

Overview

Welcome to the MachineMotion AI integration guide for Universal Robots! This guide walks you through the setup process to connect, control and create MachineLogic application with your **UR e-Series Robot!**

Compatibility Notice

This user guide is compatible for MachineMotion AI only. To access the guide for the previous MachineMotion v2 see the link at the bottom of this page.

1. System Requirements

To program a UR e-Series Robot with MachineMotion AI, ensure you have the following components:

- **MachineMotion AI Controller**
- **Pendant V3**
- **Robot Safety Module**
- **E-Stop Module with Reset**
- **UR e-Series Robot** with controller
- **Safety Extension Cables**
- **URCap Software** from Vention (via USB or download)

Note: This list depicts the minimum set of components needed to configure and control your UR e-Series robot with MachineMotion AI. Your system may have a different set of components according to your safety needs.

2. Hardware Setup

2.1 Components Connection

1. Connect the **Robot Safety Module** to the MachineMotion AI controller, pendant, and robot controller (As shown in Figure 1).

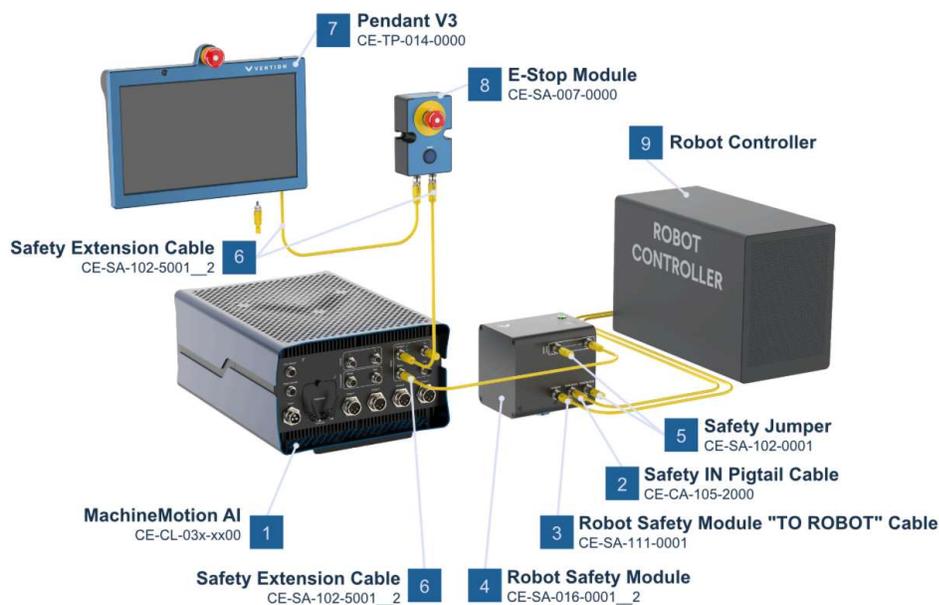
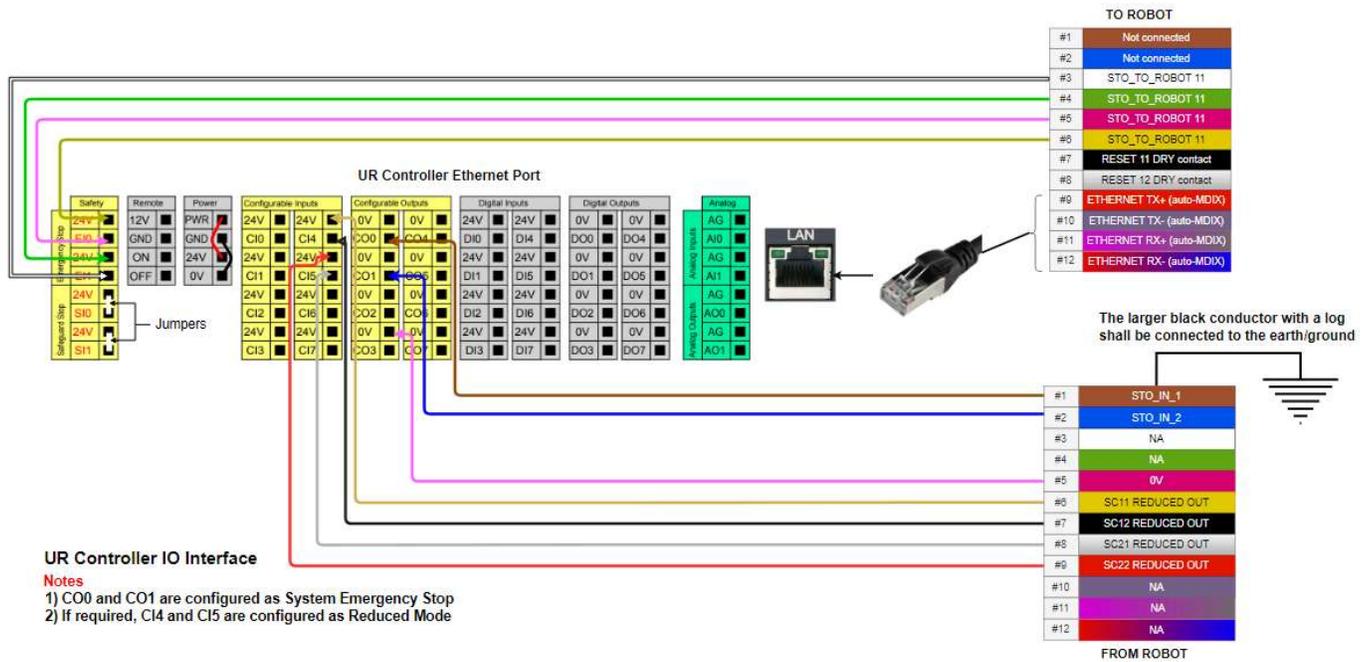


