Mech-Mind User’s Manual

Mech-Mind

Mar 06, 2023

CONTENTS

This section introduces the process of setting up master-control of a Techman (TM) robot.

CHAPTER

ONE

PREREQUISITES

Before you perform any operation on the TM robot, please make sure that the following requirements have been met.

1. The controller software (TMflow) version is 1.84 or above.
2. The version of the Mech-Mind Software Suite you use is 1.6.1 or above.
3. You have known the IP address of the robot, e.g., 192.168.2.10.

CHAPTER

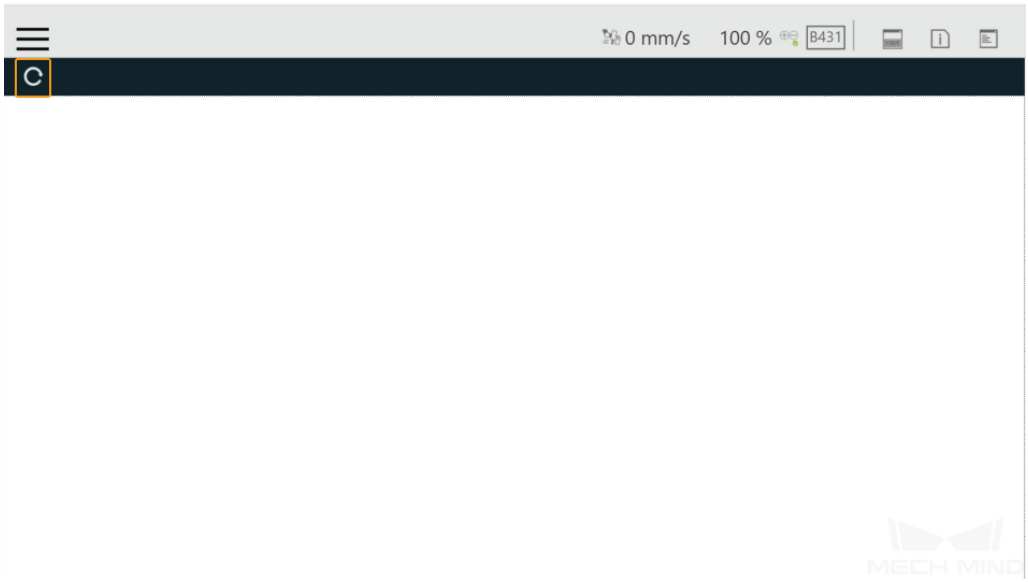
TWO

GET CONTROL OF THE ROBOT

There are two ways to control the robot, and you can choose either one according to the actual situation.

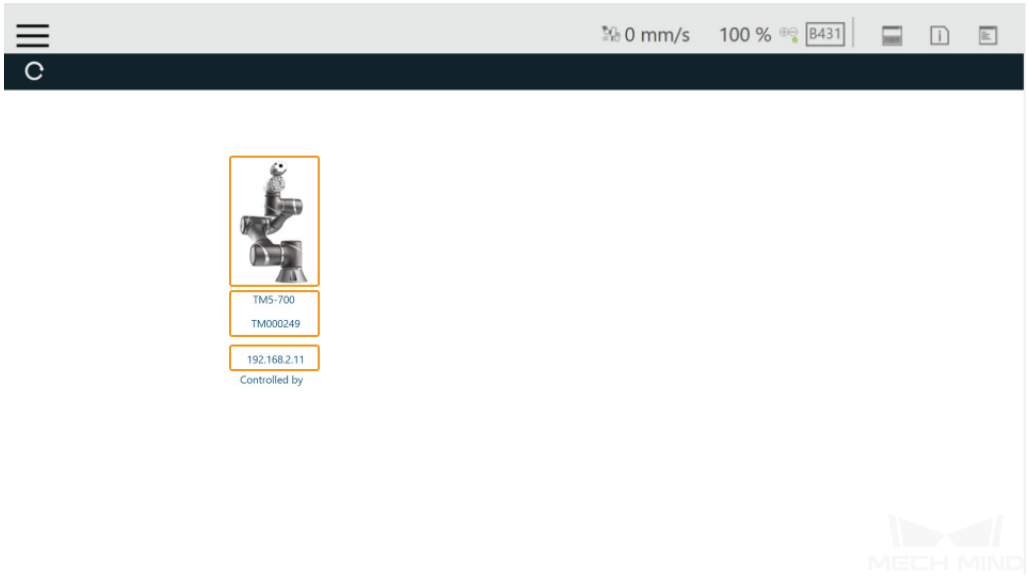
2.1 Control the Robot via the Controller

1. Connect the monitor, keyboard, and mouse to the controller through the controller's USB and HDMI ports accordingly.
2. Click  , and wait for the corresponding robot ID to appear in the window.

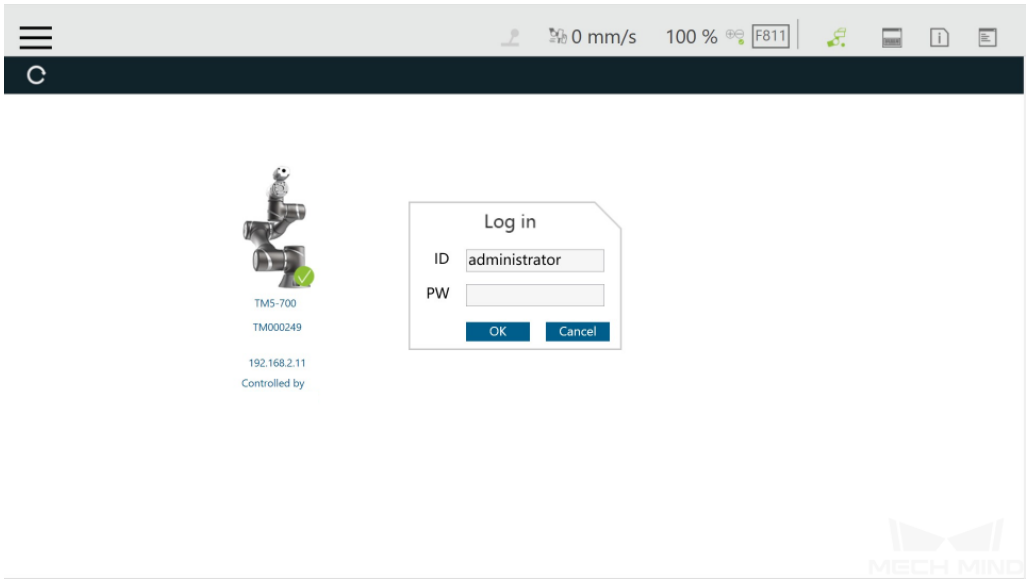


3. Connect the robot in any of the following ways:
   - Double-click the robot icon.

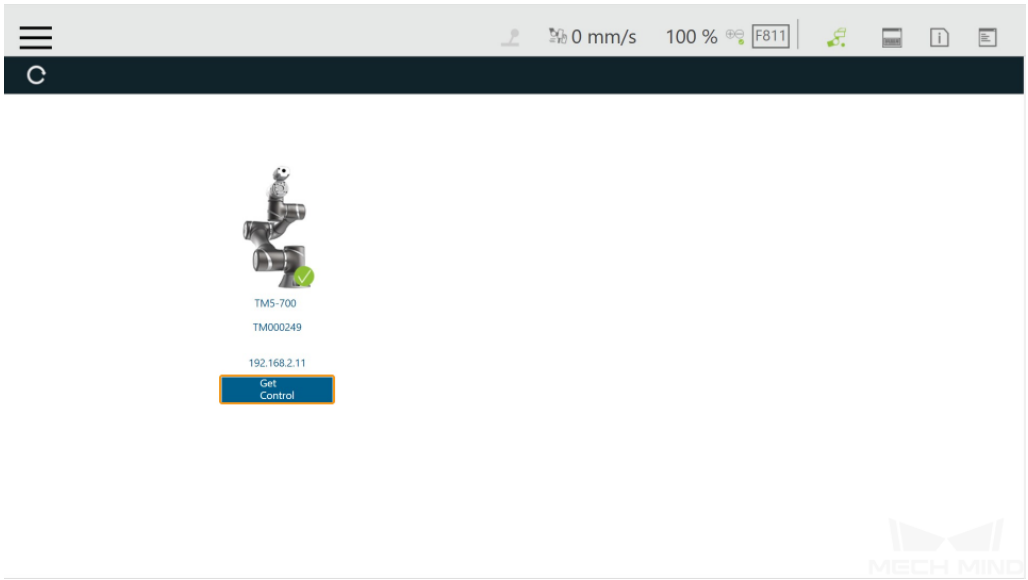
- Double-click the robot ID.
- Double-click the IP address of the robot.



