

# **Ezi-SERVO<sup>®</sup> II Plus-E ALL**

**Closed Loop Stepping System**

## User Manual

### Position Table Function

( Rev.03)



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## ※ Before Getting Started

- Presented 「Ezi-SERVOII Plus-E ALL User Manual “Position Table”」 explains position table functions of Ezi-SERVOII Plus-E ALL. There are 「User Manual Text」, 「User Manual Communication Function」 in this manual. Please utilize our product afterward understanding about proper usage method with reading these contents carefully. The word as 'Position Table' can be presented as PT (Position Table) from the following text.

- In particular, Please don't forget to recognize whole matters that requires attention about safety in 「User Manual Text」 and should try to understand properly. Besides please be safe to do not use the products improperly in any case. At worst, serious damage can be occurred as like death.

We provide this instruction manual and other instruction manual as well. Please keep these manuals in appropriate place whenever you need to find and read comfortably.

- Ezi-SERVOII Plus-E ALL has different number of input / output from Ezi-SERVOII Plus-E, so functions set and used for input / output are limited.

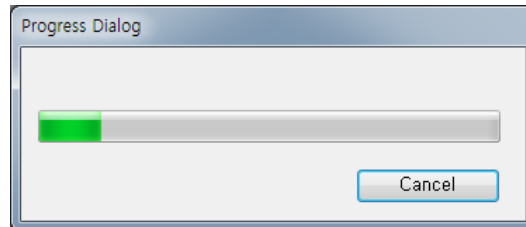
### 1) Limited function

	Ezi-SERVOII Plus-E	Ezi-SERVOII Plus-E ALL	Remarks
Position Table (When controlled by external signals)	256	4	With Ethernet, you can use 256 position tables
Input signals (Except sensor inputs)	9	3	
Output signals (Except compare out)	9	1	
PT Number	PT A0~7	PT A0~7	Only 2 out of 8 can be set
PT Output	PT Output0~2	PT Output0~2	Only 1 of 3 can be set and used

# 1 . Windows of Position Table (PT)

## 1 - 1 . Loading Position Table data

When click the 'Pos Table' button on main menu of User Program(GUI), then the system displays the following message box and loads data saved in RAM area of drive.



Functions of Position Table allows to process motions in the orders that were predefined by user. In the case of this Ezi-SERVOII Plus-E ALL drive, up to 256 steps can be saved.

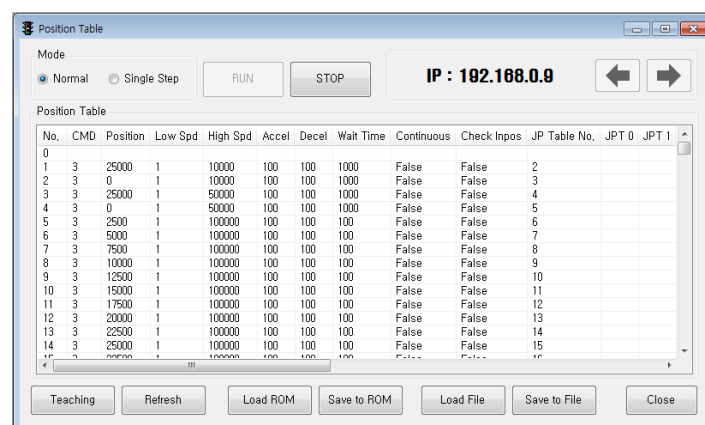
Major functions for saving items are shown as following:

- (1) Editing function of Motion step (Input/Edit/Delete/Copy)
- (2) Start and Stop function of Motion order at User Program(GUI)
- (3) Start and Stop Motion function by signal input from outside drive.
- (4) Teaching function
- (5) Functions to save Motion steps as file and to load them from file
- (6) View function of current Position Table order under execution status

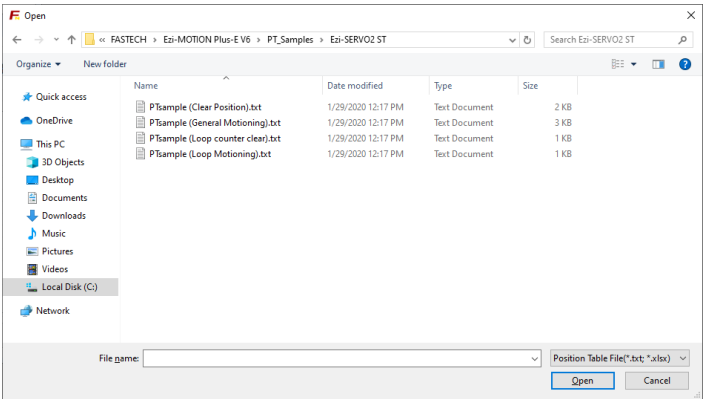
When electric power is supplied to drive, the Position Table data saved in ROM area of drive is copied to RAM area and once click the 'Pos Table' button, then the system loads the data saved in RAM area of drive.

## 1 - 2 . Main Window of Position Table

The following window describes windows and buttons which execute the position table function.



Button Name	Description
Normal/Single Step	The user can select modes to execute the position table. Normal: All position commands are in order executed according to

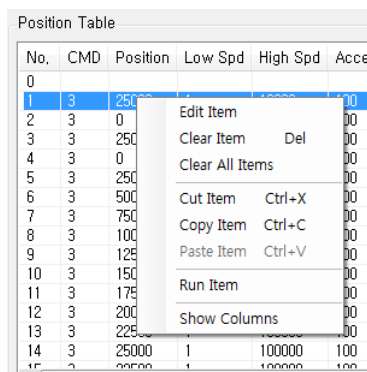
Button Name	Description
	conditions saved in the position table. Single Step : Only single position command is executed.
Run/Stop	To run/stop items at the defined position table
Teaching	Teaching is executed by either using external input signal or user program. By clicking this button, the user can easily use teaching function at the user program window. For more information, refer to <a href="#">P14.3-4 'Teaching Function'</a> .
Refresh	To display the position value measured by the teaching function. For more information, refer to <a href="#">P14.3-4 'Teaching Function'</a> .
Save to ROM	To save current position table data in ROM drive
Load ROM	To open position table data saved in ROM drive
Save to File	To save current position table data to an external file (It is saved to a folder defined by the user with a file name defined by the user. The extension is *.txt, *.xlsx.)
Load File	To read position table data saved in external file 

\* Up to **256** position table commands can be input and saved.

\* By using each position table command, the user can edit the file such as edit, copy, paste, and delete.

## 1 - 3 . Position Table Editor

When click right mouse button on a selected Position Table data line, then the following popup menu is activated.

