UNIMOTION

STDF EN Workspace
Closed Loop Stepping System Manual

TABLE OF CONTENTS

1 INSTALLATION AND CONNECTION OF THE PROGRAM

There are two operation modes as follows in STDF EN:

1) Using of dynamic-link library (DLL) which is provided for the program from Windows 7/8.1/10.
2) Using of Position Table (PT) and external signals input by the user.

1.1 Installable PC environment

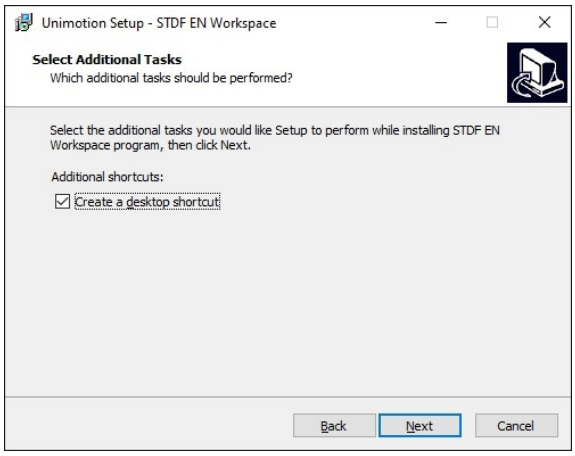
Type: Compatible with PC/AT
Ethernet 10/100 base T/TX Lan Card
Hard disk capacity more than 10 MB
Screen SVGA (1024×768 or more)
CPU Pentium 4 - 2.0 GHz or more
OS：Windows 7/ 8.1/10 (32/64-Bit)

1.2 STDF EN Workspace installation

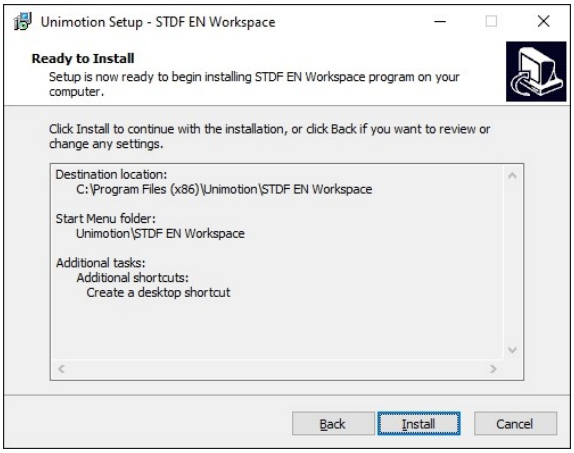
Download STDF EN Workspace program from product website and install as shown below.

Installation Start window.

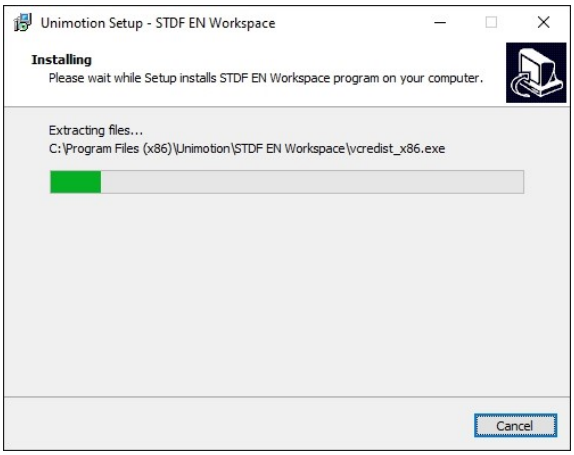
Click ‘Next’.



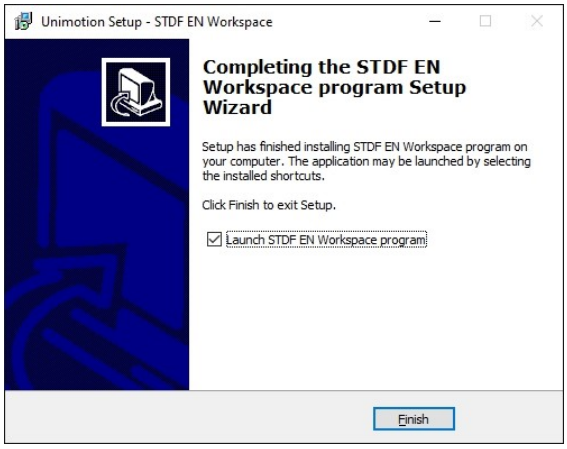
Select a folder where the program is installed, and click ‘Install’.



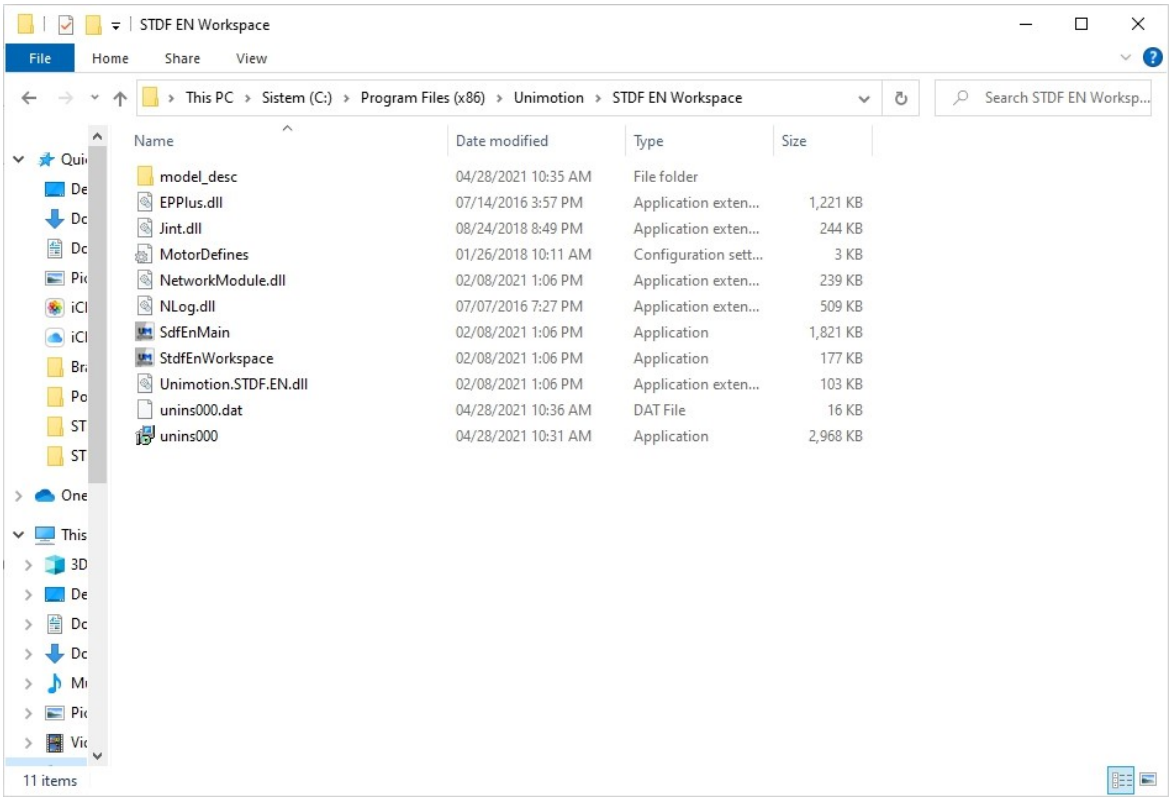
Installing.



Installation is completed.



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

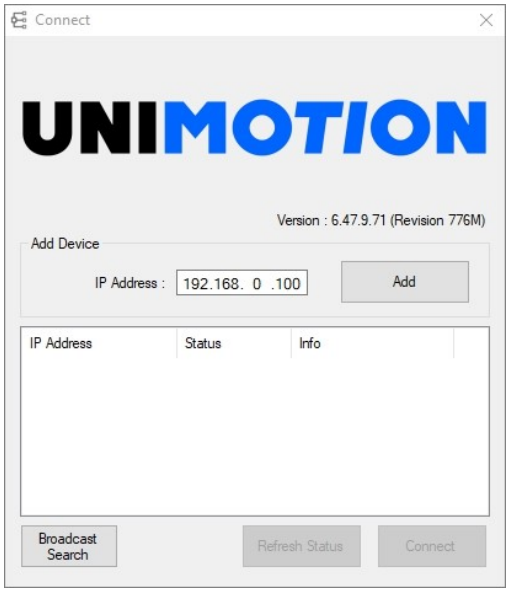


1.3 Connecting PC with Drive Module

1.3.1 How to connect

To communicate with controller module, the user should prepare Ethernet cable and connect it with the PC. For more information, refer to STDF EN Manual.

Execute User program icon (STDF EN Workspace) and click Connect. Then the following window will be displayed.



Button	Description
Add	Enter IP Address and add on List. If the item does not exist with added IP Address, List will not be added.
Broadcast Search	Search every item that can be connected to program and then add it to the list.
Refresh Status	Check the connection status of listed item.
Connect	Connect the listed item and execute program.

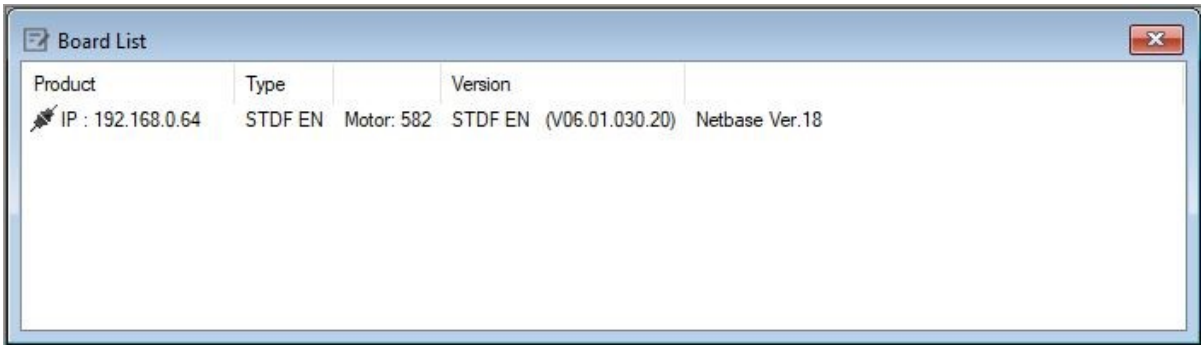
After setting each IP Address differently, if you click 'Broadcast Search' button, all products are displayed on List. At this time, if you click the 'Connect' button, all products are connected to program.

