SQUARE

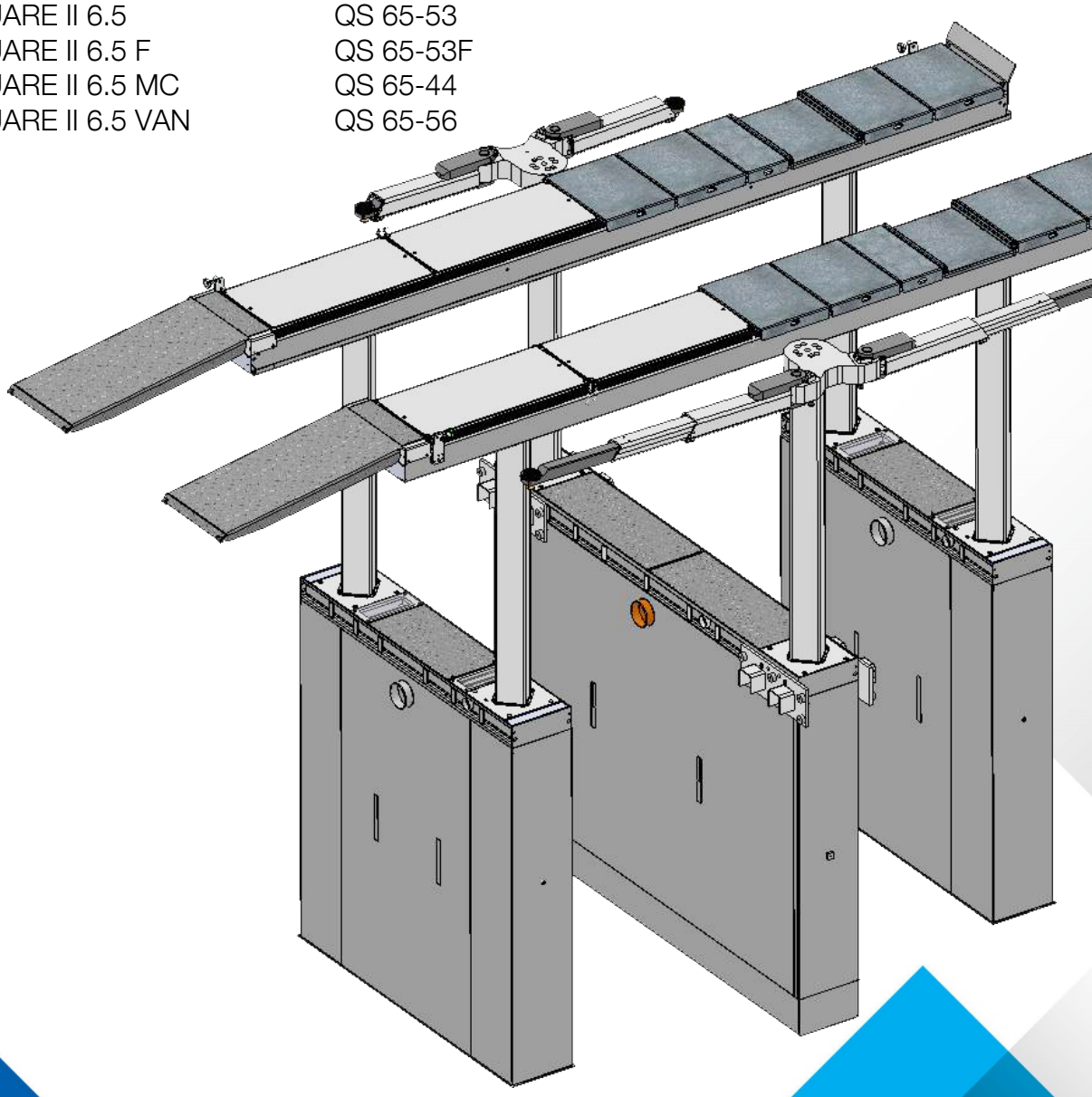
VS SQUARE II | QS 50/65

Four Post Inground Lift

Technical Handbook

TH322501-en

VS SQUARE II 5.0	QS 50-44
VS SQUARE II 5.0 F	QS 50-44F
VS SQUARE II 5.5	QS 55-56
VS SQUARE II 6.5	QS 65-53
VS SQUARE II 6.5 F	QS 65-53F
VS SQUARE II 6.5 MC	QS 65-44
VS SQUARE II 6.5 VAN	QS 65-56



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The contents of this edition have been checked with great care. However, errors cannot be fully excluded. Subject to technical change without notice.

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1 Safety

1.1 Symbols

Important safety instructions. Failure to comply with instructions could result in personal injury or property damage.

Important information.

1.2 Safety Information

This technical manual is exclusively intended for authorised and trained specialist staff. Such specialist staff include authorised, trained specialists employed by the manufacturer, the authorised dealers and the relevant service partners.

Pay attention to all instructions listed under section "Safety" in the operating manual!

Danger! Electrical hazard!

Wiring shall be done by qualified electricians using the circuit diagrams supplied.

2 Installation Plans

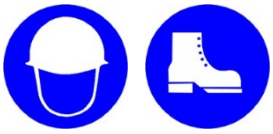
Always use the latest foundation plans, fluid and circuit diagrams.

The installation plans vary from model to model. They are contained in the documentation supplied.

3 Transport

For transportation, suitable hoisting equipment with chain suspension and lifting slings is required. If lifting slings are used, these must not be reused after transport. Do not exceed maximum load capacity.

Standing under the suspended load is prohibited!



Wear an appropriate hardhat and safety boots.

The components may swing back and forth during transport and cause crushing injuries when being set down.

4 Preparing the Installation Box

4.1 Checking the Installation Box

- Check the box for any visible damage.
- The 4 or 6 support struts inside the box must be aligned horizontally and perpendicular to the box walls.
- If any support struts are missing, the box must be braced with wooden beams.

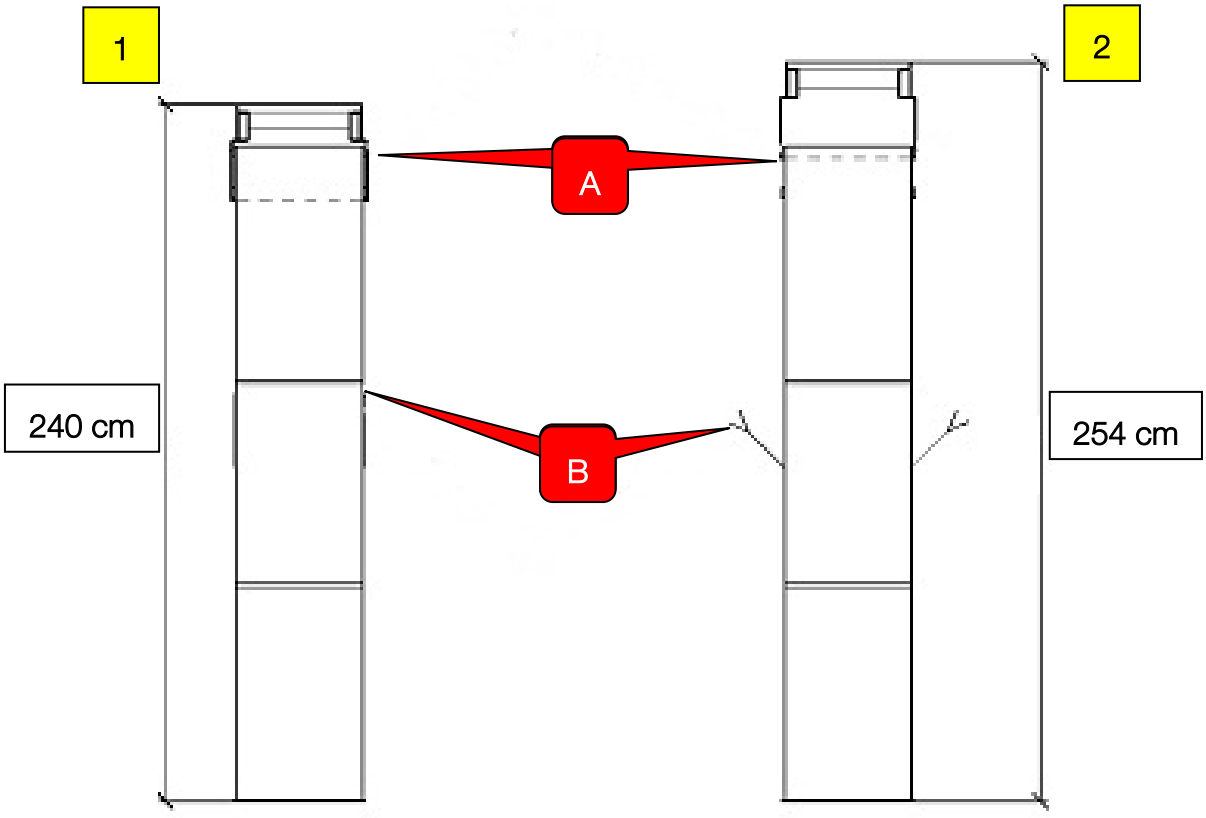
Preparing the Installation Box

- Bend the concrete anchors **B** on the box outward.
- Open the screws **A**.
- Push the frame upward.
- Tighten the screws **A** in the lower holes.

The installation boxes ZS-EBK-Uni (VZ 972173) and EBK-A 21/250 (VZ 972522) are extendable to a length of 2,54 m or 2,69 m respectively (→ **C**).
All other installation box models are not extendable!

1 Delivered Condition

2 Installation Condition



Making the Pit / Setting the Installation Box

A Make the pit according to the dimensions specified in the foundation plan.

B Suspend the box in the pit using a setting jig. Align the box precisely.

C Upper edge of box must be exactly level and 1…3 mm above the floor surface (to prevent water from entering).

D The box must be secured against floating. If the box is completely filled with water, the first layer of concrete may not exceed max. 70 cm above the bottom edge of the box.

E If the box is cast in concrete in a single step, the buoyant force, depending on the box type, is up to 80 kN. (In this case, the box requires additional reinforcement!)

Concreting

A Fill the bottom layer of concrete (up to approx. 10…20 cm above the bottom edge of the box) carefully into the pit. Do not vibrate, do not pour directly from concrete mixer.

B With the ZS Matop / Square the box bottom must be completely filled with concrete beneath it, since the lift presses onto the box bottom.

The installation box must be completely cast in concrete. Installing a separating layer (styrofoam, cardboard, etc.) between the box and the concrete is not permitted!

C Once the first layer of concrete has hardened, the second layer (max. 1.5 m) is carefully poured. Do not vibrate, do not pour directly from concrete mixer.

D Carefully fill in the remaining concrete to the bottom edge of the foundation plate. Do not vibrate, do not pour directly from concrete mixer. Remove the setting jig.

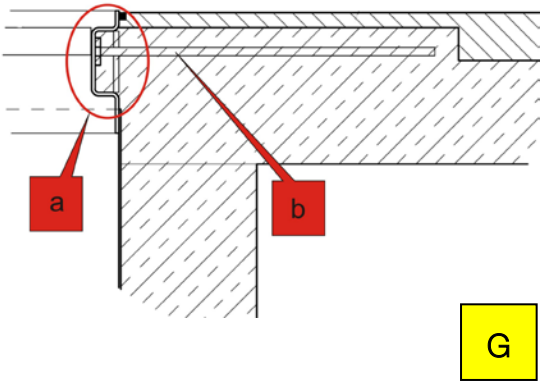
E Attach an empty conduit.

F Pour the foundation slab.

G In area **a** the installation frame must be filled completely with concrete!
Concrete steel loops must be hooked into flat steel **b**.

The installation box must be completely cast in concrete. Installing a separating layer (styrofoam, cardboard, etc.) between the box and the concrete is not permitted!

H If necessary, build up the floor.



4.2 Before Installing the Lift

- Empty and clean the box before installing the lift!
- A cover, e.g. from plastic foil, is recommended to prevent rain water from entering the set box.

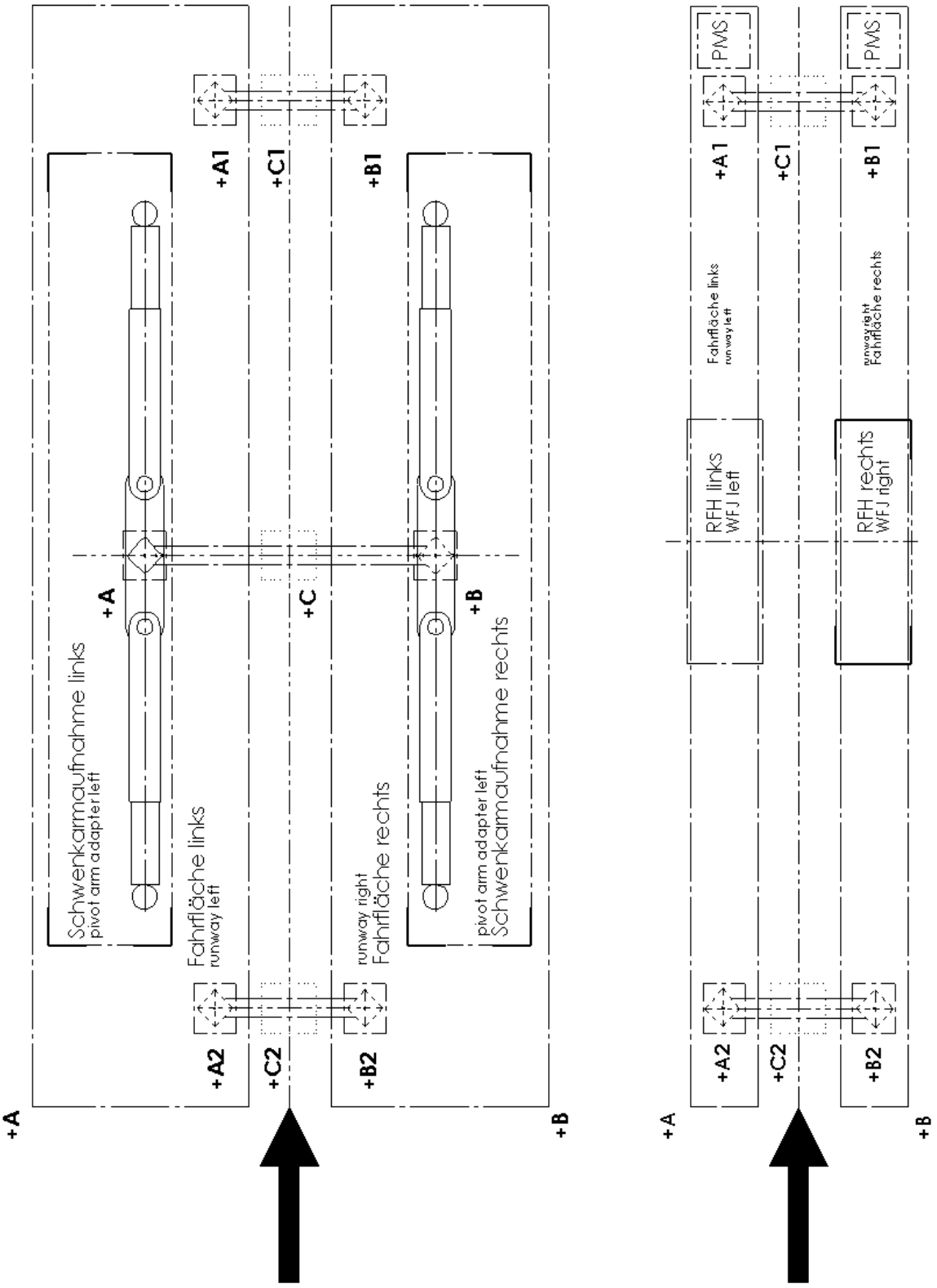
5 Positioning

5.1 Reference Identification

All components of the lift (lifting units, supports and power unit) are marked with a sticker which indicates their position.

Important: The installation must always be performed according to the following layout:

+A	Lifting unit / swing arm wheel-free jack / left runway
+B	Lifting unit / swing arm wheel-free jack / right runway
+C	Hydraulic unit of swing arm wheel-free jack
+A1	Lifting unit, left drive-off side
+B1	Lifting unit, right drive-off side
+C1	Hydraulic unit drive-off side / axle play tester / scissors wheel-free jack
+A2	Lifting unit, left drive-on side
+B2	Lifting unit, right drive-on side
+C2	Hydraulic unit drive-on side / scissors wheel-free jack


+A
+A1
+C1
+B1
+A
+C
+B
Schwenkarmaufnahme links
pivot arm adapter left
Fahrfläche links
runway left
runway right
Fahrfläche rechts
pivot arm adapter left
Schwenkarmaufnahme rechts
+A2
+C2
+B2
+A
+B
PMS
PMS
+A1
+C1
+B1
Fahrfläche links
runway left
runway right
Fahrfläche rechts
RFH links
WFJ left
RFH rechts
WFJ right
+A2
+C2
+B2
+A
+B

5.2 Overview of the Lifting Unit

The transport restraints on the lifting units must only be removed after the lift has been lowered into the installation box.

A Detent rail

B Latch

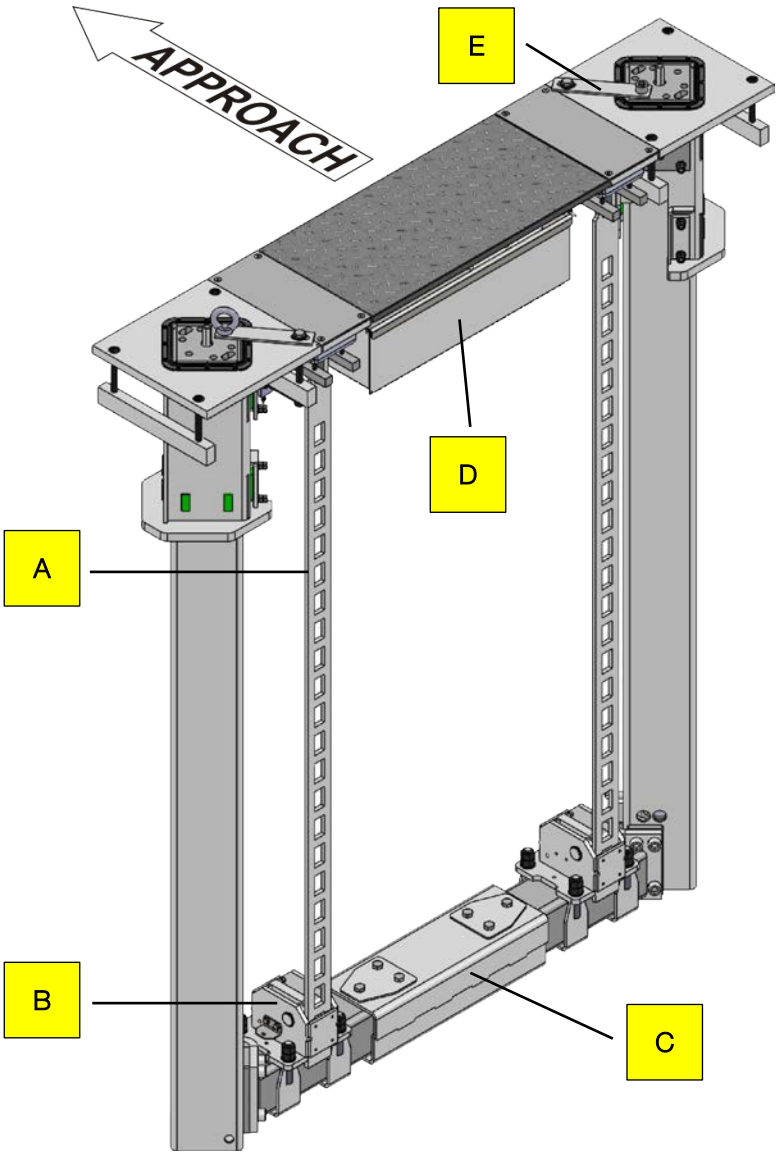
A+B: optional, only for wheel alignment lift design

C Synchronisation unit

D Hydraulic power unit

E Transport restraint

Additional devices that are installed in the support structure, such as the wheel-free jack, PMS or runway lighting, are powered via cables inside the lifting cylinder.



5.3 Setting up the Control Unit

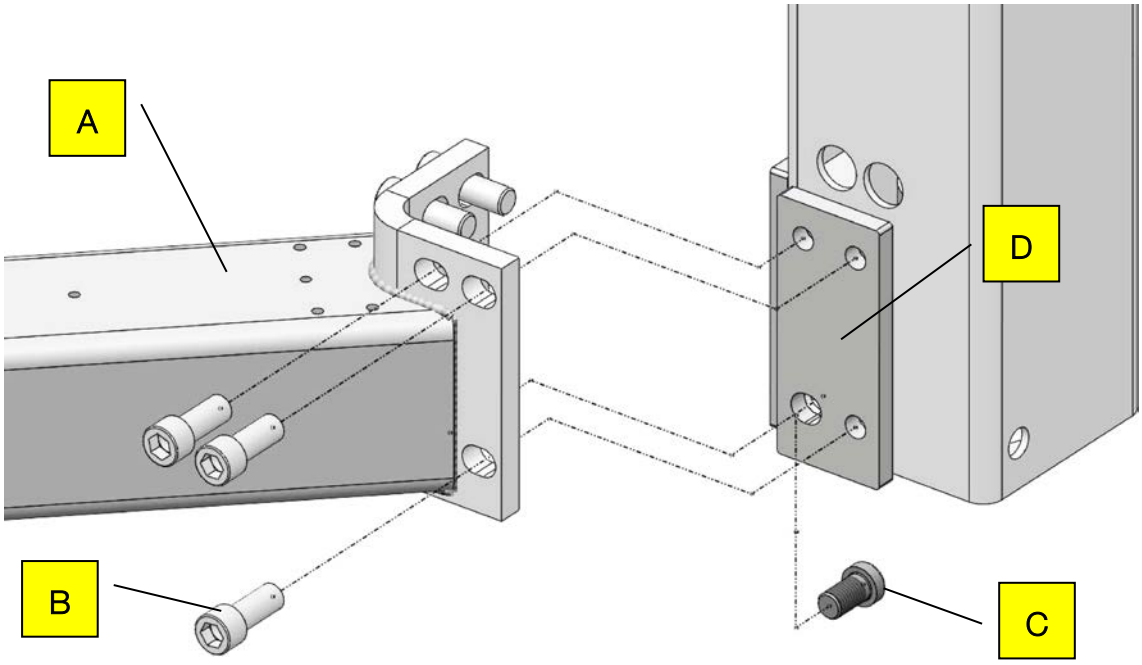
Attach the control unit of the lift in the intended location (wall mounting or on the control unit holder). Determine the control unit location in accordance with EN 1493.
Feed power supply line of the hydraulic unit, two solenoid valve control cables and one grounding cable through the prepared spare cable duct of the installation box to the control unit.
If the lift is equipped with additional control elements (cable remote control, foot switch control), install the necessary electric cables from the control element location to the control unit.

6 Assembling the Lifting Units

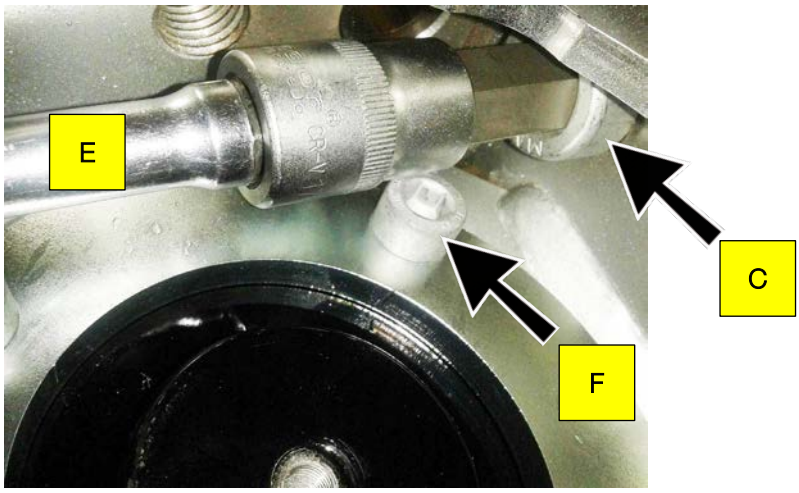
6.1 Attaching the Synchronisation Lever

The screws (B + C) for fastening the synchronising lever must not be lubricated!

Mount synchronising lever (A) of each lifting unit with six Allen screws M20×50 (B) and two Allen screws M20×35 (C) to end of lifting cylinder (D).
The screws must be tightened to 320 Nm with a verified torque wrench.



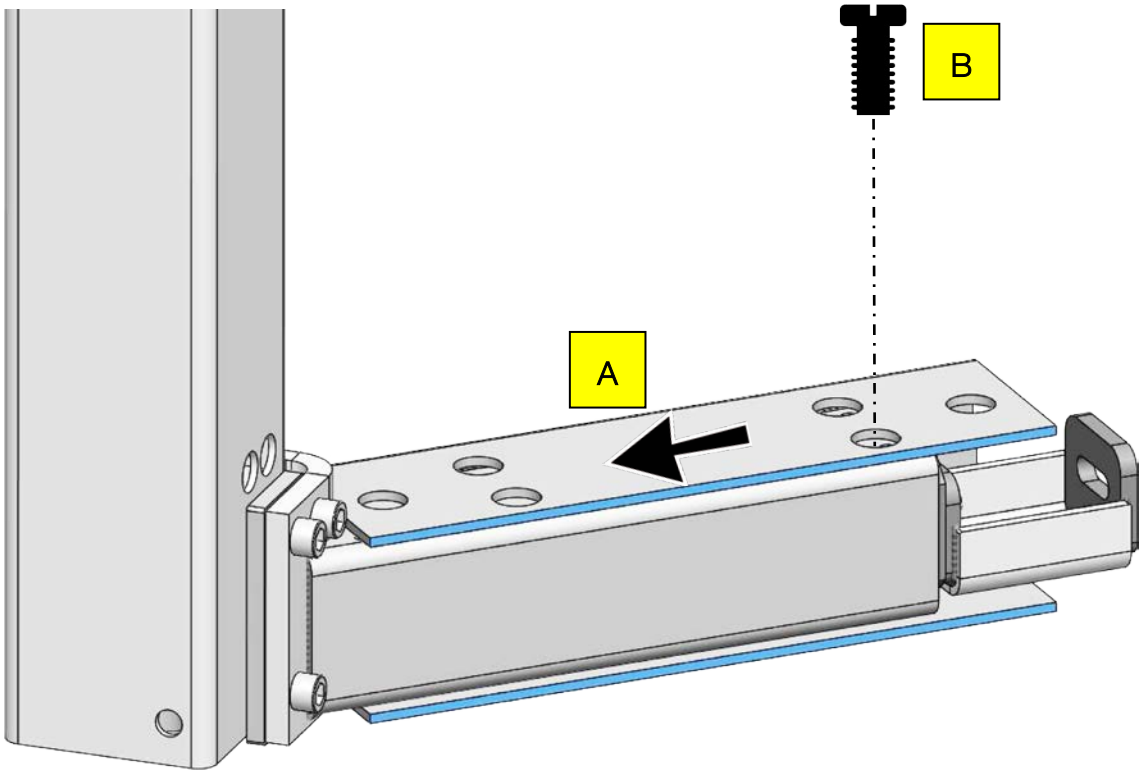
To install the two Allen screws M20x35 (C), a wrench socket with a long Allen key (E) is needed. Otherwise the cylinder screw M10x35 (F) must be removed and then retightened after installing the Allen screws.



6.2 Inserting the Connecting Tube

- Completely push the connecting tube onto the synchronisation lever of one lifting unit (A). Make sure that the drill holes in the connecting tube are pointing upwards.
- Secure the connecting tube with a screw (B) to prevent the tube from falling out while the lifting unit is lowered into the installation box.