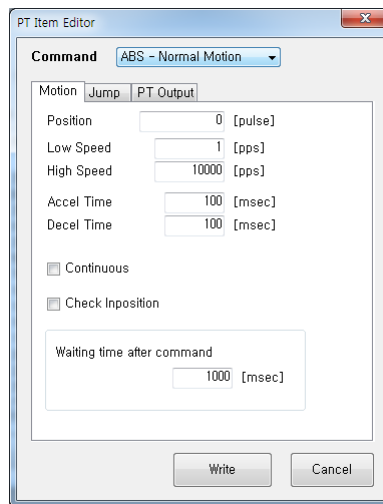


(1) Edit Item: You can edit data on the following dialog box shown as below.

(2) Clear Item: All the items of selected PT are cleared.

- (3) Clear All Items: While above function "Clear Item" clears data for one selected order, this function clears data for all the orders of 256 Position Table.
- (4) Cut Item: Used to cut selected item data of PT in order to paste on other position.
- (5) Copy Item: Used to copy selected item data of PT in order to paste on other position.
- (6) Paste Item: Paste the copied data to clipboard by "Cut" or "Copy" to other selected position.
- (7) Run Selected Item: Execute motion order from the selected No. of Position Table.

Double click on selected line of Position Table data or click the "Edit Item" from popup menu button shown above figure, then the dialog box shown right is activated.



The image shows a dialog box titled "PT Item Editor". At the top, there is a "Command" dropdown menu set to "ABS - Normal Motion". Below this are three tabs: "Motion", "Jump", and "PT Output", with "Motion" currently selected. The "Motion" tab contains several input fields: "Position" (0 [pulse]), "Low Speed" (1 [pps]), "High Speed" (10000 [pps]), "Accel Time" (100 [msec]), and "Decel Time" (100 [msec]). There are two checkboxes, "Continuous" and "Check Inposition", both of which are unchecked. At the bottom of the tab is a "Waiting time after command" field set to 1000 [msec]. At the very bottom of the dialog box are two buttons: "Write" and "Cancel".

Enter each value on [Motion], [Jump], [PT Output] tab.

After complete editing of all data completely, click "Write" to save data to RAM. In order to save data to ROM area, click 'Save to ROM' on main screen of Position Table.

## 2 . Position Table Item (PT)

### 2 - 1 . Explanation of Position Table Item

Designated Item	Description	Unit	Lower limit	Upper limit
<b>Command</b>	Specifies type of motion. For more details, refer to 「 <a href="#">2.2 Command</a> 」.	-	0	10
<b>Position</b>	Specifies position/movement scale by number of pulse.	pulse	-134,217,728	+134,217,727
<b>Low Speed</b>	Specifies low speed by number of pulse in accordance with type of motion. For more details, refer to 「 <a href="#">2.2 Command</a> 」.	pps	1	500,000
<b>High Speed</b>	Specifies high speed by number of pulse in accordance with type of motion. For more details, refer to 「 <a href="#">2.2 Command</a> 」.	pps	1	500,000
<b>ACC time</b>	Specified acceleration time by msec when starting motion.	ms	1	9,999
<b>DEC time</b>	Specified acceleration time by msec when stopping motion.	ms	1	9,999
<b>Wait time after command</b>	Specifies waiting time by msec for starting motion of next PT when specifying PT No. for jump/skip. If JP Table No is specified as blank or 'Continuous Action' is specified, this is ignored.	ms	0	60,000
<p>Note) Even if Wait Time is specified as 0[ms], the system waits for the completion signal of position setting (INP signal) or motor stop signal before starting next Position Table.</p>				
<b>Continuous</b>	If this item is checked as 'check (1)', the system continues action of current position and next position.	-	0	1

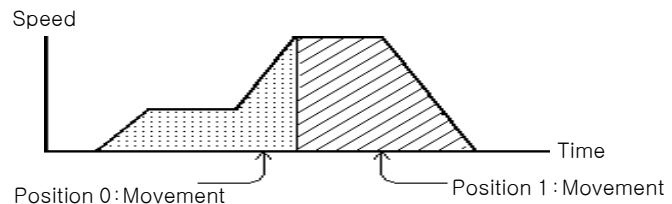
Condition 1) For this function the 'Command' item value must be '0~7'.

This function has to be used in sequentially increased goal position or sequentially decreased goal position.

Condition 2) When this function is used for more than 2 PT steps, every PT step have to be 'Continuous action' mode.

Example) When Position 0, 1 are specified as under, that is, position 0 is specified as Continuous Action, Acc/Dec of position 1 is ignored and it works with Acc/Dec of position 0.

PT No.	Cont Act	JPT No
Position 0	1	1
Position 1	0	-



JP Table No.	When this item specified, the system jumps to JP Table No and execute it after completing action of current position. If Position No is specified as 10XXX, system jumps to Position No XXX as soon as 'JPT Start 'begins, one of the input digital signal from controller to outside, becomes ON.  For program exit, specify as blank. For more details, refer to 「3.5 Input Condition - Jump」.	-	0	255								
			10,000	10,255								
JPT 0 (Input Jump Position No.0)	If any of these items is checked and there are corresponding input signals of JPT input0, JPT input1 or JPT input2, system jumps to JPT 0, JPT 1 or JPT 2 accordingly regardless of specified 'Jump Table No.'  For more details, refer to 「3.5 Input Condition Jump」.	-	0	255								
JPT 1 (Input Jump Position No.1)			10,000	10,255								
JPT 2 (Input Jump Position No.2)		-	0	255								
			10,000	10,255								
<table><tr><td>Input signal</td><td>Corresponding Input Jump Position</td></tr><tr><td>JPT input0</td><td>Input Jump Position No 0</td></tr><tr><td>JPT input1</td><td>Input Jump Position No 1</td></tr><tr><td>JPT input2</td><td>Input Jump Position No 2</td></tr></table>					Input signal	Corresponding Input Jump Position	JPT input0	Input Jump Position No 0	JPT input1	Input Jump Position No 1	JPT input2	Input Jump Position No 2
Input signal	Corresponding Input Jump Position											
JPT input0	Input Jump Position No 0											
JPT input1	Input Jump Position No 1											
JPT input2	Input Jump Position No 2											
Loop Count	If these items are specified, system repeats action of the position under specified times (Loop Count) and after then jumps to corresponding position to Loop Jump	-	0	100								
JP Table No. at the end of loop		-	0	255								



