QUICK START GUIDE

Omron TM Collaborative Robot: Initial Startup

Omron TM Collaborative Robot: Initial Startup – Ver. 1

Contents

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Version	Date	Author	Changes	HW Ver.	Sys. Ver.
01	1/17/2019	Kai Lee Aaron H Charlie K	Document Created	3.0	1.68.6800

1 Introduction

This document details how to setup the Omron TM robot from unboxing to running a simple program.

2 Useful Documents

It is strongly recommended to review the following documents in addition to this one:

TM Flow Software Manual	I626-E-02
TM Hardware Installation Manual	I623-E-02 (TM5), I624-E-02 (TM12/TM14)
TM Safety Manual	I625-E-02
TM Backup, Restore, & Update Quick Start Guide	*Document number TBD*

In addition to the documents listed above, all Omron TM related downloads can be found at:
https://industrial.omron.us/en/products/tm-series#downloads

3 Unboxing

Two boxes come with the Omron TM robot, one for the control box and one for the robotic arm.

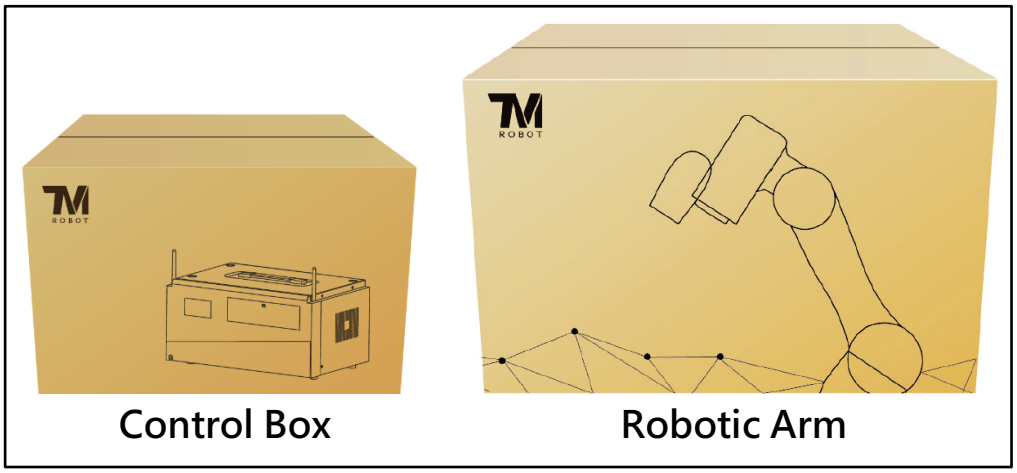

Figure 3.1 – Shipped Boxes

The following figure shows all the components that come inside the two boxes.

Figure 3.2 – Contents of Boxes

4 System Configuration

All the components are connected to the control box. Figure 3.1 shows a representation of the Omron TM control box interface. Figure 3.2 shows a typical system configuration.

NOTE: Refer to the Hardware Installation Manual for more detailed info on Omron TM Robot hardware.

