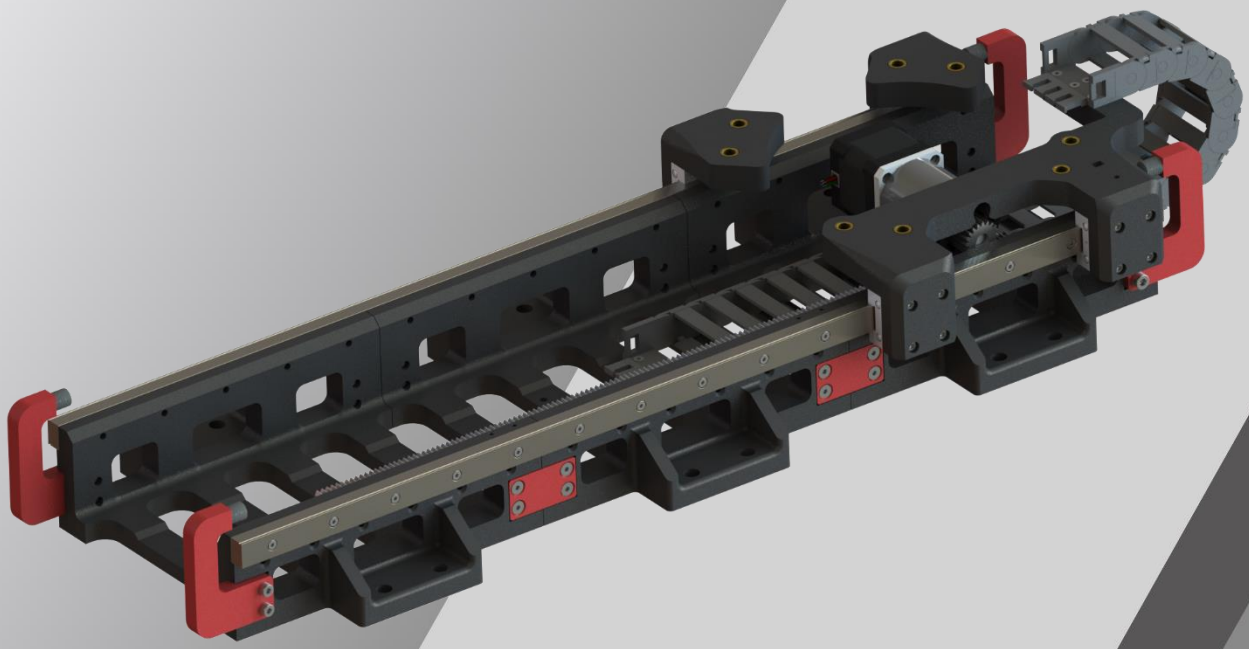
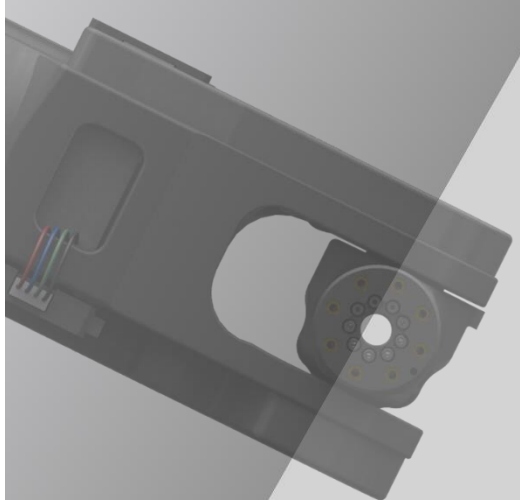
Kawasaki Robotics

# ASTORINO

## Linear Track Operation Manual





# Introduction

This manual describes the linear track option for the "Kawasaki Robotics Astorino" educational robot.

ASTORINO is an educational robot that has been specially developed for training establishments and institutions. Pupils and students can use ASTORINO to learn the automation and robotization of industrial processes in practice.

If you have any further questions, please contact local Kawasaki Support.

1. The "astorino" software included with the ASTORINO is licensed for use with this robot only and may not be used, copied or distributed in any other environment.
2. Kawasaki shall not be liable for any accidents, damages, and/or problems caused by improper use of the ASTORINO robot.
3. Kawasaki reserves the right to change, revise, or update this manual without prior notice.
4. This manual may not be reprinted or copied in whole or in part without prior written permission from Kawasaki.
5. Keep this manual in a safe place and within easy reach so that it can be used at any time. If the manual is lost or seriously damaged, contact Kawasaki.

# Symbols

Items that require special attention in this manual are marked with the following symbols.

Ensure proper operation of the robot and prevent injury or property damage by following the safety instructions in the boxes with these symbols.

**⚠ WARNING**

**Failure to observe the specified contents could possibly result in injury or, in the worst case, death.**

[**ATTENTION**]

Identifies precautions regarding robot specifications, handling, teaching, operation,

**⚠ WARNING**

1. **The accuracy and effectiveness of the diagrams, procedures and explanations in this manual cannot be confirmed with absolute certainty. Should any un-**
   **explained problems occur, contact Kawasaki Robotics GmbH at the above address.**
2. **To ensure that all work is performed safely, read and**
   **understand this manual. In addition, refer to all applicable laws, regulations, and related materials, as well as the safety statements described in each chapter.**

# Paraphrases

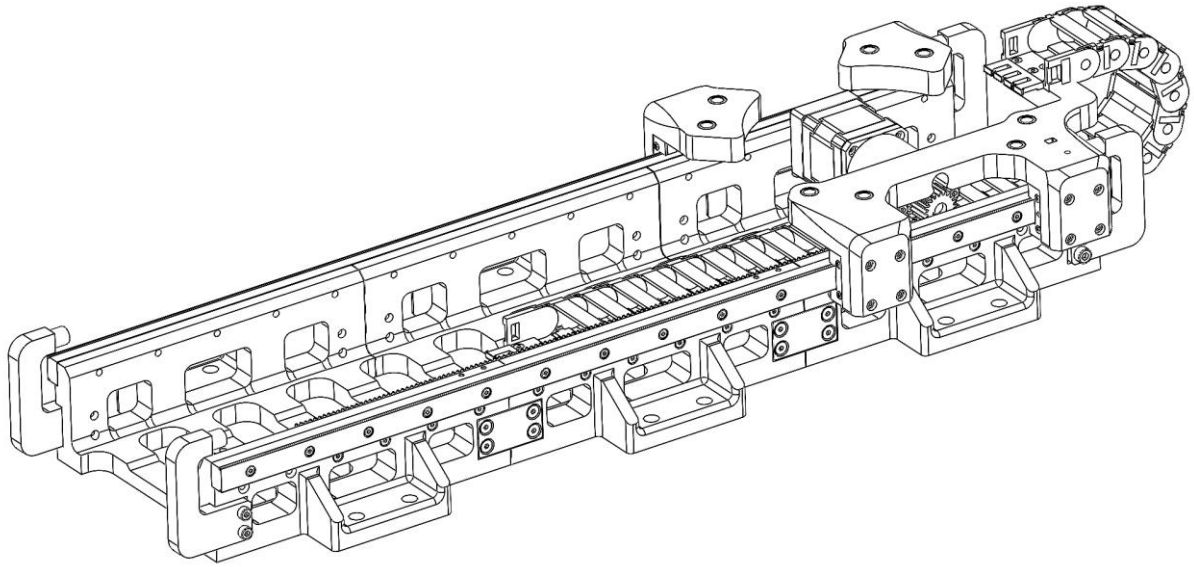
The following formatting rules are used in this manual:

- For a particular keystroke, the respective key is enclosed in angle brackets, e.g. <F1> or <Enter>.
- For the button of a dialog box or the toolbar, the button name is enclosed in square brackets, e.g. [Ok] or [Reset].
- Selectable fields are marked with a square box ☐.
  If selected a check mark is shown inside the symbol ☑.

