QUICK START GUIDE

Omron TM Collaborative Robot: Initial Startup
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<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Author</th>
<th>Changes</th>
<th>HW Ver.</th>
<th>Sys. Ver.</th>
</tr>
</thead>
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<td>01</td>
<td>1/17/2019</td>
<td>Kai Lee</td>
<td>Document Created</td>
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<td>1.68.6800</td>
</tr>
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<td></td>
<td></td>
<td>Aaron H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Charlie K</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Document Type</th>
<th>Document Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM Flow Software Manual</td>
<td>I626-E-02</td>
</tr>
<tr>
<td>TM Hardware Installation Manual</td>
<td>I623-E-02 (TMS), I624-E-02 (TM12/TM14)</td>
</tr>
<tr>
<td>TM Safety Manual</td>
<td>I625-E-02</td>
</tr>
<tr>
<td>TM Backup, Restore, &amp; Update Quick Start Guide</td>
<td>Document number TBD</td>
</tr>
</tbody>
</table>

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](image-url)
The following figure shows all the components that come inside the two boxes.

![Figure 3.2 – Contents of Boxes](image-url)
## 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](image1)

![Figure 4.2 – Basic System Configuration](image2)
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)

5.1 Boot Up Errors

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

<table>
<thead>
<tr>
<th>What happen</th>
<th>Possible Cause</th>
<th>Troubleshoot</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMI start up with error</td>
<td>E-stop is pressed</td>
<td>Release the Estop</td>
</tr>
<tr>
<td></td>
<td>E-stop safety connection is unplugged</td>
<td>Reconnect Estop ports</td>
</tr>
<tr>
<td>HMI fail to start up</td>
<td>Safeguard A disconnected</td>
<td>Reconnect Safeguard A</td>
</tr>
<tr>
<td>HMI start up, red light blinking</td>
<td>Safeguard B disconnected</td>
<td>Reconnect Safeguard B</td>
</tr>
</tbody>
</table>

Figure 5.4 – Table of Boot Errors
6 Light Ring Indicator

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.

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

*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:

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

*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.)

2. Click Get Control to get control of the robot. You are now ready to program your TM robot.
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](image)

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

![Figure 8.2 – Backup Screen](image)

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.

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

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.
Network & Internet

- Status
- Wi-Fi
- Ethernet
- Dial-up
- VPN
- Airplane mode
- Mobile hotspot
- Data usage
- Proxy

You're connected to the Internet
If you have a limited data plan, you can make this network a metered connection or change other properties.

Change connection properties

Show available networks

Change your network settings

- Change adapter options
  View network adapters and change connection settings.

- Sharing options
  For the networks you connect to, decide what you want to share.

- HomeGroup
  Set up a homegroup to share pictures, music, files, and printers with other PCs on your network.

2. Right click on the Ethernet port and select **properties**.
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.

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

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

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

---

Figure 10.3 – System Settings > Group / User

Figure 10.4 – Group Permissions

Figure 10.5 – User Permissions

Figure 10.6 – Table of Permissions
11 Example 2-Point Program

11.1 Start a new project.

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

Figure 11.5 – Diagram of Programmed Motion