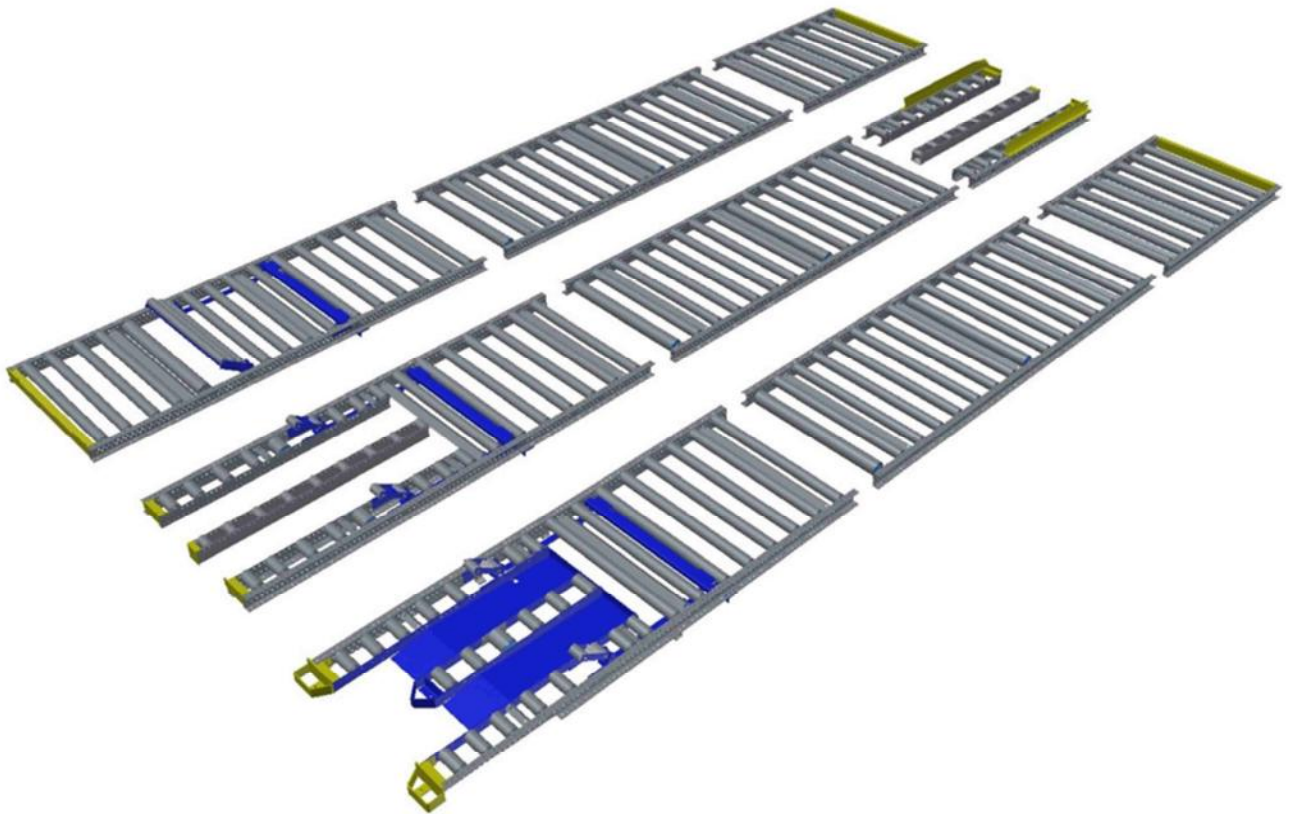




Gravity Roller Conveyor

General operating instructions



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1 About these operating instructions

1.1 Introduction

These operating instructions will help you use the gravity roller conveyor, hereinafter system, as intended and in a safe manner.

These operating instructions are part of the system. Keep these operating instructions close to the system where they are readily accessible. Include these operating instructions when selling or transferring the system in any other way.

1.2 Other applicable documents

These operating instructions are supplemented by additional project-specific operating instructions and technical documents. These other applicable documents are supplied together with the operating instructions at hand.

The following documents must be observed as well:

- Statutory accident prevention regulations and national regulations on health and safety in the workplace.
- Statutory provisions on environmental protection.
- In-house work instructions as well as maintenance instructions specified by the operator.

1.3 Manufacturer's and service address

Euroroll GmbH
An der Vogelrute 46b-50
59387 Ascheberg-Herbern
Germany

Tel.: +49 (0)2599 92503-0
Fax: +49 (0)2599 7300
Email: info@euroroll.de
Internet: www.euroroll.de

1.4 Warranty

Euroroll GmbH shall assume no liability for any personal injury and property damage attributable to non-observance of these operating instructions. Failure to observe these operating instructions shall also void the warranty and transfer responsibility to the operator.

1.5 Copyright

All documents are protected by copyright laws. Any transfer or duplication of documents, even in excerpts, as well as the use and disclosure of their contents shall be prohibited without express written consent. Failure to comply shall constitute grounds for prosecution and damages. All rights and the exercise of industrial property rights shall be reserved for Euroroll GmbH.

1.6 Text formatting features

Different elements in these instructions are highlighted by means of predefined formatting features. These features allow you to easily detect which type of text you are reading.




Regular text,
Cross references,

- Lists or
- Work steps.

2 Safety

2.1 Explanation of symbols

Danger notices and information are clearly marked throughout these instructions for use. The following symbols are used:


⚠ DANGER!	
	<p>Direct danger to life and risk of injury! Directly dangerous situation that may lead to death or severe injuries.</p>
⚠ WARNING!	
	<p>Probable danger to life and risk of injury! Generally dangerous situation that may lead to death or severe injuries.</p>
⚠ CAUTION!	
	<p>Possible risk of injury! Dangerous situation that may lead to injuries.</p>
ATTENTION!	
	<p>Risk of damage to the device! Situation that may lead to property damage.</p>



Notice:

Information to help you reach a better understanding of the processes involved.

The structure of hazard warnings provided in these operating instructions looks as follows:

⚠ SIGNAL WORD!	
	<p>Cause of the hazard Consequence of the hazard ➤ Measures to avert the hazard</p>

2.2 Intended use

The system is designed exclusively for the transport and dynamic storage of the load carriers and conveyed materials specified in chapter *Technical specifications* on page 36 .

The system is **not** approved for the transport of people.

The system may only be used in commercial enterprises by personnel who have received proper training and instructions on how to operate the system.

Intended use also includes the following requirements:

- Compliance with and observance of all information provided in these operating instructions
- Compliance with the inspection and maintenance intervals as specified in the manufacturer's documentation
- Use of appropriate loading aids for loading and unloading the load carriers

Any other use exceeding or deviating from the scope of intended use is considered improper.

2.3 Improper use

Use of the system is considered improper in the following cases:

- Use of load carriers other than those specified.
- The system is used for the transport of people.
- The system is operated by untrained personnel.
- The system is used by personnel who are not wearing the proper personal protective equipment.