	<p>Table No regardless of specified 'Jump Table No'.</p> <p>For more details, refer to 「<a href="#">3.6.1 Loop Setting</a>」.</p>		10,000	10,255
<b>PT Output set</b>	<p>Specifies output signals such as PT Output0, PT Output1, PT Output2 in order to confirm the start, pass or end of motor operation for each position.</p> <p>0,8,16 : Not use output signal 1~7 : Specifies output function when starting operation. 9~15 : Specifies output function when completing operation. 17~23 : Specifies output function when the position reach to 'Trigger Position'.</p> <p>For more details, refer to 「<a href="#">3.7 Start/Pass/End Signal Function</a>」.</p>		0	23
<b>Clear Loop Count</b>	<p>If this item is checked, Loop Count of specified No of PT is to be cleared.</p> <p>For more details, refer to 「<a href="#">3.6.1 Loop Setting</a>」.</p>	-	0	255
<b>Check Inposition</b>	<p>If this item is set, it is recognized as stopped only in Inposition state.</p>	-	0	1
<b>Trigger Position</b>	<p>Specifies position where the PT Output0, PT Output1, PT Output2 signal is ON in case of 'PT set' is 17~23.</p> <p>For more details, refer to 「<a href="#">3.7 Start/Pass/End Signal Function</a>」.</p>	pulse	-134,217,728	+134,217,727
<b>Trigger Time</b>	<p>Specifies pulse width where the PT Output0, PT Output1, PT Output2 signal is ON in case of 'PT set' is 17~23.</p> <p>For more details, refer to 「<a href="#">3.7 Start/Pass/End Signal Function</a>」.</p>	ms	0	65,535
<b>Push Ratio</b>	<p>This sets the ratio of torque per motor applied in push motion.</p> <p>For details, refer to 「<a href="#">3-8. Push Motion Function</a>」.</p>	%	20	90
<b>Push Speed</b>	<p>Set operation speed value applied in push motion. (Maximum 600[rpm])</p>	pps	1	100,000
<b>Push Position</b>	<p>Set the absolute target position value</p>	pulse	-134,217,728	+134,217,727

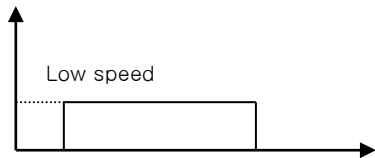
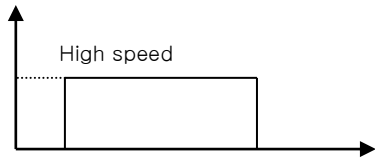
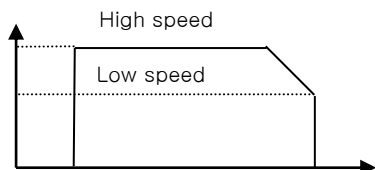
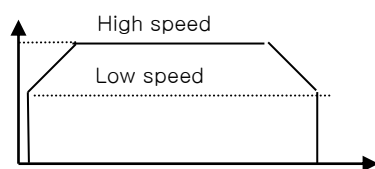
	applied during push motion.			
<b>Push Mode (Pulse Count)</b>	Select Stop mode (0) and Non-Stop mode (1 ~ 10000). For details, refer to <a href="#">「3-8. Push Motion Function」</a> .		0	10,000

## 2 - 2 . Type of Command

Item "Command" specifies type of action pattern to be executed for each position and the followings in the table are list of commands.

Command Name	Specified Value	Description
ABS – Only Low Speed	0	The value in the item "Position" is value for absolute position. 'Teaching' function can be used. 'Continuous Action' function can be used.
ABS – Only High Speed	1	
ABS - High Speed and Deceleration	2	
ABS – Normal Motion	3	
INC - Only Low Speed	4	The value in the item "Position" is value for relative position. 'Teaching' function is not supported. 'Continuous Action' is not supported.
INC - Only High Speed	5	
INC - High Speed and Deceleration	6	
INC - Normal Motion	7	
Move Origin	8	Execute the command to move to origin based on the specified current parameters specified.
Clear Position	9	Reset 'command position' value and 'actual position' value based on current position and clears the values as 0.
Push ABS Move	10	Excute the command to push motion.
Push Stop	11	Command to stop Push motion operation. For details, refer to <a href="#">「3-8. Push Motion Function」</a> .

The following table shows the motion pattern during operation according to each command name.

Command Name	Specified Value	Motion Pattern
ABS – Only Low Speed	0	
INC – Only Low Speed	4	
ABS – Only High Speed	1	
INC – Only High Speed	5	
ABS - High Speed and Deceleration	2	
INC - High Speed and Deceleration	6	
ABS – Normal Motion	3	
INC – Normal Motion	7	

## 3 . Execution of Position Table

### 3 - 1 . Explanation of Position Table Item

Position Table operation is executed by input signal or communication command. The followings are example of Position Table operation by input signal to be explained step by step.

In the case of Position Table operation by communication command, the system is executed by sending the communication commands corresponding to the control input signal.

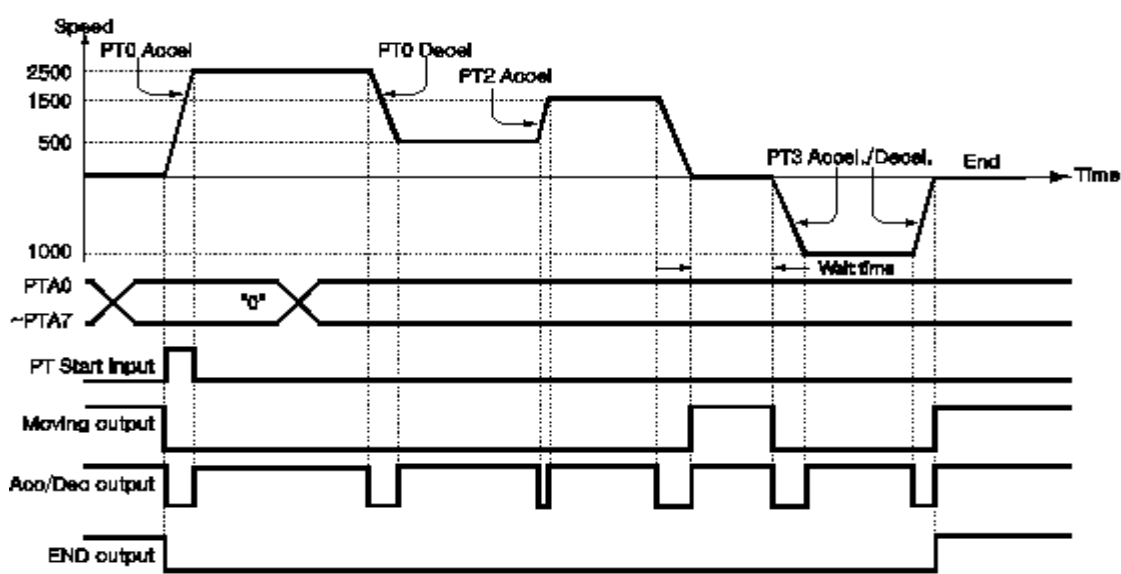
- 1) Specify Position Table No (0~255) operated by PT A0~PT A7.
- 2) If the motor is Servo OFF, click Servo ON.
- 3) Signal ON of PT Start input to start operation.

### 3 - 2 . Example of General Operation

Specify PT No through input data for PT A0 ~ PT A7 and then input 'PT Start' signal to start speed control operation.