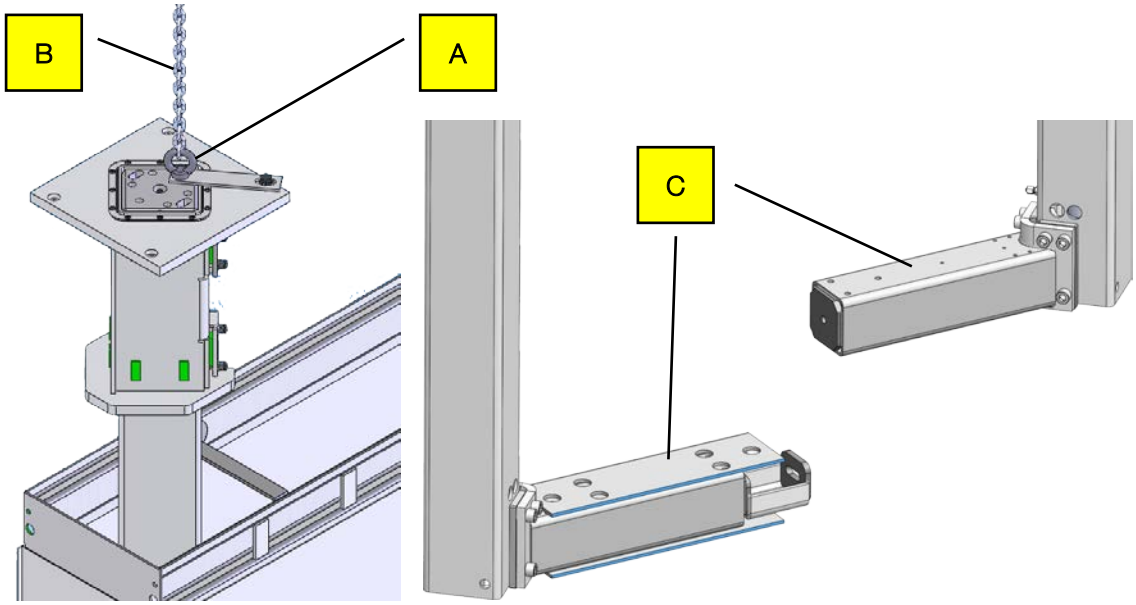
(Sectional view)



6.3 Lowering the Cylinders

A chain (B) or a harness can be attached to the eyebolt (A) of the transport restraint. The lift units can then be lowered safely into the installation box with a suitable lifting device.

Lower left- and right-hand lifting units into the installation box, but do not yet connect the synchronisation levers (C)! These will be connected after the alignment of the lifting units (see section “Assembling the Lifting Units > Installing the Synchronisation Unit”).

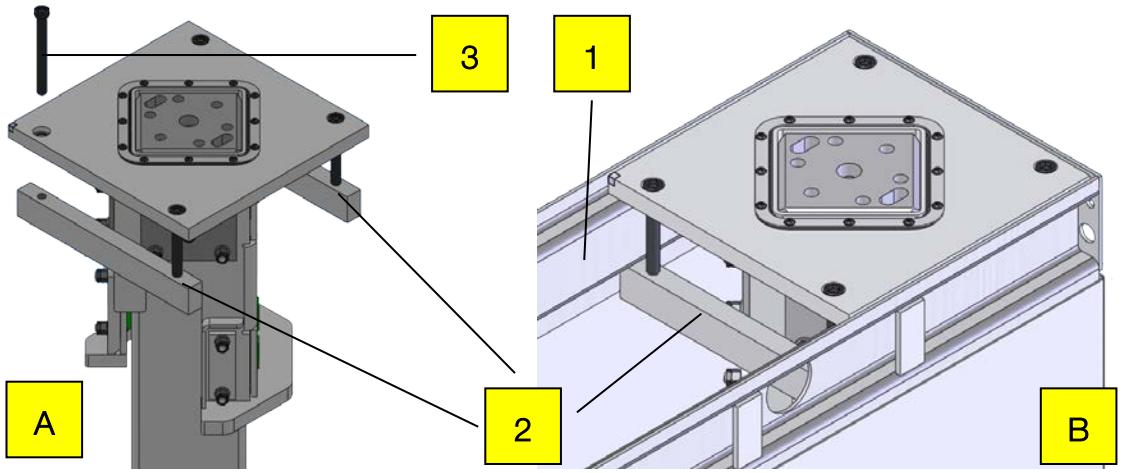


6.4 Fastening the Lifting Units

The post guides (A, B) of each lifting unit are clamped to the collar (1) of the installation box using 2 clamping parts (2). Cylinder head screws (3) M16x150 DIN 6912 with low screw heads are used to fasten the clamping parts.
Tighten cylinder head screws (3) to 140 Nm using a calibrated torque wrench.

Without installation box

In the installation box



6.5 Aligning the Lifting Units

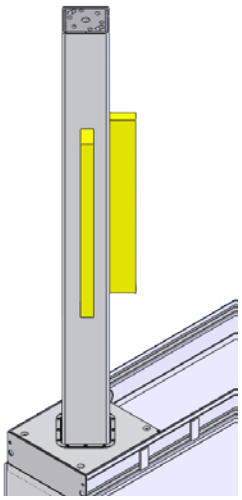
IMPORTANT: Prior to alignment, the lifting units must be hydraulically connected and bled, and the transport restraint removed. See sections “Assembling the Lifting Units > Removing the Transport Restraints” and “Hydraulic and Electrical Connections”.

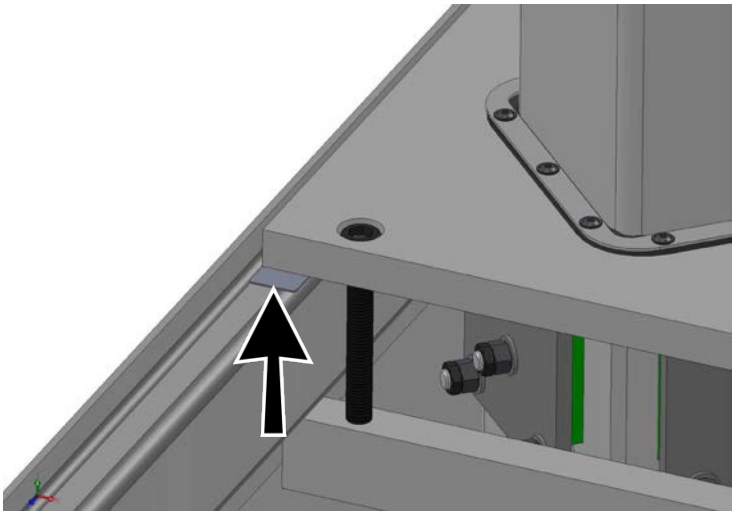
Alignment

Extend the lifting cylinders fully and use a spirit level to check whether both lifting units are perpendicular . If they are not, shims of sheet metal strip must be inserted under the head plate and box frame (see below).

Testing

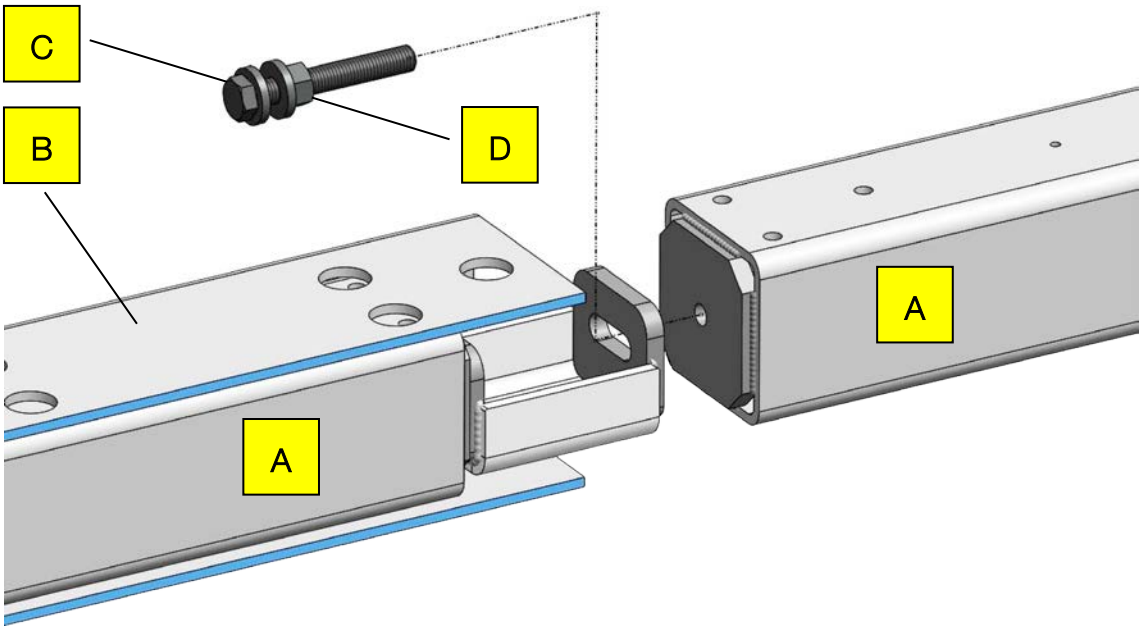
The lifting unit is correctly adjusted when the extended lifting post can be fully retracted using by its own weight. If this is not the case, the post guide must be adjusted. See the "Adjusting/re-adjusting the lifting post guides and sliding blocks" section.a



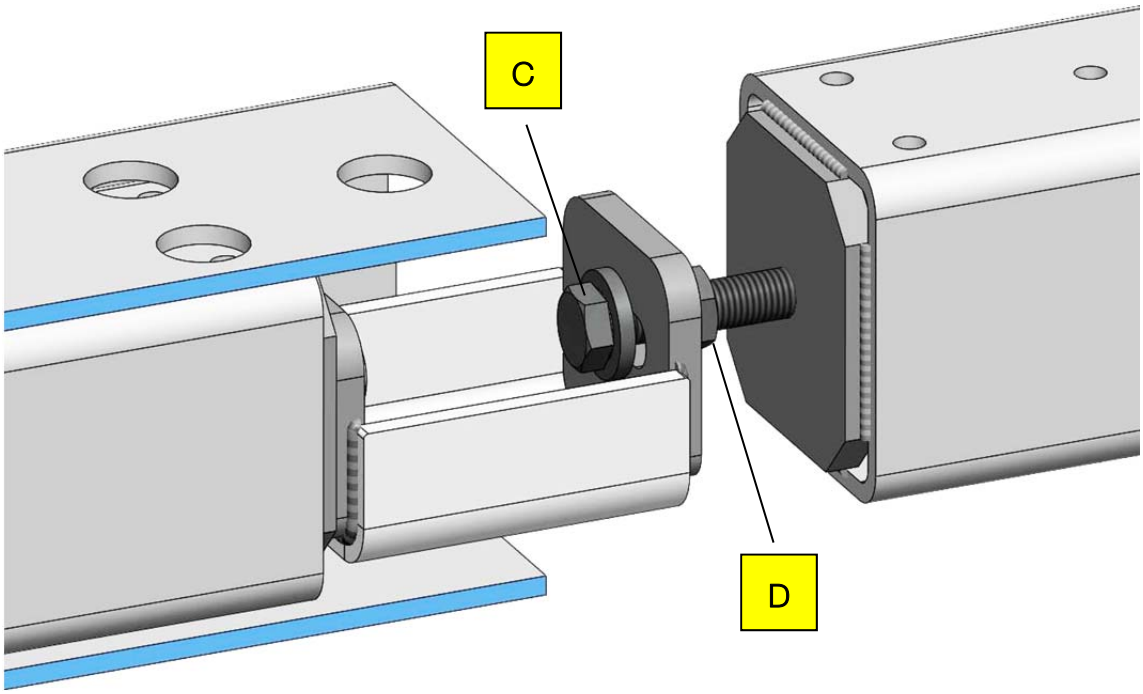


6.6 Installing the Synchronisation Unit

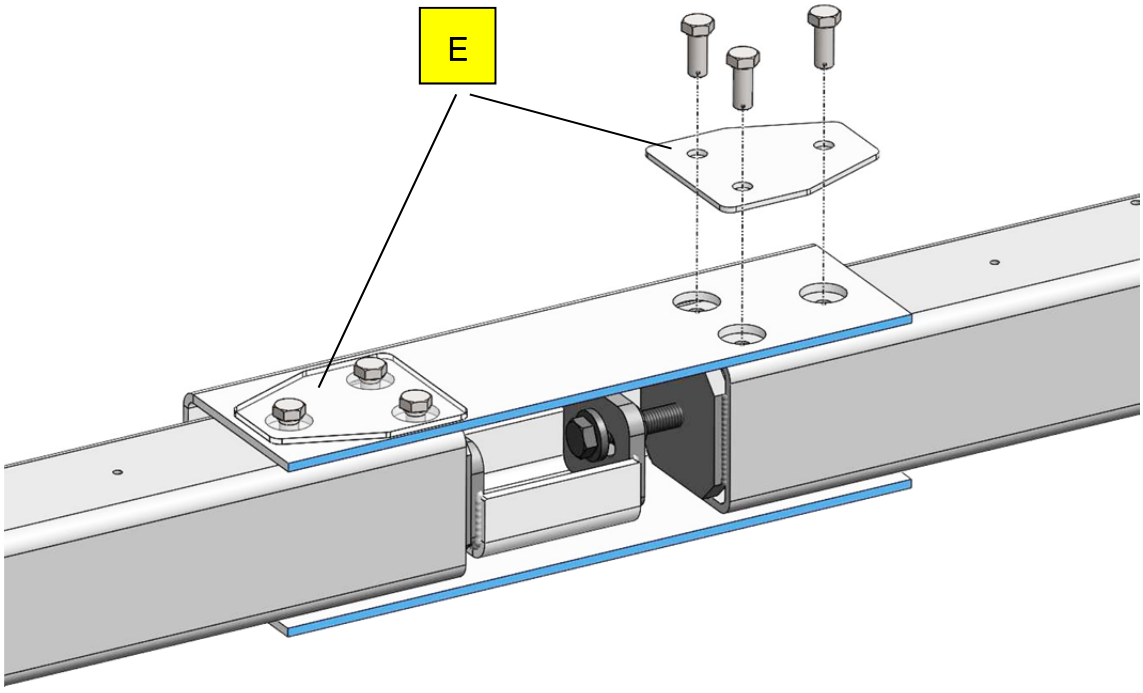
- Extend both lifting cylinders fully. Lift the hydraulic power unit out of the installation box and park it next to the lift. Important:
  – The lifting cylinders must not run into the mechanical stop.
  – Do not set the lift onto the detents.
- Check the alignment of the synchronisation levers (A) and correct it if necessary by adjusting the head plate.
- Push the connecting tube (B) to the centre above the synchronisation levers.
  Important: It must be possible to move the connecting tube easily. If this is not the case, check the alignment of the synchronisation levers.
- Connect the synchronisation levers using a connection screw M20x140 (C) and secure with a lock nut (D).



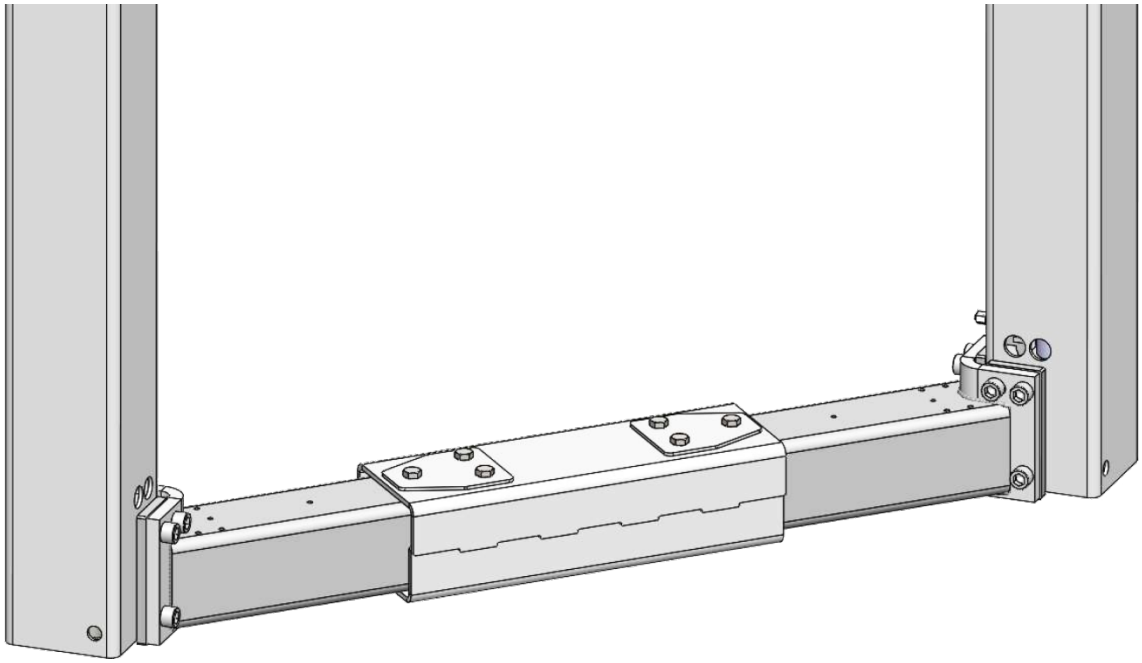
- Check the alignment of the lifting cylinders: The inside clearance between the top ends (at the support structure) and the bottom ends of the cylinders (at the synchronisation unit) must be the same, meaning that the cylinders must be in parallel with each other.
  If necessary, the length of the synchronisation unit can be adjusted using the connection screw (C). After the adjustment secure with lock nut (D).



- Fasten the connection tube tightly (E).



- Check the raising and lowering functions of the lift. The operating behaviour must not indicate any signs of tension.



(fully assembled synchronisation unit)

6.7 Mounting the Detent Rail (Optional)

Optional: Only for wheel alignment lift design

A Lid

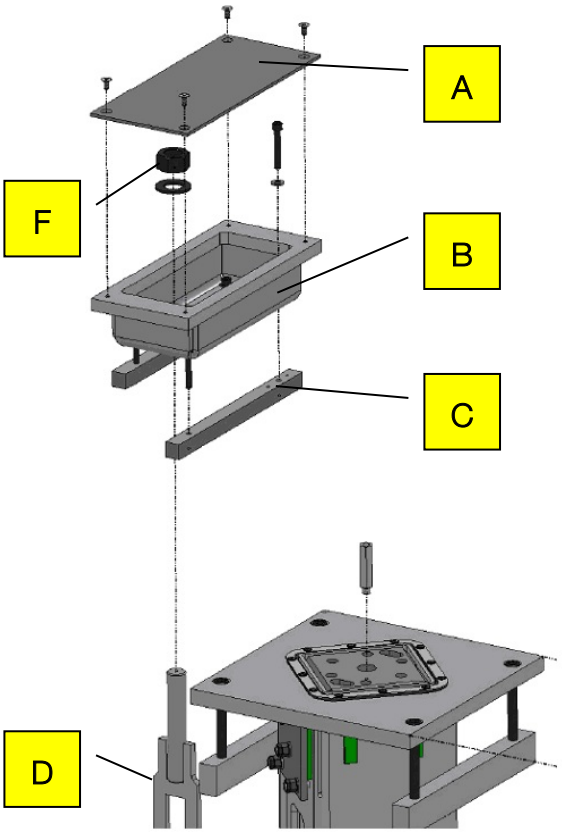
B Mount for detent rail

C Clamping elements

D Detent rail, must be inserted into latch housing

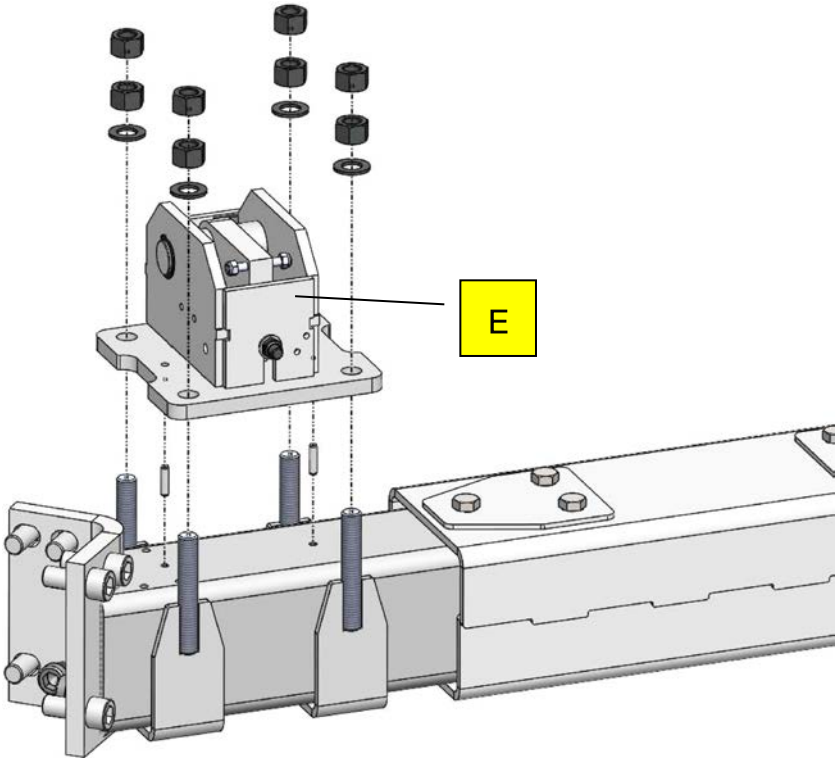
E Latch housing

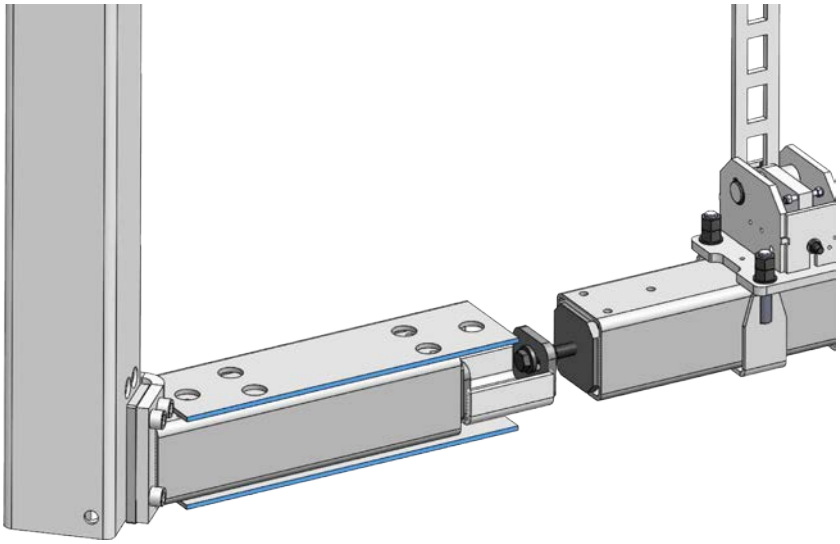
F After the wheel alignment lift has been levelled, secure the M30 nut with a second nut. This guarantees that the lift will remain level throughout the wheel alignment process.



Note approach direction when installing the latch (E) and the detent rail (D) (see section “Positioning > Overview of the Lifting Unit“).

The latch housing must be removed at least from one side before the synchronisation unit and the lifting cylinders can be dismantled,





After mounting or setting the synchronisation unit and/or the locking device (B, D, E) the lift must be relevelled (see section “Mounting the Runway Support Structure > Levelling the Runways”).

6.8 Mounting the Position Sensor System

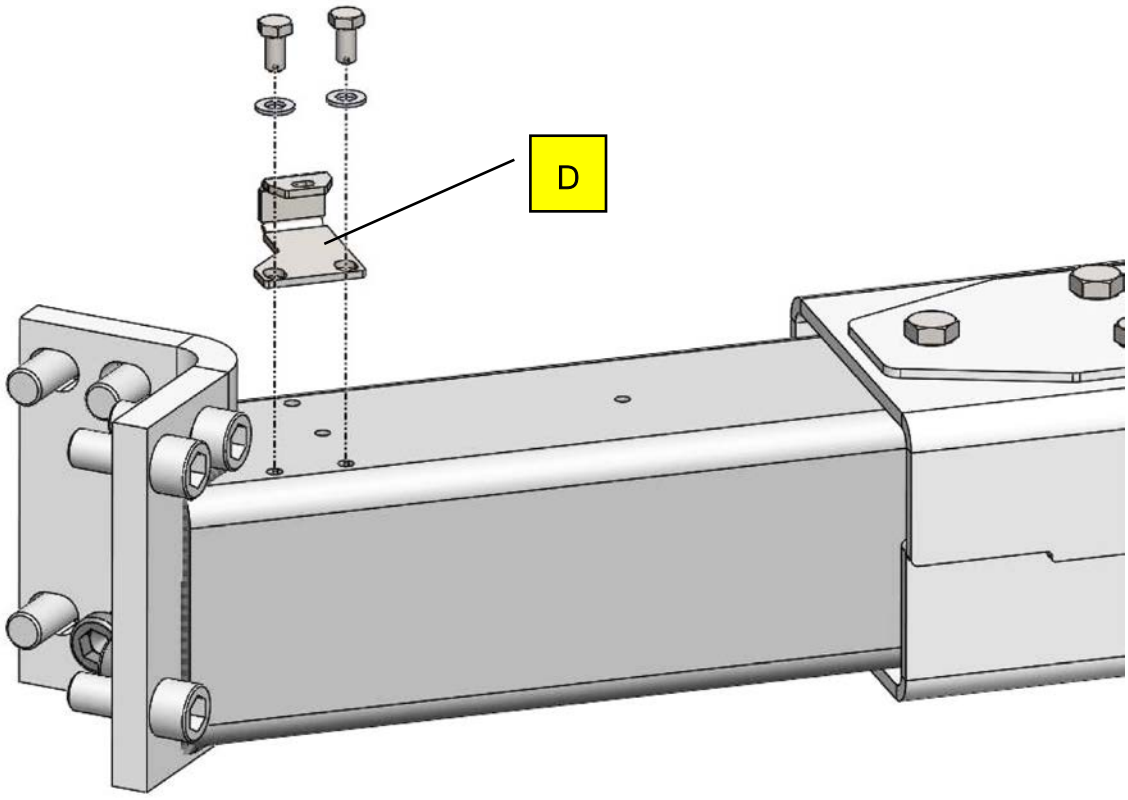
- The fastening plates must be aligned in such a way that the wire of the position sensor runs exactly perpendicular to the bottom. If it does not, the system may become damaged or it may fail prematurely.
- Ensure that the wire does not become twisted.
- The wire may not be pulled over the specified pull-out length.
- The wire may not spring back loosely.

The position sensor system comes standard with repair lifts and is optionally available for wheel alignment lifts. See following pages for detailed illustrations.

