



Instruction manual Hapo BACK & SD

V.07.25

Table of contents

II.	Introduction	3
II.1	History of changes	3
II.2	Abbreviations and definitions	3
II.3	Identification	4
II.4	Manufacturer	4
II.5	Pictogram Clarification	4
III.	General description	5
III.1	Product description	5
III.2	Components	6-7
III.3	Technical characteristics	8
IV.	Compliance and safety	9
IV.1	Type of staff	9
IV.2	Staff qualification	9
IV.3	Proper Use	9
IV.4	Use cases	10
IV.5	Precautions for use	11
IV.6	Contra-indications	12
IV.7	Residual risks	12
IV.8	Incidents	12
V.	Operating procedure	12
V.1	Unpacking	12
V.2	Setting up and adjusting the Hapo BACK	13
V.3	Removal of the Hapo BACK	27
V.4	Setting up the Hapo SD	29
	Removal of the Hapo SD	30
V.5	Transport	31
V.6	Packing	31
V.7	Storage	31
VI.	Maintenance	32
VI.1	Cleaning and maintenance	32
VI.2	Disassembly before cleaning	32
VI.3	Reassembly after cleaning	37
VI.4	Cleaning of plastic parts	41
VI.5	General Maintenance	42
VI.6	Maintenance Plan	42
VI.7	Spare and wear parts	45
VII.	Warranty	46
VIII.	Recycling	46
IX.	Disposal	46
X.	Legal information	46
XI.	Liability	46

II. Introduction

The Hapo BACK and Hapo SD are non-motorized, spring-operated physical assistance devices. These devices are used when worn by an operator, and enable a partial transfer of effort from the upper trunk, through pectoral support, to the thighs, supported by the lumbar hollow. These devices assist load handling and provide support for trunk flexion and inclination.

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

II.1. History of changes

Date	Review	Description
18/05/2022	A	Creation
07/06/2023	B	Update proper use
16/10/2023	C – V10.23	Update template
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
15/07/2025	V.07.2025	Update of sizes guide

Table 1: History of changes

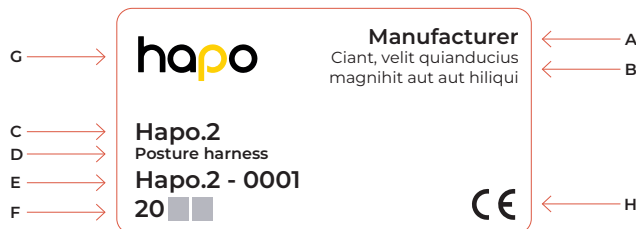
II.2. Abbreviations and definitions

Abbreviations	Definitions
Hapo	Posture harness
Hapo SD	Posture harness without unlocking
PAD	Physical assistance device
PPE	Personal protective equipment

Table 2: Abbreviations and definitions

II.3. Identification

The Hapo BACK and Hapo SD traceability label is located on the back plate (10), inside the belt (7). To access it, open the belt by pulling on the flap (6) at the back.



Number	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
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 ISO 9001:2015 certified - Quality management systems

Or



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

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 BACK and Hapo SD physical assistance devices consist 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 BACK and Hapo SD:
 - 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 BACK



Figure 2



Figure 3

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	Strap loop

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 BACK

General diagram Hapo SD



Figure 4

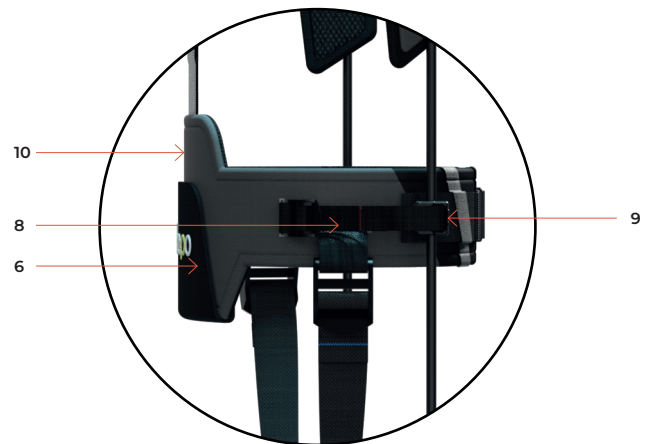


Figure 5

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

Table 6: Components of the exoskeleton Hapo SD

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

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	160 - 175 cm / 63 - 69 in	175 - 195 cm / 67 - 77 in	195 - >200 cm / 77 - 79 in
Hapo BACK	S1	S2	S3

Table 7: Sizes Hapo BACK

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	150 - 160 cm / 59 - 63 in	160 - 175 cm / 63 - 69 in	175 - 195 cm / 67 - 77 in	195 - >200 cm / 77 - 79 in
SD STANDARD	S0	S1	S2	S3
SD HARD	X	S1	S2	S3

Table 8: Sizes Hapo SD

A particular body shape may require a different Hapo BACK or Hapo SD size than that recommended by this chart.

