Ezi-STEP® Plus-R

Micro Stepping System
with Network based Motion Controller

Ezi-STEP® Plus-R MINI

Micro Stepping System
with Network Based Motion Controller

Ezi-STEP® ALL

Step Motors with Integrated
Drive and Controller

User Manual
User Program (GUI) Function

(Rev.08.05.029)

FASTECH

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This manual describes how to operate User Program (GUI) for Ezi-STEP Pus-R. For more information, refer related manuals.
(1) User Manual-Text
(2) User Manual-Communication Function
(3) User Manual-Position Table Function

1. Installation and Connection of the Program

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

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

2) Using position table (PT) and external signals inputted 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-STEP Plus-R is associated with RS-485. So, the user needs to convert RS-232C or USB for the PC into RS-485

1.1 Installation Environment of PC

Machine Type:

Compatible with PC/AT
RS－232C Port or USB Port
Hard disk more than 10MB
Screen SVGA(1024×768 or more)
CPU Pentium4 2.0 GHz or more

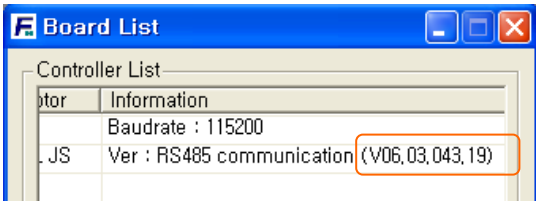
OS : Windows 2000/XP/VISTA should be normally installed.

1.2 User Program(GUI) Version

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

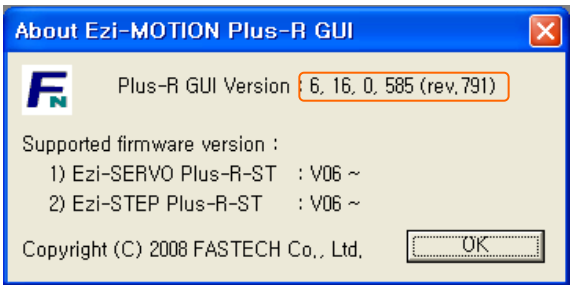
(1) Firmware program in drive :

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)

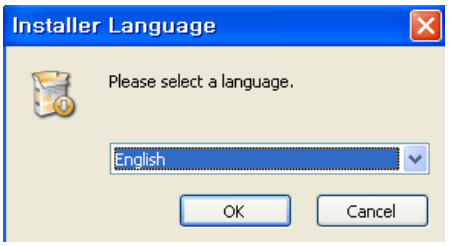
Caution	Do not mixed the drive of different version level in one network segment.

1.3 User Program (GUI) Installation Method

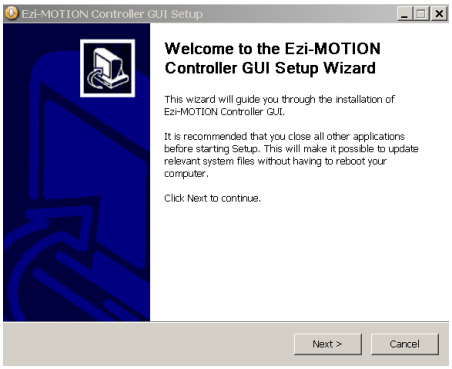
Click

icon at the installation program provided with the product, and perform as described at the window.

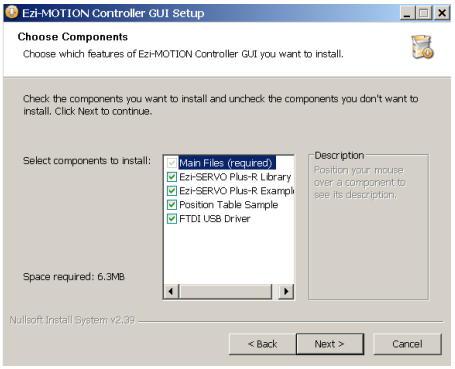
Select a language of installation screen.



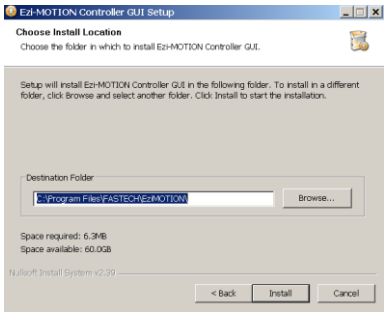
Installation Start window.
Click 'Next' button.



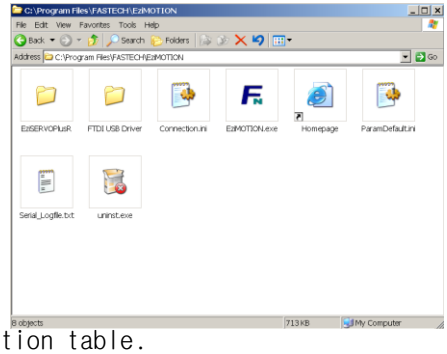
Select all installation components, and click 'next' button.



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/EziMOTION PlusR' folder is created and also GUI icon and program folders are installed.

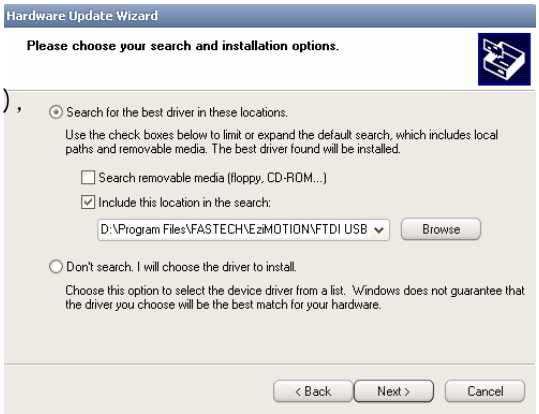
1) Include folder: *dll, *.lib, *.h files
2) Example folder: source code for sample
3) PT_Samples/Ezi-STEP folder: sample data files for position table.
4) FTDI USB Driver folder: driver program for USB converter
   When using USB to RS-485 converter, you need to install driver program for that.

