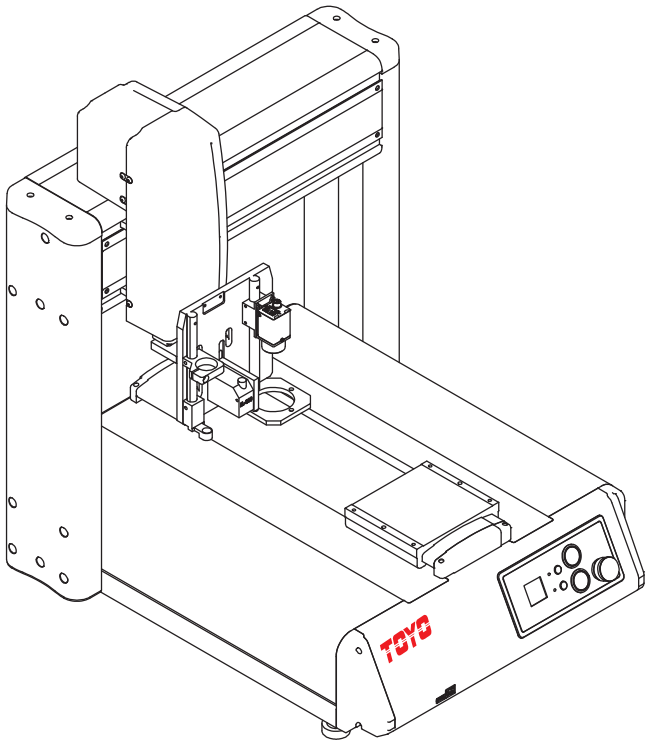
User's Manual

JT Series Desktop Robots
User Manual - English (US) Version

Ver.2501

JT Series



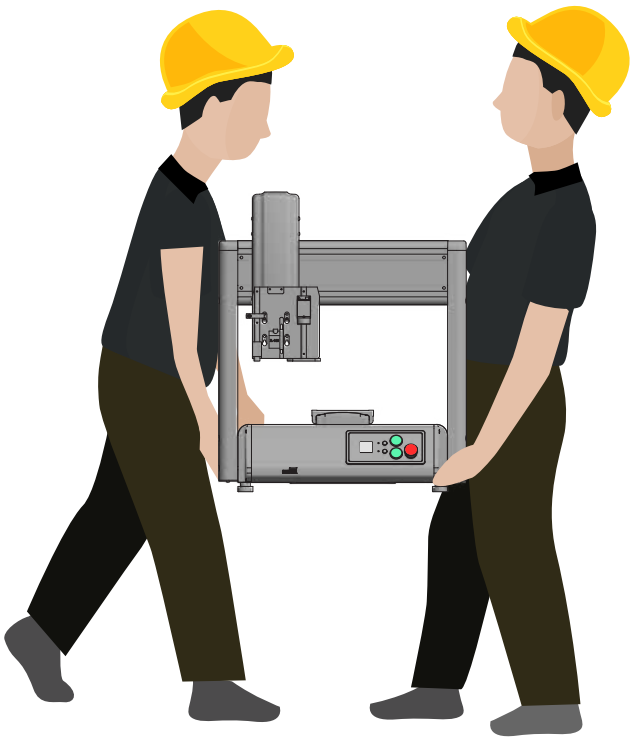
Preface

JT Series Desktop Robot
Thank you for purchasing our JT series desktop robot.

Warning
This operational manual is only an introduction that provides all the necessary information for safe use. For details, prepare an operating manual separately. Please read and fully understand the operation manual before using the product. For the most up-to-date edition, please download an electronic file from the company's official website, or contact your nearest authorized sales representative.

Proper Desktop Robot Handling Method：

1 Always remove all external electrical connections before handling.
2 Always use assistive equipment for long-distance and or long-duration handling to ensure personal safety.
3 Always have at least two people handling the desktop robot at the same time.
4 Be careful to avoid a collision when handling the desktop robot.

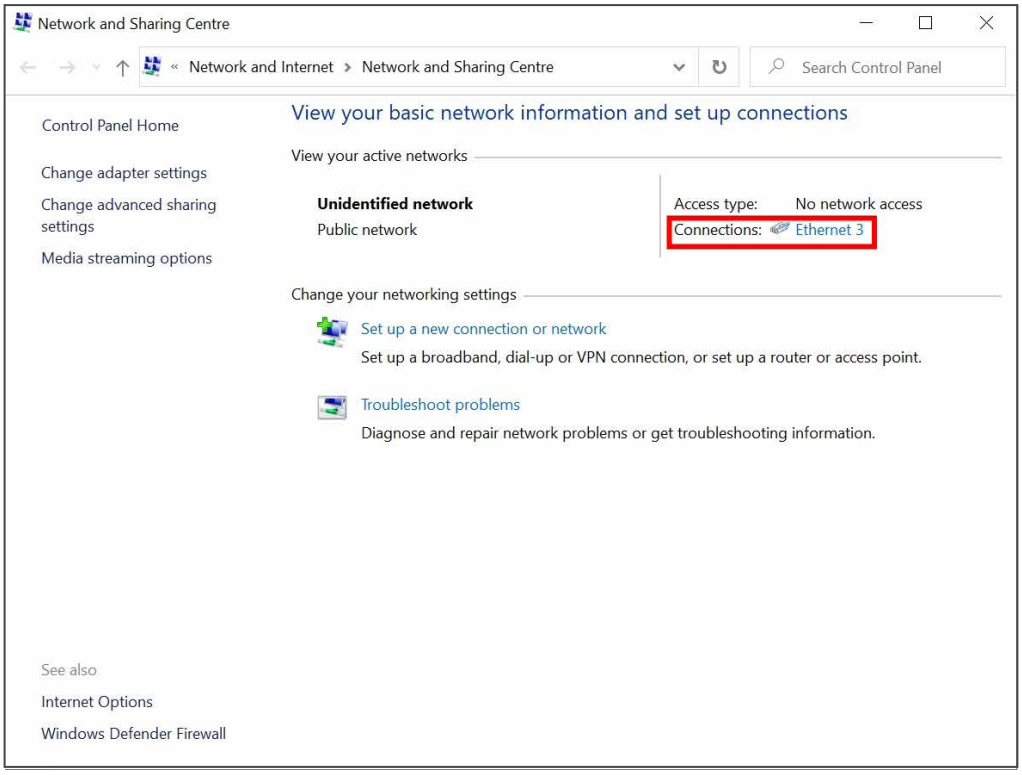


Catalog

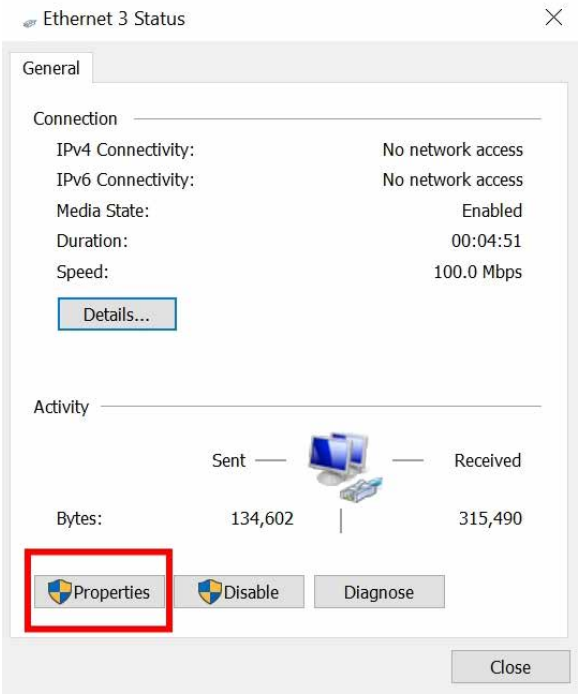
1.Communication settings

PC IP address setting

① From "Control Panel" ➡ "Network and Internet" ➡ "Network and Sharing Center " to enter the settings connection

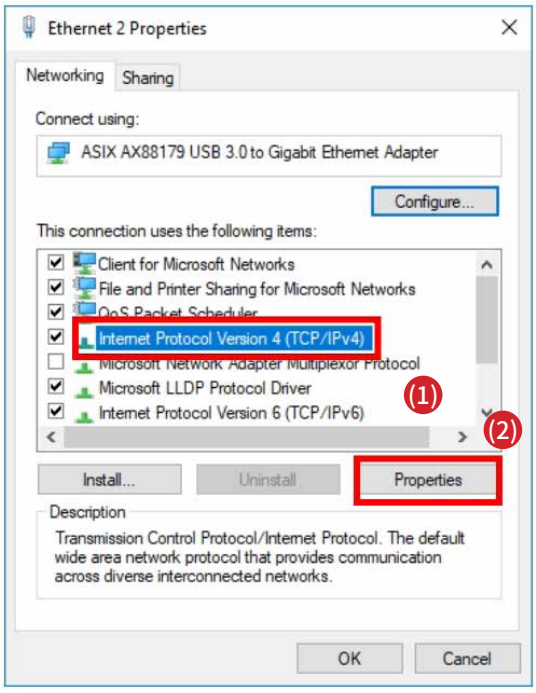


② Enter the “Content” in setting “Local Area Connect” status.

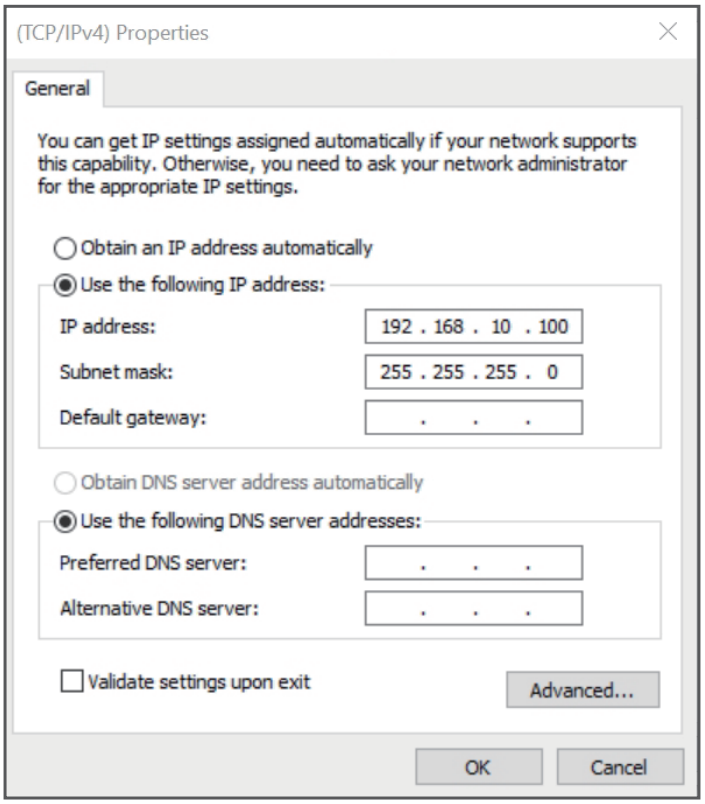


③ After entering the content

⑴ Select "Internet Protocol Version 4 (TCP / IPv4)":

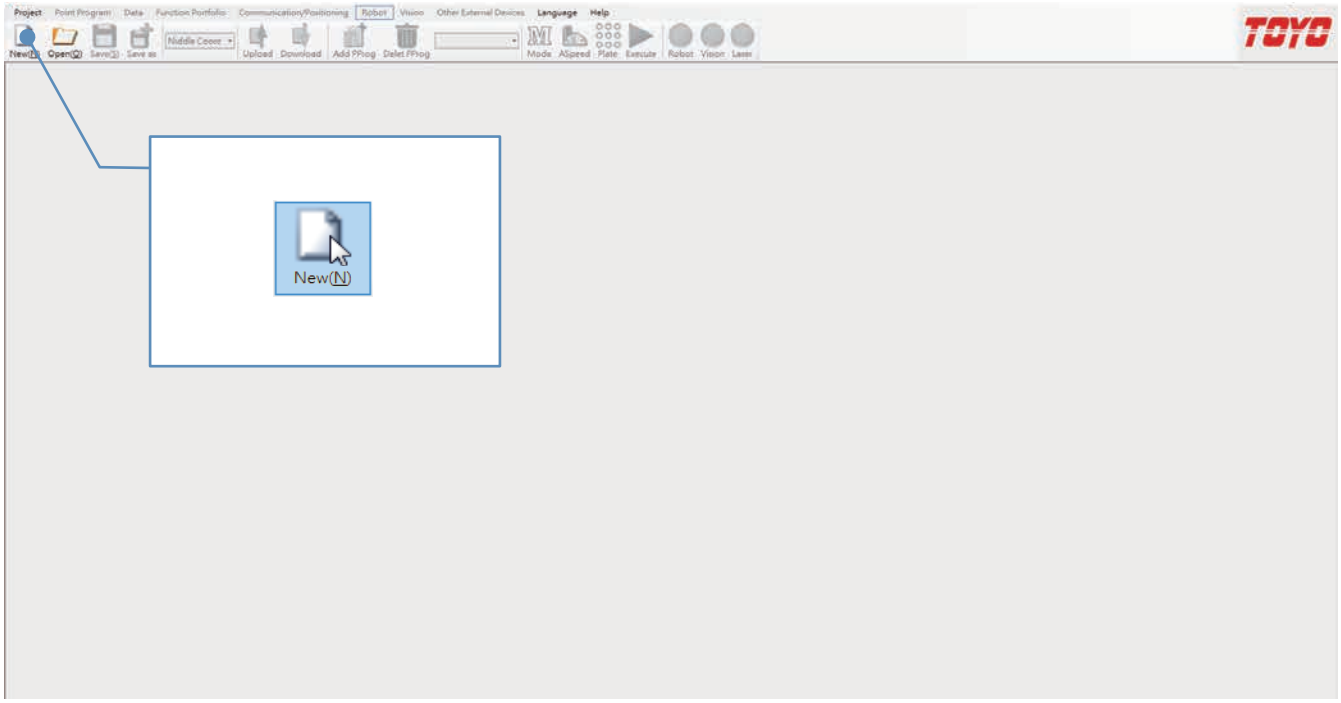


⑵ Set a IP. (The factory set value of JT desktop robot is IP: 192.168.0.100):

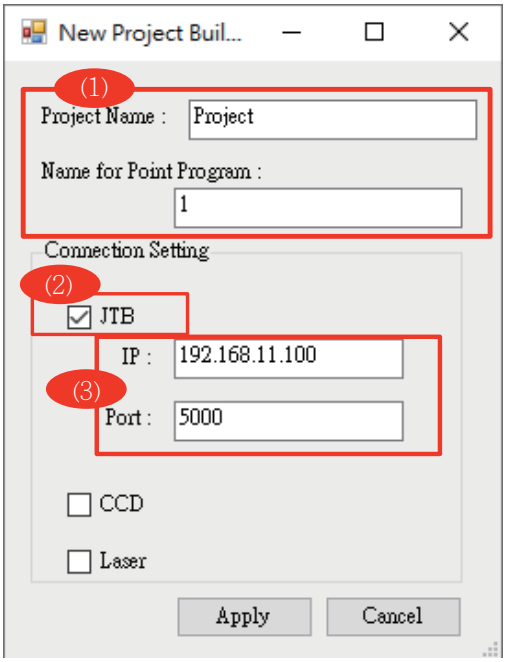


2.UI connection setup

① Open "Software" and select "Add":

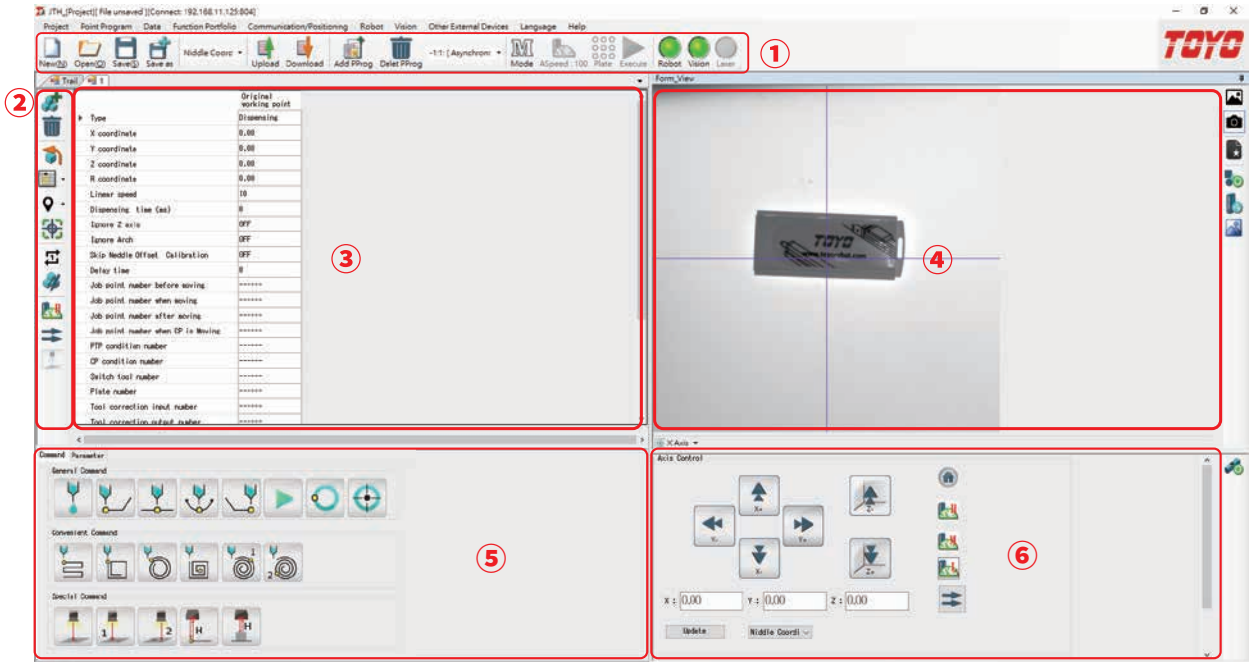


② In the Create Project Dialogue, enter the project name, procedure name, and IP address parameters in the corresponding text boxes.



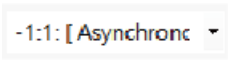
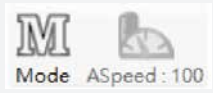
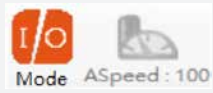
⑴ Project Name: Names the project and file.；Procedure Name: Names the procedure。
⑵ Desktop Robot Model Check Box(Default Checked)
⑶ Desktop Robot IP Address (Default Value: IP:192.168.0.100 Port:5000)，IP address settings can be edited.
After providing valid values for all of the fields in the Create Project Dialogue, press "New" and enter the program editor.

3.UI interface information



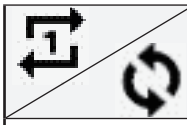
① Project Toolbar：

New(N)	New	Creates a new project file.
Open(O)	Open	Opens an existing project file.
Save(S)	Save	Saves an existing project file.
Save as	Save As	Save changes to a project to a different file.
Niddle Coord	Coordinate Status Display	Switch the coordination type(generally there are needle, vision and Laser...etc to be selected)
Upload	Upload Data	Uploads completed data to desktop robot.
Download	Download data	Downloads data from the desktop to the PC terminal.
Add PProg	Add program	Create / add a new program
Delet PProg	Delete program	Delete the selected program.

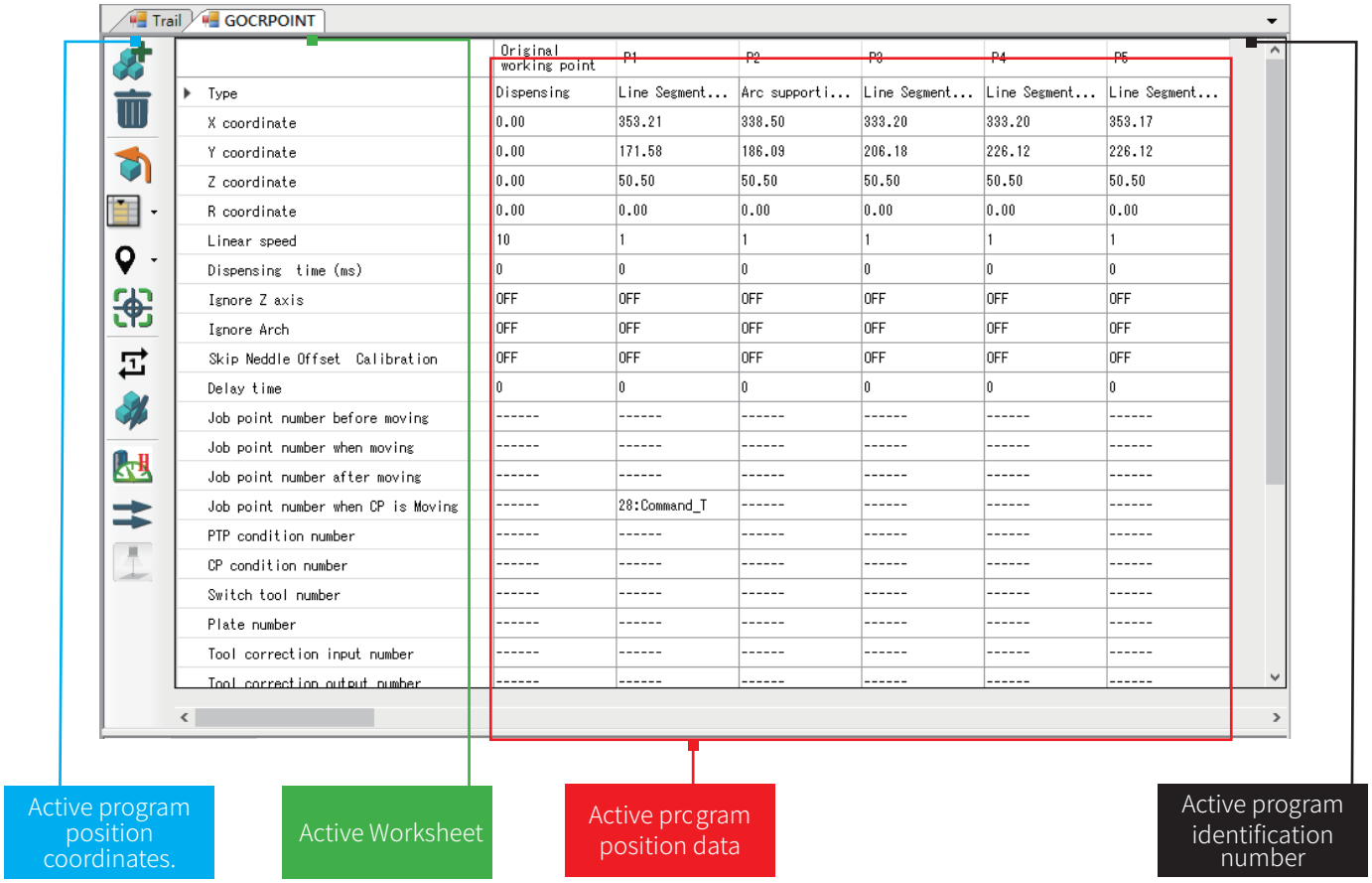
	Active Procedure Display	Displays the active compiled or executing procedure.
	Select Mode	In Manual Mode, ASPEED is inactive. This mode is mainly used for planning point location instructions for programs.
		Automatic Mode: ASPEED is active. Click to adjust the execution speed. This mode is primarily for running programs; teaching and other operations are not allowed. Programs can only be started using the robot’ s ‘START’ button or the start button on the PC.
		I/O Mode: ASPEED is inactive. Use this mode to run programs; teaching and other operations are disabled. Programs can only be started via the robot’ s IO.
	Matrix execution point selection	Select the matrix point to be executed. (It can be used after the matrix tray wizard setting)
	Run Procedure	In automatic mode, starts/stops the active procedure.
	Desktop Robot Connection Status	Displays the connection status of the desktop robot.
	Image Capture Peripheral Device Connection Status	Displays the connection status of the peripheral image capture device.
	Laser Peripheral Device Connection Status	Displays the connection status of the peripheral laser device.

② Procedure Toolbar：

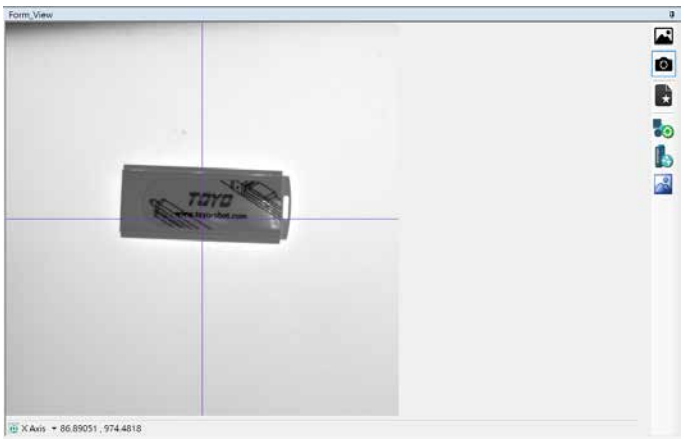
	New Point Item	Adds a point item to the end of the active programs point item collection.
	Delete Point Item	Remove the last point item from the active program point item collection.
	Import DXF	Imports a DXF file and converts to a continuous path.
	Tool Dropdown Menu	Internal tool menu "Insert, Cut, Copy, Paste"
	Function Dropdown Menu	Coordinate correction, point position accumulative copy, Mirror Copy (up and down, left and right), deviation and rotation.
	Point Teaching	Set designated point as the current coordinate position.

	Single/ Continuous Cycle Mode	Toggle procedure execution between single and continuous operation.
	Common Parameters	Set desktop-robot-level parameters
	Run Single Point Speed	Sets the movement speed of the run single point command.
	Run Single Point	Moves to the next specified position.
	Visual Analogue Path	Observe the path execution results through the visual display window of the UI.

③ Procedure Worksheet：



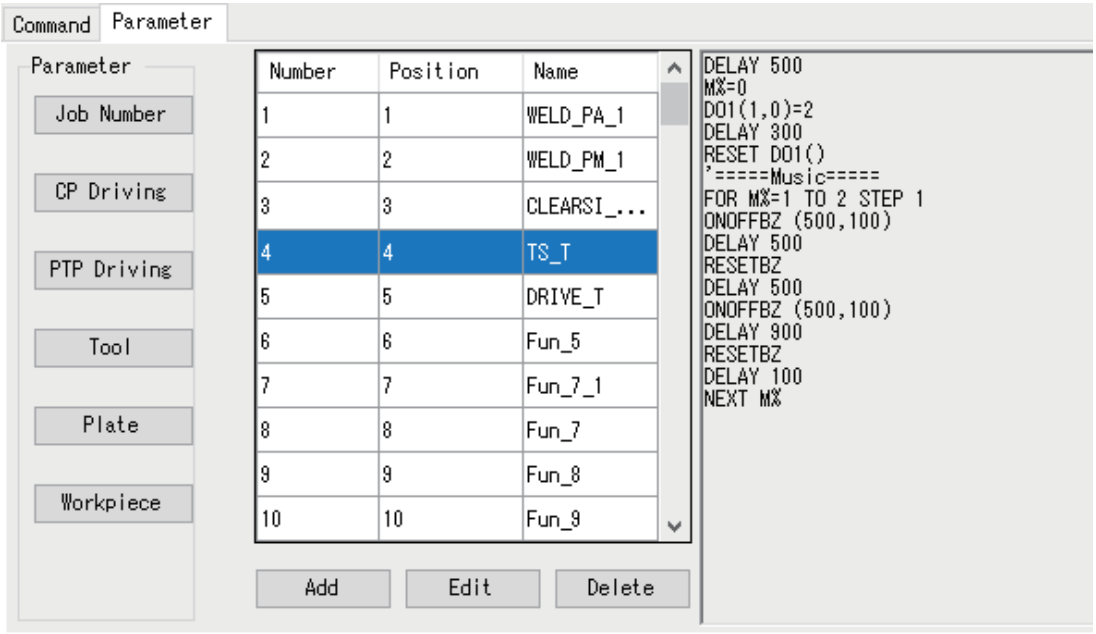
④ Image Capture Field of View (FOV) Display：



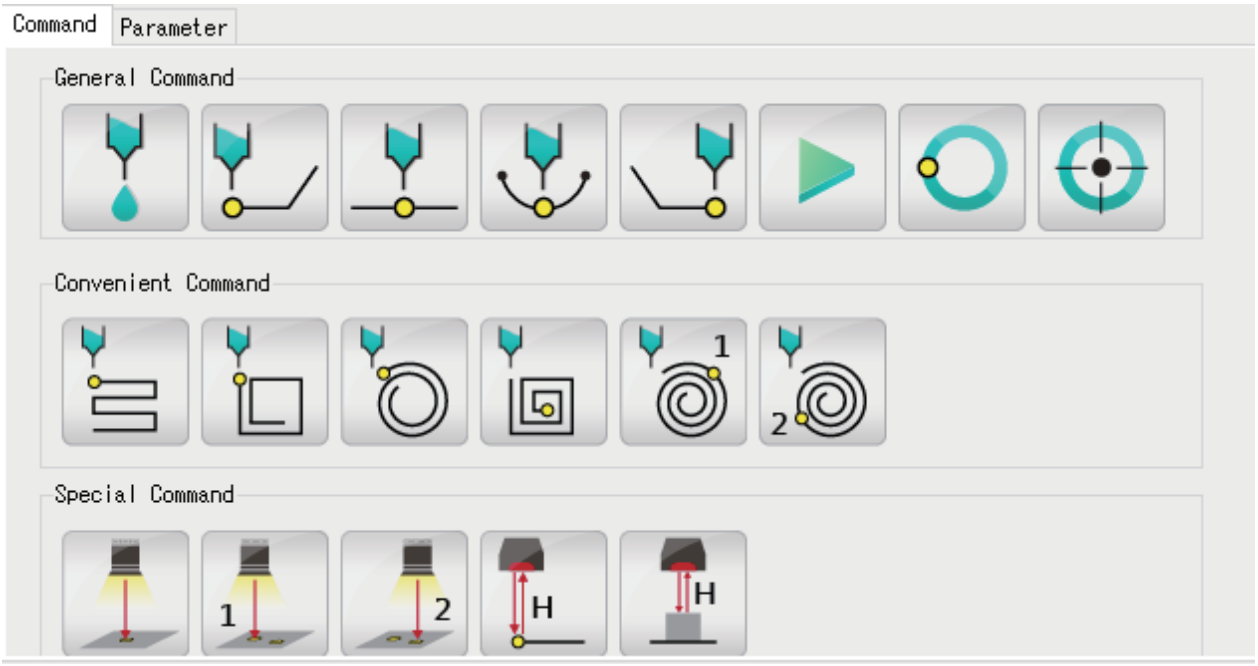
	Switch to static image capture mode.
	Switch to dynamic image capture mode.
	Edit image capture feature settings.
	Image capture parameter settings.
	Image capture parameter initialization.

⑤ Procedure-level Parameter Settings：

⑴ Procedure-level Parameter Tab Page



(2) Point, Shape Quick Button Tab Page



(1) Standard Point, Shape Commands：

	Coordinate Position	Dispensing point. Mainly for setting dispensing time		Line Segment End Point	Line segment target position.See note on arc source position
	Line Segment Start Point	Line segment source position See note on arc source position		Dwell Position	Await next movement command signal.
	Line Segment Intermediate Point	Line segment intermediate positionSee note on arc source position		Arc Source Position	Specifies an arc source position, can set subtended angle, on/off dispense.
	Arc Intermediary Position	Arc intermediary position,See note on arc source position		Arc Center Position	Specifies arc central coordinate position.

(2) Spiral Commands：

	Square Wave Source Position	Set square wave source position and related parameters.
	Spirangle Start Point	Set 1-rectangle spirangle source position and related parameters.
	Spirangle End Point	Set 1-rectangle spirangle target position.

	Spiral Start Point	Set the point which both the vertex of the inscribed triangle that defines the spiral, as well as the spiral source position.
1	Spiral Outer Circular Point 1	Set the second vertex of the inscribed triangle that defines the spiral.
2	Spiral Outer Circular Point 2	Set a vertex of the inscribed triangle that defines the spiral.

(3) Peripheral Device Commands：

	Visual Single Feature Capture Point	Set visual single feature capture point
	Visual Bi-Feature Capture Point 1	Set bi-feature capture point 1
	Visual Bi-Feature Capture Point 2	Set bi-feature capture point 2

	Line segment height measuring start point	Set the start point of Laper height measuring
	Object Height Measuring Point	Set the Laser single point height measuring

⑥ Axis Control Commands：

(1) Movement/Operation Commands：

	X + Direction Movement	Move in the positive x-axis direction.
	X - Direction Movement	Move in the negative x-axis direction.
	Y+ Direction Movement	Move in the positive y-axis direction.
	Y- Direction Movement	Move in the negative y-axis direction.
	R+ Direction Movement	Rotate in the positive R-axis direction (500D axis, special axis movement)
	R- Direction Movement	Rotate in the negative R-axis direction (500D axis, special axis movement)

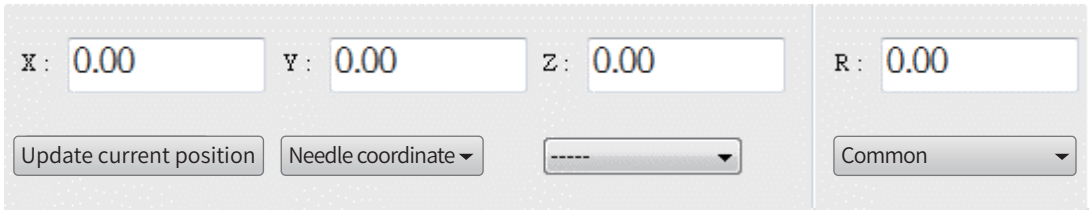
	Z+ Direction Movement	Move in the positive z-axis direction.
	Z- Direction Movement	Move in the negative x-axis direction.
	Back to Home Point	Move all axes back to their home/ origin positions.
	Move to specified position.	Move the desktop robot to a designated coordinate position.
	Position Selection Control	Select position.
	Point Items Teaching	Designate a position item to write into the current coordinate.

(2) Speed Control Commands：

	High speed	Set manual speed to 80 mm/s (value can be modified using parameters)
	Medium speed	Set manual speed to 5 mm/s (value can be modified using parameters)
	Low speed	Set manual speed to 1 mm/s (value can be modified using parameters)

	Set parameter values for each axis.
	Initialize parameter values for each axis.

(3) Coordinate Display & Switching：



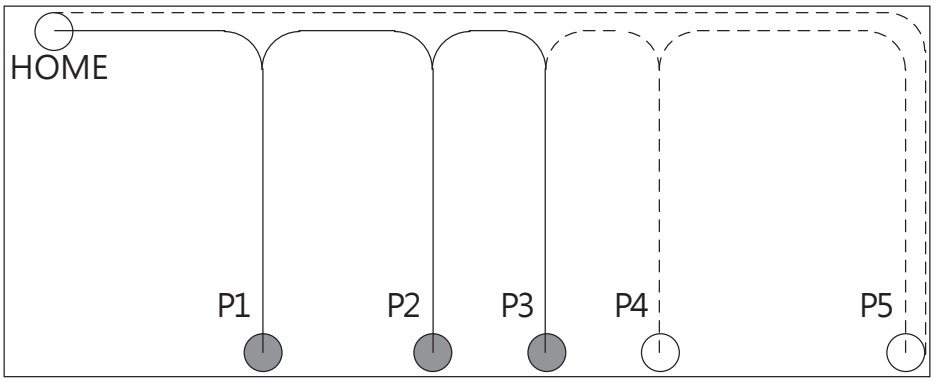
Update current position	Set coordinate origin to current position.	
Needle coordinate	Standard/special needle, image capture, and laser peripheral coordinate switch.	*1
TOOL_1	Change tool coordinates.	
Common	Switch of normal axis interpolation(X1YZ) / special interpolation(X2YZ)	*1

*1 special interpolation/coordination system switch is only available in double platform type machine

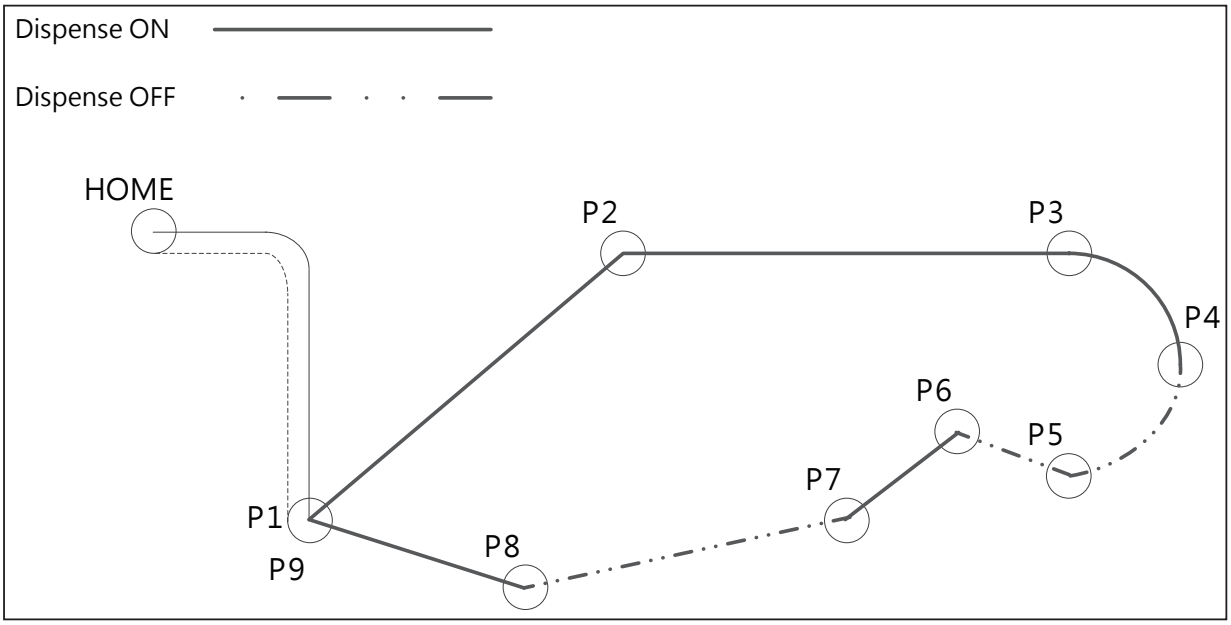
4.Point type description

① Dispense：The catalog should be limited in scope to the module and its internal components.

	Dispensing (PTP)	1. Starting from the HOME position, the robot moves to the designated point based on PTP (Point-to-Point) motion parameters and dispenses material for a programmed duration. 2. The dashed line represents the executed path. 3. After completing the movement, the robot returns to the HOME position, awaiting the next activation signal.



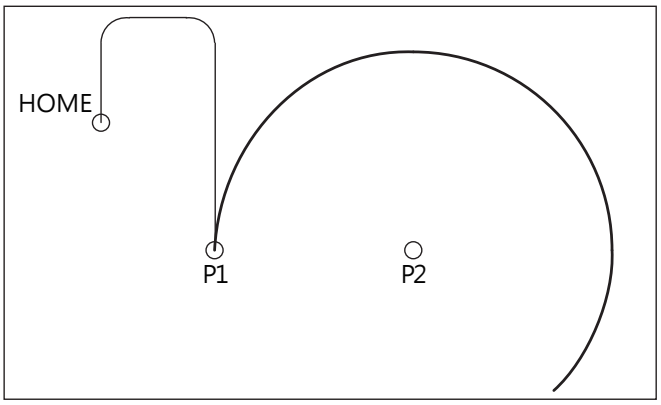
② Dispense: The thickness of the dispensed medium area is determined in part by the linear speed. Since the dispense time (value > 0 represents dispense ON) to control whether or not there is dispensing along the line segment.



③ Arc：

	Arc Center Position	(1) Set position P1 as the arc starting position (2) Set point P2 as the arc center position (3) In position P1, set parameter Parameter1 value to the subtended angle by the arc, measured in degrees. (CCW: positive, CW: negative) (4) To activate dispensing output, set 1 for dispense time on Point P1 and 0 for no dispensing output. (5) Set the value linear speed in position P2 (arc center position) linear speed cell.
	Arc Start Position	

	Original working point	P1	P2
Type	Dispensing	Start point ...	Center point
X coordinate	0.00	164.03	120.71
Y coordinate	0.00	145.09	169.73
Z coordinate	0.00	14.71	14.71
R coordinate	0.00	0.00	0.00
Linear speed	10	10	10
Dispensing time (ms)	0	0	0
Ignore Z axis	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF
Delay time	0	0	0
Job point number before moving	------	------	------
Job point number when moving	------	------	------
Job point number after moving	------	------	------
Job point number when CP is Moving	------	------	------
PTP condition number	------	------	------
CP condition number	------	------	------
Switch tool number	------	------	------
Plate number	------	------	------
Tool correction input number	------	------	------
Tool correction output number	------	------	------
Parameter 1		Angle of cir...	
		135	
Parameter 2			
Parameter 3			
Parameter 4			



④ Dwell Position：

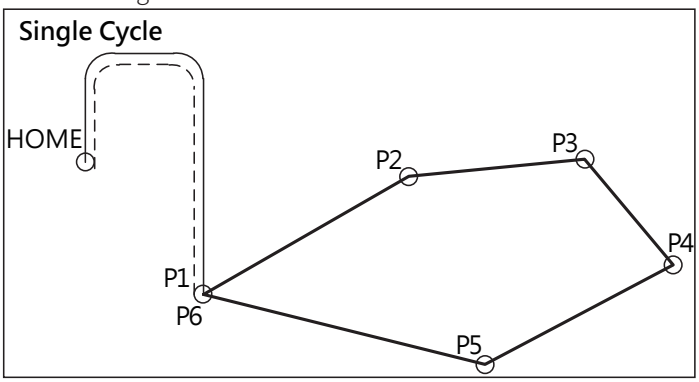
	Dwell	Awaits for the command signal at the specified position.