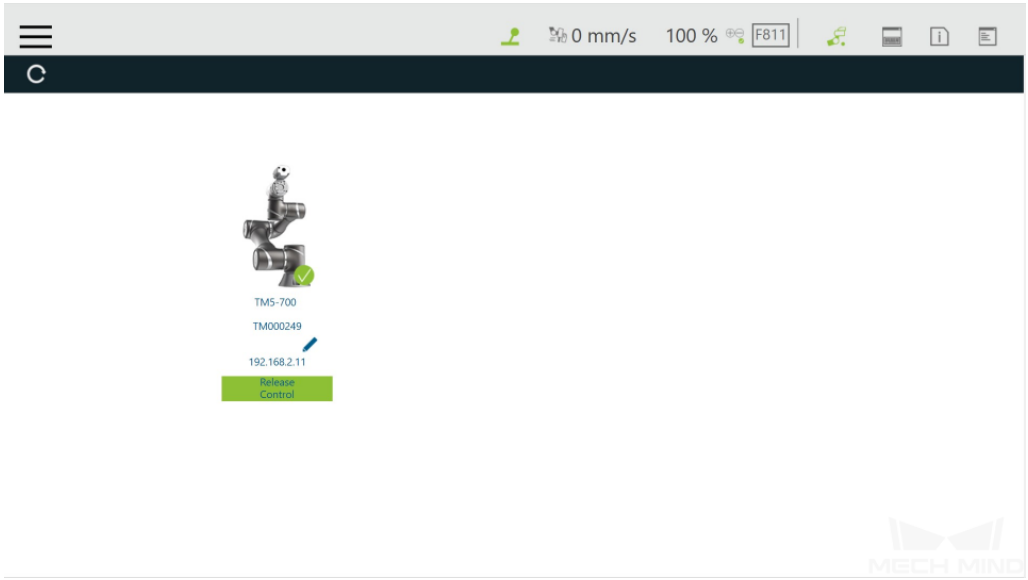
4. Enter your ID and password in the **Log in** window, and click *OK*. You can use the default ID *administrator* to log in without a password.



5. Click *Get Control* to control the robot.



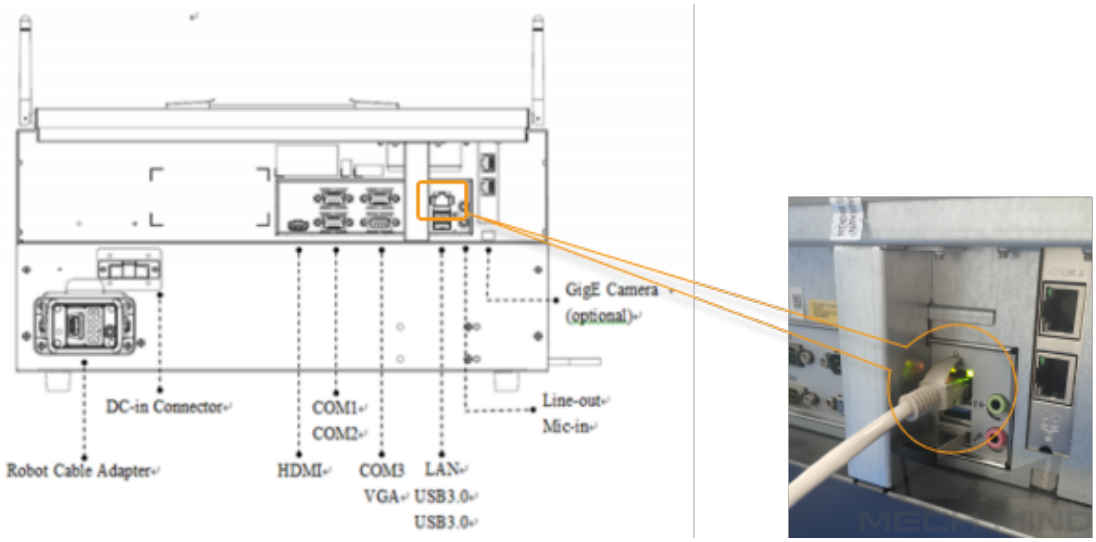
If the robot is controlled successfully, the window will be shown as below.



2.2 Control the Robot via the IPC

2.2.1 Connect Hardware

Plug the Ethernet cable into the LAN port of the robot controller to connect it with the IPC.

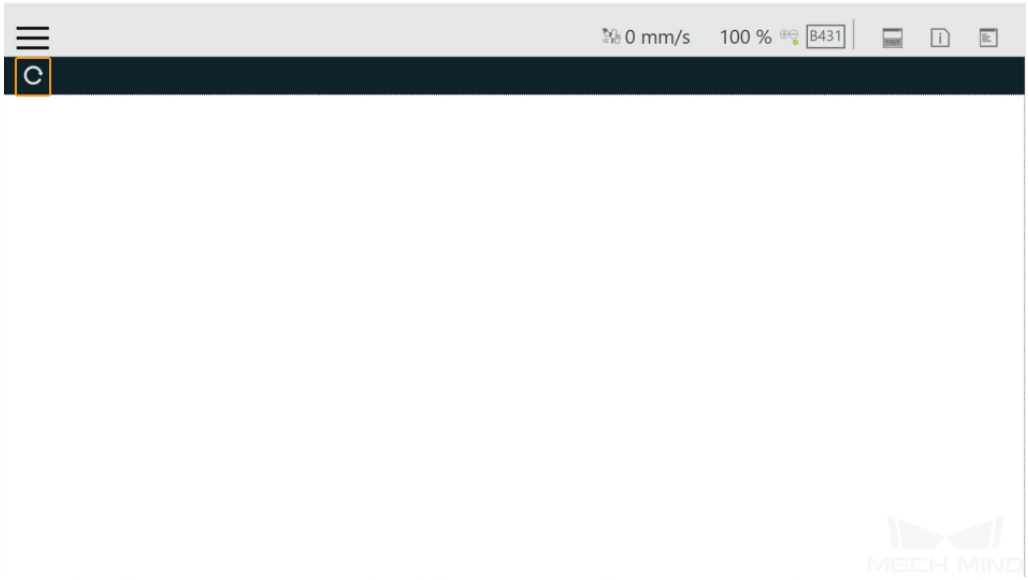


2.2.2 Set the IP Address of the IPC

Attention: Set the IP addresses of the IPC and robot to be in the same subnet, or else the robot cannot be connected successfully.

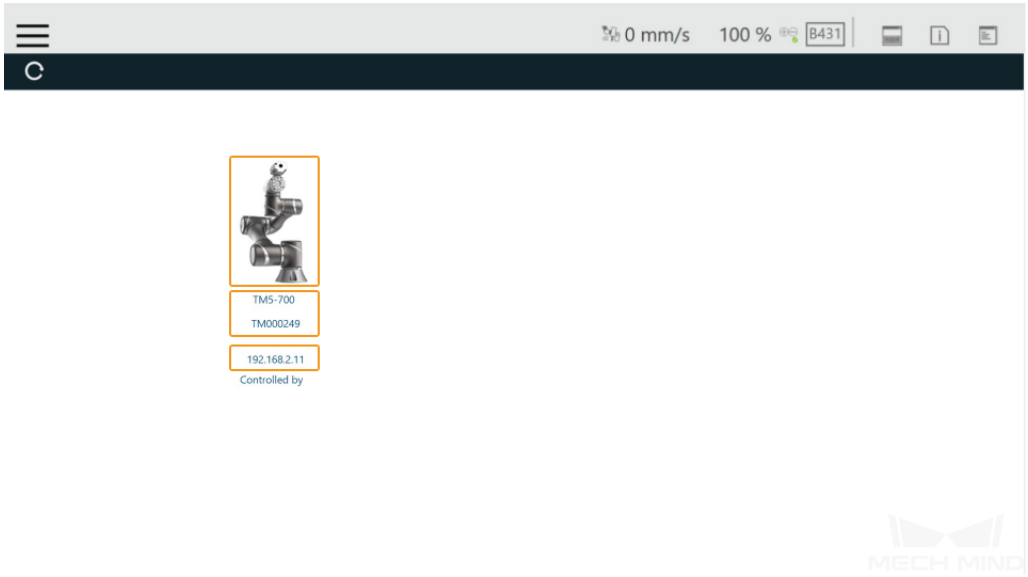
2.2.3 Control the Robot with the IPC

1. Download and install the TMflow software on your IPC from Techman Robot's website.
2. Open TMflow, click  , and wait for the corresponding robot ID to appear in the window.

