Mech-Mind User’s Manual

Mech-Mind

Mar 06, 2023

CONTENTS

1 Check Controller and Software Compatibility 2

2 Setup the Network Connection 3
- 2.1 Hardware Connection . . . 3
- 2.2 Change the Protecting Level . . . 3
- 2.3 IP Configuration . . . 8

3 Load the Program Files 11
- 3.1 Prepare the Files . . . 11
- 3.2 Load the File to the Robot . . . 11
- 3.3 Convert the Program File . . . 18
- 3.4 Designate the Program . . . 23
- 3.5 Start the robot . . . 33

4 Test Robot Connection 35
- 4.1 Configure Robot in Mech-Viz . . . 35
- 4.2 Configure Settings in Mech-Center . . . 35
- 4.3 Connect to Robot in Mech-Center . . . 35
- 4.4 Move the Robot . . . 36

This section introduces the process of loading the robot master-control program onto an NACHI robot. The process consists of the following steps:

- *Check Controller and Software Compatibility*
- *Setup the Network Connection*
- *Load the Program Files*
- *Test Robot Connection*

Please have a flash drive ready at hand.

CHAPTER

ONE

CHECK CONTROLLER AND SOFTWARE COMPATIBILITY

- There is no specific requirements on the version of robot controller.
- It is recommended to use Mech-Mind Software Suite of the lastest version.

