

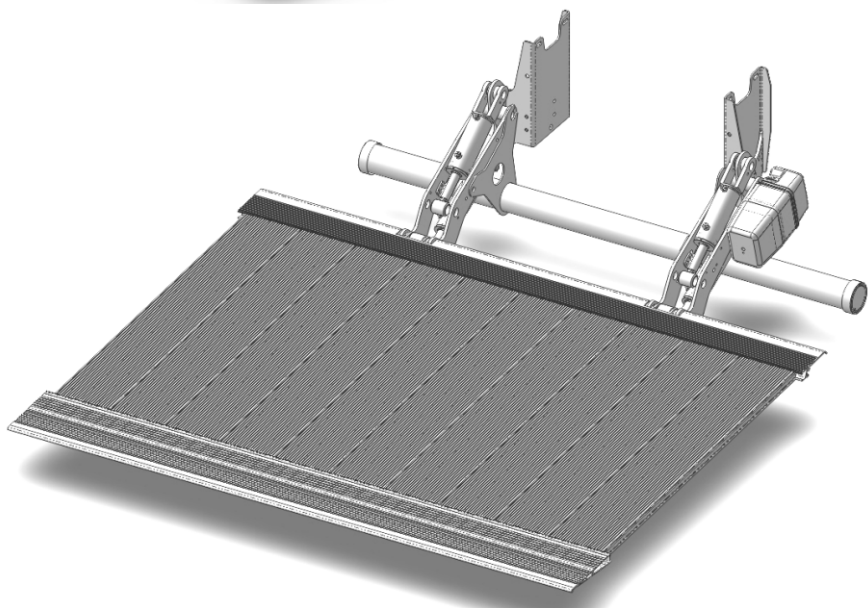
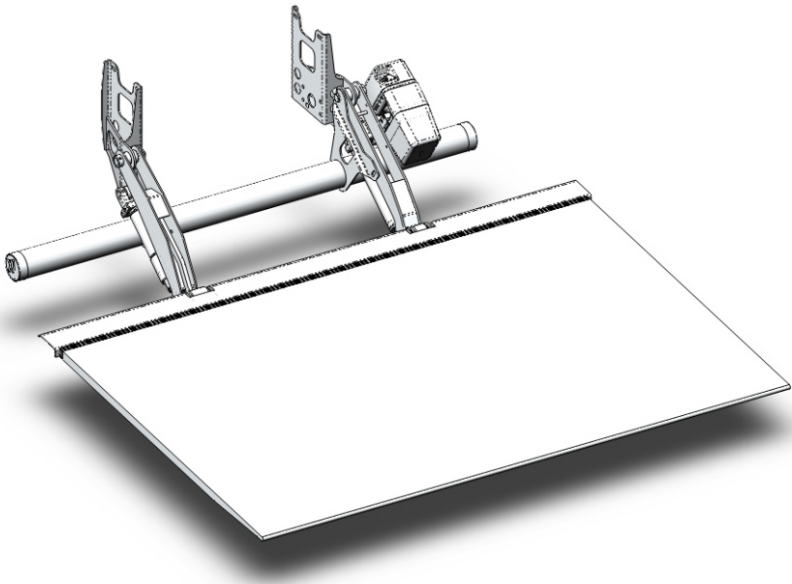


Plus-point product diversity

Installation Manual for Sørensen tail lift:
X1A 1000SL, X1A 1501, X1A 2000
X4A 1000, X4A 1500, X4A 1501



Installation Manual



for Sørensen tail lift:

- + X1A 1000SL
- + X1A 1501
- + X1A 2000

- + X4A 1000
- + X4A 1500
- + X4A 1501





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X1A 1000SL, X1A 1501, X1A 2000
X4A 1000, X4A 1500, X4A 1501



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...lifts for life

Table of contents

Introduction	2
Transport damages	2
Trailer hitch	2
Installation-safety precautions	2
Preparation of the vehicle	2
Mechanical support stands	2
Assembly measurements for X1	3
Installation chart.....	3
Cutouts in rear sill	4
Assembly measurements for X4	5
Installation chart.....	5
Cutouts in rear sill	6
Installation of the hoisting gear X 1 and X 4 with the assembly jig 20 908 561	7
Drilling distances for mounting plate for: X1A 1000 / X4A 1000 / X4A 1501	10
(up to 12t vehicle weight)	10
Drilling distances for mounting plate for X4A 1500 (unlimited vehicle weight)	10
Drilling distances for mounting plate for X1A 1501 (up to 12t vehicle weight).....	11
Drilling distances for mounting plate for X1A 1501 (unlimited vehicle weight)	11
Drilling distances for mounting plate for X1A 2000 (unlimited vehicle weight)	11
Assembly of electrical equipment in series 10	12
Foot control.....	12
Central electric.....	12
Assembly of electrical equipment in Series 9.....	13
Assembly of electrical equipment tail lift/vehicle	13
Assembly of the control panel or control box	13
Battery cable / Ground cable / Fuse.....	14
Assembling and adjusting the platform: X1, X4	15
Platform assembly	15
Adjusting the platform to the vehicle floor X1	16
Function of the adjusting fork.....	16
Adjusting the platform to the vehicle floor X4.....	17
Function of the adjusting fork.....	17
Lifting arm stop at vehicle body.....	18
Adjusting the closed platform against the body.....	18
Adjusting the platform tilting/ inclination in Series 10 (Tilt sensor programming)	19
Adjusting the platform tilting in Series 9	19
First operation of the tail lift.....	20
Entry into the test book	20
Load probation.....	21
Test against lifting an overload	21
Warning flags.....	21
Valid torque chart for all delivered and assembled screws on Sørensen tail lifts.....	22
Diagnose diode.....	23
Service Switch	24
Danger clue - Sticker "Safe handling of the tail lift"	25
Body seal	26

Introduction

These installation directions contain the instructions necessary to install the tail lift and adjust it to those vehicles for which the tailgate was designed. To determine whether the device may be installed on a certain vehicle, please contact us. We will provide the required information. If the tail lift needs to be modified or if it is necessary to differ from these installation directions, a written approval from Sörensen Hydraulik GmbH needs to be obtained first. Unapproved modifications and amendments from these installation directions may lead to failure and to operating interruptions as well as to hazards for the operator.

The warranty for the device will be voided by "unapproved modifications" and "deviations from the installation directions."

The installations guidelines of the chassis manufacturer need to be complied with!

Transport damages

For damages on the tail lift which occurred during transportation, the shipping/forwarding company will be responsible. The lift needs to be checked for damages after arrival. If any damages occurred during transportation, they need to be recorded on the waybill, so that claims can be raised. Insurance claims can be settled only by Sörensen Hydraulik GmbH and the shipping/forwarding company or its insurance.

Trailer hitch

If the vehicle has a trailer hitch, the clearance of the shaft axle to the tail lift and the overall length need to be guaranteed by the installer.

Installation-safety precautions

- Before installing, the battery of the vehicle needs to be disconnected.
- The vehicle must be secured against all unintentional shifting.
- Any special safety regulation (if applicable) must be complied with.
- Safety gear, like protective goggles, work gloves and protecting shoes, need to be available before installing, and are to be used.
- Safety devices on cranes, forklifts, and other lifting gear – necessary for installing the lift, must be checked to see if they are in proper working condition, before use.

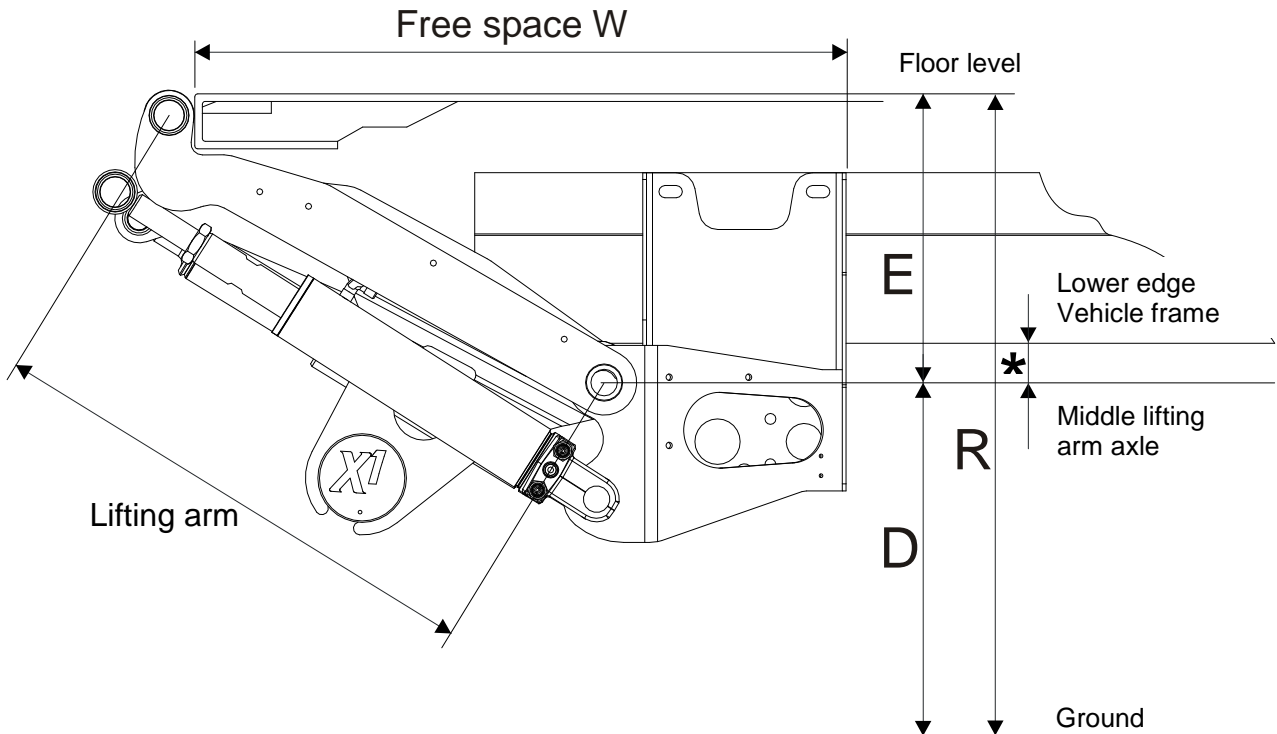
Preparation of the vehicle

Dismantle the underrun bar and the tail lights. If there are any U-shaped mounting brackets with threads on both sides, brackets, rivets, spare wheels, or couplings in the installation area of the mounting brackets, they need to be removed. If necessary, remove hinges and locks at the rear end plate of the body floor. The drivers cab should be protected against dirt using a suitable cover.

Mechanical support stands

The directives of the vehicle manufacturer state if the vehicle should be equipped with support stands. The stands delivered with the tail lift, are sent with a separate installation drawing. For stands, assembled by a third party, which do not have homologation by our technical services, there can be no warranty and no claims whatsoever concerning damages to persons, on the vehicle, on the lift or on those stands.

Assembly measurements for X1



* this measure must be observed when a ball head coupling is mounted

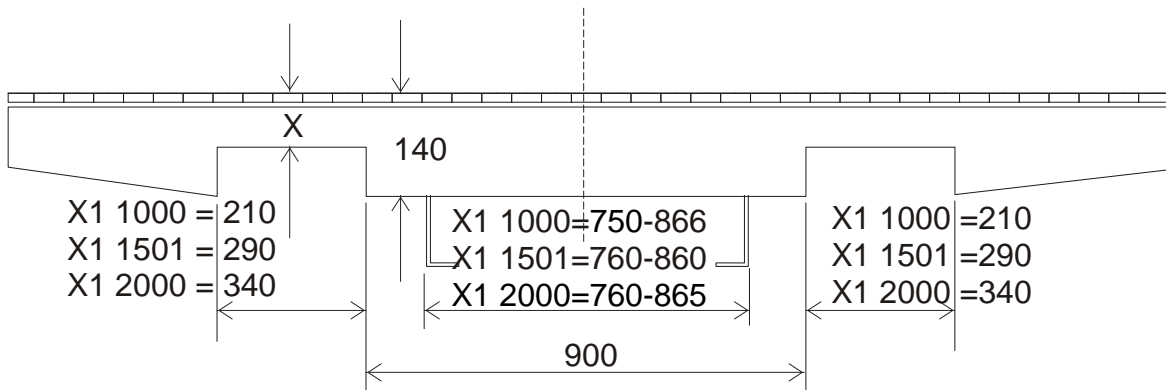
Installation chart

Model / Type	Lifting arm-length (mm) Tail lift	R max. (mm)	D up min (loaded) to max. (unloaded) (mm)	E up - to (mm)	W up - to (mm) Free space	* from lower edge vehicle frame to middle lifting arm axle min. (mm)
X1A - 1000SL	675	1180	460 - 650	400 - 530	750 - 855	20
X1A - 1000SL	750	1300	480 - 690	540 - 610	765 - 850	20
X1A - 1501	675	1200	455 - 660	450 - 540	806 - 890	25
X1A - 1501	750	1300	500 - 720	505 - 580	875 - 950	25
X1A - 2000	750	1300	510 - 700	430 - 600	855 - 995	25
X1A - 2000	875	1430	585 - 750	510 - 680	950 - 1095	25

If there is not enough space, please contact the sales department. The sales department will contact the technical department to check whether the installation, considering the dimensions of the vehicle, is possible. If the installation is possible, you will get a special drawing in which the installation situation is shown.