Improper use of the system can lead to personal injury and property damage.

Euroroll GmbH shall not assume any liability for damage that can be attributed to improper use of the system.

2.4 Prohibition of unauthorised modifications and alterations

Do not perform any modifications and alterations on the system without proper authorisation. Modifications and alterations are prohibited without the written approval of Euroroll GmbH.

2.5 Obligations of the operator

The operator of the system is subject to the statutory regulations on health and safety in the workplace applicable at the location where the system is used. Aside from the health and safety notices included in these operating instructions, the operator is also required to observe all safety, accident prevention and environmental protection regulations applicable at the location where the system is used.

The operator is required to

- become familiar with all applicable regulations on health and safety in the workplace and determine any additional risks in the context of a risk assessment that result from the special work conditions present at the system's site of operation. The operator must incorporate the findings of this assessment into instructions on the operation of the system.
- verify throughout the entire service life of the system that the operating instructions they prepared correspond to the current revision of the applicable standards and revise them if necessary.
- define a hazard area of sufficient size around the system. The hazard area must not be accessible to unauthorised personnel while the system is in operation.
- ensure that all personnel working on the system have read and understood the operating instructions. The operator is, furthermore, required to train their personnel at regular intervals, subject them to a safety briefing and inform them about all hazards involved.
- to provide personnel with the necessary protective equipment.
- ensure that the system is only used as intended and only when in proper and fully operational condition.

- to check / inspect the system at regular intervals.
- ensure that all inspection and maintenance intervals be observed.
- ensure that the operating instructions are always available at the system's site of operation as complete and fully legible copies.
- ensure that all safety notices and warnings are never removed from the system and remain clean and in fully legible condition.
- ensure that the work area is sufficiently lit.

2.6 Selection and qualification of personnel

Qualified personnel are persons who, on the basis of their training, experience and instructions as well as their knowledge of the relevant standards, provisions, accident prevention regulations and operating conditions, have been authorised by the person responsible for safety to execute the necessary activities and who, in doing so, are able to recognise and prevent possible hazards.

The operator is required to provide for the necessary qualification of the personnel. The operator must ensure the following:

- The personnel have been made familiar with the safety regulations and the residual risks.
- The personnel have been instructed on the specific requirements regarding maintenance, control and operation of the system.
- Personnel in training may only work on the system under the supervision of qualified professional staff.

2.7 Notice of residual risks

The system has been built in compliance with the state of the art, the recognised technical safety rules and all relevant standards.

Safety hazards have been eliminated by design measures or made inaccessible by suitable fixtures. Despite these measures, certain residual risks remain during the operation of the system.

Danger to personnel / negative impact on the system and other property can arise in the following cases:

- The system is operated by personnel who have not been properly trained or instructed.
- The system is not operated as intended.
- The system is improperly serviced or cleaned.

2.8 Basic safety instructions

Avoiding general hazards

The system has been built and made safe to operate in accordance with the state of the art. The system is in conformity with all applicable requirements on health and safety.

As a prerequisite for safety, the following safety regulations must be observed by both the operator of the system and their personnel:

- The personnel assigned to work on the system must have read and understood these operating instructions.
- The regulations on environmental protection as well as health and safety applicable at the system's site of operation must be observed.
- All included supplier documents must be followed as well.
- The operator must make all applicable regulations available and train the personnel entrusted to work with the system accordingly.







- All work on the system may only be performed by personnel who have been given proper authorisation.
- The system may only be operated as intended.
- The system must not be operated unless in proper technical condition.
- All safety notices and warnings attached to the system must be observed and kept in legible condition at all times.
- All work on the system requires that personnel wear the personal protective equipment necessary.
- Never reach into any moving parts.
- Never step onto the conveyor.
- Any faults affecting the safety of the personnel or the system must be eliminated without delay.
- Protective devices and monitoring equipment must never be modified or removed.
- The specified maintenance intervals must be observed.
- The system may only be operated by qualified, trained and instructed professional staff. The operating personnel must ensure that unauthorised personnel are kept away from the system area.
- Work for the purpose of servicing / troubleshooting the system may only be performed by qualified, trained and instructed professional staff.
- Cleaning, maintenance and repair operations must not be performed unless the system is shut down.
- When maintenance is complete, all loosened screw connections must be re-tightened to the necessary torque.

2.9 Safety devices

Safety devices are intended to help exclude personal injury and property damage. The system must not be operated unless all safety devices are present and fully operational.

2.10 Personal protective equipment

Wearing personal protective equipment during work is mandatory to minimise risks. The protective equipment necessary for the respective work must be worn at all times. The symbols signify the following:

Symbol	Description
	<p>Protective work clothing</p> <p>Tight-fitting work clothes with low resistance to tearing, narrow sleeves and without any protruding parts. It is designed primarily to protect against becoming caught in the moving parts of the system.</p> <p>Do not wear rings, chains or other types of jewellery.</p>
	<p>Safety boots</p> <p>For protection against heavy parts falling down and from slipping on slick surfaces.</p>
	<p>Protective gloves</p> <p>For protecting the hands against abrasions, puncture or deeper injuries and from irritating and caustic substances as well as burns.</p>
	<p>Hard hat</p> <p>For protection against heavy parts falling down and for preventing injuries.</p>
	<p>Hearing protection</p> <p>For protecting the auditory system against excessively intense noise.</p>
	<p>No admittance to unauthorised personnel!</p> <p>This prohibitory sign indicates that non-authorised personnel are prohibited from entering the area around the system.</p>

3 Description

The gravity roller conveyor is a load handling device used in material handling applications. Conveyors are used to transport mostly large and/or heavy and bulky parts, e.g. on Euro pallets in longitudinal direction.

A gravity roller conveyor is made up of several freely rotating rollers that are arranged one after the other and affixed between two profiles. The roller spacing must be determined based on the conveyed material and in such a way that the conveyed material is supported by a sufficient number of rollers. The conveyed material is, thereby, prevented from falling down. This requirement also allows for an optimisation of the conveyor system in relation to the size of the conveyed material.

The automatic transport of the conveyed material requires that the gravity roller conveyors be installed with a certain declination. Installation must be completed in such a way that the conveyed material can be put into motion at any position without being accelerated too much at any time. The recommended declination, therefore, ranges between 3.75% and 4.25%, but has to be determined accurately by experimental means.

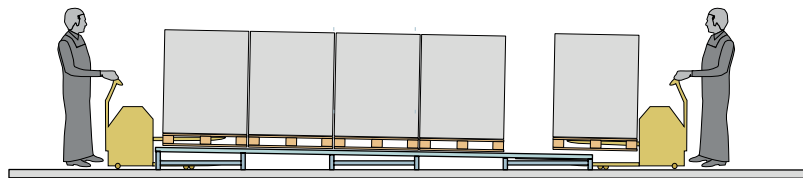


Fig. 1: Gravity roller conveyor (schematic diagram)

A live storage rack consists of multiple gravity roller conveyors that are mounted inside a rack. This set-up allows for the arrangement of several channels side by side or across multiple levels.

