

4 Transport, packing and storage

4.1 Safety during transport

Suspended loads

DANGER!

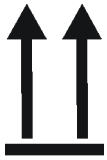
Danger to life from suspended loads!

During lifting operations, loads can swing out and fall. This can cause serious injuries or even death.

– Do not stand under suspended loads or within their swivel range.
– Only use approved and sufficiently dimensioned lifting gear and slings.

4.2 Symbols on the packaging

Above



The arrowheads of the symbol indicate the top of the package. They must always face upwards; otherwise, the contents could be damaged.

Protection from moisture

Protect packages from moisture and keep them dry.

Weight, attached load

Indicates the weight of packages.

Handle the marked package according to its weight.

Focus

Indicates the center of gravity of packages.

Observe the center of gravity when lifting and transporting.

4.3 Carrying out a transport inspection

Personnel:
- Specialist staff

Protective equipment:
- Protective clothing
- Protective gloves
- Safety shoes

1. Check the delivery for completeness and transport damage immediately upon receipt.
2. Proceed as follows in the event of externally visible transport damage:
   - Do not accept delivery or only accept it under reserve.
   - Note the extent of the damage on the transport documents or on the carrier's delivery bill.
   - Initiate a complaint *“Customer service” on page 3*.

Report every defect as soon as it is detected. Claims for damages can only be asserted within the applicable complaint periods.

4.4 Transport

Before installation in the complete machine, the conveyor may only be transported in the original packaging specified by the manufacturer.

Due to their size (up to 6 m), parts of the conveyor cannot be transported by hand.

The conveyor can be transported with the following delivery variants:

- The conveyor is fully assembled. The substructure is dismantled.
- The conveyor is detached at the separation point. The substructure is dismantled.
- The conveyor and the substructure are transported fully assembled.

Transporting pallets with a forklift truck

Protective equipment:
- Protective clothing
- Protective gloves
- Safety shoes

Transport items that are delivered on pallets may be transported with a forklift truck under the following conditions:

- The transport item must be securely fastened to the pallet.
- The transport item must be in its original packaging.
- The forklift driver must be authorized to drive industrial trucks with a driver's seat or driver's platform in accordance with locally applicable regulations.

1. Drive the forklift truck with the forks between or under the struts of the pallet.
2. Retract the forks so that they protrude on the opposite side.
3. Ensure that the pallet cannot tip when the center of gravity is off-center.
4. Lift the pallet with the transport piece and transport it to its destination.

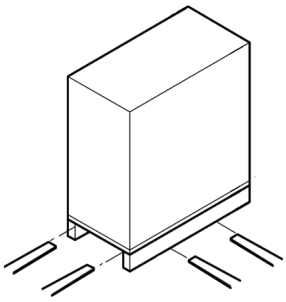


Fig. 13: Transporting pallets

4.5 Packaging

The individual items are packed according to the expected transportation conditions. Only environmentally friendly materials are used for the packaging.

The packaging should protect the individual components from transportation damage, corrosion and other damage until assembly. Therefore, do not destroy the packaging and only remove it shortly before installation.

Handling packaging materials

Dispose of packaging material in accordance with the applicable statutory provisions and local regulations.

ENVIRONMENT

Danger to the environment due to incorrect disposal!

Packaging materials are valuable raw materials and in many cases can be reused or sensibly processed and recycled. Incorrect disposal of packaging materials can pose a risk to the environment.

– Dispose of packaging materials in an environmentally friendly manner.
– Observe the locally applicable disposal regulations. If necessary, commission a specialist company with the disposal.

4.6 Storage

Storage conditions

Store packages under the following conditions:

- Do not store outdoors.
- Store in a dry and dust-free place.
- Do not expose to aggressive media.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: 5 to 40 °C
- Relative humidity: < 95%
- If stored for longer than three months, regularly check the general condition of all parts and the packaging.

5 Installation and initial commissioning

5.1 Safety during installation and commissioning

Incorrect assembly

WARNING!

Risk of injury due to incorrect installation of the conveyor!

Incorrectly mounted parts can cause the structure to break and parts of the conveyor to fall and cause serious injury.

– Fasten all existing screw connections.
– Establish the correct tightening torques.

Tilting the conveyor

WARNING!

Risk of injury due to the conveyor tipping over!

If the conveyor is not attached properly, it may tip over, resulting in injuries due to impact and crushing.

– Align the conveyor on the ground and anchor if necessary.
– Observe the requirements for the installation site.

Sharp corners and edges

CAUTION!

Risk of injury from sharp corners or edges!

Sharp corners or edges may be exposed throughout the machine area during certain activities, which can cause injuries such as cuts, abrasions, or punctures.

– Wear the prescribed personal protective equipment for all work.

5.2 Requirements for the installation site

The operator of the complete machine must define the clearances according to the application.

Access to the adjustment and maintenance area must be ensured.

The operator must ensure that the ground is sufficiently dimensioned to support the operating load on each support leg and that the support legs are anchored.

5.3 Required installation steps

The conveyor is supplied pre-assembled as far as possible. The conveyor belt is installed. Belt run and pre-load are adjusted. Different installation steps are required depending on the configuration:

- The substructure must be installed ↳ *Chapter 5.5 “Installing the substructure” on page 40*.
- Fixed lateral guides are installed.

  Adjustable lateral guides must be installed ↳ *Chapter 5.6 “Installing adjustable lateral guides” on page 45*.
- If the belt is longer than 3 m, there is a belt separation. The lateral profiles of the conveyor are each made in two parts and are connected using lateral profile connectors.

  In this case, the conveyor is completely assembled by the manufacturer. The conveyor belt is installed. Pre-load and belt run are adjusted.

  For transport, only the lateral profile connectors are loosened at the conveyor separation point. The pre-load and belt run adjustment remain the same. One half of the band is folded over and the two halves are placed on top of each other.

  The conveyor must be unfolded on site ↳ *Chapter 5.4 “Folding out the conveyor” on page 38*.
- The belt run must be checked and corrected if necessary ↳ *Chapter 7.3.1 “Correcting the belt run” on page 107*.

5.4 Folding out the conveyor

Personnel:	■ Specialist staff
Protective equipment:	■ Protective gloves
	■ Safety shoes

The conveyors are shipped in units of max. 3 m in length. If the total length of a conveyor exceeds the maximum transport length of 3 m, the conveyors are delivered in several parts.

Information on conveyor separation can be found in Appendix B.

Prerequisite:

- The conveyor is supplied disassembled.
  The conveyor belt is a separate delivery component.

The cable connection point must be at the top to prevent damage.

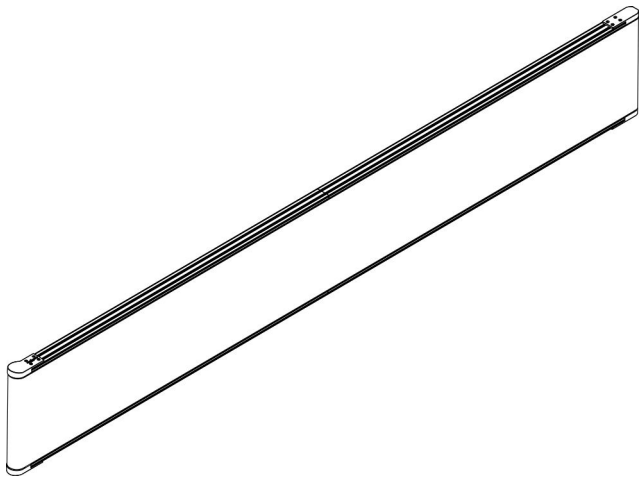


Fig. 14: Conveyor set up

1. Position the left and right conveyor halves on their sides. (Fig. 14)

   The connection point is aligned at a flat angle (<180°) to the other connection points.
2. Align the hinge point (edges of the two aluminum lateral profiles) on the gliding plate side.
3. Slide the conveyor belt over the entire sloping conveyor.
4. Align the belt in the center.
5. Align the two halves of the conveyor parallel to each other by pressing on the hinge point. This also tensions the conveyor belt.

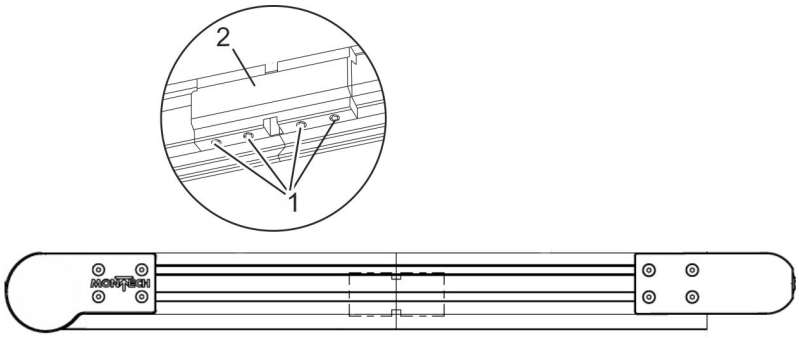


Fig. 15: Installing lateral profile connectors

6.

The connection point is only accessible from below.

Align the lateral profile connector (Fig. 15/2) on one side of the conveyor above the separation point.

7. Tighten the four screws (Fig. 15/1) of the connector.

Tightening torque: 6 Nm

8. Repeat steps 6 + 7 on the other side.

9. Adjust the belt run *Chapter 7.3.1 “Correcting the belt run” on page 107*.

5.5 Installing the substructure

5.5.1 Installing the floor stand

Delivery versions:

Version 1: Telescopic bar is pre-assembled with crossbar. Longitudinal traverses with parallel fasteners are included.

Version 2: Telescopic bar is pre-assembled. Parallel fasteners, longitudinal and transverse traverses are included.

The conveyor must be supported at the separation point from a length of 3 meters.

Information on conveyor separation can be found in Appendix B.

Personnel: ■ Specialist staff

Protective equipment: ■ Protective gloves
■ Safety shoes

Prerequisites:

■ Front adapters are mounted on the traverses.

Installing traverses (optional)

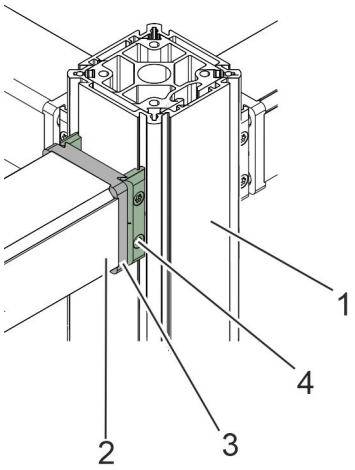


Fig. 16: Installing traverses

1 Telescopic bar
2 Traverse
3 Front adapter
4 Parallel fastener (consisting of two connector jaws and two screws)

1. parallel fastenerInsert the parallel fastener (Fig. 16/4) into the fastening groove of the telescopic bars (Fig. 16/1) and place at the desired height.
2. Insert the front adapter (Fig. 16/3) of the traverses (Fig. 16/2) between the connector jaws of the parallel fasteners (Fig. 16/4).
3. Slightly tighten the screws of the parallel fasteners (Fig. 16/4).
4. Repeat steps 1–3 for all traverses.
5. Align all connections uniformly. If necessary, loosen and move the parallel fasteners.
6. Tighten all screws of the parallel fasteners.

   Parallel fastener tightening torque: 6 Nm

5.5.2 Adjusting the height-adjustable floor stand

Adjust height-adjustable floor stands before installing the conveyor!

Personnel: ■ Specialist staff

Protective equipment: ■ Protective gloves
■ Safety shoes

1. If the conveyor is already installed: Secure the conveyor against falling.
2. Loosen the screws of the mounting brackets.

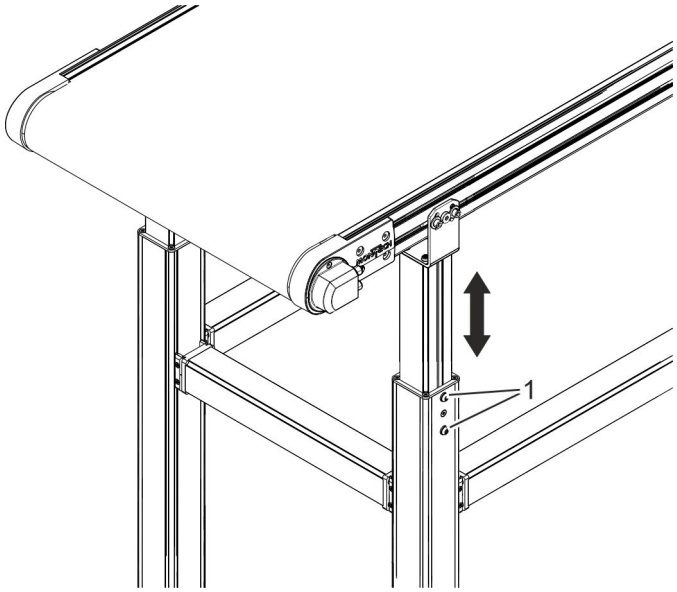


Fig. 17: Adjusting the floor stand

3. Slightly loosen the fillister head screws (Fig. 17/1).
4. Set the desired height of the conveyor.
5. Tighten the fillister head screws (Fig. 17/1) again.
   Tightening torque: 2 Nm
6. Tighten the screws of the mounting brackets.

5.5.3 Installing the mounting bracket

Personnel:
- Specialist staff

Protective equipment:
- Protective gloves
- Safety shoes

Prerequisite:

- The mounting brackets are mounted on a base.

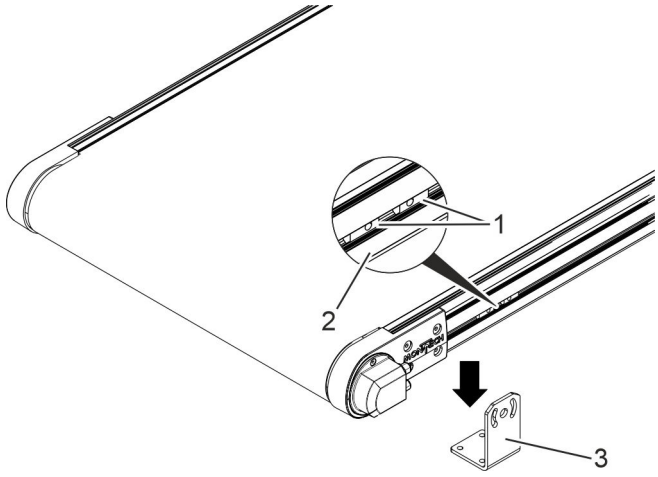


Fig. 18: Swiveling in the slot nut

1. Swivel the slot nuts (Fig. 18/1) into the lower groove (Fig. 18/2) of the conveyor.

   The exact positions depend on the configuration.

2. Place the conveyor on the mounting brackets (Fig. 18/3).

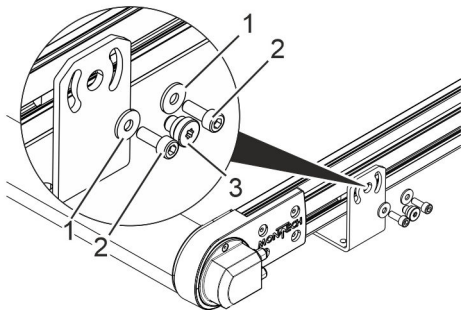


Fig. 19: Fastening the conveyor

3. Position the conveyor using the positioning screw (Fig. 19/3).
4. Repeat step 3 for all mounting brackets.

5. Fasten the conveyor to the mounting bracket (Fig. 18/3) using two cylinder head screws (Fig. 19/2) and washers (Fig. 19/1).

   Tightening torque: 6 Nm

6. Repeat step 5 for all mounting brackets.

5.5.4 Mounting the conveyor on the floor stand

Personnel:
- Specialist staff

Protective equipment:
- Protective gloves
- Safety shoes

Prerequisites:

- The floor stand is mounted and the height is adjusted correctly.

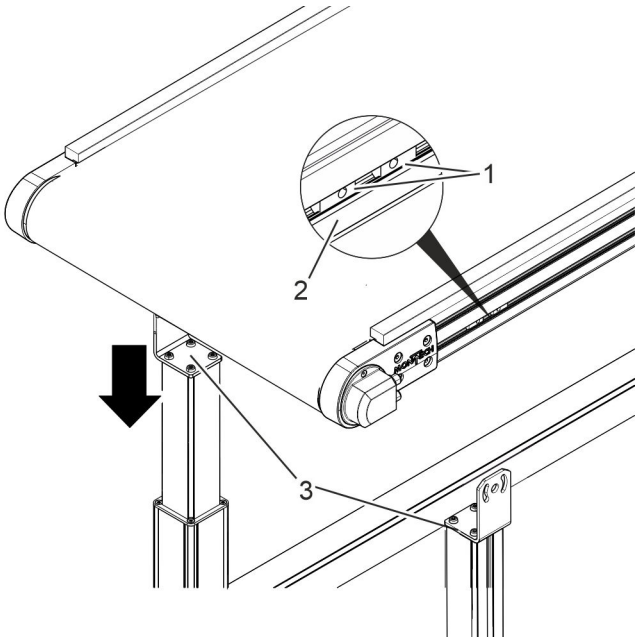


Fig. 20: Swiveling in the slot nut

1. *Fasten the floor stand in the lower groove.*

   Swivel two slot nuts (Fig. 20/1) per holder (Fig. 20/3) into the lateral profile (Fig. 20/2) of the conveyor.

   Distance between the screw holes: 32 mm

2. Place the conveyor on the holders (Fig. 20/3).

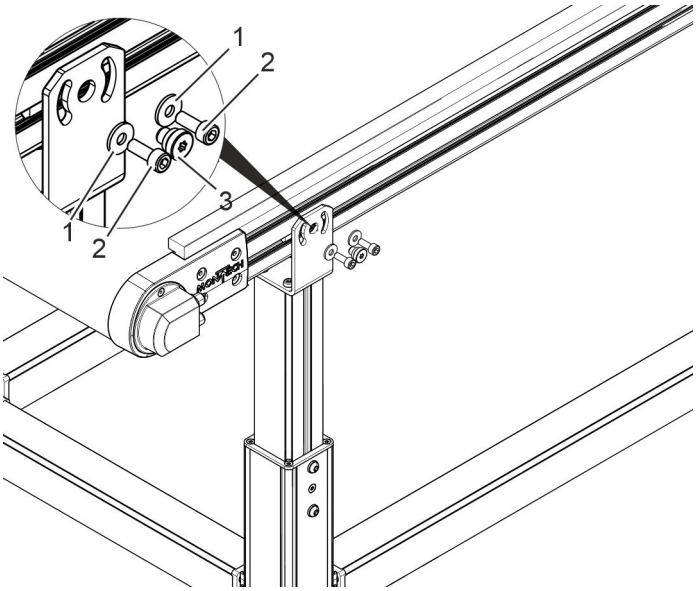


Fig. 21: Fastening the conveyor

3. Position the conveyor using the positioning screw (Fig. 21/3).
4. Repeat step 3 for all mounting brackets.
5. Fasten the conveyor to the floor stand using two cylinder head screws (Fig. 21/2) and washers (Fig. 21/1).

   Tightening torque: 6 Nm
6. Repeat step 5 for all mounting brackets.

5.6 Installing adjustable lateral guides

The bracket for the adjustable lateral guide is pre-assembled. The lateral guide is supplied loose.

Personnel:
- Specialist staff

Protective equipment:
- Protective gloves
- Safety shoes

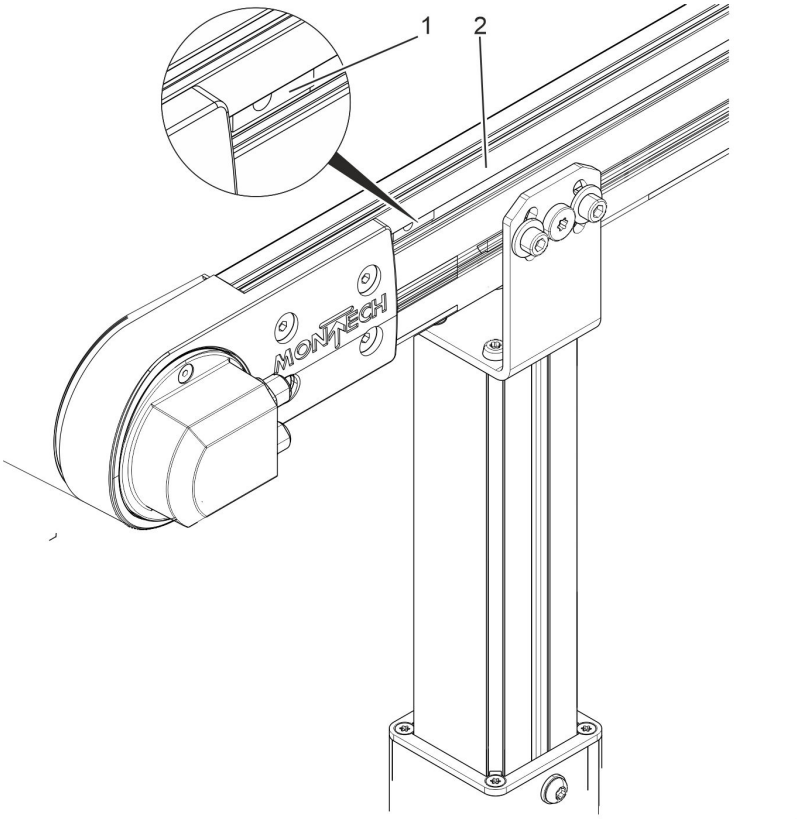


Fig. 22: Swiveling in the slot nut

1. Swivel the slot nut (Fig. 22/1) into the upper groove of the lateral profile (Fig. 22/2).

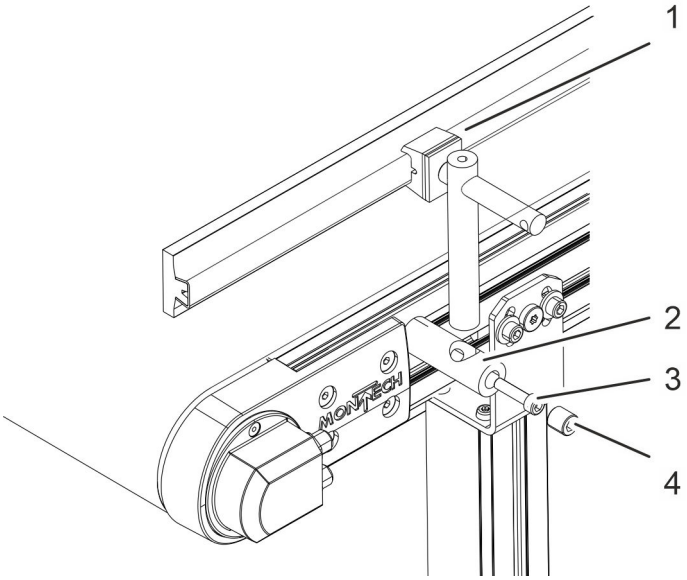


Fig. 23: Installing the variable lateral guide

2. Remove the grub screw (Fig. 23/4) from the holder (Fig. 23/2).

Fasten the holder (Fig. 23/2) with the cylinder head screw (Fig. 23/3).