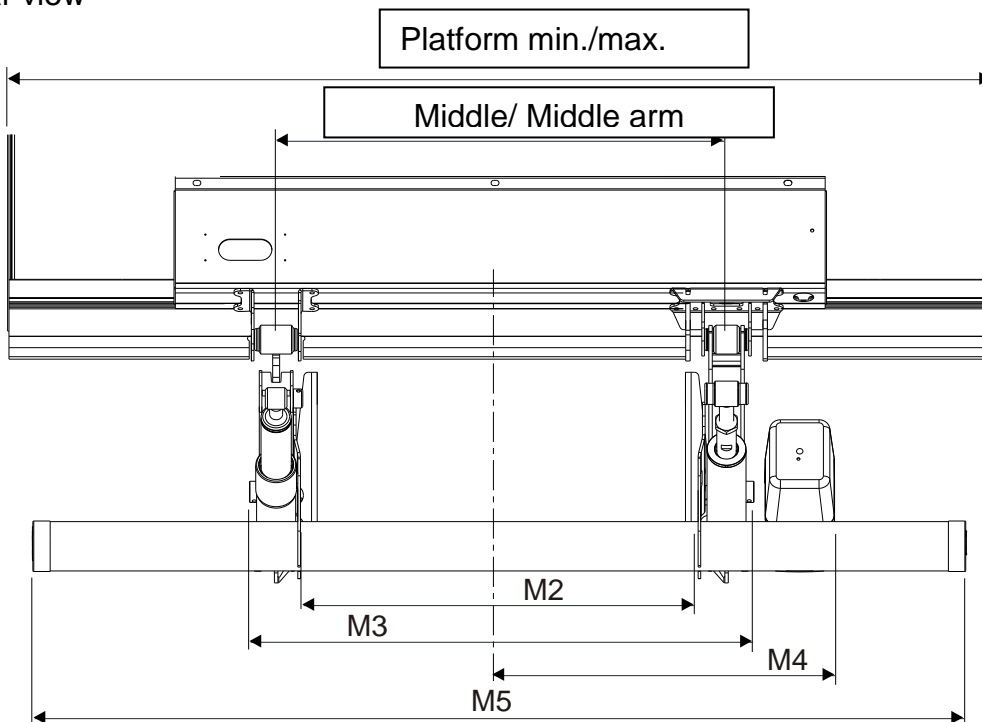
Cutouts in rear sill

Recommendations for the rear sill cutouts to install the type: X1A 1000SL, X1A 1501, X1A 2000
 If the dimension of the rear sill in the area of the lifting arms is more than 80 mm, then openings need to be cut out according to our recommendations.



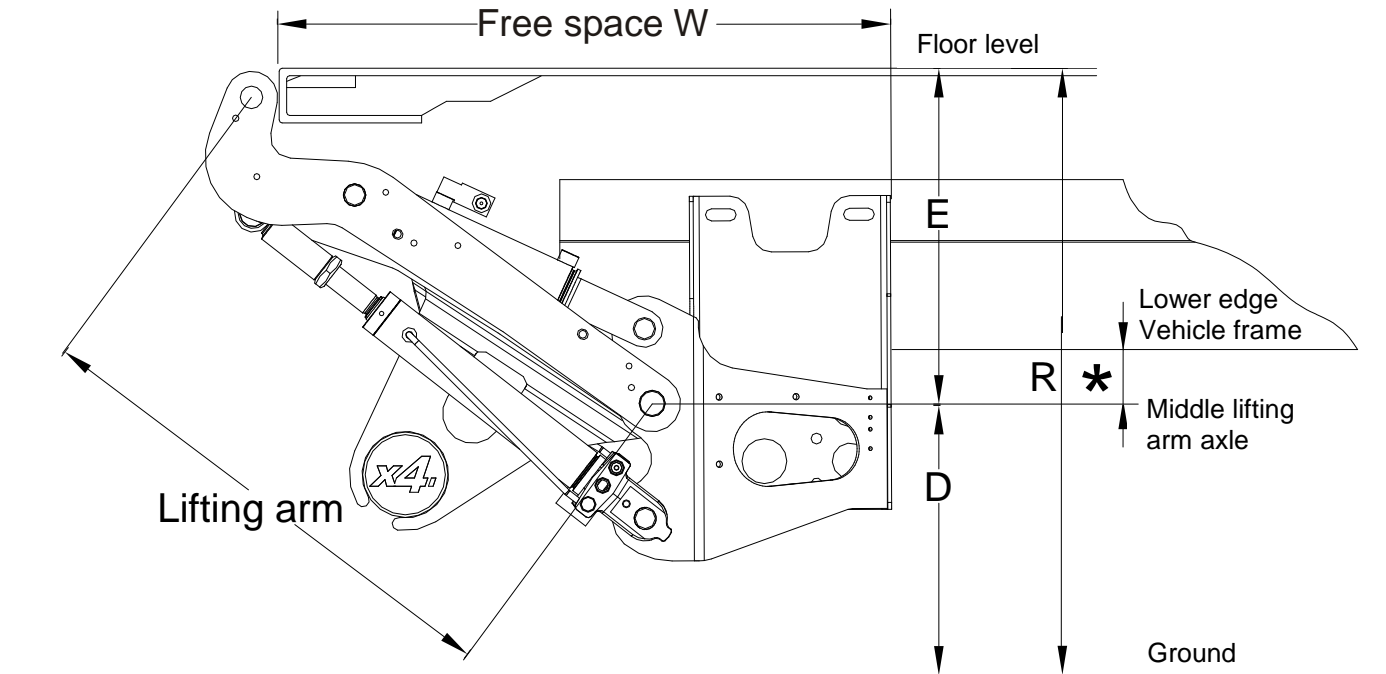
X1A 1000SL / X1A 1501	Hub 675/ Hub 750	X 80
X1A 2000	Hub 750/ Hub 875	X 130

rear view



Model / Type	Platform max/min	Lifting arm Middle/Middle	M2	max M3	max M4	M5 Standard
X1A 1000SL	2580 / 2000	1040	918	1205	865	2150
X1A 1501	2580 / 1950	1070	900	1235	875	2225
X1A 2000	2580 / 2460	1120	950	1350	950	2300

Assembly measurements for X4



* this measure must be observed when a ball head coupling is mounted

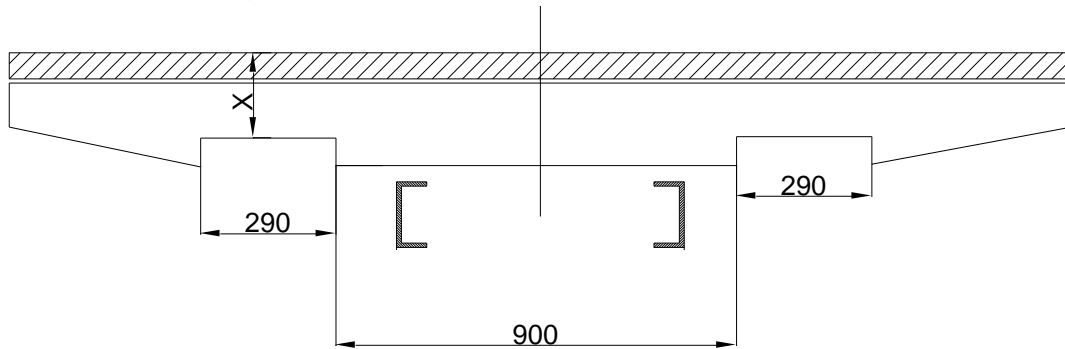
Installation chart

Model / Type	Lifting arm-length (mm) Tail lift	R max. (mm)	D up min. (loaded) to max. (unloaded) (mm)	E up - to (mm)	W up - to (mm) free space	* from lower edge vehicle frame to middle lifting arm axle min. (mm)
X4A - 1000	675	1180	460 - 650	410 - 530	750 - 855	20
X4A - 1000	750	1300	480 - 690	530 - 610	765 - 845	20
X4A - 1500	675	1200	455 - 660	450 - 540	780 - 860	25
X4A - 1500	750	1300	500 - 720	505 - 580	845 - 920	25
X4A - 1501	675	1180	460 - 650	410 - 530	750 - 855	20
X4A - 1501	750	1300	480 - 690	530 - 610	765 - 845	20

If there is not enough space, please contact the sales department. The sales department will contact the technical department to check whether the installation, considering the dimensions of the vehicle, is possible. If the installation is possible, you will get a special drawing in which the installation situation is shown.

Cutouts in rear sill

Recommendations for the rear sill cutouts to install the type: X4A 1000 / X4A 1500-1501
 If the dimension of the rear sill in the area of the lifting arms is more than 80 mm, then openings need to be cut out according to our recommendations.

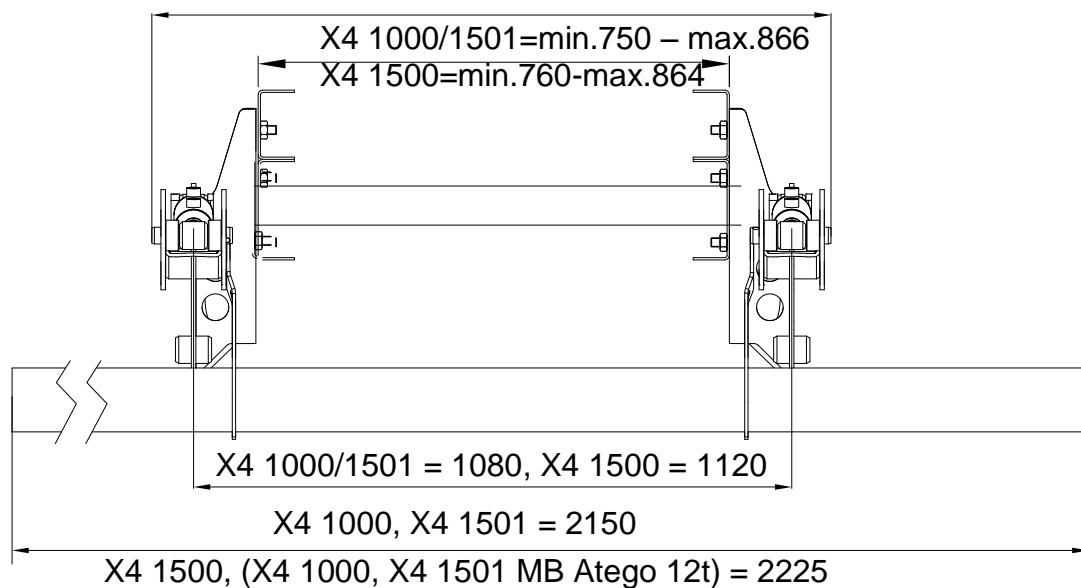


X4A 1000 / X4 1500-1501	Hub 675	X 100
X4A 1000 / 1501 at E=410	Hub 675	X 80
X4A 1000 / X4 1500-1501	Hub 750	X 120

rear view

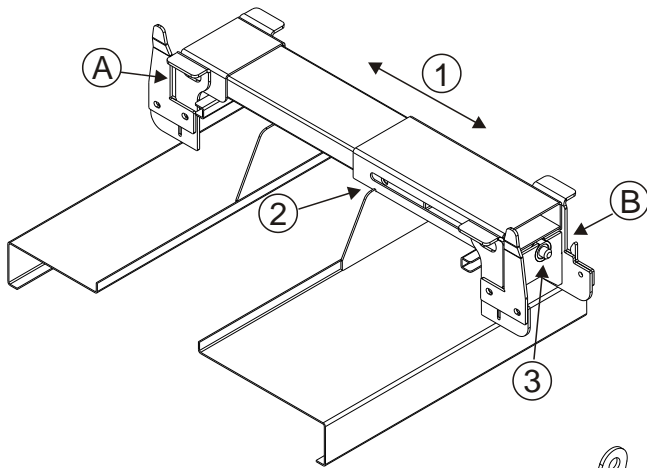
1300 (incl. HD-tube) X4 1000 and X4 1501