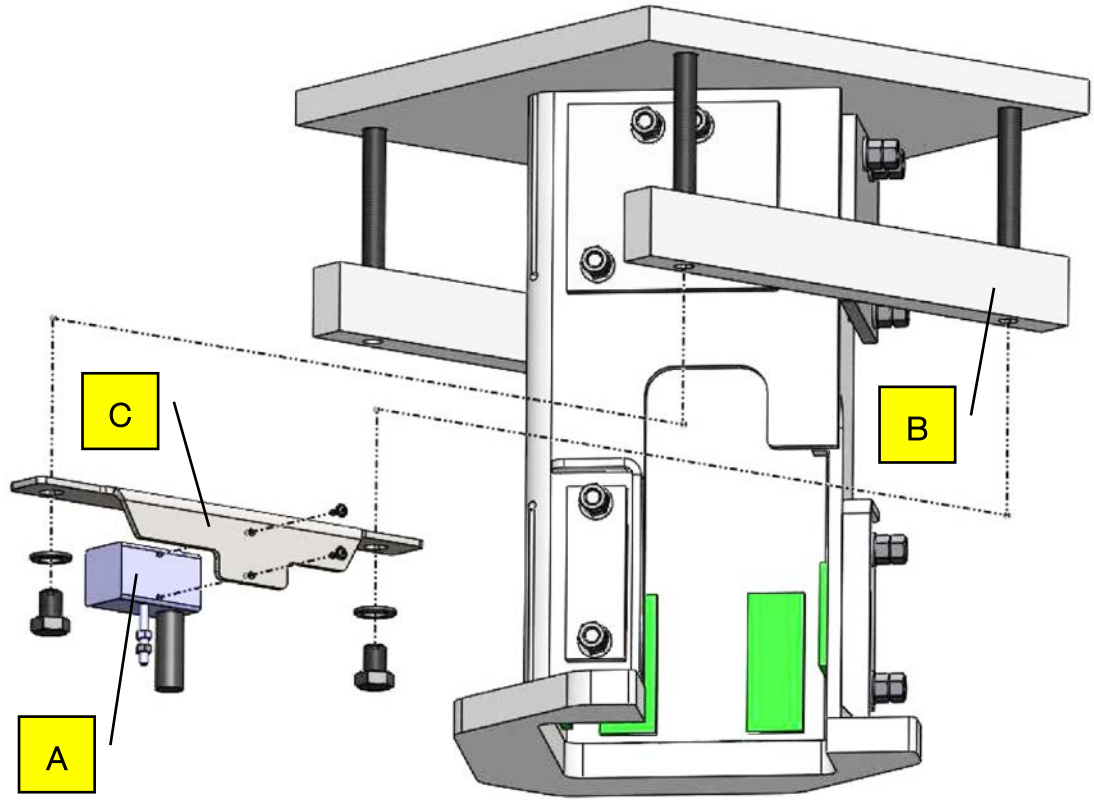
A Position sensor system
B Clamping element
C Fastening plate for the position sensor system
D Fastening plate for the wire of the position sensor system

6.8.1 Standard (Repair Lift)

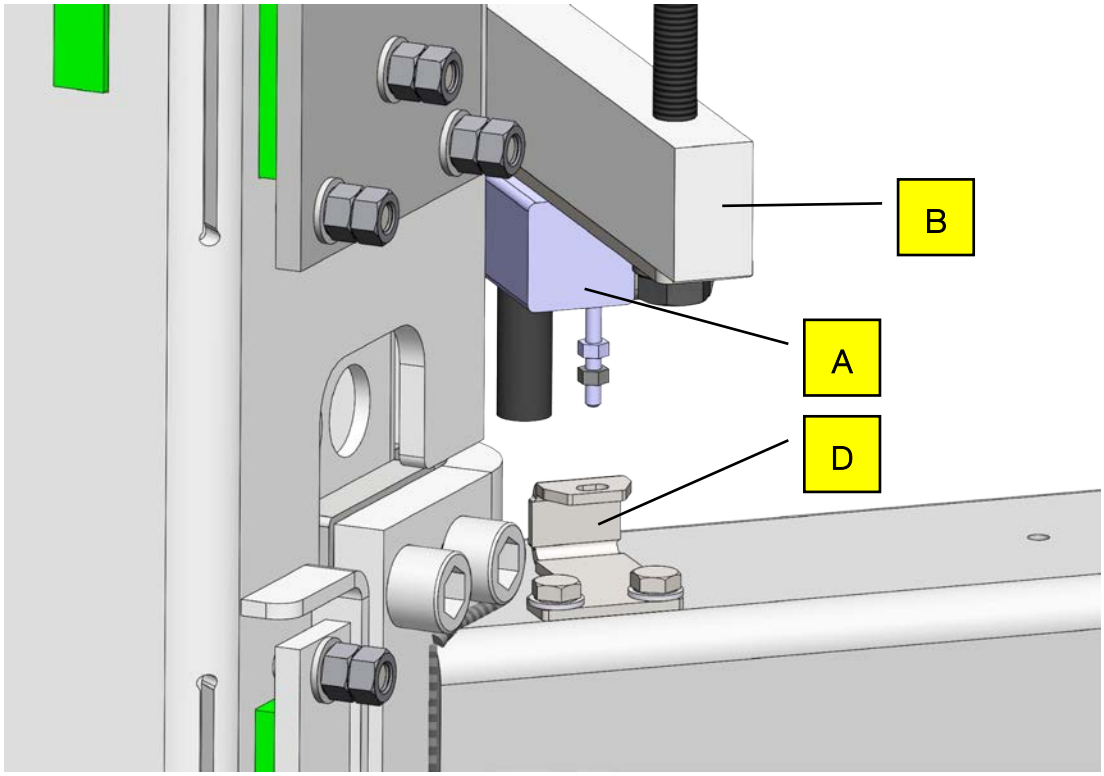
- Lower mounting point at synchronisation lever



- Upper mounting point at clamping element (same for all versions)

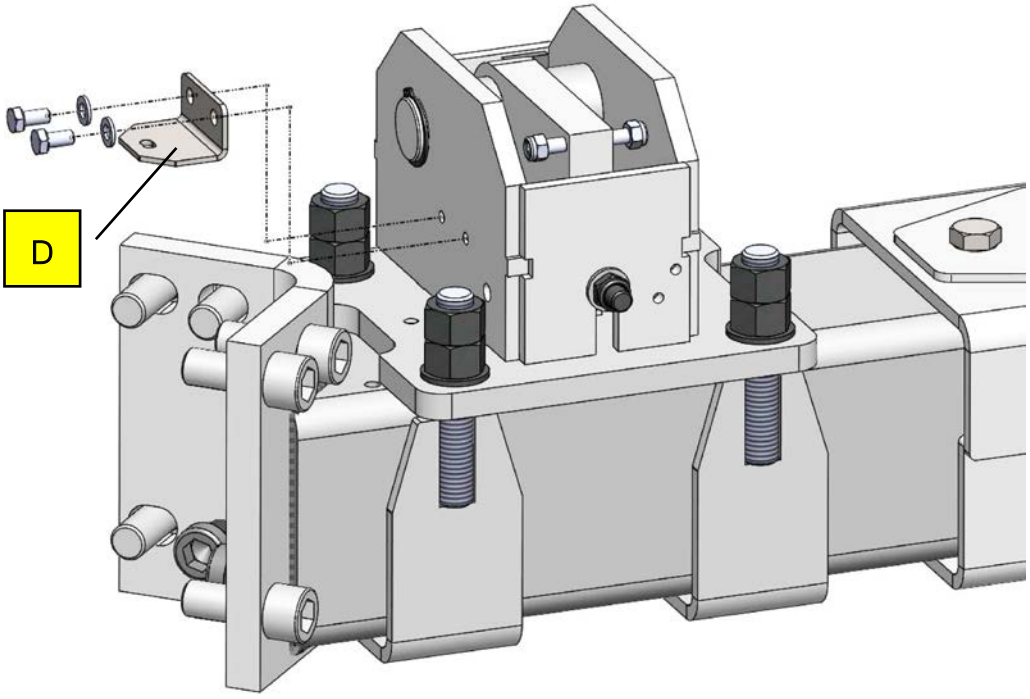


- Position sensor system, fully mounted (top + bottom)

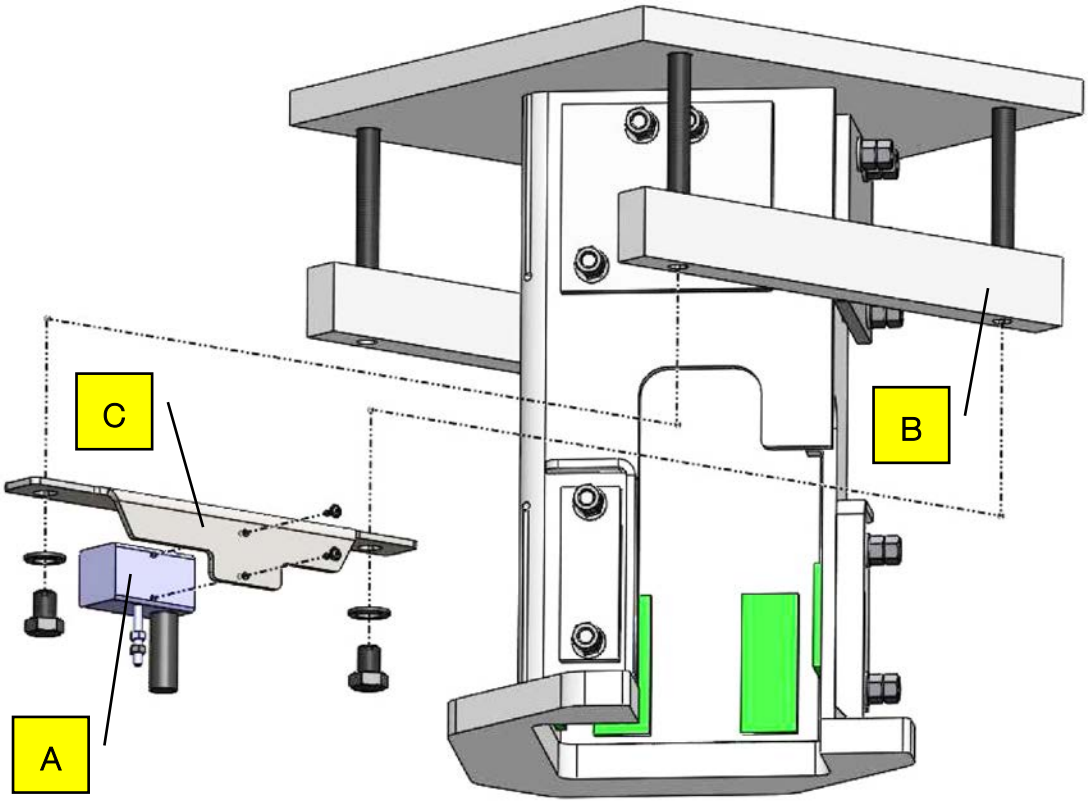


6.8.2 Optional (Wheel Alignment Lift)

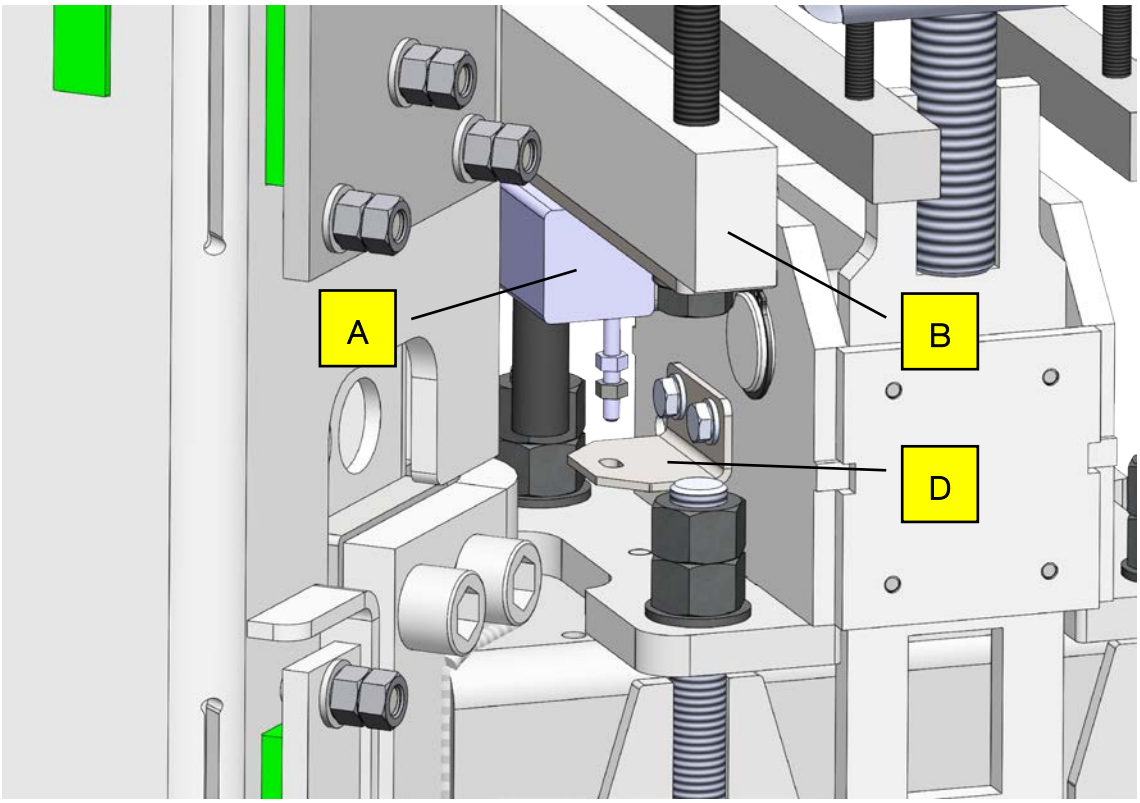
- Lower mounting point at detent rail housing



- Upper mounting point at clamping element (same for all versions)



- Position sensor system, fully mounted (top + bottom)



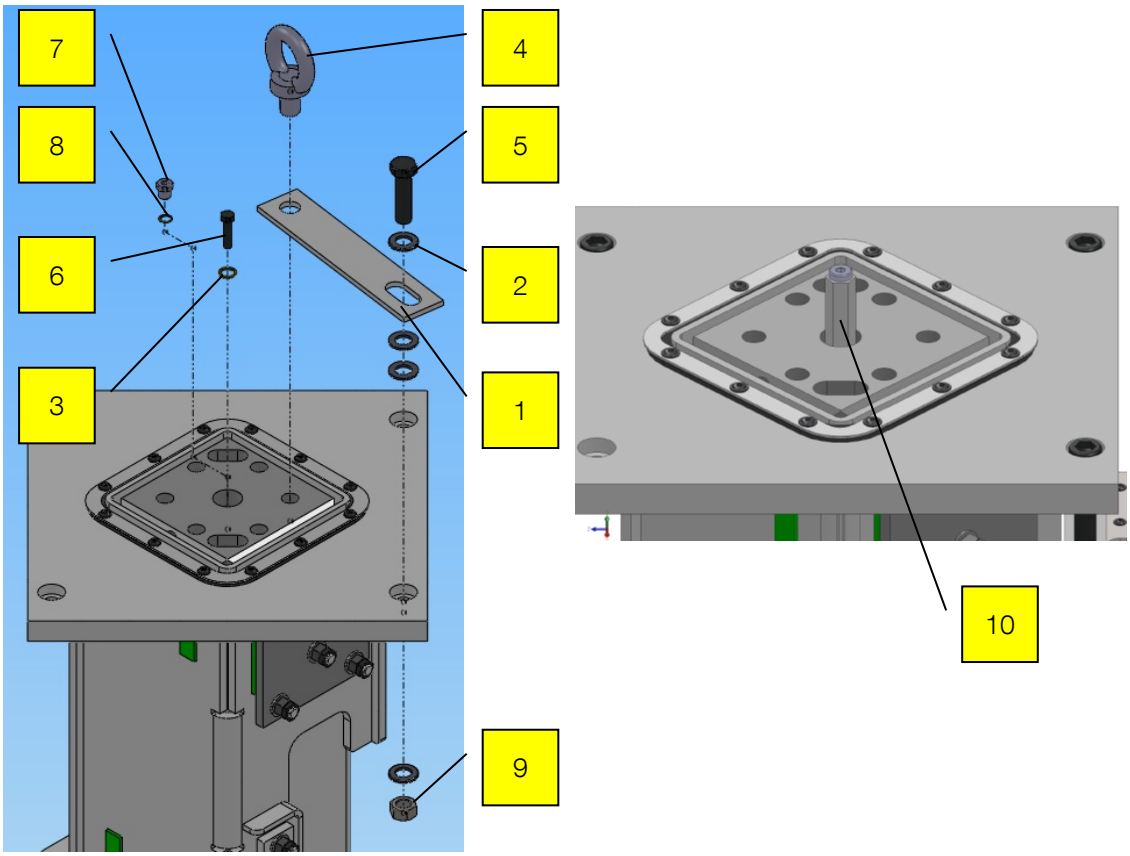
6.9 Removing the Transport Protection

When the transport restraint is removed, ensure that the lifting cylinder does not sink into or underneath the head plate!

- Only remove the transport restraint after the lifting cylinders have been fully lowered into the installation box.
- To prevent the lifting cylinders from sinking, the lifting system must be pressurised before the transport restraint is removed.
- When the lifting cylinder is raised again, the transport restraint must be fully replaced.

1	Transport restraint	6	Hex screw M8x35
2	Washer 17x30x3	7	Screw plug M12x1.5
3	Copper sealing ring 10x13x1	8	Copper sealing ring 13x18x1.5
4	Eyebolt M20	9	Hex nut M16
5	Hex screw M16x60	10	Spacer

- After the lifting units have been lowered into the installation box, remove parts (1), (2), (4), (5) and (9) of the transport restraint.
- The copper sealing ring (3) and hex screw (6) need to be replaced with screw plug (7), copper sealing ring (8) and spacer (10).



7 Connecting the Hydraulic and Electrical System

7.1 Connecting the Hydraulic Power Unit and Controller

It is advisable to group all electrical cables, hydraulic lines and pneumatic tubings with cable ties (placed at distances of roughly 250 mm) or inside a cable conduit. When the lines are laid and fastened, ensure that they are relieved from strain and free from abrasion.

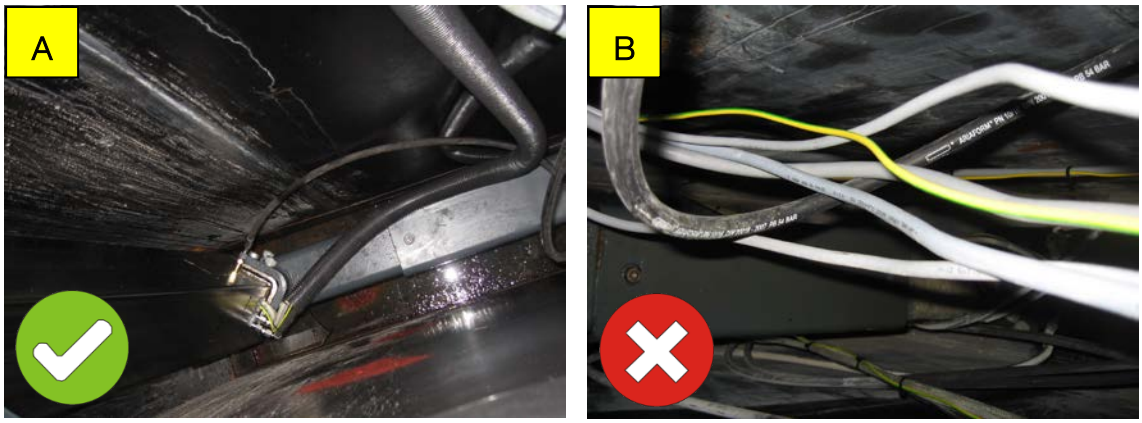
- Insert the hydraulic power unit into the frame of the installation box and connect the hydraulic lines of the two lift units to the hydraulic connections of the power unit. See section "Adjusting the Power Unit to Suit the Installation Box".
- Fill the hydraulic power unit. The fill quantity and fill specification are displayed on the tank. See section entitled "Filling the Hydraulic Power Unit".

All cables that are connected to the hydraulic power unit must remain sufficiently long. It must be possible to lift the power unit out of the installation box while it is connected, with the lift unit fully lowered, and to set aside next to the box.

- Screw the earthing cable (4 mm^2) on to the earthing bolt of the hydraulic power unit.
- Connect the plug-in connector of the solenoid valve cable to the solenoid valve and secure it.
- Connect the hydraulic motor. The motor is connected via the socket on the hydraulic power unit (the material required can be found in the socket.)
- Connect the control unit(s).

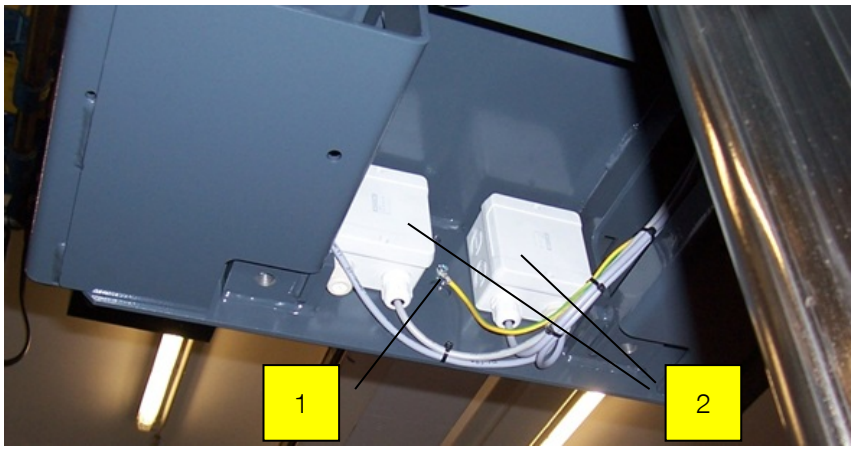
A Laid CORRECTLY B Laid INCORRECTLY

C The hydraulic power unit of a ZS SQUARE lift fully connected to the installation box



Optional

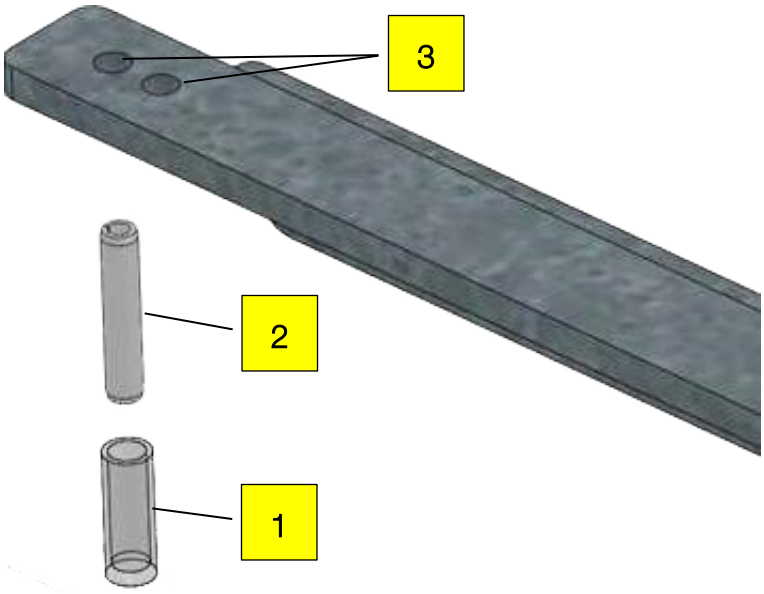
- Connect the latch pneumatic system.
- Screw the earthing cable onto the runways (1).
- Connect the runway electrical system and lighting to the terminal boxes (2).

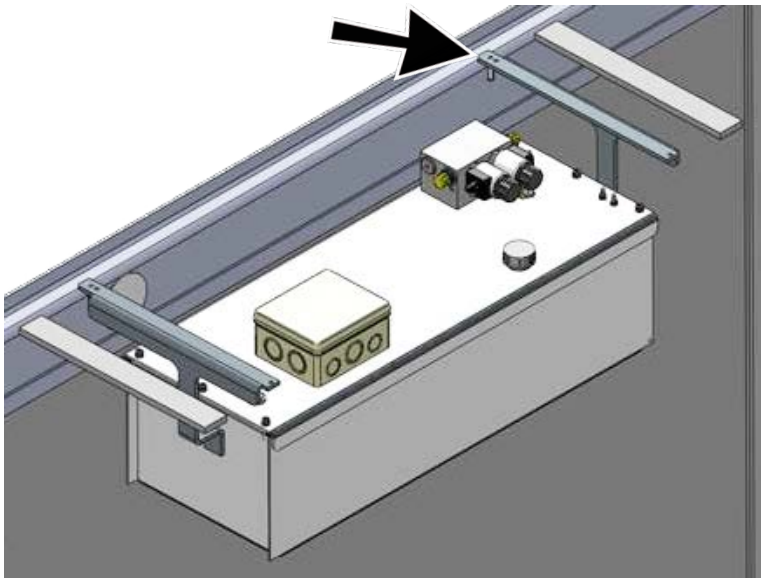


7.2 Adjusting the Power Unit to Suit the Installation Box

To prevent the hydraulic power unit from sliding in the installation box, spring pins 6×30 (2) with caps M6×20 (1) have been mounted by the suspension lugs as stops. At the end of each suspension lug, there are two bore holes (3). This ensures that all the possible installation box widths are covered.

To adjust the power unit to suit the box width, you can push the spring pins out with a punch and insert them into the appropriate holes.





7.3 Filling the Hydraulic Power Unit

All hydraulic fluid used must correspond to the specifications given in the technical manual. Be aware of cleanliness when filling the fluid to ensure that the purity class in accordance with DIN 51 524 can be guaranteed.

If the motor turns in the wrong direction, the hydraulic pump will not convey any fluid.

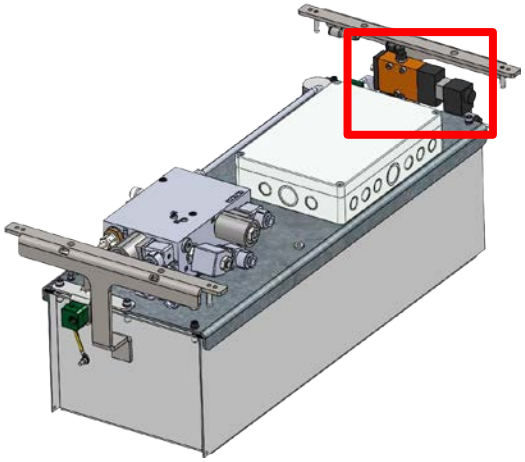
- All hydraulic lines and screw plugs must be connected.
- The lift and all additional devices must be fully lowered (retract all hydraulic cylinders).
- Unscrew the oil filling screw with dipstick from the hydraulic power unit.
- Add roughly 90% of the fill quantity specified on the hydraulic tank. The capacity specified on the hydraulic power unit is only a guideline value. The actual fill quantity may be more or less than the stated value.
- Use the dipstick to check the fluid level. When the fluid level is measured, the oil filling screw must not be screwed in – the dipstick must only rest on the surface. The fluid level must be located between the min. and the max. marks. As required, add additional fluid in 0.5-litre increments and measure the fluid level again.
- Bleed all hydraulic components.
- Check that all hydraulic components are functioning correctly.
- Check the hydraulic system for leaktightness (perform a leakage test).
- Check the fluid level again and top up the fluid in 0.5-litre steps (with all hydraulic cylinders retracted).
- Fully tighten the oil filling screw with dipstick.

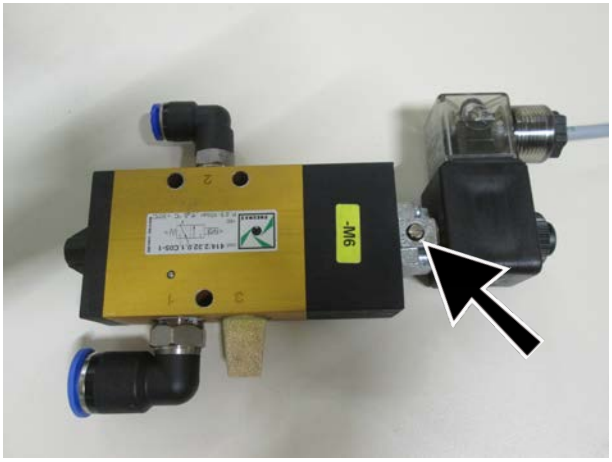
7.4 Attaching the Hydraulic Lines

In addition to the latest foundation plans, observe the hydraulic installation instructions in the annex to this handbook.

Manual jack lever operation via pneumatic unit

- The pneumatic unit for the jack lever operation is attached to the side of the power unit.
- In case of failures, the levers can be deactivated manually by rotating the slotted screw on the valve by 90°.
- After manual lever operation, the valve can be reactivated by resetting the screw.





8 Setting the Lifting Cylinder Guide and the Sliding Blocks

The guides of the lifting unit are set, tested, then sealed with paint in series at the factory.

8.1 Checking the Guide Clearance at Initial Installation

Initial Assembly

Carry out the following checks:

- The lifting unit (with movement synchronisation connector) must lower completely by its own weight without the support structure.

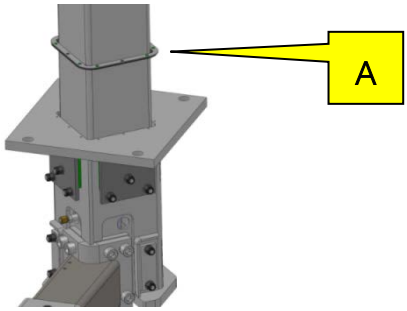
The connection tube of the movement synchronisation connector must slide easily (see section “Installing the Movement Synchronisation Connector”).
The lifting unit must be installed in the box with a vertical alignment (see section “Aligning the Lifting Units”).

- The guide clearance of both lifting units must be the same in all four directions. By shaking the extended lifting unit the clearance can be seen. The guide must ensure a tight grip of the lift cylinder.
- With the support structure and without lifting load, the lowering time should not exceed 45 seconds.
- With the support structure and a min. of 50% of the max. load capacity, the raising time should not exceed 35 seconds and the lowering time should not exceed 30 seconds.
  Important: If the lifting movement takes too long, the setting of the pressure control valve needs to be checked.

The specified raising and lowering times refer to the “small” lifting unit (hydraulic cylinder Ø50).
For the “big” lifting unit (hydraulic cylinder Ø60) these values can be slightly higher.