Figure 1: Connection Diagram for MachineMotion AI with Robot Safety Module

2. Ensure all safety devices are wired properly and the controller safety wiring is done as per following diagram



3. Power on all devices.

2.2 Robot Controller Safety Configuration

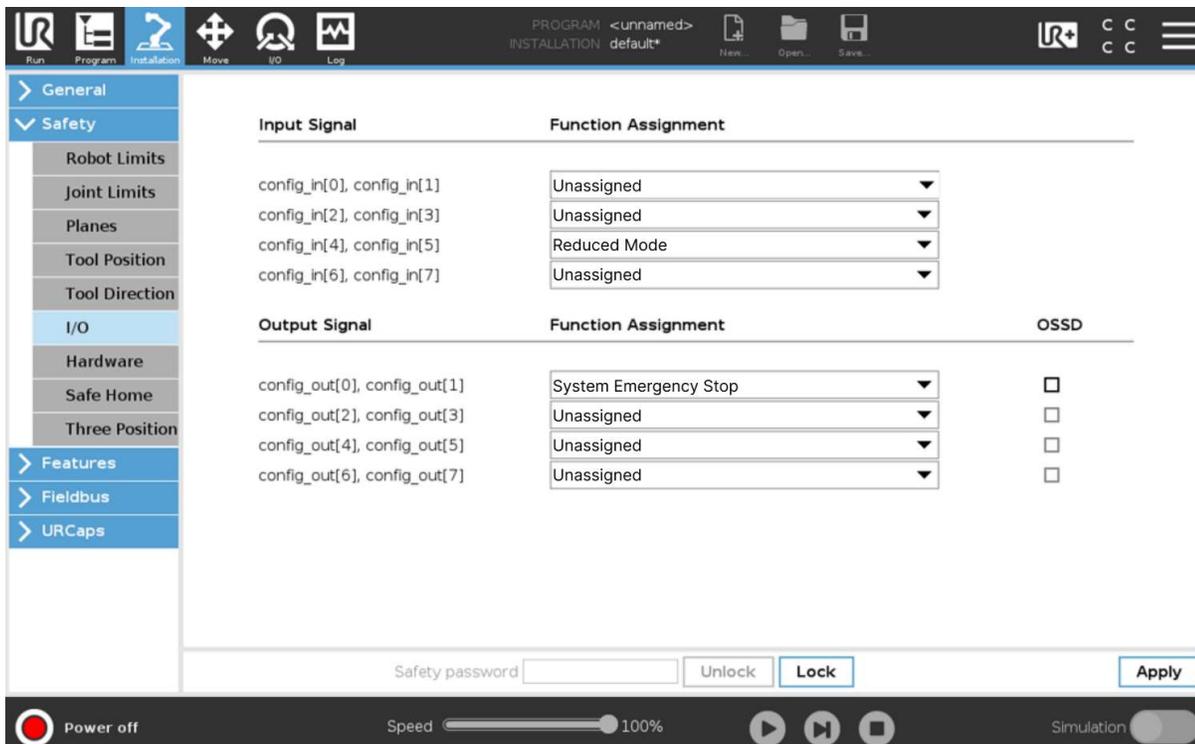
The input & output pins on the Universal Robots controller can be configured as safety pins using the UR Teach Pendant.

1. Navigate to: Installation > Safety > I/O
2. (If needed) Assign to **config_in[0], config_in[1]** : Reduced Mode
3. Assign to **config_out[0], config_out[1]** : System Emergency Stopped

Settings Lock by safety password

If the safety settings are locked by a safety password, simply input your safety password then unlock.