1350 (incl. HD-tube) X4 1500

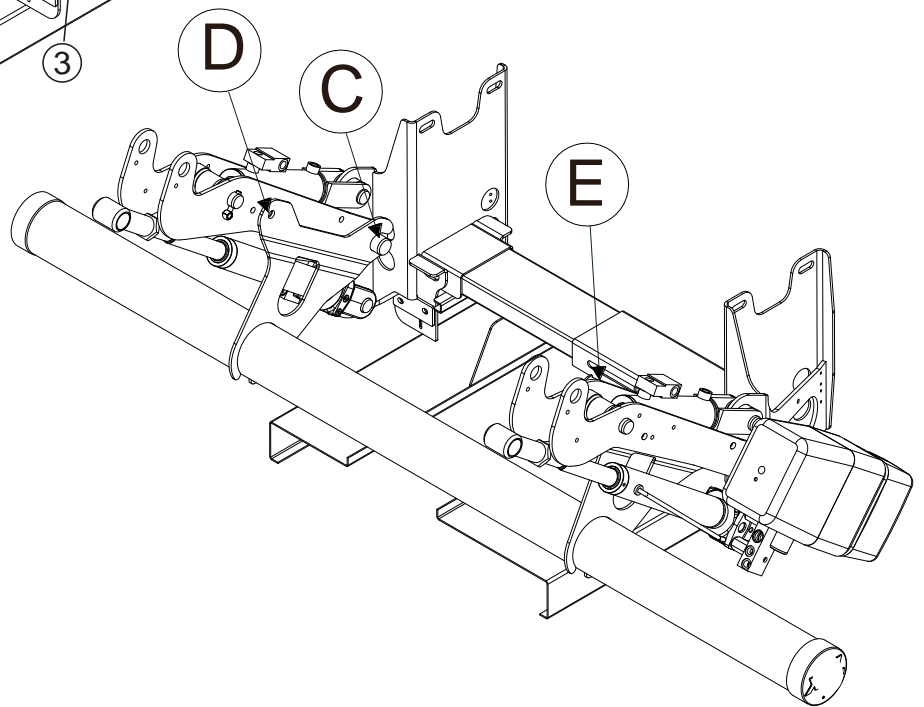


Model / Type	Platform width max./min.	Middle/Middle lifting arm
X4A 1000, X4A 1501	2580 / 1950	1080
X4A 1500	2580 / 1950	1120

Installation of the hoisting gear X 1 and X 4 with the assembly jig 20 908 561.

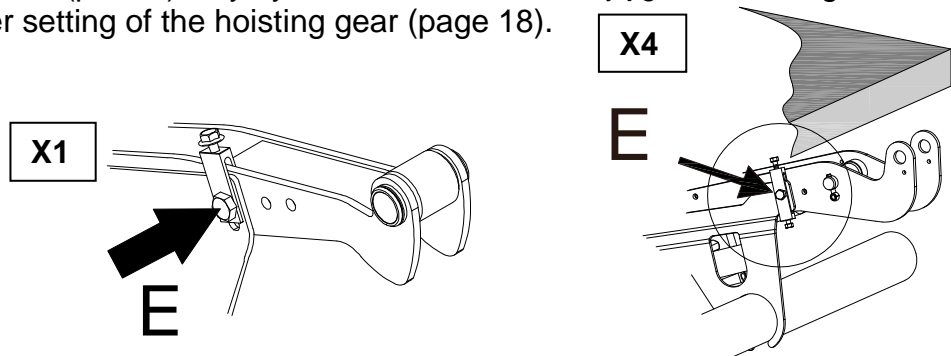


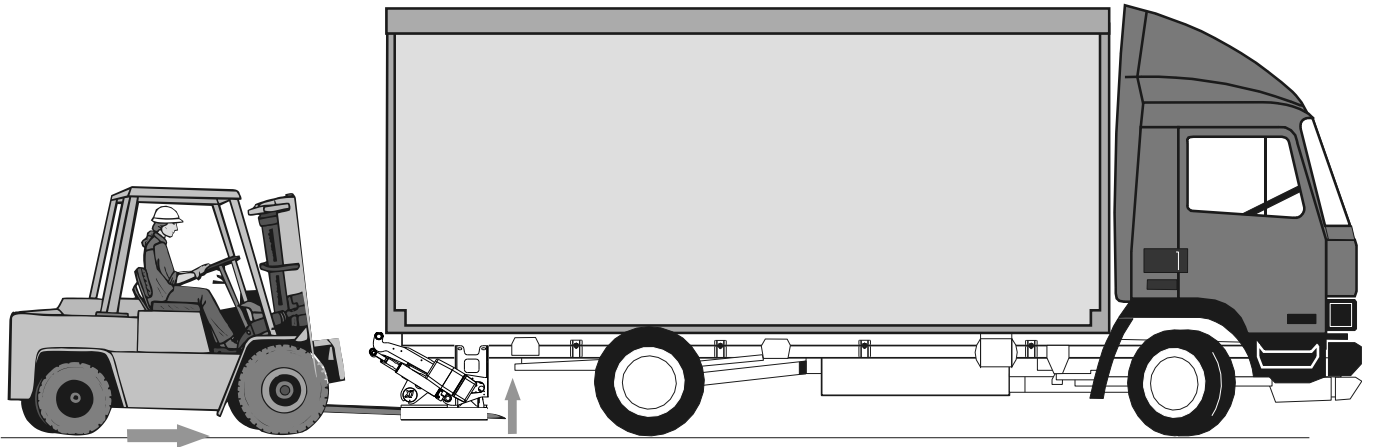
Slide the mounting bracket to frame width of the chassis minus 5 mm (pos. 1) and secure with screws (pos. 2). Put the pre-assembled left side and right side of the tail lift in the pockets of the assembly jig and secure with the clamps (item 3).



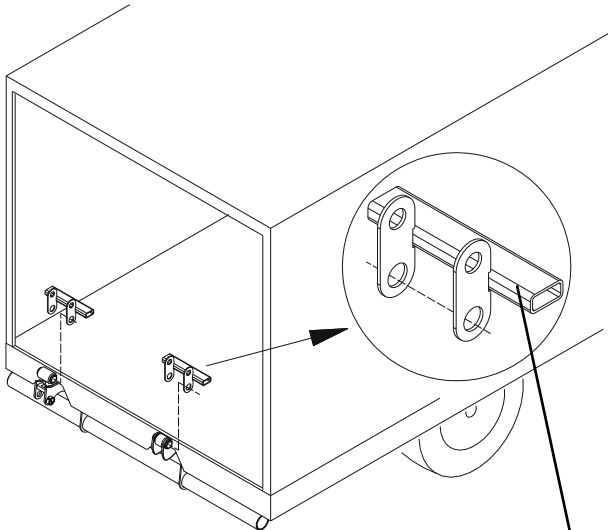
Pin Rear underrun protection over the bolts of the left and right hoisting gear side (pos. C) and secure it with the safety screw (pos. D and pos. E).

Secure the safety screw (pos. E) only by hand with the assembly jig on the tilting arm back up and tighten until after setting of the hoisting gear (page 18).



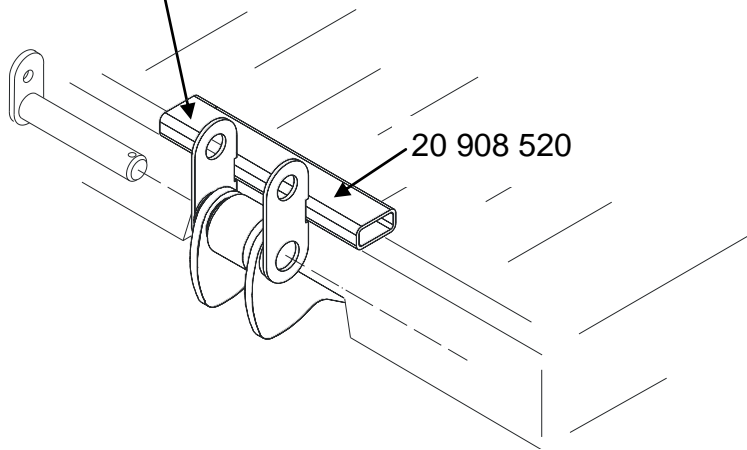


Bring the lifting gear including the assembly jig under the chassis and slide laterally over the chassis.

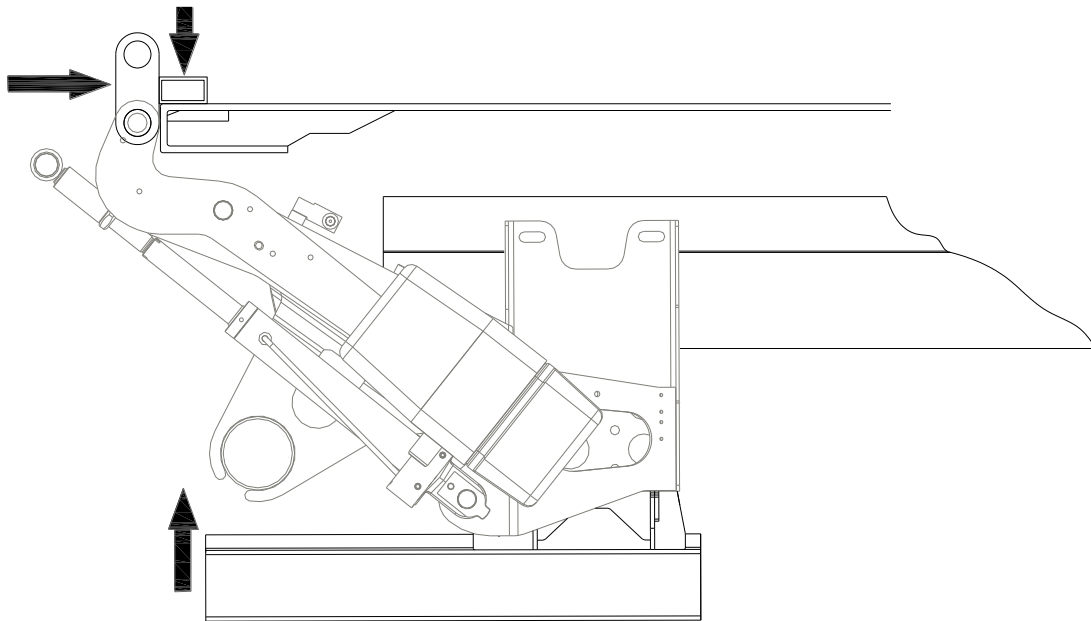


Hang the lifting arms into the mounting fixtures 20 908 520, secure them with the supplied bolts. Put them against the rear frame and secure with screw clamps against unintentional movement.

Caution! When a case seal is provided, the space for this account must be appropriate.



Clamp the mounting fixtures 20 908 520 against the rear frame and secure it against moving with screw clamps. The mounting fixtures 20 908 520 have to lie firmly on the vehicle floor.



Now press the assembly jig with the lifting gear under the vehicle, that it can not move. Verify all assembly measurements according to the table on page 4 or 6 and/or the drawing.

Please ask your technician

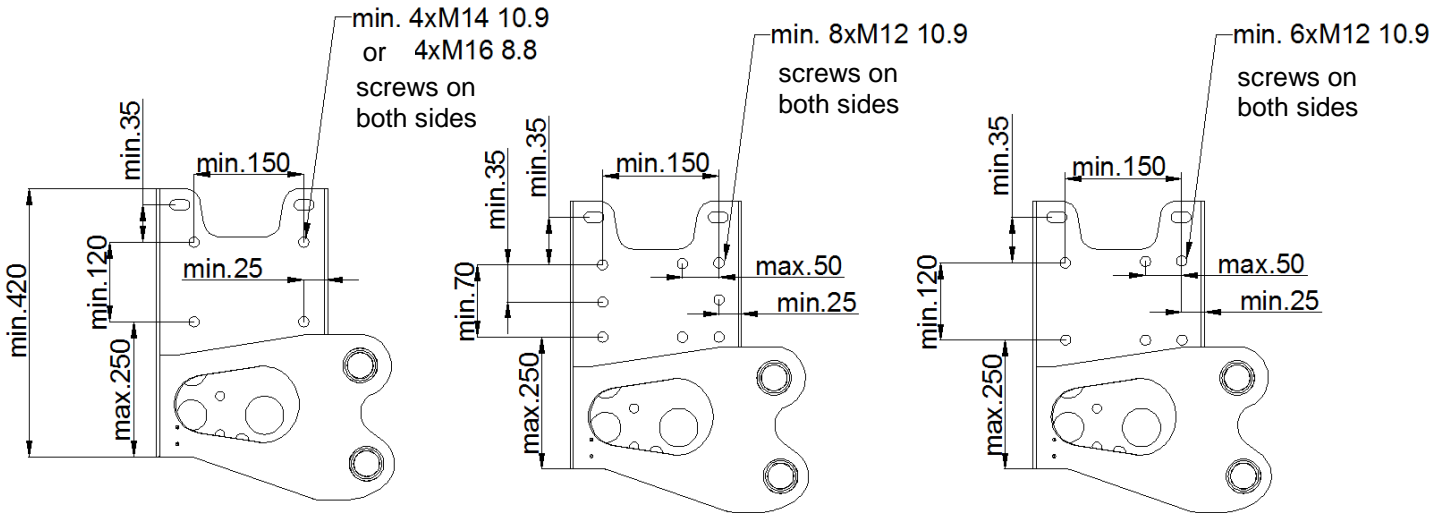
Please check if a specific drawing was sent to your company by our technical services. If yes, please assemble the lift according to that drawing. Please inform yourself at relevant services (purchasing or engineering) in your company.

