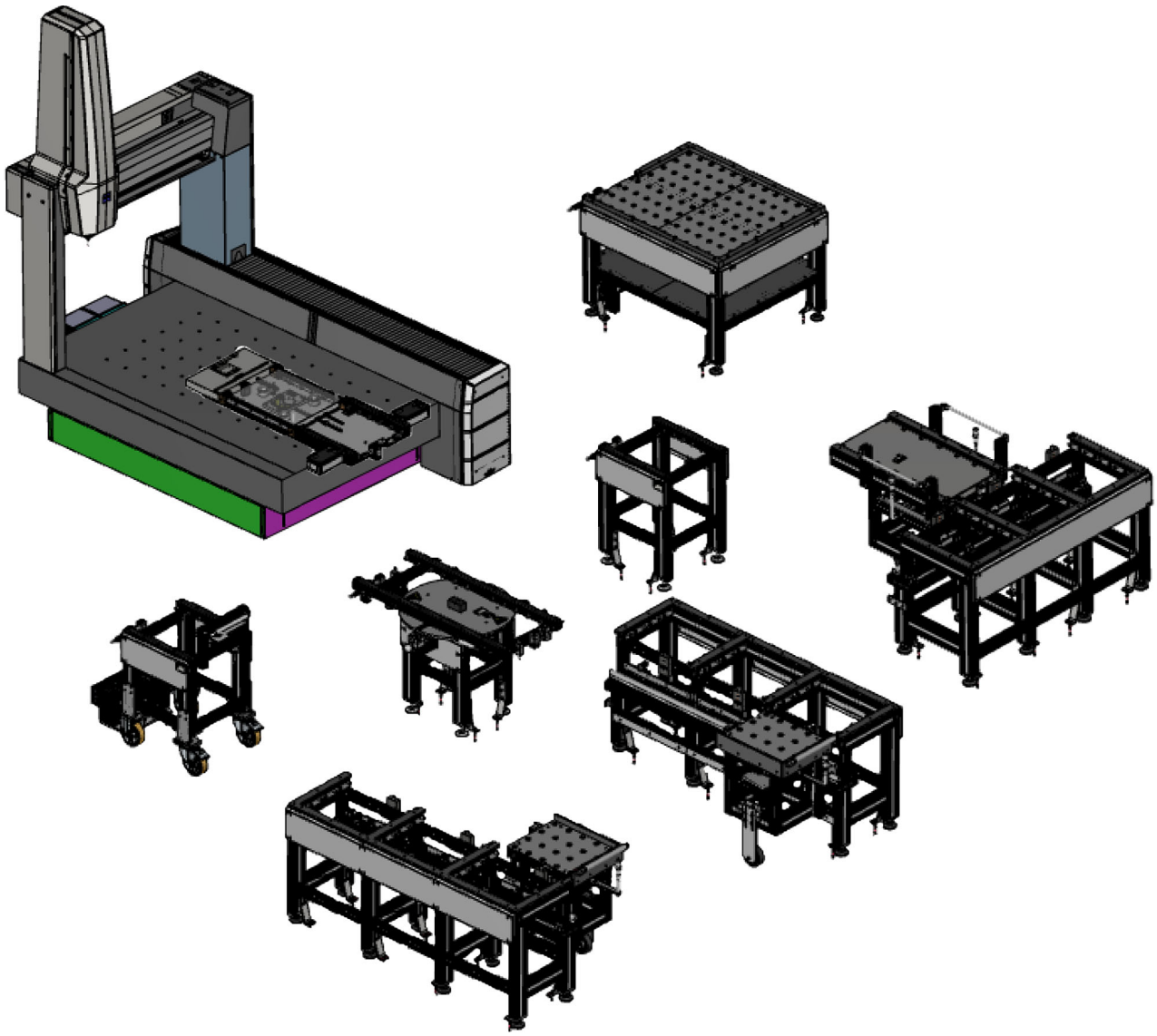

Coordinate measuring machine with manual loader

Operating Instructions
(translation)

ZEISS

Product information

Material n°.	602700-6000-002, 602700-6000-003, 602700-6000-004

Document version

Article no. Document	Version	Date	Note
602700-6000-00X_OIM	1.0	2019-04-12	Approved

If changes are made to the content of this document, a new version will be created. The existing version will become invalid and must be replaced by the valid document version.

Please read first!

- Please read these operating instructions before you start to use the ZEISS Product.
- For your safety, always keep all relevant accompanying documents readily at hand.

Contact

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Division
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Carl-Zeiss-Str. 22
D-73447 Oberkochen

Table of contents

1 Introduction

1.1 Warranty and liability

Our General Terms and Conditions of Sale and Delivery always apply. No warranty or liability claims for personal injury or material damage can be accepted if they relate to one or more of the causes given below:

– Improper use

– Improper installation, commissioning, operation and maintenance or use of spare parts that are not approved by the manufacturer.

– Non-observation of the information in these operating instructions in respect of the different life phases

– Unauthorised structural modification

1.2 EC Declaration of Conformity

The appendix contains an declaration of conformity for the coordinate measuring machine, which includes the pallet supply system.

All other optional loaders do not come under any EU directive and therefore do not require a declaration of conformity.

1.3 Importance of these operating instructions

Use of these operating instructions will ensure that the system is used for its intended purpose and operated safely. These operating instructions are intended for the operating organisation and all persons performing tasks on the system.

The figures in these operating instructions are for illustration only and may differ from your system.

For more information, the following manuals must also be adhered to:

– Coordinate measuring machine operating instructions

– Coordinate measuring machine installation instructions

– Instructions for the installed applications

All documents relevant for operation are contained on the supplied data medium.

2 Safety

2.1 Instructions and symbols

In these operating instructions, symbols are used in accordance with standard EN ISO 7010 to warn of dangerous situations. The terms "Danger", "Warning" and "Caution" are used to warn against personal injury:

⚠ DANGER

A dangerous situation resulting in death or severe injury, if it is not avoided.

⚠ WARNING

A dangerous situation that could result in death or severe injury, if it is not avoided.

⚠ CAUTION

A dangerous situation that can result in slight or moderate injury if it is not avoided.

ATTENTION

A situation resulting in damage to property if it is not avoided.

2.2 Target group

⚠ DANGER

Risk of death or injury due to lack of knowledge and incorrect operation of the system.

– Reading the operating instructions.

These operating instructions are intended for the organisation operating the system and all persons who will work on or with it.

– The Operating personnel must be adequately instructed for the corresponding tasks. Loading and unloading of workpieces and rectifying minor faults may be performed. The operating personnel must not open any housings or covers and must only operate the coordinate measuring machine in automatic mode.

– The set-up personnel must be adequately instructed for the corresponding tasks. Loading and unloading of workpieces, setting up of measuring programs and workpieces and rectification of faults may be performed. All work on electrical equipment may only be performed by a qualified electrician (see 2.3).

– Service personnel may rectify faults, perform maintenance and inspection work. Work on electrical equipment may, may only be performed by trained qualified personnel, as is the case with set-up personnel.

Changes to the software applications must be agreed with the manufacturer (see 5.10), or many only be implemented by it.

On initial start-up, the operating organisation will be instructed by the manufacturer about operation of the system. The operating organisation is responsible for any subsequent instruction of personnel.

Prerequisite for the safe handling and fault-free operation of the system is knowledge of the locally applicable safety instructions and regulations. These operating instructions contain the most important information for ensuring safe operation of the system.

2.3 Definition of a qualified person

A qualified person is someone who, based on their training and experience, can safely perform the necessary tasks and can identify and avoid possible dangers.

The following conditions apply for a qualified person:

- The qualified person must be authorised by a person responsible for the safety of the system to perform the necessary tasks.
- The qualified person must have appropriate training and experience.
- The qualified person must have received instruction about the system.
- The qualified person must be aware of the relevant standards, conditions, accident prevention regulations and the respective operating conditions.

2.4 Operating organisation requirements

The operating organisation must only allow persons to work on the system who are aware of the basic local applicable health and safety and accident prevention regulations, who have been instructed on the handling of the system and who have read and understood the operating instructions.

The operating instructions must be available at the system at all times.

The requirements for the place of installation must be fulfilled (see 3.5).

The operating organisation must take care to ensure all safety elements function as intended and satisfy the conditions of the Occupational Health and Safety Ordinance. Before starting, all protective devices (enclosure panels and main switch(es)) must be correctly attached and functional.

2.5 Personal protective equipment

The following protective equipment must be worn:

- Safety shoes with steel toecaps
  In addition, when working on the electrical system, the safety shoes must be ESD compliant, which means the shoes must be capable of electrostatically discharging themselves.
- Cut-resistant gloves (if sharp-edged workpieces require this)
- Safety glasses when cleaning (if required for the cleaning agent being used)
- Safety helmet when transporting overhead loads

2.6 Safety equipment

2.6.1 General

The pallets are locked on all assemblies, so that they cannot fall down.

2.6.2 Pictograms

Pictograms are attached to the system as shown below.

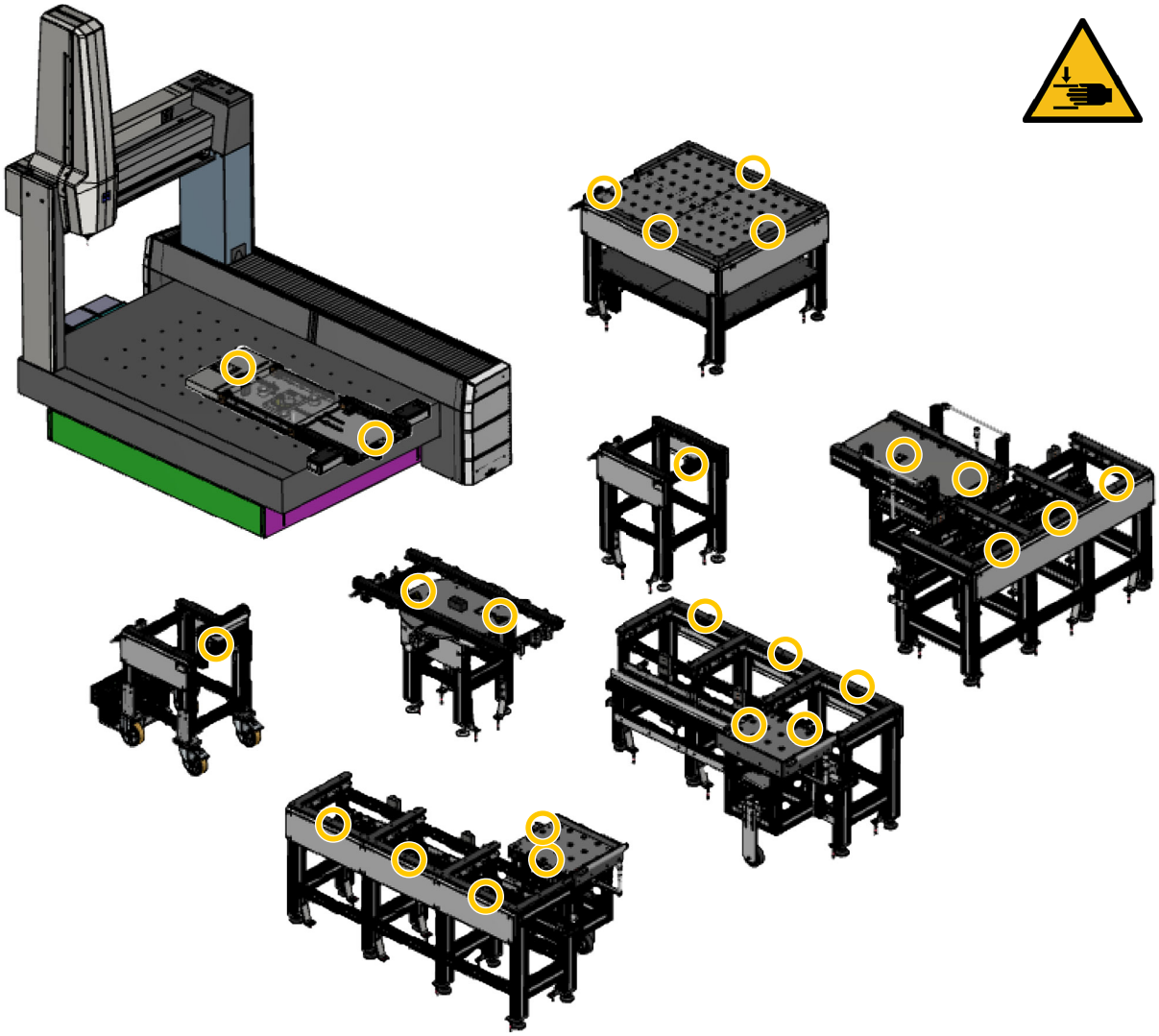

Fig. 2-1 Pictograms (illustration as an example)

2.6.3 Emergency stop

In emergency situations which threaten the lives and well-being of personnel, the emergency stop button must be pressed. This ensures that all drives are safely switched off. A red mushroom-head button on a yellow background is used as an emergency stop.

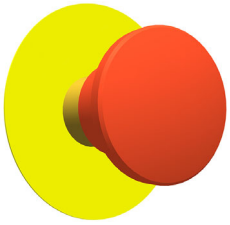

Fig. 2-2 Emergency stop button

Emergency stop buttons on the system:

– On the control cabinet of the coordinate measuring machine (if present)

– On the control console of the coordinate measuring machine

2.6.4 Safety equipment pallet supply system

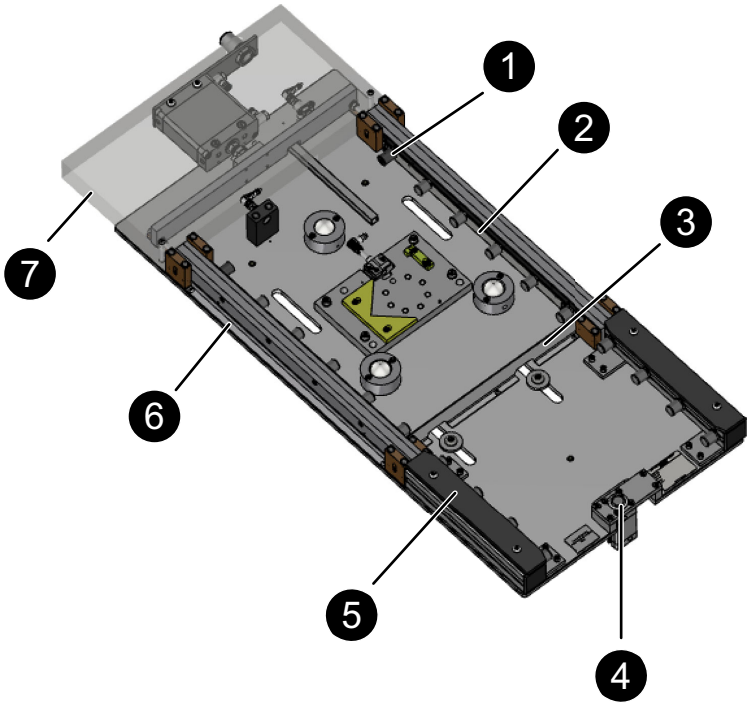

Fig. 2-3 Safety equipment of the pallet supply system (illustration as an example)

1 Eccentric roller to brake the pallet

2 Fall plate as protection against reaching in

3 Plate as protection against reaching in

4 Pressure-limited pneumatic cylinder with limit position querying at the top to prevent to pallet from falling.

5 Sliding rail at the section as protection against reaching in

6 Angle brackets as protection against reaching in

7 Sheet metal cover as protection against reaching in

2.6.5 Safety equipment for the loading table (option)

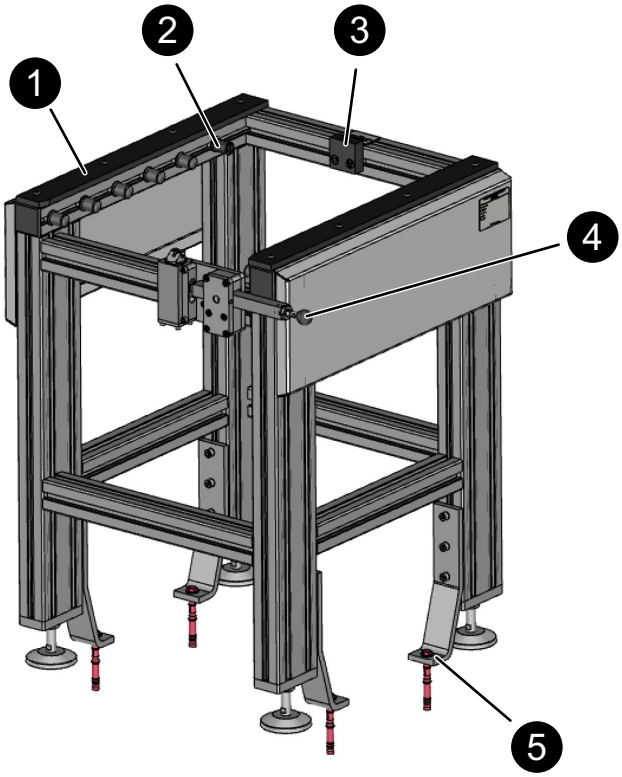

Fig. 2-4 Safety equipment of the loading table (illustration as an example)

1 Pallet guides to secure the pallet at the loading table.

2 Eccentric rollers to brake the pallet before the stop position.

3 End stop for pallet

4 Manual pallet lock on the loading table
The lock must be released, to push the pallet on to the pallet supply system.

5 Floor bracket for securing the loading table on the ground

2.6.6 Safety equipment for rotating loading station (option)

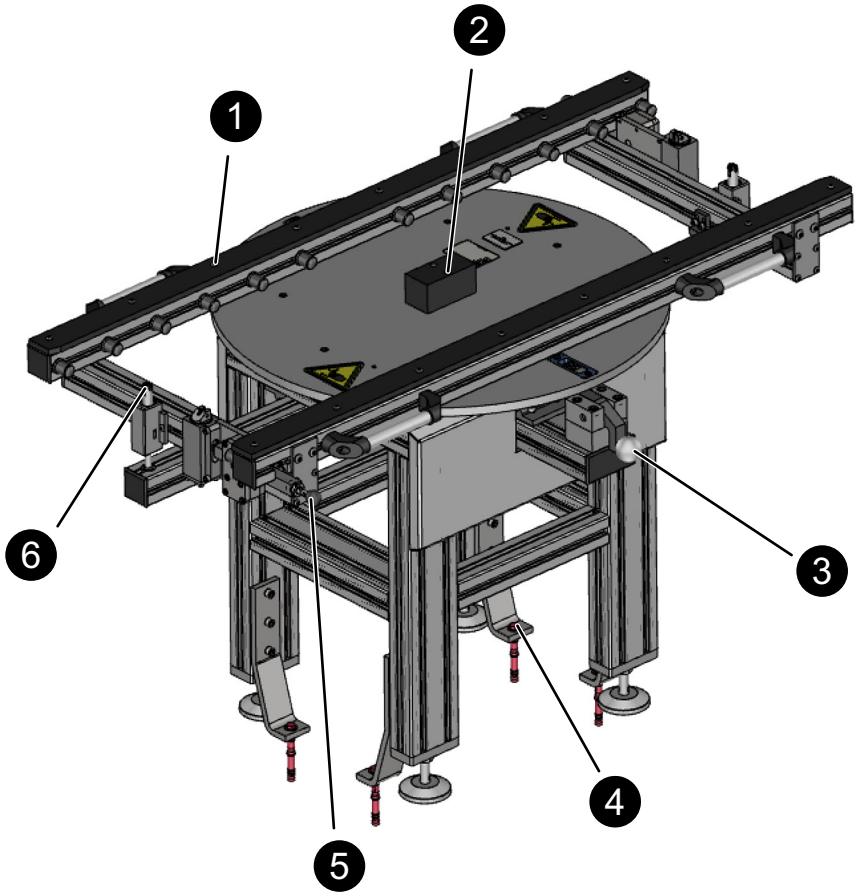

Fig. 2-5 Safety equipment for rotating loading station (illustration as an example)

1 Pallet guides to secure the pallet at the rotative loading station

2 End stop to secure the pallets at the rotative loading station

3 Lock for the rotating movement of the rotating loading station

4 Foundation angle bracket for fixing the rotating loading station to the ground

5 Hand lever as manual pallet lock on the rotating loading station

6 Mechanical bolt with lock; if the pallet has not been completely pushed over, no rotational movement can take place.

2.6.7 Safety equipment of pallet transport carriage (option)

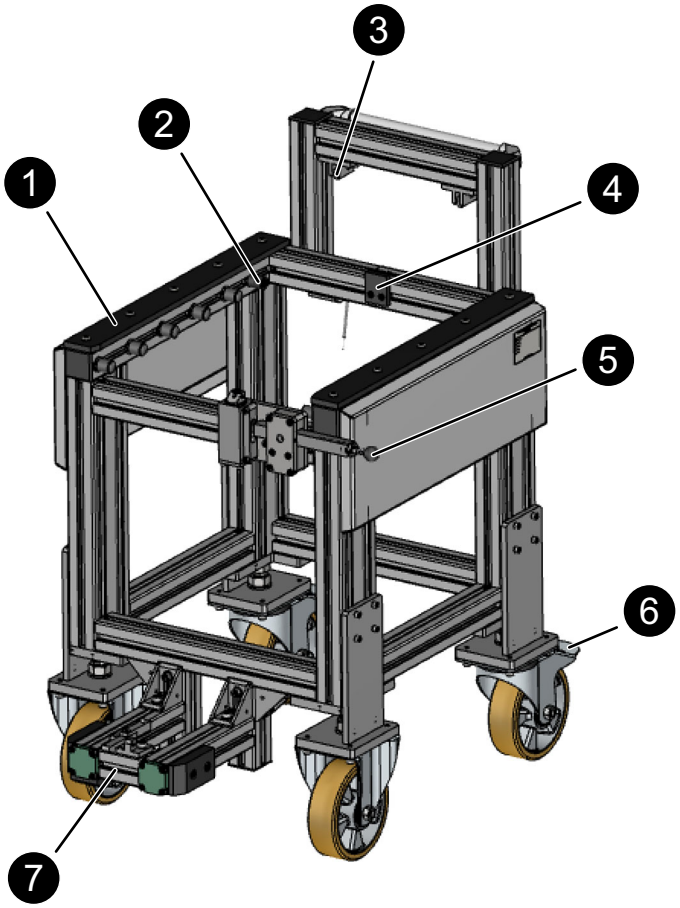

Fig. 2-6 Safety equipment of the pallet transport carriage (illustration as an example)

1 Pallet guides to secure the pallets on the loading table with ball rollers.

2 Eccentric roller to brake the pallet on the pallet transport carriage

3 Hand lever for releasing the pallet transport carriage from the docking unit

4 End stop for pallet on the pallet transport carriage

5 Hand lever as manual pallet lock on the pallet transport carriage.

6 Holding brake for locking the pallet transport carriage.

7 Locking of the pallet transport carriage to the docking unit

2.6.8 Safety equipment for the docking unit (option)

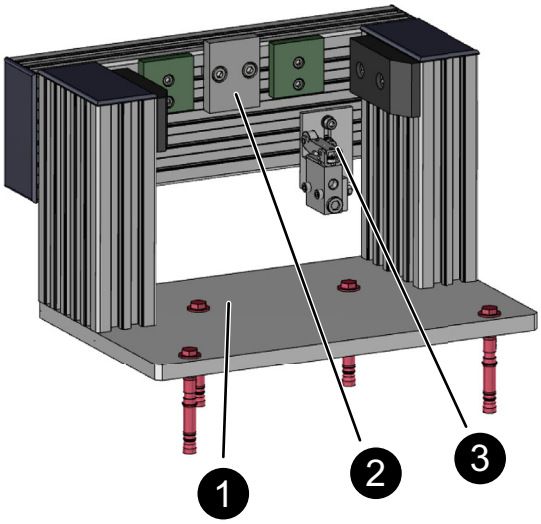

Fig. 2-7 Safety equipment for docking unit (illustration as an example)

1 Base plate for fixing the docking unit to the ground

2 Fixing plate for pallet transport carriage

3 Roller lever valve as presence check for pallet transport carriage. The roller lever valve is pressed when the pallet transport carriage is pushed up to the docking unit. The pallet securing mechanism on the pallet supply system is opened simultaneously.

2.6.9 Safety equipment of loading table with ball rollers (option)

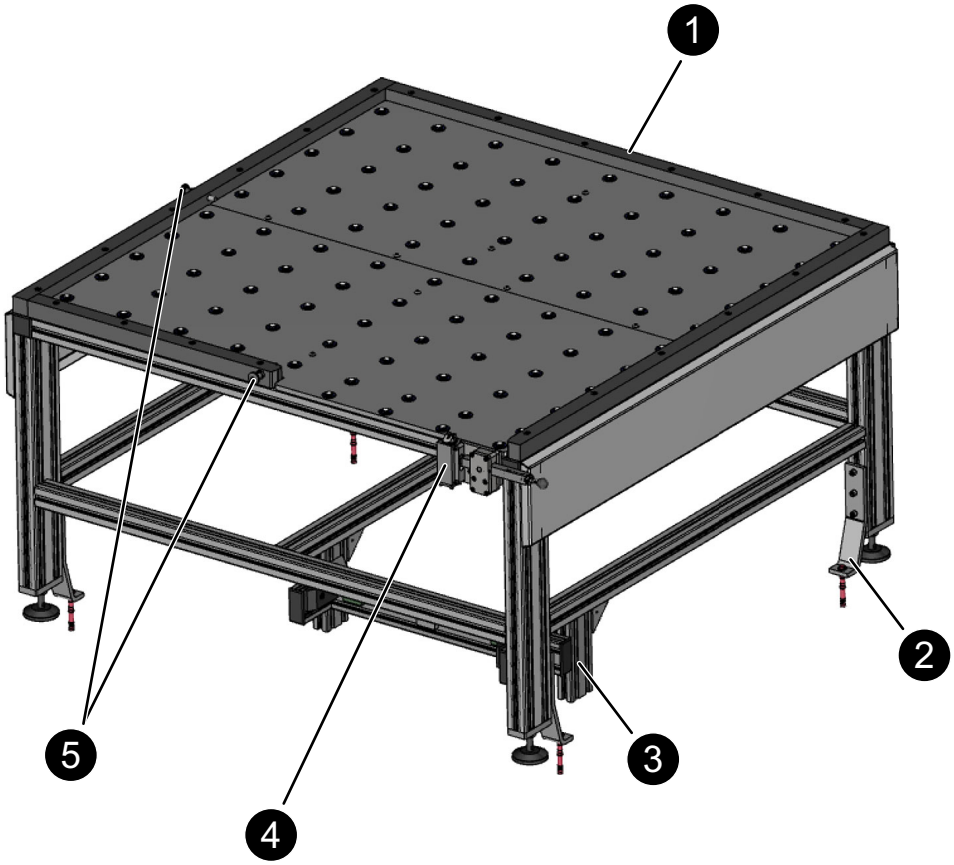

Fig. 2-8 Safety equipment of the loading table with ball rollers (illustration as an example)

1 Pallet guides to secure the pallets on the loading table with ball rollers.

2 Floor brackets for fixing the ball roller table to the ground

3 Docking unit for securing a pallet transport carriage on the loading table with ball rollers

4 Hand lever as manual pallet lock on the loading table with ball rollers

5 Securing of the pallet in the set-up position

2.6.10 Safety equipment for the transverse shuttle station (option)

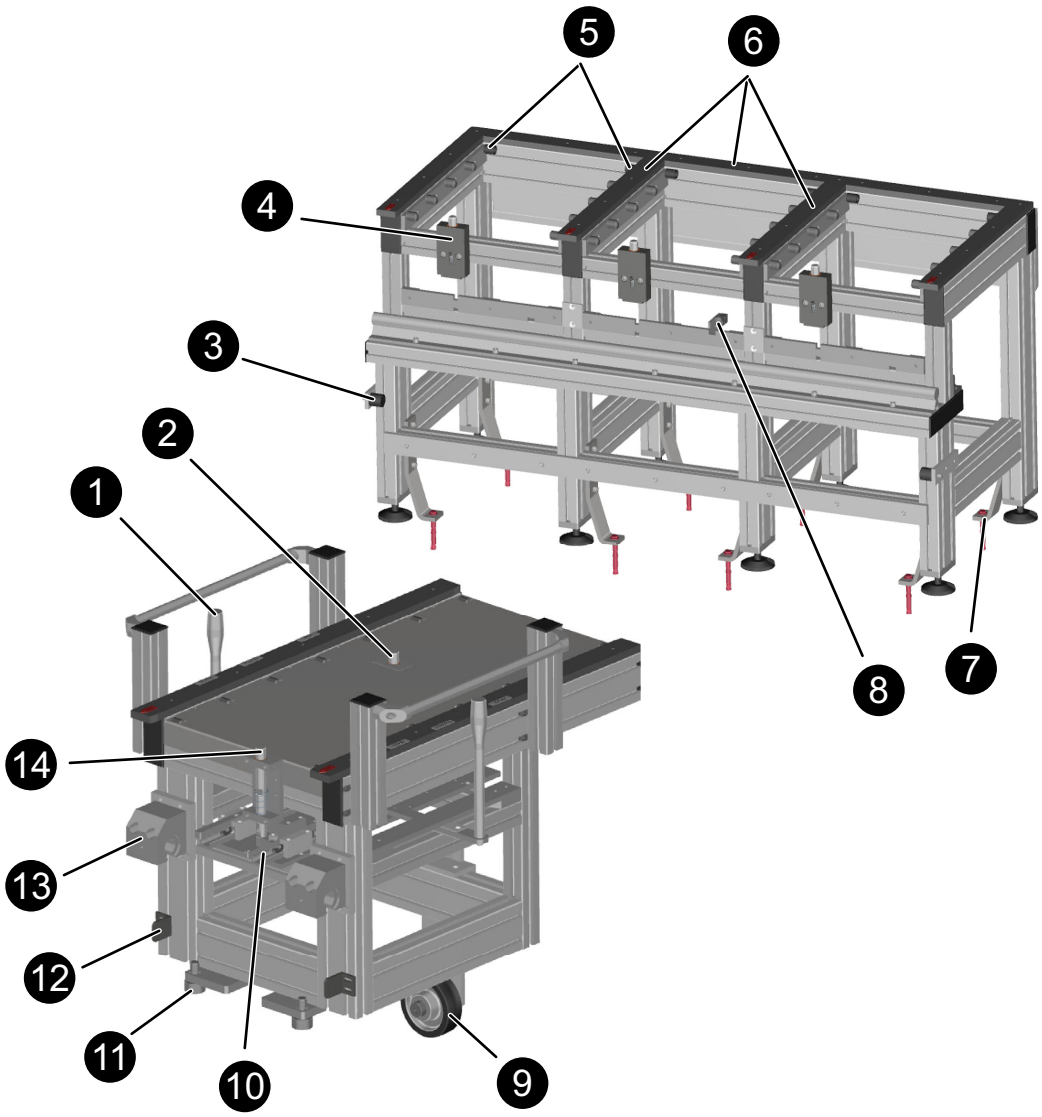

Fig. 2-9 Safety equipment for the transverse shuttle station (illustration as an example)

1 Hand lever for locking/unlocking of the shuttle in front of the setup station or in front of the pallet supply system

2 Spring-operated bolt to secure the pallet on the shuttle. The bolt is pressed down as soon as the shuttle is locked on the pallet supply system.

3 Stopper for shuttle

4 Spring-operated bolt to secure the pallet on the setup station. The bolt is pressed down as soon as the shuttle is locked in front of the setup station.

5 Eccentric rollers to brake the pallet before the stop position

6 Pallet guides to secure the pallet at the setup station.

7 Floor bracket for securing the loading table on the ground

8 Roller lever valve as a check for the presence of the shuttle in front of the pallet supply system

9 Support wheel for shuttle. A sliding strip can be installed if the floor is uneven. The sliding strip may not be set up more than 10 mm above the floor, otherwise there is a risk of tripping over it.

10 Link for locking the shuttle in front of a setup station and for releasing the pallet lock

11 Curved roller to support the shuttle on the setup stations.

12 End stop of the shuttle

13 Connection to the setup stations

14 Spring-operated bolt to secure the pallet on the shuttle. The bolt is pressed down as soon as the shuttle is locked in front of a setup station.

