

Robot Manual (8 Inches) of ST3/5-S2

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1. General Description



Please read through the manual carefully before installing and using the machine to avoid personal injury or machine damage due to improper operation.

ST3 (5) -S/S2 series of robot feature compact size, decent outline, stable and easy operation, which are used for rapid and precise removal of sprue and runner for recycling after injection molding machine finished products lay aside in the position where needed 3 axes servo robot for hot runner plate mould, 5-axis for 2-plate mold, 3-plate mold or hot runner mold.

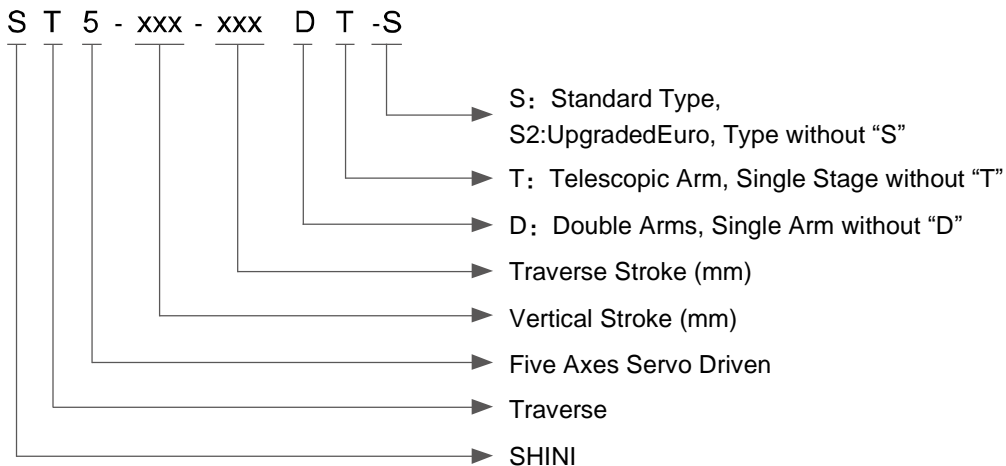
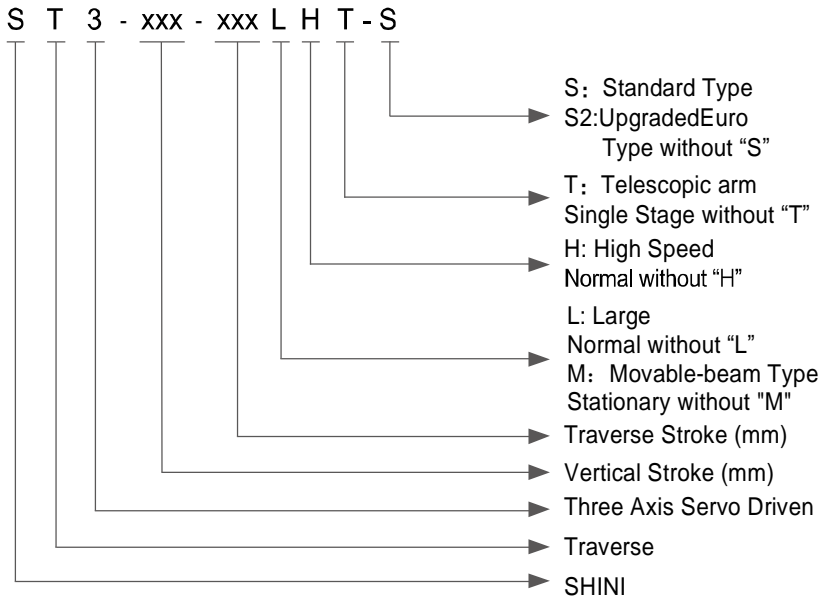


Picture 1-1: Standard Three-Axis Servo Driven Robot ST3-900-1600T-S2



Picture 1-2: Standard Five-Axis Servo Driven Robot ST5-900-1600DT-S2

1.1 Coding Principle



1.2 Application

- ST3/5-550-1000(D) -S suitable for the use with plastics injection molding machine under 100T.
- ST3/5-700-1400(D) -S suitable for the use with plastics injection molding machine 100T-200T.
- ST3/5-900-1600(D) -S suitable for the use with plastics injection molding machine 200T-300T.

- ST3/5-1100-1800(D) -S suitable for the use with plastics injection molding machine 300T-450T.
- ST3/5-700-1400(DT) -S suitable for the use with plastics injection molding machine 100T-200T.
- ST3/5-900-1600(DT) -S suitable for the use with plastics injection molding machine 200T-300T.
- ST3-1600-2200LT-S suitable for the use with plastics injection molding machine 650T-850T.
- ST3-1800-2400LT-S suitable for the use with plastics injection molding machine 850T-1600T.
- ST3-2200-2600LT-S suitable for the use with plastics injection molding machine 1600T-2400T.
- ST3-2600-2800LT-S suitable for the use with plastics injection molding machine 2400T-2800T.
- ST3-3000-3000LT-S suitable for the use with plastics injection molding machine 2800T-3600T.

1.3 Features

- European model, compact structure, and good appearance.
- I / O circuit with quick plug-in design, easy to install and maintain.
- The limit of positions with proximity sensor, high security.
- With function of stack, embedding, sorting, quality checking.
- Pick up the products quickly, put down the products slowly. It will never affect the speed, but also ensure that goods will not be bumps.
- Humanization control system, easy to operate.
- Wrist packaging designs, which can save the packaging room, avoid damage during transportation.

1.4 Safety Instructions



Please read the manual carefully before installing and using the machine to avoid personal injury or machine damage due to improper operation.

1.4.1 All Robots Safety Regulations

- 1) The operator, maintainer and relevant personnel must read through the manual, and make sure to understand the contents of the manual.
- 2) The series of robot is designed for injection molding machine (IMM) ONLY.
- 3) Any modification or altering against to the original design of the robot is not allowed.
- 4) Any improper installation and operation may result in injury to personnel and/or damage to equipment.
- 5) Please contact the manufacturer or your agent immediately if there is any problem with robot.
- 6) Please note that our robot must be cooperated with other safety device (i.e. safety door) in order to operate in normal condition.
- 7) Ensure all installations meet with safety requirements before operating.
- 8) Without the written agreement of the manufacturer, for any loss or injury caused by improper modification or misuse of the rotor, the manufacturer will not be liable for any loss or human injury.

1.4.2 Safety Concerns

- 1) The maintenance, overhaul and etc., must be executed by professionally trained personnel.
- 2) Any unrelated personnel should keep away from robot working area while it is running. All electrical wiring must be completed by professionals, and in accordance with design of specifications and wiring instructions.
- 3) Use safety fence to indicate working area while installation.
- 4) For the safety operation, the hand controller should be placed outside the robot working area.
- 5) Ensure bolts and nuts are tightened to the right torque while installation.
- 6) Ensure there is no following matter with the compressed air: phosphate-containing oil, organic solvents, sulfite gas, chlorine, acids and stale compressor oil.
- 7) The air pressure should be kept at 6MPa \pm 0.1MPa while operation.
- 8) When robot is operating, it may has little vibration, please remove any on the top of robot.

- 9) Press EMERGENCY STOP button immediately when accident occurs.
- 10) Do not modify the robot structure and control box. Please contact manufacturer or your agent if any modification is needed.
- 11) Turn off power supply and compressed air before maintenance and adjustment. Also set up warning singles and safety fences.
- 12) Please use SHINI original parts if there is any replacement.
- 13) Our robots apply to all safety standards which are required.
- 14) Please read the user manual carefully as a safety guideline.
- 15) Unauthorized personnel must inform the relative supervisor, and understand all safety rules before entering robot working area.
- 16) All maintenance, operation, repair and service must be done by professional technicians.
- 17) Please order a new user manual from the manufacturer or your agent if the user manual is damaged. Safety must be the first consideration.



Attention!

Product owner has the responsibility to ensure the operators, maintenance staff and relative staffs have read user manual thoroughly.



Attention!

Any modifications or other applications onto robot should obtain the written consent from the manufacturer, for safety purpose.



Attention!

Electricity system!

If not obey the safety recommendations and hazard signs or warning symbols stuck on the robot, it may result in electric shock to personnel.









Attention!

The user and operator should ensure the safety standard requirements to the robot was satisfied. We don't provide those safety equipment in our standard robot due to different situations and requirements owned by each user (except special equipment or which has been mentioned in this manual). Please acknowledge that the safety equipment must be installed prior to the testing and running of the robot, If such safety equipment is provided by user.

1.4.3 Hazard Signs and Warning symbols

Table 1-1: Hazard Signs and Warning Symbols Description

No.	Marks	Meaning
1		Don't touch!
2		Caution! Danger!
3		Danger! Electric Shock Risk!
4		Caution! Cause Injury!
5		Caution! High temperature!
6		No burning

1.4.4 Emergency Stop Button

The emergency stop button is at the upper right corner of controller.

When the emergency stop button was pressed, the robot will stop running immediately. To prevent the products falling down from the grippers (jigs) or suction cups (vacuum device) of the EOAT, the compressed air will not be turning off when the robot was in emergency stop situation. In addition, the robot and the controller will still display the indication of error messages.

The emergency stop circuits of the robot and of the injection molding machine are connected together by the Euromap12 or Euromap67 interface. Therefore, when pressing the emergency stop button on the injection molding machine, the robot will be involved in emergency stop condition.

1.4.5 Transportation and Storage



Attention!

Don't stay under the robot, when moving or hanging it!



Attention!

If you have to move and re-install the robot, must ask for assistance from the manufacturer or your agent. If you do not comply with this mandatory requirement, result in the injury to any person and robot broken or malfunction, the manufacturer and your agent will not have any responsibility.

1.4.5.1 Transportation

- 1) These series of robots were put in the crates before shipping and at the bottom of the crate with space left for forklift truck to move it.
- 2) Before the transporting, fasten the arm anti-falling and anti-sliding bolts to prevent the arm falling or sliding.
- 3) During transporting, prevent collision causing damage to the robot.
- 4) Must wrap the robot with water proof plastic cover and canvas cover outside during long-distance transportation, and if necessary vacuum pumping and put desiccant in it.
- 5) The temperature between -25°C to 55°C during the transportation will be good to robot. For short transportation (within 24 hours), the temperature cannot higher than 70°C .

The robot you order before shipping out from the manufacturer, it is been confirmed in good working condition, please check whether there is any damage during carrying, hanging and transporting. Please carefully dismantle the components and packaging, if you found any damage of the robot , you can use the package to wrap it again.

- 1) Any damage caused by transportation, please:
- 2) Feedback immediately to the transportation companies, your agent or manufacturer.
- 3) Claim to the shipping company, fill in the file to request compensation.
- 4) Retain damaged items for testing and checking. During the wait for testing and checking, do not return it.

Unpacking Transportation

1. After dismantling outer crate and cover, check if the model number and serial number on the nameplate is the same as what it wrote on the label on the outer crate and cover. After confirming the model number and serial number, then unpacking package, disassemble, assemble and hoist the robot.

The specific operations are as follows:

- 1) Loosen the bolts that fixed the adaptor and robot base on the support plate, and remove the adapter and robot base. (See the packaging diagram).
- 2) Use the hoist ring in the accessory box and fix it on the robot base to hoist the robot on the IMM. Then fix the base on the mounting surface of the robot on the IMM.
- 3) Use the movable hoist ring in the accessory box and fix it at the indicated position of robot, then hoist it according to the diagram.

Note:

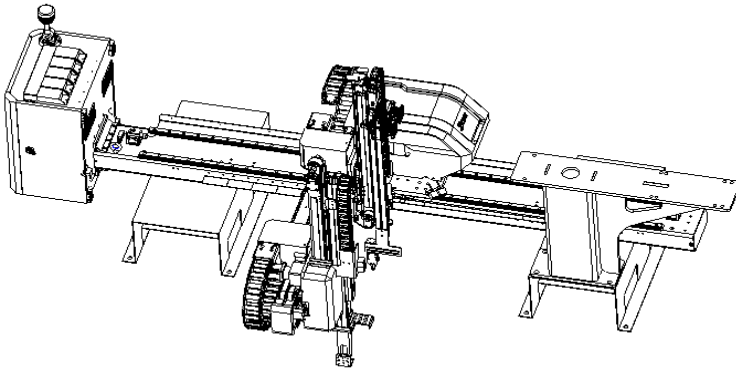
1. Remove the packing support plate should be careful to prevent the arm wrist and the machine damage or personal injury.

2. When hoisting the machine, it's necessary to adjust the sling length to achieve machine balance before lifting and moving.

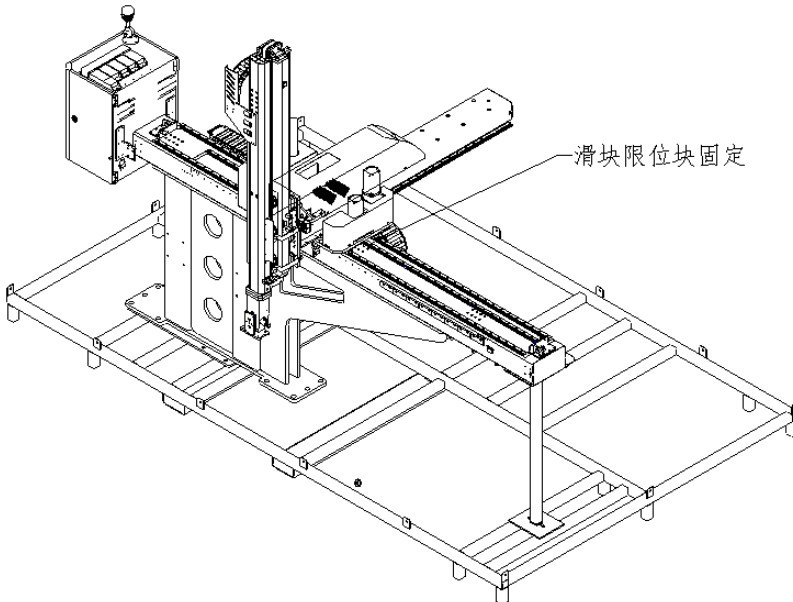
2. There is a hoisting ring in the components box in the robot package, after taking apart the robot package, install hoisting ring on the both ends of traverse arm, hoist the robot by the ends of traverse arm and crosswise arm. (See the picture).

Note:

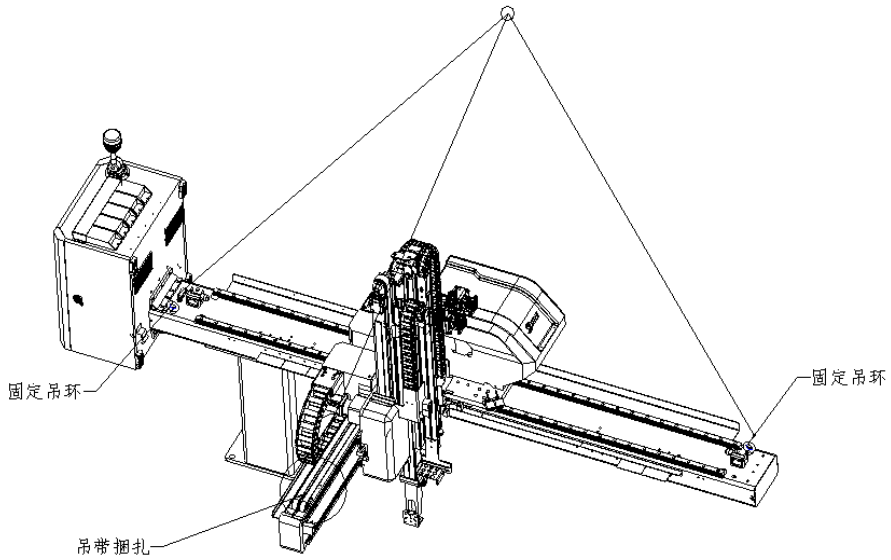
After hoisting of the robot, please loosen the hoisting rings. Then keep it and use it again next time.



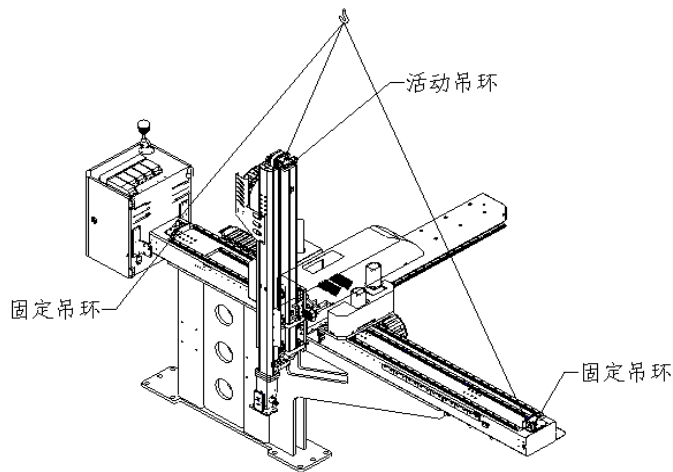
Picture 1-3: Small single stage/telescopic arm robot packing illustration



Picture 1-4: Larger ST3 telescopic arm robot packing illustration



Picture1-5: Small single stage/telescopic arm robot hoisting illustration



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Picture1-6: Larger ST3 telescopic arm robot hoisting illustration

1.4.6 Storage

- 1) Remove the compressed air supply and shut down the power, if the robot won't be use for a long time.

- 2) Robots should be stored in ventilated, dry room to prevent rusty and electrical components get damp.
- 3) The robot should be carried out anti-rust, and need to be place cover on it to prevent dust and rain erosion, if robot do not use for a long time.

1.4.7 Work Conditions

- 1) Temperature: Between +5°C to +40°C
- 2) Humidity: Temperature +40°C, relative humidity 50%
- 3) Elevation: Under 1000 meters above sea level.
- 4) Do not use the machine when the power wire was broken.
- 5) Do not use the machine when the air tube was broken.
- 6) Do not use the machine when the air pressure is not enough or too high.
- 7) Do not use the machine when the robot goes wrong or dismantles without professional, before the professional overhauling.
- 8) Do not use the machine when there are organic solvent, acidic phospholipids, sulfurous acid, chlorine and flammable and explosive dangerous matter in air.

1.4.8 Disposal of Robot

Dismantle the robot, when it went to the end service life and it's no longer used. When dismantle the robot to component parts, separate it (metal, oil and lubricants, plastics, rubber, etc.) by 7 different ways. Entrust the authorized commission company and abide the local laws and regulations of solid industrial waste treatment.

1.5 Exemption Clause

The following statements clarify the responsibilities and regulations borne by any buyer or user who purchases products and accessories from Shini (including employees and agents).

Shini is exempted from liability for any costs, fees, claims and losses caused by reasons below:

1. Any careless or man-made installations, operation and maintenances upon machines without referring to the Manual prior to machine using.
2. Any incidents beyond human reasonable controls, which include man-made vicious or deliberate damages or abnormal power, and machine faults caused by irresistible natural disasters including fire, flood, storm and earthquake.
3. Any operational actions that are not authorized by Shini upon machine, including adding or replacing accessories, dismantling, delivering or repairing.
4. Employing consumables or oil media that are not appointed by Shini.

Shini Hotline Service:

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2. Controller



F1 Robot Reference/Homing – By pressing F1 together with safety switch (aka dead man’s switch) at the side of controller to return to Home/Reference position.

F2 Robot stop (press F2 to stop auto-run and change to manual mode)

F3 Robot auto-run start (when key switch toggled to AUTO, press F3 to start auto-run)

Important Notice:

when robot working with IMM, to exit auto-run mode need to stop IMM auto-run first, and to start robot/IMM co-working auto-run need to start IMM auto-run first, which can avoid sequential mismatch problem.

F4 Reserved / Undefined button

F5 Reserved/ Undefined button

F6 Manual control flipping of EOAT (when robot in manual mode, press the button to flip the pneumatic flipping cylinder from horizontal/vertical to vertical/horizontal position)

- 1) Vacuum Suction Cup 1 (when robot in manual mode, press the button to suck or release of the vacuum circuit)

- 2) Vacuum Suction Cup 2 (when robot in manual mode, press the button to suck or release of the vacuum circuit)
- 3) Gripper 1 (when robot in manual mode, press the button to grip or release of the gripper circuit)
- 4) Gripper 2 (when robot in manual mode, press the button to grip or release of the gripper circuit)
- 5) Gripper 3 (when robot in manual mode, press the button to grip or release of the gripper circuit)
- 6) Gripper 4 (when robot in manual mode, press the button to grip or release of the gripper circuit)



Emergency Stop Button : Press the button to stop the robot immediately and the screen will show emergency stop message.



