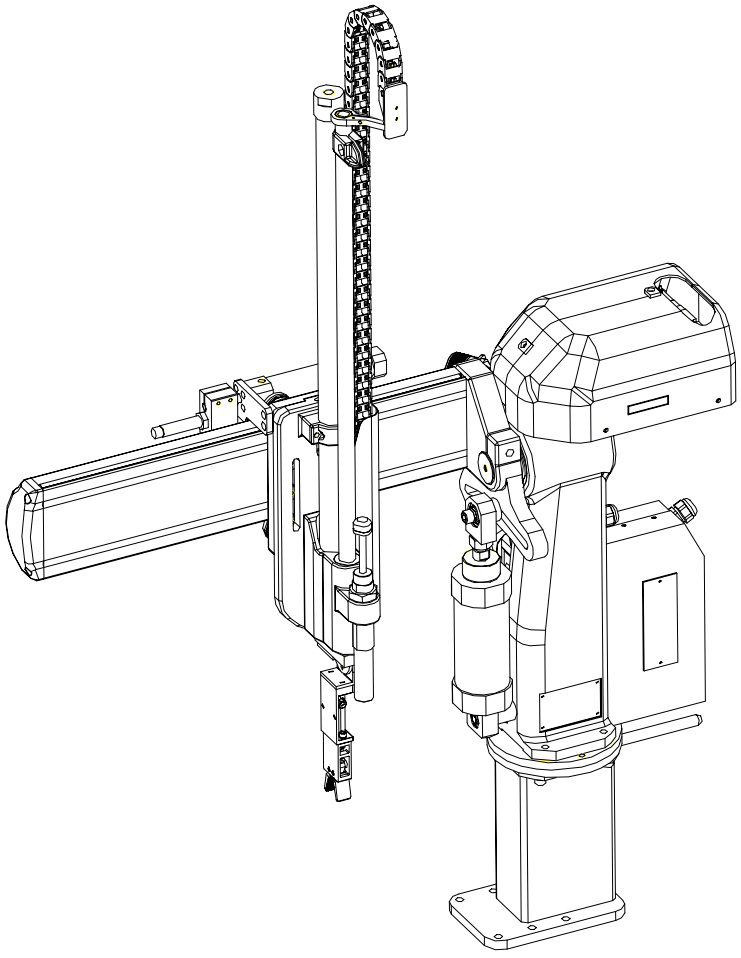
User Manual

TOPⅣ Swing Robot

■TOPⅣ 450 ■ TOPⅣ 550

■TOPⅣ 650 ■ TOPⅣ 750

■TOPⅣ 950



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

HYROBOTICS

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TOPIV User Manual
Ver 1.00

Attention Mark

Danger, Warning, Caution, Notice

This document use following attention mark for the safety of operation.

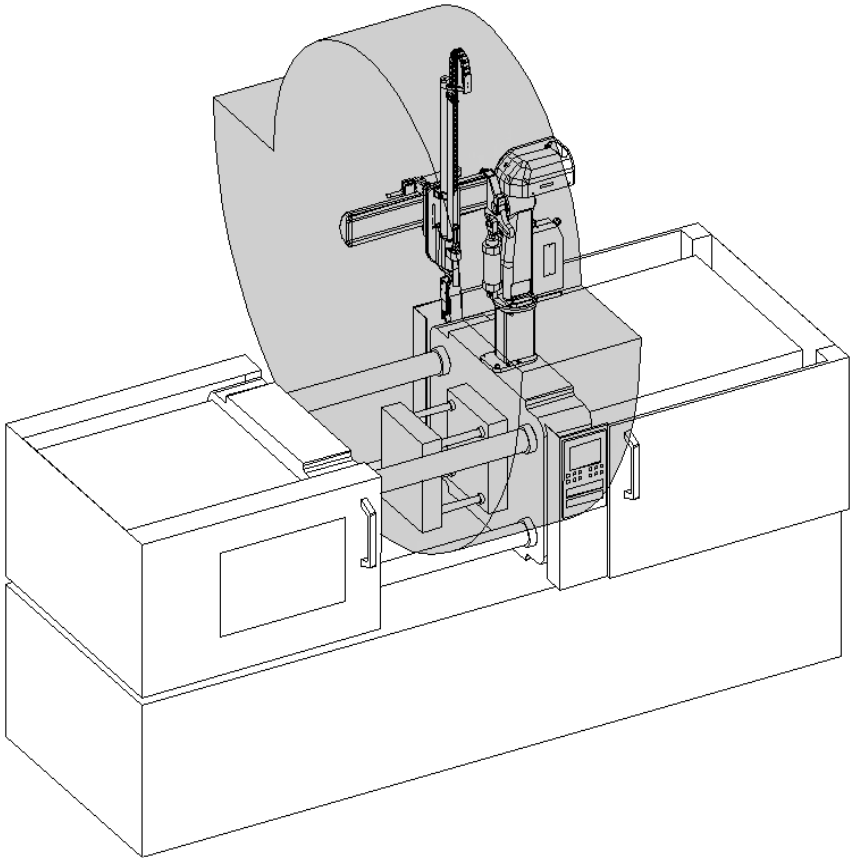
⚠DANGER	If the actions indicated in a “ DANGER” are not compiled with, death or serious damage of major equipment could results.
⚠WARNING	If the actions indicated in a “ WARNING” are not compiled with, serious injury or major equipment damage could results.
⚠CAUTION	If the actions indicated in a “ CAUTION”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

DANGER

- When installing the robot, use hoist or pork lift with c hooks and cable.

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



WARNING

- Do not enter robot motion area or inside the safety guard during robot operation. Do not touch or let 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 use an extremely flammable spray near by the robot. It may cause a fire.

- If any air leak is detected, stop the robot an eliminate the cause of air leak.

- 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.

- If any of the following cases should occur, stop the operation 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 happen during operation.

WARNING

- Only qualified personal is allowed to open the cover or control panel of the robot. Electric shock may occur

- 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.

- When disconnect or connect the plug, hold the plug not plug cord. Pulling the power cord may damage the plug and cause of fire or electric shock

- Before cleaning, inspecting, repairing and maintenance of the take out robot,. Lock out/ Tagout the robot.

- Make sure the power is off before connect any cable, if not it may be cause electric shock

- 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

WARNING

- Do not drop or give any strong shock the the handy controller. It may be cause of malfunction. Handle with care with Teach palm handy controller

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

WANRING

- Make sure the operation environment (Motion area, Safety Guard) would not be worse because of new set of equipment is added

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

- 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)

- When setting up the robot arm in the mold area by manual operation, 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.

- Before operating the robot, training required to the prospective operators and supervisors. Operators are not allowed to disassemble the robot without supervisor's permission.
- Provide a handbook consisting of the following guideline, and inform every operator of the significance of those instructions.
  - EMO Stop method in emergency situation.
  - Lock-out Tag out procedure.
  - Method and procedures for operation routines including start-up of robot and function of each switch.
  - Signs method when operate or setup more than 2 persons at the same time
  - Steps to lock out / tagout and restart the robot after EMO Stop, checking safety condition and correcting abnormal status.
  - Make sure the guide line for above items appropriate for types of the robot, installation location, condition and environment.

WARNING

- Do not operate and start-up the robot until follow the all procedure for start up.

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

- 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.

- If don't operate the robot for several days or longer time due to 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

- 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.

POWER RELATED CAUTIONS

CAUTIONS

- Handle with care with power cable, do not pull and bend too much, 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)

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

- Do not connect the earth terminal of the plug with the following condition
  - Water pipe or faucet
  - Gas pipe (Flashing or explosion may occur)
  - Grounding wire for telephone line or lightning arrestor (A big amount of current will flow through the wire in the case of lightning.)

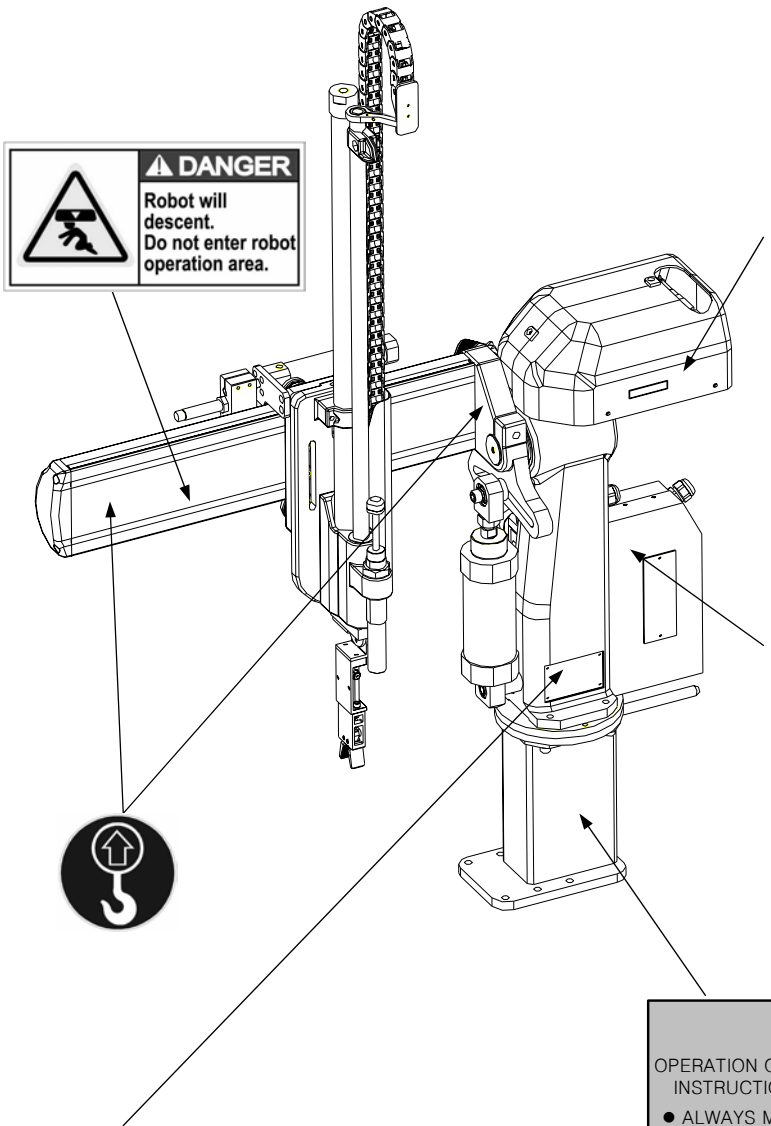
- Power off when connect or disconnect any connector of robot

- 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



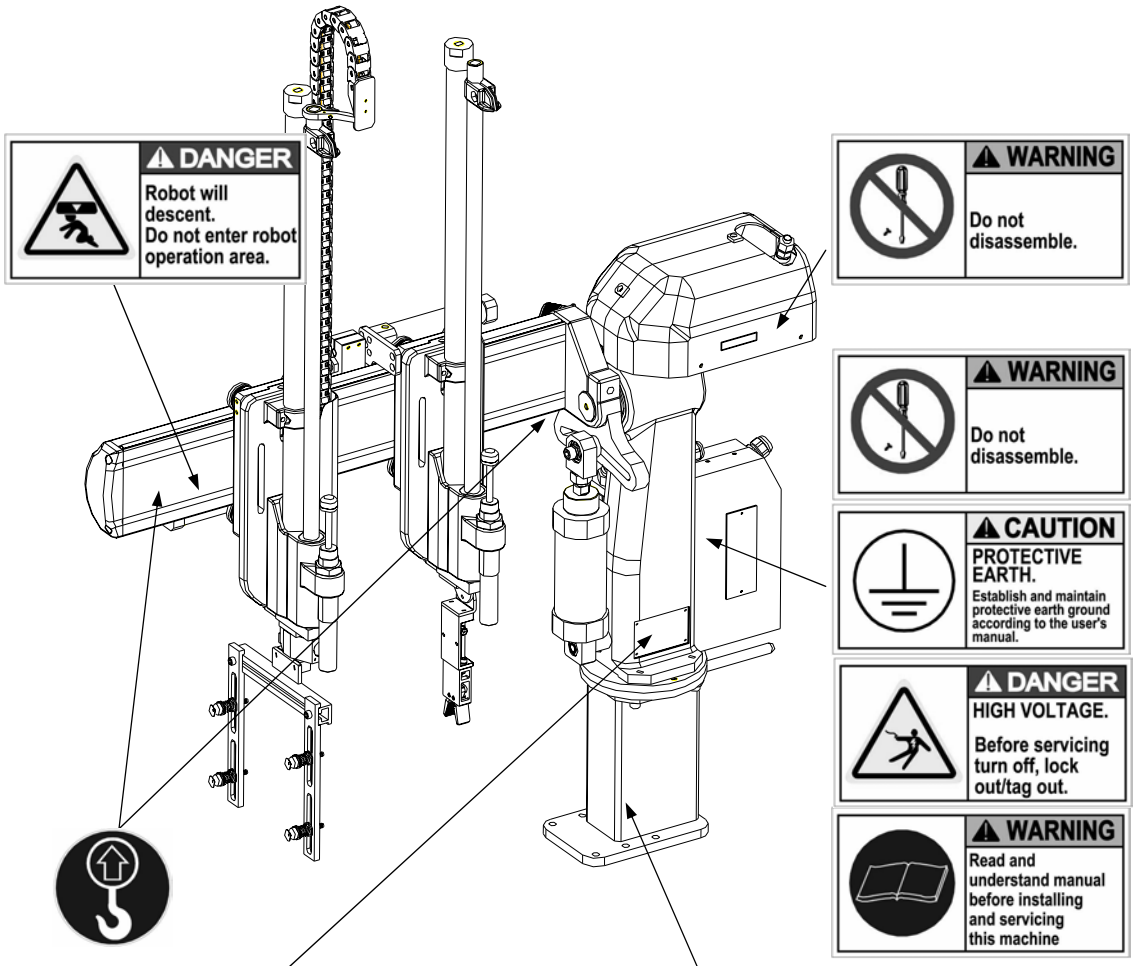
HYROBOTICS Co., Ltd.
173-228 GAJWA-DONG SEO-GU INCHON KOREA
TEL:+82-32-582-5040
FAX:+82-32-584-7040

CE	Model Name	TOPIV-A550
	Serial NO	
	Product Code	
	Manufacture Date	
Rated Voltage	100Vac-240Vac	
Rated Current	0.6A	
Rated Frequency	50/60 Hz	
Weight	35 kg	

Warning

OPERATION OF THIS MACHINE WITHOUT PROPERLY READING THE INSTRUCTION GUIDE COULD RESULT IN INJURY.

- ALWAYS MORE THAN TWO QUALIFIED PERSONAL TOGETHER MUST WORK THE MAINTENANCE, SET UP , INSPECTION AND REPAIR THE ROBOT.
- ALWAYS WEAR PERSONAL SAFETY EQUIPMENT (SAFETY HELMET, SAFETY GLASS, SAFETY SHOES) FOR OPERATION OF THE ROBOT.
- DO NOT ENTER WORKING RANGE WITH MACHINE IN OPERATION.
- ROBOT MOTION CAN CAUSE SEVERE PERSONAL INJURY. THIS MACHINE WILL OPERATE AUTOMATICALLY.
- CUSTOMER IS RESPONSIBLE FOR PROPER INSTALLATION AND GUARDING, REFER TO ALL ANSI, FEDERAL, STATE, LOCAL OR OSHA, EUROMAP
- REGUALTIONS THAT APPLY.
- PERFORM REGULA MAINTANENCE.
- WHEN CHANGE THE MOLD , MAKE SURE THERE IS NO INTERFERENCE BETWEEN MOLD AND ROBOT, CRANE.
- STOP THE OPREATION IMMEDIATELY WHEN ABONORMAL CONDITION OCCUR



HYROBOTICS Co., Ltd. 173-228 GAJWA-DONG SEO-GU INCHON KOREA TEL:+82-32-582-5040 FAX:+82-32-584-7040		
CE	Model Name	TOPIV-TWIN 550
	Serial NO	
	Product Code	
	Manufacture Date	
Rated Voltage	100Vac-240Vac	
Rated Current	0.6A	
Rated Frequency	50/60 Hz	
Weight	45 kg	

Warning

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- ALWAYS MORE THAN TWO QUALIFIED PERSONAL TOGETHER MUST WORK THE MAINTENANCE, SET UP , INSPECTION AND REPAIR THE ROBOT.
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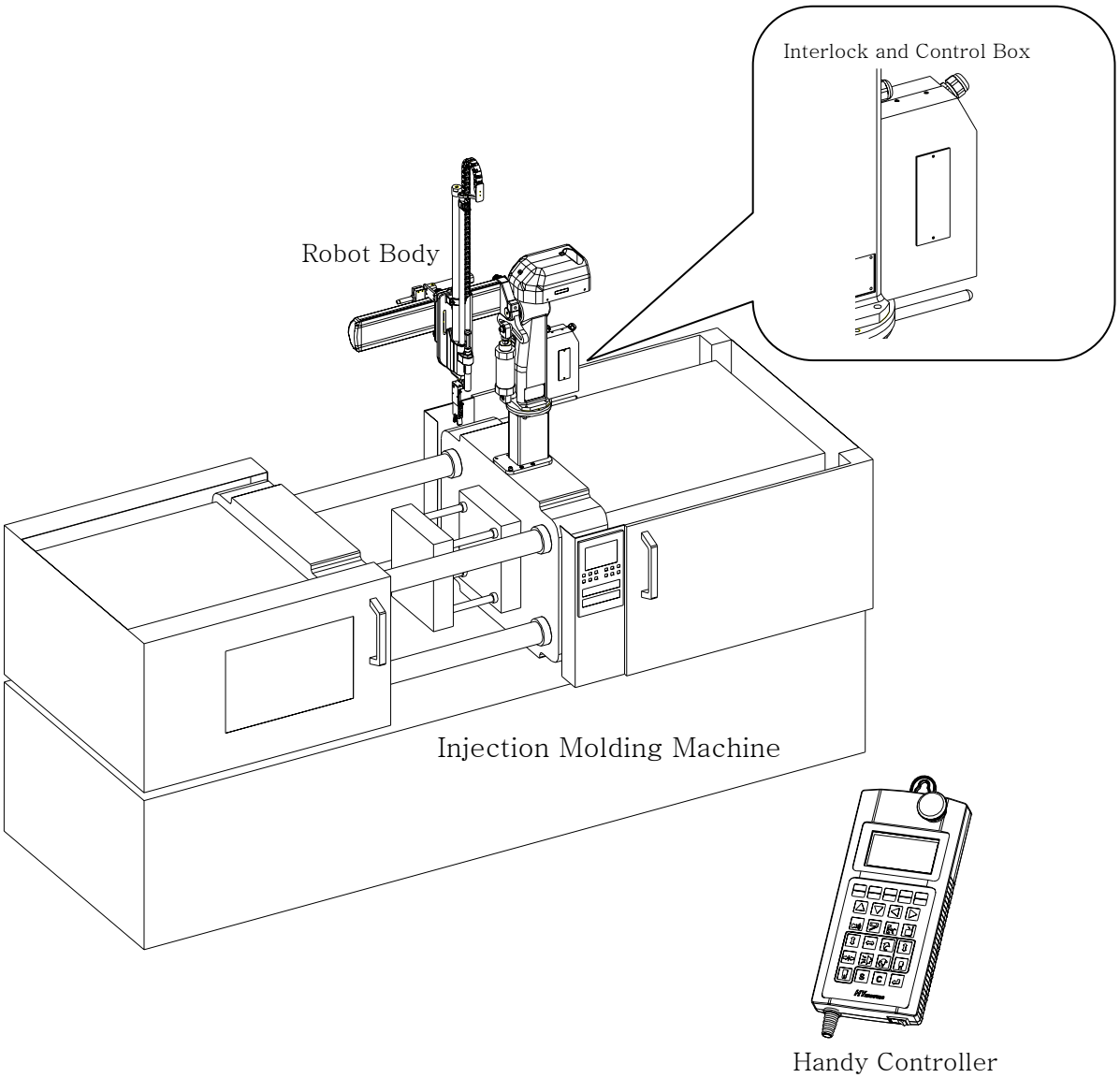
CONTENTS

1 Introduction

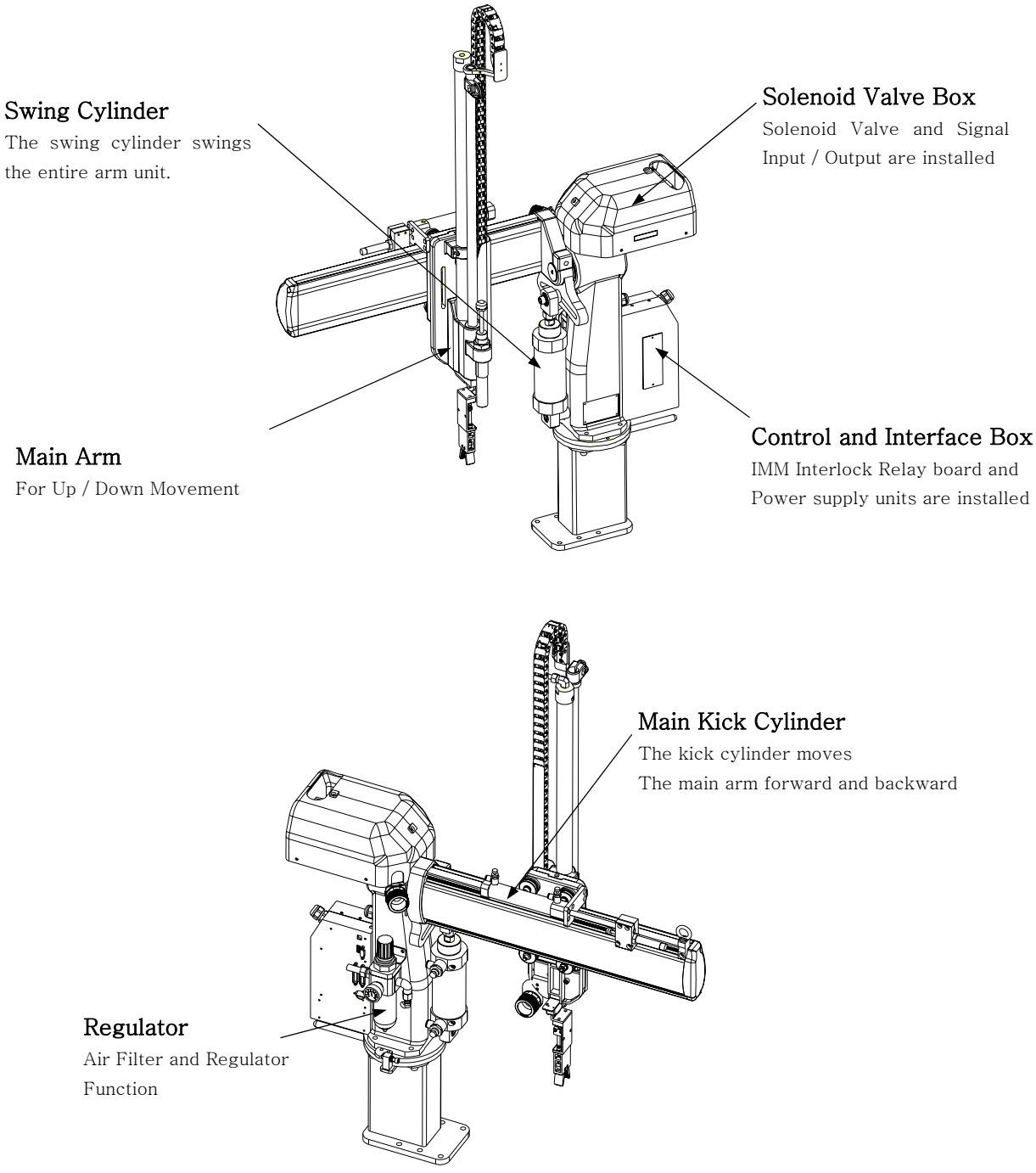
1.1 Robot Assembly

This Robot is consisted of

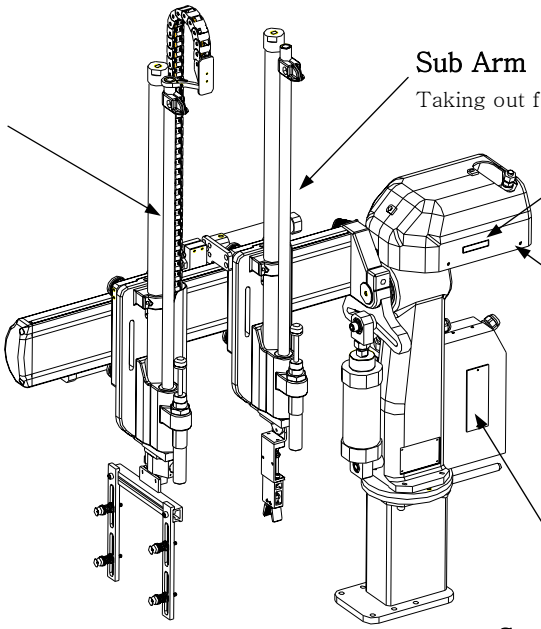
- Robot Body
- Interlock and Control Box
- Handy Controller



1.1.1Robot Body



[A, X, XC, XN Type]



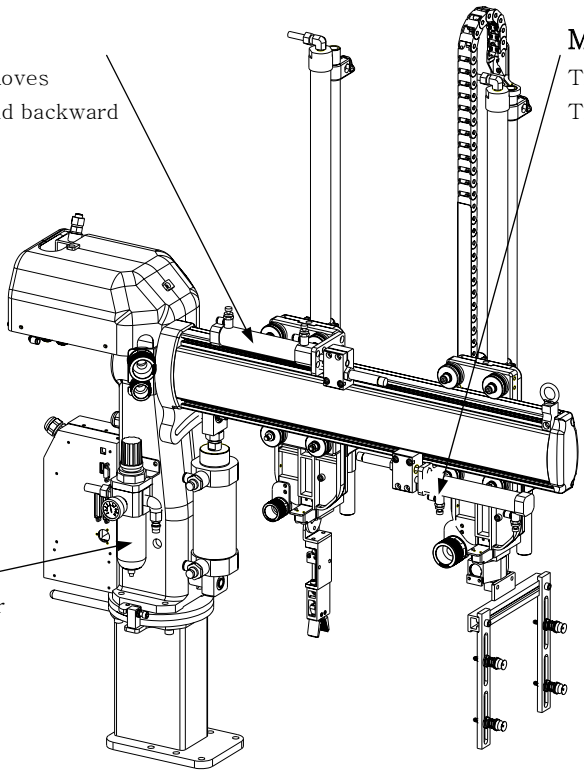
Main Arm
For Up / Down Movement

Sub Arm
Taking out for Sprue

Vacuum Sensor
Confirm Products verification with Vacuum

Solenoid Valve Box
Solenoid Valve and Signal I.O and Vacuum Sensor are installed

Control and Interface Box
IMM Interlock Relay board and
Power supply units are installed



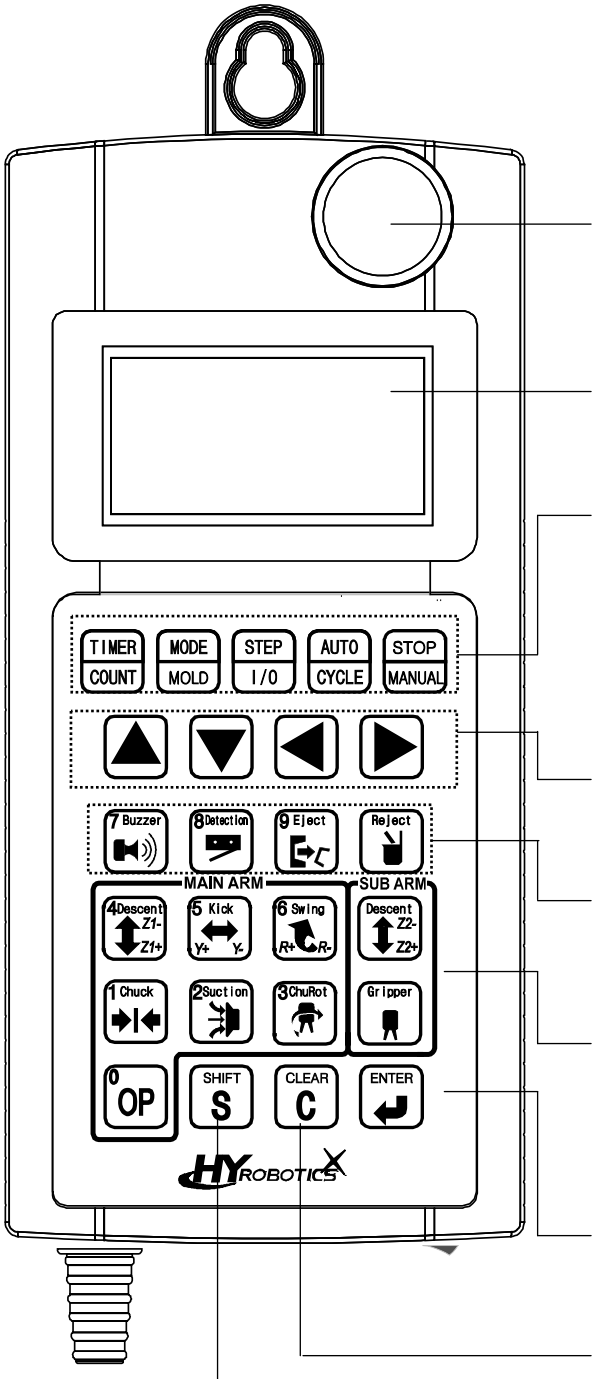
Sub Kick Cylinder
The sub kick cylinder moves
The sub arm forward and backward

Main Kick Cylinder
The main kick cylinder moves
The main arm forward and backward

Regulator
Air Filter and Regulator Function.