1.4 USB to RS-485 Converter Installation Method

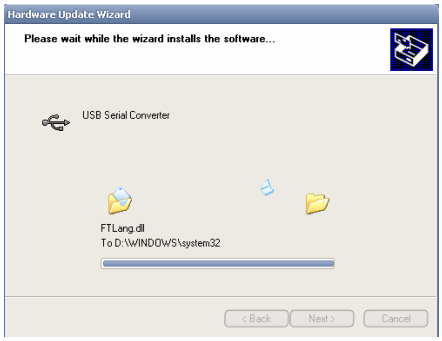
In case of using RS-232 to RS-485 converter, there's no need to install for converter.
But when you connect USB to RS-485 converter to PC, you can see the Installation Start window.

After select ① click 'Next' button.
When internet is connected to PC, it is possible to use 'automatically' installation

After select the 'FTDI USB Driver' folder (that is installed together with User Program (GUI), click 'Next' button.

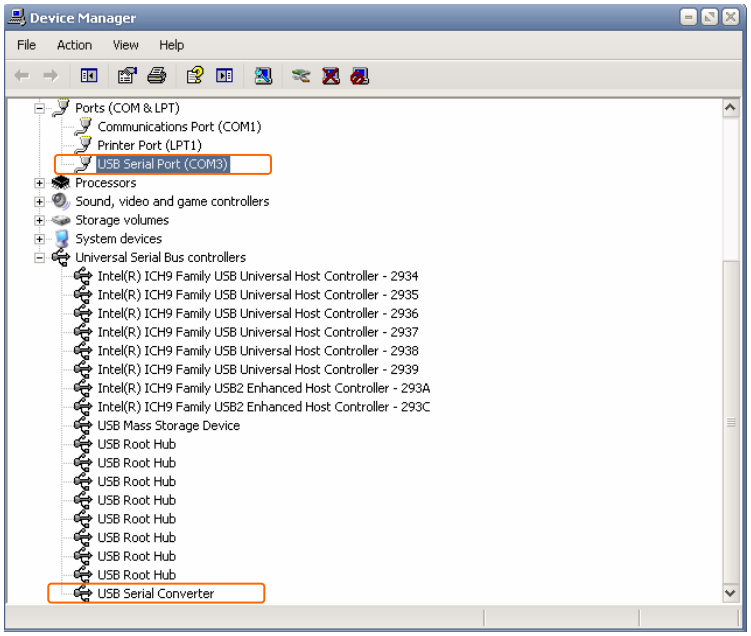


Now installing.



Installing is completed.

After installation completed, converter can be checked in Device Manager window.



1.5 Connecting PC with Drive Module

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

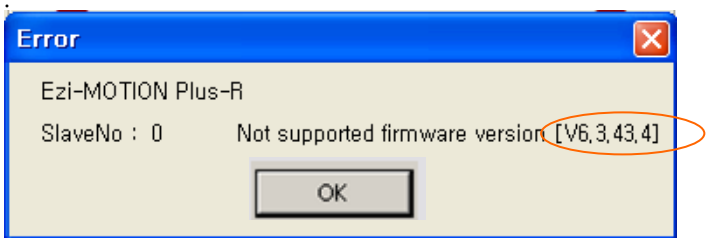
Execute EziMOTION Ezi-MOTION (Ezi-SERVO Plus-R) which is User Program (GUI), click 'Connect' button, and the following window will be displayed.

Item	Description
Port No.	To assign the port number of RS-232 or USB which is connected with drive module at the PC
Baudrate	To measure the communication speed that connects the drive to RS-485 communication. This should correspond to the switch (SW2) which sets the controller communication speed. (Drive: adjusted to 115200[bps] at the factory).

After setting, click 'Connect' button, and the controller module will try to connect 16 drives from 0 to 15 at the setting speed through a pertinent communication port.

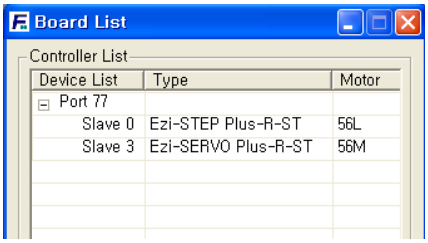
Caution	1. The communication speed of drive modules connected with one segment must be set to the same value. 2. When they are not connected, the user needs to check the port or the baudrate.

If the drive which is non-suitable for version 8 is connected, next message box is Displayed to inform.