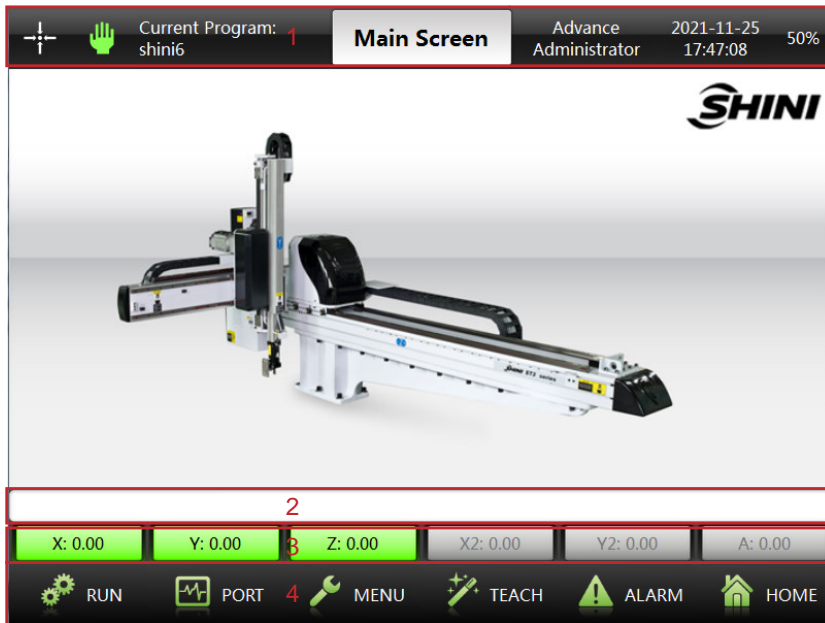
Function Key Switch: The robot enter Auto Run Standby mode when switch to AUTO, if switch to STOP the robot will stop Auto-Running and enter Auto Run Standby mode(which manual operation is not allowed), and the robot will enter manual mode for manual operation if switch to MANUAL.

2.1 Screen introduction

2.2 Basic module

The system is having consistent screen layouts for each function set and there are basic operating status and functions displayed on the screen for easier user reference and operation. Takes the main page for example to introduce the basic screen layout as below.

After turn on the robot, it will enter main page automatically as below :



1. **Current State Bar**: Show main system state such as, Homing, Auto/ Manual, program name, current user level, date/time, speed...
2. **Alarm Message Bar**: Show the latest alarm message.
3. **Servo Position**: Show current position of each servo and can enter servo control page by clicking any servo axis button.
4. **Function Menu**: Entering function and setup page by clicking this button.

2.3 Current state bar



Servo reference icon: show whether the servo reference points (home positions) located or not

	No reference points (Not yet Homing)
	Reference points located (Homing ok)

Operation mode icon: show current operation mode

	Manual mode: Enable manual operation.
	Auto Run standby mode: Able to operate in Auto Run, Single Cycle Run and Single Step Run.
	Auto Run: Full Auto, Automatically Run.
	Single Cycle Run: Automatically run one cycle of current program.
	Single Step Run: Run only one step of current program.

Current Program Name: Show current program name. Click the block will enter program management page.

Page Title: Showing current page title.

Current User: Current user level display here. There are 4 user levels which are: Operator, Advanced Operator, Administrator and Advanced Administrator. Click here will enter user management page for selecting user level (see user level chapter for details).

Time / Date: Show and set the current system Time / Date.

Overall Speed%: The actual running speed of each axis is “Overall Speed” multiplies “Running Speed” (at the servo position setting of Teach Program).

Function button

	Program Running page Here you can check current program running situation and perform Auto Run, Single Cycle, Single Step operation .
	Port Monitoring page Monitoring the port state of the system and able to manual operation of ports when in manual mode.
	Function Menu page Including system parameters, servo parameters, user interface and other settings.
	Teach Program page Conduct instructional program operations, including teaching new programs and modifying current program parameters.
	Alarm page Current and recent alarm details to facilitate analysis the cause of the alarm and error.
	Main page Return to Main page from each function page.

3. User Management

3.1 User level

There are 4 user levels as below:

- 1) **Operator:** The system default user level which doesn't need password and only perform basic operation such as Homing, Auto Run and I/O Monitoring ...
- 2) **Advanced operator:** Advanced operator password(changeable) is necessary and provide extra manual operation and select the program for running...
- 3) **Administrator:** Administrator password(changeable) is necessary and provide almost all operation other than limited by the system supplier.
- 4) **Advanced administrator:** Need advanced administrator password to login and perform all operation, including system recovery and software update/upgrade... It should be only for the system provider.

System user permissions are listed as below, √:enabled, ×:disabled:

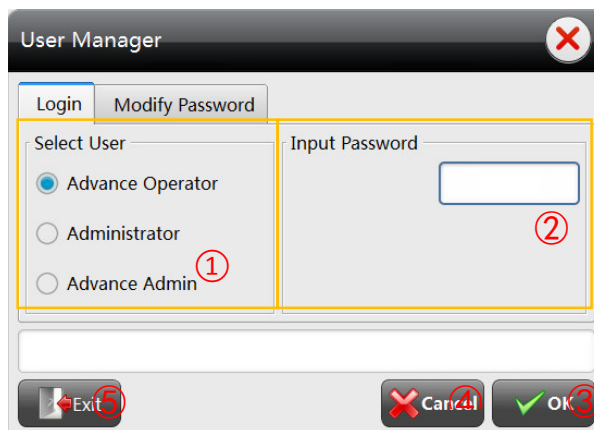
Table 3-1: System user permission table

Limit Function	Operator	Advanced Operator	Administrators	Advanced Administrators
Origin reversion	√	√	√	√
Select to load the current program	×	√	√	√
Program management	×	×	√	√
Modify system date and time	×	×	√	√
Servo operated	×	√	√	√
Program operation	√	√	√	√
Other manual operation	×	√	√	√
Teaching procedure	×	×	√	√
General system parameter	×	×	√	√
System signal	×	×	√	√

configuration				
System parameter reset	x	x	√	√
Servo safety zone parameter	x	x	√	√
Servo mechanical parameters	x	x	√	√
User interface settings	x	x	√	√
Mechanical positioning operation	x	x	√	√
System vendor maintenance	x	x	x	√
System software update	x	x	x	√

3.2 User Login

Click title status bar current user area, enter user management screen. The first page of user management screen is user login:



- 1) **Select user:** Select current enter user level. Operator need not password enter, so could select enter user level are senior operator, administrator, senior administrator.
- 2) **Input password:** Input need to login user level password.
- 3) **OK:** Click “OK” button to finish user login operator.
- 4) **Cancel:** Click “Cancel” button to give up user login and return former screen.

- 5) **Exit:** Click “Exit” button to logout current user, user level return to default operator level.

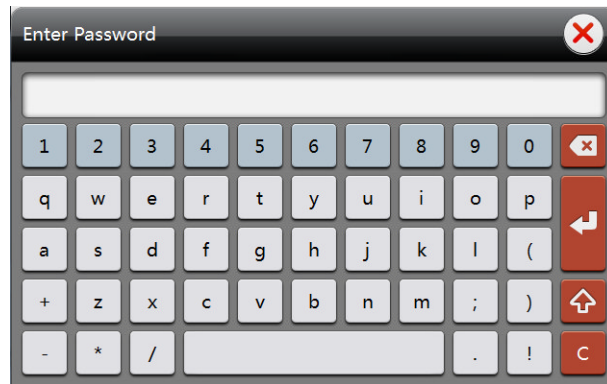
3.3 Change Password

The second page of User Management screen is password modify, basic operation is the same as user login:

- 1) **Input old password:** Input the user level old password to modify.
- 2) **Input new password:** Input the user level new password to modify.
- 3) **Confirm password:** To prevent input errors, need to input new password again. Two of the new password must input same that can modify success.

3.4 Password Input Method

User password length could be specified between 1 to 8 letters or digits, no matter uppercase or lowercase letters. Click password input box will popup a virtual keyboard, as shown below:



- 1) **Password show:** Show input password, at least one character, at most eight characters.
- 2) **Return:** Delete one password character before the cursor.
- 3) **Enter:** Confirm current input password.
- 4) **Large/small letter switch:** Switch keyboard large/small letter.
- 5) **Clear:** clear all characters.

4. System Program Management

4.1 Interface Introduce

Click the current program name on title status bar enter system program management screen. System program can save at two positions: system storage and USB storage. In program management screen can change program between system storage and USB storage, use USB storage as intermediary, is convenient to share program in different system.

Program management screen as shown below:



- 1) **Program list:** Display system all program list; click head of list will take program display by corresponding, such as click file name that click head will display program by the name of ascending/descending.
- 2) **New file name:** when perform operate new, rename and save as, need to input new file name.
- 3) **Load:** Select program from program list load as system current program
- 4) **New:** Create a new empty program; program name is the new file name input box.
- 5) **Rename:** Select program from program list rename the name of new file name input box.

- 6) **Save as:** Copy the list select program, new program named the new file name input box.
- 7) **Export to U disk:** export the program selected in the system memory to U storage. When it inserts the U disk, it can import the program selected in the U storage into the system memory.
- 8) **Delete:** Delete the select program from list.
- 9) **Template directory:** In non-teaching mode, import to this directory from the U disk, it can adjust the program by command configuration.
- 10) **System/USB memorizer:** Display program list show which memory program ,and click this button can switch list memory position;
- 11) **U catalogue:** Displays the program directory in the U disk.

Note:

1. Before unplugging the U memory, please click the [Pop-up] button in the lower left corner of the screen, and then remove the U memory safely.

2. U disk format fat32, capacity below 16G, support 2.0 interface.

4.2 Export Program Operation

From system storage export program to USB storage operational process as follow:

- 1) Plug in USB storage;
- 2) Switch program list to system storage;
- 3) Select list need to export program, it is means system storage export program; such as select Test 2;
- 4) Input new program file name; such as input Utest2;
- 5) Click [export] button, take export operation; now the Test 2 in system storage will copy to USB storage, file name is Utest2;
- 6) Click [pop up] button, pop up USB storage;
- 7) Pull out USB storage, export program operation finished.

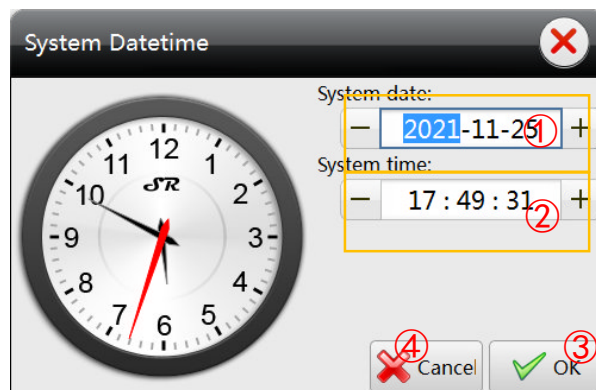
4.3 Import Program Operation

From USB storage import program to system storage operational process as follow:

- 1) Plug in USB storage;
- 2) Switch program list to USB storage;
- 3) Select list need to import program, it is means USB storage import program; such as select UTest3;
- 4) Input new program file name; such as input Test3;
- 5) Click [Import] button, take import operation; now the Utest3 in USB storage will copy to system storage, file name is Test 3;
- 6) Click [popup] button, popup USB storage;
- 7) Pull out USB storage, import program operation finished.

4.4 Modify System Date Time

Click the system current date time on the title statue bar that on the right upper corner of the screen, enter system date time modify screen:



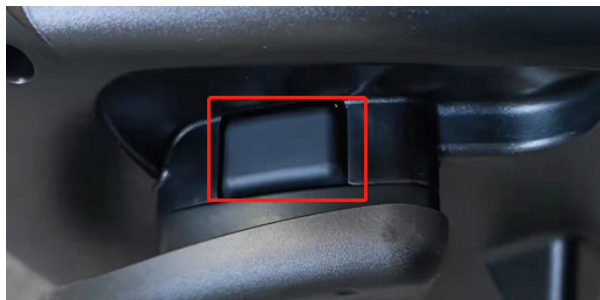
- 1) **System date edit box:** enter the modify system date. Click the part of modify date, then press +/- button adjust value; Such as click year, put the edit cursor set to the date of year, after that press +/- button adjust year set value.
- 2) **System time edit box:** Enter need to modify system time. Click the need to modify part of time, then press +/- button adjust value; such as click hour, put edit cursor set to the time of hour, after that press +/- button adjust hour set value.
- 3) **OK:** Confirm input date time and modify system current date time.
- 4) **Cancel:** Give up system date time modify, and return to previous screen.

The earliest system date can modify to January 1, 2000, date display format is year-month-day; system time is 24 hours format, time display format is hour: minute: second.

4.5 Manual Operation

4.5.1 Manual Safety Switch (aka “Dead Man’s Switch”)

In order to avoid error operating, dangerous moving, it has manual safety switch at the backside of controller; by pressing manual safety switch to carry out control in manual mode. Safety switch position as below:



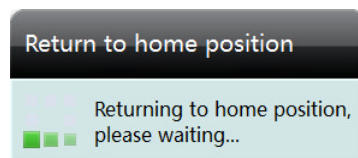
Picture 4-1: Manual Safety Switch

Manual safety switch has 3 way pressing as follow:

- 1) **Switch release:** Forbidden state, forbid manual operate robot.
- 2) **Press half:** ON statue, allow manual operate robot.
- 3) **Press all:** Forbidden state, forbid manual operate robot.

4.5.2 Servo axes Homing (Return to Reference/Home Position)

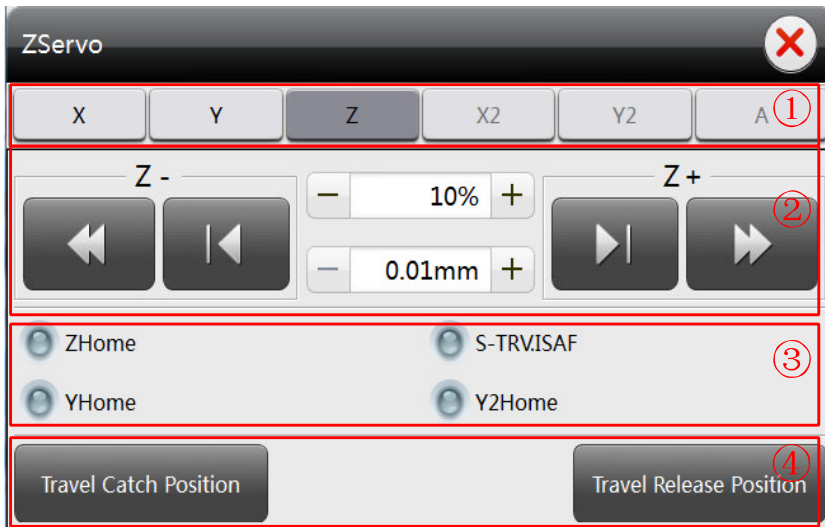
No matter which page is showing on the controller, as long as it's in manual mode, press half of the manual safety switch and press the “F1 Reference/Home” button at the left upper corner of the controller to return to Reference/Home position.



During the servo Homing, it will cause to stop Homing immediately if release or press all the manual safety switch.

4.5.3 Servo Manual Control

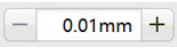
When system is in manual mode, click any servo position button above the function button bar on screen. Then entering the servo manual control branch page. (The operation is not allowed if the servo not yet Homing):



- 1) **Select current servo axis:** Select an axis you want to control by pressing that axis's servo position button at servo control branch page on screen.
- 2) **(2)Servo control:** Manually operate servo to move forward or reverse, adjust servo speed, setting of servo fine tuning distance.

Servo forward/reverse operate

Hold the forward or the reverse button to move servo forward or reverse, release the forward or the reverse button to stop moving.

- 1) Fine-tune the servo position by clicking the forward or the reverse button once and the fine-tuning distance and unit is shown and adjust here .
- 2) **(3)Safety sign display:** Display system safety area signal to let user know servo position at any time, which is convenient of user to control servo.
- 3) **(4)Rapid positioning (Shortcut):** For rapid positioning to the particular position. Different servo axis has its different rapid position.

- 4) Check “Shortcut” at “Servo Setup” of “Function Menu” page for rapid position settings.

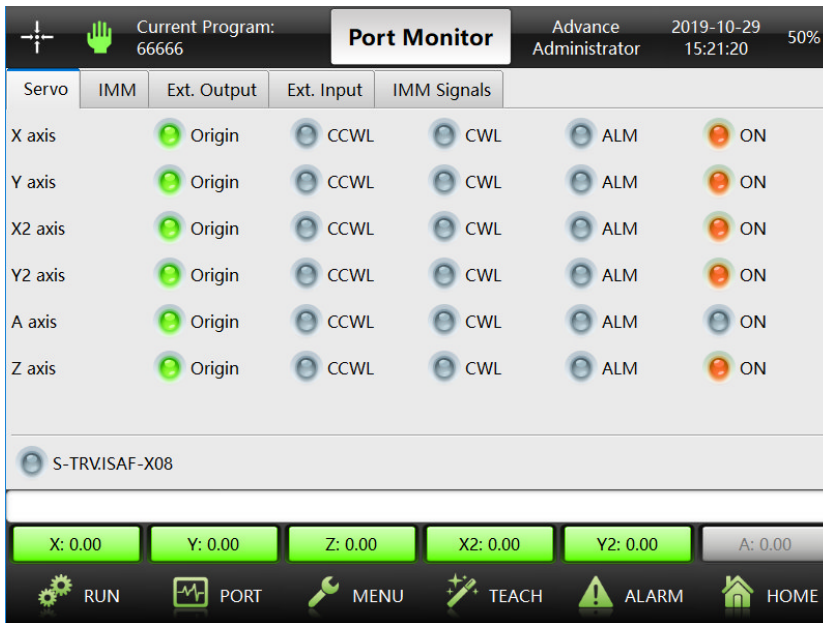
When manually operating or fine-tuning a servo, must press half manual safety switch, if release or press all the manual safety switch.

4.5.4 Output Port Manual Control

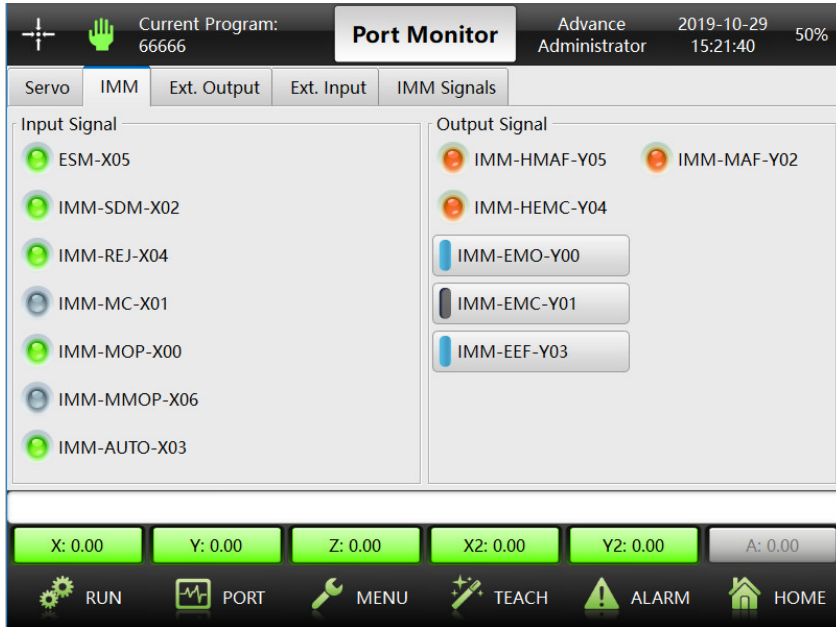
In manual mode, press the “Port” button at the bottom of screen to enter the “Port Monitor” page, you can manually control the port output.

