

Installation instructions

Tail Lift ZHD 3000-150

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1 Important information

1.1 Attention!

The following warning signs appear in the installation instructions and are intended to draw your attention to circumstances that can potentially cause problems, near misses, personal injury and/or damage to the product, etc.

**WARNING!**

WARNING indicates a potential hazard, which if ignored may lead to serious, life-threatening injury.

**CAUTION!**

CAUTION indicates a potential hazard, which if ignored, may lead to minor injuries.

IMPORTANT!

IMPORTANT indicates a risk of equipment damage.

NOTE!

NOTE refers to additional information that may help the reader understand, or perform, a given operation.

1.2 Technical support

If technical support is needed, please contact ZEPRO. Tel: +46 (0)10-459 05 04, E-mail: zeprotech@hiab.com.

Always be ready to state the tail lift's production number to guarantee you receive the correct information. The production number is given on the identification plate located on the tail lift frame.



Figure 1. Identification plate

1.3 Identification

T.ex		ZHD	3000 - 150	MA
ZHD =		Standard model		
Max. lifting capacity x 1 (kg)				
Max. lifting height		-150 = 1500 mm		
Cylinder model,		MA =	Double-acting adjustable tilt	
			Single acting Single speed Lift	

1.4 CE marking

ZEPRO tail lifts for sale on the European market are CE marked (Conformité Européenne). The manufacturer guarantees that the product complies with the EU Machinery Directive.

Follow the installation instructions carefully. Modifications not approved in writing by the manufacturer are not permitted. Welding is not permitted.



1.5 Product approval

Properly assembled, this product meets relevant requirements according to EN 1756-1:2001 + A1:2008.

1.6 Hydraulic oil

If the hydraulic oil needs to be replenished, only the oil recommended by ZEPRO is permitted to be used.

Hydraulic systems with hydraulic oil tanks without labelling are only permitted to be filled with highly refined mineral oil (art. no. 21963, 1 litre).

Hydraulic systems with hydraulic oil tanks marked with a specification for the hydraulic oil are only permitted to be filled with the oil specified on the label.

1.7 Guarantee

The ZEPRO warranty applies only if assembly has been carried out according to ZEPRO's assembly instructions by a ZEPRO approved bodybuilder.

After installation, testing and verification, register the tail lift's delivery card to validate the warranty.

1.8 Repainting

IMPORTANT!

Piston rods and cylinder covers must not be painted. Among other things, this can damage the cylinder gaskets. Boots, hydraulic hoses and cables may not be coated/painted as the solvent in the paint can damage the hoses and cables and impair durability.

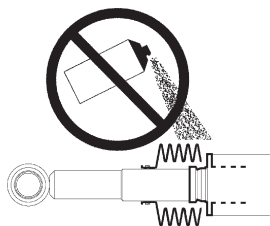


Figure 2. Piston rods, cylinder covers and boots

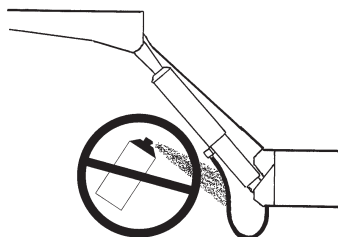


Figure 3. Hydraulic hoses

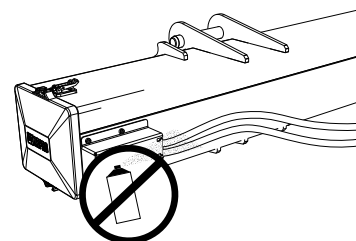


Figure 4. Cables

1.9 Battery maintenance

When storing for longer than 1 week, it is recommended to disconnect the lift from the battery via the main switch or by releasing the lift's main fuse, in order to reduce the risk of the battery discharging. The length of time the vehicle can be stored without the battery charge level becoming too low depends on the condition of the battery, the charge level prior to storage and how much power other components in the vehicle take from the battery. After a period of storage, the battery must always be charged fully before operating the lift.

When the lift is operated repeatedly without starting or using the vehicle during lift installation or carrying out service and repairs, use the battery charger between operations to maintain battery charge.

IMPORTANT!

The battery charger must be disconnected when operating the lift. Risk of material damage.

2 Safety rules

2.1 Moving parts - free movement

⚠ WARNING!

During final inspection*, the space occupied by the moving cylinders must be cleared and made safe. There is a risk of collision between the cylinder and the following items: subframe, truck chassis, beam for rear light (number plate) and the chassis bracket of the lift (with a short overhang).

**Final inspection to be carried out with the platform at the vehicle floor and tilted down 10°. The clearance from the closest part of the cylinder must be at least 40 mm.

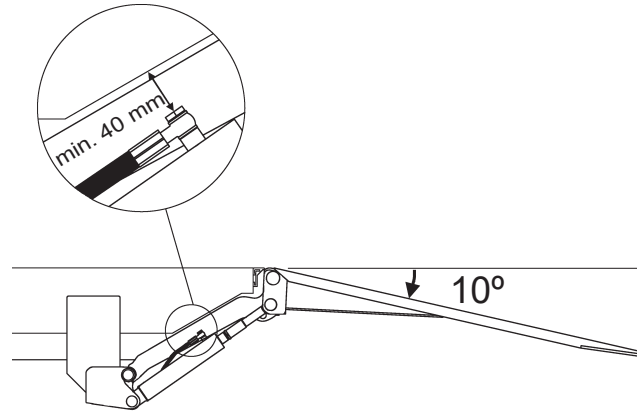


Figure 5. Clearance to the closest part of the cylinder must be at least 40 mm

⚠ WARNING!

The platform may not be tilted down more than 10° from the horizontal.

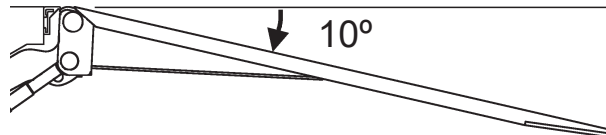


Figure 6. The platform may not be tilted down more than 10° from the horizontal

2.2 Connection of third-party equipment is forbidden

⚠ WARNING!

Connecting third-party equipment (electric or hydraulic) to Zepro tail lifts is forbidden. Connecting third-party equipment could interfere with the lift's system and its safety functions. Risk of injury and damage. If it is necessary to install other equipment, check the vehicle manufacturer's body instructions and use the attachment features on the vehicle.

2.3 Installation

⚠ WARNING!

Installation where the platform cannot reach ground level is prohibited.

⚠ WARNING!

ZEPRO tail lifts are only approved for installation using ZEPRO assembly kits.

IMPORTANT!

All specified tightening torques apply when using torque wrench or screw/nut runner with torque control. Torque spread max $\pm 5\%$.

3 Before installation

3.1 Vehicle chassis requirements

In order to comply with the applicable underrun protection standards, there are requirements for the vehicle chassis on which the rear tail lift is mounted. The moment of inertia in a cross-section on the current frame beam (excluding any support frame) shall not be less than 937 cm^4 . Thus the frame beam cross-section must measure at least $220 \times 70 \times 4 \text{ mm}$, which corresponds to a minimum moment of inertia of 937 cm^4 around the x-axis. See Figure 7. If in doubt, contact ZEPRO for support.

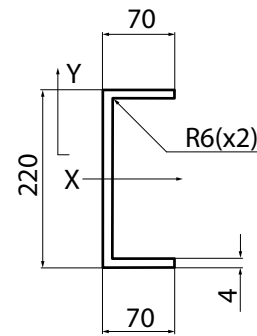


Figure 7. Cross section of vehicle chassis frame beam

⚠ WARNING!

The above dimensions are the minimum permitted for the installation of underrun protection. The strength requirements for mounting the tail lift usually require larger dimensions.

3.2 Statutory dimensions

Distance between the beam and the ground when the vehicle is unloaded:

- Max. 450 mm for vehicles with air suspension.
- Max. 500 mm for vehicles with conventional suspension.

If the exit angle with the above setting is less than 8° , the distance between beam and ground in an unladen vehicle may be increased until the angle is 8° , but to max 550 mm.

Horizontal distance from the outermost part of the platform to the underrun protection: Max 300 mm. See Figure 8.

NOTE!!

The underrun protection may be located further back and lower.

NOTE!

The underrun protection is included in the total length of the vehicle!

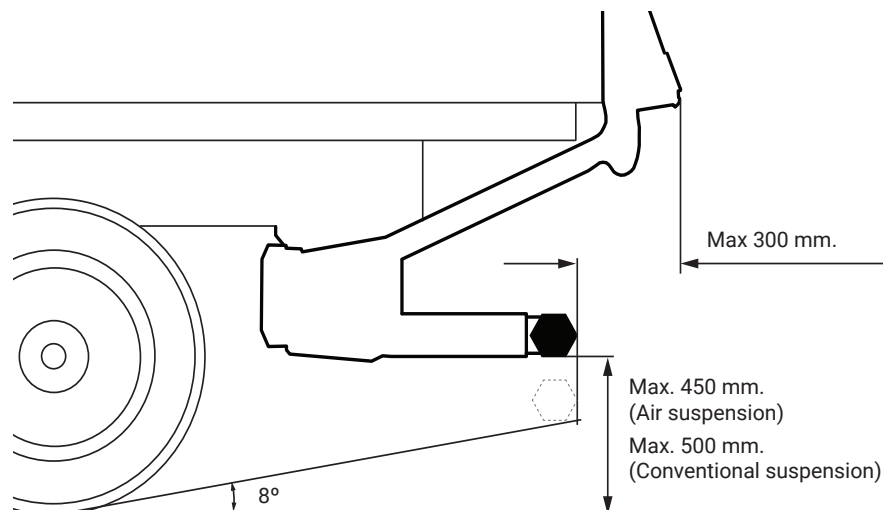


Figure 8. Statutory dimensions

Horizontal distance from the outer edge of the member to the outside of the wheel: Max. 100 mm.
See Figure 9.

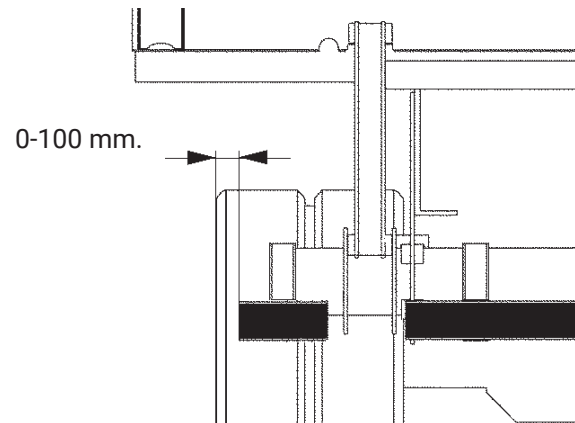


Figure 9. Statutory dimensions

The lateral distance between the underrun protection and the moving parts of the tail lift must not exceed 25 mm. See Figure 10.
Each of the individual parts of the underrun protection must have a surface area of at least 350 cm².
See Figure 10.

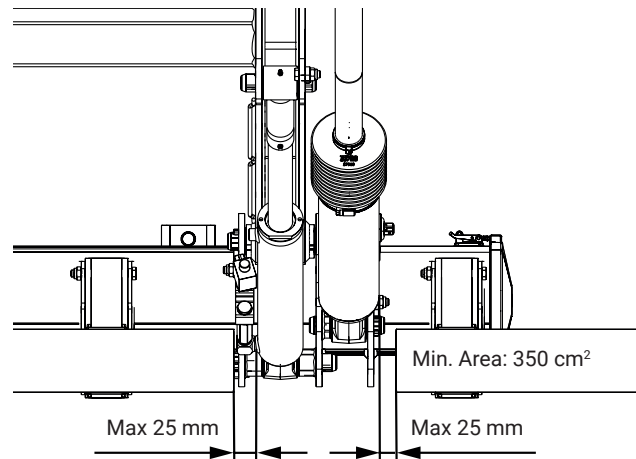


Figure 10. Statutory dimensions

3.3 Calculating the installed dimensions

For ease of installation it is best to calculate and specify the necessary dimensions in advance. Determine the C dimension first, then obtain the other dimensions from the relevant table. Try to place the lift as high as possible within the C dimension specified in the table.

3.3.1 C dimension

The C dimension is the distance between the top of the support frame and the vehicle floor level. This dimension determines the space the lift needs beneath the body (dimension D) and the distance from the lift arms in their upper position to vehicle floor level (dimension A).

3.3.2 D dimension

The D dimension is the space the lift needs, measured from the rear edge of the body to the front edge of the support frame (in the direction of the vehicle). Once the C dimension is determined, the D dimension can be obtained from the table.

3.3.3 A dimension

The A dimension is the space provided for the rear member, i.e. the space there will be between the 1st boom and the vehicle floor with the lift in the raised position. The A dimension depends on the C dimension

3.3.4 H dimension

The H dimension is the height from the ground (unloaded) to the vehicle floor level. The H dimension must not be greater than the maximum lifting height of the lift. The lift platform must always be able to reach ground level.

3.4 Installation dimensions

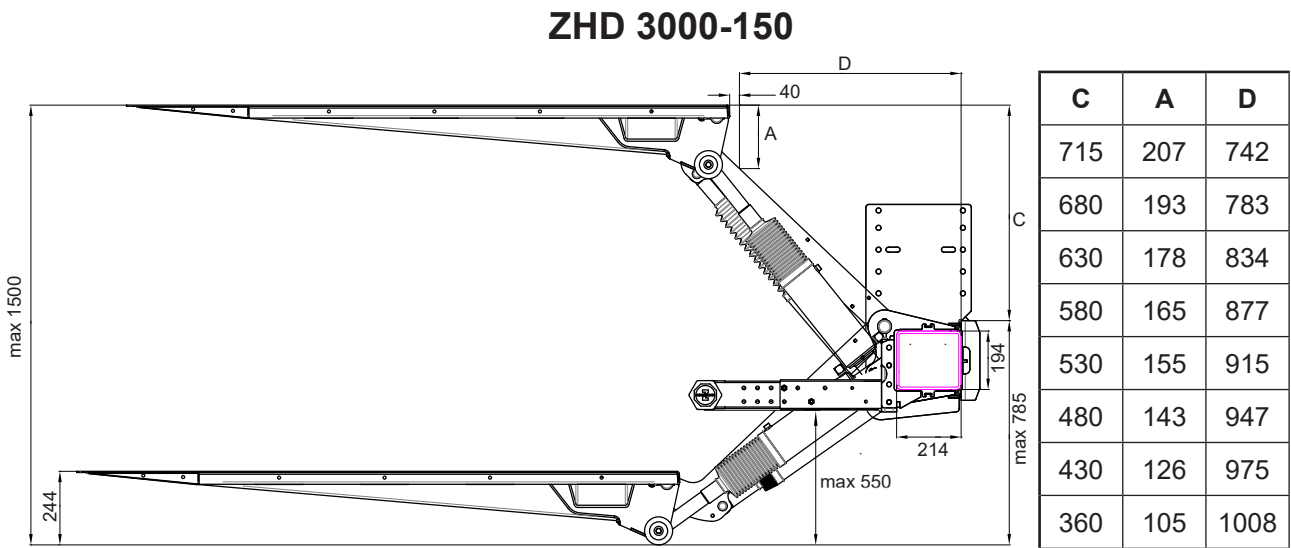


Figure 11. Installation dimensions. Try to place the lift as high as possible within the C dimension specified in the table.

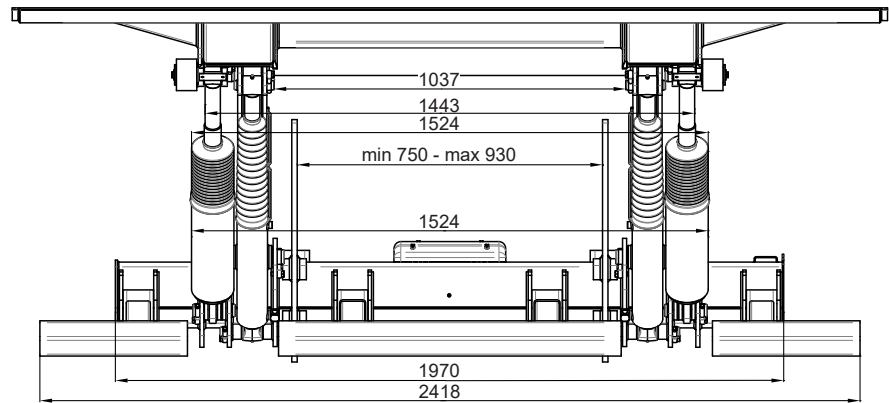


Figure 12. Installation dimensions. ZHD 3000-150

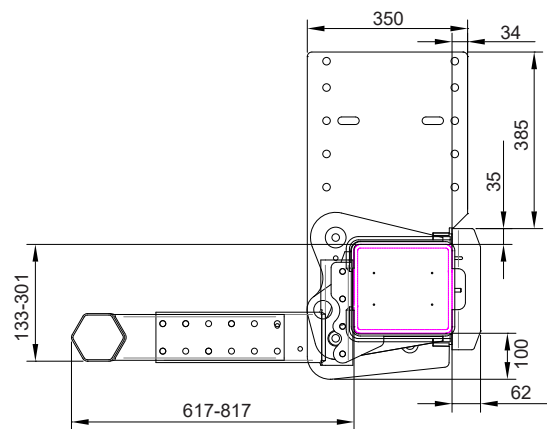


Figure 13. Chassis bracket. ZHD 3000-150

NOTE!

The underrun protection is included in the total length of the vehicle!

3.5 Rear beam cut-outs

It is often necessary to make cut-outs in the rear beam to make room for the platform arms when the platform is in the top position. Cut-out size is determined by the calculated integration dimension 'A'; see figure below.

1. Measure and mark the location and depth of the cut-outs on the rear beam. Centre the two rear beam cut-outs, i.e. the cut-outs must be equidistant from the beam's centre point.
2. Cut along the markings.
3. Grind away any burrs or sharp edges.

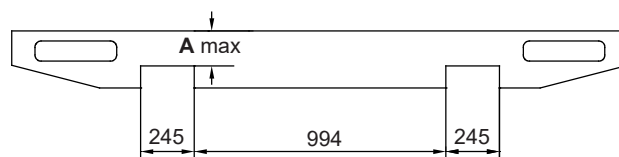


Figure 14. ZHD 3000-150

3.6 Prepare the tail lift

1. Position the support frame under the vehicle's chassis.
2. Check whether the hydraulic tank is fitted with a transport plug seal. If so, replace it with the regular tank cap supplied.

⚠ CAUTION!

Make sure no cables are pinched or in any other way damaged when the control card / relay card is folded out or removed. Do not pull out the hydraulic unit more than necessary; make sure it is not pulled completely out of the frame, as this can entail a risk of injury and damage to the equipment.

