Contents

About the Lift arm....................................................................................................................................................3

Normal use definition............................................................................................................................................ 5

Symbols used in this manual................................................................................................................................6

Lift arm specifications............................................................................................................................................ 7

Safety information...................................................................................................................................................8

Warranty information........................................................................................................................................... 10

Lift arm components..............................................................................................................................................11

Lift arm control box and cables........................................................................................................................13

Lift arm limit switch.............................................................................................................................................. 15

Controlling tilt up / down control.........................................................................................................................16

Using the swing-away mechanism.....................................................................................................................17

Cleaning..................................................................................................................................................................... 19

Support..................................................................................................................................................................... 20

Product end of life - servicing and disposal......................................................................................................... 21
About the Lift arm

This section describes the purpose of the Lift arm.

The Lift arm is an accessory that can be used to mount the KINOVA JACO® Assistive robot onto a powered wheelchair. The Lift arm mechanism increases the range and flexibility of the robot. (robot sold separately)

A swing-away mechanism lets you move the Lift arm and robot out of the way temporarily to facilitate getting into and out of the wheelchair.

⚠️ The robot and Lift arm will still function when the Lift arm is swung out. However, they should not be used when the swing-away mechanism is engaged.

A lift mechanism (tilt down) makes it easier to reach objects that are low (something on the floor or under a table).

The Lift arm is available in both left- and right-handed configurations, depending on which side of the powered wheelchair the device will be installed on.
Left-handed configuration  Right-handed configuration
Normal use definition

This section describes the expected normal use of the Lift arm.

The Lift arm is intended to expand the vertical range of the KINOVA JACO® Assistive robot while the wheelchair is stationary.

It is not meant to be activated while the wheelchair is in motion, nor is it intended to augment the maximum weight capabilities of the arm.

Users should not use the Lift arm to attempt to lift objects weighing more than the maximum payload specified for the robotic arm.

Refer to the KINOVA JACO® Assistive robot  User Guide for more details.
## Symbols used in this manual

This section describes the symbols used in the manual.

The following symbols are used in this manual:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Pinch point symbol" /></td>
<td>Pinch point</td>
</tr>
<tr>
<td><img src="image" alt="Warning / caution symbol" /></td>
<td>Warning / caution</td>
</tr>
<tr>
<td><img src="image" alt="Restriction of Hazardous Substances (RoHS)" /></td>
<td>Restriction of Hazardous Substances (RoHS)</td>
</tr>
<tr>
<td><img src="image" alt="Read all accompanying instructions" /></td>
<td>Read all accompanying instructions</td>
</tr>
</tbody>
</table>
**Lift arm specifications**

This section describes dimensions and specifications of the Lift arm.

- Weight: 5.6 kg (12.3 lbs)
- Dimensions (including mounting clamps): 500mm x 116mm x 164mm
- Control box dimensions: 115mm x 95mm x 55mm
- Swing-away mechanism maximum angle: no limit other than running into the wheels or side of the wheelchair, depending on the setup and wheelchair
- Maximum tilt down (forward) angle: 64°
- Maximum tilt up (backward) angle: 3°
- Maximum Duty cycle: 10% (Operation for 2 minutes maximum in every 20 minute period. Let rest 10 minutes for each one minute of continuous use with continuous use not exceeding two minutes.)
- Electrical rating: 24V, max 2.7A

Weight and dimensions are for the Lift arm alone and do not include the KINOVA JACO® Assistive robot.
Safety information

This section describes safety considerations for the Lift arm.

While using the Lift arm, please pay attention to the following safety issues to avoid injury or damage to the equipment.

• The Lift arm should only be installed by a trained and certified Kinova-approved professional.

• No parts should be repaired or replaced by the end user. If any problem with the device occurs, repairs are to be made only by a Kinova-certified technician.

• Do not open the internal mechanisms of the Lift arm or Lift arm controller. This should only be performed by the manufacturer. Opening the lift mechanism will void the warranty and could result in improper functioning of the device that endangers the user.

• If the device is not responding properly to controls, do not use the device until it has been verified by a trained and certified technician. Contact Kinova support for more details.

