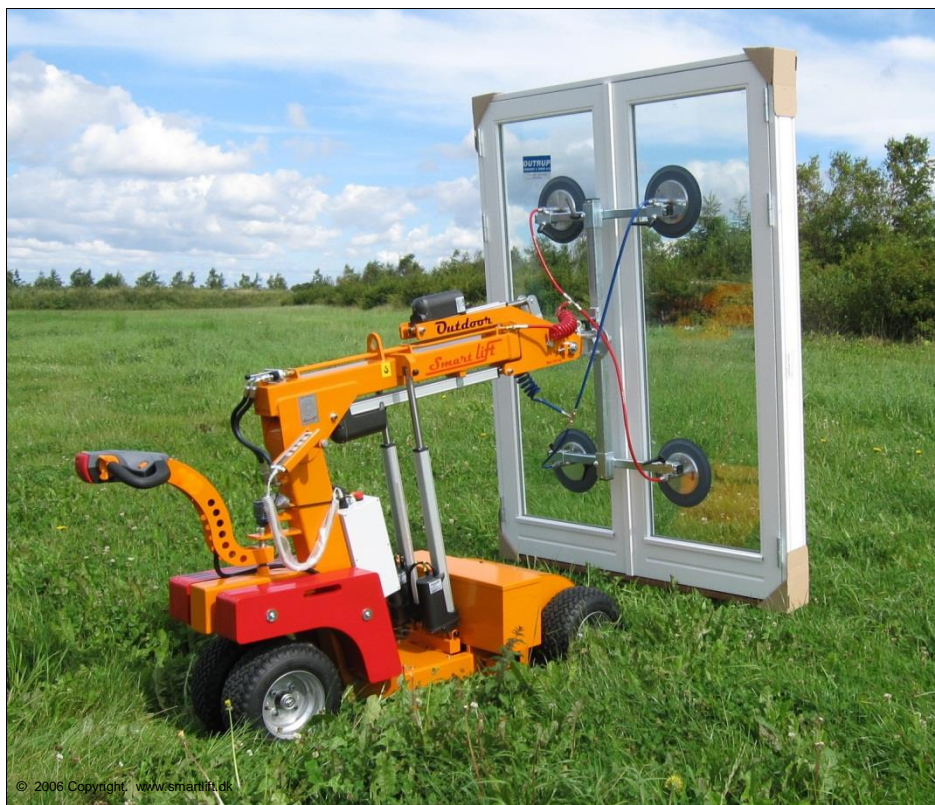


User manual

Smart Lift®



Model/type: **SL 408 OUTDOOR High Lifter – 1200W**

Smart Lift
DENMARK

N.A. Christensensvej 39, DK-7900 Nykøbing Mors
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www.smartlift.dk

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Introduction

Congratulations on your new SL 408 OUTDOOR High Lifter. SmartLift has been designed and constructed so as to safeguard product users against accidents as far as at all possible.

Unfortunately, certain functions in a machine cannot be safeguarded. This is why safety rules have been prepared by way of warnings in this instruction.

Read these safety rules on the following pages before putting your SmartLift into operation, and imagine how you may, in your daily use of the machine, ensure that warnings and safety rules will be adhered to.

Yours Sincerely,

Nicolai T. Jørgensen
Smartlift A/S
N.A. Christensensvej 39
7900 Nykøbing Mors
Telephone +45 9772 2911
E-mail : smart@smartlift.dk

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EU Declaration of Conformity



Manufacturer

Smartlift A/S
 N.A. Christensensvej 39
 DK - 7900 Nykøbing Mors

Hereby declares that:

The machine/system: Lift
 Model/type: **SL 408 OUTDOOR High Lifter – 1200W**
 Serial No.: _____
 Year/Month: ____/____

has been made in conformity with Council directive

- Machine directive 2006/42EF/EG/EU
- Low voltage directive 2006/95/EF/EG/EU + 2014/35/EU
- EMC directive 2014/30/EU

The following standards have been applied:

- | | |
|-----------------------|--|
| DS/EN ISO 12100 | (Safety of machinery - General principles for design -- Risk assessment and risk reduction) |
| DS/EN ISO 14121-2 | (Safety of machinery - Risk assessment -- Part 2: Practical guidance and examples of methods) |
| DS/EN ISO 13857 | (Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs) |
| DS/EN ISO 13849-1 | (Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design) |
| DS/EN 13155+A2 | (Cranes - Safety - Non-fixed load lifting attachments) |
| DS/EN ISO 3691-1 | (Industrial trucks - Safety requirements and verification - Part 1: Self-propelled industrial trucks, other than driverless trucks, variable-reach trucks and burden-carrier trucks) |
| DS/EN ISO 3691-5:2015 | (Industrial trucks - Safety requirements and verification - Part 5: Pedestrian-propelled trucks) |
| DS/EN 60204-32 | (Safety of machinery - Electrical equipment of machines - Part 32: Requirements for hoisting machines) |
| DS/EN ISO 13856-3 | (Safety of machinery - Pressure-sensitive protective devices - Part 3: General principles for design and testing of pressure-sensitive bumpers, plates, wires and similar devices) |

Date: _____

Signature:


 N.A. Christensensvej 39, DK-7900 Nykøbing Mors
 Tel. +45-97722911, E-mail: smart@smartlift.dk


 Nicolai T. Jørgensen, Director

General Description

	Pos.no.	Product	Number	
Vacuum	1	Pump 007	2	
	2	Suction Cup diam. 300 mm	4	
	3	Check Valve ½", vacuum	1	
	4	Replacement rubber t/suction cup	1	
	5	Slide Valve w/lock, vacuum	1	
	6	Vacuum meter diam.63 ¼", stainless	1	
	10	Hose Set	1	
	11	Hose Coupling	2	
	12	Spiral Hoses	2	
	13	Vacuum Guard	1	
	15	Alarm Light, Vacuum	1	
	16	Acoustic alarm, Vacuum	1	
	17	Line Filter	1	
	19	Stainless Spring	4	
	20	Clamp MRX.80 P-M10-25	6	
	21	Actuator – Tilting function LA 36	1	
	22	Actuator – Side shift	1	
	23	Actuator – Telescopic Arm	1	
	24	Actuator – Lift Arm LA 36	2	
	Power Supply	25	Battery 105a	2
		26	Charger Vitron Energy Blue Power Charger	1
	Wheels	27	Wheel, driving wheel	2
		27a	Wheel, dual wheels	
		30	Supporting Wheel	2
24 V	31	Safety Switch/Telemecanique	1	
	32	Control Panel	1	
	33	Emergency Stop	1	
	34	Control, Lift Arm	1	
	35	Control, Telescopic Arm/Tilt	1	
	36	Control, Side shift	1	
	37	CE Connector	1	
	38	Ermox Main Switch 24 V	1	
	39	Fuse 30 Amperes Control actuator		
	Various	40	Lock Split	1
41		Lift Eye	1	
44		Handle	3	
45		Weight Blocks 30 mm	8	
46		Supporting Leg	2	
Drive	47	Motor 1200 W/24 V	1	
	47a	On/OFF Switch for Drive Motor	1	
	47b	Fuse 100 Amperes Drive engine	1	
	47c	Fuse 10 Amperes motor controller	1	
	48	Regulating Lever	1	
	49	Curtis Motor Control	1	
	50	Safety Clamp	1	
	51	Safety Switch	1	
	53	Protective Cap for forward and back switch	1	

Transport/Handling

SmartLift is for indoor and outdoor use. Do not expose the machine to heavy rain and snow.

Prior to transport, switch off all electronics on main switch (pos. 38).

SmartLift to be fastened securely in truck/trailer for transport and protected against direct rain and snow.

Lifting by crane or similar: Always lift SmartLift in lift eye intended for this purpose (pos. 41).

NEVER lift under SmartLift with forks (fork-lift truck and similar)

Putting into Operation

Prior to putting into operation, insert vacuum hoses, and charge battery fully. The operator must have read the user manual and make sure that all security issues are respected. The user manual must always be at hand by the machine.

If the yoke has been dismantled, be aware that the washer is placed between the castle nut and the yoke.

Storage

Always switch off your SmartLift on the main switch (pos. 38), before storage.

SmartLift should be kept in a dry place.

Batteries should always be fully charged.

Technical data

Total Height	53.1 in
Total Width	32.3 in
Total Length	102.4 in
Net Weight	1022 lb
Weight Blocks	59 kg x 8 units = 472 lb
Total Weight incl. 8 weight blocks	1499 lb
24 V DC	
Charger 110V 60Hz 14A – CE plug	

Safety Rules (Pages 9, 11, 14)

Daily Use

Your SmartLift may only be used by persons who have been given qualified training in the operation of this machine and its safety functions.

Before use, user should check that there are no loose objects on the machine since this would entail breakdown and danger risks.

WARNING! Vacuum!



Working at the machine will entail danger if the various safety devices, pressure gauge (pos. 6), and acoustic alarm (pos. 16) are faulty.

Work may not be lifted until the light and acoustic alarms (pos.15, pos. 16) have stopped.

Do NOT lift moist or greasy work by the suction cups.



WARNING! Risk of overturning!



This machine MUST stand on a horizontal, firm, and stable base, with its supporting legs (pos. 46) unfolded.



WARNING!

Prior to using the lift yoke, check that nut and lock split have been securely fastened.



WARNING! Explosion Danger!

This machine may NOT be used in ATEX area. (Explosion danger environment).



DANGER!

Staying under the lifted work is strictly prohibited.



PROHIBITED!