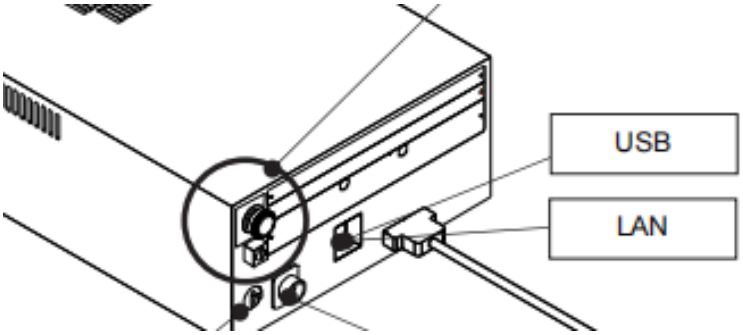
CHAPTER

TWO

SETUP THE NETWORK CONNECTION

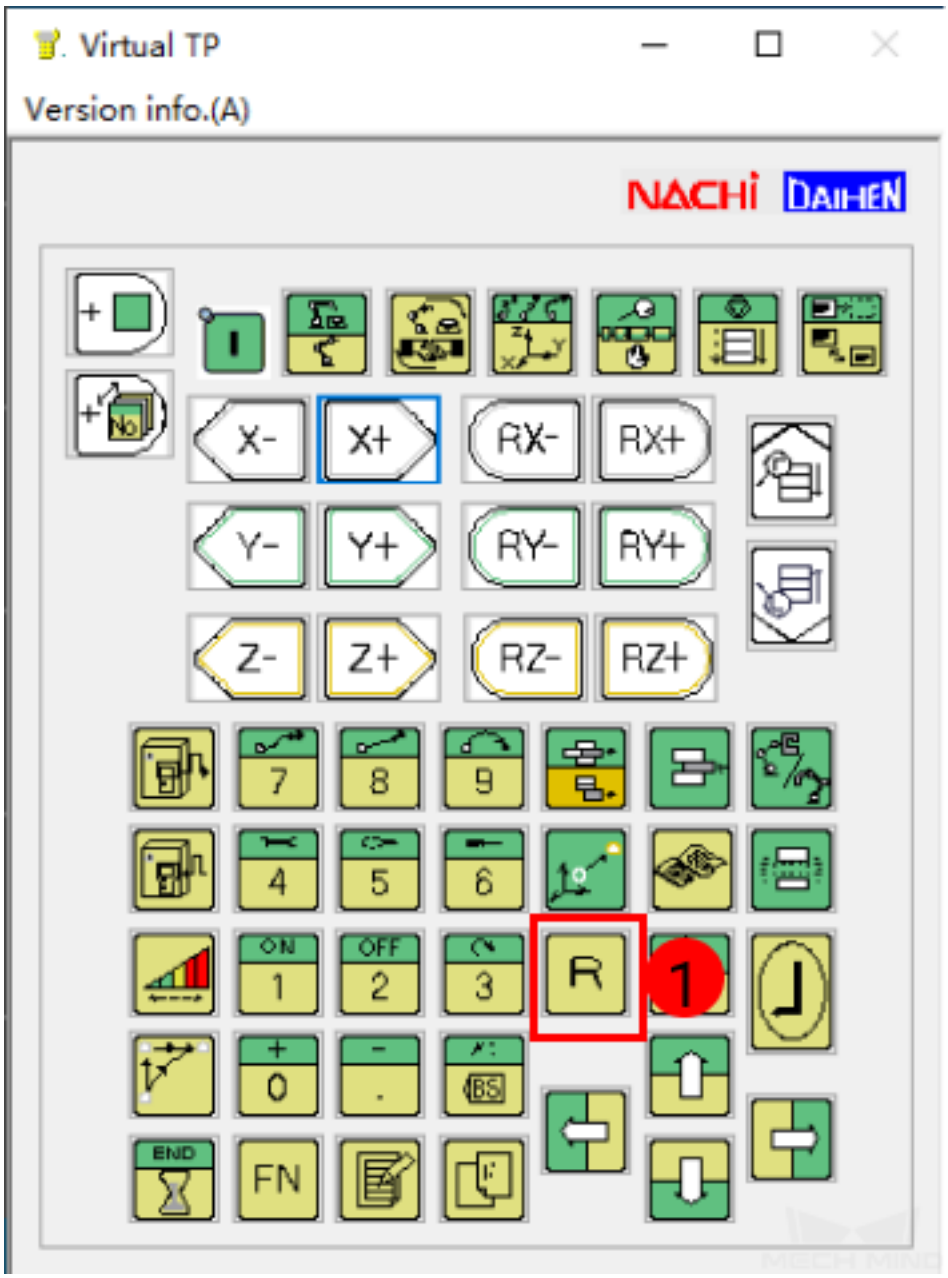
2.1 Hardware Connection

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

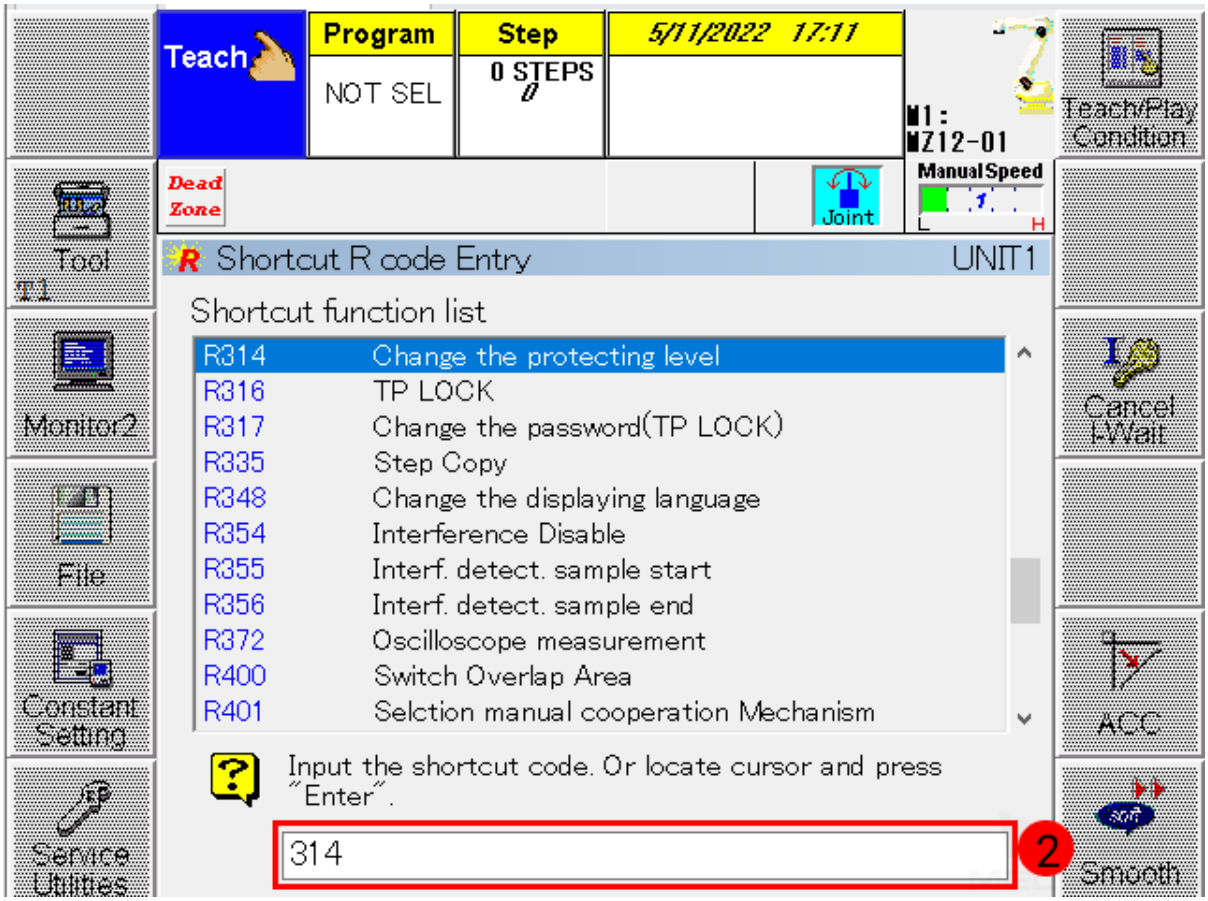


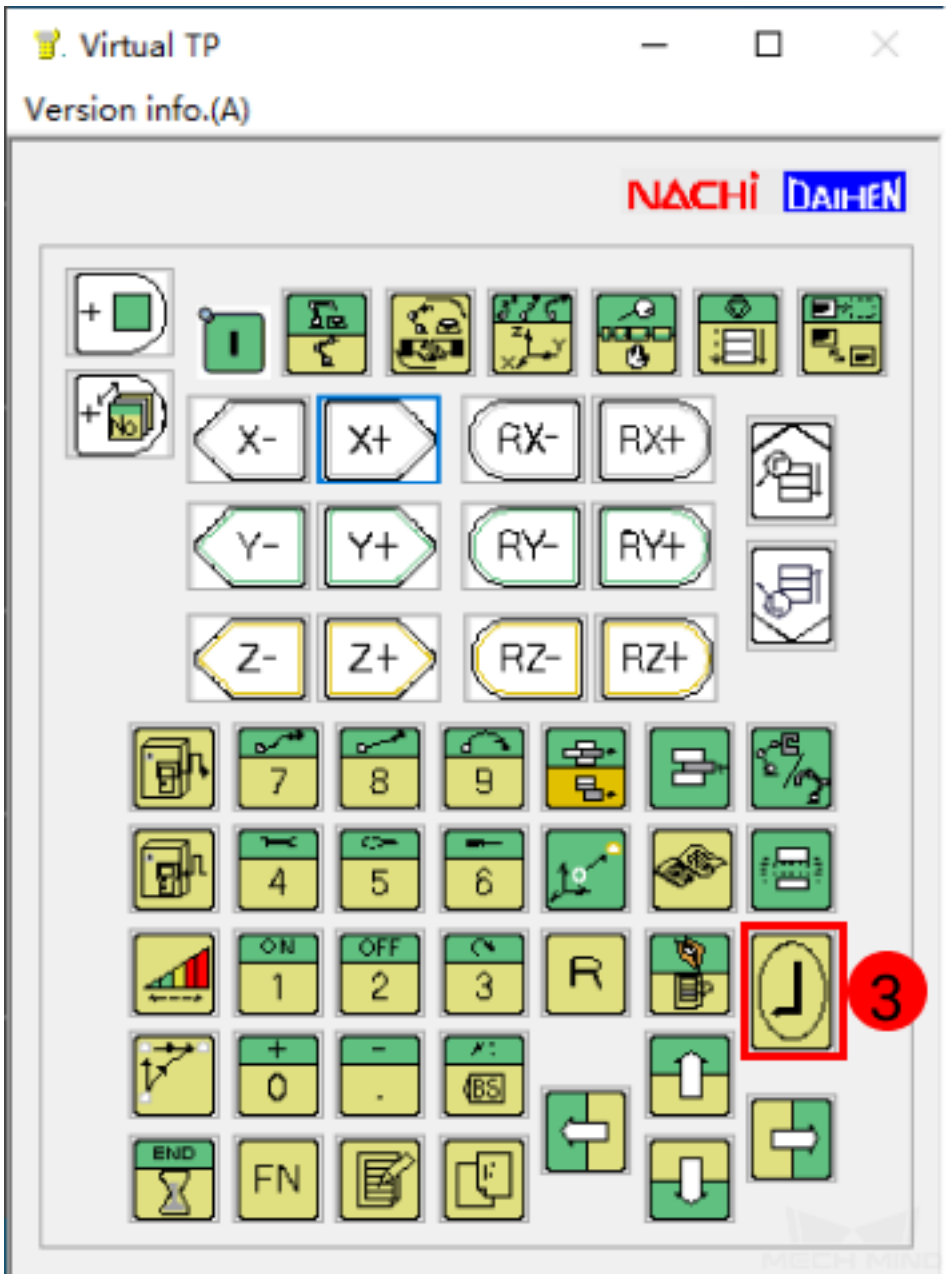
2.2 Change the Protecting Level

1. Open the teach pendant and press the key, as shown below.

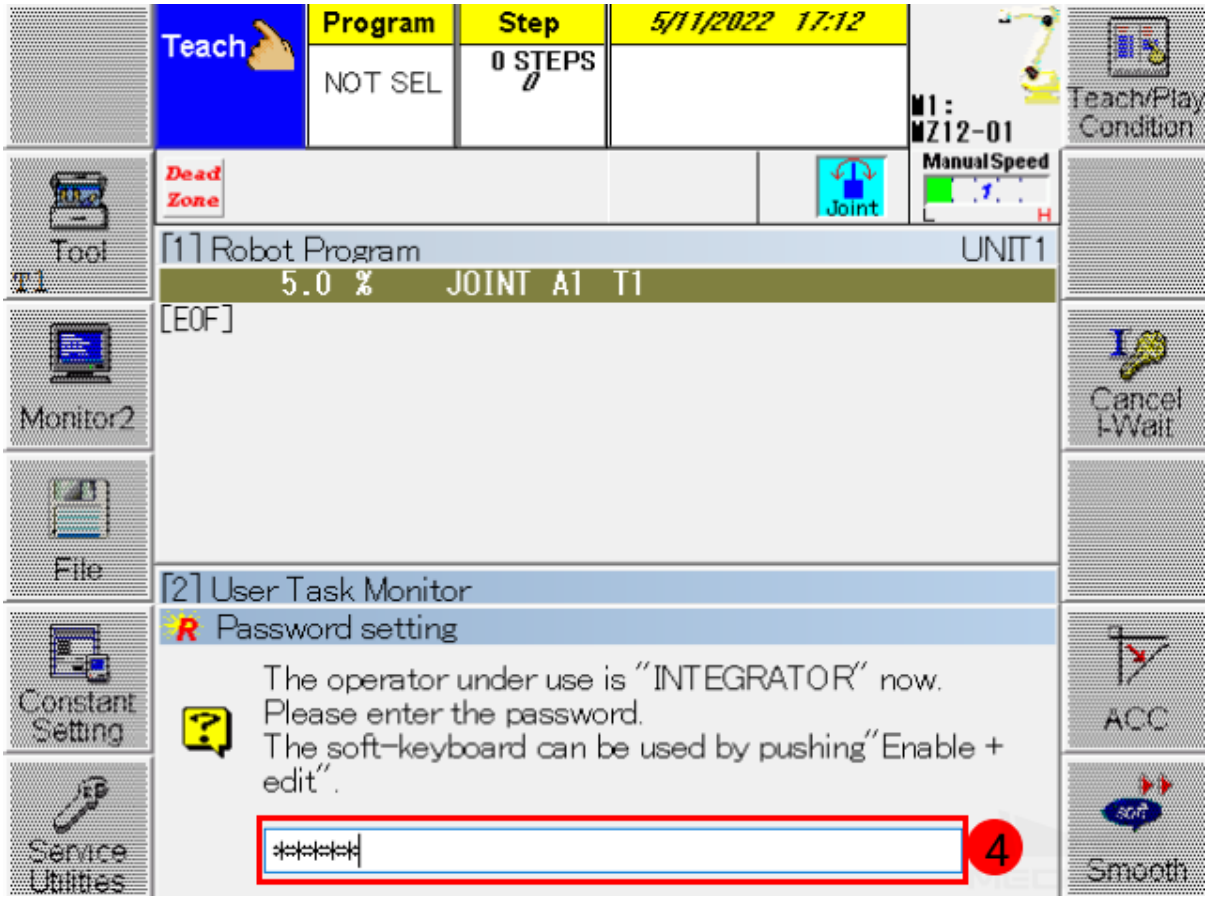


2. Enter **314** in the box as shown below, and then press (Enter key) on the teach pendant.

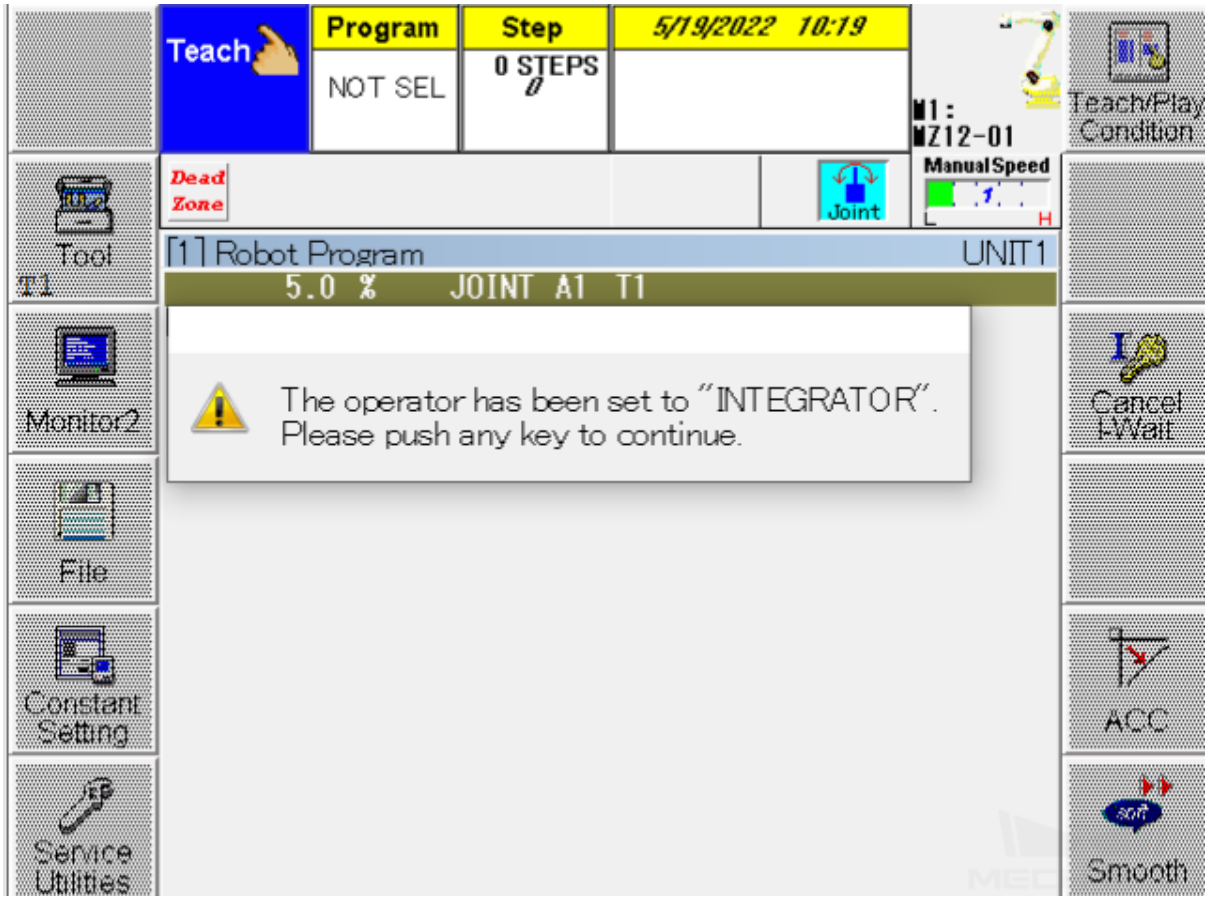

Teach
Program
NOT SEL
Step
0 STEPS
0
5/11/2022 17:11
M1:
MZ12-01
Teach/Play Condition
Dead Zone
Joint
Manual Speed
Tool
T1
Shortcut R code Entry
UNIT1
Shortcut function list
R314 Change the protecting level
R316 TP LOCK
R317 Change the password(TP LOCK)
R335 Step Copy
R348 Change the displaying language
R354 Interference Disable
R355 Interf. detect. sample start
R356 Interf. detect. sample end
R372 Oscilloscope measurement
R400 Switch Overlap Area
R401 Selction manual cooperation Mechanism
Monitor2
Cancel Wait
File
Constant Setting
ACC
Service Utilities
Smooth
Input the shortcut code. Or locate cursor and press "Enter".
314
2



3. Enter the default password **12345** in the box, and then press key on the teach pendant to change into **SPECIALIST** level.

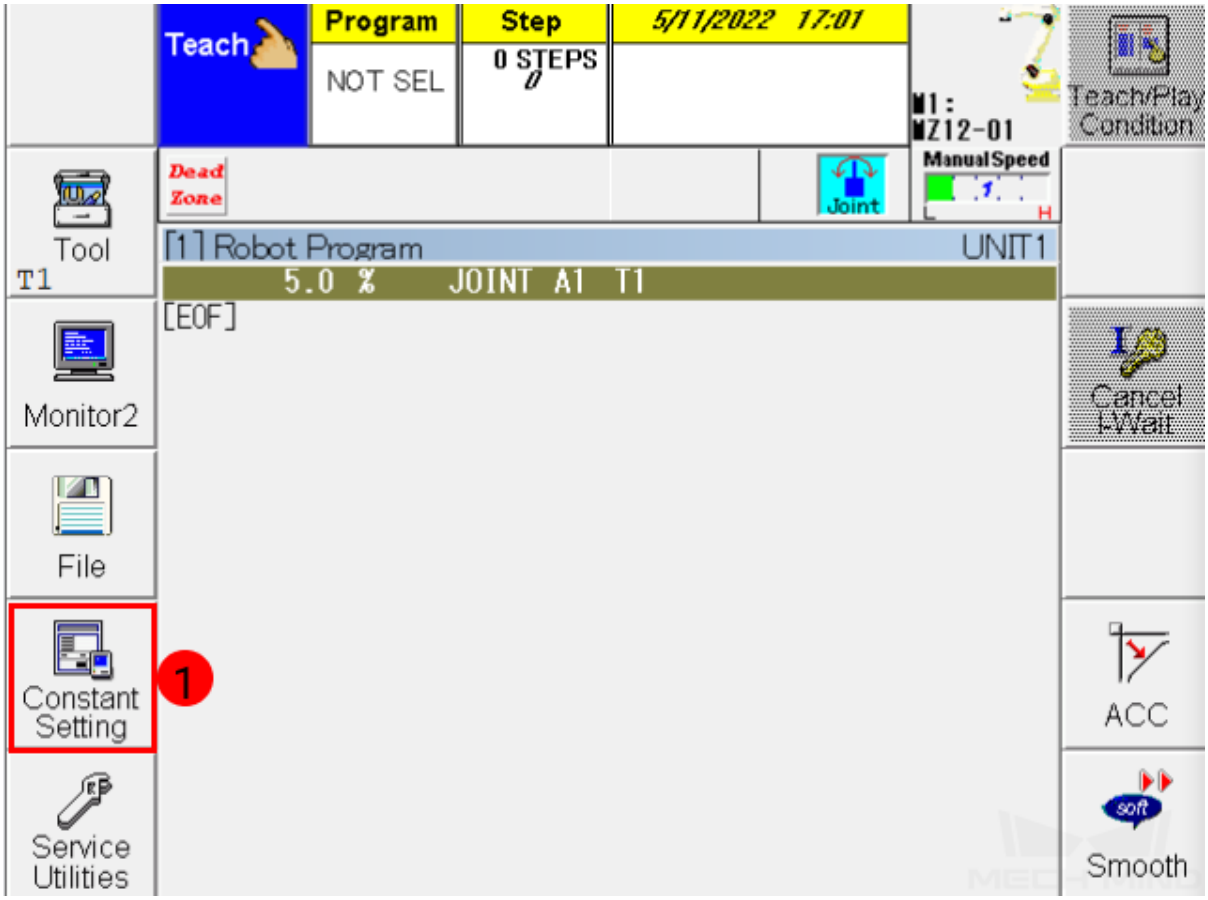


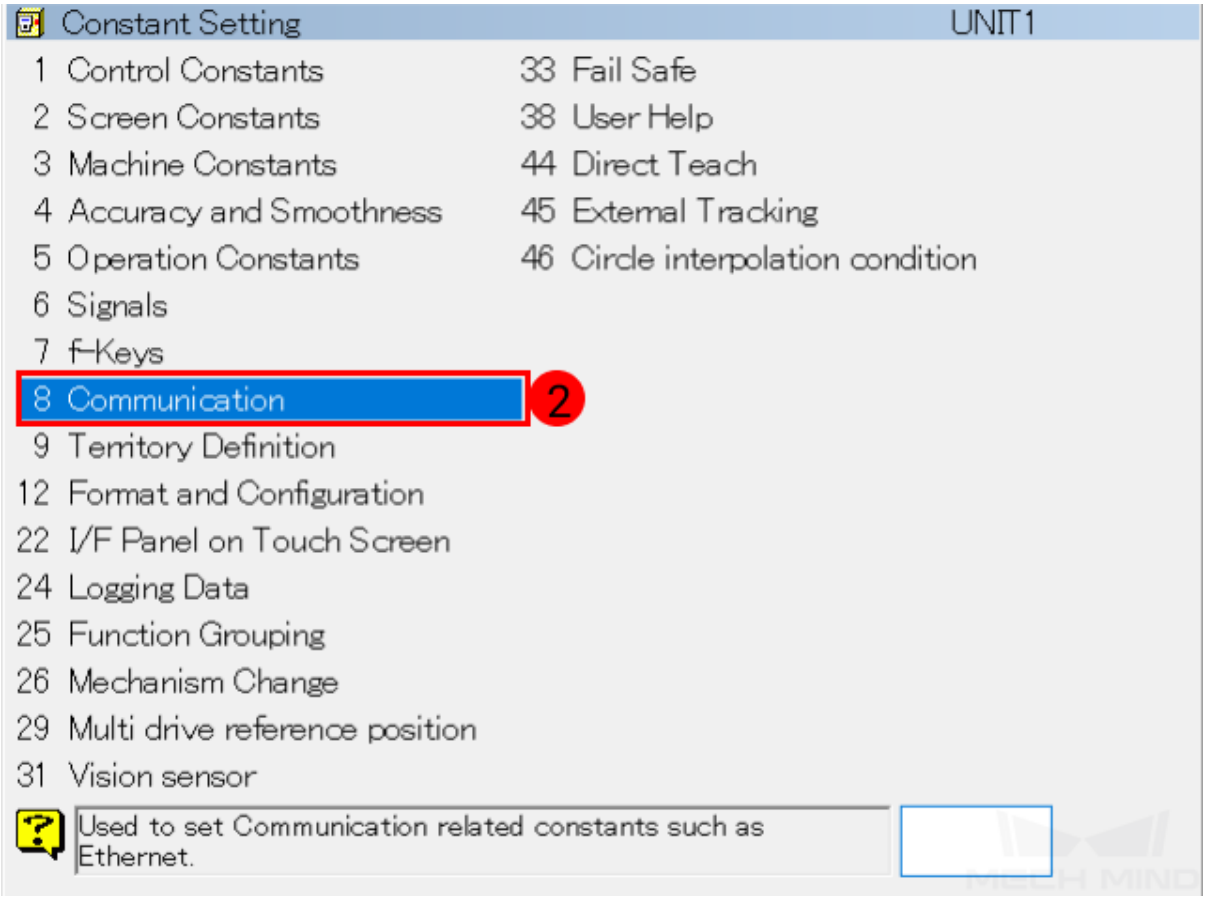
4. A pop-up window as shown below suggests that you have successfully changed the protecting level and all functions can be used from now on.