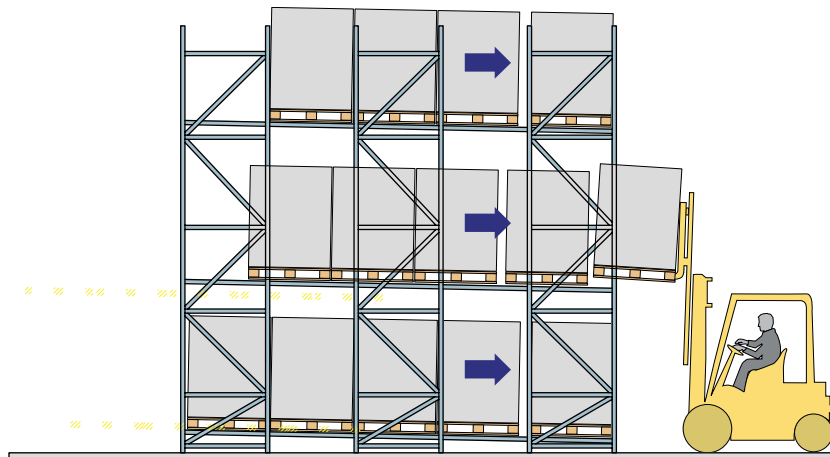


Fig. 2: Live storage rack (schematic diagram)

3.1 Modular design

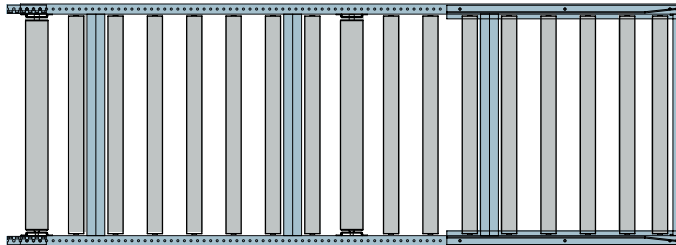
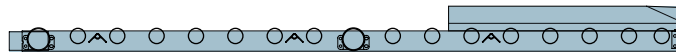
The gravity roller conveyor has a modular design and is composed of several elements:

- Loading element
- Intermediate element
- Unloading element

Loading element with continuous rollers

At the loading element, the load carrier is placed onto the gravity roller conveyor. The loading element is equipped with continuous rollers. The brake conveyor rollers

provide for a controlled downward movement of the load carriers at a constant rate of speed. The loading element is suited for loading aids with mast tilt.

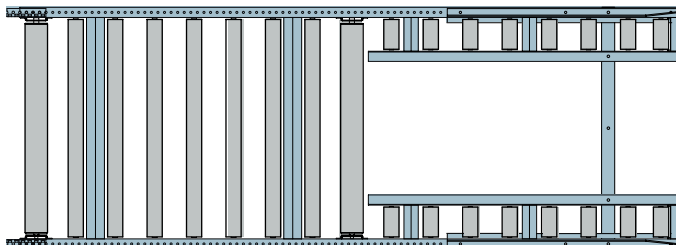


Loading element with continuous rollers (schematic diagram)

Loading element with double track loading

At the loading element, the load carrier is placed onto the gravity roller conveyor. The loading element is fitted with short rollers in the loading area on the left and the right. The brake conveyor rollers provide for a controlled downward movement of the load carriers at a constant rate of speed. The loading element is suited for loading aids with and without mast tilt.

To allow for effortless and accurate loading of a load carrier, an entry guide is attached to each side cheek on the right and the left of the loading element.

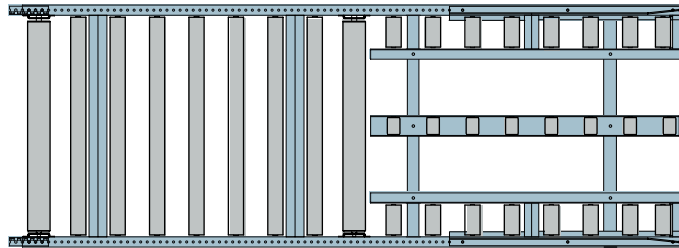
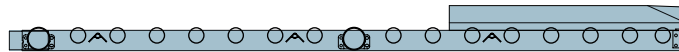


Loading element with double track loading (schematic diagram)

Loading element with triple track loading

At the loading element, the load carrier is placed onto the gravity roller conveyor. The loading element is equipped with short rollers in the loading area on the left and the right as well as in the middle. The brake conveyor rollers provide for a controlled downward movement of the load carriers at a constant rate of speed. The loading element is suited for loading aids with and without mast tilt.

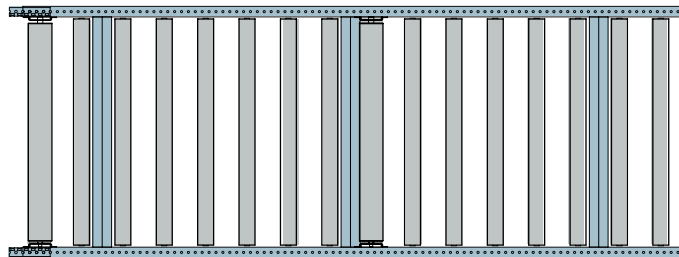
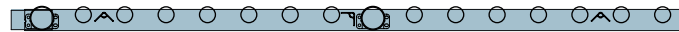
To allow for effortless and accurate loading of a load carrier, an entry guide is attached to each side cheek on the right and the left of the loading element.



Loading element with triple track loading (schematic diagram)

Intermediate element

The intermediate element is fitted with continuous rollers. The brake conveyor rollers provide for a controlled downward movement of the load carriers at a constant rate of speed.



Intermediate element (schematic diagram)

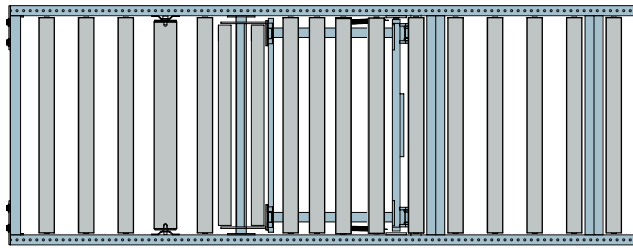
Unloading element with continuous rollers

At the unloading element, the load carrier is removed from the gravity roller conveyor. The unloading element is equipped with continuous rollers.

During dynamic deceleration, brake conveyor rollers provide for a controlled downward movement of the load carriers. End stops ensure that the load carrier along with the conveyed material is decelerated to a complete stop.

