

# INSTRUCTION MANUAL HAPO.2 AND HAPO.2 SD

MAY 2022

**hapo**  
+ We got your back

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## II. Introduction

The HAPO is a passive physical assistance device using springs. This equipment is used carried by an operator, and allows a partial transfer of the efforts of the upper trunk, by a pectoral support, towards the thighs. This takes support from lower lumbar. This device assists in the handling of loads and provides assistance in bending and tilting the trunk.

This document is the instruction manual for the HAPO. It contains all the information that must be observed from the time the HAPO is received until the end of its life. It is advisable to read the entire manual before the first installation of the HAPO. This manual should be kept close by for the life of the product.

### II.1 History of changes

Date	Review	Description
18/05/2022	A	Creation

Table 1 : History of changes

### II.2 Abbreviations and definitions

Abbreviations	Definitions
HAPO	Posture harness
HAPO SD	Posture harness without unlocking
PAD	Physical assistance device
Passive	No external energy storage or supply
PPE	Personal protective equipment

Table 2 : Abbreviations and definitions

### II.3 Identification

The HAPO traceability label is located on the back plate (10), in the belt (7). To access it, open the belt by pulling the flap (6) at the back of it.



Figure 1

Numéro	Signification
A	Manufacturer's name
B	Manufacturer's address
C	Name of the device
D	Type of product
E	Serial Number
F	Year of manufacture
G	Hapo Logo
H	CE Marking

Table 3 : Label identification

### II.4 Manufacturer

- ErgoSanté Technologie
- Siège social : 28 ZA de Labahou 30140 Anduze – France
- +33 4 48 15 06 10 (Standard call rates apply)
- [contact@ergosante.fr](mailto:contact@ergosante.fr)

## II.5 Pictogram Clarification




	General Danger
	General obligation
	General prohibition

Table 4 : Reminder of the meaning of the pictograms

## III. General description

### III.1 Product description

The HAPO physical assistance device consists of the following components:

- **Shoulder straps** : Two textile parts at the shoulders, which fixes the two springs in the front and the belt in the back with a back strap (elastic and height adjustable). These textiles allow for pectoral support, adjustable in width with the help of the pectoral strap.
- **Lumbar belt** : Textile belt positioned at the lumbar fossa and sacrum, closed with a strap and a clip at the front. Two anti-twist straps with blue ends, connected to the thigh sleeves. Two pre-tensioning straps with red ends, for adjusting the position of the springs, are positioned on each side of the belt at hip level which holds the springs. A back plate in the belt allows for lumbar support and adjustment of the back strap.
- **Thigh sleeves**: Two frames, each in a textile cover, are attached to the two lower ends of the springs. The two anti-twist straps (blue ends) as well as an elastic strap around the thigh hold the position.
- **Two springs** : Two cylindrical springs are connected at three points on the HAPO:
  - One end is attached to the shoulder strap frames,
  - The lower end is attached to the thigh sleeve frames,
  - The central fixation point is located on the side of the lumbar belt via the pre-tensioning strap, adjustable in length, disengageable or not, by a passive release mechanism with a locking ring.



### III.2 Components

#### > General diagram HAPO

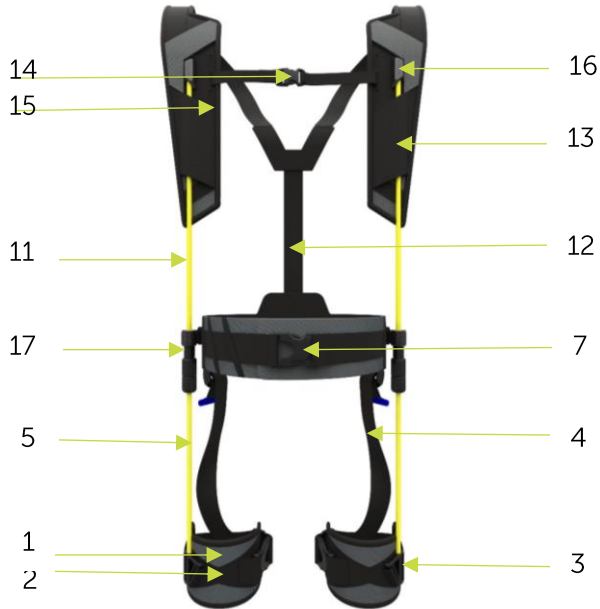


Figure 2

Position	Name of the components
1	Sleeve
2	Plastic armature sleeve
3	Spring support
4	Anti-twist strap
5	Low spring stem
6	Flap
7	Textile belt
8	Pre-tensioning strap
9	Hapo strap loop

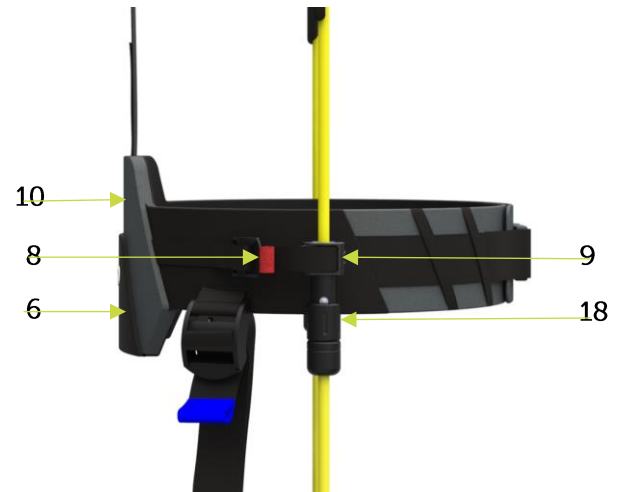


Figure 3

Position	Name of the components
10	Back plate
11	High Spring Stem
12	Back strap
13	Textile braces
14	Chest strap
15	Brace frame
16	Spring Passage
17	Unlocking mechanism
18	Locking ring

Table 5 : Components of Exoskeleton HAPO

> [General diagram HAPO SD](#)

