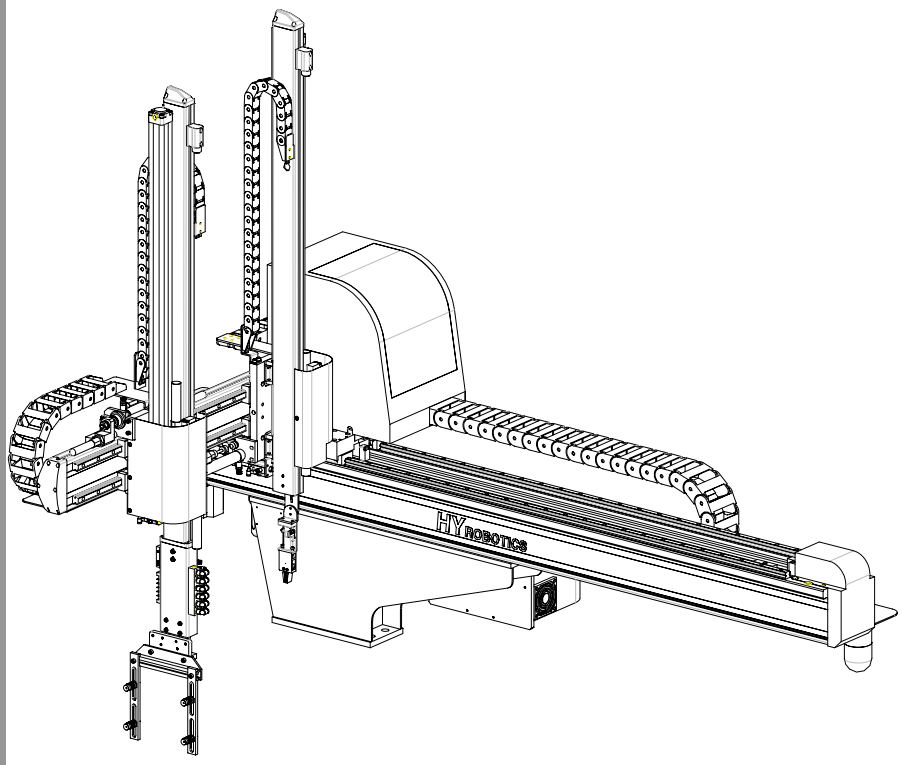
User Manual

TSα Take-out Robot

- TSα-200SI/DI
- TS-200SI/DI
- TSα-450S/D
- TSα-650S/D
- TSα-1300S/D
- TSα-3000S
- TSα-300SI/DI
- TSα-350S/D
- TSα-550S/D
- TSα-850S/D
- TSα-2000S



Read this manual completely prior to installing, operating or performing maintenance on this equipment

HY ROBOTICS

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TSa User Manual
Ver 2.00

Attention Marks

Danger, Warning, Caution, Notice

This document use following attention mark for the safety of operation

⚠DANGER	If the actions indicated in a “ DANGER” are not compiled with, death or serious damage of major equipment could results.
⚠WARNING	If the actions indicated in a “ WARNING” are not compiled with, serious injury or major equipment damage could results.
⚠CAUTION	If the actions indicated in a “ CAUTION” are not compiled with, some injury or damage could results.

NOTICE	A “ NOTICE “ provides supplementary information, emphasized a point or procedure, or gives a tip for easier operation.

OPERATIONAL WARNINGS

DANGER

- The robot must be installed in a safe and secure manner by professionals familiar with the structural engineering principles related to the installation of large industrial equipment. The information on the following pages can be used as a guide to help you install your robot. The customer must have the installation plan for the selected site verified to be adequate by a structural engineer or a similarly qualified professional. HY Robotics Co.Ltd can not accept any responsibility for damage due to improper installation

- The robot motion area is as follows, this area is the dangerous area of the robot. Be sure to operate the robot outside the safety fence. If you enter the robot motion area during Operation, a serious accident could result.

WANRING

- Do not enter robot motion area or inside the safety guard during robot operation. Do not touch or do not allow other objects interfere with the safety fence.

- Do not remove or open safety guard during robot operation. Do not operate robot inside of the safety guard .

- Do not place any cups or bottle that containing water or liquid on the top of robot or controller. It may cause of electric shock.

- Do not place any small metal (Clip, Screw, Tool, etc) on the robot body and control box. If such a piece of metals get in to the inside of robot body or controller, a electric short may occur and cause of fire.

- Do not place any heavy obstacle or object on the robot body and controller. It may damage the robot surface as well as deform the structure of robot and it may fall directly to the person.

- Do not use an extremely flammable spray near by the robot. It may cause a fire.

- If any air leakage is detected from robot , stop immediately the robot or activate E-Stop function. Lock out and Tagout until the problem fixed.
- When an error occur during operation, stop the robot immediately, find the cause of error and follow the step to re-start robot.

- Make sure following before turn on the power of robot
  - Confirm there in no person in the motion area of robot
  - Confirm the location of handy controller and tool is required place
  - Confirm there is no obstacle on the robot and in the area of robot motion

WANRING

- If any of the following cases should occur, stop the operation with E-Stop button immediately and turn off the power. If you continue the operation of machine under such conditions, a fire may result in the worst case.
  - When fume rises from the robot body or control box, or the outside surface of the robot emits abnormal heat.
  - When there is any abnormal noise from the robot.
  - When any water, or foreign obstacle is inside of the robot

- Stop the robot immediately when abnormal symptom happens during operation. When an error occurs during operation, the robot stops and alarm sounds and the error code displays on the handy controller. Press Stop button to silence the alarm. Check error table for a description of the error.

CAUTION

- If the following items are contained to the air, do not use it. Use only clean air.
  - Acid
  - Organic solvents
  - Chlorine gas
  - Sulfur dioxide
  - Compressor oil

- Do not drop or give any strong shock the the handy controller. It may be cause of malfunction.

- Handle with care with pneumatic line. It may be cause of leaks.

- Make sure the operation environment (Motion area, Safety Guard) should be proper for operation of machine equipments.

- Operate the robot with only healthy , good and normal body and mental condition.

- Do not use handy teach palm pendant (Controller) which contact with water or oil

- Make sure the operating environment is as follows
  Operation Temperature : 0℃ ~+ 40℃ (32°F ~+ 104°F)
  Storage Temperature : -25℃ ~+ 55℃ (-13°F ~ + 131°F)
  Humidity : 35 % RH ~85 % RH (without condensation).

CAUTION

- When setting up the robot arm in the mold area by Manual Mode, take really care that the robot arm does not contact with the mold or tie bar. Make sure to operate the robot outside the safety guard.

- Do not use an operation fluid other than clean compressed air

- Regulate the air pressure as specified.

- If don't operate the robot for several days or long period of the time due to plant shutoff or vacation, Turn OFF the control power.

- Proper working clothes, helmet and protective shoes required for operating and setting up the robot (Personal protective Equipment)
  - Do not operator robot without safety helmet or shoes.
  - Do not wear necktie and necklace, bracelet etc

MAINTENANCE WARNINGS

WARNING

- Before cleaning, inspecting, repairing, adjusting, or performing maintenance on the take-out, be sure to turn OFF the control power and pull out the plug and follow Lock out / Tag out Procedure. If you attempt to perform the cleaning without turning OFF the control power, electric shock. may happen.

- Only a qualified person is allowed to open the cover or panel of the take-out robot.

- Assign one qualified person who will control safety of the robot. and need to be trained by the manufacturing company or agency how to control robot and about safety

- Be sure to release pneumatic pressure before replacing a filter bowl.

- Before handling ROM, turn off the control power. Use ROM Remover to pull the ROM out. Do not drop the ROM and expose it to strong shock.

POWER RELATED WARNINGS

WARNING

- Handle with care with power cable, do not pull and bend. Do not place heavy object on the cable (No folk lift passing on the power cable). Use cable tie to organize power cable for safety. (Damaged cable could be the cause of fire or electric shock.

- Using unspecified Extension cable cause abnormal symptoms including heat and fire.

- Only qualified personal should try to install Electrical power and ground to the robot.

- Connect the earth terminal of the plug to the earth terminal of the plug socket

WARNING

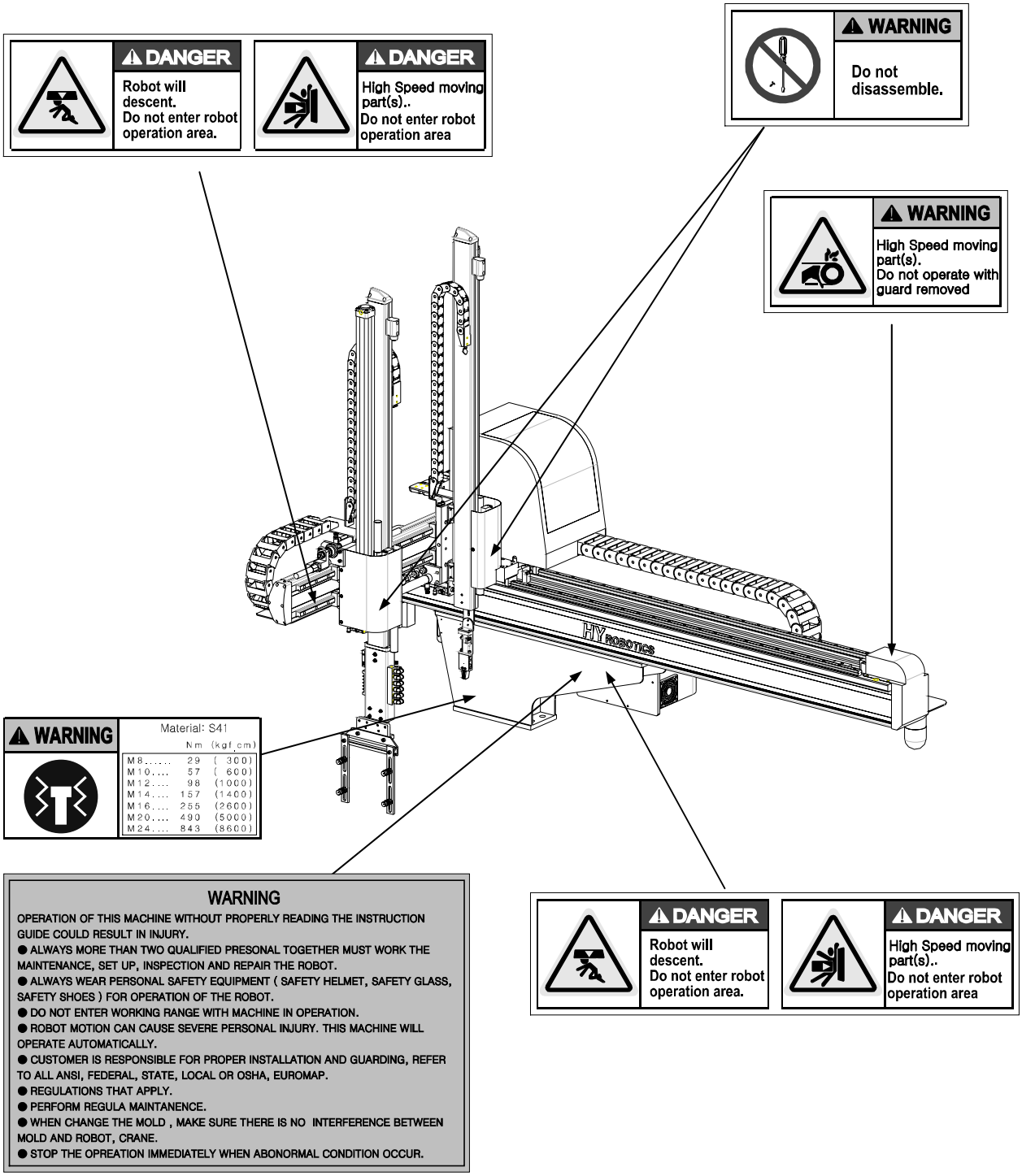
- Power off when connect or disconnect any connector of robot

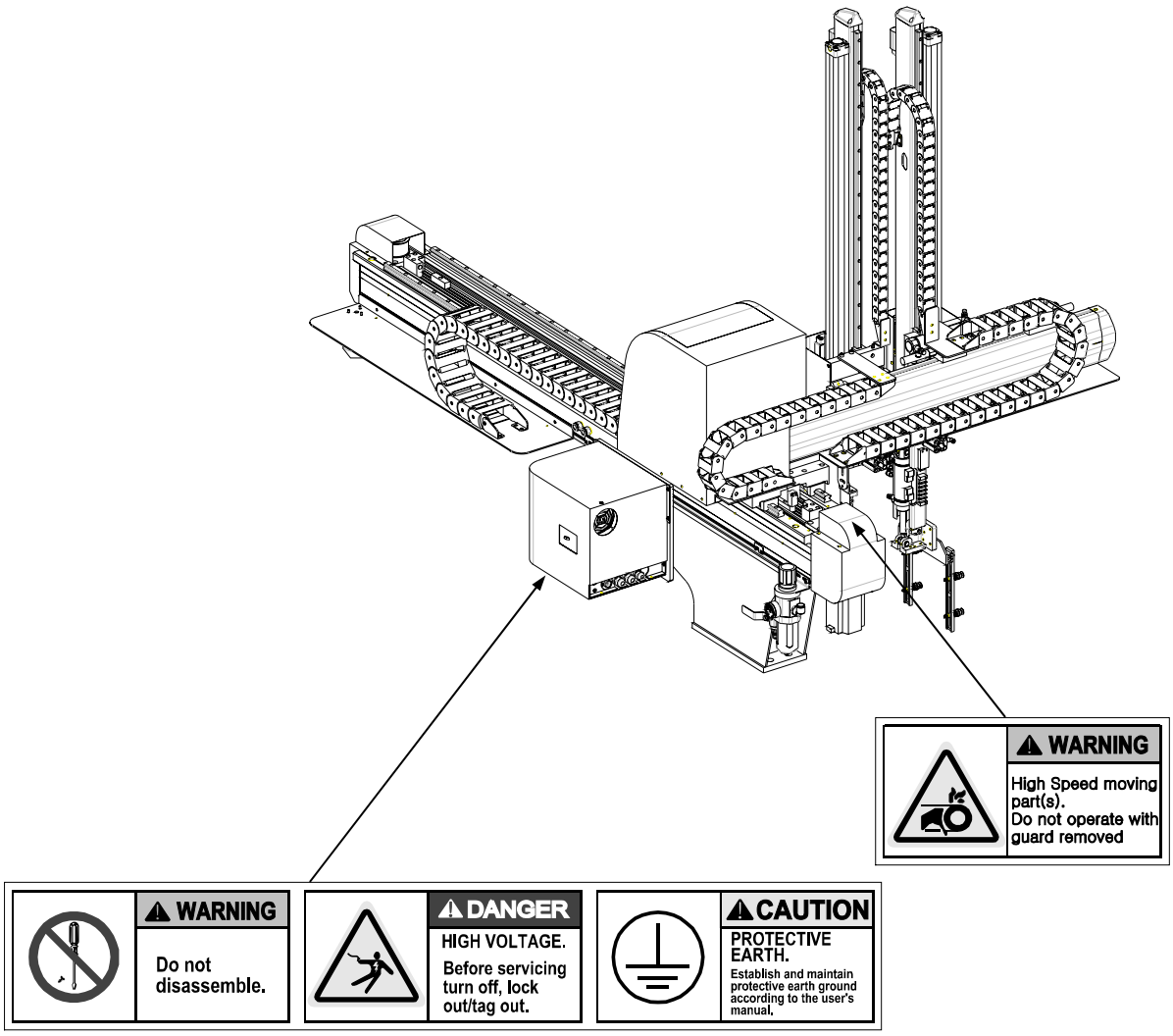
- Lockout / Tagout before opening the control box

- Connect the earth terminal of the plug to a class D grounding terminal

Safety Signs

There are safety signs on the robot like below figures. Respect and follow the messages on these signs when operating or performing maintenance on the robot. Do not peel off these labels or signs




⚠ WARNING
High Speed moving part(s).
Do not operate with guard removed
⚠ WARNING
Do not disassemble.
⚠ DANGER
HIGH VOLTAGE.
Before servicing turn off, lock out/tag out.
⚠ CAUTION
PROTECTIVE EARTH.
Establish and maintain protective earth ground according to the user's manual.

CONTENTS

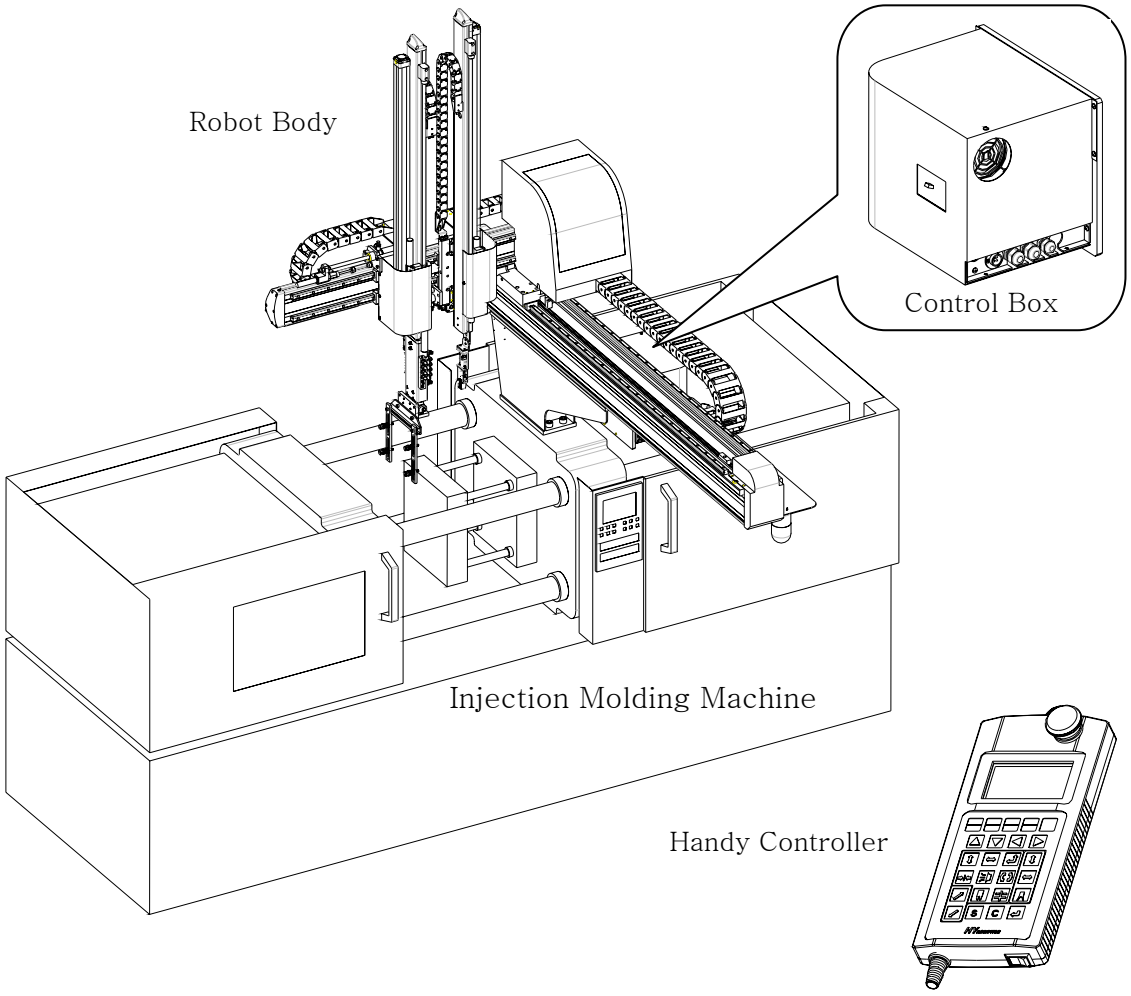
1 Introduction

1.1 Robot Assembly

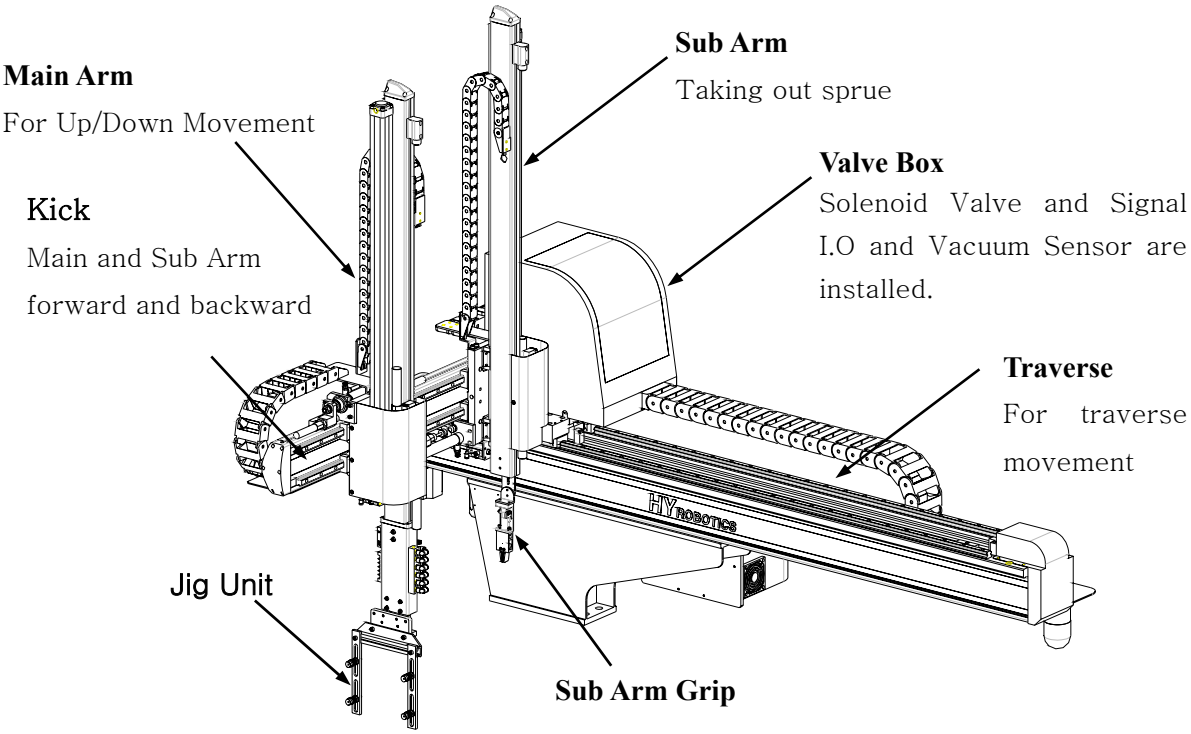
This Robot is consisted of

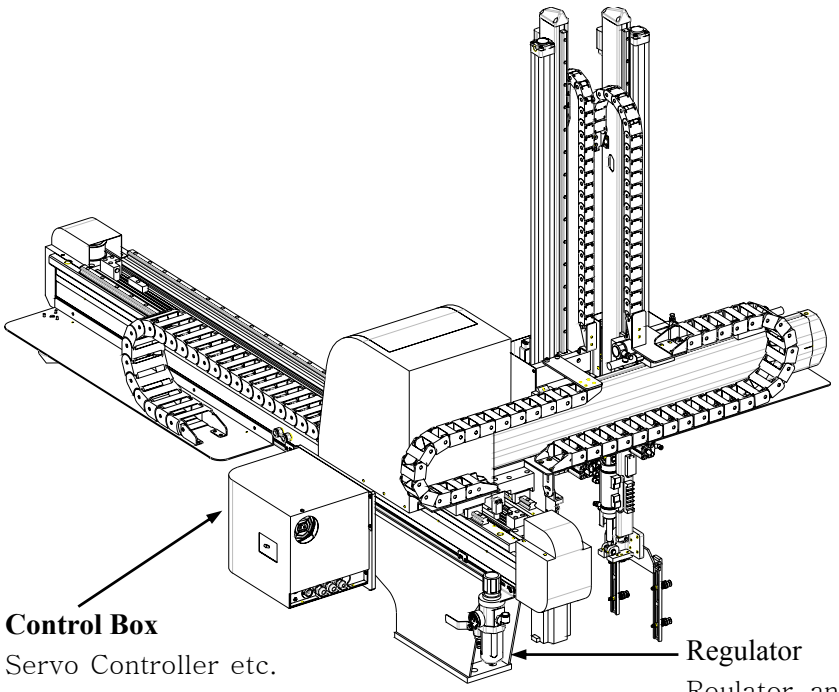
- Robot Body
- Interlock and Control Box
- Handy Controller

.

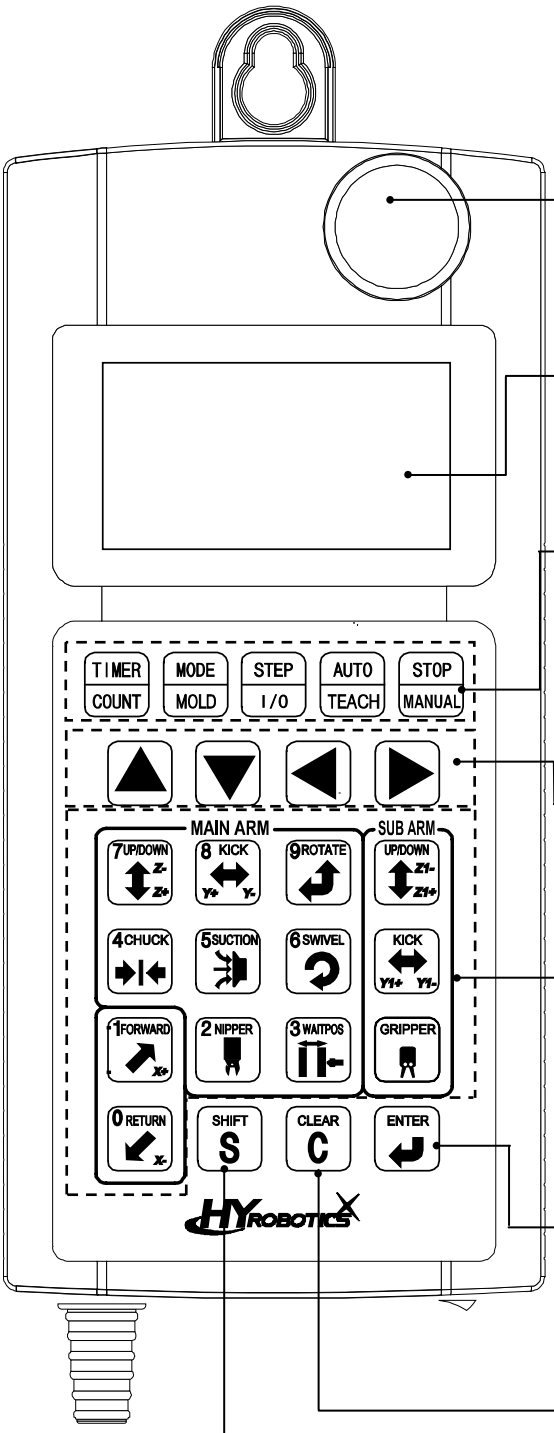


1.2 Robot Body





1.3 Handy Controller Function



● ROBOT EMO Button

Press ROBOT EMO Stop will stop operation of Robot and Activate IMM EMO Stop (Emergency)

● LED Display

Display current operation status, error message, initial settings

● Function Keys

These keys are used to access each setting screen and to switch between Auto and Manual Mode.
To use the function on the bottom half of a key,
Hold down the S(Shift) key and then press the function key

● Arrow Key (Up / Down, Left /Right)

Up / Down key move cursor to each item. Left/Right key select each mode

.

