Ezi-SERVO® II Plus-E ALL

Closed Loop Stepping System

# User Manual

## User Program (GUI) Function

( **Rev.03**)

FASTECH

# Table of Contents

**This manual describes how to operate User Program(GUI).**

**For more information, refer to related manuals as following.**

(1) User Manual-Text

(2) User Manual-Communication Function

(3) User Manual-Position Table Function

# 1 . Installation and connection of the Program

Ezi-SERVOⅡ Plus-E ALL consists of two operation modes as follows.

1) Using of Motion Library (DLL) which is provided for the program from Windows 7/ 8/ 10.

2) Using of Position Table (PT) and external signals input by the user.

For the operation modes above, refer to each related manual.

This chapter describes the user program used for installation and running test of the controller

## 1 - 1 . Installable PC environment

Type : PC/AT compatible machine

Ethernet 10/100base-T/TX Lan Card

Hard disk capacity required : 10MB or more

Screen SVGA(1024×768 or more)

CPU Pentium4 2.0GHz or more

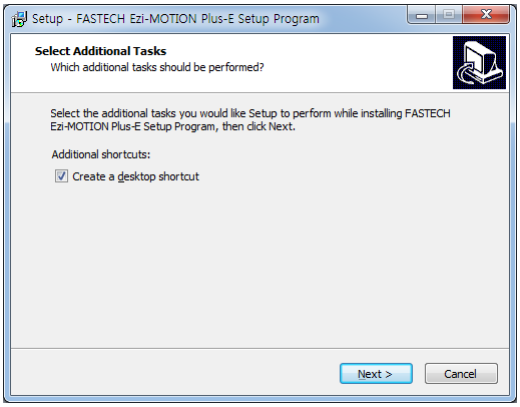
OS : PC with normally installed Windows 7/8/10 (32 / 64Bit)

## 1 - 2 . User Program (GUI) installation

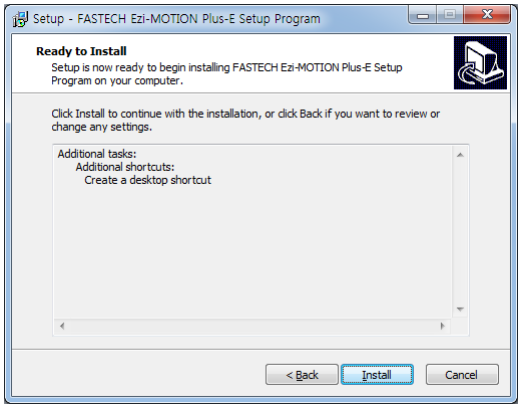
Download [Ezi-MOTION_Plus-E_SETUP] program on FASTECH website and install as shown below.

Installation Start window.

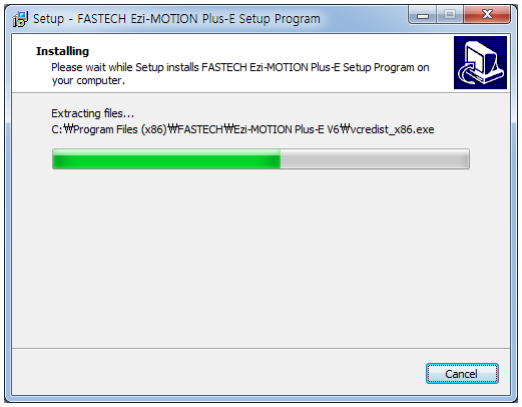
Click 'Next'.



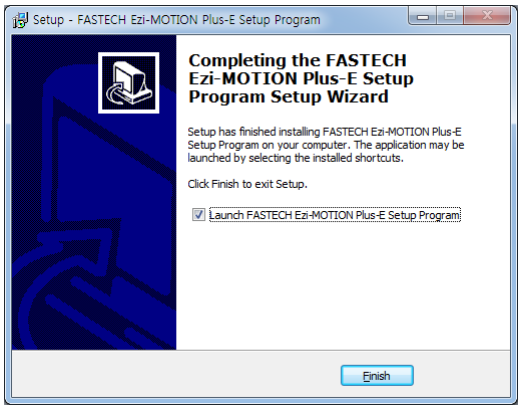
Select a folder where the program is installed,
And click 'Install'.



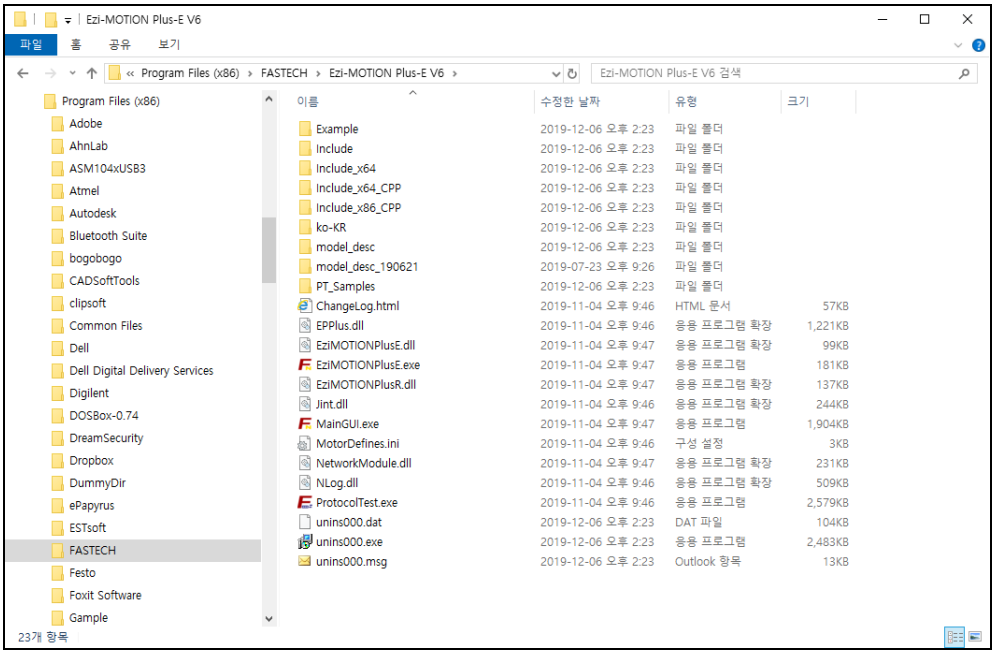

Installing




Installation is completed.



When installation is completed, you can find the below files in the selected folder.




1) Include folder : *.dll, *.lib, *.h, *.cs files (for 32bit, includes files for C#)
2) Include_x64 folder : *.dll, *.lib, *.h, *.cs files(for 64bi, includes files for C#)
3) Example folder : source code for sample
4) PT_Samples folder : sample data files for position table test

## 1 - 3 . Connecting PC with Drive Module

(1) To communicate with controller module, the user should prepare Ethernet cable and connect it with the PC. For more information, please refer to 「User Manual-Text」.

