

# Service Manual

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## LEVO LCEV



**This manual is for use by trained LEVO dealers. Read these Instructions carefully before servicing a customer wheelchair. Failure to follow these instructions could result in injury to the customer and/or damage to the wheelchair. Alterations outside of the written guidelines can also invalid the CE and ISO conformities and void the product warranty.**

**If you have questions or difficulties, please contact LEVO AG.**

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## 1. Introduction

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Aside from the regular charging of the battery and normal cleaning, the **LEVO LCEV** is generally maintenance-free. To insure the safety and proper function of the wheelchair, it should be checked at least once a year by trained service personnel.

This service manual is to be used as a reference as the authorized **LEVO** dealer to carry out safety checks, service and repair on the **LEVO LCEV**.

It is best to refer to both this service manual as well as the user manual.



### 1.1. Accident prevention & Safety

To help prevent accidents, please follow the instructions in both this and the user manual. Be aware there are possible dangers as tests and modifications are carried out. Take suitable preventive measures to insure the safety of yourself and others.



### 1.2. Adjustments - General Advice

Upon initial delivery, the safety check and adjustments should be made by the authorized **LEVO** dealer. Some of the more simple adjustments might possibly be made by the user depending on the capability of the user, family and friends. However, the following must be done only by the **LEVO** dealer. This manual will instruct you on how to proceed.



### 1.3. Repairs – General Advice

**Service, fitting and repair works on the LEVO LCEV should only be carried out by a LEVO dealer.**

- Repairs: For advice on all repairs, please contact your importer or **LEVO** directly (contact information located on the front page of the User and Service Manuals).
- Major repairs: For all major repairs (e.g. bent or damaged frame) always replace complete components. Never try to repair damaged components.
- Replacement parts: Factory replacement components should be used in all repairs; these are available through your importer or **LEVO** directly. Parts list drawings can be viewed at [www.levo.ch](http://www.levo.ch).

## 1.4. Tools & Torques



The following metric tools and torques are required to carry out maintenance work:

- Hex key
- Open-end wrench
- Torque wrench 0 to 50 Nm

and different standard tools.

Please note that the chair is delivered with a metric tool set.

| Screw size | Torque Nm | Allen key | Open-end wrench |
|------------|-----------|-----------|-----------------|
| <b>M4</b>  | 3         | 2.5mm     | 7 mm            |
| <b>M5</b>  | 6         | 3mm       | 8 mm            |
| <b>M6</b>  | 10        | 4 mm      | 10 mm           |
| <b>M8</b>  | 25        | 5 mm      | 13 mm           |
| <b>M10</b> | 50        | 6 mm      | 17 mm           |

## 1.5. Important Notes



- Lock-nuts which are removed should be replaced with new lock-nuts.
- It is preferred that thread locker (like blue Loctite) is utilized on screws/nuts.
- For replacement parts, use recommended components and spare parts supplied from **LEVO**.
- Always replace main components like frames, seat rails, armrests, backrests and legrest parts. They are **never** to be modified or repaired.
- Be sure to follow the safety advice for any repairs on gas springs, actuators and electronic parts.

## 2. Safety Checks



At least once a year, the following safety checks should be carried out by the authorized dealer. If any defect occurs, the user should immediately stop using the wheelchair until it is repaired, checked and all safety rules assured.

1. Fold down the backrest and return to the upright position. Confirm that the locking pins are seated and have correctly reset.
2. Inspect the frame and seating tubes for bends, cracks or breaks. Replace defective parts if in need of repair.
3. Check the seat and backrest upholstery for excessive wear. Replace if necessary.

4. Check the condition of straps, belts and catches and replace, if necessary.
5. Check that all nuts, screws, joints and plastic parts are secured and in proper operating condition.
6. Check that push handles are properly secured and the covers fit tightly.
7. Check brakes for proper holding efficiency.
8. Check that front casters and rear wheels rotate smoothly and that the axles are secure with no wobble. Check the tires for proper pressure and the tread for excessive wear.
9. Check all electrical cables for breaks or abrasions.
10. Check all electrical connections for signs of corrosion.
11. Check that the battery and battery connections are clean. Check the battery capacity and remind the customer to charge them every day. Especially if the batteries are old and in declining condition. If necessary, replace the battery before returning the wheelchair to the customer.

