

# User Manual

# *Smart Lift*®



**Model/type:** SL 580 MAXI – 1.36 hp

*Smart Lift*  
DENMARK

# Table of Contents

Table of Contents	2
Introduction	3
EU Declaration of Conformity	4
General Description	5
Transport/Handling/Putting into operation/Storage/Technical Data	6
Safety Rules	7
Overview/ - General Description	8
Load Diagram. Safety Function for vacuum	9
Drive Operation and Vacuum function	10
Stop – Emergency stop	11
Control Panel	12
Main Switch. Battery	14
Battery Charger	15
View of Vacuum System. Top/bottom	16
Operation of Yoke	17
Stop-Down Troubleshooting	18
Stop-Down at Vacuum System	19
Stop-Down at movements	21
Control box for actuators	23-26
Stop-Down at drive	27
Dimensioned sketch	28
Wiring Diagram	29-31

## Introduction

Congratulations on your new **SL 580 MAXI**

Smart LIFT 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 Smart LIFT 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 Tange Jørgensen

## EU Declaration of Conformity



Manufacturer  
Smart LIFT A/S  
N.A. Christensensvej 39  
DK - 7900 Nykøbing Mors

Hereby declares that:

The machine/system: Lift  
Model/type: **SL 580 MAXI** – 1.36 hp  
Serial No.:  
Year/Month: 2016 /

has been made in conformity with Council directive

- Machine directive 2006/42EC
- Low voltage directive 2006/95/EC + 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:

\_\_\_\_\_

\_\_\_\_\_

## General Description/List of Spare Parts

	Pos.nr.	Product	Number
<b>Vacuum</b>	1	Pump 007 BDC 24V	2
	2	Suction Cup diam 15,75"	4
	3	Check Valve ½", vacuum	2
	5	Slide Valve w/lock, vacuum	2
	6	Vacuummeter diam 40, stainless	2
	10	Hose Set	1
	11	Hose Coupling	2
	12	Spiral Hoses	2
	13	Vacuum Guard	2
	14	Vacuum Hose diam 10 mm	2
	15	Alarm light, Vacuum	1
	16	Acoustic alarm, Vacuum	1
	17	Line Filter VTF – 38-IN	2
	19	Stainless spring on Yoke	4
	20	Clamp MRX.80 P-M10-25	6
	21	Actuator – Tilting function - LA 36	1
	22	Actuator – Side Change- LA 36	1
	23	Actuator – Telescopic Arm LA – 36	1
	24	Actuator – Lift Arm LA – 36	2
<b>Power supply</b>	25	Battery 2 x 90A	2
	26	Charger Blue Power Charger IP65	1
<b>Wheels</b>	27	Wheel, EK-MASSIV 16 – 30	2
	30	Supporting wheel	2
<b>24 V</b>	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 Change	1
	37	CE Connector	1
	38	Ermax Main Switch 24 V	1
	39	Fuse 30 Ampere Control	
	<b>Various</b>	40	Lock Split
41		Lift Eye	1
44		Battery indicator	3
45		Weight Blocks	10
46		Supporting Leg	2
<b>Drive</b>		47	Motor 1.36 hp/24 V
	47a	On/OFF switch for Drive Motor	1
	47b	Fuse 80 Ampere Motor	1
	48	Regulating Lever	1
	49	Curtis Motor Control	1
	50	Safety Clamp	1
	51	Safety Switch	1
	52	Forward and back switch	1

## Transport/Handling

Smart Lift is for indoor handling and should only be used outdoors on a completely stable and firm base.

### **May not be exposed to rain / snow and much moisture**

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

Smart Lift to be fastened securely in truck/trailer for transport.

Lifting by crane and similar: Always lift Smart Lift in lift eye intended for this purpose (pos. 41).

NEVER lift under Smart LIFT by forks (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 Smart Lift on the main switch (pos. 38), before storage.

Smart Lift should always be kept dry. **Moisture may affect the machine functionality.**

Batteries should always be fully charged for long-term storage.

## Technical Data

Total Height	55.9 in
Total Width	30.7 in
Total Length	66.9 in
Net Weight	1051 lb
Weight Blocks	48.5 lb x 10 pcs. = 485 lb
Total Weight incl. 10 weight blocks	1536 lb
24 V DC	
Charger 110 V – CE connector	

# Safety Rules

## Daily Use

Your Smart LIFT 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.

Always see that (pos. 45) has been locked with lock split (pos. 40).



### **WARNING! Explosion Danger!**

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



### **DANGER!**

Staying under the lifted work is strictly prohibited.