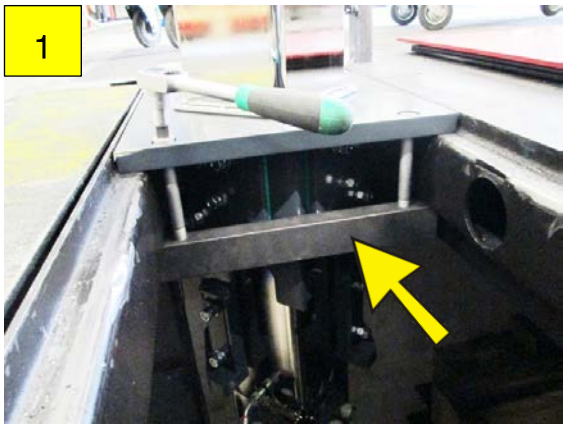
8.2 Re-setting the Guides

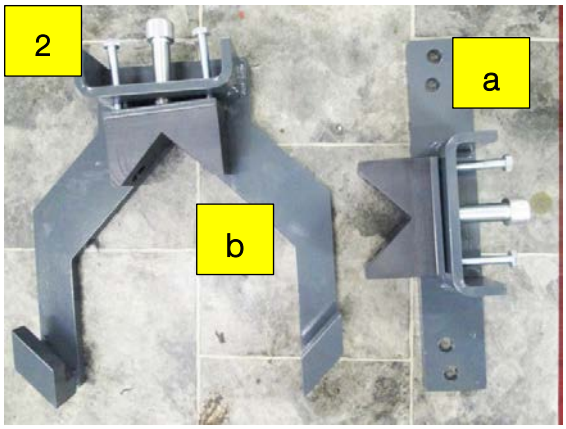
- At each change of the guide setting, the scraper ring (A) must be loosened and lifted for a visual inspection.
- The sliding blocks in the guide head must not jam and must be clearance-free.

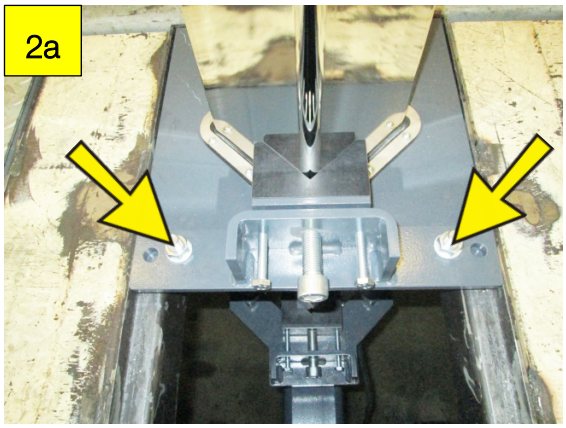


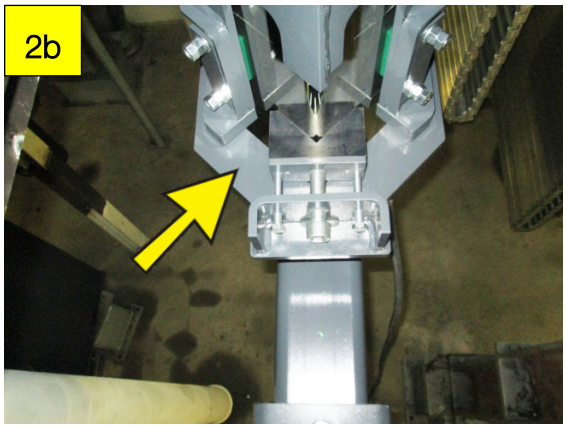
1 Raise lift to approx. 1.50 m height and remove clamping bar.
NOTE: For lifts with locking ladders, these must be removed before the positioning of the adjustment aid.

2 Attach the adjustment aid: a) on the head plate; b) at the bottom of the gusset plate.



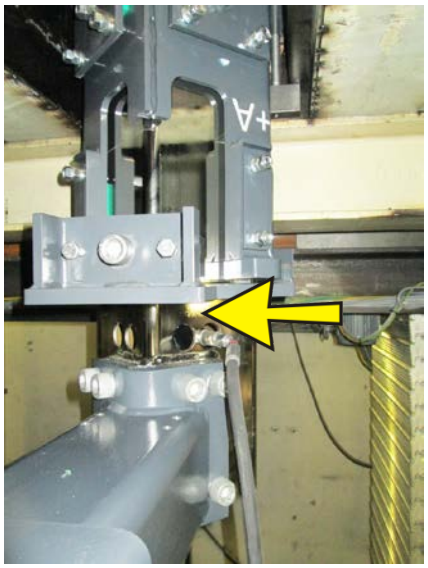






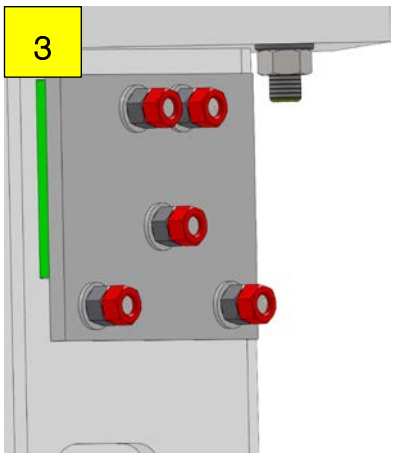
Risk of collision between the HD hose and the adjustment aid!

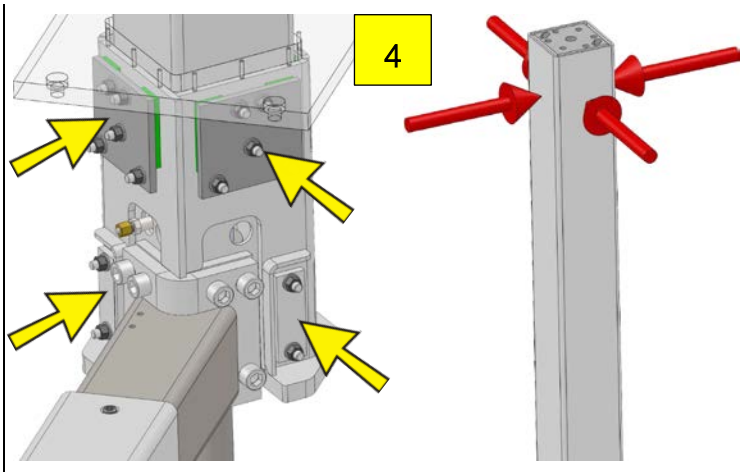
Remove the adjustment aids before raising and lowering the lifting unit.



3 Loosen and remove all lock nuts.

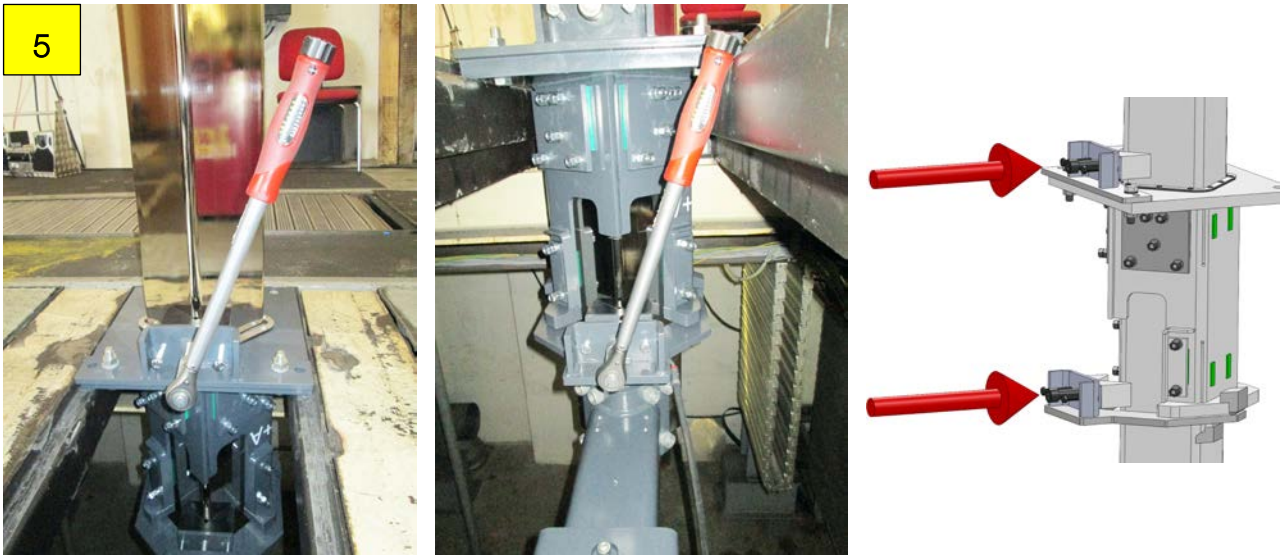
4 Loosen all clamping nuts so that the column has a guide clearance in all four directions.





5 Tighten the M20 cylinder bolt evenly at the top and bottom in order to put load on the column.

Torque
for flat head support and swing arm structures: **approx. 45 Nm**
for runway support structures: **approx. 60 Nm**

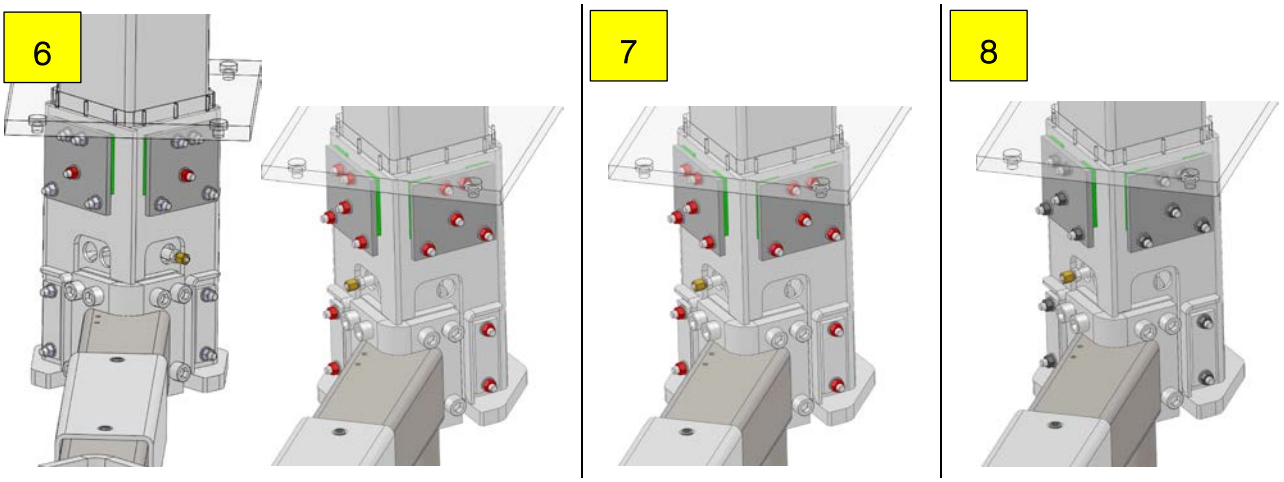


6 Place the clamping nuts in the centre and the remaining nuts hand-tight (without tools) and at the same time on the loaded column.

7 Tighten all clamping nuts with a wrench with 1/4 rotation.

8 Secure all clamping nuts with lock nuts and remount the scraper ring.

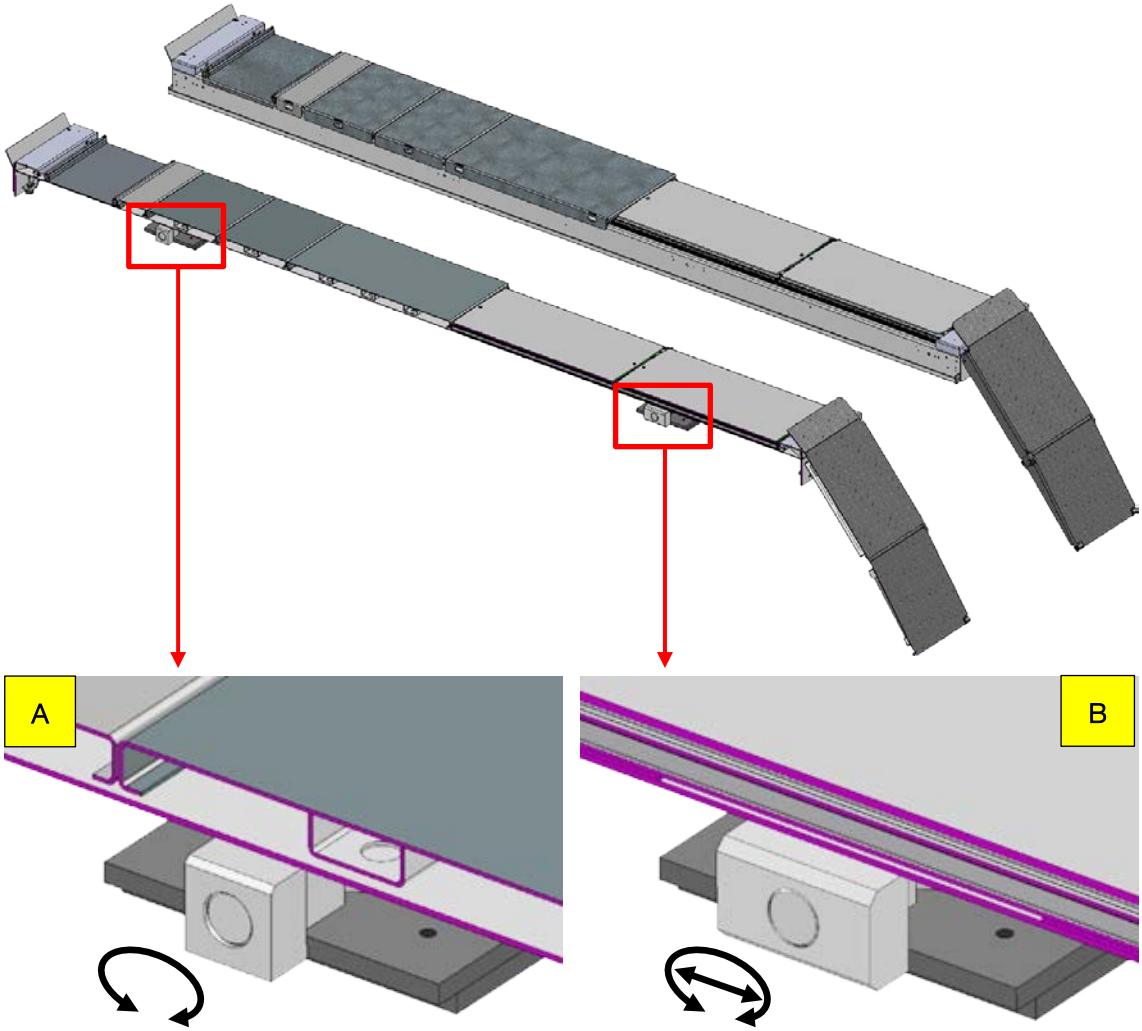
After successful resetting of the guide, the function as well as the raising and lowering times of the lifting unit must be checked, as in the initial assembly.



9 Mounting the Runway Support Structure

9.1 Determining the Fixed and Floating Bearing

The fixed bearing (A) is located on the drive-off side, the floating bearing (B) on the drive-on side.

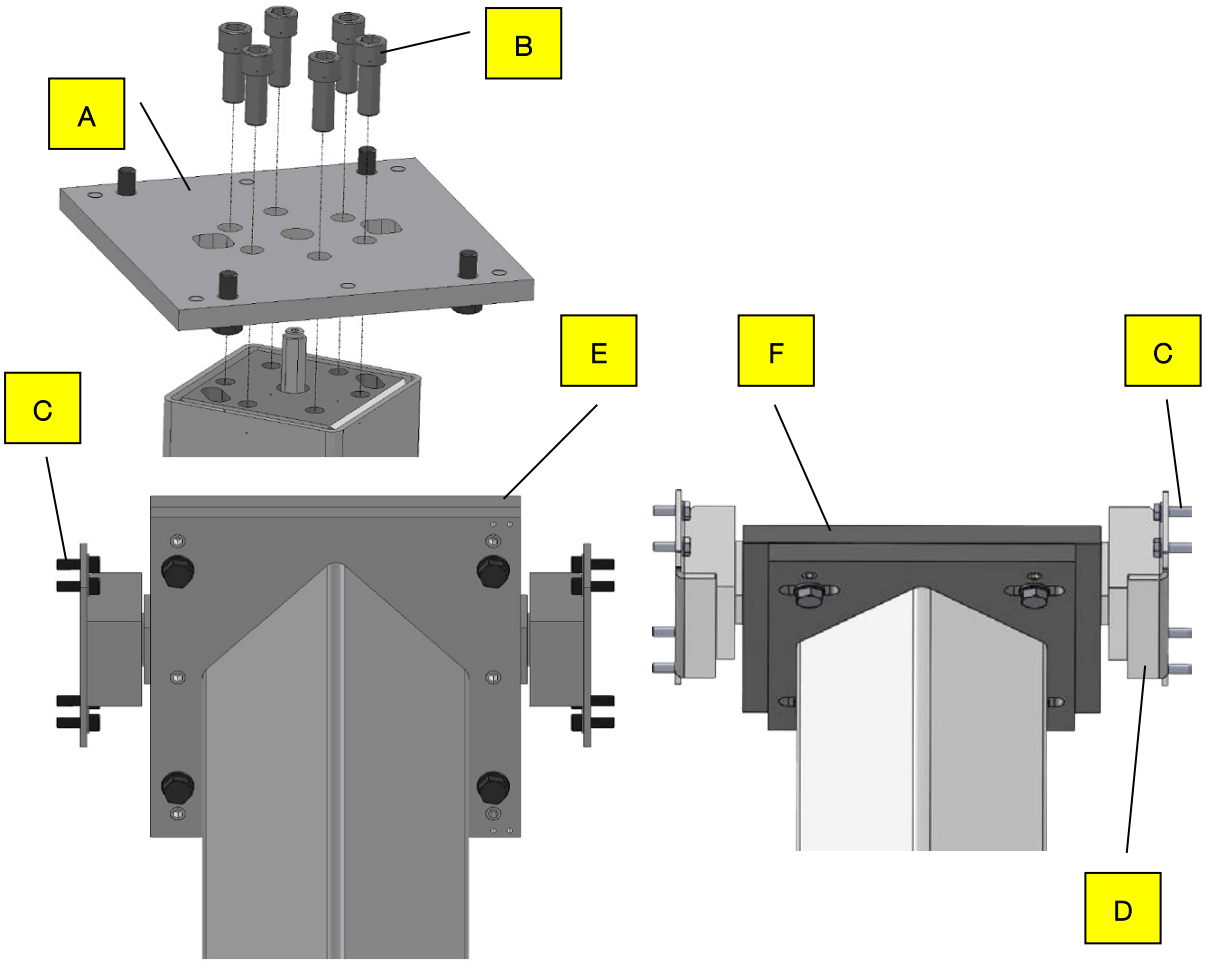


9.2 Installation

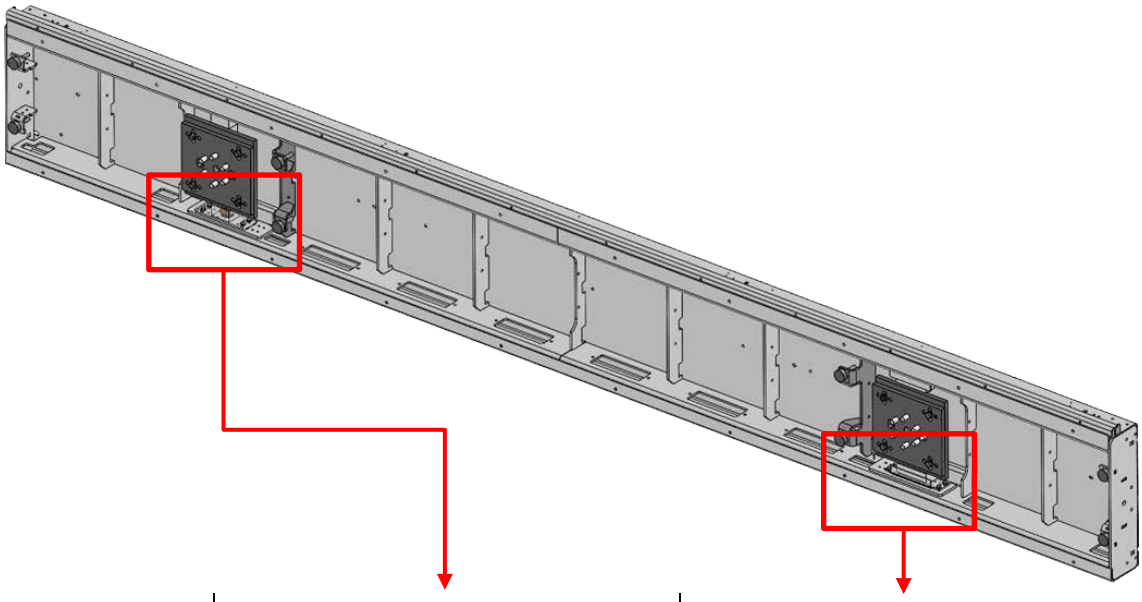
- The pneumatic lifting platform (optional) must be mounted before the support structure.
- The fixing screws of the support structure must correspond to strength class 10.9.
- Connect the electric, pneumatic and hydraulic lines for the additional devices in the driving platforms in accordance with the circuit diagrams supplied. The supply lines for the additional devices are laid inside the lifting cylinders.

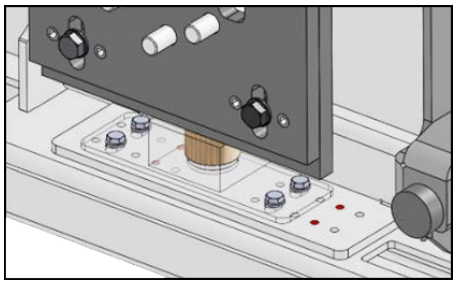
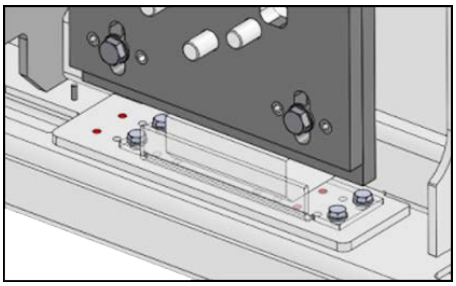
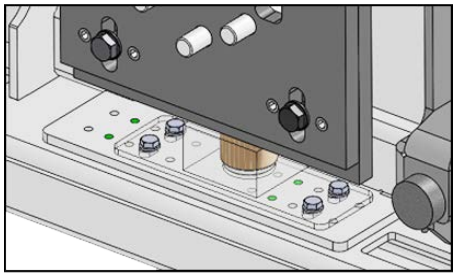
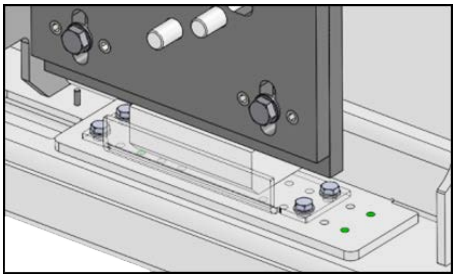
- Extend the lifting cylinder to working height.
- Mount support plate (A) with six cylinder screws (B) on the lifting cylinder (tightening torque 380 Nm).

- Use 8 hex socket screws M10×30 (C) and washers A10.5 to fasten each fixed bearing to the driving platforms. The screws must be fastened with bolt adhesive and tightened with 40 Nm.
- Use 8 hex socket screws M10×30 (C) and washers A10.5 to fasten bracket (D) to the lift support at each loose bearing.
- Place the driving platforms on support plates (A).
- Use 4 hex screws to attach bearing plates to the support plates (tightening torque 195 Nm).
  - **Fixed**-bearing side with fixed bearing (E)
  - **Loose**-bearing side with sliding blocks (F)
- After installation, check that the lift can move freely. To do this, fully raise and lower the platform once with no load and at least five times with roughly 50 % of the nominal load capacity.
- Re-adjust as required in accordance with the section entitled ‘Adjusting and checking the lifting cylinder guide’.



9.3 Setting the Cylinder Spacing in Driving Direction



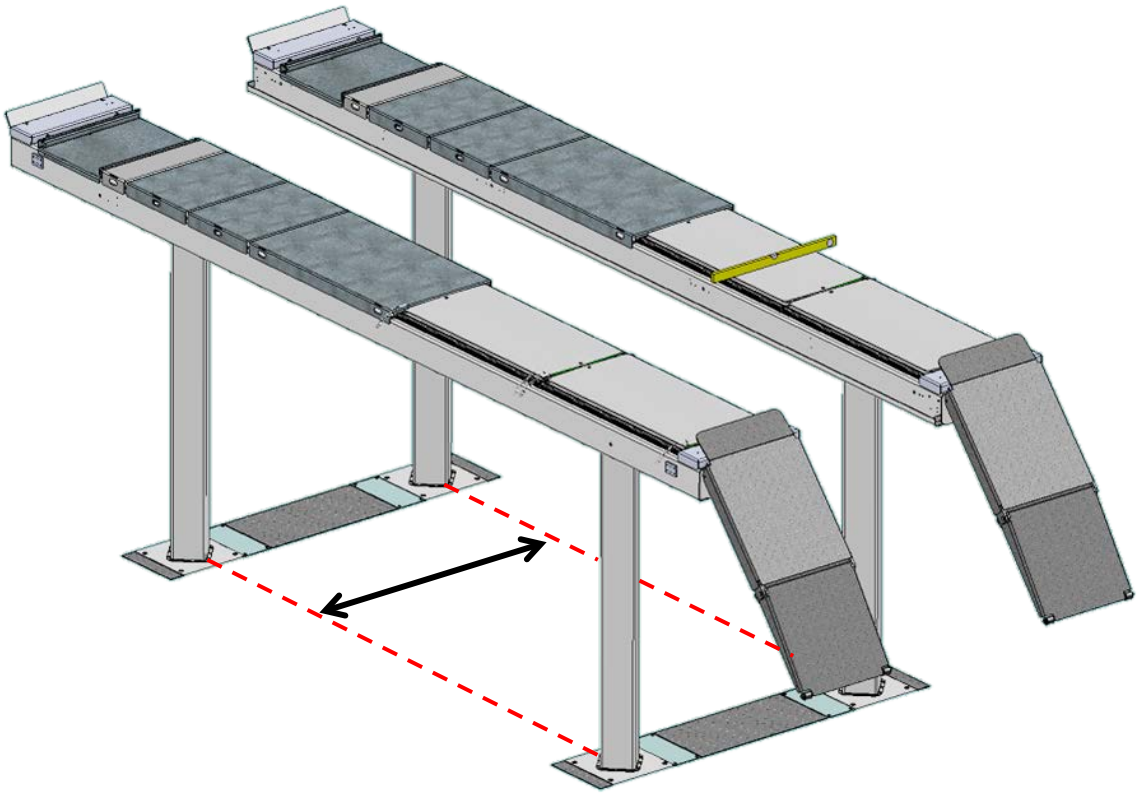
Longitudinal cylinder spacing	Fixed bearing	Floating bearing
3500		
3400		

- The bearings can be adjusted in steps of 25 mm.
- The factory-preset cylinder spacing may only be changed after consultation.

