PRC SERIES

7" Teach Pendant Manual

PRESTO
프레스토솔루션

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1 Introduction

1.1 Hardware Specification

Item	Description
Processor	TI AM335x, 800 MHz
	RAM 512 MB
LCD	800x480
Touch	Resistive
USB (Keyboard, Mouse)	1
Communication	Ethernet, RS232
Power	24V DC
Protection Grade	IP40~IP65
Case	Black
Operating Environment	0^0C~45^0C
Storage temperature	-20^0C~70^0C

1.2   Key and LED functions

| Number	Function
1.	LED
2.	Home window
3.	System Config
4.	Command terminal
5.	Program manager
6.	User Log
7.	Position Monitoring
8.	Error Log
9.	Show keypad for IP
10.	Hide keypad / Stop Scope
11.	
12.	Robot Select
13.	Jog
14.	
15.	Jog Step
16.	Velocity Increase for Jogging
17.	Velocity decrease for Jogging
18.	Using when the number of Axes is greater than 6
19.	Jogging for each axis (index 0~5)
20.	Start Program / Robot ON
21.	Stop Program / Stop motion when jogging

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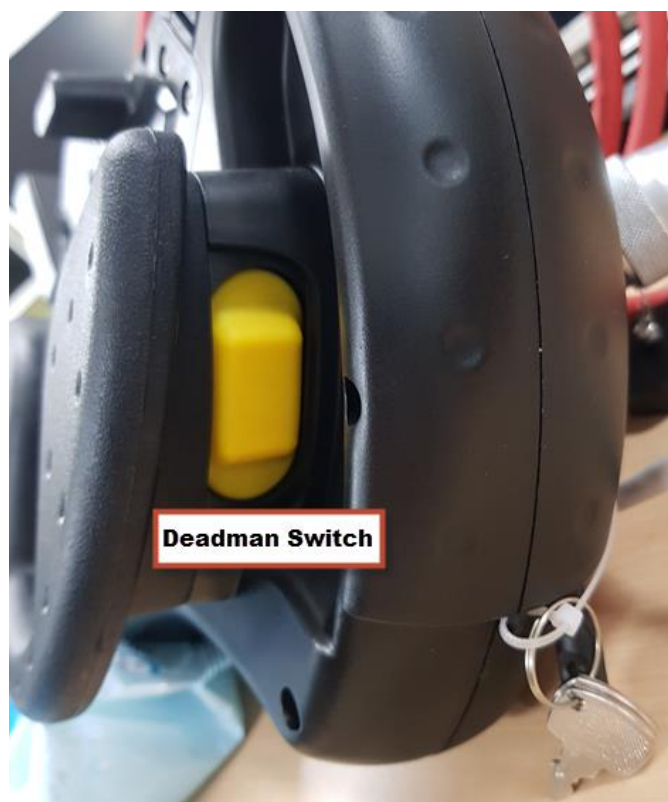
1.3   Connection

- **Robot Controller Pin Map**
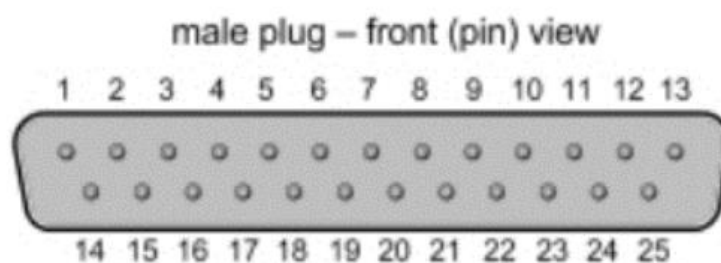
Pin#	Name	Description
System I/O		
2	EMTP1+	Emergency Switch 1pin signal(+)
15	EMTP1-	Emergency Switch 1pin signal(-)
3	EMTP2+	Emergency Switch 2pin signal(+)
16	EMTP2-	Emergency Switch 2pin signal(-)
4	SWEN1+	Enable Switch 1pin signal(+)
17	SWEN1-	Enable Switch 1pin signal(-)
6	SELCOM1+	Select Switch 1pin signal(+)
19	SELCOM1-	Select Switch 1pin signal(-)
7	SELCOM2+	Select Switch 2pin signal(+)
20	SELCOM2-	Select Switch 2pin signal(-)
Power		
1	VCC	Input power 12 ~ 24V DC
14	GND	Ground
접지	Shield	Case(Ground)
RS232		
25	GND	Ground
12	**TX**	Send data
13	**RX**	Receive data

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- **TP Pin Map**
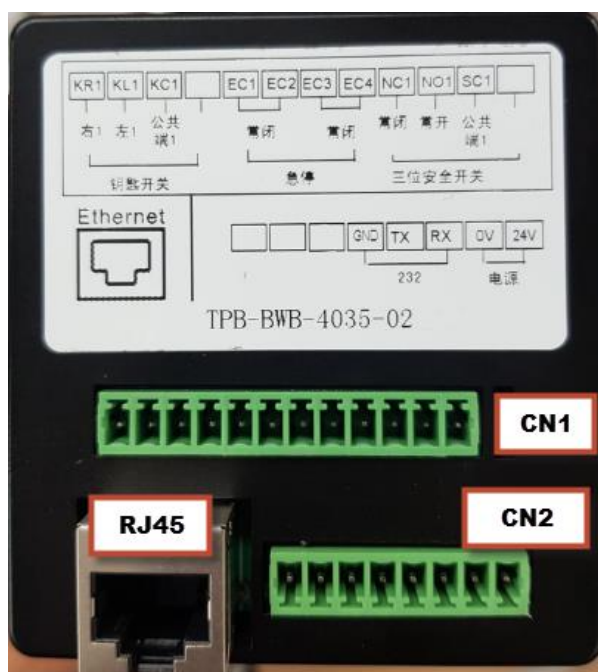
- **Connection between Robot Controller and TP**

Part	[Robot Controller]		[TP]	
Emergency Switch	2	EMTP1+	EC1	**CN1**
	15	EMTP1-	EC2	
	3	EMTP2+	EC3	
	16	EMTP2-	EC4	
Dead-man Switch	4	SWEN1+	NO1	
	17	SWEN1-	SC1	
Select Switch	6	SELCOM1+	KL1	
	7	SELCOM2+	KR1	
	20	SELCOM2-	KC1	
RS232	12	TX	RX	**CN2**
	13	RX	TX	
	25	GND	GND	
POWER	1	VCC	24V	
	14	GND	0	
Ethernet	RJ45		RJ45	

