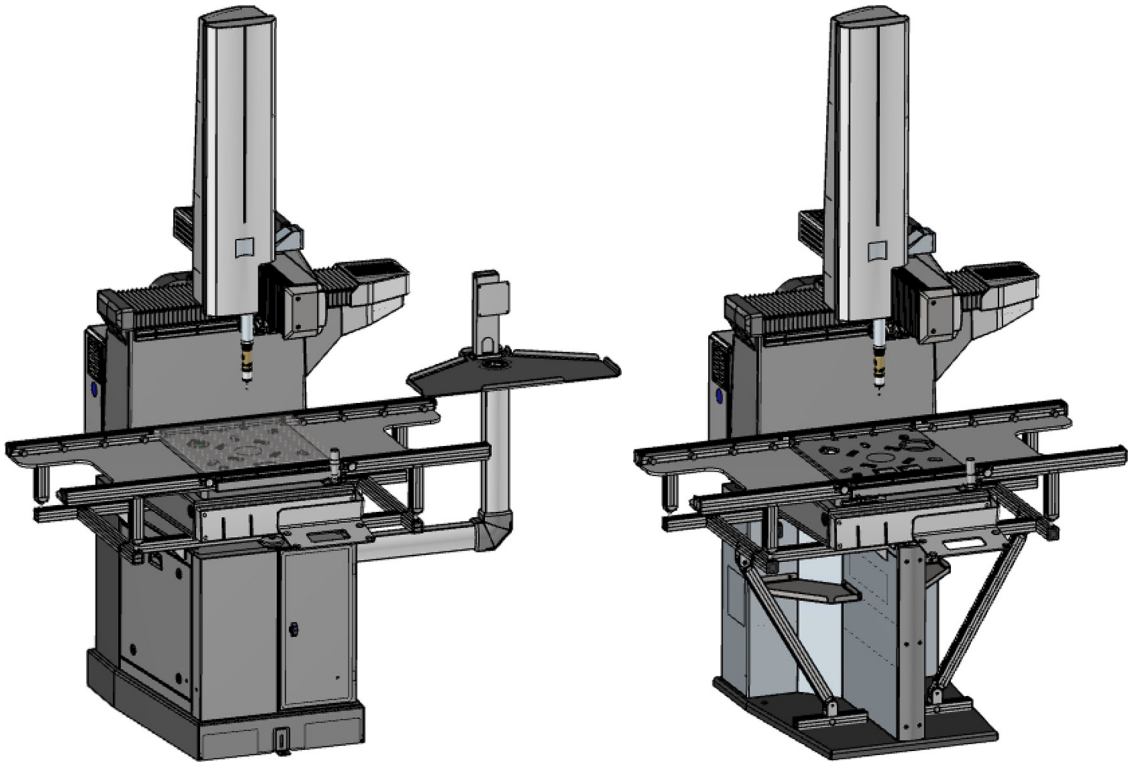

DuraMax with Duplex system

Coordinate measuring machine with manual loader

Operating Instructions
(translation)

ZEISS

Product information

System	DuraMax with Duplex system
Machine type	Coordinate measuring machine with manual loader
Material numbers	602703-9010-000, 602703-9010-100, 602703-9000-100, 602703-9000-200, 602703-9000-300

Document version

Item no. Document	Version	Date	Note
DuraMax-Duplex_OIM	1.0	2019-03-12	Invalid
DuraMax-Duplex_OIM	2.0	2019-03-25	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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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 a declaration of conformity, which asserts the conformity of the coordinate measuring machine with the EC-Machinery Directive 2006/42/EC:

It is an EC Declaration of Conformity in accordance with the EC-Machinery Directive 2006/42/EC Annex II no. 1A.

We hereby declare that the system designated below complies with the requirements of EC-Directive 2006/42/EC and the other EC directives listed below, due to its design and construction as well as in respect of the version which we have placed on the market.

In the event of a modification not previously agreed with the manufacturer, this declaration loses its validity.

Designation	DuraMax with Duplex system
Machine type	Coordinate measuring machine with manual loader
Additional EC directives	– EMC Directive (2014/30/EU) – RoHS Directive (2011/65/EU)

Applied standards, in particular:

- EN 60204-1
- EN 61326-1 Table 2, Class A
- EN 61010-1
- EN ISO 12100

The name plate is located on the right side of the coordinate measuring machine.

Details on the name plate:

– Project name

– Opportunity number

– Serial number of the coordinate measuring machine

– Year of manufacture

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 further information, the following manuals and guides must also be observed:

- Coordinate measuring machine installation instructions
- Coordinate measuring machine operating instructions
- Control console operating 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, 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 know the relevant standards, provisions and accident prevention regulations as well as the prevailing 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 goggles when cleaning (if required for the cleaning agent being used)
- Safety helmet when transporting overhead loads

2.6 Safety equipment

2.6.1 Pictograms

Pictograms are attached to the system as shown below.

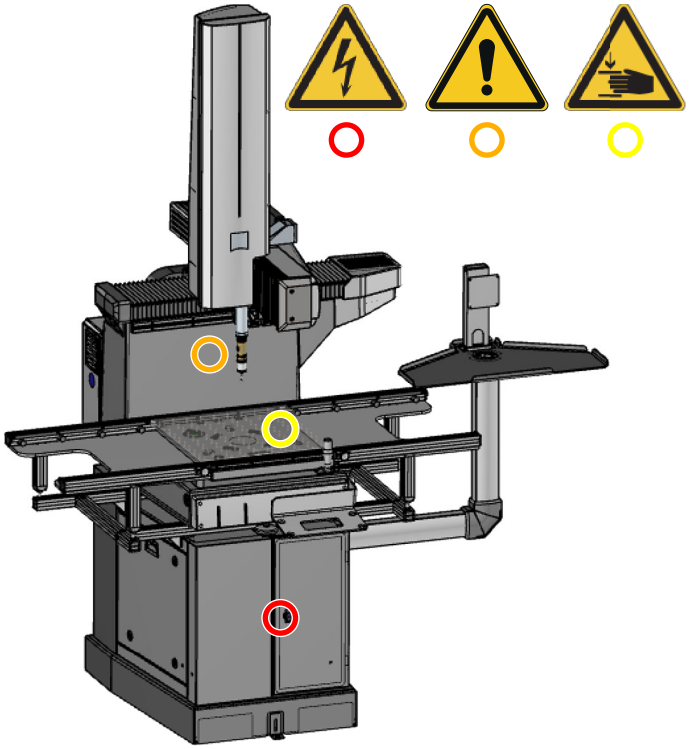

Fig. 1 Pictograms (illustration as an example)

2.6.2 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.

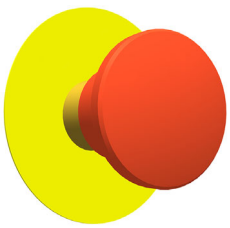

Fig. 2 Emergency stop button

Emergency stop buttons on the system:

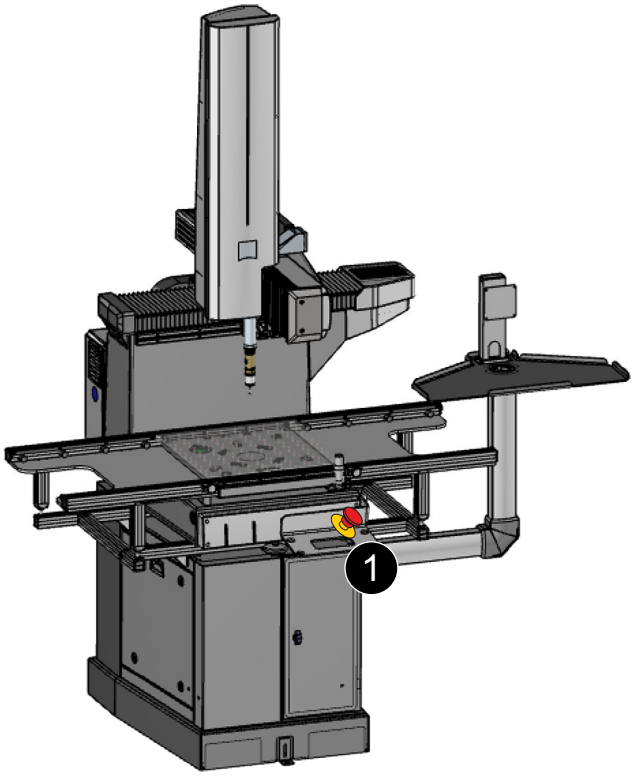

Fig. 3 Emergency stop button on the system (illustration as an example)

1 On the control console of the coordinate measuring machine

2.6.3 Safety equipment for duplex system

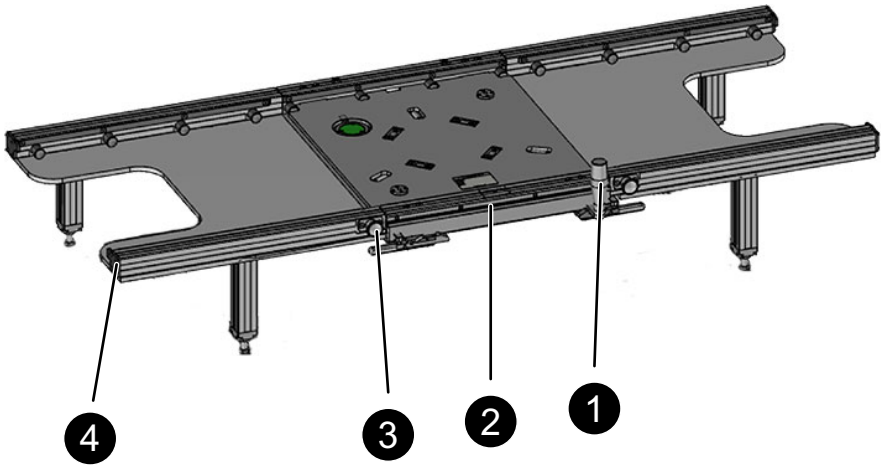

Fig. 4 Safety equipment for duplex system (illustration as an example)

