



INSTRUCTION MANUAL HAPO CS

V.06.25

HAPO CS

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HAPO CS

II. Overview

The HAPO CS is a passive physical assistance device using spring rods. This equipment is worn by an operator, and enables a partial transfer of effort from the upper trunk, supported by the torso, to the thighs, supported by the lumbar hollow. This device assists with load handling and provides support for bending the trunk at an angle.

This document is the instruction manual for the HAPO CS. It contains all the information you need to know from the moment you receive your HAPO CS until the end of its life. We recommend that you read the entire manual before installing the HAPO CS for the first time. Keep these instructions close at hand throughout the product's life.

II.1 History of modifications

Date	Revision	Description
19/07/2024	A	Creation
13/01/2025	B	
16/01/2025	V.01.25	Spare parts, warranty period and general updates
29/04/2025	V.04.25	Recycling version
12/06/2025	V.06.2025	Update of textile cleaning and care part

Table 1: History of changes

II.2 Abbreviations and definitions

HAPO: Posture harness

CS : Chest Support

Passive: No external energy storage or supply

PPE: Personal Protective Equipment

II.3 Identification

The HAPO CS traceability label is located on the back plate (10) inside the belt. To access it, open the belt by pulling on the flap (6) at the back of the belt.



Figure 2

Number	Meaning
A	Manufacturer's name and address
B	Product logo
C	Device name
D	Product type
E	Serial number
F	Year of manufacture
G	Stamp
H	CE mark

Table 2: Label identification

HAPO CS

II.4 Manufacturer

- ErgoSanté
- Head office: 28 ZA de Labahou 30140 Anduze – France
- +33 8 05 69 06 91 (cost of a local call)
- contact@ergosante.fr



ErgoSanté is certified ISO 9001:2015 - Quality management systems



or

- Hapo USA Corporation
- Head office: PO Box 31 Danville, KY USA 40423 – United States
- contact@hapo.us



II.5 Pictogram convention

	General danger
	General obligation
	General prohibition

Table 3: Pictogram meanings

III. General description

III.1 Product description

The HAPO CS physical assistance device consists of the following components (see Figure 3 and Table 4):

- **Harness:** allows the exoskeleton to be easily positioned on the shoulders. The harness (12) supports the two front springs.
The width of the harness can be adjusted by means of hook-and-loop fasteners on the front.
- **Lumbar belt:** Textile belt (7) positioned at the lumbar hollow and sacrum, closed by a strap and clip at the front. Two anti-torsion straps (4) with blue ends, connected to the thigh sleeves (1). Two pre-tensioning straps (8) with red ends, for adjusting the position of the springs (5), are positioned on each side of the belt at hip level, holding the springs in place. A back plate (10) in the waistband provides lumbar support and back strap adjustment.
- **Thigh sleeves:** Two armatures (1), each in a textile cover, are attached to the lower ends of the springs. They are held in position by two anti-torsion straps (blue ends) and an elastic strap around the thigh.
- **Springs:** Two cylindrical springs are connected at three points on the HAPO CS:
 1. One end is attached to a pivot on the side of the harness.
 2. The lower end is attached to the armatures of the thigh sleeves.
 3. The central attachment point is located on the side of the lumbar belt, via the length-adjustable pre-tensioning strap.