Tightening torque: 10 Nm

3. Repeat steps 1 + 2 for all holders. Distribute the holders evenly.

Make sure that the distance to the holder is not too great at the start and end of the lateral guide so that the guide stable.

The number of holders depends on the distance

- *0–1,400 mm = 2 holders*
- *1,400–2,400 mm = 3 holders*
- *2,400–3,000 mm = 4 holders*

4. Slide the lateral guide holders (Fig. 23/1) into the holders (Fig. 23/2).

5. Insert and tighten the grub screw (Fig. 23/4).

Tightening torque: 2 Nm

6. Mount the lateral guide in the holder and tighten it using the cross hole in the rod.

Tightening torque: 2 Nm

Adjusting the adjustable lateral guides

Personnel:
- Specialist staff

Protective equipment:
- Protective gloves
- Safety shoes

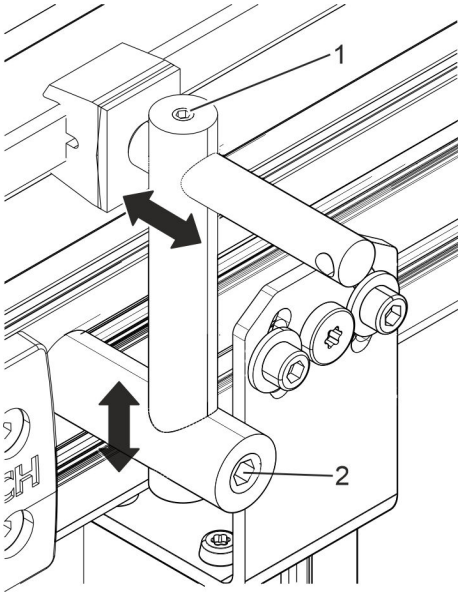


Fig. 24: Adjusting the variable lateral guide

1. Loosen the grub screws (Fig. 24/2).
2. Adjust the lateral guide to the desired height.
3. Insert and tighten the grub screw (Fig. 24/2).

   Tightening torque: 2 Nm
4. Loosen the grub screws (Fig. 24/1).
5. Adjust the lateral guide to the desired conveyor width.
6. Insert and tighten the grub screw (Fig. 24/1).

   Tightening torque: 3 Nm

If required, the lateral guide can also be adjusted in the longitudinal direction.

↳Loosen and tighten the cross hole.

5.7 Installing the MonTurn control unit

Personnel:
- Specialist staff

Protective equipment:
- Protective gloves
- Safety shoes

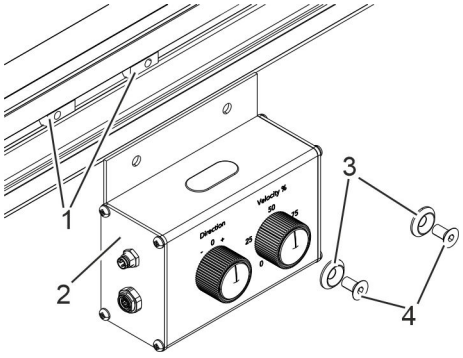


Fig. 25: Installing MonTurn

1. Swivel two slot nuts (Fig. 25/1) into the lateral profile.
2. Fasten the MonTurn (Fig. 25/2) to the slot nuts (Fig. 25/1) using two countersunk screws (Fig. 25/4) and washers (Fig. 25/3).

   Tightening torque: 3 Nm

5.8 Installing the MonTouch control unit

The MonTouch can be hooked directly into the T-slot of the lateral profile.

Proceed as follows for permanent fixation:

Personnel:
- Specialist staff

Protective equipment:
- Protective gloves
- Safety shoes

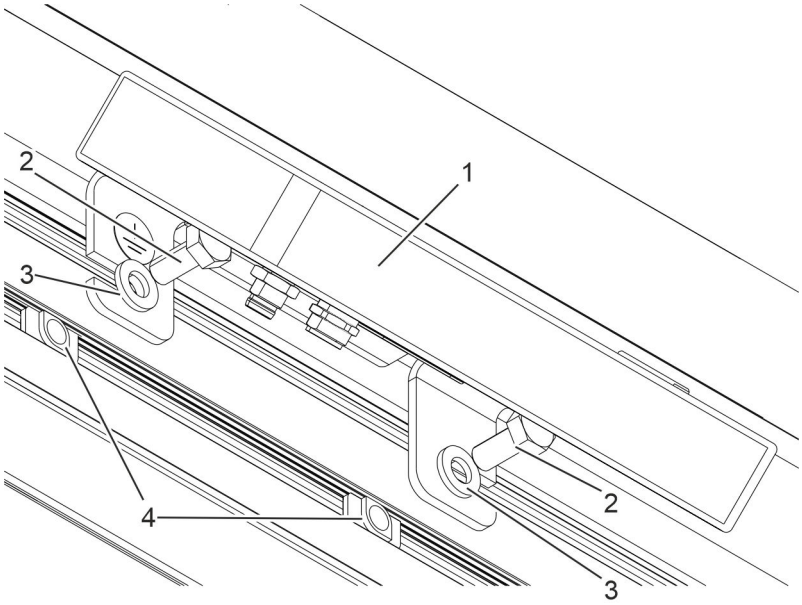


Fig. 26: Installing MonTouch

1. Hook the hammer nuts (Fig. 26/4) into the lateral profile.
2. Hook the MonTouch (Fig. 26/1) into the lateral profile.
3. Fasten the MonTurn (Fig. 26/1) to the hammer nuts (Fig. 26/4) using two countersunk screws (Fig. 26/2) and washers (Fig. 26/3).

   Tightening torque: 6 Nm

5.9 Connecting

5.9.1 Drive circuit diagram

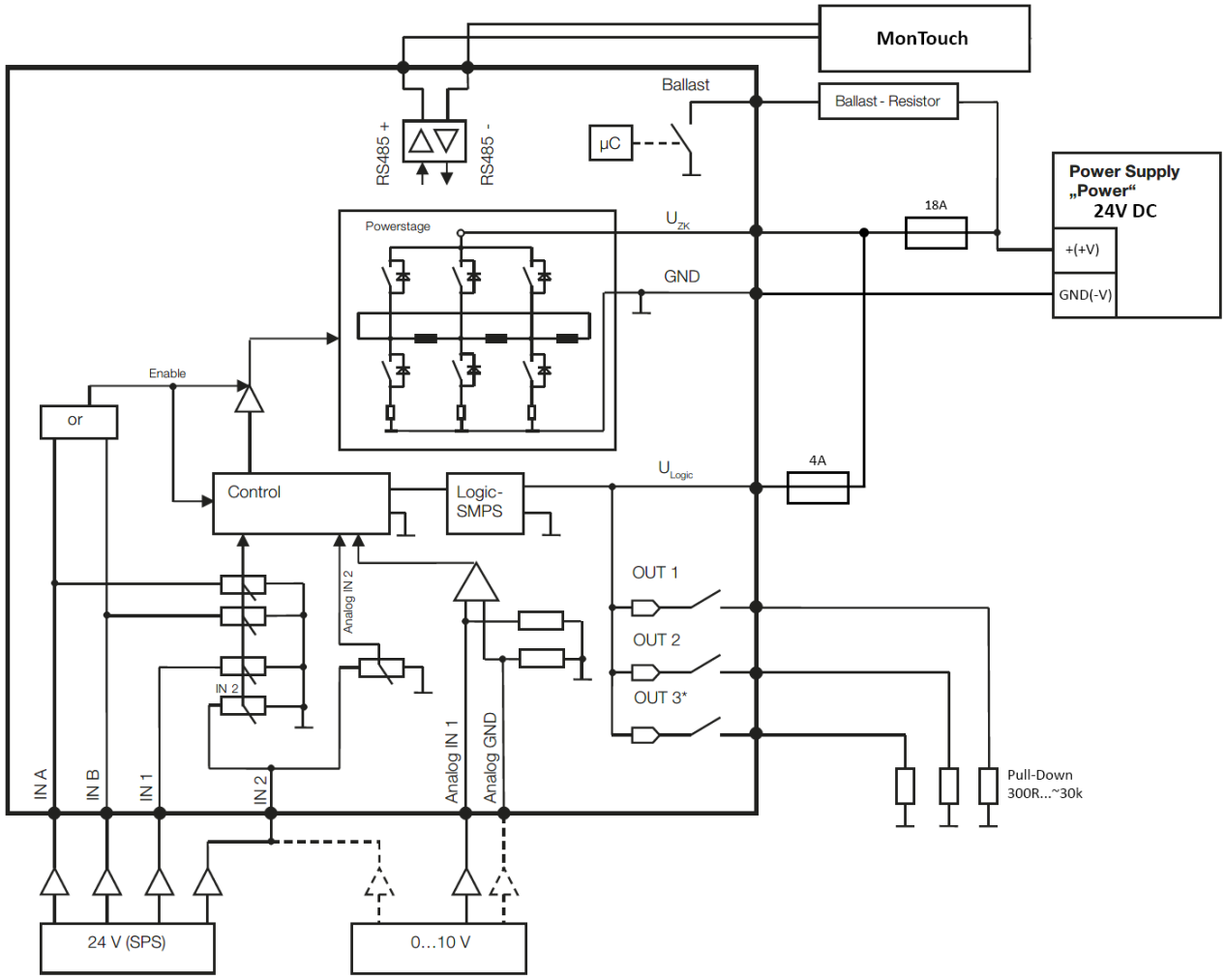


Fig. 27: Drive circuit diagram

5.9.2 Connecting the power supply

The electrical power supply must be ensured by a qualified electrician.

If MonTurn and the conveyor are not connected to the same power supply, equipotential bonding must be ensured between the two ground connections.

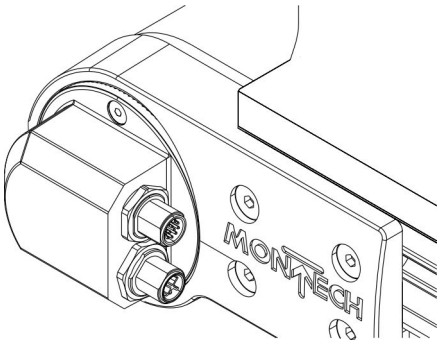
Install DIN rail power supply

The DIN rail power supply must be installed in accordance with the power supply manufacturer's installation instructions.

5.9.3 Aligning the cable outlet

The cable outlet can be aligned in four different positions.

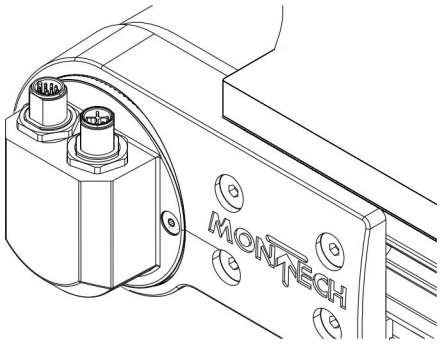
Basic position



The cable outlet is at the front as standard (Fig. 28).

Fig. 28: Front cable outlet

Cable outlet 90°

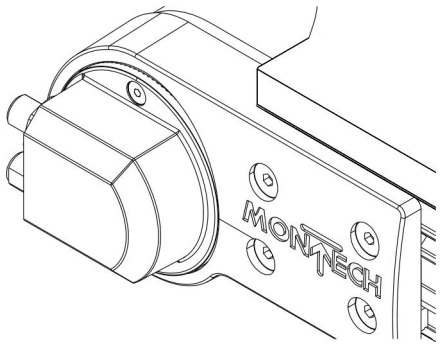


1. Loosen two screws on the cover cap.
2. Turn the cover cap of the cable outlet until the desired cable outlet position of 90° (Fig. 29) is set.
3. Check the fit of the seal.
4. Check that no strands are trapped.
5. Tighten two screws.

   Tightening torque: 2 Nm

Fig. 29: Cable outlet 90°

Cable outlet 180°



1. Loosen two screws on the cover cap.
2. Turn the cover cap of the cable outlet until the desired cable outlet position of 180° (Fig. 30) is set.
3. Check the fit of the seal.
4. Check that no strands are trapped.
5. Tighten two screws.

   Tightening torque: 2 Nm

Fig. 30: Cable outlet 180°

Cable outlet 270°

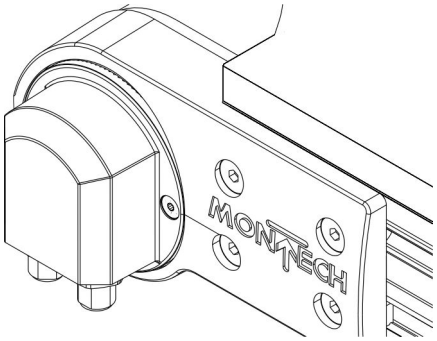


Fig. 31: Cable outlet 270°

1. Loosen two screws on the cover cap.
2. Turn the cover cap of the cable outlet until the desired cable outlet position of 270° (Fig. 31) is set.
3. Check the fit of the seal.
4. Check that no strands are trapped.
5. Tighten two screws.

   Tightening torque: 2 Nm

5.9.4 Connecting the PLC

TB40 power cable

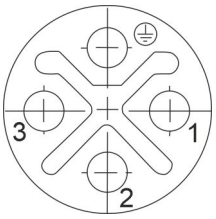


Fig. 32: TB40 power cable polarity diagram

3+PE-pole power cable (M12)			
Pin	**Color**	**Designation**	**Function**
1	Black No. 1 or brown	Up (V+)	Power supply +24 V
2	Black No. 2 or gray	Ballast	Ballast resistor connection*
3	Black No. 3 or black	GND (V-)	GND power/signal
FE	Green/ yellow	FE	Functional earth

* The motor-integrated braking chopper with external ballast resistor converts the energy not required for steeply sloped, non-self-locking conveyor belts. If the factory-set voltage threshold of 27 V is exceeded, the external resistor is switched on.

Chopper current = max. 10 A

Recommended braking resistor ≥ 3.75 Ω

Braking resistor not included in the scope of delivery

The braking resistor is not included in the scope of delivery.

It must be tested and designed according to the drive application.

TB40 signal cable

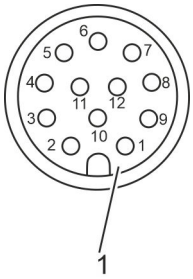


Fig. 33: TB40 signal cable polarity diagram

Signal cable, 12-pin (M12)			
Pin	**Color**	**Designation**	**Function**
1	Brown	IN A	Digital input A
2	Blue	IN B	Digital input B
3	White	IN 1	Digital input 1
4	Green	IN 2	Digital input 2
5	Pink	OUT1	Digital output 1
6	Yellow	OUT2	Digital output 2
7	Black	OUT3	Digital output 3
8	Gray	AIN 1	Analog input 1
9	Red	AGND	GND for AIN 1
10	Violet	RS485 A (+)	Parameterization interface
11	Gray/ pink	RS485 B (-)	Parameterization interface
12	Red/ blue	U_{Logik} (+V)	Logic supply +24 V

Personnel:
- Specialist staff

Protective equipment:
- Protective gloves
- Safety shoes

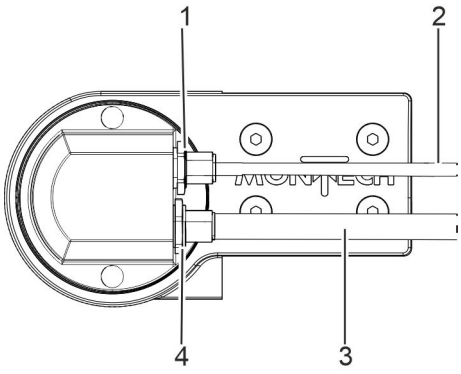


Fig. 34: Connecting MonTouch

1. Plug the signal cable (Fig. 34/2) into the signal connection (Fig. 34/1) of the drive unit.

The signal cable has open strands on the PLC side. Depending on the requirements and operating mode, the required strands must be wired to the terminals of the control system.

2. Route and wire the signal cable (Fig. 34/2) to the PLC.

3. Plug the TB40 power cable (Fig. 34/3) into the power connection (Fig. 34/4) of the drive unit.

The power cable has open strands on the power supply side. The strands must be wired. See ↳ Chapter 5.9.2 “Connecting the power supply” on page 50.

4. Route and wire the TB40 power cable (Fig. 34/3) to the power supply unit.

5.9.5 Connecting MonTurn

TB40 power cable

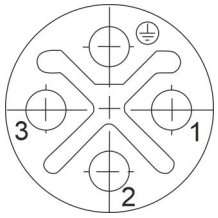


Fig. 35: TB40 power cable polarity diagram

3+PE-pole power cable (M12)			
Pin	**Color**	**Designation**	**Function**
1	Black No. 1 or brown	Up (V+)	Power supply +24 V
2	Black No. 2 or gray	Ballast	Ballast resistor connection*
3	Black No. 3 or black	GND (V-)	GND power/signal
FE	Green/ yellow	FE	Functional earth

* The motor-integrated braking chopper with external ballast resistor converts the energy not required for steeply sloped, non-self-locking conveyor belts. If the factory-set voltage threshold of 27 V is exceeded, the external resistor is switched on.

Chopper current = max. 10 A

Recommended braking resistor ≥ 3.75 Ω

TB40 signal cable - MonTurn

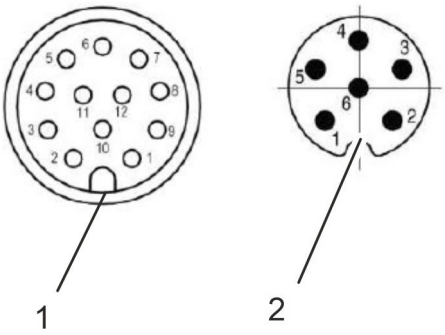


Fig. 36: TB40 signal cable polarity diagram - MonTurn

1 TB40 connection polarity diagram
2 MonTurn connection polarity diagram

MonTurn power cable

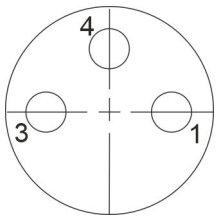


Fig. 37: MonTurn power cable polarity diagram

NOTICE!

Material damage due to incorrect connection!

As the MonTurn and MonTouch control units are not equipped with reverse polarity protection, incorrect connection of the connection cable will cause a defect in the device.

– Pay attention to the polarity of the connections when connecting the connection cable or TB40 power distribution cable to the power supply unit.

3-pole power cable (M8)			
Pin	**Color**	**Designation**	**Function**
1	Brown	Up (V+)	Power supply +24 V
3	Blue	GND (V-)	GND power
4	Black	FE	Functional earth

Personnel:	■ Specialist staff
Protective equipment:	■ Protective gloves ■ Safety shoes

The illustration and the instructions describe the connection process for the drive unit with the connection on the right.

For drive units with the connection on the left, the signal and power connectors on the drive unit are reversed.

