



## **E2 Rescue Tools Daily Care & Preventative Maintenance**



**How to keep your LUKAS Tools in  
perfect condition**

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## ***Introduction***

This booklet is written as a guideline on daily care and preventive maintenance for LUKAS Rescue Tools. The intention of all inspections is:

- to eliminate minor problems by a visual check after each use,
- to detect eventual faults in a preventive manner before they can cause a failure of the whole tool in a rescue situation,
- To save money on spare parts, because faults identified at an early stage can be fixed easier and cheaper than those identified later, where the damage is normally more serious.

This booklet is not meant as a workshop or repair manual, because repairs to the hydraulic parts require experience and special workshop equipment.



However, regular visual inspections can be carried out easily by each user. A regular check of the torque on the centre bolt for cutters and combi-tools will also prevent problems occurring.



## Maintenance for spreaders

### Introduction

The spreader operates according to a similar principle to all other Lukas tools. They, too, have been designed in such a way that a hydraulically operated piston activates mechanical joints symmetrically to open or close a set of two opposite spreader arms. This movement can then be used to spread open, squeeze or pull open objects.

Models	
<b>SP300 E2</b> <ul style="list-style-type: none"><li>• 20.0 kg operating weight</li><li>• 608 mm spreading distance</li><li>• Max Spreading force diamond tip 127kN</li><li>• Max Spreading force peel tips 145kN</li></ul>	 A blue and silver hydraulic spreader with two diamond-tipped arms and a central handle. The brand name 'LUKAS' is visible on the side.
<b>SP 310 E2</b> <ul style="list-style-type: none"><li>• 23.9 kg operating weight</li><li>• 6725 mm spreading distance</li><li>• Max Spreading force diamond tip 12324kN</li><li>• Max Spreading force peel tips 248kN</li></ul>	 A blue and silver hydraulic spreader with two diamond-tipped arms and a central handle. The brand name 'LUKAS' is visible on the side.

### Visual & User check after each use

A visual & user check should be carried out after each use of the spreader. The spreader Arms, body and hoses should be checked for the following

#### Spreader arms and tips

- visible external damage
- condition of bearing bolts and securing rings
- serration of spreader tips clean and sharp
- fixing mechanism of spreader tips in sound condition

#### Spreader Body

- oil leakage on cylinder body or control valve
- protection cover for lever arms in good condition
- plastic body in good condition and no oil leaks
- control valve returns to centre position smoothly when released (dead man function)
- the area behind the protection cover should be checked and cleared of any debris, liquids and solutions.

### Stowage

- the tool should be stowed with the spreader tips slightly open (not under pressure)

### Function and Load Test



It is recommended that a full function and load test is carried out every 3 years. This test should be carried out by LUKAS trained persons only. For a full service of Lukas rescue equipment contact PT Hydraulics.

## Maintenance for cutters

### Introduction

The cutters and combi tools have been designed in such a way that a hydraulically operated piston activates mechanical joints symmetrically to open or close a set of two opposite blade arms, thus enabling objects to be cut.

The daily care and maintenance of cutters is the same irrespective of the model. A selection of the current range of cutters available is pictured below:

Model	
<b>S700 E2</b> <ul style="list-style-type: none"><li>• HP cutter</li><li>• 21.8 kg weight</li><li>• Blade opening 192 mm</li></ul>	
<b>S311 E2</b> <ul style="list-style-type: none"><li>• HP cutter</li><li>• 17.5 kg weight</li><li>• Blade opening 150 mm</li></ul>	

### Visual & User check after each use

A visual & user check should be carried out after each use of the cutter. The cutter blades, and body should be checked for the following



### Cutter blades

- condition of bearing bolts and securing rings
- tightening torque of the nut on the central bolt (see table 1 for torque settings)
- visible external damage
- condition of shim plates between cylinder body and cutter blades
- cutting edge clean and flat with no raised points

**Note:**

Seriously deformed blades must be changed. It is recommended that both blades are changed. Prior to mounting new blades treat sliding surfaces and all bolts with special mounting grease.

