

# MATE



**MATE-XT GO**

**User manual**

CR00758393-en\_00/2026.02



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# PREFACE

Thank you for choosing the MATE-XT GO.

This document provides instructions for operation, safety, installation and maintenance of the MATE-XT GO. Additional languages are available on request from the manufacturer. All provided documentation must be placed in close proximity to the area where the MATE-XT GO is installed, maintained available for all people that work on it and preserved intact for the entire operational life of the system.

The instructions in this manual are intended for use by unqualified persons and are sufficient to ensure the safe and proper use of the device by the user.

- Please read carefully before use.
- Follow the safety instructions.
- If you are not the only user, instruct all users on the safe and proper use of the product.

Contact COMAU S.p.A. for further assistance.

## Glossary

<b>EXOSKELETON</b>	The wearable device. It is understood in the text as synonymous with MATE-XT GO.
<b>DEVICE</b>	It is understood in the text as synonymous with MATE-XT GO.
<b>USER</b>	It is understood in the text as the person who wears MATE-XT GO.

## Acronyms

<b>pDOFs</b>	Passive degrees of freedom
<b>pHRi</b>	Physical Human Robot Interface
<b>TGB</b>	Torque Generating Box

## Symbols used in the manual

Below are indicated the symbols that represent: **WARNING**, **CAUTION** and **NOTES** and their meaning.



This symbol indicates operating procedures, technical information and precautions that if are not observed and/or correctly performed may cause injuries to the personnel.



This symbol indicates operating procedures, technical information and precautions that if are not observed and/or correctly performed may cause damage to the equipment.



This symbol indicates operating procedures, technical information and precautions that must be underlined.



The symbol draws the attention to materials disposal that is regulated by the WEEE Directive.

## Modification History

The following table shows the history of the Manual release, with related changes / improvements made.

Date	Edition of the Manual	Contents
2026.02	00/2026.02	First release of the handbook

# 1. OVERVIEW

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This chapter deals with the following topics:

- [MATE-Xt GO: exoskeleton for upper limbs](#);
- [Intended use](#);
- [Individual use of the MATE-Xt GO](#);
- [First time use of the MATE-Xt GO](#);
- [Environmental conditions of use](#);
- [Storing the MATE-Xt GO](#);
- [Unintended use](#);
- [Warranty](#).

## 1.1 MATE-XT GO: exoskeleton for upper limbs

The MATE-XT GO is a passive exoskeleton<sup>\*1</sup> designed to support arms and shoulders in activities requiring arm elevation, with particular benefit in heavy tasks for the shoulder-scapular complex (e.g. repetitive movements or prolonged postures), with or without external load handling. The device is classified as Personal Protective Equipment (PPE) category II in accordance with the classification criteria set out in Annex IX to Regulation (EU) 2016/425, as described in [par. 2.1](#).

**Fig. 1.1 - Example of shoulder flexion–extension movement**



The instructions contained in this manual are sufficient to ensure correct use of the device by the customer.

Read the manual carefully before using the device.

If any part of this user manual is not clear enough, contact COMAU S.p.A. for assistance.

<sup>\*1</sup> A passive exoskeleton has no motors, batteries, or external power supply. The assistance is provided by elastic elements that store and release part of the user's movement energy. This architecture offers simplicity, lightness, quiet operation, no need for recharging, low maintenance and predictable continuous support during the intended activities.

---

## 1.2 Intended use

The device applies an assistive torque that partially compensates for the effect of gravity caused by the weight of the arm (and any work tools or external loads), thereby reducing muscular effort when working with raised arms. The assistance generated by the device does not burden the shoulder: the reaction forces are distributed and transferred in a controlled manner through padding and straps to wider, stronger and ergonomically suitable areas of the body, particularly the iliac crests and pelvis, improving comfort and stability. The principle is similar to backpacks with a pelvic belt, which transfer part of the load to the pelvis, reducing reaction forces borne by the shoulders.



The MATE-XT GO does not lift loads in place of the user and does not increase the allowed weight limits.

Typical applications of the MATE-XT GO include:

- Screwing, sealing and assembly operations above shoulder level;
- underbody work and maintenance activities in the automotive sector;
- cleaning, painting and finishing operations with raised arms, with or without support tools (e.g., telescopic poles, spray guns);
- logistics tasks and light loading/unloading;
- visual inspections and checks with arms raised;
- installation and maintenance of electrical, hydraulic and ventilation systems on walls or ceilings;
- assembly and fastening of components at height or above the assembly line (e.g., cable trays, sensors, lamps);
- painting, sanding and polishing of vertical or elevated surfaces;
- building or industrial maintenance tasks requiring continuous elevation of the upper limbs;
- inspection and finishing tasks in the aeronautical, railway or naval sectors on high or hard-to-reach structural components.

For correct and safe use, dedicated training is required (wearing, adjustments, operation limits). Refer to the documentation supplied with the device.

---

## 1.3 Individual use of the MATE-XT GO

In order to maximize its effectiveness, Comau recommends a personal and individual use of the MATE-XT GO.

However, the MATE-XT GO can be shared among several workers after sanitation (see [par. 6.1 Sanitation on page 48](#)) and adjustment (see [par. 4. Set-up on page 24](#))

If you are unsure about the permitted uses of the MATE-XT GO, contact Comau for additional information.

---

## 1.4 First time use of the MATE-XT GO

Before wearing the MATE-XT GO it is very important to follow the guidelines for choosing the correct adjustments to maximize the comfort and effectiveness of the device for the user.

During the first use, it is recommended to carefully check the proper wearing of the device, as described in Chapter 4.

In some cases, it may take some time to get used to the device; in those cases, it is suggested to start using the MATE-XT GO gradually. Depending on the user's feeling about comfort and the perceived benefit, the usage time can be increased gradually to cover the entire shift.



**Use the MATE-XT GO only in activities consistent with its intended use. If any discomfort or unpleasant sensations occur during use, stop using the device and contact Comau assistance.**

---

## 1.5 Environmental conditions of use

The MATE-XT GO can be used both in outdoor areas (tested to IP65) and in enclosed rooms.



**If you use the device in particularly dusty or dirty environments, we recommend the following:**

- Clean the mechanical parts as indicated in [par. 6.2](#).
- Visually inspect the integrity of the device.

The MATE-XT GO can be used under ambient conditions that respect the temperature range [0 to 45 °C \(32 to 113°F\)](#). The operating temperature range is intended as a guide. Contact Comau if you intend to use the MATE-XT GO at different temperatures.



At high temperatures, using the MATE-XT GO can increase sweating and become less comfortable. This effect, by itself, does not create hazardous conditions for the worker, but it may reduce tolerance for prolonged use. In case of thermal discomfort, stop using the device, ensure ventilation and hydration, and resume use only when comfort has been restored.



**Do not use or store the device in an explosive environment or near a heat source.**

---

## 1.6 Storing the MATE-XT GO

Store the MATE-XT GO in a dry, clean place away from moisture, dust and direct sunlight. Prefer vertical storage, hanging the device on a rack or dedicated support; alternatively, place it on a flat, dry and clean surface.

How to handle and store the device:

- Lift and carry the device by grasping the carbon-fiber dorsal frame. Do not lift or suspend it by the plastic parts, straps or arm supports.
- Use a hard case or protective bag during transport or long-term storage.
- Hang the device by the dorsal frame, preferably using the dedicated Comau support (sold separately). Do not suspend it by the straps, arm supports or plastic components.
- Avoid placing any loads on top of the device.
- Do not place it on moving, inclined or slippery surfaces.
- Keep it away from heat sources and open flames.
- Always handle the device with care.

---

## 1.7 Unintended use

Use the MATE-XT GO only as it was intended.

The product may not be used by:

- pregnant women;
- minors.

Consult your doctor before using the MATE-XT GO if you have:

- breast implants;
- recent shoulder or back surgery;
- any condition that may not be compatible with the use of the device.

Since the conditions listed above have not been tested, it is not possible to determine with certainty whether they may cause discomfort or pose additional risks. It may still be safe to use the MATE-XT GO under these conditions. In case of doubt, consult the occupational physician.

Do not use the device to lift loads beyond legal limits or company regulations.

Do not unlock or operate the torque generating box (TGB) locking mechanism when the device is not worn (see pag. 20); do not pull or move the TGB with the lock is engaged.

Use the device with particular caution on slippery, inclined or uneven surfaces.

During use, ensure that the work area is free from obstacles or protruding objects that could impede movement.

Do not use the device as a replacement for a safety harness: it is not a fall-protection device.

Do not immerse the device in water.

Do not use the device if any components are damaged: in such cases, stop using it and contact support.

---

## 1.8 Warranty

COMAU S.p.A. guarantees the build quality and materials of the MATE-XT GO exoskeleton for a period of 12 months from the delivery date. The warranty covers only material or manufacturing defects and does not apply to faults caused by misuse, improper operation, negligence or willful misconduct by the user, nor to any activity outside the intended uses or contrary to the instructions provided in this Manual.



The warranty is void in case of tampering, unauthorized repairs or failure to follow the maintenance procedures indicated.

---

## 2. SAFETY

This chapter deals with the following topics:

- [Certification of the device](#);
- [Residual risks](#).

---

### 2.1 Certification of the device

The exoskeleton MATE-XT GO is a product of Comau S.p.A. Via Rivalta 30, 10095 Grugliasco (TO).