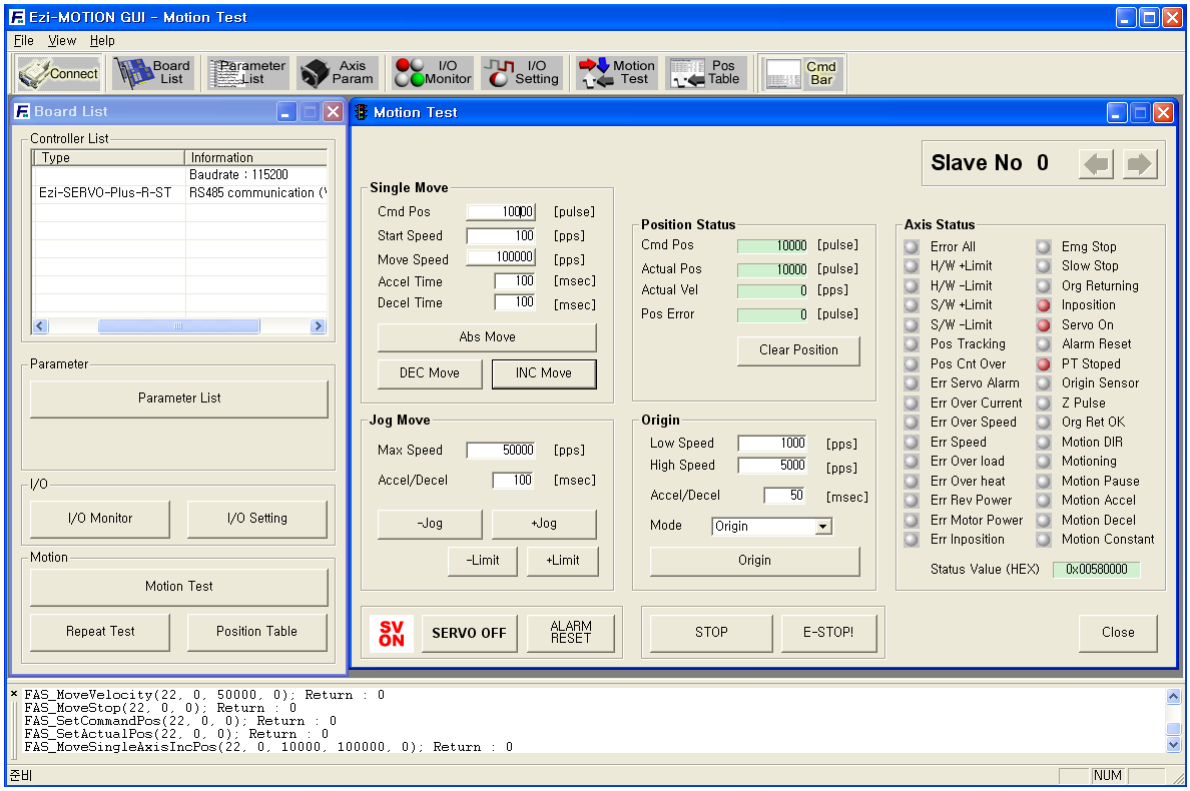


At this time, using another User Program(GUI) for Firmware version 6.

(2)When drive modules are normally connected, the user can check detailed information of controller list including the communication speed, motor type and Firmware program version at the following window.

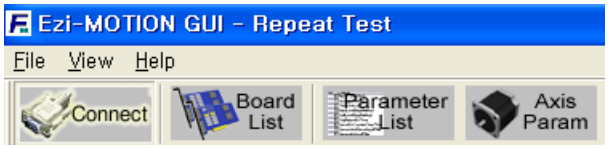


2. Main Window



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



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

2.2 Toolbar

There are various buttons to go to the next window.

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
Axis Param	To sort parameters that the user can change them easily
I/O Monitor	To monitor digital I/O signals of CN1 connector
I/O Setting	To set digital I/O signal assignment of CN1 connector
Motion Test	To execute motion commands such as Jog operation, Position operation, Origin return operation
Pos Table	To input and execute position table data
Cmd Bar	To display DLL function corresponding to the command being executed

2.3 Cmd (Command) Bar

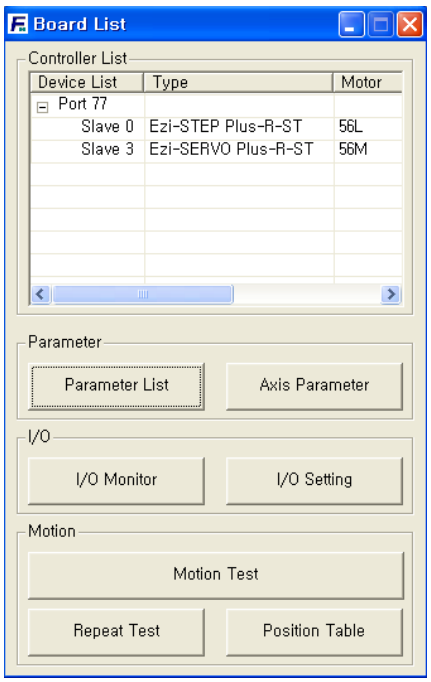
```
FAS_SetParameter(22, 0, 3, 988); Return : 0
FAS_SetParameter(22, 0, 3, 9887); Return : 0
FAS_SetParameter(22, 0, 3, 1); Return : 0
FAS_SetParameter(22, 0, 3, 10); Return : 0
FAS_SetParameter(22, 0, 3, 100); Return : 0
FAS_MoveSingleAxisIncPos(22, 0, 10000, 50000, 0); Return : 0
FAS_SetCommandPos(22, 0, 0); Return : 0
FAS_SetActualPos(22, 0, 0); Return : 0
FAS_MoveSingleAxisIncPos(22, 0, 10000, 50000, 0); Return : 0
FAS_PosTableRunItem(22, 0, 12); Return : 0
FAS_MoveStop(22, 0, 0); Return : 0
FAS_MoveStop(22, 0, 0); Return : 0
```

Click 'Cmd Bar' at the toolbar or check 'Menu→View→Command 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」.

2.4 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 setting or testing function.



Informations :

1) Slave ID number and type of drive.
2) Motor type.
3) Communication speed
4) Firmware version number of drive.

2.4.1 Parameter Area

Button	Function
Parameter List	To display the window that the user can check, edit, and manage drive parameters
Axis Parameter	To display parameters edited when the machine is set up

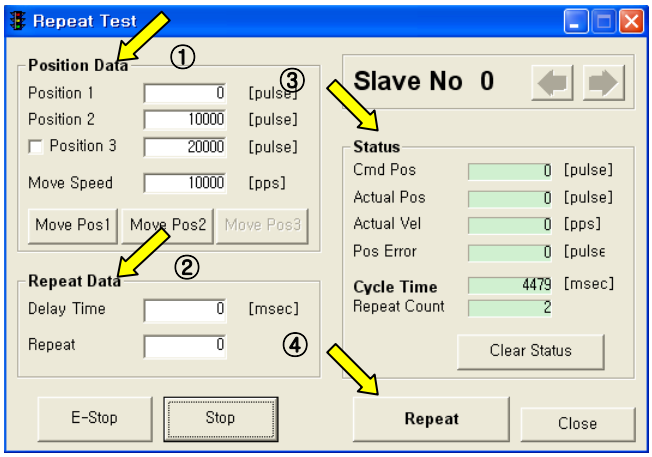
2.4.2 I/O Area

Button	Function
I/O Monitor	To monitor digital I/O signals of CN1 connector
I/O Setting	To set digital I/O signal assignment of CN1 connector.

