HYRobotics Robot Training Program

LEVEL 3

(Level 1,2 Training required)

HYROBOTICS CORP

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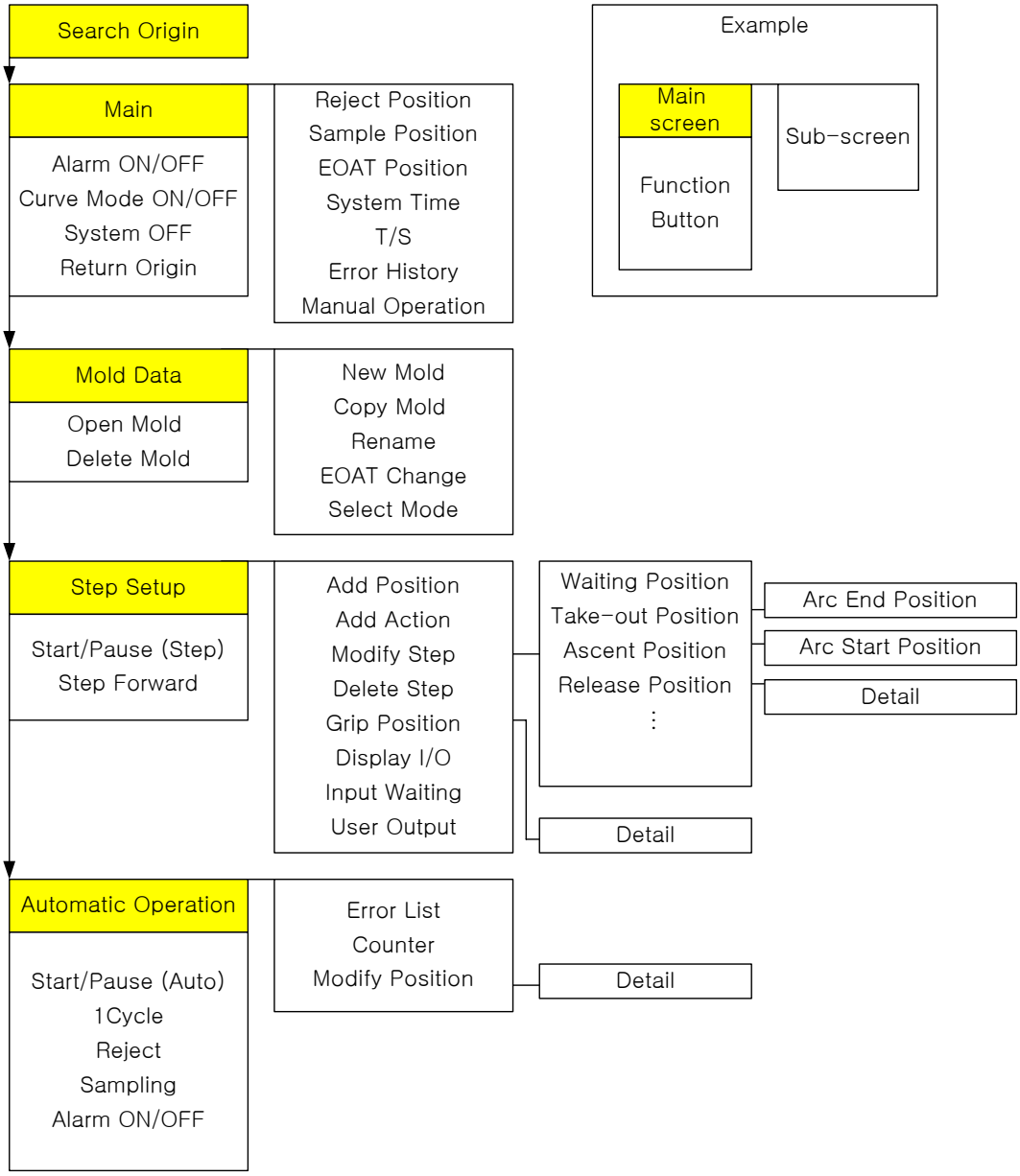
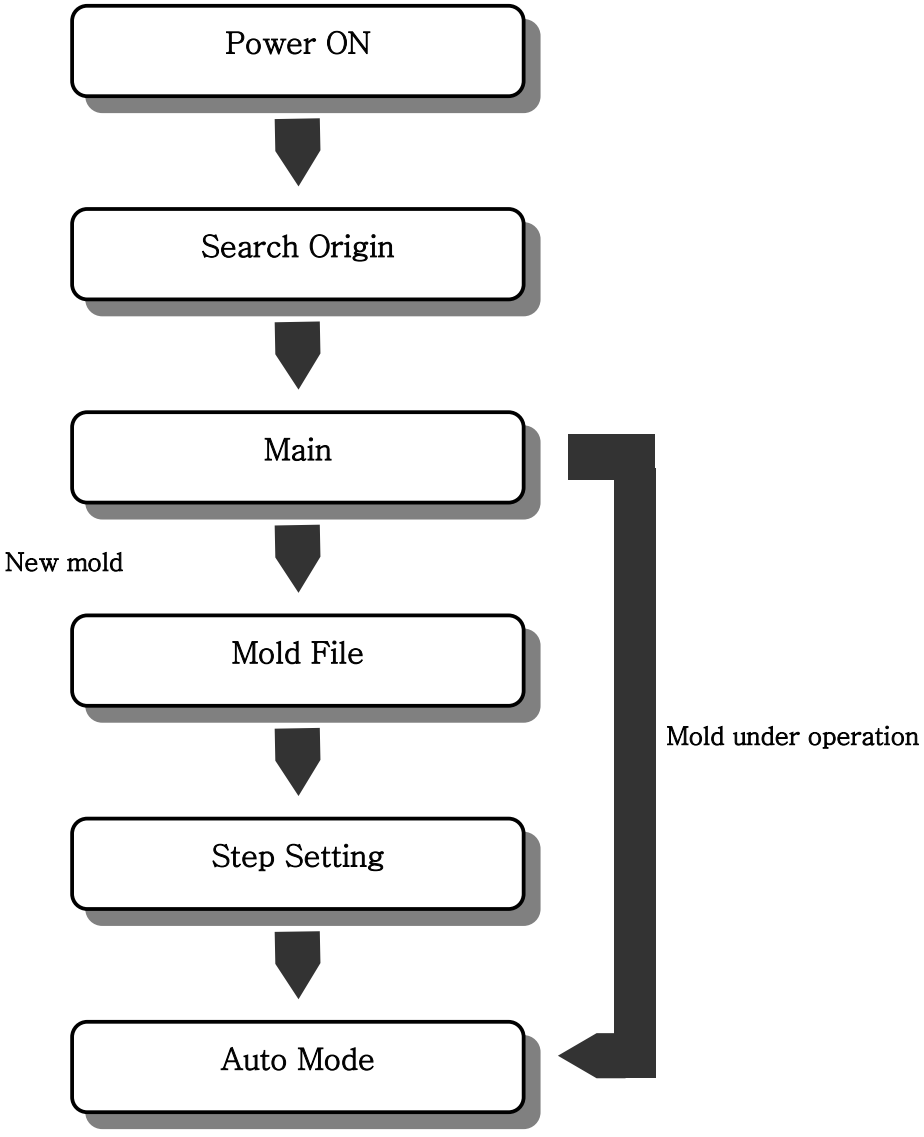
- **Screen Structure**

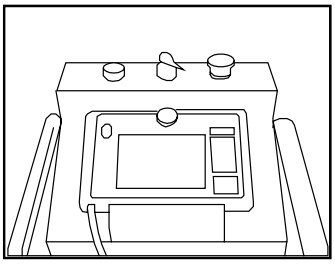


STEP FOR START-UP

Follow step for Auto Operation

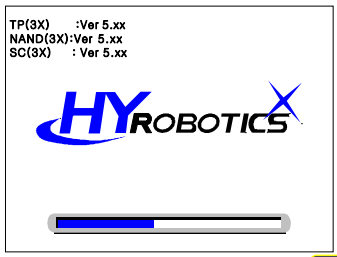


• Simple Start Up



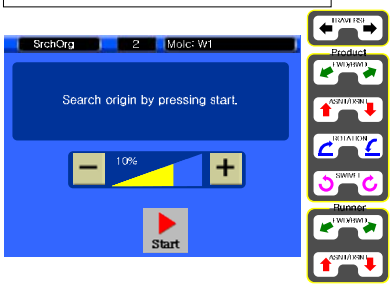
● STEP 1

Turn On Power..



● STEP 2

It will display System Version. And move to origin screen.



● STEP 3

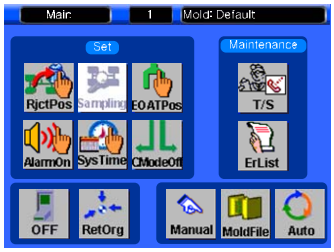
Press  for origin point of robot motion.

Before move to Origin, make sure the robot arm is in safe location. If robot arm is not if safe location, move robot arm manually to safe location with manual button.

● STEP 4

In case origin searching is completed, move to Main screen.

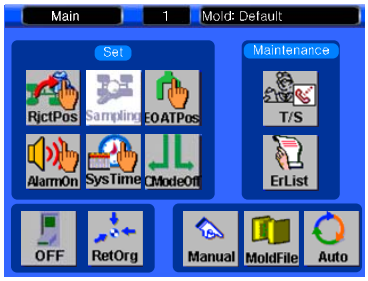
(Press  and Robot stop)



● STEP 5

Robot is in Main Screen to go to Manual or Auto

• Going Back To Auto

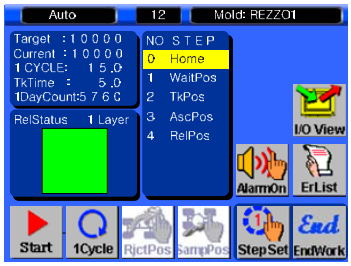


● **STEP 1**

(If there is mold operated before)

Press 

and move to Auto Mode Screen.

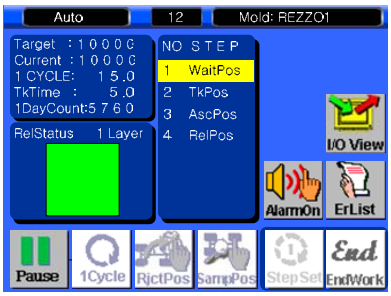


● **STEP 1**

Press 

and start Auto Operation

• Stop Operation



● STEP 1

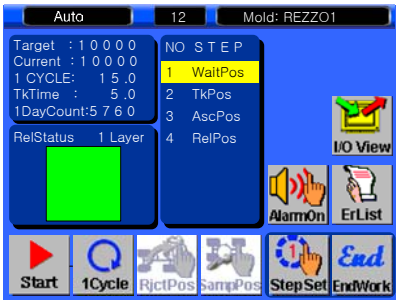
In order to stop Automatic operation before completing object quantity, press 

.