# 1 Technical specifications

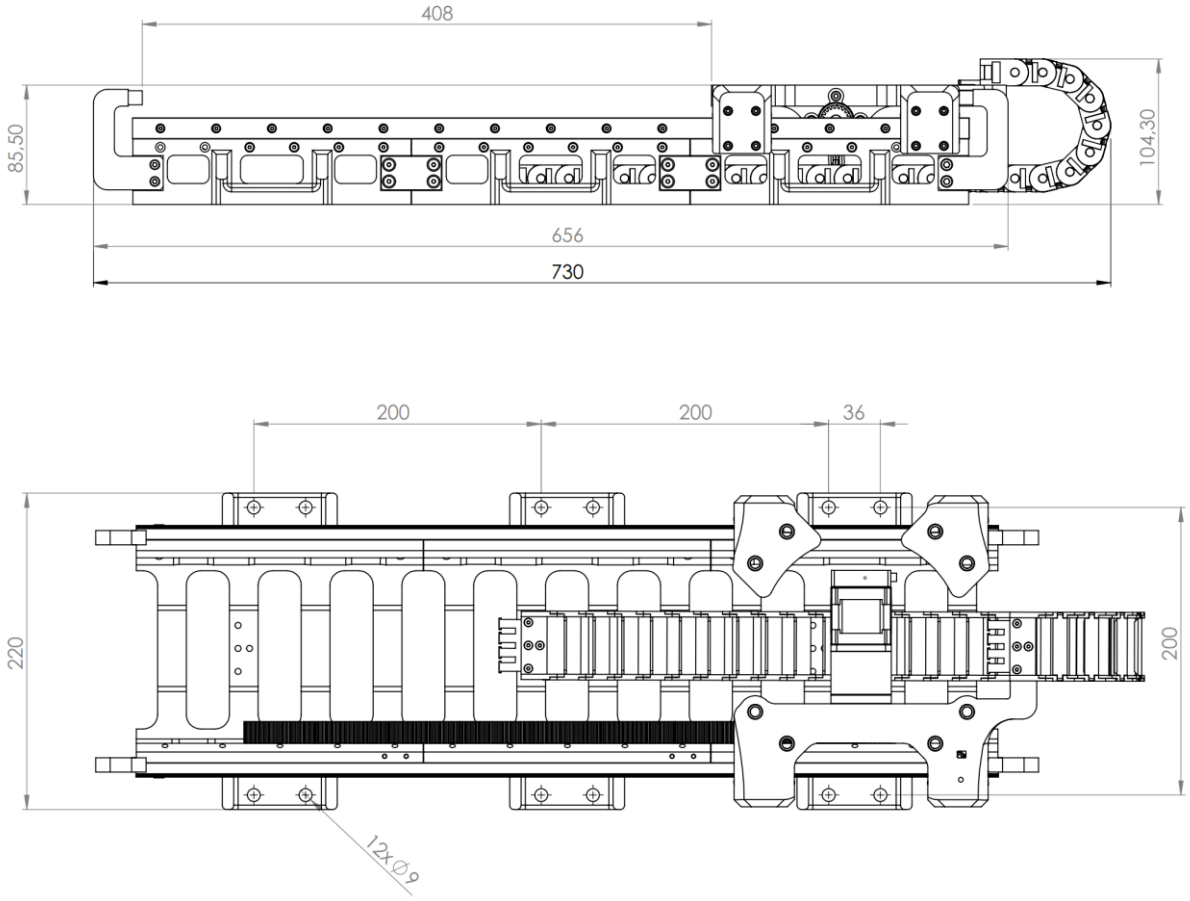
| Characteristics | | Astorino Linear Track |
|---|---|---|
| Working environment | Temperature | 0–40°C |
| | Humidity | 35–80% |
| Travel distance | | 408 mm |
| Max. speed | | 250 mm/s |
| Repeatability | | ±0.1mm |
| Size | | 730x220x105mm |
| Cooperation | | Yes |
| Weight | | 4 kg |
| Material | | Aluminium, PET-G, Steel |
| Colour | | Red/Black |

