Instruction manual for rescue equipment

Multifunction tools e100 and le100

e100

le100

173100085 EN
Edition 07.2017
replaces 10.2015

(Original instruction manual)
<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hazard classifications</td>
<td>4</td>
</tr>
<tr>
<td>2. Product safety</td>
<td>5</td>
</tr>
<tr>
<td>3. Intended use</td>
<td>8</td>
</tr>
<tr>
<td>4. Functional description</td>
<td>10</td>
</tr>
<tr>
<td>4.1 Description</td>
<td>10</td>
</tr>
<tr>
<td>4.2 Structure and functions</td>
<td>11</td>
</tr>
<tr>
<td>4.3 Hydraulic circuit diagram</td>
<td>13</td>
</tr>
<tr>
<td>4.4 Operating movement controls</td>
<td>14</td>
</tr>
<tr>
<td>5. Operation</td>
<td>14</td>
</tr>
<tr>
<td>5.1 Battery for StrongArm™ e100/le100</td>
<td>14</td>
</tr>
<tr>
<td>5.2 Operating the star grip</td>
<td>15</td>
</tr>
<tr>
<td>6. Cutting, spreading, spread open doors, lifting</td>
<td>15</td>
</tr>
<tr>
<td>6.1 Safety notes</td>
<td>15</td>
</tr>
<tr>
<td>6.2 Cutting</td>
<td>16</td>
</tr>
<tr>
<td>6.3 Spreading</td>
<td>17</td>
</tr>
<tr>
<td>6.4 Spreading open doors</td>
<td>19</td>
</tr>
<tr>
<td>6.5 Lifting</td>
<td>21</td>
</tr>
<tr>
<td>7. Accessories</td>
<td>22</td>
</tr>
<tr>
<td>7.1 Battery</td>
<td>22</td>
</tr>
<tr>
<td>7.2 Battery charger</td>
<td>23</td>
</tr>
<tr>
<td>7.3 Attachment strap</td>
<td>23</td>
</tr>
<tr>
<td>7.4 Accessory rail</td>
<td>24</td>
</tr>
<tr>
<td>8. Dismantling the equipment / deactivation following operation</td>
<td>24</td>
</tr>
<tr>
<td>9. Maintenance and service</td>
<td>25</td>
</tr>
<tr>
<td>9.1 Oil change</td>
<td>25</td>
</tr>
<tr>
<td>9.2 Inspections StrongArm™ e100/le100</td>
<td>26</td>
</tr>
<tr>
<td>9.3 Protective equipment</td>
<td>26</td>
</tr>
<tr>
<td>9.4 Checking and exchanging the filter element</td>
<td>27</td>
</tr>
</tbody>
</table>
Contents

10. Repairs 28
   10.1 General information 28
   10.2 Preventive service 29
   10.3 Repairs 29

11. Troubleshooting 32

12. Technical data 33
   12.1 StrongArm™ e100/le100 34
   12.2 Noise emission 35
   12.3 Operating and storage temperature ranges 35
   12.4 Oscillation / vibration 35
   12.5 Torque specification and wrench size for pivot bolt 35

13. EC Declaration of Conformity 36

14. Lighting unit (optional expansion possibility) 37

15. Instructions regarding disposal 39
1. Hazard classifications

We differentiate between various categories of safety instructions. The table shown below provides an overview of the assignment of symbols (pictograms) and signal words to the specific danger and the possible consequences.

<table>
<thead>
<tr>
<th>Pictogram</th>
<th>Damage / injury to</th>
<th>Keyword</th>
<th>Definition</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Image]</td>
<td>Persons</td>
<td>DANGER!</td>
<td>Immediate danger</td>
<td>Death or severe injury</td>
</tr>
<tr>
<td>[Image]</td>
<td>Persons</td>
<td>WARNING!</td>
<td>Potentially dangerous situation</td>
<td>Potential death or serious injury</td>
</tr>
<tr>
<td>[Image]</td>
<td>Persons</td>
<td>CAUTION!</td>
<td>Less dangerous situation</td>
<td>Minor or slight injury</td>
</tr>
<tr>
<td>[Image]</td>
<td>Property</td>
<td>ATTENTION!</td>
<td>Risk of damage to property/ environment</td>
<td>Damage to the equipment, damage to the environment, damage to surroundings</td>
</tr>
<tr>
<td>[Image]</td>
<td>-</td>
<td>NOTE</td>
<td>Handling tips and other important/ useful information and advice</td>
<td>No injury/damage to persons/ environment/ device</td>
</tr>
</tbody>
</table>

- Wear a helmet with a face guard.
- Wear protective gloves.
- Wear safety shoes.
- Proper recycling
- Protect the environment
- Read and follow the operating instructions.
2. Product safety

LUKAS products are developed and manufactured to ensure the best performance and quality when used as intended. The safety of the operator is the most important consideration in product design. Furthermore, the operating instructions are intended to help you use LUKAS products safely. The generally applicable legal and other binding regulations pertaining to the prevention of accidents and protection of the environment apply and are to be complied with in addition to the operating instructions. The equipment may only be operated by persons with appropriate training in the safety aspects of such equipment, otherwise, there is a risk of injury. We would like to point out to all users that they should carefully read the operating instructions and the instructions they contain before they use the equipment and carefully follow them. We further recommend that you have a qualified trainer show you how to use the product.

**CAUTION!**
The operating instructions for accessories must also be taken into account!

Even if you have already received instructions on how to use the equipment, you should still read through the following safety instructions again.

**WARNING / CAUTION!**
Please ensure that the accessories you use are appropriate for the maximum operating pressure and the performance of the rescue device!

