



Easy robot programming

Karlsruhe, November 21<sup>st</sup>, 2022

# ArtiMinds Essentials URCap Manual

[www.artiminds.com](http://www.artiminds.com)

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## 1 Requirements

## 2 Installation

## 3 Configuration

## 4 Functionality

- Move tab
- Path tab
- Demo tab
- Information tab

## 5 Uninstallation

## 6 Support

# Requirements

**M**

**Meet the following requirements to use the ArtiMinds Essentials URCap application properly:**

- Universal Robots UR3e/UR5e/UR10e \*
- PolyScope version 5.1.0 or higher \*\*
- USB drive for installation

\* Additionally the *Universal Robots offline simulator software (URSim)* can be used:

<https://www.universal-robots.com/download/?option=41508#section41493>

\*\* See the Universal Robots web page on how to upgrade the robot software:

<https://www.universal-robots.com/download/?option=41809#section41493>

# Overview

## 1 Requirements

## 2 Installation

## 3 Configuration

## 4 Functionality

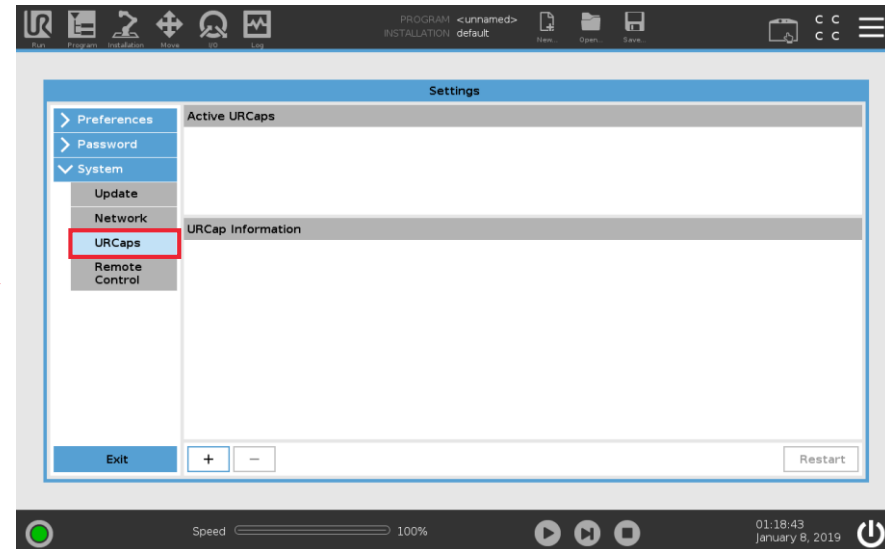
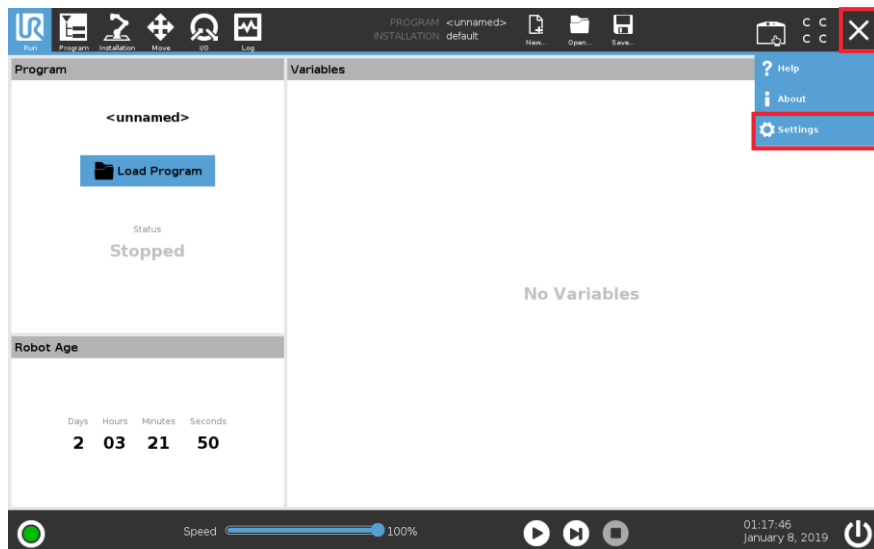
- Move tab
- Path tab
- Demo tab
- Information tab

## 5 Uninstallation

## 6 Support

## I Installation steps for the ArtiMinds Essentials URCap application:

- Copy the *artiminds\_essentials-2.0.urcap* file to a USB drive and insert the USB drive into the teach pendant of the robot.\*
- Open the settings page of UR PolyScope by pressing the *Settings* button first and then the *URCaps* button in the *System* entry.

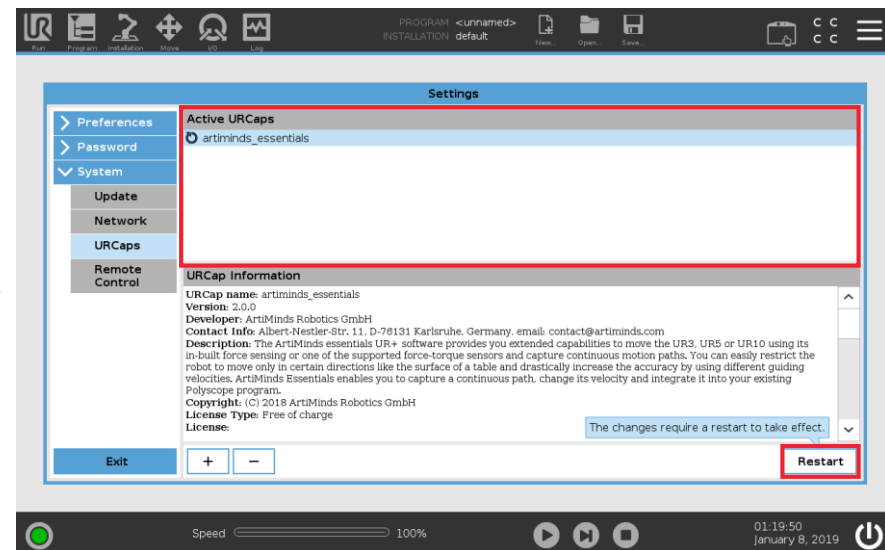
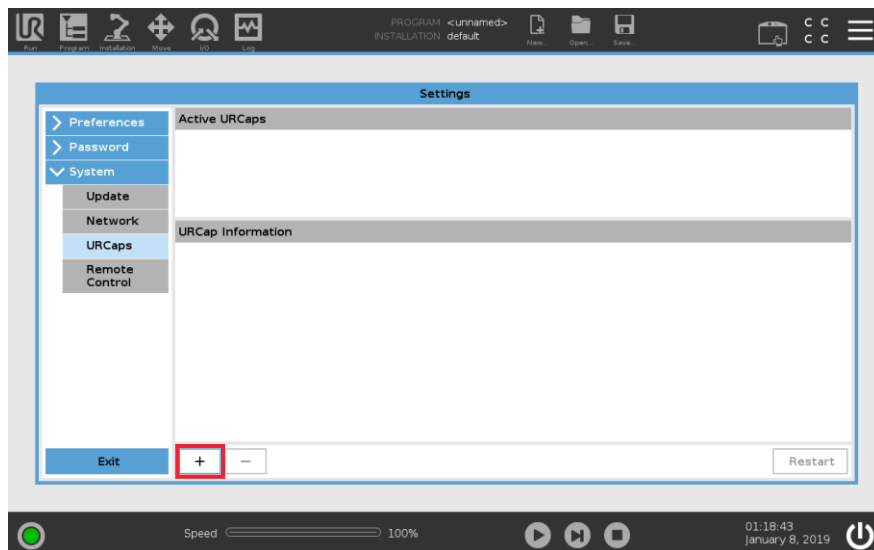



\* Optionally copy the *artiminds\_essentials-2.0.urcap* file directly to the *ur/programs* directory of UR PolyScope by using ssh.