2.3 IP Configuration

1. Go to *Constant Setting*→ *8 Communication*→ *2 Ethernet* → *1 TCP/IP* to configure **TCP/IP Settings**.


Teach
Program
NOT SEL
Step
0 STEPS
5/11/2022 17:01
M1:
MZ12-01
Teach/Play Condition
Dead Zone
Joint
Manual Speed
Tool
T1
[1] Robot Program
UNIT1
5.0 % JOINT A1 T1
[EOF]
Monitor2
Cancel Wait
File
Constant Setting
1
ACC
Service Utilities
soft
Smooth



2. Enter the robot IP address in the **IP Address** box.

Hint: The robot IP should be in the same subnet as the IPC. If you need to set the static IP, please contact the network administrator.

CHAPTER

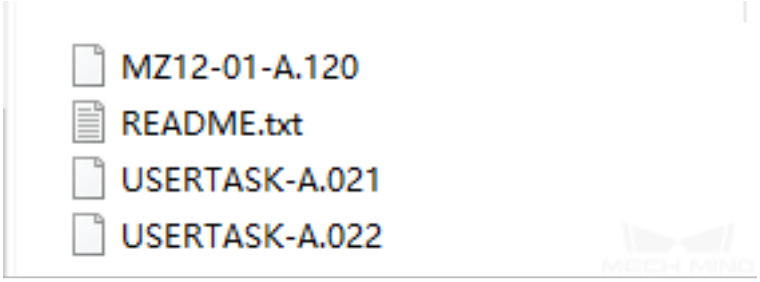
THREE

LOAD THE PROGRAM FILES

3.1 Prepare the Files

Copy the master-control program files of NACHI robot with an USB flash drive.

The files are stored in: *xxx\Mech-Mind Software Suite-x.x.x\Mech-Center\Robot_Server\Robot_FullControl\nachi*

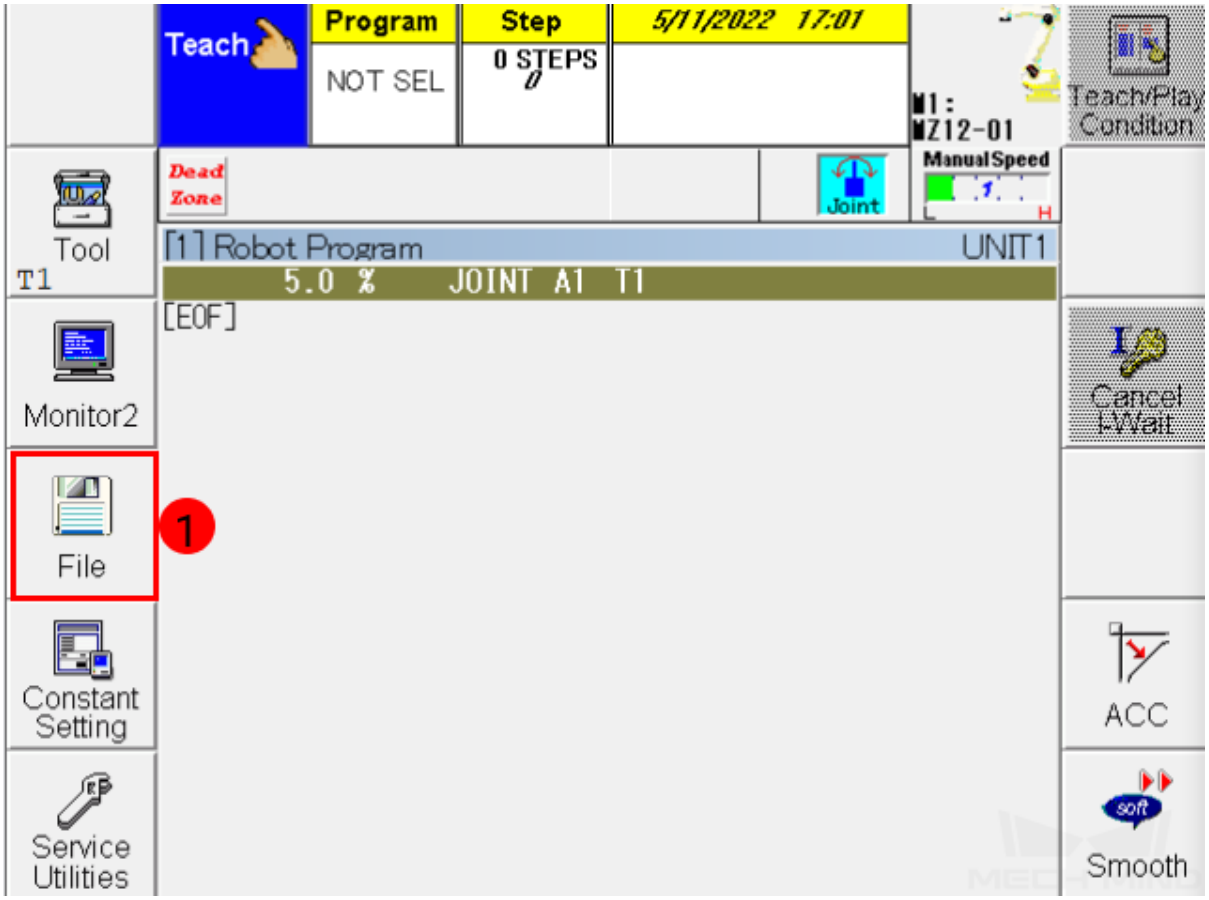


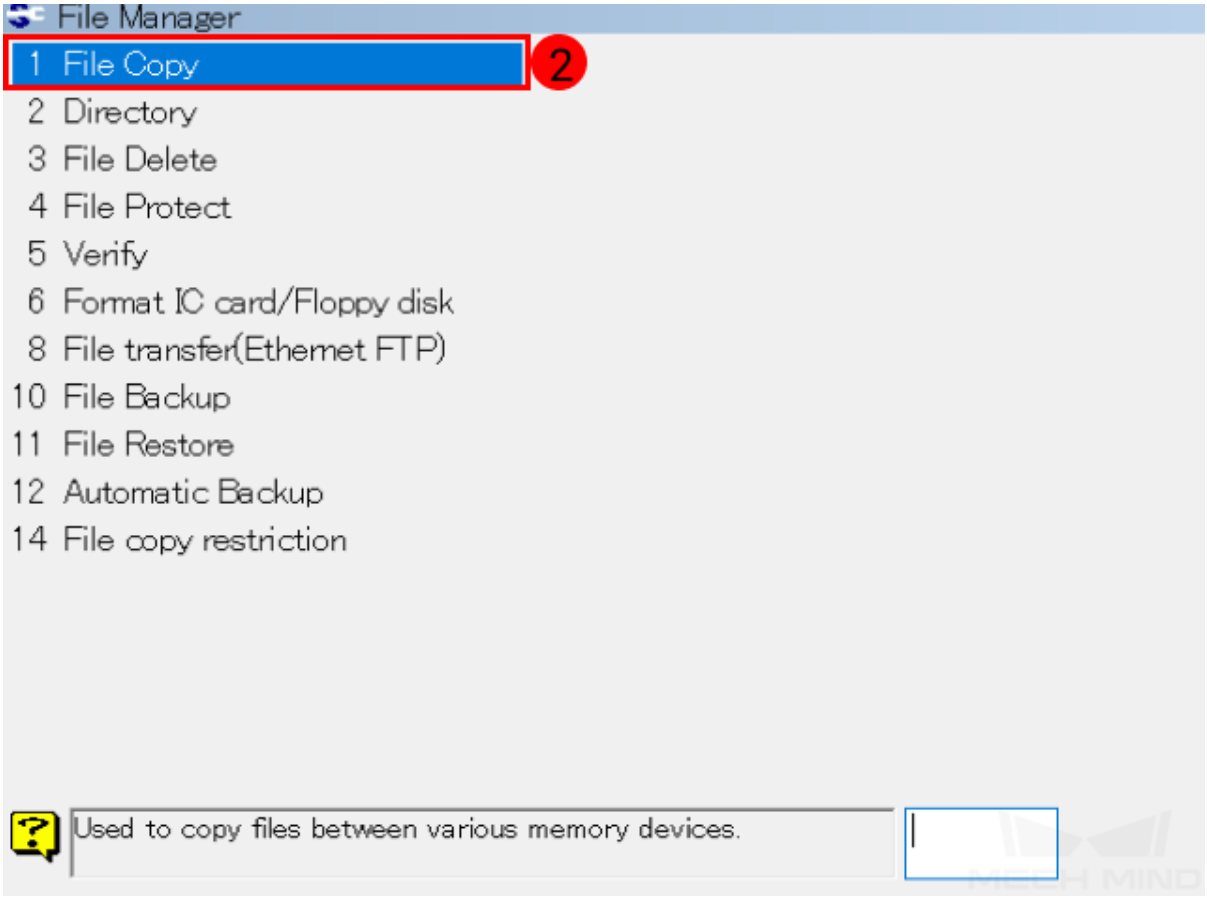
Attention: Please rename the MZ12-01-A.120 file according to the actual robot model name. For example, when loading the file to the SRA166-1 robot, rename the file as SRA166-1-A.120, and then copy and paste it into your flash drive.

3.2 Load the File to the Robot

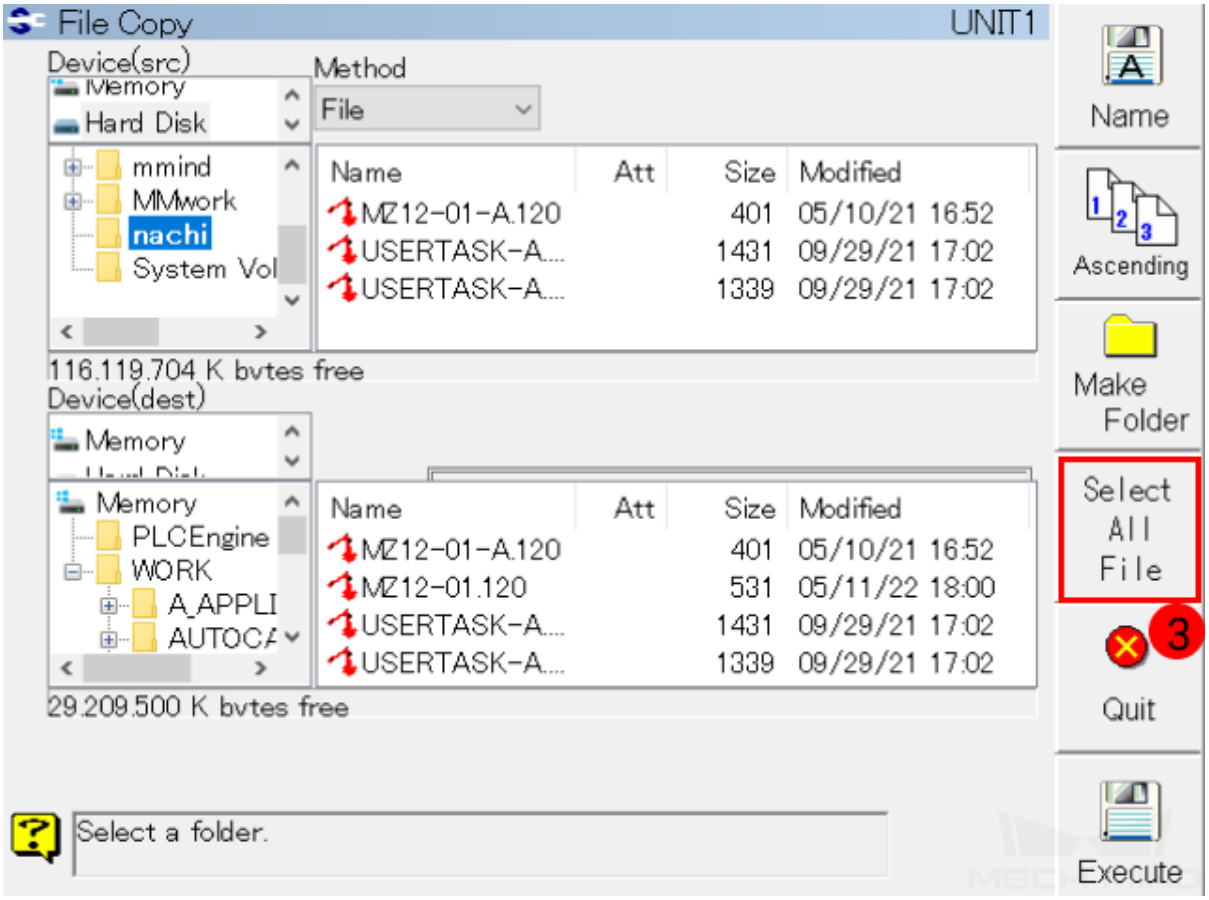
1. Plug the USB flash drive into the USB port on the back of the teach pendant, as shown below.