(1) Single Cycle：

ⓐ After procedure start, the controller to moves the from source position home to the target position.

ⓑ From position P1 the procedure starts the point-to-point (PTP) path through positions P2, P3, P4, P5, and P6.

ⓒ After the desktop robot has completed the point-to-point (PTP) path, it returns home, and then awaits for the next command signal.

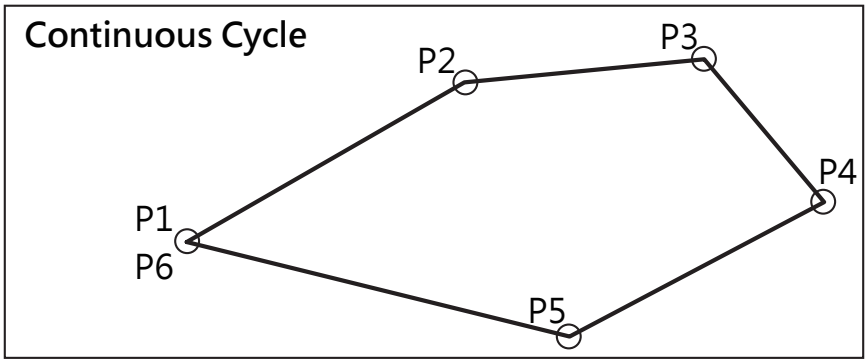


(2) Continuous Cycle：

ⓐ After procedure start, the controller to moves the from source position home to the target position P1.

ⓑ From position P1 the procedure starts the point-to-point (PTP) path through positions P2, P3, P4, P5, and P6.

ⓒ After completing the point-to-point (PTP) path, the z-axis moves in the positive direction, and then returns moving in the negative direction to repeat steps 2, 3.



(3) Continuous Cycle with Dwell：

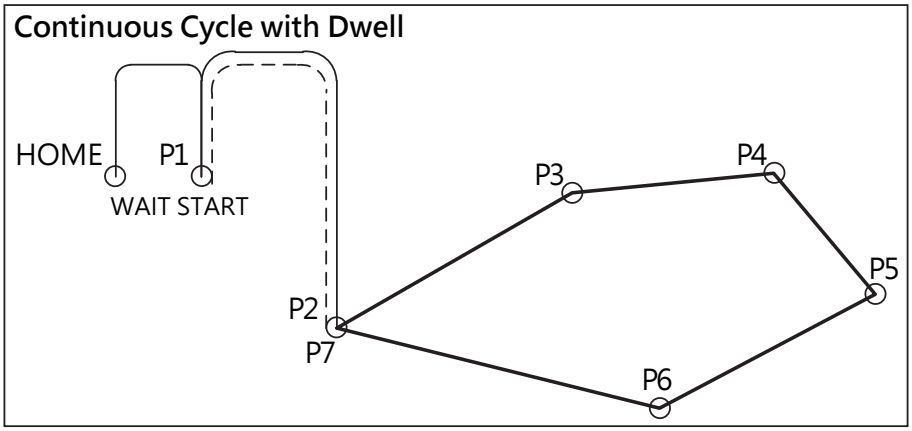
ⓐ After procedure start, the controller to moves the from source position home to the target position P1.

ⓑ At position P1 await command signal.

ⓒ After start signal, moves the from source position P1 to the target position P2.

ⓓ From position P2 the procedure starts the point-to-point (PTP) path through positions P3, P4, P5, and P6.

ⓔ After the desktop robot has completed the point-to-point (PTP) path, it returns to position P1 and awaits for the next command signal.

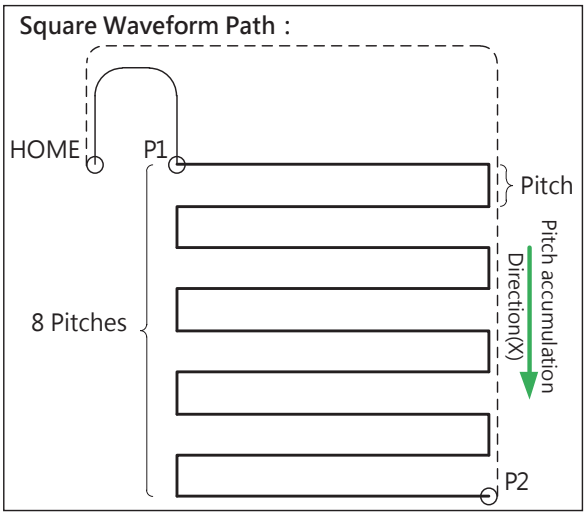


⑤ Special Command-Matrix：

	Zigzag Path Start Point	Control dispensing switch through dispensing time column(>0 is dispensing ON) Parameter 2: set the number of interval Parameter 3: set the interval accumulating direction
	Matrix Spiral Start Point	Control dispensing switch through dispensing time column(>0 is dispensing ON) Parameter 1: set the dispensable area(0 is all area; integer bigger than 0, area counts from matrix outside to inside) Parameter 2: set the number of interval
	Zigzag & Matrix Spiral path End Point	Matching with above start point to decide dispensing area. Path line speed can be set in this column.

(1) Example 1: Square Waveform Path Settings

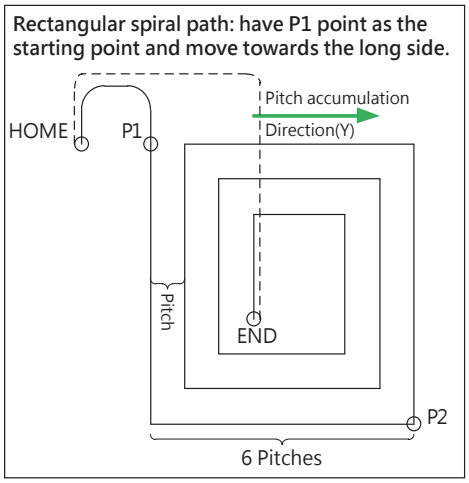
	Original working point	P1	P2
Type	Dispensing	Zigzag start...	Rectangular ...
X coordinate	0.00	184.03	120.71
Y coordinate	0.00	145.09	169.73
Z coordinate	0.00	14.71	14.71
R coordinate	0.00	0.00	0.00
Linear speed	10	10	10
Dispensing time (ms)	0	0	0
Ignore Z axis	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF
Delay time	0	0	0
Job point number before moving	------	------	------
Job point number when moving	------	------	------
Job point number after moving	------	------	------
Job point number when CP is Moving	------	------	------
PTP condition number	------	------	------
CP condition number	------	------	------
Switch tool number	------	------	------
Plate number	------	------	------
Tool correction input number	------	------	------
Tool correction output number	------	------	------
Parameter 1			
Parameter 2		The number o...	
		8	
Parameter 3		Direction (...	
		X	
Parameter 4			



*The allowable linear speed decreases as the frequency of the square waveform increases; therefore, an increase in the linear speed requires a decrease in the frequency. Likewise, an increase in the number of periods in a fixed interval, demands a decrease in the linear speed, to prevent failure.

(2) Example 2: 4-rectangle spiral path setting-1

	Original working point	P1	P2
Type	Dispensing	Rectangular ...	Rectangular ...
X coordinate	0.00	156.77	102.3
Y coordinate	0.00	160.19	240.29
Z coordinate	0.00	12.76	12.76
R coordinate	0.00	0.00	0.00
Linear speed	10	10	50
Dispensing time (ms)	0	0	0
Ignore Z axis	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF
Delay time	0	0	0
Job point number before moving	------	------	------
Job point number when moving	------	------	------
Job point number after moving	------	------	------
Job point number when CP is Moving	------	------	------
PTP condition number	------	------	------
CP condition number	------	------	------
Switch tool number	------	------	------
Plate number	------	------	------
Tool correction input number	------	------	------
Tool correction output number	------	------	------
Parameter 1		Range of dis...	
		0	
Parameter 2		The number o...	
		6	
Parameter 3			
Parameter 4			

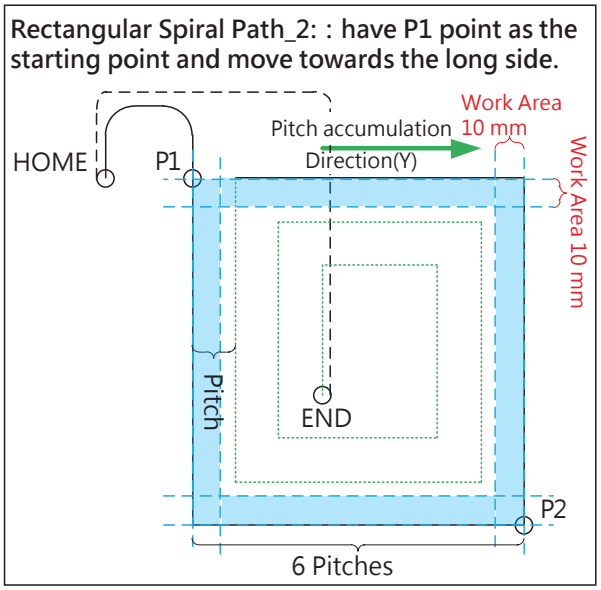


*1、The allowable linear speed decreases as the frequency of the square waveform increases; therefore, an increase in the linear speed requires a decrease in the frequency. Likewise, an increase in the number of periods in a fixed interval, demands a decrease in the linear speed, to prevent failure.

2、When the dispensing area parameter is set to 0, then the path has no additional restraints.

(3) Example 2: rectangle spiral path setting-2

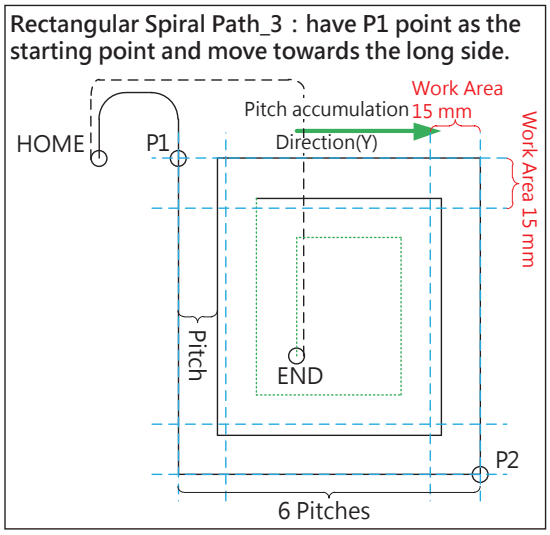
	Original working point	P1	P2
Type	Dispensing	Rectangular ...	Rectangular ...
X coordinate	0.00	156.77	102.3
Y coordinate	0.00	160.19	240.29
Z coordinate	0.00	12.76	12.76
R coordinate	0.00	0.00	0.00
Linear speed	10	10	50
Dispensing time (ms)	0	0	0
Ignore Z axis	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF
Delay time	0	0	0
Job point number before moving	------	------	------
Job point number when moving	------	------	------
Job point number after moving	------	------	------
Job point number when CP is Moving	------	------	------
PTP condition number	------	------	------
CP condition number	------	------	------
Switch tool number	------	------	------
Plate number	------	------	------
Tool correction input number	------	------	------
Tool correction output number	------	------	------
Parameter 1		Range of dis...	
		10	
Parameter 2		The number o...	
		6	
Parameter 3			
Parameter 4			



*If the track height is larger than the designated work area, an error will be raised.

(4) Example 4: 4-angle Spirangle Path Settings 3

	Original working point	P1	P2
Type	Dispensing	Rectangular ...	Rectangular ...
X coordinate	0.00	156.77	102.3
Y coordinate	0.00	160.19	240.29
Z coordinate	0.00	12.76	12.76
R coordinate	0.00	0.00	0.00
Linear speed	10	10	50
Dispensing time (ms)	0	0	0
Ignore Z axis	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF
Delay time	0	0	0
Job point number before moving	------	------	------
Job point number when moving	------	------	------
Job point number after moving	------	------	------
Job point number when CP is Moving	------	------	------
PTP condition number	------	------	------
CP condition number	------	------	------
Switch tool number	------	------	------
Plate number	------	------	------
Tool correction input number	------	------	------
Tool correction output number	------	------	------
Parameter 1		Range of dis...	
		15	
Parameter 2		The number o...	
		6	
Parameter 3			
Parameter 4			

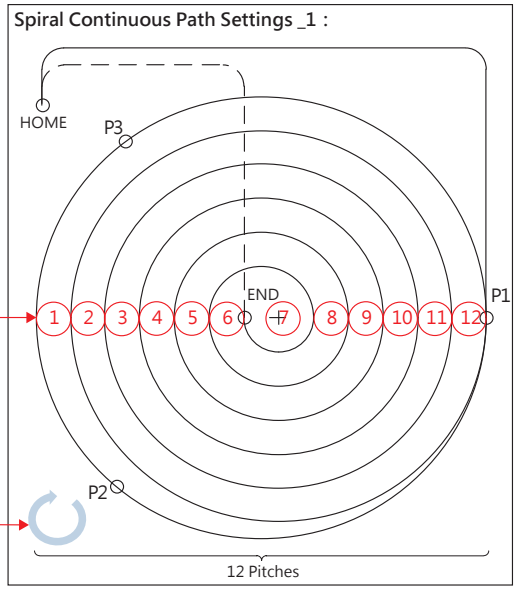


⑥ Special Command_Spiral：

	Spiral Path Start	Spiral path start point: this is the path start point, but whether to dispense or not is controlled through dispensing time column(>0 is dispense ON) Parameter 1: Work Area(0: Unrestricted; Integer > 0 ’ Units: mm) Parameter 2: Number of Turns(limited within 2~100) Parameter 3: Rim option(when dispensable area is 0 → non/outer area can be selected; when dispensable area >0 → non/outer area/inner area/all can be selected) Parameter 4: Orientation (X: CCW, Y: CW) Spiral area outer point 1: Any point on the outer circular. Path line speed can be set in this column Spiral area outer point 2: Any point on the outer circular.
	Spiral Area Outer Point 1	
	Spiral Area Outer Point 2	

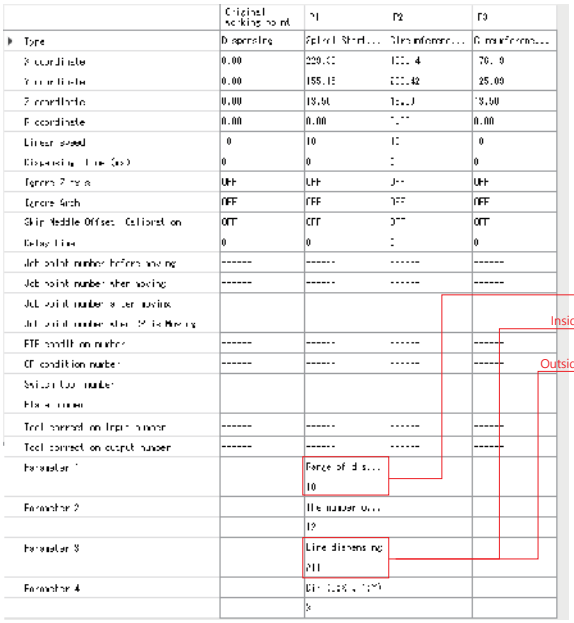
(1) Example 1: Spiral Continuous Path Settings

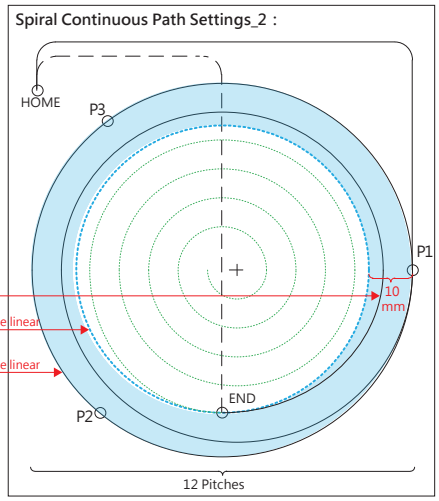
	Original working point	P1	P2	P3
Type	Dispensing	Spiral Start...	Circumferenc...	Circumferenc...
X coordinate	0.00	229.39	160.14	176.19
Y coordinate	0.00	155.15	203.42	125.09
Z coordinate	0.00	13.50	13.50	13.50
R coordinate	0.00	0.00	0.00	0.00
Linear speed	10	10	10	10
Dispensing time (ms)	0	0	0	0
Ignore Z axis	OFF	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF	OFF
Delay time	0	0	0	0
Job point number before moving	------	------	------	------
Job point number when moving	------	------	------	------
Job point number after moving	------	------	------	------
Job point number when CP is Moving	------	------	------	------
PTP condition number	------	------	------	------
CP condition number	------	------	------	------
Switch tool number	------	------	------	------
Plate number	------	------	------	------
Tool correction input number	------	------	------	------
Tool correction output number	------	------	------	------
Parameter 1		Range of dis...		
		0		
Parameter 2		The number o...		
		12		
Parameter 3		Line dispensing		
		None		
Parameter 4		Dir (0:X , 1:Y)		
		Y		



P1 Start → Spiral Path → END

(2) Example 2: Spiral Continuous Path Settings



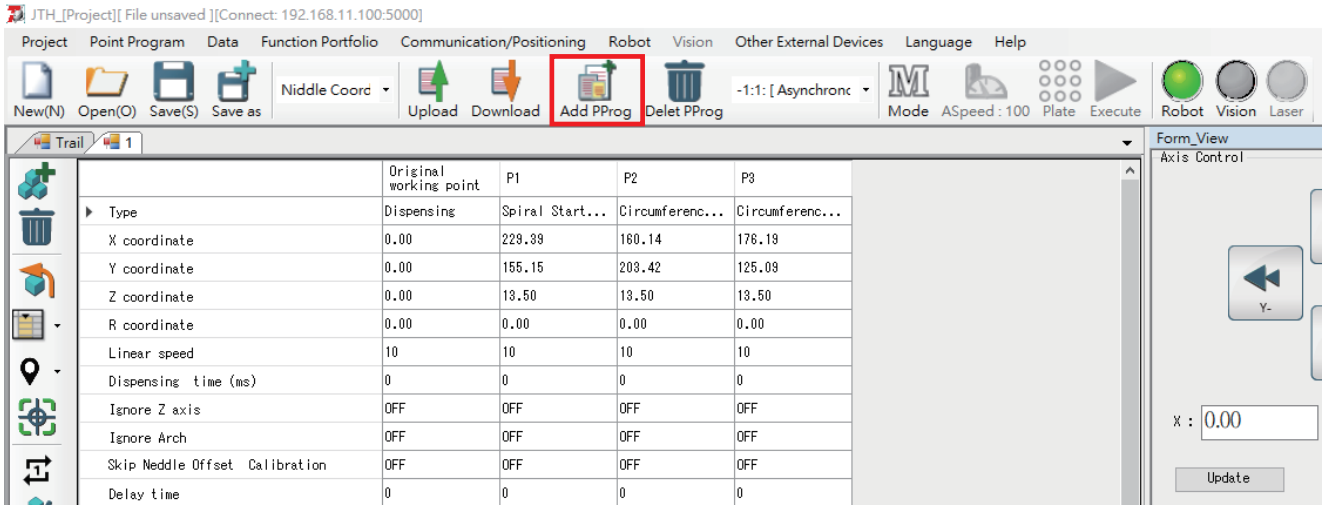


Source position P1 on the outermost track→ follows a spiral path -> completes at target position END.
If the width of the outer track is larger than the designated work area, then an error will be raised.

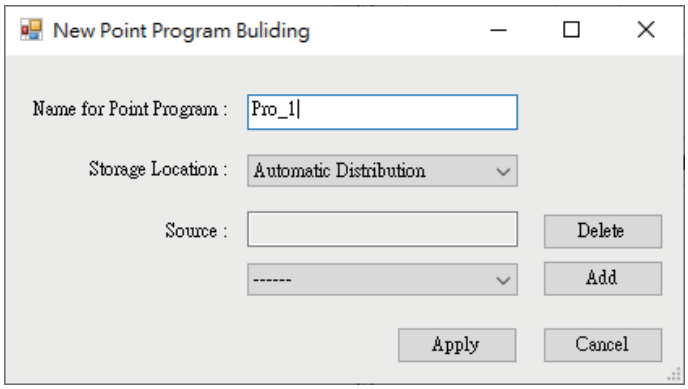
5.Simple procedure setup

Program Setting(without using visual)

① Select "add point program" to add procedure



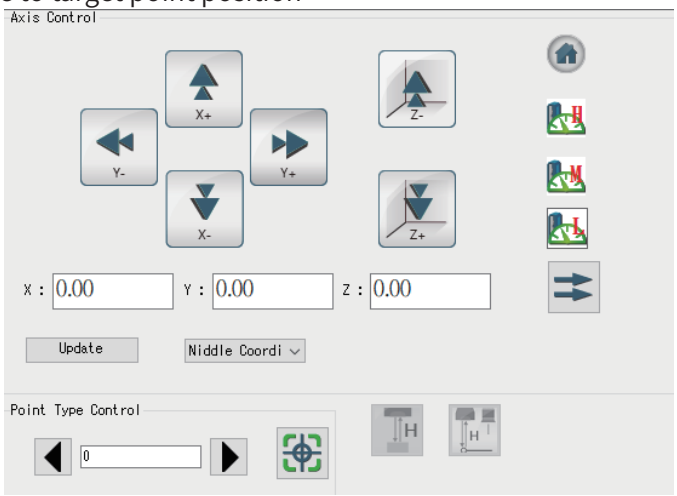
② Input a new program name and select "Add" for a new program



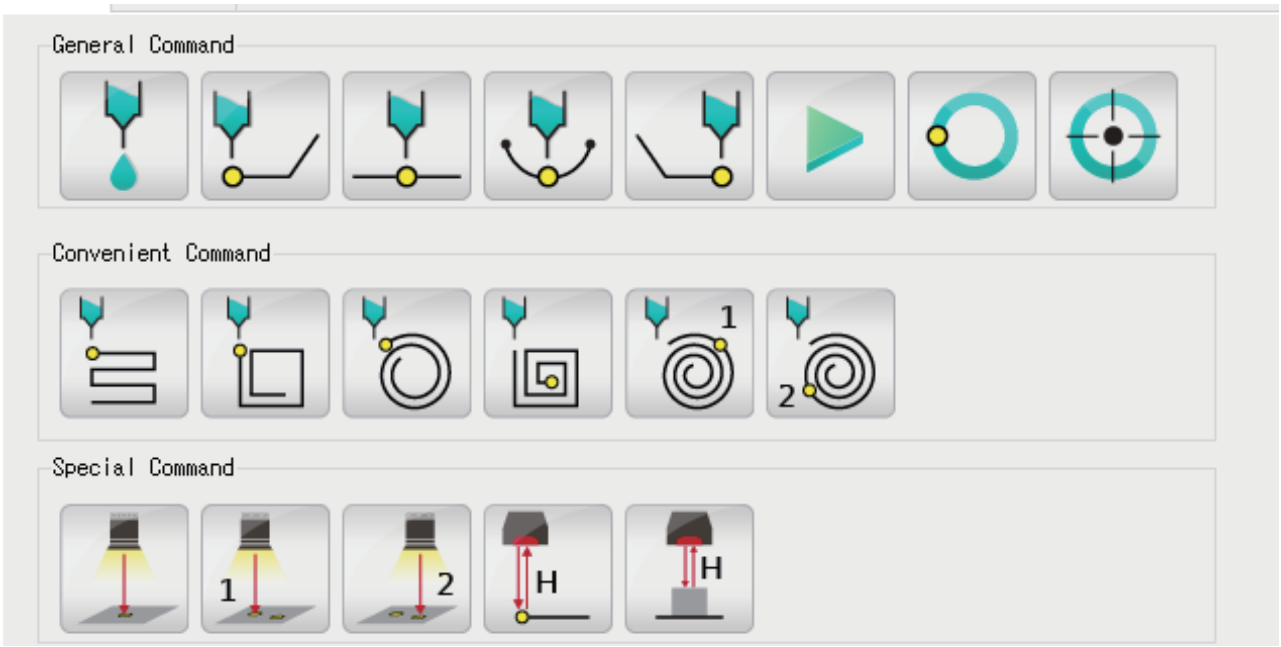
Storage location：
Self-selected or automatically dispatched by system

Information source：
Addable for single or multiple existing program data

③ Use axis control to move to target point position



④ Then choose a corresponding point type command

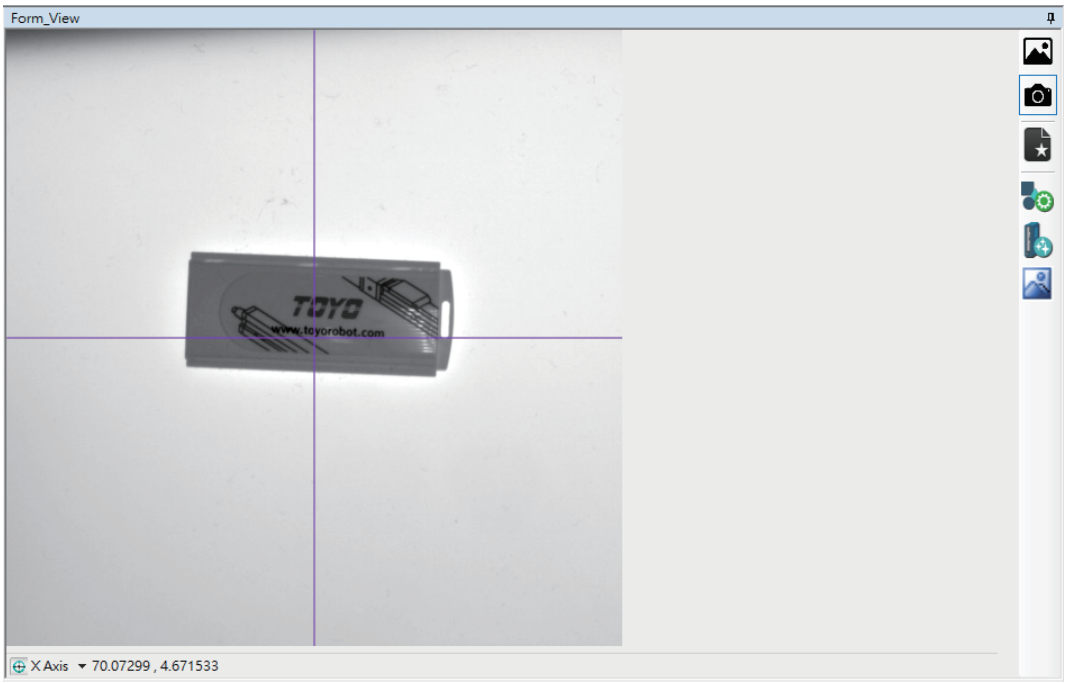


⑤ After point path teaching, check whether to add a job number or not

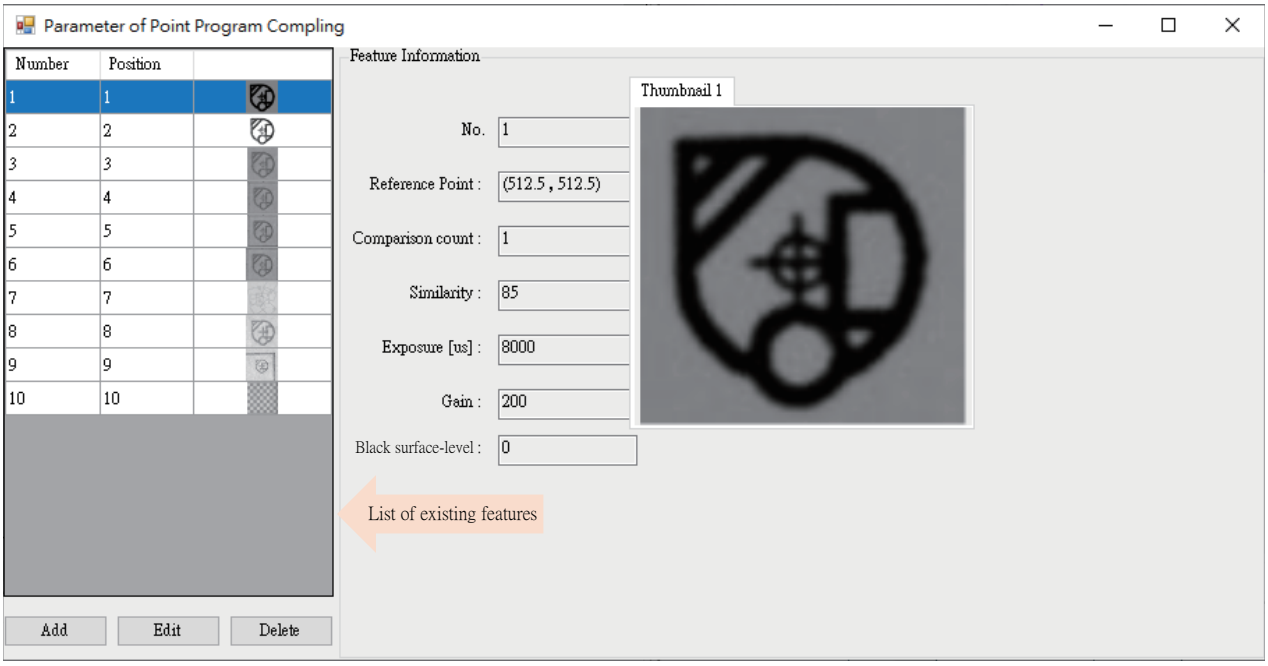
	Original working point	P1	P2	P3	P4	P5
Type	Dispensing	Line Segment...	Line Segment...	Line Segment...	Line Segment...	Line Segment...
X coordinate	0.00	250.00	250.71	251.41	250.00	251.41
Y coordinate	0.00	250.00	250.71	251.41	250.00	251.41
Z coordinate	0.00	5.00	5.00	5.00	5.00	5.00
R coordinate	0.00	0.00	0.00	0.00	0.00	0.00
Linear speed	10	1	1	1	1	1
Dispensing time (ms)	0	0	0	0	0	0
Ignore Z axis	OFF	OFF	OFF	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF	OFF	OFF	OFF
Delay time	0	0	0	0	0	0
Job point number before moving	------	------	------	------	------	------
Job point number when moving	------	------	------	------	------	------
Job point number after moving	------	13:COUNTER_T	14:READCOUNTER	14:READCOUNTER	13:COUNTER_T	14:READCOUNTER

6.Visual feature setup

① Open Image Feature Settings

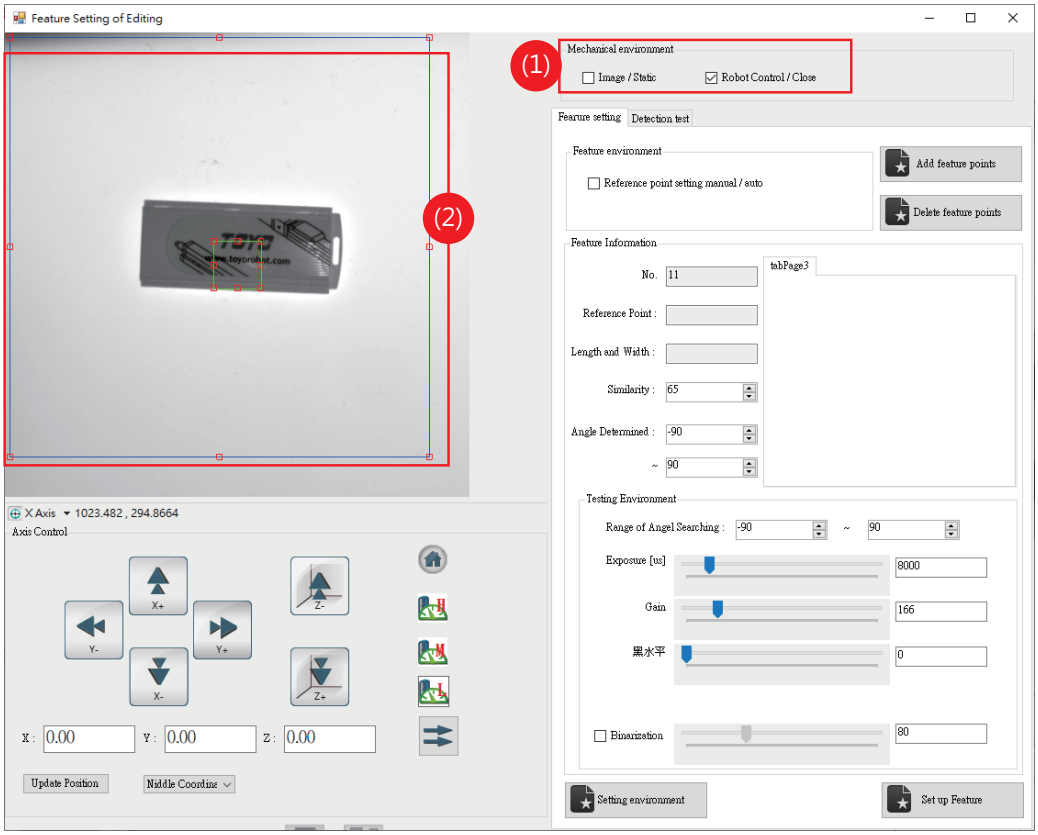


② Select New, to add a new feature

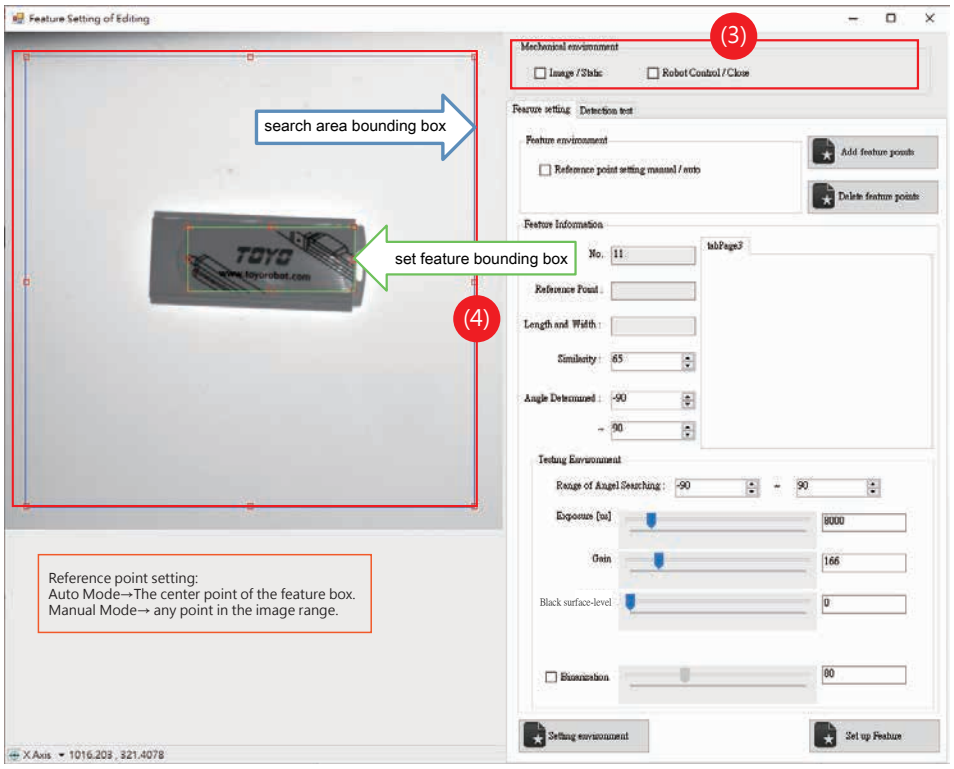


③ After creating a new feature

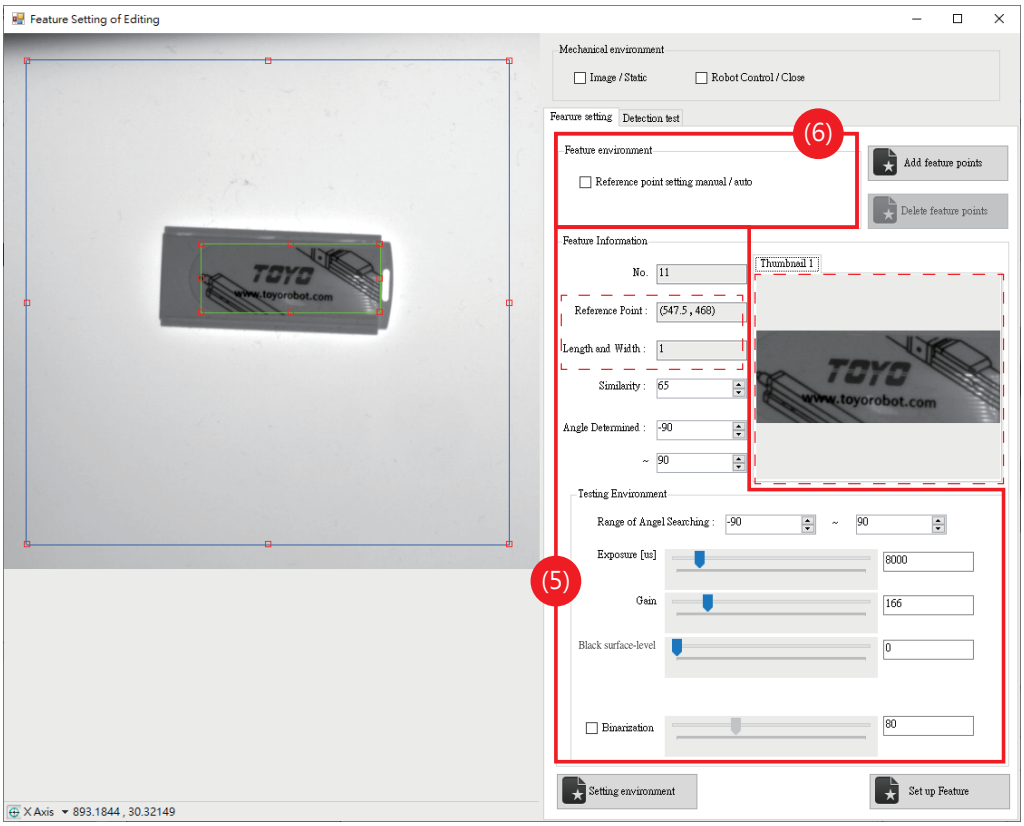
(1)Switch camera to image mode, open motion controller.
(2)Move motion controller to above the image feature location, and center the image feature as much as possible. (This coordinate position will be used for following the image capture position, set later in the program.).



