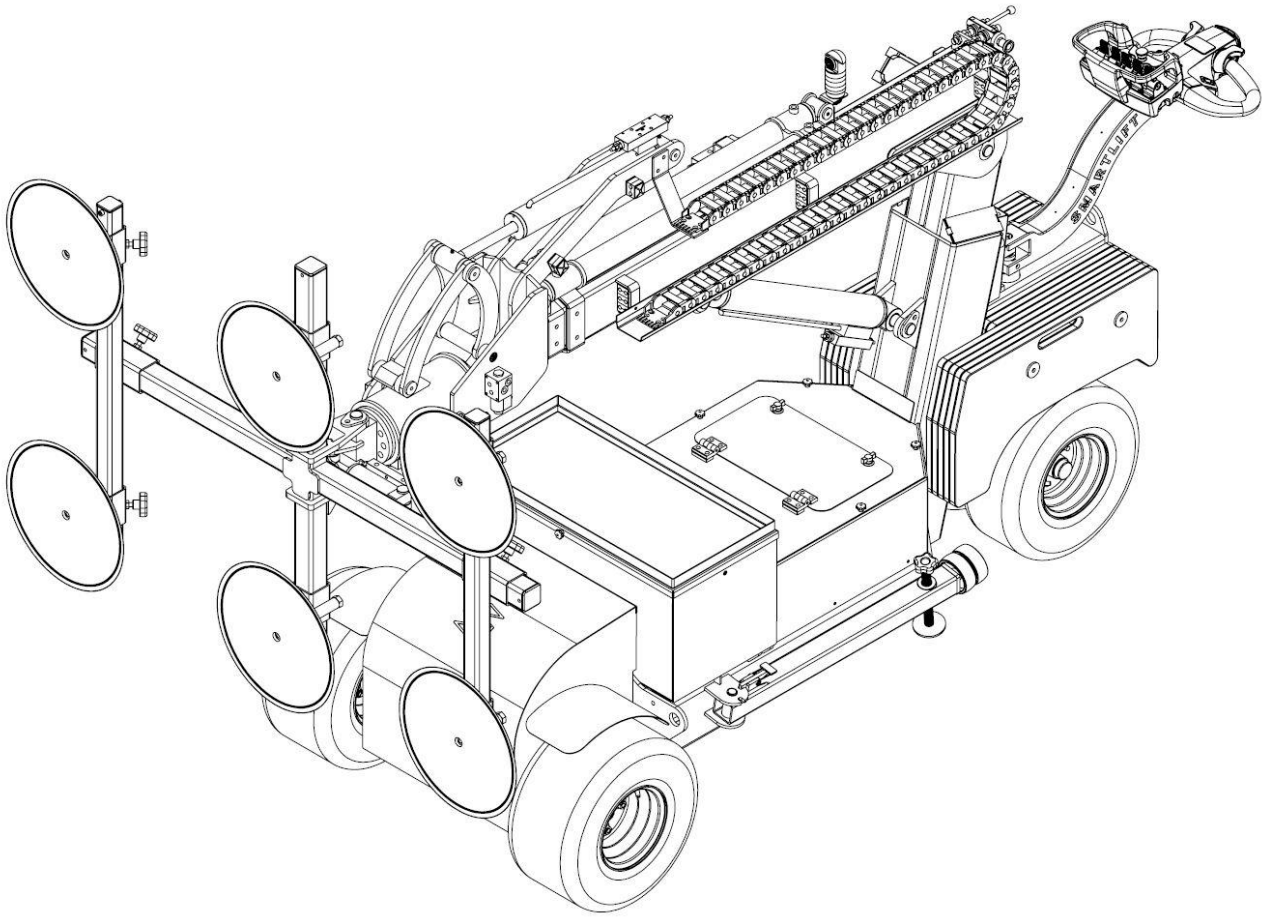
SMARTLIFT



SL 808

SL 1008

User Manual

English

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1 Introduction

Smartlift A/S is an innovative company which develops and manufactures smart lifts, which are marketed worldwide. A Smartlift is characterized by the highest levels of precision, reliability and quality.

The machines are designed to transport and install heavy window sections on construction sites and in industry so that the user does not have to perform heavy and straining manual lifting. The machines are developed with user-friendliness and flexibility in mind, so they are suitable for most tasks.

1.1 Smartlift customer service

Smartlift customer service
tel. +45 97 72 29 11
email: Customerservice@smartlift.com.

1.2 Reading guide

These instructions have been prepared in accordance with DS/EN ISO 20607:2019 Safety of machinery – Operating instructions – General principles for design, and they are the manufacturer's original operating instructions for the machines.

The operating manual provides the user with the information necessary to operate the machine effectively and safely throughout the machine's service life. General safety instructions and conditions are described in a separate section, after which the machine and its intended use are described.

The operating manual is aimed at all users of the machine, and is structured according to the user’s functions and interactions with the machine. Security-related information and instructions appear either as sections or as general information for all users.

When reviewing the operating manual, the following approach is recommended:

- Identify yourself as belonging to one or more user groups before using the machine.
- Read and understand the contents of the operating manual, including information and instructions. If applicable, you only need to read those which are aimed at your particular user type.

In case of uncertainty regarding the above, contact your immediate supervisor.

1.3 About the operating manual

The operating manual has been divided into a user manual and a service manual.

 **User manual Includes:**	 **Service manual Includes:**
Machine overview	Parts lists
Safety instructions	Advanced troubleshooting
Operation of the machine	
Service forms	

The user manual must be stored in a place which is known and accessible to the user and to maintenance personnel.

The service manual must be stored in a place which is known and easily accessible to maintenance personnel.

It is the obligation of the employer (machine owner) to ensure that everyone who services, cleans, operates, maintains or repairs the machine has read the user manual and service manual, or at least the parts of them which are relevant to their work.

Additionally, anyone who operates, services, maintains or repairs the machine is under an obligation to seek information in both the user manual and service manual.

1.3.1 The user

"User" refers to an everyday user who is not a skilled worker in the particular field. The user is assumed to have been instructed in the safety and operation of the machine, and to be able to perform tasks within its field of work. For example, for operation, it is expected that the person is able to start and stop, check the proper centering of the vacuum yoke and remove items during normal operation.
It must be ensured that the person in question has been adequately instructed about the operating instructions and trained so that the work can be performed safely.

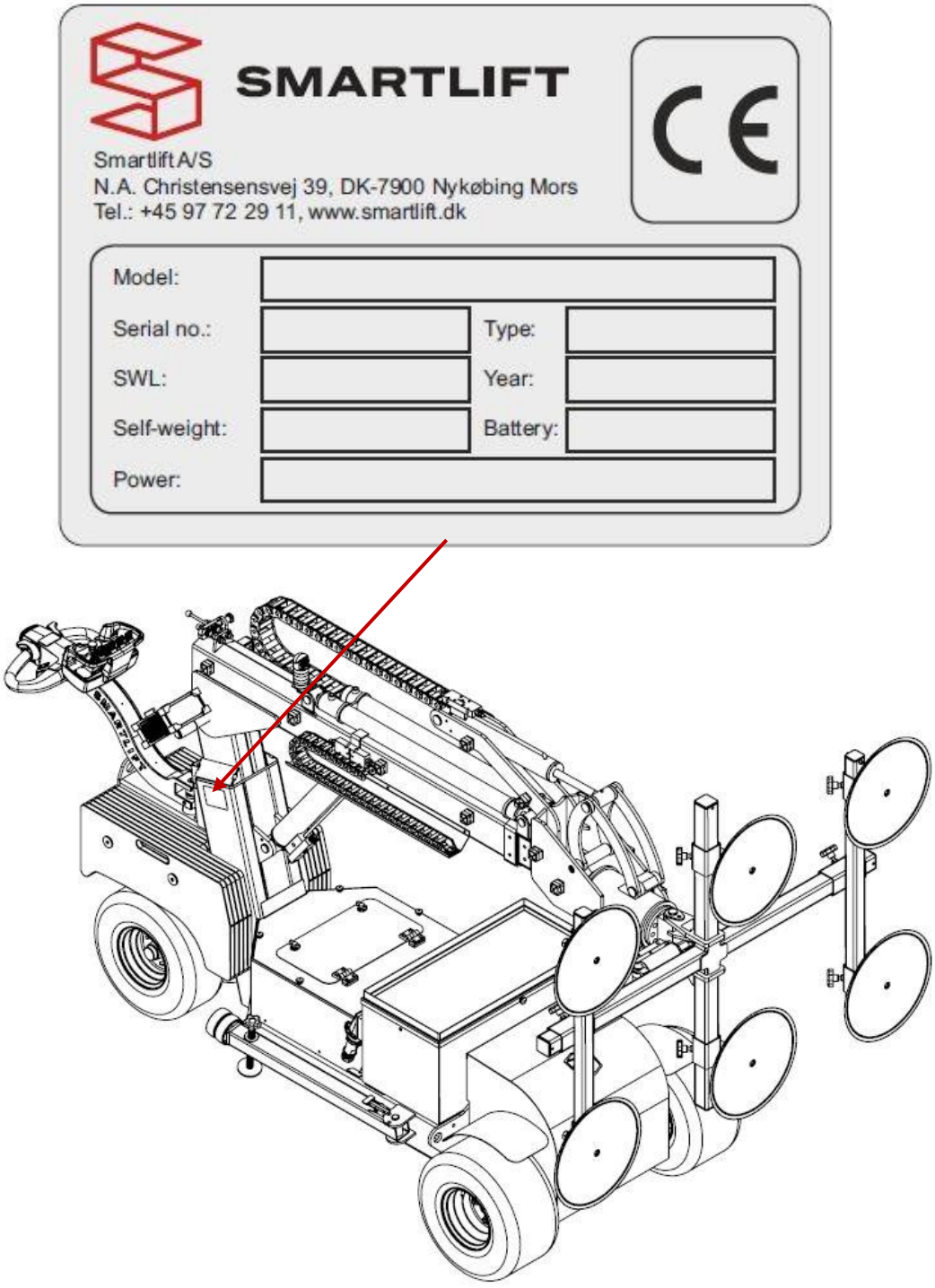
1.3.2 Maintenance personnel

Maintenance personnel must be qualified, either through having trained as e.g. blacksmiths, electricians or mechanics, or by being trained in a way that makes them equal to these professional groups. In addition, they must be familiar with the machine's operation and safety, and know the location of the emergency stop.
Maintenance personnel must have read and understood the user manual, service manual, instructions, workplace instructions, etc.
Before commencing work, repairmen and maintenance personnel must be instructed about the machine’s safety situation.
New maintenance personnel must be trained by an experienced colleague.

1.4 Machine types covered

The user manual covers machines SL 808 and SL 1008, both of which are part of Smartlift's Outdoor series which has been designed for performing work on construction sites both outdoors and indoors.