The ports can be manually controlled are: IMM output ports, extended ports of each modules and robot output signal ports.

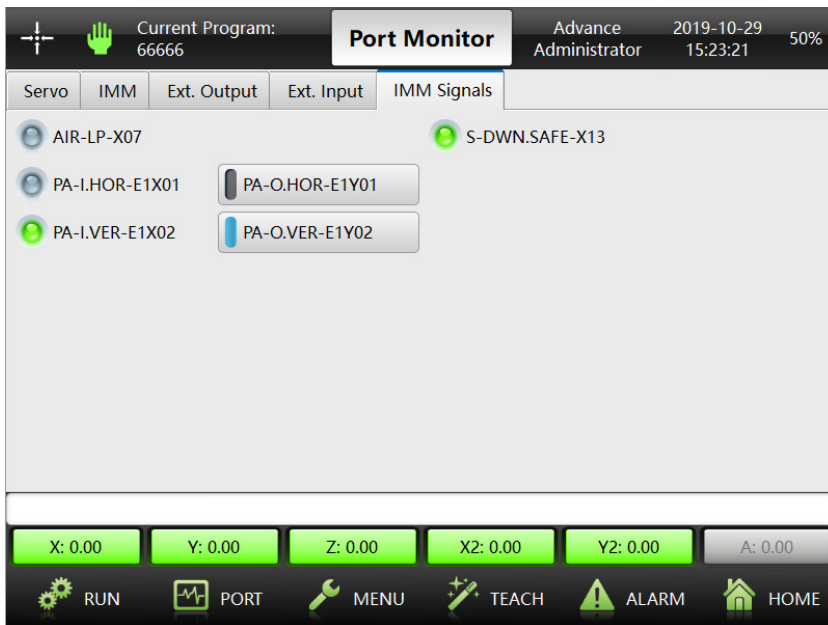
Servo signal: Able to monitor each servo axis’s Home position (origin), limit position (CCWL & CWL), alarm, activation, safety area signals.



IMM signal: Able to monitor and control IMM input/output signals.



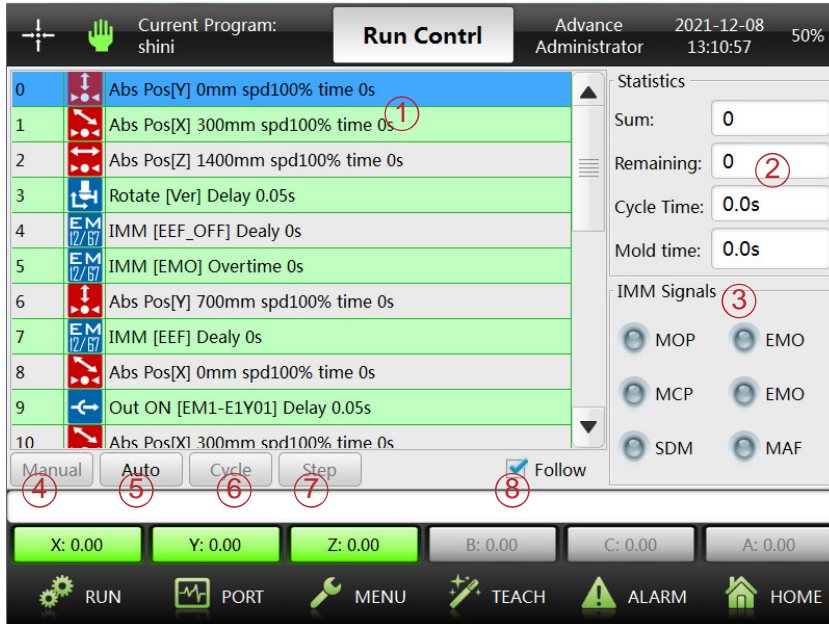
Robot signal: Monitor and control the signal of robot pneumatic circuit. Click to turn on (light on), and click again to turn off (light off).



For extended output ports, it need to activate the safety switch (dead man switch) first before controlling them to avoid accident.

4.6 System program run

Click the RUN button to enter Run Control page. This page allows you to perform operation control of current loaded program such as manual, auto, single cycle and single step. Run Control page as below:



- 1) **Current program instructions list:** Display current program instructions list.
- 2) **Statistics:** Display the related statistics information of auto mode.
 - **Sum:** The accumulation of take-out product quantity when system running automatically.
 - **Remaining:** When the production plan has been set, show the remains of the production.
 - **Cycle time:** The estimated time to finish a production cycle when system run automatically.
 - **Mold time:** The time from received the “Mold Opened Signal” to the “Enable Mode Close Signal” is given.
- 3) **IMM. signals:** Display IMM related signal which is convenient for customers to check IMM information at any time.
- 4) **Manual:** If the system is in auto standby mode, click “Manual” button to operate system manually. If the system is in auto run mode, click manual button to stop auto running and transfer to auto standby mode.

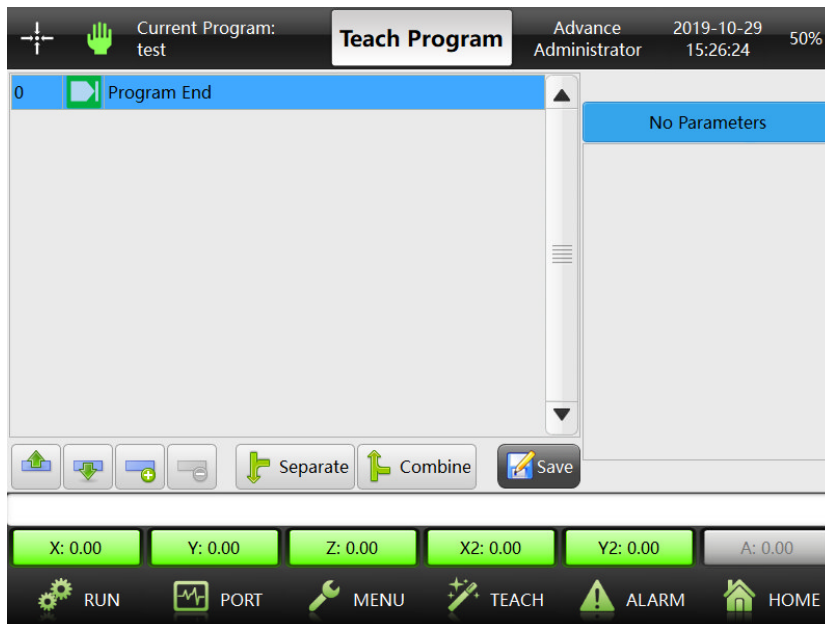
- 5) **Cycle:** If the system is in auto standby mode, click “Cycle” button will run current program only one cycle then remains in auto standby state.
- 6) **Step:** If the system is in auto standby mode, click “Step” button will run only current step(1 step only).
- 7) **Follow:** When system in auto run mode, program instruction list will follow current program instruction by pressing “Follow”.

4.7 Teach Program





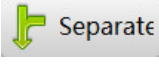
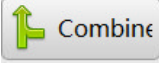

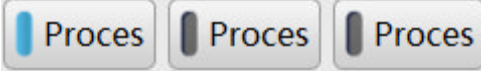
4.7.1 Instruction interface presentation

In teach program, allow you to edit and modify the current program that was loaded in the system. Click “Teach” function button to enter “Teach Program” page. If the system is in manual mode when entering “Teach Program”, you can modify the current program(in manual mode) which includes Add / Delete instruction、 adjust each axis position, edit instruction parameter, etc. If the system enters “Teach Program” in auto mode that can only modify action instruction parameter.

Teach Program as follow:



- 1) **List:** Display current program instruction list.


- 2) **Parameter:** Display the parameter of the current instruction that had been selected from instruction list.
- 3)  **Up:** Move the current selected instruction up to previous instruction.
- 4)  **Down:** Move the current selected instruction down to next instruction.
- 5)  **Add /Insert:** Inserts a new instruction between currently selected instruction and next instruction.
- 6)  **Delete:** Delete current selected instruction.
- 7)  **Separate:** In a combination of several instruction, press “Separate” to separate the selected instruction with the previous instruction.
- 8)  **Combine:** Combine the currently selected instruction with the previous instruction.
- 9)  **Save:** Save current modified program instruction and parameter.
- 10)  **Multi process function:**

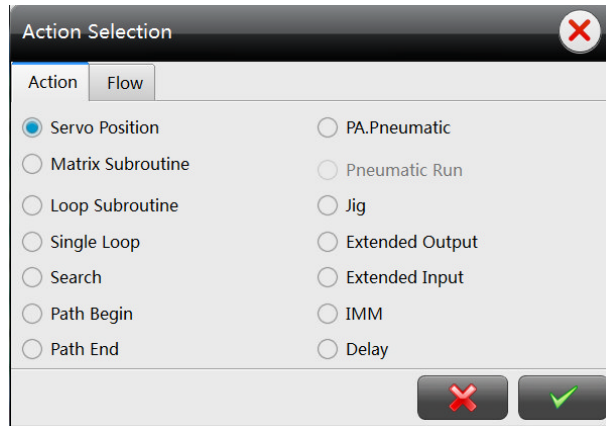
The system supports three processes running at the same time.

Each servo axis available in one process of use. System doesn't allow two and more than two processes using the same servo axis, such as: X servo axis had been selected by process 1, then the X servo axis is unavailable in process 2 and process 3 of use.

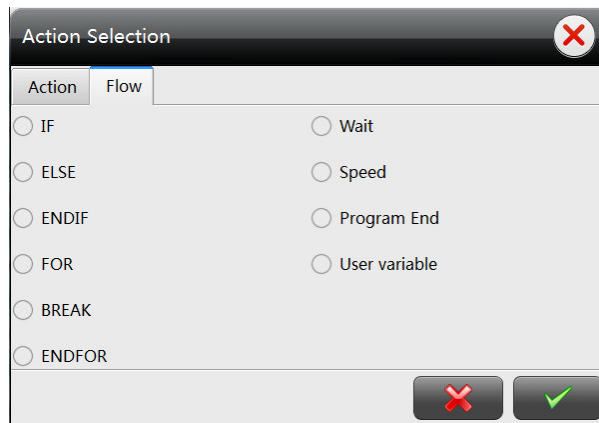
Other pneumatic actions can be use indifferent processes at the same time, the action sequence, which process command first which process actives that instruction first.


IMM instructions can only be use in the “First Process”, other processes can't.


Press Add/Insert  button then enter the “Action Selection” branch page:



The Action Selection branch page has two pages (Action/Flow), the first page shows the action instructions, and the second page shows the process instructions.



Select the instruction you want and click , then enter the corresponding instruction parameter interface.

Click  to close and leave.

4.7.2 Instructions description

Add >Action Selection > Action

Servo single axis running instruction: The parameter range is shown below, click the circle to select the corresponding axis. Here selects the X axis, the parameter refers to the position of X axis, and you can directly enter the coordinates/position you want here. Otherwise, you can manipulate the selected axis to the desired position and then click on the corresponding axis

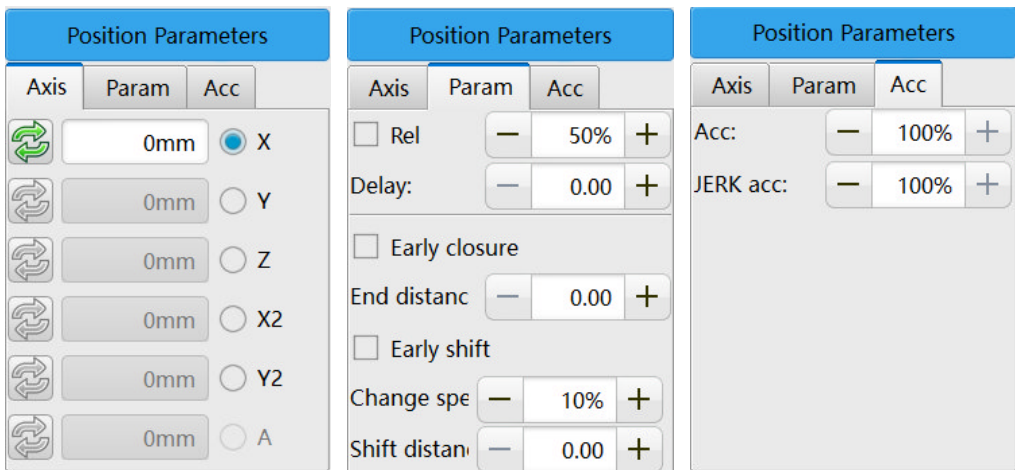


Key to synchronize the real-time position to the selected axis parameter.

At top of the parameters setting page is the speed of the selected axis when it run automatically and whether the current command position is relative or absolute.

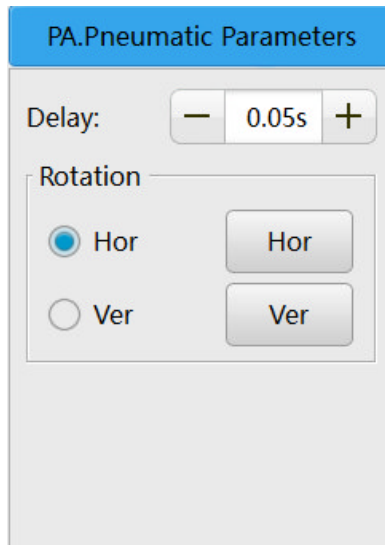
Relative position: It's the distance robot have to run from the previous position (of the same axis) to the relative position.

Absolute position: It's relative to the 0 coordinate point. Don't mark at the box of Rel to use absolute position instruction.



- 1) Speed: Set running speed of current instruction.
- 2) Relative position: The relative distance from the designated position of current instruction.
- 3) Delay: After arrive the designated position, delay the set time and then run next instruction.
- 4) Early Closure: Start next instruction before arriving the designated position of current instruction by giving a position to start next instruction when arriving it.

- 5) Early Shift : Change speed before arriving the designated position of current instruction by giving a position to change speed when arriving it.
- 6) Change speed: Change speed at a given distance.
- 7) Shift Distance: Defined the position to change speed by distance to the designated position of current instruction.
- 8) Acc: Acceleration.
- 9) Main arm pneumatic instruction: The instruction parameter had the delay time, and the rotation of the end of arm tool (side position cylinder).



The image shows a control panel titled "PA.Pneumatic Parameters". It features a "Delay:" field with a numeric input set to "0.05s" and minus/plus adjustment buttons. Below this is a "Rotation" section with two radio buttons: "Hor" (selected) and "Ver". To the right of each radio button is a corresponding button labeled "Hor" or "Ver".

Sub arm pneumatic instruction (PA. Pneumatic Parameters): The instruction parameter had the delay time, and the rotation of the end of arm tool (side position cylinder).

To use sub arm, you have to active "Enable Pneu RA" first by the following way : Main Page > Menu > System > Initialize > Enable Pneu RA

Matrix positioning: refers to X, Y, Z, three axes regular stacking.

Mode: Check the sub arm, indicating to the use of sub arm (Y2) to stack and not use of the main arm(Y) to stack, by default, indicates the main arm to stack.

Matrix Subroutine Para

Pattern Matrix Servo

Sprue Horizontal

Vertical reference plane

Trv rot hor

Counter: Counter-500

Sorting:

X	↑
Y	
Z	↓

If the “Horizontal” had not been marked that means the end of arm tool (side position cylinder) is Vertical, otherwise the end of arm tool (side position cylinder) is Horizontal.

The “Vertical reference plane” had not been marked means take the horizontal plane as the reference plane, otherwise, if it had been marked means take the vertical plane as the reference plane.

The count Counter-500 is the internal counter used to count the accumulated stack number, initial values are able to set in program initialization. The initial value let the stack start from the specified location. The initial setting must not exceed the total number of stacks, it’s invalid to exceed the total number of stacks. The counting starts from 0 to the total of stacks and recount from 0 automatically.

Select the axis and press   Key to adjust servo action sequence.

Matrix: sets the number of points in each axis and the distance between points.

Matrix Subroutine Parameters			
Pattern	Matrix	Servo	
XPos:	—	1	+
YPos:	—	1	+
ZPos:	—	1	+
XInterval:	—	0.00	+
YInterval:	—	0.00	+
ZInterval:	—	0.00	+

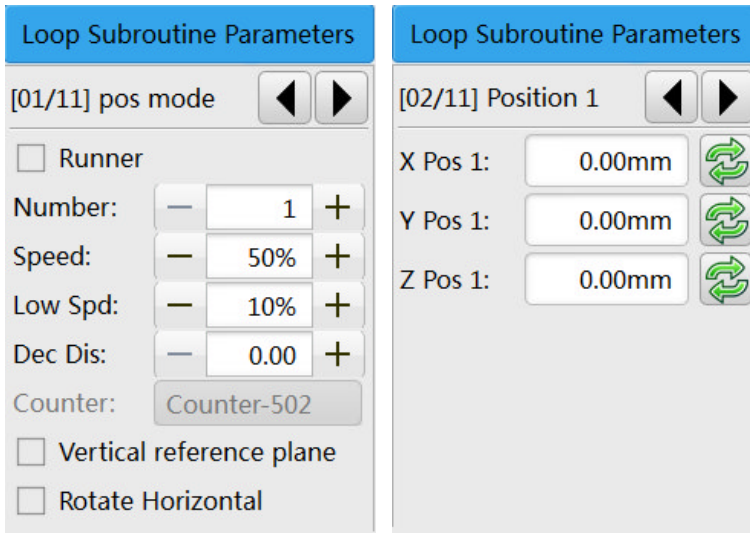
Servo: set the servo speed, the low speed of the reducing axis, the deceleration distance and the first position of each axis (optional relative).

Matrix Subroutine Parameters			
Pattern	Matrix	Servo	
Speed :	—	50%	+
Low spd :	—	10%	+
Dec Dis:	—	0.00	+
First Position			
X:	0.00mm	<input type="checkbox"/>	Relative
Y:	0.00mm	<input type="checkbox"/>	Relative
Z:	0.00mm	<input type="checkbox"/>	Relative

Cycle positioning: Positioning X, Y, Z, three axes to any position and the maximum amount is 100 points.

The location mode parameter is the same as the matrix location.

Positioning points X, Y, Z coordinate position, you can manually position, or synchronous real-time position.



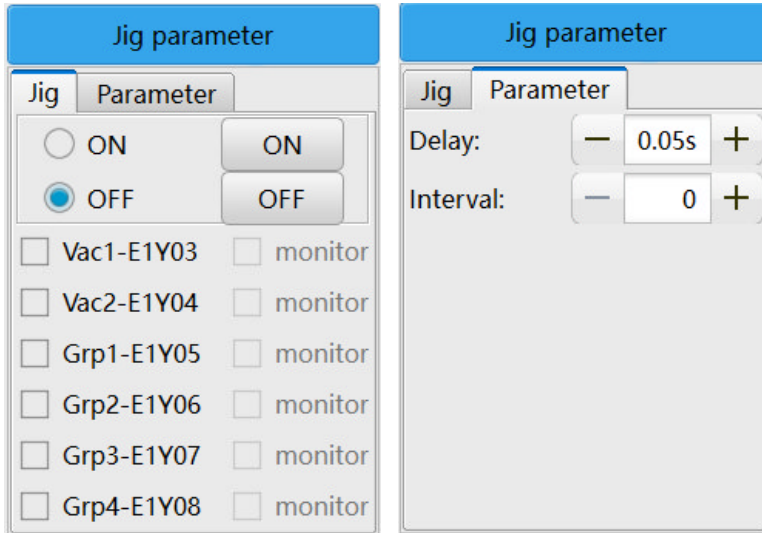
Jig/Gripper parameter instruction: Select On/Off to turn on/off the monitoring of jig/gripper. Output port click the to enter the port interface to select corresponding ports.

Input port and output port have the same way of operation.

Delay: Activate time is determined by the parameters of the “Delay” time.