When the step under progress is completed, robot stops temporarily

is switched to 

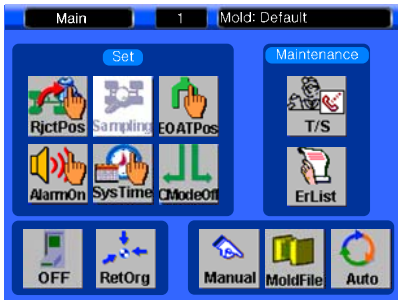
.



● STEP 2

Press 

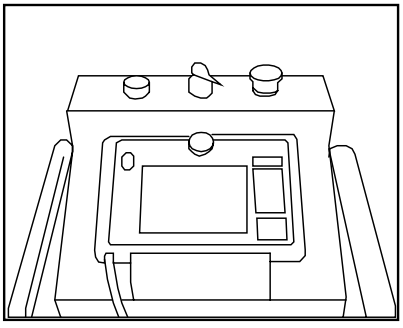
and move to Main Screen.



● STEP 3

In order to turn off Robot, press 

.



● STEP 4

Turn Off Power.

Manual

(1) Description

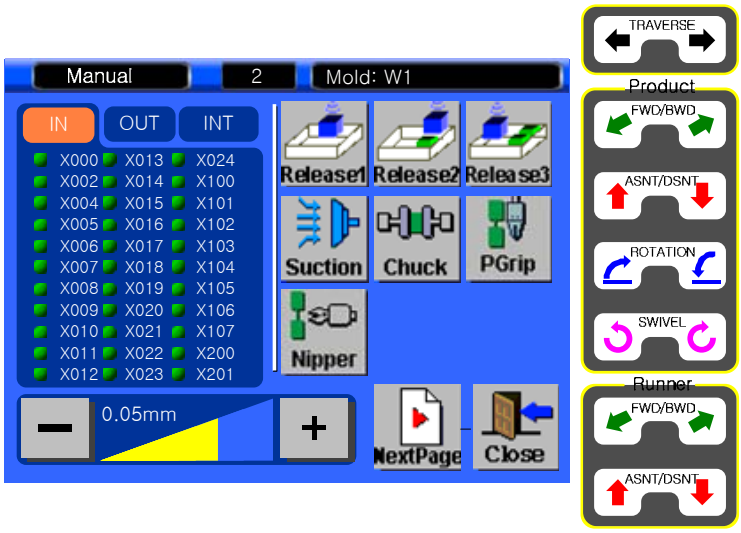
This checks I/O and operates each axis and output manually.

Output button

I/O tap

I/O display button

Manual button

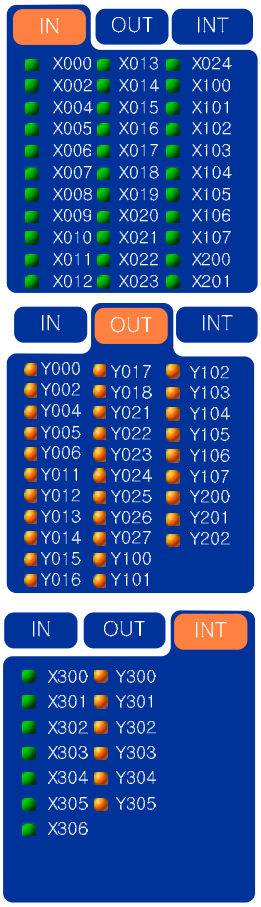


(2) Button Function

NO	Button	Description
1	IN	Display input signal.
2	OUT	Display output signal
3	INT	Display interlock signal
4	Release1	Turns on/off release 1 valve.
5	Release2	Turns on/off release 2 valve.
6	Release3	Turns on/off release 3 valve.
7	Suction	Turns on/off suction valve.[Suction On/Suction Off]
8	Chuck	Turns on/off chuck valve.[Chuck On/Chuck Off]
9	PGrip	Turns on/off product grip valve.[Product Grip On/Product Grip Off]

NO	Button	Description
10		Turns on/off Spare 1 Output.
11		Turns on/off Spare 2 Output.
12		Turns on/off Spare 3 Output.
13		Turns on/off Spare 4 Output.
14		Turns on/off User Output 1.
15		Turns on/off User Output 2.
16		Turns on/off User Output 3.
17		Turns on/off User Output 4.
18		Turns on/off User Output 5.
19		Turns on/off User Output 6.
20		Turns on/off User Output 7.
21		Turns on/off User Output 8.
22		Show Next page
23		Show Previous Page
24		Move to Main screen.

Check Input and output signal



Input on display

Output on display

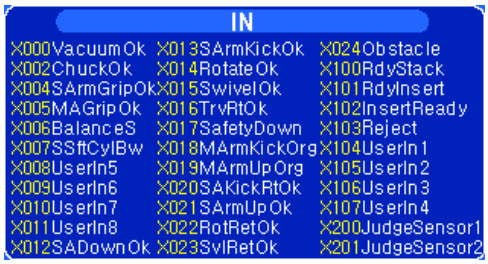
Off display

Pressing IN displays input signal on I/O display button. Press I/O display button in order to see description on input signal. Input signal description window appears.

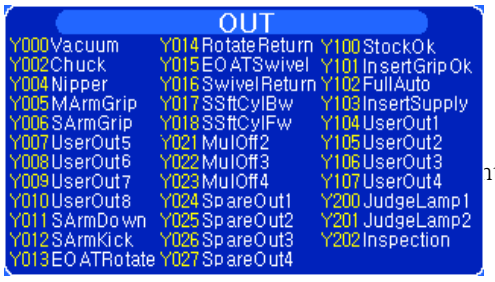
Pressing OUT displays output signal on I/O display button. Press I/O display button in order to see description on output signal. Output signal description window appears.

Pressing INT displays interlock signal on I/O display button. Press I/O display button in order to see description on interlock. Interlock signal description window appears.

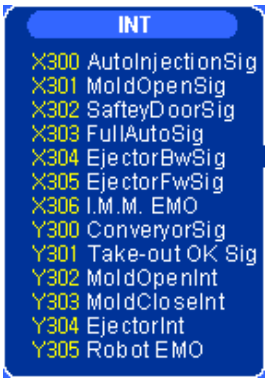
Signal Description Window



<Input signal description window>

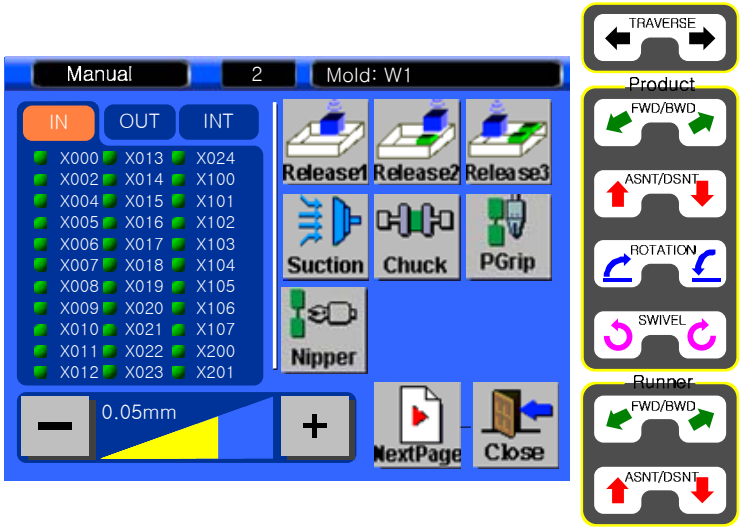


<Output signal description window>



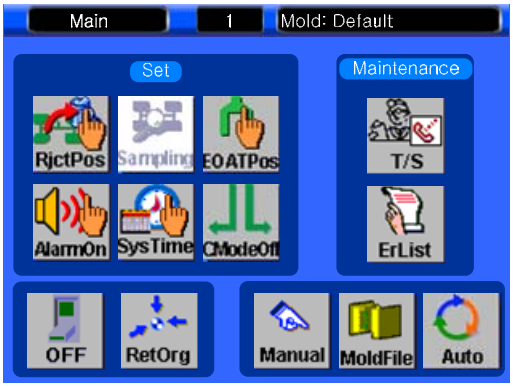
nterlock signal description window>

- **Go To Mold File Control Screen**



Close Manual Mode go to Main Screen

Mold File Screen



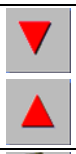
- **STEP 1**

Press move to Mold File Screen.

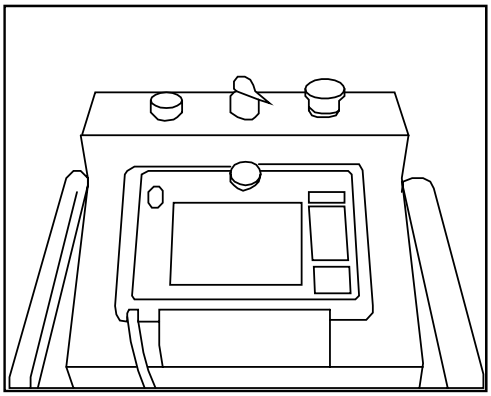
(1) Description

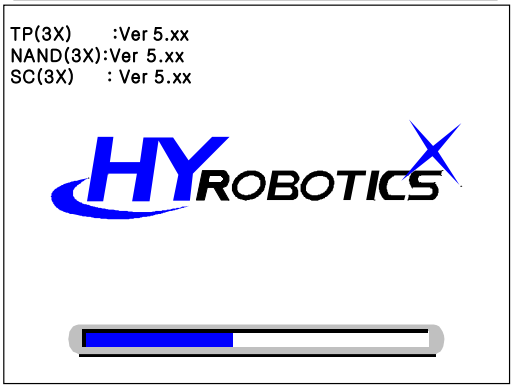
This creates, opens and copies Mold File, changes Mold File name, and changes jig.

(2) Button Fuction

NO	Button	Description
1		Selects Mold File by moving focus up and down.
2		Moves to New Mold screen which creates new mold.
3		Opens Mold File where focus is located.
4		Moves to Mold Copy screen which copies data of Mold File where focus is located.
5		Moves to Change Name screen which changes name of Mold File where focus is located.
6		Cancels Mold File. Pressing cancel button displays a message [cancel mold name?], and [yes] cancels it and [no] does not cancel it. In case [YES] or [NO] is pressed, message window disappears.
7		Moves to EOAT Change screen which changes jig.
8		Moves to Main screen.
9		Moves to Step Setup screen.
10		Move to Mold Select screen

2 Start up





Loading state bar

- **STEP 1**

Turn On Power.
Power lamp becomes on.