2.6.11 Safety equipment for the longitudinal shuttle station (option)

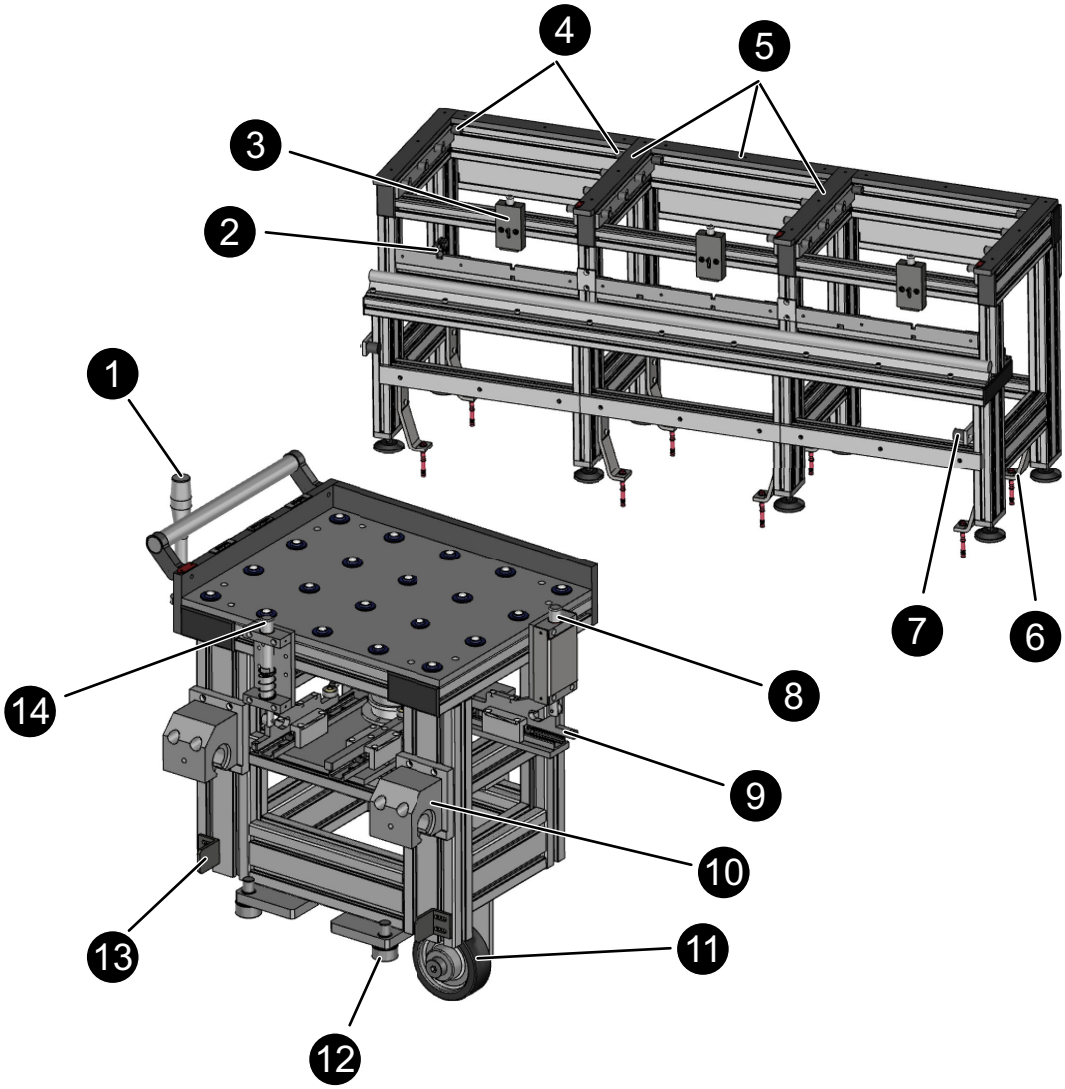

Fig. 2-10 Safety equipment for the longitudinal shuttle station (illustration as an example)

1 Hand lever for locking/unlocking of the shuttle in front of the setup station or in front of the pallet supply system

2 Roller lever valve as a check for the presence of the shuttle in front of the pallet supply system

3 Spring-operated bolt to secure the pallet on the setup station. The bolt is pressed down as soon as the shuttle is locked in front of the setup station.

4 Eccentric rollers to brake the pallet before the stop position

5 Pallet guides to secure the pallet at the setup station.

6 Floor bracket for securing the loading table on the ground

7 Stopper for shuttle

8 Spring-operated bolt to secure the pallet on the shuttle. The bolt is pressed down as soon as the shuttle is locked on the pallet supply system.

9 Link for locking the shuttle in front of a setup station and for releasing the pallet lock

10 Connection to the setup stations

11 Support wheel for shuttle. A sliding strip can be installed if the floor is uneven. The sliding strip may not be set up more than 10 mm above the floor, otherwise there is a risk of tripping over it.

12 Curved roller to support the shuttle on the setup stations.

13 End stop of the shuttle

14 Spring-operated bolt to secure the pallet on the shuttle. The bolt is pressed down as soon as the shuttle is locked in front of a setup station.

2.7 Safety instructions by life phase

The safety instructions in these operating instructions are based on the life phases, which are combined in groups:

– Instructions which are generally applicable for all life phases are combined in the "All" group.

– The second and third group combine life phases in which machine safety is active.

– The fourth group combines life phases in which machine safety is partially or completely deactivated. Here appropriate technical training is necessary so that work is correctly performed from a safety point of view.

Tabular portrayal of the grouped product life phases with user groups:

	Applies to user groups	Product life phases
1	All	In all life phases (see 2.7.1).
2	Operator	Normal operation and cleaning (see 2.7.2).
3	Set-up personnel	Set-up work, retooling and maintenance (see 2.7.2).
4	Authorised specialist personnel	Assembly, installation, service und dismantling (see 2.7.3)

2.7.1 In all life phases

The safety instructions in this chapter apply for all persons working on the system.

Do not allow anyone to tamper with safety equipment and functions. Changes of any type to the system must be agreed in advance with the manufacturer.

For safe operation, in addition to these operating instructions, the operating instructions of the coordinate measuring machine must be observed by all persons working on the system.

2.7.2 Normal operation/set-up work, retooling, maintenance and cleaning.

The safety instructions in this chapter apply for the product life phases normal operation, set-up work, retooling, maintenance and cleaning. While the operator may perform work in normal operation and for cleaning, tasks such as configuring machine settings must be performed by instructed set-up personnel.

⚠ CAUTION

Risk of injury due to pallet movement

Crushing of hands and fingers.

- The system may only be operated by instructed personnel.
- A coordinate measuring machine must only be operated by one person.
- Only one person may set up at a setup station.
- When moving pallets, always grip with both hands on the provided devices.

Operator tasks:

- The operator sets up the pallets.
- The operator pushes the pallet manually on the pallet supply system
- The operator raises and lowers the pallet on the pallet supply system by pressing a button.
- The operator starts and stops measuring operation of the coordinate measuring machine.

Option:

- The operator pushes the pallet manually between the loader in front of the pallet supply system and the pallet supply system.
- The operator pushes the pallet manually on the ball roller table and between pallet transport carriage loading table with ball rollers.
- The operator pushes the pallet transport carriage at a walking pace.
- The operator pushes the shuttle at a walking pace.
- The operator pushes the pallet manually between the shuttle and the setup station or pallet supply system.
- The operator manually rotates the rotating loading station through 180°.

The operator may not:

- Open control cabinets.
- Bypass safety functions.
- Carry out any set-up or maintenance work.
- Clear emergency situations.

2.7.3 Installation, commissioning, service and dismantling

The safety instructions in this chapter apply for the product life phases, installation, commissioning, service (maintenance, repair) and dismantling in which work may only be performed by specialist personnel authorised by the manufacturer.

⚠ WARNING

When moving large and heavy parts there is a risk of injury caused by the falling, toppling or sliding of heavy parts.

Crushing and impact injuries.

- Wear personal protective equipment.
- Suitable lifting gear must be used when moving heavy parts or assemblies (forklifts, pallet trucks, cranes).
- Screw connections must be checked for secure seating.

Carry out the stipulated maintenance work at the specified intervals (see 6). All machine parts and operating media upstream and downstream of the system, such as compressed air, must be secured to prevent unintentional commissioning:

Fig. 2-11 Securing against reactivation – padlock on the main switch (illustration as an example)

2.8 Miscellaneous

⚠ CAUTION

Risk of injury due to malfunction.

Risk of injury due to current/smoke/vapours.

- If smoke emerges or if there are unusual odours or noises, the system must be stopped immediately.
- Inform the service department of Carl ZEISS Industrielle Messtechnik GmbH (see 5.10).

2.8.1 Residual risk instruction

The system is built in accordance with the state of the art and recognised safety rules. Despite all the measures relating to safety and security incorporated into the design, it is not possible to eliminate all risks to persons or damage to systems components caused by inattentiveness or misuse of the device.

Only use the system as follows:

- For the intended application (see 3.1).
- When it is free from any safety-impairing faults.
- After rectification of any faults that could compromise safety.

The sound pressure level is < 70 dB(A). Dependent on local conditions, a sound pressure level may arise that differs from this value. In this case, the personnel must be protected with appropriate safety equipment or protective measures.

2.8.2 Design changes

No changes, additions or conversion of or to the scope of supply can be made without the manufacturer's approval.

Extensive repairs or a replacement of system parts can only be performed by specialist personnel authorised by the manufacturer.

Parts must be replaced immediately if not in perfect working order. Only use original spare and wear parts. Where third-party parts are used, it cannot be guaranteed that these have been designed and manufactured in accordance with safety requirements.

3 Parts, function and technical data

3.1 Intended use

Customer parts are to be measured on the coordinate measuring machine. They are supplied to the coordinate measuring machine on a pallet with customer-specific part fixtures supplied.

There is a pallet supply system on the coordinate measuring machine. This is used to manually push pallets into the measuring range of the coordinate measuring machine and lower them into the measuring position by pressing a button. After measurement the pallets are lifted again by pressing a button and manually withdrawn from the coordinate measuring machine.

Option:

Loading table

A loading table is placed in front of the pallet supply system. The pallet is set up on the loading table and pushed manually from the loading table on to the pallet supply system. After the measurement, the pallet is pulled manually back on to the loading table and set up again.

Rotating loading station

A rotating loading station is placed in front of the pallet supply system. Two pallets are set up on the rotating loading station. The pallet pointing towards the pallet supply system is pushed manually from the rotating loading station on to the pallet supply system. During measurement, the second pallet can be set up. After the measurement, the pallet is pulled back manually on to the rotating loading station, then the rotating loading station is turned through 180° and the prepared pallet can be immediately pushed onto the pallet supply system.

Pallet transport carriage

A pallet transport carriage can be docked in front of the pallet supply system. To do so, a docking unit is installed in front of the coordinate measuring machine. The pallet transport carriage is locked to the docking unit. Pallets can be set up on the fixed pallet transport carriage or the pallet transport carriage is used for the transport of set up pallets from the set-up position to the pallet supply system. Once the pallet transport carriage is fixed, the pallet is pushed manually on to the pallet supply system. After the measurement, the pallet is pulled manually back on to the pallet transport carriage and set up again.

Loading table with ball rollers

A loading table with ball rollers can be installed for the preparation of pallets. Up to 3 pallets can be handled on the loading table with ball rollers. The loading table with ball rollers has a transfer position at which a pallet transport carriage can be docked. The transfer of the pallet between loading table with ball rollers and pallet transport carriage is performed manually.

Shuttle station

A shuttle station is placed in front of the pallet supply system. The shuttle station can be positioned longitudinally or transversely in front of the pallet supply system and has 1 shuttle and 3-10 setup stations. The pallets are set up on the setup stations of the shuttle station. Pallets are transported to the pallet supply system from the setup stations and back again using the shuttle. Setting up must not be performed on the shuttle. To transfer the pallet between the setup station or pallet supply system and shuttle, the shuttle must be locked in the transfer position. The pallet is pushed over manually.

This system is intended for the following:

- Set-up of fixtures/devices manually and/or with the aid of lifting gear.
- Transporting of a pallet from a setup station into the measuring position and back.
- Tactile measuring of parts suitable for this device (see device specification)

Specifications for intended operation:

- Only parts may be measured whose lengths and widths do not protrude from the pallet and whose height is within the measuring range. The specified handling weight (see 3.5) must not be exceeded.
- The system may only be operated in fault-free state. This includes maintenance and repair in accordance with the regulations. Defects that impair safety must be rectified immediately.
- The system is intended solely for operation in industrial interior spaces.
- To ensure safe operation, the installation instructions, the local conditions, the correct energy connections and the service and maintenance work must be observed.
- The system may only be operated by instructed personnel. Only ever one person may set up at a setup station. The coordinate measuring machine must only be operated by one person.
- Observation of all information in the documentation.

3.2 Misuse

Reasonably foreseeable misuse includes all types of use that are not described in section 3.1. Any other use or form of use going beyond this shall be regarded as improper. The manufacturing company is not reliable for damage resulting from such use.

In particular, misuse refers to:

- Operation by personnel who have not been instructed
- CMM operation by more than one person
- Working with several persons on the loader
- Operation with removed protective enclosure/cladding
- Deactivation of safety equipment (e.g. contacts, sensors, etc.)
- Use of non-certified spare and wear parts
- Introduction of parts not suitable for this device (see device specification)
- Transporting persons
- Incorrect operation due to failure to follow the operating instructions

3.3 Scope of supply

The following components form part of the scope of supply:

– Coordinate measuring machine with control cabinet

– Pallet supply system

Option

– Probe changer

– Loading table

– Rotating loading station

– Pallet transport carriage with docking unit

– Loading table with ball rollers

– Shuttle station

3.4 Parts and function

3.4.1 Coordinate measuring machine with control cabinet

The coordinate measuring machine is used to determine the geometric sizes of parts. The parts may be of metal or plastic. Geometric sizes may for example be the dimensions width, length and height or the diameter and depth of holes. For example, the measuring data can be used to calculate the position of holes. Moreover the shape of parts can be determined using special software.

The control cabinet contains the machine electrical system including all components necessary for operation such as power supply units, fuses and circuit breakers, control elements, etc.

The coordinate measuring machine has its own operating instructions which are enclosed with the machine.

3.4.2 Pallet supply system

A set-up pallet is pushed manually to the measuring position on the pallet supply system and then lowered by pressing a button. Pallets are raised again after measurement (by pressing the respective key) and then transported out of the CMM measurement area (manually).

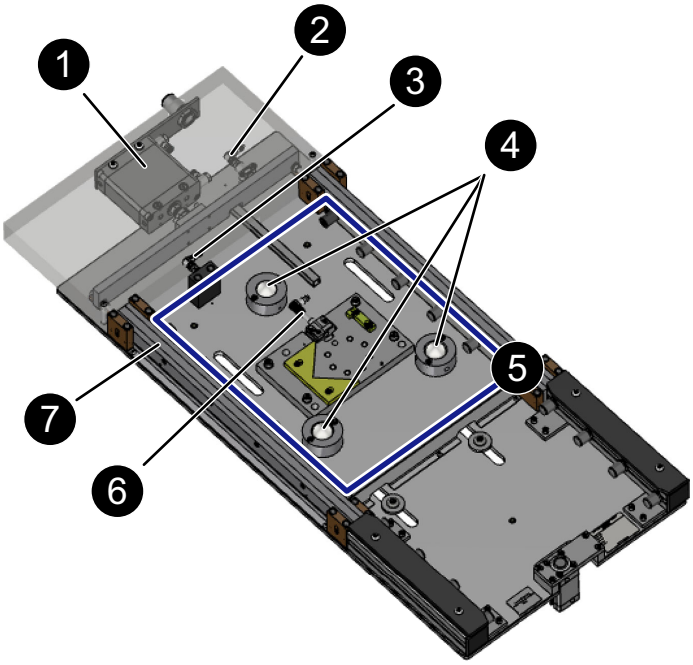

Fig. 3-12 Pallet supply system (illustration as an example)

1 Lifting cylinder (raise/lower pallet)

2 Query pallet lowered. When the pallet is lowered, travel release for coordinate measuring machine for measuring.

3 Query pallet present (travel release for pallet supply system for lowering, if pallet present)

4 3-point ball support for the pallet

5 Measuring position of the pallet

– Pallet middle along X: in measuring volume middle

– Pallet middle along Y: in measuring volume middle minus 100 mm

6 Query calibration standard present (travel release for coordinate measuring machine for calibration if no pallet is there and no pallets were lowered)

7 Lifting beam

3.4.3 Pallet supply system control console

The pallet supply system is operated using the control console.

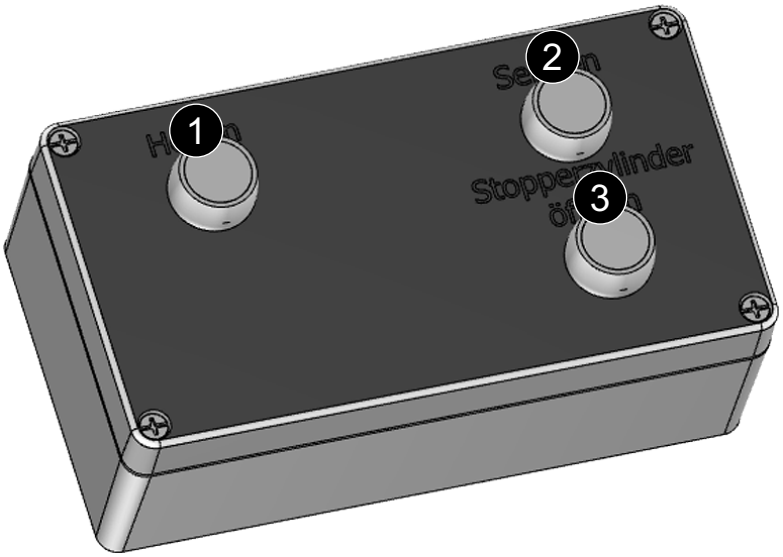

Fig. 3-13 Pallet supply system control console (illustration as an example)

1 RAISE button

2 LOWER button

3 Button OPEN STOPPER CYLINDER

3.4.4 Loading table (option)

The workpiece to be measured is set up on a pallet on the loading table. After setting up, the pallet lock must be manually released and the pallet pushed manually on to the pallet supply system. After the measurement, the pallet is pulled manually back on to the loading table and the pallet set up again.

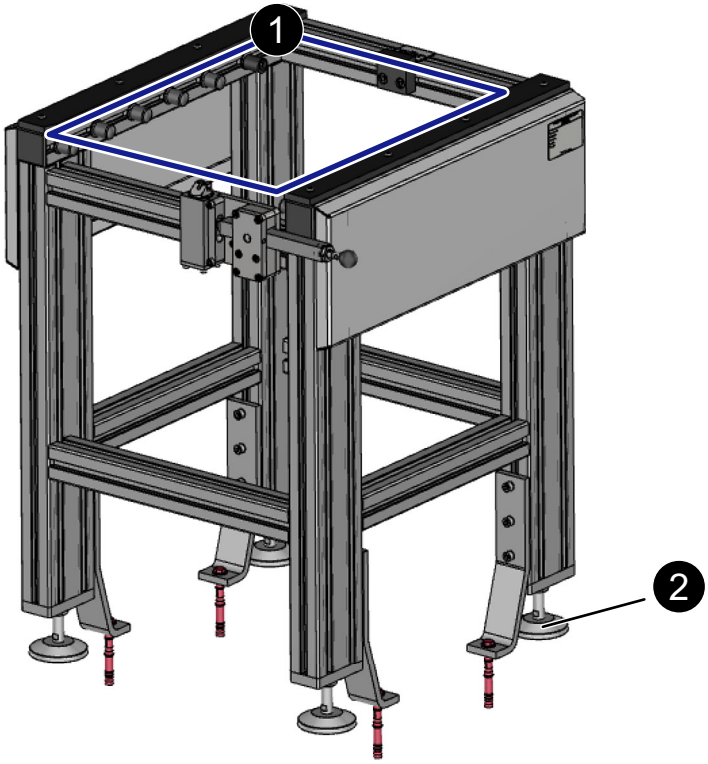

Fig. 3-14 Loading table (illustration as an example)

1 Set-up position of the pallet

2 Adjustable feet for height compensation (adjustable +/- 30 mm)

3.4.5 Rotating loading station (option)

The workpiece to be measured is set up on a pallet on the rotating loading station. After setting up, the pallet lock must be manually released and the pallet pushed manually on to the pallet supply system. During measurement, the second pallet can be set-up position at the second set-up position. After the measurement, the pallet is pulled manually back on to the rotating loading station. Then the rotating loading station is turned and the pallet which was prepared during the measurement is pushed onto the pallet supply system. During the measurement, the pallet is then set up again.

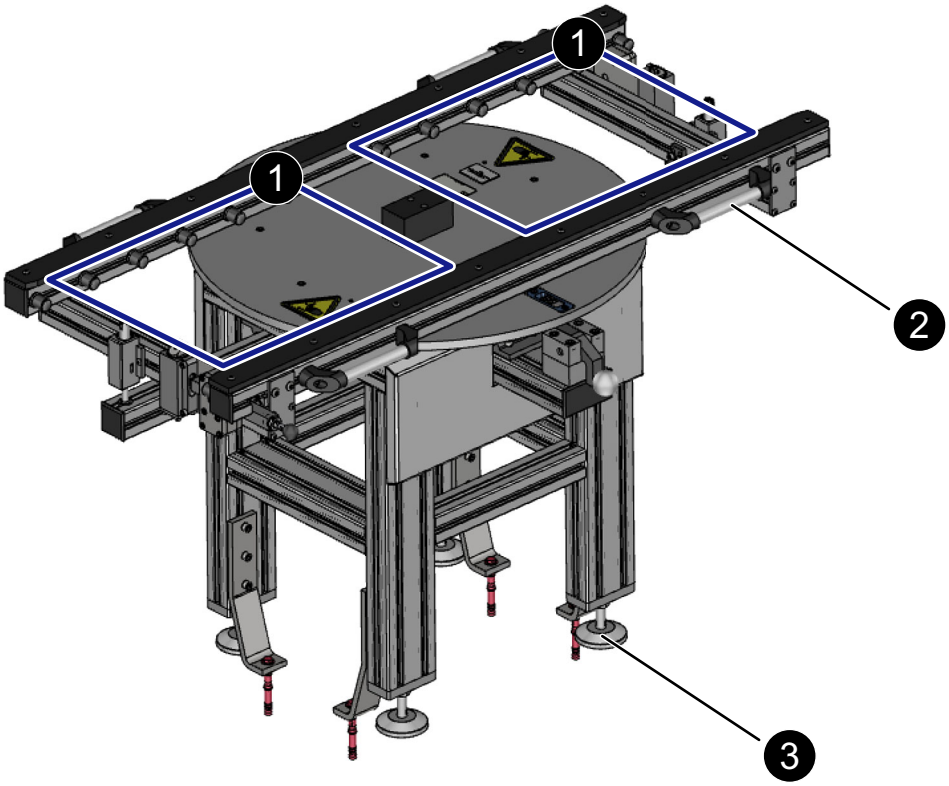

Fig. 3-15 Rotating loading station (illustration as an example)

1 Set-up position of the pallets

2 Handle for turning the rotating loading station for protection against crushing injuries

3 Adjustable feet for height compensation (adjustable +/- 30 mm)

3.4.6 Pallet transport carriage (option)

A set up pallet is transported from the setup station to the pallet supply system on the pallet transport carriage; in doing so, the pallet transport carriage is pushed at walking pace. A docking unit must be fixed to the ground in front of pallet supply system. If the pallet transport carriage is fixed, the pallet can also be set up on the pallet transport carriage. To load the pallet supply system, the pallet transport carriage must be fixed on the docking unit in front of the pallet supply system. Then the pallet lock is released and the pallet pushed manually on to the pallet supply system. After the measurement, the pallet is pulled manually back on to the pallet transport carriage, which is fixed in front of the pallet supply system, and the pallet set up again.

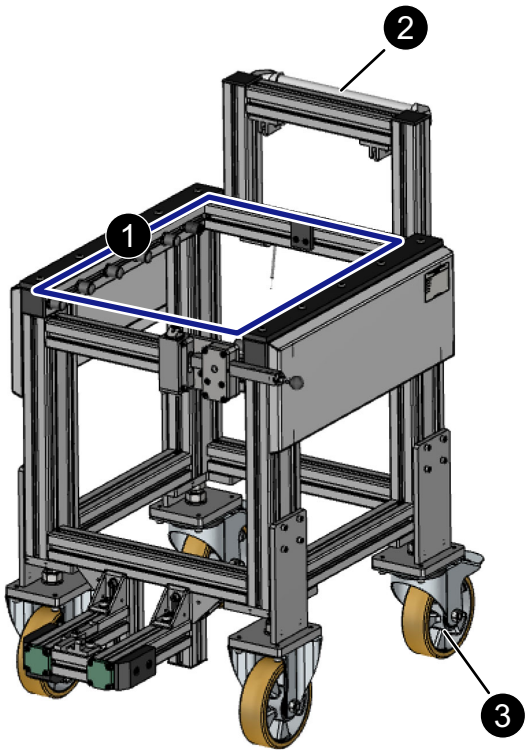

Fig. 3-16 Pallet transport carriage (illustration as an example)

1 Position of the pallet

2 Handle for pushing

3 Rollers

ATTENTION

If the floor covering is very light, it is possible that scuffing marks caused by the transport rollers may be visible on the floor.

– Clean the pallet transport castors regularly.

– Do not use acid-based cleaners. Transport castors are made from a highly elastic elastomer.

3.4.7 Docking unit (option)

The docking unit is fastened to the ground in front of the coordinate measuring machine. The pallet transport carriage is fixed to the docking unit. When the pallet transport carriage is fixed at the docking unit, the roller lever valve for the pallet supply is pressed and thus the pallet lock on the pallet supply system released. To simplify the fixing of the pallet transport carriage, a centring aid is attached on both sides.

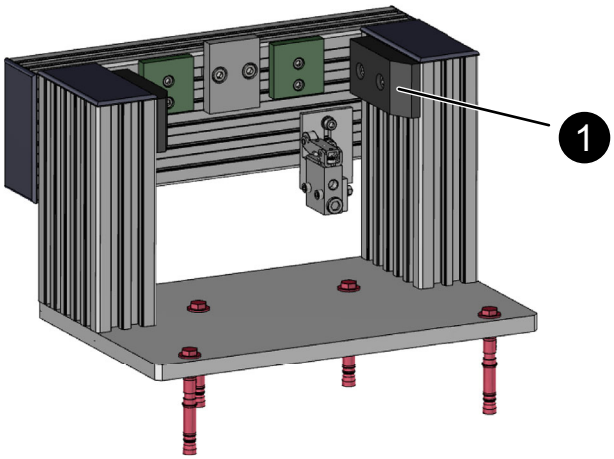

Fig. 3-17 Docking unit (illustration as an example)

1 Centring aid

3.4.8 Loading table with ball rollers (option)

Up to 3 pallets can be handled on the loading table with ball rollers. In the set-up position, the pallet can be fixed for easier setting up. A pallet transport carriage can be fixed at the transfer position. To push the set up pallet onto the pallet transport carriage, the pallet lock must be released. As the loading table with ball rollers cannot be installed directly in front of the pallet supply system, the loading of the pallet supply system must be performed via the pallet transport carriage.

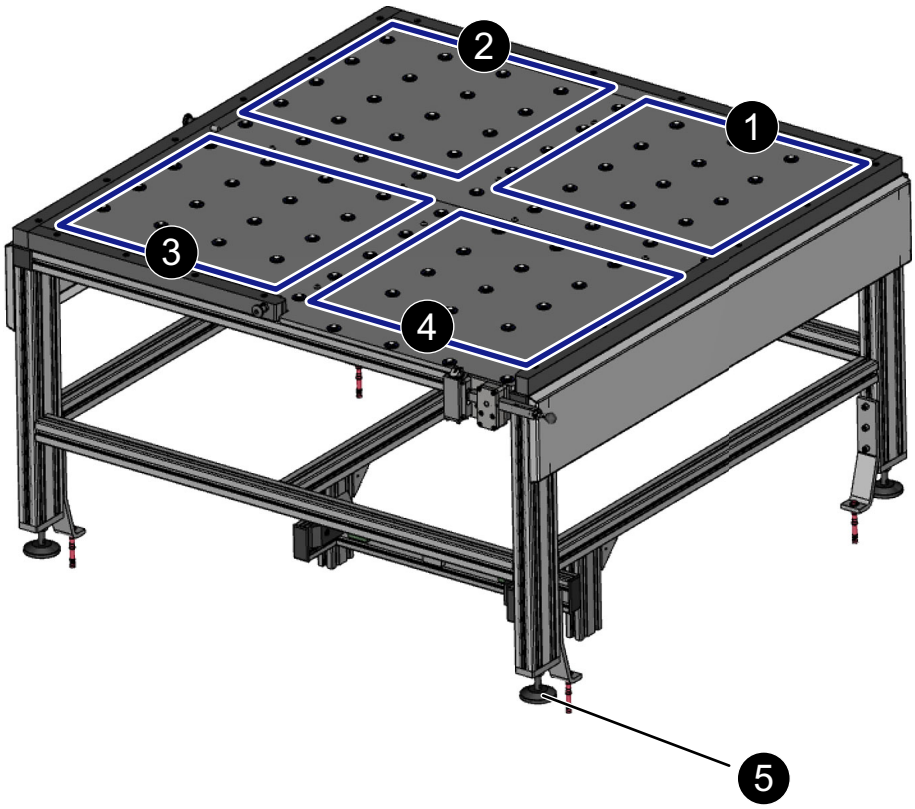

Fig. 3-18 Loading table with ball rollers (illustration as an example)

1 Empty space for handling of pallets

2 Pre-holding position of the pallet

3 Set-up position of the pallets

4 Transfer position of the pallet

5 Adjustable feet for height compensation (adjustable +/- 30 mm)

3.4.9 Transverse shuttle station (option)

This shuttle station is assembled perpendicularly to the loading direction of the pallet supply system.

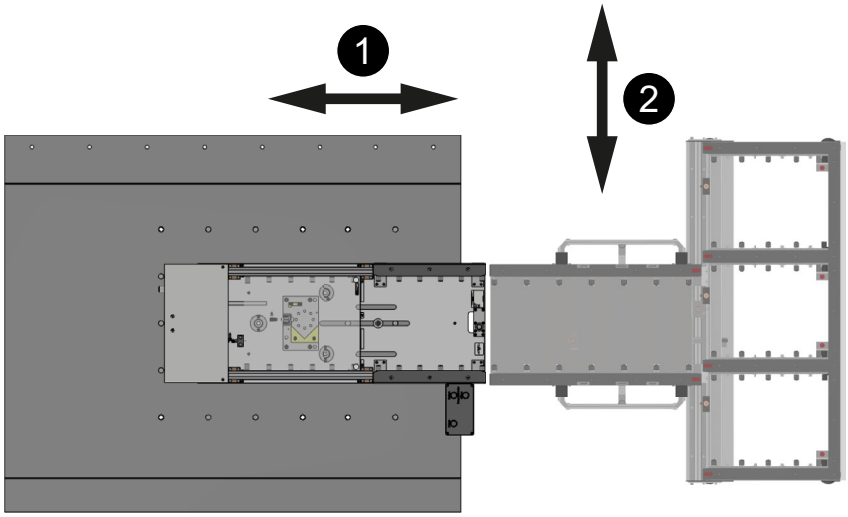

Fig. 3-19 Transverse shuttle station (illustration as an example)

1 Pallet supply system loading direction

2 Shuttle station alignment

Setup stations

Workpieces to be measured are set up on a pallet on the setup stations. One pallet can be set up on each setup station.

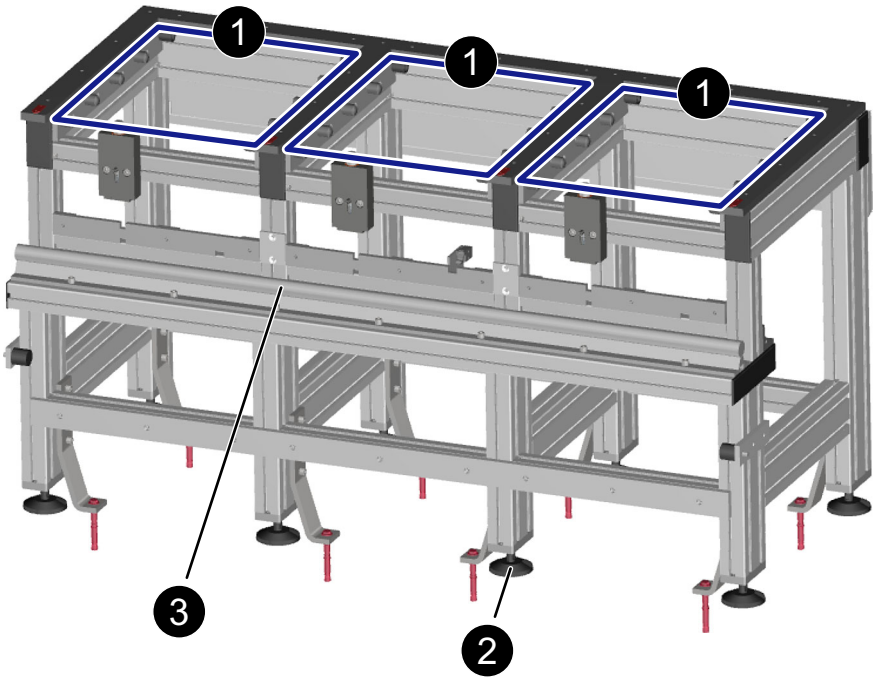

Fig. 3-20 Setup stations, transverse shuttle station (illustration as an example)

1 Set-up/Pre-holding position of the pallet

2 Adjustable feet for height compensation (adjustable +/- 30 mm)

3 Guide for shuttle

Shuttle

The shuttle is used to transport a set-up pallet between the pallet supply system and setup station, in doing so the shuttle is pushed manually at walking speed. The shuttle can be fixed in front of each setup station and in front of the pallet supply system. If the shuttle is fixed in front of the pallet supply system, the pallet lock on the shuttle in the direction of the pallet supply system is released, the roller lever valve on the setup stations is pressed and thus the pallet lock on the pallet supply system released. If the shuttle is fixed in front of a setup station, the pallet lock on the shuttle in the direction of the setup station and simultaneously the pallet lock on the setup station are released.

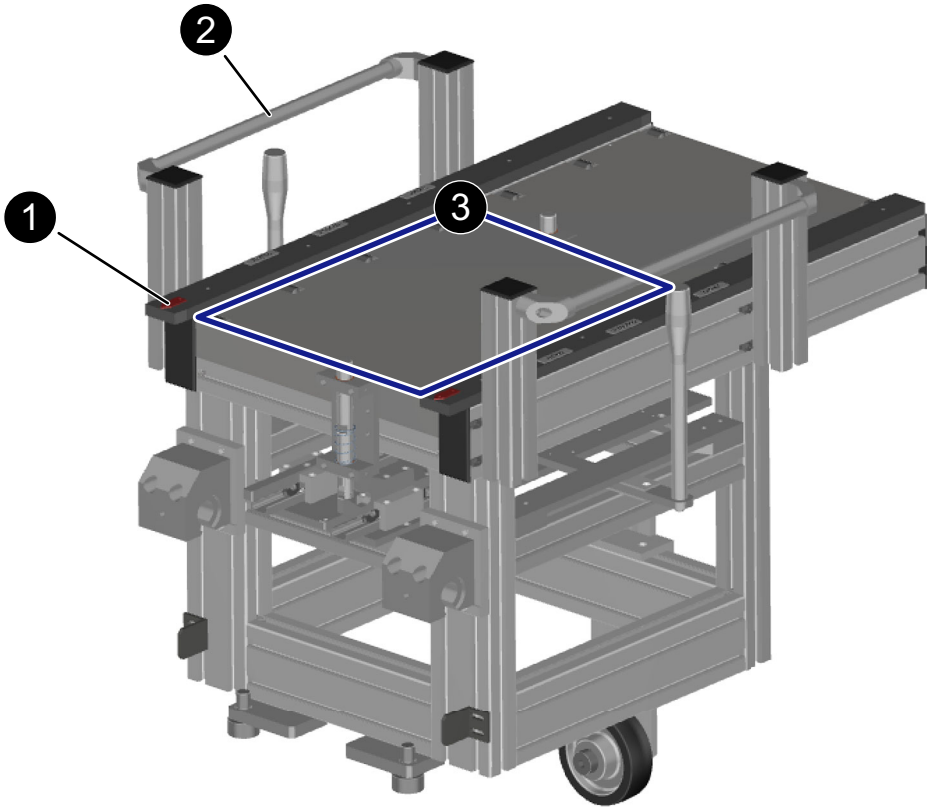

Fig. 3-21 Shuttle, transverse shuttle station (illustration as an example)

1 Positioning aid

2 Handle to move the shuttle

3 Pallet shelf for transport with the shuttle.

3.4.10 Longitudinal shuttle station (option)

This shuttle station is assembled along the loading direction of the pallet supply system.