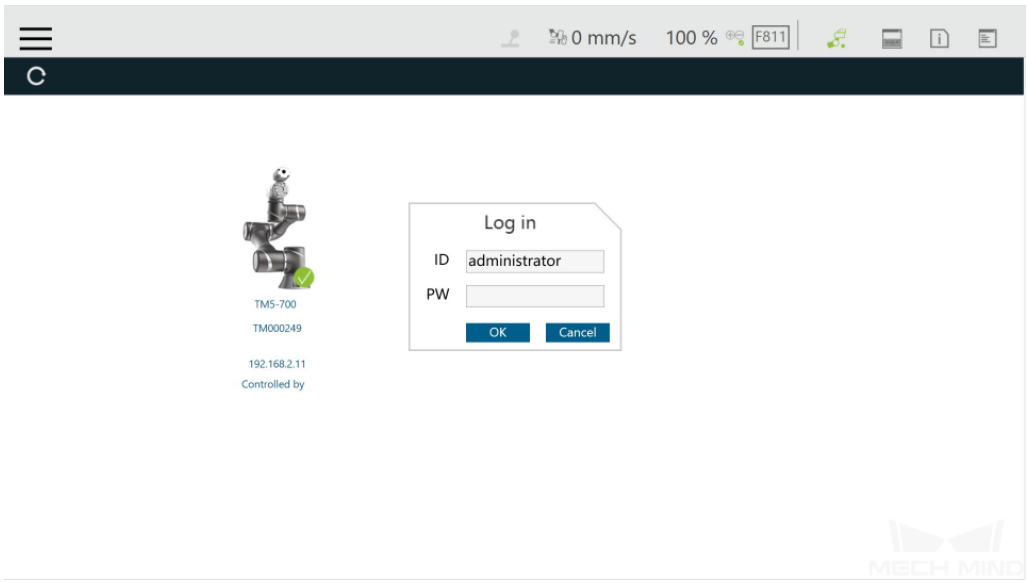


3. Connect the robot in any of the following ways:

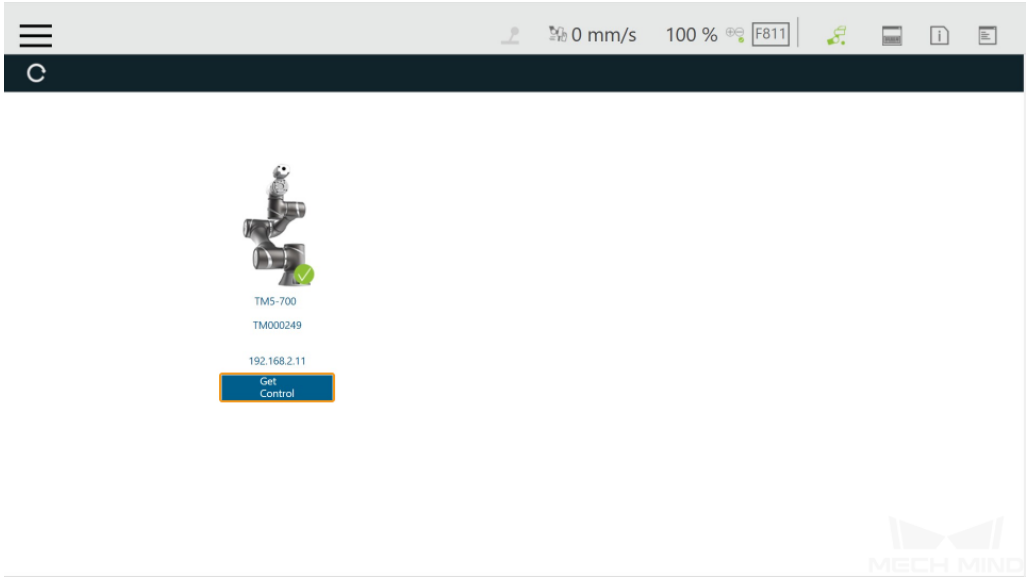
- Double-click the robot icon.
- Double-click the robot ID.
- Double-click the IP address of the robot.



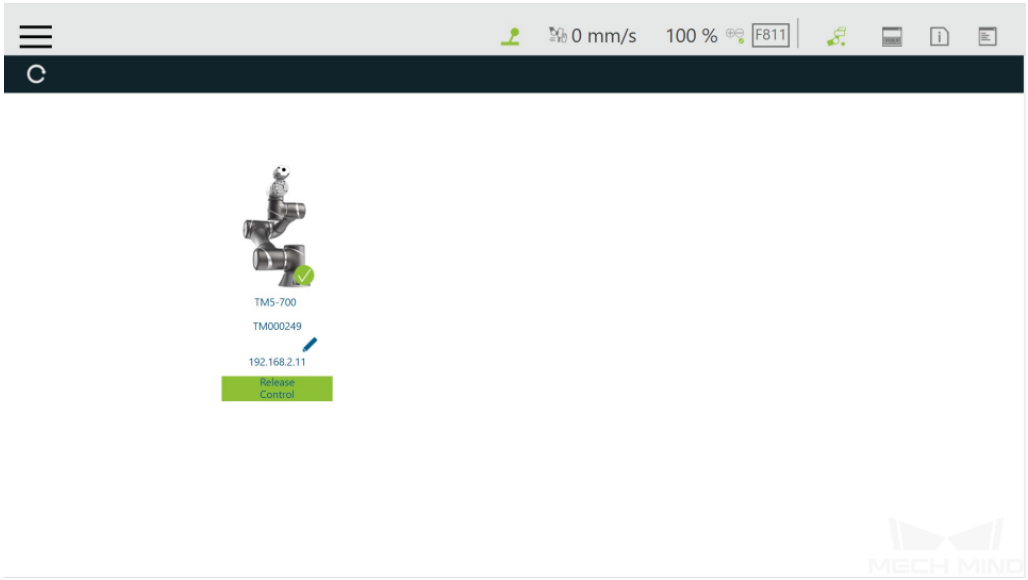
4. Enter your ID and password in the **Log in** window, and click *OK*. You can use the default ID *administrator* to log in without a password.



5. Click *Get Control* to control the robot.



If the robot is controlled successfully, the window will be shown as below.



CHAPTER

THREE

LOAD THE PROGRAM FILES

The example below uses an IPC to load the program files, and the method to load the program files with a controller is similar.

3.1 Prepare the Files

1. Plug the USB flash drive into the USB port of the IPC.
2. Rename the USB flash drive to **TMROBOT**, or else the USB flash drive cannot be recognized by the robot controller.
3. Copy the program files to the USB flash drive. The files are stored in the *xxx\Mech-Mind Software Suite-x.x.x\Mech-Center\Robot_Server\Robot_FullControl\tm* folder.

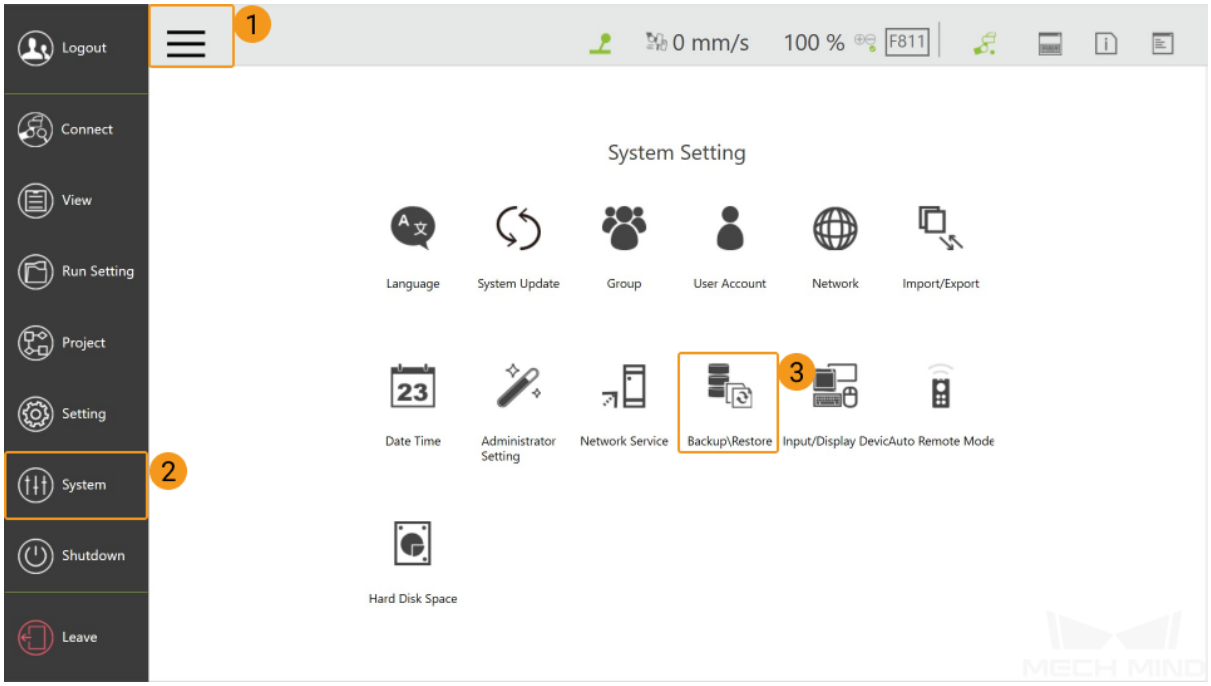
   > **Attention:** Please copy the entire *TM_Export* folder to your USB flash drive.

4. Plug the USB flash drive with the program files into the USB port of the robot controller.

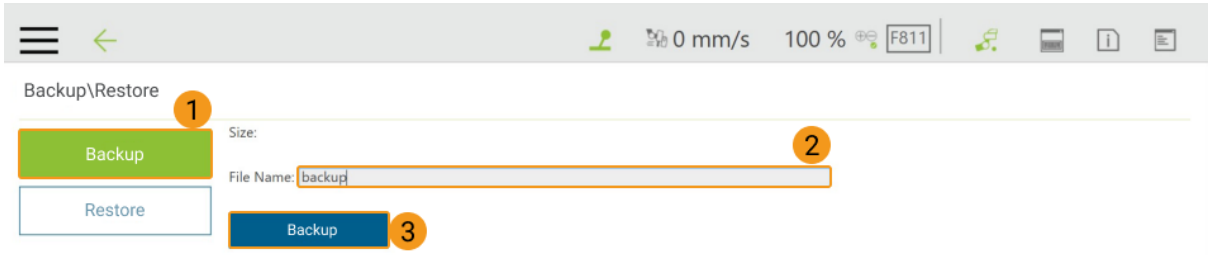
3.2 Back up Robot System Files

Hint: It is recommended to back up robot system files before loading master-control program files to avoid system corruption that may be caused by the loading operation. In case any issue occurs, you can use the backup file to restore the robot system.