[Twin Type]

1.1.2Handy Controller Function



- ROBOT EMO Button

Press ROBOT EMO Stop will stop operation of Robot and Activate IMM EMO Stop.

- 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

- Mode Selection 2

Alarm, Product Verification, Ejector, Reject (Bad Parts)

- Manual Opeation 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

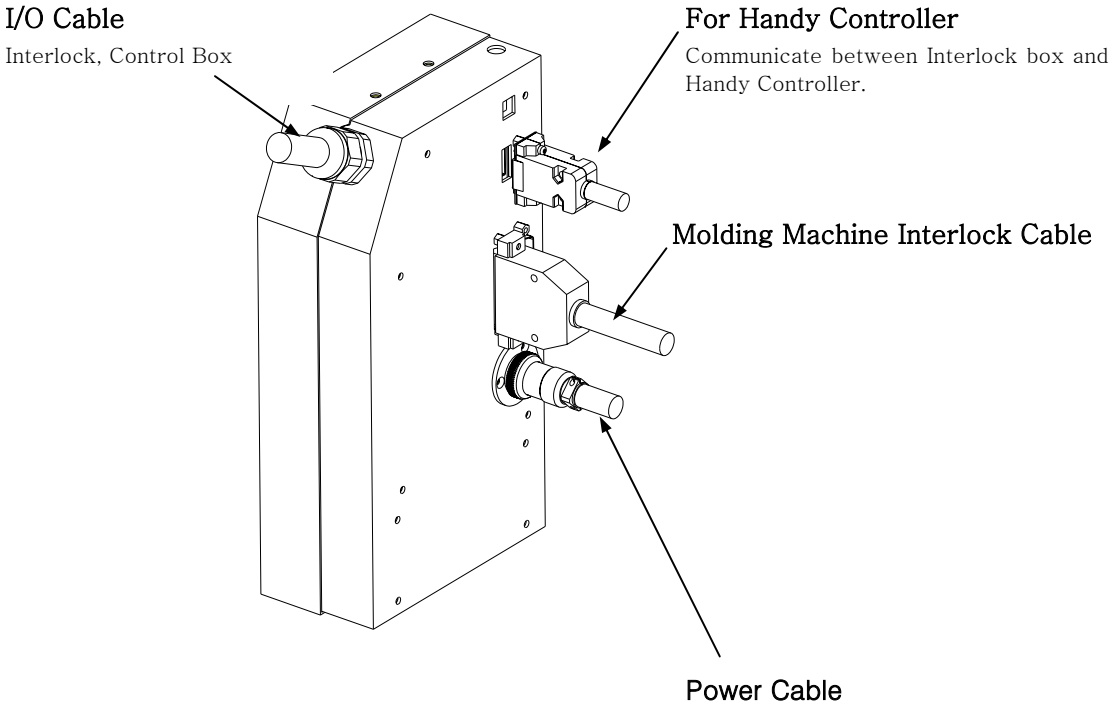
Cancel, Clear Error

- S (Shift) Key

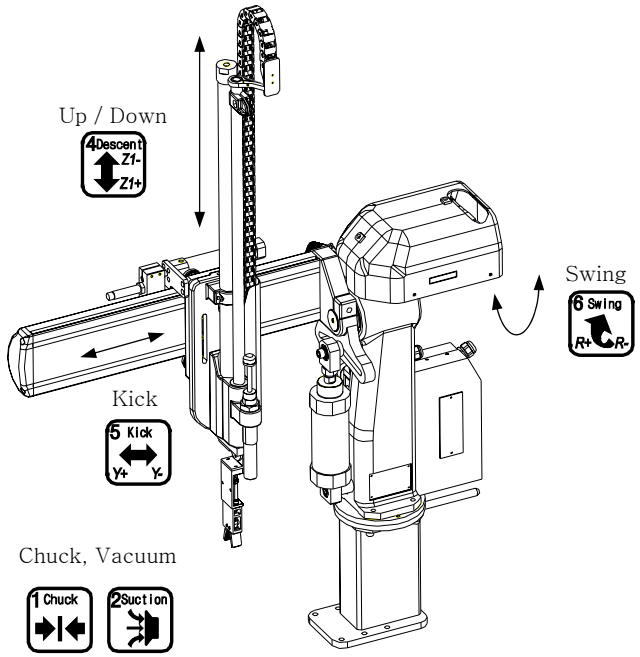
S key will use for upper case commend

1.1.3Interlock and Control Box

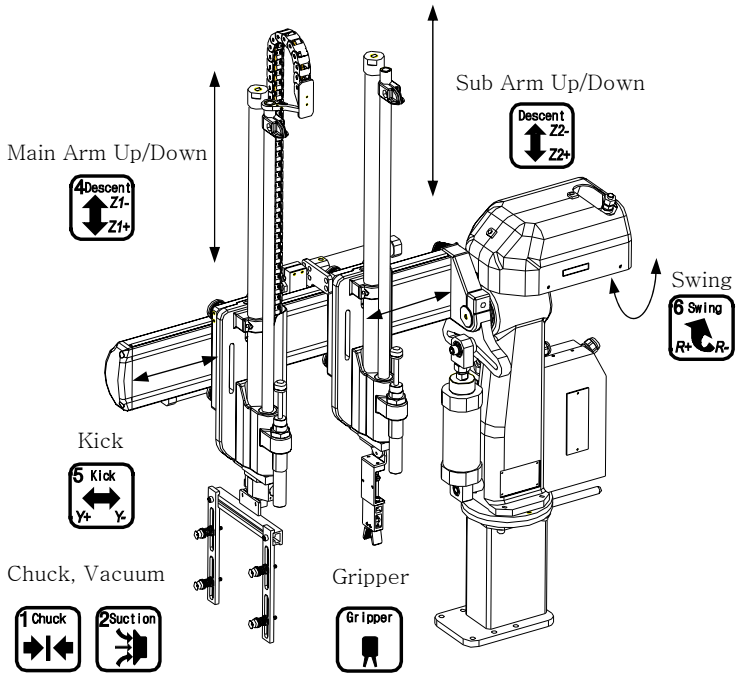
This box included Power Tranformer, Relay , Relay board
Power trans receive power from IMM and supply the power to robot and handy Controller. Each relay interlock for operation communicate handy controller CPU.



1.1.4Each Axis



[A, X, XC, XN Type]

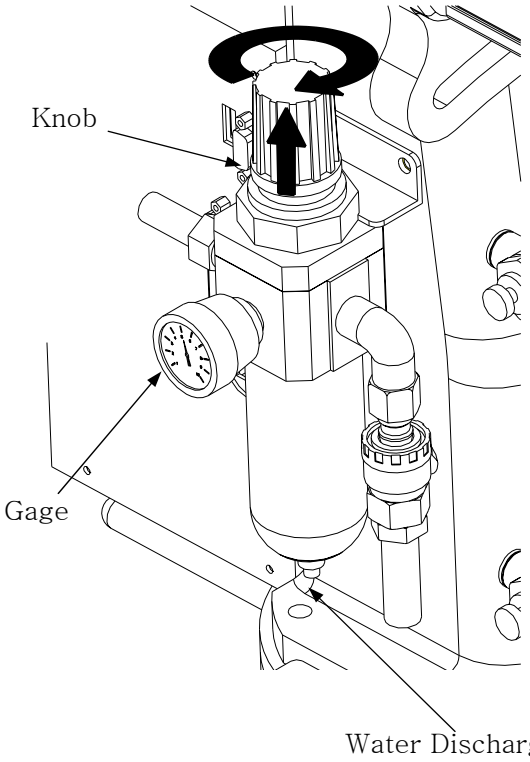


[Twin Type]

2 Before Operation

2.1 Before Operation

2.1.1Air regulator



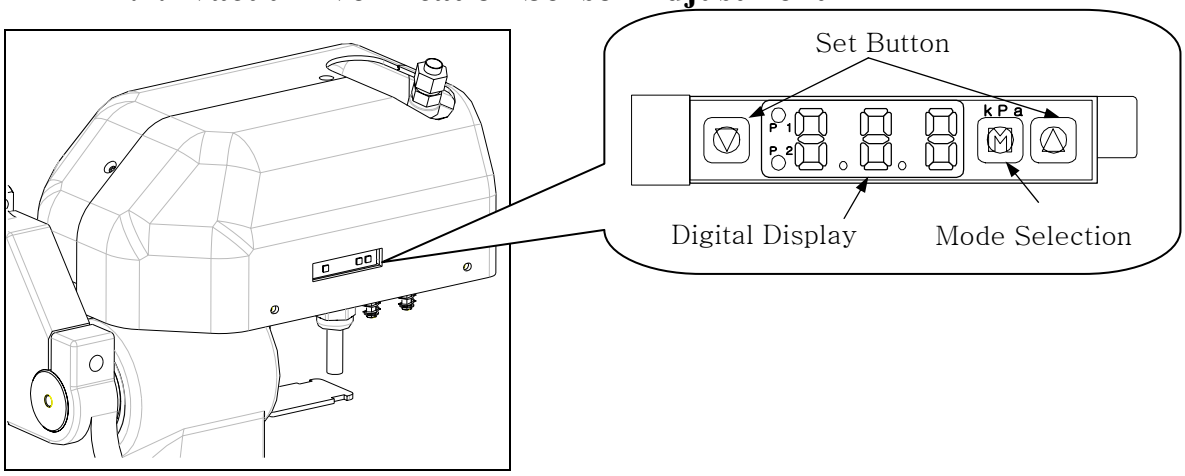
Make sure the robot arm is retracted and in the vertical position.
Beware that the robot may move suddenly as the system is pressurized.

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.

Air supply should be clean and dry

* Remove water from air regulator regularly if required.

2.1.2Vacuum Verification Sensor Adjustment

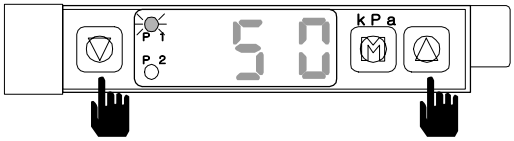


[Valve Box]

Vacuum Sensitivity Adjustment (Normally not required)

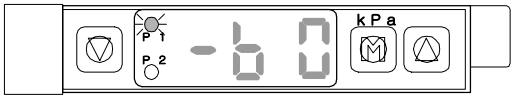
- **STEP 1**

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



- **STEP 2**

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

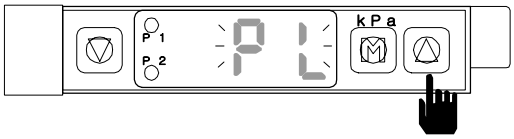


- **STEP 3**

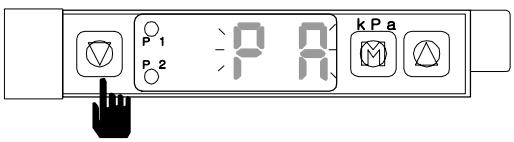
Press [M] more than 1 seconds.
Set up finished, and LED will display current Vacuum pressure.

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.
  - Check angle of rotation and bolts tightness : Check for correct angle of rotation of the arm. Adjust as necessary. Tighten as required.

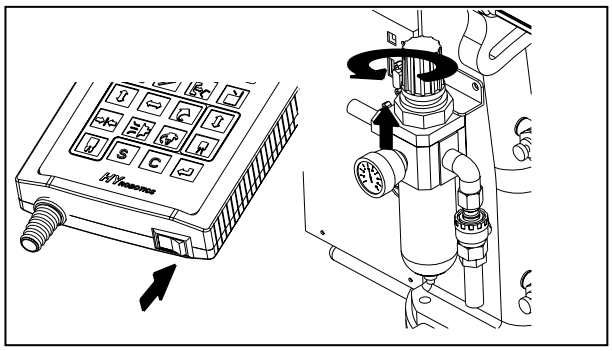
- Monthly
  - Inspecting the filter regulator : Check that the filter regulator is set at the correct pressure. Check the filter and clean or replace it as needed.
  - Checking the solenoid valves : Check that the solenoid Valves are working properly. Replace as needed.
  - Checking all electrical cables : 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

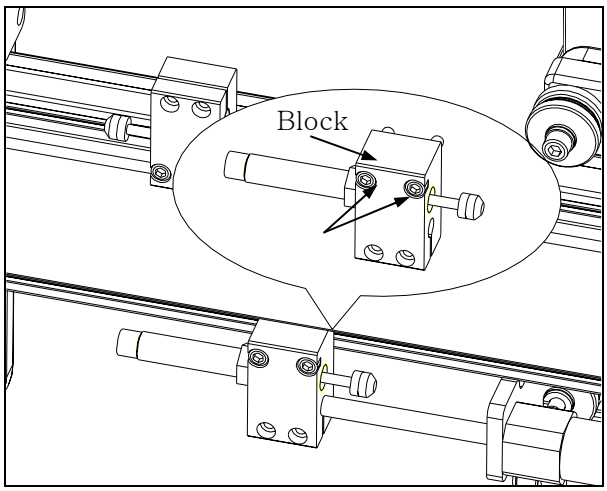
Adjust the location of Kick Cylinder with Kick shock absorber block and bolts

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



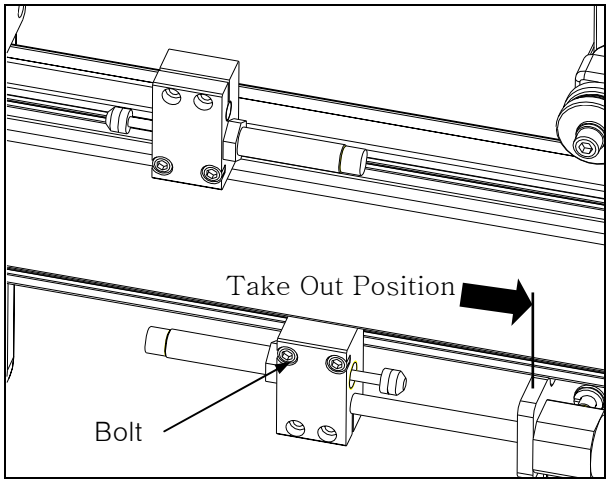
- **STEP 1**

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



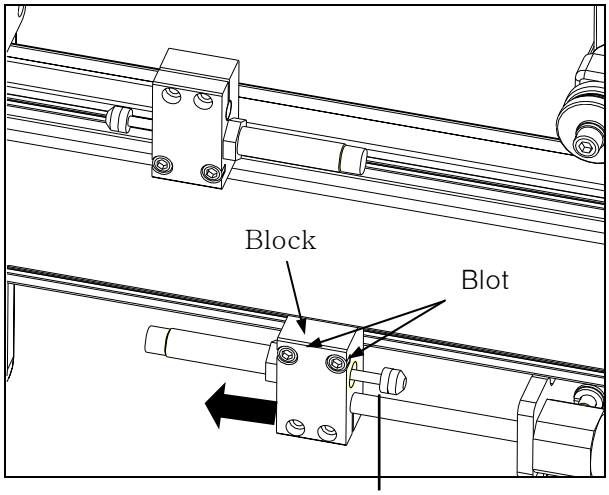
- **STEP 2**

Loosen the bolts



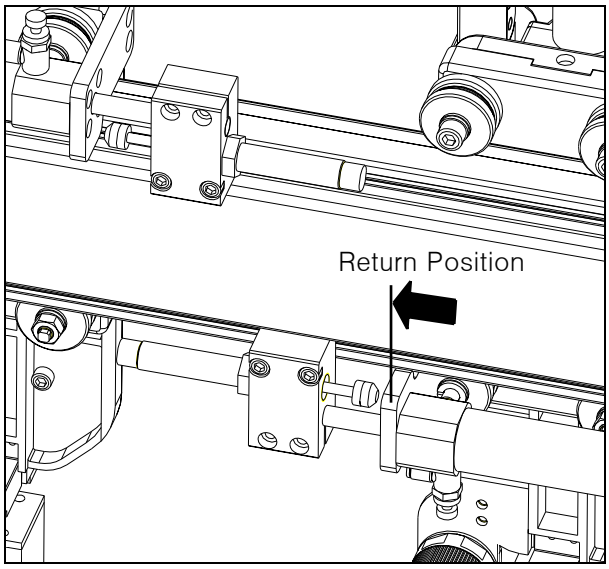
- **STEP 3**

Adjust Block location as figures.



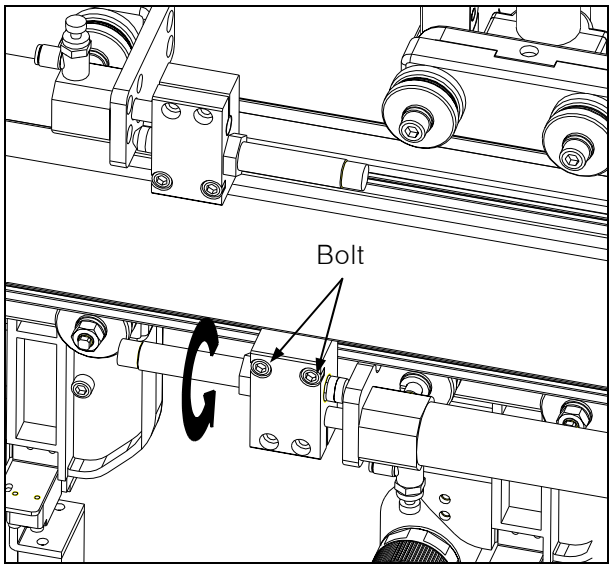
● STEP 4

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



● STEP 5

Loosen the bolts



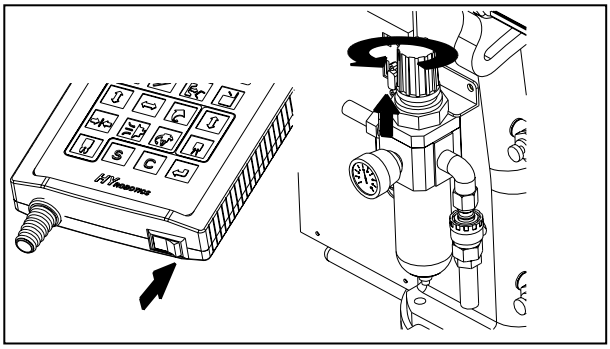
● STEP 6

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

2.4 Down Stroke Adjustment

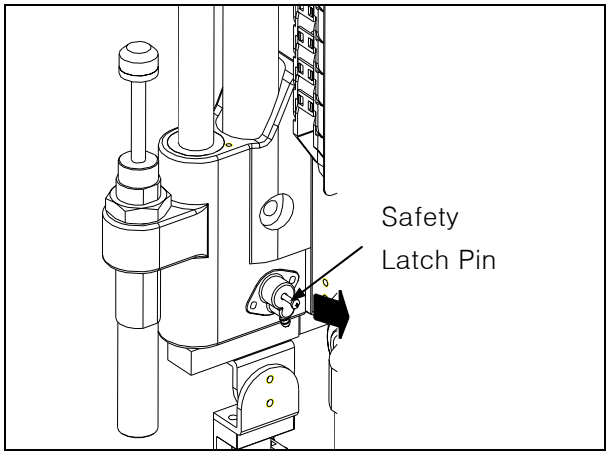
Adjust the stroke for Down Position with Stopper

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



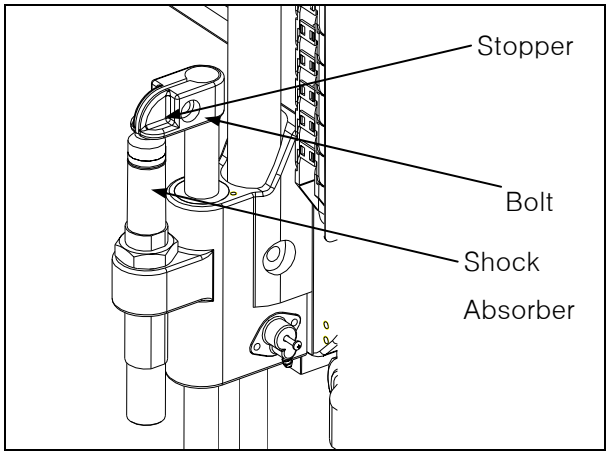
- **STEP 1**

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

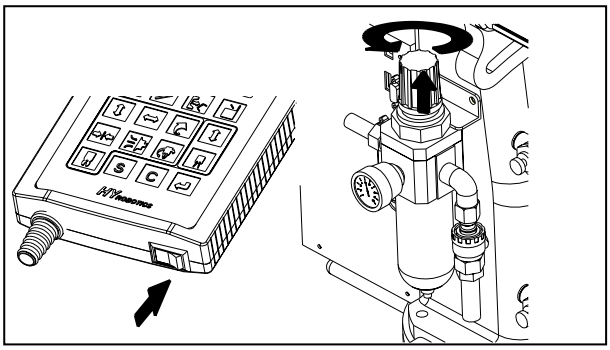


- **STEP 3**

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.

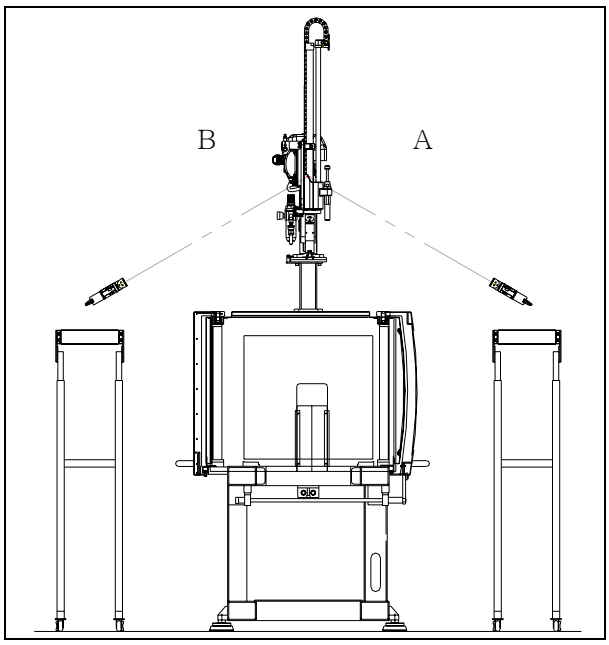
2.5 Swing Direction

Swing angle and direction can be adjusted with Swing cylinder stroke location.



- **STEP 1**

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



- **STEP 2**

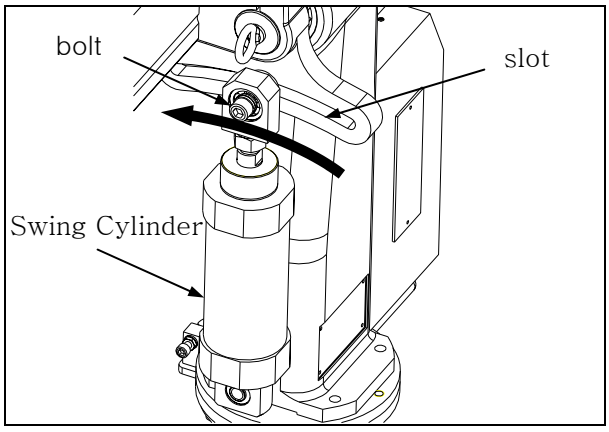
Decide on which side you want to drop the part or sprue.

If necessary, loosen the bolt to change the position of air cylinder from A to B.

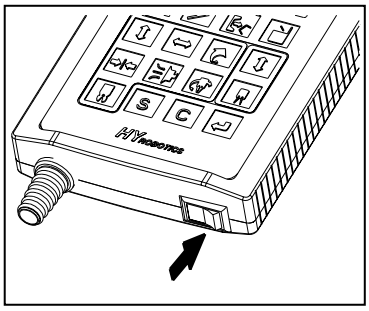
Swing amount may be adjusted by changing position along the slot.

Positioning at the end of the slot will provide less swing than position toward center.

Swing Angle adjustment must be set minimum of a half an inch away from the center of the slot.