2.4.3 Motion Area

Button	Function
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
Position Table	To input and execute position table data

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.

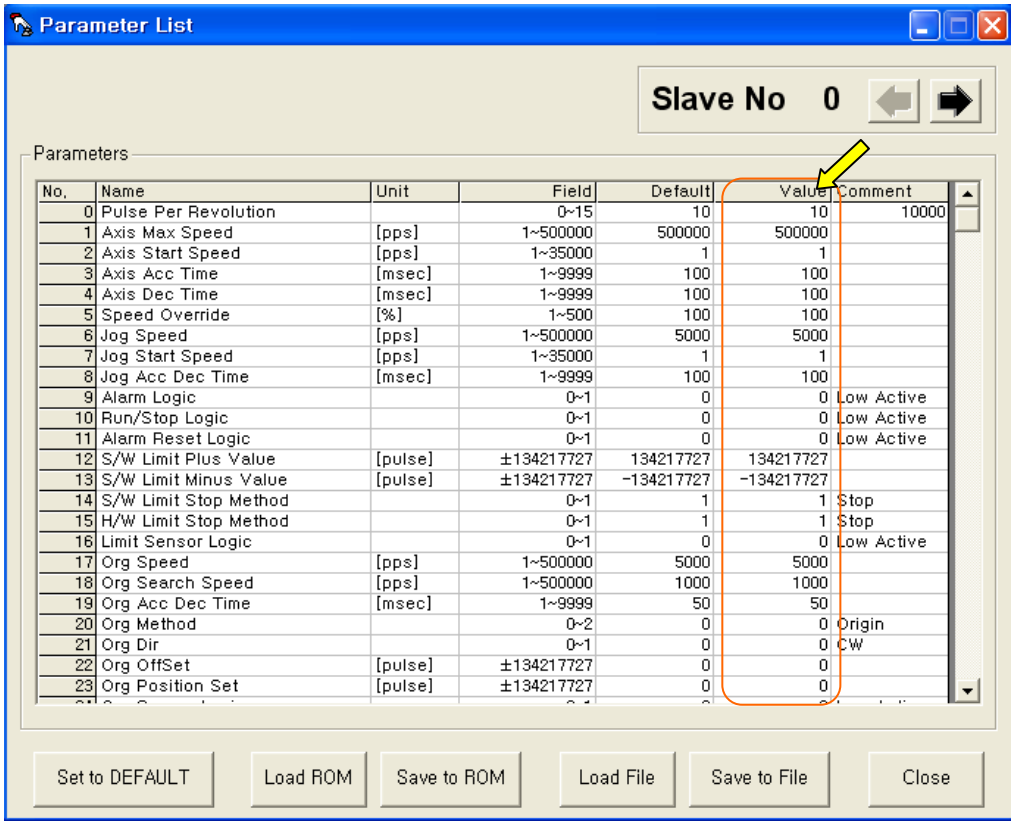
* Delay Time: Stand-by time until each motion is ended and then next motion is started. The unit is [msec].
* Repeat: To define the motion loop count. If this is set to '0', the test is endlessly repeated.

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. Parameter List



No.	Name	Unit	Field	Default	Value	Comment
0	Pulse Per Revolution		0~15	10	10	10000
1	Axis Max Speed	[pps]	1~500000	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	
6	Jog Speed	[pps]	1~500000	5000	5000	
7	Jog Start Speed	[pps]	1~35000	1	1	
8	Jog Acc Dec Time	[msec]	1~9999	100	100	
9	Alarm Logic		0~1	0	0	Low Active
10	Run/Stop Logic		0~1	0	0	Low Active
11	Alarm Reset Logic		0~1	0	0	Low Active
12	S/W Limit Plus Value	[pulse]	±134217727	134217727	134217727	
13	S/W Limit Minus Value	[pulse]	±134217727	-134217727	-134217727	
14	S/W Limit Stop Method		0~1	1	1	Stop
15	H/W Limit Stop Method		0~1	1	1	Stop
16	Limit Sensor Logic		0~1	0	0	Low Active
17	Org Speed	[pps]	1~500000	5000	5000	
18	Org Search Speed	[pps]	1~500000	1000	1000	
19	Org Acc Dec Time	[msec]	1~9999	50	50	
20	Org Method		0~2	0	0	Origin
21	Org Dir		0~1	0	0	CW
22	Org OffSet	[pulse]	±134217727	0	0	
23	Org Position Set	[pulse]	±134217727	0	0	

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 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 independently.

3.2 Parameter Input

No.	Name	Unit	Field	Default	Value
0	Pulse Per Revolution		0~9	9	9
1	Axis Max Speed	[pps]	1~500000	500000	500000
2	Axis Start Speed	[pps]	1~500000	1	1
3	Axis Acc Time	[msec]	1~9999	100	250
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.

3.3 Parameter List Window Buttons

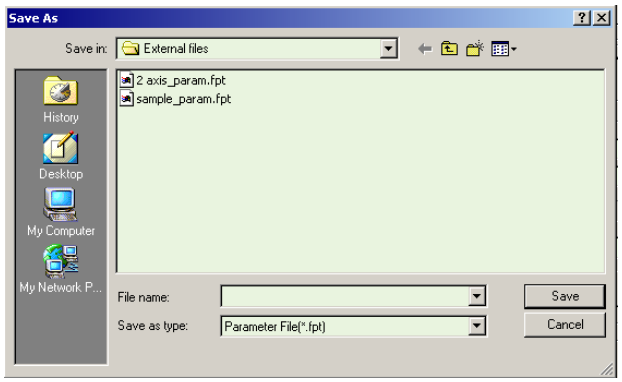
Click each button, and the following functions will be executed.