**Cutter Body**

- oil leakage on cylinder body or control valve
- protection cover for lever arms in good condition
- plastic body in good condition and no oil leaks
- control valve returns to centre position smoothly when released (dead man function)
- the area behind the protection cover should be checked and cleared of any debris, liquids and solutions.

**Stowage**

- the tool should be stowed with the cutter tips slightly overlapping

**Tensioning the Centre Bolt**

The centre bolt should be tensioned on a regular basis to ensure the correct operation of the cutter. The actual frequency of checking the tension is dependent on use. For normal road crash rescue operations and training the torque setting should be checked every 3 months. Where the tool has been subject to heavy operational use they should be checked on completion of the work

**Method for Checking Centre Bolt Tension**

- Visually inspect nut and bolt for damage.
- Loosen nut by 1/4 of turn
- Adjust torque wrench to correct setting and tighten nut.
- Torque settings for all tools are listed in the table 1.



**Function and Load Test**

It is recommended that a full function and load test is carried out every 3 years. This test should be carried out by LUKAS trained persons only. For a full service of Lukas rescue equipment contact PT Hydraulics.

## Maintenance for combination tools

### Introduction

The daily care and maintenance of Combi-tools is the same irrespective of the model. A selection of the current range of Combi-tools available is pictured below:

Model	
<b>SC 357 E2</b> <ul style="list-style-type: none"> <li>• Cutting Force up to 368 kN</li> <li>• Round steel up to 30 mm</li> <li>• Spreading force 350 kN</li> <li>• Spreading distance 360 mm</li> <li>• Weight 19.8 kg</li> </ul>	
<b>SC 250 E2</b> <ul style="list-style-type: none"> <li>• Cutting Force up to 280 kN</li> <li>• Round steel up to 26 mm</li> <li>• Spreading force 33.5 kN</li> <li>• Spreading distance 318 mm</li> <li>• Weight 15.6 kg</li> </ul>	

The combination tool is a combination of a spreader and a cutter. Carry out the visual and user checks as described above for the spreader and cutter. The torque settings for the combination tool centre bolt can be found in table 1.

### Stowage

- the tool should be stowed with the tips slightly open (not under pressure)

**Table 1: Tightening torques for central bolts on cutters and combination tools**


Torque Setting	
Tool	
S700E	MA = 150 + 10 Nm (Main Bolt) MA = 6 Nm (Grub Screw)
S311E	MA = 120+10 Nm
S700	MA = 150 + 10 Nm
SC250	MA = 120+10 Nm
SC350	MA = 120+10 Nm

## Maintenance for rescue rams

### Introduction

The rescue rams are double-acting hydraulic cylinders. Extension and retraction takes place hydraulically.

The daily care and maintenance of Rams is the same irrespective of the model.

Model	
<b>R411E</b> <ul style="list-style-type: none"><li>Extended length: 905 mm</li><li>Retracted length: 545 mm</li><li>Total Stroke 360mm</li><li>Weight 16.9 kg</li></ul>	
<b>R421 E2</b> <ul style="list-style-type: none"><li>Extended length: 1347mm</li><li>Retracted length: 597 mm</li><li>Total Stroke 750mm</li><li>Weight 19.0 kg</li></ul>	

### Visual & User check after each use

A visual & user check should be carried out after each use of the ram. The ram claws, body and hoses should be checked for the following

#### Claws on cylinder bottom and piston

- Visible external damage
- Gripping edges clean and sharp?
- Piston clean with no score mark or dents

#### Rescue ram body

- oil leakage on cylinder body or control valve
- protection cover for lever arms in good condition
- plastic body in good condition and no oil leaks
- control valve returns to centre position smoothly when released (dead man function)
- the area behind the protection cover should be checked and cleared of any debris, liquids and solutions.

### Function and Load Test

It is recommended that a full function and load test is carried out every 3 years. This test should be carried out by LUKAS trained persons only. For a full service of Lukas rescue equipment contact PT Hydraulics.