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

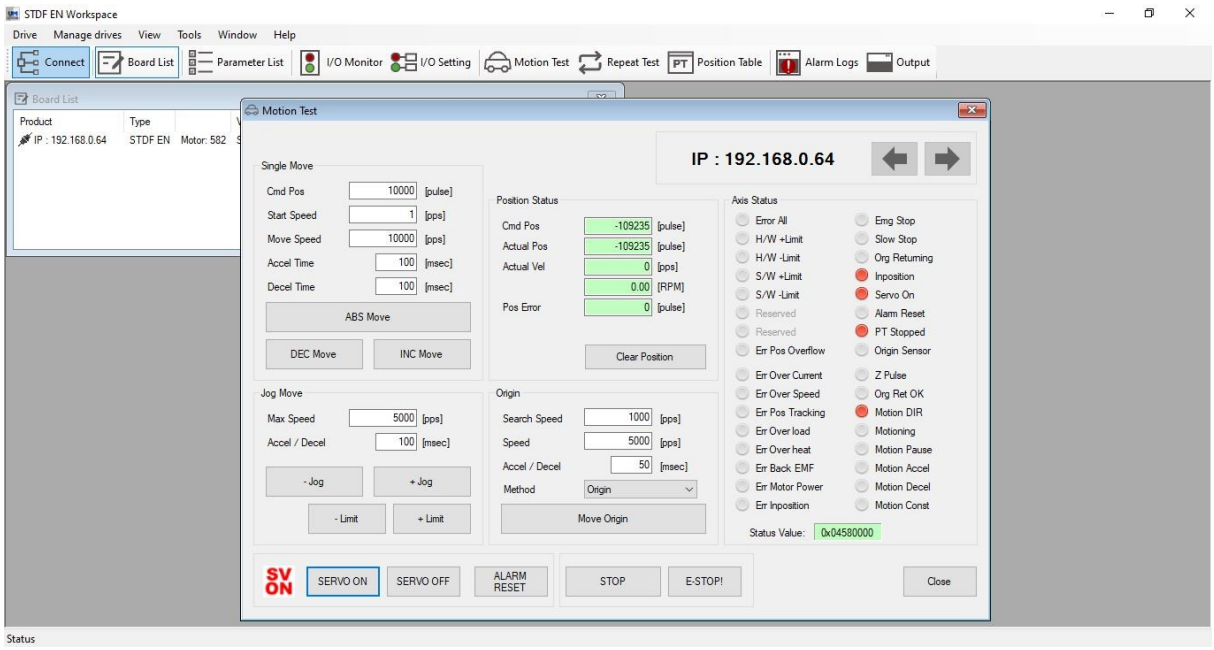
1.3.2 After connection

When the connection is completed, the window will appear as shown below.

1) IP Address of Connected drives
2) Type of all connected motors and drives
3) Firmware Version



2 MAIN WINDOW



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

2.1 Menu

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

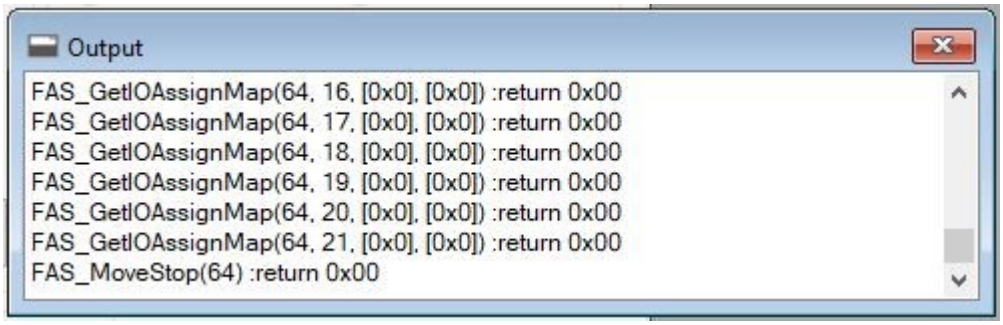
2.2 Toolbar

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

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

Button	Description
Connect	To connect or disconnect with the drive.
Board List	To display connected module information and communication status.
Parameter list	To set parameter values related to operation control like a position Command.
I/O Monitor	To monitor digital input and output signal of Drive CN1 connector.
I/O Setting	To set digital input and output signal of Drive CN1 connector.
Motion Test	To execute motion commands such as Jog operation, Position operation, Origin return operation.
Position Table	To display DLL function corresponding to the command being executed.
Output	To display DLL function corresponding to the command being executed.

2.3 Output



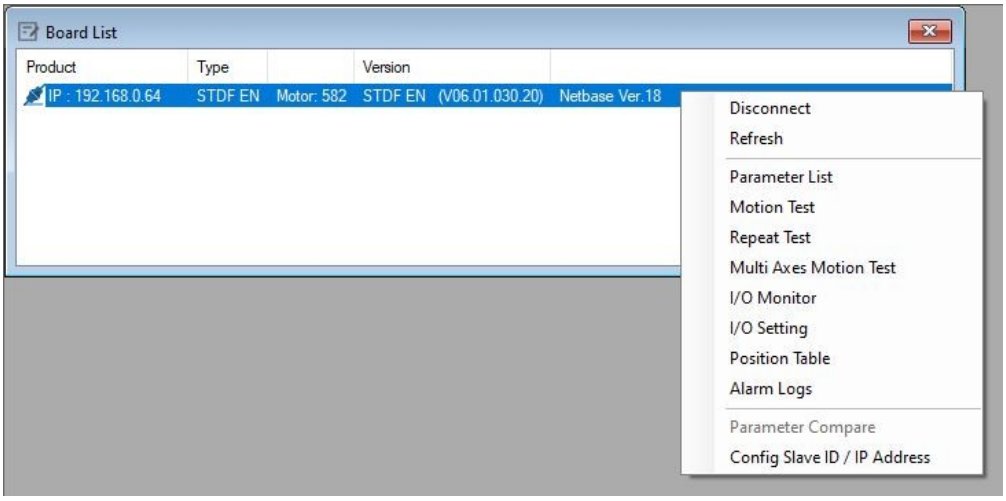
Click ‘Output’ at the Toolbar or check 'Menu – View – Output', and the above window will be displayed.

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

The above window displays functions which the user inputs or functions used when the user clicks each button. For more information of commands, please refer to STDF EN Communication Manual.

2.4 Board List

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



Type of Information

1) Drive IP Address
2) Drive Type
3) Motor Type
4) Drive Firmware version

Disconnect/Reconnect

Disconnect: Disconnect the drive.
Reconnect: Reconnect the drive.

Parameter List

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

Motion Test

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

Repeat Test

To test fixed motioning for one axis repeatedly.

I/O Monitor

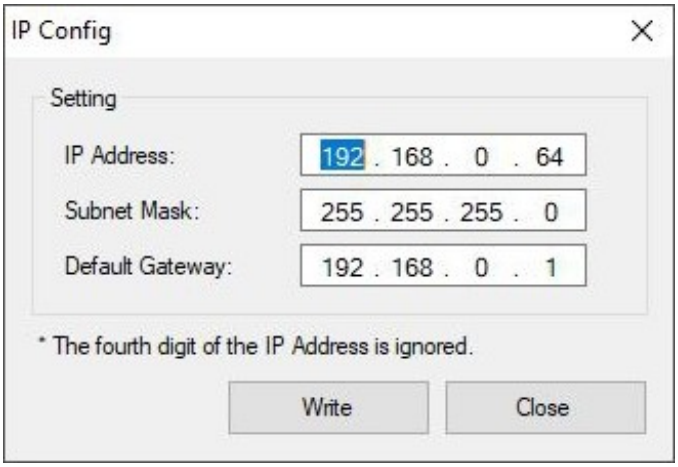
To monitor digital I/O signals of CN1 connector.

I/O Setting

To set digital I/O signal of CN1 connector.

Position Table
To input and execute position table data.

Config Slave ID/IP Address
To change default IP Address/Subnet Mask/Gateway setting.



After clicking “Write” and Power reset, Configuration is applied.

Final number of IP Address does not change.

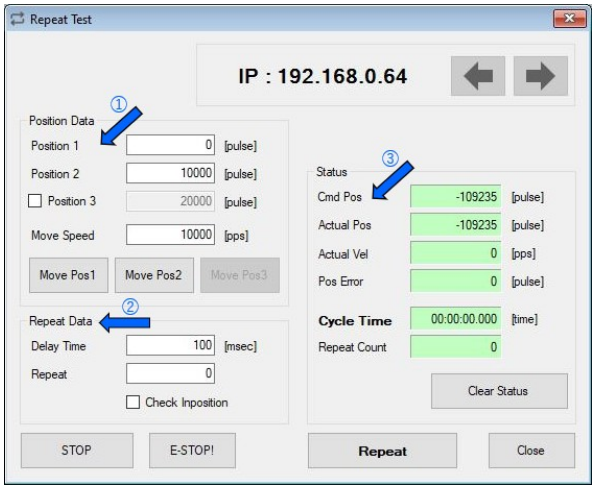
Final number can be set via the Switch.

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

2.5 Repeat Test

1) It is possible to set for up to three absolute position values and execute the repeat tests.

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 [ms].
* Repeat: To define the motion loop count. If this is set to '0', the test is endlessly repeated.

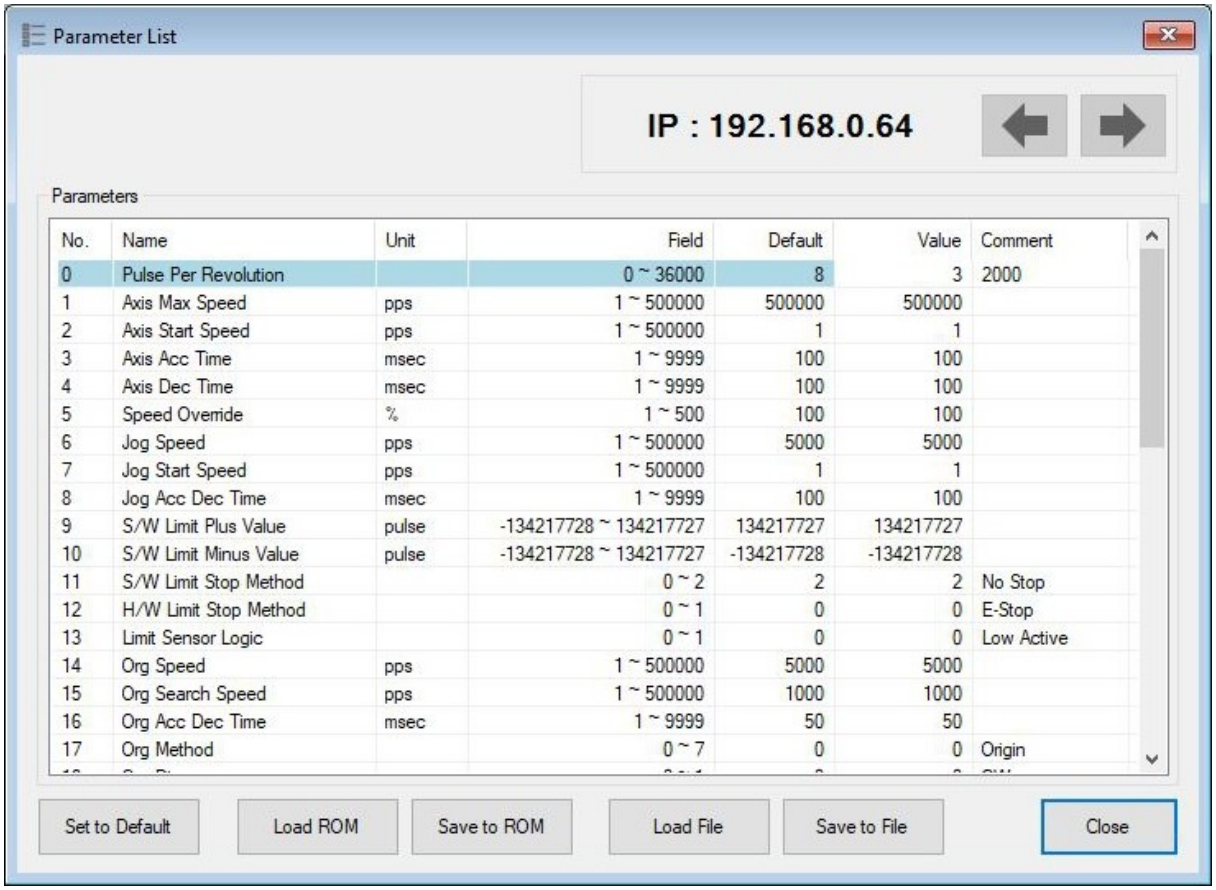


(The Motion loop is operating as following order Position1 → Position2 → Position1 and it is the 1 repeat when this cycle is done).

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) If the user clicks 'Repeat' button, it starts repeat operation according to condition.
When the user clicks 'Repeat' button while the machine is operating, the cycle in service is ended and the machine stops operating. Click 'Stop' or 'E-Stop' button, and the machine will stop regardless of the cycle.