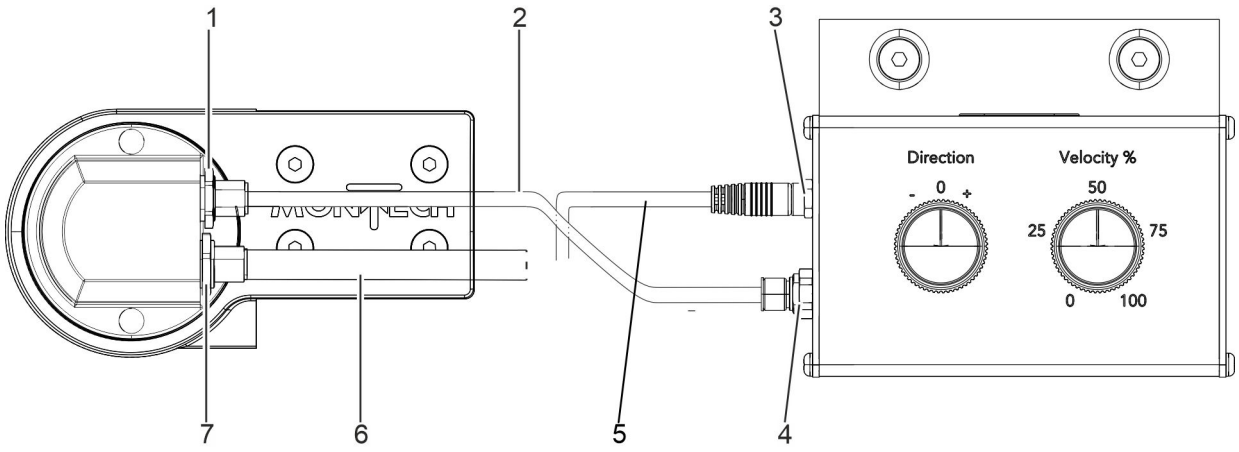


Fig. 38: Connecting the MonTurn (example: drive unit on the right)

1. Establish a signal line between the conveyor drive unit and MonTurn. Connect the "MonTurn" signal cable (Fig. 38/2) at one end to the signal connection (Fig. 38/4) of the MonTurn.
2. Connect the other end of the "MonTurn" signal cable to the signal connection (Fig. 38/1) of the drive unit.
3. Connect the "MonTurn" power cable (Fig. 38/5) to the power connection (Fig. 38/3) of MonTurn.
4. Connect the "TB40" power cable (Fig. 38/6) to the power connection (Fig. 38/7) of the drive unit.
5. Route and wire the "MonTurn" (Fig. 38/5) and "TB40" (Fig. 38/6) power cables to the power supply unit.

The MonTurn power cable has open strands on the power supply side. The strands must be wired. See Chapter 5.9.2 “Connecting the power supply” on page 50.

If MonTurn and the conveyor are not connected to the same power supply, equipotential bonding must be ensured between the two ground connections.

5.9.6 Connecting MonTouch as a control unit

TB40 power cable

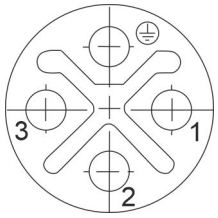


Fig. 39: TB40 power cable polarity diagram

3+PE-pole power cable (M12)			
Pin	**Color**	**Designation**	**Function**
1	Black No. 1 or brown	Up (V+)	Power supply +24 V
2	Black No. 2 or gray	Ballast	Ballast resistor connection*
3	Black No. 3 or black	GND (V-)	GND power/signal
FE	Green/ yellow	FE	Functional earth

* The motor-integrated braking chopper with external ballast resistor converts the energy not required for steeply sloped, non-self-locking conveyor belts. If the factory-set voltage threshold of 27 V is exceeded, the external resistor is switched on.

Chopper current = max. 10 A

Recommended braking resistor ≥ 3.75 Ω

TB40 signal cable - MonTouch

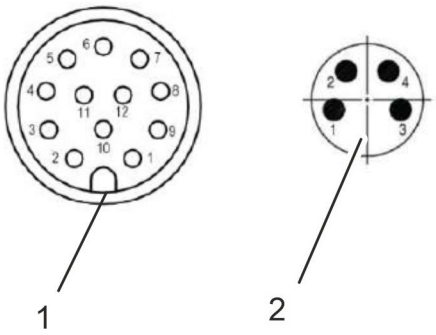


Fig. 40: TB40 signal cable polarity diagram - MonTouch

1 TB40 connection polarity diagram
2 MonTouch connection polarity diagram

MonTouch power cable

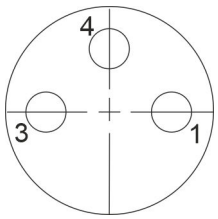


Fig. 41: MonTouch power cable polarity diagram

3-pole connection cable (M8)			
Pin	**Color**	**Designation**	**Function**
1	Brown	Up (V+)	Power supply +24 V
3	Blue	GND (V-)	GND power
4	Black	FE	Functional earth

Personnel:
- Specialist staff

Protective equipment:
- Protective gloves
- Safety shoes

The illustration and the instructions describe the connection process for the drive unit with the connection on the right.

For drive units with the connection on the left, the signal and power connectors on the drive unit are reversed.

NOTICE!

Material damage due to incorrect connection!

As the MonTurn and MonTouch control units are not equipped with reverse polarity protection, incorrect connection of the connection cable will cause a defect in the device.

– Pay attention to the polarity of the connections when connecting the connection cable or TB40 power distribution cable to the power supply unit.

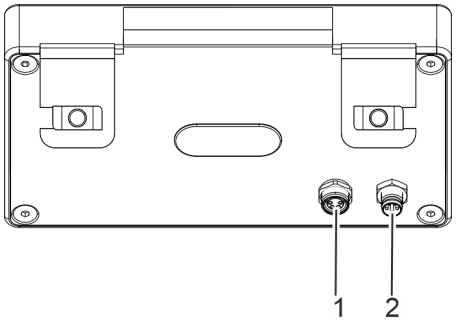


Fig. 42: MonTouch connections

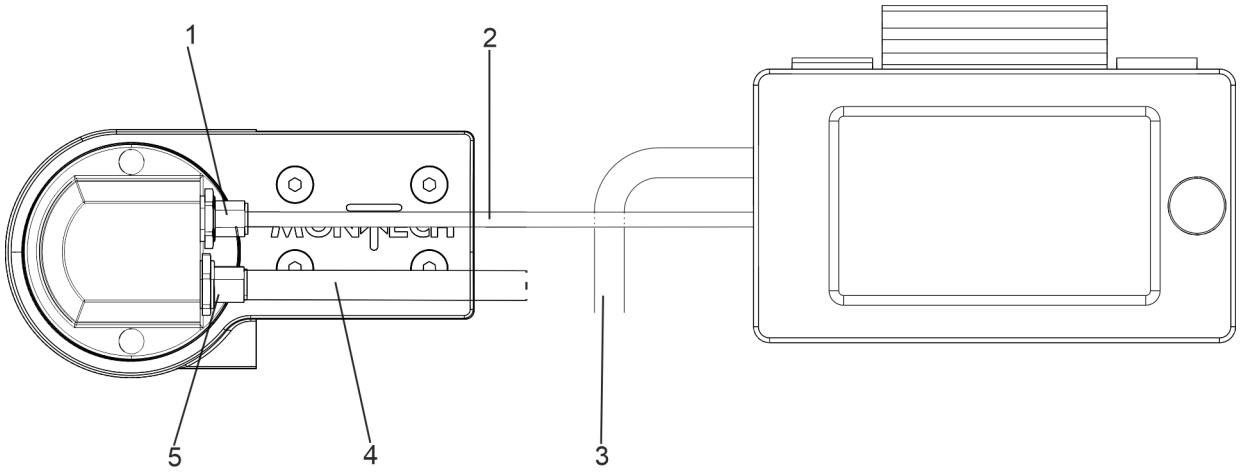


Fig. 43: Connecting MonTouch (example: drive unit on the right)

1. Establish a signal line between the conveyor drive unit and MonTurn. Connect the "MonTouch" signal cable (Fig. 43/2) at one end to the signal connection (Fig. 42/1) of the MonTurn.
2. Connect the other end of the "MonTurn" signal cable to the signal connection (Fig. 43/1) of the drive unit.
3. Connect the "MonTouch" power cable (Fig. 43/3) to the power connection (Fig. 42/2) of MonTouch.
4. Connect the "TB40" power cable (Fig. 43/4) to the power connection (Fig. 43/5) of the drive unit.
5. Route and wire the "MonTouch" (Fig. 43/3) and "TB40" (Fig. 43/5) power cables to the power supply unit.

The MonTurn power cable has open strands on the power supply side. The strands must be wired. See ↳ Chapter 5.9.2 “Connecting the power supply” on page 50.

If MonTouch and the conveyor are not connected to the same power supply, equipotential bonding must be ensured between the two ground connections.

5.9.7 Grounding the conveyor

Ground the conveyor via the TB grounding connection.

Personnel:
- Qualified electrician

Protective equipment:
- Protective gloves
- Safety shoes

1. Insert the grounding connection into a groove in the lateral profile.
2. Connect the grounding cable with a cable lug between the two washers.

5.10 Commissioning

Adjusting the belt run

Deflection Ø 60 mm

Knife edge

Personnel:
- Specialist staff

Protective equipment:
- Protective gloves
- Safety shoes

Prerequisite:

- The conveyor is fully assembled and connected in accordance with the applicable standards.
- The necessary safety devices for operation have been set.

1. Run the belt without products and check whether the belt is centered.
2. If the belt runs to one side, correct the belt run ↳ *Chapter 8.3.3 “Aligning the conveyor belt” on page 118*.
3. Run the conveyor belt with products.
4. If the products are not transported as desired, pre-tension the conveyor belt ↳ *Chapter 8.3.4 “Slackening and retensioning the conveyor belt” on page 120*.

6 Operation

6.1 Safety during operation

Illegible labeling

WARNING!

Risk of injury due to illegible signage!

Over time, stickers and signs can become dirty or otherwise unrecognizable, so that hazards cannot be identified and necessary operating instructions cannot be followed. This poses a risk of injury.

– Keep all safety, warning and operating instructions in a legible condition at all times.
– Replace damaged signs or stickers immediately.

Tilting the conveyor

WARNING!

Risk of injury due to the conveyor tipping over!

If the conveyor is not attached properly, it may tip over, resulting in injuries due to impact and crushing.

– Align the conveyor on the ground and anchor if necessary.
– Observe the requirements for the installation site.

Moving components

WARNING!

Risk of crushing between two loads during accumulation mode!

There is a risk of crushing between two conveyed goods during accumulation mode at the end section.

– Do not reach between the loads during accumulation mode.
– Train operators.

WARNING!

Risk of crushing between belt cleats and lateral guide!

Limbs can be crushed between the belt cleats and the lateral guide when the conveyor is running.

– Do not handle the end section while the conveyor is running.
– Work on the conveyor may only be carried out by trained, qualified operators.

Missing fire extinguisher

WARNING!

Hazards if a fire extinguisher is not readily available!

If there is no fire extinguisher ready for use, it will not be possible to respond appropriately to a fire. This can result in serious personal injury and considerable damage to property.

- Use fire extinguishers with suitable extinguishing powder (ABC).
- Have fire extinguishers checked regularly by an authorized agency.
- Train all operators in the use of the fire extinguisher.

Sharp corners and edges

CAUTION!

Risk of injury from sharp corners or edges!

Sharp corners or edges may be exposed throughout the machine area during certain activities, which can cause injuries such as cuts, abrasions, or punctures.

- Wear the prescribed personal protective equipment for all work.

6.2 Operation via PLC

6.2.1 Operating modes

The conveyor can be operated in two modes:

- PLC speed mode (standard)
- PLC position mode

6.2.2 PLC speed mode

In PLC speed mode, a PLC is used to operate the conveyor via digital and analog inputs on the motor. Either one of three stored speeds can be selected or an analog setpoint can be specified.

Speed mode input function						
DIN A	**DIN B**	**DIN 1**	**DIN 2**	**Direction of rotation**	**Value**	**Function**
0	0	X	X	-	0	Freewheel (drive not energized)
1	0	0	0	Positive	A1	Variable speed via AIN 1

Speed mode input function						
DIN A	**DIN B**	**DIN 1**	**DIN 2**	**Direction of rotation**	**Value**	**Function**
1	0	1	0	Positive	N1	Stored, constant speed 1
1	0	0	1	Positive	N2	Stored, constant speed 2
1	0	1	1	Positive	N3	Stored, constant speed 3
0	1	0	0	Negative	A1	Variable speed via AIN 1
0	1	1	0	Negative	N1	Stored, constant speed 1
0	1	0	1	Negative	N2	Stored, constant speed 2
0	1	1	1	Negative	N3	Stored, constant speed 3
1	1	0	0	-	0	Stop (braking and holding)
1	1	1	0	-	0	Stop (braking and holding)
1	1	0	1	-	0	Stop (braking and holding)
1	1	1	1	-	0	Stop (braking and holding)

6.2.2.1 Default values

If no belt speeds are specified, the conveyor is delivered with the following values:

	Gearbox i = 21	**Gearbox i = 30**	**Gearbox i = 80**
Stored belt speeds v1, v2, v3	v1 = 15 m/min v2 = 30 m/min v3 = 45 m/min	v1 = 10 m/min v2 = 20 m/min v3 = 30 m/min	v1 = 4 m/min v2 = 8 m/min v3 = 12 m/min
Acceleration/ deceleration	0.80 m/s²	0.56 m/s²	0.21 m/s²
Overrun	0 mm (inactive)	0 mm (inactive)	0 mm (inactive)
Restart behavior after error	Acknowledgement required	Acknowledgement required	Acknowledgement required

The default values can be subsequently adjusted using the MonTouch control unit.

6.2.2.2 Speed specification via analog input AIN 1

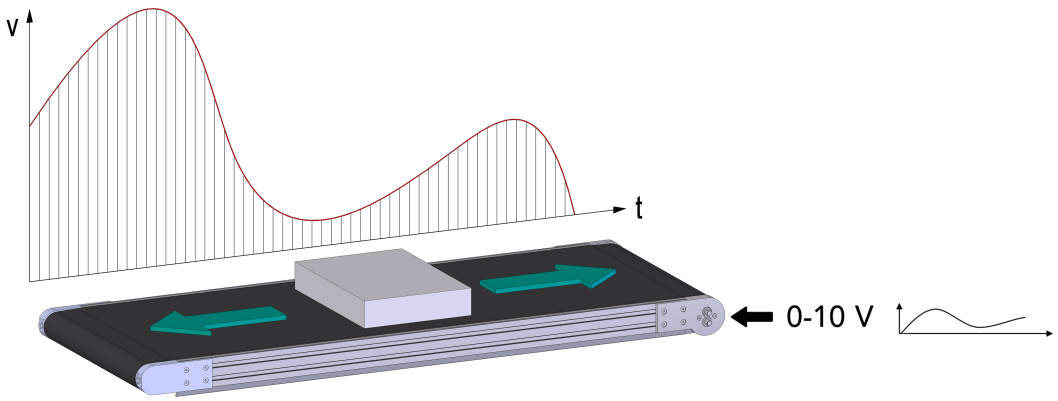


Fig. 44: Speed specification via analog input AIN1

DIN A	DIN B	DIN 1	DIN 2	Direction of rotation	Value	Function
0	0	X	X	-	0	Freewheel (drive not energized)
1	0	0	0	Positive	A1	Variable speed via AIN 1
0	1	0	0	Negative	A1	Variable speed via AIN 1
1	1	X	X	-	0	Stop (braking and holding)

The change in speed via the analog input is limited by the acceleration and deceleration values.

6.2.2.3 Speed specification via stored values

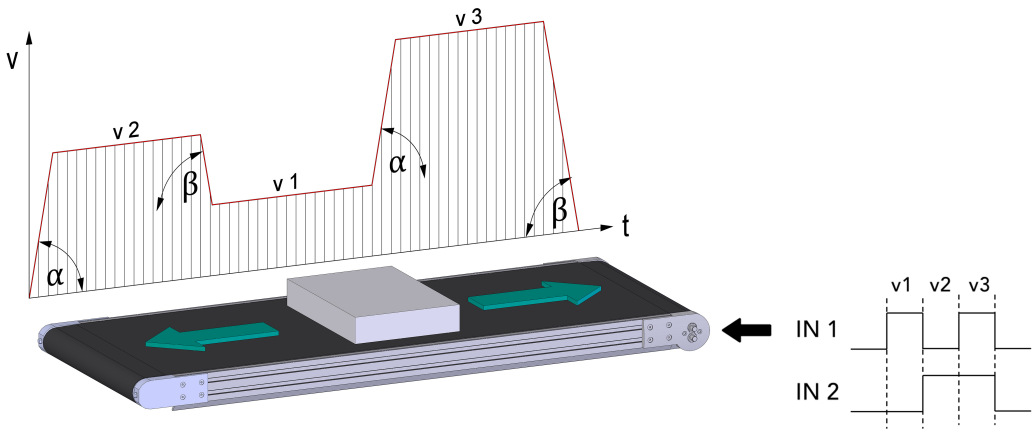


Fig. 45: Speed specification via stored values v1, v2, v3

DIN A	DIN B	DIN 1	DIN 2	Direction of rotation	Value	Function
0	0	X	X	-	0	Freewheel (drive not energized)
1	0	1	0	Positive	N1	Stored, constant speed 1
1	0	0	1	Positive	N2	Stored, constant speed 2
1	0	1	1	Positive	N3	Stored, constant speed 3
0	1	1	0	Negative	N1	Stored, constant speed 1
0	1	0	1	Negative	N2	Stored, constant speed 2
0	1	1	1	Negative	N3	Stored, constant speed 3
1	1	X	X	-	0	Stop (braking and holding)

The speed change is carried out with the acceleration and deceleration value.

6.2.2.4 Overrun

This function can be used to execute a defined distance from a trigger point (e.g., light barrier) while the conveyor is running and to stop at a hold point.

From the trigger point, the drive is position-controlled and performs the braking operation with the stored deceleration value. The braking distance is executed before the overrun. If the braking distance is greater than the overrun, the conveyor then returns to the specified hold point. To avoid this behavior, the deceleration value and the distance of the overtravel can be changed. When the conveyor is at a standstill, the stop control is active and the drive is energized.

The overrun is performed at every stop (braking and holding) and can vary in length in both the positive and negative direction The overrun can only be set at the factory.

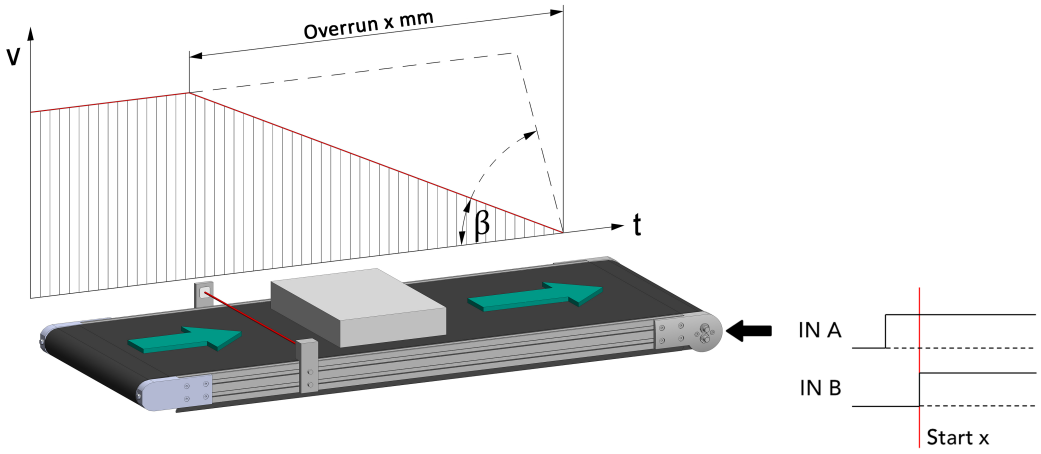


Fig. 46: Overrun

DIN A	DIN B	DIN 1	DIN 2	Direction of rotation	Value	Function
0	0	X	X	-	0	Freewheel (drive not energized)
1	0	0	0	Positive	A1	Variable speed via AIN 1
1	0	1	0	Positive	N1	Stored, constant speed 1
1	0	0	1	Positive	N2	Stored, constant speed 2
1	0	1	1	Positive	N3	Stored, constant speed 3
0	1	0	0	Negative	A1	Variable speed via AIN 1
0	1	1	0	Negative	N1	Stored, constant speed 1
0	1	0	1	Negative	N2	Stored, constant speed 2
0	1	1	1	Negative	N3	Stored, constant speed 3
1	0 → 1	X	X	Positive	-*	Transition to overrun positive + stop
0 → 1	1	X	X	Negative	-*	Transition to overrun negative + stop

* The overrun is carried out at the current belt speed in accordance with DIN 1 + DIN 2.

6.2.2.5 Output functions: digital outputs

Digital output	Logic	Status output
DOUT 1	High-active	Ready indication
DOUT 2	High-active	Overtemperature message
DOUT 3	High-active	Ready indication

Other output functions can be parameterized.

6.2.3 PLC position mode

In PLC speed mode, a PLC is used to operate the conveyor via digital and analog inputs on the motor. The speed is specified via an analog setpoint. In positioning mode, a defined distance is traveled. If a pulse is specified, the route is executed once. If x pulses are specified, the route is executed x times.