By default, Universal Robots safety password is: **easybot**



Universal Robot Safety I/O Configuration

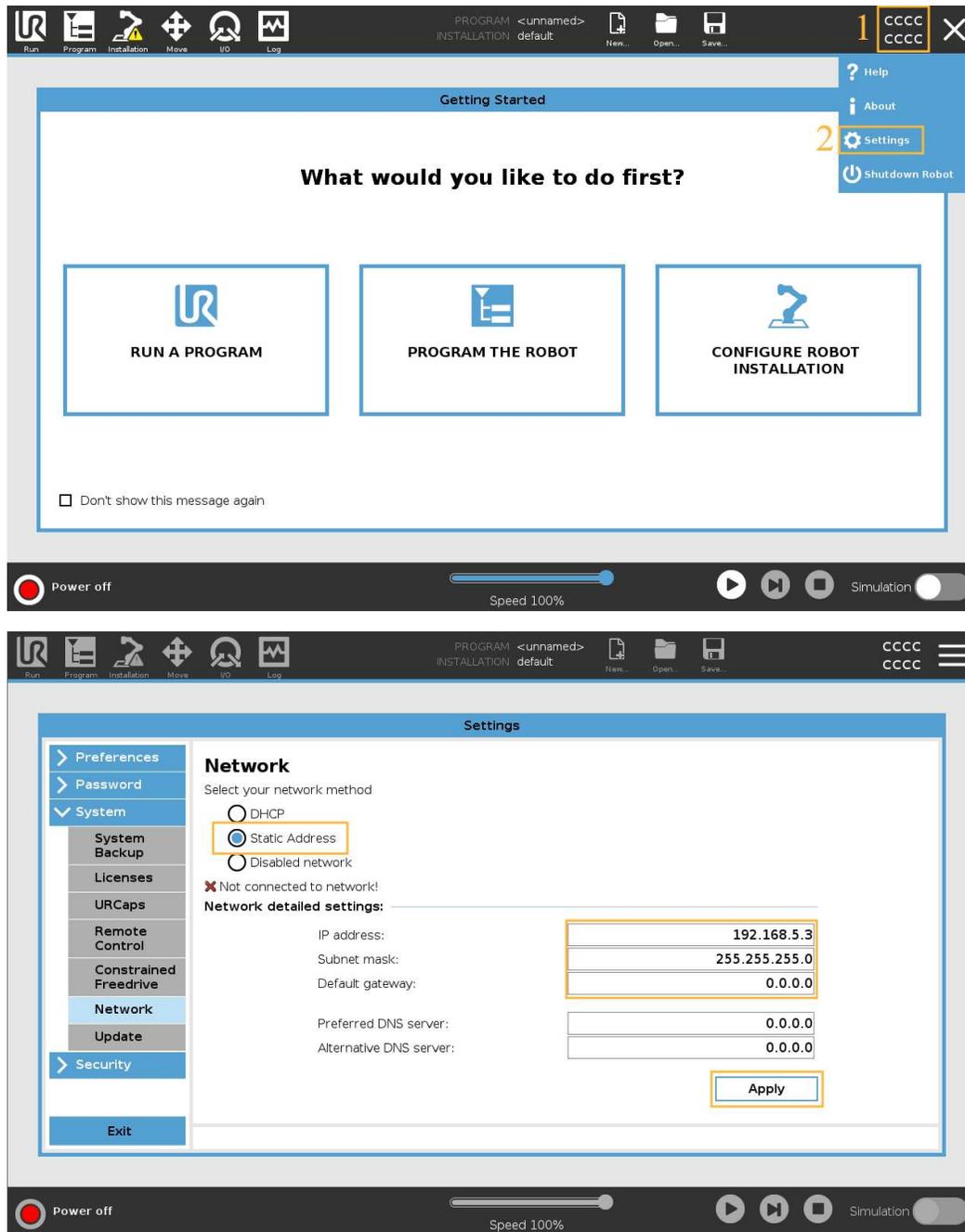
3. Configure the UR Controller Network

3.1 Set a Static IP

On the UR Teach Pendant:

1. Go to: Menu > Settings > System > Network
2. Set to **Static Address**
3. Use the following values:
 - **IP Address:** 192.168.5.3
 - **Subnet Mask:** 255.255.255.0
 - **Default Gateway:** 0.0.0.0
 - **DNS Servers:** 0.0.0.0

Click **Apply**.



3.2 Security Settings

To ensure the connection between the MachineMotion and the Universal Robot can be established properly, validate that the following settings match the following parameters.

Go to: Menu > Settings

Security → General Settings

PROGRAM <unnamed>
INSTALLATION default

CCCC
CCCC

Settings

- Preferences
- Password
- System
- Security
 - General
 - Secure Shell
 - Services
 - Permissions
- Exit

Miscellaneous Settings

Enable Magic File support

Inbound Connections

Restrict inbound network access to this subnet:

Disable inbound access to additional interfaces (by port):