3 PARAMETER LIST



Button	Description
No.	Parameter number
Name	Parameter name
Unit	Parameter unit
Field	Range that can input Parameter field
Default	Parameter default value
Value	Current parameter value
Comment	Current parameter description

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

3.1 IP Address

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

Buttons at the bottom bar including 'Save to ROM' is available only for the current drive.

To control several drive parameters, the user should execute related each one of slave independently.

3.2 Parameter input

No.	Name	Unit	Field	Default	Value	Comment
0	Pulse Per Revolution		0 ~ 36000	8	3	2000
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	100	
4	Axis Dec Time	msec	1 ~ 9999	100	100	

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

When the input value is out of right range, it is displayed in red colour.

The value cannot be inputted in the 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	Set '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, please refer to STDF EN Manual 9 - Parameter.

3.4 Save/Read to a file

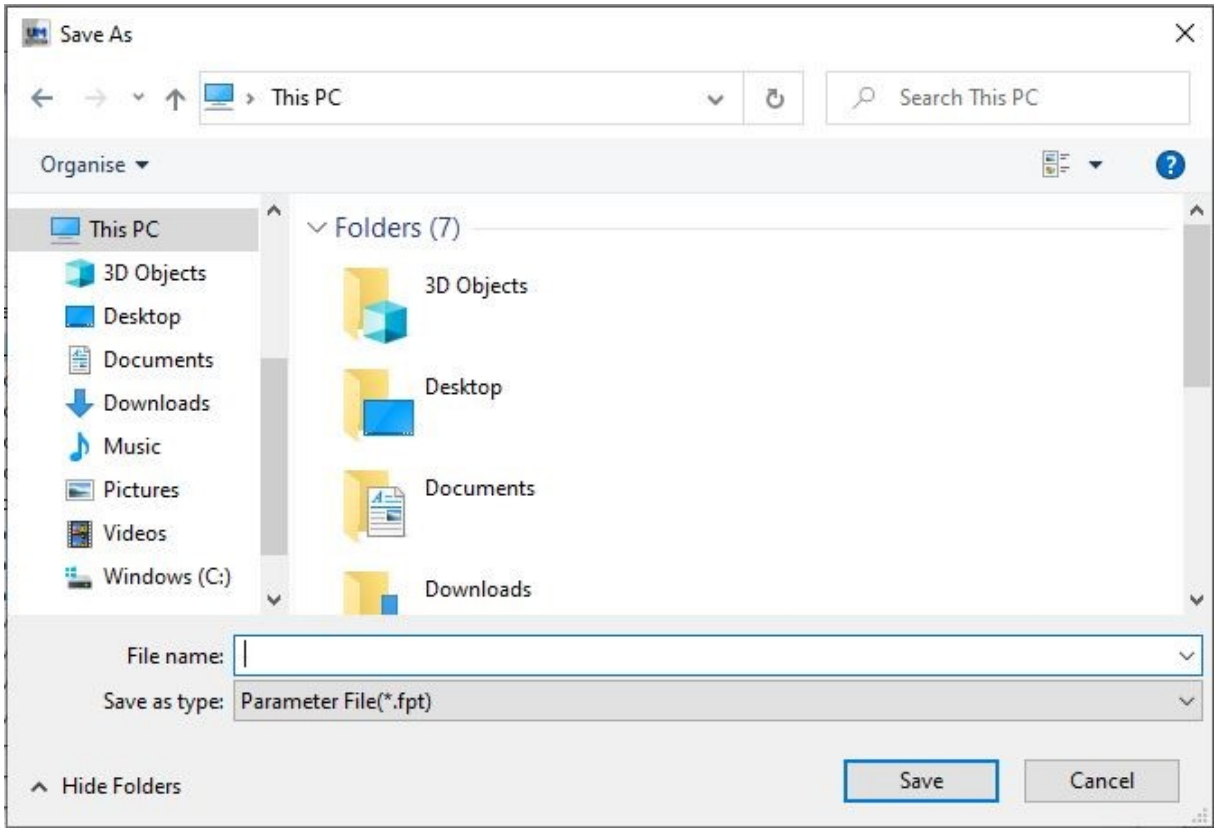
STDF EN can save parameters, input/output and position table data to an external file folder and can read them if necessary.

The user can edit a name of file, click ‘Save’ button, and save data. Then can select a file, click ‘Open’ button and read data.

File extension for parameter: *.fpt.

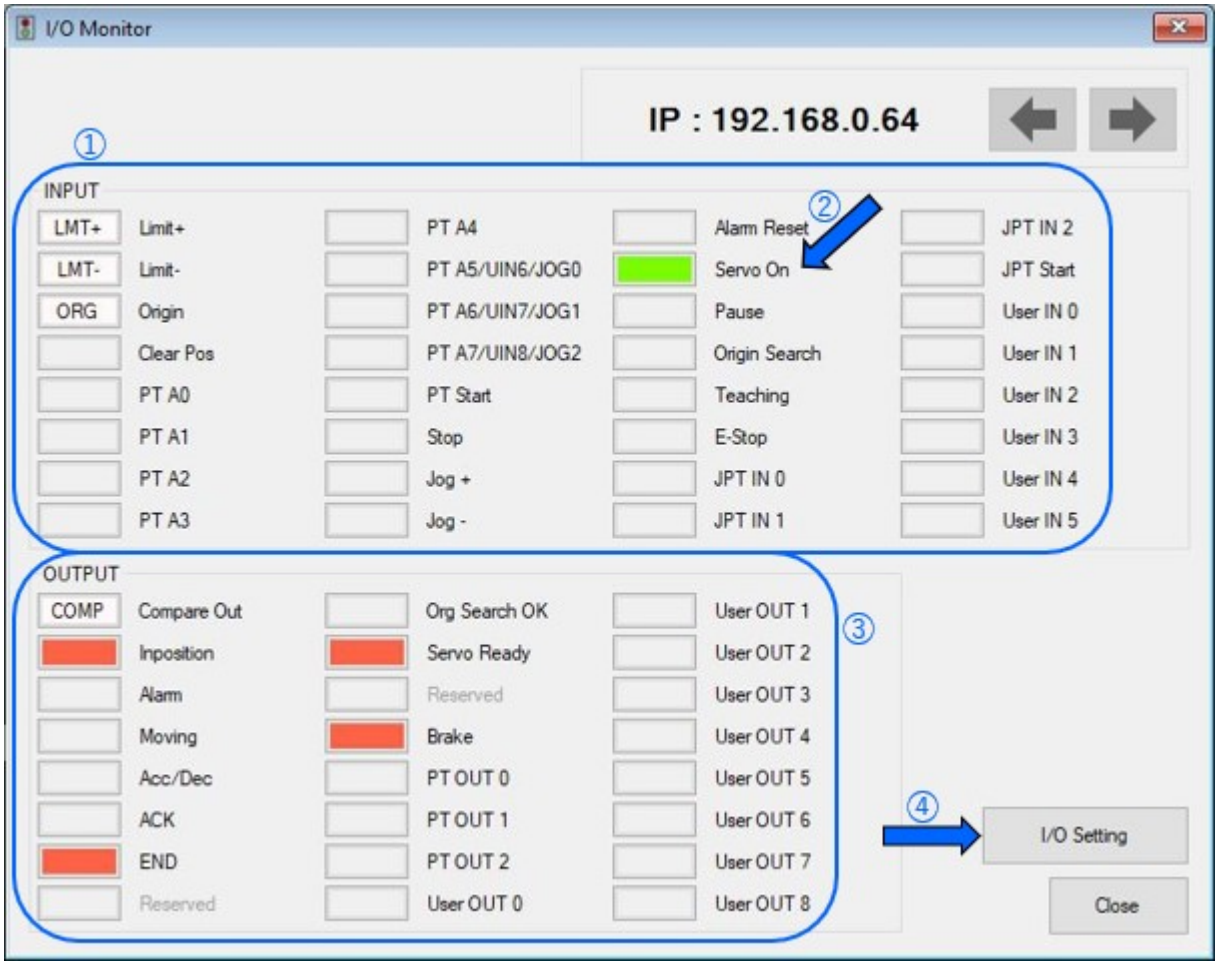
File extension for Input/output: *.fit.

File extension for position table data: *.txt.



4 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.



1) Input Signal

There are 32 definable input signals. However, just 12 signals of them can be connected with CN1 connector 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 for set as 'IN1' ~ 'IN9' is [ON] through CN1 connector, icon is changed to 'green'. When the signal is [OFF], it returns to 'white' which is the original state.

2) Virtual Input Function

Even though the input pin is not assigned to ‘IN1’ ~ ‘IN9’ at all, the user can click each button and virtually change the signal to 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

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

The first signal ‘COMP’ is used for 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 connector, icon is changed to ‘green’. When the signal is [OFF], it returns to ‘white’ which is the original state.

4) Virtual Output Function

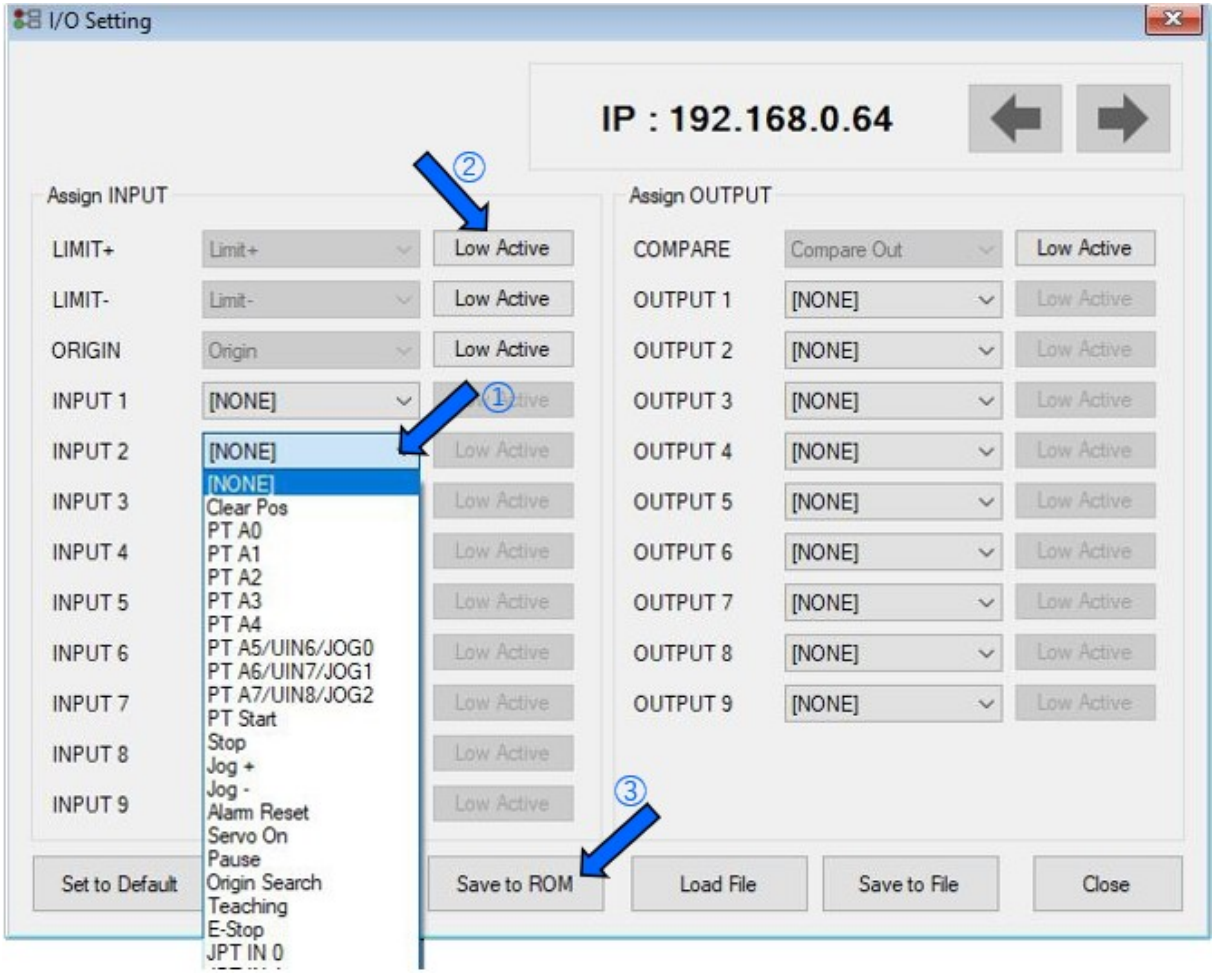
After assigning the ‘User OUT 0’ ~ ‘User OUT 8’ signals to 'OUT1’ ~ ‘OUT9’, when clicking that button the signal changes ON/OFF through that pin.