【Specifying Position Table】

PT No.	Command type	Position	Low Speed	High Speed	Accel. time	Decel. time	Wait time	Continuous Action	JP Table No.
0	3	10,000	1	2,500	50	300	0	1	1
1	3	1,000	1	500	-	-	0	1	2
2	3	5,000	1	1,500	50	300	300	0	3
3	3	-2,500	1	1,000	300	300	0	0	-



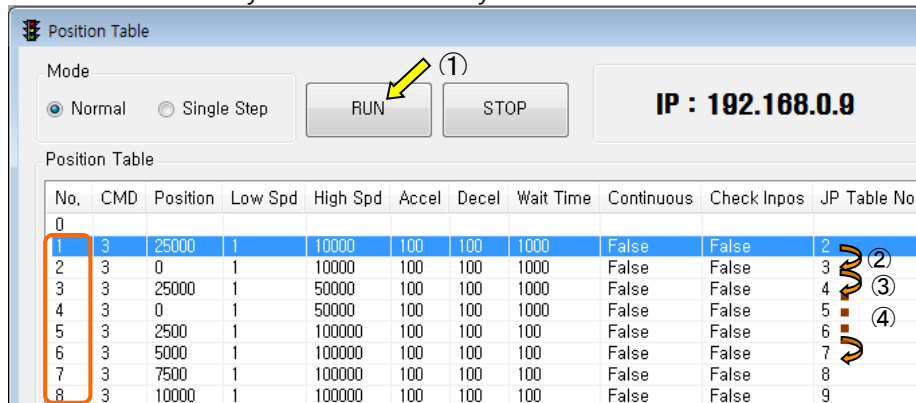
\* Refer to the sample file for testing Position Table, '[PTsample \(General Motioning\).txt](#)'.

### 3 - 3 . Operation Mode

Position Table commands can be executed by two modes as follows.

#### 3 - 3 - 1 . Normal

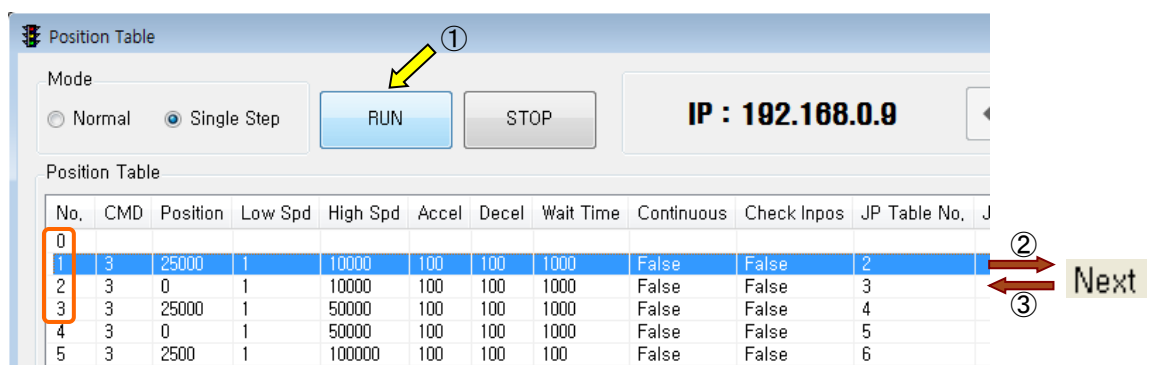
Select 'Normal' at the main window of position table, and all commands will be executed in order by conditions already loaded in PT data.



- 1) While Normal mode is selected, the user sets PT number to 0 and click 'Run' and then PT 0 is executed.
- 2) PT 1 is executed by PT data jump conditions.
- 3) PT 2 is executed by PT data jump conditions.
- 4) As mentioned above, next PT number is automatically executed by position data jump conditions.
- 5) Click 'Stop' to stop operating.

#### 3 - 3 - 2 . Single Step

Select 'Single Step' at the main window of position table, and only corresponding PT command will be executed and next PT commands will be on stand-by. This mode can be easily used when the user executes testing for each position command. And it is available for User Program (GUI) only.



- 1) While Single Step Mode is selected, the user sets PT number to 0 and click 'Run' and then PT 0 is executed.
- 2) After execution is stopped, 'Run' icon is changed into **Next** and next command is on stand-by.
- 3) Click **Next** button, and PT 1 will be executed.

- 4) When pressing each **Next** button, one PT command is executed.
- 5) Click 'Stop' to stop operation. After operation is stopped, the user can set new PT number and click 'Run' button to start the program again.

### 3 - 4 . Teaching Function

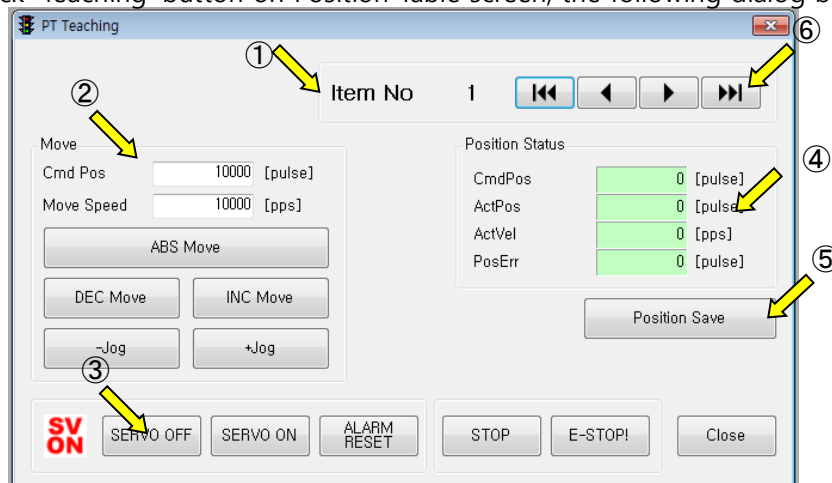
Teaching signal functionalizes that the position value[pulse] being working can be automatically inputted into a 'position' value of a specific position table.

It is the easy method to measuring the position value when it is difficult to calculate the real movement distance (position value). The type of commands which is using teaching function are in the below table.

Command Name	Value	To be used or not
ABS – Only Low Speed	0	'Teaching' can be used.
ABS – Only High Speed	1	
ABS - High Speed and Deceleration	2	
ABS – Normal Motion	3	
INC - Only Low Speed	4	'Teaching' cannot be used.
INC - Only High Speed	5	
INC - High Speed and Deceleration	6	
INC - Normal Motion	7	
Move Origin	8	
Clear Position, Push ABS Move, Push Stop	9,10,11	

#### 3 - 4 - 1 . Teaching by User Program

When click 'Teaching' button on Position Table screen, the following dialog box is activated.



- ① Select Position Table No, the figure shows that No 6 of PT is selected among 256 Position Tables.
- ② To specify the position of motor where to teach and move it.
- ③ Turn ON or OFF of Servo during teaching.
- ④ Displays current position information and the value displayed in "Actual Pos(ition)" is to be teaching value.

