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Creating Frames by Moving the Robot Arm Servos

Learn how to easily create motion sequences for your robot by physically moving its arm and recording positions using Synthiam ARC's Auto Position feature. This hands-on tutorial guides you through the process of placing your robot in Teach Mode, allowing you to move its joints manually and automatically save each pose as a Frame. This method is perfect for beginners and experts alike who want precise, natural movements without complex scripting or manual entry of servo values.

Whether you're animating a gesture, programming a repetitive task, or choreographing a performance, this tutorial will show you how to:

- Enable Teach Mode for your robot
- Move servos into desired positions by hand
- Create and name new Frames from each pose
- Build Actions using your recorded Frames
- No programming required â€” just move, save, and play!

*NOTE: This tutorial requires smart servos (also known as bi-directional servos) to function correctly.

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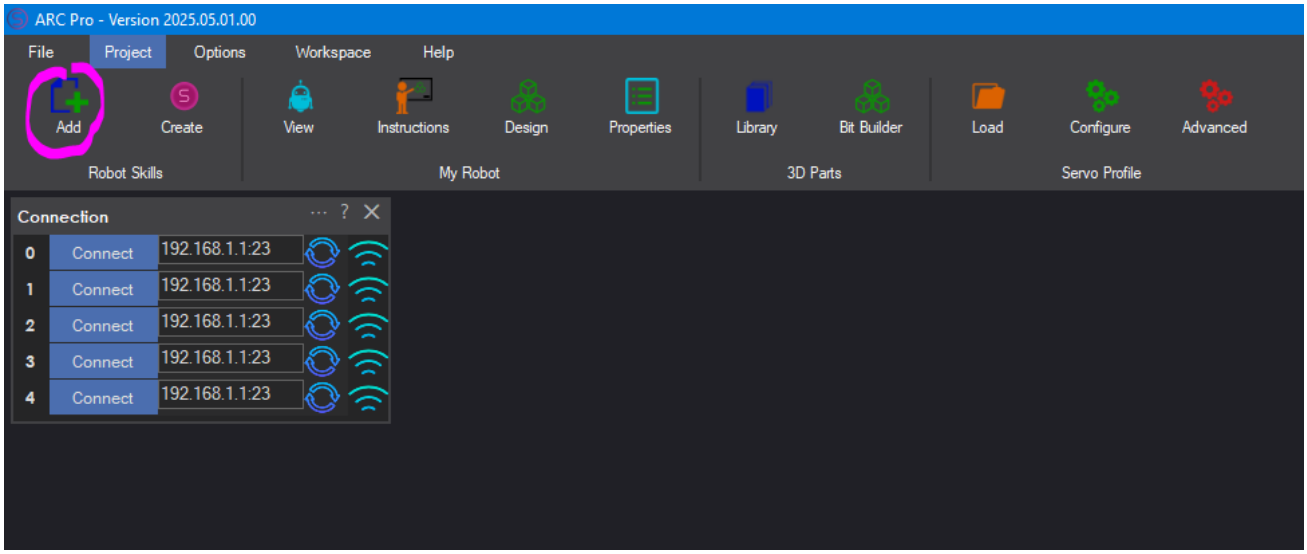
Add Auto Position

Create frames and actions to animate the robot servos into pre-defined positions. This can be used to have the robot wave, dance, or display interactive gestures.

A gait is the movement pattern of animals' limbs, including robots, during locomotion. This robot skill allows robots to customize servo animations for gait locomotion and interacting with the world. Some robots (i.e., humanoids, hexapods, and more) use servos to move with gaits based on speed, terrain, maneuverability, and energetic efficiency. Robot configurations will utilize different gaits due to variations in their design. For example, a humanoid robot employs a bipedal walking gait, whereas a hexapod utilizes a six-legged crawling gait.

Add the auto-position robot skill. Press the ADD button in the Project tab of the top menu. ï»¿



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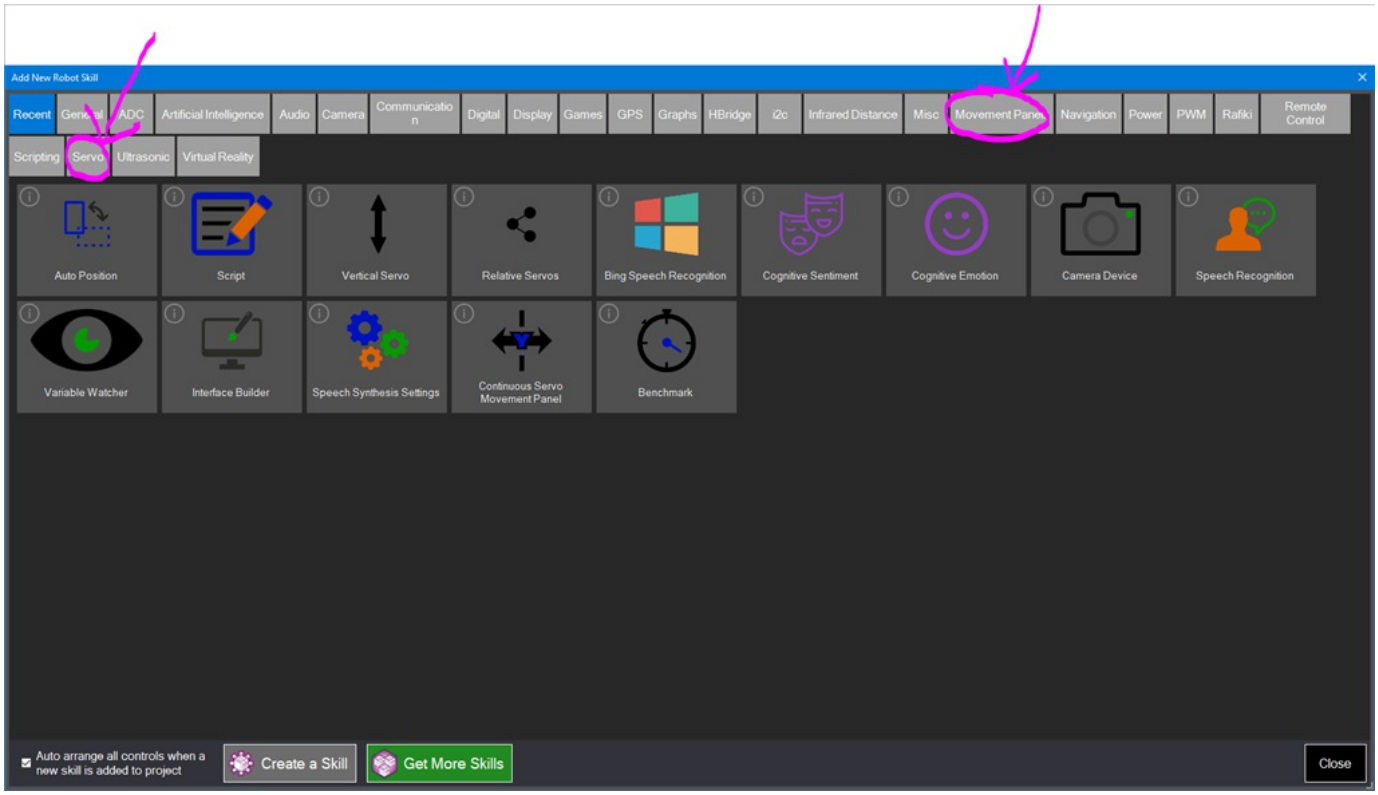
The robot skill category menu will be displayed.Â There are two types of Auto Position robot skills, categorized into two separate groups.



Two Versions There are two versions of the Auto Position robot skill (Movement Panel and Non-movement panel). The only difference between the two is the inclusion of the movement panel functionality. Read about what a movement panel is and how it works with ARC to learn which version of this robot skill to use.