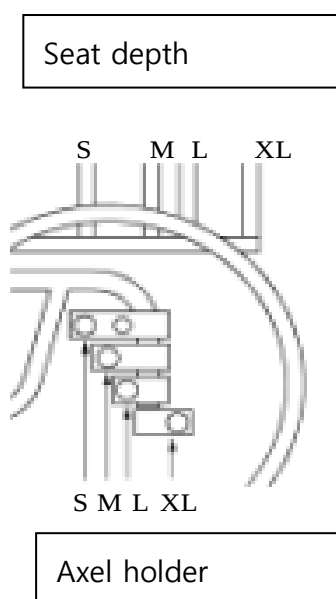
Check the standing mechanism and confirm it is operating safely.



## 3. Adjustments

### 3.1. Rear wheel position – Axle adapter types

The axle adapter mounted as standard on the **LEVO LCEV** depends on the seat depth.



- Seat depth S: axle adapter S mounted.
- Seat depth M: axle adapter M mounted.
- Seat depth L: axle adapter L mounted in forward direction.
- Seat depth XL: axle adapter L mounted in rearward direction.
- In order to adjust the **tipping** it is possible to mount a different axle adapter.
- Example: Mounting the axle adapter M on a chair with seat depth L makes the chair more liable to tip. Mounting the axle adapter L provides more stability as needed.
- For safety we recommend the installation of anti-tip rolls.



Axel adapter adjustments should only be carried out by a **LEVO** dealer.

**Caution: It is absolutely essential to ensure that when standing up, the legrest supports still rest on the ground as this is crucial to standing stability (risk of serious accident!).**



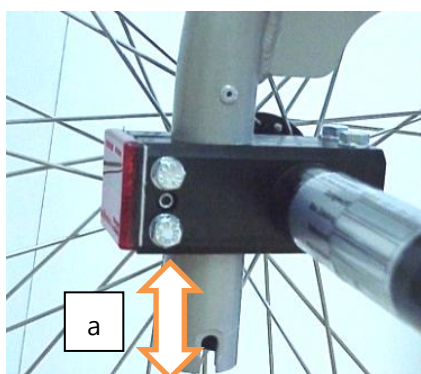
### 3.2. Axle adapter adjustment - Seat / Backrest inclination

To adjust the seat inclination the axle adapter is adjusted in height as follows:

The standard pre-set inclination is to the rear. By adjusting the height of the axle adapter it is possible to set the backrest inclination between 2° and 10° to the rear (see chart below).

To ensure these adjustments maintain safety in the standing position, the front castors and legrest plugs must be adjusted appropriately!

| Standard   |             |            |            |       | Maximum    |       | Minimum    |       |
|------------|-------------|------------|------------|-------|------------|-------|------------|-------|
| Seat depth | Seat height | Wheel size | Distance a | Angle | Distance a | Angle | Distance a | Angle |
| M          | 48          | 22"        | 45 mm      | 7°    | 20 mm      | 4°    | 60 mm      | 10°   |
| L          | 51          | 24"        | 45 mm      | 6°    | 20 mm      | 2°    | 60 mm      | 8°    |
| L          | 54          | 24"        | 20 mm      | 3°    | 20 mm      | 3°    | 60 mm      | 9°    |
| XL         | 57          | 26"        | 30 mm      | 5°    | 20 mm      | 3°    | 60 mm      | 10°   |



Release both hexagonal screws using a 10 mm spanner and tighten the pin screw between using a 3 mm hex key. The pin screw opens up the clamps on the axle adapter.

Adjust the axle adapter to the angle related height, release the pin screw and tighten the two hexagonal screws.

The same procedure is used to replace the axle support with another size/length to change the axle position respectively the tipping behaviour.



**Caution:** When adjusting the height of the axle adapter, be sure to adjust the castor angle and the length of the legrest foot accordingly. In case of large height adjustments it may be necessary to replace the legrest supports/tubes.

**It is absolutely essential to ensure that when standing up, the legrest supports still rest on the ground as this is crucial to standing stability (risk of serious accident!).**



### 3.3. Front caster and Legrest adjustment

When the rear position is adjusted, the front axle and the legrest must be adjusted.  
The following points must be observed:

- The castor axle should stand at a right angle to the ground.
- The castor should always remain in contact with the ground.
- In the uppermost standing position, the leg supports must be resting on the ground.
- Bring the **LEVO LCEV** into the standing position.



