



Collaborative Robot: 6-Axis Robots AX6 Quick Start / Setup Manual

Original instructions

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1. Safety

1.1 Conventions

The table below explains the symbols used in this document and on the product itself.

 WARNING	This symbol indicates that a danger of possible serious injury or death exists if the associated instructions are not followed.
 WARNING	This symbol indicates that a danger of possible harm to people or death caused by electric shock exists if the associated instructions are not followed properly.
 CAUTION	This symbol indicates that a danger of possible harm to people or physical damage to equipment and facilities exists if the associated instructions are not followed properly.
	This symbol indicates that safety goggles must be worn.

1.2 Installation and Operation Safety

 WARNING	Pay attention to the following safety instructions: • Please read the “Collaborative Robot: 6-Axis Robots AX6 Manual”, the “Robot Controller RC-A101 Manual” and the “AX6 / RC-A101 Safety Manual” before using this robot system. Operating the robot system without understanding and following the safety precautions from this and the mentioned documents is extremely hazardous and may result in serious bodily injury and/or severe equipment damage to the robot system. • The robot system must be used in accordance with the environmental conditions described in the relevant manual. Using the product in an environment that exceeds these conditions can shorten its service life and cause serious safety problems. • Collaborative applications: Although the collision detection reduces the hazard of collisions with the human body to a minimum, the risk of collisions with head and neck must be prevented. For further explanations, see “AX6 / RC-A101 Safety Manual”. • Non-collaborative applications: Do not enter the operating area of the manipulator while the robot is powered-up and make sure that no one is inside this area before powering up. Being within the operating area of a powered-up manipulator is extremely hazardous and may cause serious safety problems as the manipulator may move even if it seems to be stopped. For further explanations, see “AX6 / RC-A101 Safety Manual”.
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 WARNING	Performing any work or opening the controller or the manipulator while the power on is extremely hazardous and may result in electric shock and/or malfunction of the robot system! Pay attention to the following safety instructions regarding electricity: • In order to turn ON the device, make sure to connect the AC power cable to an appropriate power receptacle or the DC input to a suitable power supply according to the technical specifications of the robotic system. Only then switch on the respective circuit breaker on the front panel of the controller • Before performing any replacement procedure, stop the application, turn the controller, manipulator and related equipment off, then disconnect the power plug from the power source.
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2. Installation and First Use

2.1 Included Items and Optional Products

The following items are included when shipped from the factory:

- Manipulator: 1 pc.
- Controller: 1 pc.
- M/C Power Cable: 1 pc.
- M/C Signal Cable: 1 pc.
- Controller AC Power Cable: 1 pc.
- Teaching Device Connector Jumper: 1 pc.
- Safety I/O connector: 10 pcs.
- I/O connector: 12 pcs.

Note that in this manual, the Enable Device, see table below, is needed for certain steps.

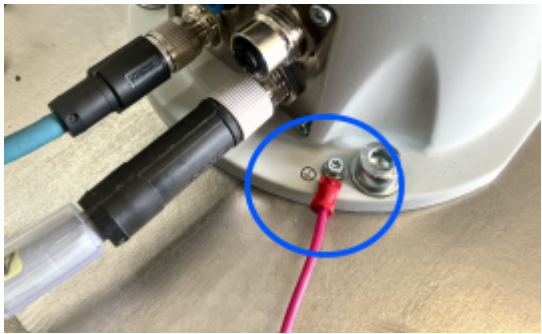
Optional items are as follows:

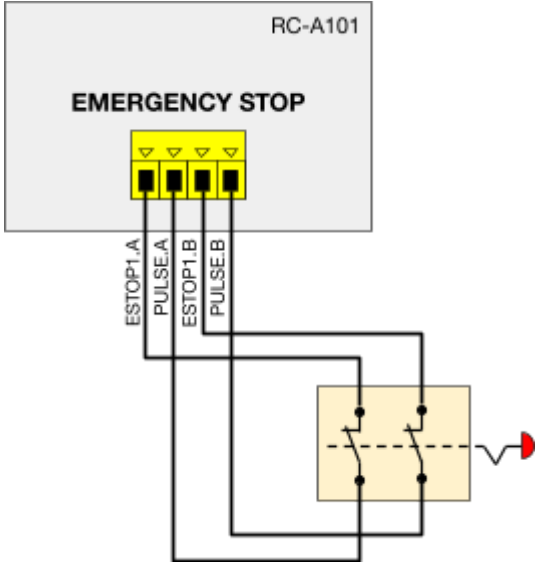
Part Name	Code
M/C Signal Cable 0.5 m	R12NZ901VY
M/C Signal Cable 1.5 m	R12NZ901VZ
M/C Signal Cable 3.0 m	R12NZ901W1
M/C Signal Cable 5.0 m	R12NZ901W2
M/C Power Cable 0.5 m	R12NZ901W3
M/C Power Cable 1.5 m	R12NZ901W4
M/C Power Cable 3.0 m	R12NZ901W5
M/C Power Cable 5.0 m	R12NZ901W6
Ethernet Cable 0.5m	R12NZ901W7
Ethernet Cable 1.5m	R12NZ901W8
Ethernet Cable 3.0m	R12NZ901W9
Ethernet Cable 5.0m	R12NZ901WA
Tablet Holder	R12NZ901WB
Enable Device	R12NZ901WC

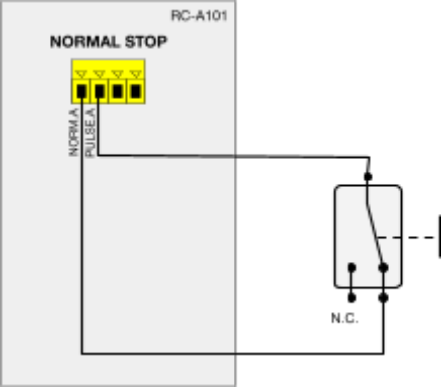
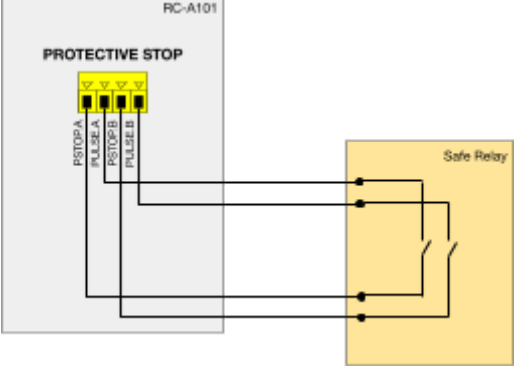
2.2 Mounting, Connection and Start-up

This step requires the controller RC-A101. For more information about the RC-A101, see the “RC-A101 User Manual”. It is recommended to keep the packing of the manipulator and controller.

2.2.1 Mount and Power Your Robot

No	Step	Image
1	Screw the manipulator AX6 onto a suitable surface using four class 8.8 M8 screws. The recommended fastening torque is 18 Nm. For details, please check the “Collaborative Robot: 6-Axis Robots AX6 Manual”.	
2	Connect the manipulator with the following cables: • Power cable (gray) • Signal cable (green)	
3	It is highly recommended to connect the manipulator base to a nearby earth outlet for fixed installations. Use a suitable (class 8.8 or A2) M3x6 screw with a torque of 0.7 Nm. For details, please check the “Collaborative Robot: 6-Axis Robots AX6 Manual”.	

4	Place the controller RC-A101 on a stable surface. Connect a teaching device or a jumper to the teaching device connector.	
5	Connect the controller to the cables that were previously plugged into the manipulator: • Power cable (gray) • Signal cable (green)	
6	Connect an emergency stop button to the “EMERGENCY STOP” input of the controller.	