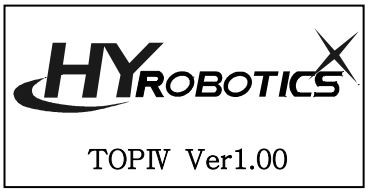
2.6 Speed Control for Down, Swing, Kick

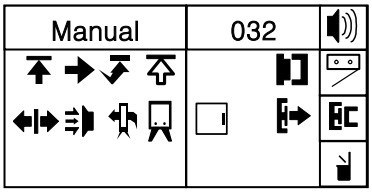


- **STEP 1**

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

Power On.

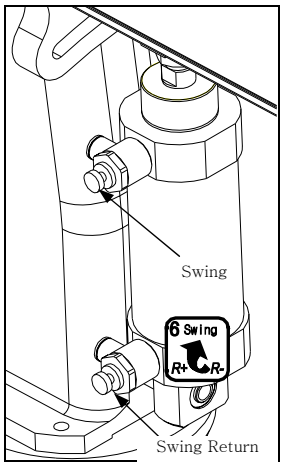




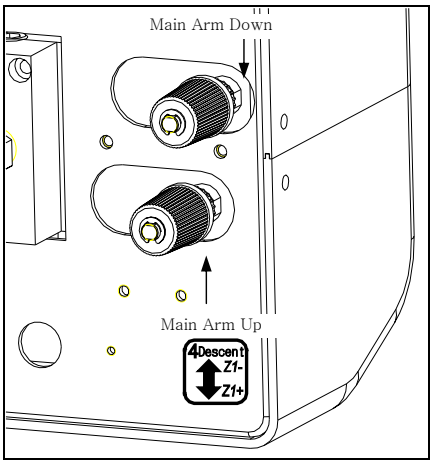
- **STEP 2**

In the manual mode, press each button to operate each axis.
Adjust motion speed with speed control valve (Air flow control valve)

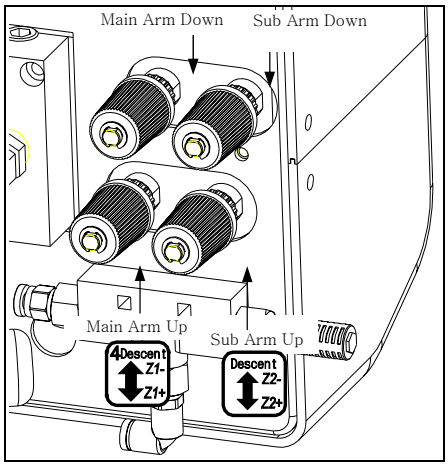
Adjust screw CW for decreasing, CCW for increasing speed.



[ROTATION]



[A, X, XC, XN TYPE]

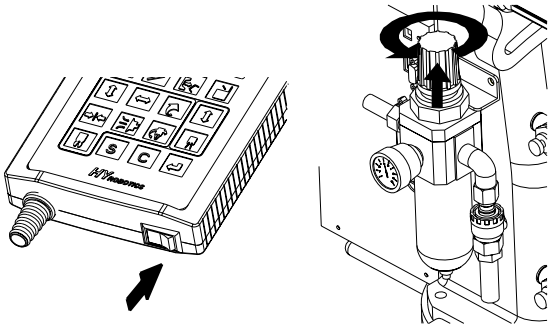


[Twin TYPE]

2.7 Cushion Control for Up, Kick, Swing

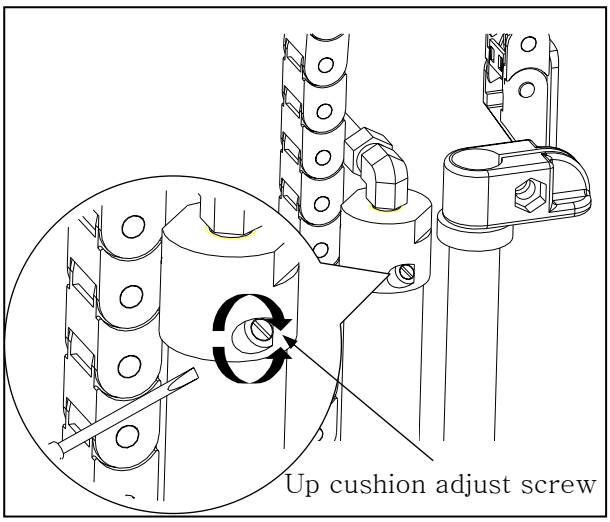
The cushions are adjusted to optimum condition at the factory. You should not need to adjust them If required , follow below step.

> ⚠CAUTION Adjusting Cushion should be done after adjust the speed control



● **STEP 1**

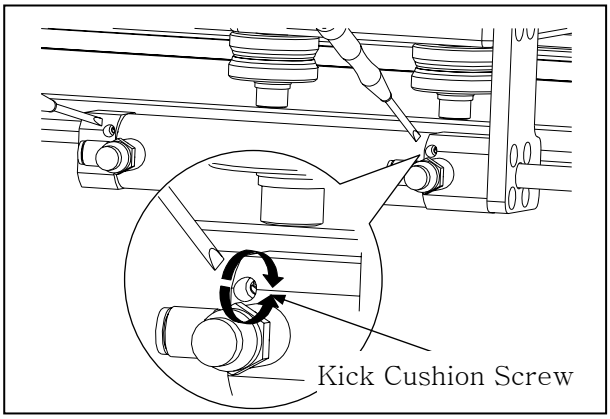
Turn off Power. Supply the air pressure to the system



● **STEP 2**

Up cushion adjust screw will control the shock absorbing ability for Up motion of cylinder

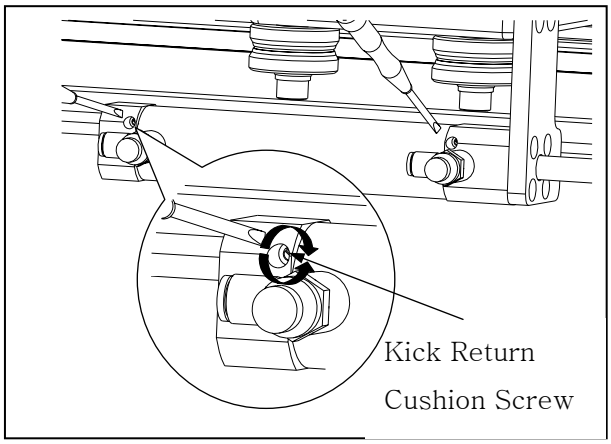
Adjust screw CW for increasing cushion , CCW for decreasing cushion.



● **STEP 3**

Adjust Kick cushion with kick Cushion adjust screw.

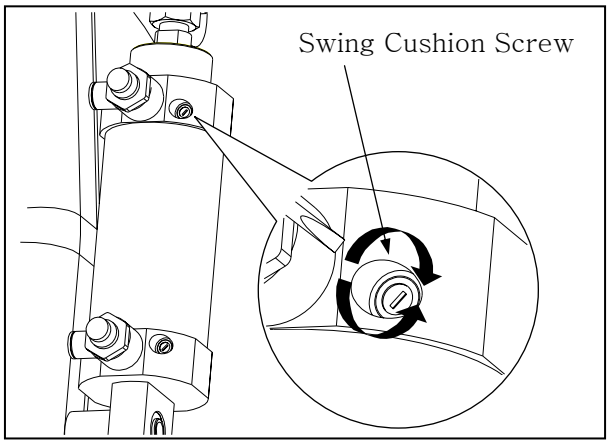
Adjust screw CW for increasing cushion, CCW for decreasing cushion



● STEP 3

Adjust Kick return cushion with kick return Cushion adjust screw.

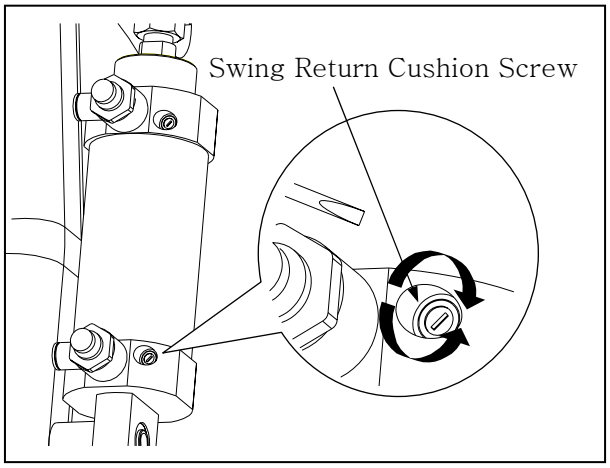
Adjust screw CW for increasing cushion, CCW for decreasing cushion



● STEP 4

Adjust swing cushion with swing cushion adjust screw.

Adjust screw CW for increasing cushion , CCW for decreasing cushion .



● STEP 5

Adjust swing cushion with swing return cushion adjust screw.

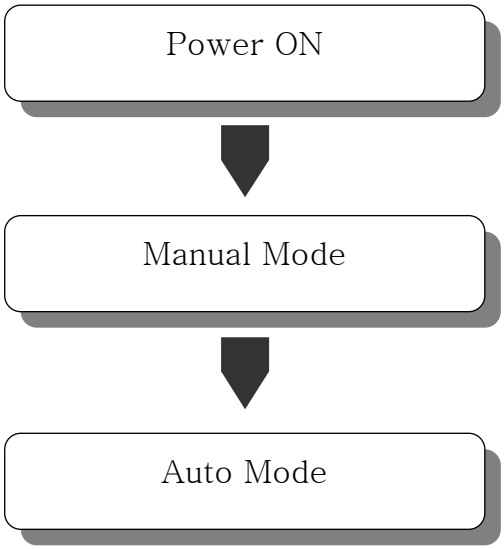
Adjust screw CW for increasing cushion , CCW for decreasing cushion .

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

3 START UP / STOP

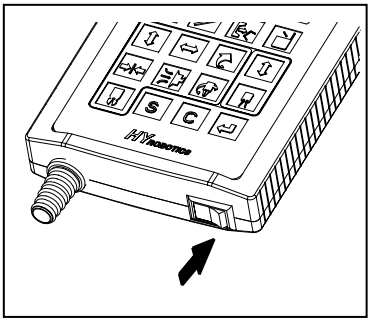
3.1 STEP FOR START-UP

Follow step for Auto Operation



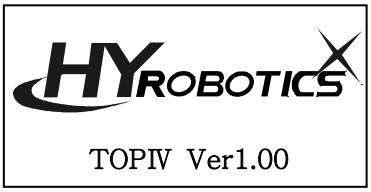
3.2 Start Up

> **NOTICE** Make sure the proper voltage to be supplied to the Robot



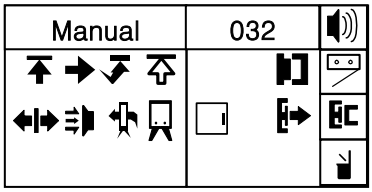
- **STEP 1**

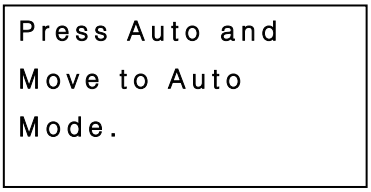
Turn On Power



- **STEP 2**

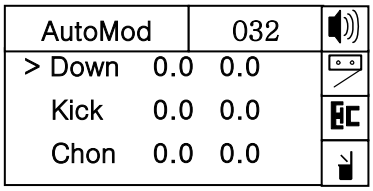
It will display System Version and go to Origin Point and Stop at Manual Mode





- **STEP 3**

Press AUTO CYCLE and move to Auto Mode

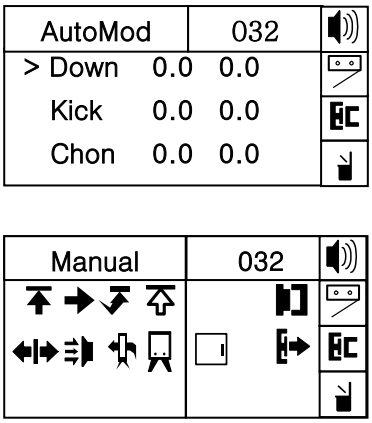


- **STEP 4**

Press AUTO CYCLE to Auto Operation

3.3 Stop Operation

> **⚠ WARNING** Follow the next step to stop the robot. Power off and Disconnect air might able to cause serious problem.



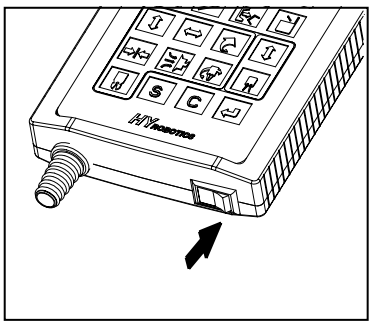
● STEP 1

Press STOP/MANUAL for Auto Mode

It will stop the operation after finish to run last step.. And moves to manual mode.

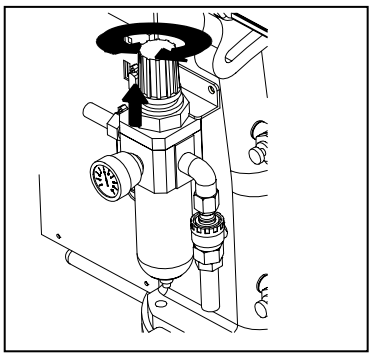
It will not stop in the middle of step . If robot runs any step, it will finish the step and stop before next step. (Due to Pneumatic Operation Pressure)

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



● STEP 2

Turn Off Power.

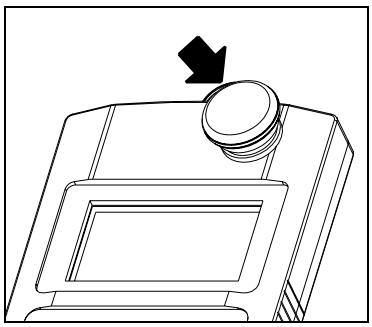


● STEP 3

Disconnect Air Pressure.

3.4 Emergency Stop

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

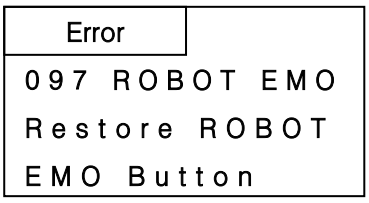


- **STEP 1**

Pressing ROBOT EMO button.

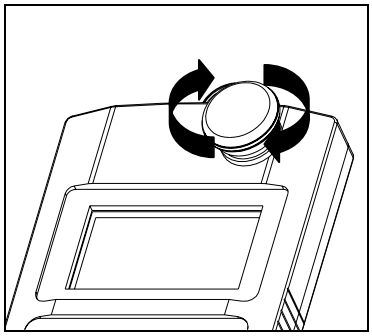
Robot will move to waiting position and stop Operation

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



3.5 Restoring Emergency Stop

⚠WARNING Eliminate Emergency Stop Environment before restoring ROBOT EMO button.



- **STEP 1**

Eliminate Emergency Stop Situation.

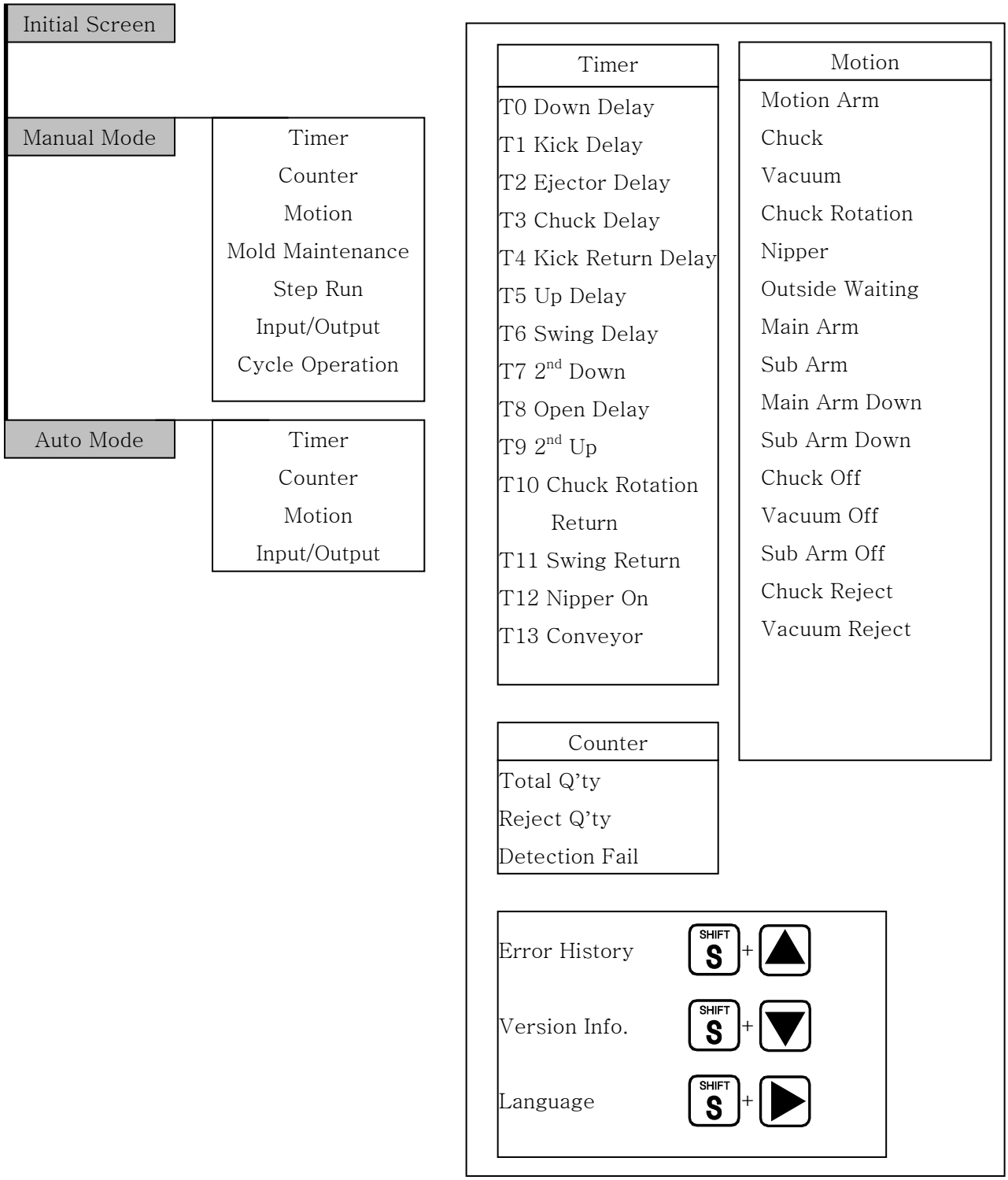
Rotate ROBOT EMO button to Clock Wise.

- **STEP 2**

Press CLEAR C and stop Alarm and Buzzer, moves to Manual Mode

4 OPERATION

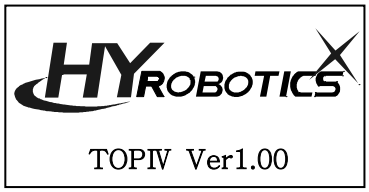
4.1 Screen Structure



4.2 Initial Screen

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

NOTICE Selecting Outside Waiting Option will initiate Robot with Swing Operation.

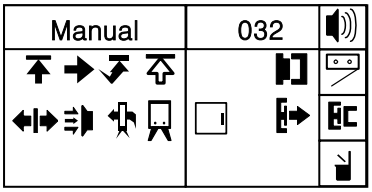


4.3 Manual Operation

(1) Manual Operation Description

Selecting Outside Waiting Option will initiate Robot with Swing Operation

> **⚠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	12		Vacuum On
2		Main Arm Up	13		Vacuum Off
3		Main Arm Up Complete	14		Chuck Rotation
4		Kick	15		Chuck Rotation Return
5		Kick Return	16		Sub Arm Down
6		Swing	17		Sub Arm Up
7		Swing Complete	18		Sub Arm Up Complete
8		Swing Return	19		Sub Arm Kick
9		Swing Return Complete	20		Sub Arm Kick Return
10		Chuck	21		Sub Arm Gripper
11		Chuck Off	22		Sub Arm Gripper Off

Interlock Signal					
Input			Output		
NO	Icon	Description	NO	Icon	Description
1		Full Auto	5		Mold Open/Close Complete Signal
2		Auto Injection	6		Ejector Signal
3		Mold Open Complete			
4		Safety Door			

(2) Button Function in Manual Mode

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

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

NO	Button	Description
1	TIMER / COUNT	Press the Timer button, LCD displays timer mode for delay time settings.
2	SHIFT S + TIMER / COUNT	Press the Timer button with Shift button, (Counter) LCD displays Counter screen , Counter screens display Total Q'ty, Reject Q'ty, Detection Fail.
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 / CYCLE	Press Auto Button LCD displays Auto Mode Screen.
8	SHIFT S + AUTO / CYCLE	Press Auto Button with Shift Button (Cycle) LCD displays One Cycle Operation Screen.
9	SHIFT S + ▲	Press Up Arrow with Shift Button. LCD displays Error History Screen
10	SHIFT S + ▼	Press Down Arrow with Shift Button. LCD displays Rom version Information
12	SHIFT S + ▶	Press Right Arrow with Shift Button. LCD displays the commend in the screen with selected Language.

NO	Button	Description
13		Press Buzzer Button(Only in Manual Mode) LCD Screen displays setting for Buzzer On/Off
14		Press Detection Button with Shift(Only in Manual Mode) On/Off Screen for Parts Verification Function
15		Press Ejector Button(Only in Manual Mode) LCD Screen displays Selection for Ejector Control Function
16		Press Reject Button (Only in Manual Mode) Robot will separate Rejected Part (Signal From IMM)
17		Press Descent Button Move Main Arm Down, Press again, Move Main Arm up.
18		Press Kick Button Move Main Arm Kick, Press again, Move Main arm Kick Return
19		Press Swing Button Robot arm will Swing , Press again, Robot arm swing return
20		Press Chuck Chuck , Press again, Chuck Off
21		Press Suction Suction, Press again, Suction Off
22		Press Chuck Rotation Rotate Chuck, Press again, Chuck Rotate Return
23		Press Descent Button for Sub Arm Move Sub Arm Down, Press again, Move Sub Arm up
24		Press Gripper Grip and Grip Off

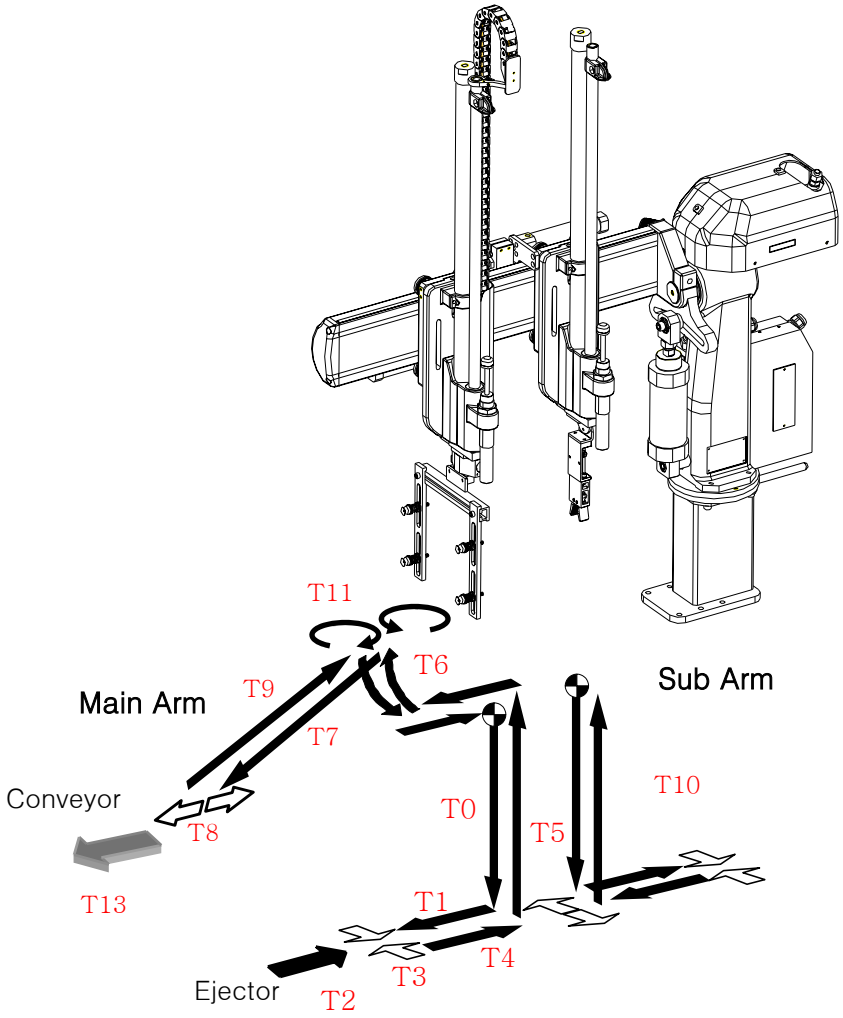
4.3.1 Timer Set Up

(1) Timer 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	032	
T0 Down	0.2	0.0
T1 Kick	0.0 <	0.0
T2 Eject	0.0	0.0



NO	Default (sec)	Name	Display	Description	
T0	0.5	Down	Down	After Mold Open Complete, delay time for move arm down	
T1	0.5	Kick	Kick	After starting Down, Delay time for Kick Movement	
T2	0.5	Ejector	Eject	After starting Kick, Delay time for Ejector Operation	
T3	0.5	Chuck	Chuck	Ejector Function	After Ejector On, Delay time for Chuck On
				No Ejector Fun.	After Kick On, Delay time for Chuck On
T4	0.5	Kick Return	KicRt	After Suction or Grip the Parts, Delay time for Kick Return	
T5	0.5	Up	Up	After Suction or Grip the Parts, Delay time for Up	
T6	0.5	Swing	Swing	After Up Complete, Delay time for Swing Motion	
T7	0.5	2nd Down	2Down	After Swing Complete, Delay time for 2nd Down	
T8	0.5	Open	Open	After Swing Complete, Delay time for Part Open	
T9	0.5	2nd Up	2Up	After Parts Open , Delay time for 2nd Up	
T10	0.0	Chuck Rot Return	CRoRt	After 2nd Up Complete, Delay time for Chuck Rotation Return	
T11	0.5	Swing Return	SwRt	After 2nd Up Complete, Delay time for Swing Return	
T12	0.5	Nipper ON	NipOn	Delay time for Nipper Cutting Operation (With Open Delay)	
T13	3.0	Conveyor	Conve	After 2nd Up, Delay time for Conveyor Operation.	

(2) Timer Button Function

NO	Button	Description
1		'<' key moves up and down to select each Timer.
2	Numeric Key	Displays Delay Time.
3		Press the Enter Button to save the change
4		Cancel the Input
5		Press Stop Button to change to Manual Mode
6		Press Auto Button to change 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 (Kick Delay) to 0.3 Seconds

Timer	032
T0 Down	0.5 < 0.0
T1 Kick	0.5 0.0
T2 Eject	0.5 0.0

- **STEP1**

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

Timer	032
T0 Down	0.5 0.0
T1 Kick	0.5 < 0.0
T2 Eject	0.5 0.0

- **STEP2**

Press [▼] , Move < to the T1 (Kick)

Timer	032
T0 Down	0.5 0.0
T1 Kick	0.5 < 0.3
T2 Eject	0.5 0.0

- **STEP3**

Press [3 ChuRot], input 0.3 sec.