Execute User program(GUI), Ezi-MOTION PlusE V6 and click 'Connect'. Then the following window will be displayed.


| Button | Description |
|---|---|
| ADD | Enter IP Address and click 'Add'.<br>If the item does not exist with added IP Address, List will not be added. |
| Broadcast Search | Search every item that can be connected and add it to the List. |
| Refresh Status | Check the connection status of listed item. |
| Connect | Connect the listed item and execute GUI. |

● After setting each IP Address and clicking 'Broadcast Search', every item will be displayed on the list. Click 'Connect' then every item will be connected with GUI.

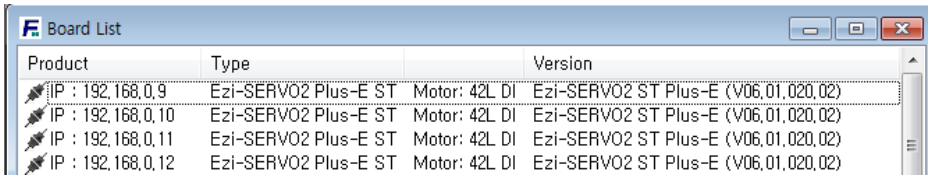
| | |
|---|---|
| Caution | **1. Please assign different IP Addresses of connected drives to a single network (segment).**<br>**2. If the connection fails, please check IP conflict and IP Address of PC.** |

(2) When the connection is completed, the window will appear as show below.

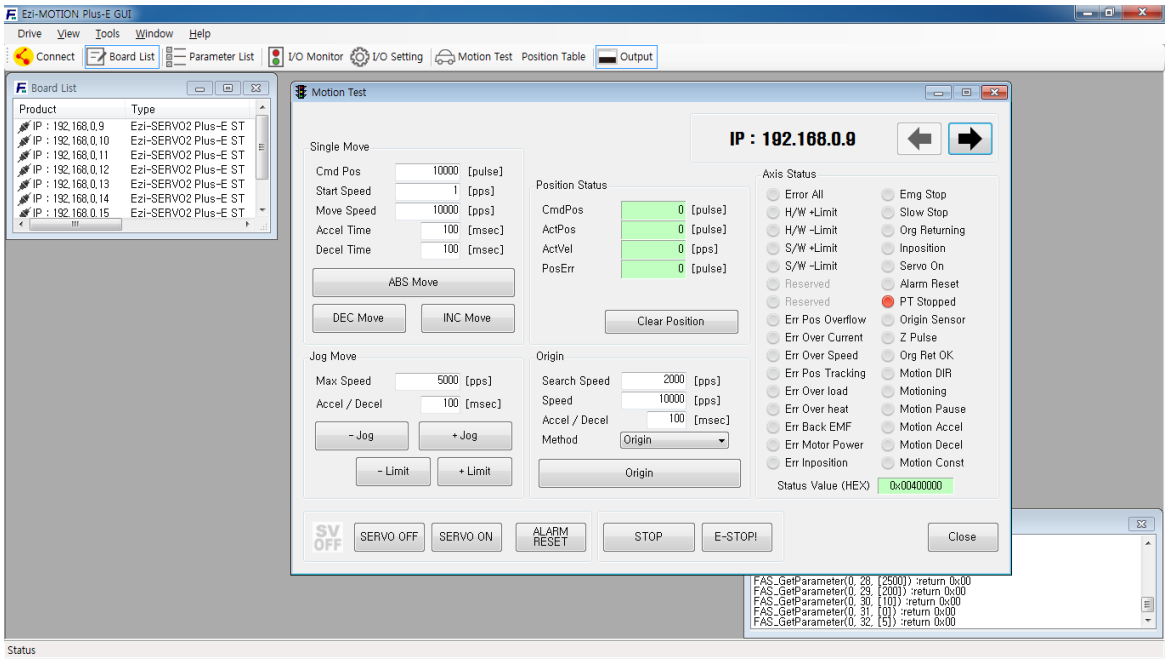
1) IP Address of Connected drives

2) Type of all connected motors and drives

3) Firmware Version

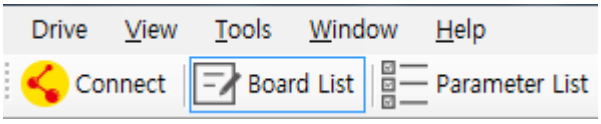


# 2 . Main Window



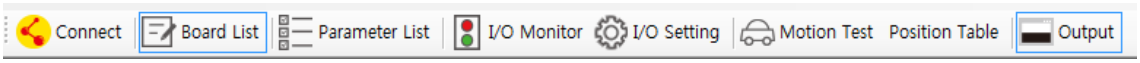

This is the basic window to operate the program. Each window is displayed in this window. The user can open each window with a toolbar.

## 2 - 1 . Menu




| Menu | Description |
|---|---|
| Drive | To connect or disconnect with the drive |
| View | To open each window |
| Tool | To select a language |
| Window | To change window's array |

## 2 - 2 . Toolbar



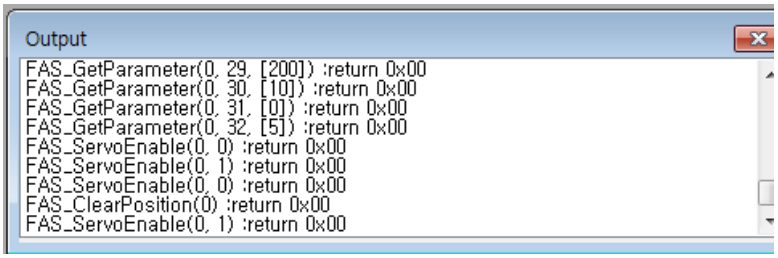

There are various buttons to go to the next window.
(Some buttons will be enabled or disabled according to the connected item.)