- **STEP 2**

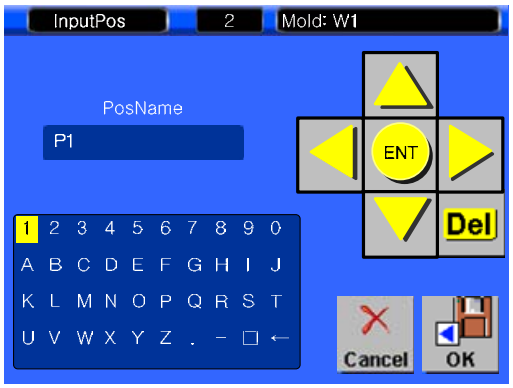
Log screen appears, and loading state bar indicates data loading level.

In case loading state bar is all full, move to origin searching screen.

1 Add Position on Basic 4 Steps

(1) Description

When you required additional position on 4 Basic Step, you can add position aftep step in Step edit screen. (Like when you need to get away from core or special motion inside of mold or 2ndary automation on out side of mold are, etc)

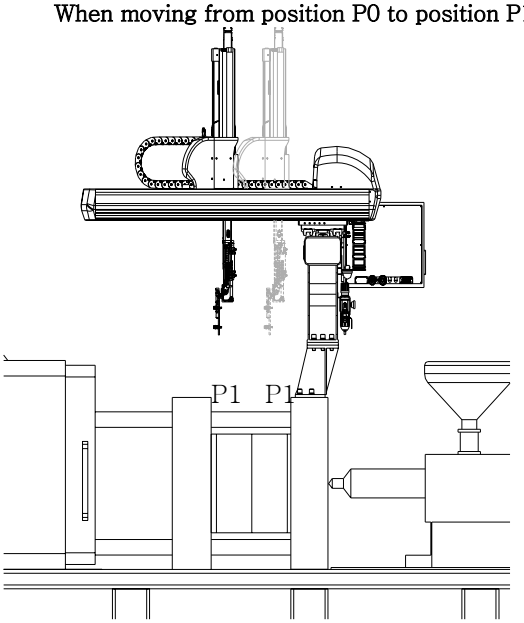


(2) Button Function

NO	Button	Description
1	Arrow button	Press arrow button to move cursor to desired text.
2		Input text on Cursor.
3		Delete text.
4		Create file name and move to Mold Manager file
5		Cancel creation.
6		Delay time before moving to arbitrary position. [inputted by numeric key pad]
7		Speed to move new location. (Input with Keypad)
8	Manual button	Operate robot with this button to get position.
9		Save current position
10		Close and move back to step screen.

(3) Example

When moving from position P0 to position P1 at 70% speed after 0.3 second delay time (To add positon)

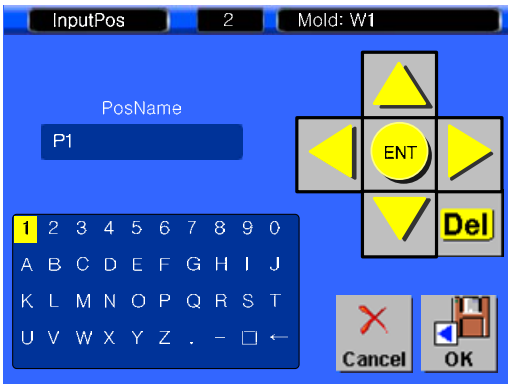


Position		
Each axes	P0	P1
Traverse	0 mm	0 mm
Main Arm Kick/Return	0 mm	100 mm
Main Arm Up/down	0 mm	0 mm
Rotation	OFF	OFF

- **STEP 1**

Press 

, move to Position Name setting screen. (This will allow operator to remember each step's position)



- **STEP 2**

Use arrow to select text. And Press ENT to input text

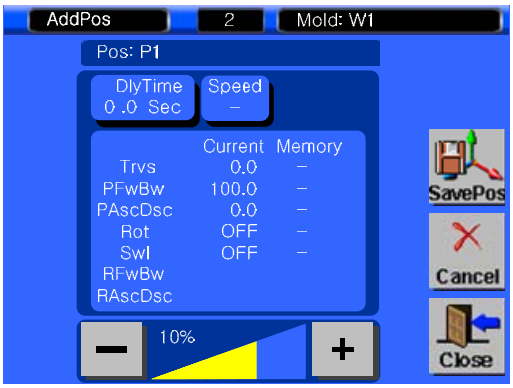
- **STEP 3**

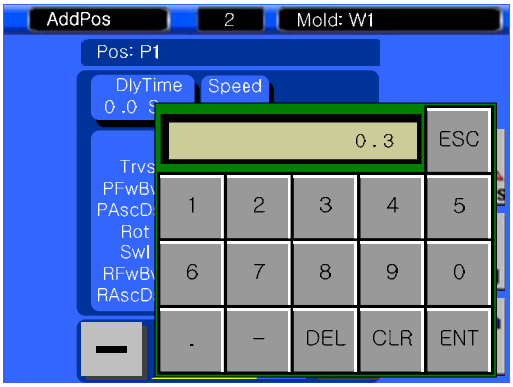
Press 

, move to position setting screen.

Press 

, to cancel go back to mold setting screen.



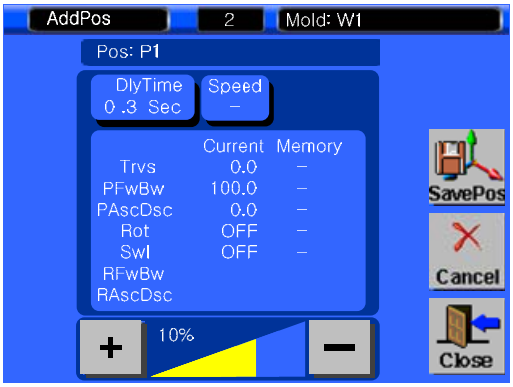


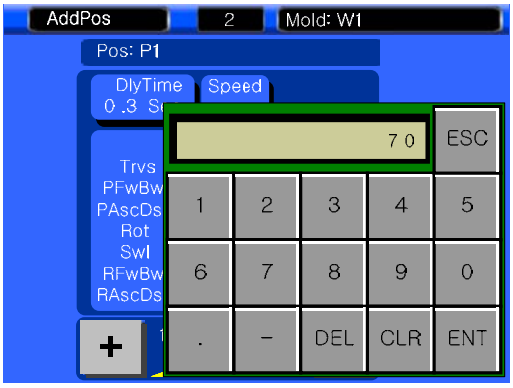
● STEP 4

[Setting for delay time at 0.3 second]

In order to set up delay time before moving to P1, Pressing DlyTime 0 .0 Sec shows numeric keypad.

Make input by pressing 0 . 3 in regular order, store delay time by pressing ENT, and then close window.





● STEP 5

[Speed setting as 70%]

In order to set up speed while moving to P1, Pressing Speed – shows numeric keypad.

Make input by pressing 7 0 in regular order, store speed by pressing ENT, and then close window.

● STEP 6

[Setting Position]

Press Manual to move robot position.

Press SavePos to save position, press Close to go to step edit screen..

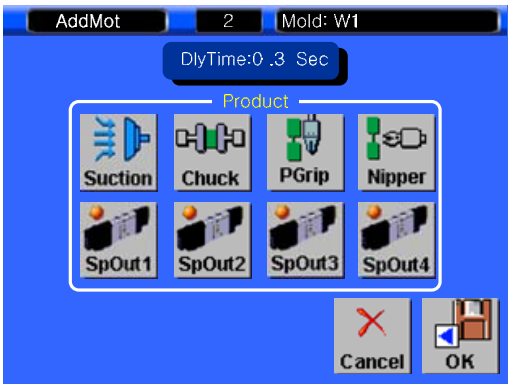
⚠DANGER

Do not add position with many axis movement for 1 position, Robot might move to the position without your intention. Manually move robot arm for 1 axis and save.

2 Add Motion

(1) Description

This screen allow to add suction, chucking, Spare output or release output that already selected.



(2) Button Function

NO	Button	Description
1	DlyTime:0 .0 Sec	Set up delay time before performing action. [Input with numeric keypad]
2	Suction	Turn on/off suction.[Suction On/Suction Off]
3	Chuck	Turn on/off chuck.[Chuck On/Chuck Off]
4	PGrip	Turn on/off product grip.[Product Grip On/Product Grip Off]
5	Nipper	Operate nipper.
6	SpOut1	Turn on/off spare out 1.
7	SpOut2	Turn on/off spare out 2.
8	SpOut3	Turn on/off spare out 3.
9	SpOut4	Turn on/off spare out 4.
10	OK	

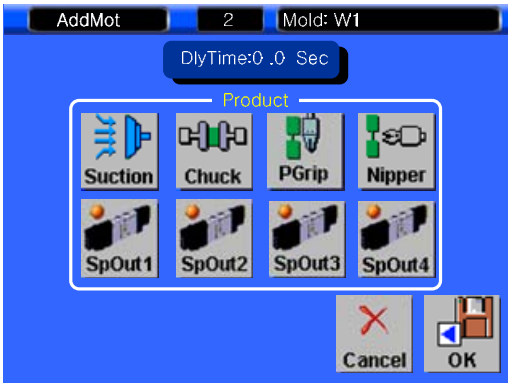
(3) How to Set

Example) When operating suction after 0.3 second delay time

● **STEP 1**

Press 

, to add motion

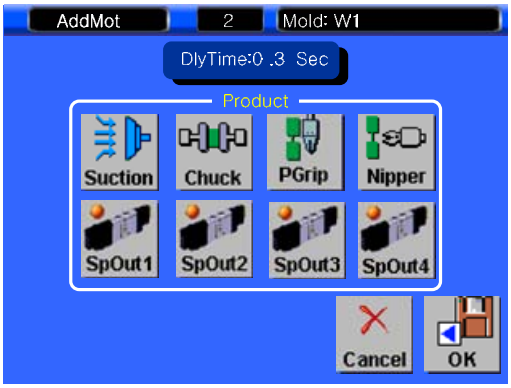


● **STEP 2**

Press DlyTime:0 .0 Sec to input delay time.

● **STEP 3**

Press . 3 to set 0.3 Sec for delay time.



● **STEP 4**

Press 

for suction on.

Press 

to save and move to step screen.

3 Modify Step

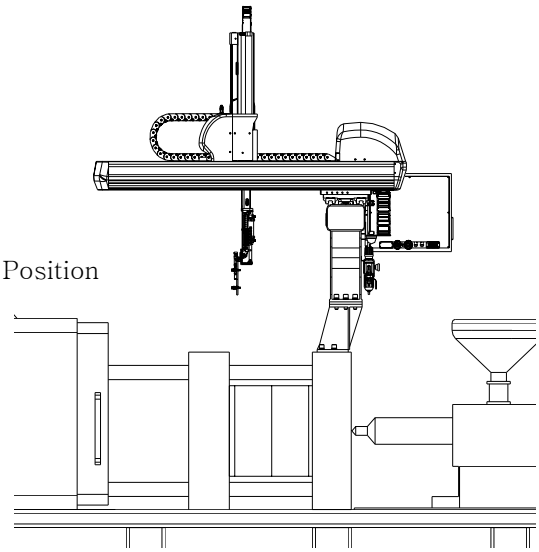
This step can change each step data. Modify Step is for changing basic positions such as Waiting Position, Take-out Position, Ascent Position and Release Position and each relevant step depending on steps to change position and timer.