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Please ensure that no body parts or clothing are caught between the visibly moving parts (e.g. blade arms).</td>
<td>Working under suspended loads is not permitted where such loads are being lifted only by means of hydraulic or electro-hydraulic devices. If this work is unavoidable, suitable mechanical supports are also required.</td>
</tr>
<tr>
<td>Wear protective clothing, a safety helmet with visor, protective footwear and gloves.</td>
<td>Inspect the device before and after use for visible defects or damage.</td>
</tr>
<tr>
<td>Warning Icon</td>
<td>Text</td>
</tr>
<tr>
<td>--------------</td>
<td>------</td>
</tr>
<tr>
<td>!</td>
<td>Immediately report any changes that occur (including changes in operating behavior) to the appropriate persons/departments! If necessary, the equipment is to be shut down immediately and secured!</td>
</tr>
<tr>
<td>!</td>
<td>All bolted connections must be checked for leaks and externally visible damage, which must be repaired immediately! Escaping hydraulic fluid can cause injuries and fires.</td>
</tr>
<tr>
<td>!</td>
<td>In the event of malfunction, immediately deactivate the device and secure it. Repair the fault immediately.</td>
</tr>
<tr>
<td>!</td>
<td>Do not carry out any changes (additions or conversions) to the equipment without obtaining the prior approval of LUKAS.</td>
</tr>
<tr>
<td>!</td>
<td>Observe all safety and danger information on the device and in the operating instructions.</td>
</tr>
<tr>
<td>!</td>
<td>All safety and danger instructions on the device must always be complete and in a legible condition.</td>
</tr>
<tr>
<td>!</td>
<td>Any mode of operation which compromises the safety and/or stability of the device is forbidden!</td>
</tr>
<tr>
<td>!</td>
<td>Repairs to the equipment may only be carried out by a trained service technician with specific knowledge of the device.</td>
</tr>
<tr>
<td>!</td>
<td>Safety devices may never be disabled!</td>
</tr>
<tr>
<td>!</td>
<td>Only genuine LUKAS accessories and spare parts are to be used for repairs.</td>
</tr>
<tr>
<td>!</td>
<td>Before switching on/starting up the device and during its operation, make sure that nobody will be endangered by this.</td>
</tr>
<tr>
<td>!</td>
<td>Observe all intervals for recurring tests and/or inspections that are prescribed or stated in the operating instructions.</td>
</tr>
<tr>
<td>!</td>
<td>When working close to live components and cables, suitable measures must be taken to avoid current transfers or high-voltage transfers to the equipment.</td>
</tr>
<tr>
<td>!</td>
<td>Please note that material could fall down or suddenly break free during spreading, cutting, lifting operations as a result of shearing, tearing or breaking; appropriate steps must be taken to avoid this.</td>
</tr>
<tr>
<td>Warning</td>
<td>Information</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>Please ensure that you do not become entangled in cables and trip when working with or transporting the device.</td>
<td>Please ensure that the battery contacts are not short-circuited.</td>
</tr>
<tr>
<td>The build-up of static charges and therefore possible sparking must be avoided when handling the device.</td>
<td>Only touch broken-off or cut-off parts while wearing protective gloves, as the torn / cut edges can be very sharp.</td>
</tr>
<tr>
<td>The StrongArm™ devices have an IP54 protection class. They are suitable for use in wet weather conditions and are splash proof.</td>
<td>StrongArm™ e100/le100 is <strong>NOT</strong> suitable for use under water.</td>
</tr>
<tr>
<td>The equipment is filled with hydraulic fluid. This hydraulic fluid can be detrimental to health if it is swallowed or its vapor is inhaled. Direct contact with the skin must be avoided for the same reason. Also, when handling hydraulic fluid, note that it can negatively affect biological systems.</td>
<td>When working with or storing the equipment, ensure that the function and the safety of the equipment are not impaired by the effects of severe external temperatures and that the equipment is not damaged in any way. Please note that the equipment can also heat up over a long period of use.</td>
</tr>
<tr>
<td>Make sure that there is adequate lighting while working.</td>
<td>Before transporting the equipment, always ensure that the accessories are positioned in such a way that they cannot cause an accident.</td>
</tr>
<tr>
<td>Always keep these operating instructions easily accessible at the place of operation.</td>
<td>Ensure the proper disposal of all removed parts, left-over oil and hydraulic fluid as well as packaging materials!</td>
</tr>
</tbody>
</table>
3. Intended use

StrongArm™ e100/le100 has been especially designed as a lightweight personal tool with many uses. It can cut, spread and lift making it versatile from a RIT (Rapid Intervention Team) situation, technical rescue, drug interdiction to a SWAT scenario. The StrongArm™ tool will lift debris, cut through wires, cables, studs or be used as a forcible entry tool to pry open doors, cut locks and spread or cut security bars. Although the StrongArm™ tool is not a vehicle extrication tool it can be used to gain access through the hood, trunk or doors in most situations. It is cross-functional and proper training is required.

StrongArm™ e100/le100 is NOT suitable for use under water.

WARNING / CAUTION! StrongArm™ e100/le100 may only be operated with the proper tool tips installed. Only use combi tips together OR only door opening tips together. NEVER interchange tips! If tips are mixed and used on the tool any warranty or guarantee claims will be voided.