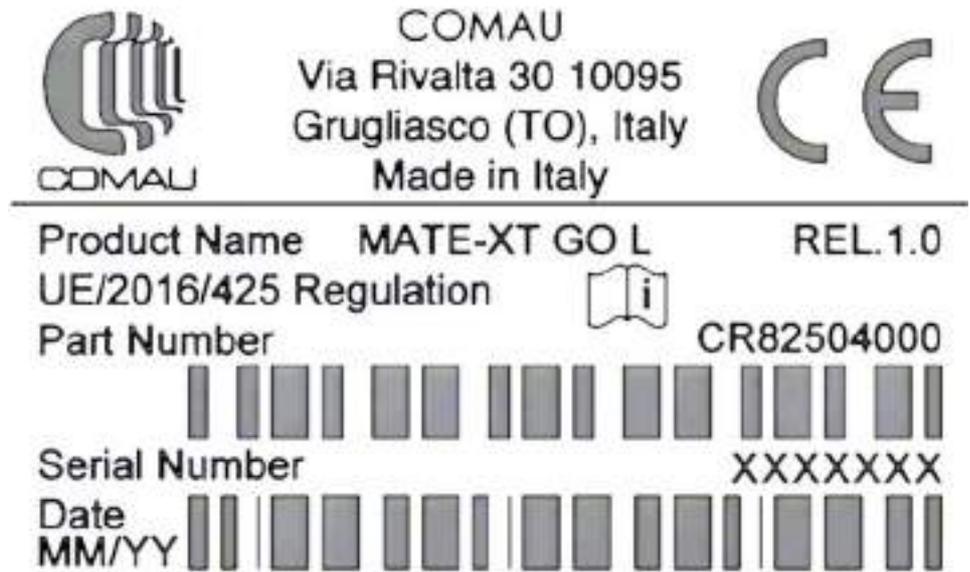
- **Name:** MATE-XT GO
- **Release:** 1.0
- **Serial number** : this can be found on the product label on the inner surface of the exoskeleton
- **Certificate:**
  - Machinery Directive 2006/42/EC
  - Standard EN ISO 13482:2014
  - Regulation (EU) 2016/425
  - UNI/TR 11950:2024

The device meets the assessed Essential Health and Safety requirements of Regulation (EU) 2016/425 applicable to the exoskeleton MATE-XT GO. The device has been classified as PPE Category II according to the classification criteria set out in Annex IX to the Regulation. Compliance with technical document UNI/TR 11950:2024 was also assessed. The notified body that has assessed the device is:

**ANCCP Certification Agency Srl (ON 0302)**

Via dello Struggino, 6 - 57121 Livorno, Italy

Fig. 2.1 - Identification plate (example for size L)



**MATE-XT GO is not a medical device within the meaning of Regulation (EU) 2017/745.**

It is not designed or marked for the purpose of diagnosing, monitoring, treating or alleviating disease or disability.

SAFETY

Fig. 2.2 - EC Conformity declaration (example for size L)

Comau S.p.A.

Sede legale: Via Rivalta, 30  
10095 Grugliasco - Torino (Italy)  
[www.comau.com](http://www.comau.com)

Fabbricante (Manufacturer)  
**Comau S.p.A.**  
Via Rivalta, 30 - 10095 - Grugliasco (Torino) - Italy  
Tel. +39-011-00 491111 Fax. +39-011-00 45481



CE DECLARATION of CONFORMITY			
<b>DICHIARAZIONE CE DI CONFORMITA'</b> - Direttiva 2006/42/CE - Allegato IIA Regolamento (UE) 2016/425 - Allegato IX	<b>EC DECLARATION OF CONFORMITY</b> - DIRECTIVE 2006/42/EC - Annex IIA -Regulation (EU) 2016/425 Annex IX	<b>DÉCLARATION CE DE CONFORMITÉ</b> - Directive 2006/42/CE - Annexe IIA -Règlement (UE) 2016/425 Annexe IX	<b>EG-KONFORMITÄTSERKLÄRUNG</b> - Richtlinie 2006/42/EG - Anhang IIA -Verordnung (EU) 2016/425 Anhang IX
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commercial name and model/type			year of construction:
function			serial number:
code		code release:	
<b>IT</b>	<b>EN</b>	<b>FR</b>	<b>DE</b>
SONO IN CONFORMITA' CON I REQUISITI ESSENZIALI DI SICUREZZA DELLA DIRETTIVA 2006/42/CE e il Regolamento (UE) 2016/425 - Allegato IX	ARE IN CONFORMITY WITH ESSENTIAL REQUIREMENTS OF THE DIRECTIVE 2006/42/CE and Regulation (EU) 2016/425 Annex IX	SONT CONFORMES AUX EXIGENCES ESSENTIELLES DE SÉCURITÉ APPLICABLES DE LA DIRECTIVE 2006/42/CE et Règlement (UE) 2016/425 Annexe IX	ENTSPRECHEN MIT DEN GRUNDLEGENDEN SICHERHEITS VORSCHRIFTEN DER RICHTLINIE 2006/42/EG und Verordnung (EU) 2016/425 Anhang IX
Sono realizzati in conformità con la seguente principale norma: EN ISO 13482:2014 Robots and robotic devices - Safety requirements for personal care robots UNI/TR 11950:2024 Sicurezza e salute nell'uso degli esoscheletri occupazionali orientati ad agevolare le attività lavorative	Are manufactured in compliance with the following standards: EN ISO 13482:2014 Robots and robotic devices - Safety requirements for personal care robots UNI/TR 11950:2024 Safety and health in the use of occupational exoskeletons aimed at facilitating work activities	Ils sont fabriqués en conformité avec les normes suivantes: EN ISO 13482:2014 Robots and robotic devices - Safety requirements for personal care robots UNI/TR 11950:2024 Sécurité et santé dans l'utilisation des exosquelettes professionnels visant à faciliter les activités de travail	Sie werden in Übereinstimmung mit den folgenden Normen hergestellt: EN ISO 13482:2014 Robots and robotic devices - Safety requirements for personal care robots UNI/TR 11950:2024 Sicherheit und Gesundheit beim Einsatz von arbeitsunterstützenden Exoskeletten
Persona giuridica autorizzata a costituire il Fascicolo Tecnico è:  COMAU S.p.A  indirizzo: via rivalta 30, Grugliasco	Legal person authorized to compile the technical file:  COMAU S.p.A  address: via rivalta 30, Grugliasco	Personne morale autorisée à constituer le dossier technique est:  COMAU S.p.A  adresse: via rivalta 30, Grugliasco	Die juristische Person, die befugt ist, die technischen Unterlagen zusammenzustellen, ist:  COMAU S.p.A  die Anschrift: via rivalta 30, Grugliasco
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Grugliasco - Torino (Italy)		POSITION Proxy holder	
		NAME	
		SIGNATURE	
Sede legale: Via Rivalta, 30 - 10095 Grugliasco - Torino (Italy)			

---

## 2.2 Residual risks



### **Danger of pinching fingers.**

In operation, passive joints (pDOF) and torque generating box (TGB) are moving components that slide or rotate together. Keep hands and fingers away from sliding or rotating areas and gaps between parts. The same caution must also be exercised by those working in the vicinity of the user.



### **Impact hazard with Torque Generating Box**

If you select the UNLOCK position when the device is not attached to the arm, the torque generating box can activate, rotate freely and collide with objects or people. Select UNLOCK only when the device is worn and stabilized; for removal, transport, or relocation, select LOCK and verify activation.

For more details on the locking mechanism, see [par. 3.1.3.1 Operation of the Torque Generating Box lock/unlock mechanism on page 21](#).

## 3. DESCRIPTION

This chapter deals with the following topics:

- [Composition of the MATE-XT GO](#);
  - [Technical features](#).
- 

### 3.1 Composition of the MATE-XT GO

The MATE-XT GO ([Fig. 3.1](#)) consists of three subsystems that work together to provide assistance to the arm, distribute loads correctly and safely and ensure the user's comfort:

- **Human-Robot physical Interface (pHRi)**  
What it is: the assembly of all parts that are in contact with the body (e.g. pads, arm supports, shoulder straps, pads and lumbar belt).  
  
Function: it provides the user's coupling, stability, comfort and load sharing toward iliac crest and pelvis, large and robust body areas, ergonomically suitable for supporting them.
- **Passive degrees of freedom (pDOFs)**  
What it is: articulations and slide guides and rotation.  
  
Function: it allows natural shoulder and arm movement, without imposing rigid trajectories. Maintain functional mobility, dynamic alignment and comfort during use.
- **Torque Generating Box**  
What it is: mechanical unit with pre-tensioned springs and kinematics.  
  
Function: the unit is capable of storing elastic potential energy and releasing it as an assist torque opposite to gravity on the arm. The torque provided by the device varies with the shoulder flexion angle and is maximum around 90°.

**Fig. 3.1 - Exoskeleton MATE-XT GO - front view**



### 3.1.1 Human-Robot physical Interface (pHRi)

The PHRI connects the device to the user's body ensuring correct load distribution, stability and comfort during use. It is made with non-allergic and non-toxic materials: it contains no latex, PVC, phthalates, halogenated organic compounds, carcinogens and reproductive toxins as indicated in "California Propositions 65", materials from the SVCH (*Substances of very High Concern*) list, or materials of animal origin.

All fabric parts are removable and machine washable (see [par. 6.3.1 Washing instructions for fabric parts on page 50](#)).

The interface also incorporates adjustments (e.g. Velcro straps, sliders, sliding slots) to adapt to different user sizes and improve fitting.

Instructions for proper fitting are given in [par. 5.2](#).

**Fig. 3.2 - Physical Human Robot Interface (pHRi) - front view**



1. T-structure padding
  2. Shoulder straps
  3. Base arm supports
  4. Pelvic belt
  5. Lumbar pad
  6. Velcro adjustment straps
  7. Adjustable front buckle
- Belt extensions - if necessary, to be installed in the case of size L (see [par. 5.3.1](#))

### 3.1.2 Passive degrees of freedom (pDOFs)

Passive degrees of freedom allow the correct fitting of MATE-XT GO and its adaptation to different body sizes ([Fig. 3.3](#)). When the device is correctly fit (see [par. 5.2 Wearing](#)

[procedure on page 35](#)) the pDOFs allow alignment with the flexo-extension axis of the shoulder, reducing kinematic constraints and parasitic forces. They also preserve the natural mobility of the scapulae, shoulders and arms during movement, improving the comfort and usability of the device

**Fig. 3.3 - Passive degrees of freedom (pDOFs)**



1. Scapulae hinge
2. Rear elastic bands
3. Vertical-axis hinge
4. Rear horizontal-axis sliding rails
5. Arm support sliding rails

### 3.1.3 Torque Generating Box

Fig. 3.4 - Torque Generating Box: overview



1. Mechanism housing structure
2. Hexagonal drive for assistance level adjustment
3. Outer shell
4. Lock/Unlock mechanism (LOCK/UNLOCK)

### 3.1.3.1 Operation of the Torque Generating Box lock/unlock mechanism

The TGB lock/unlock mechanism is a safety mechanism that prevents the TGB from activating or rotating when the exoskeleton is not worn. For the operating procedure, see [par. 3.1.3.2 Locking and unlocking the Torque Generating Box on page 22](#).