# 2 Linear Track package contents



Linear track with installation cables

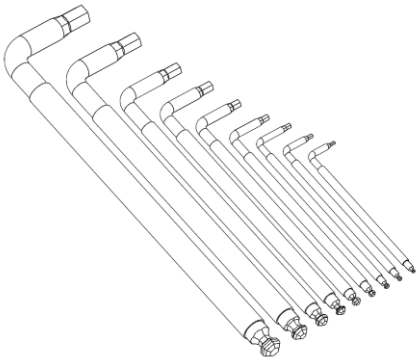
# 3 Dimensions



# 4 Installation

## 4.1 The tools you need

Allen wrench — 2 mm

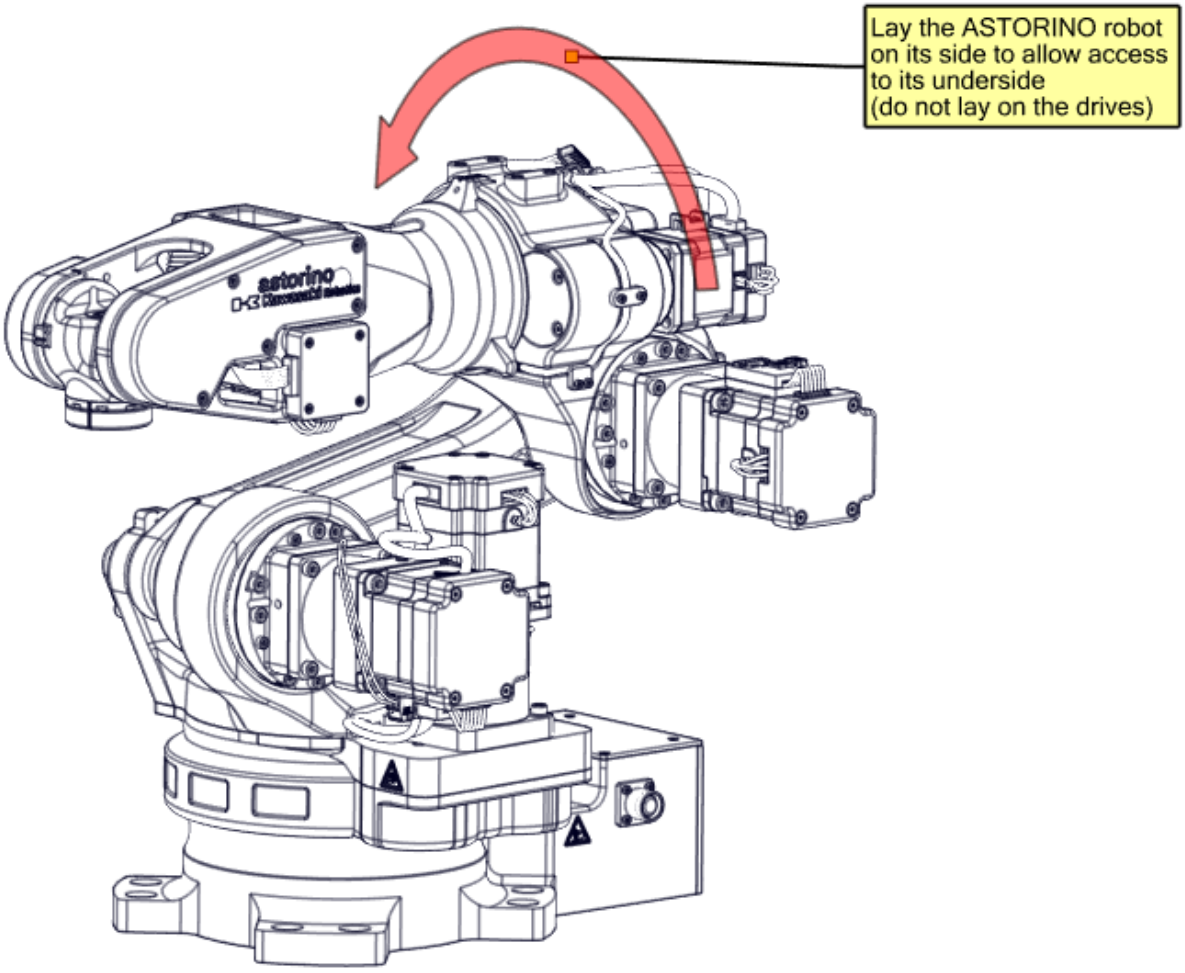


6 mm

Cross screwdriver

PH0

## 4.2 Preparing the robot

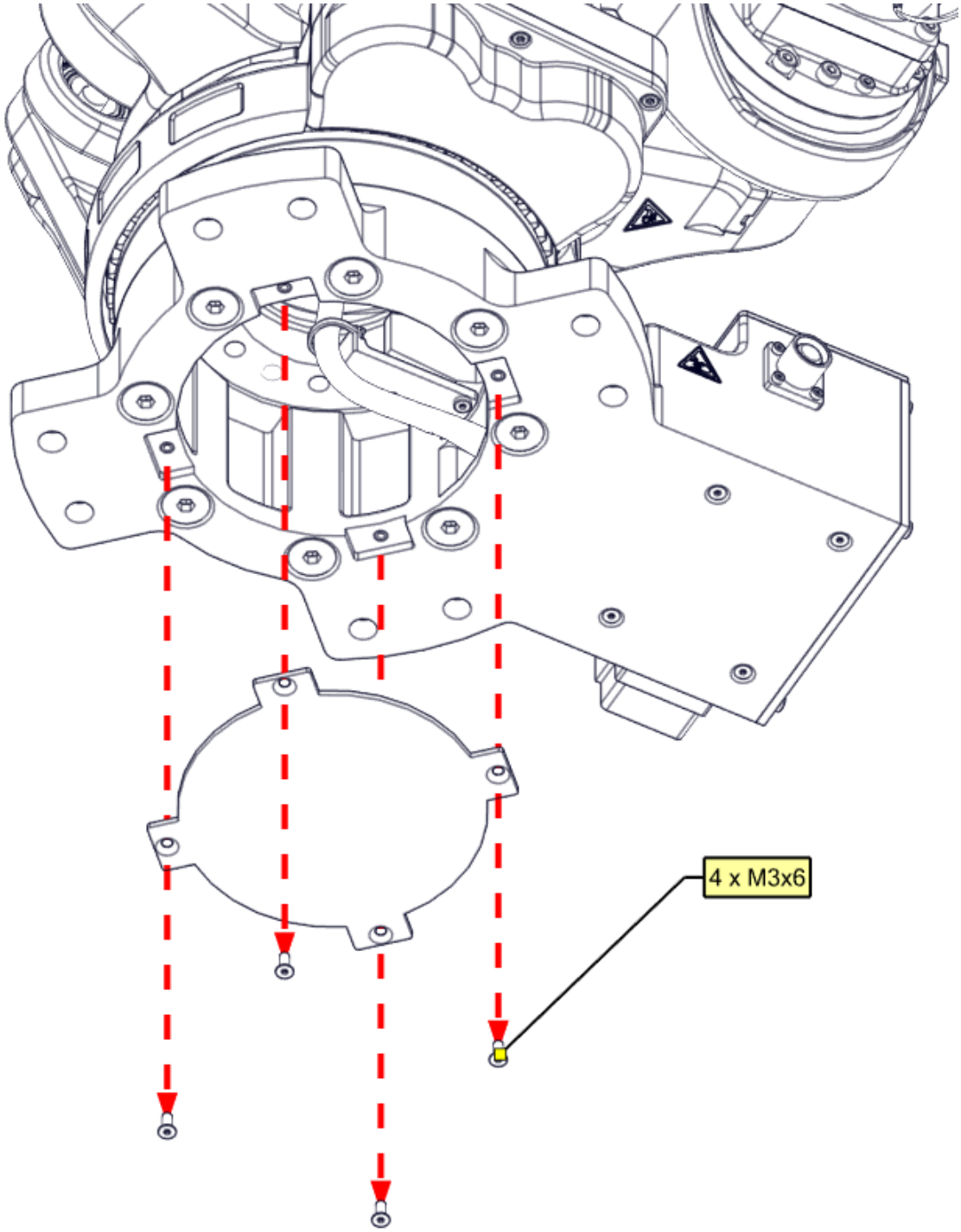



[**ATTENTION**]

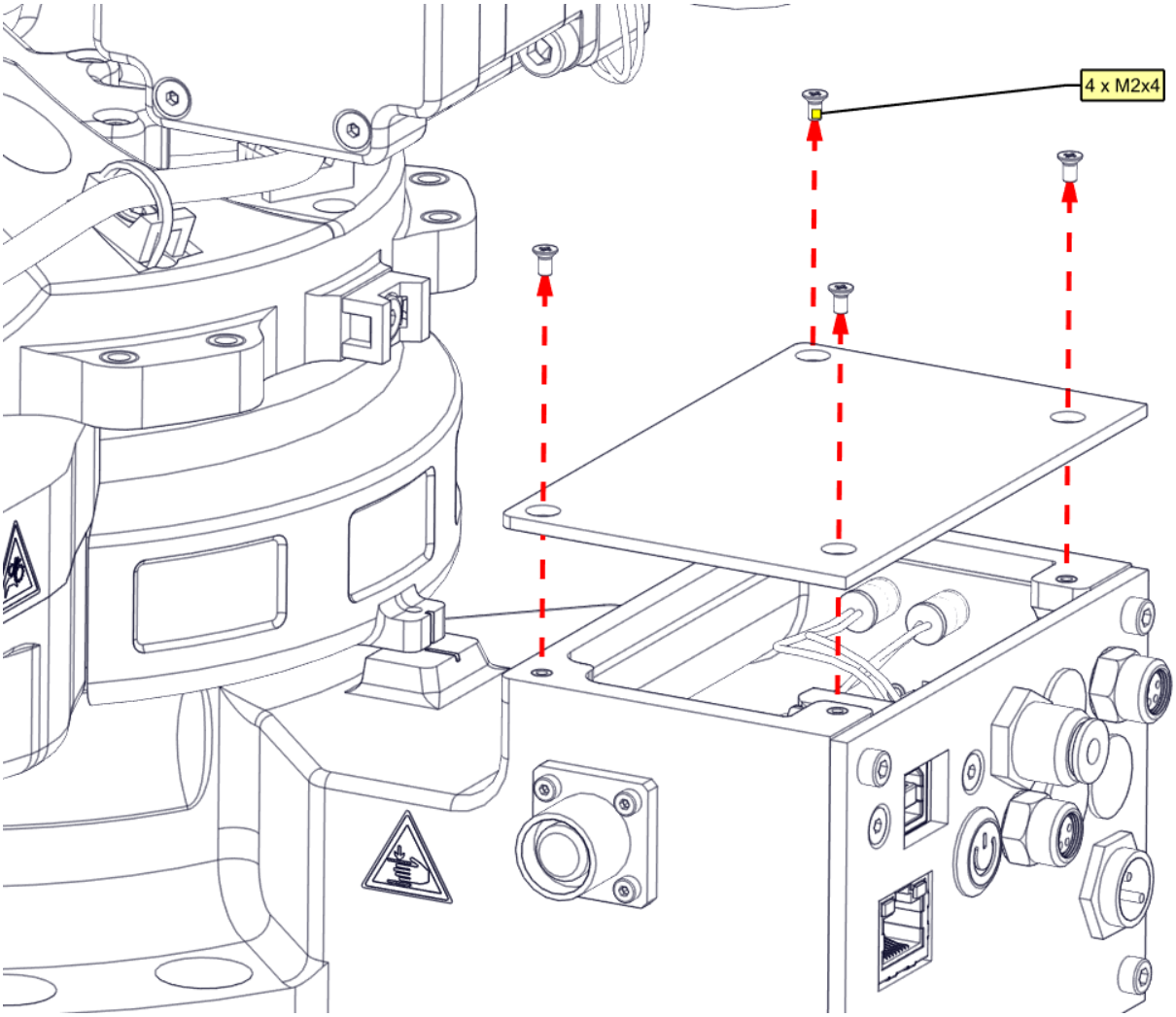
Robots with serial number higher that 30 are delivered with prepared JT7 wires.

If there is an opening at the bottom of the robot in the bottom cover, and JT7 cables are available, the steps 4.3 to 4.7 can be skipped.