CAUTION / PLEASE NOTE! Always take care in keeping any object or load properly secured while working. When lifting, always use cribbing to shore and stabilize the load. Lift an inch, crib an inch. Do not cut anything that is under tension (cables) or is a loose end.
**WARNING / CAUTION / PLEASE NOTE!**

The following may not be cut or spread:
- live cables
- prestressed and hardened parts such as springs, spring steels, steering columns and rollers
- pipes under gas or liquid pressure,
- compound materials (steel/concrete)
- explosive bodies such as airbag cartridges

The operating pressure placed on the rescue device may only be directly changed after consultation with LUKAS. A change in settings may result in damage to property and/or injuries.

The StrongArm™ e100/le100 device is **not** explosion-protected!

When using the devices in potentially explosive environment, **the following** must be excluded:
- that the device could trigger an explosion.
- that working with the device could trigger an explosion; e.g. sparks may result from cutting an object.

The responsibility for explosion prevention or for ruling out work with the device is with the operator of the device or with the person responsible at the place of use. **When working in areas at risk of explosion, all applicable legal, national and international regulations, standards and safety rules for avoiding explosions must be observed without restriction!**

The device should not come into contact with acids or alkalies. If this is unavoidable, clean the equipment immediately afterwards with a suitable cleaning agent.

You can obtain replacement parts for the rescue tools from your authorized LUKAS dealer!
4. Functional description

4.1 Description

The cutting and spreading tool StrongArm™ e100/le100 has been designed in such a way that a hydraulically operated piston activates mechanical joints symmetrically to open or close a set of two opposing tool arms, thus enabling objects to be cut or spread. Additionally, door opener tool tips especially designed for that purpose can be positioned in very narrow gaps or cracks to spread them apart.

For all devices, the movement is activated by means of a valve in the form of a star grip. All devices employ a deadman switch and full load-supporting function when the star grip is released.

The StrongArm™ e100/le100 device does not need to be connected to an external hydraulic source (e.g. a motor pump). Generation of the required hydraulic pressure takes place within the body of the device.

A rechargeable battery serves as drive and energy source.

The accumulator battery can be inserted into the opening provided in the body of the tool. It is then automatically locked into position.

You can extend the operating time of your device by using several batteries. The batteries can be recharged after use, using the external charger.

A universal accessory rail is mounted to the top of the StrongArm™ to allow optional equipment to be mounted to the tool. For example, a flashlight can be mounted to facilitate work being done under poor lighting conditions.

There is an illuminated ring around the switch on the e100 (blue) StrongArm™ tool to indicate the tool is on and ready for operation. The le100 (black) StrongArm™ tool does not have this feature in order to keep visibility low.

Another indicator that either tool is ready for operation is that the switch is recessed when it is “on”. This also prevents accidental activation.
4.2 Structure and functions

4.2.1 Illustration with combination tips

1 Star grip
2 Main switch
3 Quick exchange battery
4 Release button for battery
5 Handle (rotates 360°)
6 Locking bolt, pull up to unlock
7 Ventilation slots
8 Tool tips
   (combination snap-on tips)
9 Blade arms
10 Pivot bolt with secured nut
11a Front plastic housing
11b Rear plastic housing
12 Tool body
13 Protective cover
14 Accessory rail
15 Lighting unit
   (optional expansion)
4.2.2 Blade arms without combi or door opening tips

4.2.3 Combination tips (snap-on tips)

**Please note!**
Use caution installing or removing tips. Wear protective gloves to avoid injury.
4.2.4 Door opening tips (snap-on tips)

Please note!
Use caution installing or removing tips. Wear protective gloves to avoid injury.

CAUTION!
Use combination and door opening tips only in pairs. Never combine a single combination tip with a single door opening tip.

4.2.5 Rotatable handle

The handle can be rotated about 360 degrees with four set points every 90 degrees. This allows for easy change of position of the tool for the best angle attack. To do this, pull the locking pin upwards while turning the handle to the desired position. Let go of the locking pin and it will automatically engage the next locking position, thus securing the handle again.

4.3 Hydraulic circuit diagram

Below a simplified hydraulic cylinder representing the tool is depicted. A = tool  B = star grip valve

![Hydraulic circuit diagram]

- cutting / gripping / closing or extending the piston
- spreading / opening or retracting the piston
4.4 Operating movement controls
The piston movement is controlled by the star grip on the attached valve (see illustration below). The symbols show the turning direction for opening and closing the tool tips.

5. Operation

5.1 Battery for StrongArm™ e100/le100

Commissioning
Before initial operation, the battery of the rescue device must be fully loaded, using the external charger.

Procedure:
1. Fully press back the red release button and pull the battery carefully out of the battery cradle.
   Do not use force!

2. The battery can now be recharged in the battery charger and replaced again (observe also the separate instruction manual for the battery charger).

3. Insert the recharged or new battery into the cradle so that the red release button automatically engages. Thus, the battery is locked again.
5.2 Operating the star grip

Open the device (＞) :

Turn the star grip in the direction of the corresponding symbol (open) and hold it in this position.

Close the device (＜) :

Turn the star grip in the direction of the corresponding symbol (close) and hold it in this position.

Deadman function:
Following release, the star grip automatically returns to the pivot position, fully guaranteeing load retention.

6. Cutting, spreading, spread open doors, lifting

6.1 Safety notes

Before rescue work can commence, the object must be stabilized in its current position. Ensure that the objects to be worked on are adequately stabilized/shored to ensure that there is no risk of sliding or shifting.

Worldwide safety guidelines pertaining to the specific country must be observed and complied with.

WARNING / CAUTION / PLEASE NOTE!
The StrongArm™ e100/le100 device is not explosion-protected!
When using the device in potentially explosive environments, the following must be excluded:
- that the device could trigger an explosion.
- that working with the device could trigger an explosion; e.g. sparks may result from cutting an object.

