Mech-Mind User's Manual

Mech-Mind

May 12, 2023

Contents

This section introduces the process of setting up Master-Control of a ROKAE industrial robot.

CHAPTER 1

Check Hardware and Software Versions

- The robot in use is a ROKAE industrial robot.
- The series of the controller is XBC3, and the version is 3.6.
- Mech-Mind Software Suite version is 1.5.0 or above.

CHAPTER 2

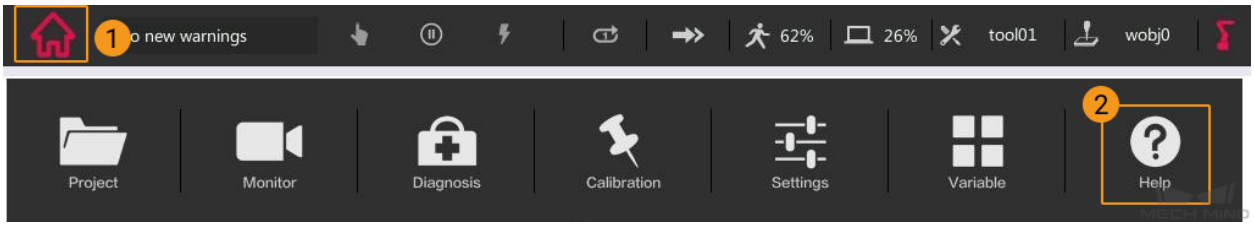
Start the Robot and Teach Pendant

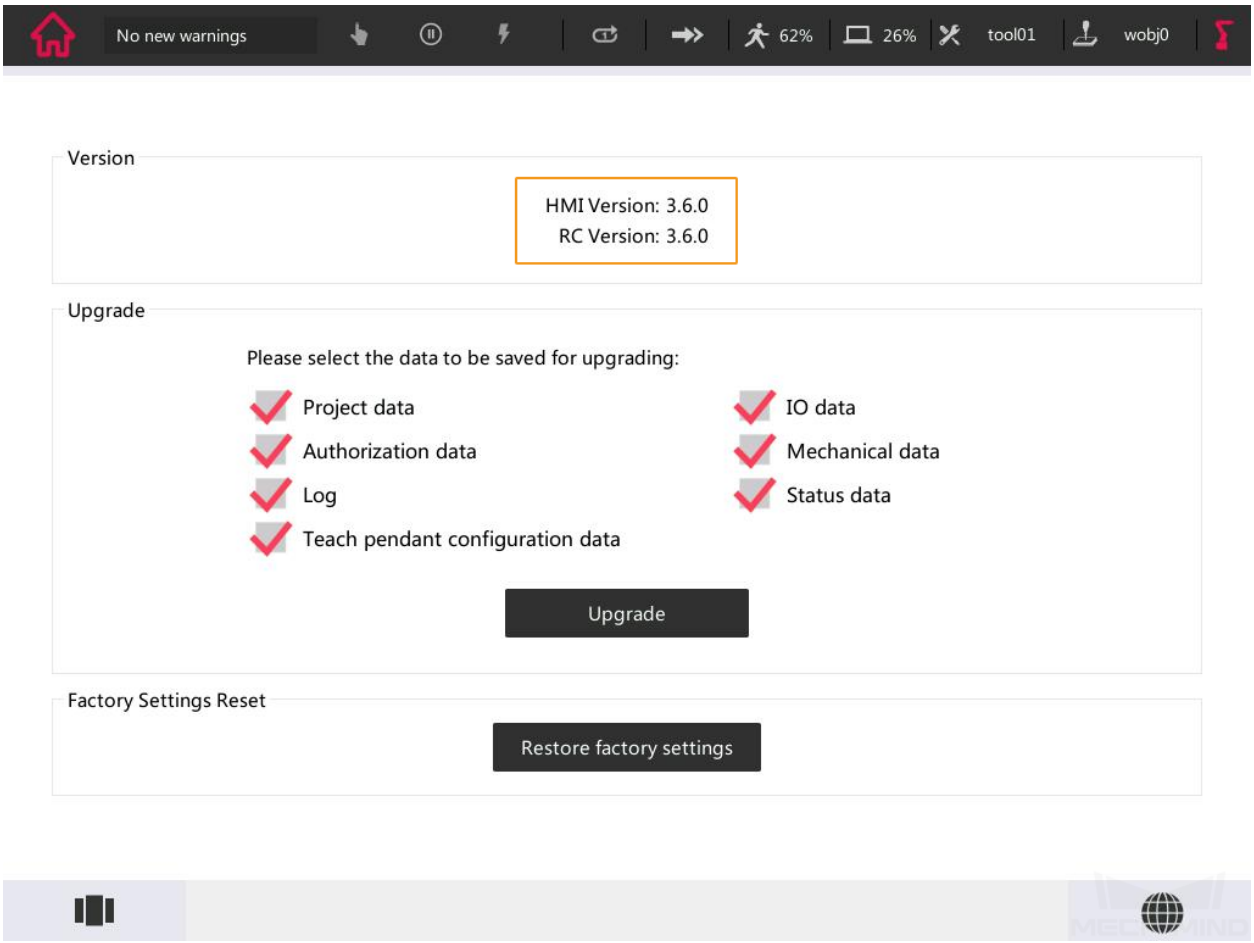
Turn the controller’ s power switch on, as shown below. If the controller is started successfully, a welcome interface will appear on the teach pendant.

CHAPTER 3

Check the Controller Version

On the teach pendant, press the icon in the upper left corner, and then press **Help** to check the version.




No new warnings
62%
26%
tool01
wobj0
Version
HMI Version: 3.6.0
RC Version: 3.6.0
Upgrade
Please select the data to be saved for upgrading:
Project data
Authorization data
Log
Teach pendant configuration data
IO data
Mechanical data
Status data
Upgrade
Factory Settings Reset
Restore factory settings

CHAPTER 4

Set up the Network Connection

4.1 Hardware Connection

Use the Ethernet cable to connect the network ports of the IPC and the robot controller.

4.2 IP Address Configuration

The default IP address of the ROKAE robot to communicate with the vision system is 192.168.2.160, which cannot be modified currently. Therefore, please modify the IP address of the IPC (192.168.2.222 is used in this example). Please refer to Set IP Address of the IPC for detailed instructions.

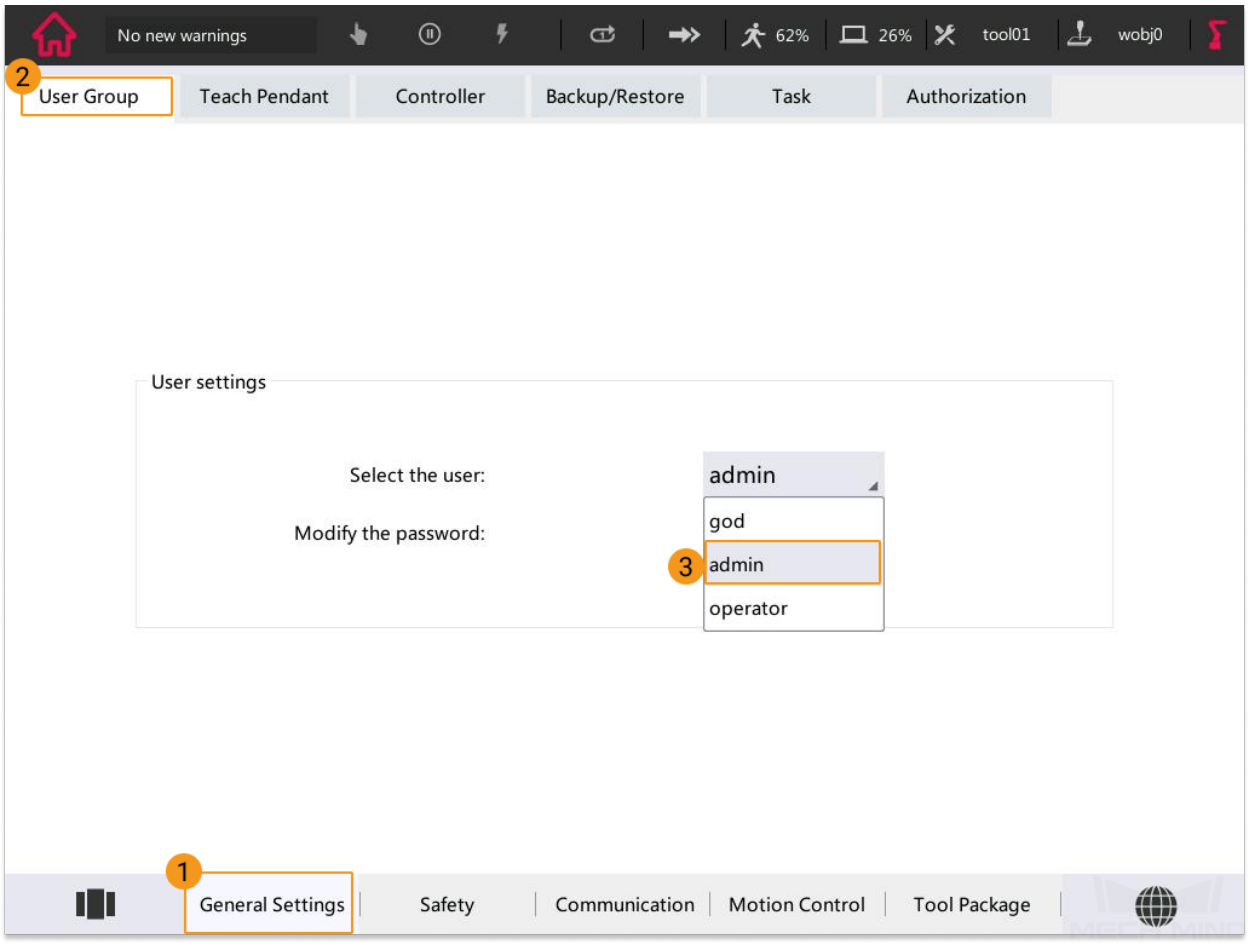
After modifying the IP address on the IPC, open the cmd command prompt of the IPC (by searching for cmd), enter "ping 192.168.2.160", and test whether the connection between the IPC and the robot is successful.

CHAPTER 5

Switch the User Type to Admin

An operator user does not have the right to manage files or operate. Therefore, please switch to the admin user.

1. On the teach pendant, press the icon in the upper left corner, and then press **Settings**.
2. Press *General Settings* → *User Group*, and select **admin**.



1. Enter the password **123456** in the pop-up window.

CHAPTER 6

Prepare the Files

1. On the IPC, open the `Mech-Center/Robot_Server/Robot_FullControl/rokae` folder in the installation directory of Mech-Mind Software Suite.

   Attention: There are three subfolders in the *rokae* folder.