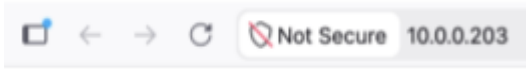
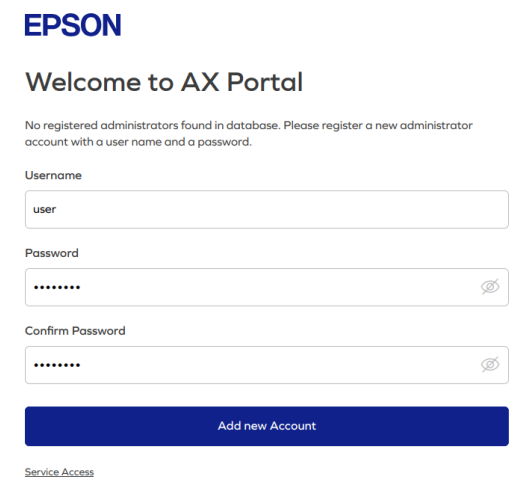
7	Connect a normally-closed button or a jumper to the “NORMAL STOP” input of the controller.	
8	Connect a safety device or a jumper to the “PROTECTIVE STOP” input of the controller.	
9	Connect the Ethernet 2 port of the controller to your computer using an Ethernet cable.	

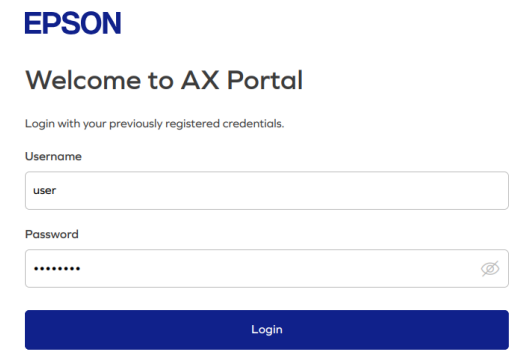
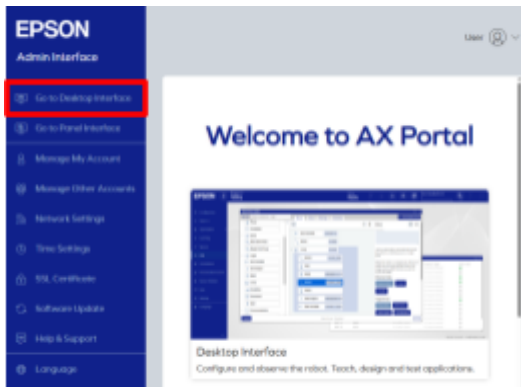
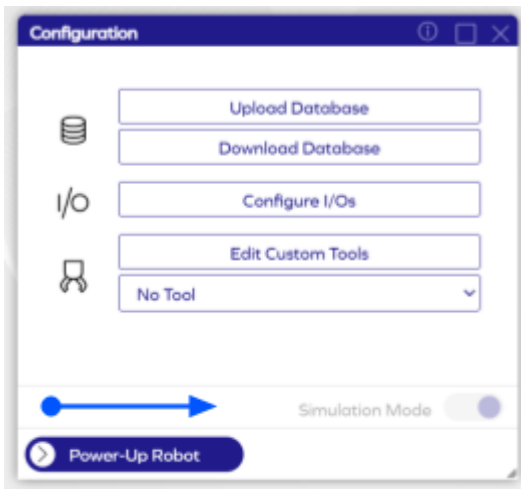
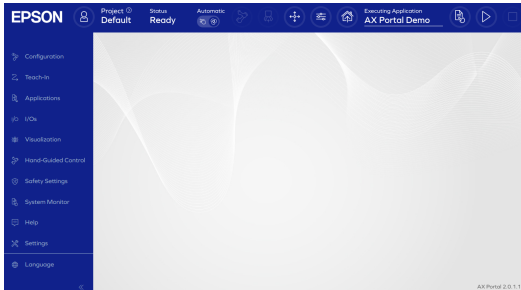
 WARNING	Pay attention to the following safety instructions regarding emergencies: • Never operate the robot without an installed Emergency Stop button. Make sure that an Emergency Stop button is always accessible. Ignoring this may lead to dangerous situations. • In the event of an emergency, such as a malfunction or any other dangerous situation, press the Emergency Stop button immediately.
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- 10** Connect the power cable to the controller and the socket. Now switch on the circuit breaker of the controller.