1.5 Nameplate

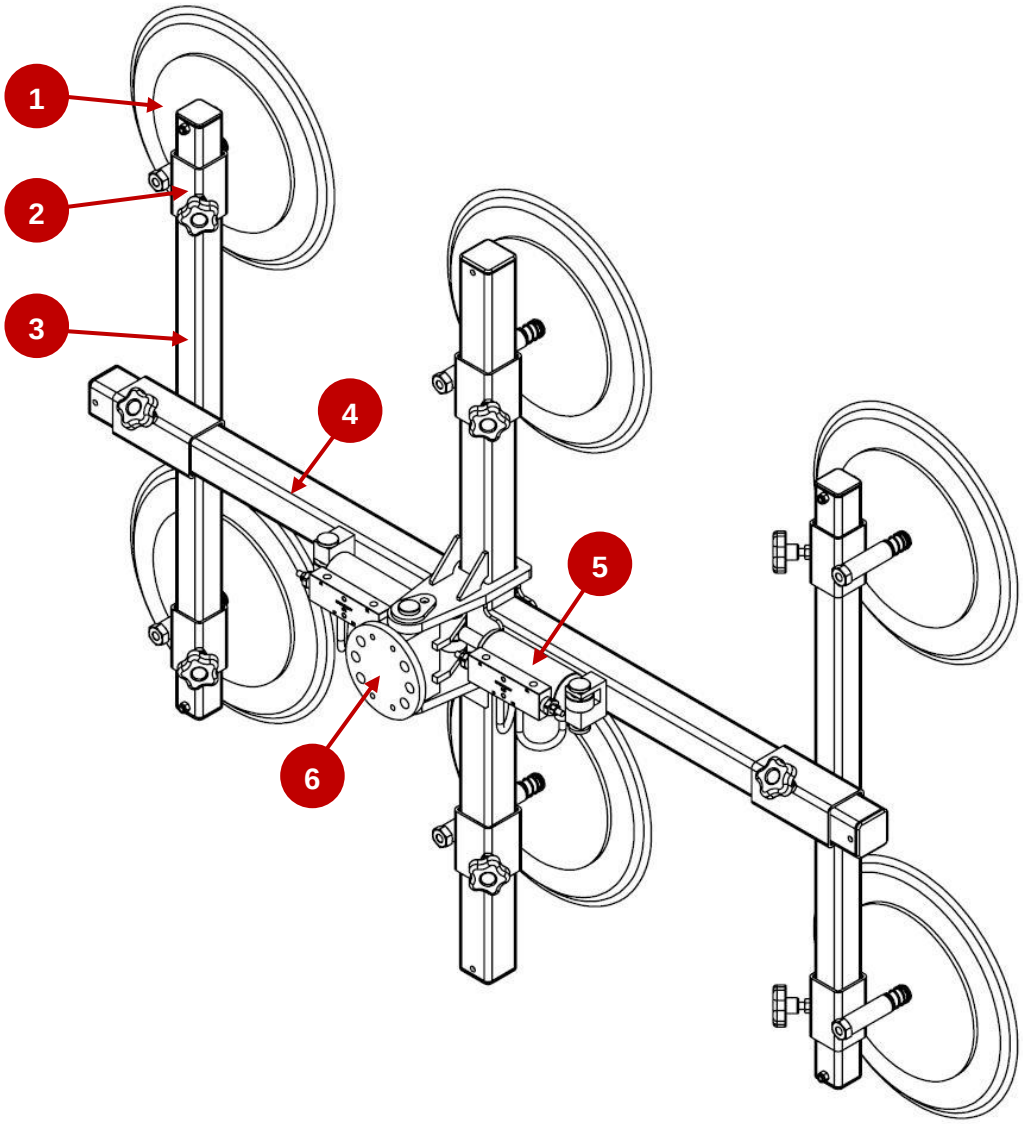


2 Overview and use

2.1 Machine overview

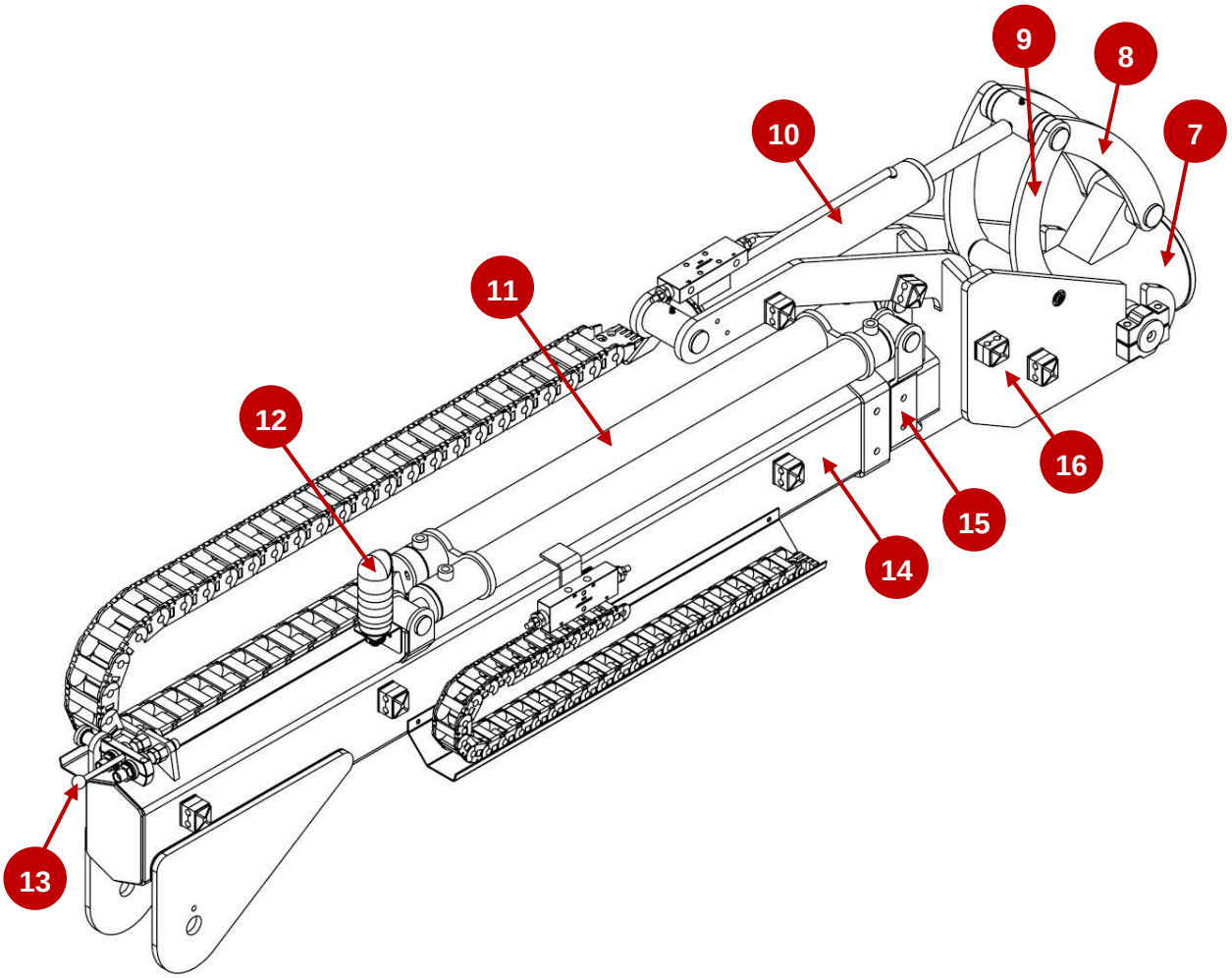
Below is an overview of the components that are mentioned in several places in this manual and which are often referred to in everyday situations

2.1.1 Vacuum yoke



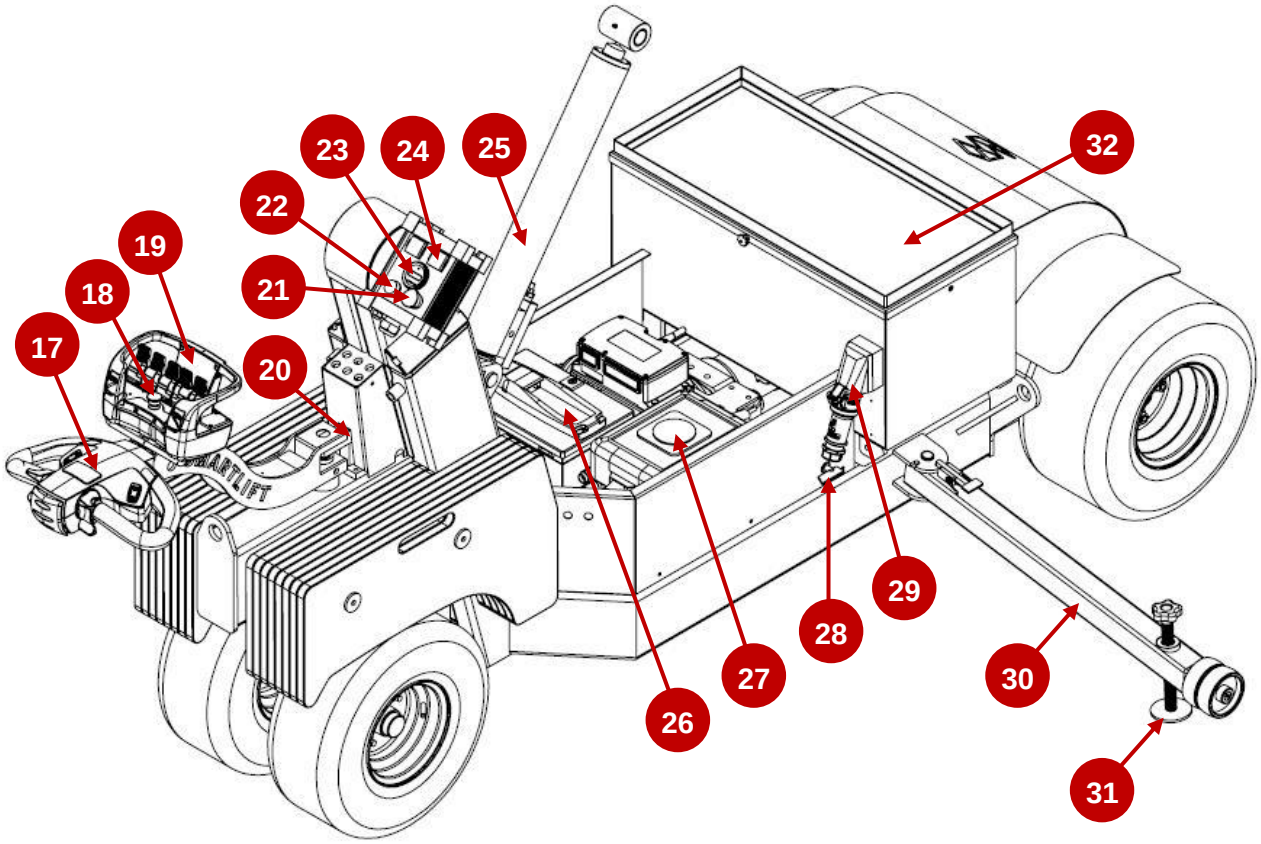
No.	Description	No.	Description	No.	Description
1	Suction cup	3	Crossbar	5	Turning cylinder
2	Suction cup holder	4	Yoke	6	Tilt head

2.1.2 Boom



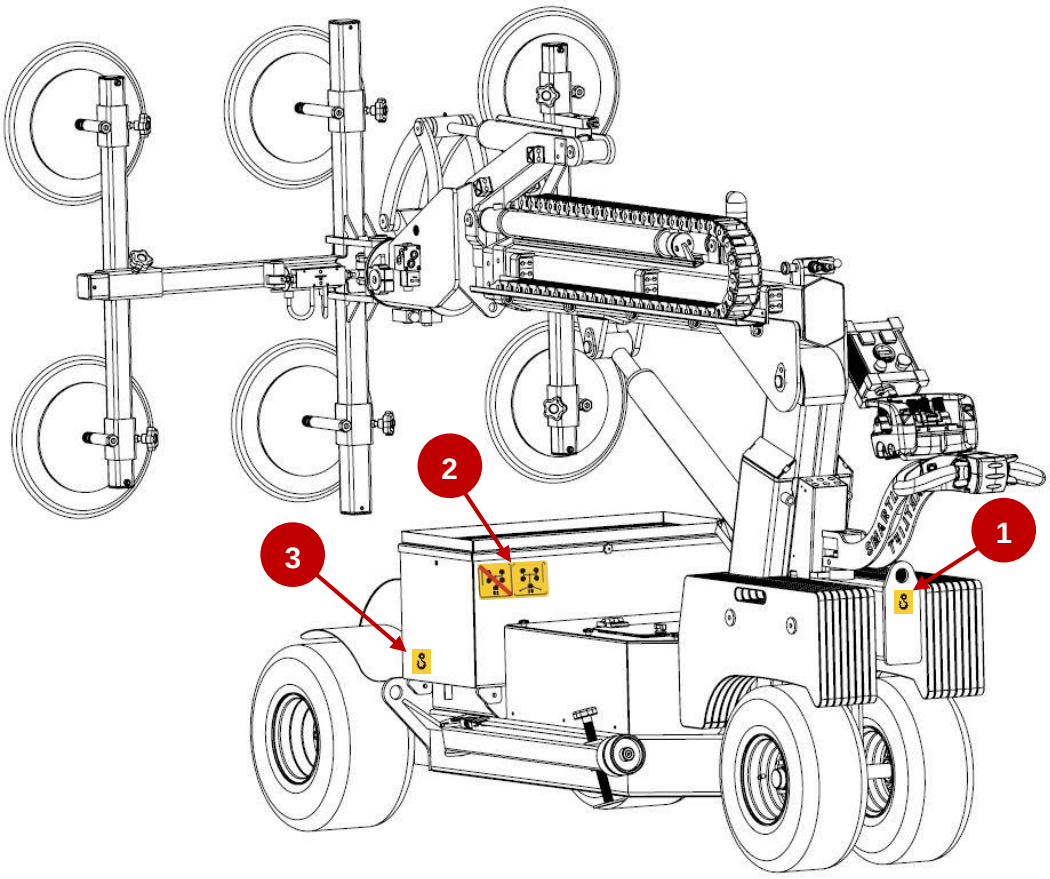
No.	Description	No.	Description	No.	Description
7	Rotator	11	Dbl. Extension cylinder	15	1. Extension boom
8	Draw bar for rotator	12	Alarm - Sound and light	16	2. Extension boom
9	Draw bar	13	Vacuum handle		
10	Tilt cylinder	14	Main boom		

2.1.3 Base machine



No.	Description	No.	Description	No.	Description
17	Control handle	23	Battery indicator	29	Charging plug
18	Emergency stop - Remote control	24	Vacuum meter	30	Support leg
19	Remote control	25	Lifting cylinder	31	Plate for support leg
20	Load cell	26	Remote control charger	32	Battery case
21	Emergency stop - Machine	27	Machine charger		
22	Vacuum alarm - light	28	Main switch		

2.2 Label overview



No.	Description
1	Hoisting and lashing eye
2	Fold out support legs when hoisting and transporting loads
3	Hoisting and lashing eye

ATTENTION! In case of illegible or unclear information and warnings on labels, load charts, etc., these must be replaced by new ones.

New labels can be ordered from Smartlift's customer service department on tel. +45 97 72 29 11 or via email: Customerservice@smartlift.com.

How to replace labels:

- Remove the old label carefully using a plastic scraper.
- Adhesive residues can be removed using alcohol.
- When the alcohol has evaporated, the new label can be applied.
- Increase durability by removing air bubbles under the label. Air bubbles can be removed by gently pushing them to the edges of the label.