1 Hand lever for lifting/lowering, with lock and rotation brake

2 Brush strip as protection against reaching in

3 Bolt as a pallet lock in the direction of the measuring position

4 End stop to secure the pallet on the loader

2.7 Safety functions

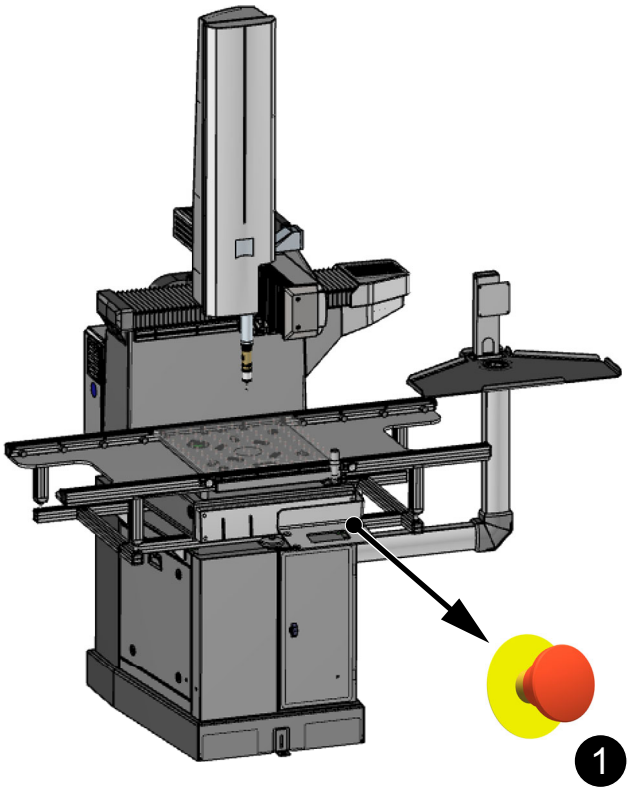

Fig. 5 Safety functions

No.	Safety function (SF)	Localisation	PL required	Achieved PL and category	Stops dangerous elements
1	Emergency stop	Control console	PLr c	PLr c, cat. 3	Coordinate measuring machine

2.8 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 2.8.1).
2	Operator	Normal operation and cleaning (see 2.8.2).
3	Set-up personnel	Set-up work, retooling and maintenance (see 2.8.2).
4	Authorised specialist personnel	Assembly, installation, service und dismantling (see 2.8.3)

2.8.1 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.

2.8.2 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 between the loading and measuring position of the pallet supply system
– The operator raises and lowers the pallet on the measuring position using a hand lever.
– The operator starts and stops measuring operation of the coordinate measuring machine.

The operator may not:

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

2.8.3 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. 6 Securing against reactivation – padlock on the main switch (illustration as an example)

2.9 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 5.8).

2.9.1 Note on residual risks

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.

⚠ CAUTION

Risk of injury due to manual movements.

Crushing, striking, shearing off of fingers and hands at the recess for the reference sphere.

– 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 just one instructed person. Other persons must keep away from the loader.

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.

2.9.2 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 workpieces are to be measured on the coordinate measuring machine. The workpieces are supplied to the coordinate measuring machine on a ZEISS pallet with customer-specific part fixtures supplied.

There is a Duplex system on the coordinate measuring machine. This is used to manually set up pallets, push them into the measuring range of the CMM and lower them into the measuring position. Pallets are raised again after measurement and then transported out of the CMM measurement area.

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)

Preconditions for intended use:

- Only parts may be measured whose lengths and widths do not protrude from the pallet and whose height is within the measurement area.
- 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.
- The installation instructions, local conditions, the correct energy connections and the service and maintenance work must all be adhered to/carried out to ensure safe operation.
- 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 chapter “3.1 Intended use”. Any other use or form of use other than that intended shall be regarded as improper. The manufacturer does not accept any liability for damage arising from such use.

Particular examples of misuse:

- Operation by personnel who have not been instructed
- CMM operation by more than one person
- Setting up with multiple people in one set-up position
- 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 documentation

3.3 Scope of supply

The following components form part of the scope of supply:

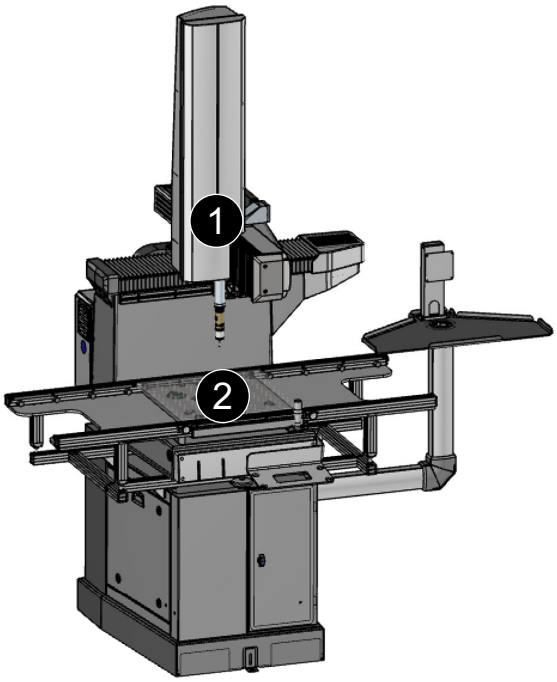

Fig. 7 Scope of supply (illustration as an example)

1 Coordinate measuring machine

2 Duplex system

3.4 Parts and function

3.4.1 Coordinate measuring machine

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 measurement data can be used to calculate the position of holes. Moreover the shape of parts can be determined using special software.

The control system which contains all the components necessary for operation – such as power supply units, fuses, control elements, etc. – is integrated into the coordinate measuring machine.

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

3.4.2 Duplex system

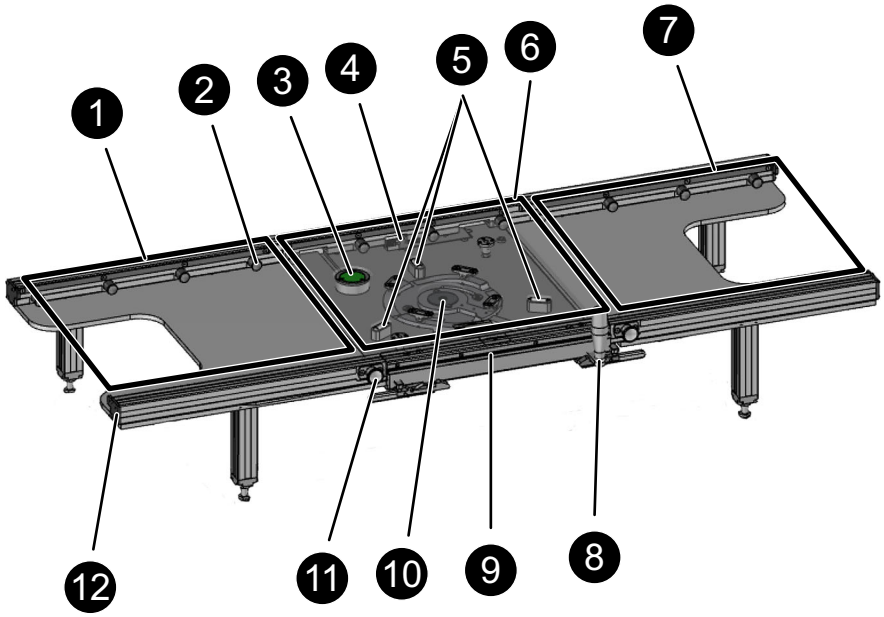

Fig. 8 Duplex system (illustration as an example)

1 Set-up position 1

2 Roller

3 Temperature sensor (option)

4 Query pallet lowered (travel release for coordinate measuring machine to measure the workpiece)

5 Pallet measuring support

6 Measuring position of the pallet

7 Set-up position 2

8 Base frame

9 Hand lever for lifting/lowering, with lock and rotation brake

10 Brush strip as protection against reaching in

11 Rotation brake

12 Bolt as a pallet lock in the direction of the measuring position

13 End stop to secure the pallet on the loader

3.4.3 Operating principle

Test parts are manually placed down, aligned and fixed onto a clamping device. The pallet is then pushed from the set-up position into the measurement area of the coordinate measuring machine and lowered with the hand lever. The measuring procedure may start. Once the test part has been measured, it is returned to the set-up position in reverse order to the above.