● Manual Operation Key (Also Numeric Key Pad)

Operate each axis or robot in manual mode
For Timer setting, Search mold number and Input Numeric number.

● Enter Key

Store the number and selected mode.

.

● C (Clear) Key

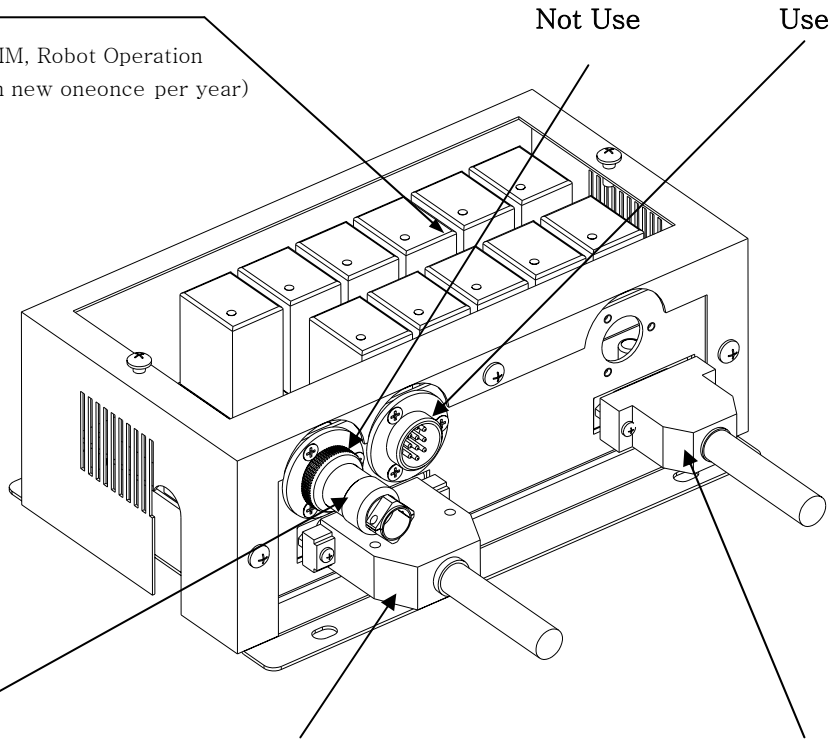
Cancel, Clear Error

● S(Shift) Key

S key will use for upper case commend

1.4 Interlock and Control Box

Interlock control box communicate and interlock the signal between the injection molding machine and the take-out robot. When robot is in use, connect the Plug to USE Socket, when robot is not in use (Operate IMM only) , move the Plug to Not Use socket.



Plug

This plug is used when robot in use or not in use (not in use : IMM operation only)

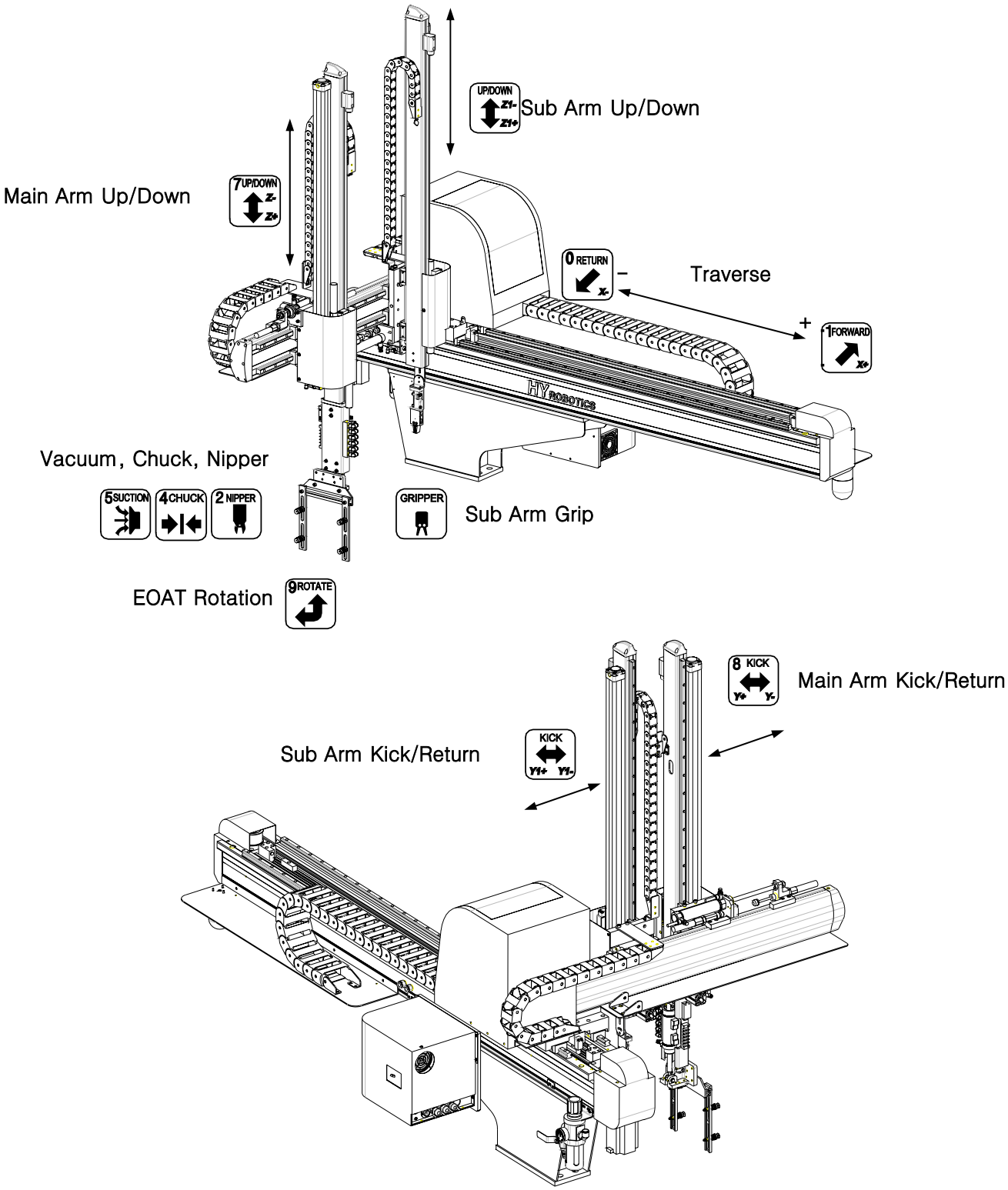
Molding Machine Interlock Cable

This cable is used to connect with the molding machine.

Robot Cable

This cable is used to connect the robot body to the interface box.

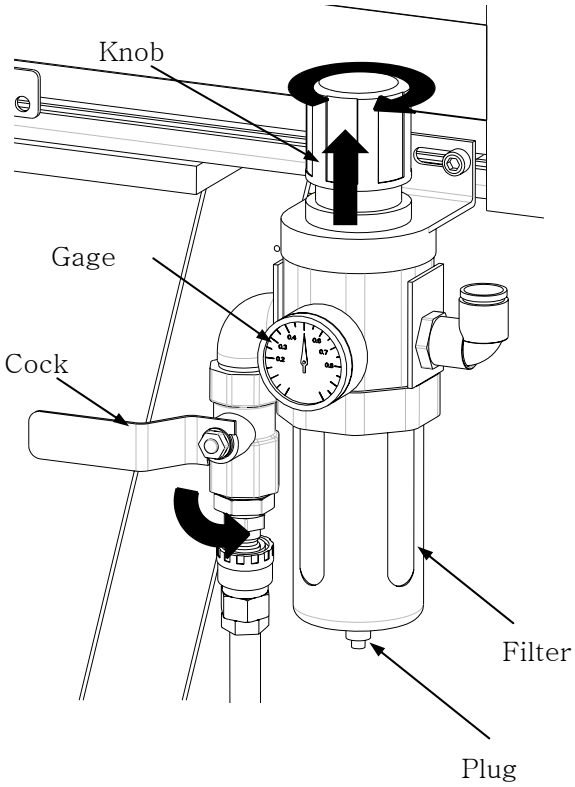
1.5 Each Axis


Sub Arm Up/Down
Main Arm Up/Down
Traverse
Vacuum, Chuck, Nipper
Sub Arm Grip
EOAT Rotation
Main Arm Kick/Return
Sub Arm Kick/Return

2 Before Operation

2.1 Before Operation

2.1.1 Air regulator



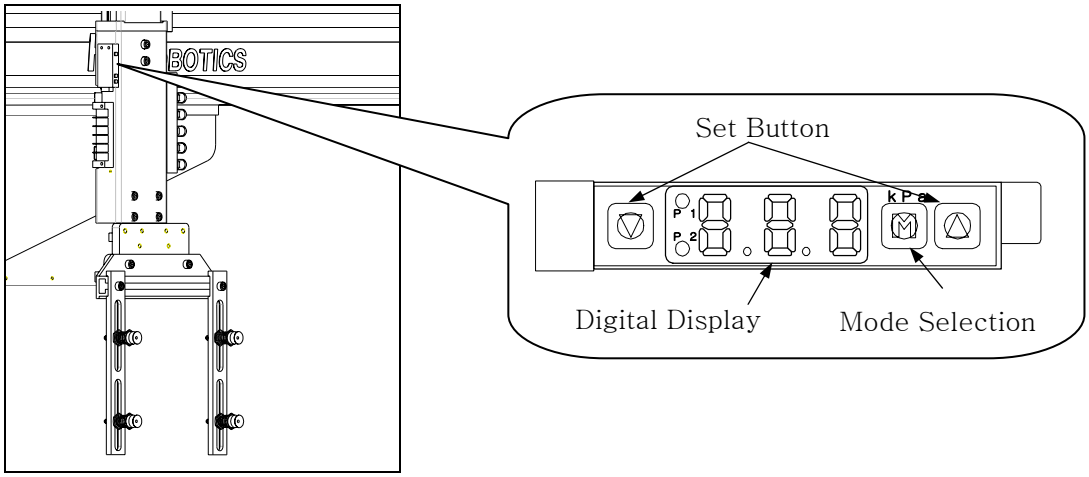
1. Make sure the robot arm is retracted
Beware that the robot may move suddenly as the system is pressurized.

2. Turn Cock counterclockwise

3. Pull Up the adjusting knob and adjust the pressure to [5.9×10^5 Pa(Gauge) or 6 kg/cm^2] and Push down to set

* Remove water from air regulator regularly if required.

2.1.2 Vacuum Verification Sensor Adjustment

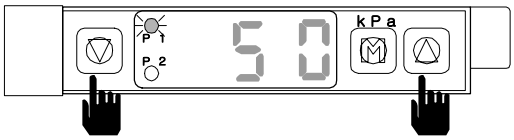


[Main Arm Up/Down]

Vacuum Sensitivity Adjustment (Normally not required)

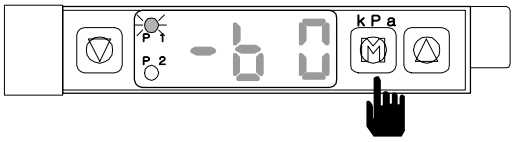
- **STEP 1**

Press [M] and [△] at the same time
P1 will blink.



- **STEP 2**

Press [▽] or [△] , set pressure -60(kpa) .

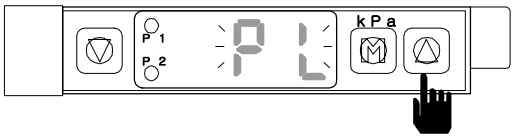


- **STEP 3**

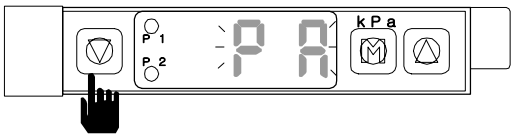
Press [M] more than 1 seconds.
Set up finished, and LED will display current Vacuum pressure.

Lock and Unlock for Vacuum Sensor value

Locking Vacuum Sensor Value will prevent setup value from changing by any mistake



Press [△] more than 3 seconds. "PL" will blink twice and Sensor will lock.



Press [▽] more than 3 seconds "PA" will blink twice and sensor will unlock.

2.2 Before Starting (Preventative Maintenance Schedule)

Before you start daily operation of the robot, perform preventive maintenance.

- Daily

- Check air Pressure is 5~6.5 kg/cm^2 or 5 ~ 7 × 10^5 Pa(Gauge)]
- Inspecting filter regulator unit : Check the bowl for water and contamination and for correct pressure.
- Check Hoses and Cables : Check for kinks, cuts and tears. Replace as needed.
- Inspecting Shock absorbers and cushions. : Make sure the are operating smoothly
- Checking Gripper return spring : Check that the gripper return spring is operating properly
- Checking residue buildup: Inspect the shafts and gripper for buildup of plastic residue. Clean as necessary.
- Checking Interlock functions. : Make sure the interlock functions are working properly.
- Checking part verification: Check that the parts verification is working properly.
- Check Suction cups

- Weekly or as often as needed.

- Check EOAT mounting screw including gripper : Check EOAT screw for tightness . Tighten as required.
- Inspecting fittings and mounting hardware : Check all fittings, screws, and component mounting hardware for tightness. Tighten as needed.
- Check the safety latch cylinder for Down. : Make sure the safety latch cylinder is working properly
- Testing the Emergency Stop Button. : Verify that the emergency stop works properly.

- Monthly

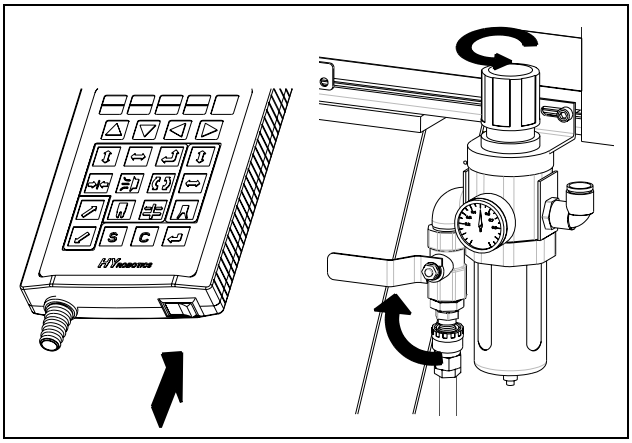
- Inspecting the filter regulator : Check that the filter regulator is set at the correct pressure. Check the filter and clean or replace it as needed.
- Checking the solenoid valves : Check that the solenoid Valves are working properly. Replace as needed.
- Checking all electrical cables : Inspect all electrical cables for cuts, burns and replace as required
- Checking the exhaust filter.
- Inspecting electrical terminal : Check all electrical terminals for tightness, adjust as required.

- Inspect each axis cylinder, make sure operation and the cushion is working properly
- Inspect body for any damage during mold set up or other operation.

2.3 Adjust Kick/Return Cylinder

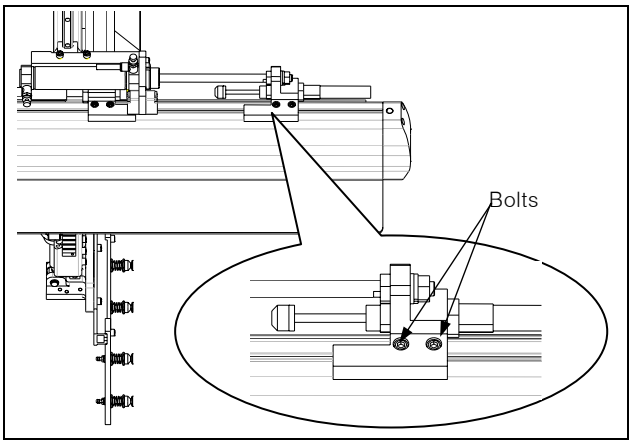
Adjust the location of Kick Cylinder with Kick shock absorber block and bolts

NOTICE This information is designed for main arm. Follow same step for sub arm as described below.



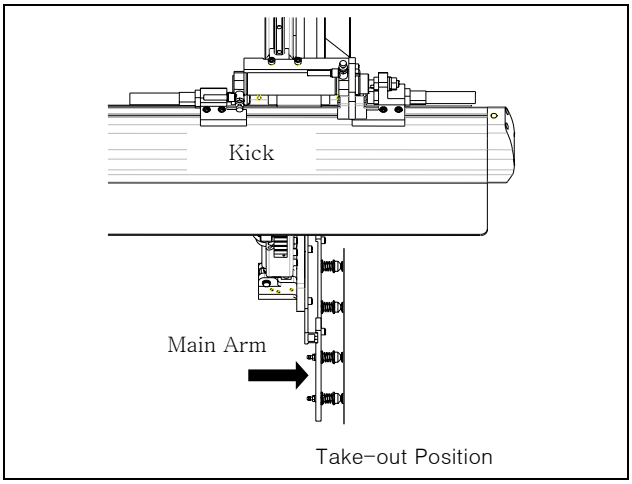
● **STEP 1**

Turn off Power and depressurized system with air regulator or disconnect air.



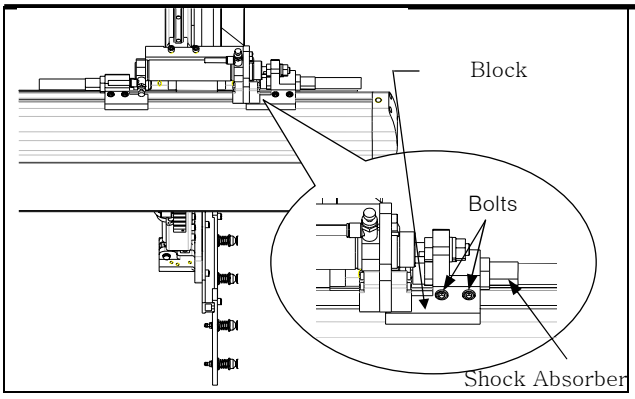
● **STEP 2**

Loosen the bolts



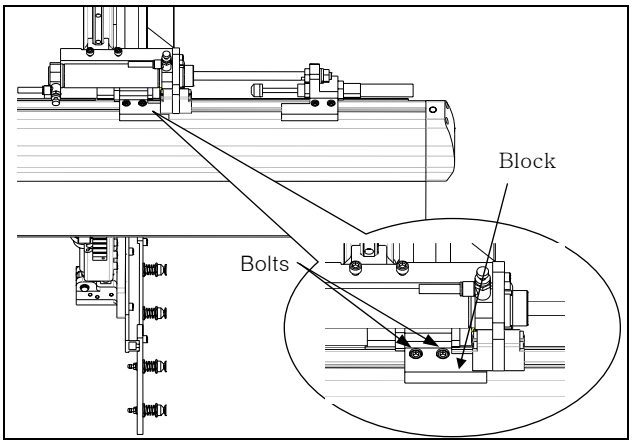
● **STEP 3**

Adjust Block location as figures.



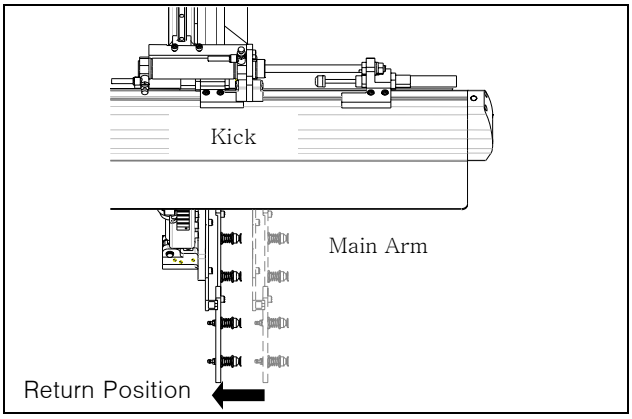
● STEP 4

Push Block to the kick cylinder guide (Till the end of Shock Absorber Stroke) . Tighten the bolts of block



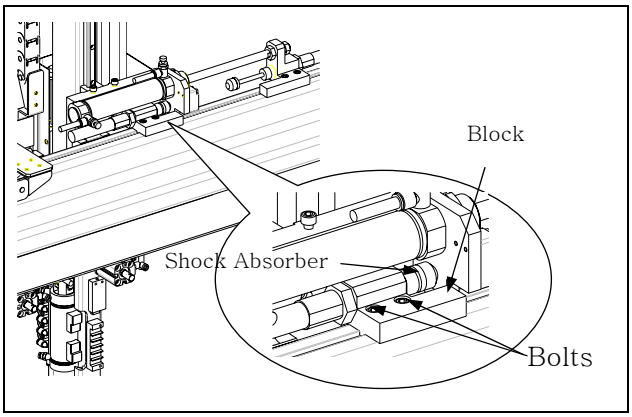
● STEP 5

Loosen the bolts.



● STEP 6

Adjust main arm location and find return position for application. Tighten bolts as needed



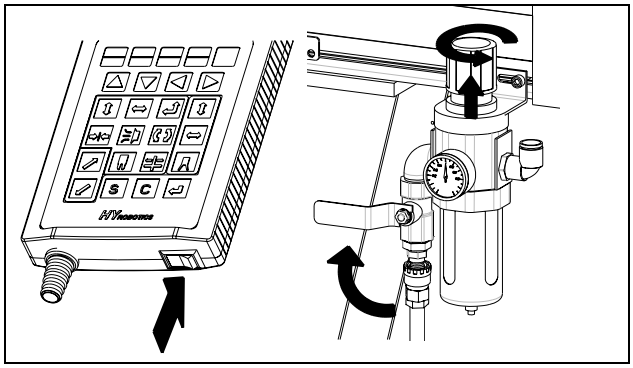
● STEP 7

Push Block to the kick cylinder guide (Till the end of Shock Absorber Stroke) . Tighten the bolts of block

2.4 Down Stroke Adjustment

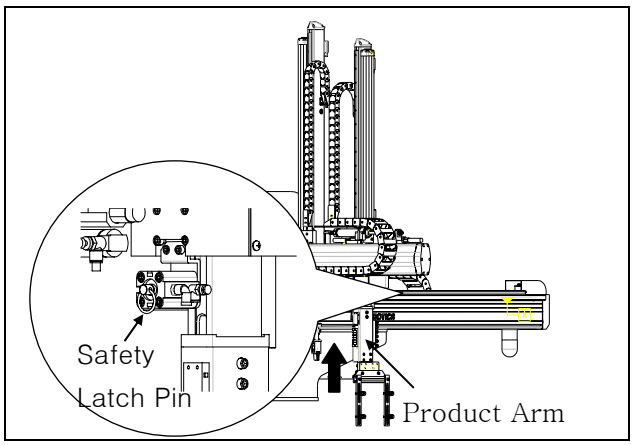
Adjust the stroke for Down Position with Stopper

NOTICE This information is designed for main arm. Follow same step for sub arm as described below



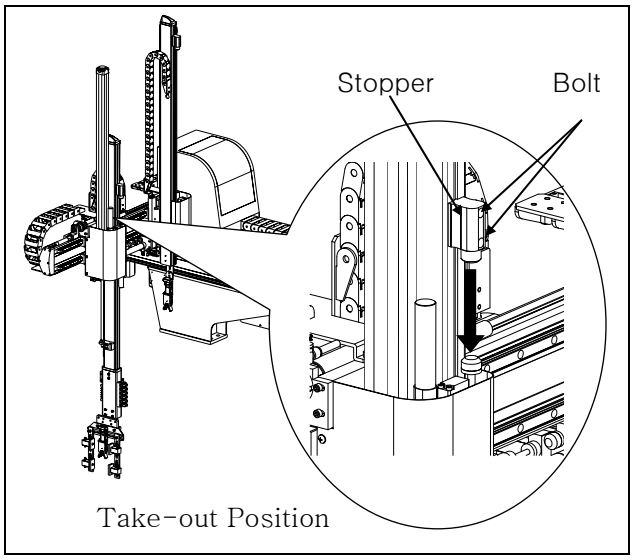
● STEP 1

Turn off Power and depressurized system with air regulator or disconnect air.



● STEP 2

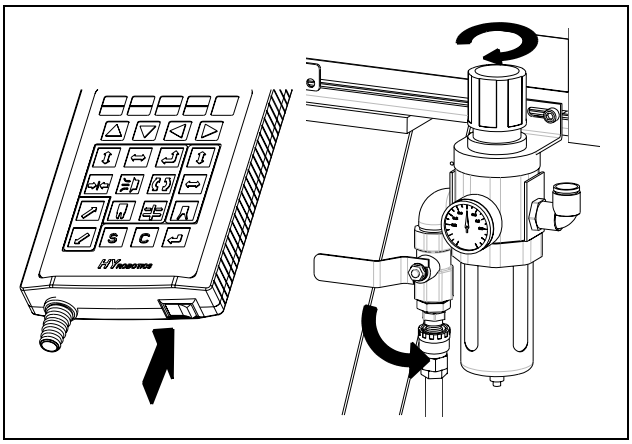
Slowly lift Arm up and Pull Safety Latch Pin.
Release Arm will allow it Down by gravity



● STEP 3

Loosen the bolt and find proper location of EOAT for parts with pushing Shock absorber with Stopper. And Tighten the bolt
Precision positioning for finding suction cups position is required in EOAT location adjustment.

2.5 Speed Control for Down, Kick, Rotation



● **STEP 1**

Normally it is not necessary to adjust speeds because they are factory set.

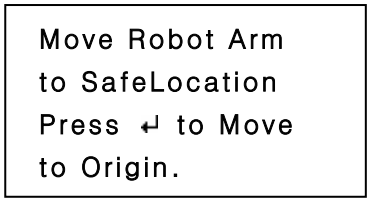
Power On and pressurized system with air regulator or connect air.

