



Plus-point product diversity

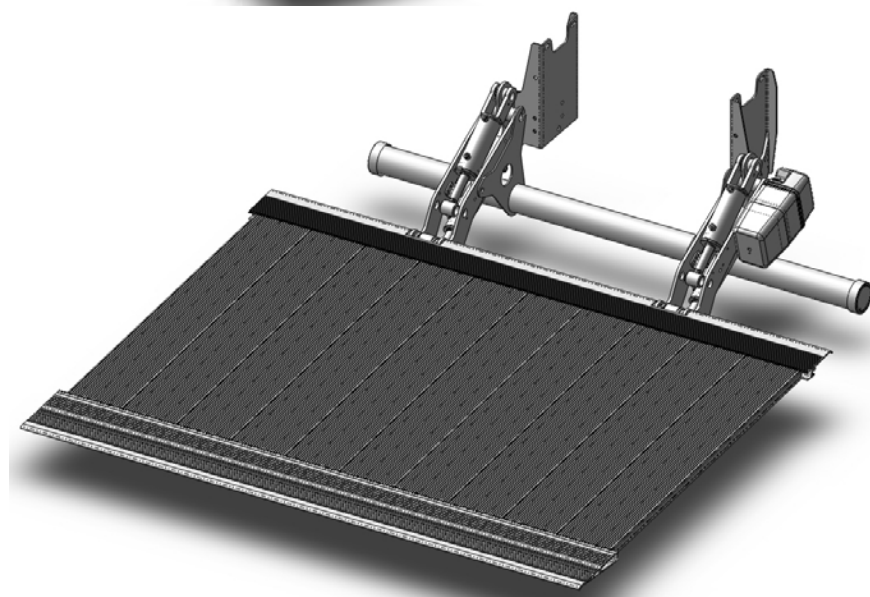
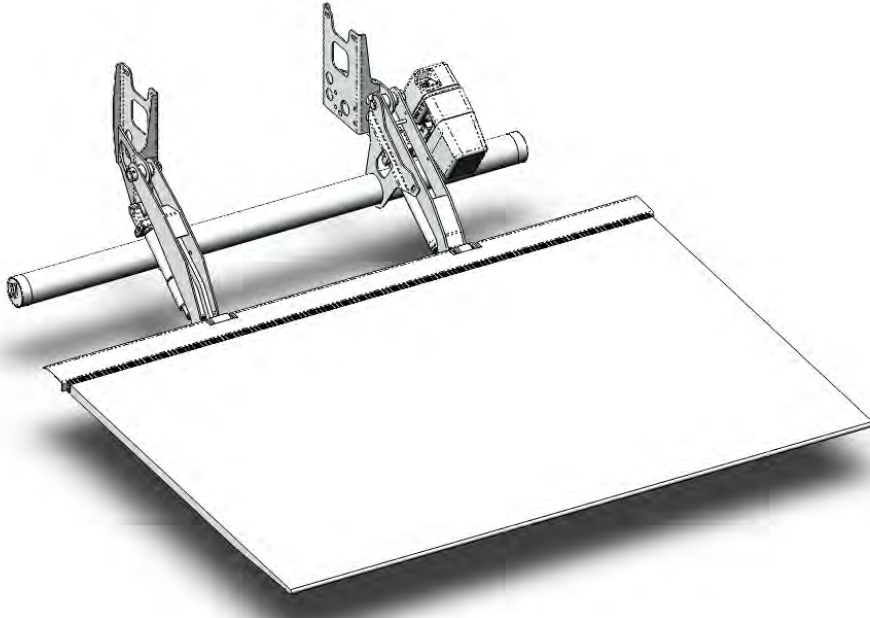
Operator`s handbook for Sörensen standard tail lift:
X1 and X4



Operator`s handbook

X1

TECHNOLOGY



x4

POWER TECHNOLOGY

for Sörensen standard tail lift:

- + X1A 500, X1A 500SL
- + X1A 500B, X1A 500BII
- + X1A 500C, X1A 500D
- + X1A 750, X1A 750SL
- + X1A 750B, X1A 750BII
- + X1A 750C, X1A 750D
- + X1AH 750, X1AH 750BII
- + X1A 1000, X1A 1000BII
- + X1A 1000B, X1A 1000SL
- + X1A3 1000, X1A6 1000
- + X1A 1500, X1A 1501
- + X1A 2000
- + X1A 2500
- + X1AK 2500
- + X1AT 2500
- + X4A 1000, X4A 1500
- + X4A 2000



...lifts for life



Plus-point product diversity

Operator`s handbook for Sörensen standard tail lift:
X1 and X4



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...lifts for life



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This users manual is valid for the following tail lifts:

X1A 500, X1A 500SL, X1A 500B, X1A 500BII, X1A 500C, X1A 500D,
X1A 750, X1A 750SL, X1A 750B, X1A 750BII, X1A 750C, X1A 750D,
X1AH 750, X1AH 750BII,
X1A 1000, X1A 1000SL, X1A 1000B, X1A 1000BII,
X1A3 1000, X1A6 1000,
X1A 1500, X1A 1501,
X1A 2000,
X1A 2500, X1AK 2500, X1AT 2500,
X4A 1000, X4A 1500, X4A 1501, X4A 2000



General

Read this users manual carefully, before using the tail lift. The hand book shall make you familiar with the way the tail lift is working, and warn for malpractice. The instructions contained therein are issued for security reasons, and for better conservation of the product. The Sörensen - tail lift may only be used for lifting and lowering loads, that must be placed according to the loading diagram. The lifting ability of the tail lift can be seen in the loading diagram on page 9 and 10.

The tail lift may only be used, maintained and repaired by personal that have an appropriate briefing about the mechanics of the device, and the dangers connected to the use of the device. All regulations for prevention of accidents must be complied to. The essential provisions are printed in the check book of this tail lift. The checkbook is a part of this users manual.

Is the tail lift is operated by untrained personal, hazards for the operator as well as other persons can occur. All safety regulations must be complied to.

It is not allowed to make any changes on the tail lift without prior written approval from the constructing department of Sörensen. Only original spare parts are may be used for repair of the tail lift. Sörensen is not liable for damages which occur through not compliance with the prescribed directions in the users manual

The users manual shall therefore be kept in the cabin of the vehicle, so it is possible to look into it for instruction. The tail lift production number is necessary for ordering spare parts, to make warranty claims or obtain technical information. You will find the tail lift production number on the name plate located on the tilt arm. A second nameplate is located on the inside of the power pack cover. Further more the number is engraved in the left main mounting flange.

Description of the Sörensen tail lift

You have decided to purchase a tail lift of top quality. Sörensen tail lifts comply with the EG Maschinenrichtlinie 2008/42/EG, as well as DIN EN 1756 – 1.

The Sörensen – tail lift is very undemanding. It has maintenance free bushings and must not be greased through out its lifetime.

Electric system/operating unit

The controlling of the different functions are done with the very flat control panel page 16. The tail lift / vehicle interface conforms to the VEHH-directive



Foot controls

With the foot controls located on the platform, the tail lift can be lowered to the ground and can be lifted to the height of the vehicle floor. The tilt-down and tilt-up at the ground are automatic.

Priority controlling

The foot control is a priority controlling. Are the tail lift operated with the foot controls then (the control panel, and the cabled remote) is electrical blocked.

Hydraulic

The tail lift are driven with a power pack unit which is mounted directly on the tilt cylinder or on the main frame of the tail lift. With this the tail lift can be driven in any wanted position over the lift and tilt cylinder. The cylinder rods are nitrated.

Main frame

The main frame as well as the other steel parts are painted black (RAL 9005).

The installation brackets are mounted in the right position for the type of vehicle present. Every new type of tail lift is driven 80.000 cycles in a long time test, before given free for sale. The underride bumper is in one piece (tested by TÜV / approved by EG). The two-cylinder version is patented, the four-cylinder version has a patent pending.

The reproduction or patent use is only allowed to our licensees.

Platform

The platform is made with aluminum extrusions which are clipped together and welded to a cross extrusion with the platform tip to obtain high stability.

Scissor lift

A standard tail lift can be fitted with a scissor lift. The scissor lift is electrically controlled and is connected to the tail lift's hydraulic system. The lifting and lowering movements are performed by an additional cylinder.

The scissor lift enables an additional lifting of the platform, up to 520 mm max above its maximum level. This enables loading and unloading operations on e.g. higher ramps.



Daily visual inspections

- Function and completeness of the operation- and Safety devices
- Readability of control and instruction signs
- Damages and completeness of pins and pin locks.
- Damages and tightness of hydraulic hoses, fittings valves
- On the cylinders
- Damages and function of event flashlights
- Main switch (special equipment) must be tested for function

Any lack must instantly be fixed, and any missing parts must be replaced!
The operator is responsible for the timely maintenance and repair of detected errors!
The users manual must always be available in the vehicle!
Repairs may only be made with original spare parts!

Annual inspection

After taking the tail lift in use, it must be inspected by a expert at least 1 time in a year. The results must be notated in the check book of the tail lift.

Battery capacity

The battery capacity for the use of tail lifts are normally prescribed by the vehicle producer, please always comply to the vehicle manufacturers installation guidelines.

Our recommendation for the battery capacity:

To build in a stronger generator and an extra battery is basically recommended. The user are responsible for the charging level of the battery.

