

DUO



DUO CM | R-AS40/50CM

Scissors Lift

Technical Handbook

TH082901-en



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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.

3.1 Transport by Crane and 4-Sling Lifting Gear and Lifting Slings

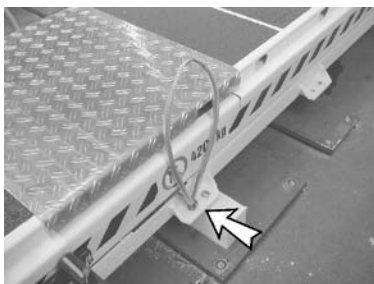
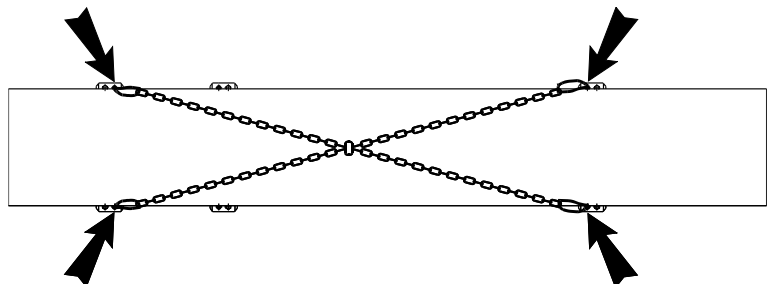


The lifting slings must be destroyed after having been used once. The manufacturer's instructions must be adhered to.

For transportation by crane and 4-sling lifting gear, four cable eyelets are required. The cable eyelets are screwed into the outer claws of the floor tub.



The minimum length of each hoisting chain is 150 cm.



4 Positioning

Position lift at installation location and remove packaging.

Assemble lift and desk. Check the positioning of the lift exactly by measuring the DB (Passage Width) and by placing a levelling board on the runway fronts. If the foundation depth is too large, foundation underlays must be used.

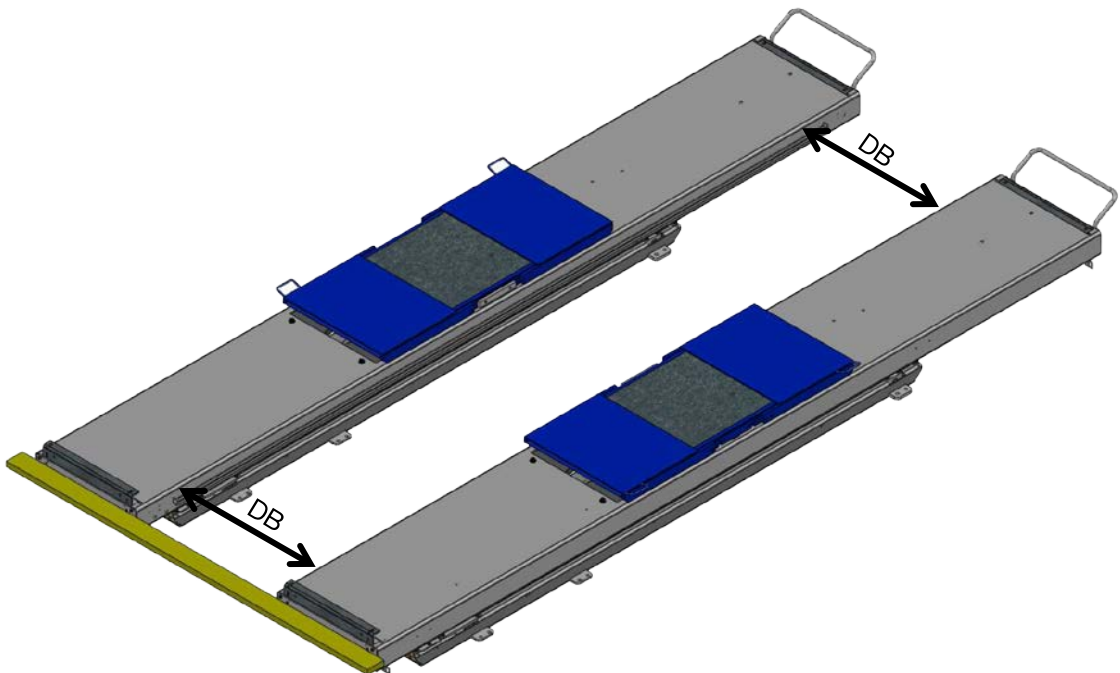
Recommended safety distance,
in relation to runways:

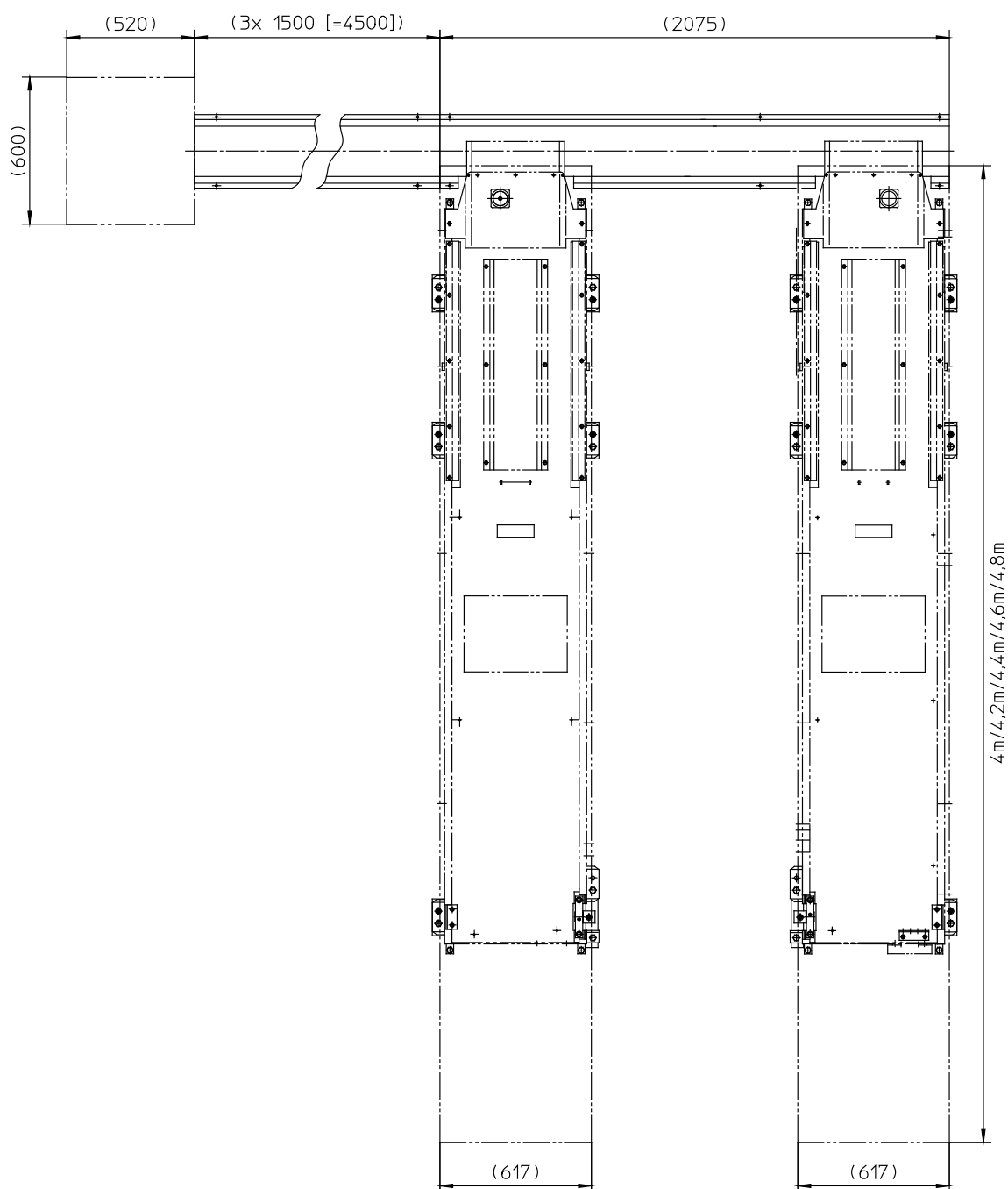
left/right side: min. **100 cm**
front / rear / walls / obstructions: **150 cm**



The DB (Passage Width) must be observed! A too narrow installation width can make a future installation of an axle jack impossible.

Example illustration DUO CM / R-AS40/50CM:





Recommended Positioning

	Model	Passage width (DB)
A	DUO CM / R-AS40/50CM	850 or 950 mm
B	DUO UC	950 mm

5 Initial Connection

5.1 Connecting the Hydraulic Hoses and Seat Valves

- 1 Connect hydraulic connection A with hose from cylinder + A and hydraulic connection B with hose from cylinder +B.
- 2 Electrically connect seat valves to +A-M1 and +B-M1.



See hydraulic and electrical circuit diagrams. An overview of the operating coils and connections of the hydraulic power unit can be viewed in the Chapter “Final Connection” in this manual.

5.2 Filling with Hydraulic Fluid

Fill the power unit with hydraulic fluid. For specification and fluid quantity see label on power unit.

5.3 Initial Raising in Service Mode

To continue with the installation, the lift must be operated in Service mode. This is necessary, as otherwise the lift would go into Error mode (time-out error due to lack of fluid in cylinder).

In Service mode, the lift can be moved with **caution** during failure. If no button is activated for a period of 3 minutes, the Service mode will automatically terminate for safety reasons. Starting the Service mode:

- Turn the main switch off.
- Wait approximately 5 seconds until the power supply is discharged.
- Press the [LIFT UP] and [LIFT DOWN] button at the same time and hold down.
- Turn the main switch on.
- Wait approximately 10 seconds until a slow signal tone starts to beep.
- Release the buttons.

An active Service mode is indicated by a slow beeping signal tone, as well as by a red flashing light and a continuous green light!

To lower the lift in Service mode, one needs to raise the lift once, to release the latches, otherwise the descent is blocked.

During Service mode, the runways as well as the optional wheel-free jack can be moved. The lift light is only switched on and off with the [LIGHT] switch.

The following functions are active if their corresponding options are enabled:

- Slide plate operation
- Inclination control
- Airbag-hinged cover is controlled
- Emergency stop switch is monitored
- Double latch is being controlled

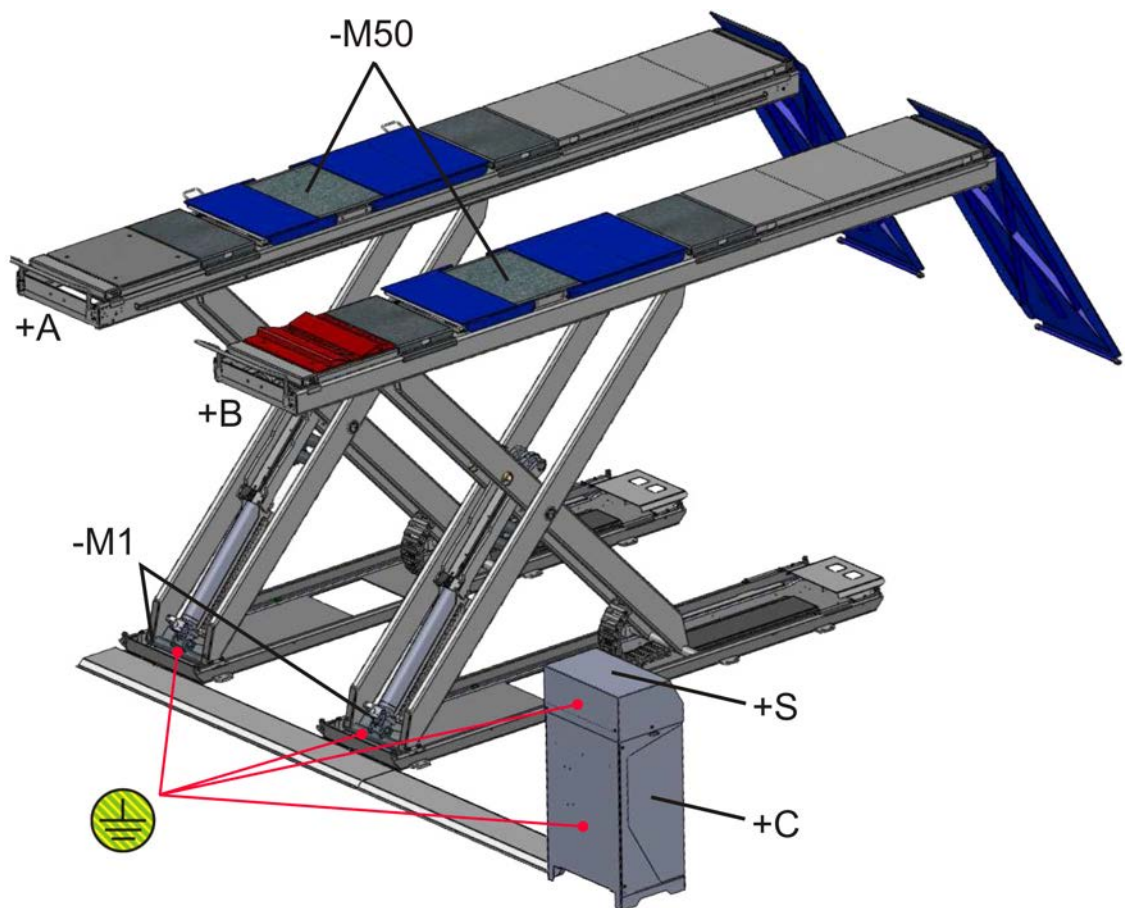
If a 10 ton drive-over option is active, the warning light is switched on throughout the service mode.

The bypass control or seat valve control are active when the measuring systems are functional and the maximum permissible difference is not exceeded.

5.4 Potential Equalization

Potential equalization must be provided for between the control desk, hydraulic power unit, the two floor tubs and (if present) the pneumatic floor cover. Note the reference labelling at the front side of the runways!

(Illustrated in example DUO CM / R-AS40/50CM)



After the installation has been completed, all hydraulic, pneumatic and electrical cables must be protected by attaching a cable cover.

6 Hydraulic Power Unit

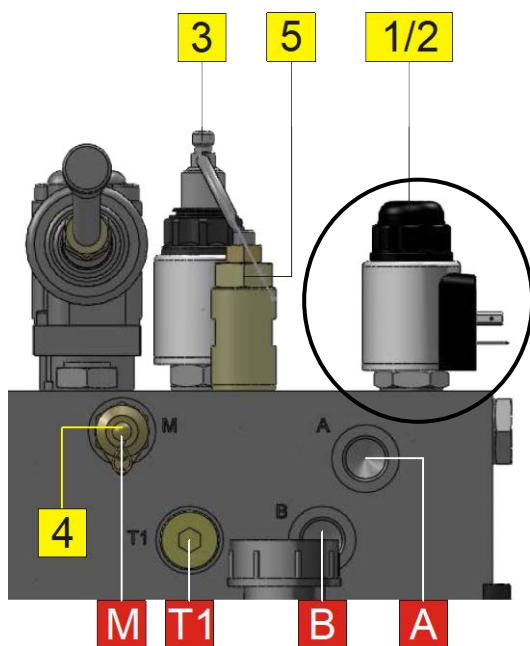
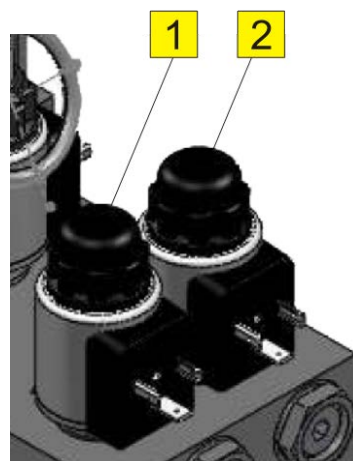
6.1 DUO CM1 / DUO CM2 / R-AS40/50CM

6.1.1 Basic Block and Wheel-Free Jack

(Part # 26000144)

	Reference labelling at the operating coil	Corresponding connection on the valve block	Function
1	+C-M1.A / +C-M4A *	A	Bypass of Lift (and normal WFJ), side +A
2	+C-M1.B / +C-M4B *	B	Bypass of Lift (and normal WFJ), side +B
3	+C-M2	T / T1	Manual lowering
4	—	M	Measuring connection for manometer (optional: Hydraulic inclination)
5	—	—	Pressure relief valve

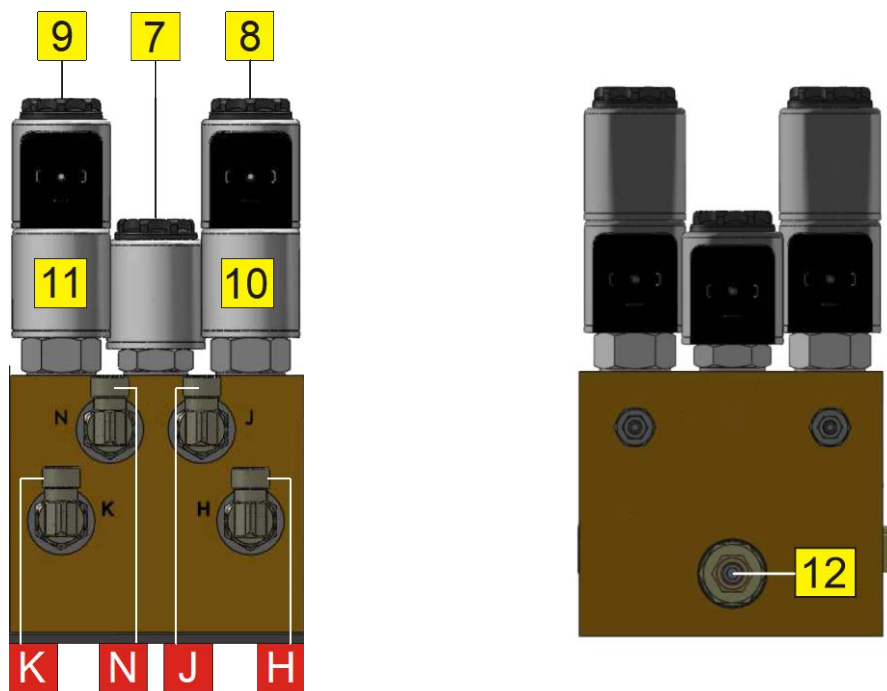
*depending on year of manufacture



6.1.2 Hydraulic Block for PMS Axle Play Detector

(Part # 26000079)

	Reference labelling at the operating coil	Corresponding connection on the valve block	Function
7	+C-M13	—	Pressure pipe PMS
8	+C-M14.A	J	PMS direction 1, side +A
9	+C-M14.B	N	PMS direction 1, side +B
10	+C-M15.A	H	PMS direction 2, side +A
11	+C-M15.B	K	PMS direction 2, side +B
12			Pressure relief valve PMS



6.2 DUO CM3

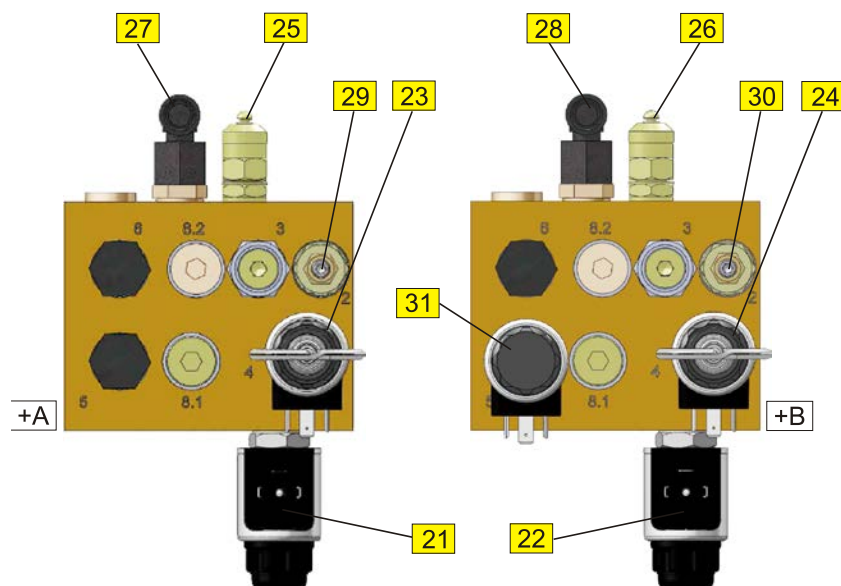
6.2.1 Basic Blocks

(2 pcs. Part # 26000370)

	Reference labelling at the operating coil	Corresponding connection on the valve block	Function
21	+C-M4.A	7	Bypass valve, side +A
22	+C-M4.B	7	Bypass valve, side +B WFJ and PMS are controlled via block B
23	+C-M2.A	4	Manual lowering (Lift only), side +A
24	+C-M2.B	4	Manual lowering (Lift + WFJ), side +B
25	—	M	Measuring connection Pump, side +A
26	—	M	Measuring connection Pump, side +B WFJ and PMS are controlled via block B
27	—	F	Hose connection, side +A
28	—	F	Hose connection, side +B
29	—	2	Pressure relief valve (Lift), side +A
30	—	2	Pressure relief valve (Lift + WFJ), side +B
31	—	5	Safety shutoff valve



When valve **+C-M2.B** is enabled to synchronise the lift, seat valves **+A-M50** and **+B-M50** must be closed.