DIN A	DIN B	DIN 1	DIN 2	Direction of rotation	Value	Function
0	0	X	X	-	0	Freewheel (drive not energized)
1	0	0	X	Positive	A1	Variable speed via AIN 1
1	0	1	X	Negative	A1	Variable speed via AIN 1
0	1	0	X	Positive	A1	Variable speed via AIN 1
0	1	1	X	Negative	A1	Variable speed via AIN 1
1	0 → 1	X	X	Positive	-*	Transition to overrun positive + stop
0 → 1	1	X	X	Negative	-*	Transition to overrun negative + stop
1	1	0	0 → 1	Positive	A1	Execute distance one time
1	1	1	0 → 1	Negative	A1	Execute distance one time
1	0 → 1	X	X	Positive	-*	Transition to overrun positive + stop
0 → 1	1	X	X	Negative	-*	Transition to overrun negative + stop

* The conveyor slows down and moves back to the position at the time of triggering (braking distance).

6.2.3.1 Default values

Unless configured otherwise, the conveyor is delivered with the following values:

	Gearbox i = 21	Gearbox i = 30	Gearbox i = 80
Distance/ pulse	1 mm	1 mm	1 mm
Max. permissible positioning speed	45 m/min	33.5 m/min	12 m/min
DOUT 1 message window	± 0.5 mm	± 0.5 mm	± 0.5 mm
Acceleration/ deceleration	0.8 m/s²	0.56 m/s²	0.21 m/s²

	Gearbox i = 21	Gearbox i = 30	Gearbox i = 80
Overrun	0 mm	0 mm	0 m
Restart behavior after error	Acknowledgement required	Acknowl-edgement required	Acknowl-edgement required

The default values can be subsequently adjusted using the Mon-Touch control unit.

6.2.3.2 Speed specification via analog input AIN 1

The braking behavior in PLC position mode differs from the braking behavior in PLC speed mode. During the transition to the IN A = IN B = high state, the conveyor brakes and returns to the position at the trigger point.

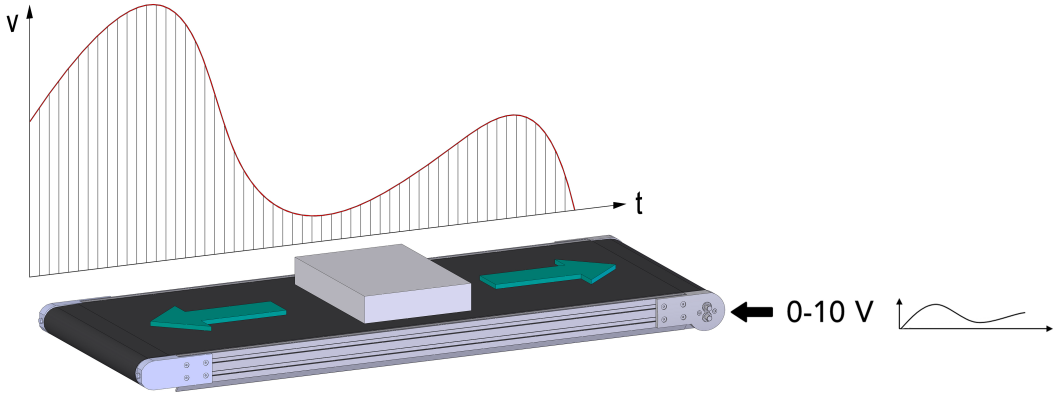


Fig. 47: Speed specification via analog input AIN 1

DIN A	DIN B	DIN 1	DIN 2	Direction of rotation	Value	Function
0	0	X	X	-	0	Freewheel (drive not energized)
1	0	0	X	Positive	A1	Variable speed via AIN 1
1	0	1	X	Negative	A1	Variable speed via AIN 1
0	1	0	X	Positive	A1	Variable speed via AIN 1
0	1	1	X	Negative	A1	Variable speed via AIN 1
1	0 → 1	X	X	Positive	-*	Transition to overrun positive + stop
0 → 1	1	X	X	Negative	-*	Transition to overrun negative + stop

* The conveyor slows down and moves back to the position at the time of triggering (braking distance).

The change in speed via the analog input is limited by the acceleration and deceleration values.

6.2.3.3 Executing distance one time

The route is executed one time with the acceleration and deceleration values on a positive edge at digital input 2 (DIN 2).

The positioning speed can be set via the analog input. The maximum positioning speed corresponds to the maximum belt speed depending on the conversion. If the positioning speed should always be maximum, the analog input can also be operated directly via a digital 24 VDC output of the PLC.

Depending on which values are specified for distance, speed, acceleration and deceleration, it is possible that the drive will not reach the desired speed (triangular movement).

The conveyor drive has a single-turn absolute encoder with a resolution of 1024 increments/revolution and an accuracy of ± 1.5°. The effective positioning accuracy depends on the gearbox, slip and elasticity of the conveyor belt.

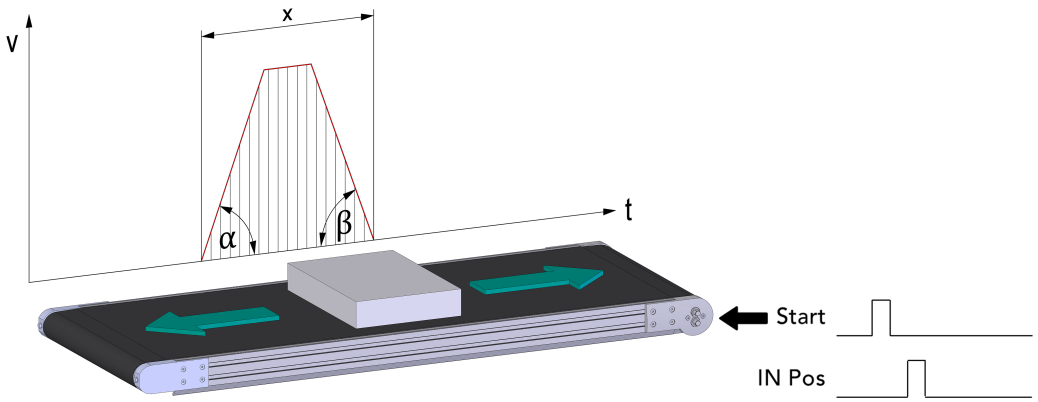


Fig. 48: Executing distance one time

DIN A	DIN B	DIN 1	DIN 2	Direction of rotation	Value	Function
0	0	X	X	-	0	Freewheel (drive not energized)
1	1	0	0	-	0	Stop (braking and holding)
1	1	1	0	-	0	Stop (braking and holding)
1	1	0	0 → 1	Positive	A1	Execute distance one time
1	1	1	0 → 1	Negative	A1	Execute distance one time

6.2.3.4 Executing the route several times

The distance is multiplied by the number of start pulses on DIN 2. If further pulses follow during execution, the distance is extended by the number of further pulses.

The positioning speed is set via the analog input. The maximum positioning speed corresponds to the maximum belt speed according to the reduction ratio. If the positioning speed should always be maximum, the analog input can also be operated directly via a digital 24 VDC output of the PLC.

Depending on which values are specified for distance, speed, acceleration and deceleration, it is possible that the drive will not reach the desired speed (triangular movement).

The conveyor drive has a single-turn absolute encoder with a resolution of 1024 increments/revolution and an accuracy of ± 1.5°. The effective positioning accuracy depends on the gearbox, slip and elasticity of the conveyor belt.

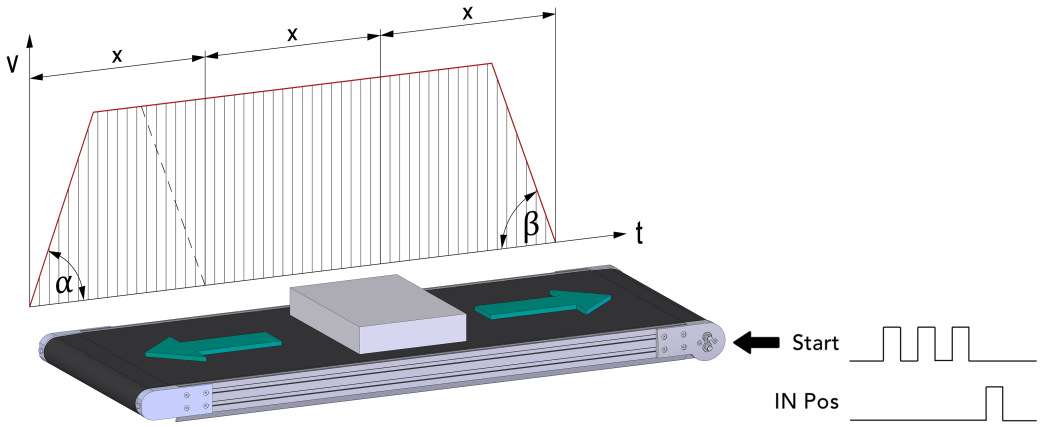


Fig. 49: Executing the route several times

DIN A	DIN B	DIN 1	DIN 2	Direction of rotation	Value	Function
0	0	X	X	-	0	Freewheel (drive not energized)
1	1	0	0	-	0	Stop (braking and holding)
1	1	1	0	-	0	Stop (braking and holding)
1	1	0	0 → 1	Positive	A1	Execute the route several times (distance = x * positive edge DIN 2*)
1	1	1	0 → 1	Negative	A1	Execute the route several times (distance = x * positive edge DIN 2*)

* Input frequency DIN 2 < 10 kHz

6.2.3.5 Overrun

This function can be used to execute a defined distance from a trigger point (e.g., light barrier) while the conveyor is running and to stop at a hold point.

From the trigger point, the drive is position-controlled and performs the braking operation with the stored deceleration value. The braking distance is executed before the overrun. If the braking distance is greater than the overrun, the conveyor then returns to the specified hold point. To avoid this behavior, the deceleration value and the distance of the overtravel can be changed. When the conveyor is at a standstill, the stop control is active and the drive is energized.

The overrun is performed at every stop (braking and holding) and can vary in length in both the positive and negative direction The overrun can only be set at the factory.

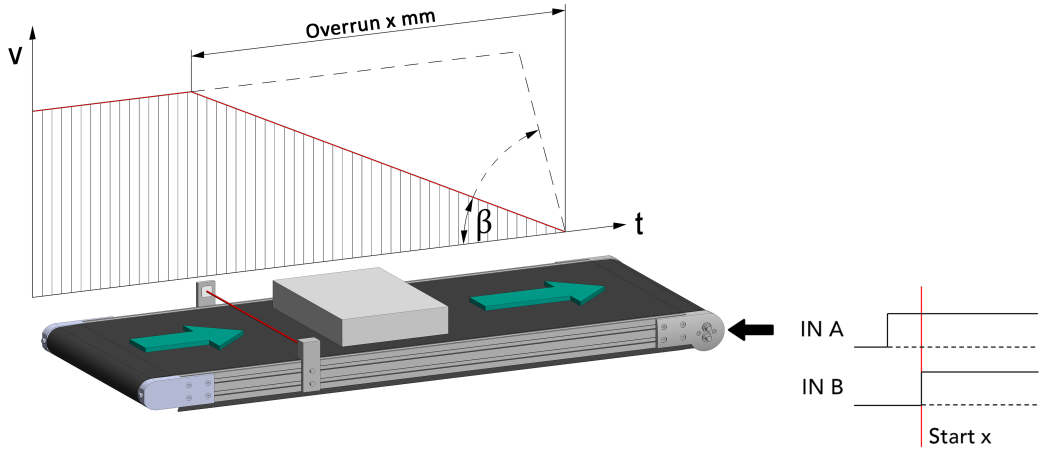


Fig. 50: Overrun

DIN A	DIN B	DIN 1	DIN 2	Direction of rotation	Value	Function
0	0	X	X	-	0	Freewheel (drive not energized)
1	0	0	X	Positive	A1	Variable speed via AIN 1
1	0	1	X	Negative	A1	Variable speed via AIN 1
0	1	0	X	Positive	A1	Variable speed via AIN 1
0	1	1	X	Negative	A1	Variable speed via AIN 1
1	0 → 1	X	X	Positive	-*	Transition to overrun positive + stop
0 → 1	1	X	X	Negative	-*	Transition to overrun negative + stop

A defined overrun (fixed value) can be activated and changed via the MonTouch control unit.

6.2.3.6 Output functions: digital outputs

Digital output	Logic	Status output
DOUT 1	High-active	Message window reached
DOUT 2	High-active	A track* encoder
DOUT 3	High-active	B track* encoder

* The resolution of the output signal is limited by the maximum permissible frequency of the digital output. The resolution at maximum belt speed is 1 mm (gearbox i = 30), 0.4 mm (gearbox i = 80) or 1.5 mm (gearbox i = 21). A lower resolution is only possible at lower belt speeds.

Other output functions can be parameterized.

6.2.3.7 “Restart” parameter

The *“restart”* parameter is used to configure the behavior after safety-critical errors. The drive cannot be operated while safety-critical faults are pending. If there are no more safety-critical faults, the drive must be started by acknowledgement to make it ready for operation.

0 = Automatic restart

1 = Acknowledgement required

The drive can also be configured for automatic restart on request.

In the case of automatic restart behavior, however, it is essential that the end user consider the risk of the conveyor starting up automatically in the risk assessment.

Firmware 1.6.4

The function is only available from firmware version 1.6.4 of the drive. The actuator firmware can be read out with the MonTouch.

6.2.4 Output functions

DOUT 1 output	DOUT 2 output	DOUT 3 output
No function	A track encoder	B track encoder
Speed message	Speed message	Speed message
Power message	Power message	Power message

DOUT 1 output	DOUT 2 output	DOUT 3 output
Ready indication	Ready indication	Ready indication
Message window reached	Message window reached	Message window reached
Temperature message	Temperature message	Temperature message

Function	Specification
A track encoder B track encoder	The resolution of the output signal is limited by the maximum permissible frequency of the digital output. The resolution at maximum belt speed is 1 mm (gearbox i = 30), 1.5 mm (gearbox i = 21) or 0.4 mm (gearbox i = 80).
Speed message	When the predefined belt speed is reached or exceeded: Output high
Power message	When the predefined current alert threshold for the winding current is reached: Output high
Ready indication	If the power or logic supply is connected and none of the following errors are present: Ready message high-active ■ Overvoltage(≥ 33 V) ■ Undervoltage(≤ 18 V) ■ Overtemperature (≥ 120 °C) ■ Hardware error ■ Overcurrent(≥ 45 A)
Message window reached	When the predefined message window is reached: Output high
Temperature message	When the predefined temperature alert threshold is reached or exceeded: Output high

6.2.5 Parameterizable values

6.2.5.1 PLC speed mode default values

	Gearbox i = 21	Gearbox i = 30	Gearbox i = 80
Stored belt speeds v1, v2, v3	v1 = 15 m/min v2 = 30 m/min v3 = 45 m/min	v1 = 10 m/min v2 = 20 m/min v3 = 30 m/min	v1 = 4 m/min v2 = 8 m/min v3 = 12 m/min
Acceleration/ deceleration	0.80 m/s²	0.56 m/s²	0.21 m/s²

	Gearbox i = 21	Gearbox i = 30	Gearbox i = 80
Overrun	0 mm	0 mm	0 mm
Restart behavior after error	Acknowledgement required	Acknowl-edgement required	Acknowl-edgement required

6.2.5.2 PLC position mode default values

	Gearbox i = 21	Gearbox i = 30	Gearbox i = 80
Distance/ pulse	1 mm	1 mm	1 mm
Max. posi-tioning speed	45 m/min	33.5 m/min	12 m/min
Message window for DOUT1	± 0.5 mm	± 0.5 mm	± 0.5 mm
Accelera-tion/decel-eration	0.8 m/s²	0.56 m/s²	0.21 m/s²
Overrun	0 mm	0 mm	0 mm
Restart behavior after error	Acknowledge-ment required	Acknowledgement required	Acknowl-edgement required

6.3 MonTurn control unit

Parameterizing

To operate the TB40 conveyor with the MonTurn control unit, the conveyor drive must be parameterized in PLC speed mode.

Parameterization is carried out at the factory. Subsequent changes can be made using the optional MonTouch parameterization unit. *Chapter 6.5 “Parameterizing the conveyor” on page 91*

Setting the belt speed

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

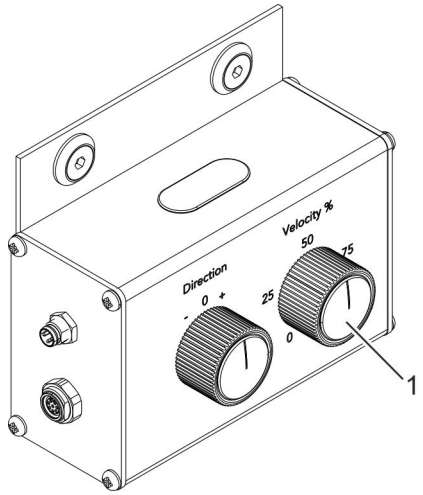


Fig. 51: Setting the belt speed

→ Set the belt speed using the rotary switch (Fig. 51/1).

When the conveyor is stopped via the rotary switch, the drive is in freewheel mode and is not energized.

Triggering start/stop in the conveying direction

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

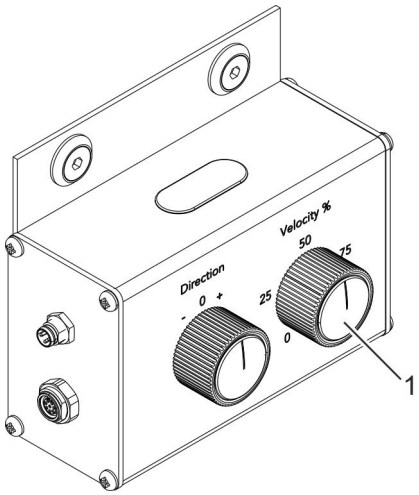


Fig. 52: Setting start/stop and the conveying direction

→ Set the start in the desired direction of rotation using the rotary switch (Fig. 52/1).

The stop position is in the middle position.

6.4 MonTouch control unit

6.4.1 User interface and operating elements

User interface

The conveyor is operated via a touch display.

The user interface is divided into two areas:

- The functional area (Fig. 53/1) contains operating elements for controlling the conveyor, technical information, and the drive status.
- The navigation area (Fig. 53/2) contains controls for navigating through the individual user interfaces.

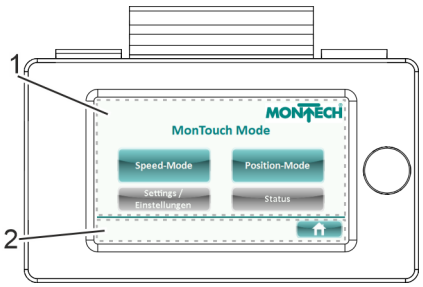


Fig. 53: MonTouch user interface

Control elements

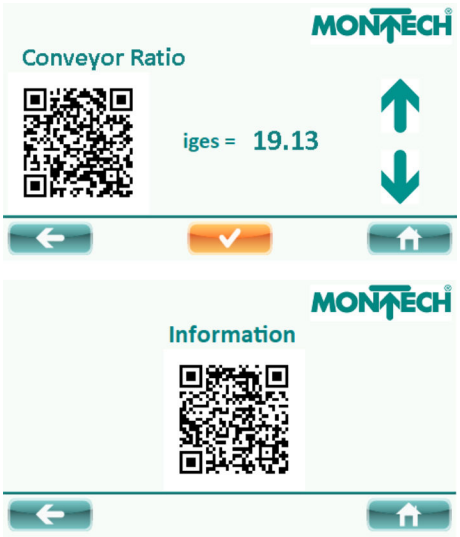
Symbol	Description	Function
	Home	Calls up the home screen of MonTouch operation.
	Back	Calls up the previous interface.
	Settings	Calls up the Settings menu.

Symbol	Description	Function
	Information	Displays more detailed information.
	Motor status	Displays status information of the drive.
	Reset	Acknowledges error messages.
	Acknowledge	Confirms entered values. Resets the cycle counter.
	Save	Saves parameters.
	Increase value	Press once briefly: Increases the value by one unit. Activate permanently: Increases the value continuously.
	Reduce value	Press once briefly: Reduces the value by one unit. Activate permanently: Reduces the value continuously.
	Button deactivated	The respective parameter is deactivated and cannot be changed.
	Button activated	The respective parameter is activated and can be changed.

Screen saver

If no input is made for 15 minutes, the display backlighting is switched off. As soon as the display is touched, the backlight comes on again.

Additional information/QR codes



For some user interfaces, additional information can be accessed via a QR code. The QR code is shown either directly on the display or by pressing the button  .

Fig. 54: Example QR codes

Prerequisites:

- Smartphone with QR scanner
- Active Internet connection

→ Scan the QR code with the QR scanner.

⇨ The link stored on *www.montech.com* is called up.

6.4.2 Starting MonTouch

When the supply voltage is applied to MonTouch and the conveyor, an initialization message appears on the display for approx. 2 seconds. Depending on the operating mode saved for the drive, the home screen for MonTouch operation or parameterization then appears. (The parameters are stored in the electronics of the drive.)