2.3 Technical Specifications

Machine model	SL 808	SL 1008
SWL	825kg 1810lb	1000kg 2200lb
Self-weight	1480kg 3260lb	
Total length	3,30m 10,85ft	
Transport length	2,85m 9,35ft	
Height	1,50m 4,95ft	
Width	1,02m 3,35ft	
Width of yoke	1,52m 4,95ft	
Driving speed, up to	6km/t 3,7mph	
Operating time, up to	10 hours	
Suction cups (diameters of)	4 x 400mm 15,75in 2 x 300mm 11,80in	6 x 400mm 15,75in
Vacuum level	-0,53 bar / -0,62 bar	
Batteries (4 pcs.)	12V	
Charger	230V / 110V	
Charging time, minimum	8 hours	
Sound level	74 dB (A) 80 dB (C)	
Expected service life	10 years	

2.4 Operating limits

It is the user's responsibility to be alert and vigilant in the environment in which the machine is used. The user must be aware of everything that could impact safety of both machine and people.

2.4.1 Materials

By default, the machine is equipped with SGF-type suction cups, which are intended for handling flat and smooth objects such as glass, plastic sheets and so on.

WARNING! Never use the machine to lift dirty, dusty, wet or greasy items.

WARNING! Never use the machine to lift items that are not airtight.

2.4.2 Lifting capacity

See the machine's lifting capacity (SWL) in conjunction with its reach in section **9.3 Load charts**.

2.4.3 Wind impact

Wind greatly impacts the stability of the machine, particularly when lifting large items. Therefore, it is important to assess the wind conditions before starting work. The table below can be used as an indicator of the percentage by which the safe working load (SWL) is reduced under certain wind conditions.

	Wind load index										
	Area		m^2	1	2	3	4	5	6	7	8	9
	Speed		sqft	10,8	21,5	32,3	43,0	53,8	64,6	75,3	86,1	96,8
	m/s	mph										
Slight wind	1	2,2		100	100	100	100	100	100	99	99	99
	2	4,5		100	99	99	99	98	98	98	98	97
	3	6,7		99	99	98	97	97	96	95	94	94
Light wind	4	8,9		99	98	96	95	94	93	91	90	89
	5	11,2		98	96	94	92	90	88	86	85	83
	6	13,4		97	94	92	89	86	83	81	78	75
Brisk wind	7	15,7		96	92	89	85	81	77	74	70	66
	8	17,9		95	90	85	80	75	70	65	60	56
	9	20,1		94	88	81	75	69	63	56	50	44
Strong wind	10	22,4		92	85	77	69	61	54	46	38	31
	11	24,6		91	81	72	63	53	44	35	25	16
	12	26,8		89	78	67	56	44	33	22	11	0

An example using an SL 1008:

At a distance of *1.25 m (4.1 ft)* from the front wheel, an SL 1008 can lift up to *750kg (1650lb)* (see load chart section **9.3.2**). At a wind speed of *8 m/s (17,9mph)* lifting an item with a surface area of *4 m^2 (43 sq ft),* the wind load index reads as *80%*

This means that the maximum load is reduced to *750 (1650lb)* x 0,8 = *600kg (1320lb)*.

As mentioned, the above table provides an indication of how to take wind impact into account, but it is the user's responsibility to assess the stability of the machine, as turbulence, wind direction, humidity, etc. also influence this.

2.4.4 Temperature and humidity

Permissible temperature range	From -20 C° to 40 C°
Permissible relative humidity (Non-condensing)	From 20 % to 80 %

2.4.5 Lighting

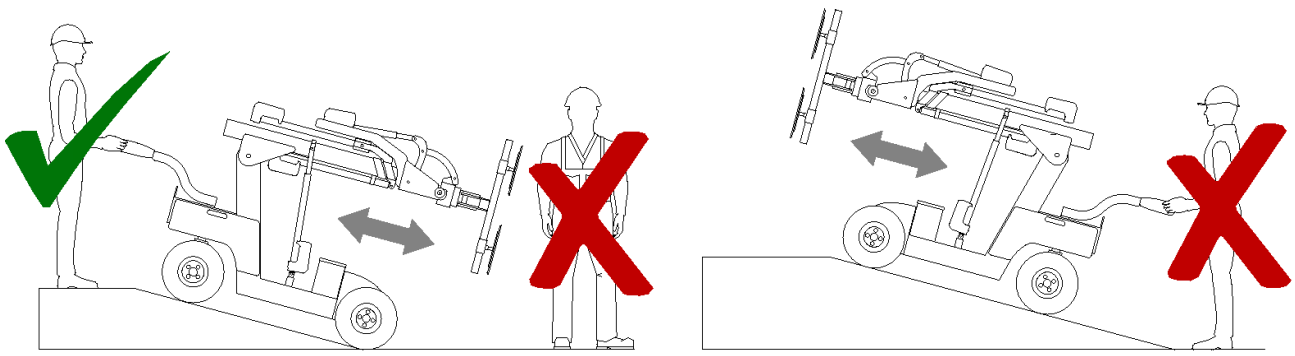
Workspace	Min 200 lux
Repair and maintenance work	Min 500 lux

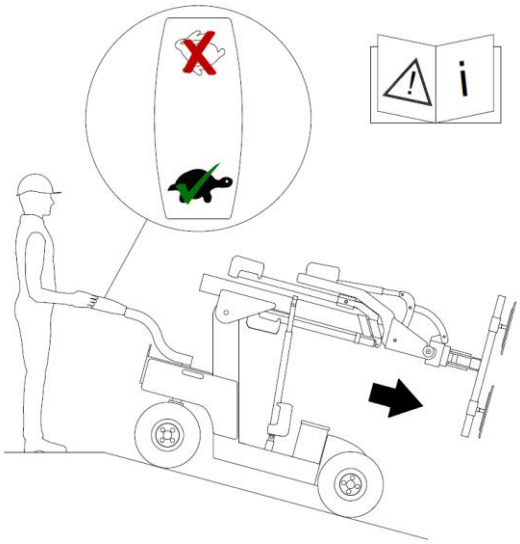
2.4.6 Surface

When using the machine, a solid surface is important. This applies during both the driving and handling of objects. If the surface is soft, it is a great advantage to use ground protection mats.

2.4.7 Slope – Location of user and persons

When driving on a slope, the user must be aware of their own and others' positions in relation to the machine.



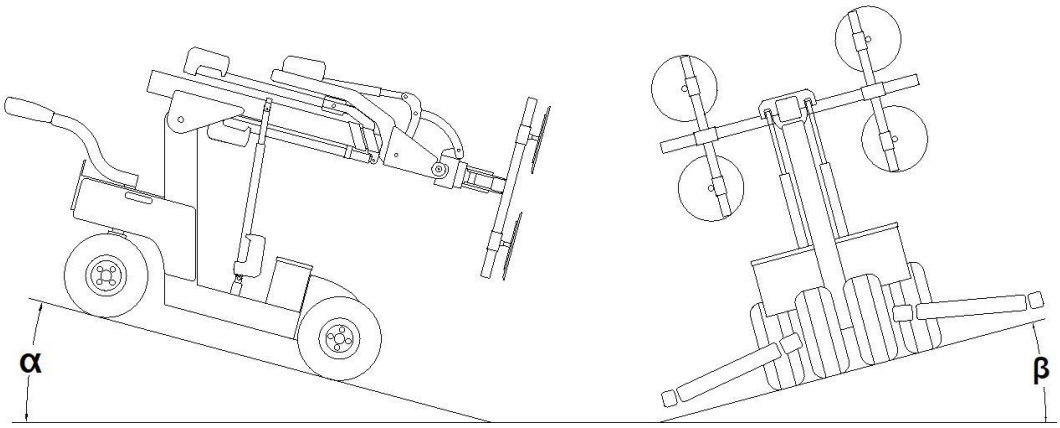


WARNING!

- **Never stand below the machine when it is moving up or down a slope!**
- **Always drive at low speed and exercise caution when going down a slope!**

2.4.8 Slope – Without load

When driving on slopes without a load, the below values cannot be exceeded, as this may increase the risk of losing control of the machine and overturning:

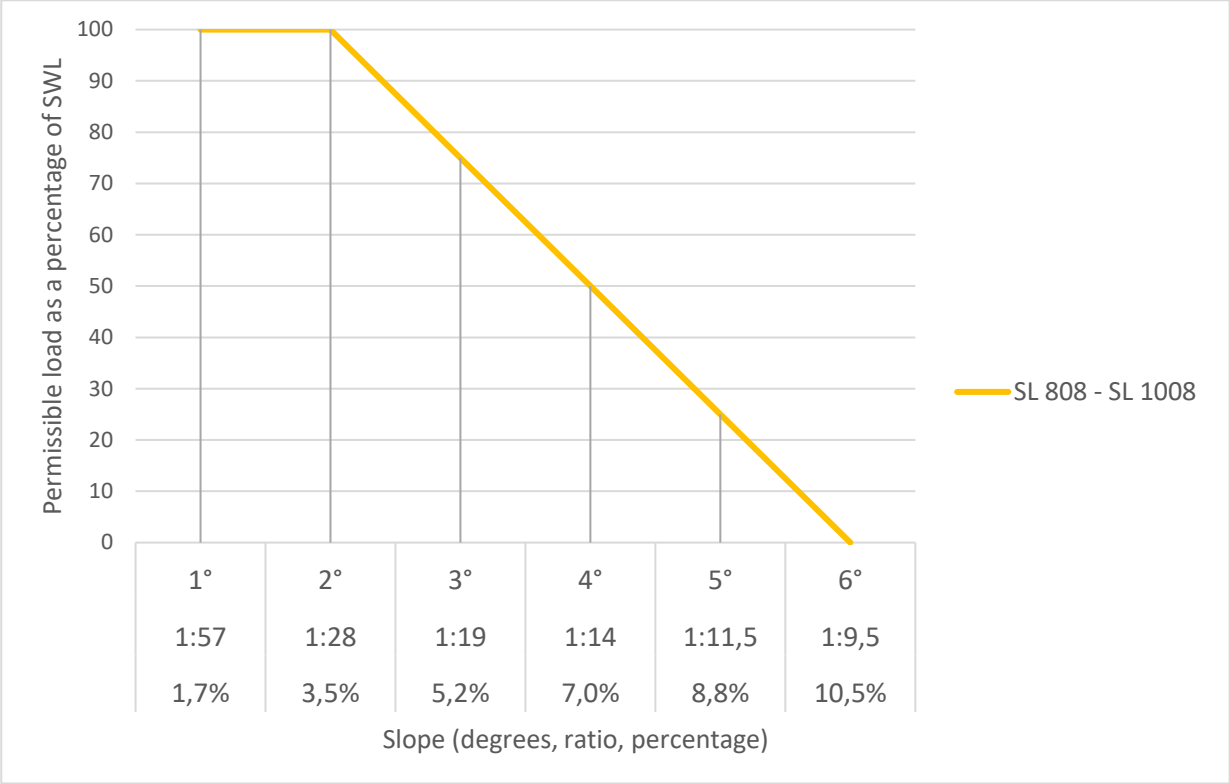


Machine	SL 808 - SL 1008
Max slope α	6°
	1:9,5
	10,5%
Max slope β	6°
	1:9,5
	10,5%

2.4.9 Slope – with load

When driving a loaded machine on slopes, the below chart can be used as a guide.

WARNING! The shape and weight of the load, the speed of the machine, and weather conditions all affect the stability of the machine when driving on a slope. Therefore, always assess whether moving it is sensible!



Example of a load situation:

- Machine: SL 1008 with SWL 1000kg (2204lb)
- Surface sloping in the direction of travel: 3° / 1:19 / 5,2%
- Permissible load as a percentage of SWL: 75%

$$SWL_{slope} = SWL_{machine} * Permissible\ load\ as\ percentage$$

$$SWL_{slope} = 1000kg\ (1320lb) * 0{,}75 = 750kg\ (1653lb)$$

3 Safety and residual risks

3.1 Safety instructions

The machine may only be used by persons who have received competent training in the use of the machine's functions and who understand the risks involved in using the machine. The user must have read and understood this user manual before using the machine. The user is always responsible for ensuring that the machine is used correctly and safely.
When using special equipment (forks, lifting hooks, etc.), the user must have read and understood the user manual for this equipment, and must hold the relevant certificates required by law.



It is forbidden to

- modify the machine.
- lift or transport people.
- be under or in front of the machine when it is loaded.
- be under the machine if it is hoisted.
- exceed the SWL of the machine or any accessories.
- exceed the load chart of the machine.
- use and charge the machine at the same time.
- lift underneath the machine using a forklift or the like.
- use the machine without wearing safety shoes.
- drive at high speed down slopes.
- use fewer than 6 suction cups when using the vacuum yoke.



WARNING! Risk of danger!

- Never use the machine without having read this manual.
- Never use the machine without having read and understood all labels on the machine.
- Never use the machine in case of visible damage or defects.
- Never use the machine without first considering the surroundings, the surface and the weather.
- Never use the machine to lift dirty, dusty, greasy or wet items.
- Never use the machine to lift items that are not airtight.
- Never use the machine without exercising great caution.
- Using the machine involves a risk of overturning.
- Always drive down slopes at low speed and with great caution.
- Never leave the machine loaded or on a slope.
- Always stay a sound distance away from the machine and load.



WARNING! Risk of explosion!