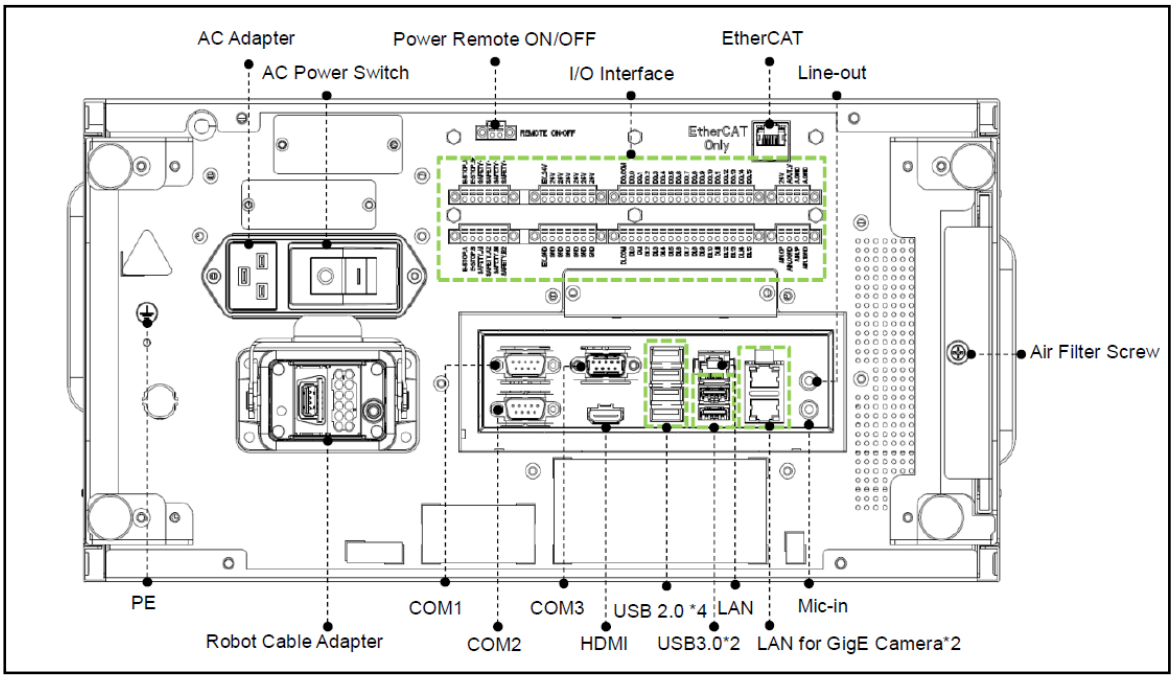

Figure 4.1 – Control Box Connections

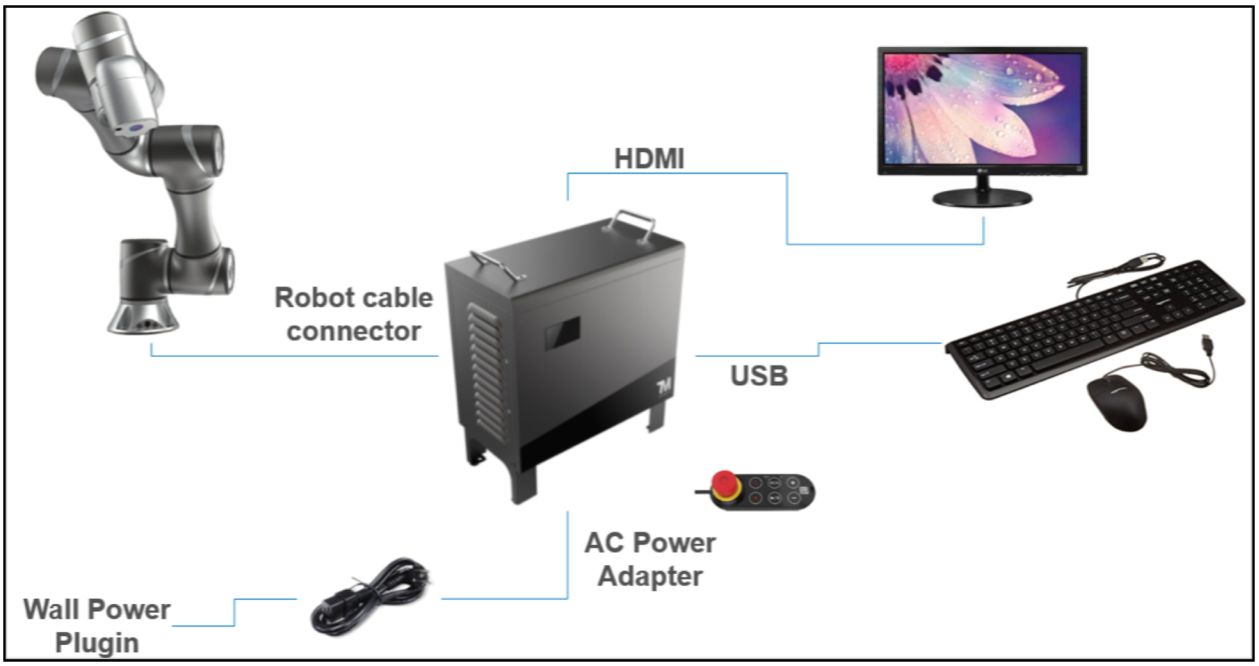

Figure 4.2 – Basic System Configuration

5 Powering On the Robot

1. Ensure that the robot and all peripherals are firmly connected to the control box.
2. Press the power button on the robot stick. (Figure 5.1)
3. Wait for the robot to display on the monitor (HMI). (Figure 5.2)

Figure 5.1 – Robot Stick

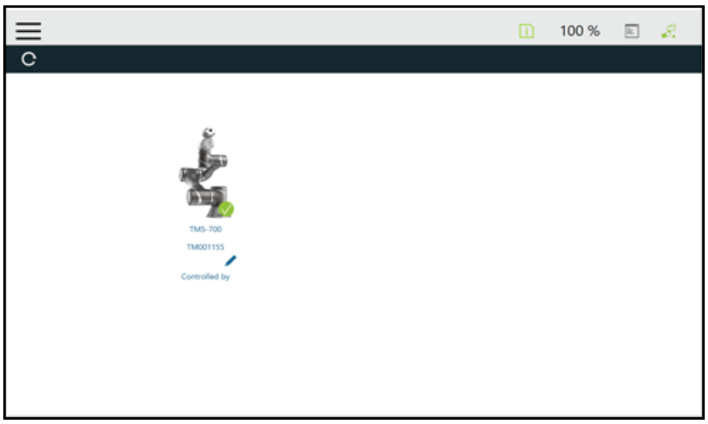

Figure 5.2 – HMI Start Screen

5.1 Boot Up Errors

The robot will not power up if one of the following has occurred:

What happen	Possible Cause	Troubleshoot
HMI start up with error	E-stop is pressed E-stop safety connection is unplugged	Release the Estop Reconnect Estop ports
HMI fail to start up	Safeguard A disconnected	Reconnect Safeguard A
HMI start up, red light blinking	Safeguard B disconnected	Reconnect Safeguard B

Figure 5.4 – Table of Boot Errors

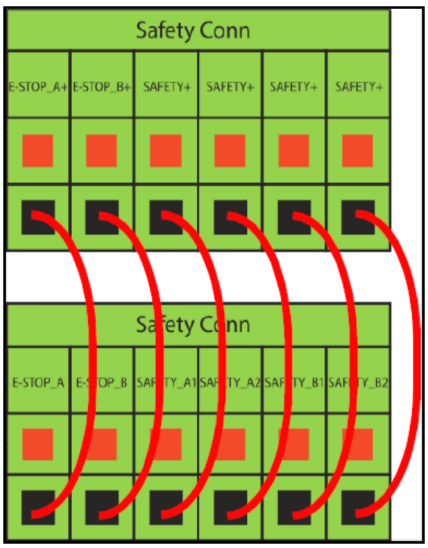

Figure 5.3 – Safety Switch Wiring Diagram

6 Light Ring Indicator

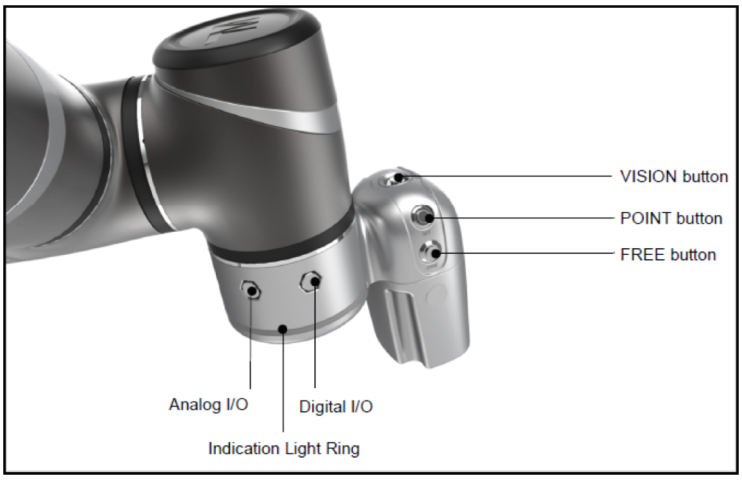

Figure 6.1 – Robot Button Diagram

The Omron TM robot has a light ring to indicate different modes and error states. For a description of indicator light colors and patterns, please refer to the table 6.2 and 6.3, shown below.

Operation Mode	Running Status	Space / Status of Safety Trigger	Operation Mode Light Indication	Auxillary Light Indication
Manual Mode	Project is not running (Incl. Step Run) (Manual Control Mode)	Full Speed Space / Normal	Green (100%)	--
		Reduced Space	Green (90%)	White (10%)
		Trip Safeguard Port B: Collaborative Mode Port	Green (90%)	Purple (10%)
		Error	Green (50%)	Red (50%)
	Project is running (Manual Trial Run Mode)	Full Speed Space /Normal	Green (50%)	Light Off (50%)
		Reduced Space	Green (50%)	White (50%)
		Trip Safeguard Port B: Collaborative Mode Port	Green (50%)	Purple (50%)
		Error	Green (50%)	Red (50%)
	Paused (Trip Safeguard Port A: Safeguard Pause Port or Paused in Trial Run)	Full Speed Space /Normal	Green (10%)	Light Off (90%)
		Reduced Space	Green (10%)	White (90%)
		Trip Safeguard Port B: Collaborative Mode Port	Green (10%)	Purple (90%)
		Error	Green (50%)	Red (50%)