3.4.4 System sections

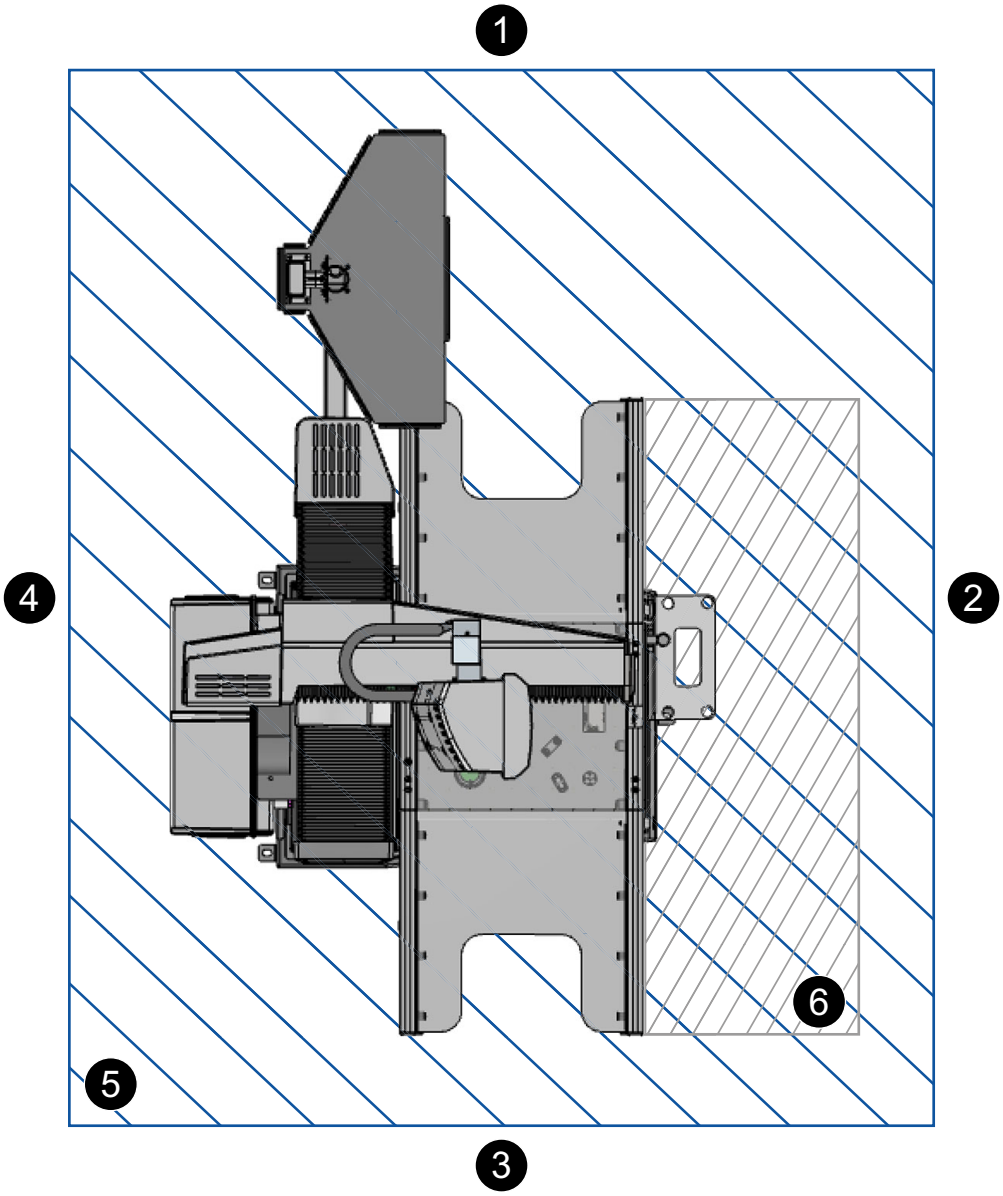

Fig. 9 System sections (illustration as an example)

1 Right side

2 Front

3 Left side

4 Rear

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

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

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	
Ambient temperature	see coordinate measuring machine operating instructions
Relative humidity	
Airborne noise	
Pallet weight	Approx. 15 kg
Pallet dimensions (L x W x H)	500 mm x 500 mm x 20 mm
Max. handling weight (pallet + device + workpiece)	25 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.

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

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.

4.2 Installation

The ambient parameters in the technical data 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 supplies must be connected by specialist personnel authorised by the manufacturer according to the circuit diagrams. The electrical connection must be a mains connection cable with a country-specific earthed plug and an IEC-60320 socket.

The following documents must also be considered:

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

4.2.3 Coordinate measuring machine

See coordinate measuring machine installation instructions.

4.2.4 Duplex system

Tools

- Allen key set
- T-handle Allen key size 5
- Drilling machine
- Drill Ø 5 mm, 6.5 mm and 8.5 mm
- 90° countersink
- Spirit level (approx. 600 mm)
- M6 and M8 screw taps
- Open-jaw wrench W/F 13, 17, 19, 22 and 24
- Prick punch
- Hammer
- Screw clamps

Preparing the coordinate measuring machine

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

Installation with a shop floor frame

1. Clean the installation area on the coordinate measuring machine.
2. The position of the loader on the coordinate measuring machine can be found in the drawing in the technical documentation. The frame for the Duplex system must sit on the shop floor frame symmetrically with the DuraMax.
3. Check the distance between the subframe and the DuraMax. Distance must be 42 mm.
4. Screw off both right-side fixing angles at the base frame.

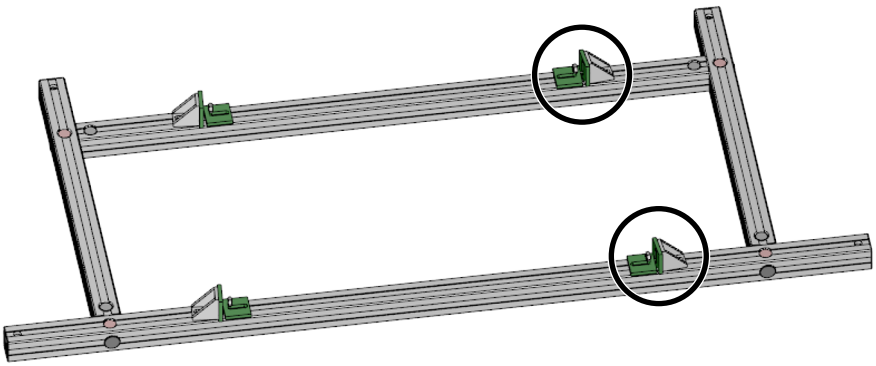

Fig. 7 Screwing off right-side fixing angles (illustration as an example)

5. Loosen the screws of the left fixing angle slightly.

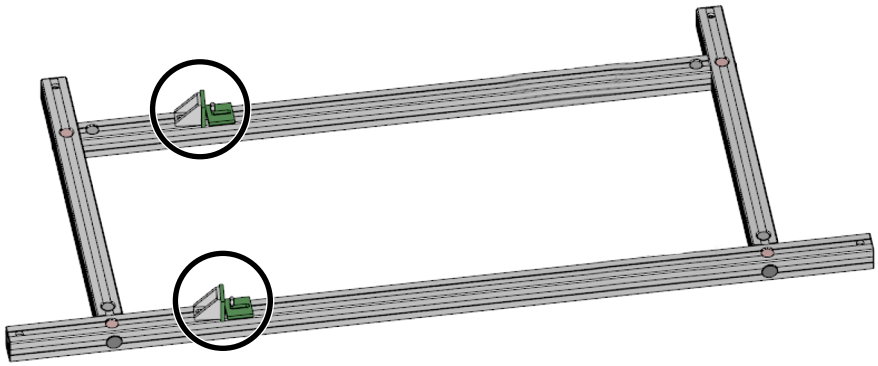

Fig. 8 Undoing the left-side fixing angles (illustration as an example)

6. Push base frame under the DuraMax until the two left angles hit against the shop floor frame with their surfaces designed for this purpose. The vibration-damping plates must be between the angle and the base frame.

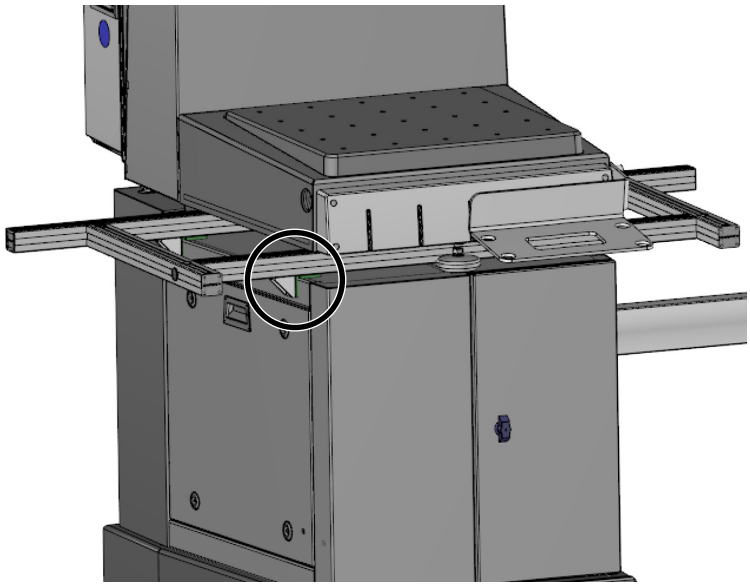

Fig. 9 DuraMax base frame (illustration as an example)

7. Screw the two right fixing angles back on but not tightly. The vibration-damping plates must be between the angle and the base frame.