- It is forbidden to use the machine in areas where there is a risk of explosion (ATEX zones).

3.2 Emergencies

3.2.1 The machine loses vacuum

WARNING! If the machine suddenly loses vacuum, the load must be immediately lowered and placed on a solid surface!

3.2.2 The machine overturns

If the machine has overturned, it must be raised by hoisting from the designated hoisting eyes. See section **5.3 Handling and lifting**.

WARNING!

- **The machine's batteries contain acid!**
- **If the machine tips over, there is a risk that battery acid will leak out!**
- **If skin or eyes come into contact with battery acid, rinse them with plenty of clean water and consult a doctor!**

WARNING! In case of a crash, the machine must undergo complete servicing!

3.3 Personal protection equipment

This section describes what personal protective equipment may be required when using the machine.

WARNING! It is forbidden to use the machine without wearing safety footwear!



In addition, the following protective equipment is recommended: Safety helmet, gloves and earmuffs.



4 Operating

This section describes which basic elements it is important to understand in order to maintain a high level of safety when using the machine. This section describes the steps it is necessary to know before, during and after use of the machine.

ATTENTION! The user is always responsible for avoiding irresponsible operation of the machine!

4.1 Before operation

WARNING!

- **Do not use a knife to remove the packaging materials!**
- **Never use the machine if visible damage or defects have been identified!**

Before operating the machine, it must be inspected for visible damage to the i.a. vacuum hoses, wires, suction cups and the vital parts of the steel structure. In addition, the machine must be inspected for any defects. If any damage or defects are identified, these must be repaired before using the machine.

Before operating the machine, the user must always conduct a thorough assessment of the machine's task, including, as a minimum:

- Operating limits (See section **2.4 Operating limits**).
- Lifting capacity (See section **9.3 Load charts**).
- Battery level.

4.2 Operation in general

The following describes a typical procedure for using the machine. For a more detailed description of functions, buttons, etc., see section **4.5 Functional overview**.

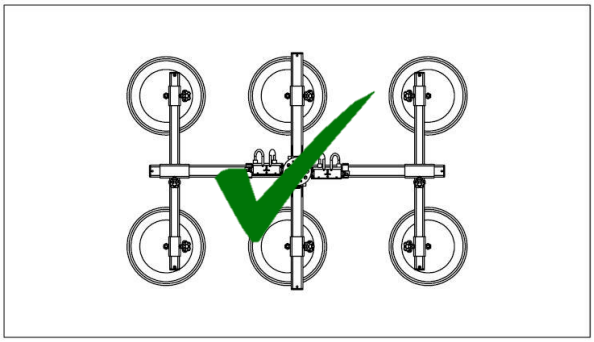
1. Turn on the machine using the main switch.
2. Check the battery level.
3. Activate propulsion on the control handle On/off button.
4. Drive the machine to the object.
   ATTENTION! When driving on terrain, the support legs must be deployed and locked!
5. Centre the machine in front of the object.
6. Turn on the remote control by first deactivating the emergency stop and the pushing the “On” button.
7. If necessary, fine-tune the position using the side shift function.
8. Deploy the support legs and adjust the plates to the surface.
9. Adjust the suction cups to fit the object.
   ATTENTION! The distance between the suction cups must be as great as possible!
10. Push the suction cups against the object using the extension function.
    WARNING! Never lift dirty, dusty, greasy or wet objects!
11. Activate vacuum.
    ATTENTION! An alarm signal sounds until sufficient vacuum has been achieved!
12. Lift and transport the object.
    ATTENTION! Transport the object as close to the surface and the machine as possible!
13. Place the item in the desired position and fasten.
14. Disable vacuum.
    ATTENTION! Wait for the machine's suction cups to release the object!
15. When handling several objects, repeat steps 2 through 14.
16. Turn the machine off at the main switch.
17. Put it to charge at the end of the working day.

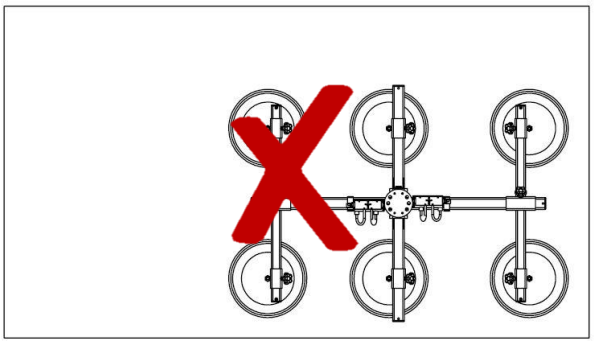
4.3 Operating functions

This section visualises where hazardous situations may occur when using the machines.

4.3.1 General:

- **ATTENTION! Before activating hydraulics for lifting, extending, tilting, turning and rotating, pay attention to the following:**
  - The vacuum yoke or load can hit the machine or the surface.
  - The vacuum hoses can get pinched or stretched.
- **ATTENTION! Before suction is applied to the load:**
  - The support legs must be deployed and locked.
  - Plates on support legs are adjusted to the surface. Distance to the surface between 15mm (0,6in) and 30mm (1,2in).
  - The star knobs on suction cup holders and crossbars must be tightened.
  - The vacuum yoke must be centred relative to the load's centre of gravity.





WARNING! If the yoke is not centred relative to the load's centre of gravity, there is a risk that the load will be pulled off the suction cups and the machine will tip over.

- **ATTENTION! Before the load is lifted:**
  - The machine must be level.
  - The positioning bolt for the vacuum must be engaged.
  - The vacuum pumps must stop, signifying sufficient vacuum.

4.4 After operation

4.4.1 Machine batteries

In order to ensure optimum preservation of battery capacity, use the following charging pattern:

- Connect the charger for at least 8 consecutive hours before using the machine.
- Connect the charger permanently when storing the machine. This maintains the batteries at a constant rate.

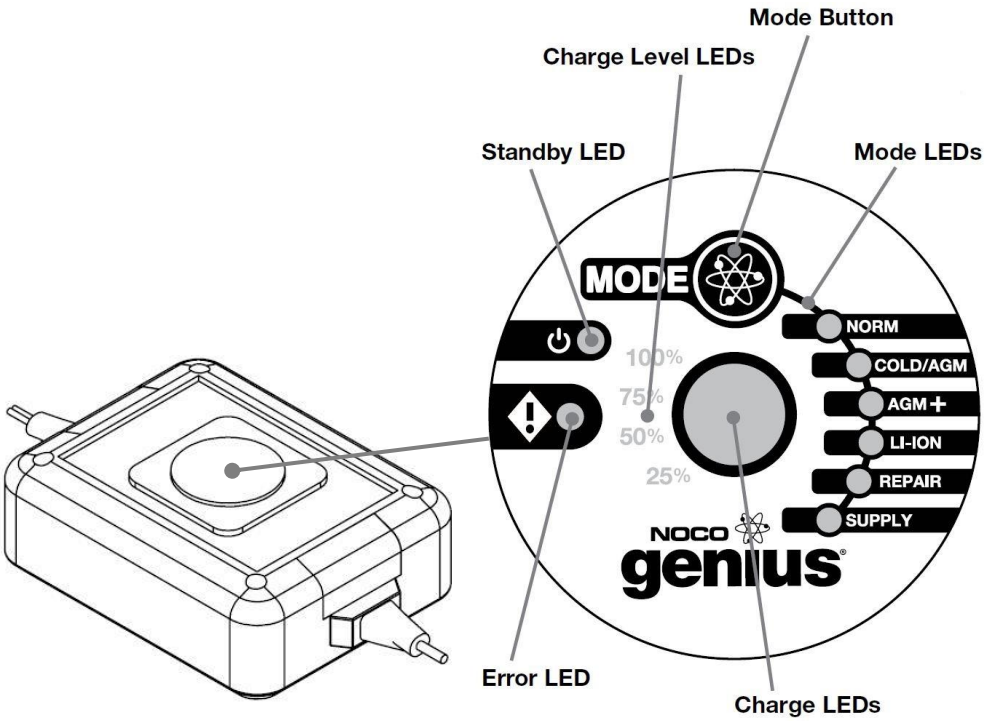
ATTENTION!

- **Charging must take place somewhere with good ventilation!**
- **Charging can never take place in a location where there are sparks, flames or smoking!**
- **The machine must be switched off at the main switch before charging!**
- **If the charger is connected for a period of time which is shorter than recommended, over time, the battery capacity will be reduced permanently!**
- **If the machine is stored for a long period of time without the charger being connected to a power supply, the battery capacity will be reduced permanently!**
- **The machine must be charged before the voltage on the batteries falls below 22.5V, otherwise the batteries will be permanently damaged!**
- **The machine cannot be used and charged at the same time. After disconnecting the charging plug, it can take up to 30 seconds before the machine can be used.**

4.4.1.1 Machine charger

See location on the charger in section **4.5.1 Power**.

ATTENTION! The charging "Mode" must be set to COLD/AGM!



Charge Level LEDs and Charge LEDs	
Charge Level LEDs	**Charge LEDs**
25% Charge Level LED illuminates when the battery is between 0% og 25% charged.	RED LEDs “spin” indicating that the batteries are charging.
50% Charge Level LED illuminates when the battery is between 25% og 50% charged.	
75% Charge Level LED illuminates when the battery is between 50% og 75% charged.	
100% Charge Level LED illuminates when the battery is between 75% og 100% charged.	GREEN LED illuminates indicating that the battery is fully charged.

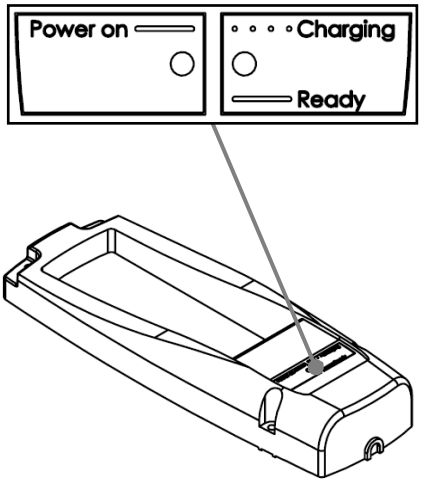
Error LED and Standby LED		
LEDs	**Cause**	**Solution**
Standby LED: 1 ORANGE flash Error LED: Illuminates RED	The battery will not hold charge.	Contact your nearest dealer or Smartlift Customer Service at tel. +45 97 72 29 11 or email: customerservice@smartlift.com.
Standby LED: 2 ORANGE flashes Error LED: Illuminates RED	The battery might be short-circuited.	Contact your nearest dealer or Smartlift Customer Service at tel. +45 97 72 29 11 or email: customerservice@smartlift.com.
Standby LED: 3 ORANGE flashes Error LED: Illuminates RED	The battery voltage is too high for the selected “Mode”.	Change “Mode” to ”COLD/AGM”.
Standby LED: 4 ORANGE flashes Error LED: Illuminates RED	Abnormal AC grid power: VAC<85V or >250V. Frequency: <45 or >65Hz	
Error LED: Illuminates RED	Reversed polarity.	Contact your nearest dealer or Smartlift Customer Service at tel. +45 97 72 29 11 or email: customerservice@smartlift.com.
Standby LED: Illuminates ORANGE	The battery voltage is too low for the charger to detect.	Check that “Mode” is set to “COLD/AGM”. Change “Mode” to “Supply Mode” for maximum 15-20 minutes. The switch back to ”COLD/AGM” again. Contact your nearest dealer or Smartlift Customer Service at tel. +45 97 72 29 11 or email: customerservice@smartlift.com.

4.4.2 Remote control batteries

In order to ensure optimum preservation of battery capacity, use the following charging pattern:

- Always keep the extra battery in the charger. See location on the charger in section **4.5.1 Power**.
  - The Charging cycle is approx. 3 hours.
- Place one battery in the remote control.
- Replace the batteries if necessary and at the end of the workday.