Operation Mode	Running Status	Space / Status of Safety Trigger	Operation Mode Light Indication	Auxillary Light Indication
Auto Mode	Project is Not Running	Full Speed Space /Normal	Blue (100%)	--
		Reduced Space	Blue (90%)	White (10%)
		Trip Safeguard Port B: Collaborative Mode Port	Blue (90%)	Purple (10%)
		Error	Blue (50%)	Red (50%)
	Project is Running	Full Speed Space /Normal	Blue (50%)	Light Off (50%)
		Reduced Space	Blue (50%)	White (50%)
		Trip Safeguard Port B: Collaborative Mode Port	Blue (50%)	Purple (50%)
		Error	Blue (50%)	Red (50%)
	Paused (Trip Safeguard Port A: Safeguard Pause Port or Paused in Trial Run)	Full Speed Space /Normal	Blue (10%)	Light Off (90%)
		Reduced Space	Blue (10%)	White (90%)
		Trip Safeguard Port B: Collaborative Mode Port	Blue (10%)	Purple (90%)
		Error	Blue (50%)	Red (50%)

Figure 6.2 – Table of Robot Modes

6.1 Collaborative Space Lighting

A blinking purple color on the light ring indicates hardware-initiated collaborative mode (blinking white indicates software-initiated collaborative mode). Refer to figure 6.3 for the description of each state. When collaborative mode triggers an error state, the indication light will return to the original mode. Please refer to the following table for troubleshooting:

Color/blinking	Description	Troubleshooting
Solid green light	Standby status in Manual Mode(Manual Control mode)	N/A
Flashing green light	Project running in Manual Mode(Trial Run mode)	N/A
Short Flashing Green light	Project paused in Manual Mode.	N/A
Alternating between Green/Red light (with buzzer 2 beeping)	Manual Mode Error	Press the FREE button to troubleshoot the error.
Solid blue light	Standby status in Auto Mode	N/A
Flashing blue light	Project running in Auto Mode	N/A
Short Flashing Blue light	Project paused in Auto Mode	N/A
Alternating between Blue/Red light (with buzzer 2 beeping)	Auto Mode Error	After switching to Manual Mode, press the FREE button to troubleshoot.
Light blue light	Safe Startup Mode	Press Stop Button for 3 seconds to return to original Mode
Flashing red light	Robot is initializing.	N/A
Light off	Emergency stop pressed	Release the Emergency Switch to turn to Safe Startup Mode
Solid red light Buzzer emits a long beep	Fatal error	Shutdown and Restart required

Figure 6.3 – Light Ring Troubleshooting Table

6.2 Switching to Collaborative Mode

Before attempting any initial set up, ensure operator safety by switching the Omron TM robot to collaborative mode. This is done by disconnecting any of Safeguard B on the control box.