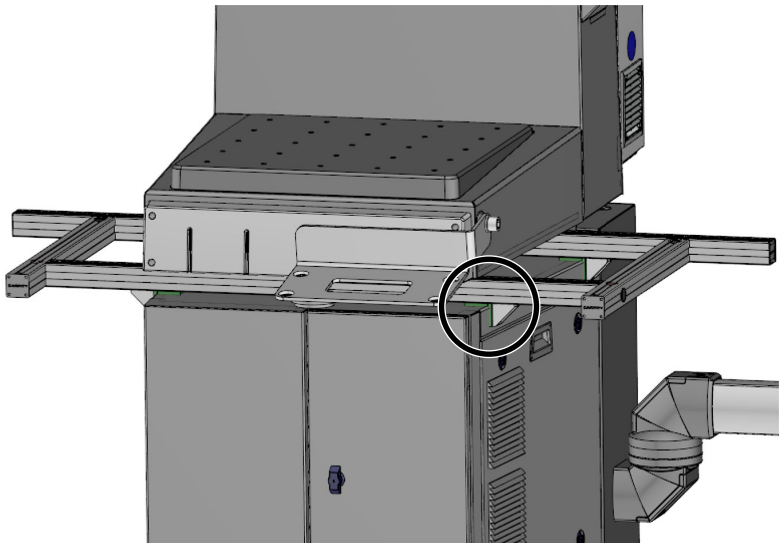

Fig. 10 Screwing on right-side fixing angles (illustration as an example)

8. Use the spirit level to check and, where necessary, readjust the alignment of the granite on the X and Y-axis.

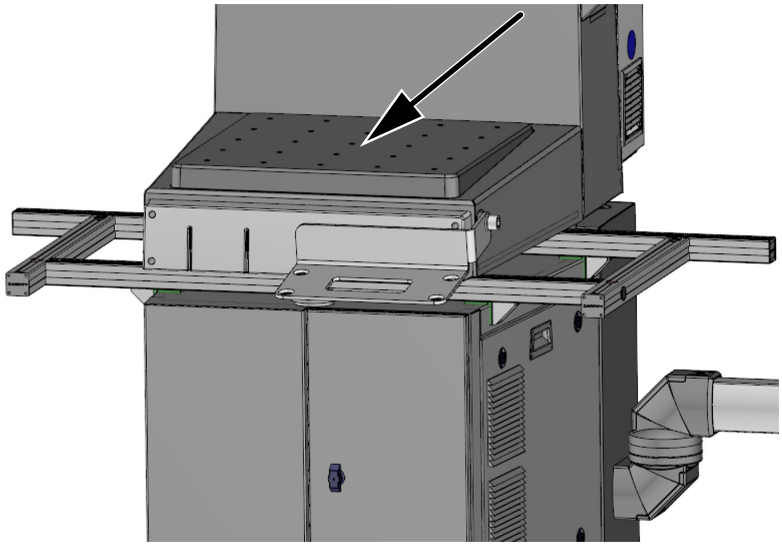

Fig. 11 Check granite plate alignment (illustration as an example)

9. Remove anti-tilt device.

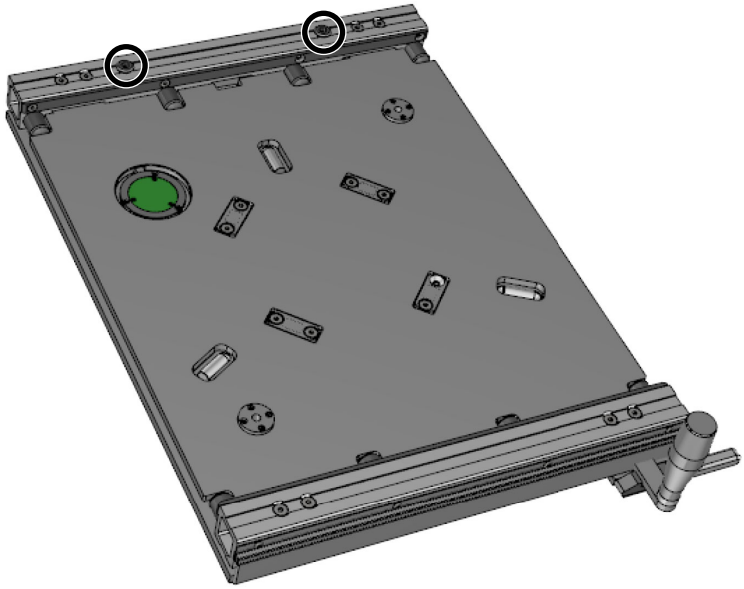

Fig. 12 Removing the anti-tilt device (illustration as an example)

10. Remove the upper part of the lifting unit.
11. Screw the bottom part including lifting plate with the supplied M10x25 screws including locking ring onto the granite. Maintain a distance of 58 mm from front edge to the granite. The granite must be free of dirt and chips.

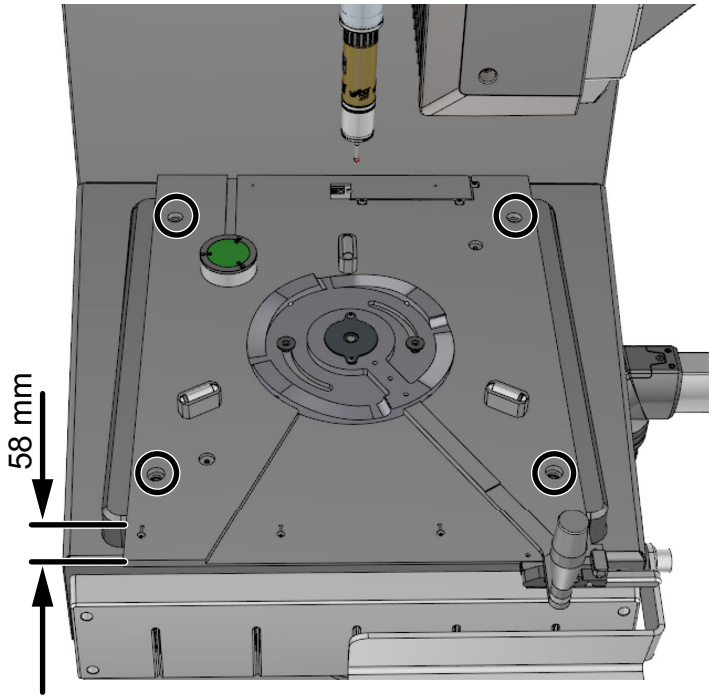

Fig. 13 Fitting the lower part (illustration as an example)

12. Place the lever of the turning plate into the raised position (right) and lock.

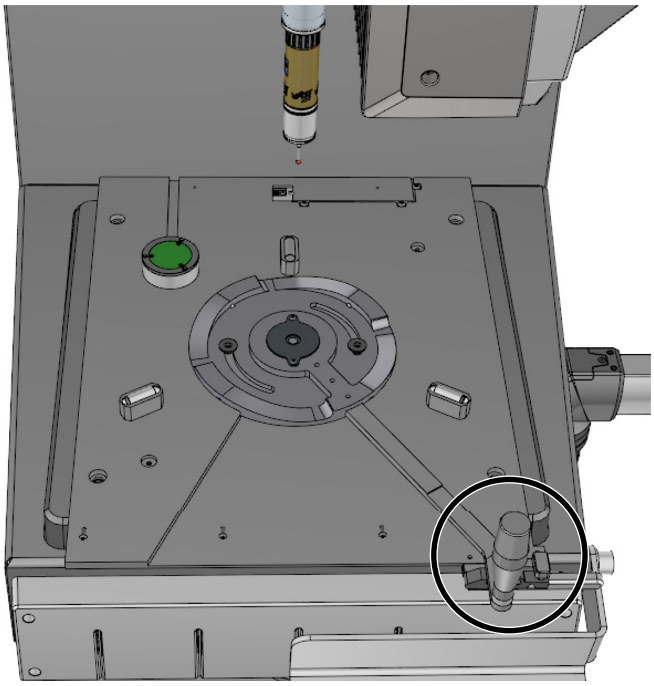

Fig. 14 Locking the lever at the right side (illustration as an example)

13. Put the upper part of the lifting unit into place again and screw on the anti-tilt-device. Place the guide sockets lightly onto the guide pins and do not tilt.

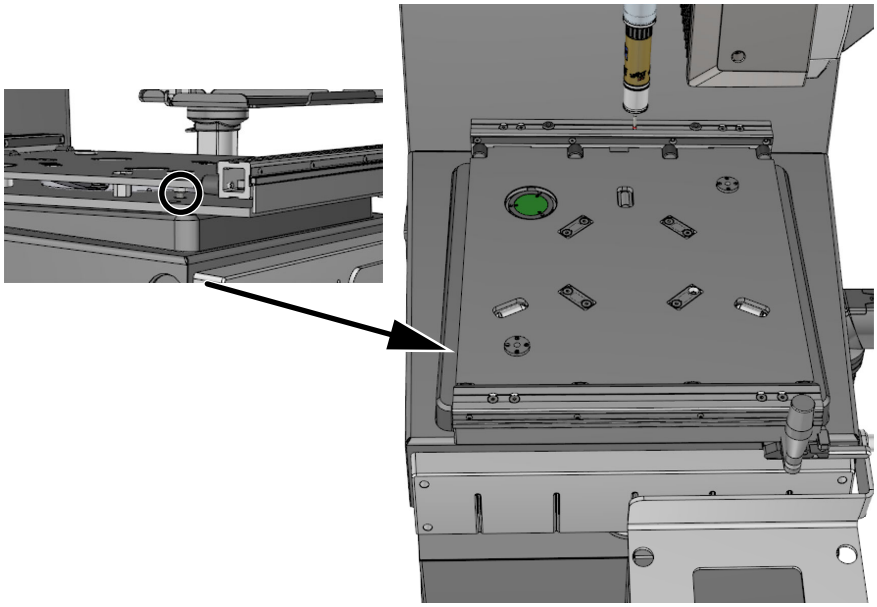

Fig. 15 Fitting the upper part (illustration as an example)

14. Lower the lifting unit and then raise it again to ensure flawless functioning.
15. Secure the base frame against tipping over and shifting with screw clamps.