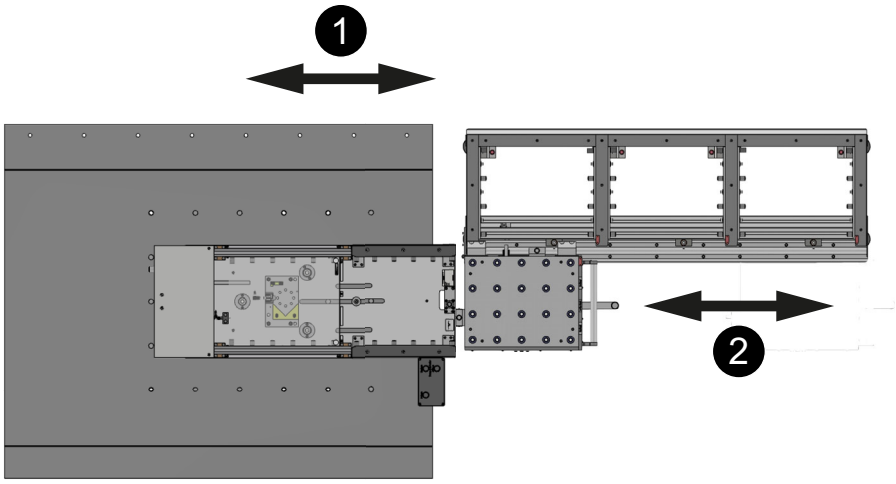

Fig. 3-22 Longitudinal shuttle station (illustration as an example)

1 Pallet supply system loading direction

2 Shuttle station alignment

Setup stations

Workpieces to be measured are set up on a pallet on the setup stations. One pallet can be set up on each setup station.

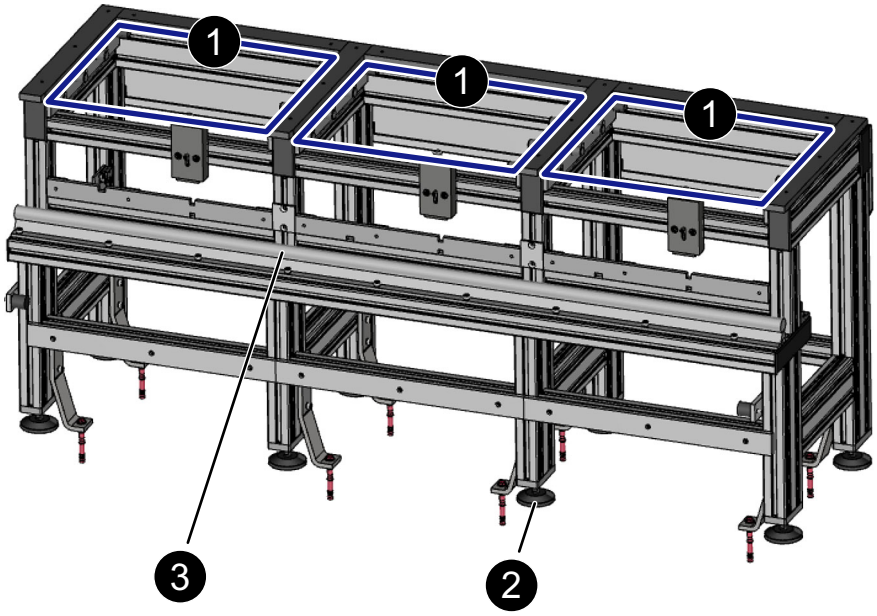

Fig. 3-23 Setup stations, longitudinal shuttle station (illustration as an example)

1 Set-up/Pre-holding position of the pallet

2 Adjustable feet for height compensation (adjustable +/- 30 mm)

3 Guide for shuttle

Shuttle

The shuttle is used to transport a set-up pallet between the pallet supply system and setup station, in doing so the shuttle is pushed manually at walking speed. The shuttle can be fixed in front of each setup station and in front of the pallet supply system. If the shuttle is fixed in front of the pallet supply system, the pallet lock on the shuttle in the direction of the pallet supply system is released, the roller lever valve on the setup stations is pressed and thus the pallet lock on the pallet supply system released. If the shuttle is fixed in front of a setup station, the pallet lock on the shuttle in the direction of the setup station and simultaneously the pallet lock on the setup station are released.

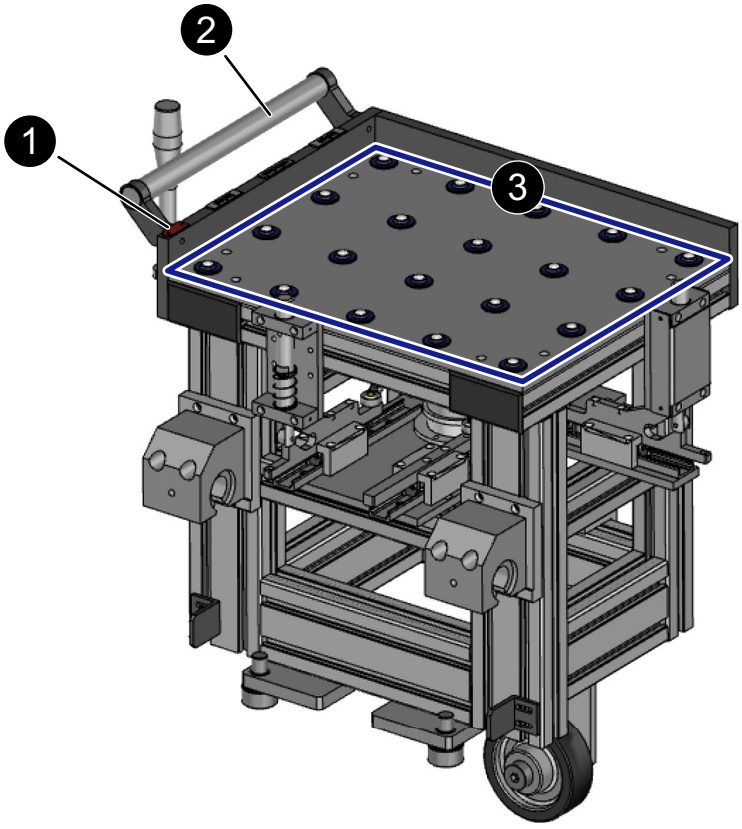

Fig. 3-24 Shuttle, longitudinal shuttle station (illustration as an example)

1 Positioning aid

2 Handle to move the shuttle

3 Pallet shelf for transport with the shuttle.

3.4.11 Operating principle

Test parts are placed down (manually / with a lifting gear), aligned and fixed onto a clamping device. The pallet is then pushed into the measurement area of the coordinate measuring machine. The pallet supply system lowers the pallet into the measuring position and the measuring process can begin. Once the test part has been measured, it is returned to the set-up position in reverse order to the above.

3.4.12 System sections

Coordinate Measuring Machine with Pallet Supply System

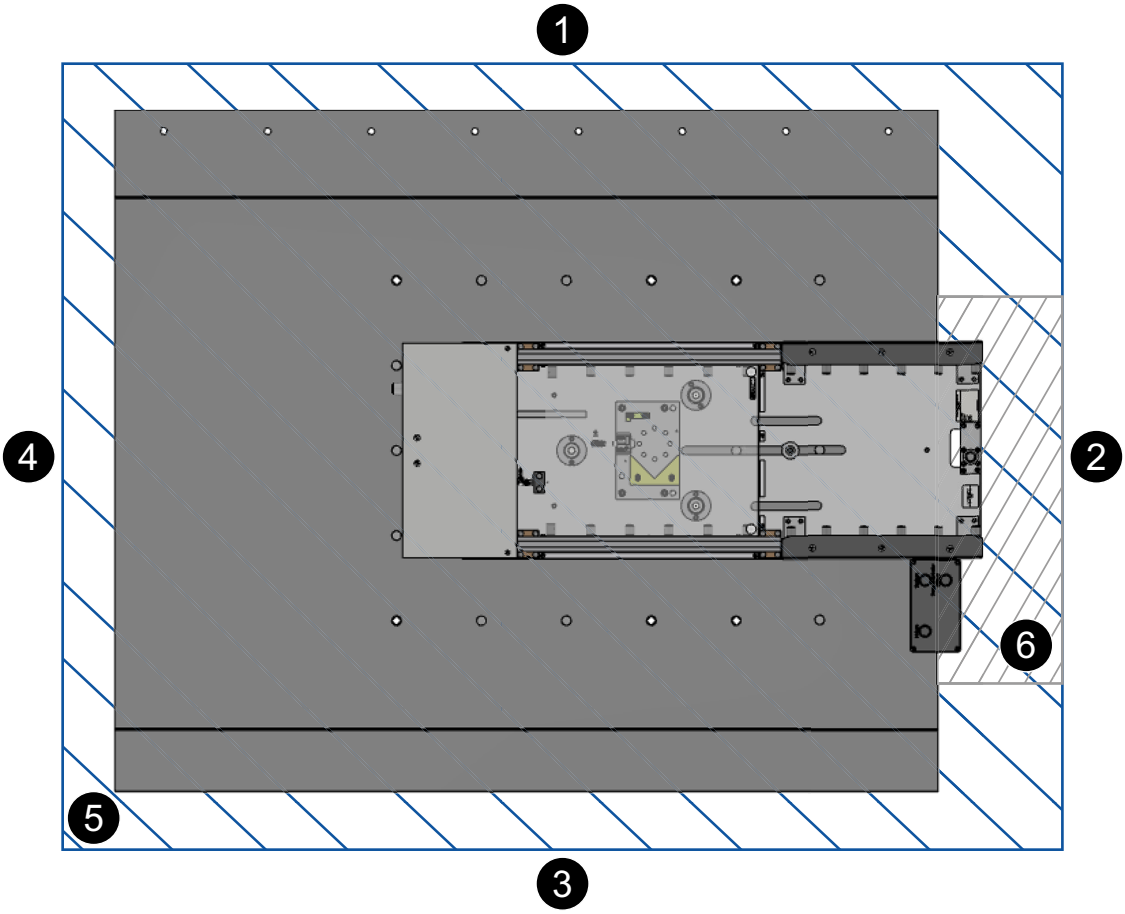

Fig. 3-25 System sections (illustration as an example)

1 Right side

2 Front

3 Left side

4 Rear

5 Blue stripes
This area is for technical specialist personnel during installation, maintenance, troubleshooting and set-up work.

6 Grey stripes
This area is used for loading the coordinate measuring machine.

Loading table (option)

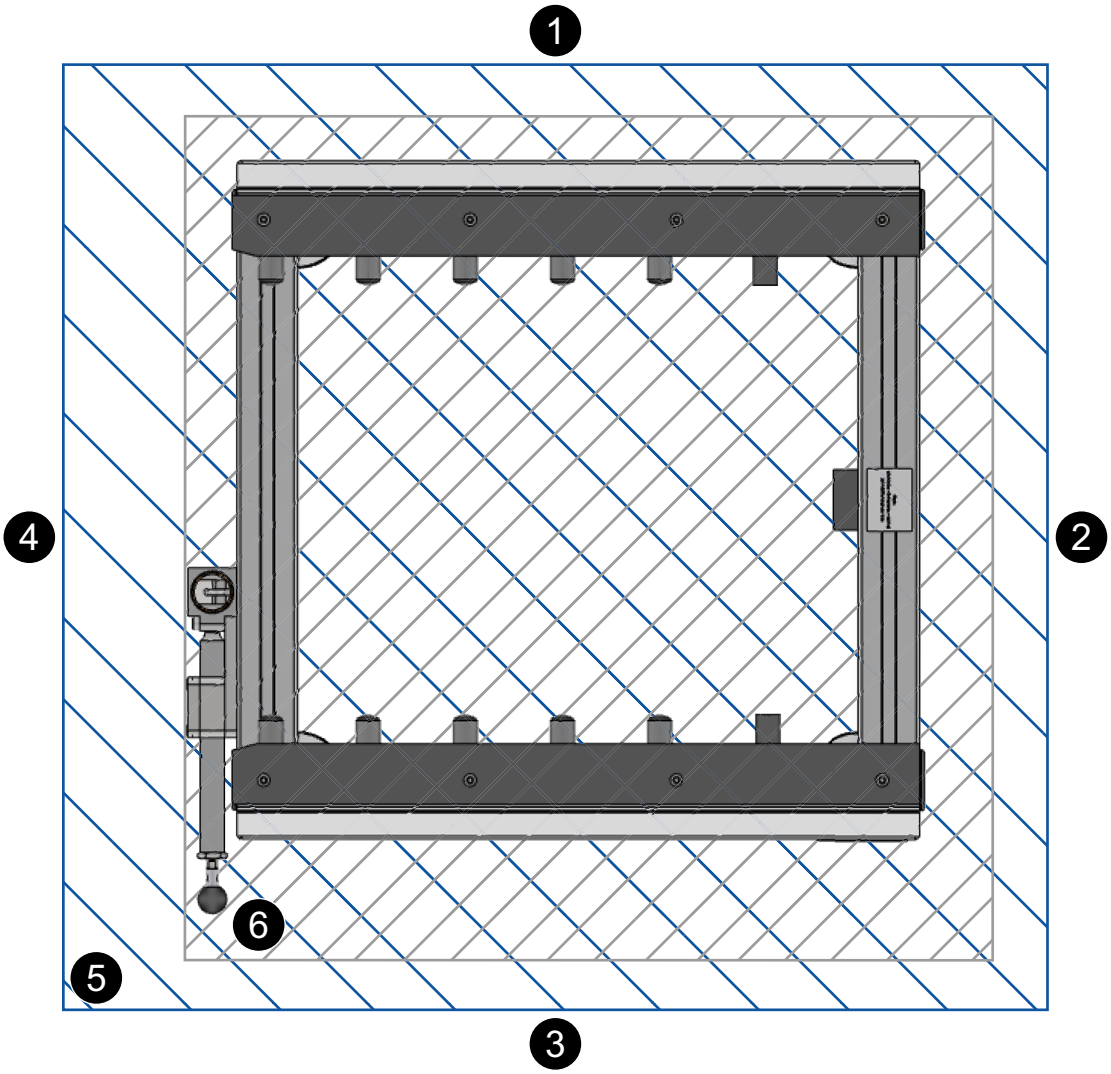

Fig. 3-26 Loading table sections (illustration as an example)

1 Right side

2 Front

3 Left side

4 Rear

5 Blue stripes
This area is for technical specialist personnel during installation, maintenance, troubleshooting and set-up work.

6 Grey stripes
This area is used for setting up the pallet.

Rotating loading station (option)

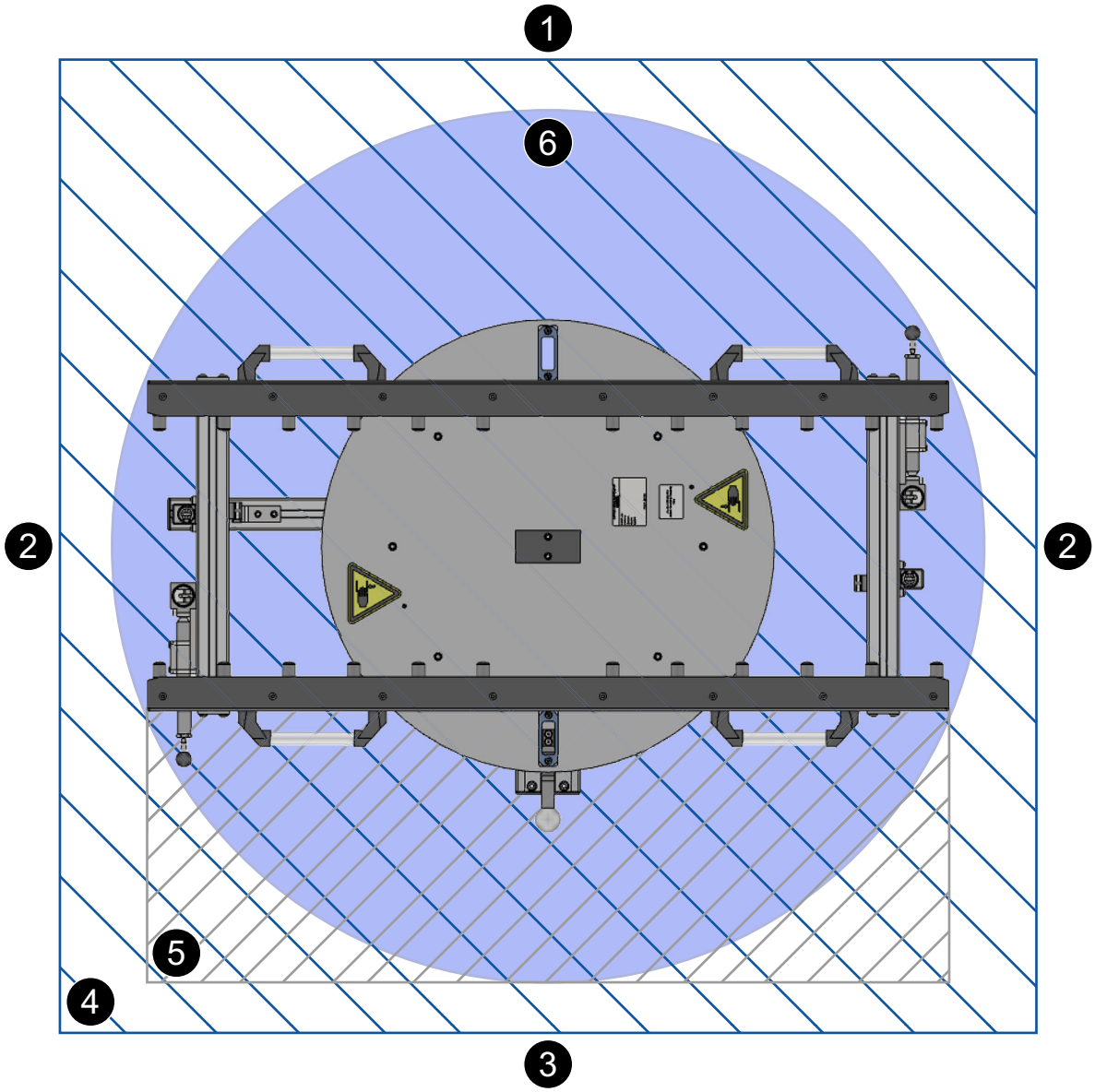

Fig. 3-27 Section sof the rotating loading station (illustration as an example)

1 Right side

2 Front

3 Left side

4 Rear

5 Blue stripes
This area is for technical specialist personnel during installation, maintenance, troubleshooting and set-up work.

6 Grey stripes
This area is used for setting up the pallets.

7 With a blue background
Impact circle (movement area of the rotating loading station)

Pallet transport carriage (option)

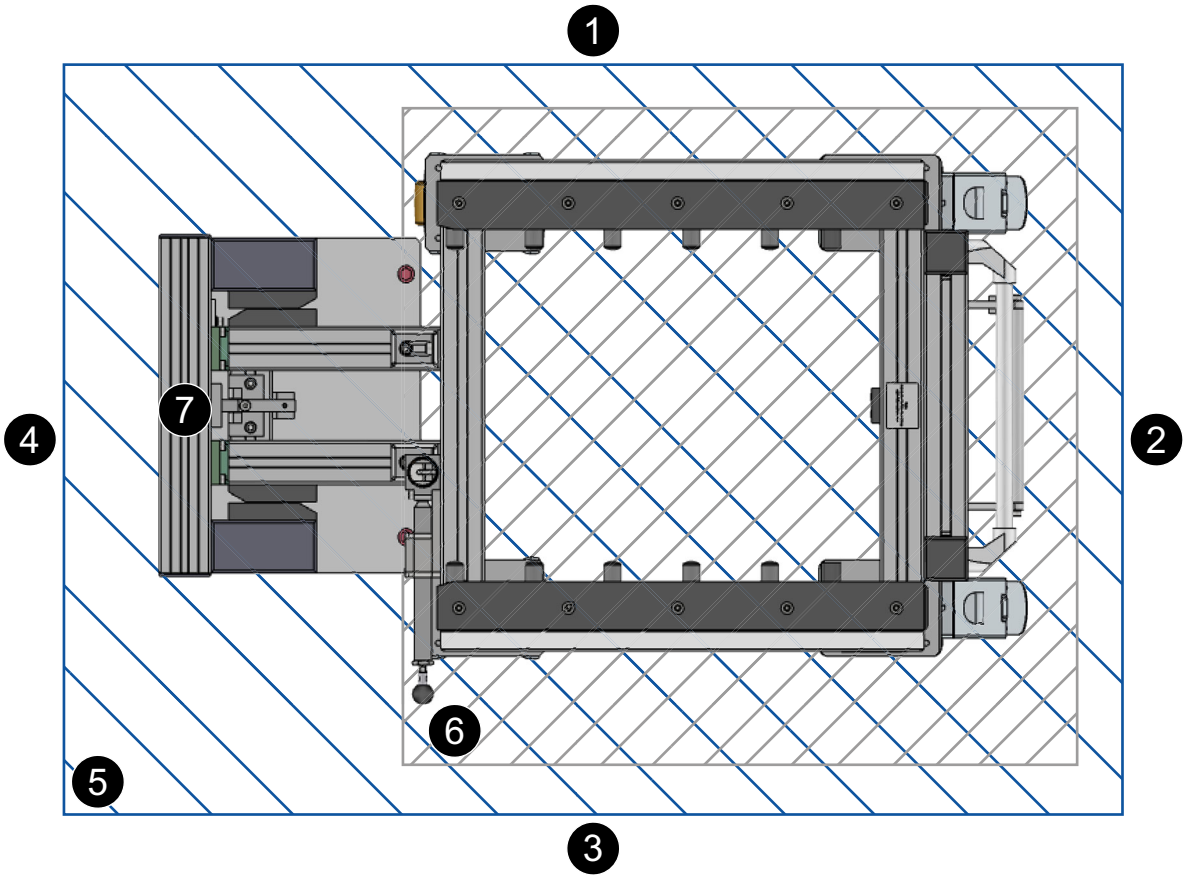

Fig. 3-28 Sections of the pallet transport carriage (illustration as an example)

1 Right side

2 Front

3 Left side

4 Rear

5 Blue stripes
This area is for technical specialist personnel during installation, maintenance, troubleshooting and set-up work.

6 Grey stripes
This area is used for loading the coordinate measuring machine.

7 Docking unit

Loading table with ball rollers (option)

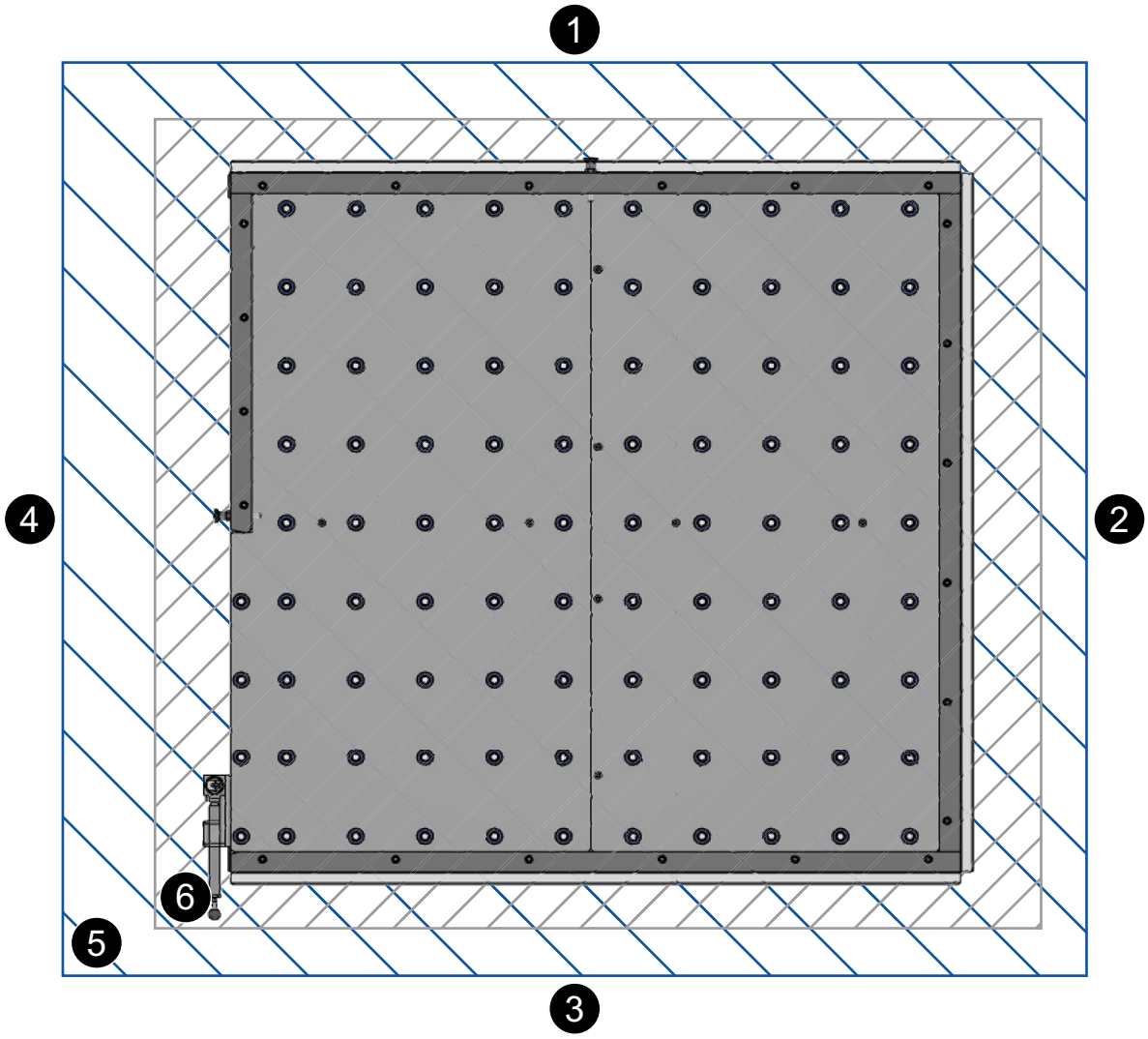

Fig. 3-29 Sections of the loading table with ball rollers (illustration as an example)

1 Left side

2 Rear

3 Right side

4 Transfer side

5 Blue stripes
This area is for technical specialist personnel during installation, maintenance, troubleshooting and set-up work.

6 Grey stripes
This area is used for setting up the pallets.

Transverse shuttle station (option)

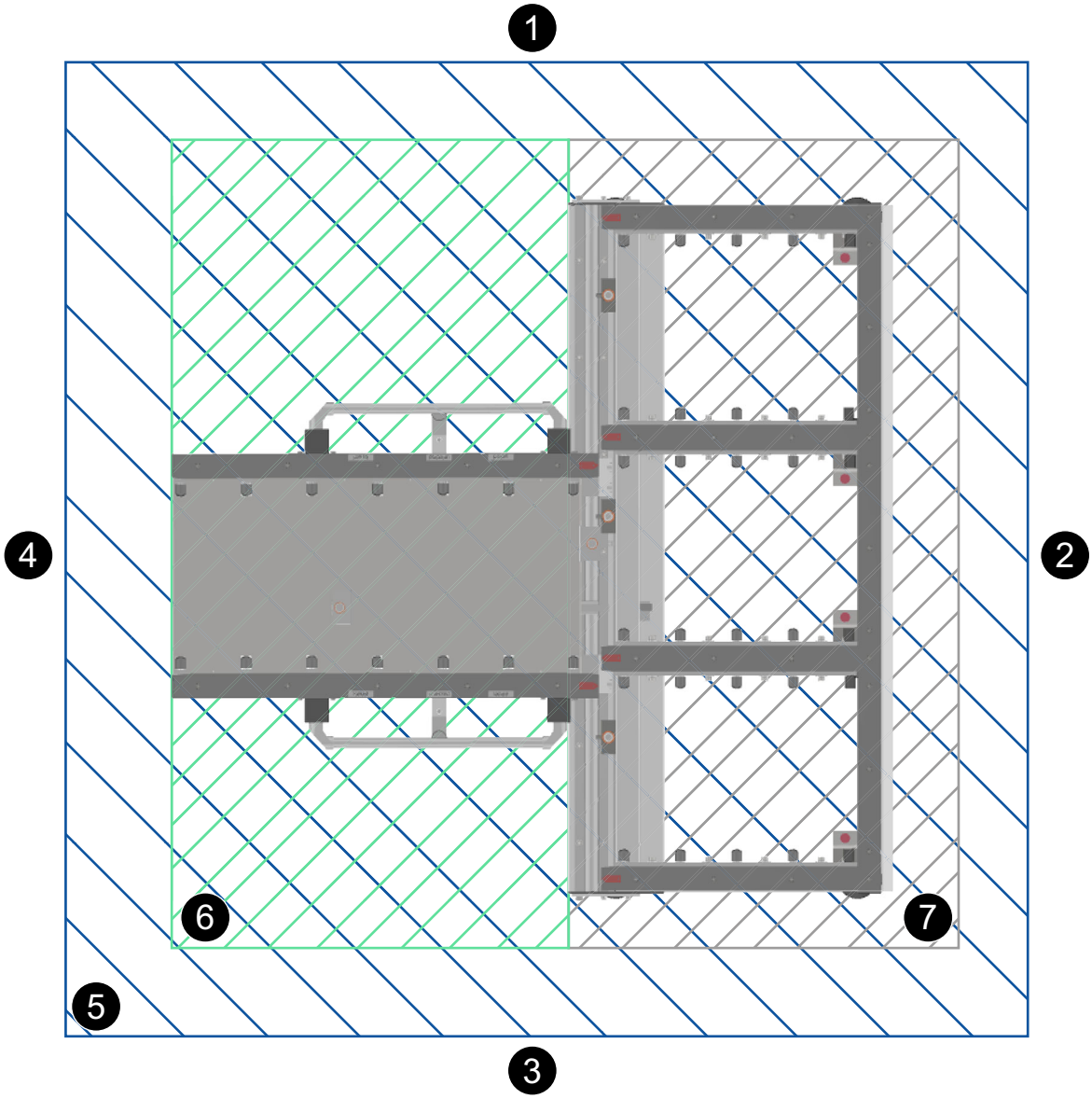

Fig. 3-30 Areas of the transverse shuttle station (illustration as an example)

1 Right side

2 Front

3 Left side

4 Rear

5 Blue stripes
This area is for technical specialist personnel during installation, maintenance, troubleshooting and set-up work.

6 Grey stripes
This area is used for setting up the pallets.

7 Green stripes
This areas is used to move the shuttle.

Longitudinal shuttle station, left operating side (option)

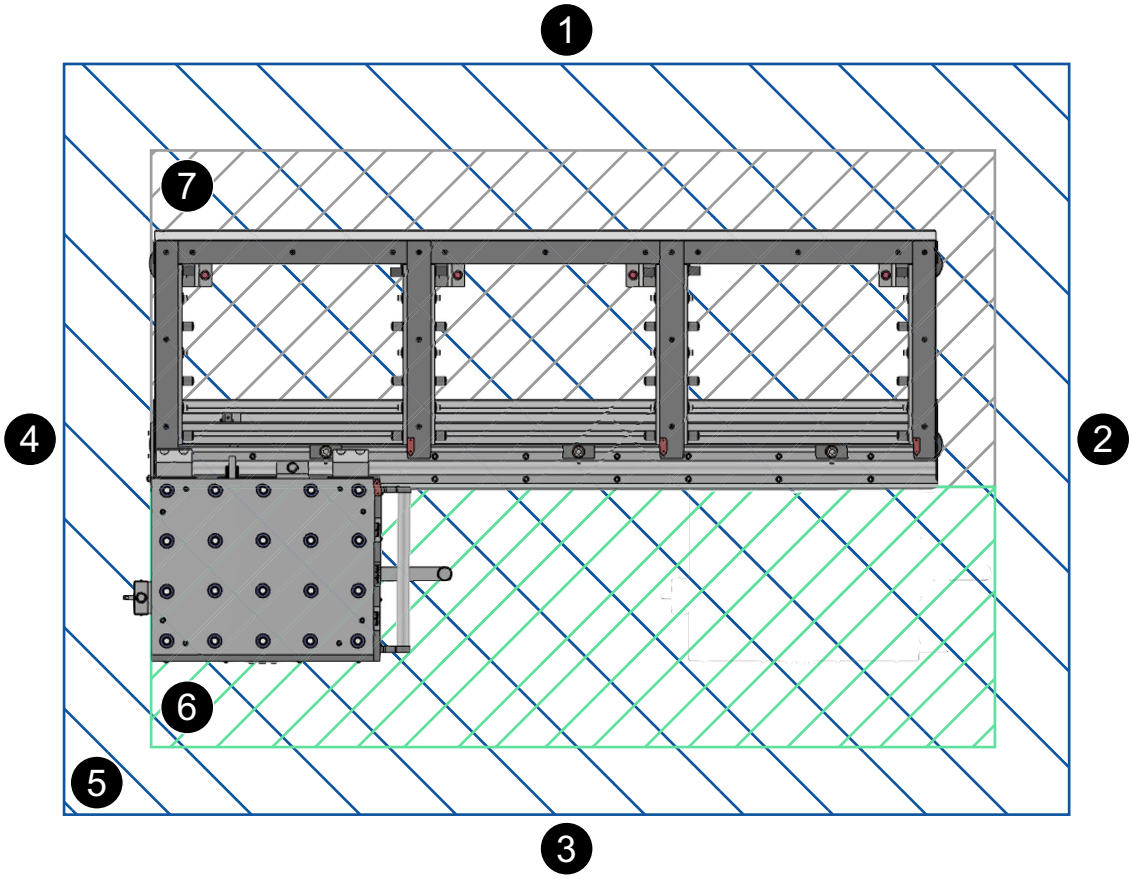

Fig. 3-31 Areas of the longitudinal shuttle station, left operating side (illustration as an example)

1 Right side

2 Front

3 Left side

4 Rear

5 Blue stripes
This area is for technical specialist personnel during installation, maintenance, troubleshooting and set-up work.