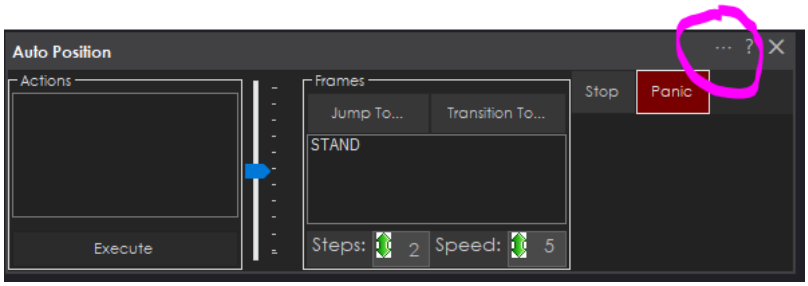
1) Regular Auto Position in Servo Category This robot skill does not have a movement panel and therefore as many of these can be added as needed.

2) Movement Panel Auto Position in Movement Panel Category This robot robot skill includes a movement panel, which is used for a GAIT or controlling a robot to walk or move.

Add Servos

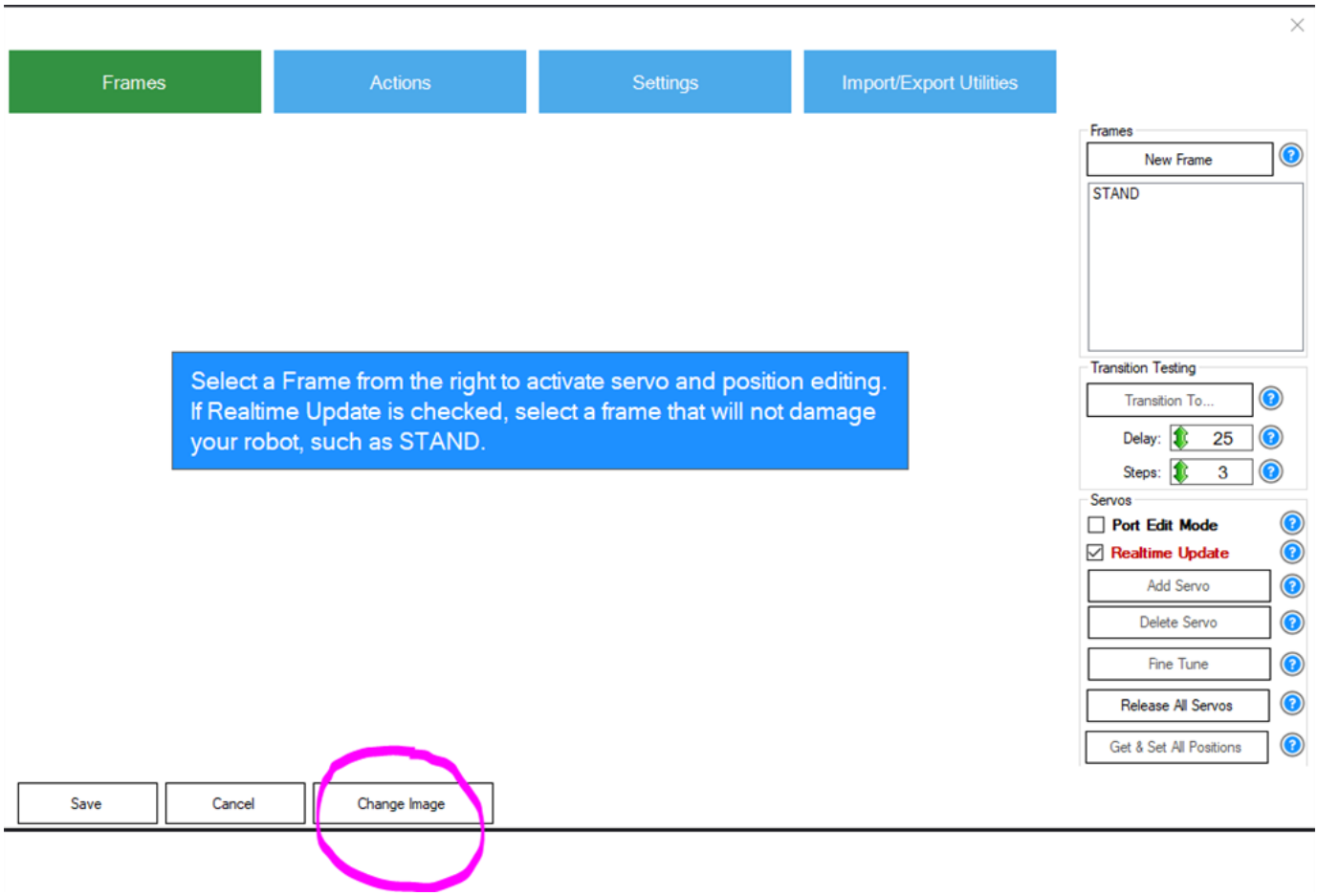
The auto position needs to be configured with servos for your robot. These are the servos that the auto position will control.