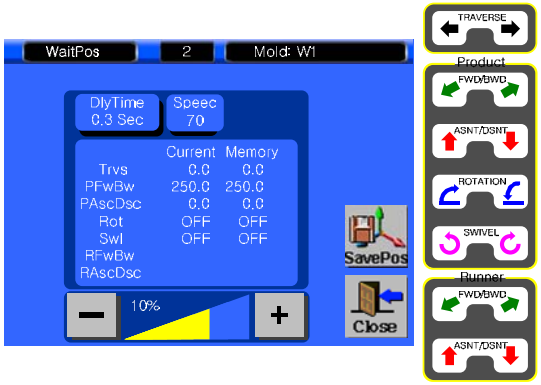
4.7.3.1 Waiting Position

(1) Description

This is a position to wait for opening of mold, where mold and jig does not make interference.

Waiting Position



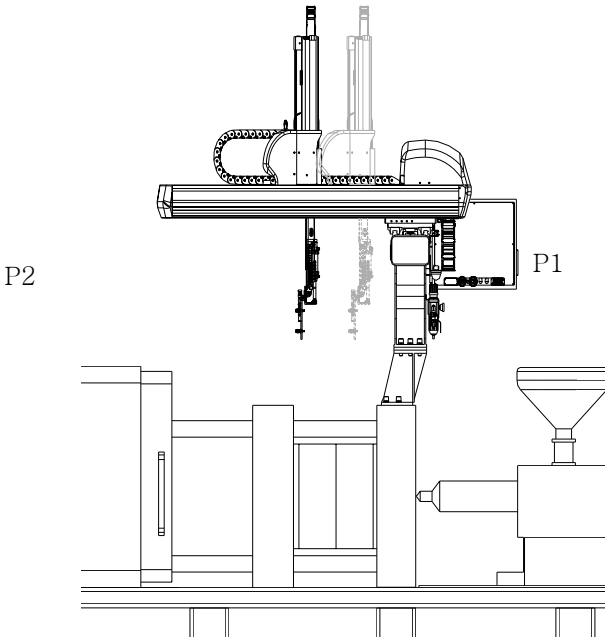


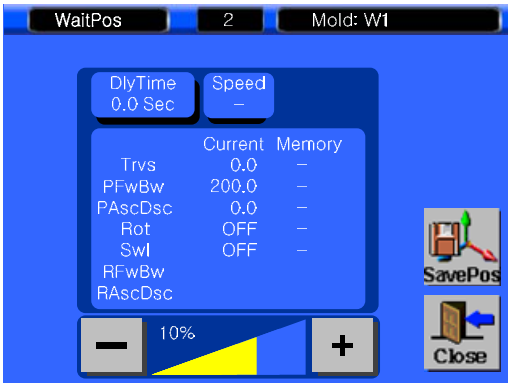
(2) Button Function

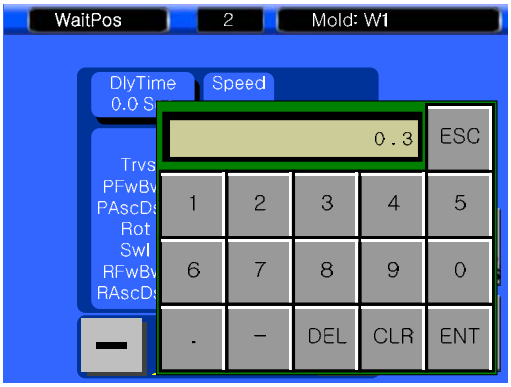
NO	Button	Description
1	Manual Button	Move Robot arm Manually
2	DlyTime 00 .0 Sec	This is delay time before moving to Waiting Position. [Input with numeric keypad]
3	Speed 000	This is a speed necessary for moving to Waiting Position. [Input with numeric keypad]
4	SavePos	Save current position and data
5	Close	Close screen move back to step screen.

(3) Example

To change position from P1 to P2 with 70% of speed with 0.3 Sec Delay time.





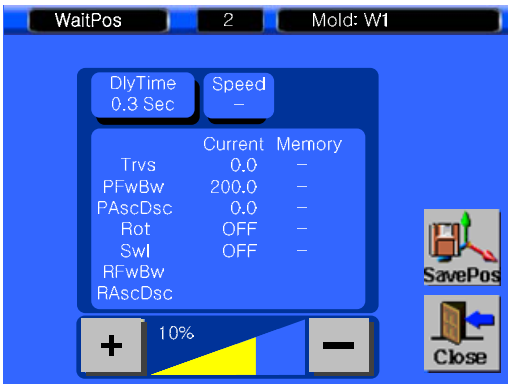


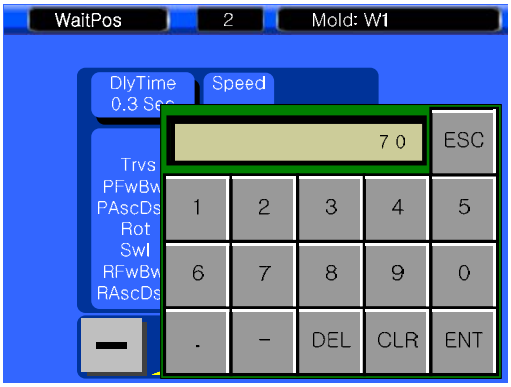
- **STEP 1**

[In case of setting delay time as 0.3 second]

In order to setting delay time before moving to Waiting Position, pressing DlyTime 0.0 Sec shows numeric keypad.

Make input by pressing 0 . 3 in regular order, store delay time by pressing ENT, and then close window.



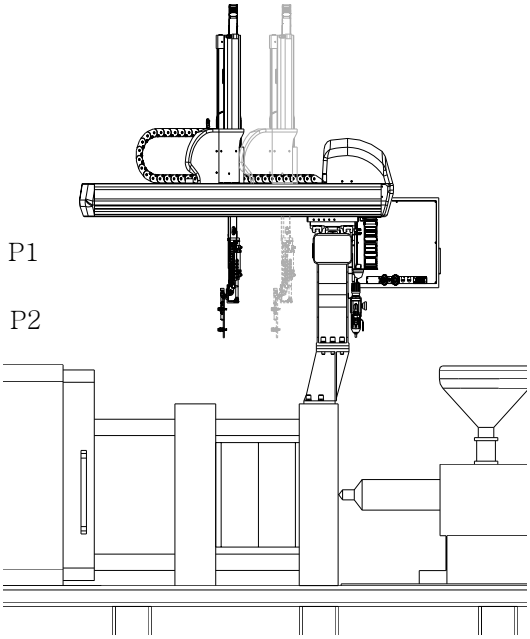


● STEP 2

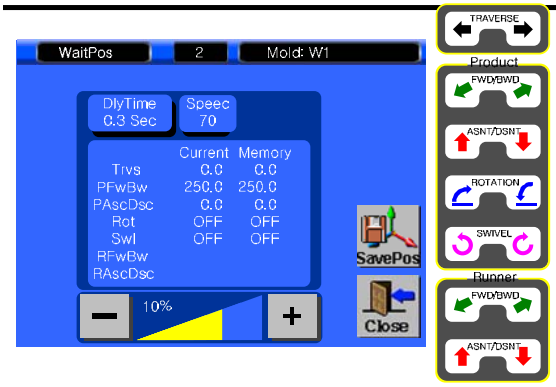
[In case of setting speed as 70%]

In order to set up speed while moving to Waiting Position, pressing Speed – shows numeric keypad.

Make input by pressing 7 0 in regular order, store speed by pressing ENT, and then close window.



Position		
Each axes	P1	P2
Traverse	0 mm	0 mm
Main Arm Kick/Return	200 mm	250 mm
Main Arm Up/down	0 mm	0 mm
Rotation	OFF	OFF



● STEP 3

Move it until product forward/backward of current value indicates 250.0 by pressing traverse of manual button.

Store current value by pressing 

, and then

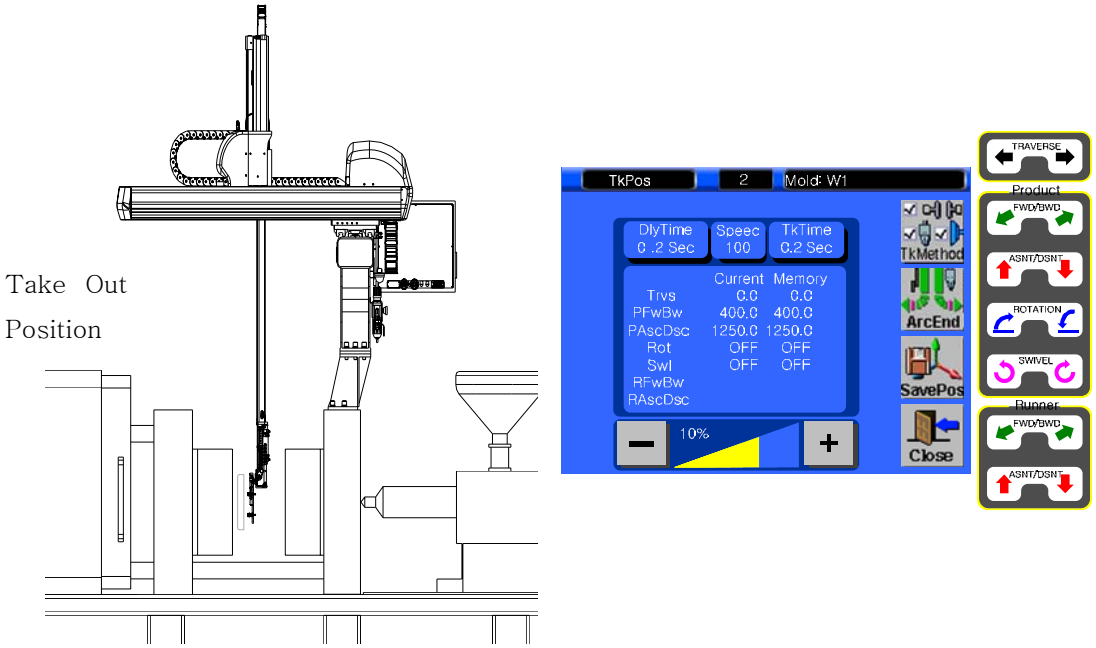
move to Step Setup screen by pressing 

.