During dragging deceleration, two drag plates ensure that the load carrier including the conveyed material is slowed down by dragging deceleration. End stops are used for the final positioning of the loading unit.

The pallet separator built in at the unloading side operates in fully automatic mode. The unloading element is suited for loading aids with mast tilt.



Unloading element with continuous rollers and dynamic deceleration (schematic diagram)

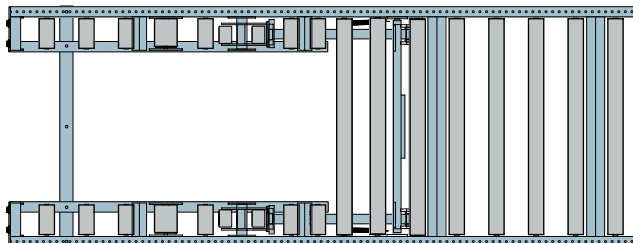
Unloading element with double track unloading

At the unloading element, the load carrier is removed from the gravity roller conveyor. The unloading element is fitted with short rollers on the left and the right at the unloading side.

During dynamic deceleration, brake conveyor rollers provide for a controlled downward movement of the load carriers. End stops ensure that the load carrier along with the conveyed material is decelerated to a complete stop.

During dragging deceleration, two drag plates ensure that the load carrier including the conveyed material is slowed down by dragging deceleration. End stops are used for the final positioning of the loading unit.

The pallet separator built in at the unloading side operates in fully automatic mode. The unloading element is suited for loading aids with and without mast tilt.



Unloading element with double track unloading and dynamic deceleration (schematic diagram)

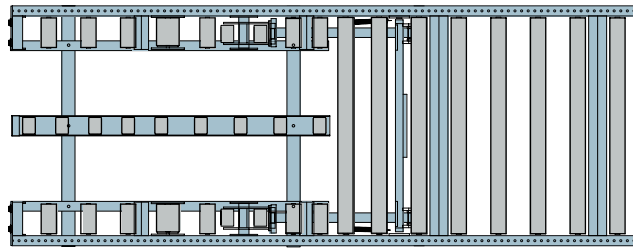
Unloading element with triple track unloading

At the unloading element, the load carrier is removed from the gravity roller conveyor. The unloading element is fitted with short rollers on the left and the right as well as in the middle at the unloading side.

During dynamic deceleration, brake conveyor rollers provide for a controlled downward movement of the load carriers. End stops ensure that the load carrier along with the conveyed material is decelerated to a complete stop.

During dragging deceleration, two drag plates ensure that the load carrier including the conveyed material is slowed down by dragging deceleration. End stops are used for the final positioning of the loading unit.

The pallet separator built in at the unloading side operates in fully automatic mode. The unloading element is suited for loading aids with and without mast tilt.



Unloading element with triple track unloading and dynamic deceleration (schematic diagram)

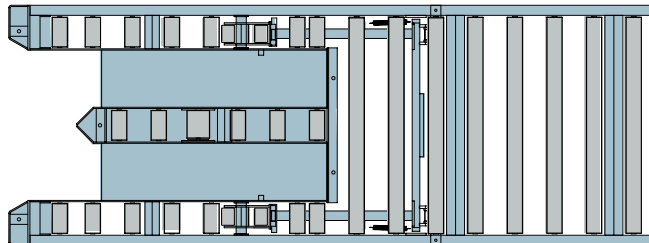
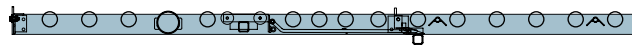
Unloading element with unloading for manual pallet jack

At the unloading element, the load carrier is removed from the gravity roller conveyor. The unloading element is fitted with short rollers on the left and the right as well as in the middle at the unloading side.

During dynamic deceleration, brake conveyor rollers provide for a controlled downward movement of the load carriers. End stops ensure that the load carrier along with the conveyed material is decelerated to a complete stop.

During dragging deceleration, two drag plates ensure that the load carrier including the conveyed material is slowed down by dragging deceleration. End stops are used for the final positioning of the loading unit.

The pallet separator built in at the unloading side operates in fully automatic mode. The unloading element is equipped with a loading ramp and suited for unloading the load carrier by means of a manual pallet jack.



Unloading element with unloading for manual pallet jack and dynamic deceleration (schematic drawing)

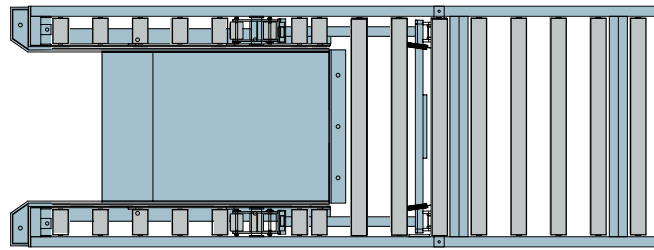
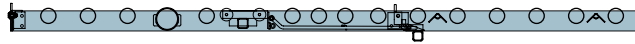
Unloading element with unloading for electric pallet jack

At the unloading element, the load carrier is removed from the gravity roller conveyor. The unloading element is fitted with short rollers on the left and the right at the unloading side.

During dynamic deceleration, brake conveyor rollers provide for a controlled downward movement of the load carriers. End stops ensure that the load carrier along with the conveyed material is decelerated to a complete stop.

During dragging deceleration, two drag plates ensure that the load carrier including the conveyed material is slowed down by dragging deceleration. End stops are used for the final positioning of the loading unit.

The pallet separator built in at the unloading side operates in fully automatic mode. The unloading element is equipped with a loading ramp and suited for unloading the load carrier by means of an electric pallet jack.

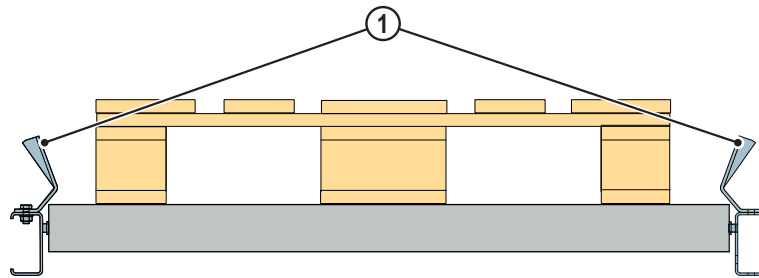


Unloading element with unloading for electric pallet jack and dynamic deceleration (schematic drawing)

3.2 Components

Entry guide

At the unloading side, an entry guide (1) allows for the centric placement of the pallet. The entry guide can be removed for automated storage operations.