Timer	032
T0 Down	0.5 0.0
T1 Kick	0.3 < 0.3
T2 Eject	0.5 0.0

- **STEP4**

Press the [ENTER] to save the change

Manual	032

- **STEP5**

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

4.3.2Counter

(1) Description

Counter can be viewed and changed using handy controller.

Counter Mode displays Total Production Quantity , Rejected Quantity , Detection Failure Quantity.

Counter	032
>C0 TotQty	10000
C1 RejQty	2
C2 DetFai	3

NO	Name	Description
C0	TotQty	Total Operation (Production) Q'ty : Robot Operation Cycle after Reset
C1	RejQty	Displays Rejected Q'ty (Need Signal from IMM)
C2	DetFai	Detection Failure Q'ty

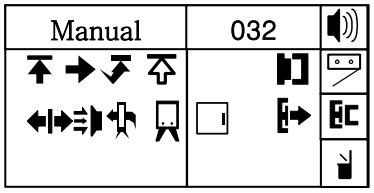
(2) Each Button Function in Counter Mode

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 Operation mode.
4		Press Auto button to back to Auto Operation 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



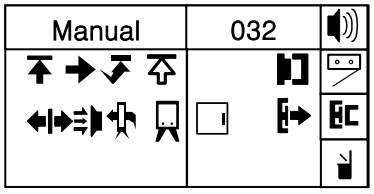
- **STEP1**

Press SHIFT S, TIMER COUNT at the same time displays Counter Screen.

Counter	032
>C0TotQty	10000
C1 Reject	2
C2 DetFai	3

- **STEP2**

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



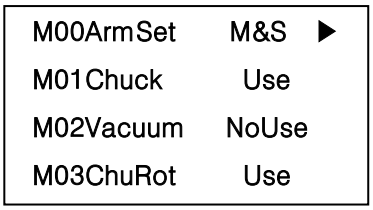
- **STEP3**

Press STOP MANUAL displays manual mode

4.3.3Mode

(1) Mode description

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



NOTICE

The below icons uses for robot motion in this book .


Origin


Chuck


Chuck Off


Vacuum

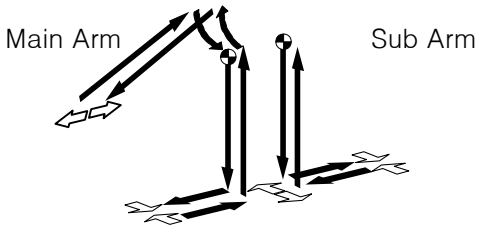
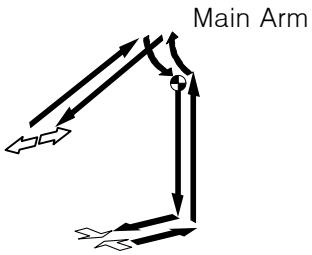
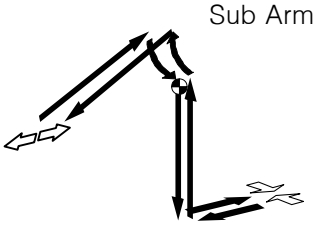

Vacuum Off

① Robot Arm Setting

Setting for Take-Out Motion Arm. Default setting is “M&S”. [This setting required in only Twin]

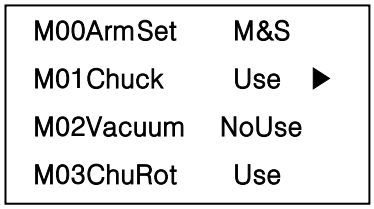
> **NOTICE** After Main arm Down, pressing Kick button in MainSub Arm Setting will operate only Main arm Kick Motion.

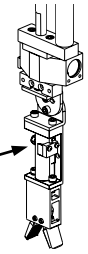
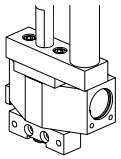
M00Arm Set	M&S ▶
M01Chuck	Use
M02Vacuum	No Use
M03ChuRot	No Use

Name	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 Chuck

Setting for using Chuck Operation for Take Out, Default setting is Use.



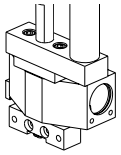
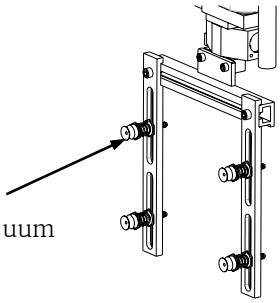
Name	Description	Motion
Use (=Default)	Take out Parts with Chuck Operation	Chuck 
NoUse	Take Out Parts without Chuck Operation (Vacuum)	

③ Vacuum

Setting for using Vacuum Operation for Take Out, Default setting is No Use.

[This function is only for XC type and Twin]

M00ArmSet	M&S
M01Chuck	Use
M02Vacuum	NoUse ▶
M03ChuRot	Use

Name	Description	Motion
NoUse	Take Out Parts without Vacuum Operation (Using Chuck).	
Use (=Default)	Take Out Parts with Vacuum Operation.	

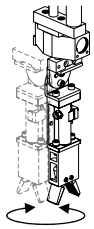
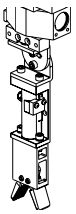
④Chuck Rotation

Setting for using Chuck Rotation Operation, Default setting is Use.

[This function is only for X, XC type and Twin]

> **NOTICE** In Twin Robot, When Arm Set is “MainSub”, Both arm should be Move to the End of Axis (Kick) in order to operate Chuck Rotation.

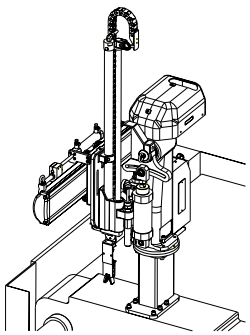
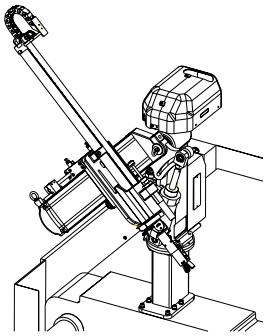
M00ArmSet	M&S
M01Chuck	Use
M02Vacuum	NoUse
M03ChuRot	Use ▶

Name	Description	Motion
Use (=Default)	Use Chuck Rotation (If parts is wide attached with sprue, taking out parts with sprue and Open after chuck rotation will be a good application for use this function)	
No Use	Chuck Rotation is not in Use mode	

⑤Outside Waiting

The Robot can wait at the outside position with swing until mold completely open when other auxiliary attached movable platen (Clamp Side Mold) . After mold completely open, robot arm will swing and descent to take out parts. Default setting is No Use

M05OutWai	NoUse ▶
M06M-Arm	LType
S-Arm	LType
M07MArmDn	Nozzl

Name	Description	Motion
No Use (=Default)	Waiting without swing until mold open complete	
Use	Waiting with swing until mold open complete	

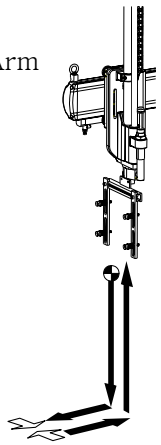
⑥Main Arm and Sub Arm

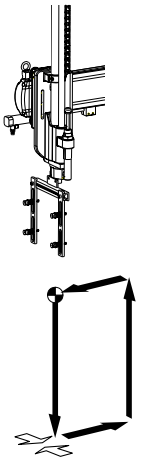
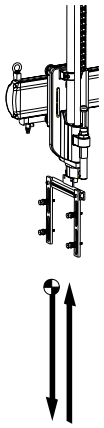
*Main Arm (M-Arm)

Setting Arm whether will Down, Kick, Grip (L Type) or Down Grip and Kick Return (U Type). Default Setting is L Type.

> **NOTICE** With Down of Main Arm and Sub Arm, Kick motion is moving to Parts, and Kick Return Motion is Moving back to Up Position.

M05OutWai	NoUse	
M06M-Arm	LType	▶
S-Arm	LType	
M07MAinDn	Nozzl	

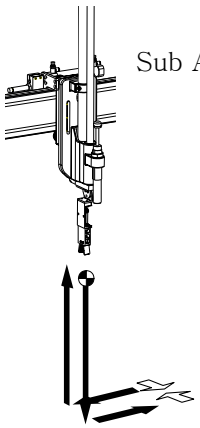
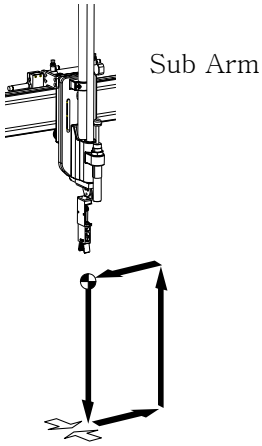
Name	Description	Motion
L Type (=Default)	Down, Kick, Chuck or Suction, Kick Return, Up.	Main Arm 

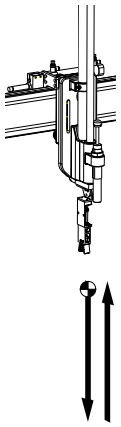
U Type	Down, Chuck or Suction, Kick Return, Up. Kick	Main Arm 
I Type	Decent, Chuck, Up	Main Arm 

*Sub Arm [Only in Twin Type]

Setting Arm whether will Down, Kick, Grip (L Type) or Down Grip and Kick Return (U Type). Default Setting is L Type.

M05OutWai	No Use	
M06M-Arm	LType	
S-Arm	LType	▶
M07MArmDn	Nozzle	

Name	Description	Motion
L Type (=Default)	Down, Kick, Chuck, Kick Return , Up.	
U Type	Down, Chuck, Kick Return, Up, Kick	

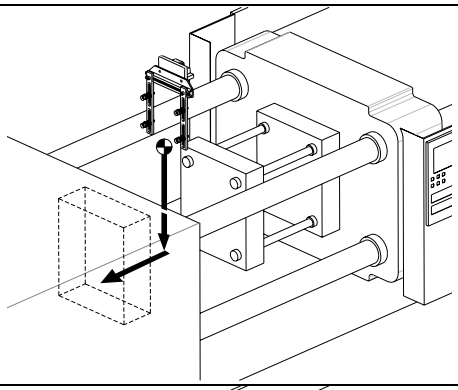
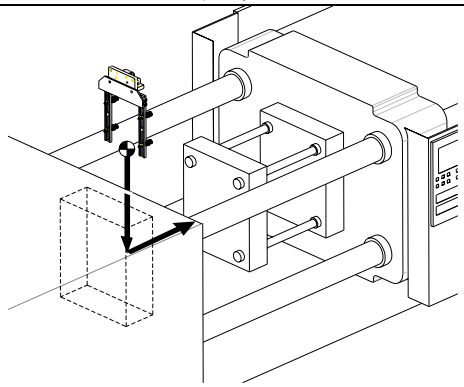
I Type	Down, Chuck, Up.	 Sub Arm

⑦ Main Arm Down (MarmDn) and Sub Arm Down (SArmDn)

*Main Arm Down

Setting Main Arm Down Position to Nozzle Side Mold Platen or Clamp Side Mold Platen

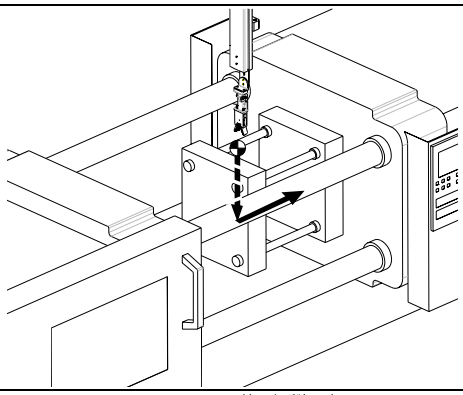
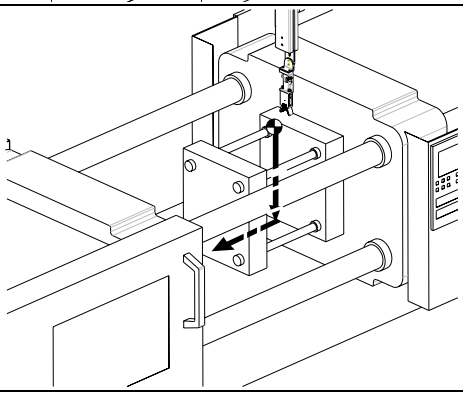
M05OutWai	NoUse
M06MArmDn	LMotion
SArmDn	LMotion
M07MainDst	Nozzle ▶

Name	Description	Motion
Nozzle (=Default)	MainArm will descent at the Nozzle Side	
Clamp	MainArm will descent at the Clamp Side	

*Sub Arm Down

Setting Sub Arm Down Position to Nozzle Side Mold Platen or Clamp Side Mold Platen

	SADown	Clamp ▶
	M08ChuOff	2 Dst
	M09VacOff	2 Ast
	M10SChOff	InMold

Name	Description	Motion
Clamp (=Default)	SubArm will descent at the Clamp Side	
Nozzle	SubArm will descent at the Nozzle Side	

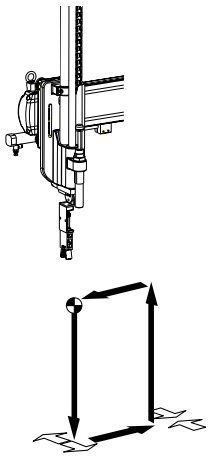
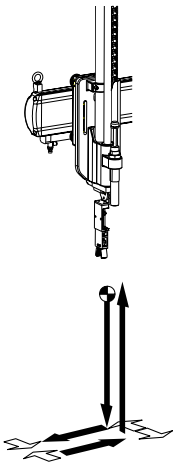
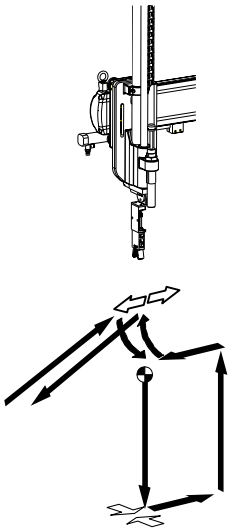
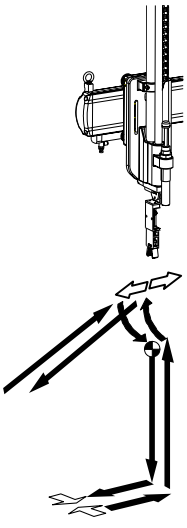
⑧ Chuck Off

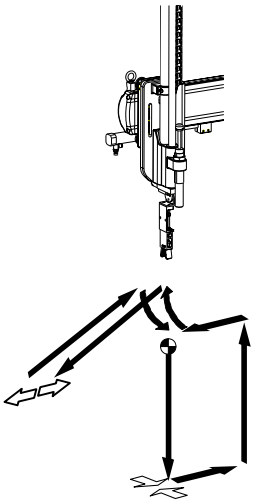
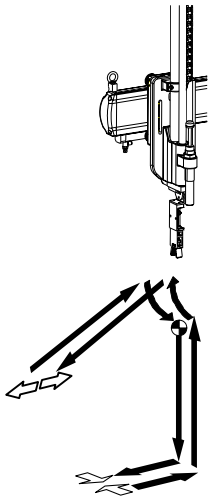
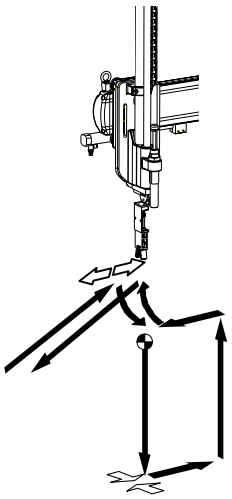
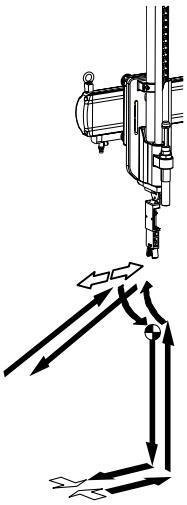
Setting the step of Part Open in Normal Production (No Rejected Parts from IMM.), Default is 2nd Down.

NOTICE

When use Chuck and Suction motion at the same time and if Chuck Release Motion and Suction Release step is different, there will be different Delay time

SArmDn	Clamp
M08ChuOff	2Down ▶
M09VacOff	2Down
M10SChOff	In Mold

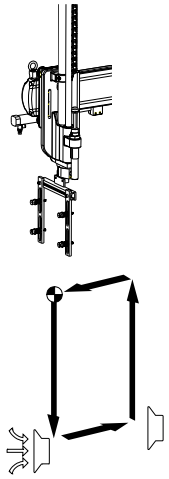
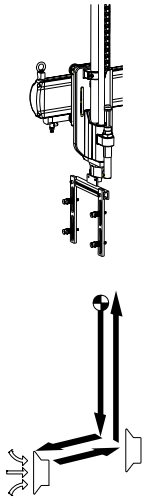
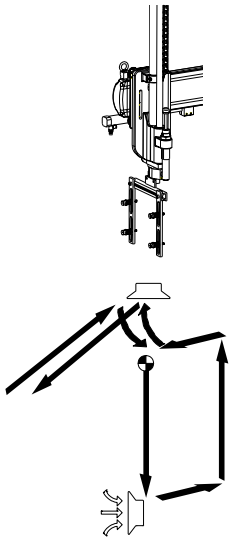
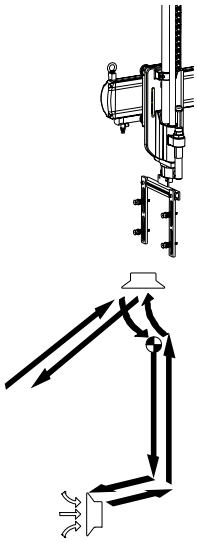
	U Type	L Type
In Mold		
OutSid		

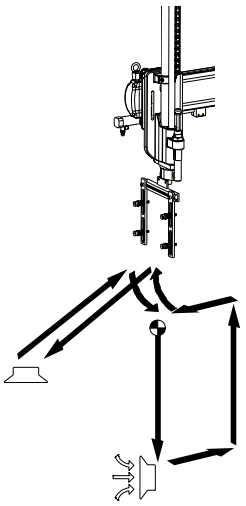
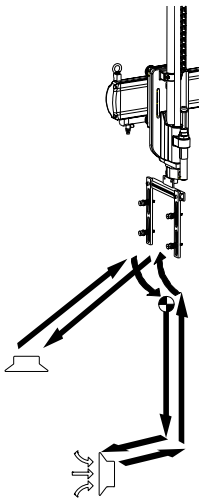
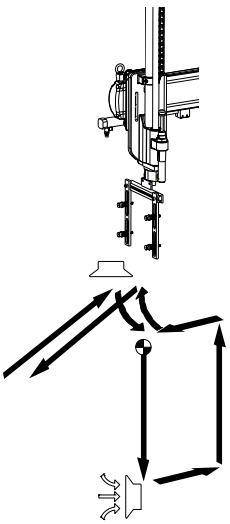
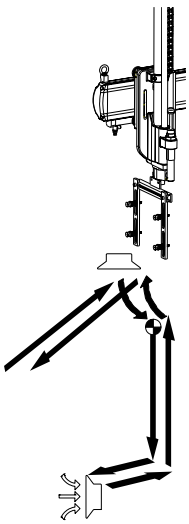
2Down (=Default)		
2Up		

⑨ Vacuum Off

Setting the step of Vacuum Off in Normal Production (No Rejected Parts from IMM.), Default is 2nd Down. [XC, Twin Type Only]

SArmDn	Clamp
M08ChuOff	2Down
M09VacOff	2Down▶
M10SChOff	In Mold

	U Type	L Type
In Mold		
OutSid		

2nd Down (=Default)		
2nd Up		

⑩ Sub Chuck Off

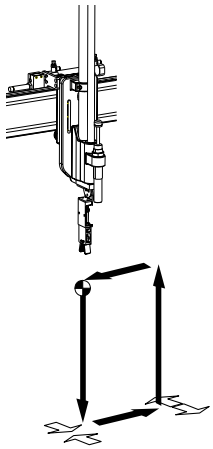
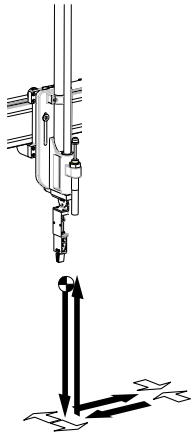
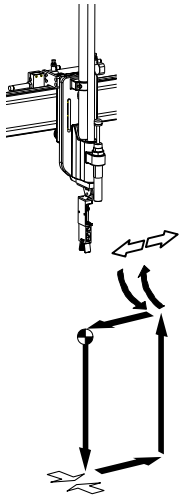
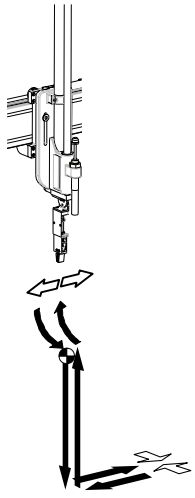
Setting Sub Chuck Off Position (Twin Type Only)

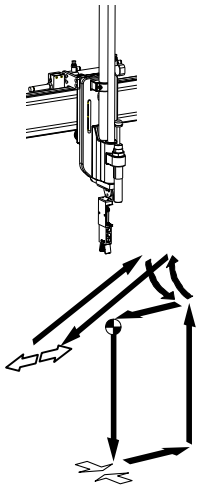
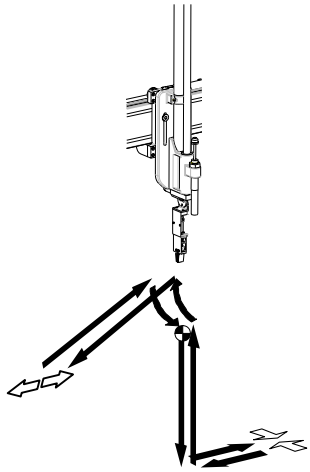
NOTICE

Sub Arm Gripper releases with Chuck when Chuck is in Use Mode

Sub Arm Gripper releases with Vacuum when Chuck is Not in Use Mode.

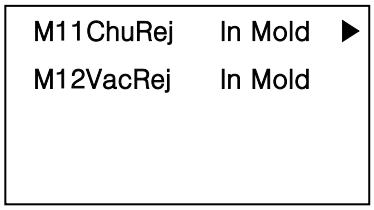
SArmDn	Clamp
M08ChuOff	2 Des
M09VacOff	2 Des
M10SChOff	In Mold ▶

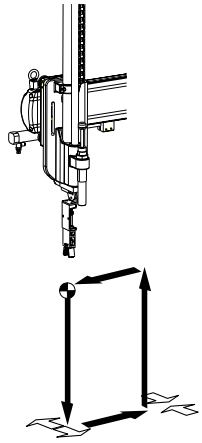
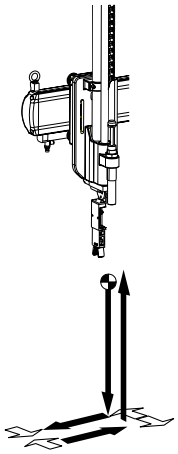
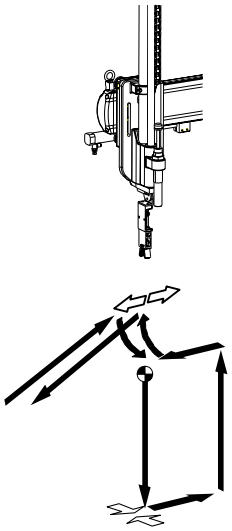
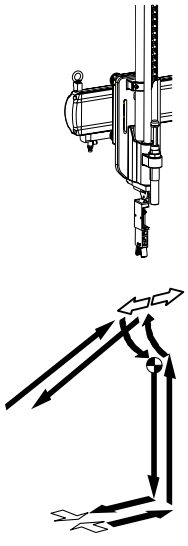
	U Motion	L Motion
In Mold (=Default)		
OutSid		

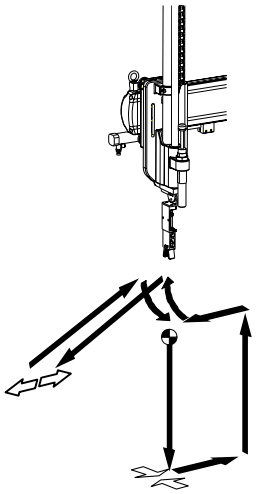
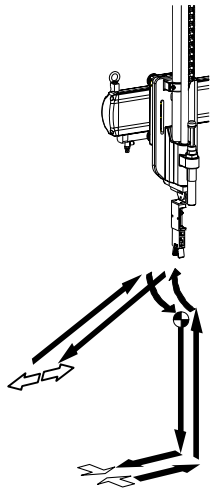
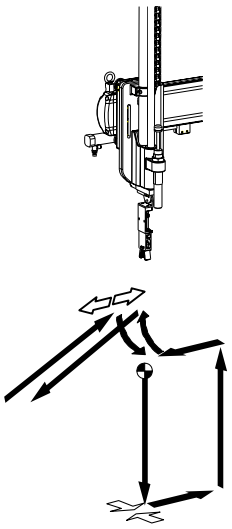
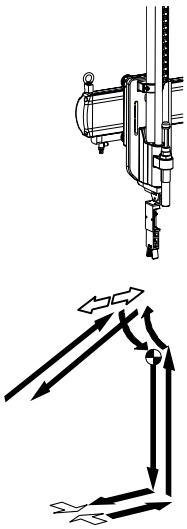
2nd Down		

⑪ Chuck Reject

Setting the Chucking Reject Open Location when reject signal received from IMM, Default set is In Mold

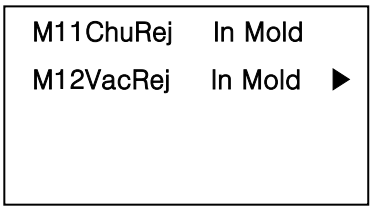


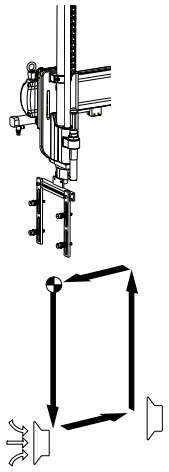
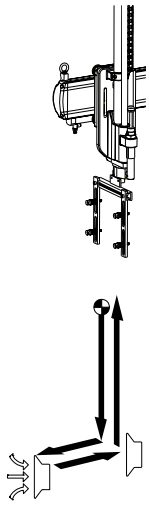
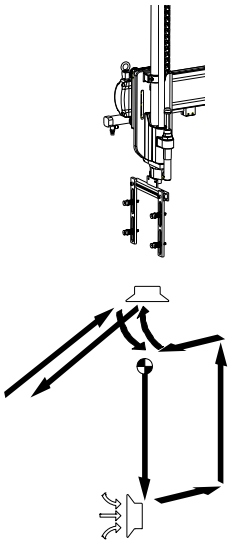
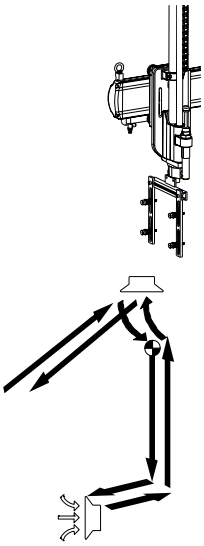
	U Motion	L Motion
In Mold (=Default)		
OutSid		

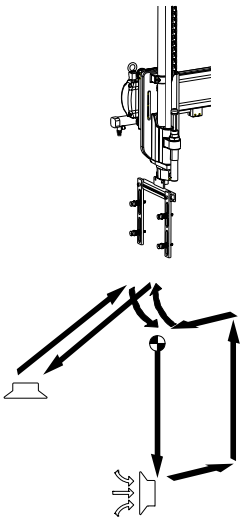
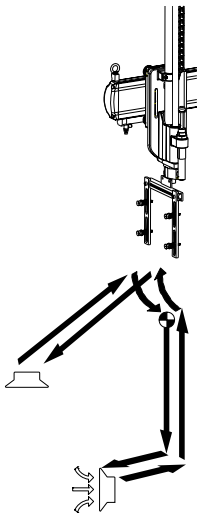
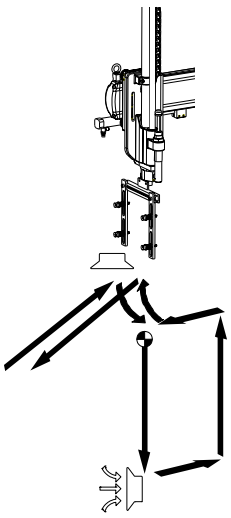
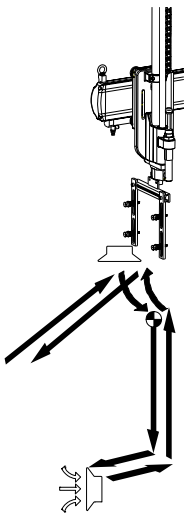
2nd Down		
2nd Up		

⑫ Vacuum Reject

Setting the Chucking Reject Open Location when reject signal received from IMM, Default set is In Mold [For XC, Twin type]



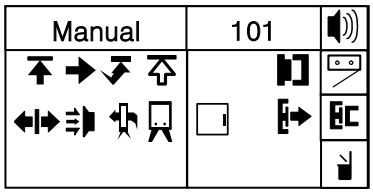
	U Motion	L Motion
In Mold (=Default)		
OutSid		

2nd Down		
2nd Up		

(2) Each Button Function in the Mode

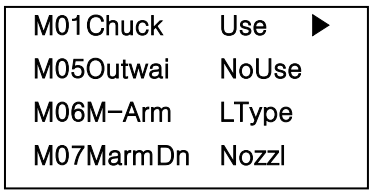
NO	Button	Description
1		Pressing Up and Down arrow key will scroll '▶' icon and select line
2		Press Right and Left arrow key will change Mode / Setting and Blink '▶' icon
3	Numeric Key	For Input Numeric Number
4		Pressing Enter key will stop Blinking of the '▶' icon and save input data
5		Stop Auto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

(3) Mode Confirmation



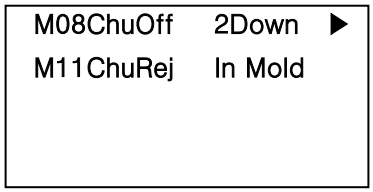
- **STEP1**

Press MODE/MOLD , will move to mode screen from Manual Mode.