Click each button, and the following functions will be executed.

| Button | Description |
|---|---|
| Connect | To connect or disconnect with the drive |
| Board List | To display connected module information and communication status |
| Parameter list | To set parameter values related to operation control like a position |

| | command |
|---|---|
| I/O Monitor | To monitor digital I/O signals of CN1 connector |
| I/O Setting | To set digital I/O signals of CN1 connector |
| Motion Test | To execute motion commands such as Jog operation, Position operation, Origin return operation |
| Position Table | To input, edit, save, and execute position table data. |
| Output | To display DLL function corresponding to the command being executed |

## 2 - 3 . Output



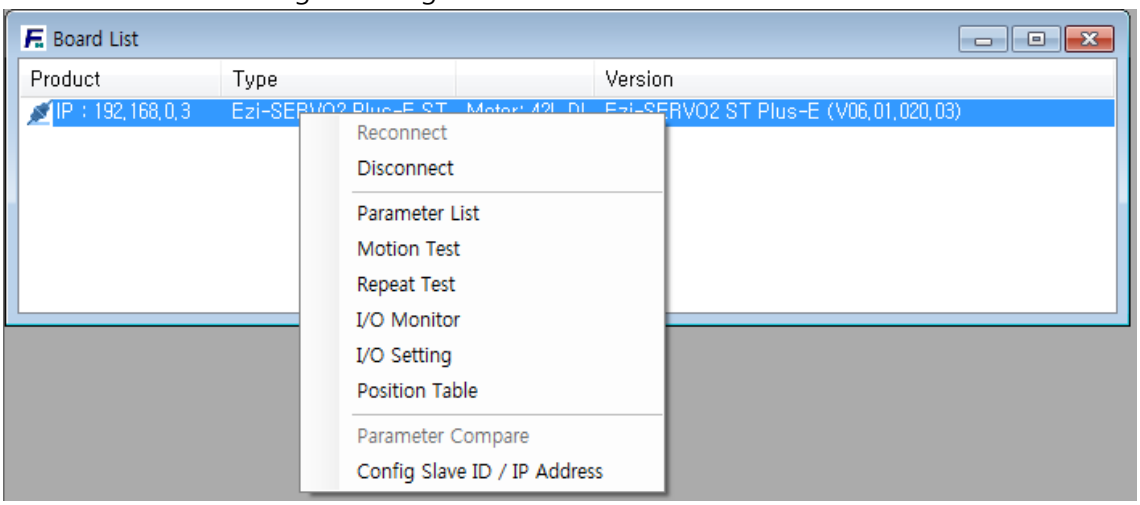

Click 'Output' at the Toolbar or check [Menu] – [View] – [Output], and the above window will be displayed.

This window includes commands used for the controller. The user can check that which function is used, how parameter values are inputted, and how they are normally processed.

The above window displays functions which the user inputs or functions used when the user clicks each button. For more information of commands, please refer to 「User Manual-Communication Function」

## 2 - 4 . Board List

To check the drive list connected with communication. The user can check information of each drive. Select the connected drive and Right-click. Then there are buttons to go to windows for function setting or testing.




Type of Information :

1) Drive IP Address
2) Drive Type.
3) Motor Type.
4) Drive Firmware Version.

- Disconnect / Reconnect

  Disconnect : Disconnect the drive.

  Re-connect : Re-connect the drive.

- Parameter List

  To display the window that the user can check, edit, and manage drive parameters.

- Motion Test

  To execute motion commands such as Jog operation, Position operation, Origin return operation.

- Repeat Test

  To test fixed motioning for 1 axis repeatedly.

- I/O Monitor

  To monitor digital I/O signals of CN1 connector.

- I/O Setting

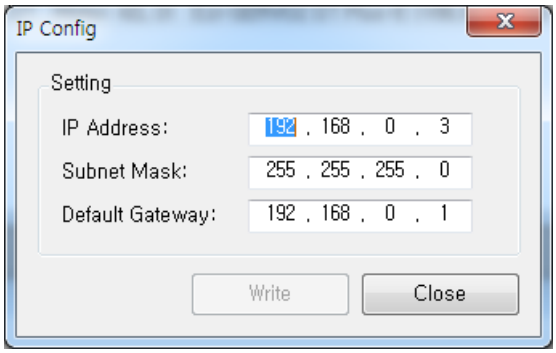
  To configure digital I/O signals of CN1 connector.

- Position Table

  To input and execute position table data.

- Config Slave ID / IP Address

  To configure IP Address / Subnet Mask / Gateway.



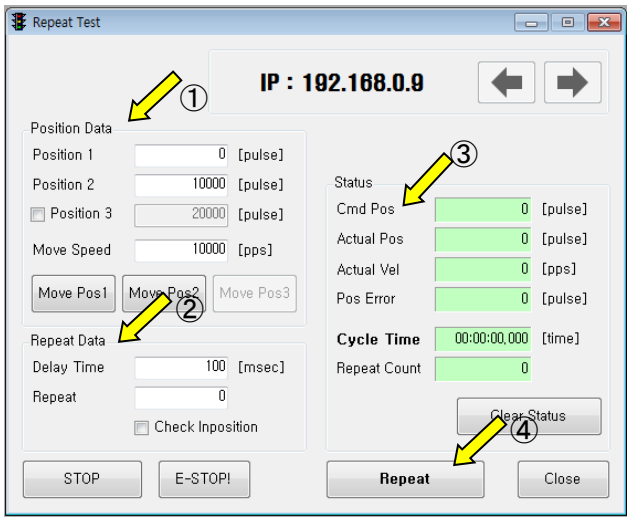

  After clicking "Write" and Power reset, Configuration is applied.

  Final number of IP Address does not change.

  Final number can be set via Switch.

  Ex) If changing IP Address : 192.168.0.3 → 192.169.10.100, then it's changed to 192.168.10.3

## 2 - 5 . Repeat Test




① The repeat test is possible for up to 3 absolute position values.

② Delay time and repeat count can be Set every repeat.

* Delay Time : Stand-by time until each Motion is ended and then next motion Is started. The unit is [msec].

* Repeat : To define the motion loop Count. If this is set to '0', the test is infinitely repeated.

(Motion loop operates from Position1 -> Position2 -> Position1, and repeat count goes up once after this.)

③ Operation status and repeat count are displayed.

* Cycle Time : Displays the time until repeat test is finished.
* Repeat Count : Increased by 1 for each motion loop completed.

④ Click the 'Repeat' button to start repeating operation according to the condition. If you click the 'Repeat' button during operation, it stops after completing the cycle in progress. If you want to stop regardless of cycle, use 'Stop' or 'E-Stop!' Button.