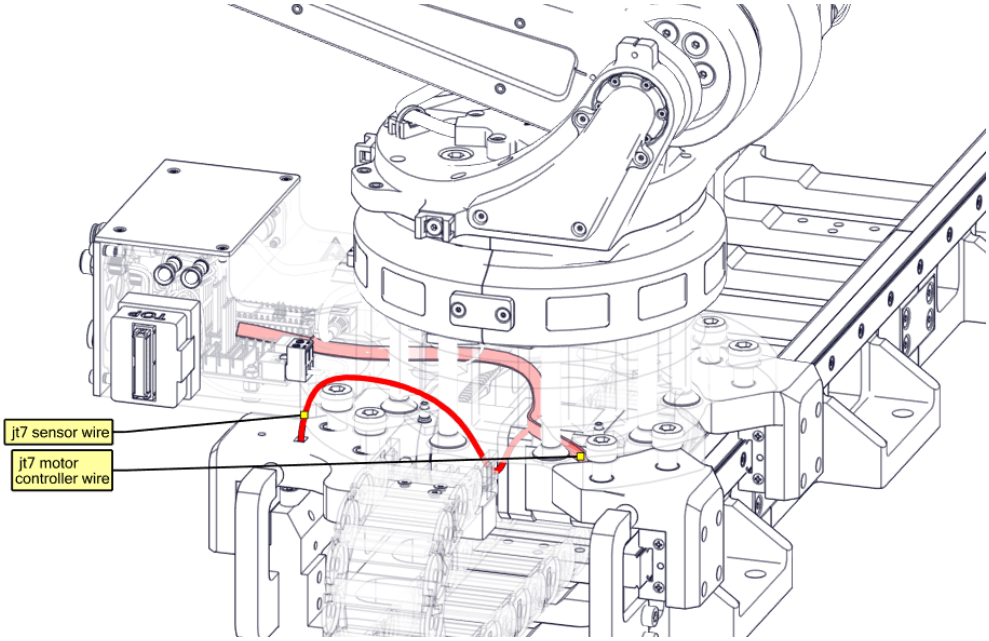
## 4.3 Bottom cover removal

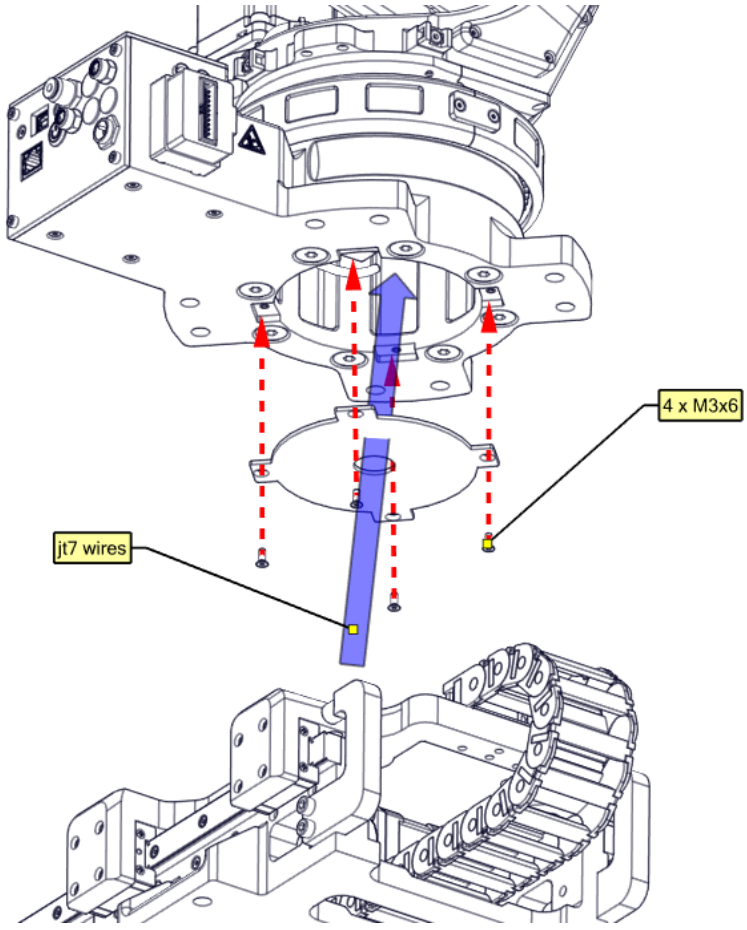


## 4.4 Removing the controller cover

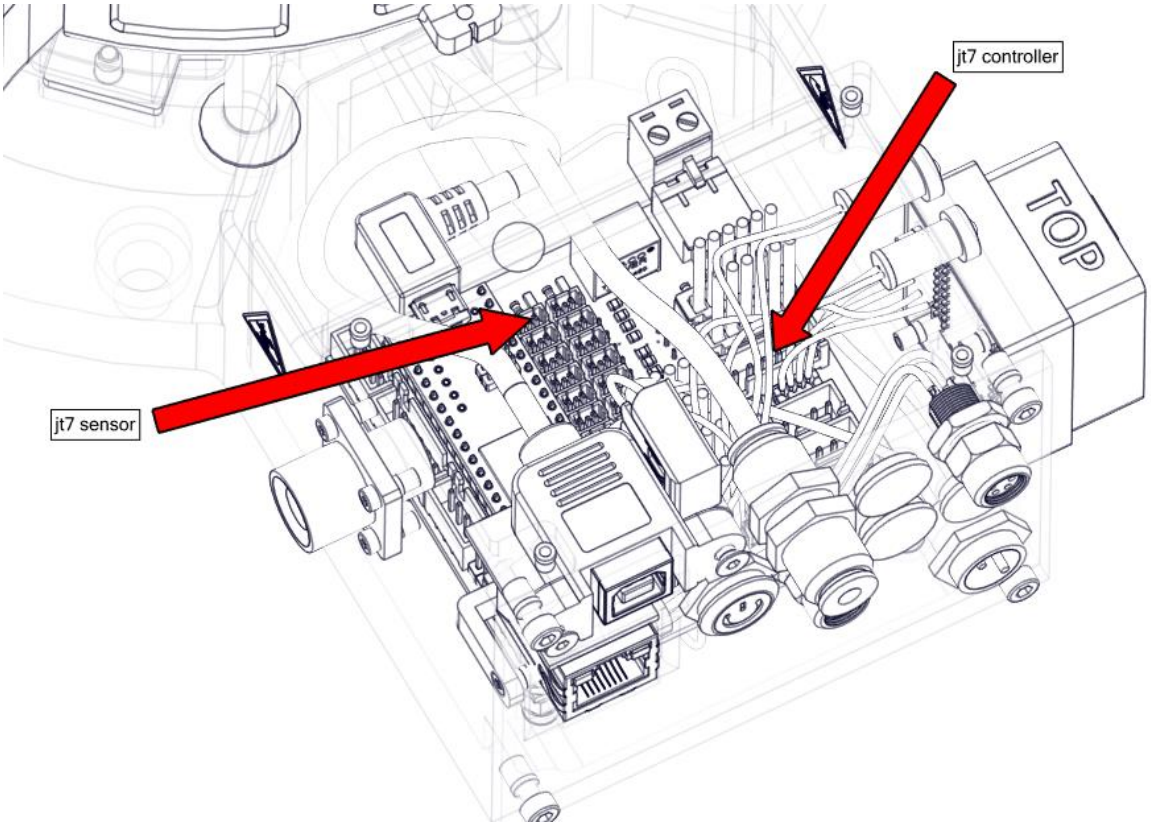


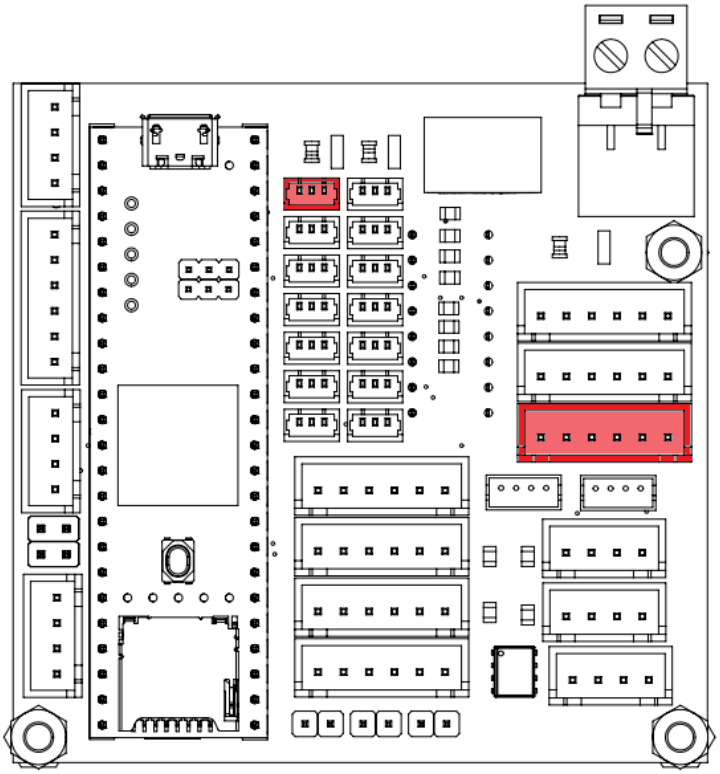
## 4.5 JT7 cables routing



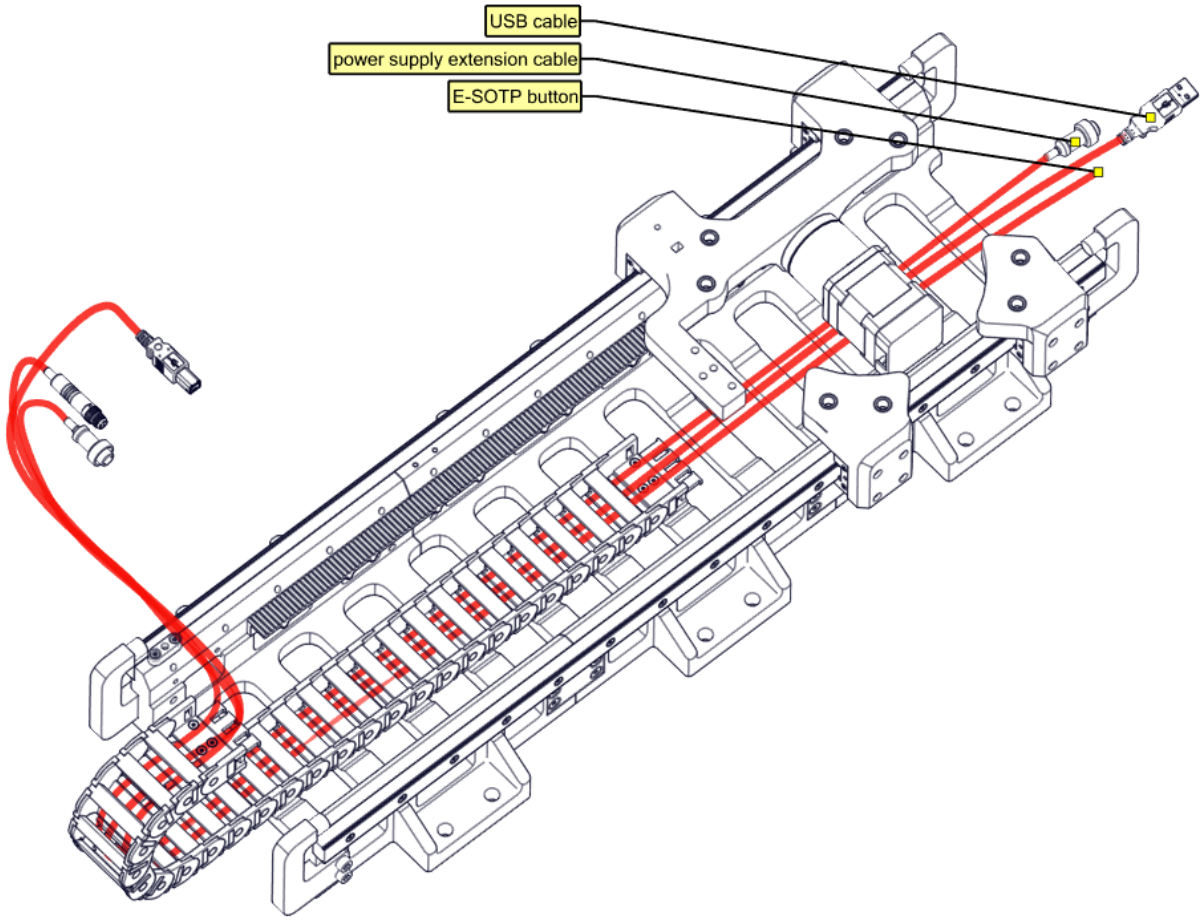