2.2.2 Connect to AX Portal

No	Step	Image
1	Use any computer with a physical Ethernet port (or use an adapter) and connect it to the Ethernet 2 port of the controller. Usually your computer gets an IP address assigned by the DHCP server of the robot controller when connected to the Ethernet 2 port. If you are using a fixed IP address, make sure it is in the range 10.0.0.xxx.	
2	Access AX Portal via a browser: Type the IP of the robot's Ethernet 2 port in the address line of your browser: https://10.0.0.203. Your browser will tell you that the connection to AX Portal is not private/secure. This is normal for websites which are running on local devices (i.e. accessed via an IP address). Visit the website anyways by accepting the browsers exception option.	
3	When you start the robot for the first time, you will be asked to create an administrator user. Make sure you store the password safely, as this can only be reset by a trained service person. Enter the desired user name and select a password. Then, click to “Add new Account”.	

4	Login with the previously created data.	 The screenshot shows the EPSON AX Portal login interface. It features the EPSON logo at the top, followed by the heading 'Welcome to AX Portal'. Below this, a message states 'Login with your previously registered credentials.' There are two input fields: 'Username' with the text 'user' and 'Password' with masked characters '*****'. A blue 'Login' button is positioned at the bottom right of the form.
5	Click on “Go to Desktop Interface”.	 The screenshot displays the EPSON Admin Interface. A sidebar on the left contains a list of navigation options. The option 'Go to Desktop Interface' is highlighted with a red rectangular box. Other options include 'Go to Panel Interface', 'Manage My Account', 'Manage Other Accounts', 'Network Settings', 'Show Settings', 'SSL Certificates', 'Software Updates', 'Help & Support', and 'Language'. The main content area shows a preview of the 'Welcome to AX Portal' desktop interface.
6	If you have no end-effector installed, you may directly power up the robot by moving the slider “Power-Up Robot” to the right. If you already have mounted an end-effector, you need to set it up first. For this, refer to the “AX Portal User’s Guide”, section “Configuration Menu”. Note that the start-up takes some seconds until the motors start and the brakes release with an audible clicking. As soon as the LED ring is on, the robot is ready.	 The screenshot shows the 'Configuration' window of the AX Portal. It contains several interactive elements: 'Upload Database' and 'Download Database' buttons; 'Configure I/Os' and 'Edit Custom Tools' buttons; a dropdown menu currently set to 'No Tool'; a 'Simulation Mode' toggle switch; and a 'Power-Up Robot' button with a blue arrow slider positioned to its left, indicating it is active.
7	Your robot is ready to use.	 The screenshot shows the main dashboard of the EPSON AX Portal. At the top, there is a status bar with 'Project ID: Default', 'Status: Ready', and 'Assessment: (P)'. Below this is a navigation sidebar with icons for 'Configuration', 'Records', 'Applications', 'I/Os', 'Visualization', 'Hand Guided Control', 'Safety Settings', 'System Monitor', 'Help', 'Settings', and 'Language'. The main area of the dashboard is a large, light-colored space with a faint grid pattern. The bottom right corner of the dashboard displays the text 'AX Portal 2.0.1.1'.

2.3 Robot Usage

2.3.1 GUI Overview

After starting, you will see the AX Portal user interface as shown below. You can use it to teach poses, as shown in the picture, but also to create programs – either with the intuitive block programming or the powerful, Python-based scripting language. Many other functions are available, such as speed settings, the simple integration of grippers or the control of I/Os.