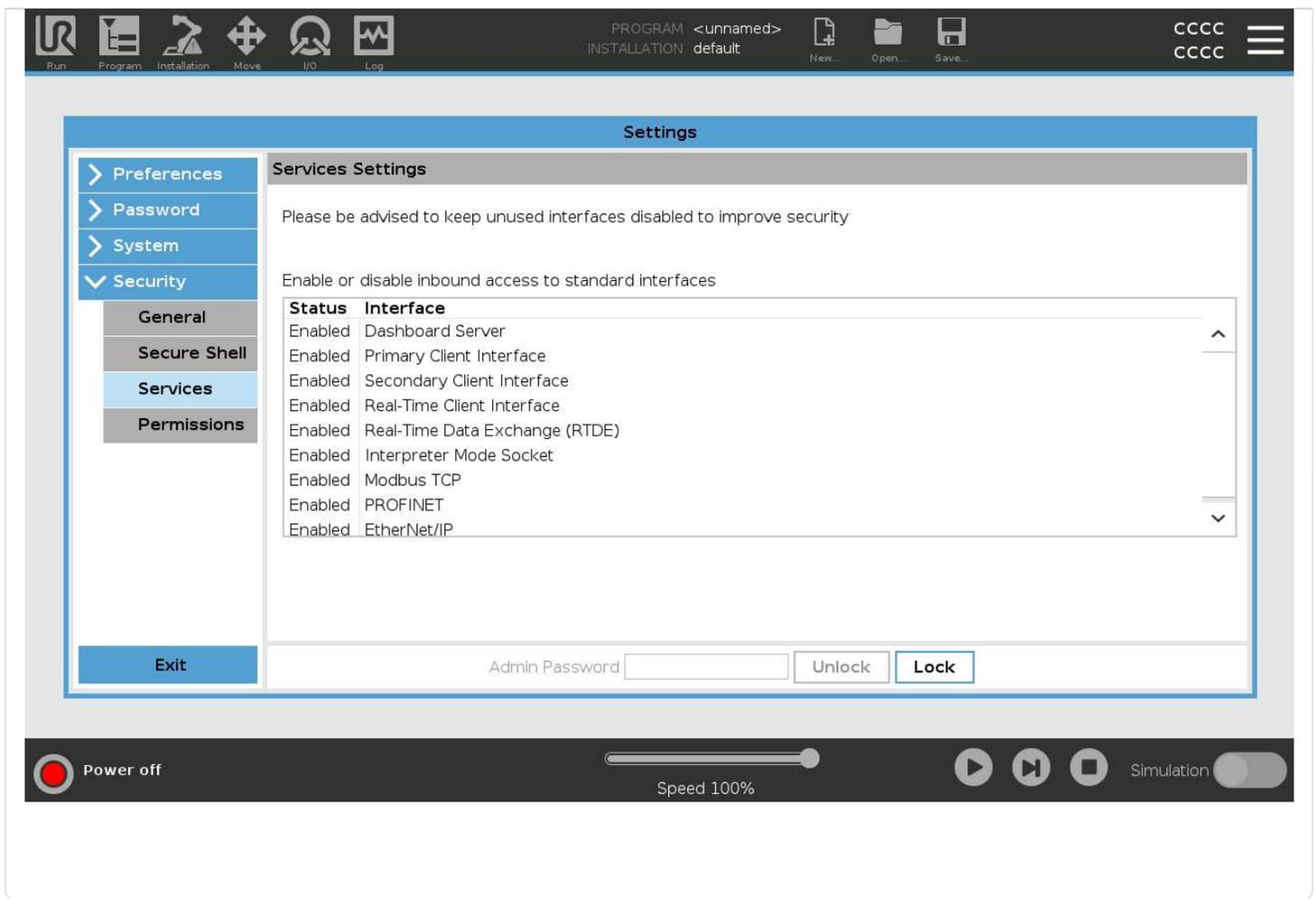
Admin Password

Power off Speed 100% Simulation

Security → Secure Shell Settings

The screenshot shows the Vention Settings window with the Security section expanded. The 'Secure Shell Settings' panel is active, showing options to 'Enable SSH Access' and 'Allow Port Forwarding'. The 'Authentication' section is set to 'Both' (Password Based and Key Based). Below this is a table for 'Manage Authorized Keys' with columns for Label, Key type, and Key. At the bottom, there is an 'Admin Password' field and 'Unlock' and 'Lock' buttons. The interface includes a top toolbar with icons for Run, Program, Installation, Move, I/O, and Log, and a bottom control bar with a Power off button, a Speed slider at 100%, and a Simulation toggle.

Security → Services Settings



4. Install and Configure the URCap

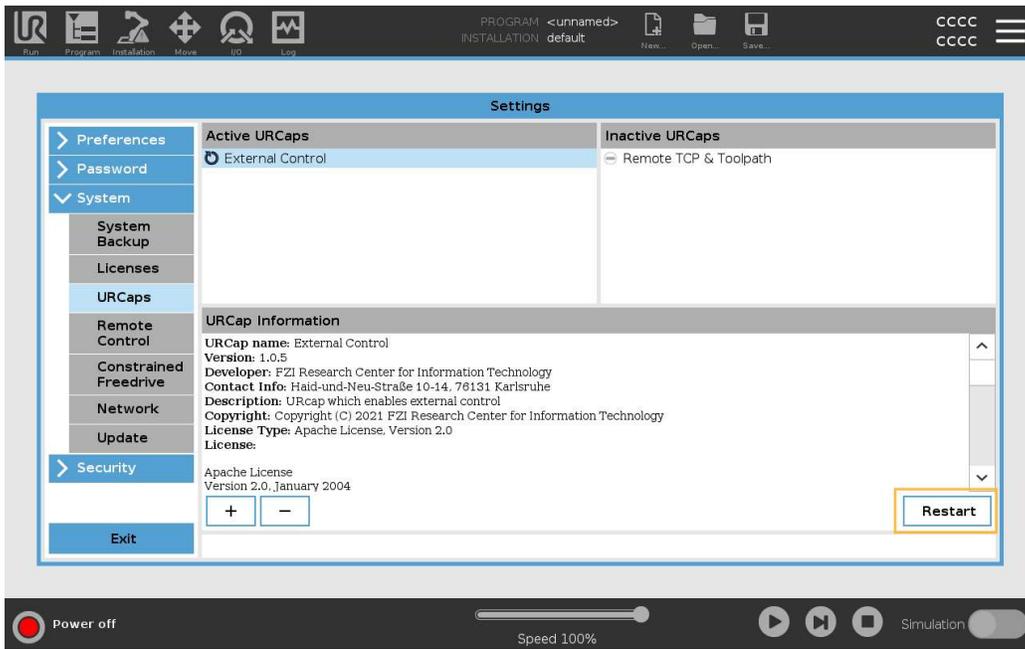
4.1 Install Vention's URCap

1. Insert the USB key with the URCap into the teach pendant.
 - a. You can also download the URCap manually with the following link:

 [externalcontrol-1.0.5.urcap](#)

34.46 KB [Download](#)

2. Go to: Menu > Settings > System > URCaps
3. Tap +, select the .urcap file, and tap Open.
4. Restart the robot controller when prompted.