6 Green stripes
This areas is used to move the shuttle.

7 Grey stripes
This area is used for setting up the pallets.

Longitudinal shuttle station, right operating side (option)

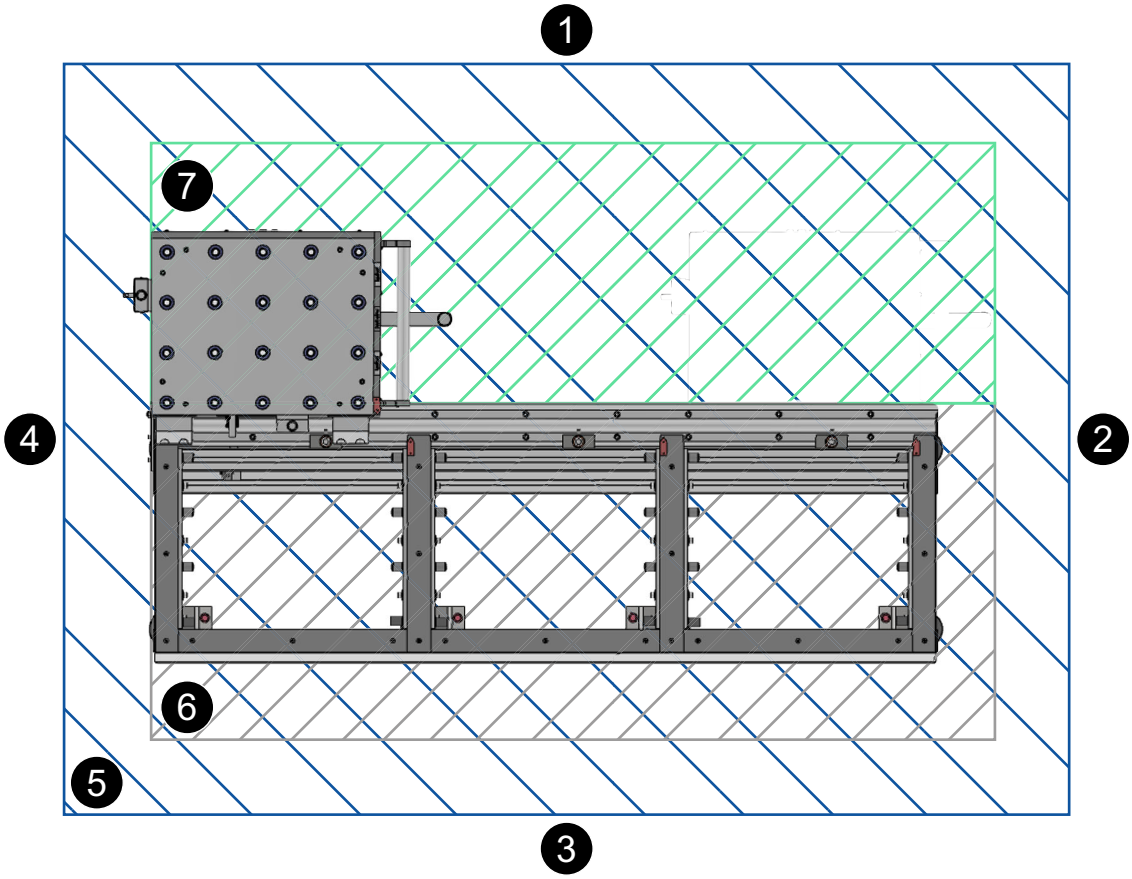

Fig. 3-32 Areas of the longitudinal shuttle station, right operating side (illustration as an example)

1 Right side

2 Front

3 Left side

4 Rear

5 Blue stripes
This area is for technical specialist personnel during installation, maintenance, troubleshooting and set-up work.

6 Grey stripes
This area is used for setting up the pallets.

7 Green stripes
This areas is used to move the shuttle.

3.5 Technical data

Condition	Value
Dimensions (L x W x H)	see layout
Mains voltage	see coordinate measuring machine operating instructions
Current type	
Frequency	
Power consumption	
Fuse	
Compressed air supply	6 - 8 bar
Air quality	acc. ISO 8573-1 Particle concentration class 6 Pressure dew point class 4 Oil concentration class 4
Loader set pressure	5.5 bar
Ambient temperature	see coordinate measuring machine operating instructions
Relative humidity	
Airborne noise	
120 kg system	
Pallet weight	Approx. 15 kg
Pallet dimensions (L x W x H)	400 mm x 500 mm x 25 mm
Max. handling weight (pallet + device + workpiece)	120 kg
250 kg system	
Pallet weight	Approx. 30 kg
Pallet dimensions (L x W x H)	630 mm x 630 mm x 25 mm
Max. handling weight (pallet + device + workpiece)	250 kg

4 Transport, installation and commissioning

Transport, installation and commissioning must be performed by specialist personnel authorised by the manufacturer. The persons tasked with transport, installation and commissioning must have read and understood chapter 2. An appropriate additional instruction is required for operation and configuration.

⚠ WARNING

Risk of injury due to suspended loads.

Crushing during handling or due to falling down of heavy parts or assemblies.

- Assembly and installation may only be performed by specialist personnel authorised by the manufacturer and having the appropriate pneumatic knowledge.
- Personnel must read the operating instructions.
- Personnel must wear personal protective equipment.
- Use suitable lifting gear for heavy parts.

The following documents must also be considered alongside these operating instructions:

- Coordinate measuring machine installation instructions
- Coordinate measuring machine operating instructions

4.1 Transport

Transport may only be performed by specialist personnel authorised by the manufacturer and using appropriate transport means.

Safe transport is only ensured when all parts have been carefully packed and the transport means secured to prevent slipping, toppling, falling over or damage. Moving parts must be removed or secured.

It is necessary to work with lifting gear (crane, forklift, etc.) for the transport and installation of a loader.

The personal protective equipment (safety shoes with steel toecaps, helmet and cut-resistant gloves) must be worn.

4.1.1 General packaging requirements

- Pallets are to be constructed so that the bearing elements of the pallet run along the length of the unit to be transported.
- When raising the pallet/box with a forklift/crane, the pallet/box may only sag slightly.
- The load application points must be marked on the pallet/box.
- Raising and lowering the packaging units in a manner which is jerky or causes impacts is not permitted.
- When loading the pallet, the load application points of the unit to be transported must be observed.

4.1.2 Pallet supply system

Threads to screw in attachment swivels are provided in the pallet supply system.

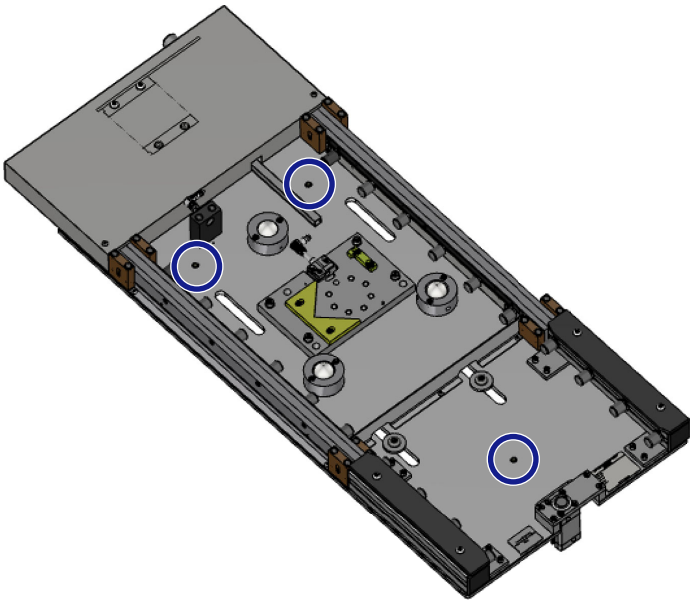

Fig. 4-33 Transport of pallet supply system (illustration as an example)

4.1.3 Loading table (option)

Suspend the loading table with 4 lifting straps.

The two side cover panels must be removed before lifting.

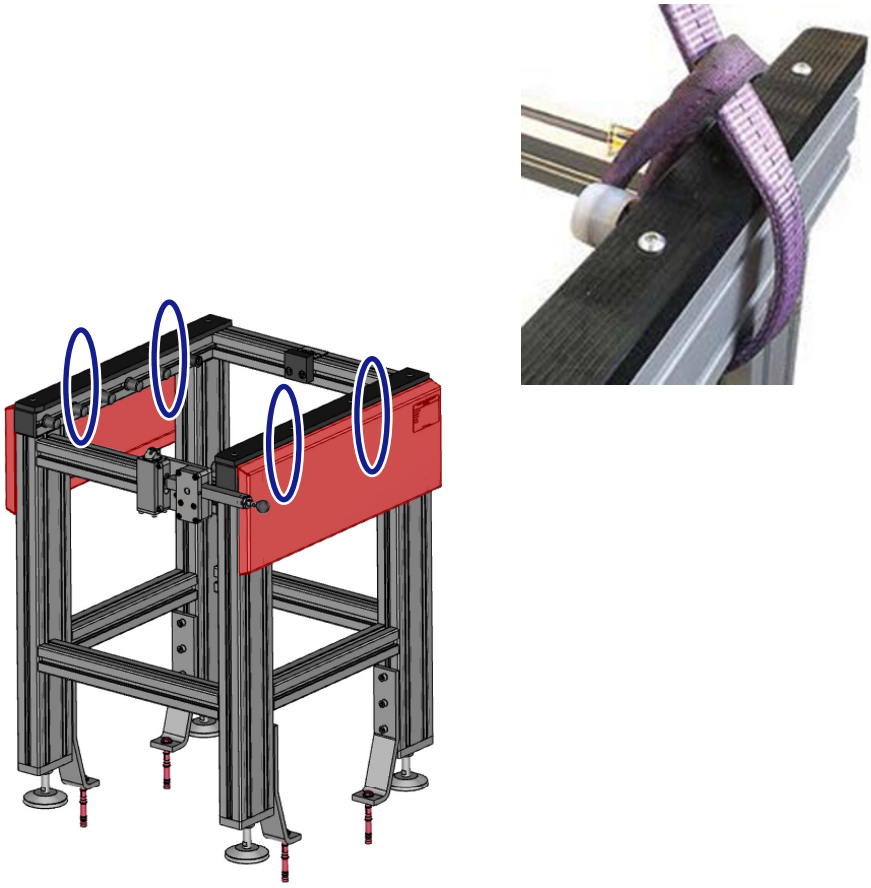

Fig. 4-34 Loading table transport (illustration as an example)

4.1.4 Rotating loading station (option)

Suspend the rotating loading station with 4 lifting straps.

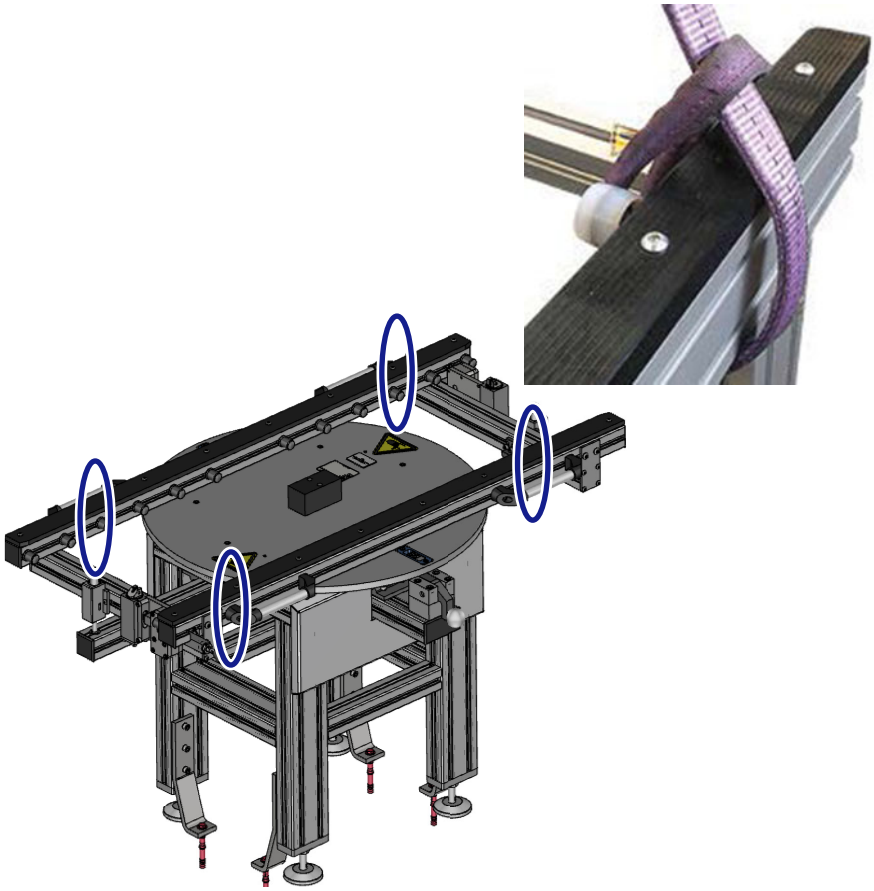

Fig. 4-35 Rotating loading station transport (illustration as an example)

4.1.5 Pallet transport carriage (option)

Suspend the pallet transport carriage with 4 lifting straps.

The two side cover panels must be removed before lifting.

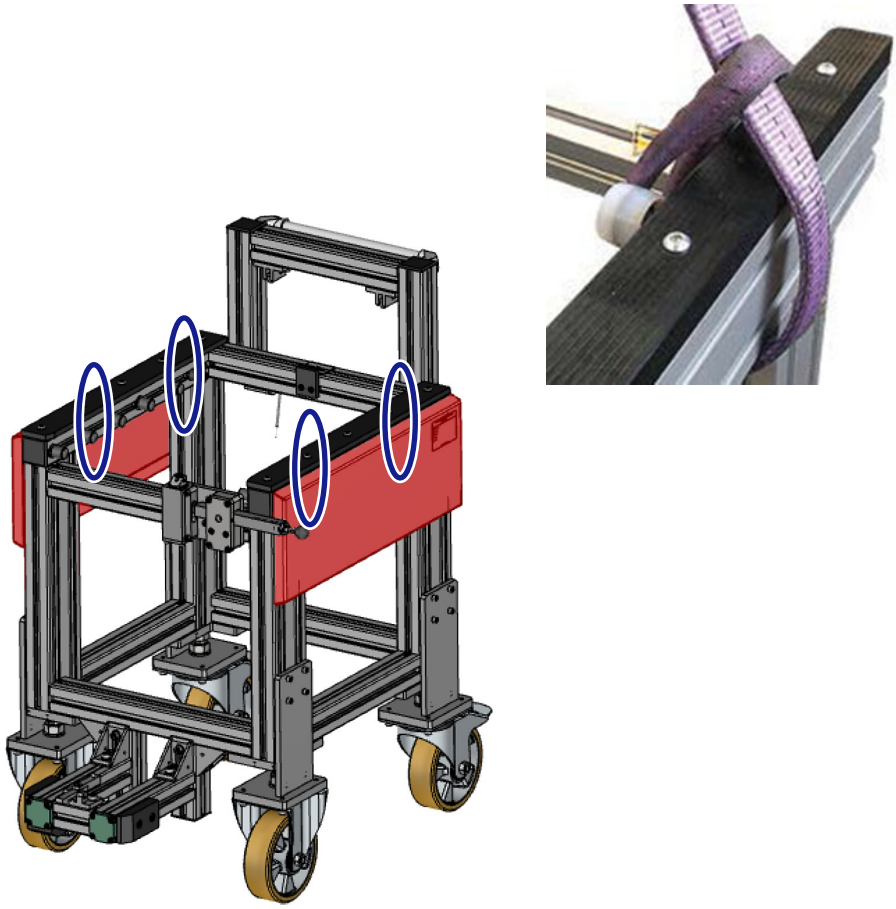

Fig. 4-36 Transport of pallet transport carriage (illustration as an example)

4.1.6 Loading table with ball rollers (option)

Suspend the loading table with ball rollers using 4 lifting straps.

The two side cover panels must be removed before lifting.

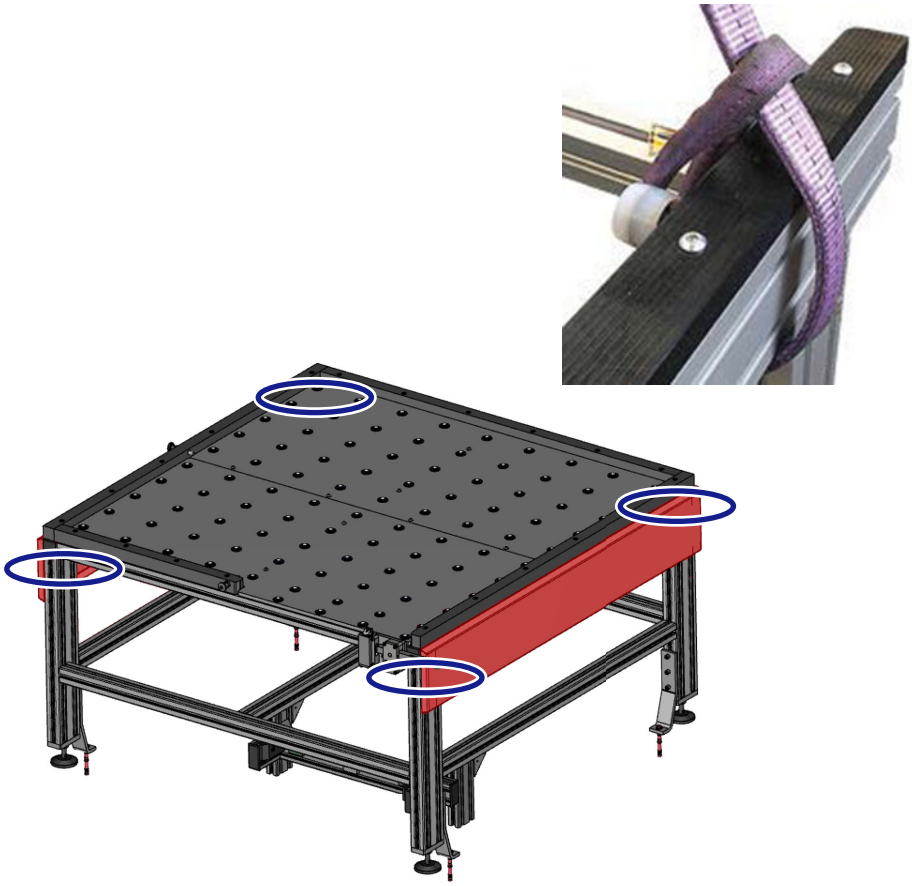

Fig. 4-37 Transport of loading table with ball rollers (illustration as an example)

4.1.7 Transverse shuttle station (option)

Suspend the shuttle station with 4 lifting straps. For shuttle stations with extra setup stations, shift the hanging position inwards (e.g. with 9 setup stations, 3 setup stations inwards), so that the weight is uniformly distributed.

The shuttle must be locked on a setup station.

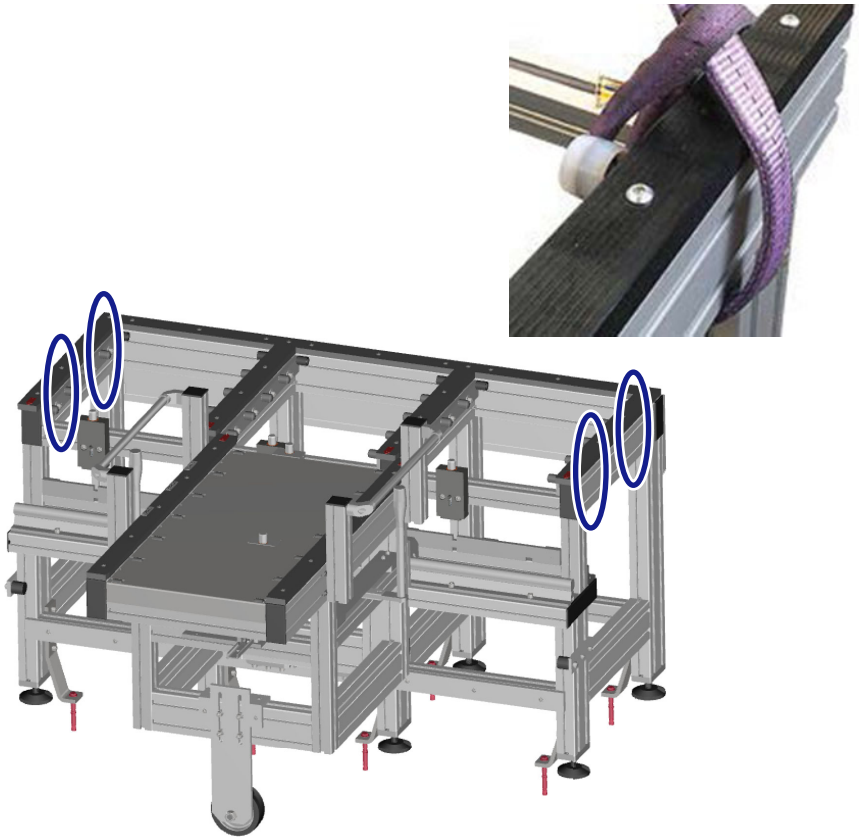

Fig. 4-38 Transverse shuttle station transport (illustration as an example)

4.1.8 Longitudinal shuttle station (option)

Suspend the shuttle station with 4 lifting straps. For shuttle stations with extra setup stations, shift the hanging position inwards (e.g. with 9 setup stations, 3 setup stations inwards), so that the weight is uniformly distributed.

The shuttle must be locked on a setup station.

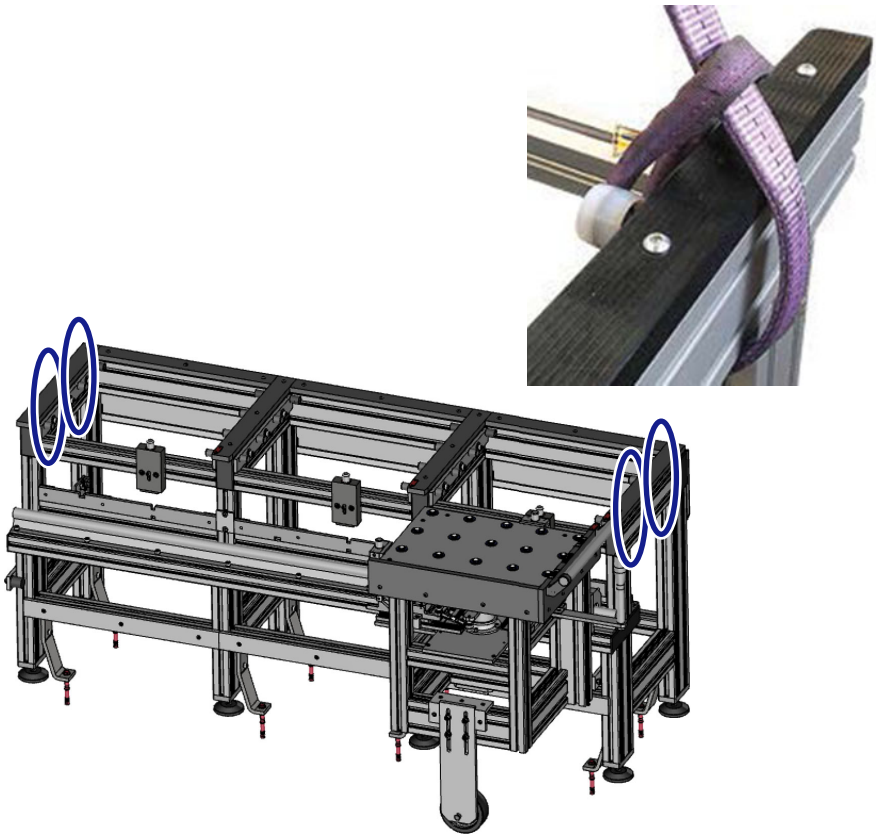

Fig. 4-39 Longitudinal shuttle station transport (illustration as an example)

4.2 Installation

The ambient parameters from 3.5 must be observed when choosing an installation location.

Configuration may only be performed by specialist personnel authorised by the manufacturer.

4.2.1 Alignment and setting up

The system is positioned and set up by specialists authorised by the manufacturer.

4.2.2 Power supply

Electrical and pneumatic supplies must be connected by specialist personnel authorised by the manufacturer according to the circuit diagrams. The electrical connection must be either a fixed wired connection or a plug-in connection in accordance with EN 60309.

To connect the coordinate measuring machine, see operating manual or installation instructions of the coordinate measuring machine.

The pneumatic connection of the loader takes place in the pneumatic control cabinet of the loader.

4.2.3 Installation of the coordinate measuring machine

See coordinate measuring machine locating instructions.

4.2.4 Setting up the loader

Tools required

- Hex key set
- Grindstone 150 mm x 50 mm x 25 mm fineness grade medium-fine
- Cloth (lint-free)
- Suitable cleaning agent
- Steel ruler
- Hose cutter
- Electronic side cutting pliers
- Cable ties
- Soft-head hammer
- No. 2 slotted screwdriver
- As necessary, M4 tap with 3.3 mm HSS drill bit
- As necessary, M5 tap with 4.2 mm HSS drill bit
- As necessary, tap wrench
- As necessary, marking calliper
- As necessary, try-square
- As necessary, hand drill

Required lifting materials

- Attachment swivel (Length of screw-in thread, max. 9.5 mm)
- Chains/ropes (approved for the required purpose)

Preparing the coordinate measuring machine

1. Move the coordinate measuring machine to the safety position
2. Switch off compressed air supply and secure to prevent unwanted switching back on.
3. Switch off control and secure to prevent unwanted switching back on.

Pallet supply system installation

1. Suspend the pallet supply system at the specified points (see 4.1) with suitable slinging gear.
2. Release the pallet supply system from the transport pallet.
3. Grind the underside with the grinding stone 150 mm x 50 mm x 25 mm fineness grade medium-fine.
4. Clean the underside with a lint-free cloth and a suitable cleaning agent.
   Ensure that no residues from the packaging or grinding remain on the surface.
5. Clean the installation area on the coordinate measuring machine. The position of the pallet supply system on the coordinate measuring machine can be found in the drawing in the technical documentation.
6. Carefully position the pallet supply system on the coordinate measuring machine. There must not be any cables or pneumatic hoses between the pallet supply system and the measuring table.
7. Manually screw the supplied M12 x 30 fastening screws, including washers, into the thread provided for this purpose.

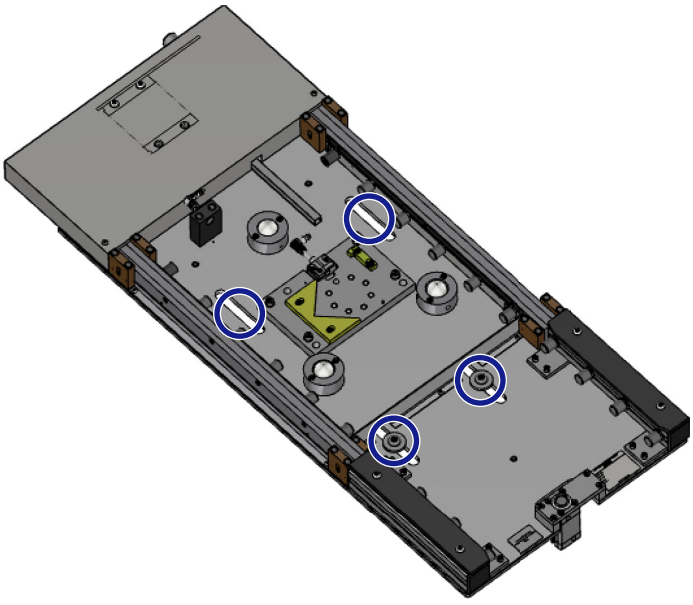

Fig. 4-40 Pallet supply system fixing (illustration as an example)

8. Undo the screws of the sheet metal covering.

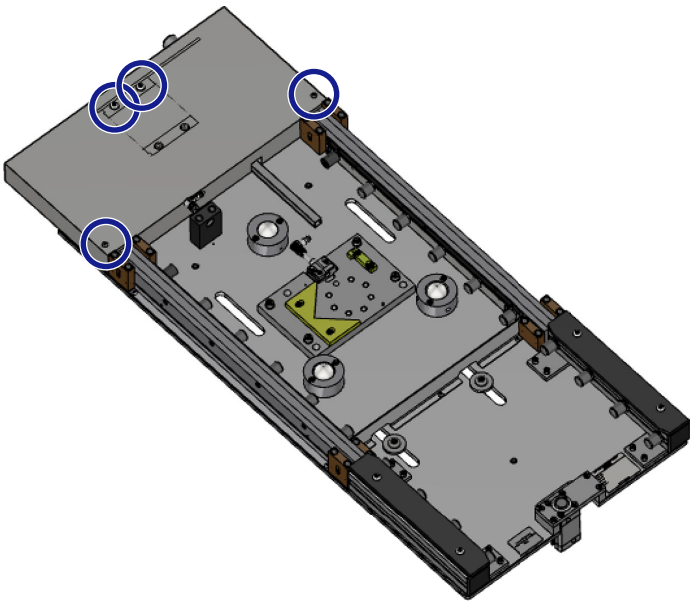

Fig. 4-41 Screws of sheet metal covering (illustration as an example)

9. Take the sheet metal covering off in an upwards direction.
10. Connect the pneumatic hoses according to their marking and the pneumatic diagram. Ensure then laying the pneumatic hoses that there is no risk of stumbling. Do not kink or crush the pneumatic hoses, to ensure that there are no dangers from residual energy.

Hose diameter	4 mm	6 mm	8 mm
Smallest bending radius	12 mm	14 mm	22 mm

11. Connect the system to the compressed air connection of the operating company or the coordinate measuring machine.
12. Fasten the Lumberg distributor and Harting plug to a suitable point on the coordinate measuring machine.
    If necessary, threads must be cut in the metal covering of the coordinate measuring machine.

13. Connect the supplied limit switch cable according to its labelling at the Lumberg distributor and the valve YP-1.
    Ensure tidy cable routing.

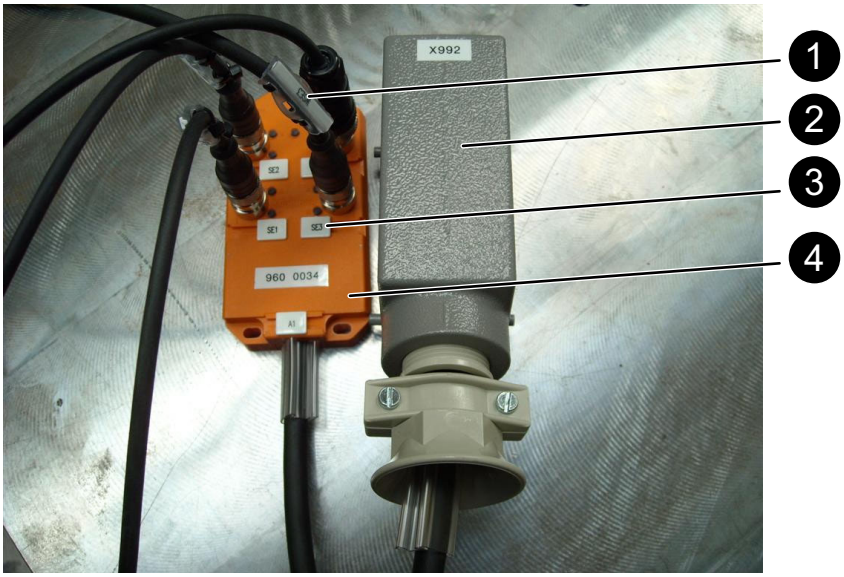

Fig. 4-42 Labelling of distributor and cables (illustration as an example)

1 Labelling of cables

2 Harting plug C99

3 Labelling of distributors

4 Plug distributor for pallet supply system signals

14. Lay the pallet on the pallet supply system using suitable slinging and lifting gear.
    Observe the approach direction.
    Bear in mind the position of the pallet on the pallet supply system

⚠ CAUTION

Risk of injury due to pallet movements.

Crushing, striking, shearing off of fingers and hands.

- Always have manual movements under control, using the corresponding speed and looking ahead.
- When moving pallets, always grip on the provided devices.
- Always operate the loader with only one person. Other persons must keep away from the loader.

15. Lower the pallet via the control console.

16. Scan the side of the pallet and move the pallet supply system to the exact position using the soft-head hammer.

17. Tighten the accessible fastening screws to a torque of 40 Nm.

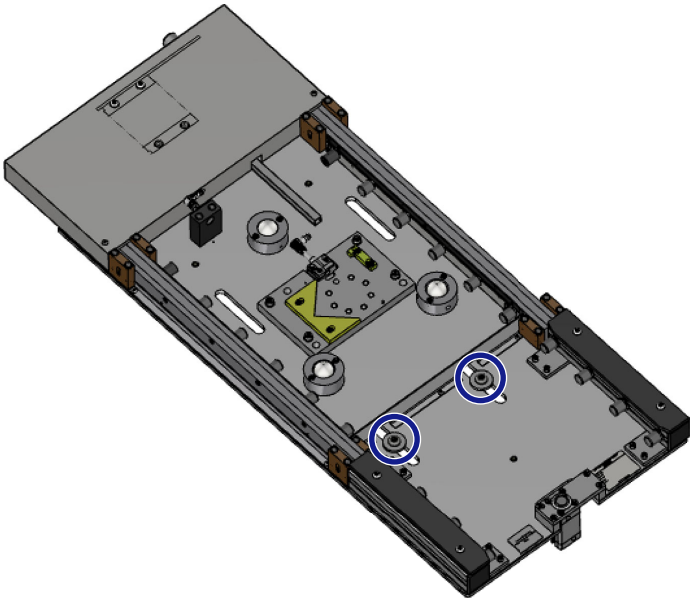

Fig. 4-43 Accessible fastening screws (illustration as an example)

18. Raise the pallet via the control console.
19. Remove the pallet from the pallet supply system using suitable slinging and lifting gear.
20. Tighten the remaining fastening screws to a torque of 40 Nm.