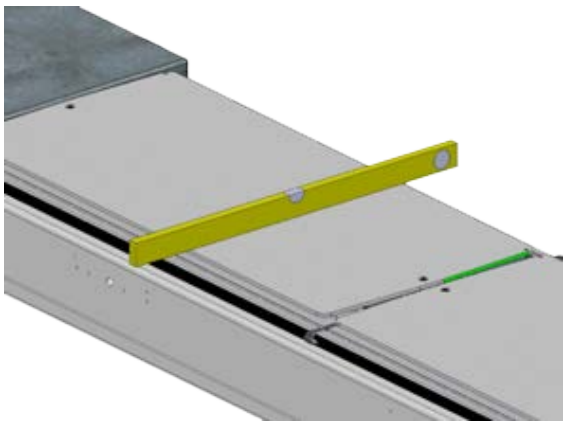
9.4 Setting the Cylinder Spacing in Transverse Direction

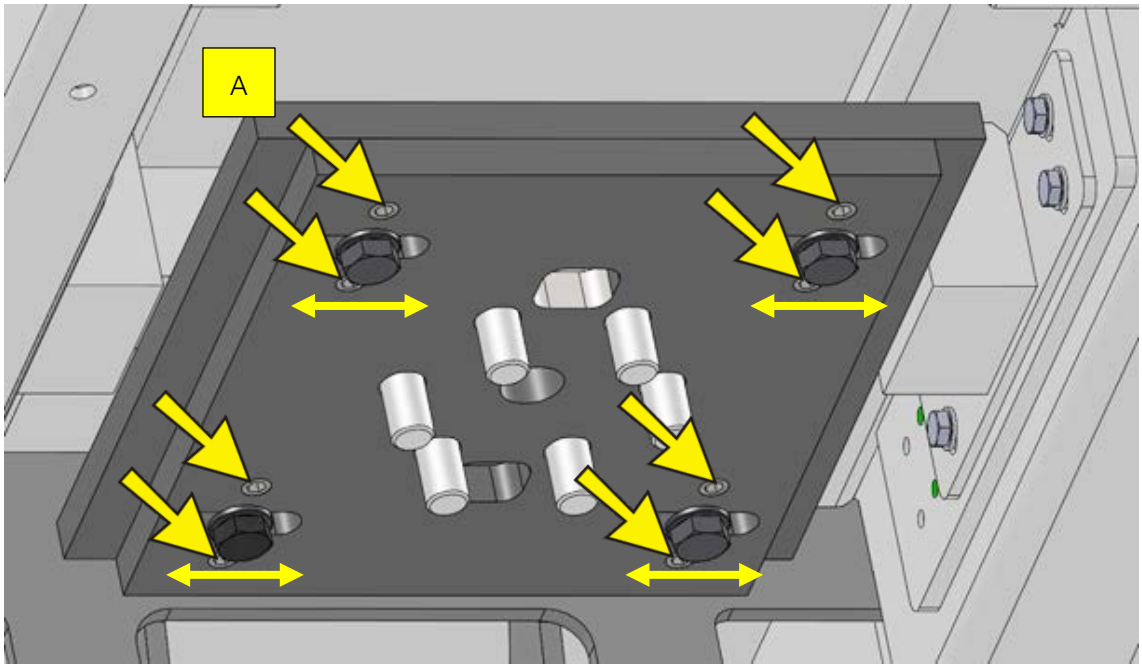
- By moving the platform (bearing plate opposite support plate), the installation width of the lifting device can be changed.
- With the transverse alignment, the gap dimensions to the floor (in floor-level installations) can be corrected.

Important for lifting units with axle lift:
The platforms must be aligned exactly parallel to each other.



- Remove the bearing plate.
- Position the spirit level and level off the eight set screws M16 (A).
- Reattach the bearing plate.





9.5 Levelling the Runways

1 Raise the lift to working height and set on the mechanical lock.

2 Measure the lift with an optical levelling device at four measuring points: two at the turntables (front side), two at the sliding plates (rear side).

3 To adjust an individual lifting post, remove the cover plate beside the cylinder unit using an Allen key (A).

4 Correct by turning the adjusting screw using an open-end wrench A/F 46 (B)

5 Lower the lift, raise again and set on the same mechanical lock. Repeat the measurement with an optical levelling device.

6 Check the runways for horizontal tilt using a spirit level (C).

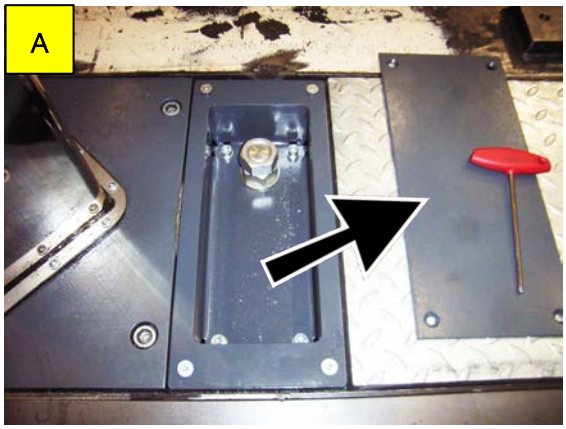
7 If required, open the hexagon fixing screw on the bottom side of the cylinder head plate (D).

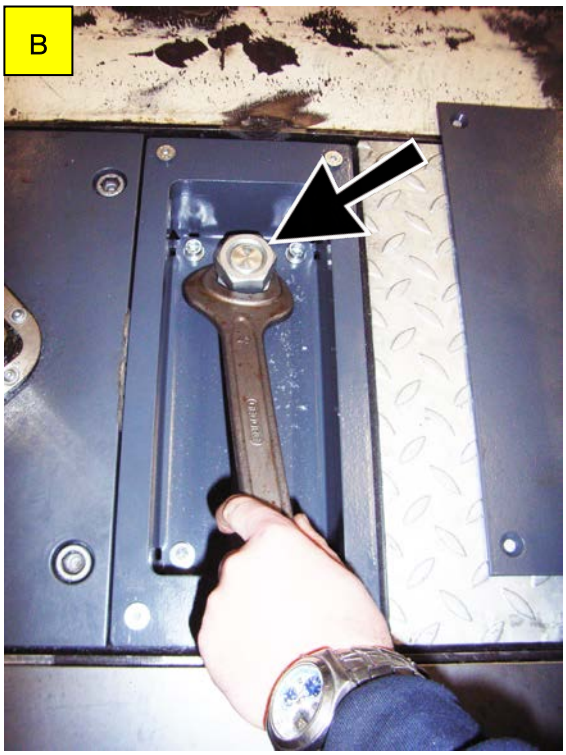
8 Adjust the horizontal setting using the six threaded pins (E).

9 Retighten the fixing screw (D).

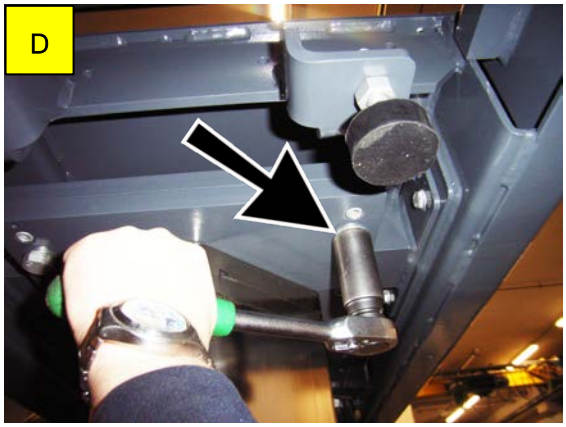
10 Load the lift with a typical vehicle and recheck the settings.

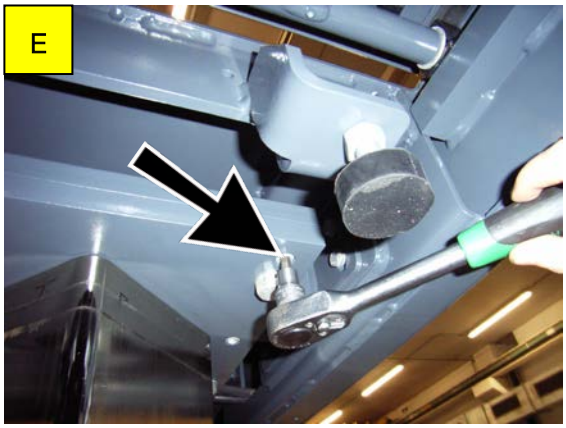
11 Secure the adjusting screws with lock nuts (B) and install the cover plates (A).





7 If necessary, loosen the hex fixing screw on the underside of the cylinder head plate (D).
8 Adjust the horizontal alignment with six set screws (E).
9 Tighten the fixing screw (D).
10 Load the lift with a standard vehicle and check the settings again.
11 Secure the adjusting screw with lock nuts (B) and install the cover plates (A).





10 Checking the Direction of Motor Rotation

Actuate RAISE button only briefly. Operation with wrong phase sequence could result in motor damage.

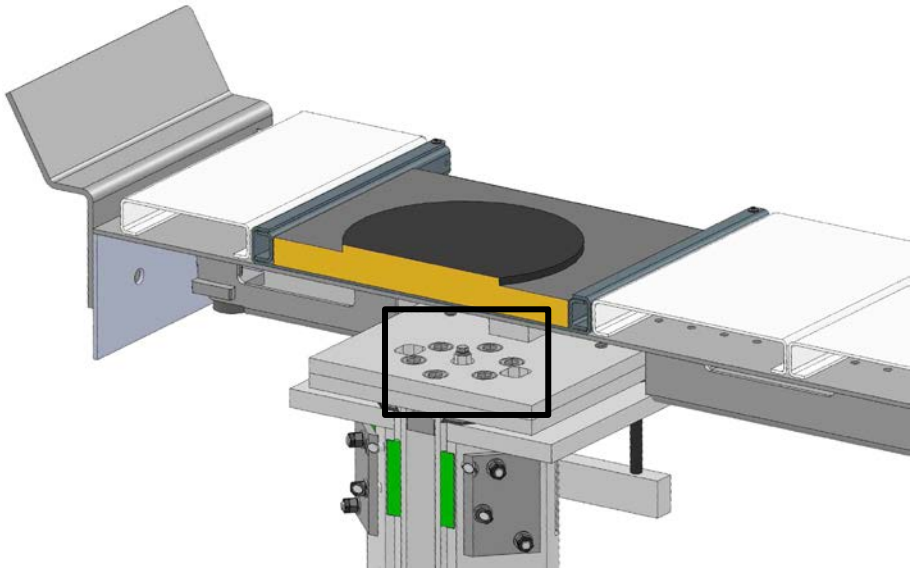
- Screw in the fuse and turn on the main switch.
- Briefly press RAISE button. If lift does not go up, interchange any two phases of the power supply cable in the control unit.

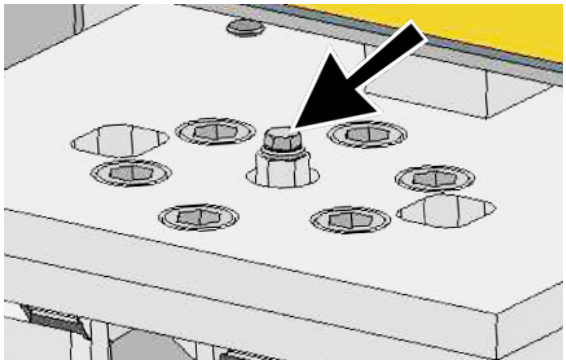
11 Bleeding the Hydraulic System

The screw plugs for venting the lift cylinders are located between the fixing screws of the support structure and can be accessed by drilling into the support structure.

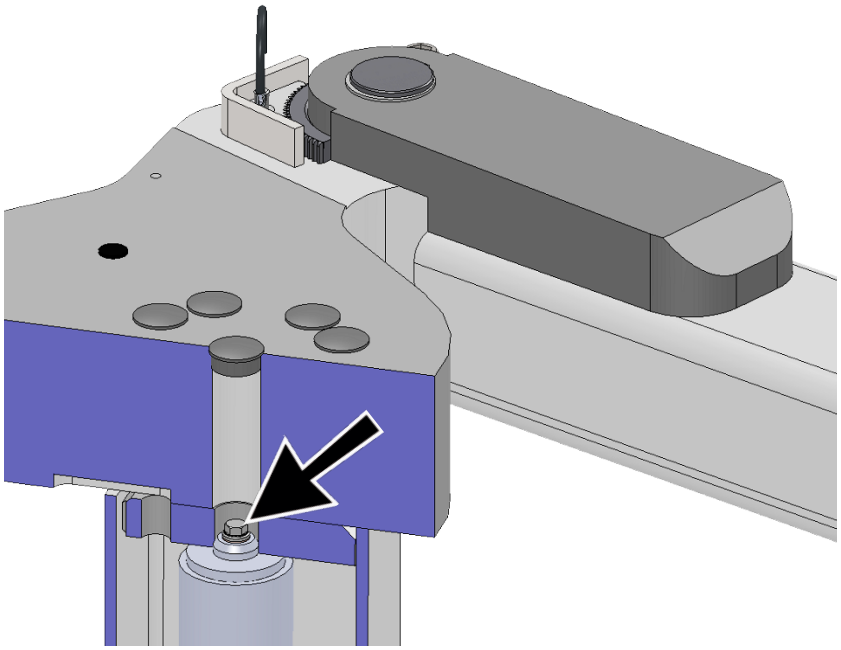
1 Lift the lifting device to approx. half of the lifting height.
2 Loosen the sealing plugs and the screw plugs of all cylinder lifts by max. one rotation.
3 In case of air-free oil leakage, close the screw plugs and tighten with a torque of 50 Nm.
4 Re-attach the sealing plugs.
5 Lower the lift completely and check the oil status in the hydraulic assembly and top up oil as required.

Lift





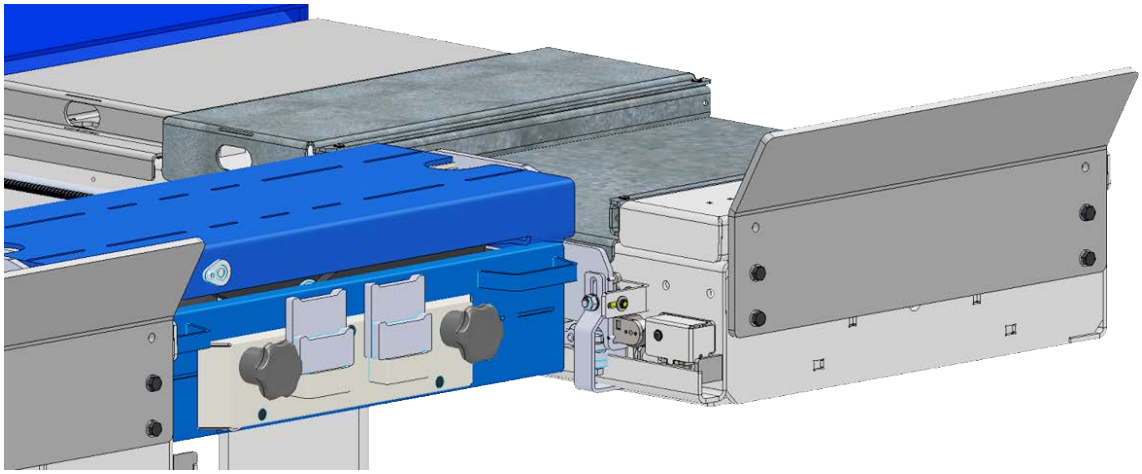
Swing Arm Jack



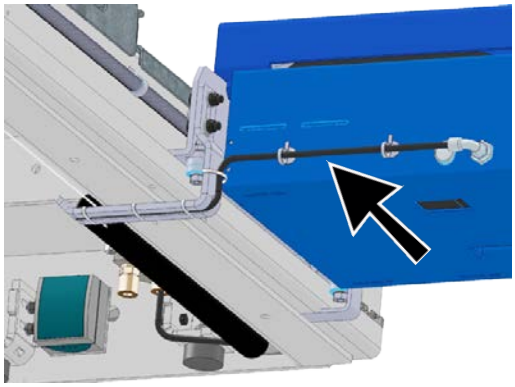
12 Axle Lift: Park Position and Hose Guide

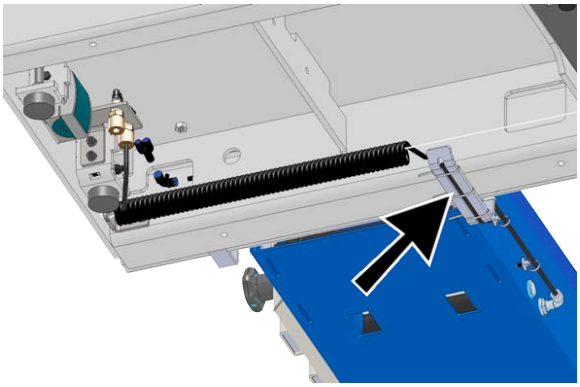
Please ensure the correct installation of the axle lift and park position.

The controls of the axle lift must be accessible from the front (platform drive-off side).
The “park position” assembly group is located at the end of the left platform and protects the axle lift from collisions (only in combination with the MAHA mount frame). A sensor monitors the position of the axle lift during lowering from the shear set height. If this is outside of the specified end position, the lift cannot be lowered any further.



The hose guide of the axle lift is under the platform in all installations. The special lift-out guard of the axle lift serves additionally for the laying of fixing of the pneumatics hose.





13 Installing the Swing Arm Support Structure

13.1 Installation

1 Extend the lifting cylinder to a lifting height of roughly 5 cm.

2 Attach the harness and use a lifting device to lift the support structure centrally on to the lifting cylinder.

3 Screw the support structure hand-tight. Per lifting cylinder, six cylinder screws M20x120-12.9 are required.

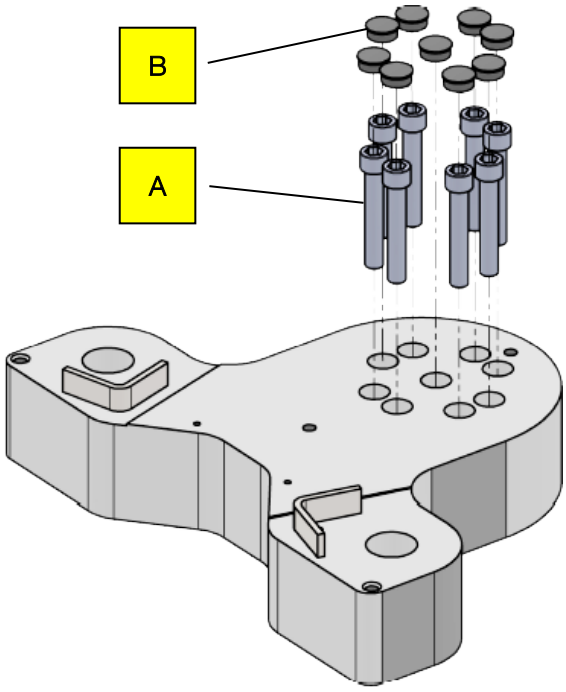
4 Tighten all cylinder screws (A) crosswise with 380 Nm.

5 Attach the sealing plugs (B).

6 After installation, check that the lift can move freely. To do this, fully raise and lower the swing arm wheel-free jack once with no load and at least five times with approx. 50% of the nominal load capacity.

7 Readjust if required (see section “Setting the Lifting Cylinder Guide and the Sliding Blocks”).

The fixing screws (1) of the support structure must correspond to strength class 12.9 and be tightened with a specified torque (see section “Torque Figures”).



13.2 Setting the Swing Arm Restraint

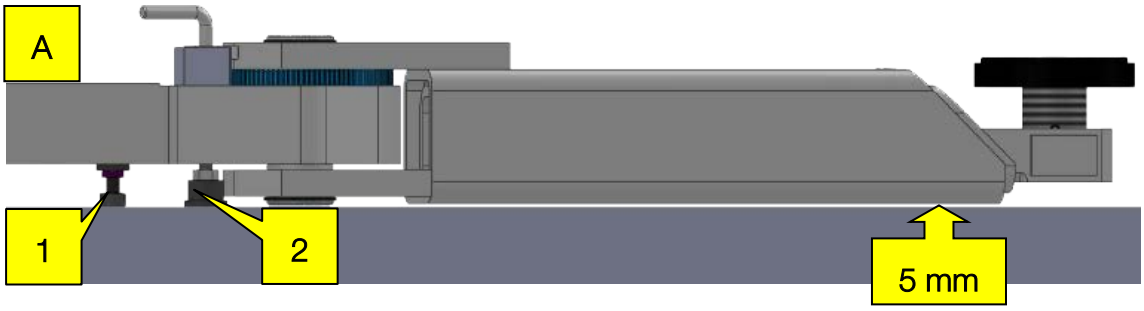
During the assembly of body supports, the support knobs and locking devices of the swing arms must be adjusted for the floor being used.
To set the support knobs and locking devices correctly, please note the following points:

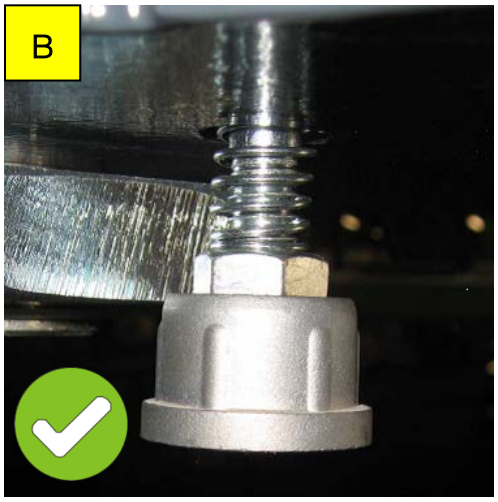
- When placing the support in the base position, the swing arm superstructure must be resting on the floor with the support knob. In the base position, the swing arms must be freely suspended above the floor over the entire swing range (toothed segment, must be completely unlocked in this position, there must be approximately 5 mm ground clearance between floor and swing arm).
- After setting the ground clearance, set the locking device at ground level and secure. Fig. B = Correct; Fig. C = Incorrect.

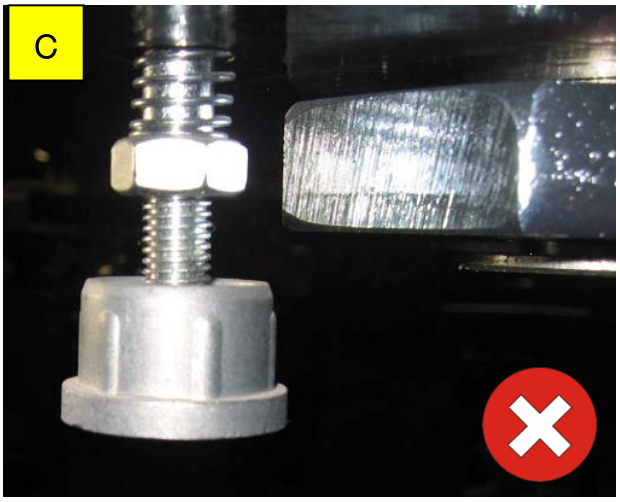
Fig. A: Overall view of the swing arm with support knob (1) and locking device (2)

Fig.: B: Locking device setting CORRECT

Fig.: C: Locking device setting INCORRECT







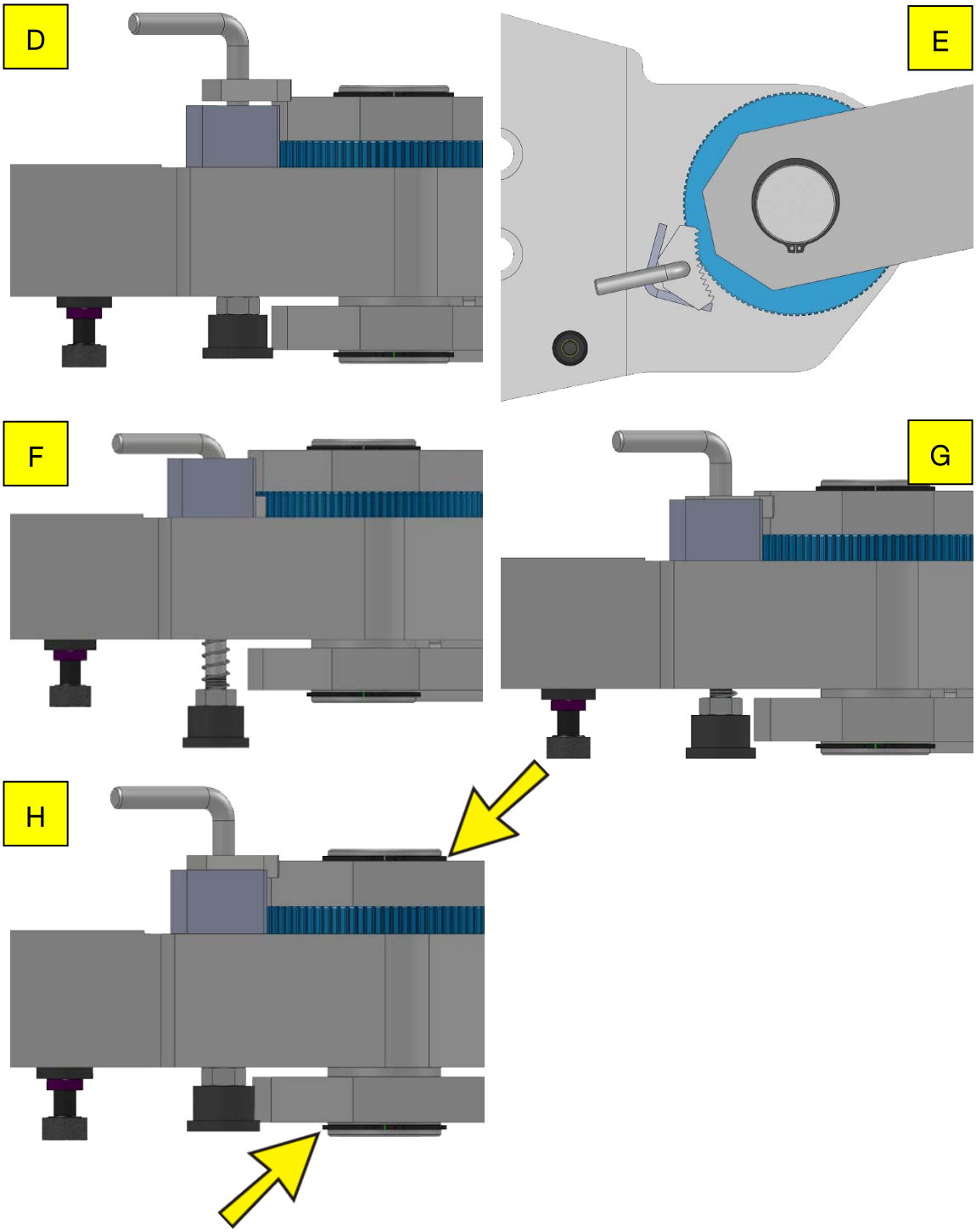
Important:
The locking device is a safety equipment item and must not be disabled!

Fig. D + E: Locking device disabled (not authorized)

Fig. F: Swing arm locked (position of locking device when the lift is in the raised position)

Fig. G: Swing arm unlocked (position of locking device when the lift is in the lowered position)

Fig. H: The locking device is set so that it cannot be disabled!


D
E
F
G
H

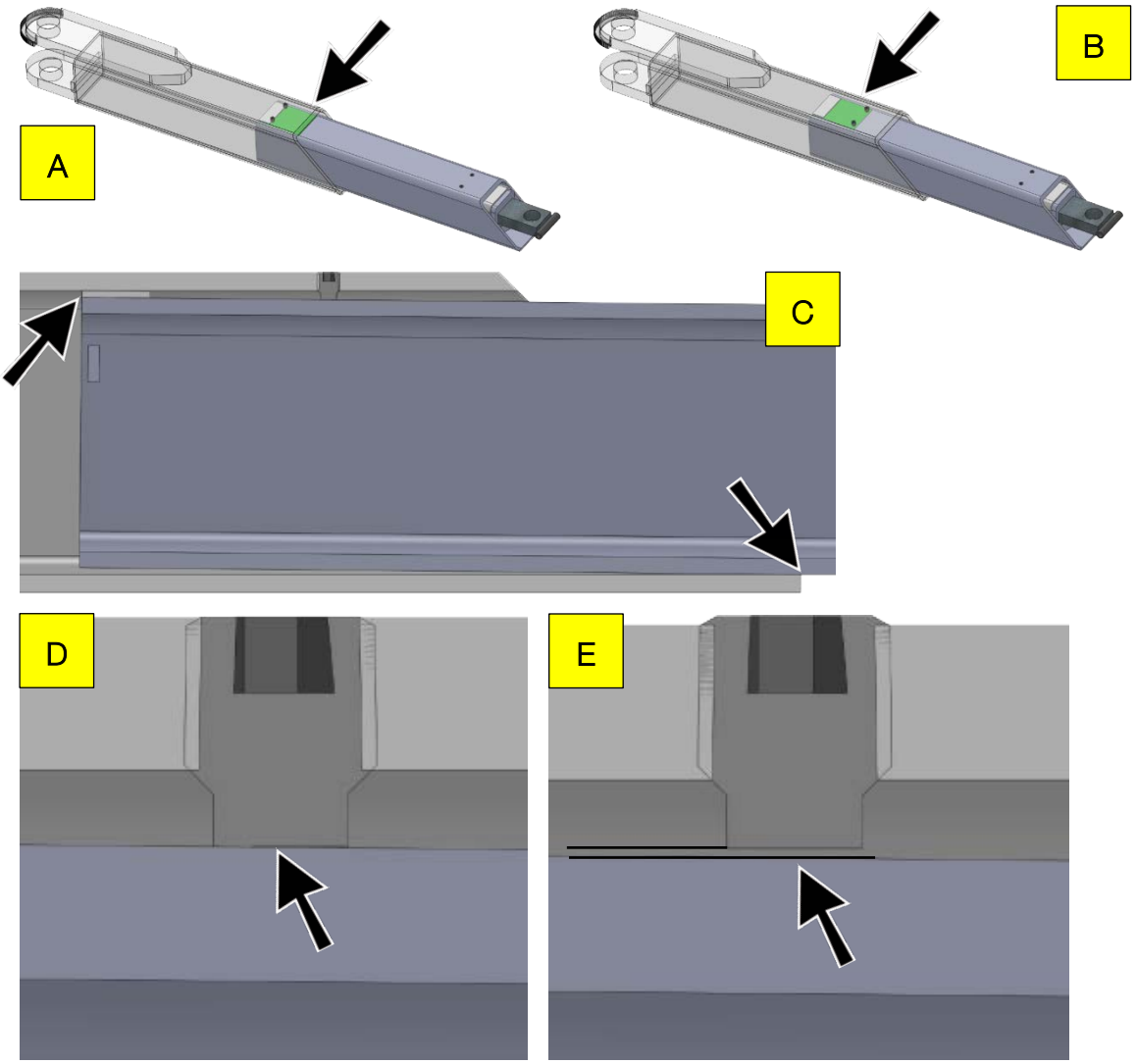
13.3 Setting the Extension Stop of the Support Arms

1 Pull out the extension over the centre of gravity.

→ The extension is now positioned clearance-free, diagonally at top and bottom (C). The green area is the area which is not visible even if the support arm is fully extended (A, B).