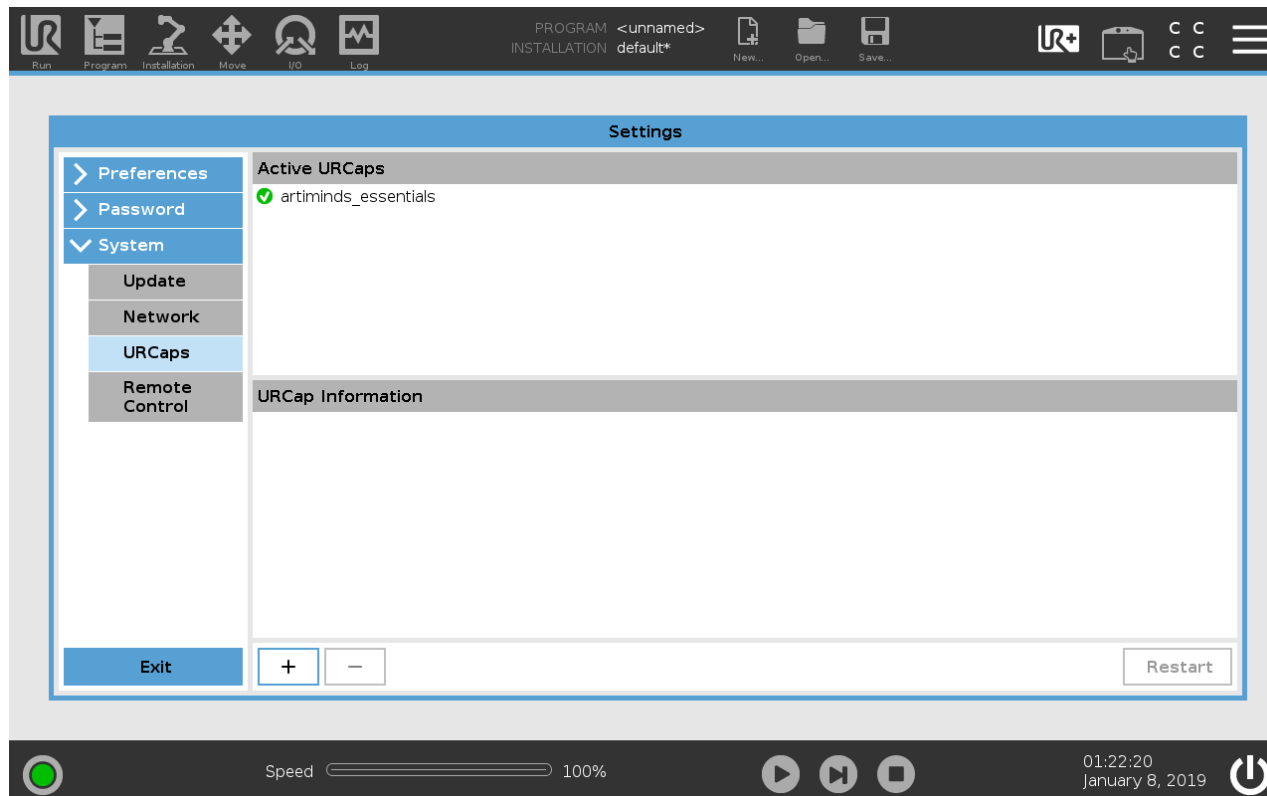
# Installation



- Click on the + button to install a new URCap application.
- Navigate to the *artiminds\_essentials-2.0.urcap* file by clicking on your *usbdrive* and select it. Confirm the selection by clicking on *Open*.
- The ArtiMinds Essentials URCap application should appear in the *Active URCaps* window with some additional information about the application.
- Restart UR PolyScope by clicking on the *Restart* button to complete the installation.



- After restarting the robot, the ArtiMinds Essentials URCap application should be marked by  in the *URCaps Setup* window to indicate that the installation has been successful.
- The ArtiMinds Essentials URCap application should start automatically with the robot.