1. Press the configure button on the auto position robot skill

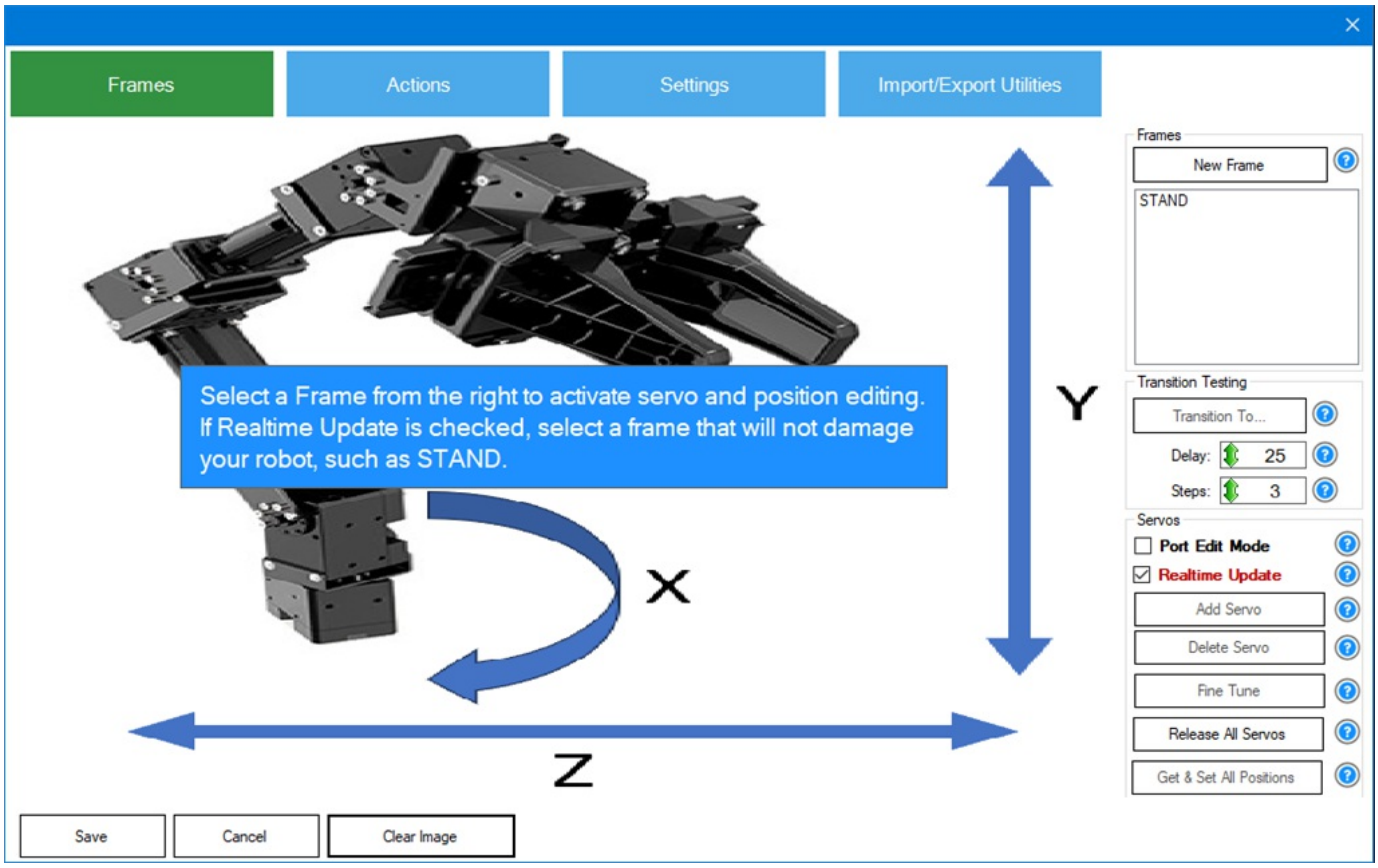


2. The configuration screen will load. Next, we will add the servos to the display that represents where the servos are on the robot. Generally, adding an image of the robot is useful so you can place the servos where they are on the robot.

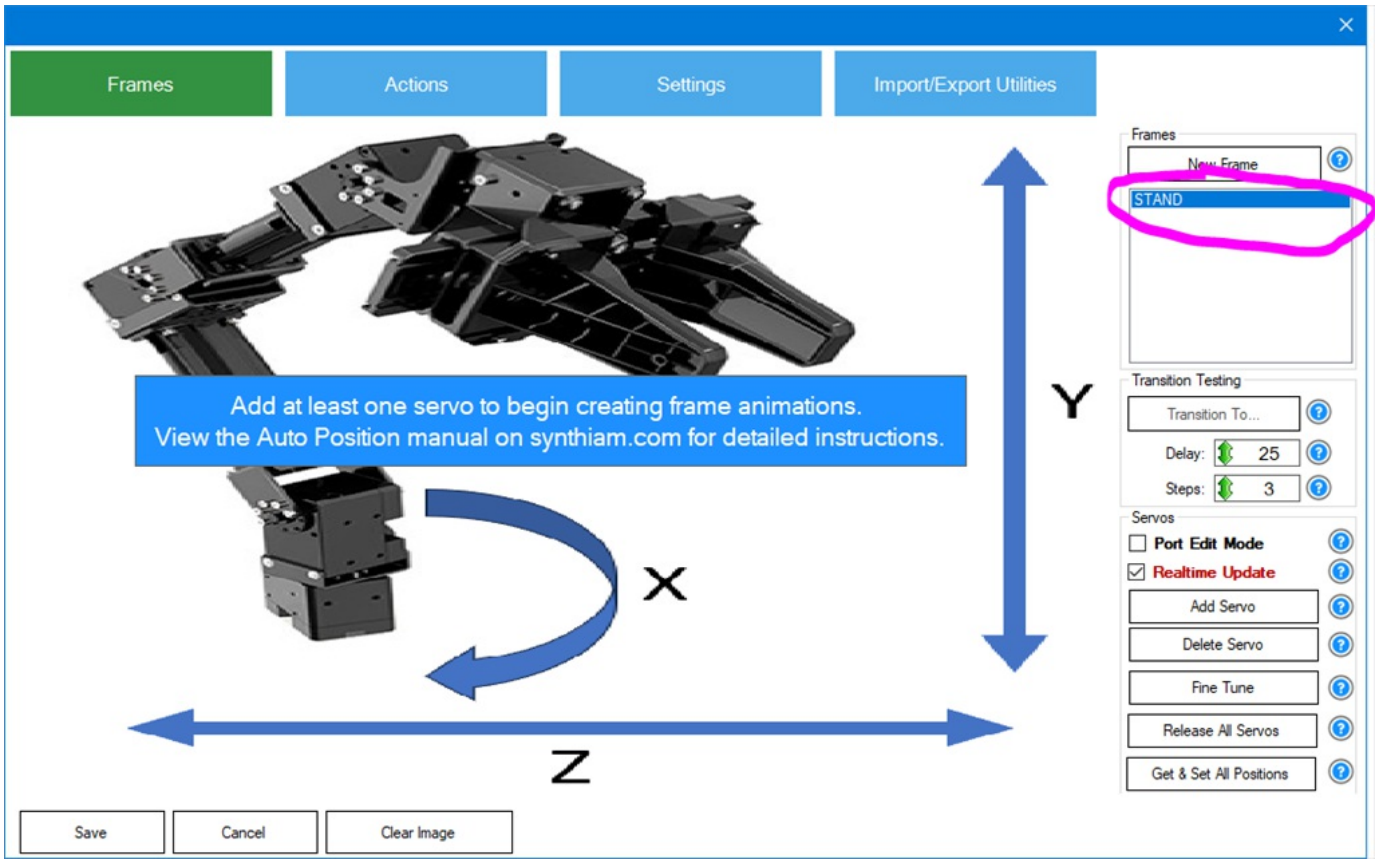
This is an optional step that you can skip if you do not want to add an image of the robot.



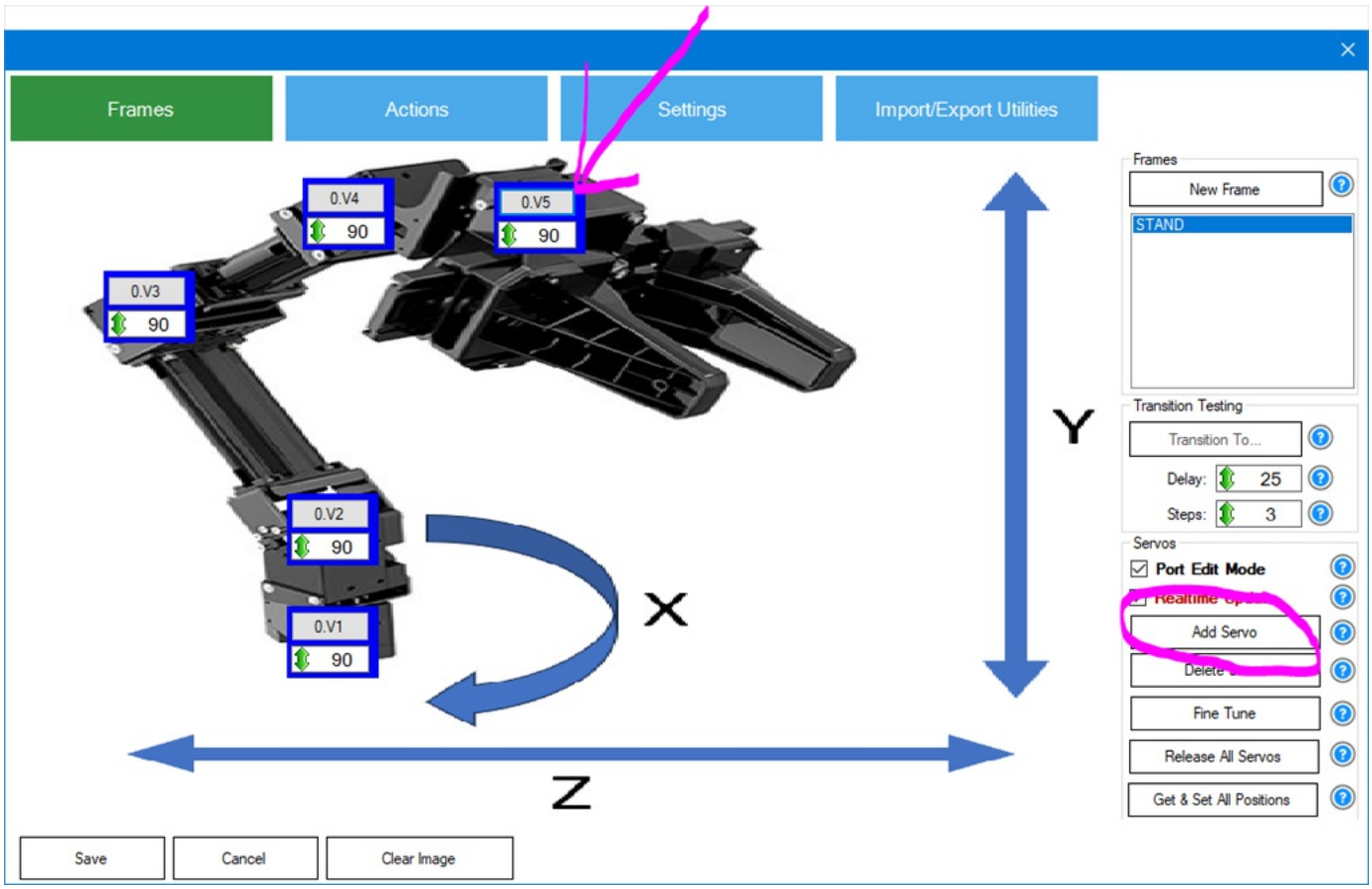
Because we're using the Robotis Open ManipulatorX in this example, we added an image of the robot arm. to the display.