**Fig. 3.5 - Torque Generator Box in rear rest position. This is the only position where the locking mechanism can be activated or deactivated**



## DESCRIPTION

### 3.1.3.2 Locking and unlocking the Torque Generating Box

The LOCK position must be selected before the device is removed, and the UNLOCK position must only be selected after the *torque generating box* is locked to the arm:

- LOCK position: mechanism is locked, rotation is not allowed;
- UNLOCK position: mechanism is unlocked, rotation is free;



If you select UNLOCK when the device is not attached to the arm, the torque generating box can rotate freely and activate inadvertently, which may cause it to collide with people or objects.



The locking mechanism can be activated (switching between LOCK and UNLOCK) only when the Torque Generating Box is in the rear rest position (Fig. 3.5).

Fig. 3.6 - Torque Generating Box (TGB): locking mechanism



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## 3.2 Technical features

Feature	Description	
Size	S	L
Weight	2,85 kg (6,3 lb)	2,90 kg (6,4 lb)
Noise level	less than 70 dB(A)	
Operating temperature	0 to 45 °C (32 to 113°F)	
Protection degree	IP65: Total protection against dust and powerful water jets from any direction.	
UV resistance	UV resistant (DIN 75220:1992)	

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## 4. SET-UP

This chapter deals with the following topics:

- [Choice of MATE-XT GO size](#);
- [Lumbar support adjustment](#);
- [Shoulder width adjustment](#);
- [Tilt adjustment of the Torque Generating Box](#);
- [Adjusting the assistance level](#).



The following adjustments are intended to optimize the comfort and fit of the device. Settings that are not perfectly optimized do not prevent the use of the device or impair its assistance functionality; however, they may reduce the perceived comfort. It is therefore recommended to strictly follow the specified procedure.



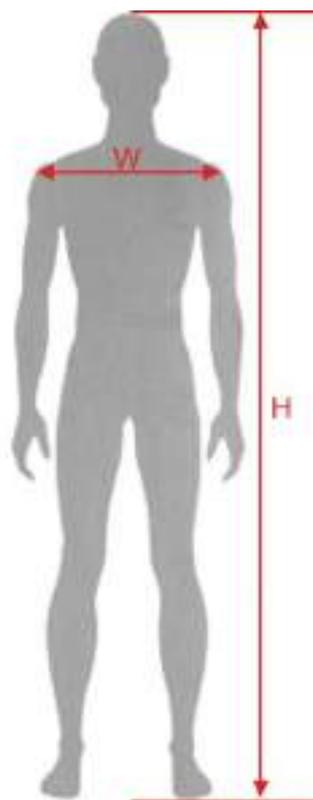
Please pay attention to the moving and rotating parts of the MATE-XT GO during the device adjustment.

## 4.1 Choice of MATE-XT GO size

The MATE-XT GO is available in two sizes: S and L.  
The table below helps selecting the right size for your physical structure.

**Tab. 4.1 - Choice of the size**

		Height H [cm]											
		<154	154-157	157-160	160-163	163-166	164-172	170-175	175-182	182-186	186-190	190-194	<194
Shoulder width W [cm]	<27	S	S	S	S	S	S-L	L	L	L	L	L	L
	33-37	S	S	S	S	S	S-L	L	L	L	L	L	L
	37-40	S	S	S	S	S	S-L	L	L	L	L	L	L
	40-44	S	S	S	S	S	S-L	L	L	L	L	L	L
	44-48	S-L	S-L	S-L	S-L	S-L	S-L	L	L	L	L	L	L
	<48	S/L	S/L	S/L	S/L	S/L	S-L	L	L	L	L	L	L



## 4.2 Lumbar support adjustment

Fig. 4.1 shows how to vary the adjustment of the lumbar support.

The lumbar support of the MATE-XT GO is adjustable in six levels. The correct setting is where:

- the lumbar pad rests on the lumbar curve of the column, allowing the device to rest on the iliac crest;
- the top of the backrest comes into contact with the scapulae

Refer to Fig. 4.1 for the procedure to adjust the device.

The following table may assist the user when fitting the exoskeleton for the first time.



After the first adjustment of the lumbar support, make small adjustments until you feel a comfortable and stable support, with the lumbar pad correctly aligned with the lumbar region and firmly anchored even after repeated movements. The main support of the device must rest on the iliac crest (pelvis) and not on the shoulder straps: avoid the so-called "backpack effect".

**Tab. 4.2 - Selection of lumbar support level**

	Height [cm]	Level to set
Size S	Up to 154	1
	154 to 157	2
	157 to 160	3
	160 to 163	4
	163 to 166	5
	166 to 172	6
Size L	170 to 175	1
	175 to 182	2
	182 to 186	3
	186 to 190	4
	190 to 194	5
	More than 194	6



Adjust the back support when the device is not fitted.

1. Open the protective panel on the back of the device.
2. Pull back the spring-loaded button.
3. Remove the Velcro fastener located on the lower part of the T.
4. Slide the metal support inside the plastic panel until reaching the level indicated in the previous table.
5. Release the spring-loaded button to lock it in position and close the protective panel to return it to its original configuration.

**Fig. 4.1 - Lumbar support adjustment**

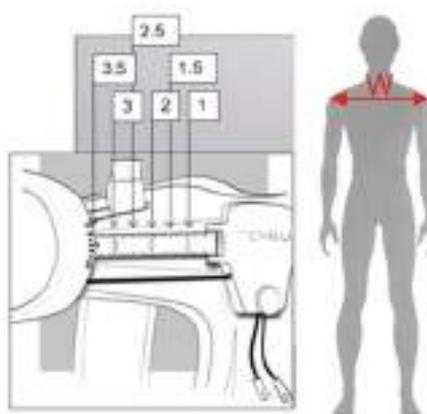


### 4.3 Shoulder width adjustment

The table below provides guidance on selecting the correct setting. First, measure your shoulder width without wearing the device. Then, adjust the lengths of the rear elastic straps by pulling or loosening them as needed, as shown in Fig. 4.2.

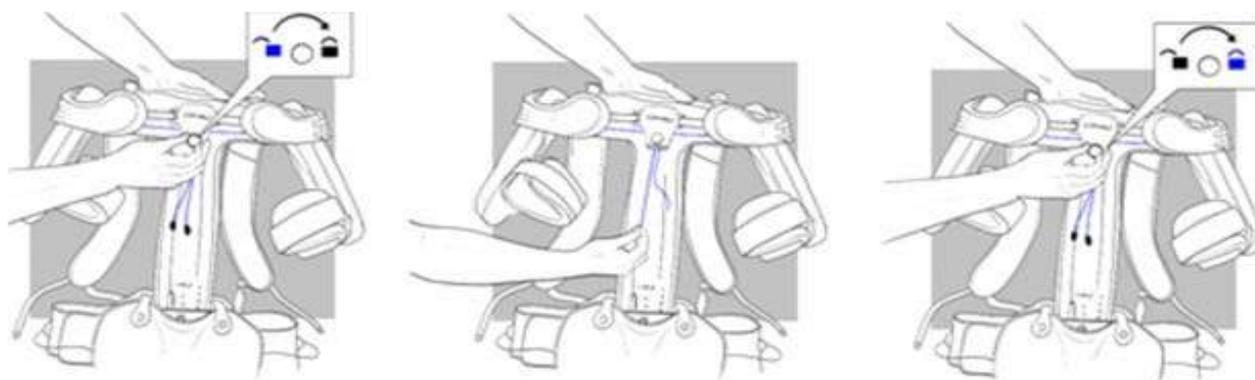
**Tab. 4.3 - Selection of shoulders fit level**

Shoulder width (bilateral) W [cm]	Level to set
Up to 31	1
31 to 35	1.5
35 to 40	2
40 to 45	2.5
45 to 49	3
Over 49	3.5



Adjust the back support when the device is not fitted.

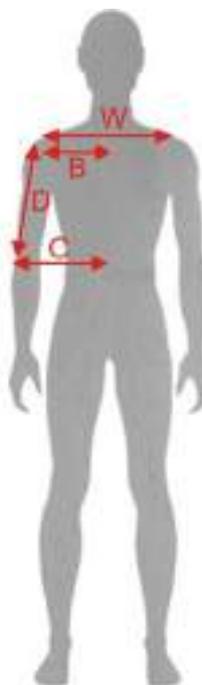
**Fig. 4.2 - How to adjust the rear elastic bands**



## 4.4 Tilt adjustment of the *Torque Generating Box*

Tab. 4.4 - Matrix for tilt adjustment

		D [cm]							
		Less than 31	31 to 34	34 to 38	38 to 41	41 to 44	44 to 47	47 to 50	50 to 53
C-B [cm]	Less than 1	1	1	1	1	1	1	1	1
	1 to 2	1	1	1	1	1	1	1	1
	2 to 3	2	2	1	1	1	1	1	1
	3 to 4	2	2	2	2	1	1	1	1
	4 to 5	2	2	2	2	2	2	1	1
	5 to 6	3	3	2	2	2	2	2	2
	6 to 7	3	3	3	2	2	2	2	2
	7 to 8	4	3	3	3	2	2	2	2
	8 to 9	4	4	3	3	3	3	2	2
	9 to 10	4	4	4	3	3	3	3	3
	More than 10	4	4	4	4	3	3	3	3



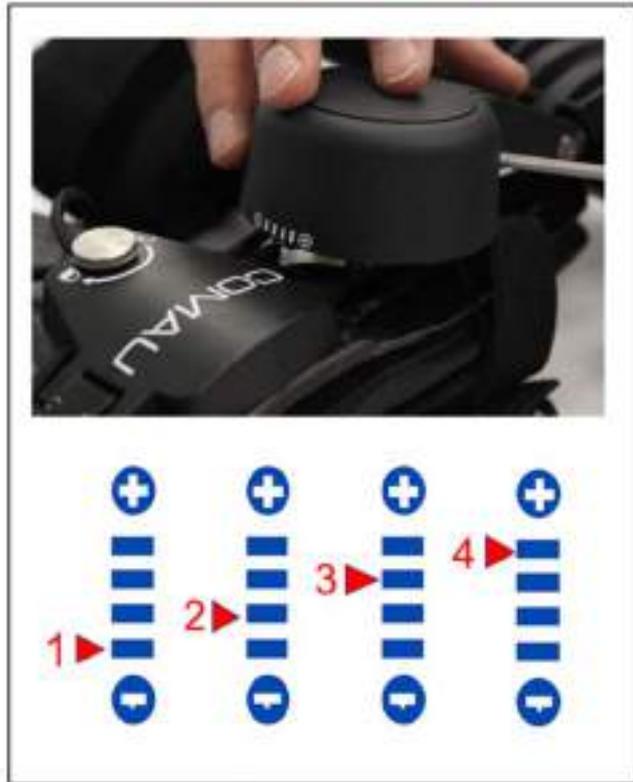
Size B is half the shoulder width (W), C is half the distance between the elbows and D is the length between the shoulder and the elbow.