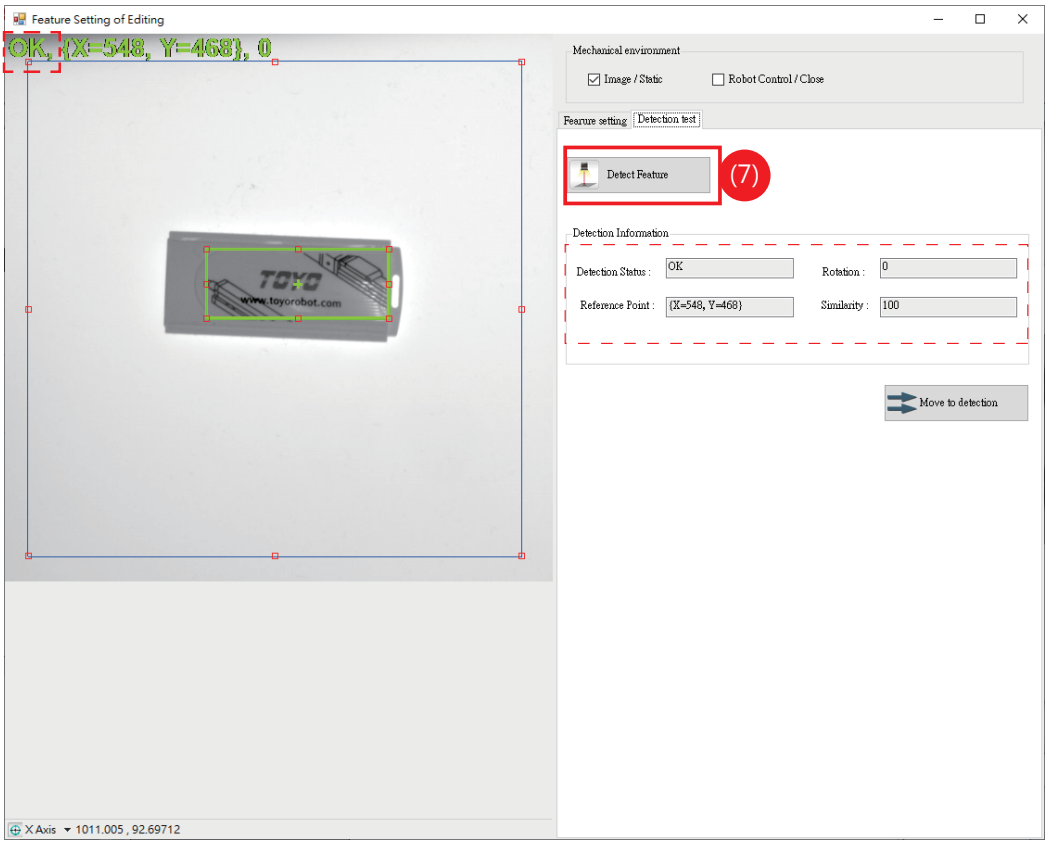
(3) Switch camera to image mode, close motion controller, choose reference position setting mode
(4) Set feature bounding box and search area bounding box



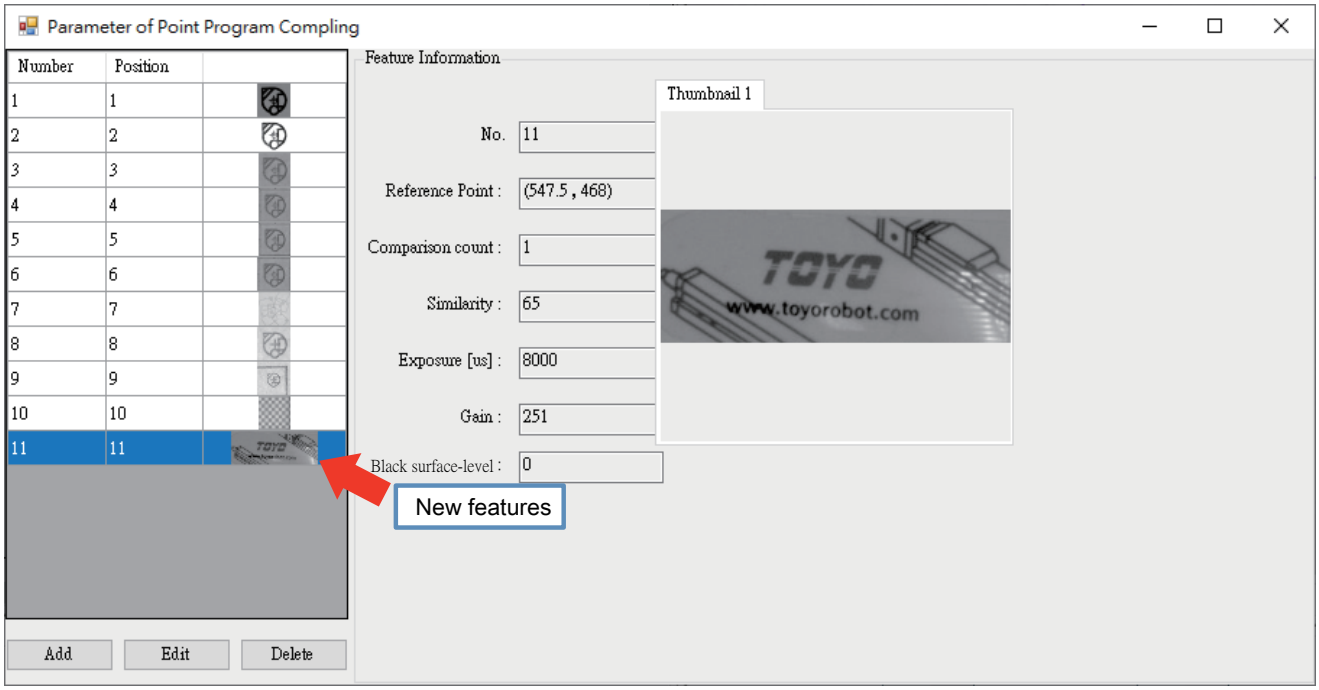
(5)Set feature information and inspection environment.
(6)After confirming there are no errors, close the image feature settings window



(7)Click Detect Feature, the related information will be presented in the feature information and image.
(8)After confirming there are no errors close the window and feature settings.

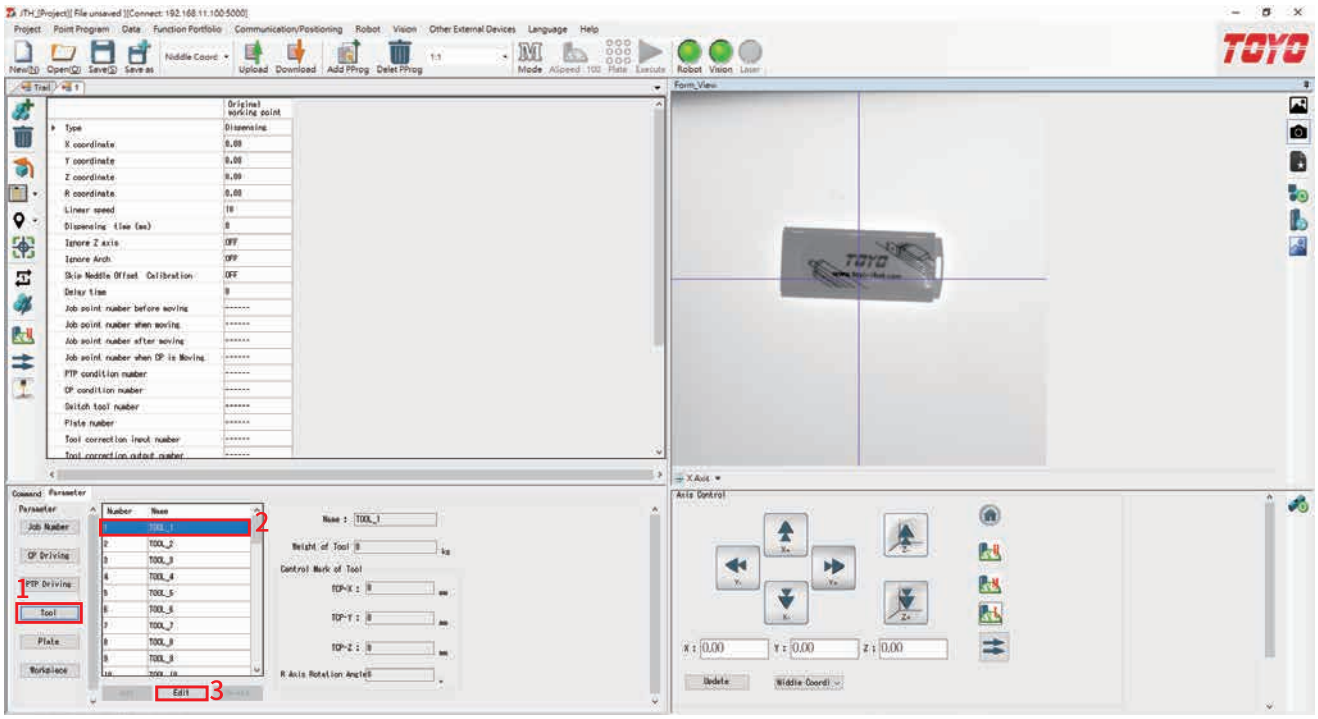


④ Features will be created and added to the features collection, close the feature editor window and complete settings.



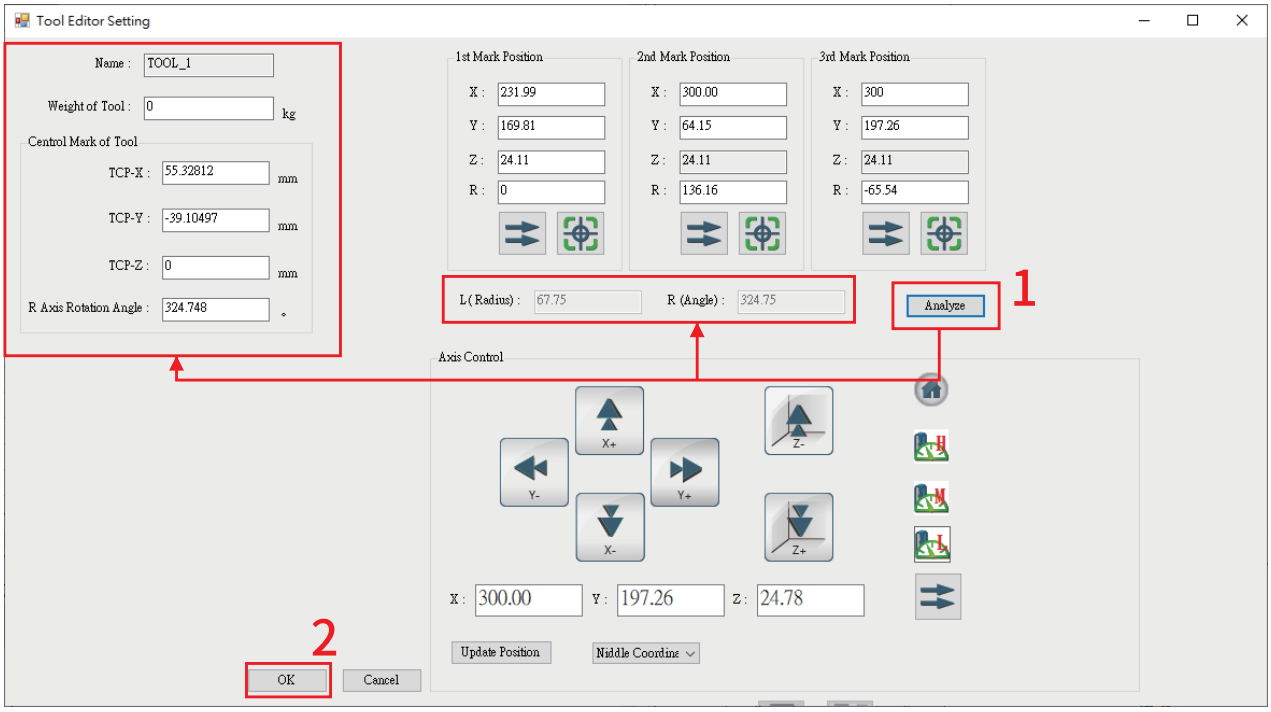
7.Tool coordination setup

① Press the tool number editor button in the parameter tab page of the operation panel located in the bottom left of the Active Window.
Select Tool Number->Select Row ->Press Edit

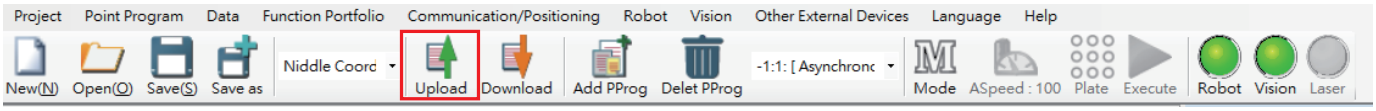


② If a tool number is not selected, then 3 different angles indicate the same position coordinate. Recommend selecting 120 degrees between angles.

③ Click "Analyze" and it will bring up the current tool center marker parameters, then click "Confirm"



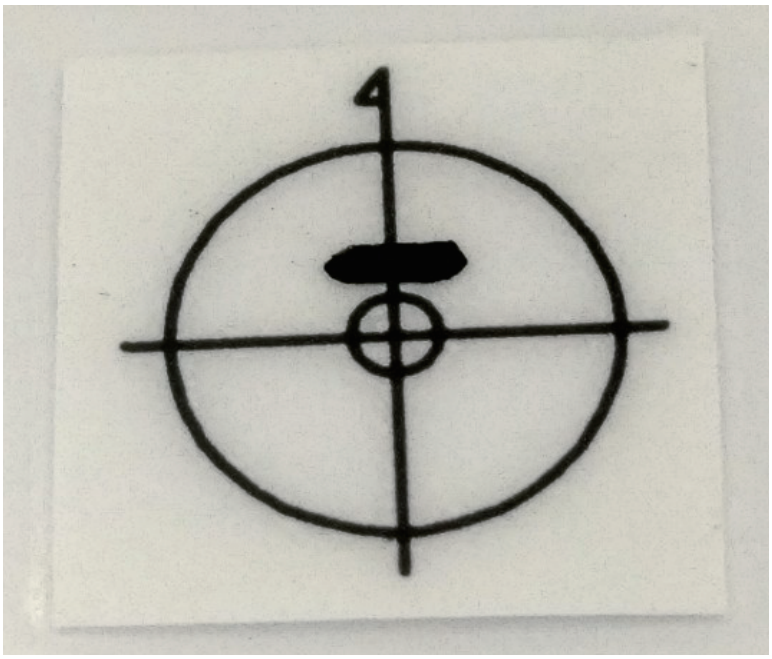
④ Upload parameter values to controller



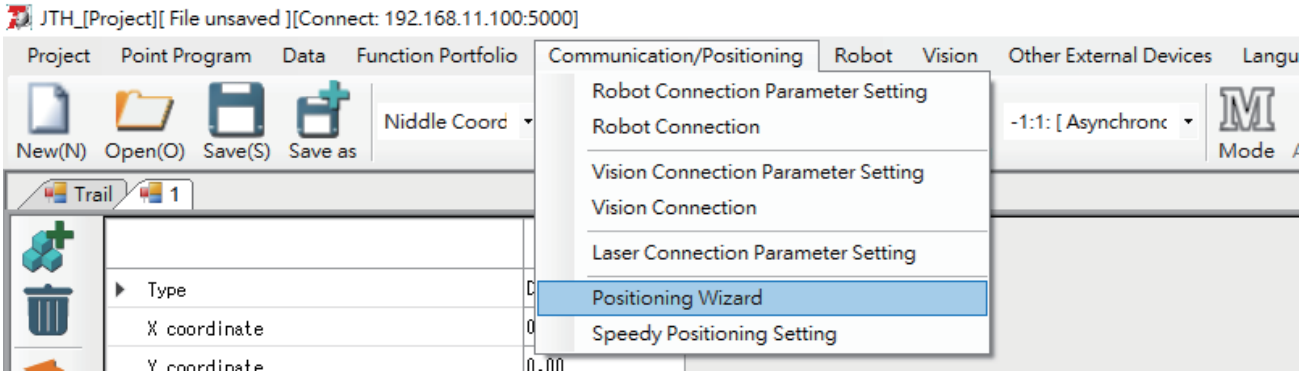
8.Calibration

Needle, Vision, Laser

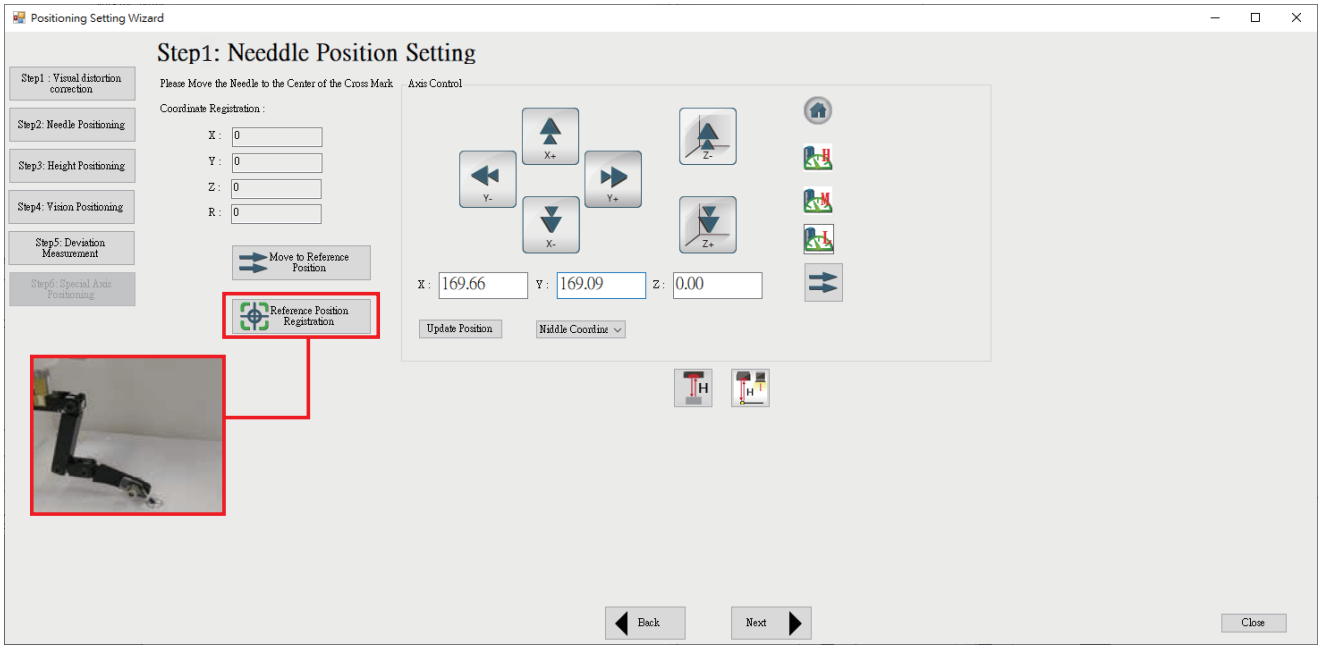
① First create a reference target to act as a reference position for all three tools.



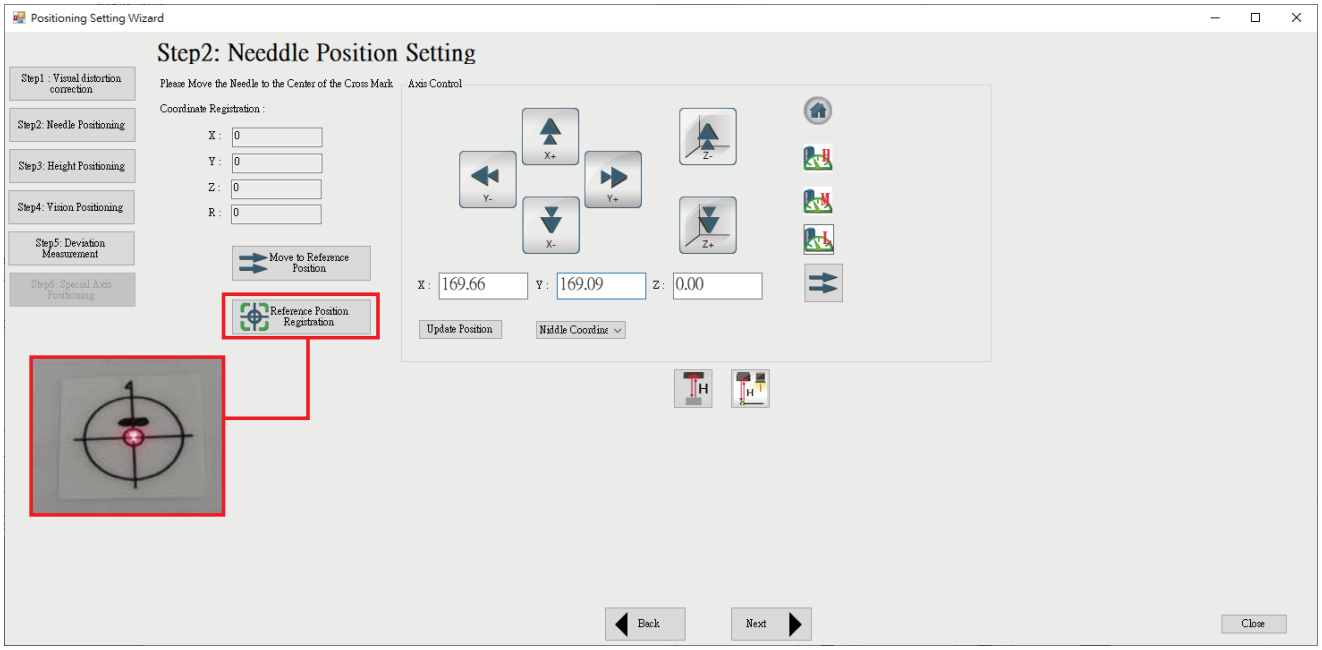
② Select Position Wizard from the Communication/Position Drop-down Menu in the Application Toolbar



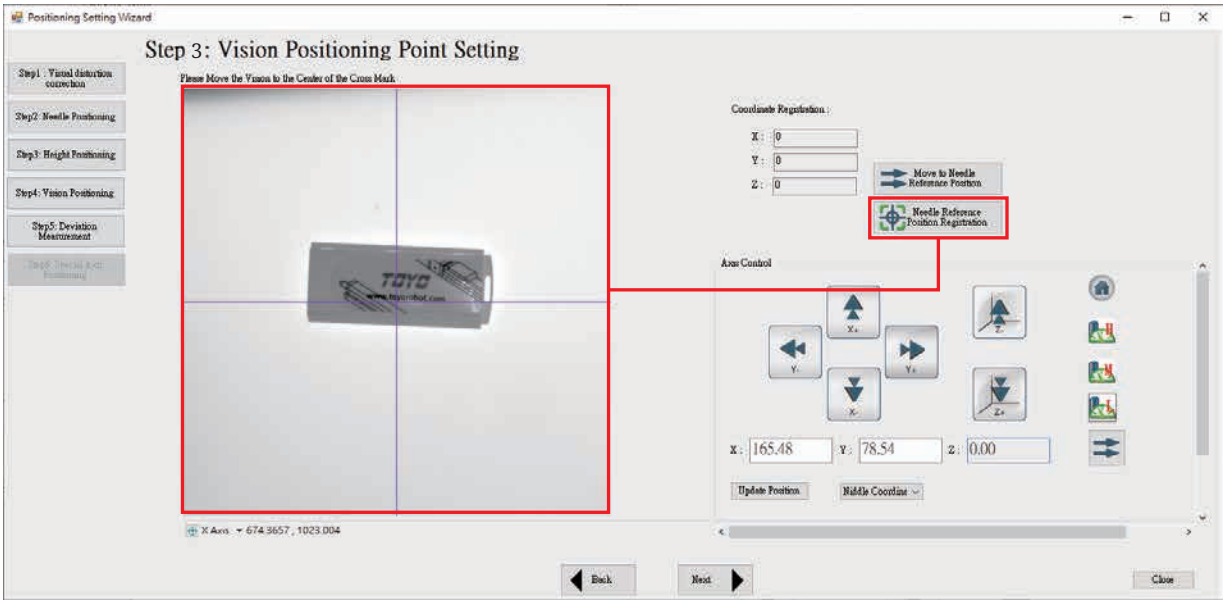
③ First move the needle to the center of the target and record this as the reference position, then press next step.



④ Move the laser to the center of the target and record this as the reference position, then press next step



⑤ Move the camera to the center of the target and record this as the reference position, then press next step

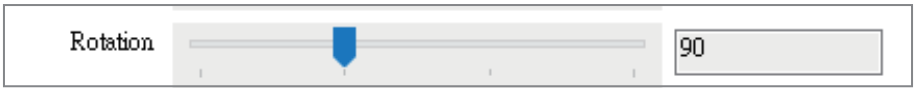


⑥ Enter the next step

(1) Set automatic calibration distance, preset value is 10 mm.

(2) Set feature with the registered position calibration feature.

＊＊ The "angle" of the detection environment in the positioning feature affects the flip angle of the image display screen of this machine. Pay special attention when setting!

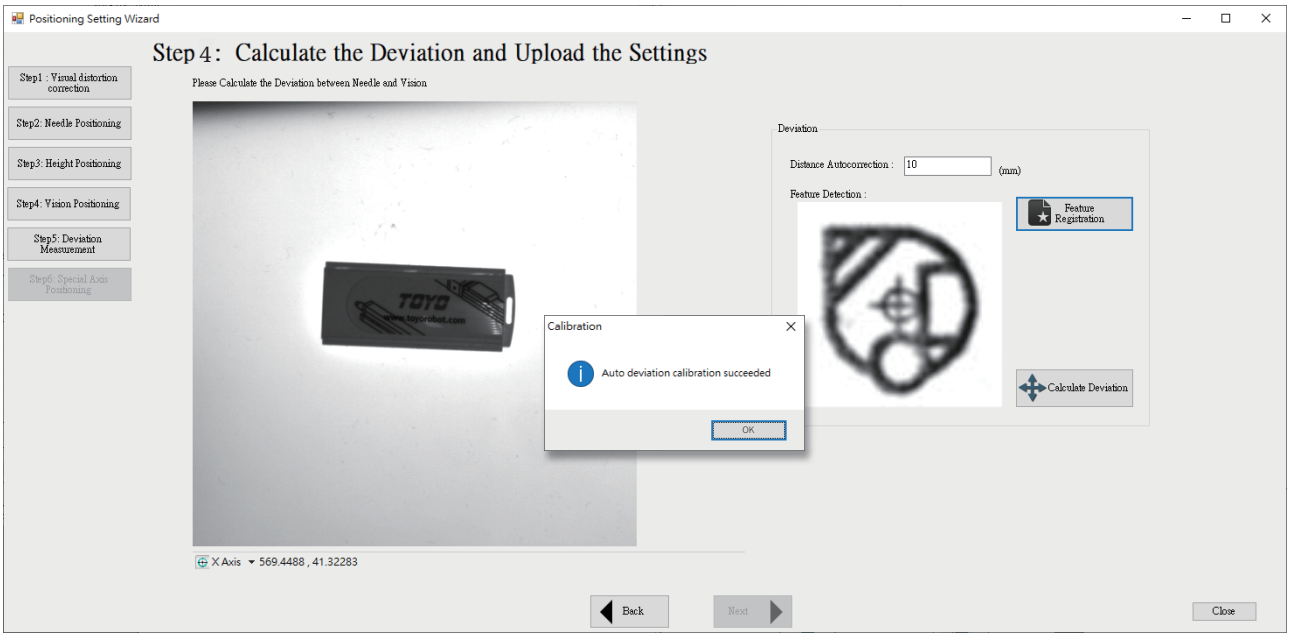


(3) After confirmation, select again Calculate Error, then complete calibration calculation.

⑦ After calibration is complete, exit the Point Wizard.

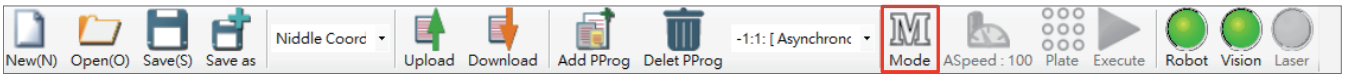
If the calibration fails, return to step 3. After moving to the visual anchor point, go to step 4 to adjust the feature point login parameters & automatically calibrate the distance and restart

Perform calculation of deviation value.



9.Visual point teaching

① Confirm whether the motion controller is in Manual Operation mode

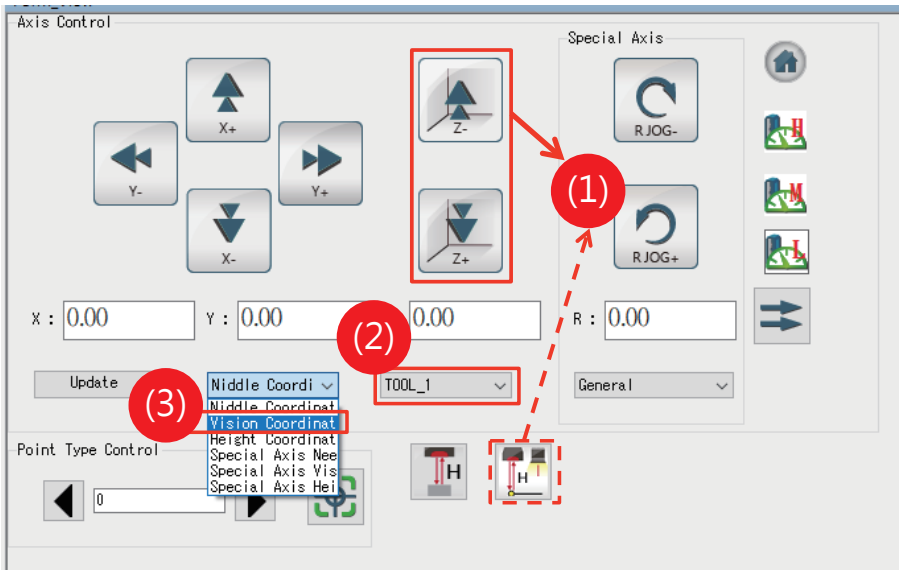


② Select an existing program or open a new program.

CCD_Test0615

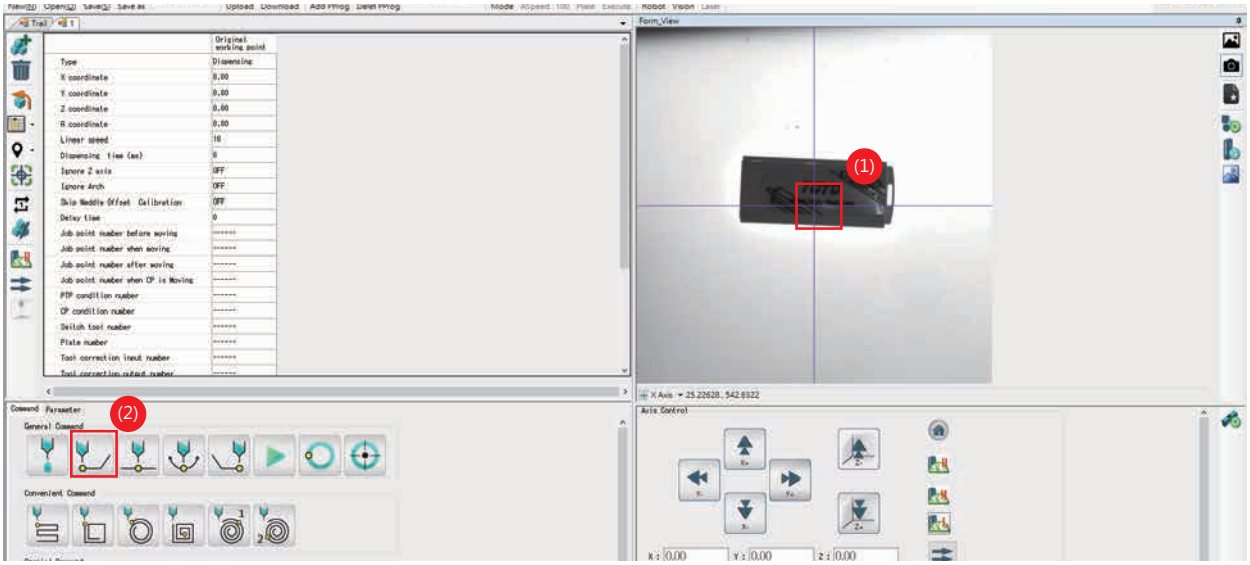
	Original working point
Type	Dispensing
X coordinate	0.00
Y coordinate	0.00
Z coordinate	0.00
R coordinate	0.00
Linear speed	10
Dispensing time (ms)	0
Ignore Z axis	OFF
Ignore Arch	OFF
Skip Neddle Offset Calibration	OFF
Delay time	0

③ (1) Adjust the visual focus by moving the Z axis. Or click "Auto Focus Correction" on the plane of the laser spot on the worktable to correct the visual focus.(The latter is limited to optional laser models)
(2) Select the tool number.
(3) And switch the coordinate system to "visual coordinate".



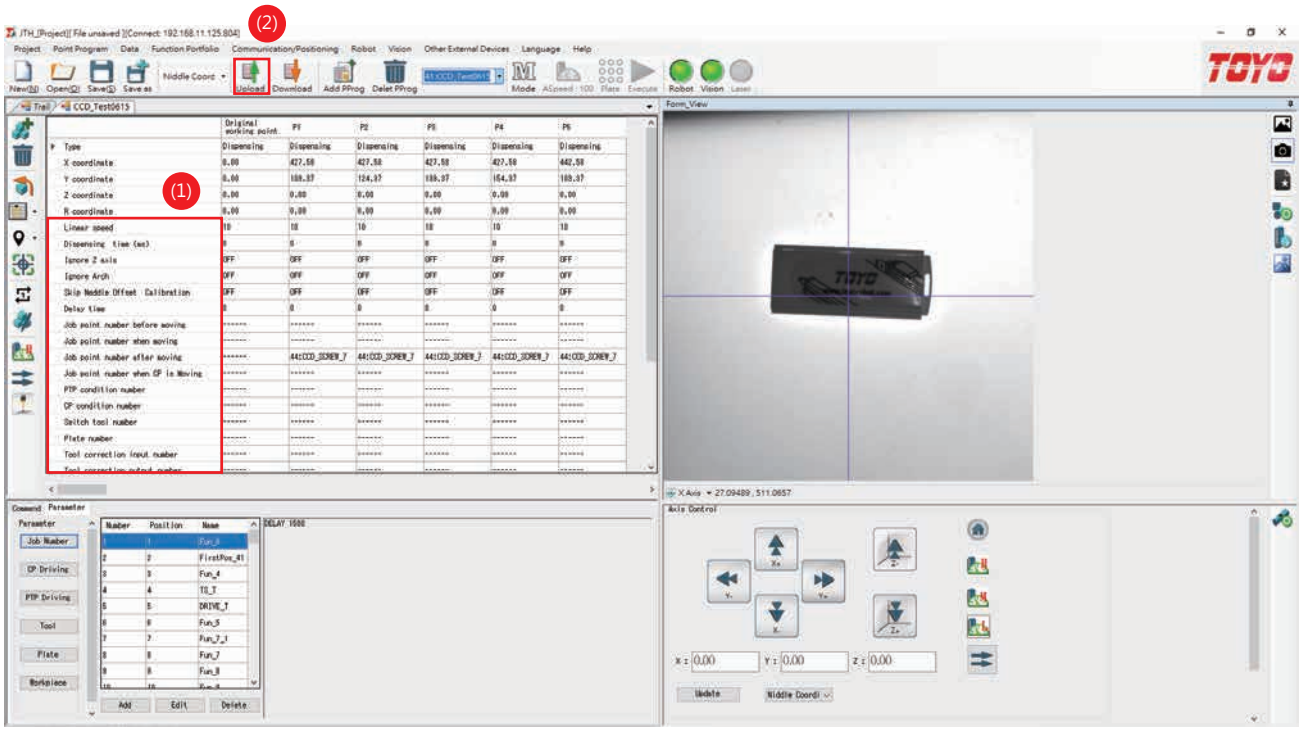
④ (1) Click the visual window screen, move the cross center point near the target point and then fine-tune, if necessary, to reach the target point by jogging

(2) Choose a command type to execute.



⑤ (1) After point teaching,set the relevant parameters as needed(line speed, dispensing time, JOB file...etc)

(2) Click "Upload" to overwrite the controller and upload the edited data to the controller.



⑥ After point position teaching, please confirm Z axis coordination and line speed.

CCD_Test0615

	Original working point	P1	P2	P3	P4	P5
Type	Dispensing	Dispensing	Dispensing	Dispensing	Dispensing	Dispensing
X coordinate	0.00	427.58	427.58	427.58	427.58	442.58
Y coordinate	0.00	109.37	124.37	139.37	154.37	109.37
Z coordinate	0.00	0.00	0.00	0.00	0.00	0.00
R coordinate	0.00	0.00	0.00	0.00	0.00	0.00
Linear speed	10	10	10	10	10	10
Dispensing time (ms)	0	0	0	0	0	0
Ignore Z axis	OFF	OFF	OFF	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF	OFF	OFF	OFF
Delay time	0	0	0	0	0	0
Job point number before moving	------	------	------	------	------	------
Job point number when moving	------	------	------	------	------	------
Job point number after moving	------	44:CCD_SCREW_7	44:CCD_SCREW_7	44:CCD_SCREW_7	44:CCD_SCREW_7	44:CCD_SCREW_7
Job point number when CP is Moving	------	------	------	------	------	------
PTP condition number	------	------	------	------	------	------
CP condition number	------	------	------	------	------	------
Switch tool number	------	------	------	------	------	------
Plate number	------	------	------	------	------	------
Tool correction input number	------	------	------	------	------	------
Tool correction output number	------	------	------	------	------	------

(1) After visual point teaching, the Z-axis coordinate will be 0. Please enter the required position as needed.
(2) If the line speed is "0", then the default setting of line speed would be 10mm/s.
(3) Dispensing time. (This is the switch of whether to dispense or not)

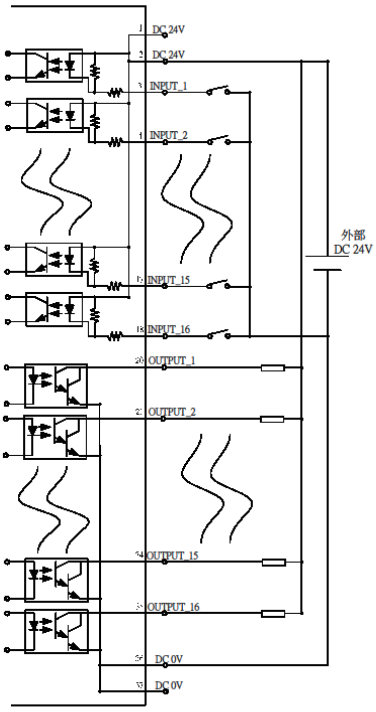
CCD_Test0615

	Original working point	P1	P2	P3	P4	P5
Type	Dispensing	Dispensing	Dispensing	Dispensing	Dispensing	Dispensing
X coordinate	0.00	427.58	427.58	427.58	427.58	442.58
Y coordinate	0.00	109.37	124.37	139.37	154.37	109.37
Z coordinate	0.00	0.00	0.00	0.00	0.00	0.00
R coordinate	0.00	0.00	0.00	0.00	0.00	0.00
Linear speed	10	10	10	10	10	10
Dispensing time (ms)	0	0	0	0	0	0
Ignore Z axis	OFF	OFF	OFF	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF	OFF	OFF	OFF
Delay time	0	0	0	0	0	0
Job point number before moving	------	------	------	------	------	------
Job point number when moving	------	------	------	------	------	------
Job point number after moving	------	44:CCD_SCREW_7	44:CCD_SCREW_7	44:CCD_SCREW_7	44:CCD_SCREW_7	44:CCD_SCREW_7
Job point number when CP is Moving	------	------	------	------	------	------
PTP condition number	------	------	------	------	------	------
CP condition number	------	------	------	------	------	------
Switch tool number	------	------	------	------	------	------
Plate number	------	------	------	------	------	------
Tool correction input number	------	------	------	------	------	------
Tool correction output number	------	------	------	------	------	------

10.External I/O configuration

D-SUB 37

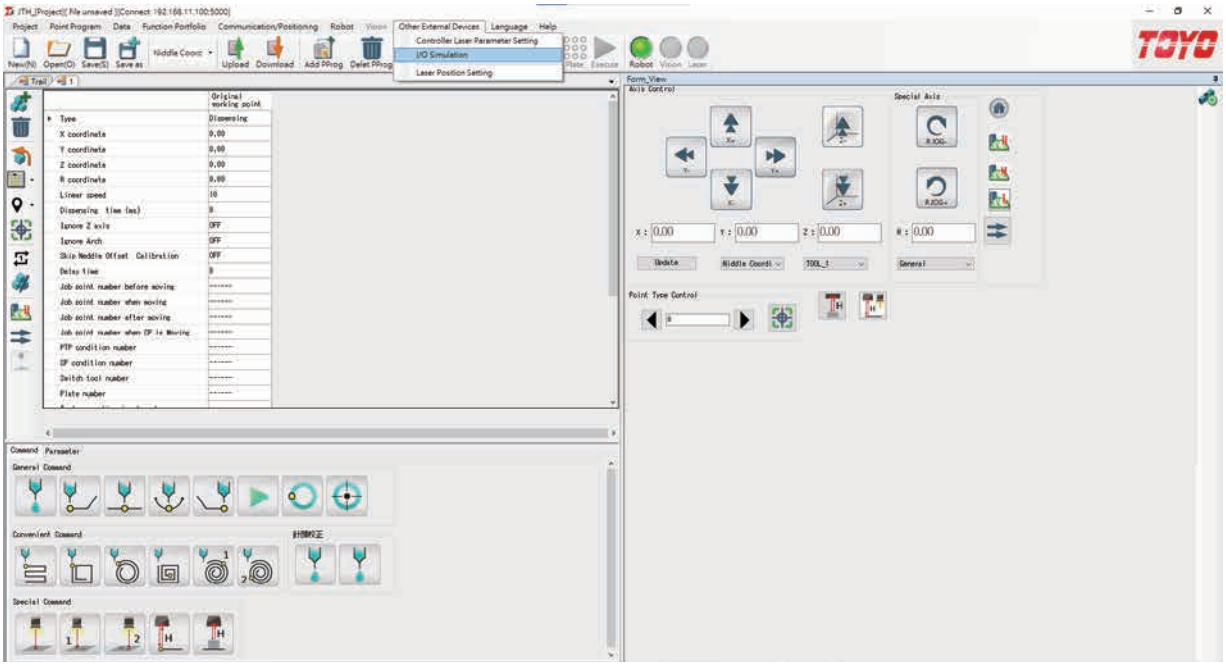
Pin No.	Description		Pin No.	Description	
1	DC 24V	External DC 24V Power Supply	20	OUTPUT_1	Ready
2	DC 24V	External DC 24V Power Supply	21	OUTPUT_2	Home Complete
3	INPUT_1	Procedure Start	22	OUTPUT_3	Stopped
4	INPUT_2	Stop Locking	23	OUTPUT_4	Procedure Active
5	INPUT_3	Procedure Restart	24	OUTPUT_5	SelectedProcedure_0 Output
6	INPUT_4	Procedure Selection Confirmed	25	OUTPUT_6	SelectedProcedure_1 Output
7	INPUT_5	SelectedProcedure_0	26	OUTPUT_7	SelectedProcedure_2 Output
8	INPUT_6	SelectedProcedure_1	27	OUTPUT_8	SelectedProcedure_3 Output
9	INPUT_7	SelectedProcedure_2	28	OUTPUT_9	SelectedProcedure_4 Output
10	INPUT_8	SelectedProcedure_3	29	OUTPUT_10	SelectedProcedure_5 Output
11	INPUT_9	SelectedProcedure_4	30	OUTPUT_11	SelectedProcedure_6 Output
12	INPUT_10	SelectedProcedure_5	31	OUTPUT_12	GeneralOutput_1
13	INPUT_11	SelectedProcedure_6	32	OUTPUT_13	GeneralOutput_2
14	INPUT_12	GeneralInput_1	33	OUTPUT_14	GeneralOutput_3
15	INPUT_13	GeneralInput_2	34	OUTPUT_15	GeneralOutput_4
16	INPUT_14	GeneralInput_3	35	OUTPUT_16	GeneralOutput_5
17	INPUT_15	GeneralInput_4	36	DC 0V	External DC 0V Power Supply (GND)
18	INPUT_16	GeneralInput_5	37	DC 0V	External DC 0V Power Supply (GND)
19	—	—	38	—	—