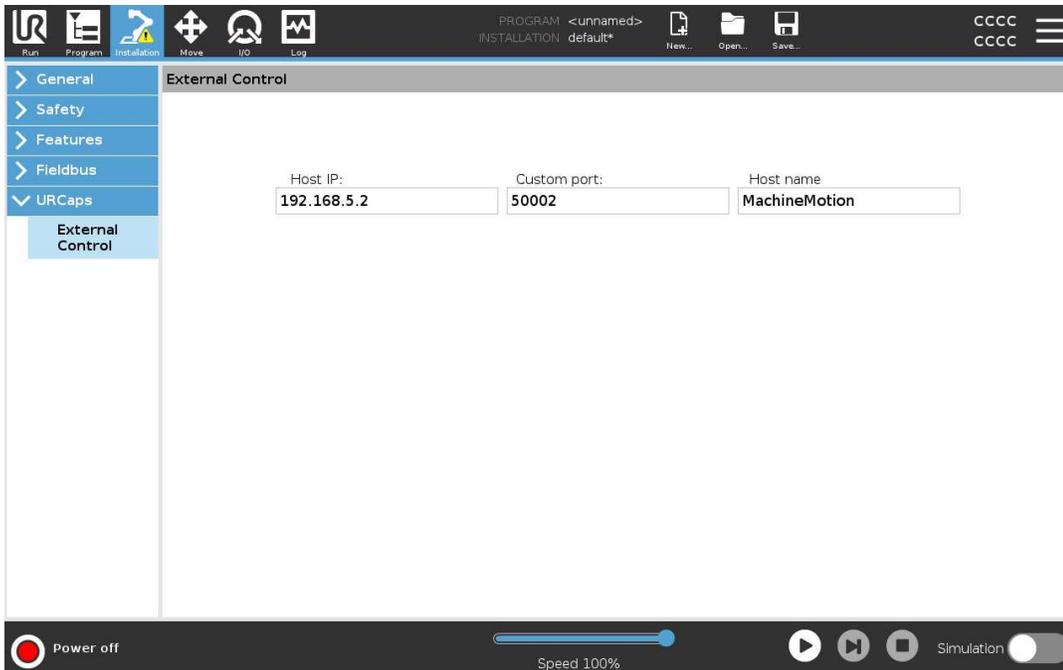


4.2 Configure the URCap

1. Go to: Installation > URCaps > External Control
2. Define the following IP and Port address according to the MachineMotion you have:

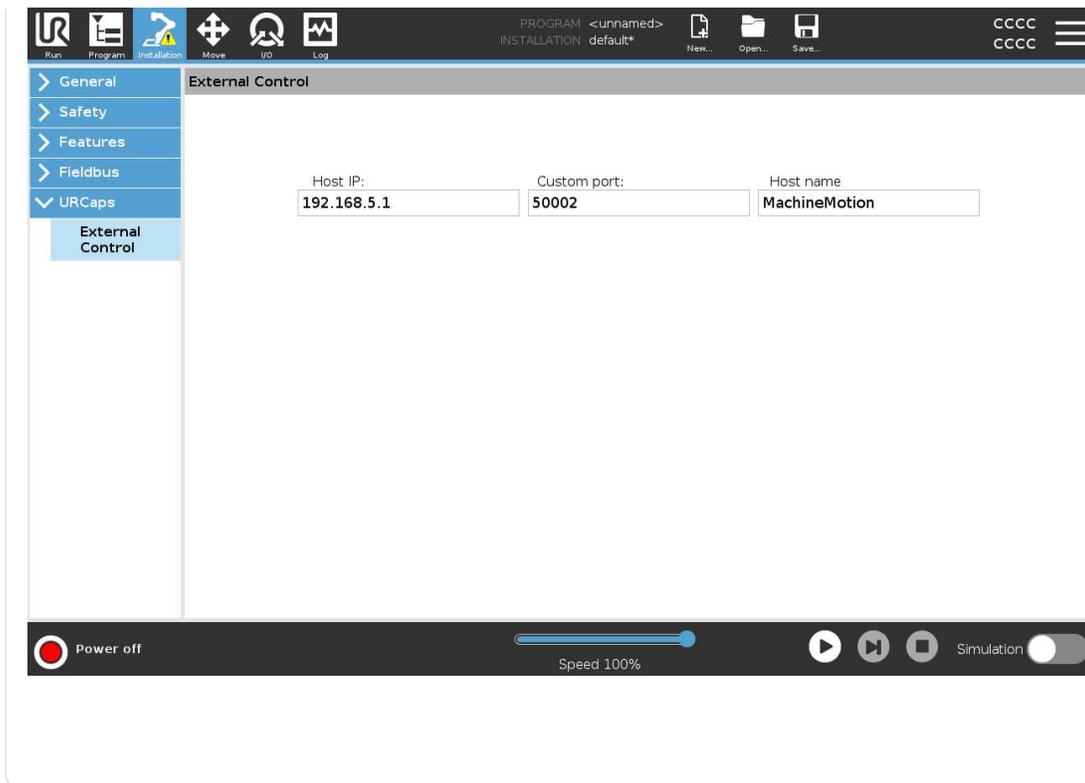
MachineMotion AI

- **Host IP:** 192.168.5.2
- **Custom Port:** 50002



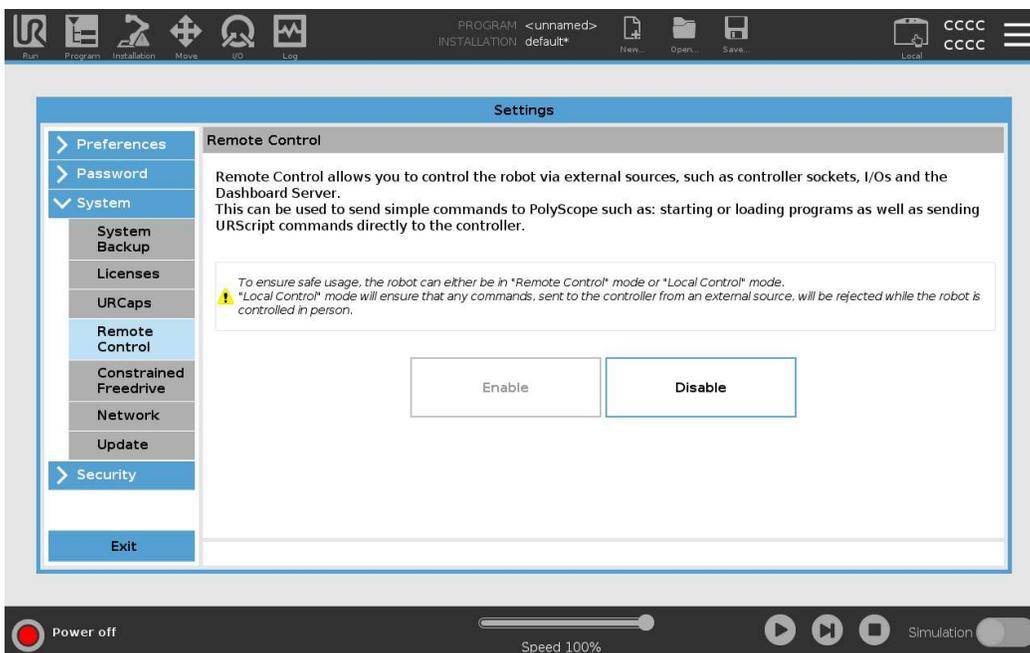
MachineMotion v2

- **Host IP:** 192.168.5.1
- **Custom Port:** 50002



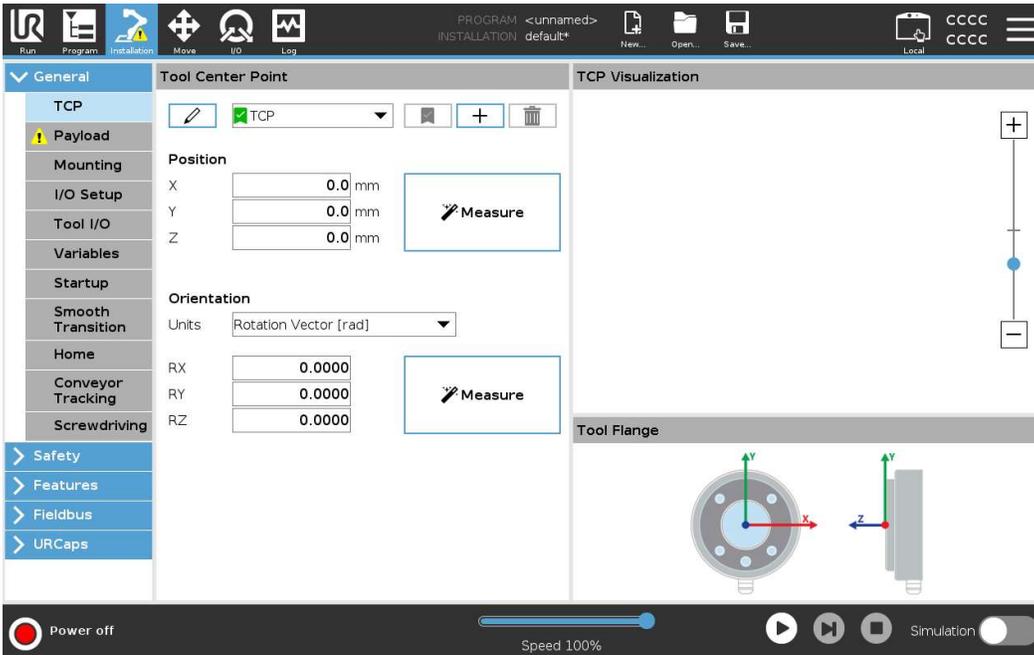
4.3 Enable Remote Control

1. Navigate to: Menu > Settings > System > Remote Control
2. Click **Enable**



4.4 Zero the TCP (Tool Center Point)

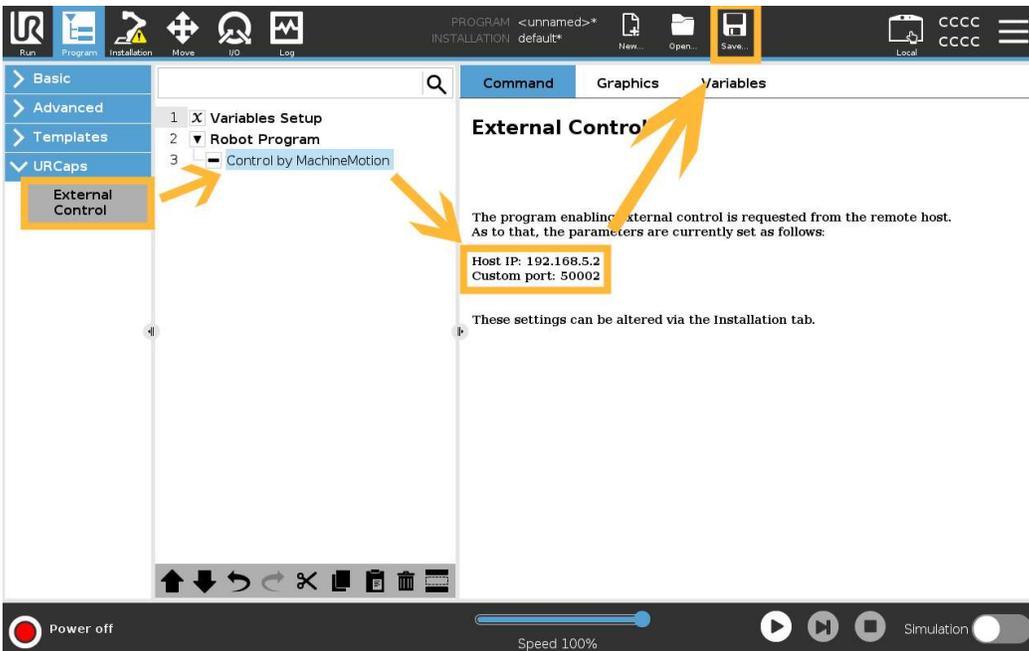
1. Go to: Installation > General > TCP
2. Set all TCP values to **0** (X, Y, Z, RX, RY, RZ)