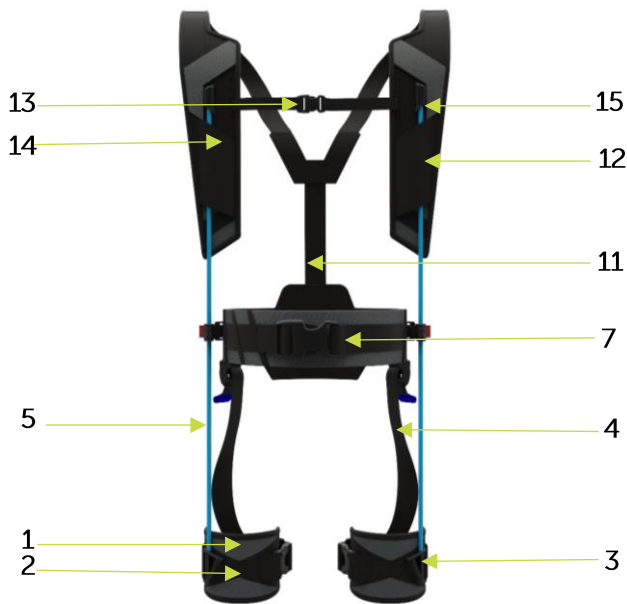


Figure 4

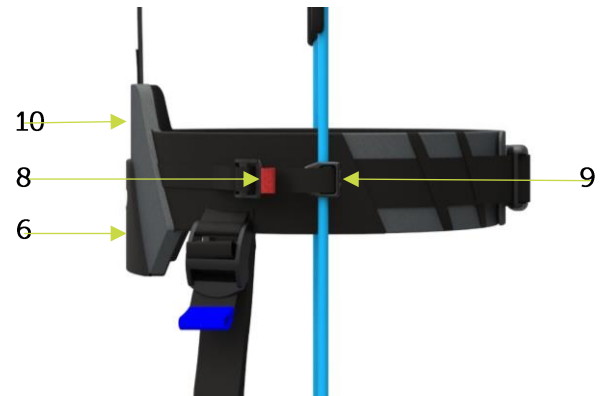


Figure 5

Position	Name of the components
1	Sleeve
2	Plastic armature sleeve
3	Spring support
4	Anti-twist strap
5	Spring Rod
6	Flap
7	Textile belt
8	Pre-tensioning strap

Position	Name of the components
9	Hapo SD strap loop
10	Back Plate
11	Back Strap
12	Textile braces
13	Chest strap
14	Brace Frame
15	Spring Passage

Table 6 : Components of the exoskeleton HAPO SD

### III.3 Technical characteristics

#### > Size

The HAPO comes in three sizes: S1, S2, S3 to adapt to different body shapes and activities. The chart below gives an indication of size.

Size	5'3"	5'5"	5'7"	5'9"	5'10"	6'00"	6'3"	6'5"	6'7"	>6'7"
Hapo	S1	S1	S1	S1/S2	S2	S2	S2	S2/S3	S3	S3

Tableau 7 : Sizes HAPO

The HAPO comes in four sizes: S0, S1, S2, S3 to adapt to different body shapes and activities. The chart below gives an indication of size.

Size	4'11"	5'1"	5'3"	5'5"	5'7"	5'9"	5'10"	6'0"	6'3"	6'5"	6'7"	>6'7"
Hapo	S0	S0	S0/S1	S1	S1	S1/S2	S2	S2	S2	S2/S3	S3	S3

Tableau 8 : Sizes HAPO SD

Some body types may require a different size of HAPO than that advised by this chart.

#### > Overall dimensions

	Hapo Size S0	Hapo Size S1	Hapo Size S2	Hapo Size S3
<b>Dimensions</b>				
Length	88 cm $\pm$ 2 cm	92 cm $\pm$ 2 cm	94 cm $\pm$ 2 cm	103 cm $\pm$ 2 cm
Width	40cm $\pm$ 2 cm	40cm $\pm$ 2 cm	40cm $\pm$ 2 cm	40cm $\pm$ 2 cm
Height	25cm $\pm$ 2 cm	25cm $\pm$ 2 cm	25cm $\pm$ 2 cm	25cm $\pm$ 2 cm
<b>Weight</b>				
2.4lbs $\pm$ 2lbsg				
<b>Noise emissions</b>				
0dB				

Table 9 : Dimensions of HAPO

#### > Duration of use

Duration of use	Hapo wearing time
5 years*	Maximum 8h/day

Table 10 : Duration of use of the HAPO

\* This useful life is based on the use of the product in accordance with its intended purpose and the maintenance instructions (Cleaning, replacement of worn parts, etc.).

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

## IV. Compliance and safety

### IV.1 Type of staff

<b>User</b>	Personnel using the exoskeleton
<b>Specialized staff</b>	Staff with in-depth knowledge for certain tasks with the product

Table 11: Type of staff



It is important to respect the type of personnel for the different tasks, otherwise it could lead to danger.

### IV.2 Staff qualification

This equipment is intended to be used by an operator trained in its use. The operator can install the equipment and its accessories themselves.

### IV.3 Proper Use

The HAPO is intended for use by a single adult user between the ages of 18 and 64. For field deployment it is advisable that the user receives instructions from specialized personnel, in order to be authorized to use the product. The product should only be used as a working tool for professional purposes. The use of the HAPO does not exempt the user from complying with standard NF X35-109, concerning the manual handling of loads. The use of HAPO does not exempt you from wearing PPE either.

#### > How it works

The posture harness is equipped with two cylindrical springs connected by a release mechanism to activate or deactivate the support function. A clear click is heard through two spring-mounted balls when the assist is engaged. This release mechanism does not exist for the Hapo SD option. To feel the assistance of the system, the user must lean forward, while bending the knees. The system will compensate for part of the user's trunk load by distributing it to the thighs and pectoral area.

#### > Use and storage environment

It is recommended that the exoskeleton be used in an open and uncluttered area to avoid impacts that could damage the product and to limit the risk of snags.

<b>Storage temperature range</b>	-50°F to +104 °F – Dry environment
<b>Operating temperature range</b>	-50°F to +104°F
<b>Not allowed</b>	Explosive environments, chemical splashes or exposure to abrasive elements.

Table 12: Normal environmental conditions of use

#### > Covered morphologies

Location	Name	Covered area (in cm)
1	Back adjustment stroke	19
2	Belt size	68 - 140
3	Sleeve size	40 - 55

Table 12 Covers of different textile parts

#### IV.4 Use cases

The HAPO is used when the trunk is bent. Here are the potential types of use:

- Partial flexion (between 0° and 90°); with or without load bearing; static or dynamic.



Figure 6



Figure 7

- Full flexion or hyperflexion (greater than 90°); with or without load bearing; static or dynamic.



Figure 8



Figure 9



- Flexion on one leg (right or left); with or without load; static or dynamic.



Figure 10



Figure 11

- Squatting; with or without load.



Figure 12



Figure 13

## IV.5 Precautions for use

- Do not use the HAPO without ensuring that all fasteners are securely fastened and that the straps are fully retracted into their designated compartments.
- Do not use HAPO under clothing.
- Do not twist the spring rods by hand so as not to exceed the mechanical limits of the material due to the extreme angulation (risk of breakage).
- Do not use the exoskeleton if the springs are damaged.
- Do not use the exoskeleton after impact without a visual check.
- Do not use a Hapo that does not fit ([see Table 7: HAPO size chart](#)).
- Remove the exoskeleton if skin irritation/itching occurs.
- Do not hold the HAPO near flames, embers or other heat sources that could damage it.
- Clean the product immediately if it comes into contact with salt water, chlorine or abrasive substances (such as sand).
- Do not use the product by more than one user, in particular:
  - Transmission to a third party without cleaning the product,
  - Use by a third party who has not been trained or instructed in the use of the product by specialist personnel,
  - Use by a third party without adjustment of the product to the specific needs of the user by specialized personnel.
- In case of reuse on other persons, it is necessary to ensure that the HAPO is cleaned at regular intervals. This will prevent contamination by germs, skin irritation or the formation of eczema.
- Do not use the product to lift a person.
- Do not use the HAPO without checking that the release mechanism is activated. If the mechanism is properly activated you will hear a clear click. If there is no click, the mechanism is likely not engaged and there is a risk of sudden loss of assistance.
- Do not use the HAPO with only one spring activated, this will lead to misuse of the HAPO, causing imbalance or a fall.
- Do not go up or down stairs without deactivating the assistance (risk of loss of balance).
- Do not jump with the Hapo.



