

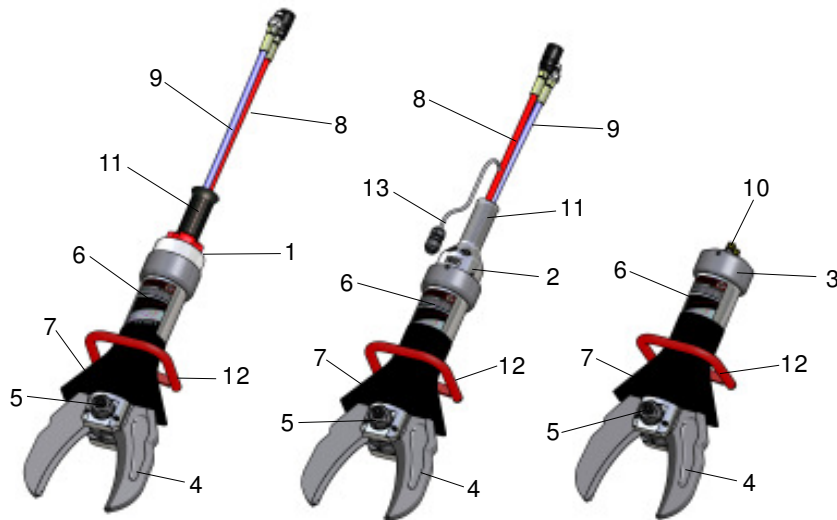
Operating Instructions Recycling system

LUKAS



Cutter LSI 501, LSI 511, LSI 530, LSI 55

84150/1490-85 GB
Issue 07.2006



with 4/3-way-valve

with electric controls

with cylinder bottom

- | | |
|---|---|
| 1 4/3-way-valve with star grip | 8 Hose line red: pressure with quick-connect socket |
| 2 Electric control unit | 9 Hose line blue: return with quick-connect plug |
| 3 Cylinder bottom | 10 Connecting nipple |
| 4 Cutter blades | 11 Handhold |
| 5 Central bolt with self-locking nut and lubricating nipple | 12 Handgriff |
| 6 Hydraulic cylinder | 13 Power connection |
| 7 Hand guard | |



LSI501



LSI511



LSI530



LSI55

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1 Correct use of the device

1.1. The device has been constructed according to the latest technology and the recognised safety regulations. However, danger to life or limb can arise for the operator or third parties occur during use or the device and other items can be damaged.

1.2. Only use the device in perfect condition and according to the instructions, safely and safety conscious! Immediately repair (or arrange repair of) malfunctions which can affect safety!

1.3 The cutter is mainly used in recycling and demolition works. The cutting tool is intended for long-term industrial use. It is designed for cutting steel, sufficiently hard non-ferrous metals, steel sheets and cables. Depending on the type of use, devices are available with different blade shapes.
Typical cutting performance is listed under „Technical Data“.

1.4 The following must not be cut:

- **energised** cables
- Pipes with pressurised gas or fluids
- **Pre-tensioned** and **hardened** parts such as springs, struts, steering columns and millings
- Mixed materials, e.g. steel/concrete

1.5 The device (without electrical controls) is suitable for **underwater use up to 40 m**.

1.6 Devices with cylinder bottom are intended for externally controlled processes. They are mainly used on robots, cranes or other manipulators.

1.7 The manufacturer / supplier is not liable for damage resulting from incorrect use. The user alone bears the risk. Correct use also includes observing the operating instructions and the inspection and maintenance conditions.

2 Organisational measures

2.1 **Always** store the **operating instructions** to hand at the location where the device is used.

2.2 In addition to the operating instructions, generally applicable statutory and other binding regulations regarding accident prevention and environmental protection must be observed and applied.
This also includes the wearing of work or protective clothing, helmet with visor or protective goggles, gloves and, if necessary, ear protectors.

2.3 The device must only be used by a properly trained person, familiar with safety regulations, as otherwise there is a danger of injury.

2.4 Comply with all safety and risk notices on the device! Keep all safety and risk notices legible.

2.5 Do not change the device, add or change anything on the device without the manufacturer's consent. This is also the case for fitting and adjusting safety equipment and valves.

2.6 The operating pressure marked on the device must not be exceeded.

2.7 Only original LUKAS parts and original LUKAS accessories and system components should be used for repairs.

2.8 Prescribed and named deadlines for tests/inspections as stated in the operating instructions must be observed.

2.9 Properly dispose of all packaging materials and removed parts.

3 General safety instructions

3.1 In the event of a malfunction, immediately shut off and secure the device. Repair (arrange repair) immediately.

3.2 Before start-up / running and during operation, ensure that nobody can be endangered by the running device. This also means checking the device for loose connections.

3.3 Do never grip between the blades and take care that body parts (e. g. hair, fingers) or clothing are never insert between openly visible movable parts.

3.4 Only touch the cutting parts with protective gloves as cutting edges are very sharp.

3.5 Please note that cut material can fall or catapult away as a result of its sudden removal and suitable protective measures should be taken.

3.6 When working, you must ensure there is sufficient illumination.

3.7 After each use of the device, check for external damage and deficiencies. Immediately report changes detected (including changes to its operation) to the appropriate office. If necessary, immediately shut off and secure the device. Check all hydraulic and electrical lines, hoses and threaded connections for leakage and check for external damage and immediately repair. Leaking oil can lead to injuries and fires. Damaged electrical lines can lead to short circuits and electric shocks which can result in death.

3.8 All types of work which affect the safety and stability of the device are prohibited. Damage can also occur as a result of the device falling over and/or persons can be injured by the falling device. Take care if you use a balancer that in case of a malfunction there is also the possibility that the device could fall down.

3.9 You must check that all safety equipment is complete and in perfect condition:

- Labels and notices (safety notices)
- Safety covers (e.g. hand guard, etc.) are on and in perfect condition.

3.10 When working near energised components and lines, suitable measures should be taken to avoid current transfers or high voltage transfers to the device.

3.11 The device is filled with hydraulic fluid. These hydraulic fluids can affect your health if drunk or if their fumes are inhaled. Direct skin contact should be avoided for this reason. When working with hydraulic fluids, please be aware that they can have a negative impact on biological systems.

3.12 The generation of an electrostatic charge producing sparks as a possible consequence should be avoided when working with the device.

3.13 When working with or storing the device, ensure that the function and safety of the device are not affected by large external temperature effects and that it is not damaged. Please note that the device can heat up as a result of prolonged use.

3.14 Safety equipment **must never** be disconnected.

3.15 Never work when overtired or inebriated.

3.16 Before transporting the device, always check that the accessories are secure.

3.17 Make sure that you do not get caught by hose lines and cables and trip when using or transporting the device.

4 Maintenance and servicing instructions

4.1 In order to carry out maintenance and service work, equipment suitable for the work is required. Only staff with specific knowledge and experience in hydraulics may work on the device!

4.2 Clean oil and all dirt from device and, in particular, connections and screw joints before starting working. Do not use aggressive detergents. Use a fibre-free cloth and ensure thorough cleanliness, especially when rebuilding.

4.3 When dismantling the device, ensure that all escaping hydraulic fluid is collected, that it does not enter the soil and that it is disposed of in accordance with existing provisions.

4.4 Always tighten loosened screws and threaded connections when assembling and observe the prescribed torque.

4.5 Work on electrical devices may only be undertaken by a specialist electrician or by trained persons under the supervision of a specialist electrician corresponding to the electrical technical regulations.

4.6 Aggressive media (acids, soaps, solvents, steam) can **damage** the device. If the device has to be operated in such an environment **in exceptional cases**, or if it comes into contact with such items, the entire device must be thoroughly cleaned. Moreover, a check according to No. 3.7 above must be undertaken.

4.7 LSI tools must be inspected at regular intervals for dirt in the hand guard, notably when working overhead. This dirt must immediately be removed (see also „Maintenance“).