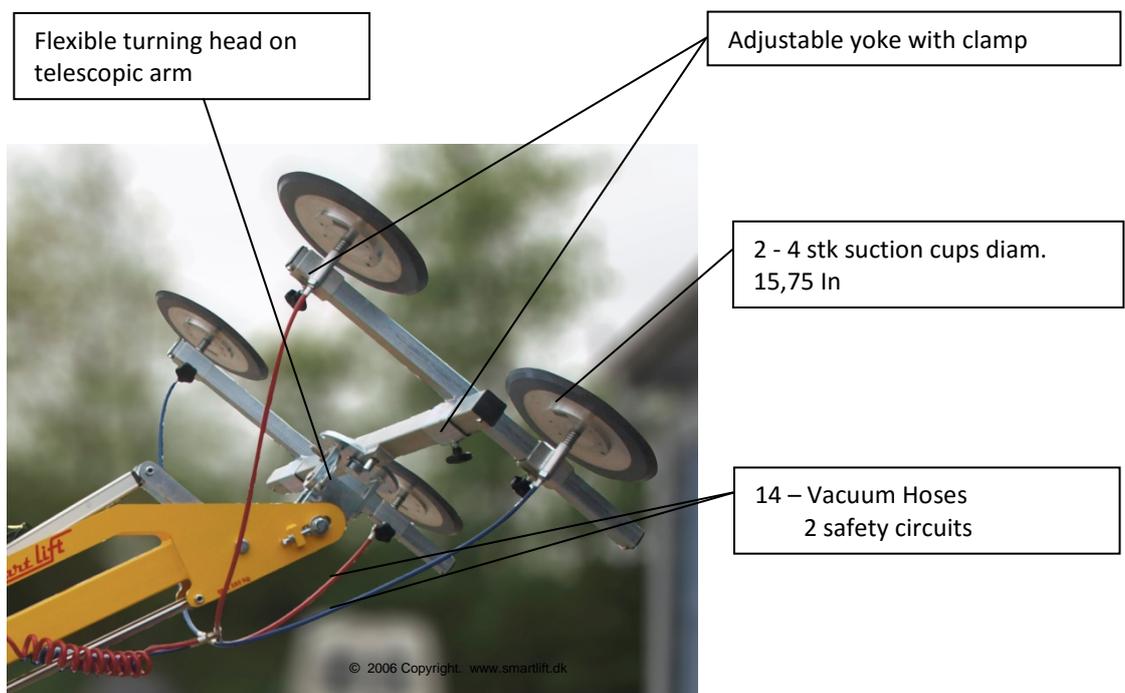
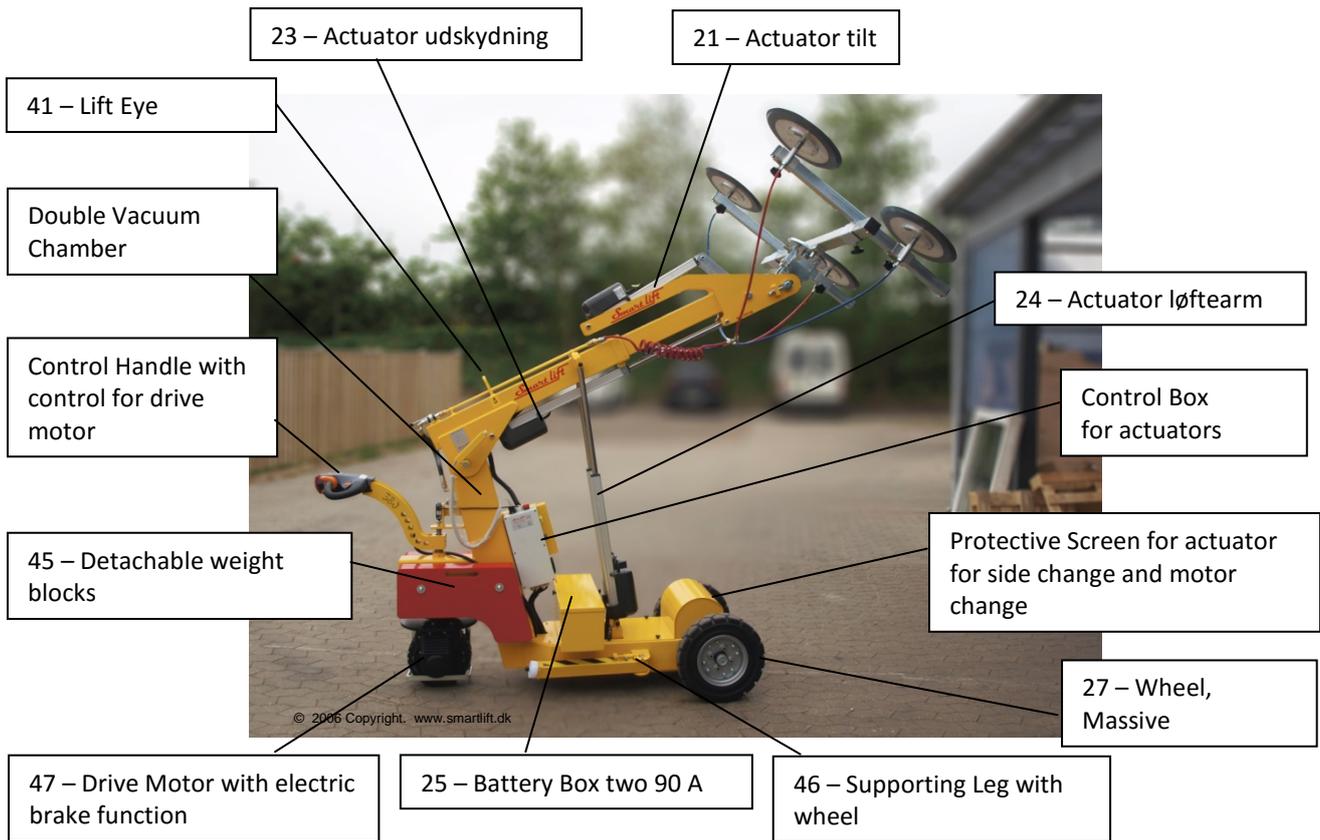


### **PROHIBITED!**

May NOT be used for lifting persons.