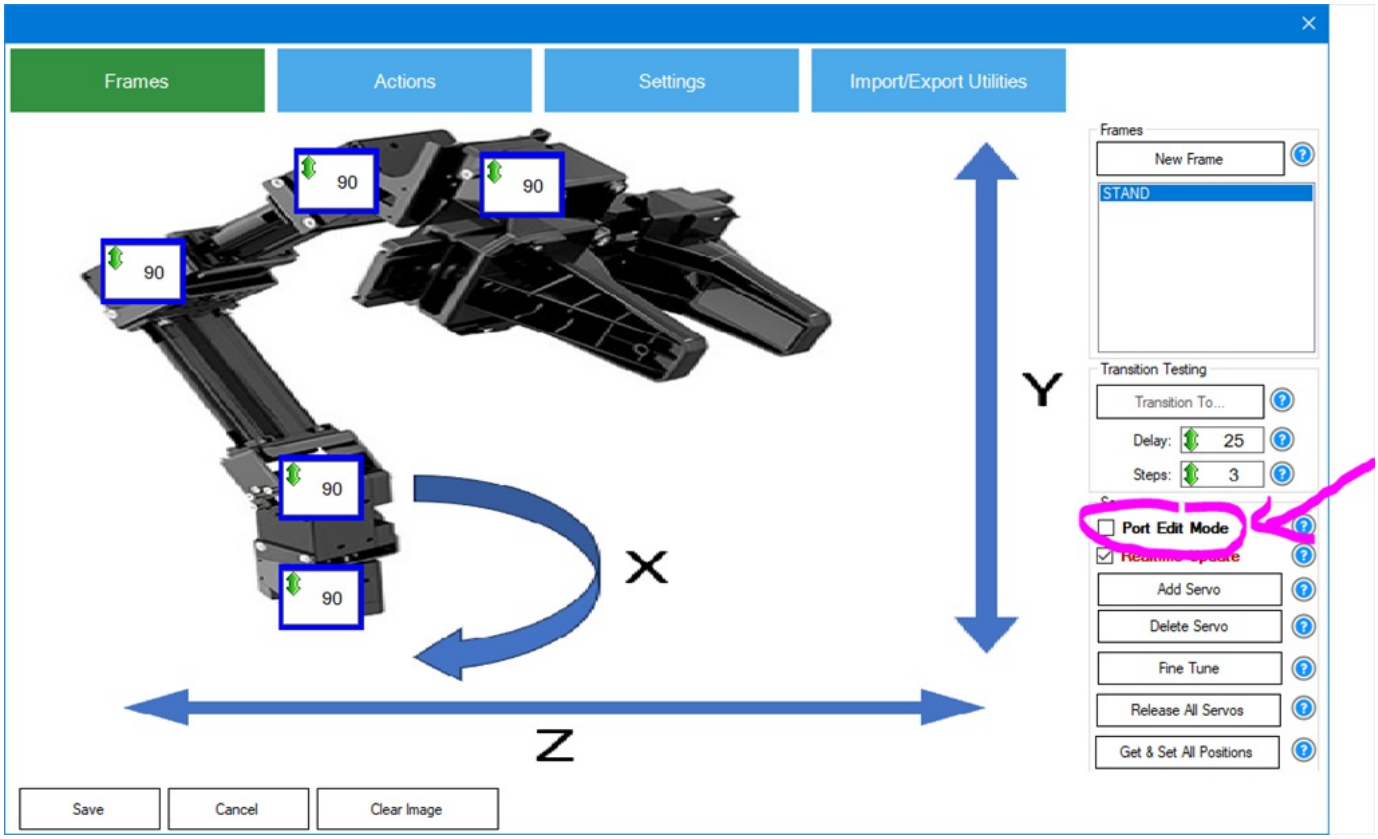
3. Now we will add servos that we will drag ontop of existing servos of the robot in the image. This makes it easier to understand what servo we're manipulating. Select the STAND frame. This is the default standard frame that we will use to add the servos. The servos will be on all frames, but we need one frame selected to begin.



4. Press the ADD SERVO button, select the port for the servo, and drag it ontop of matching servos in the image. ï»¿



5. When you're done adding the servos, uncheck the Port Edit Mode. This will prevent the servo boxes from moving and only displays positions instead of the port.