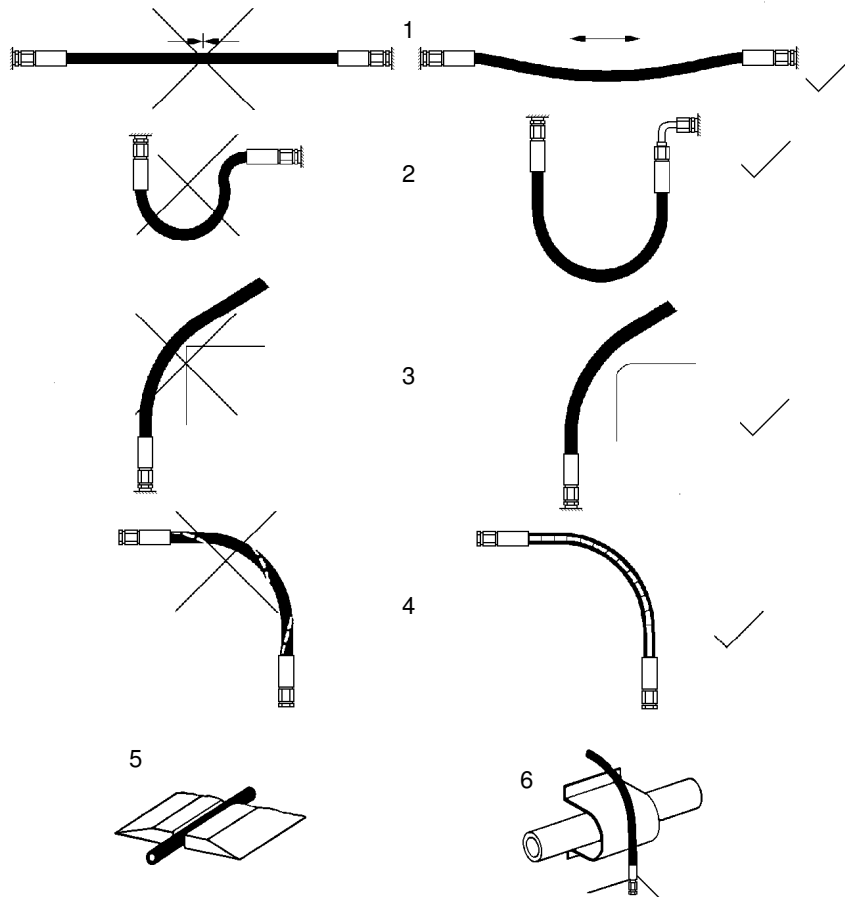
4.8 The electrical equipment of the device must regularly be inspected/checked. Deficiencies, such as loose connections and braised cables, must immediately be remedied.

5 Safety instructions for hose lines

● ATTENTION !

- The hoses must **never** come into contact **with brake fluid**.
- After coming to contact with the following fluids, the hoses must immediately be cleaned:
 - acids, soaps, solutions / diluted
 - alcohol and fuels
 - battery acids and ATF
 - phosphate esters

It is also **essential** that the hose lines are **checked for damage** after cleaning. The hose lines must be replaced if necessary.



picture 2

5.1 Handling instructions for hose lines

- The defined operating pressure must not be exceeded.
- The hoses must not be subjected to tension and torsion (see picture 2, fig. 1).
- The hose line must not be bent (see picture 2, fig. 2).
- Do not pull or lay hoses across edges (see picture 2, fig. 3).
- Do not connect twisted hoses (see picture 2, fig. 4).
- Never drive a vehicle over the hoses. Loose hose lines laid on roads and paths must be protected against damage, e.g. with hose bridges (see picture 2, fig. 5).
- In the event of high temperatures occurring externally, the hose lines must either be fitted a sufficient distance from the heat-emitting components or protected by suitable measures (shields) (see picture 2, fig. 6).
- Weights must not be suspended on the hose lines.
- Objects must not be allowed to fall onto the hose lines.

5.2 Securing the environment in the event of a hose failing

Hose lines must be laid or secured such that risk of the hose failing is avoided.

Danger can occur as a result of:

- the hose moving back and forth after tearing, e.g. through external influence,
- the pressure medium escaping under pressure,
- escaping pressure medium igniting close to a igniting source.

The danger can be avoided, for example, with protective coverings or shields.

5.2.1 Beware of hairline tears

- Escaping high-pressure oil can cause **serious injuries** when impinge to the skin.
- In the event of an injury, **immediately consult a doctor!**
- Oil must immediately be cleaned from the wound.
- Do not search for leaks using a finger.
- Depressurise the hydraulic system before loosening connections.



5.3 Storing hose lines

- Hose lines are subject to natural aging even when stores correctly and with permissible loads. As a result, their storage time and period of use are limited.

When storing hose lines, the following should be observed:

- Store cool, dry and dust-free (ideally, wrapped in plastic); avoid direct sunlight or UV radiation; shield from nearby sources of heat.
- Do not use ozone-forming lights (e.g. fluorescent lights, mercury vapour lamps) or electrical devices in the immediate surroundings
- Hose lines must be stored de-energised and in a lying position. If storing in rings, the smallest bend radius as recommended by the manufacturer, must not be exceeded.

5.4 Labelling the hose lines

- The hose is labelled with manufacturer and operating pressure.
- The maximum permissible operating pressure and month./year of manufacture are labelled at the pressurised neck.

5.5 Periods for checking and replacing hose lines

- **Check the hose lines for external damage, tears, bends and inflating after every use.**
- The operator must ensure that hose lines are replaced at reasonable intervals, even if no safety deficiencies can be detected on the hose.
- **The hose line must be replaced 10 years after manufacture at the latest (see label)!**
- Hose lines must be **checked before first start-up** of the technical equipment and then **at least once a year** to ensure a safe **working condition by a properly trained person**. For examples of possible deficiencies, see 5.6 below.

5.6 Examples of possible deficiencies to hose lines

- Damage to the external layer to the insert (e.g. chafing, cuts or tears).
- External layer becoming brittle (tears to the hose material).
- Deformations not corresponding to the natural shape of the hose when under pressure or depressurised, or when bent, e.g. separation of layers, bubbles, squashed areas, bends.
- Leaks.
- Installation requirements not observed.
- Hose leaves the fittings.
- Damage or deformation to the fittings which alleviates the function and stability of the fittings or the hose – fittings connection.
- Corroded fittings or metal inserts, which alleviates the stability.
- Storage times and period of use exceeded.

6 Functions and performance

6.1 Description

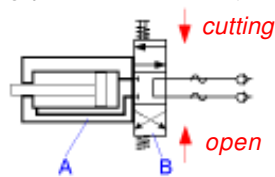
The device is designed such that a hydraulic piston is connected across two equal, opposing, symmetrical blades via mechanical joints and so cuts materials. The blades are designed for the application in terms of their geometry so that sliding of the material being cut is avoided as much as possible.

6.2 Controlling the working movements

6.2.1 LSI cutter with 4/3-way valve

The movement of the blades is controlled by the star grip on the fitted valve (see first page pos. 1).

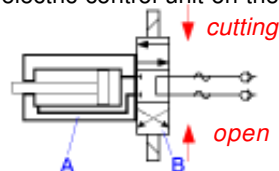
The circuit diagram is simplified here to make the function comprehensible (hydraulic cylinder (A) + 4/3-way valve (B)).



6.2.2 LSI cutter with electrical controls

The movement of the blades is controlled by the electric control unit on the fitted valve (see first page pos. 2).

The circuit diagram is simplified here to make the function comprehensible (hydraulic cylinder (A) + 4/3-way valve (B)).

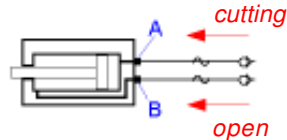


6.2.3 LSI cutter with cylinder bottom

The cutter with cylinder bottom is controlled with pressure to the correspondingly labelled connection nipple (see first page pos. 10). Control is not directly on the tool, but through external controls.

The blades are opened with pressure to connector nipple „B“.

The blades are closed with pressure to connector nipple „A“.



6.3 Hydraulic power

Only LUKAS hydraulic aggregate should be used to operate the device. If the pump aggregate is made by another manufacturer, please ensure that it is designed in accordance with LUKAS specifications, as otherwise potential dangers can occur, for which LUKAS cannot be responsible. If in doubt, contact the authorised LUKAS dealer or LUKAS direct.

Ensure that the **permissible operating pressure** for LUKAS LSI devices of **50 MPa (= 500 bar)** is not exceeded without consulting LUKAS.

6.4 Hose lines

The connection between pump aggregate and cutting tool is normally via LUKAS hose lines.

When connecting a piping, contact LUKAS directly **in advance**.

7 Connecting the device

7.1 Hydraulical

7.1.1 LSI cutter with 4/3-way valve or with electrical controls

The device has two hose lines; these are connected with the pump aggregate via a pair of hoses (5 m or 10 m as required). All hose lines are colour marked and fitted with quick connectors so that they cannot be mistaken:

HP = High pressure —>red

R = Return —>blue

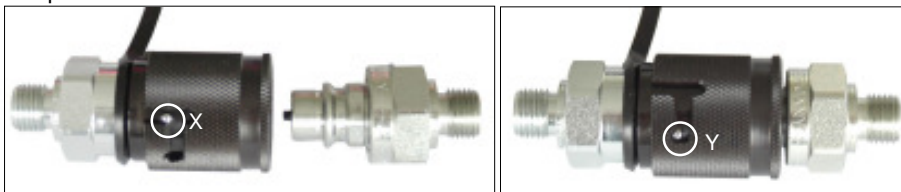
7.1.2 LSI cutter with cylinder bottom

The device has two connectors for hose lines; these will be connected with the pump aggregate via a pair of hoses (5 m or 10 m as required) (not included in the delivery). The hose lines are directly screwed to the cylinder bottom and tightened with a torque of 45Nm. Ensure that the high pressure hose are screwed into connection „A“ and the return hose is screwed to connection „B“!