HAPO CS

III.2 Components

> HAPO CS general diagram

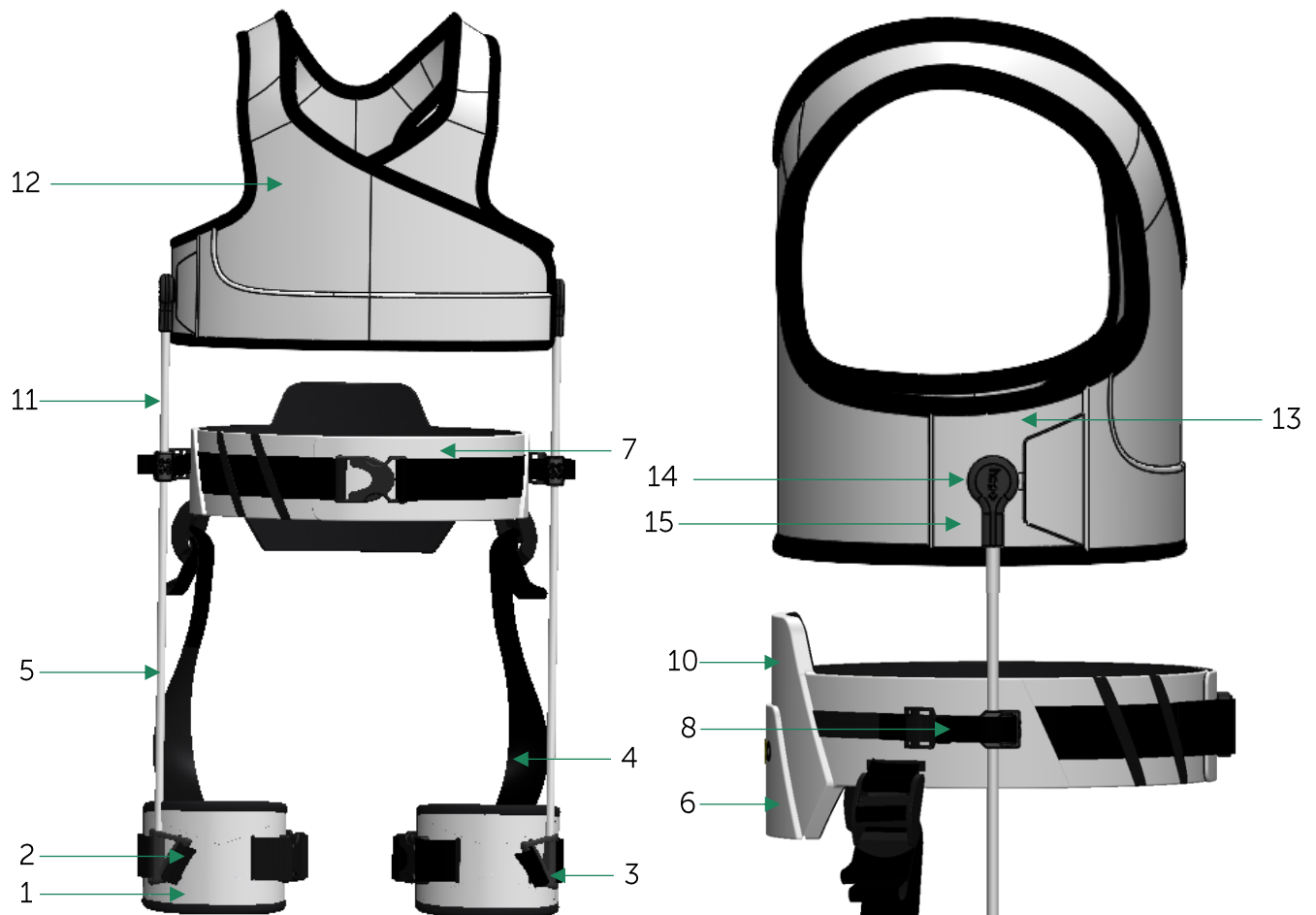


Figure 3

Position	Component name
1	Sleeve
2	Plastic armature sleeve
3	Spring support
4	Anti-torsion strap
5	Spring rod
6	Flap
7	Textile belt
8	Pre-tensioning strap

Position	Component name
9	Hapo strap loop
10	Back plate
11	High spring rod
12	Textile harness
13	Pivot support
14	Hapo high pivot
15	Pivot storage pocket

Table 4: Components of the HAPO CS exoskeleton

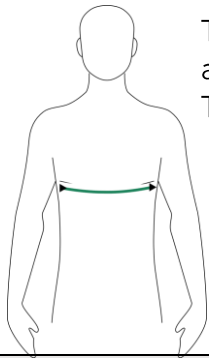
HAPO CS

III.3 Technical specifications

Assistance			
Adjustment type	Strap		
Range of motion	Trunk amplitude from 0 to 90°		
Textile composition			
45% Polyamide – 42% Polyester – 13% Elastane			
Dimensions in centimeters			
	Hapo CS Size 1	Hapo CS Size 2	Hapo CS Size 3
Lenght	85	90	100
Width	45	45	45
Height	25	25	25
Weight			
0.850kg ± 0.2kg			
Noise emission			
0 dB			

Table 5: Technical data

III.4 Sizes



The HAPO CS harness is available in two sizes to suit different body shapes and activities.

The chart below gives an indication of the size of the harness

Harness size	Bust measurement in cm	
	72 - 89	89 - 106
	S1	S2

Table 6: Morphological guide for bust size

The HAPO CS comes in three sizes to suit different body shapes and activities.

The chart below gives an indication of sizes

Spring size	Stature in cm		
	150 - 165	165 - 180	180 - 195
	S1	S2	S3

Table 7: Morphological guide for stature

III.5 Colors

The HAPO CS is available in 2 colors:

Black 

White 

IV. Compliance and safety

IV.1 Type of personnel

User	Personnel using the exoskeleton
Specialized staff	Personnel with in-depth knowledge of certain tasks involving the product

Table 8: Type of personnel



It is important to respect the type of personnel for the various tasks, as failure to do so may result in hazards.

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IV.2 [Qualification of personnel](#)

This equipment is intended for use by a trained operator.
The operator may install the equipment and accessories himself.

IV.3 [Correct use](#)

The HAPO CS is intended for use by a single adult user. For optimum use of the exoskeleton in complete safety, the user must be instructed by specialized personnel. Use of the HAPO CS does not exempt the user from complying with the standards in force in the country of use, and in particular standard NF X35-109 relating to the manual handling of loads. The use of the HAPO CS does not exempt the user from wearing PPE.

> [Operating principle](#)

The HAPO CS is a passive physical assistance device.
The HAPO CS is equipped with two composite spring rods connected to an interface on the thigh, at waist level, and to a textile harness via a pivot. The assistance provided by the HAPO CS is particularly noticeable when the user leans forward. The system compensates for part of the trunk load by distributing it to the thighs and pectoral area. The level of assistance can be adjusted to suit the task in hand, the user's morphology and so on.

> [Use and storage environment](#)

It is recommended to use the exoskeleton in an open, uncluttered area, to avoid shocks that could damage the product and to limit the risk of snagging.

Storage temperature range	-20°C to +40°C – dry environment
Operating temperature range	-20°C to +40°C
Not authorized	Explosive environment (ATEX), chemical splashes or exposure to abrasive elements.

Table 9: Normal environmental conditions

> [Covered morphologies](#)

	Name	Range covered (in cm)
1	Bust size	72 - 106
2	Waist circumference	68 - 140
3	Sleeve circumference	40 - 55

Table 10: Different textile part coverings

> [Duration of use](#)

We recommend a gradual period of use, until the user is fully accustomed to the product. The length of this period should be defined on a case-by-case basis.

To date, there is no daily duration recommended by INRS, nor by standard X35-800 (published in 2023), in the sense that this criterion must be left to the discretion of the user company, depending on the exoskeleton model, but above all on the task performed (intensity, frequency...).

HAPO CS

> [Product lifespan](#)

Duration	HAPO CS wearing time
5 years*	Maximum 8h/day
* This duration of use is based on use of the product in accordance with its intended purpose and maintenance instructions (cleaning, replacement of wearing parts, etc.).	

Table 11: HAPO CS service life

The design, manufacture and instructions for the intended use of the product have been determined on the basis of its expected service life. This includes using the product in accordance with its intended use and maintenance instructions.

V. [Use cases](#)

The HAPO CS can be used in situations involving:

- Partial flexion of the trunk (between 0° and 90°); with or without load; static or dynamic.
- Total flexion (over 90°); with or without load; static or dynamic.
- Flexion on one leg (right or left); with or without load; static or dynamic.