- **STEP2**

Press ▼ , "▶" icon will scroll down.



- **STEP3**

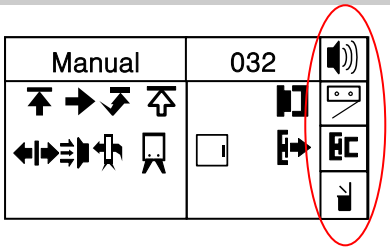
Confirm Robot Operation in Mode and Press STOP/MANUAL will move to manual mode.

NOTICE

Pressing MODE/MOLD while in Auto Mode, will move to Mode screen, and Press AUTO/CYCLE move back to Auto Mode

4.3.4Mode Setting 2

NOTICE To use “Reject Release Motion” Contact Factory.



NO	Button	Screen		Description
		Use	No Use	
1	7 Buzzer			Buzzer On or Off [Change only in Manual Mode]
2	SHIFT S + 8 Detection			Detection function On or Off [Change only in Manual Mode]
3	9 Eject			Ejector Control On or Off [Change only in Manual Mode]
4	Reject			Reject Motion On or Off [Change only in Manual Mode]

4.3.5Creating Mold File

(1) Mold Search Description

Search Mold Number

MoldNo	032
Input Mold Number to Search 0 0 0	

(2) Each Button Function in Mold search Mode

NO	Button	Description
1	Numeric Key	Input Mold Number
2		Change to Manual Mode
3		Cancel the Input Number
4		Change to Mold Maintenance Screen with selected Number

(3) Mold Maintenance

Select , Create and Delete Mold File

MoldMgr	032
>00 FREE MODE	
22 MOLD22	
23 MOLD23	

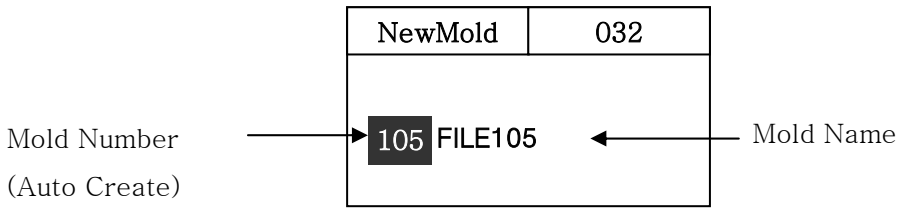
(4) Each Button Function in Mold Maintenance Screen

NO	Button	Description
1		Select 0 file can create any motion pattern and mode to create by user and move to New Mold Screen and save with Mold Number and name. 1~99: Basic Motion Pattern which is in system 100~999: User can create motion pattern.
2		Move to Manual Operation 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.

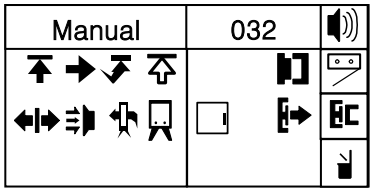


(6) Button Function in New Mold

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

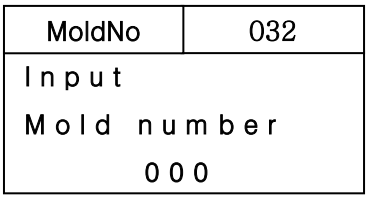
(7) Creating Mold File

Creating Mold file with new motion pattern



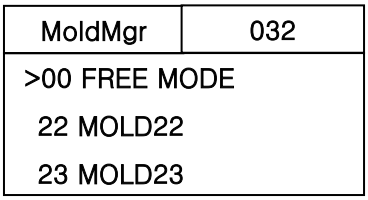
- **STEP 1**

Press SHIFT S + MODE MOLD and move to mold search Screen



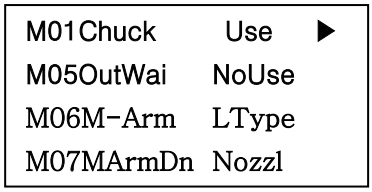
- **STEP 2**

Press ENTER to change mold maintenance mode.



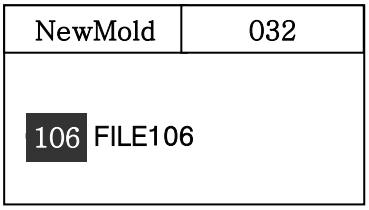
- **STEP3**

Move cursor ">" to 00 and press ENTER.



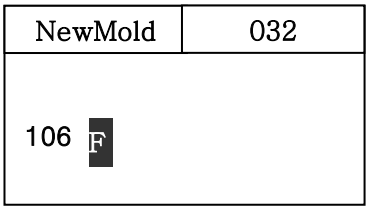
- **STEP 4**

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



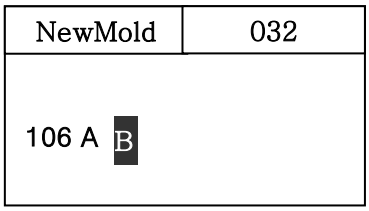
- **STEP 5**

Input Mold Number with Numeric Key and Press ENTER to save data.



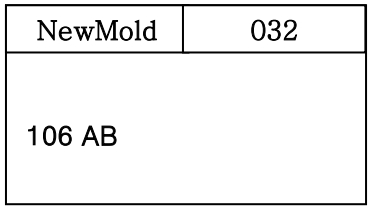
- **STEP 6**

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



- **STEP 7**

Press ▲▼, select Character
It will displays A~Z, 0~9, _, -,

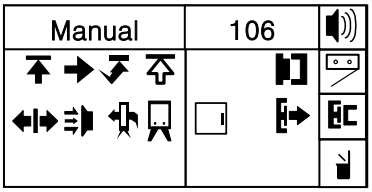


- **STEP 8**

Press ▶ move to next Character, Press ENTER to save data.

NOTICE

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



- **STEP 9**

Press STOP MANUAL will create mold name, save and move to manual mode.

4.3.6 Delete Mold File

(1) Delete Mold File

Delete Mold File that created before .

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

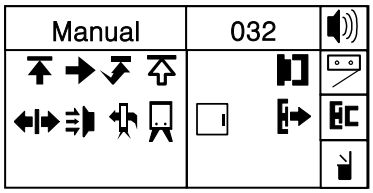
Selected Mold File →

MoldDel	032
105 FILE105	
Delete?	
[Y(↵)/N(Stop)]	

(2) Button function in Mold Delete Mode

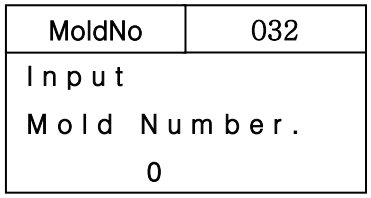
NO	Button	Description
1	ENTER	Delete Mold Selected file and move to manual mode.
2	STOP MANUAL	Cancel operation and Move to manual mode

(3) Delete Mold File



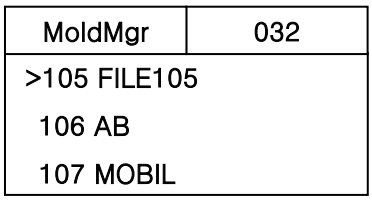
● **STEP 1**

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



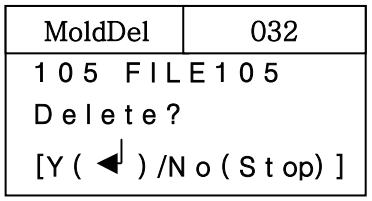
● **STEP 2**

Press ENTER and move to mold maintenance screen.



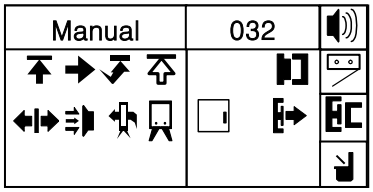
● **STEP 3**

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

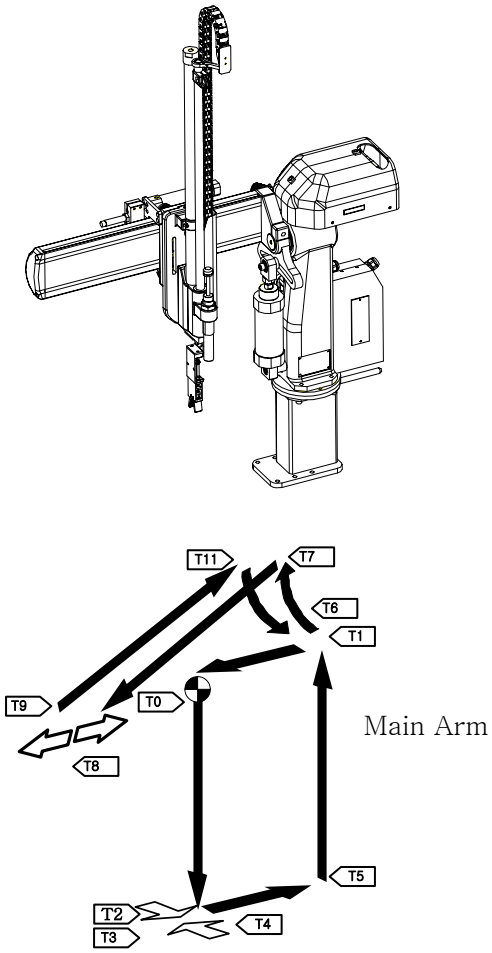
4.3.7Setting Basic Motion Pattern

(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

[A, X, XC, XN, Twin] type Motion

22 U	Main Arm Only
Robot Operation	

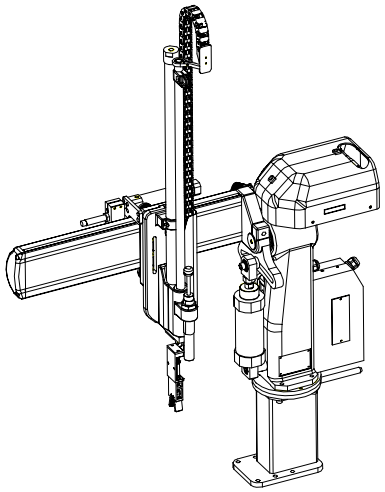


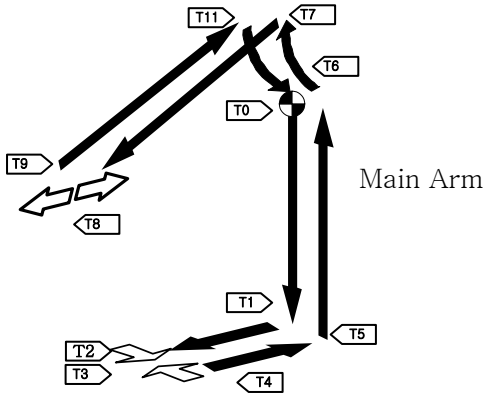
Screen

OutWai	NoUse	▶
MarmDn	Clamp	
ChuOff	Nozzl	

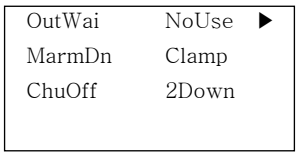
32 L	Main Arm Only

Robot Operation





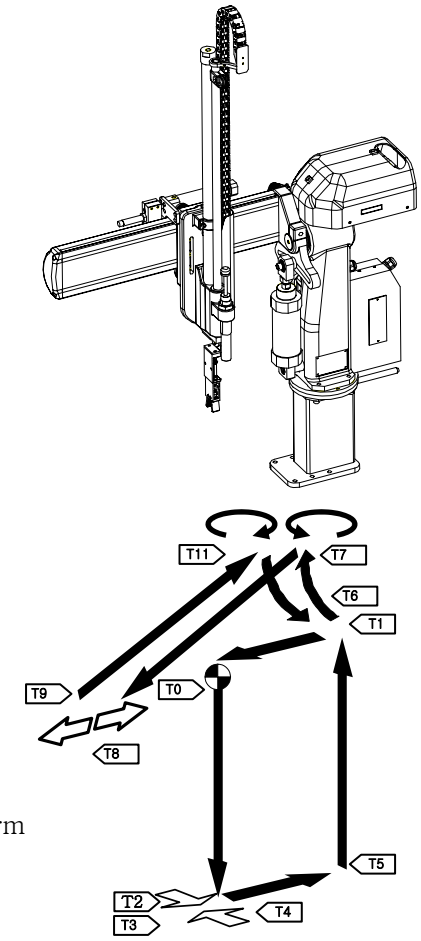
Screen



[X, XC, Twin] type Motion

23 U_X	Main Arm Only

Robot Operation



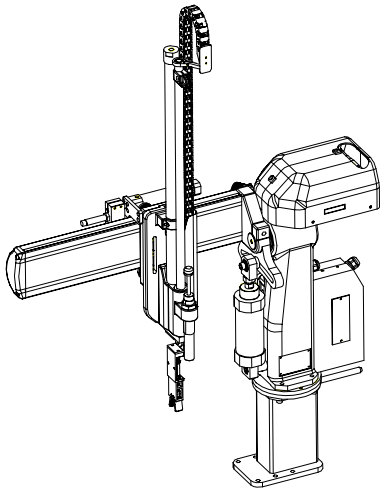
Main Arm

Screen

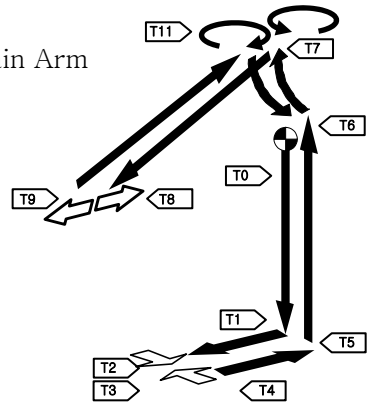
OutWai	NoUse	▶
MArmDn	Clamp	
ChuOff	2Down	