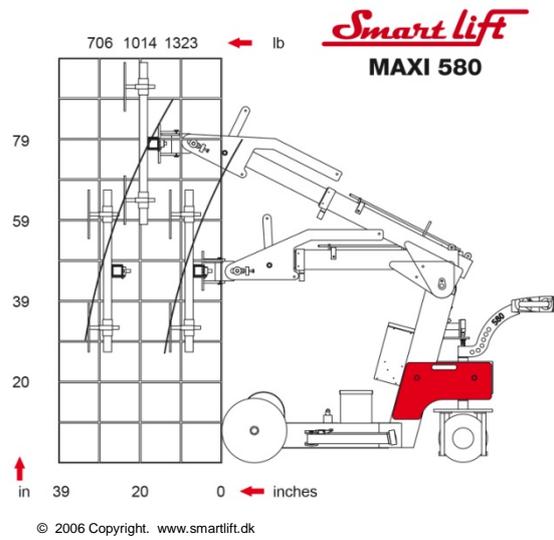


## Overview/ - General Description

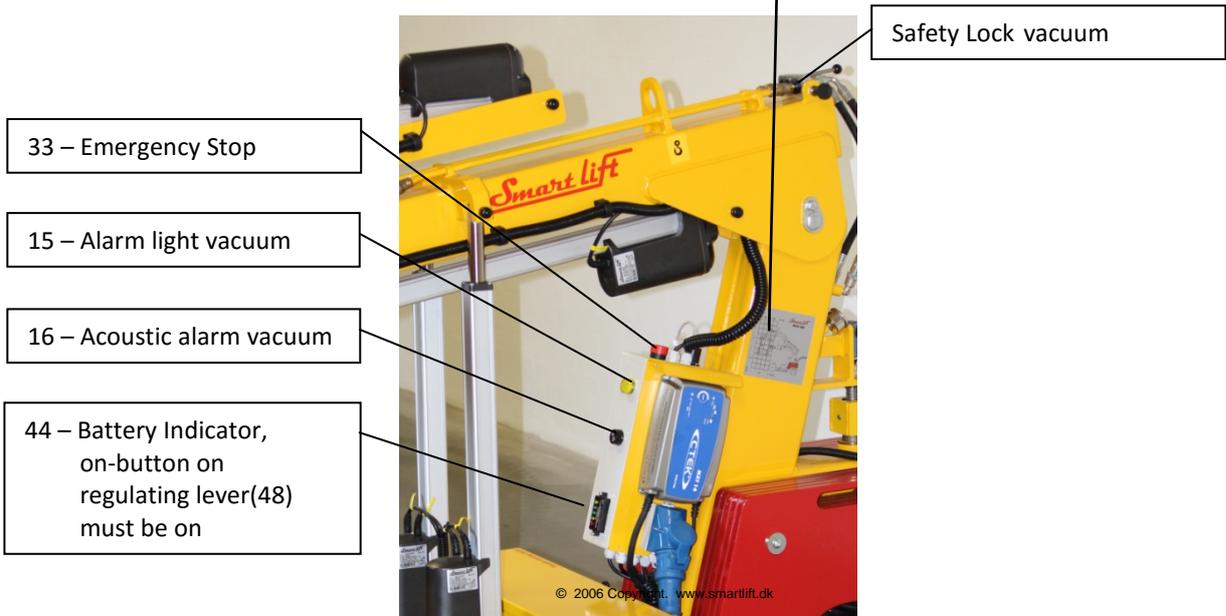


# Load Diagram

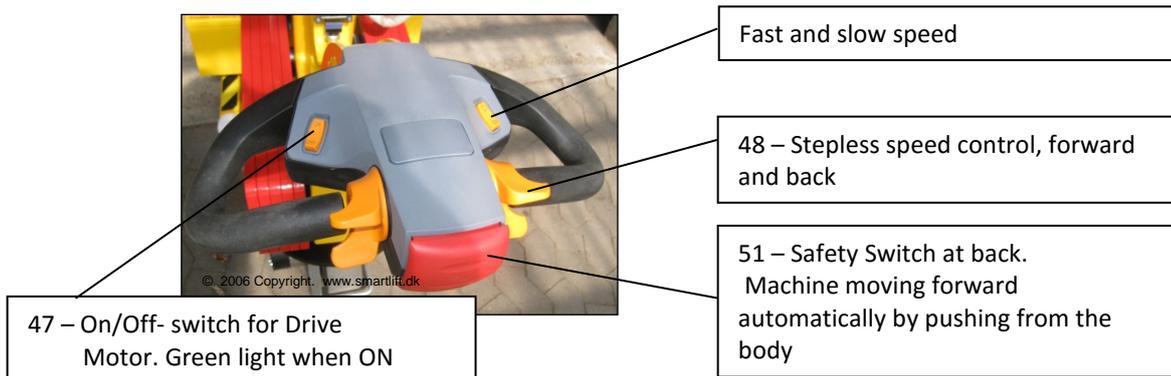
**NOTE!!**  
Load diagram attached to left side of machine



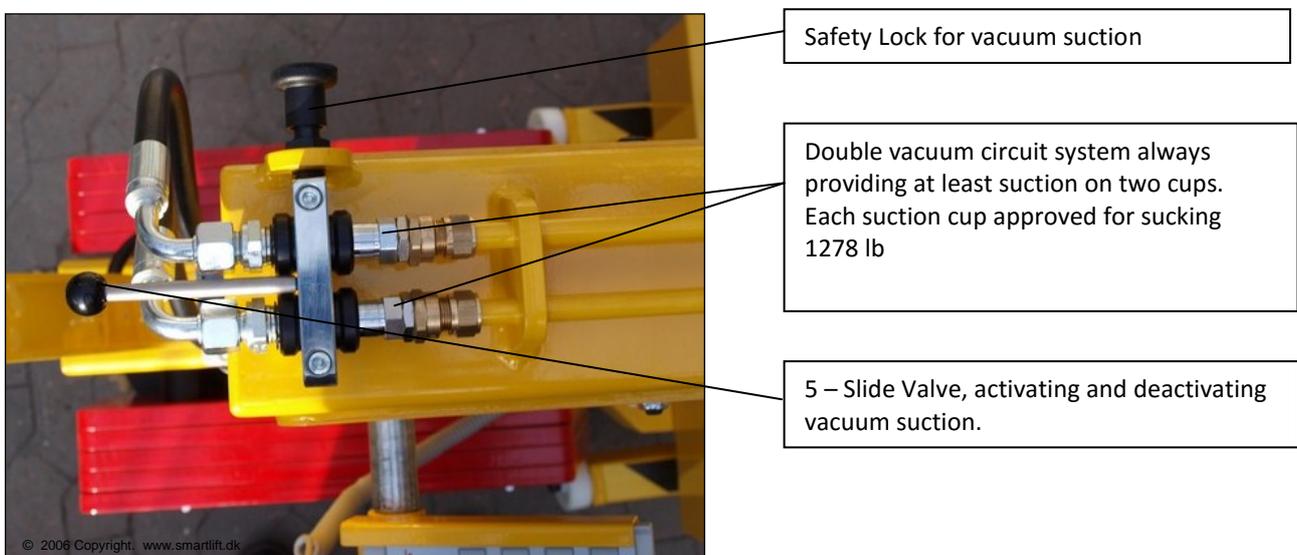
# Safety Function Vacuum



## Drive Operation (forward and back)



## Operation for VACUUM function: (machine viewed from above)



This function (pos. 5) will switch vacuum on and off. The vacuum pump is controlled by a pressure gauge and will start the pump at 0.53, and will switch off at 0.62. The vacuum function is activated by using the handle on the slide valve and is deactivated by the same – simultaneously with pulling out the button on the safety lock.



2 separate vacuum chambers

6 – 2 vacuummeters. One for each circuit.  
To show 0.5 – 0.7 for normal operation  
Should show 0.5 – 0.7 for normal operation

31 – Safety switch for overload on yoke.  
For activation of disrupted machine see section “Troubleshooting”

© 2006 Copyright. www.smartlift.dk

**STOP/EMERGENCY STOP function:**

The emergency stop button, ( pos. 33), has been placed on the actual control box. This button will turn off the actuators, electric control, as well as the drive motor.



CE Identification Sign

Control Box, containing controls for actuators, fuse 30 A for same.

16 – Acoustic alarm for missing vacuum suction

15 – Alarm light for missing Vacuum suction

Battery-indicator



© 2006 Copyright. www.smartlift.dk

## Control Panel (pos. 32) for operation of lift arm telescopic arm, tilting of yoke, and side change:



32 – Operation panel placed in special holder on the machine right hand side. May be kept manually free out of holder but be aware that the connector may not come loose at the control box

It is important that users read the function description below so that the operator will be familiar with the machine mode of operation

Smart LIFT is operated manually. This machine generally has four functions which may be operated individually or simultaneously

### **UP/DOWN function:**

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

### **TILT Function:**

This function makes the work turn round. This movement is performed by actuator, (pos. 21).