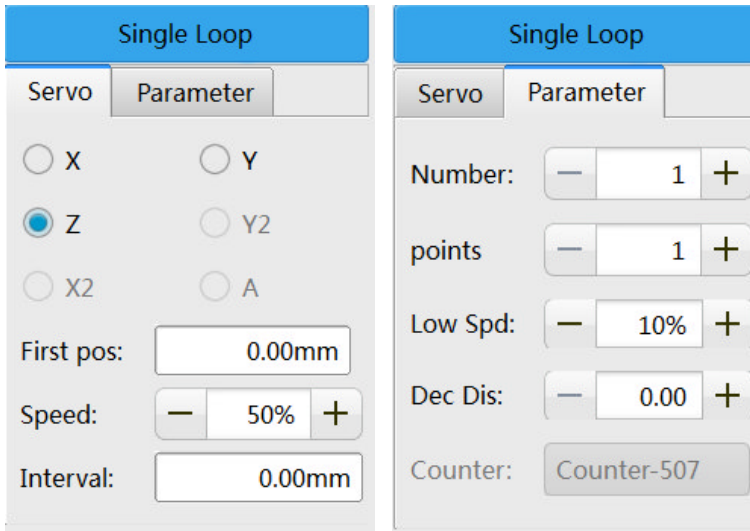
Interval: The output interval value “0” means no interval, the interval unit is the modulus, and a plurality of modes is arranged to output or detect the input at intervals;

No matter how much the interval value is, it will start counting from the first modulus. The interval function activate from the second modulus.



Single cycle positioning: single axis circular positioning instructions.

Servo optional, any single axial stack, the first point, click coordinates, display area will pop up the digital input box, enter the location to be positioned. The parameter interface can set the location points, the number of times per point (which can be considered as the number of layers per location). The running speed, interval, counter and matrix location are the same.



Extended output Parameters: Control each output port actions as open, close, pulse, take back.

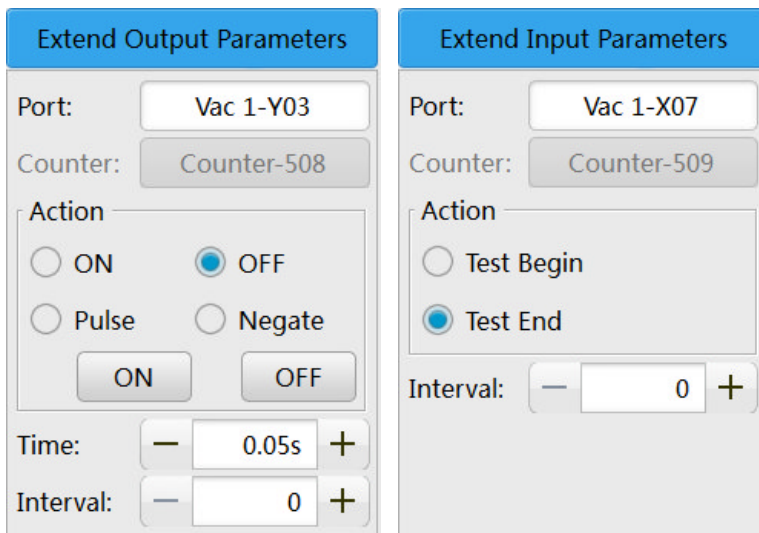
Port: Port selection.

The counter function starts counting only when the interval is not 0, otherwise the default is 0.

“Time” as the activating time of current instruction before next instruction be activate.

Interval: The unit is modulus, if the value is “0”, every modulus will output. If the value is “n”, each output has “n” modulus as interval which means after first.

The port operation is the same as the instruction selection port operation. modulus and output is “n+1” modulus and output. All output/input intervals are equal.



The image shows two side-by-side screenshots of software parameter settings. The left screenshot is titled "Extend Output Parameters" and shows: Port: Vac 1-Y03, Counter: Counter-508, Action: OFF (selected), Pulse (selected), Negate (deselected), Time: 0.05s, Interval: 0. The right screenshot is titled "Extend Input Parameters" and shows: Port: Vac 1-X07, Counter: Counter-509, Action: Test End (selected), Interval: 0.

Extended input Parameters:

Port: Port selection.

Test Begin: Turn on the input detection signal.

Test End: Turn off the input detection signal.

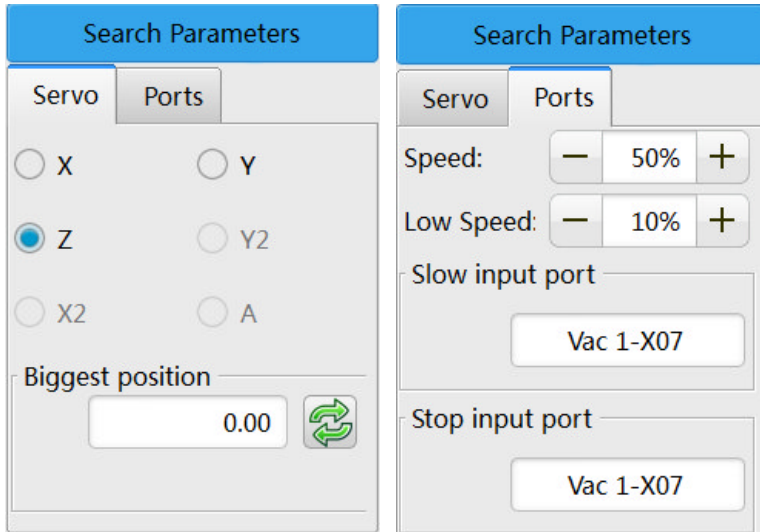
“Search” instruction parameter: A selected axis searches for input ports signal from the last position to a given position “Biggest position”.

If it detected a deceleration signal from input port, the selected servo axis changes to “ Low Speed” running.

If it detected a stop signal from input port, the selected servo axis stop running.

Speed: It's the speed at which the servo doesn't detect a deceleration or stop signal from input port. If doesn't use deceleration signal, it is recommended that the "Speed" shouldn't be too high.

Low Speed: When it detected deceleration signal, the selected servo axis changes speed to the given "Low Speed".



IMM Instruction: Work with the plastic injection molding machine.

Wait MOP: It will wait for the "Mold Opened" signal within the given "Time". It will alarm when it doesn't got the MOP signal.

Time: The waiting time for the MOP signal. Set the Time value to "0" to turn off this detection.

EMC: Enable Mold Close

EEF: Enable Ejector Forward

EEF OFF: Turn off Enable Ejector Forward

EEB: Enable Ejector Backward

EEB OFF: Turn off Enable Ejector Backward

Wait MOP: Waiting for Mold Opened Signal

EC1P1: Enable Core 1 forward

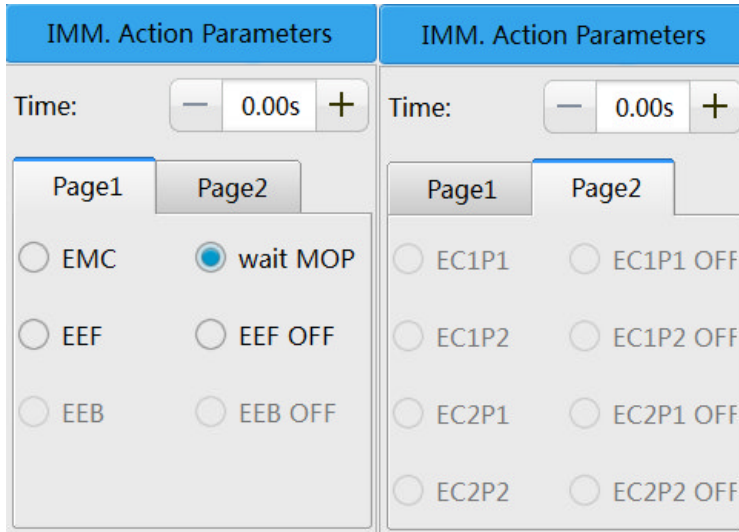
EC1P2: Enable Core 1 backward

EC2P1: Enable Core 2 forward

EC2P2: Enable Core 2 backward

EC1P1 OFF: Turn off Enable Core 1 forward

EC1P2 OFF: Turn off Core 1 backward



Delay instruction: Set a delay time.

(2)Add > Action Selection > Flow

IF condition instruction: To determined and decide what to do.

ELSE condition instruction: "Or" "Otherwise".

ENDIF condition instruction: End the previous IF condition instructions.

Above three instructions are generally used in conjunction with the execution of the program to a branch.

Method: The "IF" variance[] is activate (IF condition determines) / / in parentheses is the determine condition and followings are optional {user variables, extension inputs, extension outputs, system variable, systems, I/O

.....

.....

} // within the bracketfor conditions of the activated implementation of the program content

(ELSE or otherwise) // condition

{

.....

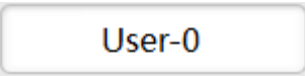
.....

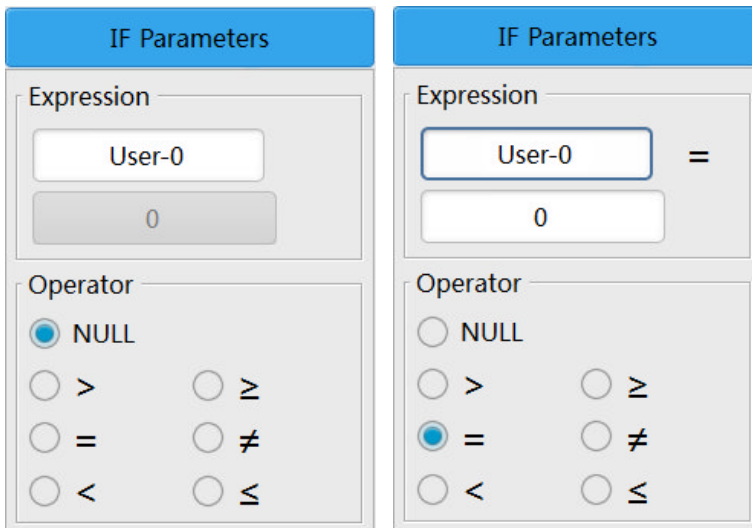
the back curly bracket} / / otherwise for the condition executing program content

End (ENDIF) / end condition (usually inserted into the IF conditional instructions will automatically insert end instructions.)

For Example:

Asbelow picture the “Expression” in the IF Parameters , the content is the

determine condition,click  to enter theuser variables selection interface: Then you can select user variables, extended input, extended output, system variables, and system I/O (after entering the selection interface, the same as the Jig/Gripper selection interface). Select “NULL” when the condition is valid, select the following “Operator”, and the second display boxes in the “Expression” become optional, optional constants, user variables, and system.



FOR: Cycle control

BREAK: Skip cycle

ENDFOR: End cycle instruction: the need to repeat the procedure perform some action.

Methods as follows:

Cycle time (FOR) (loop control instructions) // in parentheses is the cycle number optional constant or variable

{

.....

"Cycle jump" (BREAK cycle jump instruction) / cycle and condition judgment with the general out

.....

End the cycle by satisfying the set conditions

} // curly brackets for recycled content

Loop end

For Parameters

Constant

Constant: - 1 +

Variable

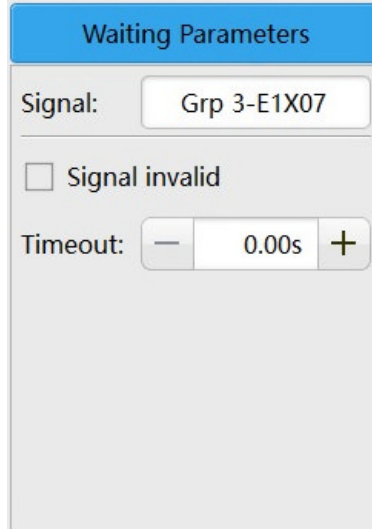
Variable: User-0

Wait: Wait for port signal.

Signal: Allsignal portsareoptional.

Signal invalid: Wait port signal valid or invalid is optional.

Timeout: Set the time value as "0" for keep waiting till it gets the signal. If set the time value more than "0", the robot will alarm when the time due.



Speed: Servo speed adjustment, select a servo axis and set the speed. It will conjunction with conditional determinate, when it comes with the conditions then change the speed.

Program end: The end of the program: Let the program end in advance and return to the first instruction to restart the program. It will conjunction with conditional determinate, when it comes with the conditions then end the program.

User variables: Separate arithmetic operations for operating user variables.

“+” : Adds the user variable to the operand and saves the resulting value into the user variable.

“x” : Multiplies the user variable with the operand and saves the resulting value into the user variable.

“-” : After subtracting operand from user variables, the values are stored into user variables.

“÷” : After dividing user variables with operand, the values are stored into user variables.

“=” : Sets the value of the user variable to the value of the operand, assigning the value of the operand to the user variable.

“%” : Variables and the number of operations will be the remainder after dividing value into the user variable.

User Variable Parameters

Variable:

Operand:

Operator

<input checked="" type="radio"/> +	<input type="radio"/> ×
<input type="radio"/> -	<input type="radio"/> ÷
<input type="radio"/> =	<input type="radio"/> %



: In a combination of instructions, to separate the current selected instruction with the previous instruction.



: Combine the current selected instruction with the previous instruction.

In the combination of instructions, it's not available for using following instructions and condition instructions as "ELSE", "Program End", "Wait", "Matrix Subroutine", "Loop Subroutine", "Single Loop", "Search", "Delay", "User Variable" and the condition instruction can't be embedded as well.

The combination of instructions can only have one Y servo axis position and one Z servo axis position.















About the servo axis instructions in the combination of instructions, the followings are not available:

1. Main arm pneumatic cylinder can't flip 2 times.
2. Sub arm doesn't allow to move horizontally twice. (crosswise movement)
3. Sub arm doesn't allow to move up and down twice.
4. Two different extended input function can't manage to control the same extended input.
5. Extended function and Jig/Gripper function can't manage to control the same extended input or output.

6. Arithmetic statement can't be used in.
7. Only allow the "Enable Mold Close" to be put in the combination of instructions, but put it twice in the same combination of instructions doesn't allow.
8. A combination of instructions allow you to activate not over 30 functions at the same time.

4.7.3 Instruction Procedure Example

The standard three axis robot –pick up products within the mold and put the products outside of mold – program example (Set the servo position to your actual position before operation).

0		Abs Pos[Z] 0mm SPD 50
1		Jig Close[Vac 1-Y03_Vac 1-X07] Delay 0.05s
2		IMM [EMC] Delay 0s
3		Rotate Ver Delay 0.05s
4		Abs Pos[Y] 0mm SPD 50
5		Abs Pos[X] 0mm SPD 50
6		Abs Pos[X] 0mm SPD 50
7		Abs Pos[Y] 0mm SPD 50
8		Rotate Hor Delay 0.05s
9		IMM [EMC] Delay 0s
10		Abs Pos[Z] 0mm SPD 50
11		Abs Pos[Y] 0mm SPD 50
12		Abs Pos[Y] 0mm SPD 50
13		Program End













Special application condition:

When the program runs to a position and has to wait for the input signal within the set time, if it gets the signal then to do the function, if it doesn't then get the signal within the set time then to do another thing.

But it's not applicable of use of "Wait" signal due to the system will sound the alarm when the signal has not been detected within the set time. We can do our own waiting instructions as the following way.

Program example:

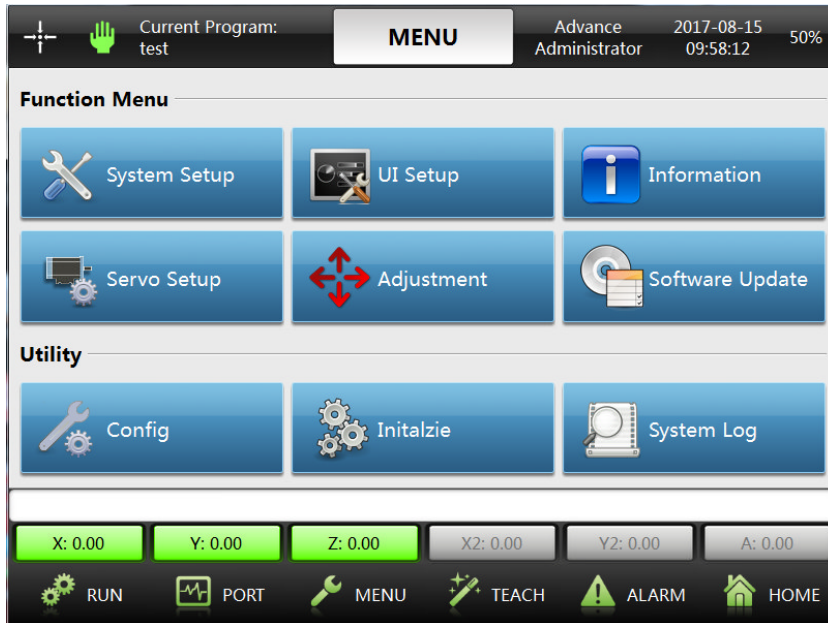
When it gets the X03 input signal within 5 seconds, then opens the Y09 output pulse for 2 seconds before automatically turn off. If there is no signal for X03 input within 5 seconds, then opens Y10 output pulse for 2 seconds before automatically turn off.

0		FOR 50 Times
1		IF Var [EM1-E1X03] Valid
2		Loop Break
3		ENDIF
4		Delay 0.1s
5		ENDFOR
6		IF Var [EM1-E1X03] Valid
7		Out Pulse [EM1-E1Y09] Width 0.05s
8		ELSE
9		Out Pulse [EM1-E1Y10] Width 0.05s
10		ENDIF
11		Program End

5. Function Menu

5.1 Function Menu Screen

Click the “Menu” button at the bottom of the page to enter the function menu.

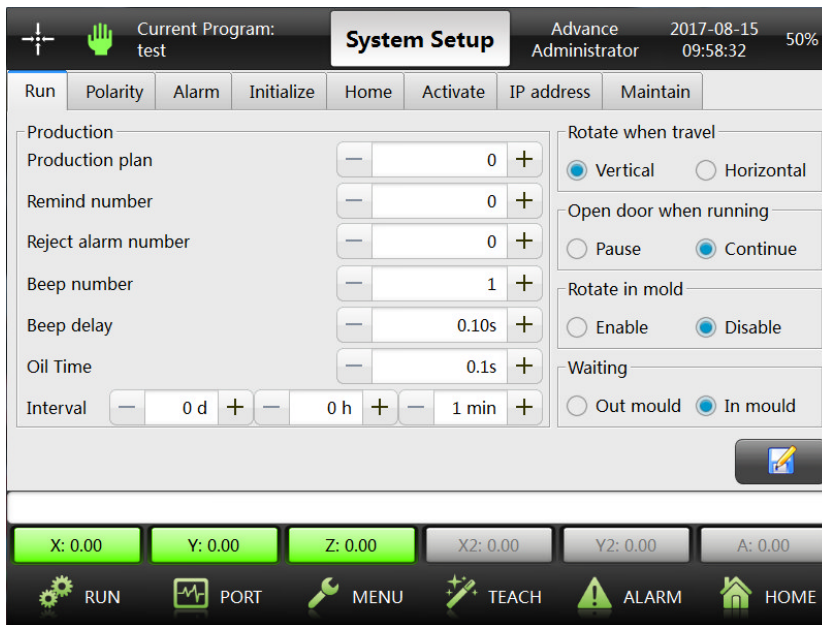


- 1) System Setup: Includes Running Parameters, Signal Input, Signal Output, Input Alarm, Initialize Settings, Settings of Homing, System Activation, IP, Settings of Maintenance.
- 2) Servo Setup: Includes servo parameter, servo safety zone for each axis, servo mechanical parameter (travel, direction), etc.
- 3) UI Setup: Set the relevant parameters of the controller interface, including language, screen parameter setting, etc.
- 4) Adjustment: It allows to adjust the servo position at low speed. Without being homing in “Adjustment” operation, it won’t activate any safety restrictions when positioning, however the limit (proximity sensor) is still valid. After being homing, it allows to adjust position between the home position and the maximum stroke.
- 5) Information: Display manufacturer information etc.
- 6) Software Update: Upgrade the control system software, change the manufacturer's information, maintain parameters, change the port name, and export the system log.

- 7) Configuration: Program parameters in a configurable program template.
- 8) Initialize: Sets the initial value and the variables of the program.
- 9) System Logs: It recorded the daily operation information of the robot and separated by different level of User.