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

#### IV.6 Contra-indications



Do not use HAPO if you are pregnant



If you have back, leg or knee problems, you should seek medical advice before using the HAPO.



The use of HAPO does not exempt you from wearing PPE.

#### IV.7 Residual risks



Residual risks remain despite the fact that safety has been integrated into the design of the product and additional preventive measures have been taken :

- If the heat source is too great, such as flames or chemical sprays, the textile will melt and degrade.
- Spring release due to strap breakage on the sling frame could cause imbalance.
- Incorrect setting of Hapo could result in discomfort or injury.

#### IV.8 Incidents

##### > Damage of an element

- Remove the product and do not use it again,
- Contact your branch or distributor.

##### > Checking the condition of your HAPO

- Remove the product,
    - For springs: Check that the colour of the spring cover is uniform. If you see a different colour it means that the spring is weakened. In this case, the HAPO should not be used,
    - For plastic parts: Check that there are no visible cracks on these parts. If there are, do not use the HAPO before contacting your agency or distributor,
- If in doubt about any of the parts, contact your distributor.



If there is a question about the condition of the device, remove the HAPO.

### Operating procedure

#### IV.9 Unpacking



Figure 14

- Check the outside of the box before opening. If damage is found before opening, take a photo of the package,
- Open the box, check that the delivery is complete.
- If damage is confirmed on opening, contact your distributor.

## IV.10 Setting up and adjusting the Hapo

### > Preparation before fitting

1 : Open all the fasteners below

Chest strap



Figure 15

Belt



Figure 16

Thigh sleeves



Figure 17

### > Installation of the shoulder straps

2 : Put the Hapo on by the shoulder straps like a backpack.



Figure 18



Figure 19



Be careful not to twist the shoulder straps.

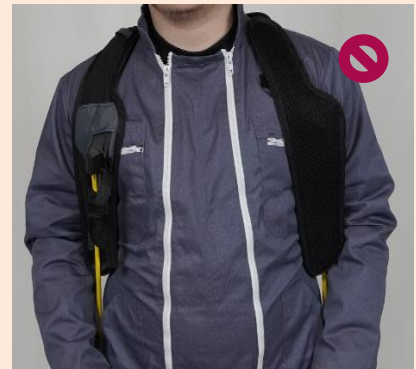


Figure 20

3 : Attach the chest strap.

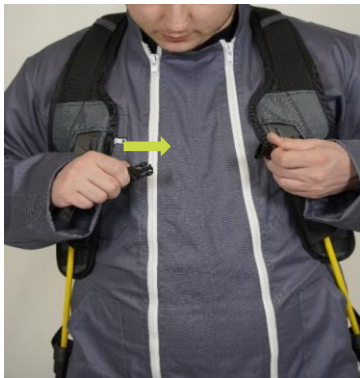


Figure 21



Figure 22



Be careful not to twist the chest strap

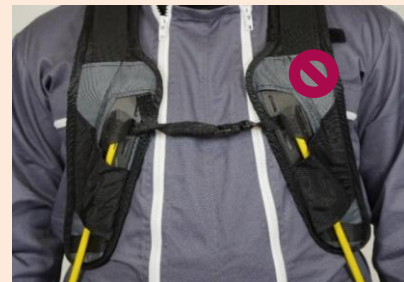


Figure 23



4 : Adjust the height of the chest strap for a comfortable fit.



Figure 24

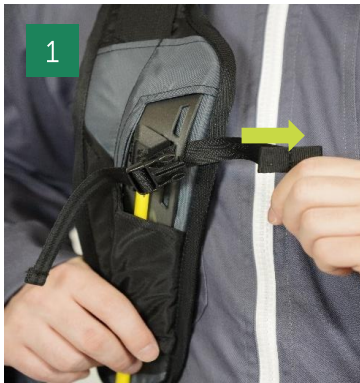


Figure 25

Pull the "T" part of the chest strap towards the outside of the shoulder strap.

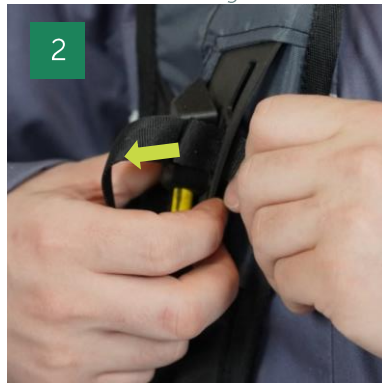


Figure 26

Pass the "T" part through the middle slot.



Figure 27

Pull the chest strap completely out of the shoulder strap frame.



Figure 28

Tuck the "T" part of the chest strap into the top slot.

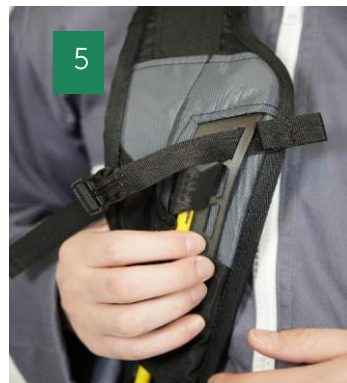


Figure 29

Pull the strap and hide the "T" part of the chest strap under the shoulder strap frame

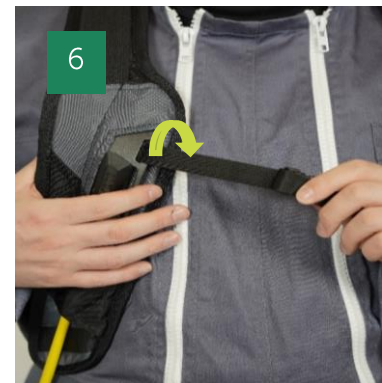


Figure 30

Fold the chest strap down to close it.





Figure 31



Be careful not to have one side of the chest strap higher than the other



Figure 32

5 : Tighten (or loosen) the chest strap. The user should not feel constricted.

Position the pectoral support point by adjusting the chest strap according to the area you feel most comfortable: - If you feel discomfort in the chest area then loosen the chest strap.

- On the contrary, if you feel discomfort in your shoulders, we advise you to tighten the chest strap.

The neck must be kept clear.



Figure 33



Figure 34



Figure 35

> [Fitting the belt](#)

6 : Position the belt at lumbar level, bringing the back of the belt in contact with your back.



Figure 36



Figure 37

7 : Loosen the strap if necessary and then attach the clip.