## SET-UP

Required equipment:

- 4 mm Allen wrench

1. Place the Allen wrench in the hexagonal seat at the top of the passive degrees of freedom.
2. Turn the wrench so that the adjustment level gauge is at the level selected in the table above.



---

## 4.5 Adjusting the assistance level

The MATE-XT GO allows eight different gradual levels of assistance to be selected (where 1 = minimum and 8 = maximum). The initial level can be estimated in [Tab. 4.5](#) depending on the height and weight of the user. This value is a starting point: the optimum adjustment of the assistance level also depends on the type of task (static or dynamic) and on the load or used tool.

Adjusting the assistance level during first use:

- set the assistance level indicated in [Tab. 4.5](#).
- perform the work task for a few minutes (replicating the same postures and using the loads or equipment encountered in the real task).
- fine-tune the adjustment in small steps ( $\pm 1$  level) until the desired configuration is achieved. An optimal assistance level is reached when, while raising the arm, adequate and satisfactory support is perceived, and when lowering it, no resistance or additional effort is felt.

If fatigue or discomfort occurs during arm lowering, reduce the level; if the assistance is insufficient during arm raising, increase it.

The MATE-XT GO is equipped with two *Torque Generating Boxes*, one for each upper limb. Adjust the assistance levels on both units according to the type of work activity:

- If the activity is symmetrical (both arms perform the same tasks), it is recommended to set the same level on both boxes.
- If the task is asymmetrical (different use of the two arms, postures or loads), perform the adjustment procedure on both Torque Generating Boxes and set different levels according to the requirements of the right and left sides.

Reminder: it is recommended to record the optimal levels for the right and left sides to facilitate re-setting in subsequent sessions.



Using an incorrect assistance level may cause discomfort, but will not harm the user.



The assistance level can also be adjusted while wearing the device and during regular work routines.

**Tab. 4.5 - Range of assistance levels in relation to the height and weight of the user**

		Weight										
		50	55	60	65	70	75	80	85	90	95	100
Height	150	1	1	1	1	2	3	4	5	5	6	7
	155	1	1	1	1	3	3	4	5	6	7	7
	160	1	1	1	2	3	4	5	5	6	7	8
	165	1	1	1	3	3	4	5	6	7	7	8
	170	1	1	1	3	4	5	5	6	7	8	8
	175	1	1	2	3	4	5	6	7	8	8	8
	180	1	1	3	4	4	5	6	7	8	8	8
	185	1	1	3	4	5	6	7	8	8	8	8
	190	1	2	3	4	5	6	7	8	8	8	8
	195	1	3	4	5	6	6	7	8	8	8	8
	200	1	3	4	5	6	7	8	8	8	8	8

**Fig. 4.3 - Close-up view of the adjustment site on the *Torque Generating Box* and assistance level indicator**



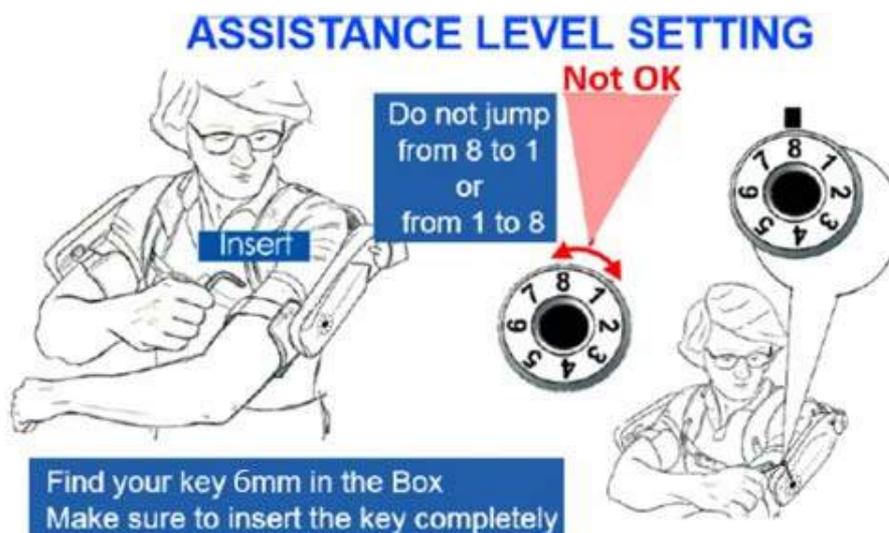
Equipment required:

- 6 mm Allen wrench
1. Insert the Allen wrench into the hexagonal seat on the *Torque Generating Box*.
  2. Turn the wrench to align the assistance level indicator (Fig. 4.3) in correspondence with the desired assistance level.



Do not switch directly from assistance level 8 to level 1, or from level 1 to level 8, to avoid any potential damage to the device.

**Fig. 4.4 - Assistance Level Setting**



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## 5. USE

This chapter deals with the following topics:

- [Precautions for use](#);
- [Wearing procedure](#);
- [Installing the extensions](#);
- [Front buckle adjustment](#);
- [Undressing procedure](#).

---

### 5.1 Precautions for use



Before starting to use the device, check the integrity of the pHRI and the cleanliness of the exposed mechanical parts of the pDOFs and TGB.

To prevent any malfunctions, ensure that the slides on the TGBs and pDOFs are free of dust and debris and remove any debris before use.

For cleaning procedures, refer to [par. 6.6.2 Inspection of the mechanical partson page 59](#) for the most suitable routine.

If the MATE-XT GO is uncomfortable or fatiguing, remove it and check the adjustments (belt, shoulder straps, assistance levels) before using it again; then you can put it on again.

Pay attention to the side clearance of the TGBs during use, while keeping adequate distance from people, obstacles and machinery.

Contact materials are biocompatible, non-toxic and non-allergic; if skin irritation occurs, remove device.

---

## 5.2 Wearing procedure

The MATE-XT GO is designed to be worn and removed by yourself. For the first fitting, the assistance of a trained person is required to facilitate understanding of the procedure and to identify the best combination of available adjustments.

### Preliminary instructions

- Do not place the device in direct contact with the skin, and ensure that clothing is appropriate: do not wear clothing that is too loose or too thick. It is recommended to wear a well-fitting cotton T-shirt or top.
- Make sure that the **locking** mechanism of the *Torque Generating Box* is in the **LOCK** position.
- Make sure that the Velcro belt (item 6 in [Fig. 3.2](#)) is easily accessible by hand.
- Pull the Velcro belt from both ends to obtain the maximum length.

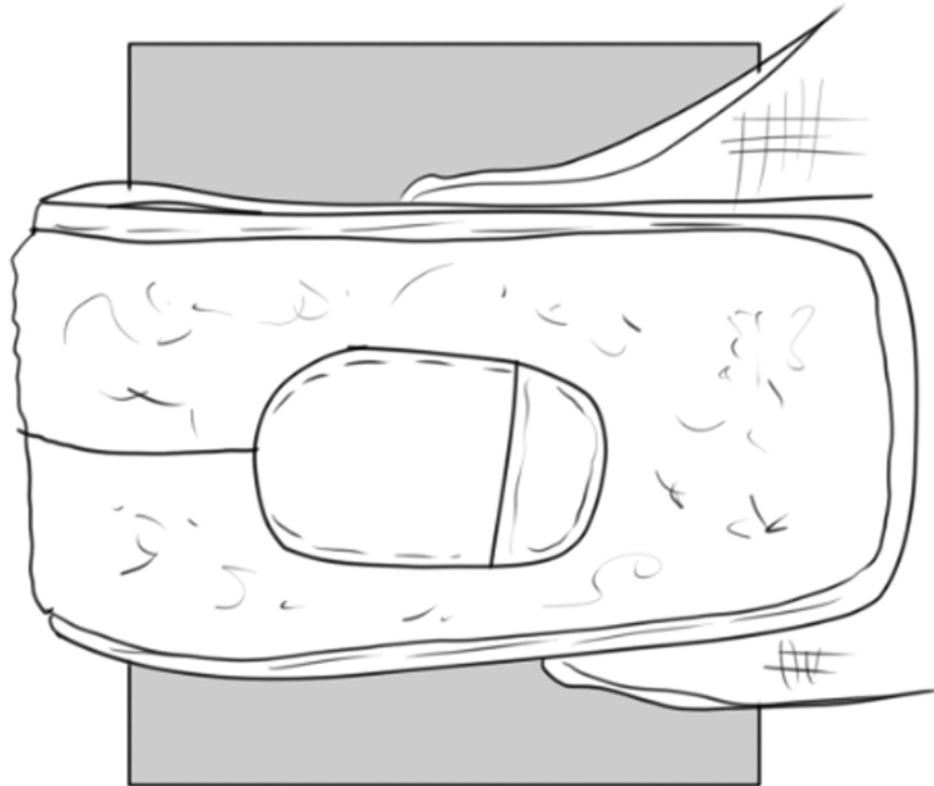
**Fig. 5.1 - Opening and extending the Velcro belt ends**