Capacity 750 kg	Batteriegröße 12 Volt - 1 x 88 Ah	24 Volt - 2 x 66 Ah
Capacity 1000 bis 1500 kg	Batteriegröße 12 Volt - 1 x 143 Ah	24 Volt - 2 x 110 Ah
Capacity 2000 bis 2500 kg	Batteriegröße 24 Volt - 2 x 143 Ah	

The electro motor

The Electro motor of the power pack has depending on capacity an input of 0,8 KW till 3KW. That gives by full voltage:
12 Volt a current of 150 A. Is the voltage lowered to 9 volt, the current will double to 300 A.
24 Volt a current of 150 A. Is the voltage lowered to 12 volt, the current will double to 300 A. This high current at low voltage results in excessive-heating of the copper winding. The result is that the protective lacquer melts, which can lead to a short-circuit and event a burned motor.



Like this you can prevent

You can avoid damages to the motor and the motor relay, if you always have sufficient voltage on the battery. If you experience that the motor has problems lifting a load that normally is no problem, then immediately stop the action and take care that the battery are charged. If you realize that the batteries are running out of power too soon, than let an expert examine the batteries and the cables leading to the power pack. Possibly the cables + and ground must be changed.

Take care that the charging fazes for the batteries are sufficient between the single loadings or unloading.

Regulations for preventing accidents

Tail lifts must comply the regulations for accident prevention BGR 500. This normative rules about controls and operation. We strongly recommend that the tail lifts owner obtains a copy of the regulation at his trade association.

The lift must be checked against the normative once a year, by authorized personel. The device has to be marked as checked by a sticker.

This is a sample from the regulations:

Requirements to the operators

Tail lifts can be operated only by persons which are older than 18 years, were trained in its operation and proved that ability to their company. They must be specifically instructed to operate the lift. That instruction must be given in writing.

Supervisor

If more than one person is working with the tail lift, the company has to appoint a supervisor.

Operating instructions

Operating the lift must be performed according to the operating instructions.

First operation

- (1) According to their operating instructions, movable tail lifts must be set up firmly and in a way that no shearing or pinching points between the lift and the environment are created
- (2) Proper laying on adequate ground of any stands must be checked before operation. Power operated stands are to be watched during operation.
- (3) Tail lifts which are set up in traffic or which are reaching into the range of other vehicles must be secured adequately.
- (4) Before starting to work with the tail lift, all devices preventing falling of persons or goods must be activated.

Handling and behavior during the operation

- (1) Tail lifts may not be loaded with a higher load than its allowed max. load. (Always take care that the loading distance is correct)
- (2) Loads shall be placed in a way, that unwanted position changes do not occur.
- (3) Entering and leaving the platform must be done over the allowed ways..
- (4) Tail lifts may only be controlled from the control positions meant be used for controlling.



- (5) The operator must by all movements of the tail lift take care that he/she or other persons are not at any risk.
- (6) Unnecessary stay on or in the range of motion of the platform, are prohibited.

Un-allowed is further more:

- 1. Stay under the load handling attachments
 - 2. To step on the load handling attachments
 - 3. To be more persons than the operator on the platform by moving.
 - 4. Use of the tail lift for purposes which it is not designed for.
- (7) Moving tail lifts are only to be driven with, when the platform is in the driving position.
- (8) The platform may not be put in movements, which may lead to getting thrown off.

Closing down the tail lift

When power driven tail lifts are taken out of use, they shall be secured against un-allowed use.

Maintenance

- (1) Before doing maintenance on elevated parts of the tail lift, these parts must be secured against unwanted movements.
 - (2) To prevent a falling down or a sinking down of the platform all bearing elements, power pack and safety devices as well as the hydraulic connections are to be examined, and defect parts must be renewed.
 - (3) Hydraulic hoses shall be renewed when necessary – though latest after 6 years.
- The changes of the hydraulic hoses as well as other maintenance made, must be noted in the check book of the tail lift.

Use

The Sørensen tail lift are designed for lifting and lowering loads. It may only be operated by one person, and only one person are allowed to drive on the platform.

General instructions

When the tail lift are in use, it must be secured that the vehicle does not make any unwanted movements. The tail lift must be observed during all functions that can be driven from the control system.

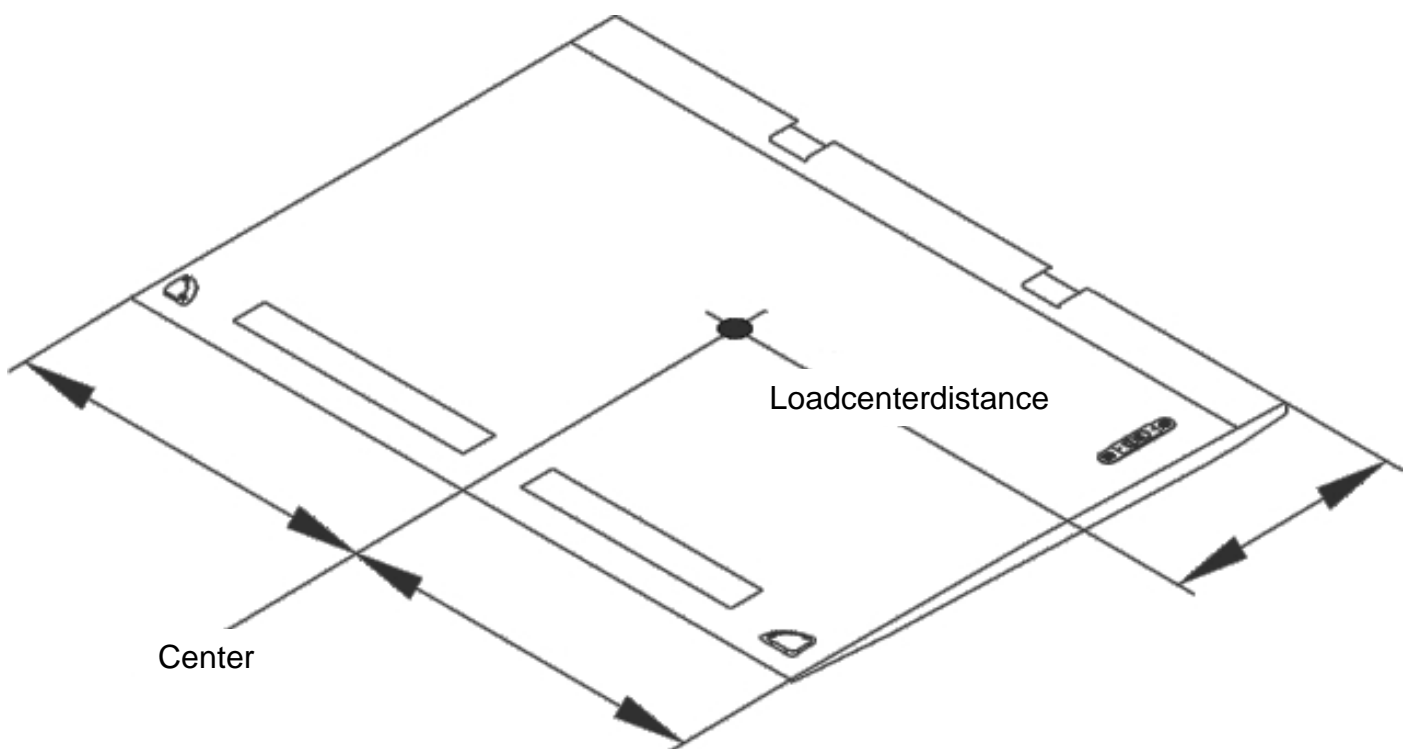
The complete working area of the tail lift must be kept free of persons or objects. Special attention shall be given to the squish and shear area between platform and body, as well the area between the platform and the ground.

Allowed load

The max. load of the tail lift may not be exceeded. Be aware of the loading diagram on the name plate. The one side load is 50 % of the max. load of the tail lift. The load center shall be kept as central as possible between the lifting arms. The bigger the loading distance is. The lower is the allowed load.