16. Install both setup stations.
17. Unscrew the adjustment sleeves approx. 20 mm out of the profile.

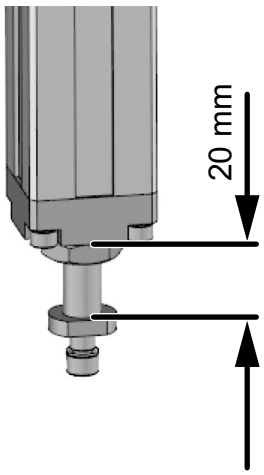

Fig. 16 Screwing out the adjustment sleeves (illustration as an example)

18. Insert the setup station into the designated hole.

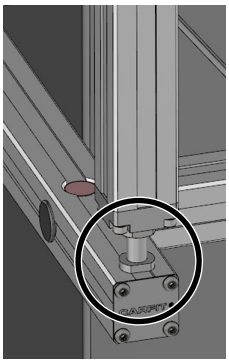

Fig. 17 Put on the setup station (illustration as an example)

19. Attach adjustment sleeves from below (M6x16 screws and locking ring) but do not tighten.

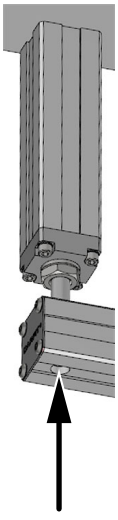

Fig. 18 Fixing the adjustment sleeves (illustration as an example)

20. Remove anti-tilt device.
21. Initially adjust both setup stations with the adjustment sleeves roughly to the height of the lifting unit.
22. Adjust both setup stations with the adjustment sleeves and a spirit level to the height of the lifting unit.
23. Remove the front and rear POM strips at the setup stations and at the lifting unit.

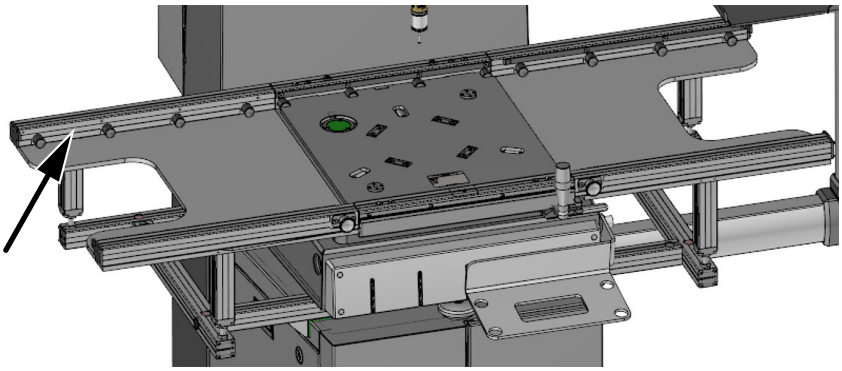

Fig. 19 Remove the POM strips (illustration as an example)

24. Screw the supplied mounting strips with the supplied M5x25 screws with the unpainted side first to the lifting unit then to the setup stations.

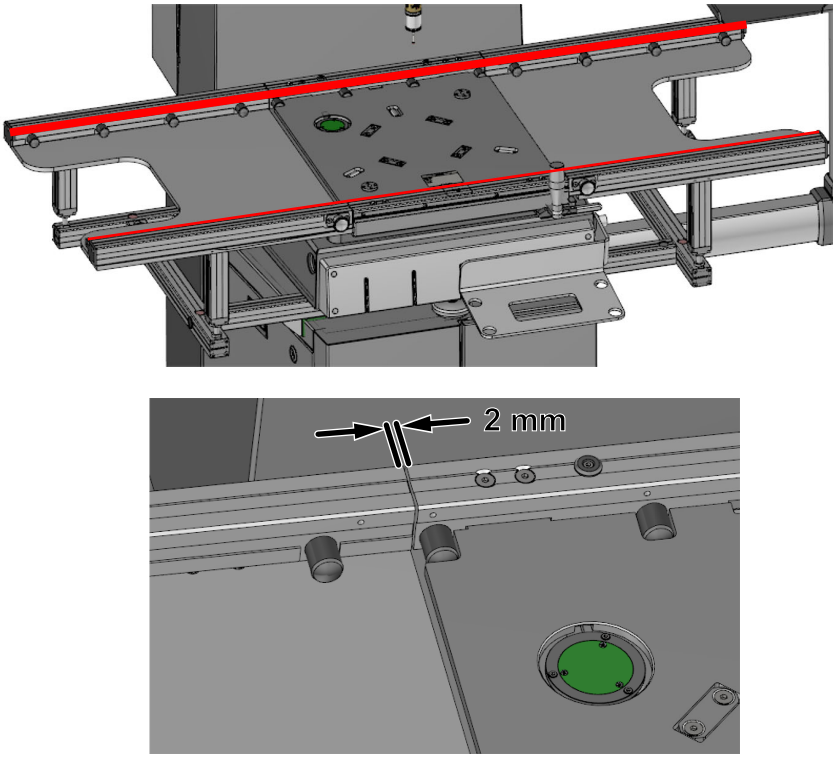

Fig. 20 Installing the mounting strips (illustration as an example)

25. Check the transition points from lifting unit to the setup stations again with the spirit level.

26. Press the four angles with the damping plates against the shop floor frame and attach the screws lightly toward the profile.

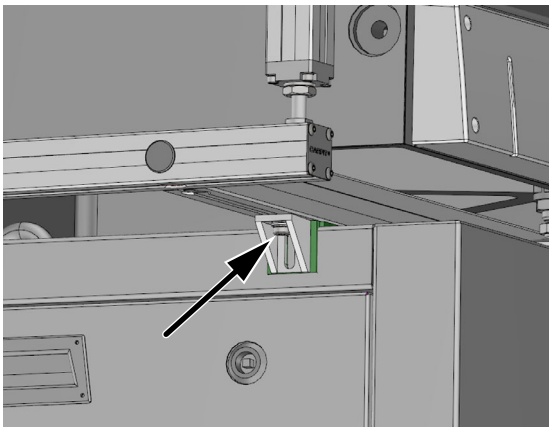

Fig. 21 Angle screwed on to profile (illustration as an example)

27. Mark the hole through the angle. When doing so, make sure that the hole is positioned as centrally as possible in the elongated hole.
28. Attach the 4 angles with the enclosed screws (M8x30 including locking ring) and the M8 nuts to the shop floor frame. To do this, release the top screws of the angle (toward the profile) once more briefly in order to prevent potential warping of the base frame of the feeder.

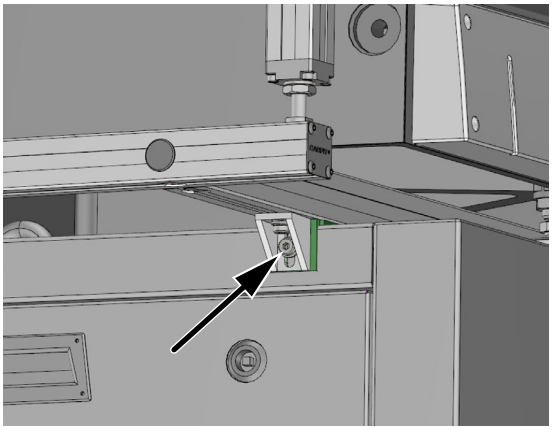

Fig. 22 Angle screwed on to frame (illustration as an example)

29. Firmly tighten all screws at the angle bracktes.

30. Remove the mounting strip.
31. Refit the POM strips.

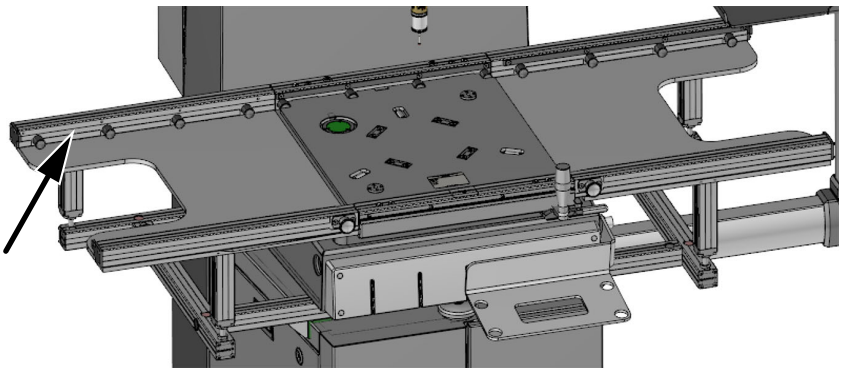

Fig. 23 Fitting the POM strips (illustration as an example)

32. Check the transition points between setup station and lifting unit with a spirit level once more and, if necessary, adjust the heights of the setup stations with the adjustment sleeves.
33. Tighten the counternuts and the screws to fix the adjustment sleeves.

