

laevo



V2.57

wearable back support for repetitive bending and bended posture

August 2020

EN Instructions for use

For USA and Canada

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1 Introduction

Thank you for choosing Laevo.

This document gives instructions for use, safety, fitting and maintenance of the Laevo.

- ▶ Read carefully before use.
- ▶ Keep for future reference.
- ▶ Follow the safety instructions.
- ▶ Instruct the user in proper and safe use of the product.

If you have questions, call Laevo or your supplier. Laevo's contact information is on the last page.

1.1 Variants

All instructions are for LAEVO B | |XO 2.57 and USA/Canada only.

The illustrations are general examples; your product can be different from the illustrations.

1.2 Explanation of warning symbols

 **DANGER!** Indicates potential life-threatening or disabling injury.

 **WARNING!** Indicates potential serious injury.

 **CAUTION:** indicates potential minor injury.

 **NOTICE:** indicates potential product damage.

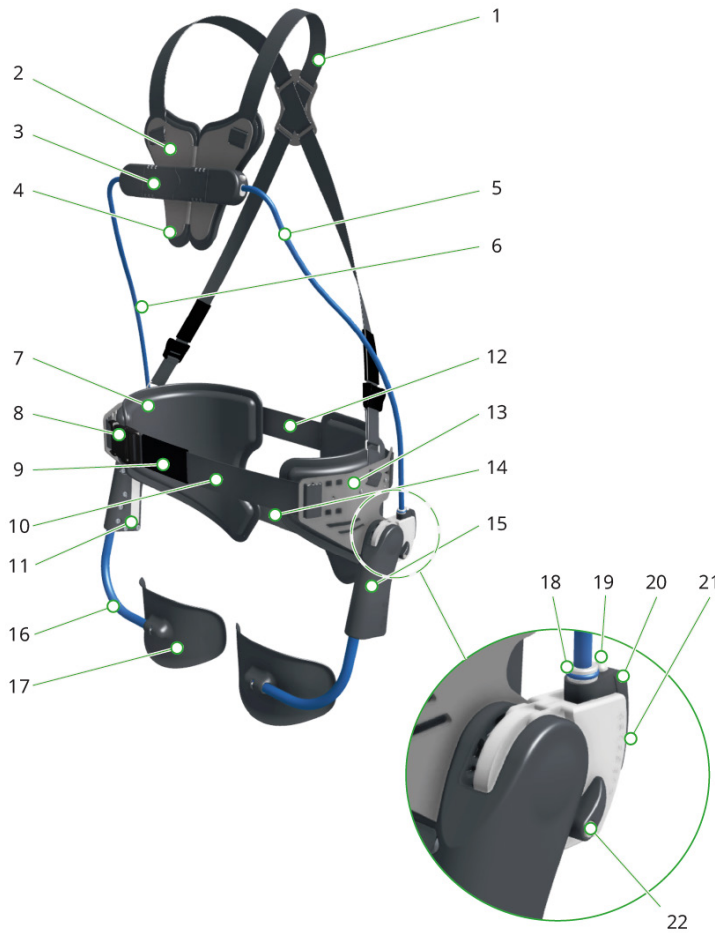
 **TIP:** Information and tips to make it even easier to use the Laevo.

Get more tips at www.laevo-exoskeletons.com

1.3 Contact

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2289 EX Rijswijk, the Netherlands
www.laevo.nl
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2 Overview Figure



- 1) suspenders
- 2) chest pad
- 3) chest pad buckle
- 4) chest gel paddings
- 5) left torso structure
- 6) right torso structure
- 7) hip paddings
- 8) front belt buckle
- 9) front belt slip
- 10) front belt
- 11) smart joint label
- 12) back belt (and slips)
- 13) hip pad
- 14) buttock belt
- 15) smart joint
- 16) leg structures
- 17) leg pads
- 18) structure size indication
- 19) structure lock button
- 20) angle adjustment block
- 21) angle indication
- 22) support on/off button

3 Application

The LAEVO B | XO is a wearable device which supports bent-forward work and repetitive lifting during work. The Laevo decreases the forces in the lower back when bending.

3.1 Indication for use

LAEVO B | XO is equipment designed and manufactured to be worn by a person for protection against back injuries. Use it when you want to:

- reduce the risk of injuries to the back during work.
- reduce fatigue due to bending or lifting
- improve work comfort
- increase work productivity

If you are not sure about correct use, contact Laevo.

3.2 Work environment

LAEVO B | XO is intended for use at work. When you are not sure the Laevo can be used at your work, during certain work tasks or in a certain work environment, do not use the Laevo B | XO and contact Laevo BV or your supplier.