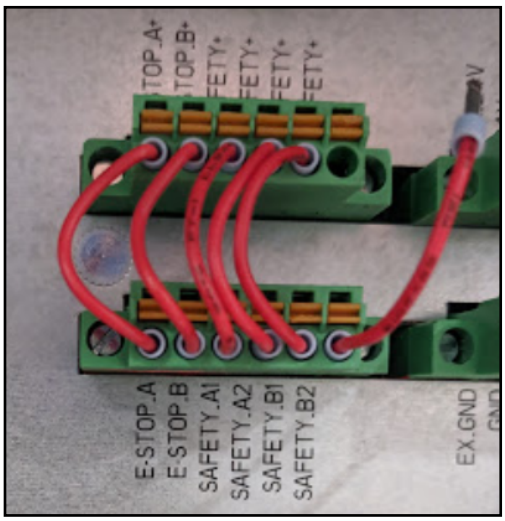

Figure 6.4 – Safety Wiring

7 Get Control of the Robot

1. Login as an administrator. (*ID* is administrator, leave *PW* blank.)

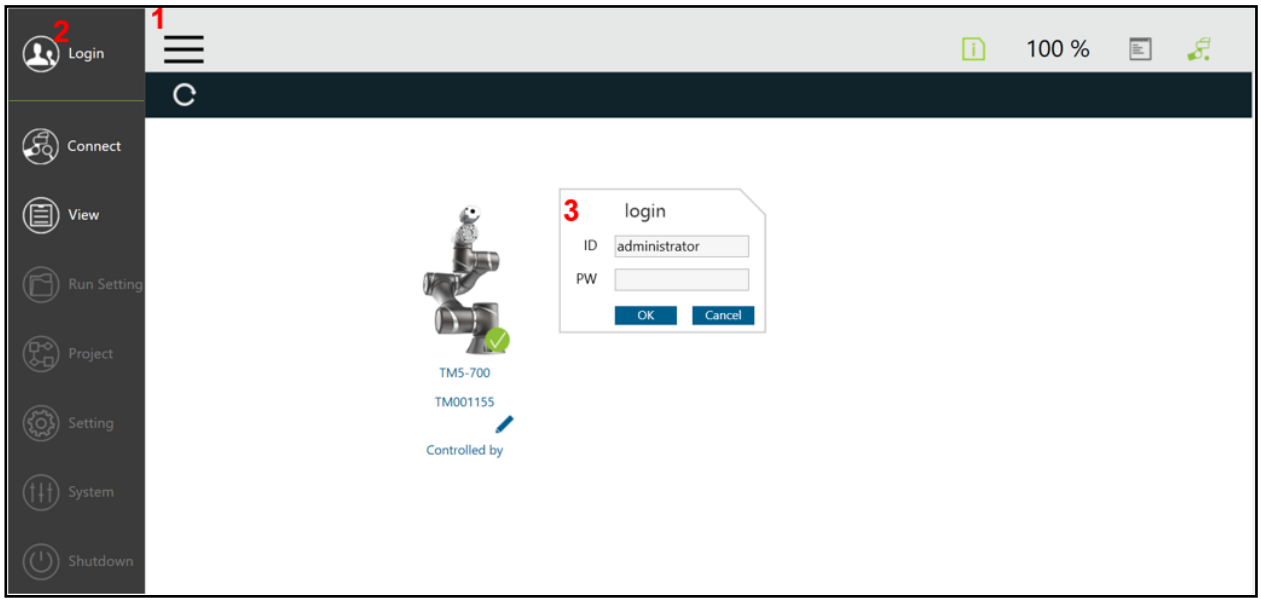

Figure 7.1 – Login Screen

2. Click ***Get Control*** to get control of the robot. You are now ready to program your TM robot.

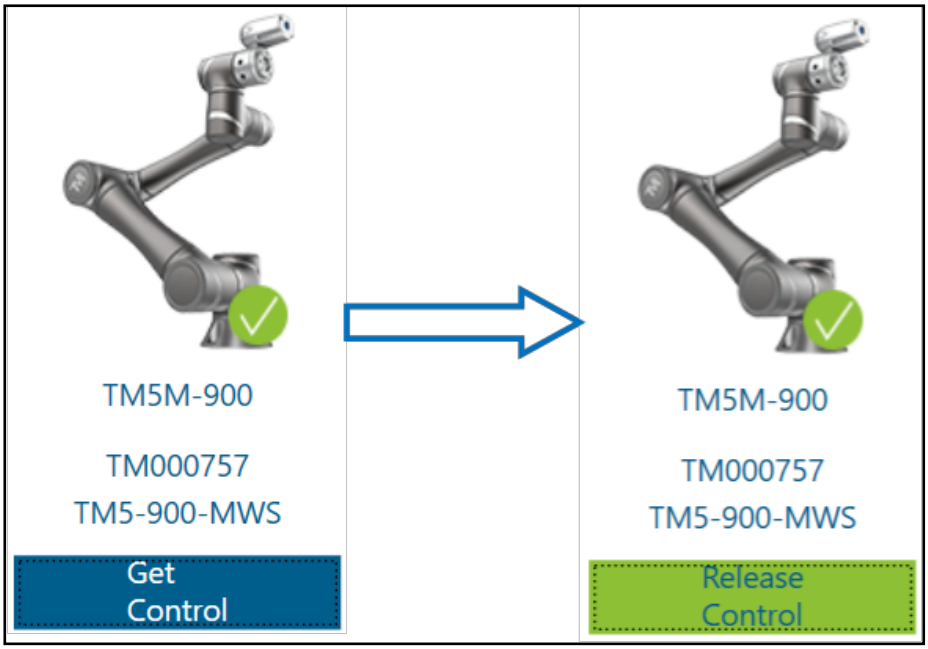

Figure 7.2 – Get Control Screen

8 Backup Factory Settings

Before making any changes in ***System Settings***, it is suggested that you back up the default factory settings first. This backup will save all software, firmware, user projects, and user settings.

1. Go to ***Backup\Restore*** under the ***System*** menu.

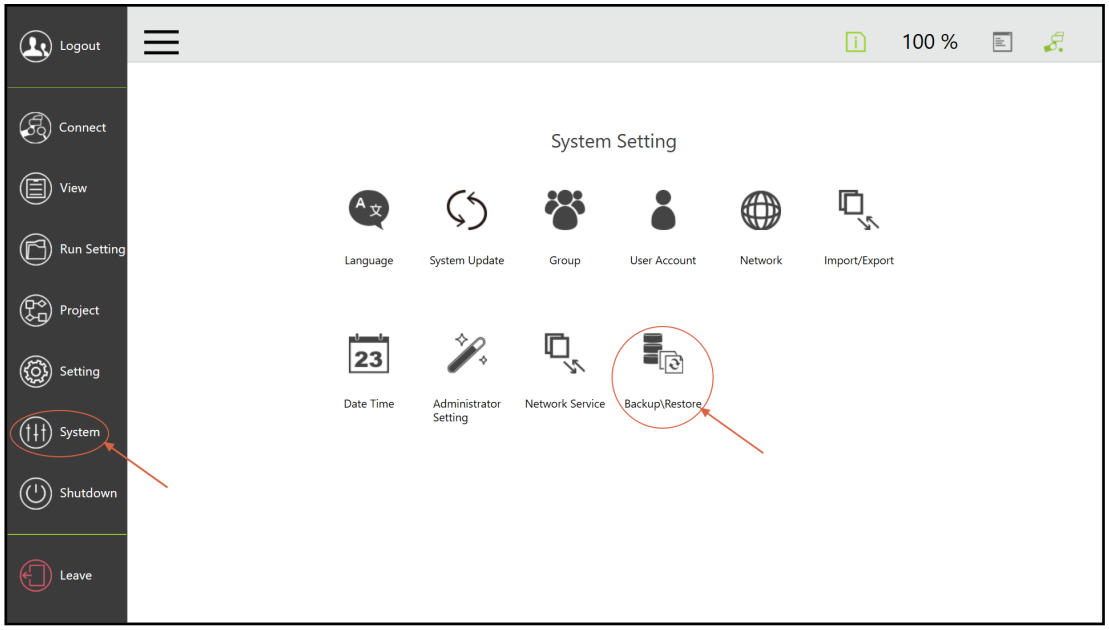

Figure 8.1 – System Setting Menu

2. Name the backup file and click the ***Backup*** button to back up current settings.

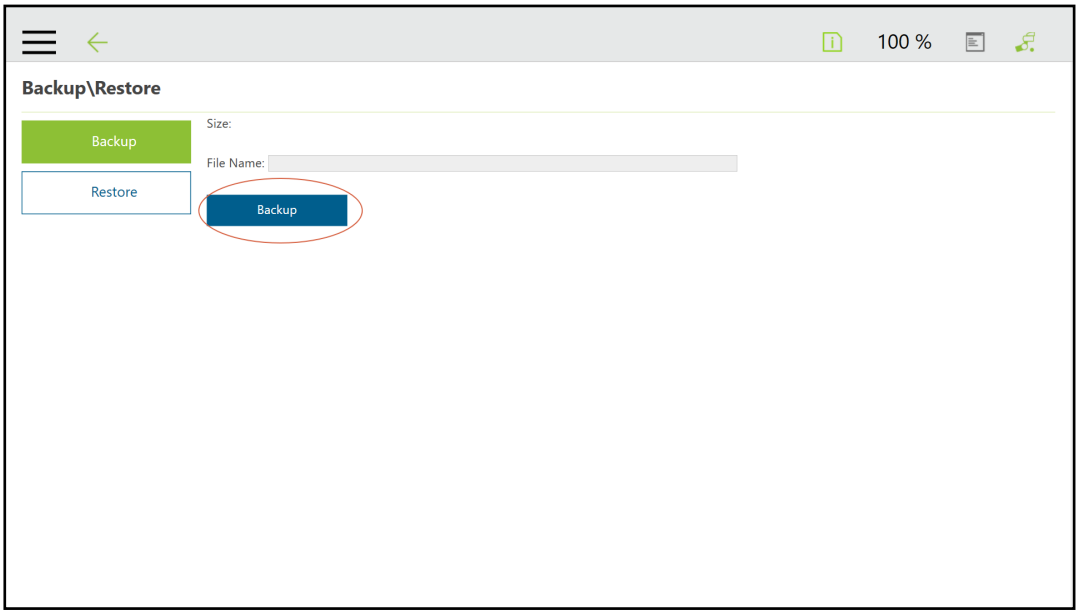

Figure 8.2 – Backup Screen

NOTE: Refer to Omron Tech Note – Omron TM – Backup – Restore - Update for more info on backing up the robot.

9 IP Address Settings

If the user requires the robot to be connected to an external Windows device such as a laptop, an Ethernet connection must be established. The robot's IP address settings will need to be updated to the same IP settings as the Ethernet port on the external device, or the other way around.