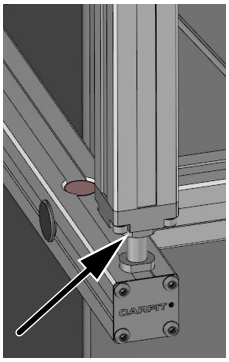

Fig. 24 Fixing the adjustment sleeves (illustration as an example)

34. Screw the M12 plug into the socket designated for this purpose.
35. Put the pallets into place at the setup stations.
    Make sure the direction arrows are at the operator's side.
36. Check pushing-over of the pallets:
    The pushing-over of the pallets from set-up position to measuring position should occur without any noticeable resistance. If the pallet strikes against the rollers of the lifting unit or the setup stations while pushing-over, the transition point must be adjusted once again using the adjustment sleeves.
37. Check lifting and lowering of the pallet:
    The pallet should roll over the bumps without resistance.

Installation with a standard frame

1. Clean the installation area on the coordinate measuring machine.
2. The position of the loader on the coordinate measuring machine can be found in the drawing in the technical documentation.
3. Check the distance between the subframe and the DuraMax. Distance must be 42 mm.
   The distance can be set using the three adjustable feet.

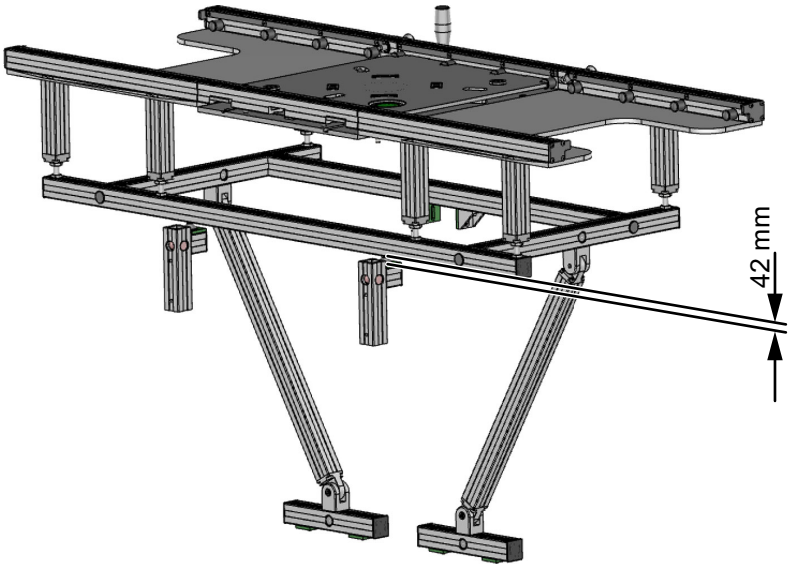

Fig. 25 Screwing off right-side fixing angles (illustration as an example)

4. Use the spirit level to check and, where necessary, readjust the alignment of the granite on the X and Y-axis.

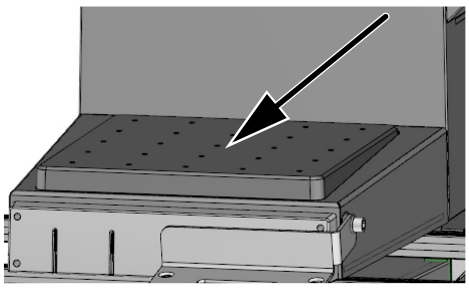

Fig. 26 Check granite plate alignment (illustration as an example)

5. Remove anti-tilt device.

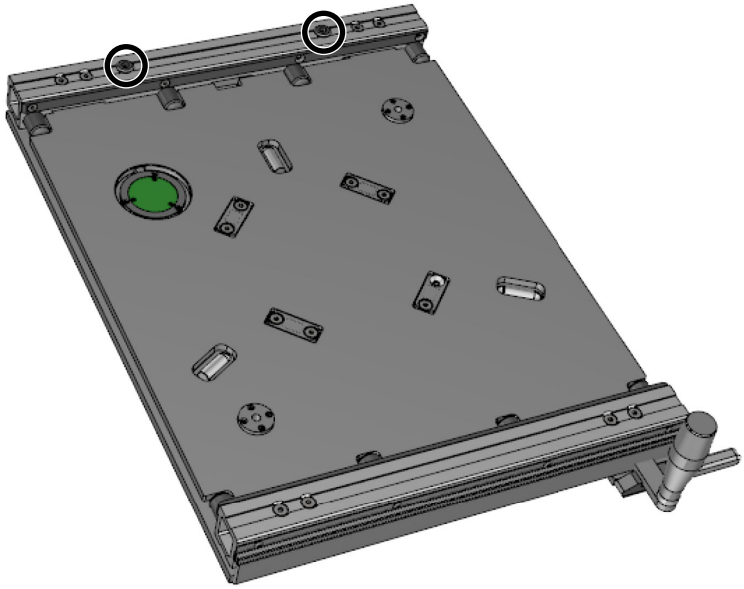

Fig. 27 Removing the anti-tilt device (illustration as an example)

6. Remove the upper part of the lifting unit.
7. Screw the bottom part including lifting plate with the supplied M10x25 screws including locking ring onto the granite. Maintain a distance of 58 mm from front edge to the granite. The granite must be free of dirt and chips.

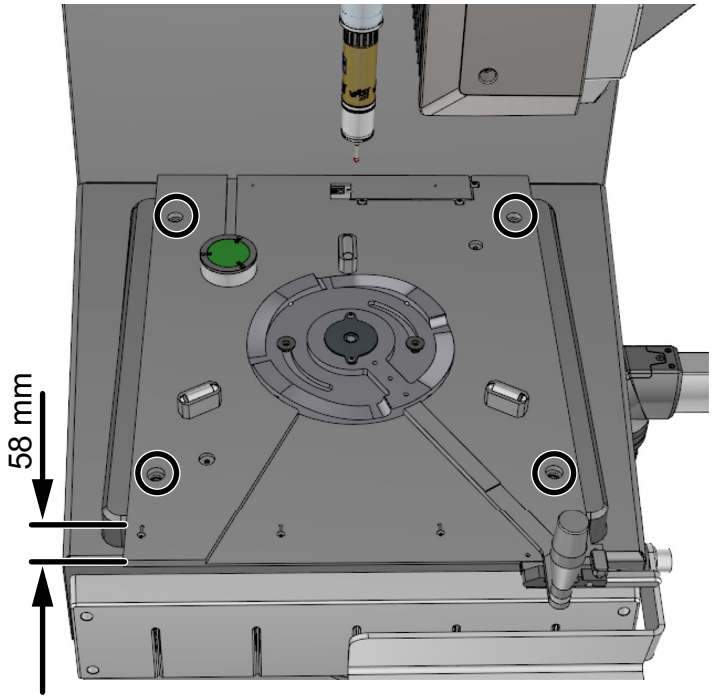

Fig. 28 Fitting the lower part (illustration as an example)

8. Place the lever of the turning plate into the raised position (right) and lock.

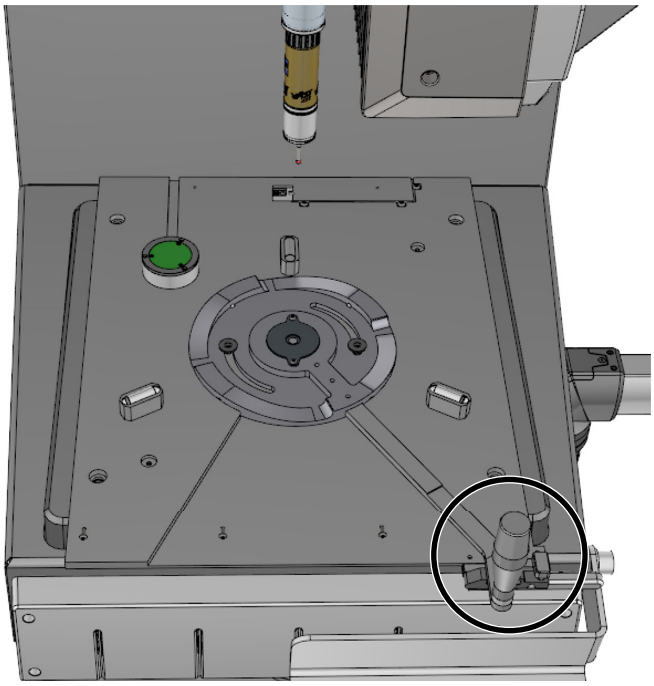

Fig. 29 Locking the lever at the right side (illustration as an example)

9. Put the upper part of the lifting unit into place again and screw on the anti-tilt-device. Place the guide sockets lightly onto the guide pins and do not tilt.