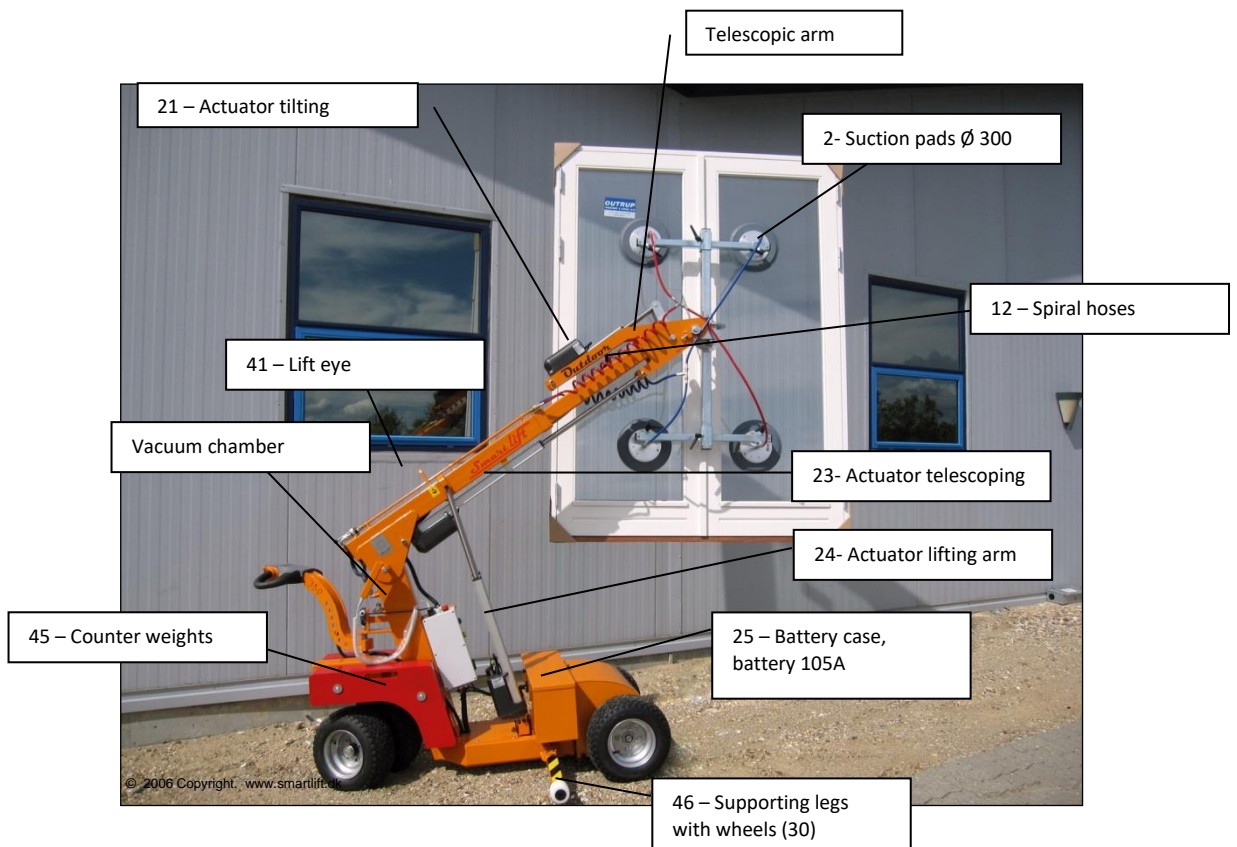
May NOT be used for person lifting. Parking on slopes is not allowed.

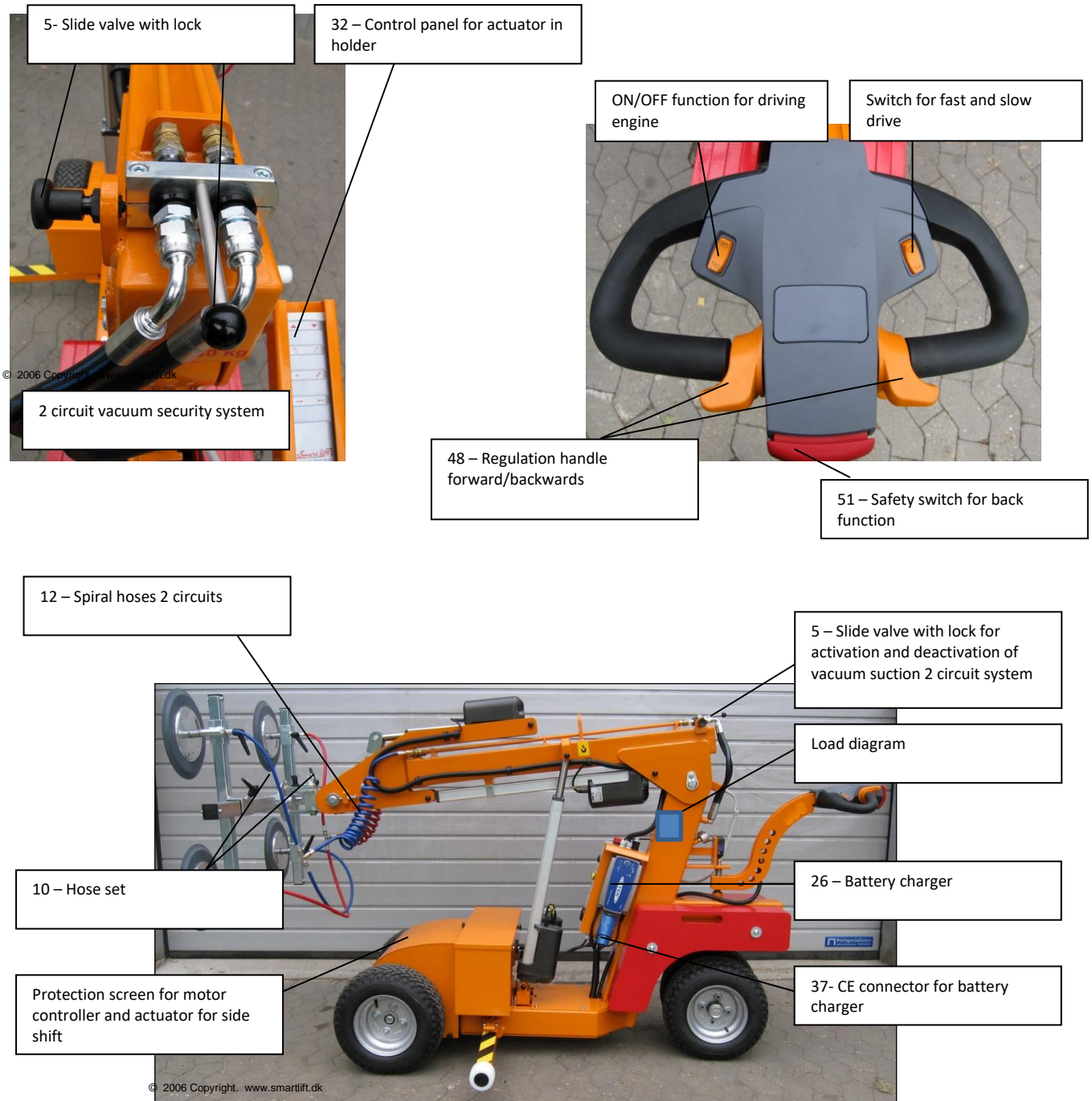


User manual

The operator must have read the user manual and make sure that all security issues are respected. The user manual must always be at hand by the machine.

Overview/General Description (pages 8, 9, 11, 14)





IMPORTANT!!!!!!

THE SUPPORTING LEGS MUST ALWAYS BE UNFOLDED WHEN DRIVING OFF ROAD TO PREVENT THE MACHINE FROM TIPPING OVER.

Operation of VACUUM function: (page 13)

This function (pos. 5) will switch vacuum on and off. The vacuum pump is controlled by a vacustat. The pumps have been programmed to stop at -0,62 bar.

The vacuum function is operated by the slide valve and safety pin on top of the telescopic arm (pos. 5). To activate vacuum, push the slide valve forward (pos. 5). To release vacuum, pull the safety pin to the left and pull the slide valve backwards.

For max. stability at transport of sucked work, the suction cups are to be centred and adapted to the transport work chosen. ***Operation of yoke with sucked work should always be conducted with caution***

Control Panel (pos. 32) for arm and yoke: (pages 9 and 15)

Users should make a point of reading the function description below, so as to become familiar with the functioning of the machine.

SmartLift is operated manually. This machine generally has four functions which may be operated individually.

UP/DOWN function:

This function will make the arm move either up or down. The movement is made via the actuators, (pos. 24).

TILTING function:

This function will make the work turn round. The movement is made by actuator, (pos. 21).

TELESCOPIC ARM function:

The movement is made via actuator, placed under the lift arm, (pos. 23).

SIDE DISPLACEMENT function:

This movement is performed via actuator, placed between the two front wheels. (pos. 22).

Electric functions: (pages 9, 11, 14)

STOP/EMERGENCY STOP function:

The emergency stop button (pos. 33) is placed on the actual control panel. This button will switch off actuators as well as drive motor.

MAIN SWITCH:

(Pos. 38) Placed on the battery case inside. Turn handle to switch off all electric functions.

DRIVE MOTOR, (pos. 47):

The drive motor is activated by an on/off switch (pos. 47a).
Then turn the regulating lever (pos. 48).