AX Portal overview.

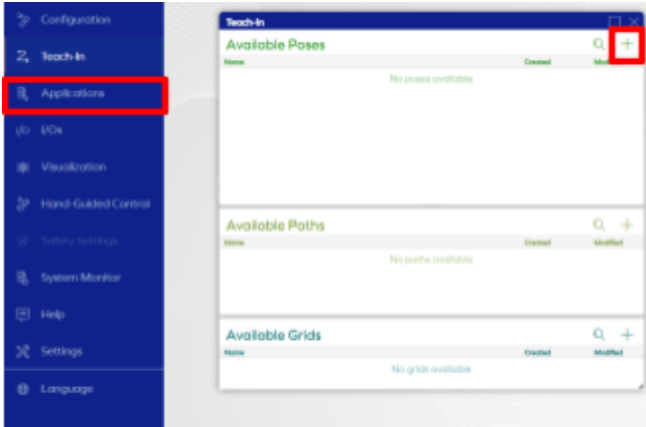
The full range of functions of AX Portal is defined in the “AX Portal User’s Guide”, in the “Collaborative Robot: 6-Axis Robots AX6 Manual” and in the “Robot Controller RC-A101 Manual”.

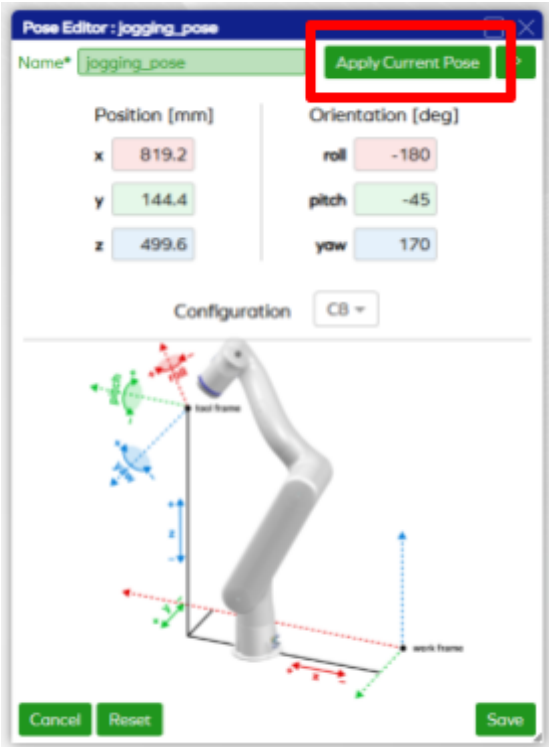
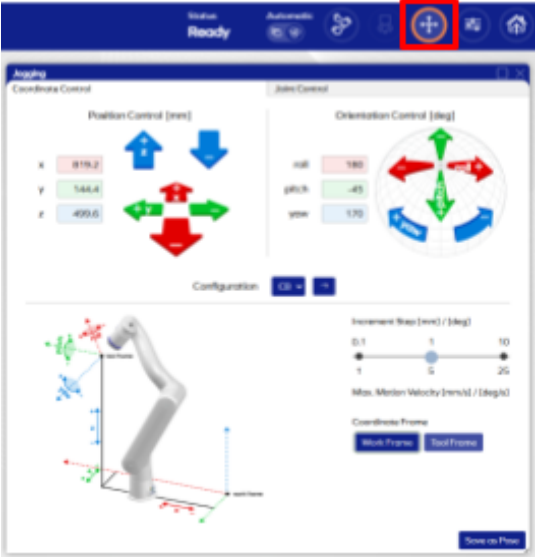
2.3.2 Operating Modes

For initial operation, programming and testing, use the robot in manual mode. In this mode, the TCP speed is limited to 250 mm/s and the robot only moves when the enabling device is being triggered.	
Once the system is set up and tested, automatic mode can be used for operation of the robot.	

