Ezi-SERVO® Plus-R
Closed Loop Stepping System

Ezi-SERVO® Plus-R MINI
Closed Loop Stepping System

Ezi-SERVO® ALL
Closed Loop Stepping System

# - User Manual -

## User Program(GUI) Function (Ver.4)

※ Before operation ※

- Thank you for your purchasing Ezi-SERVO.
- Ezi-SERVO is an all-in-one Unit, for high-speed and high-precision drive of a stepping motor, Ezi-SERVO is an unique drive that adopts a new control scheme owing to an on-board high-performance 32 bit digital signal processor.
- This manual describes handing, maintenance, repair, diagnosis and troubleshooting of Ezi-SERVO.
- Before operating Ezi-SERVO, thoroughly read this manual.
- After reading the manual, keep the manual near the Ezi-SERVO so that any user can read the manual whenever needed.

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# 1. Safety Pre-caution

## 1.1 General Precaution

- Contents of this manual are subject to change without prior notice for functional improvement, change of specifications or user's better understanding.
- When the manual is damaged or lost, please contact with FASTECH's agents or our company at the address on the last page of the manual.
- Our company is not responsible for a product breakdown due to user's dismantling for the product, and such a breakdown is not guaranteed by the warranty.

## 1.2 Put the safety First

- Before installation, operation and repairing the Ezi-SERVO thoroughly read the manual and fully understand the contents. Before operating Ezi-SERVO please understand the mechanical characteristics of the Ezi-SERVO and related safety information and precaution .
- This manual divides safely precautions into **Attention** and **Warning**.

| | |
|---|---|
| **Attention** | If user does not properly handle the product, the user may seriously or slightly injured and damages may occur in the machine. |
| **Warning** | If user does not properly handle the product, a dangerous situation (such as an electric shock) may occur resulting in death or serious injuries. |

- Although precaution is only a **Attention**, a serious result could be caused depending on the situation, Follow safely precautions.

## 1.3 Check the Product

| | |
|---|---|
| **Attention** | Check the product is damaged or parts are missing. Otherwise the machine may get damaged or the user may get injured. |

## 1.4 Installation

| | |
|---|---|
| **Attention** | ■ Carefully move the Ezi-SERVO. Otherwise, the product may get damaged or user's foot may get injured by dropping the product..<br>■ Use non-flammable materials such as metal in the place where the Ezi-SERVO is to be installed. Otherwise, a fire may occur.<br>■ When installing several Ezi-SERVO in a sealed place, install a cooling fan to keep the ambient temperature of the Ezi-SERVO as 50℃ or lower. Otherwise, a fire or other kinds of accidents may occur due to overheating. |
| **Warning** | ■ The process of installation, connection, operation, checking and repairing should be done with qualified person. Otherwise, a fire or other kinds of accidents may occur., |

## 1.5 Connect Cables

| | |
|---|---|
| **Attention** | ■ Keep the rated range of Input Voltage for Ezi-SERVO. Otherwise, a fire or other kinds of accidents may occur.<br>■ Cable connection should follow the wiring diagram. Otherwise, a fire or other kinds of accidents may occur. |
| **Warning** | ■ Before connecting cables check if input power OFF. Otherwise, an electric shock or a fire may occur.<br>■ The case of Ezi-SERVO is insulated fro the ground of the internal circuit by the condenser. Ground the Ezi-SERVO. Otherwise, an electric shock or a fire may occur. |

## 1.6 Operation

| | |
|---|---|
| **Attention** | ■ If a protection function(alarm) occurs, firstly remove its cause and then release(alarm reset) the protection function. If you operate continuously without removing its cause, the machine get damaged or the user may get injured.<br>■ Do not make Motor Free and make input signal to ON during operation. Motor will stop and stop current will become zero. The machine may get damaged or the user may get injured.<br>■ All parameter values are set by default factory setting value. Change this value after reading this manual thoroughly. Otherwise, the machine may get damaged or other kinds of accidents may occur. |

## 1.7 Check and Repair

| | |
|---|---|
| **Warning** | ■ Stop to supply power to the main circuit and wait for a while before checking or repairing the Ezi-SERVO. Electricity remaining in the capacitor may occur danger.<br>■ Do not change cabling wile power is being supplied. Otherwise, the user may get injured or the product may get damaged.<br>■ Do not reconstruct the Ezi-SERVO. Otherwise, an electric shock may occur or the reconstructed product can not get after service. |

This manual describes how to operate User Program(GUI) for Ezi-SERVO Plus-R. For more information, refer related manuals.

(1) User Manual-Text
(2) User Manual-Communication Function
(3) User Manual-Position Table Function

# 2. Installation and Connection of the Program

## 2.1 Installation Environment of PC

Ezi-SERVO Plus-R consists of two operation modes as follows:

1) Using Motion Library(DLL) provided for the program from Windows 2000/XP/WINDOW7.

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

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

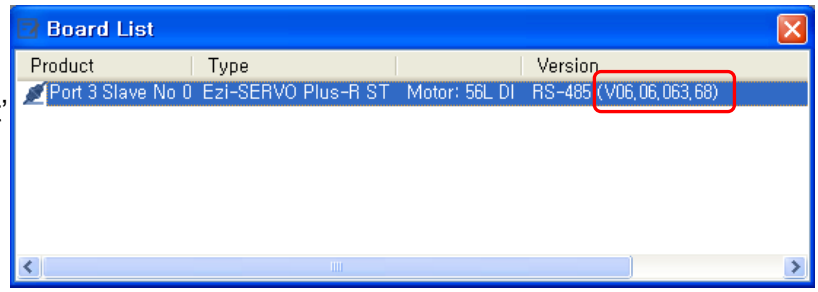
This chapter describes the user program used for installation and running test of the controller. Ezi-SERVO Plus-R is associated with RS-485. So, the user needs to convert RS-232C or USB for the PC into RS-485.

## 2.2 Program Version

There are 2 kinds of program version for Ezi-SERVO Plus-R.

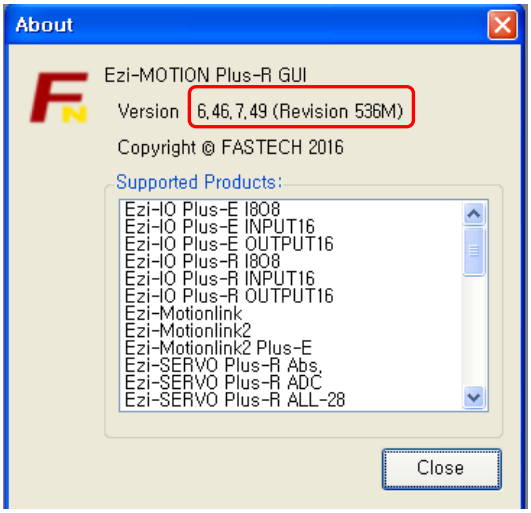
**1) Firmware program in drive :**

After connect the User Program(GUI), version number can be check in 'Board List' Window.