7.2 Connection of the plug-in coupling counterparts for HP and R hoses

The device is connected to the hydraulic pump with the plug in coupling counterparts (plug and socket), there being no risk of mix-up.

When connecting the hoses, be aware of the following basic functions of the quick couplers:



Before connecting, withdraw and hold the locking socket (position X). Connect the nipple and socket and release the locking socket. Then turn the locking cover to position Y. The connection has now been made and secured. Decoupling is carried out in reverse. It is only possible to connect the device if the hoses are **depressurised**. The supplied dust covers are used to protect against dust.

Attention!

The quick couplings currently have a special function therefore **must not be unscrewed** from the hose lines and/or **replaced!**

7.3 Electrical (only cutters with electric controls)

The device has an approx. 0.5 m electrical cable with a plug. This plug is connected with the coupling of the electrical power cable and in parallel with the hose line pair from the pump engine.

7.4 Mechanical (only cutters with cylinder bottom)

When using the cutter in a manipulator, important principles must be observed in order to exclude danger to life and limb and to the device:

- The device must be freely rotatable around its long axis (possible through axis on the robot or corresponding rotor hub / LUKAS accessories) for vertical positioning to the cut material.
- The addition of protective covers and/or measures for switch securing (e.g. safety light barrier) must be ensured.

Important!

In any case, installation must be agreed technically and in terms of safety with LUKAS!

7.5 Mechanical fixing on a balancer from the LUKAS accessories (only cutters with 4/3-way valve or electric controls)



First setup the weight of the cutter on the green swivel (see arrow on the picture left) on the reverse of the balancer, this guarantees that the cutter will remain hanging at any desired height.

Fix the balancer to the intended suspension (e. g. arm hook) by using the attached hook (see picture right, pos. 1).



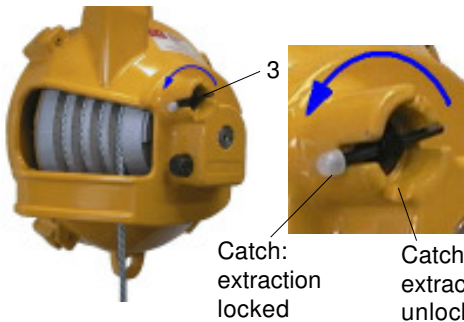


Then fix the LSI cutter to the swivel hanger (see picture left).

Note: The device cannot be clamped tighter in the hanger! This is because the cutter is pivoted in the swivel hanger.

The swivel hanger has 2 holes in order to equalise differences in center of gravity (see picture left, pos. 2) by fixing the clevis into the second hole.

The LSI cutter should now be hanging vertically aligned to the steel cable (see picture right).



Unlock the balancer by pulling out the spring bolt (see picture left, pos. 3) and turning it counterclockwise to the second, slightly higher positioned catch and release the spring bolt to snap in.

8 Operation

8.1 Initial operation

Before first starting up, check the device for external, apparent damages and deficiencies! Check all lines, hoses and screwed connections for leakages and external damages.

Before connecting the LSI-cutter, check the pump intended for use (see the separate operating instructions for the pump).

Before the first starting up and after repairs, the device must be ventilated:

- Connect device to the hydraulic pump (see „Connecting the device“)
- Fully open the device twice without load until the blades can no longer move, then immediately switch to idle and immediately close to approx. 2 mm.

8.2 Operating the 4/3-way valve with the star grip

Open device (extend):

Turn the star grip clockwise and hold in this position until the blades reach the desired opening width.

Do not hold the star grip in this position if the blades have already reached their **maximum** position.

Close device (retract):

Turn the star grip counterclockwise and hold in this position until the blades reach the desired opening width or until the blades are closed completely.

Do not hold the star grip in this position if the blades are already fully closed.

Load holding function:

After release, the star grip automatically returns to the middle position with the full guarantee of the load holding function.

8.3 Operating the electric controls

Open device (extend):

Press the **green** marked button until the blades reach the desired opening width.

Do not hold the green button down if the blades have already reached their **maximum** position.

Close device (retract):

Press the **red** marked button until the blades reach the desired opening width.

Do not hold the red button down if the blades have already reached their **maximum** position.

Load holding function:

After releasing the button, the blades remain in the selected position with the full guarantee of the load holding function.

Note: Nothing happens if both buttons are pressed simultaneously (blades do not move).

8.4 Operating with the cylinder bottom

To operate an LSI cutter with cylinder bottom, the controls are not directly on the device, but instead are external. Please be attend to the separate operating instructions for the controls you intended to use

Open device (extend):

The blades open with pressure via connection „B“.

Close device (retract):

The blades close with pressure via connection „A“.

The following must be observed because of the external controls:

If persons are working close to the device while it is in operation, the necessary steps for securing the operating area must be taken (e.g. protective equipment, automatic safety off (e.g. „safety light barriers“) or manual „Emergency Stop“-switches).

9 Cutting

9.1 Safety instructions

- Worldwide all national safety guidelines must be observed and complied.
- If there is a explosion risk, do not use motor pumps because of sparks. In such cases, manual pumps must be used.

When working with the cutter, you must wear:

- work or protective clothing,
- Helmet with visor or goggles,
- Gloves

Before using the cutter, ensure that the movement of the blades does not represent a danger to persons or objects as a result of blade movement or catapulted cut materials.

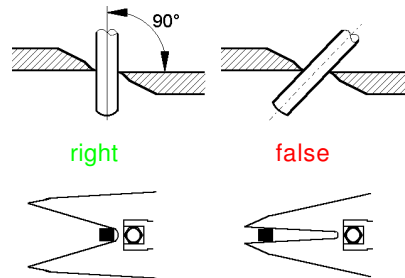
It is strictly forbidden to grip between the blades!

The following must not be cut:

- energised cables
- Lines with pressurised gas or fluid
- Pre-stressed and hardened components (such as springs, spring steel, steering columns, rollers)
- Composite materials (steel/concrete)

9.2 Cutting procedure

The blades must be applied at right angles to the object to be cut. Higher cutting performance is achieved if the cutting is as close as possible to the blade fulcrum. When cutting, the gap between the blade tips must not exceed 3 mm (Risk of blade fracture).

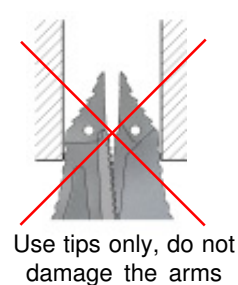
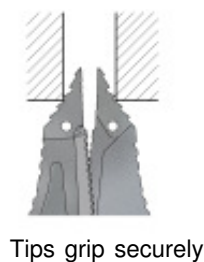
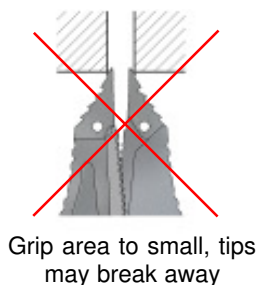


9.2.1 Attention!

When cutting with curved blades, on the blade tips the full cutting performance must not be utilized. Cutting in profiles up to 2 mm thickness is permitted.

9.3 Spreading procedure (only LSI 55)

Use front region of the tips only for enlarging a gap.



10 Dismantling the device / switching off after use

10.1 Cutter

After end of working, the blades should be closed till a few mm of tip distance. This releases the entire device in terms of the hydraulics and mechanically.

10.2 Hydraulic aggregate

After end of working, the engine must be shut down.

10.3 Hose lines

First disconnect the high pressure hose (red), then the return hose (blue) as described under 7.2. Attach the dust caps to the plug connections.

10.4 Electric cables

The electric cables should be disconnected in case of longer periods between uses.

11 Maintenance

After each operation and after the end of the shift respectively, a sight check must be carried out, at least once a year. A function test must be accomplished every 500 operating hours or if there are doubts about the safety or reliability (clean first if dirty).

Sight check

Blades

- Cutting edges free from nicks and deformation,
- Distance of blades from each other in transverse direction < 4 mm for LSI 501 and LSI 530, and < 3 mm for LSI 511 and LSI 55 (otherwise danger of breakage)
- Cutting edges cross contactless,
- Blades free of cracks
- Dirt in the protective hose (this dirt must immediately be removed)

Cutter

- General impermeability (leakages),
- Mobility of the star grip,
- Handle in existent and fixed,
- Check torque of the central bolt (see picture in chapter 12.3.1)
 M_A = torque, see „Technical data“.