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. (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. (The user defines folder position and file name. The extension is *.fpt.)

For more information of parameter types and their functions, refer to 「User Manual-Text, 12. Parameters」.

3.4 Save/Load to a File

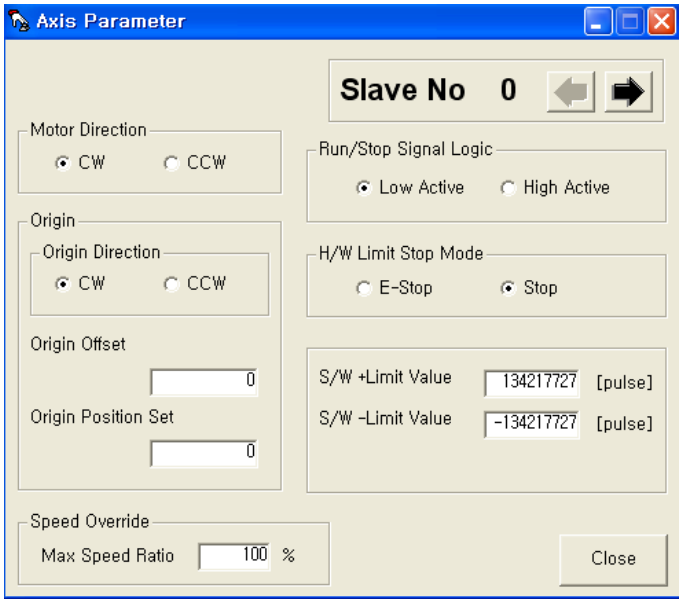
Ezi-STEP Plus-R can save parameters and position table data to an external file folder and can read them if necessary.



The user can edit a name of file, click 'Save' button, and save data. They can select a file, click 'Open' button and read data.

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

4. Axis Parameter

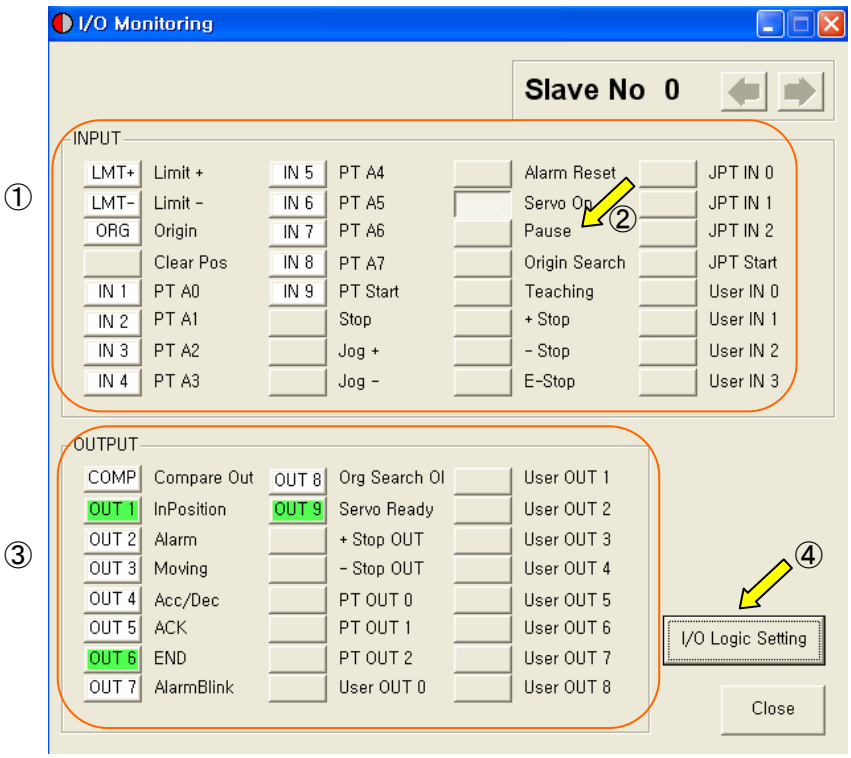


The above window is to enable the user to easily operate some important items of '3. Parameter List' items according to each function.
For more information of parameter types and their functions, refer to 「User Manual-Text, 12. Parameters」.