Figure 38

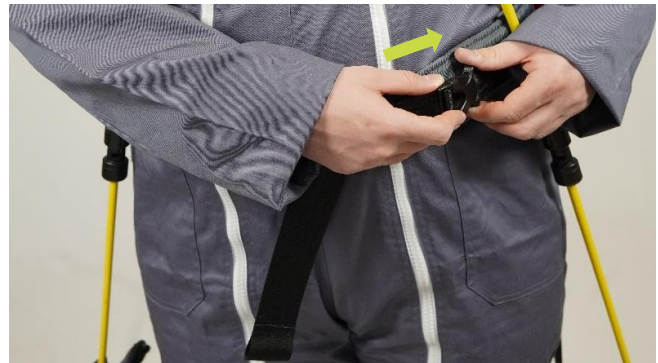


Figure 39

8 : Tighten the strap, then store the excess in the elastic loop.



Figure 40



Figure 41



> [Back strap adjustment](#)

If the shoulder straps or back strap are pressing hard against your shoulders or are too loose, the back strap should be adjusted.



Figure 42



Figure 43

9 : Open the flap on the back of the belt.



Figure 44



Figure 45



Figure 46

10 : Open the hook and loop fastener and undo the back strap from the back plate.



Figure 47

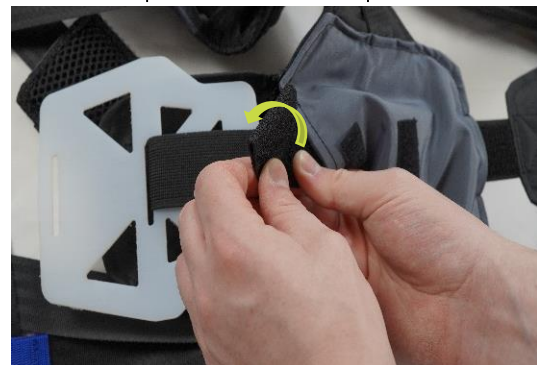


Figure 48



Figure 49



Figure 50

11 : Adjust the back strap to your liking by passing it through the various slots in the back plate. (This is only necessary for the first installation or after each wash).



Figure 51



Figure 52

Depending on the size of your HAPO (S0, S1, S2, S3) The following chart gives an indication of which slot to put the backstrap through.

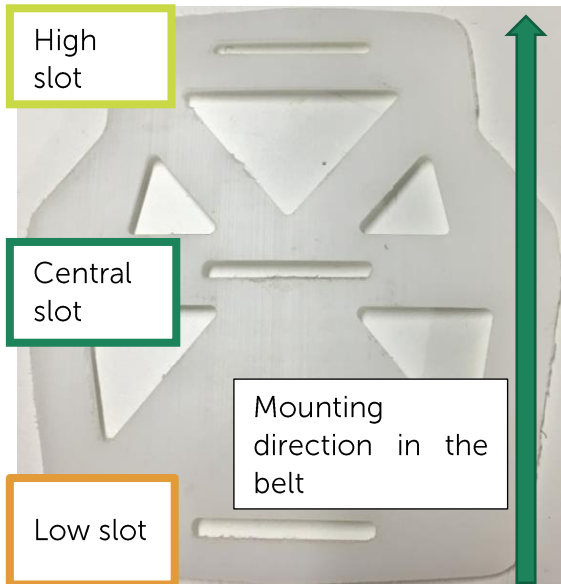


Figure 53

Slot	Low	Central	High
Hapo Size	S0/S1	S2	S3

Table 14: Abacus linking HAPO sizes and backstrap adjustments

A different adjustment than the one recommended may be necessary depending on your body type if the shoulder and back straps continue to press hard on your shoulders or if they are too loose.

> [Installation of the sleeves](#)

12 : Check that the springs (right and left) are unlocked to simplify installation. This step does not exist for the HAPO SD as it cannot be disengaged.



Figure 54



Figure 55



Figure 56

13 : Loosen the anti-twist straps (blue ends) and the elastic holding straps.



Figure 57



Figure 58



Figure 59



Figure 60



14 : Position the sleeve on the thigh.



Figure 61

15 : Attach the straps to the inner side of the sleeve, taking care not to twist the two straps. The elastic holding strap should go around the thigh.



Figure 62



Figure 63



Be careful not to twist the straps.



Figure 64

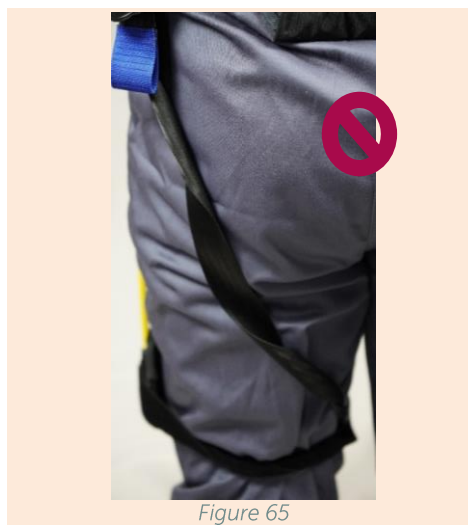


Figure 65



Be careful not to run the anti-torsion strap (blue ends) over the spring. There is a risk of breaking the spring.



Figure 66

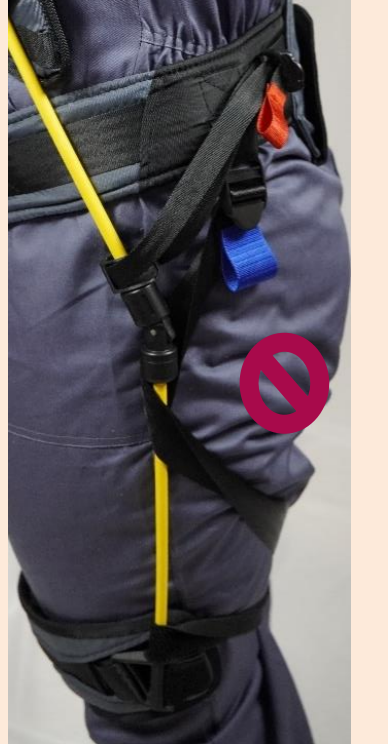


Figure 67

16 : Adjust the elastic retaining strap with the hook and loop fastener (this is only necessary for the first application or after washing).



Figure 68

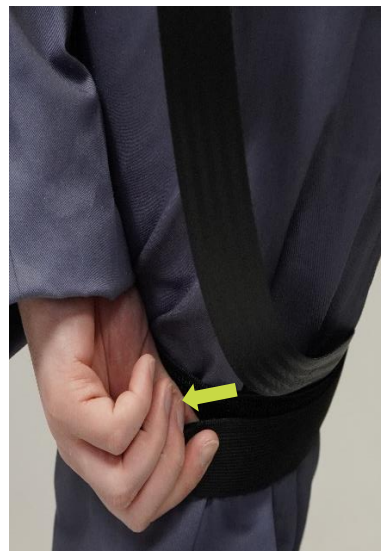


Figure 69



Be careful not to overtighten the elastic support strap, as this can lead to poor blood circulation.



Figure 70



Figure 71

17 : Adjust the anti-twist strap (blue ends) to remove slack. These settings can be saved for the next use.