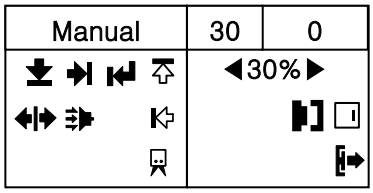
● **STEP 2**

HY Logo will displays and move to Servo Origin screen.

⚠DANGER

Before operate Servo 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.

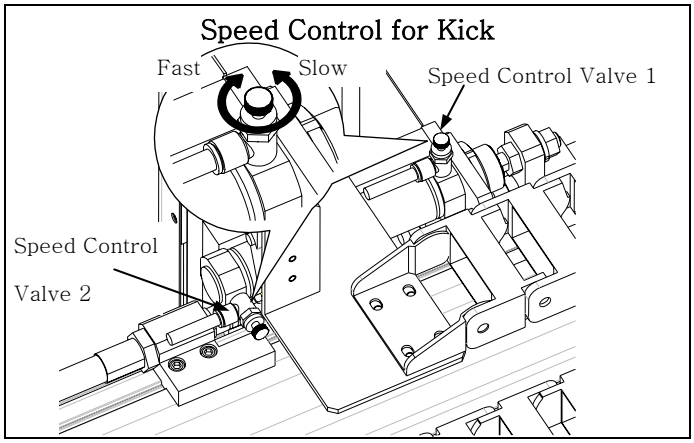




● **STEP 3**

Press 

will move each axis arm to servo origin point. And then screen will display Manual Mode screen.



● STEP 4

To adjust the Kick Cylinder speed, use speed control Valve 1.

To adjust the Kick Return Cylinder speed, use speed control Valve 2.

Turn the speed controller clockwise to reduce the speed and counterclockwise to increase the speed.

● STEP 5

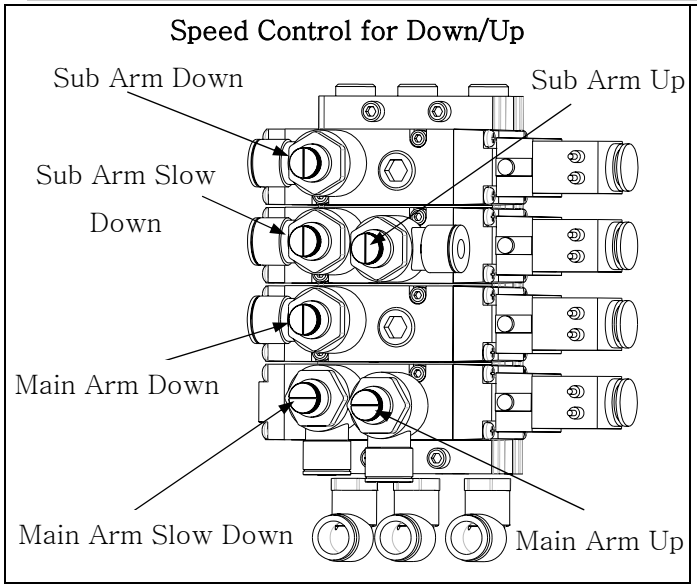
Press 

will activate kick and kick return.

Make sure the operation speed is proper. If not perform step 4

*Follow same step to adjust speed sub arm kick speed control.

NOTICE Set ascent and descent speed of main arm and sub arm with slow speed setting.



● STEP 6

There are two different speed setting. One is in mold (High Speed), the other one is outside of mold (Low Speed : Parts Protection Feature). We call it Slow down, or 2nd down. Adjust each speed with thumb screw.

● STEP 7

Press 

for main arm descent(down), press 

for sub arm, check the speed.

NOTICE

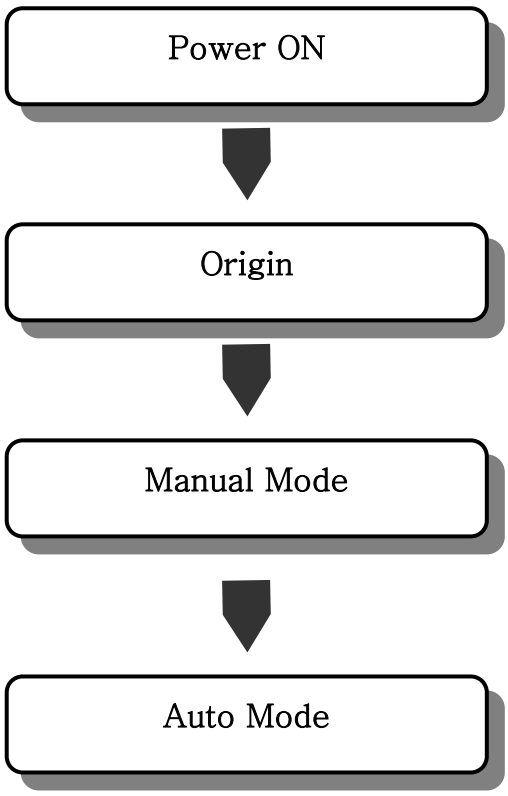
Set Slow Down Speed first and then set down speed.

Valve	Description
Main Arm Down	In Mold Descent Speed
Sub Arm Down	
Main Arm Up	Ascent Speed
Sub Arm Up	
Main Arm Slow Down	Outside of Mold Descent Speed (Slow Down)
Sub Arm Slow Down	

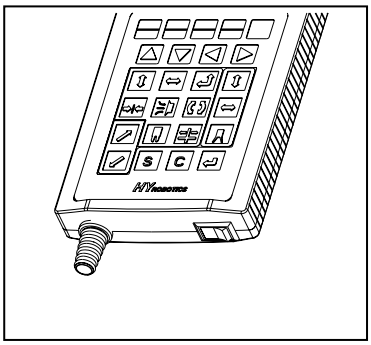
3. START UP / STOP

3.1 STEP FOR START-UP

Follow step for Auto Mode



3.2 Start Up



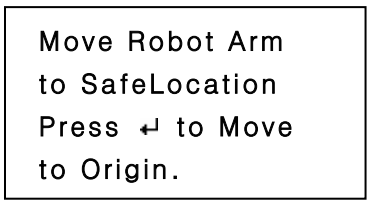
● **STEP 1**

Turn On Power..

● **STEP 2**

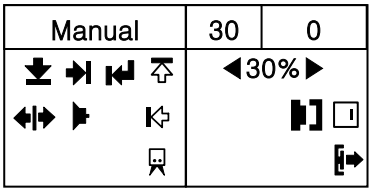
It will display System Version. And move to origin screen.

⚠DANGER Before operate Servo 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.



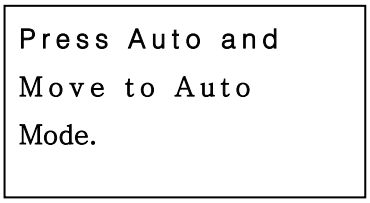
● **STEP 3**

Press ENTER will move each axis arm to servo origin point. And then screen will display Manual Mode screen.



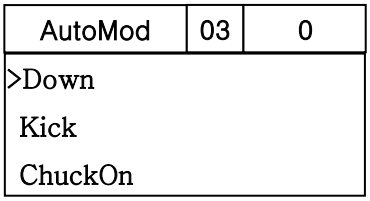
● **STEP 4**

Press AUTO/TEACH and move to Auto Message screen.



● **STEP 5**

Press AUTO/TEACH and move to Auto Mode.

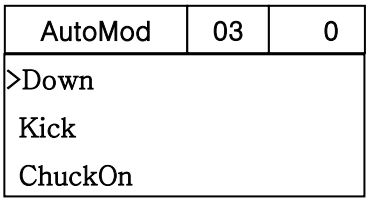


● **STEP 6**

Robot arm will move initial position and start Auto Mode

3.3 Stop Operation

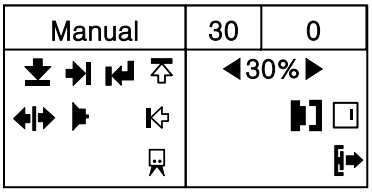
> **⚠ WARNING** Follow the next step to stop the robot. Power off and Disconnect air.



- **STEP 1**

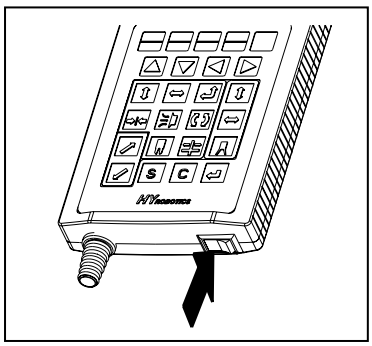
Press STOP for Manual Mode.

It will stop the operation after finish to run last step. And moves to Manual Mode.



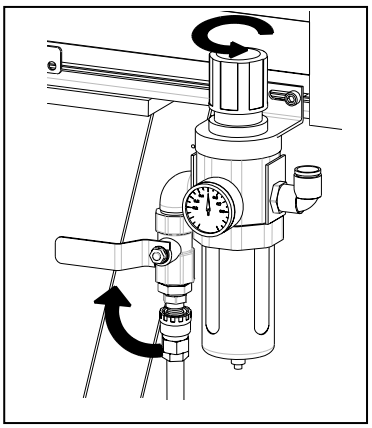
It will not stop in the middle of step . If robot runs any step, it will finish the step and stop before next step. (Due to Pneumatic Operation Pressure)

> **⚠ WARNING** Turn Off Handy Controller, Power off Molding Machine.



- **STEP 2**

Turn Off Power

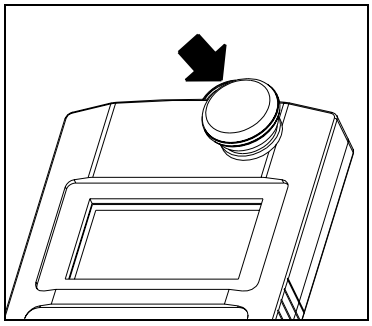


- **STEP 3**

Disconnect Air Pressure.

3.4 Emergency Stop (EMO Stop)

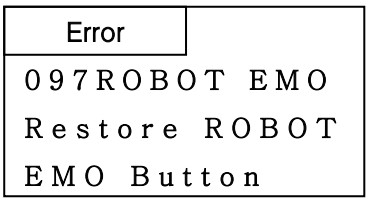
Press ROBOT EMO button in any dangerous situation (Protect People, Robot, Mold Etc)



- **STEP 1**

Pressing ROBOT EMO button.

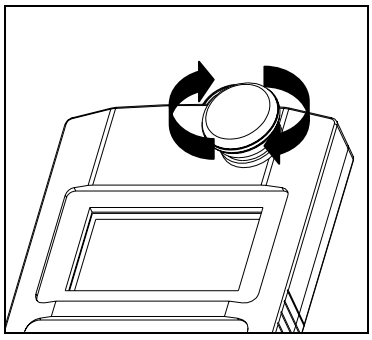
Robot will move to waiting position and stop Operation.



Alarm and buzzer will be on and Error message will appear in the handy controller.

3.5 Restoring Emergency Stop

> **⚠ WARNING** Eliminate Emergency Environment before restoring ROBOT EMO button.



- **STEP 1**

Eliminate Emergency Stop Situation.

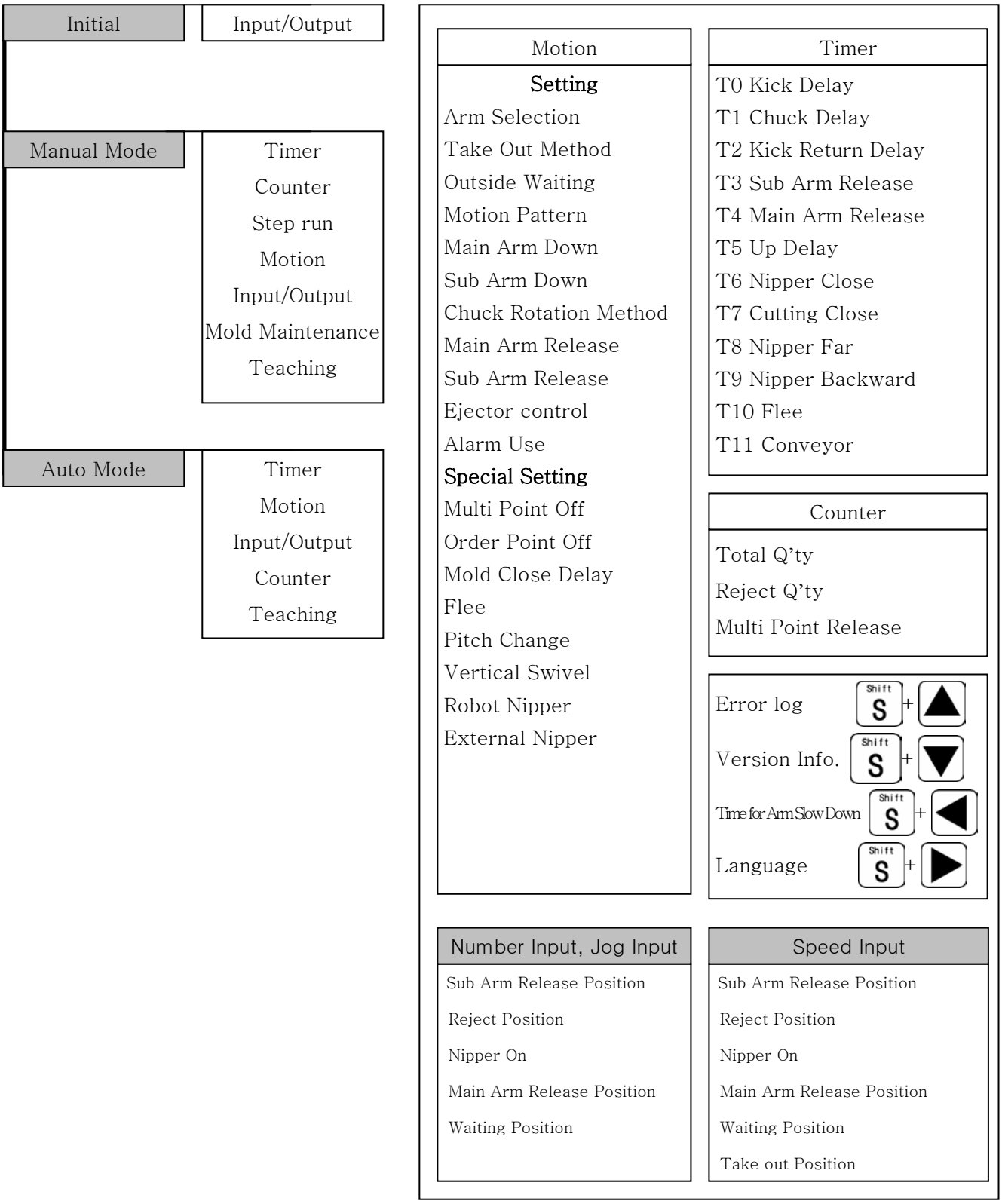
Rotate ROBOT EMO button to Clock Wise

- **STEP 2**

Press Clear C and stop Alarm and Buzzer, moves to Manual Mode.

4 OPERATION

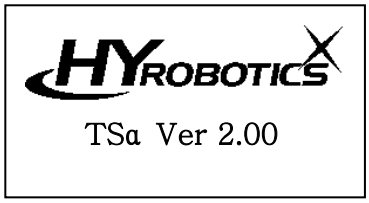
4.1Screen Structure



4.2 Initial Screen

Power on displays Logo and Robot Name/type , Robot Initialization and Move Origin Point

NOTICE	Selecting Outside Waiting Option will initiate Robot move to the selected location (Outside of Mold)



4.3 Searching Robot Origin Point

(1) Description

Robot will operate with following step to search origin point. 1. Ascent, 2. Kick Return, 3. Rotation Return, 4. Swivel Return and 5. Traverse Axis search origin point (This Step is developed to have more safety movement when restart robot)

Selecting Outside Waiting Option will initiate Robot move to the selected location (Outside of Mold) . Handy controller screen displays Manual Mode after finish origin point searching

NOTICE Before operate Servo 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.

```
Move Robot Arm
to SafeLocation
Press ↵ to Move
to Origin.
```

Order of Origin		
No	In Mold	Outside of Mold
1	Kick Return	Up
2	Up	EOAT Rotation Return
3	EOAT Rotation Return	EOAT Swivel Return(Option)
4	EOAT Swivel Return (Option)	Kick Return
5	Traverse Return	Traverse Return

(2) Button Function

NO	Button	Description
1		Operate Robot arm moves Traverse X+
2		Operate Robot arm moves Traverse X-
3		Search Origin Point and Initiate Robot Position
4		Display input / output signal screen

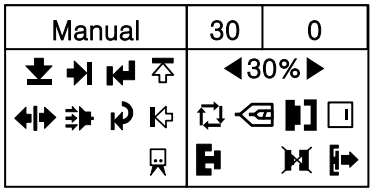
4.4 Manual Mode

(1) Description

In the Manual Mode , robot can be operated with manual operation key.

Selecting Outside Waiting Option will initiate Robot to move to the selected location

⚠DANGER CLEARING ROBOT MOTION AREA : It is the responsible of the operator to verify that the robot motion area is clear before any robot operation.



INPUT / OUT PUT					
NO	Icon	Description	No	Icon	Description
1		Main Arm Down	16		Swivel Return Complete
2		Main Arm Down Complete	17		Vacuum On
3		Main Arm Up	18		Vacuum Off
4		Main Arm Up Complete	19		Chuck
5		Mian Kick	20		Chuck Off
6		Main Kick Complete	21		Sub Arm Down
7		Main Kick Return	22		Sub Arm Complete
8		Main Kick Return Complete	23		Sub Arm Up
9		EOAT Rotation	24		Sub Arm Up Complete
10		Rotation Complete	25		Sub Arm Kick
11		EOAT Rotation Return	26		Sub Arm Kick Complete
12		Rotation Return Complete	27		Sub Arm Kick Return
13		EOAT Swivel	28		Sub Arm Kick Return Complete
14		Swivel Complete	29		Sub Arm Grip
15		Chuck Swivel Return	30		Sub Arm Grip Off
INTERLOCK SIGNAL					
Input			Output		
NO	Icon	Description	NO	Icon	Description
1		Full Auto	6		Mold Open/Close Complete Signal
2		Auto Injection	7		Ejector Signal
3		Mold Open Complete			
4		Safety Door			
5		Ejector Forward Complete			

(2) Button Function

⚠DANGER Do not enter robot motion area. If anyone enter the robot motion area during Auto Mode or Manual Mode, serious accident could results.

NOTICE Robot arm will not descent if mold is not open.

NO	Button	Description
1	TIMER / COUNT	Press Timer button, LCD displays timer mode for delay time settings.
2	SHIFT S + TIMER / COUNT	Press Timer button with Shift button. (Counter) LCD displays Counter screen, Counter screens display Total Q'ty, Detection Fail, Mult Point Release.
3	MODE / MOLD	Press Mode button, LCD displays Mode screen (Motion Mode).
4	SHIFT S + MODE / MOLD	Press Mode Button with Shift button, (Mold) LCD displays Mold Maintenance screen. (Search Mold Number, Open and Create, Delete Mold File)
5	STEP / I/O	Press Step Button LCD displays Step Motion Mode screen (Robot can operate Step by Step Operation.)
6	SHIFT S + STEP / I/O	Press Step Button with Shift Button, (I/O) LCD display Input / Output Signal.
7	AUTO / TEACH	Press Auto Button. LCD displays Auto Mode screen.
8	SHIFT S + AUTO / TEACH	Press Auto Button with Shift LCD display Number input screen to set speed and position with numeric number input.
9	SHIFT S + ▲	Press Up Arrow with Shift Button. LCD displays Error Log screen
10	SHIFT S + ▼	Press Down Arrow with Shift Button. LCD displays Version Information screen
11	SHIFT S + ◀	Press Shift and Left Arrow button LCD displays Descent (Down) Slow Speed Control screen
12	SHIFT S + ▶	Press Right Arrow with Shift Button. LCD displays with selected Language
13	7 UP/DOWN Z- Z+	Press Descent Button Move Main Arm Down, Press again, Move Main Arm up
14	8 KICK Y+ Y-	Press Kick Button Move Main Arm Kick, Press again, Move Main arm Kick Return
15	9 ROTATE	Press Rotate. Rotate Chuck, Press again, Chuck rotate return.

NO	Button	Description
16		Press Chuck Chuck , Press again, Chuck Off
17		Press Suction Suction, Press again, Suction Off
18		Press Swivel. Swing Chuck, Press again, Chuck swing return.
19		Press Descent Button for Sub Arm Move Sub Arm Down, Press again, Move Sub Arm up
20		Press Kick Button Move Sub Arm Kick, Press again, Move Sub Arm Kick Return
21		Press Gripper Grip and Grip Off
22		Press WAITPOS LCD displays waiting position setting screen (Option).
23		Press 1 Forward Robot arm will move traverse (X+)
24		Press 0 Return Robot arm will move traverse return (X-)

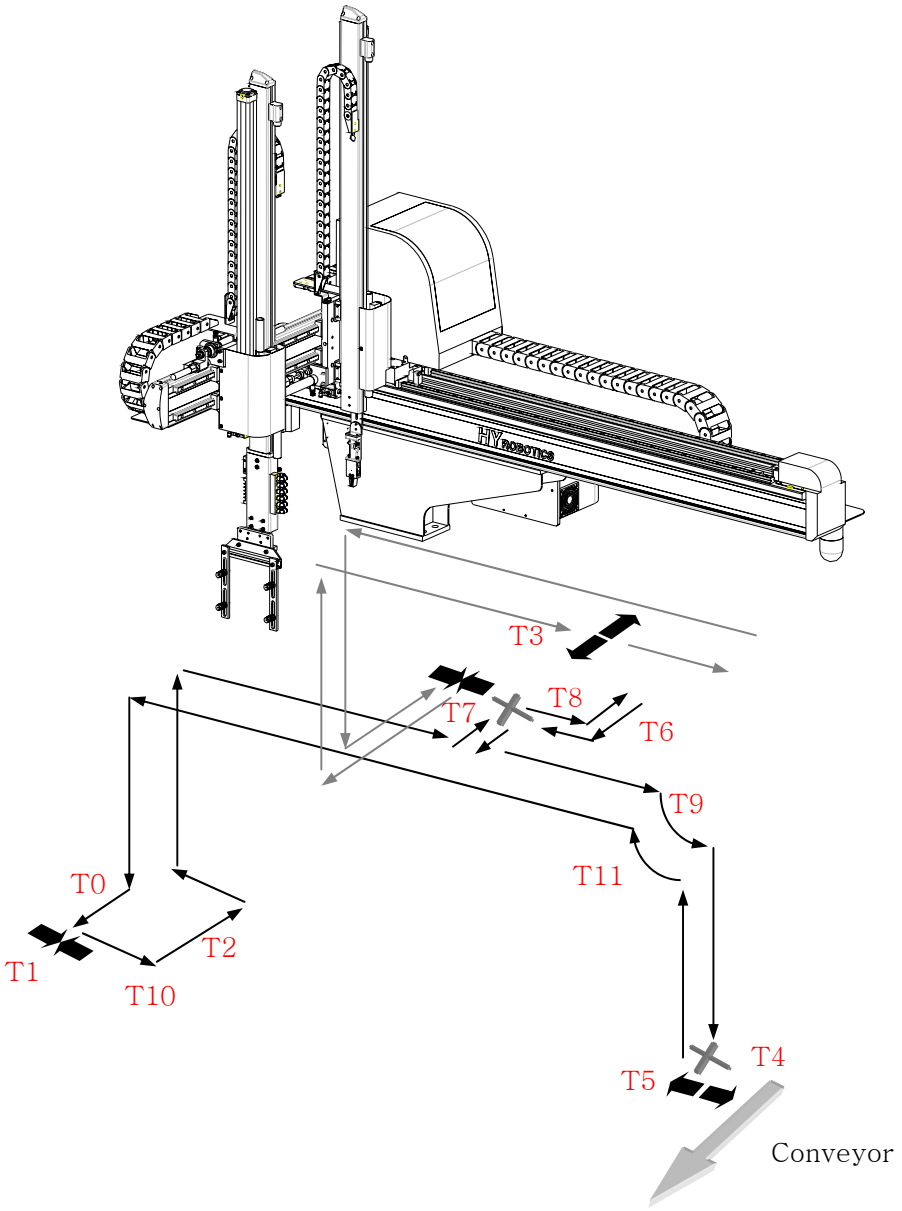
4.1.1 Timer Set Up

(1) Description

Timer setup will control the Robot motion smoothly with Injection Molding Machine Operation.

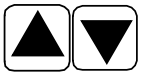
⚠DANGER Timers will not be saved separately with Mold Files. For examples setting T0 as a 0.2 Seconds will make all other mold file use T0 as 0.2 Seconds

Timer	30	0
T0 Kick	0.0	0.0
T1 Chuck	0.2 <	0.2
T2 KicRt	0.0	0.0



NO	Default (sec)	Display	Description
T0	0	Kick	After starting Down, Delay time for Kick Movement
T1	0	Chuck	Chuck Delay
T2	0	KicRt	Kick Return Delay
T3	0.5	SOpen	Sub Arm Release
T4	0.3	MOpen	Main Arm Release
T5	0.3	Up	Ascent(Up) Delay
T6	0.5	NiCls	Nipper Close
T7	0.5	CutDl	Cutting Delay – Robot Nipper, External Nipper
T8	0.5	NiFar	Nipper Far – Robot Nipper, External Nipper
T9	0.5	NiBwd	Nipper Backward
T10	0.3	Flee	Flee
T11	5.0	Conve	After 2nd Up, Delay time for Conveyor Operation.

(2) Button Function

NO	Button	Description
1		'<' key moves up and down to select each Timer.
2	Numeric Key	Input delay time.
3		Press the Enter Button to save the change
4		Cancel the Input
5		Stop Auto Mode and Back to Manual Mode
6		Pressing Auto Button will back to Auto Mode

(3) Programming Timer Settings

Timer settings can be viewed and changed using the handy controller under two conditions.

1. When the robot is in Timer Mode. 2. During Auto Mode (While Robot is running)

> **NOTICE**
>
> Timer can be changed during Auto Mode, but cannot be changed during Cycle and Step Operation.
>
> Press the Timer button to move Timer Mode while in Auto Mode

Setting T1 (Chuck Delay) to 0.3 Seconds

Timer	30	0
T0 Kick	0.0 <	0.0
T1 Chuck	0.0	0.0
T2 KicRt	0.0	0.0

● **STEP 1**

Press [TIMER / COUNT] move to Timer Mode in Manual Mode.