**2) User Program(GUI) in PC :**

After connect the User Program(GUI), version number can be check in 'About Plus-R GUI…'menu in 'Help' menu.



The level of 2 kinds program must be same as follows.

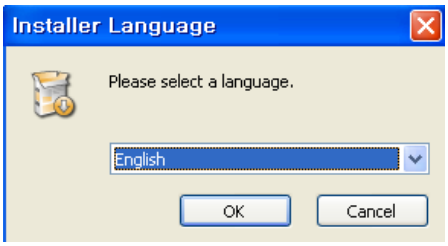
| Firmware version | Compatability | User Program(GUI) version |
|---|---|---|
| Level 6 (V06.0x.0xx.xx) | <-> | Level 6 (6.xx.x.xxx) |
| Level 8 (V08.xx.0xx.xx) | <-> | Level 8 (8.xx.x.xxx) |

| | |
|---|---|
| **Attention** | **Do not mixed the drive of different version level in one network segment..** |

## 2.3 User Program(GUI) Installation

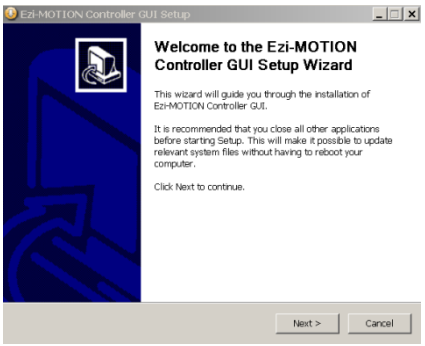
By executing ‘Ezi-SERVO Plus-R Install’ program in Fastech;s homepage(www.fastech.co.kr), please follow the next steps..

Select a language of installation screen.

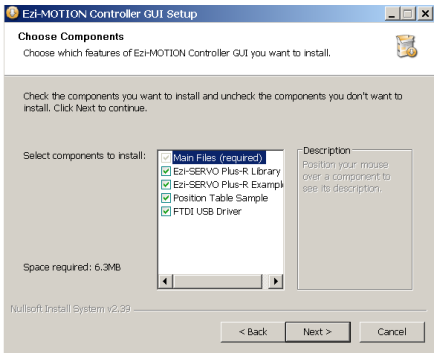



Installation Start window.

Click ‘Next’ button

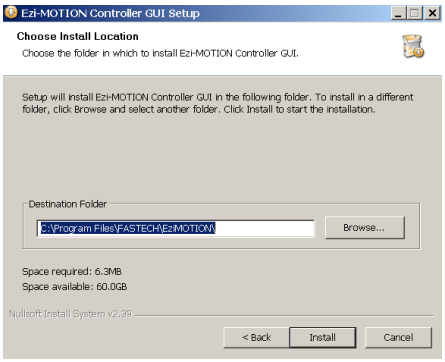



Select all installation components, and click ‘Next’ button.



Select a folder where the program is installed,

and click ‘Install’ button.



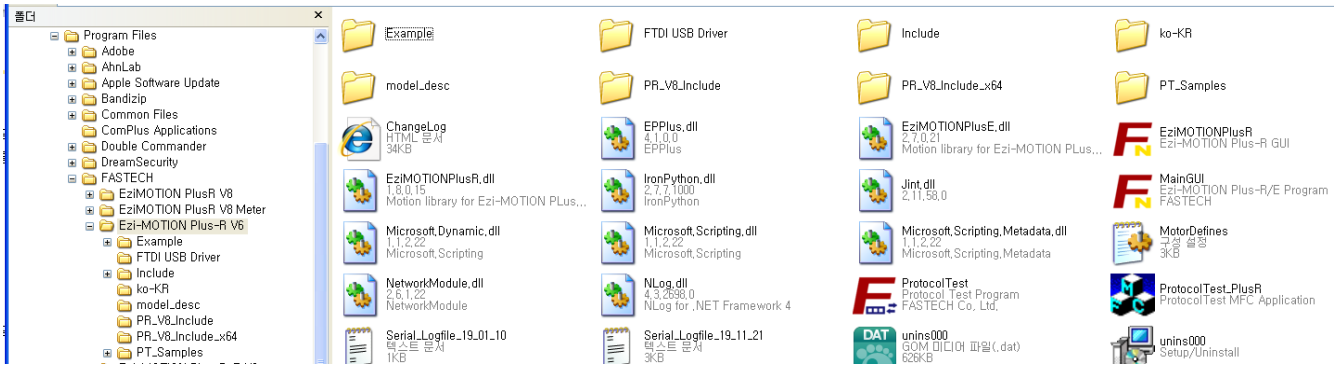

Installation is completed.


Then installation is completed at the selected folder, ‘Program Files/FASTECH/Ezi MOTION Plus-R V6’ folder is created and also GUI icon and program folders are installed.

1) Include folder : *dll, *.lib, *.h files

2) Example folder : source code for sample

3) PT_Samples folder : sample data files for position table.

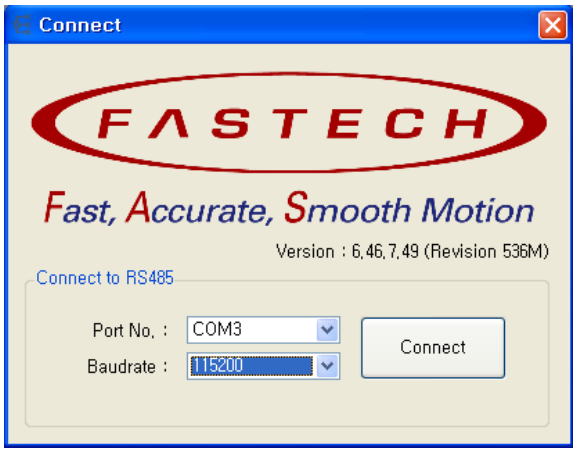



## 2.4 Connecting PC with Drive Module

Execute which is User Program(GUI),

click ‘Connect’ button,

and the following window will be displayed.