Entry guide (schematic drawing)

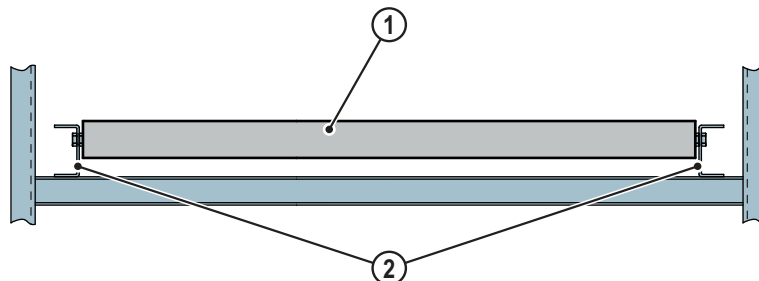
Roller protection profile

Fitted at the unloading side, a sturdy angle section acts as a protection profile to prevent the rollers from becoming damaged by the forklift. The roller protection profile can be removed for automated storage operations. It is advisable to use a reinforced roller as the first roller instead.

Rollers

Rollers (1) are mounted between the two profiles (2) of the conveyor.

To guarantee a long lifetime, the ball bearing cartridge is made of steel. The ball bearings are maintenance-free / lubricated for life.



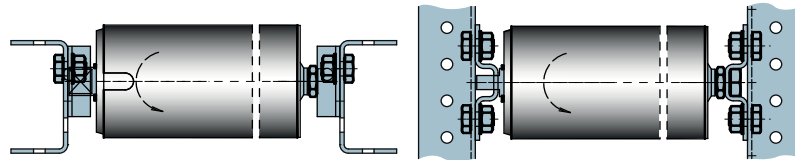
Rollers (schematic diagram)

Brake conveyor rollers

Brake conveyor rollers regulate the speed of the material conveyed on gravity roller conveyors by keeping the travel speed nearly constant. This speed control is achieved by a planetary gearbox which presses centrifugal brake shoes against the roller body

with each rotation and at a braking force that is proportionate to the applied braking torque.

At least one brake conveyor roller per pallet space is required for pallets with a continuous runner as maintaining a nearly constant speed with no accelerations and no occurrence of great forces will otherwise not be possible. The travel speed of the pallet must not significantly exceed 0.3 m/s. When the brake conveyor rollers are properly arranged, the speed is approx. 0.1 – 0.2 m/s depending on pallet weight and declination.



Brake conveyor rollers, front view and top view (schematic diagram)

Separator

The unloading side is equipped with a pallet separator. This separator operates in fully automatic mode and effects

- the separation of the pallets to be retrieved from the other pallets in the channel, allowing for the removal of the goods without danger and with no ram pressure.
- a temporary stop of the pallets in the channels until the pallets to be retrieved are fully removed from the channel.
- a deceleration of the pallets ahead of the end stop to ensure that the goods come to a gentle stop at the end of the channel.

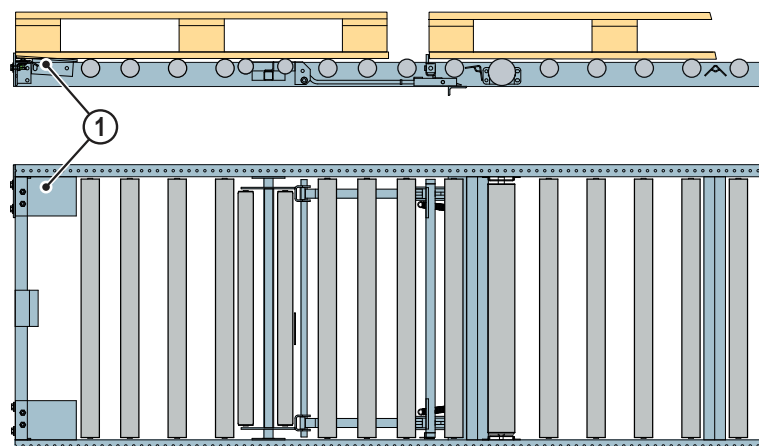
At the same time, the end stop protects the front rollers from mechanical damage caused by the forklift tines.

Separation of the pallets

The first two pallets are always separated by allowing the first pallet to accelerate across a defined distance for a short interval, i.e. by excluding the pallet from the speed control exercised by the brake rollers.

Dragging deceleration

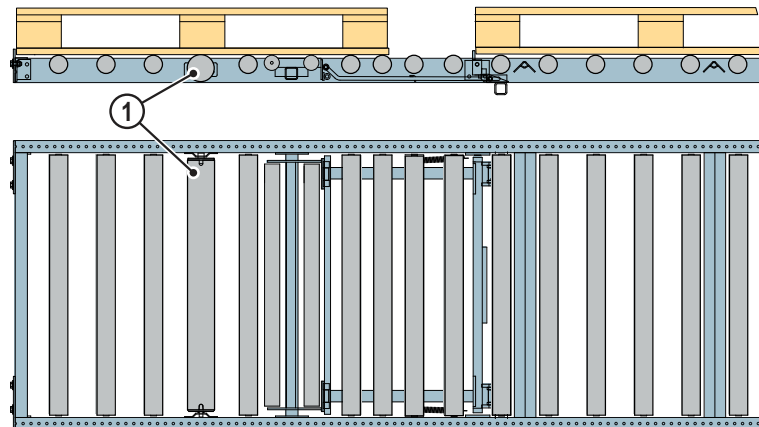
The pallet to be retrieved is slowed down by an end stop with dragging deceleration (1).



Separator with dragging deceleration (schematic diagram)

Dynamic deceleration

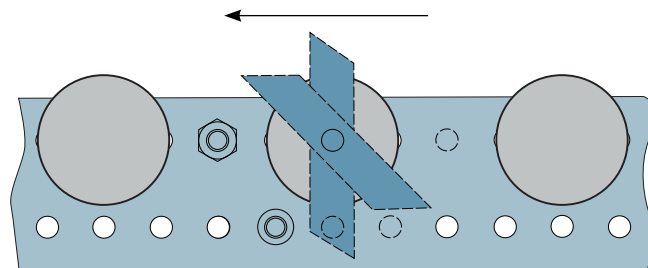
Dynamic acceleration involves a brake roller (1) that is positioned immediately in front of the end stop. This set-up ensures that the pallet will reach a precisely defined end position as required for automatic operation with racking storage and retrieval vehicles.



Separator with dynamic deceleration (schematic diagram)

Pushback stop

The pushback stop prevents the pallet from being pushed back against its direction of travel.



Pushback stop (schematic drawing)

3.3 Conveyed material

A wide variety of load carriers can be used as conveyed material:

- Wooden pallets (e.g. Euro pallet)
- Plastic pallets
- Metal load carriers (e.g. Euro lattice box pallet)



Notice:

For more detailed information, refer to the chapter *Technical specifications* on page 36.

General requirements on the loading unit

The load carrier and the goods transported on it make up the loading unit*. It must meet the following requirements:

- The dimensions of the loading unit must correspond to the project-related specifications.
- The min./max. weight and the maximum dimensions must not be exceeded.
- The goods on the load carrier must be secured in such a way that any damage during transport from the goods shifting or falling down is reliably prevented.
- The runners of the load carriers must not have any protruding nails or other interfering edges.