Hoses

- Check according to safety instructions for hose lines (see chapter 5),
- Check oil loss.

Function test

- Opens and closes properly using the star grip, electric controls or external controls (depending on the type of controls).
- Check device for maximum nominal load using a manometer (available as a LUKAS accessory).
The inspection value specifications are included under chapter „Technical data“.

12 Repairs

12.1 General

Servicing should only be carried out by the manufacturer or by staff trained by the manufacturer and by authorised LUKAS dealers.

Only components, which are available as original LUKAS spare parts, may be exchanged, because possibly there must be observed necessary special tools, assembly instructions, safety aspects or tests. Therefore use only original LUKAS spare parts.

Overpressure safety of the cutters (when not connected)

Undesired pressure could be charged in the device as a result of incorrect connections and temperature increases. Therefore the blue return hose has a safety coupling (quick connect plug, coloured yellow). Undesired overpressure (approx. 1.5 MPa) is automatically released via this plug: oil escapes as well, this is not a malfunction. If foreign couplings are used, which do not have this function, an overpressure safety element (opens at 30 MPa) in the cutter valve will take care for pressure equalization. Oil escapes in the area of the star grip. After the pressure has decreased, the valve is leak-proof again.

If the valve is permanently leaking, the device must be checked by LUKAS.

12.2 Preventative service

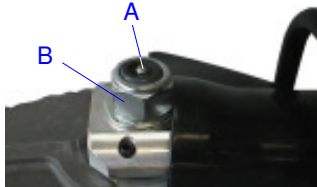
12.2.1 Routine checks

The torque of the central bolt must be checked regularly.

For torques, see the chapter „Technical data“.

Damaged blades can be maintained by sharpening to a total of **0.5 mm**. Please ensure that the internal cutting edges are coplanar.

The central bolt must be lubricated once a day with LUKAS special grease.



The lubrication nipple (A) is directly in the central bolt on the side of the self-locking nut (B).

Lubricate the cutter with a grease gun with LUKAS special grease as shown in the picture right.



Excess grease on the lubrication nipple (see left) after lubrication should be removed and disposed of professionally.

Attention!

When working with upturned blades, in particular, please ensure that no coarse fragments reaches the mechanical parts under the hand guard of the device. Moveable parts of the device could be blocked as a result and even be destroyed. The device must be checked for dirt and impurities in the mechanical part after each of such applications, and cleaned if necessary.



illustration 1

Unscrew handle and pull back the hand guard according to illustration 1.



illustration 2

Clean dirt and shards from mechanical parts as shown in Illustration 2 and blow out with compressed air carefully. If the hand guard tabs to the blades are considerably worn or torn, the entire hand guard must be replaced.

12.2.2 Main checks

The mechanical transfer elements on the device are subject to very high mechanical stresses and therefore they must be checked after 500 operating hours at latest. Thereby, appearances of attrition can be detected early so that breakages can be avoided by timely replacement of these worn parts. Perfect parts can be reassembled after careful lubrication with LUKAS special grease.

Parts with limited wear (fretting marks) can be refurbished by polishing and reassembled after careful lubrication with the corresponding grease.

If there are heavier traces of wear, the damaged parts must be replaced (in pairs). At these intervals, it is essential to check the blades for crack. A special crack test kit is available.

From time to time the cutter must be cleaned and lubricated with oil to protect it against external corrosion.

12.2.3 Function and load test

If there are doubts about the safety and reliability, an additional function and load test must be carried out. For that purpose LUKAS offers a test equipment.

12.2.4 Changing the hydraulic oil

- Change the hydraulic oil after approx. 500 operating hours, but after 2 years at latest;
- Whenever the oil of the appropriated pump (motor / hand pump) is changed. Mixing the cutters used oil with fresh oil must be avoided because of impurity.

Procedure

The cutter is in closed (retracted) position • Change oil of the pump. Unscrew return hose on the pump:

- **for hose connection:** unscrew the connector from the blue return line;
- **for quick couplings:** Fully release the union nut on the plug-in coupling of the blue return line.

Slowly extend the device with the pump. Collect the old oil from the annulus side in a separate container and dispose it like the old oil from the pump • Actuate the pump no longer.

Reconnect the return hose to the pump:

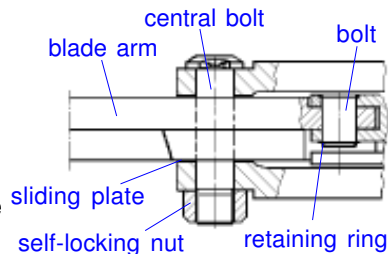
- Tighten the union nut on the plug-in coupling according to 12.3.6,
- Tighten hose nipple in the valve block with $M_A = 45 \text{ Nm}$,
- Ventilate device according to 8.1

12.3 Repairs

12.3.1 Blades / blade arm and levers

Blades / blade arm and levers must be replaced if there are breakages and cracks or if the blades are no longer in order as a result of multiple regrinding of the cutting edges (12.2.1).

- Unscrew the nut from the central bolt (wrench size of the jaw wrench see chapter "Technical data") and remove the central bolt,
- Remove the retaining ring with retaining ring nipper,
- Replace the blades and sliding plates,
- Insert bolts with retaining rings,
- Tighten the nut on the central bolt with torque according to chapter „Technical data“.



Note: The bolts are accessible, when the blades are closed.

Attention:

Thoroughly clean all sliding surfaces before assembly and grease with LUKAS special grease.

Note: Defective parts (blades, bolts, sliding plates) should always be replaced as pairs. If you detect, when changing blades, that the levers are damaged (see 12.3.1), their fit holes are deformed, fretting marks exist or they are otherwise damaged, these must be replaced too.

This repair must be carried out by an authorised LUKAS dealer or by the LUKAS service department.

12.3.2 Loss of oil at the hand hold (first page, pos. 11)

Hose connection of the pressure and return line leaky; tighten the hose connections on the control valve:

Procedure:

Loosen the 2 screws with insulation cases in the hand hold (hexagon socket SW5)

- Remove hand hold and tighten threaded connections, if necessary replace seals.
- Fix hand hold with screws and insulation cases.

12.3.3 Replacing the hand guard

The hand guard protects the operator against injuries resulting caused by the moving parts. In case of damage, the hand guard must be replaced.

Procedure:

Unscrew handle • remove blades / blade arms (see 12.3.1) • Remove hand guard • move the new hand guard over the cylinder body until the holes of the hand guard and the screw holes for the handle matches • mount handle.

12.3.4 Handle (first page, pos. 12)

Defective handles must be removed immediately.

Procedure:

Unscrew defective handle and remove it over the cylinder body • fix the new handle, if necessary replace screws and washers.

12.3.5 Labels

All damaged labels must be replaced (safety instructions, type labels, etc).

Procedure:

Remove damaged labels • clean the surfaces with acetone and glue on the new labels.

12.3.6 Quick couplers

Quick couplers on the hoses must be changed, if:

- external damages are visible • interlock does not work • oil constantly leaks when connected.

Note: Couplers must not be repaired, they must be replaced by original LUKAS parts. When assembling tighten the union nut on the hose line with $M_A = 45 \text{ Nm}$.

13 Troubleshooting

Trouble	Check	Cause	Remedy
Hoses cannot be coupled		Pressurized	Relieve pump pressure
Blades move slowly or by jerks when actuated	Hoses correctly connected, power pack operating	Air in the hydraulic system	Thoroughly vent pump unit
No pressure build-up		Insufficient oil in the tank or motor pump. Pump not ventilated after oil change	Refill oil and ventilate the system
Star grip does not return to the middle position when released		Damage of the return spring for resetting, fouling	Repair by an authorized dealer or directly by LUKAS
Oil leakage out of hoses or hose fittings		Untightness, possible damages	Replace hoses
Surface of the hydraulic hoses is dissolved		Contact with aggressive media	Replace hoses
Blades spread up at tips to a gap of more than 3 mm (LSI511 and LSI55) and more than 5 mm (LSI501 and LSI530) respectively		Torque of the central bolt nut is insufficient	Tighten, see chapter 12.2.1
Leakages: leaks at the piston rod		Defective piston rod seal	Change the seals by an authorized dealer or directly by LUKAS

If the defects cannot be repaired, contact an authorized LUKAS dealer or the LUKAS service department.

The address of the LUKAS service department is:

LUKAS Hydraulik GmbH, Weinstraße 39, D-91058 Erlangen; PF 2560, D-91013 Erlangen Kundendienst Tel 09131/698 348; Fax 09131/698 353.