1.4   Applications

실제 로봇 외에 시뮬레이터 지원

환경에 맞게 설정 후 연결 시도

통신 방식을 TCP/IP와 RS232 중 선택

Robot 상태, 통신 상태, 이더캣 상태 표시
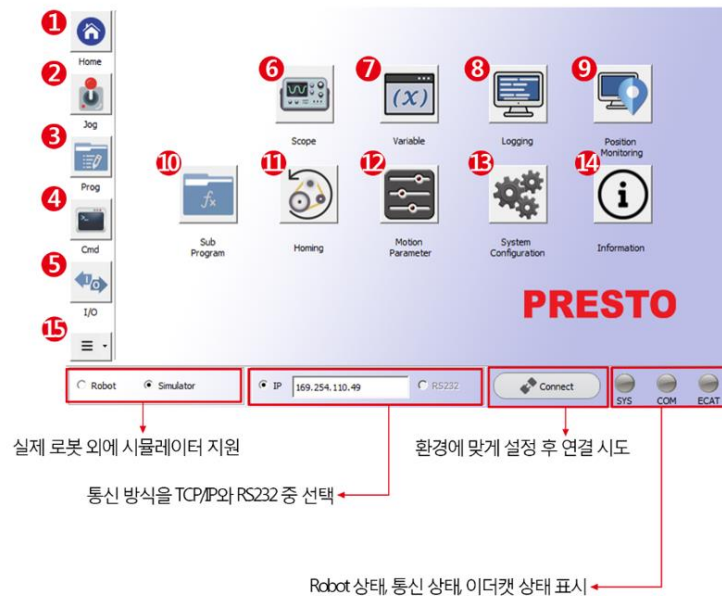
1 . Home
- 초기화면으로 이동

2 . Jog
- Servo On, Off
- Joint 좌표계 혹은 Work 좌표계로 조깅
- 3D Viewer

3 . Program
- 10개의 Program Task 지원
- 프로그램 별 Auto Run Set 가능
- Running Line Tracing 가능

4 . Command
- Single Line Command
- Program 없이 간단한 명령을 실행할 수 있음

5 . I/O
- 연결된 Digital 및 Analog I/O의 상태를 확인하고 변경 가능
- Digital Output 상태 On, Off
- Analog Output 값 변경

6 . Scope
- 8개의 채널을 통해 다양한 데이터를 한 눈에 측정
- 모터 데이터, I/O 데이터 등을 측

7 . Variable
- Integer, Double, Position Variables
- 각 변수마다 Save, Add, Edit 가능
- 마지막 변수부터 순차적 삭제 가능

8 . Logging
- Error, System, Maintenance, User Log 확인 가능

9 . Position Monitoring
- 각 로봇의 포지션 확인 가능

10 . Sub Program
- 최대 100개의 Sub Program 지원
- 함수를 만들어 Main Program에서 호출하여 사용 가능
- Functional Programming

11 . Homing
- 축 별 Homing Parameter 설정
- Homing 동작을 시작하거나 멈춤
- Homing State, Mode 등을 확인할 수 있음

12 . Motion Parameter
- 로봇, 축마다 Motion과 관련된 설정을 변경할 수 있음
- Ready, Jog, Program, Motion Parameters

13 . System Configuration
- 시스템 설정 변경(로봇명, 변수의 수, 모션 속도 등)
- 로봇, 모터 설정 변경(Pulse, Pitch, Gear Ratio, Direction 등)
- 로봇 구성 변경

14 . Information
- TP 펌웨어 버전 정보
- Presto Robot Controller 버전 정보

15 . Quick Menu
- 자주 사용하는 메뉴들로 구성
- Home으로 이동할 필요 없이 어디서나 이동할 때 필요한 메뉴

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2 Login

In order to control system, first we need to login to system.