[V.1 Precautions for use](#)

- The HAPO CS must only be used by trained operators.
- The HAPO CS must be cleaned of any foreign matter (liquid or solid) after use.
- The HAPO CS must be cleaned between each change of user.
- The HAPO CS must be checked and prepared between each change of user.
- The HAPO CS must be kept out of reach of splashing solvents or chemicals.
- The HAPO CS must be kept out of reach of flames, embers or other sources of heat that could damage it.
- The HAPO CS must be used in a clear, uncluttered area to avoid any risk of catching on parts of the working environment.
- The HAPO CS must be transported in a suitable protective bag.
- It is recommended to remove the HAPO CS if the user experiences pain related to the product.
The HAPO CS should not be worn in direct contact with the skin.
If skin irritation or itching occurs while wearing the exoskeleton, remove it immediately.
- The HAPO CS must not be used by persons with back and/or thorax pathologies without prior medical approval.
- Do not use the HAPO CS without ensuring that all fasteners are securely fastened and that the straps are fully retracted into the dedicated storage compartments.
- It is forbidden to twist the spring rods by hand.
- Do not modify the HAPO CS without written authorization from the manufacturer.
- Do not use the exoskeleton if the springs have been damaged.
- It is forbidden to use the HAPO CS after a shock, without a visual check.
- It is forbidden to use the HAPO CS in situations where there is a risk of falling, without having obtained prior approval from a health and safety officer.
- It is forbidden to use the HAPO CS while handling sharp objects, without having obtained prior approval from a health and safety officer.
- It is forbidden to use the HAPO CS when pregnant.
- It is forbidden to use HAPO CS without training or initiation in the use of the product by specialized personnel.
- The HAPO CS must not be used without being adjusted to the user's specific needs by specialized personnel.

HAPO CS

- The use of HAPO CS does not exempt the user from wearing personal protective equipment (PPE).
- HAPO CS must be used in compliance with the standards in force in the country of use.



All uses not listed in the instructions as conforming to the standards are non-conforming.

V.2 Contraindications



Do not use HAPO CS if you are pregnant.



If you have back or thorax pathologies, you should seek medical advice before using HAPO CS.

V.3 Residual risks



Despite the preventive measures implemented throughout the product design and evaluation phase, residual risks remain in the event of:

- Proximity to a source of excessive heat (flames, sparks): the textile melts and degrades.
- Improper storage of straps in the dedicated elastic loop: straps can be caught in the cogs of a machine,
- Incorrect adjustment of the HAPO CS.
- Failure to follow HAPO CS installation and removal instructions.
- Using the HAPO CS to climb or descend stairs can increase the risk of falls.

V.4 Incidents

> Component breakage

- Remove the product and stop using it,
- Contact your agency or distributor.

> Environmental impact

- Remove the product.
- Case for springs: If the color of the sheath is not uniform, or if another color appears, the spring may be weakened. In this case, HAPO CS should no longer be used.
- Plastic parts: Check that there are no visible cracks on these parts. If this is the case, do not use HAPO CS until you have contacted your agency or distributor,
- If in doubt about any of the parts, contact the distributor.



Remove the HAPO CS in any situation that could present a risk to the product.

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VI. Operating procedure

VI.1 Unpacking

Check the outside of the box. If any damage is found before opening, take a photo of the package.

Open the box and check that the delivery is complete.

Check the visual appearance of the product. If it does not conform to its general description (*see III of the manual*) or if any damage is noted, contact your branch or distributor.

VI.2 Setting up and adjusting the HAPO CS

> Preparation

1 : **Open** the belt clip

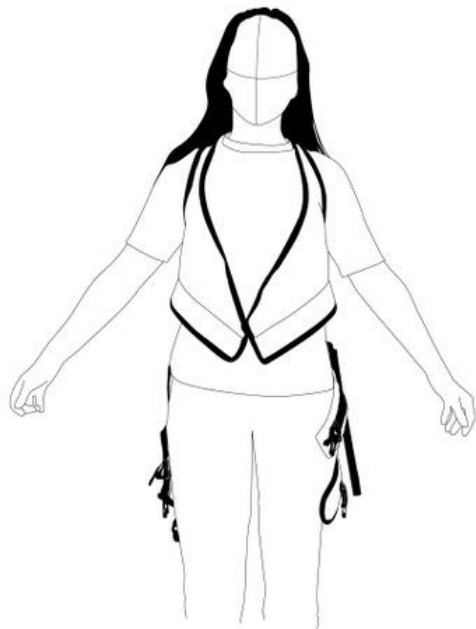
Open the sleeve fasteners.

Open the hook-and-loop fastener on the front of the harness.

Check that the harness pivot frames are correctly inserted in the pockets.

Check that the velcro flap of the pocet is correctly folded down.

2 : **Pass** your right arm through the harness armhole, then **slip on** the HAPO CS as if you were wearing a backpack.

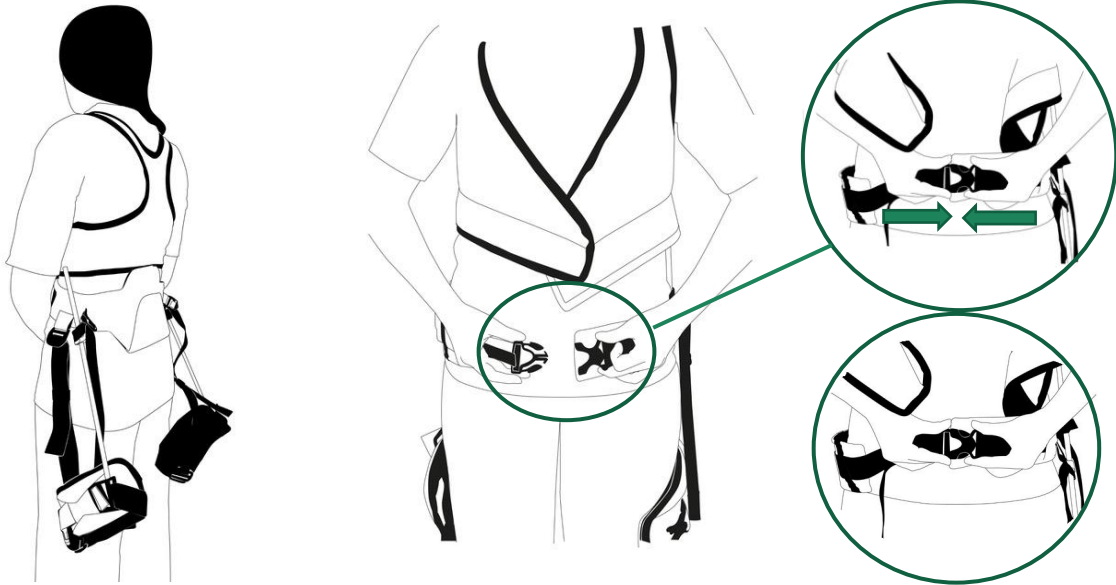


Don't twist the straps.