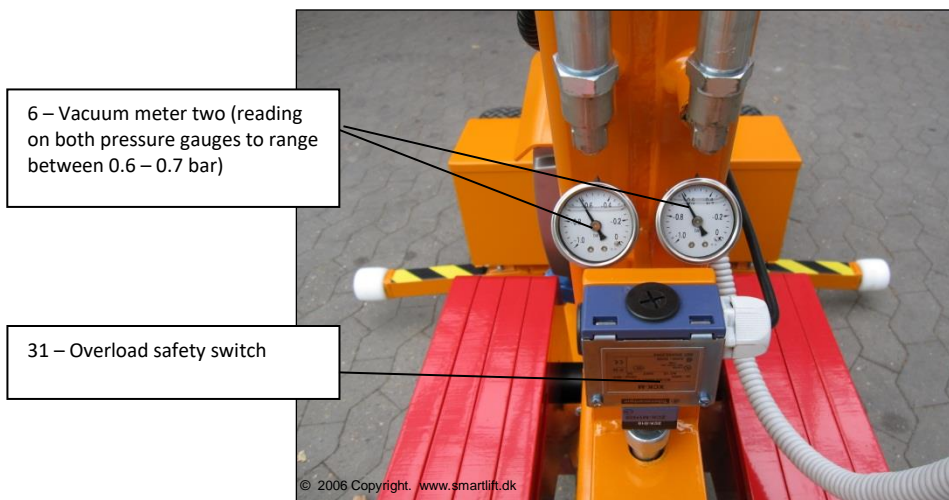
FORWARD AND BACK function, (pos. 52):

Toggle switch forward and back

SAFETY function, (pos. 51):

Activating the safety switch will stop the car, and the car will move forward.

Vacuum meter & safety switch



Charger

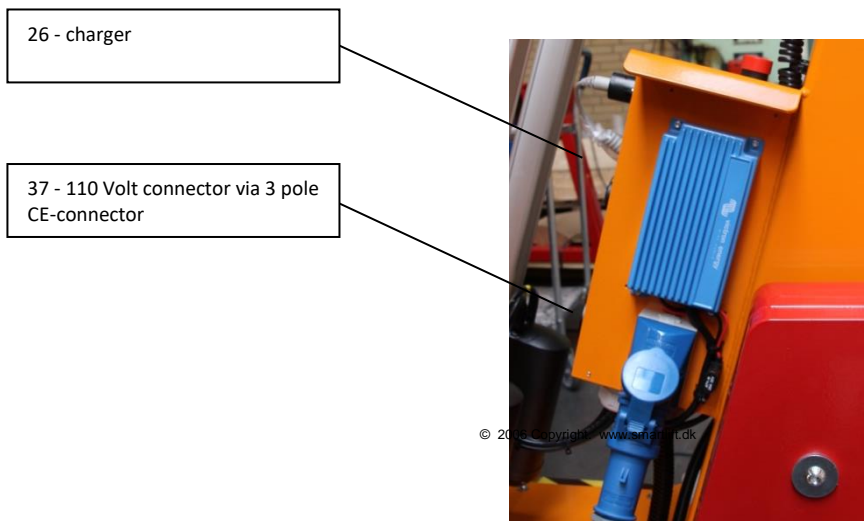
Victron Energy Blue Power Charger IP65 (pos. 26) – Battery Charger for lead acid batteries.

The blue Power charger is a three state charger (bulk-absorption float).

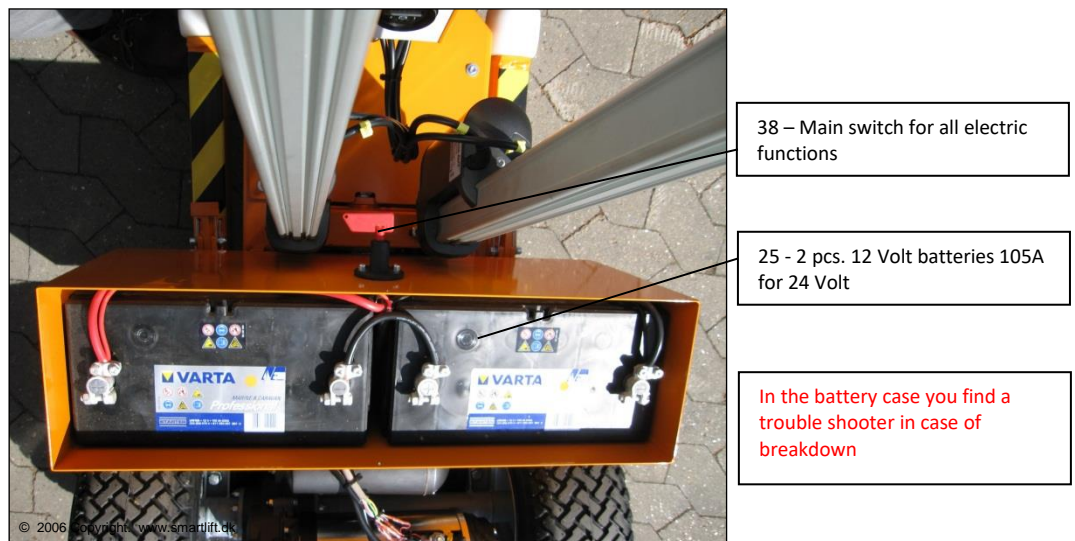
The absorption stage ends 2 hours after the charger current has reduced to 10% of the nominal current, with a maximum charge time of 18 hours.

Connection to the mains or reduction of the output voltage to 12V resp. 24V due to a DC load will trigger a new charge cycle.

Also please refer to page 29.

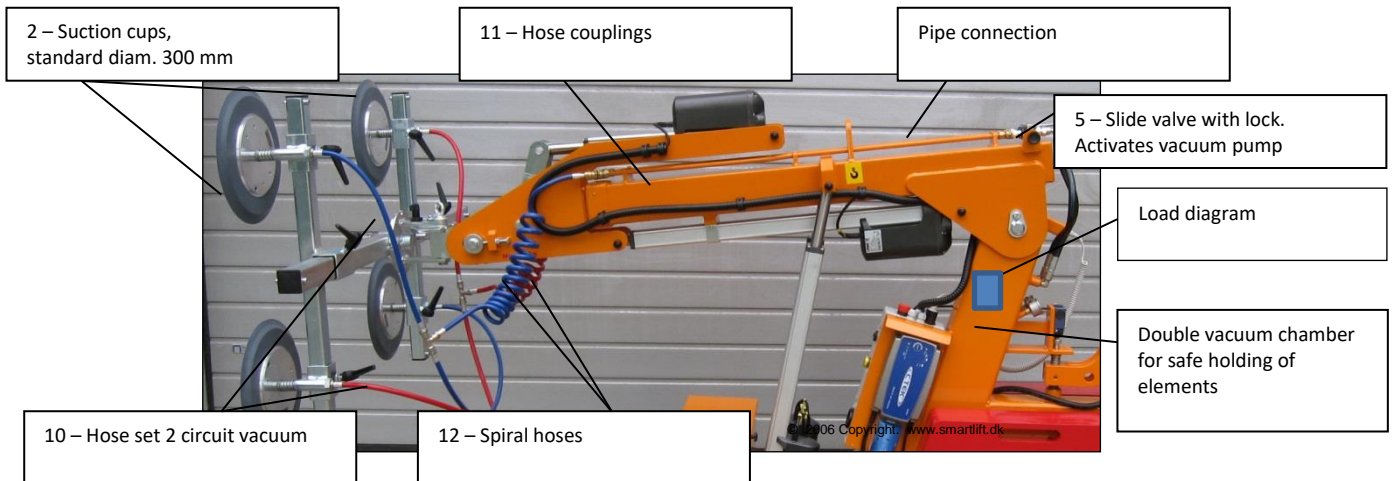


Battery case



View of vacuum system

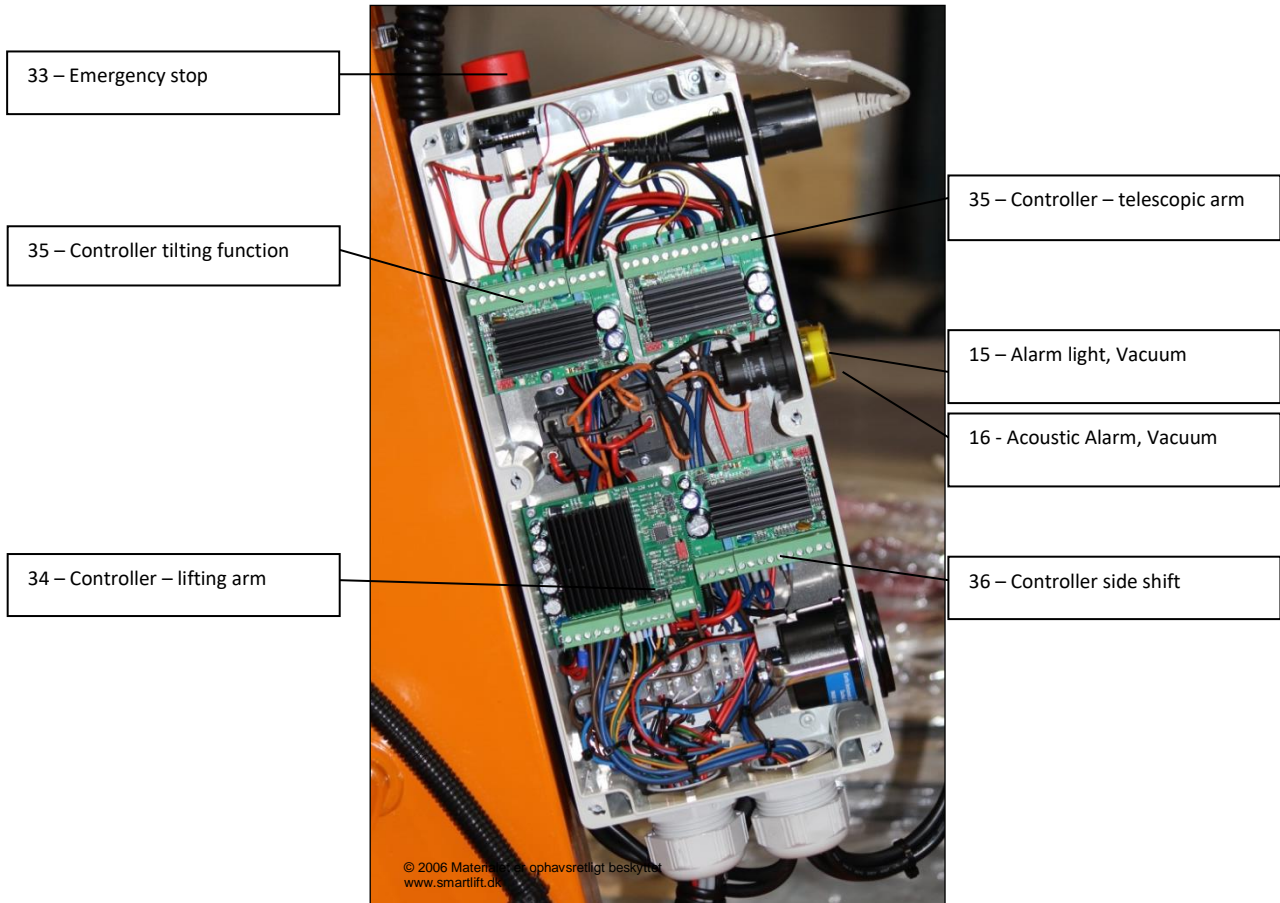
(top of machine)