USE

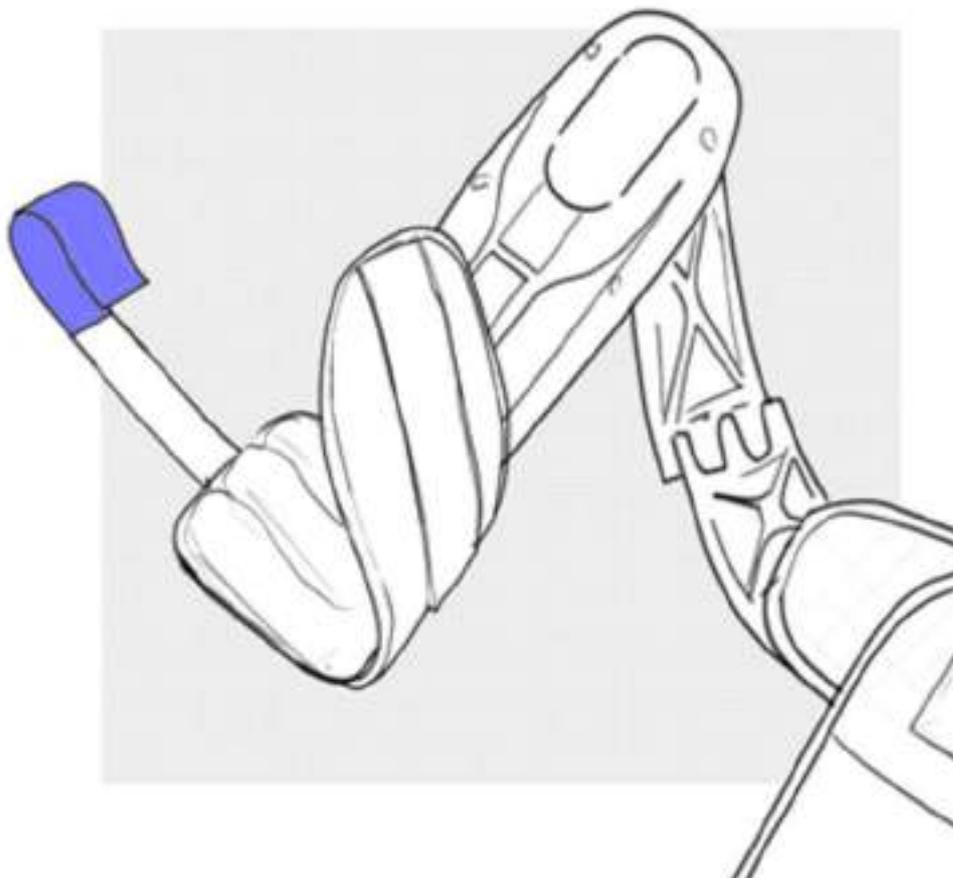
- Attach the Velcro ends of the adjustment straps to the belt.

**Fig. 5.2 - Velcro end positioned on the belt.**



- Open the straps of the arm supports.

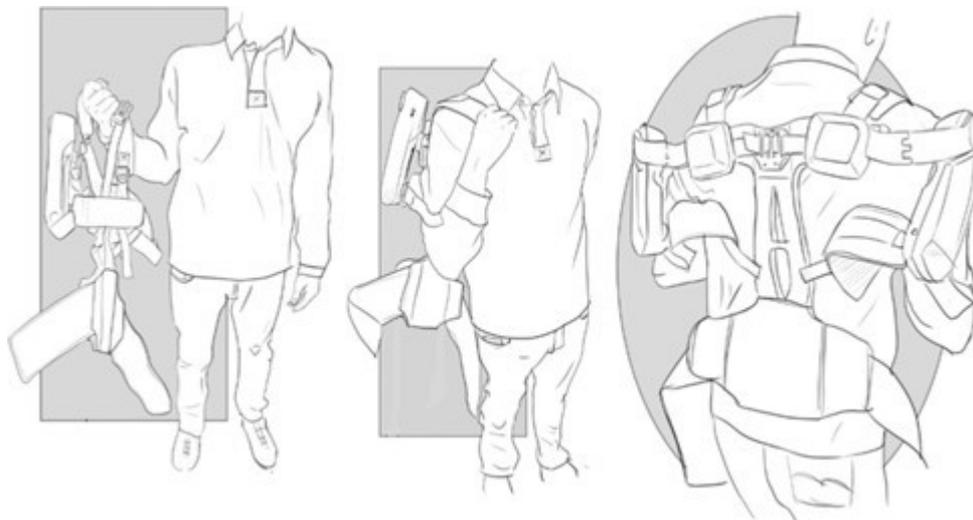
**Fig. 5.3 - Open the strap of the base arm support and temporarily attach the strap to itself**



## Wearing

1. Lift the MATE-Xt GO by a shoulder strap and wear it like a backpack.

**Fig. 5.4 - First step of wearing the MATE-Xt GO**



2. Close the Velcro belt.



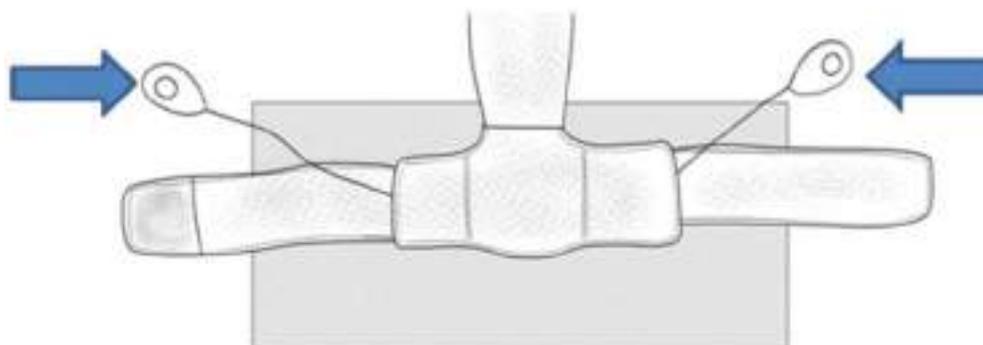
Correct wearing requires that the lumbar pad be positioned on the lumbar curve of the spine (this allows the MATE-Xt GO to rest on the iliac crest), and that the upper part of the back support rests on the scapulae.

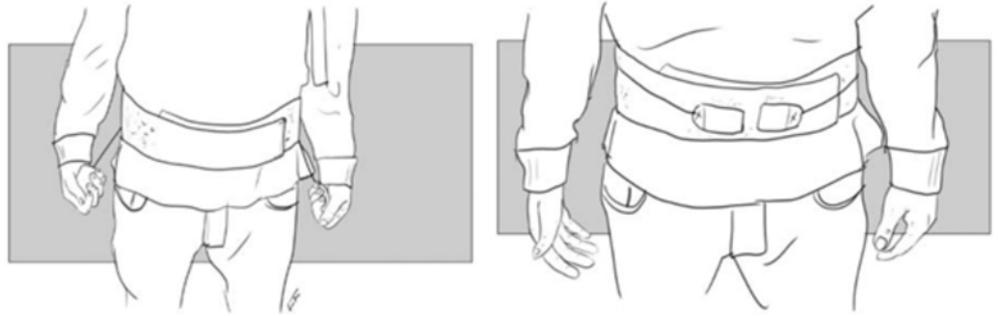


In order to avoid the “backpack effect”: ensure that the shoulder straps rest without compressing the shoulders or the trapezius muscle. If there is pressure, loosen the shoulder straps until there is approximately a two-finger space between the strap and the shoulder.

3. Adjust the tension of the Velcro belt by pulling the adjustment mechanism. Attach the Velcro ends to the belt to lock them in place.

**Fig. 5.5 - Closing the Velcro belt and adjusting its tension**

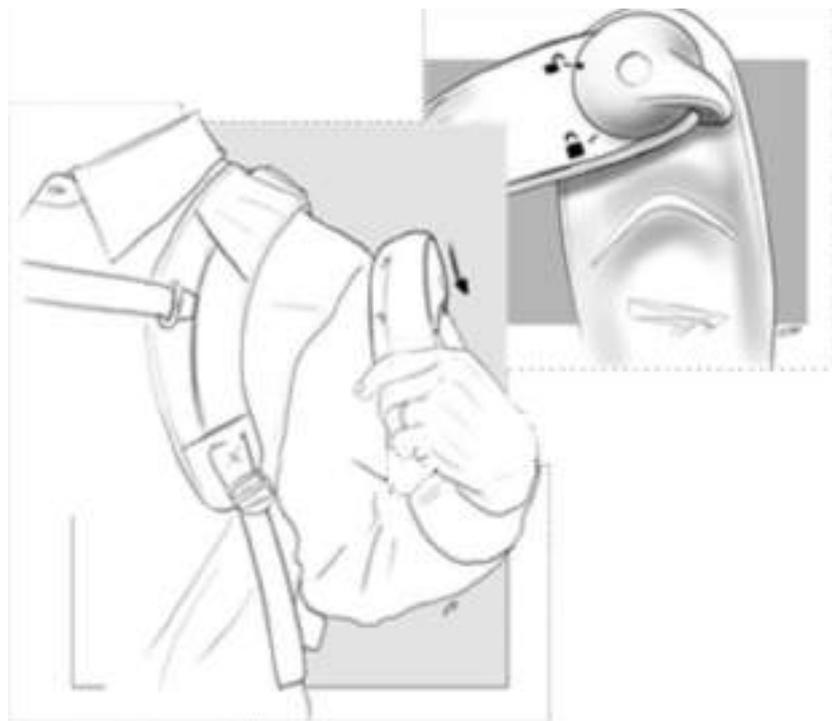




The adjustment of the Velcro tension belt is performed by pulling the laces with the visible Velcro ends in Fig. 5.5. By pulling and loosening them, it is possible to adjust the belt fit for different users and body sizes.