Overall dimensions of the Hapo BACK AND Hapo SD

	Size S0	Size S1	Size S2	Size S3
Dimensions				
Length	88 cm $\pm$ 2 cm / 34 in $\pm$ 0.8 in	92 cm $\pm$ 2 cm / 36.2 in $\pm$ 0.8 in	94 cm $\pm$ 2 cm / 37 in $\pm$ 0.8 in	103 cm $\pm$ 2 cm / 40.5 in $\pm$ 0.8 in
Width	40 cm $\pm$ 2 cm / 15.7 in $\pm$ 0.8 in	40 cm $\pm$ 2 cm / 15.7 in $\pm$ 0.8 in	40 cm $\pm$ 2 cm / 15.7 in $\pm$ 0.8 in	40 cm $\pm$ 2 cm / 15.7 in $\pm$ 0.8 in
Height	25 cm $\pm$ 2 cm / 9.8 in $\pm$ 0.8 in	25 cm $\pm$ 2 cm / 9.8 in $\pm$ 0.8 in	25 cm $\pm$ 2 cm / 9.8 in $\pm$ 0.8 in	25 cm $\pm$ 2 cm / 9.8 in $\pm$ 0.8 in
Weight				
2.4 lbs $\pm$ 2 lbs				
Noise emissions				
0db				

Table 9: Dimensions of the Hapo BACK and Hapo SD

Duration of use

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

Table 10: Duration of use of the Hapo BACK and Hapo SD

* 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

User	Personnel using the exoskeleton
Specialized staff	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 BACK and Hapo SD are intended to be used 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 BACK and Hapo SD does not exempt the user from complying with standard NF X35-109, concerning the manual handling of loads. The use of the Hapo BACK and Hapo SD does not exempt you from wearing PPE either.

How it works

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.

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.

Storage temperature range	-50°F to +104 °F – Dry environment
Operating temperature range	-50°F to +104°F
Not allowed	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

III.4. Use cases

The Hapo BACK and Hapo SD are 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. Precaution for use

- Do not use the Hapo BACK or the Hapo SD without ensuring that all fasteners are securely fastened and that the straps are fully retracted into their designated compartments.
- Do not use the Hapo BACK or the Hapo SD 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 BACK or a Hapo SD that does not fit (see Table 7: Hapo size chart).
- Remove the exoskeleton if skin irritation/itching occurs.
- Do not hold the Hapo BACK or the Hapo SD BACK or the Hapo SD 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 BACK or the Hapo SD 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 BACK or the Hapo SD 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 BACK or the Hapo SD with only one spring activated, this will lead to misuse of the Hapo BACK or the Hapo SD, 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 BACK or the Hapo SD.
- It is forbidden to use the Hapo BACK or the Hapo SD while handling sharp tools without having obtained prior approval from a health and safety officer.
- It is forbidden to use the Hapo BACK or the Hapo SD in situations where there is a risk of falling (work on the roof, etc.) without having obtained prior approval from a health and safety officer.



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

IV.6. Contra-indications



Do not use Hapo BACK or the Hapo SD if you are pregnant



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



The use of Hapo BACK or the Hapo SD 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 BACK or the Hapo SD

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 BACK or the Hapo SD 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 BACK or the Hapo SD 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 BACK or the Hapo SD.

V. Operating procedure

V.1. 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.

V.2. Setting up and adjusting the Hapo BACK

Refer to section V.4 for Hapo SD installation.

Preparation before fitting

1: Open all the fasteners below



Figure 15



Figure 16



Figure 17

Installation of the shoulder straps

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



Figure 18



Figure 19

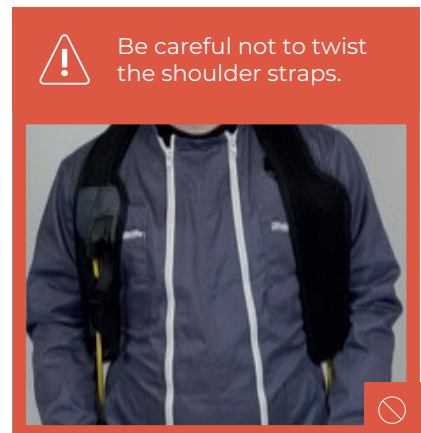


Figure 20

3: Attach the chest strap.



Figure 21

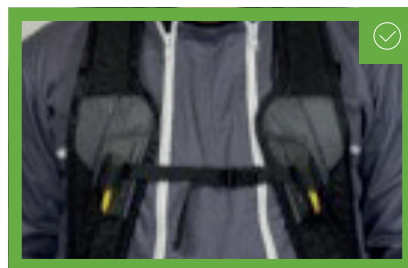


Figure 22

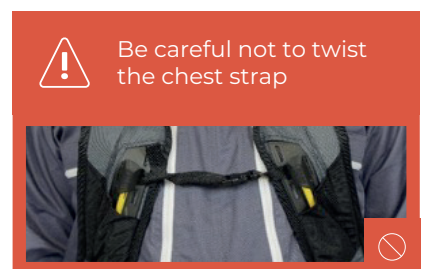


Figure 23

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

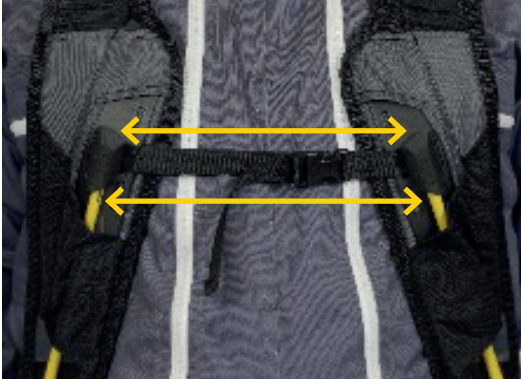


Figure 24



Figure 25

Pull the «T» part of the chest strap towards the outside of the shoulder strap.