4.4.2.1 Remote control charger

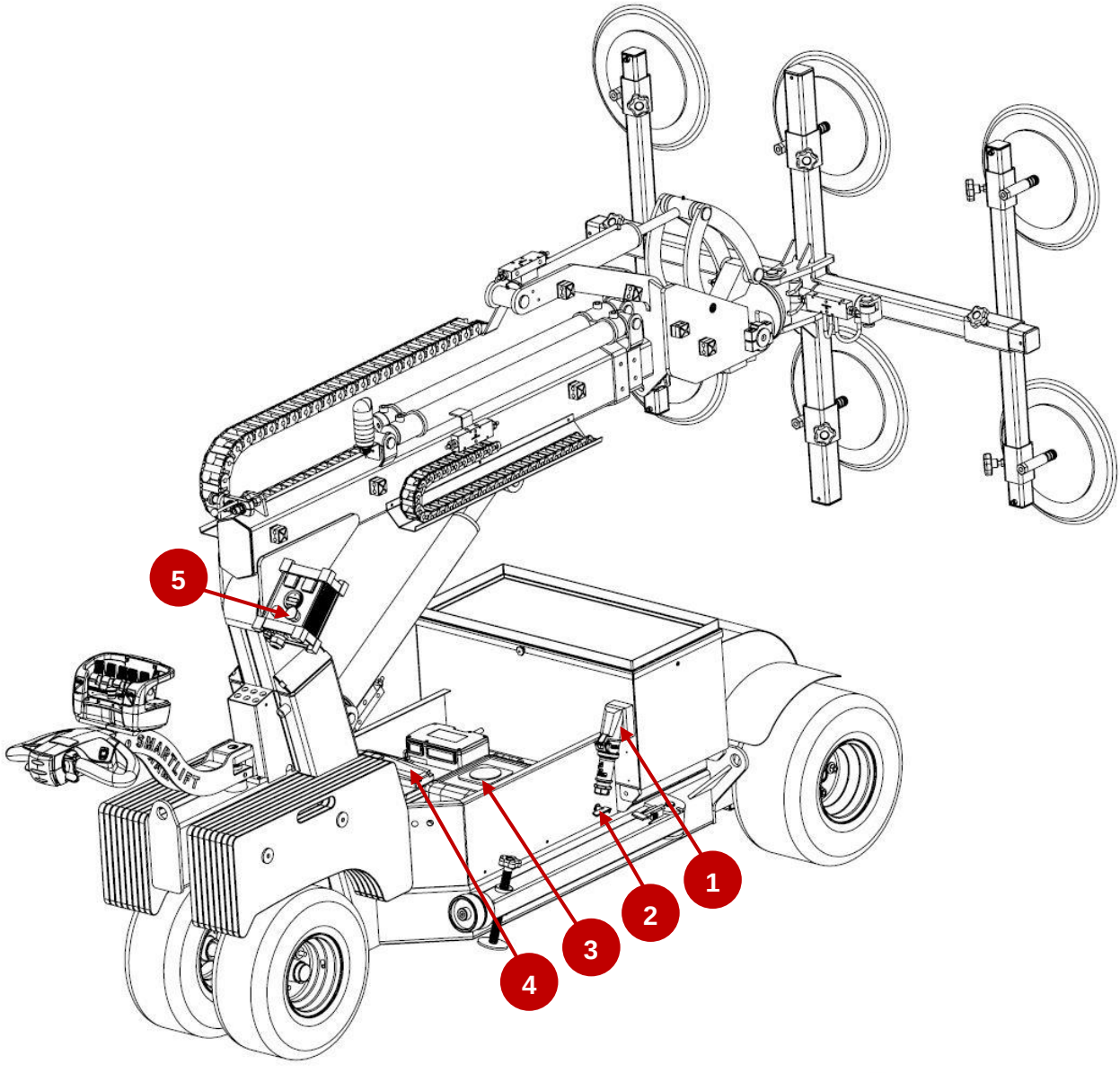


Power LED and Charging LED	
LED	**Decription**
Power LED: Illuminates RED	The charger is connected
Charging LED: Flashing GREEN	Charging battery
Charging LED: Illuminates GREEN	Fully charged / Storage-mode

4.5 Functional overview

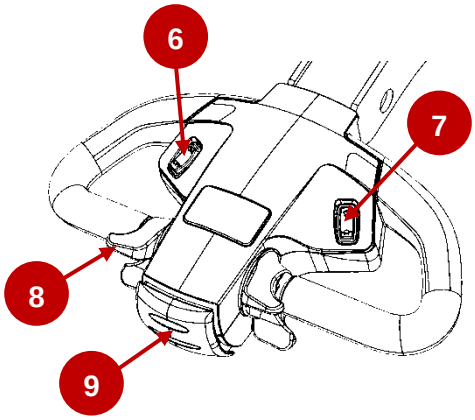
4.5.1 Power

No.	Decription	Function
1	Charging plug	Connecting the mains socket for charging
2	Main switch	Disables all functions (including vacuum)
3	Charger - Machine	Charges the batteries of the machine
4	Charger - Remote control	Charges batteries for the remote control
5	Emergency stop	Disables all functions except vacuum.

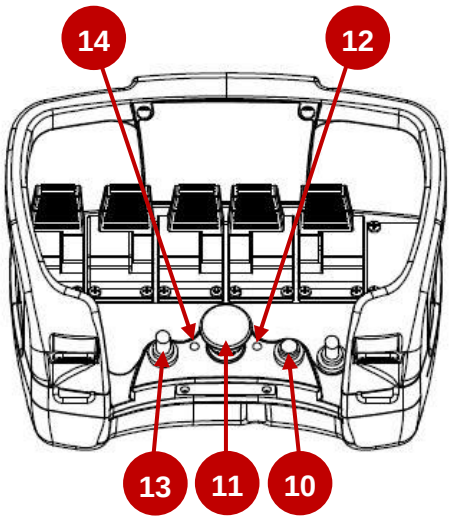


4.5.2 Control handle

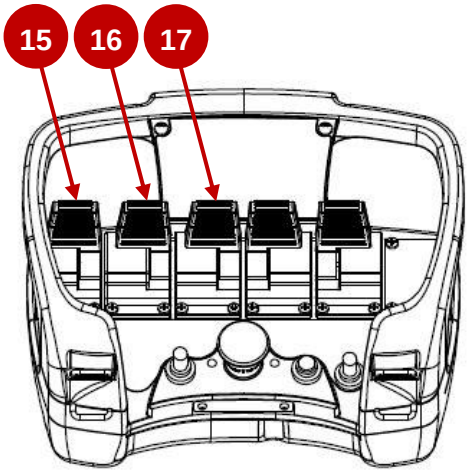
No.	Decription	Function
6	On/off button for propulsion	On: Propulsion can be activated Off: Propulsion is interrupted
7	High/low travel speed	High: High max Speed Low: Low max Speed
8	Speed and direction regulator	Used for regulating travel speed from 0 to max
9	Safety switch	”Belly button” Ensures that the risk of being squeezed between the machin and an object is minimized.



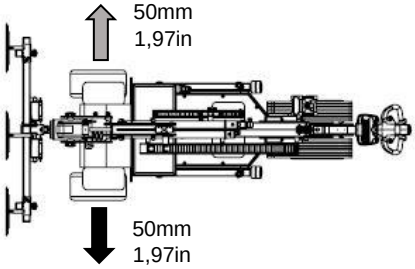
4.5.3 Remote control



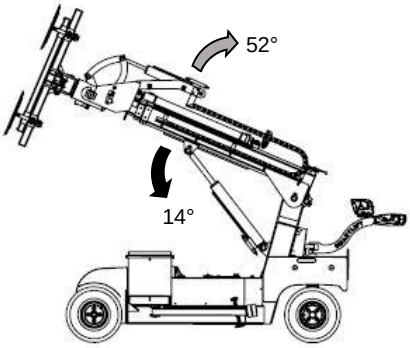
No.	Decription	Function
10	On / Reset	Turns on the remote control Reset by holding down the button for approx. 5 sec
11	Emergency Stop / Off	Disables all hydraulic functions.
12	LED	Illuminates RED when the remote control is turned on.
13	Speed limiter Hydraulic funktioner	Right: High speed left: Low speed
14	LED	Illuminates RED if there is no connection to the machine. Flashes GREEN if Low speed is activated.



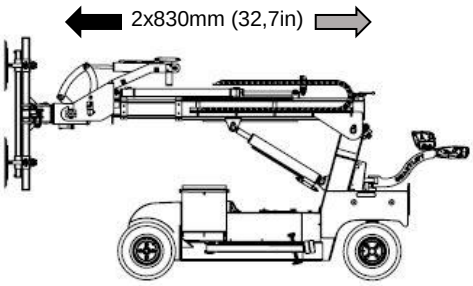
No.	Decription	Function
15	Sideshift	Forward: The machine shifts to the right Backward: The machine shifts to the left

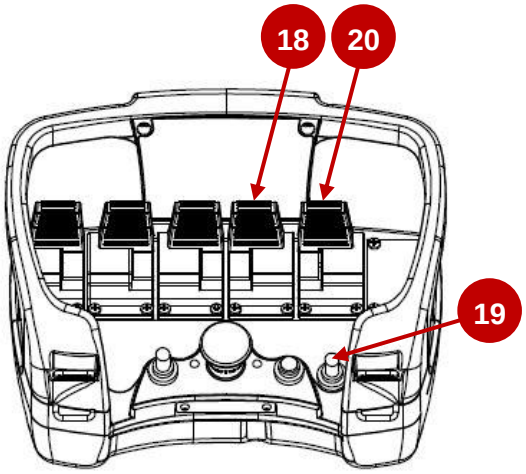


No.	Decription	Function
16	Raise / lower	Forward: The boom is lowered Backward: The boom is raised

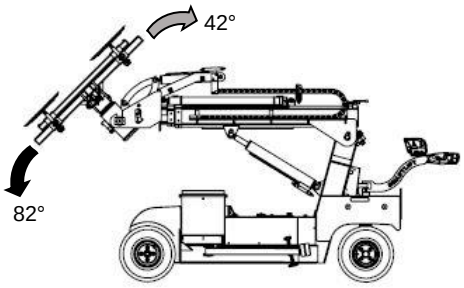


No.	Decription	Function
17	Extend / retract	Forward: The boom is extended Backward: The boom retracted

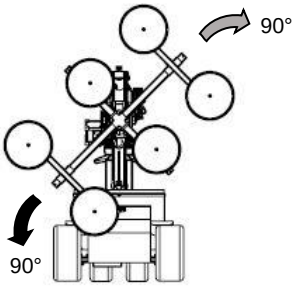




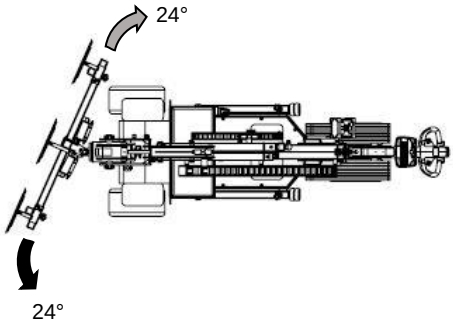
No.	Decription	Function
18	Tilt	Forward: The vacuum yoke is tilted forward. Backward: The vacuum yoke is telted backwards.



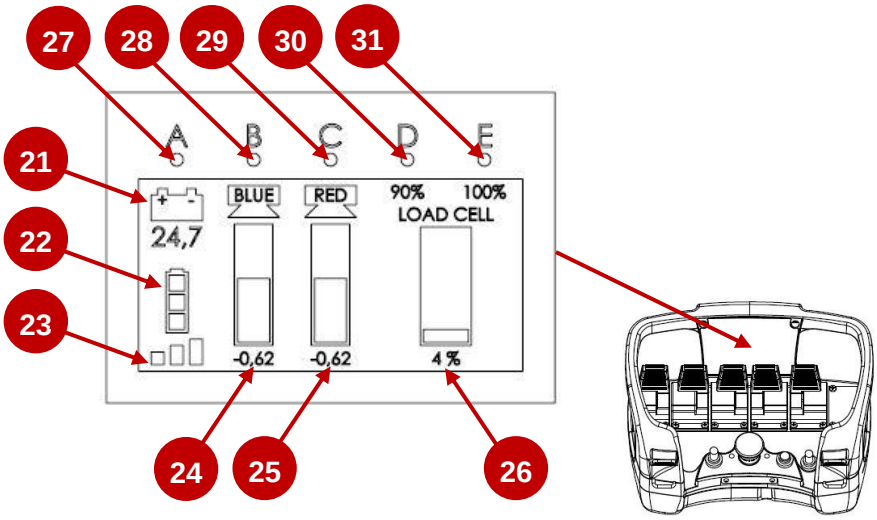
No.	Decription	Function
19	Function switch	Left: Rotation (20A) Right:Turning (20B)
20A	Rotation	Forward: The vacuum yoke is rotated clockwise. Backward: The vacuum yoke is rotated counterclockwise.



No.	Decription	Function
20B	Turning	Forward: The vacuum yoke turns to the right Backward: The vaccum yoke turns to the left



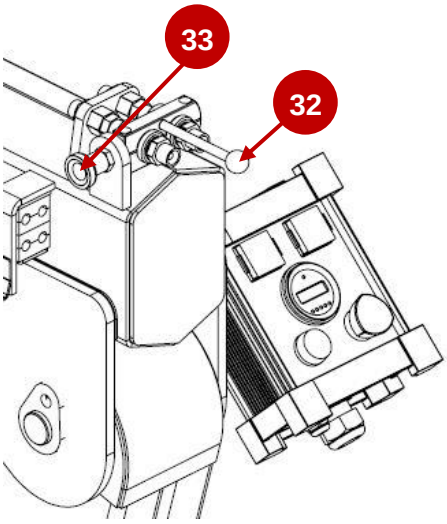
4.5.4 Display remote control (Only SL 1008)



No.	Decription	Function
21	Battery indicator Machine	Indicates the battery level of the machine (Volts).
22	Battery indicator Remote control	Indicates the battery level of the remote control.
23	Signal indicator	Indicates the signal strength between the remote control and the machine.
24	Vacuum level	Indicate the vacuum level in the BLUE vacuum circuit (Bar).
25	Vacuum level	Indicate the vacuum level in the RED vacuum circuit (Bar).
26	Load level	Indicates what percentage of the machine's lifting capacity is used.
27	GREEN LED (A)	Illuminates when the machine and the remotecontrol is powered.
28	YELLOW LED (B)	Illuminates when sufficient vacuum has been obtained (BLUE circuit).
29	YELLOW LED (C)	Illuminates when sufficient vacuum has been obtained (RED circuit).
30	YELLOW LED (D)	Illuminates when the machine is loaded with 85-99% of the lifting capacity.
31	RED LED (E)	Illuminates when the machine is loaded with 100% of the lifting capacity.