5.2 System Setup Page

“Run”– Running parameter settings





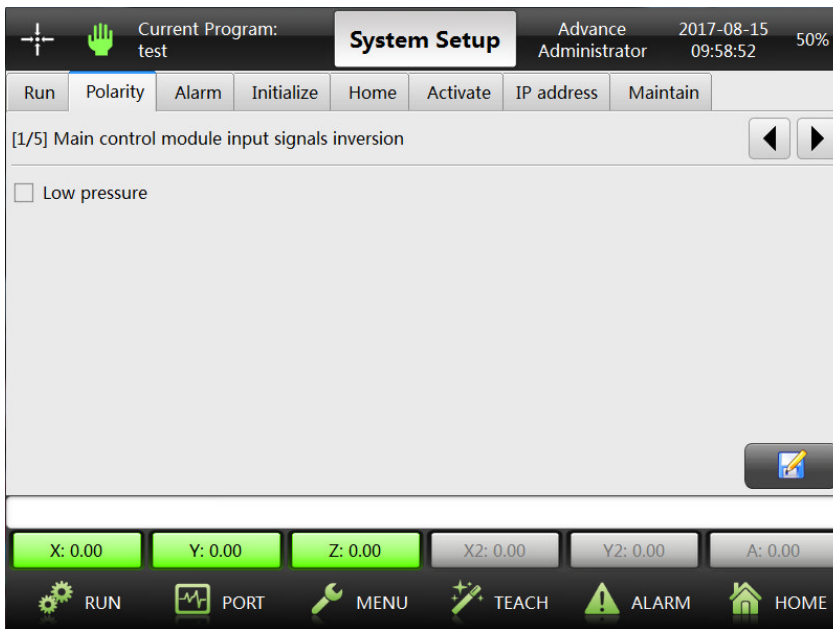
- 1) Production management:
- 2) Production plan: Planning for production quantity and arrange the production plan of the product. When the quantity of production matches the “Production plan” value, the robot will stop running and remind you that the production plan has been completed. Set the value of “Production plan” as “0” to turn off this function.

- 3) Remind number: To set a production quantity, when robot achieves the production quantity the system will remind you and temporarily stop the Auto running mode and remind. When the system reminds, press the Auto running button or open and close the safety door of injection molding machine once, the production process will continue to run Auto running mode. Set the value of "Remind number" as "0" to turn off this function.
- 4) Reject Alarm number: To set an accumulated quantity of reject (defective products), when it achieves the quantity of reject the system sounds an alarm to remind you that the quantity of reject (defective products) is surpassing. Set the value of "Reject Alarm number" as "0" to turn off this function.
 - Beep number: To set the number of beep made by the beeper when the system alarms.
 - Beep delay: To set the time length of beep made by the beeper when the system alarms each time.
 - Oil time: Set off output time.
 - The lubrication interval: Set each off time interval, start from the time.
- 5) Rotate when travel: To define the end of arm tool (side position cylinder) of the main arm keeping vertical / horizontal or rotatable when the robot is traversing.
- 6) Vertical: The robot can traverse when the end of arm tool at vertical condition.
- 7) Horizontal: The robot can traverse when the end of arm tool at horizontal condition.
- 8) No limit: The robot can traverse no matter the end of arm tool at vertical/horizontal condition.
- 9) Open door when running: To define that open the injection molding machine safety door will stop running temporarily or keep running when the robot is running auto mode.
- 10) Rotate in mold: Enable/Disable the end of arm tool (side position cylinder) of the main arm to rotate in the mold area.

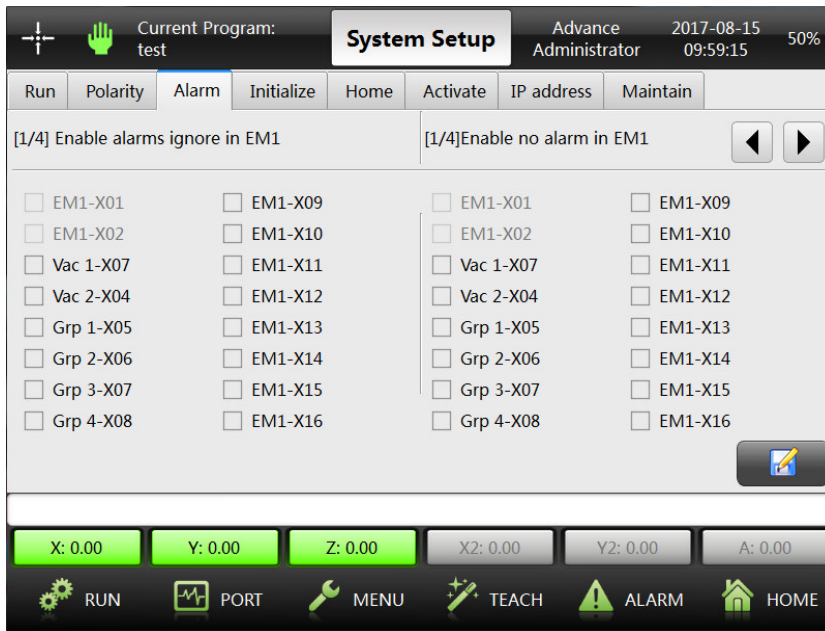
- 11) Waiting : To define whether the robot is standby waiting in mold area or out of mold area. It will detect the position of robot after mold opened.
- 12) Out mold: Our standard system default is that the robot can standby at any position out of the mold.

Input and output polarity: Set the system low pressure detection and extend the effective polarity of the input and output signal. For example, if the required polarity of the low pressure detection signal is reversed, select the

"low pressure detection" option. For 5 pages, click the   to change the page.



Alarm (input alarm): Includes “Enable alarm ignore”and “Enable no alarm in mold area” two options. Mark the box in front of the signal item you want, then by opening and closing the safety door once or push the Auto mode button on the controller to continue running and ignore the alarm caused by the ignored signal. If the alarm is not caused by the ignored signal, the alarm condition must be solved before running in Auto mode again. Mark the box in front of the signal item under “Enable no alarm in mold area” you want,the alarm is not required to sound when the robot is in the mold area, even the alarm occurred in the mold area.Then the alarm will sound is when the robot out of mold area. This signal items contains 4 pages, including suction and gripper detection and other extended inputs.



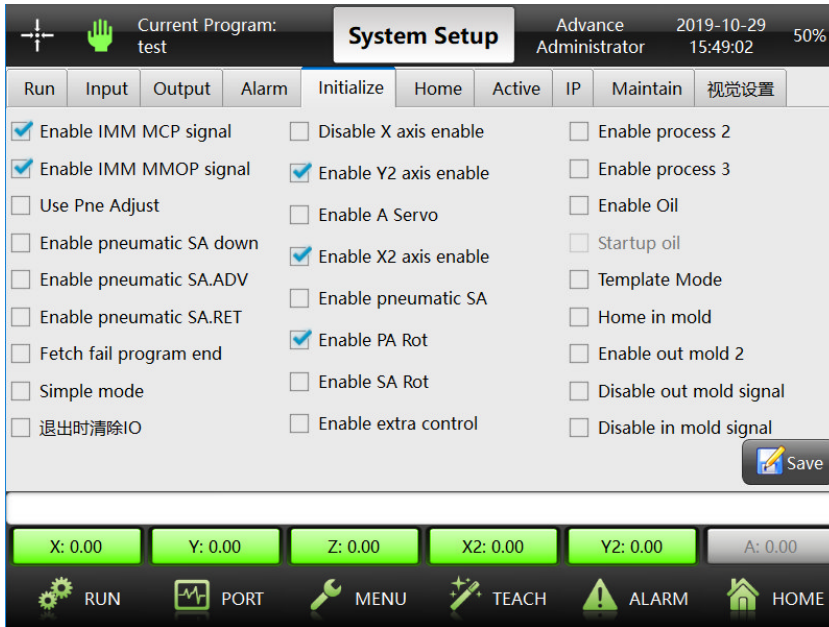
Initialize: Here can activate the mold closed, the middle plate mold and other signals.

Pneumatic Adjustment: The pneumatic adjustment function settings.

Template mode: Refers to the use of a program template, which can only modify program parameters but can't use teach programs.

Enable process 2&3: Shini robot can achieve multiple processes co-working.

Home in mold: The system default is home position outside of the mold area, you can switch over to the mold area.



Enable IMM MCP signal: This setting of using mold closed signal so the mold open signal become valid only after receiving mold closed signal.

Enable IMM MMOP signal: Allow the arm to go down only when middle mold signal is received.

Use Pne Adjust: It's used for adjusting the positioning motor which is for adjusting the pneumatic cylinder position but not applicable now.

Enable pneumatic SA down: Set to use downward position signal of pneumatic driven sub-arm.

Enable pneumatic SA.ADV: Set to use forward position signal of pneumatic driven sub-arm.

Enable pneumatic SA.RET: Set to use backward position signal of pneumatic driven sub-arm.

Fetch fail program end: Valid the product fetching failed signal and safety door open/close signal: if set to use, the robot will do homing once any product fetch failed signal or safety door open/close signal received.

Simple mode: Set to use simple mode, check the following chapter for details.

Disable X axis enable : The setting of not using X axis.

Enable Y2 axis enable : The setting of using Y2 axis.

Enable A servo: The setting of using A axis.

Enable X2 axis enable : The setting of using X2 axis.

Enable pneumatic SA : The setting of using pneumatic sub arm.

Enable PA Rot : The setting of using main arm flipping cylinder.

Enable SA Rot : The setting of using sub arm flipping cylinder.

Enable extra control: The setting of using external operation, stop and homing button. (Main control board X9:run, X10:stop, X11:homing) .

Enable process 2: The setting of using process 2.

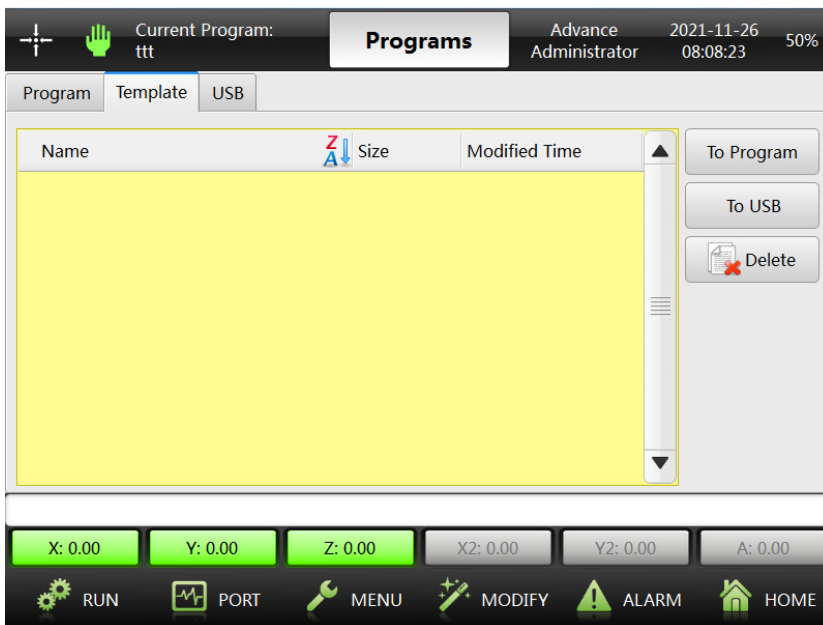
Enable process 3: The setting of using process 3.

Enable oil: The setting of using auto-greasing function.

Startup oil: The setting of using greasing when robot turns on.

Templet mode (Non-teach mode): When the system is entered templet mode and the screen will show the programs in program templates. Under such mode the program can only be loaded through USB and can set parameters

only through the function menu of Configuration  interface.



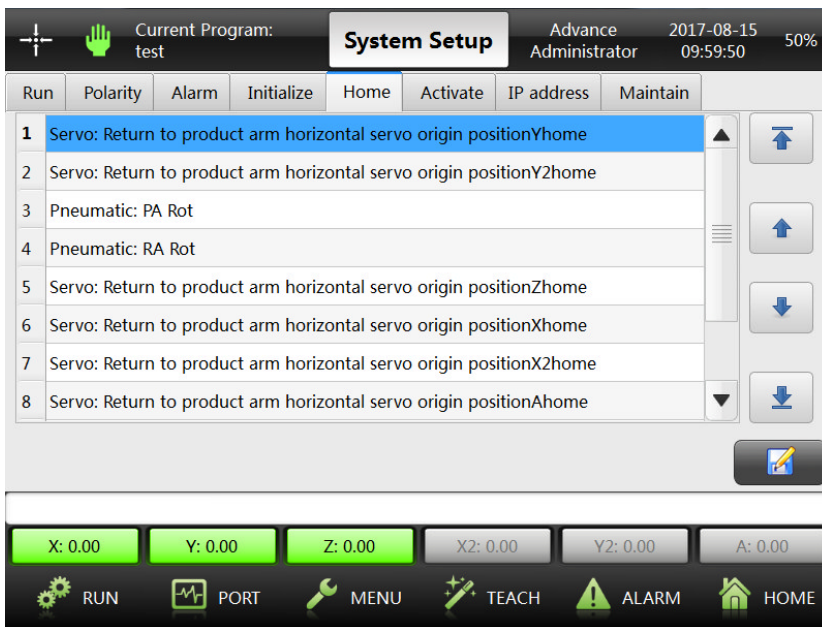
Home in mold: To switch home position within the mold area, which means the “inside the mold safety area” starts from near 0 position and ends in “out of mold area”, and “out of mold safety area” starts from near “inside mold area” and ends at the max software stroke.

Enable out mold 2: Setting and using “out of mold safety area 2”, normally used for T-type product picking and placing.

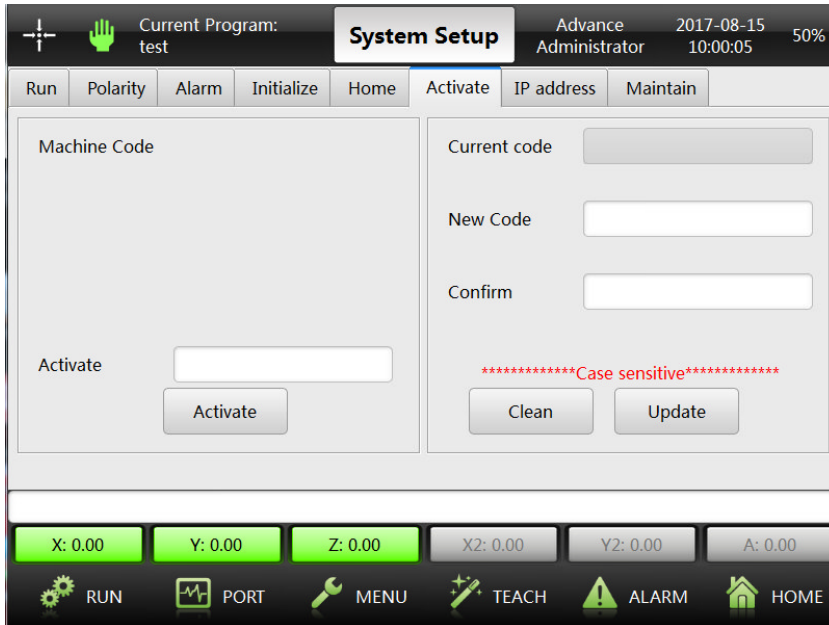
Disable out mold signal: The setting of not to detect “out of mold safety area” signal.

Disable in mold signal: The setting of not to detect “inside mold safety area” signal.

Custom-Homing settings: The setting of the robot system homing by a particular sequence, including servo axis, pneumatic components and extended port.



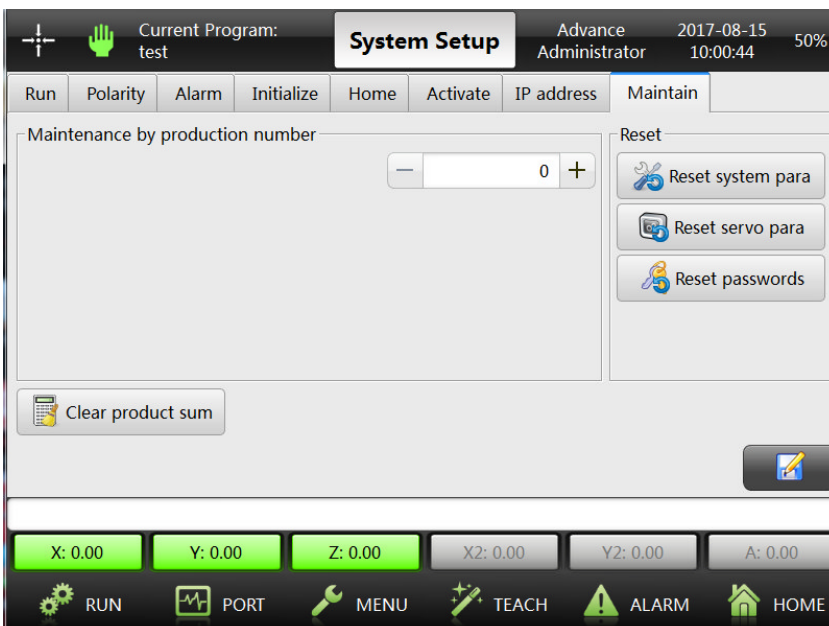
Activate: Activate robot function.



Set a product key first, then set the key and machine code to the software on the computer to generate the new activation code. Active code valid time can be set.

IP address: For remote monitoring, please check the “Shini Centralized Monitoring System” manual to find related settings in detail.

Maintain:



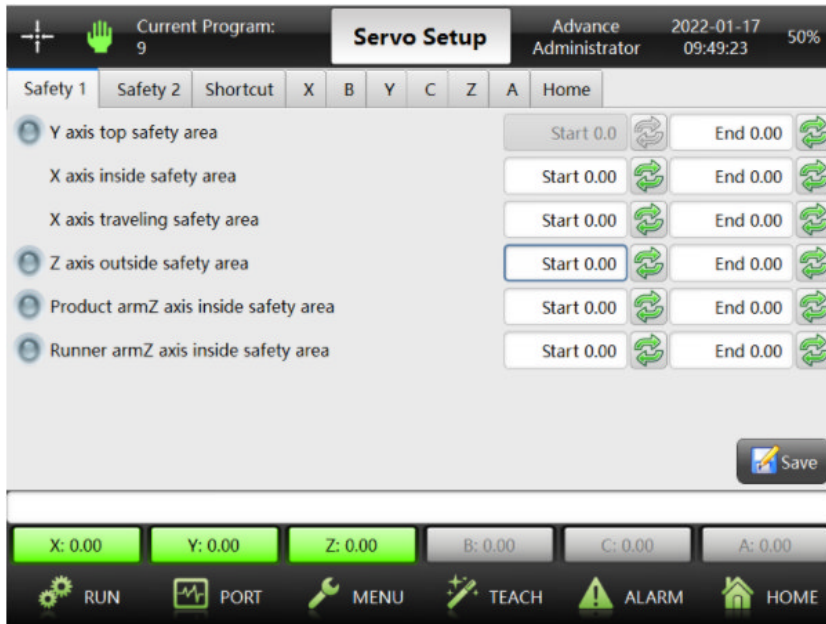
- 1) Maintenance by production number: Set up the maintenance modulus, enter the number of products produced. When production achieve the corresponding number of products, system maintenance must be carried out in order to continue to work properly.
- 2) Reset system para: Reset the system parameter settings to factory default value.
- 3) Reset servo para: Reset the servo parameter settings to factory default value.
- 4) Reset password: Reset the “advanced operator” and “administrator” password to factory default values.
- 5) Clear product sum: Eliminate the total accumulated production molds.

5.3 Servo Setup Page

In the function menu page, click the “Servo” button to enter the servo setup page. The servo control mode of this robot is position control mode, pulse & direction, and the number of pulses required for each rotation of the motor is 5000.

- 1) Safety: The safety zone settings for each servo axis.
- 2) Shortcut: Quick positioning location of each servo axis which is convenient for use when manual control.
- 3) The X, B, Y, C, Z, A servo axis: Mechanical parameters of each servo axis.
- 4) Home: The settings of homing speed for each servo axis and home setting for absolute encoder.
- 5) Click the “Save” button at the bottom right corner of the servo setup page to save the modified servo parameters when you done with the modifying.