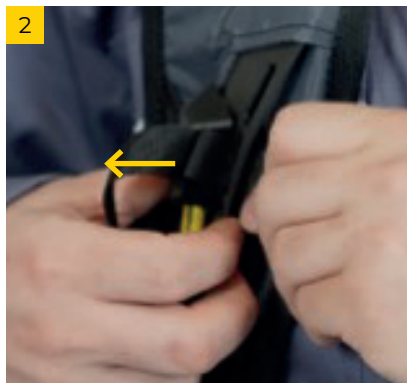


Figure 26

Pass the «T» part through the middle slot.

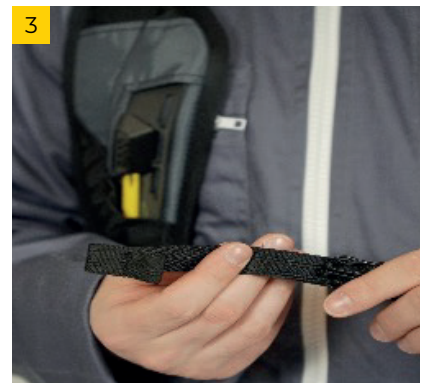


Figure 27

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.

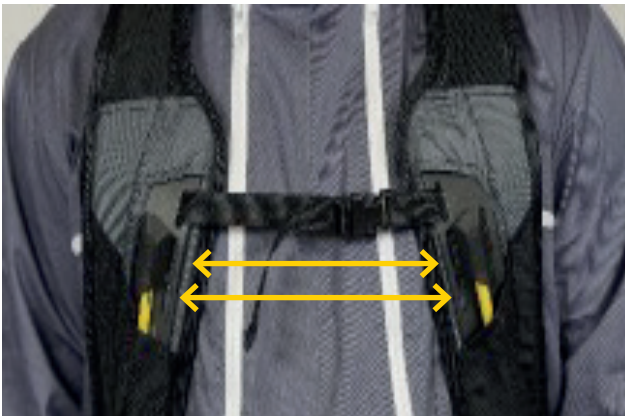


Figure 31

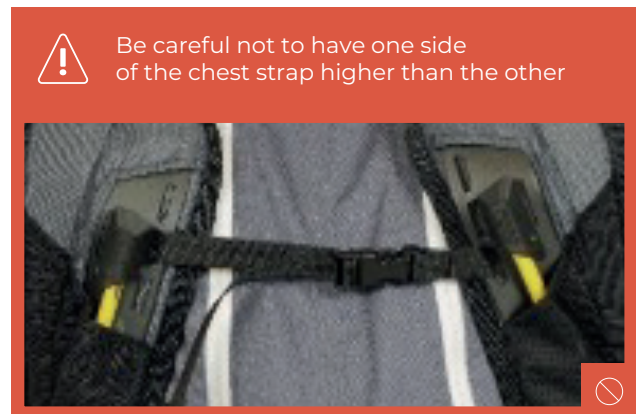


Figure 32

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.

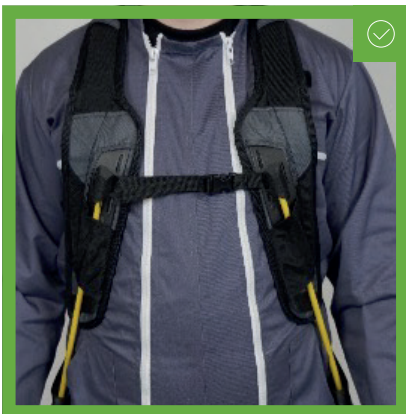


Figure 33

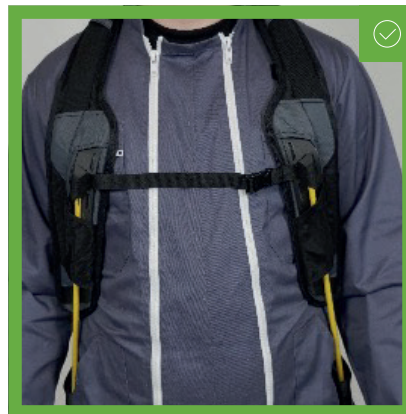


Figure 34

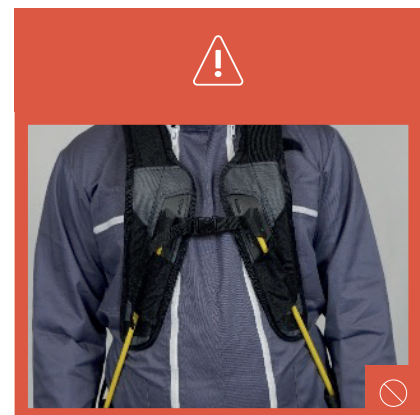


Figure 35

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.