- The runners must not be splintered or broken.
- There must not be any film or strapping under the runners.
- The residual moisture in the wooden pallets should be no more than 7% to 15%.

*If the loading unit is governed by a standard, this standard must be observed as well

Examples of poor pallet quality



Pallet quality

1. Middle runner missing, film under the runner
2. Pallet destroyed, middle runner broken
3. Middle runner splintered



Notice:

Load carriers showing severe damage must not be brought into store circulation.



4 Transport and storage

4.1 Delivery

The gravity roller conveyor was packaged for the selected type of transport in such a way that damage can be excluded to the greatest possible extent.

- Check the shipment for completeness and damage based on the shipping documents.
- Pay particular attention to pieces of equipment that have been included as loose parts.
- If detecting any defects, notify the manufacturer and, in case of transport damage, also the carrier immediately in writing.

4.2 Transport


⚠ WARNING!	
	<p>Suspended loads, falling parts! Falling parts may lead to serious injuries.</p> <ul style="list-style-type: none"> ➤ Use only approved crane systems and lifting equipment of adequate size and capacity. ➤ Use special aids (e.g. beams) if required. ➤ To protect ropes and chains against damage and tearing, use an edge guard if the sling gear is guided across the edges of packaging or machines. ➤ Secure parts against shifting during transport. ➤ Take into account that the centre of gravity will shift during transport. ➤ Stay out from under suspended loads.
⚠ WARNING!	
	<p>Tipping or falling parts! Tipping or falling parts may result in serious injuries.</p> <ul style="list-style-type: none"> ➤ Never stand under or directly next to suspended loads. ➤ Observe the bearing capacity of the means of transport. ➤ Determine the component's centre of gravity. ➤ Secure the parts against shifting during transport.


Each gravity roller conveyor comes as one transport unit. Each unit can be transported using a forklift or manual pallet jack. The minimum bearing capacity of the transport and lifting equipment must correspond to the weight of the packing piece.

4.3 Storage


- The storage location must be dry and protected against dust, dirt and vibrations.
- The packing pieces are not suited for outdoor storage.
- If stored outdoors, the packing pieces must be protected against adverse weather conditions by additional means.

5 Installation and commissioning

⚠ WARNING!	
	<p>Fall/plunge from top levels of the live storage rack!</p> <p>Risk of injury due to falls from the top levels of the live storage rack.</p> <ul style="list-style-type: none"> ➤ Allow only qualified professional staff to work on the top levels of the live storage rack. ➤ Always wear fall arresting devices / safety harnesses. ➤ Wear personal protective equipment. ➤ Before inspecting the system, make sure the channel to be inspected is blocked. ➤ Use suitable aids to drive along the channel, e.g. maintenance pallet, elevating work platform.

⚠ WARNING!	
	<p>Unsecured system!</p> <p>Risk of injury if the system is unsecured during installation and disassembly work.</p> <ul style="list-style-type: none"> ➤ The system must be secured using, for example, caution tape. ➤ Make sure that no unauthorised personnel have access to the work area.

5.1 Assembly

⚠ WARNING!	
	<p>Suspended loads, falling parts!</p> <p>Falling parts may lead to serious injuries.</p> <ul style="list-style-type: none"> ➤ Use only approved crane systems and lifting equipment of adequate size and capacity. ➤ Use special aids (e.g. beams) if required. ➤ To protect ropes and chains against damage and tearing, use an edge guard if the sling gear is guided across the edges of packaging or machines. ➤ Secure parts against shifting during transport. ➤ Take into account that the centre of gravity will shift during transport. ➤ Stay out from under suspended loads.



Notice:

Always use the assembly drawings include with the order as an installation aid; see chapter *Appendix* from page 37.



Notice:

The subsurface used for installation must be level and capable of supporting the permissible weights. Level differences can be offset by height-adjustable stands or levelling material.

The system should be anchored to the floor using M10 heavy-duty anchors.



Notice:

The floor installation for unloading by electric hand pallet jack requires the use of adhesive anchors. The adhesive anchors have a significantly higher load capacity and can absorb much greater tensile and shearing forces. The base tray must have full-faced contact with the floor and be fixed in place with anchors.



Notice:

When affixing the conveyor sections to the beams, pay attention to the following:

- The fixing screws must be positioned as close to the beam as possible.
- No underpadding must be used between beam and conveyor at the first and second beam (unloading) and at the last beam (loading).
- The unloading element and the loading element must be affixed to the first / last beam using clamping plates or beam mounting brackets.

Assembly sequence

1. Measure the surface and mark the position of the conveyor centre using a chalk line as an aid.
2. Install the support structure and align it roughly.
3. Starting at the unloading side, affix the conveyor sections to each following conveyor section using connectors with screws.
4. Use hexagon screws and nuts to affix the entry guides to the conveyor loading element.
Make sure that the “left-hand design” entry guide is fastened on the left in running direction and the “right-hand design” entry guide is fastened on the right in running direction, i.e. the entry guides must terminate flush with the bent part at the conveyor end without protruding.
5. Check the alignment of the system and verify its perpendicularity.
6. Perform a test run using light (approx. 100-200 kg) load carriers that correspond to the order.
7. Assess the test run results; see chapter *Test run result* on page 23.
8. If necessary, readjust the alignment of the system and perform another test run.
9. Fix the system in place after a successful test run.

Assembly sequence

Prerequisite: The rack frame including the beams has already been erected.

1. Use hexagon screws and nuts to affix the entry guides to the conveyor loading element.
Make sure that the “left-hand design” entry guide is fastened on the left in running direction and the “right-hand design” entry guide is fastened on the right in running direction, i.e. the entry guides must terminate flush with the bent part at the conveyor end without protruding.
2. Place the loading element onto the beams of the rack frame, align it and fastened it to the beams.
3. Insert the other conveyor sections one after the other and affix them to each following conveyor section using connectors with screws.
4. Align the conveyor sections without tightening the screw connections on the beams yet.
5. Check the alignment of the system and verify its perpendicularity.
6. Perform a test run using light (approx. 100-200 kg) load carriers that correspond to the order.

7. Assess the test run results; see chapter *Test run result* on page 23.
8. If necessary, readjust the alignment of the system and perform another test run.
9. Tighten all screw connections after a successful test run.

Test run result

If the load carrier does not sway to the right or the left, the sequence is correct, and the roller conveyor can be fastened according to the assembly instructions or assembly drawing.

If the load carrier sways to the right or the left, the underlying cause must be eliminated.

possible cause	Correction option
<ul style="list-style-type: none"> • Running surface of the load carrier is not correct 	<ul style="list-style-type: none"> ➤ Replace the load carrier
<ul style="list-style-type: none"> • Roller is not perpendicular to the roller conveyor profile 	<ul style="list-style-type: none"> ➤ Readjust roller conveyor or restore perpendicularity through alignment



Notice:

After successful corrective measures a new test run is necessary.