5) I/O Logic Setting Button

Assign the signal that the user wants to physical pin of CN1 connector and display which defines 'Active Level' of that signal is executed.

4.1 I/O Logic Setting

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



The assignment method of input and output is same and is used as mentioned below.

1) Signal Assignment

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

2) Signal Level Assignment

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

- Low Active: When the signal is set [ON] to 0 V.
- High Active: When the signal is set [ON] to 24 V.

3) Save

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.

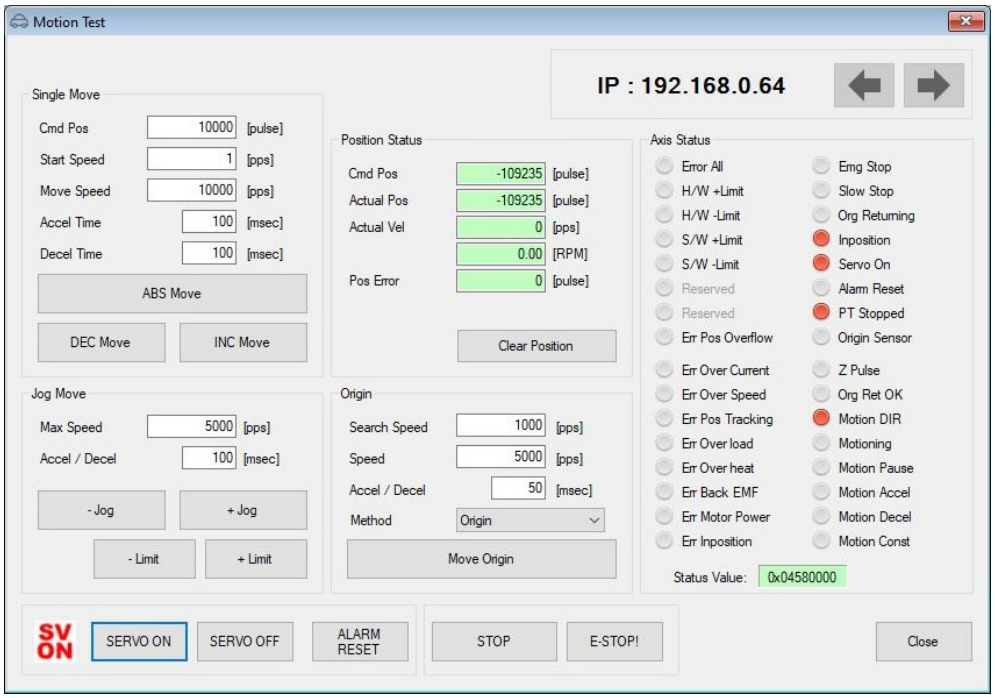
For more information of ‘I/O Monitoring’ and ‘I/O Logic Setting’ windows, refer to STDF EN Manual 5 - Control I/O Signal.

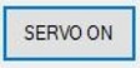
5 MOTION TEST

To test the motor connected with the controller drive. The user can test motion for one axis. User 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.

5.1 Initial Movement

1) Click Motion Test at the main menu.
2) A window will appear as shown below.



3) Select te drive for test.
4) Click 

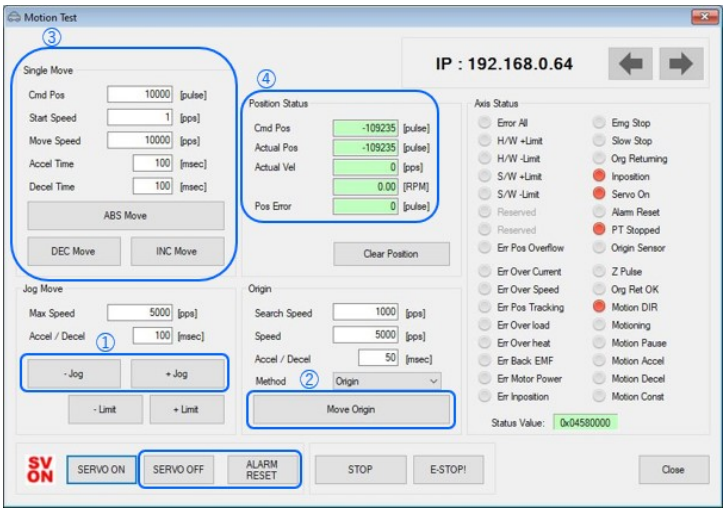
and the motor will be in the 'Servo ON' state. The icon in the bottom left corner will change to 

. At this time, the motor will be powered and its status will change to 'lock'.

5) Jog operation (①)

After setting jog related parameters, click 

a few times, and the motor will move in the set direction.



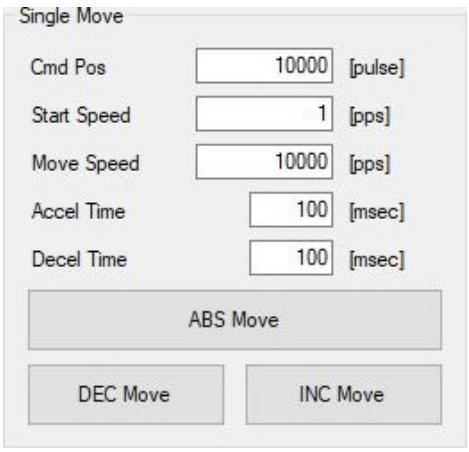
6) According to the motion of the motor, the user can check its position and operation status. Refer to the STDF EN Manual 8 - Other Operation Functions.

7) Origin Return operation(②)
Click Origin and origin return motion will be operated. The motion type may be different subject to how origin return type (parameter) is selected.

8) When origin return is finished, the red LED is displayed to ON like at the ‘Axis Status’ window. Refer to STDF EN Manual 7 - Other Operation Functions.

9) Single Move operation(③)
The user can test straight-line move command for one axis. 'Abs Move’ button moves to the absolute position, and ‘DEC Move’ and ‘INC Move’ move to the relative position.

- Cmd Pos: Indicates target position value.



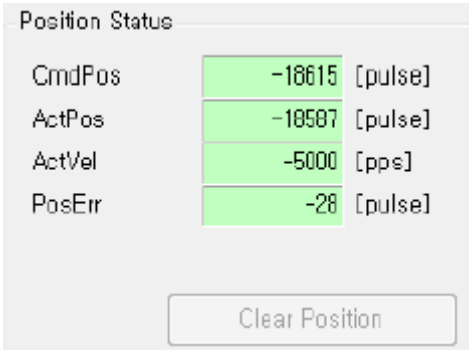
The unit is [pulse]. When 'Abs Move' is executed, this displays the absolute position. When 'DEC Move' or 'INC Move' is executed, this displays the relative position.

- Start Speed: It is linked with parameter 2 Axis Start Speed.
  If it is changed, the parameter value is also changed.
  'Start Speed' should be smaller than 'Move Speed'.

- Move Speed: It is for setting the movement speed when executing Abs Move, DEC Move, INC Move. 'Move Speed' should be larger than 'Start Speed'.

- Accel Time, Decel Time: Parameter 3 and 4 Axis Accel and Axis Decel Time are linked with each other. If it is changed, the parameter value changes as well.

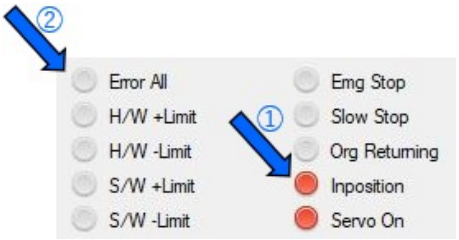
10) Position Status(④)
To displays the current position of axis. Click to Clear Position button, and Cmd Pos value and Actual Pos value will be initialized to '0'.



- Cmd Pos: It is the target position value during operation.
- Actual Pos: It is the current position value during operation.
- Actual Vel: The actual speed of the current motor.
- Pos Error: The difference between the Cmd Pos value and the Actual Pos value.

This value allows you to see how much you are following the current target position.

11) 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 gray.



① When the motor stops operation and In-position is finished, the corresponding LED at the right figure is displayed in red.

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

For more information of alarm types, refer to STDF EN Manual 5.4 - Output signal.

③ After removing the alarm cause, click 'ALARM RESET' to check that the alarm is released. Then Servo ON again.

12) Stop operation

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

Temporary stop (Pause):

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 Deceleration stop (Stop), Emergency stop (E-Stop).

When the motor needs to stop during operation, use the button as shown to the right on Motion Test window.

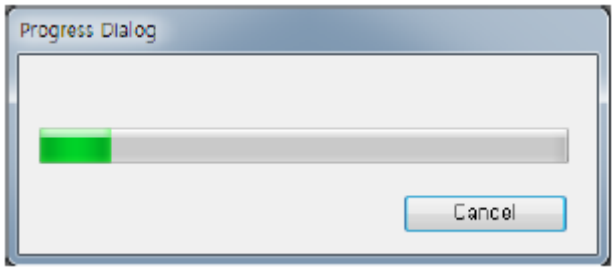
'STOP' button includes deceleration function and 'E-STOP' button does not include deceleration function.

6 POSITION TABLE FUNCTION

6.1 Windows of Position Table (PT)

6.1.1 Loading Position Table data

When clicking the 'Pos Table' button on main menu of STDF EN Workspace program, 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 pre-defined by user. In the case of this STDF EN, up to 256 steps can be saved.

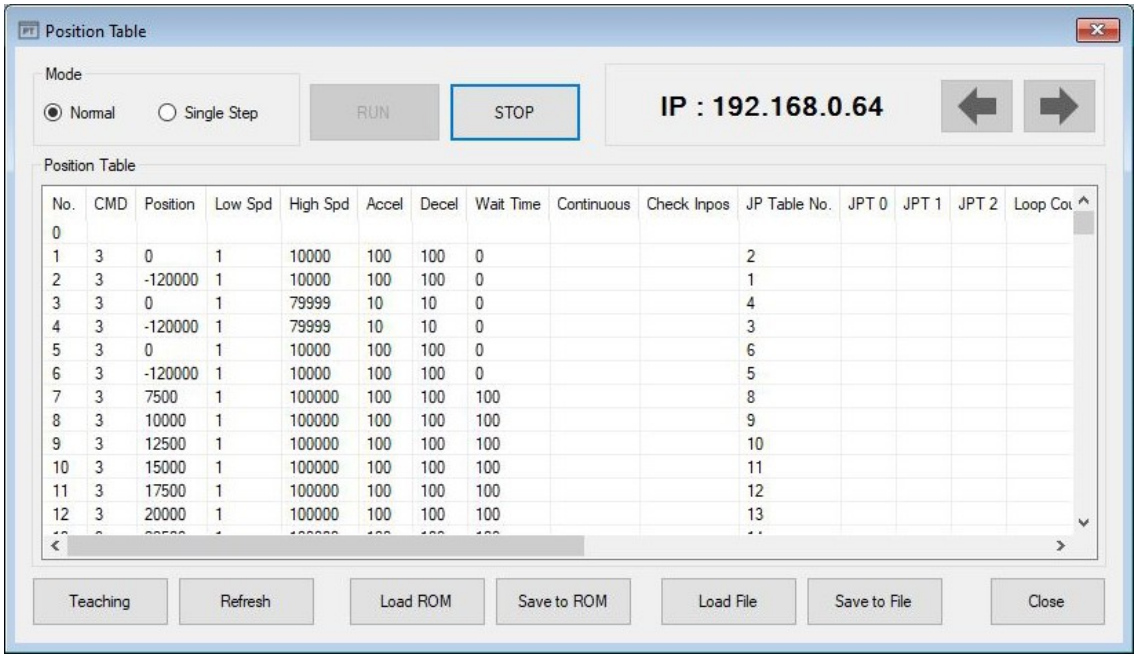
Major functions for saving items are shown as following:

(1) Editing function of Motion step (Input/Edit/Delete/Copy).
(2) Start and Stop function of Motion order at User Program.
(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.