14 Technical data

Typ of cutter		LSI 501		
Connection / control	4/3-way-valve	Electric controls	Cylinder bottom	
Ref. no.	84150/1491	84150/91491	84150/81491	
Dimensions l x w x h without connection hoses (mm)	789 x 235 x 168	789 x 235 x 168	645 x 235 x 168	
Opening at tips (mm)	180			
Weight incl. oil filling (kg)	23,5	21,7	20,4	
Operating pressure (Mpa)*	50			
Necessary oil quantity (l)**	0,15			

Typ of cutter		LSI 511		
Connection / control	4/3-way-valve	Electric controls	Cylinder bottom	
Ref. no.	84150/1492	84150/91492	84150/81492	
Dimensions l x w x h without connection hoses (mm)	755 x 235 x 168	754 x 235 x 168	610 x 235 x 168	
Opening at tips (mm)	132			
Weight incl. oil filling (kg)	23,4	21,5	20,3	
Operating pressure (Mpa)*	50			
Necessary oil quantity (l)**	0,15			

Typ of cutter		LSI 530		
Connection / control	4/3-way-valve	Electric controls	Cylinder bottom	
Ref. no.	84150/1493	84150/91493	84150/81493	
Dimensions l x w x h without connection hoses (mm)	792 x 235 x 168	791 x 235 x 168	646 x 235 x 168	
Opening at tips (mm)	279			
Weight incl. oil filling (kg)	23,1	21,5	20,2	
Operating pressure (Mpa)*	50			
Necessary oil quantity (l)**	0,15			

* 1MPa = 10 bar;

** Necessary oil quantity in the hydraulic power pack for operating the tool
(Difference in quantity piston / rod side)

Typ of cutter	LSI 55		
Connection / control	4/3-way-valve	Electric controls	Cylinder bottom
Ref. no.	84150/1494	84150/91494	84150/81494
Dimensions l x w x h without connection hoses (mm)	862 x 235 x 168	860 x 235 x 168	626 x 235 x 168
Opening at tips (mm)	430		
Weight incl. oil filling (kg)	23,9	22,5	21
Operating pressure (Mpa)*	50		
Necessary oil quantity (l)**	0,11		

* 1MPa = 10 bar;

** Necessary oil quantity in the hydraulic power pack for operating the tool
(Difference in quantity piston / rod side)

14.1 Central bolt / Torque

Type	LSI 501 / LSI 511 / LSI 530 / LSI 55
Central bolt	M 27 x 1,5
Wrench size (mm)	41
Torque (Nm)	130+10

14.2 Oil recommendations

Oil for LUKAS Hydraulic devices: Mineral oil DIN 51524 and others

	Range of oil temperature	Viscosity rating	Remarks
A	-24 +30 °C	HL 5	
B	-18 +50 °C	HLP 10	
C	-8 +75 °C	HLP 22	
D	+5 +80 °C	HLP 32	
E	-8 +70 °C	HF - E15	biodegradable

Recommended viscosity range: 10 ... 200 mm²/s










Delivered with HLP 22 DIN 51524

14.3 Hoses

Bending radius	Rmin = 38 mm
Burst resistance	Safety factor: burst pressure / max. operating pressure, min. 4 : 1
Temperature resistance	- 40 °C ... + 100 °C
Operating medium	Mineral oil according to DIN 51524

14.4 Temperature ranges

Operating temperature	-20 ... +55 °C
Ambient temperature (device in operation)	-24 ... +45 °C
Storage temperature (device not in operation)	-30 ... +60 °C

Cutting material	Cutting material dimensions with							
	LSI 501		LSI 511		LSI 530		LSI 55	
	max. [mm]	continuous operation [mm]	max. [mm]	continuous operation [mm]	max. [mm]	continuous operation [mm]	max. [mm]	continuous operation [mm]
Round bar steel (Rm 750 N/mm ²) 	28	24	30	25	28	24	28	24
Round bar steel (Rm 550 N/mm ²) 	30	25	32	26	30	25	30	25
Round bar aluminum (Rm 400 N/mm ²) 	36	32	38	34	36	32	36	32
Round bar copper (Rm 200 N/mm ²) 	38	34	42	36	38	34	38	34
U-profile steel (Rm 500 N/mm ²) 	50x40x5	40x25x5	60x40x6	60x25x6	65x45x6	60x40x5	65x45x6	60x40x5
Flat steel (Rm 500 N/mm ²) 	125x10	80x10	115x10	80x10	100x15	80x10	100x15	80x10
Steel pipe (Rm 500 N/mm ²) 	76x4	60x3	76x4	60x3	76x4	60x40x5	80x5	65x5
Square pipe (Rm 500 N/mm ²) 	60x4	40x4	60x40x6	40x4	65x5	50x4	70x5	55x4
Angle steel (Rm 500 N/mm ²) 	50x8	50x6	50x10	60x6	50x8	50x6	50x8	50x6

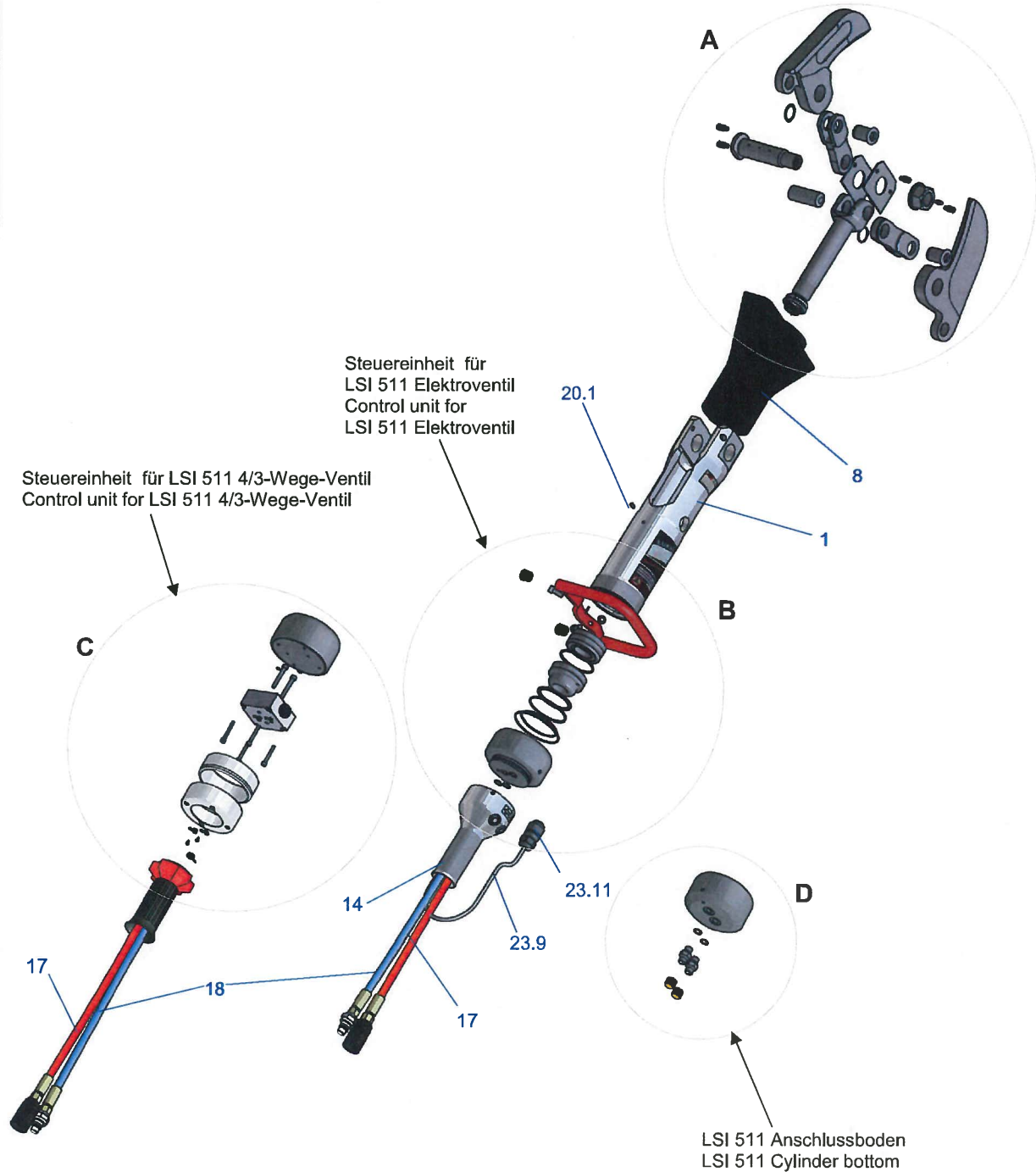
14.6 Test pressures

The stated reference test pressures only refers to the measurement with the LUKAS testing kit (from the LUKAS accessories programme). Measurements and thresholds with other test equipment must be agreed in advance with the LUKAS service department.