4.5 Create and Save a UR Program

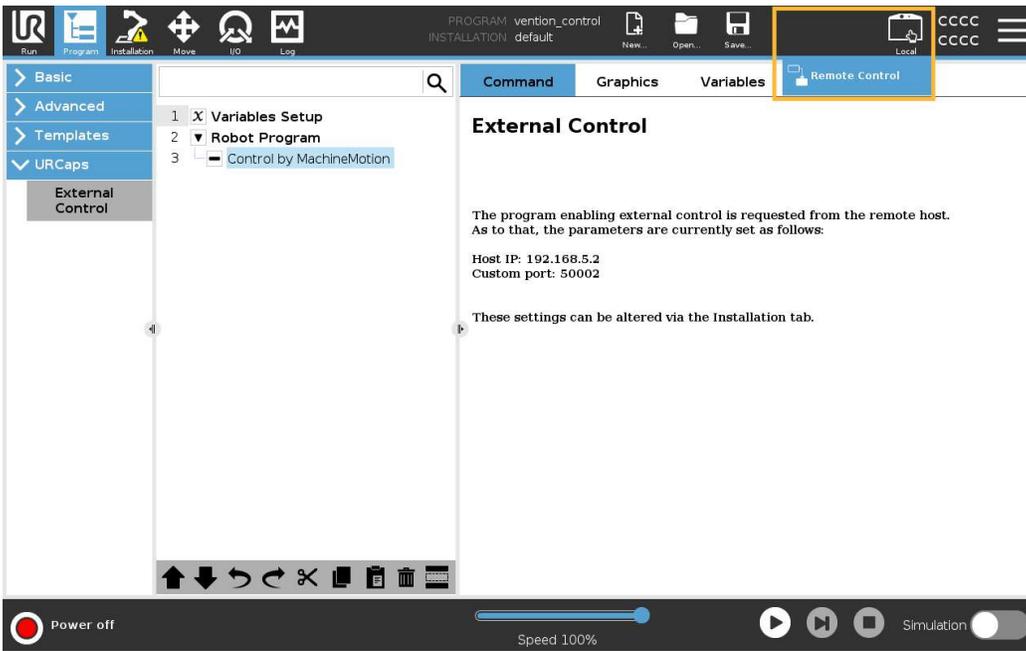
1. Create a new program: New > Program
2. From the tree view: URCaps > External Control
3. Validate the Host IP and Port are the correct one according to your MachineMotion (ensure they match step 4.2)
4. Save..
5. Select Save All, this will ensure the installation and program are saved together.
6. The program must be named with this **exact name**: vention_control.urp

Important: This name must be exact for MachineMotion AI to recognize the UR program.