IO drawing

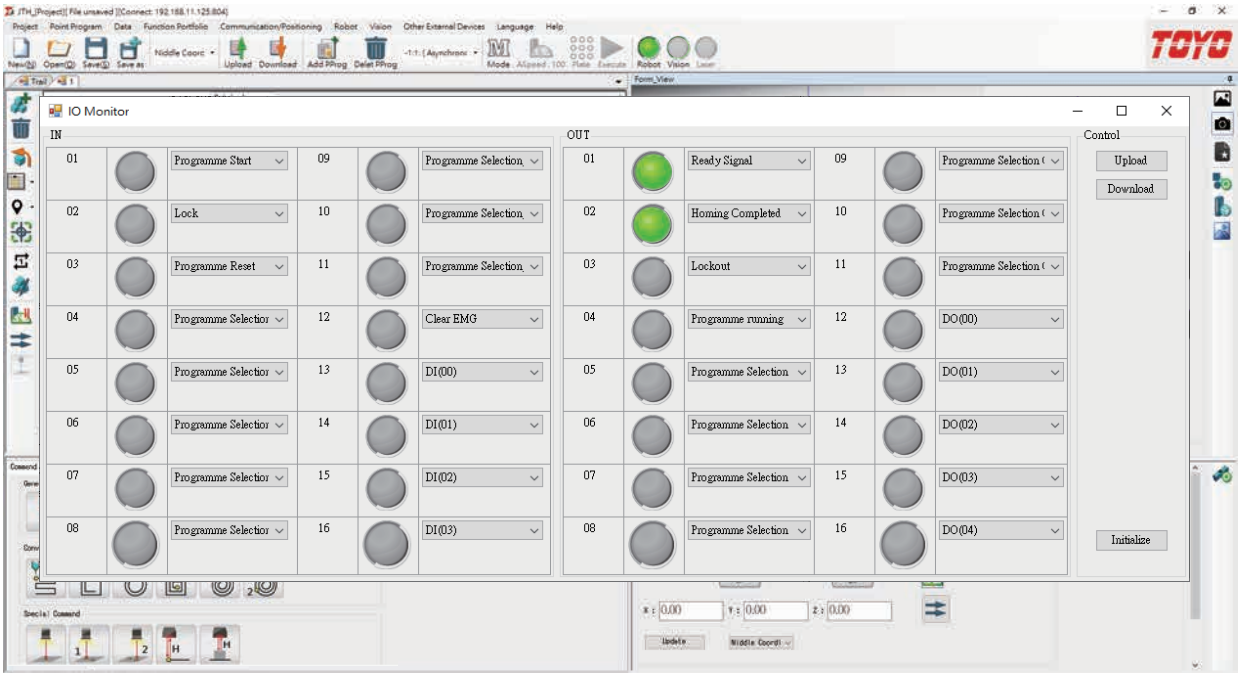
① Change IO Configuration Settings：

(1) Select IO Viewer from the Other Peripheral Device Drop-down List in the Application Toolbar

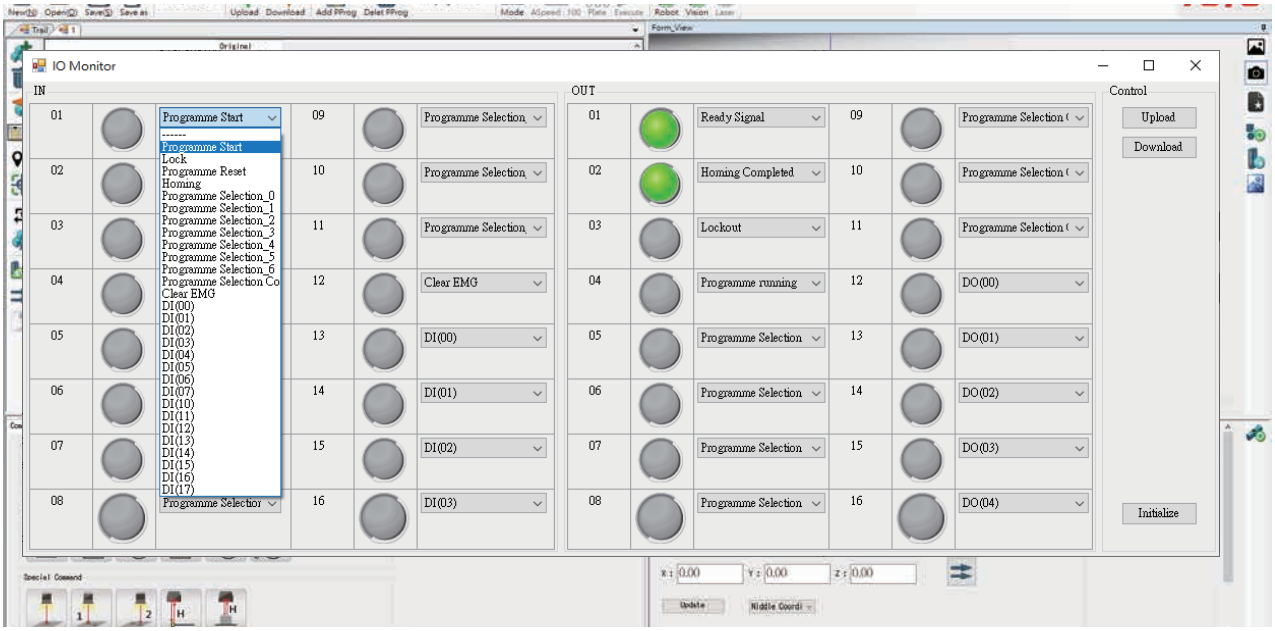


② (1) The IO Monitor Window shows the current IO signal status.

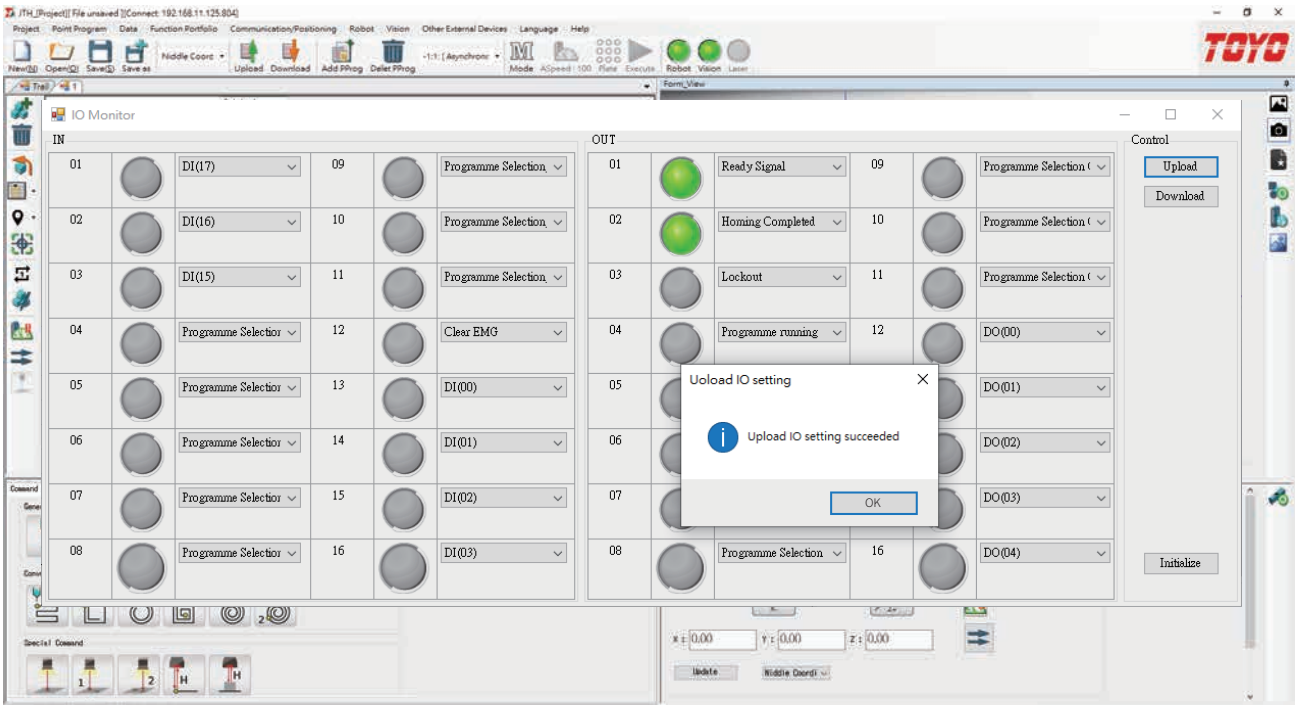
(2) Users can set the value of each 32 IO terminals to either a designated signal (12 total) or as a general-purpose.



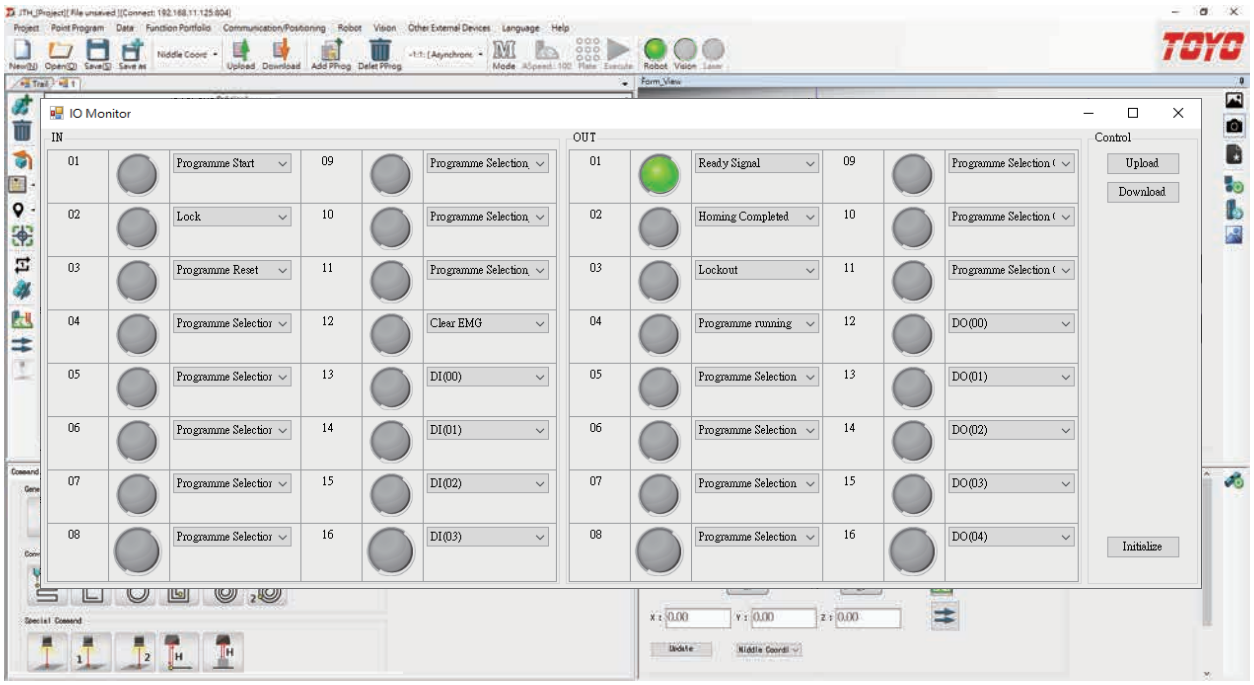
③ (1) Select signal value from the drop-down list beside the IO terminal status indicator.



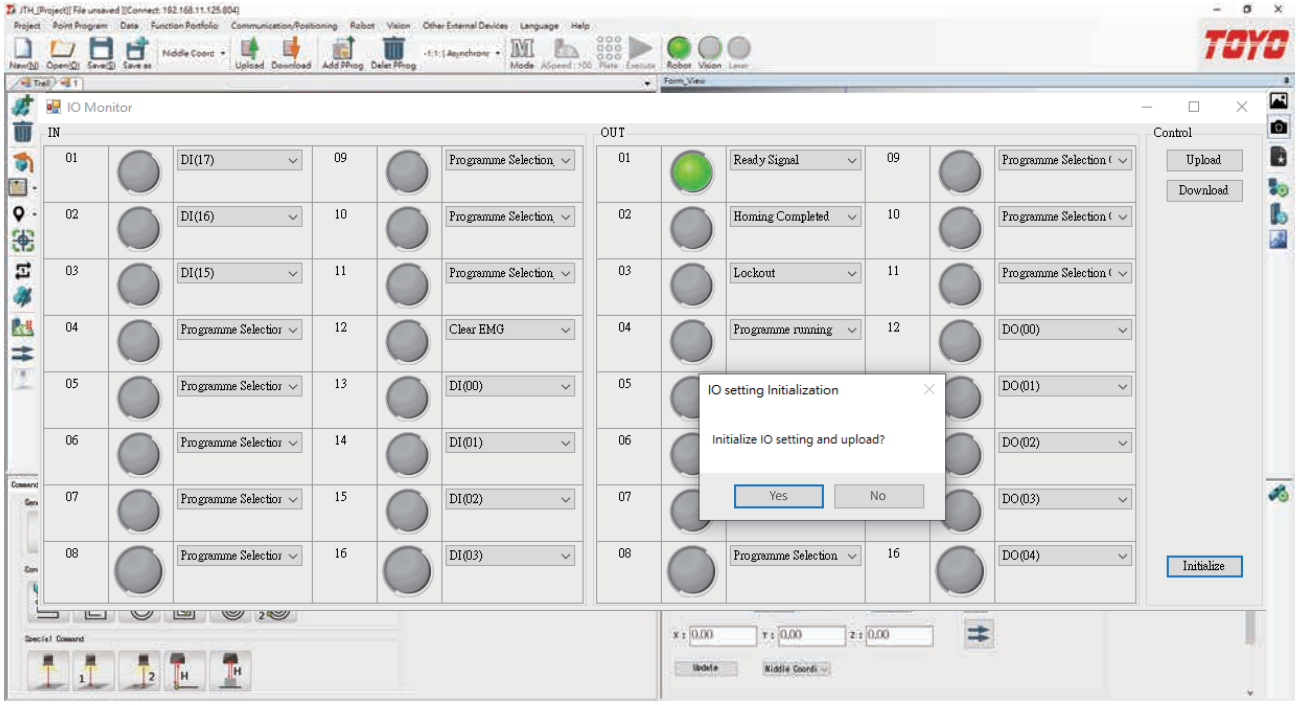
④ (1) Upload IO terminal signal settings, then close and re-open the IO Viewer Window.
(2) The IO terminal signal settings can also be downloaded.



(3) Press the Initialize Button in the bottom right of the IO Viewer Window to initialize all the IO terminal values.

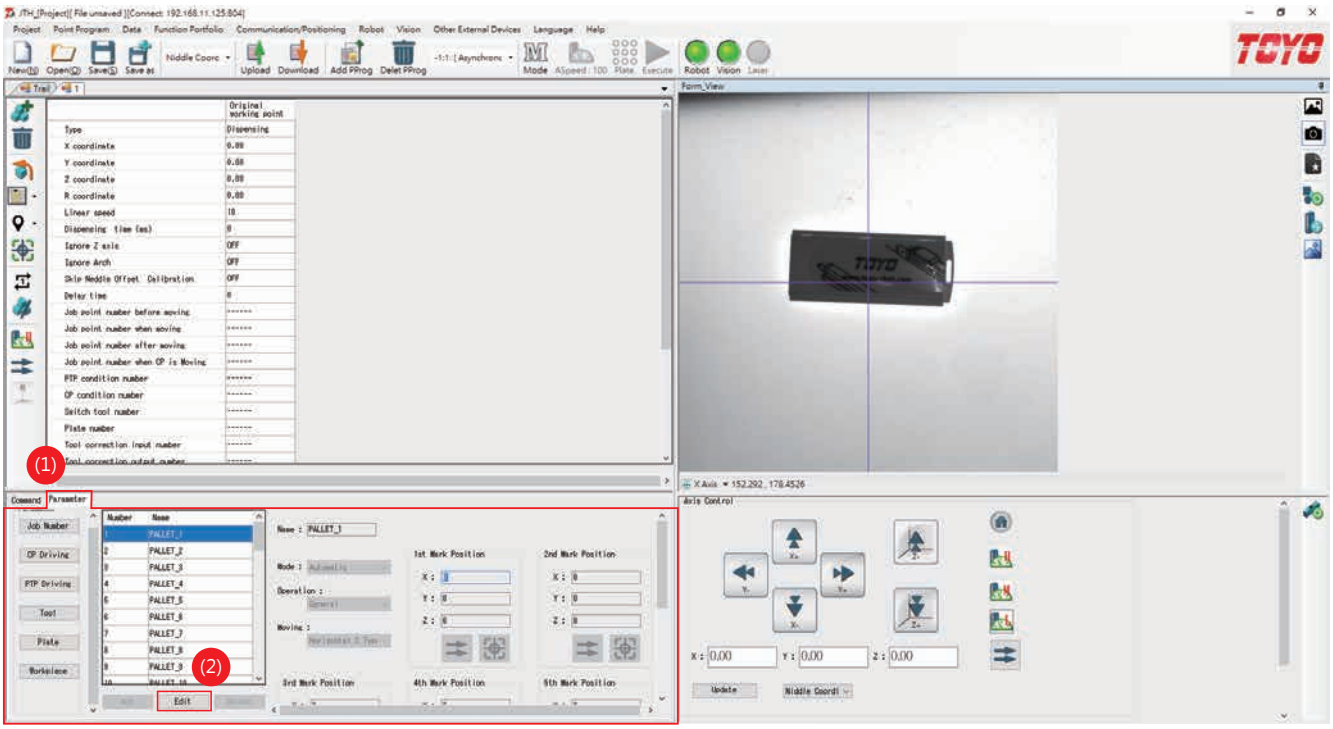


(4) A dialog box will appear to prompt the user whether or not he wants to initialize the IO terminals.



11.Matrix setup

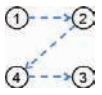
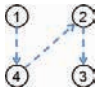
① (1)Select the Parameters Tab in the Procedure Panel located in the bottom left of the Application Window
(2)Select the Pallet Number in the Pallet List Box, then press the Edit Button



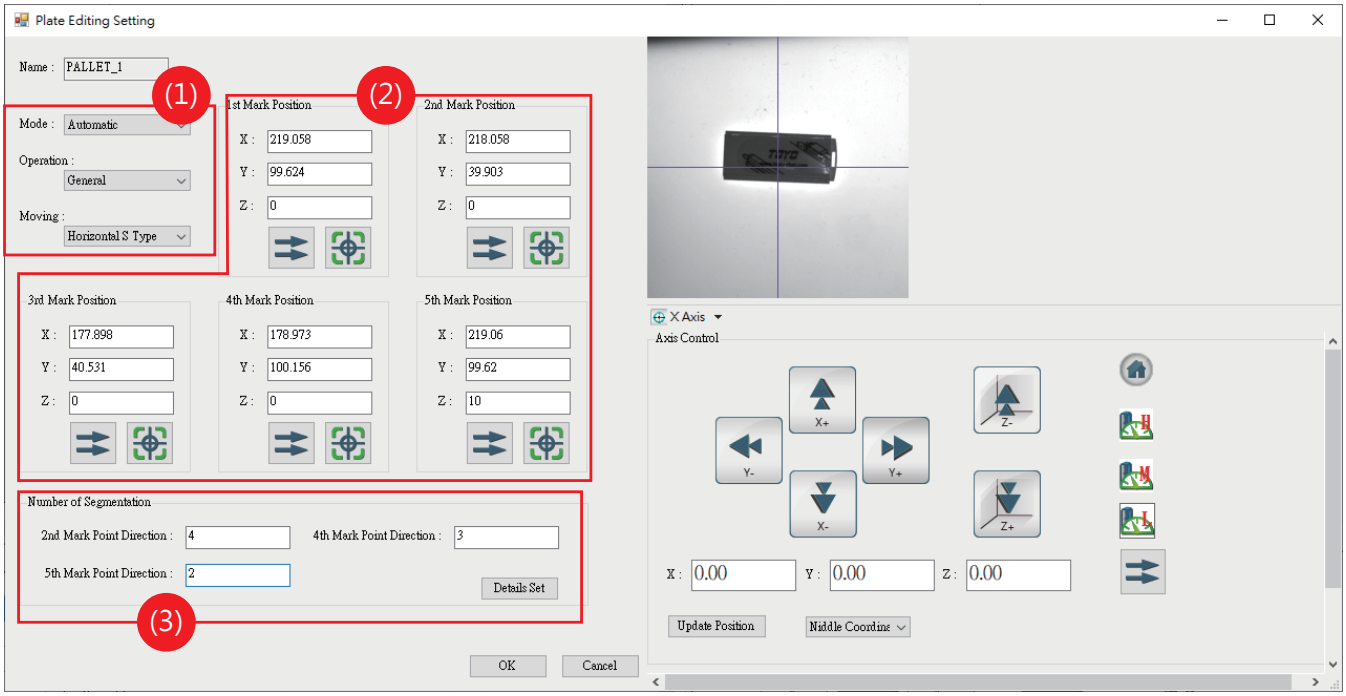
② (1)Set Array Movement Mode

Mode	Description
Automatic	execution of matrix point automatic increasing algorithm
Standard	execution of matrix point with JOB file command increasing algorithm

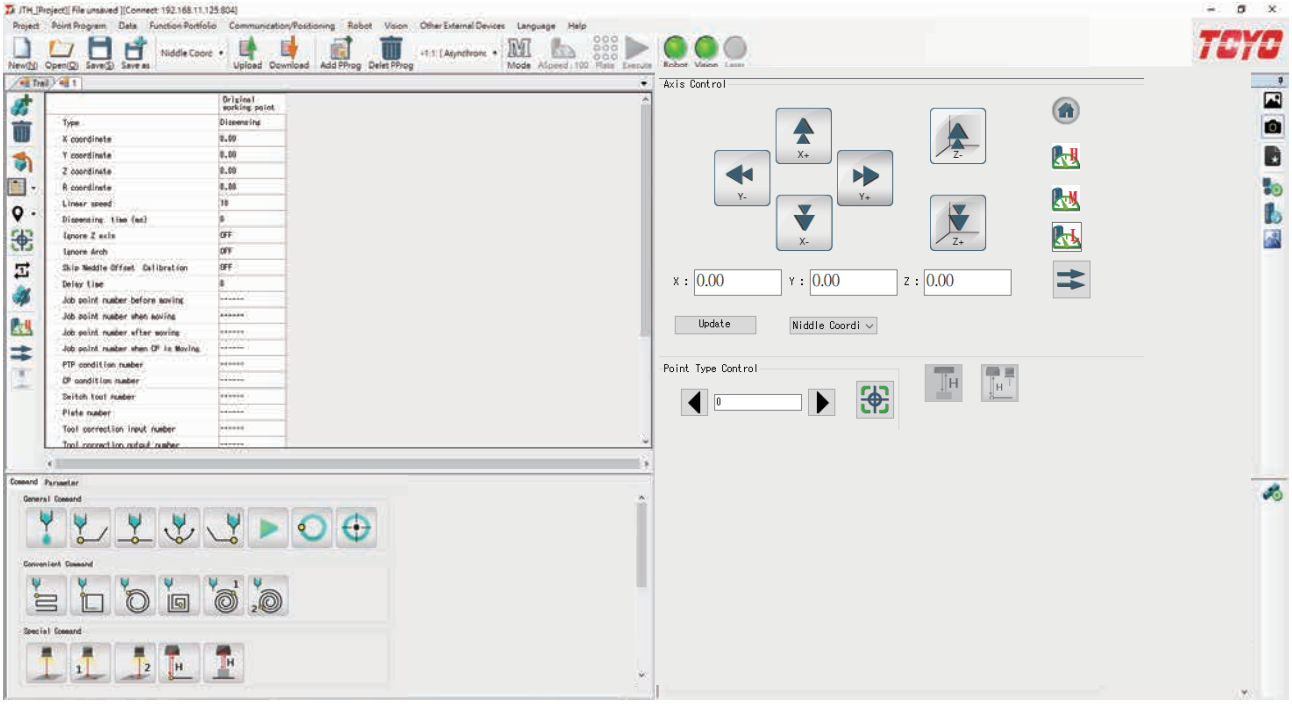
Operation	Description
Standard	X1YZ
Special Axis	X2YZ (JT500D Dual-axis model only)

Motion	Description		
Horizontal S Shape	Moves from array position 1 to target position 2		
Horizontal N Shape			
Horizontal S Shape	Moves from array position 1 to target position 4		
Vertical N Shape			

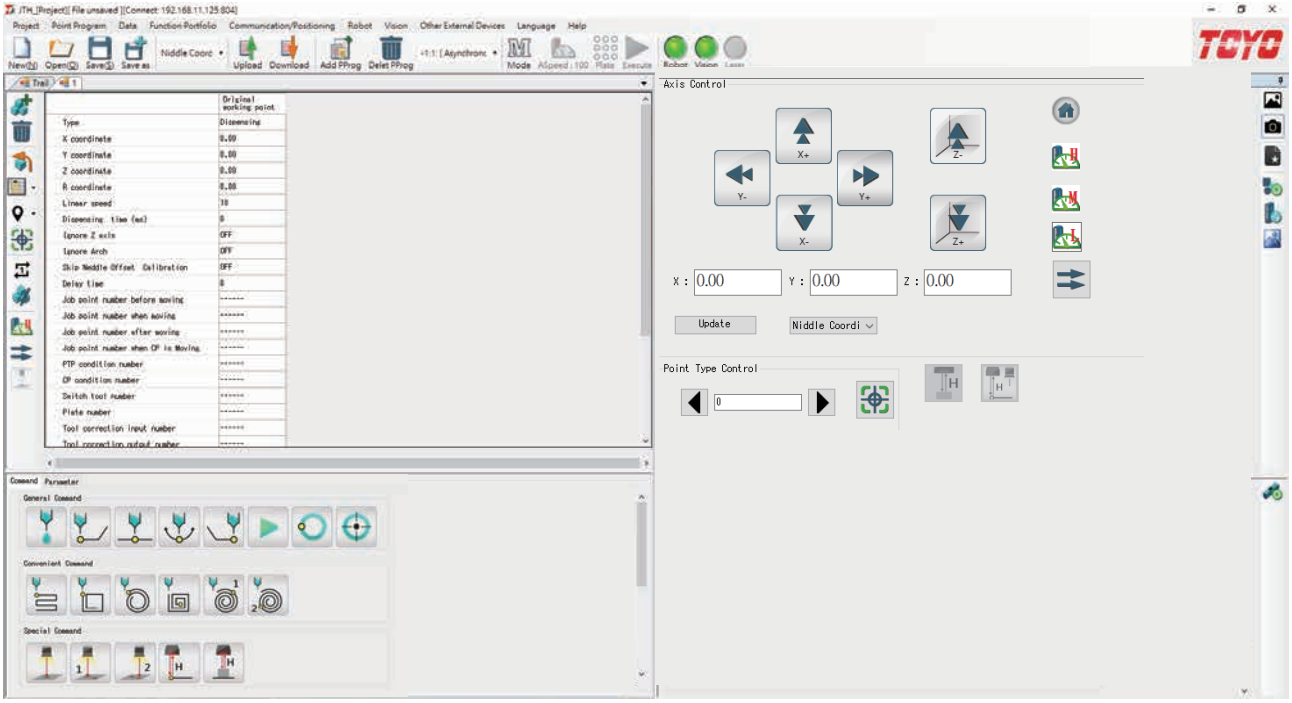
(2)According to the sequence of specified array positions. Mark array positions 1-4 in either a clockwise (CW) or counter-clockwise (CCW) direction in the plane, as this will affect orientation and sequence of motion. The fifth marked position determines the size of the array through its relative distance from the source position.
(3)Set the array partitions.Starting with the first marked position as reference, set the array's area (width, length), and vertical (height) dimensions.



Create a new point in an existing procedure and set its coordinate values to the source of an array.



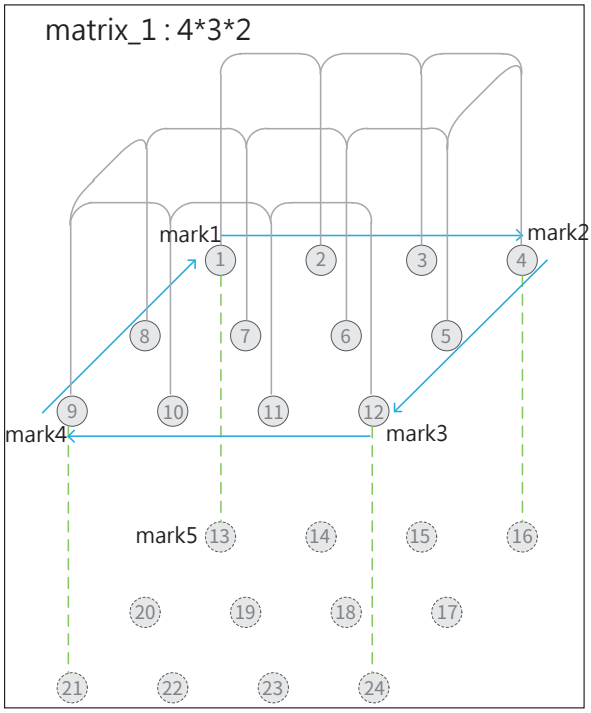
Select the newly created array instance from the Drop-down List in the point's Pallet Number Selection field.



Example 1

1. Teach the marked position in a clockwise direction, choose horizontal S type movement.
2. Divide to 4 points from mark 1 → 2 ;
divide to 3 points from mark 1 → 4 ;
divide to 2 points from mark 1 → 5.
By above to create a 4*3*2 three-dimensional matrix.
3. The matrix movement sequence should be executed according to the numbering in the diagram on the right. Point 1~12 on first layer and point 13~24 on second layer.

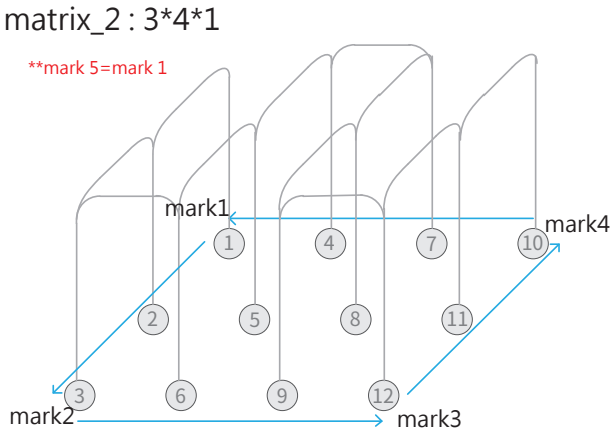
#for the matrix manual, please refer to point command description →④ matrix



Example 2

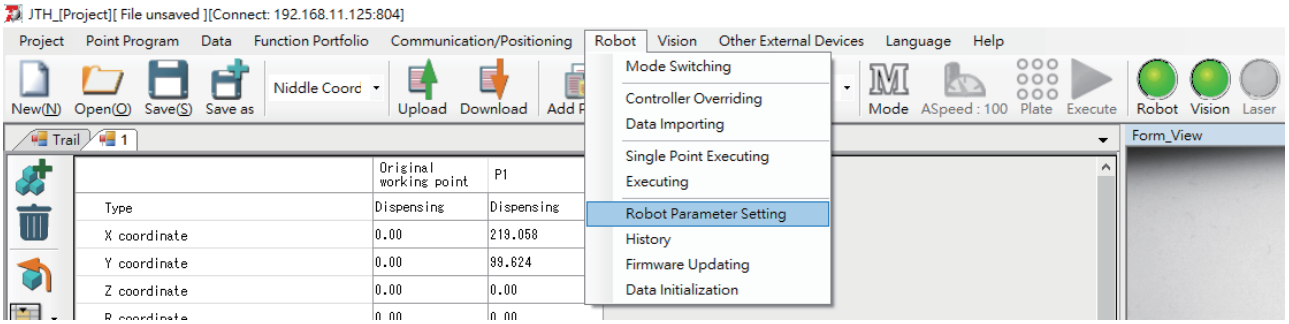
1. Teach the marked positionin an anti-clockwise direction, choose horizontal N type moving.
2. Divide to 3 points from mark 1 → 2 ;
divide to 4 points from mark 1 → 4 ;
divide to 1 points from mark 1 → 5.
By above to create a 4*3*1 flat matrix.
3. The matrix moving consequence is as the numbers of the image. Point 1~12 of one layer.

#for the matrix manual, please refer to point command description →④ matrix

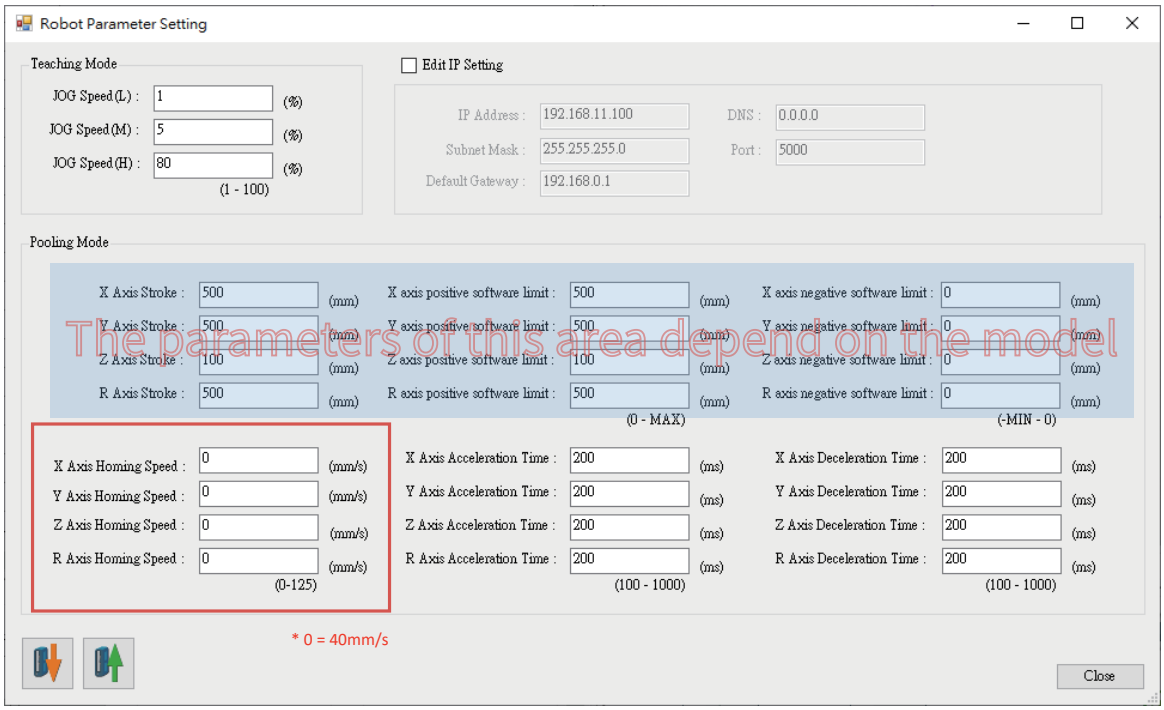


12.Parameter setup

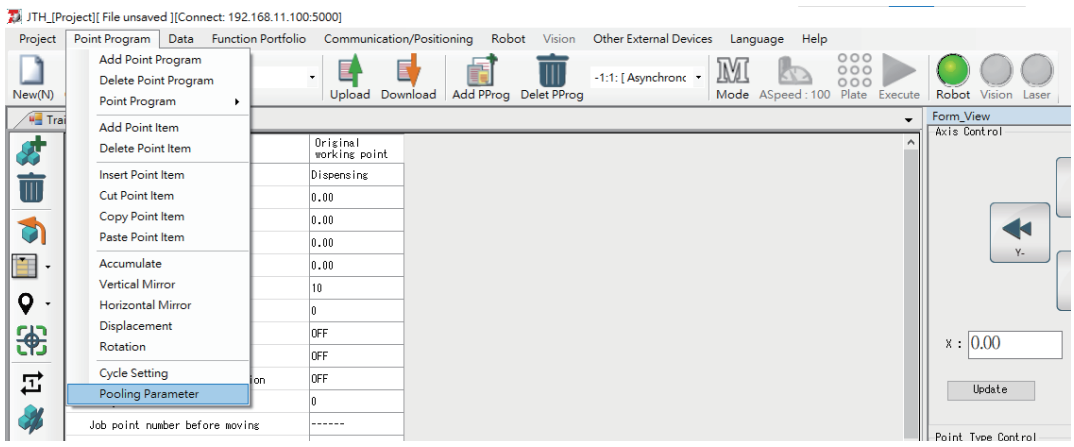
① Parameter setup of robot 



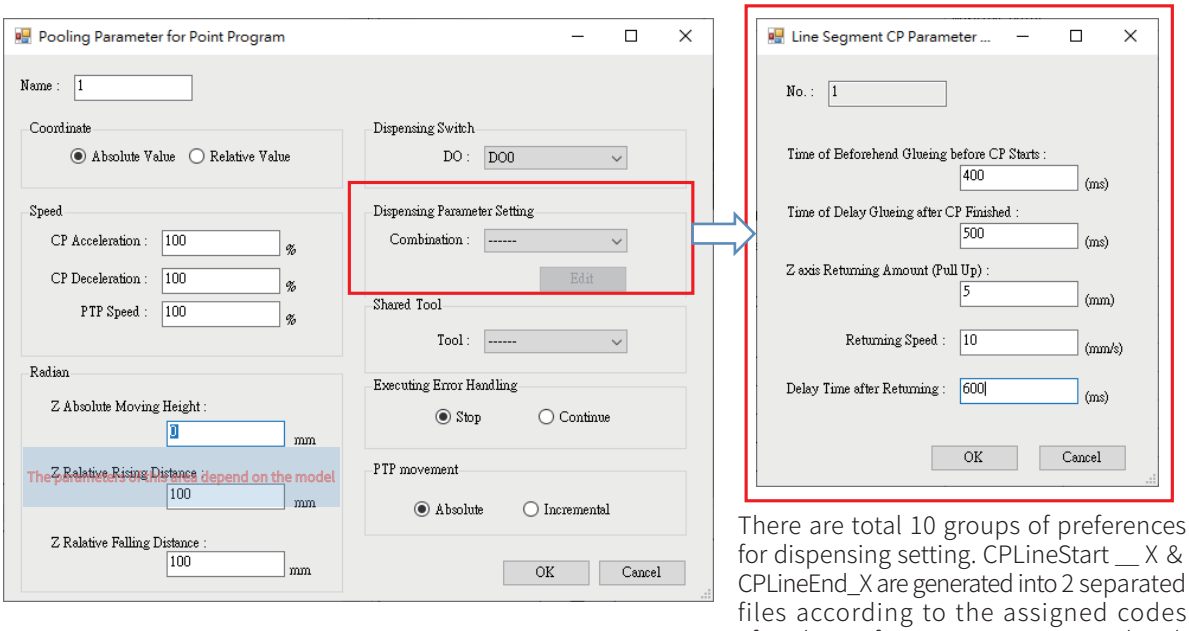
Preset the robot parameter



② Program common parameter 



Preset of program common parameter



There are total 10 groups of preferences for dispensing setting. CPLineStart __ X & CPLineEnd_X are generated into 2 separated files according to the assigned codes after the preference setting is completed. User is able to apply all CP pathways automatically or select each pathway manually.