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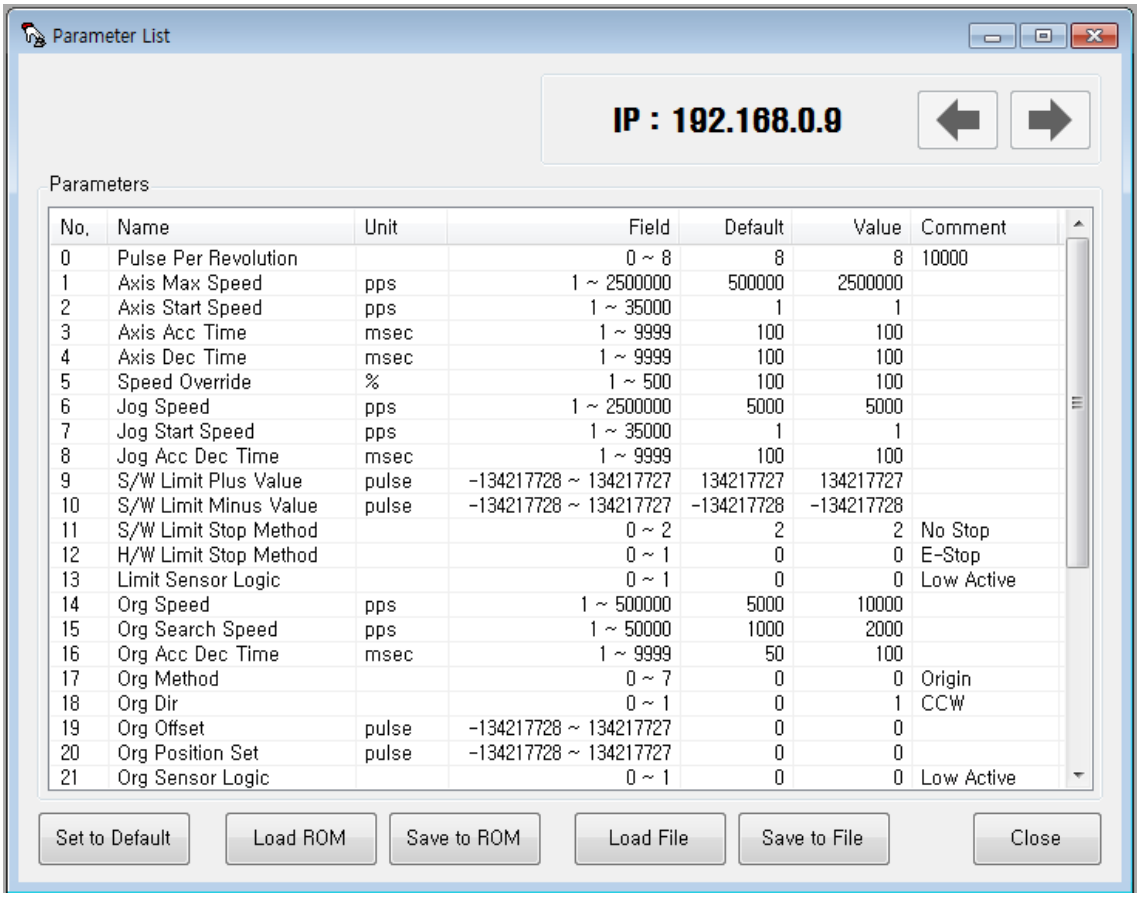
# 3 . Parameter List

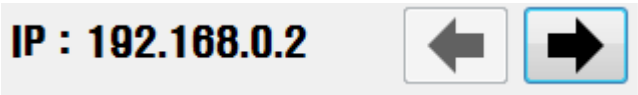



| No. | Name | Unit | Field | Default | Value | Comment |
|---|---|---|---|---|---|---|
| 0 | Pulse Per Revolution | | 0 ~ 8 | 8 | 8 | 10000 |
| 1 | Axis Max Speed | pps | 1 ~ 2500000 | 500000 | 2500000 | |
| 2 | Axis Start Speed | pps | 1 ~ 35000 | 1 | 1 | |
| 3 | Axis Acc Time | msec | 1 ~ 9999 | 100 | 100 | |
| 4 | Axis Dec Time | msec | 1 ~ 9999 | 100 | 100 | |
| 5 | Speed Override | % | 1 ~ 500 | 100 | 100 | |
| 6 | Jog Speed | pps | 1 ~ 2500000 | 5000 | 5000 | |
| 7 | Jog Start Speed | pps | 1 ~ 35000 | 1 | 1 | |
| 8 | Jog Acc Dec Time | msec | 1 ~ 9999 | 100 | 100 | |
| 9 | S/W Limit Plus Value | pulse | -134217728 ~ 134217727 | 134217727 | 134217727 | |
| 10 | S/W Limit Minus Value | pulse | -134217728 ~ 134217727 | -134217728 | -134217728 | |
| 11 | S/W Limit Stop Method | | 0 ~ 2 | 2 | 2 | No Stop |
| 12 | H/W Limit Stop Method | | 0 ~ 1 | 0 | 0 | E-Stop |
| 13 | Limit Sensor Logic | | 0 ~ 1 | 0 | 0 | Low Active |
| 14 | Org Speed | pps | 1 ~ 500000 | 5000 | 10000 | |
| 15 | Org Search Speed | pps | 1 ~ 50000 | 1000 | 2000 | |
| 16 | Org Acc Dec Time | msec | 1 ~ 9999 | 50 | 100 | |
| 17 | Org Method | | 0 ~ 7 | 0 | 0 | Origin |
| 18 | Org Dir | | 0 ~ 1 | 0 | 1 | CCW |
| 19 | Org Offset | pulse | -134217728 ~ 134217727 | 0 | 0 | |
| 20 | Org Position Set | pulse | -134217728 ~ 134217727 | 0 | 0 | |
| 21 | Org Sensor Logic | | 0 ~ 1 | 0 | 0 | Low Active |

| Item | Description |
|---|---|
| No. | Parameter number |
| Name | Parameter name |
| Unit | Parameter unit |
| Field | Parameter field |
| Default | Parameter default value |
| Value | Current parameter value |
| Comment | Current parameter description |

The user can set and save parameter values related to motion control by each drive module. 'Value' column displays the value applied to current motion control and can be edited.

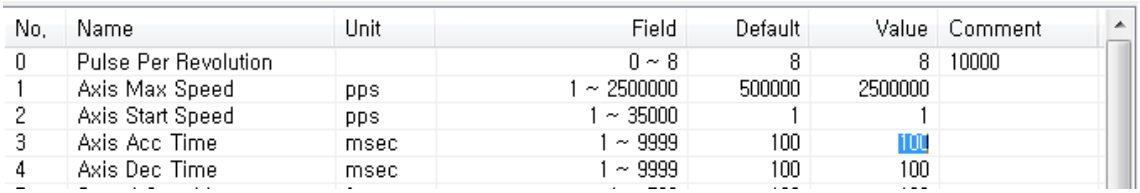
## 3 - 1 . IP Address




To display drive's number for the current parameter list window. By using right/left arrow key, the user can select other drive.

Buttons at the bottom bar including 'Save to ROM' is available only for the current drive. To control several drive parameters, the user should execute related each one of slave independently.