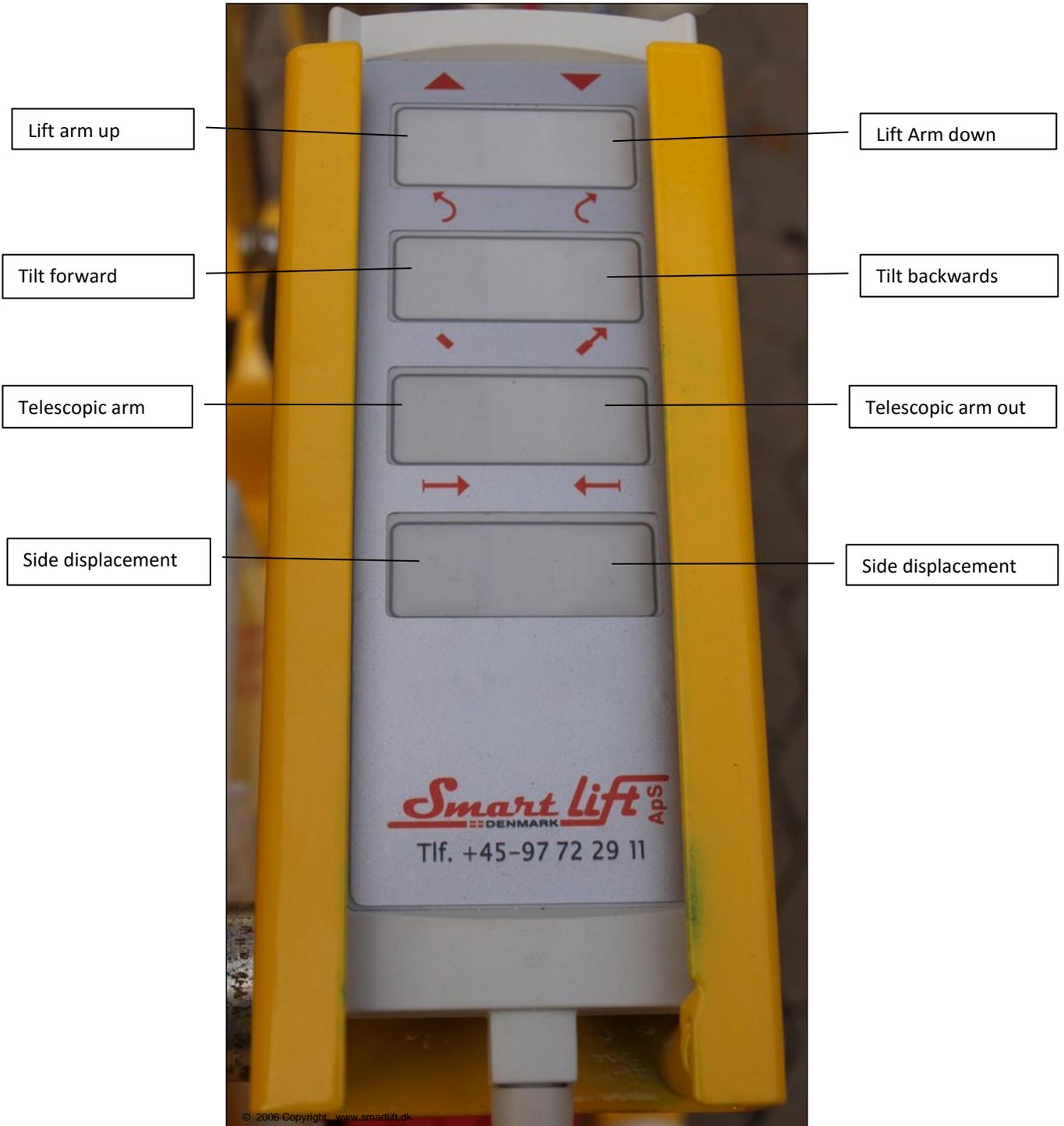
### **TELESCOPIC Function:**

This movement is performed via actuator which is placed under the lift arm (pos. 23).

### **SIDE DISPLACEMENT Function:**

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

# Control Panel



## Main Switch:

Main switch for all electric functions is placed on the battery case by the lift actuators. Turn the switch clockwise to switch on the electric connection on the machine, and the opposite way to switch off all.



38 – Main Switch, switching off all functions on el. on the machine

## Battery Case:



25 – Two 90A

## Battery Charger:



26 –Charger

37 – 110 Volt CE-connector

The battery case contains two 12 volt batteries connected in series for 24 volt operation. The batteries are maintenance free

Integrated 24 volt charger with 110 volt CE connector. The charger can also be used as a voltage unit without having the battery connected. **PLEASE NOTE the charger is not sparkless in this position.**

## 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.

# View of Vacuum System

## Top of machine

5 – Slide valve with safety lock, activating and deactivating vacuum suction



11 – Hose couplings for 2 circuits BLUE CIRCUIT / RED CIRCUIT



6 – Vacuum meters for 2-circuit vacuum suction.

2-4 suction cups with spiral springs

## Bottom of machine

### (drive and vacuum)

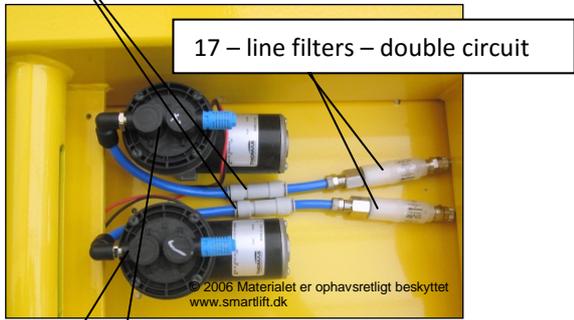
22 – Actuator for side shift

49 – Curtis controller for drive

47B – Fuse 80A for driving engine



3 – Check valves – double circuit



1 – 2 vacuum pumps 24 volt

## Operation of Yoke



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***

20 – 6 clamps for setting of width and height for suction cups mounted on the yoke

46 – supporting legs always to be unfolded during work with the machine

## Turning vertically



Smartlift MAXI may with sucked work turn round 360° vertically and 180° horizontally.

**NB !!**  
**Always be aware that all handles and locks are locked and in position**

## Turning horizontally



Safety locking pawl for turning vertically 360°



Positioning bolt. Keeping the turning head locked in fixed position when yoke is required to be turned to one of the sides. Span 180°

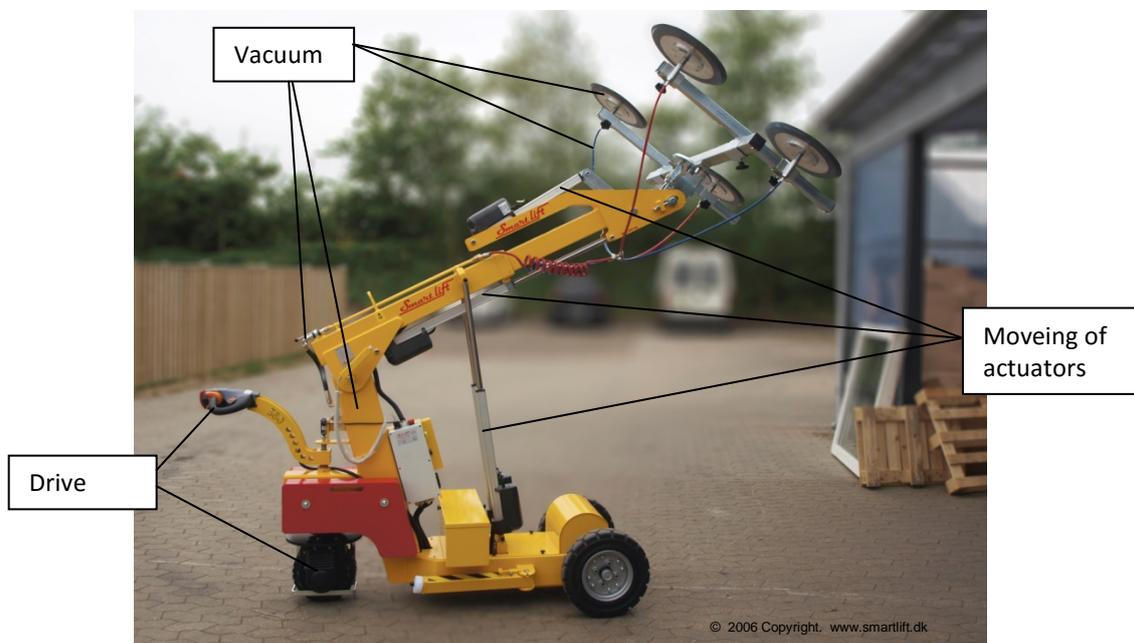
## Stop-Down Troubleshooting

On 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? (located 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 **3 overall categories:**

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



## Stop-Down at Vacuum System



Vacuum suction on both pressure gauges to be 0.62 between 0,6 -0,7)

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



*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 is constantly about 0.7 or more.*

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

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

In that case there would be a fault on the vacuum pump, or 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 – 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, 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.