4. Repeat the following steps for each arm:
  - a. Release the *Torque Generating Box* lock mechanism.

**Fig. 5.6 - Releasing the *Torque Generating Box* lock mechanism.**



USE

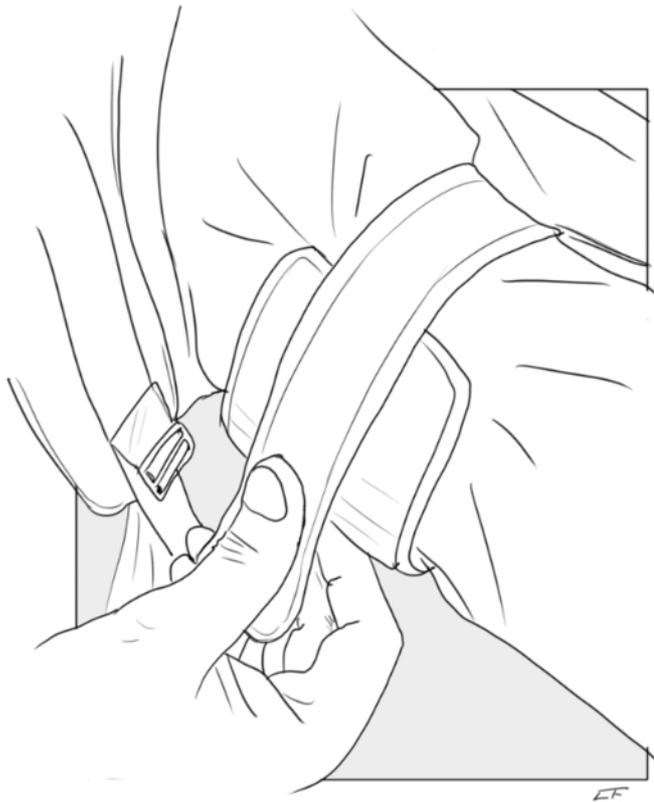
- b. Bring an arm into contact with the arm support
- c. Rotate the *Torque Generating Box* so that it supports the arm.

**Fig. 5.7 - Torque Generating Box activation procedure**



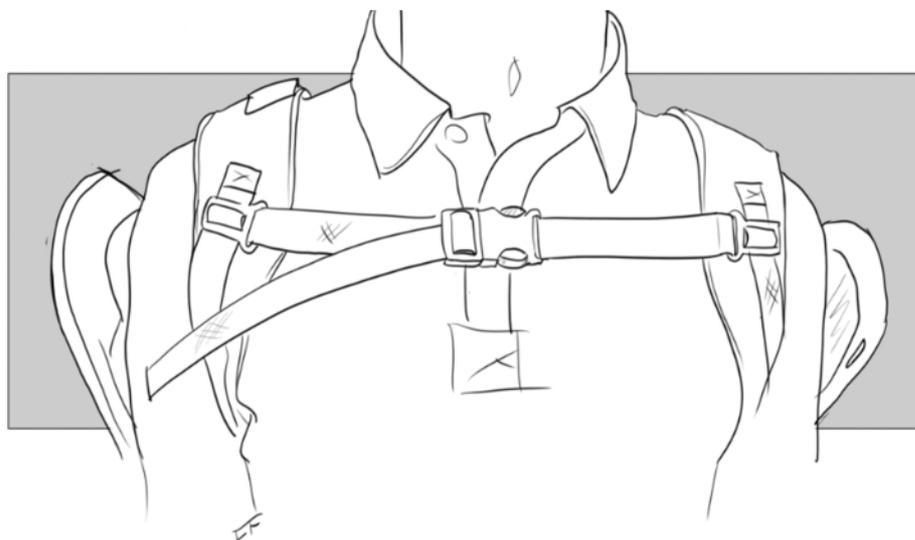
- d. Close the arm support strap.

**Fig. 5.8 - Closing the base arm support strap**



5. Close and tighten the front buckle.

**Fig. 5.9 - Closing the front buckle**



## 5.3 Installing the extensions

### 5.3.1 Belt extension

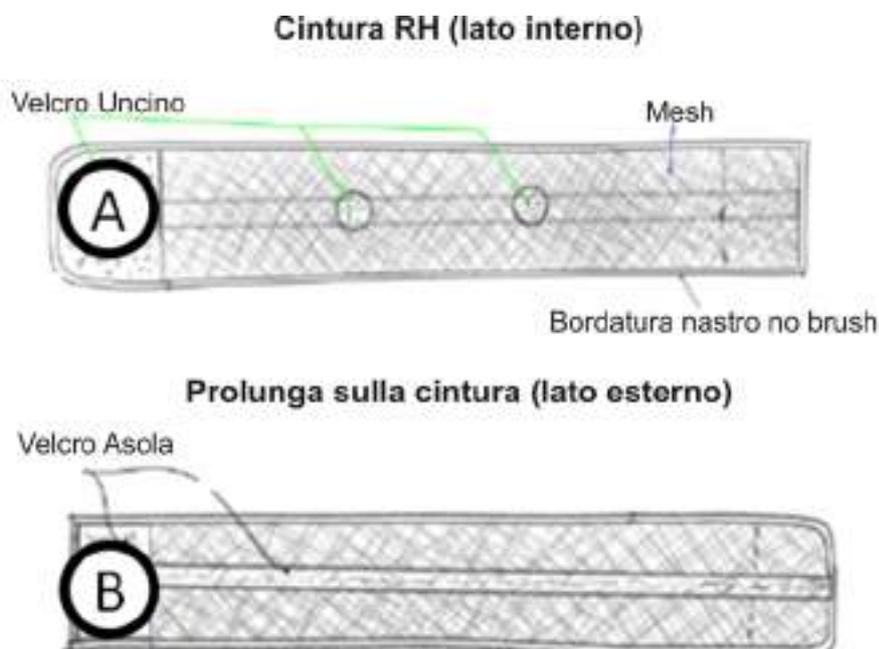
The MATE-XT GO (size L) comes with a Velcro belt extension to be installed, if required, depending on the circumference.

Follow the reference table:

**Tab. 5.1 - References for extension installation**

Waist circumference	Quantity of extensions
Less than 98 cm (3.21 ft)	not necessary
98 cm to 135 cm (3.21 ft to 4.43 ft)	1

**Fig. 5.10 - How to install the extension on the Velcro belt**



To install the extension, connect the Velcro end "A" of the belt to the terminal part of the extension "B", ensuring that the two parts are completely overlapped.

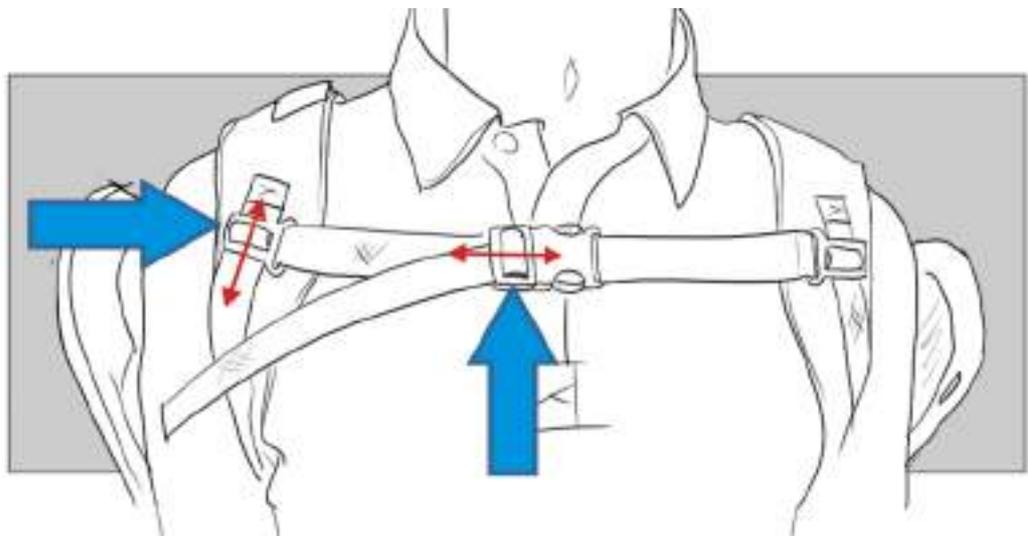
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## 5.4 Front buckle adjustment

Additional height and length adjustment of the front buckle may be required. Moving the shoulder straps closer together or further apart prevents relative slipping between the shoulder straps and the user's arms.

The position of the front buckle can be adjusted according to different body shapes by sliding it along the padded shoulder straps. Its length can also be adjusted to make it adjustable for a tighter or looser fit on the user's chest.

**Fig. 5.11 - Front buckle adjustment**



## 5.5 Undressing procedure



The following operations must be repeated for both arms separately.

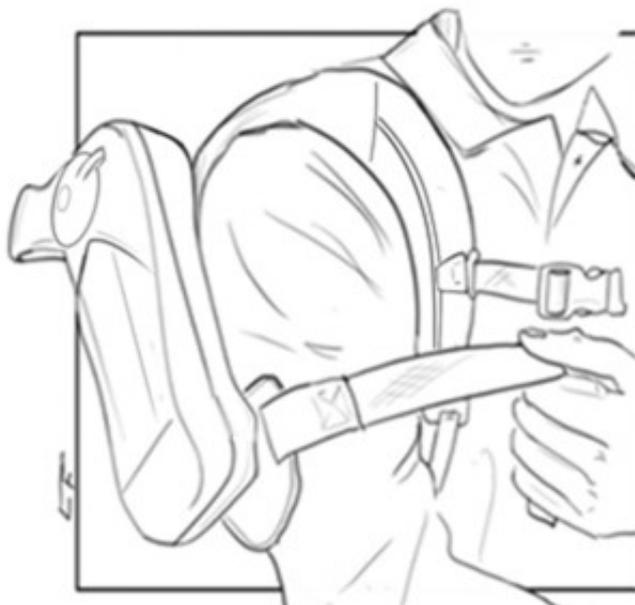
1. Move the arm of one of the two arms backward.

**Fig. 5.12 - Arm in backward position**



2. Open the corresponding arm support strap and close it on itself as shown in [Fig. 5.13](#).

**Fig. 5.13 - Opening the base arm support strap**



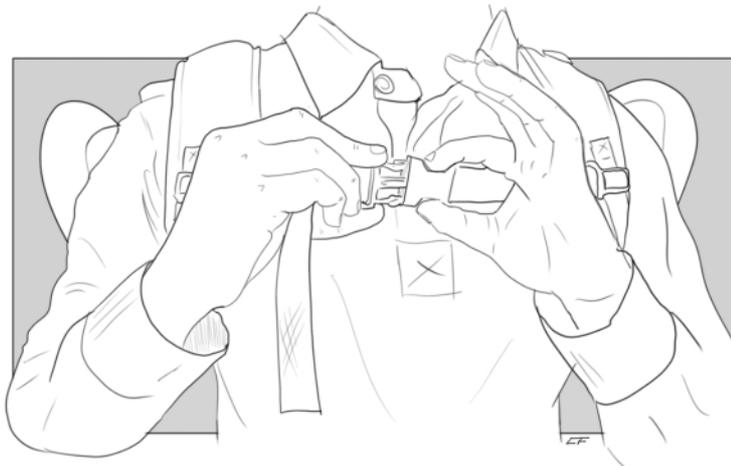
3. Lock the corresponding *Torque Generating Box* lock mechanism .