   - *singleTask5* contains commonly-used projects which support robot motion control and DO receiving. In this section, singleTask5 is used as an example.
   - *splineCurve* is an upgraded version of *singleTask5*. It is specifically developed for gluing applications. When running the program, please select either singleTask5 or splineCurve.
   - *getDIServer* is an integral service program to receive robot DI. If you want to use singleTask5 and getDIServer at the same time, the multitasking function should be enabled on the robot end. For detailed instructions, please refer to *Enable Multitasking*.

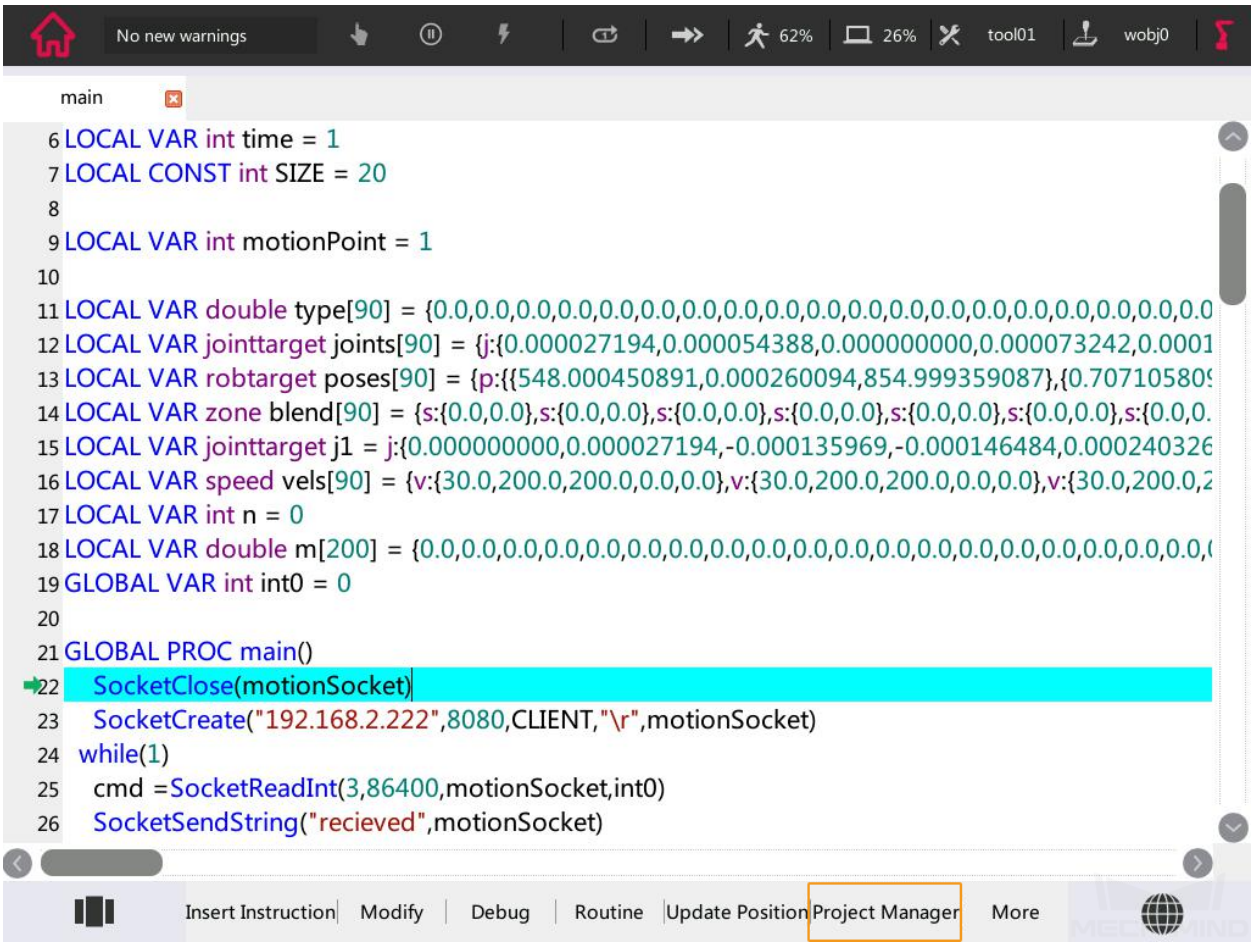
2. Plug the USB flash drive into the USB port of the IPC. Copy the **rokae** folder to the USB flash drive and then remove the USB flash drive safely.

CHAPTER 7

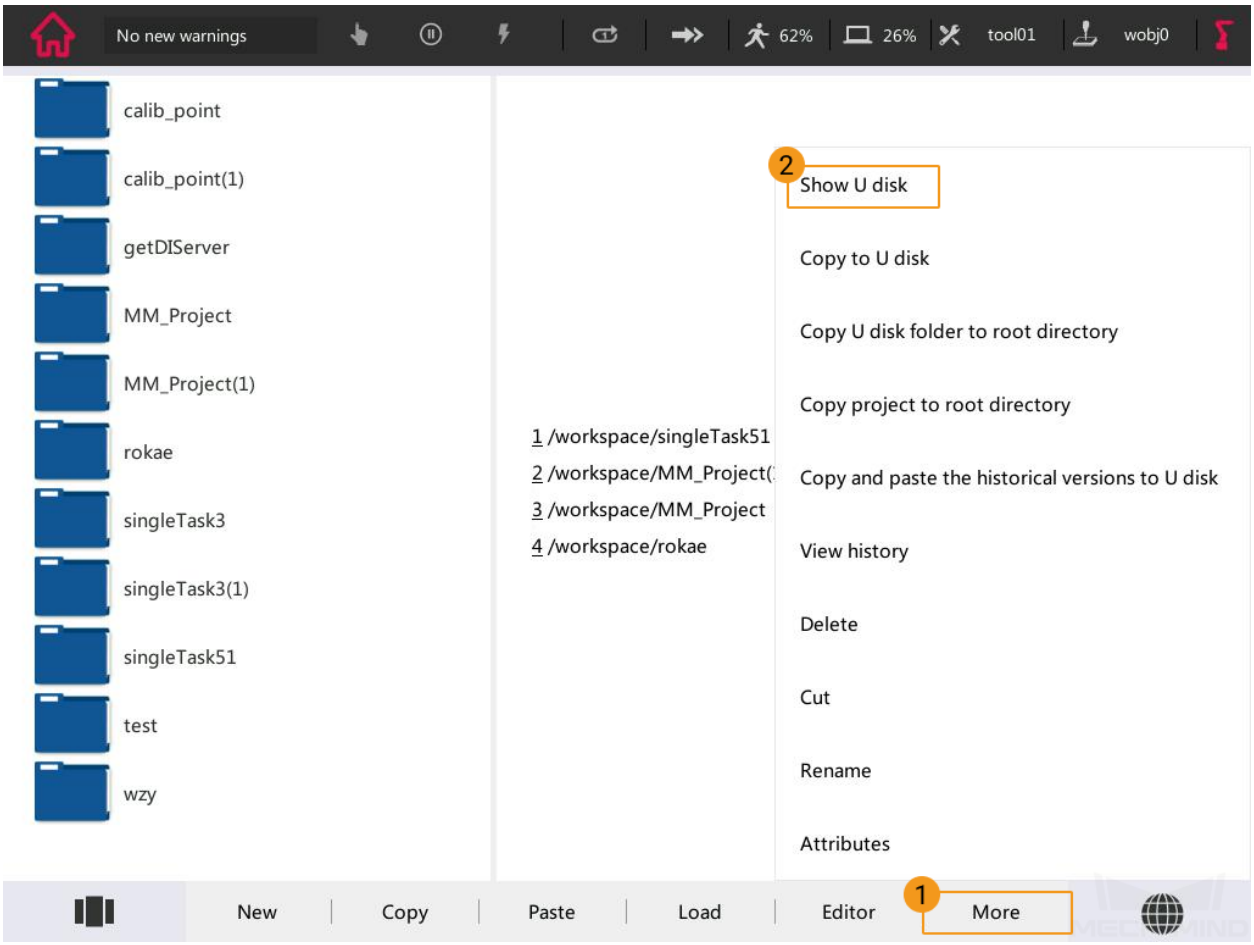
Load the Files to the Robot

Attention: 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. Please refer to *Backup and Restore Robot Files* for detailed instructions.

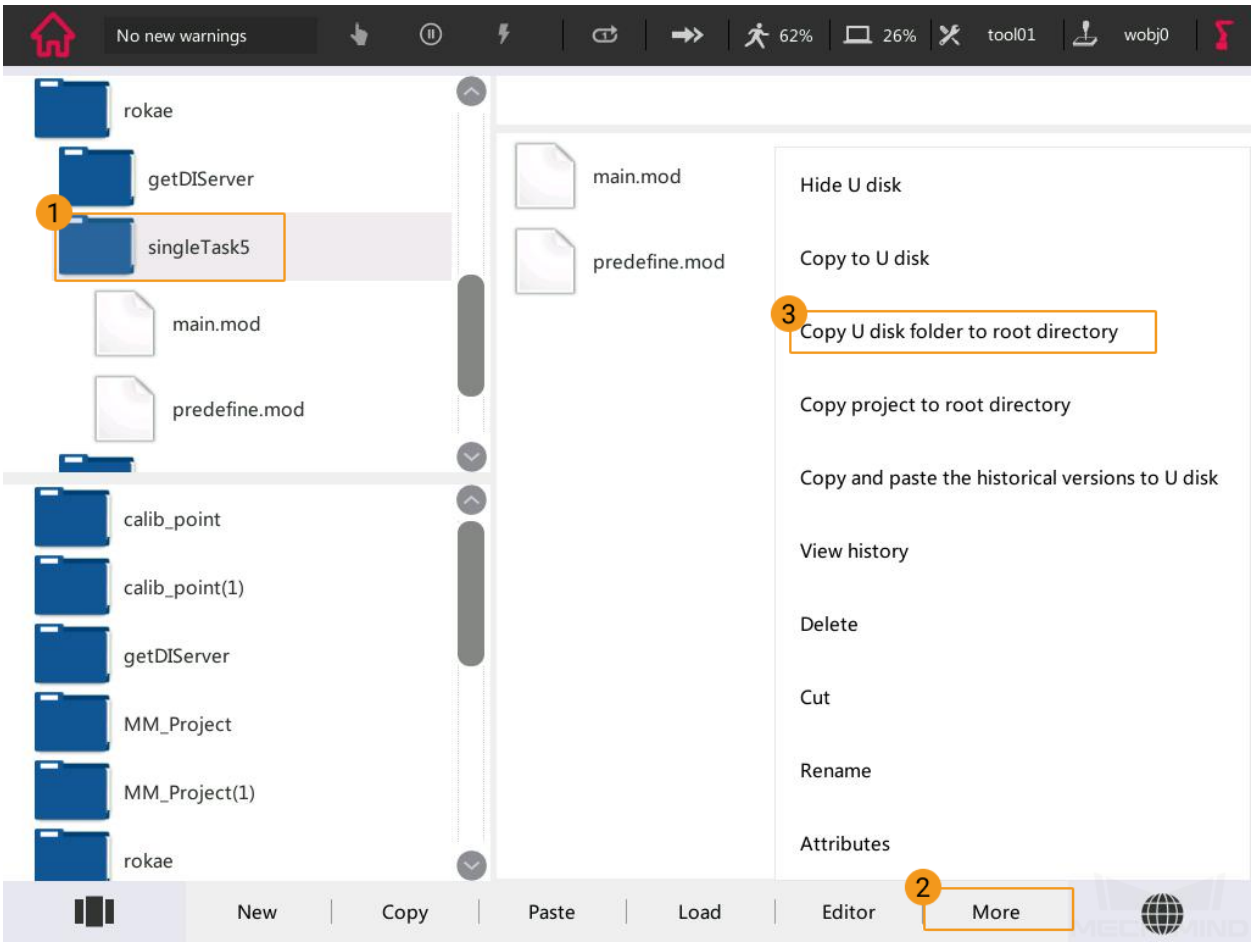
1. Plug the USB flash drive with the program files into the USB port on the robot controller.
2. On the teach pendant, press the icon in the upper left corner, and then press **Project**.
3. Press **Project Manager**.