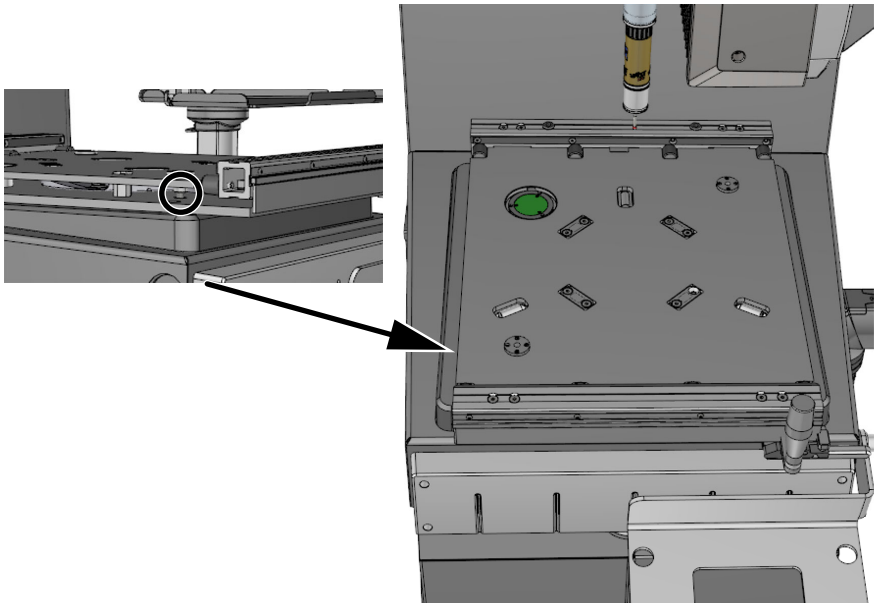

Fig. 30 Fitting the upper part (illustration as an example)

10. Lower the lifting unit and then raise it again to ensure flawless functioning.

11. Screw the rear holder of the base frame onto the base frame of the DuraMax. Introduce M6 thread on both sides as per hole template.

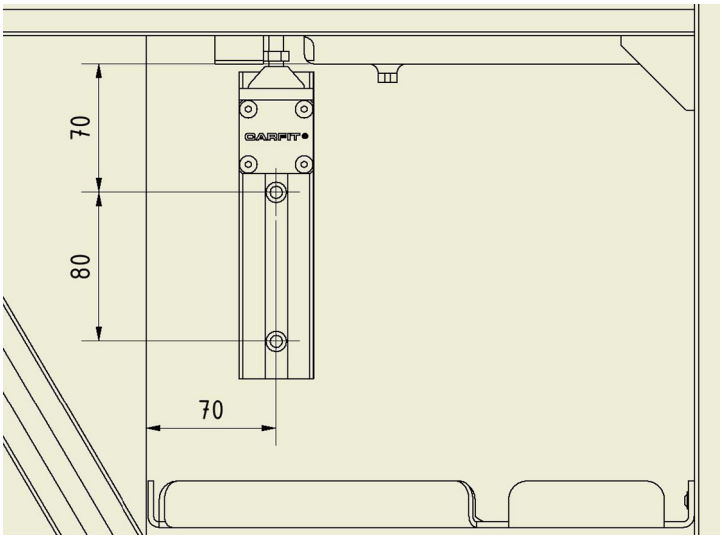

Fig. 31 Hole template

12. Firmly screw down both holders with M6x20-mm screws and locking rings.

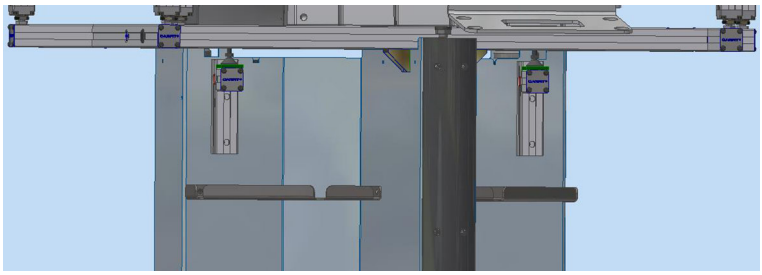

Fig. 32 Screw down holder

13. Unscrew right fixing angle from base frame.

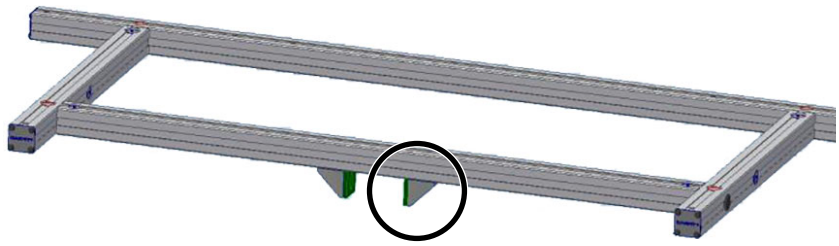

Fig. 33 Unscrew angle

14. Push through the frame between the DuraMax and the subframe until the left fixing angle is on the base frame.
15. Screw the right fixing angle back on but not tightly.

16. Turn both rear adjustable feet out of the profile until they are on the screwed-on holders.
17. Use the spirit level to check the alignment of the base frame and adjust using the two adjustable feet.
18. Screw both setup stations onto the base frame.
19. Unscrew the adjustment sleeves approx. 20 mm out of the profile.

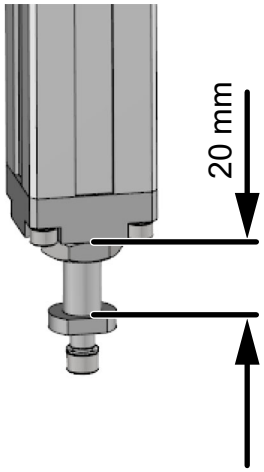

Fig. 34 Screwing out the adjustment sleeves (illustration as an example)

20. Insert the setup station into the designated hole.

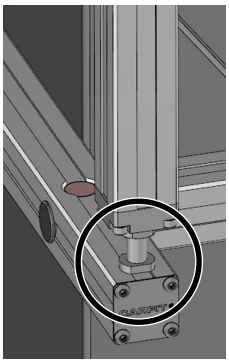

Fig. 35 Put on the setup station (illustration as an example)

21. Attach adjustment sleeves from below (M6x16 screws and locking ring) but do not tighten.

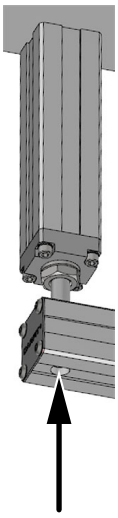

Fig. 36 Fixing the adjustment sleeves (illustration as an example)

22. Initially adjust both setup stations with the adjustment sleeves roughly to the height of the lifting unit.
23. Adjust both setup stations with the adjustment sleeves and a spirit level to the height of the lifting unit.
24. Remove the front and rear POM strips at the setup stations and at the lifting unit.

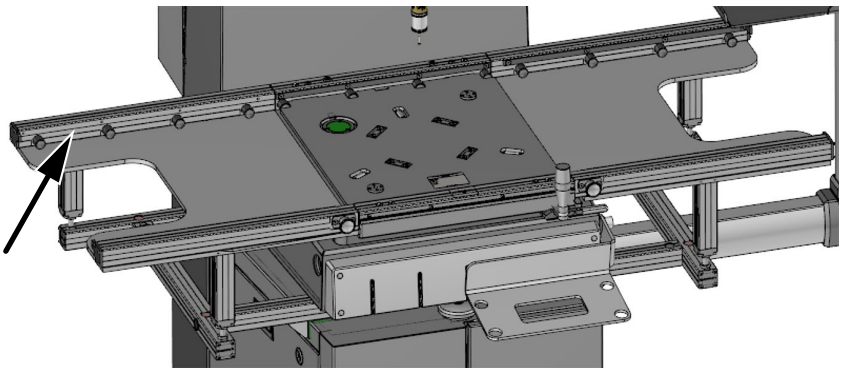

Fig. 37 Remove the POM strips (illustration as an example)

25. Screw the supplied mounting strips with the supplied M5x25 screws with the unpainted side first to the lifting unit then to the setup stations.

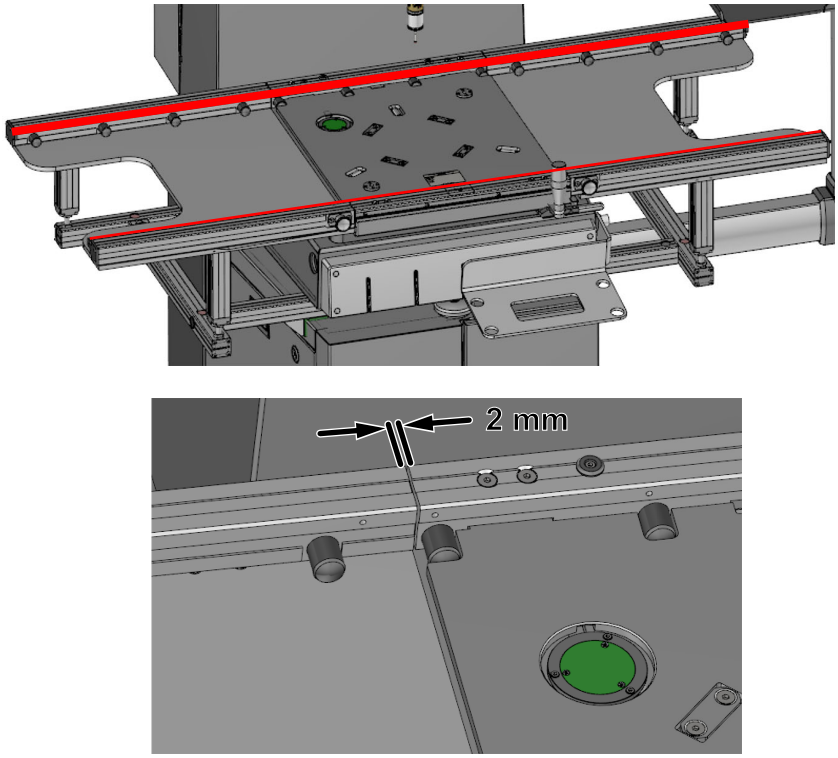

Fig. 38 Installing the mounting strips (illustration as an example)

26. Check the transition points from lifting unit to the setup stations again with the spirit level.
27. Press the four angles with the damping plates against the shop floor frame and attach the screws lightly toward the profile.