## 3 - 2 . Parameter Input



| No. | Name | Unit | Field | Default | Value | Comment |
|---|---|---|---|---|---|---|
| 0 | Pulse Per Revolution | | 0 ~ 8 | 8 | 8 | 10000 |
| 1 | Axis Max Speed | pps | 1 ~ 2500000 | 500000 | 2500000 | |
| 2 | Axis Start Speed | pps | 1 ~ 35000 | 1 | 1 | |
| 3 | Axis Acc Time | msec | 1 ~ 9999 | 100 | 100 | |
| 4 | Axis Dec Time | msec | 1 ~ 9999 | 100 | 100 | |

Select parameters as shown at the table, and the input box will be displayed and then the user can edit parameter values. When the user inputs the parameter value, it is saved to RAM area of the drive. The machine operates as the parameter is edited. However, when the drive is powered off, the value is deleted. To continuously operate the machine as the parameter value is set, the user must click 'SAVE to ROM' button and save the edited value to ROM.

When the input value is out of right range, it is displayed in red color. The value cannot be inputted in RAM of the drive.

## 3 - 3 . Parameter List Window Buttons

Click each button to execute the following functions.

| Button | Description |
|---|---|
| Set to Defualt | Converts all parameter values into 'Default Value' |
| Load ROM | Converts 'Value' items into values saved to the ROM area. |
| Save to ROM | Saves 'Value' items to the ROM area.<br>(Even though the drive is powered off, they are not deleted.) |
| Load File | Set 'Value' items to the values saved to an external file. |
| Save to File | Saves the current values to an external file.<br>(The user defines folder position and file name. The extension is *.fpt.) |

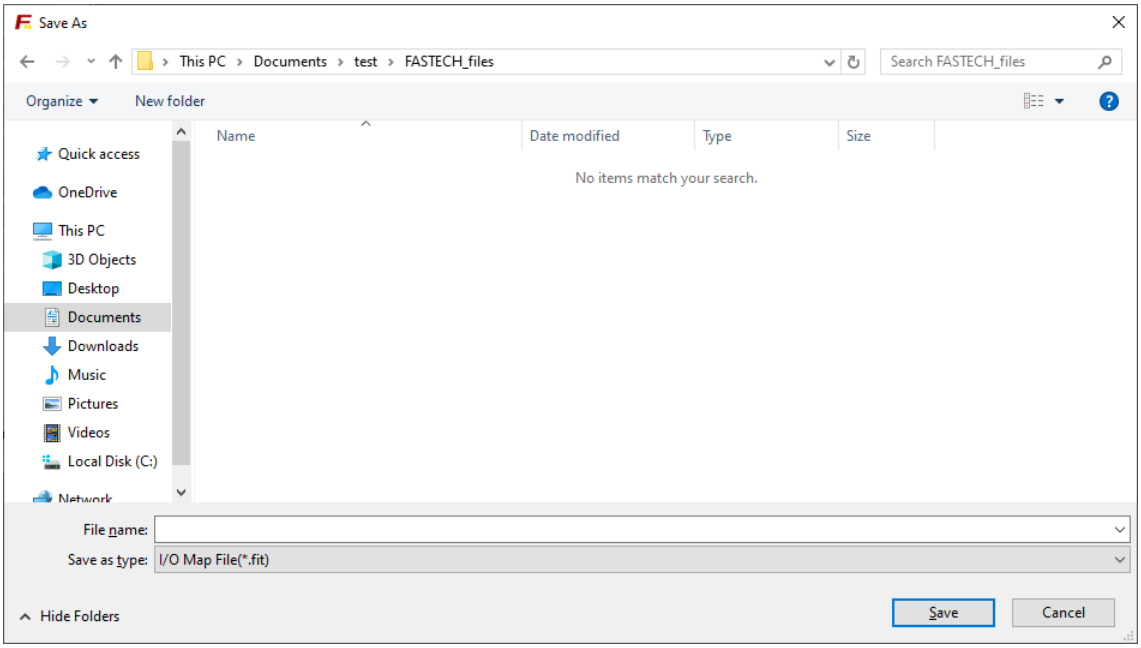
For more information of parameter types and their functions, please refer to 「User manual-Text, 10. Parameters」.

## 3 - 4 . Save to/Read from a File

Ezi-SERVOII Plus-E ALL can save parameters, I / O settings and position table data to a file in PC and read them as needed.

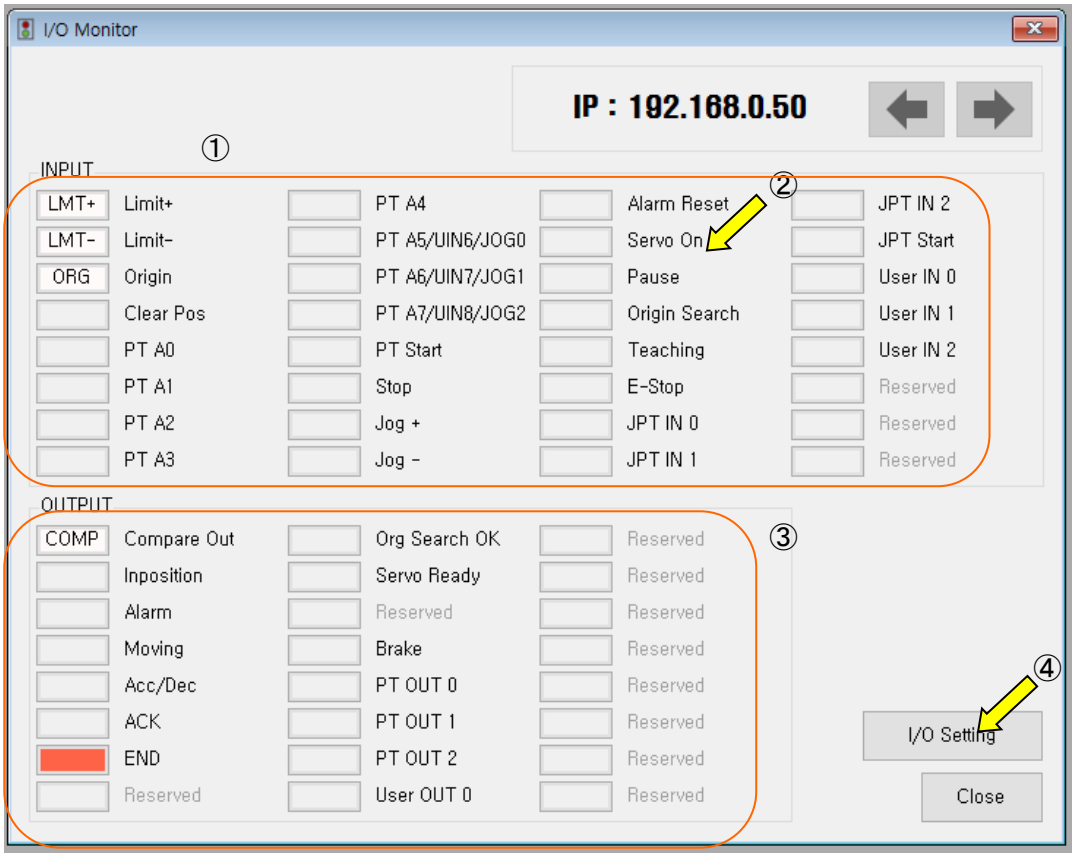
To save, enter a file name and click the Save button. For reading, select a file and click the Read button.