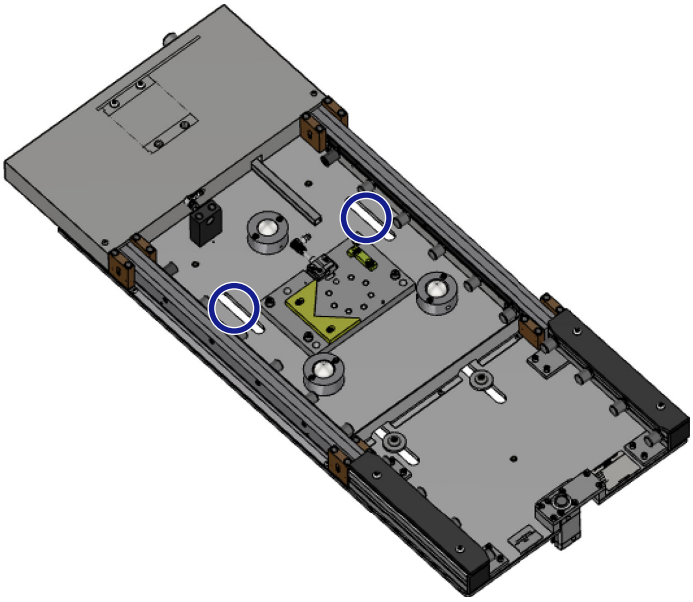

Fig. 4-44 Remaining fastening screws (illustration as an example)

21. Lay the pallet on the pallet supply system using suitable slinging and lifting gear.
    Observe the insertion direction of the pallet.
    Bear in mind the position of the pallet on the pallet supply system

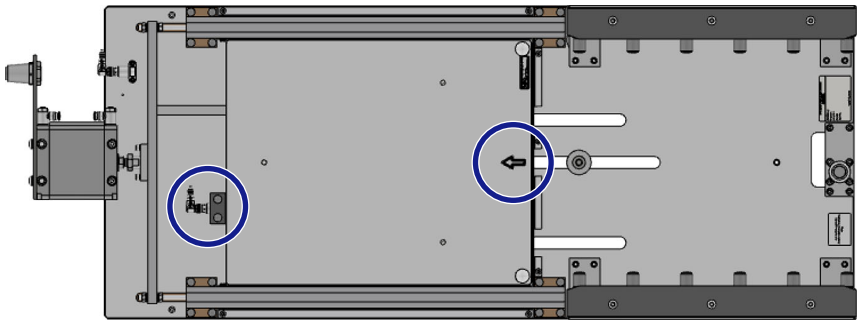

Fig. 4-45 Putting the pallet into place (illustration as an example)

22. If necessary, synchronise the lifting cylinder of the pallet supply system using the exhaust throttle.

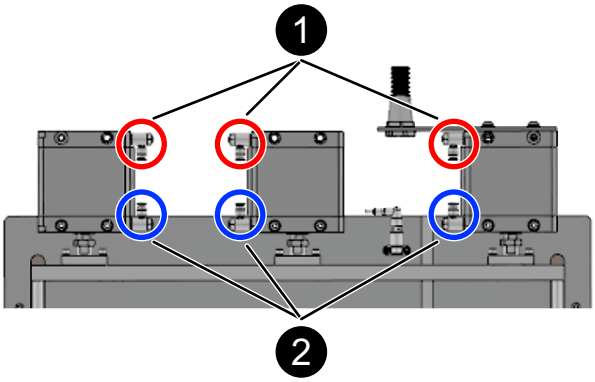

Fig. 4-46 Lifting cylinder synchronisation (figure as an example)

1 Lowering

2 Raising

23. If necessary, readjust the side guidance of the jack.

– To do so, remove the sliding rail.

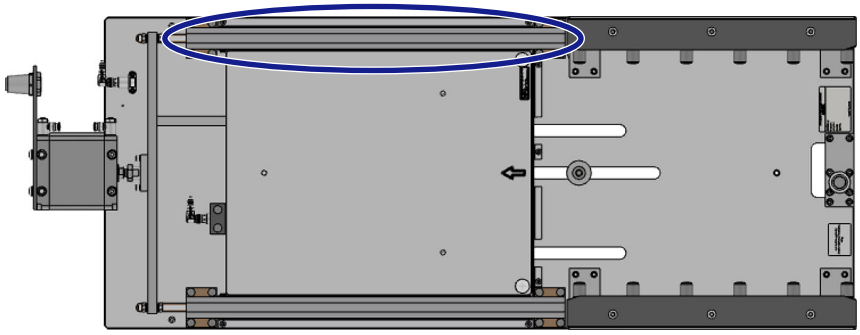

Fig. 4-47 Removing the sliding rail (illustration as an example)

– Undo the screws of the guide strip.

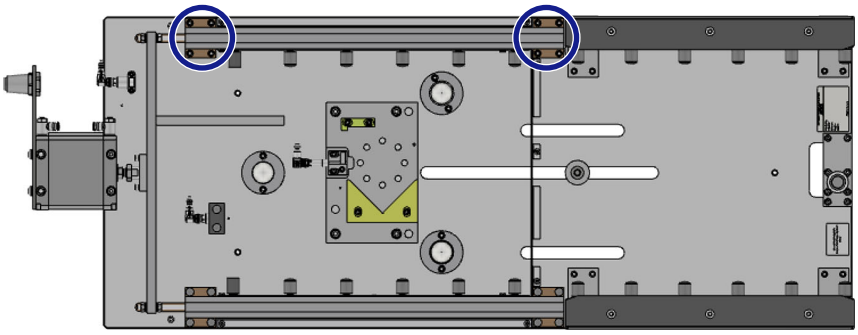

Fig. 4-48 Guide strip screws (illustration as as an example)

– Lower the pallet supply system without the pallet.
Nevertheless, SE2 must switch, otherwise lowering is not possible.

– Adjust the guiding block on the jack so that it is free from play and tighten to 25 Nm.

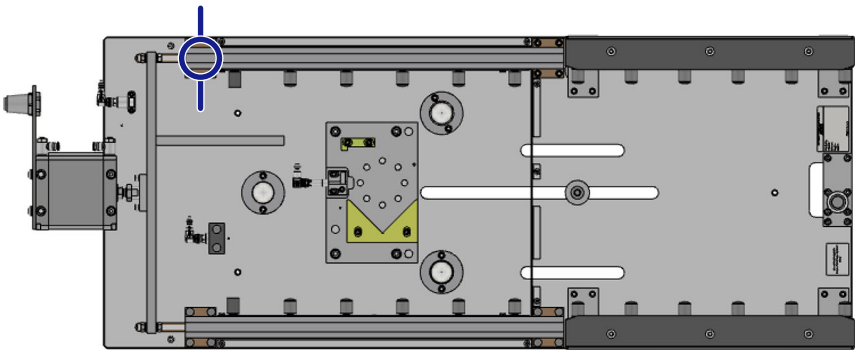

Fig. 4-49 Setting up guiding blocks (illustration as an example)

– Retighten the screws of the guide strip.

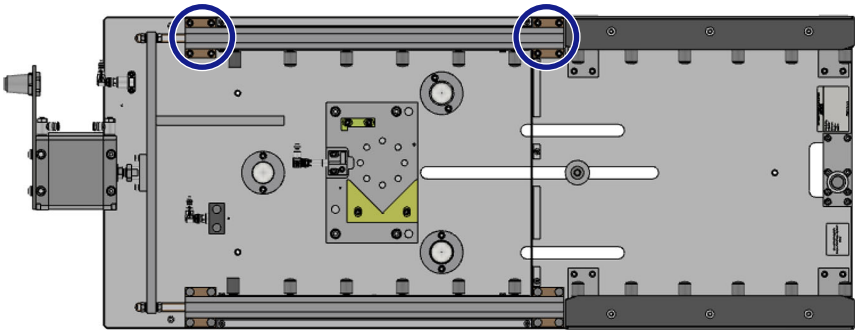

Fig. 4-50 Guide strip screws (illustration as as an example)

– To do so, refit the sliding rail.

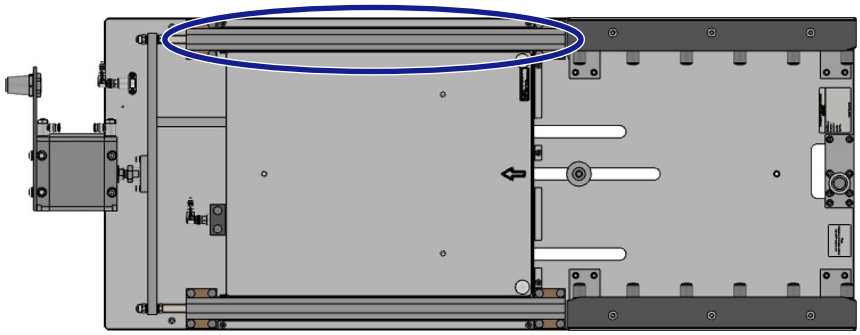

Fig. 4-51 Removing the sliding rail (illustration as an example)

24. Fit the sheet metal cover on the pallet supply system.

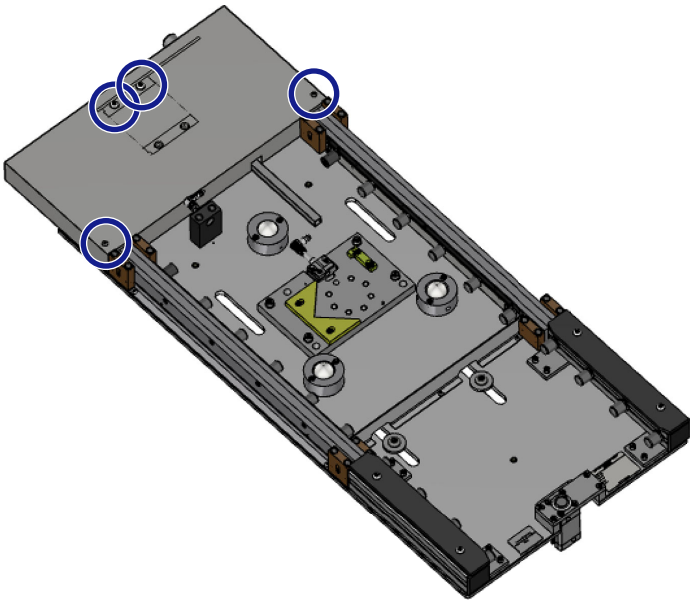

Fig. 4-52 Screws of sheet metal covering (illustration as an example)

25. Check the adjustment of the eccentric rollers on the roller conveyors of the pallet supply system. The eccentric rollers should brake the pallet shortly before its stop position.

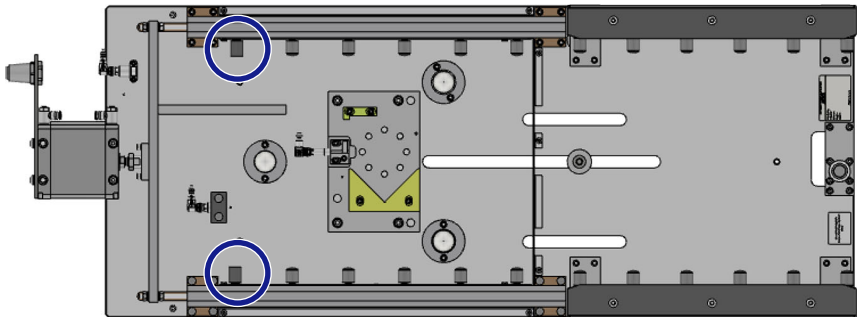

Fig. 4-53 Eccentric rollers check (illustration as an example)

26. Check the system for correct functioning.

– Insertion of the coordinate measuring machine from the safety position is only possible, if:
  Either the pallet is present (SE2) and the pallet supply system is lowered (SE1) or RSH is inserted (SE3)

– When the safety position is exited, the compressed air at valve YP1 must be switched off.

– Raising/lowering of the pallet supply system is only possible if the coordinate measuring machine is in the safety position and if a pallet is present.

Setting up the loading table (option)

1. Raise the loading table from the transport pallet as shown in 4.1. Ensure that the loading table does not tip over.

2. Position the loading table in front of the pallet supply system.

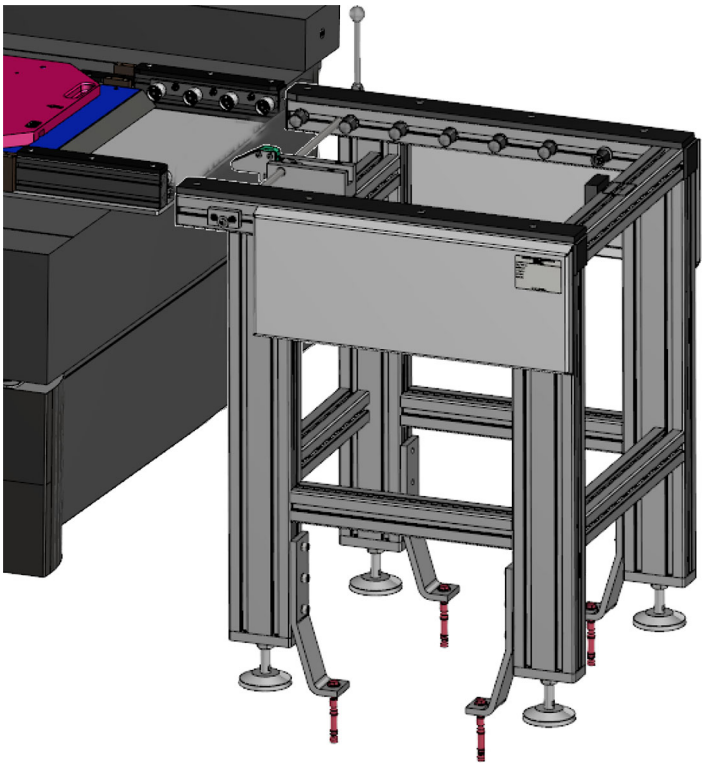

Fig. 4-54 Positioning the loading table (illustration as as an example)

3. Undo the floor bracket (1) and lock screw (2) of the adjustable foot and push the floor bracket upwards.

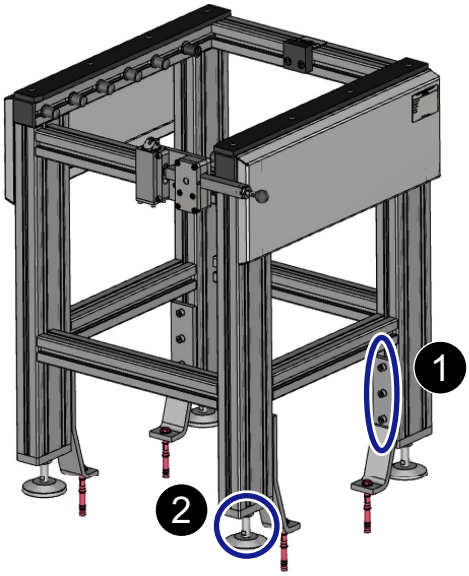

Fig. 4-55 Undoing the floor bracket counternuts (illustration as an example)

4. Align the loading table with the pallet supply system.
   Set the height using the adjustment feet.
   The loading table must be horizontal to the pallet supply system and the ground. The sliding rails of the pallet supply system and the loading table must be aligned so that they are flush with each other.
   There must not be any height offset at the pallet transition. The pallet must not stick during crossing over. If necessary shift the sliding rail in the pallet track direction.

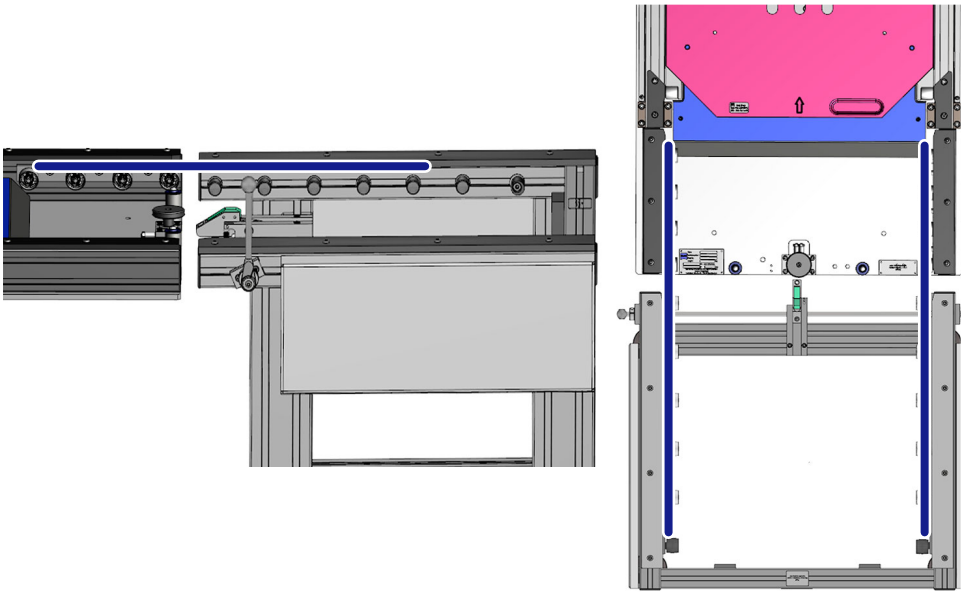

Fig. 4-56 Loading table alignment (illustration as an example)

5. Push the floor brackets downwards and mark the hole positions of the anchors/rawlpugs on the floor with a felt-tip marker.

6. Use a drill to drill a bore with 12 mm diameter and 80 mm depth.

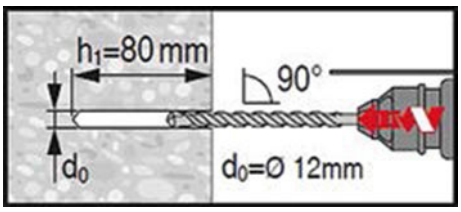

Fig. 4-57 Holes

7. Remove dust and chips from drill holes using a vacuum cleaner.

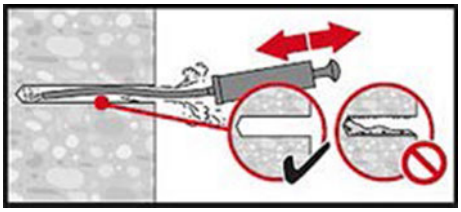

Fig. 4-58 Cleaning the holes

8. Insert the rawlplugs through the floor brackets into the holes and tighten the screws to a maximum torque of 20 Nm.

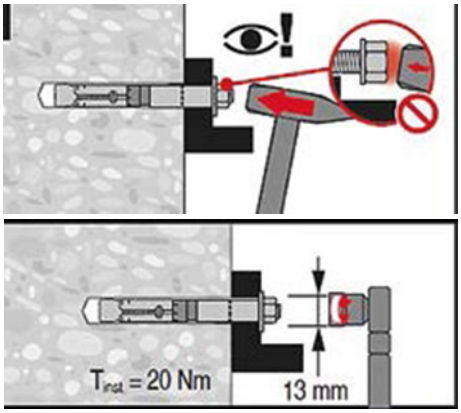

Fig. 4-59 Tighten down the loading table

9. Tighten all floor bracket fastening screws.

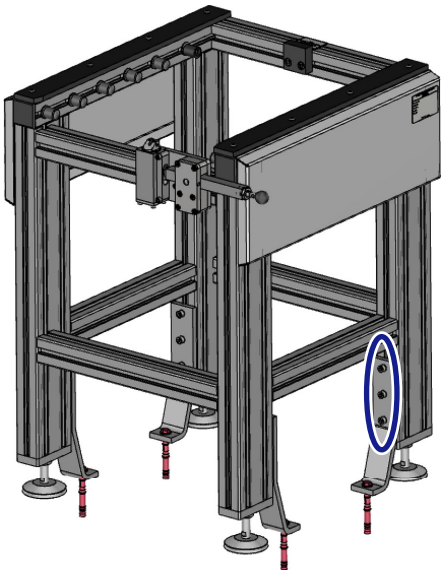

Fig. 4-60 Tightening the floor bracket screws (illustration as an example)

10. Check the loading table position again.
11. Tighten all counternuts of the adjustable feet.

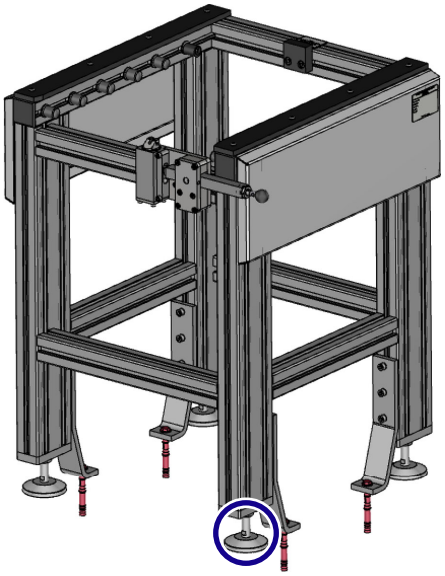

Fig. 4-61 Tightening the floor bracket screws (illustration as an example)

12. Recheck the transfer of the pallet to the pallet supply system and re-adjust if necessary.

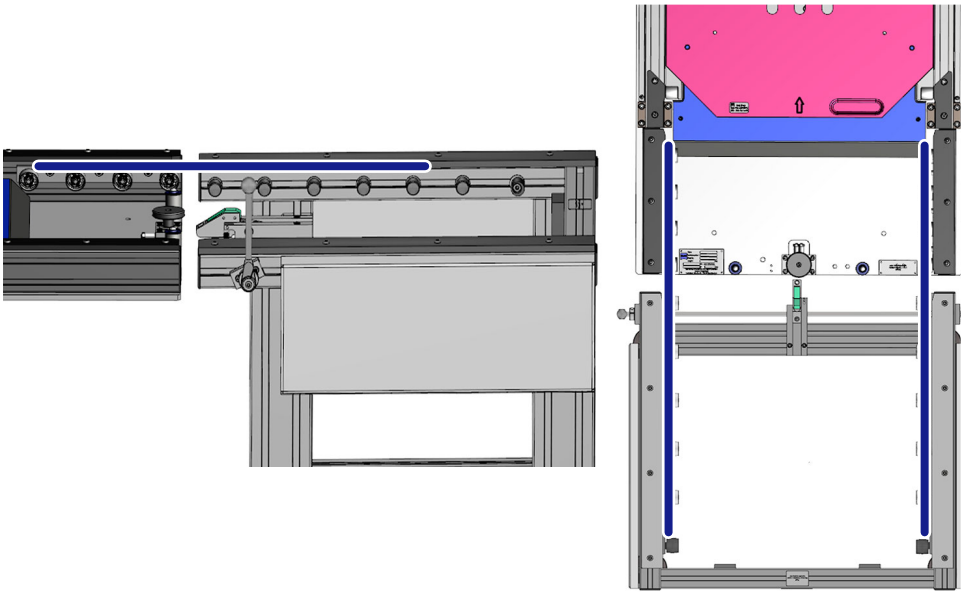

Fig. 4-62 Transfer check (illustration as an example)

13. Check the pallet lock.
14. Check the setting of the eccentric rollers. The eccentric rollers should brake the pallet shortly before its stop position.

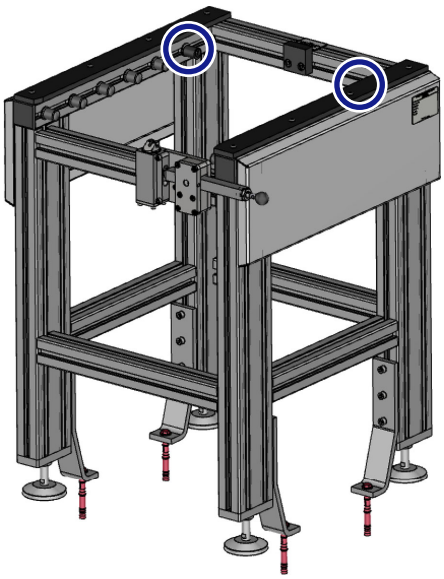

Fig. 4-63 Eccentric rollers check (illustration as an example)

Setting up the rotating loading station (option)

1. Raise the rotating loading station from the transport pallet as shown in 4.1. Ensure that the rotating loading station does not tip over.
2. Position the rotating loading station in front of the pallet supply system.

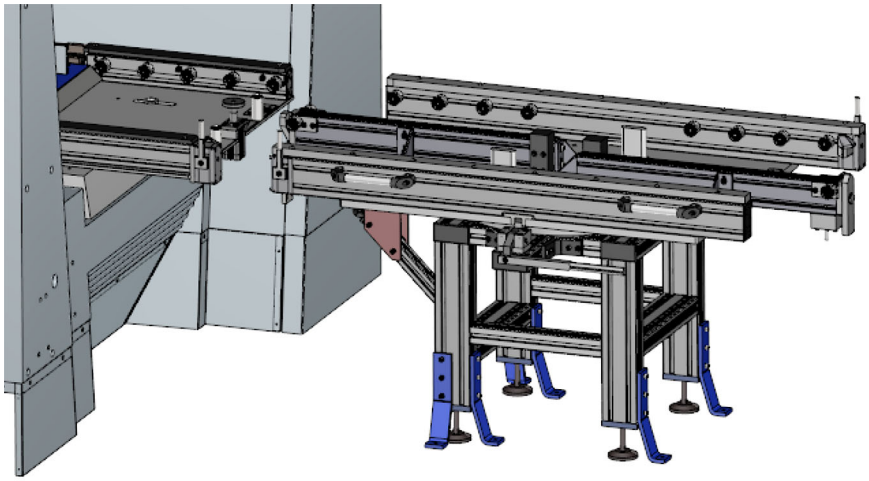

Fig. 4-64 Positioning the rotating loading station (illustration as as an example)

3. Undo the floor bracket (1) and lock screw (2) of the adjustable foot and push the floor bracket upwards.

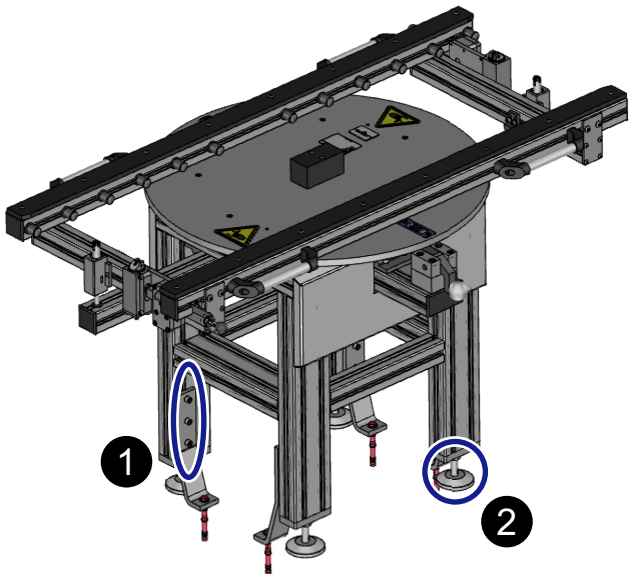

Fig. 4-65 Undoing the floor bracket counternuts (illustration as an example)

4. Align the rotating loading station with the pallet supply system. Set the height using the adjustment feet.
   The rotating loading station must be horizontal to the pallet supply system and the ground. The sliding rails of the pallet supply system and the rotating loading station must be aligned so that they are flush with each other. There must not be any height offset at the pallet transition. The pallet must not stick during crossing over. If necessary shift the sliding rail in the pallet track direction.

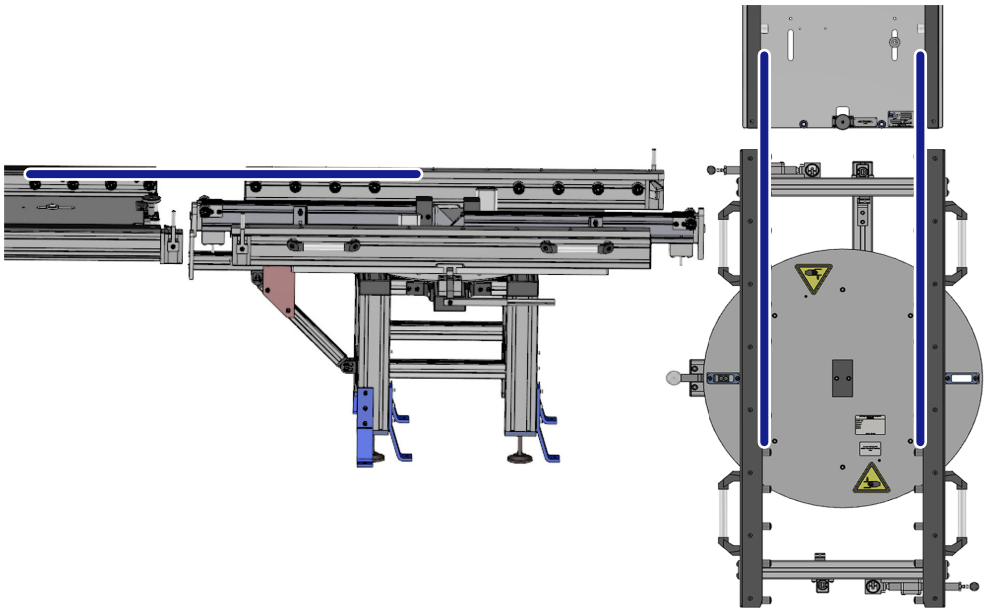

Fig. 4-66 Rotating loading station alignment (illustration as an example)

5. Push the floor brackets downwards and mark the hole positions of the anchors/rawlplugs on the floor with a felt-tip marker.
6. Use a drill to drill a bore with 12 mm diameter and 80 mm depth.

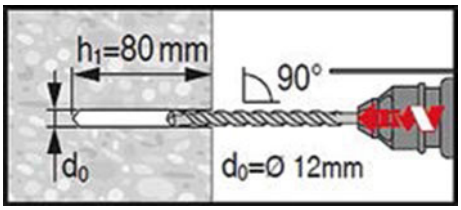

Fig. 4-67 Holes

7. Remove dust and chips from drill holes using a vacuum cleaner.

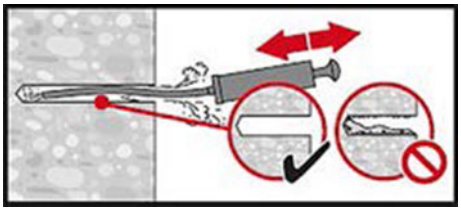

Fig. 4-68 Cleaning the holes

8. Insert the rawlplugs through the floor brackets into the holes and tighten the screws to a maximum torque of 20 Nm.

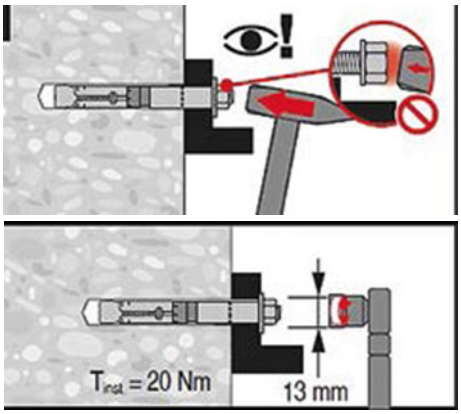

Fig. 4-69 Tighten down the rotating loading station

9. Tighten all floor bracket fastening screws.

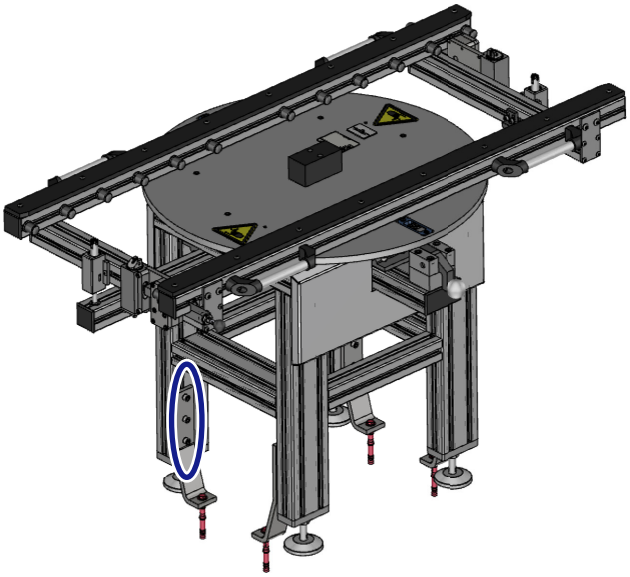

Fig. 4-70 Tightening the floor bracket screws (illustration as an example)

10. Check the position of the rotating loading station again.

11. Tighten all counternuts of the adjustable feet.

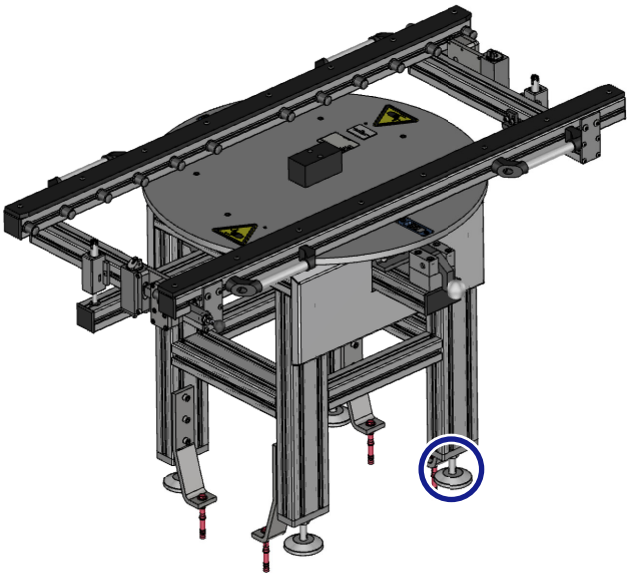

Fig. 4-71 Tightening the floor bracket screws (illustration as an example)

12. Recheck the transfer of the pallet to the pallet supply system and re-adjust if necessary.

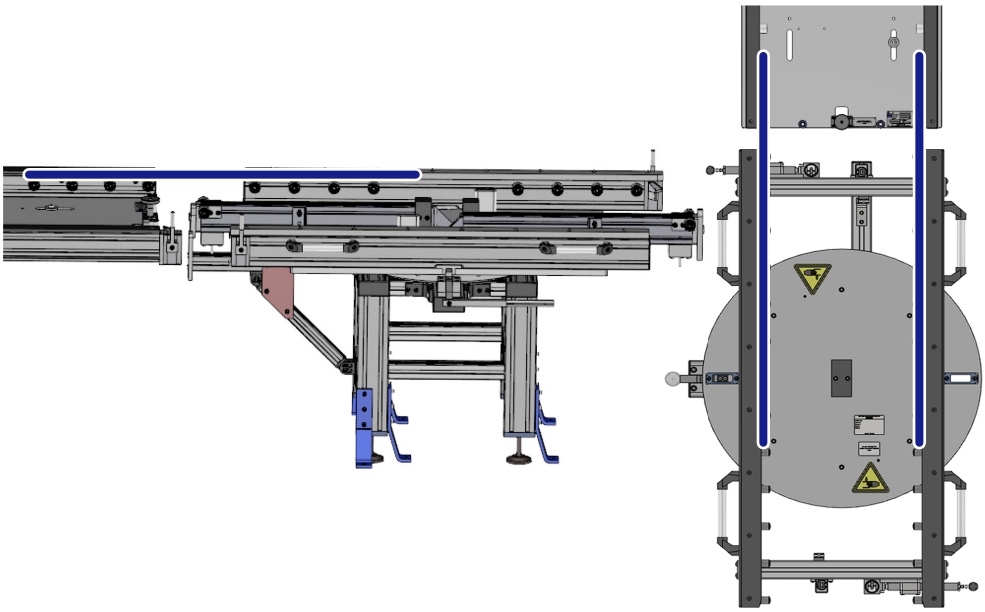

Fig. 4-72 Transfer check (illustration as an example)

13. Check the pallet lock.

Setting up the pallet transport carriage with docking unit (option)

1. Raise the pallet transport carriage from the transport pallet as shown in 4.1. Ensure that the pallet transport carriage does not tip over.
2. Position the pallet transport carriage and docking unit in front of the pallet supply system.