2 Set the set screws inside of the green area: screw in until the contact (D) and then loosen by 1/4 rotation (E).

- The set screws for the extension stop must be secured with screw locking adhesive.
- If the set screw is too tight, the coating of the extension becomes damaged, and the support arm jams. In turn, if the clearance between the set screw and the extension is too great, there is a danger of the extension falling out.
- The safety function of all individual extension limits is the basis for safe operation. The safety function must be reliably given in all operation modes (loaded, unloaded and slightly lifted support arm).
- The operation of the lifting device is only permitted with correctly set extension stop!

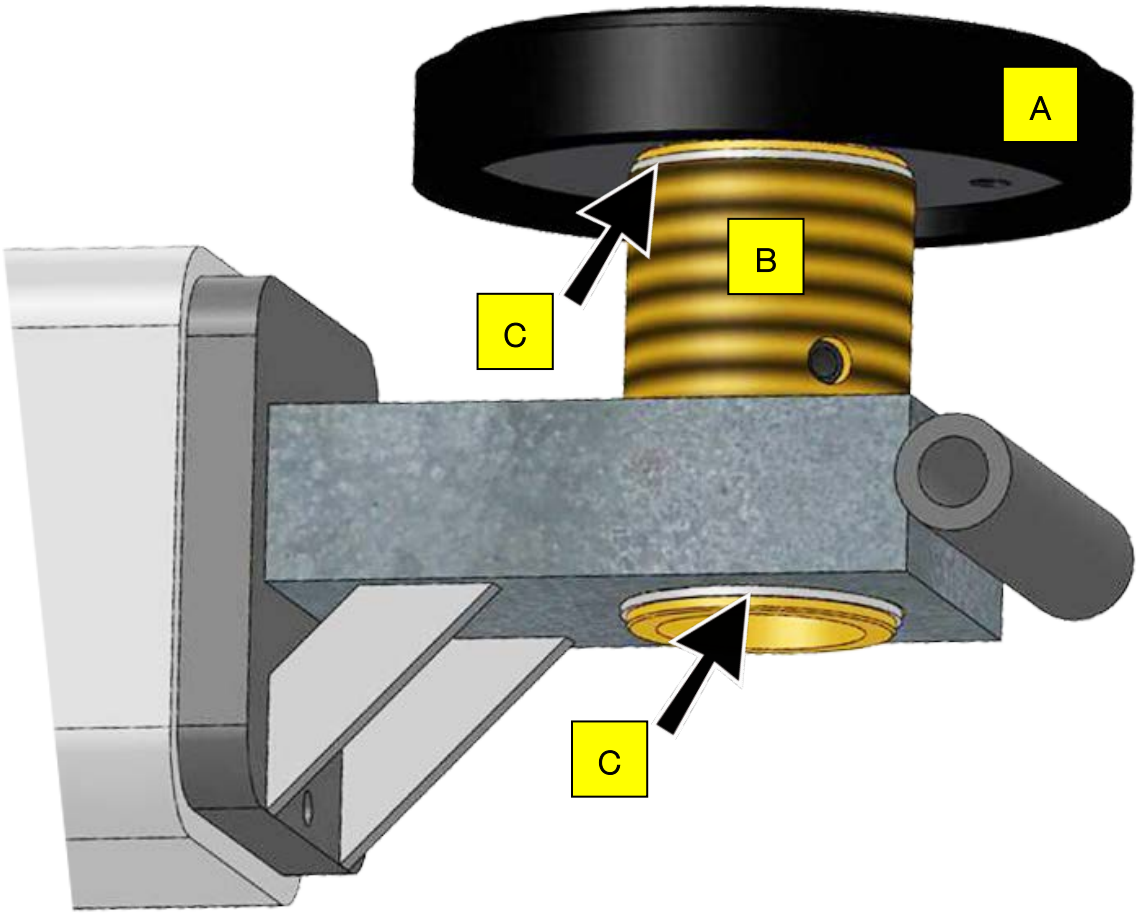


13.4 Checking the Support Disc and Adapter Thread

The adapter thread of the support disc is secured against turning out too far by a snap ring.

- Operating the lift without snap rings at the adapter thread is prohibited.
- If the secure load is impaired due to damaged rubber pads, these must be replaced.

1 Support disc with rubber pad
2 Adapter thread
3 Snap ring



13.5 Monitoring of Position and Swing Arm Restraint

13.5.1 Position Monitoring

The swing arms are in park position, when they are fully swung out: end position at cylinder screw serving as limit stop (A).

In the event that not all swing arms are fully swung out, neither the runway nor the can be moved in the collision area of the lift.

Swing Arms in Park Position

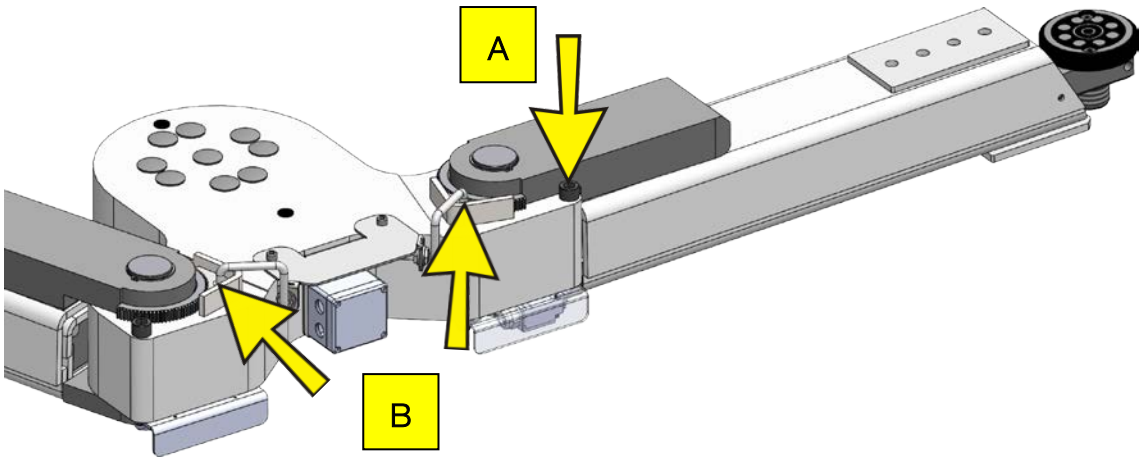
The swing arm wheel-free jack can be raised and lowered. Once the wheel-free jack reaches the upper collision limit of the lift (working height of wheel-free jack), it stops automatically and can then be raised and lowered again.

Swing Arms not in Park Position

The swing arm wheel-free jack can either be raised to the lift's lower collision limit or lowered to the lift's upper collision limit. In the shearing area between lift and swing arm wheel-free jack the wheel-free jack stops and can then be moved again, while a buzzer is beeping.
When the swing arm wheel-free jack is in the collision area, it can no longer be moved. In this case, the arms must be fully swung out to park position.

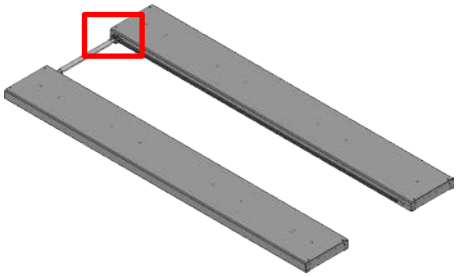
13.5.2 Monitoring of Swing Arm Restarints

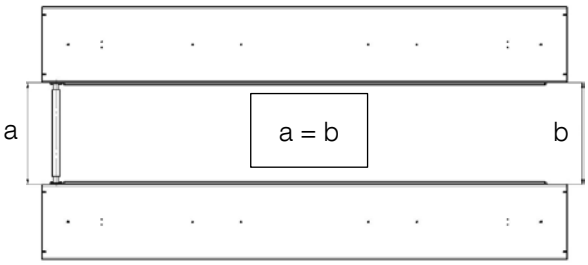
In the event that not all four swing arm restraints are locked (B), the swing arm wheel-free jack cannot be moved.

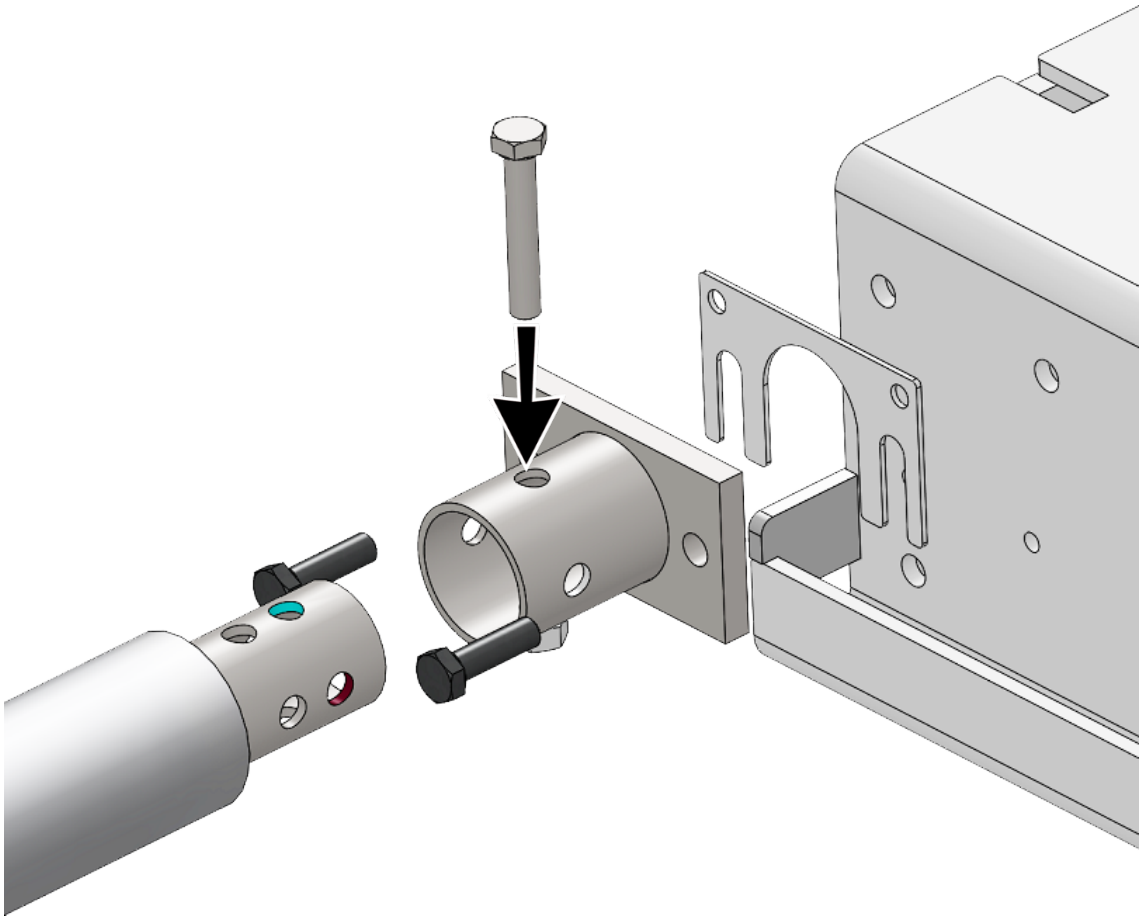


14 Setting the Runways with Crosslink

Place the crosslink between the runways. The distance between the runways must be equal at the front and rear; deviations must be compensated for with levelling plates.







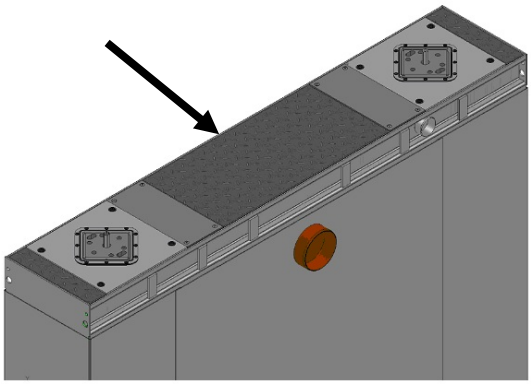
By plugging in the matching holes, the crosslink tube can be adjusted to the installation width of the platforms.

15 Sealing the Lift

15.1 Mounting the Centre Cover

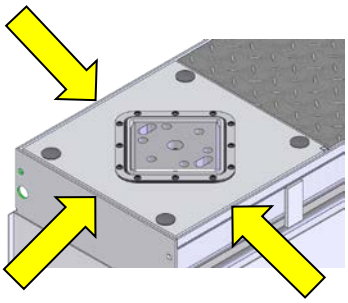
- Clean the rubber cord of the central covering and the frame of the installation box.
- Insert the central covering into the frame of the installation box. Seal the gap between the central covering and the post guide with sealing agent as required.

To facilitate assembly, the rubber cord of the central covering can be lubricated using tire assembly grease.



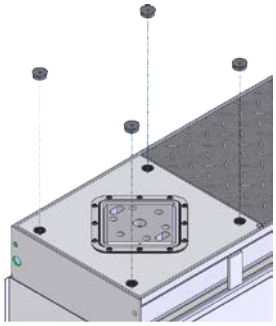
15.2 Sealing the Post Guides

Seal the gap between the post guide and the frame of the installation box.



15.3 Attaching the Sealing Plugs

Attach the plugs for the fastening screws to both post guides.

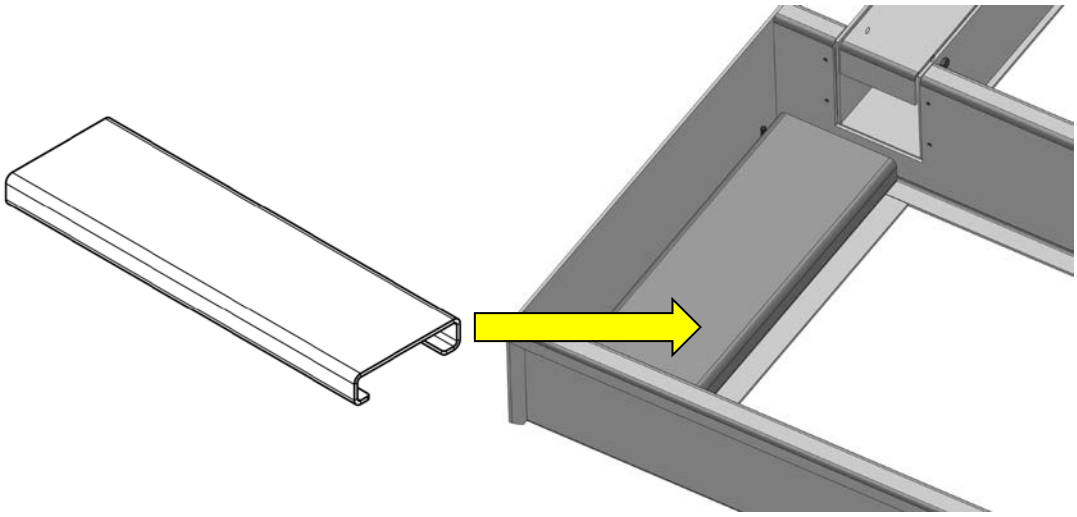


16 Attaching the Adjustment Plate

The compensating plate (part # 021087 00004 0) is required in the following combinations:

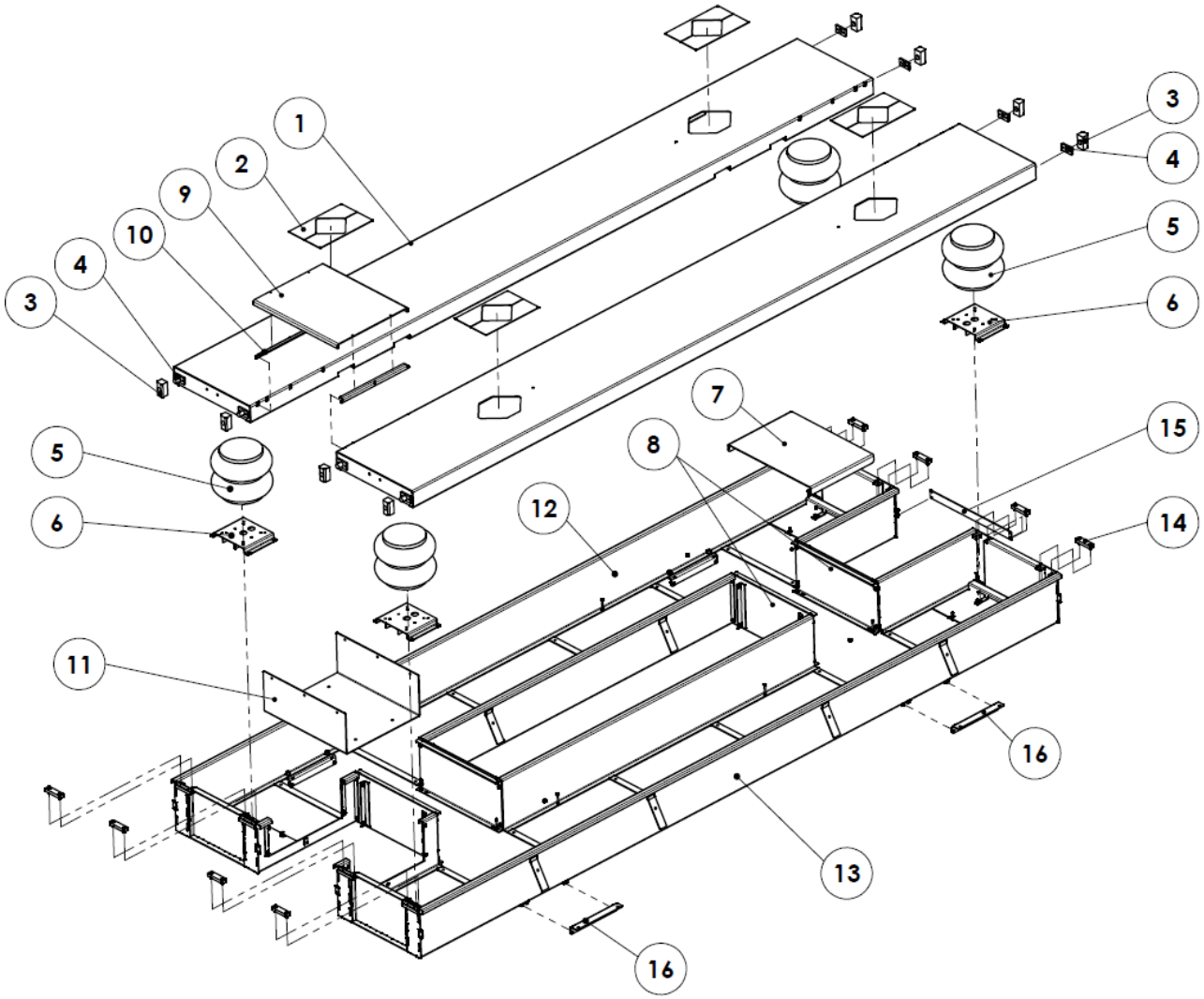
- Runway supports
- Flush mounted installation
- without Compensating plates
- without Floor Cover

- Glue the adjustment plate into the enclosure frame on all contact surfaces.



17 Pneumatic Floor Cover

17.1 Overview



1	Lifting plate	9	Axle lift cover
2	Adapter plate	10	Cover support bracket
3	Side block	11	Shaft for axle lift
4	Side block holding fixture	12	Installation trough, right
5	Pneumatic spring	13	Installation trough, left
6	Holder for pneumatic spring	14	Stop
7	Central cover	15	Cross-connection
8	Central plate	16	Fixing bar

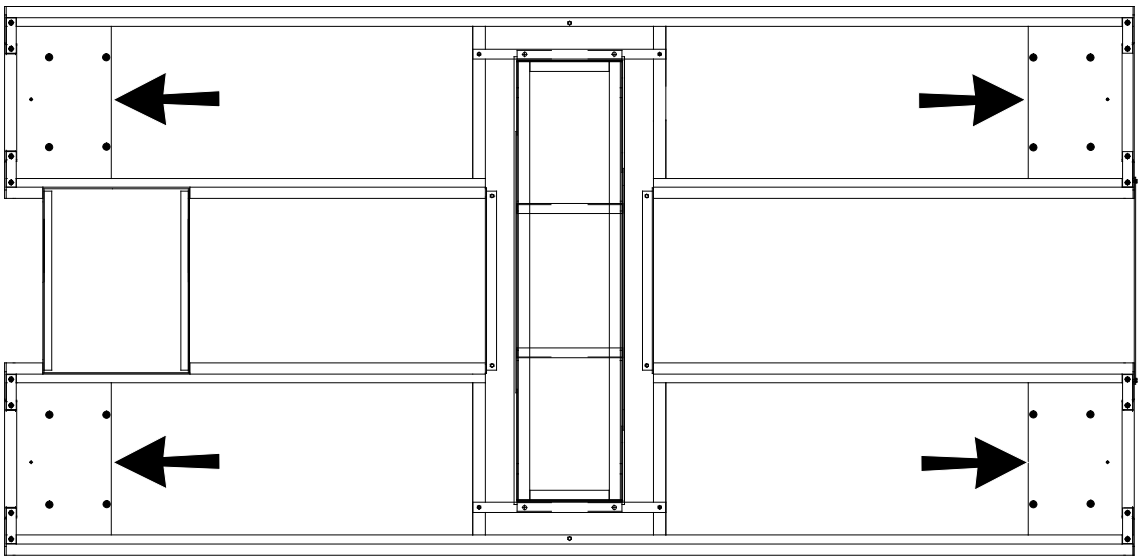
The exploded drawing also shows the parts of the pneumatic floor cover that are set in concrete during installation of the foundation trough and may not be visible.

17.2 Installation

Mounting the Air Bellows

Top view of installation troughs and installation box in concrete.

- Install the four air bellows to the fastening bolts in the installation troughs. The air hose fittings must point toward the installation box.

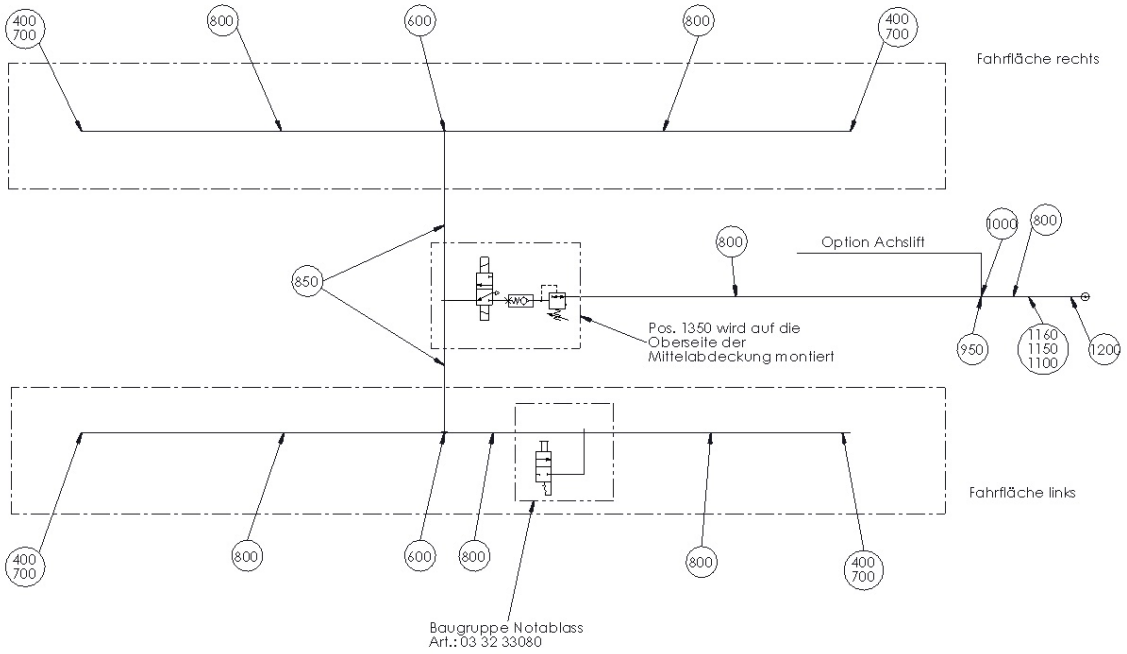


Set the pressure regulator for the pneumatic floor cover to max. 6.5 bar.

Connecting the Pneumatic System

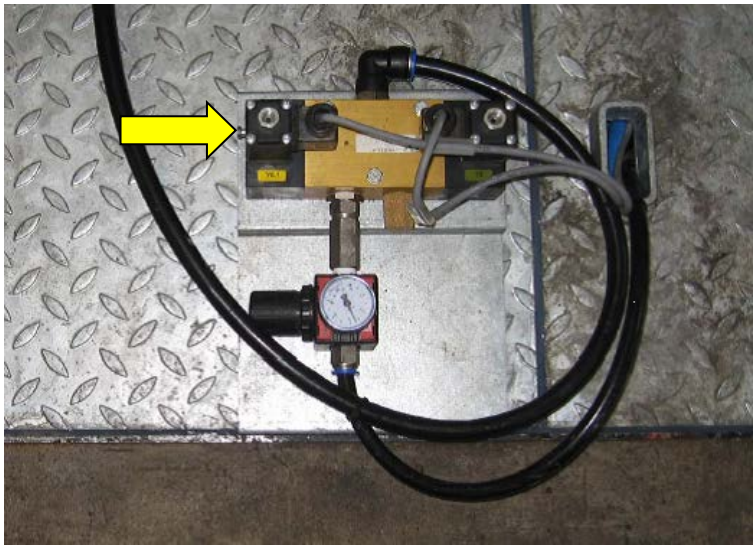
Connect the pneumatic system of the floor cover using the pneumatics diagram below.

400	Reduction from 3/4" to 3/8"
600	T screw connection, KQT 12-16
700	Swing screw connection 3/8", KQV 12-03 S
800	PUR calibrated hose, 12x9x1.5
850	PA calibrated hose, 16x13x1.5
950	T screw-in connections 1/4", KQT 12-02 S
1000	Pneumatics quick-release coupling, steel NW 7, ¼"
1100	Straight screw-in connection 3/8", KQH 12-03 S
1150	Pneumatics plug-in nipple, brass, NW 7, 3/8"
1160	Pneumatics quick-release coupling, steel NW 7
1200	PUR hose, 6x3mm
1250	Hose clamp, 13.3 GER
1300	Pneumatics hose connection grommet
1350	Pneumatics unit, ground leveling, two-post, 3.5 to
1400	T screw connection, KQT 16



Manual Lowering via the Pneumatics Unit

The pneumatics unit for the floor cover is located on the central cover of the box. Operating the lowering valve **lowers** the pneumatic floor cover in the event of any malfunctions.