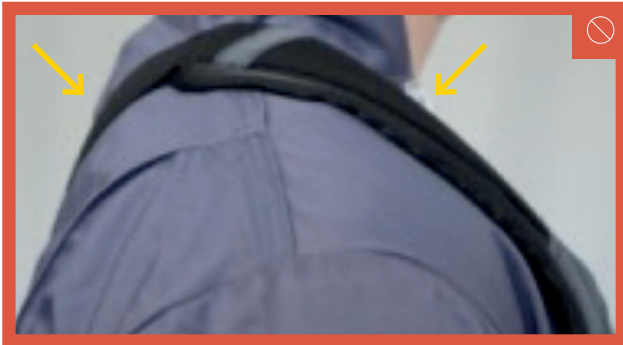


Figure 42

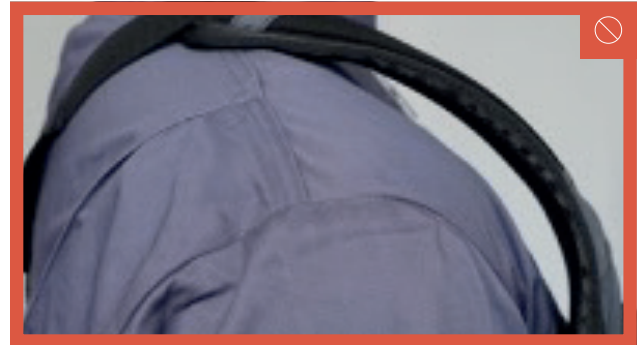


Figure 43

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

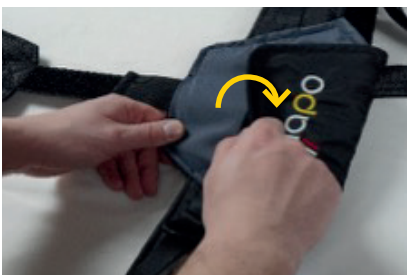


Figure 44



Figure 45



Figure 46

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



Figure 47

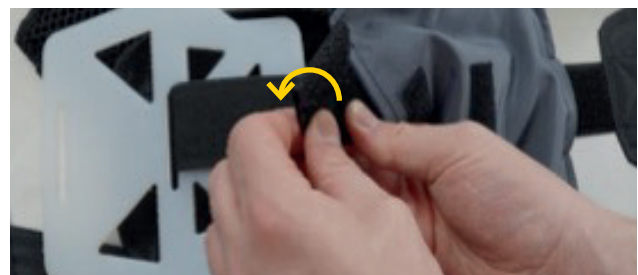


Figure 48



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 BACK or SD (S0, S1, S2, S3) The following chart gives an indication of which slot to put the backstrap through.

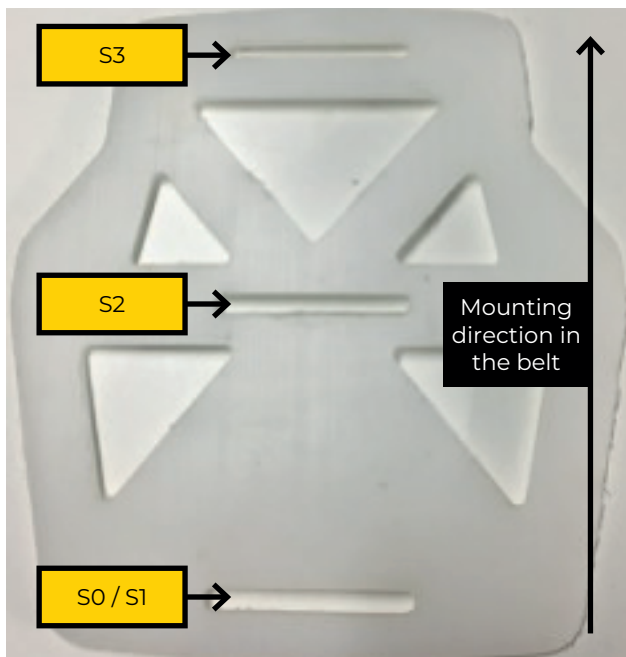


Figure 53

Slot	Low	Central	Hight
Hapo Back	S1	S2	S3
Hapo SD	S0/S1	S2	S3
Hapo SD Hard	S1	S2	S3

Table 14:
Abacus linking Hapo Back and Hapo SD 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

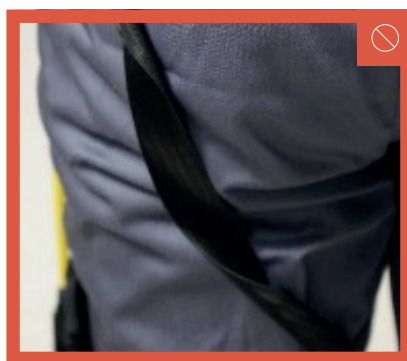


Figure 65



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



Figure 66

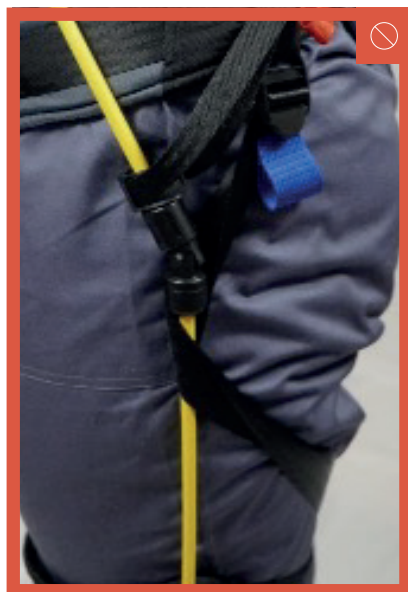


Figure 67

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.