Safety 1 (Safety area 1):



- 1) Y axis top safety area: The settings of the main arm and sub arm safety area when standby in the mold area. The start point of this safety area is a fixed value at 0. The user can set the end point of the safety area. When setting this safety area, the upper safety area sensor of the main arm requires a signal to prevent the error setting and affecting the system security.
- 2) X axis inside safety area: To set the X axis main arm safety area according to the mold opening width of the injection molding machine.
- 3) X axis traveling safety area: To set the X axis main arm safety area while traversing.
- 4) Z axis outside safety area: The setting of the safety area that allows the robot arm to go downward and put the product/sprue while inside the mold area. When setting this safety area, the outside mold area traverse safety area sensor requires a signal to prevent the wrong setting and affecting system security.
- 5) Product arm Z axis inside safety area: The setting of the safety area that allows the robot arm to go downward and pick the product/sprue while inside the mold area. When setting this safety area, the inside mold area traverse safety area sensor requires a signal to prevent the wrong setting and affecting system security.
- 6) Runner arm Z axis inside safety area: As above item 5).

Safety 2 (Safety area 2):

The sub-arm settings is the same way as the main arm.

Current Program: ttt

Servo Setup

Advance Administrator 2021-11-26 09:10:49 50%

Safety 1 **Safety 2** Shortcut X X2 Y Y2 Z A Home

- Y2 axis top safety area Start 0.0 End 0.0
- X2(Rel)inside safety area Start 0.00 End 0.00
- X2(chamfers) axis traveling safety area Start 0.00 End 0.00
- Aaxis inside safety area Start 0.00 End 0.00
- A axis traveling safety area Start 0.00 End 0.00

Save

X: 0.00 Y: 0.00 Z: 0.00 X2: 0.00 Y2: 0.00 A: 0.00

RUN PORT MENU MODIFY ALARM HOME

Single main arm system (ST3) shown as below:

No Program

Servo Setup

Advance Administrator 2021-11-26 16:26:03 50%


Safety 1 **Safety 2** Shortcut X B Y C Z A Home

- B(chamfers)inside safety area Start 0.00 End 0.00
- B(chamfers) traveling safety area Start 0.00 End 0.00
- C (rot)axis inside safety area Start 0.00° End 0.00°
- C (rot)axis trv safety area Start 0.00° End 0.00°
- A axis inside safety area Start 0.00 End 0.00
- A axis traveling safety area Start 0.00 End 0.00

Save

X: 0.00 Y: 0.00 Z: 0.00 B: 0.00 C: 0.00 A: 0.00

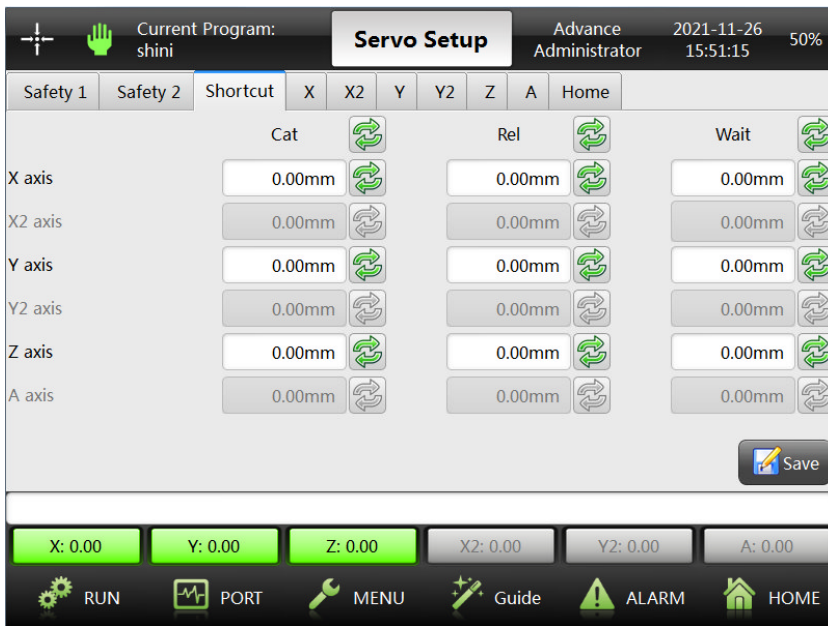
RUN PORT MENU TEACH ALARM HOME

When setting the safety area parameters of servo axis, to ensure the correctness of parameter, it's not allow to input the servo position coordinates directly. Only allows you to move it to the particular position manually through the manual mode, and then set the current servo position by clicking the synchronized button  behind the box to renew it.

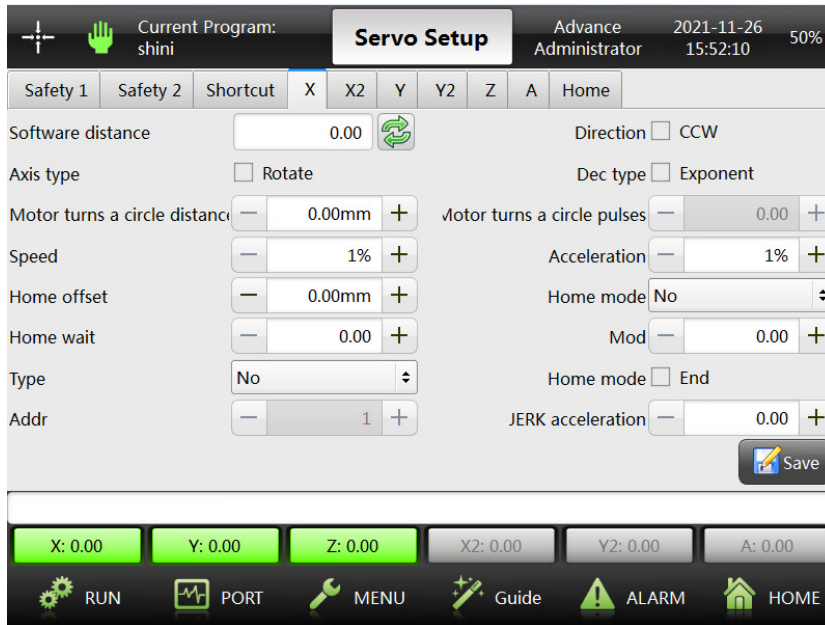
Note:

Must check all the position coordinates and setting values when done modifying to prevent the crash!

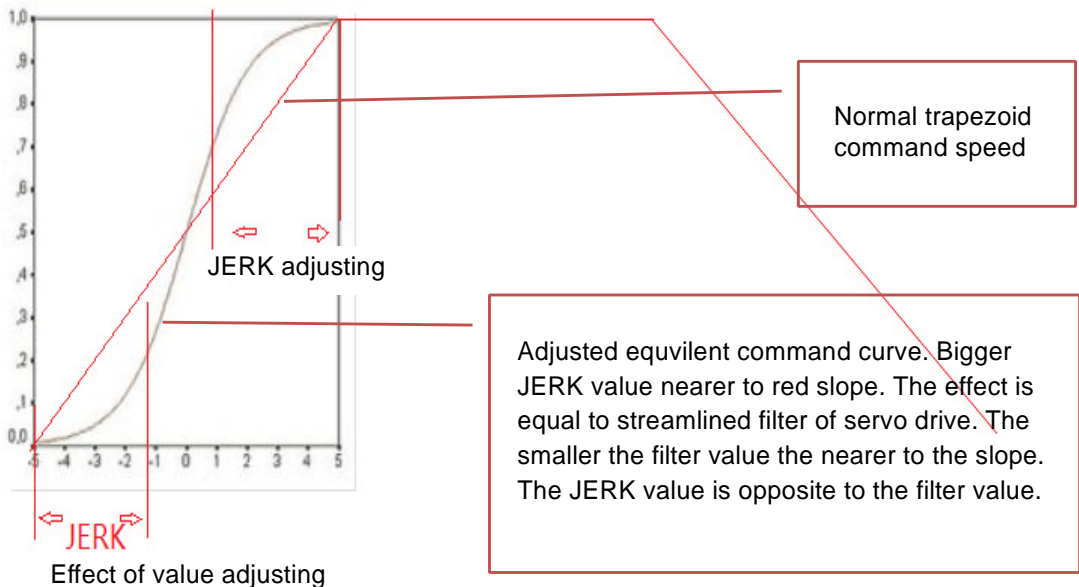
Shortcut (Quick positioning): set the rapid positioning position, easy to manually control the servo, quickly positioned to the designated location. Set up from the corresponding servo axis coordinates by clicking the sync button to refresh into the input box, you can also click on the input box pop-up digital keypad, directly enter the coordinate value.



Servo axis parameter setting



- 1) **Software distance:** The setting of the maximum distance of each servo axis that allows to run. The “Software distance” limits the maximum travel distance during Auto / Manual operation.
- 2) **Axis type:** The setting of whether the servo axis is use for rotation or linear way. Mark the box of “Rotate”to use for rotation running and the servo axis value displays in angle units, otherwise, not to mark the box of display “Rotate” to use for linear running and the servo axis value displays in linear units.
- 3) **Motor turns a circle distance:** The distance of a circle that motor ran. It’s the setting of the stroke when motor runs a circle.
- 4) **Motor turns a circle pulses:** The pulses required by the motor to rotate a circle is 5000.
- 5) **Speed:** Set the maximum speed of each servo axis from 1% to the fastest 100%.
- 6) **Acceleration:** Set the acceleration value of each servo axis from 1%, to maximum 100%.
- 7) **JERK acceleration:** When the motor starts, the recommended value of the maximum acceleration from zero speed. As show in the figure below:



- 8) Home offset: Adjust the servo stop position after homing.
- 9) Home mode: Here has three kinds of homing mode
- 10) “No” as not return home, then the system won't have to find the home position.
 “Home + Z”: The system will establish coordinates with reference to the signal of Z axis.
- 11) “Home Signal”: The system will establish coordinates with reference to the signal of home position.
- 12) Origin +Z phase, the system will establish coordinates with the z-phase signal as the reference.
- 13) Home Wait: Set the standby position after home position reset.
- 14) Type: The selection of encoder. The setting of the encoder communication way for absolute coder. “No” refer to non-absolute encoder.
- 15) Mod: Set one rotation direction. When it reaches the set value, the system will reposition from 0.
- 16) Addr: The encoder address, Set the servo communication

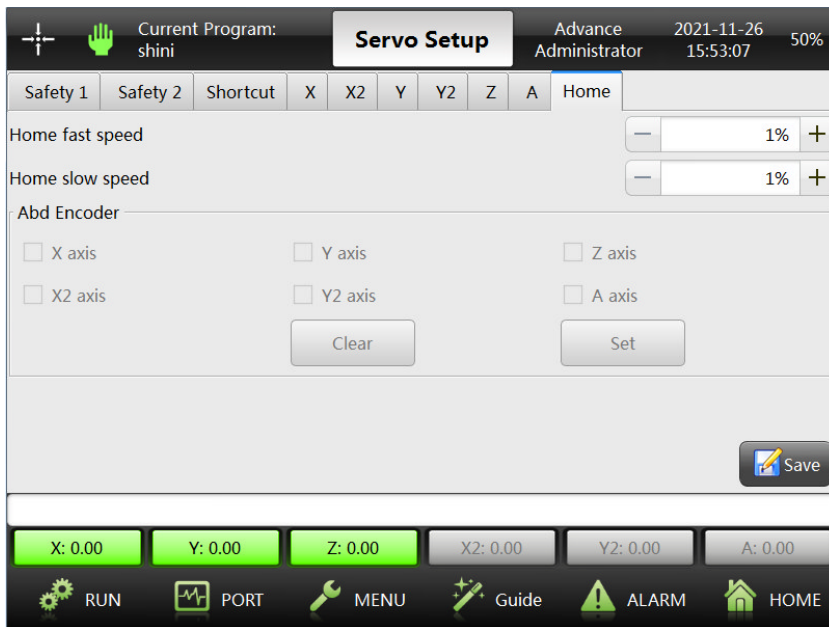
Note:

When you are setting servo mechanical parameters. Meanwhile, beware of the servo speed not to exceed the rated speed of the servo so as to cause accidents!

Home

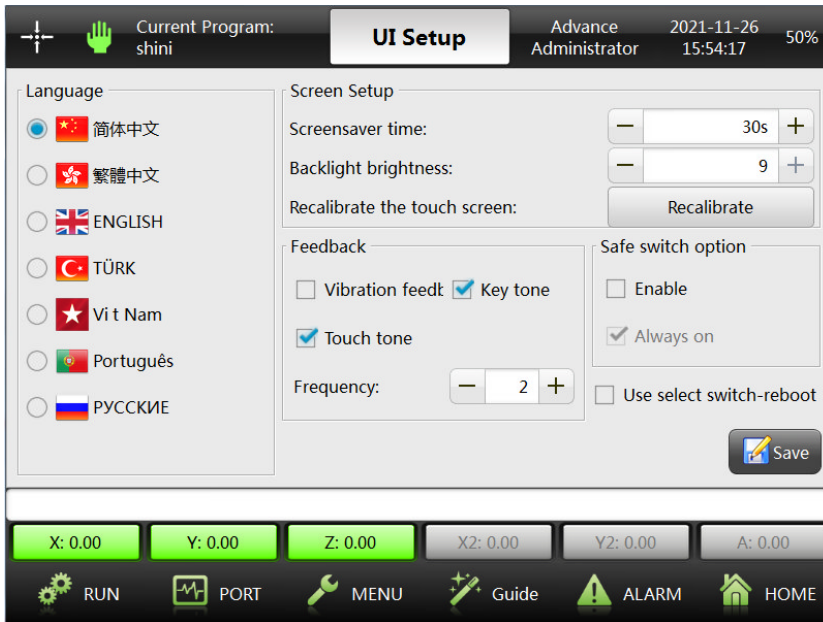
Home fast speed: The setting of minimum speed of homing from the minimum 1% to maximum 10%.

Absolute encoder, please check the absolute encoder manual for relative settings.



5.4 UI SetupPage

In the function menu page, click the “UI Setup” button to enter the UI Setup page:



- 1) Language: Select language.
- 2) Screensaver time: The setting of screensaver of controller, from the minimum 1 minute to the maximum 30 minute.
- 3) Backlight brightness: Adjust controller screen backlight brightness, the value 1 to 9 as from the darkest to the brightest.
- 4) Recalibrate the touch screen: When the point or image location represent on the controller isn't accurate and has deviation, click recalibrate button to recalibrate the touch screen.
- 5) Vibration feedback: If check the box of vibration feedback option, in some case such as system alarm, robot will vibrate to remind user; If the key tone option is selected, there will have a sound when pressing buttons on the touch screen.
- 6) Touch tone: If check the box of key tone option, it will have a sound reminding user when pressing the touch screen.

Frequency: Set the frequency of "Key tone" and "Touch tone" which has 3 sound frequency:

- 1 as Low
- 2 as Normal
- 3 as High



- 7) Safe switch option: Require the use of “the safety switch aka the dead man’s switch” or not. “Always on” is a safety setting that requires you hold the safe switch when homing.
- 8) Use select switch-reboot: The use of the function key switch which allows you to switch the operation mode (Stop, Manual, Auto). You have to restart robot if you switch this option.

5.5 Adjustment - Position Adjustment Page

Adjusting position through this function when the robot arm isn’t at the safety area and unable to control or move in manual mode. Through the “Servo Adjust” allows you to adjust servo position at low speed without homing the robot arm, beware it also without any safety limit and detection under this function, but only the proximity sensor works. Went through homing process, the “Servo adjust” function only allows you to adjust position between home point and maximum point.

Also can control pneumatic arm’s positioning motor on this page (if it has positioning motor).

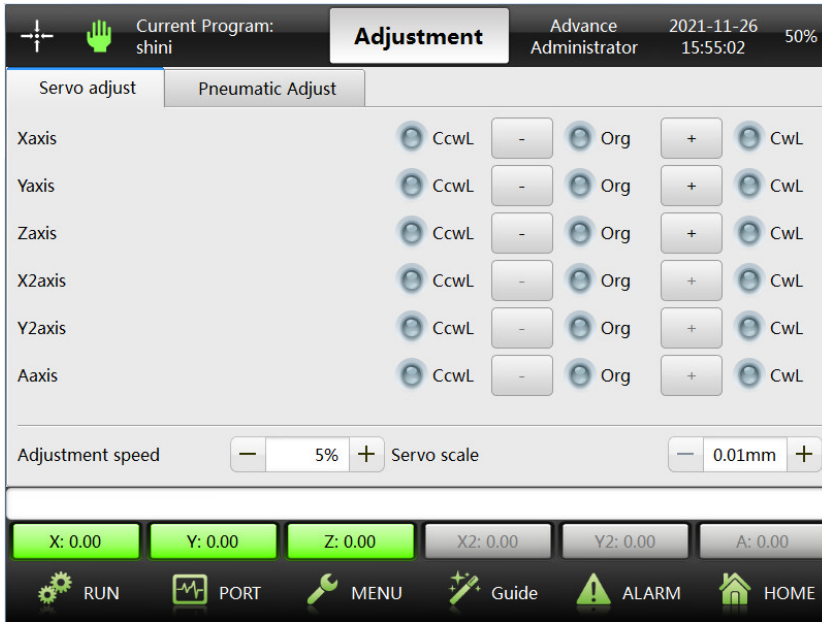
Servo adjust page as follow: Press the + or - key of the corresponding axis to

adjust the position, such as  ,  .

CcwL as counter-clockwise

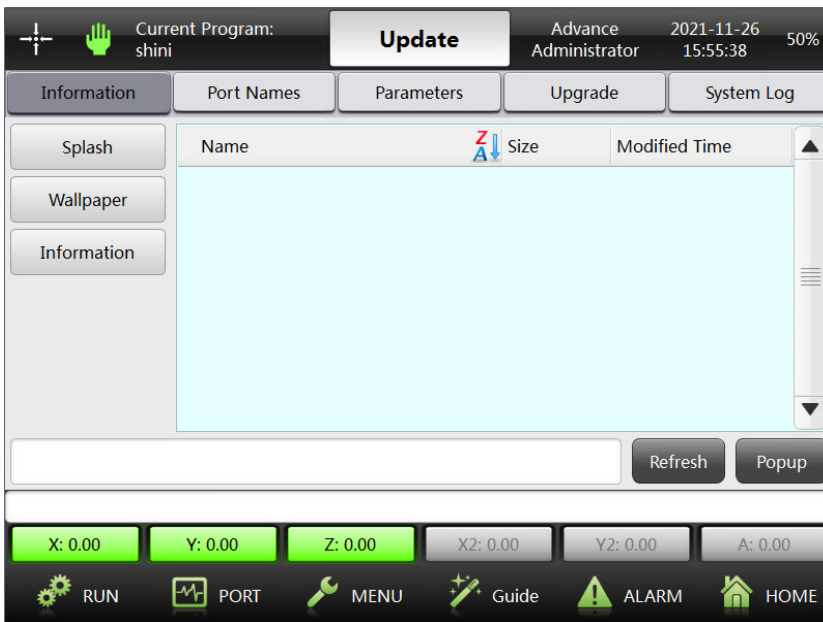
Org as home point

CwL as clockwise



5.6 Software Update

Press the “Software update” button at the Function Menu page to enter the Update page.



Software update function requires the “Advanced Administrator” user level to do it. This function allows to transfersystem parameter and servo parameter to USB, also can transfer parameters from USB to controller which is convenient for setting large sets of unified robotby specification robot parameter.

Factory’s information: Here you can customize the startupscreen, standby screen,and your factory’s information. The customization requires image file format as below table:

Table 5-1: Customized Data Specification

Directory File Name	Size	Format	Explain
Splash.png	800×600pixel	png	Startup screen
Wallpaper.png	800×407pixel	png	Standby screen (the screen background)
Information.png	800×407pixel	png	Factory’s information (pictures displayed in the system information page)

Port names: You can modify port names through the port editor then import them from USB to the controller and you can also reset them.

Parameters: Parameters maintenance, this pageallows to transfer system parameters and servo parametersfrom controller to USB andtransfer from USB to controller as well.

Upgrade: Software upgrade, through USB to upgrade controller’s software and main board software. The “Restore”allows to return to the previous software version and only one time.

System Log: Transfer system logs to USB or delete system logs.