Timer	30	0
T0 Kick	0.0	0.0
T1 Chuck	0.0 <	0.0
T2 KicRt	0.0	0.0

● **STEP 2**

Press [▼] , Move < to the T1 (Chuck)

Timer	30	0
T0 Kick	0.0	0.0
T1 Chuck	0.0 <	0.3
T2 KicRt	0.0	0.0

● **STEP 3**

Press [3 WAITPOS], input 0.3 sec.

Timer	30	0
T0 Kick	0.0	0.0
T1 Chuck	0.3 <	0.3
T2 KicRt	0.0	0.0

● **STEP 4**

Press the [ENTER] to save the change

Manual	30	0
	◀30%▶	

● **STEP 5**

Press [STOP / MANUAL], Move to Manual Mode.

4.1.2 Counter

(1) Description

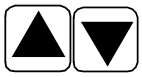
Counter can be viewed and changed using handy controller.

Counter Mode displays Total Production Quantity , Detection Failure Quantity, Multi Point Release.

Counter	30	0
>C0 TotQty	10000	
C1 DetFai	3	
C2 MulRel	2/4	

NO	Display	Description
C0	TotQty	Total Operation (Production) Quantity y : Robot Operation Cycle after Reset
C1	DetFai	Detection Failure Quantity
C2	MulRel	Current Multi Release(Off) number and Total Multi Release(Off) number

(2) Button Function

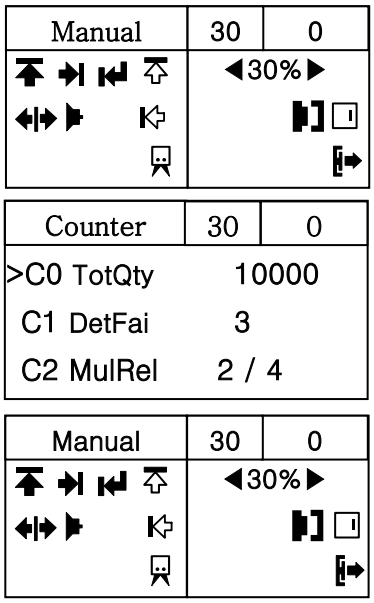
NO	Button	Description
1		Pressing arrow key scroll the > key through the list.
2		Press Clear key will Reset the item on > key. Press more than 2 seconds..
3		Press Stop button to change Manual mode..
4		Press Auto button to back to Auto Mode

(3) Counter Reset Method

NOTICE

Counter can be changed during Auto Mode, but can not be changed during Cycle and Step Operation.

Resetting C0 to 0



- **STEP 1**

Press, TIMER/COUNT with SHIFT/S key , it displays Counter screen.

- **STEP 2**

Press CLEAR/C for 2 seconds, Total will be 0 (Reset).

- **STEP 3**

Press STOP/MANUAL displays Manual Mode

4.1.3 Motion Mode

(1) description

Robot motion pattern can be decided by selecting of Each Motion Mode.

ArmSet	M&S ◀
Method	Vacuum
OutWait	NoUse
Motion	LType

NOTICE

The below icons uses for robot motion in this book


Origin

Chuck

Chuck Off


Vacuum


Vacuum

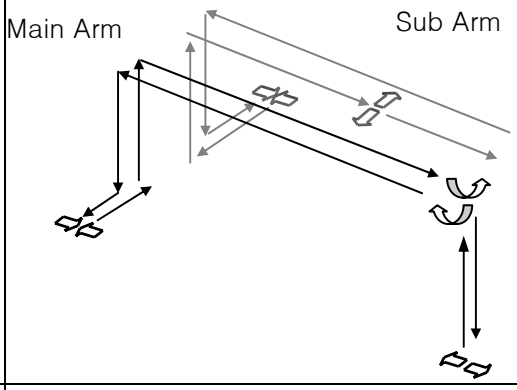
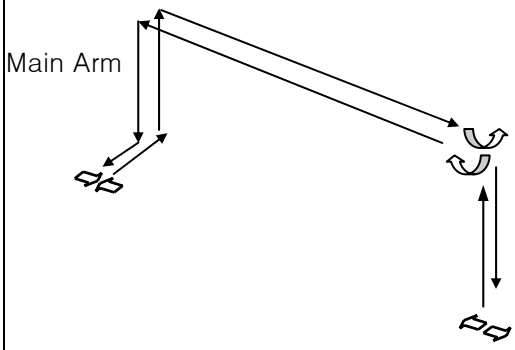
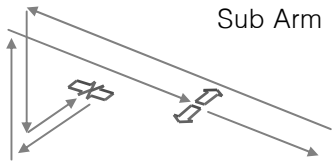

Cutting

① Robot Arm Setting

ArmSet : Robot Arm Setting

Setting for Take-Out Motion Arm. Default setting is “M&S”.

ArmSet	M&S ◀
Method	Vacuum
OutWait	NoUse
Motion	LType

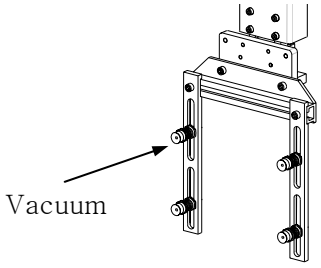
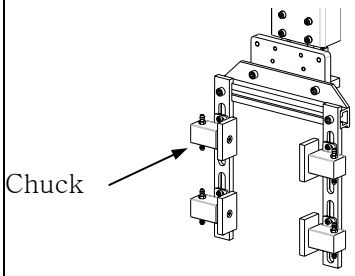
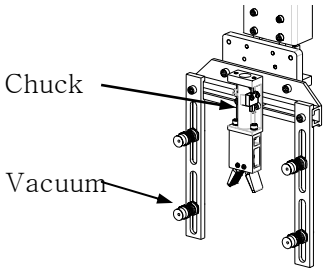
Display	Description	Motion
M&S (=Default)	Select Main and Sub for Both Arm opeartion	
M-Arm	Select Main for Main Arm Operation (Taking Out Parts)	
S-Arm	Select Sub for Sub Arm Operation (Sprue or Gate Picking)	

② Method

Setting take out method, Vacuum, Chucking.

Default setting is “Vacuum”.

ArmSet	M&S
Method	Vacuum ◀
OutWait	NoUse
Motion	LType

Display	Description	Motion
Vacuum (=Default)	Take out Parts with Vacuum Operation.	
Chuck	Take out Parts with Chuck Operation.	
Vac+ Chu	Take out Parts with Vacuum and Chuck Operation.	

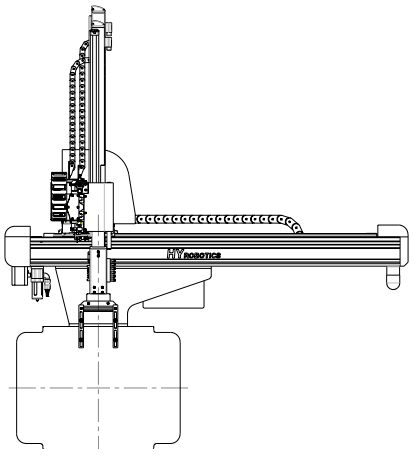
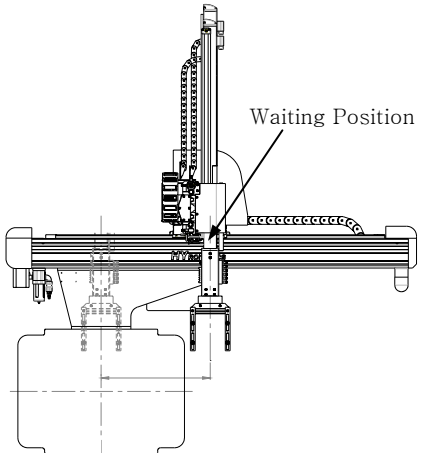
③ Outside Waiting

OutWait : Outside Waiting

When many other auxiliary products are attached on the top of the mold, robot might not able to wait on the top of the mold until the mold is completely open. Robot has function to wait outside of IMM, and robot will move to IMM after mold is completely open. (This is for minimizing crash with Robot EOAT and Attachments of Mold (Like Hose, Cylinder, Core etc).

Need to set waiting position outside of the range of Descent (Down) Area. Default setting is “NoUse”.

ArmSet	M&S
Method	Vacuum
OutWait	NoUse ◀
Motion	LType

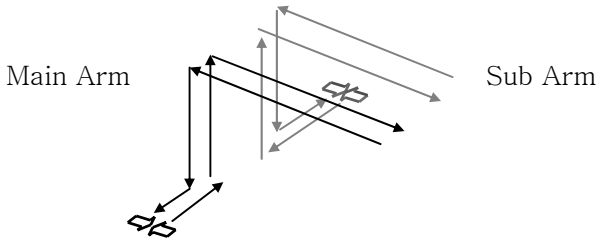
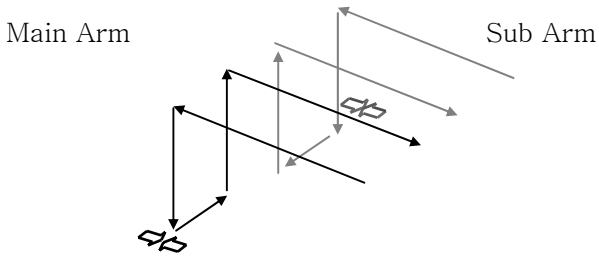
Display	Description	Motion
NoUse (=Default)	Robot wait on the top of the mold until mold is completely open.	
Use	Robot wait outside of mold until mold is open.	

④ Motion Pattern

There is two type of motion, L and U type. L type is 1.Down, 2 Kick, 3 Vacuum or Chuck, and Out and U type is 1.Down, 2.Vacuum or Chuck 3. Kick Return and Out. Main and Sub arm set together.

Default setting is “LType”.

ArmSet	M&S
Method	Vacuum
OutWait	NoUse
Motion	LType ◀

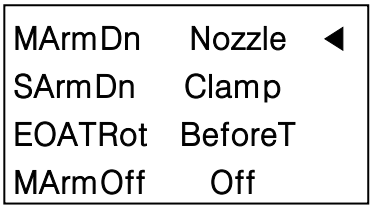
Display	Description	Motion
LType (=Default)	Main and Sub Arm operate 1. Descent, 2 Kick, 3 Chuck or Vacuum 4 Kick Return, 5. Ascent.	
UType	Main and Sub Arm operate 1. Descent, 2 Chuck or Vacuum 3 Kick Return, 4. Ascent.	

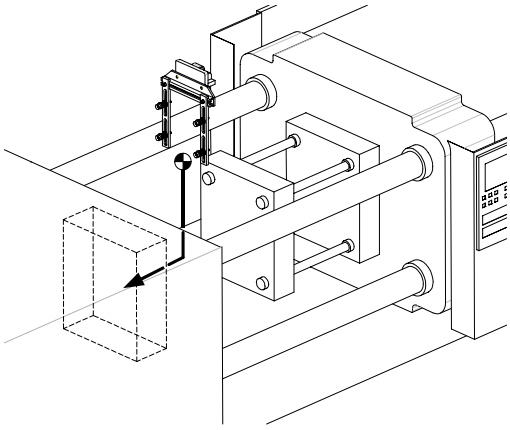
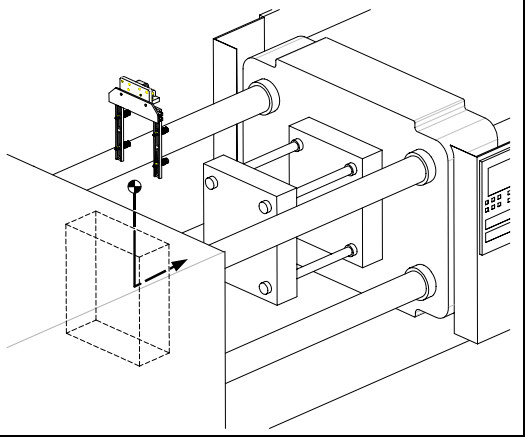
⑤ Main Arm Descent (Down)

MArmDn : Main Arm Descent (Down)

Main Arm Descent position can be set up at either nozzle side or clamp side.

Default setting is “Nozzle”.



Display	Description	Motion
Nozzle (=Default)	Main arm descent(down) at nozzle side	
Clamp	Main arm descent(down) at clamp side	

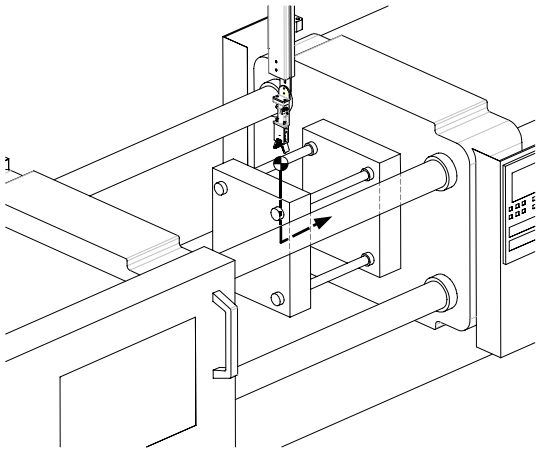
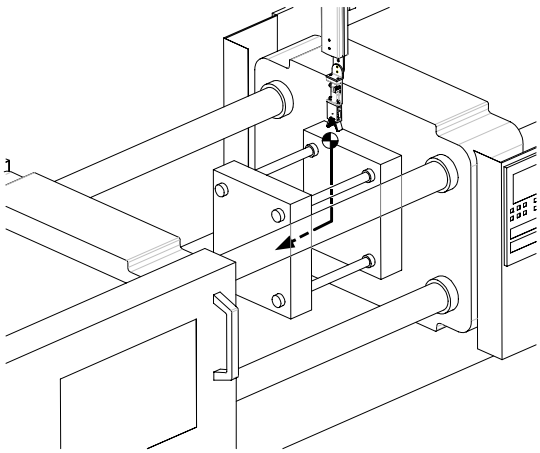
⑥ Sub Arm Descent (Down)

SArmDn : Sub Arm Descent (Down)

Sub Arm Descent position can be set up at either nozzle side or clamp side.

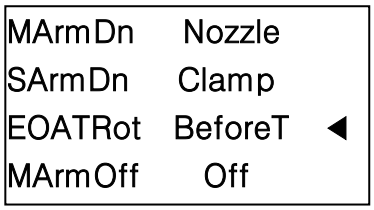
Default setting is “Clamp”

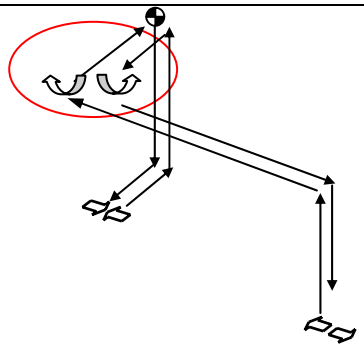
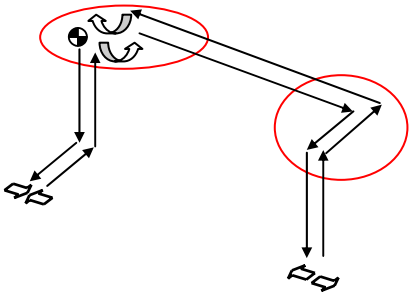
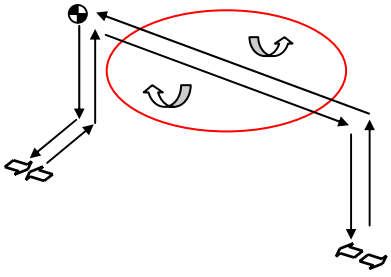
MArmDn	Nozzle	
SArmDn	Clamp	◀
EOATRot	BeforeT	
MArmOff	Off	

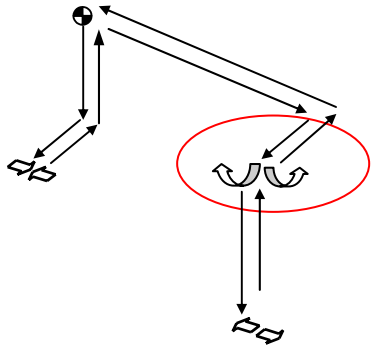
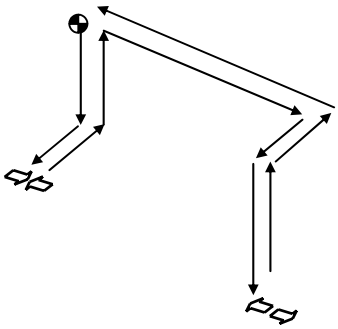
Display	Description	Motion
Clamp (=Default)	Sub arm descent(down) at clamp side	
Nozzle	Sub arm descent(down) at nozzle side	

⑦ EOAT Rotation

EoatRot : EOAT Rotation, means Chuck(EOAT) rotation time setting.
Default setting is “BeforeT”. (Before Traverse)



Display	Description	Motion
BeforeT (=Default)	Before T : Before Traverse Movement. EOAT unit rotates before traverse movement to prevent EOAT unit from crash with Safety Door. (After Kick)	
NoKick	No Kick : No Kick , Before Traverse Movement. EOAT unit rotates before Kick motion and traverse movement to prevent EOAT unit from crash with Safety Door. (After Kick) and Core of the Mold (Some Mold has core)	
WhileT	WhileT : EOAT Rotation While Moving Operate Traverse, Kick, EOAT Rotation simultaneously. (High Speed).	

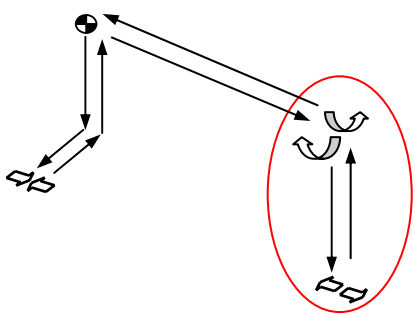
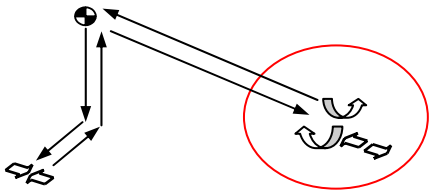
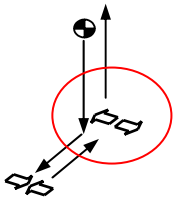
AfterT	After T : After Traverse, After Traverse and Kick, EOAT Rotate.	
NoRot	No EOAT Rotation	

⑧ Main Arm Release(Off)

MArmOff : Main Arm Release(Off), Set Main Arm Off(Parts Release) Timing

Default setting is “Off”.

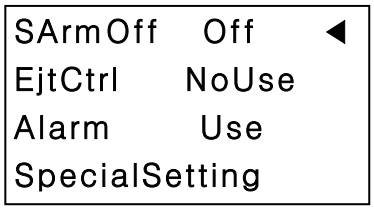
MArmDn	Nozzle
SArmDn	Clamp
EOATRot	BeforeT
MArmOff	Off ◀

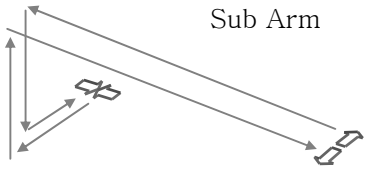
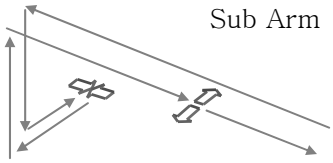
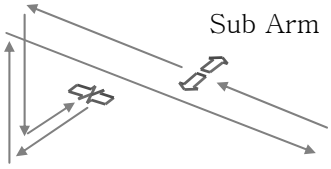
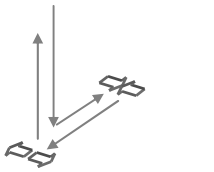
Display	Description	Motion
Off (=Default)	Traverse and Descent (Down) and Main Arm Release (Off) the Products. (Default)	Main Arm 
NoDown	Traverse and Release Products without Descent(Down)	Main Arm 
InMold	Products Arm Release(Off) the products in Mold (Drop In the IMM)	Main Arm 

⑨ Sub Arm Release(Off)

SArmOff : Sub Arm Release(Off), Set Sub Arm Off(Parts Release) Timing.

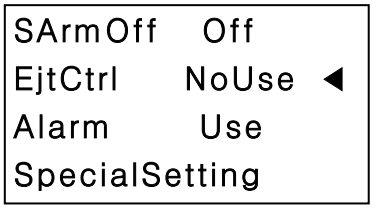
Default setting is “Off”.

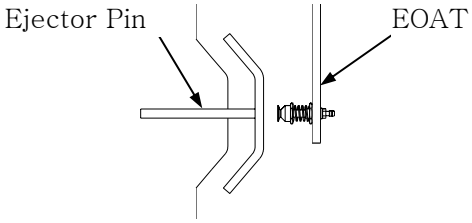
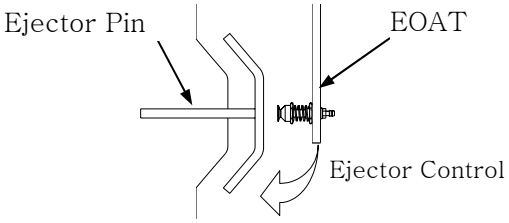


Display	Description	Motion
Off (=Default)	Traverse and Release(Off) the Runner (Sub Arm)	
TrvOff	Sub Arm Release (Off) while traversing.	
ReOff	Sub Arm Release (Off) while traversing return .	
InMold	Sub Arm Release (Off) in Mold.	

⑩ Ejector Control

When Automate Thin Plate Molded Products or Products can be drop with Ejector Kick Operation easily, Robot can control IMM Ejector. Default setting is “NoUse”.

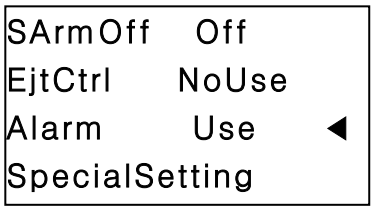


Display	Description	Motion
NoUse (=Default)	Ejector is controlled by IMM (Default)	
Use	Ejector Kick operation can be controlled by Robot. Ejector Kick operation number can be changed. Default Number is 1 time,	

⑪ Alarm (Buzzer)Use

Set Alarm (Buzzer) function in Use or Not in Use

Default setting is “Use”.

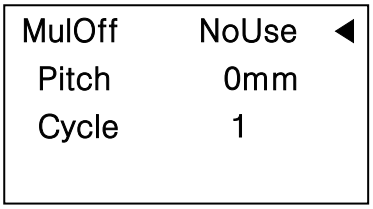


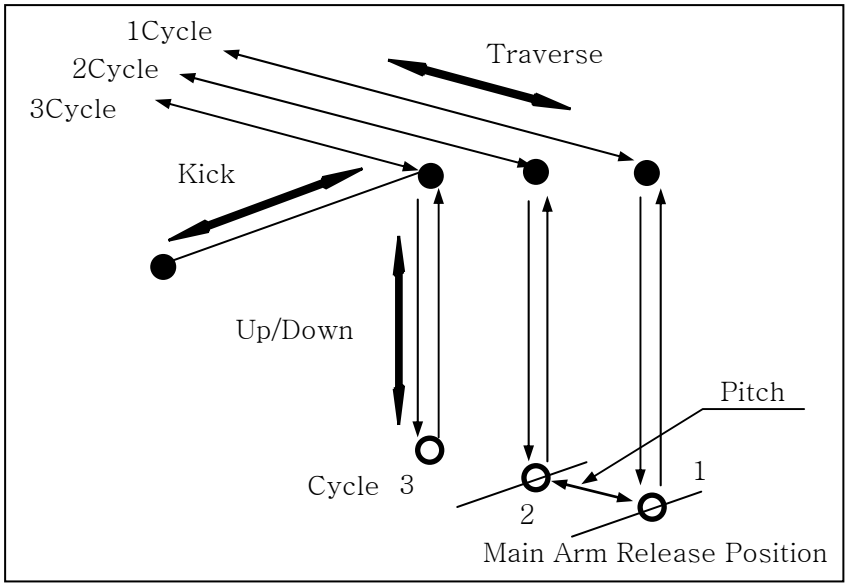
Display	Description
Use (=Default)	When Error occurs, Alarm will make a Buzzer (Siren Noise)
NoUse	When Error occurs, Alarm will not make a Buzzer (No Siren Noise)

⑫ Multi Point Off

MulOff: Multi Point Off

Each cycle can release (Off) part in a different location (Position) with specified distance with Multi Point Off Function. Default setting is “NoUse”. If “USE” , Default number of point is “ 1 “.





NOTICE

(Pitch × Number of Cycle) should be in the distance of (Products Release(Off) position – Descent available location)

In multi release (Off) mode, if (Pitch×cycle) is larger than (Release Position-Arm Descent Range) it displays “(Pitch×cycle) should be set with 0000, press C key will cancel input number.

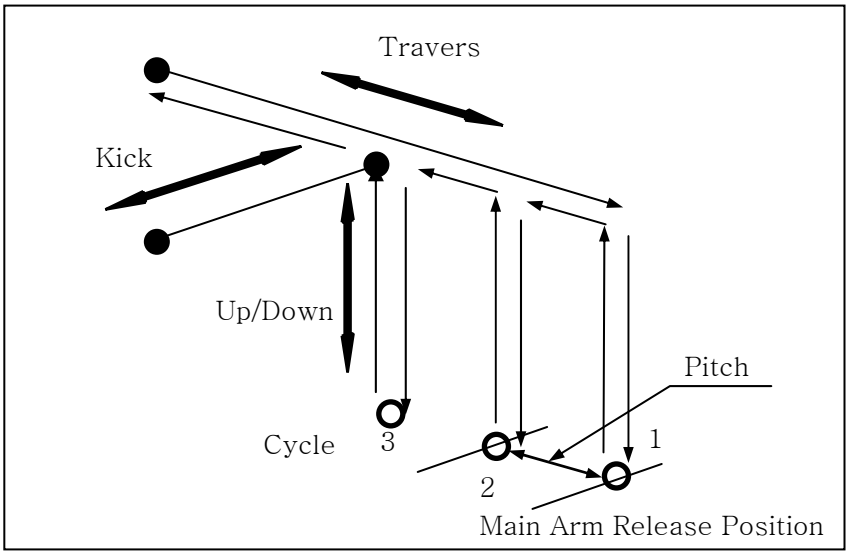
⑬Order Point Off (Option)

OrdOff : Order Point Off

When there are more than 2 cavity products in the mold, each cavity part can be released different position with Order Point Off Option.