6.2.2 Hydraulic Block for Wheel-Free Jack

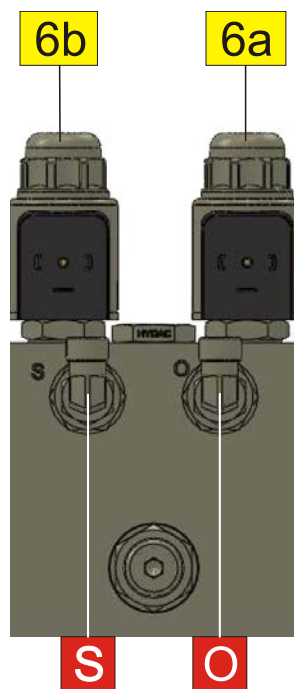
(Part # 26000288)

	Reference labelling at the operating coil	Corresponding connection on the valve block	Function
6a	+C-M10.A / -M54.A *	O	Bypass WFJ (increased speed), side +A
6b	+C-M10.B / -M54.B *	S	Bypass WFJ (increased speed), side +B

*depending on year of manufacture



This option is only available for version **DUO CM3** (increased raising and lowering speed). For versions DUO CM1, CM2 and all other lift models, the WFJ is controlled via the main connections A and B.



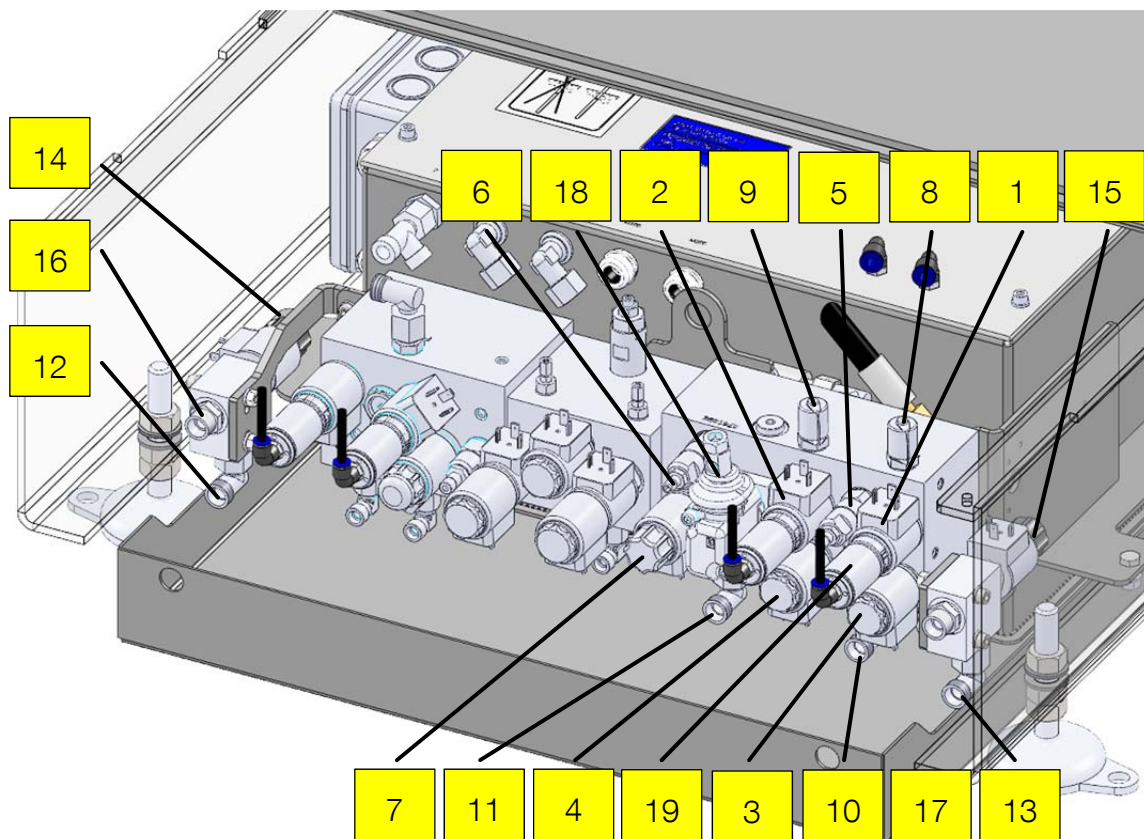
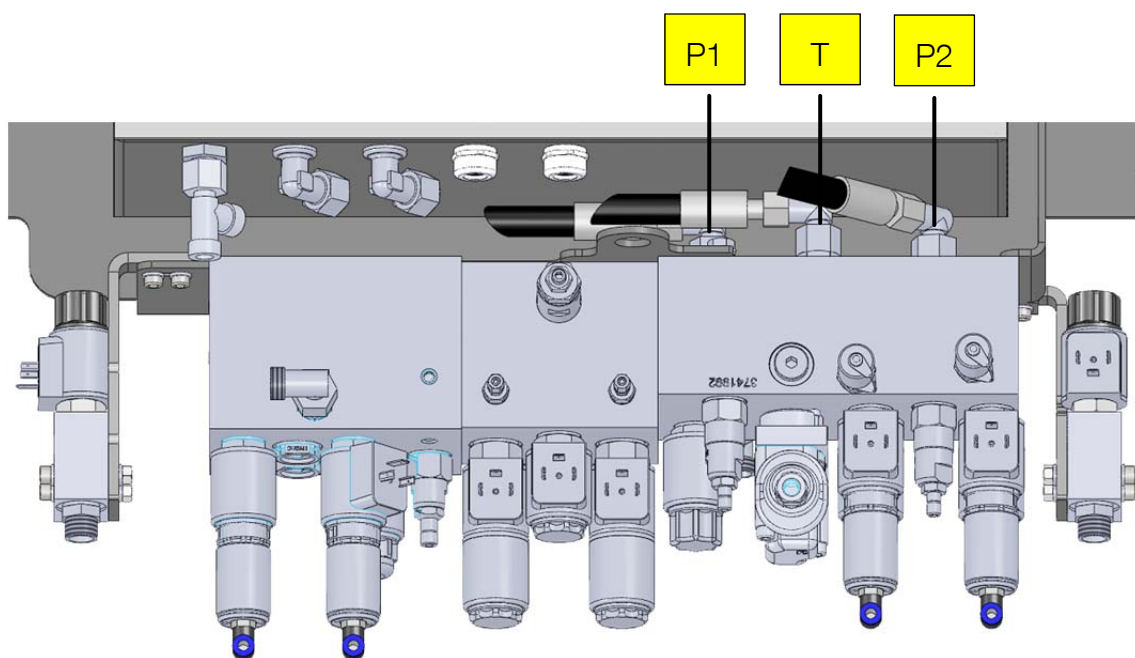
6.2.3 DUO CM4

6.2.4 Basic Block and Additional Basic Components

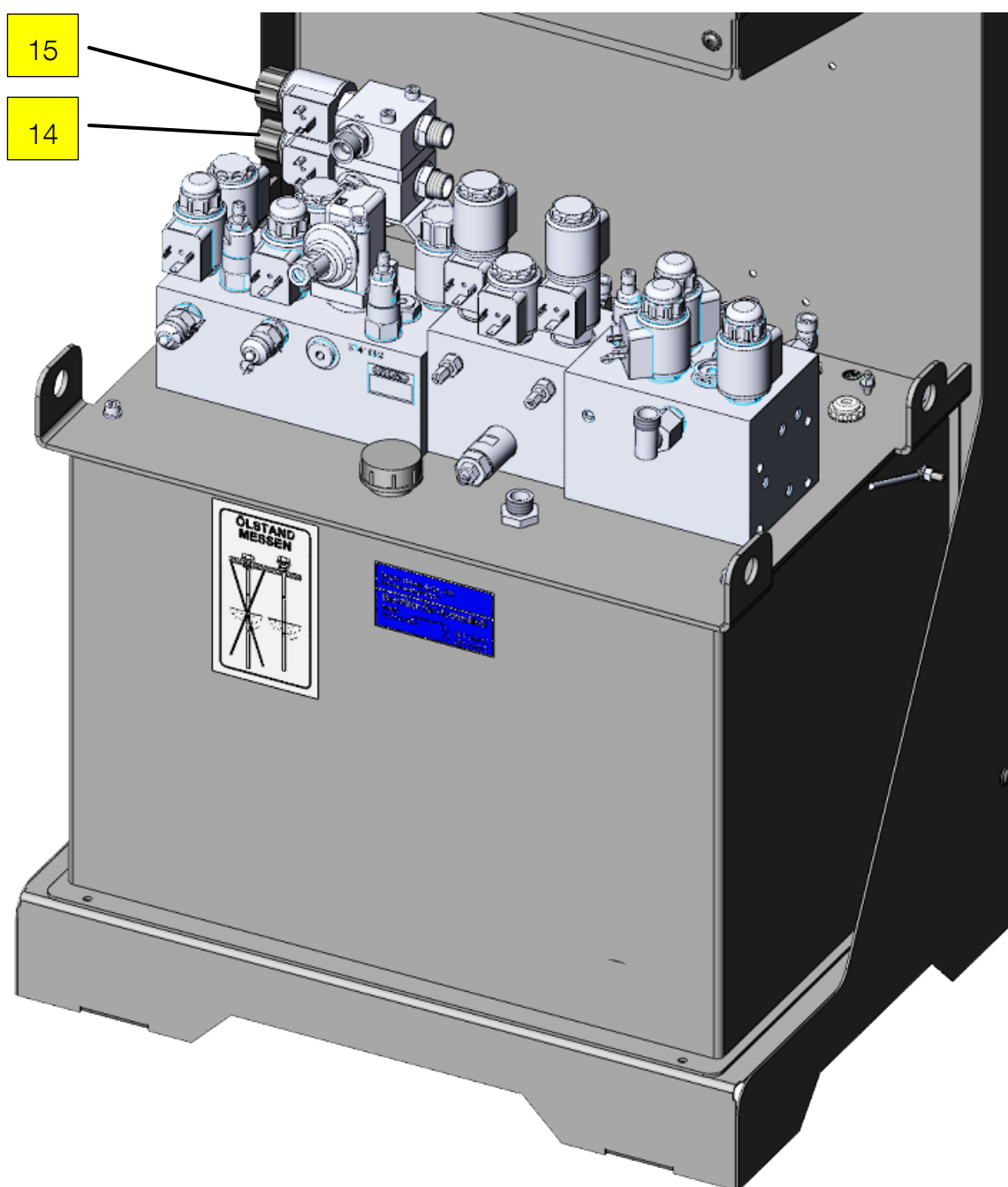
(Part # 26000351)

	Reference labelling at the operating coil	Corresponding connection on the valve block	Function
1	+C-M4.A	A	Bypass valve, side +A (manual lowering)
2	+C-M4.B	B	Bypass valve, side +B (manual lowering), WFJ and PMS
3	+C-M2.A	A	Main valve Lowering, side +A
4	+C-M2.B	B	Main valve Lowering, side +B
5	—	A	Pressure relief valve, side +A
6	—	B, P	Pressure relief valve, side +B; WFJ
7	+C-M56.1	P	Safety shutoff valve from main block to WFJ, PMS
8	—	M95	Measuring connection Pump, side +A
9	—	M90	Measuring connection Pump, side +B; RFH; PMS
10	—	14	Screw connection: line to seat valve, item 14
11	—	15	Screw connection: line to seat valve, item 15
12		10, 16	Screw connection: inlet of seat valve, item 14
13		11, 17	Screw connection: inlet of seat valve, item 15
14	+C-M5.A	A	Safety shutoff valve Raising, side +A
15	+C-M5.B	B	Safety shutoff valve Raising, side +B
16		A	Hose connection, side +A
17		B	Hose connection, side +B
18		A, B, P	Hand pump, side +A and +B, WFJ
19		1, 2	Pneumatic cylinder (valve control for manual lowering)

Middle Platform



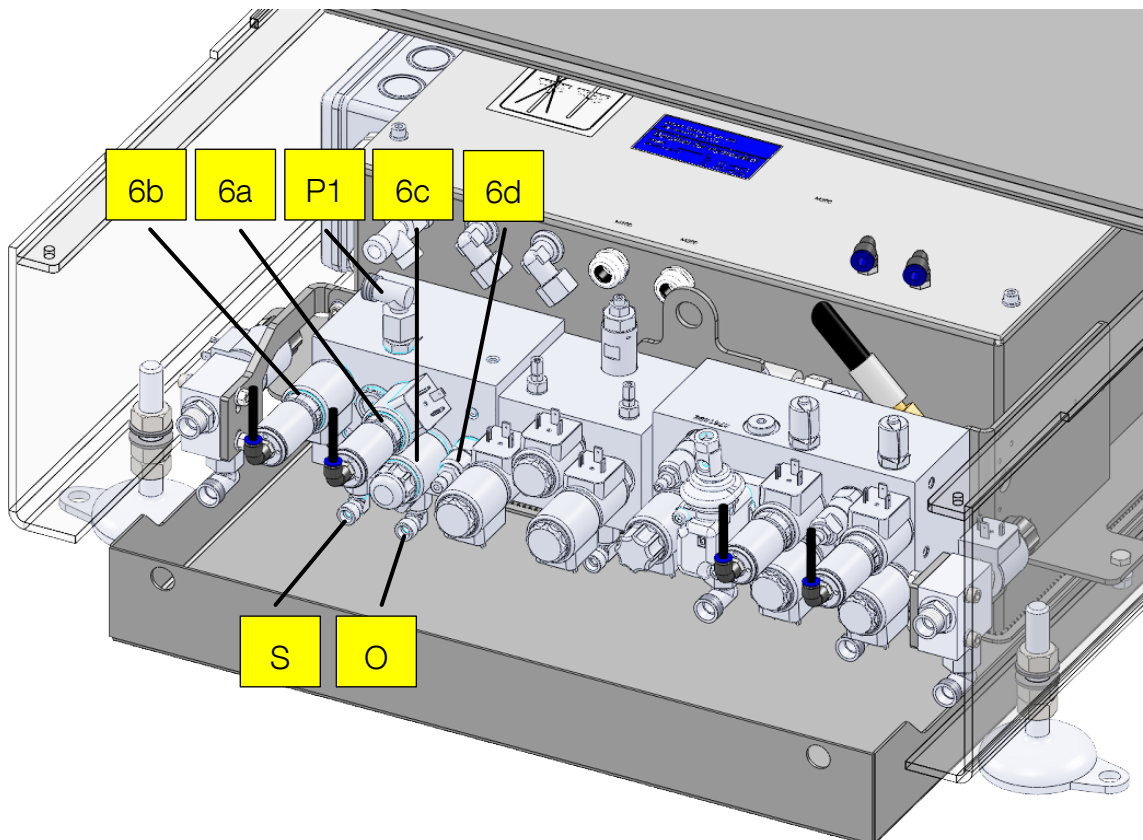
Control Desk



6.2.5 Hydraulic Block for Wheel-Free Jack

(Part # 26000300)

	Reference labelling at the operating coil	Corresponding connection on the valve block	Function
6a	+C-M54.A	O	Bypass WFJ (increased raising/lowering speed), side +A
6b	+C-M54.B	S	Bypass WFJ (increased raising/lowering speed), side +B
6c	+C-M56.2	O, S	Lowering valve WFJ (increased raising/lowering speed), sides +A and +B
6d		O, S	Adjustable flow control valve (raising speed)



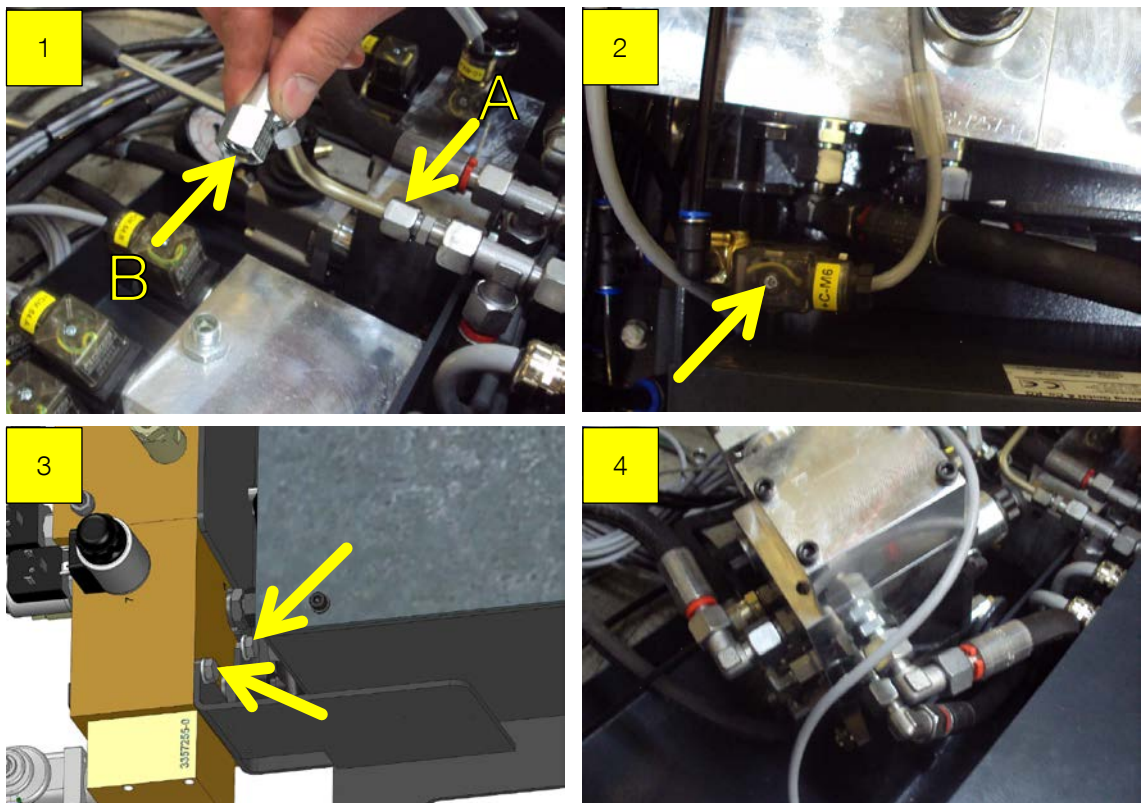
7 Final Connection

Connect the hydraulic, pneumatic and electrical lines. (See document numbers under "Installation Plans".)