## 4.6 JT7 cable connection



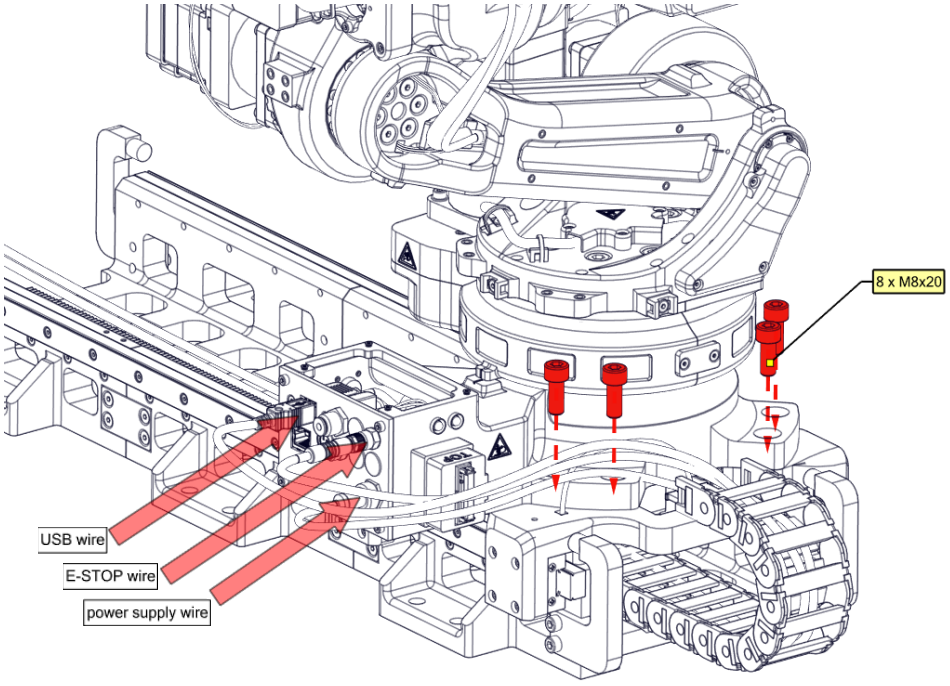
## 4.7 Cable routing

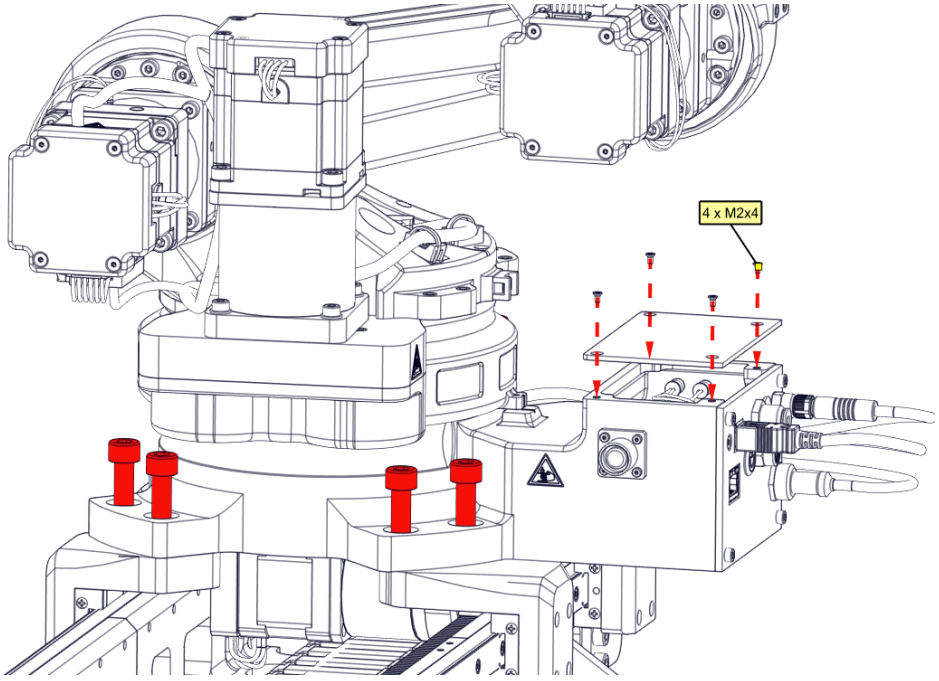



[**ATTENTION**]

If the IO24V module is used by a robot, the module should be wired similarly to the other cables shown above. (In kits containing the IO24V module and the linear track, a cable of the appropriate length is supplied.)