Figure 72



Figure 73



> [Switching on the assistance](#)

Check that the release mechanism is correctly positioned in the straps.



Figure 74

18 : Grasp the locking ring between your thumb and forefinger.



Figure 75

19 : Push the springs forward so that they are properly aligned.



Figure 76



Figure 77



20 : Keep the springs aligned and move the locking ring down to the stop until you hear a click.



Figure 78



Figure 79



Be careful to lower the locking ring completely. Risk of sudden loss of assistance if the ring is not engaged correctly.



Figure 80

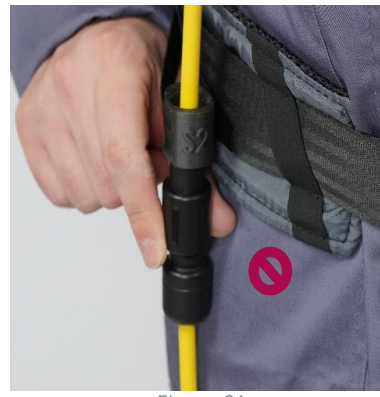


Figure 81



> [Spring tension adjustment](#)

21 : Align the springs with the hip by pulling on the red pre-tensioning straps.



Figure 82

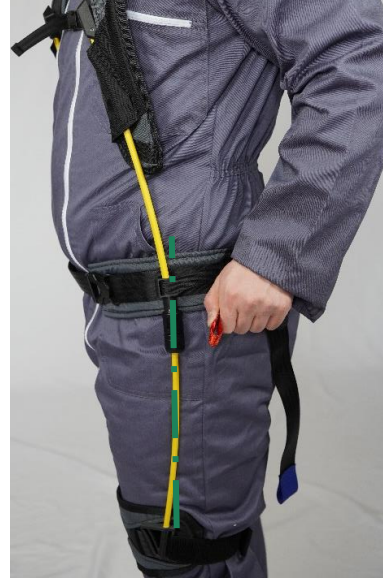


Figure 83



Be careful not to stretch the pre-tensioning strap beyond the hip (risk of breakage and injury).

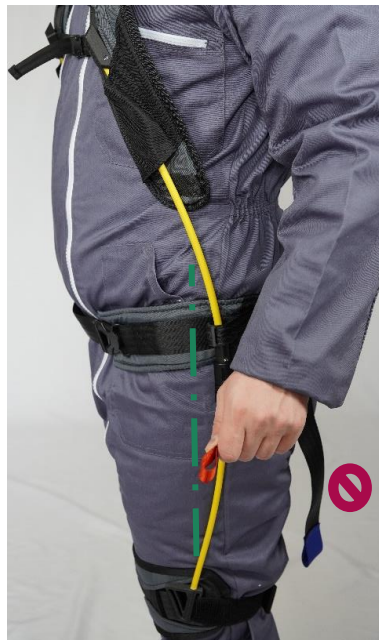


Figure 84

If the tension is too high, reduce it by pulling on the buckles of the pre-tensioning straps (red ends).



Figure 85

The Hapo.2 is ready for use.



Figure 86

## IV.11 Removal of the Hapo

### > Deactivation of assistance

1 : Grasp the locking ring between your thumb and forefinger.



Figure 87

2 : Apply forward pressure to the springs so that they are aligned.



Figure 88

3 : Keep the springs aligned and pull the locking ring up to the stop until you hear a click.



Figure 89



Figure 90

> [Detach the various clips from the HAPO](#)

4 : Undo the clip on both sleeves.



Figure 91



Figure 92

5 : Undo the belt clip.



Figure 93



Figure 94

6 : Undo the tie on the chest strap.



Figure 95

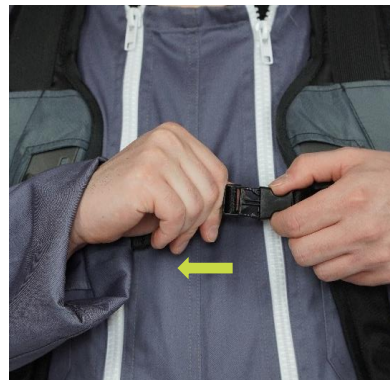


Figure 96



> [Remove the HAPO](#)

7 : Remove the Hapo.



Figure 97



Figure 98



Figure 99

8 : Hang the HAPO on a hanger for storage and close the various attachments (chest strap, belt and sleeves).

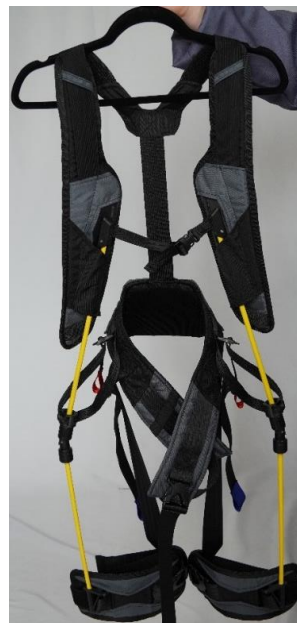


Figure 100

#### IV.12 [Setting up the Hapo SD](#)

The steps for setting up HAPO SD are similar to HAPO, but to facilitate this, some steps are in a different order:

- > Preparation before fitting (page 12)
- > Fitting the belt (page 15)
- > Fitting the sleeves (page 18)
- > Installation of the ramps (page 12)
- > Back strap adjustment (page 16)
- > Adjusting the spring tension (page 24)

The morphological adjustments (strap length, tension, etc.) are identical. The "Activate assistance" step cannot be performed for the HAPO SD.



Figure 101

The Hapo.SD is ready for use.

#### IV.13 Removal of Hapo SD

1 : Undo the fastener on the chest strap and remove the shoulder straps like a backpack

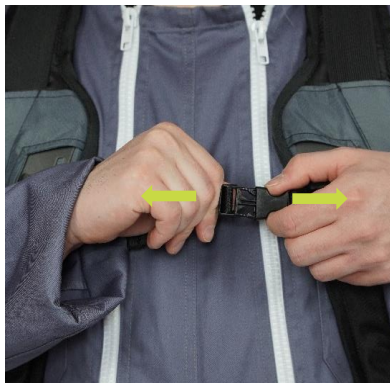


Figure 102



Figure 103

2 : Undo the clip on both sleeves.



Figure 104



Figure 105

3 : Undo the clip at the belt.



Figure 106



Figure 107

4 : Hang the HAPO on a hanger for storage and close the various attachments (chest strap, belt and sleeves).

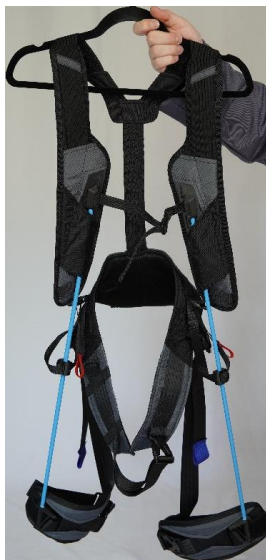


Figure 108

#### IV.14 Transport

These instructions ensure that transport, handling and storage are carried out safely. It is recommended that a hanger and carrying case be used for transport. (Figures 100 and 108). If this is not possible, it is advisable to use the shipping carton (Figure 14).