7.1 Extending Hydraulic Lines

If additional installation material is used (for lifts with special length), all connections at lift sides +A and +B must be adjusted to the same length.

7.2 Installation and Removal of Hydraulic Hoses on Lifts with Middle Platform



- 1 Open hydraulic fitting (A), remove fitting (B).
- 2 Remove pneumatic valve +C-M6.
- 3 Open fastening screws for hydraulic block on the back side approx. 2...3 turns.
- 4 Tilt the hydraulic block completely out of the fastening brackets. The hydraulic hoses can now be installed or removed.

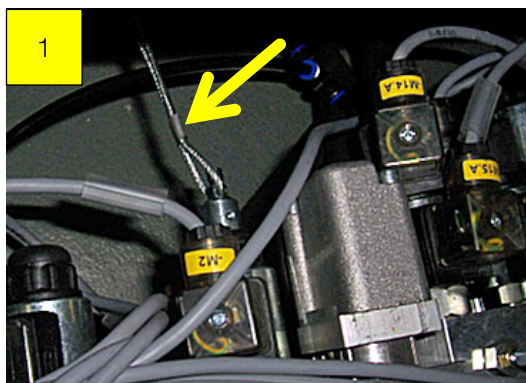
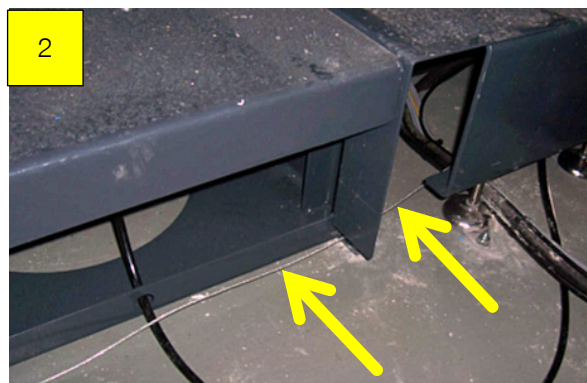
7.3 Routing the Drain Line

Make sure to route the drain lines without kinks or chafing from sharp edges. Then check the lines for unobstructed flow.



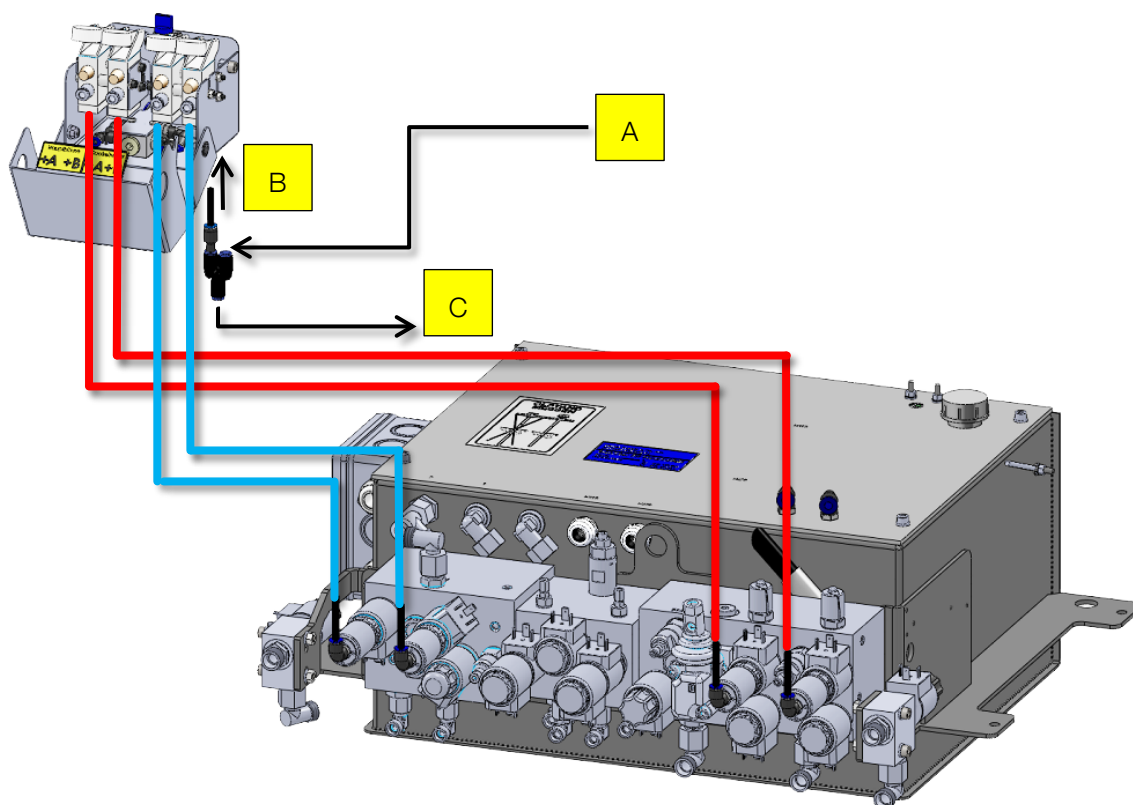
Inexpert routing may result in damage to the lift!

7.4 Routing the Manual Lowering Rope on Lifts with Middle Platform



- 1 When commissioning for the first time, remove the wire rope from the lowering valve in direction of the pull.
- 2 Remove the wire rope from the central console at the side, and guide it below the lifting floor.
- 3 Wind the end of the wire rope to a loop. Fasten the wire rope loop to the inside of the lift floor sheet metal with a cable and an adhesive clamp. **IMPORTANT: Avoid mechanical stress (no strain) when fastening!**
- 4 When using the emergency lowering device, remove the wire rope from the attachment and leave the hazard area. Activate M2 lowering valve via the wire rope.

7.5 Routing the Power Cables for the Pneumatic Manual Lowering Function on Lifts with Middle Platform



- A Compressed air supply
- B Operating unit
- C Lift

8 Aligning, Fastening, Levelling



After alignment and fastening, but **prior to** levelling, bleeding of the hydraulic system is required! (See the section "Bleeding the Hydraulic System.")

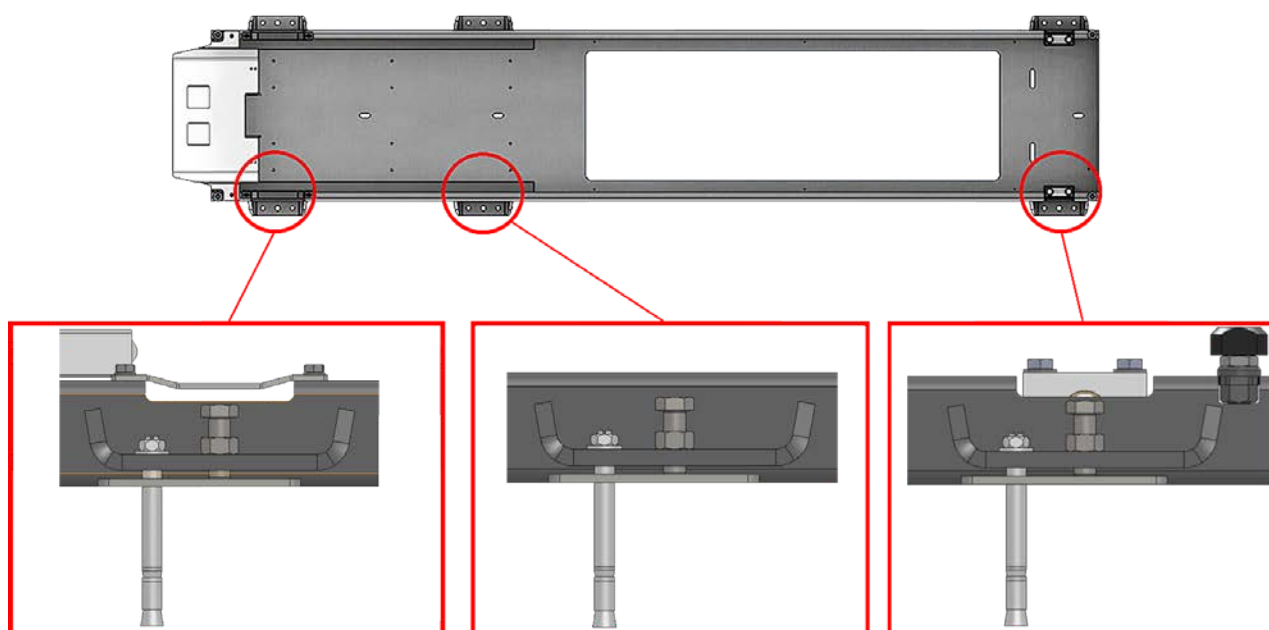
8.1 Fixture Points of the Floor Tubs

There are six fixture points on each floor tub, with which the floor tub is screwed into the substrate. In addition, each fixture point is equipped with a set screw, with which the lift can be aligned.

8.1.1 Symmetrical Floor Tubs

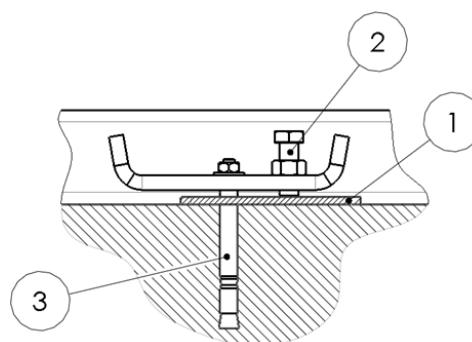


The symmetrical floor tubs are included as standard with all lifts from production date 11/2018. Exception: option "DUO CM 10t traversable" (VZ 970039).

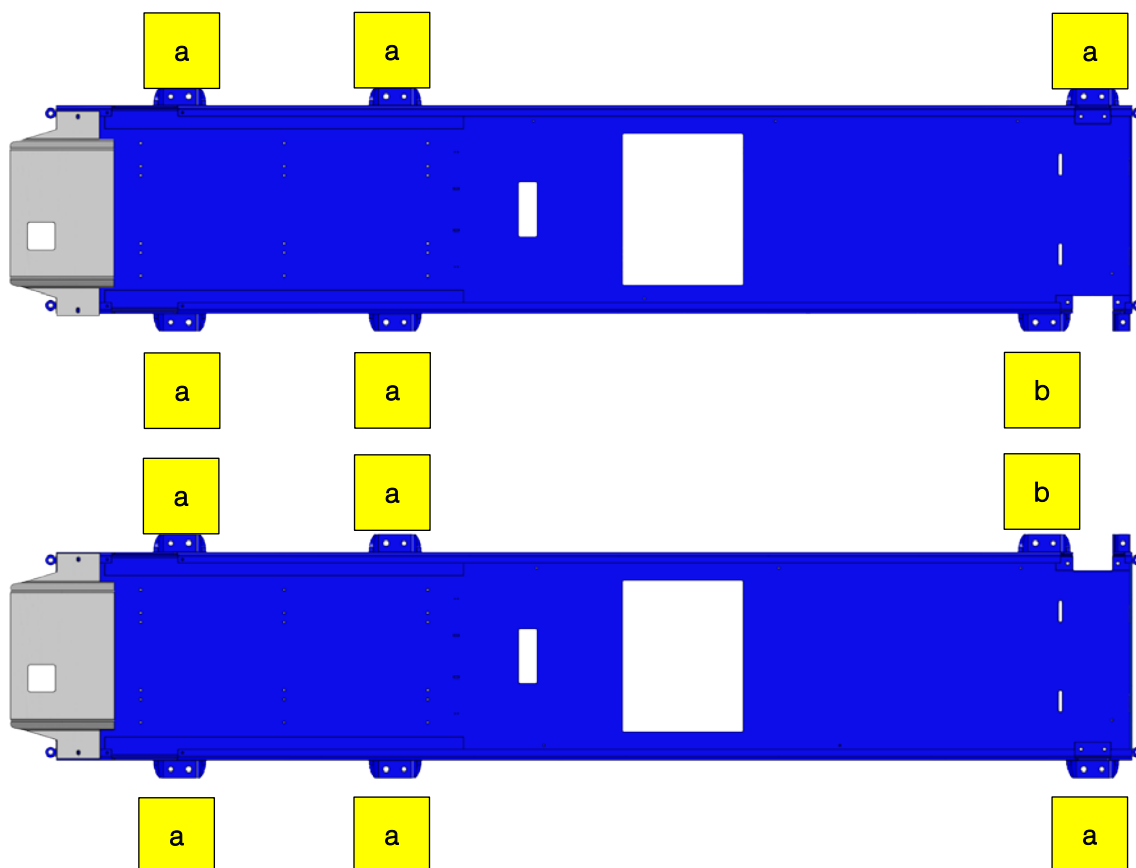


Fixture points

- 1 Shim, short
- 2 Set screw with lock nut
- 3 Heavy duty anchor

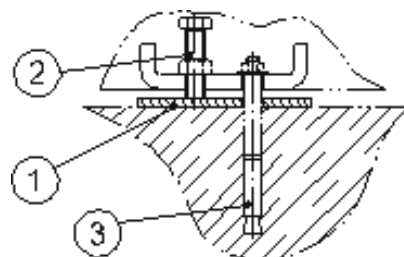


8.1.2 Asymmetrical Floor Tubs



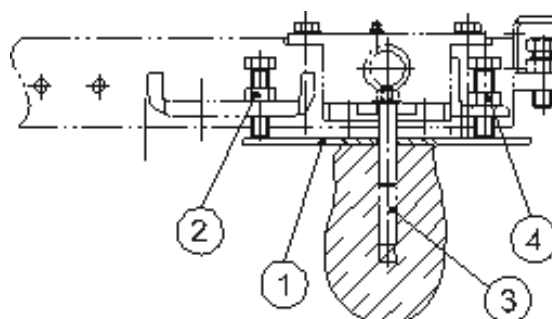
Fixture points

- 1 Shim, short
- 2 Set screw with lock nut
- 3 Heavy duty anchor



Fixture points

- 1 Shim, long
- 2 Set screw with lock nut
- 3 Heavy duty anchor
- 4 Support screw with lock nut



The support screw (4) must not be used for the alignment of the lift. After aligning, screw the support screw to the shim and lock.

8.1.3 Attaching the Shims and Set Screws

Place the shims under the fixture points in such a way that the drill holes of the shim and the fixture points are flush.

Fasten the set screws with the lock nut until these stand up on the shims.

