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MATE-XB

Muscular Aiding Tech
Exoskeleton



WHAT IS MATE-XB?

MATE-XB is a **non-powered** exoskeleton for relieving the muscular effort at the **lumbar district** for workers who need to move weights. It supports the user while working in **different positions**, e.g., when bending with the legs (squatting), bending forwards, or repetitive lifting of loads. The device is **designed to reduce back strain** during these activities and **improve the quality** of the user's work experience.

TORQUE GENERATING BOX (TGB)

Core mechanism that stores and transforms potential mechanical energy in order to create an adjustable assistive torque.

- Assistance is proportional to the torque generated by the upper part of the body
- Gentle assistance up to 25 kg
- Possibility of tuning the amount of support over 5 levels
- No hindrance while walking



GARMENT INTERFACE

All parts in direct contact with the user's body.

- Breathable and bio-compatible materials
- Wide contact area to distribute reaction forces without causing high-force points

MECHANICAL KINEMATIC CHAIN

Structure that facilitates the free movement of the user.

- The device allows the user to move the trunk freely
- The passive kinematic chain is designed to be compact around the human body
- The passive kinematic chain is designed to deal with the human-exoskeleton kinematic compatibility

HOW DOES IT WORK?

MATE-XB GIVES YOU THE EXACT LEVEL OF SUPPORT WHEN AND WHERE YOU NEED IT



The assistance provided by the MATE-XB exoskeleton mimics the effect of the trunk flexion on the lower back.

MATE-XB MOVES IN ARMONY WITH YOUR BODY



Thanks to a chain of passive degrees of freedom, the exoskeleton allows the whole user's freedom of movement.

JUST THE WAY YOU DO

MATE-XB FIT YOUR BODY

GIVING YOU THE FREEDOM TO MOVE



MATE-XB WORKS WHEN, WHERE AND HOW YOU DO.

EXTREMELY ERGONOMIC, EVERYWHERE

**FULL MOBILITY
OF THE ENTIRE BODY**

**EASY SELECTABLE
ASSISTANCE**

**LIGHTWEIGHT AND
ROBUST STRUCTURE**

COMPACT DESIGN

**EASY ENABLE/
DISABLE SWITCH**

**FAST DONNING
AND DOFFING**

**HIGH
PERSONALIZATION/FITTING**

**INTUITIVE AND
EASY-TO-USE ADJUSTMENTS**

EXTERNAL RESISTANCE



WHY IS MATE-XB UNIQUE?

FOR WORKERS

**REDUCED
MUSCULAR
EFFORT**

35% ↓
ON THE
BACK

Using MATE generates a steady reduction in back muscle activation during activities, reducing muscular strain

**PERCEIVED
EFFORT
REDUCTION**

50% ↓
ON THE
LOW BACK
ZONE
PERFORMING ACTIVITIES

Workers' perception highlighted high correlation between perceived strain reduction and the measured reduced muscular effort

FOR COMPANIES

**POSITIVELY
IMPACT YOUR
ERGONOMICS**

**LOW-COST
FLEXIBLE
ERGONOMIC
SOLUTION**

**DEPLOYABLE IN
AREAS WHERE
AUTOMATION IS
NOT POSSIBLE**

**ADDRESS
WORK-RELATED
MUSCULOSKELETAL
DISORDERS**



MATEX B



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