**Fig. 5.14 - Locking the *Torque Generating Box* lock mechanism.**



4. Open the front buckle.

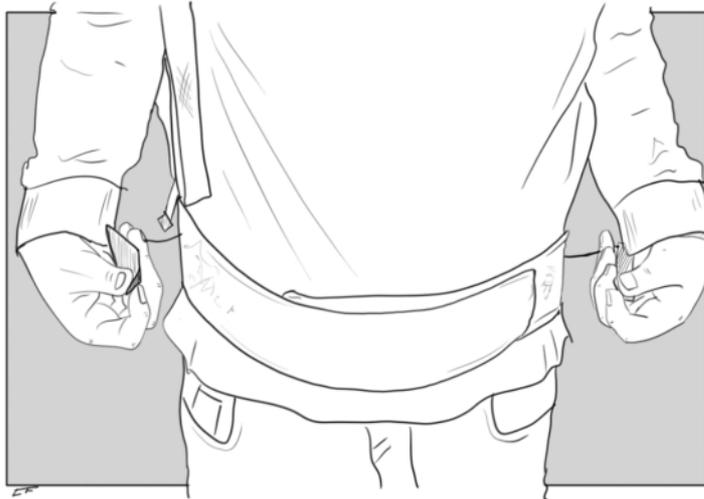
**Fig. 5.15 - Opening the front buckle**



USE

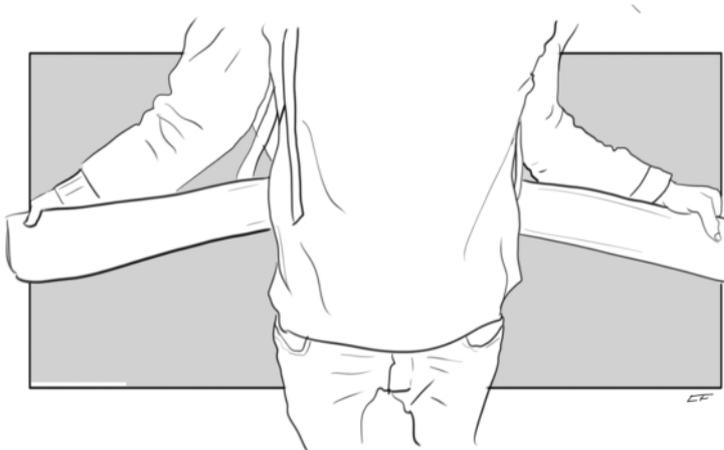
5. Detach the Velcro ends of the adjustment straps and attach them laterally on the Velcro belt.

**Fig. 5.16 - Opening the Velcro belt adjustment straps**



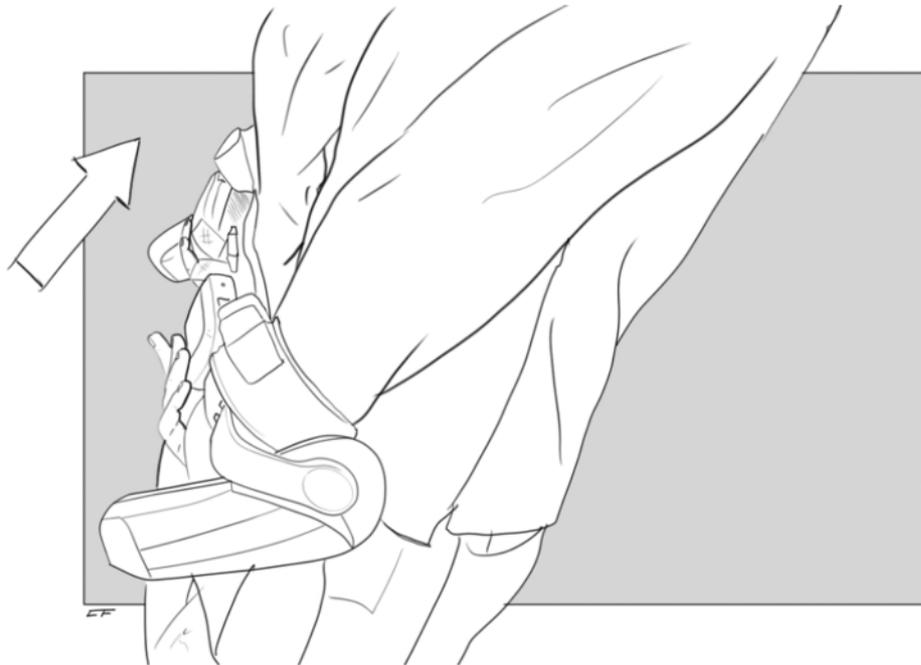
6. Open the Velcro belt.

**Fig. 5.17 - Opening the Velcro belt**



7. Remove the MATE-XT GO from the padded shoulder straps.

**Fig. 5.18 - Last step of the MATE-XT GO undressing**



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## 6. CLEANING AND MAINTENANCE OF THE DEVICE

This chapter deals with the following topics:

- [Sanitation](#);
- [Cleaning the mechanical parts](#);
- [Cleaning the fabric parts](#);
- [Removal procedure of fabric parts](#);
- [Reassembly procedure of fabric parts](#);
- [Scheduled Maintenance](#);
- [Spare parts list](#).

---

### 6.1 Sanitation

- To sanitize the parts of the MATE-XT GO we recommend the use of a spray with max. 60% concentration of alcohol.
- Sanitation can be performed every day.

## 6.2 Cleaning the mechanical parts

- Clean the hard parts and exposed mechanical components of the device MATE-XT GO using a dry cloth or one slightly moistened with water and neutral soap.
- Do not use aggressive cleaning agents, gas, alcohol or solvents.
- Check that the slides located on the *Torque Generating Box* and on the pDOFs are free from dust and debris.

**Fig. 6.1** - Detail of the slides on the *Torque Generating Box* and pDOFs



---

## 6.3 Cleaning the fabric parts

All fabrics and padded parts can be disassembled and washed.

With daily use of the device, it is recommended to wash them approximately once a month, following these instructions and procedures:

- [Washing instructions for fabric parts.](#)

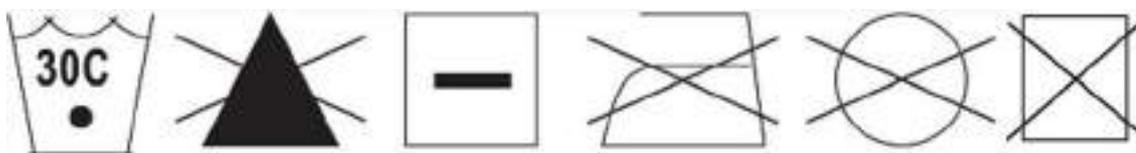
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### 6.3.1 Washing instructions for fabric parts

Use the instructions in [par. 6.4 Removal procedure of fabric parts on page 51](#) to disassemble the washable parts from the device.

Follow the guidelines below to wash the fabric parts of the wearable interface:

- Machine wash cold;
- Do not bleach;
- Dry on level ground;
- Do not iron;
- Do not dry clean;
- Do not use the dryer;
- Use mild soaps, do not use softeners.



Wash the components individually using a laundry bag, making sure that the Velcro straps are closed.

After washing and drying, use the procedure in [par. 6.5 Reassembly procedure of fabric parts on page 54](#) to reassemble the wearable parts on the device.

It is also possible to wash soft parts directly on the MATE-XT GO without disassembling the device, using a sanitation spray for fabrics (see [par. 6.1 Sanitation on page 48](#)).

## 6.4 Removal procedure of fabric parts

Removing the fabric parts requires separating the parts such as the Velcro and the buckles from the fixtures.

The necessary steps are shown in the following procedure.



Step 1:  
– remove the right shoulder strap.

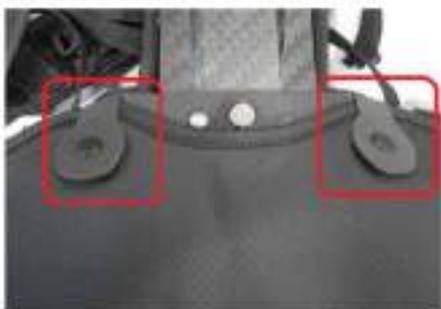
Step 2:  
– pull the string out of the buckle.



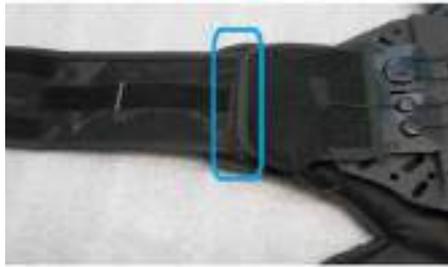
Step 3:  
– release the aluminium buckle.



Step 4:  
– open the lumbar pad using the 2 press-fit buttons.



CLEANING AND MAINTENANCE OF THE DEVICE



Step 5:

- remove the lumbar bands from the frame using the Velcro straps
- 



Step 6:

- separate the Velcro parts from those on the movable parts of the lumbar support.

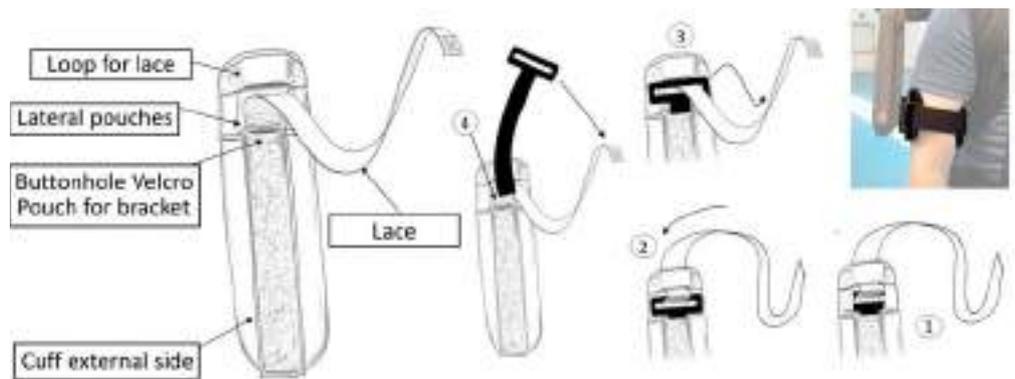


**Step 7:**

- remove the pad from the Velcro-secured T-frame.