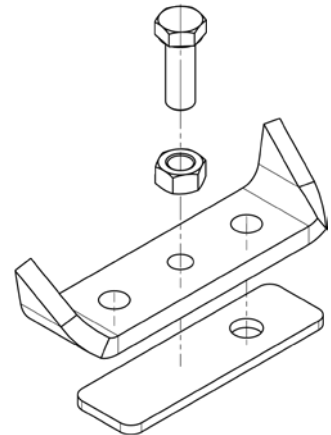
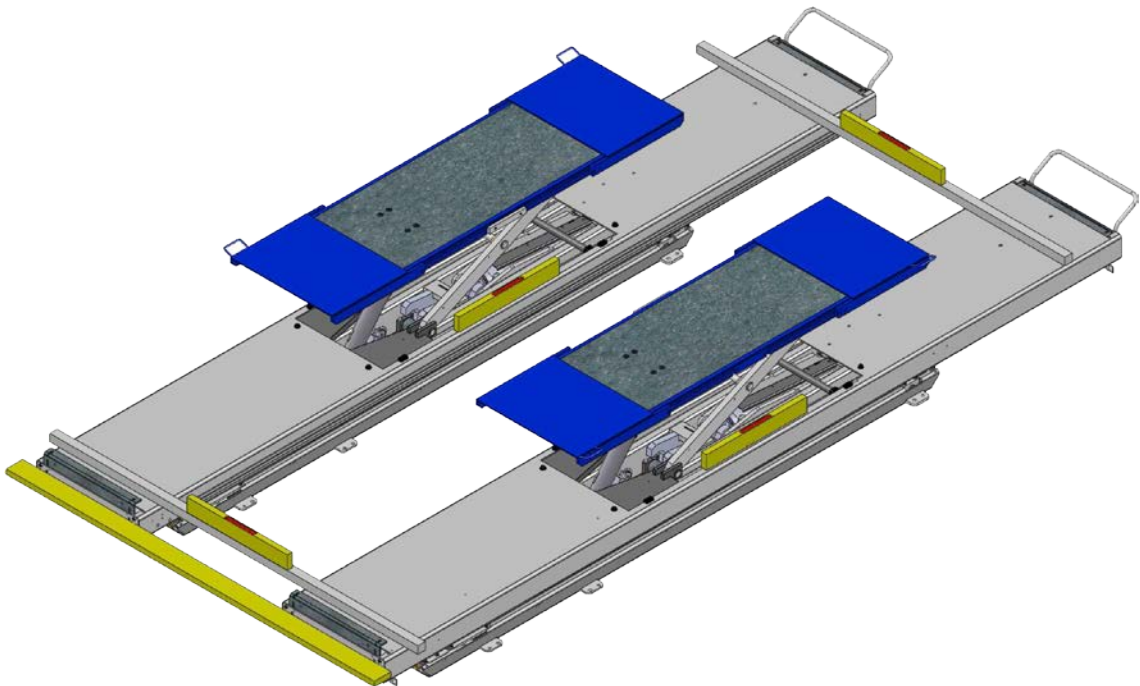


Illustration: Fixture points a with short shim

8.2 Aligning the Standard Lift

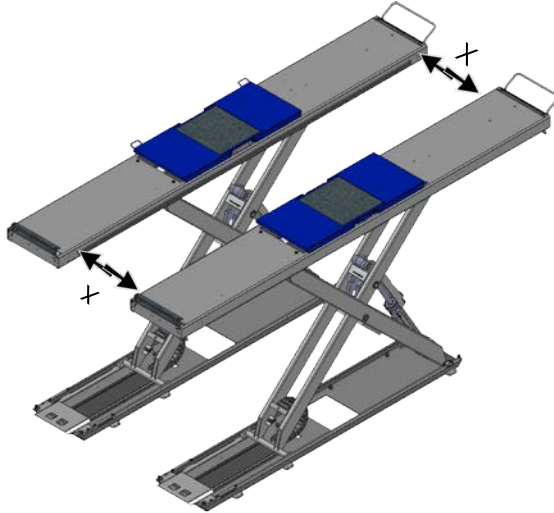
8.2.1 Aligning in the Lowest Position

- Lower lift completely.
- Check and, if necessary, correct dimension X.
- Align runways by placing a bar to the runway fronts, check and correct if necessary.



8.2.2 Aligning in the Highest Position

- Raise lift completely.
- Check dimension X and, if necessary, correct with set screws at the claws.



8.3 Aligning the Wheel Alignment Lift



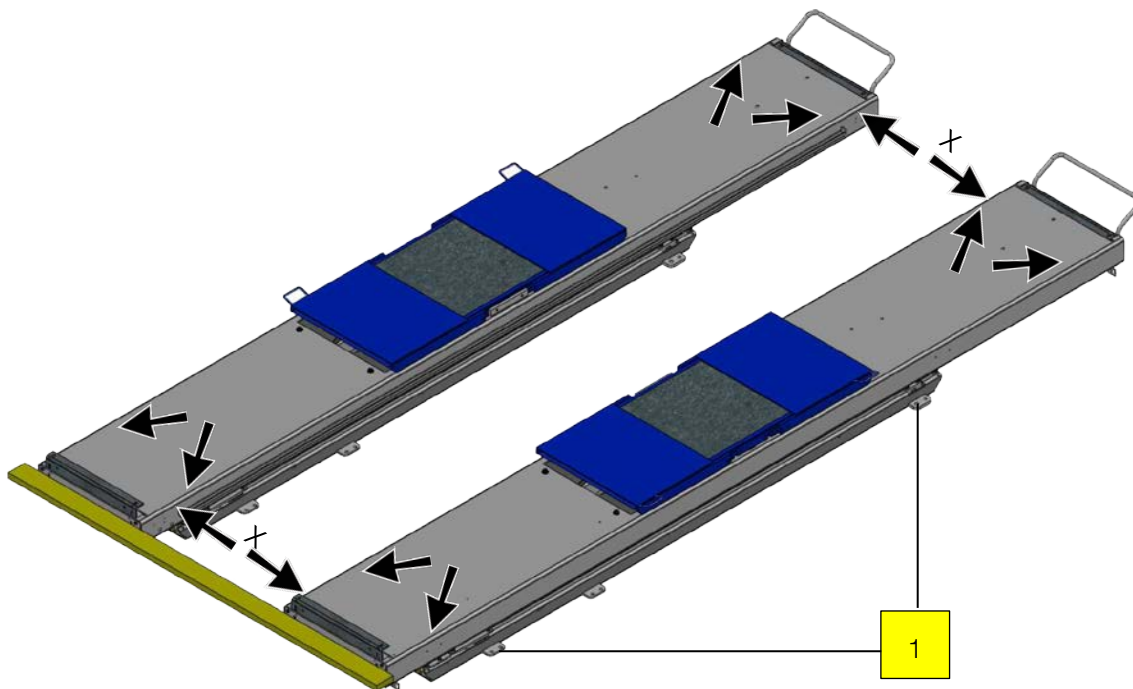
The lifts for wheel alignment are measured, levelled and set in the final assembly.

To achieve the required accuracy for the wheel alignment, the positions of the lifts must be installed nearly identical to the manufacturer's final assembly. This is achieved by carefully levelling and measuring the lift in its completely lowered position.

The permissible height difference between the floor tubs is ± 8 mm for standard lifts and ± 3 mm for wheel alignment lifts.

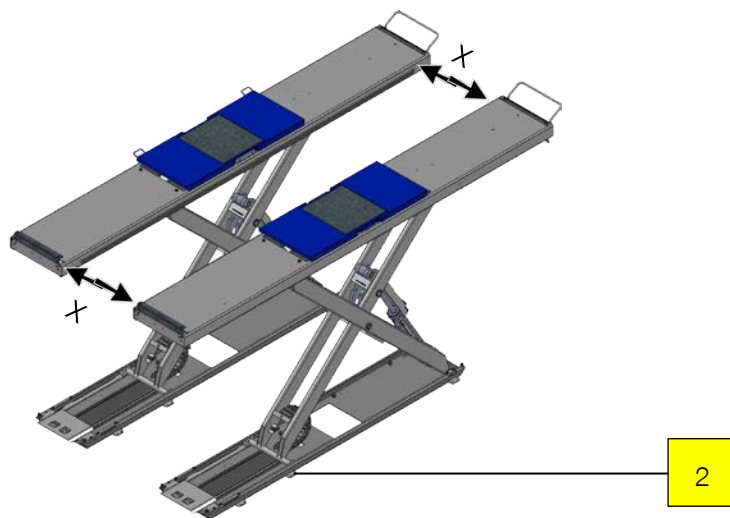
8.3.1 Aligning in the Lowest Position

- Lower lift completely.
- Check dimension X and, if necessary, correct.
- Align runways by placing a bar to the runway fronts, check and correct if necessary.
- Measure the lift with an optical levelling device at the 8 specified measuring points and align to the claws using the set screws (1).



8.3.2 Aligning in the Highest Position

- Fully raise lift and set on the topmost lock.
- Check dimension X and, if necessary, correct with set screws (2).



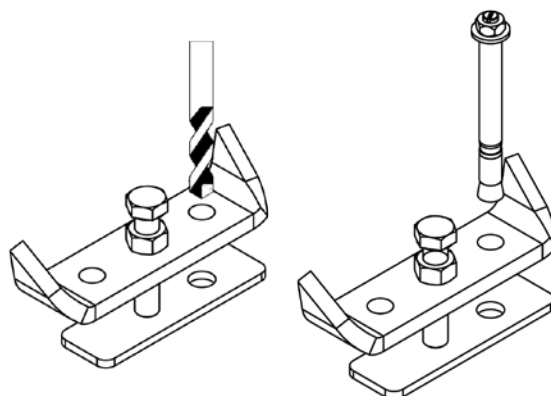
8.4 Fastening the Lift

After aligning the floor tubs, lock all set screws.

Drill the holes for the heavy duty anchors with a 15 mm Ø drill bit and clean the drill holes from drilling dust by blowing.

Then insert the heavy duty anchor and tighten with a torque according to the manufacturer's specifications.

One anchor is required for each mounting bracket. Positioning according to section "Symmetrical Floor Tubs". If drill holes are already existing in the foundation, the alternative hole in the mounting bracket can also be used.



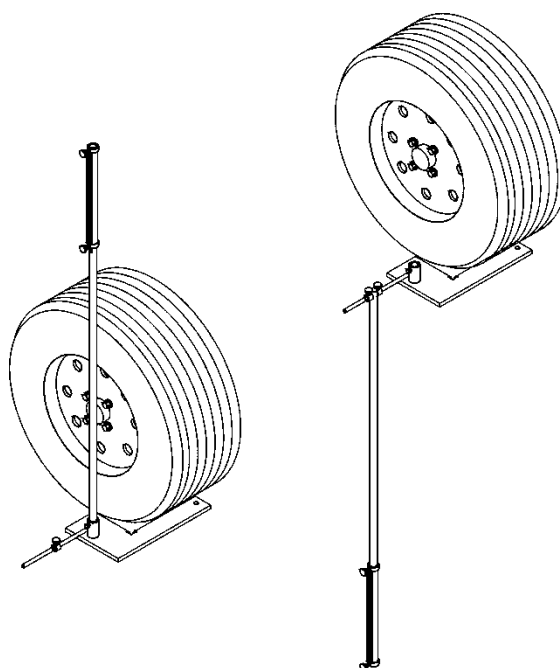
Tightening torque: 50 Nm

Adhere to the anchor manufacturer's installation instructions.

8.5 Levelling the Lift for Wheel Alignment

The lift for the wheel alignment is levelled under load, i.e. a vehicle is driven onto the runway. Slide plates or rotary tables are placed under the edges of the vehicle, whereby the slide plates must be located under the rear wheels and the rotary tables under the front wheels of the vehicle. The slide plates and rotary tables are as wide as the runways and serve the placing of the level rod (reference points). The wheel alignment lift must be levelled both in the raised and in the lowered position.

To demonstrate the main points, the lift is depicted without vehicle, slide plates and rotary tables in the following illustration.



To facilitate the measuring of all points, a levelling guide can be ordered. The level rod of the levelling guide can be attached in a standing or hanging position in order to allow the measuring of all measurement points in a lowered or raised position of the lift.

8.5.1 Levelling Procedure

- Set up optical levelling device.
It is important that all eight measuring points (both at the inner and outer sides of the wheels) must be visible through the levelling device.



During levelling of all eight measuring points, the location of the levelling device must not be changed!

- Measure all eight measuring points one after the other (measuring tripod on the slide plates or rotary table with level rod facing downwards) and record the measured values.

Should the values not comply with the specified tolerances the runways can be adjusted via their fixed or floating bearings. The following tolerances apply:

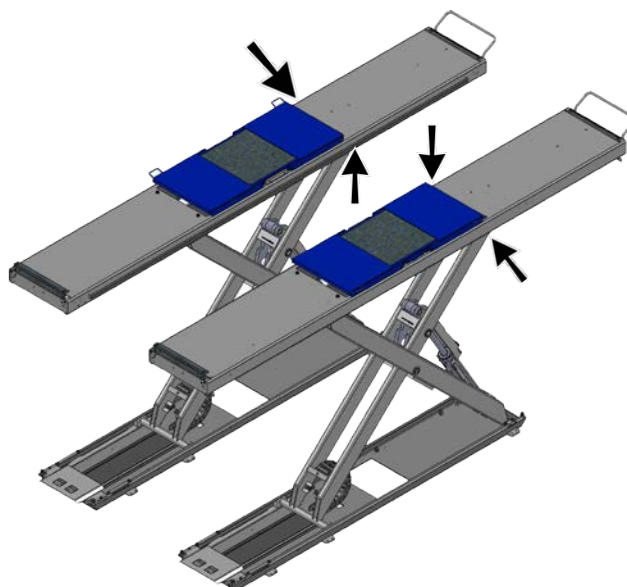
	BMW	VAG	Other
crosswise	0.5 mm	0.5 mm	1.0 mm
lengthwise	1.0 mm	1.0 mm	1.0 mm
diagonal	1.0 mm	1.0 mm	1.0 mm



The lifts for wheel alignment are measured, levelled and set in the final assembly. If installation of the lift was performed with great care, the fixed and floating bearings normally do not require adjustment.

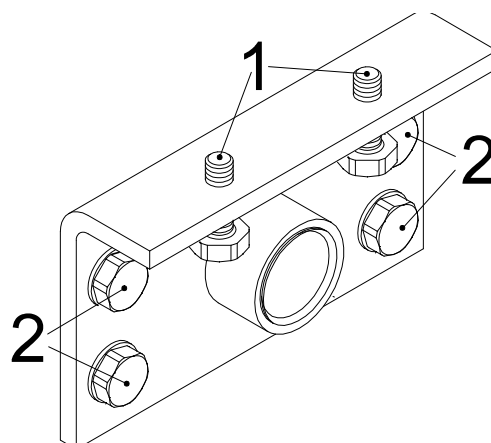
8.5.2 Adjusting the Fixed Bearings

The runways of the lifts can be set on the side where the hydraulic cylinders are located via four fixed bearings in the runways.



To set the fixed and floating bearings, the vehicle must be driven off the runway.

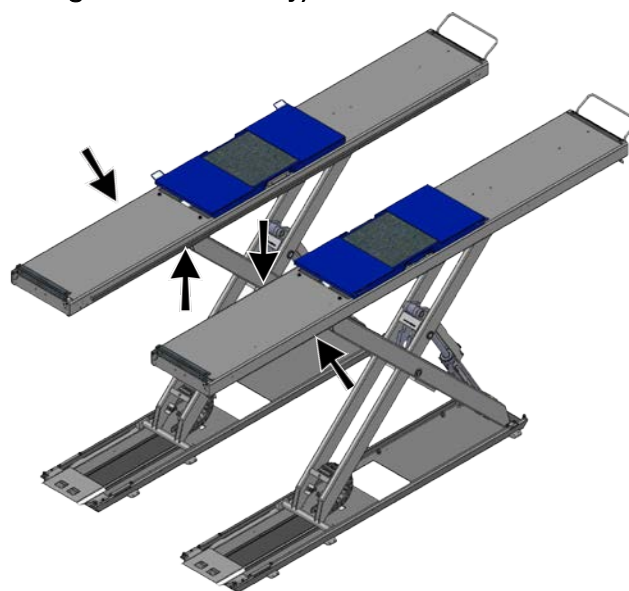
- The four upper bearings are adjusted by loosening the four hex head screws (2) by half a rotation.
- Adjusting is performed via the set screws (1).
The set screws of the fixed bearing must be each adjusted by the same amount of rotations.



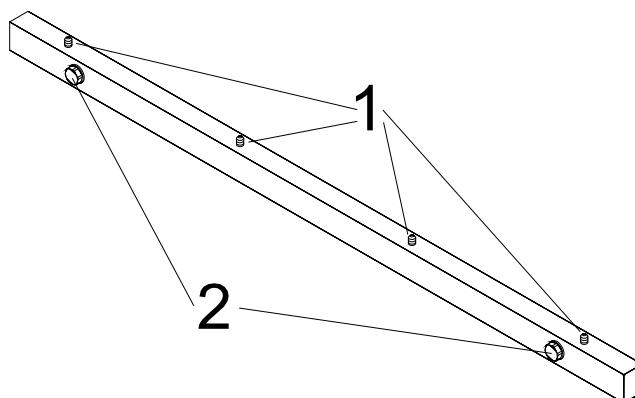
- If the values fall within the specified tolerance values, the fixed bearing screws must be tightened, however, it must be checked with the levelling rod whether the runway fronts are flush and, if necessary, corrected.

8.5.3 Adjusting the Floating Bearings (Wheel Alignment Lifts only)

The runways of the lifts can be adjusted on the side which faces away from the hydraulic cylinders, via four floating bearings (slider block tracks) in the runways.



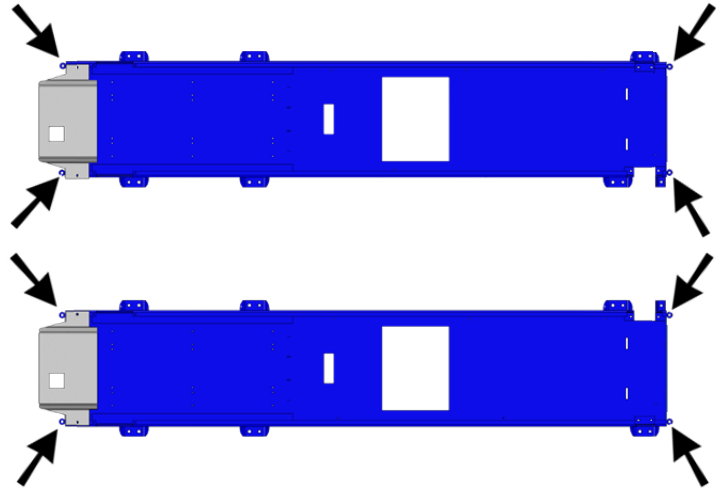
- Loosen fastening screws (2) by half a rotation.
- Adjust the floating bearing rail with the threaded pins (1) by the determined measurement.
- Check that all threaded pins are positioned on the runway. Tighten the fastening screws again.



8.5.4 Levelling in the Lowest Position

- Lower lift to lowest position.
- Measure the eight measuring points with the measuring tripod and the optical levelling device.

- The runways can be adjusted in the lower position via eight adjusting screws in the floor tubs.



After levelling of the lift, check that all adjusting screws and anchors are tight and locked. The position of the set screws must be sealed with varnish.