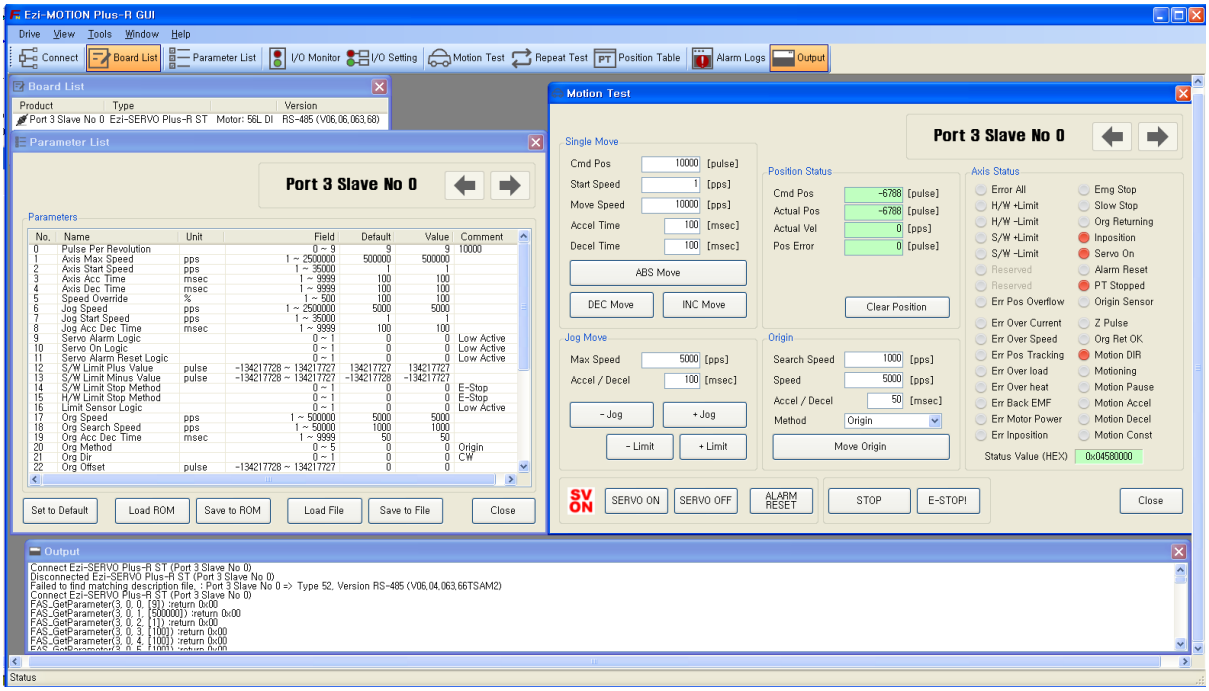


| Item | Description |
|---|---|
| Port No. | To assign the port number of RS-232 or USB which is connected with drive module at the PC . |
| Baudrate | This should correspond to the setting which sets the controller communication speed.<br>(Drive : adjusted to 115200[bps] at the factory). |

After setting, click ‘Connect’ button, and the drive module will try to connect 16 drives from 0 to 15 (firmware of same level version) at the setting speed through a pertinent communication port.

| | |
|---|---|
| ⚠ **Attention** | ■ **The communication speed of drive modules connected with one network must be set to the same value.**<br>■ **When they are not connected, the user needs to check the port or the baudrate.** |

# 3. Main Window

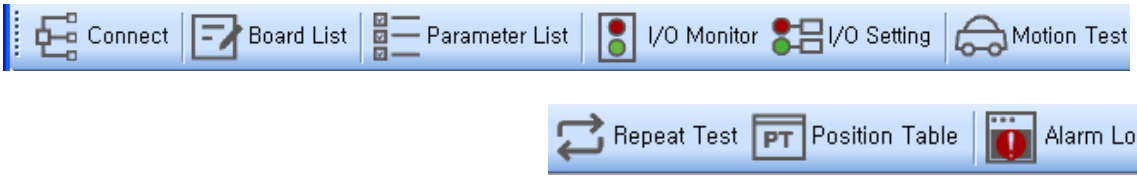



This is the basic window to operate the program. Each window is displayed in this window. The user can open each window with a toolbar.

## 3.1 Menu

There are ‘View’ menu to display other windows simply and ‘File’ menu which the user can connect and disconnect communication.

## 3.2 Toolbar



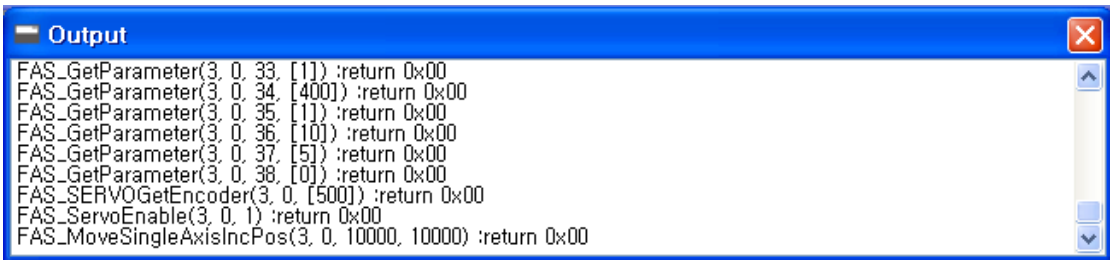

Click each button, and the following functions will be executed

| 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 sort parameters that the user can change them easily |
| I/O Setting | To monitor digital I/O signals of CN1 connector |
| Motion Test | To set digital I/O signal assignment of CN1 connector |
| Repeat Test | To execute motion commands such as Jog operation, Position operation, Origin return operation |
| Position Table | To input and execute position table data |
| Alarm Log | To display DLL function corresponding to the command being executed |
| Output | To display the DLL command that is excuted. |

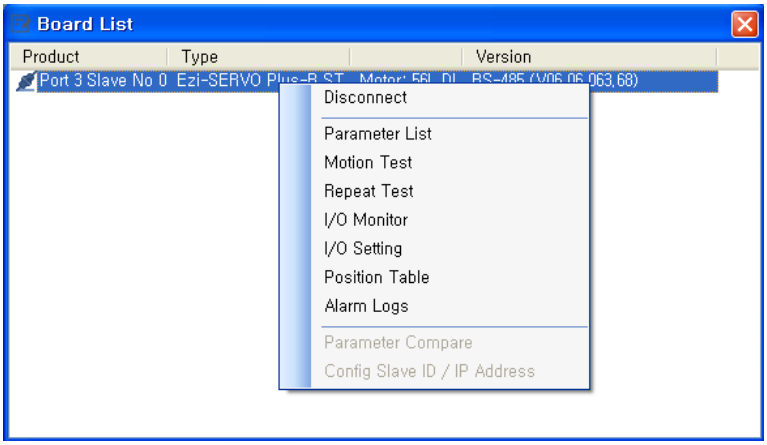
## 3.3 Output

Click ‘Output Bar’ at the toolbar or check ‘Menu –View – Output Bar’, 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 he clicks. For more information of commands, refer to 「User Manual-Communication Function」.