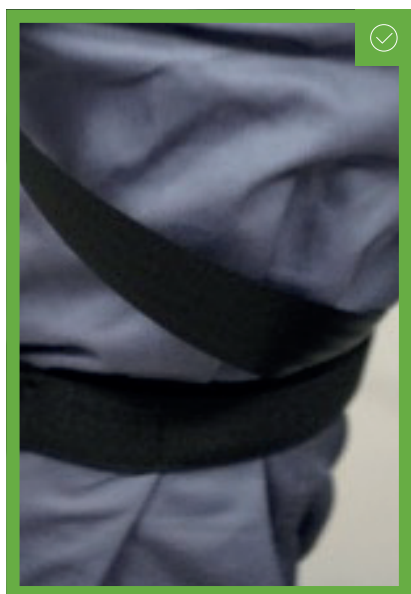


Figure 70



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

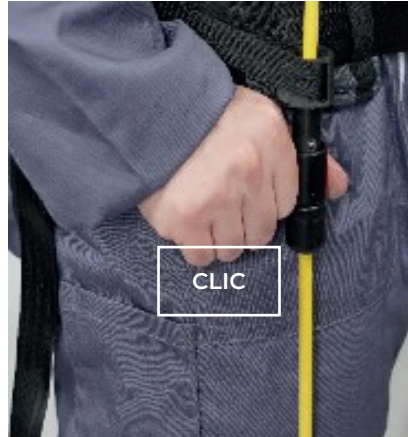


Figure 79



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

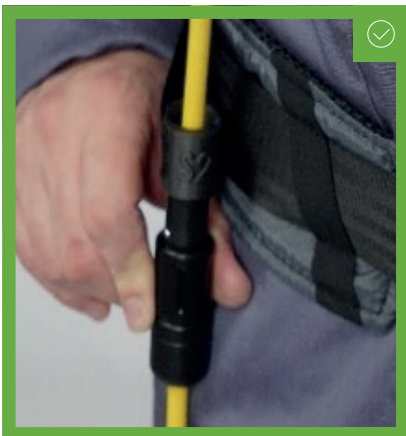


Figure 80

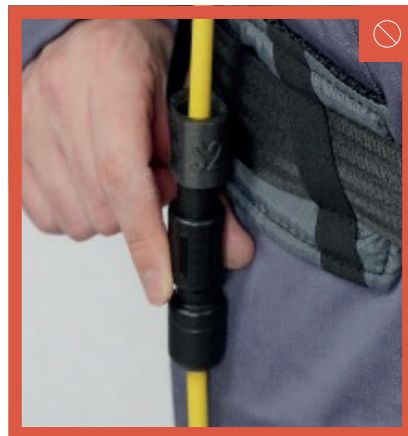


Figure 81

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).

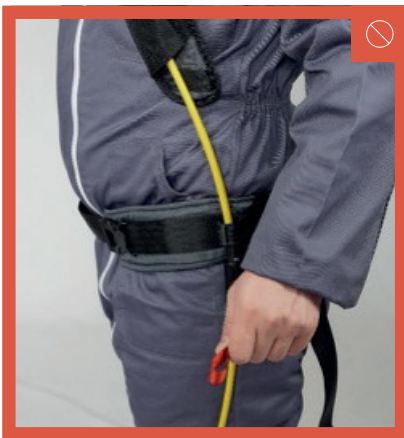


Figure 84

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



Figure 85

The Hapo BACK is ready for use.



Figure 86

V.3. Removal of the Hapo BACK

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 BACK

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 85



Figure 96

Remove the Hapo BACK

7: Remove the Hapo BACK.



Figure 97



Figure 98



Figure 99

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



Figure 100

V.4. Setting up the Hapo SD

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

- Preparation before fitting (page 13)
- Fitting the belt (page 16)
- Installation of the sleeves (page 19)
- Installation of the shoulder straps (page 13)
- Back strap adjustment (page 17)
- Spring tension adjustment (page 25)

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.

Removal of the 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 SD on a hanger for storage and close the various attachments (chest strap, belt and sleeves).



Figure 108

V.5. 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).

V.6. 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

V.7. Storage

A hanger is provided for storing the Hapo BACK or the Hapo SD. 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.

VI. Maintenance

VI.1. Cleaning and maintenance

The textile parts of the Hapo BACK and Hapo SD 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 BACK and the Hapo SD due to improper use.

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

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.

VI.2. Disassembly before cleaning

The disassembly steps are the same for Hapo BACK and Hapo SD, only the specific parts have been detailed. In order to dismantle your Hapo BACK or Hapo SD 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.