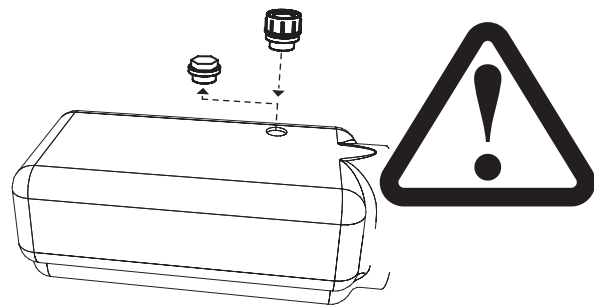


Figure 15. Where necessary, replace the transport plug with a regular tank cap

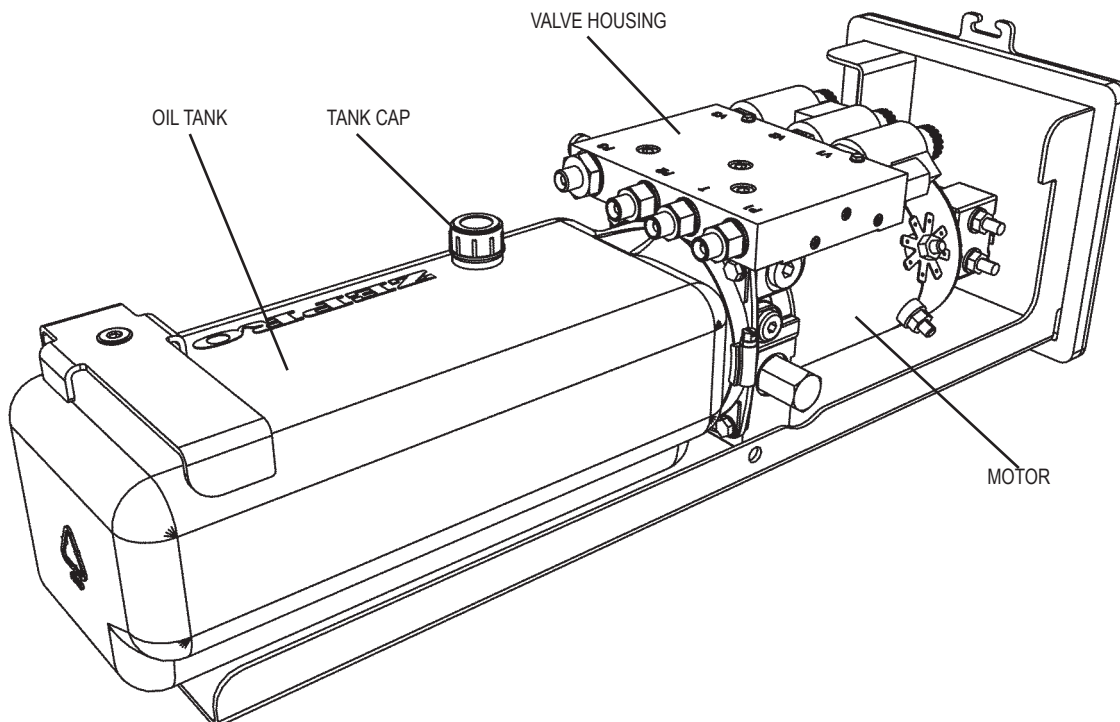


Figure 16. Hydraulic unit

3.7 Temporary connection

When the tail lift is installed, it is sometimes necessary to operate its functions in order to change the position of the cylinders and the lift arms. Temporarily connect the lift to enable the lift functions.

1. If the actuator is not connected, connect a suitable control device to Ctrl 1/C1, see section 3.7.2.
2. Connect the tail lift's main power cable to battery +12/24V.
3. Connect the negative battery terminal to the tail lift's earth cable (GND).
4. On lifts with a connected cab circuit breaker (CS), ensure it is in the ON position.
5. On lifts without a connected cab circuit breaker (CS), when operating, connect the cable (jumper) between the CSPWR and CS on the control card to simulate that the CS switch is turned on. Remove the jumper immediately after completed operation.

⚠ WARNING!

Take great care while running the lift functions and make sure nothing gets pinched: risk of personal injury and material damage.

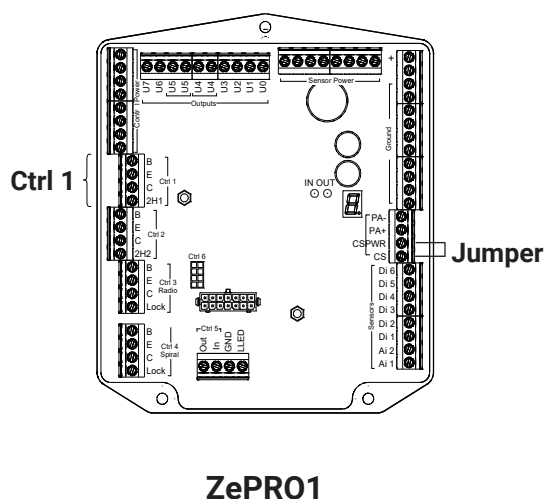


Figure 17. Temporary connection

3.7.1 Battery maintenance

When installing the lift, when the lift is operated repeatedly, the battery charger must be used between operations to maintain the battery charge level.

IMPORTANT!

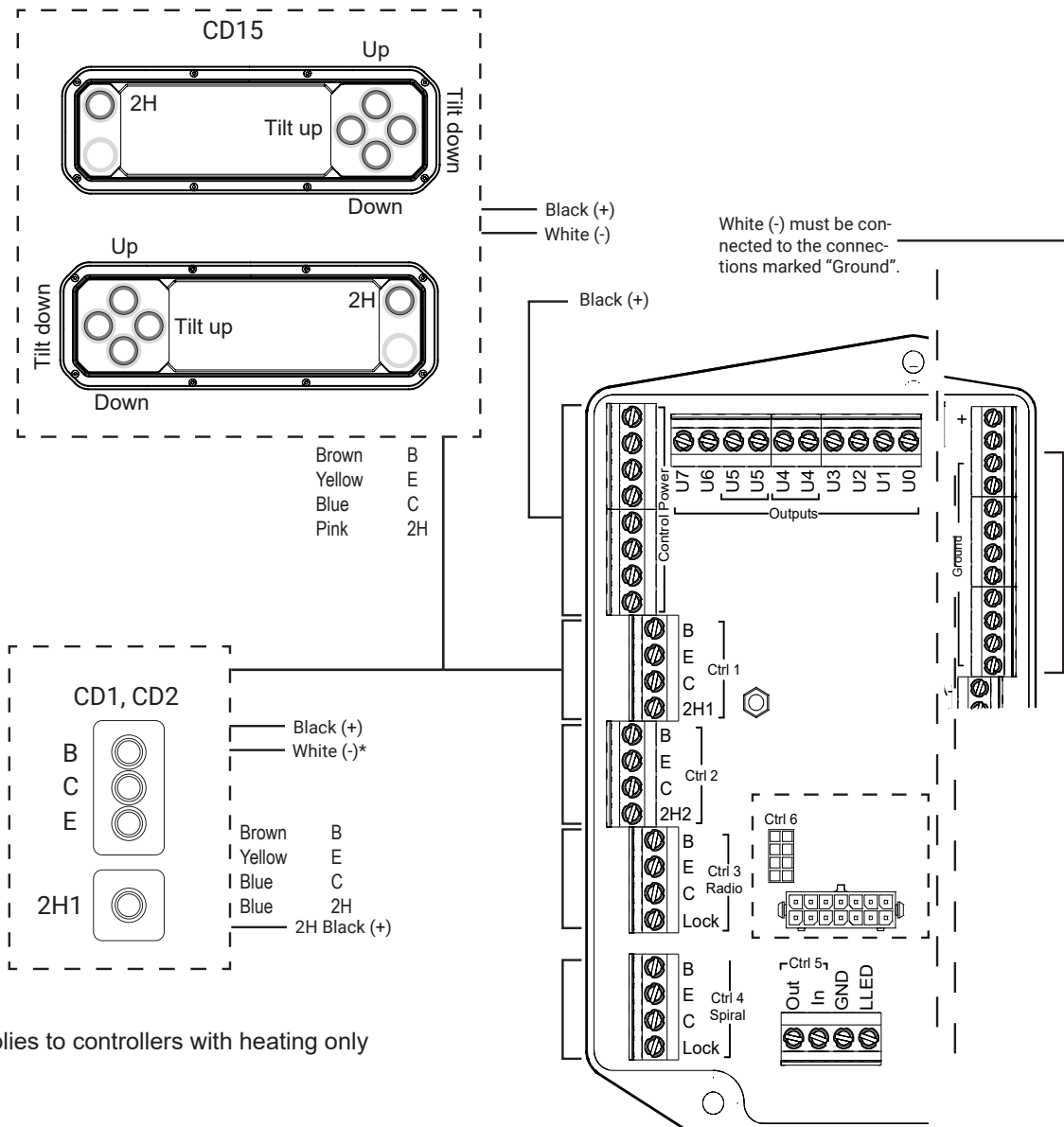
The battery charger must not be connected when operating the lift. Risk of material damage.

3.7.2 Connecting the control device to the ZePRO1 control card

The most commonly occurring controller (CD Control Device) models are shown below. Possible controller models vary depending on lift model, configuration and relevant market.

⚠ WARNING!

Make sure that the control card is disconnected from the power before connecting. Connecting more than one controller to each connection is not permitted. Risk of material damage.



* applies to controllers with heating only

4 Installation

NOTE!

Also refer to the relevant vehicle manufacturer's vehicle body instructions and Zepro's instruction manual before installation.



WARNING!

Zepro tail lifts are only approved for installation with Zepro assembly kits.

4.1 Frame

1. Measure and mark the midpoint of the vehicle's rear beam. See Figure 18.
2. Fasten or spot-weld the assembly jig to the rear beam so that each centre point aligns. See Figure 19. Art. no. 572650TL for ZHD 3000.
3. Position the support frame under the vehicle frame.
4. Raise the lift arms to their highest position.
5. Attach the lift arms to the lugs on the jig. Use the steel platform's regular pivots.
6. The support frame should be positioned as high as possible within the specified C dimension. Adjust the frame to the ideal height under the chassis. Use the lift's packaging and a forklift. See Figure 20. The frame must be positioned parallel with the floor of the vehicle body and must not be in contact with the vehicle frame; there must be a few millimetres of play. If necessary, adjust the angle of the arms by carefully operating the lift.
7. Install the brackets on the support frame so that its opening is facing towards the front of the vehicle, and adjust the position of the frame so they are in contact with the vehicle frame.
8. Install the U-profile with associated washers and nuts, but do not tighten them. Screw the nuts on alternately until the U-profile is flat against the body, see Figure 21

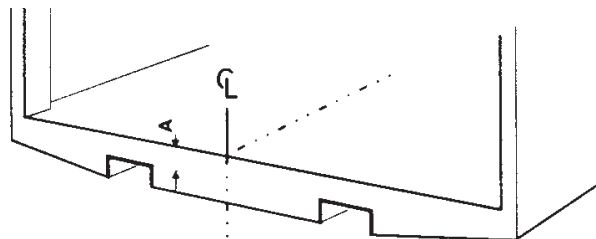


Figure 18. Measure and mark the midpoint of the rear beam of the vehicle

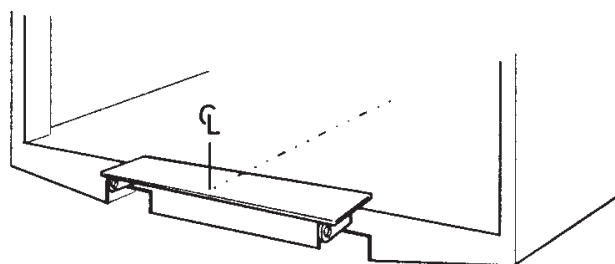


Figure 19. Fasten or spot-weld the assembly jig to the rear beam
Art. no. 72650TL for ZHD 3000

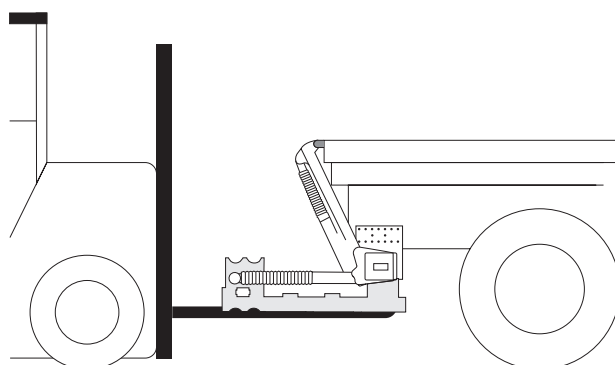


Figure 20. Use the lift's packaging and a forklift.

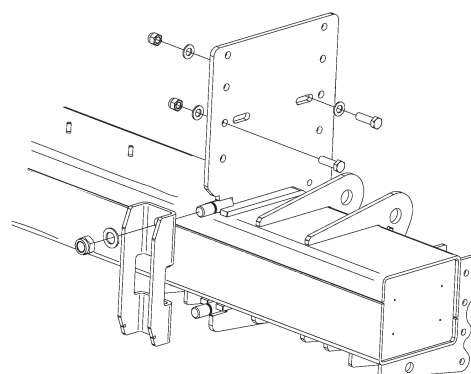


Figure 21. Install the U-profile with associated washers and nuts

9. When mounting on frame without pre-drilled holes, first install using a screw in the grooved bracket holes. Mark the centre of the vehicle frame in the grooved bracket holes, then drill $\varnothing 16$ mm holes in the frame; see Figure 23
10. Bolt the mountings securely on the exterior of the vehicle frame. Use M16x60 bolts and install the associated washer and nut on the inside of the vehicle frame. Install the bolts but do not tighten.
11. Check and fine trim the lift's position. Then tighten the bolts with a torque wrench. Tightening torque: 180 Nm.
12. Using a torque wrench, tighten the nuts holding the U-profiles. Tightening torque: 280 Nm.
13. Drill holes in the vehicle frame for $\varnothing 16$ mm attachment bolts. Drill in the outer holes of each mounting. Use M16x60 bolts and install the associated washer and nut on the inside of the vehicle frame. Installation must be performed with at least 6 bolts in the outer holes. Do not include the first screw installed in the grooved hole. If necessary, it may now be moved to one of the outer holes; see figure. Then tighten the bolts with a torque wrench. Tightening torque: 180 Nm.
14. Remove the mounting jig.

**WARNING!**

Welding is not permitted on the chassis brackets. Do not run the lift against the arm stop or with the platform installed until all bolts are properly tightened against the frame.

Do not place the lift under load until:

- the correct number of bolts are installed and tightened to torque.
- the body is mounted to strengthen the truck frame.

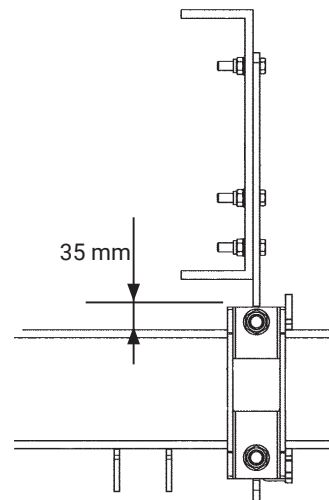


Figure 22. The frame mount requires at least 35 mm of space between the vehicle chassis and the support frame

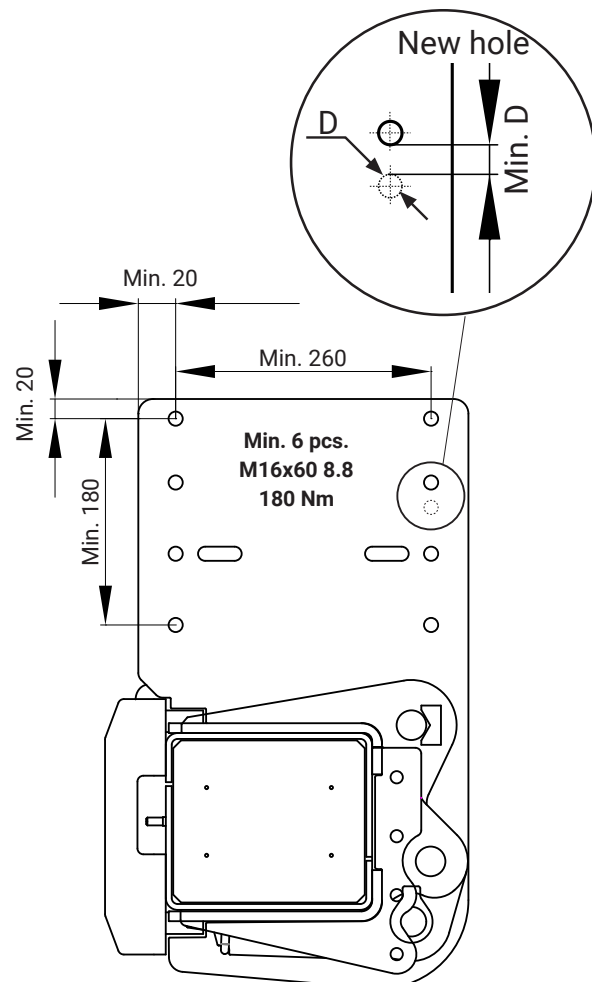


Figure 23. Install the chassis bracket with at least six M16x60 8.8 bolts

4.2 Platform

1. Check that all included components are clean, clean where necessary.
2. Lubricate the metal bushings on the upper bearing of the arms. Make sure the small holes on the inside of the bushings are filled with grease. See Figure 24.
Use LE lubricant 4622 or the equivalent.

IMPORTANT!

Carefully lubricate the metal bushings on the upper bearing of the arms. Make sure the small holes are filled with grease. After installing the platform, grease all bearings including the two regular grease nipples; see section "9 Lubrication and oil level check" on page 49.

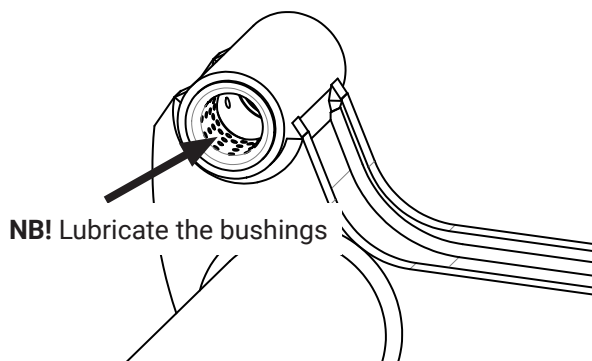


Figure 24. Take care to provide initial lubrication to the metal bushings

3. Install the platform on the arms, using the shafts and bolts supplied. Tighten the bolts using a torque wrench.

Tightening torque: 80 Nm.

IMPORTANT!

Make sure the cylinder is installed with the grease nipples facing up.

Lubricate the bushings and shaft! Use LE lubricant 4622 or the equivalent.

4. Install one of the tilt cylinders on the platform. see Figure 25
Use the shaft and support wheel supplied. Tighten the bolts using a torque wrench.
Tightening torque: 80 Nm.