# Overview

## 1 Requirements

## 2 Installation

## 3 Configuration

## 4 Functionality

- Move tab
- Path tab
- Demo tab
- Information tab

## 5 Uninstallation

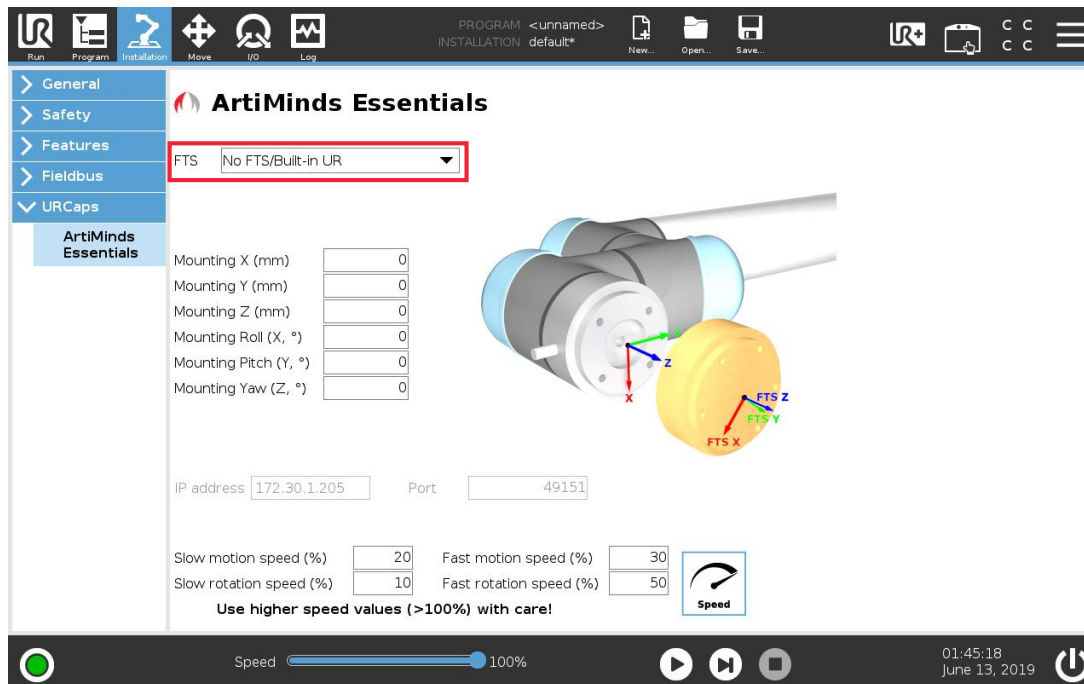
## 6 Support



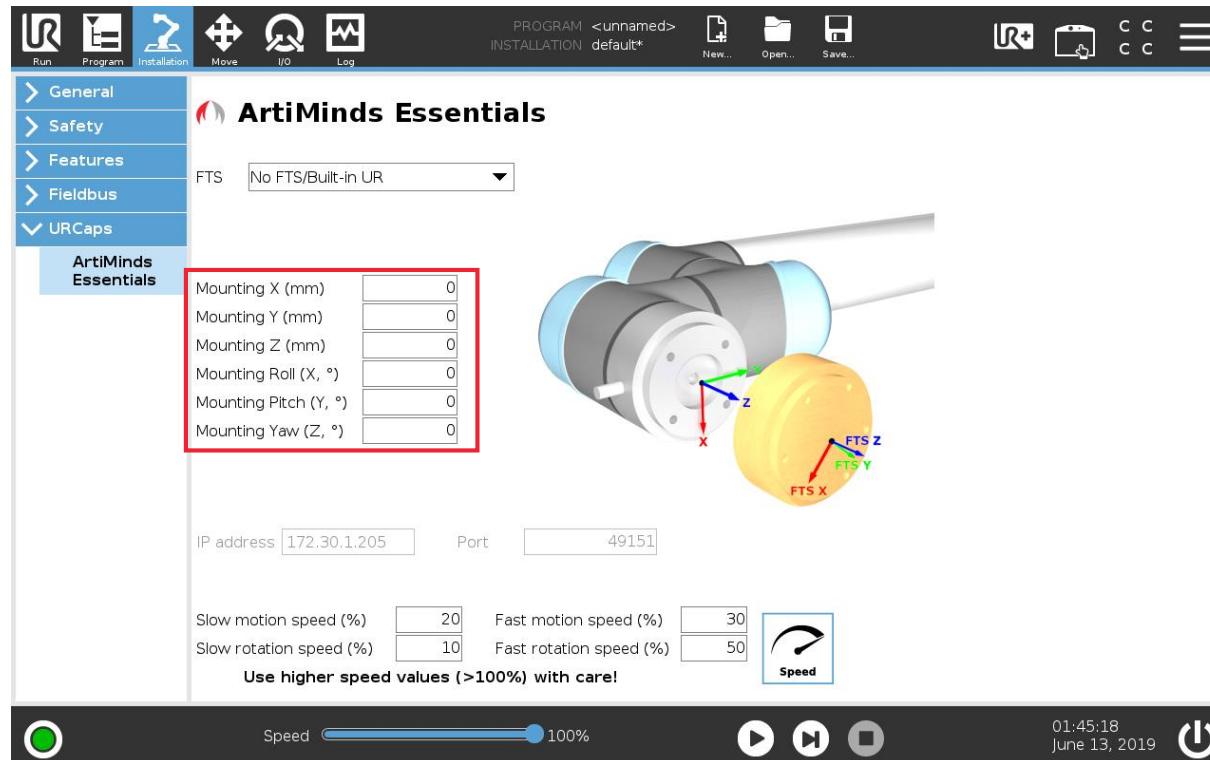
# Configuration

**T** The ArtiMinds Essentials URCap application can be configured using the ArtiMinds Essentials menu as follow:

- Open the *Installation* tab and click on the *ArtiMinds Essentials* menu entry.
- Please notice that changes to the settings can only be applied when the robot is in *Local Control* and not in *Remote Control* (see the UR manual for more details).

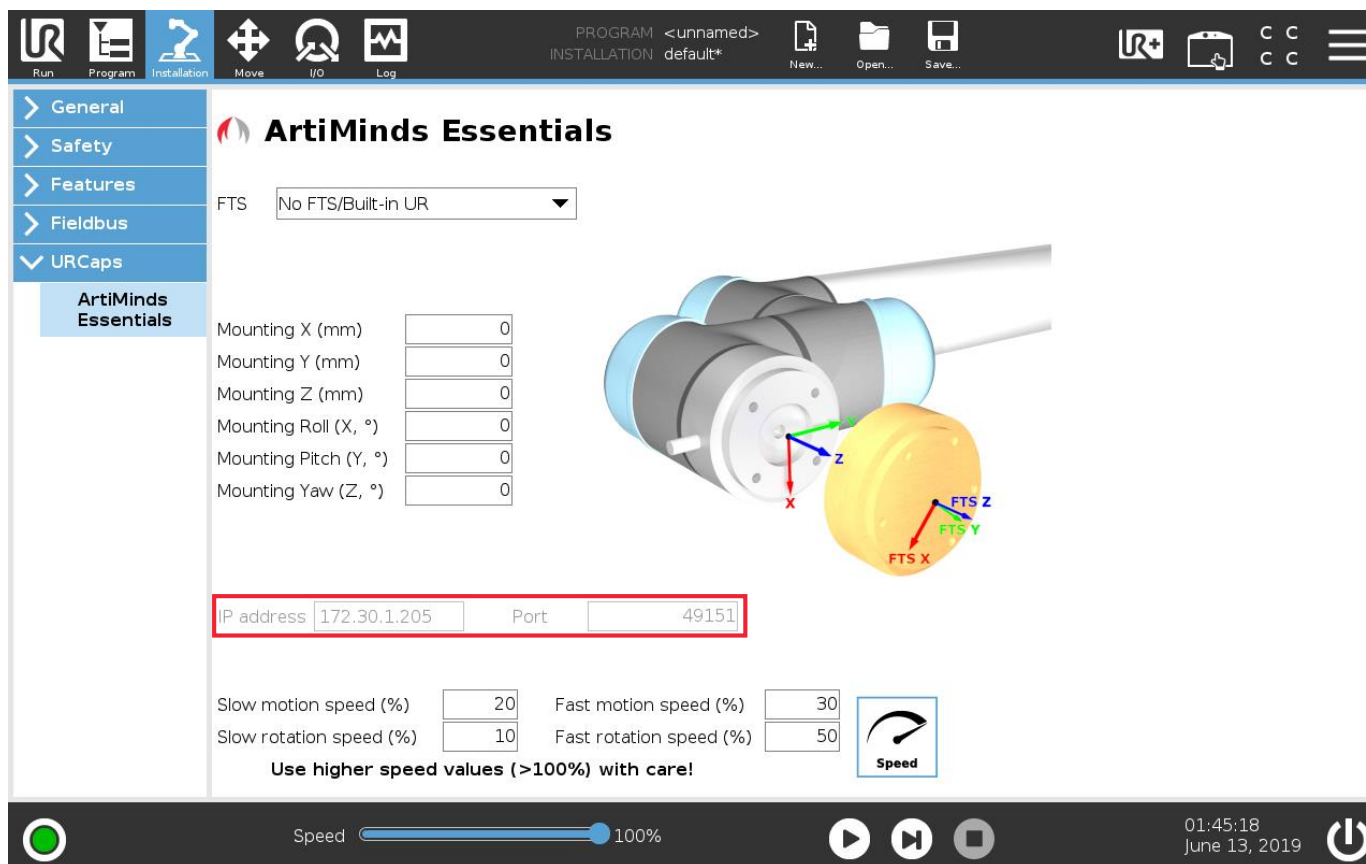


The drop-down menu allows to select one of the supported force-torque sensors. Select *Built-in UR*, if no force-torque sensor is mounted on the robot.



Use the six input-fields to configure the mounting of the force-torque sensor. The force-torque sensor is mounted relative to the TCP of the robot.

The force-torque sensor can be translated along the x-, y- and/or z-axis by -1000 to 1000mm and rotated by -360 to 360°.