#### IV.15 Packing

Size of shipping box	39in x 10in x 10in
Shipping box weight (kg)	1.5 lbs
Maximum capacity of units per shipping carton	5
Cardboard mass + 1 unit	5.3 lbs
Cardboard mass + 2 units	7.7 lbs
Cardboard mass + 3 units	10.4 lbs
Cardboard mass + 4 units	12.8 lbs
Cardboard mass + 5 units	15.2 lbs

Table 15: Packing specifications

#### IV.16 Storage

A hanger is provided for storing the HAPO. Storage should be indoors and dry. Do not leave the product in a damp place with large temperature variations.



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

### V. Maintenance

#### V.1 Cleaning and maintenance

The textile parts of the HAPO are hand and machine washable. It is necessary to follow the disassembly method for cleaning. Only the textile parts can be machine washed. The guarantee excludes any deterioration of the HAPO due to improper use.

	Machine washable at 140°F, low spin (600 rpm)
	Hand washing allowed
	Do not use bleach
	Do not iron
	Cleaning agent with solvent prohibited
	Natural drying on wire allowed

*Table 13 :Cleaning and maintenance*



Do not use detergent powder or any product containing fabric softeners, conditioners, stain removers or bleach. They will affect the performance of the textiles.

#### V.2 Disassembly before cleaning

The disassembly steps are the same for HAPO and HAPO SD, only the specific parts have been detailed.

In order to dismantle your HAPO easily, it is recommended to be on a large, flat, clear surface.





Figure 109

> [Clearance of ramps](#)

1 : Remove the chest strap from the shoulder strap frame.



Figure 110

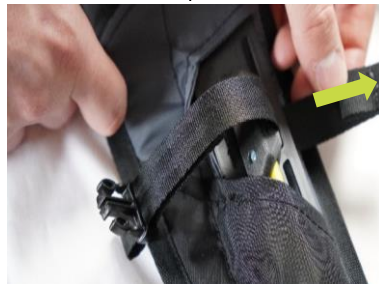


Figure 111



Figure 112

2 : Loosen the snap button and remove the frame by pulling it downwards.



Figure 113



Figure 114



Figure 115

3 : Open the flap on the back of the belt.



Figure 116



Figure 117



Figure 118

4 : Undo the back plate of the flap and remove the attached back strap.



Figure 119



Figure 120



Figure 121

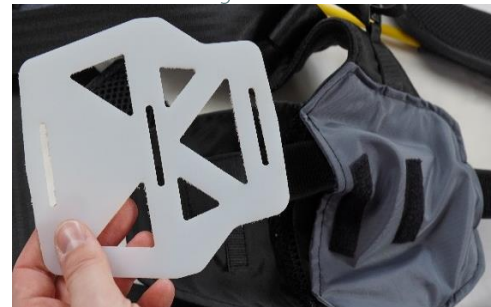


Figure 122

> [Belt release](#)

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



Figure 123



Figure 124

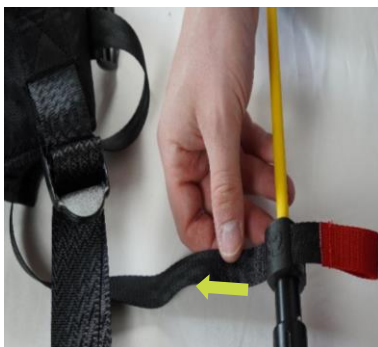


Figure 125

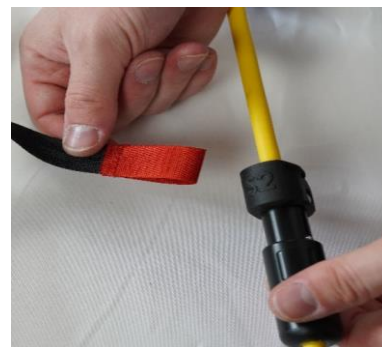


Figure 126



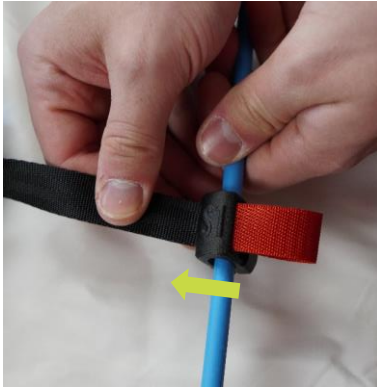


Figure 127

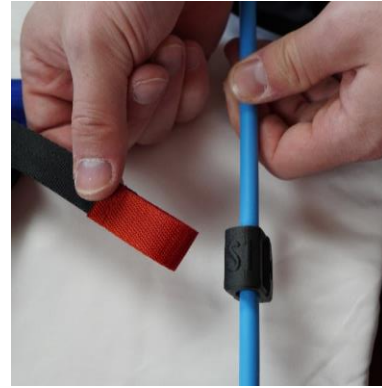


Figure 128

Hapo without unlocking

6 : Remove the back strap from the pocket by reattaching the Velcro to itself to prevent it from catching on the inside of the belt.



Figure 129



Figure 130

> [Removing the covers from the sleeves](#)

7 : Unfasten the hook and loop fastener from the elastic holding strap and remove the elastic holding strap from the spring loop.

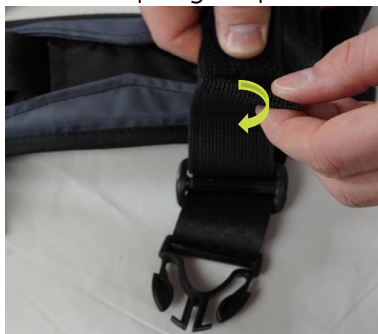


Figure 131



Figure 132

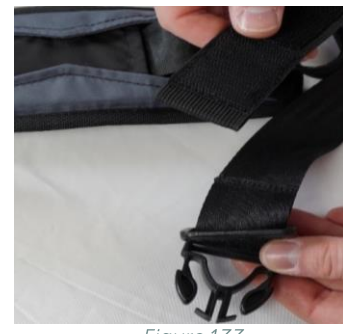


Figure 133



Figure 134



Figure 135

8 : Open the flap of the sleeve.



Figure 136



Figure 137

9 : Pull out the first (shorter) side of the frame.



Figure 138



Figure 139

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



Figure 140

11 : Pull out the second side of the frame.



Figure 141



Figure 142



### V.3 Reassembly after cleaning

The reassembly steps after cleaning are identical for HAPO and HAPO SD.

> [Reassembly of the sleeve covers](#)

1 : Open the flap and place the wider side of the frame in the wider part of the cover.



Figure 143

2 : Slide the elastic holding strap through the slot in the frame and then through the loop (spring support) connected to the spring.



Figure 144

3 : Put the second (shorter) side of the frame into the cover.