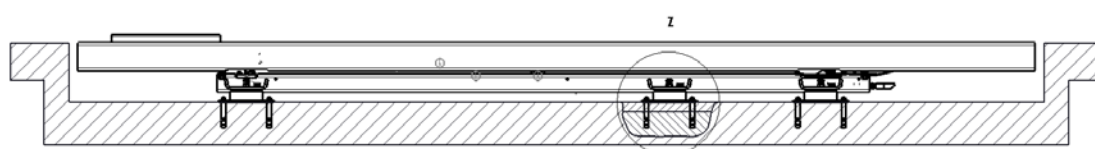
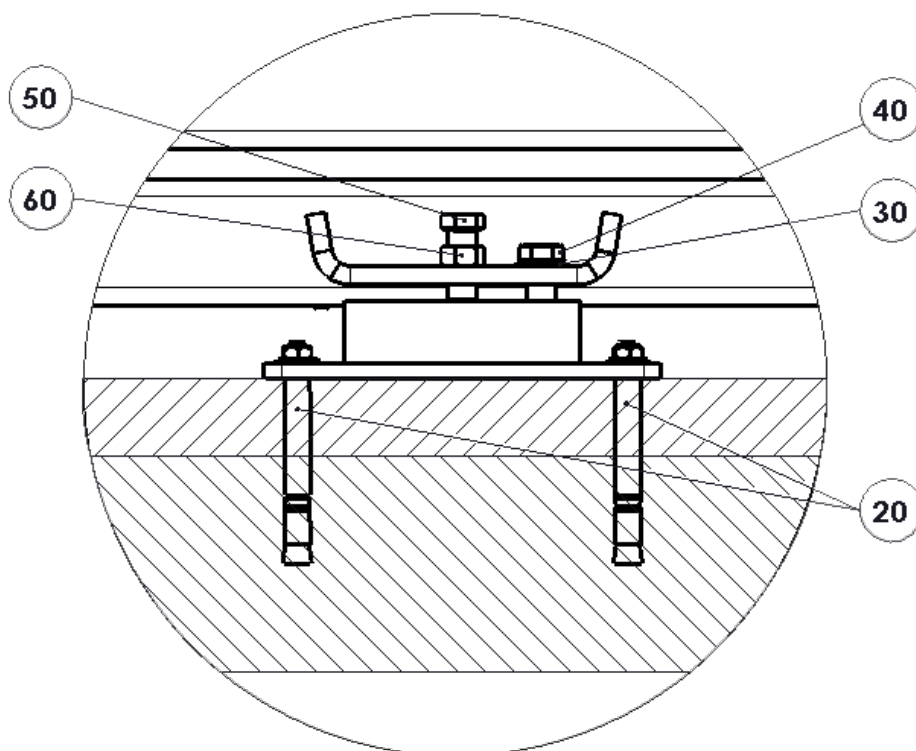
8.5.5 Wheel Alignment Computer

- If the wheel alignment computer is already in operation, place the wheel adaptors and the measuring heads against the wheels, drive the lift into the upper wheel alignment position and record or print the toe and camber values.
Then, lower the lift completely and compare the values with the upper values. The difference in toe and camber between the upper and lower position may be a maximum of 2' (arcmin) plus one digit.
If necessary, readjust the runways individually in a fully lowered position at the respective wheel contact surface. At the same time, adhere to the tolerance values mentioned above and below.
Each runway can be individually readjusted to a certain degree via the adjusting screws at the floor tubs.
- In the case of lifts with brackets for the measuring heads, the measuring heads are inserted into the brackets and the lifts lowered to the lowermost position. The toe and camber values displayed now must be stored.
If the MKS software (measuring positions control system) is installed on the wheel alignment computer, the MKS screen will automatically display when starting the computer, in which all values can be set to zero. If, at a later point, a zero point shift of more than 5' occurs, the values on the screen will be displayed in red colour (previously green). This way, the operator is notified about a zero point shift at the lift or wheel alignment device.
- In the case of wheel alignment computers which do not contain the MKS software, the toe and camber values should be noted down in order to be compared later.

8.6 Compensating Rail for Foundation Depths 280/330 mm

When a new lift is installed in an old, deep foundation (e.g. when replacing a DUO +1 with a DUO CM), the lift must be attached with compensating rails according to the following drawing.

Pos.	Quantity	Designation	Item no.
10	6	Compensating Rail	
20	24	Heavy Duty Anchor $\varnothing 15$, M10, t=45, L=141	23 5050
30	12	Washer A17	22 0125 16 3
40	12	Hex Head Screw M16x40-8.8	22 0933 16040 3
50	12	Hex Head Screw M16x45-8.8	22 0933 16045 3
60	6	Hex Nut M16-8	22 0934 16 3



9 Bleeding the Hydraulic System



Do not bleed the hydraulic system under load.

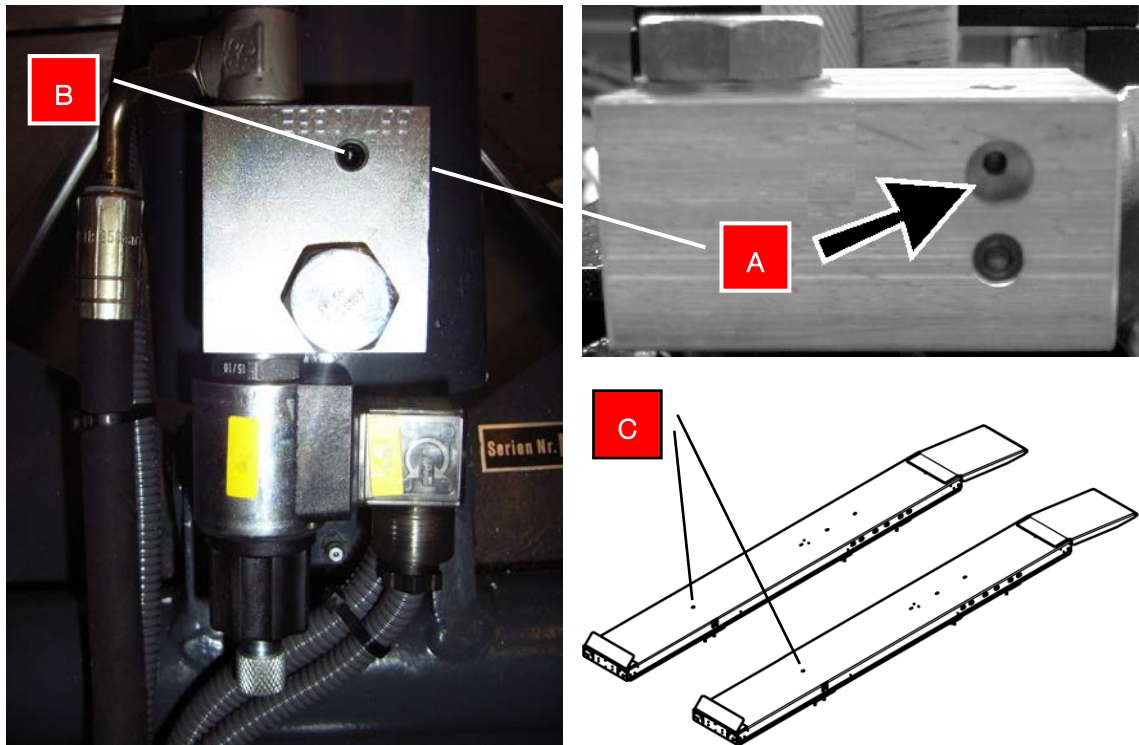
9.1 Bleeding the Main Cylinder Piston

The lifts of these series use different main cylinder makes. If the cylinder has a bleeder screw (see Fig.), bleed the piston cavity at initial operation and after replacement of cylinders:

- 1 Fully raise the lift.
- 2 Open the bleeder screw using an Allen key.
- 3 Allow the air to escape completely.
- 4 Close the bleeder screw, torque to 3 Nm.
- 5 Carry out a trial run and leakage test.



9.2 Bleeding the Lift



(Example DUO UC).

- 1 Raise the lift, then lower into basic position and press the LIFT DOWN button for a few seconds.
- 2 Raise the lift to half the lift rise.
- 3 Insert a plastic hose into the bleeding duct (A) of each hydraulic cylinder. Insert the other end into the collection container.
- 4 Open the bleeder screw (B) on the +A side by approximately 1/4 turn and close it just before reaching the basic position. ►ATTENTION: The +A side moves downwards.
Open the bleeder screw (B) on the +B side by approximately 1/4 turn and close it just before reaching the basic position. ►ATTENTION: The +B side moves downward.
The screws are accessible through elongated holes (C) in the runways.



Never fully screw out the bleeder screws as otherwise seals can be damaged.

9.3 Bleeding the Wheel-Free Jack



- 1 Raise lift and set on mechanical locks by manual lowering.
- 2 Put valves back into working order.
- 3 Raise wheel-free jack, then lower into bottom position and hold down [WFJ DOWN] button for a few seconds.
- 4 Raise the wheel-free jack to half the lift rise.
- 5 Insert a plastic hose into the bleeding duct of each hydraulic cylinder. Insert the other end into the collection container.
- 6 Open the bleeder screw (B) on the +A side by approx. 1/4 turn. Close and hand-tighten it just before reaching bottom position. ►ATTENTION: The +A side moves downwards.
Open the bleeder screw (B) on the +B side by approx. 1/4 turn. Close and hand-tighten it just before reaching bottom position. ►ATTENTION: The +B side moves downward.



Never fully screw out the bleeder screws as otherwise seals can be damaged.

10 Operational Check



The sheet enclosed in the operating manual "Quality certification for installation and maintenance work" must be completed and sent to the manufacturer.

The following items must be checked particularly during the acceptance:

- Tight fit and torque of all anchor bolts
- Upper and lower limit switch
- Synchronisation of the two lifting units
- Smooth operation of the lift with and without load
- Tightness of the hydraulic system
- Cylinder seat valves in operation, not unlocked manually
- Functionality of the safety latches
- Pinch protection set to minimum height of 120 mm

11 Service Information

11.1 Proximity Switches

11.1.1 Proximity Switches on the Latches

Only for Version with Double Latch

Option only for wheel alignment lifts.

- 1 The proximity switches at the latches (2 pcs.) or the double latches (4 pcs.) must be set as close as possible to the cylinder tube (approx. 1 mm spacing).
- 2 Check if the LEDs on the control board and the LEDs on the proximity switches light up when the runway is fully locked in the latches.

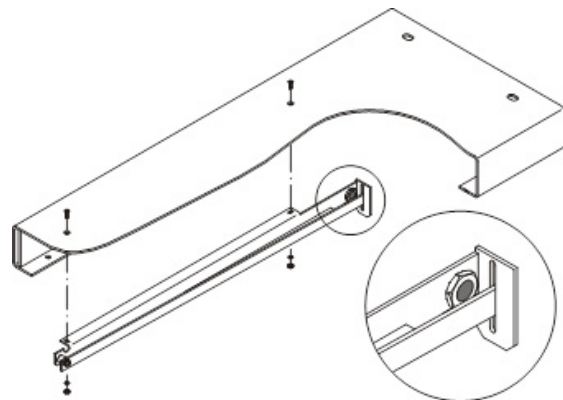
11.1.2 Proximity Switches in the Runway

Permanent/Hydraulic Inclination

If the lift is equipped with a tilt, one switch strip with proximity switches will be located below each runway.

The switch strip monitors the correct insertion of the floating bearing in the runway.

+A-B20 Function: Monitoring of
+B-B20 the inclination



PMS with Deposable Prism Jaws (only for "10 t Traversable" Version)

If the lift is equipped with a PMS that includes a deposable prism jaw, an additional proximity switch is required for the monitoring of the prism jaw position. This proximity switch is housed in the PMS with the deposable prism jaw.

+A-B18 Function: Monitoring of the retracted position of the prism jaw for "10 t traversable" version.

11.2 Setting the Photoelectric Sensor

After the completion of the installation, the correct responding qualities of the longitudinal light barriers must be checked as follows:

- 1 Position lift at eye level.
- 2 Turn adjusting screw at receiver to MIN position.
- 3 Slowly turn the adjusting screw into the MAX position, until the yellow indicator lamp behind the protective glass flashes.

- 4 Function check:
With one hand held between transmitter and receiver, press the [LIFT DOWN] button. The lift must not move! On the operating panel, the yellow indicator lamp flashes 8 times.
- 5 Acknowledge the message by pressing the [LIFT UP] button.



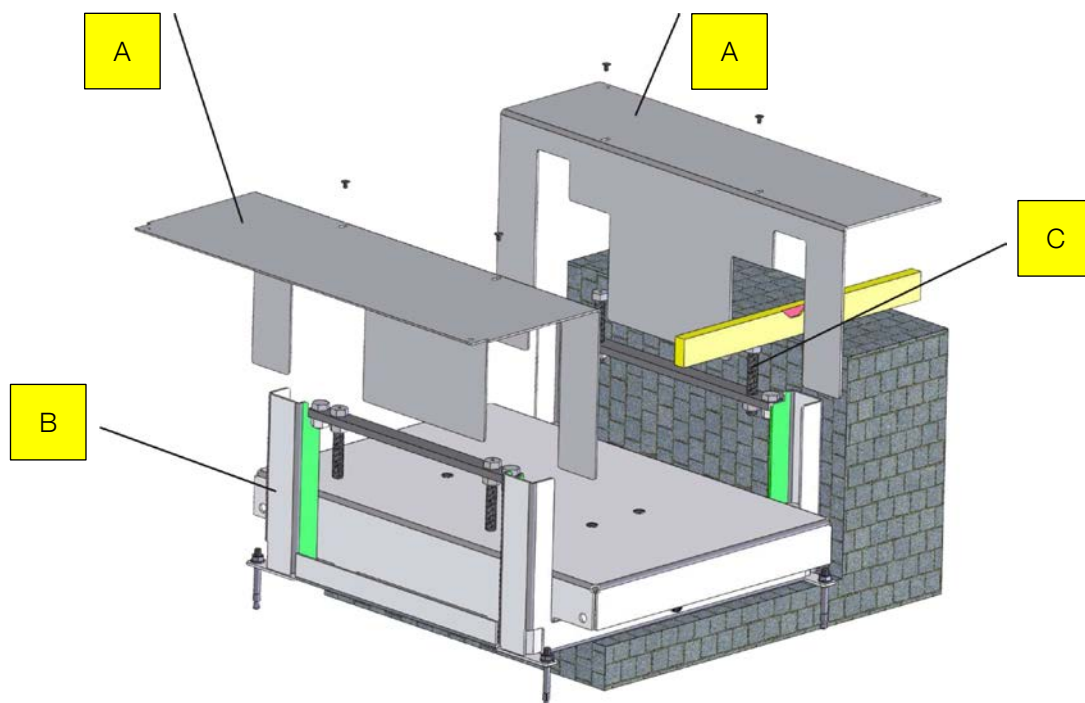
The light barriers of model DUO GN / R-AS40 (previous version) and model DUO CM / R-AS40/50CM (current version) are **not** compatible with each other!

11.3 Installation of Floor Cover

- 1 Place the lifting floor in the foundation.
- 2 Dismantle the cover plates (A).
- 3 Align the floor plate (B) of the lifting floor and anchor into the foundation.
- 4 Set the adjusting screw in such a way that it is flush with the edge of the foundation. We recommend you use a spirit level to check the alignment. Thereafter, lock the nuts of the adjusting screw.
- 5 Install the prepared pneumatic components according to the pneumatics diagram.
- 6 To finish the installation, re-install the cover plates (A) and finally perform a functional check.



The lifting floor was additionally equipped with two quick bleeder valves to increase its lowering speed.



11.4 Axle Play Detector (Optional)

11.4.1 MAH CAN RP – Variant Selection

Variants for DUO UC, status as of 28.11.2011

Hex switch S1	Variant description of the shaker plate
0	PMS 3X and PMS 3D centred on CAN-Bus
1	PMS 3X and PMS 3R centred on CAN-Bus
2	SSA4000 and PMS 3D centred on CAN-Bus
3	PMS 3X, ZS SQUARE I
4	PMS 3X or SSA4000, ZS SQUARE II
5	PMS TÜV Belgium (only cable hand lamp)
6	PMS3X Single (only front axle)
7	SSA4000 Single (only front axle)
8...9	Free
10	PMS 3P (Pneumatic)
11...15	Free

11.4.2 Hex Switch S1/S2

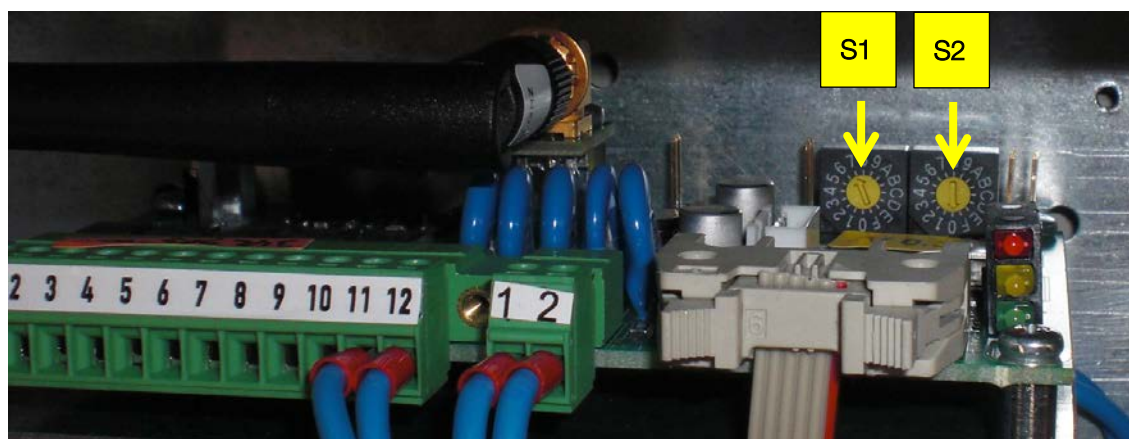
S1: Adjusting the shaker plate variant

16 hex switch positions from 0 ... F

S2: Channel Setting

16 hex switch positions from 0 ... F

Only settings 0...9 are applicable as the radio module only provides these options.



11.4.3 Connecting a Cable Hand Lamp

Inputs – Configuration MAH CAN I8 Hex-switch "F"

Input configuration for the MAH CAN I8 board for the connection of the cable hand lamp.

The MAH CAN I8 board hex switch must be on the "F" position.

MAH CAN I8	Input 1	Button A1
	Input 2	Button A2
	Input 3	Button B1
	Input 4	Button B2
	Input 5	Button C1
	Input 6	Button C2
	Input 7	Switch E
	Input 8	Switch S3 (for stand-alone variant 9, not in software yet)

11.4.4 Connection of Proximity Switches for Option "10 t traversable"

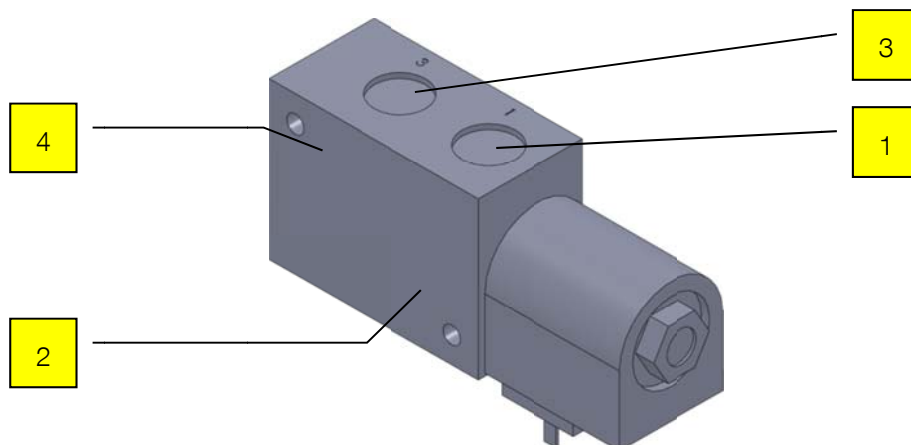
Inputs – Configuration MAH CAN I8 Hex-switch "E"

Input configuration of the MAH CAN I8 board for the connection of the input switches for centering. The MAH CAN I8 board hex switch must be on the "E" position.