Type of cutter	Testing pressure	Operating pressure
LSI 501	225 bar	50 MPa
LSI 511	330 bar	
LSI 530	340 bar	
LSI 55	260 bar	

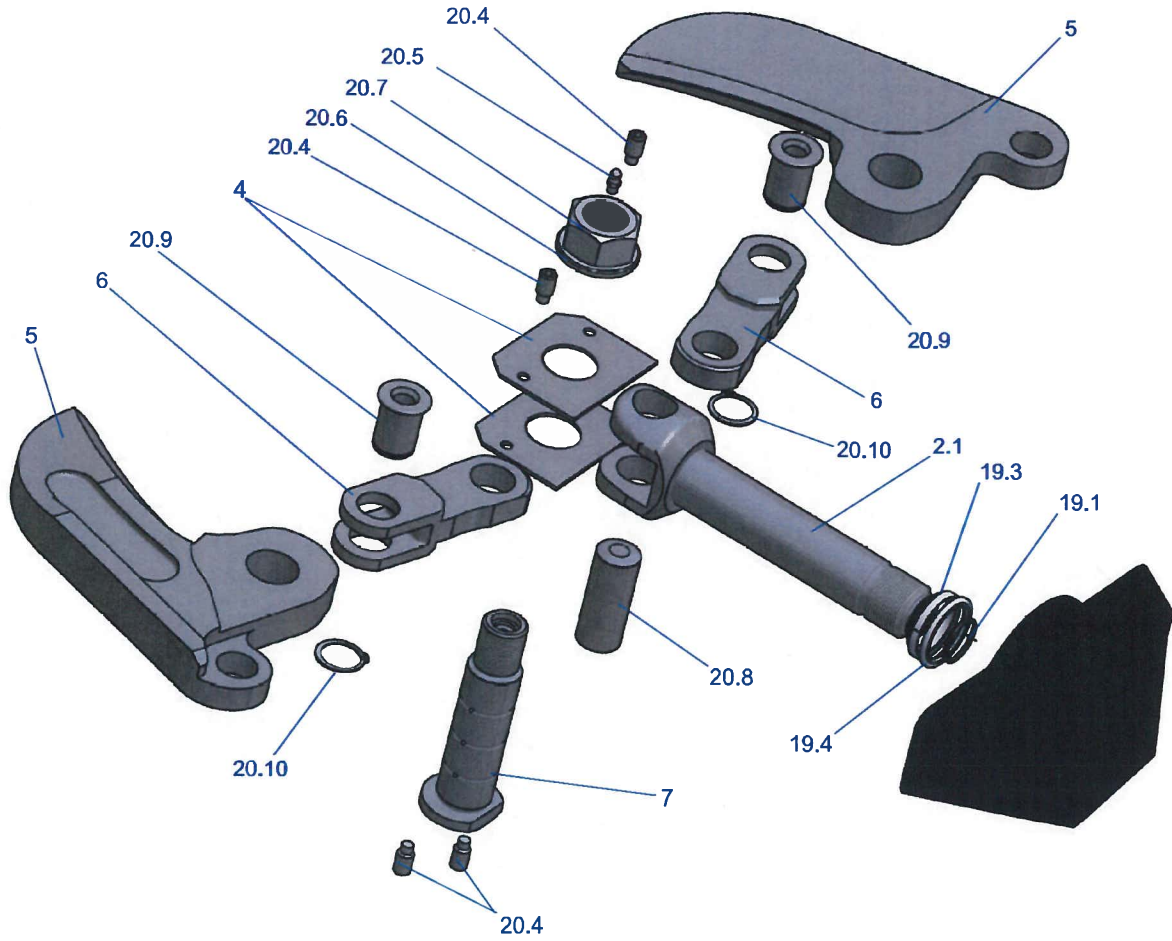
LUKAS Hydraulik GmbH
A Unit of IDEX Corporation
Weinstraße 39, 91058 Erlangen
Postfach 2560, 91013 Erlangen Germany
Telefon (09131) 698-0 • Telefax (09131) 698-394
E-Mail: info@lukas.de



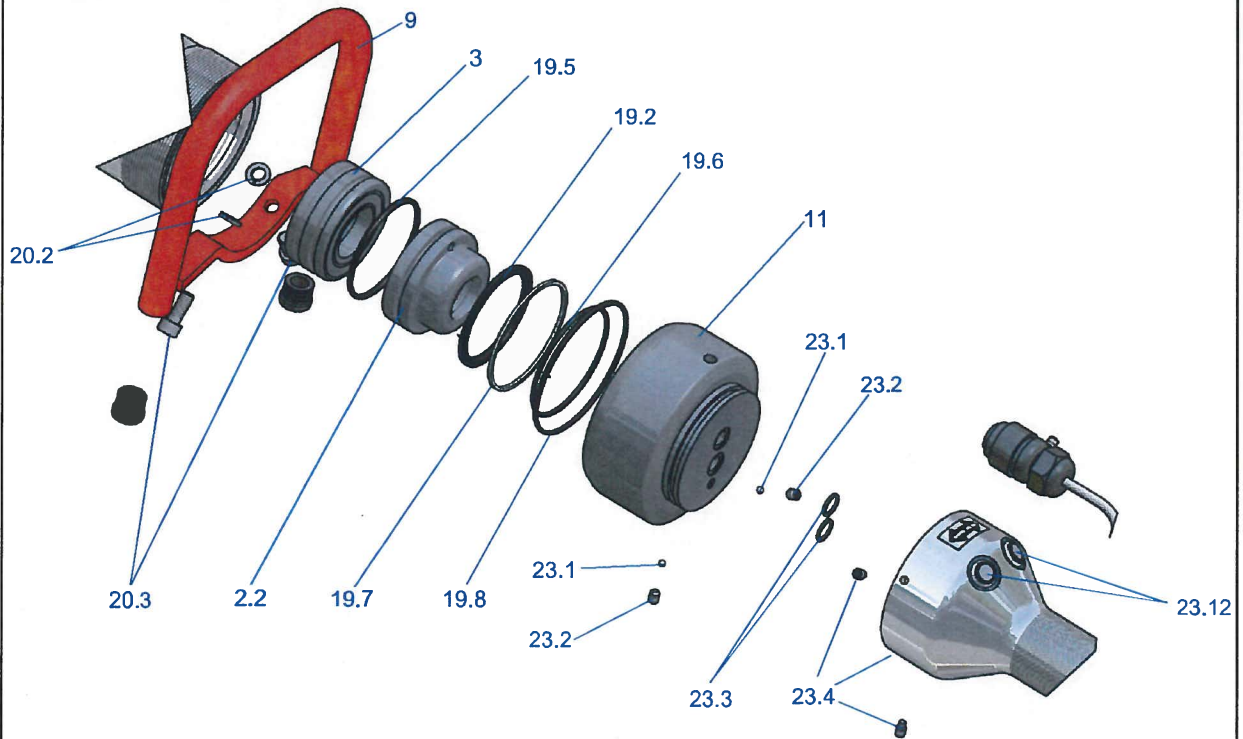


Bei Bestellung Bestellbezeichnung und Bestellnummer angeben. · When ordering please indicate description and ref. no.
Nur Ersatzteile und Teile mit XX sind einzeln lieferbar. · Only spare parts and parts with XX are available as single parts.