3.3 Contra-indications

Do not use if you have:

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

Consult a physician prior to using the Laevo, if any of the following occurred before or during use:

- inguinal hernia,
- hernia,
- knee injury,
- hip prosthesis,
- knee prosthesis,
- hyperextended knee,
- recent surgery,
- skin diseases/injury,
- inflammation,
- scars,
- skin reddening.

3.4 Work posture, tasks and activities

The Laevo will support the lower back during:

- Bending forward, holding this posture and returning upright,
- Lifting.

- ⚠ **CAUTION:** Lifting heavier loads than permitted by law
Risk of injury of arms and other body parts
 - ▶ Do not use the Laevo to lift heavier loads than permitted.
 - ▶ Do not use the Laevo to replace lifting aids for heavy loads.


The Laevo allows or partly supports:

- Kneeling,
- Squatting,
- Stretching outwards and upwards,
- Twisting,
- Walking.


- ⓘ **TIP:** Turn the support off before:
 - Walking up and down stairs,
 - Sitting,
 - Driving low-speed, professional, indoor vehicles, such as a forklift.

- ⚠ **WARNING!** Unintended activities
Risk of unsafe situations
 - ▶ Do not run, climb, work on heights or drive any vehicle outside.
 - ▶ Use the Laevo only professionally (for work).


4 Safety Instructions

-  **DANGER!** Laevo worn during CPR or defibrillator use
Reduced efficiency of CPR or defibrillator


 - ▶ Expose chest before CPR: Pull apart the two halves of the chest pad. Release the front belt buckle. Push the halves outwards.


-  **WARNING!** Discomfort or pain during use
Risk of increased discomfort or pain

 - ▶ Stop using the product.
 - ▶ When the pain is gone, build up the frequency and duration of the usage again.
 - ▶ Do not wear the Laevo directly on exposed skin.


-  **WARNING!** Use of damaged product
Loss of functionality, including sudden loss of support

 - ▶ Do not use a damaged product.
 - ▶ Do not use flammable substances (e.g. matches, lighters, candles) near the Laevo. The Laevo is not flame retardant.
 - ▶ Keep the Laevo dry.
 - ▶ Keep moving parts free of any fluids.
 - ▶ Keep moving parts free from sand, dust and debris.


-  **TIP:** For some applications and parts a protective cover is available. Contact your supplier or Laevo.

-  **WARNING!** Failure of the device while bending
Risk of sudden loss of support. If this occurs, your hands or head can suddenly move (a few centimeters)


 - ▶ Do not use the device where sudden hand or head movements could lead to injury to you or somebody else.

-  **WARNING!** Pushing buttons while bending
Risk of sudden loss of support


 - ▶ Take caution not to accidentally press buttons, for example by bumping.
 - ▶ Do not press buttons on the Laevo while another is using it.

-  **WARNING!** Fingers near smart joint while bending
Misuse can lead to cutting or crushing injury

 - ▶ Do not place your fingers near rotation points while bending.
 - ▶ Do not allow fingers from others near the Laevo during use (except setup). Keep the Laevo away from children and pets.

-  **WARNING!** Use of out-of-date parts
Risk of sudden loss of support

 - ▶ Check the date on the torso structures. If the usage of the torso structures exceeds 3 years, stop using the Laevo. Contact the supplier or replace parts.

-  **WARNING!** Structures loaded for more than 250.000 cycles or for more than 3 years.
Risk of sudden loss of support

 - ▶ Do not use the Laevo.
 - ▶ Contact the supplier or Laevo. Follow the advice.

- ⓘ **TIP:** Advise in general will be to replace the structures sooner, e.g. in 1 year. The batch-number next to the date on the torso structure could be used to track use time.
- ⚠ **WARNING!** Clothes and tools stuck in or trapped under device
Risk of injury
- ▶ Wear appropriate clothing. Do not wear clothing or accessories with loose ends, such as necklaces or scarfs.
 - ▶ Do not wear hard objects in your clothing or pockets under the Laevo.
 - ▶ If your clothing becomes ensnared in the smart joint, bend forward to open the smart joint and remove the clothing.
- ⚠ **WARNING!** Something/someone pulls chest pad
Risk of hit by chest pad
- ▶ Avoid situations where (aggressive) people can grab the Laevo.
 - ▶ Do not wear the Laevo without suspenders.
 - ▶ Option: wear clothing over the Laevo.
- ⓘ **NOTICE:** Improper use and changes
Change in or loss of functionality as well as damage to the product
- ▶ Use this product with care and only for its intended purpose.
 - ▶ Do not make any changes to the product parts.

5 Installation

ⓘ TIP

- ▶ Read these steps while using the figures from the Quick-Guide. Figure numbers are indicated as QG-1, QG-2, QG-3, etc.
- ▶ Assembling the Laevo does not require any tools, except for the supplied M6 Allen wrench.

5.1 QG-1: Preparation

- ▶ Check if the delivery is complete. See list of parts in QG-1.