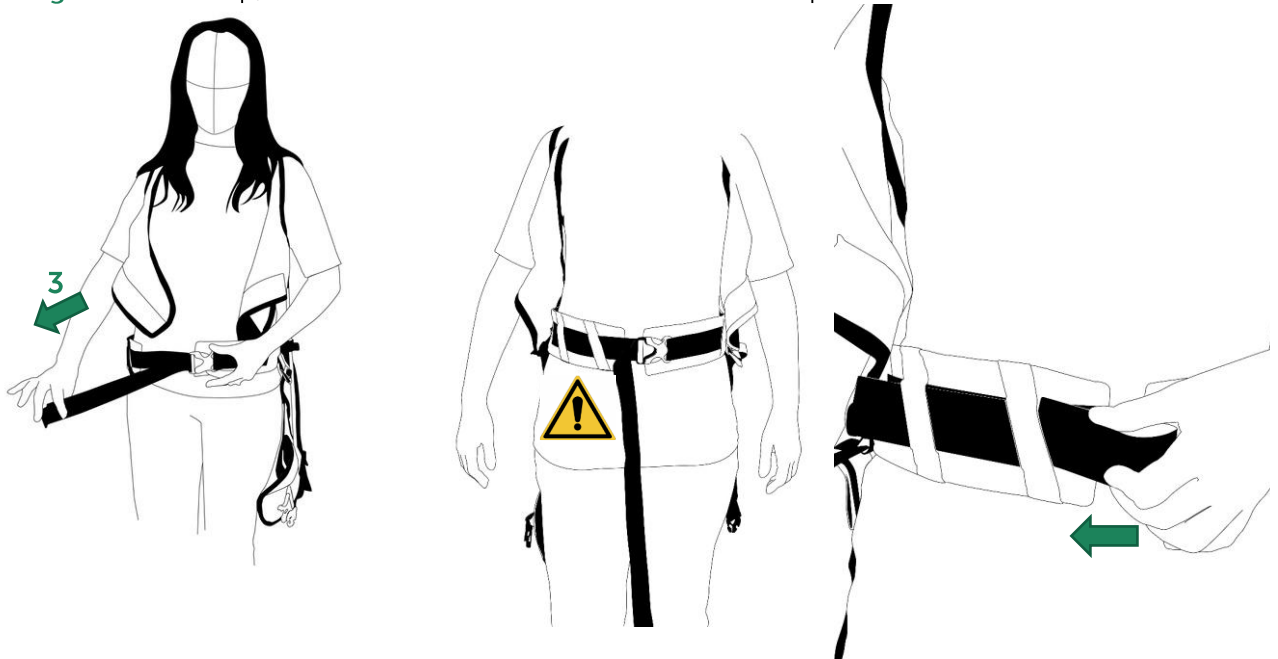
HAPO CS

> [Positioning the belt](#)

- 1: **Position** the belt at lumbar level. Bring the back of the belt into contact with the back
- 2: Loosen the strap if necessary, then **attach** the buckle.



- 3: **Tighten** the strap, then **tuck** the excess into the elastic loop.

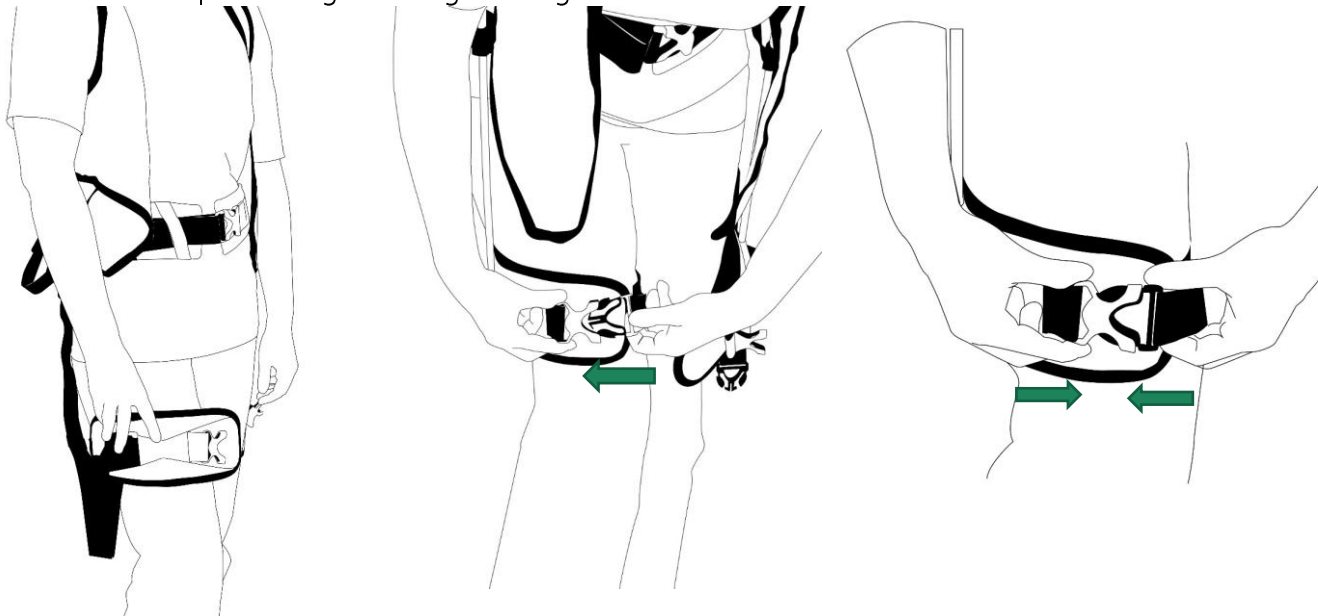


Do not pass the belt over the springs.