Default setting is “NoUse”. If “Use” , Number of Cavity is “ 2 “

OrdOff	NoUse	◀
Pitch	0mm	
Number	1	



NOTICE

Order Point Off (Pitch x Number) should be lower than Multi Point Off’s pitch

In order release (off) mode, if (Pitch×Cycle) is larger than multi release (off) mode pitch, it displays “(Pitch×Cycle) should be set with 0000.

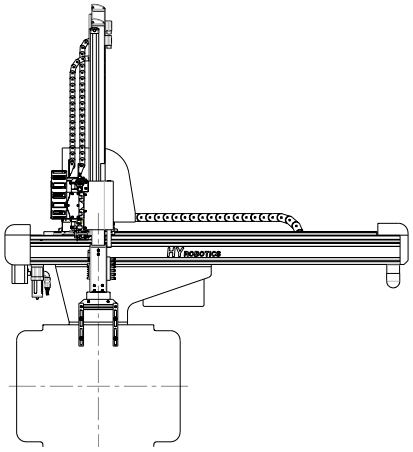
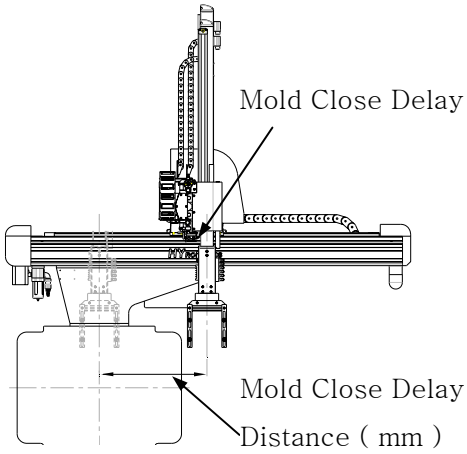
NOTICE This is optional feature, Please contact factory.

⑭Mold Close Delay

MdClos : Mold Close Delay

Robot can delay the mold close, after taking out the parts from the mold, ascent, until traverse movement to set position . Default setting is “NoUse”. Position can be set in the range of No Down Range.

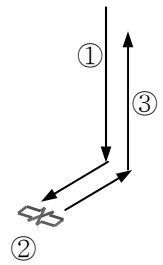
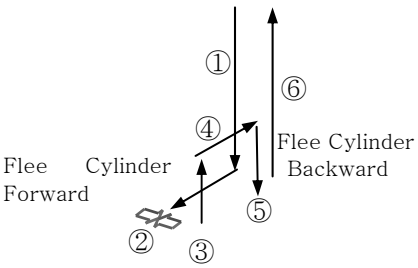
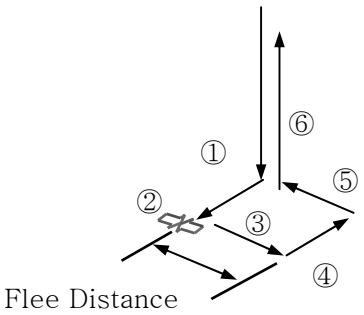
MdClos	NoUse ◀
Flee	NoUse
Pitch	NoUse
Swivel	Swivel

Display	Description	Motion
NoUse (=Default)	No mold close Delay function. Mold will close after robot arm ascent.	
Use	Mold will not close until the robot move to traverse position (mm)	

⑮Flee (Optional feature) : Some other robot company says this feature as Undercut
After Chuck or Suction the parts in mold, robot can move traverse axis (-X+) or up in mold so that parts can escape from core and Ejector attachments to take out from the mold.
Default setting is “NoUse”.

NOTICE This is optional feature, Contact factory to add this feature.

MdClos	NoUse	
Flee	NoUse	◀
Pitch	NoUse	
Swivel	Swivel	

Name	Description	Motion
NoUse (=Default)	Not in Use	
Cylin (Option)	After Chuck or Suction the parts, operate cylinder and move to up or down position and take out parts from mold * Need special Cylinder attachment	
0 mm (Traverse)	After Chuck or Suction the parts, Robot can move to traverse axis with set distance.(mm)	

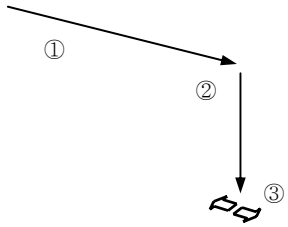
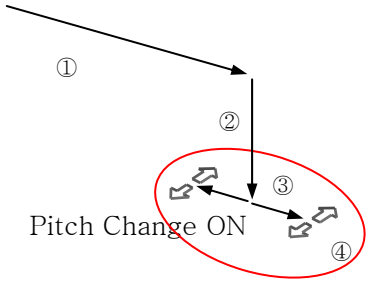
⑯Pitch Change(Option)

When robot release (off) parts with different pitch of the part's pitch of the mold, additional EOAT can be added with cylinder to change the pitch distance of the release (off)

Default setting is "NoUse".

NOTICE This is optional feature, Contact factory to add this feature.

MdClos	NoUse
Flee	NoUse
Pitch	NoUse ◀
Swivel	Swivel

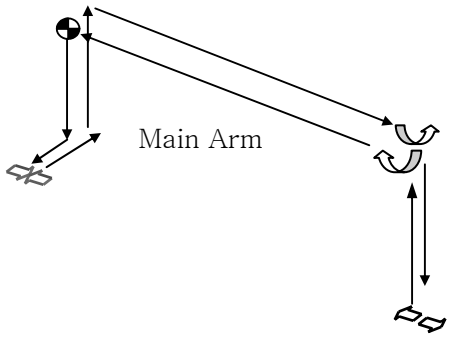
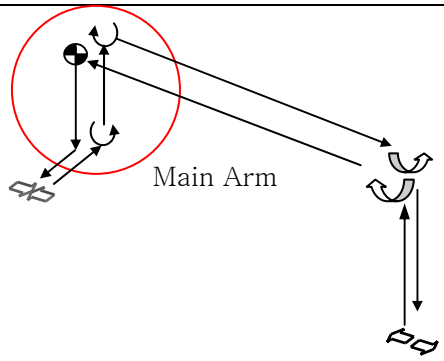
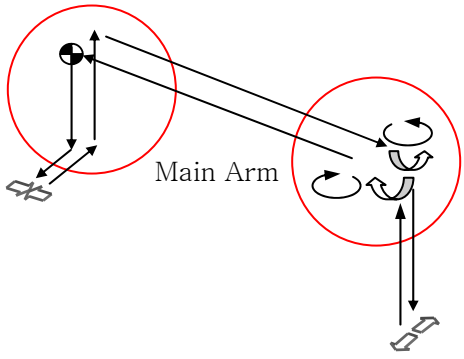
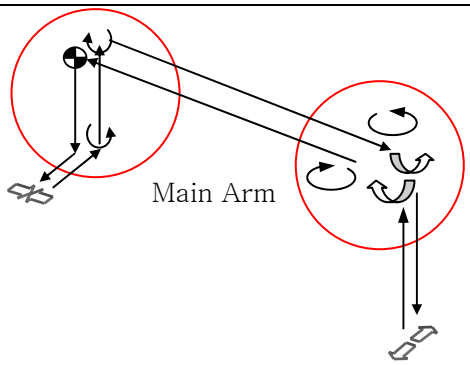
Display	Description	Motion
NoUse (=Default)	No Use	
Use	Installed EOAT cylinder can change pitch distance of the parts (Optional Feature)	

⑰Vertical Swivel (Option)

Set the Swivel operation timing. (Robot EOAT can Rotate with Vertical Axis)

Default setting is “NoUse”.

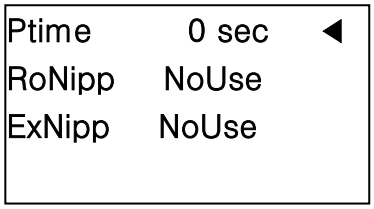
MdClos	NoUse
Flee	NoUse
Pitch	NoUse
Swivel	Swivel ◀

Display	Description	Motion
NoUse (=Default)	Not in Use	
Swivel	Robot EOAT swivel in mold and Ascent (Up) and Swivel Return. (This feature can be added when the parts is too parallel too long so that Part can not move up because of tie bar distance. Like Car Bumper)	
RoAfT	Robot EOAT swivel after traverse	
InTrv	Robot EOAT swivel in Mold and swivel return after traverse.	

⑱Process Time (Production Time)

PTime : Process Time

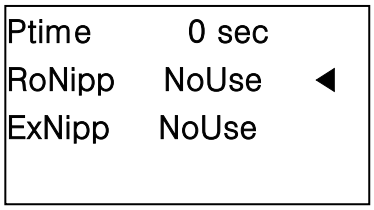
This time is for 1 total cycle of the production. If exceed error this time, it occur Process Time Error. Set time as “0” second will not occur any error. Default setting is 0 sec.

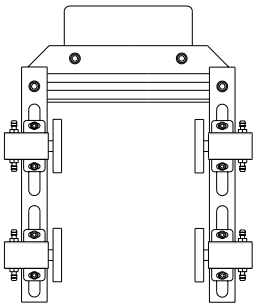
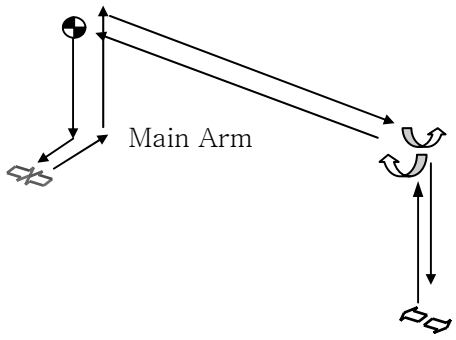
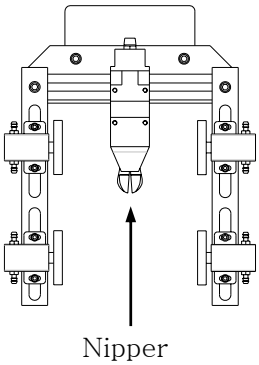
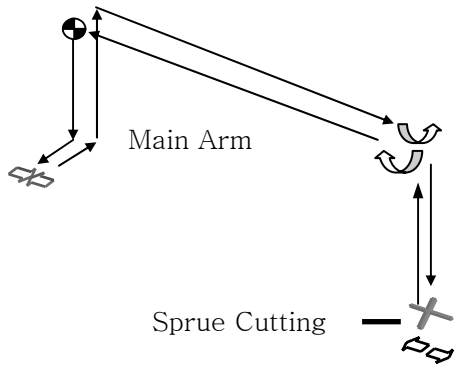


⑲Robot Nipper (Option : Nipper, Valve required)

RoNipp : Robot Nipper

Robot cut sprue or runner with attached nipper on EOAT



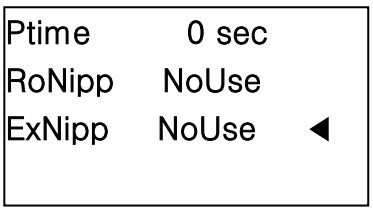
Display	Description	Jig	Motion
NoUse (=Default)	Not in Use		
Use	Robot operate cutting sprue or runner with attached nipper		

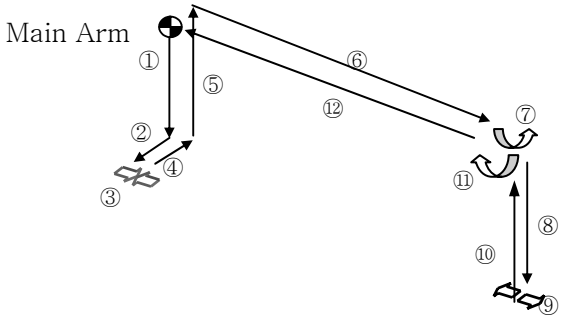
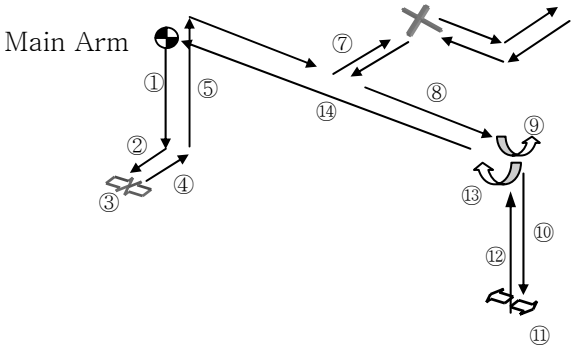
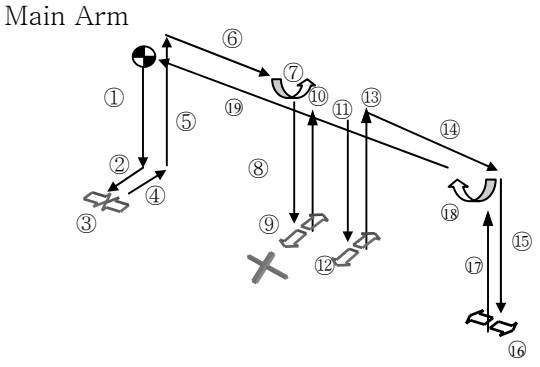
⑳External Nipper (Need Nipper Cutting Attachement Required)

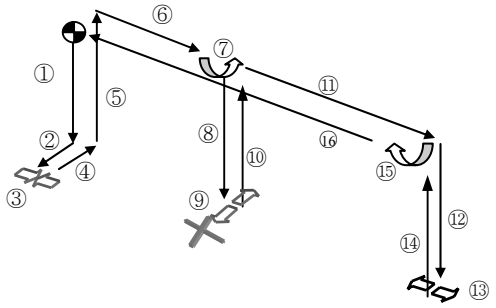
ExNipp : External Nipper

Robot can send signal of cutting sprue or nipper operating to Nipper Cutting machine

Default setting is “NoUse”.



Display	Description	Motion
NoUse (=Default)	Not In Use	
InCut	Nipper attached in Traverse Axis cut sprue and runner. (Need Nipper Cutting Attachments)	
ExCut1	Nipper cutting equipment built in out side of mold to cut sprue and runner. (Need Nipper Cutting Machine)	

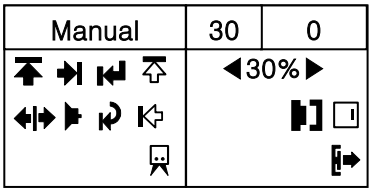
Display	Description	Motion
ExCut2	Nipper cutting equipment built in out side of mold to cut sprue and runner. (Need Nipper Cutting Machine)	

(2) Button Function

NO	Button	Description
1		Pressing Up and Down arrow key will scroll '◀' icon and select line
2		Press Right and Left arrow key will change Mode / Setting and Blink '◀' icon
3	Numeric Key	For Input Numeric Number
4		Pressing Enter key will stop Blinking of the '◀' icon and save input data.
5		Cancel the Input.
6		Press Stop Button to change to Manual Mode.
7		Press Auto Button to change to Auto Mode.

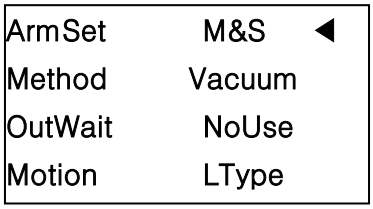
(3) Mode Confirmation

Example) Change from the suction to Chuck for TakeOut Method



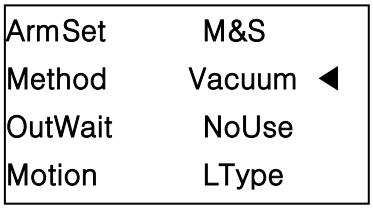
● **STEP 1**

In manual Molde, Press [MODE / MOLD] , move to mode screen



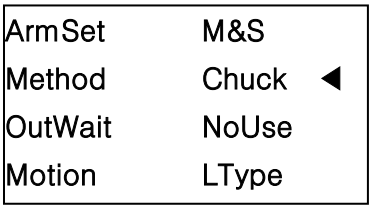
● **STEP 2**

Press [▼] , moves "◀" to Method Item.



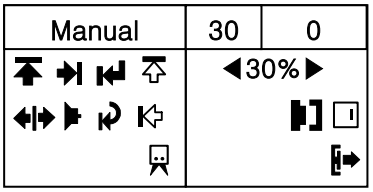
● **STEP 3**

Press [▶] , changes the mode from Vacuum to Chuck



● **STEP 4**

Press [ENTER] , saves selected mode.



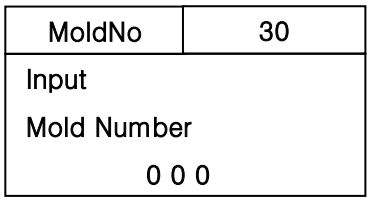
● **STEP 4**

Press [STOP / MANUAL], finish setting the mode and move to Manual Mode.

4.1.4 Creating Mold File

(1) Description

Search Mold Number



(2) Button Function in Mold Number screen

NO	Button	Description
1	Numeric Key	Input Mold Number
2	STOP	Change to Manual Mode
3	Clear C	Cancel the Input Number
4	Enter	Change to Mold Manager screen with selected Number

(3) Mold Manager

Select , Create and Delete Mold File.

MoldMgr	30
>00 FREE MODE	
01 RUN_L	
02 RUN_U	

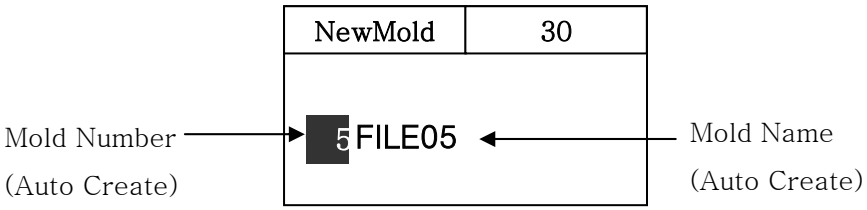
(4) Each Button Function in Mold Manager screen

NO	Button	Description
1		Open Mold File. Select 0 file can create any motion pattern and mode which can be created by user and move to New Mold screen and save with Mold Number and name. 1~6 : Basic Motion Pattern which is in system. 7~99: User can create motion pattern.
2		Move to Manual Mode.
3		Move to Delete screen for file with '>'

NOTICE	Mold Number can use only 2 Number, Mold Name can use 8 Character with Number

(5) New Mold

Save the motion pattern in the mode with new mold number and name.

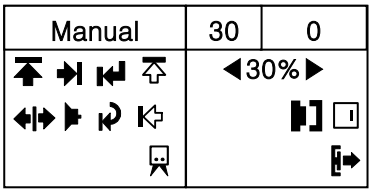


(6) Button Function in New Mold

NO	Button	Description
1	Numeric Key	Pressing the numeric key while blinking Mold Number will Input Number
2	Enter	Pressing Enter to save Mold Number and Name
3	▶	Press ▶ to scroll the cursor on the mold number.
4	▲ ▼	Selecting Mold Name Character.
5	STOP	Change to Manual Mode

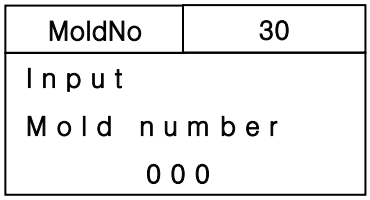
(7) Creating Mold File

Creating Mold file with new motion pattern.



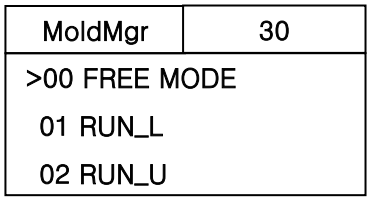
● **STEP 1**

Press SHIFT S + MODE MOLD and move to mold Number screen



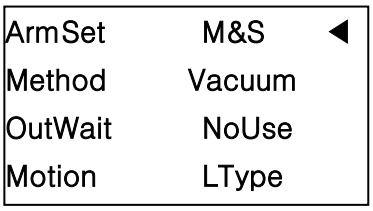
● **STEP 2**

Press ENTER to change mold maintenance mode..



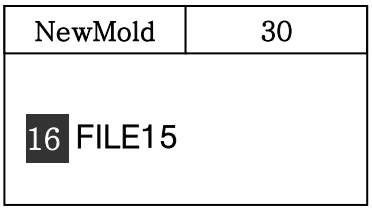
● **STEP3**

Move cursor ">" to 00 and press ENTER.



● **STEP 4**

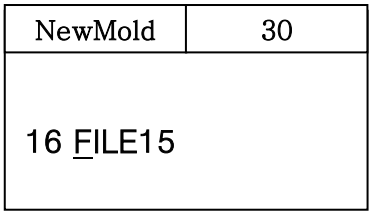
Press ▲ or ▼ move "▶" icon to the mode to select. , Press ▶ to change mode and press ENTER to set



● **STEP 5**

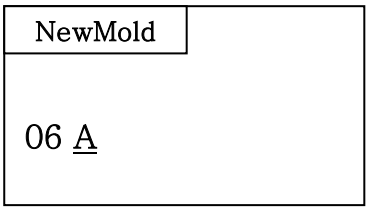
[Set Mold Number to 16]

Press CLEAR C, clear the mold number, press 1FORWARD and press 6SWIVEL to input 16 , Press ENTER to save. It will stop the blinking of the mold number.



● **STEP 6**

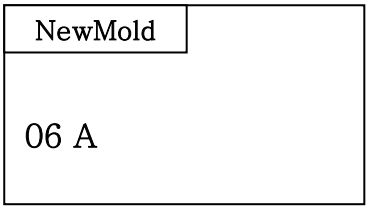
Press ▶ button will move cursor to first character of Mold Name.



● **STEP 7**

Press ▲▼, select Character

It will displays A~Z, 0~9, _, -,

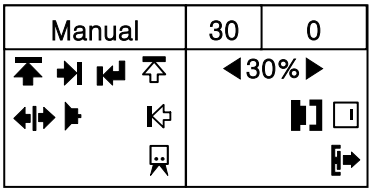


● **STEP 8**

Press Enter to save data

NOTICE

Press ◀ will move cursor to left side and, Change the text with pressing ▲▼ button.



● **STEP 9**

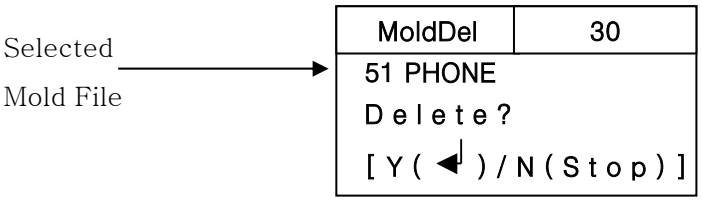
Press STOP will create mold name, save and move to Manual Mode.

4.1.5 Delete Mold File

(1) Description

Delete Mold File that created before.

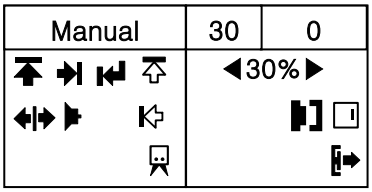
> **NOTICE** Currently open mold file can not be deleted.



(2) Button function in Mold Delete Mode

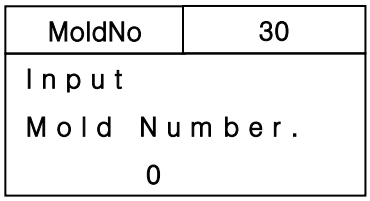
NO	Button	Description
1	ENTER	Delete Mold Selected file and move to Manual Mode.
2	STOP / MANUAL	Cancel operation and Move to Manual Mode

(3) Delete Mold File



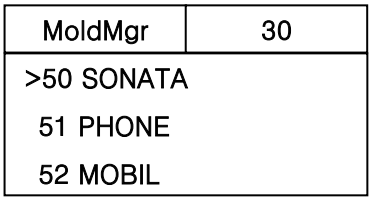
● **STEP 1**

Press SHIFT S + MODE MOLD move to mold search screen.



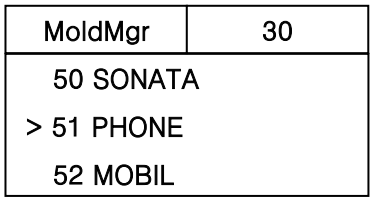
● **STEP 2**

Press ENTER and move to mold maintenance screen



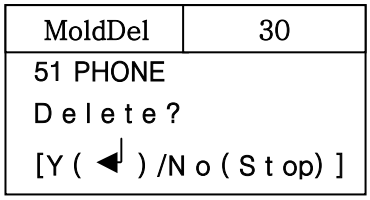
● **STEP 3**

Select mold file to delete with pressing ▲ or ▼



● **STEP 4**

Press CLEAR C displays "<Mold Number><Name> Delete?.



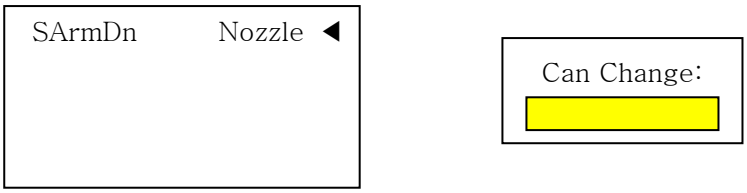
● **STEP 5**

Press ENTER will delete selected file and moves to Manual Mode

4.1.6 Setting Basic Motion Pattern

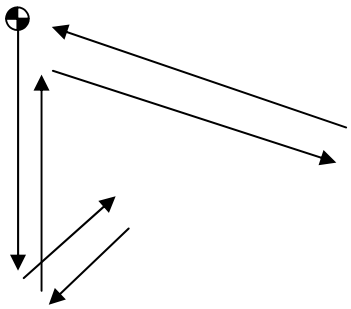
(1) Description of Basic Motion Pattern

The Motion pattern for simple and popular operation are already memorized in the system Can change some mode from the similar operation that want to create, and setting.