Bottom of Smartlift MAXI



Vacuum pump

Check valves – 2 circuits + filters



## Vacuum Guard (two)

Vacuum guard light - red when vacuum suction has been attained



(Note: Frame no.)

Vacuum Guard light green when pump is running (2 circuits)



## **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 release pressure. 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 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, push to deactivate by pulling in the telescopic arm.



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. Possibly release safety switch using a screwdriver.

*If - no response when pushing operation panel, individual functions,*

Is the safety switch 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 actor 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 change.

Cable pipes with lines should be in all holders.



23 - Actuator for telescopic arm (LA36)



23 - Actuator for telescopic arm

21 - Actuators for tilt function (LA36)

24 - Actuators for lift arm (LA36)

38 - Main switch to be turned clockwise to be on



In particular, lines at the bottom of these 2 lift actuators may, by carelessly wrong and unfortunate operation of SL-580 **MAXI**, have been damaged at connector or line.

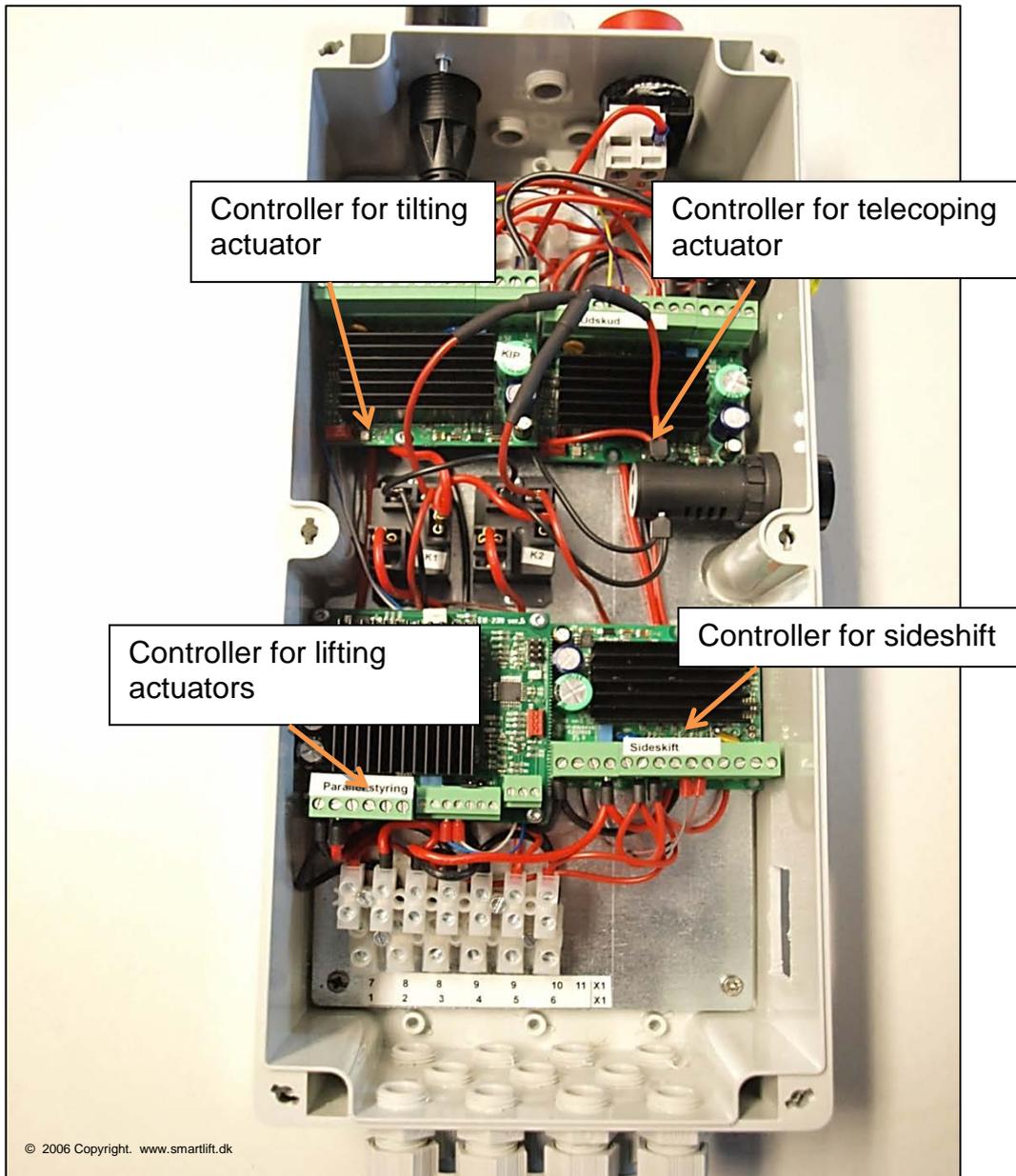


22 - Actuators for side shift (LA36)