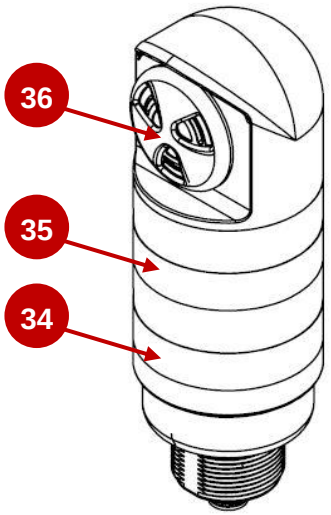
4.5.5 Vacuum

No.	Description	Function
32	Vacuum handle	Push forward to activate vaccum. Retracte to deactivate vacuum.
33	Safety lock	Locks the vacuum handle when the vacuum is activated. Pull out when deactivating vacuum.



4.5.6 Alarm - Sound and light

No.	Description	Function
34	Alarm - Light - YELOOW	Illuminates when the machine is loaded with 85-99% of the lifting capacity.
35	Alarm - Light - RED	Illuminates when the machine is loaded with 100% of the lifting capacity.
36	Alarm - Sound	The alarm sound when the machine is loaded with 100% of the lifting capacity.



5 Storage, transport, handling and lifting

5.1 Storage

If the machine needs to be stored, storage must be done under the following conditions in order to preserve the machine's condition and functional capacity:

- Indoor
- Dry
- With good ventilation

ATTENTION!

- **Water, moisture and dust can affect the machine's functionality and reduce the service life of suction cups and the vacuum system!**
- **Drought, sunlight and temperatures below 0°C (32°F) or above 25°C (77°F) may reduce the service life of the suction cups and the batteries!**

How to store:

- Turn off the main switch.
- Connect the charger so that the batteries are constantly charged and maintained. Se section **4.4 After operation**.

5.2 Transport

When transporting the machine, it is recommended that a van, machine trailer, flatbed truck or similar with sufficient load capacity is used. Find the weight of the machine in section **2.3 Technical Specifications**. See location of lifting and lashing eyes in section **2.2 Label overview**.

A method for secure fastening of the machine:

- Turn off the main switch.
- Strap the machine in place using the lashing eyes.
- Protect the machine's suction cups from rain, moisture and dust. Protective caps can be purchased in addition.

5.3 Handling and lifting

When handling and lifting the machine, use approved lifting equipment in the form of a crane or hoist with sufficient load capacity. In addition, approved lifting equipment must be used in the form of round slings, chains etc. with sufficient load capacity. Find the weight of the machine in section **2.3 Technical Specifications**. See location of lifting and lashing eyes in section **2.2 Label overview**.

A method for handling and lifting the machine.

- Turn off the main switch.
- Lift the machine in the designated hoisting eyes.

6 Maintenance and troubleshooting

6.1 Overview of service, maintenance and lubrication intervals

No.	Annually ⇩	Monthly interval ⇩	Daily	In addition to the dates listed, some components are subjected to ongoing wear and must therefore be replaced if necessary.	
1.0				**Machine log and labelling**	
1.1	X	12	X	The user manual is accessible and easy to understand.	Receipt of new user manual. State machine type and serial number when ordering.
1.2	X	12		Labels on the machine. Check that all labels are visible and intact.	Defective labels must be replaced if necessary. Load chart, SWL, attention/warning stickers.
2.0				**Battery and charger**	
2.1	X	12	X	Battery	Check the capacity of the batteries (minimum 24V on fully charged batteries).
	X	12		Battery	Battery indicator. Replace the batteries if the voltmeter reads less than 22 volts when the batteries are fully charged. The terminals must be lubricated (A).
2.2	X	12		Charger	Check the charging function: output must be 28 volts when charging.
3.0				**Vacuum system**	
3.1	X	12	X	The alarm function must be checked for each lift.	The yellow light and acoustic alarm must be active when one or both vacuum pumps are active. See vacuum level in section 2.3 Technical Specifications.
3.2	X	12		Vacuum control	Check red/green LEDs (does not apply to SL 208/1008) Display and protective glass are intact. Replace defective parts (only applies to SL 208/1008)
3.3	X	12	X	Vacuum pumps	See vacuum level in section 2.3 Technical Specifications. If the pressure drops, check and remedy. Replace defective pumps.
3.4	X	12	X	Vacuum valves	Check the opening and closing function for the slider valves.
3.5	X	12		Vacuum filters	Remove and clean. Replace if necessary.
3.6	X	3		Vacuum system test	Check vacuum on a *test plate. Switch off the main switch and controller if the test plate remains stuck for a minimum of 10 min. If the test plate falls off, find the problem and remedy it.
3.7	X	12		Test vacuum sequences	The pumps start. See vacuum level in section 2.3 Technical Specifications. The pumps stop. See vacuum level in section 2.3 Technical Specifications. The acoustic alarm and yellow light are active when the vacuum pumps start. The acoustic alarm and yellow light stop when the vacuum limit is reached.

3.8	X	12		Vacuum hoses	Check and replace if damaged.
3.9	X	12	X	Suction cups	Check for damage and replace if necessary.
3.10	X	12		Couplings	Clean and lubricate (A). Check for leaks. Tighten if necessary and replace if damaged.
4.0				**Actuator**	
4.1	X	12		Check for suspicious sounds and full movement in all directions; lifting, extension, side shift, tilt and rotation.	Defective actuators must be replaced.
4.2	X	1		Reset lifting actuator	Move the lifting actuators all the way down. Press up and down simultaneously for 10 to 15 seconds. Restart
4.3	X	12		Cables, cable routes, connectors and connections.	Check all cables for breakage and fastening. Check all connectors and connections for poor connection and proper attachment.
5.0				**Mechanical equipment**	
5.1	X	12		Base machine	Visual inspection. Welds, damage or excessive wear on parts must be repaired or replaced.
5.2	X	12		Side shift	Visual inspection. Welds, damage or excessive wear on parts must be repaired or replaced.
5.3	X	12		Arm	Visual inspection. Welds, damage or excessive wear on parts must be repaired or replaced. Adjust the liner for the extension arm.
5.4	X	12		Yoke	Visual inspection. Welds, damage or excessive wear on parts must be repaired or replaced. Lubricate moving parts. (B)
5.5	X	12		Bearings and shafts	All moving parts must be checked for wear and clearance. Defective bearings must be replaced. Lubricate all shafts and grease nipples. (B)
5.6	X	6		After approx. 50 hours of use, follow the guide on the left. Tighten all bolts according to the manual.	Make sure the bolts and screws are secured with Loctite. Bolts on the actuators cannot be retightened.
5.7	X	12	5	Main yoke	Visual inspection. Check the hand screw function. Checks: M24 nut, washer and ring pin. It must be possible to remove and reinstall the yoke easily. Attach the yoke – rotatable. Add end sections and a stop screw if necessary. Damaged parts must be replaced. Lubricate all moving parts (B)
5.8	X	12	5	Crossbars/crossbeams	Visual inspection. Check the hand screw function. Add end sections and a stop screw if necessary. Damaged parts must be replaced. Lubricate moving parts (B)
5.9	X	12	5	Holder for suction cups	Visual inspection. Check the hand screw function.

					Damaged parts must be replaced. Lubricate moving parts. (B)
6.0				**Electronics and safety equipment**	
6.1	X	1		Main switch	Check the on/off function.
6.2	X	1		Emergency stop contact	Check the functionality. Repair or replace if necessary.
6.3	X	12		Remote control • ON/OFF switch • Emergency stop switch • Function switches	Check all functions. Remedy if this does not work or is damaged, and repair or replace if necessary.
6.4	X	3		Function check of overload	Use a load to trigger an overload by moving the extension out. When the overload is triggered, all lifting except extension must be deactivated. Retract the load until the overload switch disconnects, and all functions should be functional again. Repair or replace if necessary.
7.0				**Propulsion system**	
7.1	X	12		Function test of the propulsion system	Test the throttle in both directions. Test on/off function on the steering gear Test slow/turtle and fast/hare Function test of belly button.
7.2	X	12	X	Check the brake system.	With the machine moving at full speed, release the throttle. The machine must stop completely within 2 metres. This must be done in both directions and at both speeds (turtle/hare).
7.3	X	12	X	Check the parking brake	When the machine is stationary, the parking brake must be applied. Test this by pushing and pulling on the machine. It should not be possible to move the machine manually.
	X	12		Check the mechanical brake	The brake disc is located on the propulsion engine. Check the distance between the electromagnet and the pressure plate. The distance should be 0.2 to 0.3 mm. The minimum thickness of the brake disc is 6.5 mm.
8.0				**Hydraulics (only applies to SL 1008)**	
8.1	X	12		Check the oil level	The correct oil level is 4 cm below the filling opening, with all cylinders fully retracted.
8.2	X	12		Replace pressure filter	Replace pressure filter.
8.3	X	12		Check all hoses and connection for cracks and leaks.	Check all hoses and replace if necessary.
8.4	X			Check the pressure	The system should deliver 185 bar (2700 PSI) and then bypass to the tank.
8.5	X	12	X	Function test of all hydraulic functions.	Test all hydraulic functions in full motion and look for leaks and unusual movements.
9.0				**External and additional equipment for the machine.**	
9.1		12		Battery charger for remote control	Visual inspection. Make sure the device is present and intact.
9.2		12		Extra main battery and charger.	Visual inspection. Make sure the device is present and intact.

9.3		12		Communication cable for remote control	Visual inspection. Make sure the device is present and intact.
9.4		12		Shoulder strap for remote control	Visual inspection. Make sure the device is present and intact.
10.0				**Static test load**	
10.1	X	12		Test with load Follow the load diagram according to the label/manual.	

The test plate is a plate which is big enough to allow all suction cups to be on the plate at the same time (approx. 1,5x1,5m). The plate must be airtight and can be made of plastic, steel, etc.

Lubrication schedule:

A = Silicone grease, Kema SC4 or equivalent

B = Calcium sulfonate grease

Bearings are made with Teflon surfaces or oil-rubbed bronze. Lubrication is intended for smaller moving parts.

6.2 Functional inspection

6.2.1 Vacuum system

A method for inspecting the vacuum system for leakages, referred to as a leakage inspection in this document.

ATTENTION!

- **Suction cups should be inspected daily!**
- **Vacuum hoses should be inspected monthly or quarterly, as needed!**
- **Leakage inspection of the vacuum system must be done according to section 6.1 Overview of service, maintenance and lubrication intervals!**

1. Turn on the machine using the main switch.
2. Check the battery level.
3. Adjust the suction cups to fit the test object.
   WARNING! Never use a dirty, dusty, greasy or wet object!
   WARNING! Never use an object that is not airtight!
   WARNING! There is a risk that the machine will release the object in connection with the leakage inspection!
   ATTENTION! The object must be an airtight sheet, e.g. one of plastic, steel, glass or the like!
4. Push the suction cups against the object using the extension function.
5. Activate vacuum.
   ATTENTION! An alarm signal sounds until sufficient vacuum has been achieved!
6. Monitor the machine's vacuum pumps for at least 10 minutes.
7. **WARNING! If the vacuum pump starts before 10 minutes have passed, the machine cannot be used!** See section **6.4 Troubleshooting**.
8. Disable vacuum.
9. **ATTENTION! Wait for the machine's suction cups to release the object!**
10. Turn the machine off at the main switch.

6.2.2 Safety functions

Method for inspecting security functions.

ATTENTION!

- **Security features must be inspected according to section 6.1 Overview of service, maintenance and lubrication intervals!**
- **Security features must always be available and functional!**
- **If an inspection of the security features cannot be completed and approved, the machine cannot be used until repairs have been completed and a new inspection has been carried out!**
- **Always inspect security features in an open space where there are no obstacles!**

- **Main switch**
  - Turn off the main switch.
  - Checks: All moving functions should now be inoperational.
  - Activate the main switch.
  - Checks: All moving functions should be operational again.
- **Emergency stop – Machine**
  - Activate the emergency stop by pushing the mushroom emergency stop button manually.
  - Checks: All moving functions should now be inoperational. Vacuum functions are not affected by emergency stop.
  - Deactivate the emergency stop by rotating the button.
  - Checks: All moving functions should be operational again.
- **Emergency stop – Remote control**
  - Activate the emergency stop by pushing the mushroom emergency stop button manually.
  - Checks: All remote-controlled functions should now be inoperational.
  - Deactivate the emergency stop by rotating the button.
  - Checks: All remote-controlled functions should be operational again.
- **Safety switch – Belly button**
  - Activate low driving speed
  - Activate the speed and direction regulator to put the machine in reverse.
  - Activate the belly button by pushing it manually.
  - Checks: The travel direction must be briefly changed, following which propulsion is interrupted.
  - Deactivate the speed and direction regulator and then repeat the procedure at a high driving speed.
- **Parking brake**
  - Turn off the main switch.
  - Checks: It must not be possible to push or roll the machine.
  - Turn on the main switch.
  - Checks: It must not be possible to push or roll the machine.
- **Support legs**
  - Checks: It must be possible to put the support leg in either position.
  - Checks: Locks for the support leg must be functional in both positions.
- **Load limit system – Method 1**
  - Lift the rear of the machine so that the rear wheels hover freely above the ground and the load limit switch is interrupted. It is recommended that the lashing eye at the

rear of the machine is used to do this. Regarding requirements for lifting equipment see section **5.3 Handling and lifting**.
    - Alarm with sound and YELLOW light indicates that the machine is loaded with 85-99% of the lifting capacity.
    - Alarm with sound and RED light indicates that the machine is loaded with 100% of the lifting capacity.
  - Checks: The following features must now be inoperational:
    - Side shift
    - Raise / lower
    - Extending
    - Rotation
    - Turning
    - Tilt
  - Lower the machine again and dismantle the lifting equipment.
  - Checks: All functions must be operational again.
- **Load limit system – Method 2**
  - Read the load chart on the machine to see what the lifting capacity is at fully extended position. See Load chart in section **9.3.2 SL 1008**. For example, at fully extended position, the lifting capacity of SL 1008 will be 280 kg / 620 lb.
  - Then lift a load which exceeds this, and extend this forward until the load limit system interrupts the functions.
    - Alarm with sound and YELLOW light indicates that the machine is loaded with 85-99% of the lifting capacity.
    - Alarm with sound and RED light indicates that the machine is loaded with 100% of the lifting capacity.
  - Checks: The following features must now be inoperational:
    - Side shift
    - Raise / lower
    - Extending
    - Rotation
    - Turning
    - Tilt
  - Retract the load and unload the machine.
  - Checks: All functions must be operational again.