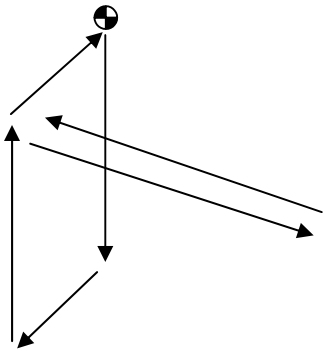


[01 Sub_L, 02 Sub_U] type Motion

① 01 Sub_L

Sub Arm Only (L type)	Item	Mode
	ArmSet	SubArm
	Method	-
	OutWait	NoUse
	Motion	Ltype
	MArmDn	-
	SArmDn	Clamp
	EOATRot	-
	MArmOff	-
	SArmOff	TrvOff
	EjtCtl	Use
	Alarm	Use

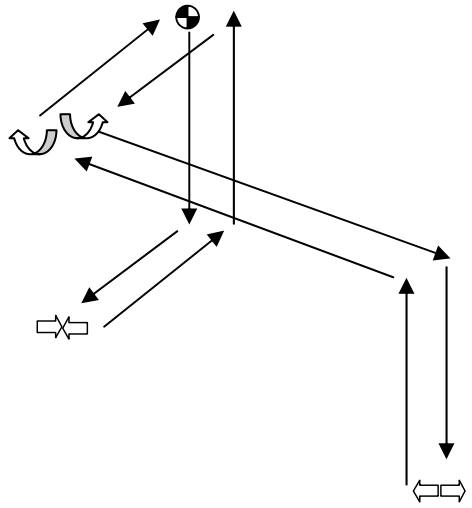
② 02 Sub_U

Sub Arm Only(U type)	Item	Mode
	ArmSet	SubArm
	Method	-
	OutWait	NoUse
	Motion	UType
	MArmDn	-
	SArmDn	Nozzle
	EOATRot	-
	MArmOff	-
	SArmOff	TrvOff
	EjtCtl	Use
	Alarm	Use

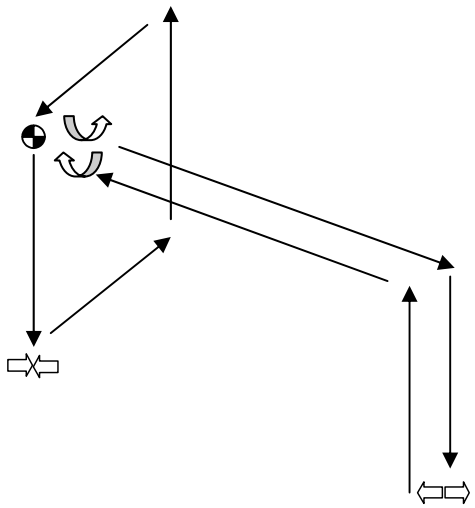
Method	Chuck ◀
MArmDn	Nozzle
EOATRot	BeforeT

[03 Main_L, 04 Main_U] type Motion

③ 03 Main_L

Main Arm Only (L type)	Item	Mode
	ArmSet	MainArm
	Method	Chuck
	OutWait	NoUse
	Motion	LType
	MArmDn	Nozzle
	SArmDn	-
	EOATRot	BeforeT
	MArmOff	Off
	SArmOff	-
	EjtCtl	Use
	Alarm	Use

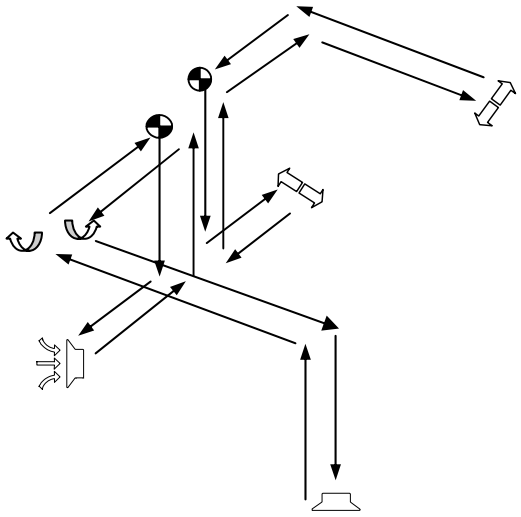
④ 04 Main_U

Main Arm Only(U type)	Item	Mode
	ArmSet	MainArm
	Method	Chuck
	OutWait	NoUse
	Motion	UType
	MArmDn	Clamp
	SArmDn	-
	EOATRot	BeforeT
	MArmOff	Off
	SArmOff	-
	EjtCtl	Use
	Alarm	Use

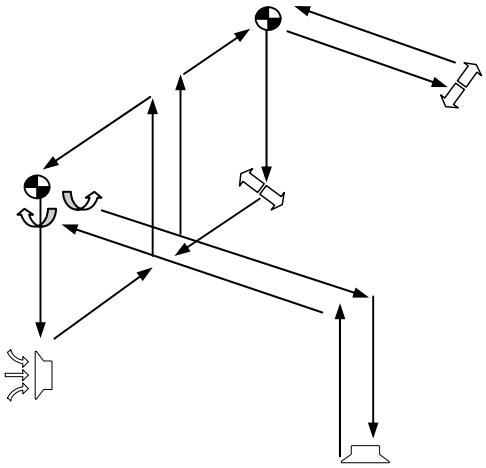
ArmSet	Vacuum ▶
MArmDn	Clamp
SArmDn	Nozzle
EOATRot	BeforeT

[05 MS_L, 06 MS_U] type Motion

⑤ 05 MS_L

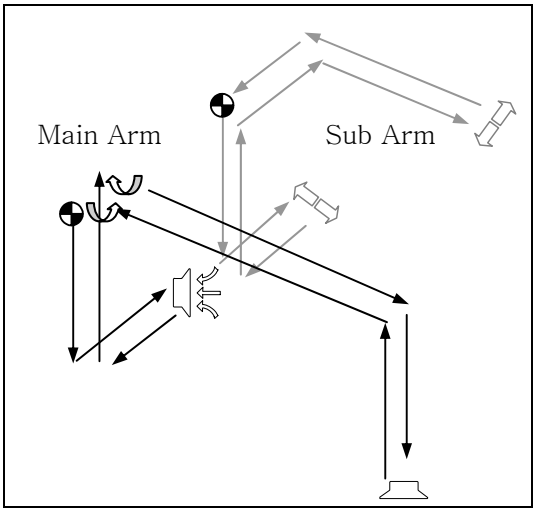
Main and Sub Arm (L type)	Item	Mode
	ArmSet	M&S
	Method	Vacuum
	OutWait	NoUse
	Motion	LType
	MArmDn	Nozzle
	SArmDn	Clamp
	EOATRot	BeforeT
	MArmOff	Off
	SArmOff	TrvOff
	EjtCtl	Use
	Alarm	Use

⑥ 06 MS_U

Main and Sub Arm (U type)	Item	Mode
	ArmSet	M&S
	Method	Vacuum
	OutWait	NoUse
	Motion	UType
	MArmDn	Clamp
	SArmDn	Nozzle
	EOATRot	BeforeT
	MArmOff	Off
	SArmOff	TrvOff
	EjtCtl	Use
	Alarm	Use

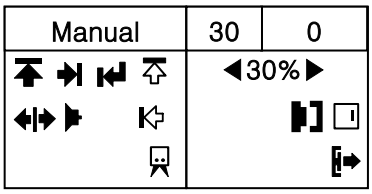
(2) Selecting Basic Motion Pattern

Example) Arm Selection(M&S), Take Out Method(Vacuum), Outside Waiting(NoUse), Motion Parttern(LType), Main Arm Down(Clamp), Sub Arm Down(Clamp), EOAT Rotation Timing(BeforeT)



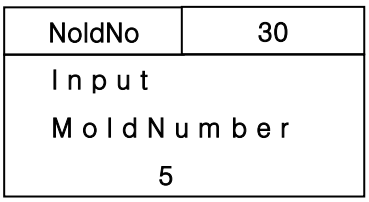
● **STEP 1**

Set Mold Number 5 which is similar with Example except Main Arm Down.



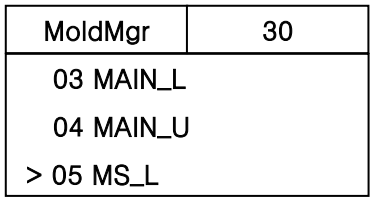
● **STEP 2**

Press SHIFT S and MODE MOLD, move to Mold Number screen.



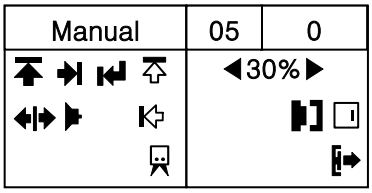
● **STEP 3**

Pressing 5 SUCTION will input 5 and ENTER will move to Mold Manager screen.



● **STEP 4**

Cursor is located at 5 mold, press ENTER moves to Manual Mode with 5 Mold Motion Pattern.



● **STEP 5**

Pressing MODE MOLD button moves to mode screen.

Method	Vacuum	◀
MArmDn	Nozzle	
SArmDn	Clamp	
EOATRot	BeforeT	

● **STEP 6**

Press  moves "▶"to EOATRot(EOAT Rotation), and Press  change Main Arm Down to BeforeT(EOAT Rotation Before Traverse).

Method	Vacuum	
MArmDn	Clamp	◀
SArmDn	Clamp	
EOATRot	BeforeT	

● **STEP 7**

Press 

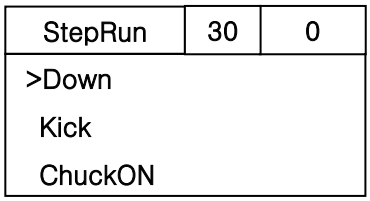
to move to Manual Mode screen.

4.1.7 Step Run

(1) Description

Step Run will operate the robot step by step of each motion.

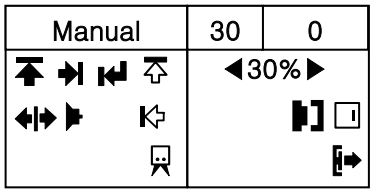
After origin, will not displays “>” cursor, pressing ▼ will displays “>” at the first step.



(2) Button Function

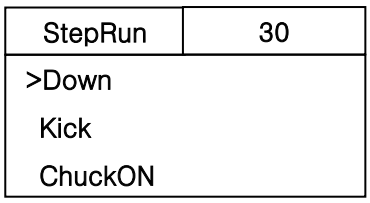
NO	Button	Description
1	▼	Press Down Arrow Key will Operate Step Operation. Press and hole 2~3 second operate 1 cycle
2	STOP / MANUAL	Move to Manual Mode.

(3) Step Operation



● **STEP 1**

Press STEP / I/O moves to Step Run screen.



● **STEP 2**

Pressing ▲ button will operate on step.

Press STOP / MANUAL will move to Manual Mode.

4.1.8 Input and Output signal check

(1) Description

Confirm Input, Output, Interlock.

Input(Out▶)	30
IA0MArmDownOk	●
IA1MArmUpOK	○
IA2M-KickOK	○

<Input screen>

Output(In▶)	30
IA0MArmDown	●
IA1MArmUp	○
IA2MArmKick	○

<Output screen>

Input			Output		
IA0	MArmDownOk	Main Arm Down Complete	OA0	MArmDown	Main Arm Down
IA1	MArmUpOk	Main Arm Up Complete	OA1	MArmUp	Main Arm Up
IA2	M-KickOk	Main Arm Kick Complete	OA2	MArmKick	Main Arm Kick
IA3	M-KReOk	Main Arm Kick Return Complete	OA3	MArmKRtn	Main Arm Kick Return
IA4	RotateOk	Rotation Complete	OA4	EOATRotate	EOAT Rotation
IA5	RotRetOk	Rotation Return Complete	OA5	RotReturn	EOAT Rotation Return
IA6	SwivelOk	Swivel Complete	OA6	EOATSwivel	EOAT Swivel
IA7	SvlReOk	Swivel Return Complete	OA7	SvlReturn	Chuck Swivel Return
IB0	ChuckOk	Chuck Confirm	OB0	Chuck	Chuck
IB1	VacuumOk	Vacuum Confirm	OB1	Vacuum	Vacuum & Multi Release1
IB2			OB2	MArmGrip	Main Arm Grip
IB3	SArmGripOk	Sub Arm Grip Confirm	OB3	SArmGrip	Sub Arm Grip
IB4	SArmDownOk	Sub Arm Down Confirm	OB4	SArmDown	Sub Arm Up/Down
IB5	SArmUpOk	Sub Arm Up Confirm	OB5	SArmKickRt	Sub Arm Kick/Return
IB6	SArmKickOk	Sub Kick Confirm	OB6	NipFwd	Nipper Forward
IB7	SArmKRtOk	Sub Kick Return Confirm	OB7	MulOff2	Multi Release(Off)2
IC0	TrvRtOk	Traverse Return Complete	OC0	MulOff3	Multi Release(Off)3
IC1	SafetyDown	Safety Down	OC1	MulOff4	Multi Release(Off)4
IC2	MSftCylBw	Main Arm Safety Cylinder Backward	OC2	MSftCylFw	Main Safety Cylinder Forward
IC3	SSftCylBw	Sub Arm Safety Cylinder Backward	OC3	MSftCylBw	Main Safety Cylinder Backward
IC4	Obstacle	Obstacle Detection	OC4	SSftCylFw	Sub Safety Cylinder Forward
			OC5	SSftCylBw	Sub Safety Cylinder Backward

Input			Output		
No	Display	Description	No	Display	Description
			OD1	PitchChg	Pitch Change
			OD2	Flee	Traverse (Flee) in Mold
			OD3	MSlowDown	Main Arm Slow Descent
			OD4	Nipper	Nipper (Internal. External)
			OD5	SSlowDown	Sub Arm Slow Descent(Down)
			OD6	ExNipCls	External Nipper Close
			OD7		
IF0	ReadyCut	Ready to Cutting	OF0	CutStart	Cutting Start
IF1	RdyStack	Ready to Stacking	OF1	StackingOK	Stacking Complete
IF2			OF2	(Waiting device)	(Waiting device)
IF3			OF3	(Waiting device)	(Waiting device)
IF4			OF4	(Waiting device)	(Waiting device)
IF5			OF5	(Waiting device)	(Waiting device)

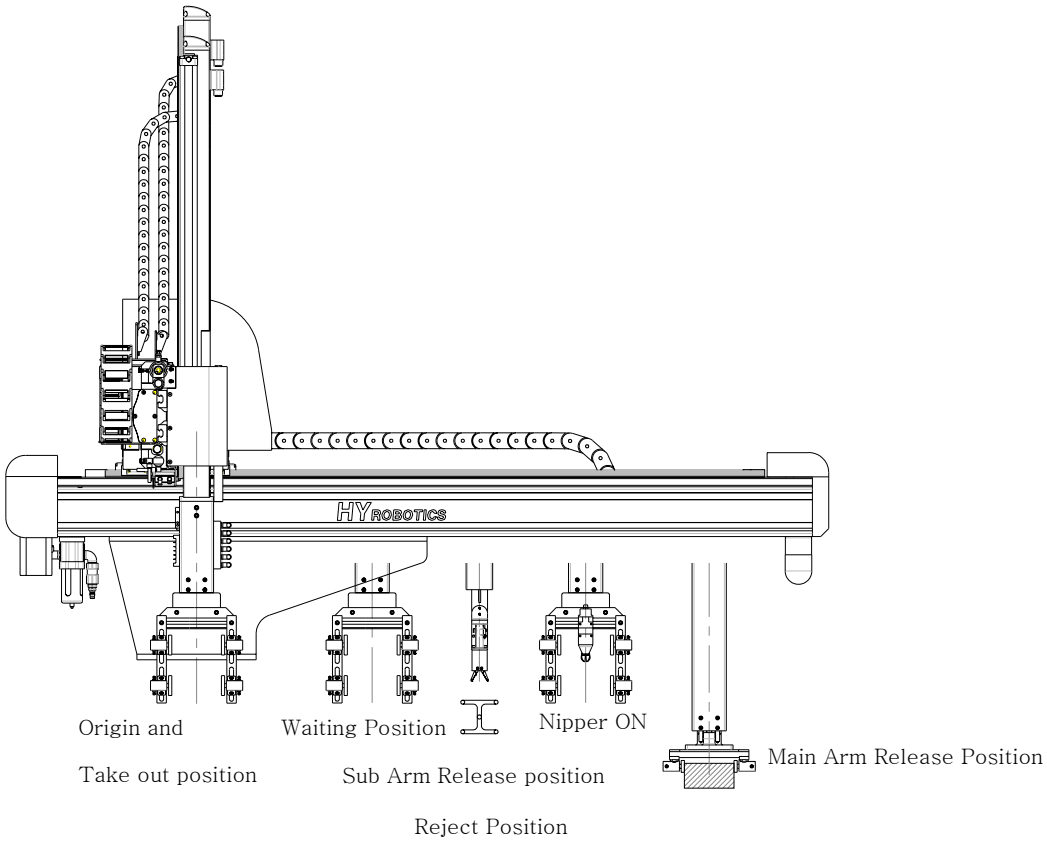
Interlock Input			Interlock Output		
No	Display	Description	No	Display	Description
IE0	AutoInject	Auto Injection	OE0	ConveyOn	Conveyor On
IE1	MoldOpen	Mold Open Complete	OE1	TakeoutOk	Take Out Complete
IE2	SafeDoor	Safety Door Open	OE2	MoldOpen	Mold Open
IE3	FullAuto	Fully Automatic	OE3	MoldClose	Mold Close
IE4	Reject	Part Reject	OE4	EjectorSig	Ejector Signal
IE5	EjtFwdOk	Ejector Forward Complete			
IE6					
IE7	ImmEmg	IMM Emergency			

(2) Button Function

NO	Button	Description
1		Displays 3 information in one page and move to next page.
2		Change Input Information screen to Output Information screen.
3		Change Output Information screen to Input Information screen.
4		Press Stop Button to change to Manual Mode.
5		Press Auto Button to change to Auto Mode.

4.1.9 Position Set with Number Input

(1) Position



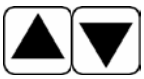
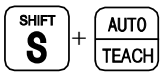
NO	Basic Position	Description
P0	Sub Arm Release Position	Release(Off) position for Sprue or Runner
P1	Reject Position	Defective Parts Release (Off) Position (Signal Required from IMM)
P2	Nipper ON	Sprue or Runner cutting position in Traverse Axis
P3	Main Arm Release Position	Release(Off) position for Parts
P4	Waiting Position	This position is for waiting outside of the mold until mold is completely open. If Core and other special attachments have added on the top of mold, this feature may required to prevent EOAT from crash.

(2) Description

In the auto mode, each position can change within ±100mm, The robot will have only one of Each position value . Origin and Take out position is 0 mm, do not required to set.

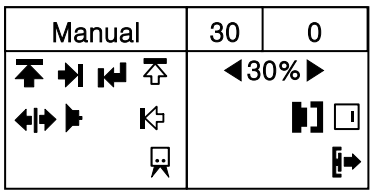
Number	30	0000
>P0SubOff	0000mm	
P1RjtOff	0000mm	
P2NipOn	0000mm	

(3) Button Function

NO	Button	Description
1		Pressing Up and Down arrow key scroll the > key and line.
2		Change Number Input screen to Speed Input screen.
3	Numeric Key	Input Position Number
4		Cancel the Input.
5		Press the Enter Button to save the Input.
6		When only move from Manual Mode Mode to Number Input mode, it can move to Jog Input screen.
7		Press Stop Button to change to Manual Mode.

(4) Example

Set Sub Arm Release Position to 1000mm



● **STEP 1**

Hold [SHIFT S] and press [AUTO TEACH], move to Mold Number screen.

Number	30	0000
>P0SubOff	900mm	
P1RjtOff	1100mm	
P2NipOn	1100mm	

● **STEP 2**

Press [1 FORWARD] [0 RETURN] [0 RETURN] [0 RETURN] to input 1000, Press [Enter] to save Position data.

Number	30	0000
>P0SubOff	1000mm	
P1RjtOff	1100mm	
P2NipOn	1100mm	

● **STEP 3**

Press [STOP MANUAL] to move to Manual Mode.

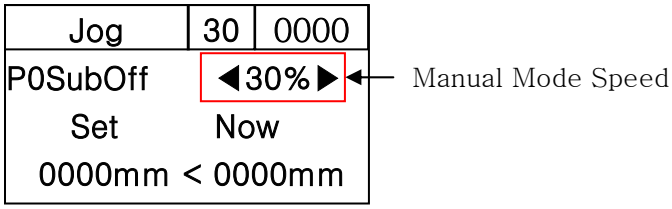
4.1.10 Position Setting with Jog Input

(1) Description

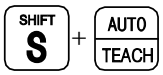
Press 

or 

set each position value

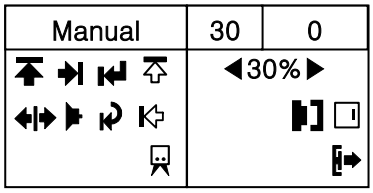


(2) Button Function

NO	Button	Description	
1		Reduce Speed	30%, 20%, 10%, 5% 10mm, 1mm
2		Increase Speed	
3		Move cursor to up or down item	
4		Traverse Movement (X+)	
5		Traverse Return Movement (X-)	
6		Save the input value and Current and set value synchronized.	
7		Press Stop Button to change to Manual Mode.	
8		Press Auto Button with Shift Button, move to Number Input screen.	

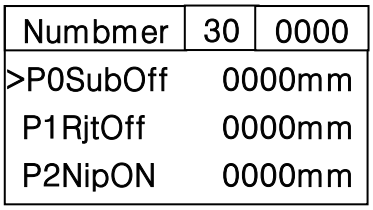
(3) Position setting with Jog Key

Set Reject Position to 100mm.



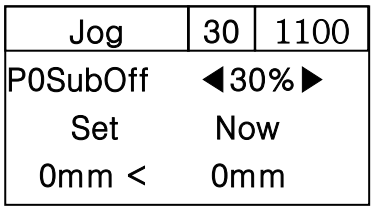
● **STEP 1**

Hold [SHIFT / S] and press [AUTO / TEACH], move to Mold Number screen.



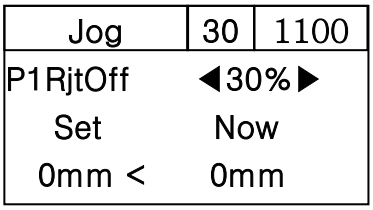
● **STEP 2**

Hold [SHIFT / S] and press [AUTO / TEACH] again, move to Jog Input screen.



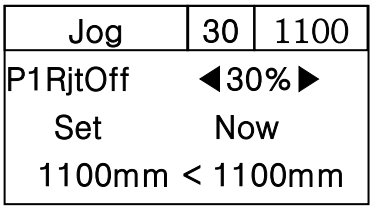
● **STEP 3**

Press [▼] to select Reject Position.



● **STEP 4**

Press [1 FORWARD] or [0 RETURN] move robot to Defective parts Release(Off) position.



● **STEP 5**

Press [ENTER] to save position data, press [STOP / MANUAL] to move Manual Mode screen.

4.1.11 Speed Setting

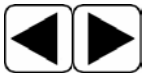
(1) Description

Setting Robot Movement (-X+) Speed in Auto Mode

Speed	30	0000
> S0 SubOff	80%	
S1 RjtOff	80%	
S2 NipOn	80%	

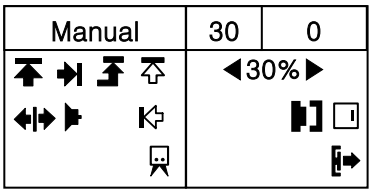
NO	Display	Description
S0	SubOff	Speed (When Robot moves to Sub Arm Release(Off) Position.)
S1	Reject	Speed (When robot moves to Defective (Reject) Position.)
S2	NipOn	Speed (When robot moves to Nipper ON Position.)
S3	MaiOff	Speed (When robot moves to Main Arm Release(Off) Position.)
S4	Wait	Speed (When robot moves to Waiting Position.)
S5	TakOut	Speed (When robot moves to Take-out Position (Chuck or Vacuum in Mold .)

(2) Button Function

NO	Button	Description
1		Scroll the cursor to select item.
2		Move and display “Number Input screen”
3	Numeric Key	Input the speed value
4		Cancel the input.
5		Save input value
6		Press Stop Button to change to Manual Mode.
7		Press Auto Button to change to Auto Mode.

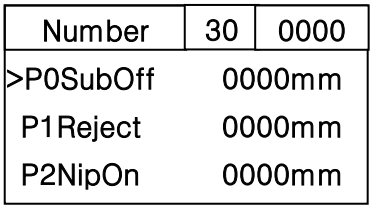
(3) Example

Set Sub Arm Release Position to 100%.



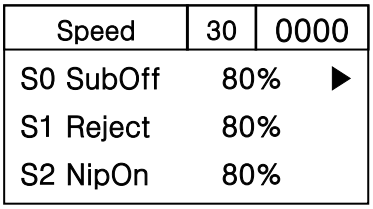
● **STEP 1**

Hold [SHIFT S] and press [AUTO TEACH], move to Number Input screen.



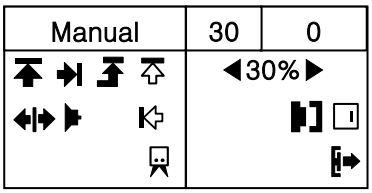
● **STEP 2**

Pressing [▶] changes Speed Input screen.



● **STEP 3**

Press [1 FORWARD] [0 RETURN] [0 RETURN] to input 100, Press [ENTER] to save speed data.

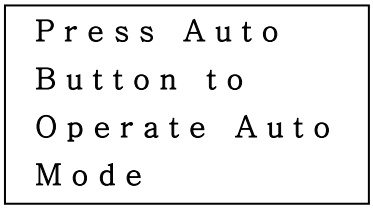


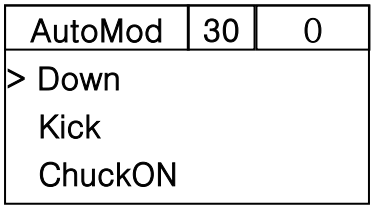
● **STEP 4**

Press [STOP MANUAL] to move to Manual Mode.

4.5 Auto Mode

(1) Description





[Auto Message] [Auto Mode screen]

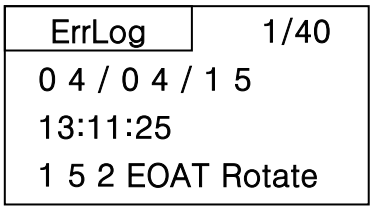
Order of Origin		
No	In Mold	Outside of Mold
1	Kick Return	Up
2	Up	EOAT Rotation Return
3	EOAT Rotation Return	EOAT Swivel Return(Option)
4	EOAT Swivel Return (Option)	Kick Return
5	Traverse Return	Traverse Return

(2) Button Function

NO	Button	Description
1	STOP / MANUAL	Stop Auto Mode and move to Manual Mode.
2	MODE / MOLD	Move to Mode screen.
3	SHIFT S + STEP I/O	Move to Input screen.
4	TIMER / COUNT	Move to Timer screen.
5	SHIFT S + TIMER / COUNT	Move to Counter screen.
6	SHIFT S + AUTO / TEACH	Move to Number Input screen.