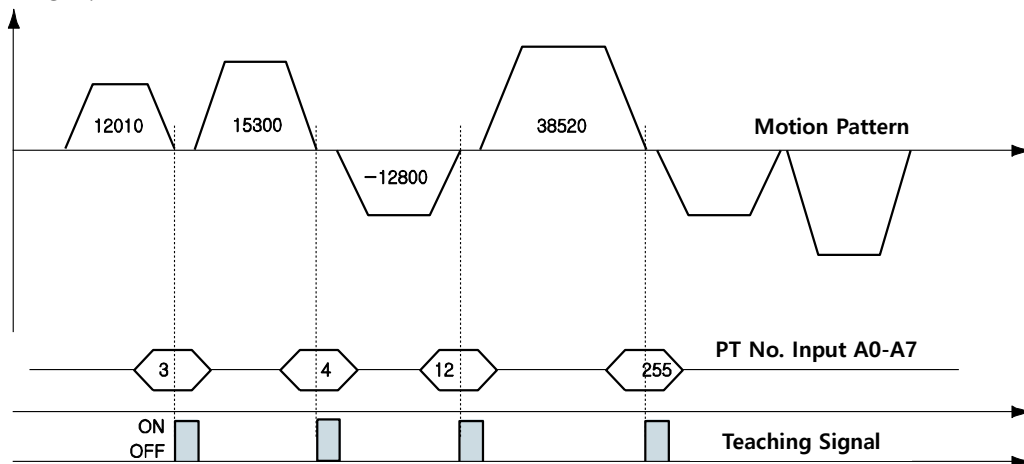
- ⑤ When clicking this "Teaching" button, current value displayed in "Actual Pos" will be saved in the item "Position" of the current PT (No 6 above case). The values are to be saved on RAM and click 'Save to ROM' button in order to save on ROM.
- ⑥ In order to move to the next position, select PT No. by using arrow keys.

### 3 - 4 - 2 . Teaching by Input Signal

You can save current position information to the Position Table data by Turning ON teaching control input signal. Also, when executes teaching, position value (No. of pulse) is specified as absolute position value.

Teaching is executing by following orders:

- 1) Select PT No. to save data and specify items like "Command", etc.  
(except item 'Position 'only)
- 2) Move the motor to the position where you want to save data of it.
- 3) Specify PT No's that teaching is executing by 'PT A0~PT A7'.
- 4) Turn ON teaching signal to save current position value into item 'Position' of Position Table data.
- 5) If you want to apply the saved value, you need to 'Refresh' PT data in order to verify the value on the User Program(GUI) screen.
- 6) The values are to be saved on RAM and click 'Save to ROM' button in order to save on ROM.



PT No. (CMD)	Position Value for each PT [pulse] (Position)
Position 3	12,010
Position 4	15,300
Position 12	-12,800
Position 255	38,520

## 3 - 5 . Input Condition Jump

Among the items to be specified, "JP Table No.", "JPT 0", "JPT 1" and "JPT 2" are used to specify next PT No. to be executed. Specified next PT No. to be executed, there are two different methods depending on the control signal as following.

### 3 - 5 - 1 . Automatic Jump

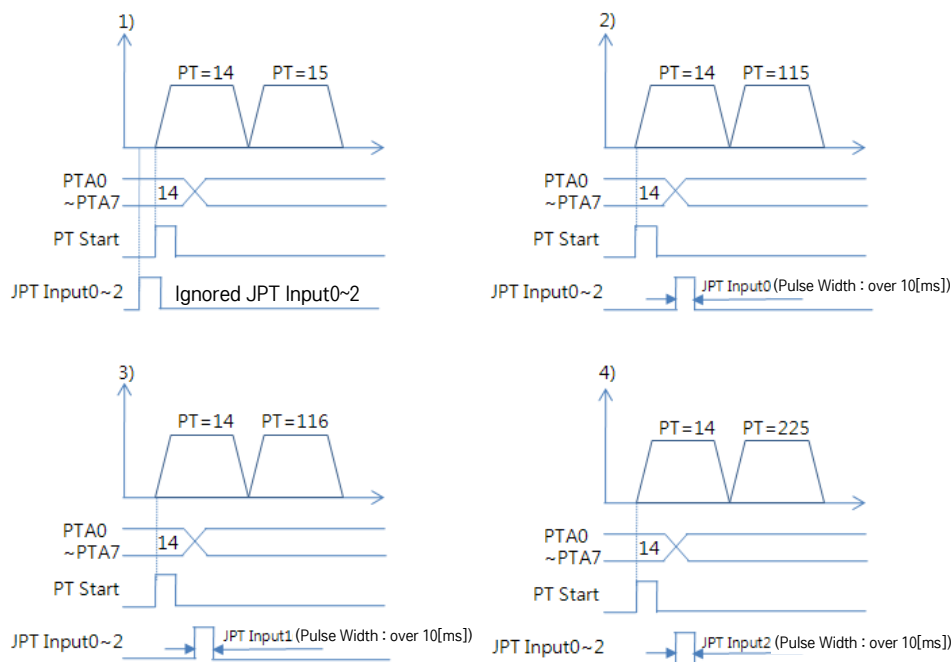
This is the method to specify next action pattern (PT No.) by input condition.

System jumps to next PT No. to be executed automatically according to procedure.

For example, as shown in the following figure, when PT No. 14 is executing 1), if there is no input signal, next action pattern is to be executed by PT No. 15 as shown in figure 1). However, if any of input signal is ON such as JPT Input0, JPT Input1 or JPT Input2 during the operation of PT No. 14, then system jumps to JPT 0, JPT 1 or JPT2 accordingly and execute it that is specified in the Position Table data as shown in the figure 2) ~ 4).

Data for PT No.14

PT No (CMD)	Position Table No to jump (JP Table No.)	Input Jump Position No 0 (JPT 0)	Input Jump Position No 1 (JPT 1)	Input Jump Position No 2 (JPT 2)
14	15	115	116	225



\* Refer to the sample file for testing Position Table, 'PT sample (Loop Motioning).txt'.



### 3 - 5 - 2 . Jump by External Signal

This is the method to specify next action pattern (PT No.) by input condition.

However, system does not jump to next PT No. to be executed automatically according to procedure, but to be executed by external signal ("JPT Start").