2. Select *File→ File copy* on the touch panel.

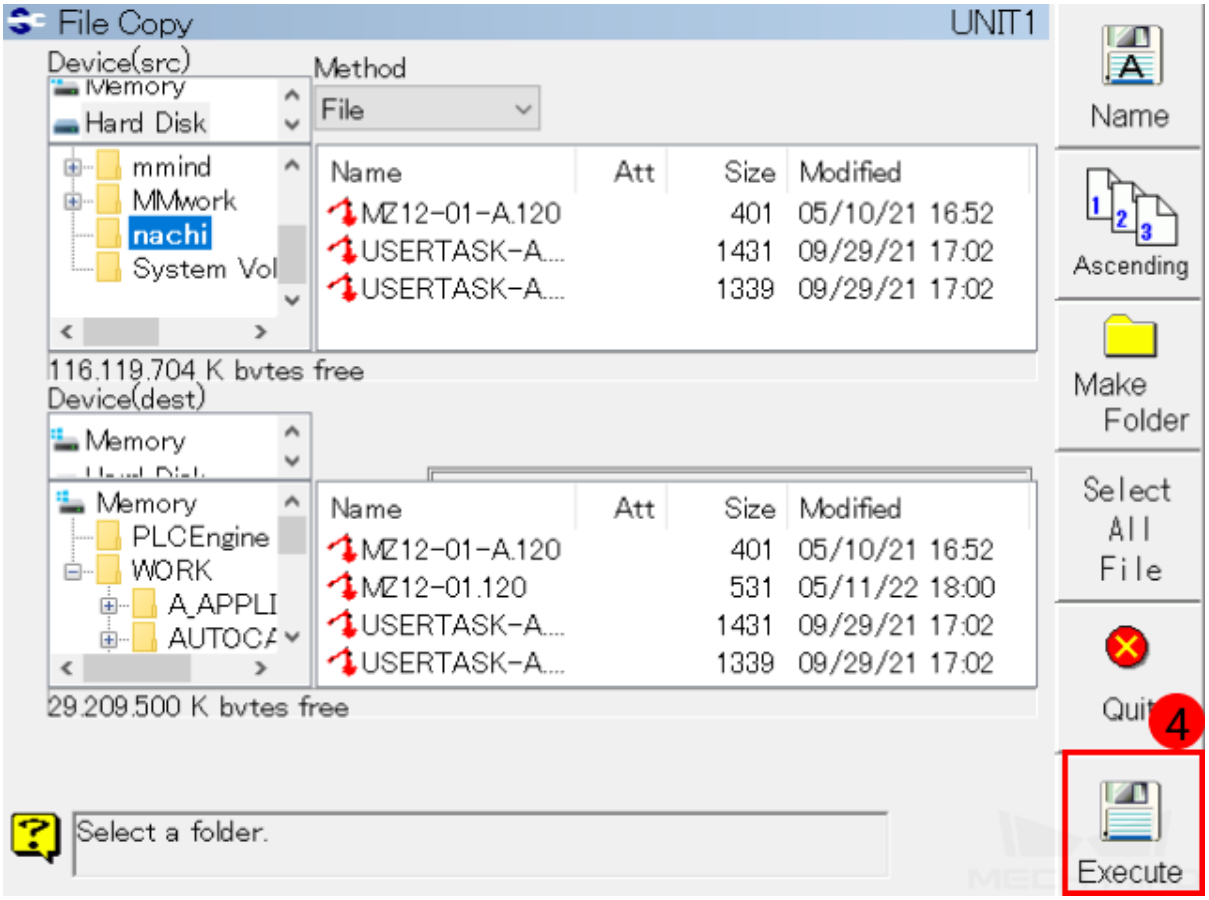

Teach
Program
NOT SEL
Step
0 STEPS
5/11/2022 17:01
M1 :
MZ12-01
Teach/Play Condition
Dead Zone
Joint
Manual Speed
Tool
T1
[1] Robot Program
UNIT1
5.0 % JOINT A1 T1
[EOF]
Monitor2
Cancel I-Wait
File
1
Constant Setting
ACC
Service Utilities
soft
Smooth



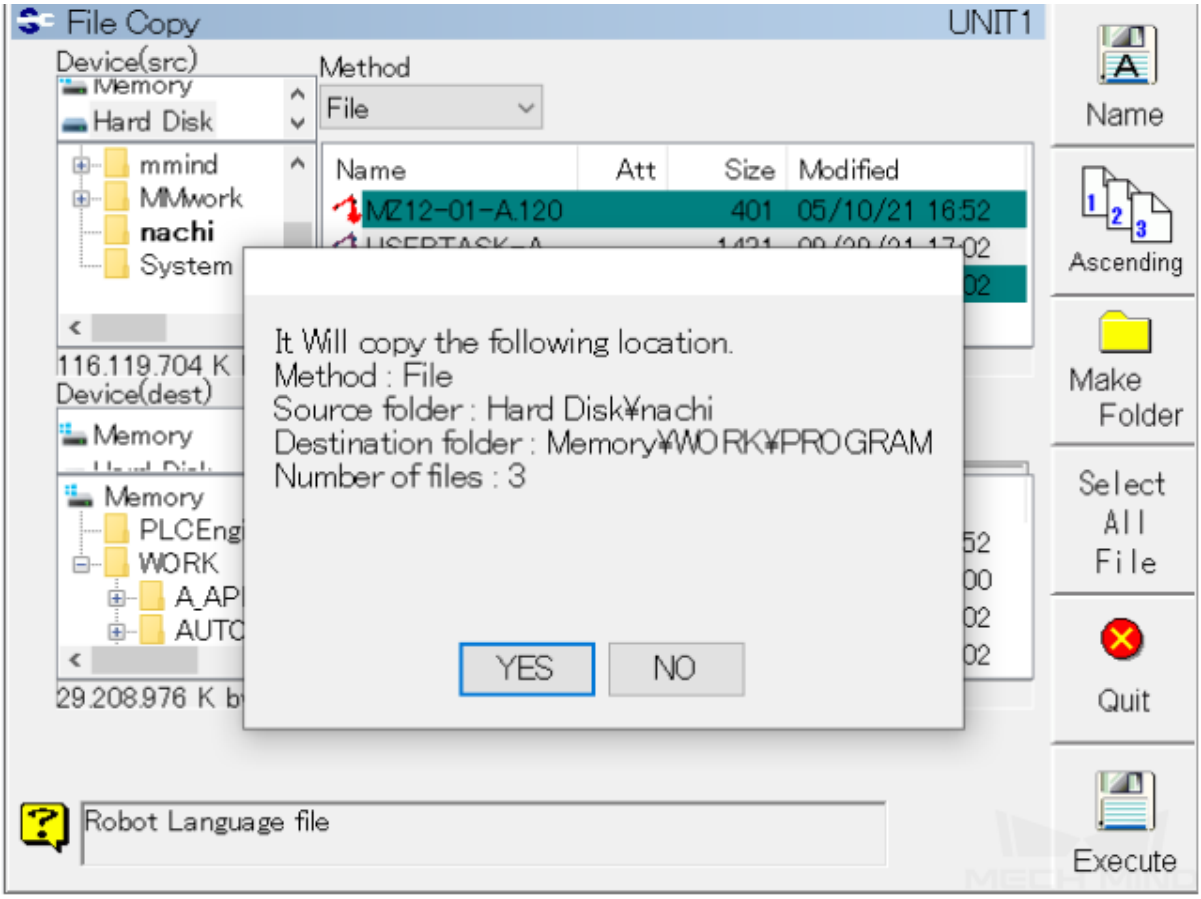
3. Device (src) is the folder of the USB flash drive. Select the folder where the program files are stored under Device (src) and the PROGRAM folder under Device (dest) and then press on *Select All File*

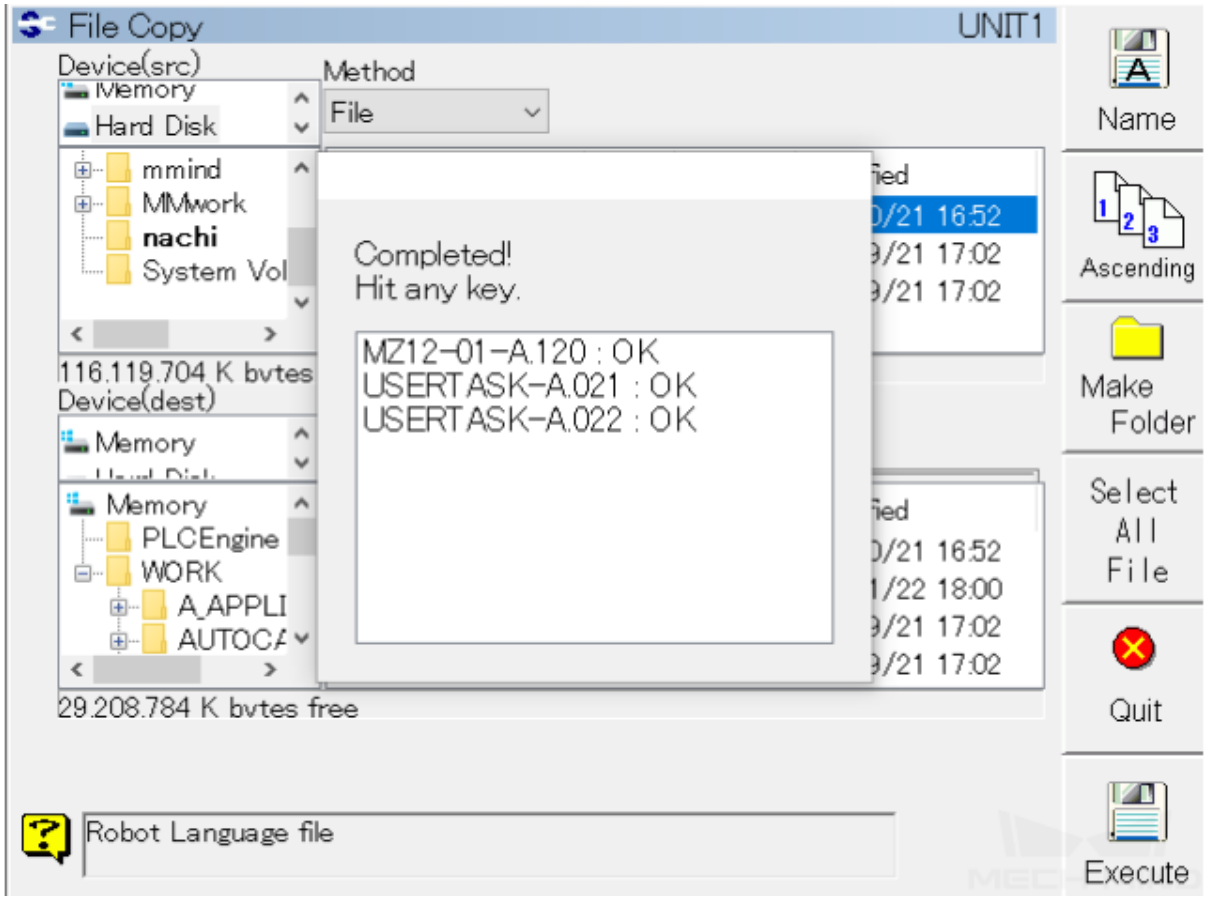


4. Press on *Execute* to import files.



5. If the following messages appear on the screen, the program files have been loaded successfully.

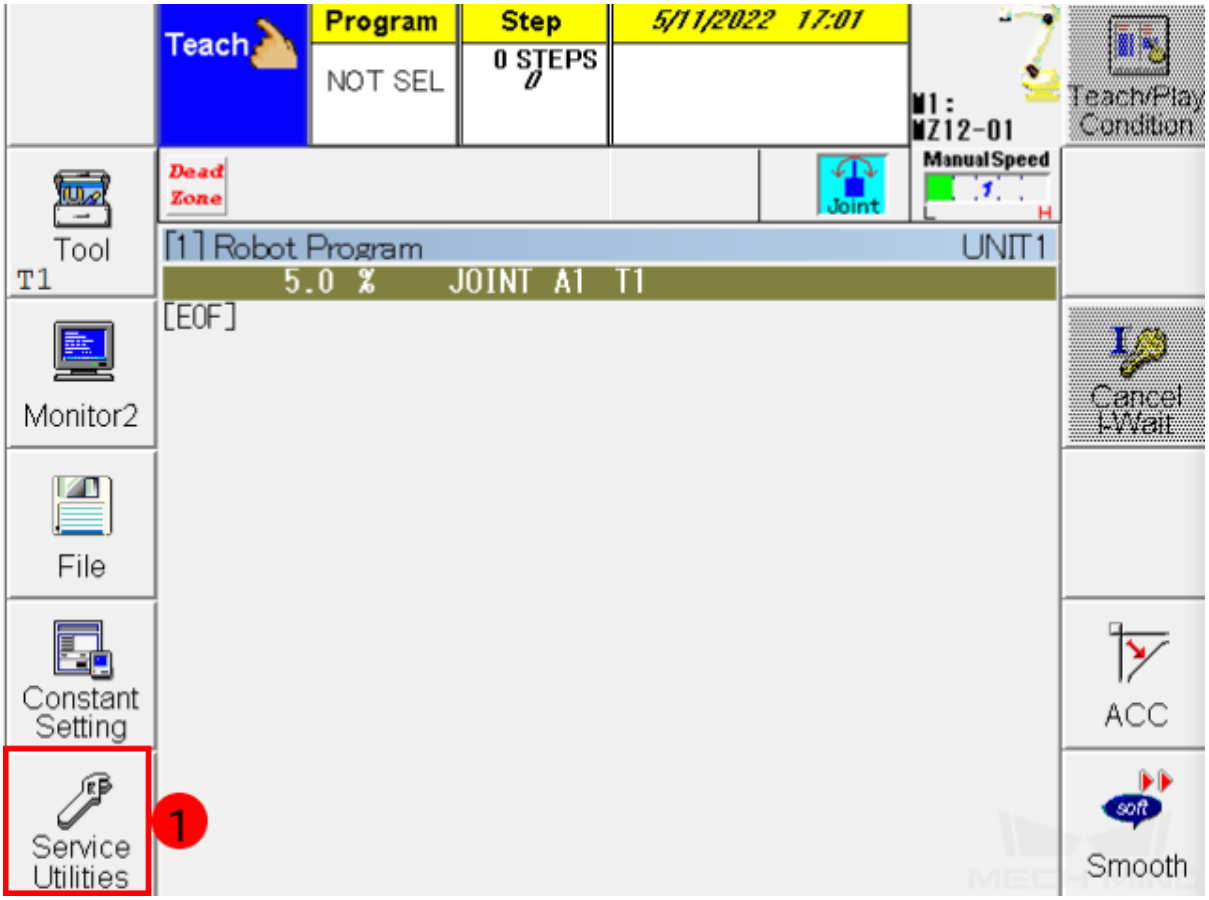

File Copy
UNIT1
Device(src)
Method
File
Hard Disk
mmind
MMwork
nachi
System
Name
Att
Size
Modified
MZ12-01-A.120
401
05/10/21 16:52
116,119,704 K
Device(dest)
Memory
PLCEngi
WORK
A_API
AUTO
29,208,976 K b
It Will copy the following location.
Method : File
Source folder : Hard Disk¥nachi
Destination folder : Memory¥WORK¥PROGRAM
Number of files : 3
YES
NO
Name
Ascending
Make Folder
Select All File
Quit
Execute
Robot Language file