Input IP
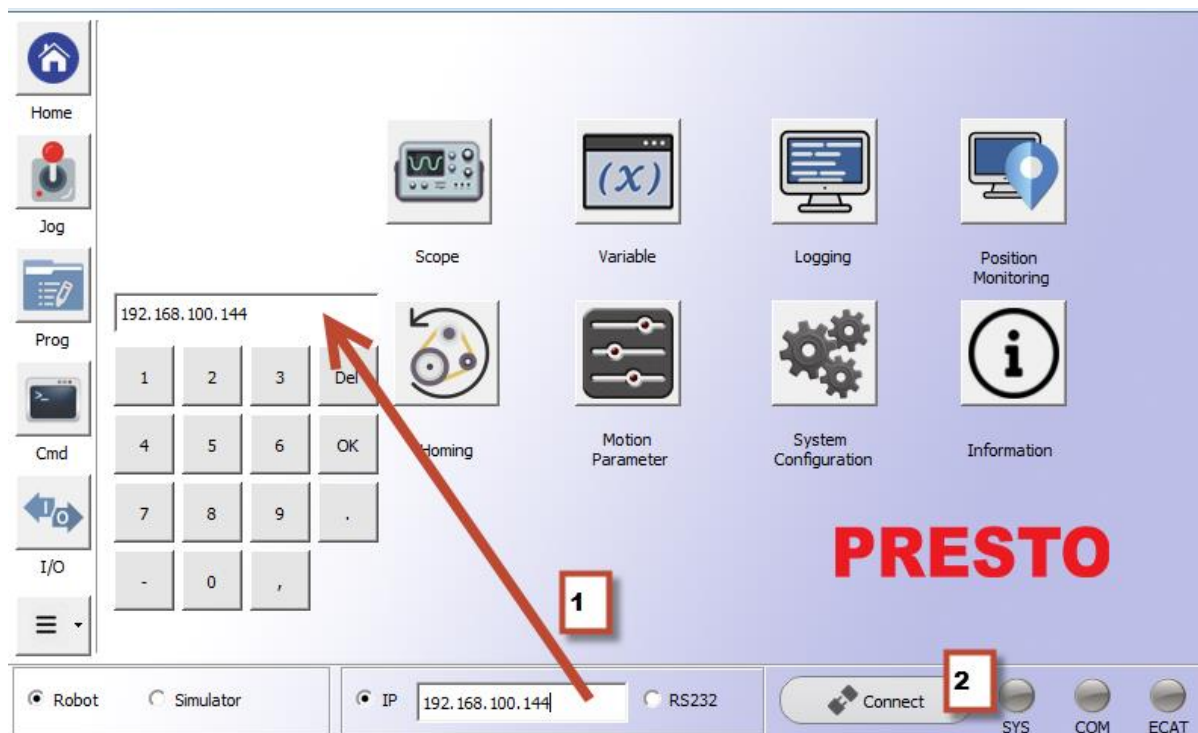
Press Connect

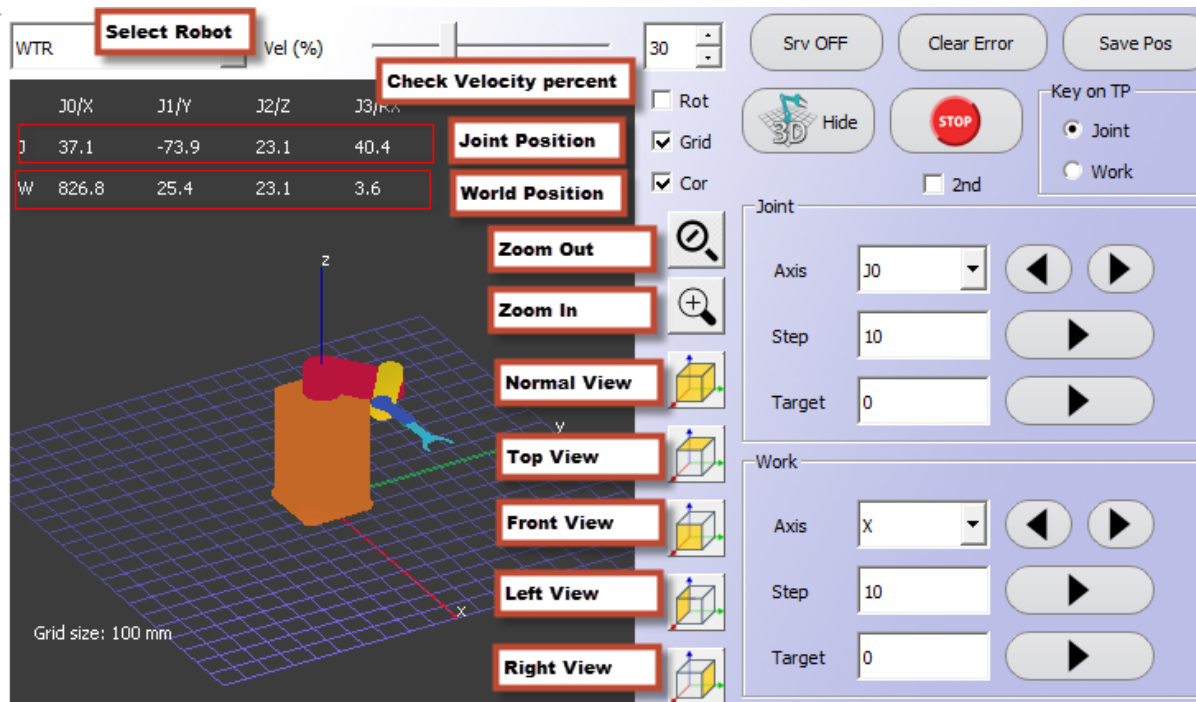If IP of Robot Controller is online, next step is choosing Login Level

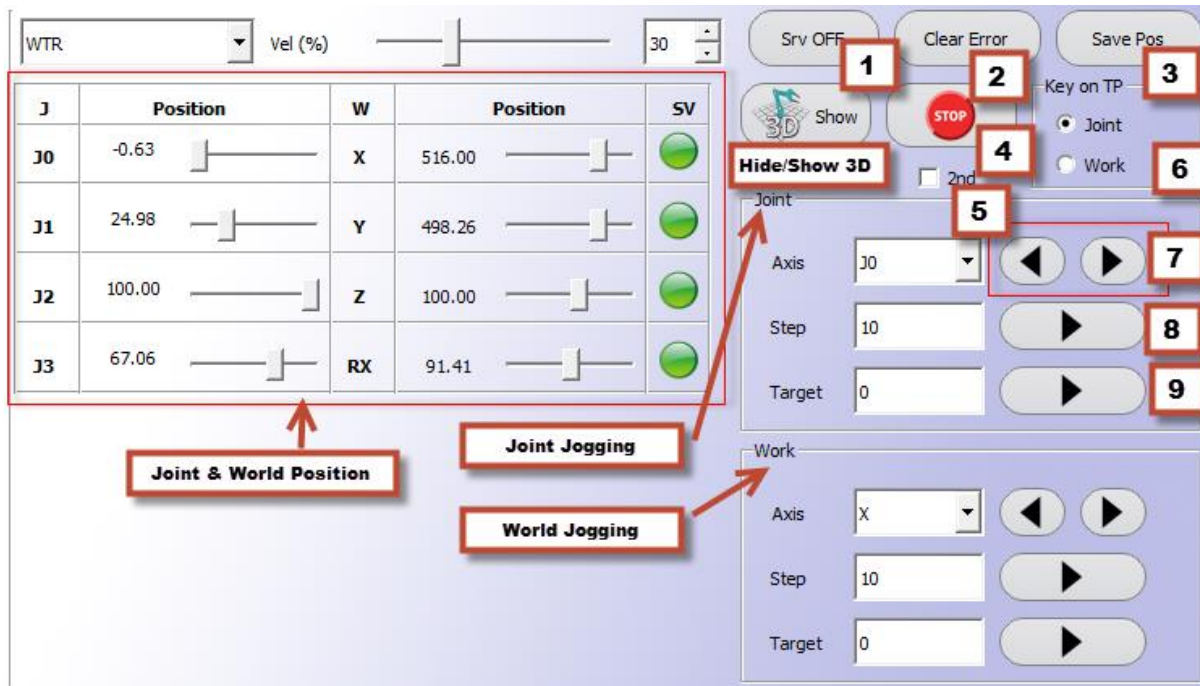Operator does not require password. Otherwise, it requires password to login to system.

3   Applications

3.1   Jogging

With 3D View

When Press Button **Hide** [3D] we change to mode without 3D.

1. **Srv ON / Srv OFF**: Turn selected robot ON / OFF.

2. **Clear Error**: Clear Drive Error of the selected robot.

3. **Save Pos**: Open Save Position Dialog to Save position to expected position variable.

4. **Stop**: Stop Jogging Motion

5. **2nd**: Show 2nd axis whether is selected.

6. **Key on TP**: Use Keypad on TP as Joint Jogging or World Jogging.

7. **Jogging** Left and right for selected Axis

8. **Step:** Jogging step with value on the left

9. **Move** selected Axis with value on the left

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1. Select variable index

2. View all available variables

3. View current position of selected robot

4. Get current value of selected variable

5. Save value from table to current variable

3.2   Program & Sub-program mananger

Program editor with Syntax Highlight and Auto-completion code support.

Program Manager

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1. Program select

2. Sub-program select

3. Program/sub-program name

4. Compile program/sun-program

5. Start/Stop opened program

6. Pause/Resume opened program

7. Save the opened program to TP

8. Open program from TP and load to current program

9. Auto-complete code support

Program Manager:

1. Auto Run at Startup Robot Controller

2. Program status with Compiled (C), Running (R), Paused (P), Error (E)

3. 10 program can run at the same time

4. Extra program can load from TP by press button at 8.

3.3 Command Terminal


```
-> JtFPos()
[31.558399, -63.111305, 47.358559, 31.554485]
-> 2*9+6
24
```

`2*9+6` ⊗ | JtFPos() ▾ | Send | Clear
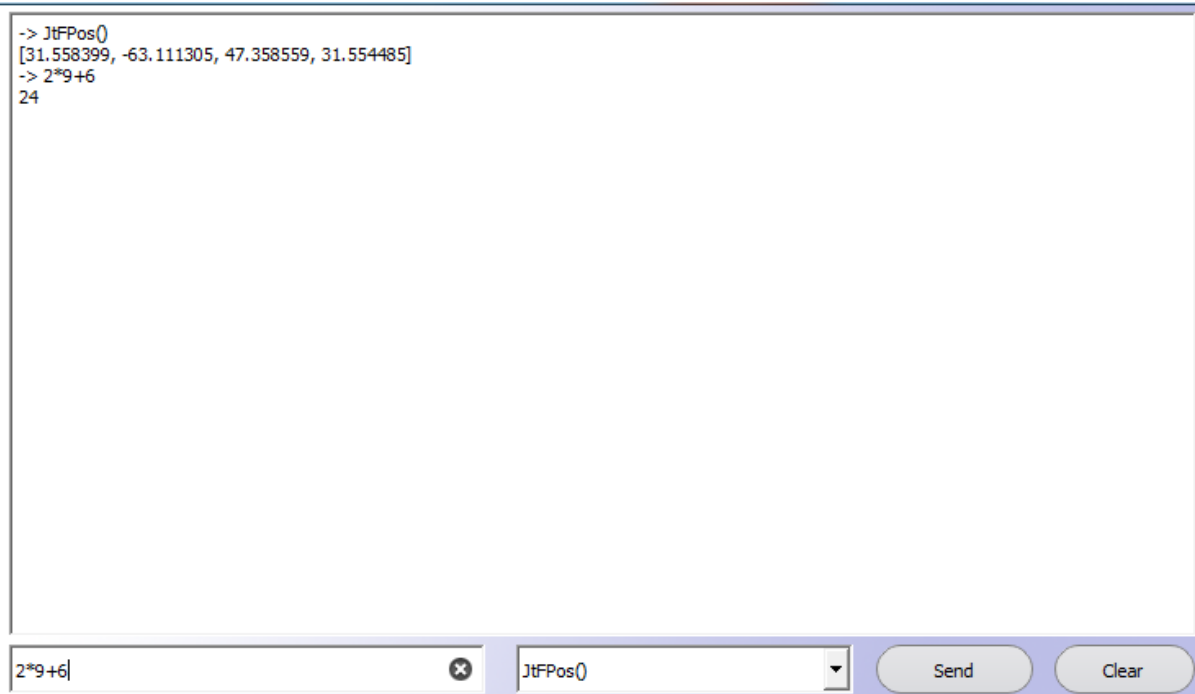
Execute single command and return result.