9.1 Change Robot Network Settings

The easiest method for changing the robot's IP address settings is to plug in a monitor, keyboard, and mouse into the controller (known as the HMI setup) and change the IP settings in TM Flow. The following instructions detail how to do this:

1. Plug in the HMI setup peripherals (monitor via HDMI, keyboard and mouse via USB).
2. Get control of the robot (see Section 6 of this document)
3. Go to ***Network*** under the ***System*** menu.

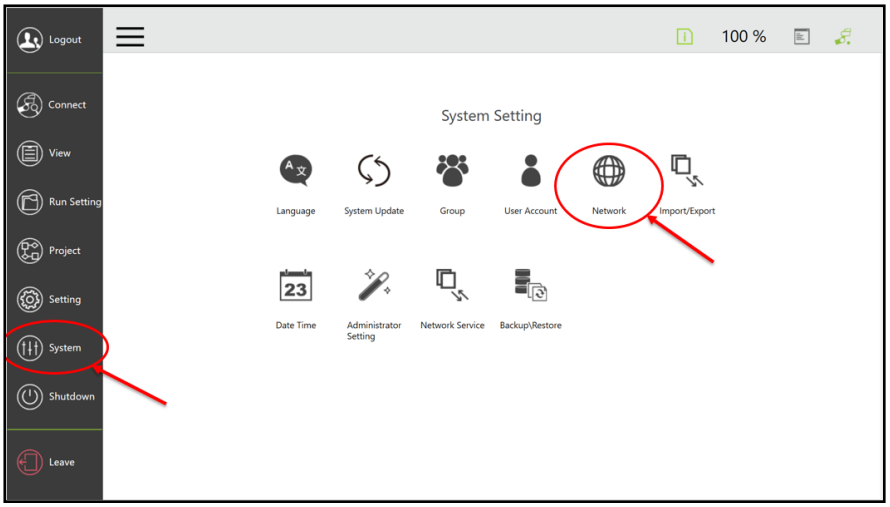

Figure 9.1 – System Settings Menu

4. Select the Local Area Connection and change the network IP address settings. Note that only an active network adapter will appear.

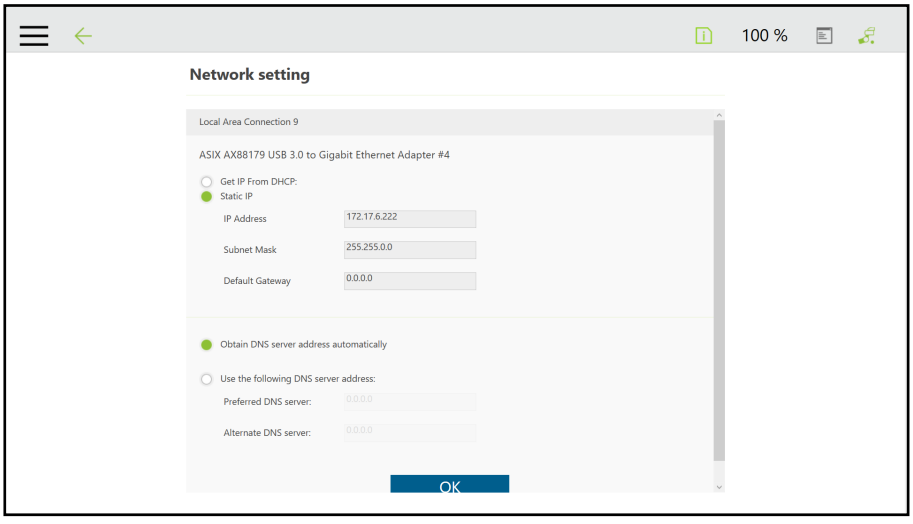

Figure 9.2 – Network Settings

9.2 Connecting an External Windows Device

If an external Windows device is needed to control the robot, it must have an Ethernet connection with the top left Ethernet port on the controller such as the one in the figure below. The other two ports on the right are for other devices such as external cameras.

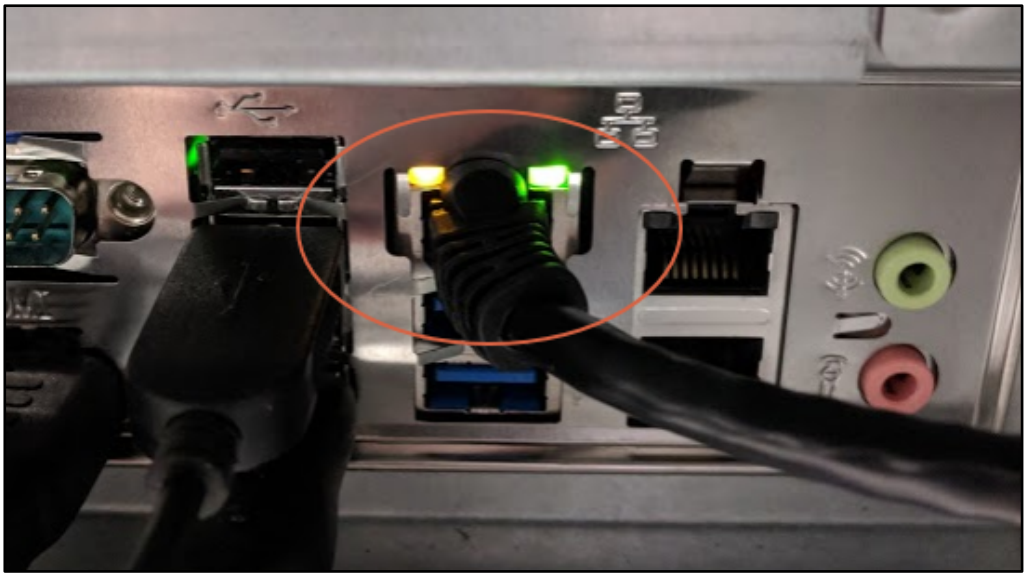

Figure 9.3 – Ethernet Connection Port

To find or change the IP settings of the Ethernet port on an external Windows device, follow these steps:

1. Go to **Change adapter options** in the **Network & Internet settings** menu.

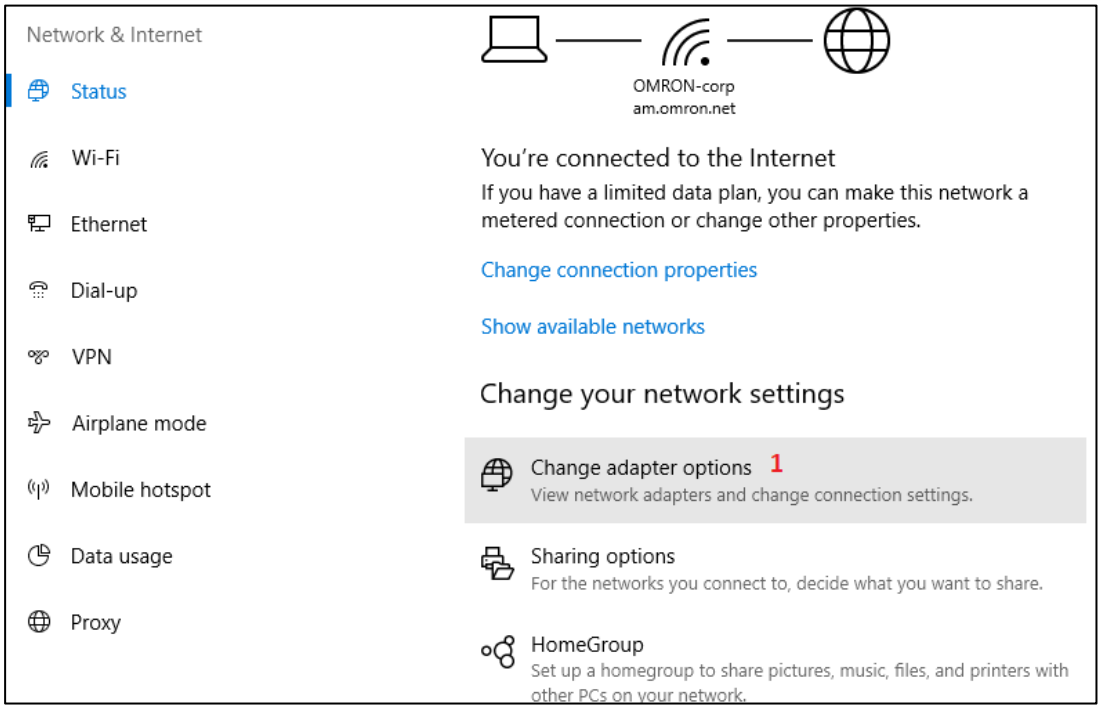

Figure 9.4 - Change Adapter Options

2. Right click on the Ethernet port and select **properties**.
3. Select the TCP/IPv4.
4. Click **Properties.**
5. Change the IP address settings.