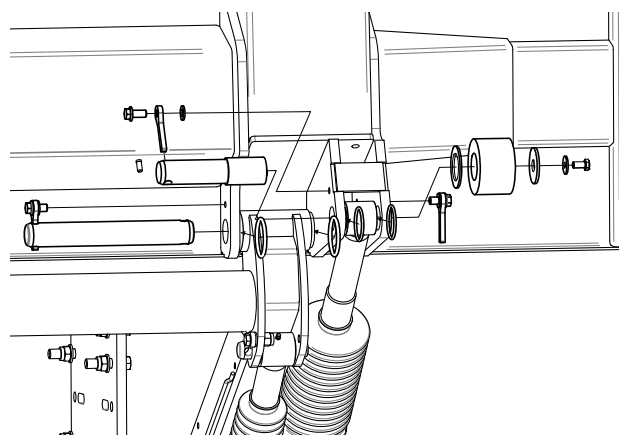


Figure 25. Install one tilt cylinder on the platform

5. Test the lift by carefully raising it to the vehicle floor level and tilting it to the vertical position. Check the position in relation to the rear beam and side posts of the vehicle. See Figure 26 and Figure 27.

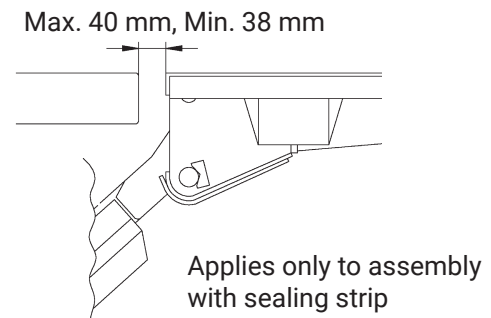


Figure 26. Check the position in relation to the rear beam of the vehicle

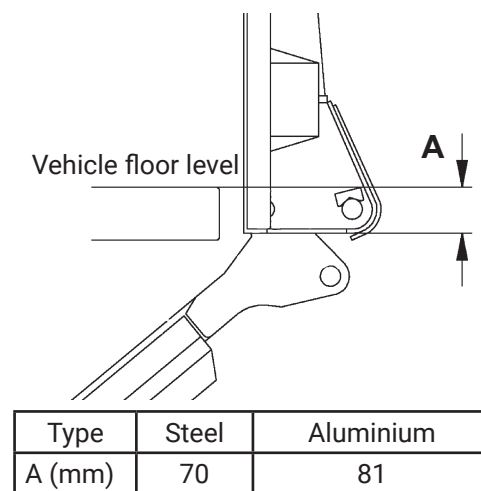


Figure 27. The platform underhang (A), varies according to platform type, and this should be taken into consideration when installing the upper edge seal.

4.2.1 Adjusting the tilt angle

IMPORTANT!

Make no adjustments to the cylinders before installing them on the platform. The tilt cylinders are factory preset.

1. Loosen the rubber bellows at the bottom where they are secured with hose clips.
2. Run tilt-up until both tilt cylinders are fully raised.

NOTE!

Always make adjustments with full hydraulic pressure in the tilt cylinders.

3. Undo the three locking screws on the cylinder mounted on the platform, Figure 28.

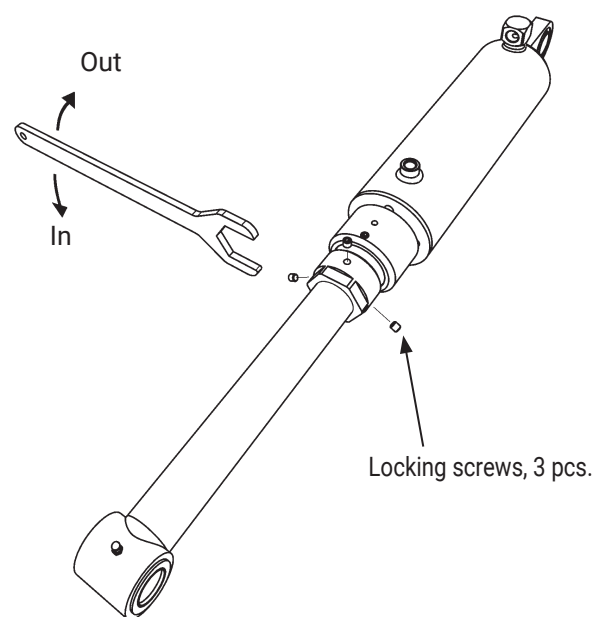


Figure 28. Adjusting the tilt angle

4. Turn the adjuster sleeve until the platform fits perfectly (A) against the seal on the body. Figure 29.

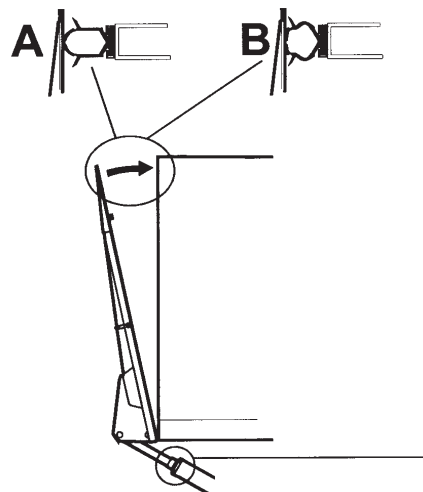


Figure 29. Adjusting the fit to the vehicle body

5. Undo the three locking screws on the other tilt cylinder. Figure 30.
6. Turn the adjuster sleeve until the tilt cylinder aligns with the platform attachment point. See Figure 30.

IMPORTANT!

The max. length of both cylinders must be adjusted equally to avoid unwanted bending forces.

7. Install the other tilt cylinder on the platform attachment point. Use the shaft and support wheel supplied.

IMPORTANT!

Make sure the cylinder is installed with the grease nipples facing up.

Lubricate the bushings and shaft! Use LE lubricant 4622 or the equivalent.

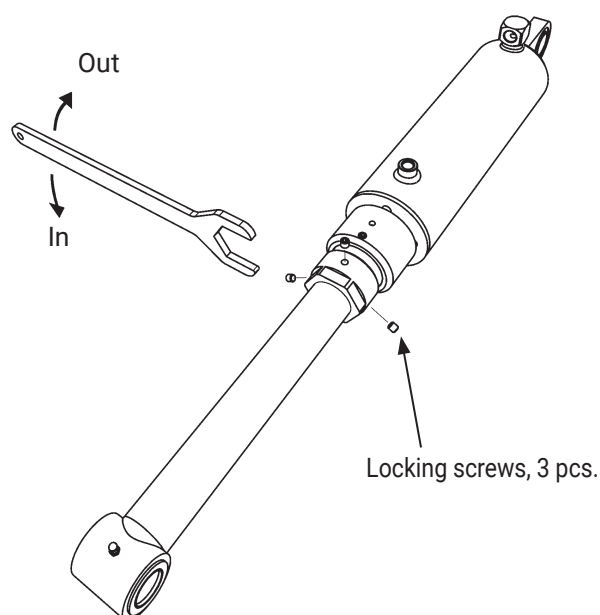


Figure 30. Adjusting the tilt angle

8. Tighten the bolts using a torque wrench.
Tightening torque: 80 Nm.
9. Adjust both cylinders alternately until the platform touches the vehicle body; see Figure 29 (B).
10. Tighten the adjuster sleeve locking screws using a torque wrench **Tightening torque: 3-5 Nm.**

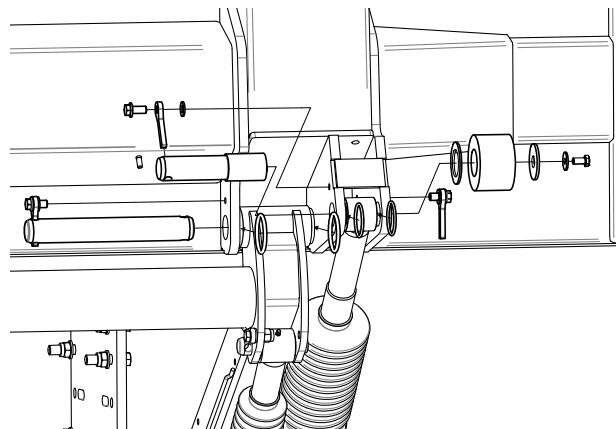


Figure 31. Install the second tilt cylinder on the platform

IMPORTANT!
After finishing the adjustment, make sure the distance between the adjusting collar and the end of the thread is no more than 30 mm.

11. Fit the tilt cylinder boots. Figure 33.

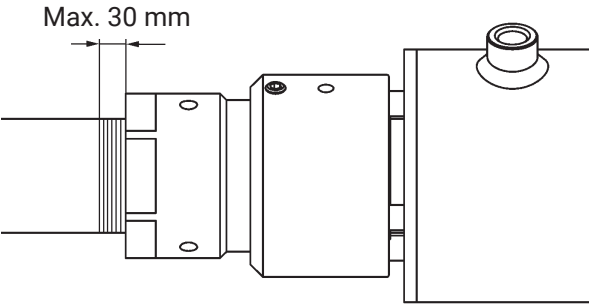


Figure 32. Adjusting the tilt angle

Lift model	
ZHD 3000-150	252 ±5 mm

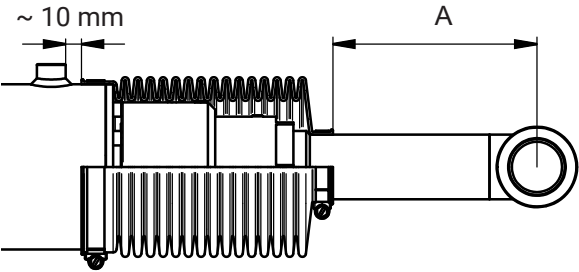


Figure 33. Installing boots

4.2.2 Adjusting tilt-down angle

NOTE!

It is necessary to adjust the tilt angle 90° to the body before adjusting the tilt down angle (see previous page).



WARNING!

To make sure the lift is safe and CE compliant, the downward tilt angle must be adjusted to max 10° if people will be present on the platform.

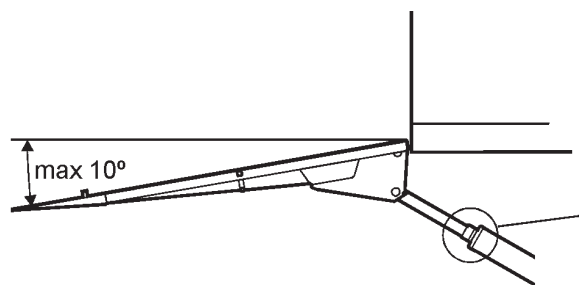


Figure 34. The tilt angle must be adjusted to max. 10° down

1. Run the lift up until the platform reaches the vehicle floor.
2. Loosen the lock screw of the end stop (2). Screw the stop all the way back toward the platform (3). Figure 35.
3. Tilt the platform down to max 10 degrees below the horizontal plane.
4. Adjust the end stop all the way to the top of the cylinder (4). Figure 35.
5. Tighten the locking screw in the stop (5). See figure. Figure 35.

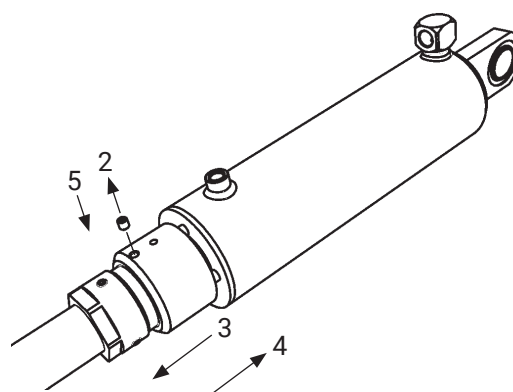


Figure 35. End stop with lock screw

Tightening torque for the locking screws is 3-5 Nm

Test all functions.

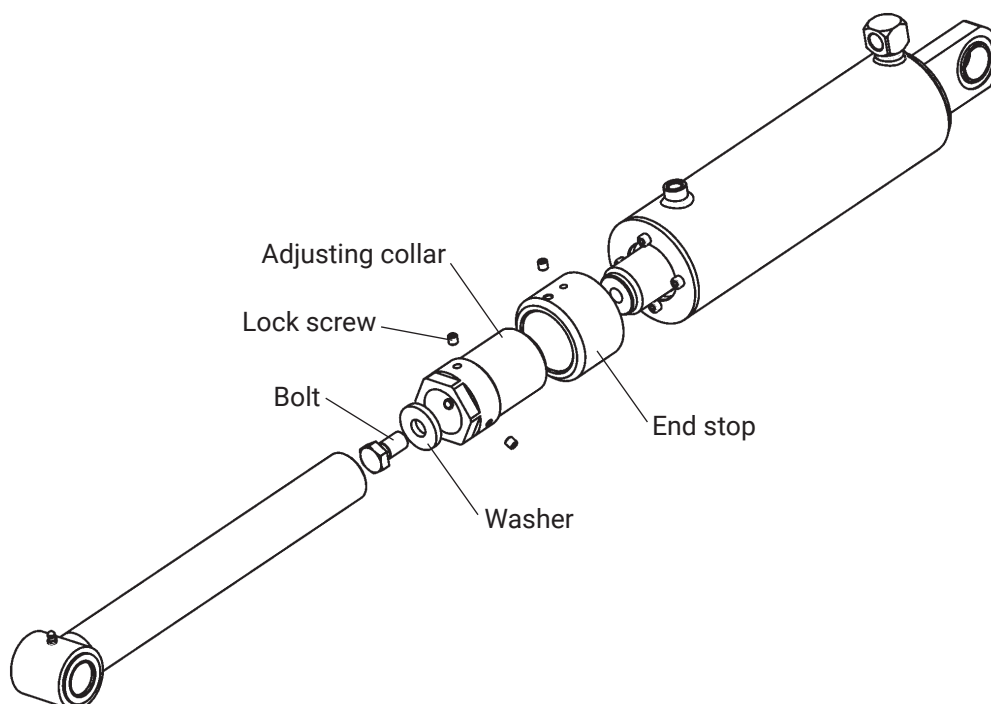


Figure 36. Tilting cylinder

4.3 Armstops

Fit end stops between the lift arms and the rear member of the vehicle floor. The left and right end stops must be reached at the same time, as high up the lift arm as possible. Installation must take place against the vehicle body.

⚠ WARNING!

It is not permitted to perform welding in the lift arm. Installation must take place against the vehicle body.

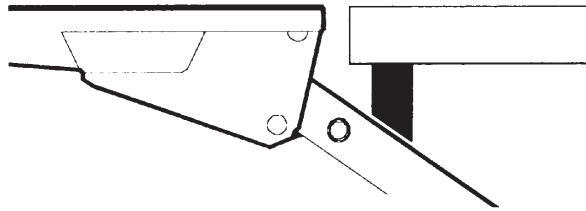


Figure 37. Fit end stops between the lift arms and the rear member of the vehicle floor

4.4 Sealing strip (horizontal)

The track is fitted using the self-tapping screws provided.

1. Mark where to drill holes for the self-tapping screws.
2. Drill holes (Ø 7.2 mm) for the screws.
3. Fit the horizontal stop strip (steel or aluminium).
4. Fit the rubber strip to the track.

4.5 Sealing strip (vertical)

1. Fit the tracks with countersunk screws, rivets or by spot welding.
2. Fit the rubber strip to the track.
3. Secure the rubber strips by swaging the tracks together at the bottom.

NOTE!

To fit an upper edge seal, create a 45° mitre against the vertical strips.

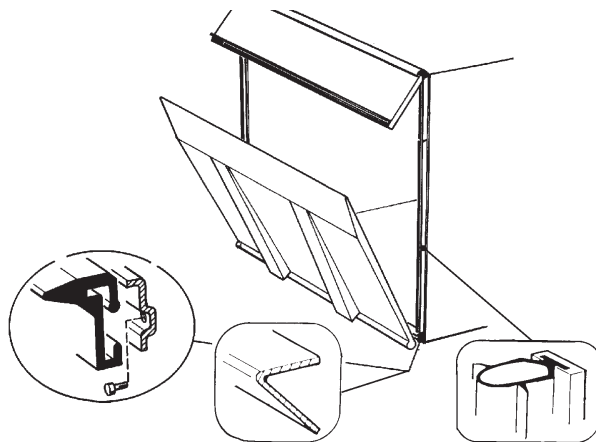


Figure 38. Installing a sealing strip

4.6 Adjustable underrun protection

Test the position of the underrun protection without tightening the bolts to check that the statutory dimensions are obtained. Adjust if necessary then tighten the bolts with a torque wrench.

1. Fit the inner part of each bracket at one of four heights. Select the height that meets the statutory requirements, see section "3.2 Statutory dimensions" on page 9. Use the corresponding bolts M12x100. Assemble without tightening the bolts, see Figure 41.
2. Fit the outer part of each bracket at one of five positions. Select a position that meets the statutory requirements, see section "3.2 Statutory dimensions" on page 9.



WARNING!

Check carefully that there is no risk of the outer part of each bracket colliding with any part of the cylinders when using the lift's functions. In particular, check in relation to the cylinders' hose connections, especially when the outer part of the brackets are installed a long way in..

Use the associated bolts M12x80. Assemble without tightening the bolts. See Figure 41.

3. Check that the installation meets the statutory requirements, see section "3.2 Statutory dimensions" on page 9.
4. Tighten all the bolts using a torque wrench.
Tightening torque: 80 Nm.

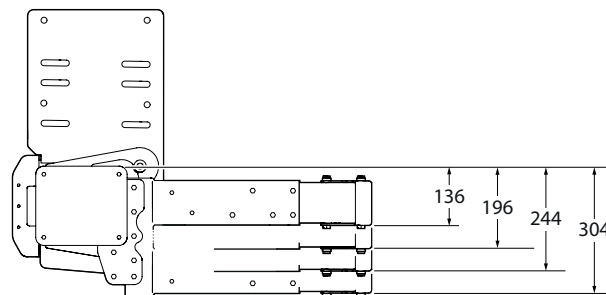


Figure 39. The inner part of the brackets can be fitted at one of four heights

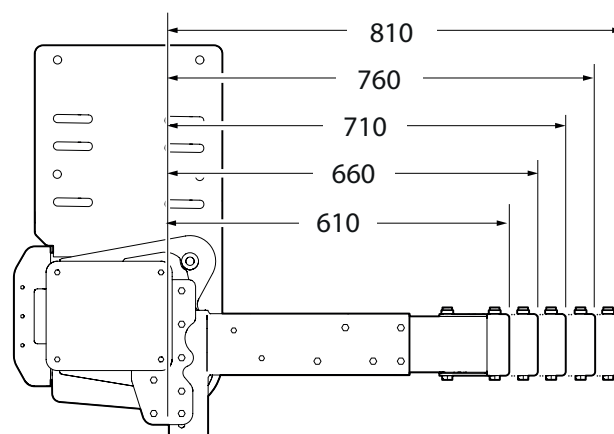


Figure 40. The outer part of the brackets can be fitted in one of five positions

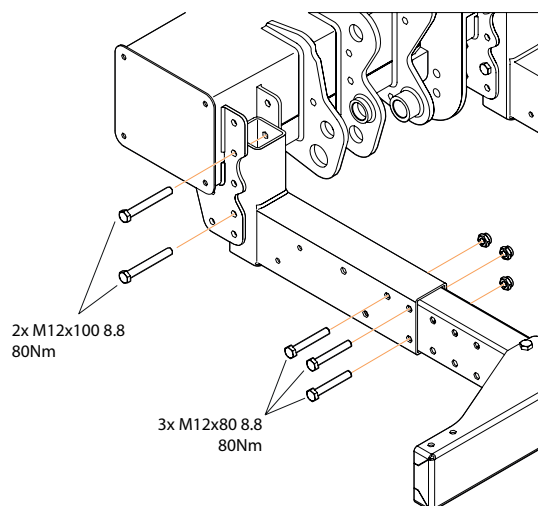


Figure 41. Installing underrun protection

NOTE!