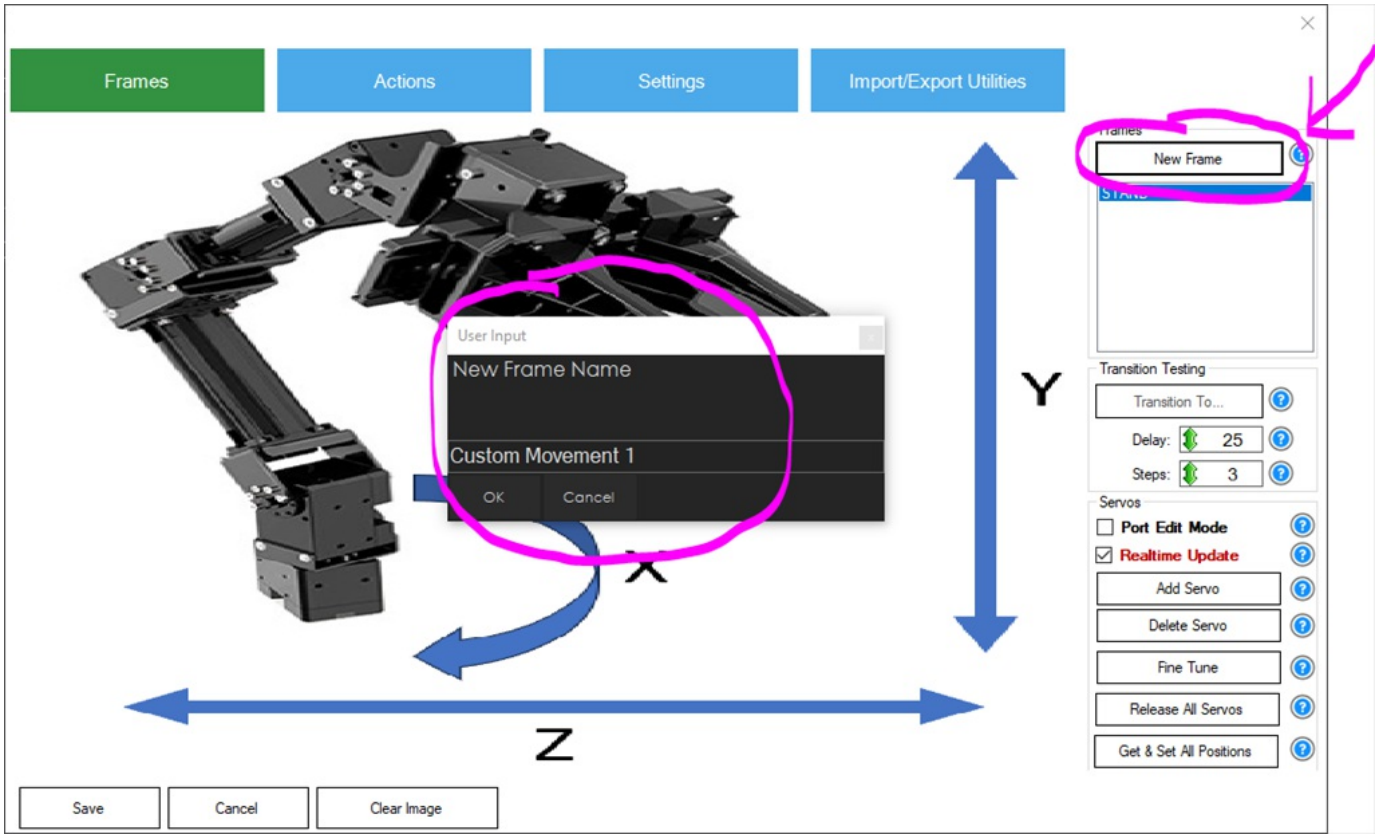


Now you will have servos representing every servo of your robot that the auto position will control.

Create New Frames

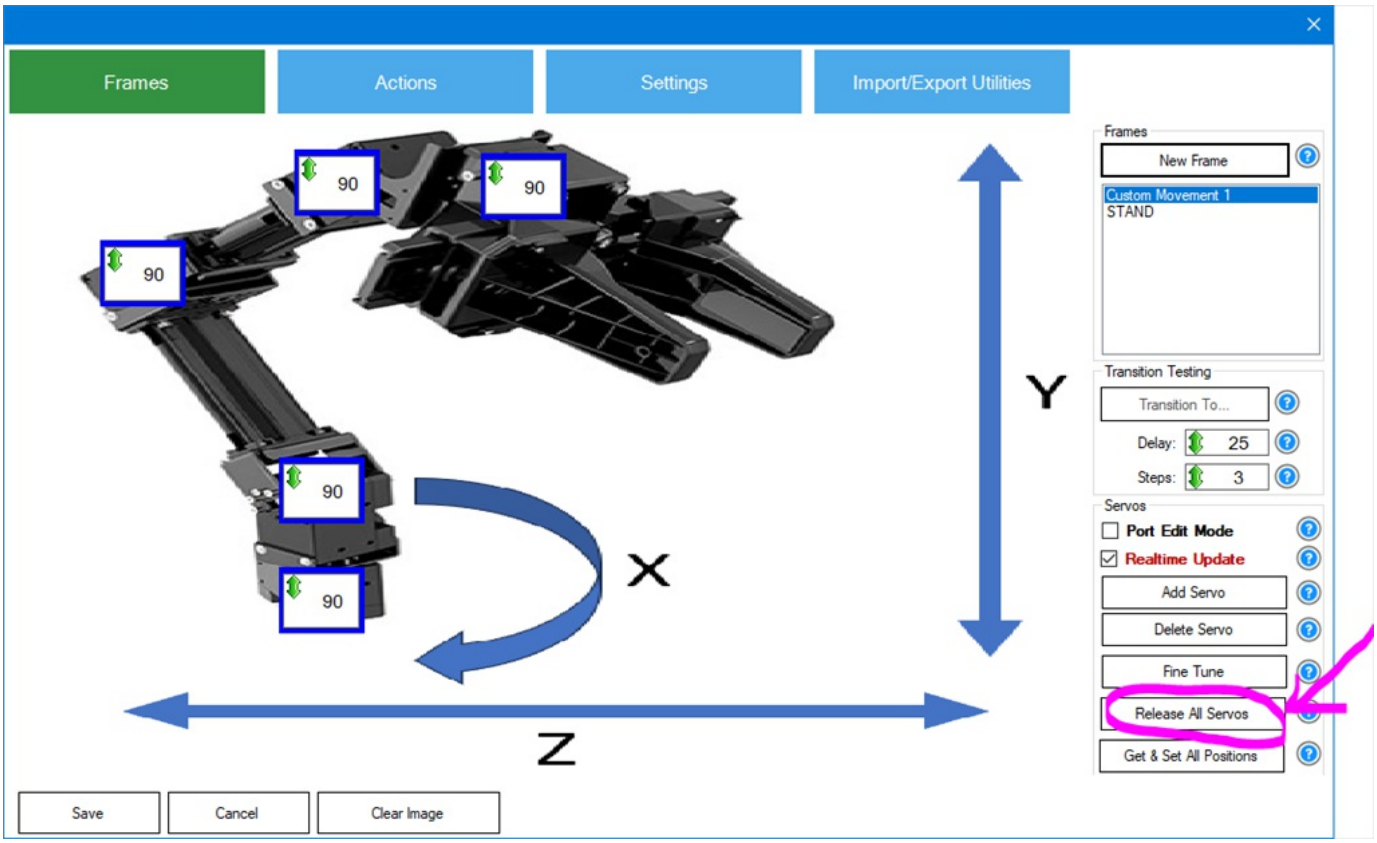
The auto position consists of frames. Each frame is a position of your robot to complete a goal. The frames will later be added to an action. An action is a collection of frames. In this stage, we'll add frames based on the robot's position. We'll manually move the robot and save each position as a new frame.

1. Press the NEW FRAME button. When this button is pressed, a dialog will be displayed prompting for the name of the new frame. The current selected frame's servo positions will be used for the new frame. We'll call this frame "Custom Movement 1" because the following frames will be called "Custom Movement 2" and so on...