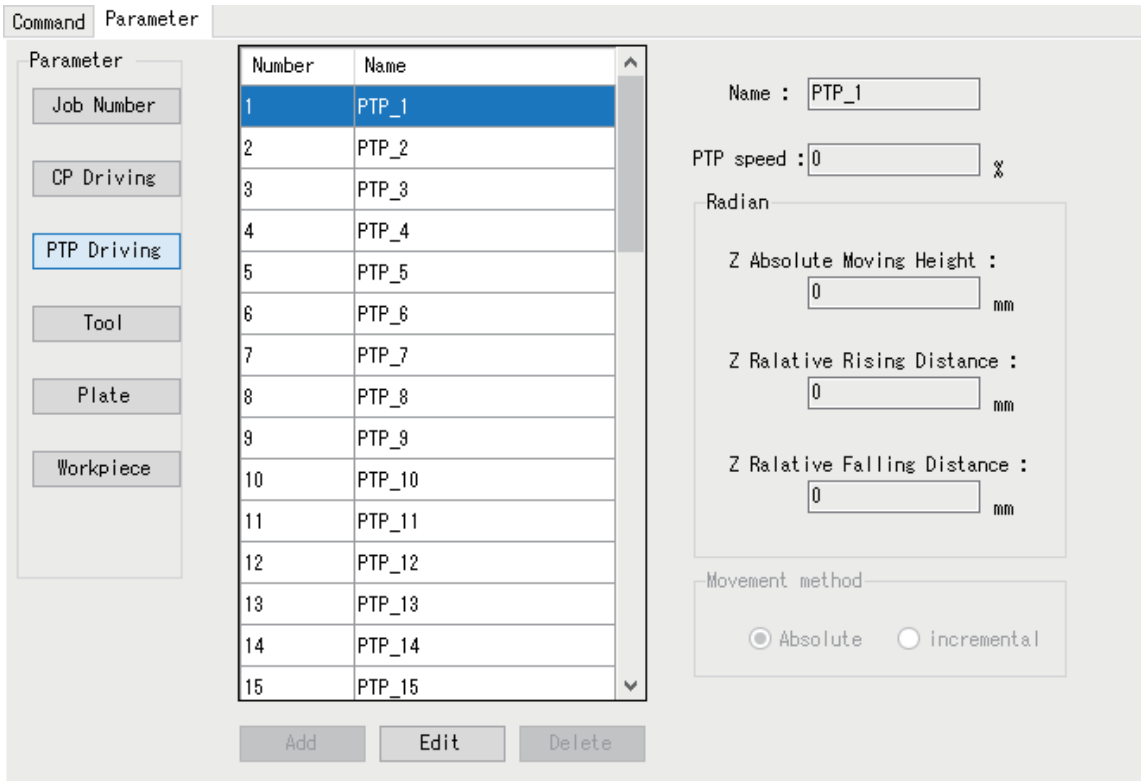
Applied example of dispensing setup combination

	Original working point	P1	P2	P3	P4	P5
		CP Path 1			CP Path 2	
Type	Dispensing	Line Segment...	Arc supporti...	Line Segment...	Line Segment...	Line Segment...
X coordinate	0.00	97.29	167.66	230.16	161.35	97.29
Y coordinate	0.00	208.51	135.29	195.21	268.99	208.51
Z coordinate	0.00	14.90	12.50	12.50	16.60	14.90
R coordinate	0.00	0.00	0.00	0.00	0.00	0.00
Linear speed	10	10	10	100	100	10
Dispensing time (ms)	0	1	0	1	0	0
Ignore Z axis	OFF	OFF	OFF	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF	OFF	OFF	OFF
Delay time	0	0	0	0	0	0
Job point number before moving	------	------	------	------	------	------
Job point number when moving	------	------	------	------	------	------
Job point number after moving	------	1:CPLineStart_1	------	2:CPLineEnd_1	1:CPLineStart_1	2:CPLineEnd_1
Job point number when CP is Moving	------	------	------	------	------	------
PTP condition number	------	------	------	------	------	------

13.PTP Drive Speed Setup

Mainly in use for movement between point to point or line to line, in order to ensure that no object will be hit when the robot is moving.

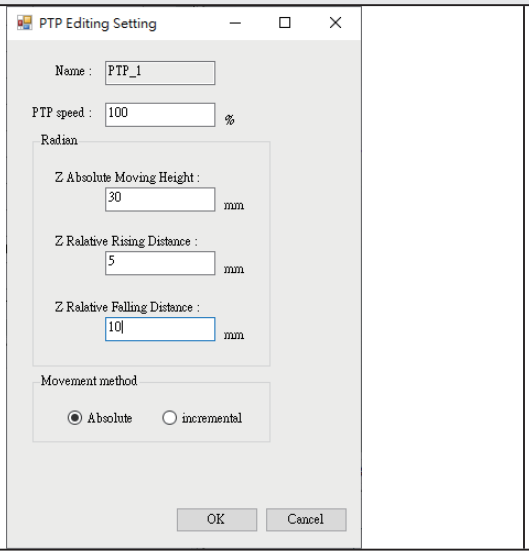
(1) Choose the sub-page "Parameter" under UI page.
(2) Choose "PTP drive condition" and click "Edit".

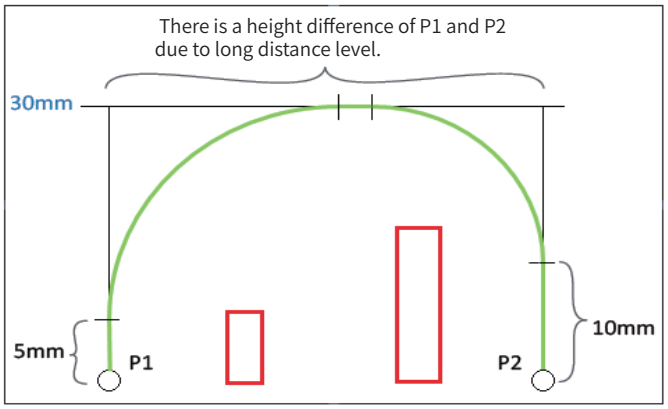


Determine the absolute height then relative height.
Absolute height: position started calculate from 0.
Relative height: position started calculate from current position.

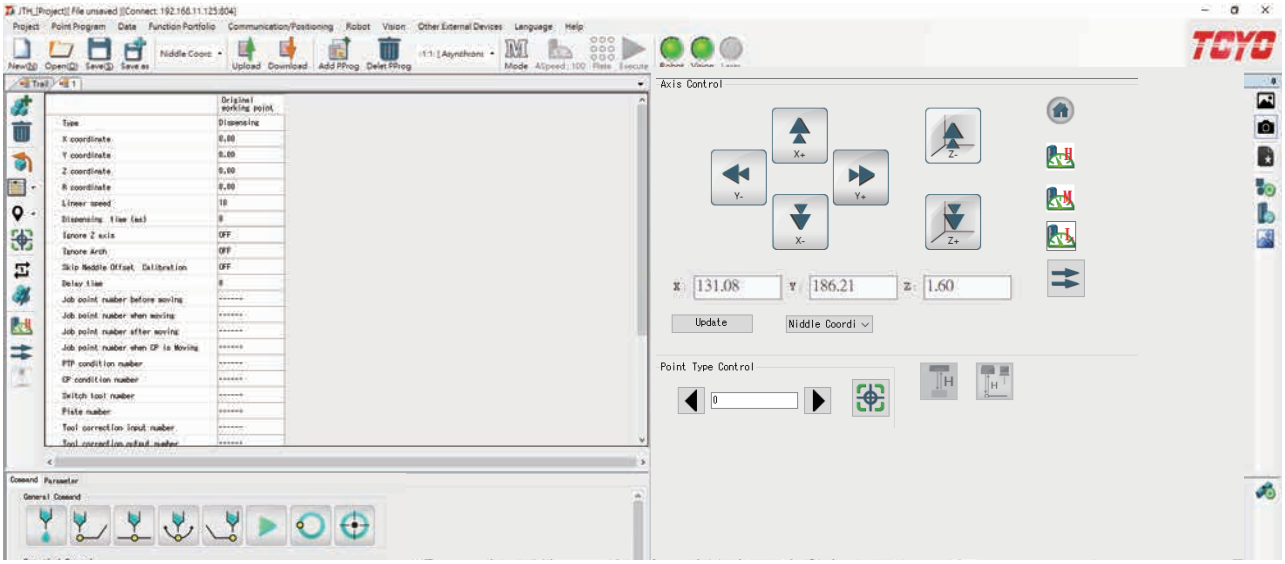
The red frames below are obstacles. To increase moving efficiency, the robot lifting height needs to be adjusted according to the actual environment and circumstance.

Example1

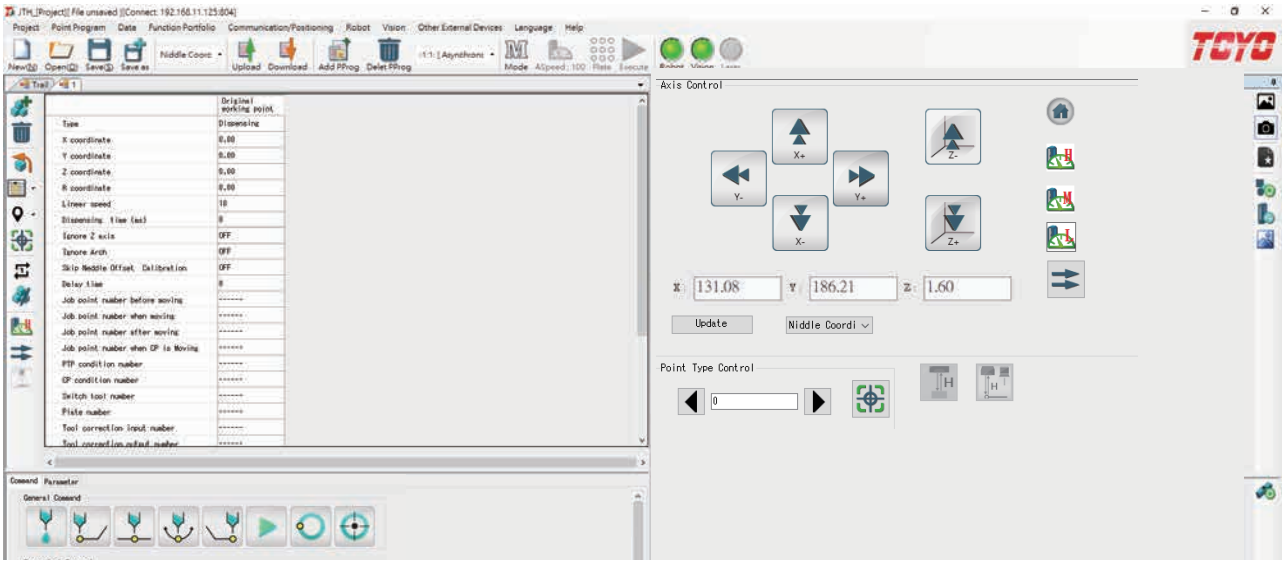




Establish 2 dispensing positions needed to be PTP.

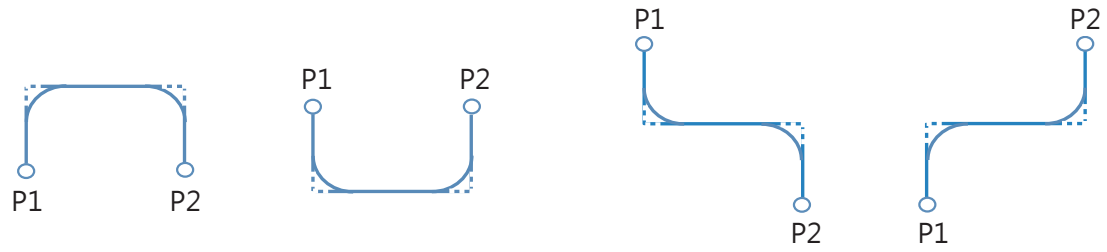


Then choose the edited PTP parameter under PTP option of P2(arrival point).

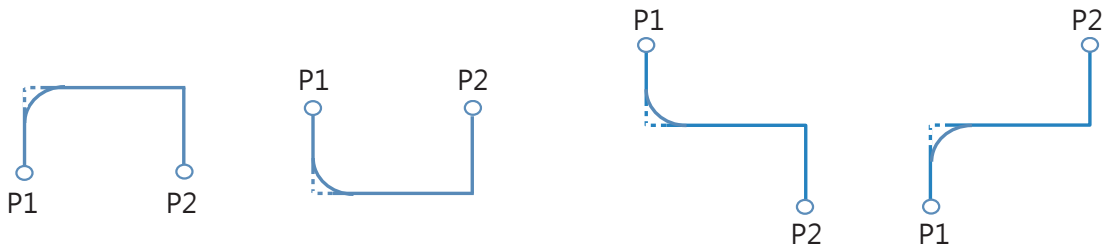


There might be unexecuted results because of setting Z axis lift/decline distance and PTP speed condition, so the PTP movement will present as follow:

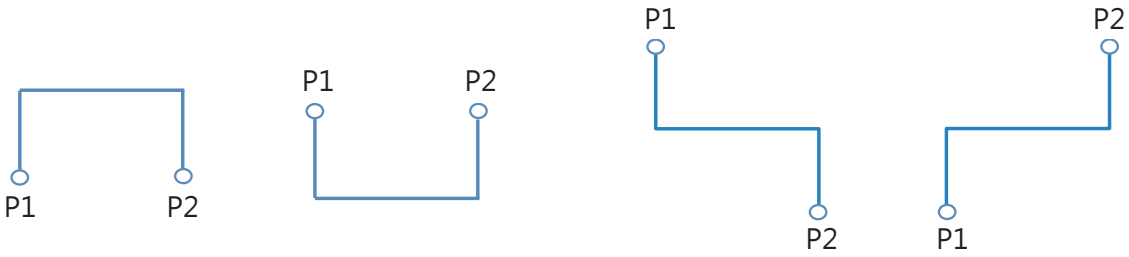
(1) Normal condition: keep all PTP condition parameter.



(2) Abnormal condition 1: only keep the lifting distance, target height and PTP speed.



(3) Abnormal condition 2: only keep the target height.



14.Visual and Laser setup

① CCD Parameter Settings

Exposure Value: the amount of light per unit area, affects image brightness
Resolution Value: affects the sharpness of outlines, the larger resolutions will result in longer image processing times.

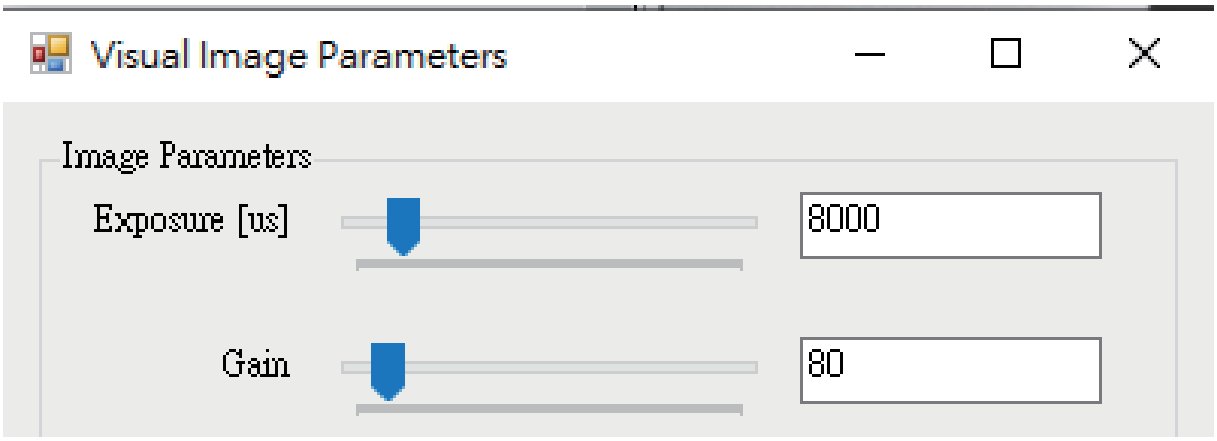
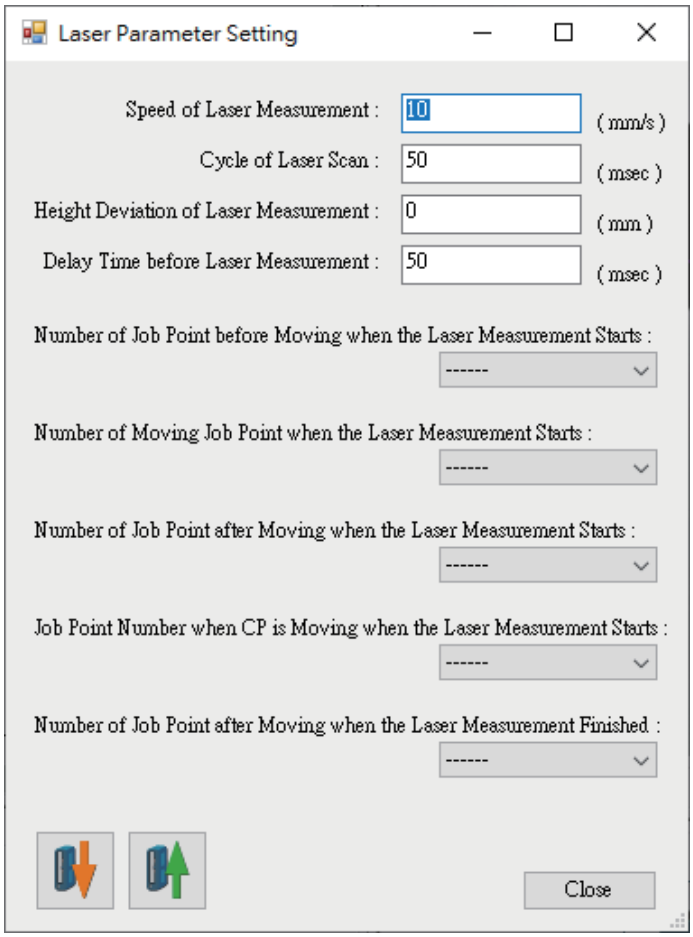


Image Parameters：set the camera exposure and resolution
When editing features it will bring the image parameters into the inspection environment. When capturing an image, the system will select the specified feature and adjust the exposure and resolution.

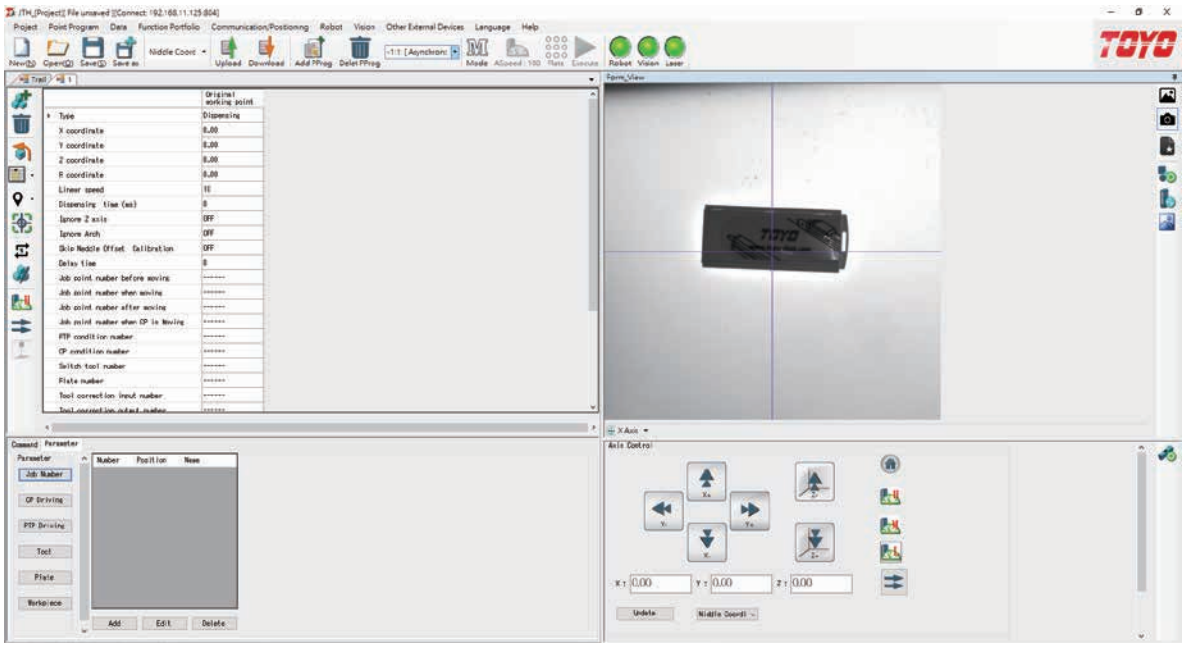
② Laser Parameter Settings

Item	Description
Laser Measurement Speed	Set the line speed of robot matching with laser head
Laser Scan Cycle	Set sample cycle length (ms)
Laser Measurement Height Offset	Set sample value error correction
Laser Measurement Wait Start Time	Set point-to-point movement measurement settling time.

	Single Point Height Measurement Type	Height Measurement Path Source Point	Height Measurement Target Position
Laser Measurement Start, Before/During/After Move Operation Point Operation Number	O	O	X
During Measurement, During CP Operation Number	X	O	X
Laser Measurement Complete, After Position Move Operation Number	X	X	O



15.Operation point command description

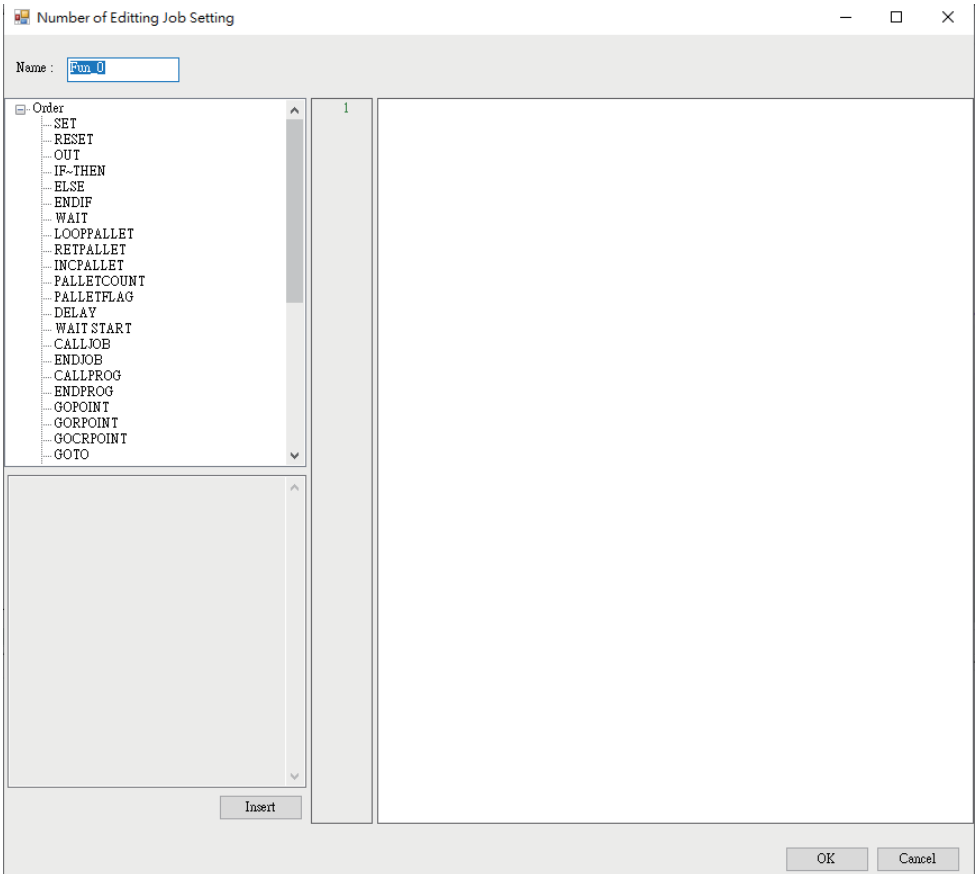


① Position Operation Setting Description

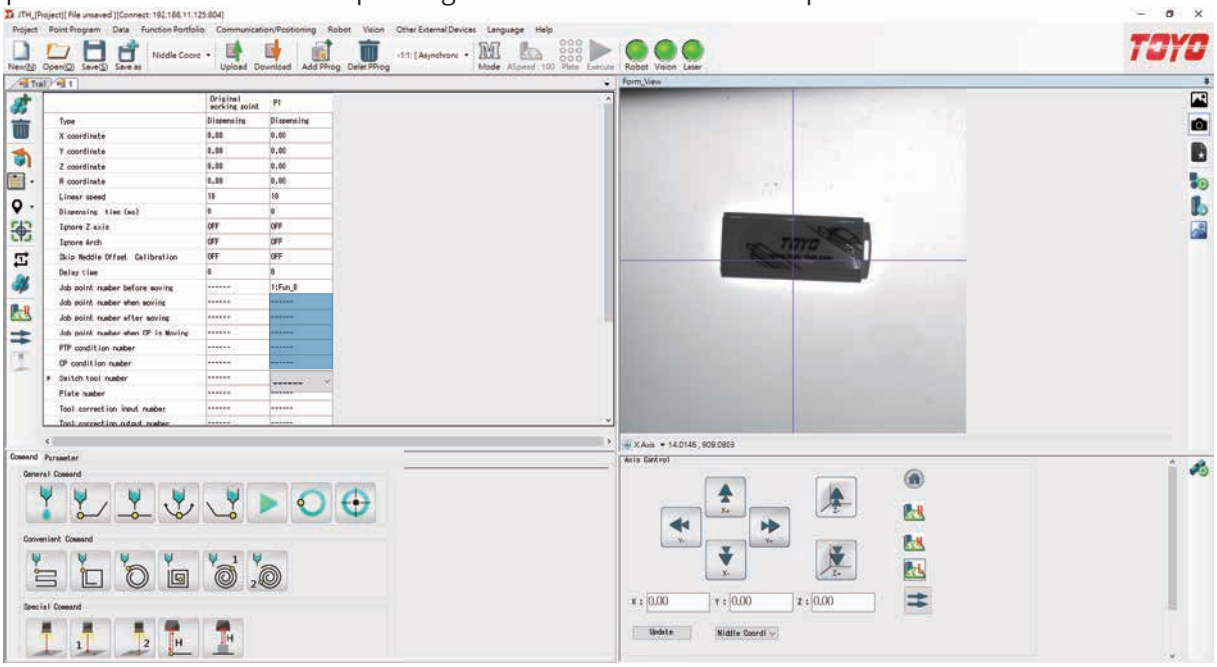
(1)Select the Parameter Tab in the Operation Panel in the bottom left of the Application Window

(2)Select Operation Number, then select New

(3)Select the command in the Command List Box in Operation Editor Window, then press Confirm Button



(4)First determine the event position, then select specific movement event (before, during, after), and the select operation number in the corresponding movement event handler drop-down list to select the command number



Point Data Type / Operation Point Type	Dispense	PTP Source Point	PTP Intermediate Point	Arc Peak Point	PTP Target Point	Circle Source Point	Circle Center Point	Square Wave Source Point	4-angle Spirangle Source Point	Square Wave/4-angle Spirangle End Point
Before Movement Operation	O	O	X	X	X	O	X	O	O	X
During Movement Operation	O	O	X	X	X	O	X	O	O	X
After Movement Operation	O	O	O	O	O	O	X	O	O	O
During Continuous Path Operation	X	O	X	X	X	X	X	O	O	X

Point Data Type / Operation Point Type	Spiral Source Point	Spiral Circle Boundary Inscribed Triangle Vertex 1	Spiral Circle Boundary Inscribed Triangle Vertex 2	Image Capture (Single Point)	Image Capture (Dual Point, Point 1)	Image Capture (Dual Point, Point 2)	Line Segment Height Measurement Source Point	Workpiece Height Measurement Point	Workpiece Height Measurement Point (Needle -> Laser)	Workpiece Height Measurement Point (Automatic)
Before Movement Operation	O	X	X	O	O	O	O	O	O	O
During Movement Operation	O	X	X	O	O	O	O	O	O	O
After Movement Operation	O	X	O	X	X	X	O	O	O	O
During Continuous Path Operation	O	X	X	X	X	X	O	X	X	X

**Line segment and work piece laser altimetry (automatic) OR Line segment and workpiece height measurement

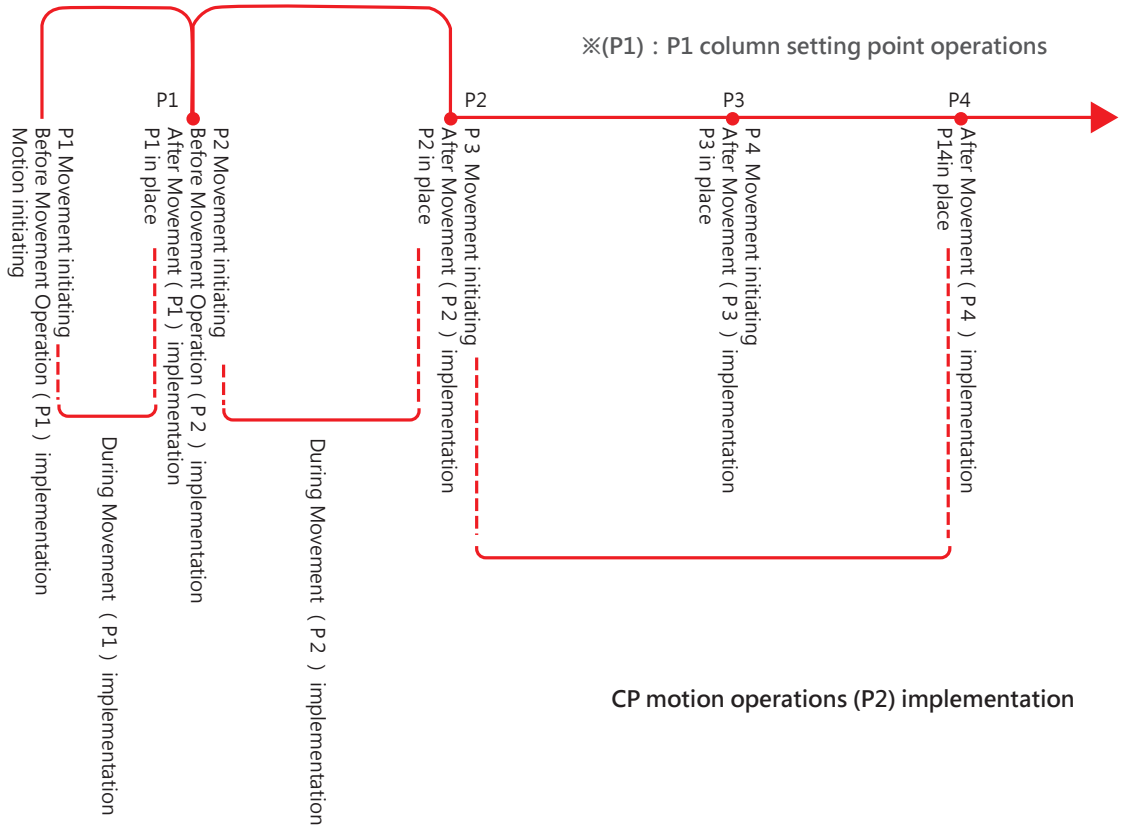
These two types refer to the operation number from the "controller laser parameter settings" when performing laser height measurement. During path execution, the reference point is based on the current point in the field.

**Operation number stop condition → its content can be executed without instructions.

**During movement operations upon reaching target position (PTP movement complete or CP movement complete) will automatically stop.

Point Operation Example Description:

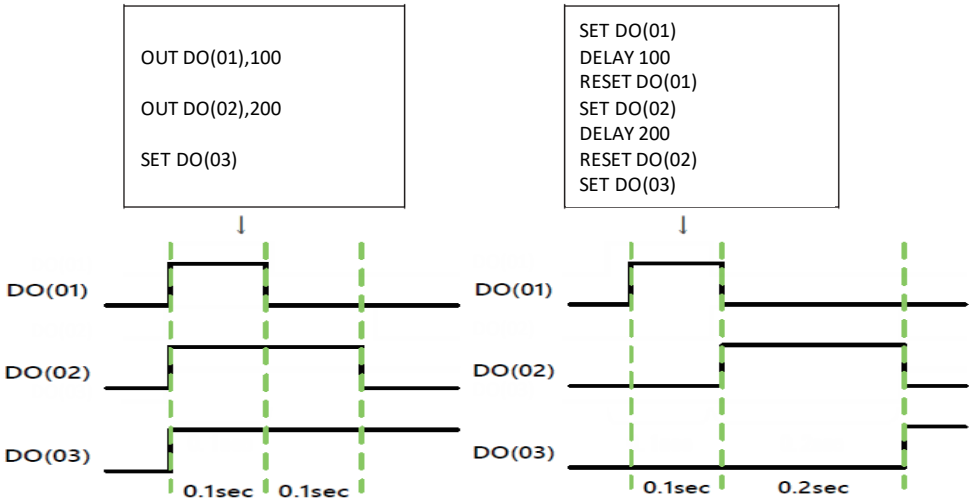
P1：Dispense (before, during, after movement point operations)
P2：Line segment source point (before, during, after movement, during CP motion operations)
P3：Line segment intermediate point (after movement operation)
P4：Line segment　point (after movement operation)



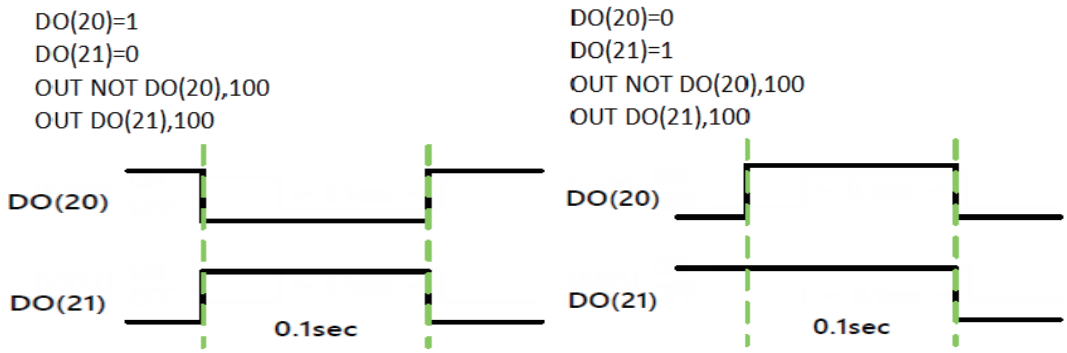
② ON/OFF Output Control

Type	Command		Required Arguments	Optional Argument	Command Content	Example	Notes
ON/OFF Output Control	1	SET	Output Address	Time Elapsed	Output ON Delay Output ON	SET DO(00) SET DO(00),100	#1 #3
	2	RESET			Output OFF Delay Output OFF	RESET DO(01) RESET DO(01),100	
	3	OUT			PWM output: Pulse-width modulated signal	OUT DO(01),100 OUT NOT DO(02),200	#1 #2

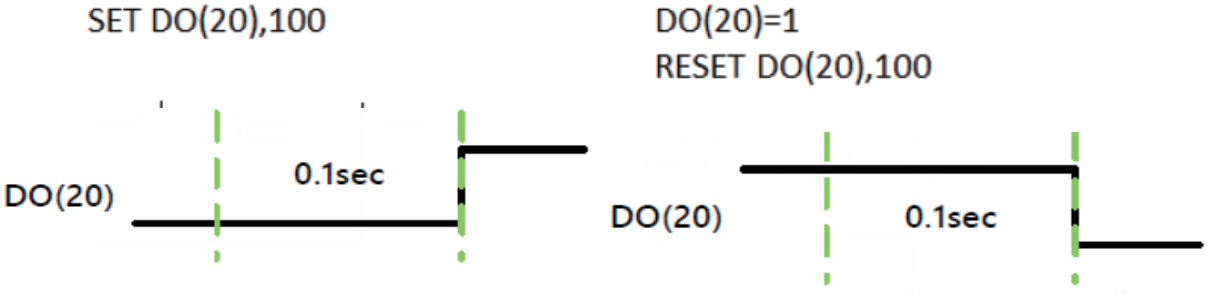
#1 Delay Output and Delay Command Comparison



#2 Delay ON/OFF in existing state



#3 Delay Set & Reset



③ Conditional Branch/Conditional Wait

Type		Command	Required Arguments	Optional Argument	Command Content	Example	Notes

Conditional Branch/ Conditional Wait	1	IF~THEN	Conditional Expression #1	—	If conditional expression evaluates to true, execute the statements in the block below the THEN keyword#2	IF (A=10) OR (DI(00)=1) THEN
						OUT DO(10),100
						GOPOINT (3,2)
						ELSE
						DRIVEI (3,-10.00)
						ENDIF
							#1

	2	ELSE	—	—	If conditional expression evaluates to false, execute the statements in the block below the THEN keyword#2		
	3	ENDIF	—	—	Condition branch end		

	4	WAIT	Conditional Expression #1	Time out limit (ms)	Wait time of specific position	WAIT DI(20)=1,1000
						IF DI(20)=0 THEN
						DO(21)=1
						ENDIF	

#1

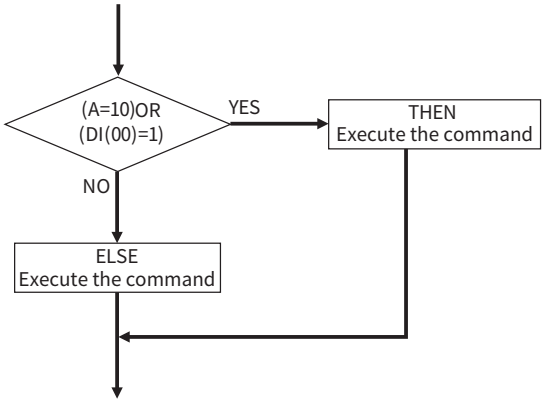
IF (A=10) OR (DI(00)=1) THEN

[statements]

ELSE

[statements]

ENDIF



IF <conditional expression>

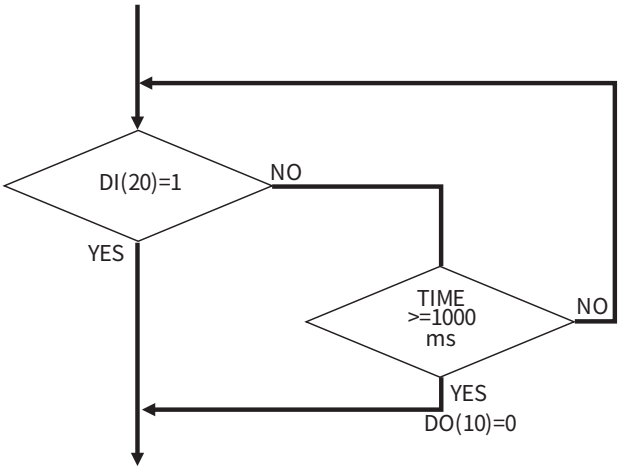
Conditional expression can be a single input address, output address, variable, or a logical combination of two or more conditions.

Logical Operators

Item	Name
1	NOT
2	AND
3	OR
4	XOR

#2 [statements]：grammar-compliant operation commands

#3 WAIT DI(20)=1,1000



④ Array

Type		Command	Required Arguments	Command Content	Example	Notes
Array	1	LOOPPALLET(,)	matrix No. & jump point No.	Loop array	LOOPPALLET(3,5)	For array increment control please refer to#1#2
	2	RSTPALLET( )	matrix No.	Reset array index	RSTPALLET(2)	
	3	INCPALLET( )		Increment Array Index	INCPALLET(1)	
	4	PALLETCOUNT( )		Current Array Index	PALLETCOUNT(10)	
	5	PALLETFLAG( )		flag ON when matrix executes to maximum number	PALLETFLAG(20)	

#1 Automatic accumulation

Procedure:

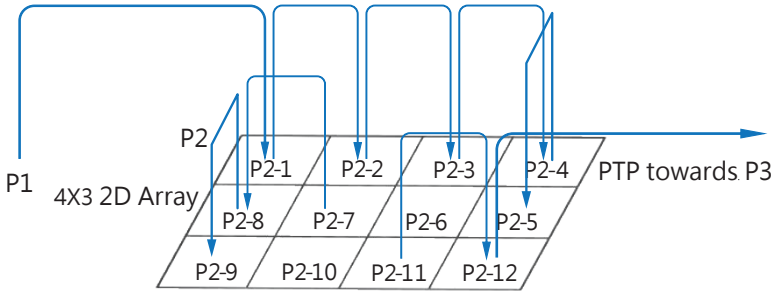
P1 (PTP Drive Point)

↓

P2 (PTP Drive Point)
Array Index Number: 3 (4x3 2D Array)
Mode: Automatic Accumulate

↓

P3 (PTP Drive Point)



#2 Custom Point Operation Accumulate

Action Description:

1.Pick parts and materials at position 1 place in 4x3 array. Array indexes 7 and 11 don't place material.

2.For array indices which parts and material which are to be placed are identified by DO (10) output signal, and those indexes which parts and material are not to be placed are identified by DO (11) output signal. The signal output duration is 1.5 seconds.