Driving loads on to the platform from the vehicle floor

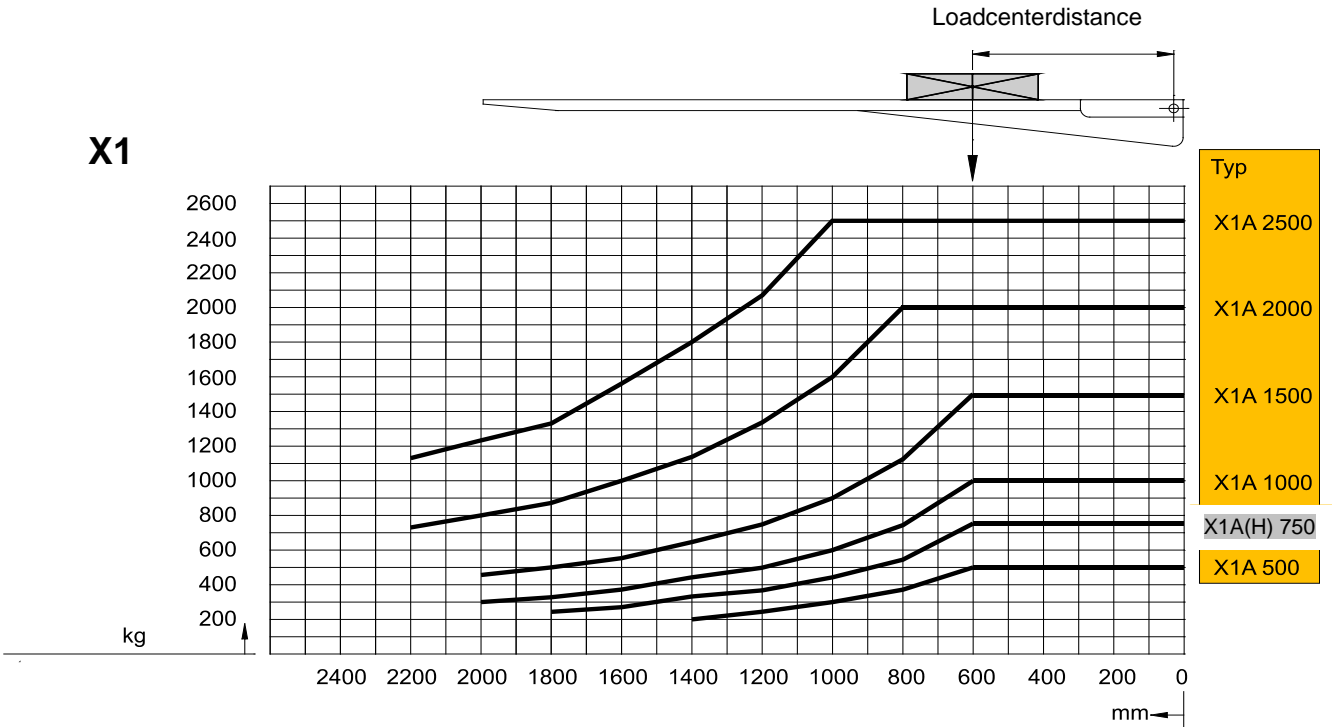
Safeguarding against loads that are larger than the max. loads or loads which is not placed in the correct loading distance and loads driven from the vehicle to the platform, is impossible. An overload like this can lead to a break down of the platform. It is the operator responsibility that the platform are not loaded with loads, that exceed the allowed loads in the loading diagram.



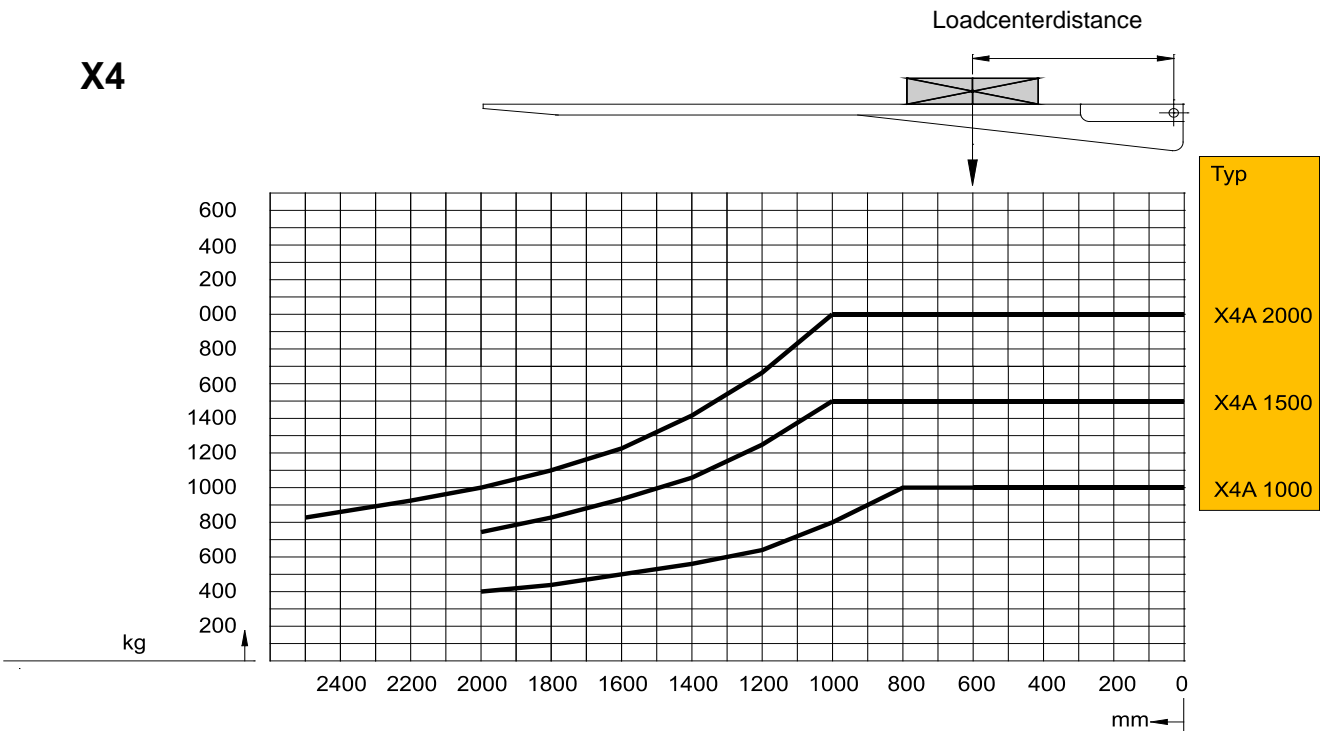
Loading diagram / capacity

In addition to the operating instructions, the tail lift loading diagram is also shown on its identification plate. The load's centre of gravity should be in the middle between the lift arms. The greater the distance of the load from the end of the flatbed, the lower the loading capacity.