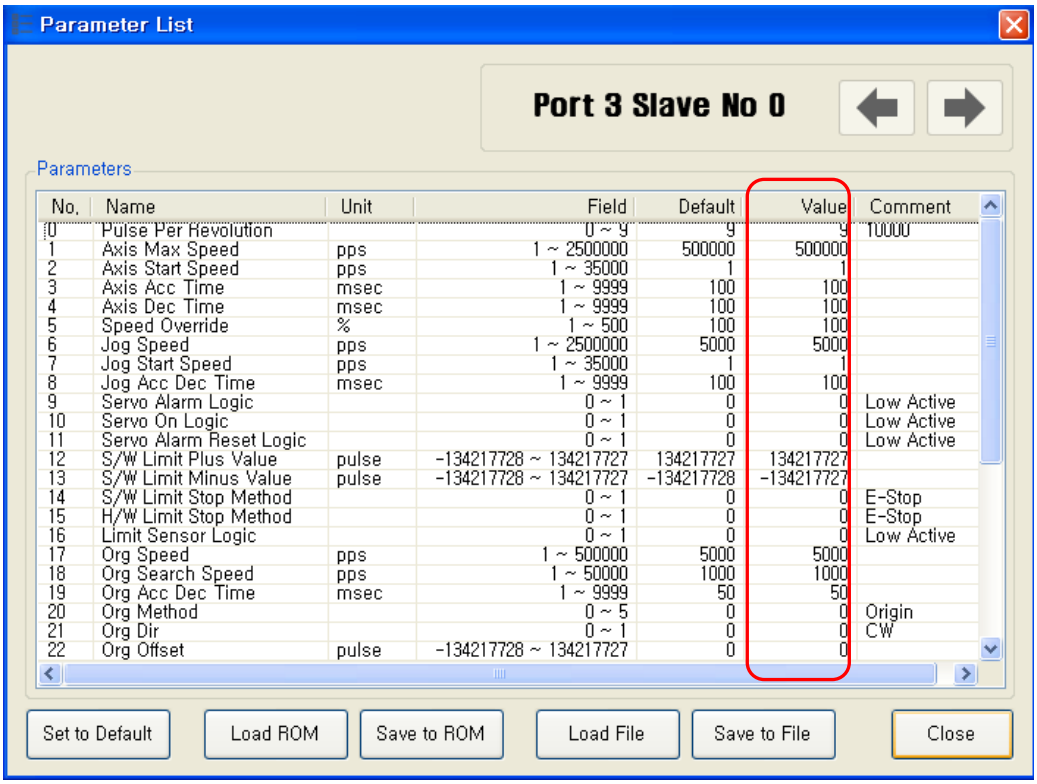


## 3.4 Board List




To check the drive list connected with communication. The user can check information of each drive. There are buttons to go to windows for function setting or testing.

## 3.5 Parameter List



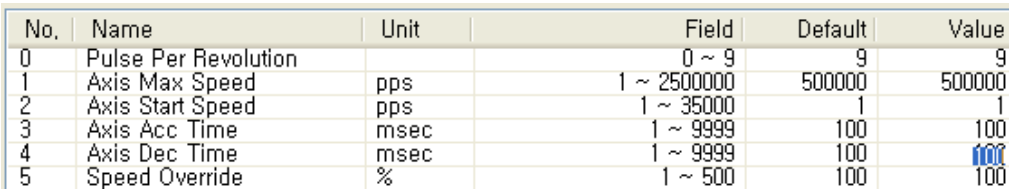

The user can set and save parameter values related to motion control by each drive module. ‘Value’ column displays the value applied to current motion control and can be edited.

### 1) Slave No

To display drive 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 separately.

### 2) Parameter Edit



| No. | Name | Unit | Field | Default | Value |
|---|---|---|---|---|---|
| 0 | Pulse Per Revolution | | 0 ~ 9 | 9 | 9 |
| 1 | Axis Max Speed | pps | 1 ~ 2500000 | 500000 | 500000 |
| 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 |

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) Parameter List Window Buttons

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

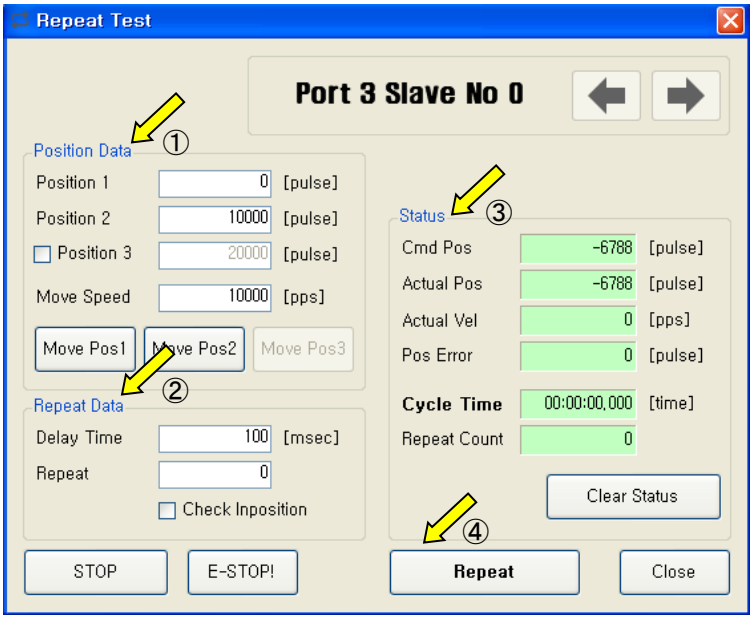
| Button | Description |
|---|---|
| Set to Default | Converts all parameter values into ‘Default Value’. |
| Load ROM | Converts ‘Value’ items into values saved to the ROM area. |
| Save to ROM | Saves ‘Value’ items to the ROM area.<br>(Even though the drive is powered off, they are not deleted.) |
| Load File | Sets ‘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.) |

### 4) Save/Load to a File

Ezi-SERVO Plus-R can save parameters, Input/output and position table data to an external file folder and can read them if necessary

File extension for parameter is *.fpt and for Input/output is *.fit. File extension for position table data is *.txt.