4.7.3.2 Take-out Position

(1) Description

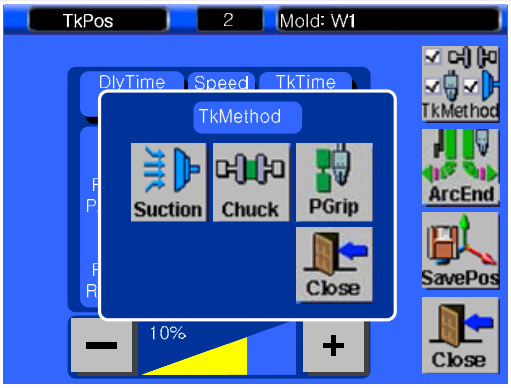
This step is for creating position to take out parts or sprue. It has Delay time before to move this position, Speed, Position. And this step has delay time to activate vacuum or chucking, and take out method, chucking, suction or spare output.



(2) Button Function

NO	Button	Description
1	DlyTime 00 .0 Sec	Indicates and sets up delay time before moving to Take-out Position. [Input with numeric keypad]
2	Speed 000	Indicates and sets up speed necessary for moving to Take-out Position. [Input with numeric keypad]
3	TkTime 00.0 Sec	Take-out delay is a delay time until product is chucked after arriving at Take-out Position. Take-out delay is indicated and set up. [Input with numeric keypad]
4	TkMethod	Stores position.
5	ArcEnd	Take-out method window to select Take-out Method appears.
6	SavePos	Save current position
7	Close	Close screen and move to step

Take-out method window



NO	Button	Function
1		Turns on/off suction.[Suction On/Suction Off]
2		Turns on/off chuck.[Chuck On/chuck Off]
3		Turns on/off product grip.[Product Grip On/Product Grip Off]

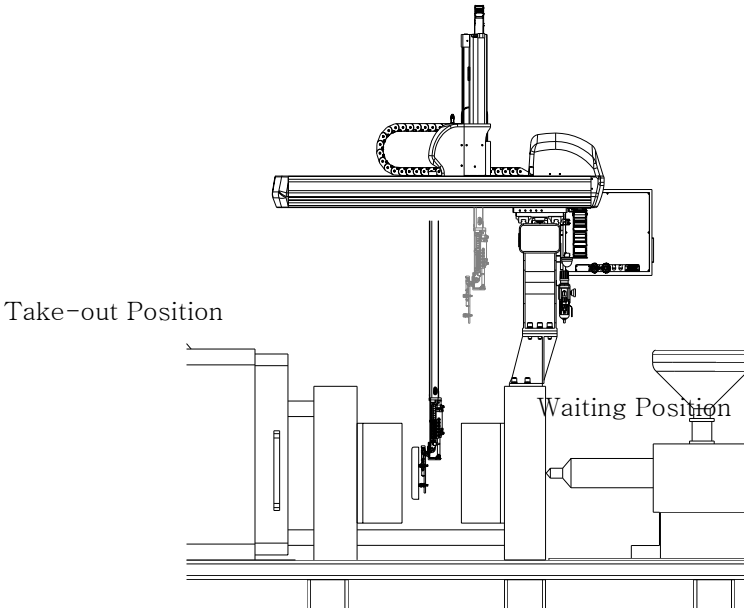
NOTICE

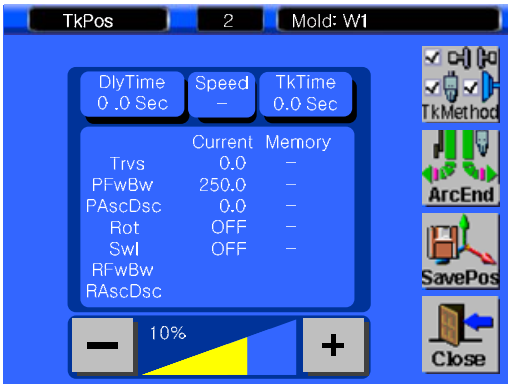
1) Initial Setting.
Robot will perform setting and save current setting.

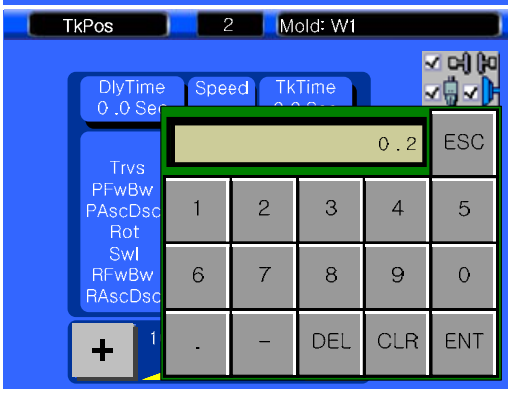
2) After Step setting.
After step set, before change setting, take method will be same as current setting.

(3) Example

In case of setting 0.2 second delay time, 100% speed, 0.3 second delay time before chucking product, position from Waiting Position to Take-out Position





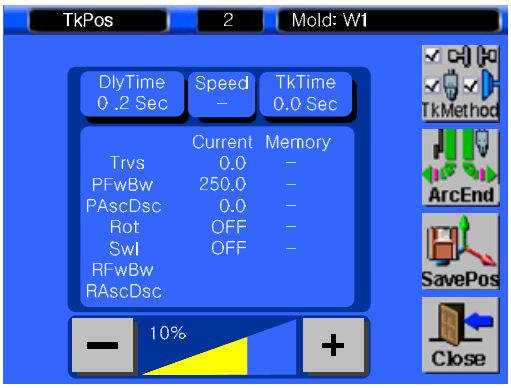


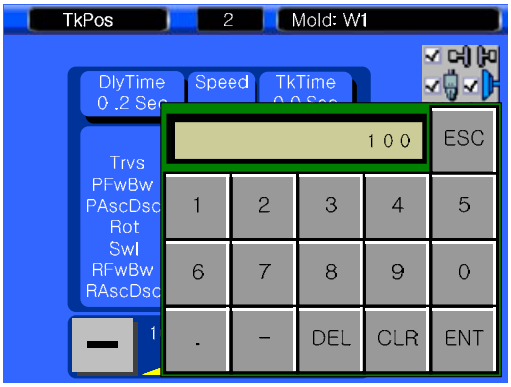
● **STEP 1**

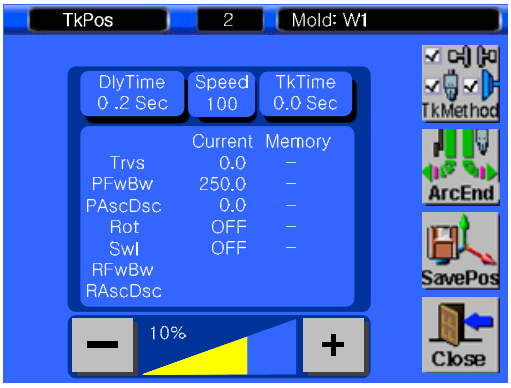
[0.2 second delay time before moving to Take-out Position]

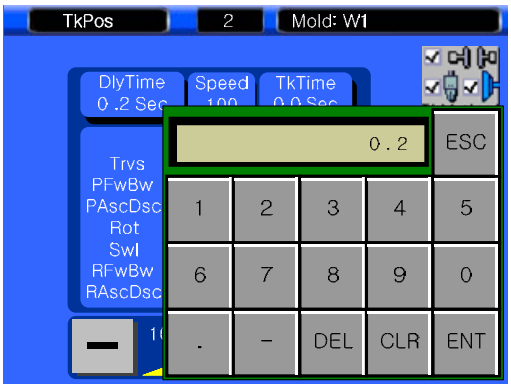
In order to setting delay time before moving to Take-out Position, pressing DlyTime 0 .0 Sec shows numeric keypad.

Make input by pressing 0 . 2 in regular order, store delay time by pressing ENT, and then close window.









● STEP 2

Speed setup with 100 % to take out position

In order to set up speed while moving to Take-out Position, pressing Speed – shows numeric keypad.

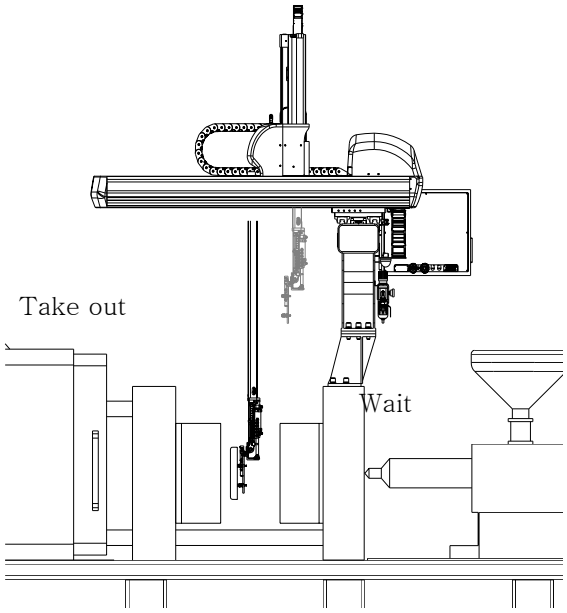
Make input by pressing 1 0 0 in regular order, store delay time by pressing ENT, and then close window.

● STEP 3

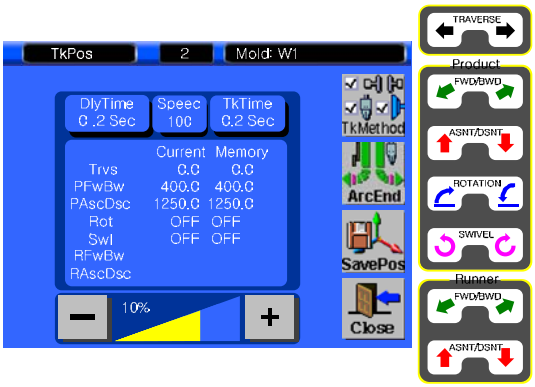
[0.3 second delay time before chucking product]

In order to setting delay time 0.2 second before chucking product after arriving at Take-out Position, pressing TkTime 0.0 Sec shows numeric keypad.

Make input by pressing 0 . 2, store take-out time by ENT, and then close window.



Position		
Each axes	Wait	TakeOut
Traverse	0 mm	0 mm
Main Arm Kick/Return	250 mm	400 mm
Main Arm Up/down	0 mm	1250 mm
Rotation	OFF	OFF



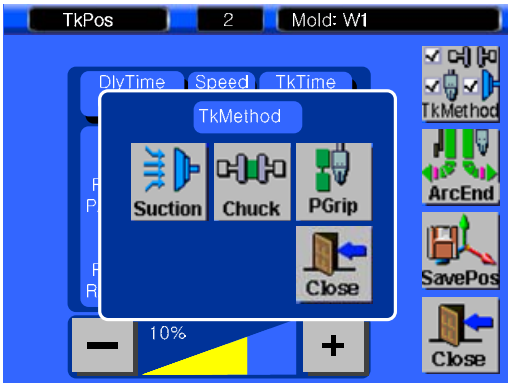
● STEP 4

[Take out, Traverse 0mm, Kick, 400mm, Up and down 1250mm, Rotation OFF]

Press manual to move robot arm to 400 PFWBW and PAscDsc to 1250.