Figure 145



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



Figure 146

4 : Close the flap with the black hook and loop fastener.



Figure 147



Figure 148

> [Reassembly of the straps](#)

5 : Slide the brace into the shoulder strap, and press the snap button, ensuring that the hole is correctly positioned.



Figure 149



Figure 150



Pay attention to the side of the shoulder straps when reassembling, the adjustment slots in the frame for the chest strap must be visible. Make sure that the snap button is pressed.



Figure 151

6 : Replace the chest strap in the slots.

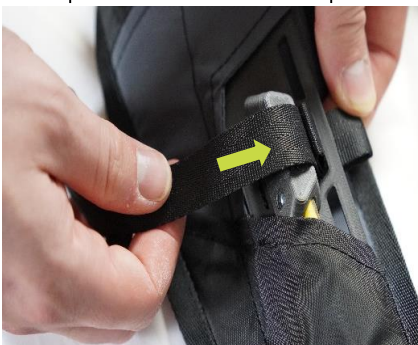


Figure 152



Figure 153



Figure 154

> [Reassembly of the belt](#)

7 : Open the flap and insert the back strap through the opening at the top.



Figure 155

8 : Pull on the back strap until it comes out of the belt, then pass the strap through the slots related to your body shape. Attach the hook and loop fastener to the strap.

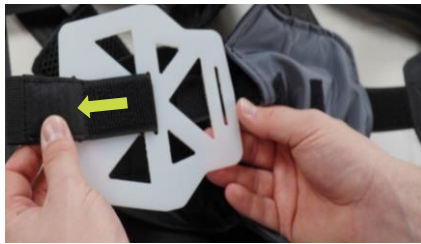


Figure 156



Figure 157

9 : Slide the back plate into its slot and close the flap.



Figure 158



Figure 159

10 : Pass the pre-tensioning strap through the strap loop.



Figure 160

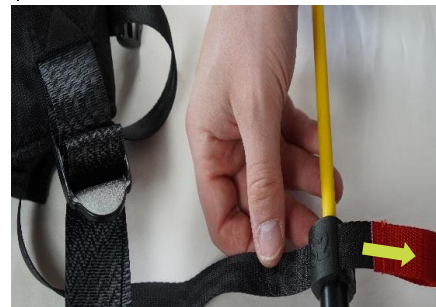


Figure 161

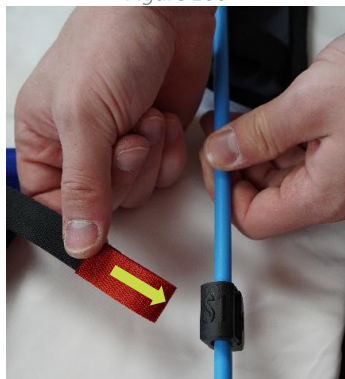


Figure 162

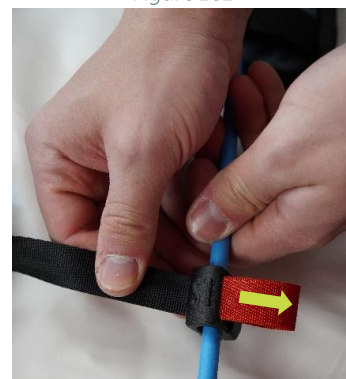


Figure 163

Hapo with unlocking

Hapo without unlocking



11 : Pass the pre-tensioning strap through the belt loop.



Figure 164



Figure 165



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

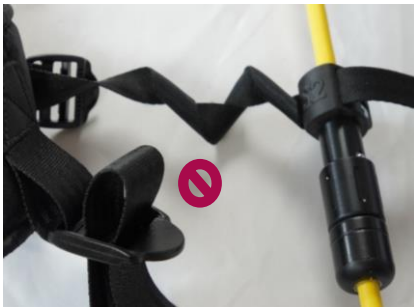


Figure 166

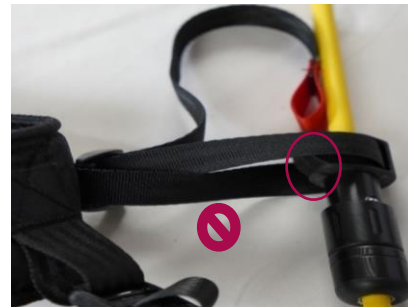


Figure 167



Figure 168



Figure 169

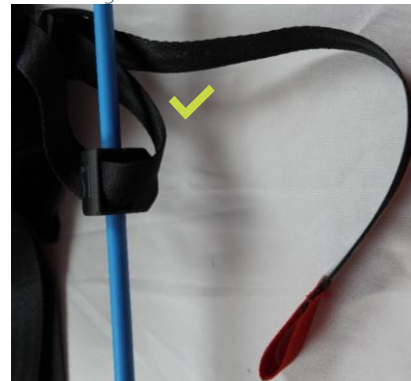


Figure 170

Hapo with unlocking

Hapo without unlocking



12 (optional) : If the anti-twist strap (blue end) comes off during washing, follow the assembly steps below.



Figure 171

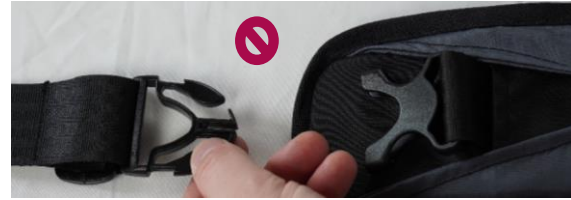


Figure 172



Figure 173



Figure 174

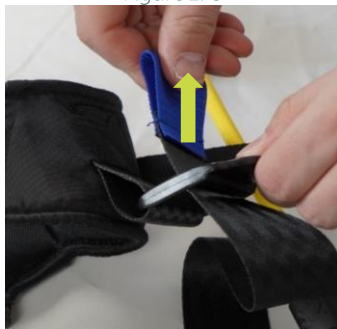


Figure 175

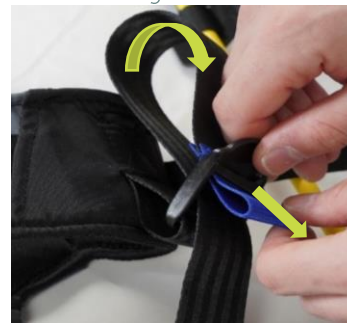


Figure 176



Figure 177



Figure 178

#### V.4 Cleaning or plastic parts

The following table gives an indication of the chemical resistance of the plastic parts of the HAPO 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.



Using solvents other than those listed in the table may degrade plastic parts instead of cleaning them. Please check that the components of the cleaning product you are about to use are listed in this table.

Parts		Spring supports, strap loops and spring loops	Unlocking mechanism	Braces and cuffs	Spring sheaths
Materials		ONYX	POM	PEHD	POLYOLEFINE
Solvents	Water + soap pH neutral	A	A	A	A
	Acetone	A	A	A	A
	Acetaldehyde	A	A	A	A
	Ammonium chloride	A	A	A	A
	Borax (boric acid)	A	A	A	A
	Glycerin	A	A	A	A
	Formaldehyde	B	A	A	A
	Isopropyl alcohol	B	A	A	A

Table 14 : Possible solvents for cleaning plastic parts



In case of doubt, or if you observe any deterioration of the part you are cleaning (swelling, discoloration, cracks, ...) please stop cleaning immediately and use another cleaning product.