• After using the Lift arm, you need to allow time for the electromechanical actuator inside the unit to cool down properly before using the Lift arm again. Allow 10 minutes of rest after each minute of use. The maximum period of continuous use should not exceed 2 minutes. Failure to follow these limits may result in damage to the Lift arm mechanism.

• The software in the Kinova robot that governs protection zones around the user and the defined trajectories of the robot assumes that the base of the robot is stationary in relation to the wheelchair and user. The software does not take into account the tilt movements of the Lift arm. Be cautious and attentive when using the robot with the Lift arm lowered, to avoid collisions between the robot and your body and/or the wheelchair.

• Ensure when lowering the Lift arm that the gripper on the end of the robot arm does not make contact with the floor or ground.

• The robot still holds up the full weight of any object, so attempting to lift a heavier object may cause damage to the robot or the Lift arm. Such damage would fall outside the limitations of the warranty.

• Do not use the Lift arm in heavy rain or snow. Do not immerse it in water or other liquids. Wipe off the device after exposure to water or liquids.

• Do not use the robot or tilt the Lift arm when the swing-away mechanism is engaged.

• The swing-away action of the Lift arm should only be activated when the wheelchair is stationary. Do not move the wheelchair while the Lift arm is swung out to the side. There is a risk of the arm hitting an object and damaging the robot or the Lift arm. Be cautious when driving the wheelchair forward while the Lift arm is lowered and the gripper of the robot is close to the floor / ground. Driving the wheelchair while the robot is in contact with the floor / ground could damage the robot arm or the Lift arm and/or cause serious injury.
• When the Lift arm is swung out to the side, do not apply extra weight on the robot and Lift arm. This will put stress on the mounting connectors attaching the lift arm to the wheelchair, as well as to the mounting rail of the wheelchair.

• Make sure that the swing-away mechanism is latched and that the Lift arm is level when passing through narrow areas. This includes, but is not limited to, doorways, narrow hallways, or aisles in shops.

• The Lift arm has potential pinch points. These are labeled on the Lift arm. The risk is low for users, but you should ensure that bystanders, particularly children, have their fingers clear of the lift mechanism before engaging the Lift arm.

• Buttons should not be disconnected from the Lift arm controller except by a Kinova-approved professional.

• The limit switch should only be adjusted by a Kinova-approved professional.
Warranty information

This section describes warranty information for the Lift arm.

1 year against defects in materials or workmanship.

Warranty claims shall be voided if:

- Conditions specified in the user manual are ignored.
- The device is used outside the normal use definition.
- Any part of the appliance is modified or opened.
- Repairs or replacements are carried out by anyone other than a certified and approved professional.
Lift arm components

This section describes the main components of the Lift arm.

The Lift arm system consists of the Lift arm itself and a control box.

The Lift arm is made up of:

- Wheelchair mounting bracket - for mounting the Lift arm on the wheelchair
- Robot mounting post - a mounting point for the robot on the Lift arm
- Electromechanical lift actuator - a motor to lower / lift the Lift arm and robot
- Lift actuator limit switch - sets a limit to how far down the Lift arm can tilt
- Body of Lift arm - chassis / frame housing the lift actuator and supporting the weight of the mounted robot
- Hinged swing-away mechanism with hinge and latch - allows the Lift arm to swing away from the wheelchair to facilitate entry and exit from the wheelchair
- Bumper screw - prevents wobble in the swing-away latch
**Lift arm control box and cables**

This section describes the *Lift arm* control box.

Figure 1: Control box

The *Lift arm* control box is a connection and control hub that serves to interconnect:

- The *Lift arm* with the wheelchair power supply
- The *Lift arm* with the user control push buttons

At the bottom of the control box is a hole through which a bundle of three cables runs, as well as two 3.5 mm mono audio jacks. These are for connecting push buttons to control the tilt-forward / tilt-backward action of the *Lift arm*.

**Note:** Control push buttons are not included with the product.
Figure 2: Control box connections

The cables running out of the bottom of the control box are as follows:

- A cable to connect to the wheelchair power supply
- A cable to provide power and control to the Lift arm motor
- A cable to connect to the Lift arm limit switch
**Lift arm limit switch**

This section describes the *Lift arm* limit switch.