11.4.5 PMS 4/2 Directional Control Valve

For the PMS option with multiple directions of motion, the depicted valve block is used. The block is located under the runway. Pro motion, one valve is required.

	1	2	3	4
Dead (no current)	closed	connected with 4	closed	connected with 2
Under current	connected with 4	connected with 3	connected with 2	connected with 1



11.4.6 Service Mode for PMS

To remove the sliding plates, the hydraulic cylinders must be pressure relieved. To do this, a Service mode was integrated. When this mode is enabled, only the valves are driven as in the normal operating mode. The hydraulic pump remains OFF.

Enable Service Mode

- Cable hand lamp: Push and hold rocker buttons A and B together for 10 seconds. The pump switches off. (Simultaneous actuation of A1 and B1 or A2 and B2).
Once the second button is detected, the valves are switched off. The pump remains ON until 10 seconds have elapsed. The plates remain in their last position.
- Radio hand lamp: Setting to mode LED ON (Manual operating button). To enable the Service mode, push and hold the operating button for 25 seconds.
During this time period, the valve is ON and the pump is also ON. After 25 seconds the pump switches OFF. The valve remains ON.

Function while Service Mode is Enabled

When in the Service mode, the valves of the corresponding moving directions can be driven using the operating buttons, and the plates can be moved by hand.

On the MAH CAN RP circuit board the Service mode is indicated by the yellow LED of VD20.

Quit Service Mode

- Cable hand lamp: Push and hold rocker buttons A and B together for 10 seconds. The output for the pump switches ON and the Service mode is quit.
- Radio hand lamp: Setting to mode LED ON. Push and hold the operating button for 25 seconds to quit the Service mode. After 25 seconds the pump switches ON.

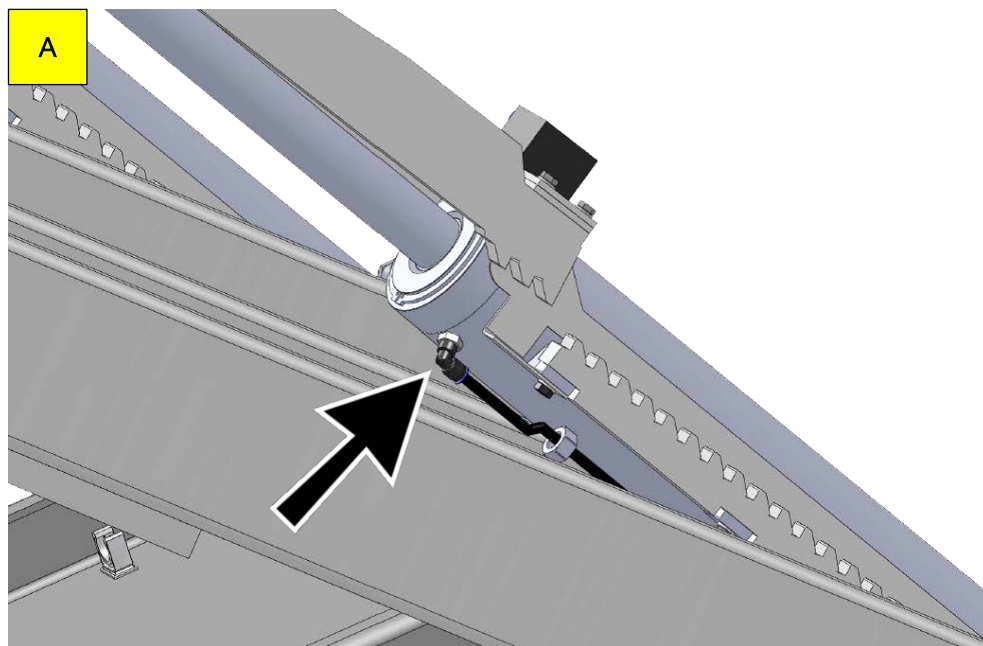
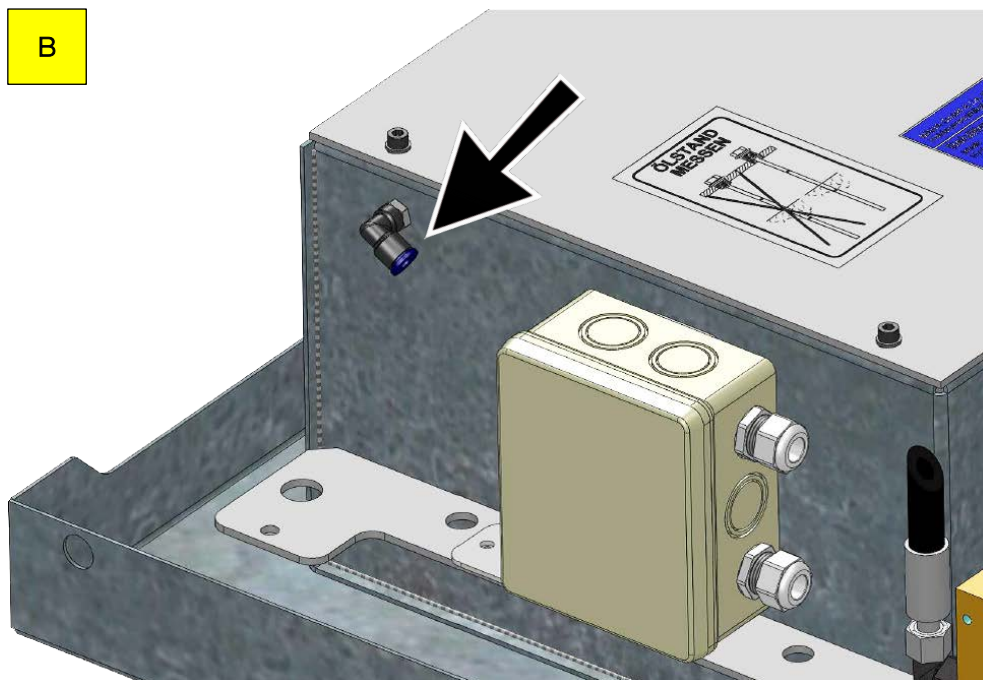
Alternatively, the Service mode can be quit by switching off the power supply.

11.5 Cleaning the Drain Line

Periodically remove and clean the drain lines of the hydraulic cylinders to prevent clogging and equipment damage. Also check that the lines are in an undamaged condition.



Preventively clean the drain line each time a cylinder is replaced or repaired.

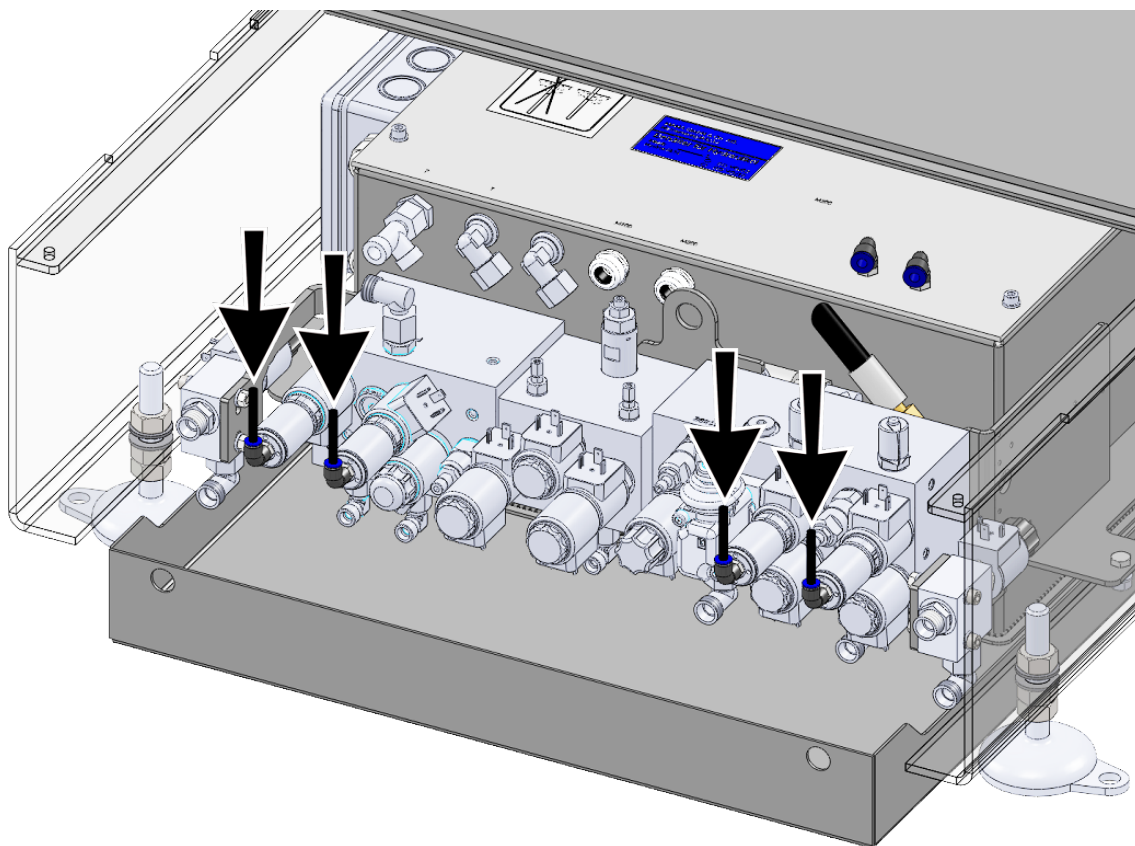


11.6 Inspecting and Servicing the Pneumatic Cylinders



All pneumatic cylinders on the power unit must be serviced at yearly intervals.

- 1 Unscrew pneumatic cylinder from valve, clean piston rod side and lubricate with a resin-free oil.
- 2 Remove hose from pneumatic cylinder. Fill 1 to 3 drops of a resin-free oil into the hose connection (see Fig.). Reattach the hose.
- 3 Run pneumatic cylinders 5 to 10 times and check for smooth operation.
- 4 Screw pneumatic cylinders onto valve.
- 5 Check manual lowering function of lift and wheel-free jack (if present).



11.7 Servicing the Bearings

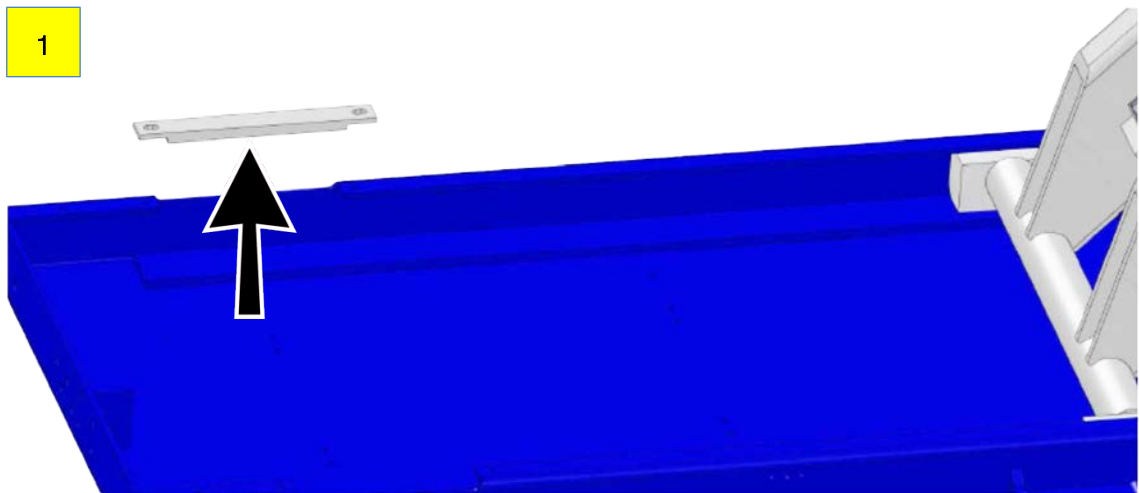


The movable bearings have no slide bushings. Main indicator for damaged or sluggish bearings is a creaking noise during lift operation. Note the following steps.

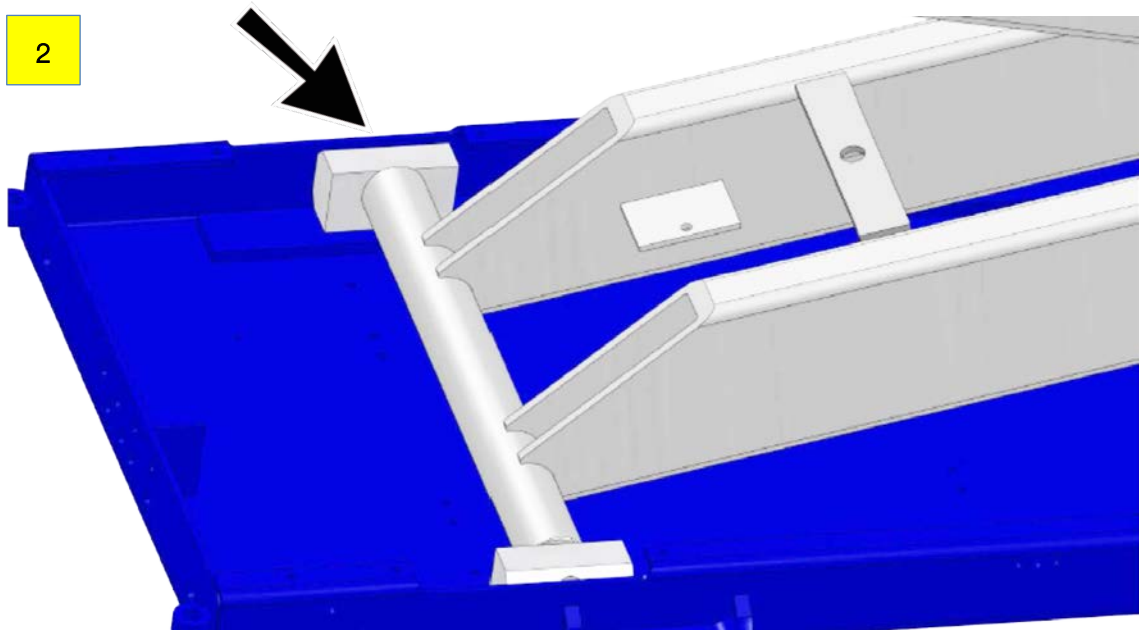
11.7.1 Movable Bearings

The movable bearings have no slide bushings. Main indicator for damaged or sluggish bearings is a creaking noise during lift operation. Proceed as follows (not applicable for lifts with runway inclination):

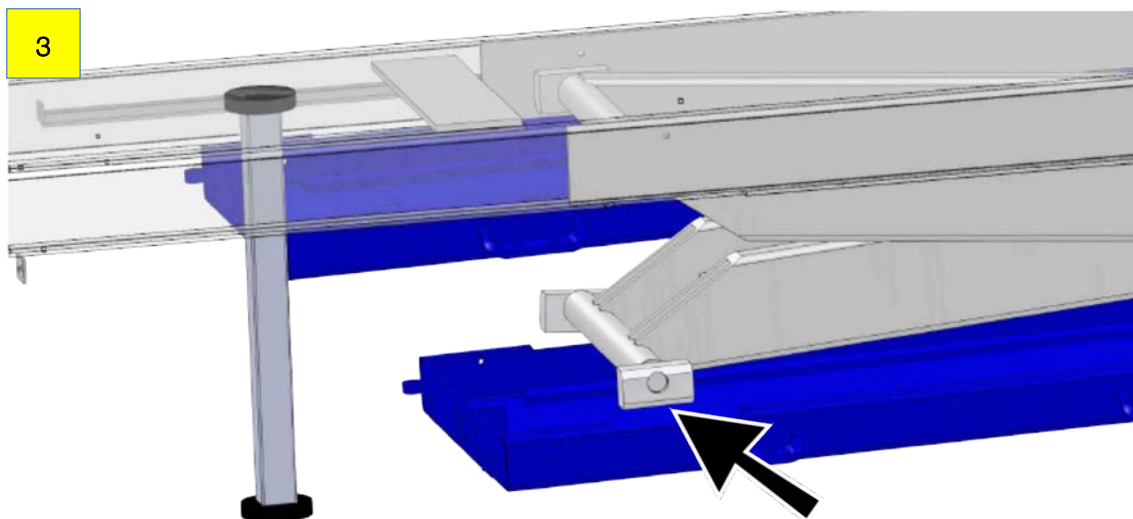
- 1 Remove the lift-out protection.



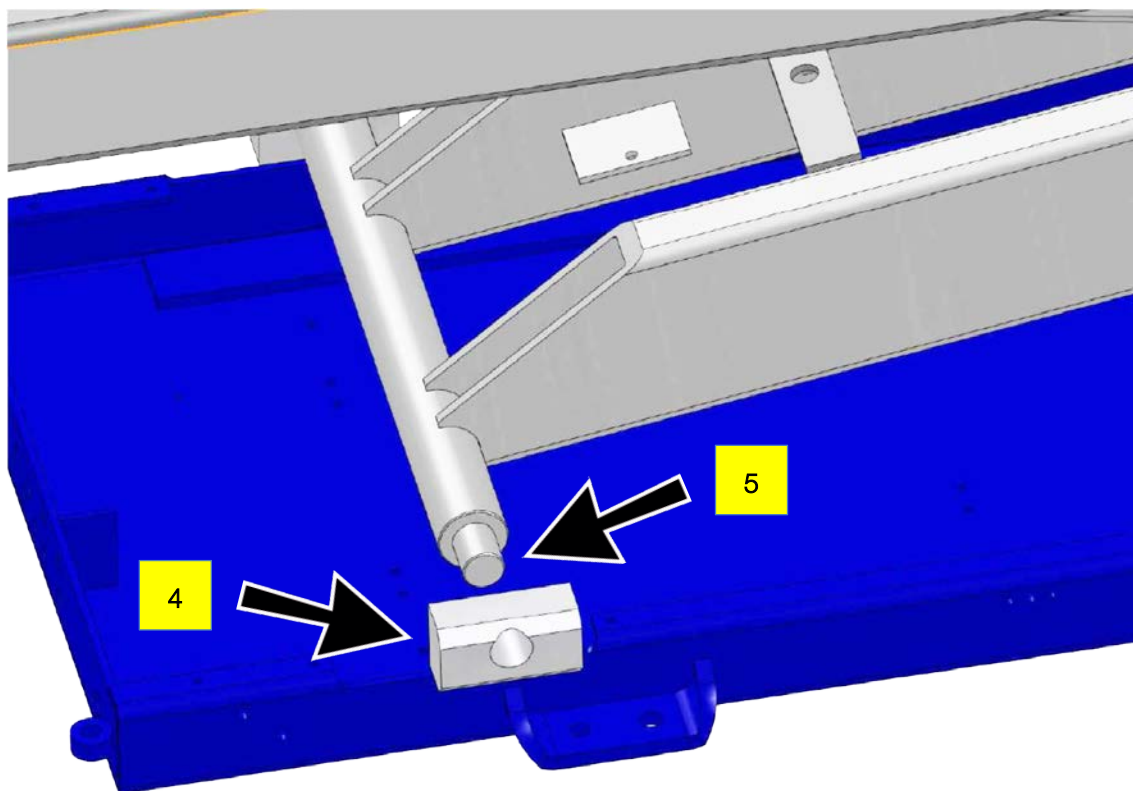
- 2 Move the scissors until the slider block is at the recessed area of the foundation tub.