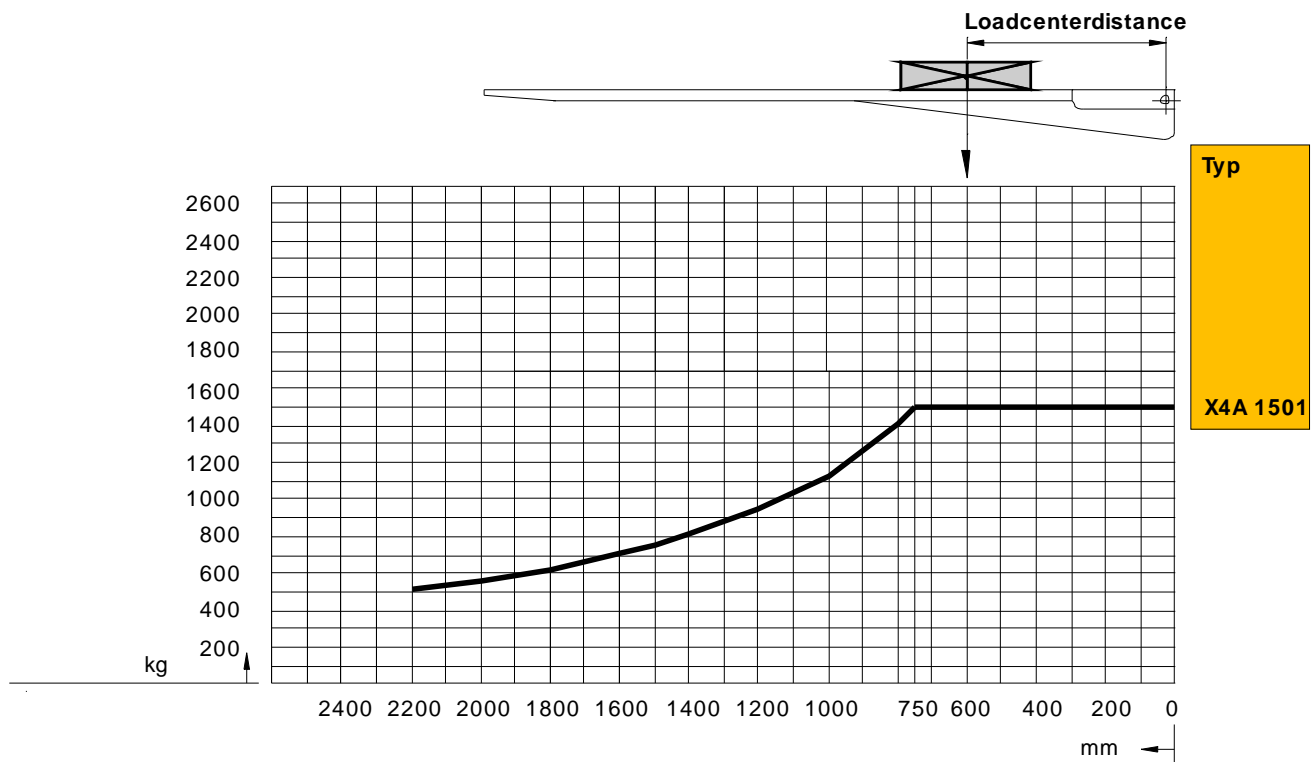
X1



X4



Model X4A 1501



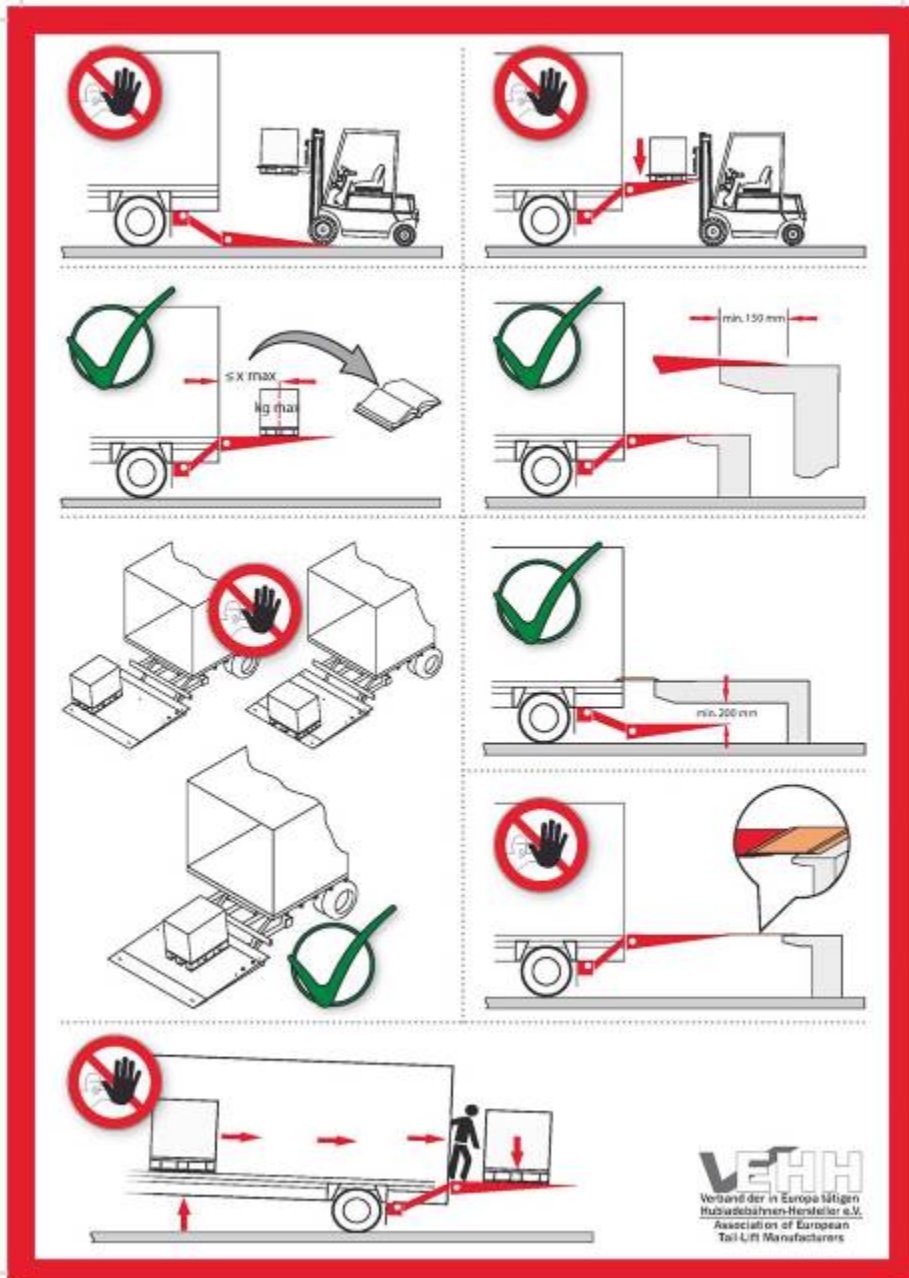
Typ
X4A 1501

The maximum loading capacity specified in the loading diagram must not be exceeded. The platform may not be used as a bridge plate.

Drive only the functions lifting and lowering when the platform is horizontal. The platform may not be tilted down, when loaded and in elated condition.

Danger clue – Sticker “safe handling of the tail lift”

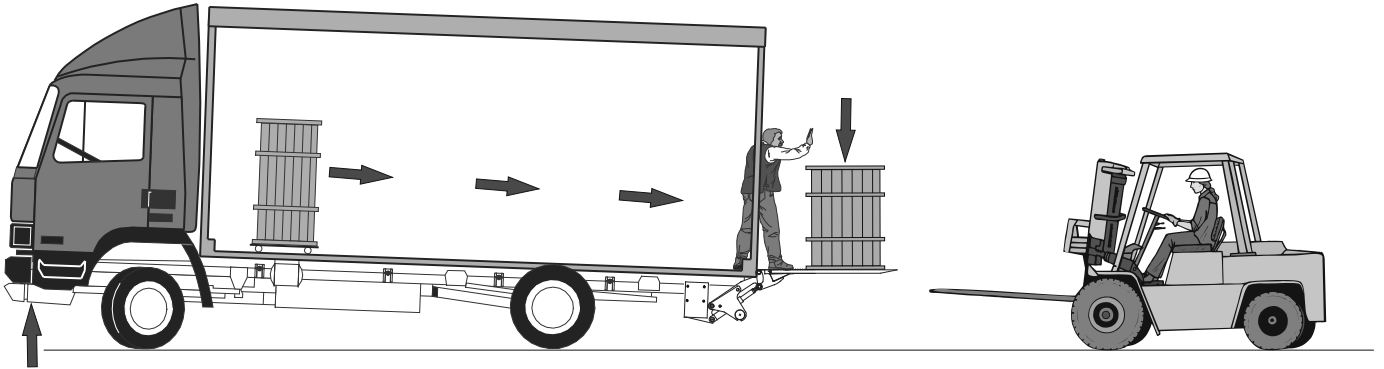
The sticker is delivered with all new tail lifts and must be placed on a visible place on the inside of the rear part of the vehicle. The danger clue – sticker shows possible falls actions and right actions in the single pictograms.



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

Danger instruction about unsecured load

Under very unfavorable conditions there is by loading and unloading over a tail lifts platform, a risk that the front axles are lifted. The sloping of the vehicle can lead to movements of not secured loads, which can lead to personal risks.



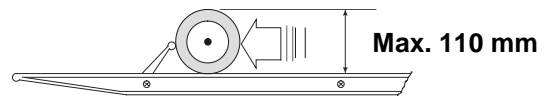
Rolling loads

Rolling or slippery goods must be secured on the platform. Without cart-stops it is not allowed to have rolling loads on the platform.

Sørensen tail lifts can if wanted be equipped with cart-stops, (wheels with maximum diameter 110 mm) are safely secured.



Attention! Be aware of the safety instruction about unsecured load, by especially tail lifts without support legs.



Description of the safety

Hose break valves

If a hose bursts, or a tube or a fitting breaks, the tail lift will, according to valid norm, lower the platform in a controlled way, with the allowed speed, as long as one of the functions on the controls are activated. Are no function then activated anymore the tail lift will stop immediately.

Safety valve

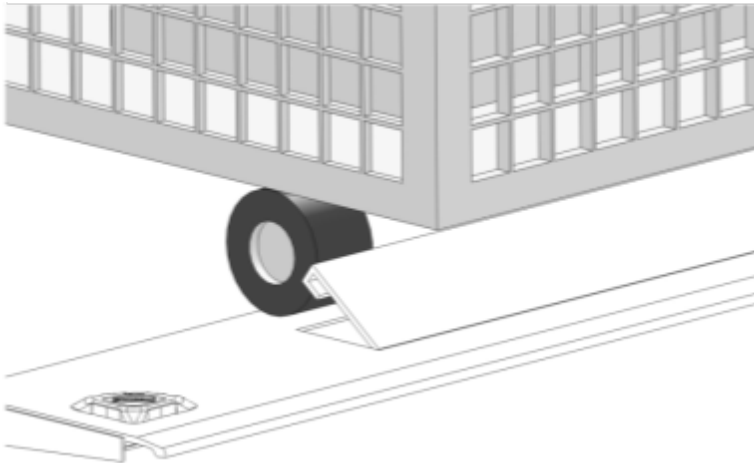
The tail lift is limited with a safety valve to lift only the max. permitted load. This valve is pre-adjusted from the factory, and adjustment of it is only permitted for experts by using a test weight and a manometer.

Electric fuses

Defect fuses are only to be renewed with fuses that have the values defined in the wiring diagram, and the on control unit. Larger fuses can lead to cable fire.

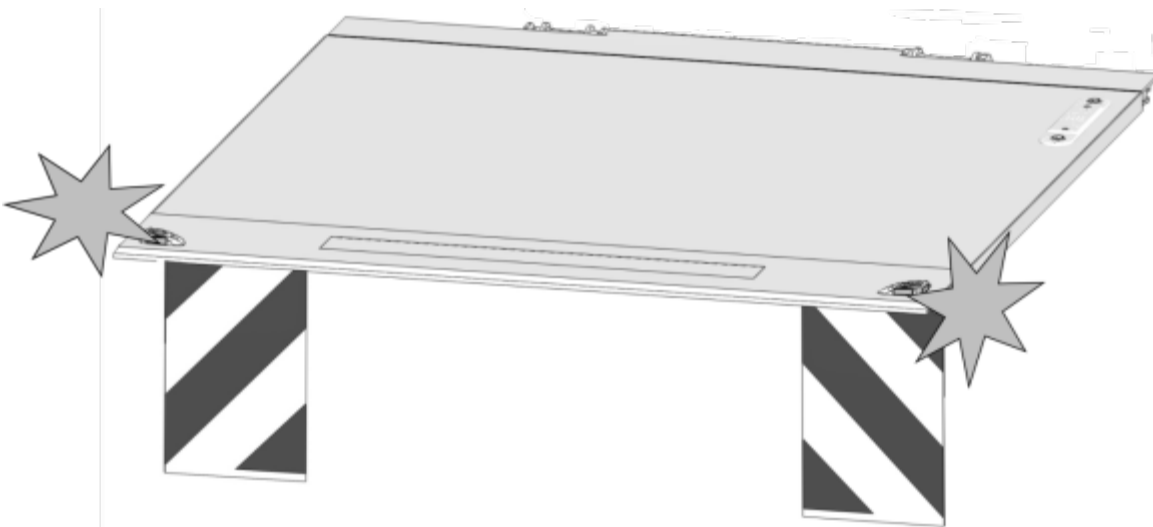
Cart stops

Are roll-container used, the tail lift must be equipped with cart stops. The function of the cart stops can be limited by dirt. The operator shall always keep these safety devices clean.