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> Sleeve installation

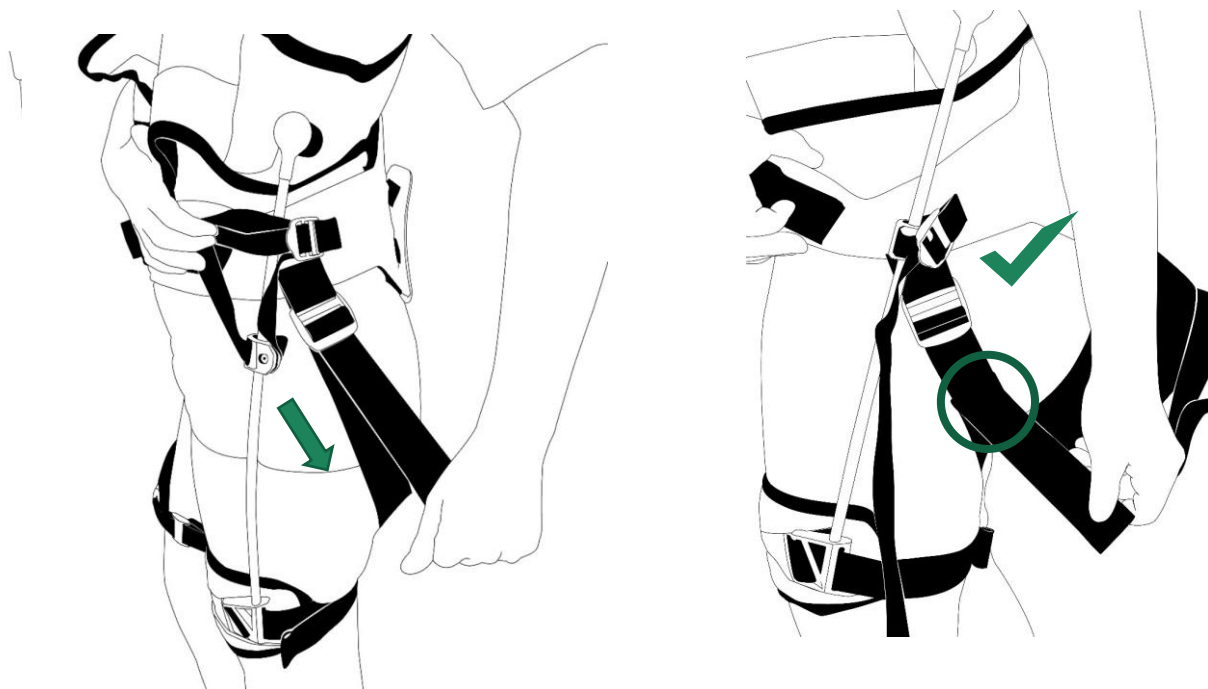
- 4: **Loosen** the anti-torsion and elastic straps on the sleeves.
- 5: **Position** the sleeve on the thigh.
- 6: **Attach** the straps to the inside of the sleeve, taking care **not to twist the 2 straps**.
The elastic strap should go around the thigh.



- 7: **Adjust** the elastic strap using the hook-and-loop fastener.
This operation is only necessary when first fitting or after washing.
- 8: **Tighten** the anti-twist strap. **Secure** the excess in the elastic loop.



Do not overtighten the elastic strap.
Do not pass the anti-torsion strap over the spring.

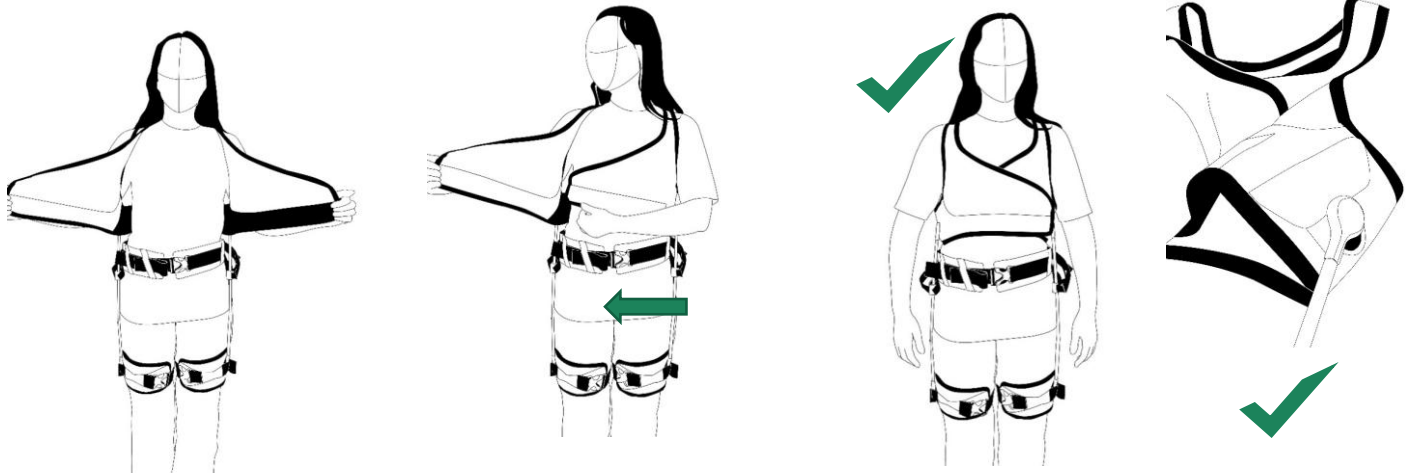


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> [Harness fitting](#)

9: **Hold** the left side of the harness under the chest, then **position** the right side over it, making sure that the 2 hook-and-loop fasteners are facing each other.