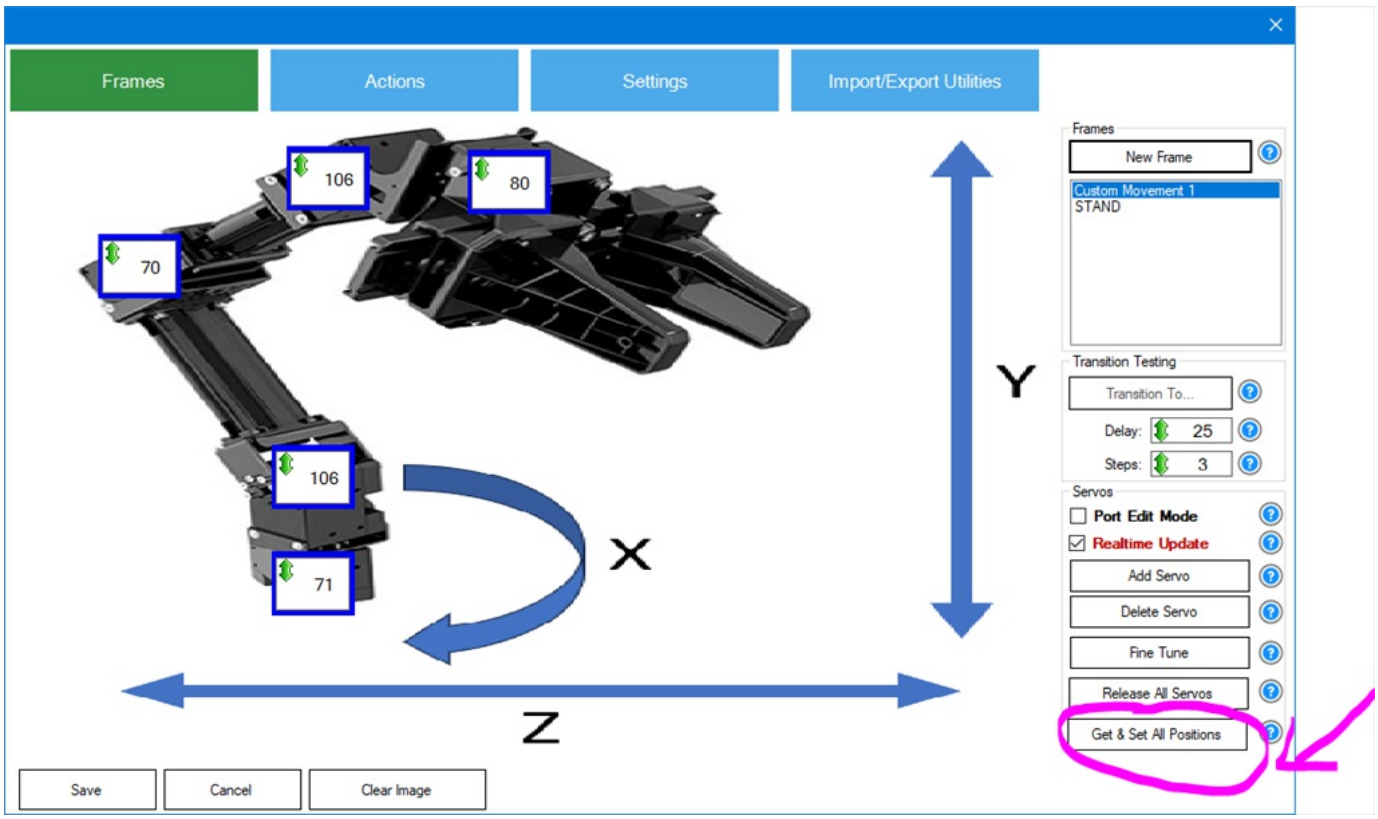


2. The robot will be in a holding position at this point. We want to move the robot so we need to release the servos. When this button is pressed, the servo will go limp and the robot will fall over.

***Note:** *Ensure you are holding the robot before pressing this button so it doesn't fall over and damage itself.*



3. Now manually move the robot arm into a position. Once you have moved it into a position that you wish to save, press the **Get & Set All Positions** button. This will obtain the positions of the servos and set them to the frame respectively.



4. To continue adding more frames with custom positions, repeated the above steps. Continue adding new frames based on the most recent frame positions by pressing **New Frame**. When you're done adding frames, there will be several frames, one per position of the robot to complete the task.

Summary To summarize the process, this step consists of...

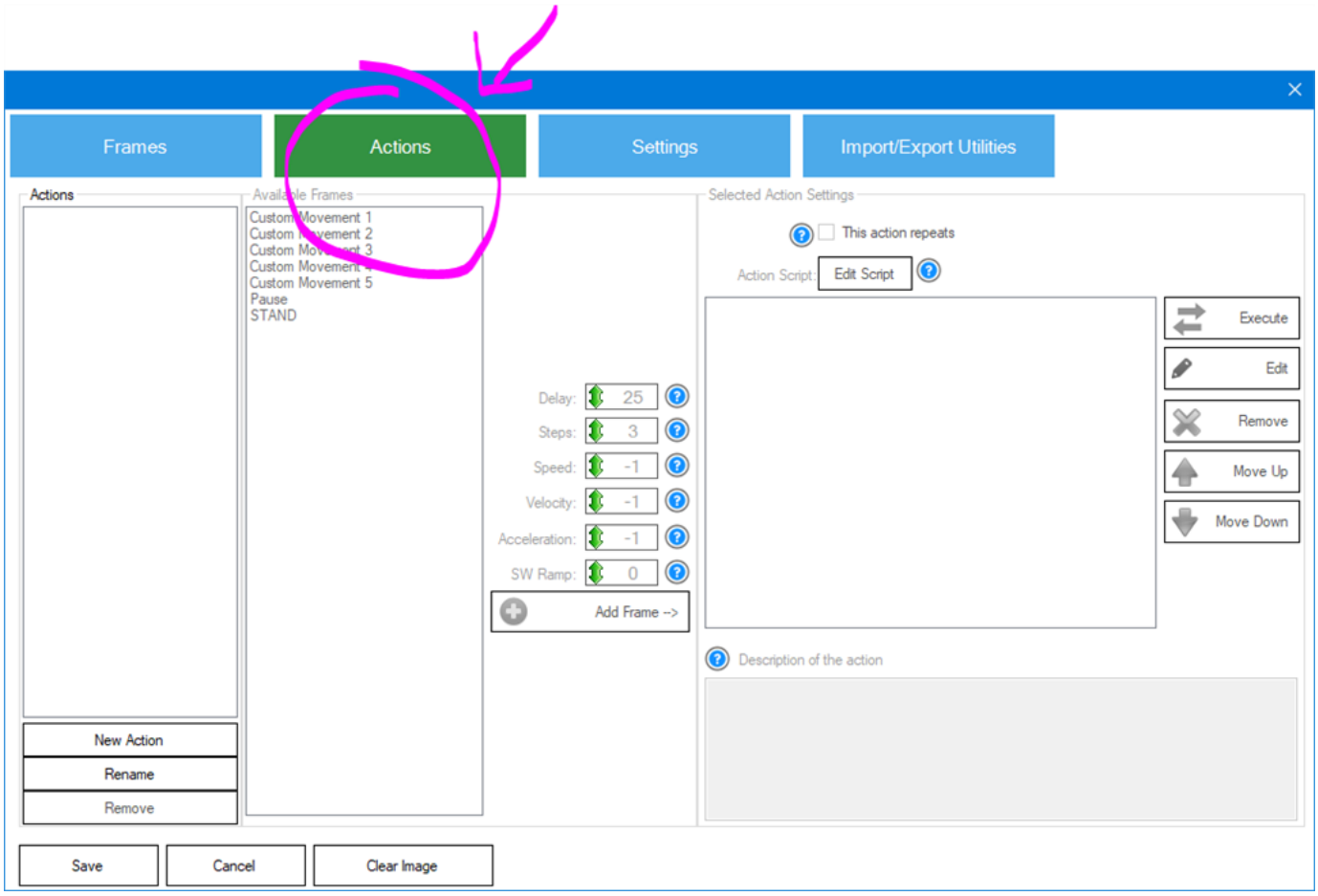
- Select a frame to start from
- Press **New Frame** to create a frame from the current frame positions

- Hold the robot and press **Release All Servos**
- Move the robot arm into a position for the current frame
- Press **Get & Set All Positions**
- Repeat