Support motion command, Math.

3.4   IO Manager

Easy to control Input/output of Digital/Analog signals by press the buttons or enter value.
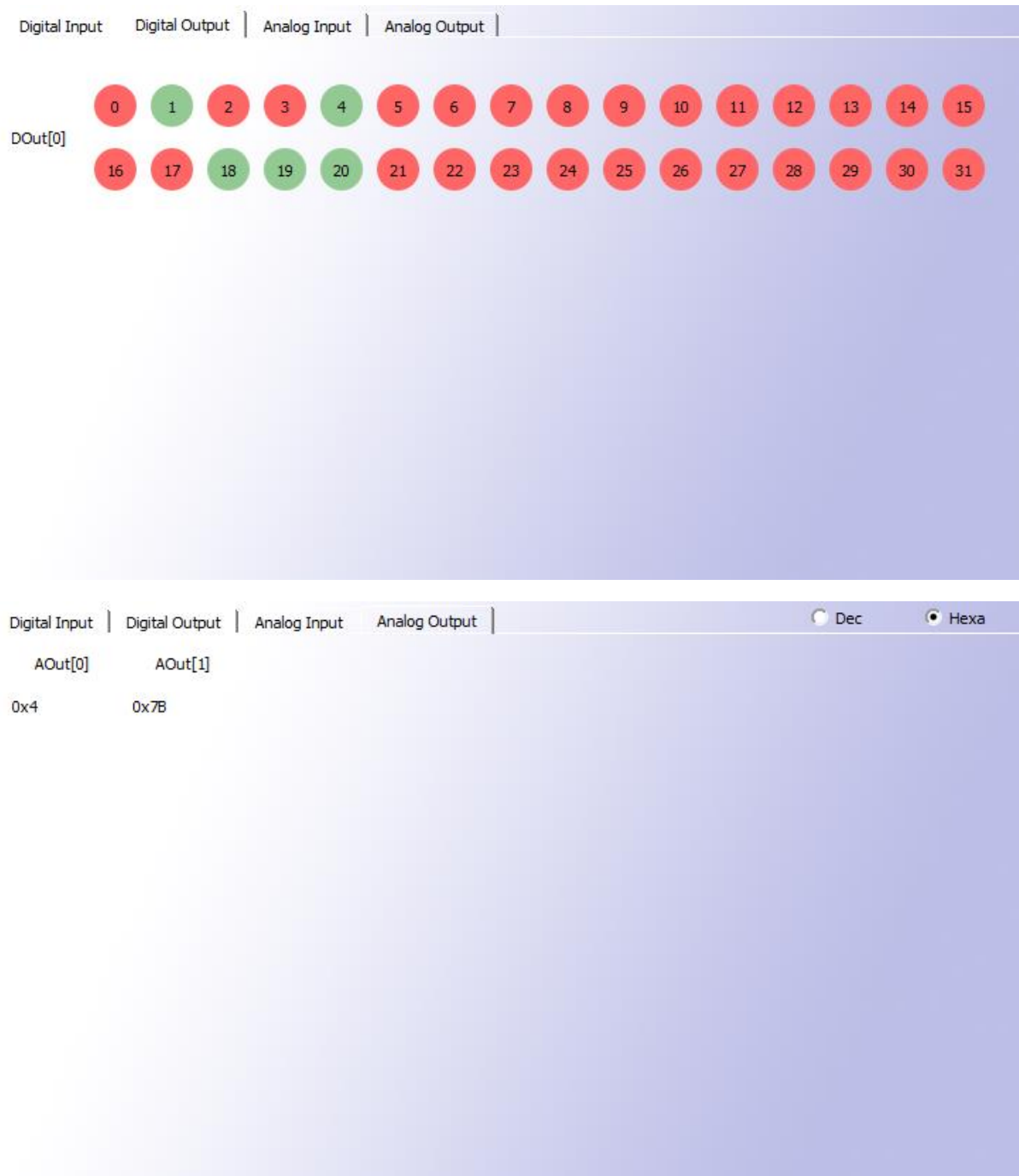
3.5   Scope