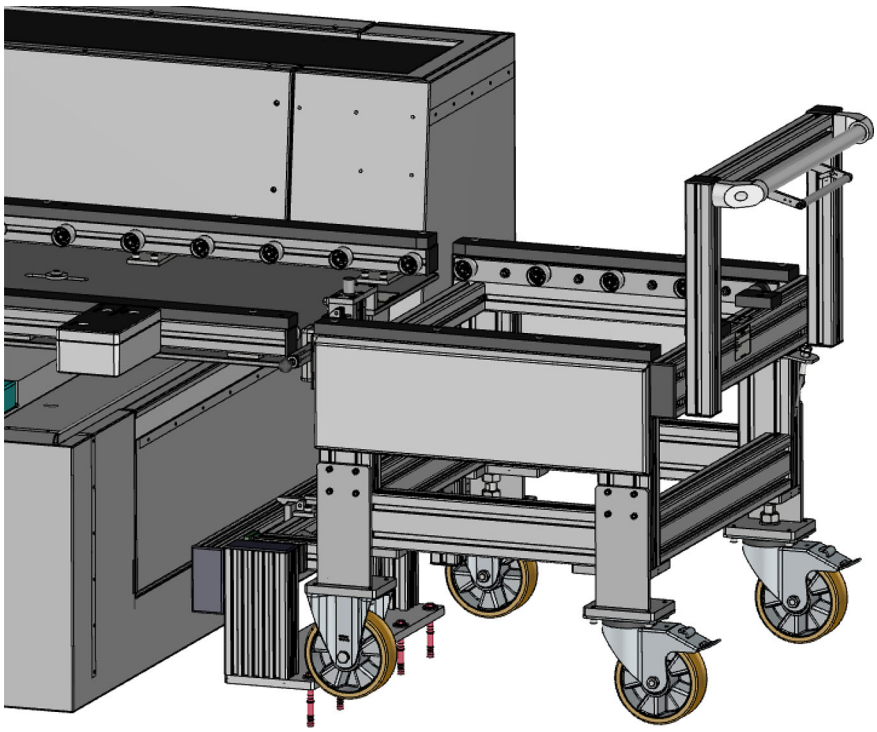

Fig. 4-73 Positioning the pallet transport carriage (illustration as as an example)

3. Adjust the height of the pallet transport carriage using the adjustment spindle between the roller and base frame.

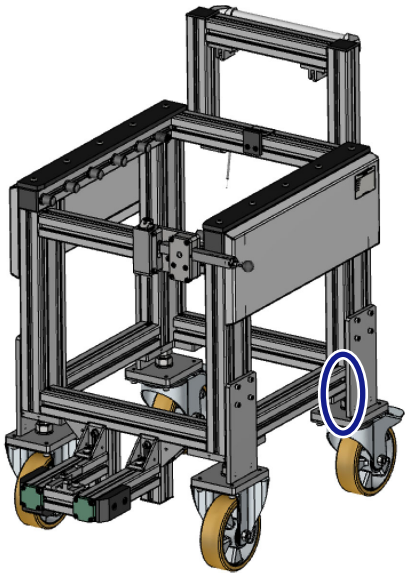

Fig. 4-74 Adjusting the height (illustration as an example)

4. Align the pallet transport carriage with the pallet supply system. The pallet transport carriage must be horizontal to the pallet supply system and the ground. The sliding rails of the pallet supply system and the pallet transport carriage must be aligned so that they are flush with each other. There must not be any height offset at the pallet transition. The pallet must not stick during crossing over. If necessary shift the sliding rail in the pallet track direction.

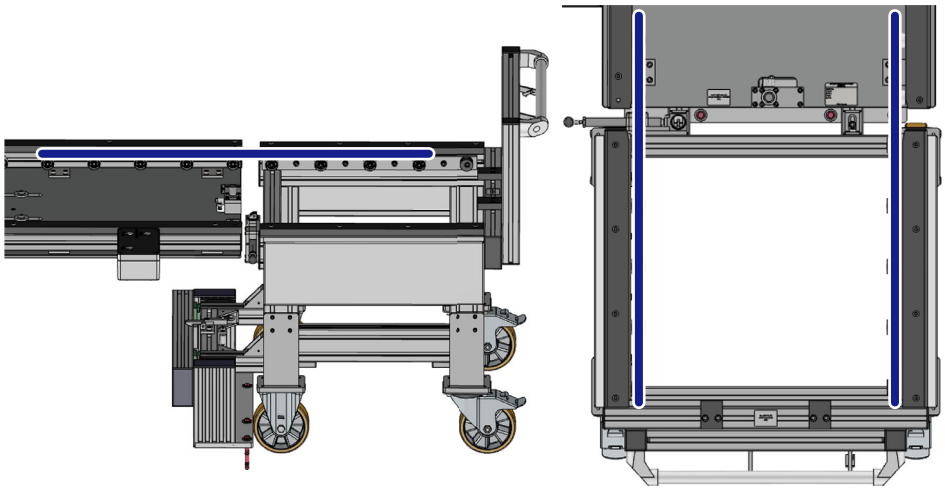

Fig. 4-75 Alignment of the pallet transport carriage (illustration as an example)

5. Mark the hole positions of the docking unit on the floor with a felt-tip marker.
6. Use a drill to drill a hole with 12 mm diameter and 80 mm depth.

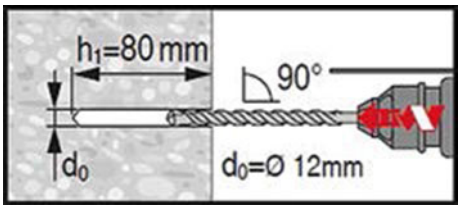

Fig. 4-76 Holes

7. Remove dust and chips from drill holes using a vacuum cleaner.

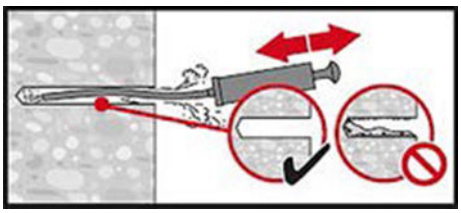

Fig. 4-77 Cleaning the holes

8. Insert the rawlplugs through the floor brackets into the holes and tighten the screws to a max. torque of 20 Nm.

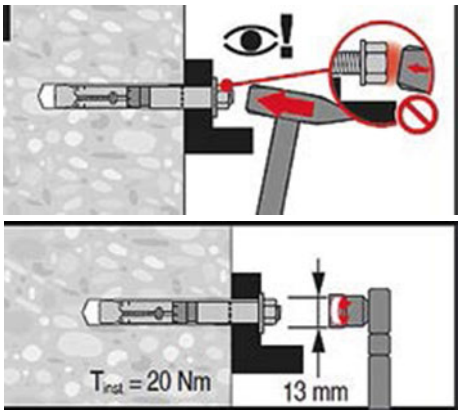

Fig. 4-78 Tighten down the loading table

9. Check the pallet transport carriage position again.
10. Recheck the transfer of the pallet to the pallet supply system and re-adjust if necessary.

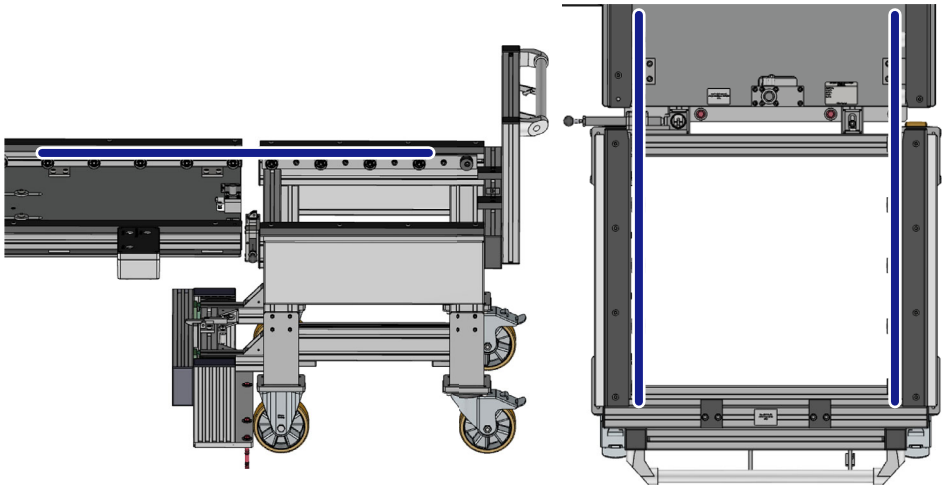

Fig. 4-79 Transfer check (illustration as an example)

11. Check the pallet lock.

12. Check the setting of the eccentric rollers. The eccentric rollers should brake the pallet shortly before its stop position.

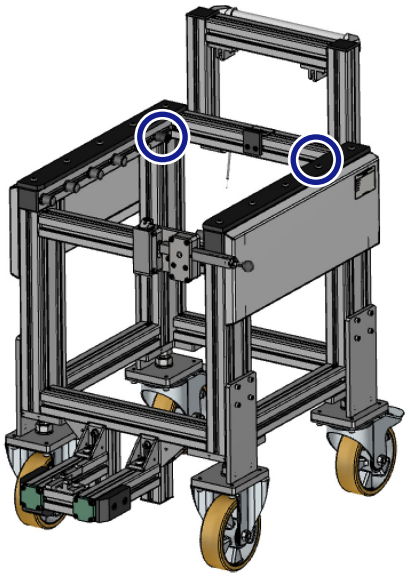

Fig. 4-80 Eccentric rollers check (illustration as an example)

Setting up the loading table with ball rollers (option)

1. Raise the loading table with ball rollers from the transport pallet as shown in 4.1. Ensure that the loading table with ball rollers does not tip over.
2. Position the loading table with ball rollers in the desired position.
3. Undo the floor bracket (1) and lock screw (2) of the adjustable foot and push the floor bracket upwards.

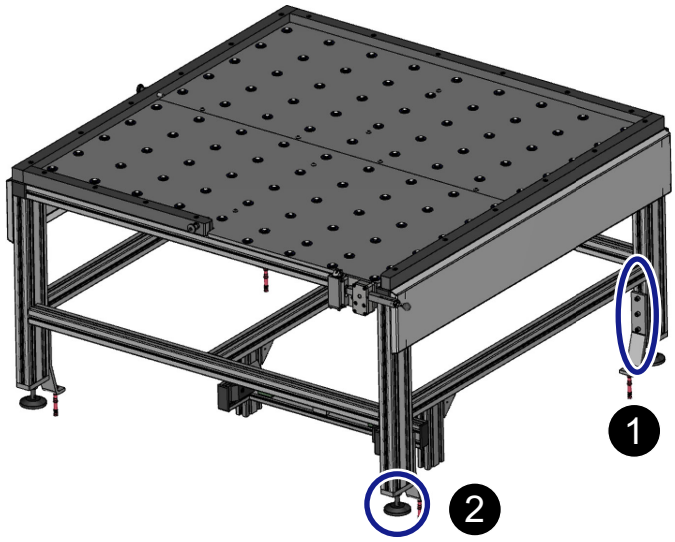

Fig. 4-81 Undoing the floor bracket counternuts (illustration as an example)

4. Align the loading table with ball rollers relative to the pallet transport carriage.
   Set the height using the adjustment feet.
   The loading table with ball rollers must be horizontal to the pallet transport carriage and the ground. The sliding rails of the pallet transport carriage must be aligned so that they are flush with each other. There must not be any height offset at the pallet transition. The pallet must not stick during crossing over. If necessary shift the sliding rail in the pallet track direction.

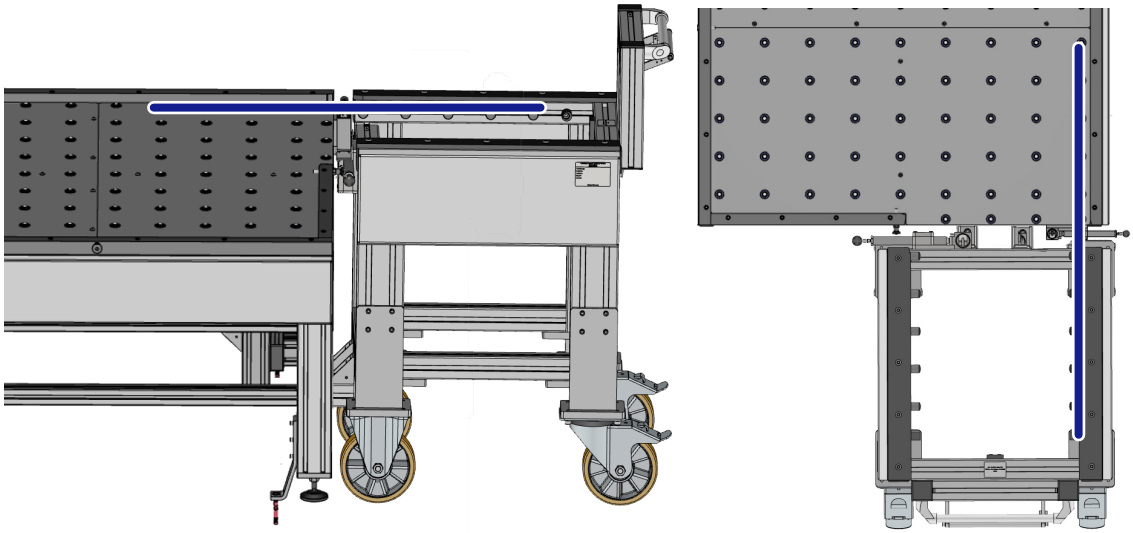

Fig. 4-82 Alignment of the loading table with ball rollers (illustration as an example)

5. Push the floor brackets downwards and mark the hole positions of the anchors/rawlplugs on the floor with a felt-tip marker.
6. Use a drill to drill a hole with 12 mm diameter and 80 mm depth.

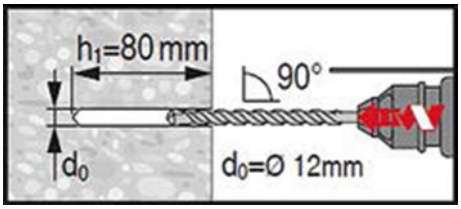

Fig. 4-83 Holes

7. Remove dust and chips from drill holes using a vacuum cleaner.

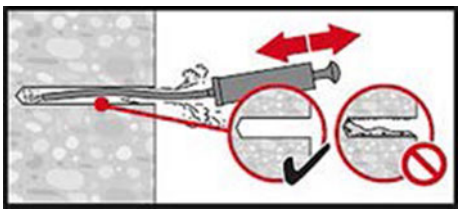

Fig. 4-84 Cleaning the holes

8. Insert the rawlplugs through the floor brackets into the holes and tighten the screws to a max. torque of 20 Nm.

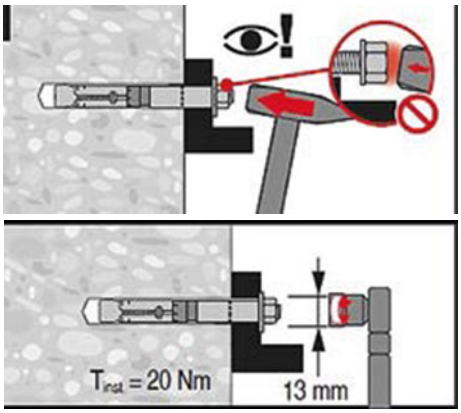

Fig. 4-85 Tighten down the loading table

9. Tighten all floor bracket fastening screws.

Fig. 4-86 Tightening the floor bracket screws (illustration as an example)

10. Recheck the position of the loading table with ball rollers.
11. Tighten all counternuts of the adjustable feet.

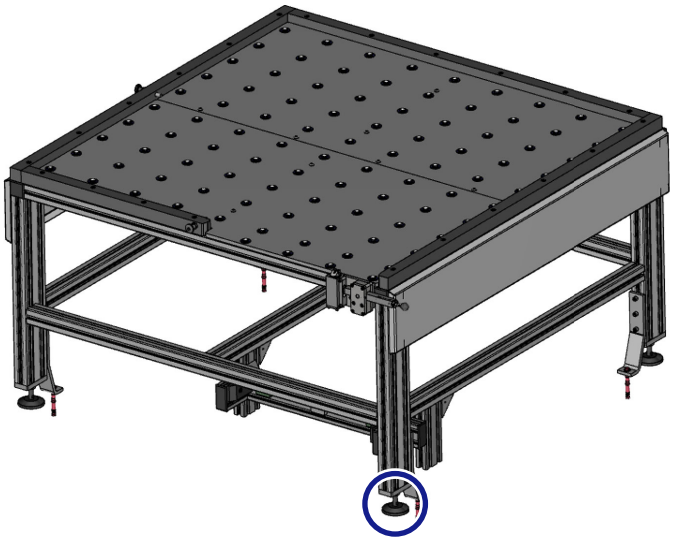

Fig. 4-87 Tightening the floor bracket screws (illustration as an example)

12. Recheck the transfer of the pallet to the pallet transport carriage and readjust if necessary.

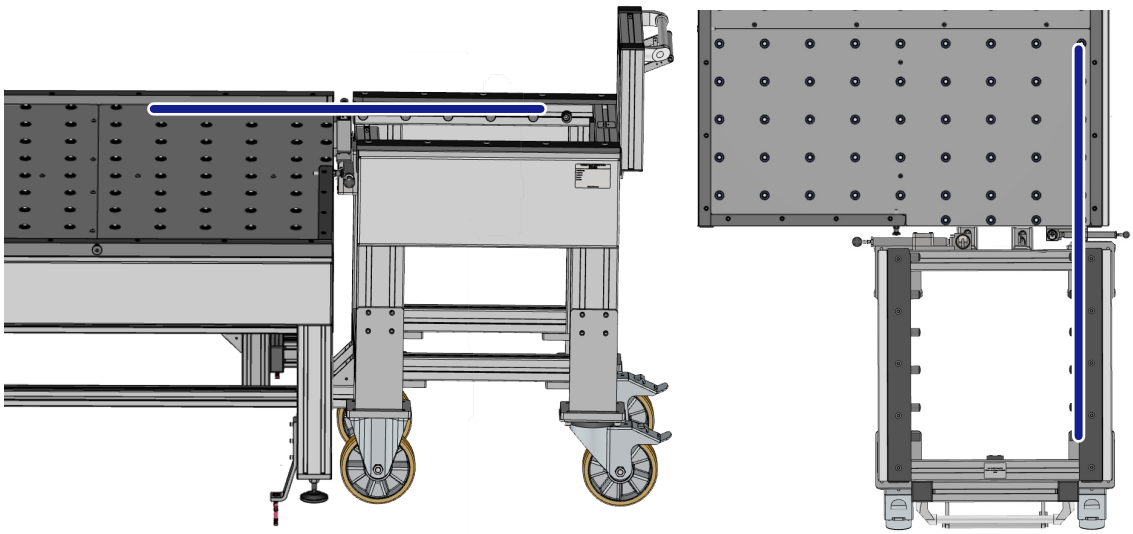

Fig. 4-88 Transfer check (illustration as an example)

13. Check the pallet lock.

Setting up the transverse shuttle station (option)

1. Raise the shuttle station from the transport pallet as shown in 4.1. Ensure that the shuttle station does not tip over. The support wheel of the shuttle must be in contact with the floor.
2. Position the shuttle station in front of the pallet supply system.

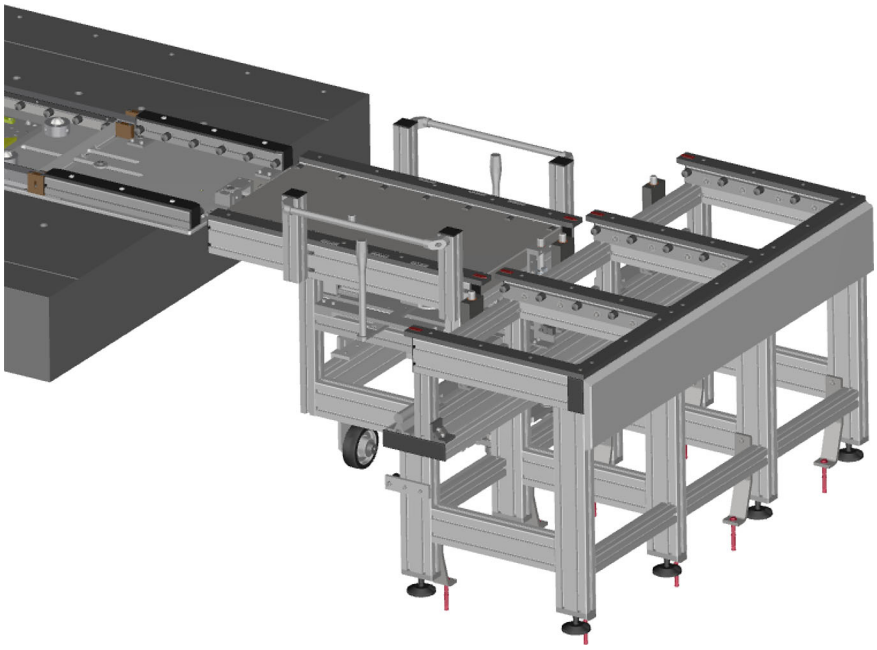

Fig. 4-89 Positioning the shuttle station (illustration as as an example)

3. Undo the floor bracket (1) and lock screw (2) of the adjustable foot and push the floor bracket upwards.

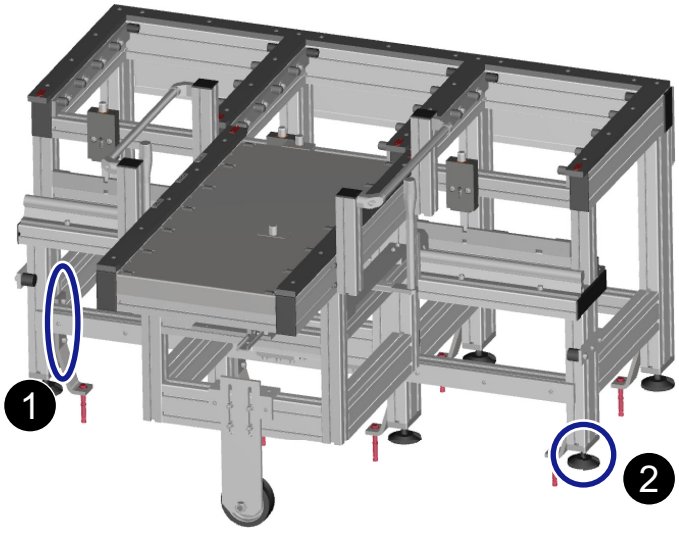

Fig. 4-90 Undoing the floor bracket counternuts (illustration as an example)

4. Push the shuttle to the CMM loading position.
5. Lock shuttle in loading position.
6. If necessary, readjust the roller lever valve.

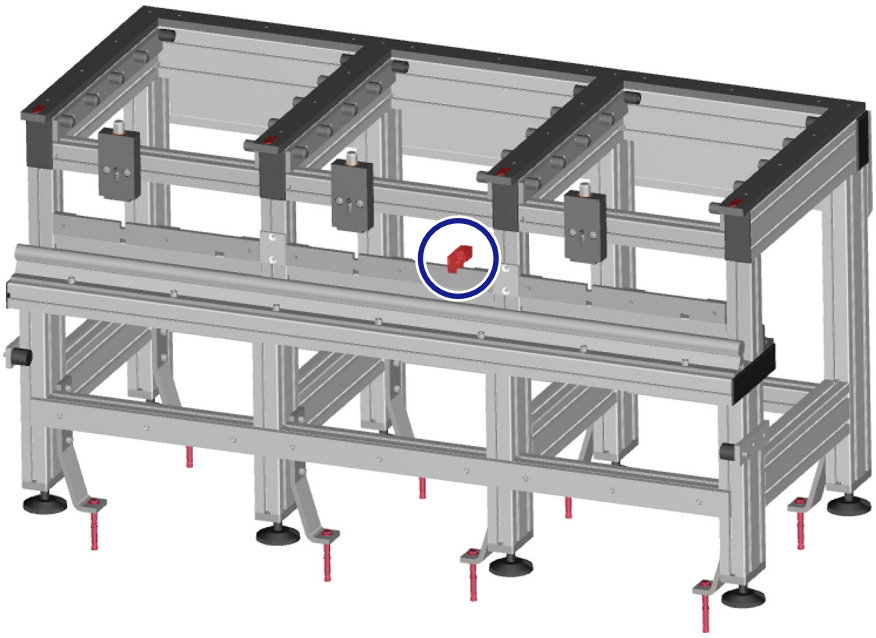

Fig. 4-91 Roller lever valve (illustration as an example)

7. Switch on the coordinate measuring machine.
8. Switch on the coordinate measuring machine control system.
9. Switch on the coordinate measuring machine drives.
10. Adjust the height of the shuttle station using the spirit level on the pallet supply system. Adjustment using the adjustable foot and the support wheel.

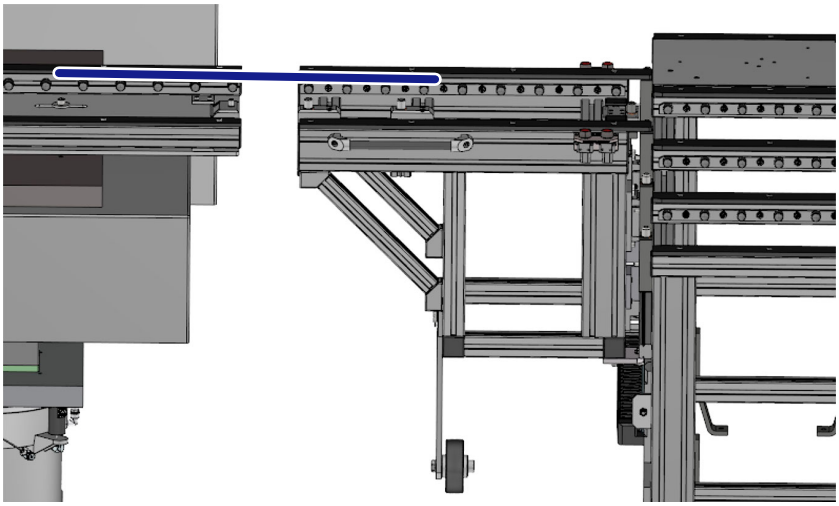

Fig. 4-92 Height alignment (illustration as an example)

11. Align the shuttle loading position relative to the coordinate measuring machine/pallet supply system so it is flush. If the pallet can be pushed without resistance on the pallet supply system, the position of the shuttle station is correct.

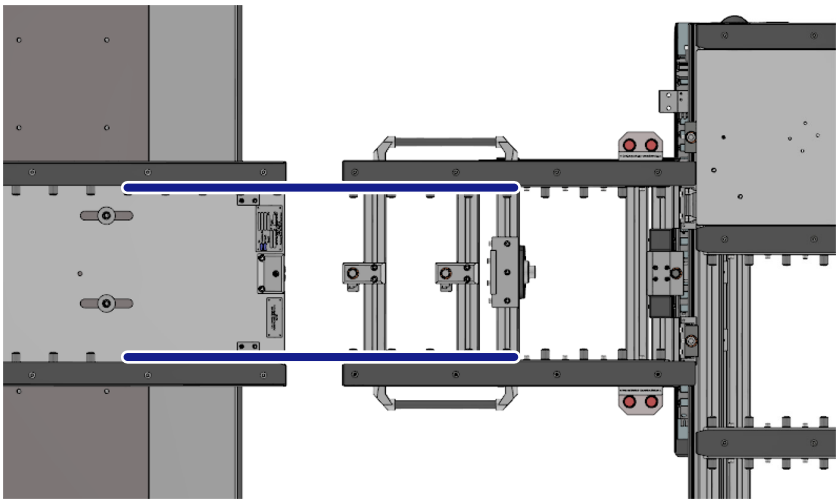

Fig. 4-93 Flush alignment (illustration as an example)

12. Push the floor brackets downwards and mark the hole positions of the anchors/rawlplugs on the floor with a felt-tip marker.
13. Use a drill to drill a hole with 12 mm diameter and 80 mm depth.

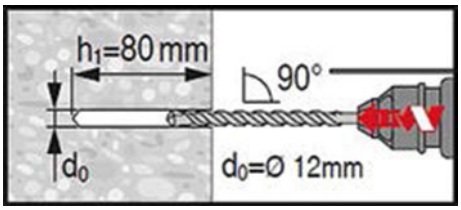

Fig. 4-94 Holes

14. Remove dust and chips from drill holes using a vacuum cleaner.

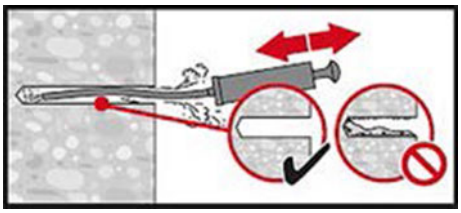

Fig. 4-95 Cleaning the holes

15. Insert the rawlplugs through the floor brackets into the holes and tighten the screws to a max. torque of 20 Nm.

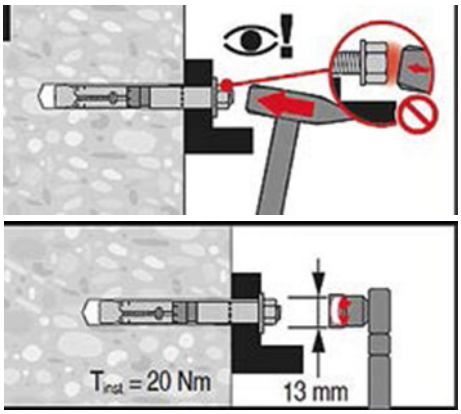

Fig. 4-96 Tighten down the loading table

16. Tighten all floor bracket fastening screws.

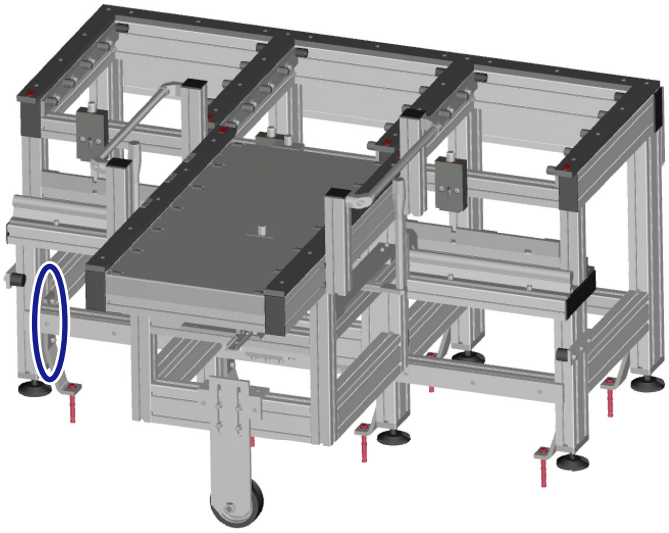

Fig. 4-97 Tightening the floor bracket screws (illustration as an example)

17. Check the shuttle station position again.

18. Tighten all counternuts of the adjustable feet.

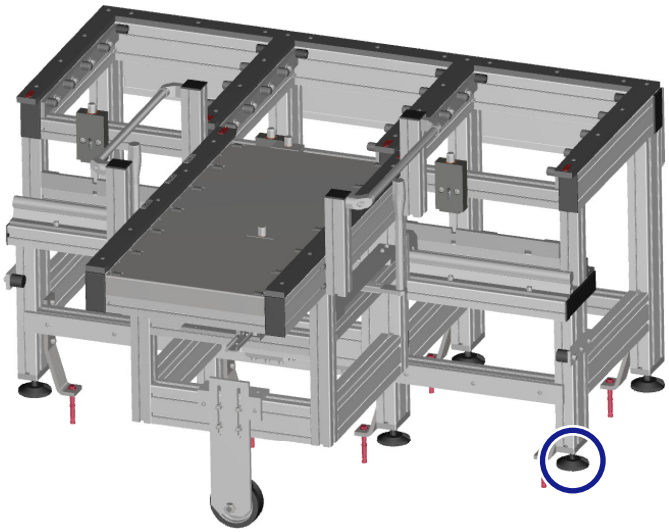

Fig. 4-98 Tightening the floor bracket screws (illustration as an example)

19. Recheck the transfer of the pallet to the pallet supply system and re-adjust if necessary.
20. Check the pallet lock.
21. Check the setting of the eccentric rollers. The eccentric rollers should brake the pallet shortly before its stop position.