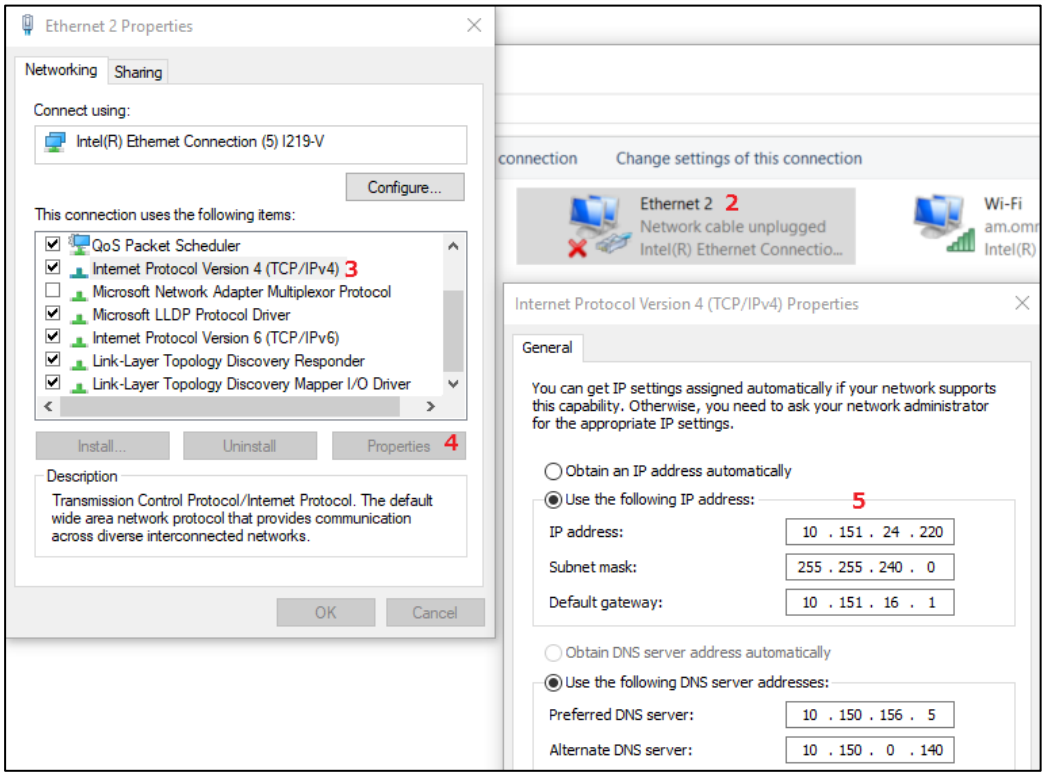

Figure 9.5 - Change IP Settings on an External Windows Device

10 Changing the Admin Password and User Accounts

10.1 Admin Password

1. Go to **Administrator Setting** under the **System** menu.

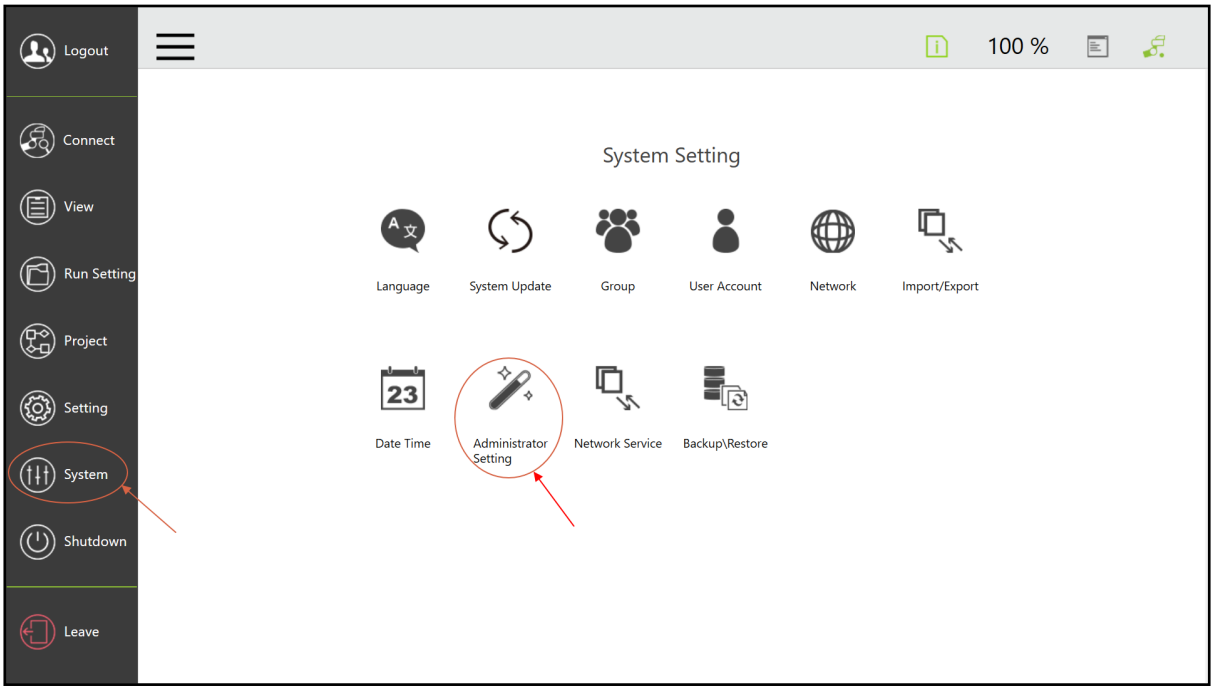

Figure 10.1 – System Setting Menu > Administrator Setting

2. Enter a new password, confirm password, and then click ***Setting***. The new password is now set.

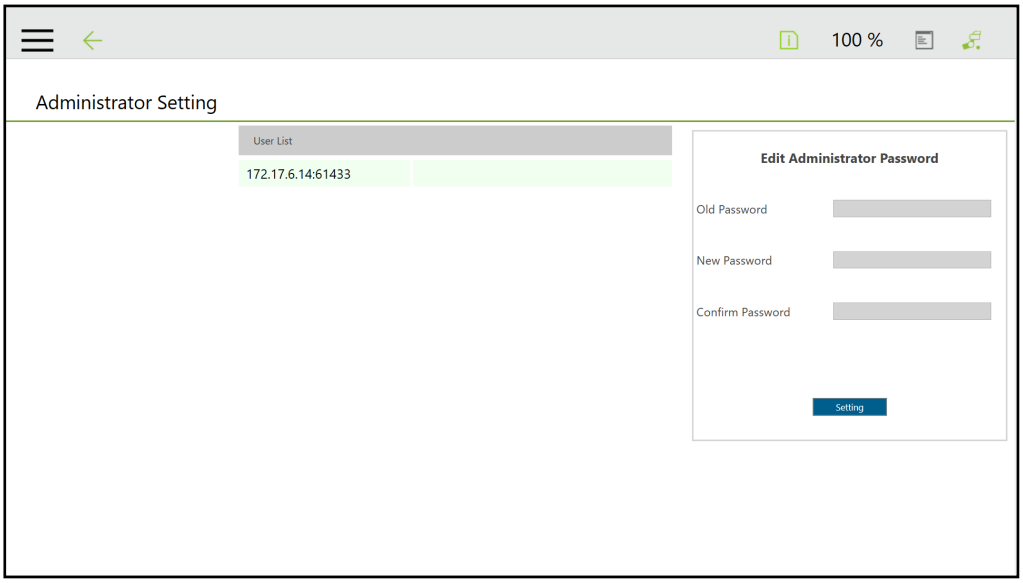

Figure 10.2 – Administrator Settings

10.2 User Accounts and Groups

User group and the user account can be used to limit access to certain features and settings in TM flow. Note that only one person can control the robot at any one time and only one instance of TM flow can be logged in under each user account at any time. Therefore, each user should log out and/or exit TM Flow when done using the robot to allow for other users to get control of it.

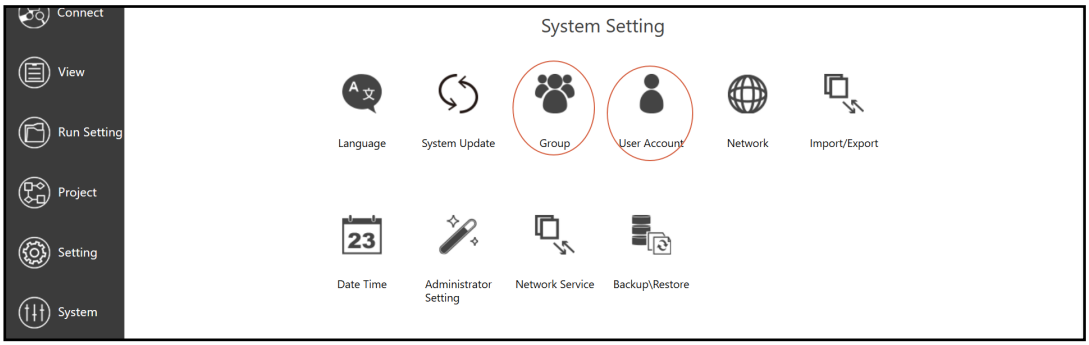

Figure 10.3 – System Settings > Group / User

Create user groups and define group permissions in the ***Group*** menu under **System**.

GroupName	Run Setting	Project	Setting	View	System	Edit Setting
Operator	○	○	○	●	○	✎ ✖
Maintenance	●	●	○	●	●	✎ ✖
SafeOp	●	●	●	●	●	✎ ✖

Figure 10.4 – Group Permissions

After creating groups, users can be assigned to those groups in the ***User Account*** menu.

Name :	Group :	Run Setting	Project	Setting	View	System	GroupName
James	SafeOp	●	●	●	●	●	✎ ✖
Evan	Maintenance	●	●	○	●	●	✎ ✖
Mimi	Operator	○	○	○	●	○	✎ ✖

Figure 10.5 – User Permissions

Permission	Description
Run Setting	User can switch the current running project in Run Setting page
Project	User can create and modify program here
Setting	All the Robot setting including I/O, safety, component and more can be found here
View	All the robot status can be viewed here
System	User can modify the system setting including update, user account, backup and more here.