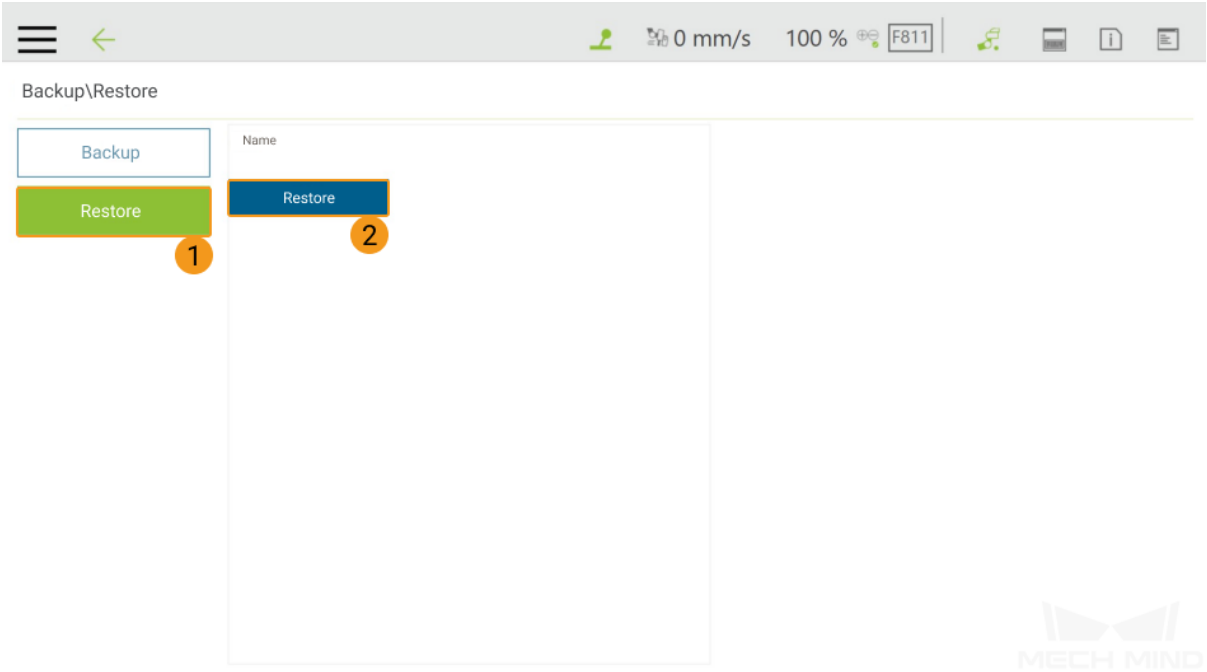
1. Open the TMflow software, click the  icon in the upper left corner of the window, and select *System → Backup\Restore*.



2. Click *Backup*, enter a **File Name** for the backup file, and then click *Backup*.

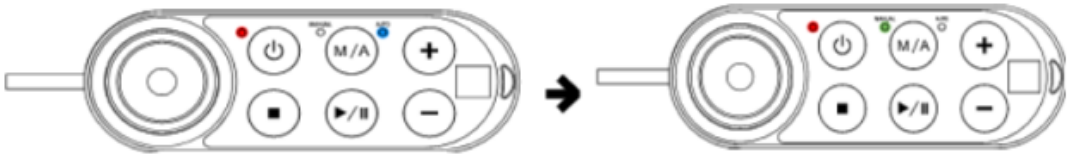


If you need to restore the robot system with the backup file, click *Restore* and then *Restore*.

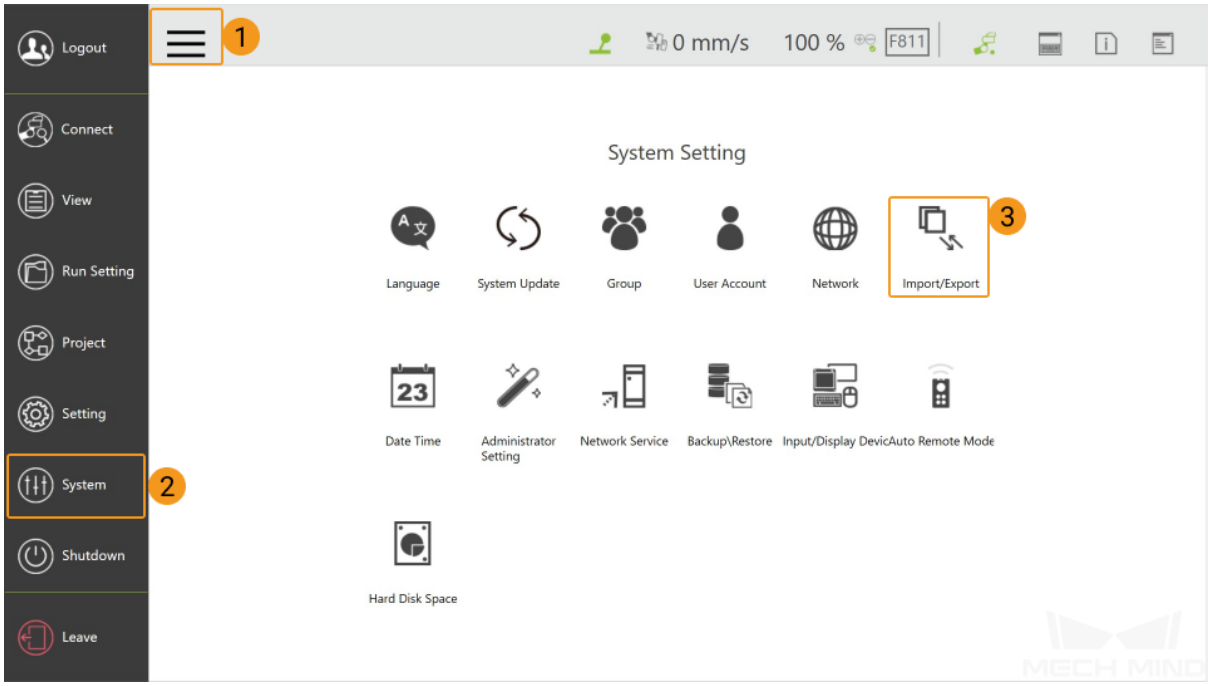


3.3 Load the Files to the Robot

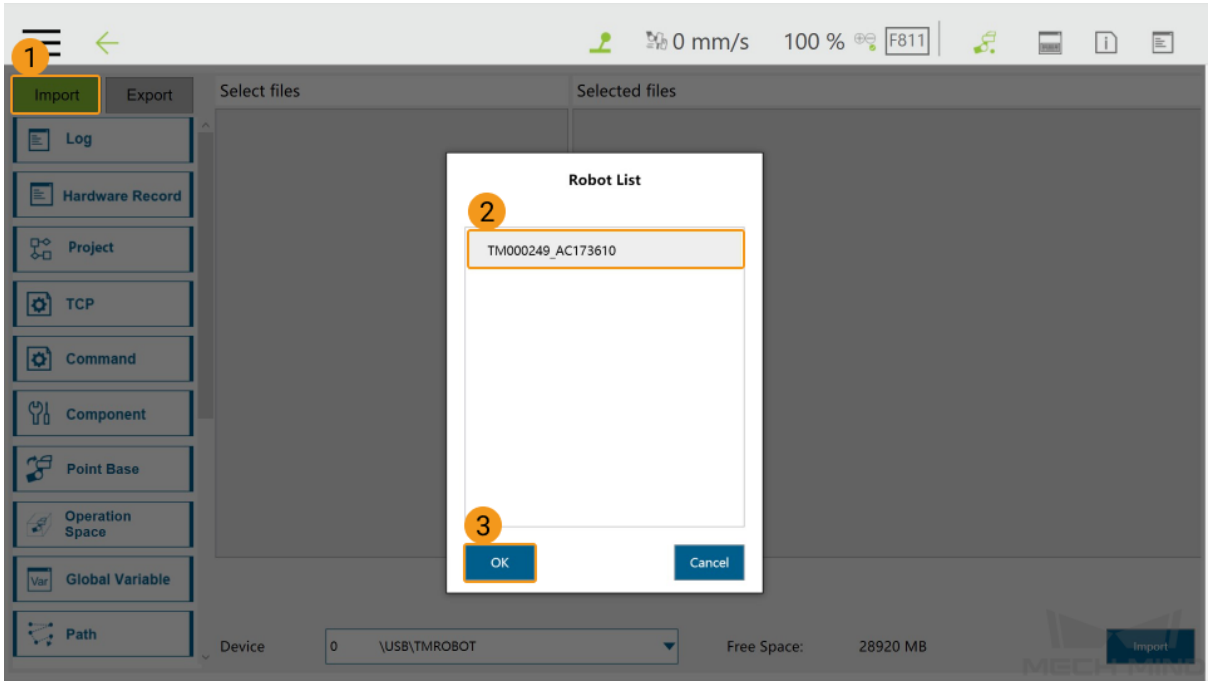
Before loading the files to the robot, please press and hold the `M/A` button on the Robot Stick to switch the robot to the Manual mode (the green Manual light is on).