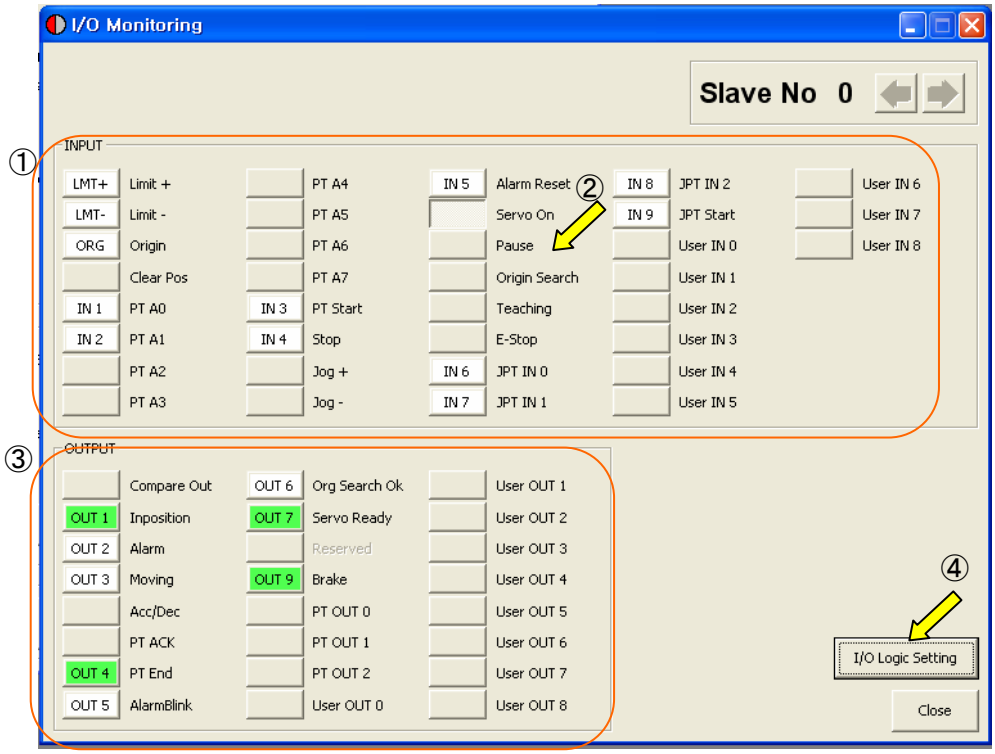
5. I/O Monitoring

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.

I/O Monitoring of Version 6 level GUI



I/O Monitoring of Version 8 level GUI



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(*1) 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(*2) 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 'green'. 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.

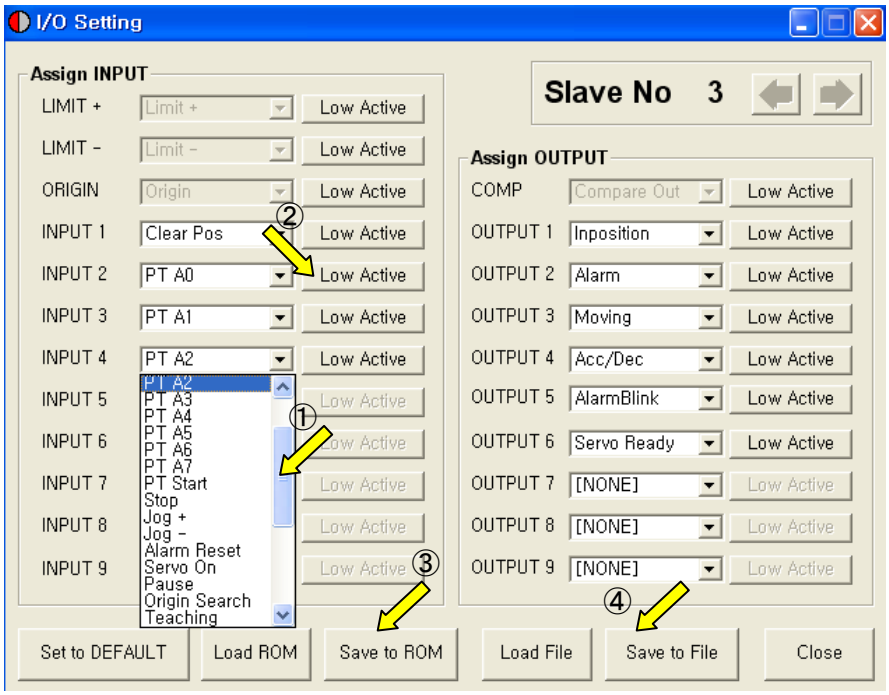
*1 : Ezi-STEP-PR : The user can set up to 9 signals for input.
Ezi-STEP-PR-MI/Ezi-STEP-ALL : The user can set up to 7 signals for input.

*2 : Ezi-STEP-PR : The user can set up to 9 signals for output.
Ezi-STEP-PR-MI/Ezi-STEP-ALL : The user can set up to 1 signals for output.

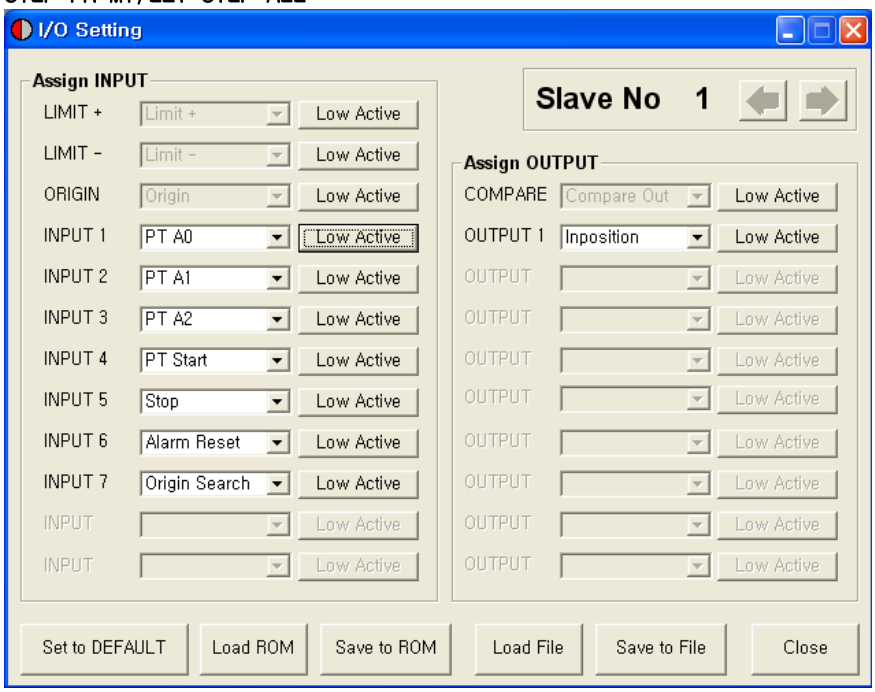
6. I/O Logic Setting

Click 'I/O Logic Setting' icon at the I/O Monitor window, and the following window will be displayed.

for Ezi-STEP-PR :



for Ezi-STEP-PR-MI/Ezi-STEP-ALL :



The assignment method is same in input and output.

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 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 in 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, 7. Control Input and Output Signal」.