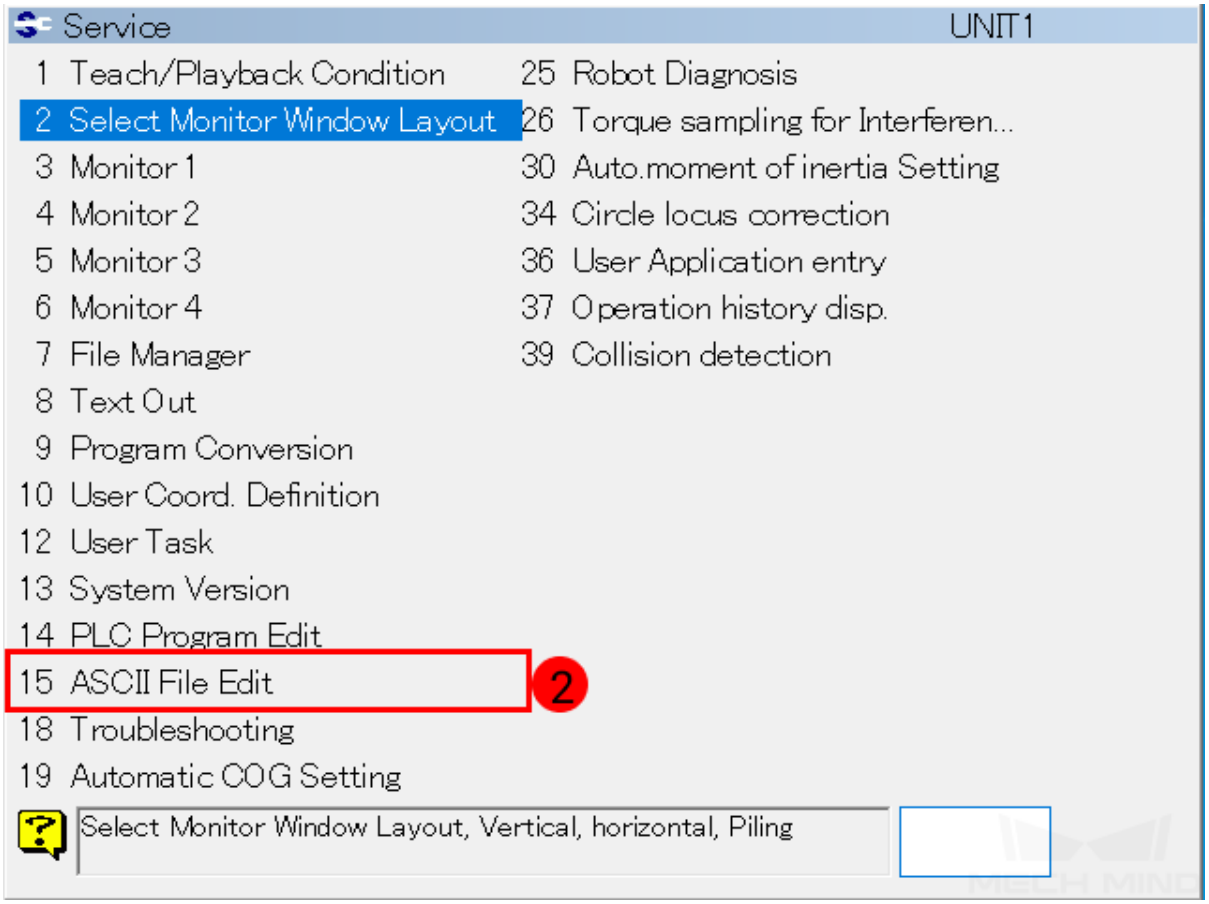


Attention:	Please reboot the robot after exiting the program.

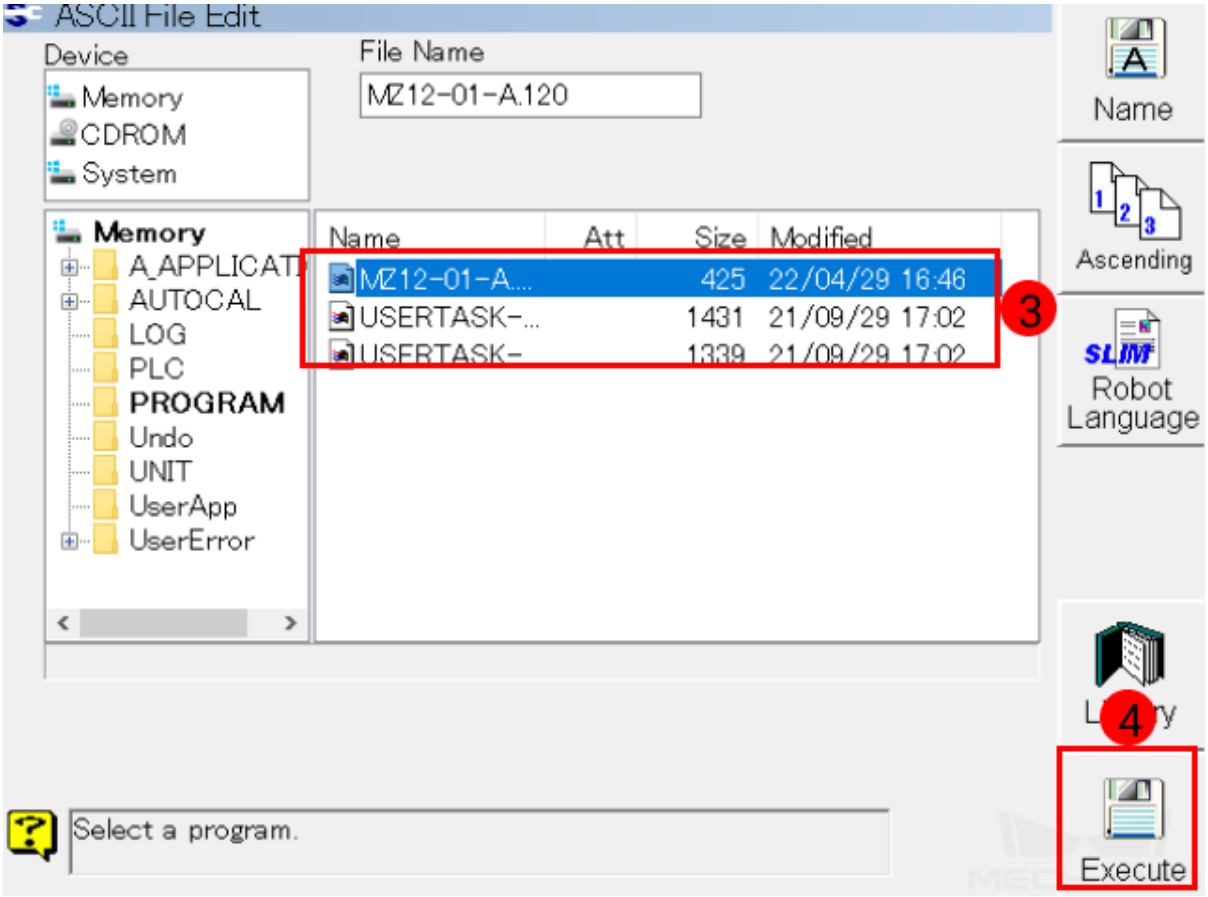
3.3 Convert the Program File

1. Go back to the main interface, press on *Service Utilities→ ASCII File Edit* to edit the ASCII files.

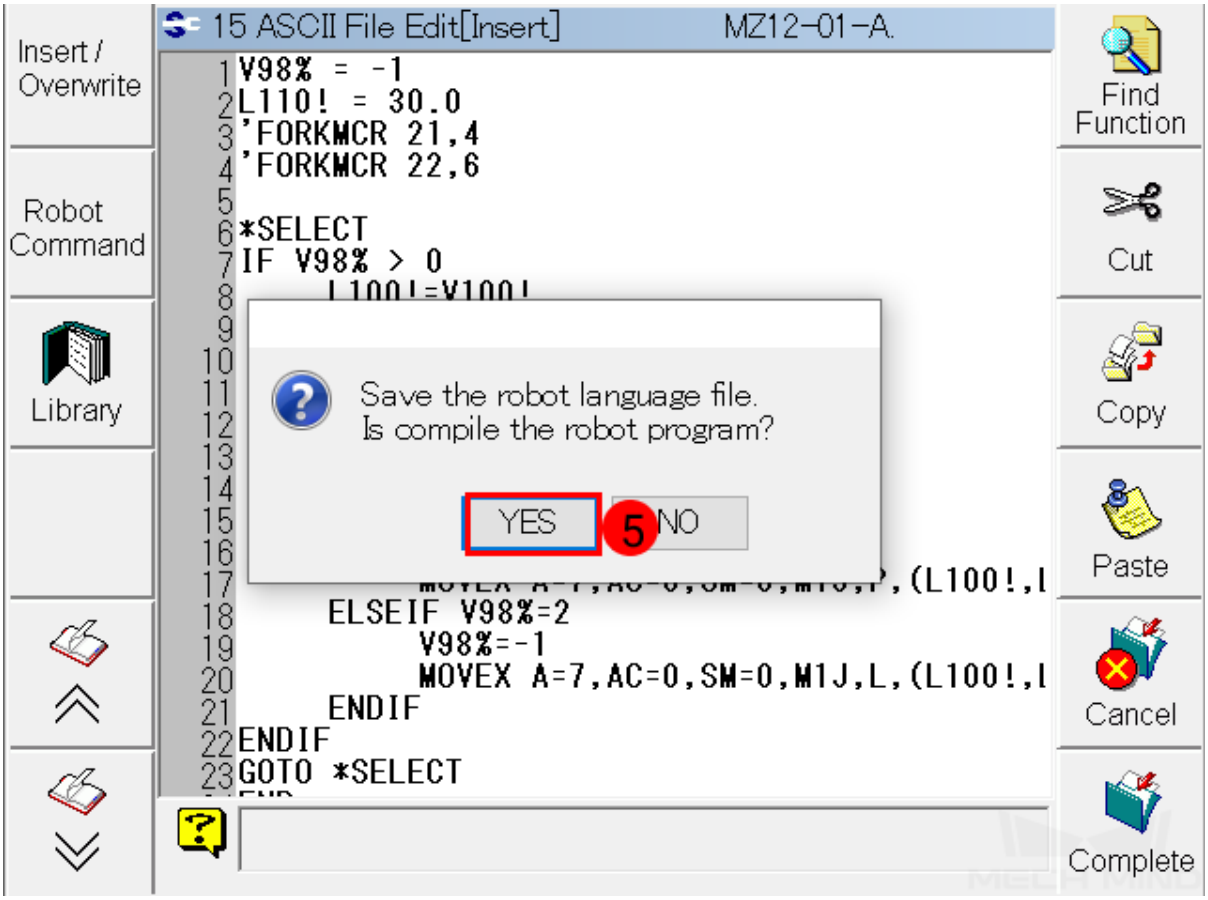

Teach
Program
NOT SEL
Step
0 STEPS
5/11/2022 17:01
M1:
MZ12-01
Teach/Play Condition
Dead Zone
Joint
Manual Speed
Tool
T1
[1] Robot Program
UNIT1
5.0 % JOINT A1 T1
[EOF]
Monitor2
Cancel Wait
File
Constant Setting
ACC
Service Utilities
1
soft
Smooth



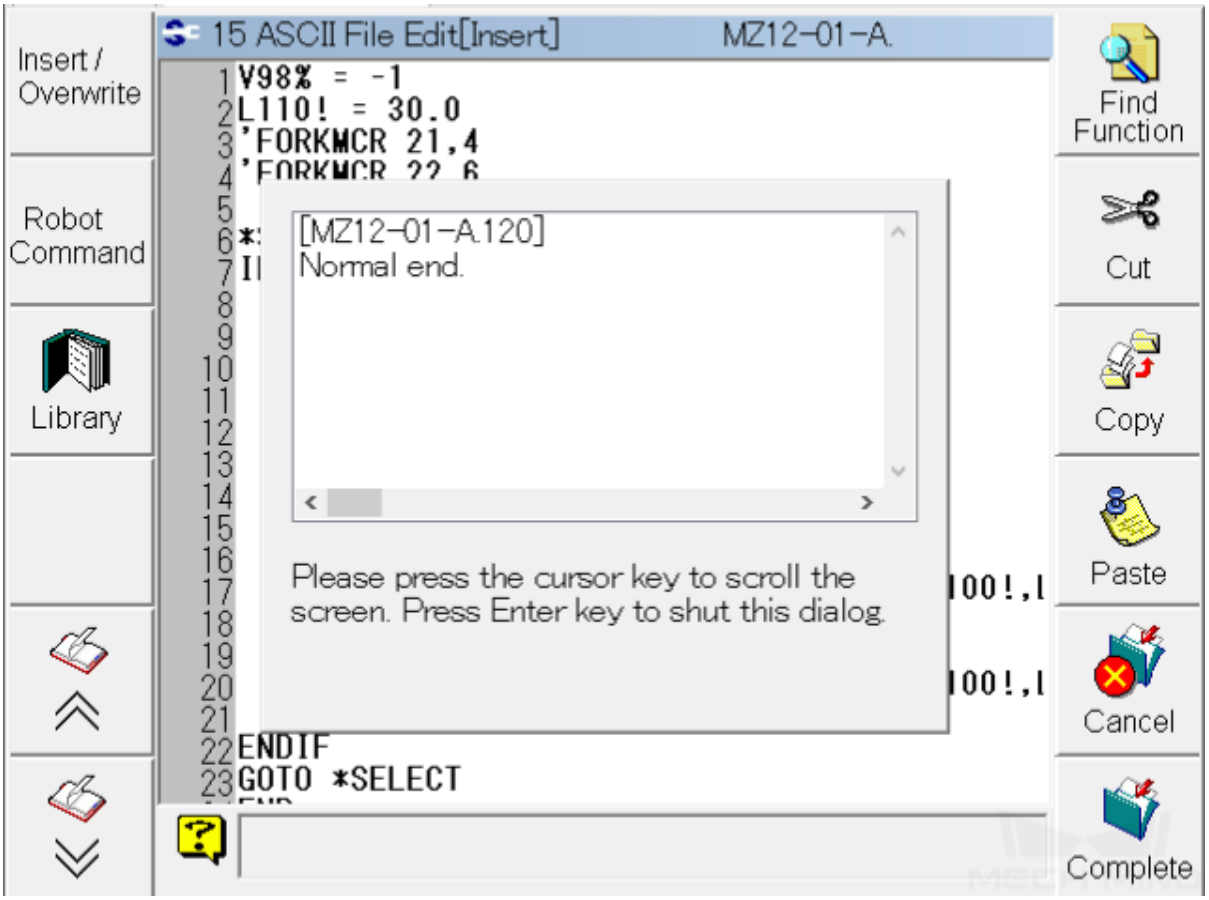
2. Select the file and press on *Execute*. Please perform the same operation on all three files in turn, and you can only start executing after the previous execution is completed.



