

laevo

exoskeletons



User Manual
HL-V2.5.0-EN

Laevo
V2.5

a wearable back support
to support
repetitive bending &
working in a forward
bended posture

Make sure that you read and understand this manual before you use the Laevo.

This manual is intended for users of the Laevo. This manual contains all the information necessary for optimal use of the Laevo. It also contains important safety and maintenance information and describes potential problems related to use.

Always keep this user manual in the vicinity of the Laevo so that you always have access to information about its use, maintenance and safety.

All information, pictures, illustrations and specifications are based on the product information that was available at the time this manual was printed. The pictures and illustrations are general examples; your individual product may differ from the pictures and illustrations shown here.

The manual can also be requested at Laevo or viewed online at www.laevo.nl. If you still have questions after reading the manual, please feel free to get in touch with Laevo or your supplier. You can find the contact information on the last page of this manual.

Enjoy the Laevo!

Team Laevo

Table of Contents

Introduction	5
Overview Figure	7
Installation	8
Using the Laevo	14
Precautionary Measures and Safety Instructions	16
Maintenance, Repair and Disposal	20
Technical Specifications	21

1. Introduction

The Laevo is a wearable (back) support which supports bent-forward work and repetitive lifting movements.

The Laevo relieves the load on the back when working or moving around. Use it when you suffer from backaches or if you are trying to prevent them. The portable structure lessens the relative weight of the upper body and reduces the load on your lower back. The Laevo is a posture supporting tool that enhances the sustainable employability of a person.

The Laevo is intended to facilitate bent-forward work and lifting. The Laevo also allows you to walk, work while standing erect or stretch outwards or upwards. Any use other than that described in this manual is considered unintended use. If you have any doubts about proper use, please contact Laevo.

The Laevo makes bent-forward activities easier on the back. Because the Laevo reduces the load on the lower back you can do these activities more often, for longer duration or with more weight.

But the Laevo may NOT be used to do lifting that is heavier than permitted by law. The effect on the maximum liftable weight is limited. The Laevo is not meant to replace lifting aids for heavier weights.

Liability

Laevo B.V. cannot be held liable for:

- personal injury or damage to property as a result of a user or third party not following the recommendations and warnings contained in this manual,
- damage due to changes and/or alterations to the original product; wear and damage caused by the user due to improper use; damage due to use of non-original replacement parts.

Maximum number of bends

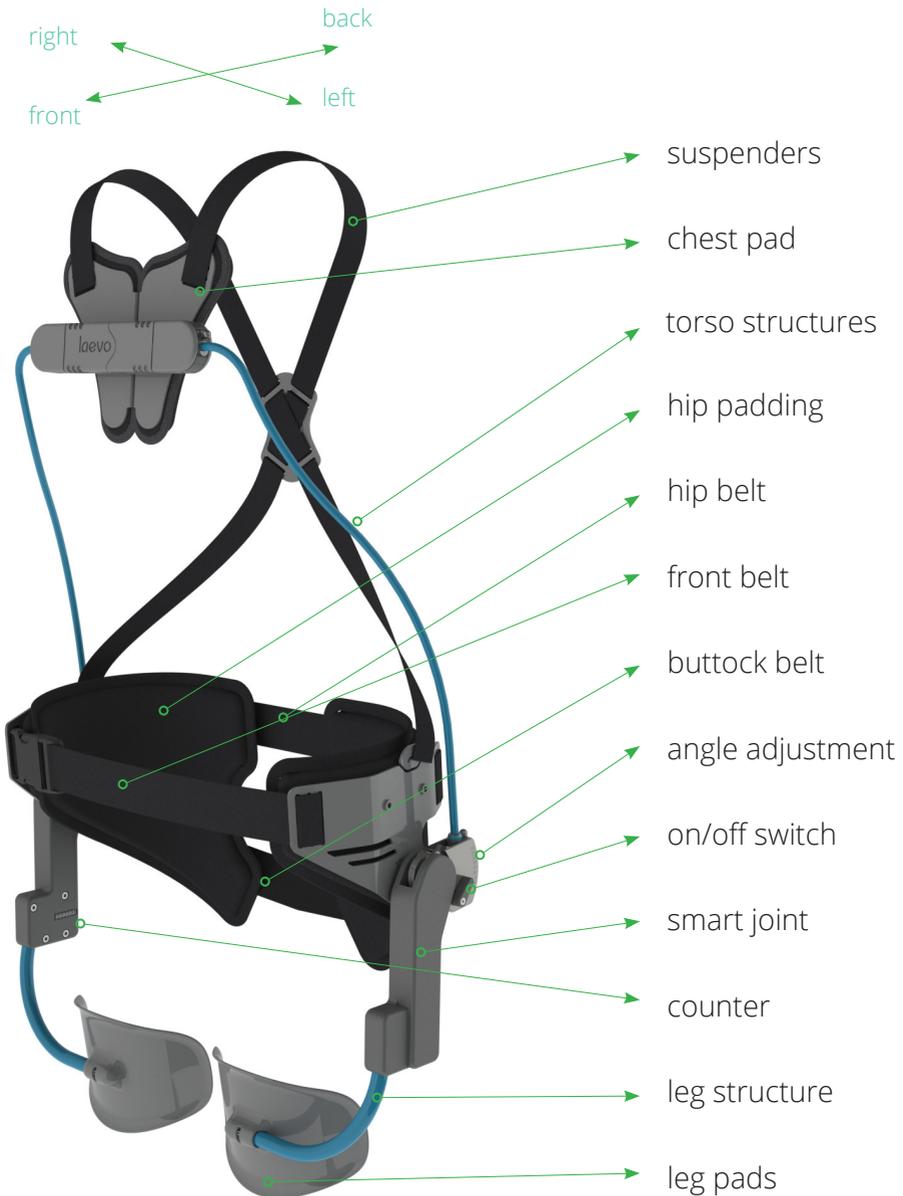
The Laevo has been tested for a minimum of 250,000 full bends, in the activated setting. The number of bends is displayed on the counters that have been integrated into the Smartjoint. When one of the counters reaches 250,000 load cycles, the Laevo may NO longer be used. The Laevo must then first have maintenance by Laevo before it can be used again. Please contact Laevo for this purpose.