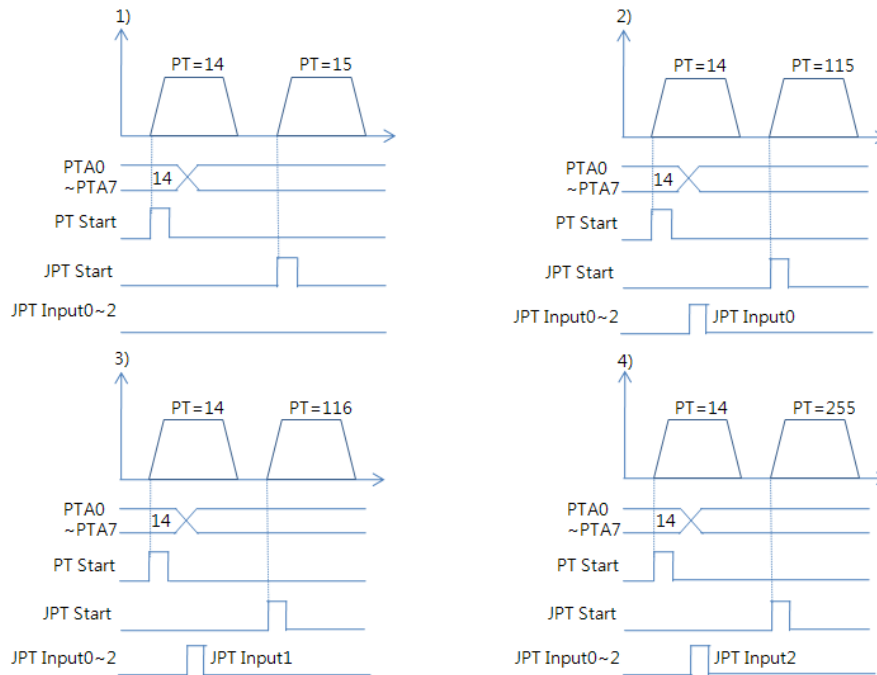
**Difference from the function in 'section 4.5.1' :**

- 1) Jump Position No to jump need to have the format of 10XXX. and
- 2) 'JPT Start' needs to be [ON] in order to execute the next action.

If specified "Wait Time" of PT data is more than 0, then the next action is to be executed after the specified time from the external signal.

Data for PT No 14

PT No (CMD)	Wait Time (Wait Time)	Position Table No to jump (JP Table No.)	Input Jump Position No 0 (JPT 0)	Input Jump Position No 1 (JPT 1)	Input Jump Position No 2 (JPT 2)
14	0	10,015	10,115	10,116	10,255



\* If more than 2 signals become [ON] of 3 'Input Jump Position No0 ~ Input Jump Position No2', the lower number (JPT0 > JPT1 > JPT2) has the high-priority and will be executed.

## 3 - 6 . Loop condition Jump

### 3 - 6 - 1 . Specifying Loop

If 「Loop Count」 and 「Loop Jump Table No」are specified, system repeats the action of position specified times (Loop Count) and then jumps to corresponding position to 「Loop Jump Table No. 」 regardless of specified 「Jump Position No」, that is, 「Jump Position No」 is ignored.

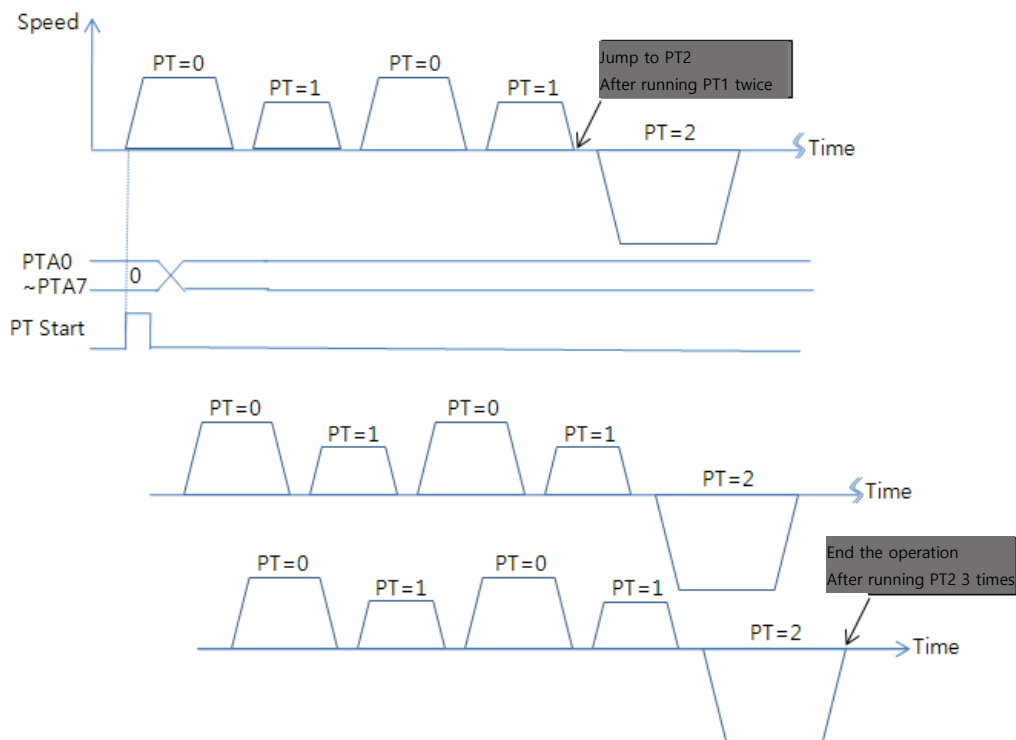
There are rules in specifying loop as following

- 1) If '0' is specified for 「Loop Count」, loop function is cancelled.
- 2) If system needs to jump before repeating the specified times, it jumps to JP Table No.
- 3) If 'blank' is specified for 「Loop Jump Table No」, system exits in execution.
- 4) If 「Loop Jump Table No」 is specified in the form of 10XXX, next action is executed by the external signal "JPT Start".

Following Table is one of example for specifying loop.

Specifying Position Table

PT No (CMD)	Movement Scale (Position)	Position Table No. to jump (JP Table No.)	No. of Loop (Loop Count)	Position Table No. to jump after completing loop (Loop Jump Table No.)	Loop Counter Clear (Loop Counter Clear)
0	8000	1	0	0	-
1	4000	0	2	2	-
2	0	0	3	-	1



- Refer to the sample file for testing Position Table, '[PTsample \(Loop Motioning\).txt](#)'.

### 3 - 6 - 2 . Loop Count Clear

"Loop Counter" is internal counter in drive to compare no. of repeat with the no. specified in the item "Loop Count" of PT data.

This function clears "Loop Counter" to 0 (zero) of the specified PT data after completion of looping. If 「Loop Count Clear」 is specified as blank, this function is cancelled.

Following table shows an example of specifying Loop Counter Clear.

Specifying Position Table

PT No. (CMD)	Movement Scale (Position)	Position Table No. to jump (JP Table No.)	No. of Loop (Loop Count)	Position Table No. to jump after completing loop (Loop Jump Table No)	Loop Counter Clear (Loop Counter Clear)
0	8000	1	0	0	-
1	4000	0	2	2	-
2	0	0	0	0	1

1) Specify "Loop Counter Clear" of PT No. 2 as PT No. 1.

2) Start operation from PT No. 0.

When starts operation, system reset all "Loop Count" values as 0 (zero).