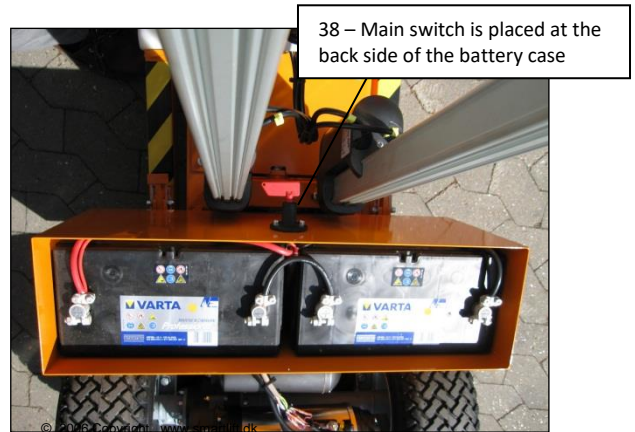
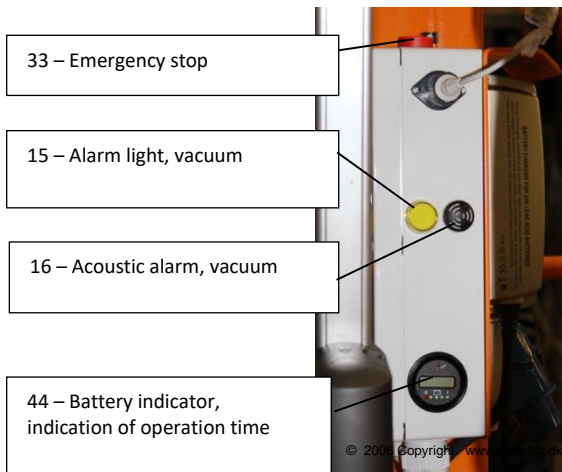
(bottom of machine)