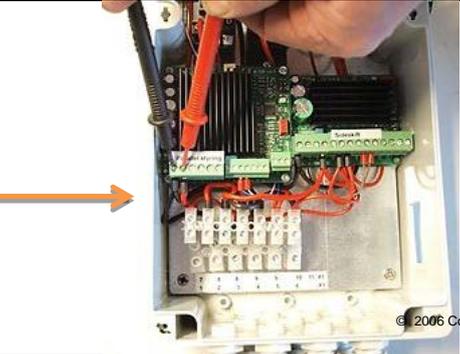
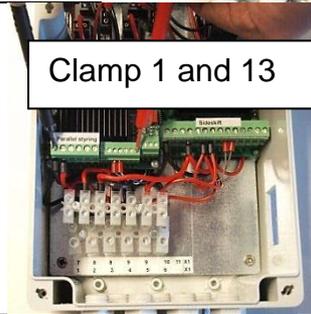
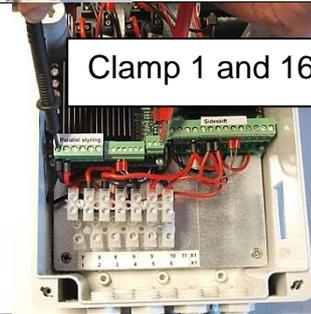
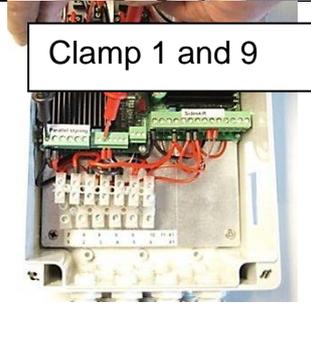
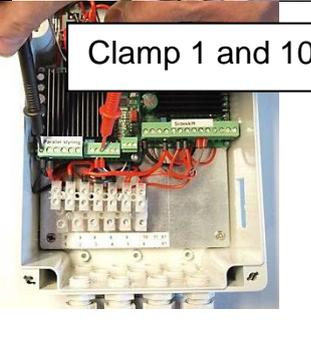
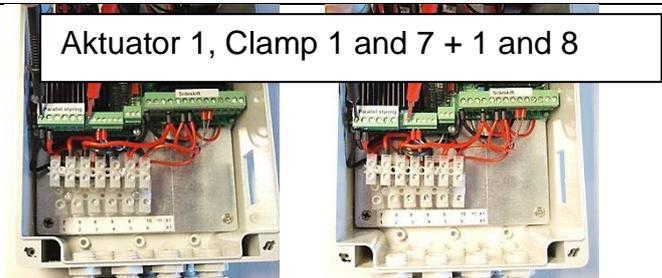
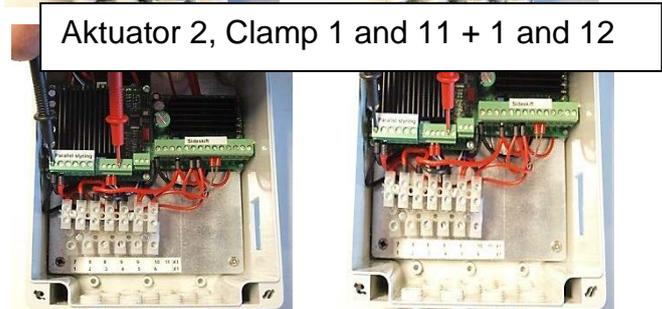
To check this actuator, remove the protective screen. In case of lacking or wrong function, check for any murmuring/noise and loose lines.

## Control box with controllers for all actuators

Faults on movement of actuators can be diagnosed by measuring systematically as described in the following two pages.

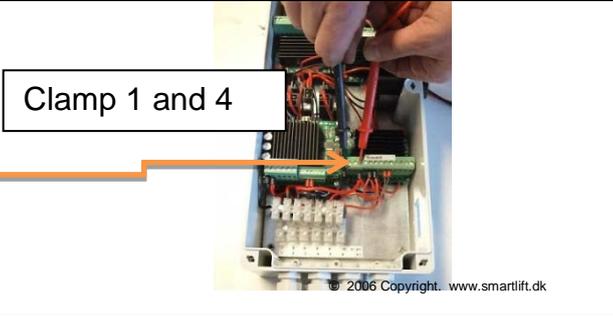
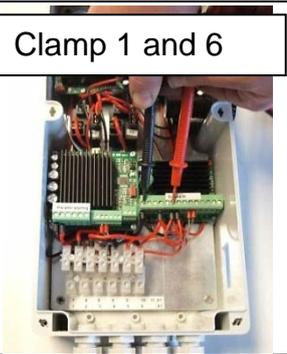
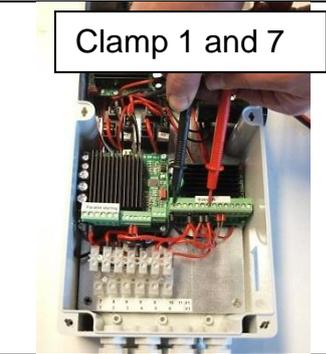
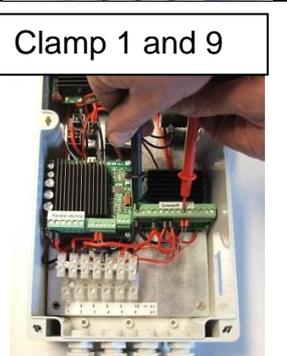
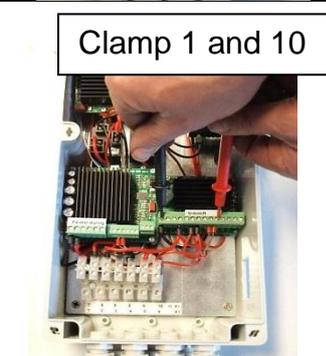
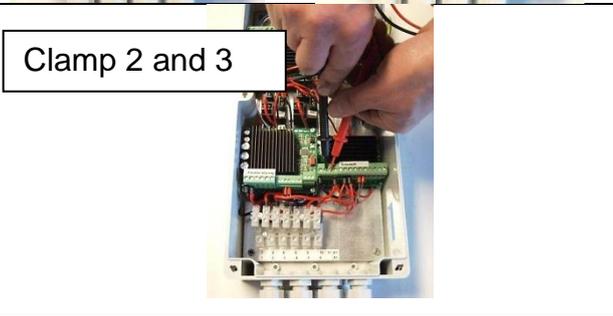
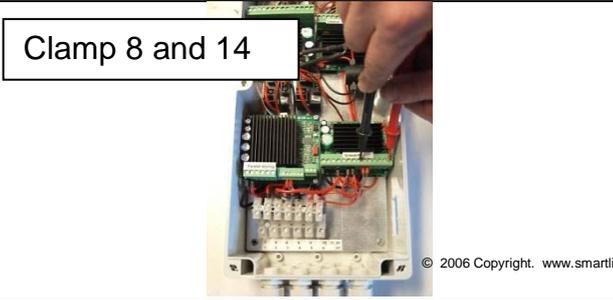


### Synchronous controller (controller for lifting actuators)

<p>Controller for lifting actuators (2 pcs.) Voltage between clamps 1 and 2 must be approx. 24 Volt</p>	 <p>© 2006 Copyright. www.smartlift.dk</p>
<p>Safety switch below the lifting actuators can be switched off. Voltage between clamp 1 and 13 must be approx. 24 Volt</p>	<div style="display: flex; justify-content: space-around;"> <div data-bbox="638 705 949 1019">  <p>Clamp 1 and 13</p> </div> <div data-bbox="965 705 1276 1019">  <p>Clamp 1 and 16</p> </div> </div>
<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>	<div style="display: flex; justify-content: space-around;"> <div data-bbox="638 1019 949 1368">  <p>Clamp 1 and 9</p> </div> <div data-bbox="965 1019 1276 1368">  <p>Clamp 1 and 10</p> </div> </div>
<p>Possible faults on pulses from lifting actuator can be checked by activating the control panel in steps. At the same time measure the voltage between clamps 1 and 7 as between 1 and 8 for actuator 1.  For actuator 2 between clamps 1 and 11 as between 1 and 12  The measuring device varies from 0-24 VOLT</p>	<div style="display: flex; flex-direction: column; justify-content: space-around;"> <div data-bbox="638 1368 1300 1646">  <p>Aktuator 1, Clamp 1 and 7 + 1 and 8</p> </div> <div data-bbox="638 1646 1300 1955">  <p>Aktuator 2, Clamp 1 and 11 + 1 and 12</p> </div> </div>

### Controller for single actuator (sideshift, tilt of yoke, telescopic arm)

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

<p>No reaction on actuator for sideshift, 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, sideshift 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 main switch is on - to be turned clockwise to switch on. Has the red On/Off switch on the regulating lever been put into position On (green lamp on)? Have batteries been charged (check indicator)? Is the 80-ampere fuse beside the motor control under the screen at the front of the machine OK? Check regulating lever and cables for visible faults and damage. There may be faults on lever or control unit.