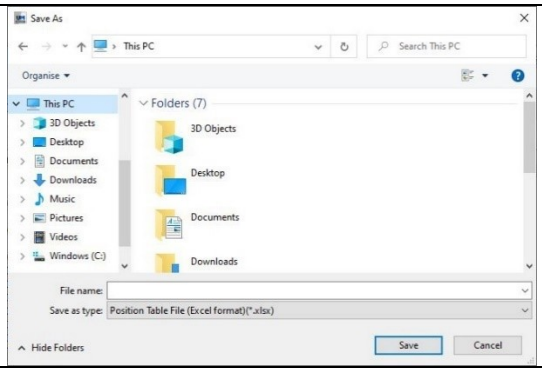
When electric power is supplied to drive, the Position Table data saved in ROM area of drive is copied to RAM area and once the 'Pos Table' button is clicked, then the system loads the data saved in RAM area of drive.

6.1.2 Main Window of Position Table

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



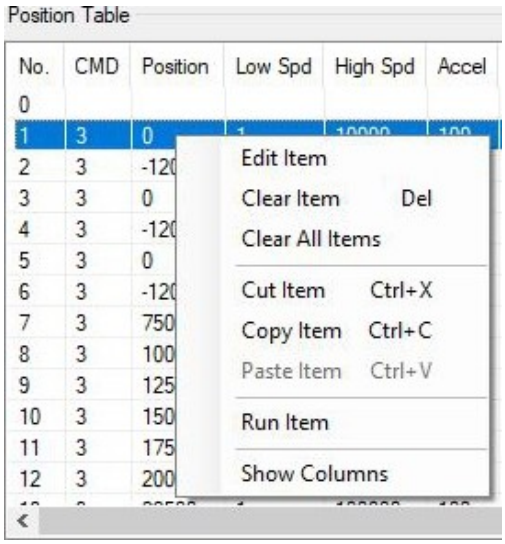
Button	Description
Normal/Single Step	The user can select modes to execute the position table. Normal: All position commands are executed in order according to the conditions saved in the position table. Single Step: Only single position command is executed.
Run/Stop/Next	To run/stop items at the defined 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 6.3.4 - Teaching Function.
Refresh	To display the position value measured by the teaching function. For more information, refer to 6.3.4 - Teaching Function.
Save to ROM	To save the current position table data in the ROM drive.
Load from ROM	To open the position table data saved in the ROM drive.
Save to File	To save the 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 extensions are *.txt and *.xlsx).
Load File	To read the position table data saved in external file.

- Up to 256 position table commands can be inputted and saved.
- By using each position table command, the user can edit the file such as edit, copy, paste, and delete.

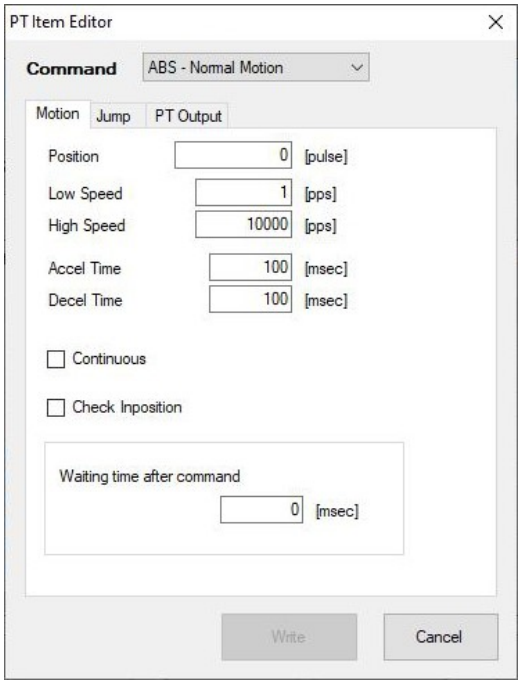
6.1.3 Position Table Editor

When clicking the right mouse button on a selected Position Table data line, the following pop up menu is shown.



(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 & Paste' selected item data of PT.
(5) Copy Item: Used to 'Copy & Paste' selected item data of PT.
(6) Paste Item: Paste the copied data to clipboar 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 pop-up menu button shown above figure, then the dialog box shown below is activated.



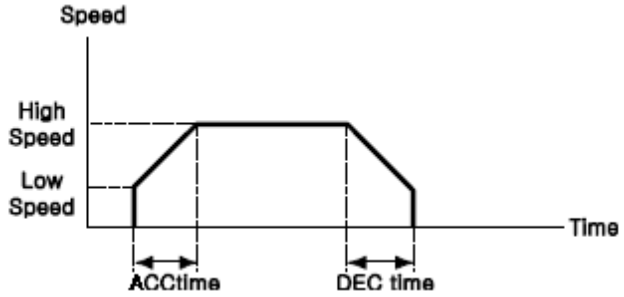
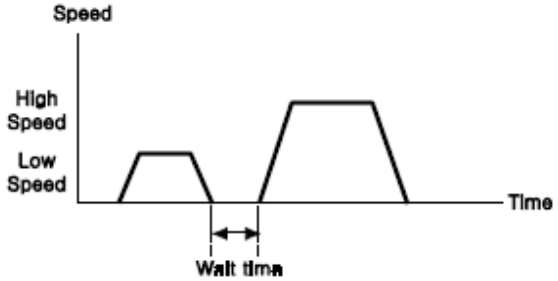
Enter each value on 'Motion', 'Jump', 'PT Output' tab.

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.

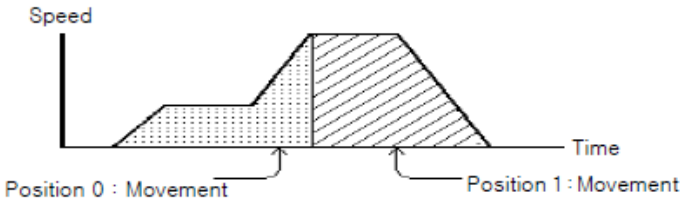
6.2 Position Table Item (PT)

6.2.1 Explanation of Position Table Item

Designated Item	Description	Unit	Lower limit	Upper limit
Command	Specifies type of motion. For more details, refer to 6.2.2. - Type of Command.	-	0	10
Position	Specifies position/movement scale by number of pulses.	pulse	-134.217.728	+134.217.727
Low Speed	Specifies low speed by number of pulses in accordance with type of motion. For more details, refer to 6.2.2. - Type of Command.	pps[1]	1	500.000
High Speed	Specifies high speed by number of pulses in accordance with type of motion. For more details, refer to 6.2.2 - Type of Command.	pps[1]	1	2.500.000

ACC time	Specified acceleration time by msec when starting motion.	ms	1	9999
DEC time	Specified deceleration time by msec when stopping motion.	ms	1	9999
				
Wait time	When the PT No. item to jump is set, the waiting time until the next position operation is started and is set in ms. This item is ignored if JP Table No is set to "blank" and Continuous Action is "checked."	ms	0	60.000
 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.				
Continuous action	If this item is set 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) In order to use this function continuously, all PT steps must be set to 'Continuous action'. Ex) If position 0 and 1 are set as below and position 0 is designated as continuous operation, acceleration and deceleration of position 1 are ignored and acceleration/deceleration of position 0 is operated.				

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 6.3.5 - Input Condition Jump.	-	0	255
			10.000	10.255
JPT 0	If this item is set, it jumps to a position other than the jump position number 'j' (input jump position number) when there are JPT input0, JPT input1, and JPT input2 inputs. For more information, refer to 6.3.5 - Input Condition Jump.	-	0	255
			10.000	10.255
JPT 1		-	0	255
			10.000	10.255
JPT 2		-	0	255
			10.000	10.255

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 Table No regardless of specified [Jump Table No]. For more details, refer to 6.3.6. - Loop Condition Jump.	-	0	100
Loop Jump Table No.		-	0	255
			10.000	10.255

PT set	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. 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' For more details, refer to 6.3.7. - Start/Pass/End signal function.		0	23
Loop Counter Clear	If this item is checked, Loop Count of specified no of PT is to be cleared. For more details, refer to 6.3.6. - Loop Condition Jump.	-	0	255
Check In-pos	If this item is checked, stop condition is recognized as In-position finishes.	-	0	1
Trigger Pos	In case of setting 'PT set' as 17 ~ 23 among setting items, set the arbitrary position value to send output signal to PT Output0, PT Output1, PT Output2. For more details, refer to 6.3.7. - Start/Pass/End signal function.	ms	0	65.535
Push Ratio	Specifies motor torque ratio for push Motioning. For more details, refer to 6.3.8. - Push Motion Function.	%	20	90
Push Speed	Specifies motion speed of push motioning (Max. 200 rpm).	pps[1]	1	33.333
Push Position	Specifies absolute target position of push motioning.	pulse	-134.217.728	+134.217.727

Push Mode (Pulse Count)	Specifies the push mode: Stop mode (0) or Non-stop mode (1 ~ 10.000). For more details, refer to 6.3.8. - Push Motion Function.		0	10.000

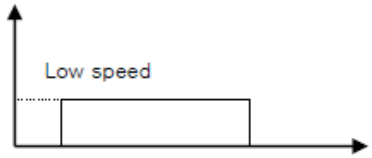
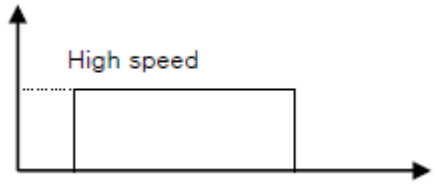
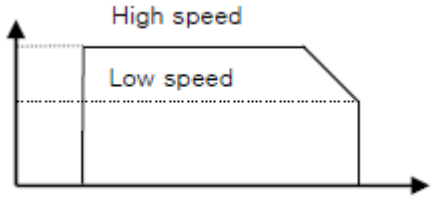
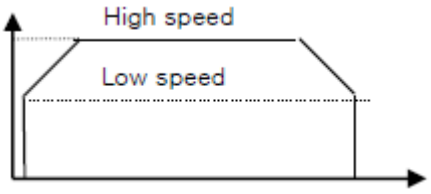
[1]pps → Pulse per Second

6.2.2 Type of Command

Item 'Command' specifies the type of action pattern to be executed for each position and the following in the table is the list of commands.

Command Name	**Specified Value**	**Description**
Abs Move 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 Move high speed	1	
Abs Move high speed with deceleration	2	
Abs Move with acceleration and deceleration	3	
Inc Move 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 Move high speed	5	
Inc Move high speed with deceleration	6	
Inc Move with acceleration and deceleration	7	
Move to 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	Execute the command to push motion.
Stop	11	To stop the motioning of Push motion Non-stop mode command. For more details, refer to 6.3.8. - Push Motion Function.

The following table shows speed patterns for each action of command.