Figure 10.6 – Table of Permissions

11 Example 2-Point Program

11.1 Start a new project.

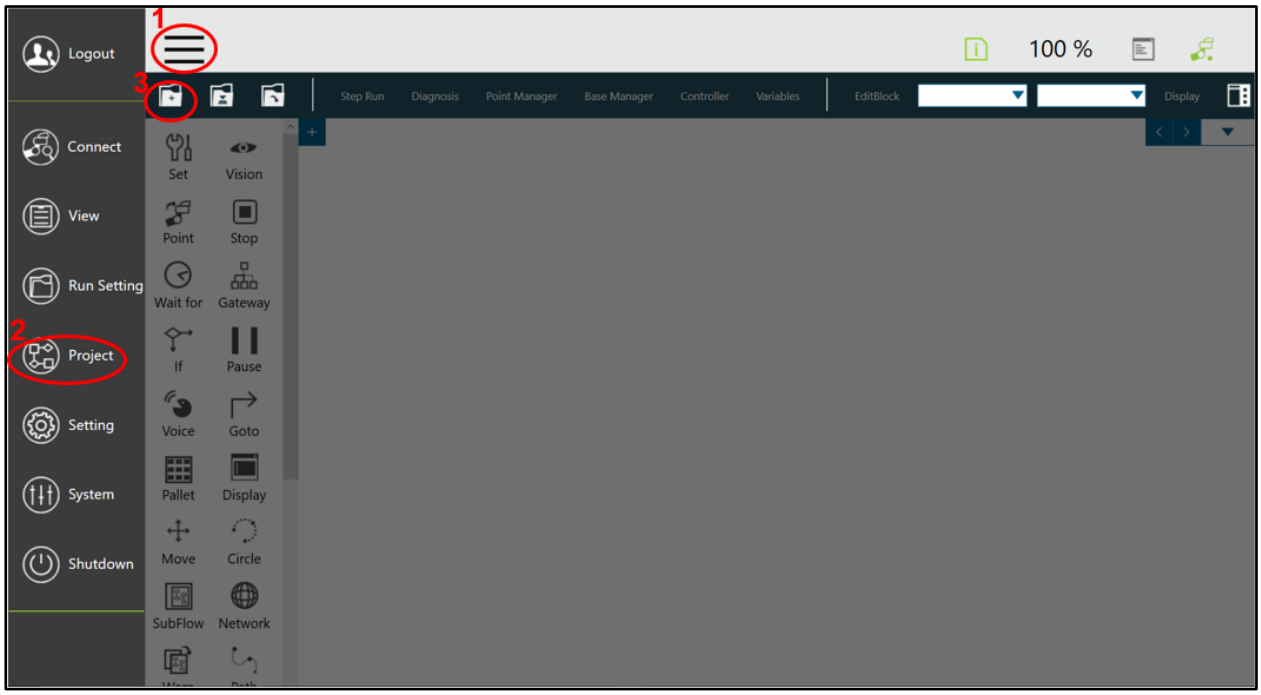

Figure 11.1 – New Project Screen

2. Name the project.
3. Press and hold the “Free” button on the robot end effector to move the robot to an initial position.
4. Press point button OR drag and drop a point node in TM Flow. Both operations will create a new point in the project named P1. Note that the flow connection has been already made from the last point you selected, which in this case is “Start”.
5. Press and hold the “FREE” button on the robot end effector and move the robot to a new position.
6. Press point button to record this position as P2. Again note that the flow connection has been already made from the last point you selected, which in this case is “P1”.
7. Connect the bottom node of P2 to the top node of P1 to create a loop, such as in Figure 10.3.

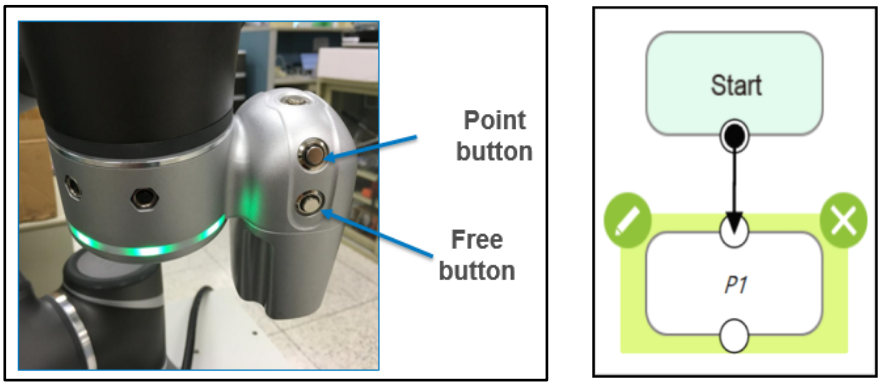

Figure 11.2 – Point Button

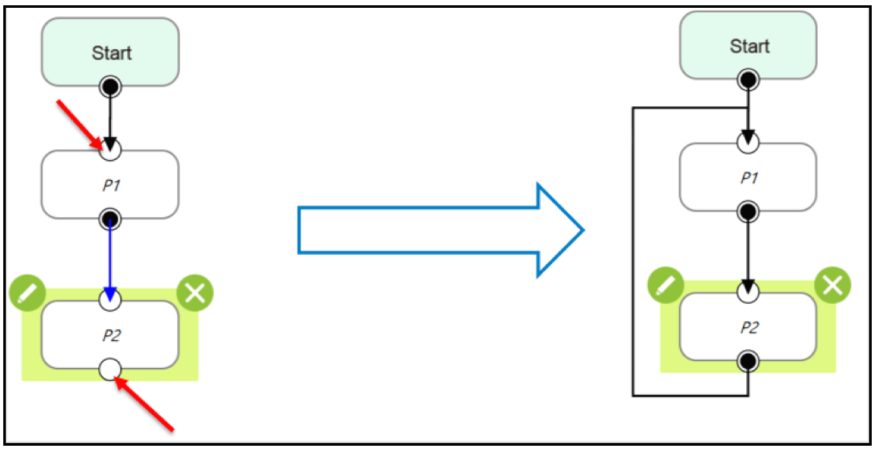

Figure 11.3 – Basic Program Flow

11.2 Running the Program

1. Press the **Play/Pause** button to start the program.

Note, at this point the robot will start to move.

To stop robot motion, do one of the following:

a. Press the **Play/Pause** button again
b. Press the **Stop** button (returns to the project menu and resets project flow to the Start).
c. Press the **E-Stop**. (**E-Stop** kills power to the robotic arm, but the controller will remain powered on).

Figure 11.4 – Robot Stick

At this point, the program is running! The robot will keep moving between P1 and P2.

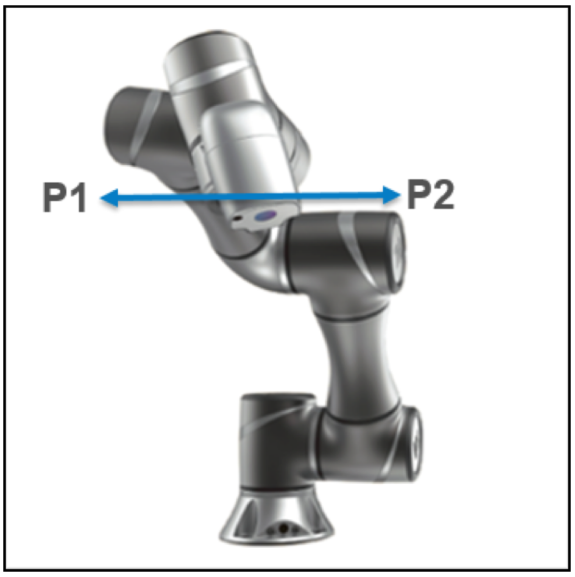

Figure 11.5 – Diagram of Programmed Motion

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Toronto, ON, Canada • 416.286.6465 • 866.986.6766 • www.omron247.com

OMRON ELECTRONICS DE MEXICO • HEAD OFFICE
México DF • 52.55.59.01.43.00 • 01-800-226-6766 • mela@omron.com

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Apodaca, N.L. • 52.81.11.56.99.20 • 01-800-226-6766 • mela@omron.com

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