The responsibility for explosion prevention or for ruling out work with the device lies with the operator of the device or with the person responsible at the place of use.

When working in areas at risk of explosion, all applicable legal, national and international regulations, standards and safety rules for avoiding explosions must be observed without restriction!
The following are to be worn when working with the rescue equipment:
- protective clothing,
- safety helmet with visor or protective goggles,
- protective gloves
- safety shoes
- and, if necessary, ear protection
- wear special protective clothing in case of extremely high temperatures

Before operating the device, you should ensure that no participants or bystanders are at risk
from the movements of the device or from flying fragments! Avoid unnecessary damage to
property belonging to others or to objects not involved in the rescue or damage caused by
flying fragments.

It is strictly prohibited to reach into the path of the
device (e.g. between the blades/spreader arms and the
material/object to which the force is to be applied)!

CAUTION / PLEASE NOTE!
The strong effect of the force of the rescue equipment during operation could
cause pieces of the vehicle to break off or fly off, posing a danger to persons.
those not involved in the emergency operation should therefore keep at a safe
distance appropriate to the situation. Any trapped or enclosed persons must
be protected.

6.2 Cutting
The blades should be positioned at a 90° angle to the object to be cut, if possible.
Higher cutting capacities can be achieved by cutting as close as possible to the blade’s pivot point.

During cutting, the gap between the blade tips (in the transverse direction) must not be exceeded, otherwise the blade is in danger of breaking:

<table>
<thead>
<tr>
<th>StrongArm™</th>
<th>max. gap between the blade tips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Einheit</td>
<td>[mm] / [in.]</td>
</tr>
<tr>
<td>e100 / le100</td>
<td>2 / 0.08</td>
</tr>
</tbody>
</table>

**ATTENTION!**
Where possible, avoid cutting through high-strength parts of the vehicle body (e.g. side impact protection). This may result in damage to the blades or to increased wear and tear!

### 6.3 Spreading

Use the front of the tips only to increase an existing gap. To increase grip and to avoid having the tips slip or break out of the part to be processed, the grip should be reapplied at an early stage. The highest force develops in the rear area of the cutting tip or in the rear spreading area of the spreading tip.

**WARNING / CAUTION / PLEASE NOTE!**
The steel tool arms may not be damaged.
Working surface is too small, tips slip off. Only for increasing the size of a gap (not suitable for spreading)

Tips get a safe grip.

Work with the tips only. Do not damage the tool arms!

Every effort should be made to fully engage the width of the tip during a spreading / lifting maneuver (see picture below). Failure to do so, could result in debris flying.
6.4 Spreading open doors
The door opener tips are especially designed for using them for forced opening of locked doors.

6.4.1 Points of application:
Doors with single protection: locking furniture and hinge plates.
Doors with multiple protection: locking furniture, hinge plates and at each locking bolt, if required.

6.4.2 Procedure
When applying the unit, the claws must be pressed or beaten into the door crack as hard and deep as possible (refer to application examples).
When working in an environment which involves the risk of explosions, sparks must be avoided when the claws are pushed into the door gap!

WARNING / CAUTION / ATTENTION!
- There is the risk of sparks, if the device gets in contact with metal or stone!
- There is the danger of injuries in the area doors breaking open.
6.4.3 Operating safety instructions and application examples
When operating rescue devices, wear
• protective clothing
• helmet with visor or goggles
• protective gloves.

**WARNING / CAUTION / ATTENTION!**
During operation of this rescue device, parts of the object worked on with this device may break away and endanger people standing nearby. Onlookers must be kept at a **safety clearance** (of at least 5 m / 16 ft.).

Application example - office door

Application example - steel door
6.5 Lifting

**WARNING / CAUTION / ATTENTION!**
The load must **NEVER** exceed threading force of the multifunction tool.

**CAUTION / ATTENTION!**
The load to be lifted must be secured against slipping as prescribed in the respective applicable guidelines and regulations.

- Work only with the middle area of the tips.
- Do not damage the tool arms.

**WARNING / CAUTION / ATTENTION!**
Before dismantling the used equipment, you must ensure that the load being moved is in stable, non-slip location!
7. Accessories

7.1 Battery

Only LUKAS lithium-ion rechargeable batteries may be used to operate the device. These guarantee optimum performance and maximize the operating time of the device.

**NOTE:**

To ensure maximum operating time and maximum uptime, you must make sure that the battery is always fully charged before connecting it to a rescue device.

**NOTE:**

Indicator lights are the same as found on SCBA systems (Self-Contained Breathing Apparatus - Symbols G, G, Y, R).

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>nom. Voltage</th>
<th>Capacity</th>
<th>Energy</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td>V DC</td>
<td>Ah</td>
<td>Wh</td>
<td>kg</td>
</tr>
<tr>
<td>Battery</td>
<td>25.2</td>
<td>3.9</td>
<td>98.3</td>
<td>1.2</td>
</tr>
</tbody>
</table>

The charge status display is activated either by pressing a switch or activates automatically when reaching a certain charge level (see table below).

**Capacity**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Activated by switch</th>
<th>Automatic activation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>Constant light</td>
<td>No</td>
</tr>
<tr>
<td>75%</td>
<td>Constant light</td>
<td>No</td>
</tr>
<tr>
<td>50%</td>
<td>Flashing yellow, red continuous light</td>
<td>Yes</td>
</tr>
<tr>
<td>25%</td>
<td>Flashing red till battery is discharged</td>
<td>Yes</td>
</tr>
</tbody>
</table>
7.2 Battery charger

Only the battery charger from the LUKAS accessories list may be used for the lithium-ion batteries. This guarantees optimum charging and operating time for the battery.