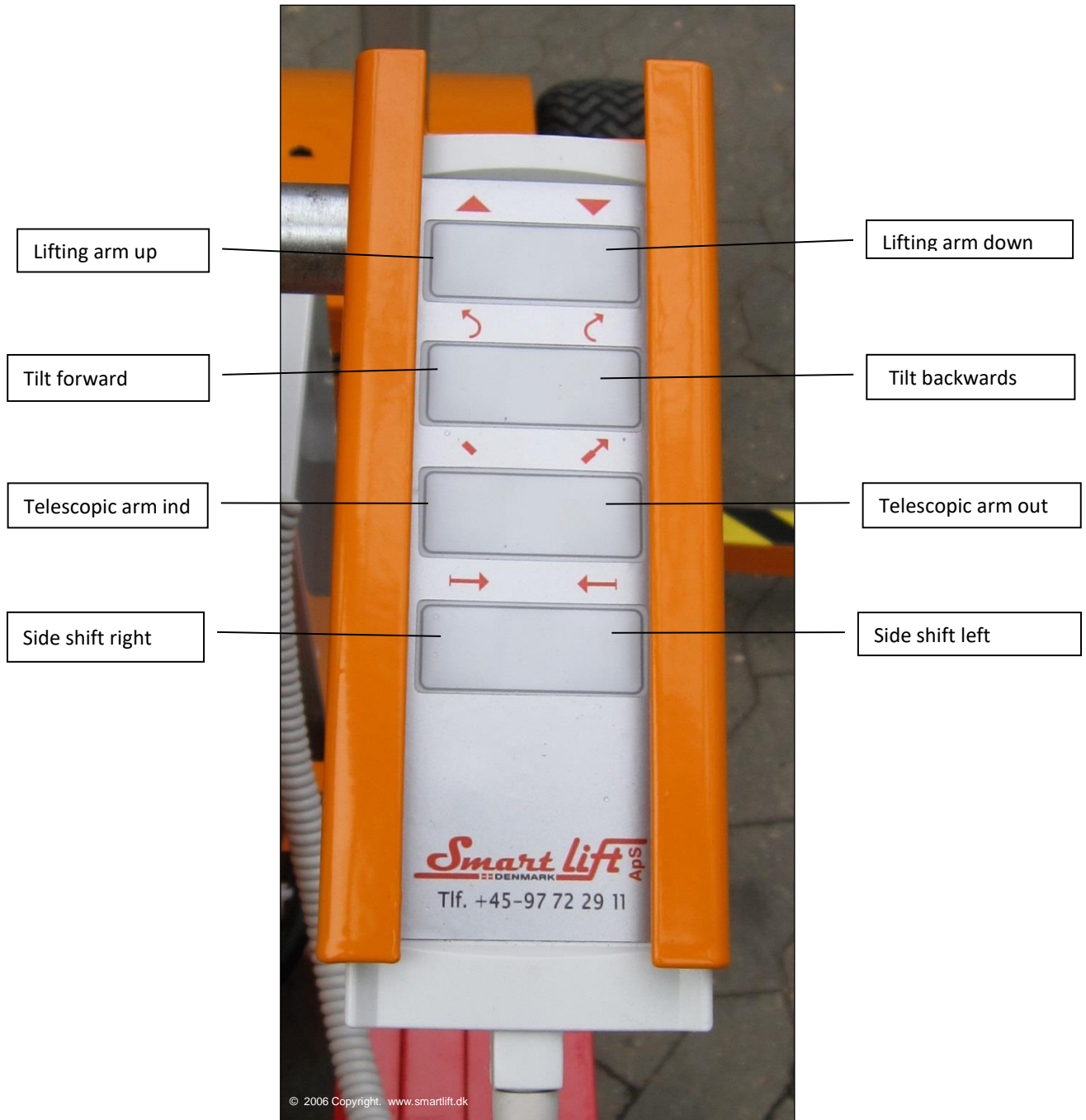
Control Box



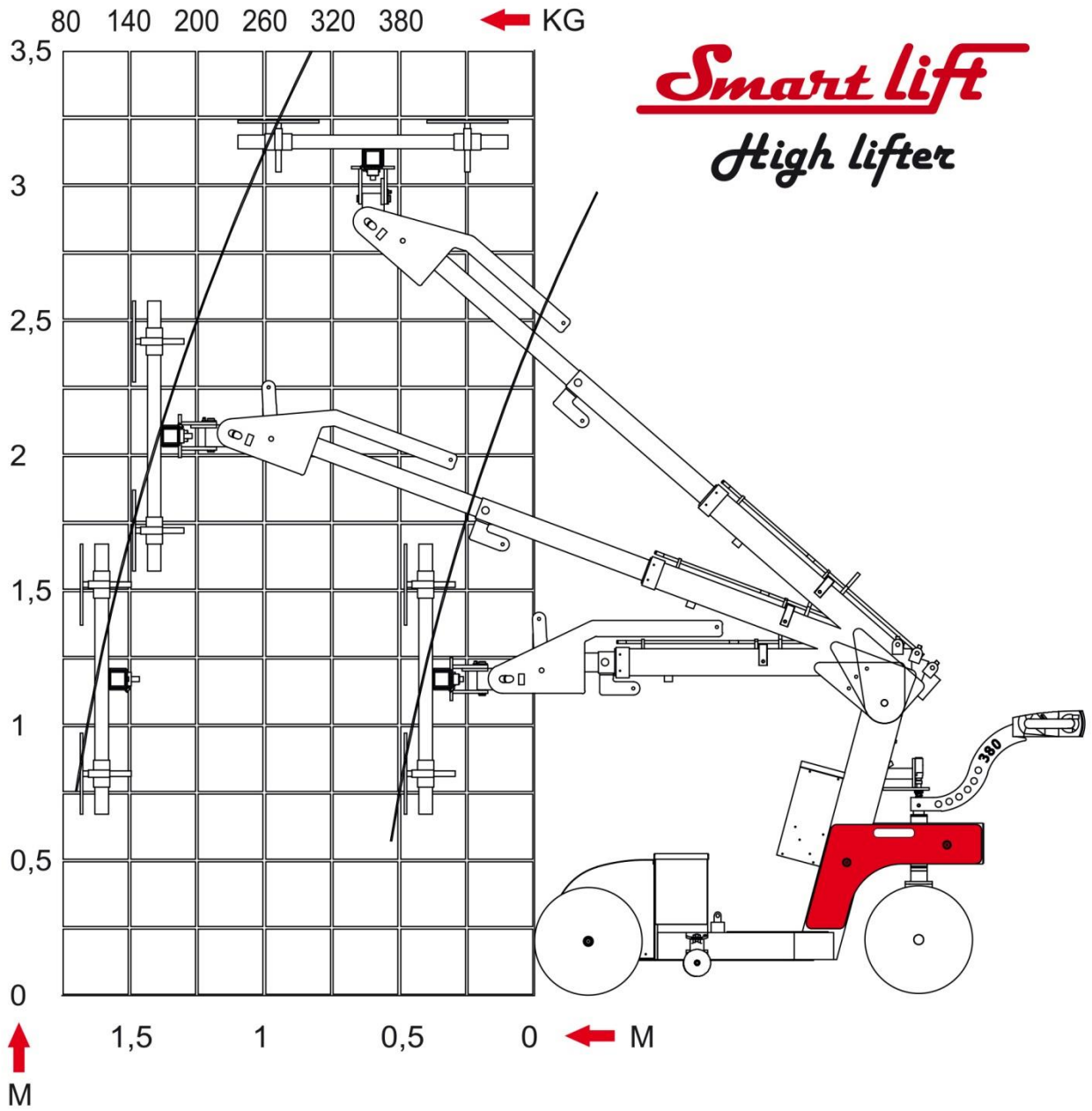
Switches and alarms



Control panel for arm and yoke (pos. 32)



SMARTLIFT 408 OUTDOOR High Lifter

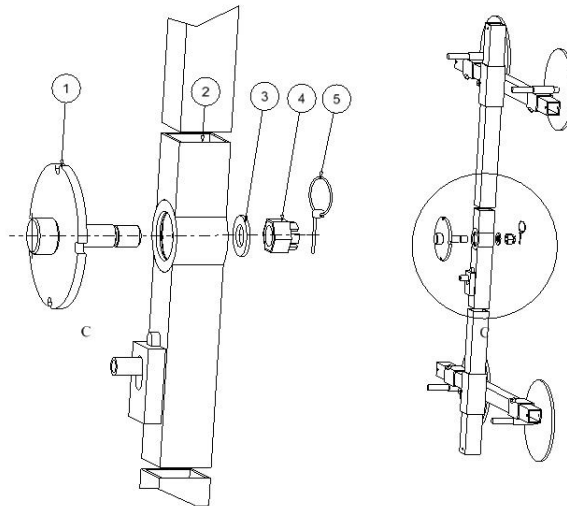


When operating High Lifter please be aware of:



If the yoke has been dismantled, be aware that the washer is placed between the castle nut and the yoke.

Tighten by hand



THE SUPPORTING LEGS MUST ALWAYS BE UNFOLDED WHEN DRIVING OFF ROAD



Stop Down troubleshooting

For any fault on Smartlift, first look into the options below:

- Has anything visible been broken, or is anything unusual, about the machine? Is there any murmuring or noise?
- Have the batteries been charged, and the main switch switched on? (the On/Off button on the drive handle shall have been switched on (lighting) to read battery voltage on battery indicator)
- Has the emergency stop button switched the machine off? (placed on grey control box)
- Has the safety switch been switched off on account of overloading (placed under pressure switches)?
- Is the hose set intact, and has it been connected correctly?

Troubleshooting and remedying of faults will be divided into three overall categories:

1. **Vacuum** (machine capacity for sucking work)
2. **Movements controlled via control panel** up and down function of lift arm, tilting of yoke, side shift of machine.
3. **Drive controlled by regulating lever** – Forward and back function of machine.



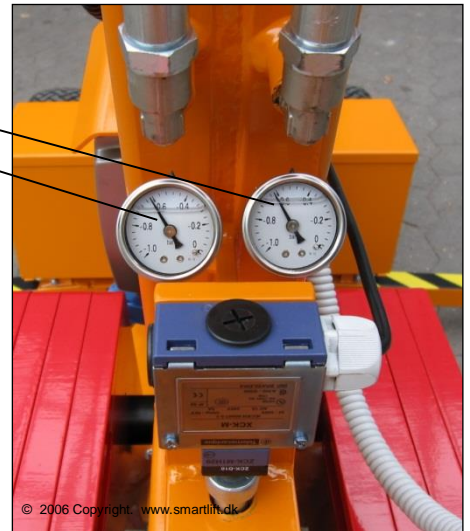
© 2006 Copyright. www.smartlift.dk

1. Stop Down vacuum system



Slide valve w/safety lock for activation and deactivation of vacuum suction.

Vacuum suction on both pressure gauges to be 0.62 bar (between 0.6 – 0.7 bar)



If – vacuum pump will not run.

Always check that there is power on the machine, and that it has not been disconnected by switch or by fuse in the control box. Relay for pump may also be defective.

If – vacuum pump runs constantly.

Check that the slide valve is closed (should be closed to generate vacuum). Read pressure gauge (should be about 0.60).

If – the pressure gauge indication is constantly about 0.7 bar or more.

In that case, there will be a fault on the vacuum guard.

If – the pressure gauge is constantly appr. 0.55 bar or less, and the pump is running.

In that case there would be a fault on the vacuum pump, or a leak on the hose connection between check valve and vacuum pump.

If – the pressure gauge indication drops after the main switch has been disconnected, and the slide valve closed.

In that case, there will be a fault – a leak between slide valve and check valve. Pressure gauge, slide valve or vacuum guard may be defective. If hoses are dismantled at couplings, and the pressure continues to drop, the fault will be with the slide valve.

If – the vacuum pump starts and runs constantly, possibly with dropping pressure, when the slide valve is opened, in connection with suction of work.

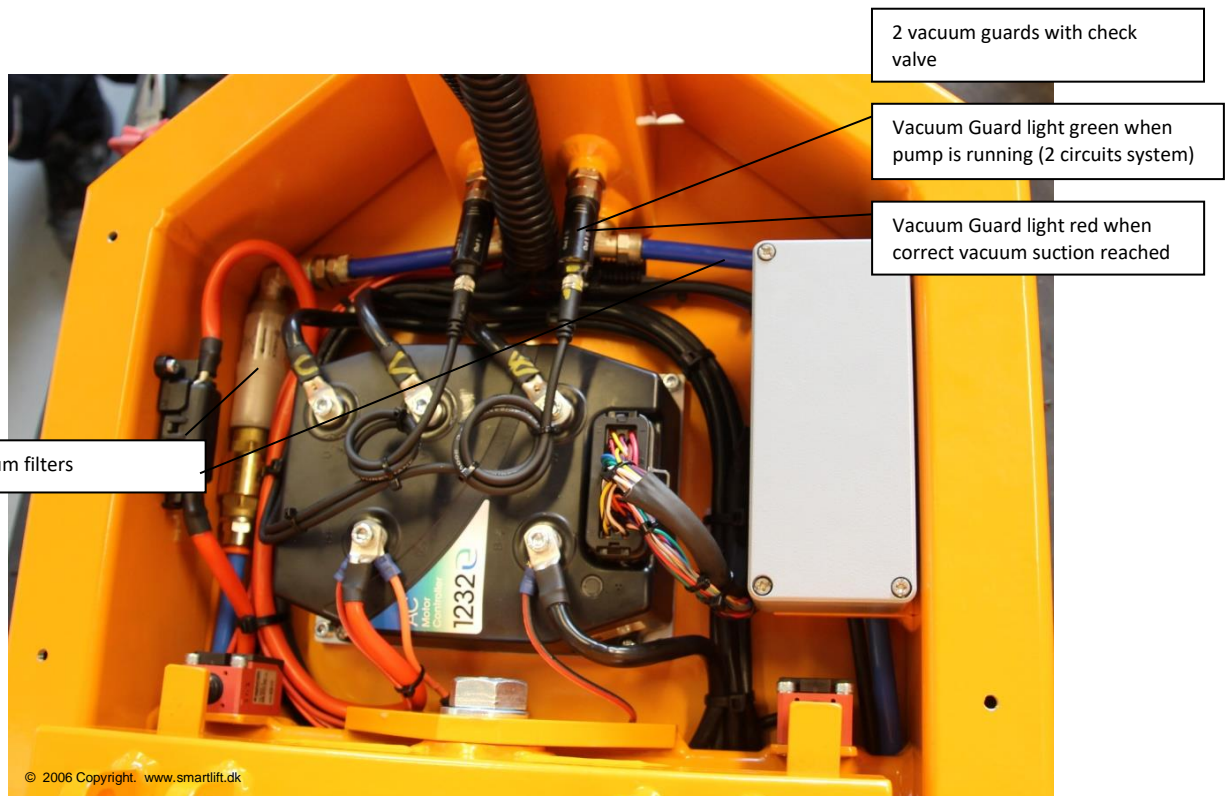
Check that all suction cups bear correctly on the work, i.e. that the particular suction cup is parallel with the work, and that no parts of the suction cups protrude from the work (IMPORTANT !!!).

If – the vacuum pump starts and stops at very brief intervals.

Dismantle spiral hoses at couplings and close the slide valve if this has not been done already. If the vacuum pump still starts and stops at very brief intervals, there may be a fault on the check valve.

If – the vacuum pump starts and runs, and stops at brief intervals, possibly with dropping pressure on one or both pressure gauges, when the slide valve is opened, after correct suction of work.