3.5.1   Capture signal
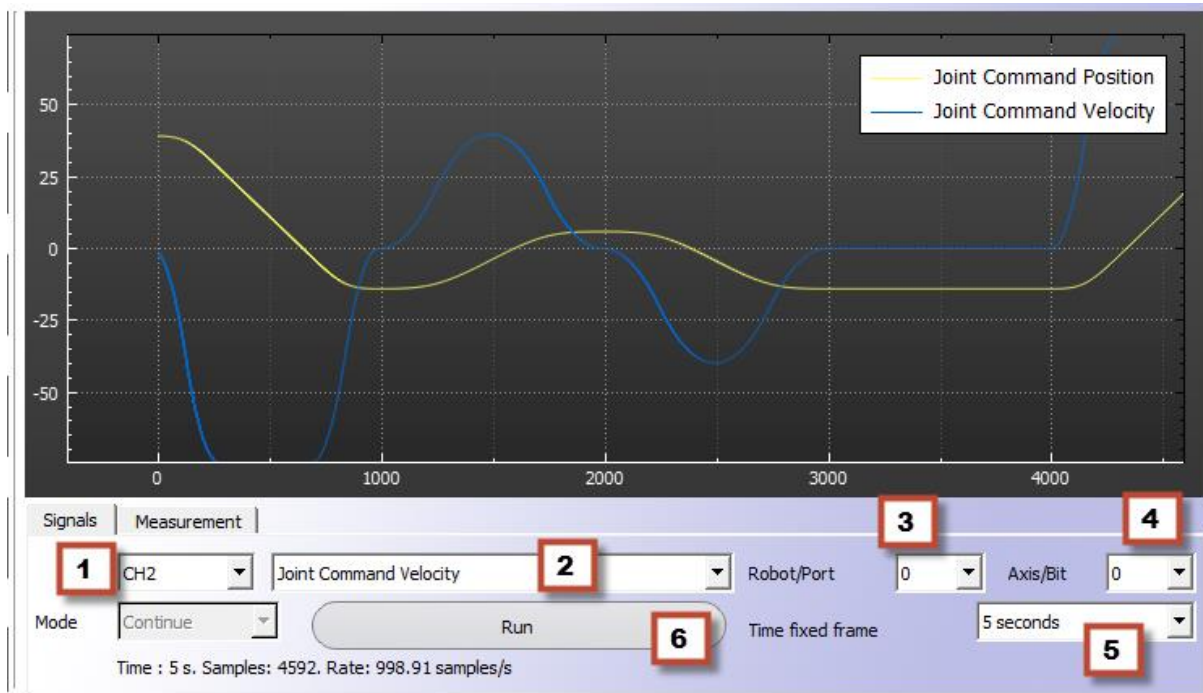
1. Select Channel (8 channel)

2. Select Signal

3. Select Robot Index (in case of multiple robots are used) or Port of Digital/Analog IO

4. Select Axis Number (in case of multiple robots are used) or Bit Index (in case of Digital IO are used)

5. Select how long to be fixed within scope window.

6. Run/Stop scope

3.5.2 Measure signal

By right click and drag the mouse to produce a rectangle, we can zoom in graph within the rectangle.

By moving the ruler, we can get data measurement in the table.
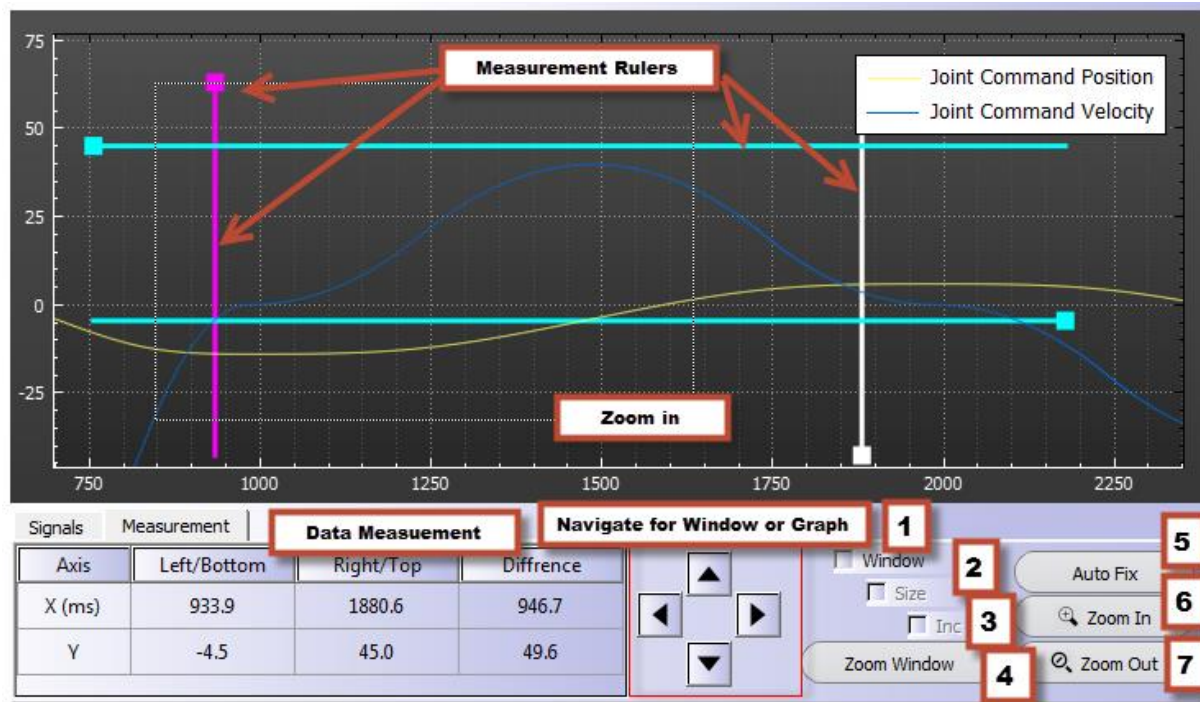
1. Choose using window to zoom

2. Change size by navigation tool (default deceased in size)

3. Increased in size when using navigation tool

4. Zoom within the zoom window

5. Fix all data of scope into the scope window

6. Zoom in

7. Zoom out

3.6   Variable Manager

Support managing Integer, Double and Position variable for adding, editing, and deleting each type of variable.

1.   Select Robot

2.   Refresh robot variable data

3.   Add new variable

4.   Remove the last variable

3.7   Logging

Support log for error, system, maintenance, and user log.
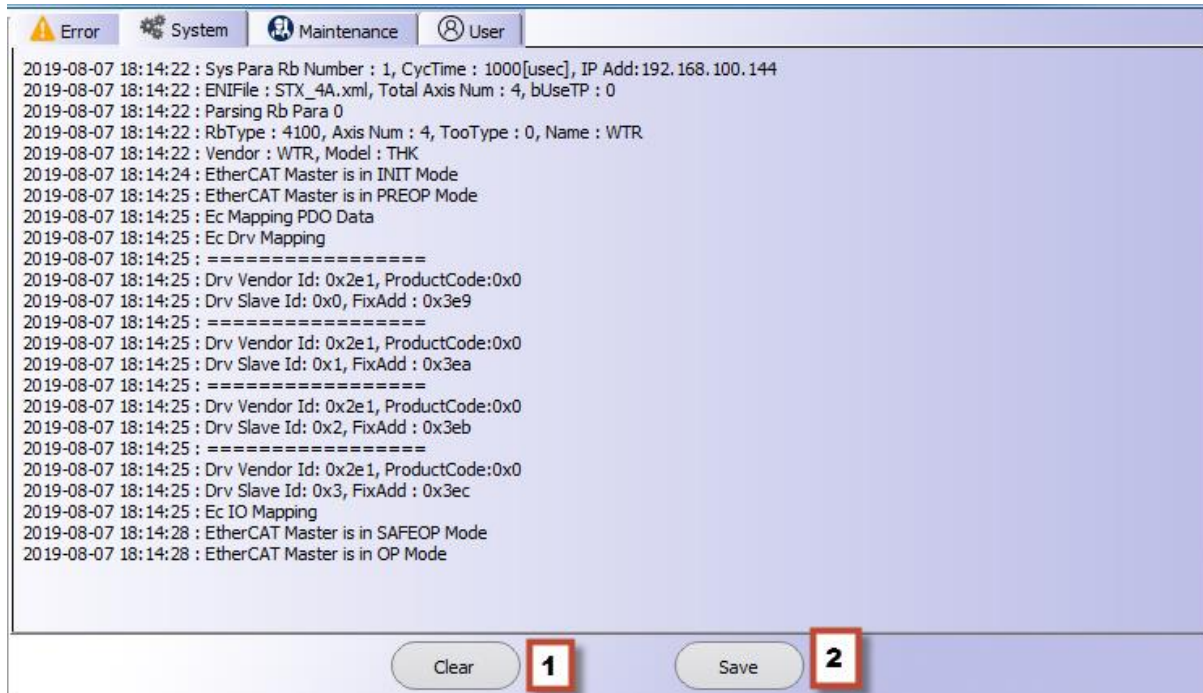
1. Clear log on TP and Robot Controller

2. Save current log to file on TP.

3.8 Position Monitoring

User can monitor position of all robot (joint and world) within a window.