Store current value by pressing 

.



● STEP 5

[the Take-out Method as suction]

Pressing 

shows Take-out Method window,

and pressing 

sets up suction.

Pressing 

closes Take-out Method window.

Move to Step Setup screen by pressing 

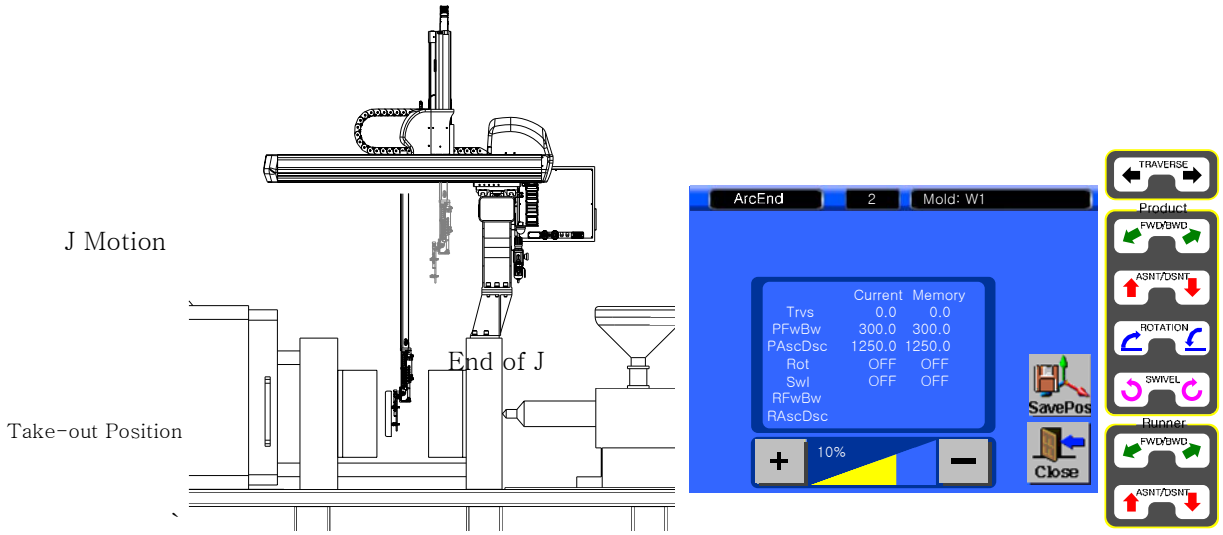
.

- J Motion Related

1 Arc end position

(1) Description

Set end point in the section where product forward/backward and product ascent/descent are moving simultaneously while moving from Waiting Position to Take-out Position.

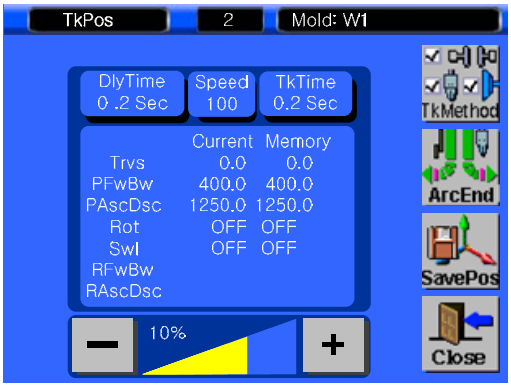


(2) Button Function

NO	Button	Description
1		Save Current Position
2		Close Screen.

(3) Example

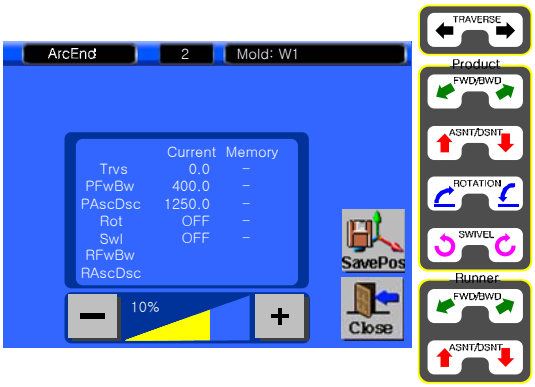
To set up J or Arc Motion to move from waiting position to take out position,

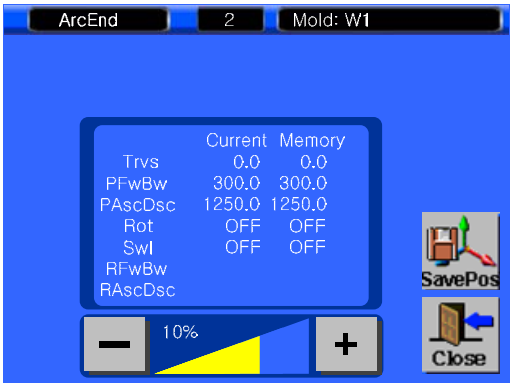


- **STEP 1**

Press  , move screen to end of Arc position

Position		
Each axes	Take-out Position	Arc End Position
Traverse	0 mm	0 mm
Main Arm Kick/Return	400 mm	300 mm
Main Arm Up/down	1250 mm	1250 mm
Rotation	OFF	OFF





● STEP 2

Press manual to move robot arm to PFWBW becomes to 300.0

● STEP 3

Store current value by pressing 

.

Move to Take-out Position screen by pressing 

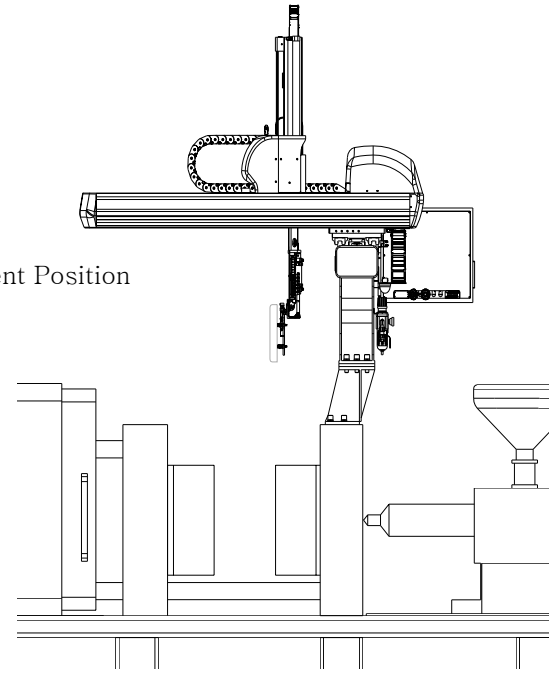
.

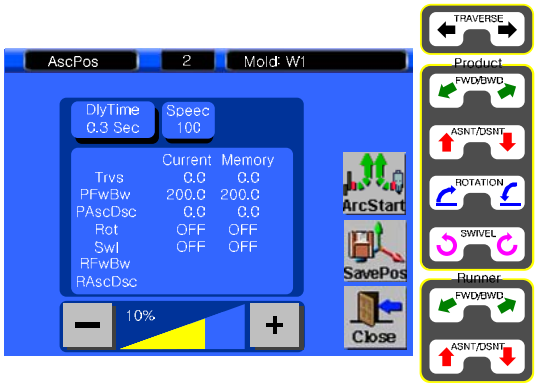
3 Ascent Position

(1) Description

This is ascent complete position after take out parts, this will allow molding machine to run next cycle (Mold will close)

Ascent Position



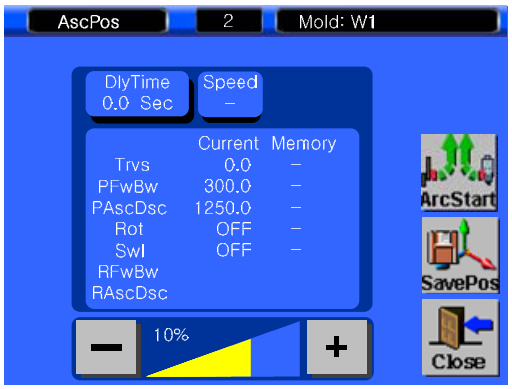


(2) Button Function

NO	Button	Description
1	DlyTime 00.0 Sec	Delay time before moving to Ascent Position [Input with numeric keypad]
2	Speed 000 %	Speed necessary for moving to Ascent Position [input with numeric keypad]
3	ArcStart	Move to Arc Start Position screen.
4	SavePos	Store current value.
5	Close	Move to Step Setup screen.

(3) Example

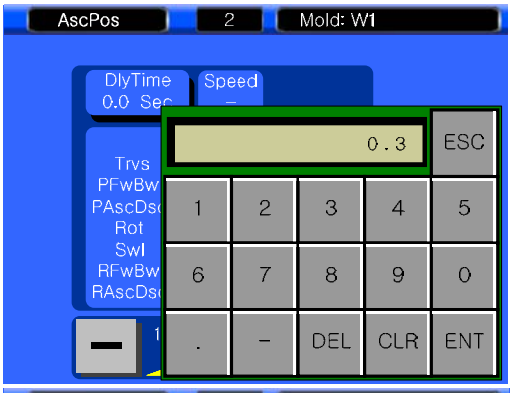
Delay time 0.3 Sec, Speed 100%, Move Robot arm from take out position to ascent complete position.



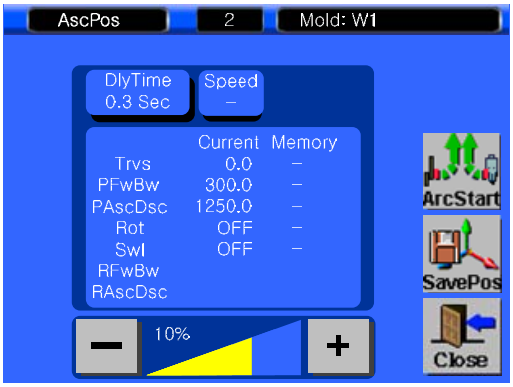
● **STEP 1**

[Delay time 0.3 Sec before motion]

Press DlyTime 0.0 Sec, displays numeric keypad.



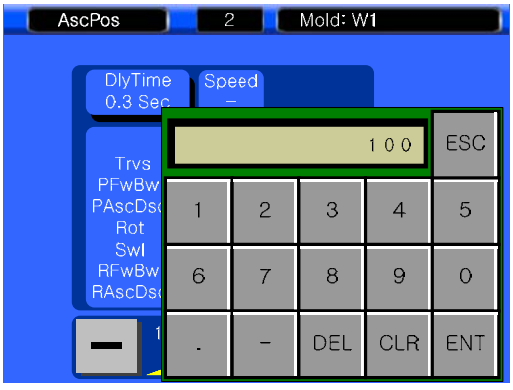
Press 0 . 3, ENT to save number and close.