MonTouch operation

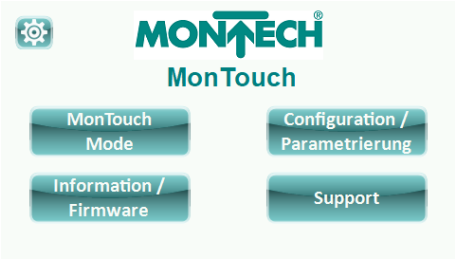


Fig. 55: Home screen MonTouch operation

The conveyor drive can be parameterized for the required application.

In MonTouch mode, the conveyor is controlled via the control unit (speed mode and position mode).

Information about the conveyor can also be called up (technical data, connection description, digital I/Os).

Parameterization

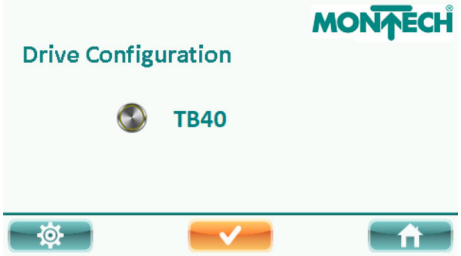


Fig. 56: Parameterization home screen

The conveyor drive can be parameterized for the required application (speed mode, position mode or MonTouch operation).

The conveyor is controlled via a higher-level control system (e.g., PLC).

6.4.3 Setting the language

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Safety shoes

Prerequisite:
- The MonTouch home screen or the parameterization home screen is displayed.

1. Press the button.
   ⇨ The *"Language settings"* menu opens.
2. Select the desired language.
3. Press the button.
   ⇨ The selected language is set. The *"Parameters successfully saved"* message window appears for about 2 seconds. The home screen is then displayed again.

> *If the button is pressed, the original language is retained.*

6.4.4 Reading firmware

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:
- The MonTouch home screen is displayed.

Press *"Information/Firmware"*.
⇨ The firmware version of the motor and a QR code are displayed.

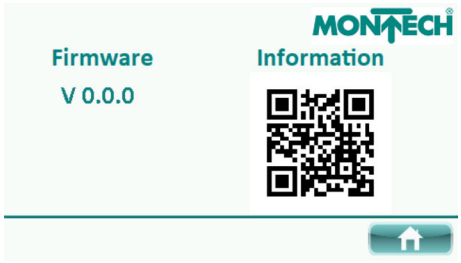


Fig. 57: Information/Firmware

6.4.5 MonTouch as a control unit

Prerequisite

To be able to use the MonTouch as a control unit, the drive must be parameterized *Chapter 6.5.2.2 “Parameterizing MonTouch mode” on page 95*.

6.4.5.1 Speed mode

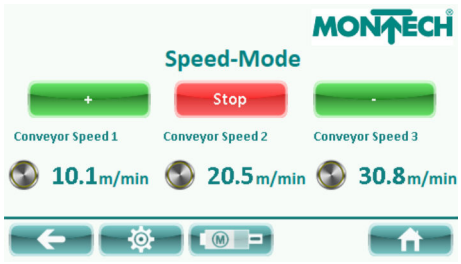


Fig. 58: Speed mode

In speed mode, the conveyor is started and stopped in the corresponding conveying direction.

The three different belt speeds can be set.

Control elements

Symbol	Description	Function
+	Positive running direction	Start the conveyor in the positive direction.
-	Negative running direction	Start the conveyor in the negative direction.
Stop	Stop	Stop the conveyor.

Starting speed mode

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:

- The *“MonTouch Mode”* home screen is displayed.

1. Select *“Speed mode”*.
2. Use the button to select the desired belt speed.
3. Press the + or - button to start speed mode.

> *The running direction and belt speed selection can be changed dynamically.*

Do not leave the user interface while the conveyor is running. If the , , or button is pressed, the message "Please stop the motor" appears.

Stopping speed mode

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:
- The conveyor runs in speed mode.

→ Press the Stop button.
  ⇨ The conveyor is stopped with a controlled delay.

Or as a quick stop:

→ Press the *"QUICK STOP"* button.
  ⇨ The conveyor is stopped immediately.

Setting the belt speed

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:
- The *"MonTouch Mode"* home screen is displayed.

1. Select *"Speed mode"*.
2. Press the button.
3. Use the button to select the belt speed.
4. Use the and buttons to set the belt speed.

The value range is limited and adapts to the set total gear ratio.

5. Press the button.

⇨ The set values are saved. The *"Parameter successfully saved"* message window appears for about 2 seconds. The *"Speed mode"* screen is then displayed again.

The conveyor can now be operated at the saved speeds.

The parameters are permanently stored in the drive's EEPROM memory after the parameterization process has been completed. This means that the parameter values are retained even if the supply voltage fails or is removed.

If the or button is pressed, the original values are retained.

6.4.5.2 Position mode

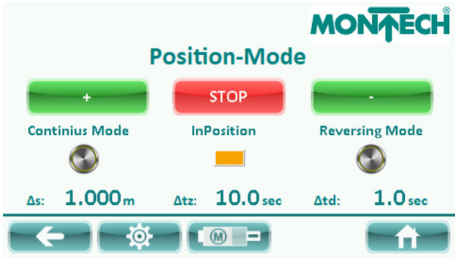


Fig. 59: Position mode screen

A defined movement sequence can be saved in position mode.

In the single movement sequence, the distance Δ s is executed once in the specified cycle time Δ t. The dwell time Δ td has no influence.

In continuous operation, the distance Δ s is executed in the specified cycle time Δ t. The conveyor then stands still for the dwell time Δ td. The process then starts all over again.

In reversing mode, the distance Δ s is executed in the specified cycle time Δ t. The conveyor then stands still for the dwell time Δ td. The process then starts again with a different direction of rotation.

Control elements

Symbol	Description	Function
+	Positive running direction	Start the conveyor in the positive direction.
-	Negative running direction	Start the conveyor in the negative direction.
Stop	Stop	Stop positioning cycle.
	Target position not reached	Positioning order not yet fulfilled.
	Target position reached	Positioning order fulfilled.
Δ s	Route	Distance to be covered

Symbol	Description	Function
Δ tz	Cycle time	Travel time
Δ td	Downtime	Standstill between cycles (dwell time)

Starting speed mode

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:
- The *"MonTouch Mode"* home screen is displayed.

1. Select *"Position mode"*.
2. Press the + or - button to start position mode.

Do not leave the user interface while the conveyor is running. If the , , or button is pressed, the "Please stop positioning cycle" message appears.

Stopping position mode

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:
- The conveyor runs in position mode.

Press the Stop button.

⇨ The conveyor is stopped with a controlled delay.

Or during a quick stop:

Press the *"QUICK STOP"* button.

⇨ The conveyor is stopped immediately.

Setting parameters for the positioning cycle

The parameters of the positioning cycle depend on the acceleration and deceleration values set. The limit values for the travel distance and the cycle time are adjusted automatically.

Changes to the acceleration values may mean that the position mode parameters cannot be maintained. In this case, the parameters are reset to the default values (Fig. 59).

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:
- The drive is stopped.

1. Press the button.
2. Use the button to select the desired parameter.
3. Use the and buttons to set the desired value.

The limit values for the travel distance and the cycle time depend on each other and on the acceleration values set. The limits adapt dynamically.

When a limit value is reached, the value stagnates. If the limit is changed, the other value must also be changed.

The dwell time can be set in the range 0.1 to 999.9 s. The belt speed value shows the maximum speed reached during the positioning job.

4. Press the button.

⇨ The set values are saved. The *"Parameter successfully saved"* message window appears for about 2 seconds. The *"Position mode"* screen is then displayed again.

The conveyor can now be operated with the saved parameters.

The parameters are permanently stored in the drive's EEPROM memory after the parameterization process has been completed. This means that the parameter values are retained even if the supply voltage fails or is removed.

If the or button is pressed, the original values are retained.

6.4.5.3 Setting basic parameters

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:
- The *"MonTouch Mode"* home screen is displayed.

Setting the acceleration ramp

1. Select *"Settings"*.
2. Select *"Acceleration ramp"*.
3. Use the button to select the acceleration or deceleration value.
4. Use the and buttons to set the desired value.

The value range is limited and depends on the total gear ratio.

5. Press the button.

⇨ The set values are saved. The *“Parameter successfully saved”* message window appears for about 2 seconds.

The conveyor can now be operated with the saved parameters.

The parameters are permanently stored in the drive's EEPROM memory after the parameterization process has been completed. This means that the parameter values are retained even if the supply voltage fails or is removed.

If the or button is pressed, the original values are retained.

Setting the correction factor

1. Select *“Settings”*.
2. Select *“Correction factor”*.
3. Use the and buttons to set the desired value.

The value range is limited and depends on the total gear ratio.

4. Press the button.

⇨ The set values are saved. The *“Parameter successfully saved”* message window appears for about 2 seconds.

The conveyor can now be operated with the saved parameters.

The parameters are permanently stored in the drive's EEPROM memory after the parameterization process has been completed. This means that the parameter values are retained even if the supply voltage fails or is removed.

If the or button is pressed, the original values are retained.

6.4.5.4 Drive status overview

The status overview shows various motor data. The information is distributed over two user interfaces (Fig. 60).

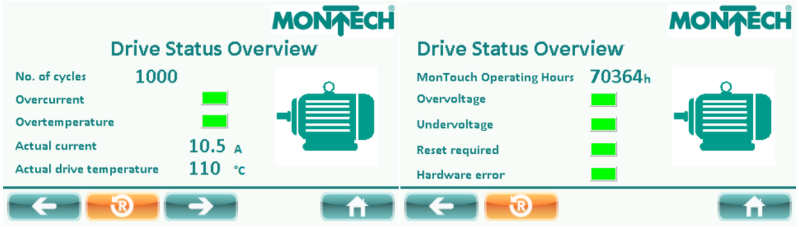


Fig. 60: Drive status overview

Number of cycles

Displays the number of positioning mode cycles performed. The counter can be reset by pressing the button for 3 seconds.

If the voltage is interrupted, the meter data are lost. The value is not saved in the EEPROM memory.

Overcurrent

Indicates an error if the winding current is > 20,000 mA.

The winding current is not the current consumption of the drive.

Overtemperature

Indicates an error if the measured PCB temperature is > 100 °C.

The error can be acknowledged if the PCB temperature is < 95 °C.

Current flow

Displays the current winding current in steps of 0.1 A.

The winding current is not the current consumption of the drive. The displayed value is a calculated value.

Current drive temperature

Displays the current PCB temperature in steps of 1 °C.

Operating hours of drive system

Displays the operating hours of MonTouch operation. The value is saved in the EEPROM memory every hour on the hour.

If the voltage is interrupted, the data since the last storage are lost.

Overvoltage

Indicates an error if the voltage value of the power supply exceeds 28 V DC.

The voltage hysteresis is 2 V DC.

Undervoltage

Indicates an error if the voltage value of the power supply falls below 18 V DC.

The voltage hysteresis is 2 V DC.

Reset required

Indicates that a reset is necessary after troubleshooting.

Hardware Error

Displays an error if the drive detects a hardware error.

This error cannot be acknowledged. Contact customer service “Customer service” on page 3.

Calling up drive status overview

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:

- The *“Position Mode”* or *“Speed Mode”* screen is displayed.

→ Press the button.

Or:

Prerequisite:

- The *"MonTouch Mode"* screen is displayed.

→ Select the *"Status"* button.

6.4.5.5 Acknowledging a motor error

If a motor error occurs, a message appears (Fig. 61).

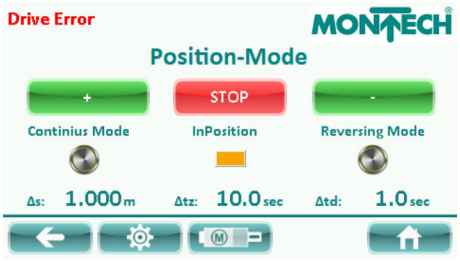


Fig. 61: Motor error

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

1. Calling up drive status overview *"Calling up drive status overview" on page 90*.
   ⇨ The existing error is displayed in red.
2. Eliminate the cause of the error.
3. Press the button.
   ⇨ The error is acknowledged.

6.5 Parameterizing the conveyor

6.5.1 Connecting MonTouch as a parameterization unit

The parameterization unit with the corresponding cable set can be connected to an existing system.

Personnel:
- Specialist staff

Protective equipment:
- Protective gloves
- Safety shoes

The illustration and the instructions describe the connection process for the drive unit with the connection on the right.

For drive units with the connection on the left, the signal and power connectors on the drive unit are reversed.

Prerequisite:

- The conveyor is connected for PLC operation or for MonTurn operation and is ready for use.
- The conveyor is de-energized.

Preparing MonTouch

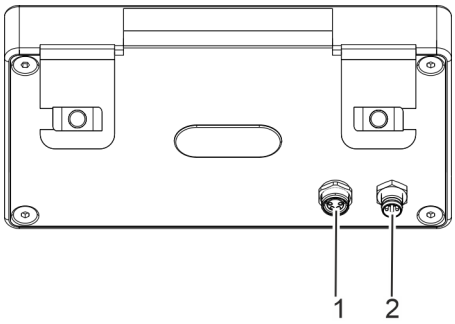


Fig. 62: MonTouch connections

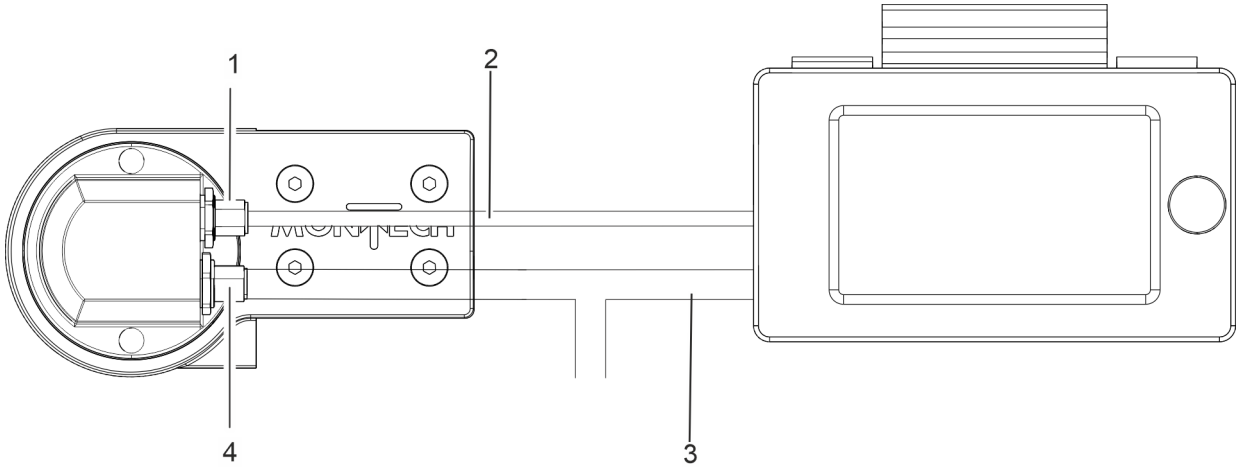


Fig. 63: Connecting MonTouch

1. Plug the power distribution cable of the parameterization unit into the connection (Fig. 62/2) on one side.
2. Plug the signal cable of the parameterization unit into the connection (Fig. 62/1) on one side.

3. Disconnect the existing cable at the connection of the drive unit (Fig. 63/1) and plug in the signal cable of the parameterization unit instead (Fig. 63/2).
4. Insert the power distribution cable of the parameterization unit (Fig. 63/3) into the power supply circuit. To do this, disconnect the existing cable at the drive unit connection (Fig. 63/4) and connect the power distribution cable of the parameterization unit instead (Fig. 63/3).
5. Connect the power cable from the conveyor to the power distribution cable of the parameterization unit (Fig. 63/3).
   ⇨ The drive unit and parameterization unit are supplied simultaneously via the supply cable.
6. Switch the power supply to the conveyor back on and carry out the parameterization.
7. Once the parameterization has been completed, de-energize the conveyor and restore the original wiring.

6.5.2 Using MonTouch as a parameterization unit

6.5.2.1 Selecting the operating mode

Possible operating modes

The following operating modes can be selected:

- MonTouch operation: The conveyor is controlled using the MonTouch control unit. No external control unit can be used. *Chapter 6.5.2.2 “Parameterizing MonTouch mode” on page 95*
  The following MonTouch mode parameters can be set via the parameterization unit (control unit):
  MonTouch mode parameterization
  – Total gear ratio
  – Restart behavior
- MonTurn operation: The conveyor is controlled using the MonTurn control unit. No external control unit can be used. *Chapter 6.5.2.3 “Parameterizing MonTurn mode” on page 96*
  The following MonTurn mode parameters can be set via the parameterization unit:
  MonTurn mode parametrization
  – Total gear ratio
  – Restart behavior

- PLC speed mode: The conveyor is controlled by a higher-level control system (e.g., PLC). The direction of rotation and one of the three fixed speeds are selected via four digital inputs. The speed can also be set continuously via an analog input (1–10 V). *Chapter 6.5.2.4 “Parameterizing PLC speed mode” on page 97*
  The following PLC speed mode parameters can be set via the parameterization unit:
  PLC speed mode parameterization
  – Total gear ratio
  – Fixed speeds v1, v2, v3
  – Acceleration and deceleration ramps
  – Overrun distance, cw or ccw
  – Restart behavior
  – Correction factor
  – Output messages for Out1, Out2, Out3
    - A track encoder
    - B track encoder
    - Speed alert threshold
    - Current alert threshold
    - Message window in position
    - Temperature alert threshold
- PLC position mode: The conveyor can be controlled by a higher-level control system (e.g., PLC). A clearly defined route is traveled with a pulse via a digital input. If there are several pulses, the route is traveled several times. The speed is set continuously via an analog input (1–10 V). *Chapter 6.5.2.5 “Parameterizing the PLC position mode” on page 100*
- PLC position mode: parameterization
  – Total gear ratio
  – Travel distance per pulse
  – Belt speed
  – Positioning window
  – Acceleration and deceleration ramps
  – Overrun distance, cw or ccw
  – Restart behavior
  – Correction factor
  – Output messages for Out1, Out2, Out3
    - A track encoder
    - B track encoder
    - Speed alert threshold
    - Current alert threshold
    - Message window in position
    - Temperature alert threshold

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:
- The "Parameterization" home screen is displayed.

1. Select *“TB40”*.
   ⇨ The operating modes are displayed.
2. Press the button to select the desired operating mode.
3. Press the button.
   ⇨ The selected operating mode is confirmed.

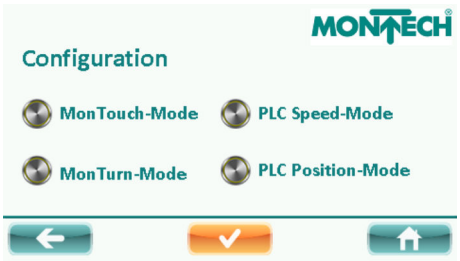


Fig. 64: Overview of operating modes

If MonTouch mode is stored on the drive, the parameterization process can be cancelled using the button.

If the PLC speed mode or PLC position mode is stored on the drive, the parameterization process must be completed. Otherwise, the “Parameterization not completed” message will appear.

6.5.2.2 Parameterizing MonTouch mode

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:
- The *“Parameterization”* home screen is displayed.

1. Select *“TB40”*.
   ⇨ The operating modes are displayed.

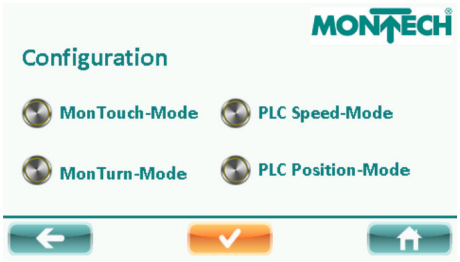


Fig. 65: Overview of operating modes

2. Press the button to select *"MonTouch mode"*.
3. Press the button.
   ⇨ The selected operating mode is confirmed.
4. Use the and buttons to set the required value for the total gear ratio.

> *For further information, see Appendix "Total gear ratio" on page 141.*

5. Press the button.
   ⇨ The set value is saved. The *"Parameter successfully saved"* message window appears for about 2 seconds. The main window for MonTouch operation is then displayed.

   The conveyor can now be operated in MonTouch mode.

> *The parameters are permanently stored in the drive's EEPROM memory after the parameterization process has been completed. This means that the parameter values are retained even if the supply voltage fails or is removed.*

6.5.2.3 Parameterizing MonTurn mode

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:
- The *"Parameterization"* home screen is displayed.

1. Select *"TB40"*.
   ⇨ The operating modes are displayed.

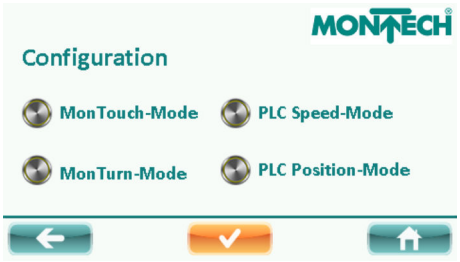


Fig. 66: Overview of operating modes

2. Press the button to select *"MonTurn mode"*.
3. Press the button.
   ⇨ The selected operating mode is confirmed.
4. Use the and buttons to set the required value for the total gear ratio.