## 4.8 Robot assembly on the track



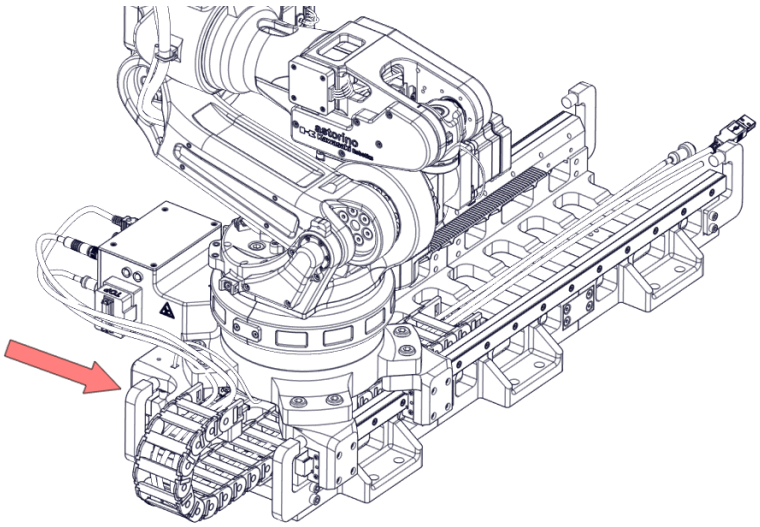

[**ATTENTION**]

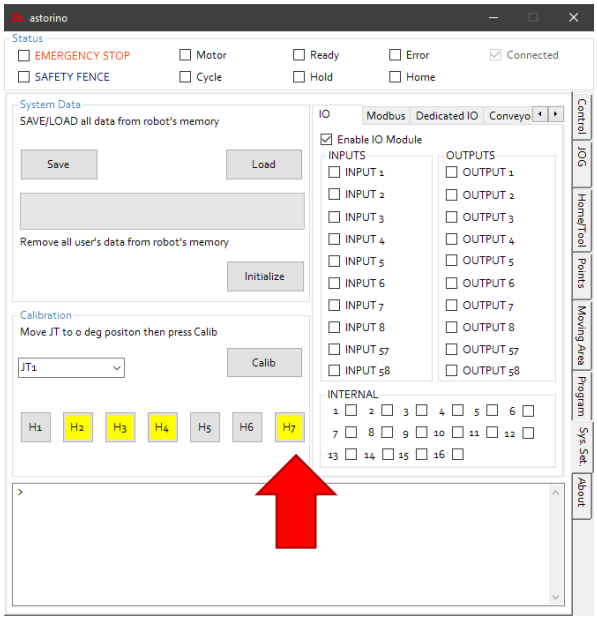
Cables should be fastened to the holder located next to the jt7 sensor cable using a cable tie.

# 5 Enabling JT7 axis in software

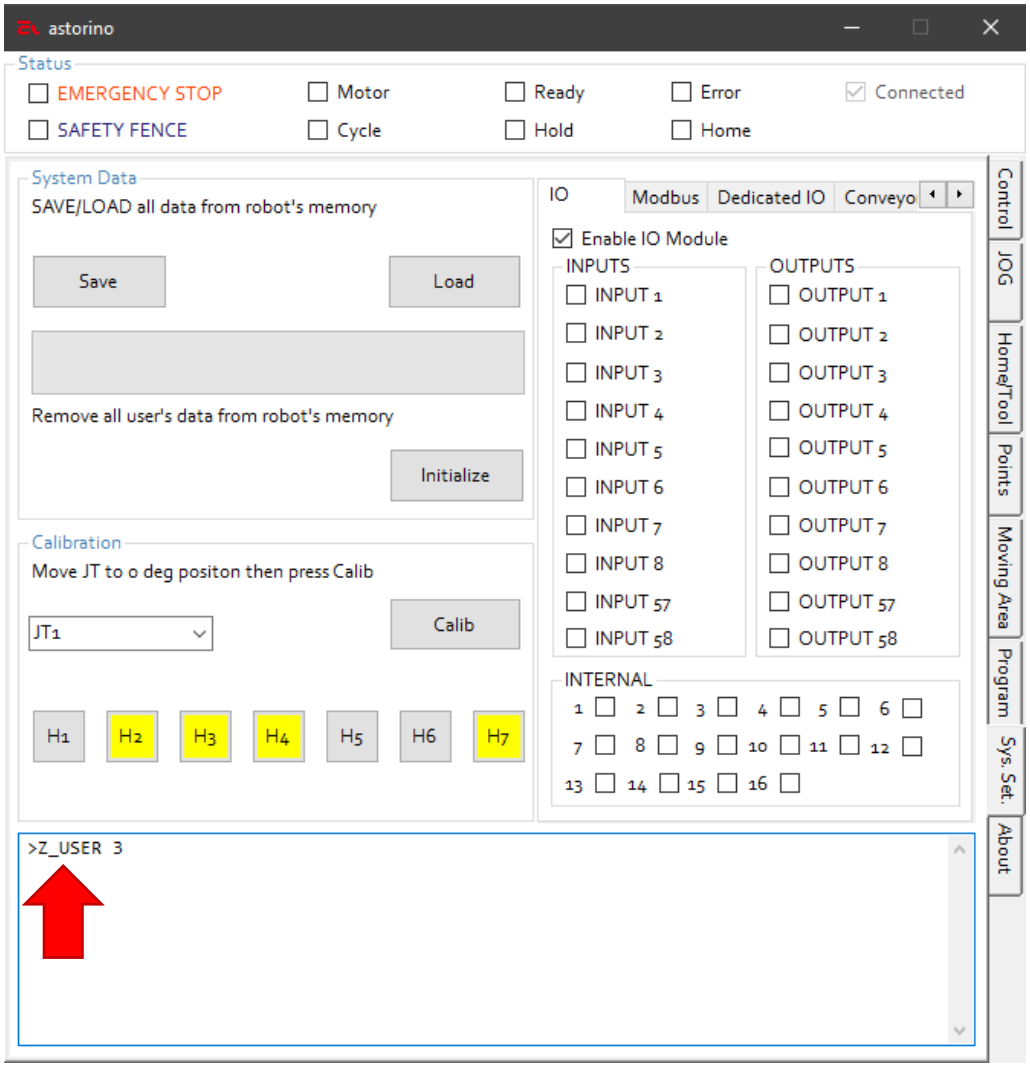
**WARNING**

**Before starting the process of adding the jt7 axis in the software, make sure that the robot is positioned on a track in such a way that the jt7 sensor is above the magnet and its signal is visible in the software under the tab sys. set.**