**NOTE:**
Pay strict attention to the separate operating instructions for the battery charger.

7.3 Attachment strap

The single point attachment strap will be placed on the tool before the pump housing and tool head are assembled. It is the ONLY recommended way to carry this tool using a harness. It will spin freely to allow easy repositioning of the tool. The attachment strap will need to be replaced by an authorized dealer. LUKAS offers this attachment strip as accessory. For more information please turn to your authorized LUKAS dealer!
7.4 Accessory rail

The accessory rail allows the attachment and variable positioning of various lighting units. The lighting unit is optional and not offered by LUKAS.

8. Dismantling the equipment / deactivation following operation

Once work has been completed, the device arms should be closed until the tips are only a few millimeters apart. This relieves the hydraulic and mechanical strain on the equipment.

NOTE:
Never store the device with fully closed arms! By fully closing the arms, hydraulic pressure and mechanical tension may develop in the device.

Clean the device after each operation and grease all metal surfaces as well as all moving parts. The lock pin (button) of the plug-on tips should also be greased from time to time. Greasing provides protection against excessive wear and tear as well as corrosion. Avoid storing the equipment in a damp environment.
9. Maintenance and service

The device is subject to very high mechanical stresses. A visual inspection must therefore be carried out after every use and a more in-depth inspection must be carried out every six months. These inspections enable the early detection of wear and tear, which means that punctual replacement of these wearing parts prevents breakage. Regularly check the torque of the pivot bolt. (You will find the torque specification for the pivot bolt in the chapter on “Technical Data”.) An annual inspection of the tool is due once a year. This inspection must be performed by a person with the necessary expertise. This means that the person must possess adequate specialist knowledge and experience in the fields of electrical engineering and hydraulics, so that they can objectively assess the condition of the tool. Every three years a crack test of the blades is also essential. A special crack testing kit is available for this purpose. Every 3 years or when there might be doubts regarding the safety or reliability of the unit, an additional function check is to be carried out (complying with the applicable national and international regulations for the maintenance intervals of rescue equipment). In the Federal Republic of Germany, regular safety inspections according to the regulations of the Gesetzlichen Unfallversicherung (GUV; ‘Legal accident insurance’) are mandatory.

**ATTENTION!**
Clean off any dirt before checking the equipment!

**WARNING / CAUTION / PLEASE NOTE!**
To perform maintenance and repairs, personal safety equipment appropriate for the work is a mandatory requirement. The maintenance and repair staff must have adequate technical and specialized knowledge. **LUKAS offers appropriate training courses for this.**

9.1 Oil change

Under normal working conditions routine oil changes are not necessary with StrongArm™ tools. The prerequisite is that:
• the tools are always properly handled and stowed as per the applicable operating manual
• the tools are tested on a regular basis as per our instructions on preventive maintenance
• after 10 years service life an oil change is recommended

Regular tests, oil change and/or repairs must be carried out by repair and maintenance personnel that is trained and authorized by the manufacturer.
9.2 Inspections StrongArm™ e100/le100

Inspections to be carried out:

**Visual Inspection**

**StrongArm™ e100/le100 with cutting and spreading function**
- Opening width of the blade arms on the tips (see chapter "Technical data"),
- General tightness (leaks),
- Operability of the star grip - check the automatic return into middle position after release (deadman function),
- Existence and stability of handle and rotation function,
- Labels complete and legible,
- Covers in perfect condition,
- Check the torque of the pivot bolt (for torque $M_A$, see "Technical Data").
- Blade arms free of cracks and nicks or deformations on the cutting surfaces,
- Cutting surfaces fit on top of each other without making contact,
- Bolts and retaining rings of the blade arms are in place and in good condition,
- Illumination of main switch (blue device), (work area optionally) fully functional.
- Opening width of arms at the tips (see chapter "Technical Data"),
- Tool arms/tips not cracked,
- Pins and retaining rings on the tool tips are present and in a proper condition,
- Corrugation of the tips clean and well-edged, no tears.
- The tips must be in place and locked (Lock and Release function).

**Battery and power supply**
- Casing undamaged,
- Electrical contact surfaces clean and undamaged
- Battery(-ies) fully charged (when used)
- Charging state display of lithium-ion battery or batteries fully functional
- Battery lock and release function

**Functional test**
- Easy opening and closing or extension/retraction of star grip controls,
- No unusual noises
- No further movement of tool arms when interrupting the valve function during the process (deadman switch).

9.3 Protective equipment
- Check the protective equipment used on / in the vicinity of the rescue device. Pay particular attention to the protective cover for the movable parts (there should be no cracks!).
9.4 Checking and exchanging the filter element

The air suction filter is to be checked at least once a year or after use in a dusty environment. The filter can be checked from the outside if the battery is removed (see illustrations below). If the filter is severely contaminated, it will need to be replaced. The removable filter cover is located on the outside at the rear housing where it is fixed with two screws.

Procedure:
1. Unscrew the two attachment screws at the cover with a torx wrench/screwdriver (TX 15) and take the cover off (see illustration below).
2. Now you can take out the filter element and replace it by a new one.
3. Reassembling will be carried in reverse order.
Do not exceed the torque of 1.5 Nm (13 lbf·in.), to avoid damaging the thread or housing.
10. Repairs

10.1 General information

Service work may only be performed by the device manufacturer or by personnel trained by the device manufacturer and authorized LUKAS dealers. Only LUKAS spare parts may be used to replace all components (see spare parts list), as special tools and compliance with, assembly instructions, safety aspects and inspections are required (see also chapter “Maintenance and Servicing”). During assembly, ensure that all components are particularly clean, as dirt can damage the equipment!