33 L_X	Main Arm Only

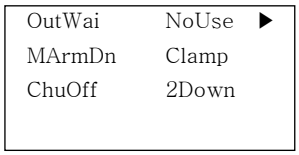
Robot Operation



Main Arm



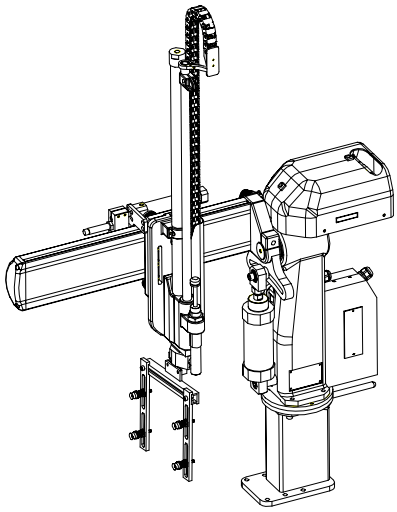
Screen

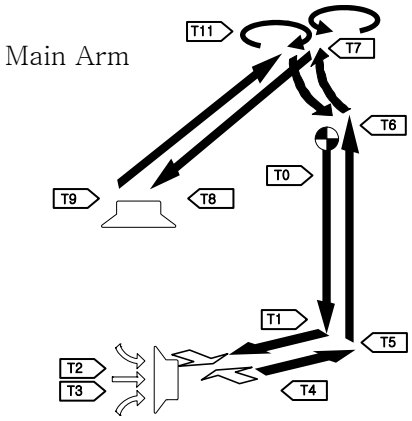


[XC, Twin] type Motion

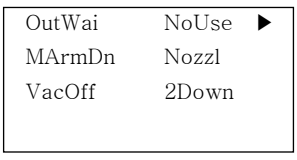
36 U_X_V	Main Arm Only

Robot Operation



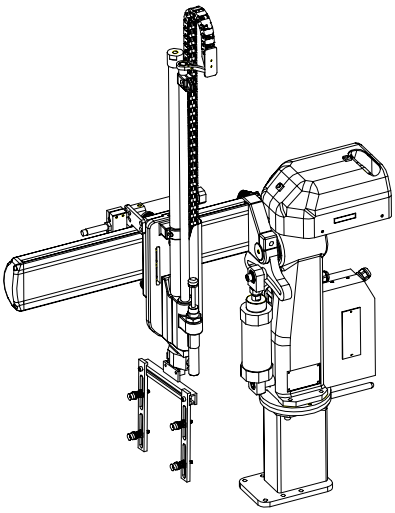


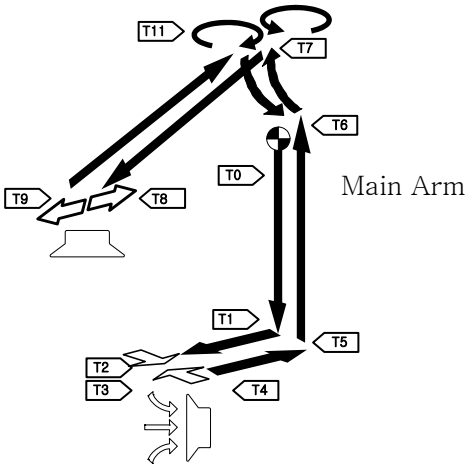
Screen



37 L_X_V	Main Arm Only

Robot Operation





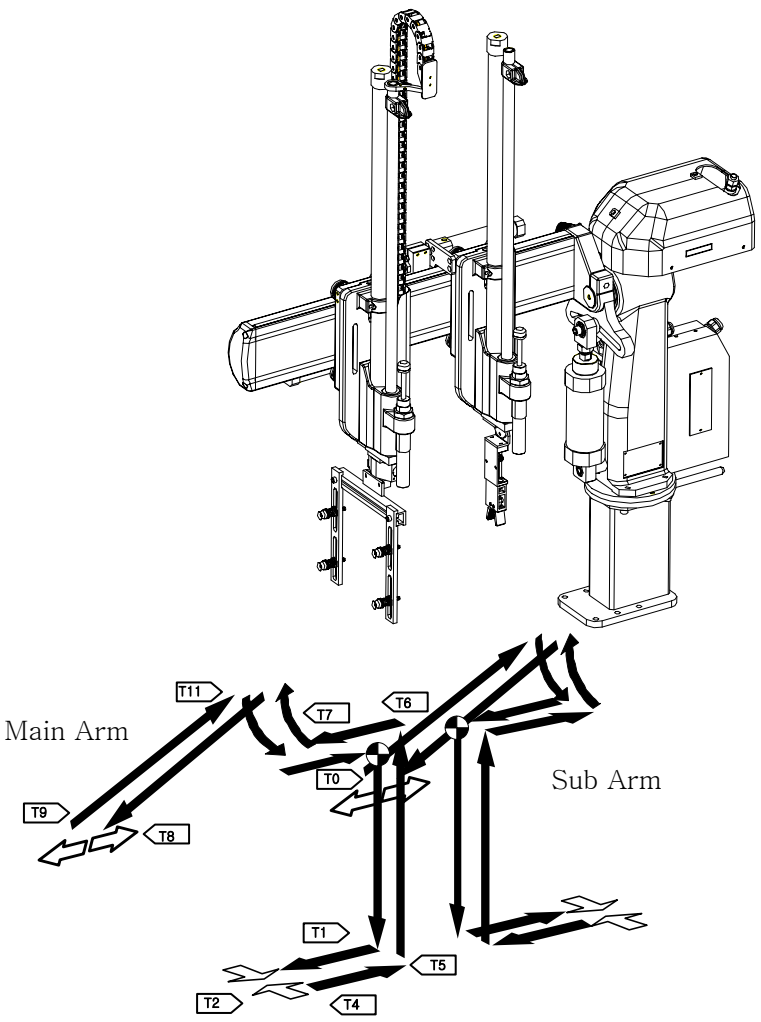
Screen

OutWai	NoUse	▶
MArmDn	Nozzl	
ChuOff	2Down	
VacOff	2Down	

[Twin] type Motion

40 D_L	Main & Sub

Robot Operation

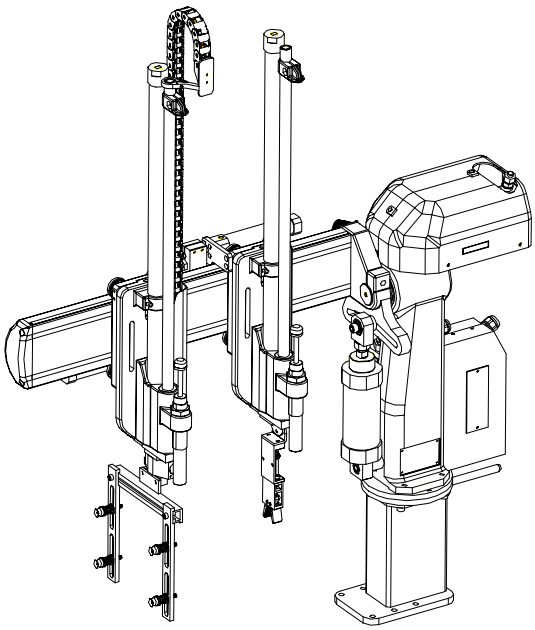


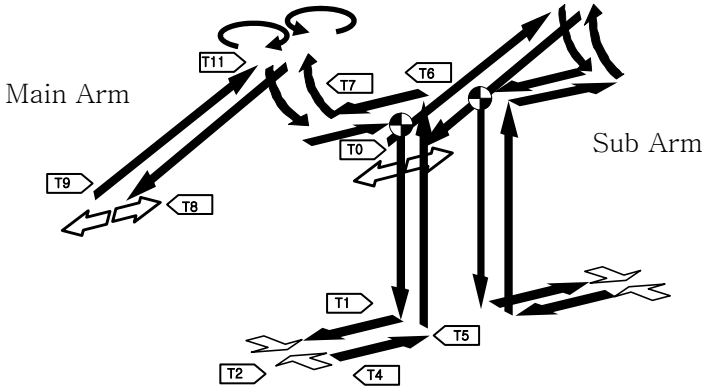
Screen

OutWai	NoUse ▶
MArmDn	Nozzl
SArmDn	Clamp
SAOff	2Down

41 D_L_X	Main & Sub

Robot Operation



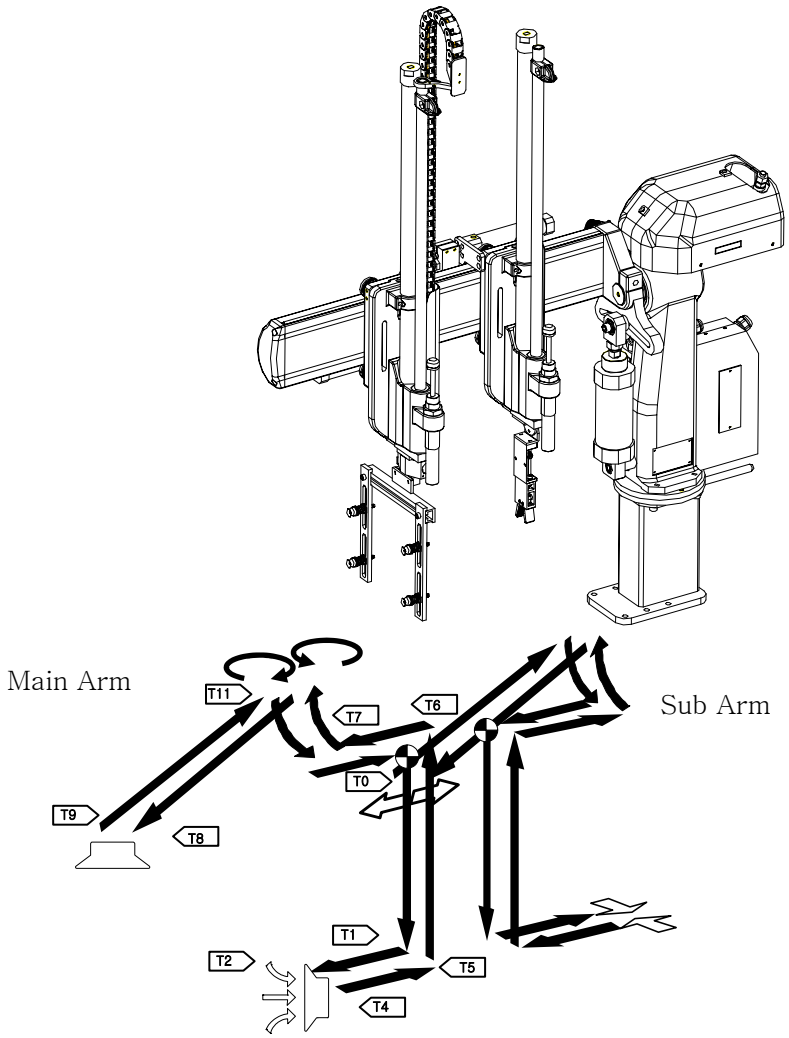


Screen

OutWai	NoUse ▶
MArmDn	Nozzl
SArmDn	Clamp
SAOff	2Down

43 D_L_X_V	Main & Sub

Robot Operation

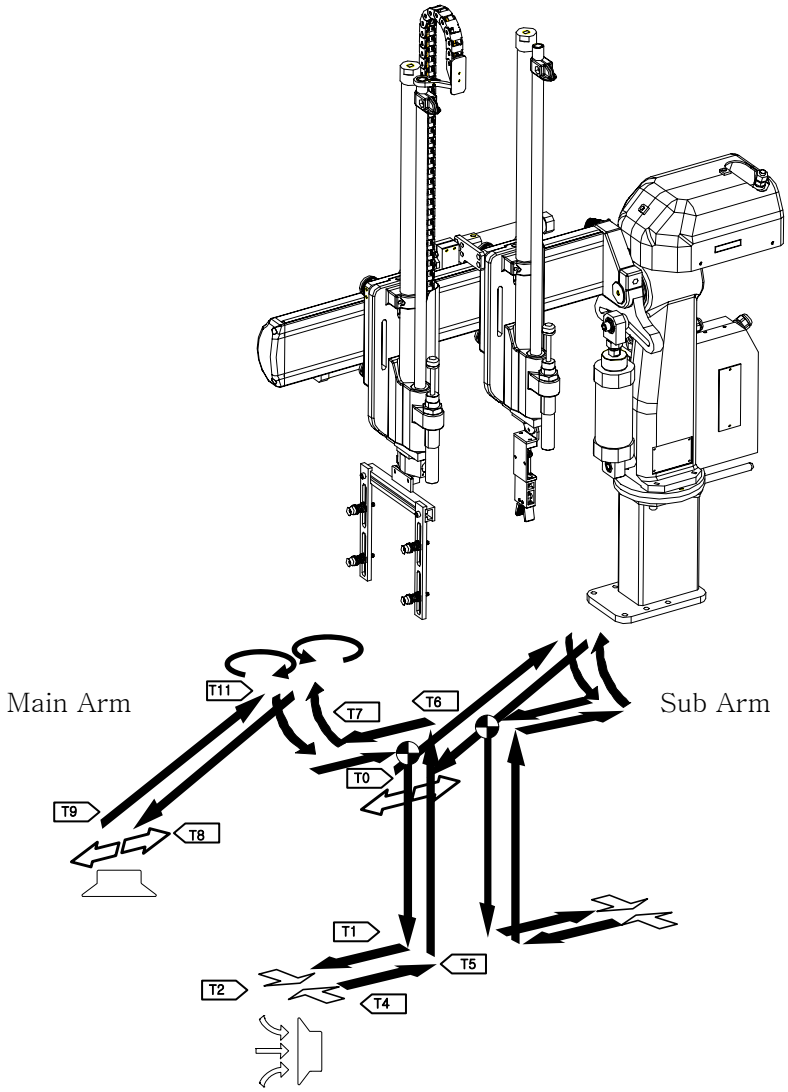


Screen

OutWai	NoUse ▶
MArmDn	Nozzl
SArmDn	Clamp
SAOff	2Down

45 D_L_X_VC	Main & Sub

Robot Operation

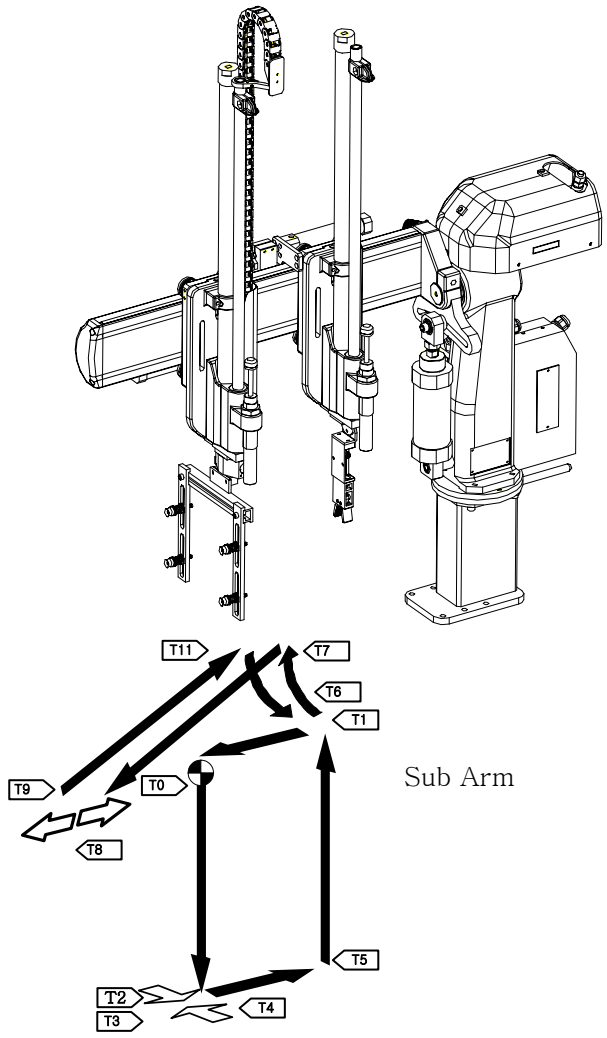


Screen

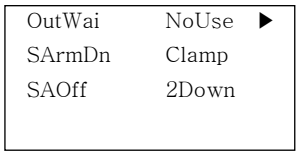
OutWai	NoUse ▶
MArmDn	Nozzl
SArmDn	Clamp
SAOff	2Down

82 Sub U	Sub Arm Only

Robot Operation

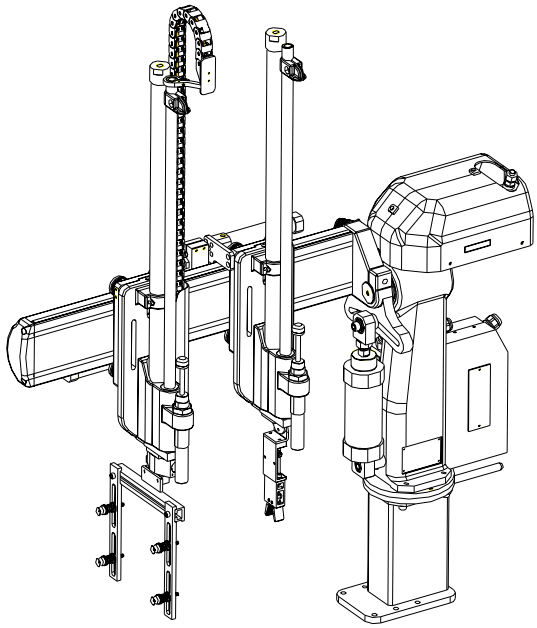


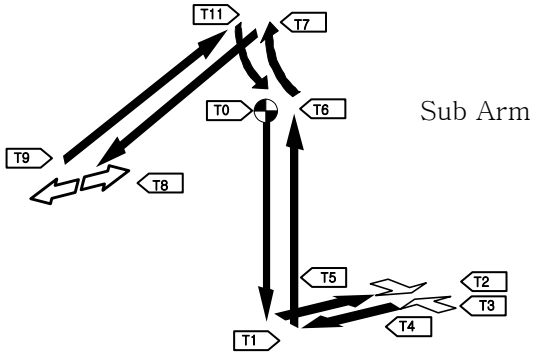
Screen



84 Sub L	Sub Arm Only

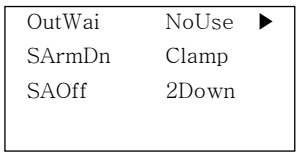
Robot Operation





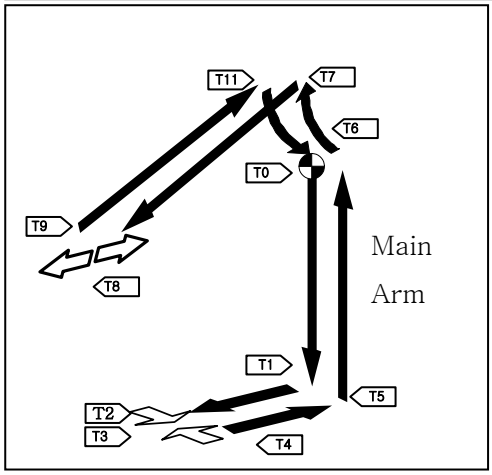
Sub Arm

Screen

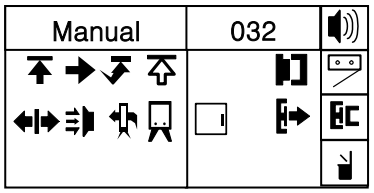


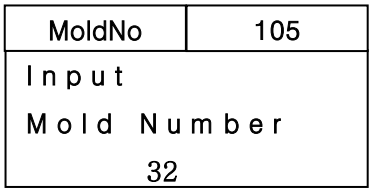
(2) Selecting Basic Motion Pattern

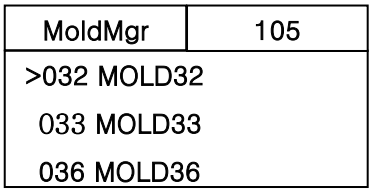
Example) Main Arm Only , LType, Take Out parts with Chuck and Swing and Release

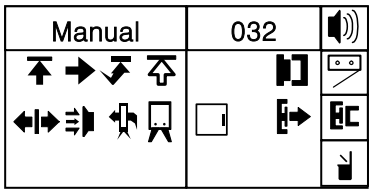


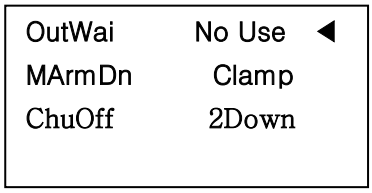
[Mold Number 32]











- **STEP 1**

Set Mold Number 32 which is similar with Example except Part Open

- **STEP 2**

Press SHIFT S and MODE MOLD, moves to Mold Search Screen

- **STEP 3**

Pressing 3ChuRot 2Suction will input 32 and Press ENTER will move to mold maintenance screen.

- **STEP 4**

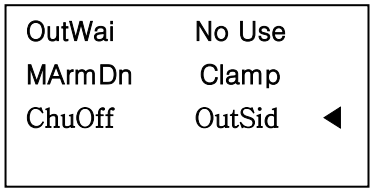
Cursor is located at 32 mold, press ENTER moves to manual mode with 32 Mold Motion Pattern

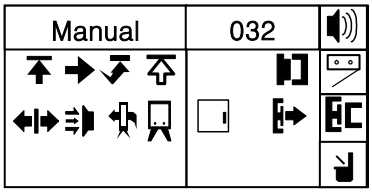
- **STEP 5**

Pressing MODE MOLD button moves to mode screen.

- **STEP 6**

Press ▼, move '▶' to ChuOff(Chuck Off) and Press ▶ ,change change 2Down to OutSid.





● STEP 7

Press STOP MANUAL to move to Manual Screen

4.3.8 Step Run

(1) Description of Step Run

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

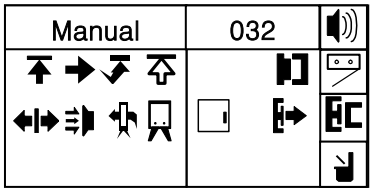
After origin, will not displays ">" cursor, pressing ▲ will displays ">" at the first step

StepRun	032
>Down	
Kick	
ChuOn	

(2) Button Function

NO	Button	Description
1	▲	Press Up Arrow Key will Operate Step Operation
2	STOP MANUAL	Move to Manual Mode

(3) Step Operation



- **STEP 1**

Press STEP I/O moves to Step Operation Screen

StepRun	032
>Down	
Kick	
ChuOn	

- **STEP 2**

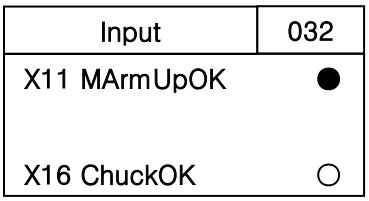
Pressing ▲ button will operate one step

Press STOP MANUAL will move to manual mode

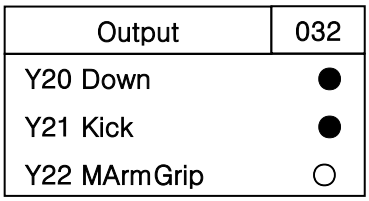
4.3.9Input/Output

(1) Description

Confirm Input, Output, Interlock



<Input Screen>



<Output Screen>

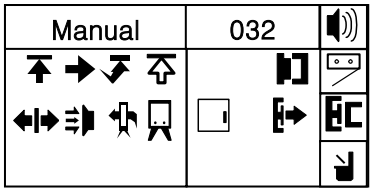
Input			Output		
X11	Main Arm Up Confirm	MArmUpOk	Y20	Down	Down
			Y21	Kick	Kick
X16	Chuck Confirm	ChuckOk	Y22	Chuck	Chuck
X14	Swing Confirm	SwingOk	Y23	Swing	Swing
X15	Swing Return Confirm	SwingRtOk	Y2F	Swing Return	SwingRt
			Y24	Chuck Rotation	ChuckRo
X17	Vacuum Confirm	VacuumOk	Y25	Vacuum	Vacuum
			Y26	Nipper Cutting	NipperCut
X1G	Sub Arm Up Confirm		Y2D	Sub Arm Up	SArmUp
			Y2E	Sub Arm Kick	SArmKick
X1F	Sub Arm Grip Confirm		Y27	Sub Arm Grip	SArmGrip
			Y28	Alarm	Alarm
			Y2G	Main Power	MainPower

Interlock Input				Interlock Output			
X1H	FullAuto	FullAuto	DC	Y29	Cycle Start	CycleStart	Relay
X19	Auto Injection	Injection	Relay	Y2A	Mold Open/Close	MoldOp/Cl	Relay
X18	Mold Open Complete	MoldOpen	Relay	Y2B	Ejector	Ejector	Relay
X1A	Safety Door	SafetyDoor	Relay	Y2C	Conveyor	Conveyor	DC
X1B	Reject	Reject	DC	Y28	Buzzer	Buzzer	DC
X1I	EMO from IMM	IMM EMO	Relay				

(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		Move to manual mode.
5		Move to Auto Mode

(3) Confirm Input / Output Signal



● **STEP1**

Press [SHIFT / S] and [STEP / I/O] displays Input / Output screen.

Input	032
X11 MArmUpOK	●
X16 ChuckOK	○

● **STEP 2**

Pressing [◀] or [▶] change Input or Output

Pressing [▲] or [▼] select signal to confirm

Output	032
Y20 Down	●
Y21 Kick	●
Y22 MArmGrip	○

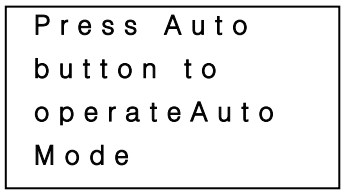
● **STEP 3**

Press [STOP / MANUAL] move to manual mode.

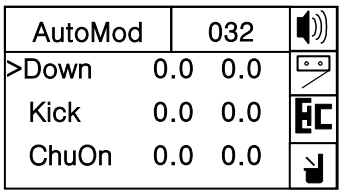
Press [AUTO / CYCLE] move to auto mode.

4.4 Auto Operation

(1) Description



[Auto Message]



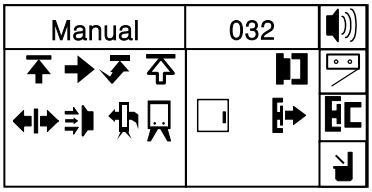
[Auto Mode Screen]

Order of Origin		
NO	In Mold	Outside of Mold
1	Kick Return	Up
2	Up	Kick Return
3		Swing Return

(2) Button Function

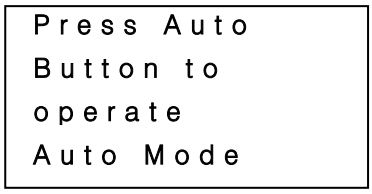
NO	Button	Description
1	STOP / MANUAL	Stop Auto Operation and move to Manual Mode
2	MODE / MOLD	Move Mode Screen
3	SHIFT S + STEP / I/O	Move I/O Screen
4	TIMER / COUNT	Move Timer Screen
5	SHIFT S + TIMER / COUNT	Move Counter Screen

(3) Auto Operation



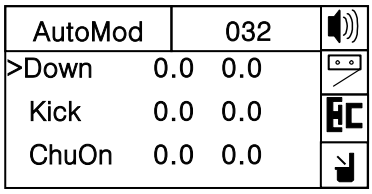
● **STEP1**

Pressing AUTO CYCLE button displays Auto Messages



● **STEP 2**

Pressing AUTO CYCLE moves the robot to origin and start auto operation.



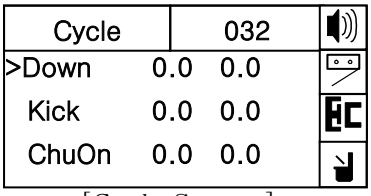
● **STEP 3**

Pressing STOP MANUAL will stop auto operation and moves to manual mode

4.5 Cycle Operation

(1) Cycle Operation

Manual Mode, Pressing SHIFT S and AUTO CYCLE moves the robot to the origin point and operate 1 cycle (If Outside waiting has been selected, robot arm will swing)

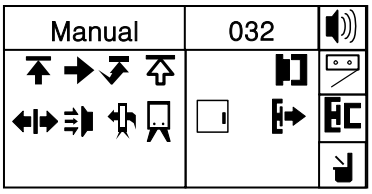


[Cycle Screen]

(2) Each Button Function

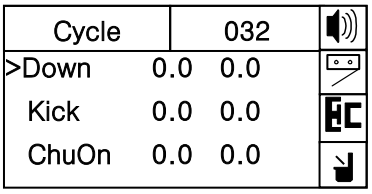
NO	Button	Description
1	STOP MANUAL	Stop Operation and Moves to Manual mode

(3) Cycle Operation



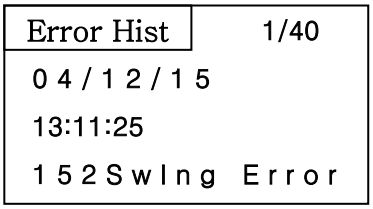
- **STEP1**

Press SHIFT S and AUTO CYCLE , moves to the cycle operation mode. Operate 1 Cycle and moves to manual mode



4.6 Error History

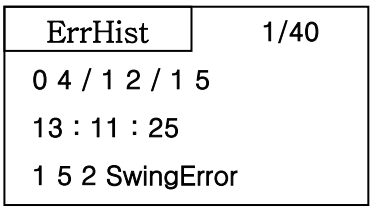
(1)Description

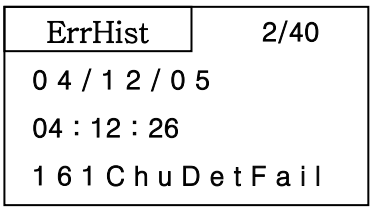


(2) Each Button Function

NO	Button	Description
1	▲ ▼	Move the cursor to different error history
2	STOP MANUAL	Change to the manual mode
3	AUTO CYCLE	Change to the Auto Mode

(3) Checking Error History





- **STEP 1**

Press SHIFT S and ▲ at the same time, displays error history screen.

- **STEP 2**

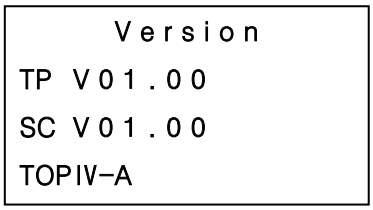
Find error with pressing ▲ or ▼ button

- **STEP 3**

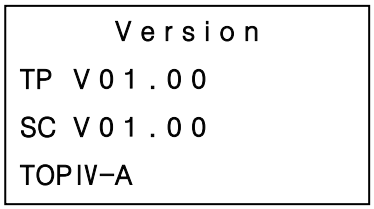
To move to manual mode, press STOP MANUAL.

To move to auto mode, press AUTO CYCLE.

4.7 Version Information



(1) Version Information



- **STEP 1**

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

- **STEP 2**

To move to manual mode, press STOP MANUAL

To move to auto mode, press AUTO CYCLE

4.8 Error Recovery

(1) Error Description

Displays error recovery method

Error	043
152 SwIngErr	
(X14)Confirm	
Swing Sensor	

(2) Error Recovery

Error	043
152 SwIngErr	
(X14)Confirm	
Swing Sensor	

- **STEP 1**

Pressing 

, Stop Buzzer

- **STEP 2**

Pressing 

again will close message screen

4.9 Change Language

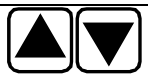
Press 

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

4.10 Robot and Program maintenance Screen

Turn power on with pressing 

FindError	1s
AutoInput	NoRun
SafetyDoor	Run
Injection	Run

NO	Button	Description
1		Move cursor ▶ and displays setting
2		Pressing right and left arrow button will change mode and pressing  will save data
3	Numeric	Input Number
4		Save data
5		Moves to Manual Mode

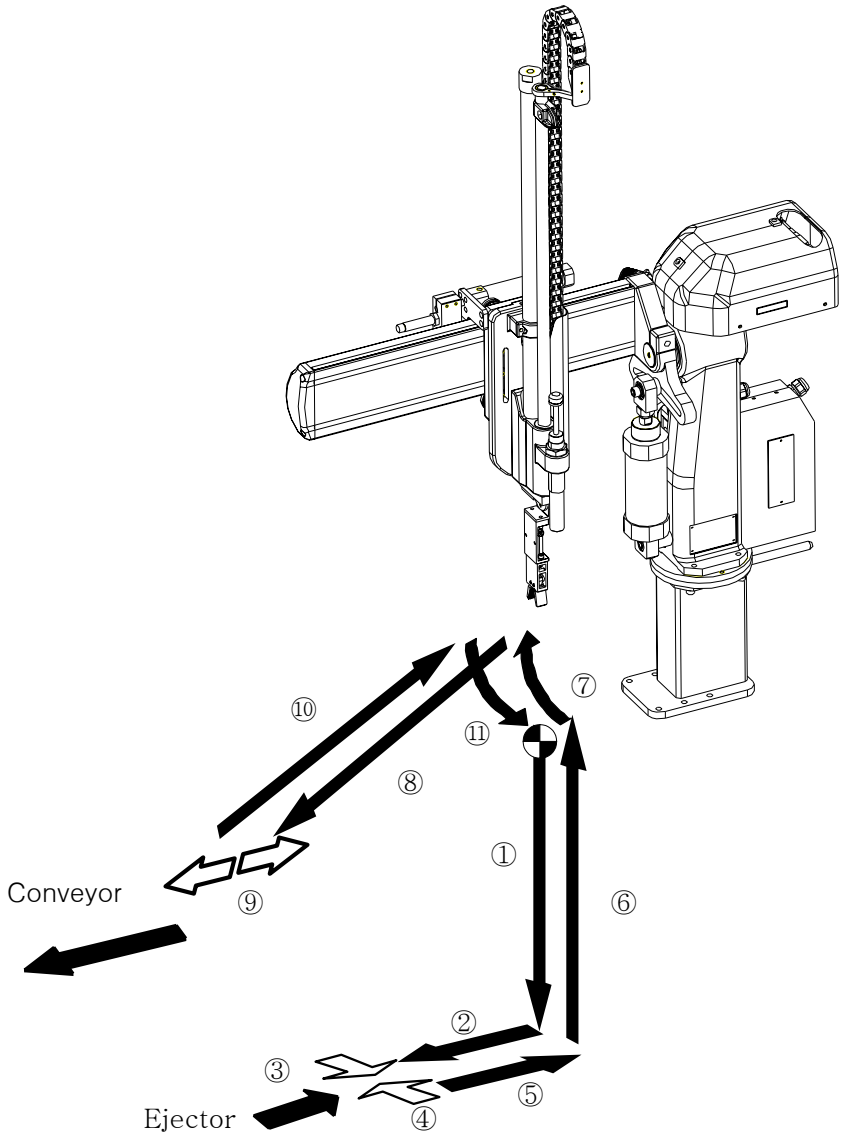
NO	Screen	Mode	Order	Default/Setting	Description	Etc
1		Error Evaluation		Default=1sec	Selecting 0 will not use Error Evaluation Function	# Sec (1, Unit : Second)
2		Auto Signals	①	Use	Full Auto Signal is Required	
			②	No Use(=default)	Full Auto Signal is not required	
3		Safety Door Signals	①	Use(=default)	Safety Door Signal is required	
			②	No Use	Safety Door Signal is not required	
4		Injection	①	Use(=default)	Injection Signal is required	
			②	No Use	Injection Signal is not required	

FindError	1s
AutoInput	NoRun
SafetyDoor	Run
Injection	Run

5	RejectIMM NoRun ProceTim 0s Dat 00/00/00 Tim 00:00:00	Reject from IMM	①	No Use (=default)	Rejection signal is not required	
			②	Use	IMM Rejection signal required to reject parts	
6		Process Time			Setting Process time to 0 will not use process time	## (00, Second)
7		Date			Setting Date	
8		Time			Setting Time	
9	DelAllMold Yes DelErrHist No	All Mold file Delete	①	Yes	Pressing Enter will delete all mold file	
			②	No	Pressing Enter will not delete all mold file	
10		All Error history Delete	①	Yes	Enter will delete all Error History	
			②	No	Enter will not delete all Error History	

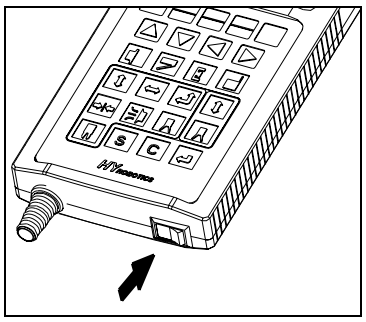
5 Follow Up

5.1 Motion Pattern Selection



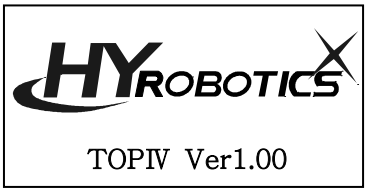
①. Down
②. Kick
③. Ejector
④. Chuck ON
⑤. Kick return
⑥. Up
⑦. Swing
⑧. 2nd Down
⑨. Chuck Off
⑩. 2nd Up
⑪. Swing Return

5.2 Start Up



- **STEP 1**

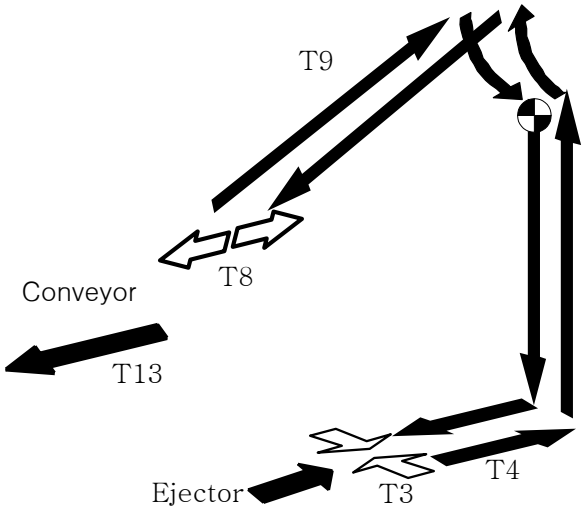
Turn On Power.