The underrun protection is included in the total length of the vehicle!

4.6.1 Fixed underrun protection

1. Install the brackets on the tail lift frame using 3 x M12x100 bolts each, without tightening them. See Figure 42.
2. Install the centre sheet-metal profile using 4 x M12x110 bolts on the brackets. See Figure 43.
Tightening torque 55 Nm.
3. Tighten the bolts used to install the inner brackets in step 1.
Tightening torque 55 Nm.
4. Install the outer sheet-metal profiles using 2 x M12x110 bolts each. See Figure 44.
Tightening torque 55 Nm.

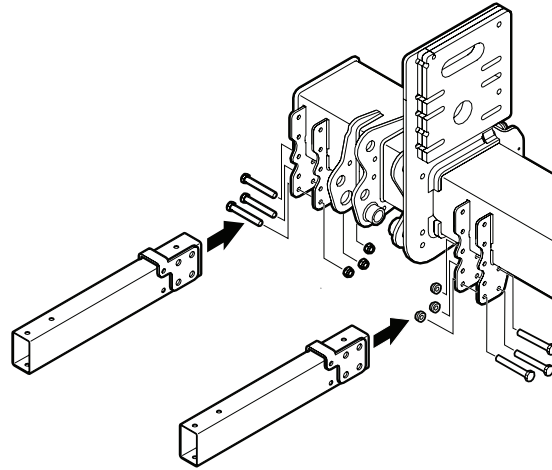


Figure 42. Installing brackets on the frame

NOTE!

The underrun protection is included in the total length of the vehicle!

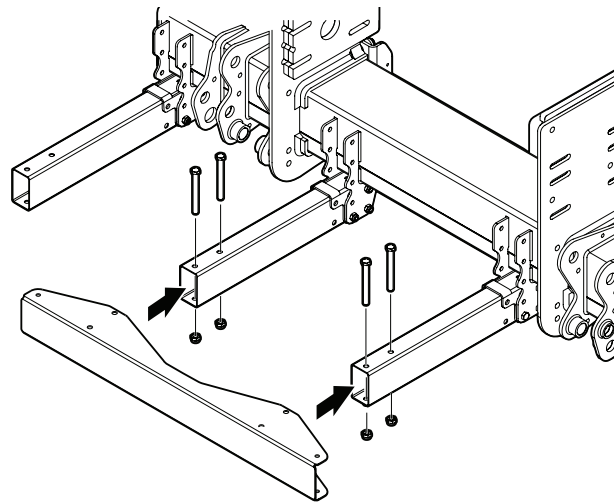


Figure 43. Installing the inner sheet-metal profile

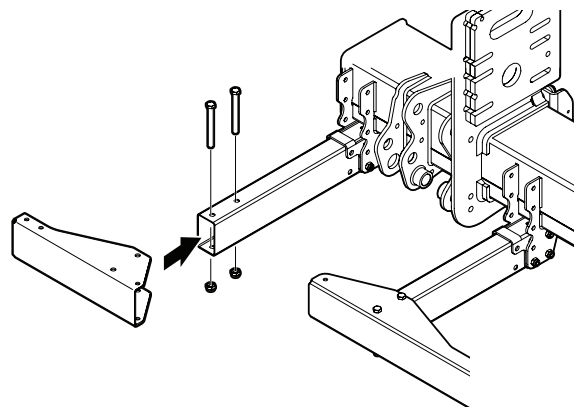


Figure 44. Installing the outer sheet-metal profile

4.7 Purging the cylinders

Purge the lift cylinders by lowering the platform all the way to the ground a few times. It may be necessary to raise the truck to allow the platform to be lowered completely.

Purge the tilt cylinders by tilting the platform all the way up to the vehicle body and then all the way down.

4.8 Platform tilt speed

The downward tilt speed of the platform when operating within its working range (from 45° downwards) must not exceed 4°/second.

4.8.1 Setup

1. Put the platform at an angle of 45°.
2. Run the "Tilt down" function without using the 2H function and at the same time see how long it takes for the platform to reach horizontal position.
3. Calculate the tilt speed of the platform by dividing the number of degrees (45°) by the time taken. The result must not be greater than 4°/second.
4. If necessary, adjust the tilt speed using the knob on the hydraulic unit. The knob is fastened with a check nut. Then repeat steps 1-4 until the desired tilt speed is attained. Fasten the check nut once setup is complete.

⚠ WARNING!

The downward tilt speed of the platform when operating within its working range (from 45° downwards) must not exceed 4°/second. Higher speed means an increased risk of personal injury.

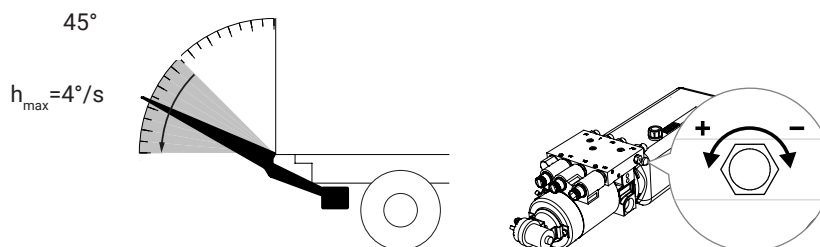


Figure 45. Setting the tilt speed downwards within the working range (from 45° downwards)

4.8.2 Quick opening

The quick opening function is activated if the 2H button is held in at the same time as the buttons for the "Tilt down" function are held in, provided that the angle of the platform is then outside the working area (i.e. above 45°). As long as these buttons are held in, the platform will be tilted downwards at the highest possible speed to -10°. In this way, the time for opening the platform from vertical to horizontal position can be minimised without sacrificing safety.

4.9 Angle sensor

1. Install the angle sensor on the platform using the nuts, bolts and washers supplied and attach the cable using cable ties; see. Figure 46.
2. Connection is described later in section 6.

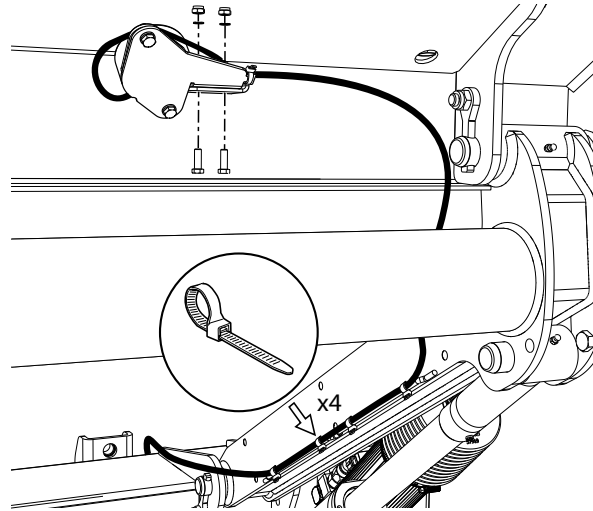


Figure 46. Installing the angle sensor

4.10 Controllers

1. Install the primary controller on the side of the vehicle normally facing away from the traffic. The distance between the vehicle's rear edge and the centre of the controller must be 300-600 mm. Connection is performed later in section 6 if this is not already done from the factory.
2. Any additional controllers can be installed in an optional location. Connection is described later in section 6.

IMPORTANT!

The controller's cable intake must always face downwards.

Pay attention and be careful when running cables to get longer life for the cables and to reduce the risk of unnecessary downtime.

Cables must not be clamped to brake lines or the vehicle's normal electrical system.

The cable must be protected by rubber grommets when it passes through beams or walls.

Cables must be installed sufficiently far from, or be protected against, sharp edges so they cannot chafe or otherwise sustain damage that could lead to a short-circuit and cable fires.

Take care not to bend cables with too tight a radius as this can cause damage.



WARNING!

The primary controller must always be fitted on the side that is facing away from moving traffic. Fitting in any other way involves increased risk of injury.

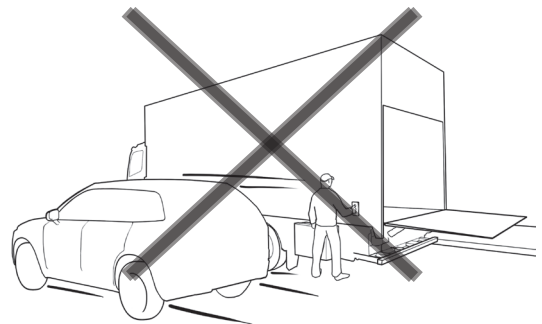
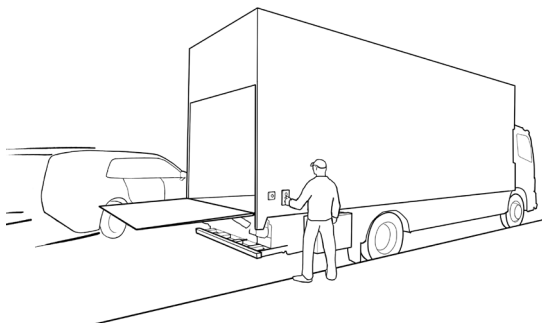


Figure 47. Installing controllers

4.10.1 Controllers 3+1 (CD 1)

1. Fit the controllers in the desired locations. However, locate them such that the operator's working position is as safe as possible, and with an adequate overview of the load, tail lift and their working area.
2. The distance between the vehicle's rear edge and the centre of the controllers must be 300-600 mm. The distance between the controllers must be at least 260 mm. See Figure 48.
3. Any additional controllers can be installed in an optional location.
4. Run the controller cabling to the tail lift cable grommet. Connection is described later in section 6.

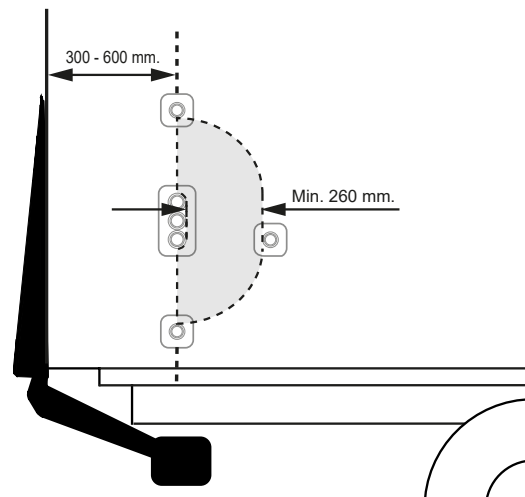


Figure 48. Installing controller CD 1 with two-handed grip.

4.10.2 Controller UCU (CD 19)

The UCU can be delivered as either a vertical or a horizontal controller

Installation on the outside of the body

The cable is always connected to the control unit. If the cable needs to be disconnected from the control unit to be pulled through the wall:

1. Raise the connector latch to pull out the connector. See Figure 49
2. When the cable has been pulled through the wall, reconnect it to the controller and secure it using the latch.
3. Keep enough cable in the space on the back of the panel so that the plug can be detached from the panel in case of replacement in the future. Figure 49

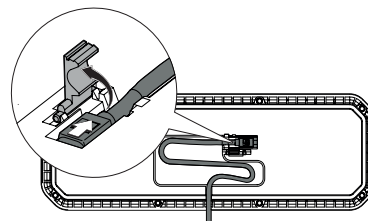
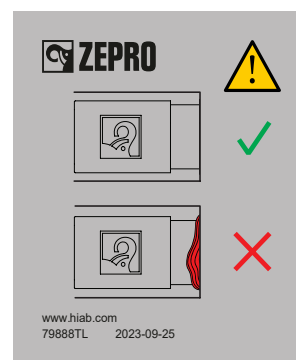


Figure 49. Disconnecting the connector



NOTE!

Make sure that the connector is correctly fitted with the rubber seal not be visible

4. Carefully break off the outer part of the plug and place in the recess. See Figure 50.
5. Then install the controller securely on the body. See Figure 51

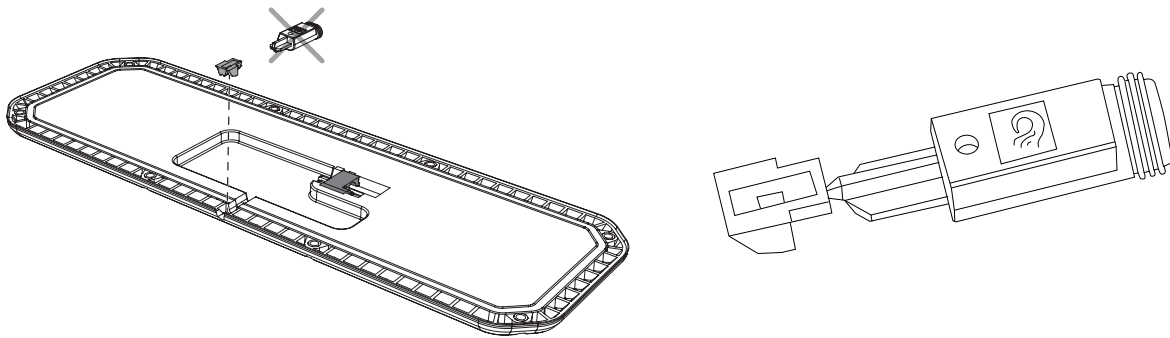


Figure 50. Installation of plug for sealing UCU.

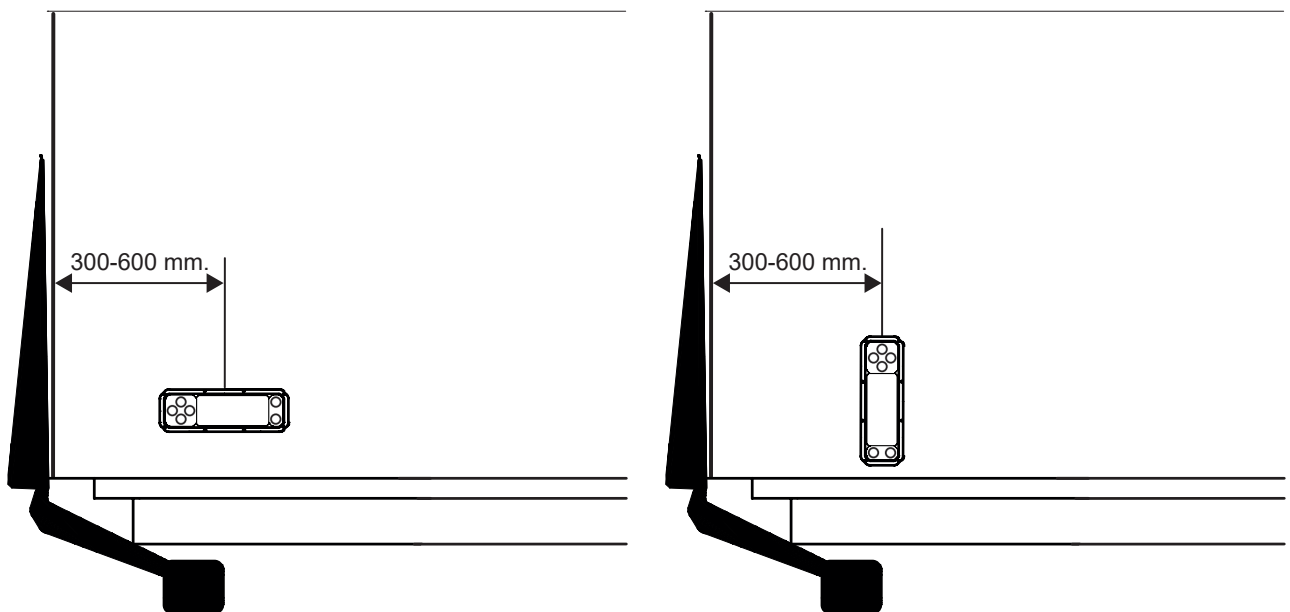


Figure 51. Installing controllers

Installation on the underside of the body

The cable is usually connected to the controller and the controller bolted to the bracket at the factory. Bolt the bracket to the underside of the body. Use the self-adhesive drilling template supplied.

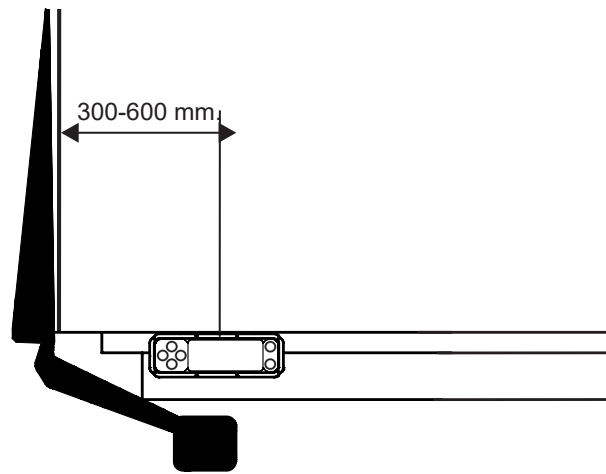


Figure 52. Installing controllers

4.10.3 Connector for a hand-held controller**Installing the controller bracket**

The connector is usually mounted on the bracket and connected to the lift. Bolt the bracket in the controller bracket. Use the nuts and bolts supplied.

Installation on the underside of the body

The connector is usually mounted on the bracket and connected to the lift. Bolt the bracket to the underside of the body. Use the self-adhesive drilling template supplied.

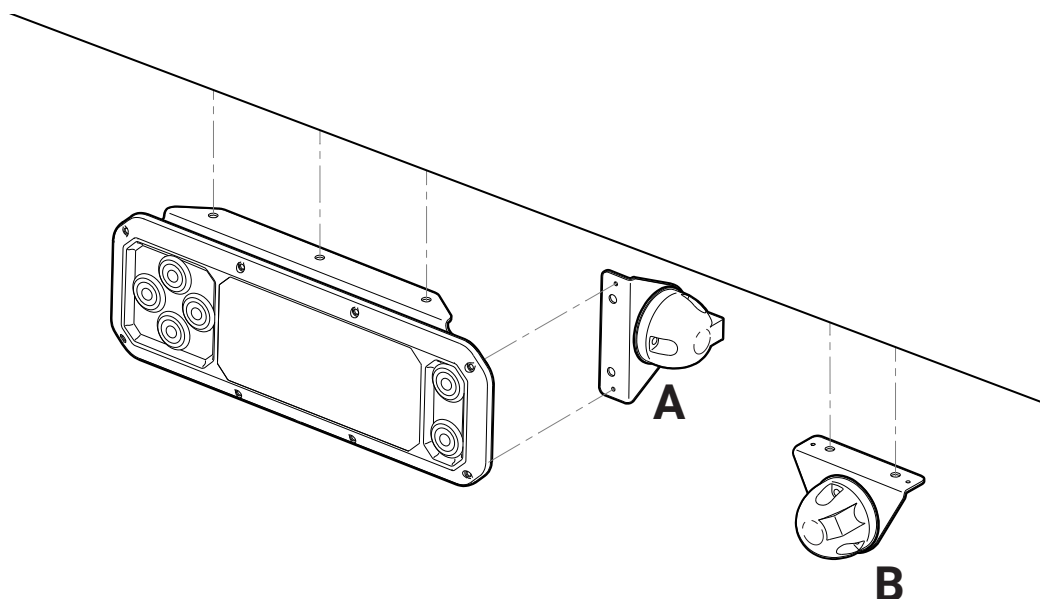


Figure 53. Installing controller CD19 and the connector for a hand-held controller

5 Cable routing

5.1 General

IMPORTANT!