Finally, it is important to quickly wipe off the wet areas of the product. Be careful not to let the solvent dry on the plastic parts.

## V.5 General Maintenance

### > [Daily inspections](#)

The daily inspection can be carried out by the user or by specialized personnel. The aim is to check the condition of the product:

- Ventral, chest and thigh strap clips: check the visual condition and the correct engagement of their closure.
- Plastic parts: check for cracks.
- Textile elements: Textiles must be free of tears, excessive fraying that may affect the integrity of the product.
- Joints: Check the visual condition and proper functioning of the release mechanism joint (17).
- Spring rods: Before each use, carry out a visual check of the springs. Three layers of protective covers are available to assess the condition.

Yellow springs with unlocking	Yellow – Blue – Red
Blue springs without unlocking	Blue – Yellow – Red

Table 15 : Order of duct thicknesses



If you see the red sheath, stop using the Hapo immediately and replace the spring assembly.

## V.6 Maintenance Plan

The frequency of checks and maintenance varies according to the actual degree of use. If the product will be subjected to heavy use, the maintenance intervals should be increased in line with the expected load.

It is recommended that the following steps be carried out at least once a year. The daily inspection steps should also be carried out during the annual maintenance.

### > [General screw elements](#)

- Observe the tightening torques defined in the following maintenance steps (page 43)
- The use of medium threadlocker (ref: LOCTITE® 243) is mandatory for belt bolts that have been disassembled. The arrow indicates where the threadlocker should be applied.

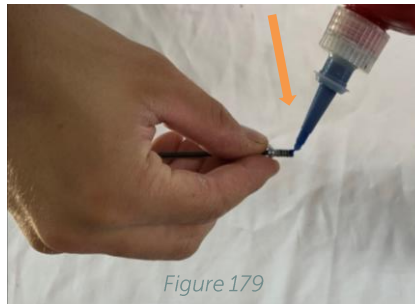


Figure 179

### > [Replacement of textiles](#)

- Belt (7), reference : CEH2200
  - Replace with the product disassembled.
  - Follow the instructions "VIII.2 Disassembly before cleaning" and "VIII.3 Reassembly after cleaning".
- Textile braces + chest strap (13+14), reference: KITH2008
  - Replace with the product disassembled.
  - Follow the instructions "VIII.2 Disassembly before cleaning" and "VIII.3 Reassembly after cleaning".
- Textile thigh sleeve cover (1), reference : MAH2200
  - Replace with the product disassembled.
  - Follow instructions "VIII.2 Disassembly before cleaning" and "VIII.3 Reassembly after cleaning"
- Anti-twist strap (4), part number: SEH2201
  - Replace with the product disassembled.
  - Follow the instructions "VIII.2 Disassembly before cleaning" as well as the instructions "VIII.3 Reassembly after cleaning"

### > [Control of correct operation](#)

- Spring release: The locking ring of the release mechanism must be able to slide through its entire movement without ever being stopped. The click of the system ensures the correct position of the locking ring in one direction or the other. If not, carry out a visual check and cleaning if necessary. If necessary, replace the complete spring assembly (see table below for part number).

- Strap loops: The loops (9) of the pre-tension straps (red ends) must remain fixed in relation to the spring rods. If not, tighten the 2 M4 screws (the one on the right spring rod and the one on the left spring rod) with a 2.5mm hexagon key to a torque of 0.9 N.m.



Figure 180



Figure 181

- Fixing high springs with braces: The high spring rods must remain fixed in relation to the braces. If this is not the case, reposition the springs and then tighten the two M5 grub screws with a 2.5mm Allen key to a torque of 0.6N.m (two on each spring rod - the right and the left).

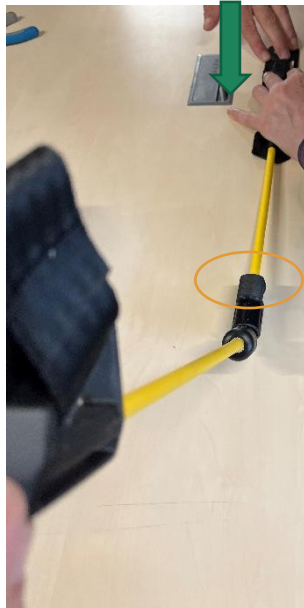


Figure 182



Figure 183



## V.7 Spare and wear parts

Types	Parts	Reference	Spare parts	Wear parts
Textiles	Textile Belt	CEH2200	X	X
	Textile straps + chest strap	KITH2008	X	X
	Chest strap	SEH2200	X	X
	Textile thigh sleeve cover	MAH2200	X	X
	Anti-twist strap	SEH2201	X	X
Sub-assembly	Sleeve armature	MAH2100	X	
	Brace armature	BRH2100	X	
Support Unit	Pair of S1 springs complete + Brace	REH2301	X	
	Pair of S2 springs complete + Brace	REH2302	X	
	Pair of S3 springs complete + Brace	REH2303	X	
	Strap Loop S1	KITH2001	X	
	Strap Loop S2	KITH2002	X	
	Strap Loop S3	KITH2003	X	
	Pair of springs SD S0 complete + Brace	REH2310	X	
	Pair of springs SD S1 complete + Brace	REH2311	X	
	Pair of springs SD S2 complete + Brace	REH2312	X	
	Pair of springs SD S3 complete + Brace	REH2313	X	
	Strap loop SD S0	KITH2004	X	
	Strap Loop SD S1	KITH2005	X	
	Strap Loop SD S2	KITH2006	X	
	Strap Loop SD S3	KITH2007	X	
Accessories	Pair of Hapo S1 low spring protectors	KITH2009	X	X
	Pair of Hapo S2/S3 low spring protectors	KITH2010	X	X
	Pair of low spring protectors Hapo SD S0	KITH2011	X	X
	Pair of low spring protectors Hapo SD S1	KITH2012	X	X
	Pair of low spring protectors Hapo SD S2	KITH2013	X	X
	Pair of low spring protectors Hapo SD S3	KITH2014	X	X
	Transport case HAPO	HAPO_CA		

Table 16 : Hapo spare and wear parts

## VI. Warranty

The Hapo is warranted for 1 year from the declaration of warranty.

After purchasing your Hapo, please go to the following address and fill in the form:

<https://ergosante.fr/declaration-de-garantie/>

## VII. Disposal

Disposal of the equipment must comply with your country's sorting requirements.

## VIII. Legal information

The Hapo is CE marked in accordance with Directive 2006/42/EC. The legal requirements are subject to the national legislation of the country of use.

## IX. Liability

The manufacturer is only responsible if the product is used in accordance with the descriptions and instructions in this document. The manufacturer is not liable for any damage resulting from non-compliance with this document.