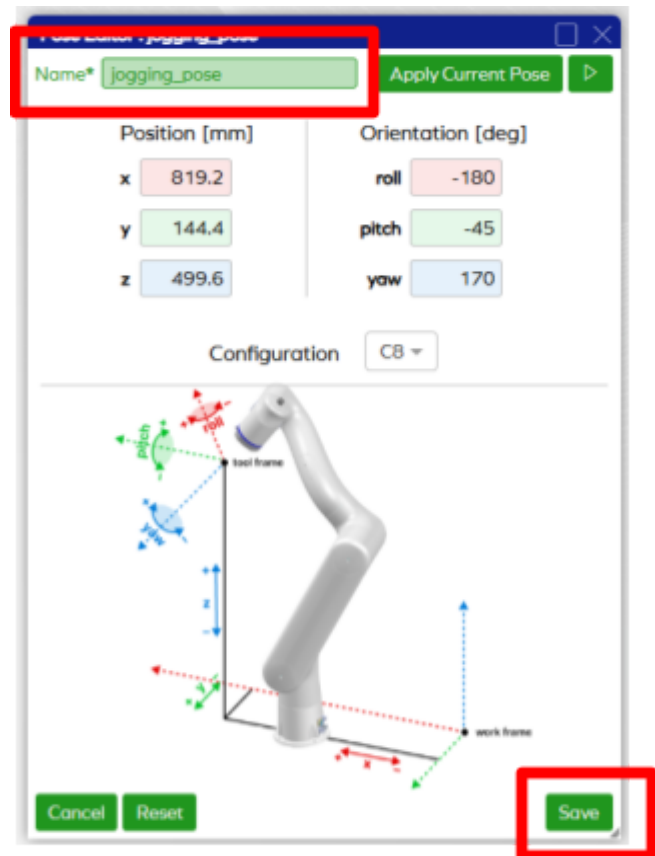
 WARNING	Automatic mode must only be used if the system is equipped with the necessary safety functions, has been tested, and its safety has been confirmed by a risk assessment. Using automatic mode in other situations is very dangerous. For further information, please refer to the “AX6 / RC-A101 Safety Manual”.
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2.3.3 Teach Poses by Hand-Guided Control or Jogging

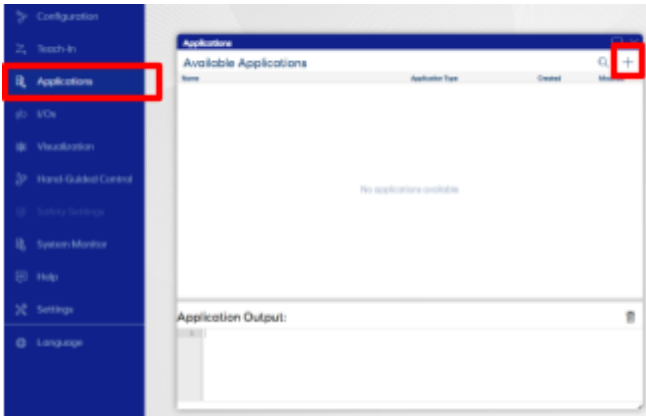
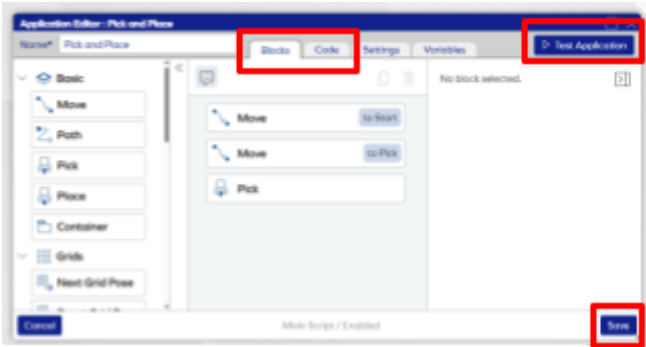
No	Step	Image
1	Applications are usually based on poses. All your poses are listed in the “Teach-In” window. There, you can create poses by clicking on the “+”.	