> *For further information, see Appendix "Total gear ratio" on page 141.*

5. Press the button.
6. Use the and buttons to set the restart behavior.
   - Acknowledgement required (default)
   - Automatic
7. Press the button.
   ⇨ The set values are saved. The *"Parameter successfully saved"* message window appears for about 2 seconds. The home screen is then displayed again.

   The conveyor can now be operated with the MonTurn control unit.

> *The parameters are permanently stored in the drive's EEPROM memory after the parameterization process has been completed. This means that the parameter values are retained even if the supply voltage fails or is removed.*

6.5.2.4 Parameterizing PLC speed mode

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:
- The *"Parameterization"* home screen is displayed.

1. Select *"TB40"*.
   ⇨ The operating modes are displayed.

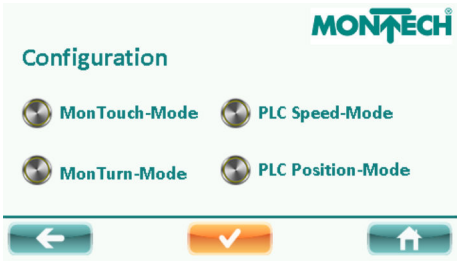


Fig. 67: Overview of operating modes

2. Press the button to select *“PLC speed mode”*.
3. Press the button.
   ⇨ The selected operating mode is confirmed.
4. Use the and buttons to set the required value for the total gear ratio.

> *For further information, see Appendix “Total gear ratio” on page 141.*

5. Press the button.
6. Press the button to select one of the three *“belt speeds”*.
7. Use the or button to set the belt speeds.

> *The belt speeds are permanently stored after parameterization has been completed; they can be controlled via the digital inputs (bit pattern).*
>
> *The value range is limited and adapts to the set total gear ratio.*
>
> *For further information, see Appendix “Belt speeds” on page 142.*

8. Press the button.
9. Press the button to select *“the acceleration and deceleration value”*.
10. Use the and buttons to set the acceleration and deceleration values.

> *The value range is limited and adapts to the set total gear ratio.*
>
> *For further information, see Appendix “Acceleration values” on page 146.*

11. Press the button.
12. Press the button to select *“positive and negative tracking values”*.
13. Use the and buttons to set the positive and negative overrun values.

> *If both values are set to 0.000 m, no overtravel is performed.*
>
> *For further information, see Appendix “Overrun” on page 147.*

14. Press the button.

15. Use the ↑ and ↓ buttons to set the restart behavior.
    - Acknowledgement required (default)
    - Automatic
16. Press the ✓ button.
17. Use the ◉ button to select the desired outputs.
18. Use the ↑ and ↓ buttons to select the desired output function.

For further information, see ↳ Appendix “Output assignment” on page 148.

19. Press the ✓ button.
20. Use the ↑ and ↓ buttons to set the speed alert threshold.

For further information, see ↳ Appendix “Output assignment” on page 148.

21. Press the ✓ button.
22. Use the ↑ and ↓ buttons to set the current alert threshold.

For further information, see ↳ Appendix “Output assignment” on page 148.

23. Press the ✓ button.
24. Use the ↑ and ↓ buttons to set the temperature alert threshold.

For further information, see ↳ Appendix “Output assignment” on page 148.

25. Press the ✓ button.
26. Use the ↑ and ↓ buttons to set the correction factor.

For further information, see ↳ Appendix “Correction factor” on page 152.

27. Press the button.

⇨ The set values are saved. The *"Parameter successfully saved"* message window appears for about 2 seconds. The home screen is then displayed again.

The conveyor can now be controlled via the analog and digital input.

> *The parameters are permanently stored in the drive's EEPROM memory after the parameterization process has been completed. This means that the parameter values are retained even if the supply voltage fails or is removed.*

6.5.2.5 Parameterizing the PLC position mode

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:

- The *"Parameterization"* home screen is displayed.

1. Select *"TB40"*.

⇨ The operating modes are displayed.

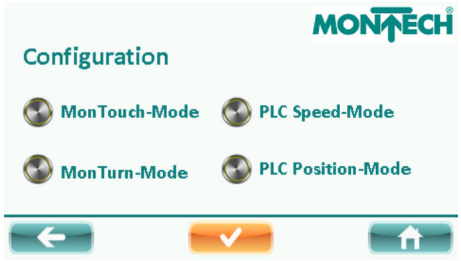


Fig. 68: Overview of operating modes

2. Press the button to select *"PLC positioning mode"*.
3. Press the button.

⇨ The selected operating mode is confirmed.

4. Use the and buttons to set the required value for the total gear ratio.

> *For further information, see Appendix "Total gear ratio" on page 141.*

5. Press the button.
6. Press the button to select *"the route, track speed"* or *"positioning window"*.
7. Use the and buttons to set the corresponding values.
8. Press the button.
9. Use the button to select *"acceleration"* or *"deceleration"*.

10. Use the ↑ and ↓ buttons to set the value.

> *The value range is limited and adapts to the set total gear ratio.*
>
> *For further information, see ↳ Appendix "Acceleration values" on page 146.*

11. Press the ✓ button.
12. Press the ◉ button to select *"positive and negative tracking values"*.
13. Use the ↑ and ↓ buttons to set the positive and negative overtravel values.

> *If both values are set to 0.000 m, no overtravel is performed.*
>
> *For further information, see ↳ Appendix "Overrun" on page 147.*

14. Press the ✓ button.
15. Use the ↑ and ↓ buttons to set the restart behavior.
    - Acknowledgement required (default)
    - Automatic
16. Press the ✓ button.
17. Use the ◉ button to select the desired outputs.
18. Use the ↑ and ↓ buttons to select the desired output function.

> *For further information, see ↳ Appendix "Output assignment" on page 148.*

19. Press the ✓ button.
20. Use the ↑ and ↓ buttons to set the speed alert threshold.

> *For further information, see ↳ Appendix "Output assignment" on page 148.*

21. Press the ✓ button.
22. Use the ↑ and ↓ buttons to set the current alert threshold.

> *For further information, see ↳ Appendix "Output assignment" on page 148.*

23. Press the button.

24. Use the and buttons to set the temperature alert threshold.

For further information, see Appendix “Output assignment” on page 148.

25. Press the button.

26. Use the and buttons to set the correction factor.

For further information, see Appendix “Correction factor” on page 152.

27. Press the button.

⇨ The set values are saved. The *“Parameter successfully saved”* message window appears for about 2 seconds. The home screen is then displayed again.

The conveyor can now be controlled via the analog and digital input.

The parameters are permanently stored in the drive's EEPROM memory after the parameterization process has been completed. This means that the parameter values are retained even if the supply voltage fails or is removed.

6.6 Restart behavior

6.6.1 “Restart” parameter

The *“restart”* parameter is used to configure the behavior after safety-critical errors. The drive cannot be operated while safety-critical faults are pending. If there are no more safety-critical faults, the drive must be started by acknowledgement to make it ready for operation.

0 = Automatic restart

1 = Acknowledgement required

The drive can also be configured for automatic restart on request.

In the case of automatic restart behavior, however, it is essential that the end user consider the risk of the conveyor starting up automatically in the risk assessment.

Firmware 1.6.4

The function is only available from firmware version 1.6.4 of the drive. The actuator firmware can be read out with the MonTouch.

6.6.2 Restart acknowledgement

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisite:

- The parameterization for the restart behavior is set to "Acknowledgement required."

→ Set IN A and IN B to 0 (freewheel).

To restart the drive, it must be restarted via IN A and/or IN B, depending on the parameterization and bit pattern.

The rising edge causes the error to be acknowledged.

On the output side, the switchover to "ready for operation" is made by the acknowledgement, i.e., only after the start signal has been given.

7 Maintenance

7.1 Safety during maintenance

Cleaning work

NOTICE!

Contact of water with live components!

If cleaning work is carried out on the conveyor, material damage may occur if water comes into contact with live parts or enters electrical and electronic parts and components (control cabinet, etc.).

- Proceed with caution during cleaning and ensure that no water comes into contact with live parts or splashes into electrical and electronic components or components that must not be exposed to water for safety reasons.
- Clean the relevant areas with a damp cloth only; do not use a high-pressure or steam cleaner.
- Train staff regularly.

Moving components

WARNING!

Risk of injury during all work on the conveyor when it is switched on!

When working on a conveyor that is in operation, there is a risk of injury due to the movement of components, stored energy, and contact with live parts.

- Switch off the conveyor and secure it against being switched on again. The operator must establish a lockout/tagout procedure that reduces or isolates hazardous energy and secures the machine against unintentional restarting.
- Before restarting, ensure that all protective devices are fitted and functional.

WARNING!

Risk of injury when adjusting the conveyor belt while the conveyor is running!

There is a risk of injury from impact, crushing, shearing and drawing in when working on a moving conveyor.

- Work should only be carried out by qualified personnel.
- Take particular care when working near moving parts.
- Wear personal protective equipment.

Incorrect assembly

WARNING!

Risk of injury due to incorrect installation of the conveyor!

Incorrectly mounted parts can cause the structure to break and parts of the conveyor to fall and cause serious injury.

– Fasten all existing screw connections.
– Establish the correct tightening torques.

Illegible labeling

WARNING!

Risk of injury due to illegible signage!

Over time, stickers and signs can become dirty or otherwise unrecognizable, so that hazards cannot be identified and necessary operating instructions cannot be followed. This poses a risk of injury.

– Keep all safety, warning and operating instructions in a legible condition at all times.
– Replace damaged signs or stickers immediately.

Sharp corners and edges

CAUTION!

Risk of injury from sharp corners or edges!

Sharp corners or edges may be exposed throughout the machine area during certain activities, which can cause injuries such as cuts, abrasions, or punctures.

– Wear the prescribed personal protective equipment for all work.

7.2 Maintenance schedule

Interval	Maintenance work	Personnel
If required	Correct the belt run ↳ *Chapter 7.3.1 “Correcting the belt run” on page 107*.	Specialist staff
Monthly	Check the conveyor belt for damage ↳ *Chapter 7.3.2 “Checking the conveyor belt” on page 108*.	Operator
	Check lugs and screws.	Operator
	Check MonTurn for damage.	Operator
	Check MonTouch for damage.	Operator
	Check plug connections and cables for damage.	Operator
Every six months	Clean the conveyor ↳ *Chapter 7.3.3 “Cleaning the conveyor” on page 109*.	Operator
	Check grounding connection.	Qualified electrician
	Check the connector plug of the MonTouch.	Qualified electrician

7.3 Maintenance work

7.3.1 Correcting the belt run

The conveyor belt must run centrally over the diverter roller and the drive roller. The edges of the conveyor belt must not touch the sides of the conveyor.

Personnel:
- Specialist staff

Protective equipment:
- Protective gloves
- Safety shoes

→ Correct the belt run by tightening or loosening the hexagon head screws (Fig. 69/1).

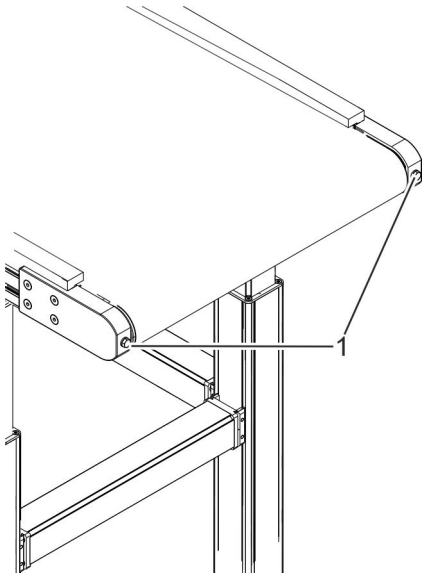


Fig. 69: Correcting the belt run

7.3.2 Checking the conveyor belt

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

1. → Check the belt run and correct if necessary ↳ *Chapter 8.3.1.1.1 “Pre-loading the conveyor belt” on page 115*, ↳ *Chapter 7.3.1 “Correcting the belt run” on page 107*.

2. → Check the conveyor belt for damage (especially the joints). Replace the conveyor belt if damaged ↳ *Chapter 8.3.1 “Replacing the conveyor belt” on page 114*.

7.3.3 Cleaning the conveyor

Cleaning the conveyor

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

1. Switch off the conveyor and secure it against being switched on again.
2. Clean the conveyor with a dry cloth.

Cleaning the conveyor belt

NOTICE!

Damage due to cleaning with water!

If the conveyor belt is improperly cleaned with water, the conveyor belt may be damaged.

- When cleaning with hot water or steam, do not exceed the permissible temperature for the conveyor belt.
- Do not use high-pressure cleaners.
- Dry off the conveyor belt after cleaning.
- Do not place the conveyor belt in water or other liquids for long periods of time.
- Only use soft brushes.

Personnel:
- Operator

Protective equipment:
- Protective cover
- Protective clothing
- Protective gloves
- Safety shoes

1. Switch off the conveyor and secure it against being switched on again.
2.
   - Remove light soiling (e.g., dust) with a soft cloth.
   - Remove oily or greasy soiling with a suitable solvent (*“Suitable solvents” on page 110*).
   - Remove stubborn dirt by brushing with soapy water or washing with a suitable solvent.

   Special requirements apply to the cleaning and disinfection of synthetic conveyor belts in the food industry.
3. Dry off the conveyor belt.

Suitable solvents

Habasit resistance category	1	2	3	4	5	6	7	8	9	10
Material coating (transport side)	PA	NBR PUR Hamid	PVC	EPDM	NBR PUR SI	TPU PUR+TPU NBR+TPU SI+TPU	PVC	PTFE	TPO	Habilene
Material: reinforced fabric	PA	PA AR Hamid CEL	PET	PET	PET Glass	PET AR BW	PET	AR	PET	PET
Cleaning agent										
Neutral[1]	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Alkaline[2]	✔	✔	✔	o	✔	o	✔	✔	✔	✔
Acid[3]	x	x	✔	✔	✔	✔	✔	✔	✔	✔
Chloric[4]	o	o	o	o	o	o	o	✔	✔	✔
Alcohol[5]	✔	✔	o	✔	✔	o	✔	✔	✔	✔

Explanation of symbols

✔ - Resistant in normal climate (23 °C, 50% relative humidity)

o - Conditionally stable.

Depending on the concentration, development time, thermal and mechanical stress, discoloration, swelling, embrittlement or abrasion is possible.

x - Not stable even at low concentrations.

List of materials

AR - Aramid
BW - Cotton
CEL - Cellulose
EPDM - Ethylene propylene terpolymer
NBR - Acrylonitrile butadiene rubber
PA - Polyamide
PCV - Polyvinyl chloride (monomer plasticizer)
PET - Polyester
PTFE - Polytetrafluoroethylene (Teflon)
PUR - Polyurethane (cross-linked)
PVC - Polyvinyl chloride (polymer plasticizer)
SI - Silicone
TPO - Polyolefin thermoplastic
TPU - Polyurethane thermoplastic

Examples of cleaning agents

[1] - Water
[2] - Soapy water, soda, ammonia solution
[3] - Vinegar, citric acid
[4] - Javel water (sodium hypochlorite solution < 1%)
[5] - Ethanol, methanol, methylated spirits

Unsuitable solvents

– *Aromatic compounds (benzene, toluene, xylene)*
– *Chlorinated hydrocarbons (trichloroethylene, tetrachloroethylene, hydrogen tetrachloride)*
– *Ketones (acetone, methyl ethyl ketone)*

8 Malfunctions

8.1 Spare parts

Incorrect spare parts

WARNING!

Risk of injury due to the use of incorrect spare parts!

The use of incorrect or faulty spare parts can result in danger to personnel and cause damage, malfunctions or total failure.

- Only use original spare parts from the manufacturer or spare parts approved by the manufacturer.
- Always contact the manufacturer if anything is unclear.

Loss of warranty

Loss of warranty

The manufacturer's warranty is void if unauthorized spare parts are used.

Order

Obtain spare parts from authorized dealers or directly from the manufacturer ↳ *Manufacturer's contact details on page 4.*

8.2 Fault table

Conveyor belt

Fault description	Cause	Remedy
Belt runs off to one side during operation.	Incorrect position of the diverter roller	Check the position of the diverter roller at the end section. (↳ *Chapter 7.3.1 “Correcting the belt run” on page 107*)
	Convey heavy products on the side of the belt.	Transport heavy products in the middle of the belt.

MonTouch

Fault description	Cause	Remedy
Initialization is permanently displayed.	Communication problem between MonTouch and the conveyor.	Check connection of MonTouch and conveyor. If the problem persists, contact customer service ↳ *“Customer service” on page 3*.
Overcurrent fault	Winding current is > 20,000 mA.	Check the conveyor for mechanical damage. Check for blockages caused by foreign objects. Check the belt run and correct if necessary.

Fault description	Cause	Remedy
Overcurrent fault	Winding current is > 20,000 mA.	Acknowledge error ↳ *Chapter 6.4.5.5 “Acknowledging a motor error” on page 91*.
Overtemperature error	The maximum PCB temperature is > 100 °C.	Check the conveyor for mechanical damage. Check for blockages caused by foreign objects. Check the belt run and correct if necessary. Acknowledge error if the PCB temperature is < 95 °C ↳ *Chapter 6.4.5.5 “Acknowledging a motor error” on page 91*.
Overvoltage error	Voltage value of the power supply exceeds 28 V DC.	Check power supply. Acknowledge error ↳ *Chapter 6.4.5.5 “Acknowledging a motor error” on page 91*.
Undervoltage error	Voltage value of the power supply falls below 18 V DC.	Check power supply. Acknowledge error ↳ *Chapter 6.4.5.5 “Acknowledging a motor error” on page 91*.
Hardware error	Drive detects a hardware error.	Contact customer service ↳ *“Customer service” on page 3*.

8.3 Troubleshooting work

8.3.1 Replacing the conveyor belt

Running direction of the conveyor belt

The running direction of the belt must be maintained if the belt ends are joined by means of an overlapping welded joint (Thermofix).

For Z-joints (Flexproof) or welded end-to-end joints (Quickmelt), the running direction is unimportant.

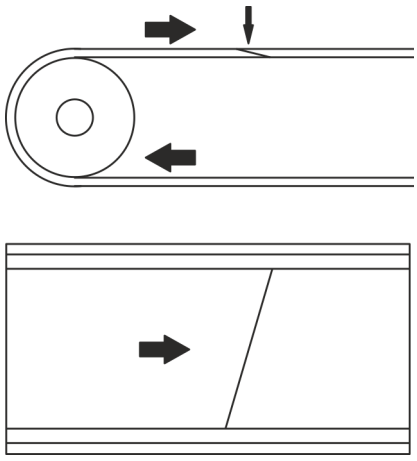


Fig. 70: Thermofix running direction

8.3.1.1 Replacing endless belts

We recommend installing endless belts if the conveyor is easily accessible or if the necessary equipment for welding continuous splicing is not available.

Personnel:
- Specialist staff

Protective equipment:
- Protective clothing
- Protective gloves
- Safety shoes

Prerequisites:
- All obstructive attachments (e.g., control unit, lateral guides) have been removed.
- The substructure has been dismantled.
- Switch off the conveyor and secure it against being switched on again.

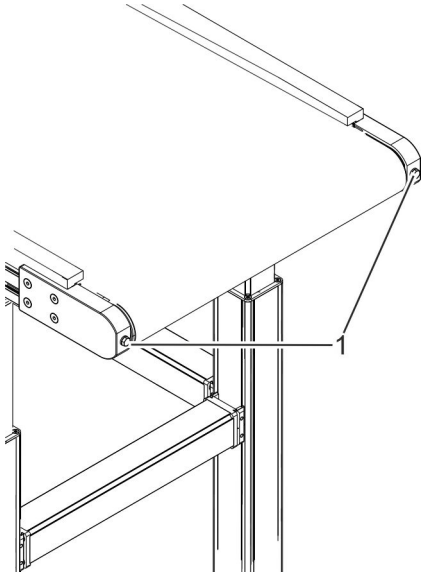


Fig. 71: Loosen the clamping screws

1. Slacken the conveyor belt by alternately loosening the two tensioning screws (Fig. 71/1).
2. Pull the conveyor belt off to one side.
3. Fit the replacement conveyor belt onto the conveyor. Note the mounting direction.
4. Pretension the conveyor belt ↬ *Chapter 8.3.5 “Tensioning the conveyor belt for the first time” on page 122*.
5. Correct the belt run ↬ *Chapter 7.3.1 “Correcting the belt run” on page 107*.

8.3.1.1.1 Pre-loading the conveyor belt

The pre-load of the conveyor belt is individual and is specified on the conveyor’s rating plate (↬ Chapter 10.7 “Rating plate” on page 129).

The conveyors are supplied with pretensioned conveyor belts. The conveyor belt must be pretensioned when replacing it.