3. After pressing on *Execute*, a window as below will pop up, and then select *Yes*.

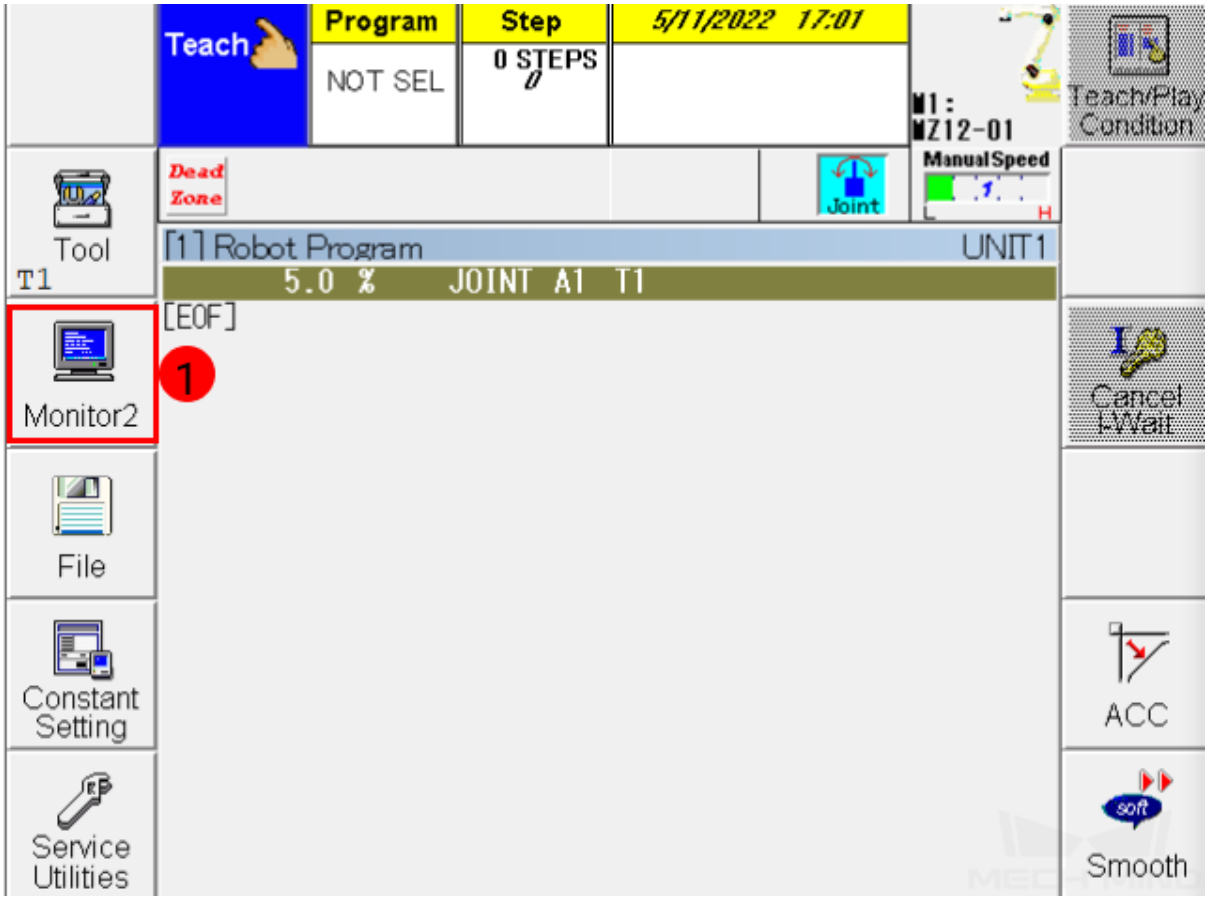


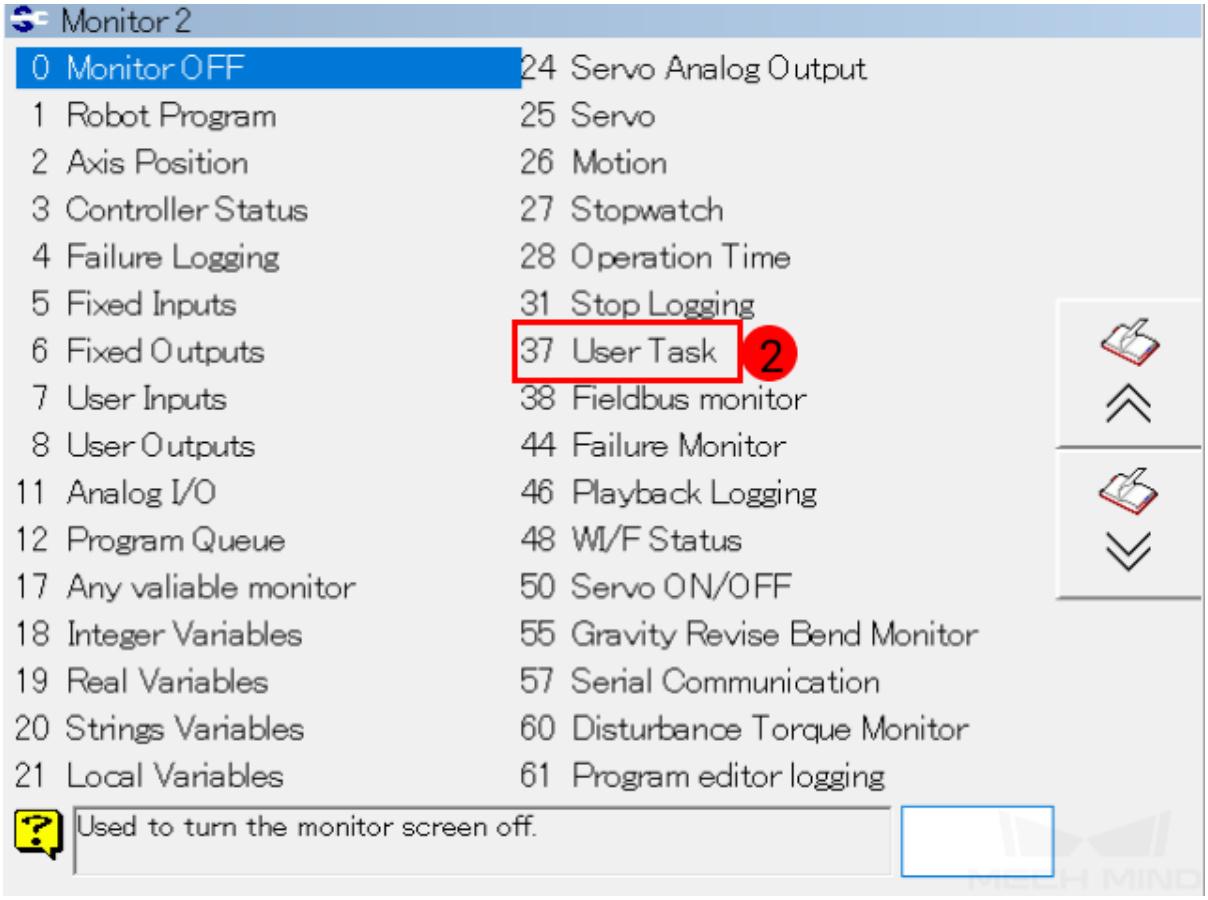
4. After converting the program file to the robot language, a message as shown below will appear.

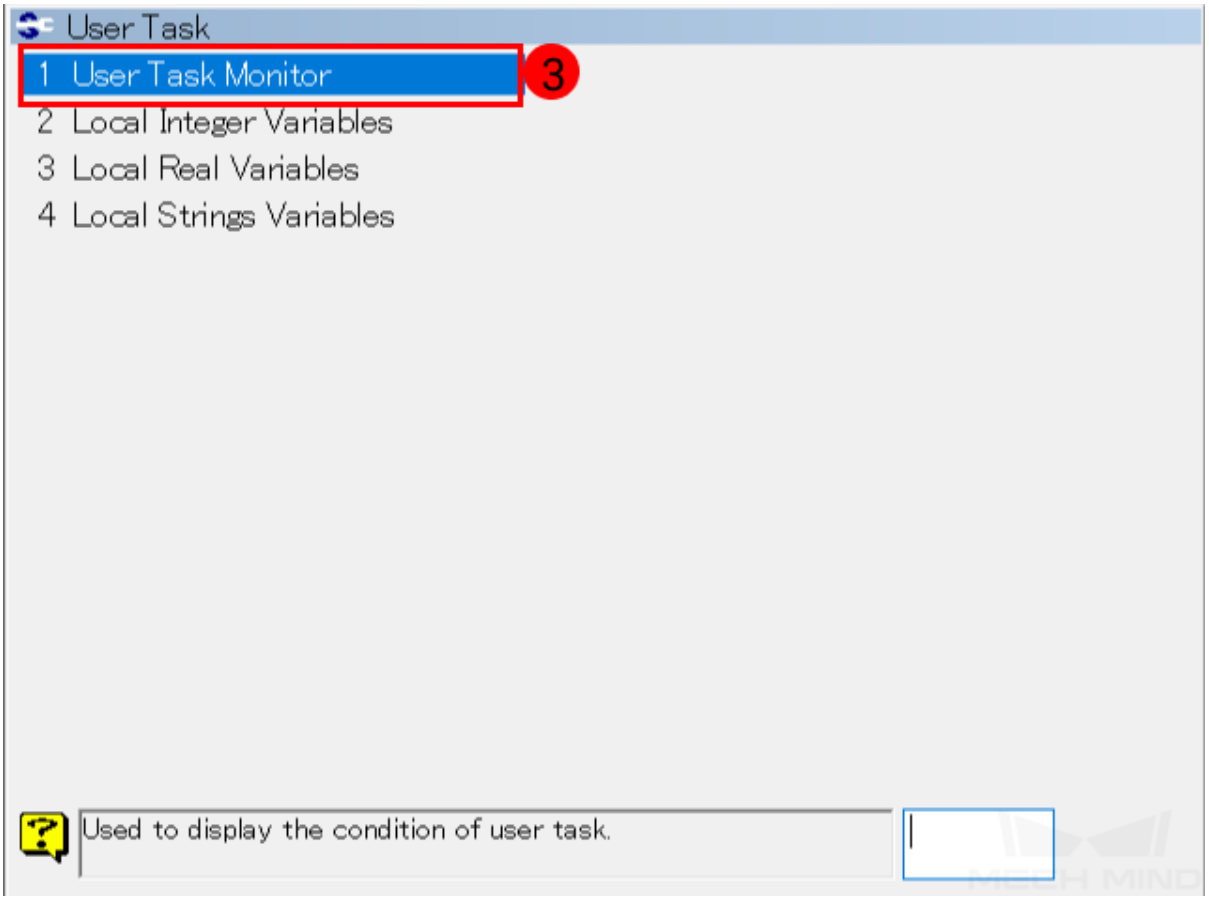


3.4 Designate the Program

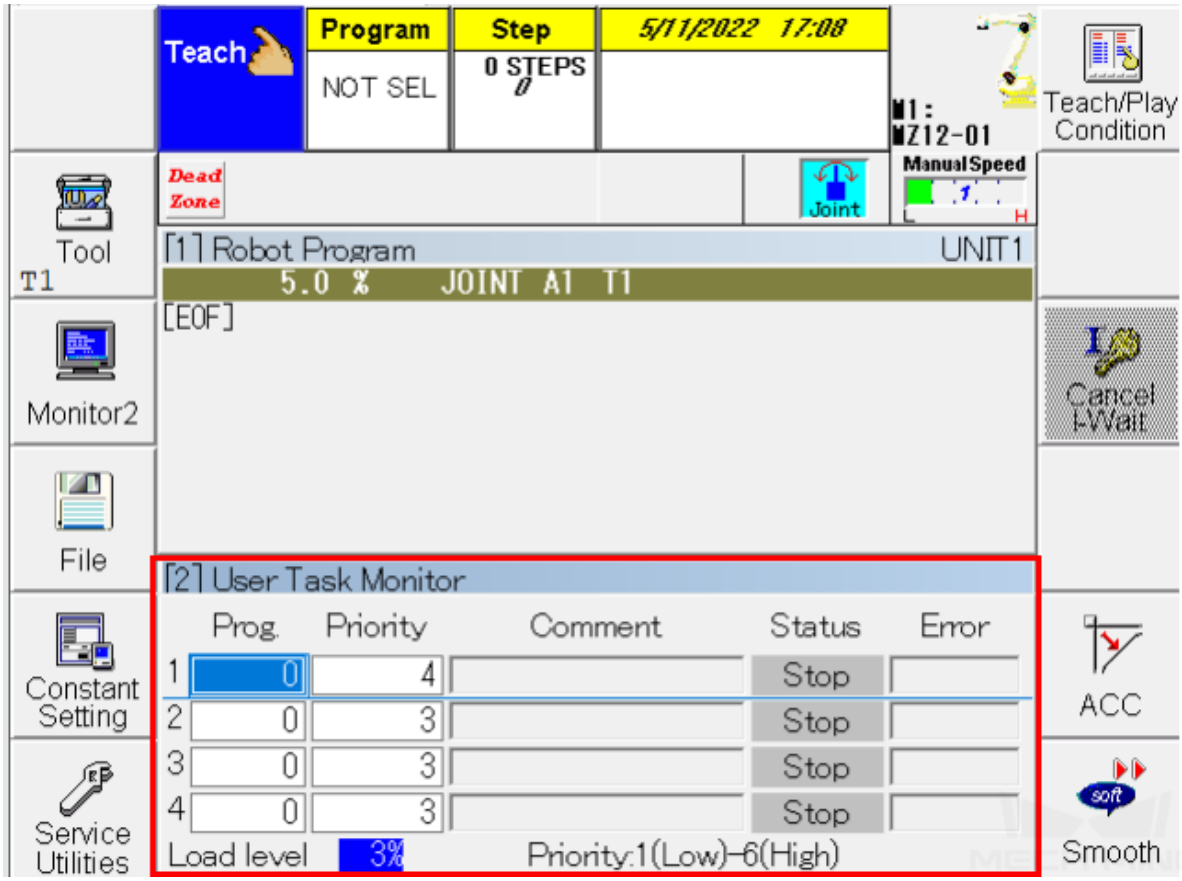
1. Return to the main interface, go to *Monitor2–> User Task–> User Task Monitor*.