3.Pick-and-place materials and parts complete move to waiting position P3 to wai

Procedure:

P1 (PTP Drive Point) | Point Operation Number: 25

↓

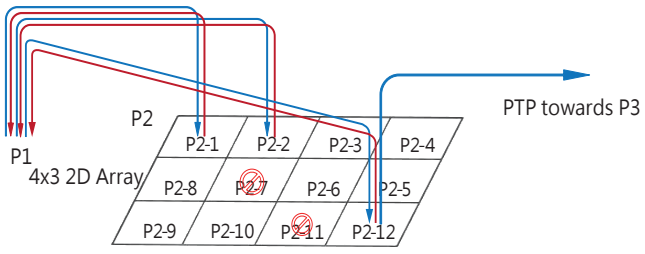
P2 (PTP Drive Point)

matrix No.:25 (flat matrix 4 X 3 X 1) mode/ movement:normal/ horizontal S	operation point No.:25 (as the left image)

↓

P3 (Wait Source Point)

```
A=PALLETCOUNT(25)+1
IF (A=7 OR A=11) THEN
OUT DO(10),1500
ELSE
OUT DO(11),1500
ENDIF
INCPALLET (25)
IF PALLETFLAG(25)=1 THEN
GOTO*LEAVE
ELSE
LOOPPALLET(25,1)
ENDIF
*LEAVE:
```



⑤ Delay/Wait Start

Type	Command		Required Arguments	Command Content	Example	Notes
Delay/Wait Start	1	DELAY	duration (ms) OR time (ms)	Wait the specified time (ms)	DELAY 300	
	2	WAIT START	—	Procedure pause. When the start signal or Start button is ON, the procedure resumes.	WAIT START	#1

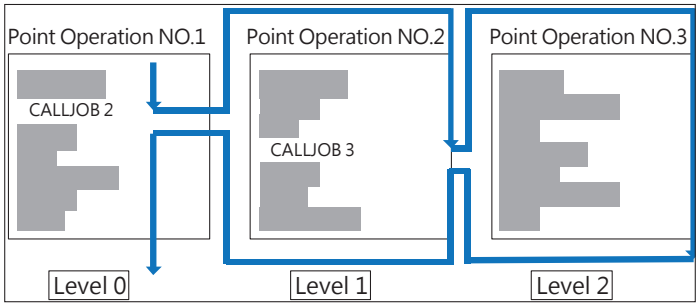
#1 When the motion controller is moving, WAIT STAT commands are invalid

⑥ Program Flow Control

Type	Command		Required Arguments	Command Content	Example	Notes
Execution Flow Control	2	CALLJOB( )	Point Operation Number	Invoke the specified point operation number	CALLJOB (2)	Maximum Call Stack Depth: 10#1
	4	ENDJOB	—	End active point operation		
	6	CALLPROG( )	Procedure Number	Invoke the specified procedure number#2	CALLPROG (3)	
	7	ENDPROG	—	End Active Program		
	8	GOPOINT(,)	drive condition No., point No.	Move motion controller to specified point in work area.	GOPOINT (3,1)	#3
	9	GORPOINT(,)	drive condition No., relative point No.	Move control to specified relative coordinate position.	GORPOINT (2,7)	
	10	GOCRPOINT(,)	drive condition No., target point No.	During continuous path movement, move to selected target position.	GOCRPOINT (4,2)	#4
	11	GOTO	specific label No.	Jump to specified label	GOTO *L6	
	12	Label statement	Label Name	*[Label Name]:	*L6:	

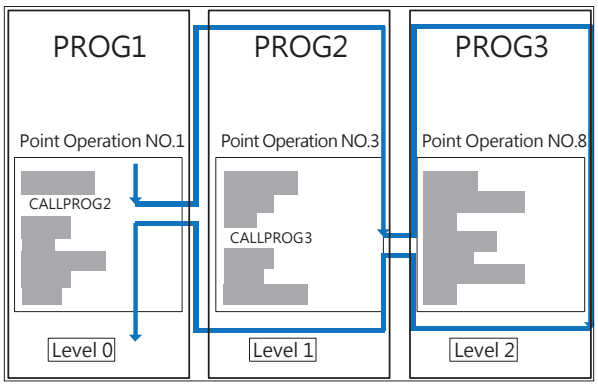
#1 Maximum call stack depth is 10

(1) When executing a CALLJOB task, when the ENDJOB command is executed control is return to the calling procedure/ operation/program/job.

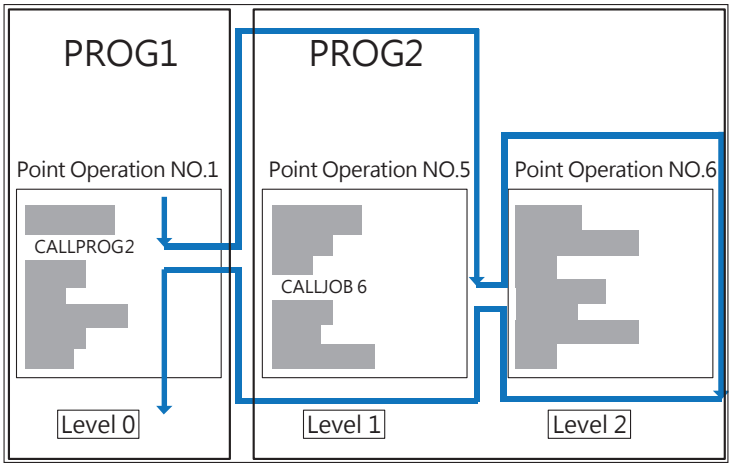


When ENDJOB is executed, there is no return from the previous layer, an error will occur.

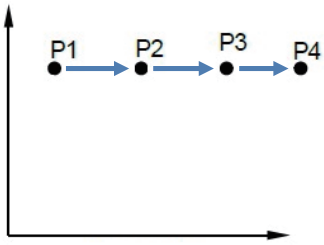
(2) When executing CALLPROG task, when the PROG is completed, the program control moves up the call stack one level.



(3) Programs and Jobs can be call each other.

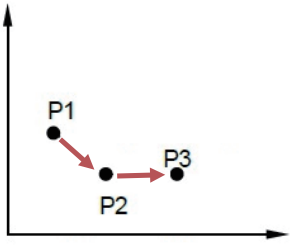


#2 Procedure 5 (Figure 1) at point P2 invokes Program 7 (Figure 2) using the CALLPROG command. The result is shown Figure 3.



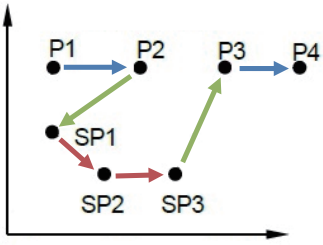
PROG5<absolute coordinates>
(PTP Drive Point)

Figure 1



PROG7<absolute coordinates>
(PTP Drive Point)

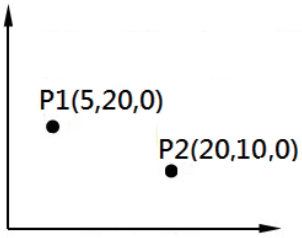
Figure 2



After PROG5 moves to P2,
Execute command CALLPROG 7

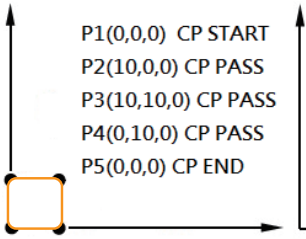
Figure 3

Relative Coordinate Procedure and CALLPROG Command Usage.



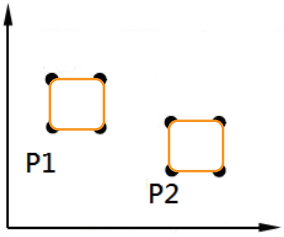
PROG5<bsolute Coordinates>
(PTP Drive Point)

Figure 1



PROG7 <Relative Coordinates>
(CP continuous path)

Figure 2



After PROG5 moves to P1 and P2,
execute CALLPROG 7

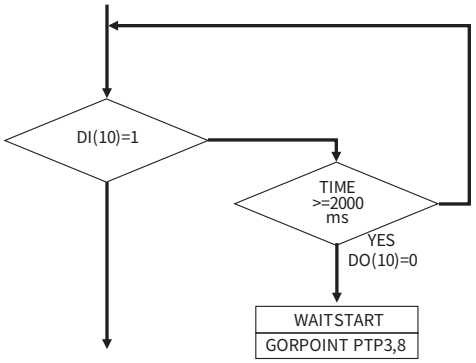
Figure 3

#3 GOPOINT & GORPOINT cannot be used in Continuous Path Procedures

Point operation number after target point P2 reached

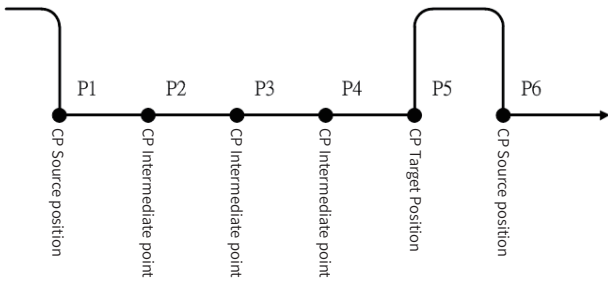
Operation Command	Result

WAIT DI(10),2000
 	
IF DI(10)=0 THEN
WAIT START
GORPOINT (3,8)
ENDIF
	Wait for DI(10) ON ’ within 2000ms
	Is OFF, skip to the next line.
	If DI(10) is OFF Then WAIT START.
	Wait for start signal ’ Then go to
	relative coordinate position (3, 8) ’ use
	PTP movement number 3 condition ’
	go to relative position P2, point 8.



#4 Continuous Paths (Incl. Quick Commands)

GOCRPOINT(PTP Drive Condition Number,Target Position)
Target Position Selection: 0 -> Active CP Source Position
1 -> Next CP Source Position
right image EX:
Active CP starts from P1 and ends at P5,Executes expected commands &Conditional movements are as follows
Condition 1 → GOCRPOINT 3,1
will use PTP drive condition 3 to move to P6
Condition 2 → GOCRPOINT 3,0
will use PTP drive condition 3 to move to P1



⑦ FOR、WHILE Loop

Type	Command		Required Arguments	Command Content	Example	Notes

FOR、WHILE Loop	1	FOR	counter variable、initialization value、end value，increment value #1	Re-run statement block between FOR and NEXT keywords, from counter initial value to final value	FOR A=1 TO 10 STEP 1
					DRIVEI (3,1.00)
					IF DI(00)=1 THEN
					EXIT FOR
					ENDIF
					NEXT A	

	2	NEXT	contro variebility			
	3	EXIT FOR	—	Exit For-Next Loop		
	4	WHILE	Conditional Expression #2	While conditional expression evaluate true execute[statements]	WHILE (DI(10)=1) AND (B=6) A=A+1 WEND	
	5	WEND	—			

#1

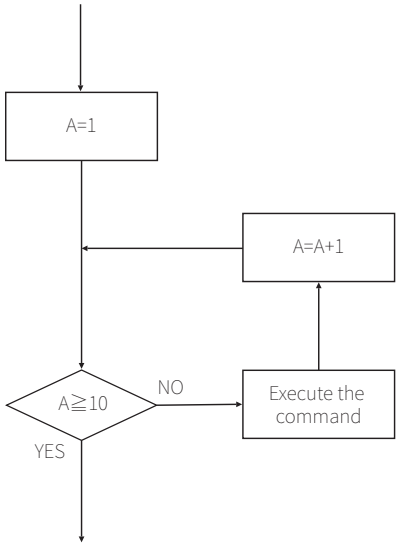
FOR A=1 TO 10 STEP 1
[statement]
NEXT A

FOR <conditional expression>
Conditional expression can be a single input address, output address, variable, or a logical combination of two or more conditions.

algorithm logic

item	name
1	NOT
2	AND
3	OR
4	XOR

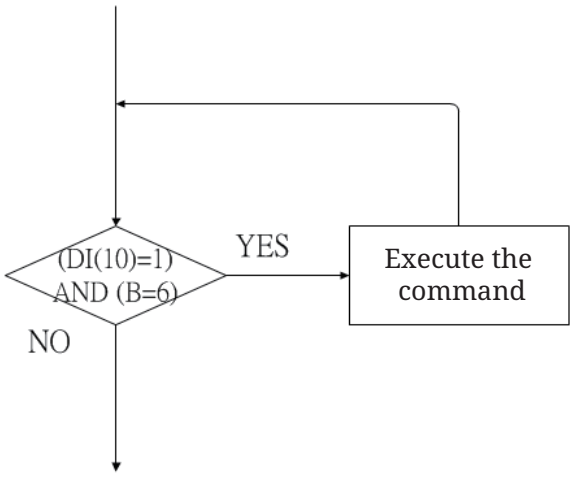
[Execute the command]: All operating point commands that match the syntax.



#2

WHILE (DI(10)=1) AND (B=6)
[statements]
WEND

WHILE <condition expression>
Conditional expression can be a single input address, output address, variable, or a logical combination of two or more conditions.



algorithm logic

item	name
1	NOT
2	AND
3	OR
4	XOR

[Execute the command]: All operating point commands that match the syntax.

⑧ Drive control

Type	Command		Required Arguments	Optional Argument	Command Content	Example	Note
Drive control	1	DRIVE(,)	Axis, Position	specific speed、STOPON specific condition	move to the absolute coordinate position using specified axis and speed	DRIVE (3,10.00),S=10	#1
	2	DRIVEI(,)	Axis, Distance		move to the relative coordinate position using specified axis and speed	DRIVEI (3,-5.00),STOPON DI(00)=1	
	3	MOVE(, ,)	Coordinate Position		move to the absolute coordinate position using specified speed	MOVE (10.00, 20.00, 5.00)	
	4	MOVEI(, ,)	Coordinate		move to the absolute coordinate position using relative speed	MOVEI (10.00, 20.00, 5.00),S=20	
	5	ORGORD	Specified Axis	—	Specified axis home	ORGORD 1	
	6	ABSRST	—	—	All axes home	ABSRST	
	7	CHECKPOS	—	—	Return to absolute position (0,0,0,0) and inspect position error.	CHECKPOS	#2

#1 [Selection]

Specified Linear Speed：
DRIVE (3,10.00),S=10 Refers to the third axis (Z-axis) uses 10% of the movement speed to move to the absolute coordinates 10.00 mm.
STOPON Condition Settings：
MOVEI (10.00, 20.00, 5.00),STOPON DI(00)=1 Using current position as reference, move to the relative coordinate position.
If DI(00)=1 is received during motion,then immediately stop movement, complete the command and jump to the next command.

#2 Please refer to the system flag CHECKPOSFLAG for the result of position deviation inspect.
normal: 1 ; abnormal: 0

P1 (PTP Drive Position)

↓

P2 (PTP Drive Position)	

After movement, operation number: X X	Content
	CHECKPOS
	IF CHECKPOSFLAG=0 THEN
	ABSRST
	ENDIF

↓

P3 (PTP Drive Position)

Movement Description：

1、Run PTP to Point P1

2、After executing PTP to Point P2, enter operation number, through CHECKPOSFLAG command check the position error.
CHECKPOS Execution Result:
CHECKPOSFLAG=1，Run PTP P3
CHECKPOSFLAG=0, Return to origin, then runPTP P3。

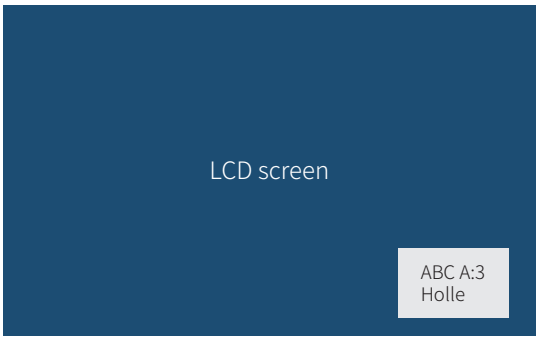
CHECKPOS → Return to absolute position(0,0,0,0).Confirm origin position error, through the position error inspection result，system flag CHECKPOSFLAG will determine whether the error within acceptable range. Since product users can step into another action.

⑨ Display on LCD

Type	Command		Required Arguments	Command Content	Example	Notes
Display on LCD	1	PRINT “ “	string literal or variable	Displays the data on the LCD panel. (Display limit fixed)	PRINT "ABC" PRINT "A:";A;"\n"	#1

#1

```
A=3
PRINT "ABC"
PRINT "A:";A;"\n"
PRINT "Holle"
```



⑩ COM Input/Output

Type	Command		Required Arguments	Command Content	Example	Notes
COM Input/ Output	1	SEND	terminal name、string expression ordesignated input/output terminal or variable.	From specified terminal send/receive messages.	ONLINE SEND CMU TO A$ SEND "OK!!" TO ETH SEND DI1() TO CMU OFFLINE	#1 #2
	2	ONLINE	—	Terminal Communication ON		#3
	3	OFFLINE	—	Terminal Communication OFF		

#1

Item	Terminal Name
1	ETH
2	CMU

#2 Terminal Send

[Terminal Name] TO [transfer data]

EX: CMU TO A$ through CMU pathway received bit string move to variable A$

Terminal Receive
[Source] TO [Terminal Name]

EX: DI2() TO ETH Send DI2() content through ETH pathway

#3 Communication terminal OFF, then any communication through any terminal is ignored.

⑪ Variable Declaration/Comments

Type	Command		Required Arguments	Command Content	Example	Notes
Assignment/ Comment	1	[LET]	Variable Name, Value &name	Variable declaration	A%=1	#1
	2	‘	—	Notable at the end of final line or an independent line	‘ABC	#2

#1 Assign Value
[LET] <variable>=<value expression> "LET keyword is optional, can directly assign variables using the "=" assignment operator

⑫ Procedure (Before, During, After CP Movement) Command Restrictions

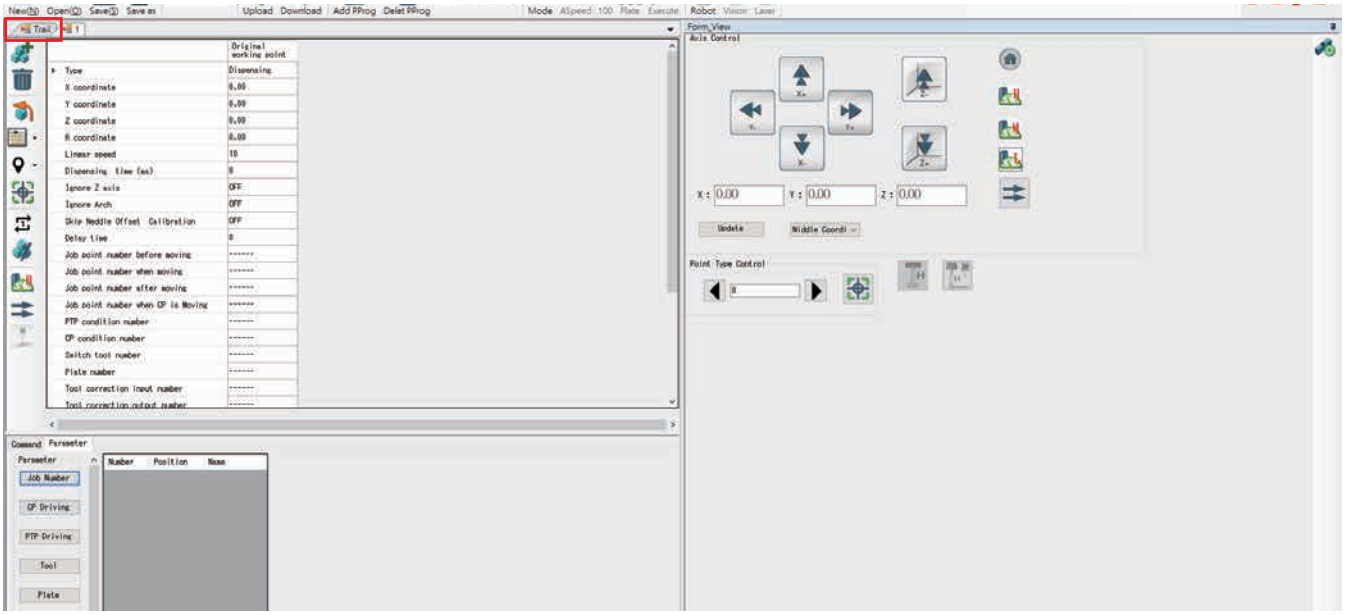
Movement Type / Command		PTP			CP & Quick Command Start				CP PASS	CP END & Quick Command Last Reference Point	Note
		Before Movement	During Movement	After Movement	Before Movement	During Movement	After Movement	During CP Drive	After Movement	After Movement	
ON / OFF IO Control	SET	O	O	O	O	O	O	O	O	O	
	RESET	O	O	O	O	O	O	O	O	O	
	OUT	O	O	O	O	O	O	O	O	O	
Conditional Branch, Wait	IF~THEN	O	O	O	O	O	O	O	O	O	
	ELSE	O	O	O	O	O	O	O	O	O	
	ENDIF	O	O	O	O	O	O	O	O	O	
	WAIT	O	O	O	O	O	O	O	O	O	
Array	LOOPPALLET	O	O	O	O	O	O	O	O	O	
	RETPALLET	O	O	O	O	O	O	O	O	O	
	INCPALLET	O	O	O	O	O	O	O	O	O	
Delay/ON Delay	DELAY	O	O	O	O	O	O	O	O	O	
	WAIT START	O	X	O	O	X	O	X	X	O	
Flow Control	CALLJOB	O	X	O	O	X	O	X	X	O	
	ENDJOB	O	X	O	O	X	O	X	X	O	
	CALLPROG	O	X	O	O	X	O	X	X	O	
	ENDPROG	O	X	O	O	X	O	X	X	O	
	GOPOINT	O	X	O	O	X	O	X	X	O	
	GORPOINT	O	X	O	O	X	O	X	X	O	
	GOCRPOINT	X	X	X	X	X	X	O	X	O	
	GOTO	O	O	O	O	O	O	O	O	O	
	LABEL	O	O	O	O	O	O	O	O	O	
FOR、WHILE Loop	FOR	O	O	O	O	O	O	O	O	O	
	NEXT	O	O	O	O	O	O	O	O	O	
	EXIT FOR	O	O	O	O	O	O	O	O	O	
	WHILE	O	O	O	O	O	O	O	O	O	
	WEND	O	O	O	O	O	O	O	O	O	
Drive Control	DRIVE	O	X	O	O	X	O	X	X	O	
	DRIVEI	O	X	O	O	X	O	X	X	O	
	MOVE	O	X	O	O	X	O	X	X	O	
	MOVEI	O	X	O	O	X	O	X	X	O	
	ORGORD	O	X	O	O	X	O	X	X	O	
	ABSRST	O	X	O	O	X	O	X	X	O	
	CHECKPOS	O	X	O	O	X	O	X	X	O	
LCDDisplay	PRINT	O	O	O	O	O	O	O	O	O	
COMCOM Send/ Receive	SEND	O	O	O	O	O	O	O	O	O	
	ONLINE	O	O	O	O	O	O	O	O	O	
	OFFLINE	O	O	O	O	O	O	O	O	O	
Variable Assignment, Comments	[LET]	O	O	O	O	O	O	O	O	O	
	‘	O	O	O	O	O	O	O	O	O	

16.Trajectory Operation Instructions

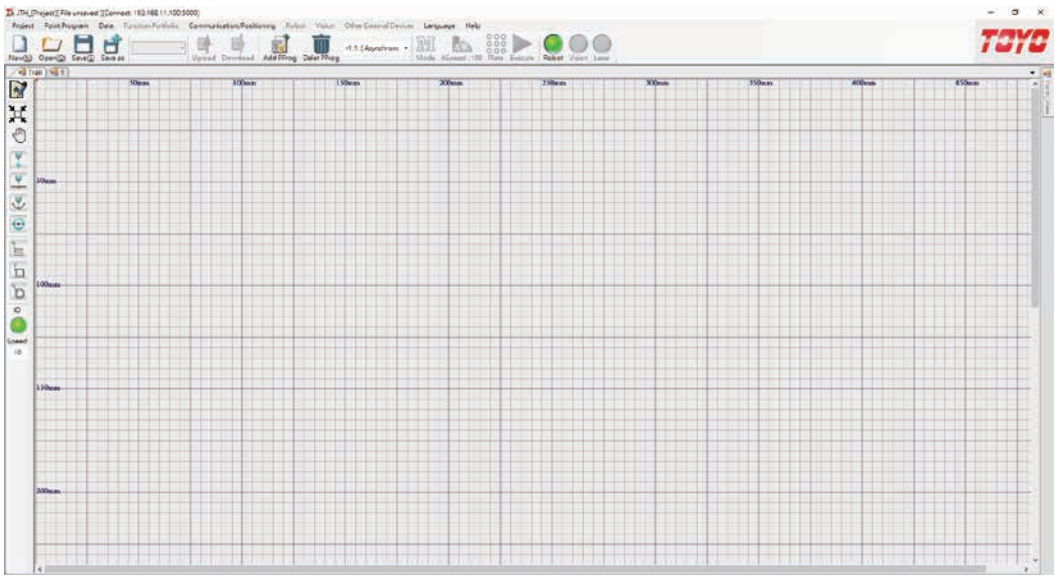
Motion Drawing Panel: View and edit the path of the motion controller (2D paths)

Attention:
1.Points cannot be removed from the active procedure points collection. Points can only be removed the active procedure collection in the active procedure tab page.
2.Motion drawing panel cannot display nor edit the height of the motion controller.
3.Points in the motion drawing panel only approximate the position of the motion controller. For accurate point coordinate values, refer to the values in procedure tab page.
4.Points cannot be inserted into the current path. Points can only added to the end of the procedure points collection.

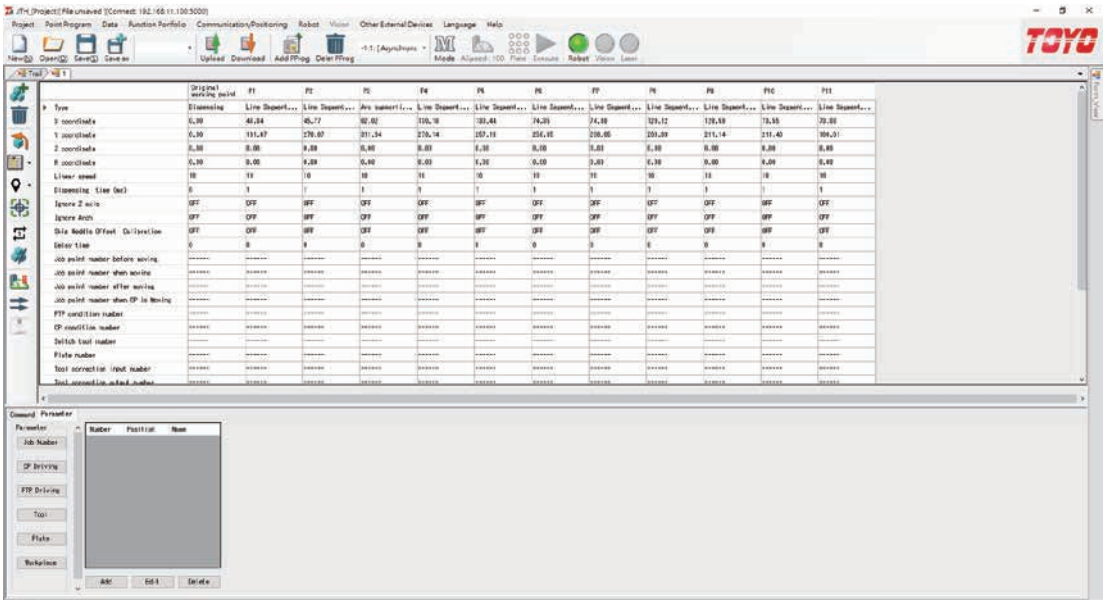
① Select the motion viewer tab page in the procedure tab collection

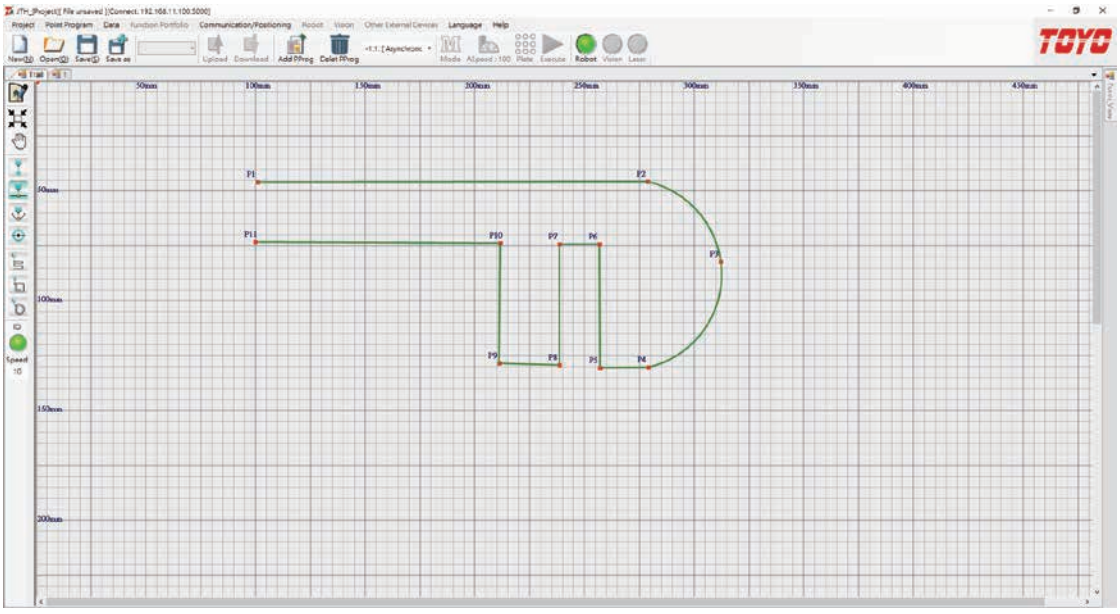


(1) Y-axis is located at the top of the drawing panel extending rightward in the positive direction.
(2) X-axis is located at the left of the drawing panel extending downward in the positive direction.

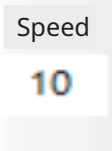


② Point procedure path edits will be displayed in the motion viewer, the point will be sorted by index in the point collection.





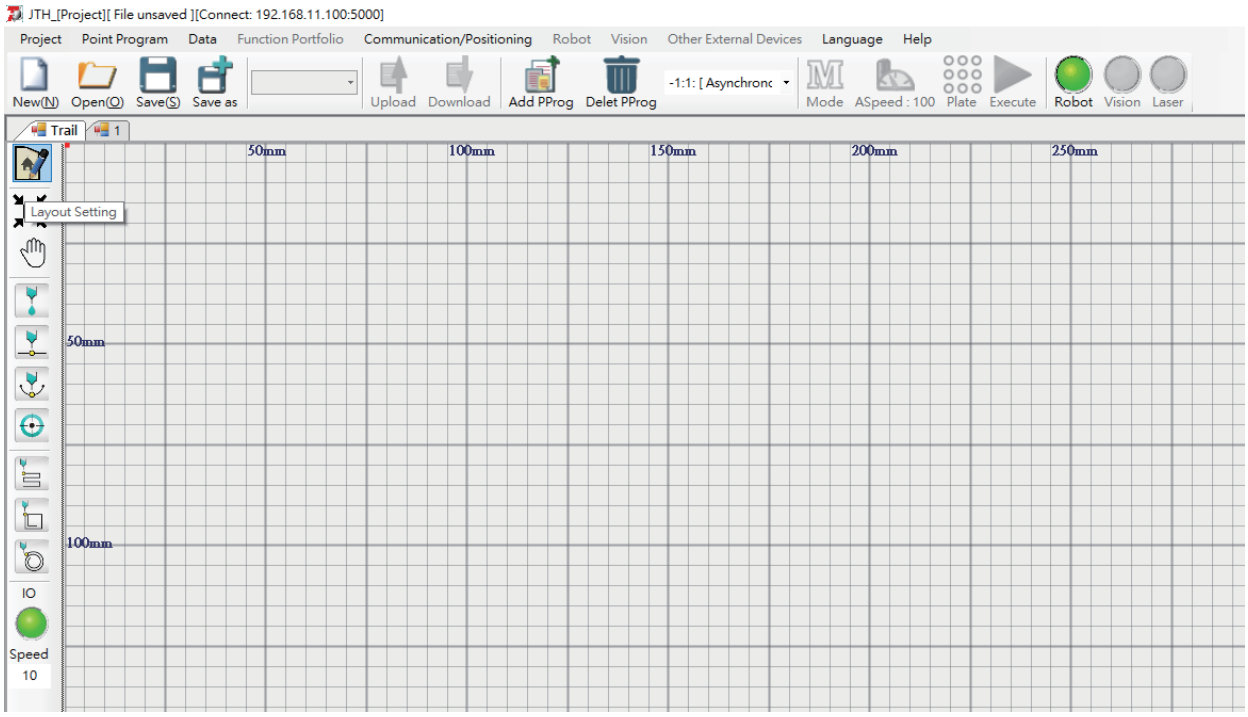
Points can be added in the motion viewer/drawing panel

	Sheet settings, can insert an image into the motion viewer background
	Exit full-screen mode
	Drag movement
	Dispense
	Line segment, two points are required to create a line segment
	Arc, first select the source and target points, and then select a third point on the arc.
	Circle, requires a source position on the circumference and the center position
	Square wave, after setting the relevant parameters, set the mutually diagonal start and target points
	4-angle spirangle, after setting the relevant parameters, select diagonal vertexes of the bounding rectangle. (The vertexes will only be displayed in the motion viewer)
	Spiral type. After clicking set parameter, choose start point then choose any 2 points on the circular(in the orbit, it only presents a circular instead of spiral)
	Green indicates the desktop robot is connected, gray indicates there is no valid connection
	Linear speed

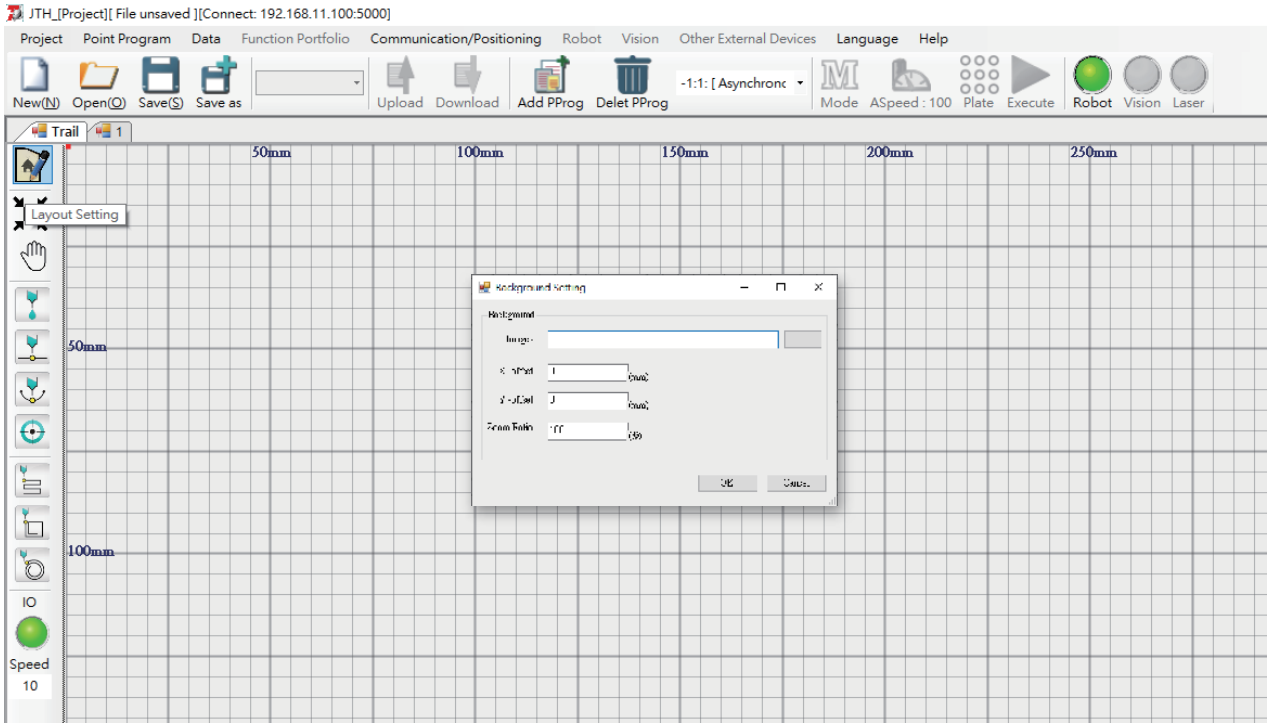
② Chart Settings

Attention:

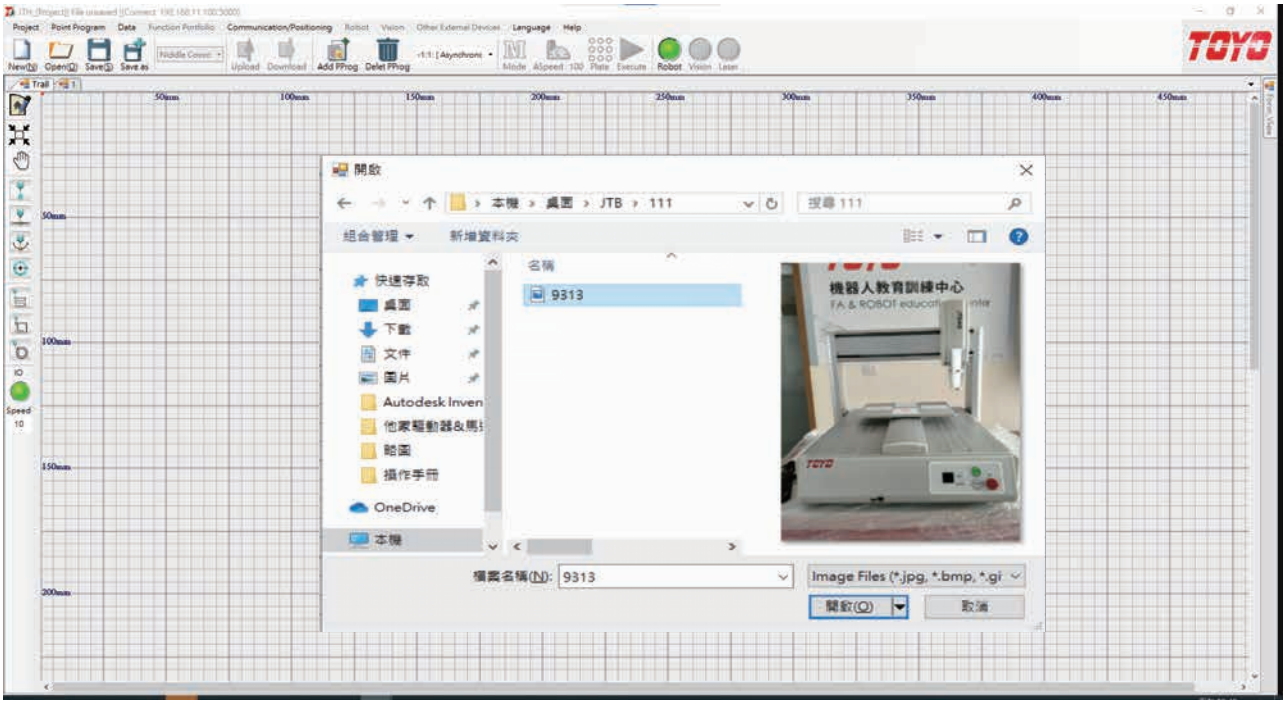
This function does not save the image in the active procedure. If the procedure is not changed or is simply switched, then the image will remain in motion viewer until the project or image file is closed.