Warning markings and flashlights

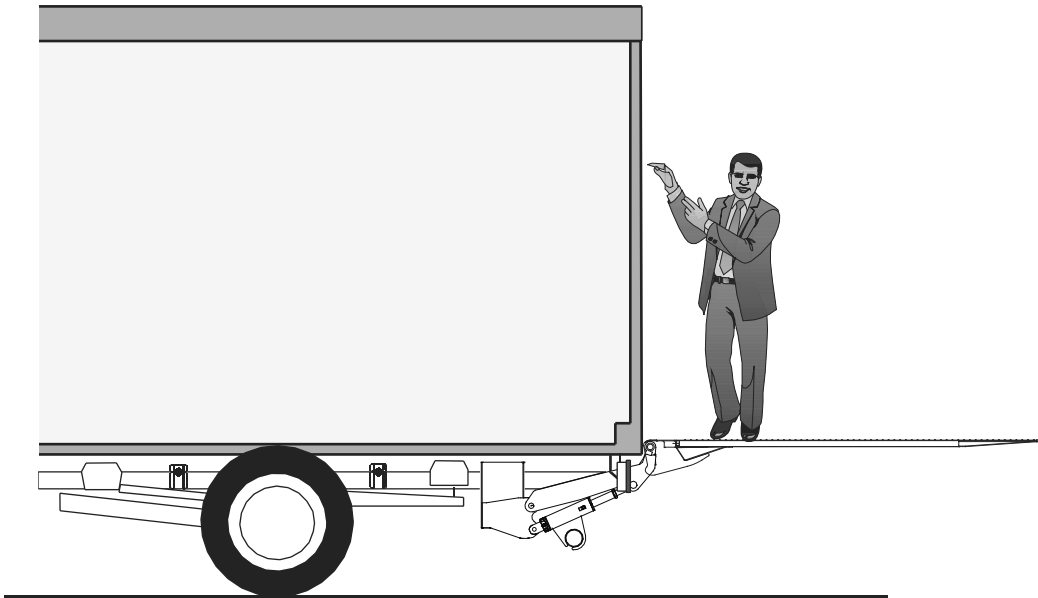
The tail lifts platform can be equipped with warning marks and/or with flashlights. These safety devices must always be functionally and be kept clean.



Safety instructions for the function

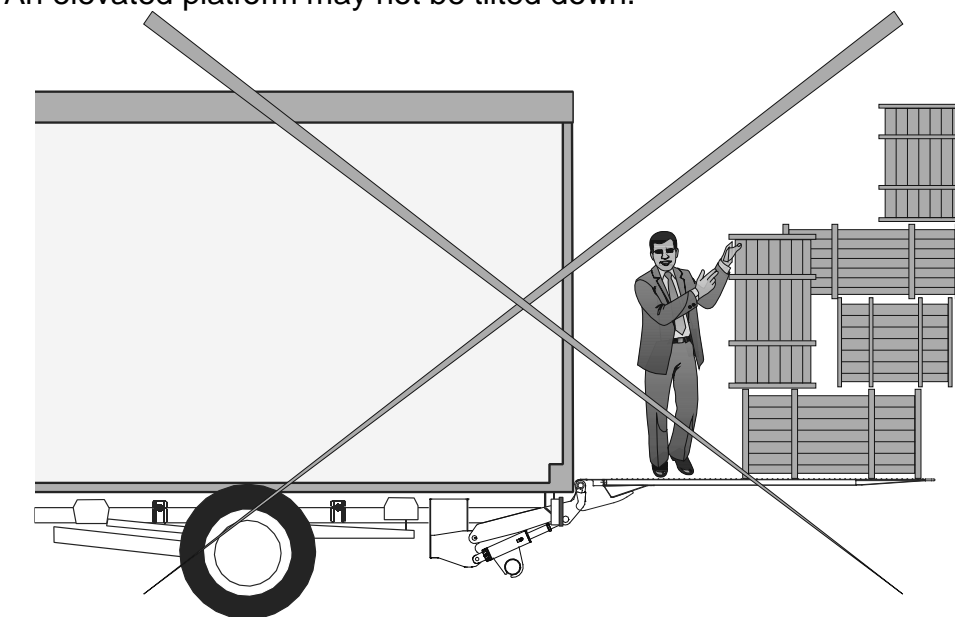
Driving on the platform

By loading the platform it must be secured that there are sufficient room left on the platform so that the operator can drive along on the platform and operate the tail lift.
Only the operator are permitted to drive on the platform.



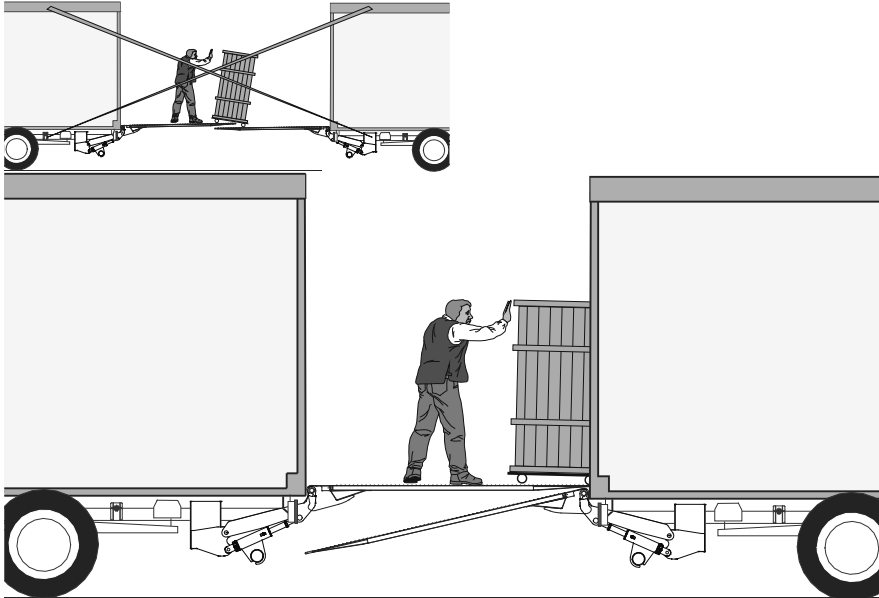
Securing load

Make sure that the load are secured against slipping and kipping!
An elevated platform may not be tilted down.



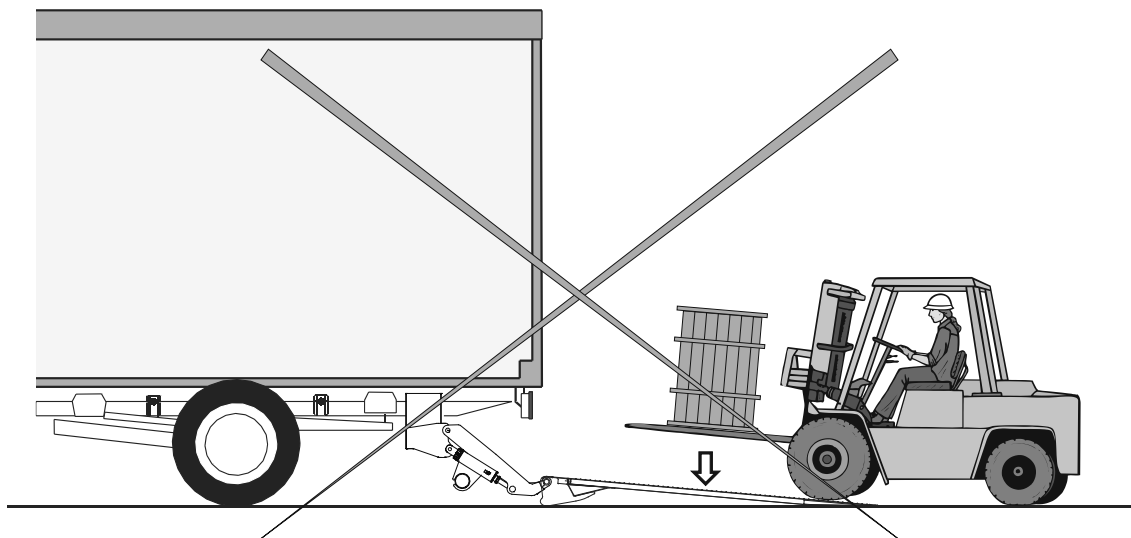
Transshipping from one vehicle to another

By transshipping from one vehicle to another, only one of the two platforms can be used. The platform used must have the platform tip resting on the floor of the other vehicle overlapping **min. 150mm** and can only be driven over with allowed max. load.