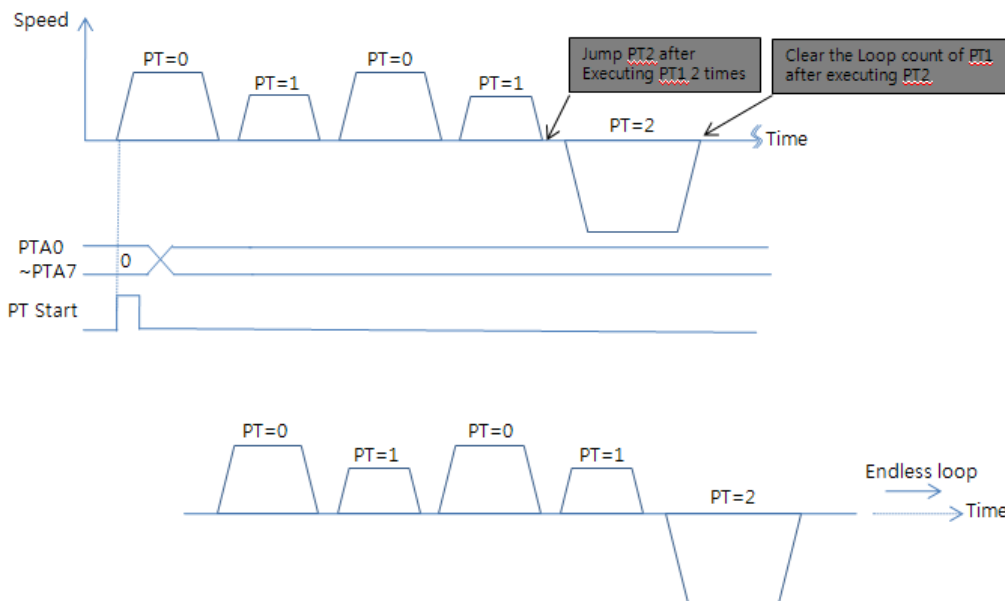
3) After repeats the loop block PT No.0 ~ PT No.1 two times, the "Loop Counter" becomes 2, same as specified "Loop Count", so system completes looping and jumps to PT No.2.

4) After executing PT No.2, system jumps to PT No.0.

Before jumping to PT No.0, system clears "Loop Counter" - the internal counter as 0 (zero).

5) Then paragraph 3) and 4) are repeated infinitely.

6) If the "Loop Counter Clear" of PT No.2 was not specified, "Loop Counter" increased continuously and so jumping to PT No.2 occurs only once at the first time and then repeats the loop block PT No.0 ~ PT No.1 infinitely because the internal counter "Loop Counter" value will never meet the specified "Loop Count" value.



- Refer to the sample file for testing Position Table, 'PT sample (Loop counter clear).txt'.

### 3 - 7 . Start/Pass/End Signal Function

By specifying the item「Start/Pass/End Signal Function」, user can recognize the status of Position Table whether operation started, is under pass operation, or completed operation through control signal output.

If you do not want to use 「Start/Pass/End Signal Function」, specify this item as 0,8 or 16. If other value is specified, the position performs following actions depending on specified value.

This function is work on both absolute positioning and relative position motion.

#### 3 - 7 - 1 . Start/End Signal

- If the value between 1 to 7(Start Sign) is specified for PT Set, PT Output HEX value is output through output of 'PT Output 0 ~ PT Output 2'at the time of starting operation.
- If the value between 9 to 15(End Sign) is specified for PT Set, PT Output HEX value is output through output of 'PT Output 0 ~ PT Output 2 'after completion of operation

PT Set value	PT Output 2 signal	PT Output 1 signal	PT Output 0 signal	PT Output HEX value	Function
0	OFF	OFF	OFF	0	Not use output function of PT Output 0~2.
1	OFF	OFF	ON	1	PT Output 0~2 signals turn to [ON] at the time of starting operation of the corresponding PT.
2	OFF	ON	OFF	2	
3	OFF	ON	ON	3	
4	ON	OFF	OFF	4	
5	ON	OFF	ON	5	
6	ON	ON	OFF	6	
7	ON	ON	ON	7	
8	OFF	OFF	OFF	0	Not use output function of PT Output 0~2.
9	OFF	OFF	ON	1	PT Output 0~2 signals turn to [ON] after end of operation of the corresponding PT.
10	OFF	ON	OFF	2	
11	OFF	ON	ON	3	
12	ON	OFF	OFF	4	
13	ON	OFF	ON	5	
14	ON	ON	OFF	6	
15	ON	ON	ON	7	

\* If you set the PT Set value to 9 ~ 15 and use the jump function at the same time and set the Wait Time to 0, the PT Output will not be output.

### 3 - 7 - 2 . Pass Signal

☒ PT Output Set

☐ Start Sign
 ☐ End Sign
 ☒ Pass Sign

Output

☒ PT 0
 ☒ PT 1
 ☐ PT 2

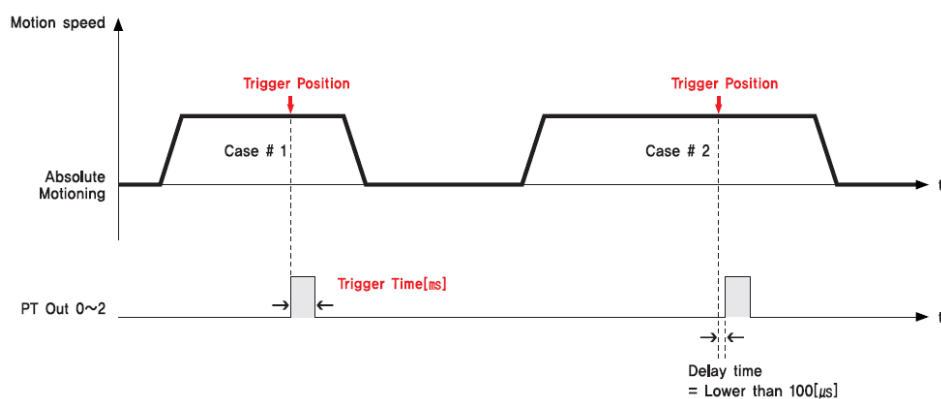
Pass Sign

Trigger Position  [pulse]

Trigger Time  [msec]

- If the value between 17 to 23(Pass Sign) is specified for PT Set, PT Output HEX value is output through output of 'PT Output 0 ~ PT Output 2' at the position of 'Trigger Position'.

PT Set Value	PT Output 2 Signal	PT Output 1 Signal	PT Output 0 Signal	PT Output HEX Value	Function
16	OFF	OFF	OFF	0	Not use output function of PT Output 0~2.
17	OFF	OFF	ON	1	PT Output 0~2 signals turn to [ON] for the time of trigger condition of the corresponding PT.
18	OFF	ON	OFF	2	
19	OFF	ON	ON	3	
20	ON	OFF	OFF	4	
21	ON	OFF	ON	5	
22	ON	ON	OFF	6	
23	ON	ON	ON	7	



- \* The signal pulse width of PT Output is set by 'Trigger Time' value.
- \* The 'Trigger Position' is not the absolute position value, but the relative position value from the start position of that PT command.