2 In the pose editor, there is the possibility to enter coordinates or to apply the values of the current robot pose (“Apply Current Pose”).	
3 For applying the current pose, the robot can be moved by pressing the hand-guided control button or with the jogging window.	Hand-Guided Control  Jogging Window 

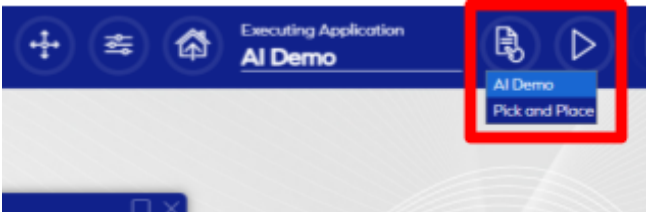
4 Choose a name and save your pose.



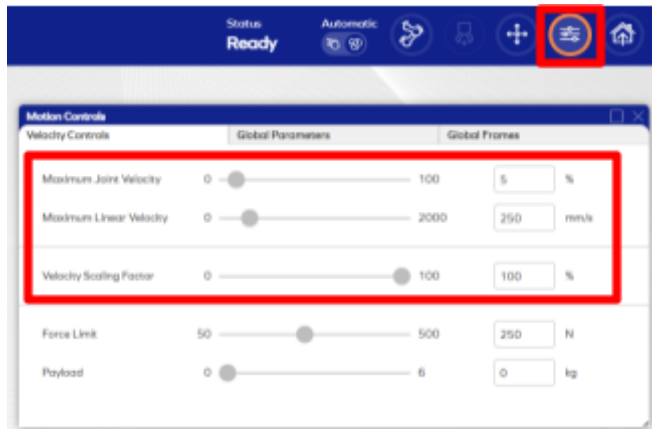
2.3.4 Create an Application

No	Step	Image
1	Applications are usually based on poses. All your applications are listed in the “Application” window. There, you can create applications by clicking on the “+”.	
2	You can start your first application using block programming. Advanced users can switch to the program code editor. The application can be tested in the Application Editor. Choose an application name and save your application.	

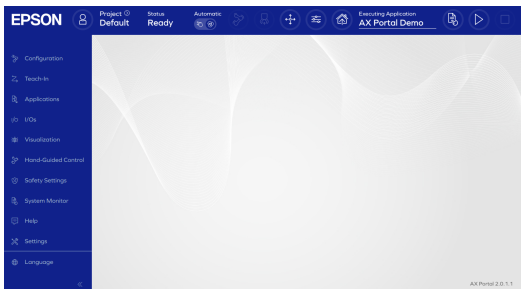
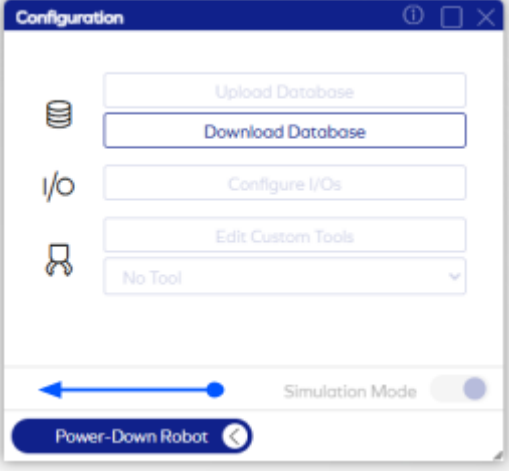
2.3.5 Select and Run Applications

No	Step	Image
1	You can select the current program in the top-right corner and start it by clicking the play button.	