- **STEP 2**

Displays Logo and moves to manual mode

5.3 Timer setting



NO	Default	Setting	Name
T3	0.5 sec	0.3 sec	Chuck
T4	0.5sec	0.3 sec	Kick return
T8	0.5sec	0.6 sec	Open
T9	0.5sec	0.4 sec	2nd Down
T13	3 sec	2 sec	Conveyor

Timer	
T3 Chuck	0.5 < 0.0
T4 KicRt	0.5 0.0
T5 Up	0.5 0.0

Timer	
T3 Chuck	0.3 < 0.3
T4 KicRt	0.5 0.0
T5 Up	0.5 0.0

● STEP 3

[Move to timer screen , set T3 chuck delay to 0.3 sec]

Press TIMER/COUNT , move to timer screen.

Press 3ChuRot and press ENTER to save data.

Timer	
T3 Chuck	0.5 0.0
T4 KicRt	0.5 < 0.3
T5 Up	0.5 0.0

Timer	
T3 Chuck	0.5 0.0
T4 KicRt	0.3 < 0.3
T5 Up	0.5 0.0

● STEP 4

[Setting T1 Kick Return to 0.3 sec]

Press ▼, move cursor to Kick Return Delay.

Press 3ChuRot and input 0.3sec, Press ENTER to save data

Timer	
T6 Swing	0.5 < 0.0
T7 2Down	0.5 0.0
T8 Open	0.5 0.0

Timer	
T6 Swing	0.5 0.0
T7 2Down	0.5 0.0
T8 Open	0.6 < 0.6

● STEP 5

[Set T8 to 0.6 sec]

Press ▼, move the cursor to MaiRel

Press 6 Swing R+ R- to Input 0.6 sec and press ENTER to save data

Timer	
T09 2Up	0.5 < 0.4
T10 ChuRt	0.0 0.0
T11 SwRt	0.5 0.0

Timer	
T09 2Up	0.4 < 0.4
T10 ChuRt	0.0 0.0
T11 SwRt	0.5 0.0

● STEP 6

[Set T9 2nd Up to 0.4 sec]

Press ▼, moves the cursor to 2nd Up Delay (2Up)

Press 4Descent Z1- Z1+ to input 0.4 sec, Press ENTER to save data

Timer	
T13 Conve	3.0 < 0.0

Timer	
T13 Conve	2.0 < 2.0

● STEP 7

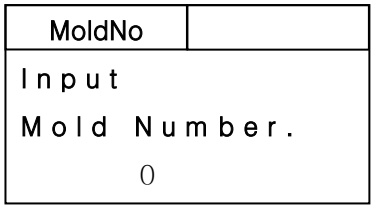
[Set T10 to 2 sec]

Press ▼, moves the cursor to Conveyer (Conve)

Press 2Suction and 0 OP to input 2 sec, press ENTER saves data.

Press STOP MANUAL to move to manual mode.

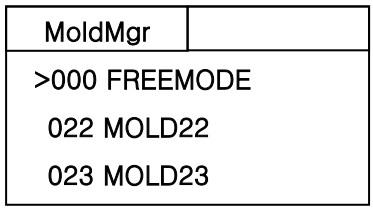
5.4 Mold Create



- **STEP 8**

Hold SHIFT S and press MODE MOLD , displays mold search mode.

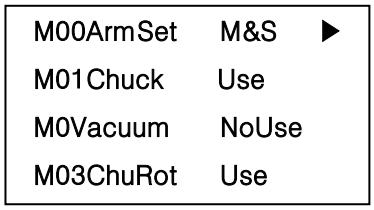
Press ENTER moves to mold maintenance screen and cursor will be on 0



- **STEP 9**

Pressing ENTER on the 0 Mold (Free mode) and moves to mode screen , Press ▼ to confirm motion pattern and mode ,

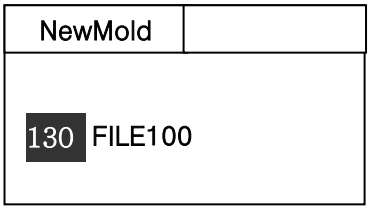
Press , STOP MANUAL to move to mold maintenance screen



- **STEP** 10

[Set Mold Number to 130]

Press 1 Chuck 3 ChuRot 0 OP to input 130, Press ENTER to save data .



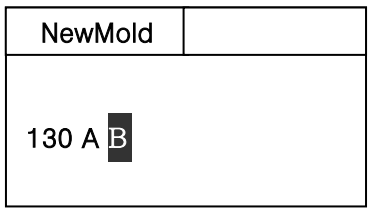
- **STEP 11**

[Set Mold Name to AB]

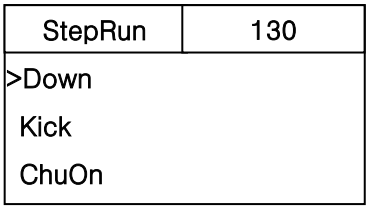
Press ▶ , cursor will move to first character and blinking .

Press CLEAR C, select A with pressing ▲ ▼, pressing ▶ move to next character space, press ▲ ▼ select "B" , and Press ENTER to save data.

Press STOP MANUAL will create Mold File and moves to Manual mode



5.5 Step Operation



- **STEP 12**

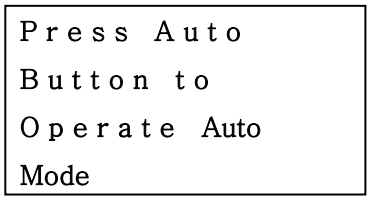
To confirm the motion pattern is right , operate step operation

Pressing  will operate motion step by step

Press 

and moves to manual mode

5.6 Auto Operation



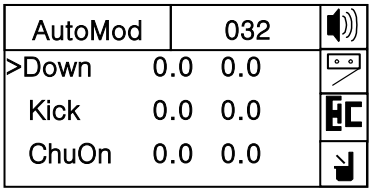
- **STEP 13**

Press 

change to Auto Message Screen.

Press 

again will start Auto Operation



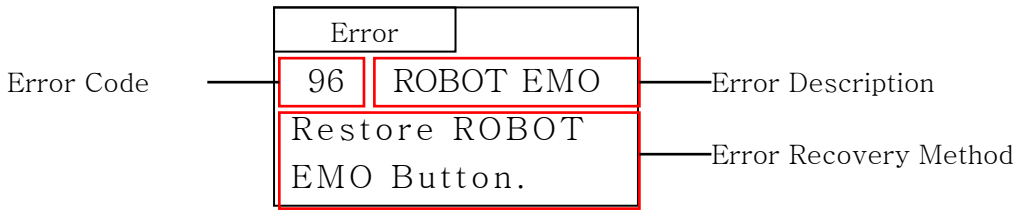
- **STEP 14**

To Stop Operation press 

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

Code	Description	Cause	Recovery Method
16	SC-CRC Error	1. Noise 2. Hardware Failure 3. Program Failure	1. Reboot system 2. Contact Factory
17	SC Error		
18	Not Command		
19	NotExeCmd		
32	ComDataError		
35	No Reponse		
38	Header Error		
41	NotSendCmd		

6.2.2Emergency

Code	Description	Causes	Recovery Method
96	ROBOT EMO	Stop by emergency switch	Remove cause of emergency stop and then cancel it by turning emergency stop button.
98	IMM EMO	Stop by Injection Molding Machine emergency switch	Remove cause of emergency stop and then cancel it by turning Injection Molding Machine emergency stop button.

6.2.3Pneumatic

Code	Description	Causes	Recovery Method
132	SwSensorErr	Swing/Swing Return Sensor input at the same time	Check Swing / Return Sensor
148	SArmUp Error	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.
150	MArmUpError		
152	SwingError		
153	SwingRtError		

6.2.4Sol valve

Code	Description	Causes	Recovery Method
160	Vacuum Fail	1. Vacuum Failure 2. Check Suction Pad 3. Leaking at Stem and Fitting 4. Adjust Vacuum sensitivity	1. Open Safety Door and Fix Problem in Manual Mode 2. Replace Pad. 3. Tight Stem and Fitting Screw
161	Chuck Fail	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
163	SArmGripFail	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

6.2.5Machine Abnormality

Code	Description	Causes	Recovery Method
176	SCInitiError	1. Noise 2. Program Failure	Reboot Contact Factory

6.2.6Interlock Related

Code	Description	Causes	Recovery Method
202	MoldOpenErr	Rarely some Molding Machine lose Mold Open Complete Signal momentarily when Robot arm in Take-Out Position.	1. Reboot 2. Contact Factory

6.2.7Operation Error

Code	Description	Causes	Recovery Method
214	NoMoldOpen	In Manual Mode, activate Robot Arm Down without Mold Open Complete	Check Mold completely opened. (Check Mold Open Complete Sensor)
215	TimeLimitExc	Time Limit Exceed.	Check I.M.M and Robot

6.2.8Internal Program Error

Code	Description	Causes	Recovery Method
227	KeySig.Fail	Internal Program Failure	Contact Factory Fix step program
228	FileLoadFail		
229	ComColdFail		
230	PageModeFail		
231	NoDiskSpace	Mold file is Full	Delete old mold files
232	SetValFail	Internal Program Failure	Contact Factory
234	SetupValFail		
236	SCInfoError	Wrong Version	Contact Factory

Appendix

A.Specification

Power voltage : 100Vac – 240Vac, 0.6A, 50/60Hz

Control method : Sequence program

Pneumatic pressure : 0.4 to 0.5 Mpa (Proof pressure 0.8 Mpa)

Take-out dry cycle (*1) : 0.7 second

Entire dry cycle : 3.2 seconds

Maximum weight capacity : 2 kg (*2)

Noise level : 66 dB

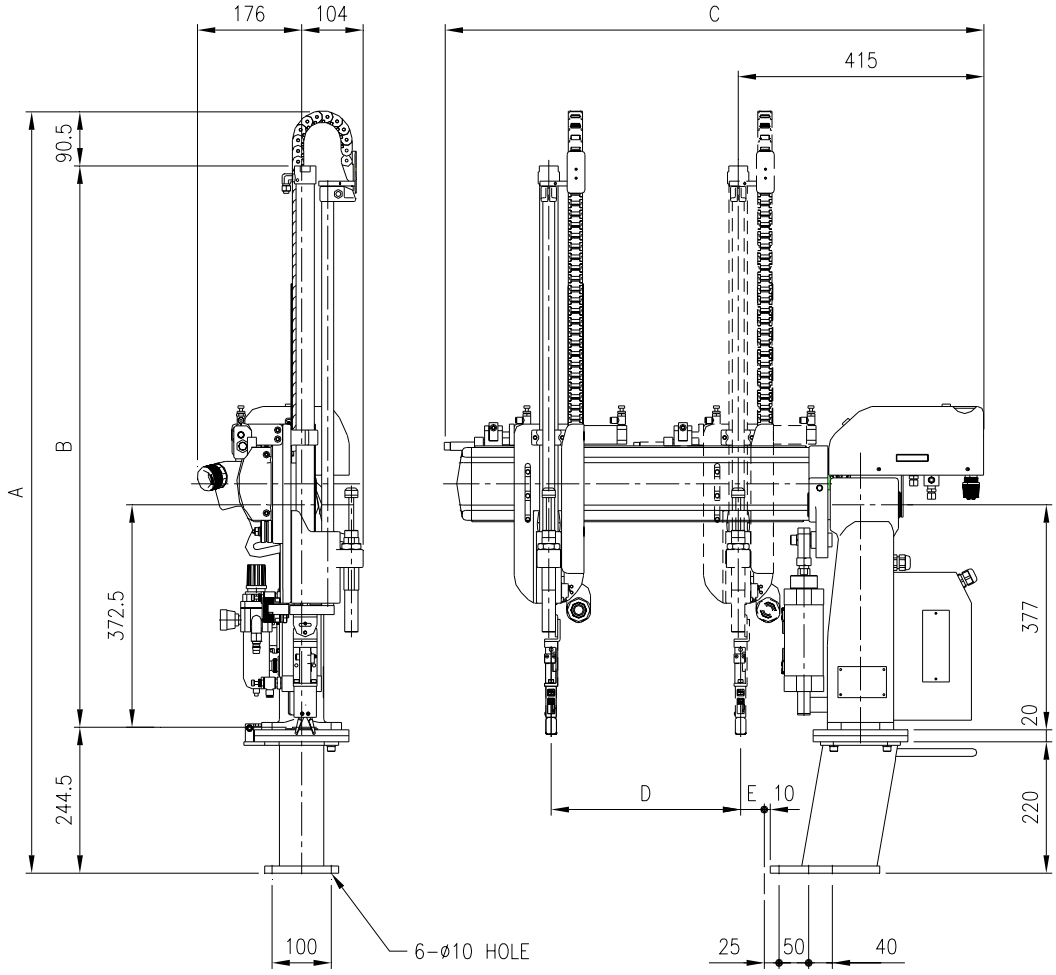
*1 The dry cycle is based on test conditions established by us.

*2 Includes the chuck and the end-of-arm tool.

MODEL	Applicable injection molding machine	Descent stroke (mm)	Kick stroke (mm)	Swing stroke (both directions) (degrees)	Waiting position adjustment range (mm)	Pneumatic consumption (Nl/cycle)	Robot body weight (kg)
TOPIV- A X 450 XC	80 ton or less	450	90	50 to 90	100	7	34
TOPIV- A X 550 XC	120 ton or less	550				8	35
TOPIV- A X 650 XC	180 ton or less	650				9	36
TOPIV- A X 750 XC	220 ton or less	750	150			10	37
TOPIV- A X 950 XC	350 ton or less	950				12	38
TOPIV-Twin 450	80 ton or less	450	90			11	44
TOPIV-Twin 550	120 ton or less	550				13	46
TOPIV-Twin 650	180 ton or less	650				15	48

B.External Dimension

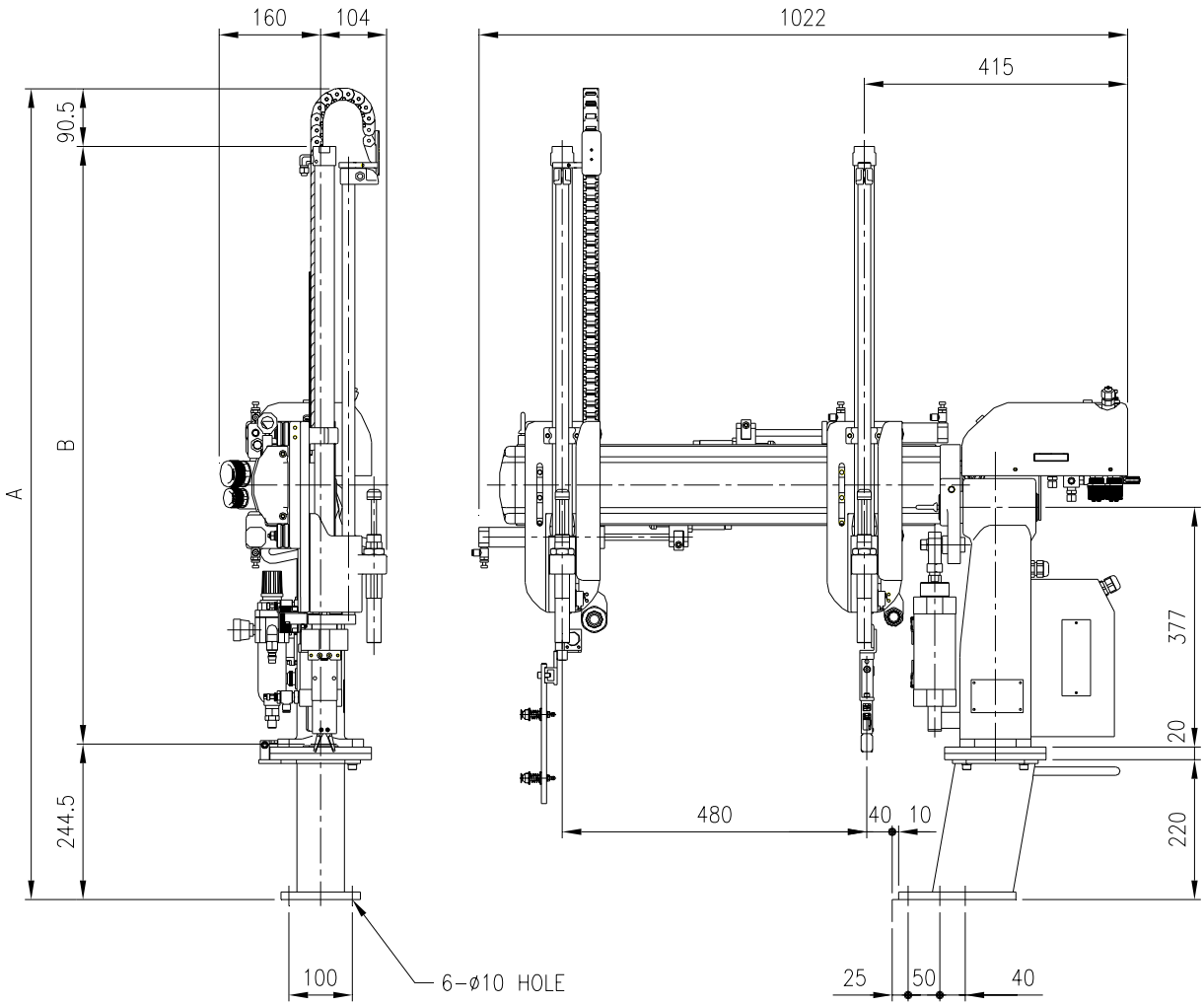
A, X, XC Type



(Units: millimeters)

MODEL	A	B	C	D	E
TOPIV- A X 450 XC	1175	840	910	320	40
TOPIV- A X 550 XC	1275	940			
TOPIV- A X 650 XC	1375	1040			
TOPIV- A X 750 XC	1475	1140	1110	520	
TOPIV- A X 950 XC	1675	1340			

TWIN Type

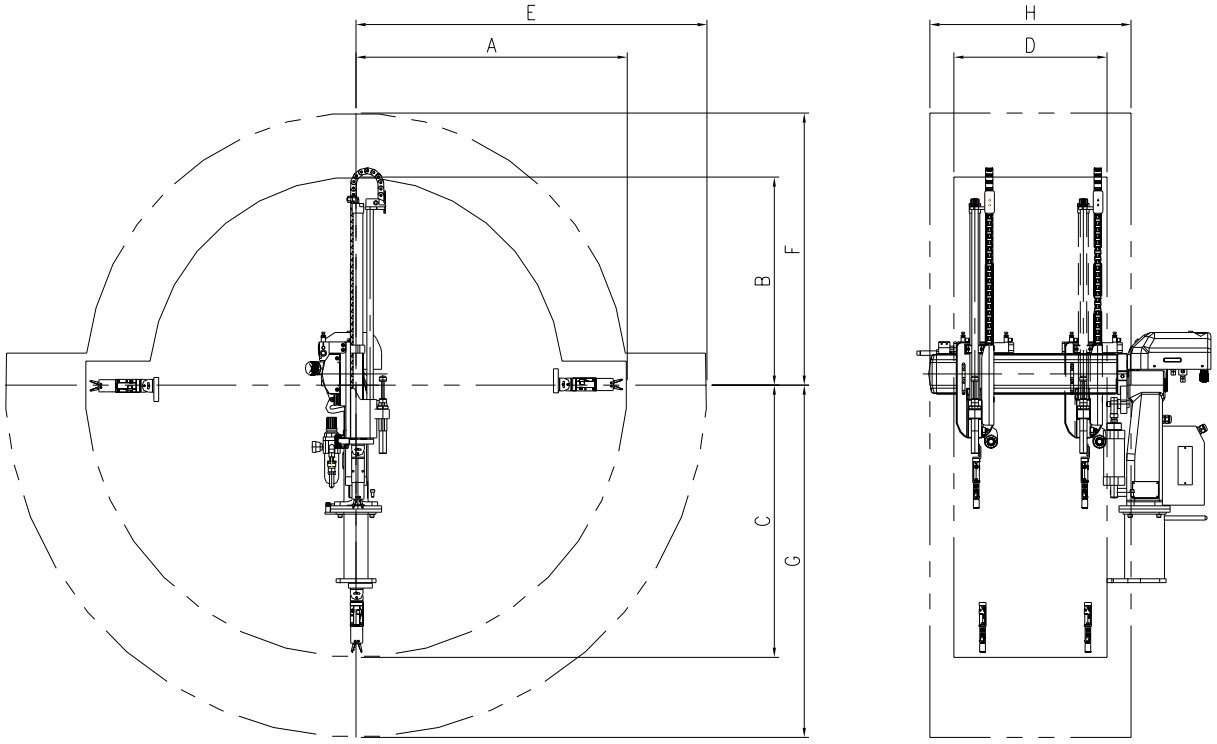


(Units: millimeters)

MODEL	A	B
TOPIV-TWIN 450	1175	840
TOPIV-TWIN 550	1275	940
TOPIV-TWIN 650	1375	1040

C.Safeguard space

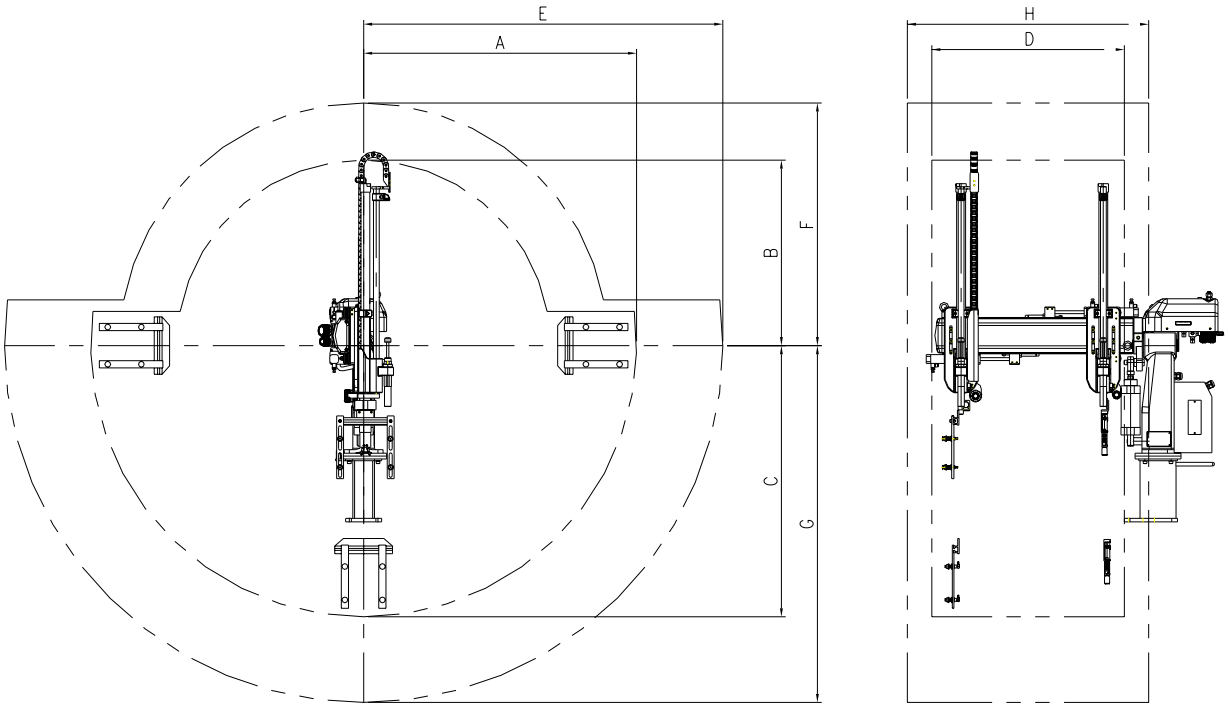
A, X, XC Type



(Units: millimeters)

MODEL	Maximum working space				Safeguard space			
	A	B	C	D	E	F	G	H
TOPIV-A X XC 450	850	650	850	480	1100	850	1100	630
TOPIV-A X XC 550	950	750	950		1200	950	1200	
TOPIV-A X XC 650	1050	850	1050		1300	1050	1300	
TOPIV-A X XC 750	1150	950	1150	680	1400	1150	1400	830
TOPIV-A X XC 950	1350	1150	1350		1600	1350	1600	

TWIN Type

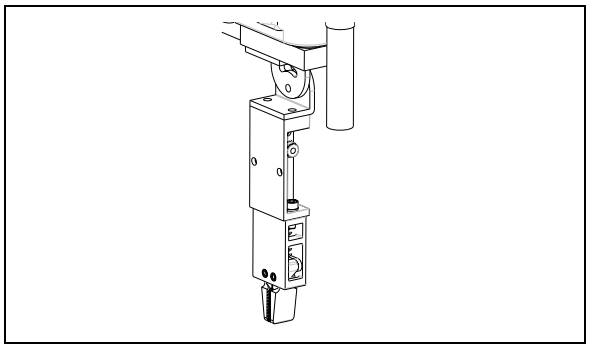


(Units: millimeters)

MODEL	Maximum working space				Safeguard space			
	A	B	C	D	E	F	G	H
TOPIV-TWIN 450	950	650	950	580	1250	850	1250	750
TOPIV-TWIN 550	1050	750	1050		1350	950	1350	
TOPIV-TWIN 650	1150	850	1150		1450	1050	1450	

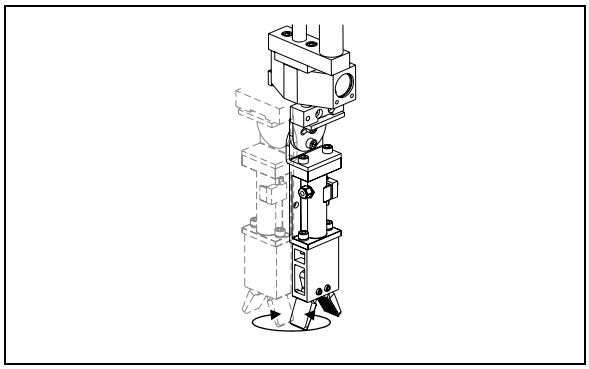
D.Optional features

The swing type take-out robot consists of A, X, XC and Twin. Contact us for details.