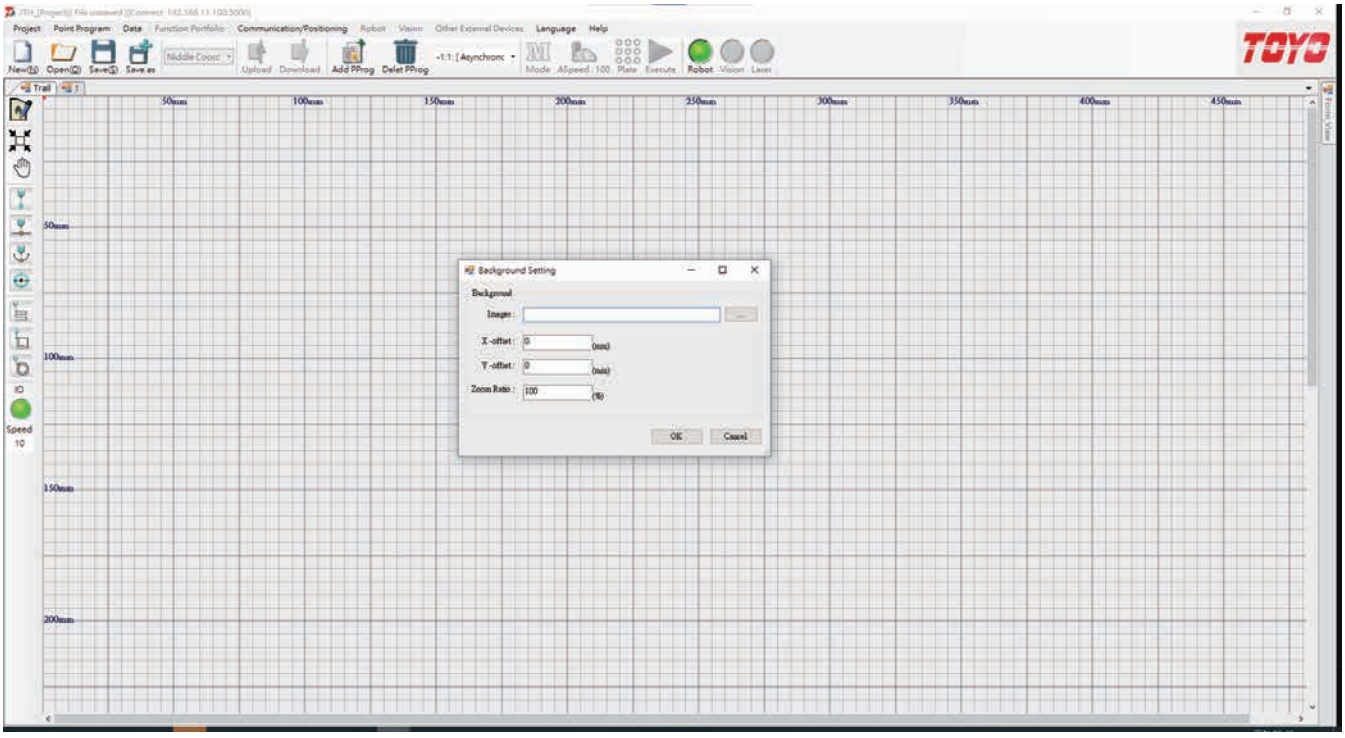


Select the file and offset values

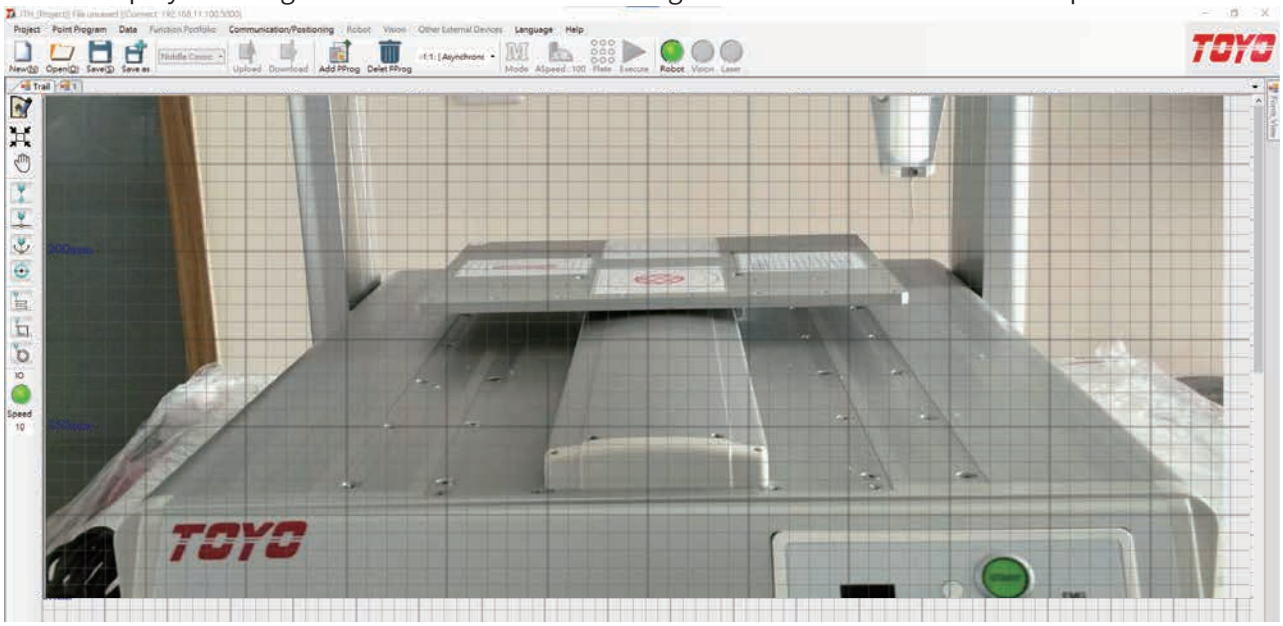


Select an image to upload to the 2D motion chart.

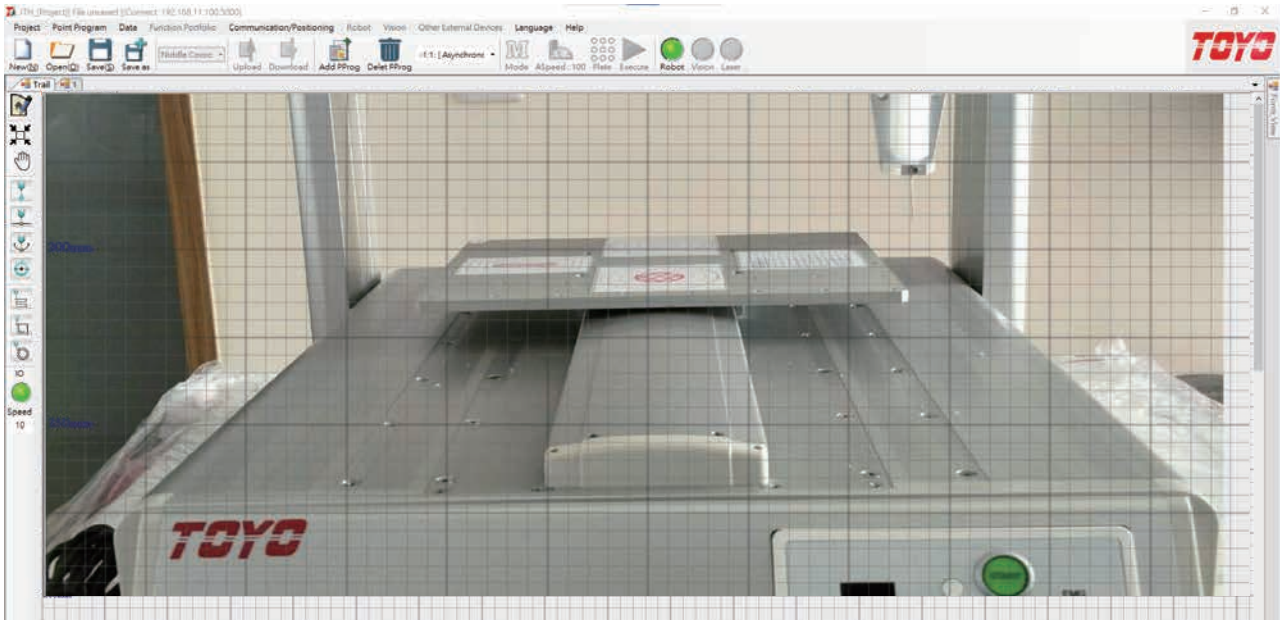




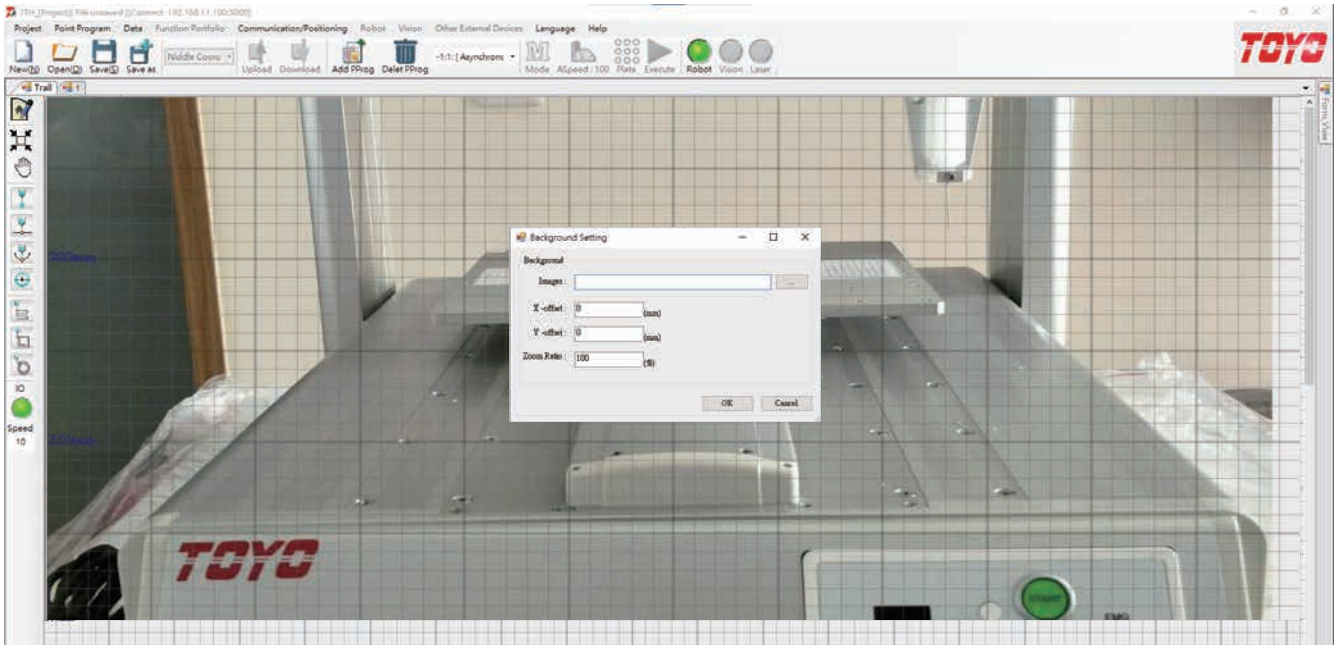
This will display the image in the motion chart. This image will not be saved in the active procedure.

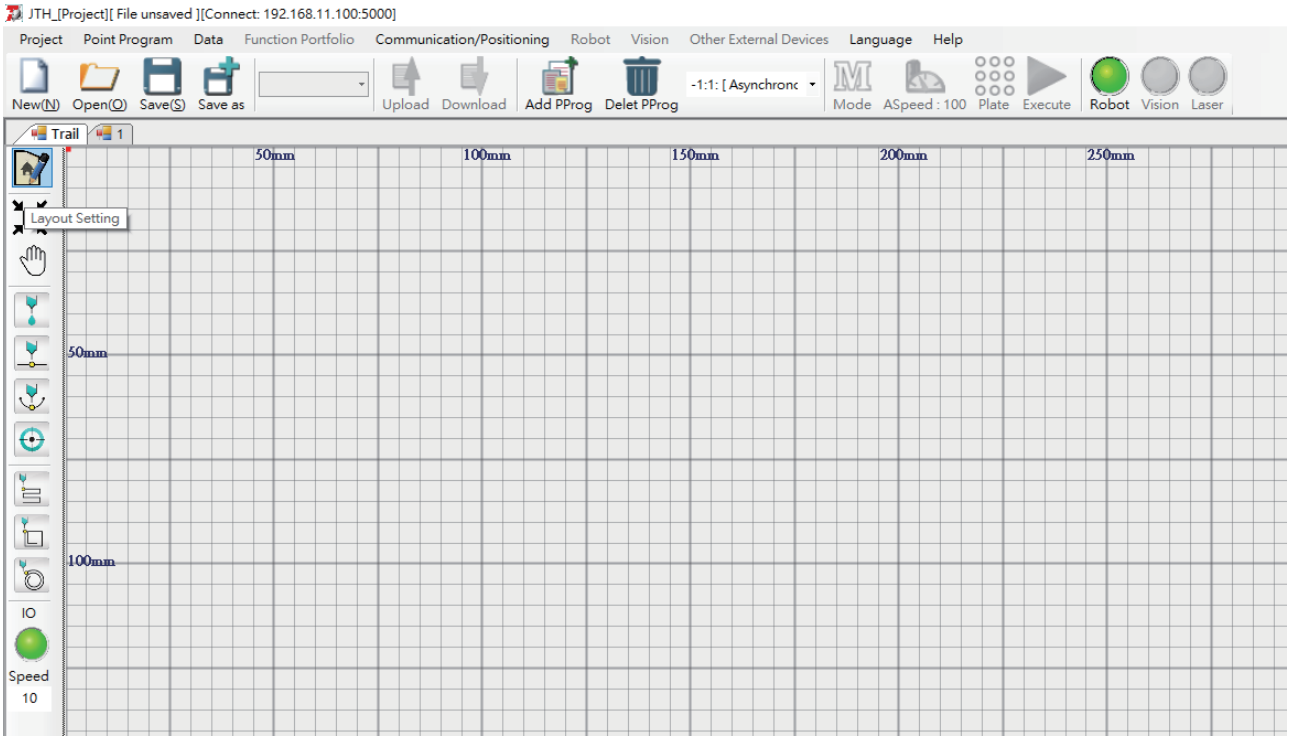


In independent procedure switch mode this image will remain. If the image is closed, then it must be uploaded again as follows.



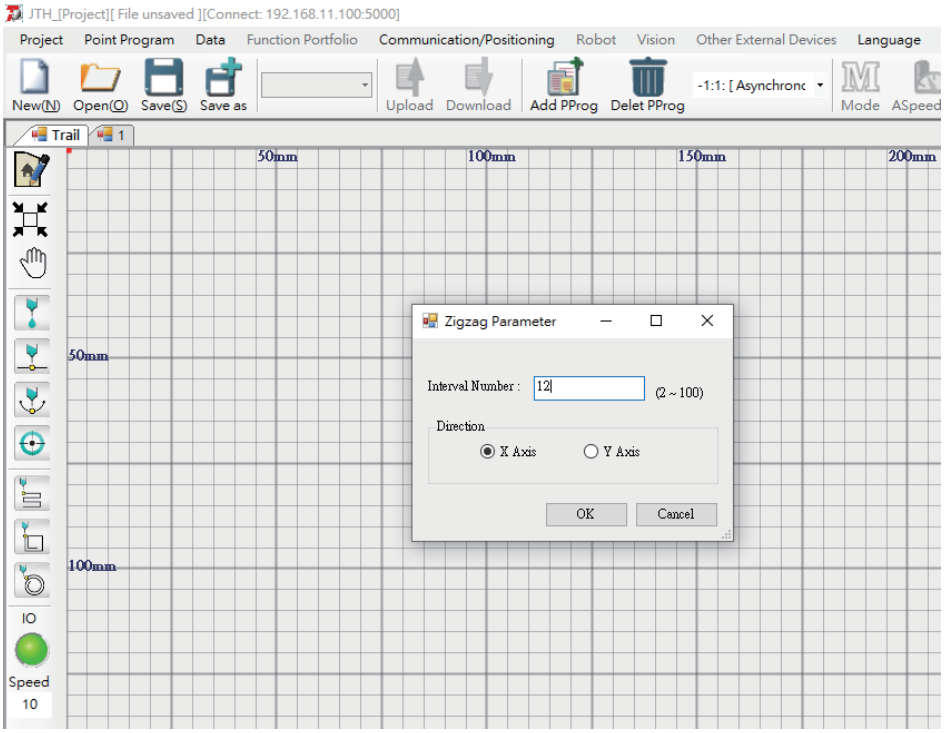
In the <name> dialog box, remove the URL from the file path text box, and then press the confirm button



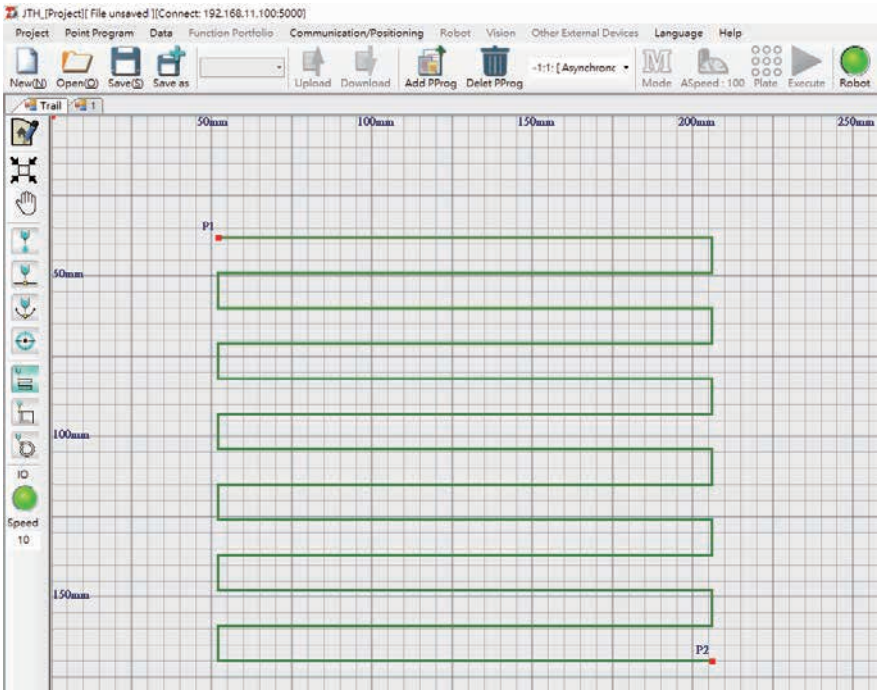


Zigzag type:

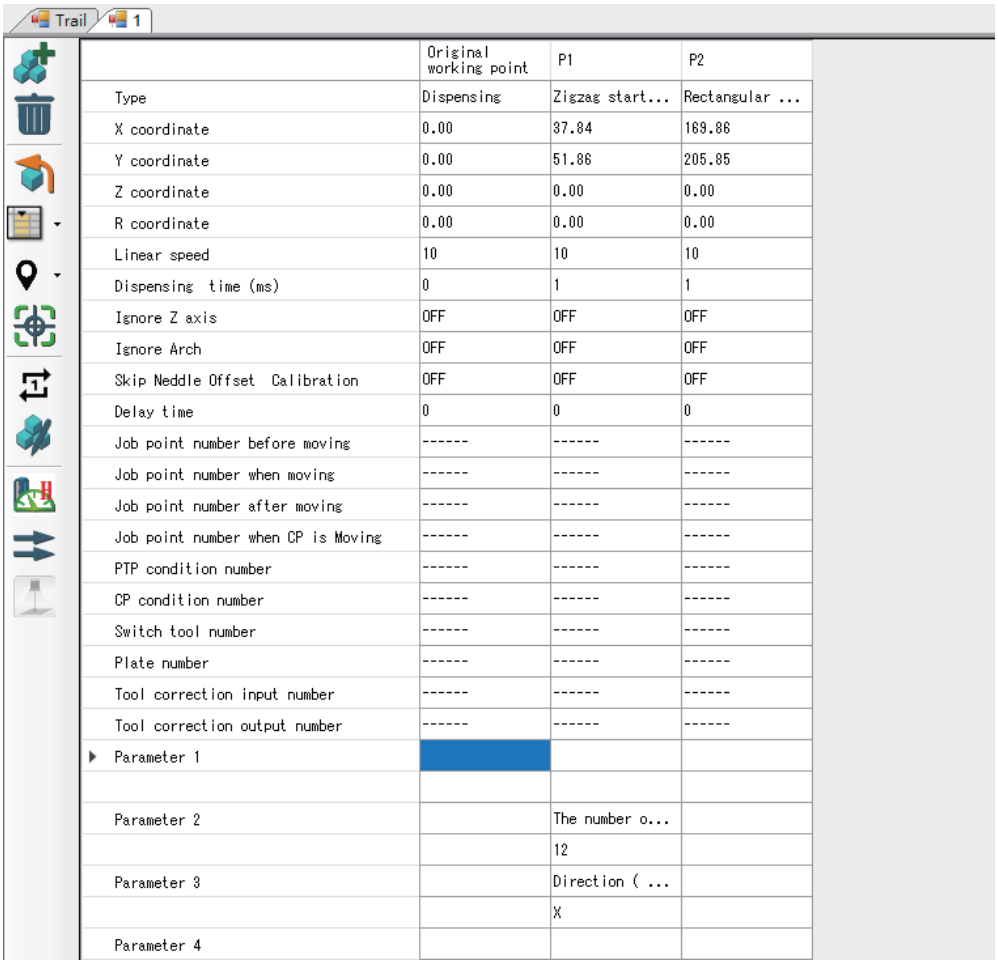
First set the orientation and number of half-intervals



Set the source and target points of the path (must be mutually diagonal)



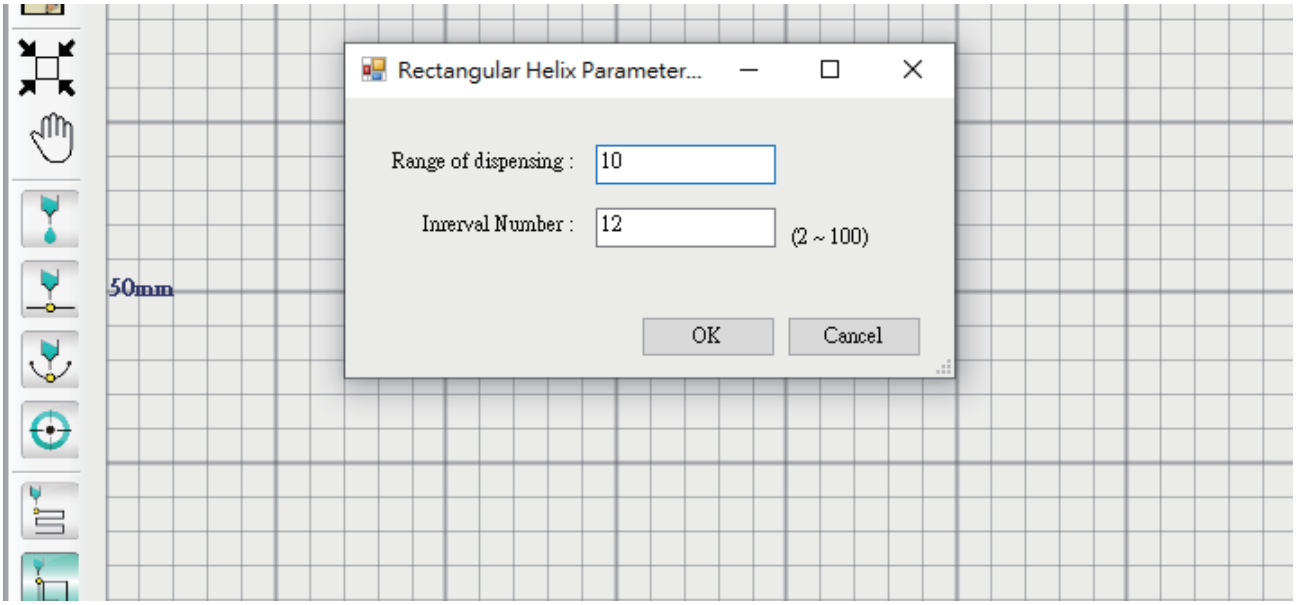
Points along the path will also be automatically generated and placed within the procedure



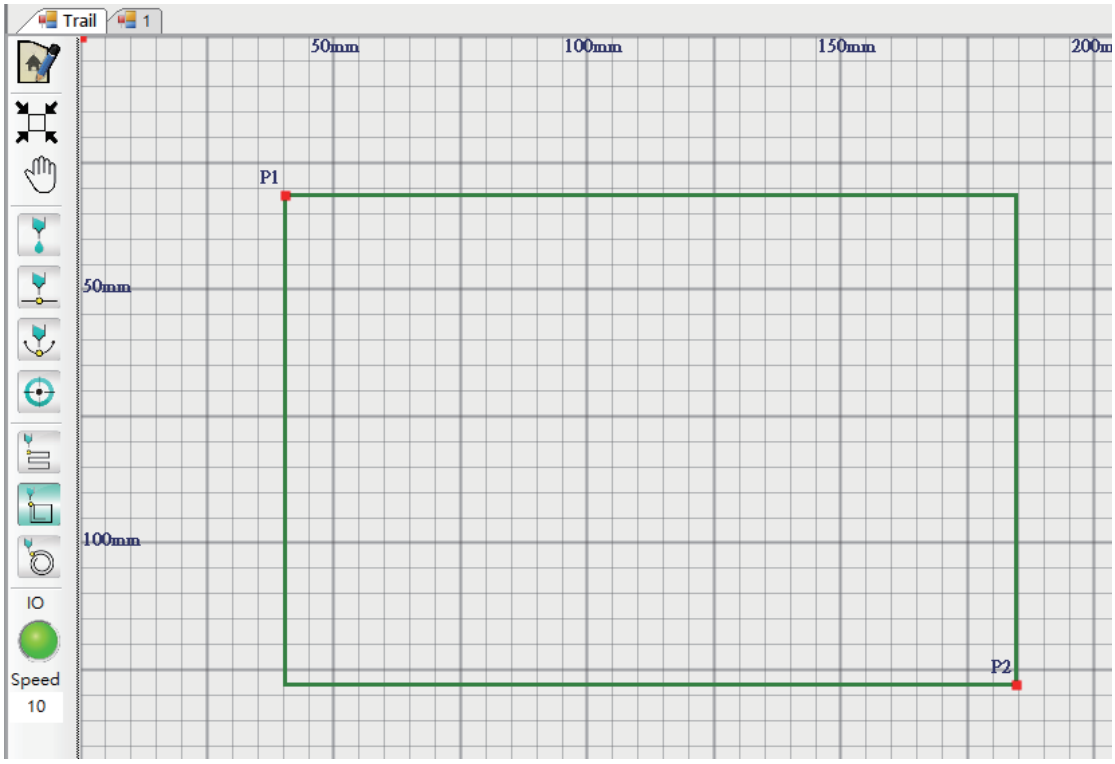
	Original working point	P1	P2
Type	Dispensing	Zigzag start...	Rectangular ...
X coordinate	0.00	37.84	169.86
Y coordinate	0.00	51.86	205.85
Z coordinate	0.00	0.00	0.00
R coordinate	0.00	0.00	0.00
Linear speed	10	10	10
Dispensing time (ms)	0	1	1
Ignore Z axis	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF
Delay time	0	0	0
Job point number before moving	------	------	------
Job point number when moving	------	------	------
Job point number after moving	------	------	------
Job point number when CP is Moving	------	------	------
PTP condition number	------	------	------
CP condition number	------	------	------
Switch tool number	------	------	------
Plate number	------	------	------
Tool correction input number	------	------	------
Tool correction output number	------	------	------
Parameter 1			
Parameter 2		The number o...	
		12	
Parameter 3		Direction (...	
		X	
Parameter 4			

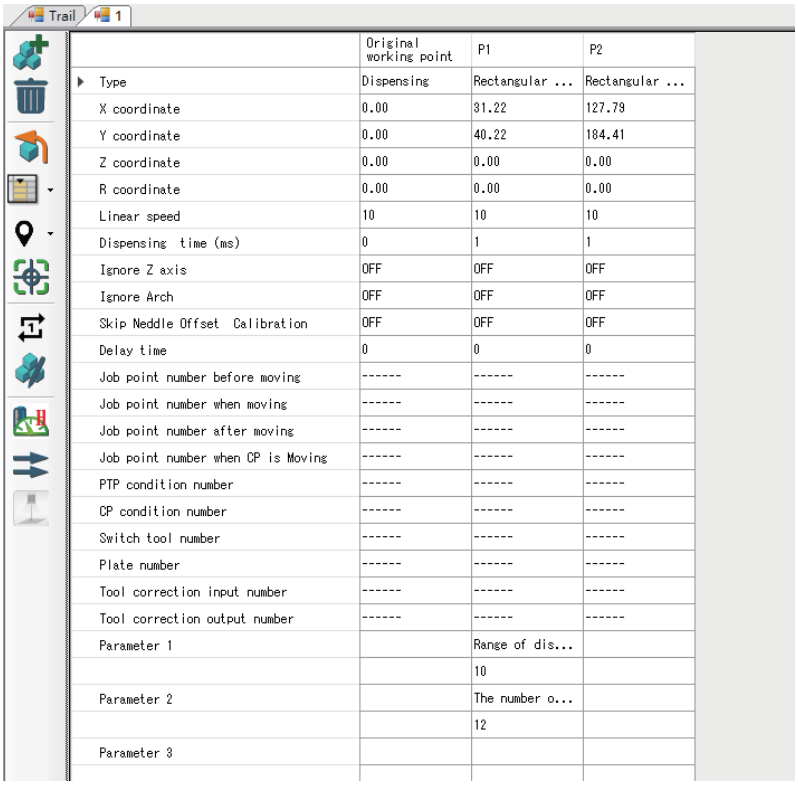
4-rectangle Spirangle:

Set the track height and number (Please refer to Section xx, Pages yy-zz)



Set mutually diagonal vertexes of the bounding box (motion drawing panel will only display the bounding box, and not the 4-angle spirangle)

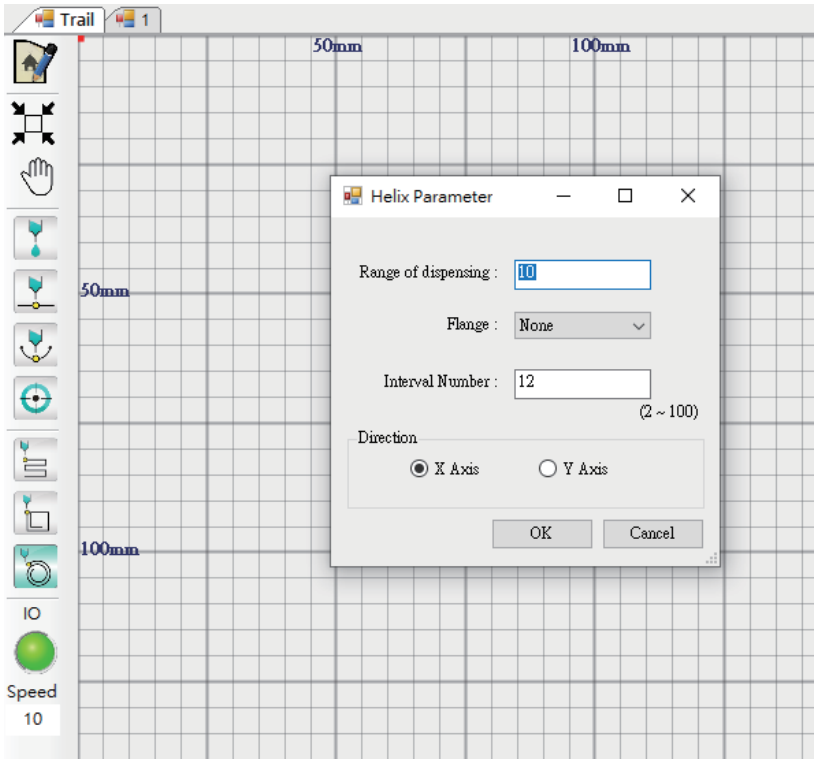




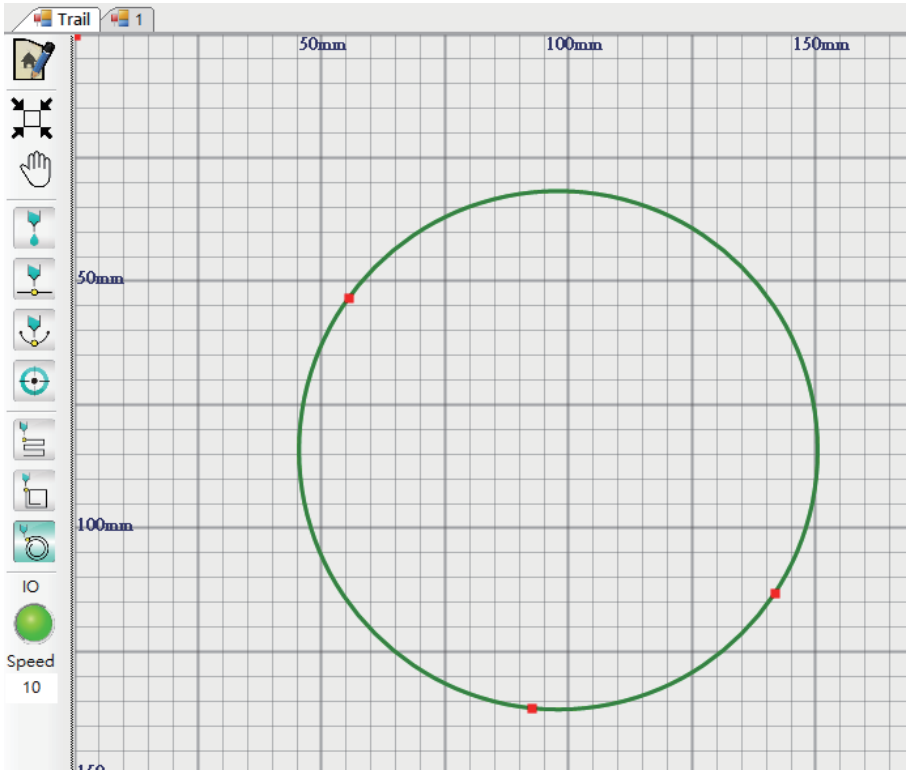
	Original working point	P1	P2
Type	Dispensing	Rectangular ...	Rectangular ...
X coordinate	0.00	31.22	127.79
Y coordinate	0.00	40.22	184.41
Z coordinate	0.00	0.00	0.00
R coordinate	0.00	0.00	0.00
Linear speed	10	10	10
Dispensing time (ms)	0	1	1
Ignore Z axis	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF
Delay time	0	0	0
Job point number before moving	------	------	------
Job point number when moving	------	------	------
Job point number after moving	------	------	------
Job point number when CP is Moving	------	------	------
PTP condition number	------	------	------
CP condition number	------	------	------
Switch tool number	------	------	------
Plate number	------	------	------
Tool correction input number	------	------	------
Tool correction output number	------	------	------
Parameter 1		Range of dis...	
		10	
Parameter 2		The number o...	
		12	
Parameter 3			

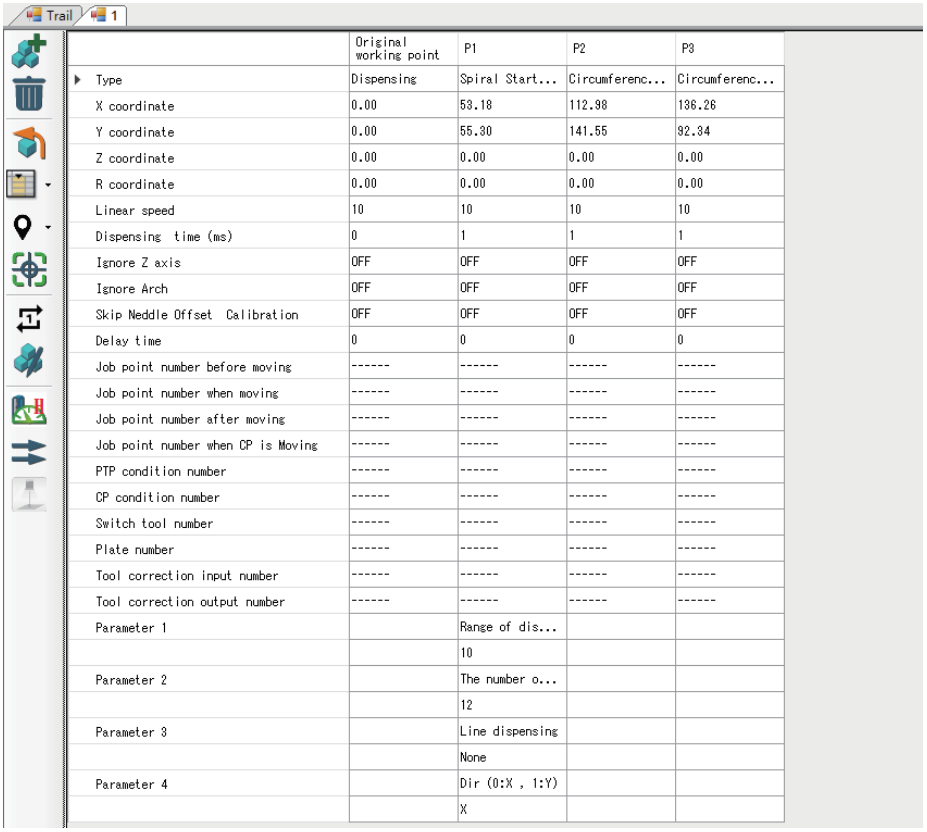
Spiral:

Set spiral parameters(Section No. or Pg. No.)



Section No. or Pg. No(only the bounding circle will be displayed)



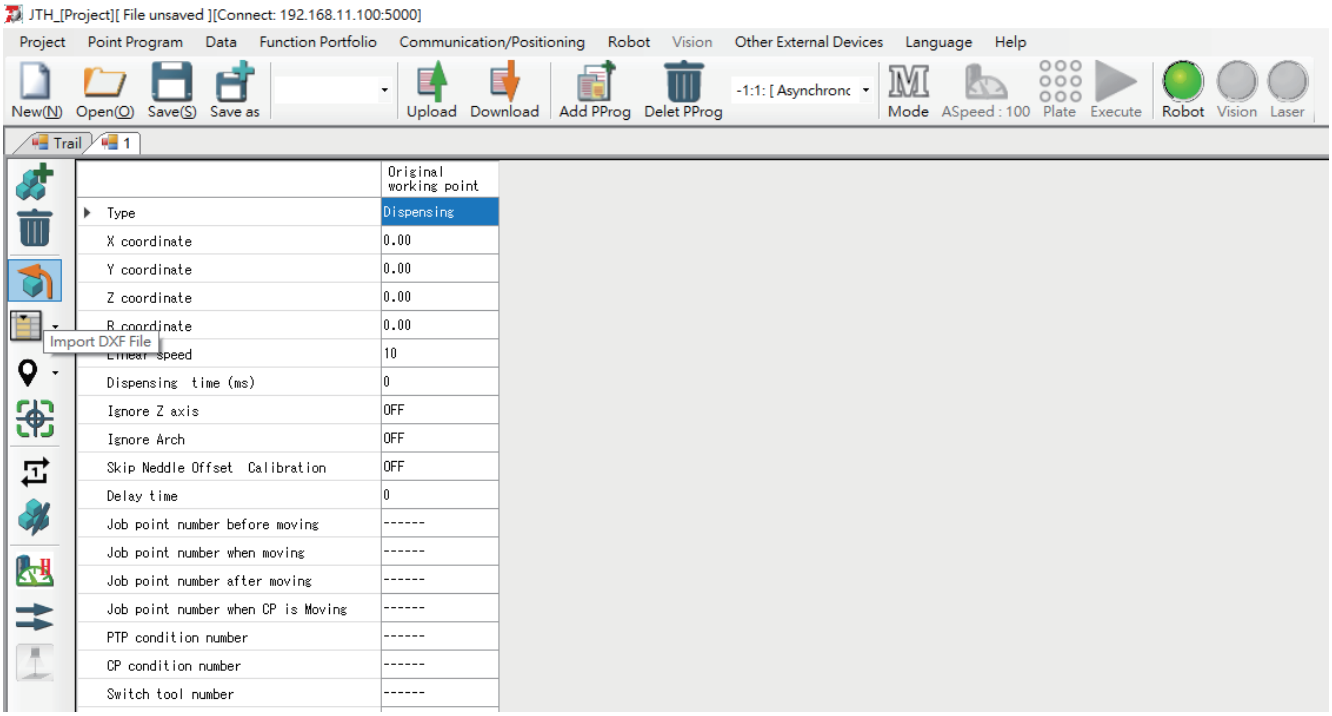


	Original working point	P1	P2	P3
Type	Dispensing	Spiral Start...	Circumferenc...	Circumferenc...
X coordinate	0.00	53.18	112.98	136.26
Y coordinate	0.00	55.30	141.55	92.34
Z coordinate	0.00	0.00	0.00	0.00
R coordinate	0.00	0.00	0.00	0.00
Linear speed	10	10	10	10
Dispensing time (ms)	0	1	1	1
Ignore Z axis	OFF	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF	OFF
Delay time	0	0	0	0
Job point number before moving	------	------	------	------
Job point number when moving	------	------	------	------
Job point number after moving	------	------	------	------
Job point number when CP is Moving	------	------	------	------
PTP condition number	------	------	------	------
CP condition number	------	------	------	------
Switch tool number	------	------	------	------
Plate number	------	------	------	------
Tool correction input number	------	------	------	------
Tool correction output number	------	------	------	------
Parameter 1		Range of dis...		
		10		
Parameter 2		The number o...		
		12		
Parameter 3		Line dispensing		
		None		
Parameter 4		Dir (0:X , 1:Y)		
		X		

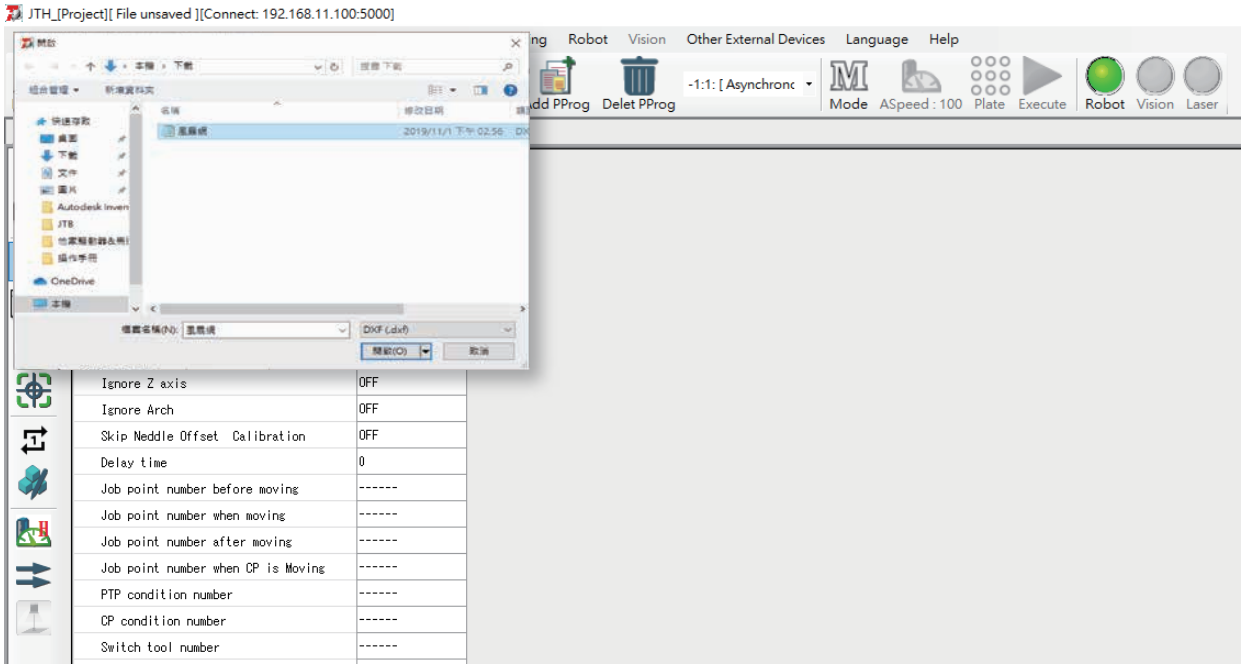
17.Import DXF file description

This function can take a DXF-formatted AutoCAD file and import it into the JTB procedure.
First convert the CAD model into polyline, otherwise the import function will have unexpected behavior.
Turn it into a polyline to know the order of the point position for sorting

①In the Procedure Toolbar located on the left hand side of the Active Window press the Import DXF File Button

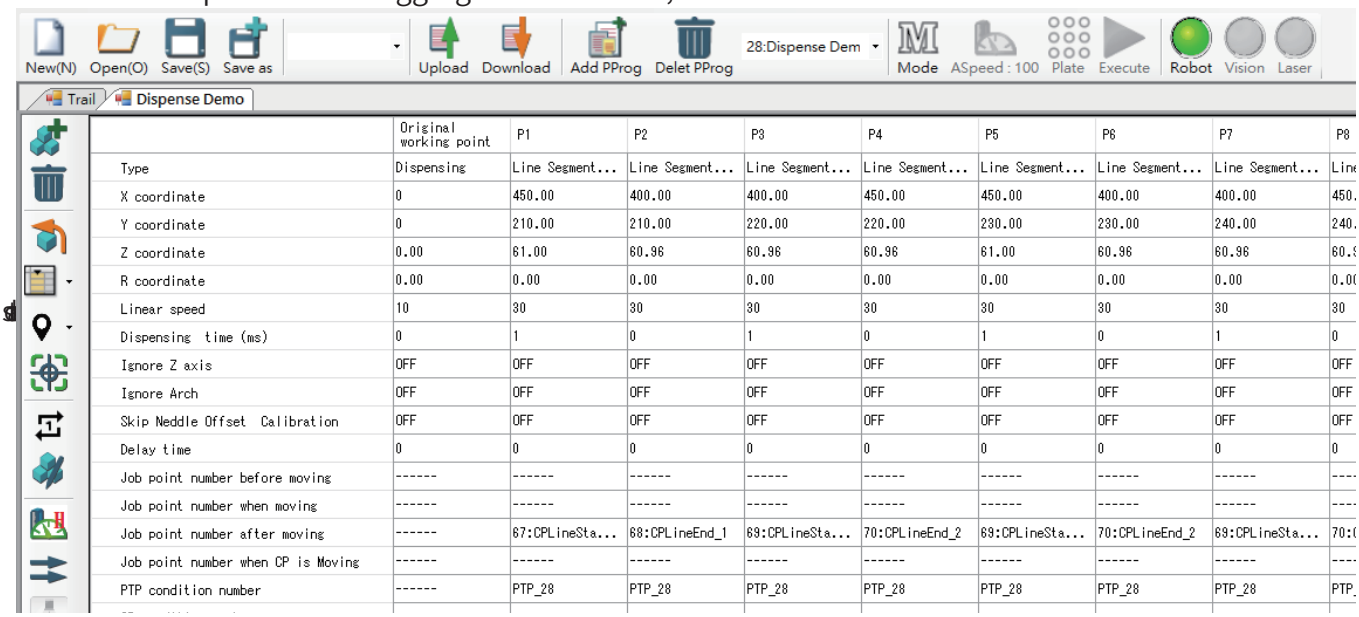


Select the polyline DXF file.