Detail A / detail A

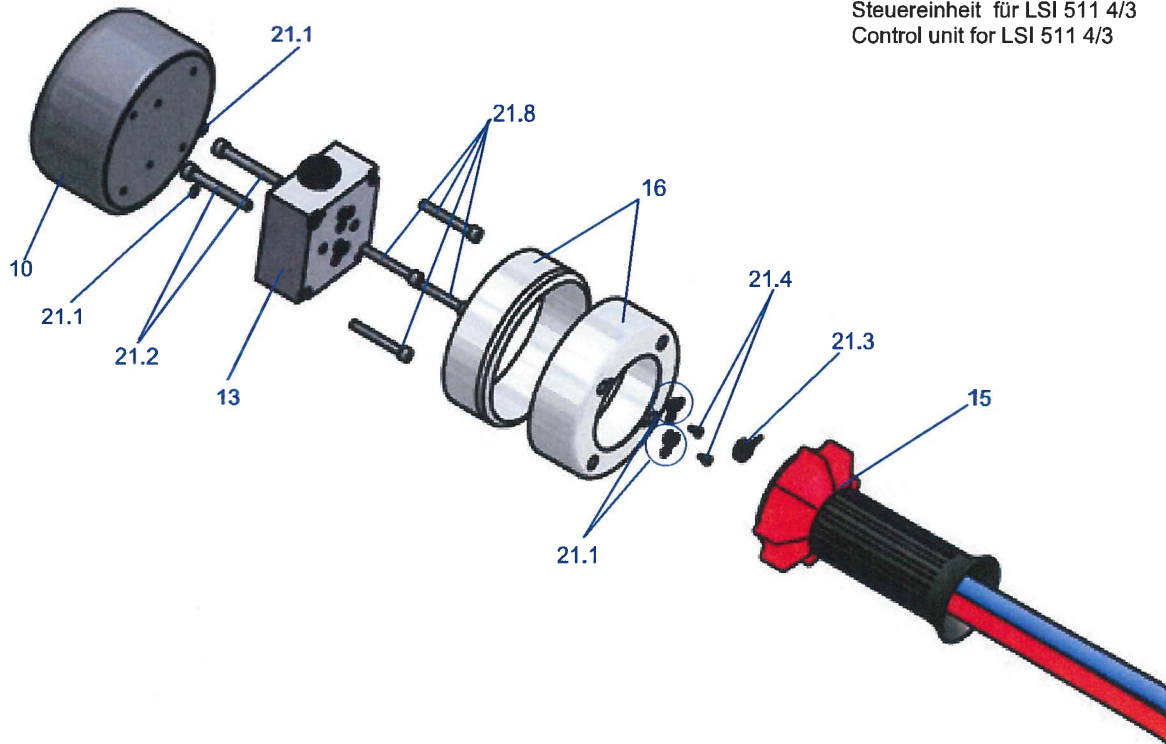


Detail B / detail B



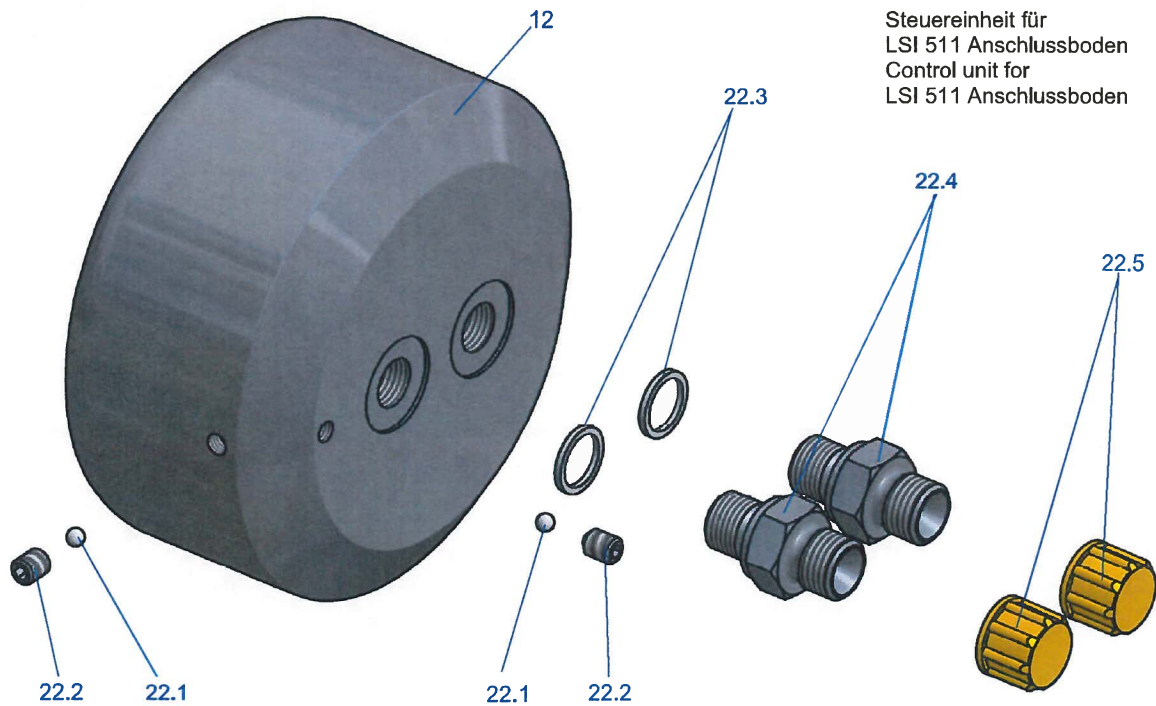
Detail C / detail C

Steuereinheit für LSI 511 4/3
Control unit for LSI 511 4/3

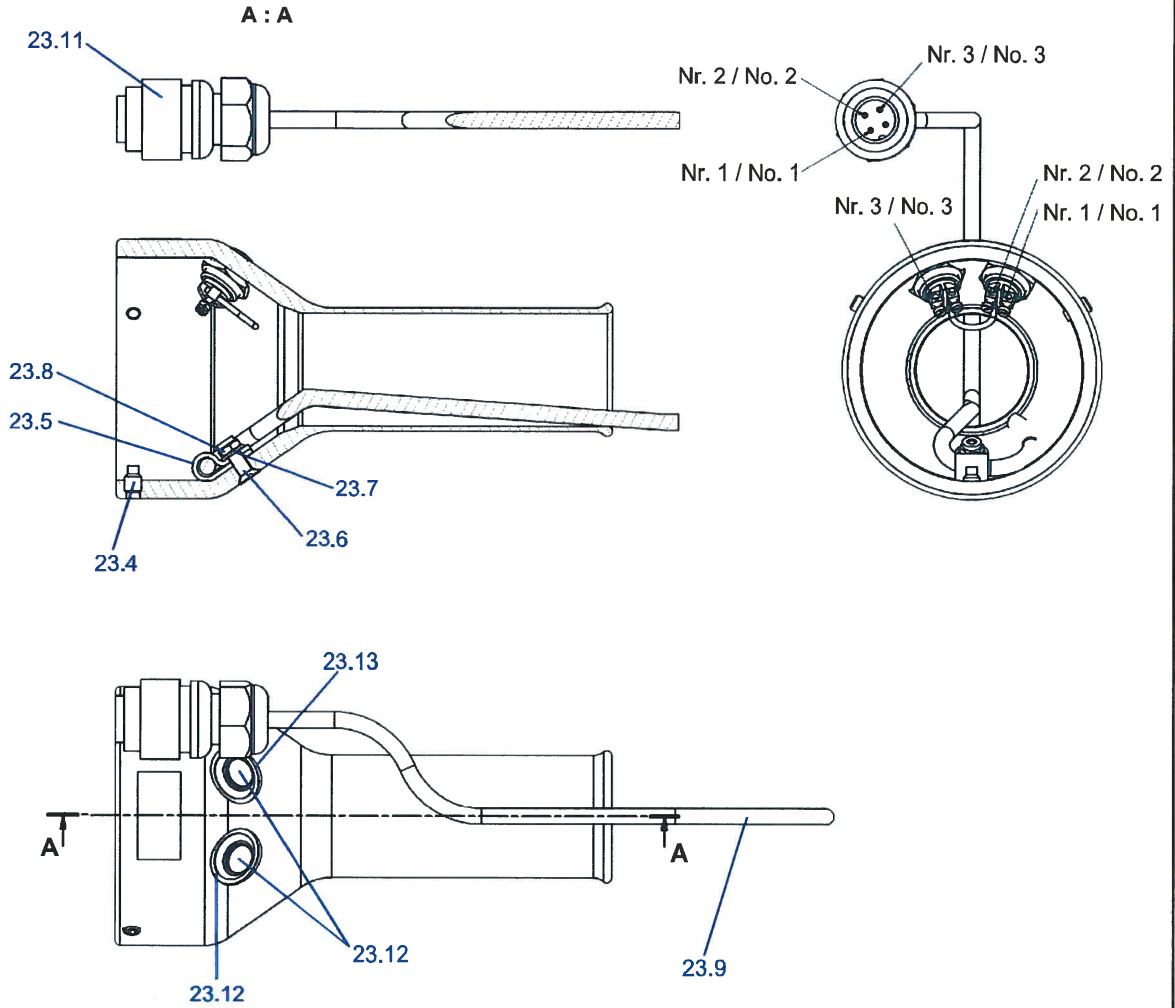


Detail D / detail D

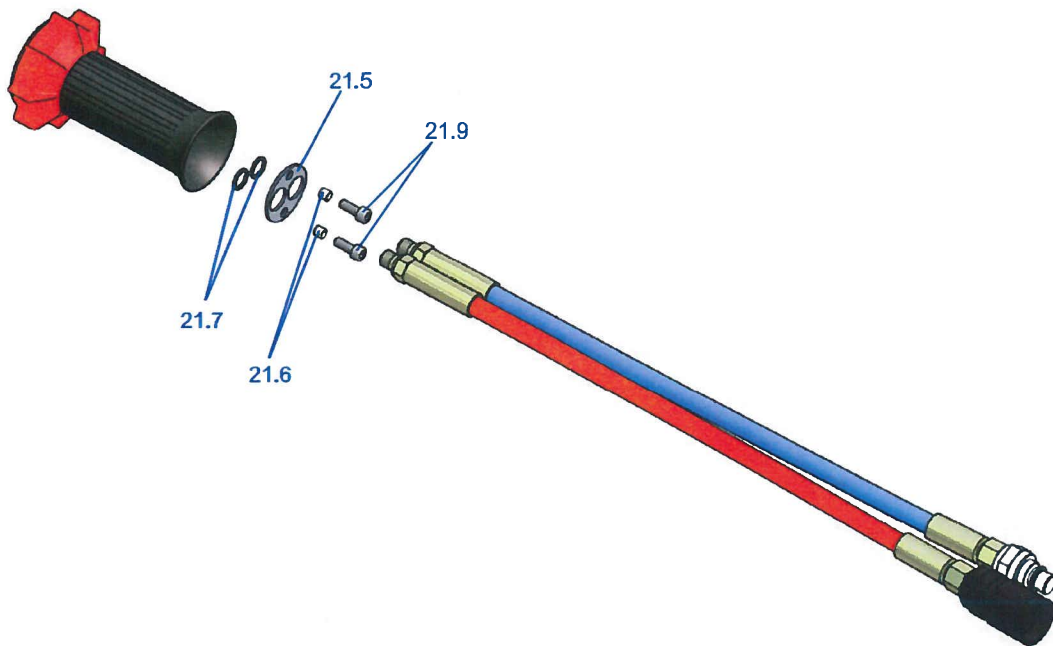
Steuereinheit für
LSI 511 Anschlussboden
Control unit for
LSI 511 Anschlussboden



Detail E-Ventil / detail E-valve



Detail Schieberventil / detail slide damper - valve



Pos. Item	Bestellbezeichnung	Description	Bestellnummer Ref.no.	Menge Quant.			lieferbar available
				LSI 511 4/3-Wege-Ventil 84150/1492	LSI 511 Elektroventil 84150/91492	LSI 511 Anschlussboden 84150/81492	
1	Zylinderkörper	cylinder body	V84150/1490-01	1	1	1	XX
2	Kolben, kpl.	piston, cpl.	V84150/1240-03	1	1	1	XX
(2.1)	Kolben	piston		1	1	1	-
(2.2)	Kolbenbund	piston bottom		1	1	1	-
3	Führungsbuchse	guidance sleeve	V84150/1490-02	1	1	1	XX
4	Gleitblech	sliding plate	V84150/1490-12	1	1	1	XX
5	Schermessersatz (inkl. Gleitblech)	cutting blade set (incl. sliding plate)	V84150/1492-05	1	1	1	XX
6	Hebelglied	lever	V84150/1490-08	1	1	1	XX
7	Lagerbolzen	bearing bolt	V84150/1490-07	1	1	1	XX
8	Schutzschlauch	hand guard	V84150/1490-11	1	1	1	XX
9	Bügelgriff	handle	V84150/1490-13	1	1	1	XX
10	Anschlussboden (4/3-Wege-Ventil)	cylinder bottom (4/3-way-valve)	V84150/1490-16	1			XX
11	Anschlussboden (Elektro)	cylinder bottom (electric)	V84150/1490-26		1		XX
12	Anschlussboden	cylinder bottom	V84150/1390-31			1	XX
13	Sperrblock	check valve	V84150/0814	1			XX
14	Elektro Ventil	electric valve	V84150/6122		1		XX
15	Schieberventil	slide damper	V84150/0816	1			XX
16	Haube, kpl.	hood, cpl.	V84150/1490-30		1		XX
17	Anschlusschlauch 0,5m, blau, kpl.	connection hose 0.5m, blue, cpl.	V84150/8075	1	1	1	XX
18	Anschlusschlauch 0,5m, rot, kpl.	connection hose 0.5m, red, cpl.	V84150/8076	1	1	1	XX
19	Dichtungsbeutel	seal bag	84150/1490-99	1	1	1	XX
(19.1)	O-Ring (Ø25,07 x 2,62)	o-ring (dia. 25.07 x 2.62)		1	1	1	-
(19.2)	Glydtring	glydtring		1	1	1	-
(19.3)	Abstreifer	wiper		1	1	1	-
(19.4)	Stepseal	stepseal		1	1	1	-
(19.5)	O-Ring (Ø63,09 x 3,53)	o-ring (dia. 63.09 x 3.53)		1	1	1	-
(19.6)	O-Ring (Ø71,12 x 2,62)	o-ring (dia. 71.12 x 2.62)		1	1	1	-
(19.7)	Stützring (Ø71,91 x 2,18)	backup ring (dia. 71.91 x 2.18)		1	1	1	-
(19.8)	O-Ring (Ø88,57 x 2,65)	o-ring (dia. 88.57 x 2.65)		1	1	1	-

-- Bestandteil eines Komplettpaketes
Part of a complet-package

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All spare parts of this list will be delivered inclusive all needed sealing and standard parts for changing them!