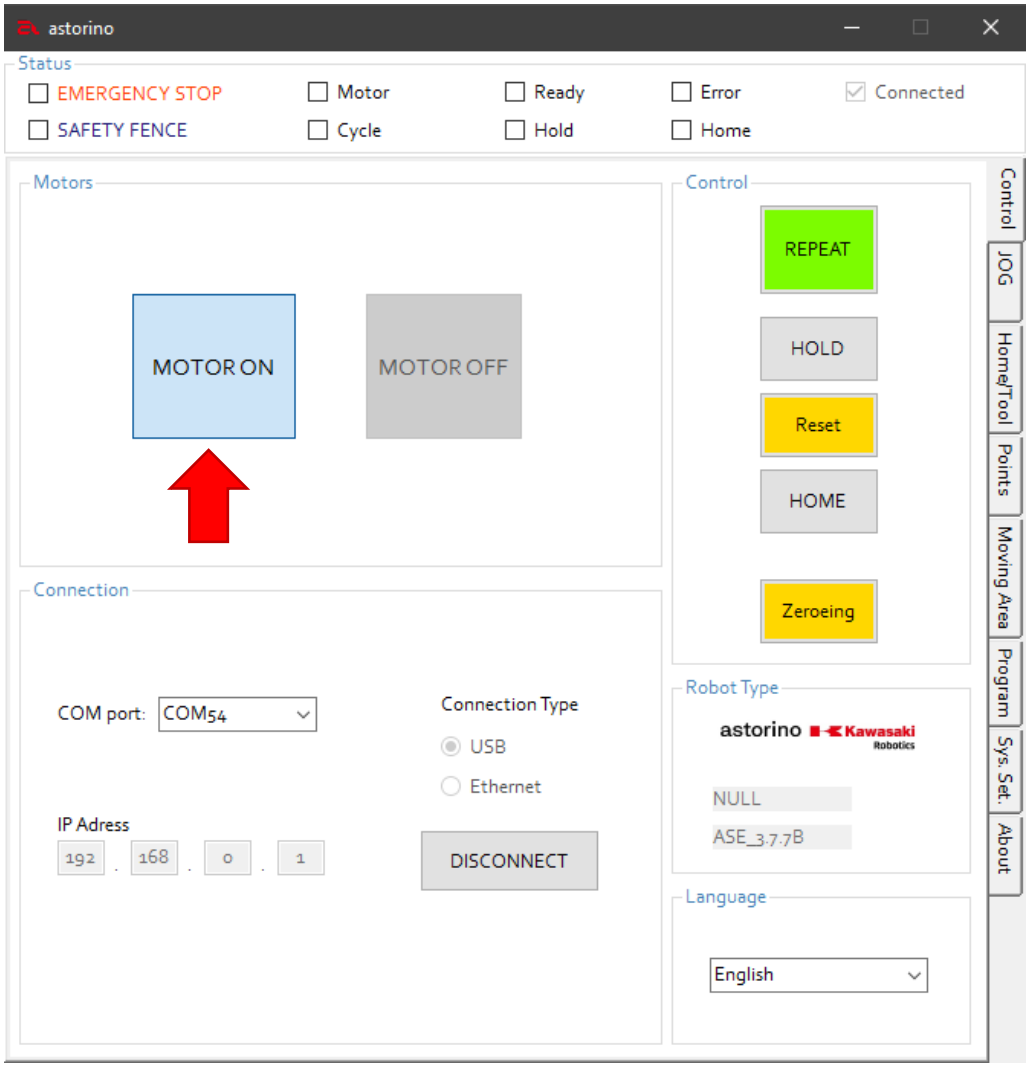


## 5.1 Change user level to 3:




In the terminal type command: Z_USER 3 and press ENTER.

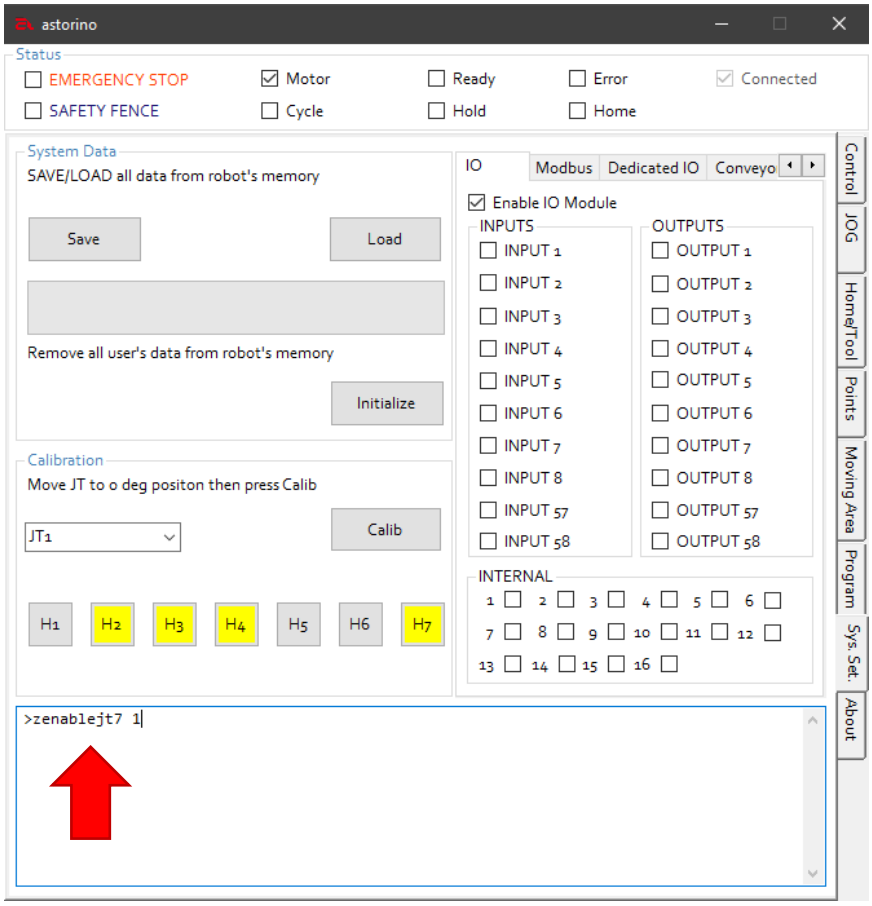
## 5.2 Turn on the motors:

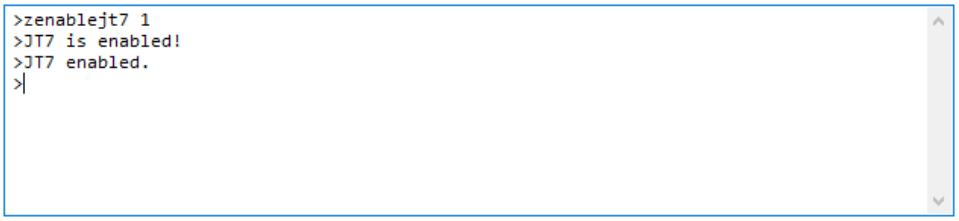



**[ATTENTION]**

Robot does not need to be ZEROED!

## 5.3 Enable JT7 in the controller:



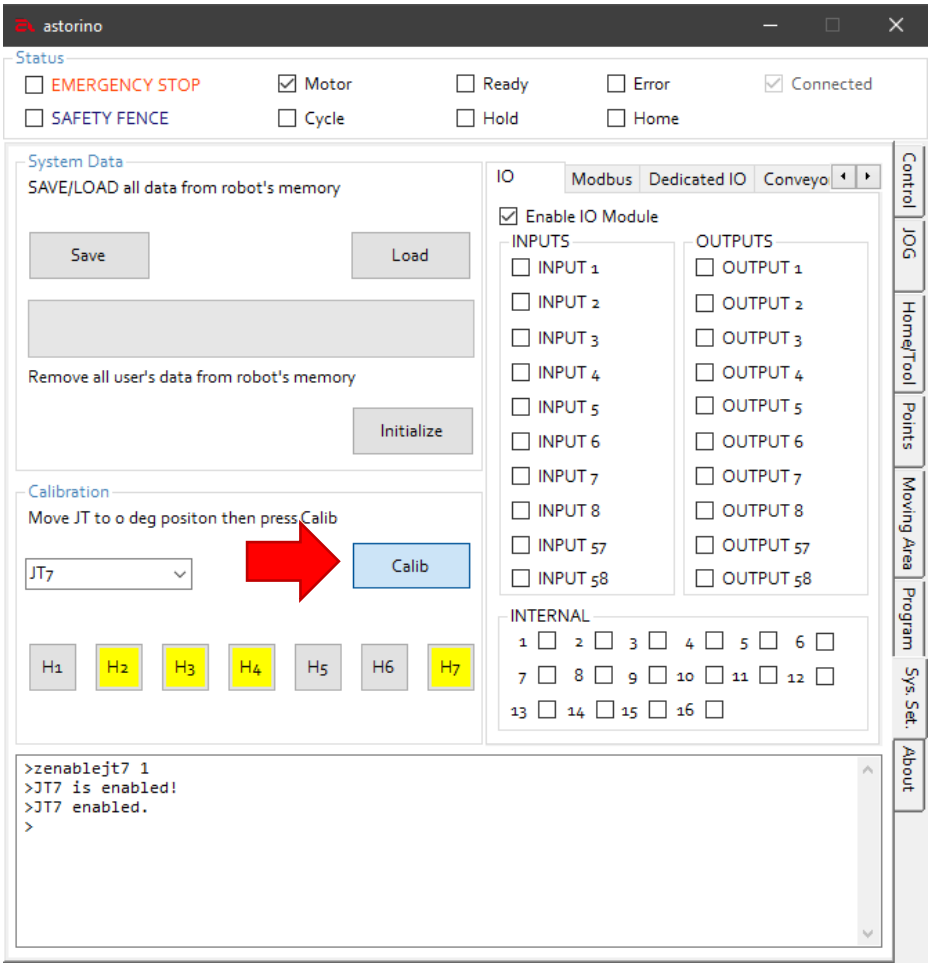

**[ATTENTION]**

When removing the robot from the track, use the command "zenablejt7 0" to disable its operation.

## 5.4 Calibration of the jt7 axis:

**[ATTENTION]**

During the calibration process, the robot will make small movements along the track!





After a successful calibration process, the robot is able to fully cooperate with the running track and ready for use.