Note:

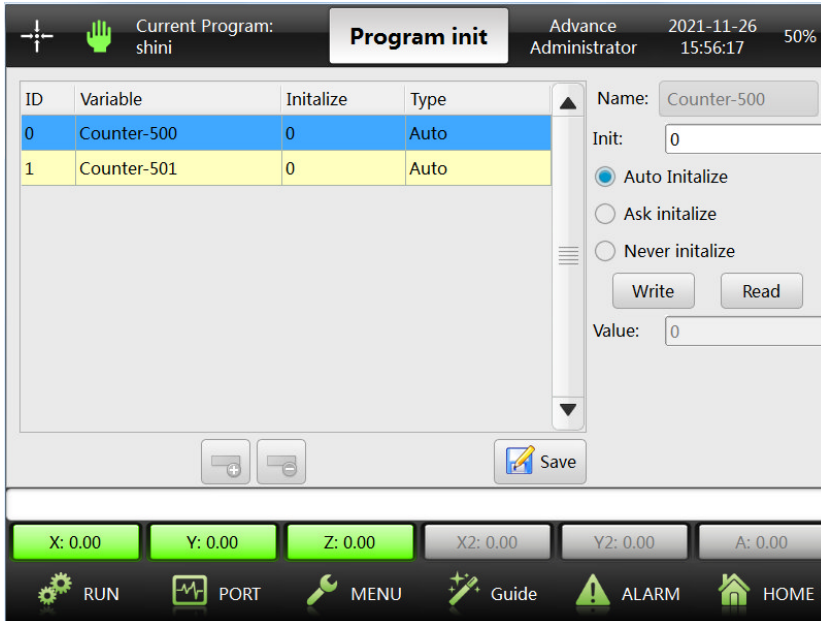
Do not unplug the USB during upgrading the controller software! Before you unplug the USB, click the [Popup] button(eject) first!

5.7 Initialize

The settings of the initial value of variables in the process where can set “Auto initialize”, Ask initializeand “Never initialize” or write a new initial value of variable by pressing “Write” button.

“Read”: Reads the current value of the current selected counter.

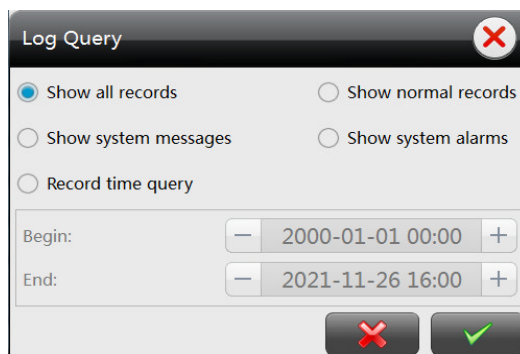
For example: Counter-500 is the output interval counter of Y03 and set an output at intervals of 5 molds. Then the Counter-500 counter will start counting from the initial value (initial value add 1 when a mold done). When the initial value gets 4, restart counting from “0” again.



5.8 System Log

In the function menu page, click the system log according to the user's request where you can search it by the recorded date, the alarm logs, the system logs, normal records and all records.

When you search the log through the condition of date, the following “Begin date” and end “End date” are required and then you can adjust the time you want to check the logs. As shown in the following figure:



5.9 Information

Here can check the software version of the current system including touch panel version, main control board software version, system type, factory information, etc.

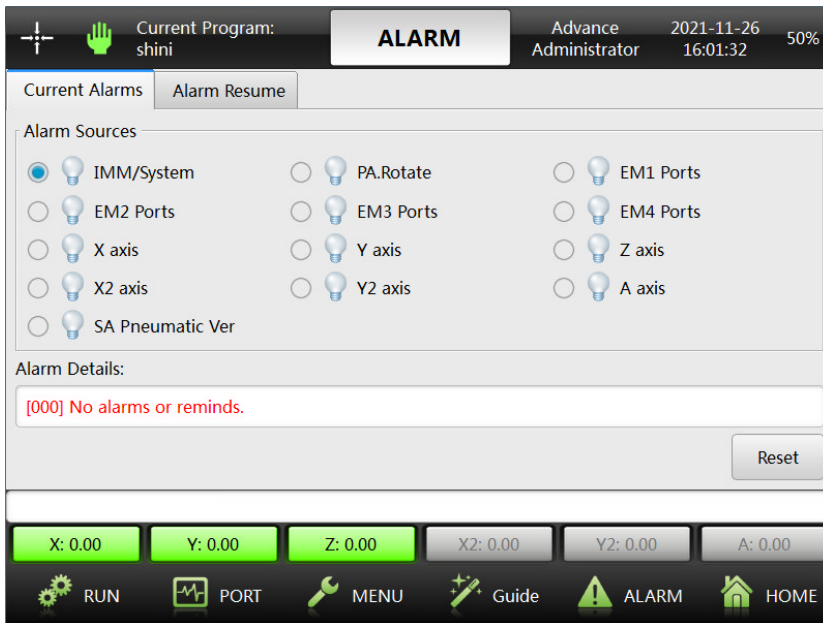


6. Alarm and History Record

6.1 System Current Alarm Information

Click the alarm function button at the bottom of screen to enter “Alarm page” where has “Current Alarms” and “Alarm Resume” (Alarm History) information. Current Alarms: The current alarm information classify according to where it comes (source) which can display 12 alarm source at the same time the same page. Rather than just shows the last alarm information which is convenience to user to check the alarm state.

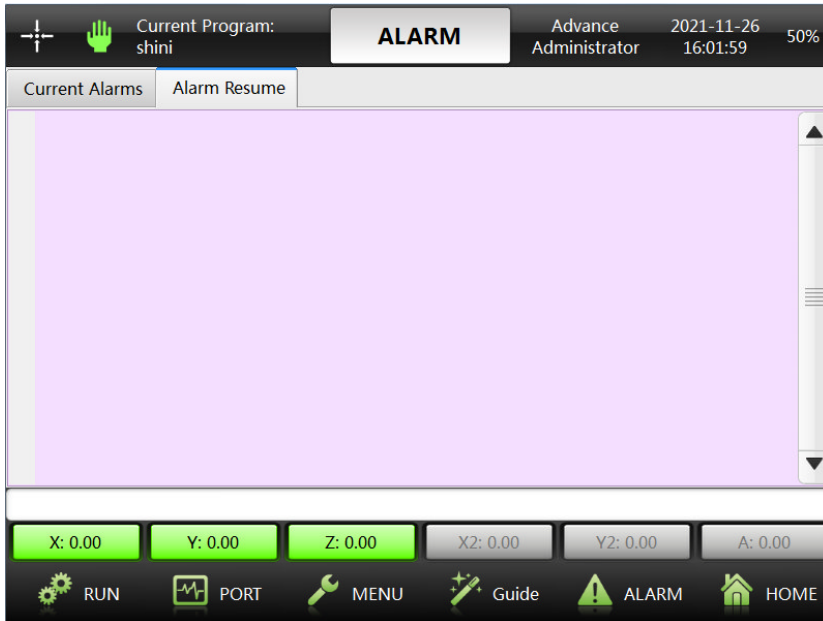
Current Alarms page as followed:



- 1) Select an alarm in the alarm sources column: Here has 12 alarm sources. When alarm happened, it will turn on the corresponding indicator lamp before the alarm source, tells this source has alarm. To check alarm detail information, please select alarm source first and the selected alarm detail information will show at the “Alarm Detail” row below.
- 2) Alarm Details: Show the detail information of selected alarm.
- 3) When the alarm was cleared: Click the Homing button or F4 to reset before next operation.

6.2 Alarm Resume (Alarm History)

The another page of Alarm function second is “Alarm Resume” (Alarm History information) where listed recently happened alarm records (Up to 50000 pcs).



6.3 Alarm Information and quick Solutions List

Table 6-1: Alarm Information List

Alarm Code	Alarm Information	Solutions
[000]	No alarms or reminds.	
[001]	Invalid action of main arm.	If the new instruction is still invalid when the invalid instruction deleted, please contact the agent/manufactureur.
[002]	Invalid action of IMM.	If the new instruction is still invalid when the invalid instruction deleted, please contact the agent/manufactureur.
[003]	Invalid condition instruction.	If the new instruction is still invalid when the invalid instruction deleted, please contact the agent/manufactureur.
[004]	Invalid system running type.	If the new instruction is still invalid when the invalid instruction deleted, please contact the agent/manufactureur.
[005]	Invalid system status.	If the new instruction is still invalid when the invalid instruction deleted, please contact the agent/manufactureur.
[006]	Invalid parameters of instruction.	If the new instruction is still invalid when the invalid instruction deleted, please contact the agent/manufactureur.

[007]	Invalid instruction.	If the new instruction is still invalid when the invalid instruction deleted, please contact the agent/manufacture.
[008]	Invalid instruction.	If the new instruction is still invalid when the invalid instruction deleted, please contact the agent/manufacture.
[009]	Invalid program index.	If the new instruction is still invalid when the invalid instruction deleted, please contact the agent/manufacture.
[010]	Loop instruction format error. Without end of loop.	In the program, a "FOR" instruction (loop start) must go with a "ENDFOR" instruction (loop end). Check if there is any extra of "FOR" or lack of "ENDFOR" in the program.
[011]	Loop instruction format error. Without begin of loop.	In the program, a "ENDFOR" instruction (loop start) must go with a "FOR" instruction (loop end). Check if there is any extra of "ENDFOR" or lack of "FOR" in the program.
[012]	Condition instruction format error. Without end condition instruction.	In the program, a "IF" instruction (condition start) must go with a "ENDIF" instruction (condition end). Check if there is any extra of "IF" or lack of "ENDIF" in the program.
[013]	Without end of program instruction.	Check the current program and add a "Program End" (in the Action selection) instruction in it.
[014]	More than 30 instructions in combine action.	Check programing and make the instructions less than 30 lines.
[015]	Combine instruction format error. Without end of combine.	Add combine end command.
[016]	System variable is read-only, cannot write.	System variable is read-only variable and cannot re-write.
[017]	The index of user variable is overflow, the valid index from 0 to 255.	Check and see if user variable number exceeds the range of number (0~255).
[018]	IMM auto signal is absent.	Checkif there is "AUTO-X03" signal inthe port monitor page of controller. If there isn't, check the DC 24V voltage of "2 AUTO terminals" of "CN1 terminals block" on the main control board. If it doesn't have, then check the wiring.
[019]	IMM safe door signal is absent.	Check if there is "SDM-X02" signal in the port monitor page of controller. If there isn't, check the DC 24V voltage of "2 SDM terminals" of "CN1 terminals block" on the main control board. If it doesn't have, then check the wiring.
[020]	IMM middle mould open position signal is absent.	Check if there is "MMOP-X06" signal in the port monitor page of controller. If there isn't, check the DC 24V voltage of "MID terminals" of "CN2 terminals block" on the main control board. If it doesn't have, then check the wiring.
[021]	The production plan has completed.	Planned production quantity is reached. Please check it.
[022]	The sum of rejects exceed standard.	Defective productsquantity alarm, please check the mold.
[023]	Cannot change current program when system is not in manual status.	Please switch to manual mode before modifying the program.
[024]	Cannot change the automatic running status when system in manual or error status.	Please handle and cancel the alarm thenswitch to auto-run mode.
[025]	Cannot change system status when system in error status.	Please handle and cancel the alarm then operate it again.
[026]	System is busy, cannot change system status.	Please stop running and then operate it again.

[027]	Forbid mould close when the vertical position of runner arm out of safe area.	Please check if the sub-arm (runner arm) is within the safe area or not. If it doesn't, please move it to safe areabefore closing the mold. If it was, check the sub-arm safety area signal where may have problem.
[028]	Prohibit mould close if vertical position of product arm out of safe area.	Please check if the main arm (product arm) is within the safe area or not. If it doesn't, please move it to safe area before closing the mold. If it was, check the main arm safety area signal where may have problem.
[029]	The system setup do now allow rotate action inside mould.	Please operate the robot correctly. If have to flip within the moldarea, please allow "Rotate in mold" in System Setup of Menu.
[030]	Cannot enter auto status when vertical servo of product arm not at origin position.	Please manually move the main arm to safe position or homing before switchingto auto-run mode.
[031]	Cannot enter auto status, if robot out of external safe area.	Please move the robot arm to the out of mold safety area or homing, before switching to auto-run mode.
[032]	There has no current program, please load current program.	Please click the "Current Program"at the upper right corner of the screen and enter a program by clicking or create a new one by clicking "New".
[033]	Does not detect a valid extended input signal.	Please check if the extended input port receives any signal.
[034]	Cannot enter auto status when product arm rotate horizontal.	Please check the main arm pneumatic flipping cylinder and rotate it to vertical or change the setting in "System Setup".
[035]	Cannot enter auto status when product arm rotate vertical.	Please check the main arm pneumatic flipping cylinder and rotate it to vertical or change the setting in "System Setup".
[036]	Servo must do finding reference operation at first.	Please do homing and then operate.
[037]	Not allow to travel when the vertical position of product arm is not at origin.	Please check if the main arm (product arm) is within the safe area or not. If it doesn't, please move it to safe area before traversing (Z axis). If it was, check the main arm safety area signal where might have problem.
[038]	Not allow to travel when the vertical position of runner arm is not at origin.	Please check if the sub-arm (runner arm) is within the safe area or not. If it doesn't, please move it to safe area before traversing (Z axis). If it was, check the main arm safety area signal where might have problem.
[039]	Cannot execute the operation if the horizontal position out of safe area and vertical position is not at origin.	Robot crosswise (X axis) running exceeds theinside mold safety area.
[040]		
[041]	Prohibit vertical servo action of runner arm without mould open position signal.	Check if the IMM's mold opened to the position. If it was, check the DC 24V voltage of "2 MOP terminals" of "CN1 terminals block" on the main control board. If it doesn't have, then check the wiring.
[042]	Prohibit vertical servo action of runner arm without middle mould open 133.	Check if the IMM'smiddle mold opened to the position. If it was, check the DC 0V voltage of "MID terminals" of "CN1 terminals block" on the main control board. If it doesn't have, then check the wiring.
[043]	Prohibit vertical servo action of product arm without mould open 134.	Check if the IMM'S mold opened to the position. If it was, check the DC 24V voltage of "2 MOP terminals" of "CN1 terminals block" on the main control board. If it doesn't have, then check the wiring.

[044]	Prohibit vertical servo action of product arm without middle mould open position signal.	Check if the IMM's middle mold opened to the position. If it was, check the DC 0V voltage of "MID terminals" of "CN1 terminals block" on the main control board. If it doesn't have, then check the wiring.
[045]	Prohibit vertical servo action of product arm when traveling position out of safe areas.	Please check the range of traverse (Z axis) safety area and then move up/down the robot arm.
[046]	Prohibit vertical servo of runner arm move, if traveling position out 144.	Please check the range of traverse (Z axis) safety area and then move up/down the robot arm.
[047]	The horizontal position of product arm out of safe area.	Please check the servo crosswise (X axis) safety area setting while inside the mold area.
[048]	Servos cannot move at same time when setup safe areas.	Not allow 2 or more axes moving at the same time when adjusting servo safety area.
[049]	Cannot enter auto status when vertical position of runner arm is not 140.	Please check if sub-arm is at the home position. If it isn't, manually move it to home position then switch to auto-run mode. If it was, check sub-arm's "ORG terminal" of "SCN4" port on the main board and check if the signal is normal or not.
[050]	System needs maintenance by manufacturer.	Please send the product key and machine code to agent or machine manufacturer to get activate code.
[051]		
[052]	Cannot enter auto status if not load current program.	Please load in a new program or create a new program, then switch to auto-run.
[053]	System is busy, cannot execute other operation.	Please do the operation again when it stop busy running.
[054]	System instruction pointer invalid.	Please contact your agent or manufacturer.
[055]	Cannot delete current program.	Cannot delete current program.
[056]	Pause auto running if safe door is opened.	Please check if safety door signal is interrupted or not.
[057]	System status error.	Please contact your agent or manufacturer.
[058]	System settings do not allow product arm descend, if product arm rotate horizontal.	Please set the "Rotate in mold" to "Enable" in the "System Setup" page in the "Menu" of the controller before flipping the pneumatic flipping cylinder.
[059]	Horizontal position of product arm exceeds the software distance.	Current command of position exceeds software limit and please check the program.
[060]	Vertical position of product arm exceeds the software distance.	Current command of position exceeds software limit and please check the program.
[061]	Traveling position exceeds the software distance.	Current command of position exceeds software limit and please check the program.
[062]	Vertical position of runner arm exceeds software distance.	Current command of position exceeds software limit and please check the program.
[063]	Horizontal position of product arm exceeds the software distance.	Current command of position exceeds software limit and please check the program.
[064]	The position of extended servo exceeds the software distance.	Current command of position exceeds software limit and please check the program.
[065]	Traveling position in internal safe area but not detect the valid sensor signal.	Please check if the traverse's inside of mold safety area sensor is malfunction or not. If it isn't, please check the servo safety area setting in the Servo Setup to check if the area is within the sensor sensing range.
[066]	Traveling position in external safe area but not detect the valid 157.	Please check if the traverse's out of mold safety area sensor is malfunction or not. If it isn't, please check the servo safety area setting in the Servo Setup to check if the area is within the sensor sensing range.