20	Normteilbeutel	standard parts bag	84150/1490-96	1	1	1	XX
(20.1)	Gewindestift (M6 x 12)	threaded pin (M6 x 12)		1	1	1	--
(20.2)	Federring (Ø8)	spring washer (dia. 8)		2	2	2	--
(20.3)	Schraube (M8 x 18)	screw (M8 x 18)		2	2	2	--
(20.4)	Gewindestift (M10 x 20)	threaded pin (M10 x 20)		4	4	4	--
(20.5)	Schmiernippel (M6)	lubricating nipple (M6)		1	1	1	--
(20.6)	Scheibe (Ø28)	washer (dia. 28)		1	1	1	--
(20.7)	Mutter (M27 x 1,5)	nut (M27 x 1.5)		1	1	1	--
(20.8)	Zylinderstift (Ø27 x 68)	cylinder bolt (dia. 27 x 68)		1	1	1	--
(20.9)	Bolzen (Ø25)	bolt (dia. 25)		2	2	2	--
(20.10)	Sicherungsring (Ø25 x 1,2)	retaining ring (dia. 25 x 1.2)		2	2	2	--
21	Ersatzteilbeutel (4/3-Wege-Ventil)	spare parts bag (4/3-way-valve)	84150/71490-96	1			XX
(21.1)	O-Ring (Ø5 x 1,6)	o-ring (dia. 5 x 1.6)		8			--
(21.2)	Schraube (M6 x 45)	screw (M6 x 45)		2			--
(21.3)	Schenkelfeder	leg spring		1			--
(21.4)	Schraube (M3 x 6)	screw (M3 x 6)		2			--
(21.5)	Isolierscheibe	insulating disk		1			--
(21.6)	Isolierrohr	insulating tube		2			--
(21.7)	Dichtring (Ø12 x 15,5)	sealing washer (dia. 12 x 15.5)		2			--
(21.8)	Schraube (M5 x 40)	screw (M5 x 40)		4			--
(21.9)	Schraube (M6 x 16)	screw (M6 x 16)		2			--
22	Ersatzteilbeutel (Anschlussboden)	spare parts bag (cylinder bottom)	84150/81490-96			1	XX
(22.1)	Kugel (Ø4)	ball (dia. 4)				2	--
(22.2)	Gewindestift (M6 x 8)	threaded pin (M6 x 8)				2	--
(22.3)	Dichtring (Ø12 x 15)	sealing washer (dia. 12 x 15.5)				2	--
(22.4)	Anschlussnippel (G1/4 - M14 x 1,5)	connecting nipple (G1/4 - M14 x 1.5)				2	--
(22.5)	Schraubkappe	screw plug				2	--
23	Ersatzteilbeutel (Elektroventil)	spare parts bag (electric valve)	84150/91490-96		1		XX
(23.1)	Kugel (Ø4)	ball (dia. 4)			2		--
(23.2)	Gewindestift (M6 x 8)	threaded pin (M6 x 8)			2		--
(23.3)	Dichtring (Ø12 x 15,5)	sealing washer (dia. 12 x 15.5)			2		--
(23.4)	Gewindestift (M6 x 10)	threaded pin (M6 x 10)			3		--
(23.5)	Rohrschelle	pipe clip			1		--
(23.6)	Schraube (M5 x 16)	screw (M5 x 16)			1		--
(23.7)	Scheibe (Ø5,3)	washer (dia. 5.3)			1		--
(23.8)	Mutter (M5)	nut (M5)			1		--
(23.9)	Elektro-Anschlusskabel (0,5m)	electric connecting cable (0.5m)			1		--
(23.10)	Aderendhülse (1,5mm ²)	conductor sleeve (1.5 mm ²)			8		--
(23.11)	Leitungsstecker	conducting connector			1		--
(23.12)	Drucktaster	push-button			2		--
(23.13)	Aufkleber rot (Drucktaster)	label red (push-button)			1		--
(23.14)	Aufkleber grün (Drucktaster)	label green (push-button)			1		--
24	Schildersatz Stanzbogen	set of labels	V84150/1492-90	1	1	1	XX

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