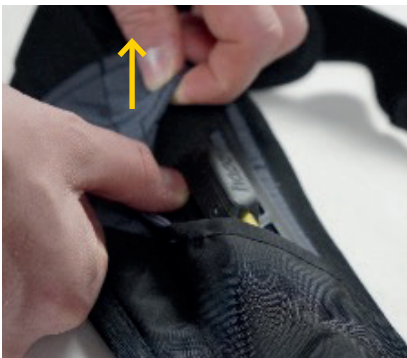


Figure 113



Figure 114



Figure 115

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

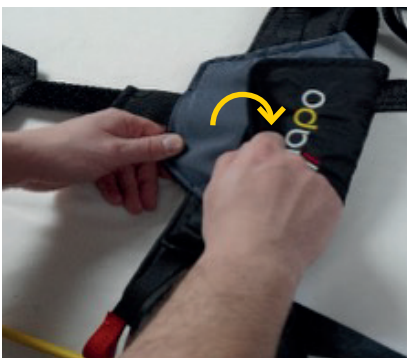


Figure 116



Figure 117



Figure 118

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



Figure 119



Figure 120

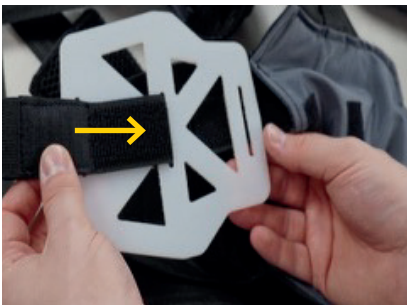


Figure 121



Figure 122

Belt release

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

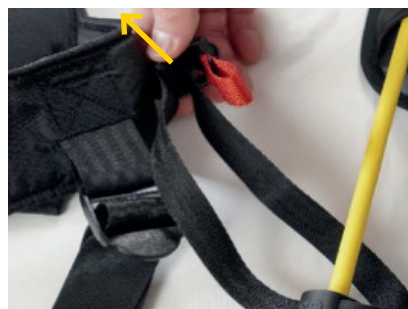
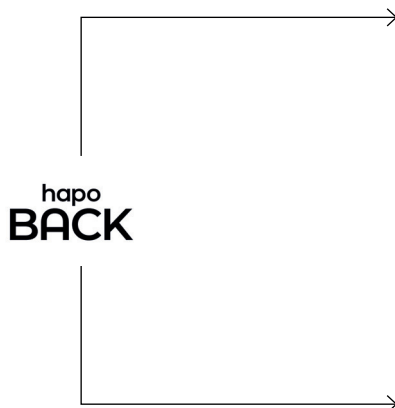


Figure 123



Figure 124

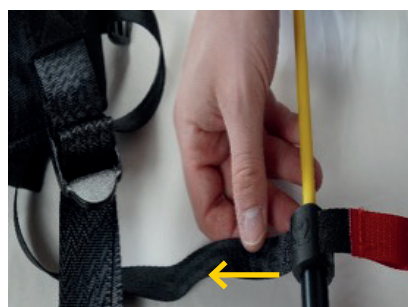


Figure 125

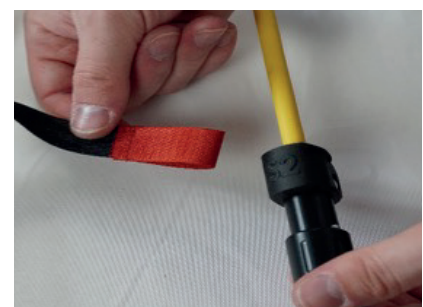


Figure 126

hapo
SD

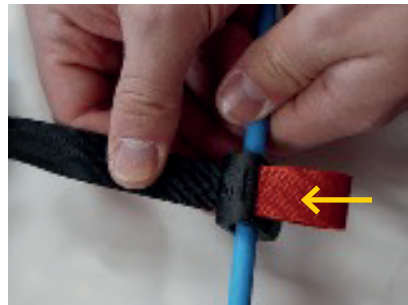
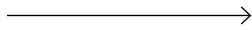


Figure 127



Figure 128

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.

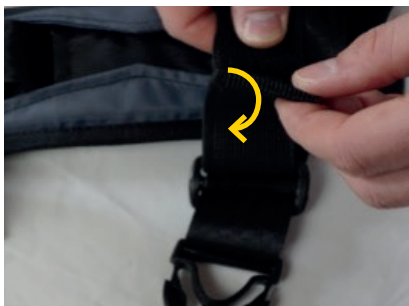


Figure 131



Figure 132

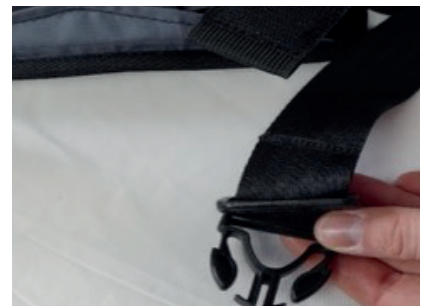


Figure 133



Figure 134



Figure 135

8: Open the flap of the sleeve.

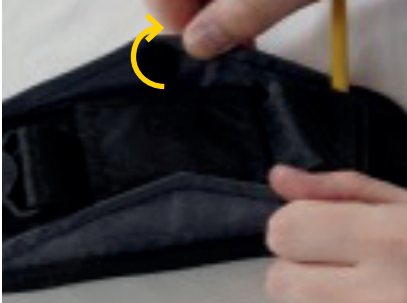


Figure 136



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

VI.3. Reassembly after cleaning

The reassembly steps after cleaning are identical for Hapo BACK 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



Figure 146



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

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



Figure 151



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.

6: Replace the chest strap in the slots



Figure 152

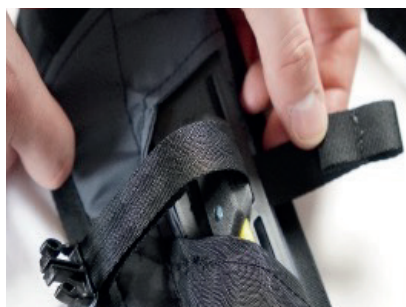


Figure 153



Figure 154

Reassembly of the belt

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

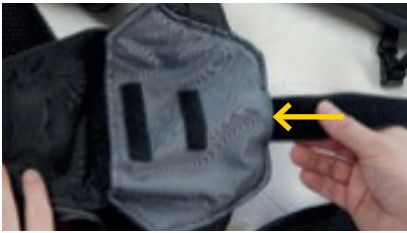


Figure 155

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.