Drill the mounting holes through the mounting plate and vehicle frame according the description on page 11 or 12 in this installation manual. Then tighten the mounting plates to the frame of the vehicle with the mounting screws from the accessory bag. If holes are in the range of the mounting adapter in the vehicles chassis, they can be used for this mount.

Caution! To the drill in the chassis the guidelines of the vehicle manufacturer must be strictly observed.

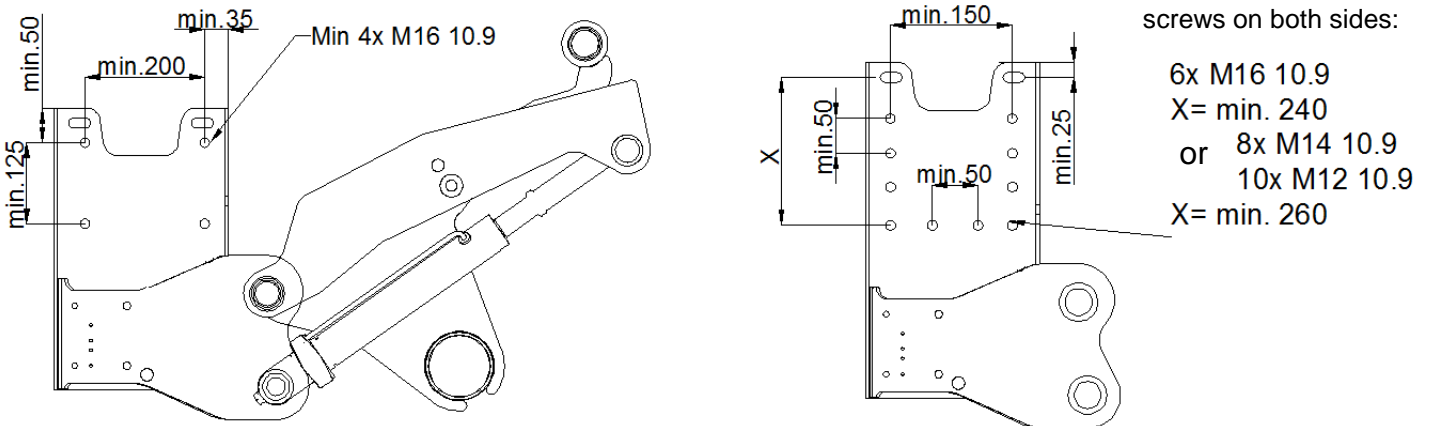
**Drilling distances for mounting plate for: X1A 1000 / X4A 1000 / X4A 1501
(up to 12t vehicle weight)**

mounting variants

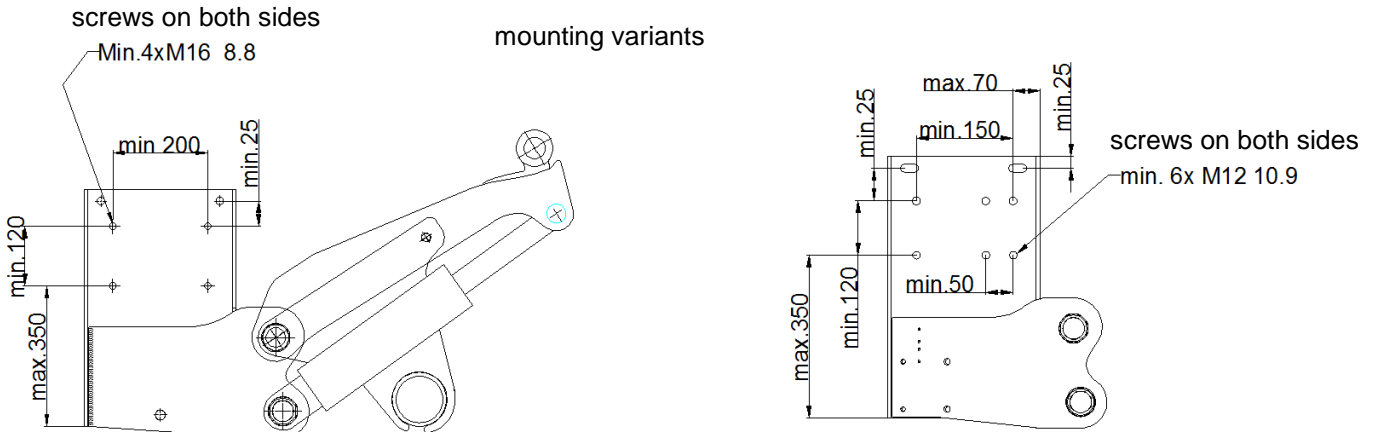


**Drilling distances for mounting plate for X4A 1500
(unlimited vehicle weight)**

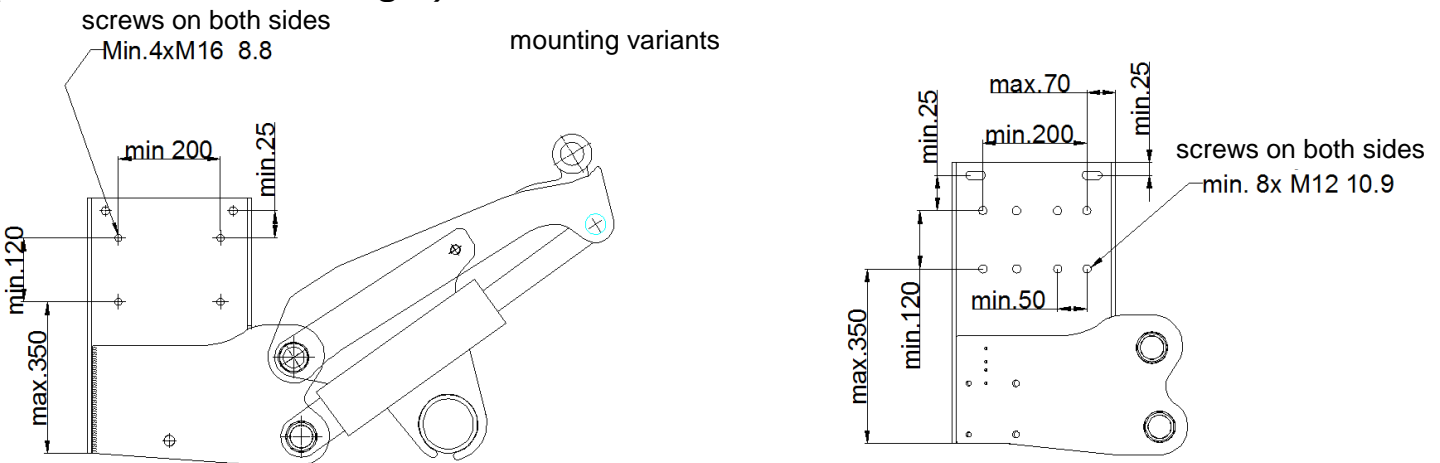
alternative mounting



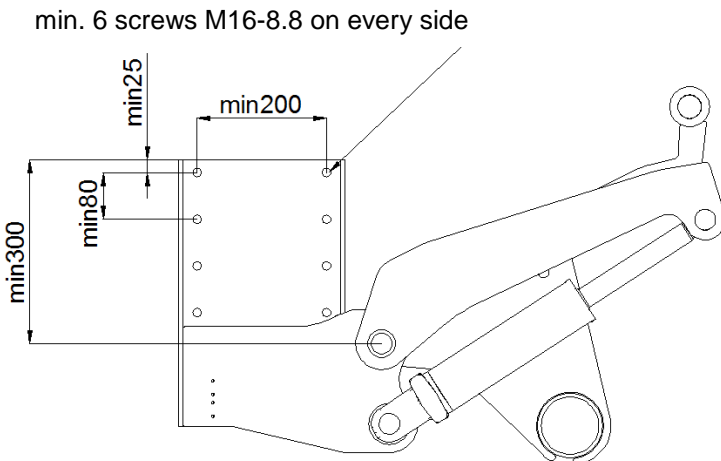
Drilling distances for mounting plate for X1A 1501 (up to 12t vehicle weight)



Drilling distances for mounting plate for X1A 1501 (unlimited vehicle weight)



Drilling distances for mounting plate for X1A 2000 (unlimited vehicle weight)



Assembly of electrical equipment in series 10



Attention!

The tail lift is only to be operated, when the battery cables are connected as prescribed, and if there is sufficient voltage available. Don't ever use a charging device or start booster – it can lead to damages of the electric motor and the motor relay.

Foot control

The foot control is connected to the cable set into the platform and tested at the factory to function.

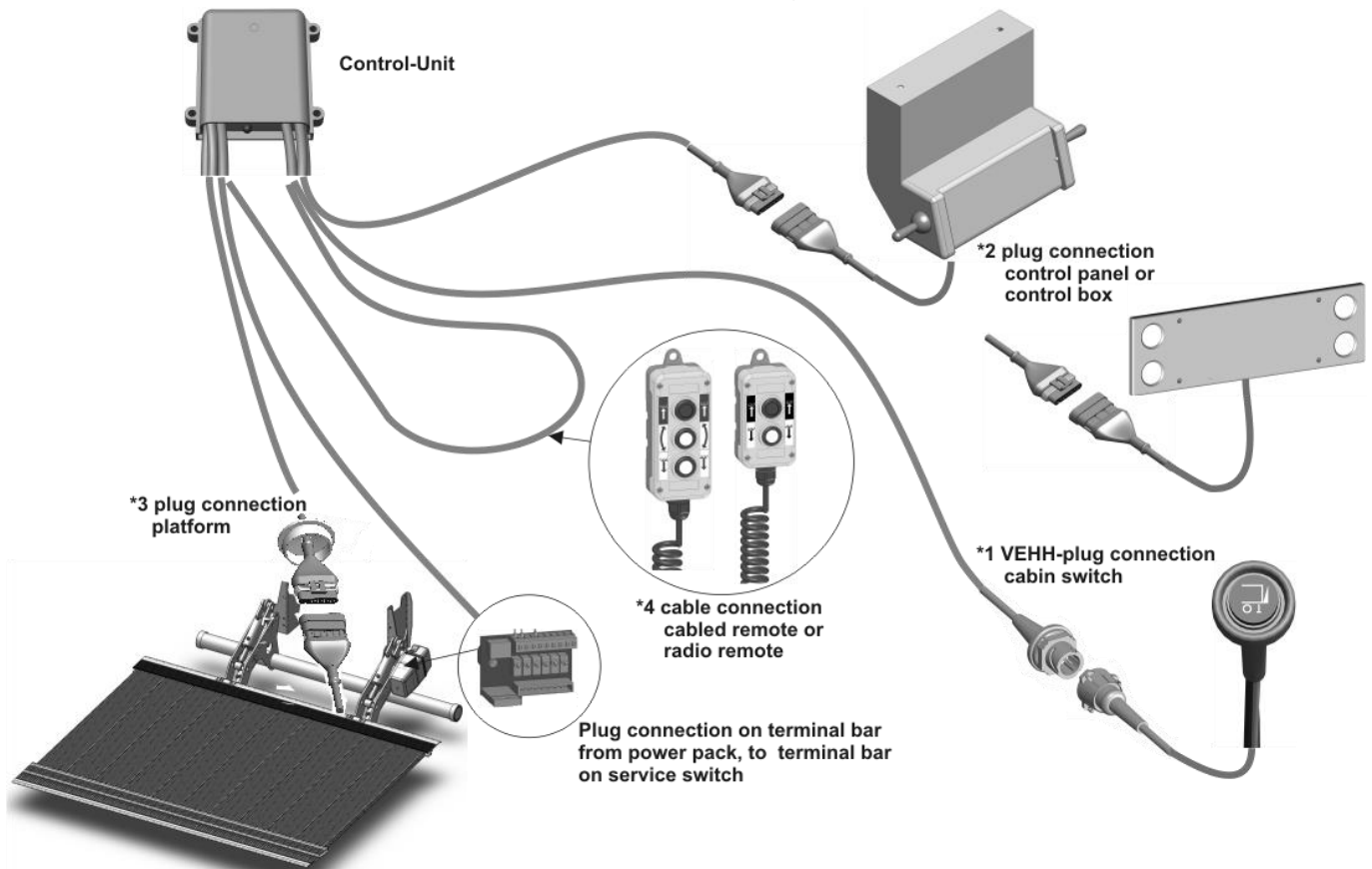
After the installation of the platform is to route the wire from the Central electrical system (central control unit) on the tilting arm down and to secure with the supplied cable ties/looms, to exclude pinching or scrubbing.