In order to ensure a high degree of reliability for many years to come, it is important that components such as batteries, chargers, main current and earth cables, fuses and main switches are dimensioned correctly and assembled with great accuracy. Insufficient battery power can permanently damage the electrical components in the tail lift (solenoid, electric motor, solenoid valves, relay board/control board and more.)

Insufficient main power and/or earth cable area may result in overheating, poor performance of the electrical system and shortened life expectancy of the main electrical components.

Earth connection must be made primarily to the negative terminal of the battery. Alternatively, another well-protected earthing point, which will not increase the voltage drop, can be used. The earthing point must be so well protected that increased voltage drop due to oxidation over time can be eliminated. Risk of material damage. Warranty rights do not apply to material damage caused by insufficient earthing.

Always install a shrink hose over the cable connection when installing cable terminals.

Pay attention and be careful during all cable routing to ensure longer cable life and reduce the risk of unnecessary downtime:

- Cables must not be clamped to brake lines or the vehicle's normal electrical system.
- The cable must be protected by rubber grommets when it passes through beams or walls.
- Cables must be installed sufficiently far from, or be protected against, sharp edges so they cannot chafe or otherwise sustain damage that could lead to a short-circuit and cable fires.
- Take care not to bend cables to too tight a radius as this can cause damage.

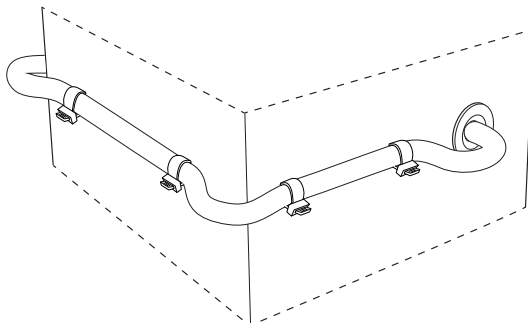


Figure 54. Protect the cable against sharp edges and use cable grommets



Figure 55. Always use shrink hose over the cable connection when fitting cable terminals

5.2 Sizing electrical systems

Ensure that the battery and charger capacity is sufficient for the product in question and that cable with sufficient cross-sectional area is used.

Hydraulic unit 7100	24 volt
Pump - Motor unit	220 A
Minimum recommended conductor cross sectional area (copper cables, plus and minus cables)	
Control cable	1.5 mm ²
Supply cable, L < 13 m	35 mm ²
Supply cable, L = 13 - 19 m	50 mm ²
Supply cable, L > 19 m	50 mm ² *
Battery	
Min. capacity, I_{min} (available for lift)	180 Ah
Min. voltage during operation, U_{min} (at lift)	18 Volt

* **Additional batteries required**

NOTE!

Make sure the tail lift has access to the minimum recommended current capacity (I_{min}).

Some vehicle models have restrictions regarding the amount of current the lift can access from the existing battery. Some vehicle models do not fully charge the battery. It may therefore be necessary to switch to a battery and sometimes also to a charger with a larger capacity.

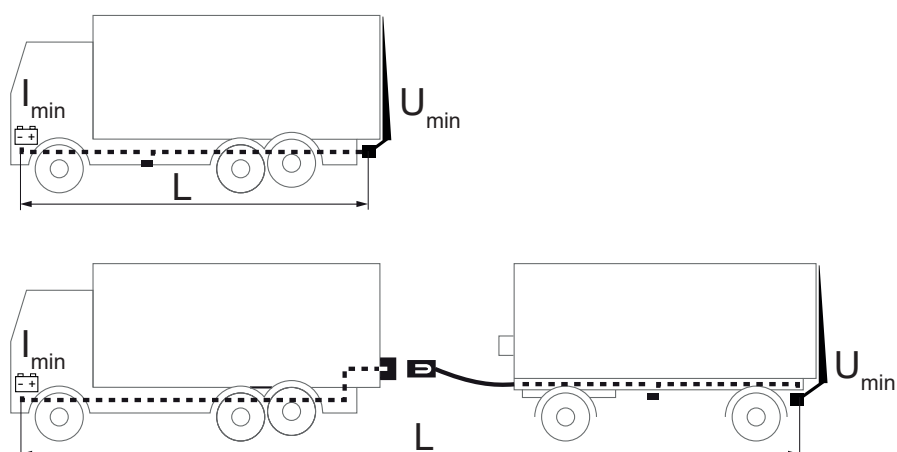


Figure 56. Battery capacity and definition of the length of the earth and main power cables

5.3 Main power cable, earth cable, main fuse and main switch

Main switch should always be mounted when cab switches (CS) are not used, for example when installing on trailers. Main switches can also be installed in combination with cab switches (CS) if desired.

1. If the positive battery terminal is suitable for the main fuse of the lift, it can be used for mounting the fuse. Otherwise, secure the fuse box in a suitable, well-protected position as close to the battery as possible.
2. When using the fuse box, route the main power cable from the battery to the fuse box. Prepare the cable with cable terminals and shrink hose over the connections without connecting it. Connection is described later in section 6.
3. On tail lifts with cable-mounted quick connector for its earth connection, connect the earth cable to the quick connector.
4. Route/connect the tail lift earth cable to the negative terminal of the battery or to a well-protected earthing point.

IMPORTANT!

Earth connection must be made primarily to the negative terminal of the battery. Alternatively, another well-protected earthing point, which will not increase the voltage drop, can be used. The earthing point must be so well protected that increased voltage drop due to oxidation over time can be eliminated. Risk of material damage. Warranty rights do not apply to material damage caused by insufficient earthing.

When installing without main switch

5. On tail lifts with cable-mounted quick connector for its main power, connect the main power cable to the quick connector.
6. Route the main power cable from the tail lift to the fuse box/battery plus terminal. Prepare the cable with a cable terminal and shrink hose without connecting. Connection is described later in section 6.

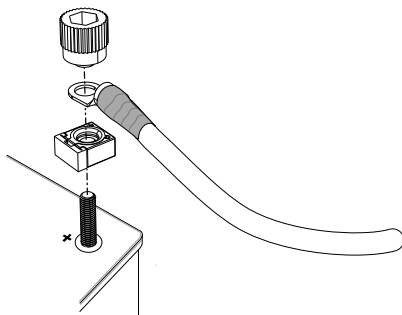


Figure 57. Connection to the battery's positive terminal

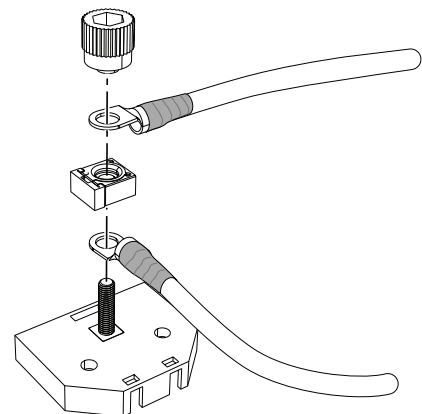


Figure 58. Connection to the fuse box

5.3.1 Main power switch

1. The main power switch is installed on the bracket at the factory. Bolt the bracket to the underside of the body. Use the self-adhesive drilling template supplied.
2. Connect the main power switch cable to the quick connector on the tail lift power supply cable.
3. Connect the power supply cable to the other quick connector on the main power switch cabling.
4. Run the power supply cable from the main power switch to the fuse box / battery positive terminal. Prepare the cable with a cable terminal and shrink hose without connecting. Connection is described later in section 7.

IMPORTANT!

The positive cable to the battery and main fuse is connected later in Section 7, after the cable has been routed/installed.

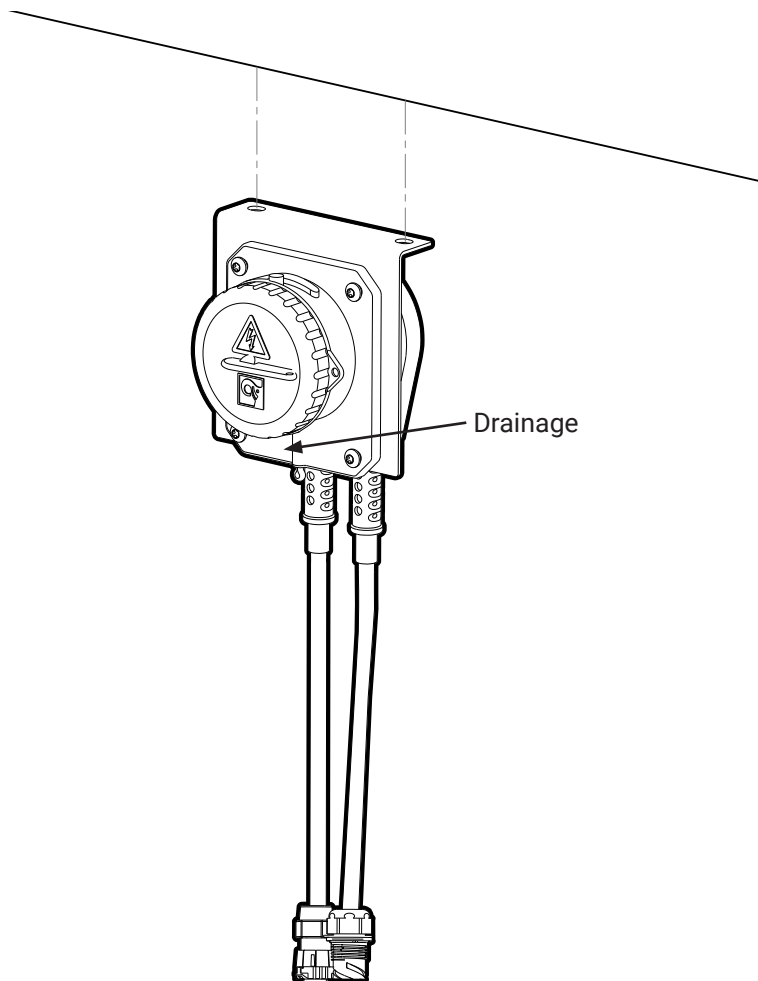


Figure 59. Installing the main power switch

5.4 Control power cable

When using cab switches (CS), route the control current cable from the cab switch CS to the tail lift cable grommet. Connection is described later in section 6.

5.5 Open platform alarm

An open platform alarm must be installed in the form of a warning lamp in the cabin. Route the lamp cables to the tail lift cable grommet. Connection is described later in section 6.

5.6 Foot controller / Warning lights

If the tail lift is equipped with warning lights and/or foot controller, their cabling must be routed and connected according to the following description.

1. Connect the supplied cable to the connector on the foot controller/warning lighting cable.
 2. Route the cable and install with cable ties according to Figure 60 and Figure 61. The quick connector must be positioned in such a way that it does not conflict with the underrun protection while the lift arm is in motion. Measure the distance (A) from the centre of the lift arm shaft to the centre of the underrun protection; see Figure 62.
 3. Measure the same distance (A) on the lift arm; see Figure 62.
 4. Then place the quick connector at least 100 mm outside or inside the measured point (A); see Figure 62.
- Connection is described later in section 6.

IMPORTANT!

Route the cable between the platform and the lift arm tube such that it is well protected when the platform touches the ground. Position the quick connector in such a way that it does not conflict with the underrun protection while the lift arm is in motion. Leave enough slack to the first cable tie to avoid the risk of damage to the cable during lift operation.

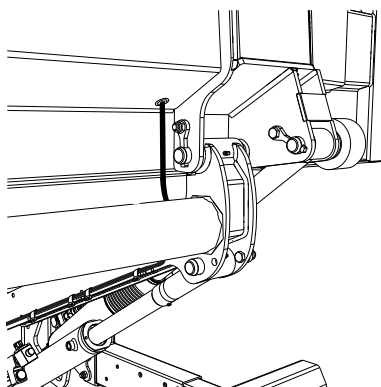


Figure 60. Installing cabling

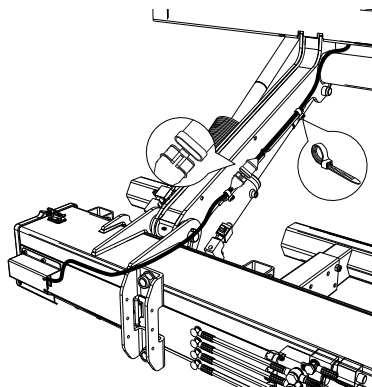


Figure 61. Installing cabling

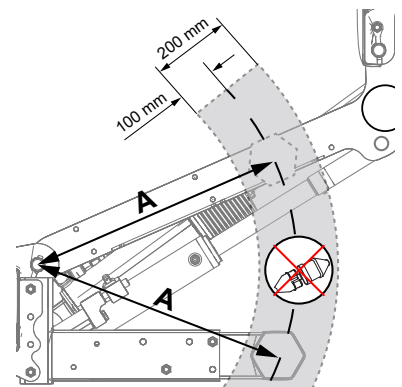


Figure 62. Quick connector location

6 Connection

6.1 Cable grommet

6.1.1 Before connection

1. Disconnect the cable grommet's protective cover, which is secured with four screws; see Figure 63.

6.1.2 After connection

1. When all the cables are mounted in the appropriate place through the cable glands. Make sure the cables are firmly seated.
2. Reassemble the protective cover with the four screws. Make sure the protective cover closes tightly.

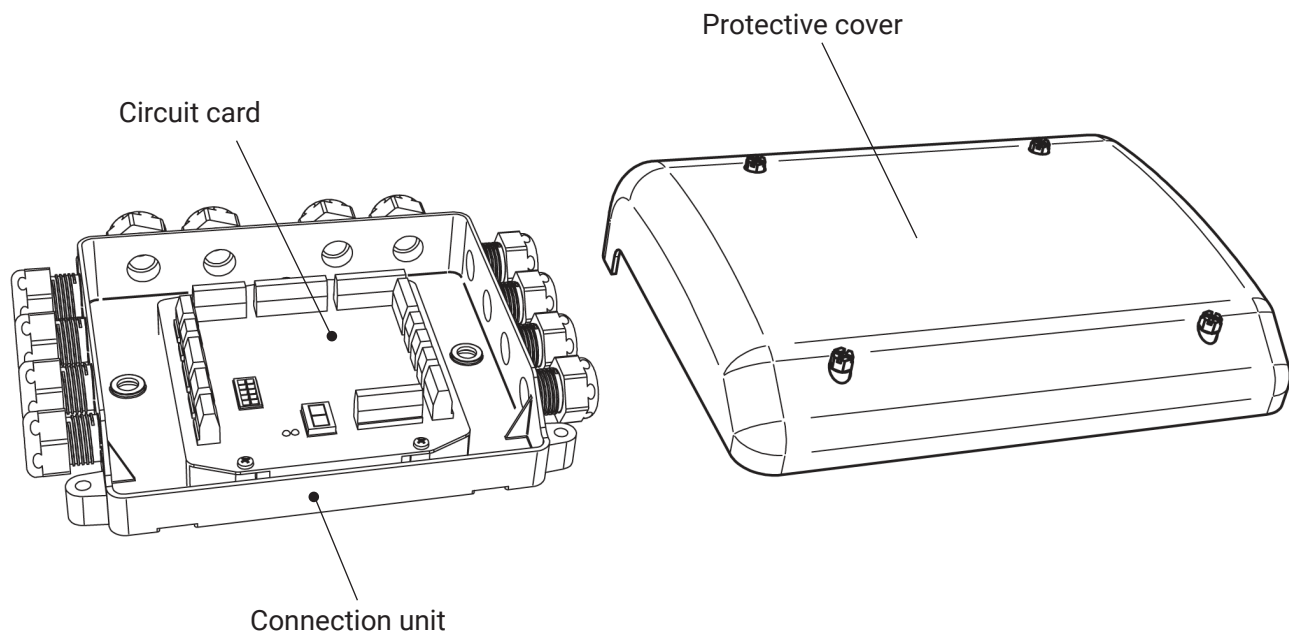


Figure 63. Connection unit

6.2 Connection

IMPORTANT!

Make sure that the control board is disconnected from the power before connecting peripheral equipment. Risk of material damage.

1. Run the cabling through the grommet.
2. Connect the relevant controller. See Section 6.2.1.
3. Where applicable, connect the warning lights. See Section 6.2.2.
4. Where appropriate, plug in cab switch (CS) and open platform alarm. See Section 6.2.4.
5. Replace the cable grommet, see Section 6.1.2.

IMPORTANT!

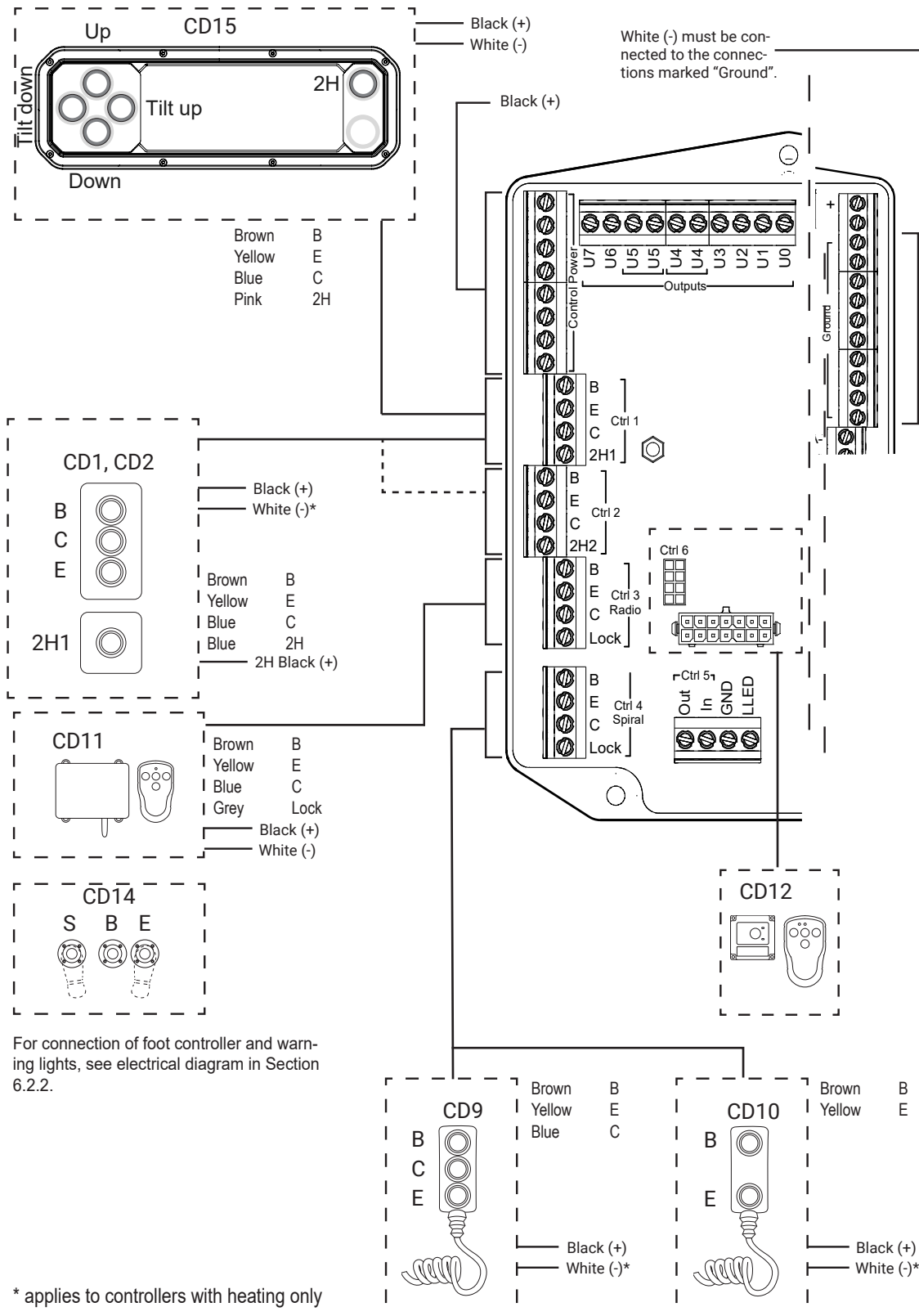
Ensure that no cables are pinched or in any other way damaged when the control board is tilted out/in.