The *Lift arm* includes a limit switch. This serves to limit the extent to which the lift arm tilts forward. This angle limit is adjustable during installation.

⚠️ The limit switch should only be adjusted by a Kinova-approved professional.

When the downward tilt of the *Lift arm* reaches the angle limit, the *Lift arm* will no longer respond to inputs from the user tilt down push-button control.
Controlling tilt up / down control

This section describes the control of the Lift arm to tilt the arm down or up. Control buttons let the user control the tilt down (forward) and tilt up (backward) functionalities. There are two separate buttons. One button is used to make the Lift arm tilt down (forward), and the other button causes the Lift arm to tilt up (backward).

Hold down the appropriate button until the Lift arm is inclined to the desired level, and then release. If you tilted the Lift arm farther than you wanted to, simply use the other control to reverse direction and adjust accordingly.
Using the swing-away mechanism

This section describes how to use the swing-away mechanism on the Lift arm.

The swing-away mechanism consists of:

- A hinge around which the rotation takes place
- A latch to keep the body of the Lift arm fixed to the side of the wheelchair when the swing out mechanism is not in use

The swinging arm pivots around the hinge to swing out the body of the lift from the side of the wheelchair. When the swing-away mechanism is not in use, the mechanism is latched to the frame of the Lift arm. The swing-away mechanism is meant to make it easier for the user to get out of the wheelchair on the side of the Lift arm.

When it is time to use the swing-away mechanism, lift the latch to release it.

The Lift arm is swung out and back manually.
There is no powered control for this mechanism. Users may require assistance for this.

**Note:** At some angle, depending on the wheelchair and the setup, the *Lift arm* will make contact with the side of the wheelchair or one of the wheels of the wheelchair. Don't try to force the *Lift arm* to swing out farther than this natural limit.

**Note:** The lift mechanism and the robot can still be activated when the arm is swung out. However, for safety reasons, it is recommended not to do so and is not considered to be normal use.
Cleaning

This section describes guidelines for cleaning the **Lift arm**.

- To clean the **Lift arm**, it is best to use a lightly moistened cloth (without dripping) to clean the outer case.
- Internal components such as the motor or the mechanism may only be cleaned by Kinova personnel.
- If you notice any heavy contamination here, please contact Kinova directly.

⚠️ The **Lift arm** should not be submerged in water or other liquids.
Support

This section describes contact information for technical support issues.

For support, USA and Canadian customers can contact Kinova inc. at **Address:** Kinova inc., 4333 Grande-Allee, Boisbriand, QC, Canada, J7H 1M7. **Telephone:** 1-855-6-KINOVA. **website support page:** www.kinovarobotics.com/support

European customers can contact our European office at **Address:** Kinova Europe GmbH, Großkitzighofer Straße 7a, 86853 Langerringen, Deutschland. **Telephone:** +49 8248 8887-928, **website support page:** www.kinovarobotics.com/support
Product end of life - servicing and disposal

This section describes what to do at the end of the normal life of the product, giving instructions for servicing or disposal.

The Lift arm is expected to last for the lifetime of the Kinova robot that it accompanies.

At the end of this period, there are two options:

- Continue using the device
- Replace the device and dispose of the old device appropriately

If you wish to continue to use the Lift arm after the normal life span of the product has passed, Kinova highly recommends that you return the device temporarily to Kinova for routine servicing to inspect the device and replace / repair any internal components that may be worn out.

For more details:

- **USA and Canadian customers** - **Address:** Kinova inc., 4333 Grande-Allee, Boisbriand, QC, Canada, J7H 1M7 **Telephone:** 1-855-6-KINOVA. **website support:** [www.kinovarobotics.com/support](http://www.kinovarobotics.com/support)

- **European customers** - **Address:** Kinova Europe GmbH, Großkitzighofer Straße 7a, 86853 Langerringen, Deutschland, **Telephone:** +49 8248 8887-928, **website support:** [www.kinovarobotics.com/support](http://www.kinovarobotics.com/support)

If you wish to dispose of the device, note that the device contains materials that can be recycled and/or require specialized disposal. Specialized companies can dismantle the unit and sort out these materials. When you dispose of the unit, inform yourself about local regulations concerning waste management.
There is no need too small.
No task too great.