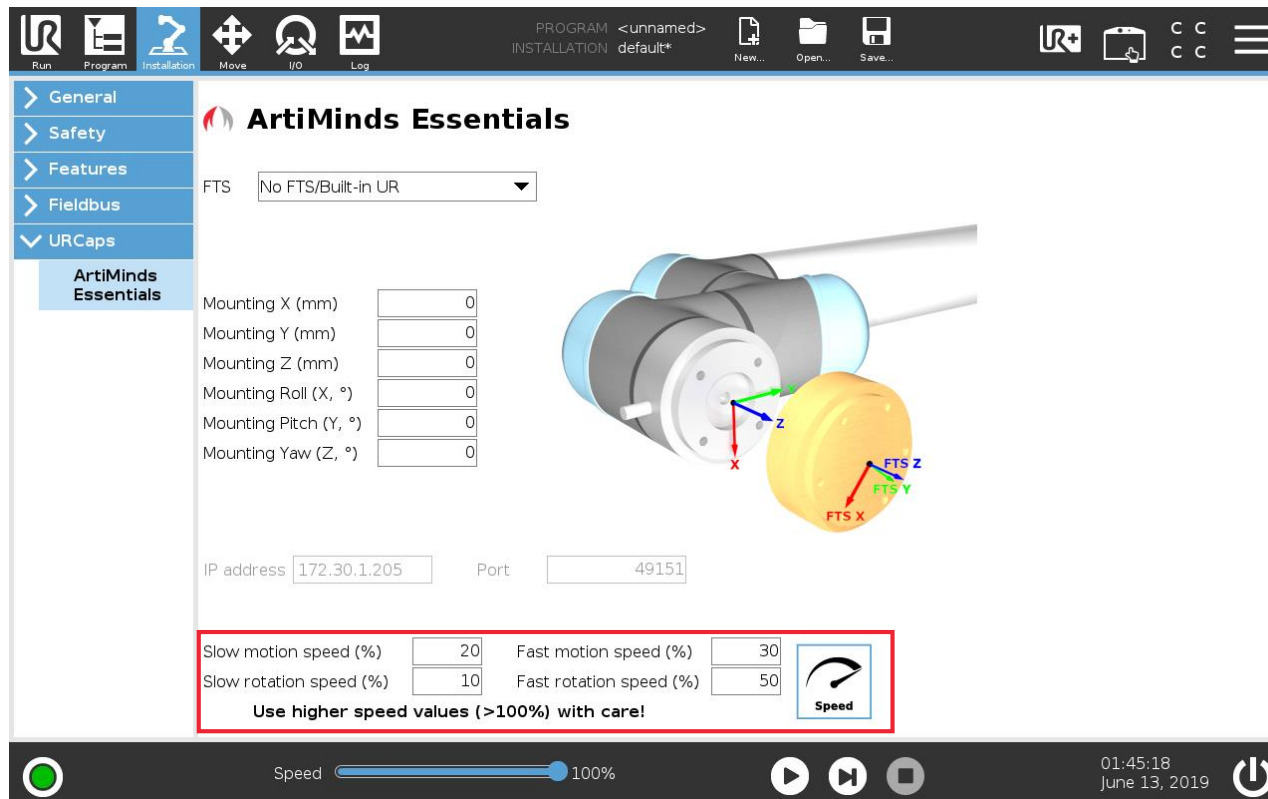


The following two options are only available if a force-torque sensor with a network connection is used (e.g. ATI 6D Net F/T). Set the configured IP address and port of the used force-torque sensor.

## Configuration

Typical ports of the different supported force-torque sensors:

- ATI 6D Force Torque Sensor: 49151
- ATI Axia80 (URCap < 2.7.8): 40404  
ATI Axia80 (URCap >= 2.7.8): 47405
- Optoforce HEX-70-XE/HEX-E: 49151
- OnRobot HEX-E/H: 49151



These options allow to set the movement speed of the robot. The overlay allows to switch between a slow and a fast speed, both can be configured separately.

The translational and rotational speed allow values between 0.0 and 200.0%.

# Overview

## 1 Requirements

## 2 Installation

## 3 Configuration

## 4 Functionality

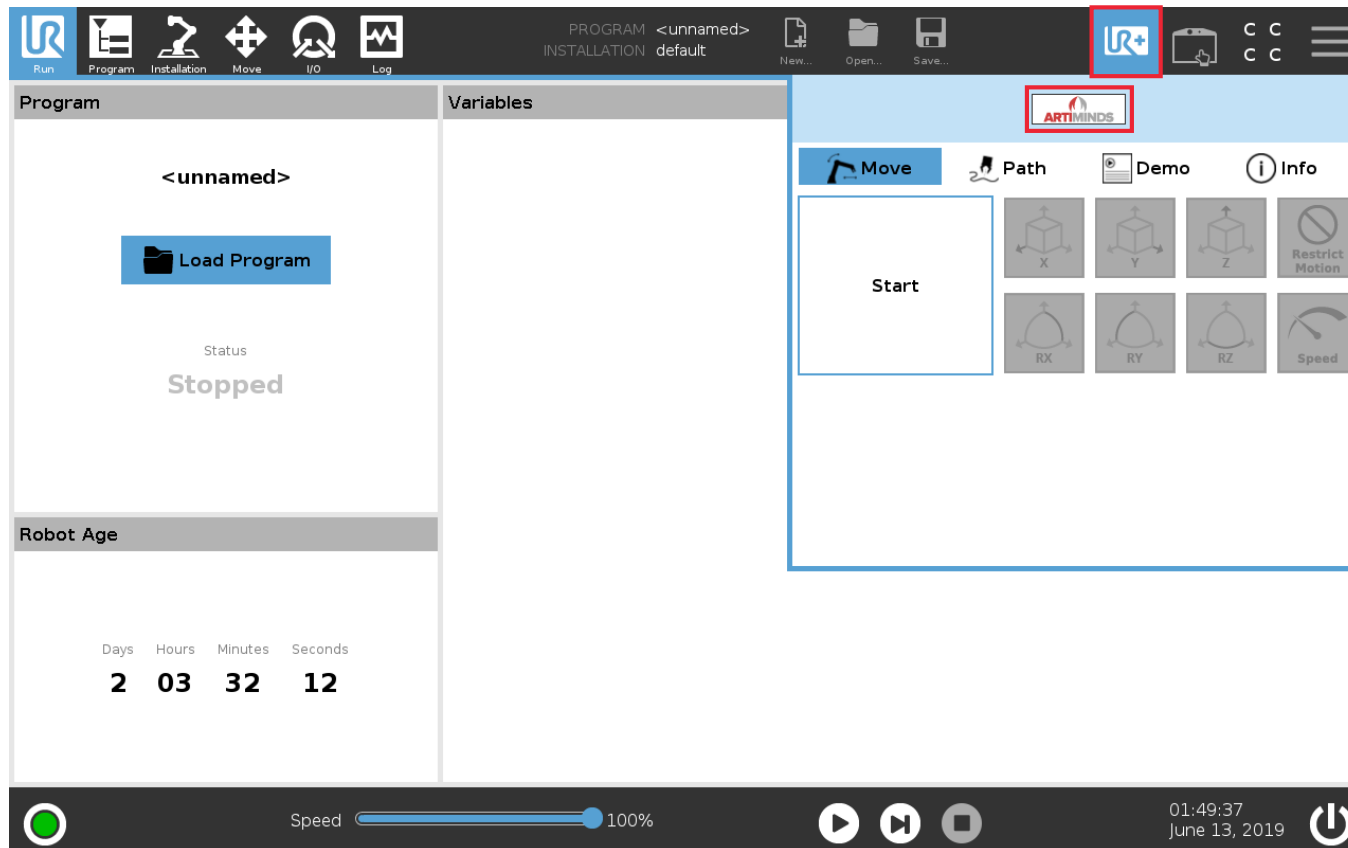
- Move tab
- Path tab
- Demo tab
- Information tab

## 5 Uninstallation

## 6 Support

P

Press the **UR+** button on the top of UR PolyScope to open the URCap toolbar section and select the ArtiMinds logo to open the ArtiMinds Essentials URCap application.



## Functionality

**T** The ArtiMinds Essentials URCap application consists of four tabs with various functionality (select one of those tabs to open additional options):



**Move tab** – Provides functionality to guide the robot in different directions or just along a certain axis easily.



**Path tab** – Allows to record a robot path (movement sequence of the robot). The recorded path can be played and saved as *.urp* program for later use.