# 6 Linear track operations

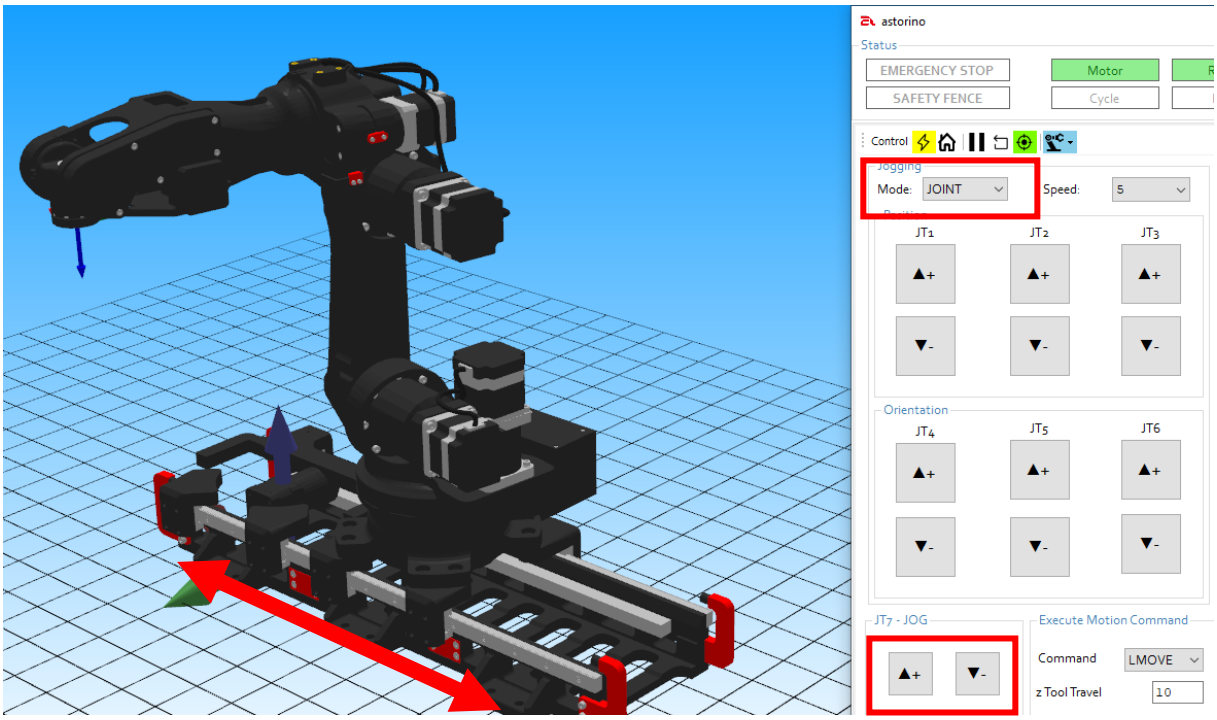
Linear track can be operated via astorino software, Teach Pendant or program/commands. By default linear track is working in a cooperation mode with astorino robot. That means that there is a mathematical connection between those two devices.

## 6.1 Motion in Teach Mode

Linear track can be moved in two ways:

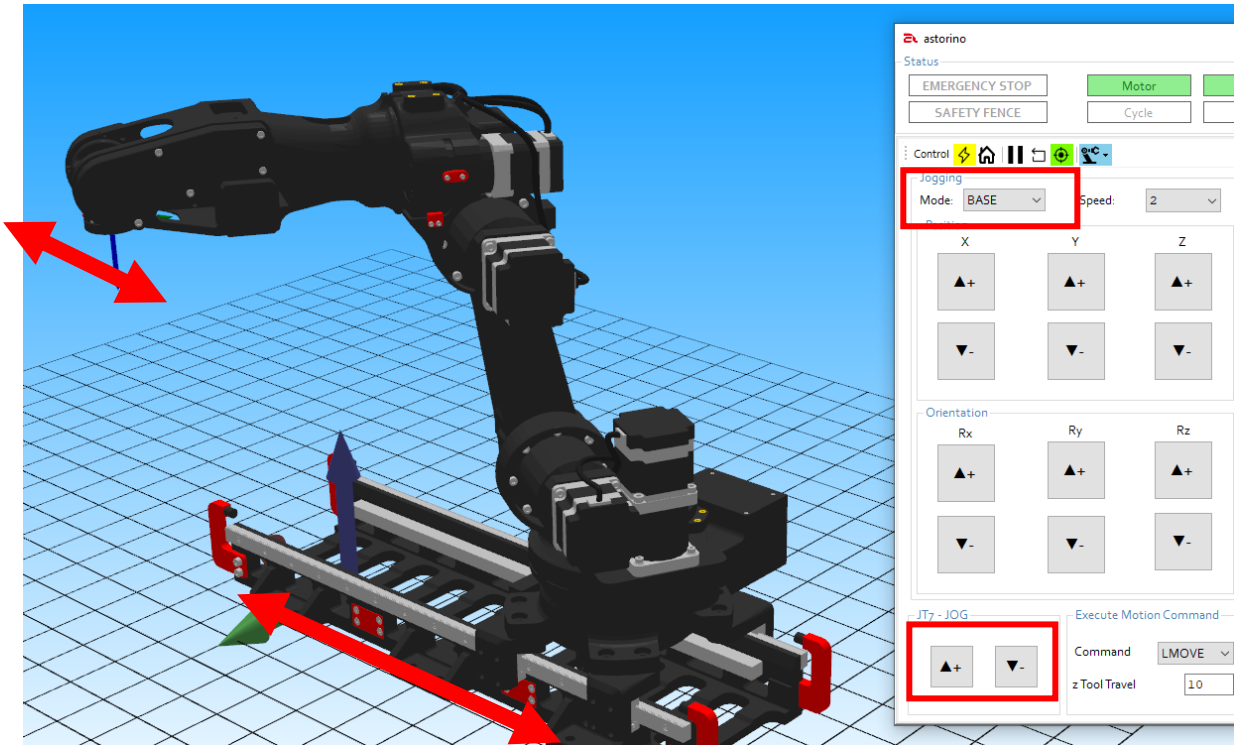
- In cooperation with a robot (BASE, TOOL, CONV)
- Without cooperation with a robot (JOINT)

Motion in JOINT mode:




Robot TCP will not stay stationary

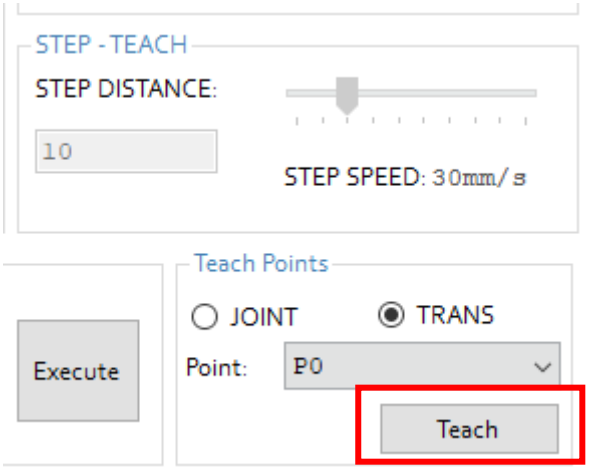
Motion in BASE, TOOL, CONV




Robot TCP will stay stationary

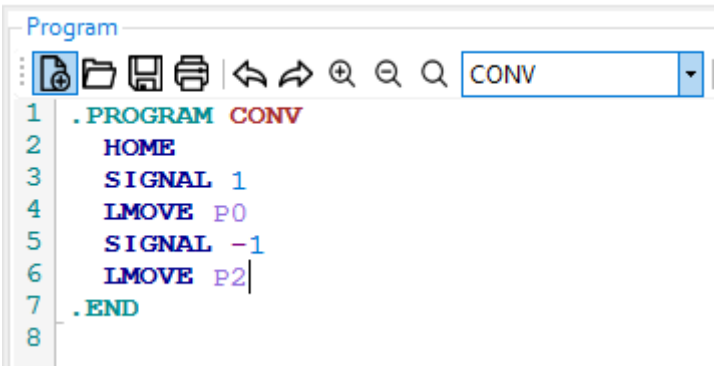
## 6.2 Teaching points

Move the robot and linear track to desired position, select point number to be recorded and then press TEACH



## 6.3 Using Linear track in program

Linear track is “invisible” for the user from programming point of view, just use normal commands like LMOVE and stored points.




Robots controller will automatically calculate the desired motion with cooperation with a linear track.

# 7 MANUFACTURER DATA

Kawasaki Robotics Astorino
Linear Track Operation Manual Manual

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