Driving with a fork lift on the platform lying on the ground

It is not allowed to drive on the platform with a fork lift! (exception: The combined weight of the fork lift and the load are smaller than the allowed max. load of the tail lift). Doing this the platform must rest firmly on the ground – (also the platform tip).



By any loading or unloading the vehicle must be secured, so it does not roll away. (Activate parking brake).

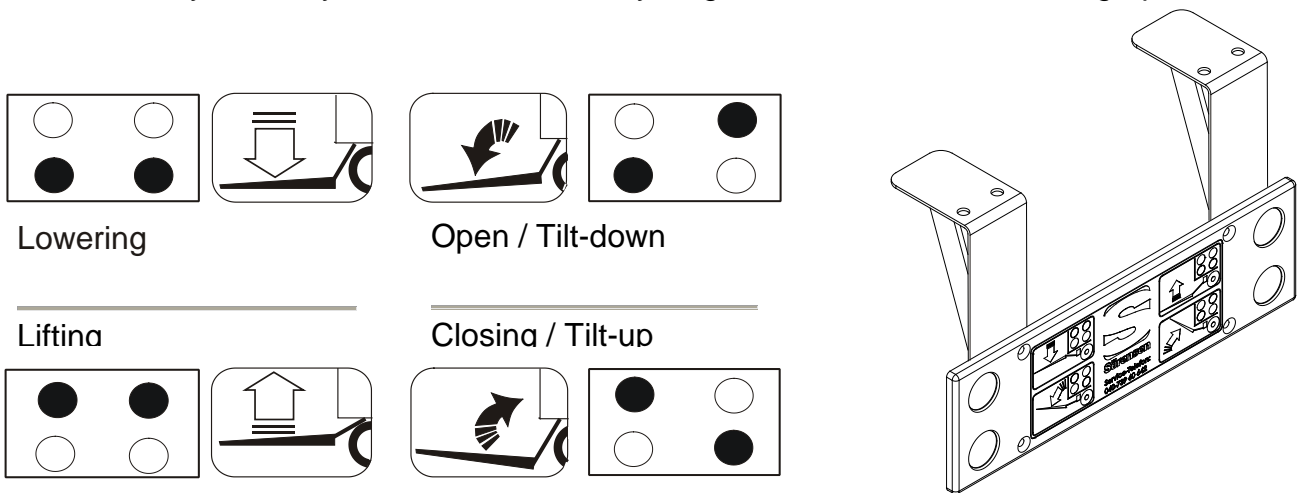
Turning on the tail lift

With the switch in the cabin you switch on the control system of the tail lift. When the red control lamp is lights up, the tail lift is ready for operation.



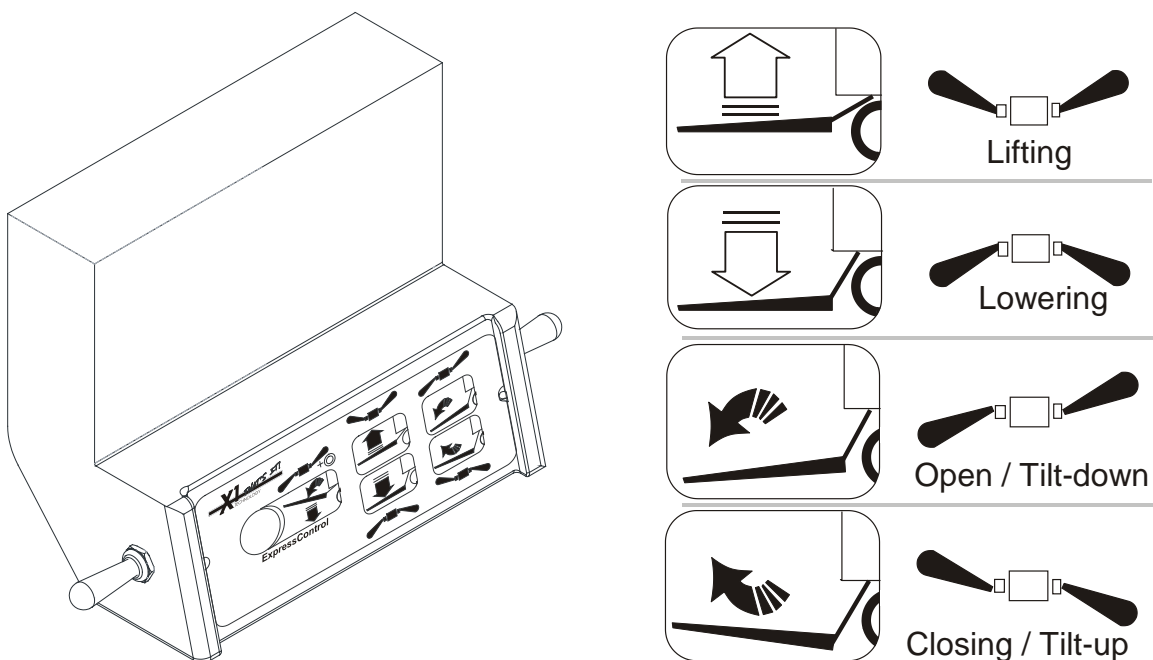
Control panel

To drive the different functions on the control panel, you must always activate two different simultaneously. The key combination for every single function is shown in the graphics.



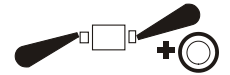
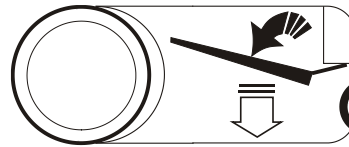
Hand control box

All functions must be operated with two hands by switching the toggle switches located at the side of the hand control box.



Option ExpressControl button

When using the express control switch at the same time than the toggle switches, the tail lift lowers and opens at the same time, and will be much faster on the ground.



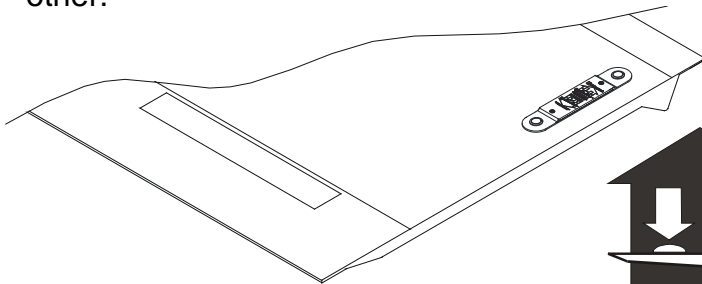
Open + Tilt-down (at the same time)

Controlling the tail lift from the platform

From the platform the operator may only drive the tail lift with the foot controls, or with a handheld remote, that are operated from a marked space on the platform.

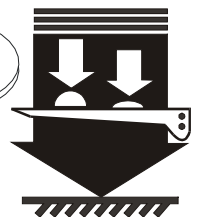
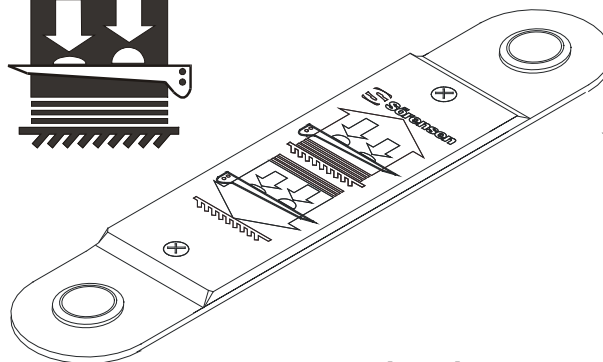
Foot controls

The foot controls is designed so that both has to be activated – one at the time after each other.