- 3 Support the runway on the floor. Lower the lift until the slider blocks are above the foundation tub.



- 4 Remove the slider blocks, check for damage and replace as required.
- 5 Check axle pins for damage. If no severe damage is found, slightly sand the axle pins with fine sandpaper and lubricate them with a grease film.

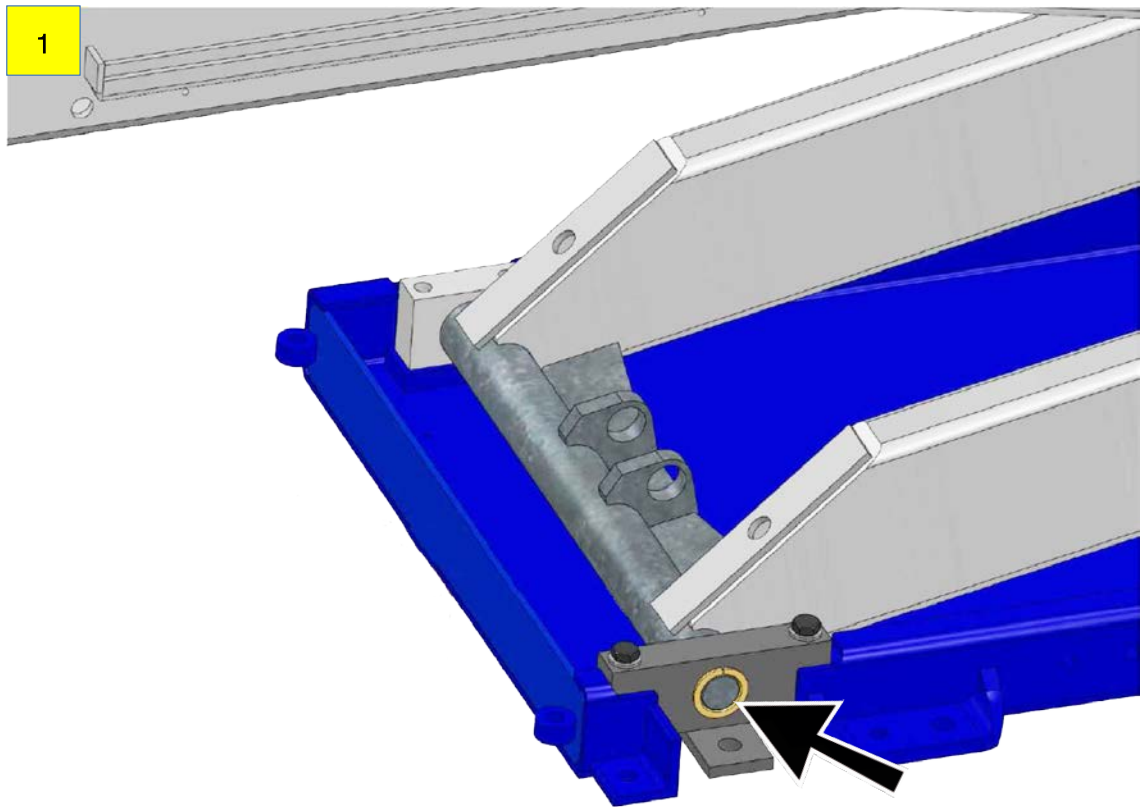


- 6 Reattach the slider blocks to the axle pins and check for smooth rotation.
- 7 Clean and grease the running surfaces of the slider blocks in the foundation tub.
- 8 Reset the lift into an operational condition.

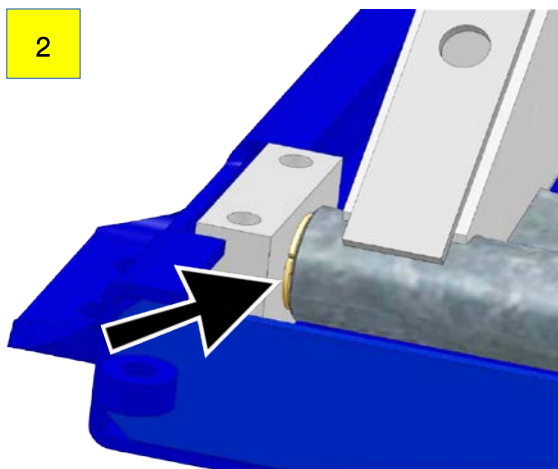
11.7.2 Thrust Bearings

The thrust bearings are maintenance-free friction bearings, which must be periodically checked for play and visible damage. Proceed as follows:

- 1 Raise the lift and shake the runways by hand. Check radial bearing play. A slight clearance between thrust bearing and axle pin may be present due to manufacturing tolerances.



- 2 Visual check: The collar of the friction bearing must be present and undamaged over its entire circumference.

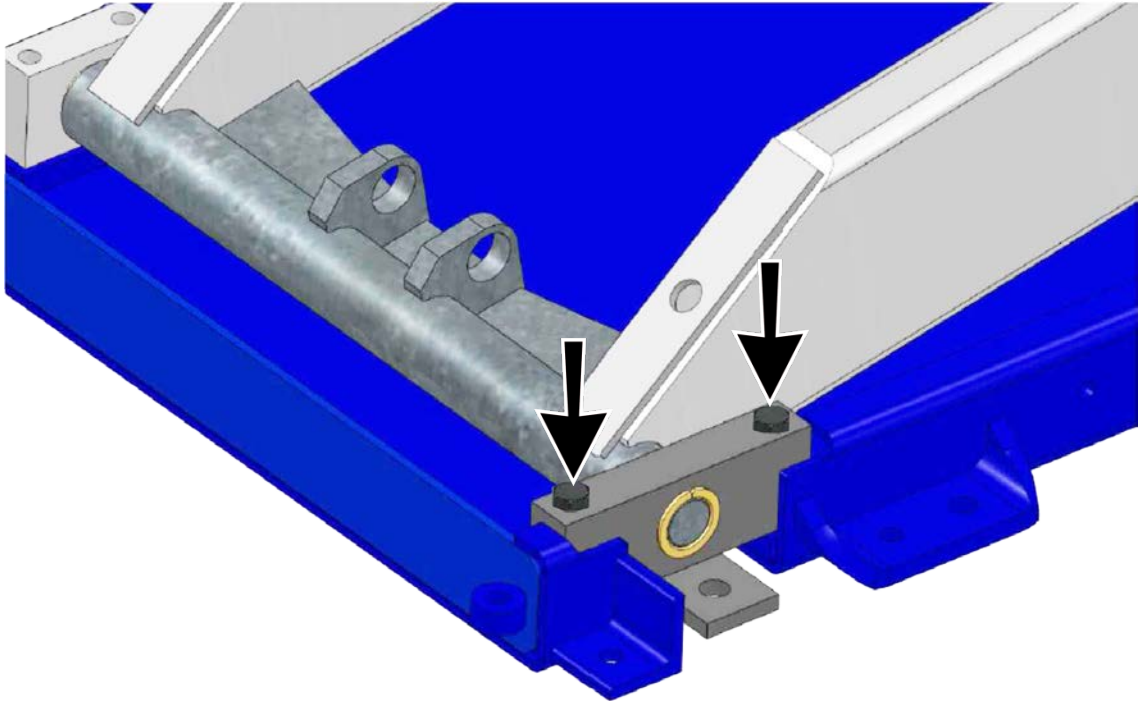


If damaged bearings are found during inspection steps 1 and 2, these must be replaced. A hoisting device is necessary for carrying out this repair!



Warning – Risk of Accident

Always secure the main scissors against slipping away before opening the thrust bearing screws!



11.8 Changing and Checking the Lighting Mode

11.8.1 Changing the Lighting Mode

To switch from “Automatic” to “Manual” lighting mode and back:

- Press the [LIGHT] button for at least 5 s, until the status lamp on the foil keypad switches over.

11.8.2 Checking the Lighting Mode

When the lift is fully lowered:

- Press the [LIGHT] button.
 - a) If lighting is switched on → “Manual” mode is enabled.
 - b) If lighting is *not* switched on → “Automatic” mode is enabled. Lighting is automatically switched on when lift is raised.

12 Information on the Control Electronics

12.1 Description

The MAH HS082 lift control is a PCB for the controlling and monitoring of lifts with increased security requirements. By means of the integrated CAN bus, other modules such as keyboards, input boards, output boards, display units and PMS control boards, can be connected.

The integrated Dead Man's Type Control switches all safety valves off if no keys are being operated. In addition, the power supply of these safety valves (seat valves, latches) can be interrupted by an emergency off-switch.

The control board has four analogue inputs with which the signal of the height measuring systems can be measured and monitored.

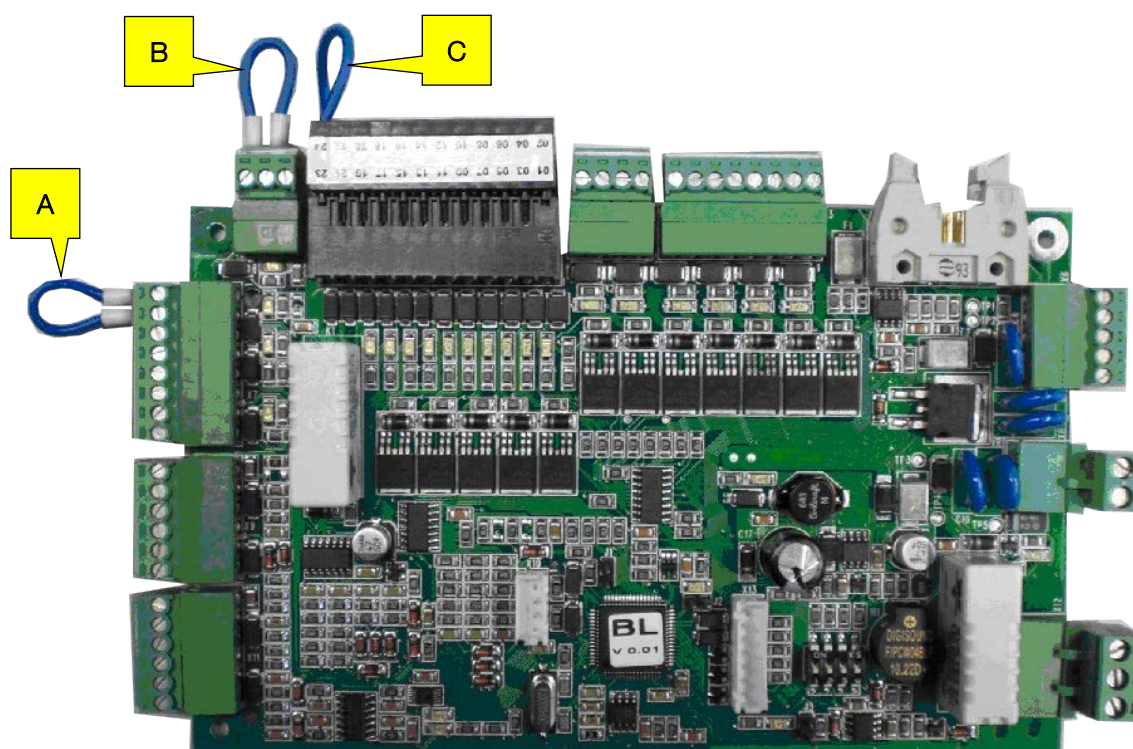
Furthermore, the control board has a total of 12 outputs, 5 of which have a dead man's control function, one potential-free output for 230 VAC and eight 24 VDC inputs.

12.2 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



12.3 CAN Bus Terminating Resistors



When replacing PCBs MAH HS0812 and MAH HT08, set the terminating resistors of the CAN bus according to the circuit diagram.

12.4 FLASH Memory Card

The MAH HS0812 control board contains a FLASH memory card (KE item no. MAH SPI FL or MAHA item no. 52 0541), on which all software programs and settings are stored on.

Replacing the Control Board

If the control board is replaced, then the FLASH memory card must be taken from the old control board and inserted into the new control board. The main switch must be off! When switching the device on, the software program on the new control board will be replaced with the programme on the FLASH memory card, should the versions differ. Subsequently a referencing (reset) should be performed.

The original parameters and operating hours counters are retained with a few exceptions. Only the following will be lost:

- the light status (on or off)
- the status of the slide plate (locked or unlocked)
- the active status in the case of two control units (the control unit which was active)
- a saved working height
- the status of a triggered ceiling light barrier.

Software Update with FLASH Memory Card

- For this, a FLASH memory card with the desired software must be programmed via the LON-manager. The entire configuration must also be performed on the FLASH memory card, e.g. with an EXCEL sheet.

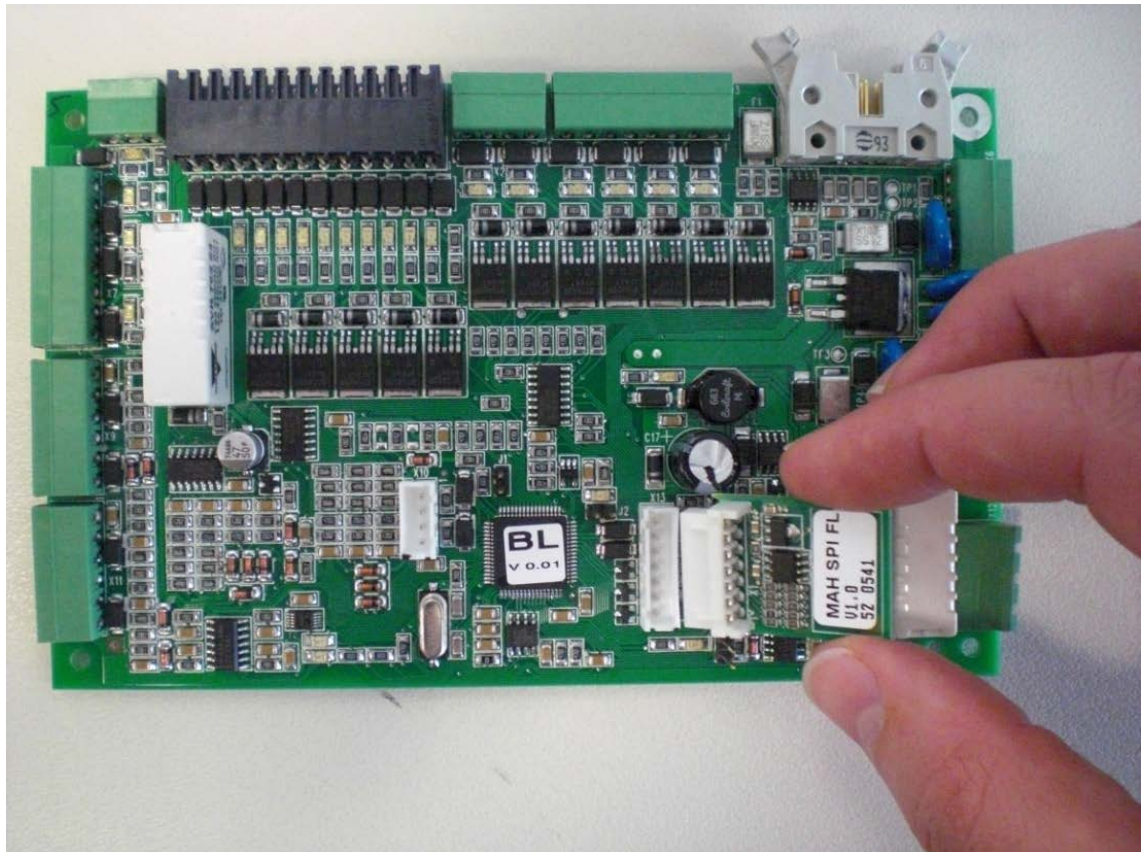
When the FLASH memory card is inserted into the control board, the software update will automatically start at the connected module boards, should they differ in versions.

Subsequently a referencing (reset) should be performed.

- 1 Main switch OFF.
 - 2 Remove SPI flash module loaded with old software.
 - 3 Insert SPI flash module loaded with new software.
 - 4 Main switch ON.
- The SPI flash module transfers the new software. **IMPORTANT:** Do not press any keys during transfer!
Once the data has been transferred successfully a signal tone beeps and the green LED lights up.



Please reference the scissors lift again after exchanging the SPI flash memory on the board. See Chapter "Special Programs".



12.5 Extending and Connecting the Measuring System Cable

Cable Extension

Cable extension may be required e.g. when replacing a lift cylinder.

Required Parts

Installation material, part # 030080 01658 0 (1 pce per lift cylinder)



To avoid short circuit:

- Turn off the main switch and unplug connector from PCB.
 - Do not cut the cable as a whole.
-

Procedure

- 1 Expose the single conductors and attach hose.
- 2 Connect single conductors.
- 3 Pull hose over the connection point.
- 4 Fix hose by heating with a hot air gun.