- Unscrew and remove the cylindrical screws using a 4 mm hex key, then set the plastic legrest foot either higher or lower so that the leg supports are standing on the ground. You may have to turn the legrest foot by 90°.

- **In the full standing position the legrests must touch the ground.**



- Bring the **LEVO LCEV** into the standing position.
- Release the two screws using a 5 mm hex key and turn the excentric disc until the axle is vertically adjusted. You may have to turn only one of the two excentric discs. Tighten the cylindrical screws tightly.



### 3.3.1. Legrest support adjustment

The legrest supports should be replaced if the seat height of the wheelchair has been adjusted and they no longer reach the ground in the uppermost standing position or if they reach the ground too soon.

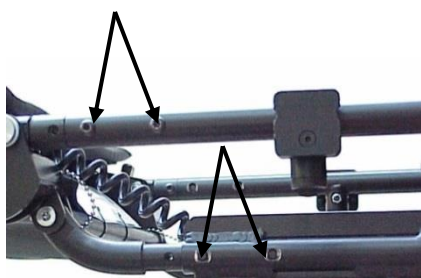


- Remove the rear wheels
- Remove the footrest
- Release the screws at both legrest supports using a 5 mm hex key and remove them together with the spacer bushing. Then pull the leg supports out of the frame.
- Replace the legrest supports and re-assemble in reverse order.

### 3.4. Seat depth adjustment

The seat depth is adjustable and can be set exactly to the user's upper leg length. This is important for a straight, comfortable and correct standing position.

**Attention:** An incorrect seat depth adjustment can cause pain, pressure sores or malposition. The seat depth adjustment should only be carried out by a **LEVO** dealer!



- Drive the seat up into a comfortable working position.
- Remove the seat upholstery.
- Unscrew all four screws using a 4 mm hex key inside the adjusting levers as well as the screws at the outside of the seat supports and remove them.
- Adjust the seat to the required depth by pulling all four rear seat support and adjusting levers simultaneously out of the front tubes or pushing them into them.
- Tighten all eight screws after adjustment.

**Attention:** The hexagonal screws for the seat depth adjustment are safety coated with locker. They can be used approximately three times until the coating has worn off. For safety reasons use new screws after a couple of adjustments!



## 4. Replacement and Repair

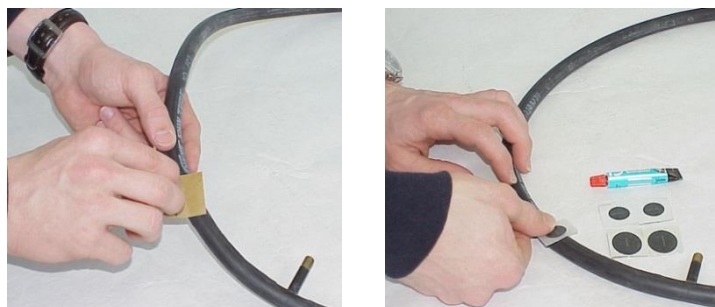
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### 4.1. Rear wheel tire/inner tube replacing



- Remove the wheel and open the valve by pressing down to let out the air.
- Using a tire wedge, ease both sides of the tire over the wheel rim and pull the inner tube out of the tire.
- Replace the inner tube by forcing one side of the tire back over the wheel rim, pump up the tire a little, ease the valve through into the hole and lay the inner tube along inside of the tire. Once the whole tube is snug inside the tire, force the other side of the tire back over the wheel rim by starting on the side opposite the valve.
- Check lest the inner tube be caught between tire and rim before pumping it up in line with the manufacturer's recommended tire pressure.

### 4.2. Tire inner tube repair



- Remove the inner tube and tire following the steps described above.
- Repair the hole using a puncture repair kit and follow the manufacturer's instructions which will normally include cleaning the area around the hole and roughening the tube surface before applying the vulcanized solution.
- Allow to dry, then firmly attach the rubber patch. Again, first allow to dry, then pump up the tube to check that the patch is airtight.
- Replace the inner tube. Once the whole tube is snug inside the tire, force the tire back over the wheel rim (starting on the side opposite the valve).

- Check that the inner tube is not caught between tire and rim before pumping it up in line with the manufacturer's recommended tire pressure.



### 4.3. Gas Spring replacement

**Warning:** The gas springs are pressurized and are potentially dangerous. Always drive the actuator into fully-standing position to extend and release the gas springs before disassembling. **NEVER** disassemble gas springs in the seated position if the gas springs are compressed.