For tilt-up and lifting

1. Activate button (lower nearest body)
2. Begin lifting/tilt-up (button lift)

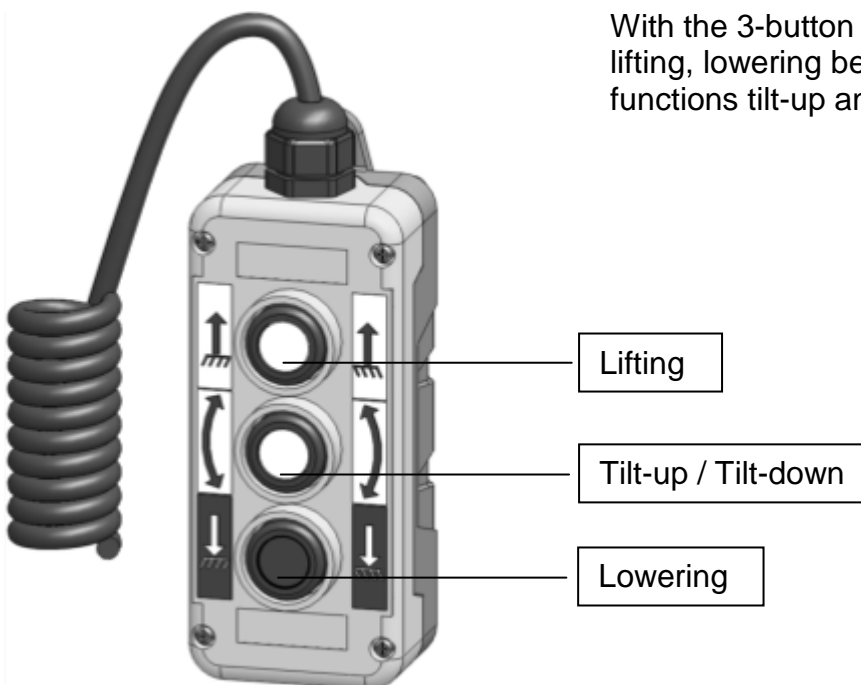
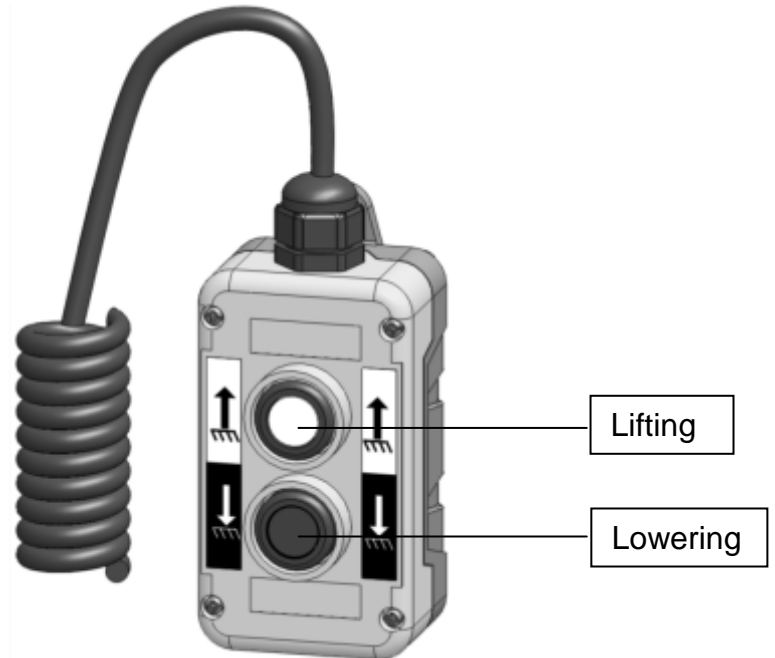


For lowering tilt-down

1. Activate button lift
2. Begin lowering/tilt-down (button lower)

Option handheld remote with spiral cable

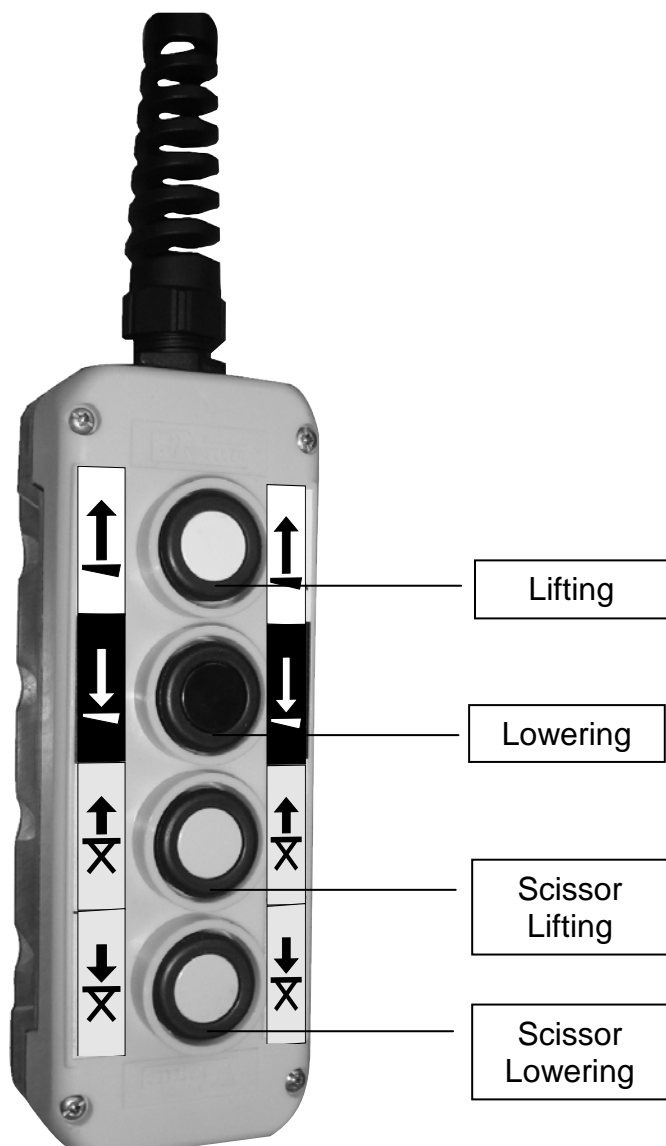
With the 2-button handheld remote the functions lifting and lowering can be operated, after the platform has been opened with the control panel.



With the 3-button handheld remote the functions lifting, lowering be driven. Additionally the tilt functions tilt-up and tilt-down be driven.

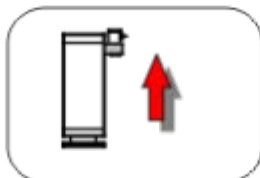
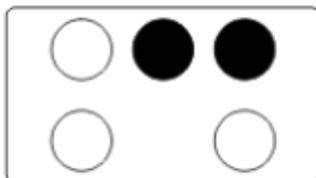
Scissor lift 4 Button- handheld remote (only for lift with intergrated scissor lift)

The scissor-lift is operated with the 4-button handheld remote control. After opening the platform with the control panel, the functions lifting and lowering can be operated. The remaining two buttons are used to lift and lower the scissor-lift.

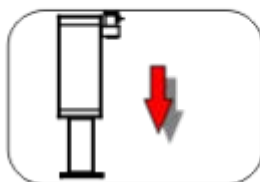
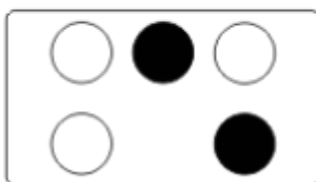


Operating of the option hydraulic stands of the scissor-lift with the 5-button control panel

The operation of the tail lift with a membrane switch is describe on page 16 under control panel. The stands are lifted and lowered with the 5-button operating panel, when the plattform is open. The stands are retracted automatically when the platform is closed. The automatic retraction can be interrupted by pressing the additionnal button or when the 30 second timer disables that function.



Stand retraction



Stand lowering



Warning!

There is no display in the cabin whether the stands are retracted or lowered. The operator must check the status of the stands before driving off.



Care, maintenance, inspection and repair

Before starting any maintenance work, the tail lift must be secured against unforeseen movement.

Check that all screw connections are tight. Check that cables and hoses are able to move freely. Correct shearing and chafing points on cables and hoses. Immediately replace damaged hydraulic hoses with ones of the same quality. Note down the replacement in the control book.

During cleaning it should be ensured that no moisture penetrates the power pack or the control box. The bearing areas should not be cleaned with high pressure or steam jets, as this may allow dirt and moisture to penetrate the bearing.

Check the hydraulic unit for leaks. With the tail lift lowered, check the oil level with the platform lowered to the ground in the unit's tank (dipstick on the oil filler neck cover).

The maximum oil level has been reached when the dipstick dips approx. one centimetre into the oil.

Carry out an annual oil change and clean the suction filter. Carry out the oil change before any period of frost, in order to prevent the hydraulic unit from freezing up.

Repairs to load bearing components

Repairs to load bearing components are only to be carried out in an authorized repair shop, and are to be inspected by a competent person and entered in inspection records.

Hydraulic oil - recommendations

HPLD 22 (ISO VG 22) deterging, so that free water stays in emulsion (ice forming in winter) and to improve the oil film.