Warranty

Should the Laevo exhibit any defects within the first year after purchase, please contact Laevo and we will see to a suitable solution.

The warranty conditions are sent to you by your supplier. In any doubt, please refer to our website: <http://en.laevo.nl/legal/>.

2. Overview Figure



Most of the following instructions are visualized in the Quick-Guide. When you are in doubt you should always contact your supplier.

Preparation

The Laevo is personally delivered or transported in a cardboard box with filler material. This box contains:

- The Laevo, consisting of the following parts:
 - The hip belt, with Smartjoints and legpads attached,
 - The chestpad,
 - The suspenders,
 - One or multiple sets of torso structures,
- A Quick-Guide for first use,
- This manual.

Torso structures selection

The Laevo V2.5 parts are universal, except for the torso structures. Having a torso structure size that is right for you, and your activity, is a key factor in perceived comfort, ease of use and effectiveness of the Laevo.

- In case of **made-to-measure structures**, check the label to verify if these are for you, and only use these structures when you wear the Laevo. Do not wear custom structures that are not for you.
- In case of **standard sizes**, you have received one or multiple sets. As a starting point, select the torso structure size matching your body dimensions from the following table. The torso structures are color-coded by a ring on the bottom connector, corresponding to following table:

Size	Body Length	Ring Color
Small	Less than 1,72m	
Medium	Between 1,72 and 1,80	
Large	Between 1,80 and 1,88	
Extra Large	1,88 and longer	

Assemble the Laevo with the suggested torso structure and adjust it to your body by following the steps in the Quick-Guide and below. Test the fit by making the first movements as described.

In case the suggested structures immediately feel (for example) too long or too wide, try the shorter or narrower sizes. Selecting a different torso structure is common since body shapes differ a lot, even while having comparable body length and weight.

Should you have the idea that the dimensions of the Laevo do not fit your physique, stop using the Laevo and contact your supplier. Custom structures are available for users that cannot fit a standard size.

Assembling the Laevo

Assembling the Laevo does not require any tools. Follow the Quick-Guide to go through these corresponding steps:

1. Take the Laevo parts out of the box and place them neatly on a clean and smooth surface.
2. Check the labels on the Smartjoint to check if the credentials match you or your company. Select the right structures (see above).

3. Take the chestpad and torso structures, and look at the top connector.

Notice that this connector has a Left (L) and Right (R) indication, and that this letter should face the Laevo logo side of the chestpad.

Mount the torso structures to the chestpad by pressing the button on the corresponding side of the chestpad, slide in the top torso structure connector, and release the button to lock the parts together. Make sure these are locked together securely by lightly pulling the structure out of the chestpad.

Notice that the torso structures can be locked to the chestpad in three width settings. This adjustment can be used to improve comfort. Make sure that the left and right structures are in the same width setting.