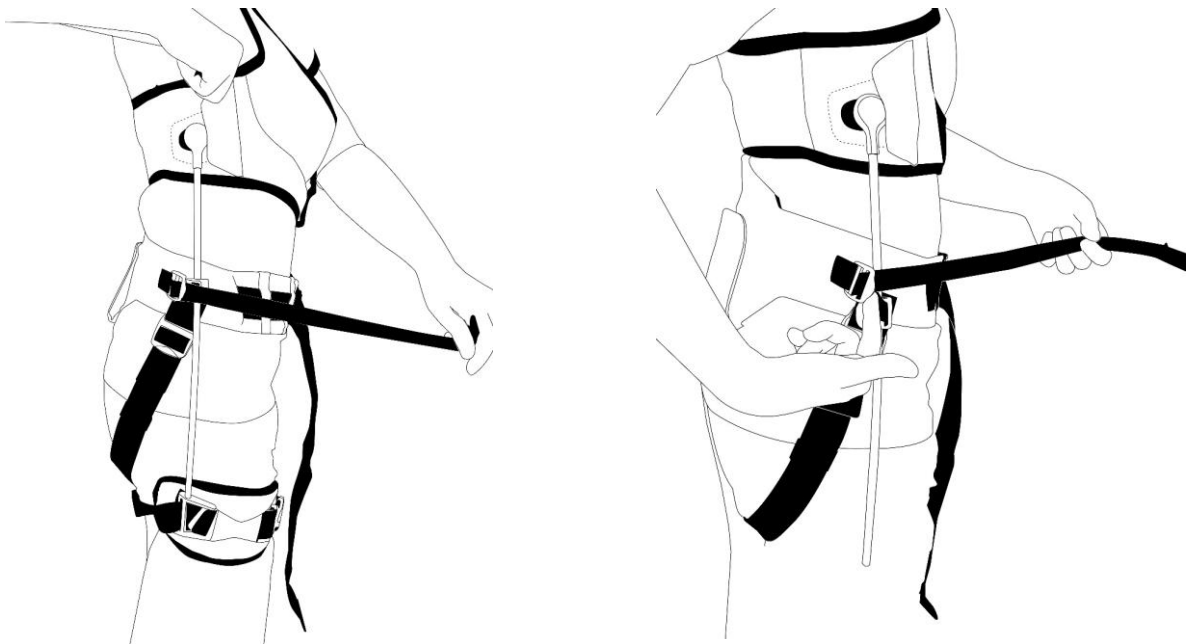
10: **Check** that the velcro flap of the pocket is correctly folded.



> [Assistance setting](#)

11: **Align** the springs with the hip by pulling on the pre-tensioning straps.

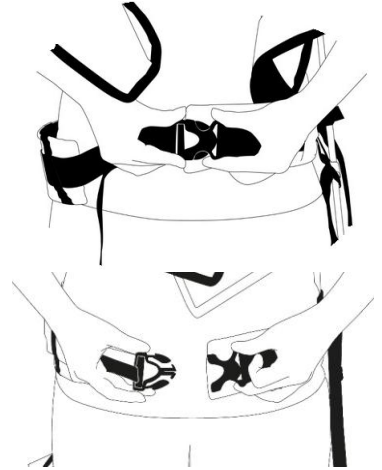
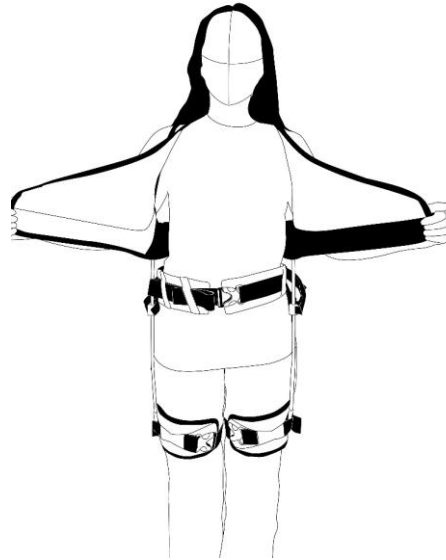
If the tension exerted is too high, reduce it by pulling on the buckles of the pre-tensioning straps.



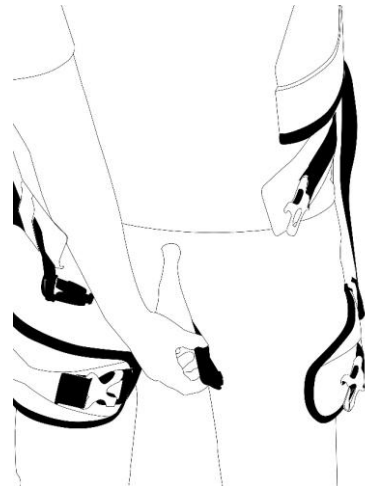
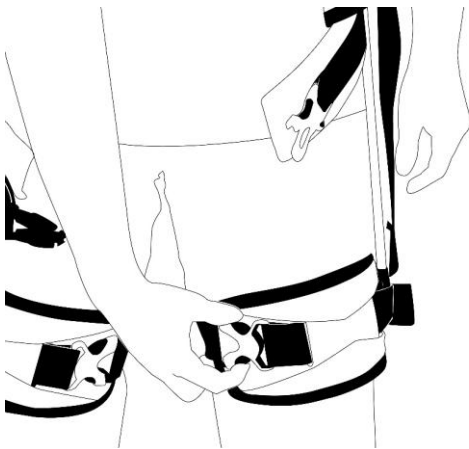
HAPO CS

VI.3 Removing and storing the HAPO CS

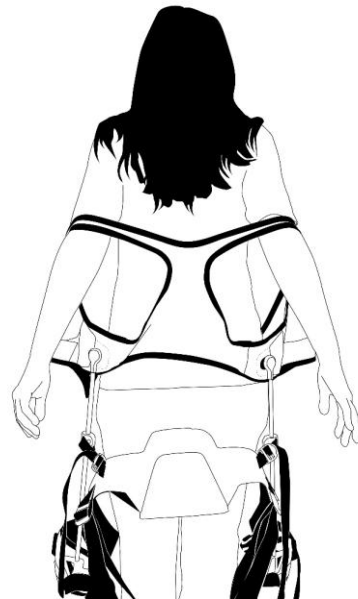
- 1: **Open** the harness
- 2: **Open** belt clip.



- 3: **Undo** the fasteners on the sleeves.
- 4: **Remove the** HAPO CS.

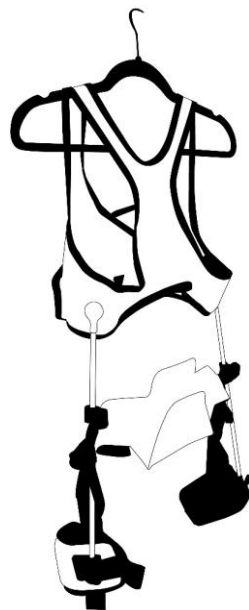


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5: **Close** the various fasteners (harness, belt and sleeves)

6: **Hang** the HAPO CS on a hanger or store it in a bag.



VI.4 Transport

We recommend carrying the HAPO CS on a hanger and/or in a suitable carrying case.

VI.5 Storage

A hanger is supplied for storing the HAPO CS.