In colder regions, the oil class HLPD 10 can be used

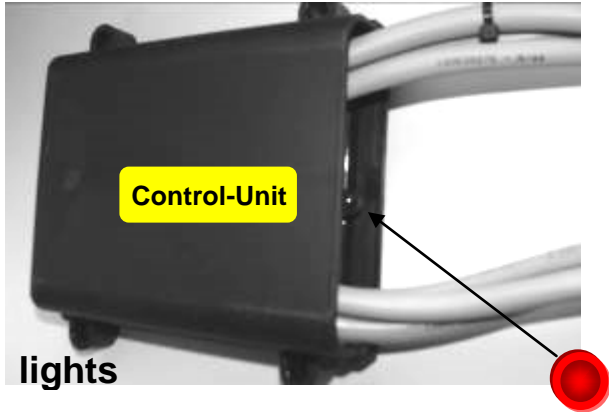
Sørensen Hydrauliköl HLPD 10 part. no. 20 841 181
 Sørensen Hydrauliköl HLPD 22 part no. 60 700 283
 Sørensen bio oil part no. 20 858 811

Aral (BP)	Castrol Hyspin HLPD 22	Panolin	HLP SYNTH (bio oil)
Aral (BP)	Castrol Hyspin DSP 22	Panolin	HLP Plus
DEA	Econa E 22 (bio-oil)	DEA	Actis HLPD22
Esso	Hydraulik Oil H-LPD 22	Mobil Oil	H-LPD 22
Shell	Tellus DO 22	Fuchs	Rhenolin MR 5

Diagnosis diode

Explanation of the diagnosis diode on the control unit

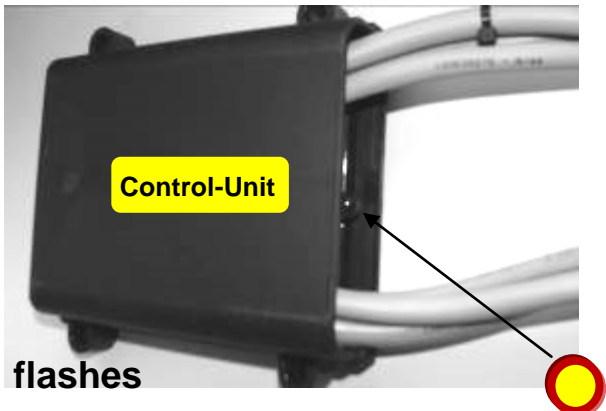
Control-Unit Series 10



diode lights constantly. If:

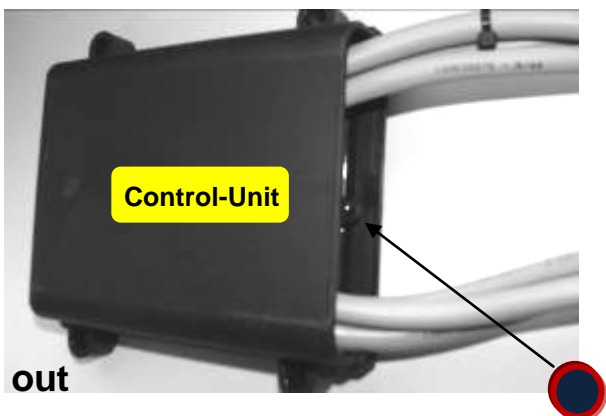
Cabin switch is on
or
platform position 60° till ca. 90 °
or
platform position 0° till -10°

Explanation: platform closed (vertical) 90°
platform open (horizontal) 0°
platform tip tilted down -10°



diode flash signal, if:

Control key operated
or
foot control operated
or
key on cabled operated



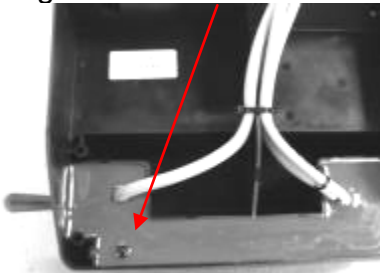
diode out, if:

Main switch off
or
platform position 0° till 60°

control panel



diagnose LED



Option: control box series 9

Test of the sensor-switch in the platform:

platform closed and lift on:

LED lights.

Power supply Ok.

platform position 0 ° till ca. 60 °:

LED out

Sensor-switch S1 is Ok.

platform lights are activated.

platform position 0° till -10° (tilted down)

LED lights.

Sensor switch S2 is Ok.

The switch over occurs by horizontal position.

Making it possible to set the automatic tilt- function.

Test of the pressure switch S4:

With the foot control keys for lowering – >> begin lowering.

LED flashes.

As soon as the platform has reached the ground and the pressure switch switches, the flashing changes into constant light - **LED lights** and the platform tilts down.

This indicates, that the pressure switch has switched. If not, the pressure switch is defect.

Troubleshooting

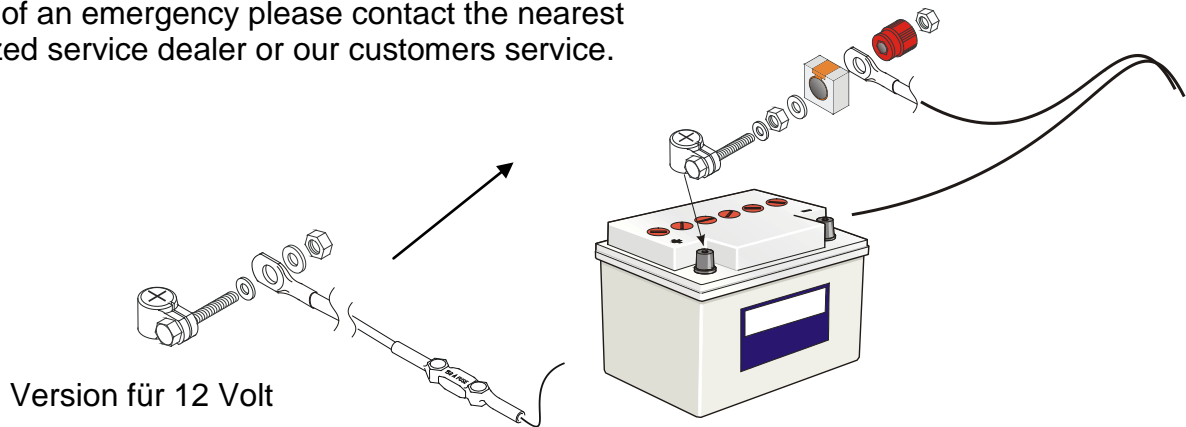
1. Motor does not work on one function only	Toggleswitch on hand control box defect
	Cable from hand control box to pump box defect
	Wiring inside pump box defect
	Switch relay defect (Starter Solenoid)
2. Platform tilts down alone without operating that function.	Solenoid valves on tilting cylinder defect
3. Platform does not tilt down when touching the ground.	Cable to pressure switch defect
	Pressure switch defect
4. Tail lift does not lift rated capacity	Load is placed in excess of permitted loading distance
	Weight of load too high
	Overload security valve not set properly
	Pump defect
	Voltage insufficient (low Battery)
5. Tail lift does not tilt up from ground when unloaded	Toggle switch does not operate
	Mercury switch S2 defect or not set properly
6. Tail lift does not tilt up from ground when loaded.	Load is placed in excess of permitted loading distance
	Weight of load too high
	Overload security valve not set properly
7. Tail lift tilts from ground above horizontal	Mercury switch S2 defect or not set properly
8. Motor of power pack does not work	Battery cable or ground cable not connected or defect or empty battery
	Cable to cabin switch disconnected
	Main fuse defect
	Fuse in power pack defect
	Battery main switch not on. Cabin switch not on.
	The motor relay is defect and doesn't switch
	Motor defect
9. Motor doesn't run when a key is operated	Motor relay defect
	Connection from control unit to power pack defect
	Control line in the power pack defect
	Control unit defect

10. the tail lift will not open or if very slow	The platform is squishes on body
	Motor of power pack doesn't run
	Cable to solenoid defect
11. Tail lift will not lower or if, then slow	Solenoid Y3 are not powered or is defect
	Valve YA doesn't switch
	Throttle valve in tilt cylinder defect or clogged
12. Tilt down function doesn't work by operating foot control or handheld remote	Pressure switch S4 doesn't switch
	Cable defect
	Mechanical damage on lift cylinder
13. The platform tilts down without operating any functions	Solenoid on tilt cylinder defect
14. platform doesn't tilt down by ground contact	Cable to pressure switch defect
	Pressure switch defect
15. Tail lift doesn't lift	Power pack doesn't run
	Too little oil in the tank
	Voltage too low
16. The tail lift doesn't lift the max. allowed weight	Load is out of loading distance
	Load too big
	Relief valve incorrect adjusted
	Pump defect
17. The platform doesn't tilt up from ground	Voltage too low
	Control unit defect
18. The platform tilts up higher than horizontal	Micro switch doesn't switch
	Sensor switch S2 defect or incorrect adjusted
	Cable to sensor switch S2 defect
19. The tail lift will not tilt up/close	Control unit defect
	Not enough hydraulic oil

If the motor does not stop "tail lift can not be turned off at all"

disconnect the positive cable from the battery by disconnecting the main switch or throwing the main fuse.

In case of an emergency please contact the nearest authorized service dealer or our customers service.



Failure on the tail lift in open position

If the tail lift in an emergency situation are lifted or closed by hand or mechanical means, the hydraulic cylinders will be filled with air. The safety valves will hereby be out of function. So by careless opening and lowering of the platform acute danger to life occurs, as the platform can fall uncontrolled to the ground. In a case like this be sure that the platform is secured by robes or chain, for example:

Attention! The tail lift is unsecured and may only be opened by trained technical personnel. By opening occurs danger to life!

Operation failure

In case of failure, please contact our customers service or the next authorized service dealer. We will provide an up-to-date list of service dealers on request

Contact Sørensen Technical Service at phone 040 – 739 60 6-42, fax 040 – 739 60 6-66 or www.soerensen.de.

Warranty

Our tail lifts have a warranty time of 24 month from delivery date. The warranty only concerns damages resulting in defect material, design or manufacturing. The warranty is limited in any case to the replacement or the repair of the defect component. Labour costs are only reimbursed if the work was performed in an authorised workshop, according to our time schedules. Collateral costs, for example for a rental truck or a vehicle transfer are not part of warranty claims and therefore not paid.

Liability exclusions

Our liability excludes: damages assigned to wrong installation or operation of the tail lift, as well as overloading, improper use, insufficient battery charge or capacity, accidents or damages do to ground contact (e.g. rough terrain at building sites).