**Demo tab** – Displays videos, images and information about ArtiMinds and possible usage scenarios of the overlay.

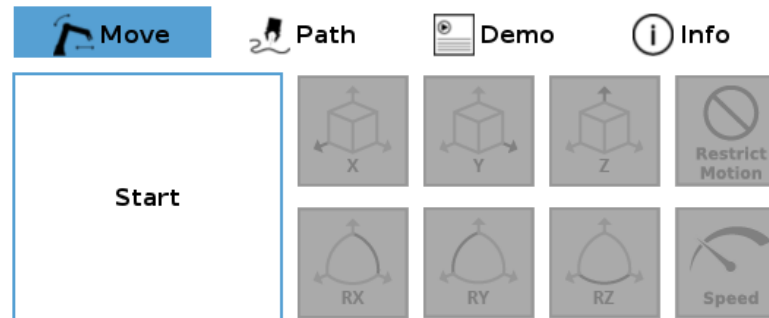


**Information tab** – Allows to reset and uninstall the overlay. Copyright information is shown.

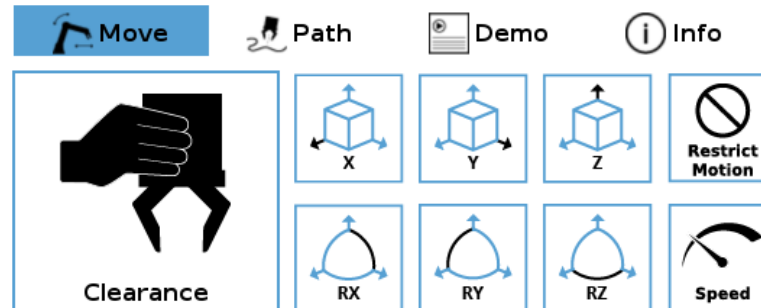


## Functionality

**T** **Move tab** - When the overlay is opened for the first time, the robot can't be guided directly. Press **Start** to begin and establish a connection with the robot. As UR script code will be executed, the robot might be set to **Remote Control** first (see the UR manual for more details).

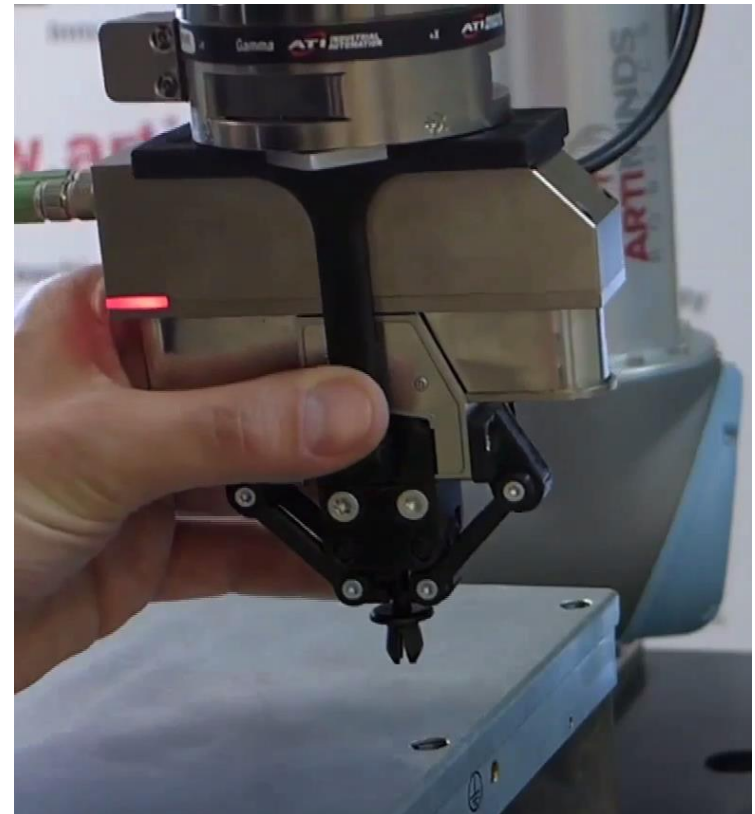
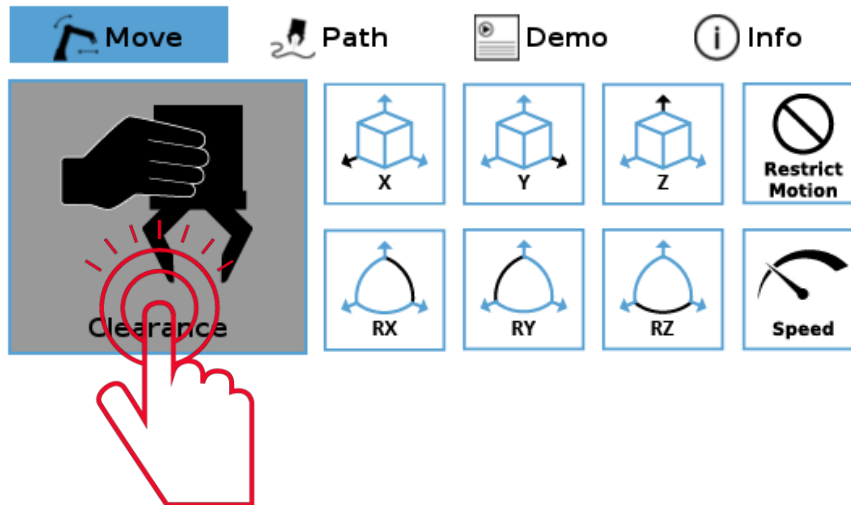


- Once a connection has been established the other buttons of the *Move* tab are enabled. The robot can be guided using the overlay now.



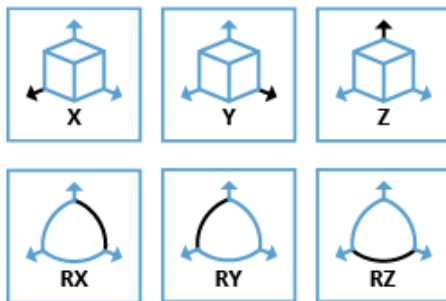
## Functionality – Move tab

- The *Clearance* button has to be pressed to actually move the robot. Keep the button pressed and guide the robot physically by using your hand.
- While pressing the button, it is coloured green, to indicate that the robot can be moved based on the forces measured by the robot.

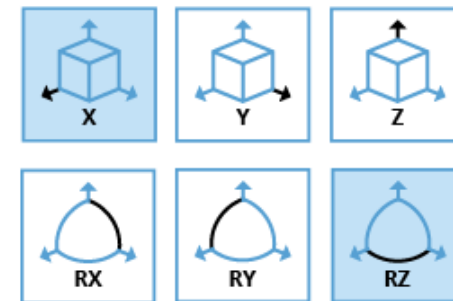


## Functionality – Move tab

- The six buttons *X*, *Y*, *Z*, *RX*, *RY* and *RZ* define along which axis the robot can be moved or rotated around. The axes refer to the Tool-Center-Point of the robot.
- Toggle one or more of the six buttons to restrict or allow the robot movement or rotation for that specific axis.
- If a button has a white background color, the robot can't move along or rotate around that axis.
- If a button has a blue background color, the robot can move along or rotate around that axis.



The robot is not allowed to move along or rotate around any axis



The robot is allowed to move along the x-axis and rotate around the z-axis

## Functionality – Move tab

- The movement of the robot, while pressing the *Clearance* button, can be controlled further by two other options:



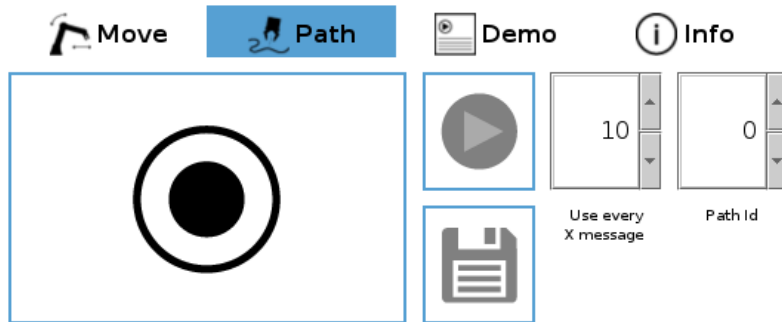
Allows to set if the movement of the robot should be restricted or not. If enabled the robot will not move outside an area of 100mm or 25°



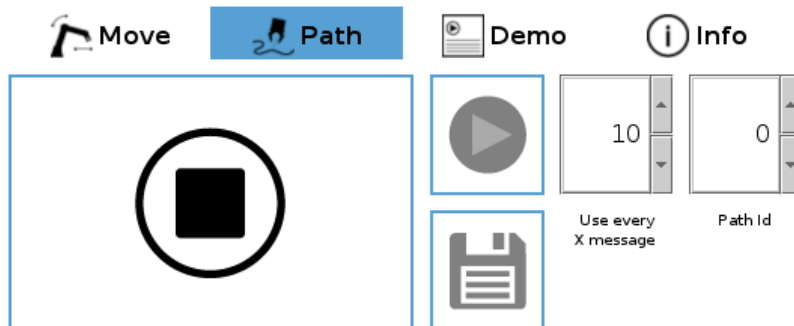
Allows to set if the movement speed of the robot should be slow or fast.