WARNING / CAUTION / PLEASE NOTE!
To avoid injuries, take out the battery each time before you do any repairs. This avoids an unwanted start up or movement in the cutting and spreading area of the device.
As the devices may also be pressurized when not in operation, protective clothes must be worn when repairs are being carried out.

NOTE:
Always register your tool on the LUKAS internet site. This is the only way to guarantee extended warranty cover.

ATTENTION!
Because LUKAS devices are designed for highest performance, only components specified in the spare parts list for the appropriate equipment may be replaced. Other components in the device may only be replaced if:
- You have participated in an appropriate LUKAS service training course.
- You have been explicitly granted permission by LUKAS Customer Service (valid LUKAS certificate required!)

ATTENTION!
When cleaning units and equipment, note that no cleaning agent may be used that has a pH value outside the range 5 - 8!
10.2 Preventive service

10.2.1 Care instructions
The outside of the device should be cleaned with a damp cloth from time to time (not the electrical contacts in the connection slot, and on the battery). In addition, the metal surfaces are to be coated with a suitable medium to counteract corrosion (not the electrical contacts in the connection slot, on the battery).
(In case of doubt, contact your authorized LUKAS dealer or LUKAS directly!)

10.2.2 Function and load test
If there is any doubt regarding the safety or reliability of a device, a function and stress test must also be performed by an authorized LUKAS dealer or LUKAS directly.

10.3 Repairs

10.3.1 Replacing the protective cover
1. Remove handle as described in 10.3.2.
2. Unscrew the two attachment screws with a hex key.
3. Pull the rounded ear edges carefully outwards and then backwards out of the guide grooves keeping them in place.
4. Push new protective covers into the guide grooves proceeding in reverse order.
   Reinstall attachment screws.
10.3.2 Replacing the handle

1. Unscrew the two attachment screws with an Allen key.
2. Remove the lower part of the handle while holding the upper part. Then take off the upper part.
3. Position the new handle and hold it, while mounting the lower part with the attachment screws (use medium strength thread lock e.g. LOXEAL® 54-03 or Loctite 243).

10.3.3 Replacing the blade arms

1. Close the blade arms so that the tips are almost touching and remove the battery.
2. Remove protective cover as described before.
3. Remove lock screw with an Allen key (2 mm / 0.08 in.).
4. Unscrew nut of pivot bolt (wrench size 30) and remove bolt.
5. Remove retaining rings on both blade arm bolts and remove them.
6. Remove blade arms and replace with new ones.
7. Reassembly is carried out in reverse order.

**ATTENTION!**
Don’t forget to apply LUKAS special grease to all sliding surfaces.

**NOTE:**
The torques specifications required can be taken from the spare parts list of your particular unit.

### 10.3.4 Decals
All damaged and/or illegible decals (safety notices, type plate etc.) must be replaced.

**Procedure:**
1. Remove damaged and/or illegible decals.
2. Clean surfaces with industrial alcohol.
3. Affix new decals.
Take care to affix the labels in the correct positions. If this is no longer known, you should ask your authorized LUKAS dealer or contact LUKAS directly.
# 11. Troubleshooting

<table>
<thead>
<tr>
<th>Fault</th>
<th>Check</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blades, spreader arms move slowly or jerkily when operated</td>
<td>Battery fully charged?</td>
<td>Battery week</td>
<td>Charge battery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Battery defective</td>
<td>Replace battery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Air in the hydraulic system</td>
<td>Repair by an authorized dealer, by personnel specially trained by LUKAS, or by LUKAS itself</td>
</tr>
<tr>
<td>Blades, spreader arms do not move when operated</td>
<td>Battery fully charged?</td>
<td>Battery week</td>
<td>Charge battery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Battery defective</td>
<td>Replace battery</td>
</tr>
<tr>
<td>Device doesn’t perform at its given power</td>
<td>Device defective</td>
<td>Device defective</td>
<td>Repair by an authorized dealer, by personnel specially trained by LUKAS, or by LUKAS itself</td>
</tr>
<tr>
<td>Following release, the star grip does not return to the central position</td>
<td>Casing damaged or star grip operation not working smoothly?</td>
<td>Damage to the torsion spring for reset</td>
<td>Repair by an authorized dealer, by personnel specially trained by LUKAS, or by LUKAS itself</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soiled valve or star grip</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Defective valve</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other mechanical damage (e.g. star grip)</td>
<td></td>
</tr>
<tr>
<td>Hydraulic fluid leaking from the piston rod</td>
<td>Defective rod seal</td>
<td>Damage to the piston</td>
<td>Repair by an authorized dealer, by personnel specially trained by LUKAS, or by LUKAS itself</td>
</tr>
</tbody>
</table>
Contact an authorized LUKAS dealer or the LUKAS Customer Service Department directly if the malfunctions cannot be rectified.
The address for the LUKAS Customer Service Department is:

LUKAS Hydraulik GmbH
A Unit of IDEX Corporation

Weinstrasse 39, D-91058 Erlangen
Tel.: (+49) 09131 / 698 - 348
Fax.: (+49) 09131 / 698 - 353
http://www.lukas.com

12. Technical data
Since all values are subject to tolerances, minor differences may occur between the data on your equipment and the data in the following tables.
The values may also differ because of reading inaccuracies and/or tolerances in the measuring equipment used. If the given values in the tables are re-converted into different units, minor inaccuracies may occur when rounded values were used.

