Model/type: **SL 408 OUTDOOR High Lifter – 1200W**
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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
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www.smartlift.dk
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:______________

Nicolai T. Jørgensen, Director
## General Description

<table>
<thead>
<tr>
<th>Pos.no.</th>
<th>Product</th>
<th>Number</th>
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<tbody>
<tr>
<td>1</td>
<td>Pump 007</td>
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</tr>
<tr>
<td>2</td>
<td>Suction Cup diam. 300 mm</td>
<td>4</td>
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<tr>
<td>3</td>
<td>Check Valve ⅝”, vacuum</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Replacement rubber f/suction cup</td>
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<tr>
<td>5</td>
<td>Slide Valve w/lock, vacuum</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Vacuum meter diam. 63 ⅜”, stainless</td>
<td>1</td>
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<tr>
<td>10</td>
<td>Hose Set</td>
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</tr>
<tr>
<td>11</td>
<td>Hose Coupling</td>
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<tr>
<td>12</td>
<td>Spiral Hoses</td>
<td>2</td>
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<tr>
<td>13</td>
<td>Vacuum Guard</td>
<td>1</td>
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<tr>
<td>15</td>
<td>Alarm Light, Vacuum</td>
<td>1</td>
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<tr>
<td>16</td>
<td>Acoustic alarm, Vacuum</td>
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<td>17</td>
<td>Line Filter</td>
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<td>19</td>
<td>Stainless Spring</td>
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<td>20</td>
<td>Clamp MRX.80 P-M10-25</td>
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<td>21</td>
<td>Actuator – Tilting function LA 36</td>
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<tr>
<td>22</td>
<td>Actuator – Side shift</td>
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<tr>
<td>23</td>
<td>Actuator – Telescopic Arm</td>
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<tr>
<td>24</td>
<td>Actuator – Lift Arm LA 36</td>
<td>2</td>
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<tr>
<td>25</td>
<td>Battery 105a</td>
<td>2</td>
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<tr>
<td>26</td>
<td>Charger Vitron Energy Blue Power Charger</td>
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<tr>
<td>27</td>
<td>Wheel, driving wheel</td>
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<tr>
<td>27a</td>
<td>Wheel, dual wheels</td>
<td>2</td>
</tr>
<tr>
<td>30</td>
<td>Supporting Wheel</td>
<td>2</td>
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<tr>
<td>31</td>
<td>Safety Switch/Telemecanique</td>
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<tr>
<td>32</td>
<td>Control Panel</td>
<td>1</td>
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<tr>
<td>33</td>
<td>Emergency Stop</td>
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<tr>
<td>34</td>
<td>Control, Lift Arm</td>
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<tr>
<td>35</td>
<td>Control, Telescopic Arm/Tilt</td>
<td>1</td>
</tr>
<tr>
<td>36</td>
<td>Control, Side shift</td>
<td>1</td>
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<tr>
<td>37</td>
<td>CE Connector</td>
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<tr>
<td>38</td>
<td>Ermax Main Switch 24 V</td>
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<tr>
<td>39</td>
<td>Fuse 30 Amperes Control actuator</td>
<td>1</td>
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<tr>
<td>40</td>
<td>Lock Split</td>
<td>1</td>
</tr>
<tr>
<td>41</td>
<td>Lift Eye</td>
<td>1</td>
</tr>
<tr>
<td>44</td>
<td>Handle</td>
<td>3</td>
</tr>
<tr>
<td>45</td>
<td>Weight Blocks 30 mm</td>
<td>8</td>
</tr>
<tr>
<td>46</td>
<td>Supporting Leg</td>
<td>2</td>
</tr>
<tr>
<td>47</td>
<td>Motor 1200 W/24 V</td>
<td>1</td>
</tr>
<tr>
<td>47a</td>
<td>On/OFF Switch for Drive Motor</td>
<td>1</td>
</tr>
<tr>
<td>47b</td>
<td>Fuse 100 Amperes Drive engine</td>
<td>1</td>
</tr>
<tr>
<td>47c</td>
<td>Fuse 10 Amperes motor controller</td>
<td>1</td>
</tr>
<tr>
<td>48</td>
<td>Regulating Lever</td>
<td>1</td>
</tr>
<tr>
<td>49</td>
<td>Curtis Motor Control</td>
<td>1</td>
</tr>
<tr>
<td>50</td>
<td>Safety Clamp</td>
<td>1</td>
</tr>
<tr>
<td>51</td>
<td>Safety Switch</td>
<td>1</td>
</tr>
<tr>
<td>53</td>
<td>Protective Cap for forward and back switch</td>
<td>1</td>
</tr>
</tbody>
</table>
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

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Height</td>
<td>53.1 in</td>
</tr>
<tr>
<td>Total Width</td>
<td>32.3 in</td>
</tr>
<tr>
<td>Total Length</td>
<td>102.4 in</td>
</tr>
<tr>
<td>Net Weight</td>
<td>1022 lb</td>
</tr>
<tr>
<td>Weight Blocks</td>
<td>59 kg x 8 units = 472 lb</td>
</tr>
<tr>
<td>Total Weight incl. 8 weight blocks</td>
<td>1499 lb</td>
</tr>
<tr>
<td>24 V DC</td>
<td></td>
</tr>
<tr>
<td>Charger 110V 60Hz 14A – CE plug</td>
<td></td>
</tr>
</tbody>
</table>

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.

Smartlift®
**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.

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).