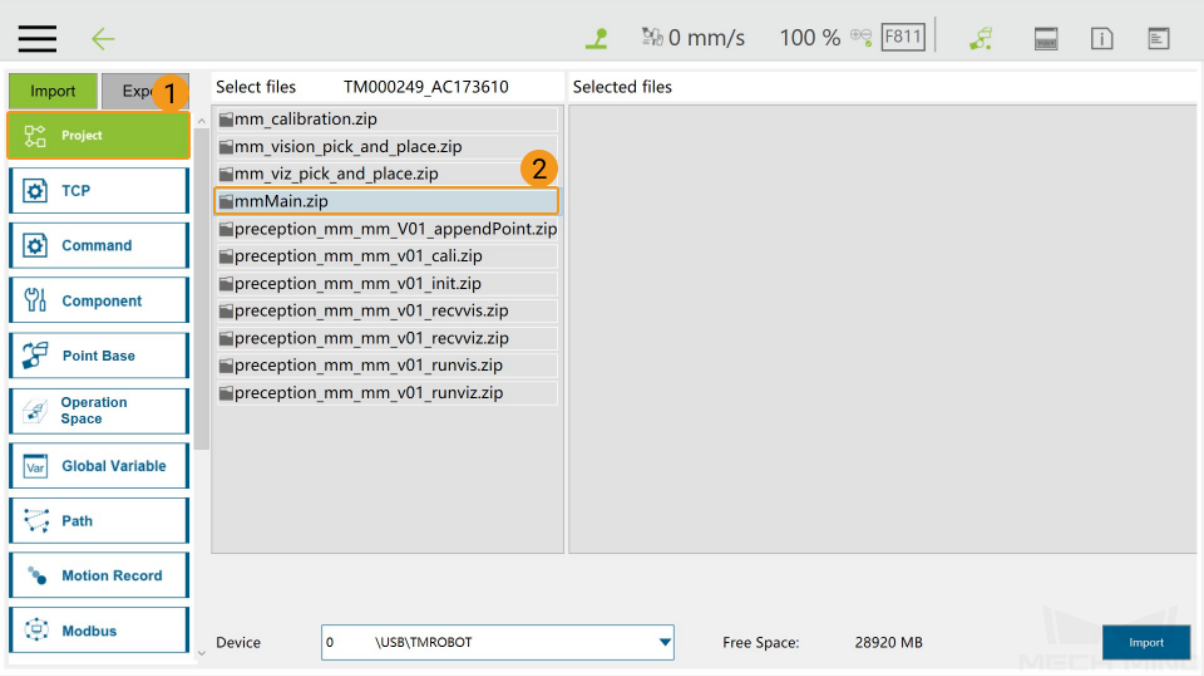
1. Open the TMflow software, click  and then select *System* → *Import/Export*.



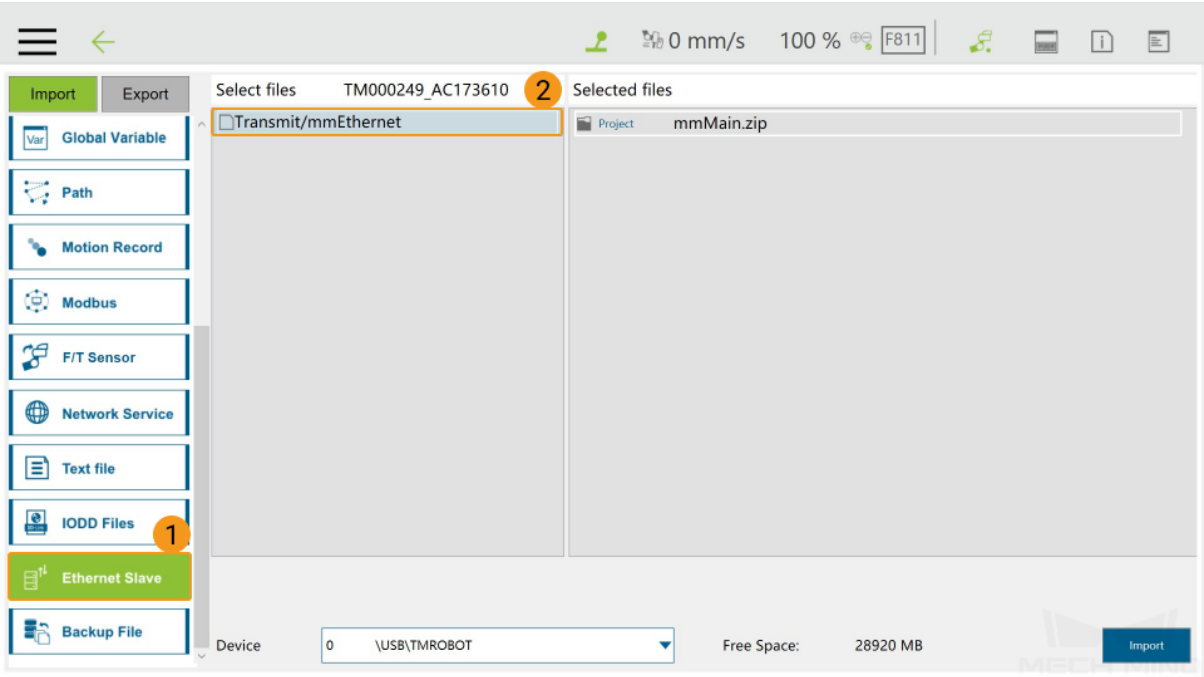
2. Click *Import*, and a **Robot List** window will pop up, select the program file **TM000249_AC173610** and click *OK*.

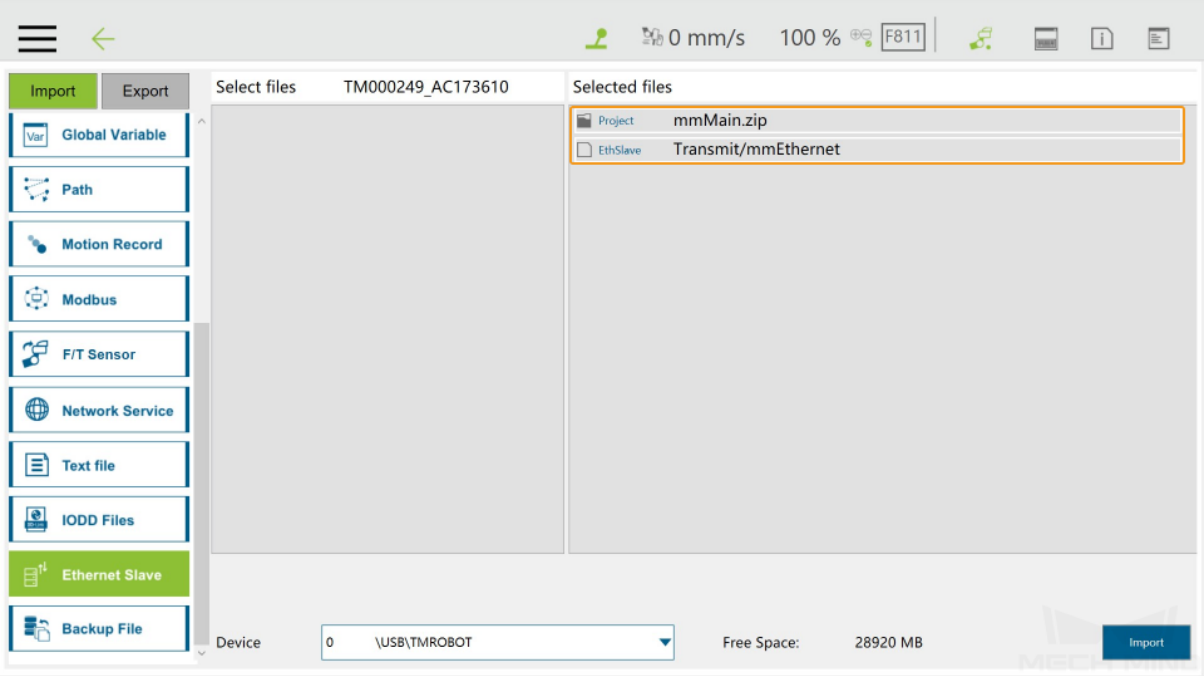


3. Click **Project**, and select **mmMain.zip** in the **Select files**, and then it will be displayed in the **Selected files** panel on the right.

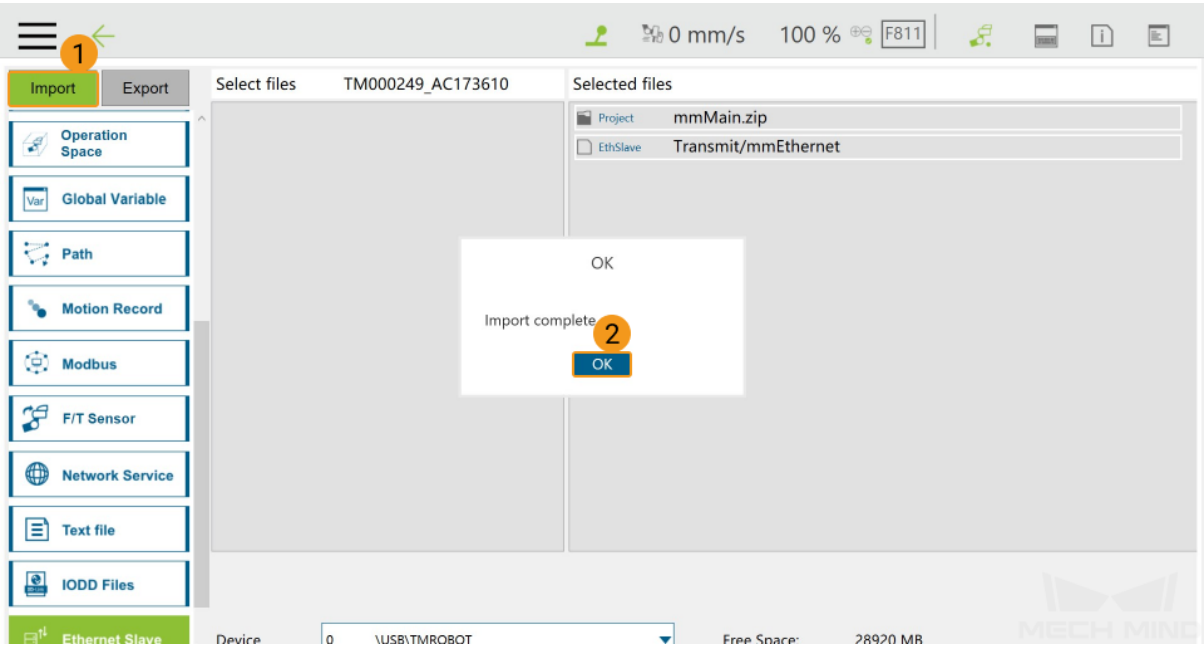


4. Click **Ethernet Slave**, and select **Transmit/mmEthernet**, and then it will be displayed in the **Selected files** panel on the right.