Command Name	Specified Value	Motion Pattern
Abs Move low speed	0	
Inc Move low speed	4	
Abs Move high speed	1	
Inc Move high speed	5	
Abs Move high speed with deceleration	2	
Inc Move high speed with deceleration	6	
Abs Move with acceleration and deceleration	3	
Inc Move with acceleration and deceleration	7	

6.3 Excution of Position Table

6.3.1 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.

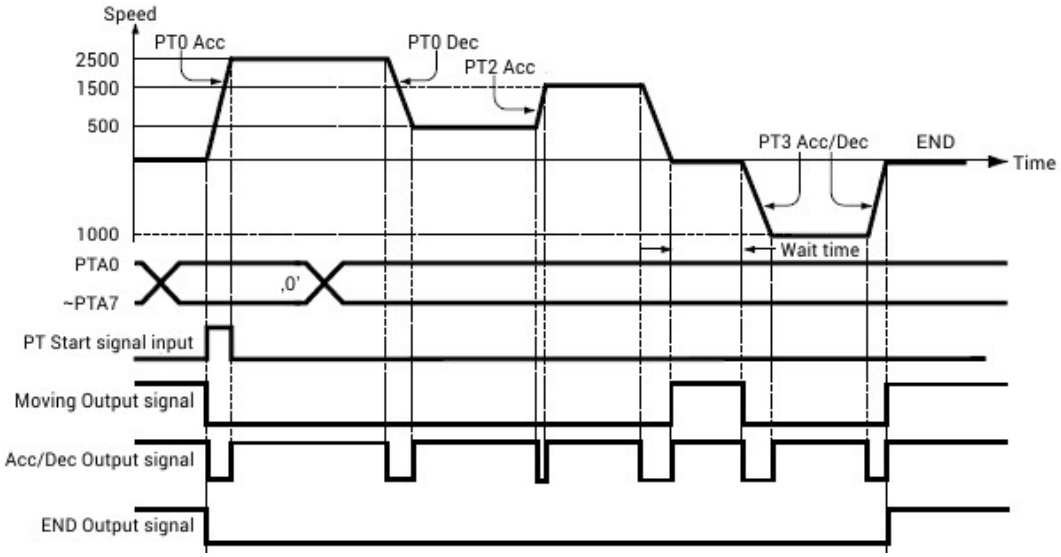
In the case of Position Table operation by communication command, the system is executed by sending the communication commands corresponding to the control input signal.

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.

6.3.2 Example for general operation

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

PT No.	Command type	Position	Low Speed	High Speed	Acc. time	Dec. time	Wait time	Continuous Action	JP Table No.
0	3	10.000	1	2500	50	300	0	1	1
1	3	1000	1	500	-	-	0	1	2
2	3	5000	1	1500	50	300	300	0	3
3	3	-2500	1	1000	300	300	0	0	-

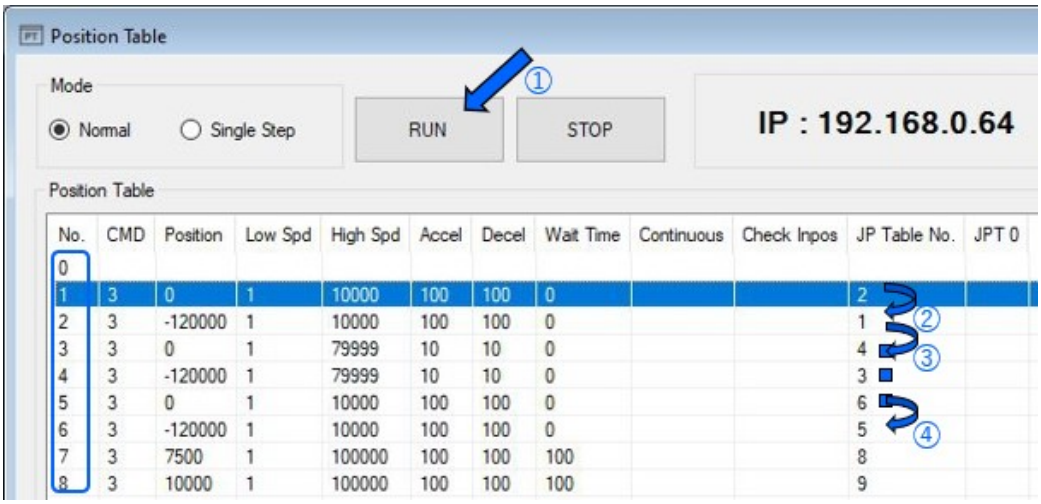


6.3.3 Operation Mode

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

Normal

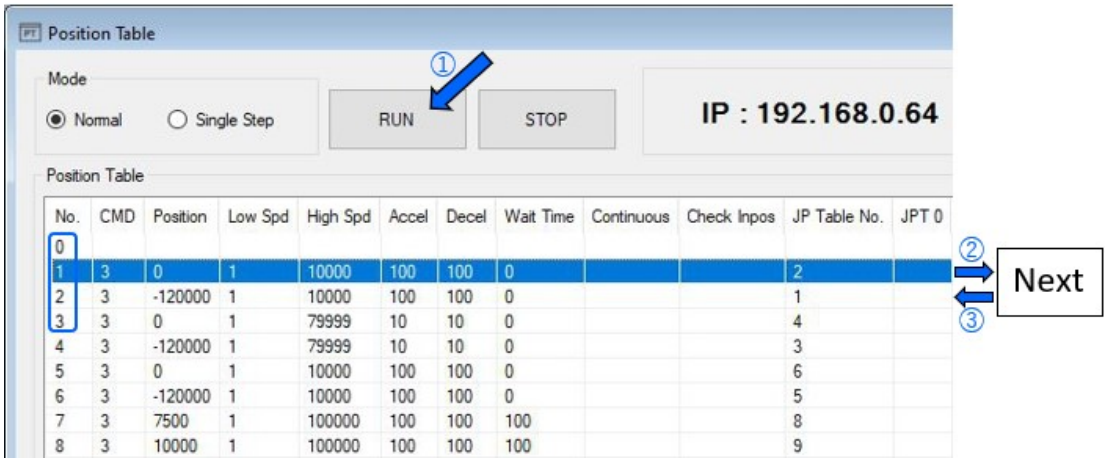
Select 'Normal' at the main window of position table, and all commands will be executed in order by conditions already loaded in PT data.



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.

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 only.



① With Single Step Mode selected, set PT number to start operation as 0 and click 'Run', PT 0 is executed.
② After execution is stopped, ‘Run’ icon is changed into ‘ and next command is on stand-by.
③ Click button and PT 1 will be executed.
④ When pressing each button, one PT command is executed.
⑤ Click ‘Stop’ to stop operation. After operation is stopped, the user can set new PT.

6.3.4 Teaching Function

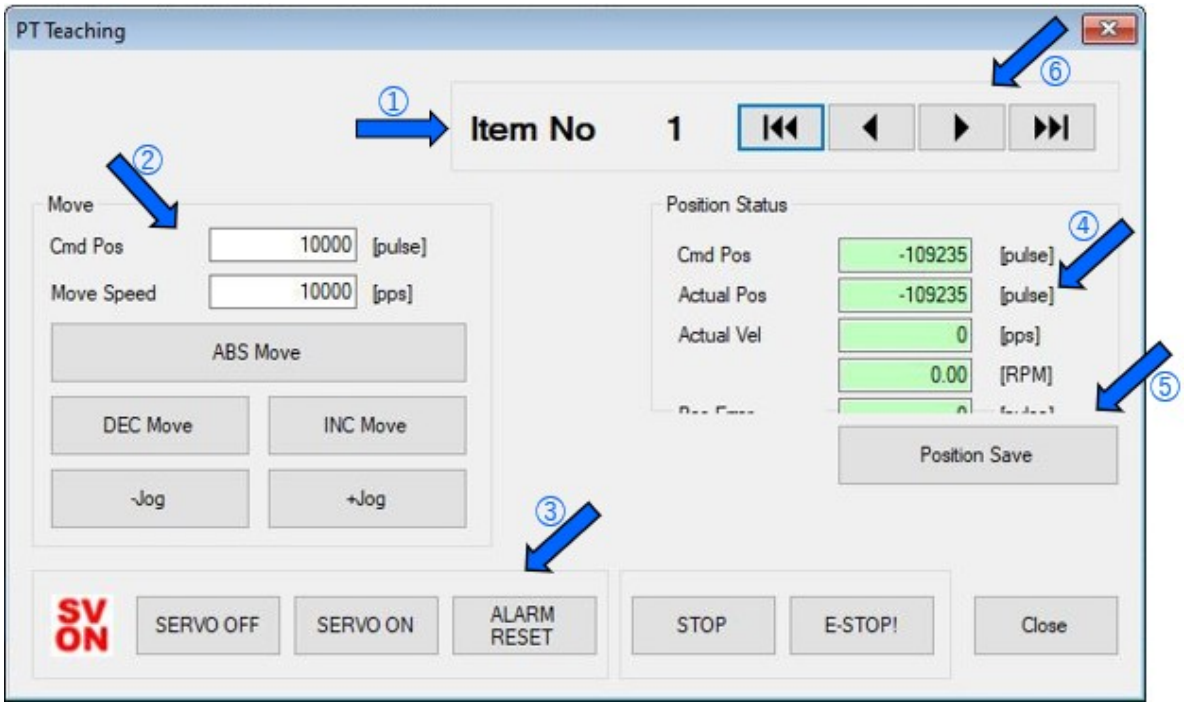
Teaching signal functionalizes that the position value [pulse] is working and can be automatically inputted into a position value of a specific position table.

It is the easy method to measure 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 Move low speed	0	'Teaching' function can be used.
Abs Move high speed	1	
Abs Move high speed with deceleration	2	
Abs Move with acceleration and deceleration	3	
Inc Move low speed	4	'Teaching' function cannot be used.
Inc Move high speed	5	
Inc Move high speed with deceleration	6	
Inc Move with acceleration and deceleration	7	
Move to Origin	8	
Clear Position, Push Abs Move, Stop	9, 10, 11	

Teaching by user program

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



① Select No.1 among 256 Position Table.

② Move the motor to the position that you want.

③ It is possible to set the Servo ON or OFF during teaching.

④ Display the current position information and the value displayed in ‘Actual Position’ is to be teaching value.

⑤ Current 'Actual Pos' value is an absolute position value. It is saved on the 'Position' of selected PT. It is saved on RAM, so click 'Save to ROM' button' to save on ROM.

⑥ In order to move to the next position, select PT No. by using the arrow keys.

Teaching by Input signal

You can the save current position information to the Position Table data by turning the teaching control input signal to ON. Also, when executing the teaching function, position value (no. of pulses) 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).

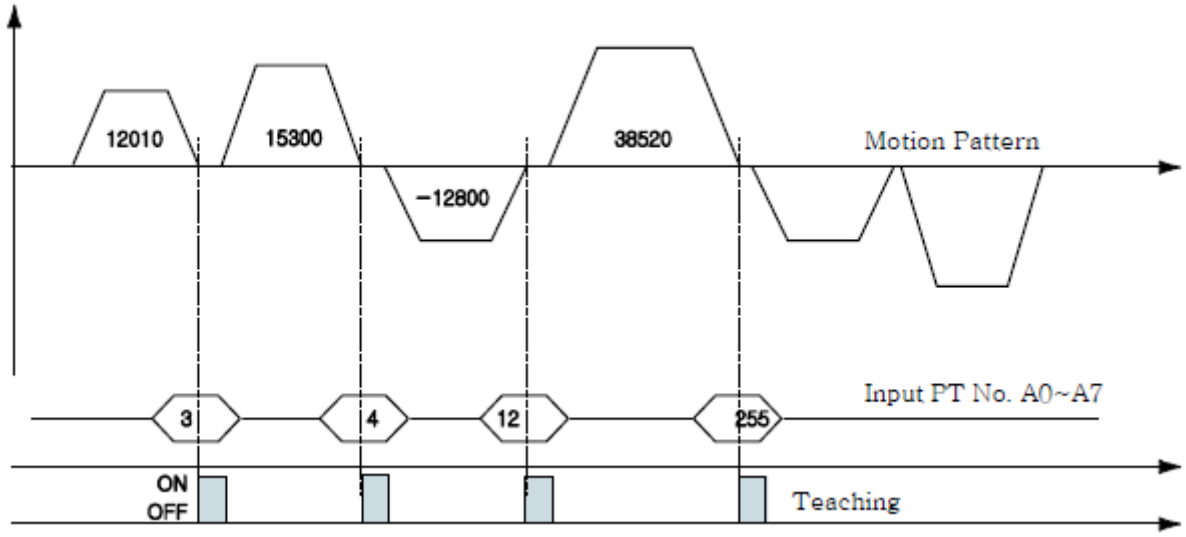
② Move the motor to the position where you want to save the data for it.