5.2 QG-2: Label check and torso structures selection

In case of made-to-measure Laevo:

1. Check the label to verify the Laevo is for you.
2. Do not wear a custom Laevo that is not for you.
3. Do not use custom torso structures that are not for you.

In case of standard sizes:

- ▶ Select the torso structure or Laevo size for first fitting from the table 'Body length to structure indication' in 'Specifications' at the end of this manual.

ⓘ **TIP:** Custom torso structures and Laevos are available for users that do not fit a standard size.

ⓘ **TIP:** Quick-Guide step 15 and 16 explain how and when to switch to a larger or smaller size.

5.3 QG-3: Attach the leg pads to the smart joints


1. Remove all packaging and tape from the leg pads.
2. Slide the left leg pad into the left smart joint.
3. Put the two screws in the two holes.
4. Tighten with the supplied key, until the screw heads hit the housing.
5. Repeat for the right leg pad.


5.4 QG-4: Attach the suspenders to the chest pad and hip belt

- ▶ Check if the suspenders are already fixed. If not:
 1. Attach the suspenders to the hip belt.
 2. Make sure the Laevo logo faces outward and the buckles are below the crossing.
 3. Make sure the suspenders do not twist.
 4. Attach the suspenders to the chest pad.

5.5 QG-5: Attach the torso structures to the smart joint

1. Push the 'structure lock button' of the left smart joint.
2. Move the left torso structure in the hole to a comfortable height setting.
3. Rotate the indents towards the button to make sure the parts can lock.
4. Release the button.
5. Repeat for right side.


 **NOTICE:** Make sure left and right have the same height setting.

 **WARNING!** Bending with unlocked parts
Risk of sudden loss of support

- ▶ Pull lightly on all structure ends to make sure all ends are locked.

5.6 QG-6: Attach the torso structures to the chest pad

1. Use the Torso Structure with indicator "L" for the left side of the body.
2. Push the button on the left side of the chest pad.
3. Move the structure in the hole to a comfortable width setting. There are 3 width settings.
4. Release the button.
5. Repeat for the right side.

 **NOTICE:** Make sure left and right have the same width setting.

6 Fitting

ⓘ TIP

- ▶ Read these steps while using the figures from the Quick-Guide. Figure numbers are indicated as QG-1, QG-2, QG-3, etc.
- ▶ The Laevo can be adjusted in many ways to improve the fit.

6.1 QG-7: Before fitting / first use

1. Adjust the suspenders to the longest size (see QG-10).
2. Set the angle of the smart joint to the maximum setting.

6.2 QG-8: Open the chest pad and the hip belt front buckle

6.3 QG-9: Put on the Laevo

1. Put the Laevo on like a coat.
2. Close the chest pad.
3. Close the hip belt front buckle.

6.4 QG-10: Adjust the suspenders

ⓘ TIP: A second person can help you with this step.

1. Adjust the suspender length with the sliding clamps so the pivot point of the smart joint is at your hip joint height.
2. Adjust the height of the crossing to your comfort.

6.5 QG-11: Tension the belts

- ▶ Tension the front belt and back belt until:
 - the Laevo is close around the body,
 - the leg pads are in front of the thighs.

6.6 QG-12: Adjust width or change torso structures

1. Adjust the 3-step width setting of the torso structures for comfort.
2. Change to a bigger structure size if the structure irritates the torso during normal use.
3. Change to a smaller structure size if structure irritates the arms during normal use.

6.7 QG-13: Adjust height or change torso structures

1. Adjust the 3-step height setting of the torso structures for comfort.
2. Change to a larger size if the chest pad irritates the belly.
3. Change to a smaller size if the chest pad irritates the neck or the armpit while bending.

6.8 QG-14: Set smart joint angle

- 1. Make sure the support is on, using the 'support on/off buttons'.
- 2. Decrease the initial angle using the 'angle button' on the back of the smart joint to a point where the chest pad pushes lightly against the chest when standing in a natural, straight position.

 **WARNING:** Forced button.
Risk of sudden loss of support.
▶ Use this button lightly.

 **NOTICE:** Make sure the initial angles are set to equal values left and right.

7 First use

7.1 QG-15: First movements with the Laevo

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

1. Bend forward from the hip, hands towards the toes.
2. Bend your knees.
3. Bend forward at an angle and stretch outwards.

These movements should be comfortable and easy. If not:

1. Perform the checks listed in the next chapter.
2. Repeat the fitting process.
3. Contact your supplier.

7.2 QG-16: Lock belt buckles with slips.

To lock the buckles and prevent the belt settings from changing:

1. Slide the back belt slips over the back and buttock belt buckles.
2. Slide the front belt slip over the front belt buckle.

To roll up excess belt strap:

1. Roll up any excess belt strap.
2. Fold it into the elastic loop at the end of the belt.

8 Checks

! TIP

- ▶ Perform these checks while using the figures from the Quick-Guide. Figure numbers are indicated as QG-A, QG-B, etc.