5. Click *Import*. After the files have been imported successfully, click *OK* in the **Import complete** pop-up window.



6. **Unplug the USB flash drive** from the IPC after you have completed the above steps.

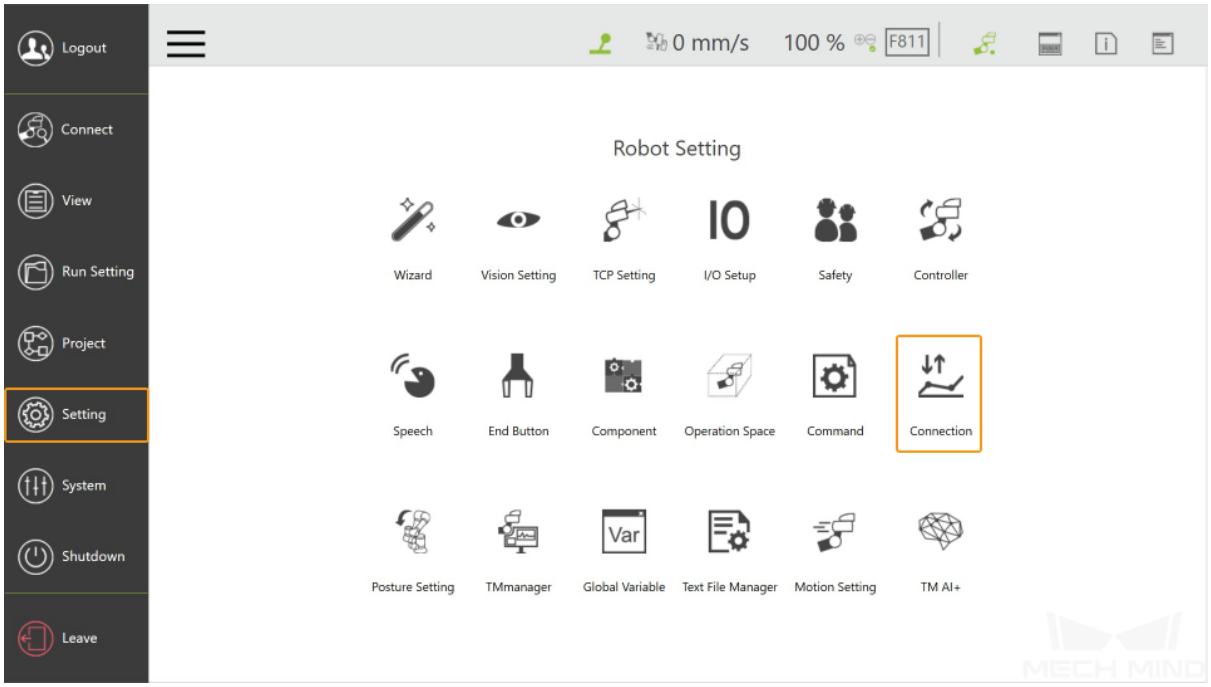
CHAPTER

FOUR

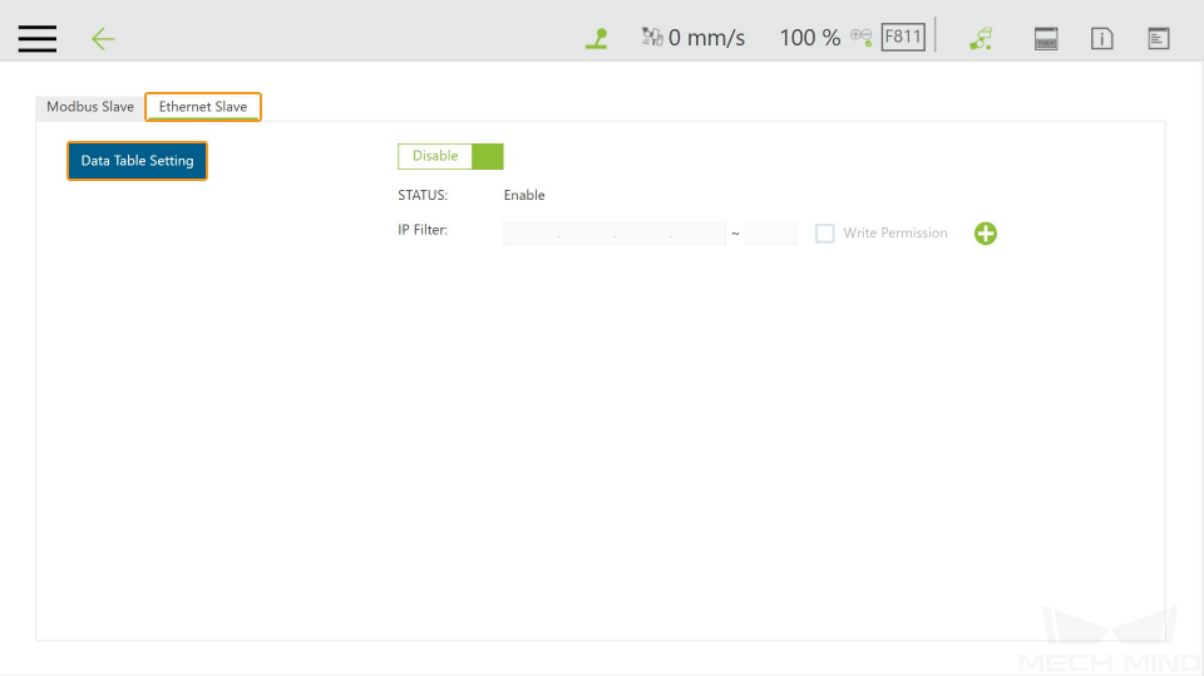
RUN THE PROGRAM

4.1 Enable the Ethernet Slave Service

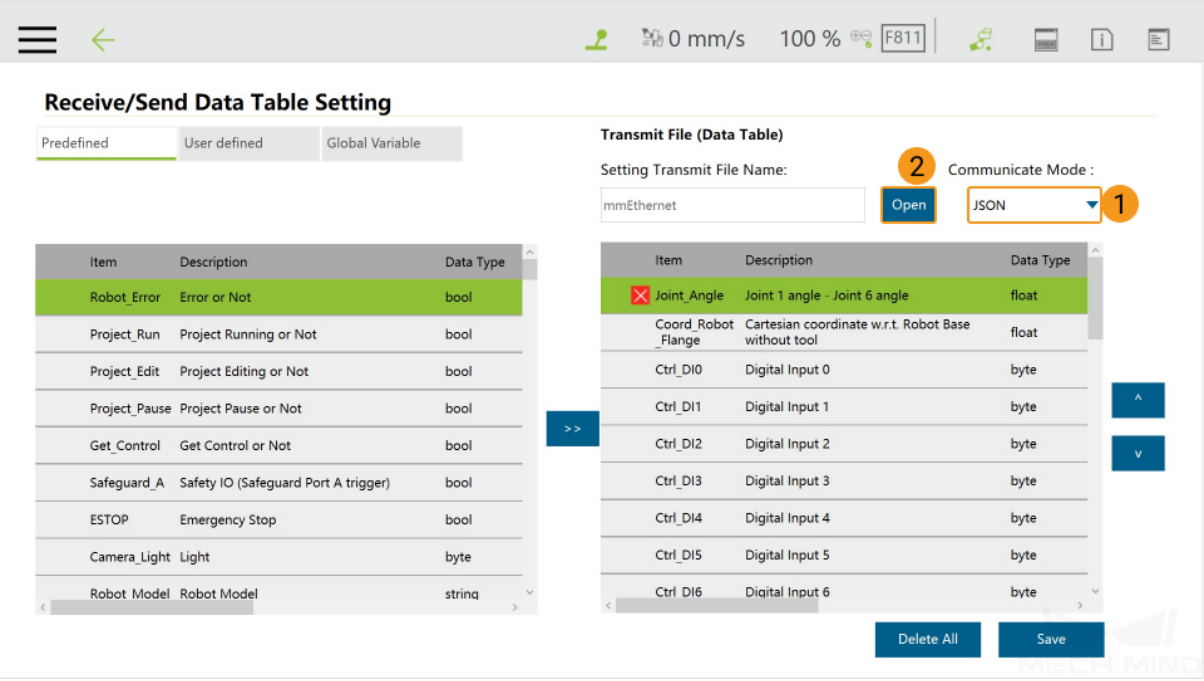
1. Select *Setting* → *Connection*.