③ Specify PT No’s. that teaching is executing by ‘PT A0 ~ PT A7’.

④ Turn ON the teaching signal to save current position value to the item Position of Position Table data.

⑤ If you want to apply the saved value, you need to ‘Refresh’ PT data to verify the value on the User Program screen.

⑥ The values are to be saved on RAM and clicking the ‘Save to ROM’ button, saves them 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

6.3.5 Input Condition Jump

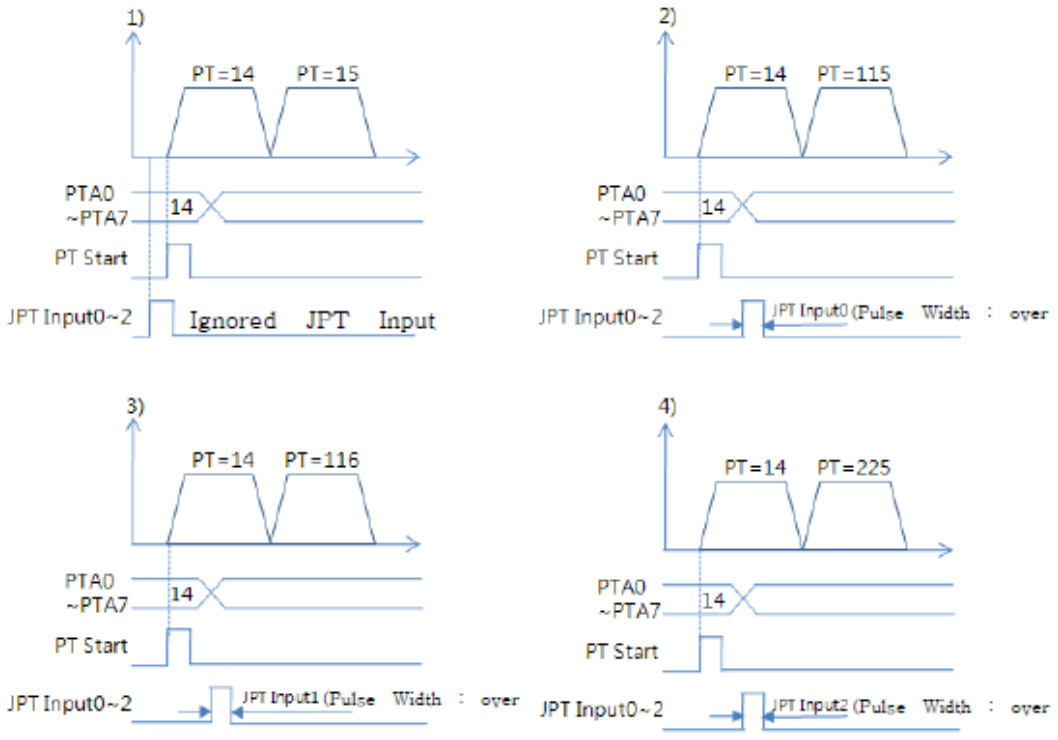
Among the setting items, 'JP Table No.', 'JPT 0', 'JPT 1' and 'JPT 2' are used to specify next PT no. to be executed. Specified next PT no. to be executed, there are two different methods depending on the control input signal as following.

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, 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).

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



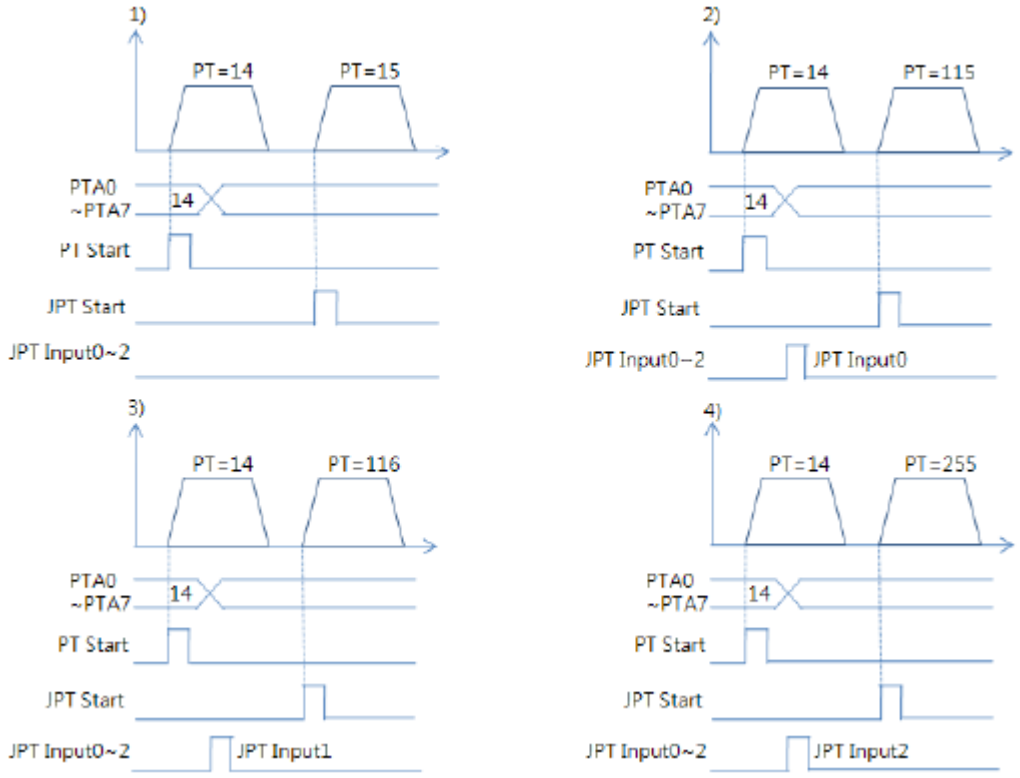
Jump by External Signal

This is the method to specify next action pattern (PT no.) by input condition. It is executed by an external signal instead of automatically jumping to the next PT to be executed according to the procedure.

'Difference from the function in 'section Automatic Jump':
1) Jump Position No. to jump need to have the format of 10XXX.
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.

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 No. (JPT0~2)', the lower number (JPT0 > JPT1 > JPT2) has the high-priority and will be executed.*

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. That is, Jump Position No. is ignored.

There are rules in specifying loop as following.

1) If Loop Count is set to 0, the loop setting function is canceled.

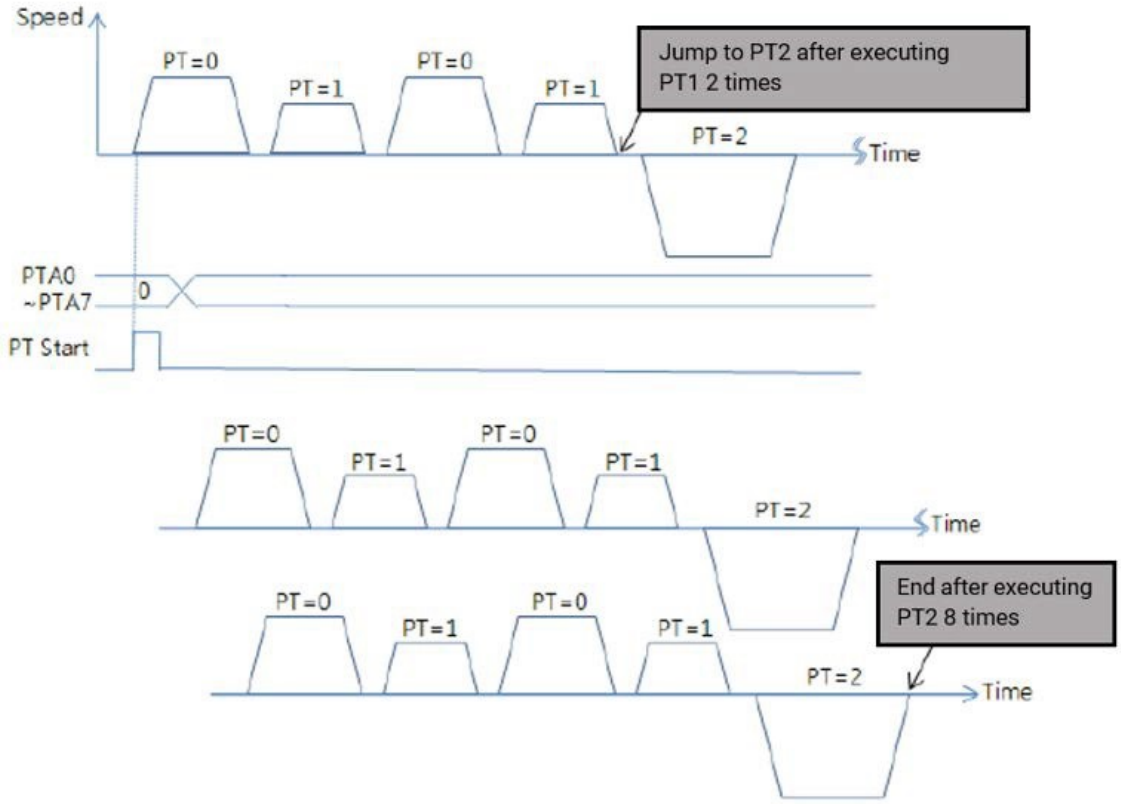
2) If the Loop Count is not reached during operation, jumps to Jump Position No (When Loop Count is reached, Jump Position No. is ignored and jumps to Loop Jump Table No).

3) If user set Loop Jump Table No. to 'blank', it ends after the corresponding PT motion is executed.

4) If Loop Jump Table No. is set to 10XXX, it is executed by 'JPT Start' input signal.

Following Table is one of example for specifying loop.

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



Loop counter Clear

The 'Loop Counter' is a counter inside the drive to compare with the value of the 'Loop Count' of the PT item.

After the PT motion is executed, the loop counter value of 'Position Table' specified in this item is cleared to '0'. If you set Loop Clear to 'blank', this function will be released.

Following table shows an example of specifying Loop Counter Clear.