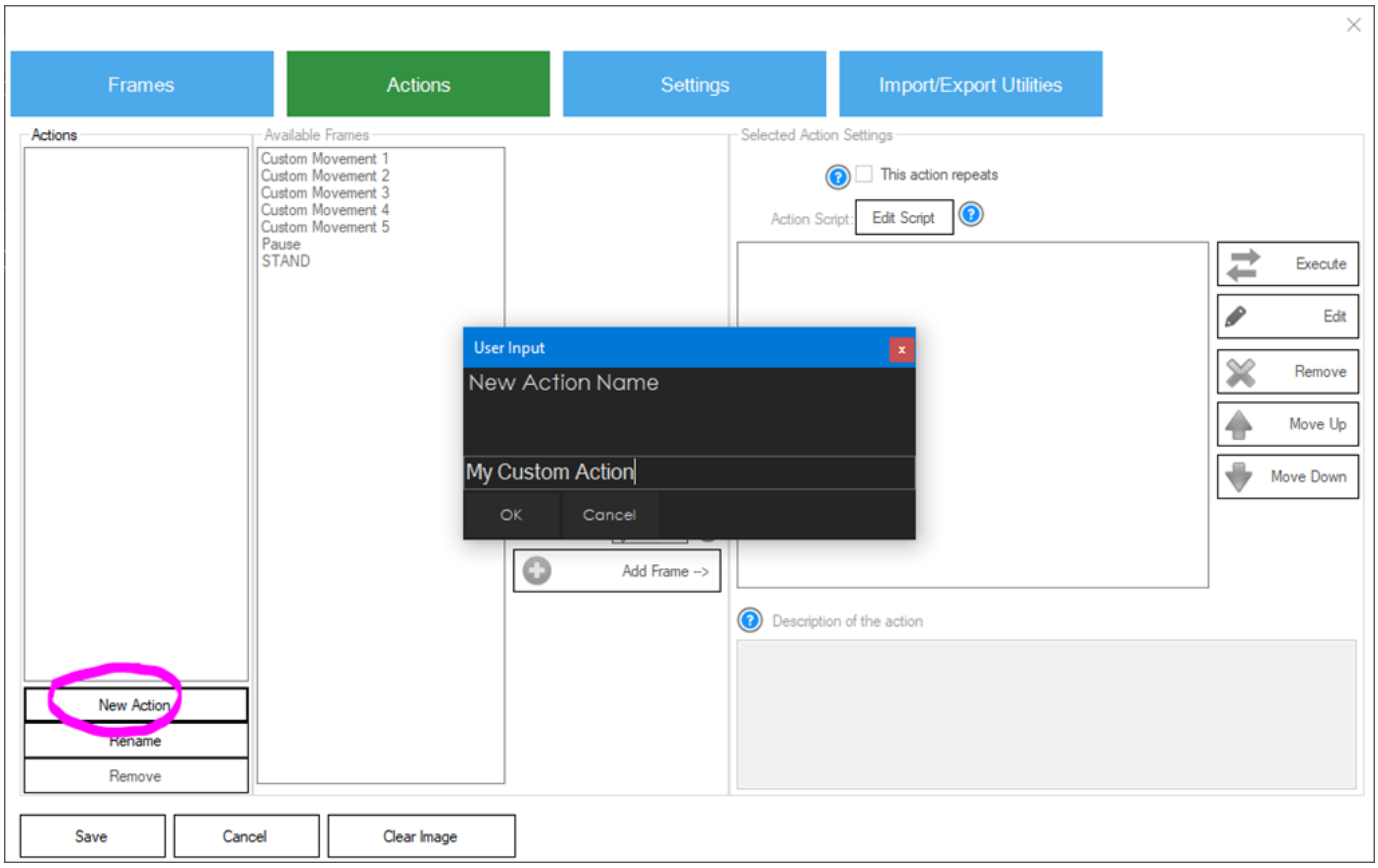
Create Action From Frames

An Action is a collection of frames. The frames you have added can be added to an action for playback.

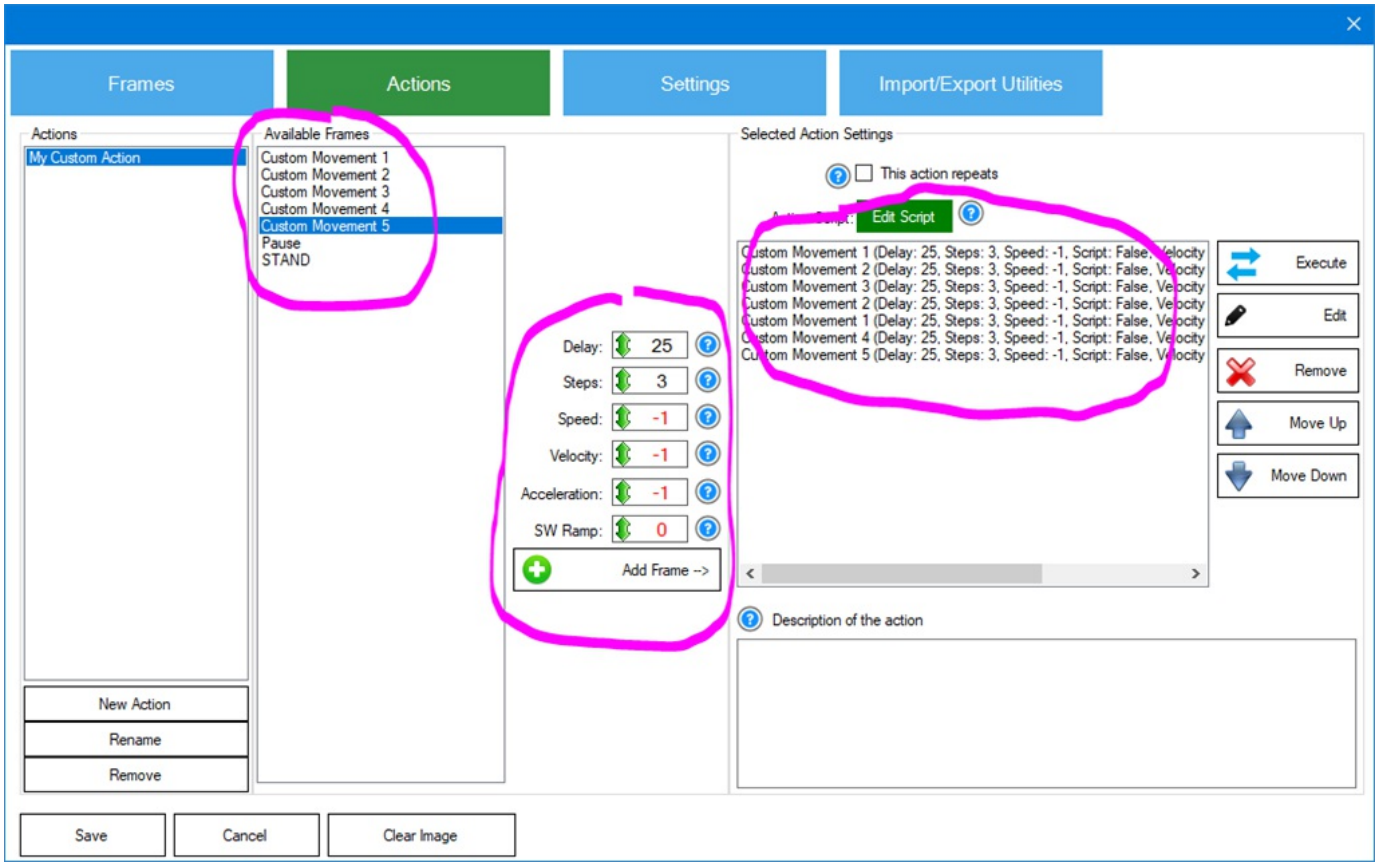
1. Select the **Actions** tab.