4. Press **More** and select **Show U disk**.



5. Select the **singleTask5** folder in the flash drive, press **More**, and select **Copy U disk folder to root directory**.

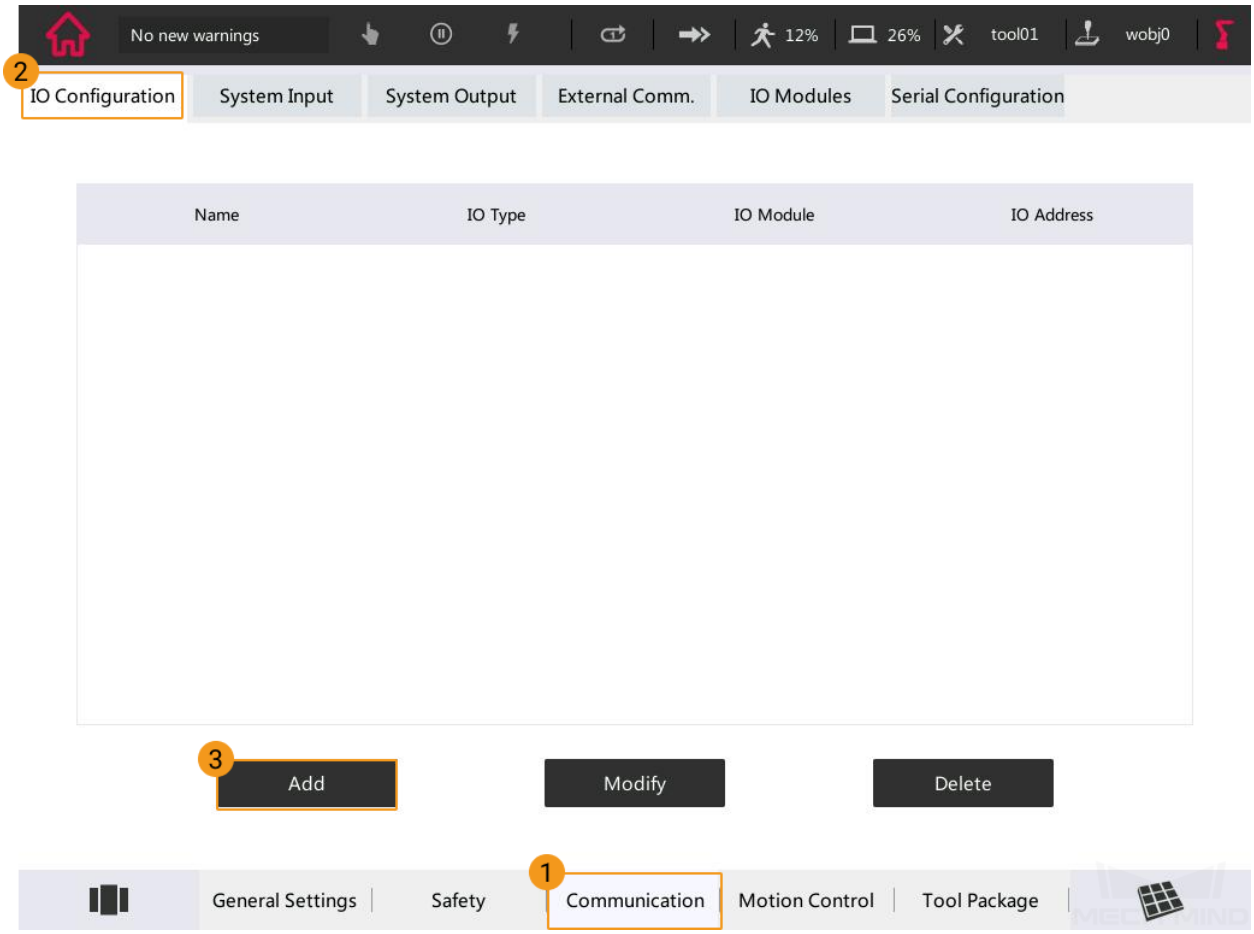


Once pasted successfully, the singleTask5 folder can be found in the file browser at the bottom left.

CHAPTER 8

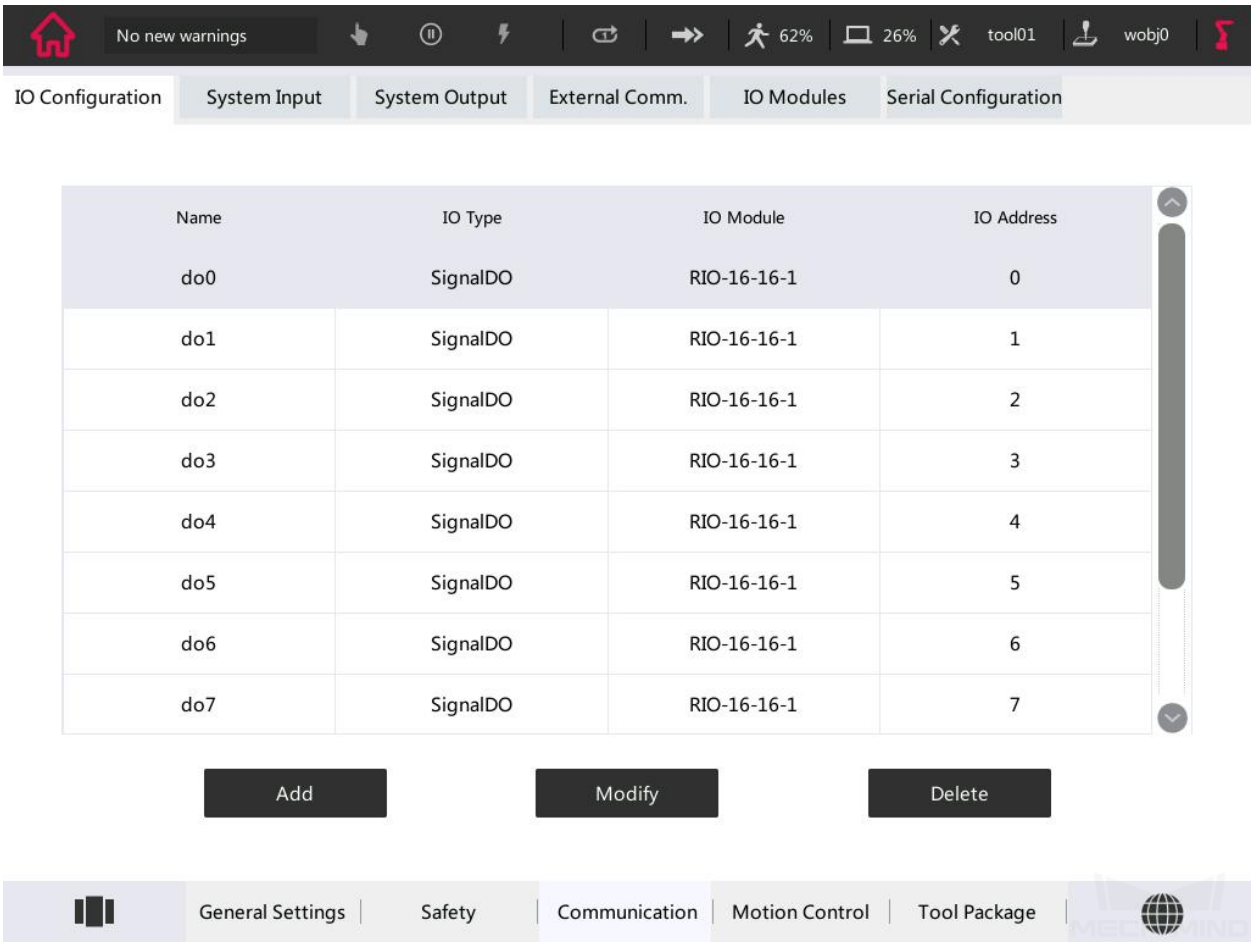
Configure Robot I/O

1. On the teach pendant, press the icon in the upper left corner, and then press **Settings**.
2. Press *Communication* → *IO Configuration* → *Add* in turn.



3. Add do0, and the specific options are shown below.

Similarly, add do0 to do7. The final result is shown in the figure below.


No new warnings
62%
26%
tool01
wobj0
IO Configuration
System Input
System Output
External Comm.
IO Modules
Serial Configuration
Name
IO Type
IO Module
IO Address
do0
SignalDO
RIO-16-16-1
0
do1
SignalDO
RIO-16-16-1
1
do2
SignalDO
RIO-16-16-1
2
do3
SignalDO
RIO-16-16-1
3
do4
SignalDO
RIO-16-16-1
4
do5
SignalDO
RIO-16-16-1
5
do6
SignalDO
RIO-16-16-1
6
do7
SignalDO
RIO-16-16-1
7
Add
Modify
Delete
General Settings
Safety
Communication
Motion Control
Tool Package