Control light on switch may show error code at various flash signals (contact Smartlift)

47 a - ON/OFF switch



Fast and slow function

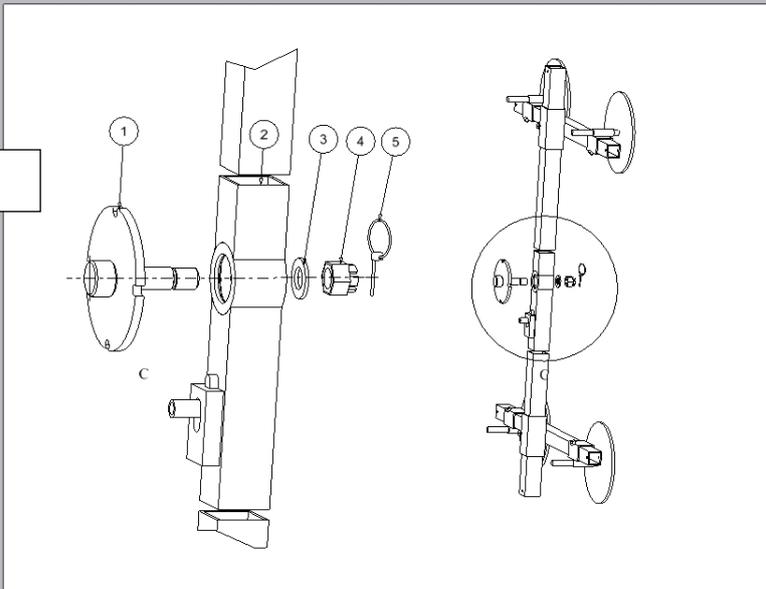
48 -Accelerator DRIVE, Forward and back

47 b - Fuse 80 A for drive

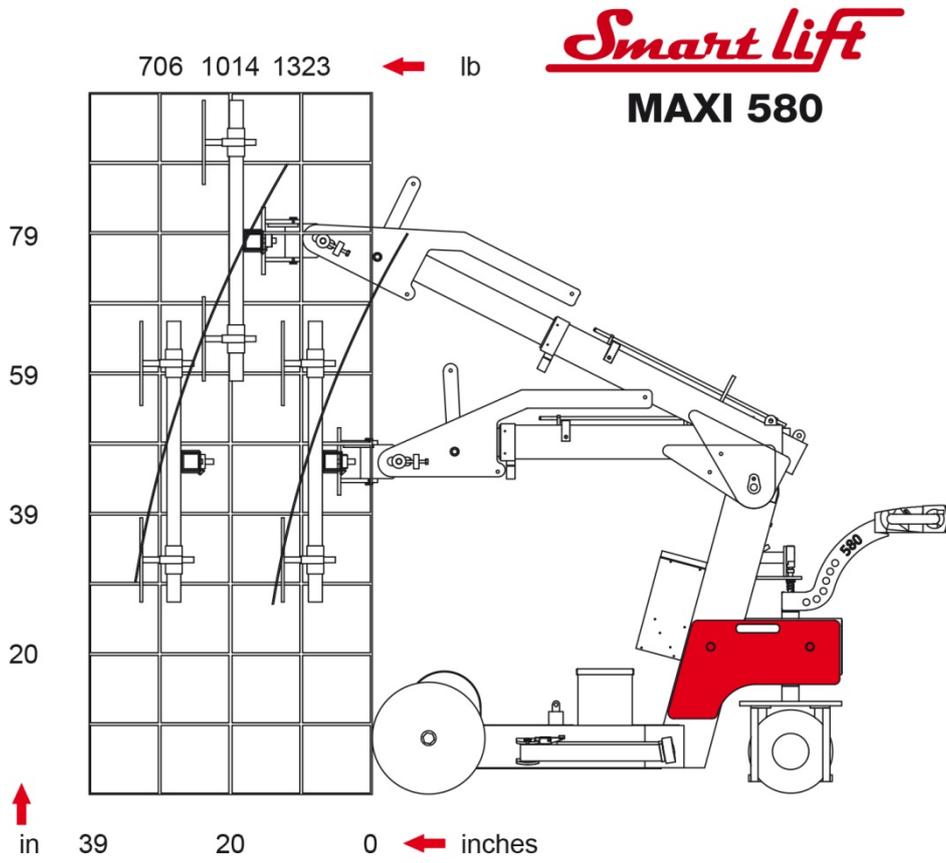


**If the yoke has been dismantled, be aware that the washer is placed between the castle nut and the yoke.**

Tighten by hand

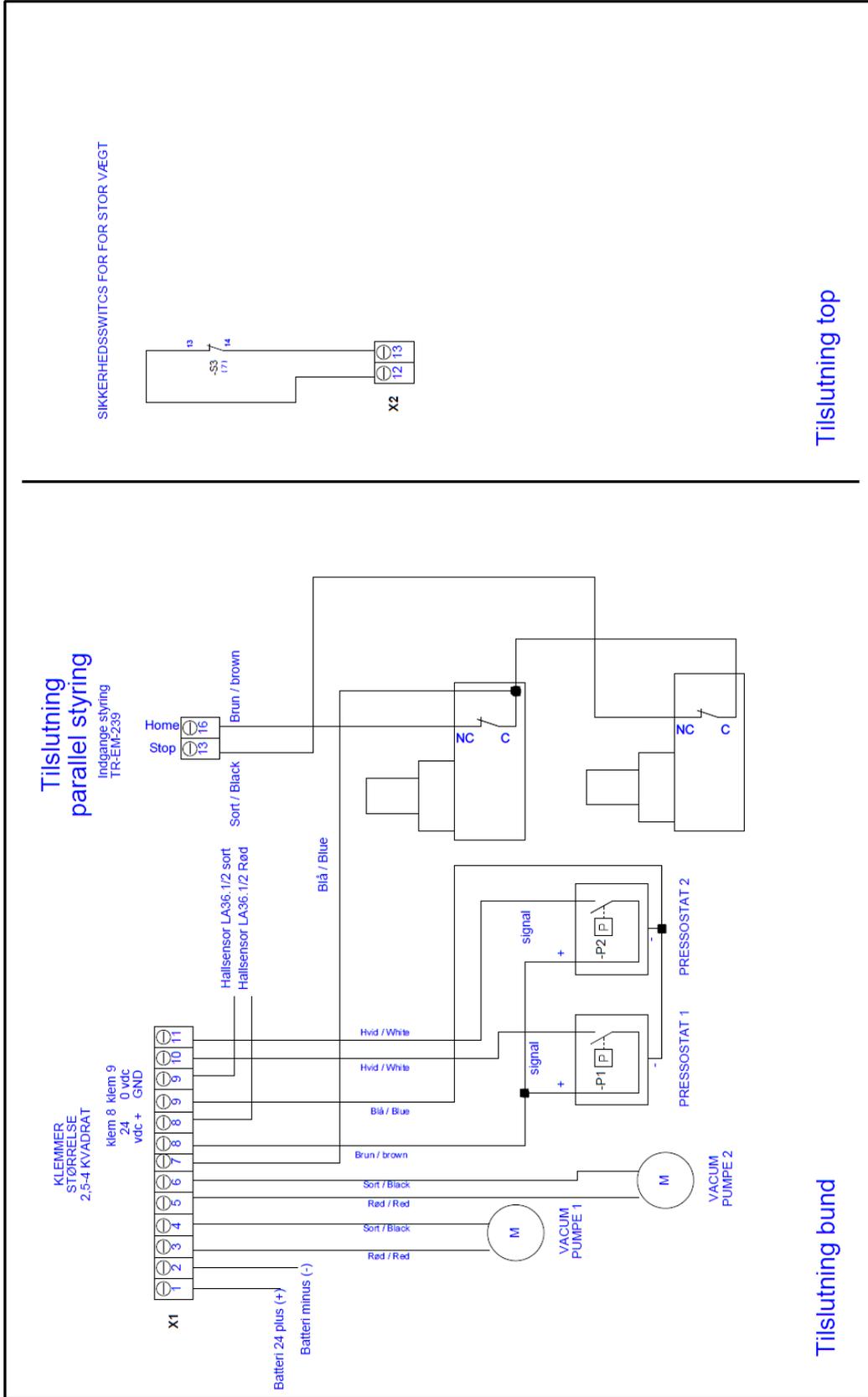


# Dimensioned sketch



© 2006 Copyright. www.smartlift.dk



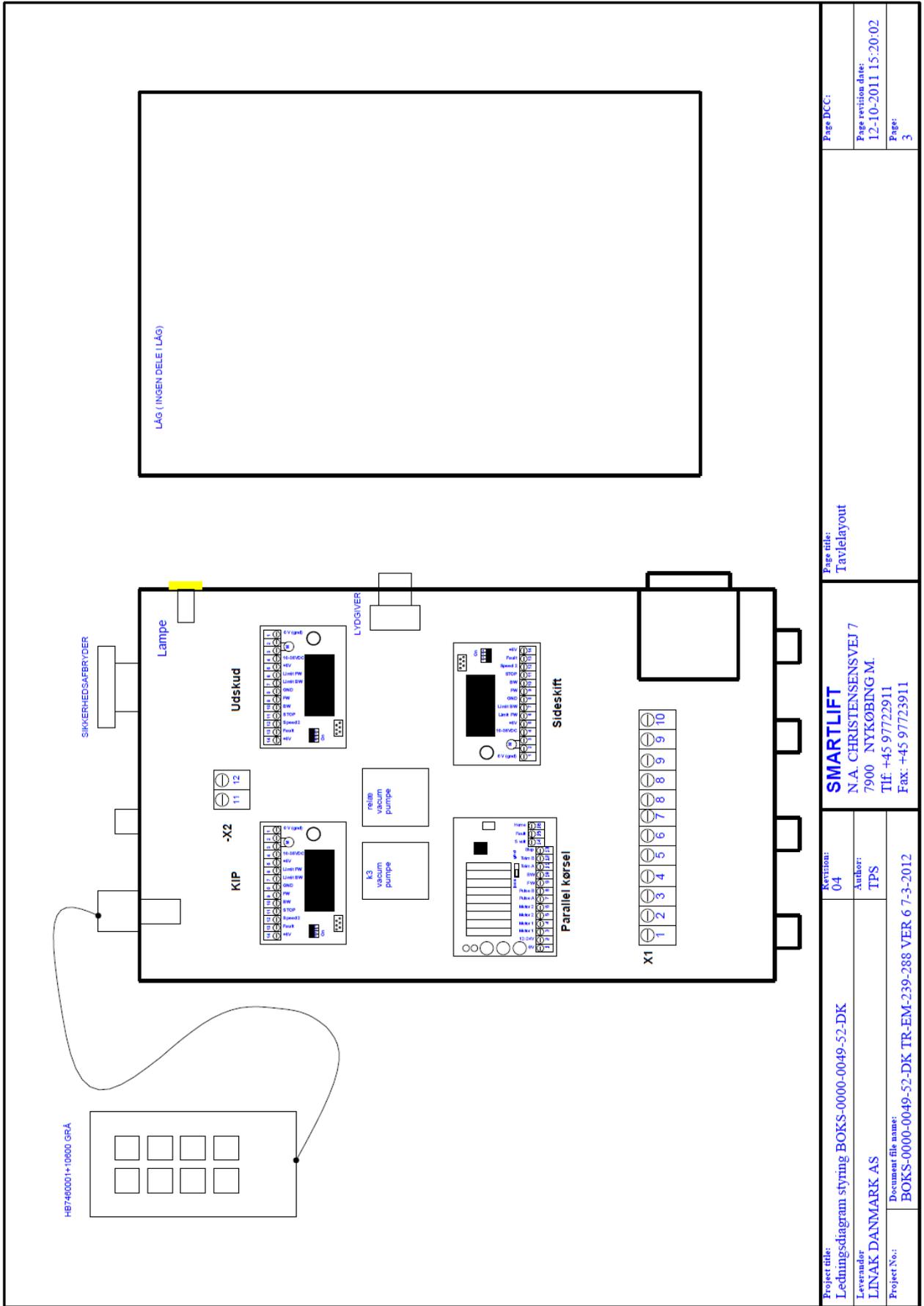


SIKKERHEDSSWITCS FOR FOR STOR VÆGT

Tiislutning top

Tiislutning bund

<p><b>SMARTLIFT</b> N.A. CHRISTENSENSVEJ 7 7900 NYKØBING M. Tlf. +45 97722911 Fax. +45 97723911</p>	<p>Page title: Klemliste varenummer BOKS-0000-0049/52-DK</p>	<p>Page DCC: Page revision date: 07-03-2012 13:00:50 Page: 2</p>
<p>Project title: Ledningsdiagram styring BOKS-0000-0049/52-DK</p>	<p>Revision: 04</p>	<p>Page DCC: Page revision date: 07-03-2012 13:00:50 Page: 2</p>
<p>Levnerader: LJNAK DANMARK AS</p>	<p>Author: TPS</p>	<p>Page DCC: Page revision date: 07-03-2012 13:00:50 Page: 2</p>
<p>Project No.: BOKS-0000-0049-52-DK TR-EM-239-288 VER 6 7-3-2012</p>	<p>Document file name:</p>	<p>Page DCC: Page revision date: 07-03-2012 13:00:50 Page: 2</p>



Project title: Lødningsdiagram styring BOKS-0000-0049-52-DK	Revision: 04	Page title: Tavlelayout	Page DCC:
Levemand: LINAK DANMARK AS	Arbejder: TPS	Page revision date: 12-10-2011 15:20:02	Page: 3
Project No.:	Document file name: BOKS-0000-0049-52-DK TR-EM-239-288 VER 6 7-3-2012		