6.2.1 Controller (ZePRO1)

The most commonly occurring controller (CD Control Device) models are shown below. Possible controller models vary depending on lift model, configuration and relevant market.

⚠ WARNING!

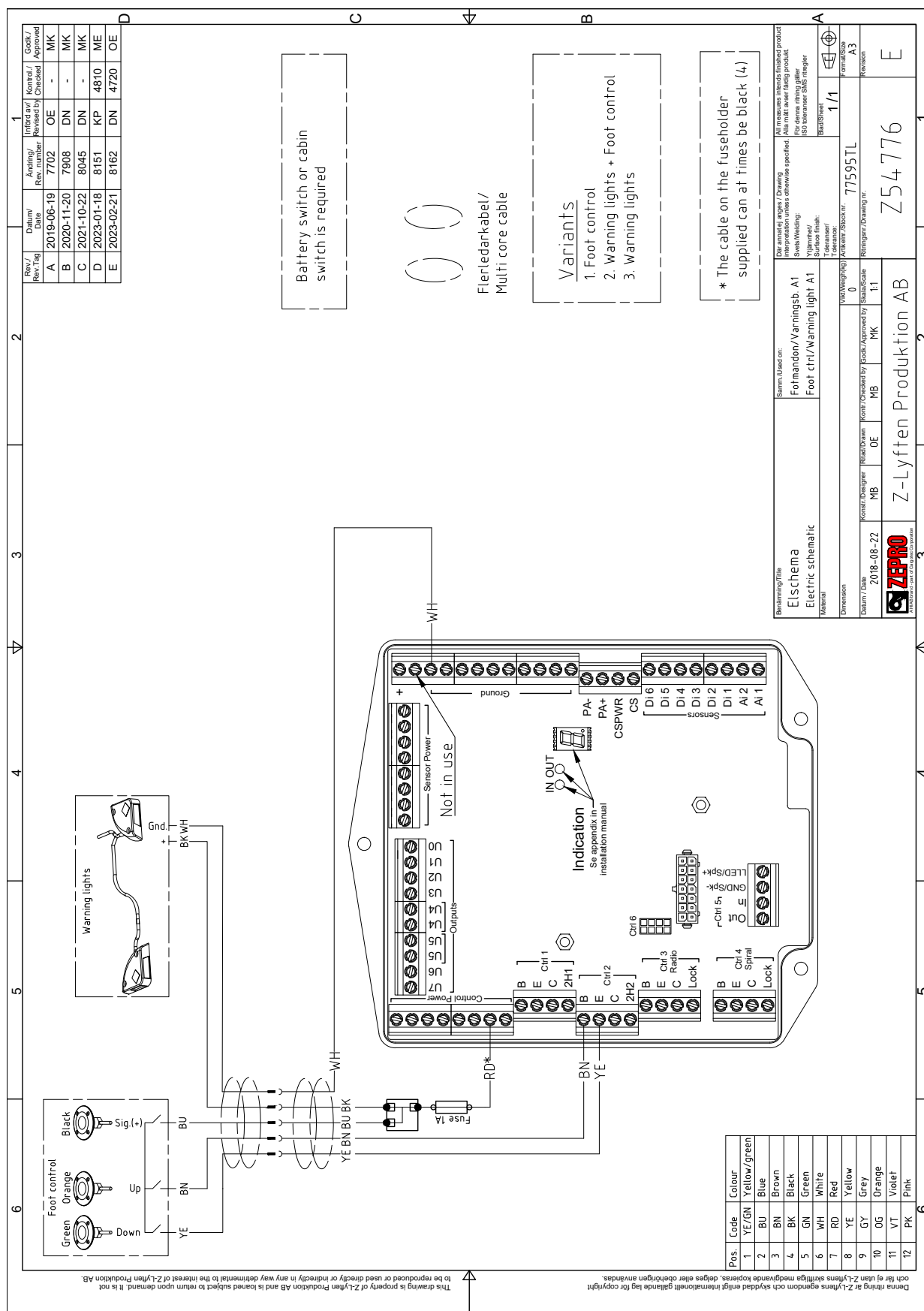
Make sure that the control board is not powered up before connecting. Connecting more than one controller to each connection is not permitted. Risk of material damage.



For connection of foot controller and warning lights, see electrical diagram in Section 6.2.2.

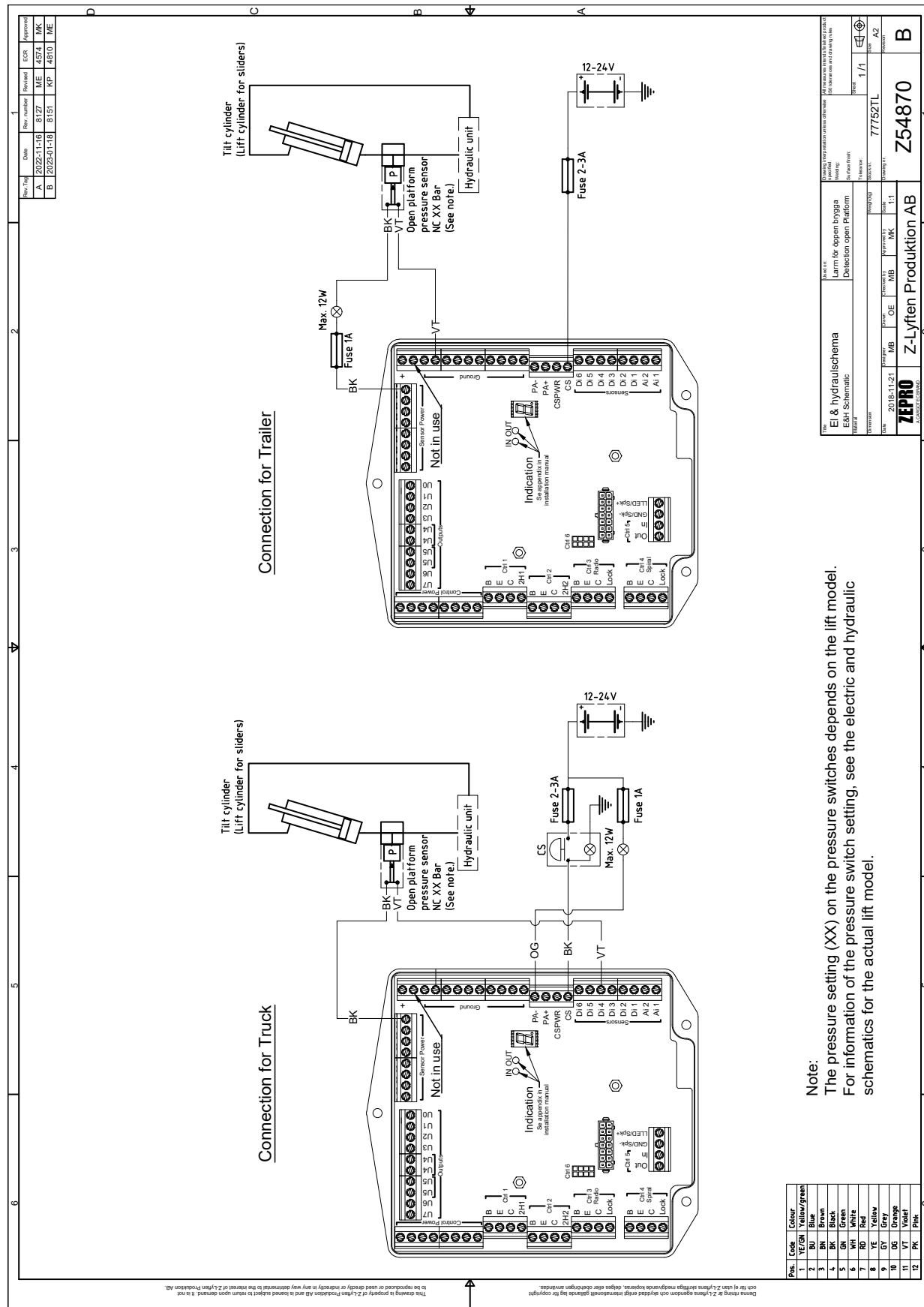
* applies to controllers with heating only

6.2.2 Warning lights and foot controls



6.2.3 Cab switch and open platform alarm

Applies when installing without main switch



Note:

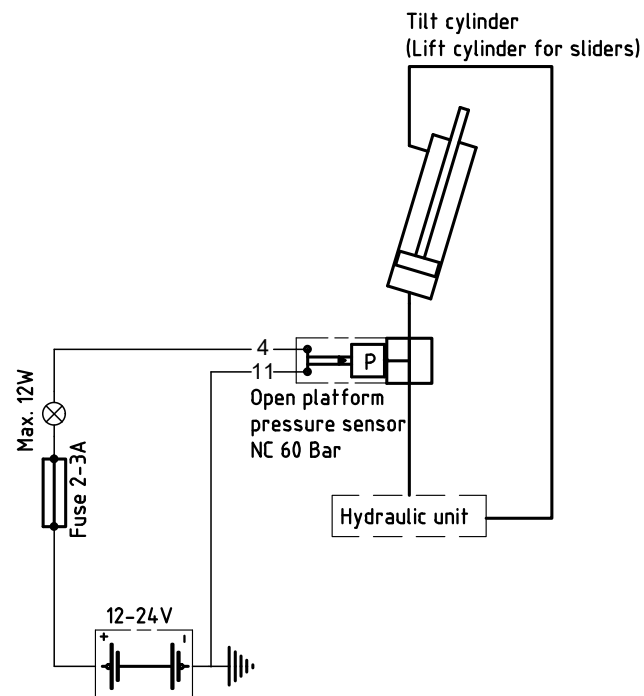
Note:
The pressure setting (XX) on the pressure switches depends on the lift model.

For information of the pressure switch setting, see the electric and hydraulic

schematics for the actual lift model.

6.2.4 Open platform alarm

Applies when installing with main switch



7 Powering up the tail lift

1. If applicable, ensure that the main switch is in the "Off" position.
2. If applicable, ensure that the cab switch (CS) is in the "Off" position.
3. When using a fuse box, connect the cable (1) to the battery's positive terminal and to the fuse box and place the fuse (2) above, see Figure 64.
4. When connecting directly to the positive battery terminal, place the fuse (2) on the positive terminal, see Figure 64.
5. Connect the main power cable (3) to the fuse box / positive terminal, see Figure 64 - Figure 65.
6. Screw tight the cable connections and fuse with the knob (4). Install the cables at 90° or 180° from each other. Install the fuse at right angles to the cables; see Figure 64 - Figure 65.

IMPORTANT!

The knob must bear against and centre the cable lug so that it does not come into contact with the screw. Incorrect installation can cause the fuse to be ineffective. Risk of fire in the event of a short circuit.

7. Install the fuse box cover.
8. Where fitted, set the main switch to the ON position.
9. Where fitted, set the cab switch to the ON position.

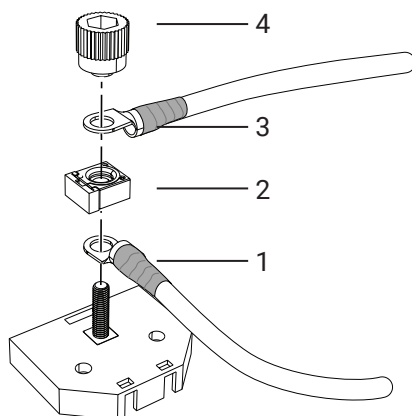


Figure 64. Connection to the fuse box

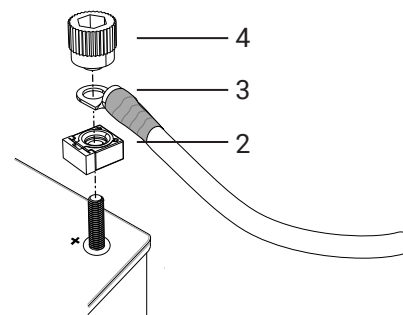


Figure 65. Connection to the battery's positive terminal

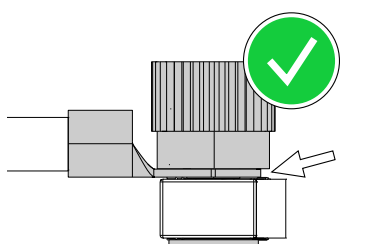


Figure 66. Correct installation

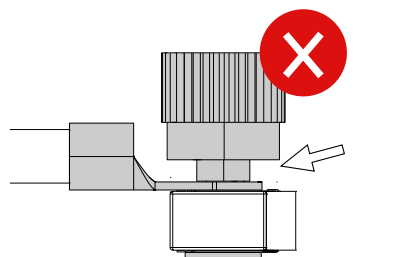


Figure 67. Incorrect installation

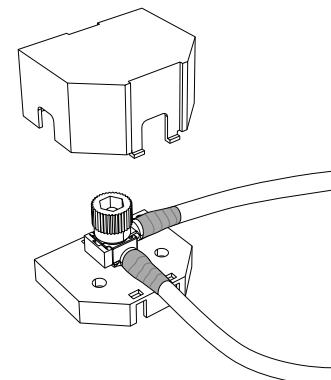
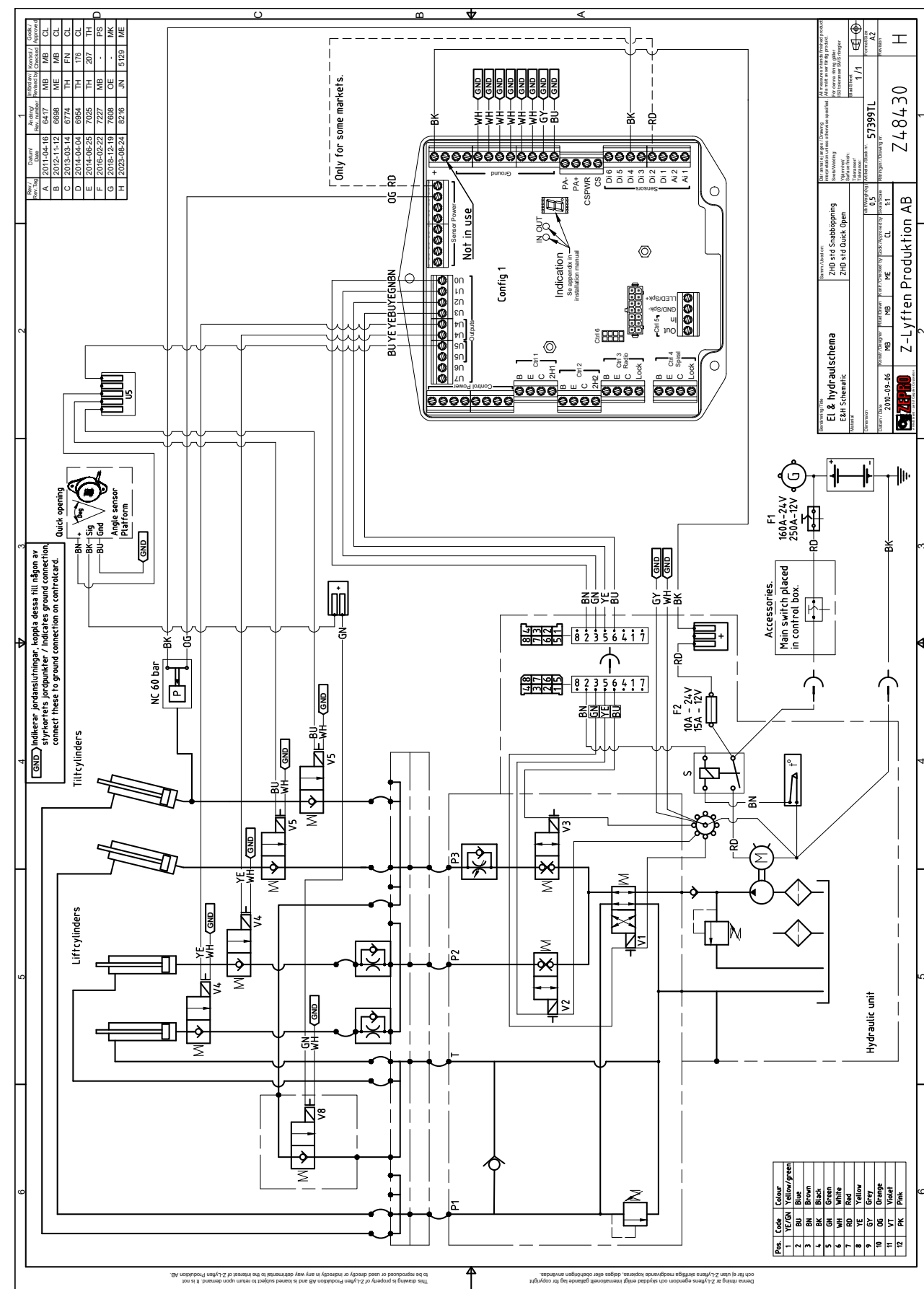