5.2 Commissioning

Steps prior to commissioning

Prior to commissioning, verify that

- all foreign materials have been removed from the system.
- all elements have been precisely aligned.
- all protective devices have been fitted.

Commissioning without load



- Perform a general function test of the system.
- Check the operation of the individual parts/components.
- Check if all screw connections are securely tightened.
- Check the operation of the brake conveyor rollers.
- Check the adjustable stands.
- Check the quality of the load carriers used.

Commissioning with load

- Perform a general function test of the system.
- Perform a test run using light (approx. 100-200 kg) load carriers that correspond to the order.
- Check the travel of the conveyed material.
- Perform test runs with all load carriers that correspond to the order.
- Check the travel of the conveyed material.
- Check the operation of the safety devices.

Once commissioning has been completed successfully, the system can be put into operation.

6 Operation

⚠ WARNING!	
	<p>The conveyed material will move while on the system!</p> <p>There is a risk of sustaining severe crushing injuries from reaching between conveyed material and stationary structural elements.</p> <ul style="list-style-type: none"> ➤ Wear personal protective equipment. ➤ Do not reach into the system during operation. ➤ Keep at a distance.
⚠ CAUTION!	
	<p>Moving parts!</p> <p>Risk of crushing injuries at moving parts.</p> <ul style="list-style-type: none"> ➤ Wear personal protective equipment. ➤ Keep at a distance. ➤ Do not reach into the system.
ATTENTION!	
	<p>Risk of equipment damage!</p> <p>Pushing pallets against the direction of conveyance can result in damage to essential functional elements (e.g. separator, brake conveyor roller).</p> <ul style="list-style-type: none"> ➤ Use the gravity roller conveyor only in the direction of conveyance. ➤ Do not push pallets back against their direction of travel.
ATTENTION!	
	<p>Risk of equipment damage!</p> <p>Slamming the pallet down on the receiving element can damage the rollers, the pallet or the loaded material.</p> <ul style="list-style-type: none"> ➤ Set down the pallet carefully. ➤ Avoid slamming down or dropping the pallet.

6.1 Loading the system



Notice:

Loading the system requires the use of loading aids (e.g. forklift) with tilting mast/fork.

- Insert the fork of the loading aid (e.g. forklift) under the load carrier.
- Carefully lift the load carrier.
- Slowly move up to the loading area of the system.
- Align the load carrier at a right angle with the channel.
- Raise the load carrier approx. 50 mm above the roller protection profile.
- Retract the load carrier until its entire length is above the conveyor.
- Adjust the fork of the loading aid to the tilt of the conveyor and lower the load carrier carefully until it rests on the rollers.

If the channel is not filled completely:

As soon as the fork of the loading aid stops supporting it, the load carrier will slowly descend inside the channel, releasing the fork.

- Set the fork of the loading aid to the horizontal position.
- Carefully pull the operator unit out straight.

If the channel is filled completely:

The load carrier stops without releasing the fork.

- Maintain the tilt of the fork and adjust the height of the fork while pulling out.
- Carefully pull the loading aid out straight.
- Insert the fork of the loading aid (e.g. forklift) under the load carrier.
- Carefully lift the load carrier.
- Slowly move up to the loading area of the system.
- Align the load carrier at a right angle with the channel.
- Raise the load carrier approx. 50 mm above the roller protection profile.
- Retract the load carrier until its entire length is above the conveyor.
- Lower the loading aid carefully until the load carrier rests on the rollers.
- Carefully lower the fork further between the side profiles until it is released.
- Carefully pull the loading aid out straight.

6.2 Removing load carriers



Notice:

The removal of load carriers from the system requires the use of loading aids (e.g. forklift) with tilting mast/fork.

- Carefully move the loading aid (e.g. forklift) up to the centre of the unloading side and align it at a right angle with the channel.
- Set the height of the fork such that it can be inserted under the load carrier.
- When inserting the fork under the load carrier, gradually adjust the tilt to the declination of the conveyor.
- Raise the load carrier by approx. 50 mm.
- Carefully pull the load carrier out straight using the loading aid.
- Carefully move the loading aid (e.g. forklift) up to the centre of the unloading side and align it at a right angle with the channel.
- Set the height of the fork such that it can be inserted under the load carrier.
- Insert the fork under the load carrier.
- Raise the load carrier by approx. 50 mm.
- Carefully pull the load carrier out straight using the loading aid.



Notice:

The removal of load carriers from the system requires the use of loading aids (e.g. forklift) with tilting mast/fork or a manual or electric pallet jack.

When using a loading aid with tilting mast/fork:

- Carefully move the loading aid (e.g. forklift) up to the centre of the unloading side and align it at a right angle with the channel.
- Set the height of the fork such that it can be inserted under the load carrier.
- When inserting the fork under the load carrier, gradually adjust the tilt to the declination of the conveyor.
- Raise the load carrier by approx. 50 mm.
- Carefully pull the load carrier out straight using the loading aid.

When using a manual or electric pallet jack:

- Carefully move the manual pallet jack up to the centre of the unloading side and align it at a right angle with the channel.
- Slide the manual pallet jack with the fork lowered up the ramp and under the load carrier.
- Raise the load carrier by approx. 50 mm.
- Carefully pull the load carrier out straight using the manual pallet jack.

7 Troubleshooting

⚠ WARNING!



The conveyed material will move while on the system!

Risk of injury while the conveyed material is moving or when it starts moving again.

- Allow only qualified professional staff to perform troubleshooting operations.
- Do not stop load carriers that are in motion.
- Never stand in front of the load carrier. Always stand behind a load carrier that has come to a stop and is supposed to be set back in motion.
- Wear personal protective equipment.

⚠ WARNING!



Unsecured system!

Severe injuries if the system is unsecured during troubleshooting.

- Make sure that the system is shut down before performing troubleshooting operations.
- The system must be secured using, for example, caution tape.
- Make sure that no unauthorised personnel have access to the work area.

⚠ WARNING!



Fall/plunge from top levels of the live storage rack!

Risk of injury due to falls from the top levels of the live storage rack.

- Allow only qualified professional staff to work on the top levels of the live storage rack.
- Always wear fall arresting devices / safety harnesses.
- Wear personal protective equipment.
- Before inspecting the system, make sure the channel to be inspected is blocked.
- Use suitable aids to drive along the channel, e.g. maintenance pallet, elevating work platform.

ATTENTION!

Risk of equipment damage!

Pushing pallets against the direction of conveyance can result in damage to essential functional elements (e.g. separator, brake conveyor roller).

- Use the gravity roller conveyor only in the direction of conveyance.
- Do not push pallets back against their direction of travel.



Notice:

If a load carrier stops, the cause behind the stop is not necessarily an error in the system. Inserting the next load carrier usually restores regular operation.