NOTE:
The following tables contain only the technical data necessary for operation and storage. Further information about your device is available directly from LUKAS.

Operating pressure: StrongArm™ e100/le100: 70 MPa / 10000 psi
### 12.1 StrongArm™ e100/le100

<table>
<thead>
<tr>
<th>Device type</th>
<th>StrongArm™ e100 / le100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item number</strong></td>
<td>95-10-10 (e100 blue)</td>
</tr>
<tr>
<td></td>
<td>95-10-11 (le100 black)</td>
</tr>
<tr>
<td><strong>Dimensions (excluding battery)</strong></td>
<td></td>
</tr>
<tr>
<td>L x W x H</td>
<td>796 x 195 x 210</td>
</tr>
<tr>
<td>[mm]</td>
<td>31.3 x 7.7 x 8.3</td>
</tr>
<tr>
<td>[in.]</td>
<td></td>
</tr>
<tr>
<td><strong>Opening width (at the tips)</strong></td>
<td></td>
</tr>
<tr>
<td>with combi tips</td>
<td>215 mm</td>
</tr>
<tr>
<td>[mm]</td>
<td>8.5</td>
</tr>
<tr>
<td>[in.]</td>
<td></td>
</tr>
<tr>
<td><strong>Opening width cutting</strong></td>
<td></td>
</tr>
<tr>
<td>(end of cutting area w/ combi tips)</td>
<td>207 mm</td>
</tr>
<tr>
<td>[mm]</td>
<td>8.15</td>
</tr>
<tr>
<td>[in.]</td>
<td></td>
</tr>
<tr>
<td><strong>Max. cutting force</strong></td>
<td></td>
</tr>
<tr>
<td>[kN]</td>
<td>155</td>
</tr>
<tr>
<td>[lbf.]</td>
<td>34845</td>
</tr>
<tr>
<td><strong>LSF spreading force</strong></td>
<td></td>
</tr>
<tr>
<td>(according to NFPA)</td>
<td></td>
</tr>
<tr>
<td>[kN]</td>
<td>24</td>
</tr>
<tr>
<td>[lbf.]</td>
<td>53</td>
</tr>
<tr>
<td><strong>HSF spreading force</strong></td>
<td></td>
</tr>
<tr>
<td>(according to NFPA)</td>
<td></td>
</tr>
<tr>
<td>[kN]</td>
<td>30</td>
</tr>
<tr>
<td>[lbf.]</td>
<td>6744</td>
</tr>
<tr>
<td><strong>Force spreading min.</strong></td>
<td></td>
</tr>
<tr>
<td>[kN]</td>
<td>28</td>
</tr>
<tr>
<td>[lbf.]</td>
<td>6295</td>
</tr>
<tr>
<td><strong>Maximum spreading path</strong></td>
<td></td>
</tr>
<tr>
<td>[mm]</td>
<td>212</td>
</tr>
<tr>
<td>[in.]</td>
<td>8.3</td>
</tr>
<tr>
<td><strong>Mass net (without battery, without tool tips, incl. oil)</strong></td>
<td>9,8</td>
</tr>
<tr>
<td>[kg]</td>
<td>9,8</td>
</tr>
<tr>
<td>[lbs.]</td>
<td>21.6</td>
</tr>
<tr>
<td><strong>Mass (with battery, without tool tips, incl. oil)</strong></td>
<td>11,1</td>
</tr>
<tr>
<td>[kg]</td>
<td>11,1</td>
</tr>
<tr>
<td>[lbs.]</td>
<td>24.4</td>
</tr>
<tr>
<td><strong>Mass (excl. battery, with combi tips)</strong></td>
<td>11,2</td>
</tr>
<tr>
<td>[kg]</td>
<td>11,2</td>
</tr>
<tr>
<td>[lbs.]</td>
<td>24.6</td>
</tr>
<tr>
<td><strong>Mass (excl. battery with door opening tips)</strong></td>
<td>11,8</td>
</tr>
<tr>
<td>[kg]</td>
<td>11,8</td>
</tr>
<tr>
<td>[lbs.]</td>
<td>26.0</td>
</tr>
<tr>
<td><strong>Nominal electrical voltage</strong></td>
<td></td>
</tr>
<tr>
<td>(with lithium-ion battery)</td>
<td></td>
</tr>
<tr>
<td>[V DC]</td>
<td>25.2</td>
</tr>
<tr>
<td><strong>Protection category</strong></td>
<td></td>
</tr>
<tr>
<td>IP</td>
<td>54</td>
</tr>
<tr>
<td><strong>Battery type used for device</strong></td>
<td></td>
</tr>
<tr>
<td>Lithium-ion</td>
<td></td>
</tr>
<tr>
<td><strong>Specification (NFPA 1936)</strong></td>
<td></td>
</tr>
<tr>
<td>A5/B3/C5/D6/E6</td>
<td></td>
</tr>
</tbody>
</table>
12.2 Noise emission

<table>
<thead>
<tr>
<th>Device type</th>
<th>e100 / le100</th>
<th>dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idling (measured at a distance of 1 m, according to EN)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Full load (measured at a distance of 1 m, according to EN)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Idling (measured at a distance of 4 m, according to NFPA)</td>
<td>67</td>
<td></td>
</tr>
<tr>
<td>Full load (measured at a distance of 4 m, according to NFPA)</td>
<td>70</td>
<td></td>
</tr>
</tbody>
</table>