## Functionality – Path tab

**P** Path tab – Record a robot path for later playback or save it as a *.urp* program

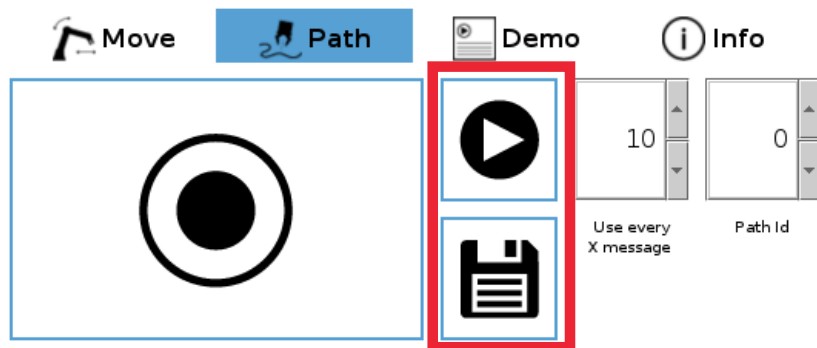


Press the *Record* button to start the recording process. Move the robot by using the *Clearance* button of the *Move* tab. All movements of the robot are recorded as a sequential path.



Press the *Record* button (now with the *Stop* symbol) again to stop the recording process.

## Functionality – Path tab



Once a path has been recorded, two additional buttons are enabled to play or save the recently recorded path.



Press the *Play* button to play the recently recorded path. The robot moves slowly back to the position, when the recording process has been started. Then the robot follows the movements of the recorded path.

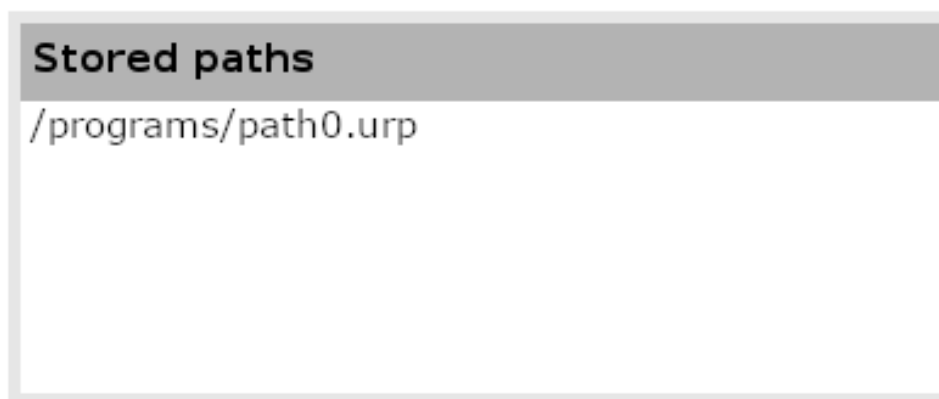
The movement speed of the robot, while the robot follows the recorded path, can be controlled by using the *Speed* setting at the bottom of UR PolyScope.



## Functionality – Path tab



Use the **Save** button to save the recently recorded robot path as *.urp* program on the robot. The program is saved as *pathX.urp*, where *X* is the *Path Id* that can be controlled in the *Path* tab of the overlay (see next pages).



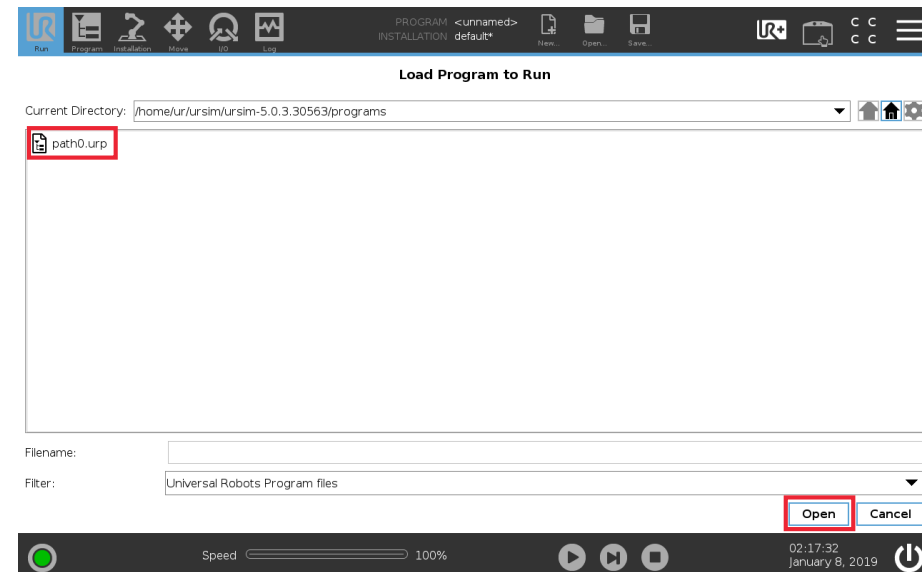
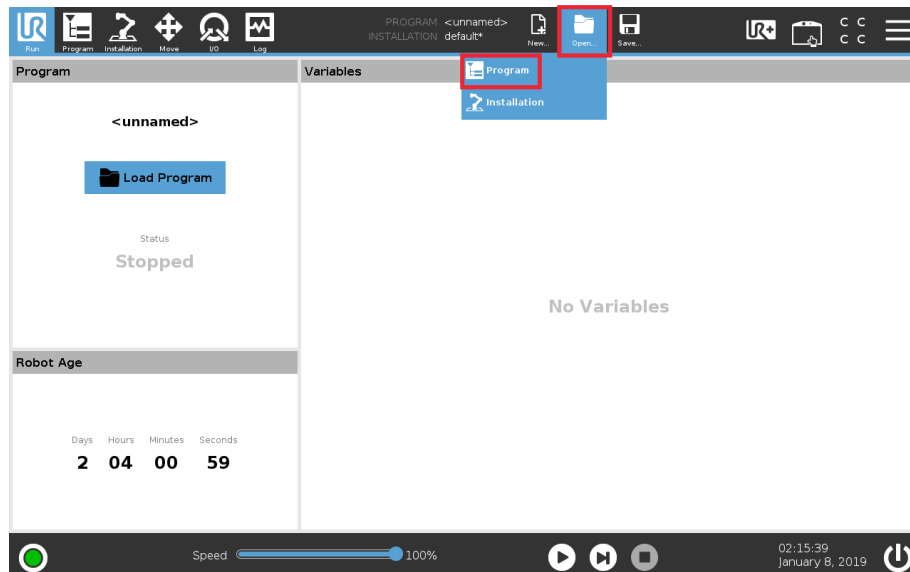
**?** Save recorded path as /programs/path1.urp?