4. Mount the torso structures to the hip belt assembly by pressing the top button on the corresponding Smartjoint, slide in the bottom torso structure connector, and release the button to lock the parts together. Make sure these are locked together securely by lightly pulling the structure out of the Smartjoint.
 - Notice that the locking is only possible when the relative orientation of the torso structures and Smartjoint is right. Locking is only possible when the front of the chestpad is aligned with the front of the Smartjoint, with a +/- 45 degree rotation margin.
 - Notice that the torso structures can be locked to the Smartjoint in 3 length settings. This adjustment can be used to improve comfort. Make sure that the left and right structures are in the same length setting.

5. Take the suspenders and mount them to the chestpad and hip belt. Make sure the Laevo logo is facing backwards and is in the right orientation, and the suspenders are not twisted.
 - When mounted, set the suspenders to the longest size possible.
6. Using the buttons on the back of the Smartjoints, set the initial angles to the maximum setting of 35 degrees.
7. The Laevo is ready for first donning!

Donning and setting up the Laevo

The Laevo can be adjusted in many ways to improve the fit. Follow the Quick-Guide to go through these corresponding steps:

8. Open the chestpad and hip belt front buckle.
9. Put the Laevo on like a coat and close the chestpad and hip belt front buckle again. Because everything is set to maximum size the Laevo hangs loosely around the body.
10. Adjust the suspender length with the sliding clamps so the pivot point of the Smartjoint is at your hip joint height. Adjust the height of the crossing to your comfort. A helping hand is welcome at this step.
11. Tension the front hip belt a bit.
12. Tension the back top and bottom hip belts. Adjustment of the 3 hip belts is another key factor in comfort. With the lengths of these 3 belts you are able to move the Smartjoint to a specific location on your hips. Place the pivot point of the Smartjoint as close as possible to your hip joint. You might have to adjust all belt a couple of times to get it right.
 - The top of the femur (thigh bone) is in line with the hip-

joint. It can be felt clearly moving though the skin when one pivots his foot in- and outward, while resting the heel on the ground. This point is generally 10cm below the top of the pelvis. Looking down on the Laevo, align the Smartjoints so they are parallel to each other and your body. This will improve comfort.

13. When the belts are sufficiently adjusted, roll up any excess strap and fold it neatly into the elastic loop at the end of the belt.
14. Make sure Smartjoints are locked using the switches on the sides. Decrease the initial angle using the switch on the back of the Smartjoint to a point where the chestpad pressing lightly against the chest when standing in a natural, straight position. Make sure the initial angles are set to equal values left and right.
15. When needed, adjust the 3-step width setting of the torso structures in the chestpad to improve comfort.
16. When needed, adjust the 3-step length setting of the torso structures in the Smartjoint to improve comfort.
17. Your Laevo is ready!

First movements

The first time you use the Laevo, gently make the following movements:

- Bend forward from the hip,
- Bend your knees,
- Bend forward at an angle and stretch outwards.

These movements should be comfortable and easy. In case of discomfort contact your supplier.

Checks

Check the following settings of the Laevo with the Quick-Guide:

- A. The height and the fitting of the leg pads on the thighs.
- B. While standing straight, pressure of the chest pad on the chest should be limited. It is okay for the chest pad to come loose from the body.
 - if necessary, adjust the angle of the structures according to step 14.
- C. The torso structures need to follow the contours of the body, so your arms still have sufficient freedom of movement.
 - if necessary, adjust the width of the structures according to step 15.
- D. While you are bending forward, the chest pad can slide. However, it should not slide into your throat. Should this happen:
 - tighten the back lower hip belt,
 - adjust the hip belts so the Smartjoints are placed further towards the back of the body,
 - adjust the length of the torso structures according to step 16,
 - select shorter torso structures,
 - try a bending movement / technique with more hip rotation and less spine or neck bending.

(De)activating the Smartjoints

In the Laevo V2.5 it is possible to turn the Smartjoint on and off using the switch on the side. Operate this switch only when standing upright (no pressure on the chestpad). Rotate both switches up to deactivate the Laevo and notice the lack of support while bending forward. Turn the Smartjoint back on by rotating the switches back down again. Only switch between states when standing upright and no pressure is on the chestpad, and use only light force. Make sure both Smartjoints are in the same state after switching.

Work posture, tasks and activities

The following activities can be performed with the Smartjoint turned on or off:

- Forward bended working,
- Lifting,
- Bending to the ground,
- Kneeling and squatting,
- Stretching outwards and upwards,
- Walking.

With the Smartjoint turned off these activities can be performed:

- Walking up and down stairs,
- Sitting.
- Driving low-speed, professional, indoor vehicles, such as a forklift.

It is not advised to perform the following activities with the Laevo:

- Running,
- Climbing,
- Driving any vehicle outside.

User environment

The Laevo is designed for indoor use.