● **STEP 2**

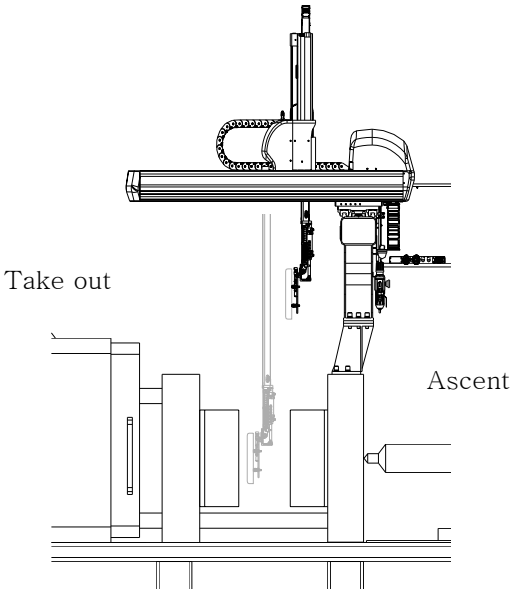
Speed Setting 100%

Press Speed –, displays key pad.



Press 1 0 0, Press ENT to save and close windows

Each axes	Take out	Ascent
Traverse	0 mm	0 mm
Main Arm Kick/Return	300 mm	200 mm
Main Arm Up/down	1250 mm	0 mm
Rotation	OFF	OFF



● STEP 3

[To setup ascent complete to Traverse 0mm, PFWBW(Kick) 0mm, Ascent 0mm, Chuck Rotation OFF]

Press manual so that current number of position becomes PFWBW 0.00, PASCDSC 0.00,

Press 

to save

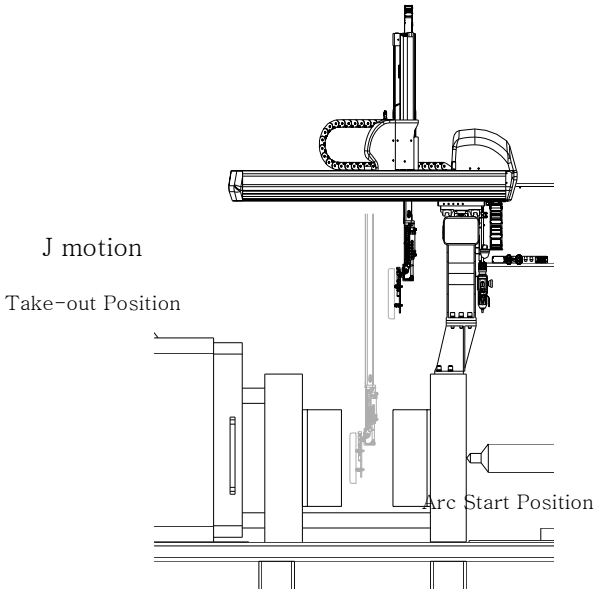
Press 

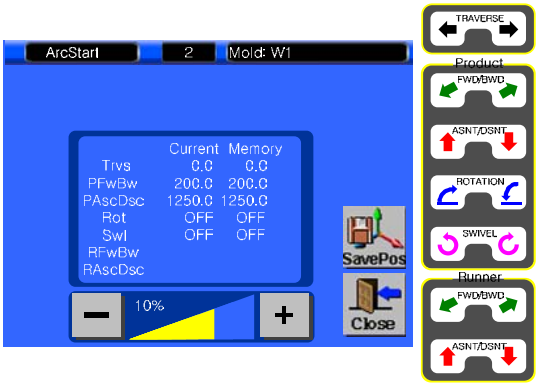
to move to step setting screen.

J motion Start (Arc Start Position)

(1) Description

This sets up start point where Forward/backward Axis and Product Arm move simultaneously when moving from Take-out Position to Ascent Position.



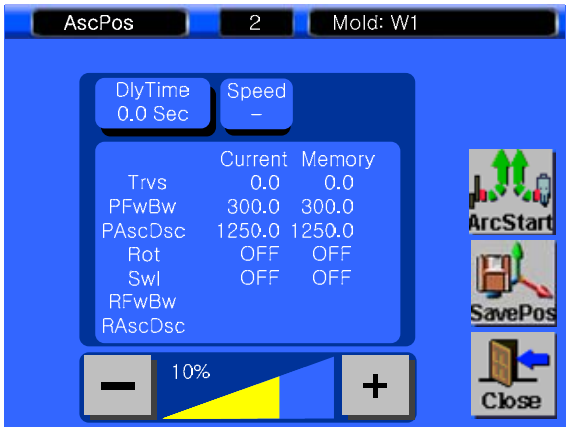


(2) Button Function

NO	Button	Description
1		Store current value.
2		Move to Ascent Position screen

(3) Example

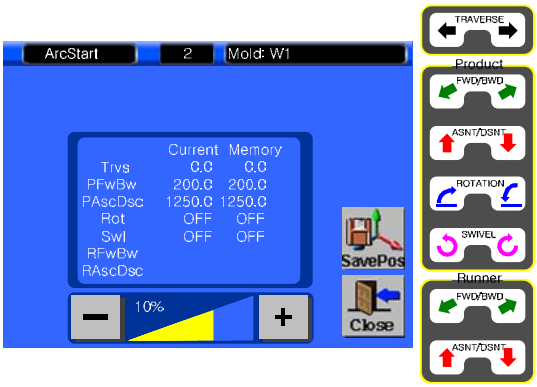
Samples of creating J motion start point to move back to waiting position. Arc Start Positon.



- **STEP 1**

Press  move to Arc Start Position.

Position		
Each axes	Ascent Position	Arc Start Position
Traverse	0 mm	0 mm
Main Arm Kick/Return	200 mm	250 mm
Main Arm Up/down	1250 mm	1250 mm
Rotation	OFF	OFF



● **STEP 2**

Press manual to move robot arm to PFWBW to 250.0.

Press 

to save

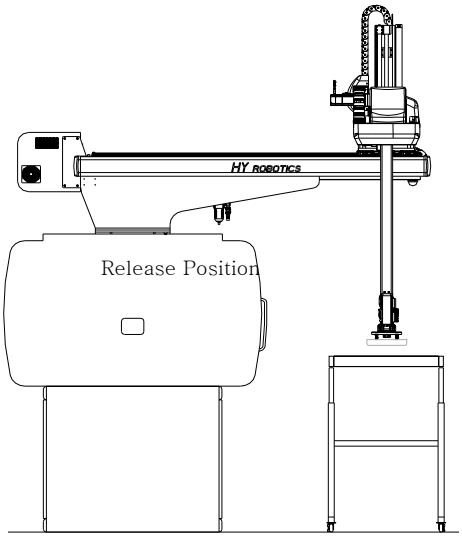
Press 

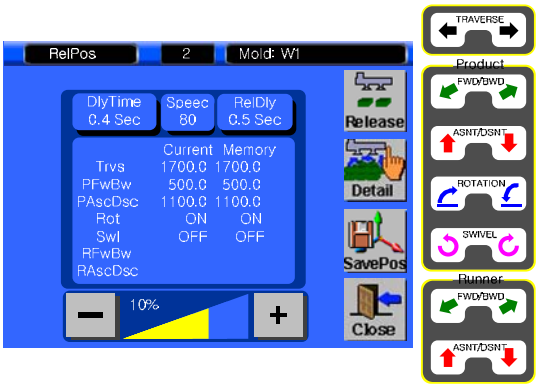
to move to previous screen..

4 Release Position

(1) Description

This is for products release position setting screen. Consist of all release or staking features.



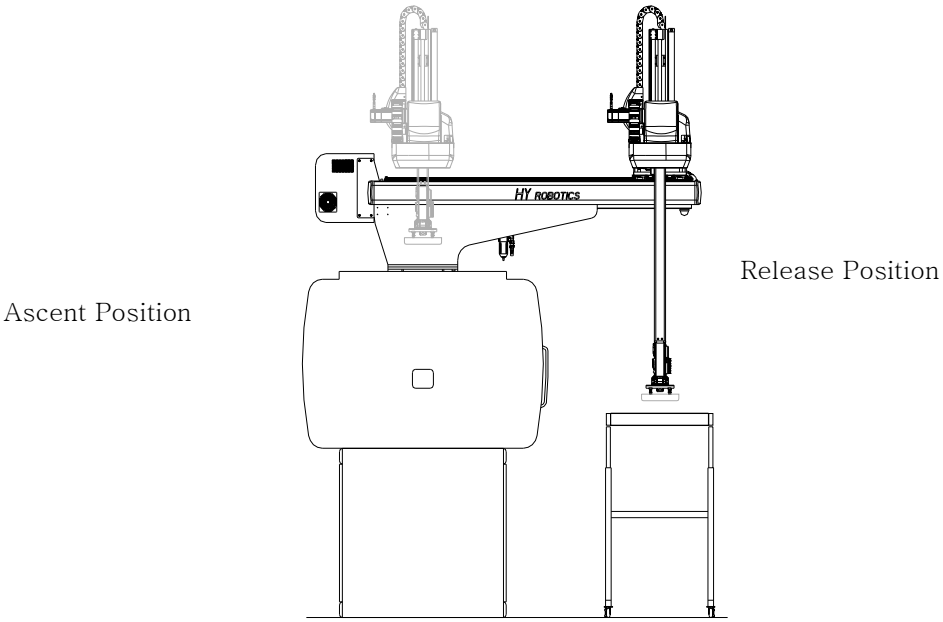


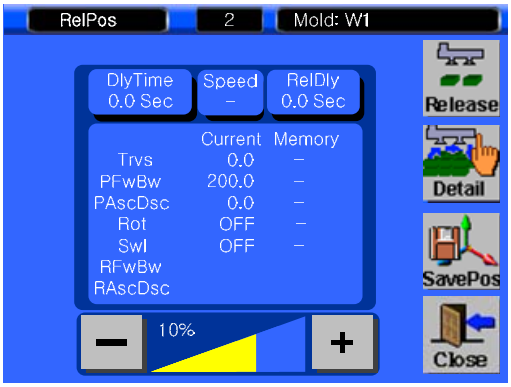
(2) Button Function

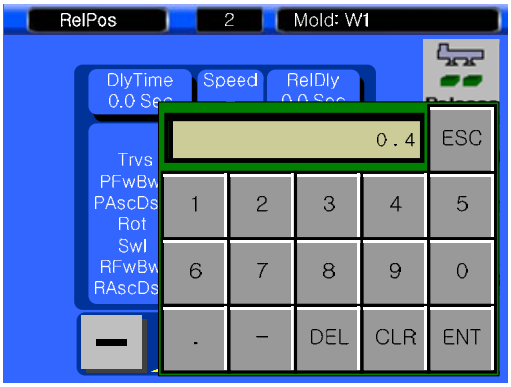
NO	Button	Description
1	DlyTime 00.0 Sec	This is delay time before moving to Release Position. [input with numeric keypad]
2	Speed 000	This is a speed necessary for moving to Release Position. [input with numeric keypad]
3	RelDly 00.0 Sec	This is delay time before opening product after moving to Release Position. [input with numeric keypad]
4	Release	Opens the take-out product.
5	Detail	Moves to Detail Setup screen.
6	SavePos	Store current value.
7	Close	Move to Step Setup screen.