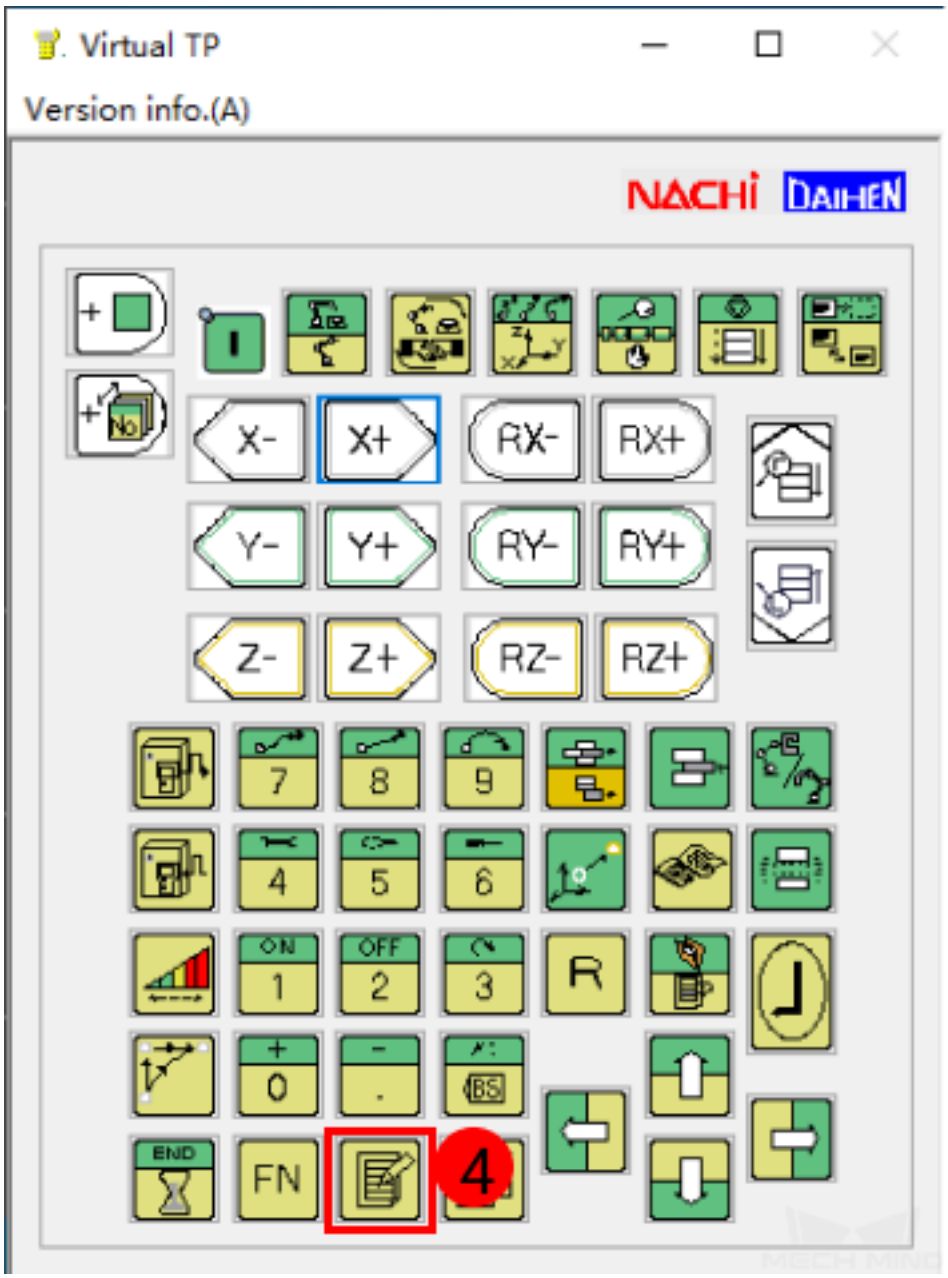

Teach
Program
NOT SEL
Step
0 STEPS
5/11/2022 17:01
M1:
MZ12-01
Teach/Play Condition
Dead Zone
Joint
Manual Speed
Tool
T1
[1] Robot Program
UNIT1
5.0 % JOINT A1 T1
[EOF]
1
Monitor2
Cancel I-Wait
File
Constant Setting
ACC
Service Utilities
soft
Smooth

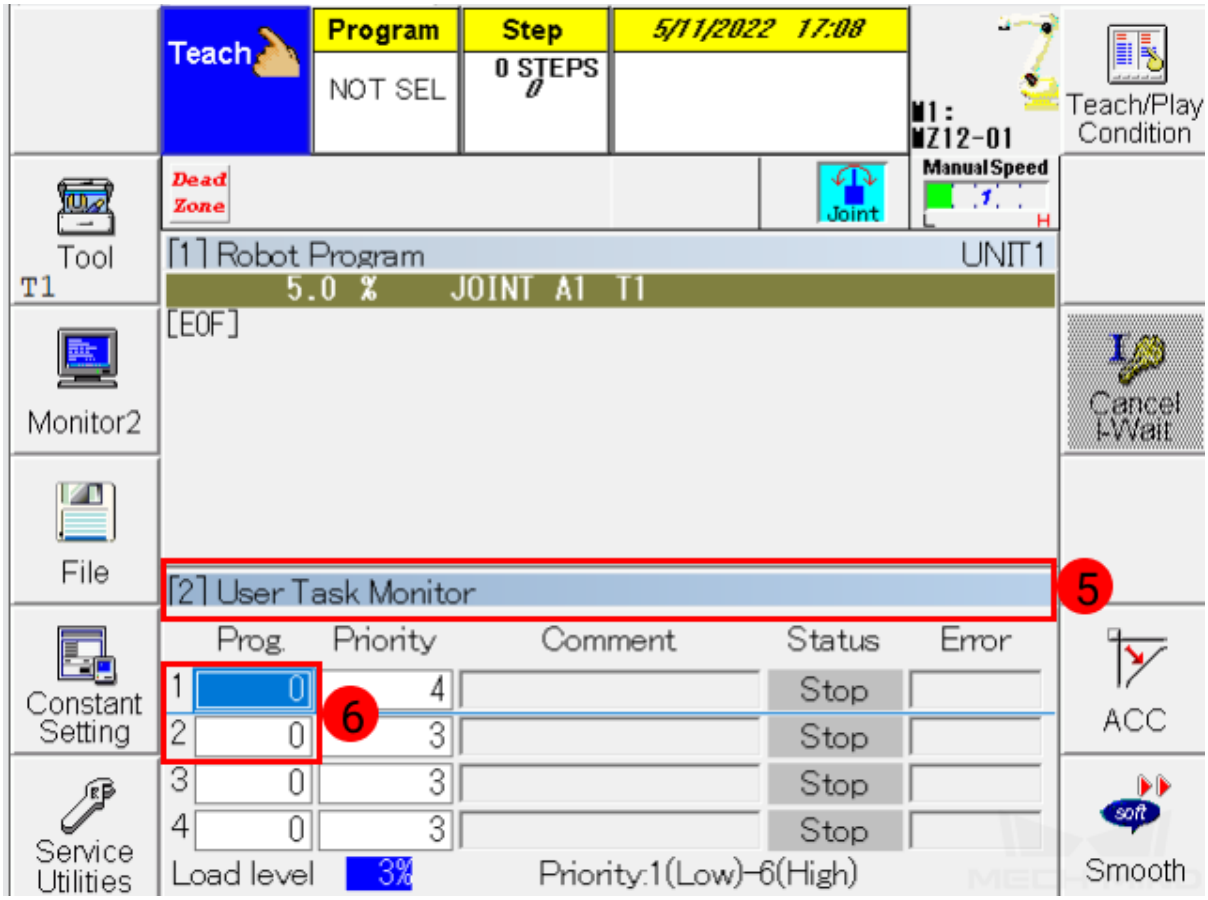

Monitor 2
0 Monitor OFF
1 Robot Program
2 Axis Position
3 Controller Status
4 Failure Logging
5 Fixed Inputs
6 Fixed Outputs
7 User Inputs
8 User Outputs
11 Analog I/O
12 Program Queue
17 Any valiable monitor
18 Integer Variables
19 Real Variables
20 Strings Variables
21 Local Variables
24 Servo Analog Output
25 Servo
26 Motion
27 Stopwatch
28 Operation Time
31 Stop Logging
37 User Task
38 Fieldbus monitor
44 Failure Monitor
46 Playback Logging
48 WI/F Status
50 Servo ON/OFF
55 Gravity Revise Bend Monitor
57 Serial Communication
60 Disturbance Torque Monitor
61 Program editor logging
2
Used to turn the monitor screen off.

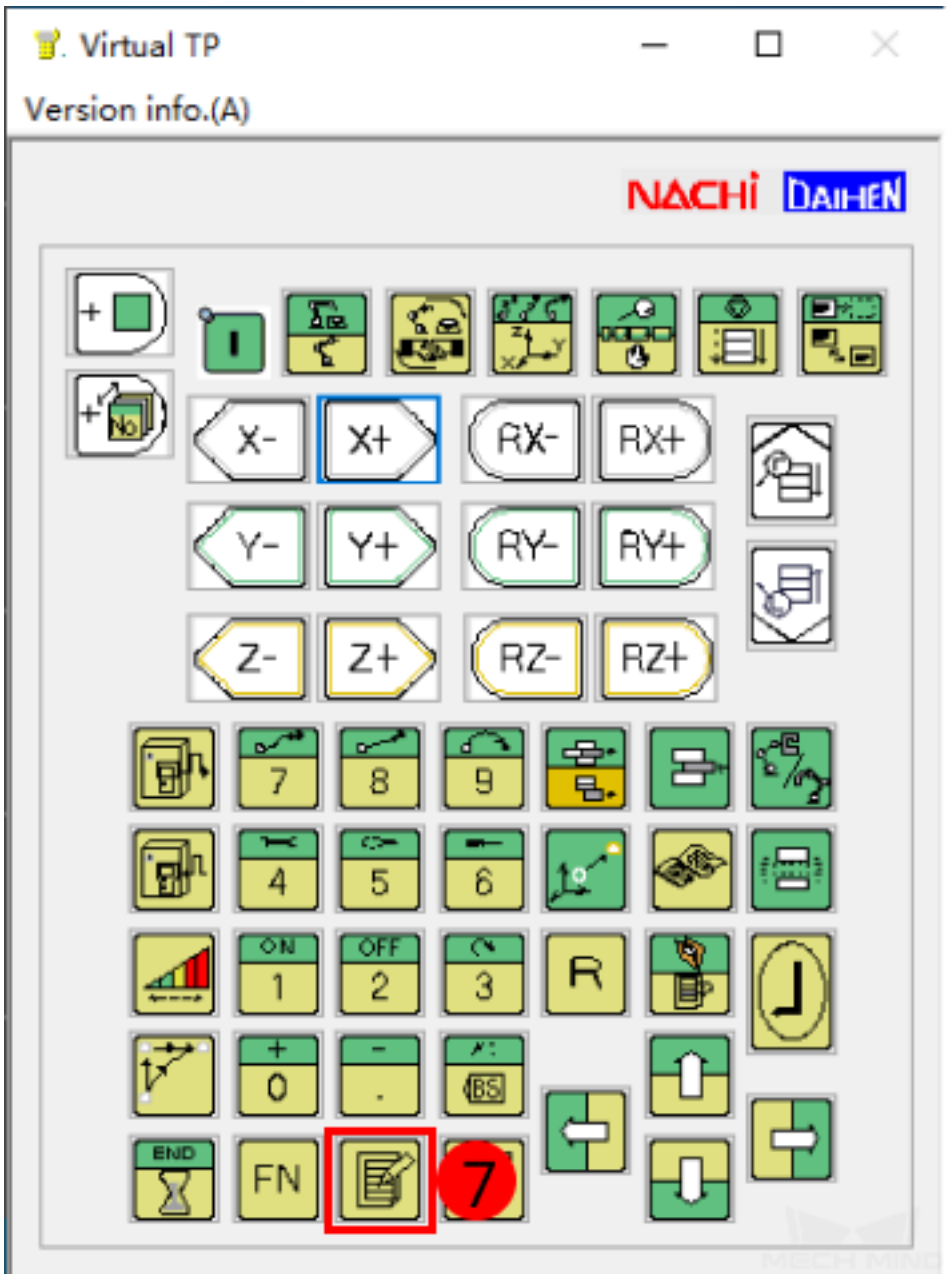


2. Now you can see the **User Task Monitor** as shown below. Press the key on the teach pendant, and then the **User Task Monitor** (0) line will turn orange, suggesting that it is editable now. Enter 21 in the first line in the Program column, and enter 22 in the second line. Then, press key.


Teach
Program
NOT SEL
Step
0 STEPS
0
5/11/2022 17:08
M1:
MZ12-01
Teach/Play Condition
Dead Zone
Joint
Manual Speed
Tool
T1
[1] Robot Program
UNIT1
5.0 % JOINT A1 T1
[EOF]
Monitor2
Cancel I-Wait
File
[2] User Task Monitor
Prog.
Priority
Comment
Status
Error
1 0 4 Stop
2 0 3 Stop
3 0 3 Stop
4 0 3 Stop
Load level 3%
Priority:1(Low)–6(High)
Constant Setting
ACC
Service Utilities
soft
Smooth

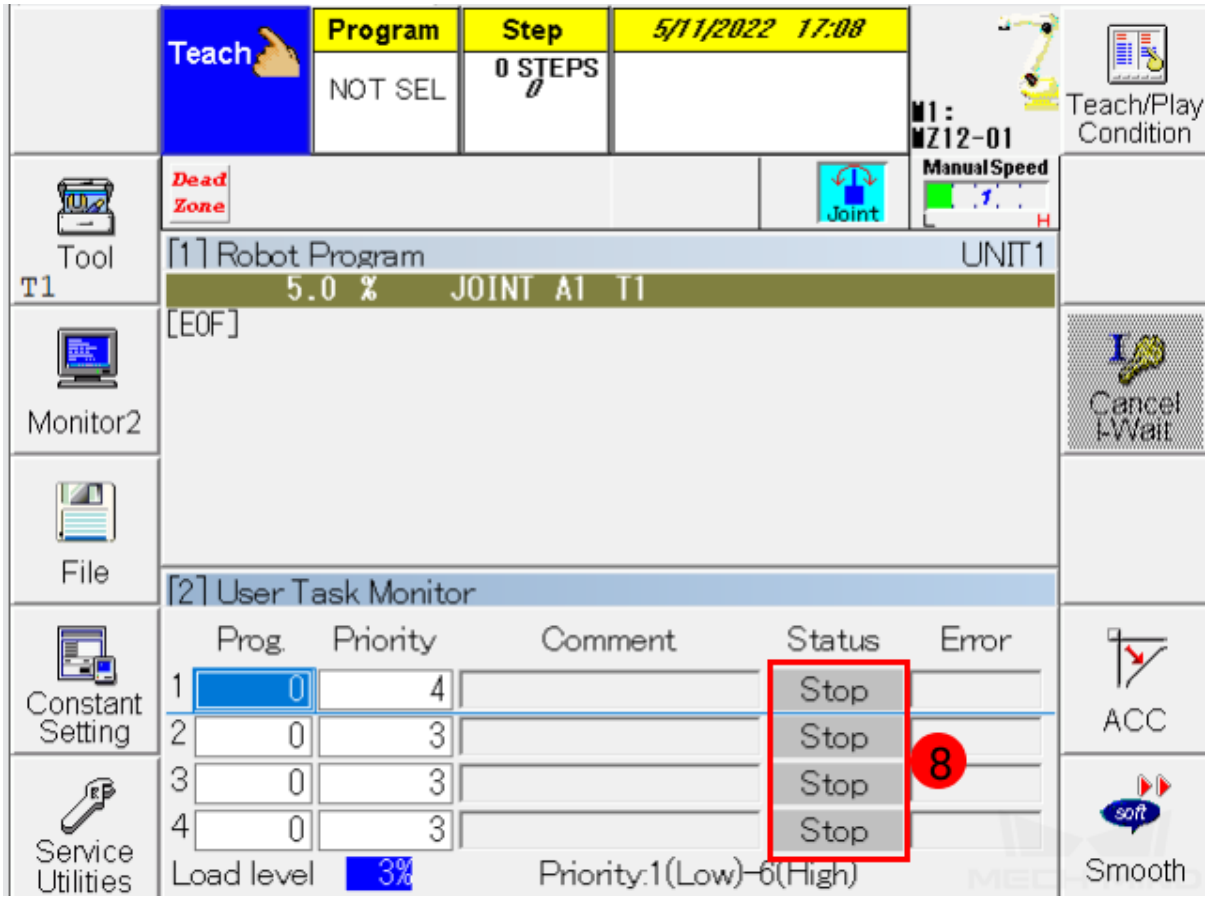

Virtual TP
Version info.(A)
NACHI
DAIHEN
X-
X+
RX-
RX+
Y-
Y+
RY-
RY+
Z-
Z+
RZ-
RZ+
7
8
9
4
5
6
ON
1
OFF
2
3
R
0
BS
END
FN
4