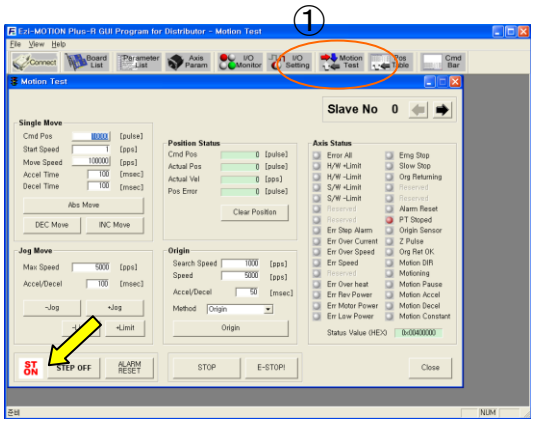
4) Load and Save to File : ④

Current I/O Logic setting status can be saved to external file and load from external file. Refer to 「3.4 Save/Read to a File」.

7. 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.

7.1 Initial Movement

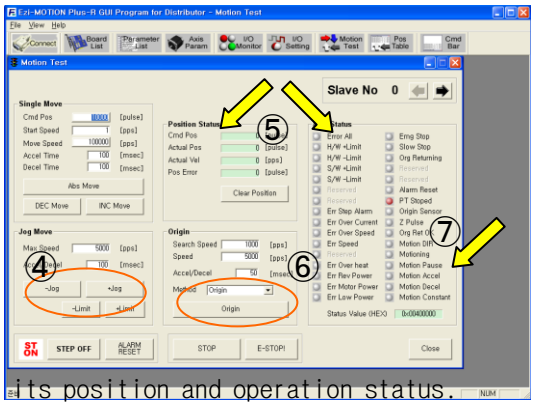


1) Click 'Motion Test' at the manin menu.

2) The window as shown to the right is displayed.

3) When power is ON, it display ST ON

The motor starts to be electrified and the motor becomes 'lock' status.



4) Jog Operation

After setting jog related parameters, click -Jog +Jog and press it for a while, and 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, 9. Other Operation Functions」.

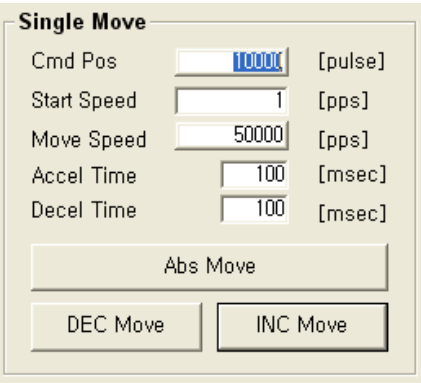
6) Origin Return Operation.

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 Origin Search OK at the 'Axis Status' window. For more information, refer to 「User Manual-Text, 9. Other Operation Functions」.

7.2 Single Move Operation

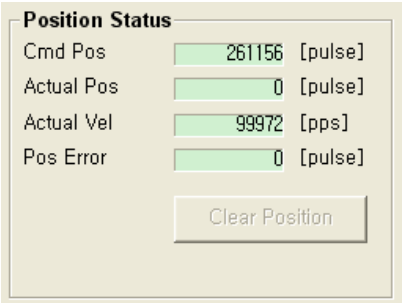
The user can test straight-line move command for one axis. 'Abs Move' button finds and moves to the absolute position, and 'DEC Move' and 'INC Move' find and move to the relative position.



* 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, Decel Time: To set AxisAccel and AxisDecel Time in parameter lists.

7.3 Position Status

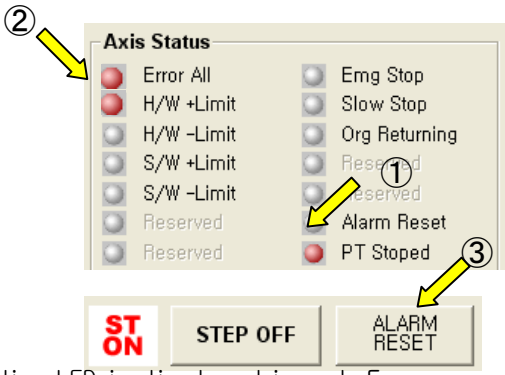
To displays the current position of axis. Click Clear Position button, and Cmd Pos value and Actual Pos value will be initialized to '0(zero)'.



* Cmd Pos: displays target position value while the motor is operating.
* Actual Pos: displays current position value while the motor is operating.
  (When external encoder is connected)
* 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.

7.4 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.

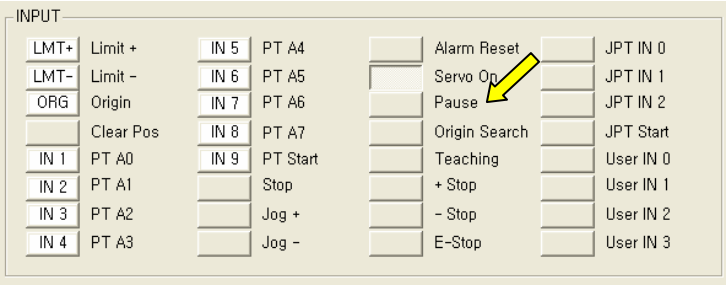


1) When PT motioning is completed, the corresponding LED at the right figure is displayed in red.
2) When an alarm occurs during operation, the corresponding LED is displayed in red. For more information of alarm types, refer to 「User Manual-Text, 7.4 Output Signal」.
3) After removing the alarm cause, click 'ALARM RESET' to check that the alarm is released. Then change the LED into STEP ON again.

7.5 Stop Operating

7.5.1 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.

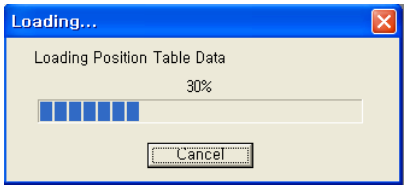


7.5.2 Complete Stop

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.