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*. 
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

6 – Vacuum meter two (reading on both pressure gauges to range between 0.6 – 0.7 bar)
31 – Overload 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

In the battery case you find a trouble shooter in case of breakdown.
View of vacuum system

**(top of machine)**

- 2 – Suction cups, standard diam. 300 mm
- 11 – Hose couplings
- Pipe connection
- 5 – Slide valve with lock. Activates vacuum pump
- 10 – Hose set 2 circuit vacuum
- 12 – Spiral hoses

**(bottom of machine)**

- 1 – 2 Vacuum pumps
- Double vacuum chamber for safe holding of elements
- Load diagram

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Control Box

33 – Emergency stop

35 – Controller tilting function

34 – Controller – lifting arm

35 – Controller – telescopic arm

15 – Alarm light, Vacuum

16 – Acoustic Alarm, Vacuum

36 – Controller side shift

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Switches and alarms

33 – Emergency stop

15 – Alarm light, vacuum

16 – Acoustic alarm, vacuum

44 – Battery indicator, indication of operation time

38 – Main switch is placed at the back side of the battery case
Control panel for arm and yoke (pos. 32)

- Lifting arm up
- Lifting arm down
- Tilt forward
- Tilt backwards
- Telescopic arm ind
- Telescopic arm out
- Side shift right
- Side shift left
SMARTLIFT 408 OUTDOOR High Lifter
When operating High Lifter please be aware of:

- Spring must be back in place after turning the yoke.
- Bolt must be in position in the hole after turning the yoke to the side.
- 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.
1. Stop Down vacuum system

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.

Actuator for tilting

Line should be in holders

Emergency stop

Actuators for lifting, 2 pcs. Linak LA36

Main switch to be turned clockwise to be on

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 tilting 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

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Control box with controllers for all actuators

- Controller for tilting actuator
- Controller for telecoping actuator
- Controller for lifting actuators
- Controller for side shift
Syncronous controller (controller for lifting actuators)

- Controller for lifting actuators (2 pcs.)
  Voltage between clamps 1 and 2 must be approx. 24 Volt

- Safety switch below the lifting actuators can be switched off.
  Voltage between clamp 1 and 13 must be approx. 24 Volt

- Press up and down on the remote control. Voltage between clamp 1 and 9 and 1 and 10 must be approx. 24 Volt

---

<table>
<thead>
<tr>
<th>Clamp 1 and 13</th>
<th>Clamp 1 and 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp 1 and 9</td>
<td>Clamp 1 and 10</td>
</tr>
</tbody>
</table>
### 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)

<table>
<thead>
<tr>
<th>Fault Description</th>
<th>Voltage Requirement</th>
<th>Clamps Referenced</th>
</tr>
</thead>
<tbody>
<tr>
<td>No reaction on actuator for side shift, tilt of yoke or telescopic arm.</td>
<td>+ 24 Volt (Clamp 1 and 4)</td>
<td>Clamp 1 and 4</td>
</tr>
<tr>
<td>Security switch can be abrupted</td>
<td>+ 24 Volt between Clamps 1 and 6 as between 1 and 7</td>
<td>Clamp 1 and 6, Clamp 1 and 7</td>
</tr>
<tr>
<td>Fault on remote control when moving single actuators</td>
<td>+ 24 Volt between clamps 1 and 9 as between 1 and 10</td>
<td>Clamp 1 and 9, Clamp 1 and 10</td>
</tr>
<tr>
<td>Activate the control panel for movement of tilt, side shift or telescopic arm.</td>
<td>24 Volt or more</td>
<td>Clamp 2 and 3</td>
</tr>
<tr>
<td>No reaction on movements and none of the above faults.</td>
<td>+ 5 Volt</td>
<td>Clamp 8 and 14</td>
</tr>
</tbody>
</table>

*If this is not the case, the print on the controller can be defective.*
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?
Battery charger  Victron Energy - Blue Power Charger IP65

For complete manual refer to:

INDICATIONS:

<table>
<thead>
<tr>
<th>LED indication</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow LED on</td>
<td>battery being charged.</td>
</tr>
<tr>
<td>Yellow LED on and green LED on</td>
<td>absorption charge.</td>
</tr>
<tr>
<td>Green LED on</td>
<td>battery fully charged, float charge.</td>
</tr>
</tbody>
</table>
## Wiring for SL 408 Outdoor High Lifter

<table>
<thead>
<tr>
<th>Component</th>
<th>Color</th>
<th>Pin</th>
<th>Details</th>
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<tbody>
<tr>
<td>Engine</td>
<td>Brown</td>
<td>1</td>
<td>Pin 13 Red/Blue</td>
</tr>
<tr>
<td></td>
<td>Blue</td>
<td>2</td>
<td>Pin 5 Pink</td>
</tr>
<tr>
<td></td>
<td>Yellow</td>
<td>3</td>
<td>Pin 8 Green</td>
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<tr>
<td></td>
<td>Grey</td>
<td>4</td>
<td>Pin 32 Red/Green</td>
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<td></td>
<td>Red</td>
<td>5</td>
<td>Pin 26 Brown</td>
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<tr>
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<td>White</td>
<td>6</td>
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<td>Curtis controller</td>
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<td>Steering</td>
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<td>7</td>
<td>Pin 24 Yellow/Red</td>
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<tr>
<td></td>
<td>Brown</td>
<td>8</td>
<td>Pin 11 Pink</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>9</td>
<td>Pin 33 Pink/Black</td>
</tr>
<tr>
<td></td>
<td>Grey</td>
<td>10</td>
<td>Pin 16 Grey/Black</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>11</td>
<td>Pin 1 Red</td>
</tr>
<tr>
<td></td>
<td>Blue</td>
<td>12</td>
<td>Pin 22 Violet/Red</td>
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