Storage should be indoors and dry.

Do not store the HAPO CS in damp conditions or with wide temperature variations.



Improper storage could damage the spring rods and lead to premature breakage.
Improper storage could weaken non-textile parts, leading to wear and tear.

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VII. Maintenance

VII.1 Textile cleaning and care

The textile parts of the HAPO CS are hand and machine washable (Table 10). The disassembly method described in section VII.3 must be followed for cleaning. Only the textile parts can be machine-washed. The warranty excludes any deterioration of the HAPO CS due to poor maintenance.

Machine washable at 140°F , low spin (600 rpm)
Hand washing allowed
Do not use bleaching agent
Do not iron
Cleaning agent with solvent prohibited
Natural drying on wire allowed
Close all Velcro® fasteners before machine washing Use a washing net

Table 12: Cleaning and care



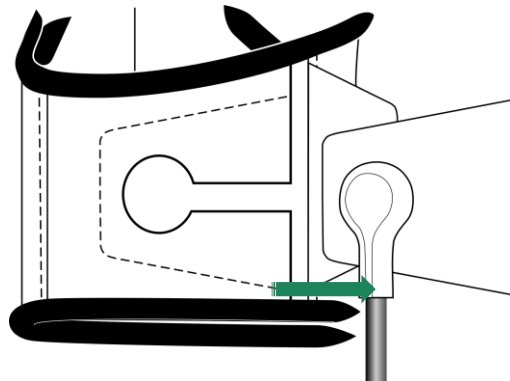
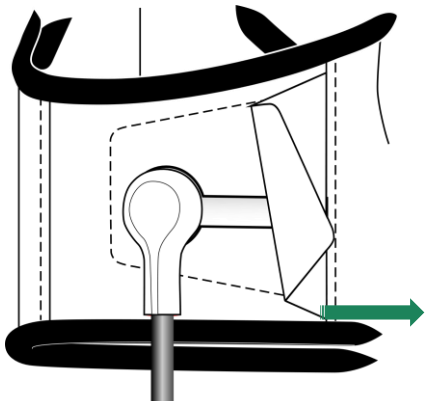
Do not use detergent powder or any product containing fabric softener, conditioner, stain remover or bleach. They will affect textile performance.

VII.2 Disassembly before textile cleaning

For easy disassembly of the HAPO CS, it is recommended to stand on a flat, unobstructed surface.

> Releasing the harness pivots

- 1: **Open** the hook-and-loop flap on the side pocket of the harness.
- 2: **Remove** the frame and pivot from the side pocket.



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> [Belt release](#)

3: **Open** the flap at the back of the belt.

4: **Remove** the back plate from the rear pocket of the belt.



5: **Remove** the pre-tensioning straps (red ends) from the loop on the springs.



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> [Release sleeves](#)

6: **Open** the strap clip of the anti-torsion strap.



7: **Open** sleeve flap.

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8: Pull out the frame.



9: Detach the hook-and-loop fastener from the elastic retaining strap and remove the elastic retaining strap from the spring loop.



10: Remove the elastic retaining strap from the frame through the slot.

11: Pull out the second side of the frame.

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VII.3 Reassembly after cleaning

> Reassembling sleeve covers

- 1: **Open** the flap and place the wider side of the frame in the wider part of the cover.
- 2: **Slide** the elastic retaining strap through the slot in the frame, then through the loop (spring support) connected to the spring.

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3: Place the second (shorter) side of the frame in the cover.



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Be careful not to wind the sleeve cover upside down (the longest part of the flap should be downwards).

4: **Close** the flap with the hook-and-loop fastener.



> [Refitting the belt](#)

5: **Open** the flap and slide the back plate into its housing.

6: **Close** the flap.

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- 7: Pass the prestressing strap through the strap loop.
8: Pass the prestressing strap through belt loop.



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Be careful not to twist the pre-tensioning strap when reassembling, and orient the waist towards the front.

> [Reassembling the harness](#)

7: **Open** the hook-and-loop flap and slide the pivot plate into its housing.

8: **Insert** pivot into rounded pocket opening.

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9: **Close** pocket flap with hook-and-loop fastener.



10: **Close** the male clip of the anti-torsion strap on the female part of the sleeve.



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11: **Pass** the self-gripping strap through the loop of the anti-twist strap.



VII.4 Cleaning plastic parts

The following table gives an indication of the chemical resistance of HAPO CS plastic parts to the solvents used in the most common cleaning products (A: Very good resistance; B: Good resistance). These solvents can be used to clean the various plastic parts of the exoskeleton.

Parts		Spring cover	Sleeve armature / Pivot armature	Strap loop / Pivot / Spring support
Materials		PE+PP	PEHD	PAHT-CF
Solvents	Water + soap pH neutral	A	A	A
	Acetone	X	A	A
	Acetaldehyde	n/a	A	A
	Ammonium chloride	A	A	A
	Borax (boric acid)	X	A	A
	Glycerin	A	A	A
	Formaldehyde	n/a	A	A
	Isopropyl alcohol	A	A	A

Table 13: Possible solvents for cleaning plastic parts ; A: Very good resistance; B: Good resistance; n/a: Not applicable; X: Not resistant



If any damage to the part is observed during cleaning (swelling, discoloration, cracks, etc.), stop cleaning immediately and replace the part.
Areas moistened by the product must be dried quickly.

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VII.5 General maintenance



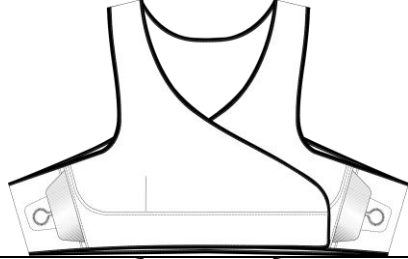
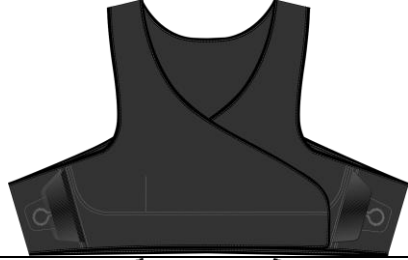
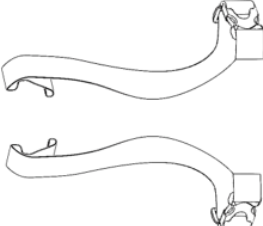
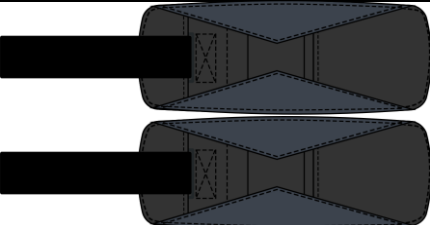
The frequency of checks and maintenance varies according to the actual degree of use. The product may be subjected to heavy use, in which case maintenance intervals should be reduced in line with the expected load.