## 3.6 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 endlessly repeated.

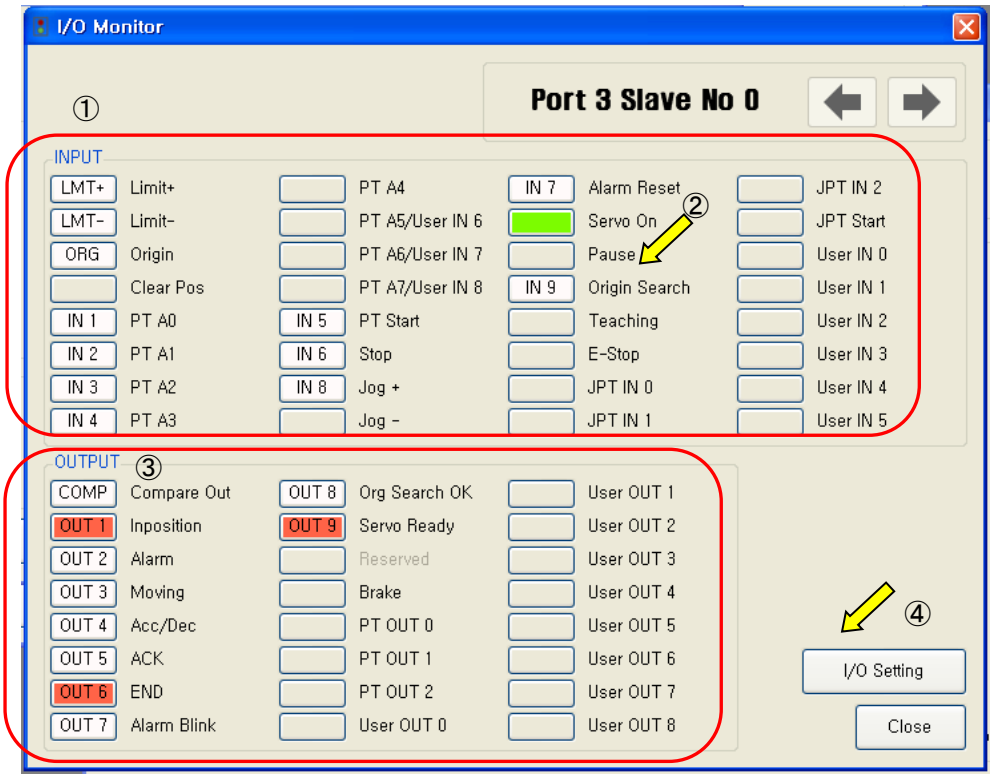
③ Operation status and repeat count are displayed.

***** Cycle Time : displays the time until repeat test is completely finished.

***** Repeat Count : increases whenever one motion loop is finished.

④ When the user clicks 'Repeat' button while the machine is operating, the cycle in service ends and the machine stops operating. Click 'Stop' or 'E-Stop' button, and the machine will stop regardless of the cycle.

## 3.7 I/O Monitor




The user can set and check control I/O signals related to operation control through CN1 connecter. The next window is the sample setting of I/O Monitoring status.(standard for Ezi-SERVO Plus-R)

**1) Input Signal : ①**

There are 32 definable input signals. However, just 12 signals of them can be connected with CN1 connecter physically at one time.

The first three signals are fixed to '***LIMIT+*** ', '***LIMIT-*** 'and '***ORIGIN*** 'sensors. Therefore other signals cannot be connected and used with these pins. The user can set up to 9 signals to Input 9 pins at one time. '***IN1*** '~'***IN9*** 'indicators are displayed to current setting signals.

When each signal is [ON] through CN1 connecter, icon is changed into '**green**'. When the signal is [OFF], it returns to 'white' to the original state.

**2) Virtual Input Function : ②**

Even though the input pin is not assigned to 'IN1'~'IN9' at all, the user can click each button and virtually change the signal into [ON]/[OFF]. For instance, click 'Pause' button, and the stop function will be operated temporarily. But only 'PT Start' signal is exceptional.

**3) Output Signal : ③**

There are 24 definable output signals. However, just 10 signals of them can be connected with CN1 connecter physically at one time.

The first signal '***COMP***' is used to specific purpose only. Therefore other signals cannot be connected and used with this pin. The user can set up to 9 signals to Output 9 pins at one time. '***OUT1***'~'***OUT9***' indicators are displayed to current setting signals.

When each signal is [ON] through CN1 connecter, icon is changed into '**red**'. When the signal is [OFF], it returns to 'white' to the original state.

**4) Virtual Output Function:**

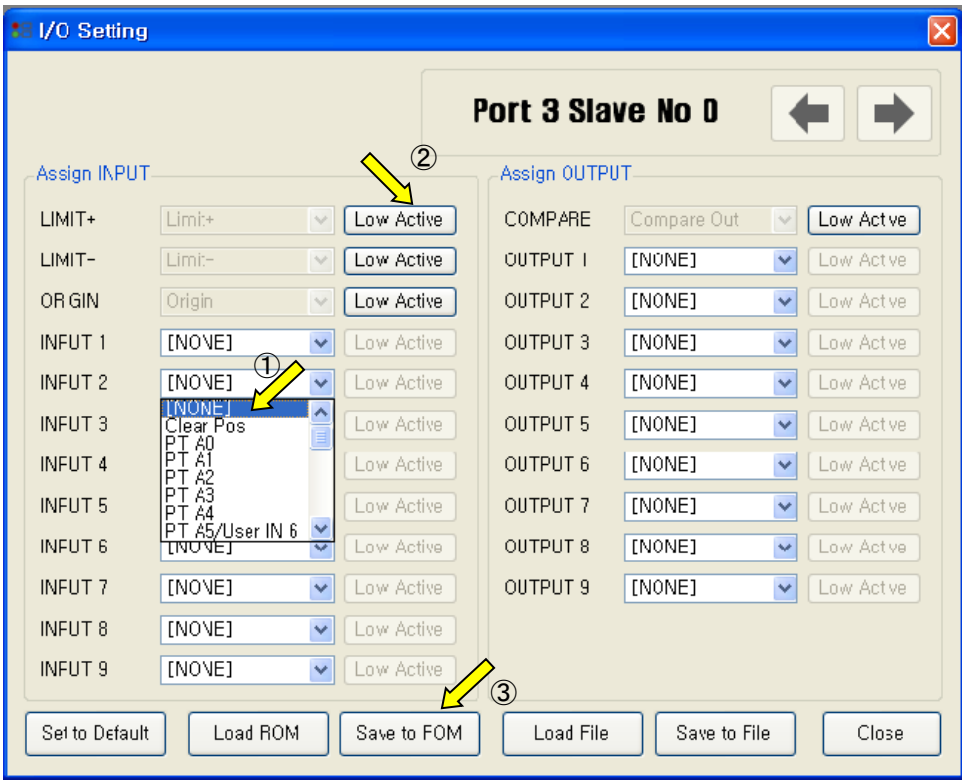
After assigning the 'User OUT 0' ~ 'User OUT 8'signals to OUT1' ~ 'OUT9', when click that button the signal changed [ON]/[OFF] through that pin.

**5) I/O Logic Setting button : ④**

Click this icon, and the following window will be displayed. Then he can assign a pertinent signal to the physical pin of CN1 connecter and define 'Active Level' of the signal.

## 3.8 I/O Setting

Click 'I/O Logic Setting' icon at the I/O Monitor window, and the following window will be displayed. (standard for Ezi-SERVO Plus-R)




**1) Signal Assignment : ①**

To change pin assignment of CN1 connecter, click ▼ button to the right of the corresponding signal name as showed above, and select signals will be displayed at the drop-down menu.

**2) Signal Level Assignment : ②**

These buttons provide the user with functions that he can select the active level of signal for the signal to be recognized to [ON]. He can click the button to the right of the signal name and set the signal.