Personnel:
- Specialist staff

Protective equipment:
- Protective gloves
- Safety shoes

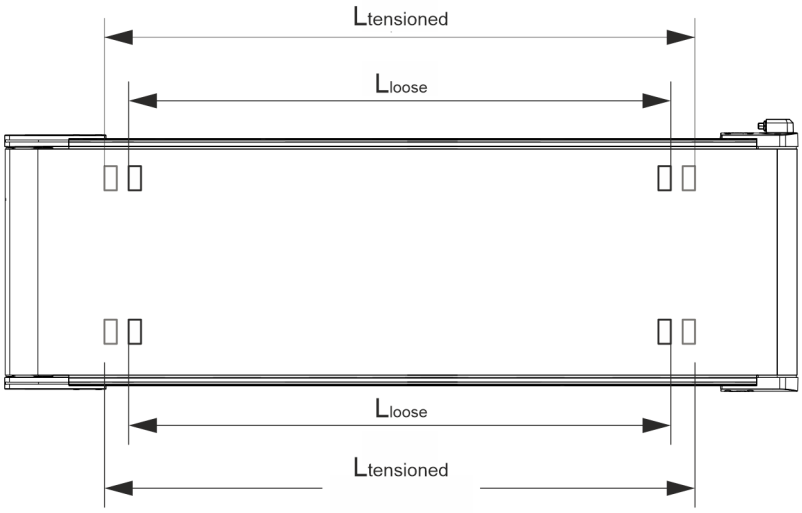


Fig. 72: Positioning measuring marks

1. Attach four measuring marks to the top of the conveyor belt so that the distance (L_{loose}) is the same on both sides (e.g., 500 or 1,000 mm) (Fig. 72).
2. Tighten the clamping screws (Fig. 73/1) evenly until the required pre-load is achieved.

   ⇨ The measuring marks move away from each other.
3. Check that the pre-load is the same on both sides.

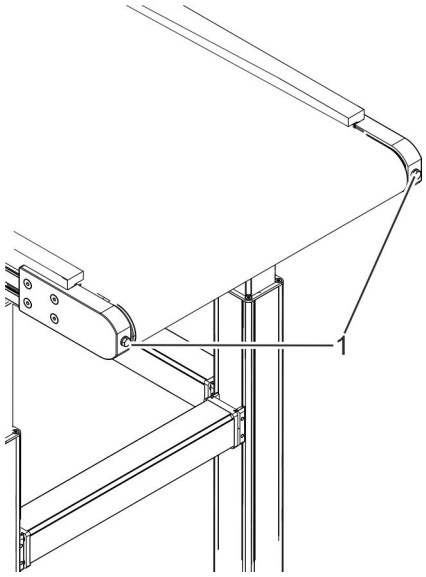


Fig. 73: Tightening the clamping screws

Calculation of pre-load (example: 0.4%)	Distance between the measuring marks: 1,000 mm, required pre-load: 0.4% $L_{tensioned} = L_{loose} + L_{loose}/100 * V_{required}$ (%) $L_{tensioned}$ = 1,000 mm + 1,000 mm/100 * 0.4 % = 1,004 mm

8.3.2 Replacing the drive unit

Personnel:
- Specialist staff

Protective equipment:
- Protective clothing
- Protective gloves
- Safety shoes

1. Switch off the conveyor and secure it against being switched on again.
2. Disconnect the signal cable and power cable from the drive unit.
3. Place markings at a predetermined distance (e.g., 1 meter) on the conveyor belt and note the distance.
4. Slacken the conveyor belt by alternately loosening the clamping screws (Fig. 74/1).

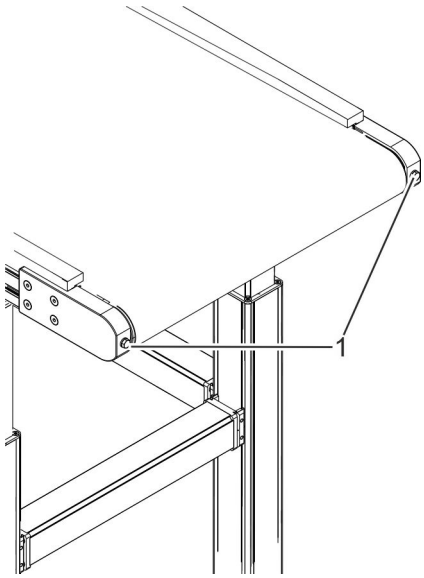


Fig. 74: Tightening the clamping screws

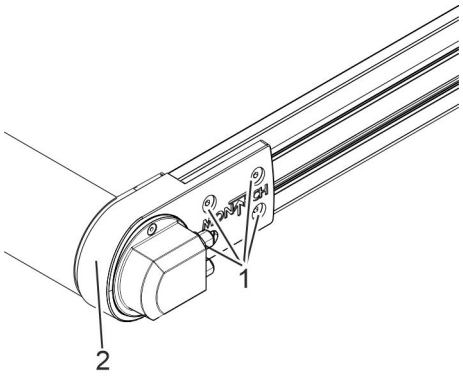


Fig. 75: Replacing the drive unit

5. Loosen and remove four screws (Fig. 75/1).
6. Pull out the drive unit (Fig. 75/2) in the direction of the connector plugs.
7. Slide in the replacement drive unit (Fig. 75/2) from the direction of the connector plugs. The bearing is located on the opposite side.
8. Insert and tighten four screws (Fig. 75/1) on both sides.

   Tightening torque: 6 Nm
9. Plug the signal cable and power cable into the drive unit.
10. Pretension the conveyor belt again to the original distance between the markings. *Chapter 8.3.1.1.1 “Pre-loading the conveyor belt” on page 115*.
11. Correct the belt run *Chapter 8.3.3 “Aligning the conveyor belt” on page 118*.

8.3.3 Aligning the conveyor belt

The conveyor belt was pre-tensioned and adjusted at the factory before delivery. It may be necessary to readjust the belt run due to transport or installation.

- *After a standstill of more than 2 hours, allow the conveyor belt to run in nominal operation for 5–10 minutes so that the conveyor belt can run in to the new setting.*
- *When adjusting, the belt requires 2–10 rotations to react to the change. Only then make further settings*
- *All drive and diverter rollers must be clean. Replace damaged or badly worn parts.*
- *After each adjustment, allow the belt to run a few rotations in the new direction before making any further corrections.*

Adjusting the belt reaction during belt run with diverter roller Ø60 mm

Infeed

Personnel:
- Specialist staff

Protective equipment:
- Protective clothing
- Protective gloves
- Safety shoes

The conveyor belt moves towards the side on which it first touches the diverter roller in the direction of travel

→ Make corrections in small steps by turning the clamping screw (Fig. 76/2) clockwise by 1/8 to 1/4 turn. The conveying direction corresponds to the direction of the arrow (Fig. 76/1).

⇨ The conveyor belt reacts in the direction of the arrow (Fig. 76/3).

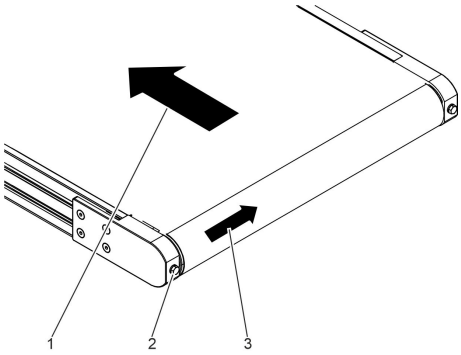


Fig. 76: Diverter roller infeed

Outlet

The conveyor belt moves towards the side on which it first touches the diverter roller in the direction of travel

→ Make corrections in small steps by turning the clamping screw (Fig. 77/2) clockwise by 1/8 to 1/4 turn. The conveying direction corresponds to the direction of the arrow (Fig. 77/1).

⇨ The conveyor belt reacts in the direction of the arrow (Fig. 77/3).

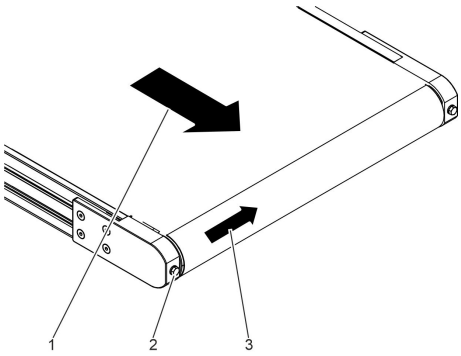


Fig. 77: Diverter roller outlet

Adjusting the belt reaction during belt run with knife edge Ø16 mm

The ball-bearing knife edge is mounted in a sturdy steel beam with several support points. The steel beam is held in place by recesses in the lug. The beam can no longer be adjusted once the lugs have been fitted. The knife edge beam is therefore fitted and aligned before delivery.

The belt pre-load and belt run are adjusted at the factory before delivery using the diverter roller located underneath. The belt run can be adjusted as required using the diverter roller.

Infeed

The conveyor belt moves towards the side on which it first touches the diverter roller in the direction of travel

→ Make corrections in small steps by turning the clamping screw (Fig. 78/2) clockwise by 1/8 to 1/4 turn. The conveying direction corresponds to the direction of the arrow (Fig. 78/1).

⇨ The conveyor belt reacts in the direction of the arrow (Fig. 78/3).

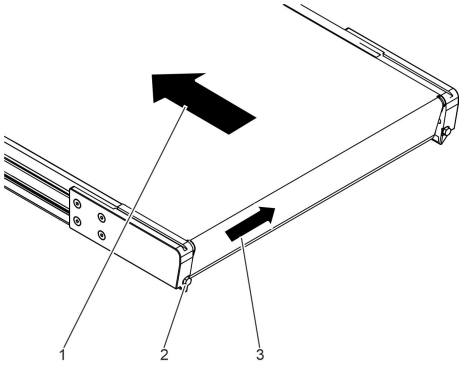


Fig. 78: Knife edge infeed

Outlet

The conveyor belt moves towards the side on which it first touches the diverter roller in the direction of travel

→ Make corrections in small steps by turning the clamping screw (Fig. 79/2) clockwise by 1/8 to 1/4 turn. The conveying direction corresponds to the direction of the arrow (Fig. 79/3).

⇨ The conveyor belt reacts in the direction of the arrow (Fig. 79/3).

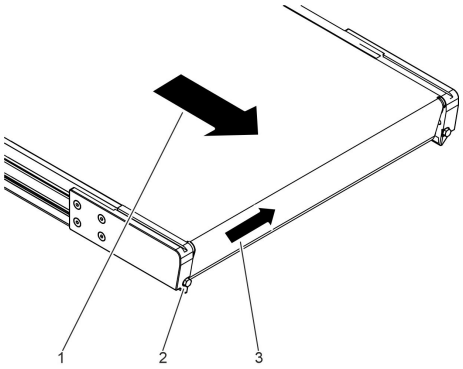


Fig. 79: Knife edge outlet

8.3.4 Slackening and retensioning the conveyor belt

Retensioning a loosened conveyor belt using the method described for initial tensioning will result in overtensioning, as the new elongation is added to the initial elongation that has not yet been fully released.

Slackening the conveyor belt

Personnel:
- Specialist staff

Protective equipment:
- Protective clothing
- Protective gloves
- Safety shoes

Fig. 80: Top view of diverter roller

1. Measure the distance from the lug to the axis of the diverter roller on both sides (lug on the left and on the right) and make a note of it (Fig. 80).
2. Slacken the conveyor belt by alternately loosening the clamping screws on the left or right lug.
   ⇨ The conveyor belt is slackened.

Tensioning the conveyor belt

The conveyor belt is slackened.

The axis must be moved as parallel as possible. Otherwise, the axis may tilt in the guides of the lugs.

Set the clamping screw on the left or right side to the values noted (Fig. 80) and tighten.

Alternative procedure

Slackening the conveyor belt

If the markings from the first tensioning are still visible, the existing markings can be used.

1. Apply measuring marks at intervals of, e.g., 1,000 mm on each side of the tensioned belt.
2. Note the original distance between the measuring marks of the tensioned belt.
3. Release the clamping device.
   ⇨ The distance between the measuring marks becomes shorter.
   ⇨ The conveyor belt is slackened.

Tensioning the conveyor belt

The conveyor belt is slackened.

The axis must be moved as parallel as possible. Otherwise, the axis may tilt in the guides of the lugs.

→ Adjust the clamping screw on the left or right side and tighten until the measuring marks reach the previously noted distance (e.g., 1,000 mm).

8.3.5 Tensioning the conveyor belt for the first time

The conveyor belt is pretensioned ↬ *Chapter 8.3.1.1.1 “Preloading the conveyor belt” on page 115*.

1. → Place two measuring marks 1,000 mm apart on each side of the untensioned belt.
2. → Tension the belt to the required pre-load using the tensioning device.

   The pre-load can be seen on the rating plate ↬ *Chapter 10.7 “Rating plate” on page 129*.
3. → If the distance between the markings increases to 1,005 mm, the correct tension has been reached (at 0.5% pre-expansion).
4. → Turn the belt at least one round and measure the distance between the markings again.
5. → Tension the belt to the required initial elongation.

9 Disassembly and disposal

9.1 Safety during disassembly

Moving components

WARNING!

Risk of injury during all work on the conveyor when it is switched on!

When working on a conveyor that is in operation, there is a risk of injury due to the movement of components, stored energy, and contact with live parts.

– Switch off the conveyor and secure it against being switched on again. The operator must establish a lockout/tagout procedure that reduces or isolates hazardous energy and secures the machine against unintentional restarting.
– Before restarting, ensure that all protective devices are fitted and functional.

Sharp corners and edges

CAUTION!

Risk of injury from sharp corners or edges!

Sharp corners or edges may be exposed throughout the machine area during certain activities, which can cause injuries such as cuts, abrasions, or punctures.

– Wear the prescribed personal protective equipment for all work.

9.2 Disassembly

Personnel: ■ Specialist staff

Protective equipment: ■ Protective clothing
■ Protective gloves
■ Safety shoes

1. Switch off the conveyor and secure it against restarting *Chapter 2.11 “Securing against restarting” on page 23*.
2. Disconnect the conveyor from the power supply.
3. Clean components *Chapter 7.3.3 “Cleaning the conveyor” on page 109*.
4. Disassemble and collect components according to material type.

9.3 Disposal

Incorrect disposal

ENVIRONMENT

Danger to the environment due to incorrect disposal!

Incorrect disposal can pose a risk to the environment.

– Have electrical waste, electronic components, lubricants and other auxiliary materials disposed of by authorized specialist companies.
– If in doubt, obtain information on environmentally sound disposal from the local municipal authority or specialized disposal companies.

If no take-back or disposal agreement has been made, disassembled components must be recycled:

- Scrap metals.
- Recycle plastic components.
- Dispose of the remaining components, sorted according to material properties.

10 Technical data

10.1 Dimensions

Data	Value	Unit
Length	360–6,000	mm
Height	83–1,600	mm
Floor stand height, max. (fixed)	1,500	mm
Floor stand height, max. (telescopic)	1,220	mm
Width	300–976	mm
Conveying width, max.	766	mm
Conveyor width	300–800	mm
Diameter of the diverter rollers	60	mm
Diameter of the drive roller	78	mm
Diameter of the knife edge	16	mm

MonTurn

Data	Value	Unit
Length	124	mm
Width	107	mm
Height	69	mm

MonTouch

Data	Value	Unit
Length	150	mm
Width	85	mm
Height	32	mm

10.2 Performance data

Data	Value	Unit
Speed (± 10%)	0.25 to 45	m/min
Load, max.	200	kg
Permissible line load	100	kg/m
Warranty period	3	Years

10.3 Connected loads

		Recommended protection
Power supply	Motor 24VDC	18A
Electronics supply		4A

Data	Value	Unit
Motor	24	V EC

MonTurn

Data	Value	Unit
Nominal voltage	24	V EC
Supply voltage range	20–28	V DC
Rated current	0.5	A
Output signal, analog	0–10	V

MonTouch

Data	Value	Unit
Nominal voltage	24	V DC
Supply voltage range	20–28	V DC
Rated current	0.5	A
Output signal	24	V

10.4 Inputs and outputs

Inputs IN A, IN B, IN 1, IN 2

Data	Value	Unit
Input level	PLC level	
Low level	< 5	V
High level	> 15	V
Protection against polarity reversal and voltages	≤ 30	V
In case of cable breakage	Logic level 0	
Input impedance	5.4	kΩ
Input frequency	≤ 10	kHz
Input frequency with setpoint specification PWM/frequency via IN 1/IN 2, max.	15	kHz

Data	Value	Unit
Input dynamics (Tau)	≤ 0.1	ms

Analog inputs AIN 1, AGND

Data	Value	Unit
Input voltage (analog IN)	0–10	V
Analog GND reference (differential measurement)	AGND	
Input frequency	≤ 1	kHz
Internal resistance	8	kΩ
Signal resolution	10	bit
Measurement tolerance (related to final value 10 V)	≤ 2	%
Polarity reversal protection	No*	

Outputs OUT 1, OUT 2, OUT 3

Data	Value	Unit
Output	PNP	
Output level	High-side driver dependent on U_{logic}	
Low level	Open source	
High level	> U_{logic} - 2	V
Output current/channel	≤ 100	mA
Peak output current/channel	approx. 600	mA
Polarity reversal protection	No*	
Overload-proof	Yes (thermo-switching)	
Output frequency at$_{out}$ = 100 mA	≤ 1	kHz

* There is no general reverse polarity protection. If the logic voltage is equal to or higher than the voltage applied to the output, it will not cause a defect.

10.5 Security and monitoring function

Functions:

- Temperature monitoring of the output stage
- Under- and overvoltage monitoring of the system voltages, overcurrent limitation
- Overload protection through I^2t

Data	Value	Unit
Temperature switch-off point (hysteresis 10 K)	120	°C
U_{ZK} overvoltage switch-off (hysteresis 2 V)	33	V
U_{ZK} undervoltage switch-off (hysteresis 2 V)	18	V
Overload protection I^2t	45	A
Hardware overcurrent circuit as max. winding current limiter	53	A
Resolution of SingleTurn absolute encoder	10/1024	bit/increments per motor revolution
Resolution on conveyor belt (gearbox 30)	0.008	mm
Resolution on conveyor belt (gearbox 80)	0.003	mm
Accuracy – absolute encoder	± 1.5	°
Accuracy on conveyor belt (gearbox 30)	± 0.035	mm
Accuracy on conveyor belt (gearbox 80)	± 0.013	mm

* Without consideration of slip and elasticity

10.6 Operating conditions

Data	Value	Unit
Ambient temperature	+10 to 40	°C
Relative humidity (non-condensing)	< 95	%
Storage temperature	+5 to 40	°C
Storage humidity (non-condensing)	< 95	%
Protection class (MonTurn/MonTouch)	IP50	

Data	Value	Unit
Protection class (conveyor)	IP66	

10.7 Rating plate

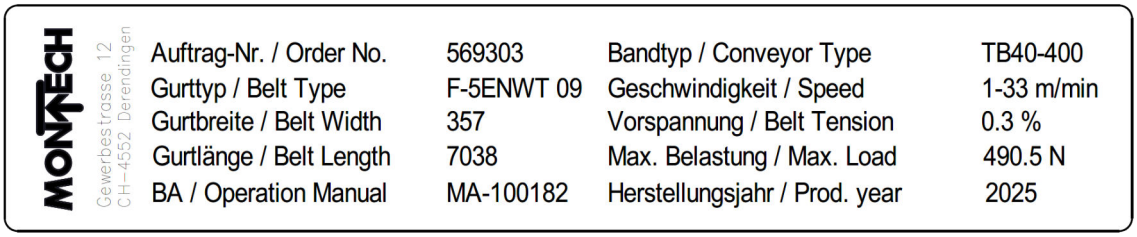


Fig. 81: Rating plate example

The rating plate is attached to the drive unit.

The rating plate contains the following information:

- Manufacturer
- Address
- Order number
- Belt type
- Belt width
- Belt length
- BA (operating instructions)
- Belt type
- Speed
- Pre-load
- Max. load
- Year of manufacture

10.8 Noise emission

Data	Value	Unit
Sound level	< 65	dB(A)

Noise emission

11 Index

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Appendix

A Declaration of incorporation

Declaration of incorporation in accordance with the EC Machinery Directive 2006/42/EC, Annex II B

The manufacturer:	Montech AG | Gewerbestrasse 12 | CH – 4552 Derendingen +41 32 681 55 00 | info@montech.com | www.montech.com

Hereby declares, that the partly completed machine

designation	**Conveyor TB40**
with/without	**Control unit MonTurn / MonTouch**

complies with the essential health and safety requirements of the Machinery Directive 2006/42/EC Annex I.

The partly completed machine also complies to the

relevant EC directives:	Machinery Directive 2006/42/EG Low Voltage Directive 2014/35/EU Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility.
and the applied harmonized standards:	EN ISO 12100:2010

The technical documentation for this partly completed machinery has been drawn up in accordance with Annex VII, Part B. **Montech AG** undertakes to transmit this technical documentation electronically to national authorities upon justified request.

Documentation Officer	Marlis Millonig Head of Product Management and Quality Assurance Montech AG Gewerbestrasse 12 4552 Derendingen Switzerland

Commissioning of the partly completed machinery is prohibited until the partly completed machinery has been integrated into a machine that complies with the provisions of the EC Machinery Directive and the EC Declaration of Conformity in accordance with Annex II A has been submitted.

Place, date	Derendingen, 06.05.2025
Firma	Montech AG
Adresse	Gewerbestrasse 12 4552 Derendingen Switzerland
Authorized representative	
Names of the signatory	Daniel Pauli
Position of the signatory	CEO

Montech AG | Gewerbestrasse 12 | 4552 Derendingen | Switzerland | info@montech.com | www.montech.com

B Belt separation

Mechanical structure of the TB40

Conveyor belt transport length

The conveyors are shipped in units of max. 3 m in length. If the total length of a conveyor exceeds the maximum transport length of 3 m, the conveyors are delivered in several parts.