**Save**

**Cancel**

## Functionality – Path tab

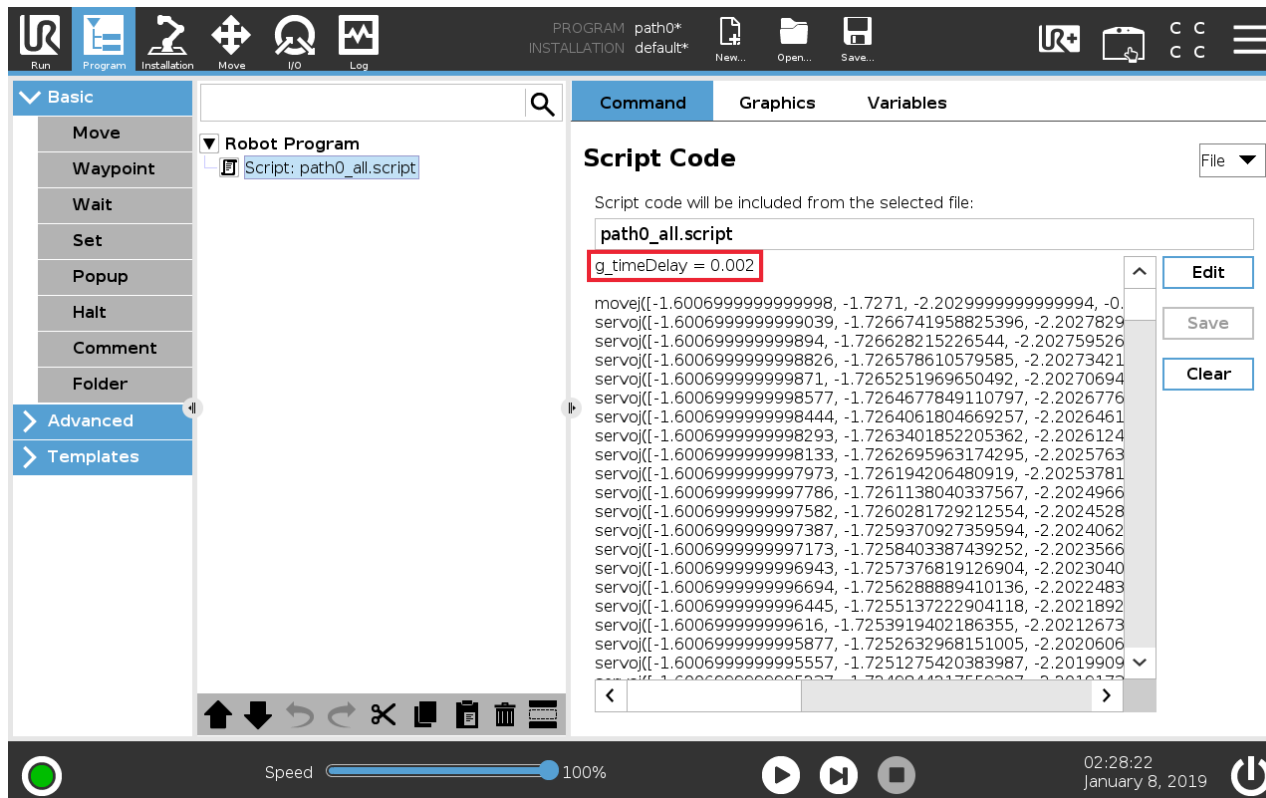
- The saved *.urp* program (recorded path) can be loaded as any other *.urp* program on UR PolyScope by pressing the *Open* and *Program* buttons (see the manual of UR PolyScope for additional information).





## Functionality – Path tab

- The robot movement speed of the recorded path can be changed very flexible, if the saved `.urp` program of the recorded path is opened in UR PolyScope.
- The variable `g_timeDelay` of the `.urp` program defines the time in milliseconds between two successive recorded points, so the movement speed can be increased by enhancing this variable or reduced by declining it. Make all changes with care!



## Functionality – Path tab



Use every  
X message

Use this numeric spinner to control the amount of points generated when recording a path. A value of 1 indicates that each 2ms a point will be generated. A value of 2 will generate a point each 4ms and so on.

More recorded points can better represent a robot path, but the generated script code will be much bigger.

Use every X message	Time between two recorded points (ms)	Amount of recorded points (lines in robot script code) in 1s
1	2ms	500
2	4ms	250
5	10ms	100
10	20ms	50
20	40ms	25
50	100ms	10
100	200ms	5
200	400ms	2

## Functionality – Path tab

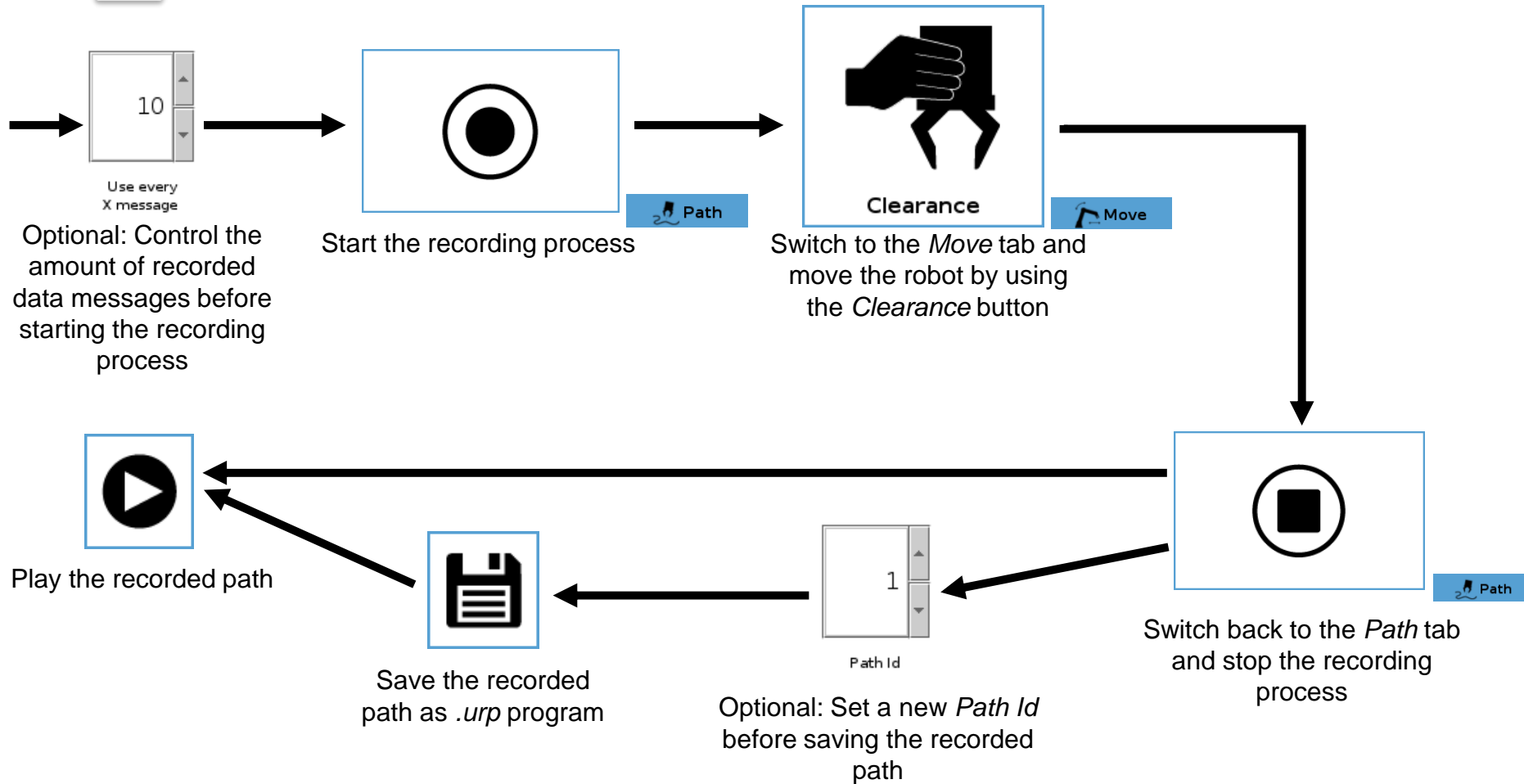


Path Id

Use this numeric spinner to set the *Path Id* of the current robot path. This id is used to create a unique name for the path that is used to save it (see previous pages).