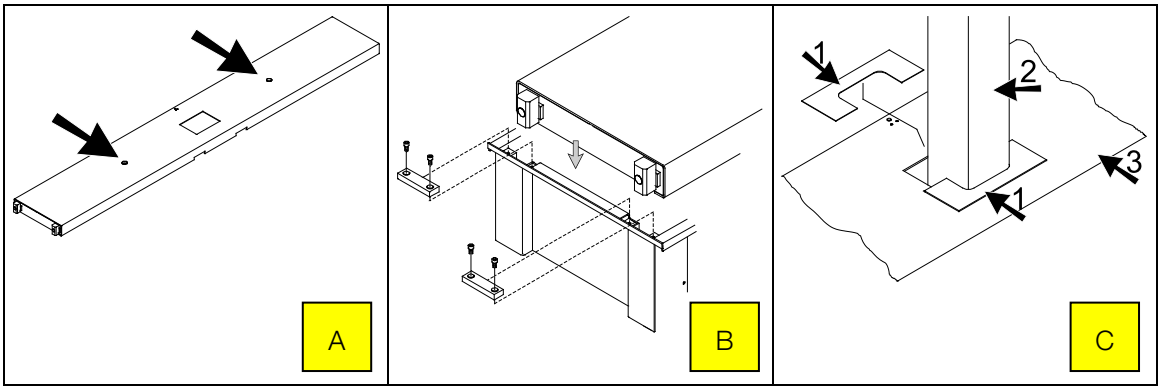
Completing the Floor Cover Installation

A Two eyebolts can be screwed into each floor cover for chain attachment. Once this is done, you can use a suitable lifting device to lower the floor cover into the guides of the installation frame.

B Insert the floor covers into the guides of the installation frame and mount the stops.

Before gluing the adapter plates in place, check that all the adhesive surfaces are free from grease and clean them as required.

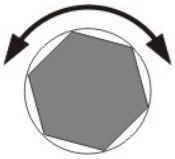
C After the runways have been mounted, drive on to the lift. Use vinegar-free, neutrally binding silicone to adhere adapter plates (1) around lifting post (2) on runway (3).



18 Bleeding the Scissors-Type Wheel-Free Jack

On the valve block with lettering (A) there are four hex socket screws:

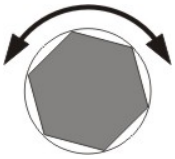
Loosen screw ➔ Activate valve



Tighten screw ➔ Deactivate valve

The valve blocks and the cylinders of the wheel-free jack each have one screw (D + F):

Loosen screw ➔ Deactivate valve



Tighten screw ➔ Activate valve

Procedure:

→ Both sides of the wheel-free jack are in the home position.

1 Fully tighten the screws for valves +A3-V1 and +A3-V2 on valve block (A).
At the same time, the screws for valves +A3-M52.AB and +A3-M51.AB must be open.

2 Press the ‘Lift’ button.

→ The slave side of the wheel-free jack begins to rise, followed by the master side.

3 Disconnect valve connector (B) from +B3-M50 and +B3-M50.1. The valves (C) remain closed!

4 Loosen screws (D) on valve blocks +B3-M50 and +B3-M50.1. At the same time, the screws on valve blocks +A3-M50 and +A3-M50.1 must be closed.

→ The cylinders are stationary.

5 Press the ‘Lower’ button.

→ The slave side is lowered.

6 Feed 8×1 mm Tecalan tubing (E) from the side opening of the valve block into a container.

7 Press the ‘Lift’ button.

8 If oil comes out with no air, tighten the screws on valve blocks +B3-M50 and +B3-M50.1.

9 Loosen screws (F) on the master cylinders.

10 Press ‘Lift’ in jog mode.

11 When oil comes out of the master cylinders with no air, tighten screws (F) again.

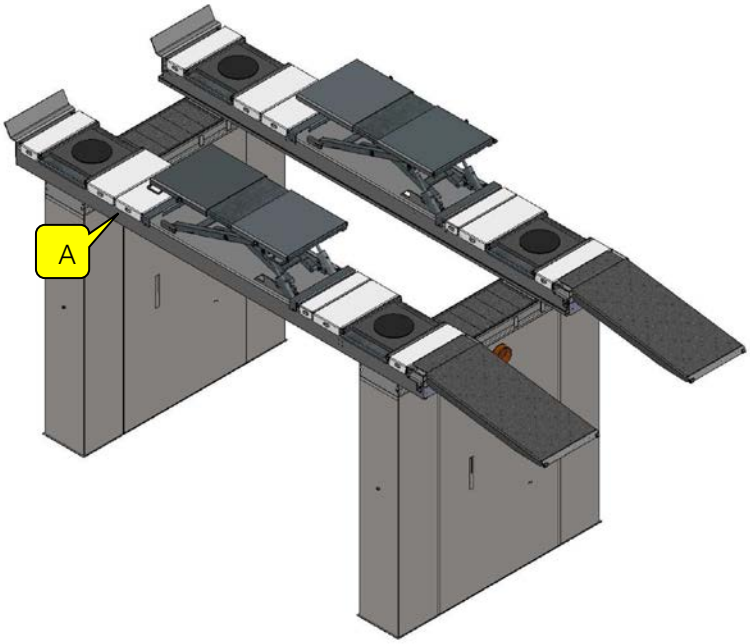
12 Reconnect valve connector (B) to +B3-M50 and +B3-M50.1.

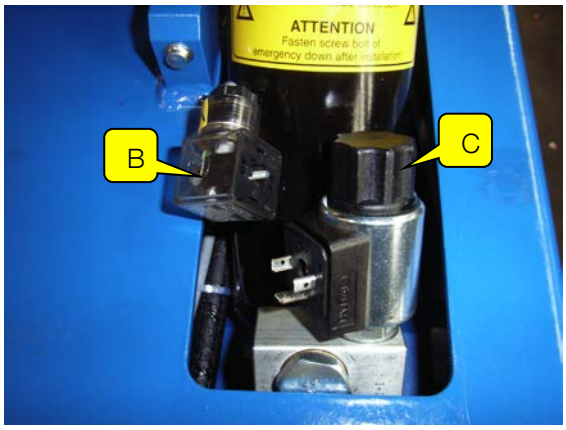
13 Press the ‘Lift’ button to move the wheel-free jack to the upper stop and level it.

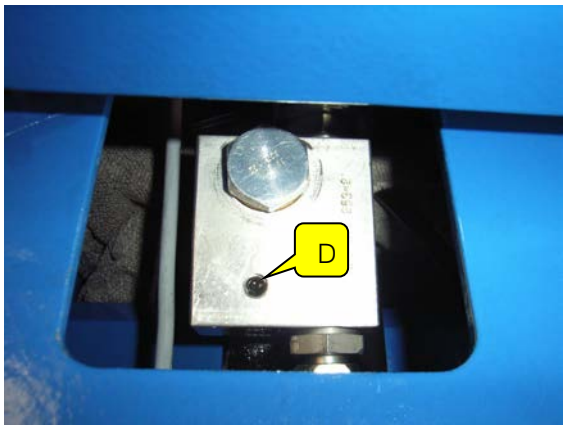
14 Press the ‘Lower’ button to lower the wheel-free jack to the home position.

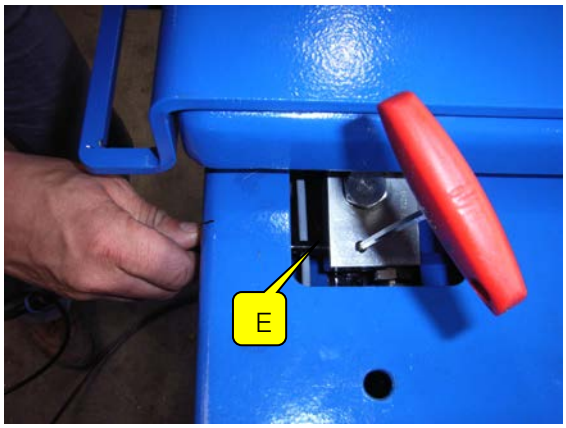
15 Perform de-aeration for the other side in a similar way.

16 Once the de-aeration procedure has been completed, loosen the screws for valves +A3-V1 and +A3-V2 on valve block (A).


A


ATTENTION
B
C


D


E

F
ACHTUNG
Nach der Montage die
Notablaßschraube schließen!

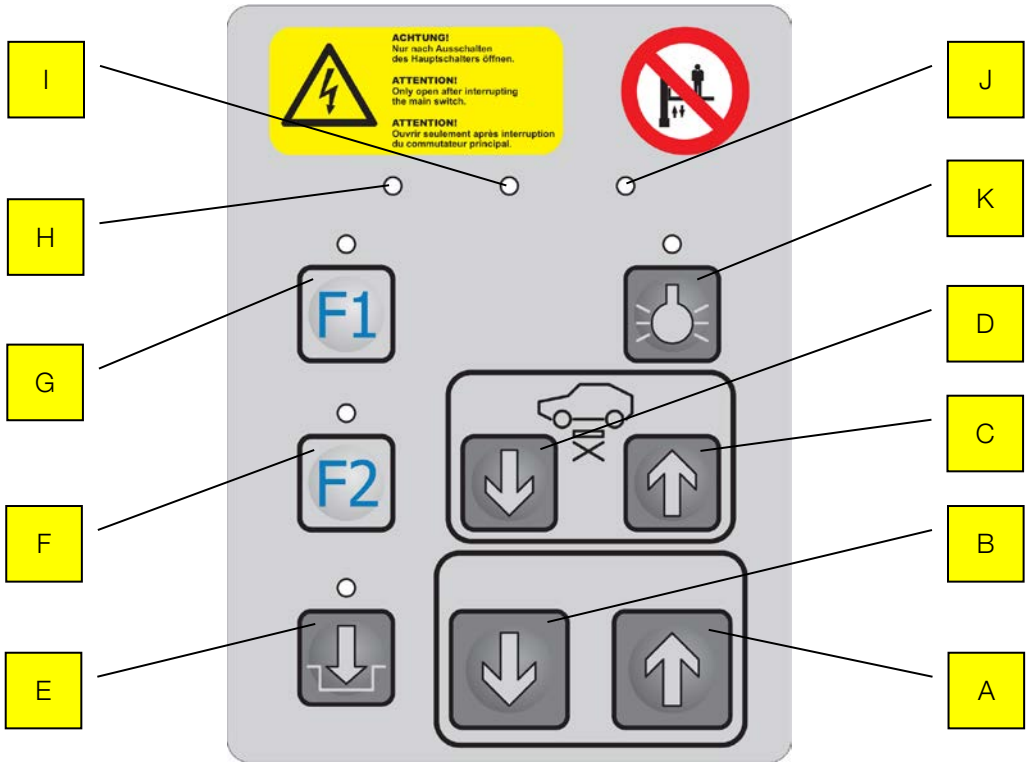
19 Operational Check

The acceptance of the lift is performed by an expert. He shall check all functions and safety devices and confirm the result on the sheet enclosed in the operating manual "Quality Certificate for Installation and Service". This form must be completed and returned to the manufacturer.

During the acceptance, the following points must be checked again particularly:

- Upper and lower limit switch
- Synchronisation of the two lifting cylinders
- The fastening torques of all fastening screws and nuts
- Smooth operation of the lift with and without load
- Tightness of the hydraulic system

20 Control Unit



	Function	Short Form
A	Raise lift	LIFT UP
B	Lower lift	LIFT DOWN
C	Raise swing arm jack	WFJ UP
D	Lower swing arm jack	WFJ DOWN
E	Latch On/Off *On (LED on): Wheel alignment mode, latch in operation* *Off (LED off): Regular mode, without latch*	LATCH
F	Multifunctional key 2	F2
G	Multifunctional key 1	F1
H	LED red (Malfunction or Error code); see below	
I	LED gelb (Malfunction or Error code); see below	
J	LED green (Ready for operation); see below	
K	Illumination On/Off *On (LED on): Illumination is on when above pinch point (CE Stop) and is off when below* *Off (LED off): Illumination is always off*	

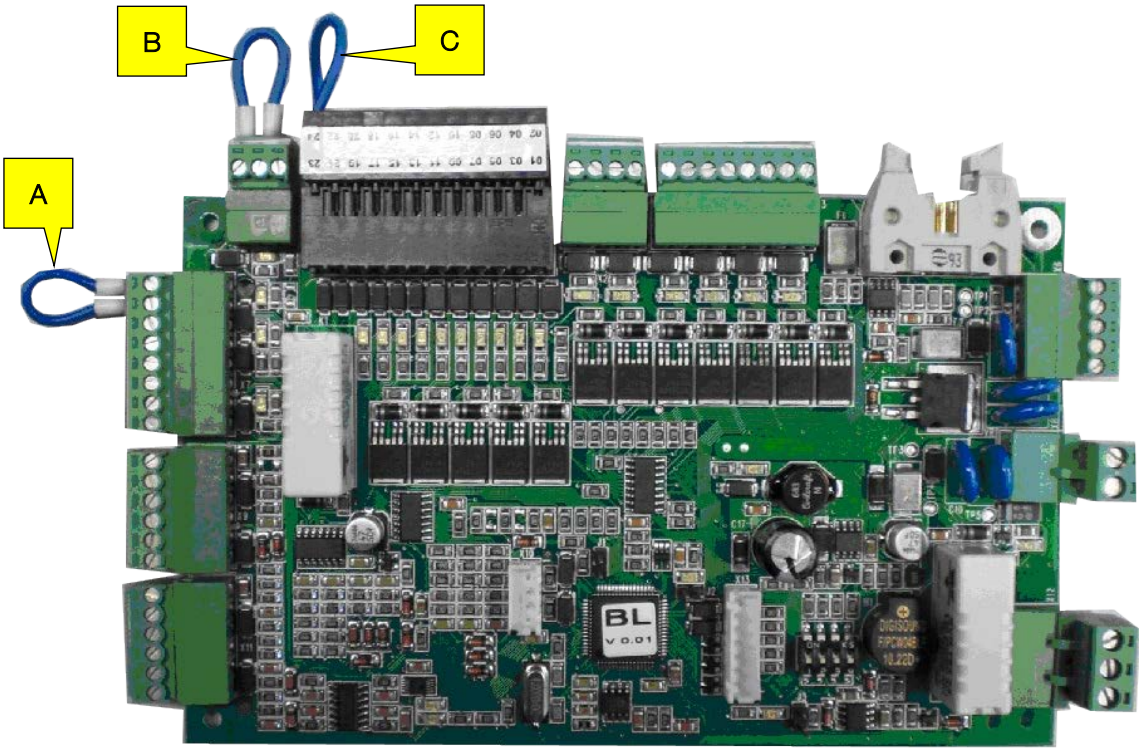
21 Error Codes

Fault number	Description	Cause
2	Axle lift error within the shear position (option axle lift active)	The axle lift is not in its park position within the shear position! Before raising or lowering , the axle lift must be put into the park position.
3	Obstacle difference	When lowering in NOTCHES the sharper difference for an obstacle is monitored. If this is exceeded, the system is switched off and the fault message is displayed. Thereafter, the lift can still be raised.
4	Maximum difference	Maximum permissible difference exceeded. Runway and/or wheel free jack have reached the maximum permissible height difference. Raising and lowering is only possible manually of in emergency mode.
5	-	
6	Internal keyboard error	When switching on, a key is activated or the keyboard is defective.
7	External keyboard error	When switching on, a key is activated or the keyboard is defective.
8	Zero point error in height measuring	During adjustment of the zero point, the lift was not right at the bottom or the height sensor/cable is defective.
9	Motor too hot	The temperature sensor at the pump motor was triggered, or in case of no sensor, the bridge at the circuit is mission.
10	-	
11	-	
12	-	
13	-	
14	-	
15	-	
16	Raising error	The lift does not raise although the pump is on and the seat valves are open (test time 2s). Cause of error: Contactor defective, pump defective, measuring system defective.
17	Measuring system error	The signal level of the measuring system is outside of the permissible range. Either the measuring system or the cables are defective.

Fault number	Description	Cause
18	Contactor monitoring error	The status of the contactor monitoring contact reports that either the contactor is hanging (signal in de-energised contactor) or the cable is defective (no signal from actuated contactor). All pump contactors and the power contactor are monitored.
19	Release control error	The status of the release relay monitoring reports that either the release contact is hanging (signal at de-energised release relay) or the releaserelay is defective (no signal at actuated releaserelay). This error also occurs when voltage is fed back to the outputs, be-cause e.g. a cable is frayed!
20	Deficient plug memory (MAH SPI FL)	Plugged memorymodule is deficient or missing.
21	Timeout MAH HT08 internal (option external control unit active)	internal keyboard circuit board not responding. CAN-bus deficient of no MAH HT08 board present or dip switch 2 on HT08 is not on OFF.
22	Timeout MAH HT08 external (Option external control unit active)	External keyboard circuit board not responding. CAN-bus deficient of no MAH HT 08 board present or dip switch 2 on HT08 is not on ON.
23	-	
24	-	
25	-	
26	-	
27	-	
28	-	
29	-	
30	Incorrect boot loader version in the MAH HS0812 control board	Control board must be replacedwith a board with a boot loader version of V0.03 or higher.
31	-	
32	-	

22 Control PCB

Installation



(Example)

Options that can be activated on the board by jumpers:

A Axle lift position monitoring X1: 1 to 12

B Ceiling light barrier X2 (grey terminal strip)

C Emergency stop palm button X5: 23 on 24

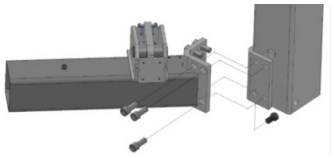
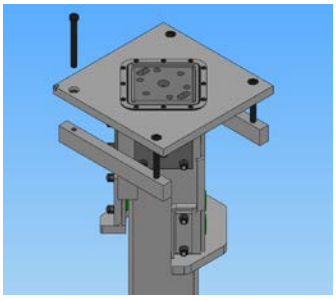
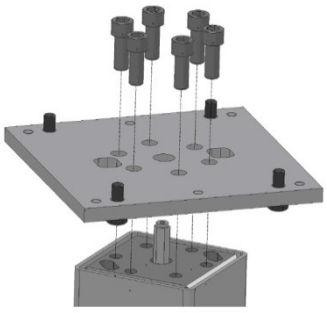
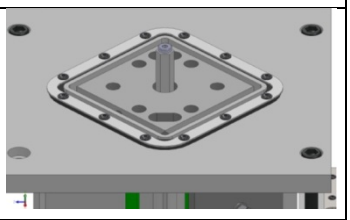
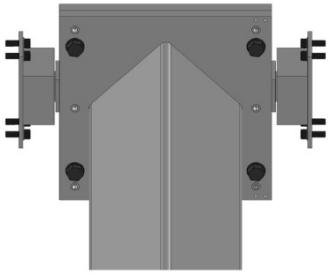
Changing the Flash Memory

1 If the control circuit board MAH HS0812 is replaced, the FLASH memory MAH SPI FL must be taken from the old control circuit board and put onto the new one while the master switch is switched off.

2 Switch on the main switch. Software with parameters is transferred to the control circuit board (red LED next to the FLASH memory flashes for about 20 s). When this process is completed, the control circuit board beeps and the green Ready LED outside on the keyboard lights up.

3 Switch the main switch off and back on again. Wait until the green "Ready for operation" LED comes on and the board emits a beep. The lift is now ready for operation.

23 Torque Figures

Screw(s)	Tightening torque [Nm]	
Fastening screws with synchronising lever	320	
Fastening screws of the clamping parts on the lifting cylinder guide	140	
Fastening screws of the support structure	380	
Screw plug	50	
Fastening screws, fixed/loose bearing	195	

24 Setting the Pressure Relief Valve

The hydraulic pressure varies from model to model and is preset in the factory. The valid pressure values for the individual pressure relief valves should be taken from the relevant fluid plans.

The pressure can only be set/measured when the cylinder is in the mechanical end position (moved hydraulically until contact is made).

The factory setting may only be changed if all known causes of failure have been ruled out. Any changes to the factory setting must be recorded in the inspection log.

A pressure relief valve is used to prevent the lifting unit from being used inappropriately (in this case: with overload). In borderline cases, the factory pressure settings may be increased at the valve by a maximum of 10%. The valve pressure may only be increased to more than 110% with the specified nominal load in accordance with EN 1493:2010.

25 Care of the Nickel-Plated Lifting Cylinders

If the lifting cylinders are soiled with dirt or residues of underbody protection, polishing wax, oil or grease, the sliding performance will be impaired.

Care of the lifting cylinder not only improves sliding performance, it also provides an additional seal to protect the attractive nickel-plated surfaces.

Procedure:

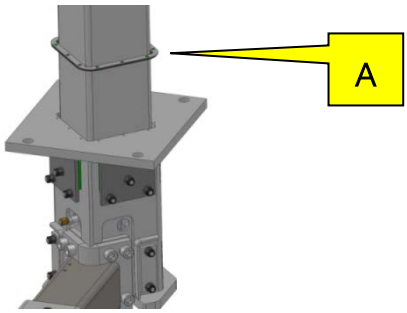
1 Extend the lifting cylinder fully.

2 Remove the wiper ring and push it up completely (see image).

3 Use a suitable cleaning agent (e.g. brake cleaner) to fully remove all residues and dirt from the nickel surfaces.

4 Apply HLP 22 with a cloth or spray bottle to preserve the nickel surfaces. The surfaces should be covered with a thin and even film of oil.

Depending on how much dirt is present, the protective sealant coating may need to be re-applied. This must be done as part of annual inspection and servicing at the latest.



26 Special Programs

26.1 Special Programs without Service Mode

The special programs can be started by simultaneously pressing two buttons while switching on the lift.

26.1.1 Setting the Lift to Zero (Referencing in Bottom Position)

Lower the 4P lift and the wheel-free jack/2P lift into bottom position.

Starting the referencing procedure:

- Main switch OFF.
- Wait approx. 5 seconds until the power supply unit has discharged.
- Press and hold down the [DOWN] + [WFJ-DOWN] buttons at the same time.
- Main switch ON.
- Wait for approx. 10 seconds until the signal tone beeps once.
- Release the buttons.

The lift is not automatically referenced. If the lift is in bottom position and the display indicates a remaining height, the lift must be referenced again.

If the lift is referenced above a third of the overall height, an error message displays and referencing is not performed.

26.1.2 Resetting the Service Interval

Every time the runways are moved, the lift counter for the service interval counts up by one. As soon as a preset configuration variable has been reached, the green Ready lamp starts to flash. To reset the service interval, proceed as follows:

- Main switch OFF.
- Wait approx. 5 seconds until the power supply unit has discharged.
- Press and hold down the [F1] + [LIGHT] buttons at the same time.
- Main switch ON.
- Wait approx. 10 seconds until the signal tone beeps three times.
- Release the buttons.

26.2 Special Programs in Service Mode

The software version can be found on the yellow label on the dongle of the control board, or during switch-on on the (optional) display at the operating unit.

Switching to Service Mode

1 Main switch OFF.

2 Wait for approx. 5 seconds until the power unit has discharged.

3 Hold down the [UP] + [DOWN] buttons at the same time.

4 Main switch ON.

5 Wait for approx. 10 seconds until the beeper sounds slowly.

6 Release the buttons.

► The service mode is enabled when the beeper sounds slowly, the red LED light flashes and the green LED light is steady.

- Please take special caution in this mode. If no button is pressed for a period of 3 minutes, the service mode is automatically disabled for safety reasons.
- To lower the lift, you need to raise it *once*, to release the latches. Otherwise, lowering of the lift is blocked.
- In service mode, the runways and the optional wheel-free jack can be moved with buttons [UP] / [DOWN] / [WFJ-DOWN] / [LATCH].
- In service mode, the lift light may *only* be switched on and off with button [LIGHT].
- The emergency stop switch is monitored, provided that the required options are enabled.

26.2.1 Saving the Maximum Lifting Height

1 Raise the 4P lift with the [UP] button and the 2P lift (if present) with the [WFJ-UP] button to the desired maximum height. Hold down the [F1] and [LIGHT] buttons for 5 seconds. The [F1] LED flashes for 1 second.

2 The maximum lifting height is now saved.

The maximum lifting height of the 4P or 2P lift is saved only if these are *not* in bottom position. To save *only* the maximum lifting height of the 4P lift, lower the 2P lift completely and raise the 4P lift to the desired maximum height.

In the event that the maximum height selected would be too close to a locking notch, the software will automatically set the maximum height lower. This is to ensure that the lift can always be safely disengaged from the lock ladder.

26.2.2 Saving a Fixed Locking Notch Position

To save a fixed locking notch position, proceed as follows:

1 Raise the 4P lift with the [UP] / [DOWN] buttons to a position above the locking notch position that is to be saved (preferably, this should be the topmost locking notch).

2 Set the lift onto the locking latches with the [LOCK] button.

3 Hold down the [LOCK] + [LIGHT] buttons at the same time until the [LOCK] LED flashes for 1 second.

4 A fixed locking notch position is now saved.

While the lift is raised and lowered, the software will automatically calculate the other locking notch positions.

26.2.3 Saving the Shearing Height

The preset sheraing height can be changed as follows:

1 Raise the 4P lift with the [UP] / [DOWN] buttons **and** the 2P lift (if present) with the [WFJ-UP] / [WFJ-DOWN] buttons to the desired shearing height.

2 Hold down the [F2] + [LIGHT] buttons at the same time until the [F2] LED flashes for 1 second.

3 The shearing height of the 4P lift **and** the 2P lift (if present) is now saved.

The shearing heights of the 4P lift and the 2P lift are always saved together. An individual selection is not possible.

26.2.4 Test Program for Commissioning the Lift

To enable the test program for commissioning the lift, hold down the [LIGHT] button for approx. 5 seconds, until the yellow LED starts flashing.

Now the seat valves, bypass valves, the pumps and the height measuring system can be checked.

26.2.5 Checking the Connections of the Seat Valves, Bypass Valves, the Pumps and the Height Measuring System

Completely lower the lift. The test can be carried out only with the lift in bottom position.

Hold down [F1] + [UP] buttons together

Lifting unit 1 of the lift is raised to the maximum height difference. In this way, the pump and the height measuring system can be checked for proper connection. The height measuring system must then display the distance covered.

Hold down [F1] + [DOWN] buttons together

Lifting unit 1 of the lift is moved using the bypass valve. In this way, the bypass valve can be checked for proper connection.

Hold down [F1] + [WFJ-DOWN] buttons together

Lifting unit 1 of the lift is moved using the seat valve. In this way, the seat valve (lowering valve) can be checked for proper connection.

Hold down [F2] + [UP] buttons together

Lifting unit 2 of the lift is raised to the maximum height difference. In this way, the pump and the height measuring system can be checked for proper connection. The height measuring system must then display the distance covered.

Hold down [F2] + [DOWN] buttons together

Lifting unit 2 of the lift is moved using the bypass valve. In this way, the bypass valve can be checked for proper connection.

Hold down [F2] + [WFJ-DOWN] buttons together

Lifting unit 2 of the lift is moved using the seat valve. In this way, the seat valve (lowering valve) can be checked for proper connection.

26.2.6 Emergency Manual Levelling of Runways and/or Optional Wheel-Free Jack

To equalise height differences between the runways, the individual lifting units can be manually lowered with the following key combinations. Use extreme caution!

<F1> + <DOWN> → Lower lifting unit 1	<F1> + <WFJ DOWN> → Lower WFJ A-side
<F2> + <DOWN> → Lower lifting unit 2	<F2> + <WFJ DOWN> → Lower WFJ B-side

This function is also suitable for checking if the DOWN valve is properly connected to the lifting unit.

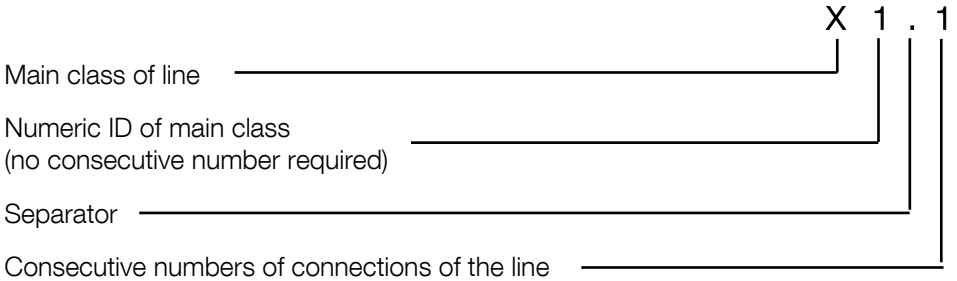
27 Annual Inspection

- The maintenance interval prescribed by the manufacturer is 12 (twelve) months.
  This maintenance interval refers to normal workshop usage. If the equipment is used more frequently or under severe operating conditions (e.g. outdoors), the interval must be reduced accordingly.