4.6 Error Log

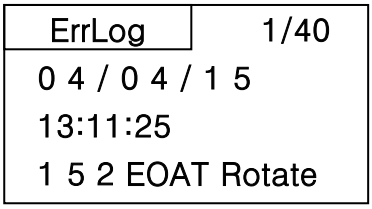
(1) Description

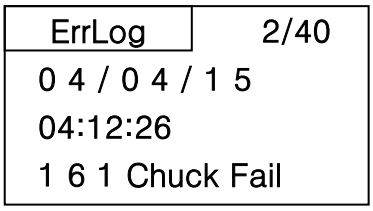


(2) Each Button Function

NO	Button	Description
1	▲ ▼	Move the cursor to different error log.
2	STOP / MANUAL	Change to the Manual Mode
3	AUTO / TEACH	Change to the Auto Mode

(3) Checking Error Log





- **STEP 1**

Press SHIFT S and ▲ at the same time, displays Error Log screen.

- **STEP 2**

Find error with pressing ▲ or ▼ button.

- **STEP 3**

To move to Manual Mode, press STOP / MANUAL.

To move to Auto Mode, press AUTO / TEACH.

4.7 Version Information

(1) Description

Check Version Information.

Version
TP V02.00
SC V02.00
IF V01.00

(2) Each Button Function

NO	Button	Description
1	STOP / MANUAL	Change to the Manual Mode
2	AUTO / TEACH	Change to the Auto Mode

(3) Checking Version Information

Version
TP V02.00
SC V02.00
IF V01.00

- **STEP 1**

Press SHIFT / S and ▼ at the same time, displays version.

- **STEP 2**

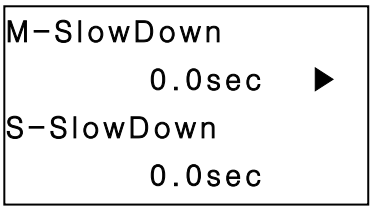
To move to Manual Mode, press STOP / MANUAL.

To move to Auto Mode, Press AUTO / TEACH.

4.8 Time for Arm Slow Down

(1) Description

Operation of Robot arm descent operate with two solenoid valve for high speed operation. One of these two valve can change the off timing so that robot can minimize shock in the structure and increase life cycle time. This time is between descent on and descent off.



(2) Button Function

NO	Button	Description
1		Pressing Up and Down arrow key scroll '▶'icon and select line.
2	Numeric Key	Input Time for Arm Slow Down.
3		Cancel the input.
4		Press the Enter Button to save to change.
5		Press Stop Button to change to Manual Mode..
6		Press Auto Button to change to Auto Mode.

4.9 Error Recovery

(1) Error Description

Displays error recovery method.

Error	30
152 EOAT Rotate Check EOAT Rotate IA4	

(2) Each Button Function

NO	Button	Description
1	CLEAR C	Press Clear button, Stop Alarm and Buzzer , Press again Clear button error message.

(3) Error Recovery

Error	30
152 EOAT Rotate Check EOAT Rotate IA4	

- **STEP 1**

Pressing CLEAR C, Stop Buzzer.

- **STEP2**

Pressing CLEAR C again will close message screen.

4.10 Change Language

Press 

and  at the same time, change Korean, English, Chinese.

4.11 Robot and Program maintenance Screen

Turn power on with pressing 

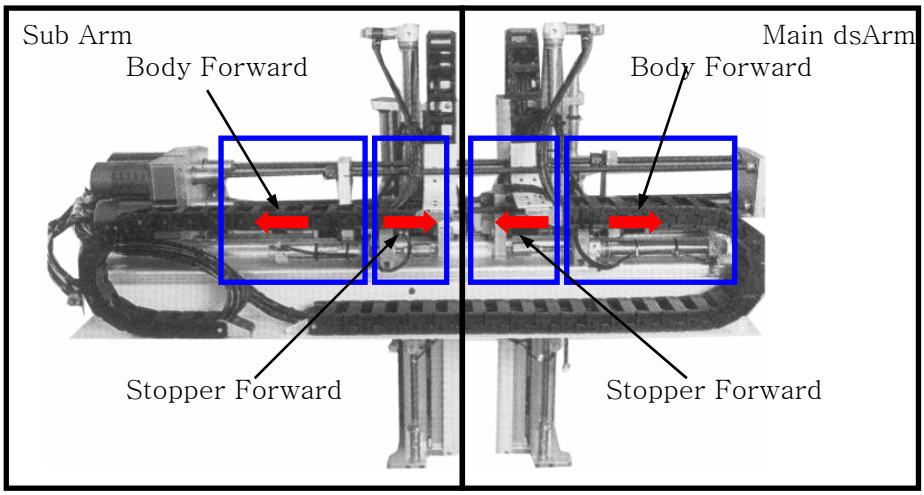
NO	Screen	Mode	Order	Default/Setting	Description	Etc
1	TrvsLimit -0 0mm ◀ 0 0 0 0mm DownLimit 0000mm FleeLimit ±00mm	Limit for Traverse			- Traverse Limit Range	
					+ Traverse Limit Range	
2		No Down Range			No Down Range	
3		In Mold Traverse Limit			Traverse Limit in Mold	±20mm
4	Origin NoSet ◀ Safety NoUse AutoInp NoUse TKOFail NoUse	Origin	①	NoSet (=default)	Press Enter will not current position to origin point	
			②	Set	Press Enter will change current position to Origin Point	
5		Safety Use	①	NoUse (=default)	Not In Usa	
			②	Use	Ultra Sound Safety	
6		Auto Input	①	NoUse (=default)	Auto Input Signal from IMM is not required	
			②	Use	Auto Input Signal from IMM is required for Auto Mode.	
7		Take Out Fail	①	Use (=default)	Not sending Take Out Fail signal to IMM	
			②	NoUse	Send Signal to IMM when robot can take out the part or sprue	
8	IMAlarm NoUse ◀ IMRejec NoUse AllDelMold Yes DelErrLog Yes	IMM Alarm	①	NoUse (=default)	IMM E-stop Input don't activate Robot E-Stop	
			②	Use	IMM E-Stop activate Robot E-Stop	

9*		IMM Reject	①	NoUse (=default)	IMM defective Input don't separate reject part by robot	
			②	Use	IMM defective Input activate Robot to separate reject part to set position	
10		Total Mold Delete	①	No (=default)	Enter will not delete mold file	
			②	Yes	Enter will delete All mold file	
11		Error Log Delete	①	No (=default)	Enter will not delete Error Log	
			②	Yes	Enter will delete Error Log	
13		Time			Set Robot time by Hour, Minute, Seconds.	
14						
15		Date			Set Robot time by Year, Month, Date	
16	Time 00:00:00 ◀ Date 00/00/00 FindError 00.0 EjectFwd NoUse					
17		Find Error			Finding Error Time	##.#Sec
18		Eject Forward	①	NoUse (=default)	No Confirmation for Ejector Kick Complete Signal	
			②	Use	Confirm for Ejector Kick Complete Signal	
20	CutTime 0.0sec ◀	Cutting Time			Cutting time can set from 0.1 sec to 9.9 Sec.	

4.12 Waiting Device (Option)

(1) Dscription

This is a device fabricated to adjust the Kick/Return position of Main and Sub Arm with remote controller.

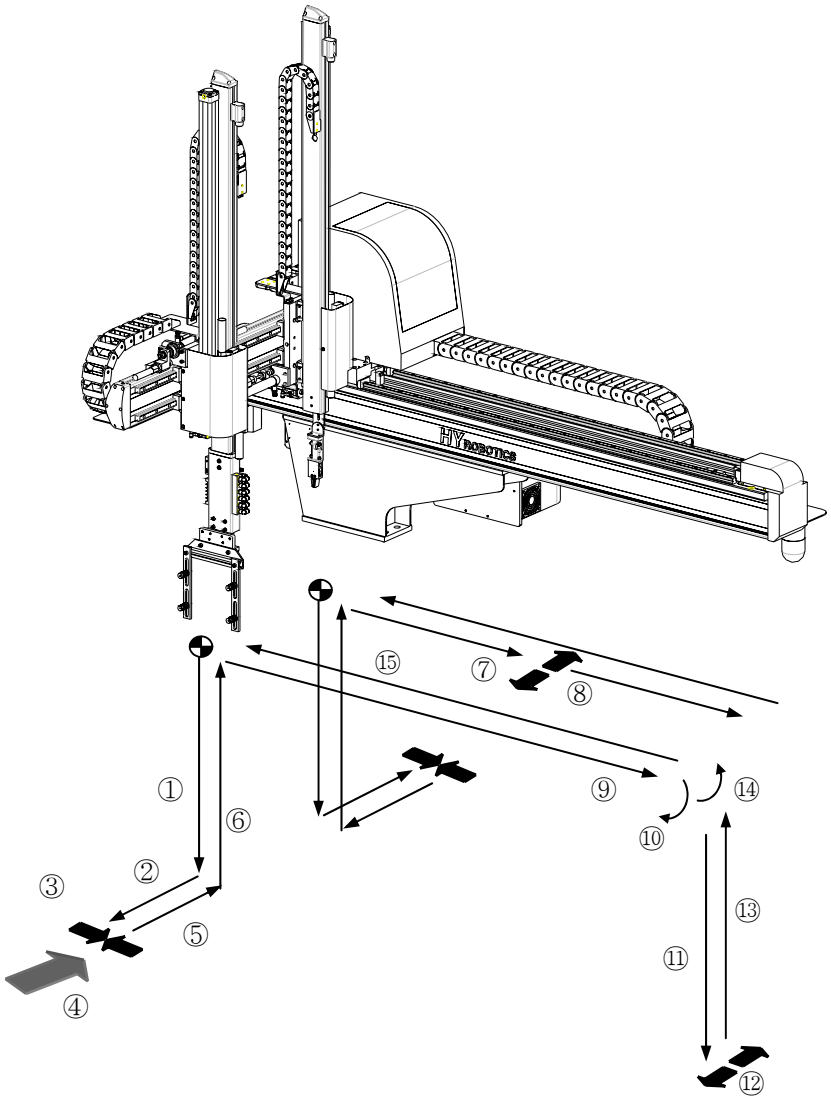


(2) Button Function

NO	Button	Description
1		Pressing this once shows waiting device setup screen and pressing this once again makes it disappear.
2		Selects Main or Sub Arm.
3		Operate Robot arm body move to Kick Axis
4		Operate Robot arm body move to Kick Return Axis
5		Operate Stopper move to Kick Axis
6		Operate Stopper move to Kick Return Axis

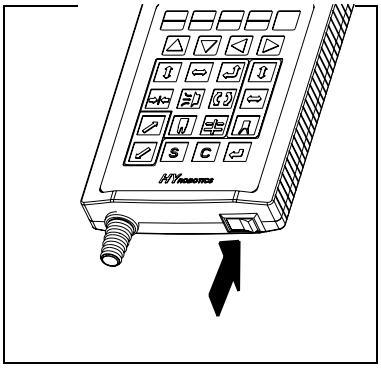
5 Follow Up

5.1 Motion Pattern Selection



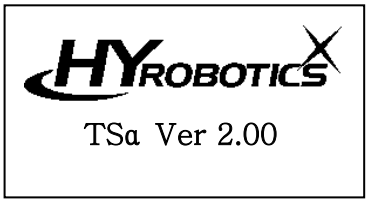
①. Down
②. Kick
③. Chuck ON
④. Ejector Forward
⑤. Kick Return
⑥. Up
⑦. Sub Off Position
⑧. Sub Arm Off
⑨. Main Arm Release Position
⑩. EOAT Rotation
⑪. 2nd Descent
⑫. Main Arm Release
⑬. 2nd Ascent
⑭. EOAT Rotation Return
⑮. Take Out Position

5.2 Start Up



● **STEP 1**

Turn On Power.

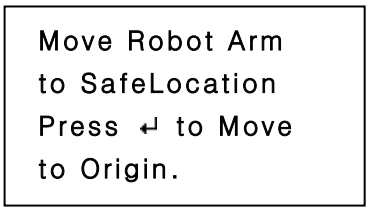


● **STEP 2**

Displays Logo and moves to Origin screen.

5.3 Move to Origin

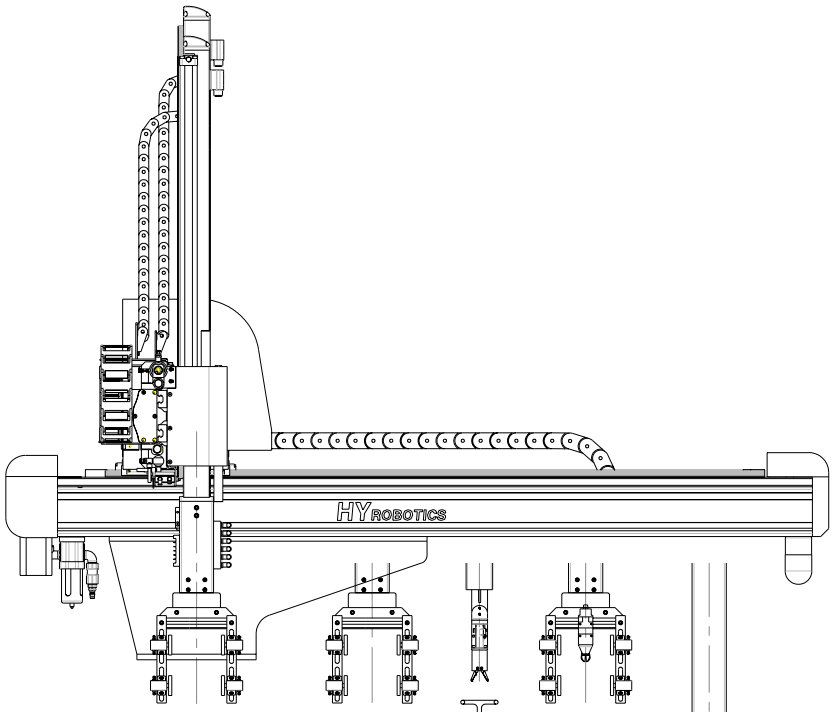
⚠DANGER Before operate Servo Origin, make sure the robot arm is in safe location. If robot arm is not if safe location, move robot arm manually to safe location with manual button.



● **STEP 3**

Press ENTER will move each axis arm to servo origin point. And then screen will display Manual Mode screen.

5.4 Set Position



Manual		0
	◀30%▶	

- **STEP 4**

[Move to Number Input screen]

Press SHIFT S and AUTO TEACH, moves to Number Input screen.

Number		0
>P0SubOff	0000mm	
P1RjtOff	0000mm	
P2NipOn	0000mm	

- **STEP 5**

[Move to Jog Input screen.]

To set up Each position with Actual Robot movement, moves to Jog Input screen with pressing SHIFT S and AUTO TEACH at the same time

Jog		0
P0SubOff	◀10%▶	
Set	Now	
0mm <	0mm	

● STEP 6

[Set Sub Arm Release Position]

Press 

or 

, move Sub Arm to the Parts Release (Off) Position.

* Press  or  to adjust Manual Mode speed. Can set up 30%, 20%, 10%, 5% of Normal Speed. Distance can be set 10mm, or 1mm.

Jog		750
P0SubOff	◀10%▶	
Set	Now	
750mm <	750mm	

● STEP 7

Press 

, save current value to setting value.

Press 
, move to screen for setting of the defect parts separate position

Jog		750
P0SubOff	◀10%▶	
Set	Now	
0mm <	750mm	

● STEP 8

[Set Reject Position]

Press 

or 

, move robot arm to the position for separating of defect (Reject) parts. Press 

to save current value to setting value.

Jog		750
P0SubOff	◀10%▶	
Set	Now	
750mm <	750mm	

● STEP 9

Press 
, move to screen to set Nipper Operation Position.

Jog		750
P2NipOn	◀10%▶	
Set	Now	
0mm <	750mm	

● STEP 10

[Set Nipper Position]

Press 

or 

, move robot arm to desired Nipper Cutting Position.

Jog		1000
P2 NipOn	◀10%▶	
Set	Now	
1000mm < 1000mm		

● STEP 11

Press [Enter], save current value to set.

Press [▼], move to Main arm release (Off) setting screen.

Jog		1000
P3 MaiOff	◀10%▶	
Set	Now	
0mm < 1000mm		

● STEP 12

[Set Main Arm Release Position]

Press [1FORWARD] or [0RETURN], move main arm to the desired position for parts release (off).

Jog		1200
P3 MaiOff	◀10%▶	
Set	Now	
1200mm < 1200mm		

● STEP 13

Press [ENTER], save current value to set

Jog		1200
P4 Wait	◀10%▶	
Set	Now	
0mm < 1200mm		

● STEP 14

[Set Waiting Position]

Press [▼], move to waiting position setting screen.

Jog		720
P3 Wait	◀10%▶	
Set	Now	
720mm < 720mm		

● STEP 15

Press [1FORWARD] or [0RETURN], move robot arm to desired out side waiting position.

Press [ENTER], save current value to set

Press [STOP MANUAL], move to Manual Mode.

5.5 Speed Setting

Number		720
>P0SubOff	750mm	
P1RjtOff	750mm	
P2NipOn	1000mm	

● **STEP 16**

[Set Main Arm Release Speed to 100%]

Press AUTO/TEACH with SHIFT S at the same time, move to the number input screen.

Speed		720
>S0SubOff	80 %	
S1RjtOff	80 %	
S2NipOn	80 %	

● **STEP 17**

Press ▶, move to speed input screen.

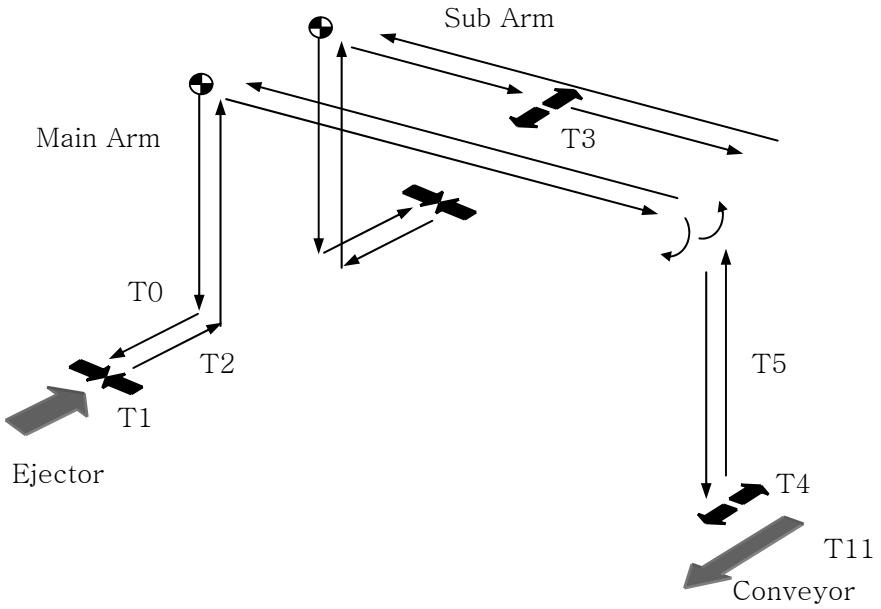
Press ▼ three times, move cursor '>' to main arm off (Release)

Speed		720
>S3MaiOff	100 %	
S4Wait	80 %	
S5TakOut	80 %	

● **STEP 18**

Press 1FORWARD 0RETURN 0RETURN in order, Main arm Off(Release) speed is 100% , Press ENTER to save. Press STOP/MANUAL, move to Manual Mode

5.6 Timer Setting



NO	Default	Display
T0	0 sec	Kick
T1	0 sec	Chuck
T2	0 sec	KicRt
T3	0.5 sec	S-Off
T4	0.3 sec	M-Off
T5	0.3 sec	UpDly
T11	5 sec	Conve

Timer		720
>T0 Kick	0.0 <	0.0
T1 Chuck	0.0	0.0
T2 KicRt	0.5	0.0

- **STEP 19**

[Move to timer screen, set T0 chuck delay 0.3 sec]

Press TIMER COUNT, move to timer screen.

Timer		720
>T0 Kick	0.3 <	0.3
T1 Chuck	0.0	0.0
T2 KicRt	0.5	0.0

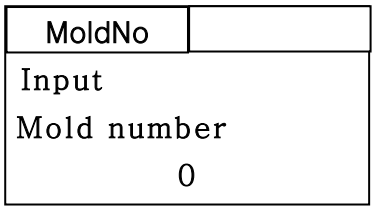
- **STEP 20**

Press 3 WAITPOS and input 0.3sec, Press ENTER to save data.

Press STOP MANUAL, move to Manual Mode.

Manual		720
	◀30%▶	

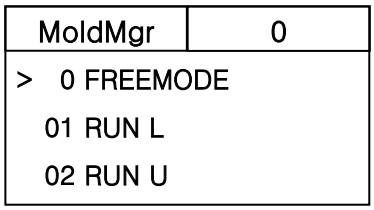
5.7 Mold Create



● **STEP 21**

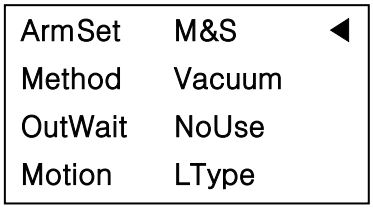
Hold [SHIFT S] and Press [MODE MOLD], displays Mold search mode.

Press [ENTER] moves to mold manager screen and cursor will be on 0.



● **STEP 22**

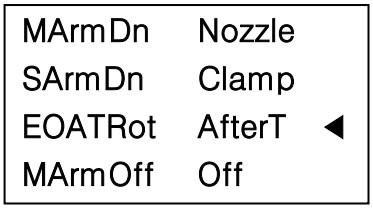
Pressing [ENTER] on the 0 Mold (Free mode) and moves to mode screen.



● **STEP 23**

[To set Chuck(EOAT) after traverse]

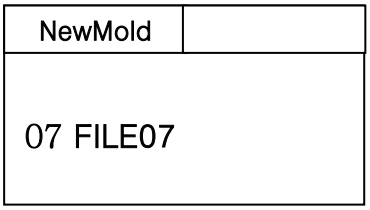
Press [▼] until cursor move to EOATRot.



● **STEP 24**

Press [▶] until display AfterT,

Press [ENTER] to save it..

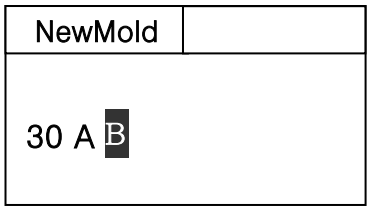


● **STEP 25**

[Set Mold Number to 30]

Press [CLEAR C] to cancel Mold Number, Press [3 WAITPOS] [0 RETURN] to input 30.

Press [ENTER] to save data.



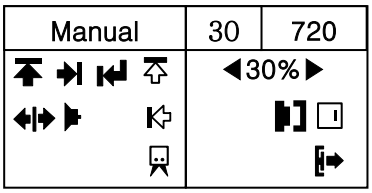
● **STEP 26**

[Set Mold Name to AB]

Press [▶], cursor will move to first character and blinking.

Press [Clear C], select A with pressing [▲] [▼], pressing [▶] move to next character space, press [▲] [▼] select “B”, and

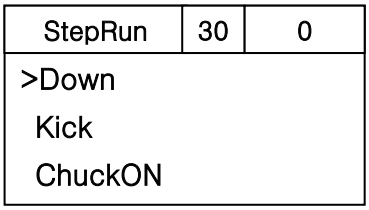
Press [ENTER] to save data.



● **STEP 27**

Press STOP/MANUAL will create Mold File and moves to Manual Mode.

5.8 Step Run



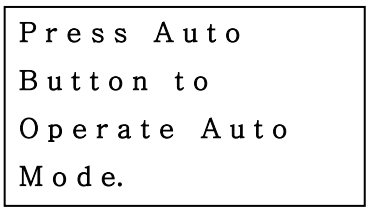
● **STEP 28**

Pressing STEP/I/O, move to Step Run screen.

Pressing ▲ will operate motion step by step.

Press STOP/MANUAL and moves to Manual Mode.

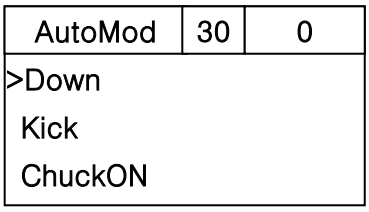
5.9 Auto Mode



● **STEP 29**

Press AUTO/TEACH change to Auto Message screen.

Press AUTO/TEACH again will start Auto Mode.



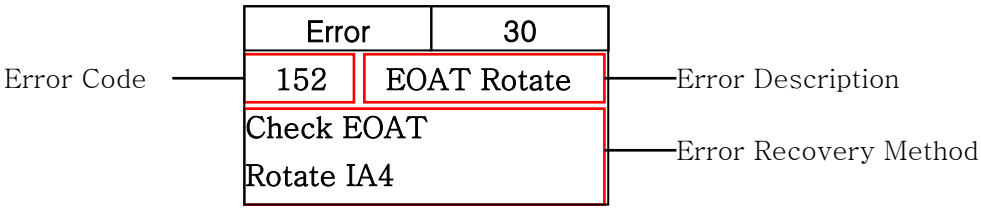
● **STEP 30**

To Stop Operation press STOP/MANUAL.

6 Error

6.1 Error Screen

This Chapter describes Error Code and Error recovery method.



Error cause Alarm and Buzzer, display the error message.

Press CLEAR C Stop Alarm and Buzzer, Press again CLEAR C clear error messages.

6.2 Error List

6.2.1 Communication Related

NO	Display	Cause	Recovery Method
16	SC-CRC	1. Noise 2. Hardware Failure 3. Program Failure	1. Reboot system 2. Contact Factory
17	SCCmdTmOv		
18	NoCommand SC		
19	NotExcCmd		
20	CmdInMotion		
21	IF-CRC		
22	IFCmdTmOv		
23	NoCommandIF		
24	IL-CRC		
25	ILCmdTmOv		
26	NoCommandIL		
32	SCDataComu		
33	IFDataComu		
34	ILDataComu		
35	SCNoResponse		

6.2.2 Motor Related

NO	Display	Cause	Recovery Method
48	TrvsCWLimt	Traverse Movement stop by touching CW Limit Proximity Sensor.	Operate robot arm to other direction (End of Stroke)
55	TrvsCCWLimt	Traverse Movement stop by touching CCW Limit Proximity Sensor.	Operate robot arm to other direction (End of Stroke)
64	TraverOrigin	Error for searching Origin Point	Confirm Touch Plate or Sensor
71	TrvsInitial	Communication Error of Each Axis and Controller.	1. Press CLEAR C and restart robot. 2. Check each connector and Tighten screw of Error Drive and Controller.
80	Servo Alarm	1. Motor Overload 2. Motor Overpower 3. Bad Encoder Connector 4. Motor Power 5. Crash	1. Confirm Servo Motor Drive Alarm Code. 2. If motor overload error occur, robot may hit barrier or operate mistake crash. Restart robot after completely shutdown robot for more than 20 seconds.
96	ROBOT E-Stop	Stop by emergency switch	Remove cause of emergency stop and then cancel it by turning emergency stop button.
98	IMM E-Stop	Stop by Injection Molding Machine emergency switch	Remove cause of emergency stop and then cancel it by turning Injection Molding Machine emergency stop button.