Central electric

The Control-Unit (central controlling unit, central electric) is pre mounted from the factory. The connection (see sketch) to the cabin switch on the dashboard *1, to the control panel *2, to the platform *3, to the handheld cabled remote *4 or radio remote *4 (option for export) must be done during the installation. The attachment of the cables to the device, must be done with the supplied cable ties/looms, after the installation.

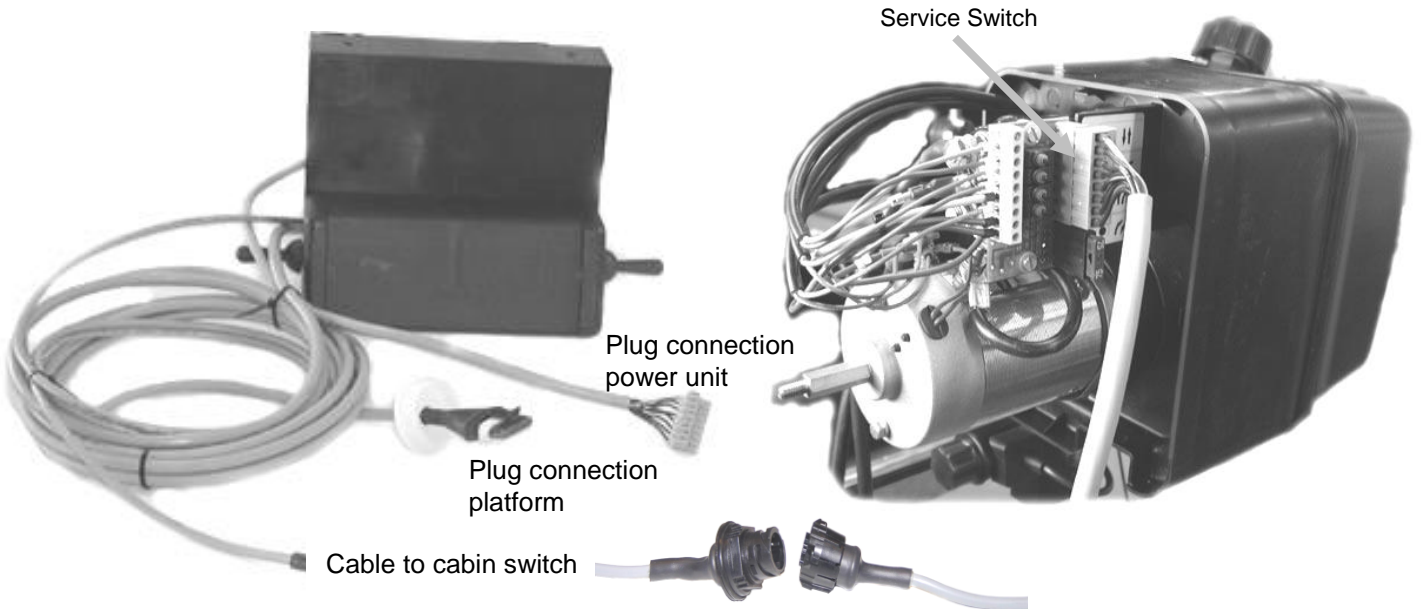


Attention! The cables may not chafe or squashing.



Assembly of electrical equipment in series 9

Attention! The features of the tail lift can only be operated, even temporarily, if the battery cables are connected firmly to it and if there is enough voltage available. Never use a loading or starting device, as this will heavily damage the electric motor and the power relay.

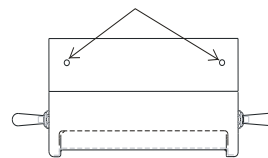
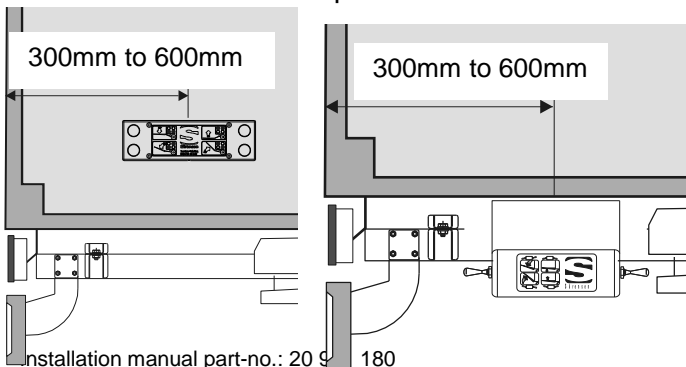


Assembly of electrical equipment tail lift/vehicle

Vehicle with Dashboard without pre-equipment: a 16mm hole for the cabin switch must be drilled
Dashboard with pre-equipment empty spots for switches: The tail lift cabin switch shall be mounted in a free original baffle (see drawing) and connected according to the electrical diagram enclosed. Pass the cable from the cabin switch to the power unit and connect it with the round connector of the control box. Connect the cable with the green power strip on the circuit board in the power unit.
Dashboard in version demands of VEHH with switch for tail lift: This pre-equipment complies with the demands of VEHH. The cable interfaces (battery cable/control line) tail lift/vehicle shall be connected. The electrical installation is herewith completed.

Assembly of the control panel or control box

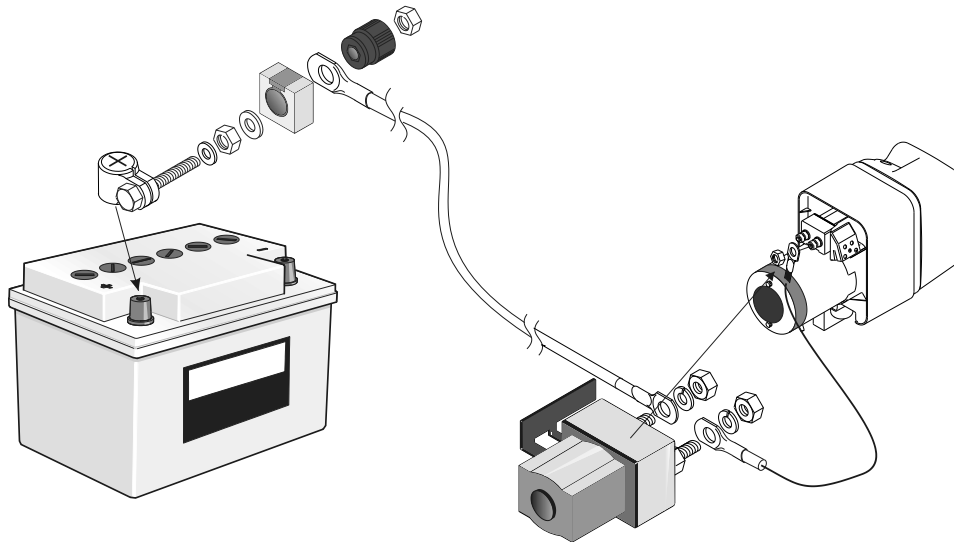
The control box must be assembled on the right side of the vehicle, so that the operator can oversee the whole platform while operating the lift.
 The distance between the rear edge of the body and the middle of the control panel or box must be 400 mm ± 100 mm European Norm EN 1756-1



The control box is attached with two screws M8, 8.8, passed through the 8.5 mm holes and fastened with two self-retaining nuts or secured with loctite.

Battery cable / Ground cable / Fuse

Main power fuse version for 12 Volt and 24 Volt devices



Assemble the fuse kit to the battery plus. Lead the plus cable from the battery to the power unit and connect it to the motor relay.

Please connect the power unit mass cable directly on the mass point designated by the vehicle manufacturer.

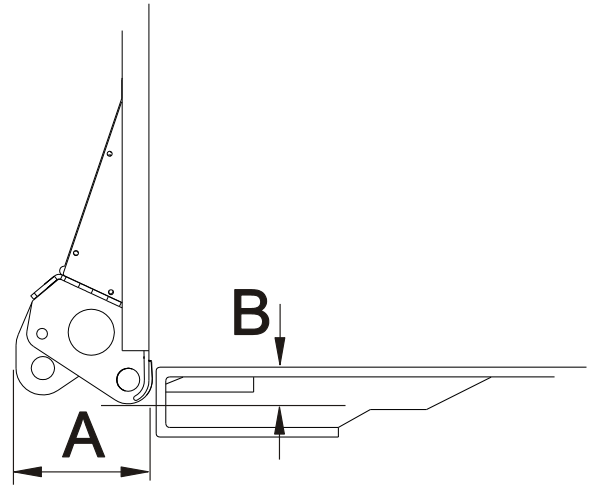
Take care that no chafe marks are made, and that the cables are not close to heat carrying objects.

	12 Volt	24 Volt
battery capacity	1 x 143 Ah	2 x 110 Ah

The guidelines of the vehicle manufacturer must be followed

Assembling and adjusting the platform: X1, X4

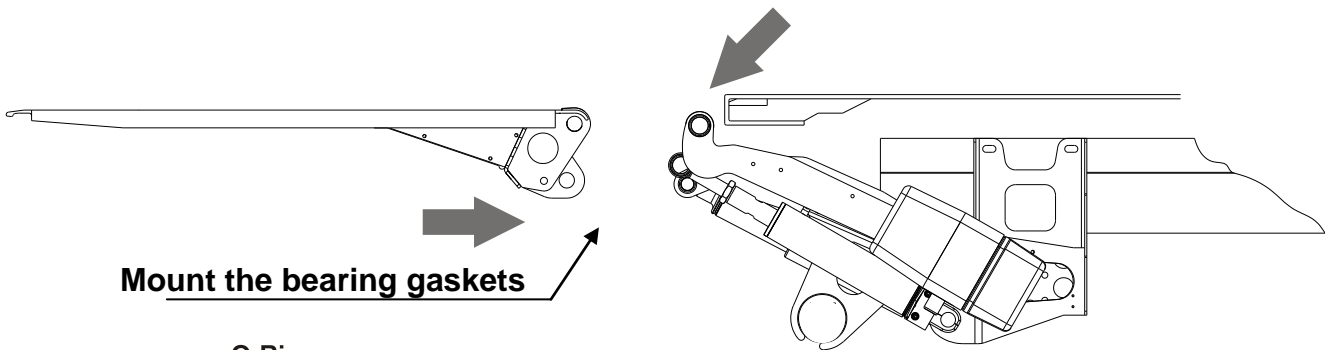
Type	A	B
X1 – 1000	230	58
X1 – 1501	240	66
X1 – 2000	235	67
X4 – 1000	230	58
X4 – 1500	230	58
X4 – 1501	230	58



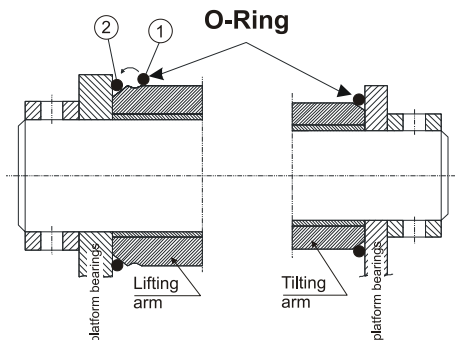
Platform assembly

The lifting unit is lowered enough to allow an easy assembly of the platform.

Apply some of the special grease provided on the platform bearings, put on the O-ring gaskets, hang in the lifting arms and the tilting cylinder, mount the bolts and secure them.



Mount the bearing gaskets

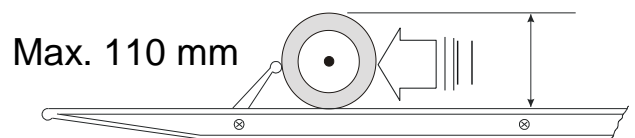


All bearing positions are sealed with an O-ring gasket. While assembling the platform, these gaskets must be placed on each sides of the lifting and tilting arm in position 1. After the assembly is completed, they must be rolled cautiously back into position 2

Caution!

Enter the tail lift only with protective footwear like safety boots.