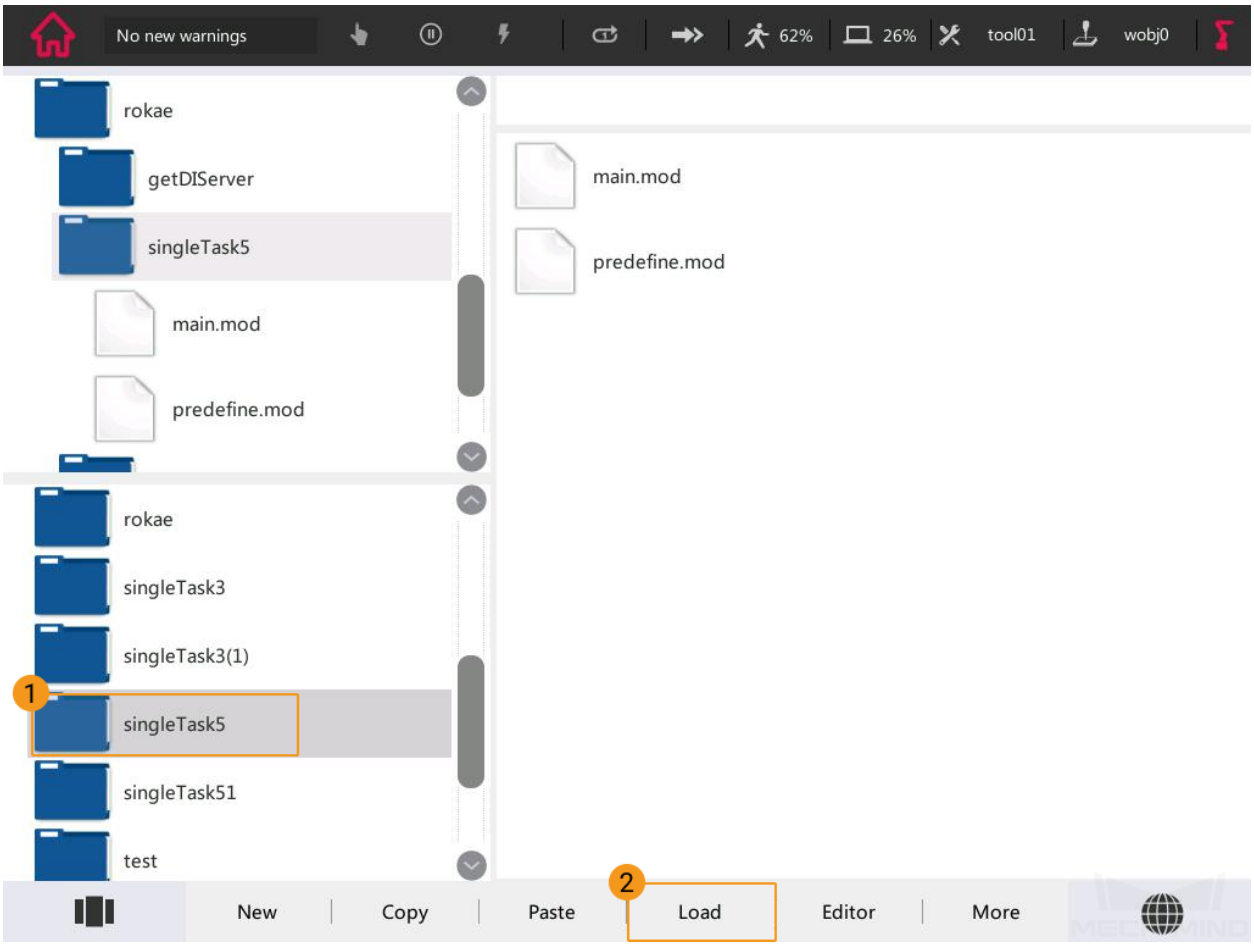
CHAPTER 9

Test Robot Connection

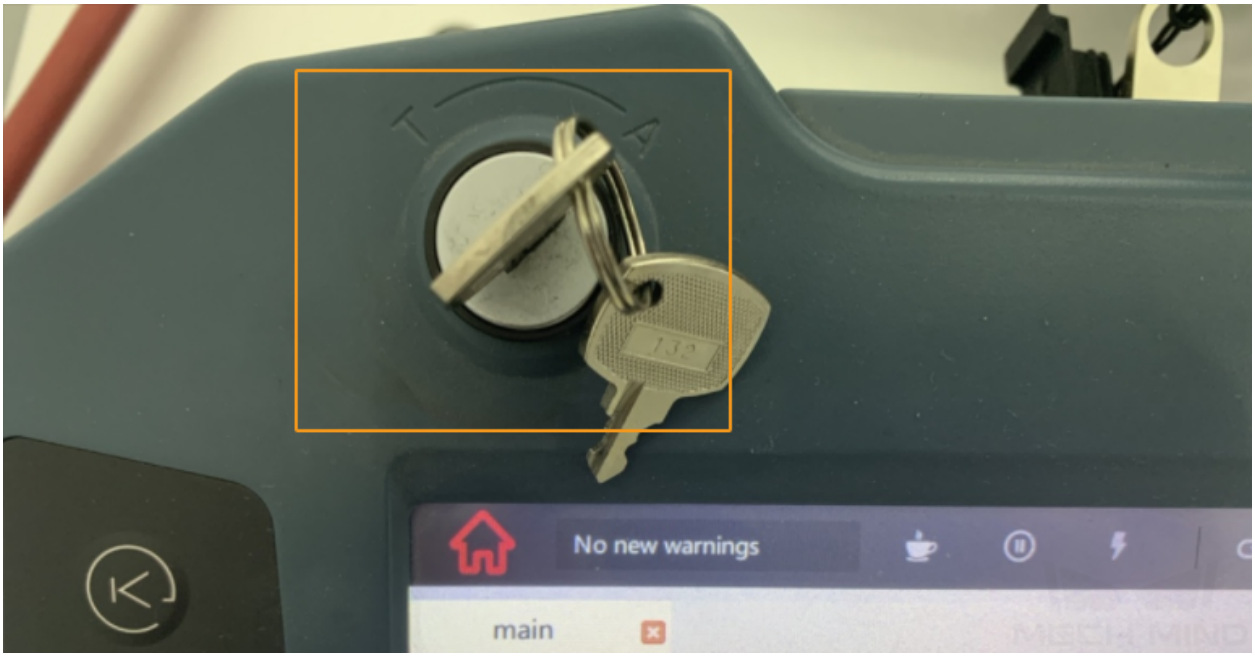
Before running the Master-Control program, please ensure you have configured robot in Mech-Viz and configured settings in Mech-Center. The **Host IP address** in Robot Server should be set to **192.168.2.160**. For detailed instructions, please refer to test_robot_connection.

In the main interface of Mech-Center, click **Connect Robot** in the toolbar. The loading and running process should be completed in 120 seconds, or else you should click **Connect Robot** in the toolbar again.

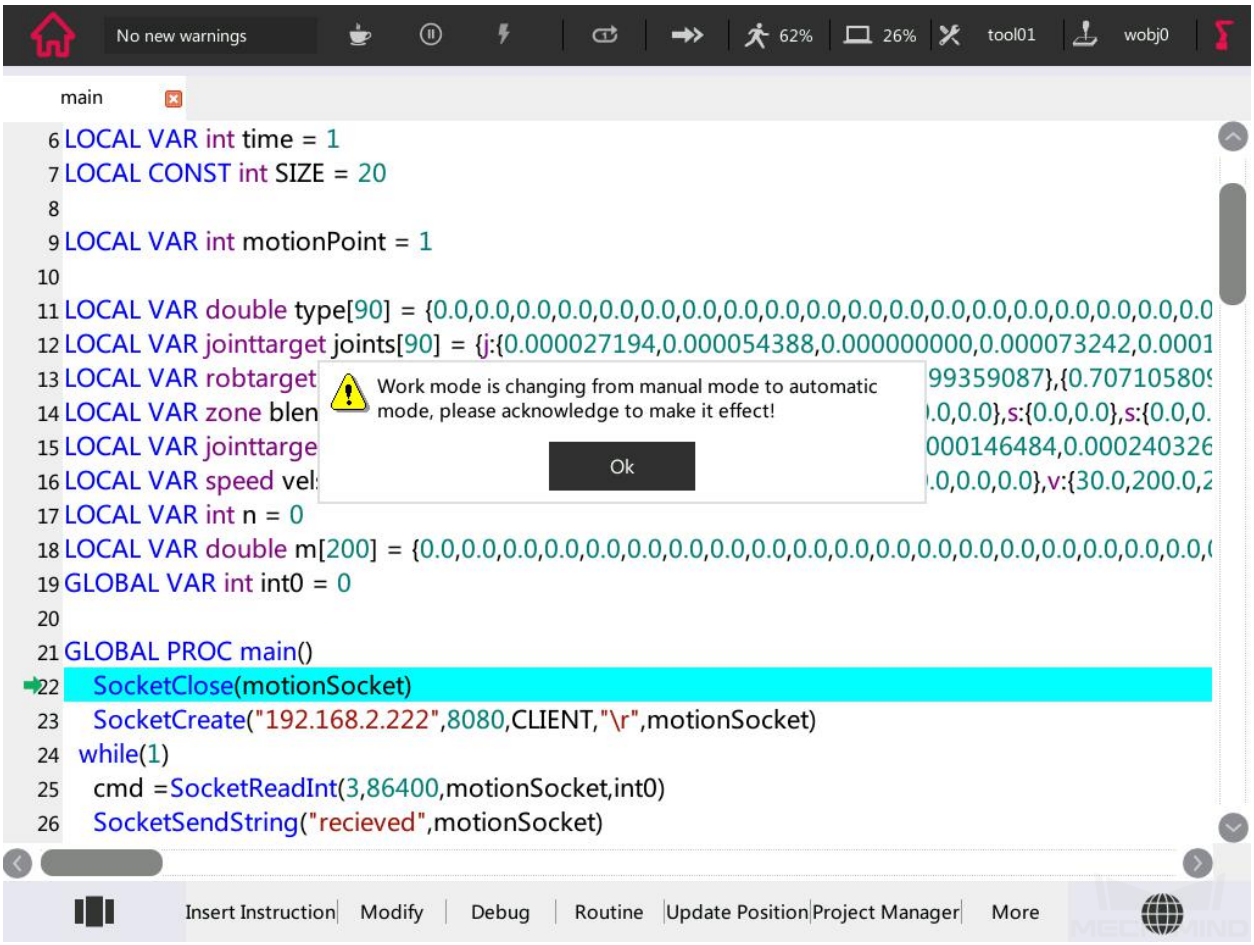
1. Select the local singleTask5 folder, and press **Load**.



2. Switch the teaching mode to automatic mode. The figure below shows the teach pendant in the automatic mode.

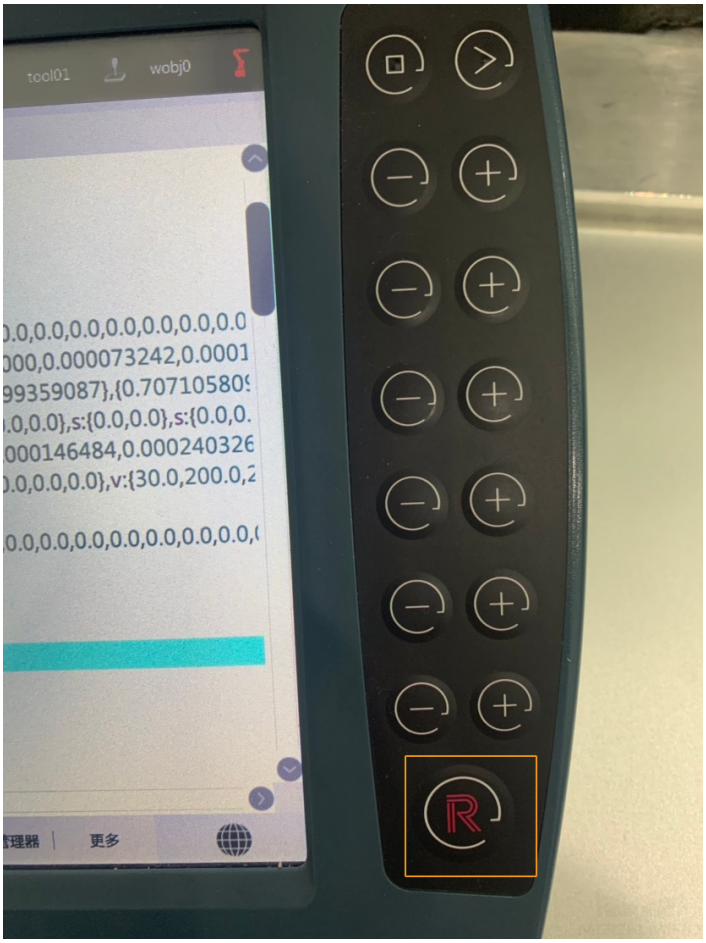


Select **Ok** in the pop-up window as shown below.