6.2.3 Pneumatic

NO	Display	Cause	Recovery Method
128	SKick/RtSame	Sub Arm Kick and Runner Kick Return Sensor confirm(OK)at the same time	Check Sub Arm Kick and Runner Kick Return Sensor
129	MKick/RtSame	Main Arm Kick and Runner Kick Return Sensor confirm(OK)at the same time	Check Main Arm Kick and Runner Kick Return Sensor
130	SUpDnSame	Sub Arm Up and Down Sensor confirm(OK) at the same time	Check Sub Arm Up and Down Confirm Sensor
131	MUpDnSame	Main Arm Up / Down Sensor signal Confirm(OK)at the same time	Check Main Arm Up and Down Sensor
132	RotateSensor	EOAT Rotation and Rotation Return Sensor confirm(OK) at the same time.	EOAT Chuck Rotation and Rotation Return Sensor.
133	SwivelSensor	Chuck Swivel and Swivel Return Sensor confirm(OK) at the same time.	Check Swivel and Swivel Return Sensor.
134	SubArmUpOk	When Sub Arm Up Ok signal should not be confirmed.	Check Sub Arm up Ok Sensor
135	MainArmUpOk	When Main Arm Up Ok signal should not be confirmed.	Check Main Arm up Ok Sensor
144	SubKick	1. Air Pressure is Low 2. Sensor is not confirm position 3. Bad Sensor 4. Wire damaged	1. Check Air Regulator 2. Check I/O 3. Check Sensor Touch Plate 4. Fix and Move Origin Point..
145	SubKickRt		
146	MainKick		
147	MainKRt		
148	SubArmUp		
149	SubArmDown		
150	MainArmUp		
151	MainArmDown		
152	EOATRotate		
153	RotateReturn		
154	Swivel		
155	SwivelReturn		
156	M-SafetyBwd		
157	S-SafetyBwd		

6.2.4 Sol valve

NO	Display	Cause	Recovery Method
160	VacuumFail	A. Vacuum Failure B. Check Vacuum Pad C. Leaking at Stem and Fitting D. Adjust Vacuum sensitivity	1. Open Safety Door and Fix Problem in Manual Mode 2. Replace Pad. 3. Tight Stem and Fitting Screw
161	ChuckFail	1. Chuck Motion Failure 2. Chuck Sensor Touch Failure 3. Bad Sensor	1. Open Safety Door and Fix Problem in Manual Mode 2. Adjust location of Sensor 3. Replace Sensor
162	MArmGripFail	1. Gripper Motion Failure 2. Wrong Sensor Location 3. Bad Sensor	1. Open Safety Door and Fix Problem in Manual Mode. 2. Adjust location of Sensor 3. Replace Sensor
163	SArmGripFail	4. Gripper Motion Failure 5. Wrong Sensor Location 6. Bad Sensor	4. Open Safety Door and Fix Problem in Manual Mode. 5. Adjust location of Sensor 6. Replace Sensor

6.2.5 Machine Abnormality

NO	Display	Cause	Recovery Method
176	SCInitiError	1. Noise 2. Program Failure	Reboot Contact Factory
178	OriginFail (Touch Plate : Origin Sensor Touch Plate)	1. Touch Plate Setting 2. Touch Plate Sensor Bad 3. Servo Motor Pulley loosened 4. Bad Belt	1. Reset Touch Plate 2. Change Touch Plate Sensor 3. Tighten motor Pully 4. Belt change
179	DownProhibit	Sub Arm Release position should be within the Descent ok position	Sub Arm Off position need to be set after pass the down prohibit sensor.

6.2.6 Interlock Related

NO	Display	Cause	Recovery Method
202	MoldOpenOk	Rarely some Molding Machine lose Mold Open Complete Signal momentarily when Robot arm in Take-Out Position.	1. Reboot 2. Contact Factory

6.2.7 Operation Error

NO	Display	Cause	Recovery Method
208	ArmIsNotUp	Traverse Movement without Up (Ascent) Complete	Ascent Main and Sub Arm
209	NoMotionArea	When Robot can not move due to out of operation range	Move the robot arm to other direction
210	OverLimit	Pallet setting is wrong	Reset Number and Pitch
214	NoMoldOpen	In Manual Mode, activate Robot Arm Down without Mold Open Complete	Check Mold completely opened. (Check Mold Open Complete Sensor)
215	OverTmLimit	Time Limit Exceed.	Check I.M.M and Robot

6.2.8 Internal Program Error

NO	Display	Cause	Recovery Method
231	OverFileNum	Mold file is full.	Delete old mold files.
236	SC InfoError	SC Wrong Version	Contact Factory
237	IF InfoError	IF Wrong Version	
238	IL InfoError	IL Wrong Version	

Appendix

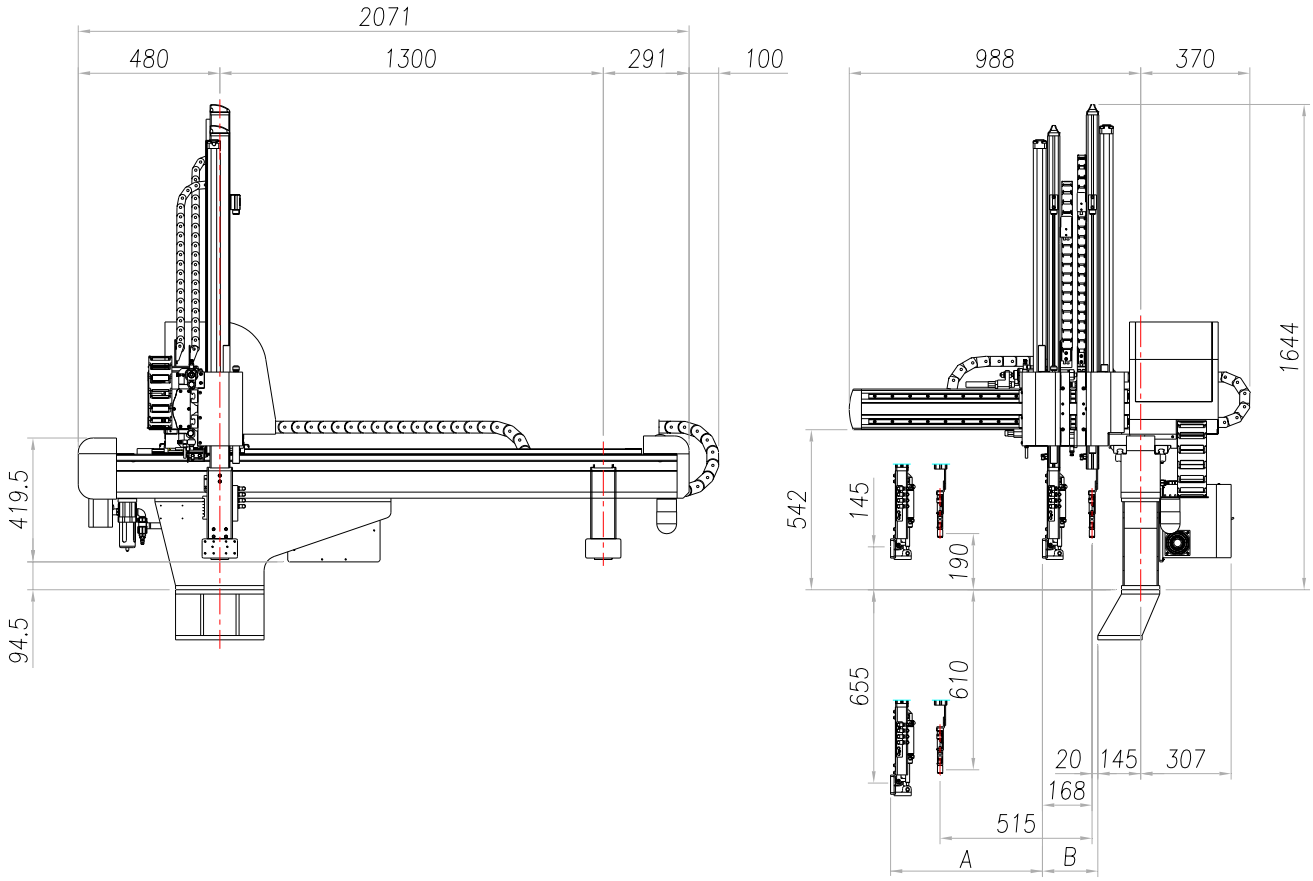
A. Specification

Power	Control Method	Pneumatic Pressure
100Vac–240Vac 50/60Hz	Sequence Program	0.5 to 0.6 Mpa

MODEL	Applicable injection molding machine	Traverse stroke (mm)			Kick stroke (mm)		Descent stroke (mm)		Pneumatic consumption (Nl/cycle)	Robot body weght (kg)	Maximum weight capacity (kg)	Take-out dry cycle (sec)	Entire dry cycle (sec0	Noise level (dB)
		standard	L Type	LL Type	Main Arm	Sub Arm	Main Arm	Sub Arm						
TS-200SI	Up to 250 ton	1500	-	-	150	-	800	-	22		3			
TS-200DI					150	90	800	850	25		3			
TSa-200SI	Up to 250 ton	1300	1500	1700	150	-	800	-	25		3			
TSa-200DI					150	100	800	850	35		3			
TSa-300SI	Up to 350 ton	1500	1700	-	250	-	1050	-	32		3			
TSa-300DI					250	150	1050	1100	42		3			
TSa-150S	Up to 150 ton	1300	-	-	150	-	700	-	22		5			
TSa-150D					150	100	700	700	29		5			
TSa-250S	Up to 250 ton	1500	-	-	150	-	800	-	24		5			
TSa-250D					150	100	800	800	32		5			
TSa-350S	Up to 350 ton	1600	-	-	300	-	1000	-	44		10			
TSa-350D					300	150	1000	1000	59		10			
TSa-450S	Up to 450 ton	1800	-	-	350	-	1100	-	48		10			
TSa-450D					400	150	1100	1100	66		10			
TSa-550S	Up to 550 ton	1800	-	-	400	-	1250	-	70		10			
TSa-550D					400	150	1250	1250	88		10			
TSa-650S	Up to 650 ton	2000	2200	-	500	-	1500	-	80	800	20	3.8	12	
TSa-650D					500	150	1500	1500	102	880	20			
TSa-850S	Up to 850 ton	2000	2200	-	500	-	1600	-	141	900	20	4	13	
TSa-850D					500	150	1600	1600	163	1000	20			
TSa-1300S	Up to 1300 ton	2500	2700	-	600	-	1800	-	157	1050	25	4.5	15	
TSa-1300D					600	200	1800	1800	182	1200	25			
TSa-2000S	Up to 2000 ton	3500	4000	-	800	-	2100	-	220	2200	40	7	21	
TSa-3000S	Up to 3000 ton	4000	4500	-	1000	-	3000	-	274	2700	70	9	25	

B. External Dimension

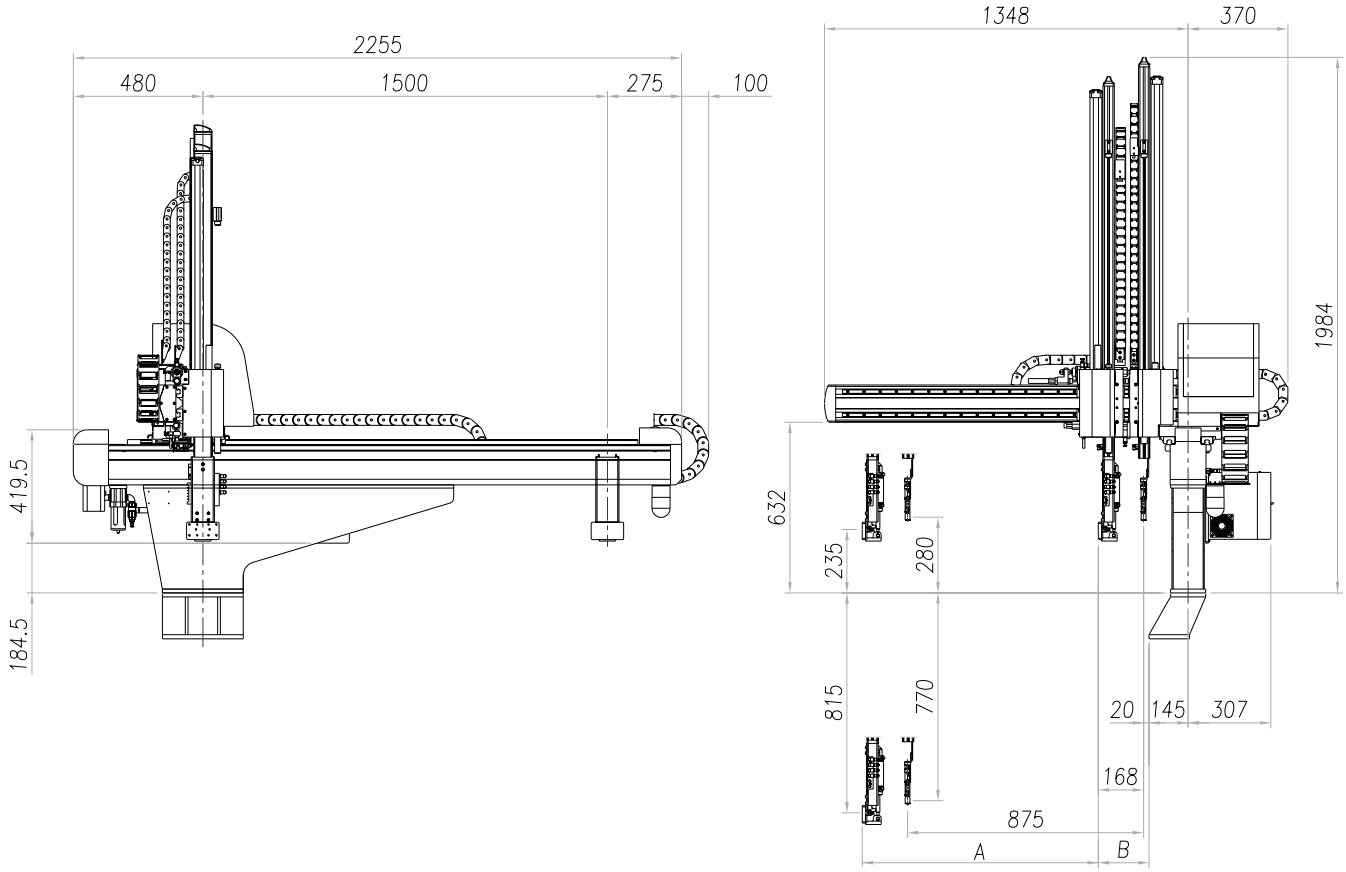
B.1 TSα-200DI dimension



(Unit: mm)

Type	A	B
200SI	645	58
200DI	515	188

B.2 TSα-300DI dimension

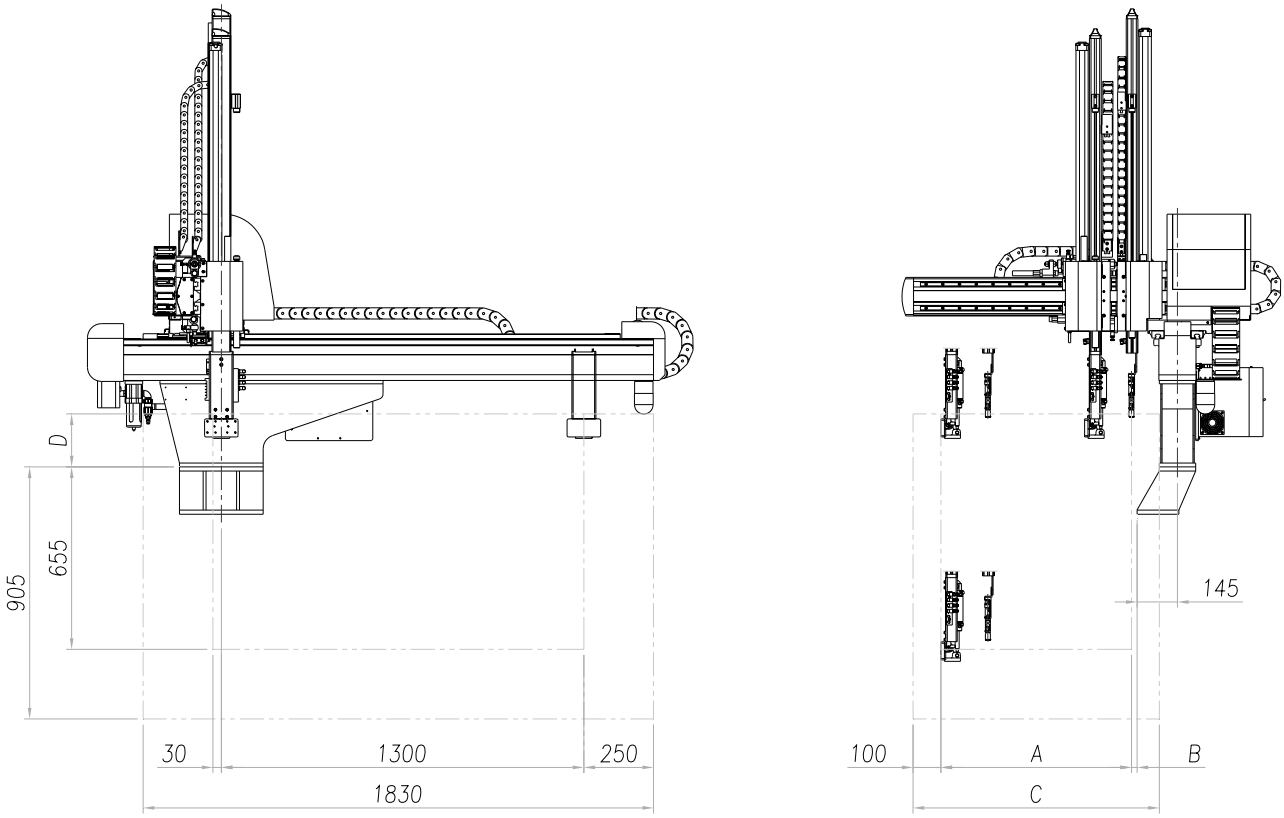


(Unit: mm)

Type	A	B
300SI	1005	58
300DI	875	188

C. Safe guarded space

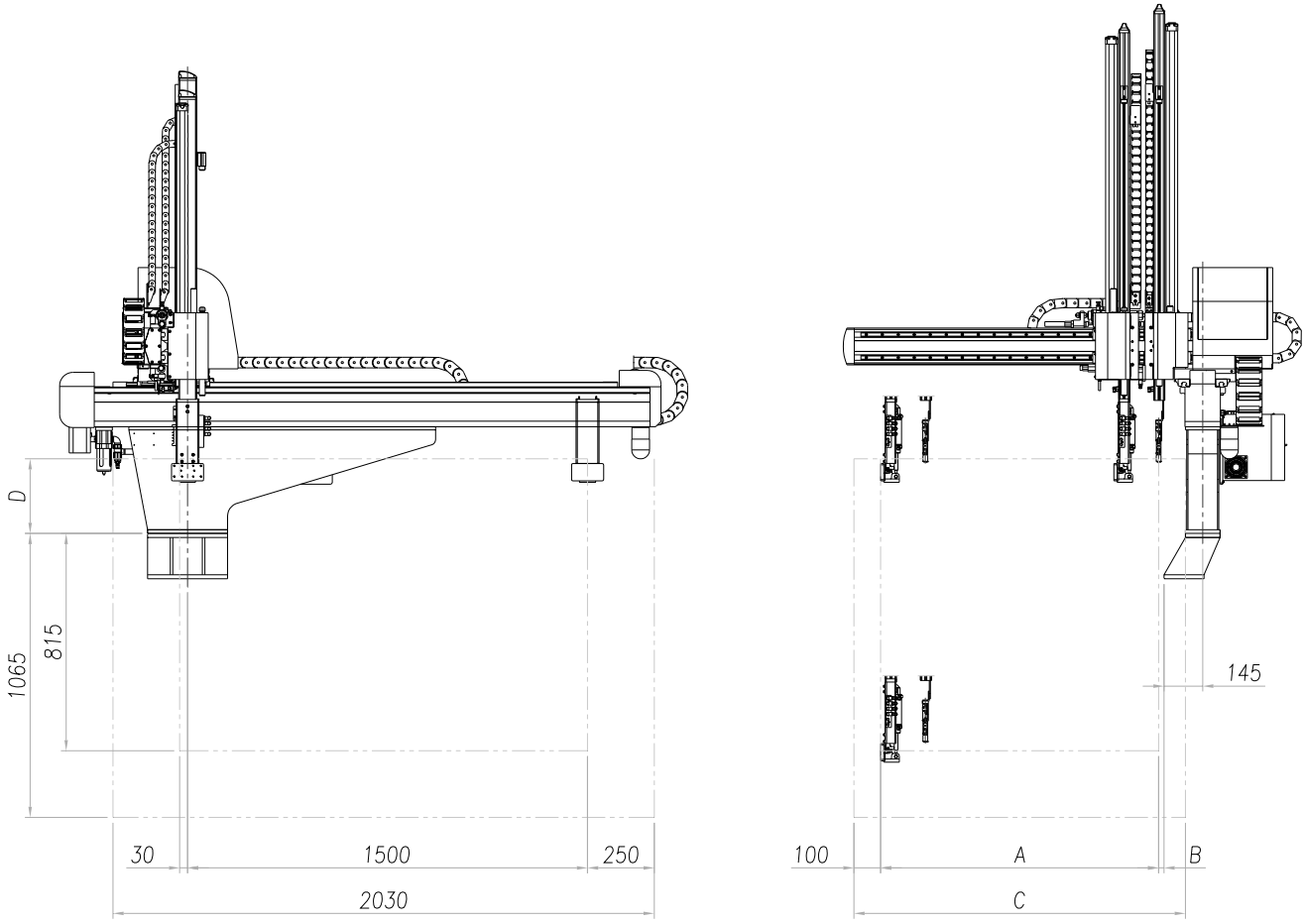
C.2 TSα-200DI



(Unit: mm)

Type	A	B	C	D
200SI	645	58	815	145
200DI	683	20	883	190

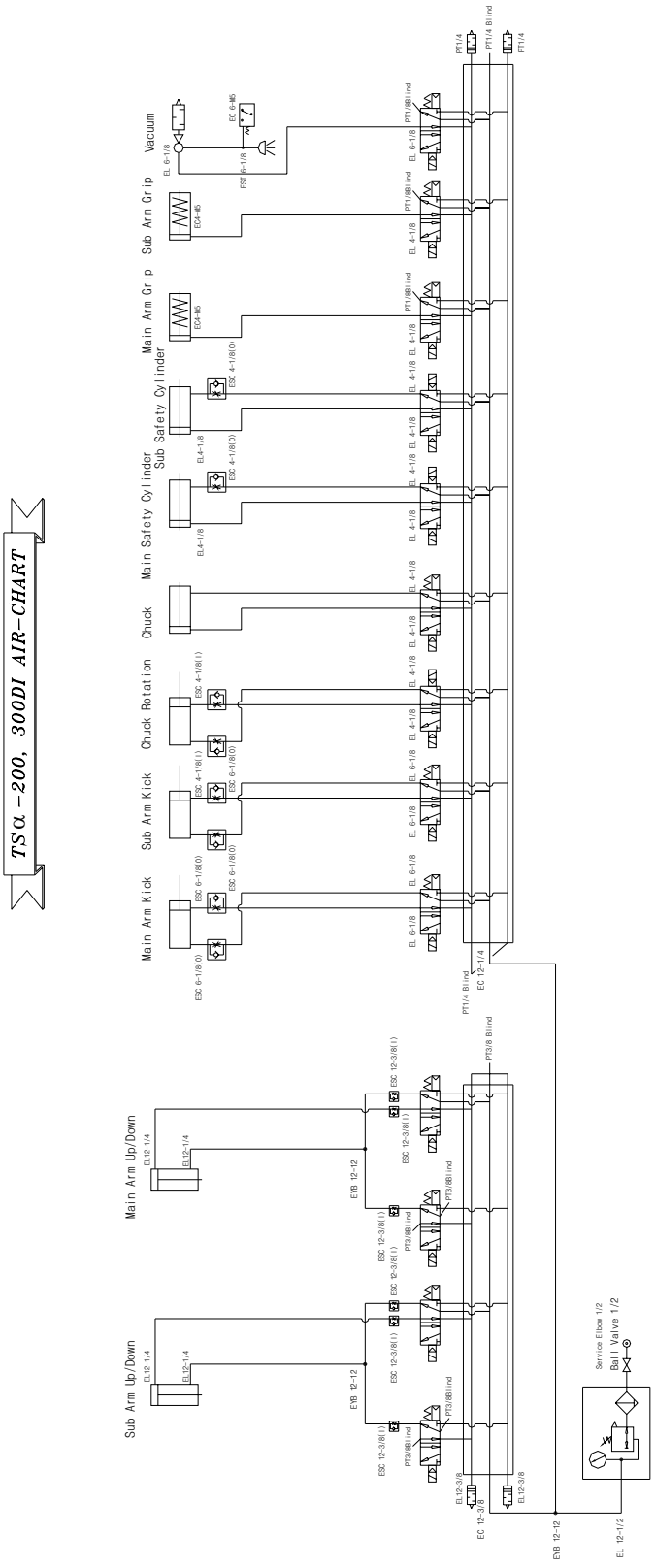
C.2 TSα-300DI



(Unit: mm)

Type	A	B	C	D
300SI	1173	58	1273	235
300DI	1043	20	1243	280

H. Air Chart


TSα-200, 300DI AIR-CHART
Vacuum
Sub Arm Grip
Main Arm Grip
Sub Safety Cylinder
Main Safety Cylinder
Chuck
Chuck Rotation
Sub Arm Kick
Main Arm Kick
Main Arm Up/Down
Sub Arm Up/Down
Service Elbow 1/2
Ball Valve 1/2

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