* Low Active : when the signal is set[ON] to 0 volt
* High Active : when the signal is set[ON] to 24 volt

**3) Save : ③**

Output pin of CN1 can be set described same as input. All changed signals are temporarily saved to the RAM area. To save them to the ROM area, the user must click 'Save to ROM' button. At this time, current parameter values are saved to the ROM area as well.

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

## 3.9 Motion Test

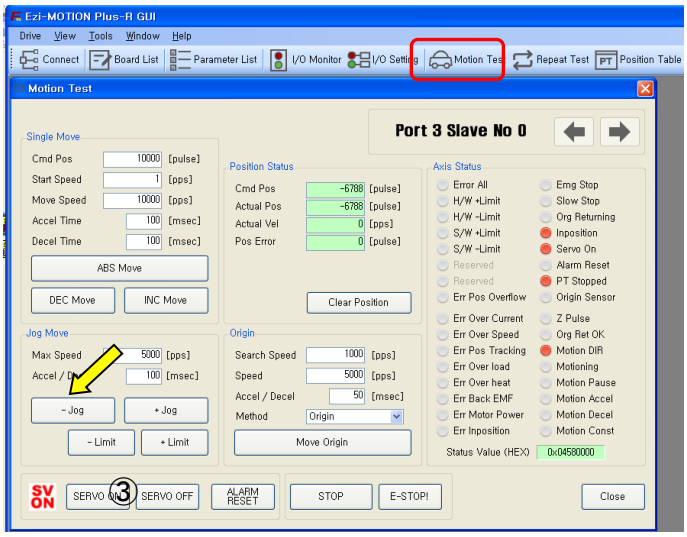
To test the motor connected with the controller drive. The user can test motion for one axis. He can test that the motor moves to the given position, and also simply transfer the motor to one direction. The user can move the motor to the origin or the limit and then test its sensor. At the position status and the axis status, the user can check the position, speed, and status of the current axis.

### 3.9.1 Initial Movement

1) Click 'Motion Test' at the manin menu.

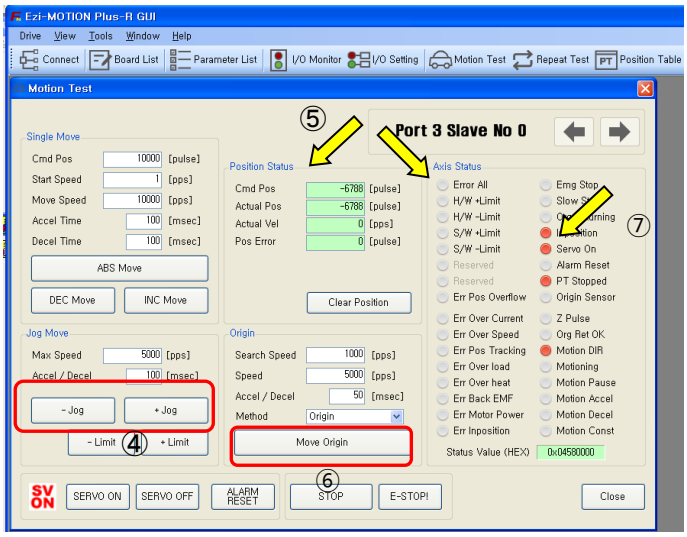
2) The window as shown to the right is displayed

3) By click 'SERVO ON' , the motor will be start to be electrified and the motor becomes 'lock' status.



4) **JOG Operation**

After setting jog related parameters, click and press '-Jog' or '+Jog' button. The motor will be operated to the setting direction.




5) According to the motion of motor, the user can check its position and operation status. For more information, refer to 「User Manual -Text, 7. Other Operation Functions」

6) **Origin Return Operation**.

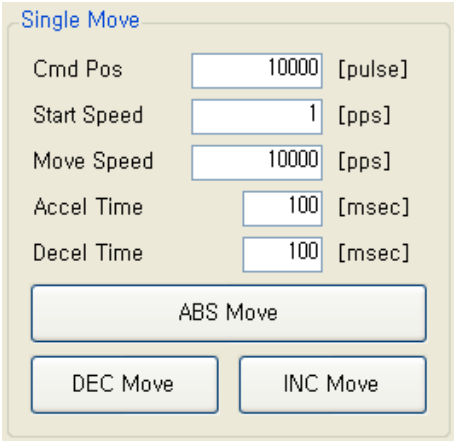
Click 'Origin', and origin return motion will be operated. The motion type may be different subject to how origin return type(parameter) is selected.

7) When origin return is finished, the red LED is displayed to ON like at the 'Axis Status' window. For more information, refer to 「User Manual-Text, 7.Operation Functions」

### 3.9.2 Single Move Operation

The user can test straight-line move command for one axis.

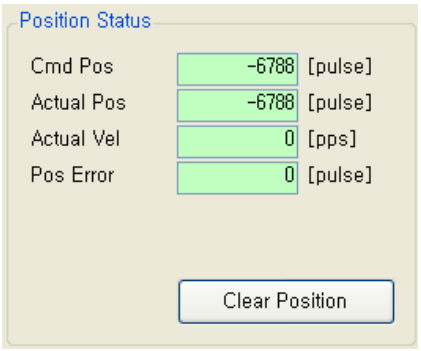
'ABS Move' button finds and moves to the absolute position, and 'DEC Move' and 'INC Move' find and move to the relative position.




* Cmd Pos : Indicates target position value. The unit is [pulse]. When 'ABS Move' is executed, this displays the absolute position. When 'DEC Move' or 'INC Move' is executed, this displays the relative position.
* Start Speed : To set AxisStartSpeed at the second item in parameter lists.'Start Speed' should be smaller than 'Move Speed'.
* Move Speed : To set the moving speed when ABS Move, DEC Move, or INC Move is executed. 'Move Speed' should be larger than 'Start Speed'.
* Accel Time and Decel Time : To set AxisAccel and AxisDecelTime in parameter lists.

### 3.9.3 Position Status

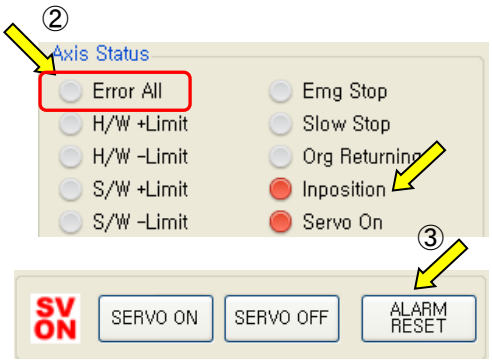
To displays the current position of axis. Click ‘Clear Position’ button, and Cmd Pos value and Actual Pos value will be initialized to ‘0(zero)’.