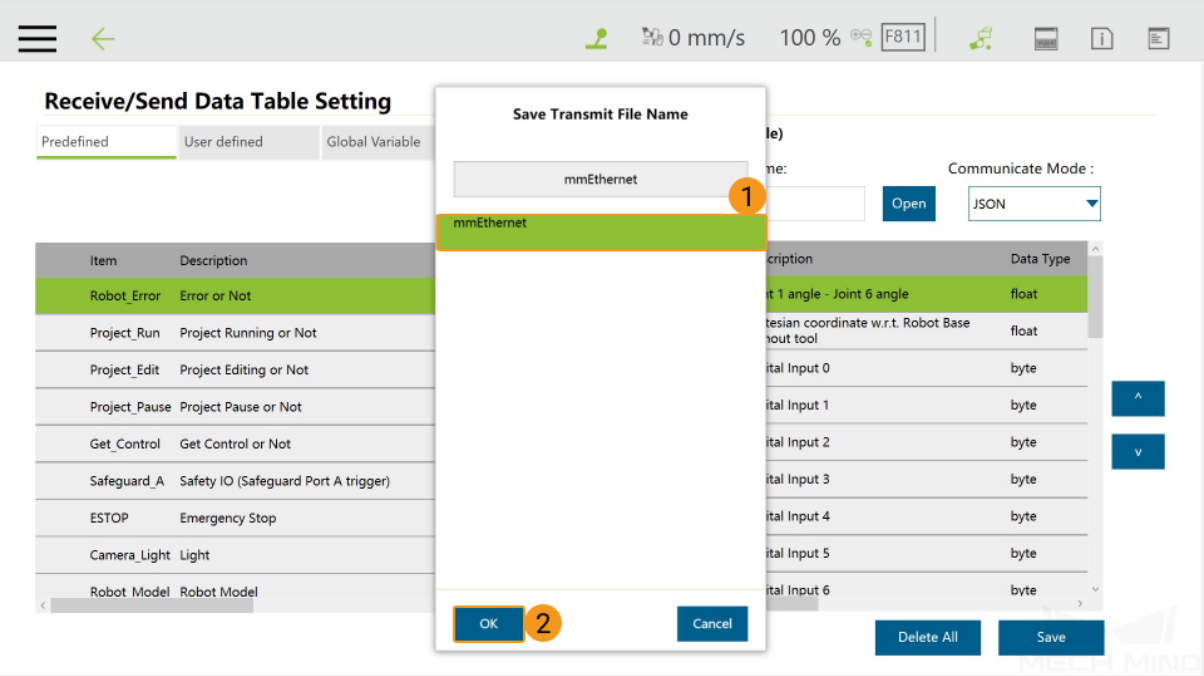
2. Select *Ethernet Slave* → *Data Table Setting*.



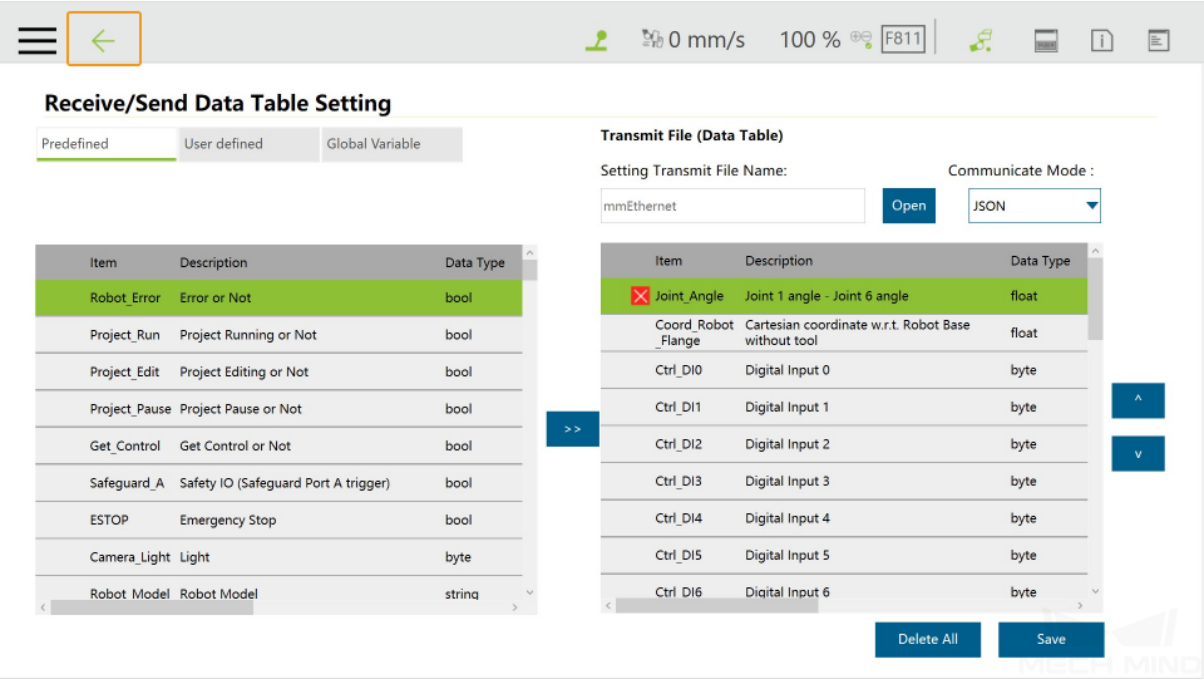
3. Set the **Communicate Mode** to **JSON**, and click *Open*.



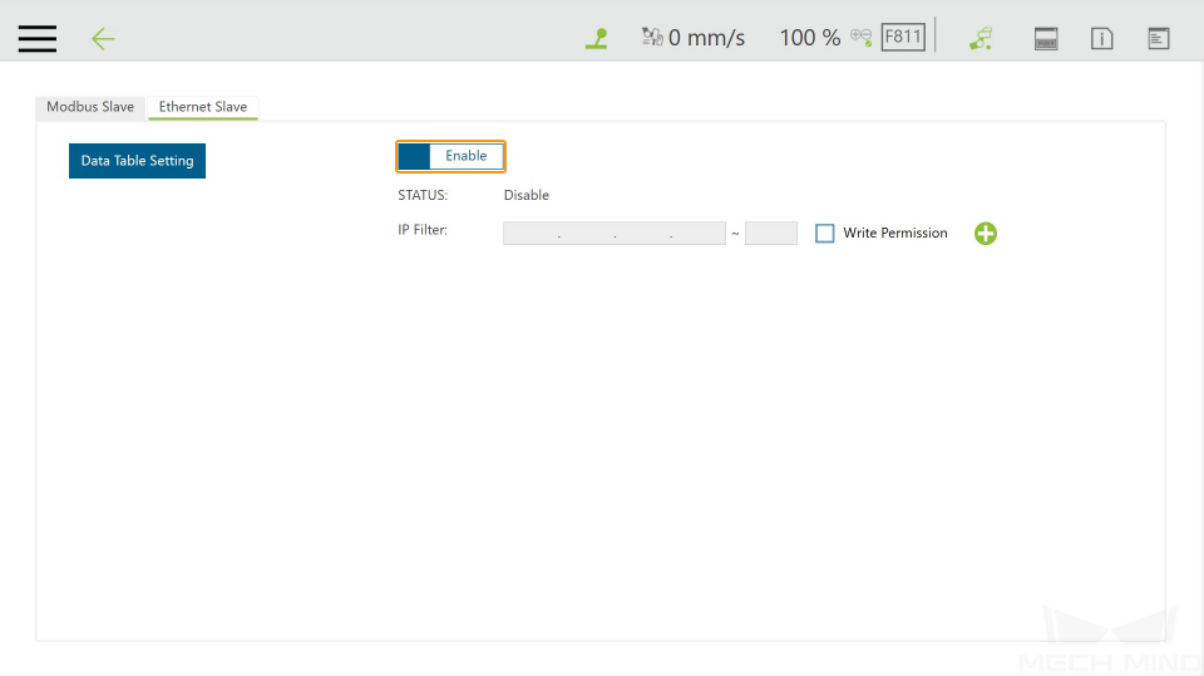
4. Select **mmEthernet** in the pop-up **Save Transmit File Name** window, and click *OK*.