- A type

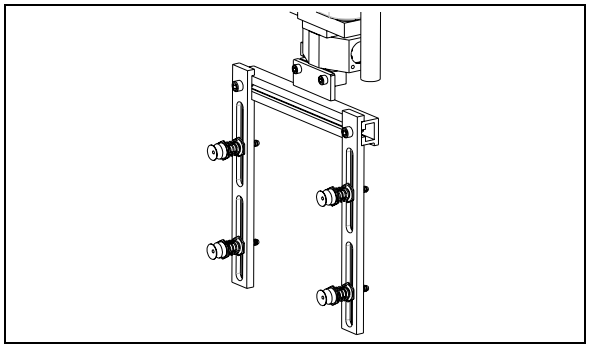
Sprue Picker with Gripper



- X type

Sprue Picker with Gripper + 90° Rotation

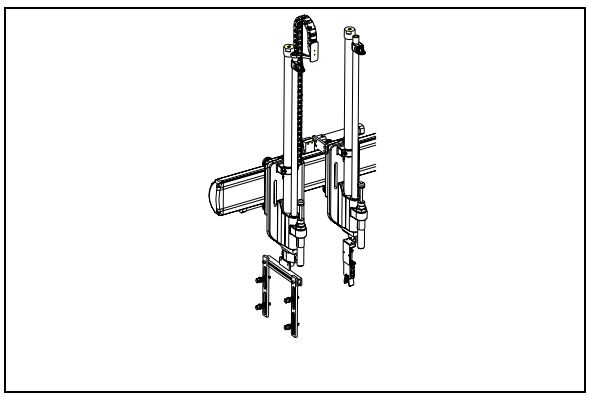
Releasing product onto a conveyor or a chuck with scratch prevented.



- XC type

Sprue Picker with Gripper + 90° Rotation + Vacuum Unit

Multiple product take-out with suction.



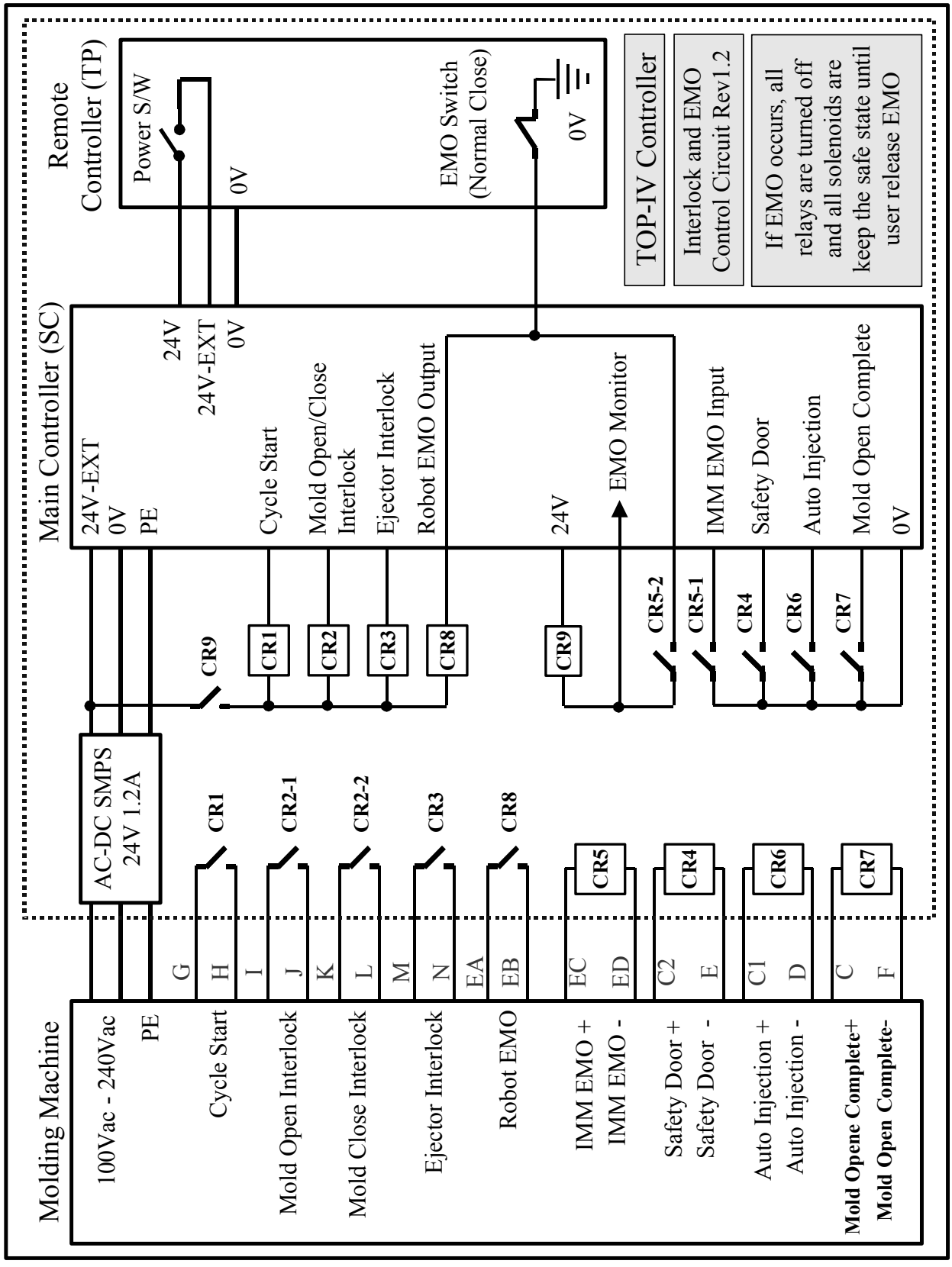
- Twin type

Correspond to 3-Plate Mold

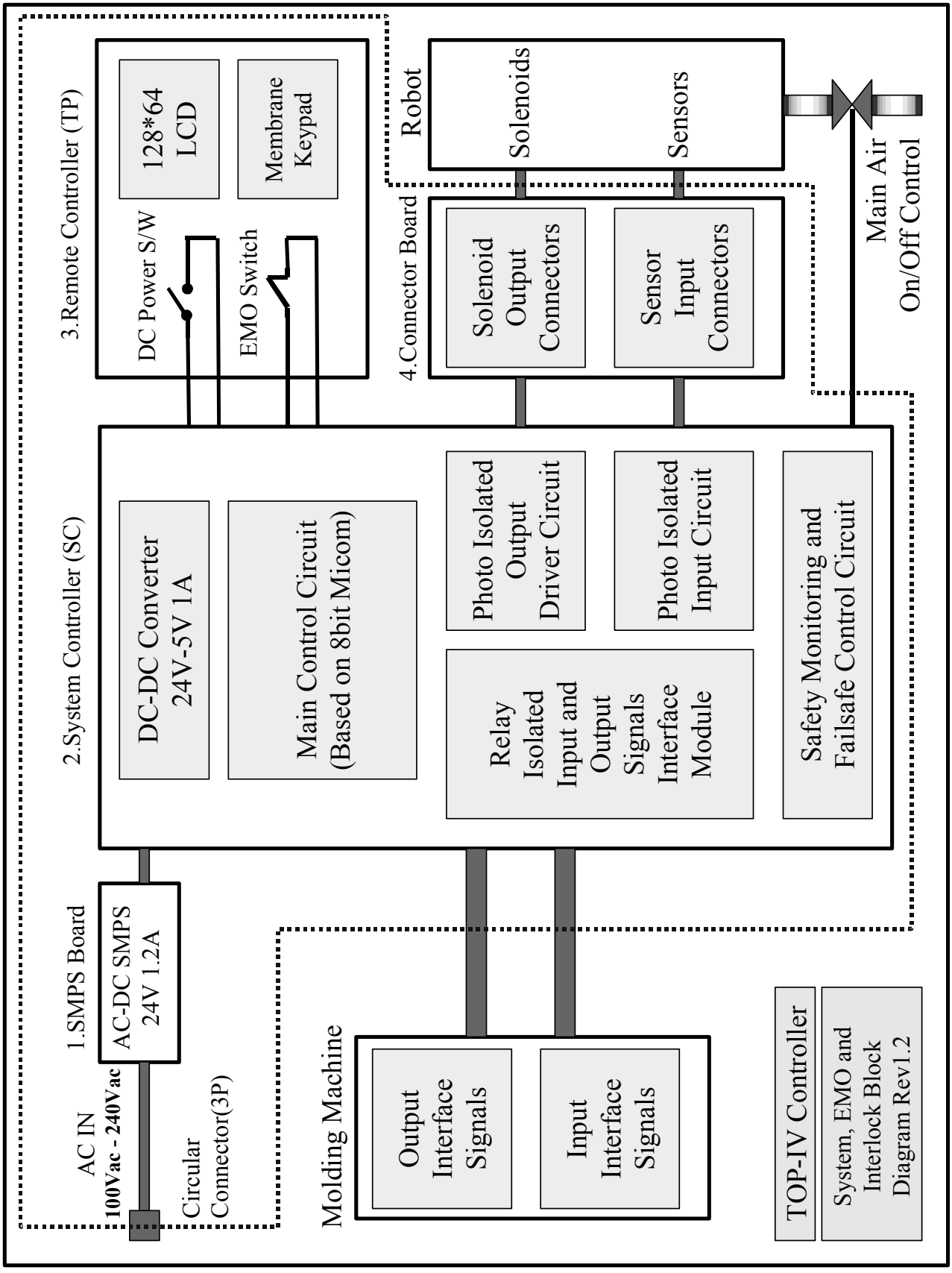
Sprue Picker for 3-plate Mold

With Gripper + 90° Rotation + Vacuum Unit

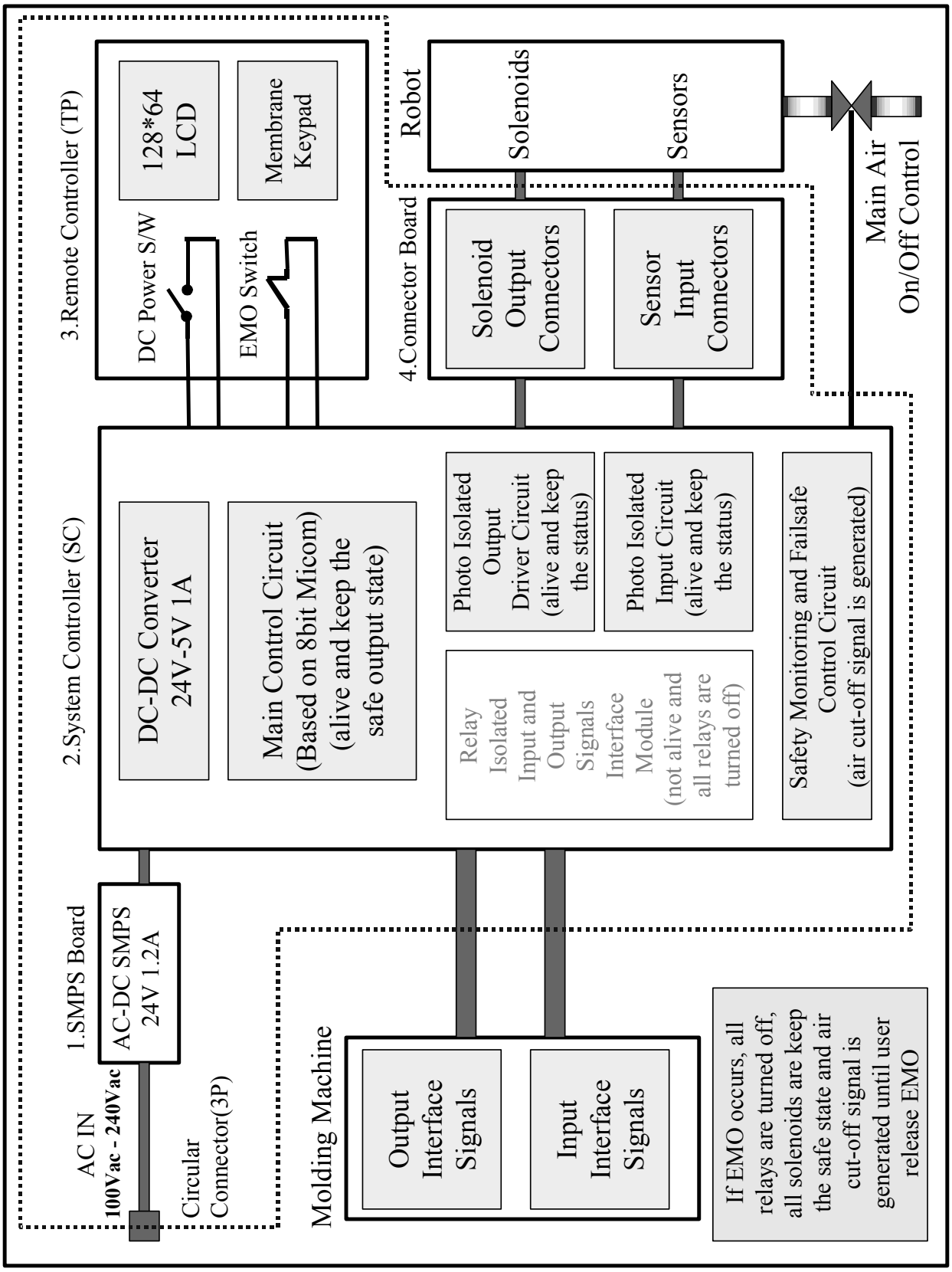
E. Interlock and EMO Control Circuit



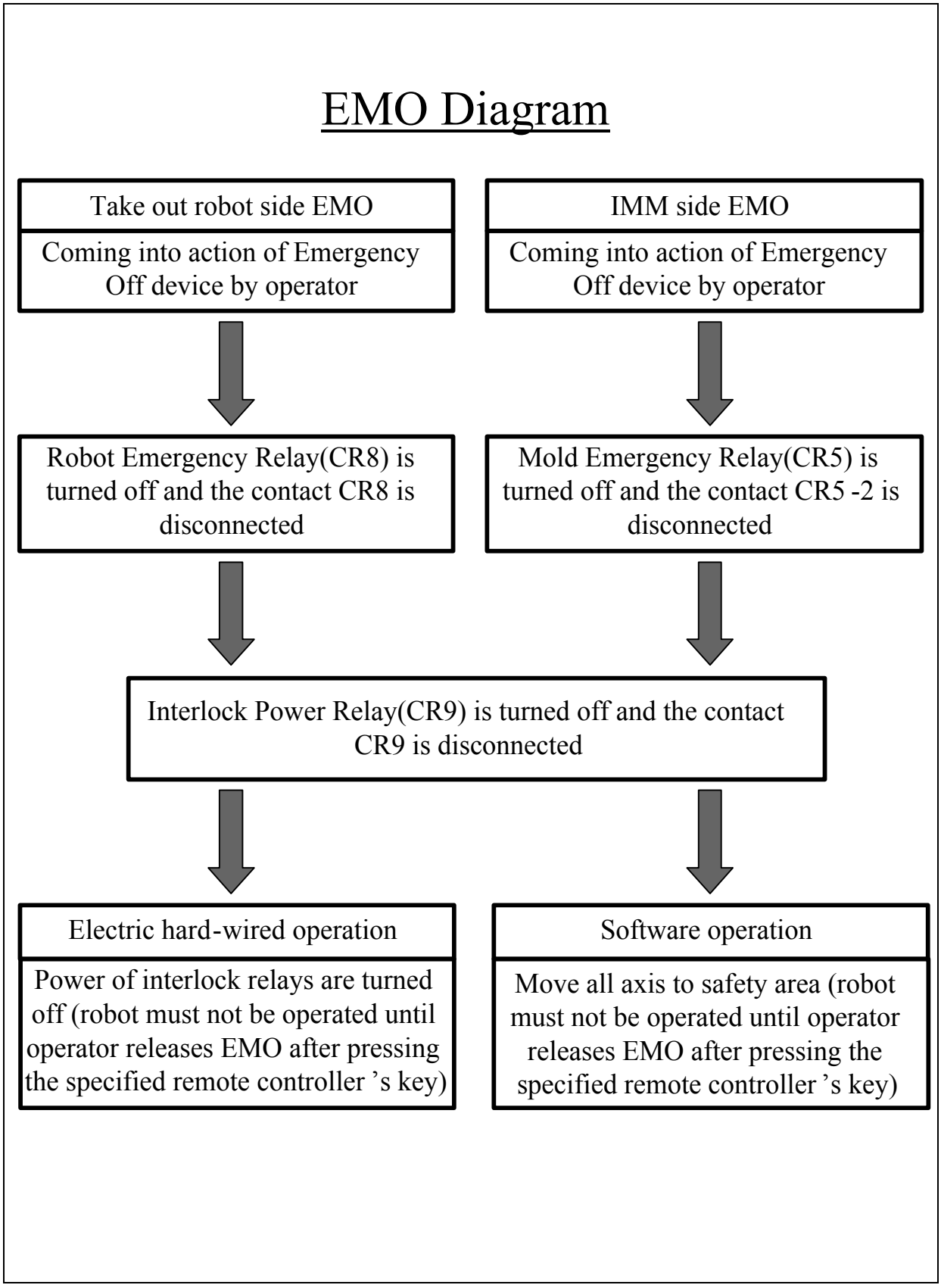
F. System and EMO and Interlock Block Diagram



G. After the action of EMO, System, EMO and Interlock Block Diagram



H. EMO Diagram



I. Interlock Diagram

Diagram of Interlock Device at Normal Operation

1. Waiting for an IMM finishes an 1 -cycle injection operation

If an IMM finished an 1 -cycle injection operation, the 'Mold open Complete' relay CR7 and the 'Safety Door' relay CR6 are turned on and the 'Auto Injection' relay was turned on and turned off (pulse generation)

↓

2. A Robot performs takeout operation

Before down the stroke for takeout, robot turns off the 'Mold Open/Close Interlock' relay CR2 (for prevention the next 1-cycle injection operation of an IMM)

↓

3. A takeout operation is finished by a robot

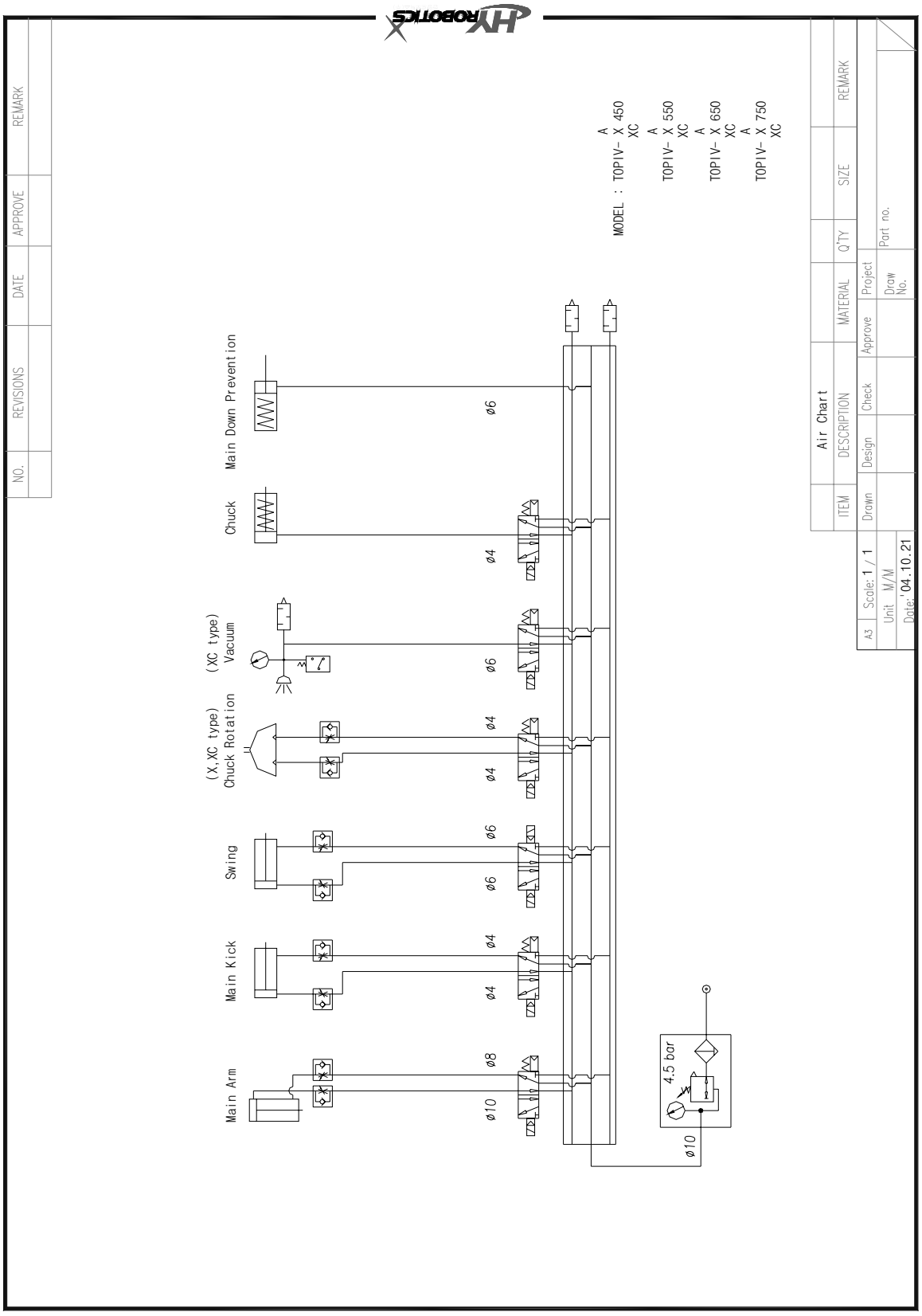
If a robot finished a takeout operation and all strokes were moved up and the product grip was gripped, the 'Cycle Start' relay CR1 and the 'Mold Open/Close Interlock' relay CR2 are turned on (for allow the next 1 -cycle injection operation of an IMM)

↓

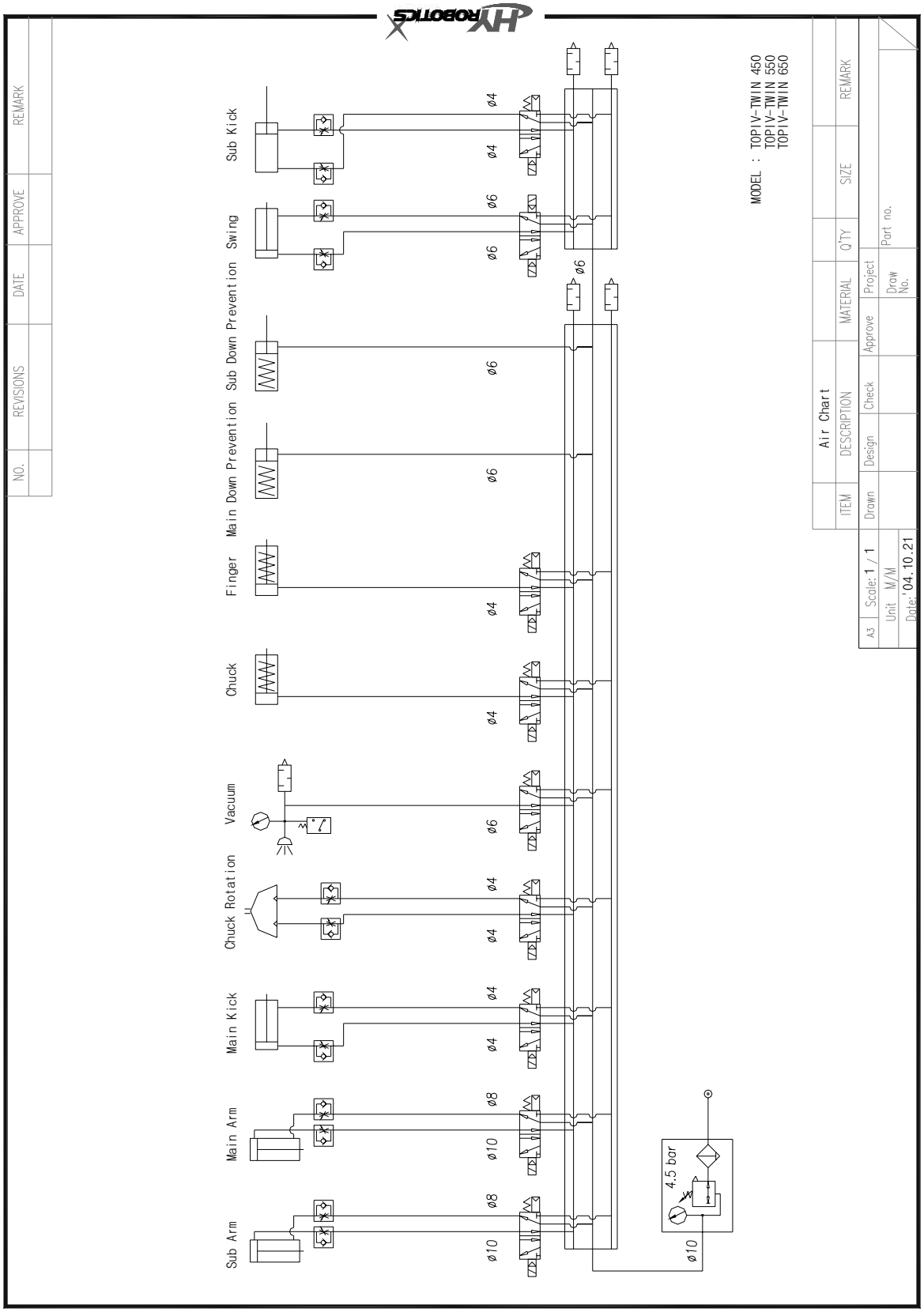
4. Repeat the step1,2 and 3

J. Air Chart

A, X, XC Type



TWIN Type


HX ROBOTICS
MODEL : TOPIV-TWIN 450
TOPIV-TWIN 550
TOPIV-TWIN 650
Sub Kick
Swing
Sub Down Prevention
Main Down Prevention
Finger
Chuck
Vacuum
Chuck Rotation
Main Kick
Main Arm
Sub Arm
4.5 bar
Air Chart
Scale: 1 / 1
Unit M/M
Date: '04.10.21

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