hapo
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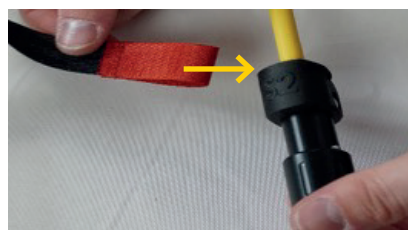
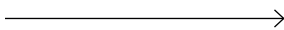


Figure 160

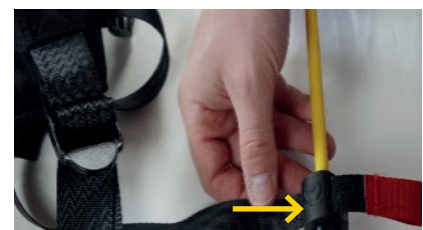


Figure 161

hapo
SD

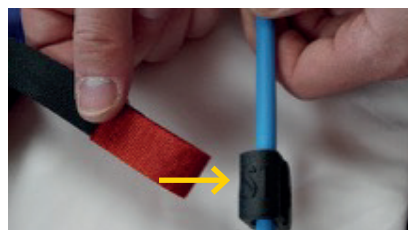


Figure 162

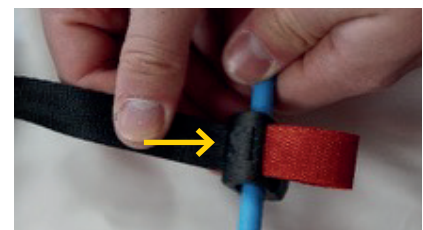


Figure 163

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.

**hapo
BACK**



Figure 166

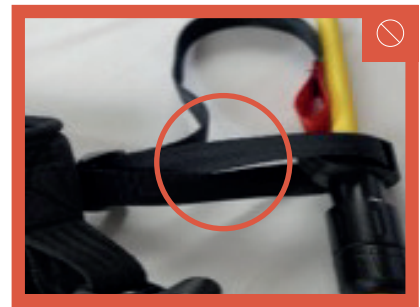


Figure 167

**hapo
SD**

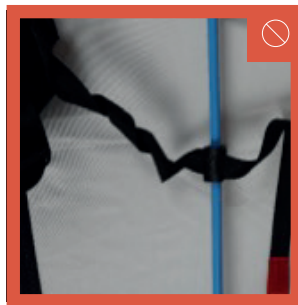


Figure 168

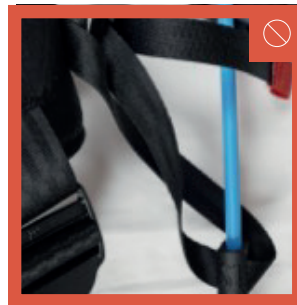


Figure 169

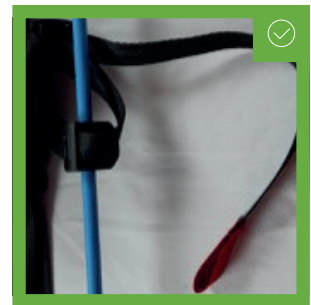


Figure 170

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



Figure 171

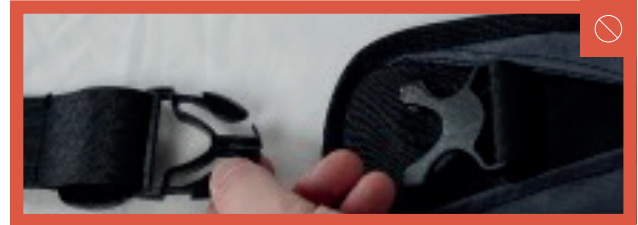


Figure 172



Figure 173

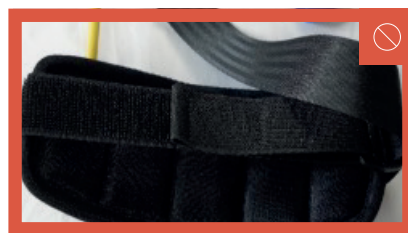


Figure 174

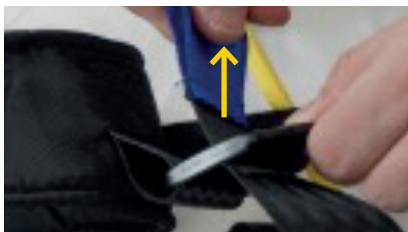


Figure 175



Figure 176



Figure 177



Figure 178

VI.4. Cleaning or plastic parts

The following table gives an indication of the chemical resistance of the plastic parts of the Hapo BACK and Hapo SD 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	PE+PP
Solvents	Water + soap pH neutral	A	A	A	A
	Acetone	A	A	A	X
	Acetaldehyde	A	A	A	n/a
	Ammonium chloride	A	A	A	A
	Borax (boric acid)	A	A	A	X
	Glycerin	A	A	A	A
	Formaldehyde	B	A	A	n/a
	Isopropyl alcohol	B	A	A	A

Table 14: Possible solvents for cleaning plastic parts; A: Very good resistance; B: Good resistance; n/a: Not applicable; X: Not resistant



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.

VI.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: Braided - Yellow - Red.