* Cmd Pos : displays target position value while the motor is operating.
* Actual Pos : displays current position value while the motor is operating.
* Actual Vel : displays the actual operation speed of motor.
* Pos Error : displays the difference between Cmd Pos value and Actual Pos value. By this value, the user can check how much the current target position is tracked correctly.

### 3.9.4 Axis Status and Alarm

To display the current axis status. Each status is displayed to On/Off. ‘On’ indicates in red and ‘Off’ indicates in white.



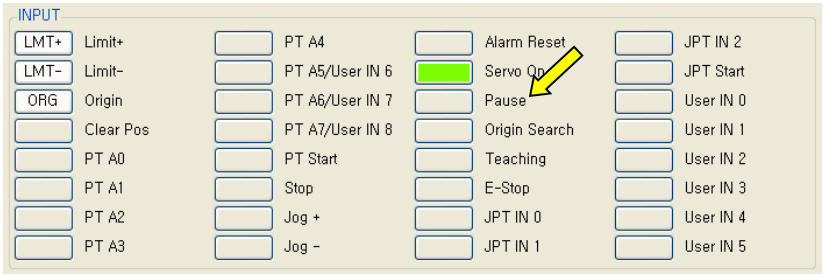

1) When the motor stops operation and Inposition is finished, the corresponding LED at the right figure is displayed in red.

2) When an alarm occurs during operation, the corresponding LED is displayed in red.

### 3.9.5 Stop Operating

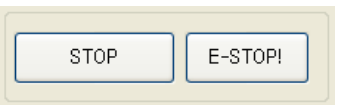
#### 1) Temporary Stop

Click ‘Pause’ button at the I/O Monitoring window to stop the motion temporarily. When clicking the button again, the motor restarts to operate. If ‘Pause’ signal is set to IN1~IN9, the actual external signal must be supplied to [ON] status.



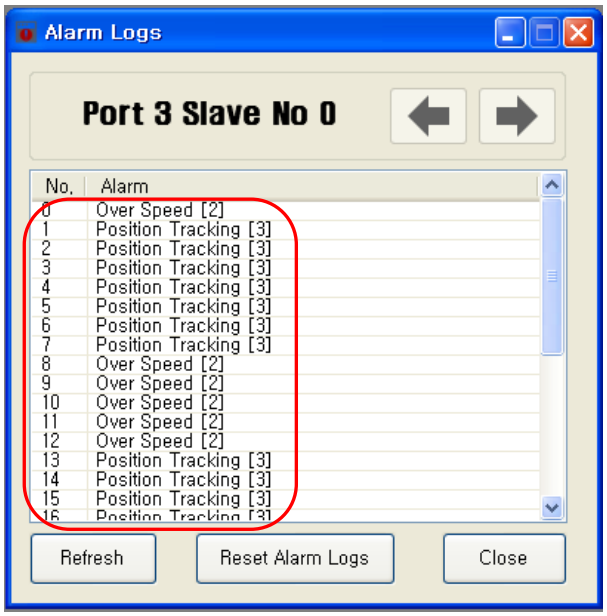

#### 2) Complete Stop

When the motor needs to stop completely during operation, the button as shown to the right is available. ‘STOP’ button includes deceleration function and ‘E-STOP’ button does not include deceleration function.



## 3.10 Alarm Logs

If an alarm occurs, its log informations are save in ROM area in the drive.




1) The maximum number of alarm logs are 30.

2) The inquiry of alarm log is possible only on Servo OFF status.

3) To remove alarm log,

use the ‘Reset Alarm Logs’ menu.

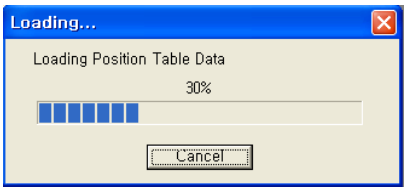
* Ezi-SERVO ALL-28 is not support this function.

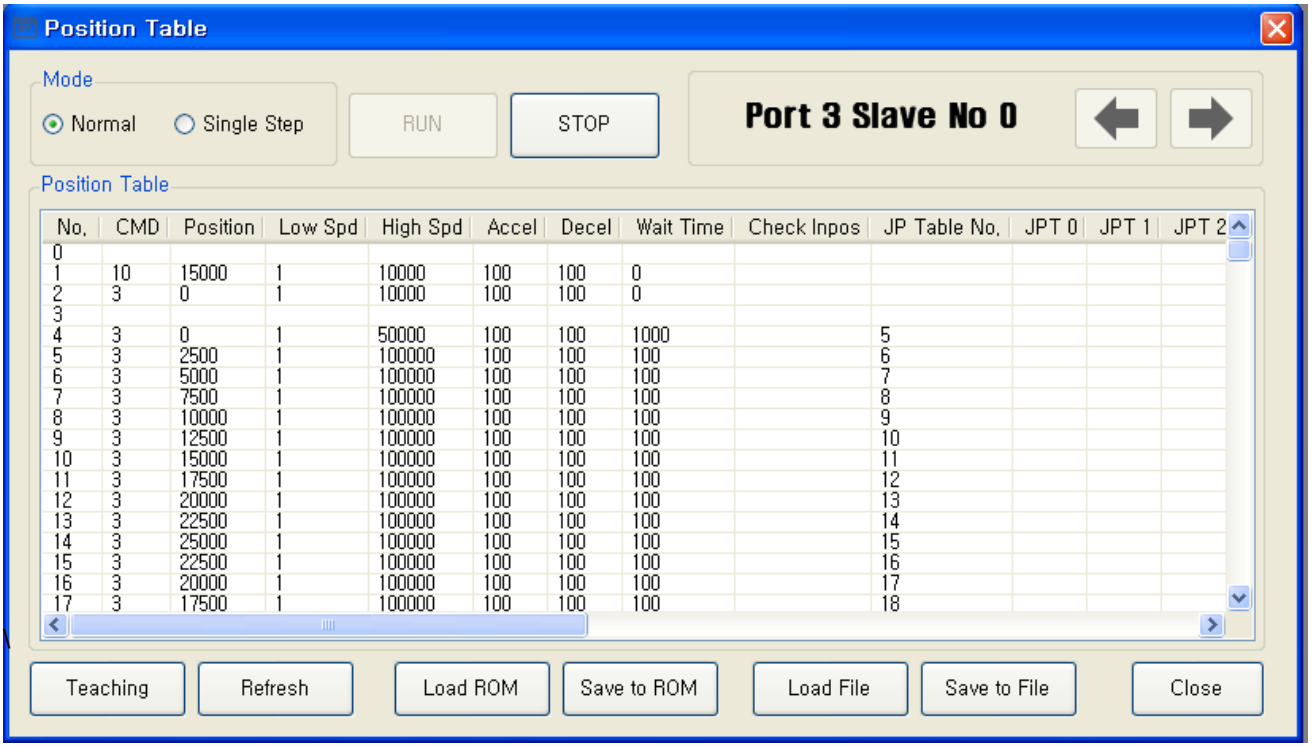
## 3.11 Position Table (PT)

For more information of position table, refer to 「User Manual-Position Table Function」. This chapter introduces its basic usage. This chapter describe the standard for Ezi-SERVO Plus-R and is not supported for Ezi-SERVO ALL-28.