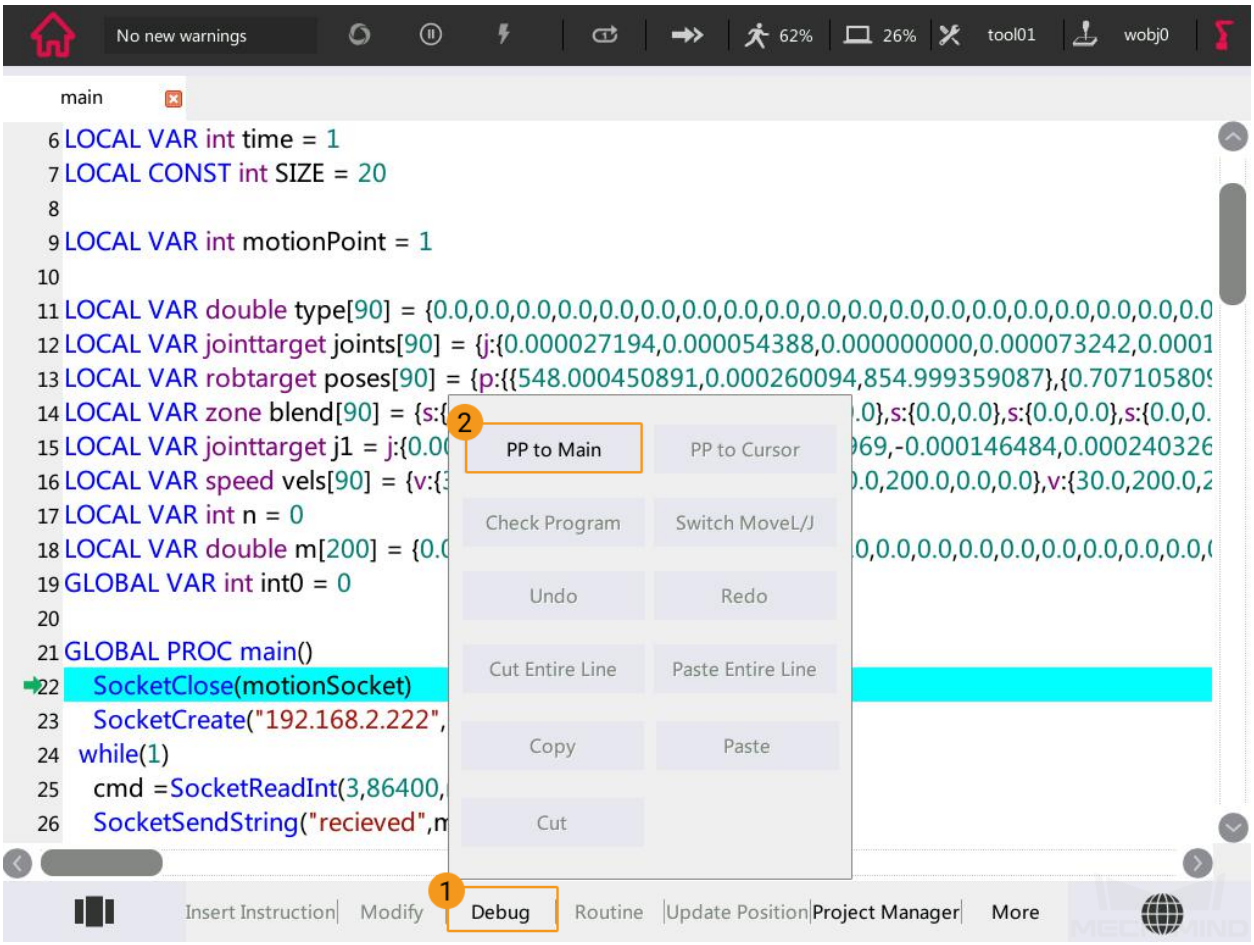


3. Press the button as shown in the figure below. If the once-flashing indicator light turns to be always on, the servo is successfully turned on in the automatic mode.

4. Press the button as shown in the figure below to power on the robot.

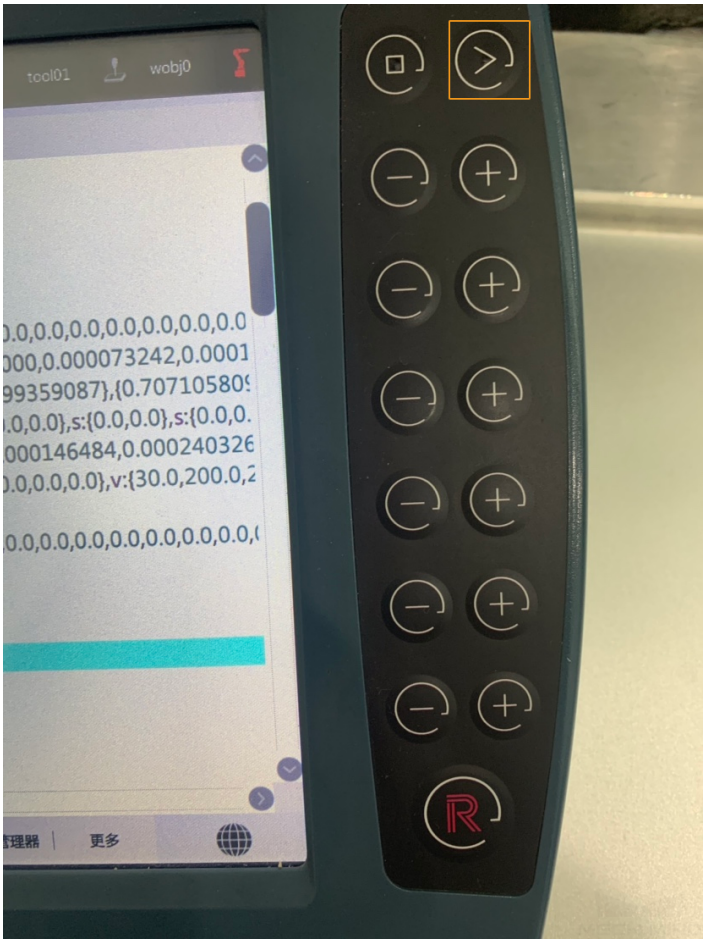


5. Press **Debug** and select **PP to Main**.



6. Click the icon as shown below to adjust the program' s running speed.

7. Press the button as shown below to run the program.



If the robot is connected successfully, a message saying **Robot: server connected to the robot** shows up in the **Log** panel of Mech-Center.