2.3.6 Use Speed Controls

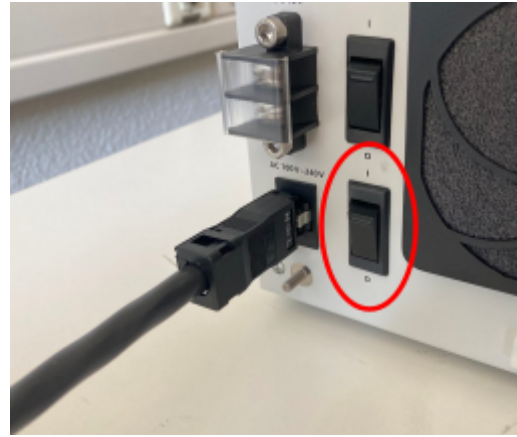
No	Step	Image
1	The control window contains settings to limit the maximum robot velocity and to scale down the velocity of all robot movements by a scaling factor. These controls are useful during setup of robot applications, e.g. for limiting the velocity while validating a new application or changing movements in existing applications.	 The image shows a software interface for a collaborative robot. At the top, there is a status bar with 'Status Ready' and several icons. One icon, representing a list or settings, is highlighted with a red square. Below this is a window titled 'Motion Controls' with three tabs: 'Velocity Controls', 'Global Parameters', and 'Global Frames'. The 'Velocity Controls' tab is active. It contains five settings, each with a slider and a numeric input field: 'Maximum Joint Velocity' (0 to 100, input 5, unit %), 'Maximum Linear Velocity' (0 to 2000, input 250, unit mm/s), 'Velocity Scaling Factor' (0 to 100, input 100, unit %), 'Force Limit' (50 to 500, input 250, unit N), and 'Payload' (0 to 6, input 0, unit kg). A red rectangle highlights the first three settings.

2.4 Shut Down

No	Step	Image
1	For shutting down the robot, stop the movement or trigger the normal stop. If you trigger the normal stop, continue with step 4.	
2	Click to “Configuration”.	
3	Click “Power-Down Robot” and answer all dialogues. Wait until the LED ring on the manipulator turns off.	

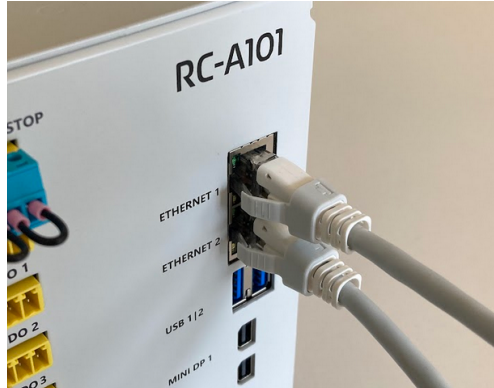
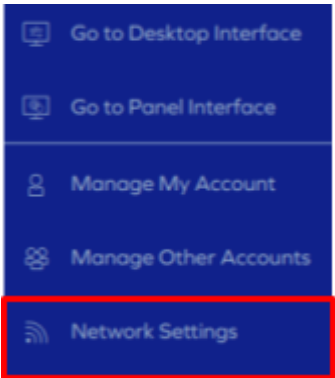
4

Switch the main switch of the controller off.



2.5 Network Settings

The IP address of Ethernet port 1 can be changed by the user (either static or DHCP). For Ethernet port 2, the IP address 10.0.0.203 is permanently assigned. This ensures that the robot can always be reached if the settings on port 1 are incorrect or unknown. The following section shows how to configure Ethernet port 1.

No	Step	Image
1	Connect the Ethernet 1 port of the controller to the network or machine you would like to connect the controller to. Keep the Ethernet 2 port still connected to your computer.	
2	Switch on the controller. After a few moments, access the controller with the IP address https://10.0.0.203.	
3	Log in and open the network settings.	
4	If your network assigns IP addresses via DHCP, it is now displayed here. You may use this address to reach the robot from within your network. Alternatively, a fixed IP address can be set ("Manual IP Address").	