- ▲ The Laevo may not be used or stored in direct sunlight.
- ▲ The Laevo may not be used in a setting where the ambient temperature is lower than 0 °C or higher than 40 °C.

Gradually increase use

Gradually increase first use of the Laevo: from 1 hour a day, to 2 hours a day, to 4 hours a day, to 6 hours a day onwards to the maximum time of 8 hours a day.

Storage

When the Laevo is not being used, preferred method of storage is to hang it on a hat rack or in a clothes locker. Make sure that it is stored in a dry place.

5. Safety Instructions

Failure to comply with the instructions contained in these precautionary measures and safety instructions could result in injury to the user(s) and/ or damage to the product. Please read this information carefully.

Check structure connectors before each use

The user needs to make sure the structures are securely mounted to the chestpad and Smartjoint. Gently trying to pull out the structures, without pressing the mounting switches while standing in a straight position with no load on the chestpad, is advised.

Discontinue use and contact your supplier

- ▲ when experiencing physical complaints or negative side-effects,
- ▲ when wearing the Laevo becomes less comfortable,
- ▲ when a part is dysfunctional (for example: a buckle or a hinge),
- ▲ if you notice visible damage.

Sometimes the solution is to stop and restart getting used to the product. Just stop and build up the frequency and duration of the usage again.

Laevo and your physical condition

The Laevo is not safe for use by individuals with one of the following conditions:

- a pacemaker,
- breast implants,
- removal of the axillary lymph nodes.

Individuals with one of the following conditions should contact a physician prior to using the Laevo. For example, it can be advised to do an extra slow build-up of the wearing time:

- inguinal hernia,
- knee injury,
- hip prosthesis,
- knee prosthesis,
- hernia,
- hyperextended knee,
- recent new knee or hip.

Calamities

▲ If CPR or a defibrillator has to be used on someone wearing a Laevo, the Laevo must first be disengaged. This can be done by pulling apart the two halves of the torso pad and the belt buckle, making it possible to flip the Laevo outward and expose the chest.

Avoid dangerous situations

- ⚠ The Laevo is only intended for professional use.
- ⚠ Only use a Laevo that fits your body.
- ⚠ Do not use any flammable substances (e.g. matches, lighters, candles) in the vicinity of the product. The materials used in the Laevo are not flame retardant.

Avoid moisture, dust and damages

- ⚠ The Laevo must be kept dry. The moving parts of the Laevo must be kept free of any fluids.
- ⚠ The mechanical parts of the Laevo must be kept free of sand and other debris.
- ⚠ Do not stand on (parts of) the Laevo.
- ⚠ Do not place any heavy objects on (parts of) the Laevo.

Wear appropriate clothing

It is inadvisable to wear, while wearing or carrying a Laevo, any clothing with loose ends, such as a necklace or a scarf.

- ▲ Make sure there are no hard objects in your clothing or pockets that could become pinned underneath the Laevo.
- ▲ If your clothing becomes ensnared in the smart joint, bend forward to open the smart joint and remove the clothing from the smart joint.
- ▲ Do not wear the torso or leg pad directly on exposed skin.

Beware of jamming

Misuse can lead to entrapment, with possible injuries.

- ▲ Never place your hands or fingers near the smart joint and chestpad while bending.
- ▲ Keep the Laevo away from children and pets.

Beware of bystanders

- ▲ Avoid situations where (potentially aggressive) people might attempt to grab the Laevo, which could lead to a dangerous situation. In such circumstances, it is advisable to wear clothing (e.g a jacket) over the Laevo to reduce the risk of someone grabbing it.

Cleaning

To clean the Laevo, use a moist cloth, lukewarm/hot water and a mild cleaning product (no cleaning products that contain solvents).

- ▲ Make sure no water gets into the moving parts. Never immerse the Laevo in water.
- ▲ Do not use any solvents, bleach, polisher or detergent.

Maintenance

Regularly check (according to extent of use):

- the counters on the smart joint,
- for visible damage,
- whether all parts are still securely attached without play,
- functioning of the adjustments and switches,
- if the metal colored surface of the smartjoint is a bit greasy.

Repair

For customer service and repair, please contact your supplier.

Disposal

Please contact the supplier if you no longer need the product or if it needs to be disposed off on account of depreciation. The supplier will ensure that it is disposed of properly.

7. Technical Specs

Technical Product Specifications

Product name:	Laevo
Product number:	Laevo V2.5
Serial number:	Retrievable on the sticker on the inner sides of the Smartjoints.
Weight:	2.8 kg
Size:	Size depends on the measurements of the user.
Certification:	CE - Medical Device Class I



Manual

Manual no: HL-V2.5.0-EN

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