5. Click ⍰ in the **Receive/Send Data Table Setting** window.

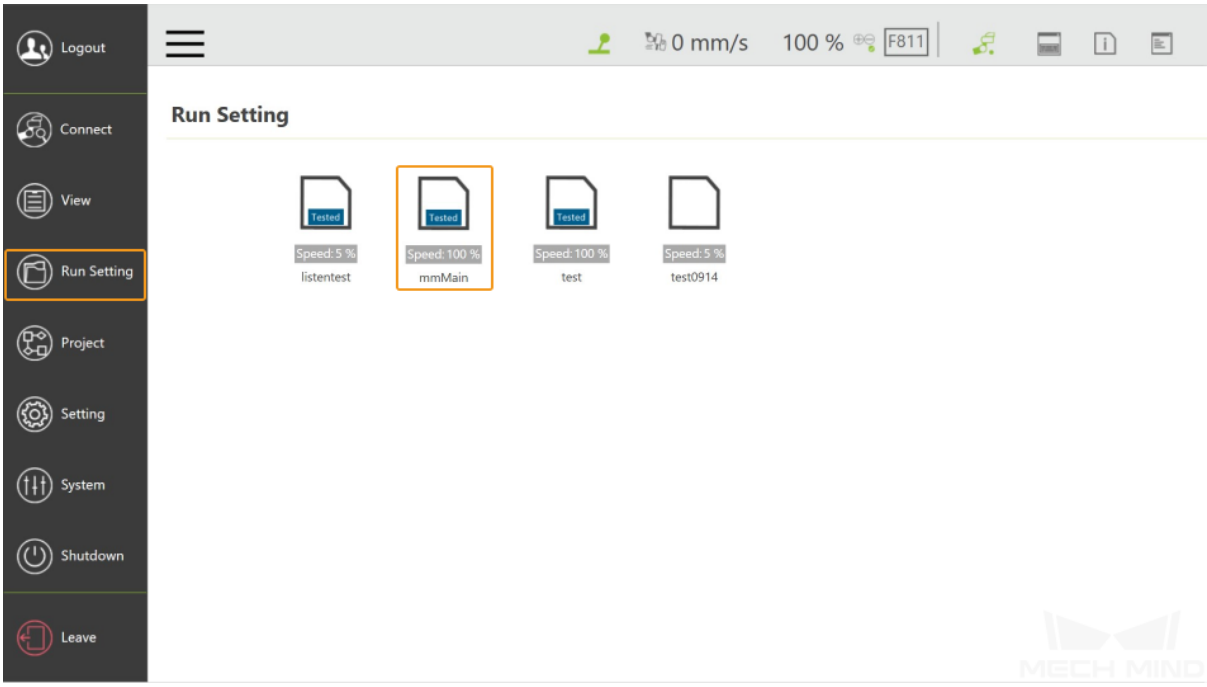


6. Click *Enable*.

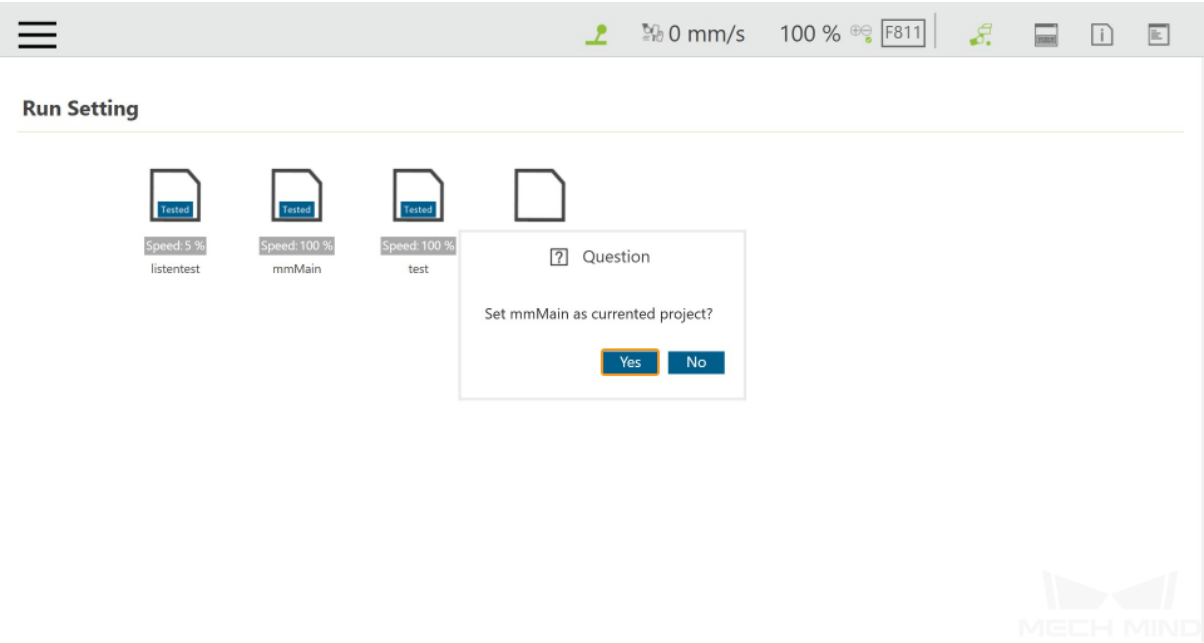


4.2 Run the mmMain Program

1. Select *Run Setting* → *mmMain*.



2. Click *Yes* in the pop-up window to set mmMain as the current project.



3. Press the `M/A` button on the Robot Stick until you hear a beep, which suggests that the Manual mode has been disabled.

   Press the buttons **+ - + + -** in sequence, and the blue Auto light will be on, suggesting that the robot has been switched to the Auto mode.

4. Then press the `Run` button on the Robot Stick, and the program will be run after three beeps.

CHAPTER

FIVE

TEST ROBOT CONNECTION

5.1 Configure Robot in Mech-Viz

1. Open Mech-Viz, click *New project* to create a new project.
2. Select the robot model in use in the next page.
3. Save the project by pressing `Ctrl` + `S`.
4. In the toolbar, change the **Vel.** (velocity) and **Acc.** (acceleration) parameters to **5%**.
5. Right-click the project name in **Resources** and select **Autoload Project**.

5.2 Configure Settings in Mech-Center

1. Open Mech-Center and click on *Deployment Settings*.
2. Go to **Robot Server**, and make sure **Use robot server** is checked.
3. Check if the robot model displayed next to **Robot type in Mech-Viz project** matches the one in use.
4. Set the Robot IP address, and click **Save**.

5.3 Connect to Robot in Mech-Center

1. Click *Connect Robot* in the Toolbar.
2. The robot is successfully connected if:
   - A message saying **Robot: server connected to the robot** shows up in the **Log** panel, and
   - A robot icon with the robot model shows up in the **Service Status** panel.

5.4 Move the Robot

1. In Mech-Viz, click *Sync Robot* in the toolbar to synchronize the pose of the real robot to the simulated robot. Then, click *Sync Robot* again to disable the synchronization.
2. Click the **Robot** tab in the lower right, and change the joint position of J1 slightly (for example, from 0° to 3°). The simulated robot will move accordingly.
3. Click *Move real robot*, the real robot should move accordingly.

> Attention: When moving the robot, please pay attention to safety hazards. In the case of an emergency, press the emergency stop button on the teach pendant!

Note: After running the mmMain program on the robot side but Mech-Center fails to connect the robot, you can use **NetAssist** in the *xxx\Mech-Mind Software Suite-x.x.x\Mech-Center\tool* directory as a client to connect the 5890 and 5891 ports of the robot to check if these two ports are opened successfully.

- If port 5890 cannot be connected successfully, please check whether the mmMain program on the robot side has been run successfully.
- If port 5891 cannot be connected successfully, please check whether the Ethernet Slave on the robot has been enabled or restart the robot.

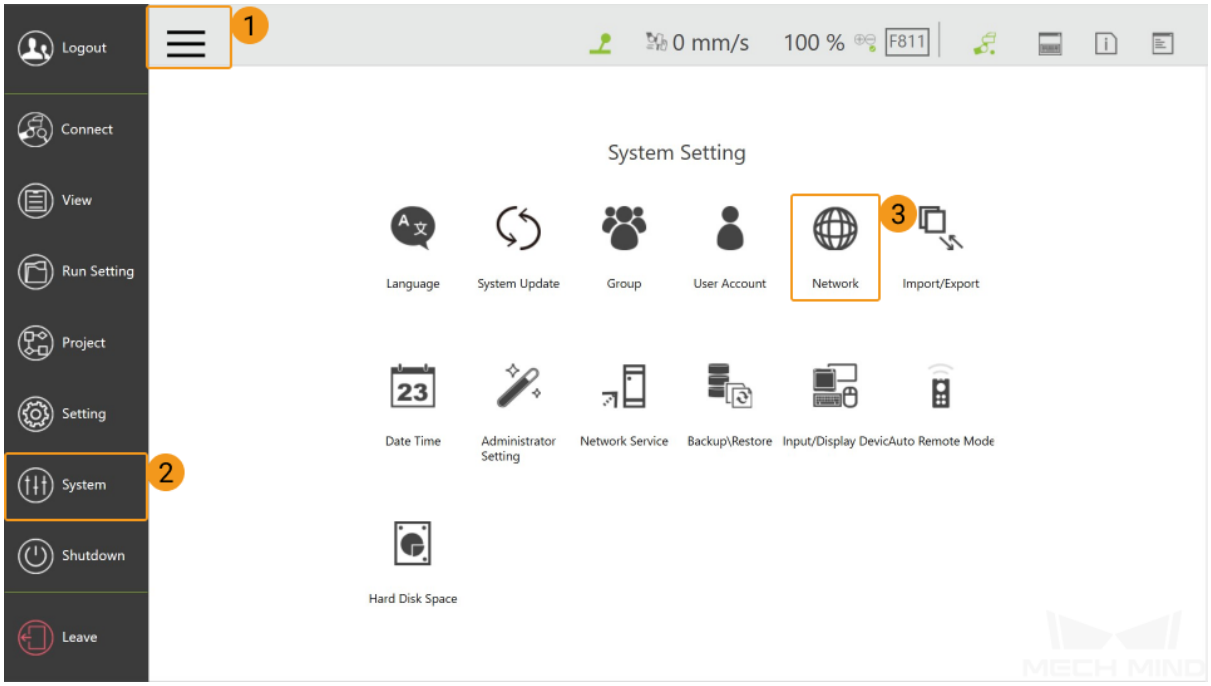
CHAPTER

SIX

APPENDIX

6.1 Modify the IP Address of the Robot

1. Click  , and select *System* → *Network*.



2. Set the IP Address and Subnet Mask in the **Network setting** window. Please make sure that IP addresses of the robot and the IPC belong to the same subnet.