8. Please refer to the last part in test_robot_connection to move the robot.

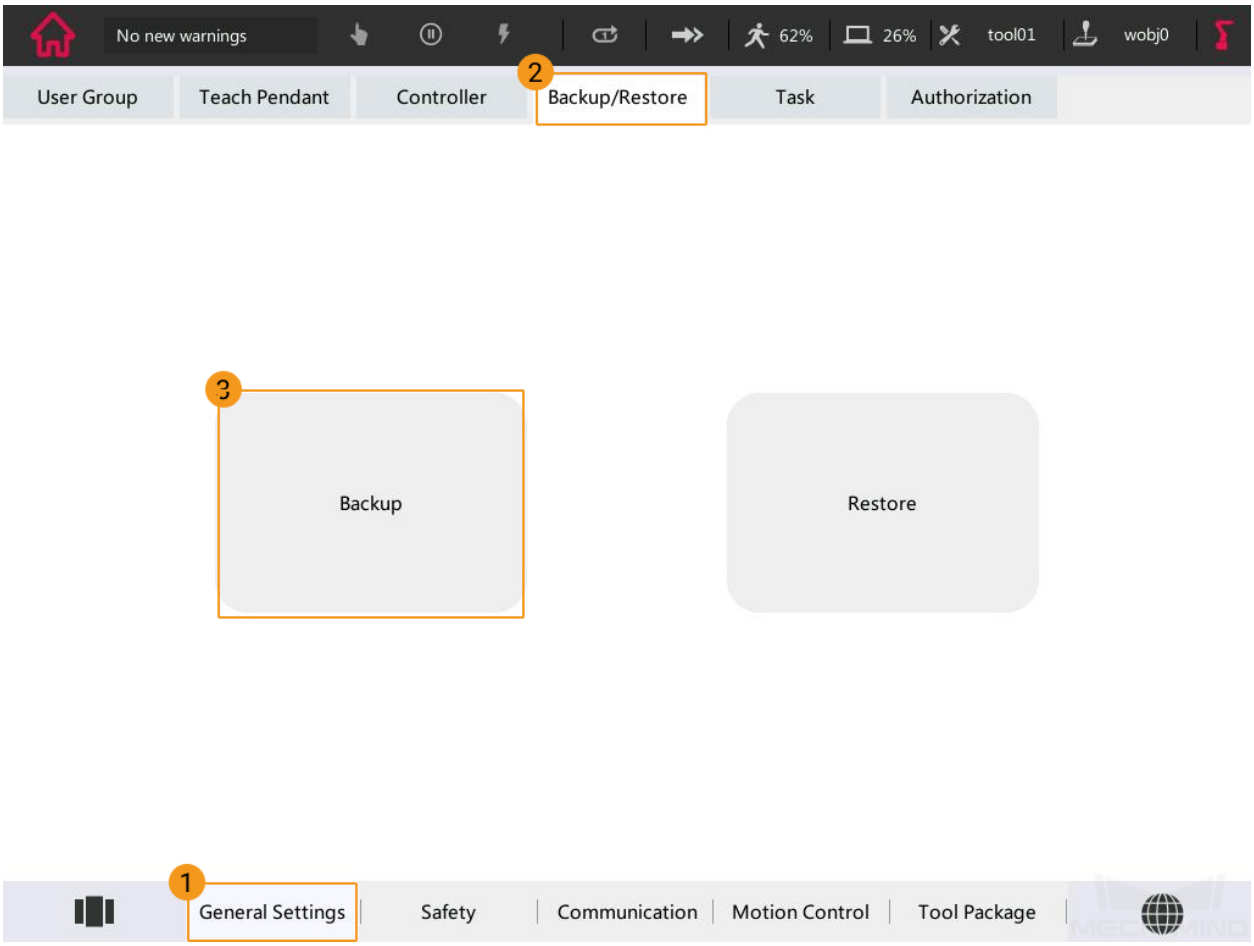
CHAPTER 10

Common Operations

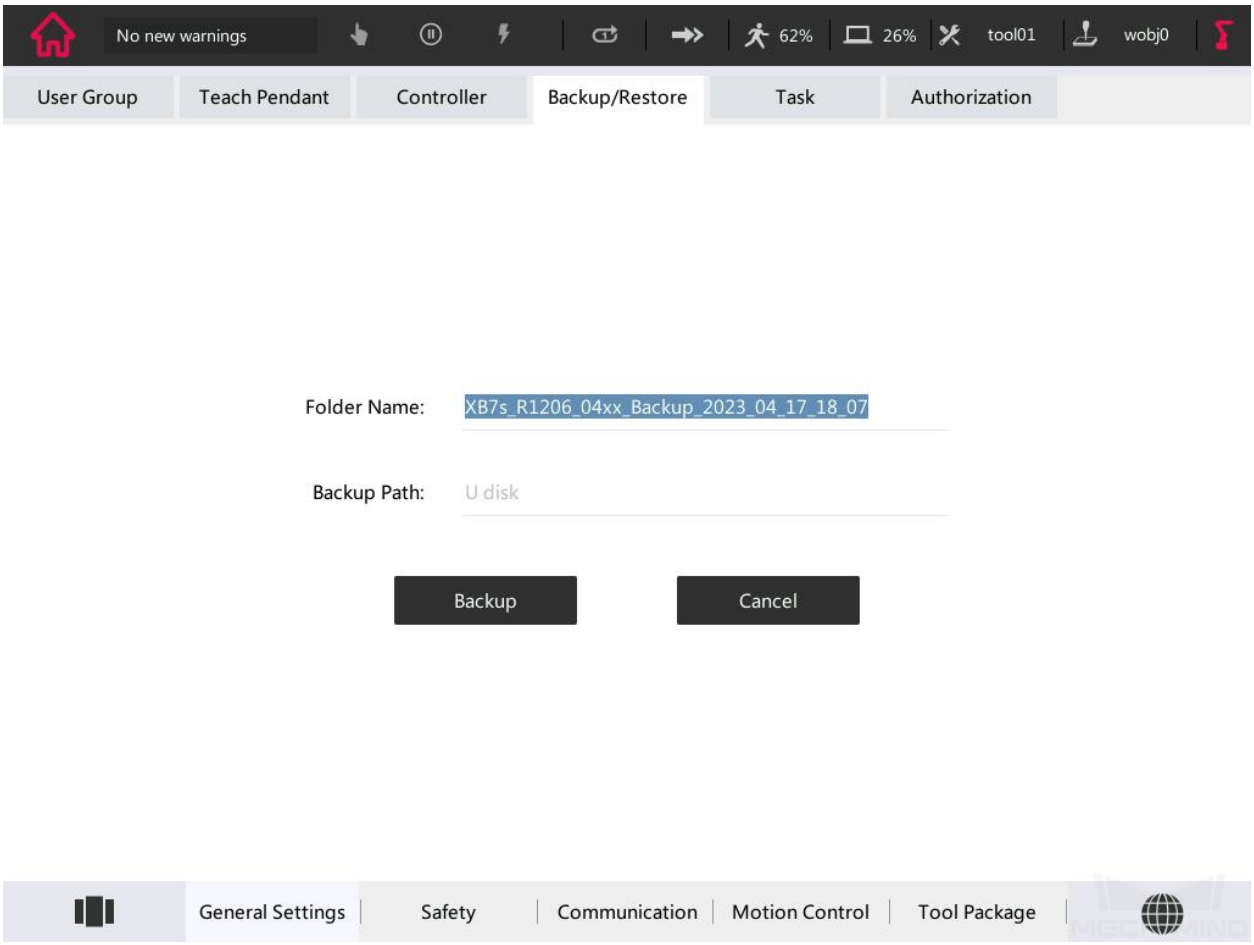
10.1 Backup and Restore Robot Files

10.1.1 Backup

1. Plug the USB flash drive into the USB port on the robot controller.
2. On the teach pendant, press the icon in the upper left corner, and then press **Settings**.
3. Press *General Settings* → *Backup/Restore*, and select **Backup**.

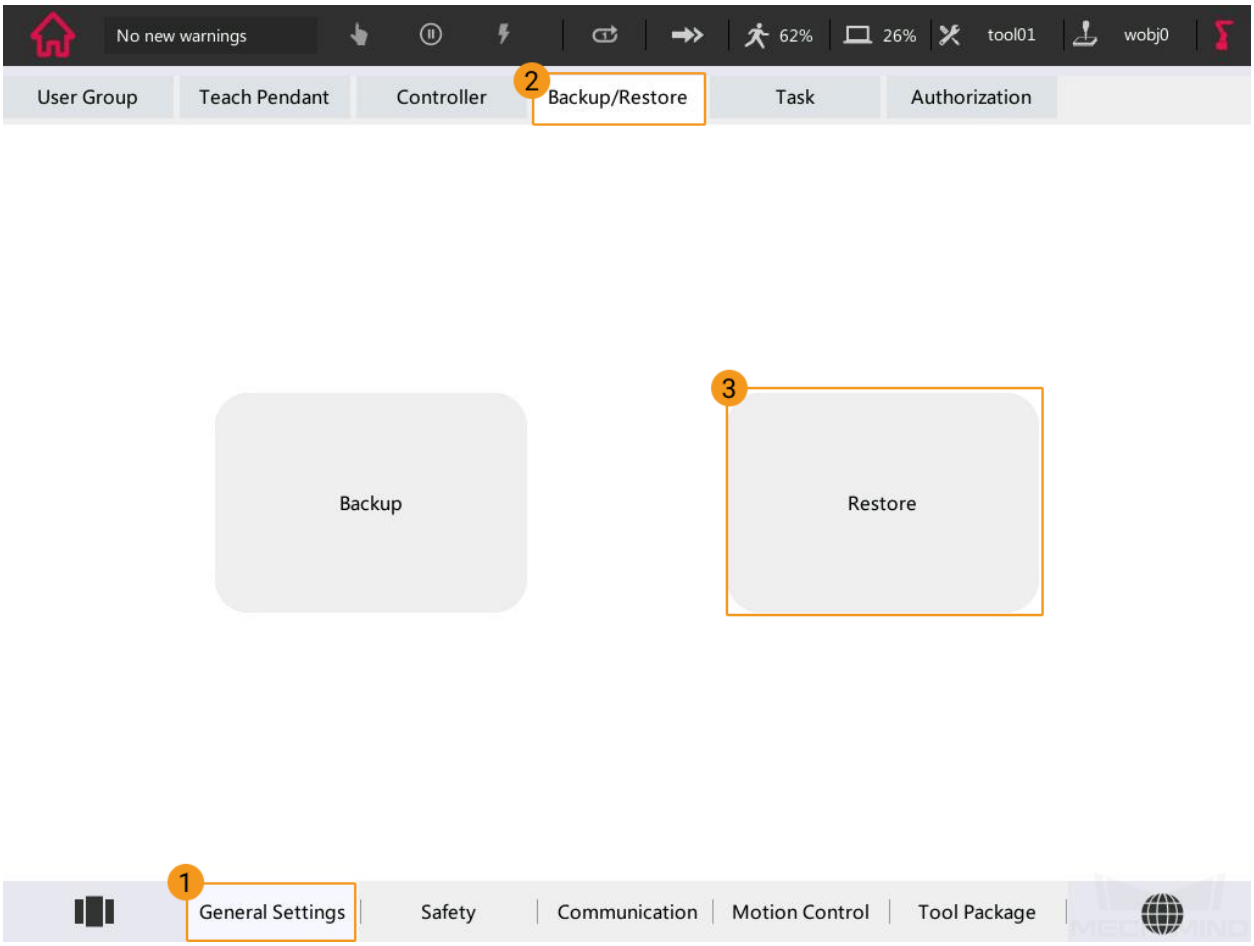


4. Select **Backup** in the pop-up window.

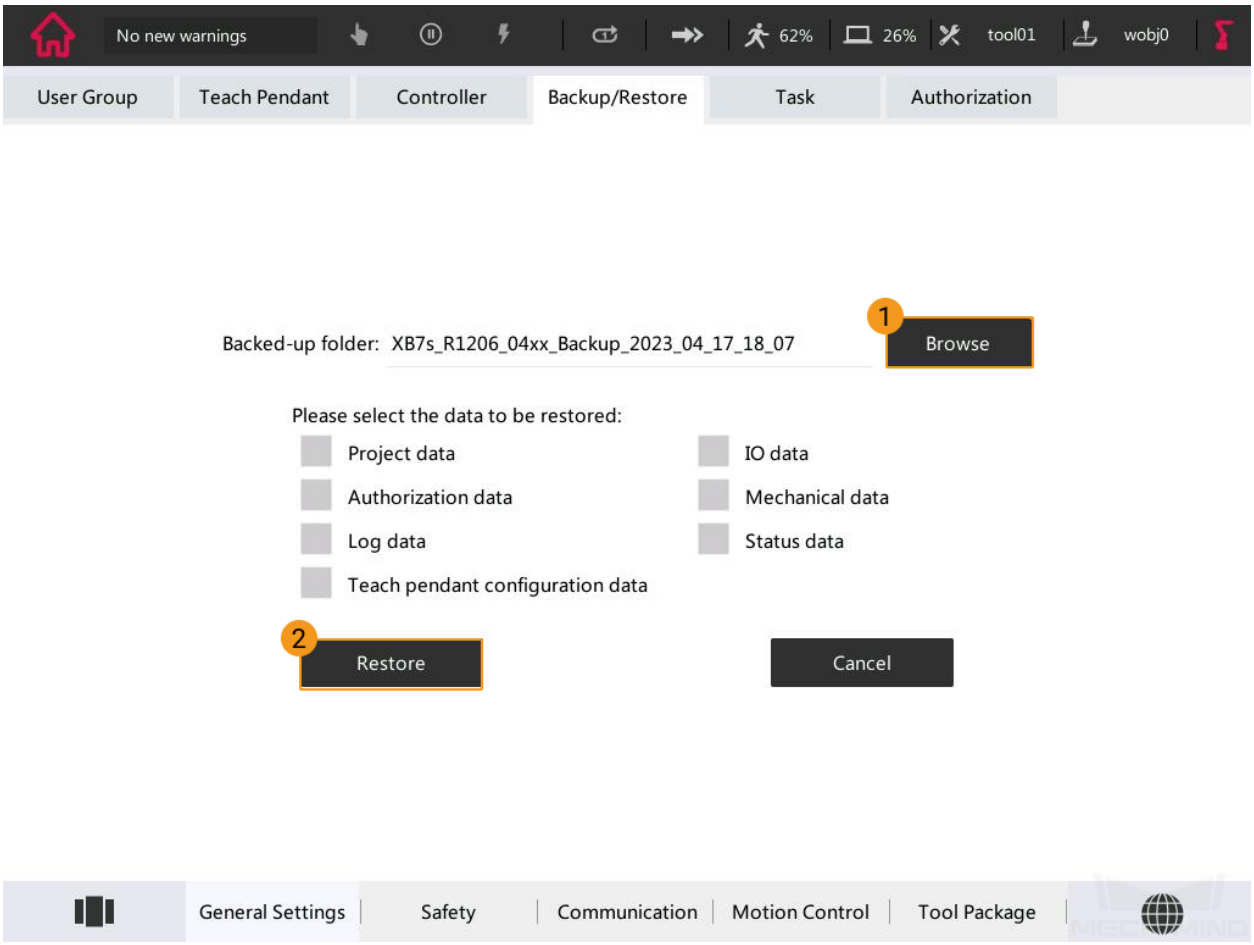


10.1.2 Restore

1. Press *General Settings* → *Backup/Restore*, and select **Restore**.



2. In the pop-up window, press **Browse** to select the directory where the backup file is stored. Then select the data to be restored according to the actual requirement, and press **Restore**.