Close slide valve. Disconnect one vacuum circuit at hose coupling, and then open the slide valve for vacuum suction again. If the vacuum suction on the pressure gauge for disconnected circuit is now constantly 0.6 bar, there will be a fault on the hose set or at the suction cups in disconnected vacuum circuit. Test the same procedure in case of fault on the other vacuum circuit system. You may listen for leaks.



2. Stop-Down at "movements" controlled via control panel

If – no response to pushing control panel, all functions

Has emergency stop been released? Reconnect emergency stop by turning the emergency button. Check whether main switch is on (placed on battery case between lift actuators) – to be turned clockwise to switch on.

Check whether the control panel connector is correctly placed in the control box. Have batteries been charged? – on/off button on handle for drive should be on to read battery indicator?

Is 30-ampere fuse in control box OK?

Has the safety switch been activated? If activated, try to deactivate by pulling in the telescopic arm, or act as follows:

The safety switch has correctly switched off the machine.

To re-establish function on the machine, you may, for instance, using a screwdriver push up the switch, and the safety switch will resume its function.

The telescopic arm is run back in, and work too heavy for the machine is lowered back in place. Should the safety switch switch off again at this manoeuvre, you may, using your body weight, push the machine in place by applying pressure on the weight blocks.



If –no response when pushing control panel, individual functions,

Has the safety switch been activated? If activated, try one of the possibilities above. There may be a fault on actuators for movements, or when controlling these.

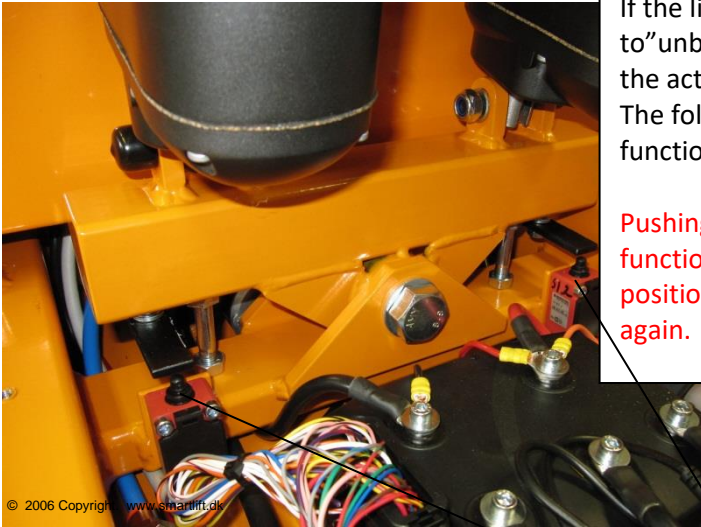
Actuators, and Control of these

For faults on movements of actuators, always first check visually and by review of the machine whether anything visible is wrong, or “wrong” from an acoustic point of view, from one of the actuators. Lines may be loose or torn, and bolts may be loose. Finally, the actual actuator telescopic arm may be bent. The machine has totally five actuators. 1 for tilting of yoke, 2 for lifting of arm, 1 for telescoping of arm, and 1 for side shift.



In particular lines at the bottom of these two lift actuators may, by carelessly wrong and unfortunate operation of SL-408, have been damaged at connector or line.

Fault on lift actuator



If the lift actuators, or one of these, stop due to "unbalanced" load, one of the safety switches under the actuators will have switched off the power supply. The following may be done to re-establish normal function:

Pushing the operation panel button repeatedly to function "down" will run lift actuators to bottom position, and both actuators should run synchronously again.

Safety switch for non-synchronous running on actuator



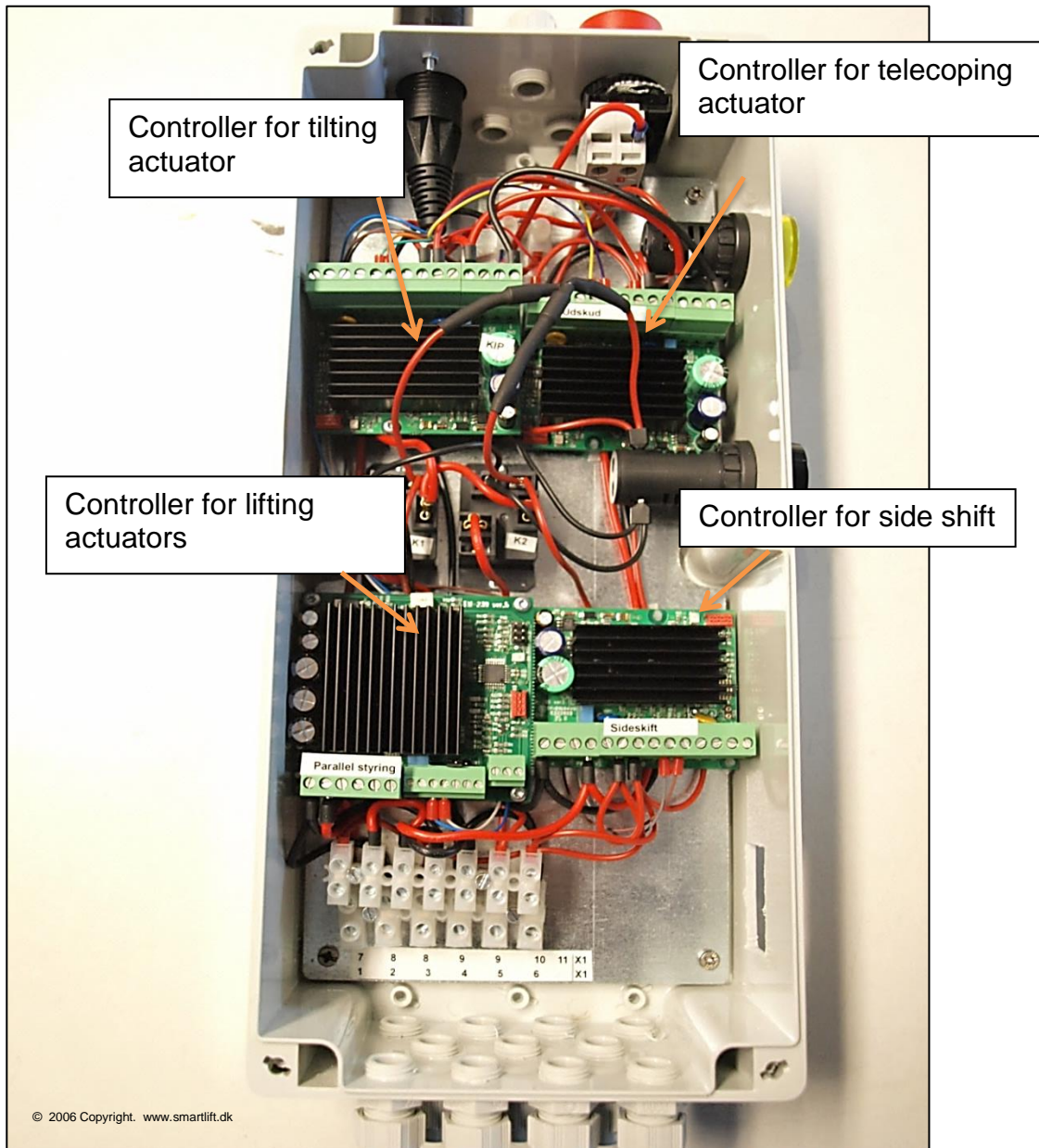
Actuator for tilt function

Actuator for telescopic arm

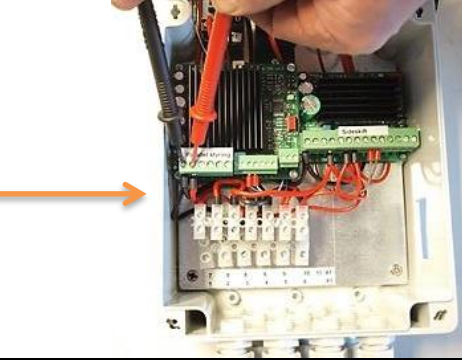
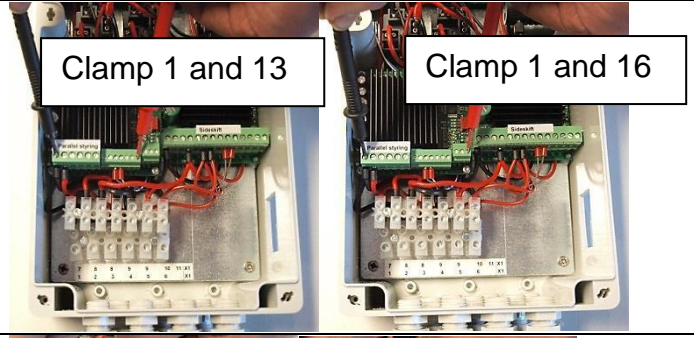
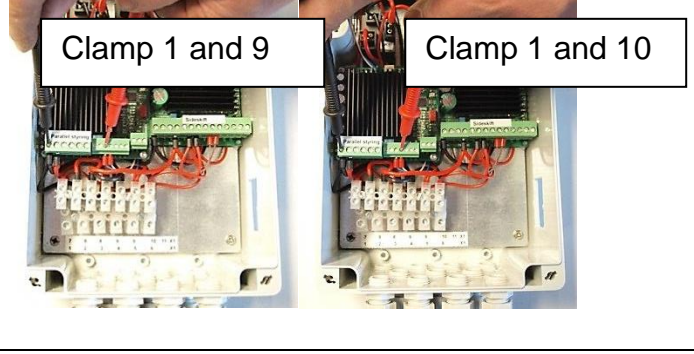
Here, too, all lines should be undamaged, and placed correctly at lead-ins etc.