## Functionality – Path tab

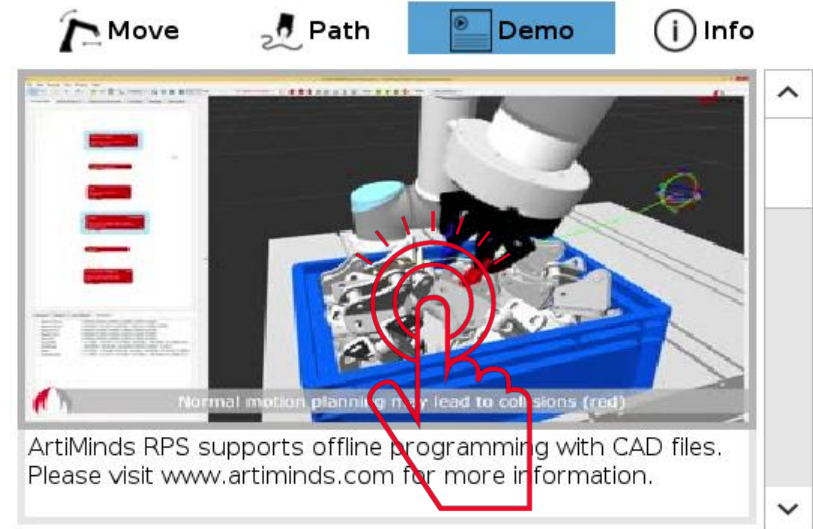
### Overview of an example recording process:



## Functionality – Demo tab

**D Demo tab – Open this tab to see information about ArtiMinds or possible usage scenarios**

- Click on the play button to start the playback of a video. Click on the video again to stop it.
- Use the sliders to read the full text or see other applications.



## Functionality – Information tab

- I** Information tab – Display the copyright information about the ArtiMinds Essentials URCap overlay



Uninstalls the overlay (see also next chapter of this manual).

# Overview

## 1 Requirements

## 2 Installation

## 3 Configuration

## 4 Functionality

- Move tab
- Path tab
- Demo tab
- Information tab

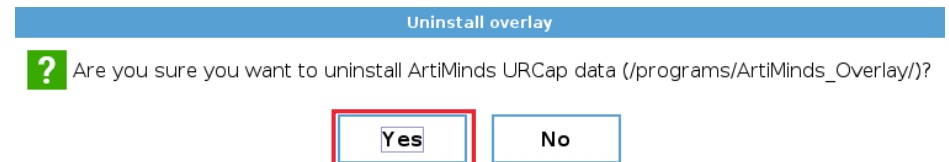
## 5 Uninstallation



## 6 Support

**T** To uninstall the ArtiMinds Essentials URCap overlay two steps are required:

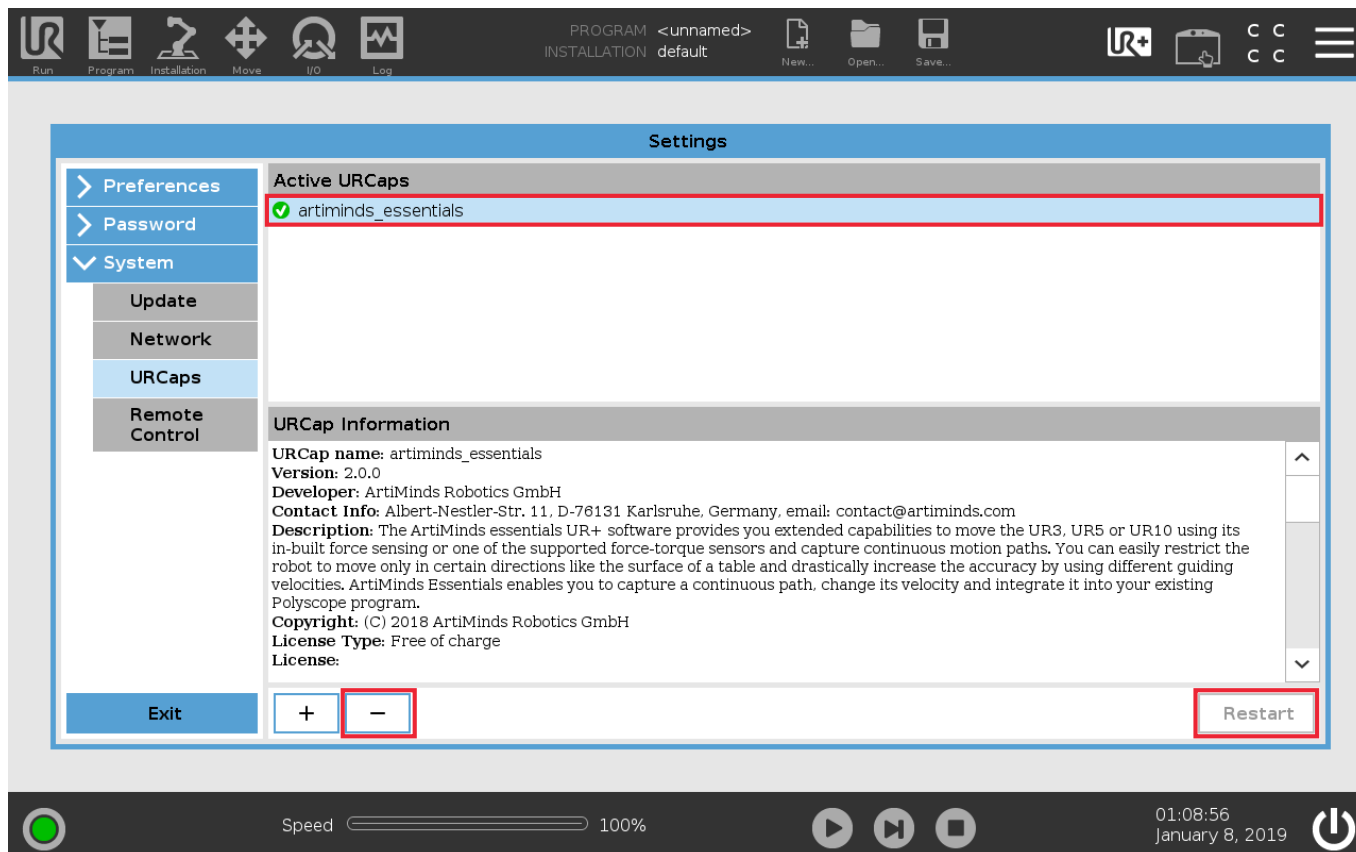
- 1** If you do not want to keep the ArtiMinds Essentials settings, press the *Uninstall* button in the *Information* tab of the overlay and confirm the question dialog with *Yes*:





2

Go into the *URCaps Setup* window (see chapter Installation) to select the *artiMinds\_essentials* entry in the *Active URCaps* menu and press the – button. Restart the robot/UR PolyScope to complete the uninstallation process.



# Overview

## 1 Requirements

## 2 Installation

## 3 Configuration

## 4 Functionality

- Move tab
- Path tab
- Demo tab
- Information tab

## 5 Uninstallation

## 6 Support

F

For problems or support please contact:



**ArtiMinds Robotics GmbH**

Emmy-Noether-Straße 10  
D-76131 Karlsruhe  
Germany

Phone: +49 721 96694781

Email: [support@artiminds.com](mailto:support@artiminds.com)

[www.artiminds.com](http://www.artiminds.com)