		Day	Week	Month	Year
Harness	Textile	Visual check for excessive tearing or fraying that could impair product use.	Wash as recommended (see Table 10).		
	Pivot storage pocket	Check visual condition. Check that hook-and-loop flap is correctly positioned.		Check hook and loop fastener attachment	
	Pivot frame				Tightening control: Tightening torque M4 screw: 0.9N.m Use of threadlocker
Belt	Textile	Visual check: tearing, excessive fraying that could impair product use.	Wash as recommended (see Table 10).		
	Clip / Fastener	Check visual condition. Check fasteners for proper engagement.		Check that fasteners engage properly	
	Loop / Clip	Visual check (cracks)	Washing with solvent authorized (see table 11) if liquid or solid bodies are present on the part.		Fasteners Tightening control: Tightening torque M4 screw: 0.9N.m Use of threadlocker
Sleeves	Textile	Visual check for excessive tearing or fraying that could impair product use. Hook-and-loop fasteners must be free of excessive particles or dirt.	Wash as recommended (see Table 10).		
	Clip / Fastener	Check visual condition. Check that latches engage properly.		Check that fasteners engage properly	
Spring	Spring	Check visual condition (red sheath not visible).		Check springs for adhesion at both ends	

Table 14: Maintenance plan

HAPO CS

VII.6 Spare parts and accessories

Types	Reference	Parts	Image
Textiles	KITCS003	Harness Kit S1 White	
	KITCS001	Harness Kit S1 Black	
	KITCS004	Harness Kit S2 White	
	KITCS002	Harness Kit S2 Black	
	KITH2001	HAPO Textile Belt Kit Black-Grey	
	KITH2025	HAPO Textile Belt Kit White	
	KITH2002	Anti-twist strap kit HAPO.2 and HAPO SD.2	
	KITH2024	Kit Pair of thigh sleeves HAPO Black-Grey	

HAPO CS

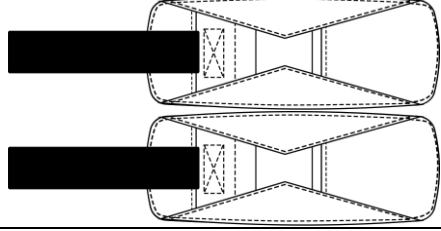
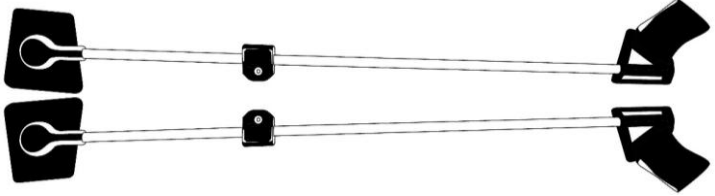
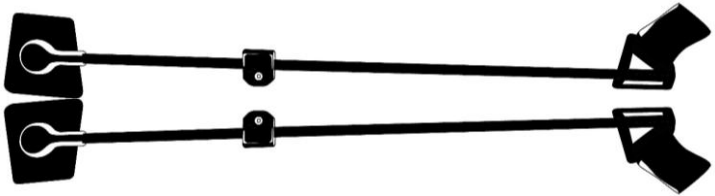
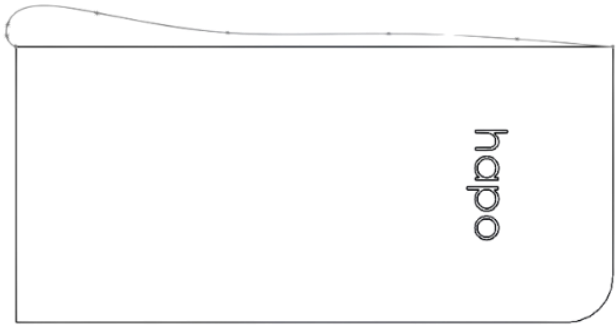
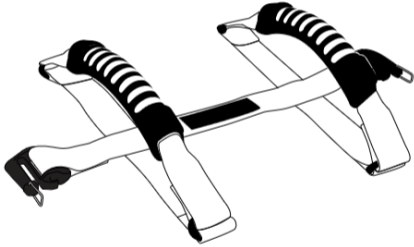
	KITH2026	Kit Pair of HAPO thigh sleeves White	
Springs	KITCS008	S1 Spring Pair Kit White	
	KITCS009	S2 Spring Pair Kit White	
	KITCS010	Spring Pair Kit S3 White	
	KITCS005	S1 Spring Pair Kit Black	
	KITCS006	S2 Pair Spring Kit Black	
	KITCS007	Pair of Black S3 Springs	
Accessories	HDTH2	HAPO carrying case	
	HHAN	Hapo Handles	

Table 15: HAPO CS spare parts and accessories

VIII. Warranty

The HAPO CS is guaranteed for 2 years from the date of the warranty declaration, or failing that, from the date of shipment to the manufacturer. Following purchase of the HAPO CS, go to the following address and complete the form: <https://www.hapo.eu/en/content/63-warranty-statement>

HAPO CS

IX. Recycling

To protect the planet and limit waste production, ErgoSanté offers to recover and recycle your exoskeletons at the end of their life. Each part is carefully sorted by material, then deposited in the appropriate skips or crushed in-house to encourage reuse.

X. Disposal

When disposing of your equipment, please comply with your country's sorting requirements.

XI. Legal information

The HAPO CS is CE marked in accordance with directive 2006/42/CE for sales in Europe. Legal conditions are subject to the national legislation of the country of use.

XII. Liability

The manufacturer is liable only if the product is used in accordance with the descriptions and instructions in this document. The manufacturer accepts no liability for damage arising from failure to comply with these instructions.

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