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

VI.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),
 - 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), Replace with the product disassembled.
 - Follow the instructions «VIII.2 Disassembly before cleaning» and «VIII.3 Reassembly after cleaning».
- Textile thigh sleeve cover (1),
 - Replace with the product disassembled.
 - Follow instructions «VIII.2 Disassembly before cleaning» and «VIII.3 Reassembly after cleaning»
- Anti-twist strap (4),
 - 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

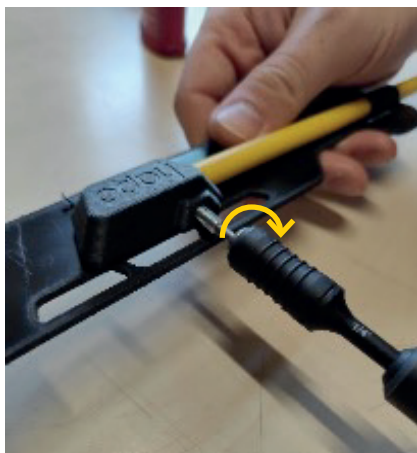


Figure 183

VI.7. Spare and wear parts

Types	Reference	Parts	Hapo
Textiles	KITH2008	Kit Textile brace Hapo.2 and Hapo SD.2 3	Hapo.2 / SD
	KIH2042	Kit Textile brace Hapo.2 and Hapo SD.2 white	Hapo.2 / SD
	KITH2001	Kit Textile belt Hapo Black-Grey	Hapo.2 / SD
	KITH2025	Kit Textile belt Hapo white	Hapo.2 / SD
	KITH2002	Kit Anti-torsion strap Hapo.2 and Hapo SD.2	Hapo.2 / SD
	KITH2003	Kit Hapo.2 and Hapo SD.2 chest strap	Hapo.2 / SD
	KITH2024	Kit Pair of thigh sleeves Hapo Black-Grey	Hapo.2 / SD
	KITH2026	Kit Pair of thigh sleeves Hapo white	Hapo.2 / SD
Springs	KITH2016	Kit Pair of S1 springs + armature	Hapo.2
	KITH2017	Kit Pair of S2 springs + armatures	Hapo.2
	KITH2018	Kit Pair of S3 springs + armatures	Hapo.2
	KITH2031	Kit Pair of S1 springs white + armature	Hapo.2
	KITH2032	Kit Pair of S2 springs white + armatures	Hapo.2
	KITH2033	Kit Pair of S3 springs white + armatures	Hapo.2
	KITH2019	Kit Pair of SD S0 springs + armatures	Hapo.2 SD
	KITH2020	Kit Pair of SD S1 springs + armatures	Hapo.2 SD
	KITH2021	Kit Pair of SD S2 springs + armatures	Hapo.2 SD
	KITH2022	Kit Pair of SD S3 springs + armatures	Hapo.2 SD
	KITH2034	Kit Pair of SD S0 Standard white springs + armatures	Hapo.2 SD
	KITH2035	Kit Pair of SD S1 Standard white springs + armatures	Hapo.2 SD
	KITH2036	Kit Pair of SD S2 Standard white springs + armatures	Hapo.2 SD
	KITH2037	Kit Pair of SD S3 Standard white springs + armatures	Hapo.2 SD
	KITH2027	Kit Pair of SD S0 Hard black springs + armatures	Hapo.2 SD
	KITH2028	Kit Pair of SD S1 Hard black springs + armatures	Hapo.2 SD
	KITH2029	Kit Pair of SD S2 Hard black springs + armatures	Hapo.2 SD
	KITH2030	Kit Pair of SD S3 Hard black springs + armatures	Hapo.2 SD
	KITH2038	Kit Pair of SD S0 Hard white springs + armatures	Hapo.2 SD
	KITH2039	Kit Pair of SD S1 Hard white springs + armatures	Hapo.2 SD
	KITH2040	Kit Pair of SD S2 Hard white springs + armatures	Hapo.2 SD
	KITH2041	Kit Pair of SD S3 Hard white springs + armatures	Hapo.2 SD
Accessories	HDTH2	Hapo carrying case	Hapo.2 / SD
	PDYH2	Dynamic pack Hapo.2 and Hapo SD.2	Hapo.2 / SD
	HHAN	Hapo Handles	Hapo.2 / SD
	KITH2009	Kit Hapo S1 spring protection	Hapo.2
	KITH2010	Kit Hapo S2 spring protection	Hapo.2
	KITH2015	Kit Hapo S3 spring protection	Hapo.2
	KITH2011	Kit Spring protection Hapo SD.2 size S0	Hapo.2 SD
	KITH2012	Kit Spring protection Hapo SD.2 size S1	Hapo.2 SD
	KITH2013	Kit Spring protection Hapo SD.2 size S2	Hapo.2 SD
	KITH2014	Kit Spring protection Hapo SD.2 size S3	Hapo.2 SD

VII. Warranty

The Hapo BACK and the Hapo SD are warranted for 2 years from the declaration of warranty. After purchasing your Hapo BACK or Hapo SD, please go to the following address and fill in the form: <https://www.Hapo.eu/en/content/63-warranty-statement>

IX. Disposal

Disposal of the equipment must comply with your country's sorting requirements. www.Hapo.eu/en/content/63-warranty-statement.

X. Legal information

The Hapo BACK and Hapo SD are CE marked in accordance with Directive 2006/42/EC for sales in Europe. The legal requirements are subject to the national legislation of the country of use.

XI. 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.

	+33 (0) 9 72 17 96 10
	contact@Hapo.eu
	www.Hapo.eu
	
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