No	Robot Name		J0/X	J1/Y	J2/Z	J3/RX	J4/RY	J5/RZ
0	WTR	J	0.00	0.00	0.00	0.00		
		W	938.00	0.00	0.00	0.00		
1	RS_PUMA	J	0.00	0.00	0.00	0.00	0.00	0.00
		W	396.10	-0.00	707.00	-0.00	90.00	0.00
2	LPK_SCARA	J	0.00	0.00	0.00	0.00		
		W	500.00	0.00	0.00	0.00		
3	PS_DELTA	J	0.00	0.00	0.00			
		W	0.00	-0.00	139.28			

3.9 Homing

WTR

	Srv	Axis	JPos	State	Mode
☐		J0	5.89	ERROR	NONE
☐		J1	19.60	NONE	CSP
☐		J2	100.00	NONE	CSP
☐		J3	65.92	NONE	CSP

Select All   Save To Flash

Homing parameters

Axis No	J0
Method	1
Velocity	20.00
Return Vel	5.00
Acceleration	100.00
Offset	0.00

*Method: -128~127

This number depends on the drive

Set Homing Parameters

Set All Axes

* Please select robot from Jogging window

Start   Stop

First, we set homing parameters then we can **Start** or **Stop** the homing process.

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3.10 Motion Parameter

1. Select robot for setting motion parameters

2. Select Motion type: Manual, Program and Ready

3. Save to Flash: Save current motion parameters to flash, then next restart robot controller can re-use them.

4. Get current motion parameter from Robot Controller

5. Set joint motion parameter from left table to Robot Controller

6. Set work motion parameter from left table to Robot Controller

3.11 System Configuration

3.11.1 General Settings

1. Select COM (Serial Port) on TP that will connect to Robot Controller

2. Refresh to get new status of serial ports

3. Change the password if login as Programmer or Administrator

4. Update license code long-run of Robot Controller

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3.11.2 Robot Controller Settings

Change some information about Robot Controller

1. IP address

2. Cycle time: 4000ms, 2000ms, 1000ms, 500ms, 250ms

3. Robot Number: Automatically Counted when adding/removing robot

4. Toto Axis Number: Automatically Counted when adding/removing robot

5. ENI File: Choose ENI on Robot Controller by click **Search** button
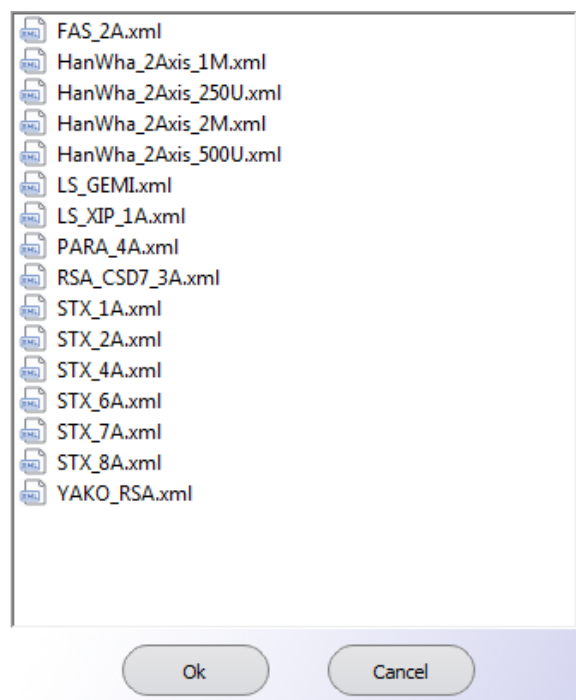
6. **Add Robot From File**: Add robot by file from TP.
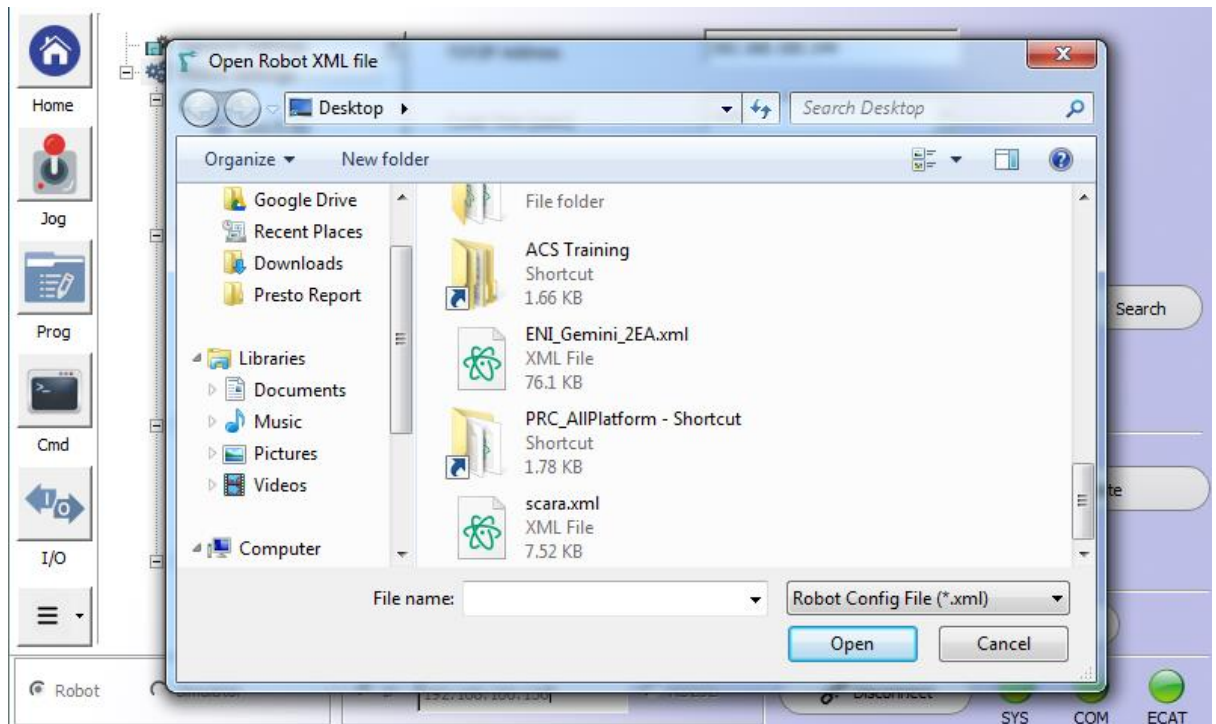
7. **Add Robot From Template**: Add robot by file from Robot Controller.