12.3 Operating and storage temperature ranges

Device including rechargeable battery

<table>
<thead>
<tr>
<th>Operating temperature, standard</th>
<th>°C / °F</th>
<th>-20 … +55</th>
<th>-4 … +131</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature extreme range for 9 min., cyclical (device operational)</td>
<td>°C / °F</td>
<td>-20 … +120</td>
<td>-4 … +250</td>
</tr>
<tr>
<td>Storage temperature, standard (device not operational)</td>
<td>°C / °F</td>
<td>-25 … +45</td>
<td>-13 … +113</td>
</tr>
<tr>
<td>Ambient temperature extreme range for 7 min. (device not operational)</td>
<td>°C / °F</td>
<td>-30 … +150</td>
<td>-22 … +300</td>
</tr>
</tbody>
</table>

12.4 Oscillation / vibration

The total oscillation value / vibration value to which the upper limbs are exposed, is usually below 2.5 m/s². Higher values may be measured for short periods as a result of interaction with the materials to be processed.

(The oscillations / vibrations were determined in accordance with DIN EN ISO 20643.)

12.5 Torque specification and wrench size for pivot bolt

<table>
<thead>
<tr>
<th>Device type</th>
<th>e100 / le100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pivot bolt</td>
<td>M 20 x 1.5</td>
</tr>
<tr>
<td>Wrench size</td>
<td>30</td>
</tr>
<tr>
<td>Torque</td>
<td>100 +10</td>
</tr>
<tr>
<td>Torque</td>
<td>885 + 89</td>
</tr>
</tbody>
</table>
13. EC Declaration of Conformity

EG-Konformitätserklärung / EC Declaration of Conformity

Im Sinne der EG-Maschinenrichtlinie 2006/42/EG, Anhang II A
inan accordance with the EC Machinery Directive 2006/42/EC, Appendix II A

Hiermit erklären wir, dass die nachfolgend bezeichneten Multifunktionsgeräte
We hereby declare that the following multifunction devices

<table>
<thead>
<tr>
<th>ArtikelNr. / Item no.</th>
<th>Modell und Typ / Model and type</th>
</tr>
</thead>
<tbody>
<tr>
<td>95-10-10; 273100000</td>
<td>StrongArm™ e100</td>
</tr>
<tr>
<td>95-10-11; 273180000</td>
<td>StrongArm™ le100</td>
</tr>
</tbody>
</table>

- in der von uns gelieferten Ausführung den Bestimmungen der Maschinenrichtlinie 2006/42/EG und den sie
  umsetzenden nationalen Rechtsvorschriften entsprechen.
  Berücksichtigt wurden insbesondere die Normen:
    Risikobeurteilung und Risikominderung.

- in the versions supplied by us conform to the EC Machinery Directive 2006/42/EC and the national statutory
  provisions that implement them.
  The following standards have particularly been taken into consideration:
  - DIN EN ISO 12100, publication date: 2011-03 – Safety of machinery - General principles for design - Risk
    assessment and risk reduction.

Bei einer nicht mit uns abgestimmten Änderung oder Verwendung der Maschine/Ausrüstung verliert diese Erklärung
ihre Gültigkeit.
This declaration loses its validity in the case of alterations or usage of the machinery/equipment not approved by
LUKAS.

Erlangen, 26.05.2015

i. V. Carsten Sauerbier
Bevollmächtigter / Authorized Representative
Director of Technical Innovation and Development
IDEX Europe GmbH

i. A. Thomas Littwin
Konstrukteur / Engineering Designer
IDEX Europe GmbH
14. Lighting unit (optional expansion possibility)

The lighting unit is optional and not offered by LUKAS.
The illustration shows a typical installation of a flashlight as an overview.

Pay always attention to the separate instruction manual provided from the supplier or manufacturer to mount and operate your flashlight unit as intended.
The light must be separately ordered by the customer at a deliberate supplier.
LUKAS recommends the TLR Series offered by STREAMLIGHT.

Short description TLR Series:

Mounting the light to the device:
1. Open the rail clamp tensioning bolt and position the illumination unit at the outer bottom edge of the accessory rail, so that the rail key matches the rail groove (see illustration below). Now snap the unit into place by pressing it down until you detect or hear it clearly engaging.
2. Close rail clamp tensioning bolt until it is tight. The light is fixed now.
3. For demounting proceed in reverse order.

Operating the light:
1. Tap the left side of the paddle switch down = constant light as long as you hold it down.
   After release the light goes out.
2. Tap the left side of the paddle switch down and immediately re-press within 0.4 s and hold = strobe mode as long as you hold it down.
3. Tap down the right side of the paddle switch = constant light. Tap again to stop illumination.
4. Tap down the right side of the paddle switch and immediately re-press within 0.4 s = constant strobe mode. Tap again to stop illumination.

WARNING / CAUTION / PLEASE NOTE!
The light or LASER beam of the lighting unit can cause serious injuries or lead to blindness. Any accessories attached to the accessory rail are used at the risk of the user.
NOTE:
Pay also strict attention to the separate operating instructions for the light and take further details from it.
15. Instructions regarding disposal

Please duly dispose of all packaging materials and removed items.

Electrical equipment, accessories and packaging should always be disposed of in an environmentally compatible way.

*Only for EU countries:*  
Do not dispose of electrical equipment with your household waste!  
According to the European Directive 2002/96/EC governing electrical and electronic waste and their application in national legislation, old electrical equipment must be separately collected and recycled in an environmentally compatible manner. *Please also take into account the notes in the separate operating instructions for the battery chargers.*
Please duly dispose of all packaging materials and removed items.