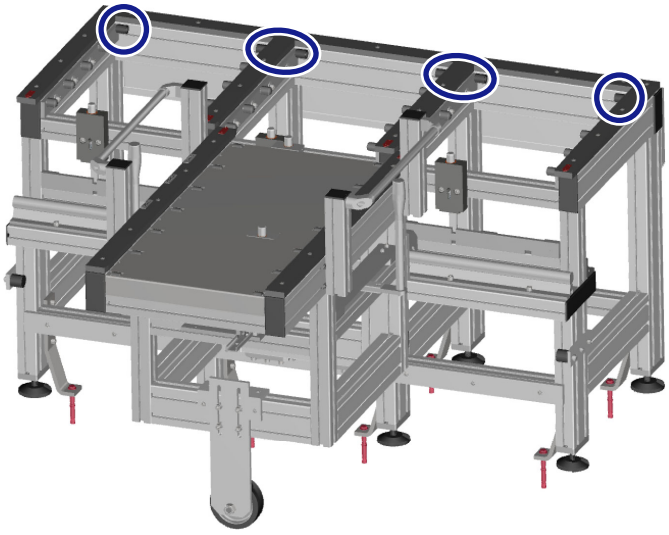

Fig. 4-99 Eccentric rollers check (illustration as an example)

Setting up the longitudinal shuttle station (option)

1. Raise the shuttle station from the transport pallet as shown in 4.1. Ensure that the shuttle station does not tip over. The support wheel of the shuttle must be in contact with the floor.
2. Position the shuttle station in front of the pallet supply system.

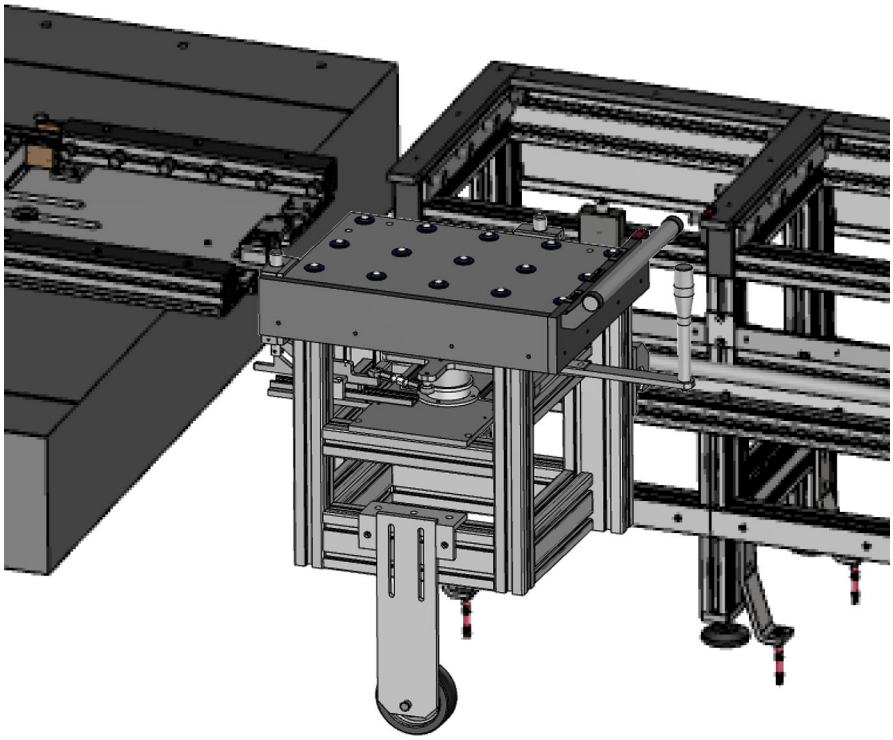

Fig. 4-100 Positioning the shuttle station (illustration as as an example)

3. Undo the floor bracket (1) and lock screw (2) of the adjustable foot and push the floor bracket upwards.

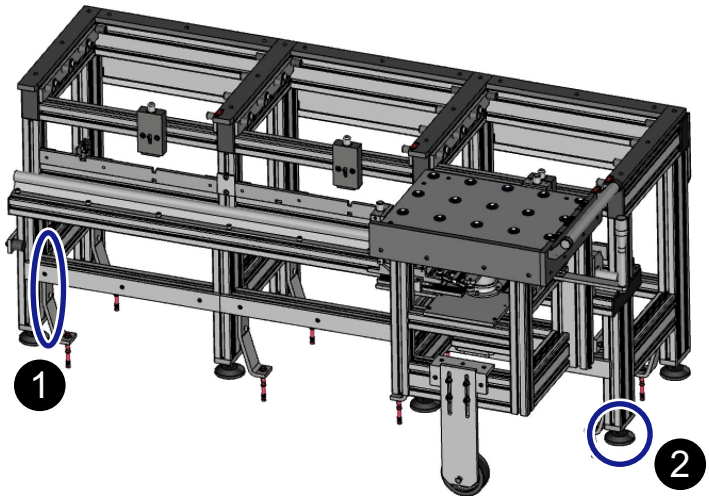

Fig. 4-101 Undoing the floor bracket counternuts (illustration as an example)

4. Push the shuttle to the CMM loading position.
5. Lock shuttle in loading position.
6. If necessary, readjust the roller lever valve.

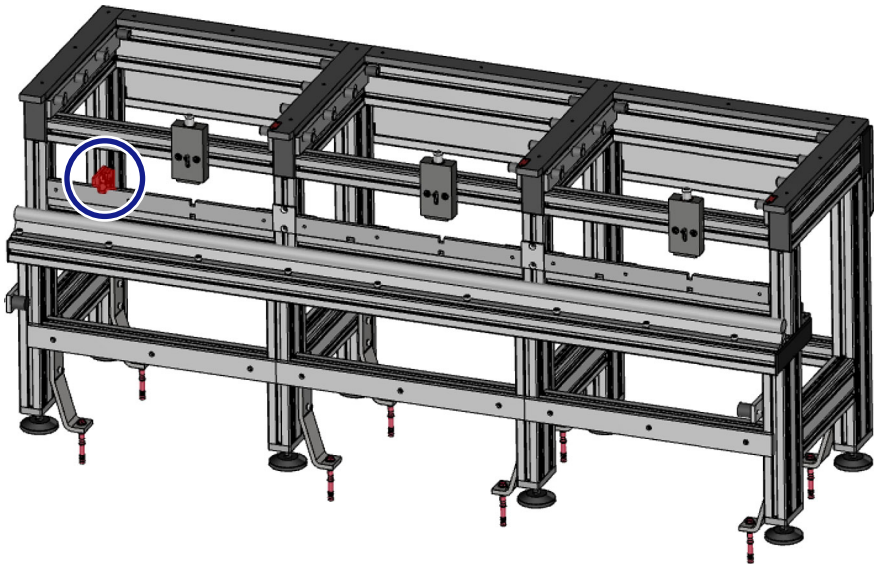

Fig. 4-102 Roller lever valve (illustration as an example)

7. Switch on the coordinate measuring machine.
8. Switch on the coordinate measuring machine control system.
9. Switch on the coordinate measuring machine drives.
10. Adjust the height of the shuttle station using the spirit level on the pallet supply system. Adjustment using the adjustable foot and the support wheel.

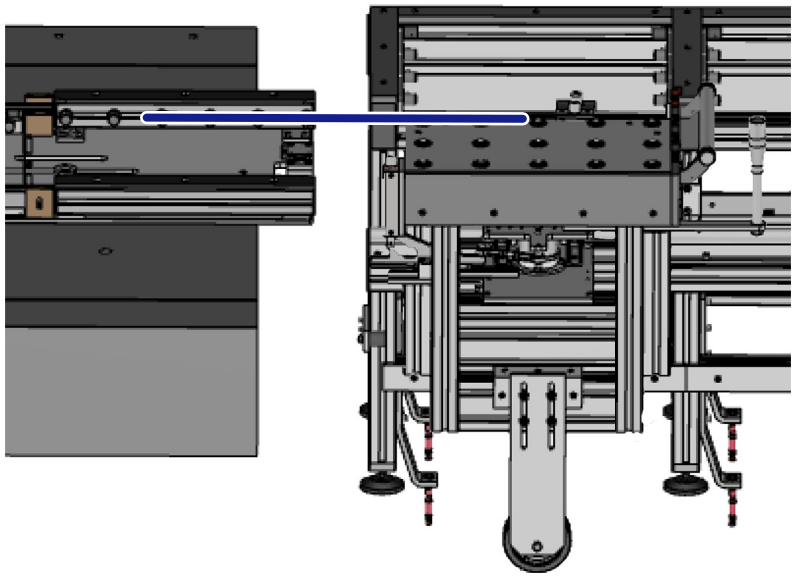

Fig. 4-103 Height alignment (illustration as an example)

11. Align the shuttle loading position relative to the coordinate measuring machine/pallet supply system so it is flush. If the pallet can be pushed without resistance on the pallet supply system, the position of the shuttle station is correct.

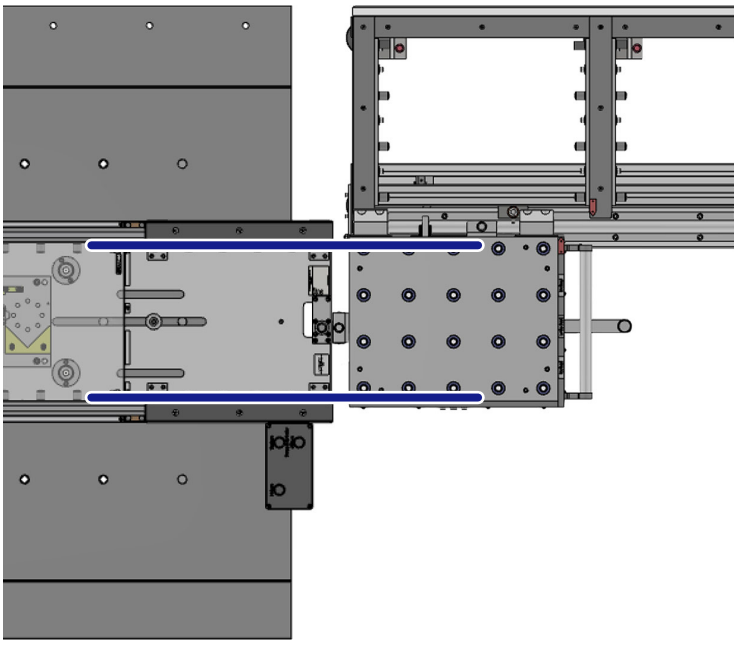

Fig. 4-104 Flush alignment (illustration as an example)

12. Push the floor brackets downwards and mark the hole positions of the anchors/rawlplugs on the floor with a felt-tip marker.
13. Use a drill to drill a hole with 12 mm diameter and 80 mm depth.

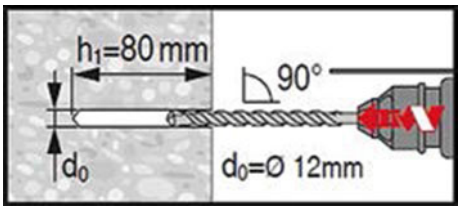

Fig. 4-105 Holes

14. Remove dust and chips from drill holes using a vacuum cleaner.

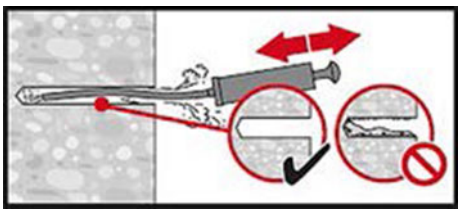

Fig. 4-106 Cleaning the holes

15. Insert the rawlplugs through the floor brackets into the holes and tighten the screws to a max. torque of 20 Nm.

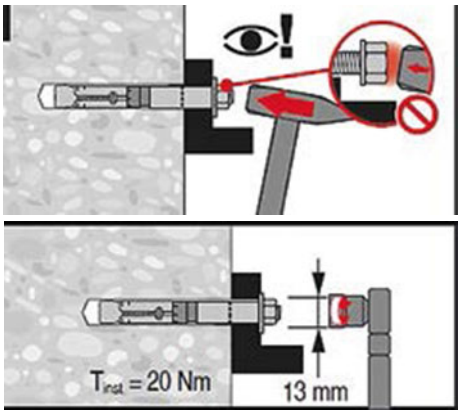

Fig. 4-107 Tighten down the loading table

16. Tighten all floor bracket fastening screws.

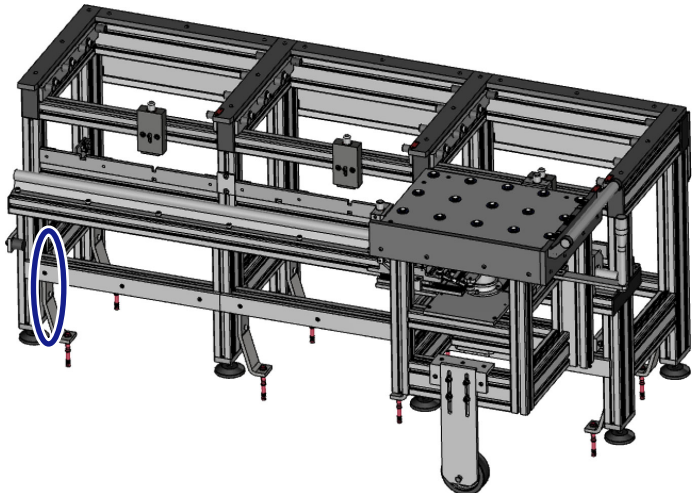

Fig. 4-108 Tightening the floor bracket screws (illustration as an example)

17. Check the shuttle station position again.

18. Tighten all counternuts of the adjustable feet.

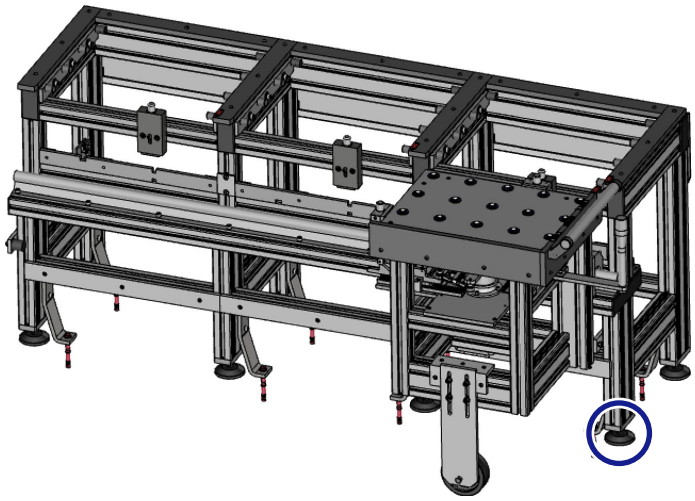

Fig. 4-109 Tightening the floor bracket screws (illustration as an example)

19. Recheck the transfer of the pallet to the pallet supply system and re-adjust if necessary.
20. Check the pallet lock.
21. Check the setting of the eccentric rollers. The eccentric rollers should brake the pallet shortly before its stop position.

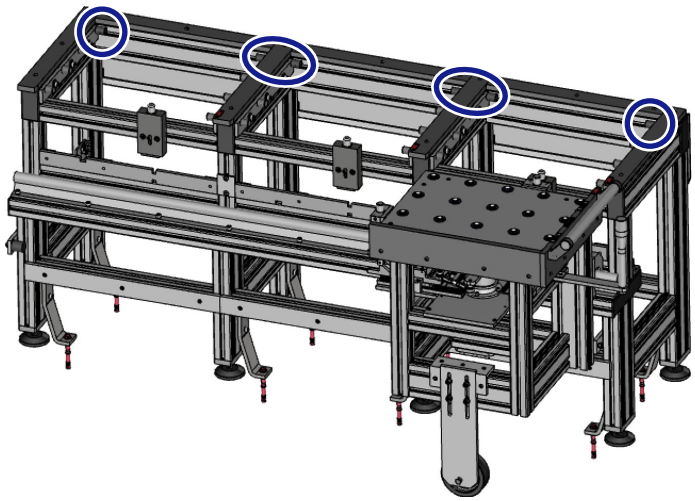

Fig. 4-110 Eccentric rollers check (illustration as an example)

4.3 Commissioning

4.3.1 Switching on

See 5.1.

4.3.2 Function check

Before commencing normal operation, a function check of all safety elements must be performed and documented.

5 Operation

5.1 Switching on

5.1.1 Prerequisite

– First check the system visually. The system may only be operated in fault-free state.

– If you are starting an automatic measurement process, make sure that there is nobody in the danger area of the coordinate measuring machine.

5.1.2 Process

1. Switch on the coordinate measuring machine (see coordinate measuring machine operating instructions).
2. Switch on the compressed air supply to the loader.

5.2 Switching on of the coordinate measuring machine without use of the loader

1. Replace the Harting plug with an emergency plug.
2. Switch on the coordinate measuring machine (see coordinate measuring machine operating instructions).

5.3 Switching on after an emergency stop

1. Clear the hazardous situation.
2. Make sure that nobody is in the hazardous area.
3. Release the emergency stop button from its engaged position.
4. See coordinate measuring machine operating instructions.

5.4 Releasing the pallet lock

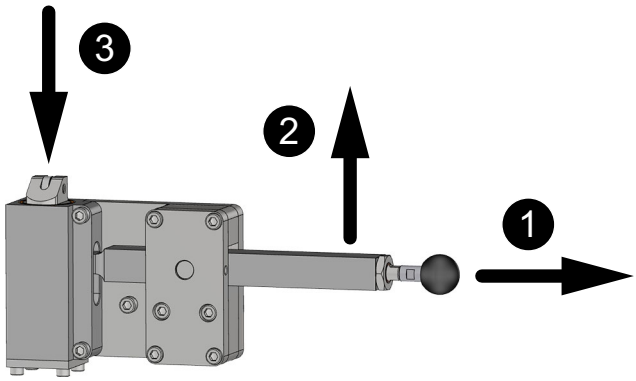

Fig. 5-111 Loading the pallet supply system loader (illustration as an example)

1. Pull out ball handle (1).
2. Swivel the hand lever upwards.
3. Pallet lock is lowered

5.5 Loading the workpiece

⚠ WARNING

Risk of injury due to heavy loads

Crushing of fingers during handling or due to falling down of modules and workpieces.

– Only use suitable lifting gear (e.g. a crane) to lift heavy items and workpieces onto/off the pallet.
– Wear personal protective equipment.

⚠ CAUTION

Risk of injury due to tipping.

Crushing of body parts.

– Feed pallets and devices centrally.
– If the load is not in the centre use a counterweight.
– Workpieces that must, for measuring reasons, be placed on the device so that tilting is likely, must be mechanically secured.

⚠ CAUTION

Risk of injury due to manual movements.

Crushing and knocking of body parts.

- Always have manual movements under control, using the corresponding speed and looking ahead.
- Always pull/push with both hands on the provided devices.
- Wear personal protective equipment.

5.5.1 Prerequisite

- The coordinate measuring machine has been switched on and is in the safety position (see coordinate measuring machine operating instructions).

5.5.2 Process on the pallet supply system

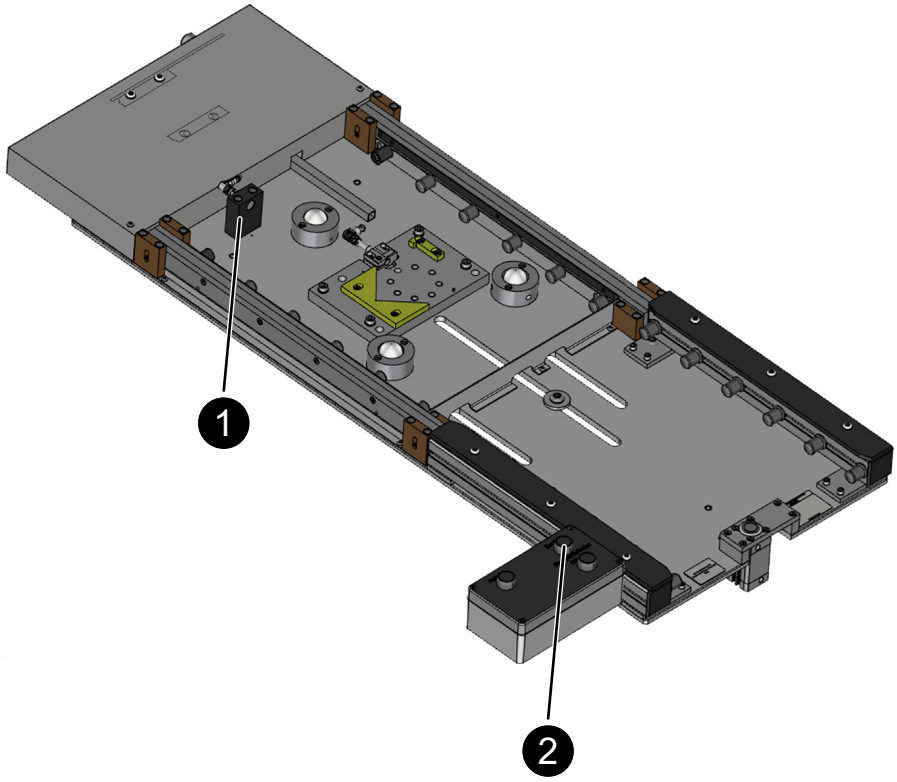

Fig. 5-112 Loading the pallet supply system loader (illustration as an example)

1. A set-up pallet is placed on the pallet supply system.
2. Push the pallet up to the stop (1).
3. Lower the pallet into the measuring position using the button at the control panel (2).
4. Once the pallet is located in the measuring position, start measuring.

5.5.3 Process on the loading table (option)

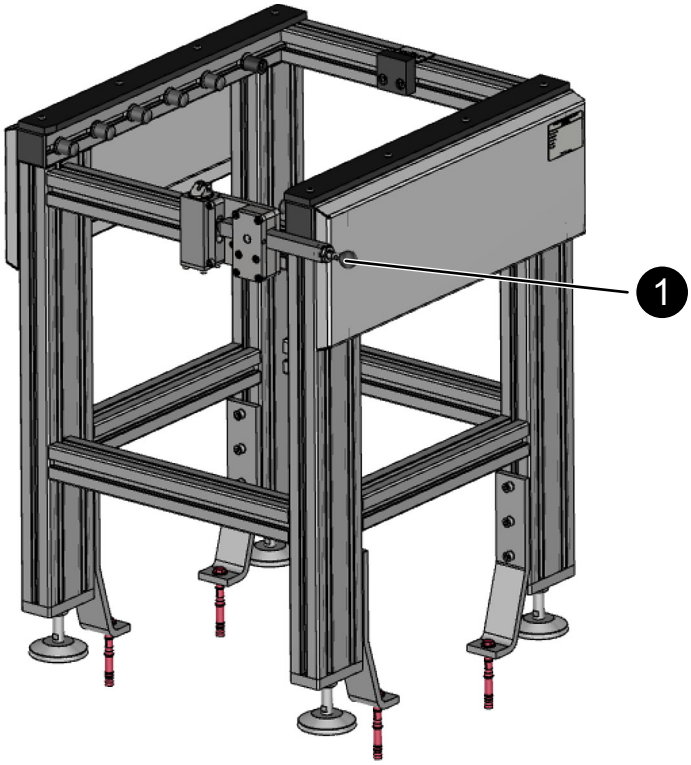

Fig. 5-113 Loading the loading table (illustration as an example)

1. Set up the pallet on the loading table.
2. Release the pallet lock (1), see 5.4 and push the pallet onto the pallet supply system.
3. For the remainder of the procedure, see 5.5.2.

5.5.4 Process on the rotating loading station (option)

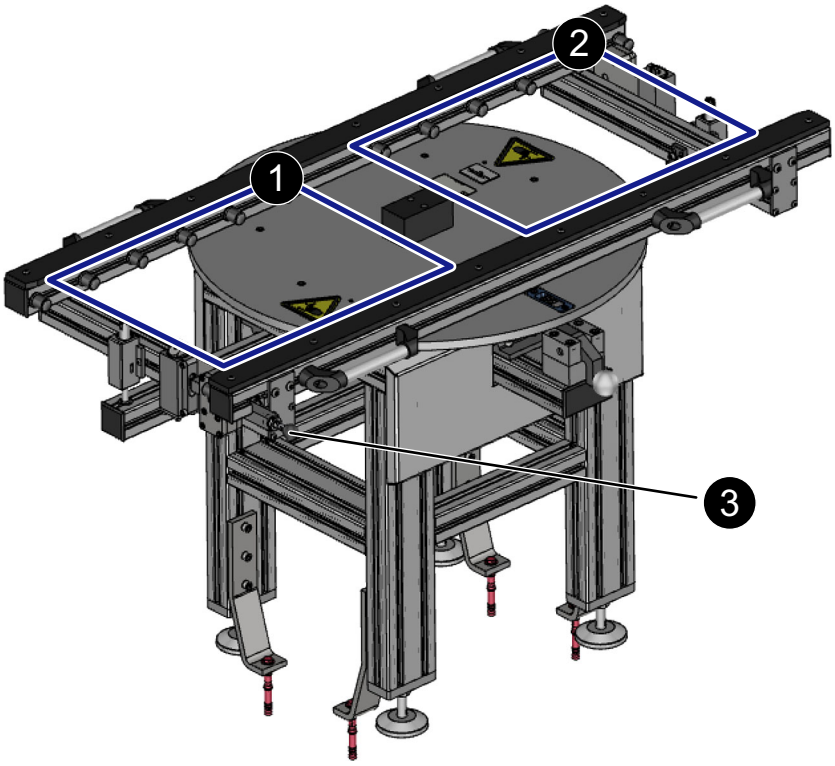

Fig. 5-114 Loading the rotating loading station (illustration as an example)

1. Set up the pallet on the rotating loading station (1).
2. Release the pallet lock (3), see 5.4 and push the pallet onto the pallet supply system.
3. For the remainder of the procedure, see 5.5.2.
4. During measurement, the second pallet (2) can be set up.

5.5.5 Process on the pallet transport carriage (option)

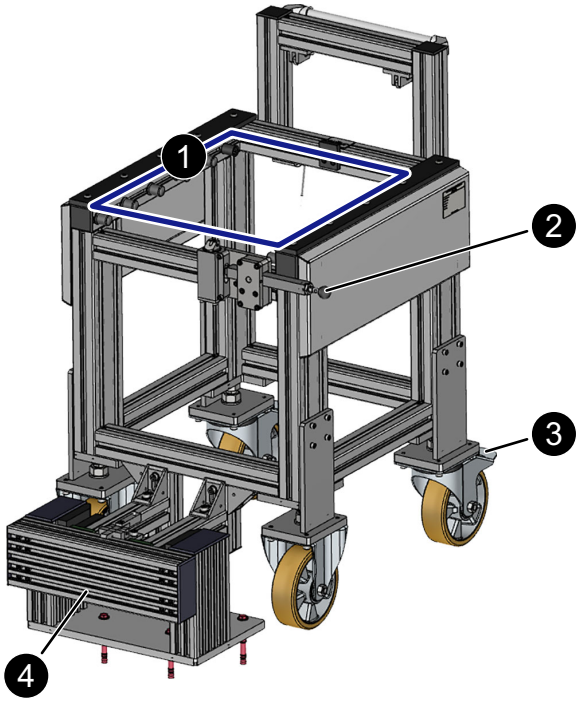

Fig. 5-115 Loading the pallet transport carriage (illustration as an example)

1. Set up the pallet on the pallet transport carriage (1).

– For setting up, the pallet transport carriage must be fixed either on the docking unit (4) or in the set-up position with the holding brakes (3).

2. Fix the pallet transport carriage at the docking unit (4).
3. Release the pallet lock (2), see 5.4 and push the pallet onto the pallet supply system.
4. For the remainder of the procedure, see 5.5.2.

5.5.6 Process on the loading table with ball rollers (option)

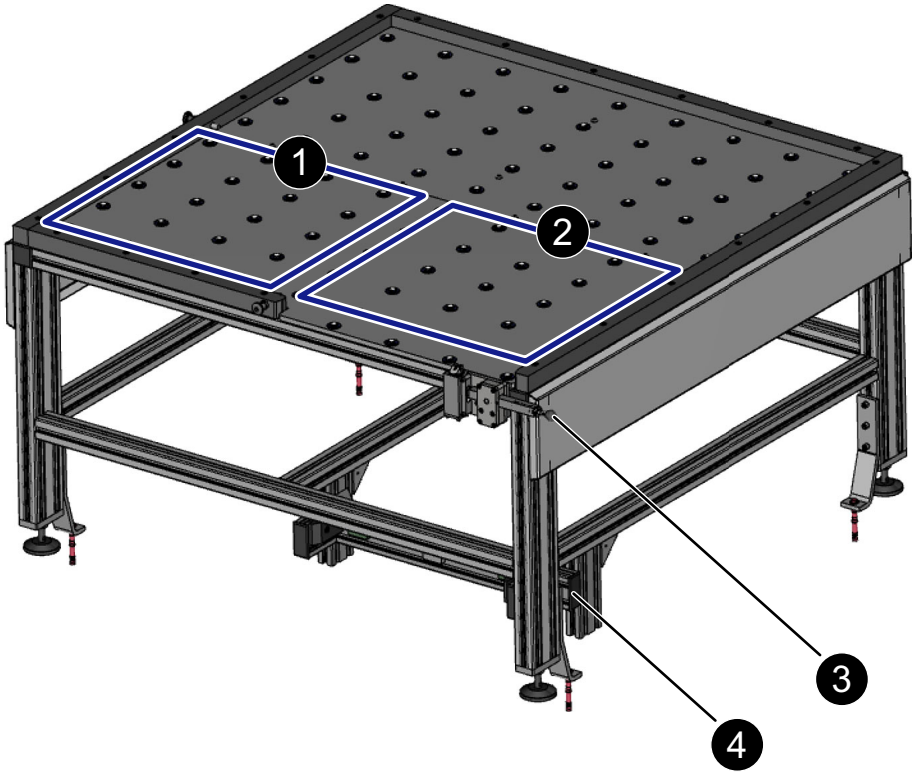

Fig. 5-116 Loading the loading table with ball rollers (illustration as an example)

1. Set up the pallet on the loading table with ball rollers (1).
2. Push the pallet to the transfer position (2).
3. Fix the pallet transport carriage at the docking unit (4).
4. Release the pallet lock (3), see 5.4 and push the pallet up to the stop on the pallet transport carriage.
5. Release the pallet transport carriage and push to the coordinate measuring machine.
6. For the remainder of the procedure, see 5.5.5.

5.5.7 Process on the shuttle station (option)

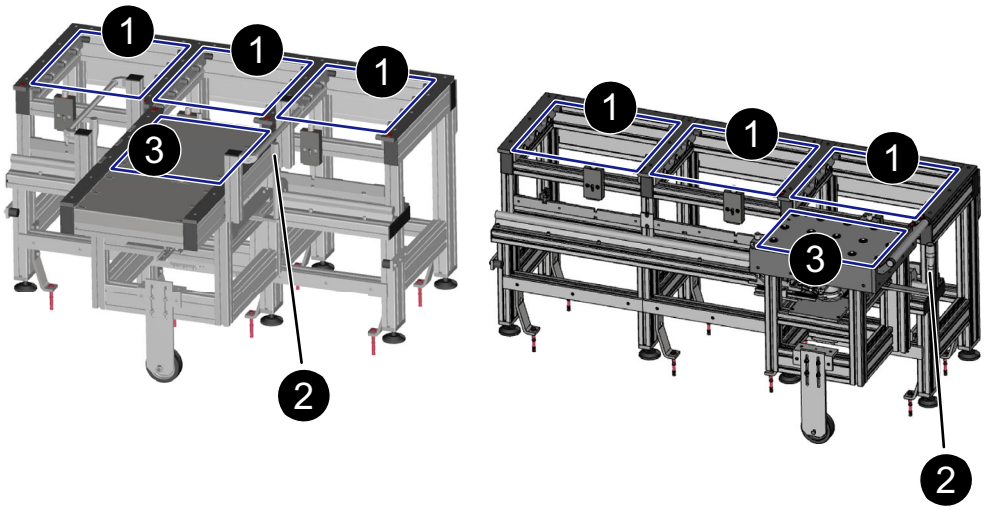

Fig. 5-117 Loading the shuttle station (illustration as an example)

1. Set up a pallet on a setup station (1).
2. Release the shuttle lock (2).
3. Push the shuttle to the setup station.
4. Lock the shuttle. During locking, the pallet lock on the shuttle in the direction of the setup station and the pallet lock at the setup station are released.
5. Push the pallet onto the shuttle (3).
6. Release the shuttle interlock.
7. Push the shuttle to the loading position in front of the coordinate measuring machine.
8. Lock the shuttle. During locking, the pallet lock on the shuttle in the direction of the pallet supply system and the pallet lock on the pallet supply system are released.
9. Push the pallet onto the pallet supply system.
10. For the remainder of the procedure, see 5.5.2.

5.6 Unloading the workpiece

⚠ WARNING

Risk of injury due to heavy loads

Crushing of fingers during handling or due to falling down of modules and workpieces.

– Only use suitable lifting gear (e.g. a crane) to lift heavy items and workpieces onto/off the pallet.

– Wear personal protective equipment.

⚠ CAUTION

Risk of injury due to manual movements.

Crushing and knocking of body parts.

– Always have manual movements under control, using the corresponding speed and looking ahead.

– Always pull/push with both hands on the provided devices.