File extension for parameter : *.fpt
File extension for Input/Output : *.fit
File extension for position table date : *.txt, *.xlsx



# 4 . I/O Monitoring

This function is to set control input and output signals related to operation control and check the status through CN1 connector. The figure below is an example of temporary setting the input and output signals.




### 1) Input Signal : ①

Although there are 29 types of input signals that can be specified, the number of signals that can be simultaneously connected to the CN1 connector is six.

The first three signals are fixed to the "LIMIT +", "LIMIT-" and "ORIGIN" sensors, so no other signals can be connected to this pin. Therefore, up to three signals can be set as custom inputs to the remaining three pins simultaneously. 'IN1' to 'IN3' will appear on the currently set signal.

For signals set to 'IN1' to 'IN3', the icon changes to 'Green' when each signal is [ON] through the connector of CN1 and becomes white as the signal turns to [OFF].

### 2) Virtual Input : ②

Even if the input pin is not assigned to any of 'IN1' to 'IN3', you can virtually change the signal to [ON] / [OFF] by clicking the button. For example, if you click 'Pause' during motion operation, the pause function will be activated. The exception is the 'PT Start' signal.

**3) Output Signal : ③**

Although there are 14 types of input signals that can be specified, the number of signals that can be simultaneously connected to the CN1 connector is two.

The first one, 'COMP', is fixed for a specific purpose, so you can't connect another signal to this pin. Therefore, up to one signal can be set as an output on the other pin simultaneously. 'OUT1' will appear on the currently set signal.

When each signal is [ON] through CN1's connector, the icon will change to 'Red', and when it becomes [OFF], it will return to its original white color.

**4) Virtual Output :**

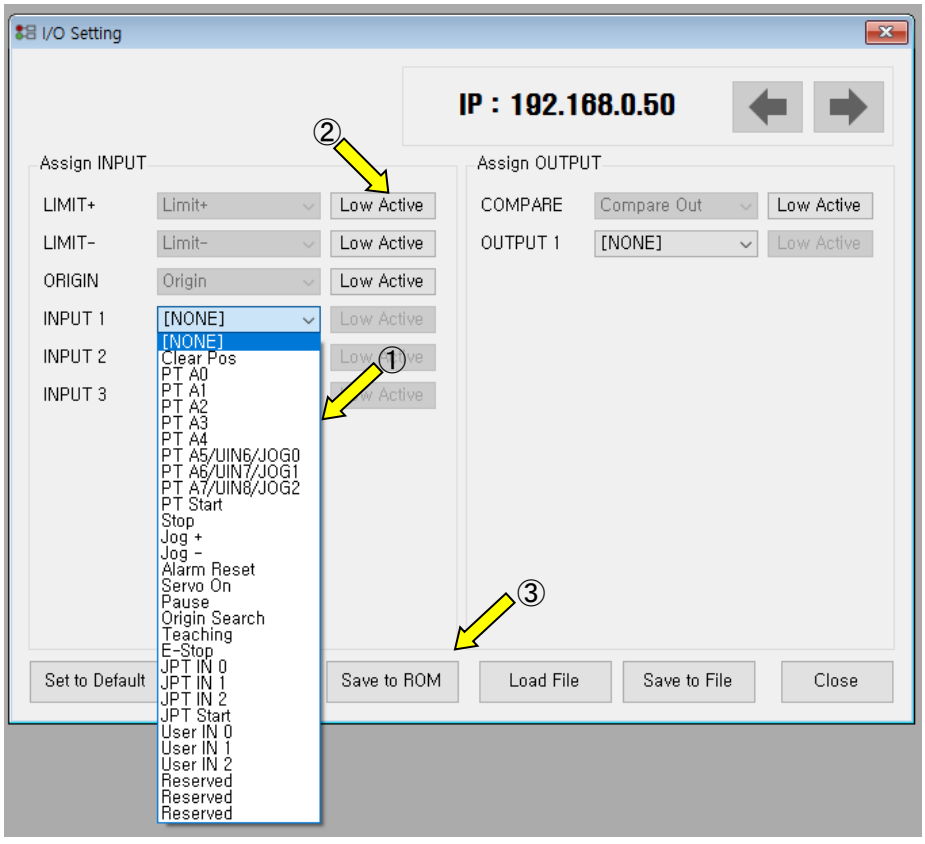
If you assign the User OUT 0 signal to OUT1 and click the button, the signal will be changed to [ON] / [OFF] through the corresponding pin.

**5) I/O Logic Setting Button : ④**

The screen to assign the desired signal to the physical pin of the CN1 connector and specify the 'Active Level' of the signal is displayed.

## 4 - 1 . I/O Logic Setting

Click the I / O Logic Setting icon on the I / O Monitor screen above to display the following screen.



Input and output setting method is same and use as follows.

**1) Signal Assignment : ①**

To change the pin assignment of the CN1 connector, click ▼ to the right of the signal name as shown above and select the signal that appears in the drop-down menu.

**2) Signal Level Assignment : ②**

The function to select the actual signal level to recognize the signal as [ON] is provided, and the setting is made by clicking the button to the right of the signal name.

* Low Active : [ON] when 0 volt is input.
* High Active : [ON] when 24 volt is input.

**3) Save : ③**

Set the output pin of CN1 in the same way as the input. By default, all changes are temporarily saved in RAM, and you need to click the "Save to ROM" button to save to ROM. At this time, the current parameter values are saved together in ROM.

For more information of 'I/O Monitoring' and 'I/O Logic Setting' windows, refer to 「User Manual-Text, 6. Control Input and Output Signal」.

# 5 . Motion Test

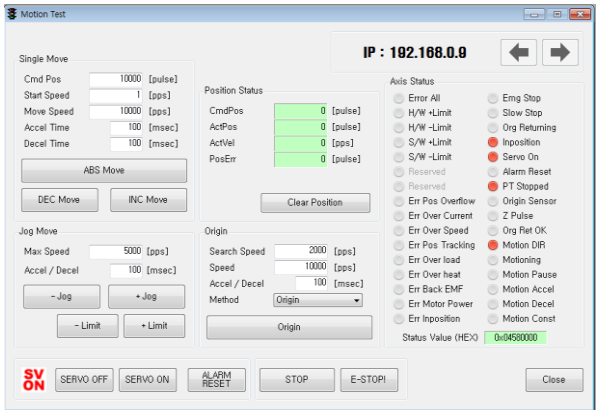
This is the screen to test the motor connected to the drive.