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

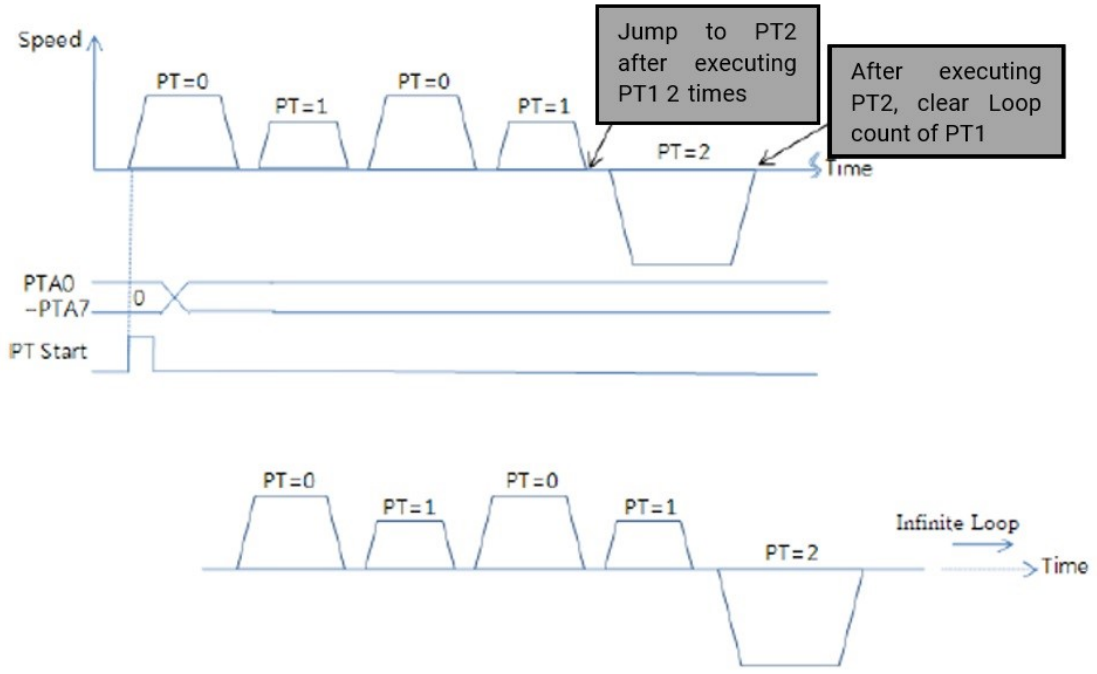
1) Specify ‘Loop Counter Clear’ of PT No. 2 as PT No. 1.
2) Start operation from PT No. 0.
   When the operation starts, the system resets all ‘Loop Count’ values to 0.

3) After the loop block PT No.0 ~ PT No.1 is repeated two times, the 'Loop Counter' becomes the 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.

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

6) If this 'Loop Clear' value is not specified, 'Loop Counter' value of internal drive increase continuously. It jumps to PT No.2 one time, after that, repeat block 'PT No.0 ~ PT No.1' block infinitely.



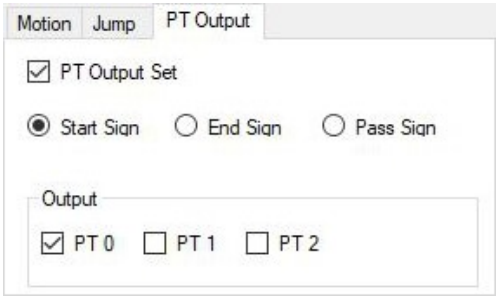
6.3.7 Start/Pass/End signal function

By specifying the item Start/Pass/End Signal Function, user can recognize the status of Position Table whether operation has started, is under pass operation, or completed 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 works on both absolute positioning and relative positioning motion.

Start/End Sign



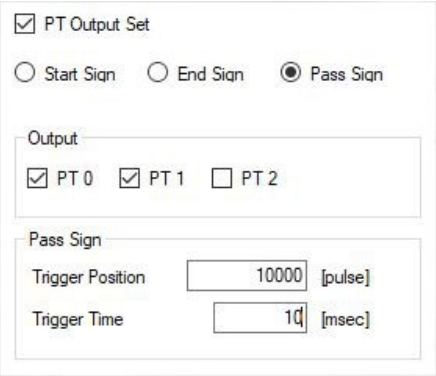
If the value between 1 to 7 (Start Sign) is specified for PT Set, PT Output HEX value is output through output of 'PT Output 0 ~ PT Output 2' at the time of starting operation.

If the value is 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	

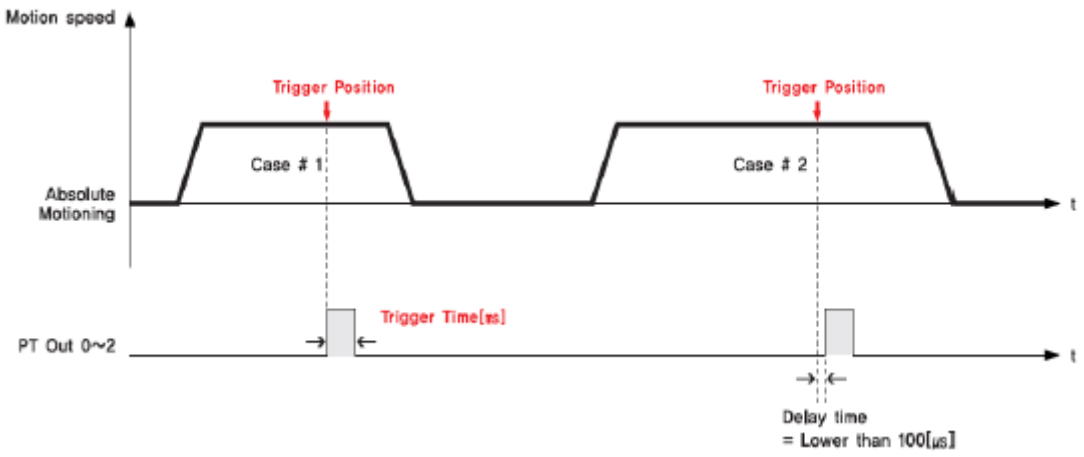
*If you set the PT Set value to 9 ~ 15 and use the jump function at the same time and set the 'Wait Time' to 0, the PT Output will not be output.

Pass Sign



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' when the position starts.

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	Do not use output function of PT Output 0 ~ 2.
17	OFF	OFF	ON	1	PT Output 0 ~ 2 signals become [ON] when the motion of PT of the corresponding number reaches Trigger Position.
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.

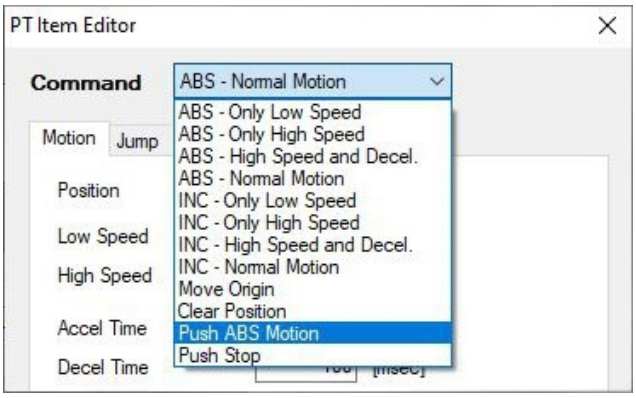
The 'Trigger Position' is not the absolute position value, but the relative position value from the start position of that PT command.

6.3.8 Push Motion Function

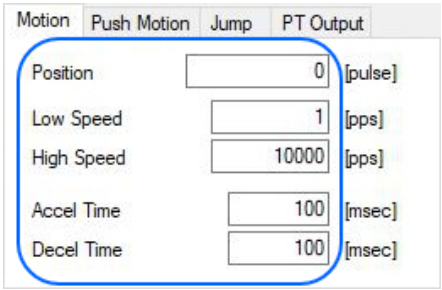
It is a function to move while maintaining a fixed force from a certain position during movement by position command, to stop movement in stop mode when it comes into contact with work during movement, and to keep the force in None-Stop mode.

Setting method

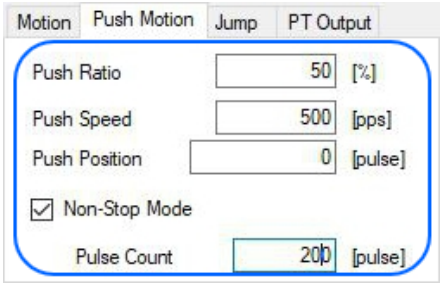
1) Select the command type to 'Push ABS Motion'.



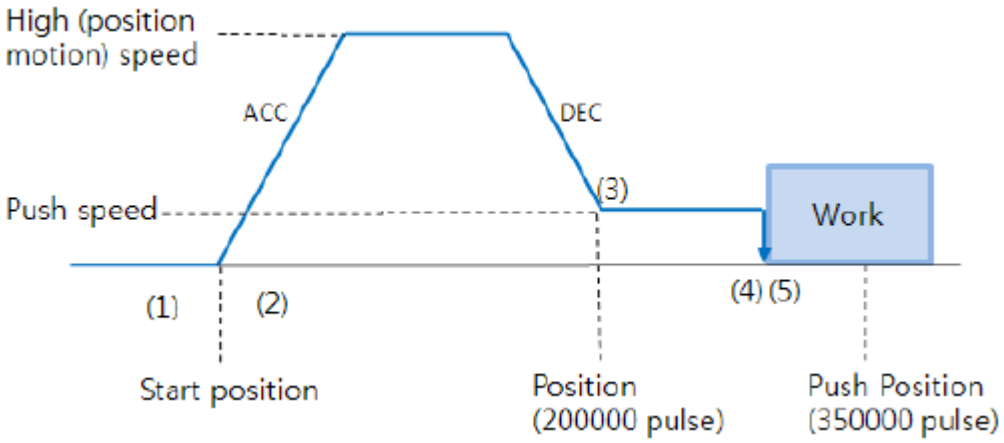
2) Specifies the normal position motion command settings.



3) Specifies the Push motion command settings.



Push motion function



(1) Start Push Motion command.

(2) Normal position motion command is executed (status: position mode).

(3) Decelerate the speed from position motion to push motion.
(Push motion speed must be lower than 200 rpm)

(4) Push motioning until the work detected with specified motor torque (status: push mode).

(5) There are two methods according to mode

a. When Push mode is 'Stop mode':

After the work detected, the motor will stop but the motor torque will be maintained. At that time, the end signal of 'In-position'/'PT Stopped'/'END' signal is effective. The maintained motor torque will be return to normal Servo ON status (release 'push mode' and change to 'position mode') by 'stop' command or normal 'position motion' command.

The next is an example of PT data for a simple 'Stop mode' Push function test.

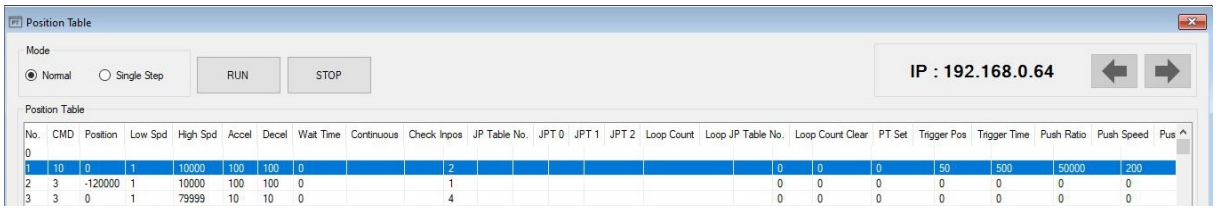
b. When Push mode is ‘Non-stop mode’:

After the work detected, the motor will not stop and the motor torque will be maintained. At that time, the end signal of ‘In-position’/’PT Stopped/’END’ is effective. The ‘Stop’ command must be executed before the next motion command. (But in Stop mode, if there are not a shock in a mechanism, do not need to ‘Stop’.)

At this time, it moves in the opposite direction by the value of ‘Push mode setting’ among the control condition parameters to mitigate the impact on the equipment. Therefore, if user 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 more information about current Push motion, refer to STDF EN Manual 7.6. - Push Motion Function.

The next is an example of PT data for a simple 'Non-Stop mode' Push function test.



As above example

1) If execute PT No.1, Push motioning during 5.000 [ms] after work detect.

2) And then execute PT No.2 (Stop function).

3) Move to start position and repeat push motioning again by executing PT No.3.

Caution
In the case of Non-stop mode, must execute the 'Stop' command before the next motion command in the work detect the situation.

Caution
If there is a shock in the mechanism, the time delay is needed for returning the original state after ‘Stop’ operation.

For more information about current Push motion, refer to STDF EN Manual 8.7. - Push Motion Function.

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