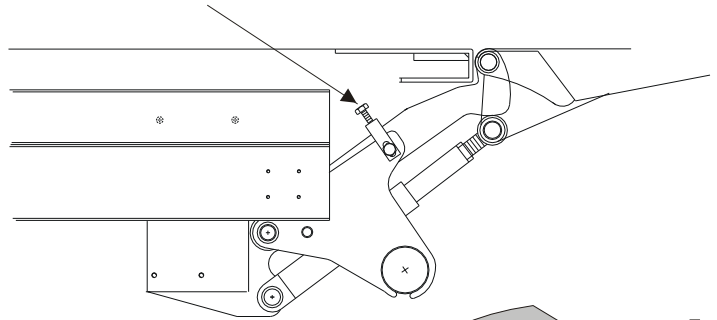
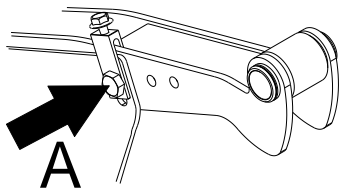
Rolling or slippery goods must be secured on the platform. Sörensen tail lifts can be, if wanted equipped with cart-stops. Wheels with maximum diameter 110mm are safely secured.



Adjusting the platform to the vehicle floor X1

With the control box, place the lifting unit near the rear vehicle frame. The lifting arms shall not touch the rear beam, please leave a gap of about 10 mm.

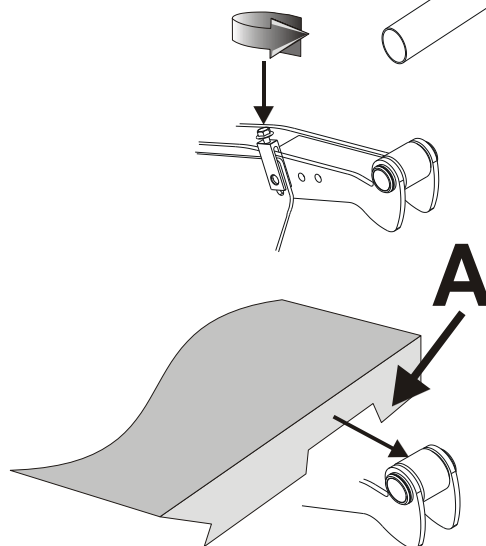
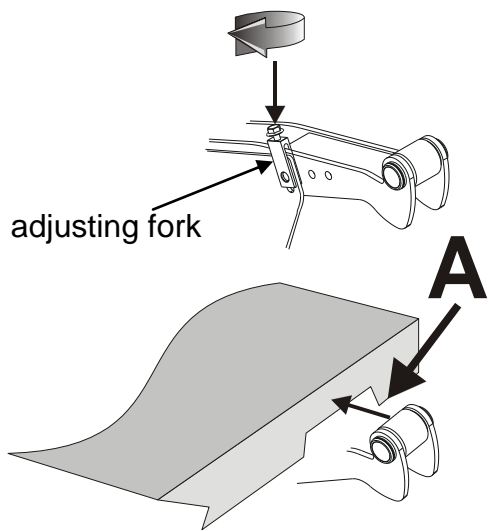
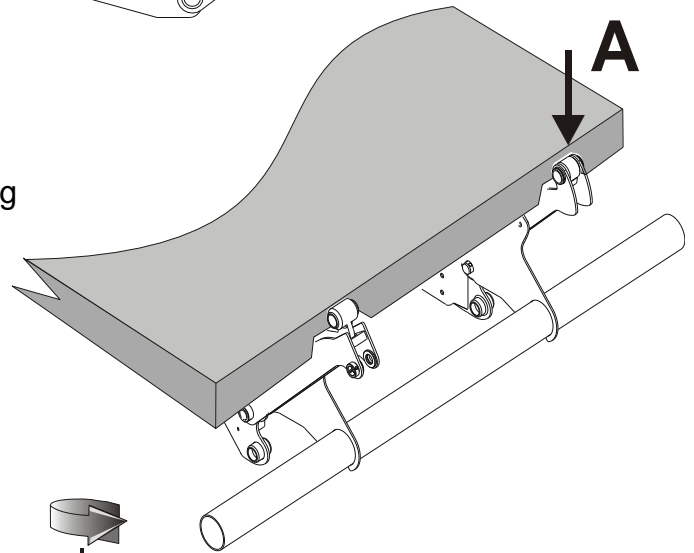
With the adjusting screw, the lifting unit is adjusted so that the rear frame and the platform are parallel with each other. After adjusting the platform, both security screws (A) of the underride bumper must be tightened.



Function of the adjusting fork

After the assembly, both lifting arms shall touch the rear beam at the same time, and must not spring when the platform is loaded

If necessary, this adjustment is made with the adjusting fork located on the right lifting arm. If the screw is turned to the right, the lifting arm is tightened more against the rear beam.



When the adjusting screw is turned to the right, the lifting arm lifts closer to the rear beam.

If the adjusting screw is turned to the left, the lifting arm lowers away from the rear beam.

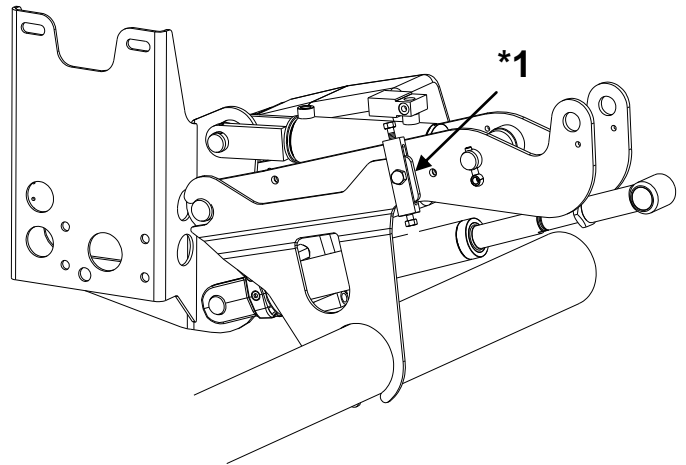
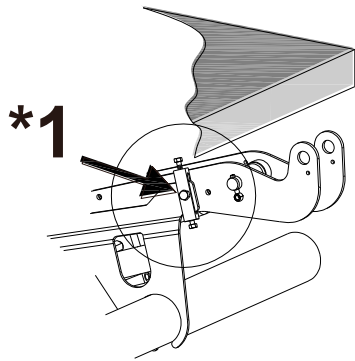
Adjusting the platform to the vehicle floor X4

After the assembly, both lifting arms shall touch the rear beam at the same time, and must not spring when the platform is loaded.

If necessary, this adjustment is made with the adjusting fork located on the right lifting arm.

For adjusting, drive the lifting mechanism with open platform hydraulically behind the rear frame. The fastening screw of the rear underride bumper (* 1) must be loosened before adjusting.

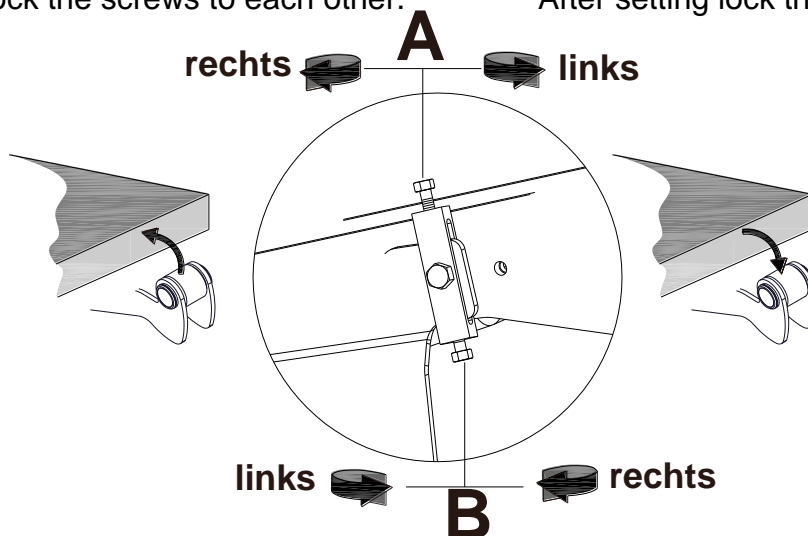
The lifting arms shall not touch the rear beam, please leave a gap of about 10 mm. With the adjusting screw, the lifting unit is adjusted so that the rear frame and the platform are parallel with each other. After adjusting the platform, the security screws (A, B and * 1) of the underride bumper must be tightened.



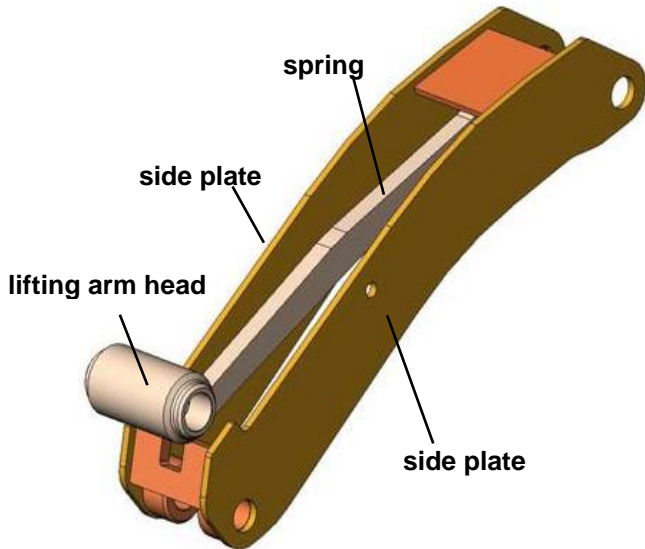
Function of the adjusting fork

When turning to the right of the upper screw and turning to the left of the lower screw, the lifting arm is lowered further from the rear frame. After setting lock the screws to each other.

When turning to the left of the upper screw and turning to the right of the lower screw, the lifting arm goes up closer on the rear frame. After setting lock the screws to each other.



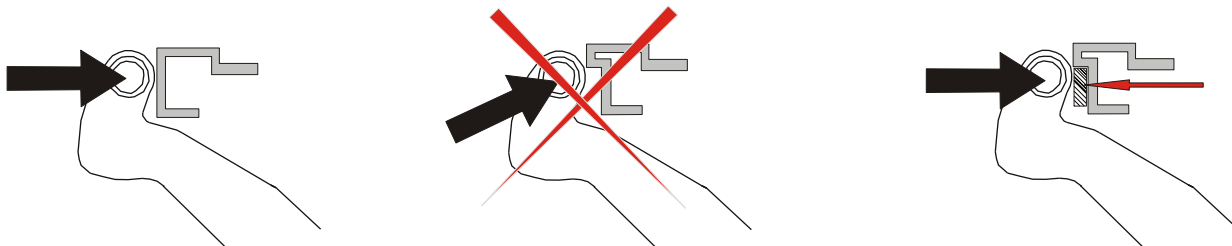
Lifting arm stop at vehicle body



If you assembled the tail lift correctly, both lifting arms will stop at the same time on the rear vehicle frame.

If this should not be possible due to the assembly configuration, it is essential that the lifting arm stops only with the **head of the spring** against the rear beam and that the **side plates** can be pushed freely against the **lifting arm head**.

Eventually reinforce the rear beam in the area where the lifting arms push against it, so that it is not crushed when lifting with hydraulic pressure.

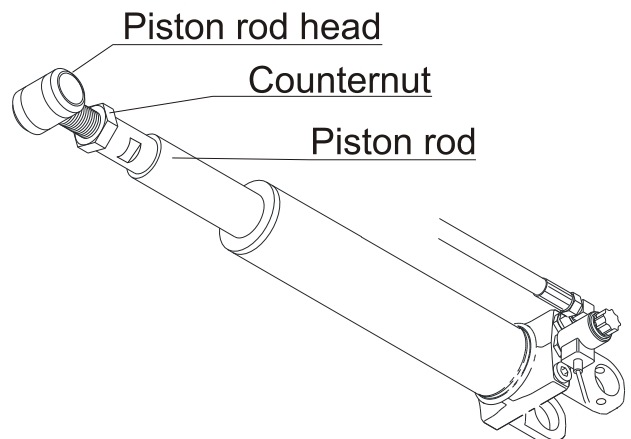


Always push the lifting arms against a plain surface. Fill any edge so that the heads always push against a plain and firm surface. The body could be lifted and the spring of the lifting arm not work properly.

Adjusting the closed platform against the body

Close the platform with the control box. The cylinder must come to its internal limit when the platform is leaned lightly against the rear frame, or when the platform forms a 90° angle with the vehicle floor. If the platform pushes with full pressure against the rear frame without reaching the cylinder's limitation, the length of the piston rod has to be adjusted.