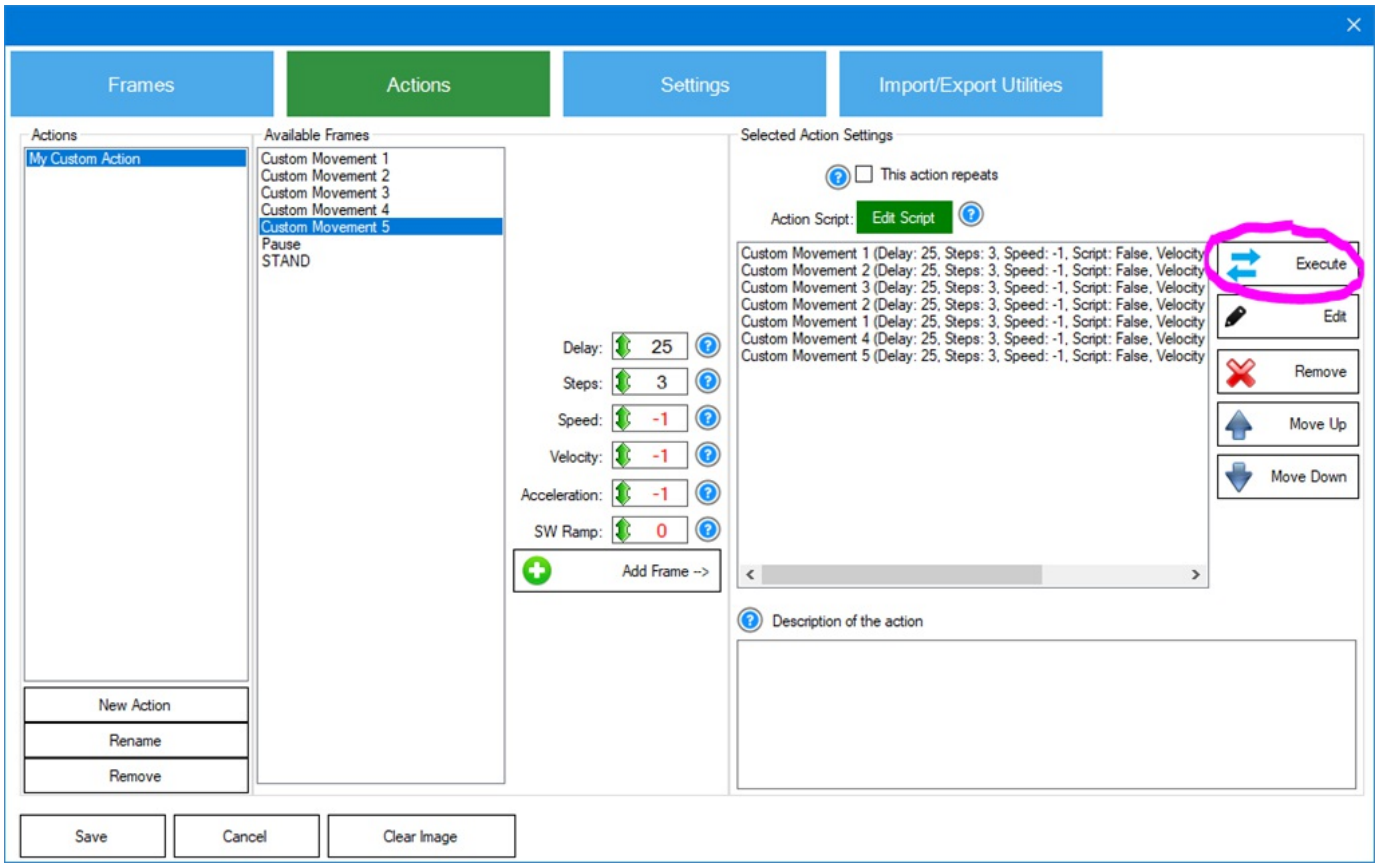
2) Click New Action and give the action a name.Â



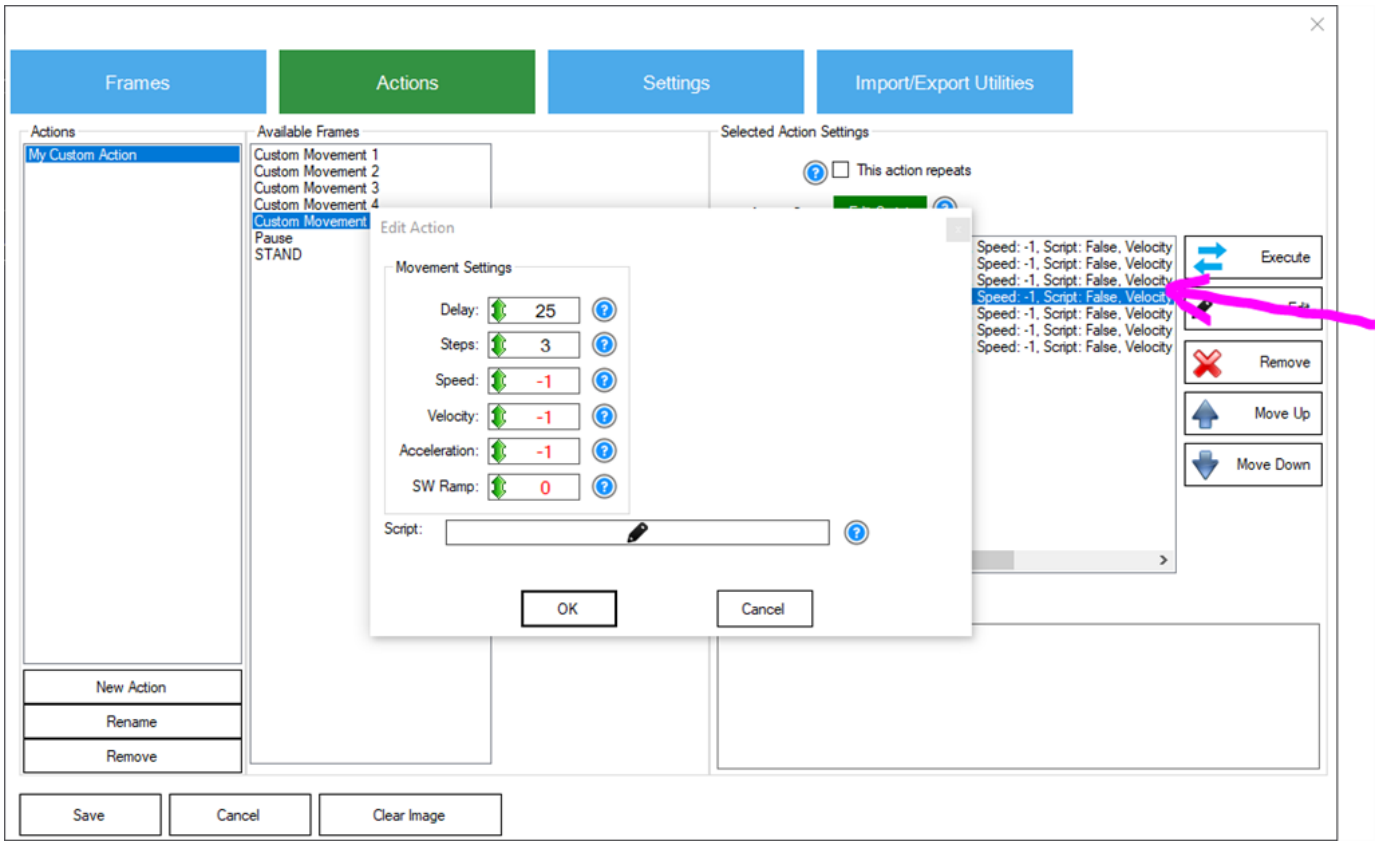
3) From the Available Frames list, double-click on the frames that you wish to add to the action. Or, select the frame that you want to add, modify the parameters, and press the Add Frame button.



4) After frames are added to the action, you can test it by pressing the Execute button.



5) If you wish to make changes to the speed, acceleration, etc of the frame transitions in the action, you can double click on the frame within the action and change the settings. Or, you can select the frame and press the EDIT button.



Voila!

You have now created custom frames by moving the robot manually and added them to an action. The auto-position manual provides more information on how to utilize the robot's additional features. For example, you can have actions executed using the control command from speech recognition, camera detection, or even triggered by AI.