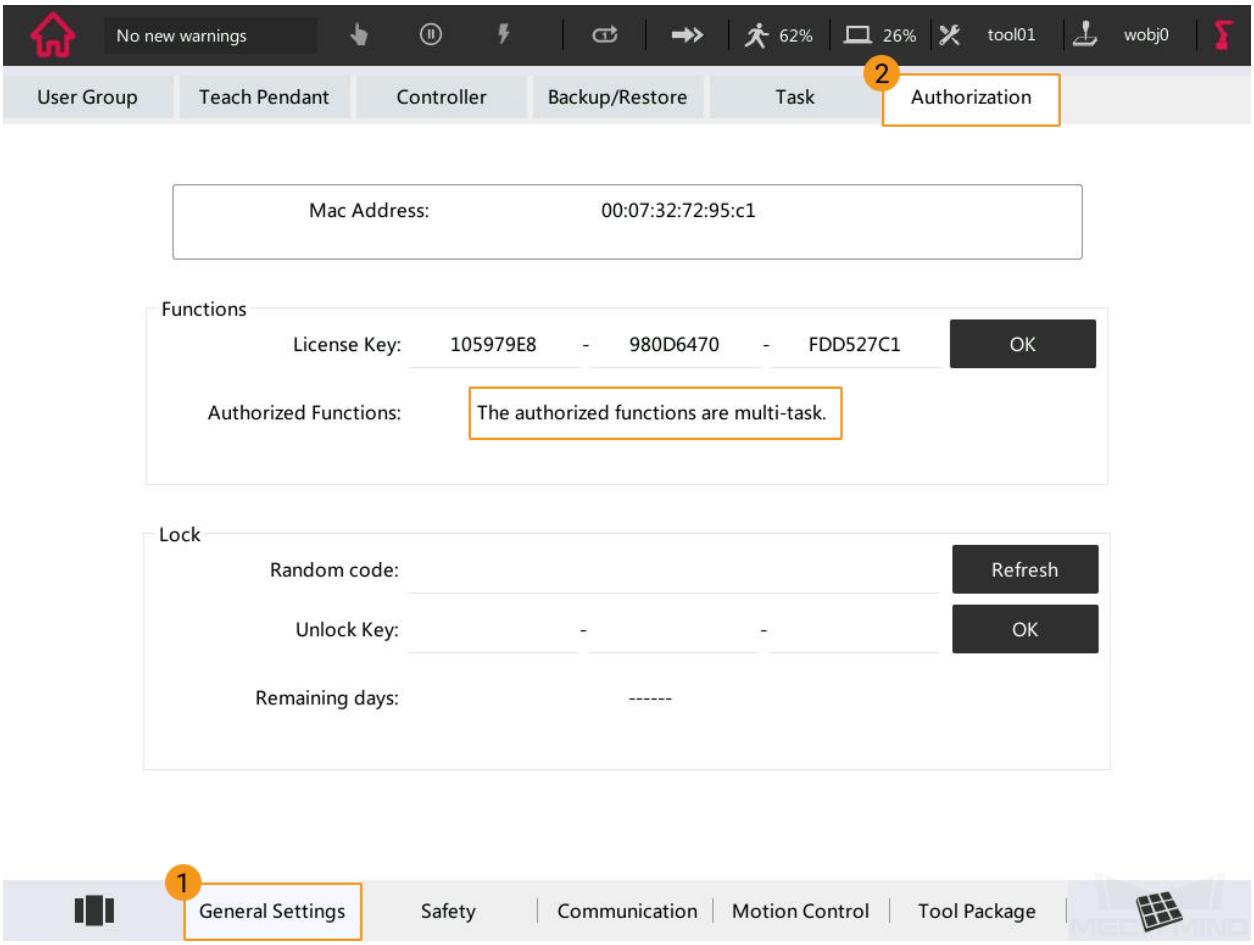


Enable Multitasking

Confirm Whether the Robot Supports Multitasking

By default, ROKAE robots do not support multitasking. To enable multitasking, you need to request a license key (a string of keys based on MAC address encryption) from the manufacturer.

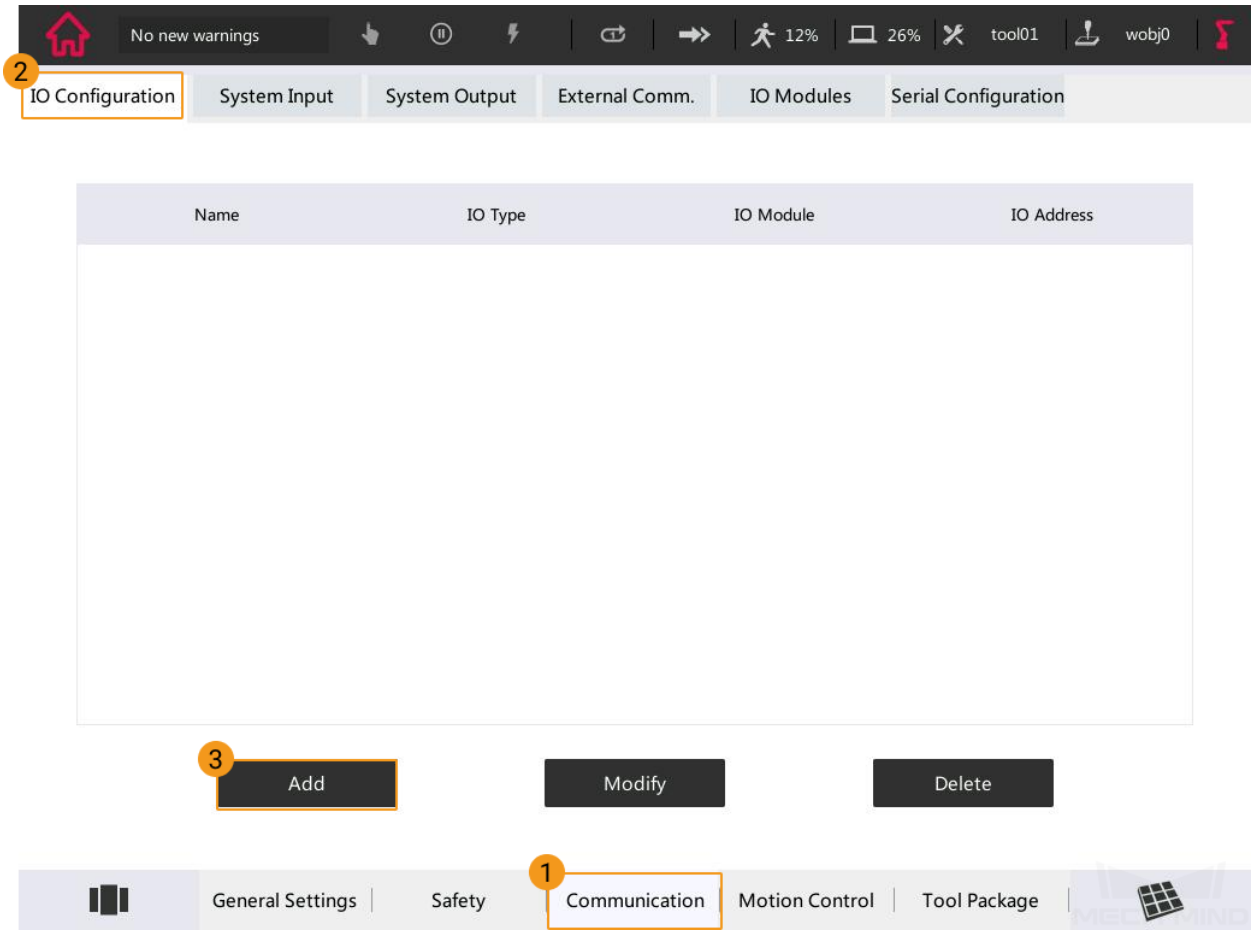
1. On the teach pendant, press the icon in the upper left corner, and then press **Settings**.
2. Press *General Settings* → *Authorization* and check whether there is an authorized function.



If there is not an authorized function. You need to contact the robot manufacturer to request a license key and enter it in the corresponding text box.

Configure getDIServer and singleTask5 Tasks

1. Copy and paste **singleTask5** and **getDIServer** to the robot system. Please refer to *Prepare the Files* for detailed instructions.
2. Add gi0.
   a. On the teach pendant, press the icon in the upper left corner, and then press **Settings**.
   b. Press *Communication* → *IO Configuration* → *Add*.