Open the platform 10° to 15°, in order to relieve the cylinder. Unscrew the counternut on the piston and turn the piston head one way or the other to shorten or lengthen it. Try out the settings, by closing the platform again, in order to perform a preliminary tension. Only then, retighten the counternut.

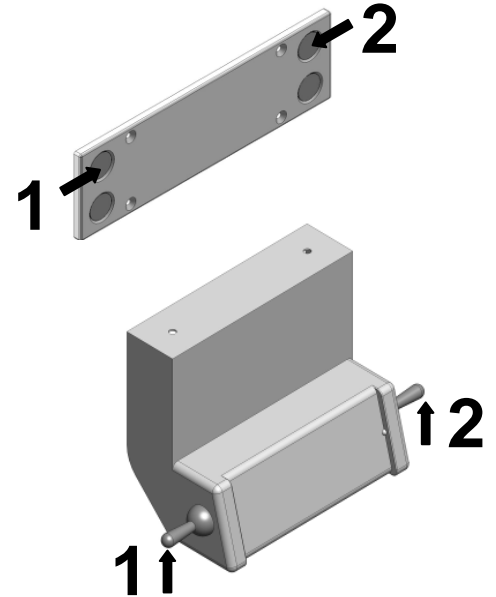


Adjusting the platform tilting/ inclination in Series 10 (Tilt sensor programming)

After installation or repair of the tail lift.
The programming is done with a key combination.

with the control panel

- Drive the platform to the horizontal position
- press button 1 (upper left) three times, then
- press button 2 (upper right) three times



with the control box (option)

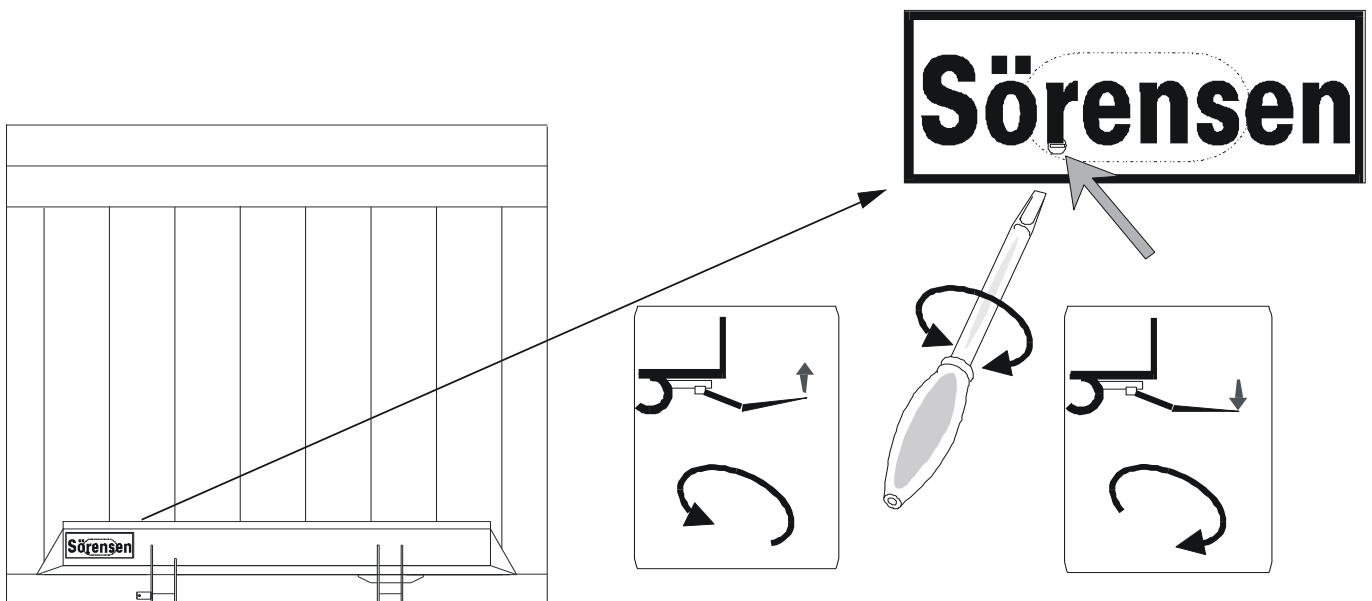
- Drive the platform the horizontal position
- turn the left lever switch (1) three times upwards, then
- turn the right lever switch (2) three times upwards

The flashing-light switches off for 5 seconds and indicates the success of the programming.
The programmed adjustment will be active until another programming are made.

Adjusting the platform tilting in Series 9

Turning the adjusting screw to the right – the upward tilting shuts down earlier.
The platform tip shows further down.

Turning the adjusting screw to the left – the upward tilting shuts down later.
The platform tip shows further up.





First operation of the tail lift

Verify the tail lift readiness for operation. Check that all moving parts can move freely (no pinching or rubbing of cables or lines etc...) Check the hydraulic system for leakage.

Suggestions for hydraulic oil

HLPD 22 (ISO-VG 22) "detergent", to emulsify free water (to avoid ice formation in winter operation) and to improve the oil film cohesion.

Sörensen Hydraulic oil part no.60 700 283

Sörensen Biological oil part no. 20 858 811

Aral	Vitam DE 22	Shell	Hydrol DO 2
BP	Energol H LPD 22	Panolin	HLP SYNTH (Bio-oil)
BP	Biohyd 32 (Bio-oil)	DEA	Actis HLPD22
DEA	Econa E 22 (Bio-oil)	Mobil Oil	H-LPD 22
Esso	Hydraulic Oil H-LPD 22	Fuchs	Rhenolin MR 5

Painting the lifting unit

The lifting unit is delivered powder-coated from the factory. If another painting should be wished for, it has to be performed by the bodybuilder (please remember to sand the lifting unit before any paint job). It is also essential to very carefully protect the black piston rods, ideally with tape. Remove all tape and paint rests from the rod prior to tail lift operation as these can damage the seals and will cancel the warranty.

Operation instructions

The sticker showing the instructions for operating the tail lift is tagged on the control box by the factory.

Type label

The type label, containing the loading diagram is tagged on the right lifting arm (in driving direction), a second label is tagged by the factory into the power unit hood.

Entry into the test book

After completion of the assembly, the paragraph of the test book „Test before first operation“ has to be filled out and signed by qualified personnel

Checking the operation speeds

Vertical speed

The vertical speed (lifting and lowering) must not exceed 15cm/sec. If lifting and lowering are too fast, please check the voltage on the vehicle and on the power unit. The two values must be identical. Should lowering and opening be too fast, please verify if the throttles work properly or if they are dirty.

In both cases, please call the Sörensen Hydraulik GmbH service department!

Opening and closing speed

If the platform is not closed and/or opened by hand, the angle speed must not exceed 10°/sec.

Tilting speed

The angle speed for tilting shall not exceed 4°/sec. The platform tilting must be limited to a max. of 10°

Load probation

Static test

Place the platform half way between the ground and the vehicle floor. Place a weight up to 125% of the nominal capacity in the middle of the platform within the loading distance. The permitted loading distance and the nominal capacity are engraved on the type label of the tail lift. The load diagram shows the capacity modifications according to the distance from the vehicle. Within a test time of 15 min, the lift must not lower more than 15 mm nor tilt down more than 2°.

The bodybuilder is bound to check the tail lift for deformations after the static test.

Dynamic test

The functions lifting, lowering and tilting are to be checked with a load complying with the loading diagram. If necessary, adjust the hydraulic pressure valve so that the given load can be lifted securely.

Caution! The pressure valve is factory set, normally a correction is not necessary. If that correction should be necessary anyway, please comply with following instructions:

Perform a setting of the pressure valve only by connecting a pressure gauge with which the pressure can be verified. The maximum allowed pressure is engraved on the type label.

After the static and dynamic tests, a visual leakage inspection of the hydraulic system must be performed.

Test against lifting an overload

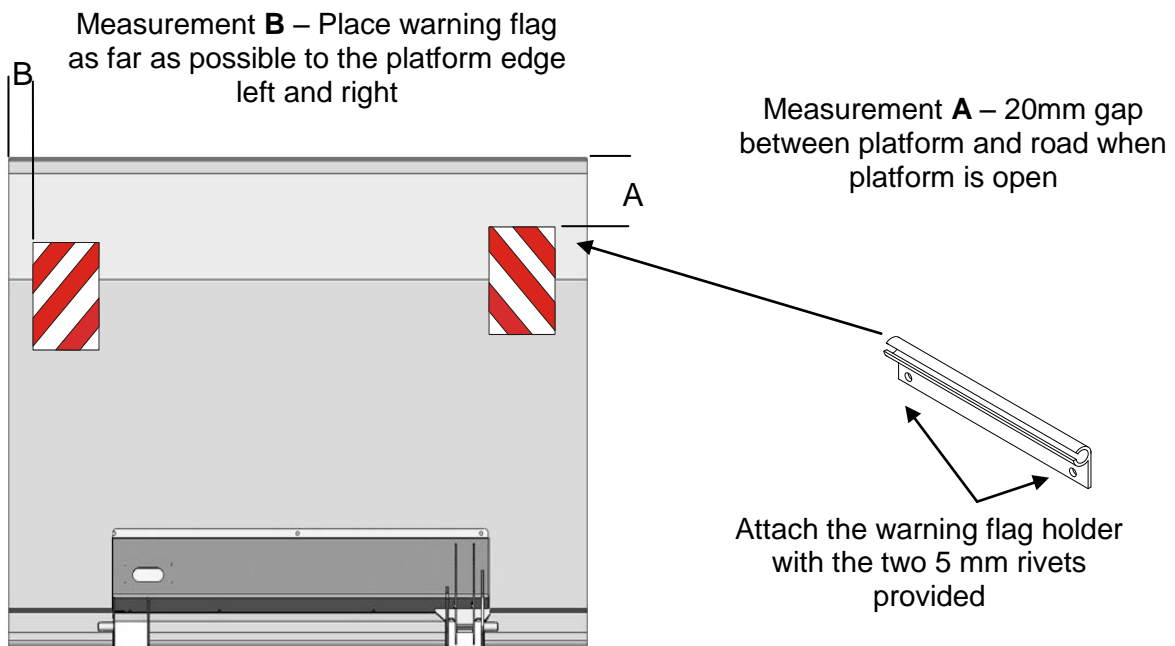
With a test it must be ensured that the device will not lift a load greater than 125% of the nominal capacity from the ground.

Verification of security features

All functions of the tail lift have to be operated until the security features are activated.

Warning flags

Attach the warning flags supports with the two 5 mm rivets provided.



Valid torque chart for all delivered and assembled screws on Sörensen tail lifts.

screw dimensions		torque in Nm	couplings DIN 3852		torque in Nm
8.8					
M4		2.7	G1/4"		40
M6		9.5	G3/8"		95
M8		23	G1/2"		130
M10		46	union nut		
M12		80	M16 x 1.5		60
M14		130	M18 x 1.5		60
M16		195	plugs		
M20		385	G1/8"		15
10.9			G1/4"		33
M10		70	G3/8"		70
M12		115			
M14		180			
M16		275			
M20		542			
flangescrew					
M14		215			
M16		310			

Diagnose diode

Explanation of the diagnose diode on the Control-Unit and the diagnose diode on the control box at series 9 (option)

diode controlling function	Cabin switch or key switch	diode off	diode on	diode flashes
platform closed (90°)	off	X		
platform closed	on		X	
platform open (90° bis 60°)	on		X	
platform open (60° - 0°)	on	X		
platform tilted down (0° bis -10°)	on		X	
pushed button or switch *	on			X

description:

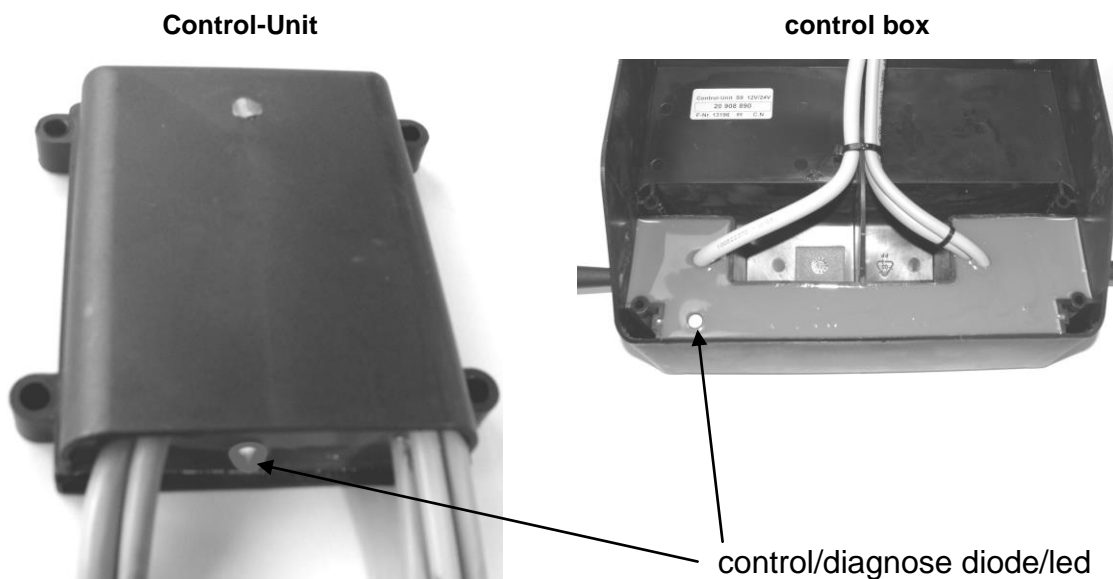
90° = platform is closed

0° = platform is open in a horizontal position

-10° = platform is tilted down

* when a control of the manual pushbutton, switches, push button of the remote control, or a foot switch is pressed, the control/diagnose diode/led will flash