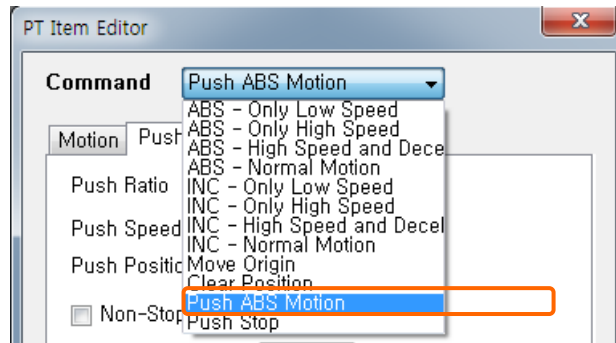
## 3 - 8 . Push Motion Function

Push Motion is a function that keeps a fixed torque from a certain position during movement by position command.

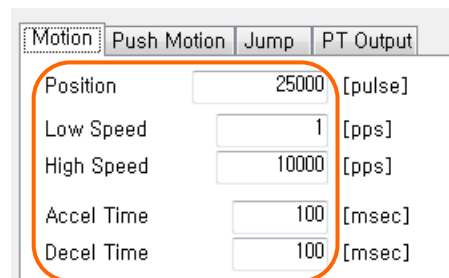
It stops movement in Stop mode when it comes into contact with work during movement and keeps the force in None-Stop mode.

### 3 - 8 - 1 . How to Set Up

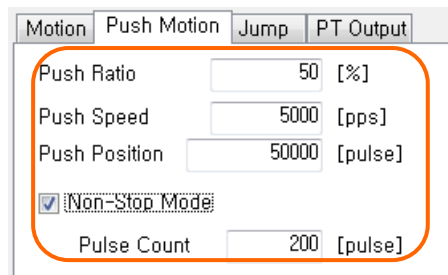
1) Command type should be designated as Push ABS Motion as follows.



2) Set normal move command condition.

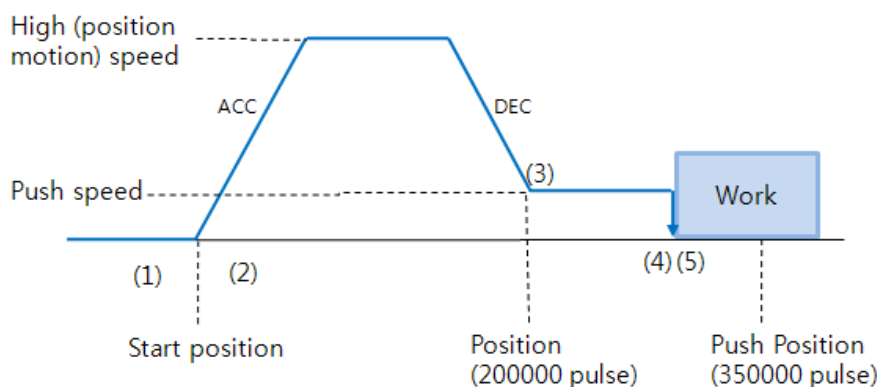


3) Set Push motion command condition.



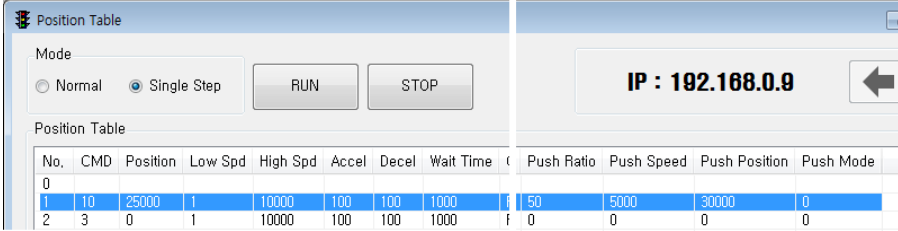
Shown in the figure is the Non-Stop Mode, which sets the backward movement to 200[pulse].

### 3 - 8 - 2 . Detail of Function



- (1) Execute Push Motion Command
- (2) Execute normal position motion command. (position mode)
- (3) Decelerate from normal position motion and reach push motion speed(The speed should be under 200[rpm]).
- (4) Move while maintaining a fixed torque until the work comes in contact(push mode).
- (5) There are two modes.
  - 1) When Push mode is set to '**Stop mode**' :  
 When it comes into contact with the work, it stops and maintains torque.  
 At this time, the completion signal(Inposition/PTStoped/END) is generated.  
 The maintained torque will be released and changed to Servo ON(changed to position mode) with Stop command and normal position motion command.

The following is a simple example of PT data for push mode push function test.



The screenshot shows a software window titled 'Position Table'. It has a 'Mode' section with 'Normal' and 'Single Step' radio buttons, and 'RUN' and 'STOP' buttons. Below is a 'Position Table' with columns: No., CMD, Position, Low Spd, High Spd, Accel, Decel, Wait Time, Push Ratio, Push Speed, Push Position, and Push Mode. The table contains three rows of data.

No.	CMD	Position	Low Spd	High Spd	Accel	Decel	Wait Time	Push Ratio	Push Speed	Push Position	Push Mode
0											
1	10	25000	1	10000	100	100	1000	50	5000	30000	0
2	3	0	1	10000	100	100	1000	0	0	0	0

- 2) When Push mode is set to '**Non-stop mode**' :  
 When it comes into contact with the work, it keeps pushing and maintains torque.  
 At this time, the completion signal(Inposition/PTStoped/END) is generated.  
 Before next motion command, **Stop command should be executed in Non-stop mode.** (If there is no contact with the work, stop command is not necessary.)  
 At this time, it moves in the opposite direction by the value of 'Push mode setting' to mitigate the impact on the machine.  
 Therefore, if you do not use the stop command, no backward motion will be executed.  
 At this time, the speed of backward motion is fixed at 5,000 [pps].

For additional function description about Push motion(Torque control), please refer to [「User Manual Text 8-6. Push Motion Function」](#).


The following is a simple example of PT data for the Push motion test of the non-stop mode method.

No.	CMD	Position	Low Spd	High Spd	Accel	Decel	Wait Time	Continuous	Check Inpos	JP Table No.	Push Ratio	Push Speed	Push Position	Push Mode
0														
1	10	25000	1	10000	100	100	1000	False	False	2	50	5000	30000	200
2	11	0	0	0	0	0	1000	False	False	3	0	0	0	0
3	3	0	1	50000	100	100	5000	False	False	1	0	0	0	0

In the example above,

- 1) If you run PT No.1, it will **execute push motion for 5,000[msec]** after work detection,
- 2) execute stop command(PT No.2),
- 3) and by executing PT No.3, it returns to the starting point and repeat all procedure again.

 <b>주의</b>	<b>For Non-stop mode, <span style="color: red;">Stop command should be executed</span> before other motion commands if work is in contact.</b>
---	--

 <b>주의</b>	<b>In the event of an impact on the machine, a certain amount of time is required before returning to normal operation after stopping.</b>
---	--

To check the current push motion(torque control) status, please refer to 「[User Manual Text 8-6. Push Motion Function](#)」.





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