The overview below lists possible causes behind faults as well as information on how to remedy these faults.

Fault	Cause	Remedy
Pallet stops	Pallet is damaged	➤ Remove the pallet from store circulation
	Uneven load distribution on the pallet	➤ Repack the pallet
	Film or strapping under the runners	➤ Remove film or strapping from under the runners
	Pallet does not correspond to the order specifications	➤ Remove the pallet from store circulation
	Roller / brake conveyor roller defective	➤ Replace defective roller / brake conveyor roller
	Conveyor pulled out of alignment	➤ Correct the conveyor alignment
Pallet travelling too fast (> 0.3 m/s)	Brake conveyor roller defective	➤ Replace defective brake conveyor roller
	Pallet does not correspond to the order specifications	➤ Remove the pallet from store circulation
	Pallet too heavy	➤ Reduce weight to the permissible level
Pallets are not separated	Brake conveyor roller defective	➤ Replace defective brake conveyor roller
	Separator defective	➤ Repair / replace the separator
	Weight of the pallets are not within the permissible limits	➤ Pack the pallet such that its weight is within the permissible limits




8 Shutting down the system

The system must be shut down prior to cleaning and maintenance and before being taken out of service.

Proceed as follows:

- Remove all load carriers.
- Cordon off the system.

9 Upkeep

⚠ WARNING!	
	<p>Fall/plunge from top levels of the live storage rack! Risk of injury due to falls from the top levels of the live storage rack.</p> <ul style="list-style-type: none"> ➤ Allow only qualified professional staff to work on the top levels of the live storage rack. ➤ Always wear fall arresting devices / safety harnesses. ➤ Wear personal protective equipment. ➤ Before inspecting the system, make sure the channel to be inspected is blocked. ➤ Use suitable aids to drive along the channel, e.g. maintenance pallet, elevating work platform.
⚠ WARNING!	
	<p>The conveyed material will move while on the system! There is a risk of sustaining severe crushing injuries from reaching between conveyed material and stationary structural elements.</p> <ul style="list-style-type: none"> ➤ Wear personal protective equipment. ➤ Do not reach into the system during operation. ➤ Keep at a distance.
⚠ CAUTION!	
	<p>Moving parts! Risk of crushing injuries at moving parts.</p> <ul style="list-style-type: none"> ➤ Wear personal protective equipment. ➤ Keep at a distance. ➤ Do not reach into the system.
ATTENTION!	
	<p>Risk of equipment damage! Improper cleaning can lead to damage or corrosion on the system.</p> <ul style="list-style-type: none"> ➤ Do not use abrasive agents, pressure washers or other means that may cause damage to the system.

9.1 Cleaning

The system must be inspected regularly for contamination and foreign materials. The system must be cleaned if heavily contaminated or soiled by foreign materials.

- Shut down the system; see chapter *Shutting down the system* on page 29.
- Remove foreign materials from the system.
- Clean the system with a dry cloth.
- Keep the floor clean in the area of the system.

9.2 Maintenance

Maintenance schedule

The specified maintenance intervals apply if the conveyor is used in single shift operation. Shorten the maintenance intervals if the system is used under heavy-duty conditions or in multi-shift operation.

Assembly	Activity	Interval				
		daily	weekly	monthly	semi-annually	annually
Gravity Roller Conveyor						
Gravity Roller Conveyor	Visual inspection for external damage; replace damaged components	X				
Screw connections	Check if all screw connections are securely tightened; re-tighten loose connections			X		
Rollers	Check the running performance; replace the roller if damaged			X		
Brake conveyor rollers	Check the running performance; replace brake conveyor roller if damaged			X		
Separator	Check operation; replace separator if damaged			X		

- Document all maintenance operations in a maintenance record. Refer to the next page for a template.

9.3 Spare parts

All spare parts used on the system must be spare parts delivered / expressly approved by Euroroll GmbH. Euroroll GmbH will not assume any warranty or liability for damage that can be attributed to the use of non-original spare parts.

Spare parts stock

To ensure the continuous operation of the system and maintain the capacity to tide over extended delivery times, we recommend that you keep a sufficient stock of spare and wear parts.

Spare part orders

You can order original spare parts from Euroroll's customer service department. You will find the service address on page 4.

For lists of spare and wear parts, refer to the corresponding drawings included in the appendix.


To allow for the quick and correct processing of your spare part order, we ask that you submit the following information:


1. Designation of your system
2. Year of manufacture
3. Order confirmation number (R-)
4. Item number
5. Designation and, if applicable, drawing/article no.
6. Order quantity
7. Shipping address

10 Decommissioning

This chapter provides you with important information on how to disassemble and dispose of the system. This information applies in the following situations:

- The system is set up in a different location.
- The system is put into storage.
- The system is scrapped.

⚠ WARNING!	
	<p>Unsecured system!</p> <p>Risk of injury if the system is unsecured during installation and disassembly work.</p> <ul style="list-style-type: none"> ➤ The system must be secured using, for example, caution tape. ➤ Make sure that no unauthorised personnel have access to the work area.

⚠ WARNING!	
	<p>Fall/plunge from top levels of the live storage rack!</p> <p>Risk of injury due to falls from the top levels of the live storage rack.</p> <ul style="list-style-type: none"> ➤ Allow only qualified professional staff to work on the top levels of the live storage rack. ➤ Always wear fall arresting devices / safety harnesses. ➤ Wear personal protective equipment. ➤ Before inspecting the system, make sure the channel to be inspected is blocked. ➤ Use suitable aids to drive along the channel, e.g. maintenance pallet, elevating work platform.

10.1 Disassembly

Observe the following rules when disassembling the system:

- Follow all safety instructions.
- Observe the regulations on accident prevention.
- Make sure that no unauthorised person is in the area of the system to be dismantled.
- Always wear safety boots when handling heavy components.
- Always wear protective gloves when handling sharp-edged components.

10.2 Disposal

The environmentally compatible disposal of operating supplies, electronic assemblies, reusable materials and other components of the system is governed by national and regional legislation. Turn to the local authority responsible for your area to obtain specific information on disposal. Contact Euroroll's customer service if you have any questions on the materials used. All parts must be sorted for environmentally compatible disposal.

Sort the parts by the materials of which they are made:

- Electronic scrap
- Metals
- Plastics
- Fluids
- Hazardous waste

Recycling

- Recycle all parts that are suitable for reuse.

11 Technical specifications

Conveyed material

Load carriers suitable for use	Euro pallet, 800 × 1200 mm CHEP blue pallet, 800 × 1200 mm as confirmed
Weight including goods	max. 1000 kg
Overloading	none (load secured)
Running surface	level (suitable for roller conveyors), without undershrinkage
Direction of conveyance	longitudinal in the direction of the runners

12 Appendix

In the appendix you will find the following documents:

- Fitting Drawings