**1) Reading position table data**

Click ‘Pos Table’ icon at the main menu, and data saved to the RAM area will be loaded and then the following window will be displayed.

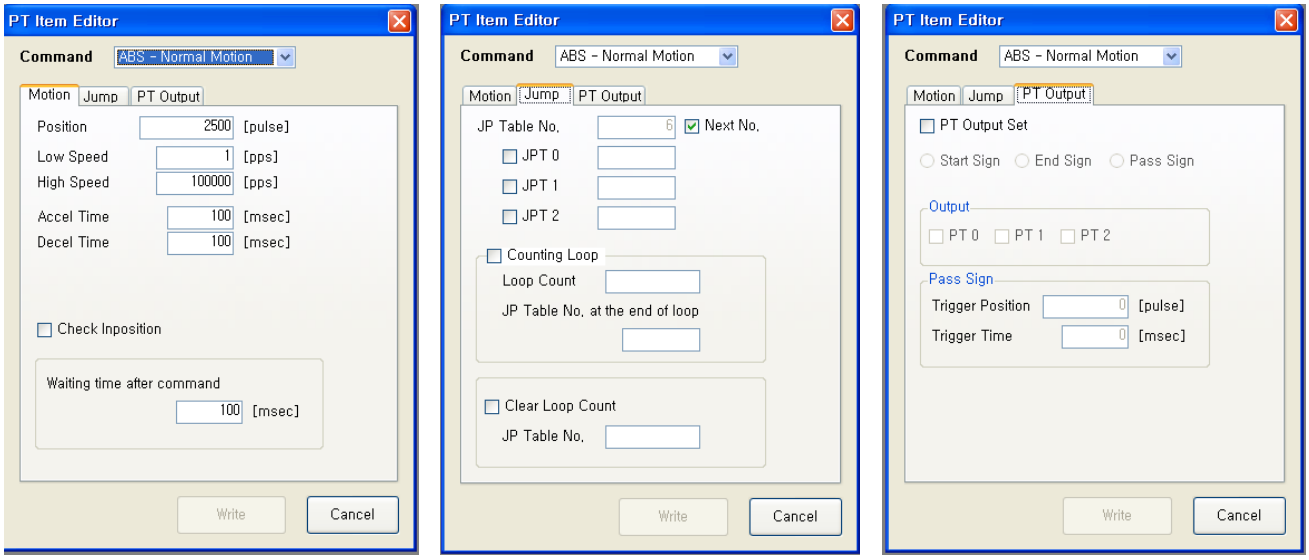


Position table data can be changed at any time. The position table can save up to 256 step data. If the position table is used to the program area, it may be used for all point numbers without restriction. That is, it is possible to start at a random point number and jump to other point number.

### 2) Position Table(PT) Edit

Put the mouse on a specific PT data line, click its right button, and the pop-up menu will be displayed as shown below.

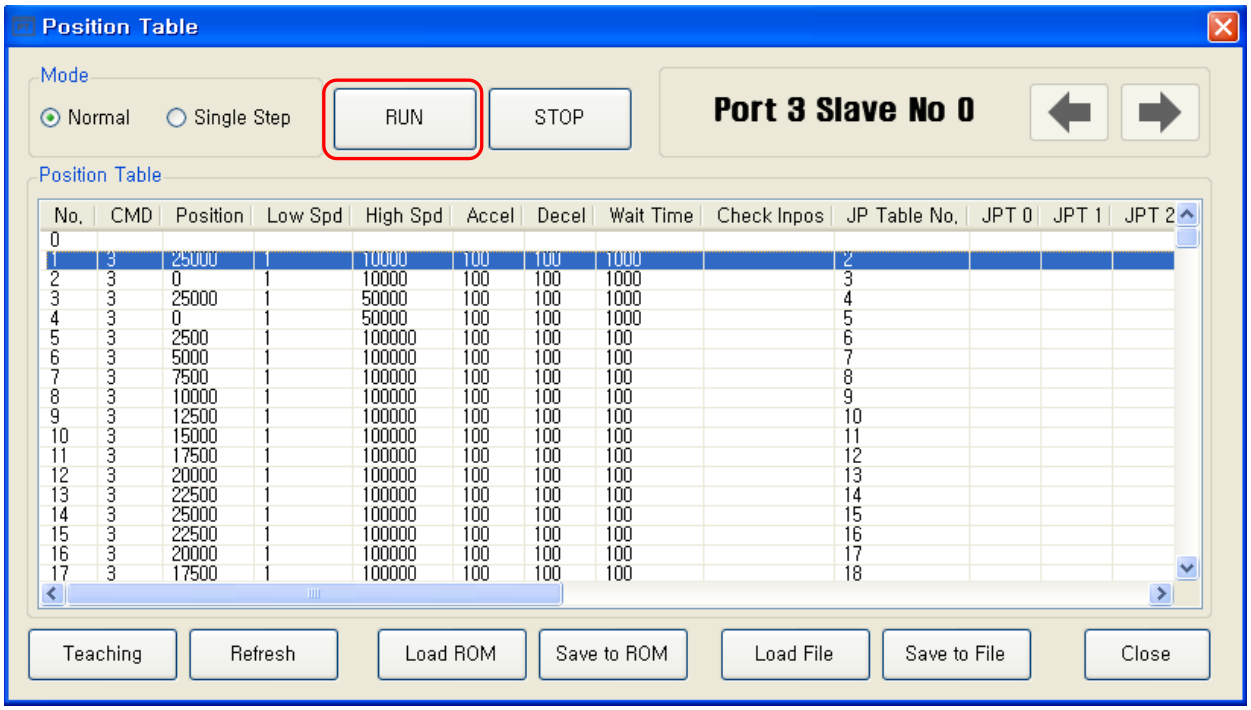



***** Input the value in order from ‘Command’ related items according to operation modes.

***** When all data of the positing table is completely inputted, click ‘Save’ key to save data.

***** To edit the next position table, the user should use PT select button.

### 3) Position Table(PT) Operation



## 3.11. Position Table (PT)

Set the motor to ‘Servo ON’ and select the mode ‘Normal’, click PT No to start motion, and then execute ‘Run’.

While PT No is operated in sequence, PT lines in service are changed in grey. Also, the user may monitor the operation status as described at ‘3.9.3 Position Status’ and ‘3.9.4 Axis Status and Alarm’ through ‘Motion Test’ window


*Fast, Accurate, Smooth Motion*

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