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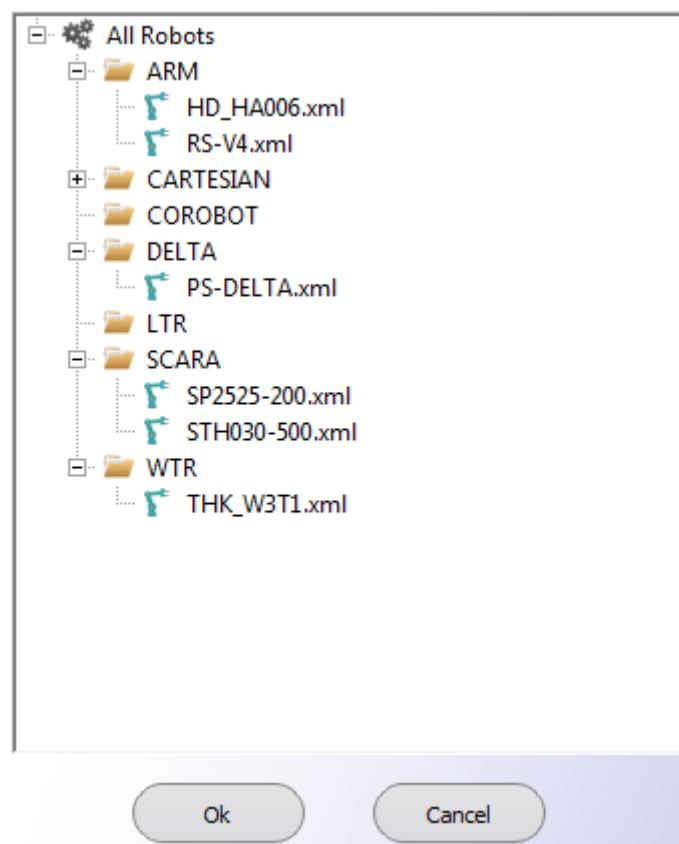
3.11.3 Each Robot Settings

3.11.4   Motor/Drive Settings

After setting, we can press button **Save all Parameter to RC and Reboot** to start with new settings.

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3.12   Software information
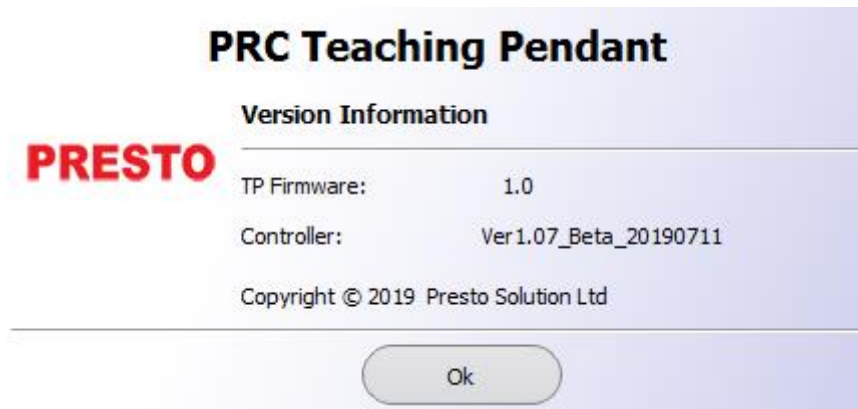
4   Virtual Keyboard and keypad

4.1   Virtual Keyboard

Normal mode

Upper Case with **Shift**

Special key with "**!#1**" button
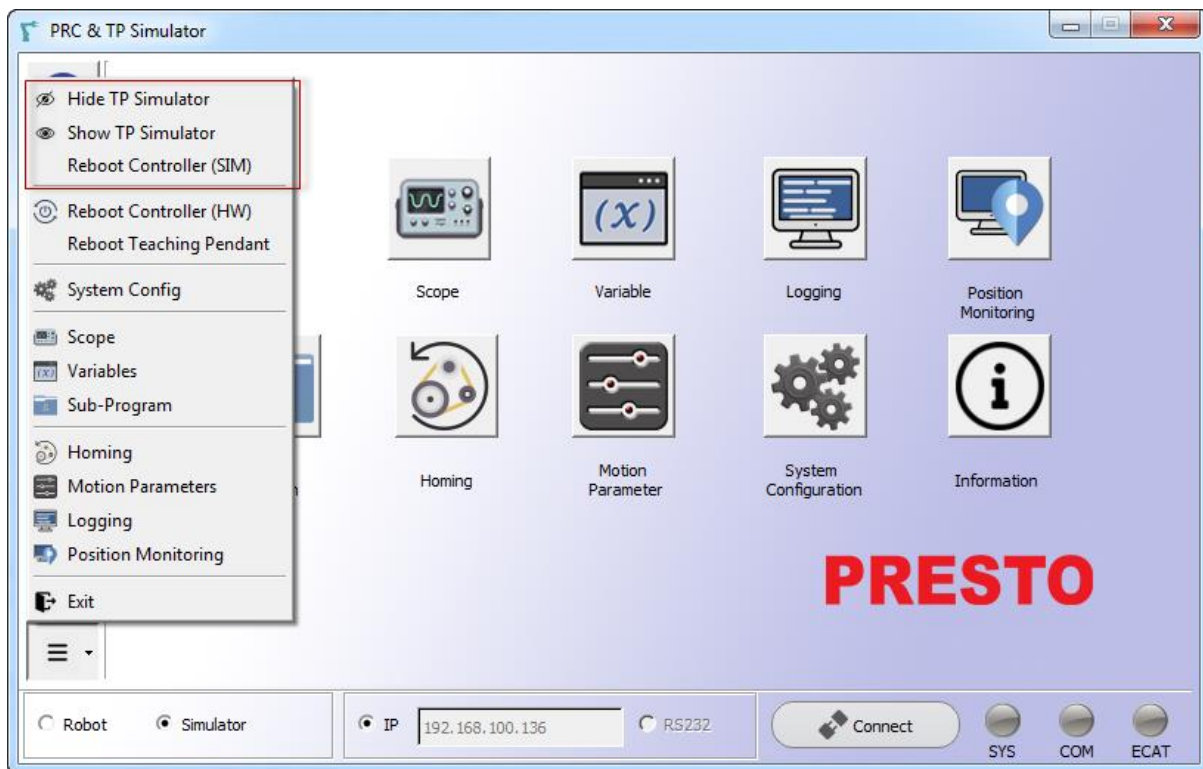

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4.2   Virtual Keypad

5   Teaching Pendant Simulator

When using with PCs, Teaching Pendant Simulator can support both **Robot Controller Simulator** and **Teaching Pendant Simulator**.