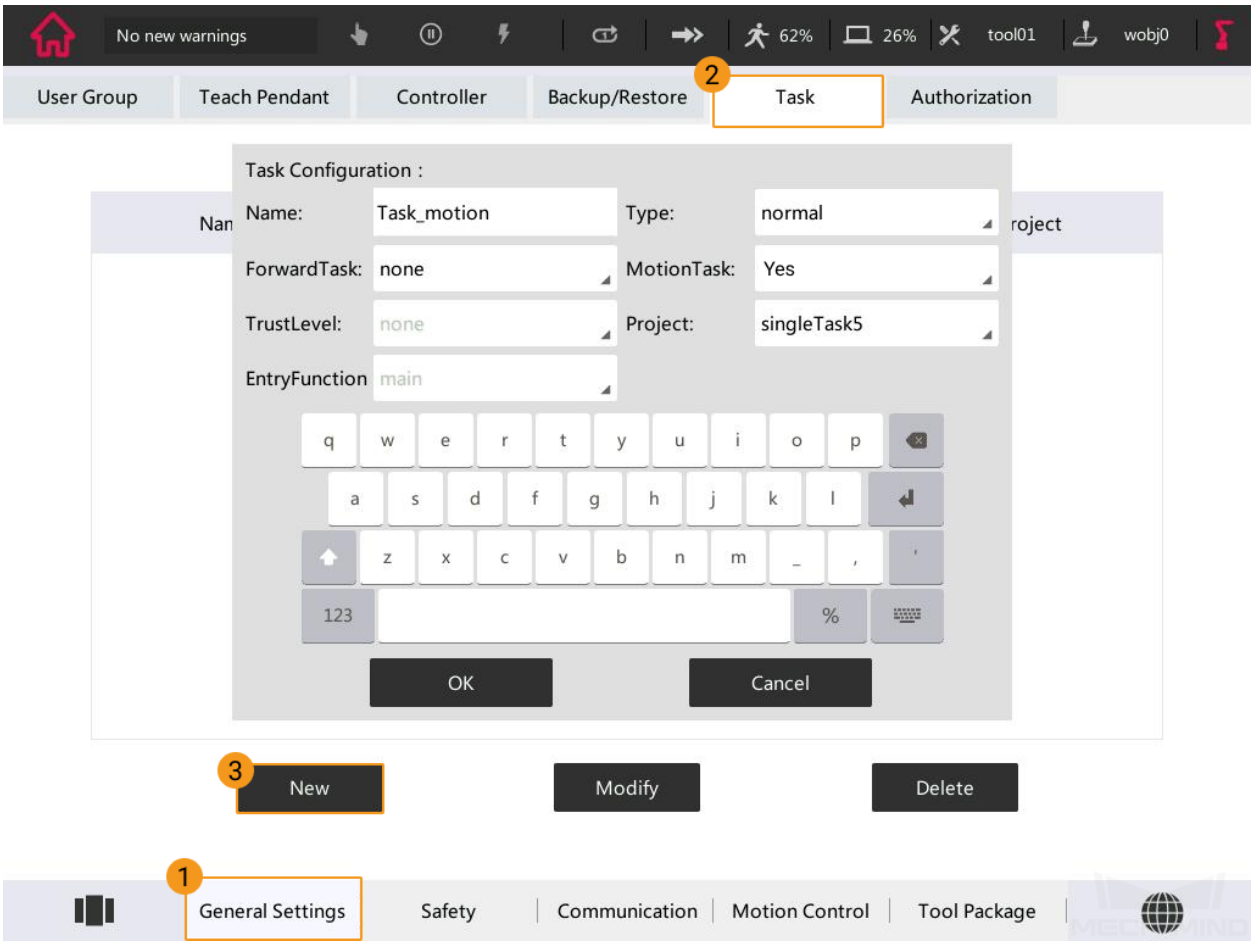


c. Configure the options as shown in the figure below, and press **OK**.

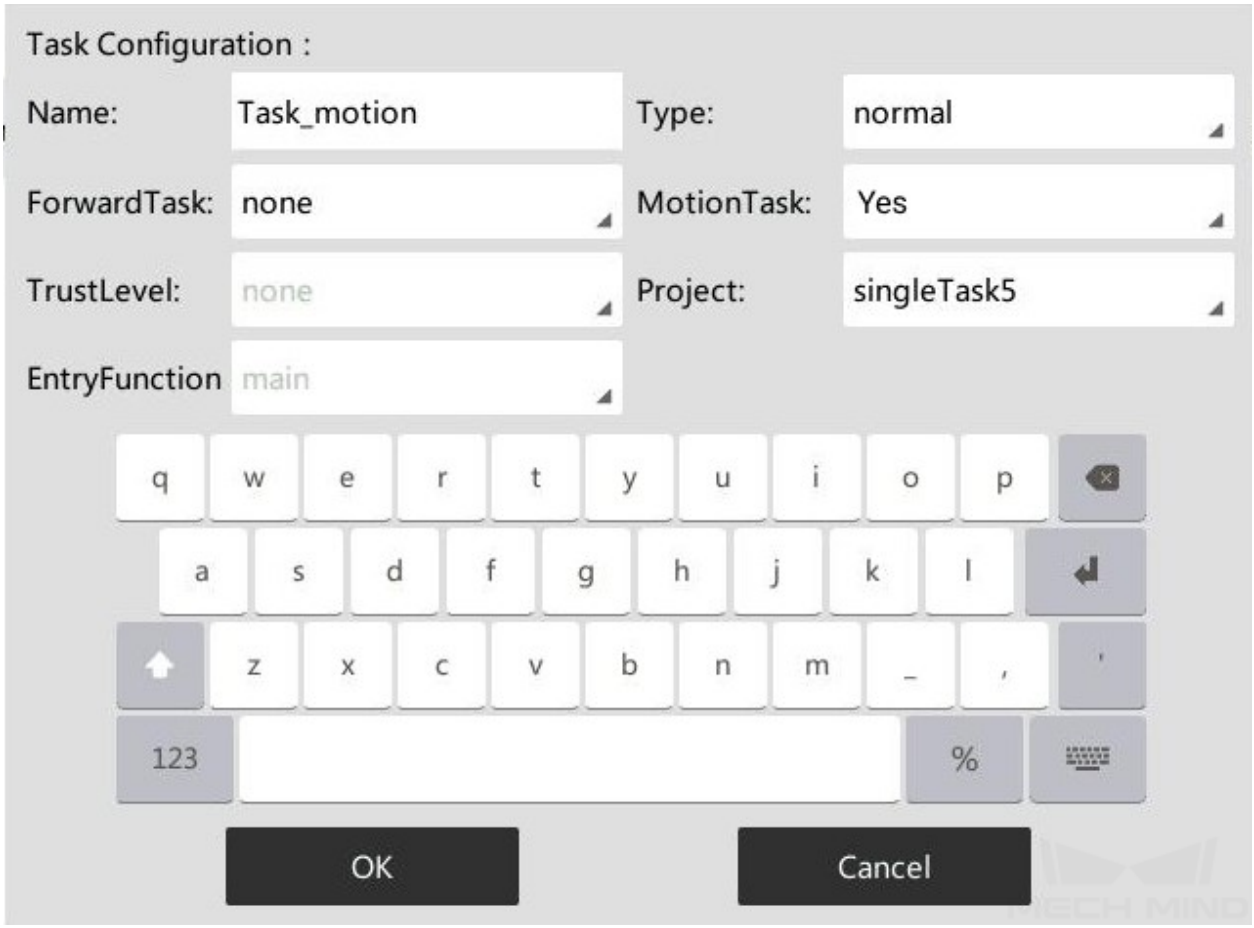
3. Configure tasks and parameters.

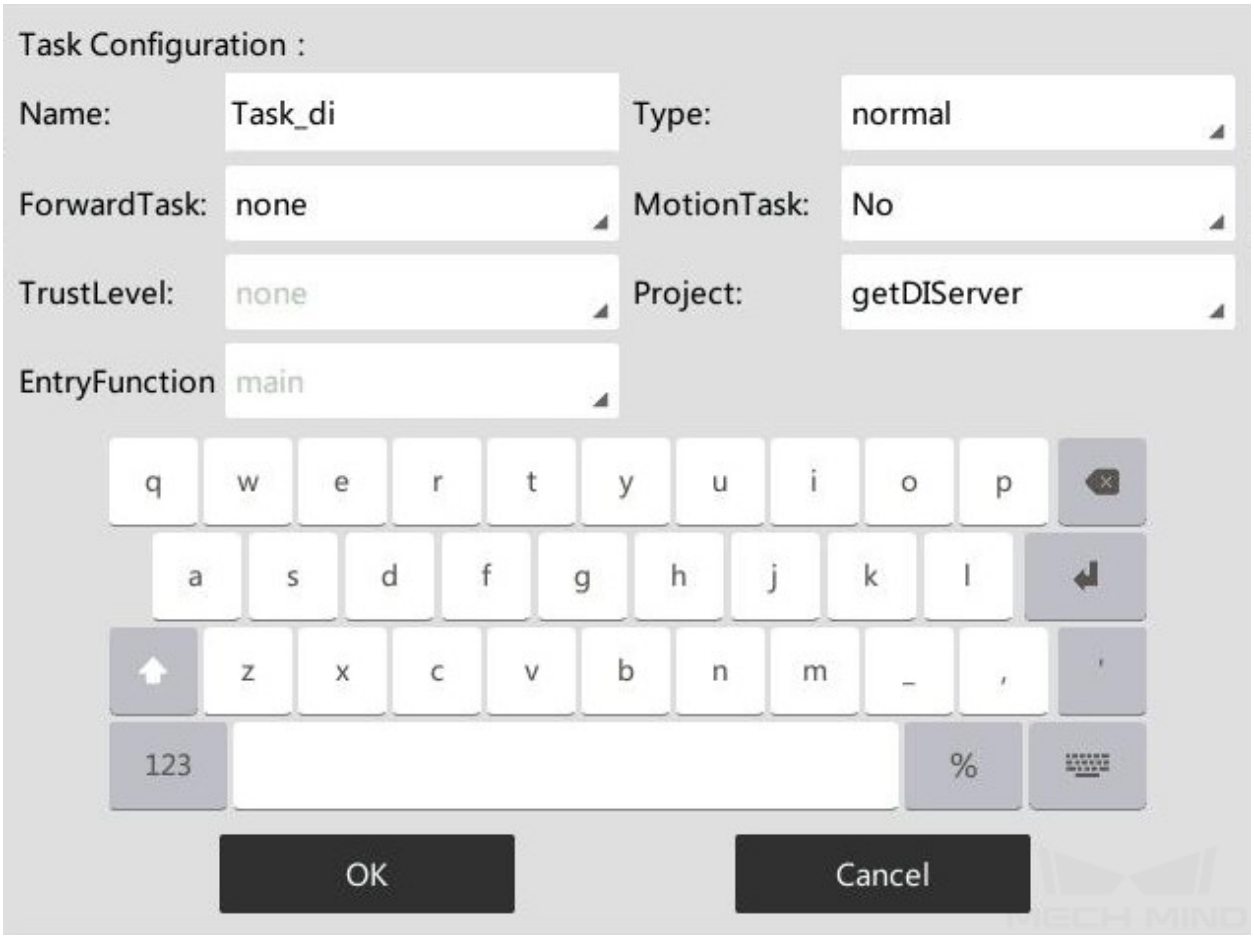
   a. On the teach pendant, press the icon in the upper left corner, and then press **Settings**.

   b. Press *General Settings* → *Task* → *New*.



c. Configure the two tasks as shown in the figure below, and click **OK**.


Task Configuration :
Name:
Task_motion
Type:
normal
ForwardTask:
none
MotionTask:
Yes
TrustLevel:
none
Project:
singleTask5
EntryFunction
main
q w e r t y u i o p
a s d f g h j k l
z x c v b n m _ ,
123
%
OK
Cancel



Please refer to *Test Robot Connection* to learn about how to run the tasks.