- Lift up the spring clip for the ball joint and gas spring shaft and lift the joint off. Do not remove the clip completely.
- Drive the seat approximately 4 cm down, so that the ball joints are in front of the drive shaft.



- Unscrew the gas springs by turning to the right and away from the rear connecting rod.
- Assemble in reverse order making sure the gas spring is fully screwed into the rear connector and that the lock-nuts are tightened.



## 4.4. Actuator replacement

**Warning:** The gas springs are pressurized and are potentially dangerous. NEVER disassemble the Actuator in the seated position when the gas springs are compressed. Only disassemble the actuator if the chair is in the fully standing position and the gas springs are released.



- Disconnect the actuator plug from the battery controller.
- You will need an assistant. Let them pull the seat down, so that the gas springs are released and the load on the screws in the front and rear connectors decreased.
- Remove the cylindrical screw from the drive shaft. Let the seat slowly raise into the fully upright position.
- Release the lock nuts at the rear connector using a 17 mm spanner and remove the screws using an 8 mm hex key. Remove the actuator.
- Mount the rear end of the new actuator first, then drive the seat down until the shaft of the new actuator connects with the front connector. Assemble in reverse order.

## 4.5. Control Switch replacement

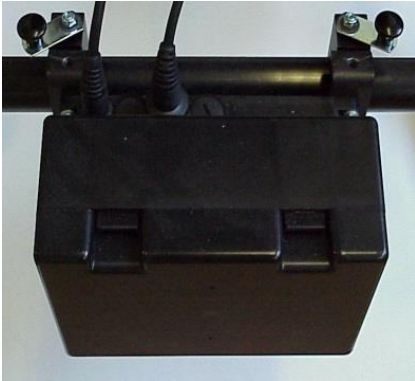


- Disconnect the battery-controller plug at the rear of the armrest.
- Unscrew the screw inside the rear of the armrest.
- Loosen the hexagon nut at the front of the control switch using a 14 mm spanner. Remove nut and washer.
- Slightly pull out the control switch to the rear.



- Cut-off the defective control switch with a cable cutter. Solder and insulate the new control switch making sure to connect the cable colors correctly.
- Assemble in reverse order

## 4.6. Battery-Controller replacement



- Disconnect the actuator plug and the battery plug from the battery-controller.
- Push the two buttons to the outside
- Take off the battery-controller.
- Install the the battery-controller in reverse order.

**Attention:** In the case of an electronic defect the complete battery-/ electronic box must be replaced! No repairs should be attempted (warranty voided and safety issues).

## 4.7. Batteries replacement



- Press the four plastic tabs on the battery cover and remove the cover from the battery and electronic unit.
- **Caution:** Press all four tabs simultaneously, not only the two upper ones. The two lower ones may break off!
- Take out the batteries and disconnect the pin contacts.
- Install the batteries in reverse order.

**Attention:** Always replace both batteries together, never just one!

**Caution:** When working on the batteries take care not to short-circuit them with metal tools, etc. Always take off wristwatches and jewellery. When reconnecting the batteries check that the cables are connected to the correct terminals.

**Caution:** Contact with the acid is dangerous. Immediately rinse of any spilt acid from your body with water and consult a doctor. Immediately take off any clothing contaminated with acid.



**Always wash your hands after working on the batteries.**

## 5. Final Check

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After carrying out repairs to the wheelchair, thoroughly check that all functions are operating correctly before returning the wheelchair to your customer. A wheelchair should only be returned to customer after all defects have been rectified.

## 6. Cleaning and Disinfection

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Before the wheelchair is returned to the client, make sure it is clean and dry.

- Cleaning can be accomplished with a moist cloth, then wiping dry.
- Mild detergents and warm water can be used for heavier debris.
- Never apply furniture polish, pure spirits or solvents for cleaning as this can damage the surface finishes.
- For disinfecting the surface, we recommend an alcohol-based spray. After a thorough pre-cleaning, smaller areas can be disinfected as necessary. Please consult the **LEVO AG** service centre if you have further questions.

## 7. Version Management

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| Version-No. | Date       | Description                         | Release |
|-------------|------------|-------------------------------------|---------|
| 1.0         | 2020-03-16 | Document separated from user manual | JC      |
| 1.1         | 2022-02-22 | Update to format                    | JC      |
|             |            |                                     |         |