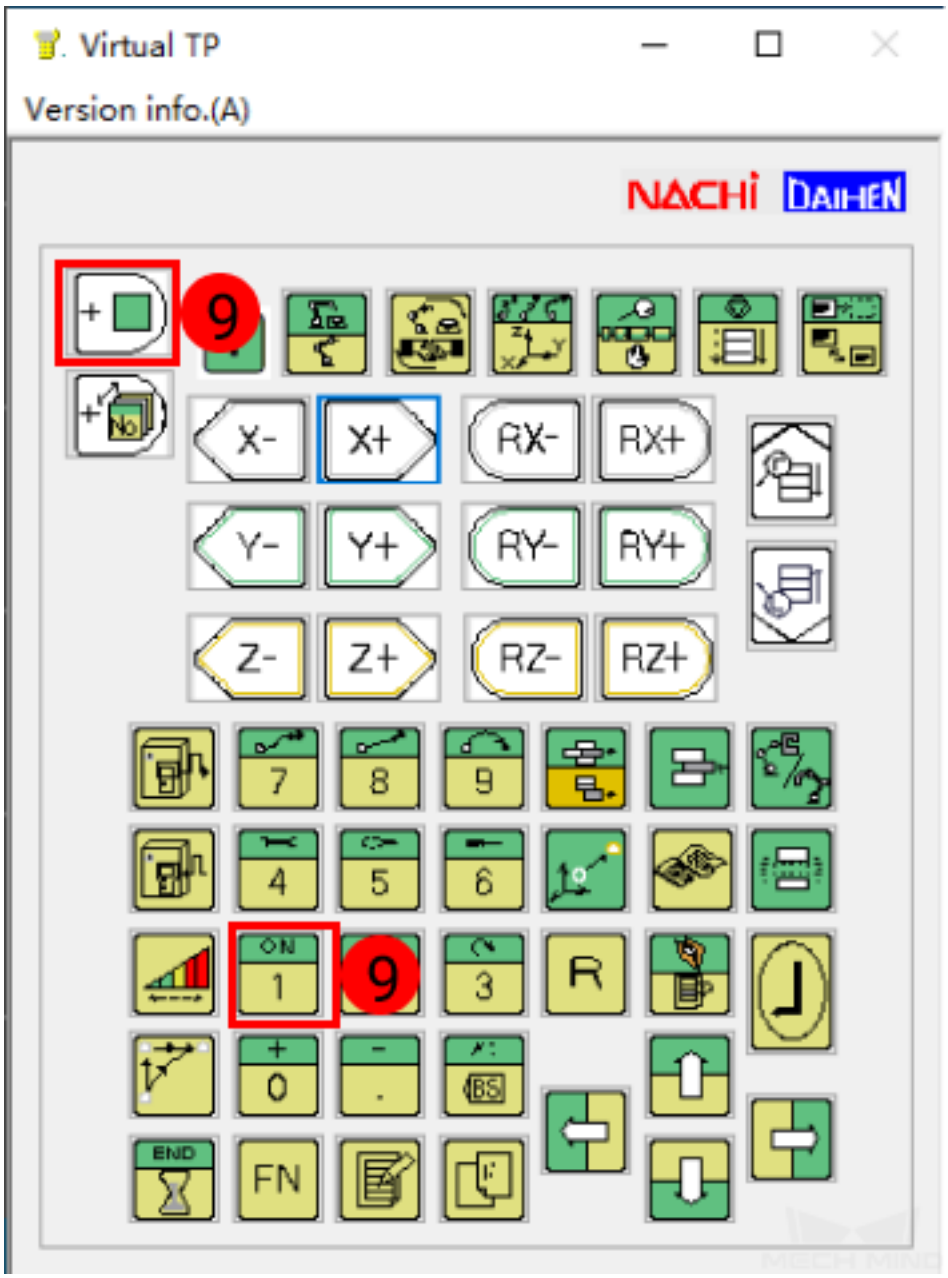

Teach
Program
NOT SEL
Step
0 STEPS
5/11/2022 17:08
M1:
MZ12-01
Teach/Play Condition
Dead Zone
Joint
Manual Speed
Tool
T1
[1] Robot Program
UNIT1
5.0 % JOINT A1 T1
[EOF]
Monitor2
Cancel Wait
File
[2] User Task Monitor
5
Prog.
Priority
Comment
Status
Error
1 0 4 Stop
2 0 3 Stop
3 0 3 Stop
4 0 3 Stop
6
Constant Setting
ACC
Service Utilities
Smooth
Load level 3%
Priority:1(Low)–6(High)



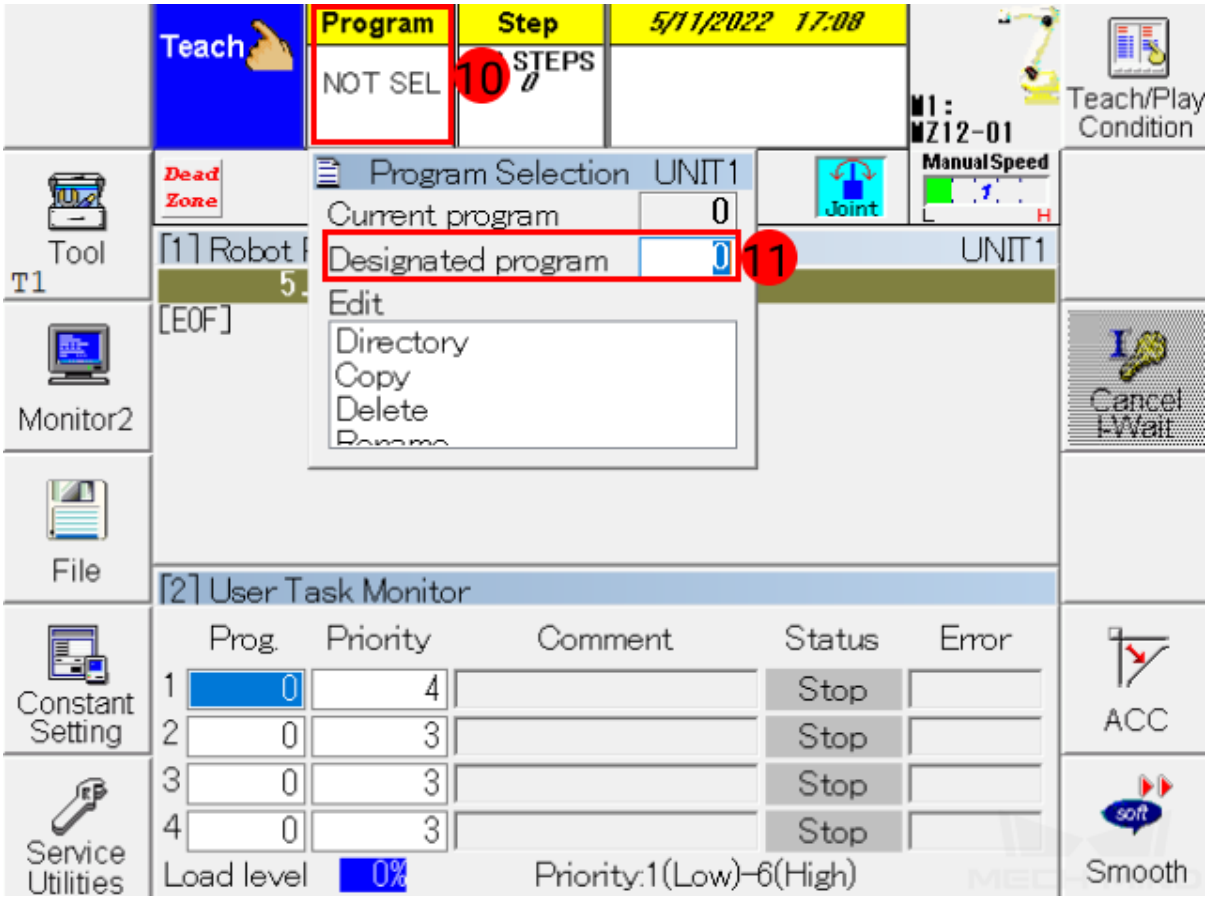
Hint: If the robot cannot move in a smooth way, please change the priority level of the program 21 from 4 to 5.

3. Select the **Status** column, and press and keys at the same time.


Teach
Program
NOT SEL
Step
0 STEPS
5/11/2022 17:08
M1:
MZ12-01
Teach/Play Condition
Dead Zone
Joint
Manual Speed
Tool
T1
[1] Robot Program
UNIT1
5.0 % JOINT A1 T1
[EOF]
Monitor2
Cancel Wait
File
[2] User Task Monitor
Prog.
Priority
Comment
Status
Error
1 0 4 Stop
2 0 3 Stop
3 0 3 Stop
4 0 3 Stop
8
Constant Setting
ACC
Service Utilities
Smooth
Load level 3%
Priority:1(Low)-6(High)

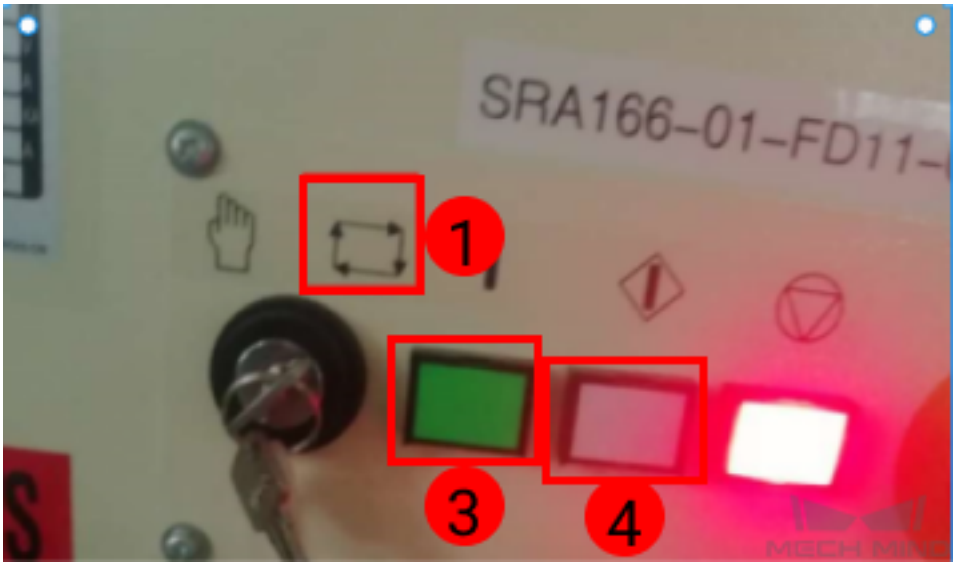


4. Go to *Program→ Designated Program*, enter 120 in the box, and then press key. The designated program will appear in the Program panel and User Task Monitor.

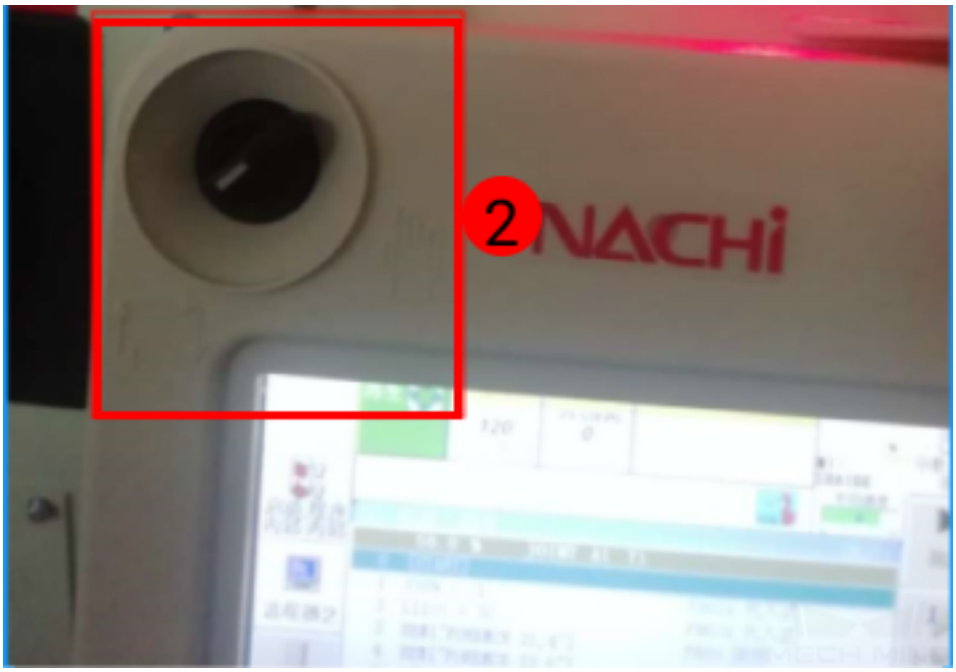


3.5 Start the robot

1. Turn the key on the controller and orientate it to the location 1.



2. Turn the selector switch as shown below. Press the green button and white button in turn to start the robot.



Hint: After running the master-control program successfully, you can open Mech-Center to connect the robot.

CHAPTER

FOUR

TEST ROBOT CONNECTION

4.1 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**.

4.2 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**.

4.3 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.

4.4 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!