– Wear personal protective equipment.

5.6.1 Prerequisite

– The coordinate measuring machine has completed measuring and is in safety position again (see the coordinate measuring machine operating instructions).

5.6.2 Process on the pallet supply system

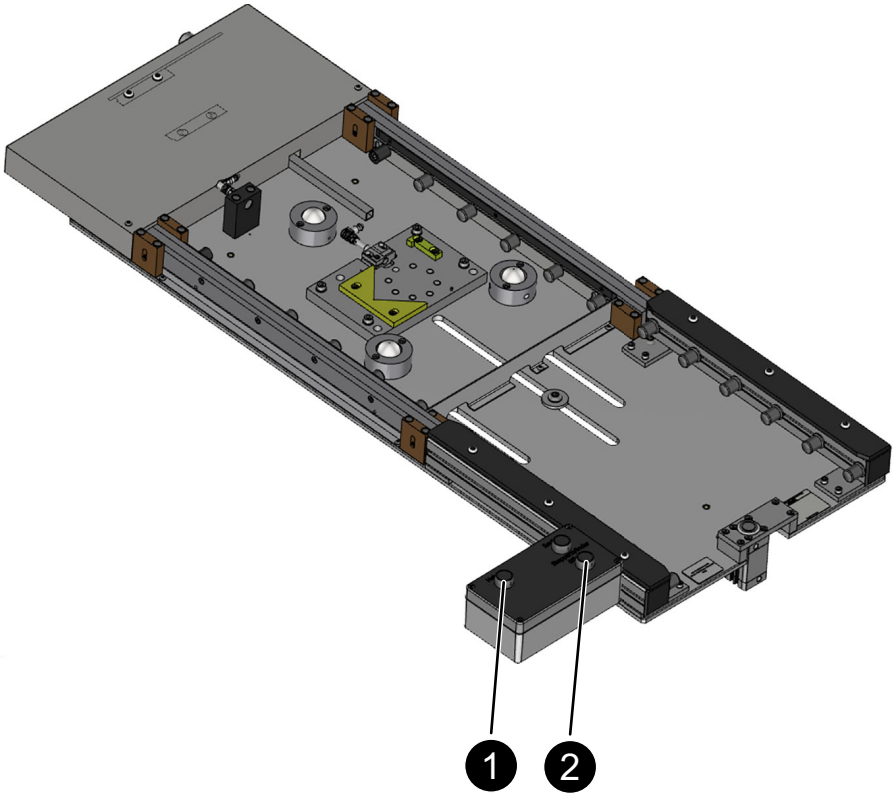

Fig. 5-118 Unloading the pallet supply system (illustration as an example)

1. Raise the pallet from the measuring position using the button at the control console (1) and pull out.
2. To be able to pull the pallet down from the pallet supply system, release the pallet lock with the button on the control console (2).

5.6.3 Process on the loading table (option)

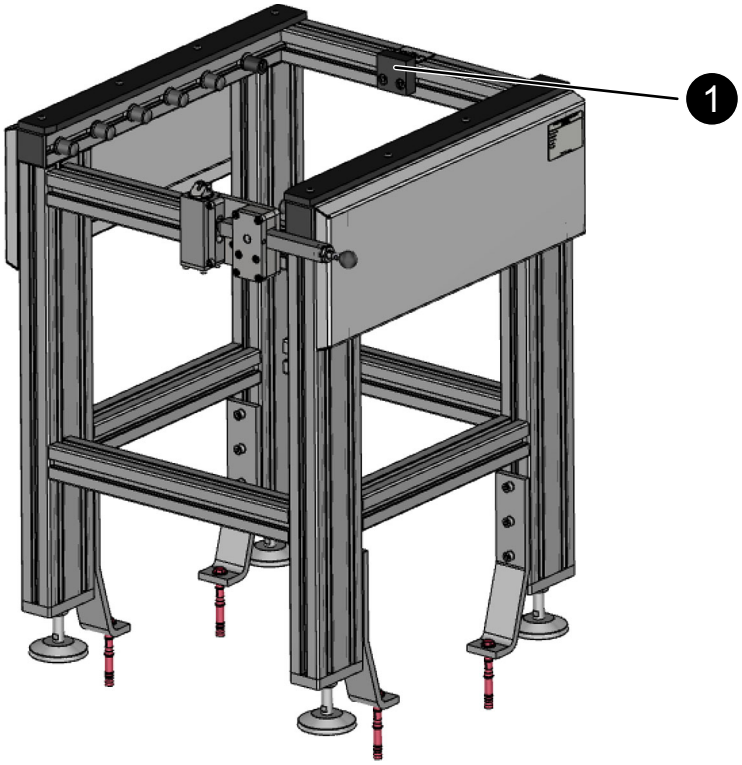

Fig. 5-119 Loading table unloading (illustration as an example)

1. Pull the pallet up to the stop (1) on the loading table.
2. Set up a new workpiece.

5.6.4 Process on the rotating loading station (option)

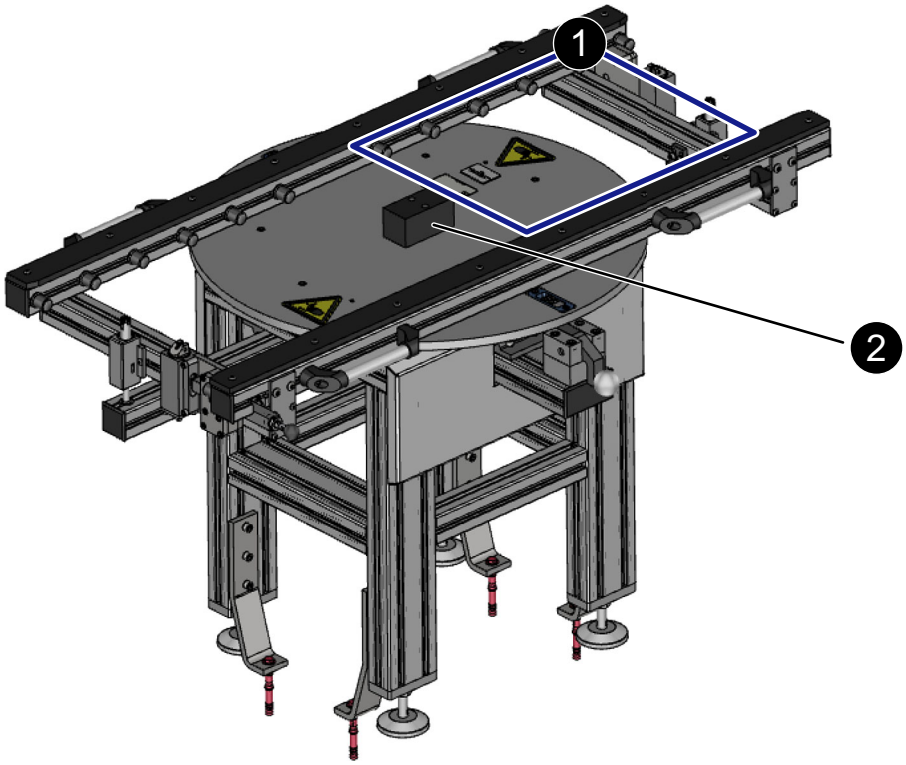

Fig. 5-120 Rotating loading station unloading (illustration as an example)

1. Pull the pallet up to the stop (2) onto the rotating loading station.
2. Rotate the rotating loading station, see 5.7 and load a prepared pallet (1).
3. Set up a new workpiece.

5.6.5 Process on the pallet transport carriage (option)

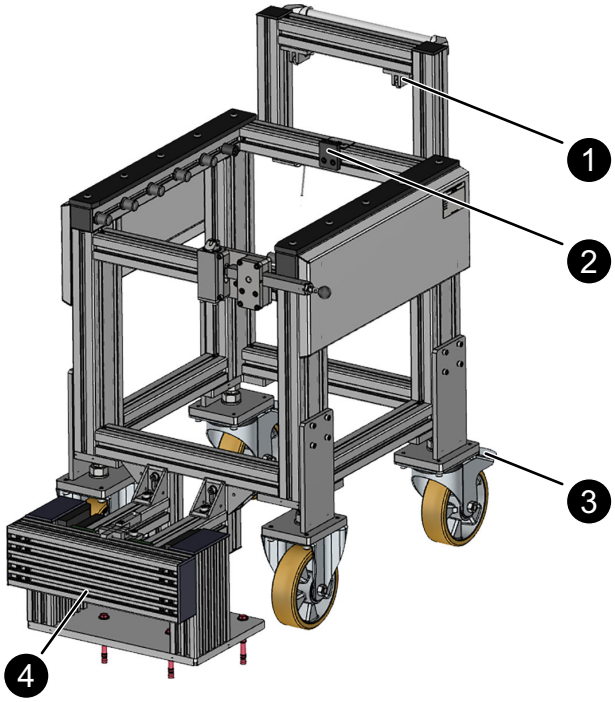

Fig. 5-121 Unloading the pallet transport carriage (illustration as an example)

1. Fix the pallet transport carriage at the docking unit (4).
2. Push the pallet up to the stop (2) on the pallet transport carriage.
3. Release the pallet transport carriage from the docking unit (4) using the lever (1) and push to the set-up position.
4. Fix the pallet transport carriage either at a docking unit or using the holding brakes (3).
5. Set up a new workpiece.

5.6.6 Process on the loading table with ball rollers (option)

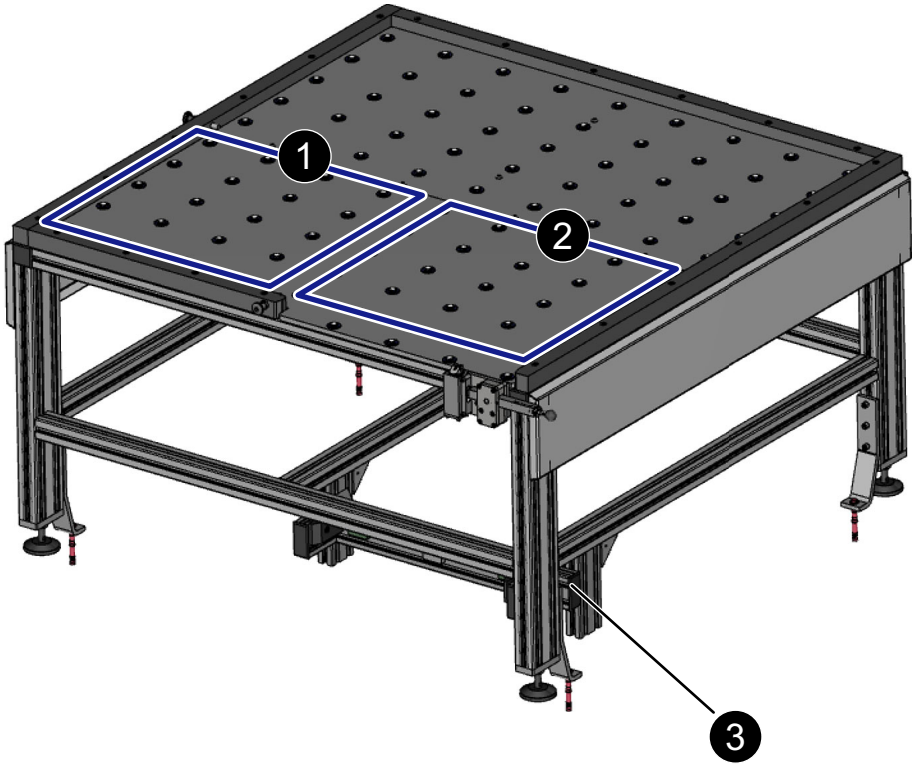

Fig. 5-122 Unloading the loading table with ball rollers (illustration as an example)

1. Fix the pallet transport carriage to the docking unit (3) at the loading table with ball rollers.
2. Push the pallet to the transfer position (2).
3. Push the pallet to the set-up position (1).
4. Set up a new workpiece.

5.6.7 Process on the shuttle station (option)

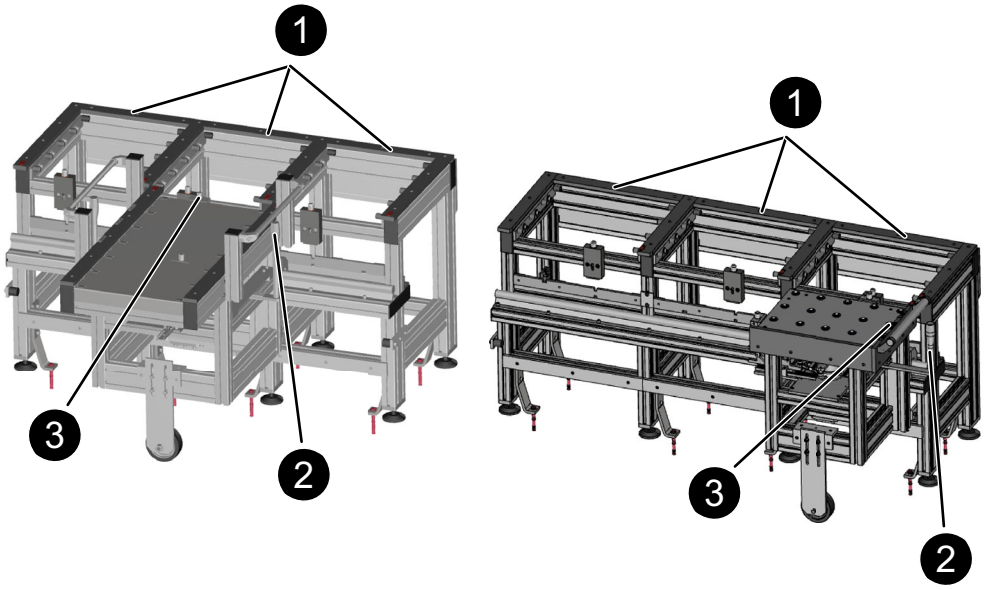

Fig. 5-123 Shuttle station unloading (illustration as an example)

1. Push the shuttle in front of the pallet supply system.
2. Lock the shuttle (2). During locking, the pallet lock on the shuttle in the direction of the pallet supply system and the pallet lock on the pallet supply system are released.
3. Pull the pallet up to the stop (3) on the shuttle.
4. Release the shuttle lock (2).
5. Push the shuttle in front of an empty setup station.
6. Lock the shuttle. During locking, the pallet lock on the shuttle in the direction of the setup station and the pallet lock at the setup station are released.
7. Push the pallet up to the stop (1) on the setup station.
8. Set up a new workpiece.

5.7 Turning the rotating loading station (option)

⚠ CAUTION

Risk of injury due to manual movements.

Crushing, striking, shearing off of fingers and hands.

- Always have manual movements under control, using the corresponding speed and looking ahead.
- When moving the rotating loading station, always grip with both hands on the handles.
- Always operate the loader with just one instructed person. Other persons must keep away from the loader.

5.7.1 Prerequisite

- There must not be any pallet between the pallet supply system and rotating loading station

5.7.2 Process

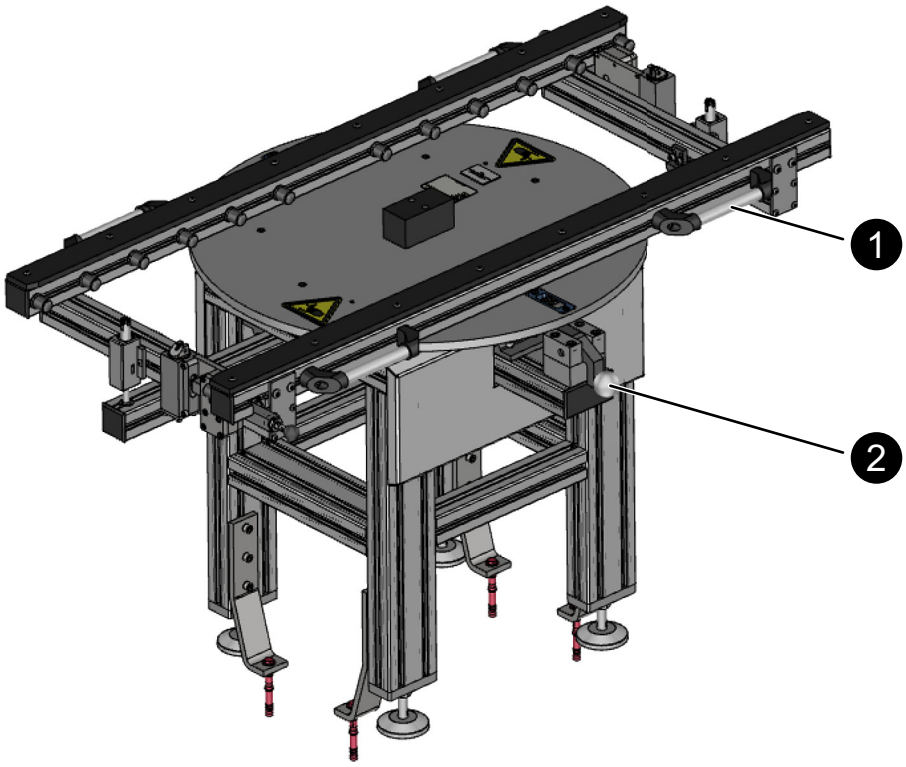

Fig. 5-124 Rotating loading station unloading (illustration as an example)

1. Release the lock for the rotational movement (2).
2. Turn the rotating loading station using the handles (1) until the rotating loading station is locked again.

5.8 Faults

5.8.1 Pallet supply system

Error	Cause/Remedy	Correction by
System does not start	No compressed air, no travel release for the coordinate measuring machine, pallet is not pushed in to the end position. Check the compressed air. Check the pallet position.	Operator
The coordinate measuring machine is interlocked with the pallet supply system	Check the solenoid valve. Bypass the solenoid valve.	Specialist personnel
The coordinate measuring machine does not start.	The initiator (SE1) "Pallet lowered" is not tripped. Check the pallet position.	Operator
Pallet is not raised	Too little pressure in the system, cylinder defective. Compressed air check by the operator. Pneumatic cylinder check by specialist personnel.	Operator / specialist personnel
Pallet is not lowered	The initiator (SE2) "Pallet present" is not tripped. Coordinate measuring machine not in the safety position. The compressed air has been switched off at the air conditioner. Check the pallet position. Check the position of the coordinate measuring machine. Check the compressed air.	Operator
Lifting beam is not lowered	Dirt under the guide. Hoses are kinked. Guide is blocking the beam. Cleaning und check by the operator. Replacement of the hoses and releasing of the clamp by specialist personnel.	Operator / specialist personnel
Eccentric rollers do not brake the pallet.	Adjustment of the eccentric rollers.	Specialist personnel
Sensors and pressure switches do not switch correctly	Check the sensors and pressure switches.	Specialist personnel

Error	Cause/Remedy	Correction by
Pallet requires a large amount of pushing force.	Check the castors. Replace if worn. Check the rollers for free movement and foreign matter. Check the level of the rollers and adjust as required. Check by the operator. Have it adjusted by a qualified person.	Operator / specialist personnel
Pallet lock jammed	Clean and readjust, if necessary.	Cleaning by the operator. Have it adjusted by a qualified person.

5.8.2 Loading table (option)

Error	Cause/Remedy	Correction by
Eccentric rollers do not brake the pallet.	Adjustment of the eccentric rollers.	Specialist personnel
Pallet is skewed or wobbly at the loading table.	Adjustment of the roller strip.	Specialist personnel
Pallet requires a large amount of pushing force.	Check the castors. Replace if worn. Check the rollers for free movement and foreign matter. Check the level of the rollers and adjust as required. Check by the operator. Have it adjusted by a qualified person.	Operator / specialist personnel
Pallet lock jammed	Clean and readjust, if necessary.	Cleaning by the operator. Have it adjusted by a qualified person.

5.8.3 Rotating loading station (option)

Error	Cause/Remedy	Correction by
The rotating loading station cannot be turned. Check the manual lock.	Check whether the securing bolt is free.	Operator
Pallet clamped at the securing bolt	Check whether the rotating loading station is in transfer position.	Operator
Pallet is skewed or wobbly at the set-up position.	Adjustment of the roller strip.	Specialist personnel

Error	Cause/Remedy	Correction by
Pallet requires a large amount of pushing force.	Check the castors. Replace if worn. Check the rollers for free movement and foreign matter. Check the level of the rollers and adjust as required. Check by the operator. Have it adjusted by a qualified person.	Operator / specialist personnel
Lock jammed	Clean and readjust, if necessary.	Cleaning by the operator. Have it adjusted by a qualified person.

5.8.4 Pallet transport carriage (option)

Error	Cause/Remedy	Correction by
Eccentric rollers do not brake the pallet.	Adjustment of the eccentric rollers.	Specialist personnel
Pallet is skewed or wobbly at the pallet transport carriage.	Adjustment of the roller strip.	Specialist personnel
Pallet requires a large amount of pushing force.	Check the castors. Replace if worn. Check the rollers for free movement and foreign matter. Check the level of the rollers and adjust as required. Check by the operator. Have it adjusted by a qualified person.	Operator / specialist personnel
Pallet transport carriage is not locked to the docking unit.	Check the function of the roller lever valve of the docking unit.	Check by the operator. Must be adjusted by specialist personnel
Pallet transport carriage cannot be disconnected from the docking unit.	Check the function of the roller lever valves on the pallet supply system Check whether the pallet is completely on the pallet transport carriage or pallet supply system.	Operator
Large force required to move the pallet transport carriage.	Check direction of the transport rollers; the front fixed castors should be parallel to one another. Check whether the steering castors (with locking unit) move freely and can be aligned in travel direction. Check for foreign matter in the rollers Check the floor coverings; the floor covering for the transport rollers must not be soft.	Operator
Pallet lock jammed	Clean and readjust, if necessary.	Cleaning by the operator. Have it adjusted by a qualified person.

5.8.5 Loading table with ball rollers (option)

Error	Cause/Remedy	Correction by
Pallet is skewed or wobbly at the loading table with ball rollers.	Adjustment of the rollers.	Specialist personnel
Pallet requires a large amount of pushing force.	Check the castors. Replace if worn. Check the rollers for free movement and foreign matter. Check the level of the rollers and adjust as required. Check by the operator. Have it adjusted by a qualified person.	Operator / specialist personnel
Pallet lock jammed	Clean and readjust, if necessary.	Cleaning by the operator. Have it adjusted by a qualified person.
Shuttle is unplugged and cannot be unlocked.	Check whether there is compressed air. Check whether the cylinder of the pallet lock travels upwards. Check whether the shuttle locking cylinder has compressed air. Check the energy chain for any kinks in the hoses. Check whether the pallet supply system cylinder and pallet cylinder to the pallet supply system have switched at the shuttle. Adjust the cylinder or replace the defective valve, as required.	Check by the operator. Correction by qualified personnel.

5.8.6 Shuttle station (option)

Error	Cause/Remedy	Correction by
Eccentric rollers do not brake the pallet.	Adjustment of the eccentric rollers.	Specialist personnel
Pallet requires a large amount of pushing force.	Check the castors. Replace if worn. Check the rollers for free movement and foreign matter. Check the level of the rollers and adjust as required. Check by the operator. Have it adjusted by a qualified person.	Operator / specialist personnel
Pallet lock jammed	Clean and readjust, if necessary.	Cleaning by the operator. Have it adjusted by a qualified person.

Error	Cause/Remedy	Correction by
Pallet has too much play when being moved onto the shuttle (> 3 mm).	Readjust or replace the sliding rails.	Specialist personnel
Pallet is skewed or wobbly at the setup station.	Adjustment of the roller strip.	Specialist personnel
Large amount of force required to move the shuttle.	Check whether there are any foreign objects under the supporting wheel or else adjust it. Check the guide rail and carriage for any foreign objects, oil the rail if necessary. The guide carriages are lubricated for life. Check the junction points if there are multiple rails, adjust the rail as required; all rails must be at the same level. Check the rollers for any foreign objects, replace as necessary.	Check by the operator. Correction by qualified personnel.

5.9 Switching off

It is important to switch the system off with the pallet lowered, as the reference point travel of the coordinate measuring machine only takes place if the pallet supply system issues a release to the coordinate measuring machine.

1. Close all active processes.
2. Switch off the coordinate measuring machine (see coordinate measuring machine operating instructions).
3. Switch off the air conditioner.
4. Switch off the compressed air supply of the thermal protection cab.
5. Switch off the compressed air supply to the loader.

5.10 Events and messages

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6 Cleaning and maintenance

Cleaning and maintenance work must only be performed by instructed personnel and after switching off of the system.

Chapter 2 of these operating instructions must have been read and understood before cleaning and maintenance tasks are performed.

6.1 Cleaning and care

The system must always be kept in a clean condition. It must always be kept free of tools, liquids, chips and swarf or any other foreign substances.

The rags and materials that are used must be handled and disposed of correctly, especially when cleaning with solvents.

⚠ DANGER

Danger to life due to electric voltage.

Risk of electric shock inside the electrical installations.

- Electrical installations must only be opened by authorised specialist personnel of the manufacturer who have the correct electrical knowledge.
- Before opening of electrical installations, the power supply must be safely switched off and secured to prevent reactivation (e.g. with a padlock on the main switch).
- Do not use any liquids in the are of electrical installations.

Do not use dampened rags when cleaning near electrical currents. However, if cleaning is necessary, the system must first be switched to a voltage-free state, otherwise there is a danger of death.

As a rule, the following applies:

Dusty parts must be cleaned by wetting, never rub dust off with a dry cloth! Mild soap or mild detergent in lukewarm water and a soft cloth, sponge or chamois leather must be used.

Exempt from this are steel parts. Steel parts must not be moist-wiped.

If water cannot be used for cleaning, e.g. during installation work, a damp cloth or chamois leather may be carefully used (avoiding scouring).

Vacuuming of the system is permitted provided the suction nozzle does not cause electrostatic charging and does not come into contact with any parts.

Not to be used:

– Abrasives or caustic/degreasing cleaning agents.
– Hard sponges or brushes.
– Chemicals such as acetone, carbon tetrachloride, methyl ethyl ketone, paint thinner or alcohol compounds with more than 5 % alcohol.
– Compressed air for cleaning by blowing off.

6.2 Maintenance

Only use original parts when replacing parts and spare parts.

6.2.1 Coordinate measuring machine

You can find detailed information on the maintenance work for the coordinate measuring machine in the operating manual of the coordinate measuring machine.

6.2.2 Pallet supply system

Interval	Task	Perform by
Daily	Check the set operating pressure at the maintenance unit. Listening check of the connections and lines for escaping air.	Operator
Daily	Visual inspection of the filter control valve at the inspection glass. If necessary, drain liquid.	Operator
Daily	Visual inspection of the end stops for wear. Have them replaced by specialist personnel if required.	Operator / specialist personnel
Daily	Check that the rollers function properly.	Operator
Monthly	Cleaning of all surfaces.	Operator
Monthly	Cleaning of the 3-point ball supports. – Remove any loose balls – Clean the seat – Insert the balls again	Operator
Monthly	Visual inspection of the eccentric rollers for wear. Have them replaced by specialist personnel if required.	Operator / specialist personnel
Monthly	Check the pneumatic system for any leaks. Check the lines for damage such as signs of rubbing, scoring and kinking. Replace any damaged lines at once.	Specialist personnel

Interval	Task	Perform by
Monthly	Clean the filter insert in the maintenance unit, replace it if necessary. Replace the silencer as well if necessary.	Specialist personnel
Half-yearly	Check the sliding strips and guides at the crossbeam and lifting beam for wear, adjust as required.	Specialist personnel
Half-yearly	Pneumatic cylinders: Checked that the screwed and bolted connections and the hoses are done up tightly. Check for leaks.	Specialist personnel
Yearly	Check the sliding rails for pallets for wear and, if necessary, arrange for specialists to replace them.	Operator / specialist personnel
Yearly	Check that the rollers function properly and are not dirty.	Specialist personnel
Yearly	Check the pallet supply system for corrosion and any signs of fatigue in the fastenings. During repair work, replace safety elements (e.g. split pins, safety nuts) with new ones.	Specialist personnel
Yearly	Check all screw connections and earth anchors for tightness. Defective parts must be repaired or replaced.	Specialist personnel
As necessary	The installation location around and below the pallet supply system must be kept clean.	Operator
As necessary	Clean initiators (do not use dirty or lint-containing cloths. Do not use solvent or other liquids).	Operator
As necessary	Clean the lifting beam. Adjust as required (specialist personnel)	Operator / specialist personnel
As necessary	Replace any ball bearings and rollers that are worn or defective.	Specialist personnel

6.2.3 Loading table (option)

Interval	Task	Perform by
Daily	Visual inspection of the end stops for wear. Have them replaced by specialist personnel if required.	Operator / specialist personnel
Daily	Check that the rollers function properly.	Operator
Monthly	Cleaning of all surfaces.	Operator
Monthly	Visual inspection of the eccentric rollers for wear. Have them replaced by specialist personnel if required.	Operator / specialist personnel
Yearly	Check the sliding rails for pallets for wear and, if necessary, arrange for specialists to replace them.	Operator / specialist personnel
Yearly	Check that the rollers function properly and are not dirty.	Specialist personnel
Yearly	Check the loading table for corrosion and any signs of fatigue in the fastenings. During repair work, replace safety elements (e.g. split pins, safety nuts) with new ones.	Specialist personnel
Yearly	Check all screw connections and earth anchors for tightness. Defective parts must be repaired or replaced.	Specialist personnel
As necessary	The installation location around and below the loading table must be kept clean.	Operator
As necessary	Replace any ball bearings and rollers that are worn or defective.	Specialist personnel

6.2.4 Rotating loading station (option)

Interval	Task	Perform by
Daily	Visual inspection of the end stops for wear. Have them replaced by specialist personnel if required.	Operator / specialist personnel
Daily	Check that the rollers function properly.	Operator
Monthly	Cleaning of all surfaces.	Operator
Yearly	Check the sliding rails for pallets for wear and, if necessary, arrange for specialists to replace them.	Operator / specialist personnel
Yearly	Check that the rollers function properly and are not dirty.	Specialist personnel
Yearly	Check the rotating loading station for corrosion and any signs of fatigue in the fastenings. During repair work, replace safety elements (e.g. split pins, safety nuts) with new ones.	Specialist personnel
Yearly	Check all screw connections and earth anchors for tightness. Defective parts must be repaired or replaced.	Specialist personnel
As necessary	The installation location around and underneath the rotating loading station must be kept clean.	Operator
As necessary	Replace any ball bearings and rollers that are worn or defective.	Specialist personnel

6.2.5 Pallet transport carriage (option)

Interval	Task	Perform by
Daily	Visual inspection of the end stops for wear. Have them replaced by specialist personnel if required.	Operator / specialist personnel
Daily	Check that the rollers function properly.	Operator
Monthly	Cleaning of all surfaces.	Operator
Monthly	Visual inspection of the eccentric rollers for wear. Have them replaced by specialist personnel if required.	Operator / specialist personnel
Yearly	Check the sliding rails for pallets for wear and, if necessary, arrange for specialists to replace them.	Operator / specialist personnel
Yearly	Check that the rollers function properly and are not dirty.	Specialist personnel
Yearly	Check the pallet transport carriage for corrosion and any signs of fatigue in the fastenings. During repair work, replace safety elements (e.g. split pins, safety nuts) with new ones.	Specialist personnel
Yearly	Check all screw connections and earth anchors for tightness. Defective parts must be repaired or replaced.	Specialist personnel
As necessary	The installation location around and below the pallet transport carriage must be kept clean.	Operator
As necessary	Replace any ball bearings and rollers that are worn or defective.	Specialist personnel

6.2.6 Loading table with ball rollers (option)

Interval	Task	Perform by
Daily	Check that the rollers function properly.	Operator
Monthly	Cleaning of all surfaces.	Operator
Yearly	Check the sliding rails for pallets for wear and, if necessary, arrange for specialists to replace them.	Operator / specialist personnel
Yearly	Check that the rollers function properly and are not dirty.	Specialist personnel
Yearly	Check the loading table with ball rollers for corrosion and any signs of fatigue in the fastenings. During repair work, replace safety elements (e.g. split pins, safety nuts) with new ones.	Specialist personnel
Yearly	Check all screw connections and earth anchors for tightness. Defective parts must be repaired or replaced.	Specialist personnel
As necessary	The installation location around and below the loading table with ball rollers must be kept clean.	Operator
As necessary	Replace any ball bearings and rollers that are worn or defective.	Specialist personnel

6.2.7 Shuttle station (option)

Interval	Task	Perform by
Daily	Visual inspection of the end stops for wear. Have them replaced by specialist personnel if required.	Operator / specialist personnel
Daily	Check that the rollers function properly.	Operator
Monthly	Cleaning of all surfaces.	Operator
Monthly	Visual inspection of the eccentric rollers for wear. Have them replaced by specialist personnel if required.	Operator / specialist personnel
Yearly	Check the sliding rails for pallets for wear and, if necessary, arrange for specialists to replace them.	Operator / specialist personnel
Yearly	Check that the rollers function properly and are not dirty.	Specialist personnel
Yearly	Check the shuttle station for corrosion and any signs of fatigue in the fastenings. During repair work, replace safety elements (e.g. split pins, safety nuts) with new ones.	Specialist personnel
Yearly	Check all screw connections and earth anchors for tightness. Defective parts must be repaired or replaced.	Specialist personnel
As necessary	The installation location around and below the shuttle station must be kept clean.	Operator
As necessary	Replace any ball bearings and rollers that are worn or defective.	Specialist personnel
As necessary	Check the linear slides at the rubbing areas. The linear slide must be free of any foreign bodies.	Operator

7 Decommissioning and disposal

7.1 Disposal and recycling

Decommissioning and disposal may only be performed by specialist personnel authorised by the manufacturer adhering to the respective accident prevention regulations. When disposing of the system, ensure materials are correctly sorted taking into consideration the relevant national and regional waste disposal regulations.

1. Run the system until empty.
2. Switch the system off (see 5.9).
3. Remove the electrical and compressed air service lines:
4. Remove loose parts.
5. Attach transport securing devices.

7.2 Storage instructions

If the system is to be put into storage, the storage area must be dry and free of dust. The recommended storage temperature is between +5°C and +50°C. The system must be placed on a flat and level surface. Unpainted metal surfaces should be protected against rust using an acid-free oil film. The system must be covered.