6.3 Cleaning the machine

- Clean the machine with running water, soap and a soft brush.
  ATTENTION! Do not use a pressure washer to clean the machine.
  ATTENTION! Never direct the jet of water at the engine!
- Clean the control handle using a cloth with soap and water.
  ATTENTION! Never direct the jet of water at the control handle!
- Clean the suction cups with ethanol.
- Alternatively, the suction cups can be cleaned with hot water, soap and a soft brush.
  - Always rinse with clean water.
  - Let the suction cups dry at room temperature.

  ATTENTION!
  - **Never direct the jet of water at the suction cups!**
  - **Always make sure that water does not enter the vacuum system.**

  ATTENTION! Never use the following products to clean the suction cups:
  - **Pure glycerine.**
  - **The solvents trichlorethylene, carbon tetrachloride or hydrocarbons.**

- **Vinegar-based cleaners.**
- **Sharp objects, metal brushes, sand paper etc.**

6.4 Troubleshooting

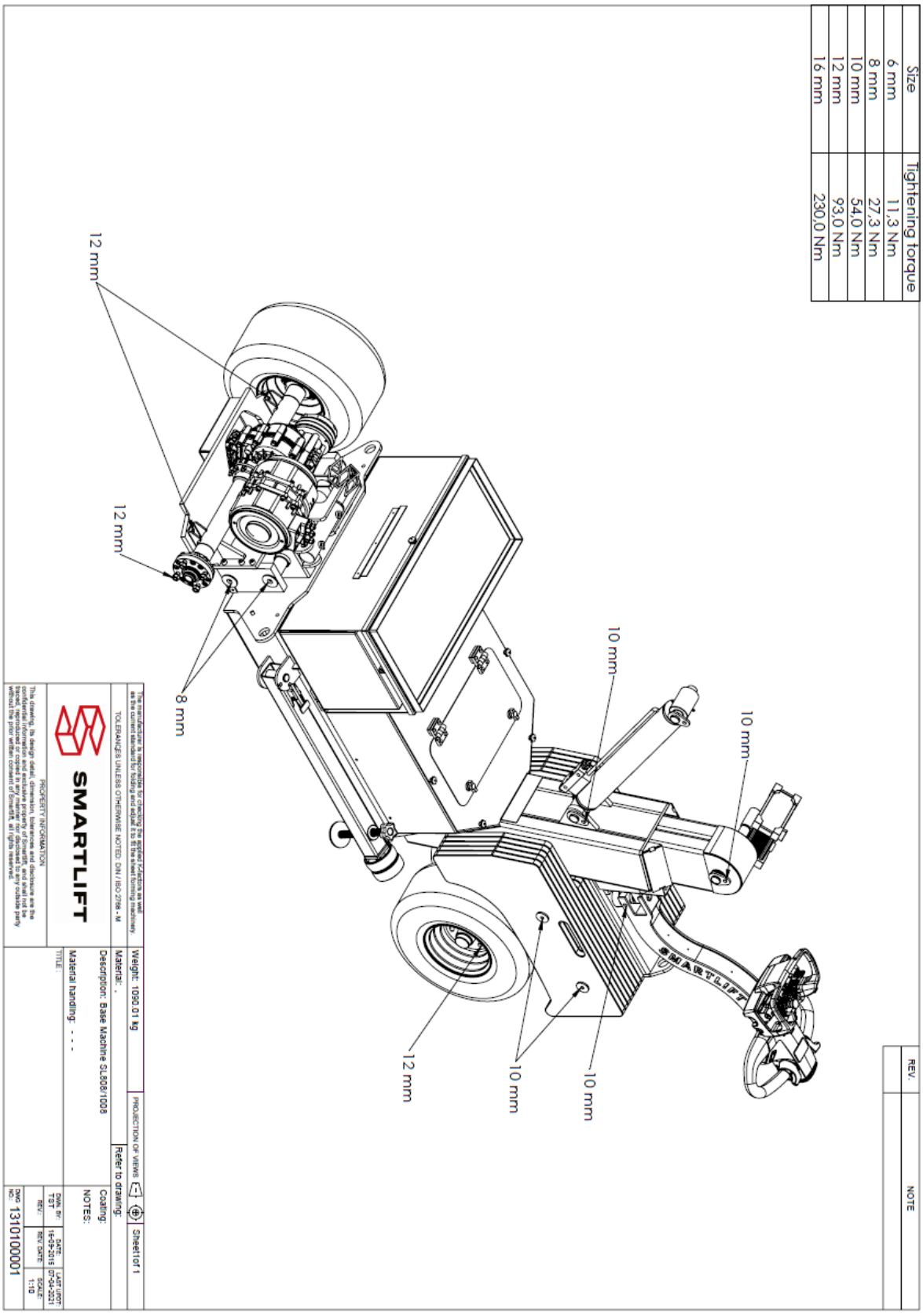
ATTENTION! In case of unexpected failure or malfunctioning of the machine, the machine must be stopped immediately, and the fault must be reported to Smartlift customer service immediately via tel. +45 97 72 29 11 or via email customerservice@smartlift.com.

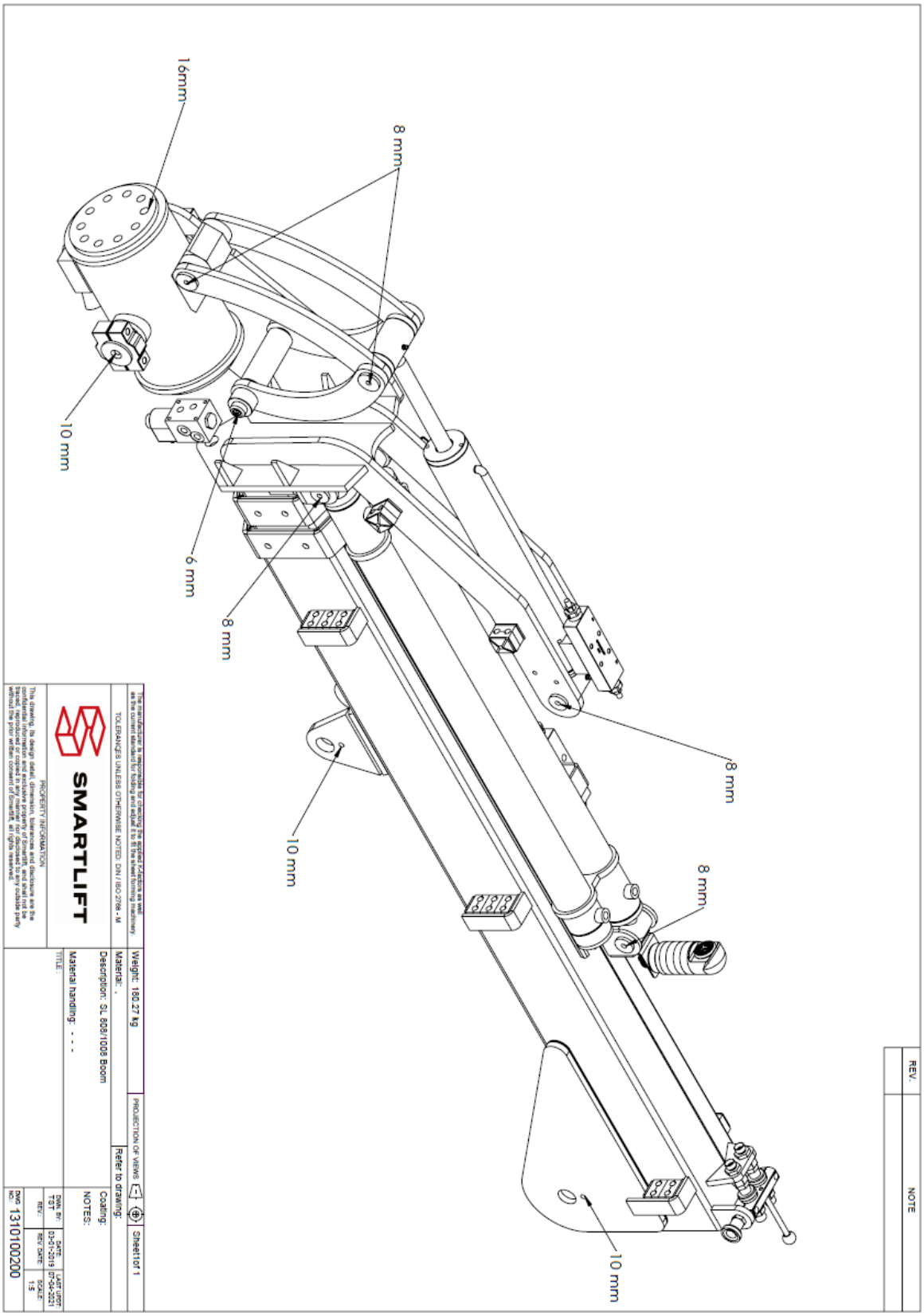
No.	Problem	Cause	Solution
1.	No response to: • Propulsion • Hydraulic functions • Vacuum system	• The power has been interrupted • The batteries have been discharged • The emergency stop has been pushed	• Turn the main switch • Check the battery level • Release the emergency stop • Check fuses
2.	No response to: • Side shift • Raise / lower • Tilt • Turn / rotation	• The load limit system has interrupted the functions due to overload	• Retract the extension boom
3.	No response to: • Propulsion	• The engine has no electricity • The brake does not release • On/off witch is set to “OFF”	• Check point 1. • Press the “on” button • Check fuse for motor control
4.	• Vacuum pump runs frequently or continuously	• Leak in the vacuum system. • ATTENTION! The vacuum level must be maintained for at least 10 minutes without the pumps running!	• Unload the machine immediately • Check that the suction cups seal tightly against the object • Check the vacuum hoses and suction cups for damage • Check that the slide valve has been closed • ATTENTION! The vacuum pumps must restart.
5	No response to: • Hydraulic functions	• The pump does not start • The remote control is not connected (RED LED on the left side of the emergency stop is illuminating. • The machine is out of range (100m / 109yd)	• Check point 1. • Reset the remote control by holding down the “ON” button for 5 seconds.

6.5 Fuses

Size	Function	Position
125A	Propulsion	By the main switch
100A	Hydraulik	By the main switch
50A	For the machine charger	In the battery case
3A	For the remotecontrol charger	In the battery case
30A	Supply to the control box	In the control box
10A	Emergency stop	In the control box
10A	Horn	In the control box

6.6 Tightening torques




16mm
8 mm
10 mm
6 mm
8 mm
8 mm
8 mm
10 mm
10 mm
REV.
NOTE
SMARTLIFT
Weight: 180.27 kg
Material: -
Description: SL 808/1008 Boom
Coating:
NOTES:
Material handling: - - -
Refer to drawing:
PROJECTION OF VIEWS
Sheet1of 1
DWG NO 1310100200
DWN. BY TST
DATE 03-01-2019
REV. DATE
LAST UPDT 07-04-2021
SCALE 1:5
REV.:

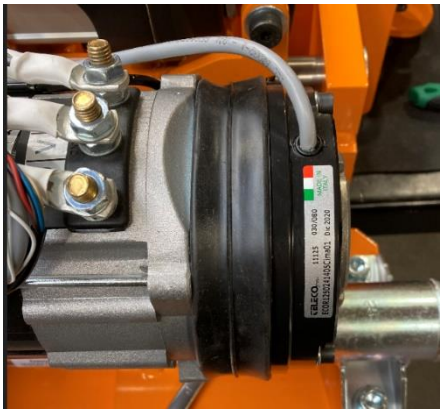
6.7 Checking the parking brake

The machine must be stationary and the direction selector/speed controller cannot be activated.