- Maintenance work shall be done only by authorized and trained service technicians provided by the manufacturer, licensed dealers or service partners.
- In case of non-compliance the manufacturer's warranty becomes void.

28 Annex: Connection Identification

28.1 Connection Identification Code

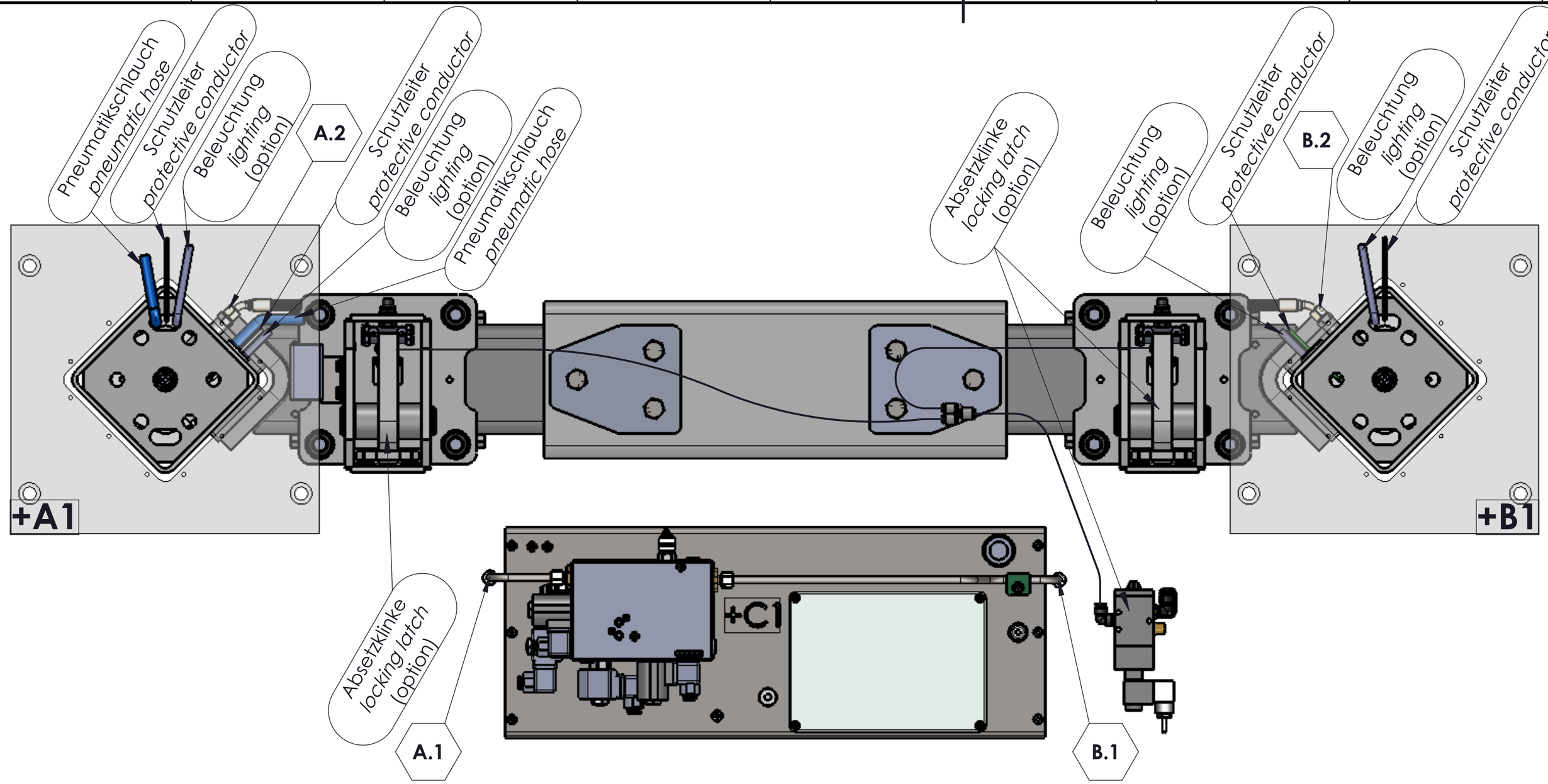


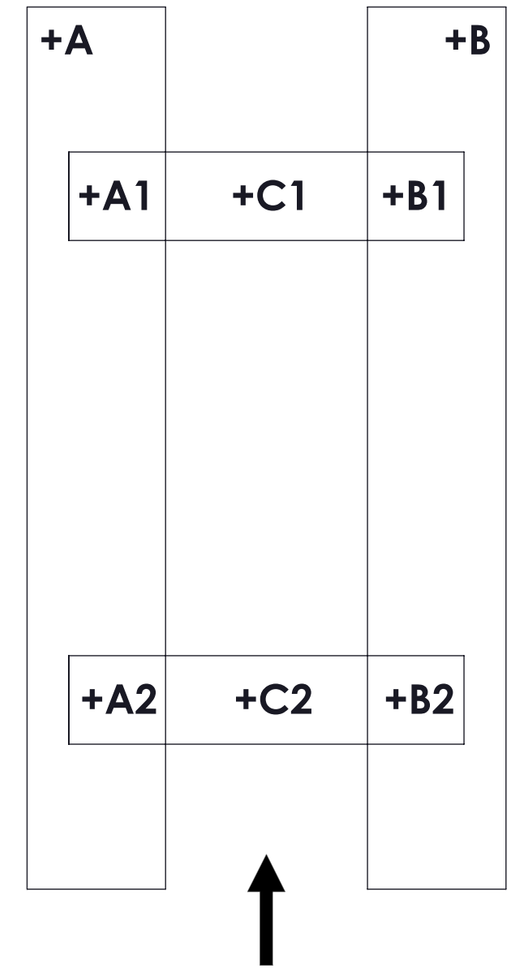
Main classes:

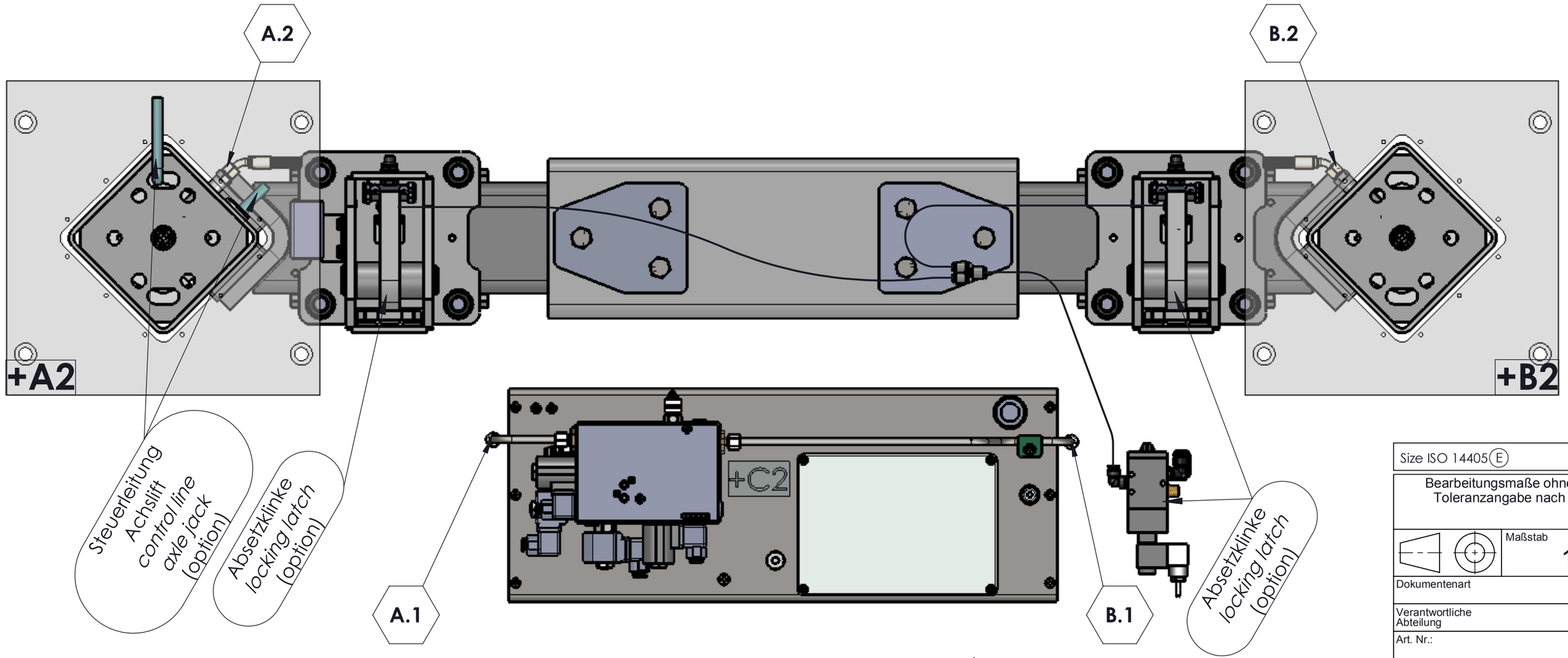
A, B	Cylinder connection	T	Return line
P	Pressure line	X	Other lines

28.2 Hydraulic Installation Instructions

See following pages.





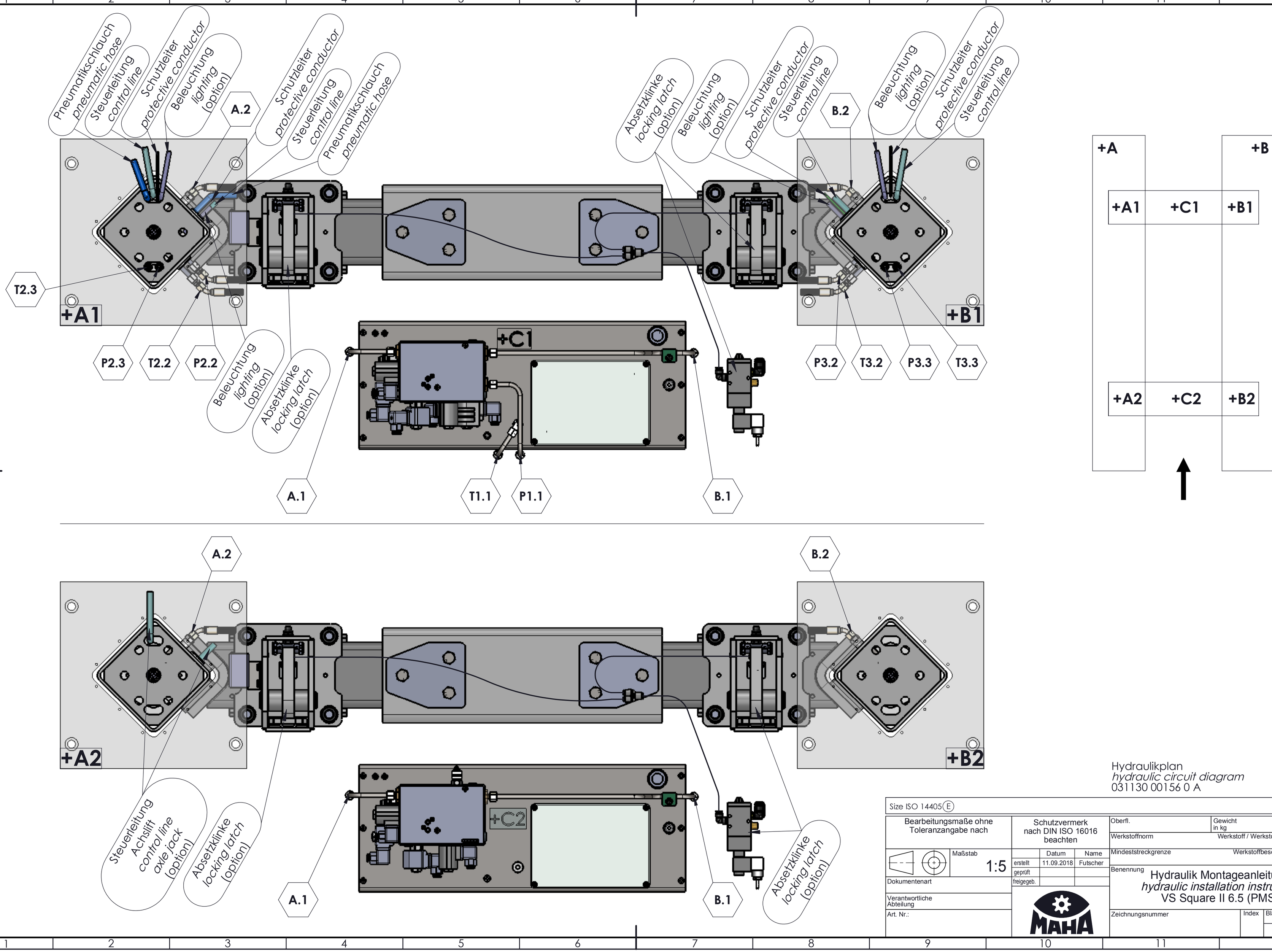


Hydraulikplan
hydraulic circuit diagram
031130 00156 0 A

Size ISO 14405 (E)

Bearbeitungsmaße ohne Toleranzangabe nach	Schutzvermerk nach DIN ISO 16016 beachten	Oberfl.	Gewicht in kg / RG:
		Werkstoffnorm	Werkstoff / Werkstoffnummer
Maßstab 1:5		Mindeststreckgrenze	Werkstoffbescheinigung
Dokumentenart	erstellt 11.09.2018 Futscher; geprüft; freigegeb.	Benennung	Hydraulik Montageanleitung *hydraulic installation instruction* VS Square II 6.5 (heben/senken)
Verantwortliche Abteilung		Zeichnungsnummer	Index / Blatt / von: A2
Art. Nr.:			

MAHA



Hydraulikplan
hydraulic circuit diagram
031130 00156 0 A

Size ISO 14405 (E)

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Art. Nr.:		Zeichnungsnummer	Index / Blatt / von A2

	Datum	Name
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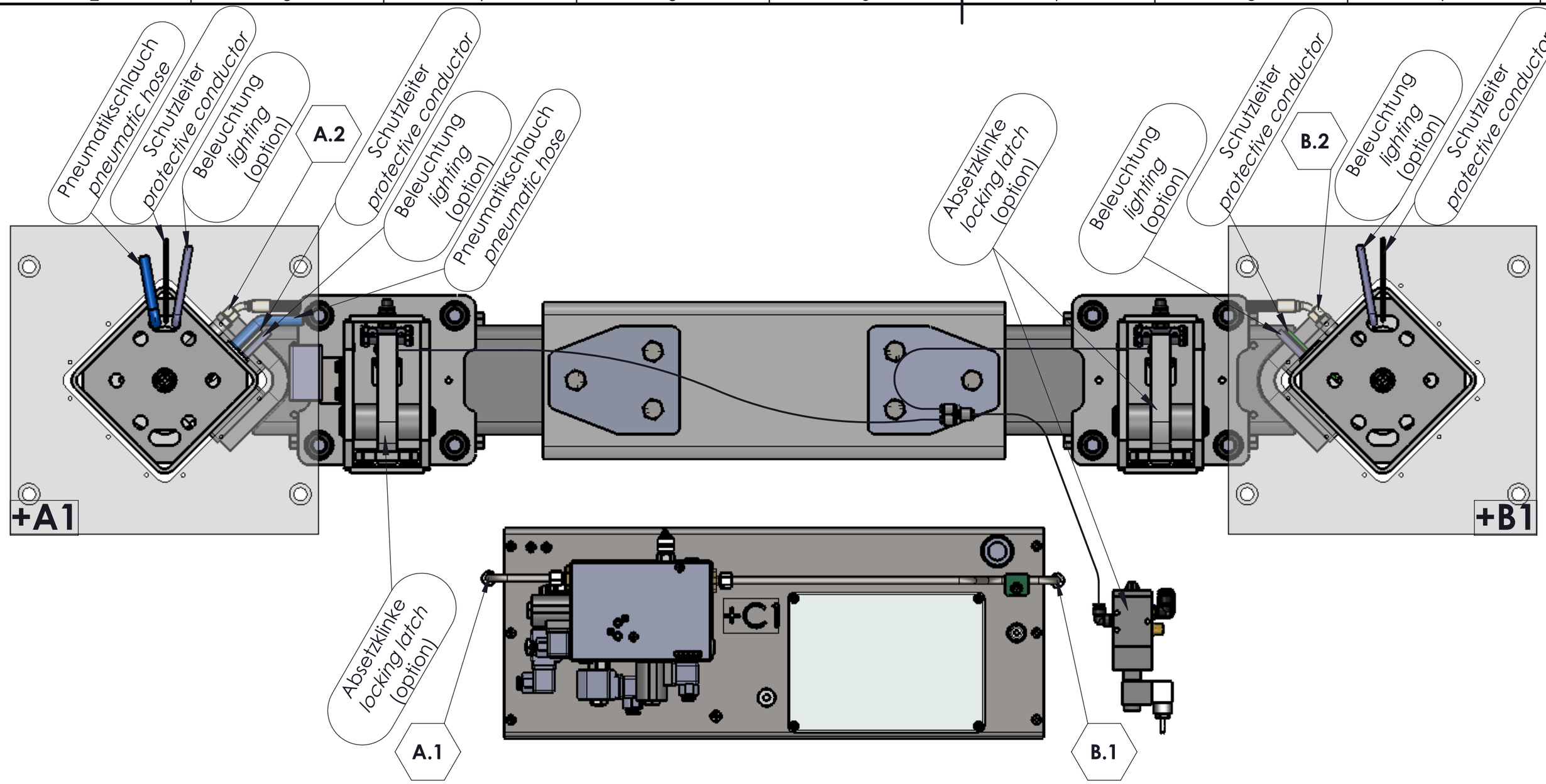
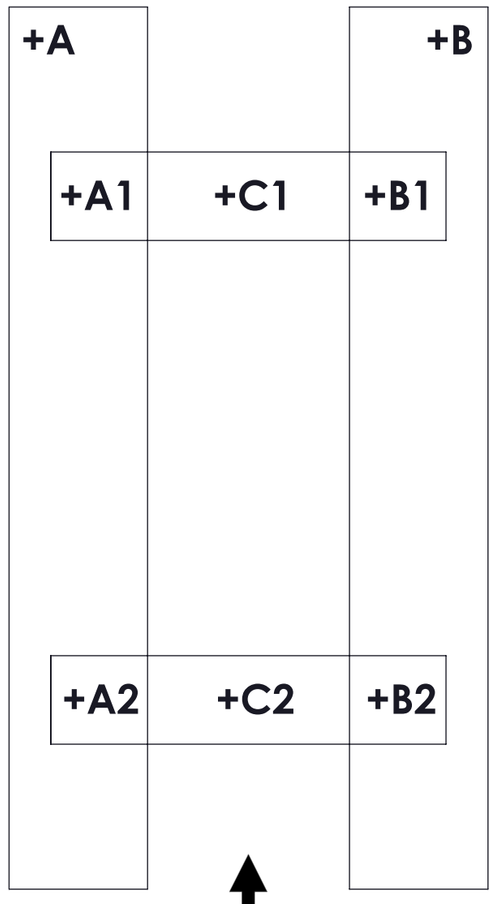
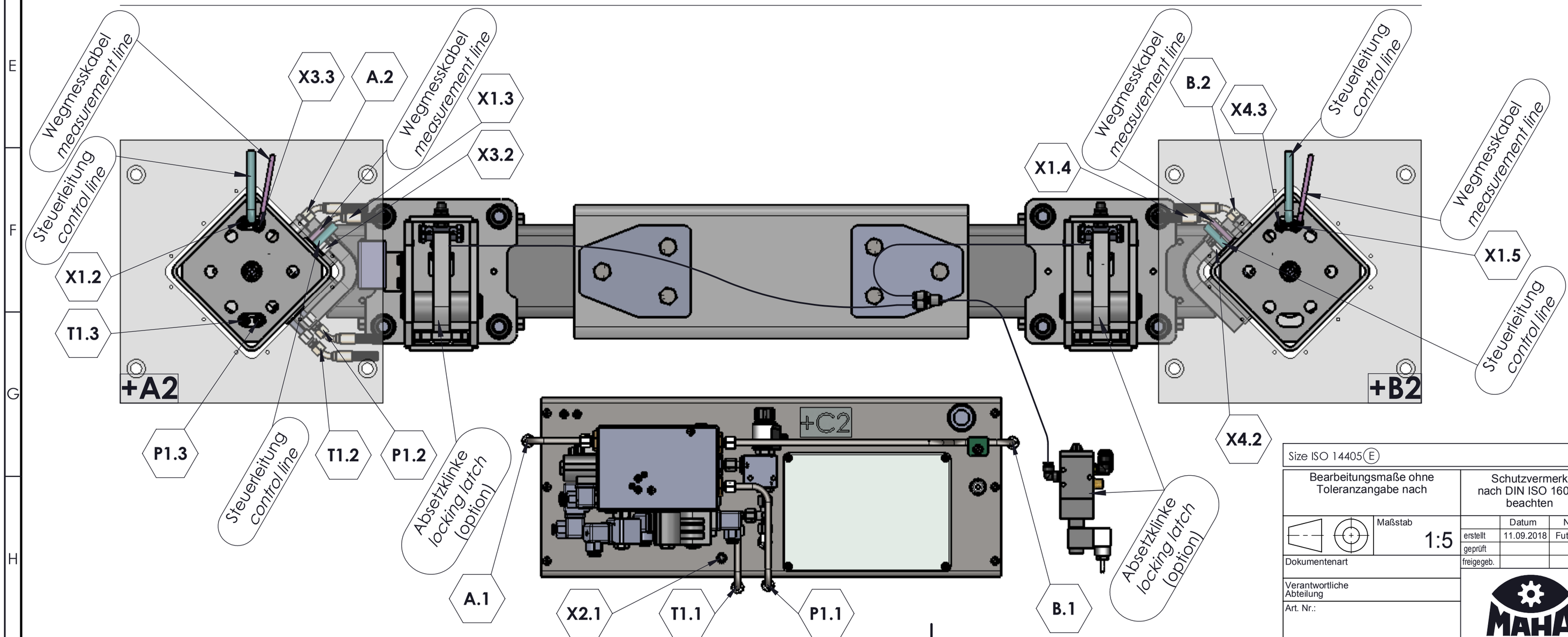
geprüft		
freigegeb.		

MAHA







Hydraulikplan
hydraulic circuit diagram
031130 00156 0 A

Size ISO 14405 (E)

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Art. Nr.:		Zeichnungsnummer	Index / Blatt / von

	Datum	Name
erstellt	11.09.2018	Futscher
geprüft		
freigegeb.		

MAHA

A2

Pneumatikschlauch *pneumatic hose*
Steuerleitung *control line*
Schutzleiter *protective conductor*
Beleuchtung *lighting (option)*
A.2
Schutzleiter *protective conductor*
Beleuchtung *lighting (option)*
Pneumatikschlauch *pneumatic hose*
Steuerleitung *control line*
Absetzklinke *locking latch (option)*
Beleuchtung *lighting (option)*
Schutzleiter *protective conductor*
Steuerleitung *control line*
B.2
Beleuchtung *lighting (option)*
Schutzleiter *protective conductor*
Steuerleitung *control line*
T2.3
+A1
+B1
P2.3
T2.2
P2.2
Absetzklinke *locking latch (option)*
+C1
P3.2
T3.2
P3.3
T3.3
A.1
T1.1
P1.1
B.1

+A
+B
+A1
+C1
+B1
+A2
+C2
+B2

Wegmesskabel *measurement line*
Steuerleitung *control line*
X3.3
A.2
Wegmesskabel *measurement line*
X1.3
X3.2
X1.2
T1.3
+A2
P1.3
Steuerleitung *control line*
T1.2
P1.2
Absetzklinke *locking latch (option)*
+C2
A.1
X2.1
T1.1
P1.1
B.1
Wegmesskabel *measurement line*
B.2
X4.3
Steuerleitung *control line*
X1.4
Wegmesskabel *measurement line*
X1.5
Steuerleitung *control line*
+B2
X4.2
Absetzklinke *locking latch (option)*

Hydraulikplan
hydraulic circuit diagram
031130 00156 0 A

Size ISO 14405 (E)

Bearbeitungsmaße ohne Toleranzangabe nach	Schutzvermerk nach DIN ISO 16016 beachten			Oberfl.	Gewicht in kg / RG:
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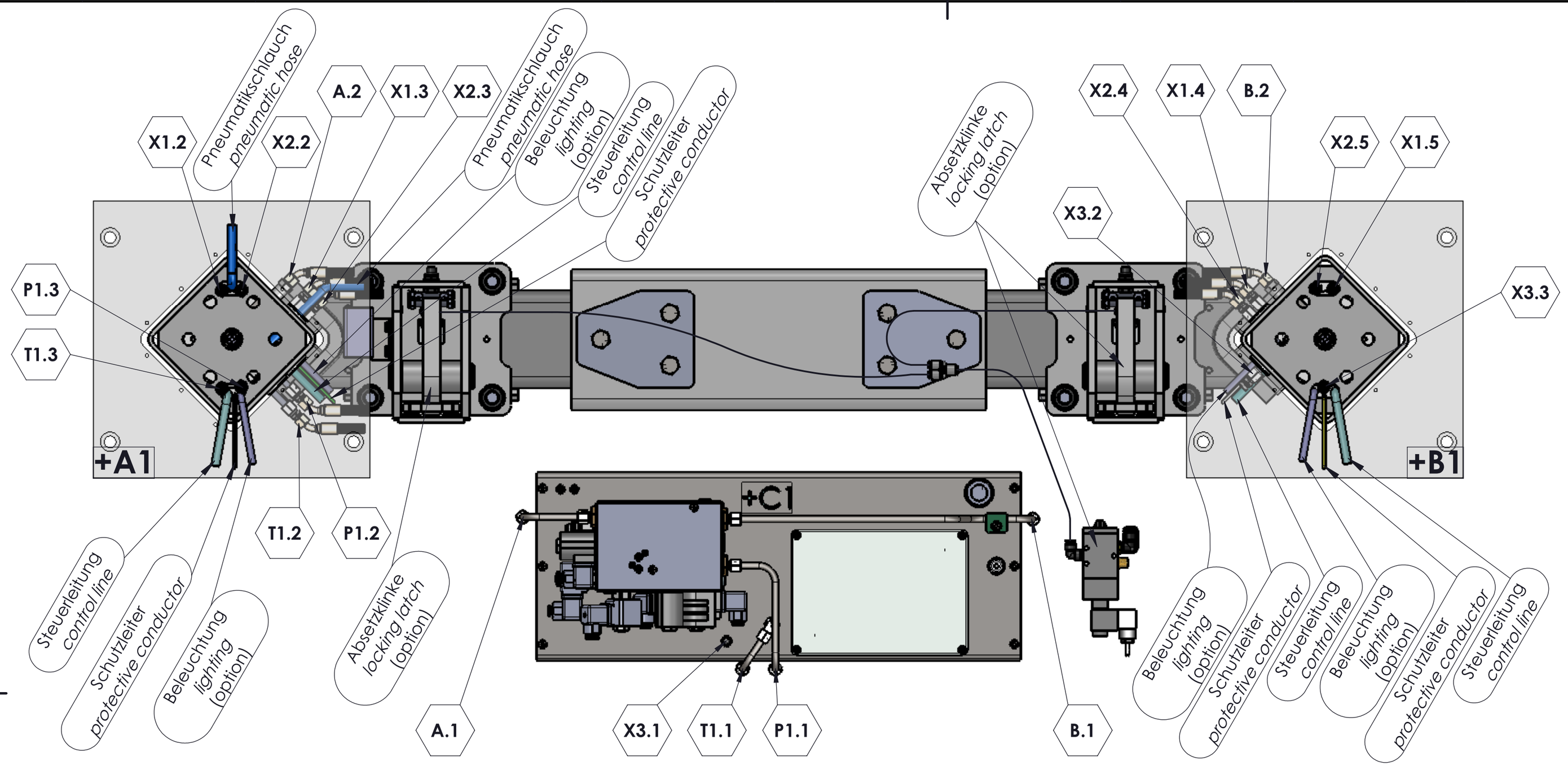
Dokumentenart	geprüft				
Verantwortliche Abteilung	freigegeb.				
Art. Nr.:	MAHA			Zeichnungsnummer	Index / Blatt / von: A2



Hydraulikplan
hydraulic circuit diagram
031130 00134 0 A

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Art. Nr.:			