This screen allows you to perform a motion test on one axis. You can test moving to a fixed position or simply move it in one direction. You can also test the Sensor by moving it to the origin or limit.

In Position Status and Axis Status, you can check the position, speed, and status of the current axis.

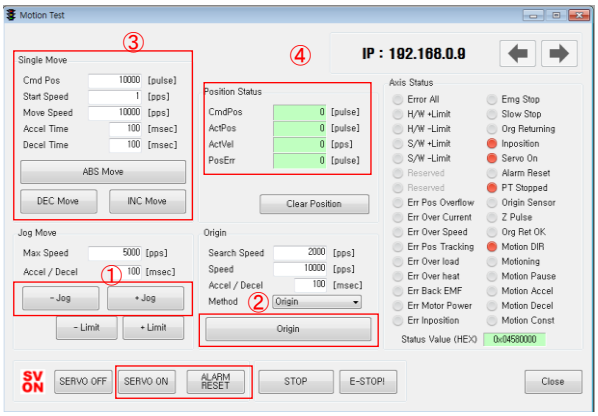
## 5 - 1 . Initial Movement

1) Click 「Motion Test」 on the main menu.
2) The screen shown on the right is displayed. Select the drive to test run.
3) If you click SERVO ON, the motor turns into Servo ON and changes to SV ON.
In this state, the motor is energized.



4) **Jog Operation**(①)

After setting the jog related parameters, click -Jog +Jog on the right screen to run the motor in the set direction while pressing the button.




5) Position status and operation status can be checked according to the movement of the motor. For more information, refer to 「User Manual-Text, 8. Other Operation Functions」.

6) **Origin Return Operation**(②)

Click 「Origin」 to execute the homing operation. The content of the operation depends on the selection of the homing method (parameter).

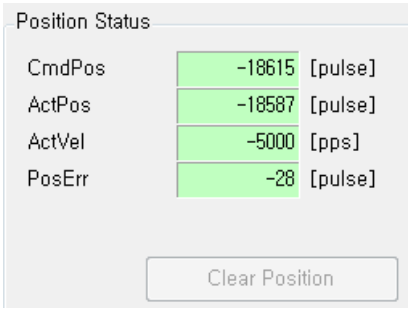
7) When homing is completed, it is displayed as ON in red like Origin Search OK In 'Axis Status' window. Refer to 「User Manual-Text, 8. Other Operation Functions」.

8) **Single Move Operation**(③)

You can test the linear movement command of an axis. 'ABS Move' button moves the absolute target position, 'DEC Move' and 'INC Move' move to the incremental target position.


* Cmd Pos : Target position value, unit is [pulse].
  Absolute position when ABS Move is executed, and incremental position when DEC Move and INC Move are executed.
* Start Speed : It is linked with Parameter No. 2 Axis Start Speed.
  If you change it, the parameter value will change as well.
  Start Speed must be less than Move Speed.
* Move Speed : When executing ABS Move, DEC Move, INC Move, set the moving speed.
  Move Speed must be greater than Start Speed.
* Accel Time, Decel Time : These are linked with Parameter No.3 and No.4, Axis Accel/Axis Decel Time. If you change them, the parameter values will change as well.

### 9) Position Status(④)




This area shows the position information of the current axis.

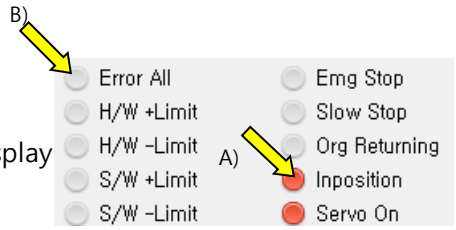
Clear position button resets the current Cmd Pos, Actual Pos to 0.

* Cmd Pos : Target position value during operation.
* Act Pos : Current position value in progress.
* Act Vel : Actual operation speed of current motor.
* Pos Error : The difference between the Cmd Pos and Act Pos values.
  With this value you can check the tracking of the motor against the current target position.

### 10) Axis Status and Alarm

The Axis Status area shows the status of the current axis.

Each state is displayed as ON / OFF, and if it is ON, it will be red, and if it is OFF, it will be gray.




A) When the operation of motor is finished and Inposition Is completed, it is displayed in red as the right figure.

B) If an error occurs during operation, the error indication display turns red.

For more information on alarm types, refer to 「User Manual-Text, 6-4. Output Signal」.


C) After removing the cause of the alarm, click 'ALARM RESET' to clear the alarm.

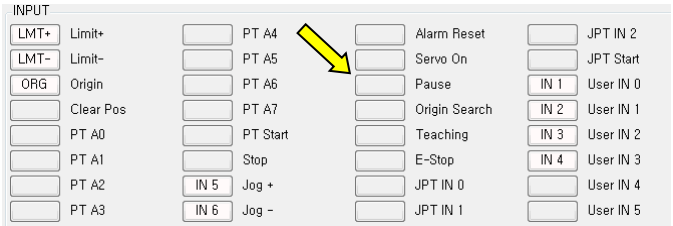
After the alarm is cleared, Servo On again.

### 11) Stop Operation

There are 'Pause', 'Stop', and 'E-Stop' commands for Stop operating.

A) Pause

If you click 'Pause' button on the I / O Monitoring screen on the right, the motion in motion will be paused. Click the button again to resume driving.




If you set the 'Pause' signal to 'IN1 ~ IN3', you must supply the actual external signal to [ON].

B) Deceleration Stop(Stop), Emergency Stop(E-Stop)

If stop is required during operation, use the button on the right side of the Motion Test window.