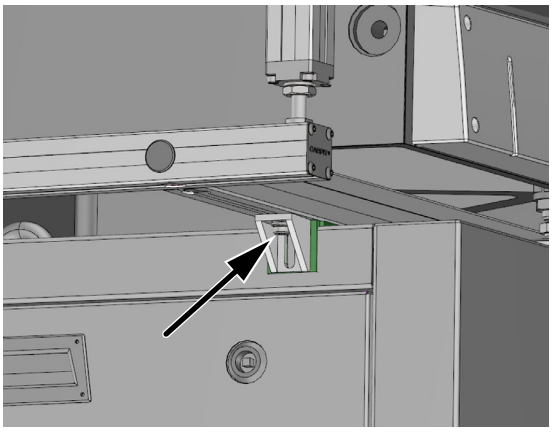

Fig. 39 Angle screwed on to profile (illustration as an example)

28. Mark the hole through the angle. When doing so, make sure that the hole is positioned as centrally as possible in the elongated hole.

29. Attach the 4 angles with the enclosed screws (M8x30 including locking ring) and the M8 nuts to the shop floor frame. To do this, release the top screws of the angle (toward the profile) once more briefly in order to prevent potential warping of the base frame of the feeder.

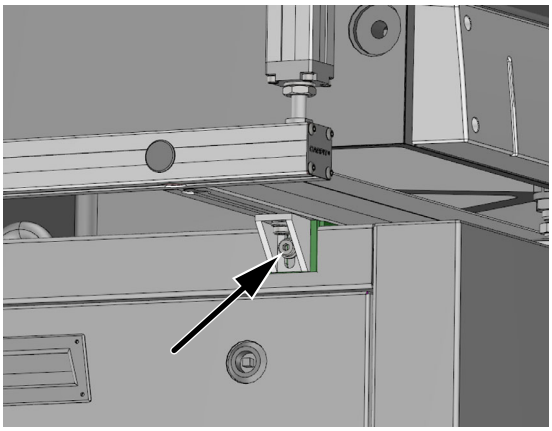

Fig. 40 Angle screwed on to frame (illustration as an example)

30. Firmly tighten all screws at the angle bracktes.
31. Place crosspieces in the top joints and bolt together with the supplied M8x35 screws and locking washers.

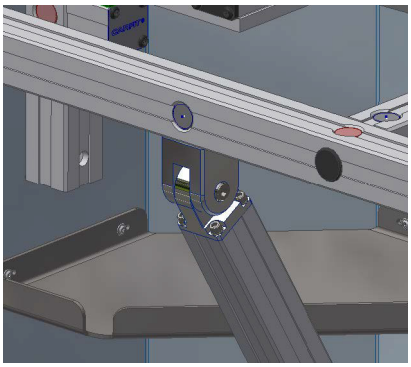

Fig. 41 Insert crosspiece into joint

32. 32. Screw bottom profiles with the joints onto the crosspieces. Attach damping plates between profile and base frame.

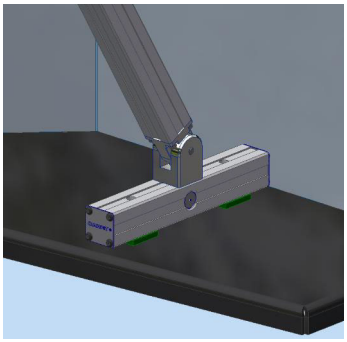

Fig. 42 Screwing on lower profiles

33. Drill fixing holes for the support and screw the profiles onto the base frame with the supplied M6x20 screws and locking rings. The base

frame of the loader must not be pulled down by the bolted connection, because otherwise the damping plates could become warped due the screws being overtightened.

34. Tighten the screws for fixing the joints.
35. Check the base frame alignment again using the spirit level.
36. Remove the mounting strip.
37. Refit the POM strips.

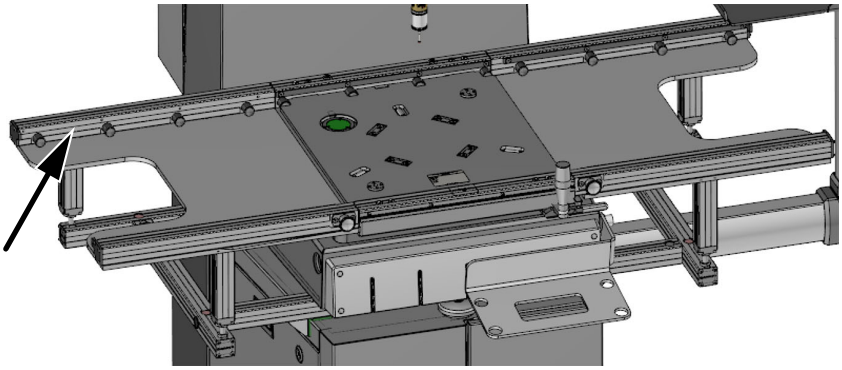

Fig. 43 Fitting the POM strips (illustration as an example)

38. Check the transition points between setup station and lifting unit with a spirit level once more and, if necessary, adjust the heights of the setup stations with the adjustment sleeves.
39. Tighten the counternuts and the screws to fix the adjustment sleeves.

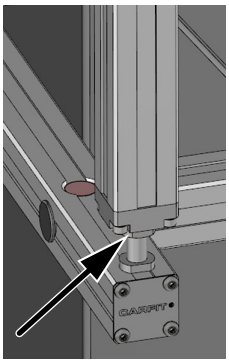

Fig. 44 Fixing the adjustment sleeves (illustration as an example)

40. Screw the M12 plug into the socket designated for this purpose.

41. Put the pallets into place at the setup stations.
    Make sure the direction arrows are at the operator's side.
42. Check pushing-over of the pallets:
    The pushing-over of the pallets from set-up position to measuring position should occur without any noticeable resistance. If the pallet strikes against the rollers of the lifting unit or the setup stations while pushing-over, the transition point must be adjusted once again using the adjustment sleeves.
43. Check lifting and lowering of the pallet:
    The pallet should roll over the bumps without resistance.

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 run, make sure that there is nobody in the danger area of the coordinate measuring machine.

– The pallet must be lowered into the measuring position to allow the CMM to carry out a homing run.

ATTENTION

Temperature sensor is not recognised.

If the CMM is switched on without the pallet being lowered into measuring position, the temperature sensor is not recognised.

5.1.2 Process

1. Switch on the coordinate measuring machine (see coordinate measuring machine operating instructions).

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 danger area.
3. Release the emergency stop button from its engaged position.
4. See coordinate measuring machine operating instructions.

5.4 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.

– Load 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.

5.4.1 Prerequisite

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

5.4.2 Process

1. In the set-up position, equip the pallet with a workpiece.
2. Pull bolt to release the pallet.
3. Push the pallet to the measuring position.
4. Use the hand lever to lower the pallet into measuring position.
5. Start measurement.

5.5 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.

5.5.1 Prerequisite

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

5.5.2 Process

1. Use the hand lever to raise the pallet from measuring position.
2. Pull bolt to release the pallet.
3. Push the pallet to the set-up position.
4. Equip the pallet with a new workpiece.

5.6 Faults

Error	Cause/Remedy	Correction by
The coordinate measuring machine does not start.	The initiator "Pallet lowered" is not tripped. Check the pallet position.	Operator

5.7 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).

5.8 Events and messages

Service Support:

Carl Zeiss Industrielle Messtechnik GmbH

Carl Zeiss Str. 22

73447 Oberkochen

Germany

Phone: +49 73 64 20 6336

6 Cleaning and maintenance

Cleaning and maintenance work must only be performed by instructed personnel and after switching off the coordinate measuring machine with thermal protection cab and manual loader.

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

6.1 Cleaning and care

The coordinate measuring machine with thermal protection cab and manual loader must always be maintained in a clean condition. It must always be kept free of tools, liquids, chips and swarf or any other foreign substances.

Used substances and materials must be handled and disposed of correctly, in particular 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 area of electrical installations.

Do not clean using liquids in the vicinity of electric currents or live parts. However, if cleaning is necessary, the coordinate measuring machine with thermal protection cab and manual loader 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 using a damp cloth, never wipe with a dry cloth! Mild soap or mild detergent in lukewarm water and a soft cloth, sponge or chamois leather must be used.

Steel parts are an exception to this. 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 coordinate measuring machine with thermal protection cab and manual loader 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 Duplex system

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 and measuring supports	Operator
Yearly	Check the loader 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. Repair or replace any defective parts.	Specialist personnel
As necessary	The installation location must be kept clean.	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 5.7).
3. Remove the electrical 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 location 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.