(3) Example

In case of setting 0.4 second delay time, 80% moving speed, 0.5 second delay time before opening product, position from Ascent Position to Release Position.





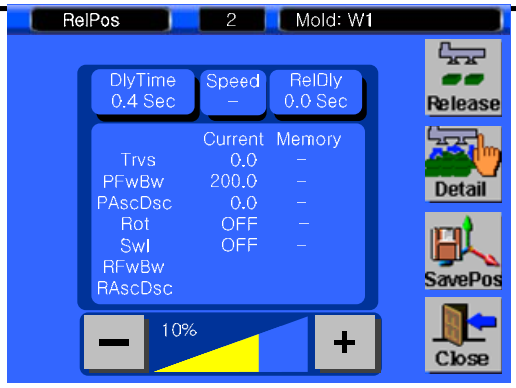


● **STEP 1**

[0.4 sec delay time before moving to Release Position]

In order to setting delay time before moving to Release Position, pressing [DlyTime 0 Sec] shows numeric keypad.

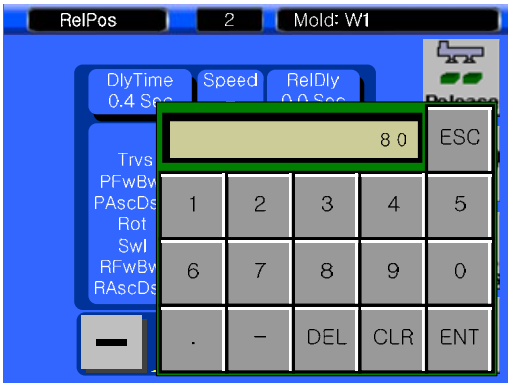
Make input by pressing [0] [.] [4] in regular order, store delay time by pressing [ENT], and then close window.



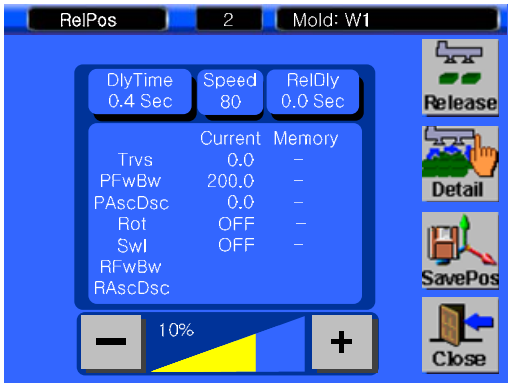
● STEP 2

Set up speed to 80%

In order to set up speed while moving to Release Position, pressing Speed – shows numeric keypad..



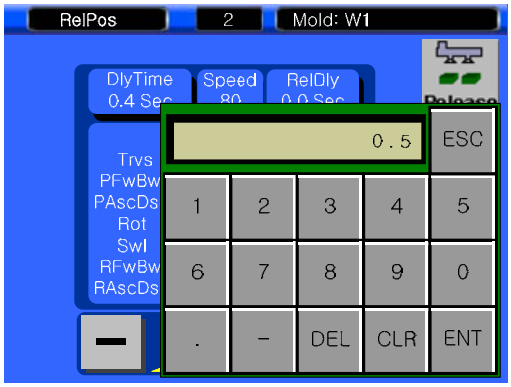
Make input by pressing 8 0 in regular order, store delay time by pressing ENT, and then close window.



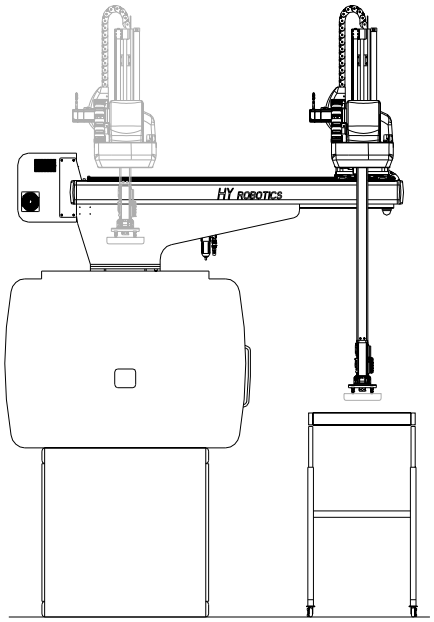
● STEP 3

Delay time 0.5 Sec

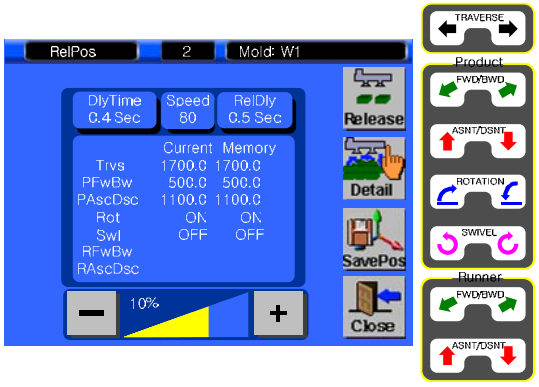
Press RelDly 0.0 Sec for set up, Delay time for release.



Make input by pressing 0 . 5 in regular order, store delay time by pressing ENT, and then close window.



Position		
Axis	Up	Release
Traverse	0 mm	1700 mm
PFWBW	200 mm	500 mm
PASDS	0 mm	1100 mm
Rotation	OFF	ON



● STEP 4

Set release position to Traverse 1700mm, PFWBW(Kick) to 30mm, Up and Down to 1100mm, Chuck Rotation is on]

Press manual to Traverse 1700mm, PFWBW(Kick) to 30mm, Up and Down to 1100mm, Chuck Rotation is on

Store current value by pressing 

, and then

move to Step Setup screen by pressing 

.

Cancel the product by pressing 

.

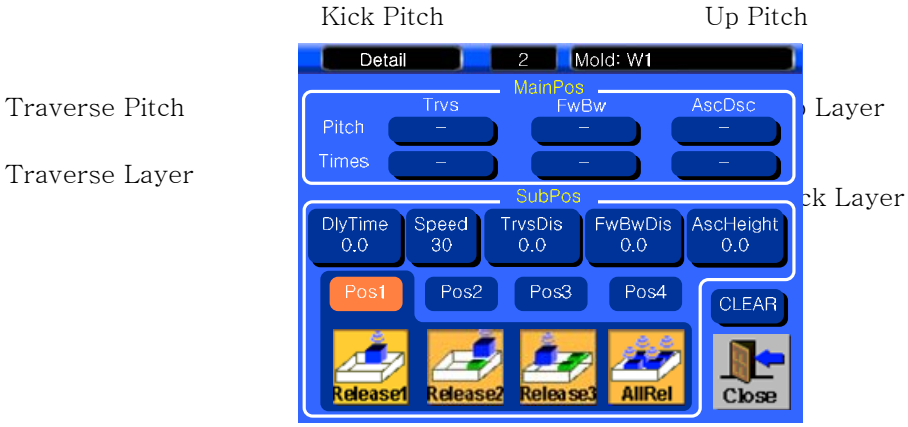
Move to Step Setup screen by pressing 

NOTICE Traverse is possible only by completing ascent of take-out arm in C region.
Refer to [1.3.3 operation range]

4.7.3.4.1 Stacking Position Setting.

(1) Description

MainPos is for releasing parts to different position each cycle with Traverse, Kick, Up distance setting with layer. Pitch is for distance between each axis, Times is for layer for each axis.



(2) Button Function

NO	Button	Description	Input
1	Traverse Pitch	Distance of Traverse for each cycle	Numeric Keypad
2	Kick Pitch	Distance of Kick for each cycle	
3	Up Pitch	Distance of Up for each cycle	
4	Traverse Layer	Setting layer for Traverse	
5	Kick Layer	Setting layer for Kick	
6	Up Layer	Setting layer for Up	
7	CLEAR	Clear	

(3) Example

Stacking a product to locate to 300 mm for Traverse Axis and 200 mm Kick Axis for each cycle. (2 x 2)

Up

Product

4

Traverse

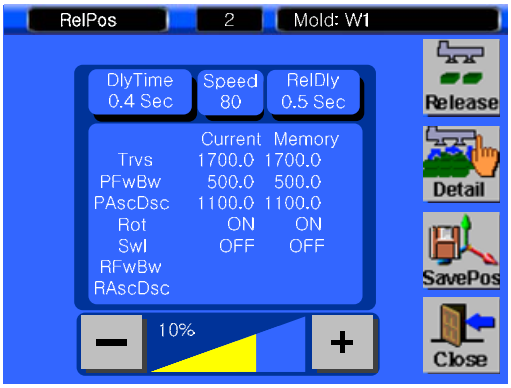
2

200mm

3 1

300m

Kick



● **STEP 1**

Press 

to set up detail stacking.

● **STEP 2**

① Input 300 in Pitch of Trvs
② Input 2 in **Time of Trvs**
③ **Input 200 in Pitch of FwBw**
④ Input 2 in Times of FwBw.

● **STEP 3**

Press 

to close and save.

4 Delete Step

(1) Description

To delete created step or delete input information for 4 basic step.

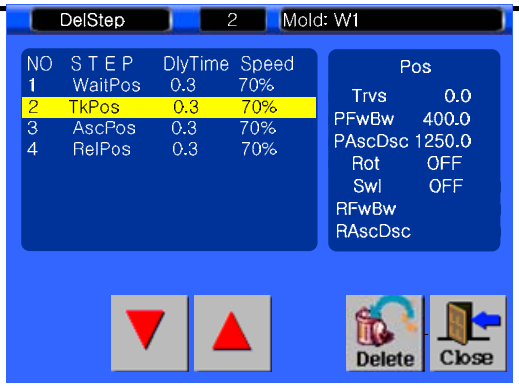
(2) Button Function

NO	Button	Description
1		Move cursor to below
2		Move cursor to up
3		Delete step on cursor. Current robot step can't be deleted 4 Basic step can't be deleted but only input information like position, timer)
4		Close and move back to step screen.

(3) Example

- **STEP 1**

Press  to go to step delete screen.



- **STEP 2**

Press ▼ or ▲ to move cursor to step to delete

Press Delete, it will show " Delete Step ? "YES will delete and no to cancel

Press Close to close

END OF LEVEL 3 PROGRAM