Service sticker – According to legislation SL-OUTDOOR must be serviced once a year

Control box with controllers for all actuators

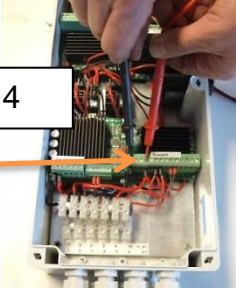
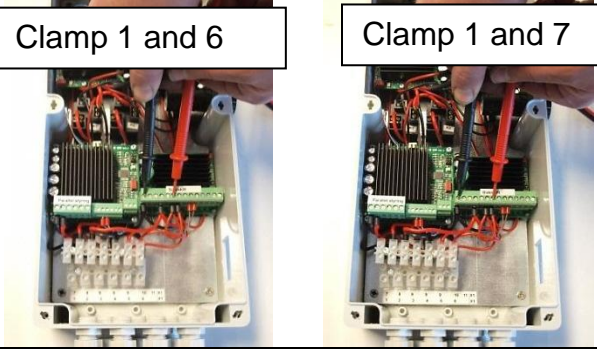
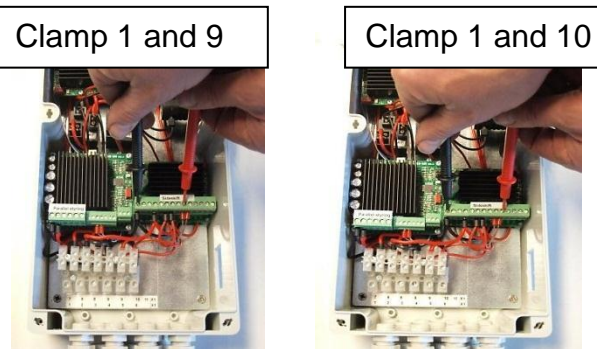
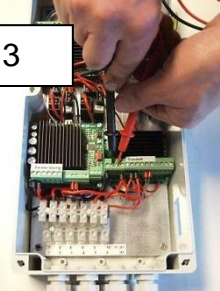
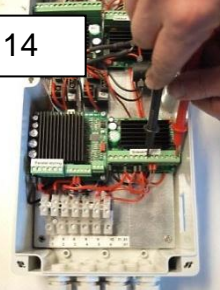


Synchronous controller (controller for lifting actuators)

<p>Controller for lifting actuators (2 pcs.) Voltage between clamps 1 and 2 must be approx. 24 Volt</p>	
<p>Safety switch below the lifting actuators can be switched off. Voltage between clamp 1 and 13 must be approx. 24 Volt</p>	
<p>Press up and down on the remote control. Voltage between clamp 1 and 9 and 1 and 10 must be approx. 24 Volt</p>	

Controller for single actuator (side shift, tilt of yoke, telescopic arm)

(The illustration is from side shift controller. The procedure is the same for tilt and telescoping)

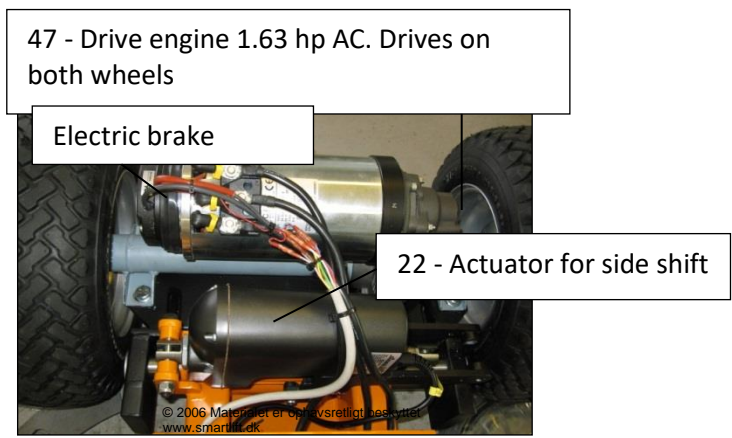
<p>No reaction on actuator for side shift, tilt of yoke or telescopic arm.</p> <p>Voltage must be + 24 Volt (Clamp 1 and 4)</p>	 <p>Clamp 1 and 4</p>
<p>Security switch can be abrupted</p> <p>Voltage must be + 24 Volt between Clamps 1 and 6 as between 1 and 7</p>	 <p>Clamp 1 and 6</p> <p>Clamp 1 and 7</p>
<p>Fault on remote control when moving single actuators</p> <p>Voltage must be + 24 Volt between clamps 1 and 9 as between 1 and 10</p>	 <p>Clamp 1 and 9</p> <p>Clamp 1 and 10</p>
<p>Activate the control panel for movement of tilt, side shift or telescopic arm.</p> <p>Voltage between clamps 2 and 3 must be 24 Volt or more</p>	 <p>Clamp 2 and 3</p>
<p>No reaction on movements and none of the above faults.</p> <p>Voltage between clamp 8 and 14 must be + 5 Volt</p> <p>If this is not the case, the print on the controller can be defective</p>	 <p>Clamp 8 and 14</p>

3. Stop-Down at Drive Section

If - no response at activation on regulating lever (no click sound)

Check whether the main switch is on – to be turned clockwise to switch on. Is the switch on the regulation handle for on/off in position ON? – Have the batteries been charged (check indicator)?

Is the 100 Ampere fuse for the driving motor intact? Is the 10 Ampere fuse for the motor controller intact?



Tyre pressure max for all four wheels:
43 PSI/2,95 Bar/295 Kpa.

Battery charger

Victron Energy - Blue Power Charger IP65



For complete manual refer to:

<https://www.victronenergy.com/upload/documents/Datasheet-Blue-Power-Battery-Charger-IP65-90-135VAC-EN.pdf>

INDICATIONS:

LED indication

Yellow LED on:

Yellow LED on and green LED on:

Green LED on:

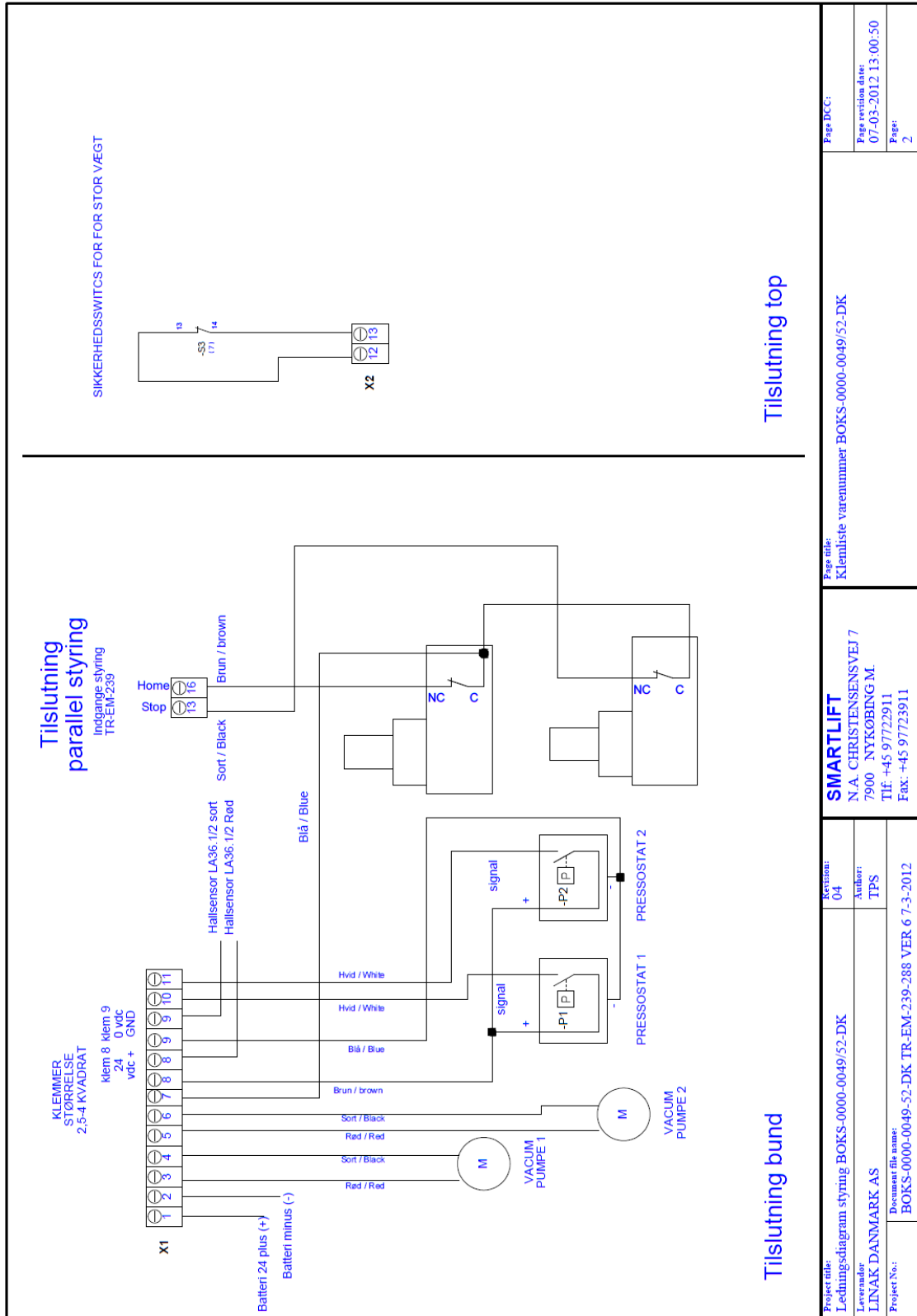
Description

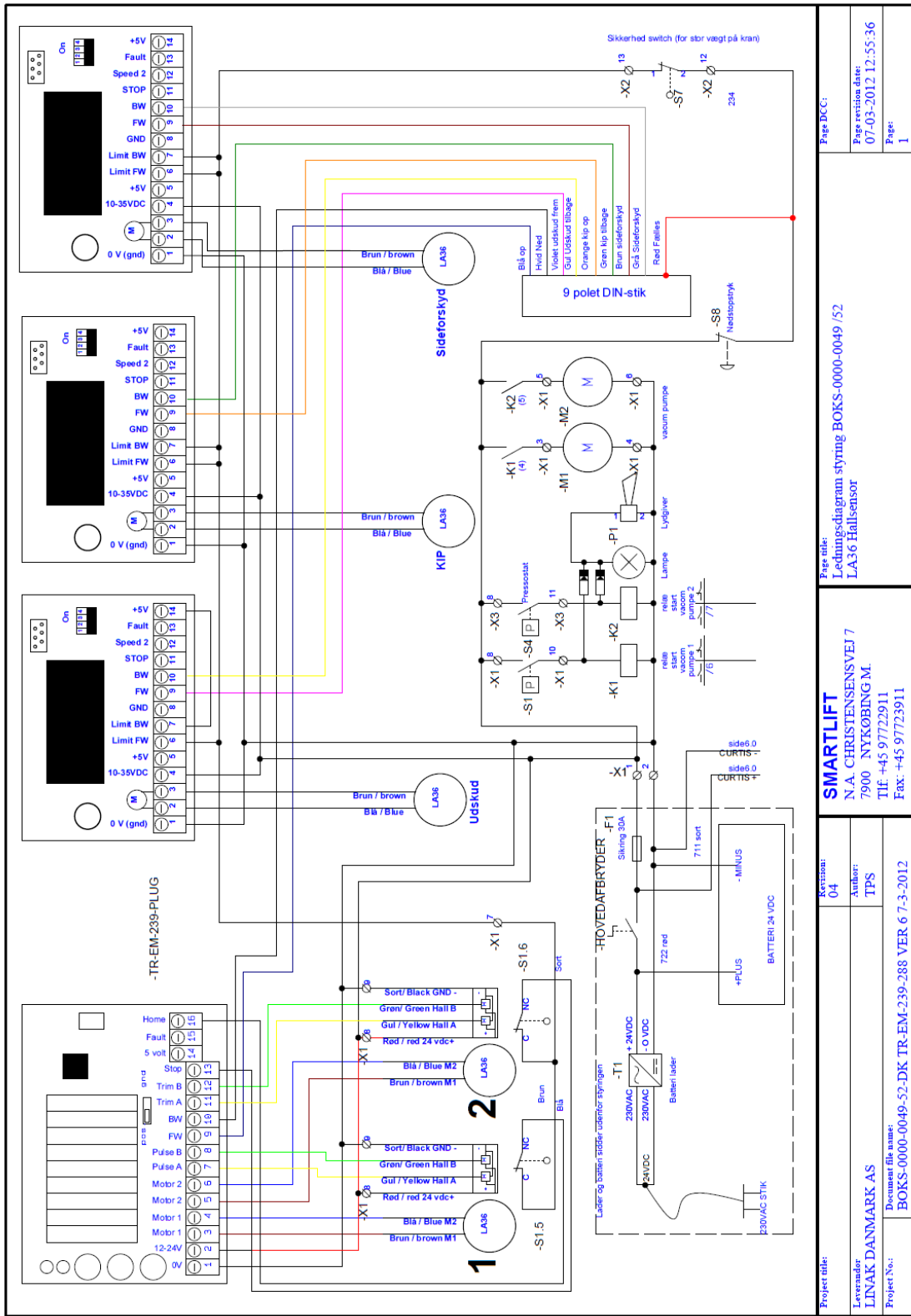
battery being charged.

absorption charge.

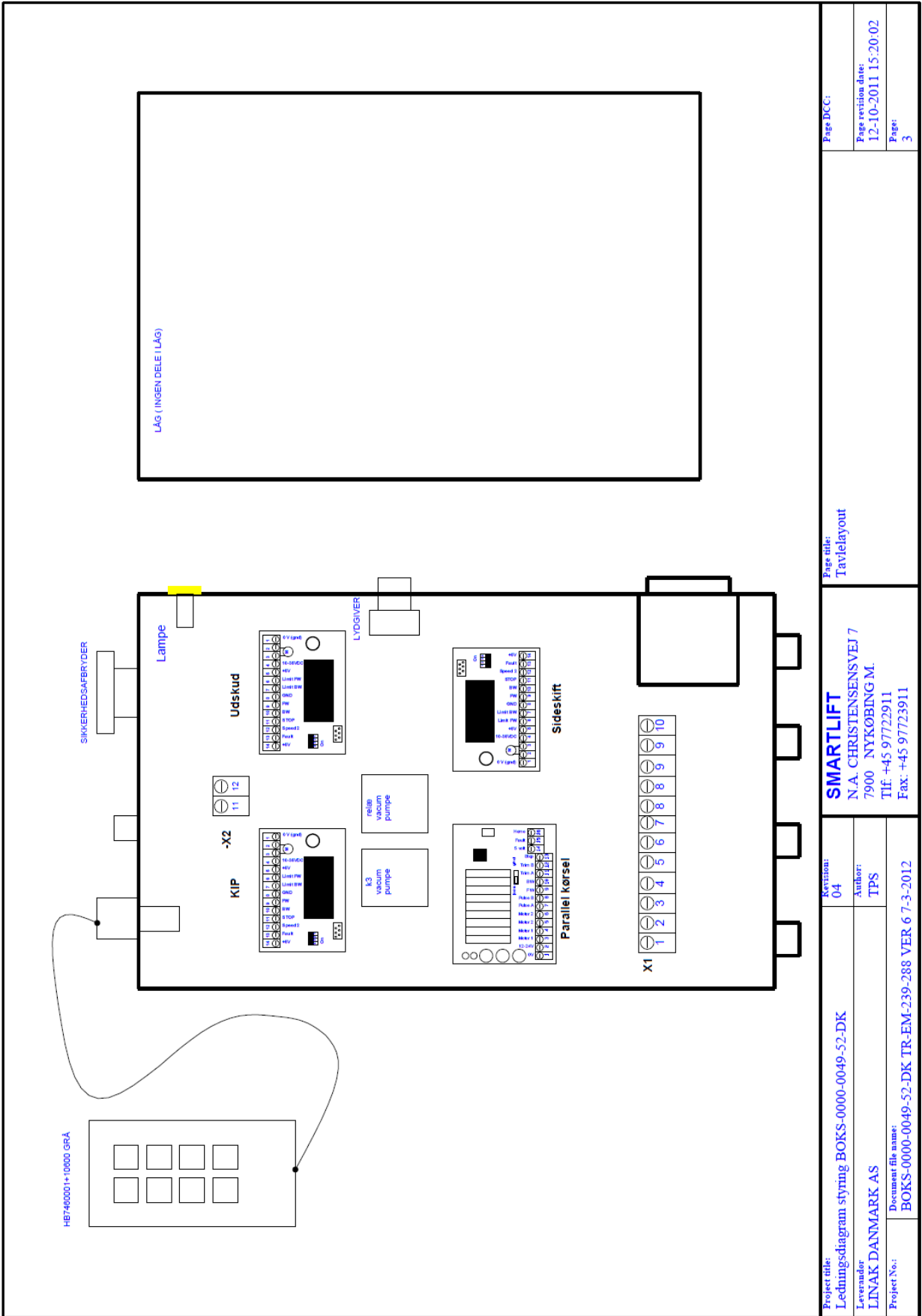
battery fully charged, float charge.

WIRING DIAGRAMS





<p>Page title: Ledningsdiagram styring BOKS-0000-0049 / 52 LA36 Hallsensor</p>	<p>Page revision date: 07-03-2012 12:55:36</p> <p>Page: 1</p>
<p>Project title: Kestonnet 04</p>	<p>Author: TPS</p>
<p>Lawender: LINAK/DANMARK AS</p> <p>Project No.:</p>	<p>Document file name: BOKS-0000-0049-52-DK TR-EM-239-288 VER 6 7-3-2012</p>



Projekt filnavn: Ledningsdiagram styring BOKS-0000-0049-52-DK	Revisjon: 04	Side filnavn: Tavlelayout	Side DCC: Page 3
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Wiring for SL 408 Outdoor High Lifter

Engine	Brown	1	Pin 13 Red/Blue	Curtis controller
	Blue	2	Pin 5 Pink	
	Yellow	3	Pin 8 Green	
	Grey	4	Pin 32 Red/Green	
	Red	5	Pin 26 Brown	
	White	6	Pin 31 Grey/Blue	
Steering	Yellow	7	Pin 24 Yellow/Red	
	Brown	8	Pin 11 Pink	
	White	9	Pin 33 Pink/Black	
	Grey	10	Pin 16 Grey/Black	
	Green	11	Pin 1 Red	
	Blue	12	Pin 22 Violet/Red	
	Red	13	Red	
Battery Indicator	Red	14	Pin 25 Red	
	Blue	15	Pin 28 Blue	Curtis controller
	Green	16	Pin 29 Green	
Engine	Green	÷	Negative	
	Pink	÷		
Steering	Pink	÷		
Battery Indicator	Black	÷		
Curtis controller	Black Pin 7	÷		