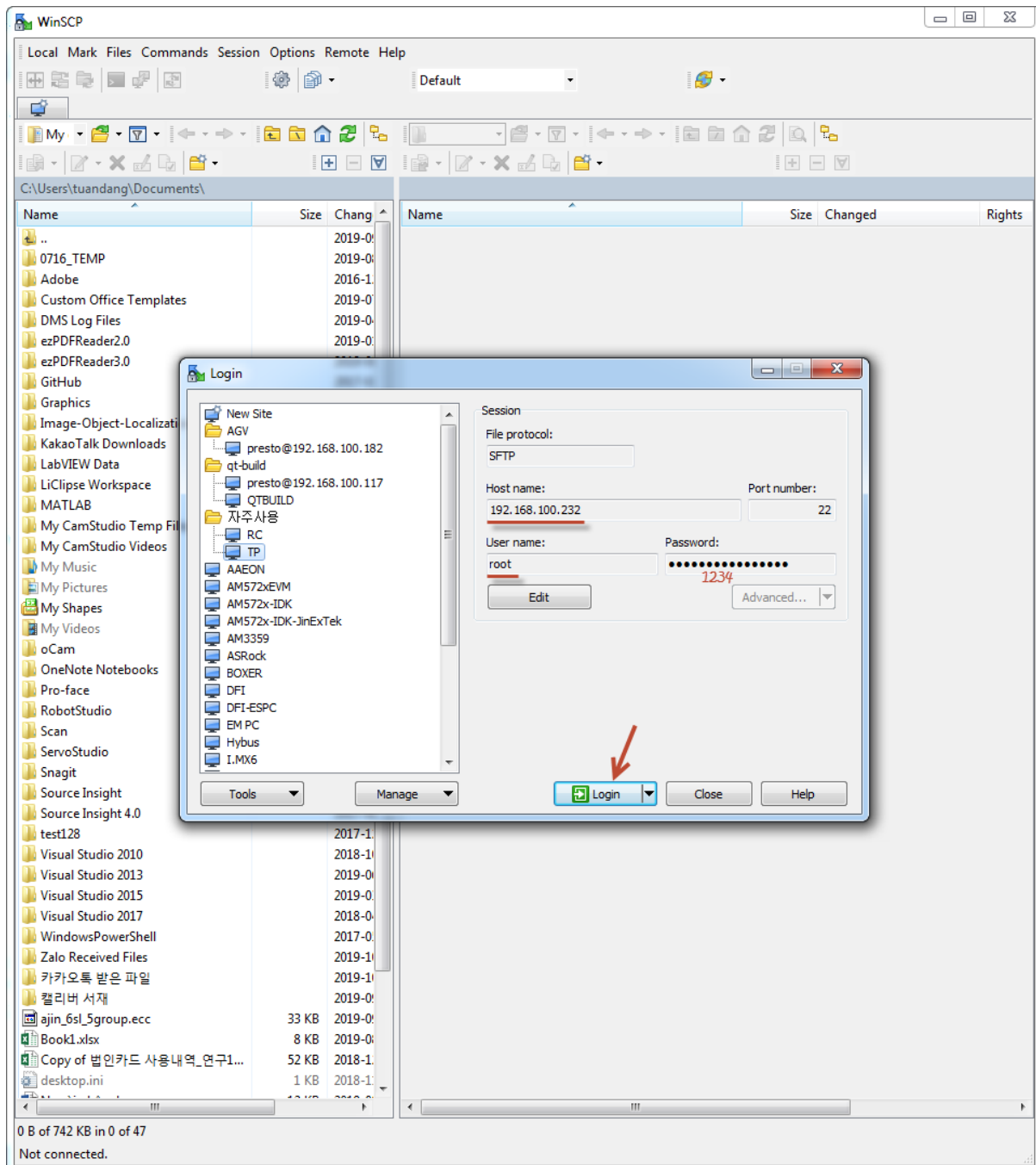Simulator menu will be showed when we click more button.

We can start Robot Controller Simulator by choosing **Reboot Controller (SIM)** menu.

We can use Teaching Pedant Simulator by choosing **Show TP Simulator** menu.

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6   Upgrade TP Firmware

## 6.1   Upload file using WinSCP (https://winscp.net/eng/download.php)

Fill information: **Hostname**, **Username**, and **Password** as picture above and click login

After login, navigate to firmware file (name **prc**), then drag firmware file from source (PC) to destination (TP) to upload file.
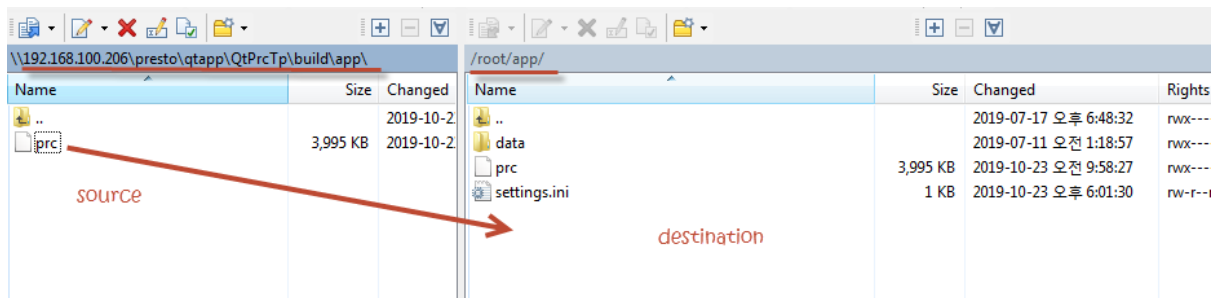
6.2 Change permission to run application

Login to TP system using Putty (https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html)
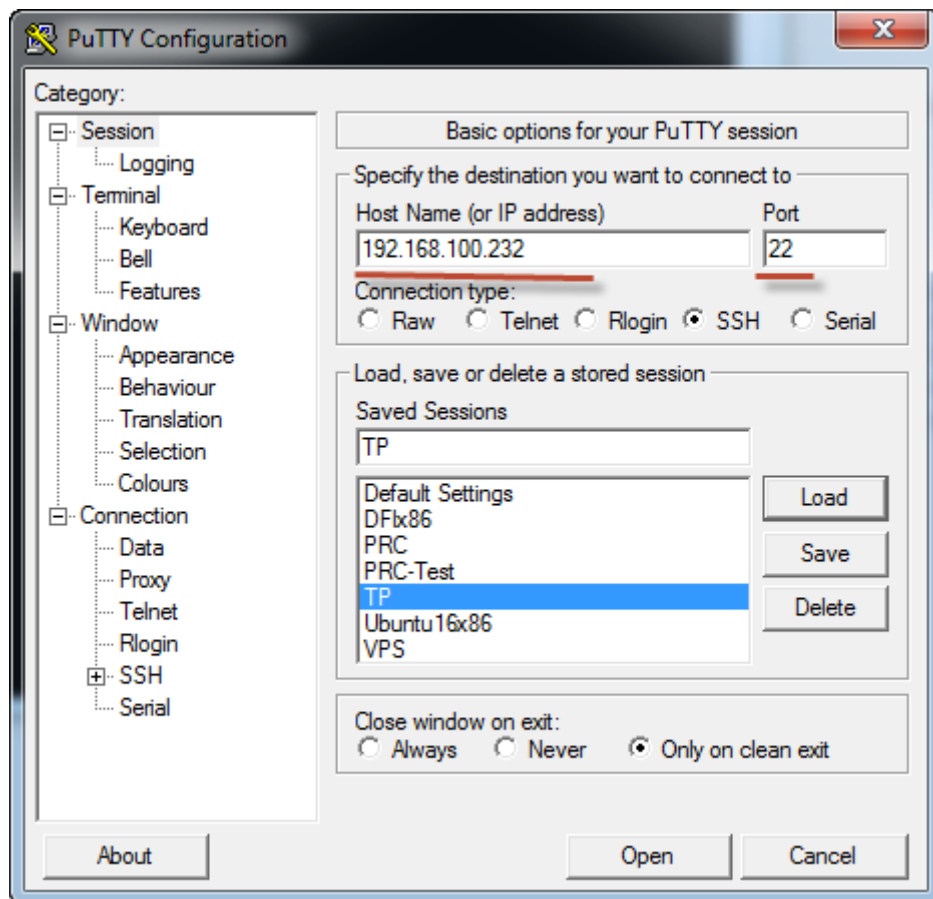
Fill hostname or IP and port as picture above.

- Fill username and password as picture above

- Navigate to **app** director by **cd app**

- Change permission by **chmod +x prc**

- Reboot TP

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