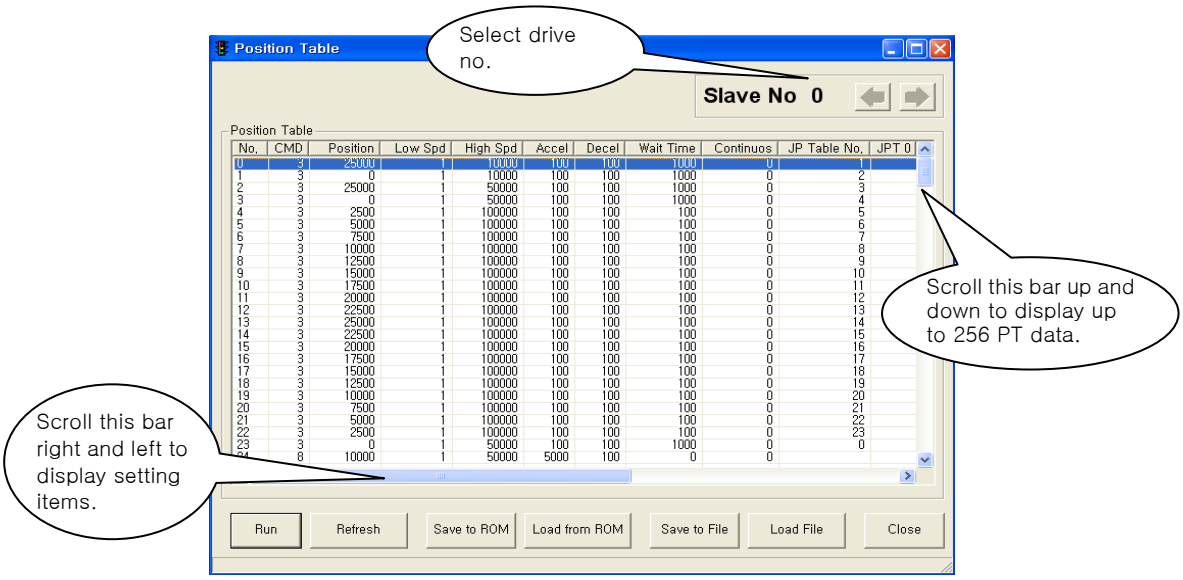
8. Position Table (PT)

For more information of position table, refer to 「User Manual-Position Table Function」. This chapter introduces its basic usage.



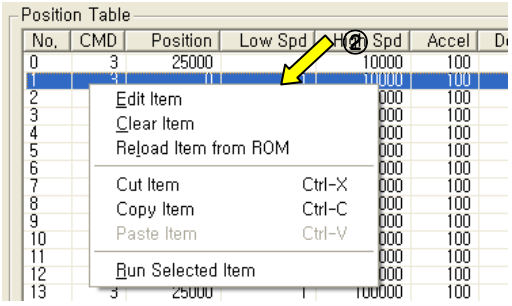
1) Reading position table data

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

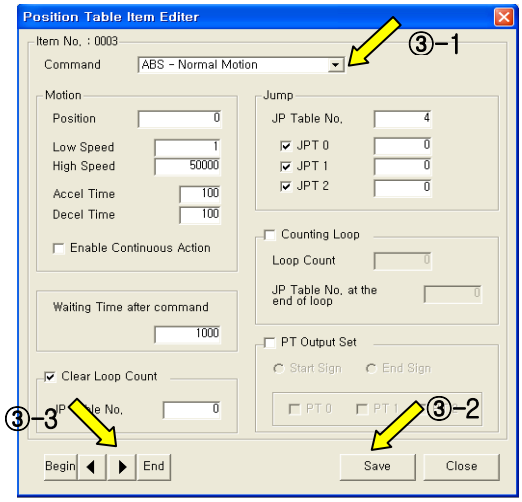


Position table data can be changed at any time. The position table can save up to 256 step data. If the position table is used to the program area, it may be used for all point numbers without restriction. That is, it is possible to start at a random point number and jump to other point number.

2) Put the mouse on a specific PT data line, click its right button, and the pop-up menu will be displayed as shown to the right. All of the functions can be implemented. Click 'Edit Item', and the user can edit data at the window like 3) below.



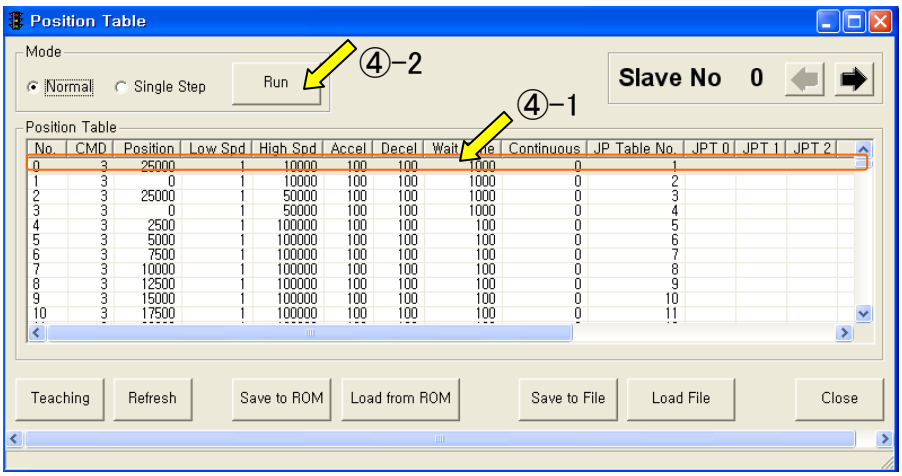
3) Put the mouse on a specific PT data line, double click its left key, and the right window will be displayed.



* 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.

This data is saved in the RAM area. So, when power is off, data is deleted. Click 'Save to ROM' button, and save the data to the ROM area.

4) 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 '7.3 Position Status' and '7.4 Axis Status' through 'Motion Test' window,

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