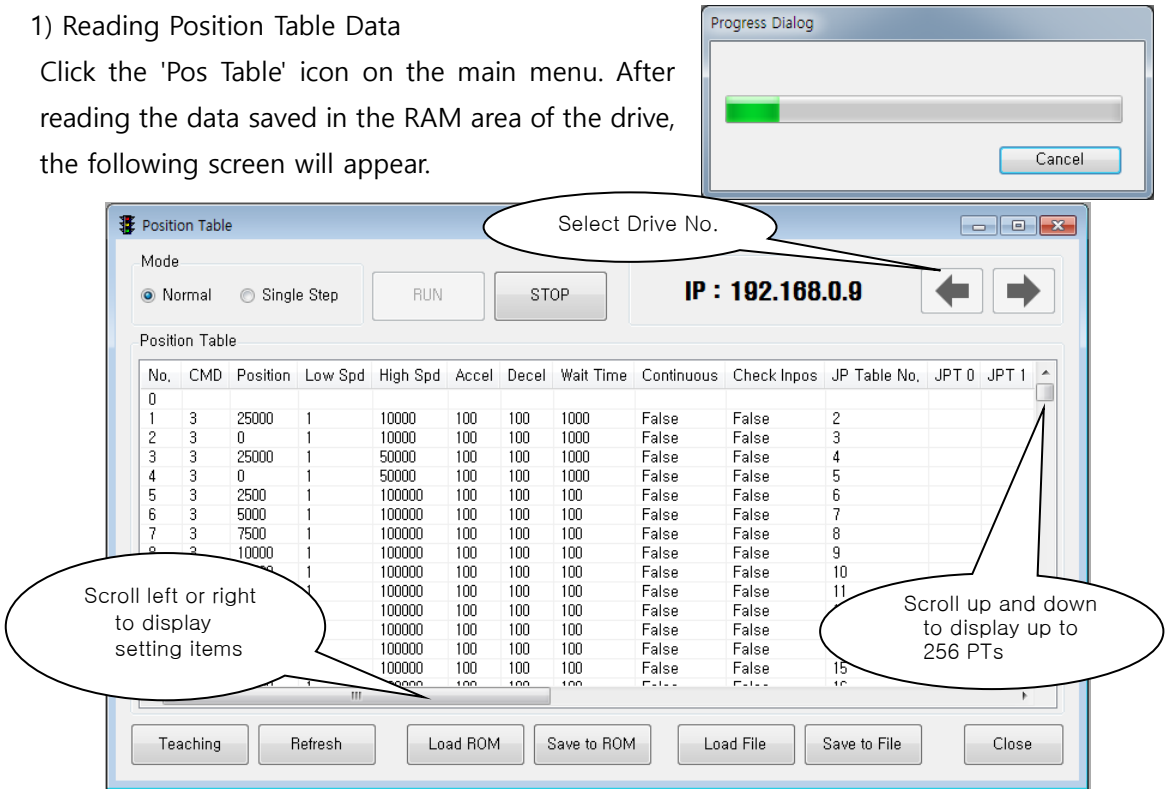

'STOP' is a stop function with deceleration function, and 'E-STOP!' is an immediate stop function without deceleration.

# 6 . Position Table (PT)

For more information about position table, refer to 「User Manual_Position Table Function」.
This chapter introduces the basic functions.

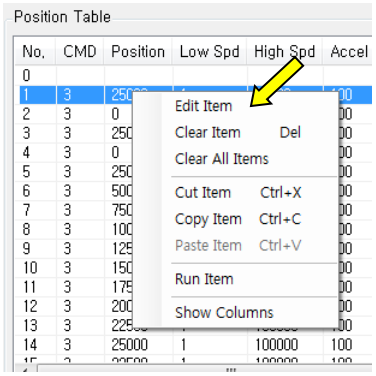
1) Reading Position Table Data

Click the 'Pos Table' icon on the main menu. After reading the data saved in the RAM area of the drive, the following screen will appear.

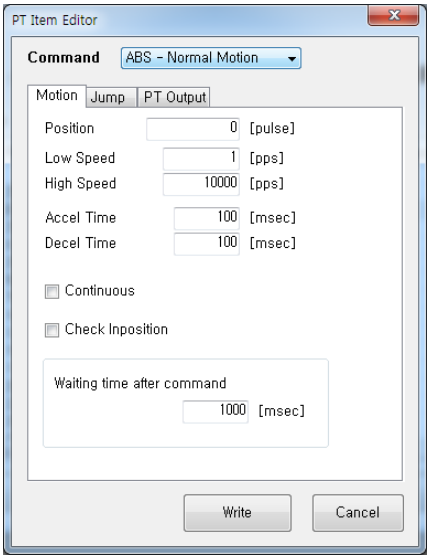



It is always possible to change the position table data.
The position table can store up to 256 steps of data. If the position table is used in the program area, it is possible to use any point number without restriction. In other words, it is possible to start from an arbitrary point number and jump to an arbitrary point number.

2) Clicking the right mouse button on a specific PT data line brings up a pop-up menu as shown in the figure on the right, and all the functions are implemented. Click 'Edit Item' to edit on the screen like 3) below.



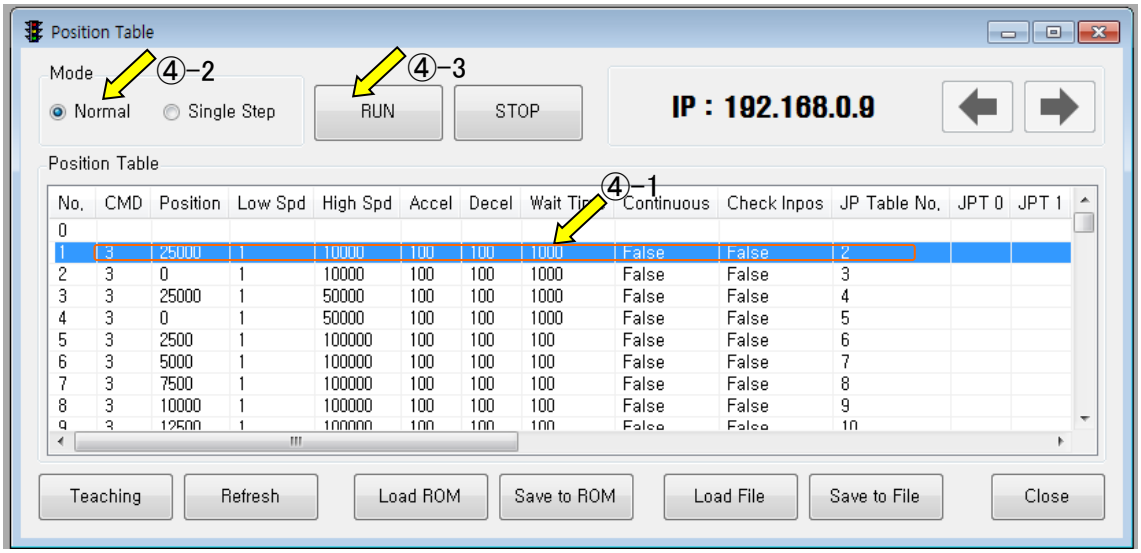
3) Double click on a specific PT data line to open the window shown on the right.




* Enter the values in order starting from the 'Command' selection, depending on the driving mode.
* When you have finished entering all the data in the position table, click 'Write' to save it in the RAM area first.
* Use the arrow buttons to modify the next position table.
* Refer to 「User Manual-Position Table Function」 for more detailed information.

Since this data is stored in the RAM area, the data is deleted when the power is turned off. Click 'Save to ROM' to save in ROM area.

4) First of all, prepare the motor in Servo ON state, click PT number to start as shown below, select Mode as 'Normal' and execute 'Run'.




As PT is operated in sequence, the row of PT step currently being operated is grayed out.

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*Fast, Accurate, Smooth Motion*

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