1. Remove the front mudguard



2. Remove the rubber sleeve by the parking brake. The rubber sleeve can be pulled to the side without being damaged.



3. Measure the distance between the electromagnet/pressure plate and the brake surface.
   - New brake disc approx. 10mm
   - Used brake disc minimum 6,5mm



6.8 Spare parts

If spare parts are needed, these can be ordered by contacting your nearest dealer or Smartlift Customer Service at tel. +45 97 72 29 11 or email: customerservice@smartlift.com

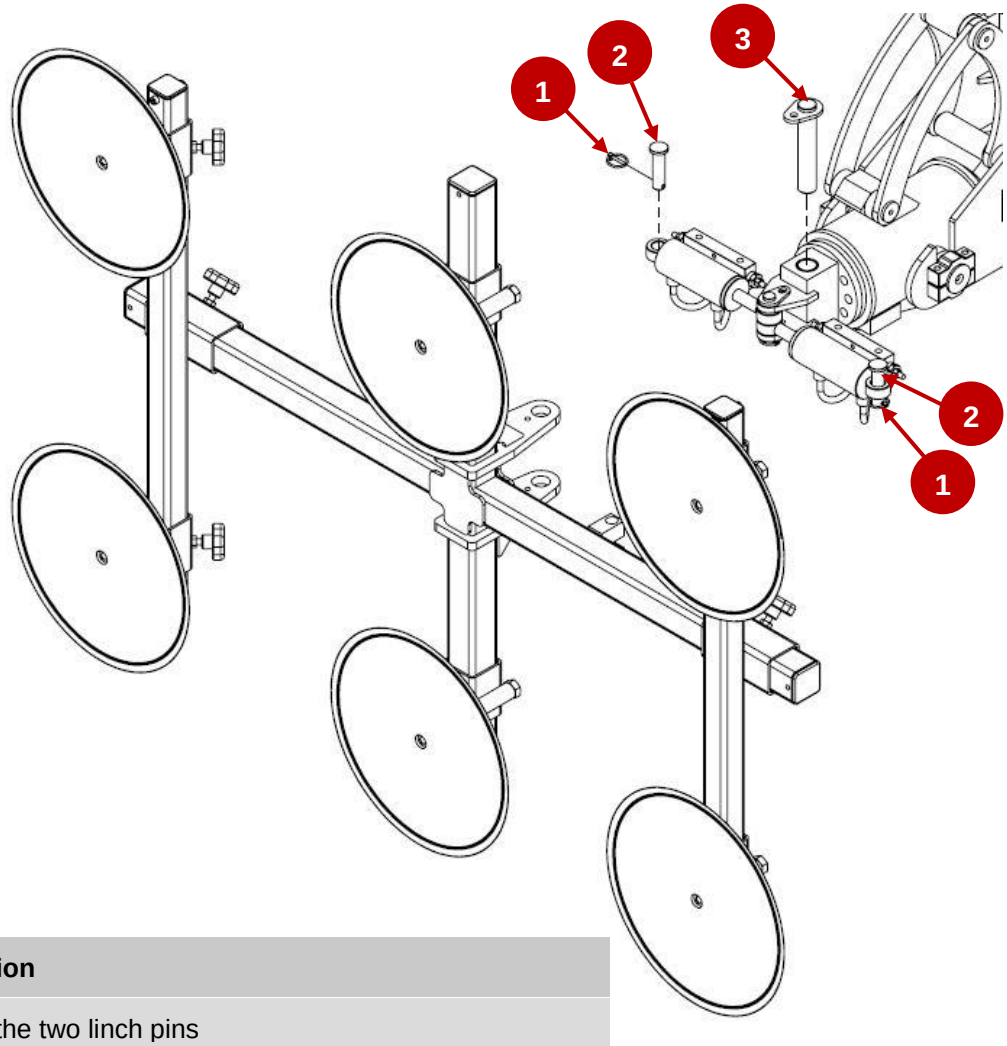
7 Scrapping and disposal

The machine must be scrapped and disposed of in accordance with local regulations.

8 Dismantling the vacuum yoke

This describes how the vacuum yoke is removed.

In order to remove the vacuum yoke, the following steps must be completed in the indicated order.



No.	Description
1	Remove the two linch pins
2	Removing the two shafts holding the turning cylinders
3	Remove the shaft holding the yoke

9 Annexes

9.1 Terms and abbreviations

Term	Text
Warning!	Things that can cause bodily injury or death
Attention!	Things that can cause bodily injury or property damage
The user	The person who operates the machine and is responsible for security
The machine	The entire basic machine unit and any equipment model
Vacuum yoke	A collective term for yoke, crossbars and suction cups
The load	The object to be lifted
Wind load	Effect of wind on the load and machine

Abbreviation	Significance
SL	Smartlift
SWL	Safe working load/ safe load capacity

9.2 Declaration of conformity

Manufacturer and bearer of responsibility for the compilation of technical files:

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

Hereby declares that:

Model:

☐ SL 808

☐ SL 1008

Serial no.: _____

Date: _____ - _____ - 20_____

has been manufactured in accordance with the following EC directives:

The Machinery Directive 2006/42EC

The EMC Directive 2014/30/EU

Date:_____ **Signature:**_____

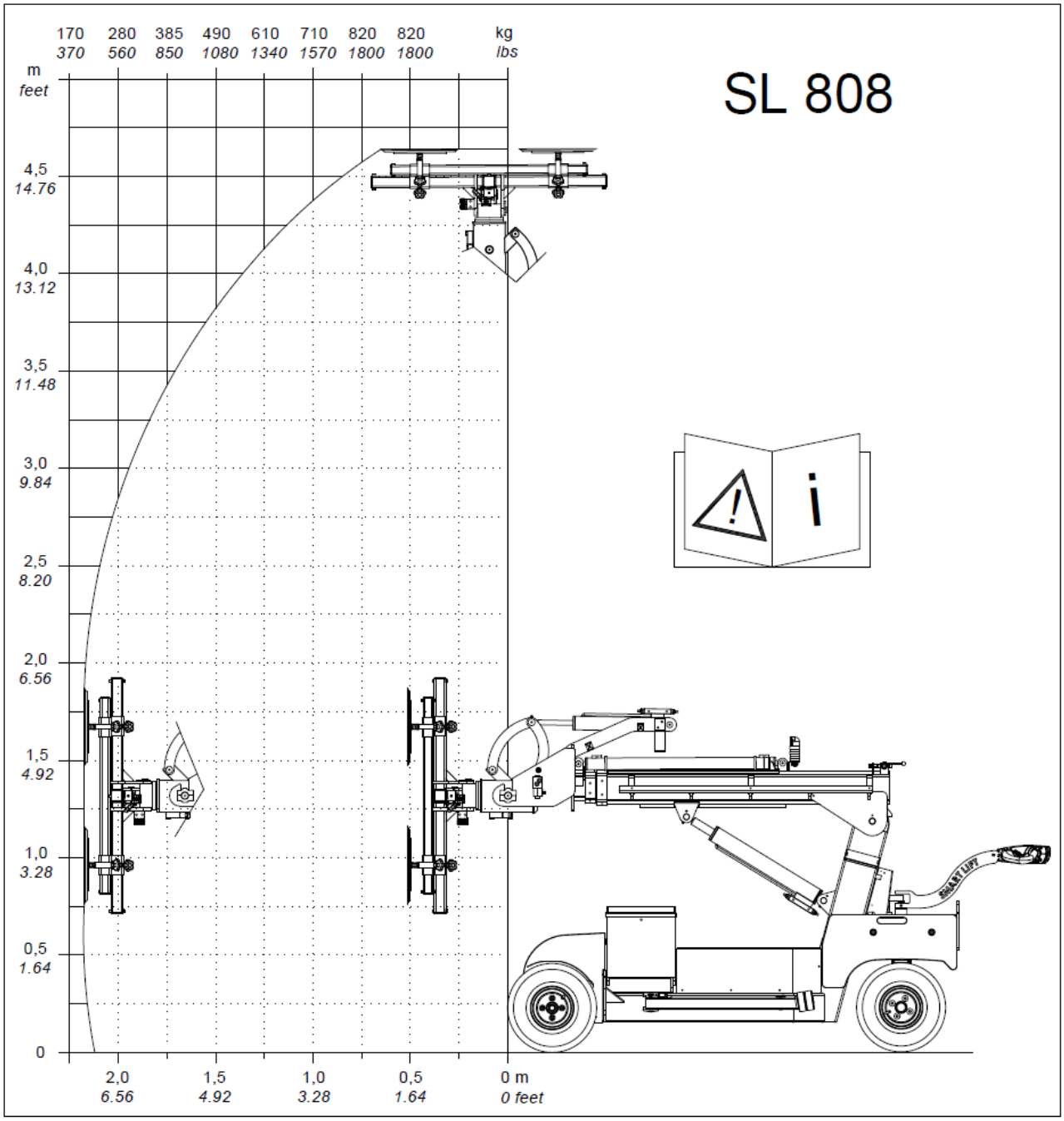
SMARTLIFT
N. A. Christensensvej 39, DK-7900 Nykøbing Mors
Tel. +45 9772 2911 E-mail: smart@smartlift.com

Jacob Libach Nielsen, CEO

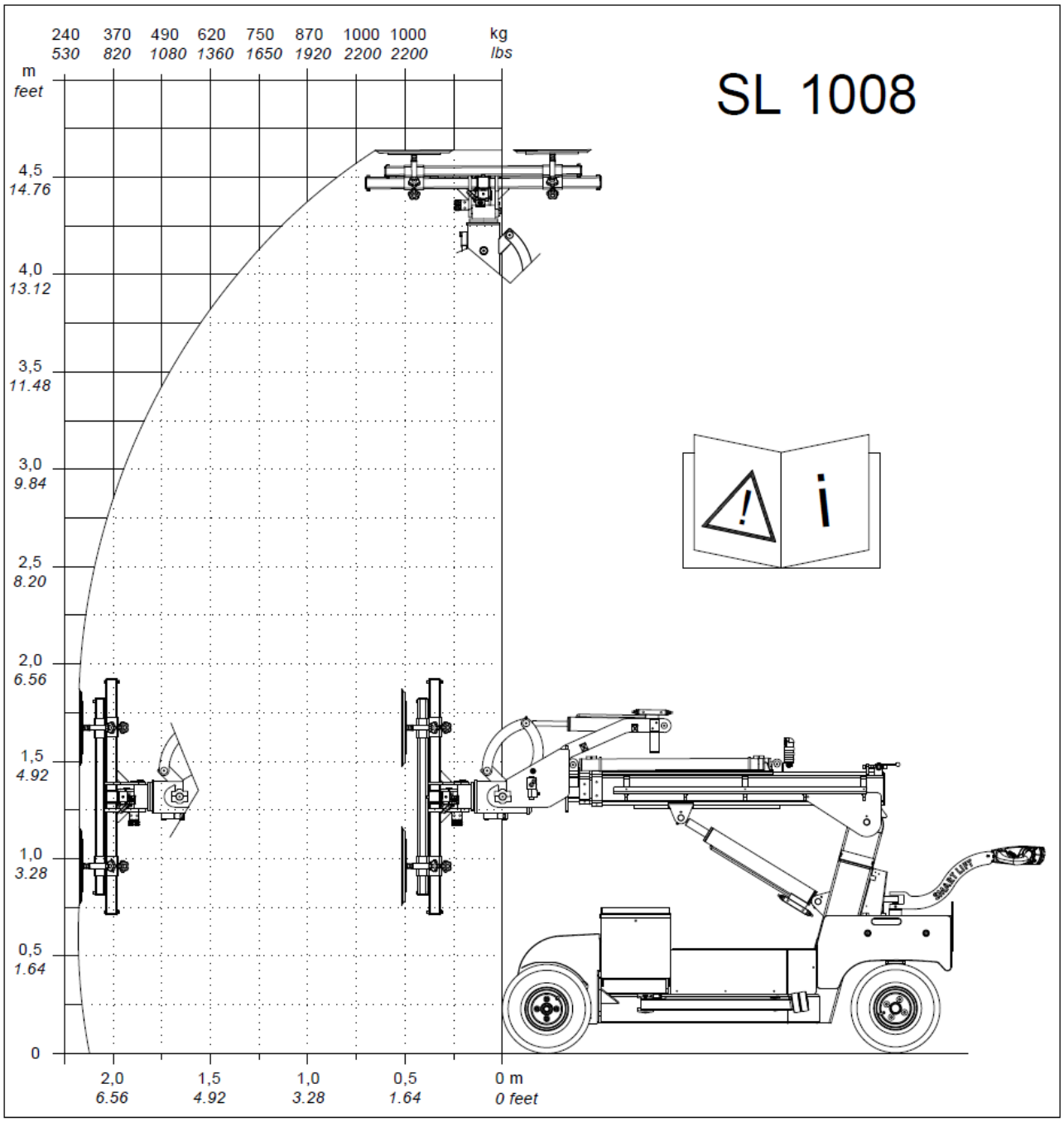
9.3 Load charts

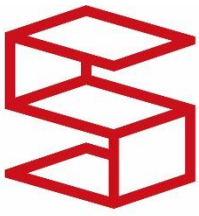
Load charts only apply to machines with standard configurations.

9.3.1 SL 808



9.3.2 SL 1008


SL 1008
240 370 490 620 750 870 1000 1000 kg
530 820 1080 1360 1650 1920 2200 2200 lbs
m
feet
4,5
14.76
4,0
13.12
3,5
11.48
3,0
9.84
2,5
8.20
2,0
6.56
1,5
4.92
1,0
3.28
0,5
1.64
0
2,0
6.56
1,5
4.92
1,0
3.28
0,5
1.64
0 m
0 feet



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