**Step 8:**

- release the Velcro tape from the loop and slot of the aluminium support;
- remove the fabric arm support by pulling it out of its seat;
- repeat for the right-hand side and the left-hand side.



## 6.5 Reassembly procedure of fabric parts

Reassembling the fabric parts requires mounting the parts such as the Velcro and the buckles on the fixtures.

The necessary steps are shown in the following procedure.



**Step 1:**

- insert the right-hand arm supports.



**Step 2:**

- insert the left-hand arm supports.



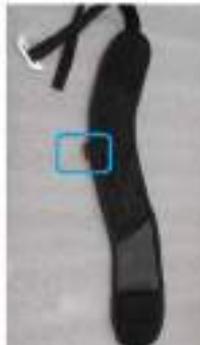
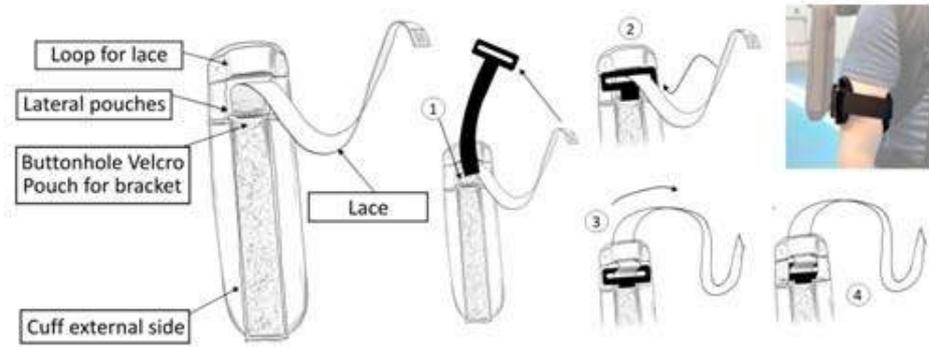
**Step 3:**

- pass the Velcro tape through the slot of the aluminium support and then through the loop of the fabric arm support;
- close the Velcro on the other side (right side).

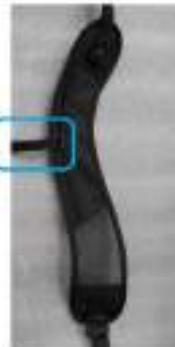


**Step 4:**

- pass the Velcro tape through the slot of the aluminium support and then through the loop of the fabric arm support;
- close the Velcro on the other side (left side).



Left shoulder strap



Right shoulder strap



**Step 5:**

- insert the strap into the slot on the carbon frame from the inside to the outside;
- turn it back toward the plastic buckle.

CLEANING AND MAINTENANCE OF THE DEVICE



Step 6:

- insert the right and left shoulder strap belt into the T-frame.
- then insert into the buckle in steps 1 and 2.



The white mark on the strip must be visible toward the plastic ring.



Step 7:

- on the right-hand side, insert the aluminium retainer into the second slot starting from the top of the plastic lumbar structure.



Lumbar structure



Step 8:

- using the Velcro, place the back Soft Cover on the carbon T-frame.



Be careful when aligning the Soft Cover with the carbon T.

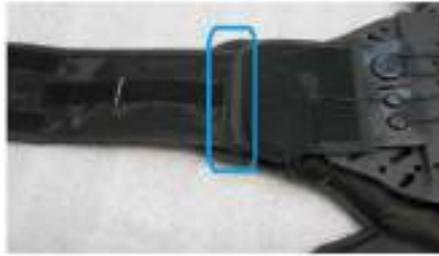
**Step 9:**

- mount the movable parts on the lumbar support by inserting them into the specific housing and rotating them outwards to secure them.

**Step 10:**

- insert the lumbar pad into the plastic support.

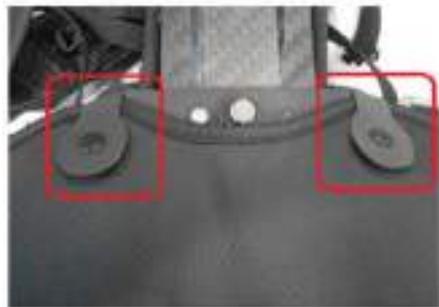
CLEANING AND MAINTENANCE OF THE DEVICE



- Step 11:**
- install the lumbar bands by matching the related Velcro parts with those on the floating parts of the lumbar support plastic structure.



- Step 12:**
- repeat on the right-hand side.



- Step 13:**
- close the lumbar pad using the 2 press-fit buttons.

## 6.6 Scheduled Maintenance

Scheduled maintenance carried out at the specified intervals ensures that your MATE-XT GO is operating for a long and reliable period.

Frequency	Activity required	Reference
Annual	<a href="#">Inspection of fabric parts (pHRI)</a>	<a href="#">par. 6.6.1</a>
	<a href="#">Inspection of the mechanical parts</a>	<a href="#">par. 6.6.2</a>

### 6.6.1 Inspection of fabric parts (pHRI)

Inspect the integrity of the fabric parts annually.

After one year of daily use of the device, some of the fabric parts of the pHRI may need to be replaced.

To remove the worn part of the fabric, proceed as usual for cleaning and washing (see [Removal procedure of fabric parts](#)) and replace the damaged part with the original part listed in [par. 6.7 Spare parts list on page 60](#).

### 6.6.2 Inspection of the mechanical parts



The MATE-XT GO does not require scheduled maintenance on mechanical parts. A periodic visual inspection is sufficient to check for dust or debris on the *Torque Generating Box* and pDOF slides/guides; remove dust or debris, if any.

It is recommended that this inspection be performed before use and more frequently in dusty environments. For cleaning procedures, see "Cleaning the mechanical parts".

Do not disassemble/reassemble any part of the MATE-XT GO (except for removal of fabric parts for cleaning).

In case of impact, check the integrity of the MATE-XT GO; if any damage is found, discontinue use and contact COMAU.

Please refer to COMAU for technical assistance ([www.comau.com/mate](http://www.comau.com/mate)).

## 6.7 Spare parts list



For maintenance of the MATE-XT GO, only use original spare parts. Do not use spare parts for different purposes than those indicated.

The following tables show:

- Fabric kit spare parts, size S (individual parts are not supplied)
- Fabric kit spare parts, size L (individual parts are not supplied)
- Torque Generating Box spare parts

**Tab. 6.1 - Fabric kit spare parts, size S (individual parts are not supplied)**



Position	Comau Part No.	Description	Quantity
1	CR82458705	T-structure padding	1
2	CR82458606	Lumbar pad	1
3	CR82458607	Right belt	1
4	CR82458608	Left belt	1
5	CR82458601	Arm supports	2
6	CR82458603	Right shoulder strap	1
7	CR82458604	Left shoulder strap	1
---	CR82458700	Complete kit	---

**Tab. 6.2 - Fabric kit spare parts, size L (individual parts are not supplied)**



Position	Comau Part No.	Description	Quantity
1	CR82458605	T-structure padding	1
2	CR82458606	Lumbar pad	1
3	CR82458607	Right belt	2
4	CR82458608	Left belt	1
5	CR82458601	Arm supports	2
6	CR82458603	Right shoulder strap	1
7	CR82458604	Left shoulder strap	1
---	CR82458600	Complete kit	---

Tab. 6.3 - Torque Generating Box spare parts



The image shows two black torque generating boxes. The box on the left is labeled with a small '1' in a square, and the box on the right is labeled with a small '2' in a square. Both boxes have 'MATE' printed on them and a circular component at the bottom.

Position	Comau Part No.	Description	Quantity
1	CR82458200	Torque Generating Box right	1
2	CR82458300	Torque Generating Box left	1

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## 7. DISPOSAL OF PARTS

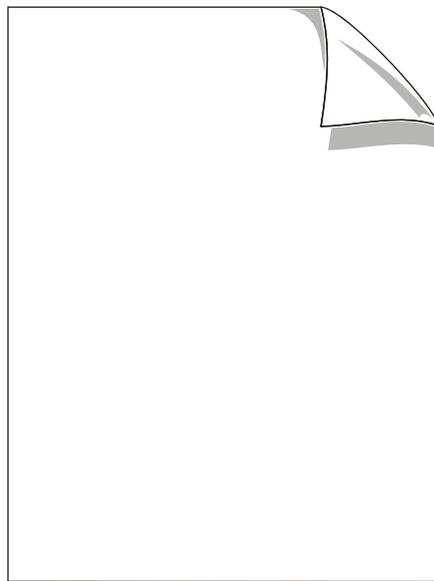
- If partial or complete disposal of the MATE-XT GO is necessary, the parts to be disposed of must be collected separately (e.g., metal with metal, plastic with plastic).

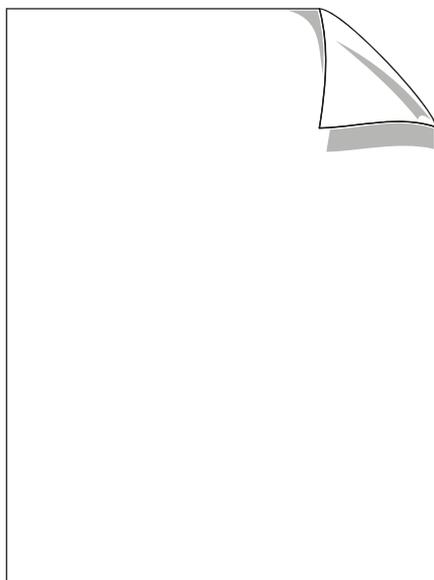


Disposal operations must be carried out in accordance with the legislation of the country in which the MATE-XT GO is used.

The plastic parts of the MATE-XT GO are type 7, according to European Directive 97/129/EC.

DISPOSAL OF PARTS







[robotics.comau.com](http://robotics.comau.com)

**Original instructions**

**Made in Comau**