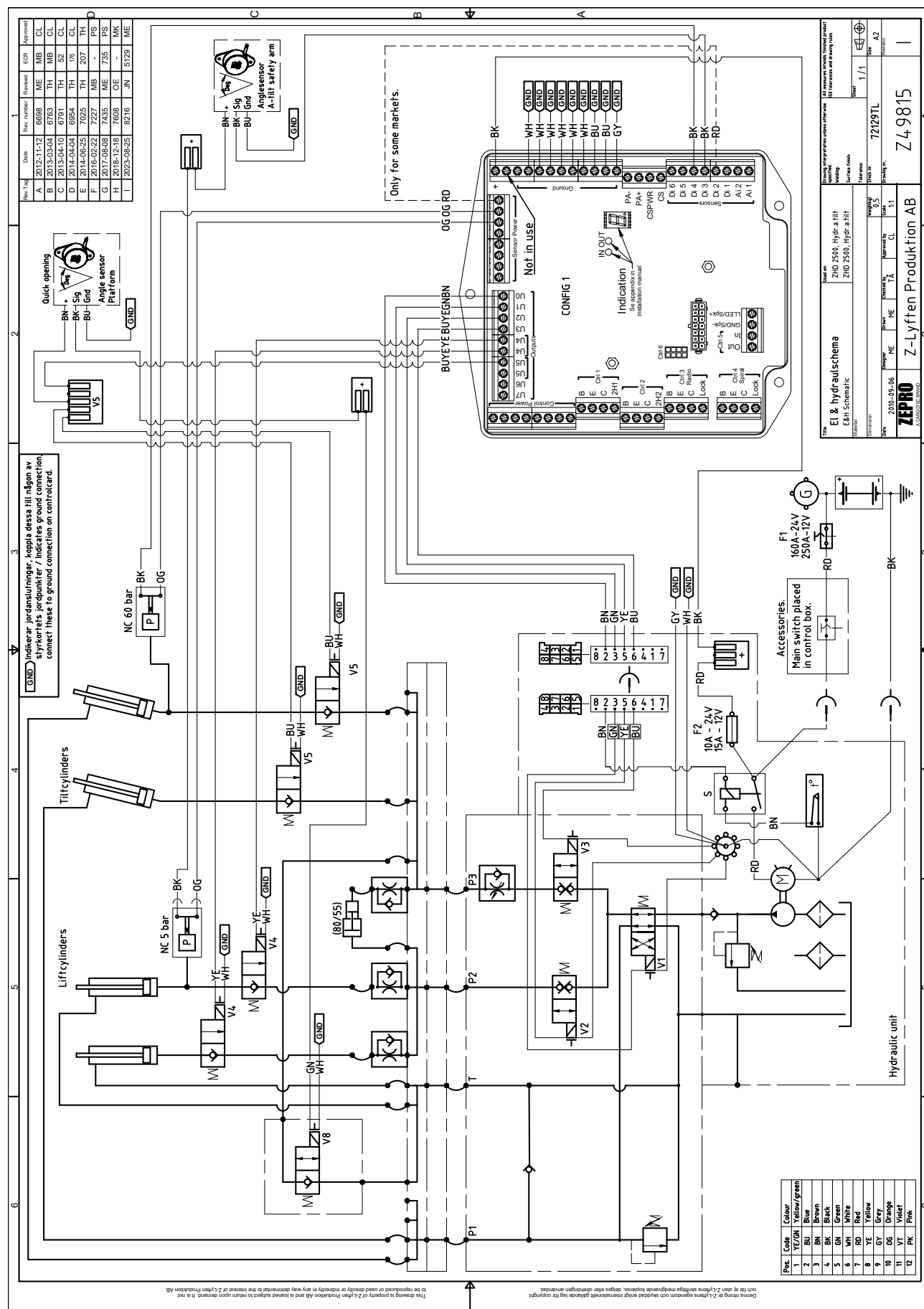
Figure 68. Cover, fuse box

8 Electric and hydraulic diagram

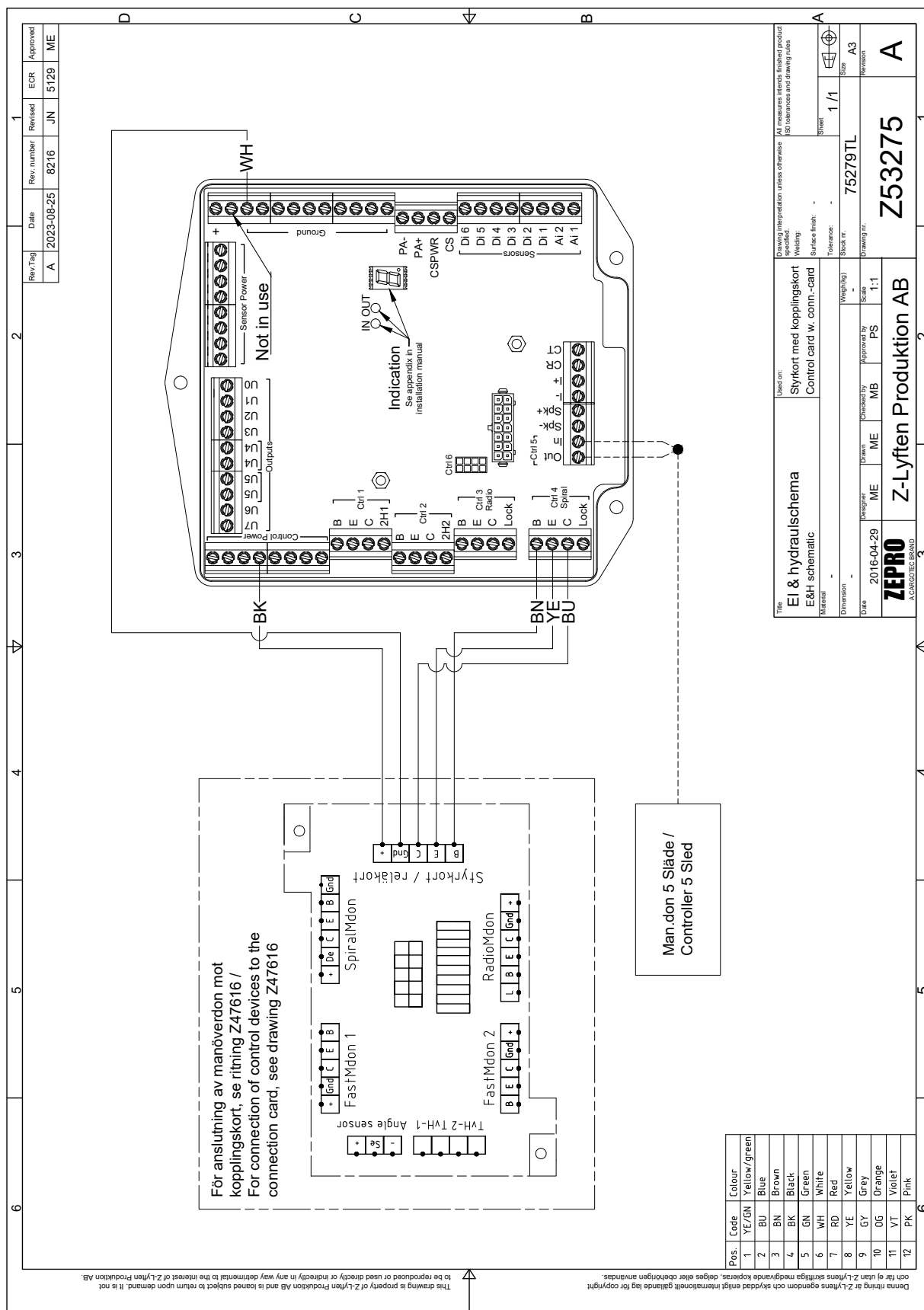
8.1 ZHD 3000-150 MA



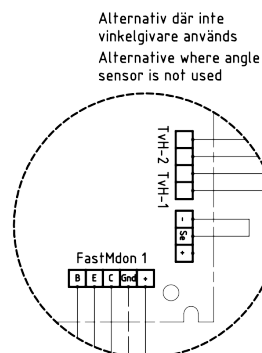
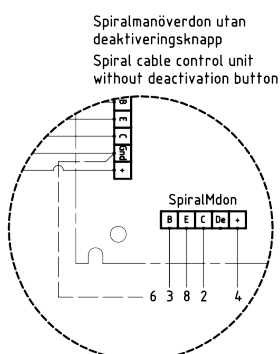
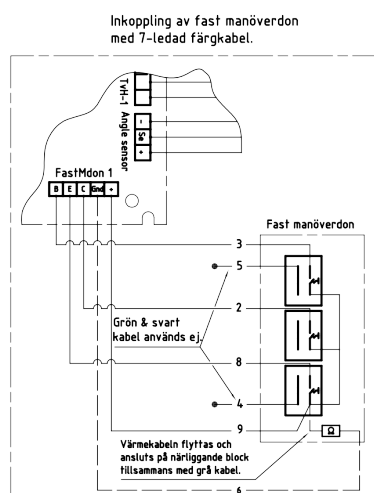
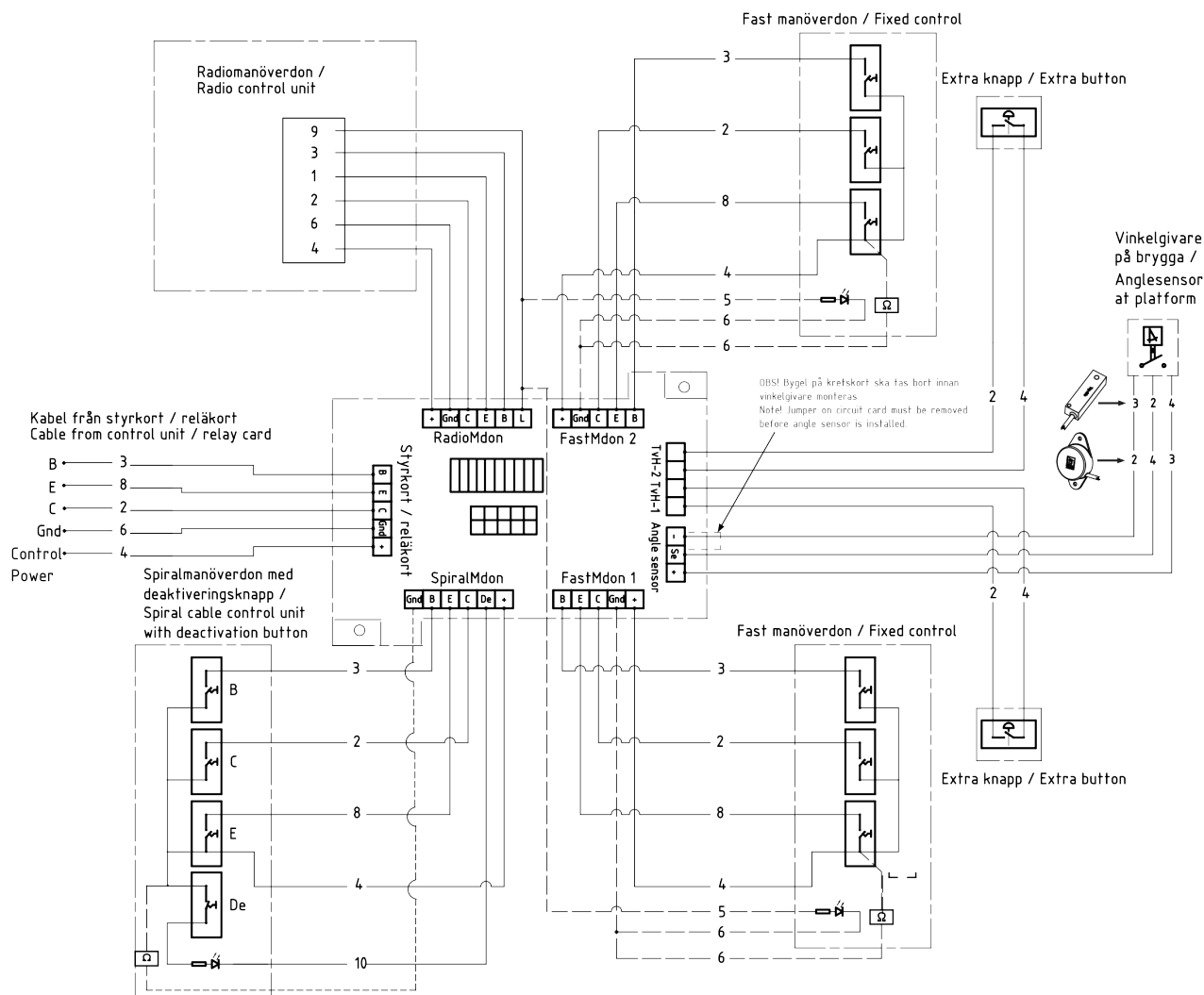
8.2 ZHD 3000-150 MA, with hydraulic Auto-tilt



8.3 ZHD 3000-150 MA with electric autotilt



8.4 ZHD 3000-150 MA Connection to circuit board, 4-button operation



9 Lubrication and oil level check

The following lubrication points must be greased on installation. They must then be lubricated at least 4 times a year.

9.1 Lubrication

NOTE!

Use LE lubricant 4622 or the equivalent.

Grease at least 4 times / year

1. Right liftcylinder, lower bearing.
2. Left liftcylinder, lower bearing.
3. Right liftcylinder, upper bearing.
4. Left liftcylinder, upper bearing.

9.2 Oil level check

Check the fluid level in the tank during maintenance, top up if necessary. The marking on the hydraulic tank indicates the type of hydraulic fluid used. Mineral hydraulic fluid, product no. 21963 (1 litre), or biodegradable synthetic fluid, product no. 22235 (1 litre).

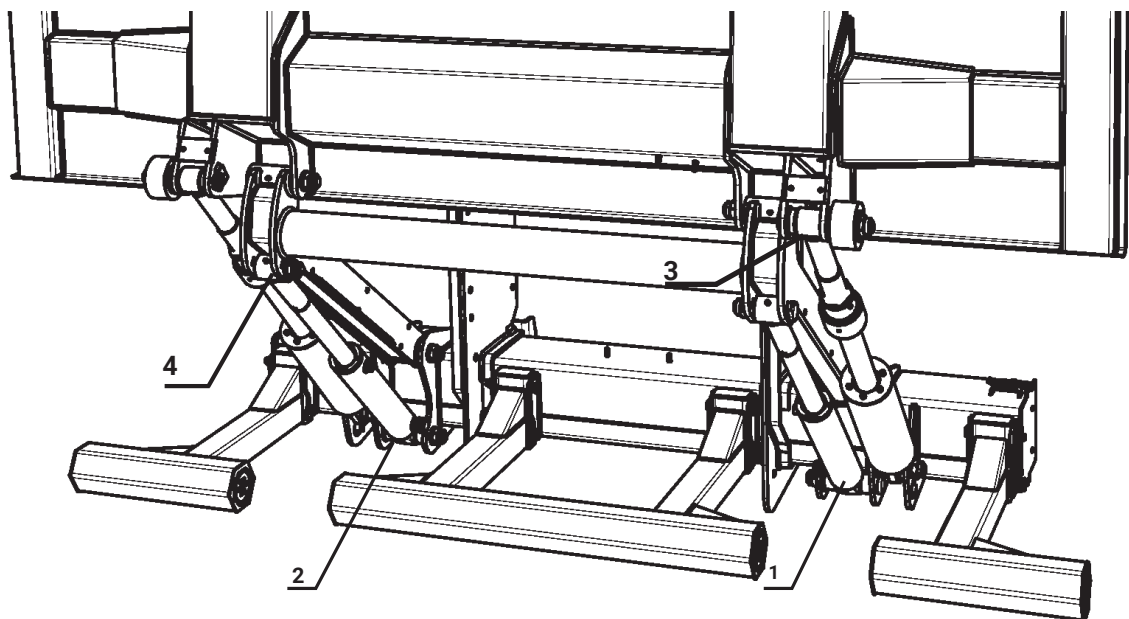


Figure 69. Lubrication points

10 Marking

Below, an overview of the location of the different markings is shown. Images of markings and additional information can be found under the relevant subchapter for subsequent pages.

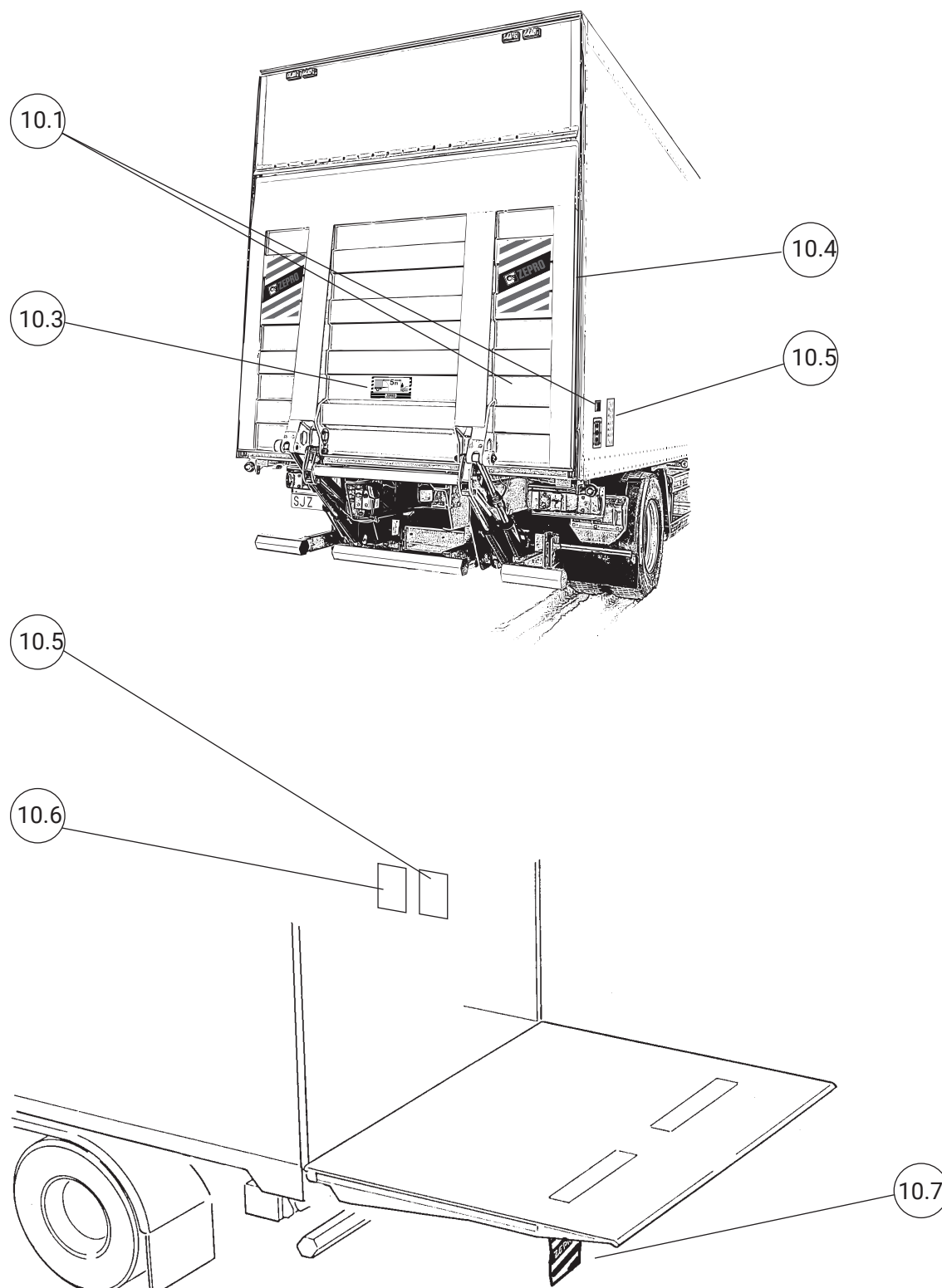


Figure 70. Overview of labelling

10.1 Loading diagram

Affix the load diagram in a suitable, conspicuous place on the platform and in the vicinity of the primary controller or in the designated location on the controller (CD19).