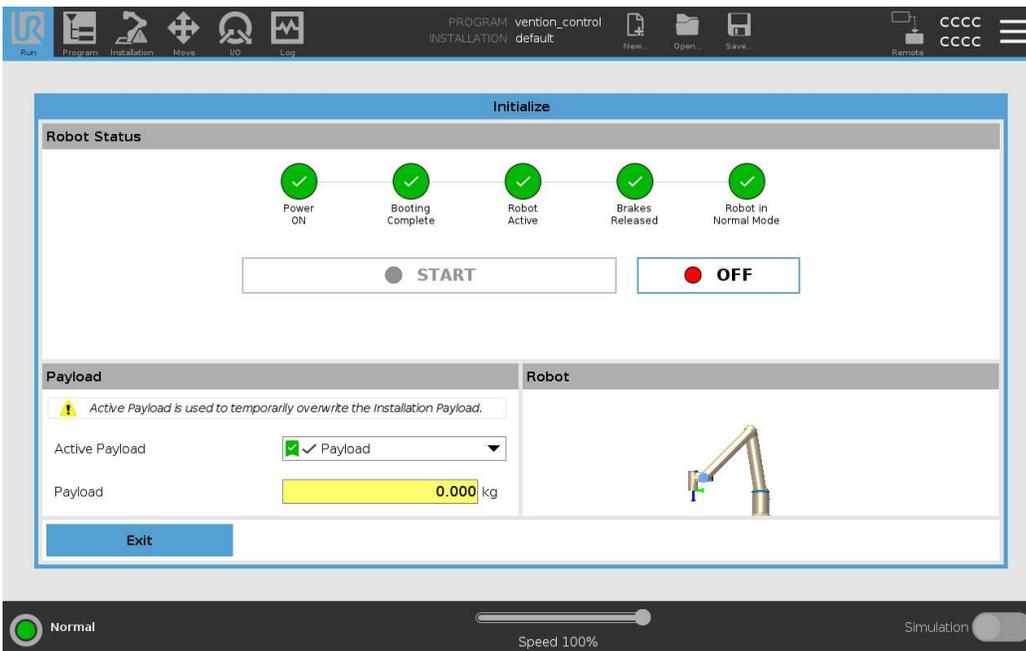
4.6 Switch to Remote Control Mode

1. On the top bar, switch from **Local** to **Remote Control**



4.7 Power On the Robot

1. Tap on the red pill displaying Power off
2. Tap **On**
3. Tap **Start**
4. The robot should now be energized and ready to be controlled



5. Connecting to the Robot Controller from MachineMotion

You're now ready to deploy your MachineLogic application from your **Vention project** to the MachineMotion AI controller!
 Follow the steps detailed in the [Deploy your Application and Configuration to Controller](#) documentation.

6. Troubleshooting

6.1 Robot connection troubleshooting

If the robot connection fails, there could be a few reasons that are the root cause:

Issue	
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Robot not responding	Controller is in Local mode
IP conflict	IP address mismatch
Safety error	Module not wired correctly

6.2 Retrieving logs

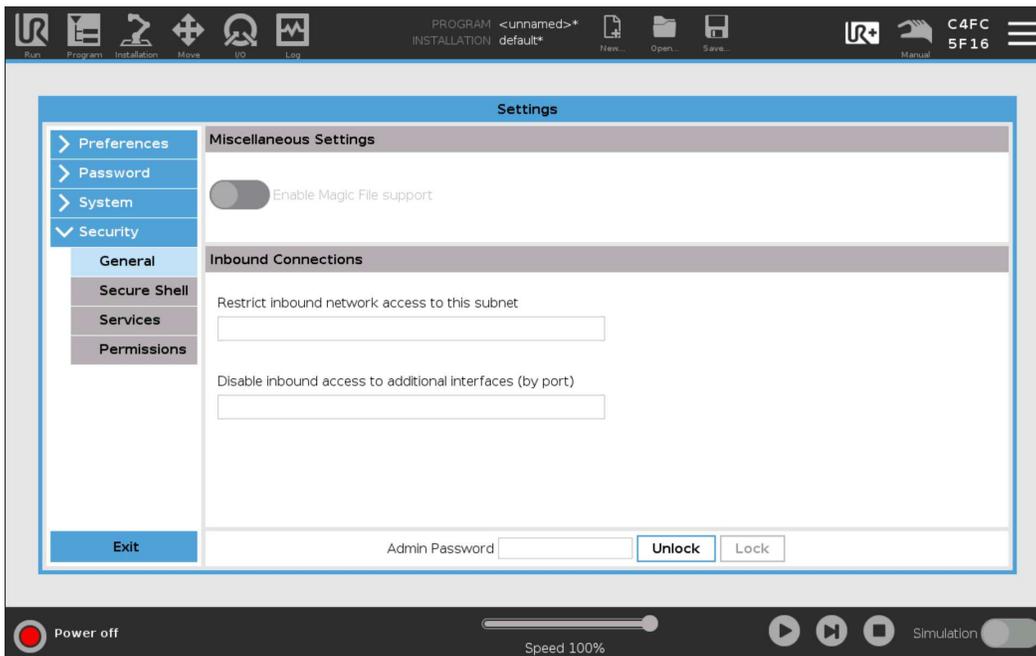
You can retrieve the robot's logs directly from the MachineMotion, with the MachineMotion software releases v3.2.0 or newer. The MachineMotion will assume that the IP address of the robot is 192.168.5.3 and that the password was unchanged.

To enable this feature, you need to ensure that ssh capabilities are enabled on your robot controller, under `Settings > Security > Secure Shell`

Also ensure that you are not restricting the MachineMotion's IP address in the robot controller's inbound connections.

Under `Settings > Security > General` :

- "Restrict inbound network access to this subnet" should be left empty, or not exclude the MachineMotion's IP address
- "Disable inbound access to additional interfaces" should be left empty, or not include the port used for ssh (usually port 22)



MachineMotion v2 - Configuration User Guide

[Safety Configuration User Guide v2](#)

[Robot Configuration User Guide v2](#)