8.1 QG-A: Leg pad position

8.2 QG-B: Pressure while standing straight

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 width of the torso structures (QG-14).

8.3 QG-C: Structure body shape fit

The torso structures follow the contours of the body and the arm should be free to move.

- ▶ If necessary, adjust the width of the torso structures (QG-12).

8.4 QG-D: Chest pad hits the neck

While you are bending forward, the chest pad can slide. This is normal.

! NOTICE: Chest pad hits the throat **Unusable product or risk of discomfort**


1. Tighten the back lower hip belt.
2. Adjust the smart joints towards the back of the body (QG-11).
3. Bend with more hip rotation and less spine or neck bending.
4. Adjust the length of the torso structures or select shorter torso structures (QG-13).

9 Daily use


9.1 QG-I: Turn the support on or off

Use the 'support on/off buttons' on the smart joints.

1. Rotate up to turn the support off.
2. Rotate down to turn the support on.


 **WARNING:** Forced button.
Risk of sudden loss of support.
▶ Use this button lightly.


 **NOTICE:** Make sure both smart joints are in the same state before use.


 **NOTICE:** Use the button only when you stand upright.

9.2 QG-II: Use environment

The Laevo is for indoor use.

 **NOTICE:** The Laevo may not be used or stored in direct sunlight.

 **NOTICE:** The Laevo may not be used in a setting where the ambient temperature is lower than 0 °C or higher than 40 °C.

 **TIP:** For some applications and parts a protective cover is available. Contact your supplier or Laevo.

9.3 QG-III: 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, onwards to the maximum time of 8 hours a day.

9.4 QG-IV: Storage

1. Store in a dry place.

 **TIP:** Store hanging.

1. Close the chest pad.
2. Store on a hat rack or in a clothes locker.

10 Maintenance

TIP

This chapter describes all maintenance that can be performed by an (unskilled) end user.

- ▶ Contact your supplier for other maintenance.

10.1 Removing and replacing chest gel paddings

The gel paddings on the chest pad are attached with Velcro.

1. Pull hard to remove.
2. Replace with new paddings.

10.2 Removing and replacing hip paddings

The paddings on the hip are attached with push buttons.

1. Pull hard to remove.
2. Replace with new paddings.

10.3 Removing and replacing structures

See step 5.4 (QG-4)

10.4 Removing and replacing leg structures

See step 5.3 (QG-3)

10.5 Cleaning

To clean the Laevo, the chest gel paddings or the hip paddings:

1. Use a moist cloth, lukewarm/hot water and a mild cleaning product (no cleaning products that contain solvents).
2. Make sure no water gets into the moving parts. Do not immerse the Laevo in water.
3. Do not use any solvents, bleach, polisher or detergent.
4. Do not machinewash paddings. Hand wash only.

10.6 Maintenance

- ▶ Regularly check:
 - for visible damage,
 - whether all parts are still securely attached without play,
 - functioning of the adjustments and buttons,
 - if the smart joint is greased.

10.7 Repair and disposal

- ▶ Please contact your supplier.

11 Legal information

11.1 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.

11.2 Warranty

The Laevo Business Warranty covers the product. This can be found at www.laevo-exoskeletons/legal/. Contact Laevo or your supplier to obtain a printed version.

12 Specifications







12.1 Technical specifications Laevo V2.5

Product name:	Laevo V2.5
Product numbers:	V2.50 and higher
Weight:	2.8 kg
Serial number:	See label (on smart joint)
Certification:	CE - Medical Device Class I
Expected lifetime	250.000 bends or 3 years
Materials used:	<ul style="list-style-type: none"> • Chest pad: Exgel (Oeko-Tex Standard 100) • Hip pad inside: Synthetic mesh fabric • Hip pad filling: Comripol 120kg/m² • Hip pad outside: Synthetic fabric • Leg pad: Polypropylene
Table: Laevo V2.5 specifications (assembled)	

12.2 Technical specifications Laevo V2.5 - Torso structures

V2.5 torso structures	
Product name:	Laevo V2.5 torso structures
Product numbers:	V2.54 and higher
Serial number:	See top end
Expiry date:	See top end
Material:	Powder coated steel, aluminium
Table: Laevo torso structures	

12.3 Dimensions and ring color Laevo V2.5

Size		Body length		V2.5 Ring Color	
		From [cm]	To [cm]		
Custom	-	any	any	-	-
Extra Small	xs	156	164	purple	
Small	s	164	172	yellow	
Medium	m	172	180	orange	
Large	l	180	188	blue	
Extra Large	xl	188	196	green	
Table: body length to structure indication - MALE					
 NOTICE! This table is purely indicative. Body shape is not proportional to body length or weight.					

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