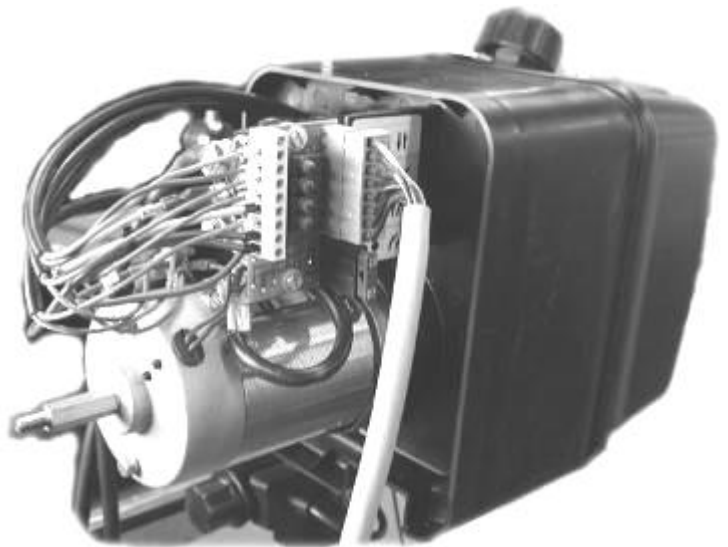
Position of the diagnose diode



Service Switch

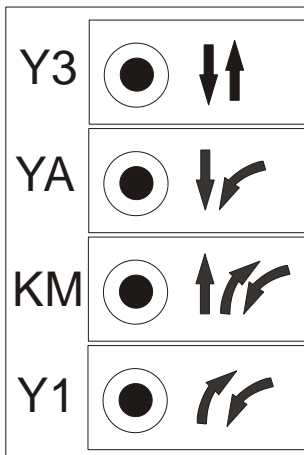
Over the switching unit mounted in the power unit (**Service Switch**), authorized personnel can operate and test directly all the tail lift functions.

In case of a failure of the control box or the footswitch, a trained person can drive the tail lift to any of its positions with that Service Switch (**emergency function**).



Option Internal body light

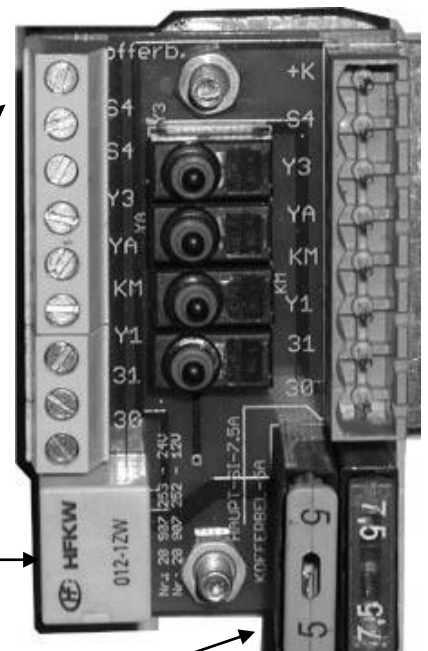
Sörensen can provide an extended body light Service Switch. This Service Switch provides the possibility to connect the internal light of the body to it. The light is switched on and off at the same time as the tail lift, with the cabin switch and is secured with a 5 ampere fuse.



Internal body light

Mounted relay only on body light version

Fuse for body light



Function	YA	Y1	Y3	KM
lifting			•	•
lowering	•		•	
opening / tilting low	•	•		•
closing / tilting high		•		•

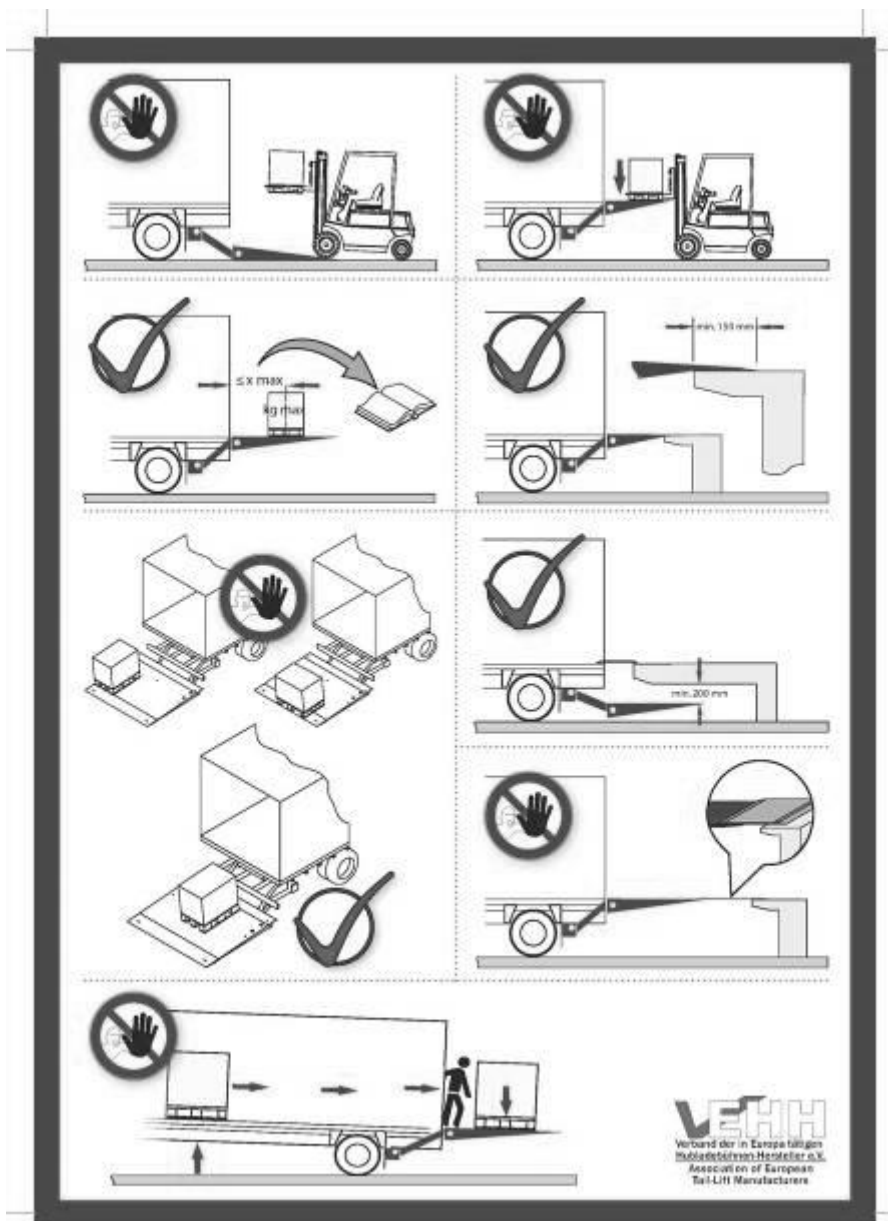
Please respect sequence, switch KM always last



Danger clue - Sticker “Safe handling of the tail lift”

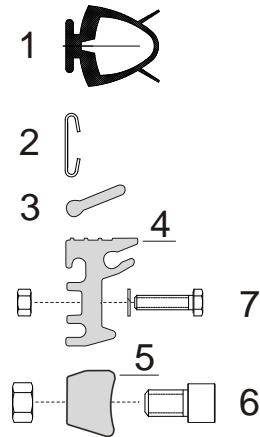
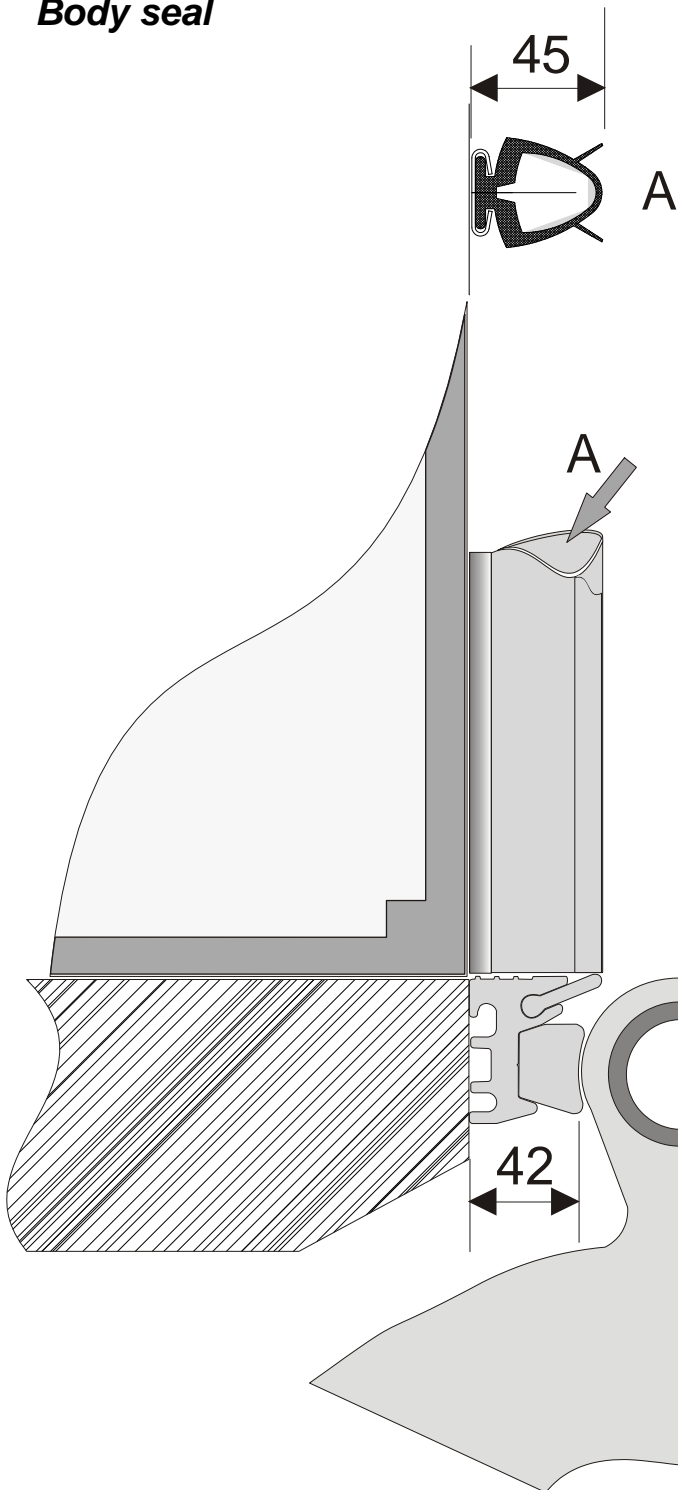
This sticker is delivered with all new tailgates, and must be placed on a visible place on the inside of rear part of the vehicle. The danger clue – sticker shows possible falls actions and right actions in the single Pictograms.

On this place we want to thank the installation companies for their support in the objective, to make it clear for the operators how the tailgate is operated in a proper way.



This sticker can be ordered under the part number 20 909 238.

Body seal



full set 20 908 418

- | | | |
|---|------------------------|--------|
| 1 | rubber profile | 3,0 m |
| 2 | rail (aluminium) | 2,6 m |
| 3 | rubber profile | 2,5 m |
| 4 | rail aluminium profile | 2,5 m |
| 5 | stopper 150 mm wide | 2 pcs. |
| 6 | allen screw | 4 pcs. |
| 7 | hexagon screw | 6 pcs. |

6 and 7 is not in scope of delivery



Turn the end stop 180° for X1 1000, X1 1501 or X1 2000, X1 2500