1



2



3



4



Cable Connection



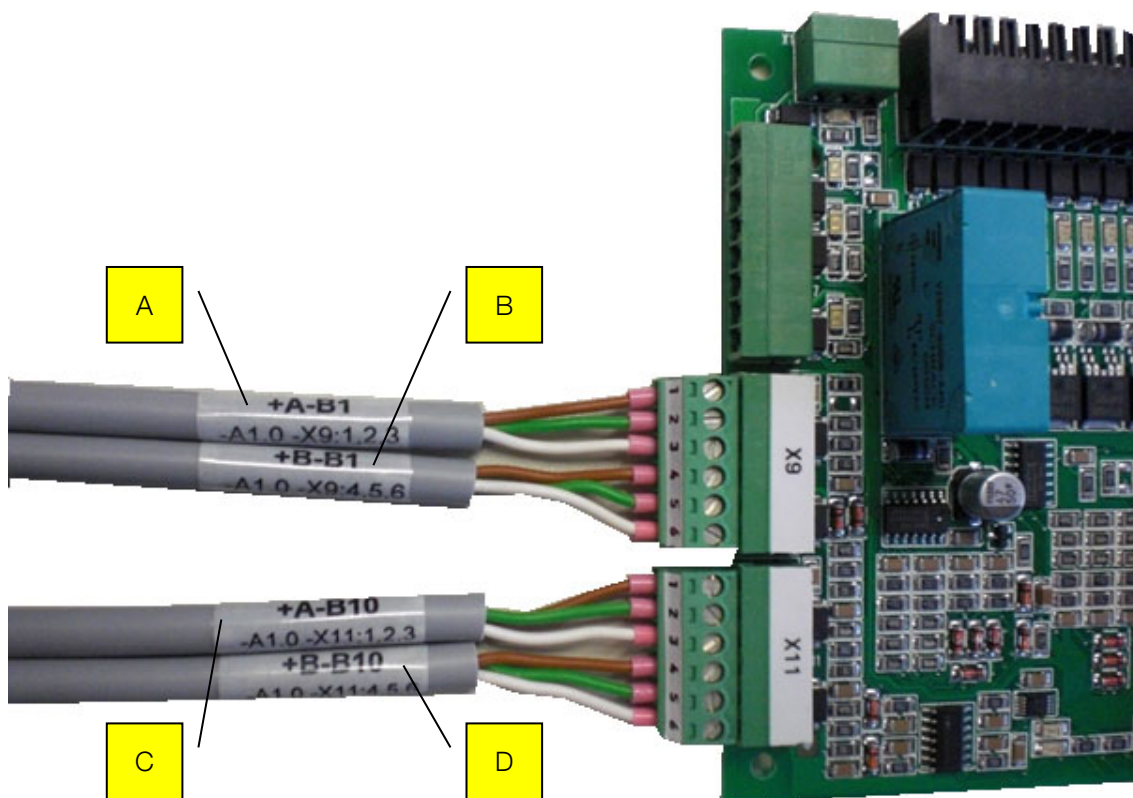
Risk of damage!

Failure to observe the following points can result in damage to the measuring system.

- The main switch must be switched off for any activities at the control (including plugging in or out of plugs, cutting of cables).
- Ensure the correct allocation of wire colours for the terminal assignment of the connectors.
- Ensure the correct positioning to the control board when inserting the connectors.

A	Height measurement cylinder Runway +A	—B1	B	Height measurement cylinder Runway +B	—B1
C	Height measurement cyl. -B10 / -B50 *		D	Height measurement cyl. -B10 / -B50 *	

*depending on year of manufacture



12.6 Testing the Measuring System

Runways

The two measuring systems for the +A/+B of the runways are connected to the X9 of the HS0812 board.

Measurement system left /+ A		Measurement system right /+ B	
X9.1	24 V-Out	X9.4	+24V-Out
X9.2	Sensor signal	X9.5	Sensor signal
X9.3	Gnd	X9.6	Gnd

The sensor voltage of the +A sensor must be measured between X9.2 and X9.2 and the sensor voltage of the +B sensor must be measured between X9.5 and x9.6 with a multimeter.

Cylinder runway CM [mm]	Cylinder runway UC [mm]	Current [mA]	Sensor voltage with HS0812-internal 500 Ω [V]
0	0	4.0	2.0
64	59	5.6	2.8
128	119	7.2	3.6
192	178	8.8	4.4
256	238	10.4	5.2
320	297	12.0	6.0
385	356	13.6	6.8
449	416	15.2	7.6
513	475	16.8	8.4
577	535	18.4	9.2
641	594	20.0	10.0

Wheel-Free Jack

The two measuring systems for the +A/+B of the WFJ are connected to the X11 of the HS0812 board.

Measurement system left /+ A		Measurement system right /+ B	
X11.1	24 V-Out	X11.4	+24V-Out
X11.2	Sensor signal	X11.5	Sensor signal
X11.3	Gnd	X11.6	Gnd

The sensor voltage of the +A sensor must be measured between X11.2 and X11.3, and the sensor voltage of the +B sensor must be measured between X11.5 and x11.6 with a multimeter.

Cylinder runway CM [mm]	Cylinder runway UC [mm]	Current [mA]	Sensor voltage with HS0812-internal 500 Ω [V]
0	0	4.0	2.0
15	21	5.6	2.8
30	42	7.2	3.6
45	63	8.8	4.4
60	84	10.4	5.2
75	105	12.0	6.0
90	126	13.6	6.8
105	147	15.2	7.6
120	168	16.8	8.4
135	189	18.4	9.2
150	210	20.0	10.0

13 Error and Information Messages

Error messages are displayed with the red lamp lighting constantly and the yellow lamp flashing an error code.

Code no.	Description	Cause
2	Axle lift error below pinch point (Option Axle lift enabled)	Axle lift not in parking position below pinch point level! Before the lift can be raised or lowered, push the axle lift to its parking position.
3	Difference for Obstruction	When lowering the lift onto the mechanical locks, the stricter difference for obstruction applies. If this is exceeded, the system is shut down and the error message is displayed. The lift can still be raised.
4	Difference max.	Maximum permissible difference. Runways and or wheel-free jack have reached maximum permissible height offset. Lift operation only manually or in emergency mode.
5	Inclination error (Option Inclination enabled)	Runways outside guide rail. B20/B21 – Proximity switches do not give a signal. Monitoring carried out above pinch point protection.
6	Internal keypad error	Button pressed during switch-on or keypad defective.
7	External keypad error	Button pressed during switch-on or keypad defective.
8	Zero error, Height measuring system	Lift was not in bottom position during zero adjustment, or height sensor / sensor line defective.
9	Motor overheated	Temperature sensor at pump motor was triggered, or jumper on PCB is missing if sensor not present.
10	Longitudinal light barrier defective (Option Long. light barrier enabled)	Self-test of longitudinal light barrier revealed that light barrier/cable is defective.
11	Reserved	Reserved for latch detection program.
12	-	
13	-	
14	Error Seat valve pressure test, Runways	During pressure build-up the runways move with closed seat valves. Conclusion: Seat valves leaking.
15	Error Seat valve pressure test, wheel-free jack (Option Wheel-free jack)	During pressure build-up the wheel-free jack moves with closed seat valves. Conclusion: Seat valves leaking.
16	Raising error	Lift will not raise, although pump is on and seat valves are open (testing time 2 s). Cause: Contactor defective, pump defective, seat valves do not open, measuring system defective.
17	Measuring system error	Signal level of measuring system outside permissible range. Either measuring system or cables defective.
18	Contactor monitoring error	Status of Contactor monitoring reveals that either the contactor is blocked (signal despite de-energized contactor) or the cable is defective (no signal despite energized contactor).

Code no.	Description	Cause
19	Enable monitoring error	Status of Enable monitoring reveals that either the enable contact is blocked (signal despite de-energized enable relay) or the enable relay is defective (no signal despite energized relay).
20	Plug-in memory defective (MAH SPI FL)	Plug-in memory module not present or defective.
21	Timeout MAH HT08 internal (Option Internal control unit enabled)	Internal keypad PCB does not respond. CAN bus defective, or no MAH HT08 board present, or DIP switch 2 on HT08 not in OFF position.
22	Timeout MAH HT08 external (Option External control unit enabled)	External keypad PCB does not respond. CAN bus defective, or no MAH HT08 board present, or DIP switch 2 on HT08 not in ON position.
23	Timeout MAH CAN IN8 Module 0 (Option Proximity switch latch)	CAN IN8 module address 0 does not respond. Module not present or defective? Address switch correctly set to 0? CAN bus ok?
24	Timeout MAH CAN IN8 Module 1 (Option Inclination, Long. light barrier, Transverse light barrier, Radiator)	CAN IN8 module address 1 does not respond. Module not present or defective? Address switch correctly set to 1? CAN bus ok?
25	Timeout MAH CAN IN8 Module 2 (Option Measuring head monitoring)	CAN IN8 module address 2 does not respond. Module not present or defective? Address switch correctly set to 2? CAN bus ok?
26	Timeout MAH CAN RP Module (Option PMS)	CAN RP board does not respond. PCB not present or defective? CAN bus ok?
27	Wrong bootloader on MAH CAN RP (Option PMS)	Wrong bootloader version on MAH CAN RP board. Board must be replaced.
28	Timeout MAH CAN IN8 Module E (Option PMS monitoring)	CAN IN8 module address E does not respond. Module not present or defective? Address switch correctly set to E? CAN bus ok?
29	Reserviert	Reserved
30	-	
31	-	
32	-	

Information messages are displayed with the green lamp lighting constantly and the yellow lamp flashing an information code.

Code no.	Description	Cause
2	Axle lift position when lift reaches pinch point	Axle lift not in parking position when lift reaches pinch point during lowering motion.

Code no.	Description	Cause
3	Difference for Obstruction	Height offset between left and right side has reached a preset value which is interpreted as an obstruction blocking the lift motion. From now on seat valve control!
4	Ceiling light barrier	Ceiling light barrier triggered during raising motion.
5	Emergency stop	Emergency stop switch is on.
6	Measuring head position	Measuring head not in parking position during lowering motion.
7	PMS cover not closed	PMS cover not properly closed.
8	Longitudinal light barrier	Longitudinal light barrier interrupted during lowering motion.

14 Special Programs

14.1 Special Programs without Service Mode

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

- 1 Lower lift into bottom position with [DOWN] and wheel-free jack with [WFJ-DOWN] button.
- 2 Main switch OFF.
- 3 Wait approx. 5 seconds until the power supply unit has discharged.
- 4 Press and hold down the [DOWN] + [WFJ-DOWN] buttons at the same time.
- 5 Main switch ON.
- 6 Wait for approx. 10 seconds until the signal tone beeps once.
- 7 Release the buttons.
- 8 Reference the lift at the top (see section "Special Programs in Service Mode > Disable Seat Valve and Bypass Valve Control > Referencing the Lift in Upper End Position).



- Note for software version V1.02.005 or higher: Lift must be referenced **both** in bottom position **and** at the top.
- 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.

14.1.2 Saving the Working Height

- 1 Move the lift to the desired lifting height with the [UP] / [DOWN] buttons.
- 2 Main switch OFF.
- 3 Wait approx. 5 seconds until the power supply unit has discharged.
- 4 Press and hold down the [LATCH] + [UP] buttons at the same time.
- 5 Main switch ON.
- 6 Wait approx. 10 seconds until the signal tone beeps twice.
- 7 Release the buttons.



- When the lift is raised and reaches this working height, it will stop automatically.
 - If you want to delete the working height, fully lower the lift and repeat the saving process in bottom position.
-

14.1.3 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:

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

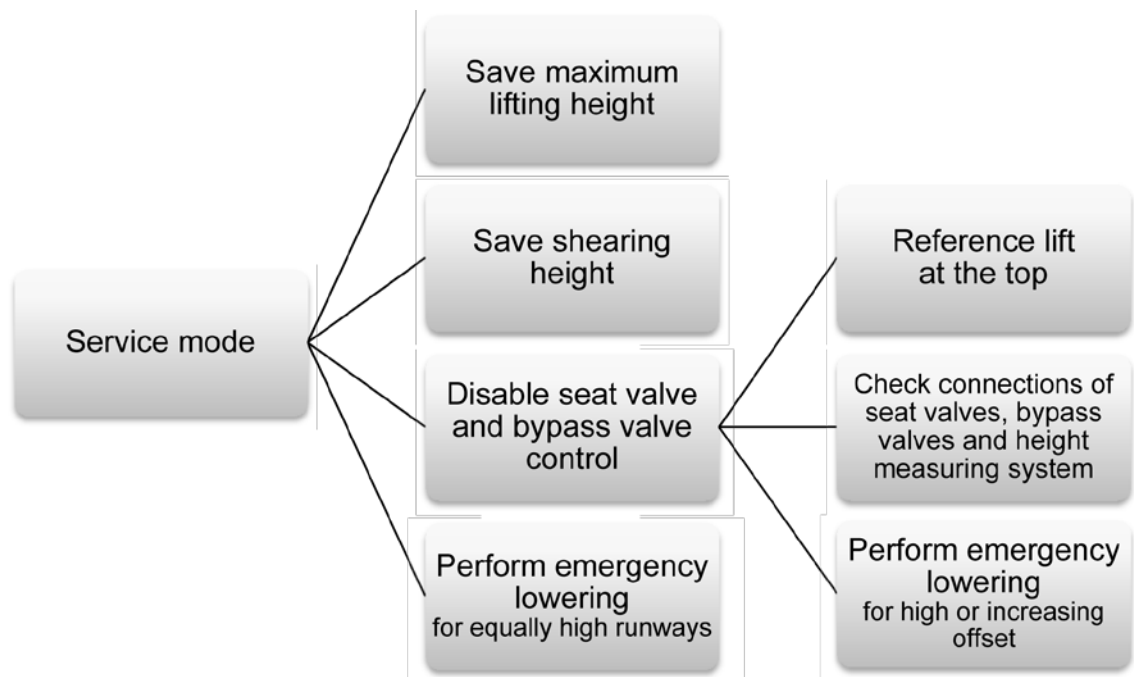
14.2 Special Programs in Service Mode



These instructions are valid for software version V1.02.009 or higher, if not stated differently.

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.

Functional Diagram



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].

14.2.1 Saving the Maximum Lifting Height

- 1 Raise the lift with the [UP] button or the wheel free jack with the [WFJ-UP] button to the desired lifting height.
If you *only* want to save the maximum lifting height of the lift, lower the WFJ completely before raising the lift.
 - 2 Hold down the [F1] and [LIGHT] buttons at the same time until the LED [F1] flashes for 1 second.
- The maximum lifting height is now saved.



Note for software versions lower than V1.02.005: To save the maximum lifting height, *only* activate the [F1] button *without* the [LIGHT]. Otherwise, the procedure is identical.

14.2.2 Saving the Shearing Height

- 1 Raise the lift with the [UP] / [DOWN] buttons *and* the wheel free jack with the [WFJ-UP] / [WFJ-DOWN] button to the desired lifting height.
The shearing heights of the lift and the WFJ are always saved together. An individual selection is not possible.
 - 2 Hold down the [F2] and [LIGHT] buttons at the same time until the LED [F2] flashes for 1 second.
- The shearing height is now saved.



Note for software versions lower than V1.02.005: To save the shearing height, *only* activate the [F2] button *without* the [LIGHT]. Otherwise, the procedure is identical.

14.2.3 Performing an Emergency Lowering (for Equally High Runways)



Risk of tilting! During lowering, the runways and the vehicle must be monitored at all times. In case of danger, release all buttons immediately.

- 1 Raise the lift with the [UP] button until the latches are released.
- 2 Lower the lift into bottom position with the [DOWN] button.



- If the height offset of the runways is > 50 mm or if the offset increases noticeably during lowering, the Emergency Lowering must be performed with disabled seat valve and bypass valve control. See below for description.
 - In case of power failure or breakdown, the lift can only be lowered manually. See Operating Instructions for description.
-

14.2.4 Disabling the Seat Valve and Bypass Valve Control

To disable the height control in service mode:

- 1 Press the [LIGHT] button for approx. 5 seconds until the yellow lamp starts to flash.

→ The bypass valve control and seat valve control are now disabled.

The following functions are available in this test mode:

a) Referencing the Lift at the Top

- 1 Raise the lift with the [UP] button and the wheel free jack with the [WFJ-UP] button to the mechanical stop.
- 2 Main switch OFF. (NOTE: By switching off you also exit the service mode!)
- 3 Wait for approx. 5 seconds until the power unit has discharged.
- 4 Hold down the [UP] + [WFJ-UP] buttons at the same time.
- 5 Main switch ON.
- 6 Wait for approx. 10 seconds until the signal tone beeps 2 times.
- 7 Release the buttons.

→ The current heights (digits) of the lift are saved automatically.



Note for software version V1.02.005 or higher: Lift must be referenced *both* in bottom position *and* at the top.

b) Checking the Connections of the Seat Valves, Bypass Valves and the Height Measuring System

Before the test can start, the lift must be lowered into bottom position. If not already done, perform a zero point referencing now.

To check the correct connection of the bypass valves, the seat valves, the latch and the measuring system, press the [LIGHT] button for approx. 5 seconds until the yellow lamp starts to flash.



If the lift is not in bottom position, this test will not run!

[F1] Button

Select the lifting unit with the [F1] button. Each time the [F1] button is activated, the F1 lamp will flash a different code, indicating which lifting unit has been selected. When pressing the button again, the next lifting unit is selected. After 2 (without WFJ) or after 4 (with WFJ) flashes, the system goes back to lifting unit 1.

1 x flash	=	Lift runway 1	(+A) left
2 x flash	=	Lift runway 2	(B+) right
3 x flash	=	WFJ 3	(+A) left
4 x flash	=	WFJ 4	(B+) right

[UP] Button

With the [UP] button:

- the pump is switched on
- the latches are unlocked (not for WFJ)
- the seat valve of the selected lifting unit is opened

The lifting unit is raised up to the maximum difference and then automatically switches off (if the height measuring systems function).

During the automatic switch-off, the lamp above the [LATCH] button lights up, if the measuring system on the selected lifting unit has detected this difference (measuring system is connected to the correct lifting unit).

The correct connection of the seat valve and the measuring system has now been checked.

[DOWN] Button

With the [DOWN] button:

- the latches are unlocked (not for WFJ)
- the seat valve of the selected lifting unit is opened
- the bypass valve of the selected lifting unit is opened

If correctly connected, the lifting unit will now lower back into bottom position via the bypass valve. The correct connection of the seat valve and the bypass valve has now been checked.

To exit the test program, press the [LIGHT] button again for approx. 5 seconds until the yellow lamp stops flashing.

c Performing an Emergency Lowering (for High or Increasing Offset)



Risk of tilting! During lowering, the runways and the vehicle must be monitored at all times. In case of danger, release all buttons immediately.

- 1 Disable the seat valve of the higher runway (+A-M1 or +B-M1).
 - 2 Raise the lower runway to the same height by using the [UP] button.
 - 3 Re-enable the seat valve of the originally higher runway.
 - 4 Raise the lift with the [UP] button until the latches are released.
 - 5 Lower the lift into bottom position with the [DOWN] button.
-



- If the height offset of the runways is > 50 mm and remains constant, the Emergency Lowering with disabled seat valve and bypass valve control can be performed. See above for description.
 - In case of power failure or breakdown, the lift can only be lowered manually. See Operating Instructions for description.
-

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