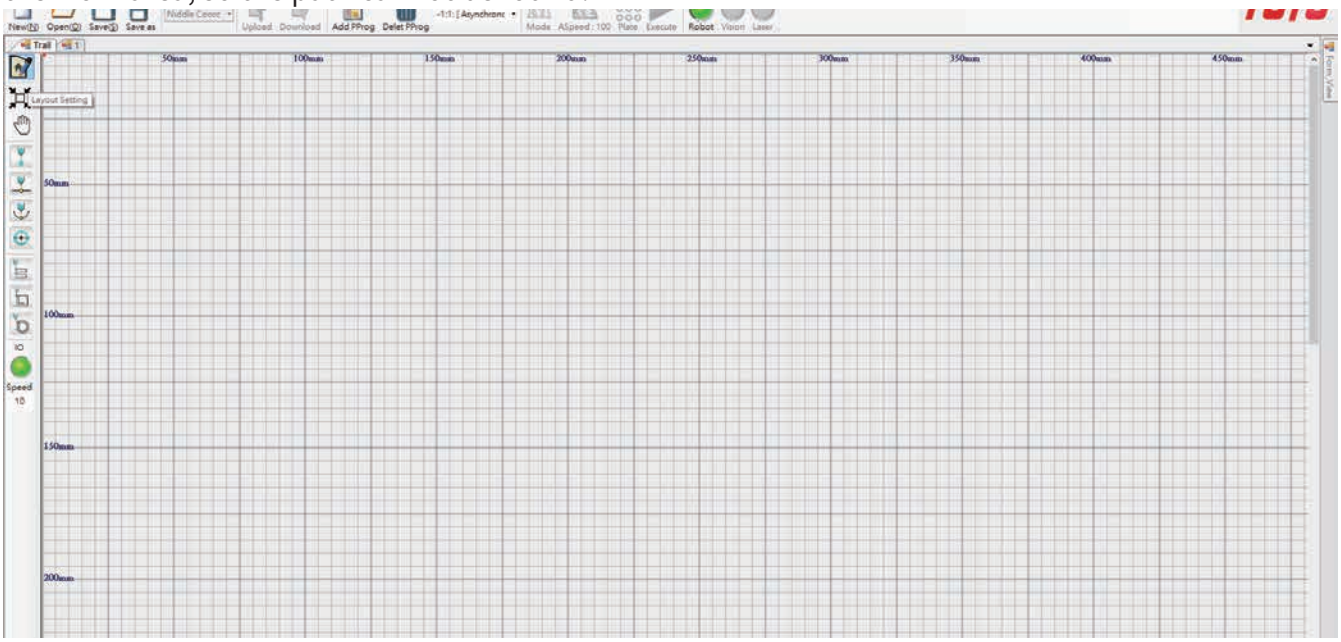
The application will automatically add points to the procedure points collection in the order they occur on the polyline. If the imported file is not a polyline drawing, then the points collection will not be sortable.

If the imported file is not a polyline drawing, the points will be auto-generated based on their position and aggregated line order, but cannot be sorted.

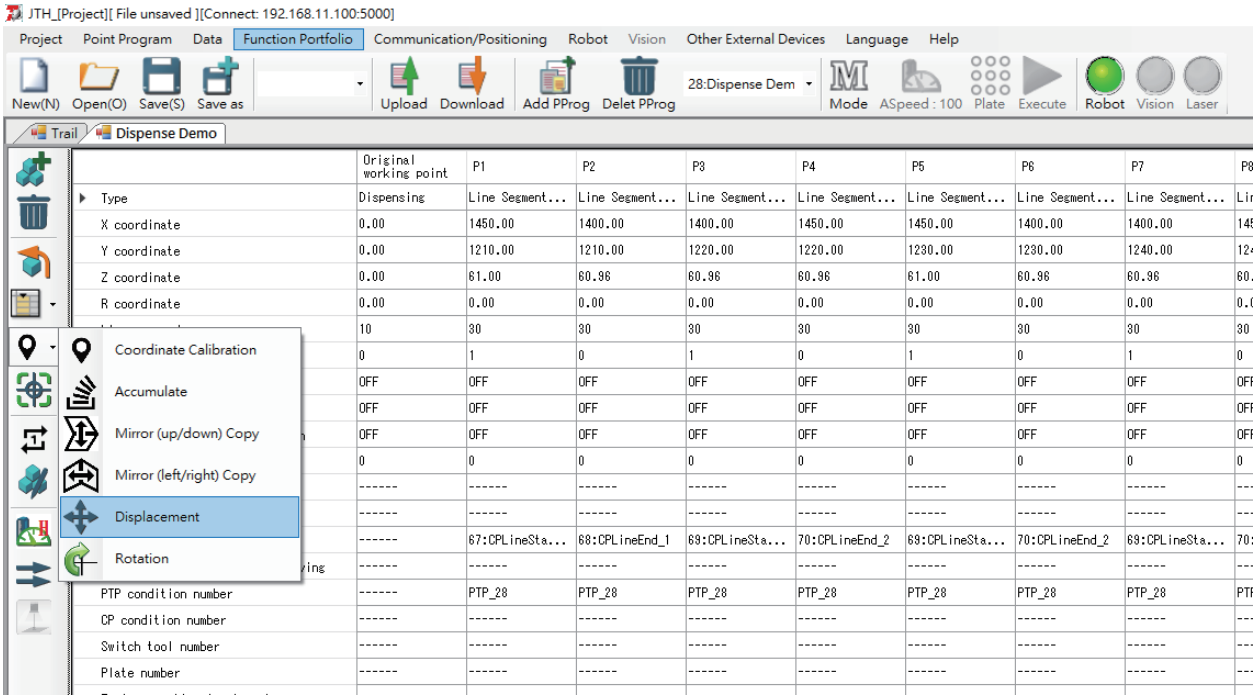


	Original working point	P1	P2	P3	P4	P5	P6	P7	P8
Type	Dispensing	Line Segment...	Line Segment...	Line Segment...	Line Segment...	Line Segment...	Line Segment...	Line Segment...	Line
X coordinate	0	450.00	400.00	400.00	450.00	450.00	400.00	400.00	450.
Y coordinate	0	210.00	210.00	220.00	220.00	230.00	230.00	240.00	240.
Z coordinate	0.00	61.00	60.96	60.96	60.96	61.00	60.96	60.96	60.
R coordinate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Linear speed	10	30	30	30	30	30	30	30	30
Dispensing time (ms)	0	1	0	1	0	1	0	1	0
Ignore Z axis	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Delay time	0	0	0	0	0	0	0	0	0
Job point number before moving	------	------	------	------	------	------	------	------	----
Job point number when moving	------	------	------	------	------	------	------	------	----
Job point number after moving	------	67:CPLineSta...	68:CPLineEnd_1	69:CPLineSta...	70:CPLineEnd_2	69:CPLineSta...	70:CPLineEnd_2	69:CPLineSta...	70:(
Job point number when CP is Moving	------	------	------	------	------	------	------	------	----
PTP condition number	------	PTP_28	PTP_28	PTP_28	PTP_28	PTP_28	PTP_28	PTP_28	PTP_

The coordinate positions of all the points in the procedure points collection exceed the bounds of the work area, so the path cannot be found.

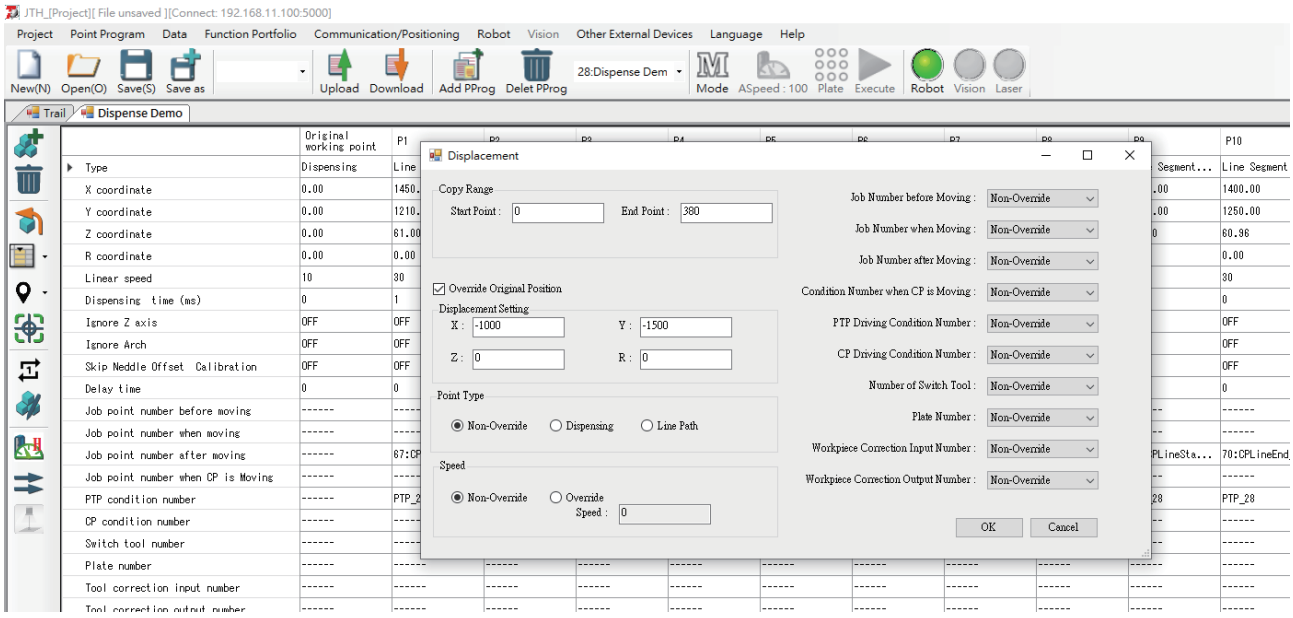


Use offset to find the move the path into the effect work area.

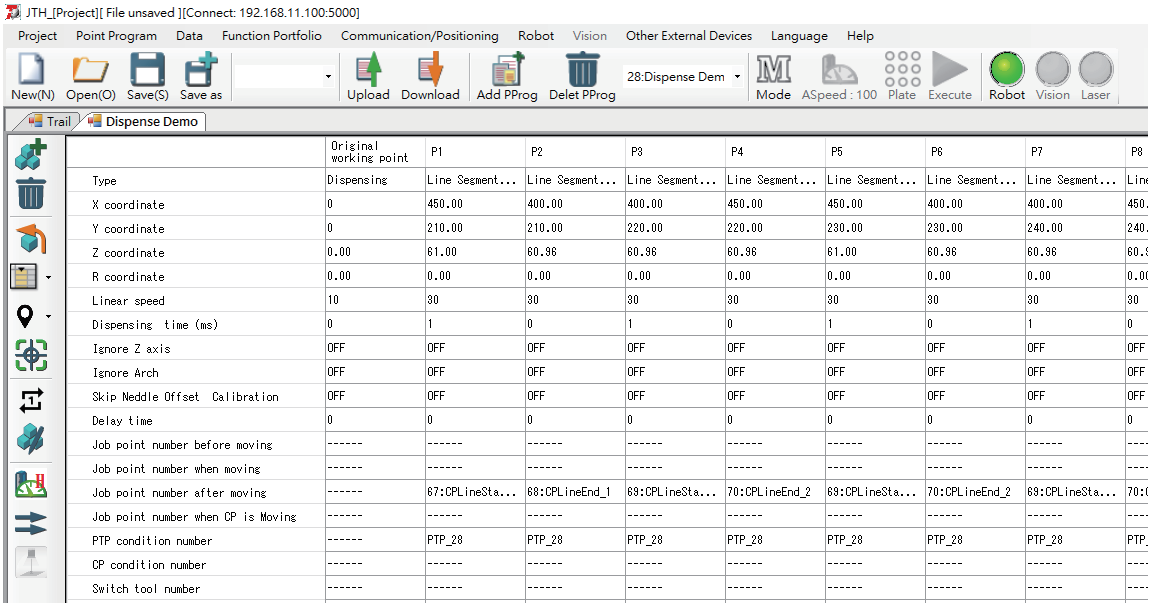


User must complete all of the fields Offset Dialog Box:

EX: There are 380 graphics in this group, and choose whether to copy or overwrite, and then choose the offset.
DXF import is generated by drawing, or all can be adjusted into line segments or glued, and then finally set the linear speed.

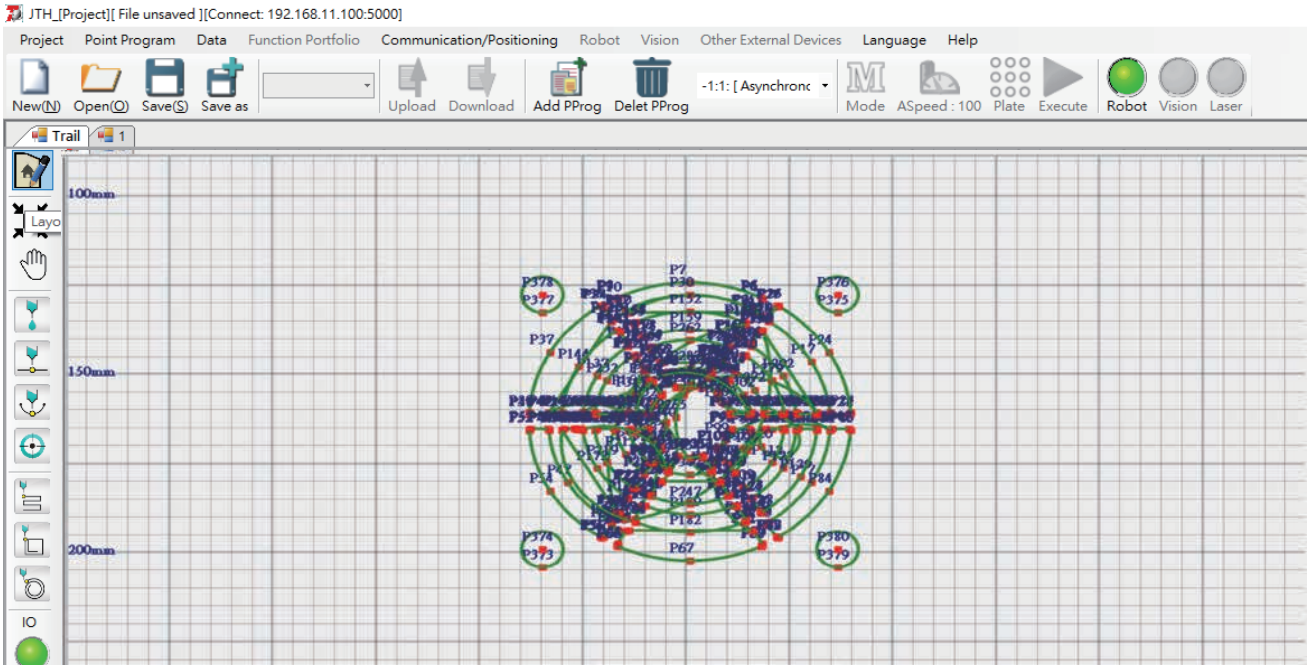


Offset parameter will be applied automatically.



	Original working point	P1	P2	P3	P4	P5	P6	P7	P8
Type	Dispensing	Line Segment...	Line Segment...	Line Segment...	Line Segment...	Line Segment...	Line Segment...	Line Segment...	Line
X coordinate	0	450.00	400.00	400.00	450.00	450.00	400.00	400.00	450.
Y coordinate	0	210.00	210.00	220.00	220.00	230.00	230.00	240.00	240.
Z coordinate	0.00	61.00	60.96	60.96	60.96	61.00	60.96	60.96	60.
R coordinate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Linear speed	10	30	30	30	30	30	30	30	30
Dispensing time (ms)	0	1	0	1	0	1	0	1	0
Ignore Z axis	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Ignore Arch	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Skip Neddle Offset Calibration	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Delay time	0	0	0	0	0	0	0	0	0
Job point number before moving	------	------	------	------	------	------	------	------	----
Job point number when moving	------	------	------	------	------	------	------	------	----
Job point number after moving	------	67:CPLineSta...	68:CPLineEnd_1	69:CPLineSta...	70:CPLineEnd_2	69:CPLineSta...	70:CPLineEnd_2	69:CPLineSta...	70:
Job point number when CP is Moving	------	------	------	------	------	------	------	------	----
PTP condition number	------	PTP_28	PTP_28	PTP_28	PTP_28	PTP_28	PTP_28	PTP_28	PTP
CP condition number	------	------	------	------	------	------	------	------	----
Switch tool number	------	------	------	------	------	------	------	------	----

The desktop robot path can be drawn in the path drawing panel.



18.Product specification

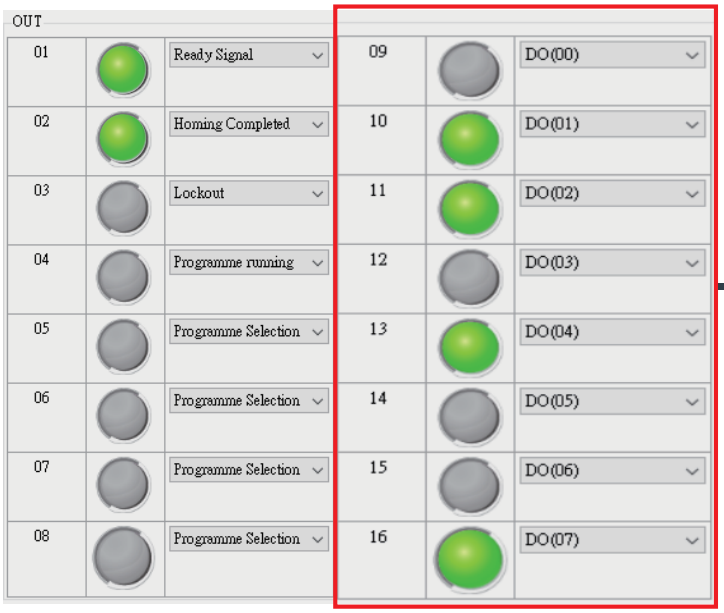
Procedure		Upper limit 100 procedures
Points		Procedure point upper limit 50,000 points Project point upper limit 1,000,000 points
Operation number	Before Move Point Operation Number	maximum 100 sets each set 1000 lines
	During Move Point Operation Number	
	After Move Point Operation Number	
PTP Movement Condition Codes		Upper limit 50 conditions
Continuous Path Code		Upper limit 50 conditions
Change Tool Code		Upper limit 50 conditions
Array Number		Upper limit 50 conditions
Workpiece Revision Number		Maximum 3000
Executing condition number		
IO	Input Signal	16 signals can be used, including 12 dedicated signals, 16 general purpose Signal, users can freely use
	Output Signal	16 signals can be used, including 12 dedicated signals, 16 general purpose Signal, users can freely use

Appendix A: Communication command

No.	Command Format	Application	Description
1	@SPEED k <CR><LF>	[TX] – @SPEED 50 <CR><LF> [RX] – OK<CR><LF>	set the move speed. Use when the move command hasn' ordered speed
2	@MSPEED k <CR> <LF>	[TX] – @MSPEED 100<CR><LF> [RX] – OK<CR><LF>	set the operating speed in manual mode
3	@ABSRST <CR><LF>	[TX] – @ABSRST<CR><LF> [RX] – ORG_0.00 0.00 0.00 0.00<CR><LF>	origin point returning
4	@MOVE L [Coor.],[VEL] <CR><LF>	[TX] – @MOVE L 300.0 300.00 0 0,V=300<CR><LF> [RX] – OK<CR><LF>	straight moves to specific absolute coordination. MOVE L needs to use line speed V=(V value 1~800)
5	@MOVEI L [Coor.],[VEL] <CR><LF>	[TX] – @MOVEI L 50000 0 0 0 ,V=100<CR><LF: [RX] – OK<CR><LF>	straight moves to specific relative coordination. MOVE L needs to use line speed V=(V value 1~800)
6	@MOVE P [Coor.],[SPEED%] <CR><LF>	[TX] – @MOVE P 300.00 300.00 48.20 0 ,S=5<CR><LF> [RX] – OK<CR><LF>	PTP moves to specific absolute coordination. MOVE P nee to use line speed S=(S value 1~100)
7	@MOVE P [Coor.],[Arch],[SPEED%] <CR><LF>	[TX] – @MOVE P 300.00 300.00 48.20 0 ,Z=12.3,S=5<CR><LF> [RX] – OK<CR><LF>	PTP Arch moves to specific absolute coordination. MOVE needs to use line speed S=(S value 1~100)
8	@?WHERE <CR><LF>	[TX] – @?WHERE<CR><LF> [RX] – 119609 70965 79002 330606 0 0<CR><LF> [TX] – @?WHRXY<CR><LF> [RX] – 119.61 70.96 79.00 330.61 0.00 0.00<CR><LF>	obtain the current position
9	@?WHRXY <CR><LF>		
10	@INCH k+ <CR><LF>	[TX] – @INCH Y +<CR><LF> [RX] – OK<CR><LF> [TX] – @INCH Z +<CR><LF> [RX] – OK<CR><LF>	specific axis positive inch move
11	@INCH k- <CR><LF>		specific axis negative inch move
12	@JOG k+ <CR><LF>	[TX] – @JOG X +<CR><LF> [TX] – @STOP<CR><LF> [RX] – OK<CR><LF>	specific axis positive continuous move
13	@JOG k- <CR><LF>		specific axis negative continuous move
14	@STOP <CR><LF>		stop
15	@?ABSRST <CR><LF>	[TX] – @?ABSRST<CR><LF> [RX] – OK<CR><LF>	obtain origin point returning status
16	@?VER <CR><LF>	[TX] – @?VER<CR><LF> [RX] – 001000104190226<CR><LF>	obtain current version
17	@?SPEED <CR><LF>	[TX] – @?SPEED<CR><LF> [RX] – 100<CR><LF>	obtain current speed
18	@?MSPEED <CR><LF>	[TX] – @?MSPEED<CR><LF> [RX] – 15<CR><LF>	obtain speed of current manual mode
19	@EMGRST <CR><LF>	[TX] – @EMGRST<CR><LF> [RX] – OK<CR><LF>	clear emergency stop error status
20	@TIME [Y M D H I S] <CR><LF>	[TX] – @TIME 2019 2 27 9 41 30<CR><LF> [RX] – OK<CR><LF> [TX] – @?TIME<CR><LF> [RX] – 2019/02/27 09:41:31<CR><LF>	set system RTC
21	@?TIME <CR><LF>		obtain system RTC
22	@DO(k)= n<CR><LF> @DO 0()=m<CR><LF> ad more details P62	[TX] – @DO()=6<CR><LF> [RX] – OK<CR><LF>	usable after setting as common output(DO) in OUT
23	@?IN <CR><LF> ad more details P63	[TX] – @?IN<CR><LF> [RX] – 03 03 03 0b 4a 55<CR><LF>	load DI signal
24	@?OUT <CR><LF> ad more details P64	[TX] – @?OUT<CR><LF> [RX] – 01 01 01 00 03 30<CR><I	load DO signal
25	@?DIk<CR><LF> ad more details P65	[TX] – @?DI0<CR><LF> [RX] – 07<CR><LF>	read DI signal, input signal can only read but can not char forcely
26	@MANUAL<CR><LF>	[TX] – @MANUAL<CR><LF> [RX] – OK<CR><LF>	change the control mode to manual
27	@AUTO <CR><LF>	[TX] – @AUTO<CR><LF> [RX] – OK<CR><LF>	change the control mode to auto
28	@RESET <CR><LF>	[TX] – @RESET<CR><LF> [RX] – OK<CR><LF>	reset the program in pause
29	@RUN p<CR><LF>	[TX] – @RUN 2<CR><LF> [RX] – OK<CR><LF>	execute program
30	@ASPEED k<CR><LF>	[TX] – @ASPEED 53 <CR><LF> [RX] – OK<CR><LF>	set the move speed in auto mode
31	@?ASPEED <CR><LF>	[TX] – @?ASPEED<CR><LF> [RX] – 53<CR><LF>	Receive current speed of Auto mode

	Note	Sample
t yet	k:1~100 %*MOVE speed of related moving command	@SPEED 50 <CR><LF>
	k:1~100 % *JOG、IMCH speed of operating command	@MSPEED 30 <CR><LF>
		@ABSRST <CR><LF>
	[axis]：X Y Z R A BPulse units indicate: integer mm unit indicates: floating point* 1pulse=0.001mm	@MOVE L 100.0 100.0 20.0 0.0,V=10
		@MOVEI L 300.00 5.00 2.00 0.0 ,V=100 <CR><LF>
eds	[axis] indicates as above [Arch]is the vertical lift height before moving	@MOVE P 50.00 40.00 30.00 0.0 , S=50 <CR><LF>
P	[axis] indicates as above [Arch]is the vertical lift height before moving	@MOVE P 50.00 40.00 30.00 0.0 , Z=5.0,S=80 <CR><LF>
	unit：pulse	@?WHERE <CR><LF>
	unit：mm	@?WHRXY <CR><LF>
	k:X、Y、Z、R(X2 axis needs R axis to function normally)inch moving value(mm)=Mspeed *0.01	@INCH X + <CR><LF>
		@INCH X - <CR><LF>
	k:X、Y、Z、R stop please input@STOP command	@JOG X + <CR><LF>
		@JOG X - <CR><LF>
	OK= orgin point returning finish; NG= origin point returning not finish	@STOP <CR><LF>
		@?ABSRST <CR><LF>
		@?VER <CR><LF>
		@?SPEED <CR><LF>
		@?MSPEED <CR><LF>
	valid when EMG happens	@EMGRST <CR><LF
		@TIME 2017 2 25 16 30 30 <CR><LF
	C.E. year/month/day hour:minute:second	@?TIME <CR><LF>
	k:0~7 n=0~1	@DO(2)=1 <CR><LF> @DO0()=23 <CR><LF>
	read 16 input status	@?IN<CR><LF>
	read 16 input status	@?OUT<CR><LF>
nge	k：0~3 (2、3 have no function temporarily)	@?DI0()<CR><LF>
		@MANUAL <CR><LF>
		@AUTO <CR><LF>
	only valid in pause	@RESET <CR><LF>
	p=1~100 (100sets of program)	@RUN 1<CR><LF>
	k:1~100 %*AUTO mode speed of move command	@ASPEED 20<CR><LF>
		@?ASPEED <CR><LF>

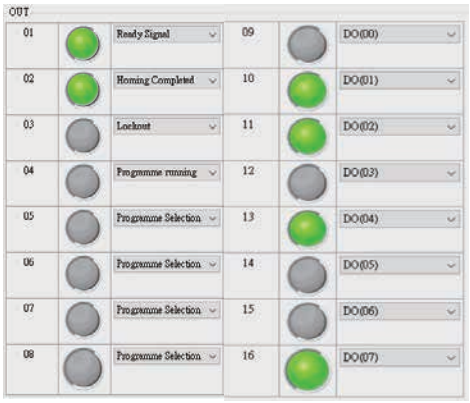
① Defined Output (DO) Description



To use DO output, DO output must be first set, when setting please set in order to avoid an error.

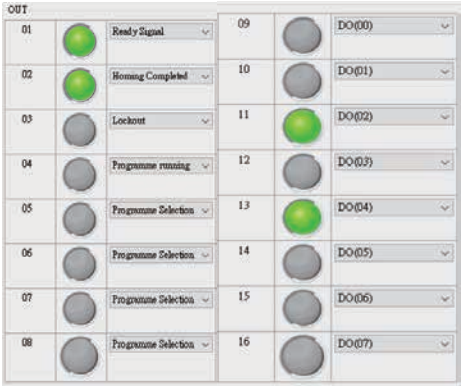
[TX] – @DO0()=150<CR><LF>

[RX] – OK<CR><LF>



[TX] – @DO0()=20<CR><LF>

[RX] – OK<CR><LF>



② IN description

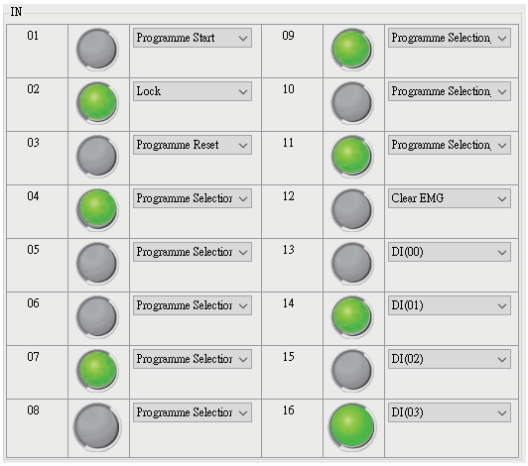
[TX] – @?IN<CR><LF>

[RX] – 03 03 03 0b 58 f5<CR><LF>

IN status is composed by 4 WORD, each number concludes 4 BIT as presented of left image.

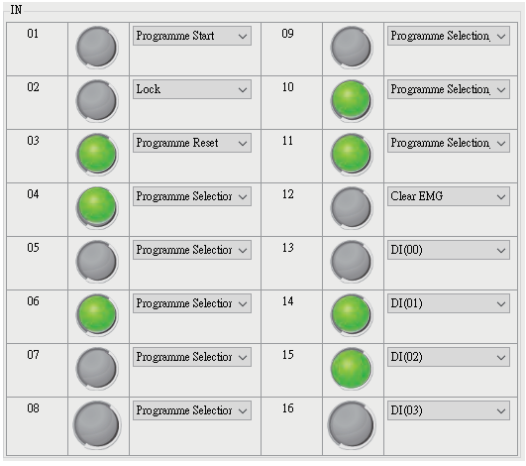
[TX] – @?IN<CR><LF>

[RX] – 03 03 03 0b 4a 55<CR><LF>



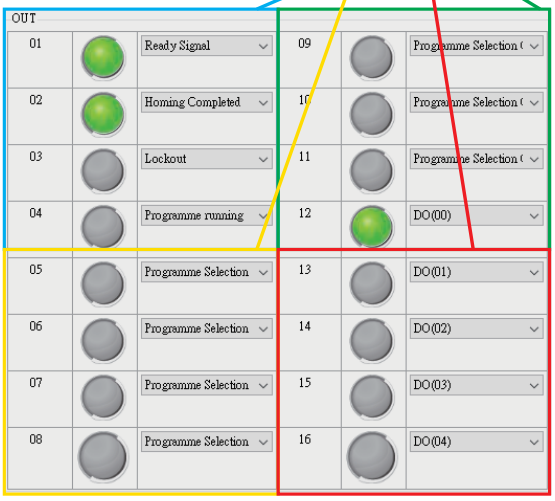
[TX] – @?IN<CR><LF>

[RX] – 03 03 03 0b 2c 36<CR><LF>



③ OUT description

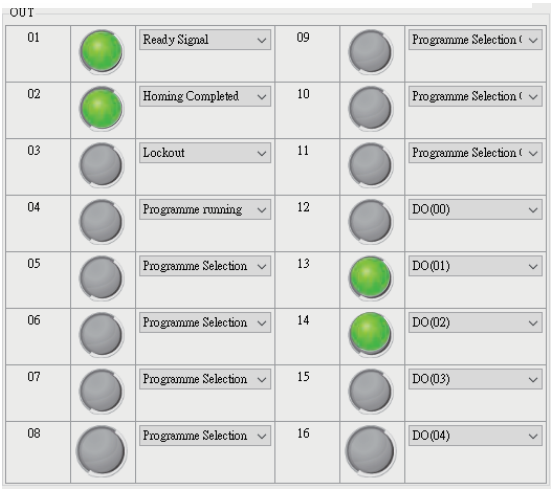
[RX] – 01 01 01 00 03 08<CR><LF>



Each output state is 4 nibbles long, as is shown in the colored frames in the figure to the left.

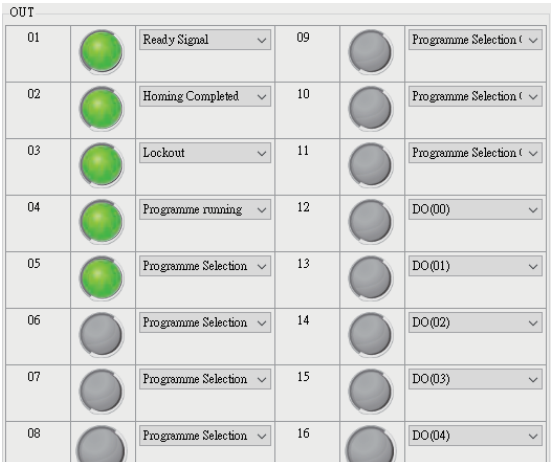
[TX] – @?OUT<CR><LF>

[RX] – 01 01 01 00 03 30<CR><LF>



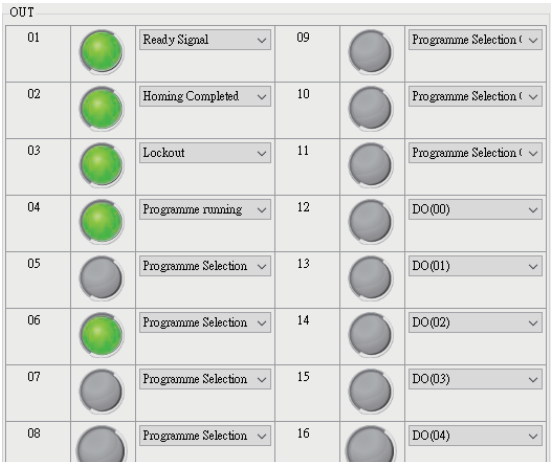
[TX] – @?OUT<CR><LF>

[RX] – 01 01 01 00 1f 00<CR><LF>



[TX] – @?OUT<CR><LF>

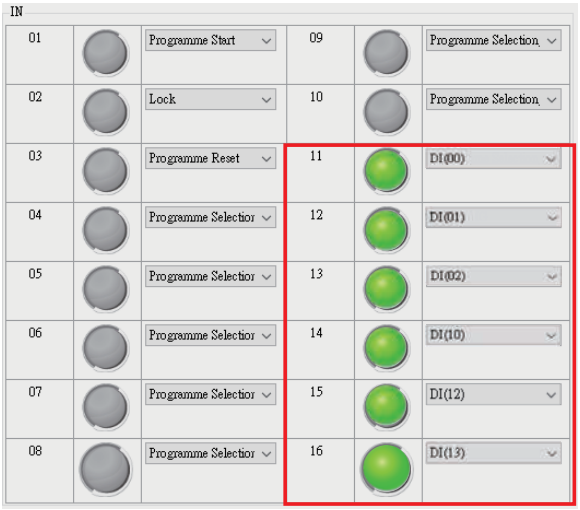
[RX] – 01 01 01 00 2f 00<CR><LF>



④ Defined Input (DI) Description

[TX] – @?DI0<CR><LF>

[RX] – 07<CR><LF>



?DI should only be used for general-purpose input. If the user wants to know the current value of DI00-DI17, then he should use the ?DI0 for DI00-07 and ?DI1 for DI10-17. The previous queries will return the bits in hexadecimal format.

Below are the differences between the various input commands:

[TX] – @?IN<CR><LF>

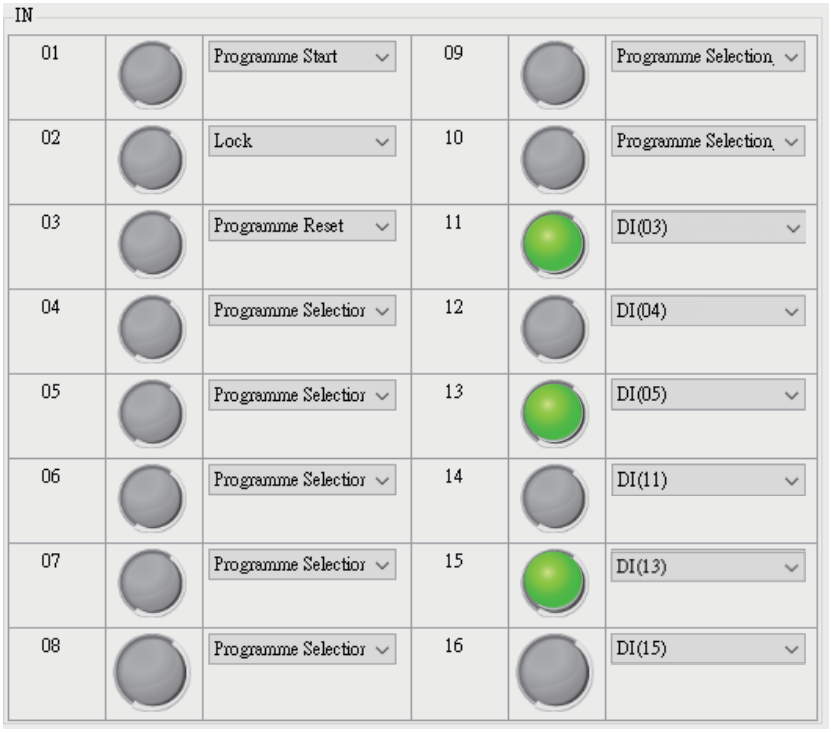
[RX] – 07 07 07 0b 00 54<CR><LF>

?INValue of bits IN01-IN16 current status, as below image,
IN01 ~ IN04=0，IN05 ~ IN08=0
IN09 ~ IN12=4，IN13 ~ IN16=5

[TX] – @?DI0<CR><LF> [TX] – @?DI1<CR><LF>

[RX] – 28<CR><LF> [RX] – 08<CR><LF>

?DI0Value of bits DI00-DI07(Hexadecimal)==>DI0=28
?DI1Value of bits DI10-DI17(Hexadecimal)==>DI1=8



User's Manual

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