The individual parts of the conveyor belts must be assembled according to the following diagrams.

Supporting the conveyor

Before commissioning, the conveyor must be fixed inside at the separation points (D) with the lateral profile connector on both sides. This connection is only used for alignment purposes. The conveyor must be supported directly at the separation point on both sides.

Transport direction

As a rule, the transport direction is in the direction of the drive unit. Operation in the opposite direction is only permitted after consultation with the manufacturer.

End section with diverter roller

ALG	Adjustable lateral guide; length in mm (min. 500 mm)
FLG	Fixed lateral guide, length in mm
C, C1, C2	Lateral profile length
D	Separation point for transport

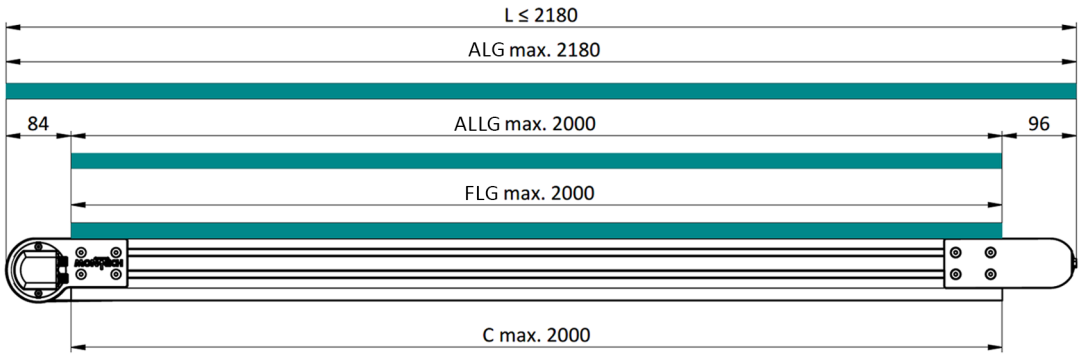

Fig. 82: Belt separation UR 0–2,180 mm

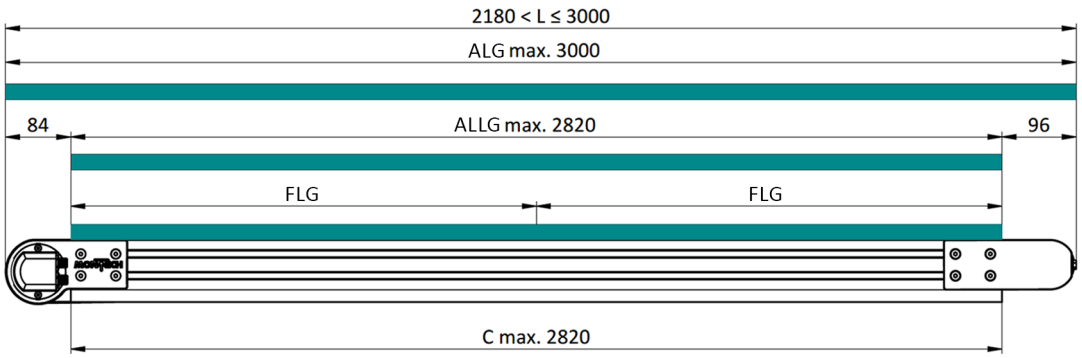

Fig. 83: Belt separation UR 2,180–3,000 mm

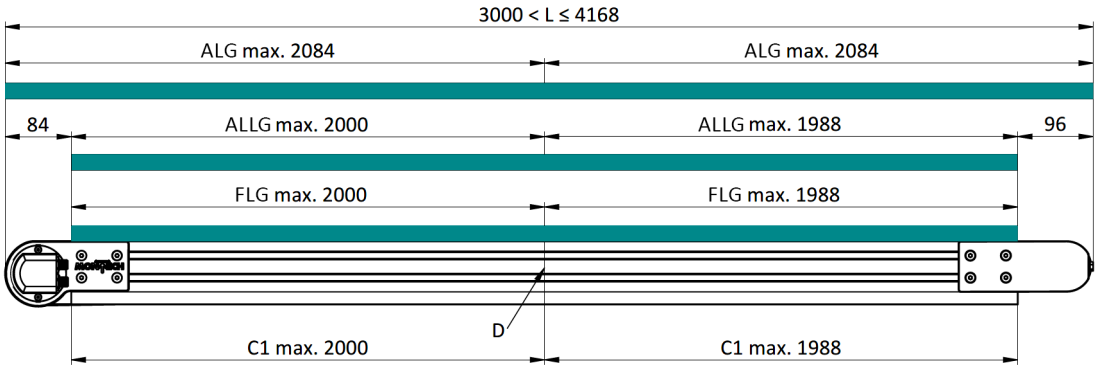

Fig. 84: Belt separation UR 3,000–4,168 mm

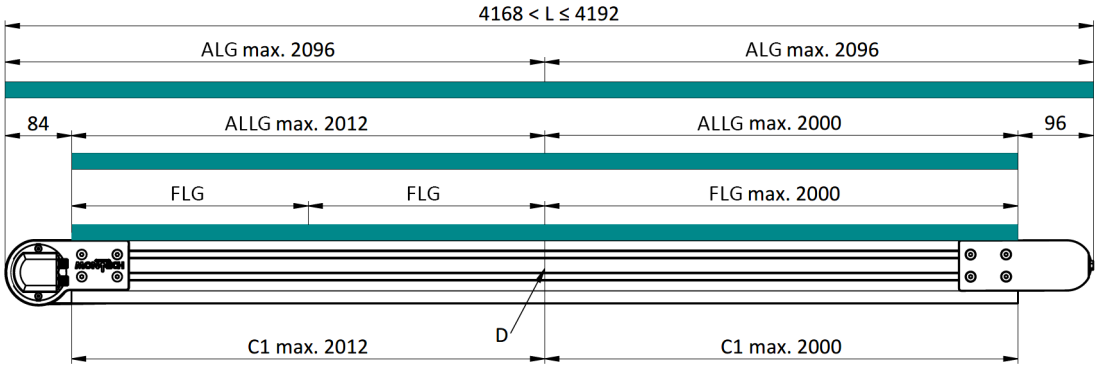

Fig. 85: Belt separation UR 4,168–4,192 mm

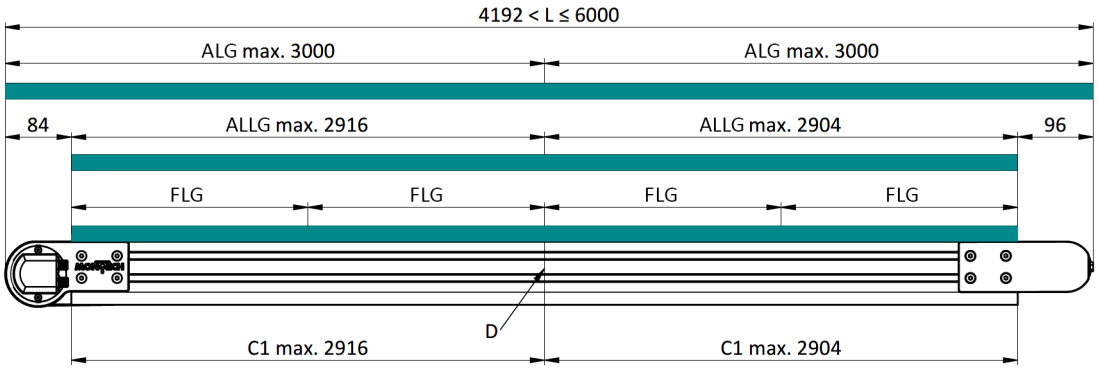

Fig. 86: Belt separation UR 4,192–6,000 mm

End section with knife edge

ALG	Adjustable lateral guide; length in mm (min. 500 mm)
FLG	Fixed lateral guide, length in mm
C, C1, C2	Lateral profile length
D	Separation point for transport

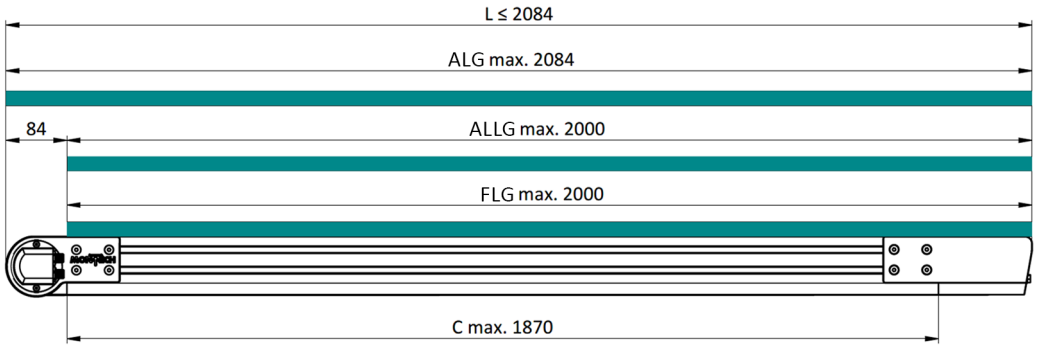

Fig. 87: Belt separation MK 0–2,084 mm

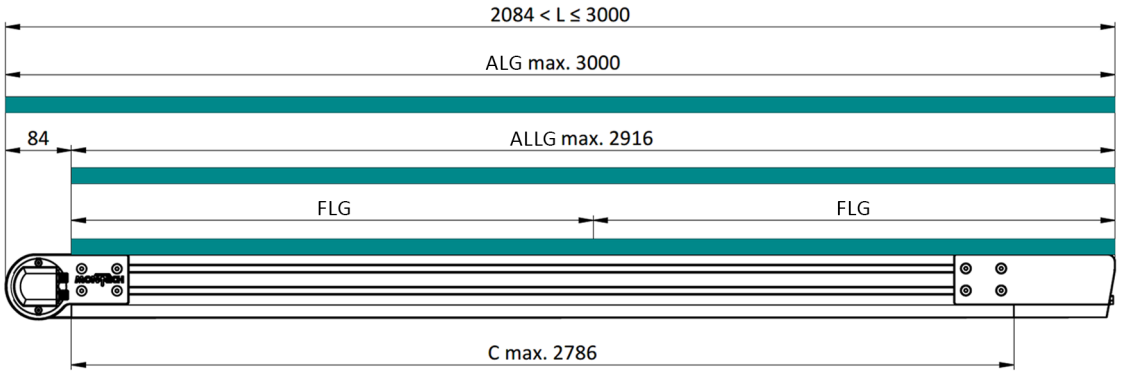

Fig. 88: Belt separation MK 2,084–3,000 mm

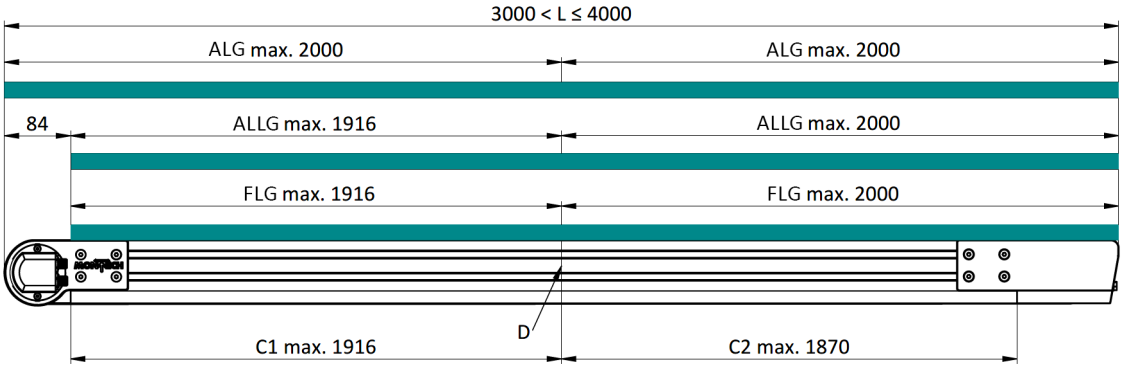

Fig. 89: Belt separation MK 3,000–4,000 mm

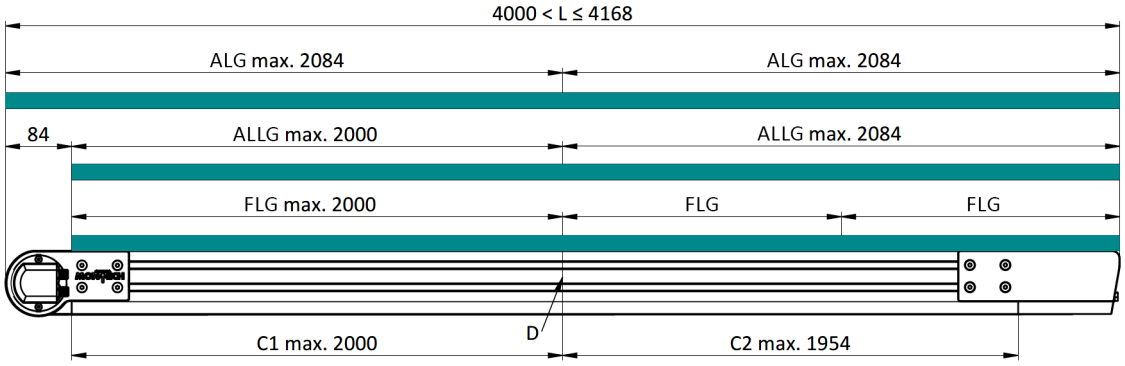

Fig. 90: Belt separation MK 4,000–4,168 mm

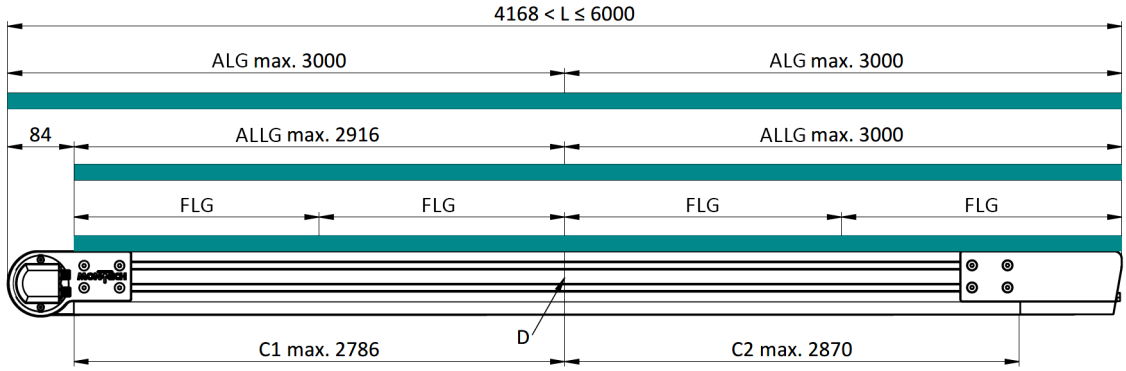

Fig. 91: Belt separator MK 4,168–6,000 mm

C MonTouch parameters

C.1 Total gear ratio

The total gear ratio i_{total} describes the distance traveled in mm per motor revolution [mm/rev]. This factor depends on the roller diameter, gear ratio and belt thickness.

	Unit	Min. Value	Max. value
i_{total}	mm/rev	1	25

Calculation of i_{total}

Symbol	Designation
D_{Roller} [mm]	Ø drive roller
b_{Belt} [mm]	Belt thickness
$i_{Gearbox}$	Gear ratio
i_{total} [mm/rev] = $(D_{Roller} + b_{Belt}) * \pi / i_{Gearbox}$	

The overall gear ratio depends mainly on the gear ratio of the planetary gearbox.

Standard values from i total for the available gear ratio

The standard values were calculated using the standard belt. The values must be adjusted depending on the configuration of the conveyor.

The overall gear ratio has an influence on most of the following parameters. The more precisely the overall gear ratio is set, the more precise the speeds and positioning of the conveyor will be.

C.2 Belt speeds

Belt speeds N1, N2 and N3 have the unit m/min. After parameterization, the belt speeds are permanently stored on the motor and can be used via the digital inputs (bit pattern).

	Min. Value	Max. value	Gearbox 30 standard values	Gearbox 80 standard values
N1 [m/min]	N_{min}	N_{max}	10	4
N2 [m/min]	N_{min}	N_{max}	20	8
N3 [m/min]	N_{min}	N_{max}	30	12

Calculation of the limit values

Symbol	Designation
i_{total} [mm/rev]	Total gear ratio *Appendix "Total gear ratio" on page 141*
f_{corr} [%]	Correction factor *Appendix "Correction factor" on page 152*
N_{min} [m/min] = 12 * i_{total}/f_{corr} N_{max} [m/min] = 400 * i_{total}/f_{corr}	

C.3 Positioning

C.3.1 Travel distance (pulse)

The travel distance can be used via the digital inputs (bit pattern).

	Min. Value	Max. value
Travel distance Δ s [m]	0.001	9.999

C.3.2 Positioning the belt speed

The belt speed set corresponds to the maximum speed of the conveyor. It is controlled via the analog input.

	Min. Value	Max. value
N [m/min]	N_{min} ↳ *Appendix “Belt speeds” on page 142*	N_{max} ↳ *Appendix “Belt speeds” on page 142*

C.3.3 Positioning window

The positioning window defines the tolerance range of the target position message. The positioning window is divided into a negative and a positive component.

	Min. Value	Max. value
Positioning window [m]	0.001	0.1

Positioning window (example)

Positioning window: 0.020 m

Out 1: Positioning window reached

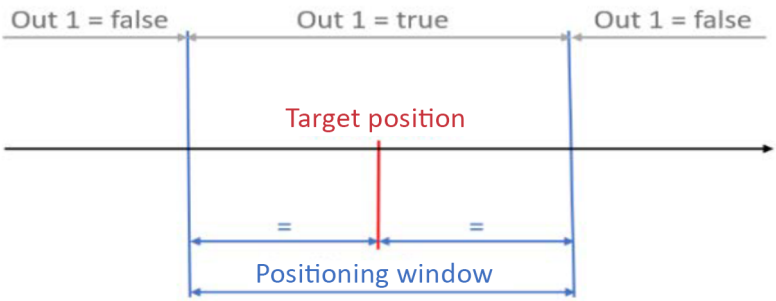

Fig. 92: Positioning window (example)

To receive feedback as to whether the target position or the positioning window has been reached, an output must be parameterized with "Positioning window reached" ↳ *Appendix “Assignment of outputs Out 1, etc. Out 3” on page 148.*

C.4 Acceleration values

The acceleration values define the acceleration or deceleration of the conveyor belt. The minimum and maximum values change depending on the overall gear ratio.

	Min. Value	Max. value
a [m/s^2]	a_{min}	a_{max}

Calculation of the limit values

Symbol	Designation
i_{total} [mm/rev]	Total gear ratio ↪ *Appendix "Total gear ratio" on page 141*
a_{min} [m/s^2] = 0.0133 * i_{total} a_{max} [m/s^2] = 0.3333 * i_{total}	

C.5 Overrun

	Min. Value	Max. value
Positive overtravel [m]	0	9.999
Negative overtravel [m]	0	9.999

C.6 Output assignment

C.6.1 Assignment of outputs Out 1, etc. Out 3

For the digital outputs on Motor Out 1, etc. Out 3, the following messages can be parameterized:

Name	Output	Description
A track encoder	Out 2	
B track encoder	Out 3	
Speed message	Out 1...Out 3	↳ *Appendix “Speed alert threshold” on page 149*
Power message	Out 1...Out 3	↳ *Appendix “Current alert threshold” on page 150*
Ready indication	Out 1...Out 3	
Positioning window reached	Out 1...Out 3	
Temperature message	Out 1...Out 3	↳ *Appendix “Temperature alert threshold” on page 151*
RS485-controlled	Out 1...Out 3	

When the respective alert threshold is reached, the output signal on the motor is switched to 24 V.

C.6.2 Speed alert threshold

The speed alert threshold can be parameterized to one of the three outputs (Out 1 ... Out 3).

	Min. Value	Max. value	Default
v_{thres} [m/min]	N_{min} ↺ *Appendix “Belt speeds” on page 142*	N_{max} ↺ *Appendix “Belt speeds” on page 142*	

C.6.3 Current alert threshold

The current alert threshold can be parameterized to one of the three outputs (Out 1 ... Out 3).

	Min. Value	Max. value	Default
I_{thres} [A]	0	15	

C.6.4 Temperature alert threshold

The temperature alert threshold can be parameterized to one of the three outputs (Out 1 ... Out 3).

	Min. Value	Max. value	Default
T_{thres} [A]	0	115	

C.7 Correction factor

The correction factor is used for fine adjustment of the actual values (travel distance, travel time, belt speeds, acceleration ramps, etc.). Deviations from the target value to the actual value in the range of ± 10% must be compensated for with the correction factor.

	Min. Value	Max. value	Default
f_{corr} [%]	90	110	100

Calculation of the correction factor

Symbol	Designation
Target value	Set value
Actual value	Measured value
f_{corr} [%] = 100 * target value / actual value	

The same unit must be used for the target value and actual value.