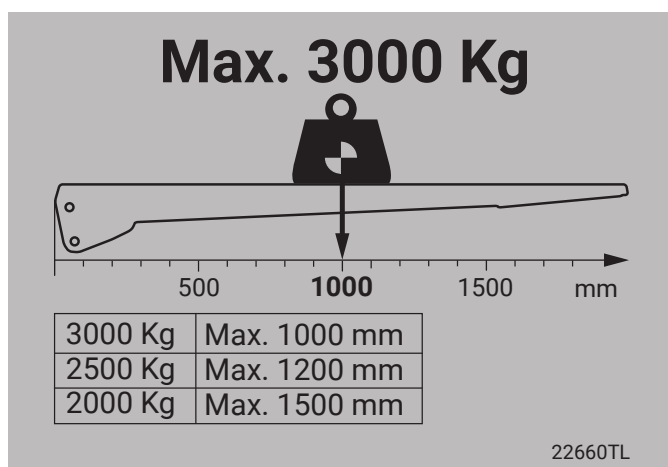


Figure 71. Load diagram for load capacity 3000 kg, load centre distance 1000 mm.

10.2 Identification plate

The identification plate is fixed on to the tail lift's frame. Affix the corresponding sticker version of the identification plate, preferably by the cab door post to facilitate identification.

The identification plate contains the following information:

- Type of lift
- Max. permitted load in kg
- Production number
- Year of manufacture
- Address and tel. no. of manufacturer
- Country of manufacture
- Type number for approved underrun protection (RUPD)
- Type number for electromagnetic compatibility (EMC)

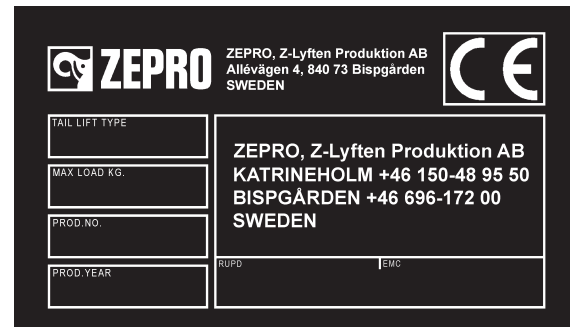


Figure 72. Identification plate

10.3 Work area

Affix the sticker clearly visible on the rear of the vehicle.

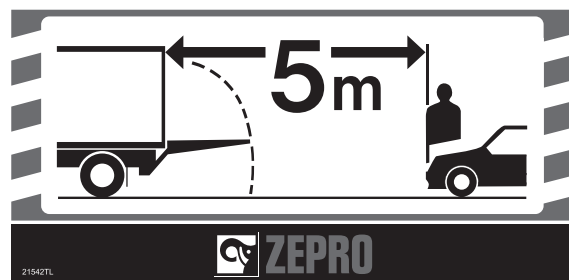


Figure 73. Work area

10.4 Warning tape

The warning tape is affixed along the edges of the platform to make the edges more conspicuous when the platform is deployed.

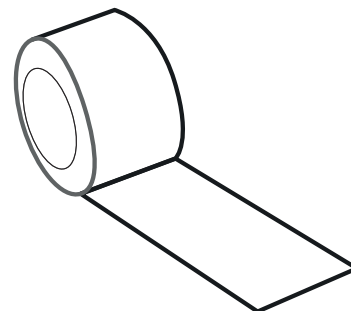


Figure 74. Warning tape

10.5 Controller sticker

Affix the controller sticker next to the relevant controller. The stickers are available in standard versions and in reversed version for affixing on the opposite side of the vehicle. Make sure the stickers are affixed so the image of the vehicle/tail lift on the sticker is in the same direction as the vehicle on which it is affixed.

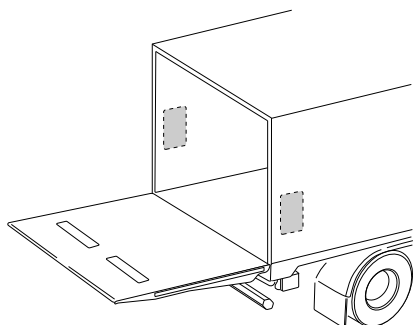


Figure 75. Standard mounting

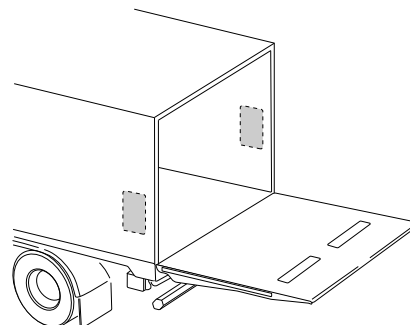


Figure 76. Reversed mounting

Control device	Sticker
CD 1, 2, 9	55053TL*
CD 1,2,9 Horizontal	79854TL**
CD 10	77661TL

* The sticker section for 2-hand operation is delivered on the same backing paper and has to be affixed if the application has 2-hand operation. For applications without 2-hand operation, this part of the sticker is discarded.

** Ordered separately

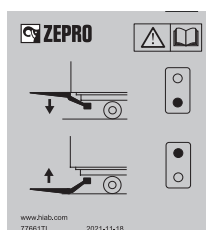


Figure 78. Control device sticker for CD 10

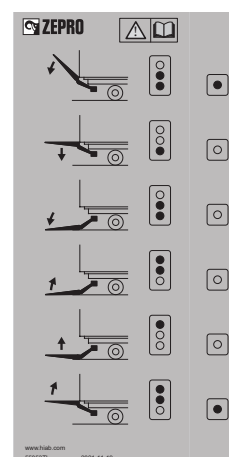


Figure 77. Control device sticker for CD 1, 2, 9

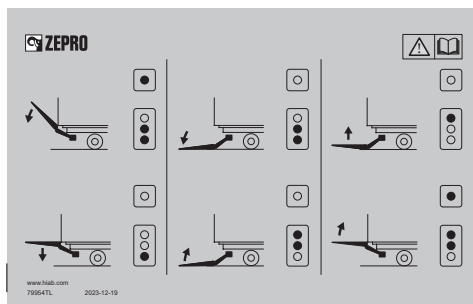


Figure 79. Control device decal for CD 1 with the two-hand button mounted above the control device.

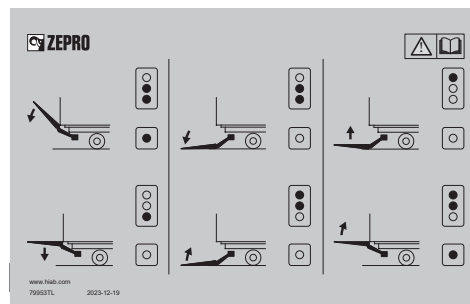


Figure 80. Control device decal for CD1 with two-hand button mounted below the control device.

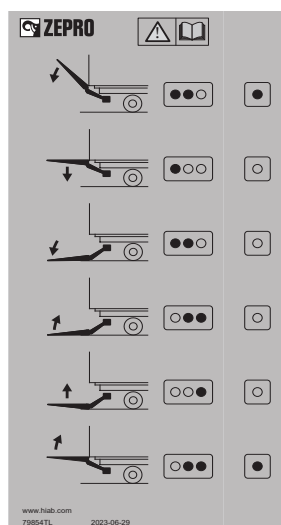
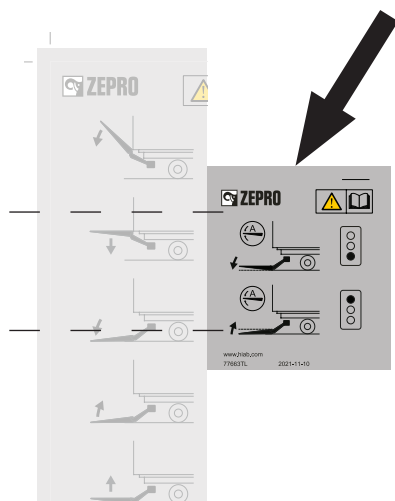


Figure 81. Control device decals for CD 1, 2 and 9 for horizontal control device is ordered separately. 79854TL

10.5.1 Autotilt additional sticker

There is an additional sticker affixed next to the control device sticker on tail lifts fitted with autotilt. The stickers are available in standard versions and in a laterally reversed version for affixing on the opposite side of the vehicle.

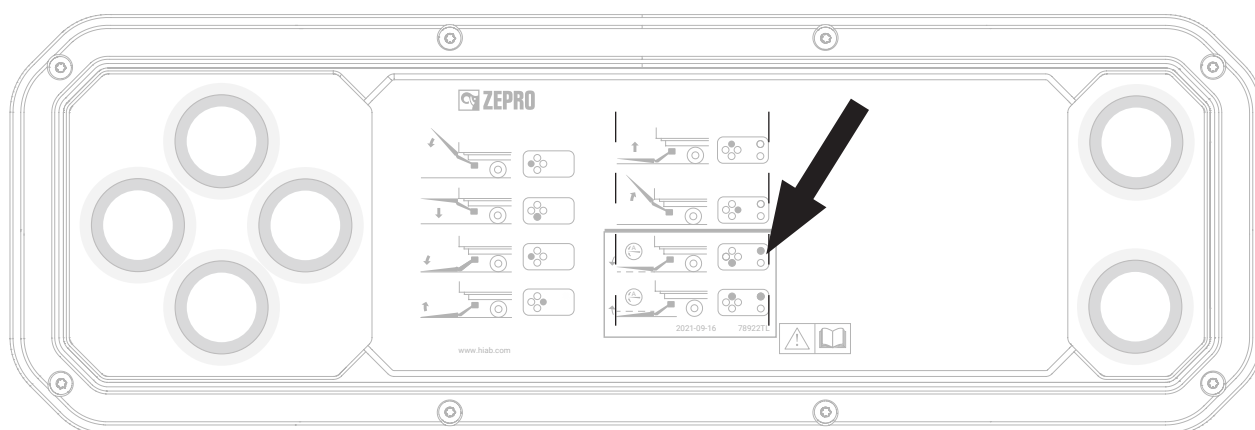
Affix additional autotilt stickers for CD1, CD4 and CD9 next to their respective controller stickers and align them with the two middle symbols for the tilt down and tilt up functions.



Additional autotilt sticker for CD 1 & CD 9

Control device	Stickers
CD 1, CD 9	77663TL
CD 20	78922TL

Affix the additional CD20 autotilt sticker on control device CD20 directly below the line in the right column of symbols and in line with the symbols above.



Additional autotilt sticker for CD 20

10.6 Danger area

If one is fitted, affix the sticker on the inside of the vehicle body next to the hand control unit.

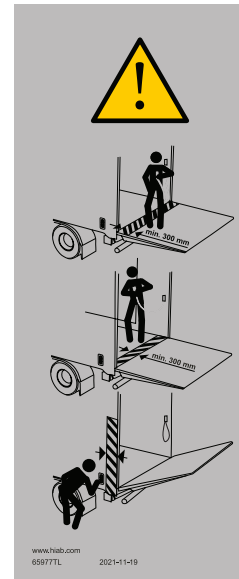


Figure 82. Danger area

10.7 Warning flags

Install warning flags as close to the top and as close to the edge of the platform as possible, but without the risk of the flags coming loose when the platform is placed on the ground. Swage the tracks together to secure the warning flags. The flags must be provided with reflective tape.



Figure 83. Warning flags

11 Testing and verification

Testing and verification of the tail lift takes place in accordance with the installation/delivery inspection. Verify that the tail lift is suitable for the vehicle in question and for the intended use.

11.1 Static load test

11.1.1 Deformation

- Position the tail lift half way to vehicle floor level and with the platform horizontal. Measure dimensions A-B-C-D for comparison as illustrated. Figure 84
- Place a test load on the platform, as shown in table (for each lift model/lift capacity).
- Remove the test load from the platform.
- Repeat the measurement of A-B-C-D and verify that there has been no deformation of the lift or its attachment point.

11.1.2 Operation

- Place a test load on the platform, as shown in the table. The tail lift must be at the same level and angle as the vehicle floor.
- Leave the test load for 15 minutes.
- Verify that platform operation is not more than 15 mm in the vertical direction (points A and D) and not more than 2° in the angular direction (points B and C), in relation to the vehicle floor level.

11.1.3 Static load (Test load 1.25 x tail lift loading capacity). For tail lifts with a load centre of 1000 mm.

Capacity	Load 2000 kg	Load 2500 kg
	Distance out on platform (L)	
3000 kg	1845 mm	1500 mm

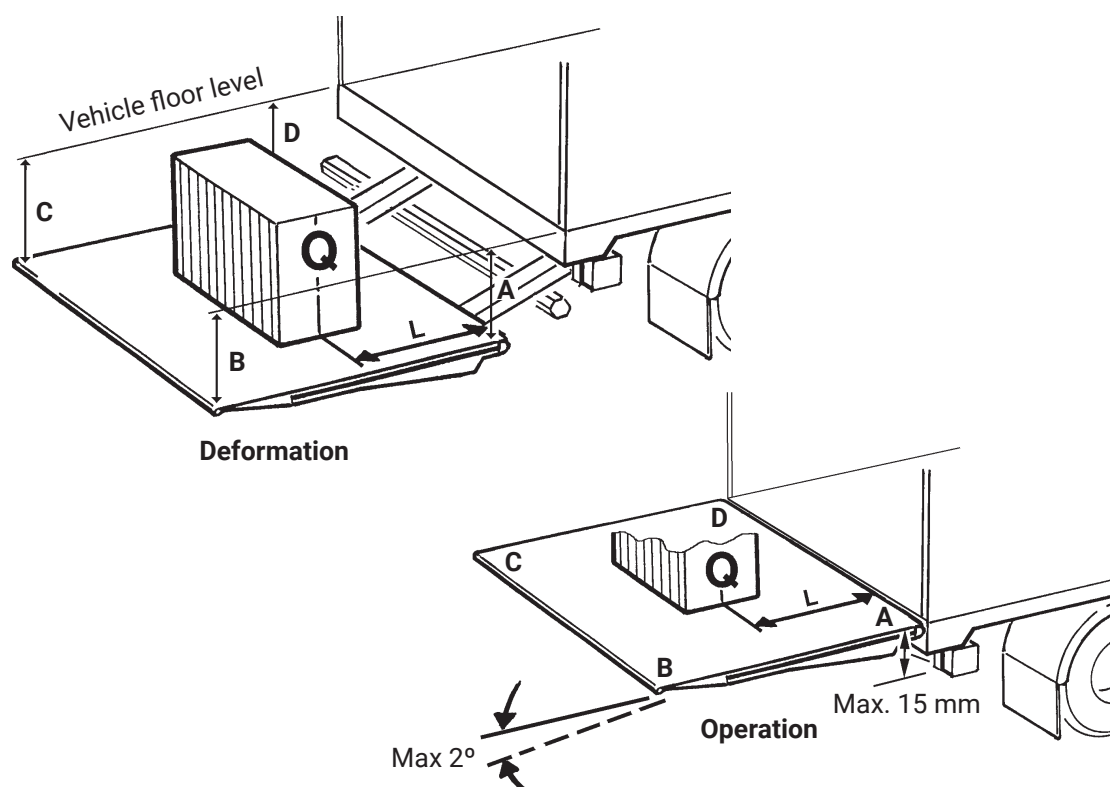


Figure 84. Testing and verification

11.2 Dynamic load test.

11.2.1 Test with max. load

- Place a test load on the platform, as shown in table (for each lift model/lift capacity).
- Check that the lift operates correctly in the normal range of movement, i.e. up, down, tilting at ground level and tilting at vehicle floor level.

11.2.2 Test with overload

- Place a test load on the platform, as shown in table (for each lift model/lift capacity).
- The test load should be 1.25 x the lift model's max. load. Verify that the tail lift cannot lift the load when the up function is switched on (it may however be possible to tilt up the load).

11.2.3 Dynamic load (Test load 1.0 x tail lift loading capacity). For tail lifts with a load centre of 1000 mm.

Capacity	Load 2000 kg	Load 2500 kg
	Distance out on platform (L)	
3000 kg	1875 mm	1200 mm

11.3 Test of safety functions

The tail lift functions must be tested.

Check:

- That the red lamp in the vehicle's driver's cab goes out when the platform is fully closed against the body, and conversely, that it comes on when the platform opens.
- that the platform cannot be opened or closed without the use of two-hand operation.
- that the platform cannot be tilted more than -10 degrees when using spiral cable controller or radio controller when the platform is flush with the vehicle floor.
- That the tail lift cannot be activated if the cabin switch is in the off position.
- That the tail lift cannot be activated when the main switch fuse is removed.
- That the overflow valve is activated when the lift is operated up to the vehicle floor level or end stops.
- That the tail lift cannot be lowered or tilted down if the electrical connector from the electric hose rupture valves is disconnected from the lift and tilting cylinders respectively.
- That the max load sticker is present and suitably positioned in relation to the load diagram for the lift model concerned.
- That warning flags and reflectors are fitted and fulfil their function correctly.
- That all safety and operating stickers are affixed in their respective positions.
- That the platform's mechanical locking device is working (if accessible).
- That the instructions for using the tail lift have been left in the driver's cab.
- That the CE declaration of conformity has been completed.

12 Registration

For the tail lift's guarantee to be valid, the delivery card must be registered in C-care (www.c-office.com). The bodybuilder is responsible for registration in C-care and must certify in the intended location in tail lift's manual that registration has been done.

13 Specifications

13.1 Weights

Many of the lift components are heavy, requiring the use of lifting equipment to get them in place. Make sure the weight of the components does not exceed the maximum permitted load of the lifting equipment. The following is a list of selected components with their weight.

Complete Lift chassis (except platform)		Lift components (included in complete lift chassis)	
ZHD 3000-150	471 kg	Support frame ZHD 3000	132 kg
		Lift arm ZHD 3000-150	63 kg
		3-part underrun protection bar cpl. ZHD 3000-150	46 kg
Steel platforms		Complete frame bracket	32 kg
Steel platform 2000x2580 mm	378 kg	Lift cylinder ZHD 3000-150	15,8kg/pce
Steel platform 2500x2560 mm	466 kg	Tilt cylinder ZHD 3000-15	30.6kg/pce



HIAB

BUILT TO PERFORM

Zepro, Del and Waitco are Hiab trade marks for tail lifts. Hiab is a world-leading supplier of equipment, intelligent services and digital solutions for on-road load handling. As an industry pioneer, our company commitment is to increase the efficiency of our customers' operations and to shape the future of intelligent load handling.