## ***eDraulic Battery & Power Supply Maintenance***

### **Caring For your Lithium-ion Battery**

The eDraulic Rescue Tools are powered by Lithium-ion batteries, it is important to know how best to care for them so you have the power when you need it most.

Lithium-ion is superior to nickel and lead-based batteries and the applications for lithium-ion batteries are growing as a result. A typical Lithium-ion battery provides 500 discharge/charge cycles. The battery prefers a partial rather than a full discharge. Frequent full discharges should be avoided when possible. Instead, charge the battery more often. There is no concern of battery memory when applying unscheduled charges.

Although lithium-ion is memory-free, batteries with fuel gauges exhibit what engineers refer to as "digital memory". Here is the reason: Short discharges with subsequent recharges do not provide the periodic calibration needed to synchronize the fuel gauge with the battery's state-of-charge. A deliberate full discharge and recharge every 30 charges corrects this problem. Letting the battery run down to the cut-off point in the equipment will do this. If ignored, the fuel gauge will become increasingly less accurate.

Once the batteries have been charged they remain ready for use for a period of many months. Lithium ion batteries have a very low self-discharge rate of approx 8% in the first month and then just 2% for each following month.

Each battery will give an approximate working time of 30 minutes under normal rescue conditions. Time to recharge is 60 minutes to 90% and 75 minutes to full charge

### **Caring For your Power supply**

The power supply permits unlimited operation for the eDraulics tools and can be run from any 115V or 230V supply.

When in use care should be taken not to damage the power lead and a visual inspection of all parts should be carried out after each use.

## ***Accessories***

### **Batteries**

Only LUKAS lithium/ion rechargeable batteries are provided for operating eDRAULIC tools. To ensure the optimal performance and service life of eDRAULIC tools, we recommend that you use the specially developed lithium/ion batteries.



**eDraulic Battery**



**High Capacity  
eDraulic Battery**

### **Battery Charger**

Only the "eDRAULIC Power Pack Charger" may be used for the lithium/ion batteries.



### **Power Supply**

The eDRAULIC tools have a unique power supply with integrated electronics, allowing the devices to be operated for an almost unlimited time by connecting them to an external power source. The power supply converts the voltage of the external power source in such a way that it may be used instead of a battery.



## Troubleshooting

Trouble	Control	Cause	Solution
Blades, spreader arms or cylinder pistons move slowly or jerkily when operated	Battery fully charged?	Battery flat	Charge battery
		Battery defective	Replace battery
	Power supply cable connected?	Air in the hydraulic system	Repair of fault by authorised dealer, staff specially trained by LUKAS or directly by LUKAS
		Power supply not properly connected to the eDRAULIC device (not automatically locked).	Reinsert power supply into the connection slot.
		Power supply cable not properly connected to the external power supply.	Reconnect external power supply.
		Power supply or power supply cable defective.	Replace power supply or power supply cable.
External power source defective.	Use other external power source		
Blades, spreader arms or cylinder pistons do not move when operated.	Battery fully charged?	Battery flat	Charge battery
		Battery defective	Replace battery
	Power supply cable connected?	Power supply cable defective	Replace power supply cable
Device doesn't perform at its given power		Device defective	Repair of fault by authorised dealer, staff specially trained by LUKAS or directly by LUKAS

Trouble	Control	Cause	Solution
Following release, the star grip doesn't return to the central position	Casing damaged or star grip operation does not work smoothly?	Damage to the torsion spring for reset	Repair of fault by authorised dealer, staff specially trained by LUKAS or directly by LUKAS
		Soiled valve or star grip	
		Defective valve	
		Other mechanical damage (e. g. star grip)	
Hydraulic fluid leaks on the piston rod		Defective rod seal	Repair of fault by authorised dealer, staff specially trained by LUKAS or directly by LUKAS
		Damage to the piston	
The useful operating time between the individual charging cycles is less than 5 minutes, despite charging the batteries according to the instructions.		Battery defective	Replace battery