[067]	Horizontal servo of runner arm cannot move when traveling position out of safe area.	Please operate again when the sub arm is in the traverse safety area.
[068]	Horizontal servo of product arm cannot move when traveling position out of safe area.	Please operate again when the sub arm is in the traverse safety area.
[069]	Product arm is in top safe area but not detects the valid sensor signal.	Please check if the main arm standby safety area sensor is malfunction. If it isn't, check the safety area setting in the "Servo Setup" and check if the range of safety area is within the sensor sensing area.
[070]	Runner arm is in top safe area but not detects the valid sensor signal.	Please check if the main arm standby safety area sensor is malfunction. If it isn't, check the safety area setting in the "Servo Setup" and check if the range of safety area is within the sensor sensing area.
[071]	The index of matrix or loop subroutine is invalid.	Delete current program and create a new one write it again. If the problem remains, please contact your agent or manufacturer.
[072]	The position number of loop subroutine is invalid.	Check the loop positioning setting anything wrong, contact agent or manufacturer if not able to solve.
[073]	The number of products has reached the value of the remind settings.	Robot reminds you that now "reaching the production plan quantity".
[074]	Condition instruction cannot be nested in combine instruction.	Instructions with same condition cannot run in the program combination.
[075]	Product arm has rotated horizontal, but not detect the valid signal.	Please check if there has "DC 0V" input from "X1" port of "CN1 terminal block". If it doesn't has, then check the wiring.
[076]	Product arm has rotated horizontal, but detect vertical signal.	Please check the wiring of "X1" port of "CN1 terminal block". If it doesn't has any problem, then check the robot.
[077]	Product arm has rotated vertical, but not detect the valid signal.	Please check if there has "DC 0V" input from "X2" port of "CN1 terminal block". If it doesn't has, then check the wiring.
[078]	Product arm has rotated vertical, but detect the horizontal signal.	Please check the wiring of "X2" port of "CN1 terminal block". If it doesn't has any problem, then check the robot.
[079]	Product arm horizontal servo alarm, please check the servo driver.	Check the alarm code shown on the main arm crosswise (X1 axis) servo driver and do troubleshooting.
[080]	Product arm horizontal servo ready signal is absent.	Check the servo ready signal between the main board and the main arm crosswise (X1 axis) servo driver.
[081]	Product arm horizontal servo in position signal is absent.	Check the servo positioned signal between the main board and the main arm crosswise (X1 axis) servo driver.
[082]	Product arm vertical servo alarm, please check the servo driver.	Check the alarm code shown on the main arm (Y1 axis) servo driver and do troubleshooting.
[083]	Product arm vertical servo ready signal is absent.	Check the servo ready signal between the main board and the main arm (Y1 axis) servo driver.
[084]	Mold opening waiting time out.	The waiting time is due but still no signal of mold opened. Please check if IMM has any problem, or set the waiting time as 0 (no need to wait and alarm) to avoid the alarm.
[085]	Traveling servo alarm, please check the servo driver.	Check the alarm code shown on the traverse (Z axis) servo driver and do troubleshooting.
[086]	Traveling servo ready signal is absent.	Check the servo ready signal between the main board and the traverse (Z axis) servo driver.
[087]		

[088]	Runner arm vertical servo alarm, please check the servo driver.	Check the alarm code shown on the sub-arm (Y2 axis) servo driver and do troubleshooting.
[089]	Runner arm vertical servo ready signal is absent.	Check the servo ready signal between the main board and the sub-arm (Y2 axis) servo driver.
[090]	Runner arm vertical servo in position signal is absent.	Check the servo positioned signal between the main board and the sub-arm (Y2 axis) servo driver.
[091]	Runner arm horizontal servo alarm, please check the servo driver.	Check the alarm code shown on the sub-arm crosswise (X2 axis) servo driver and do troubleshooting.
[092]	Runner arm horizontal servo ready signal is absent.	Check the servo ready signal between the main board and the sub-arm crosswise (X2 axis) servo driver.
[093]	Runner arm horizontal servo in position signal is absent.	Check the servo positioned signal between the main board and the sub-arm crosswise (X2 axis) servo driver.
[094]	Extended servo alarm, please check the servo driver.	Check the alarm code shown on the extended axis servo driver and do troubleshooting.
[095]	Extended servo ready signal is absent.	Check the servo ready signal between the main board and the extended axis servo driver.
[096]	Extended servo in position signal is absent.	Check the servo positioned signal between the main board and the extended axis servo driver.
[097]	Injection mould machine occur emergency stop, please check the IMM.	If IMM emergency stop is not activated, check if it has "DC 0V" on the "ESM" port of "CN2 terminals block" on the main board. If it isn't, check the wiring.
[098]	Robot occur emergency stop, please check the robot.	Please check if the robot's emergency stop button is pressed. Release the button and operate before making sure everything is OK.
[099]	Pressure of air is too low, please check the air pressure.	If the pressure of compressed air is normal, check if it has "DC 0V" on the "X7 terminal" of "CN3 terminals block" on the main board. If it doesn't have, then check the wiring or compressed air tube.
[100]	Runner arm inside the mold area, the no mold opening signal of IMM.	Please check if the IMM's mold opened signal is consistent. It could be signal interrupted or disconnected.
[101]	Runner arm inside the mold area, but no middle mold opening signal of IMM.	Please check if the IMM's mid-mold signal is consistent. It could be signal interrupted or disconnected.
[102]	Product arm inside the mold area, but no mold opening signal of IMM.	Please check if the IMM's mold opened signal is consistent. It could be signal interrupted or disconnected.
[103]	Product arm inside the mold area, but no mold opening signal of IMM.	Please check if the IMM's mid-mold signal is consistent. It could be signal interrupted or disconnected.
[104]	Product arm horizontal servo has arrived cw limit position.	Please check the servo axis position than do the reverse operation by "Adjustment" in the Menu.
[105]	Product arm horizontal servo has arrived ccw limit position.	Please check the servo axis position than do the reverse operation by "Adjustment" in the Menu.
[106]	Product arm vertical servo has arrived ccw limit position.	Please check the servo axis position than do the reverse operation by "Adjustment" in the Menu.
[107]	Product arm vertical servo has arrived cw limit position.	Please check the servo axis position than do the reverse operation by "Adjustment" in the Menu.
[108]	Traveling servo has arrived cw limit position.	Please check the servo axis position than do the reverse operation by "Adjustment" in the Menu.
[109]	Traveling servo has arrived ccw limit position.	Please check the servo axis position than do the reverse operation by "Adjustment" in the Menu.
[110]	Runner arm vertical servo has arrived cw limit position.	Please check the servo axis position than do the reverse operation by "Adjustment" in the Menu.
[111]	Runner arm vertical servo has arrived ccw limit position.	Please check the servo axis position than do the reverse operation by "Adjustment" in the Menu.

[112]	Runner arm horizontal servo has arrived ccw limit position.	Please check the servo axis position than do the reverse operation by “Adjustment” in the Menu.
[113]	Runner arm horizontal servo has arrived cw limit position.	Please check the servo axis position than do the reverse operation by “Adjustment” in the Menu.
[114]	Extended servo has arrived cw limit position.	Please check the servo axis position than do the reverse operation by “Adjustment” in the Menu.
[115]	Extended servo has arrived ccw limit position.	Please check the servo axis position than do the reverse operation by “Adjustment” in the Menu.
[116]	Product arm vertical servo at origin position, but not detect origin signal.	Please check the proximity sensor of main arm (Y1 axis) and if it has signal input to the “ORG terminal” of the “SCN2 terminals block” on the main board.
[117]	Servo movement timeout, please check the servo driver parameter settings.	Check the parameter setting of servo driver.
[118]	The index of servo axis for servo positioning is invalid.	Delete the current program and write the program again. If problem still remains, please contact your agent or manufacturer.
[119]	IO extend module 1 communication error.	Please check if the communication cable between the IO board and main control card is OK or not. If it's OK, find out what goes wrong with the IO board by changing to different connecting port and testing.
[120]	IO extend module 2 communication error.	Please check if the communication cable between the IO board and main control card is OK or not. If it's OK, find out what goes wrong with the IO board by changing to different connecting port and testing.
[121]	IO extend module 3 communication error.	Please check if the communication cable between the IO board and main control card is OK or not. If it's OK, find out what goes wrong with the IO board by changing to different connecting port and testing.
[122]	IO extend module 4 communication error.	Please check if the communication cable between the IO board and main control card is OK or not. If it's OK, find out what goes wrong with the IO board by changing to different connecting port and testing.
[123]	Arms cannot descend without external descend safe signal.	Please check the “out of mold safety sensor” is working or not. If it's working good, then check if it has DC 0V input on the “X13 terminal” of “CN3” terminals block on the main board. If it doesn't, please check the wiring.
[124]	System settings do not allow traveling if product arm rotate vertical.	Allow it by check the “Rotate when travel” in the “System Setup” page of “Menu” in the controller if you want.
[125]	Cannot execute the operation if the horizontal position out of safe 216	Check servo safety area setting by the “Servo Setup” page of the “Menu” in the controller.
[126]	Horizontal position of runner arm exceeds safe area.	Check servo safety area setting by the “Servo Setup” page of the “Menu” in the controller.
[127]	Runner arm vertical servo at origin position, but not detect origin 218	Please check the proximity sensor of sub-arm (Y2 axis) and if it has signal input to the “ORG terminal” of the “SCN4 terminals block” on the main board.
[128]	There has IMM mold open position signal, but no middle mold open 219	Please check the current situation of IMM, then check if it has “DC 0V” on the “MID terminal” of “CN2 terminals block” on the main board. If it doesn't, please check the wiring.
[129]	System is auto running, but no IMM auto signal.	Please check if it has “DC 24V” on the 2 “AUTO terminals” of “CN1 terminals block” on the main board. If it doesn't, please check the wiring.

[130]	Servo position conflict between main arm and sub arm.	Please check the program and make sure the horizontal position of main arm and sub-arm is safe or not.
[131]	Only allow IMM-EMC in combine.	
[132]	There's no mold open position signal in mold(wait out mold).	Please check the current situation of IMM and check if it has DC 24V on the 2 "MOP terminal" of "CN1 terminals block" on the main board. If it doesn't, then check wiring.
[133]	There's no middle mold open position signal in mold(wait out mold).	Please check the current situation of IMM and check if it has DC 0V on the "MID terminal" of "CN2 terminals block" on the main board. If it doesn't, then check wiring.
[134]	It's not safe for servo Z to enter mold, there's no mold open position signal(wait out mold).	Please check the current situation of IMM and check if it has DC 24V on the 2 "MOP terminal" of "CN1 terminals block" on the main board. If it doesn't, then check wiring.
[135]	It's not safe for servo Z to enter mold, There's no middle mold open position signal (wait out mold).	Please check the current situation of IMM and check if it has DC 0V on the "MID terminal" of "CN2 terminals block" on the main board. If it doesn't, then check wiring.
[136]	Invalid runner arm action.	Delete current program and write the program again. If problem still remains after, please contact your agent or manufacturer.
[137]	Runner arm is moving down, but electric eye is off.	Please check if pneumatic sub-arm is set to be used and it's in running condition or not. Then check if it has DC 0V input on the "X14 terminal" of "CN3 terminals block" on the IO board 1. If it doesn't, please check wiring.
[138]	Runner arm is moving down, but the moving up electric eye is on.	Please check if pneumatic sub-arm is set to be used and it's in running condition or not. And check the wiring as well.
[139]	Runner arm is moving up, but electric eye is off.	Please check if pneumatic sub-arm is set to be used and it's in running condition or not. Then check if it has DC 0V input on the "X13 terminal" of "CN3 terminals block" on the IO board 1. If it doesn't, please check wiring.
[140]	Runner arm is moving up, but the moving down electric eye is on.	Please check if pneumatic sub-arm is set to be used and it's in running condition or not. And check the wiring as well.
[141]	It's not safe to move down when the runner arm is not at fetch or release point.	Please check the robot arm position is within safety area or not. The arm can move down only when it is within safety area.
[142]	It's not safe to move down for runner arm, because there isn't have IMM-MOP signal in mold.	Please check the current situation of IMM and check if it has DC 0V on the 2 "MOP terminal" of "CN1 terminals block" on the main board. If it doesn't, then check wiring and if the signal had been interrupted or disconnected.
[143]	It's not safe to move down for runner arm, because there isn't have IMM-MMOP signal in mold.	Please check the current situation of IMM and check if it has DC 0V on the "MID terminal" of "CN2 terminals block" on the main board. If it doesn't, then check wiring and if the signal had been interrupted or disconnected.
[144]	There is not have IMM-IMOP signal when the runner arm is in mold.	Check IMM mid-mold signal.
[145]	There is not have IMM-IMOP signal when the product arm is in mold.	Check IMM mid-mold signal.
[146]	There are too many continuous paths.	The instruction "Path" in the program exceeds system limit.
[147]	Continuous paths across regions may not be safe.	Change the path.
[148]	Continuous mold down, no mold finished, may not be safe.	Without the "Mold Opened" signal. So the robot arm cannot move down.

[149]	Continuous die down without mid plate die may not be safe.	Without the “Mold Opened” signal. So the robot arm cannot move down.
[150]	No path ends.	In the path programming, a “Path Begin” must go with a “Path End”. Please check if there is any extra of “Path Begin” or lack of “Path End” in the program.
[151]	Invalid activation code.	Contact your agent or manufacturer.
[152]	The JOG mode can only be converted to manual mode.	Contact your agent or manufacturer.
[153]	Active activation code.	System alarm, click to cancel the alarm.
[154]	Cannot wait for open mode statements in the path.	Can’t put “Wait MOP” (wait for mold open) instruction into path programming.
[155]	In mold safety and out of mold security with signal simultaneously.	Please check the current position and situation of robot arm. Then check if it has signal on the “ORG terminal” and “X8 terminal” of “CN3 terminals block” on the main board and wiring.
[156]	Variable operation cannot be 0.	Variable cannot be 0.
[157]	Activation code expired.	Contact your agent or manufacturer.
[158]	It is not safe for the arm to go down. The X axis is not in the safe area of the mold.	It is not safe for the arm going down. X axis is not in the inside mold safety area.
[159]	It is not safe for the arm to go down. Axis B is not in the safe area of the mold.	It is not safe for the arm going down. Axis B is not in the inside mold safety area.
[160]	It is not safe for the arm to go down, and the A-axis is not in the safe area of the mold.	It is not safe for the arm going down. A-axis is not in the inside mold safety area.
[162]	The auxiliary boom is pneumatically introduced but the electric eye is not bright.	1.Check the air pressure between the solenoid valve and pneumatic cylinder and the proximity sensor. 2.Check if the air tube was blocked or any blockage in the tube. 3.Check if the arm structure was been blocked.
[163]	The auxiliary boom is pneumatically introduced, but the electric eye is bright.	1.Check the air pressure between the solenoid valve and pneumatic cylinder and the proximity sensor. 2.Check if the air tube was blocked or any blockage in the tube. 3.Check if the arm structure was been blocked.
[164]	Auxiliary boom pneumatic retraction but electric eye is not on.	1.Check the air pressure between the solenoid valve and pneumatic cylinder and the proximity sensor. 2.Check if the air tube was blocked or any blockage in the tube. 3.Check if the arm structure was been blocked.
[165]	The auxiliary boom is pneumatically retracted but the imported electric eye is bright.	1.Check the air pressure between the solenoid valve and pneumatic cylinder and the proximity sensor. 2.Check if the air tube was blocked or any blockage in the tube. 3.Check if the arm structure was been blocked.
[166]	Communication error of expansion IO board 5.	Please check the communication cable between the IO board and main board. If it is OK, find out what goes wrong with the IO board by exchanging different ports.
[167]	Axis B is not in the safe area of the mold, and the arm is not safe to go down.	Check the B axis safety area settings and parameters is proper for current situation or not.
[168]	The C axis is not in the safe area of the mold, and the arm is not safe to go down.	Check the C axis safety area settings and parameters is proper for current situation or not.

[169]	Y axis is not in the upper position, arm chamfer is not safe.	Check the Y axis upper position proximity sensor is on and its wiring.
[170]	Y axis is not in the upper position, arm rotation is not safe.	Check the Y axis upper position proximity sensor is on and its wiring.
[171]	The C axis is not in the safe position, and it is not safe for the arms to traverse.	1.Check the C axis proximity sensor and its wiring. 2.Check the C axis safety area settings and parameters.
[172]	The chamfer of the arm is not safe and cannot exceed the safe area in the mold.	Check the arm flipping/rotating axis safety area settings and parameters.
[173]	The arm rotation is not safe and cannot exceed the safety area in the mold.	Check the arm flipping/rotating axis safety area settings and parameters.
[174]	The C-axis position exceeds the software stroke.	Check C axis "Software distance" at the "Servo Setup" of the Menu.
[175]	B axis position exceeds software stroke.	Check B axis "Software distance" at the "Servo Setup" of the Menu.
[176]	Axis B is not in the safe area, arm traverse is not safe.	1.Check the B axis proximity sensor and its wiring. 2.Check the B axis safety area settings and parameters.
[177]	Axis A is not in safe area, arm crossing is not safe.	1.Check the B axis proximity sensor and its wiring. 2.Check the B axis safety area settings and parameters.
[178]	The A-axis is not safe to operate and cannot exceed the safety area in the mold.	Check the A axis safety area settings and parameters is proper for current situation or not.
[179]	The X-axis is not in the safe area, and the arms are not safe to cross.	Check the X axis safety area settings and parameters is proper for current situation or not.
[180]	The auxiliary boom pneumatic chamfer is horizontal, but the electric eye is not bright.	1.Check the air pressure between the solenoid valve and pneumatic cylinder and the proximity sensor. 2.Check if the air tube was blocked or any blockage in the tube. 3.Check if the arm structure was been blocked.
[181]	The auxiliary boom pneumatic chamfer is horizontal, but the vertical electric eye is bright.	Check and see if the horizontal and vertical sensors of pneumatic flipping cylinder connected reversely.
[182]	The auxiliary boom pneumatic chamfer is vertical, but the electric eye is not bright.	1.Check the air pressure between the solenoid valve and pneumatic cylinder and the proximity sensor. 2.Check if the air tube was blocked or any blockage in the tube. 3.Check if the arm structure was been blocked.
[183]	The auxiliary boom pneumatic chamfer is vertical, but the horizontal electric eye is bright.	Check and see if the horizontal and vertical sensors of pneumatic flipping cylinder connected reversely.
[184]	Absolute value encoder not supported for X axis.	1.Check if the robot was equipped the non-absolute servo driver and motor. 2.Check if the absolute encoder wasn't been set to use by the "Type" (encoder type) at "Servo Setup" of the Menu.
[185]	Absolute encoder not supported for Y axis.	1.Check if the robot was equipped the non-absolute servo driver and motor. 2.Check if the absolute encoder wasn't been set to use by the "Type" (encoder type) at "Servo Setup" of the Menu.

[186]	Absolute value encoder not supported for Z axis.	1.Check if the robot was equipped the non-absolute servo driver and motor. 2.Check if the absolute encoder wasn't been set to use by the "Type" (encoder type) at "Servo Setup" of the Menu.
[187]	Absolute encoder not supported for axis C.	1.Check if the robot was equipped the non-absolute servo driver and motor. 2.Check if the absolute encoder wasn't been set to use by the "Type" (encoder type) at "Servo Setup" of the Menu.
[188]	Absolute encoder not supported for axis B.	1.Check if the robot was equipped the non-absolute servo driver and motor. 2.Check if the absolute encoder wasn't been set to use by the "Type" (encoder type) at "Servo Setup" of the Menu.
[189]	Absolute encoder not supported for axis A.	1.Check if the robot was equipped the non-absolute servo driver and motor. 2.Check if the absolute encoder wasn't been set to use by the "Type" (encoder type) at "Servo Setup" of the Menu.
[190]	X axis absolute value encoder communication error.	1.Check the communication cable connecting between servo driver and main board. 2.Check the communication settings and parameters.
[191]	Communication error of Y-axis absolute value encoder.	1.Check the communication cable connecting between servo driver and main board. 2.Check the communication settings and parameters.
[192]	Communication error of Z-axis absolute value encoder.	1.Check the communication cable connecting between servo driver and main board. 2.Check the communication settings and parameters.
[193]	Communication error of absolute value encoder of axis C.	1.Check the communication cable connecting between servo driver and main board. 2.Check the communication settings and parameters.
[194]	Communication error of absolute value encoder of axis B.	1.Check the communication cable connecting between servo driver and main board. 2.Check the communication settings and parameters.
[195]	Communication error of absolute value encoder of axis A.	1.Check the communication cable connecting between servo driver and main board. 2.Check the communication settings and parameters.
[196]	Oil filling alarm.	Check if greasing feedback signal was received or not.
[197]	External safety door opening is suspended.	Check if the external safety door signal was been interrupted or disconnected.
[199]	There is overlap between the safety zone inside and outside the Z-axis die.	The system was run to a certain position but the robot wasn't actually there. Can reset the safety area smaller than before or set the distance of inside mold and outside mold proximity sensor longer than before.
[208]	System software is not authorized legally! Pirated software will affect the security and stability of the system. www.sinobot.com.cn	Contact your agent or manufacturer.
[209]	The traverse is not safe, and the X-axis is not in the safe area of the mold.	Check X axis inside mold safety area setting and parameters is proper for current situation or not.
[210]	Not outside the mold, the chamfer level is not safe.	Check the inside mold area main arm pneumatic flipping cylinder setting .
[211]	Battery power down.	Check the mercury battery on the main board.
[212]	System power down.	Check the voltage of power input.

[213]	X axis absolute value encoder battery voltage is low.	Check if encoder battery voltage is normal or not, and check if the wiring correct or not.
[214]	Y axis absolute value encoder battery voltage is low.	1.Check the voltage of absolute encoder's battery. 2.Check the wiring is correct or not.
[215]	The battery voltage of Z-axis absolute encoder is low.	1.Check the voltage of absolute encoder's battery. 2.Check the wiring is correct or not.
[216]	Absolute value of axis C encoder battery voltage is low.	1.Check the voltage of absolute encoder's battery. 2.Check the wiring is correct or not.
[217]	B-axis absolute encoder battery voltage is low.	1.Check the voltage of absolute encoder's battery. 2.Check the wiring is correct or not.
[218]	A-axis absolute value encoder battery voltage is low.	1.Check the voltage of absolute encoder's battery. 2.Check the wiring is correct or not.
[220]	The C-axis is not safe and cannot exceed the safety zone when traversing (the traversing is not currently in the safety zone).	Check the settings and parameters of C axis inside mold and outside mold safety area.
[221]	Axis B is not safe and cannot exceed the safety zone when traversing (the traversing is not currently in the safety zone).	Check the settings and parameters of B axis inside mold and outside mold safety area.
[222]	The A-axis is not safe and cannot exceed the safety zone when traversing (the traversing is not currently in the safety zone).	Check the settings and parameters of A axis inside mold and outside mold safety area.
[223]	The X-axis is not safe and cannot exceed the safety zone when traversing (the traversing is not currently in the safety zone).	Check the settings and parameters of X axis inside mold and outside mold safety area.
[255]	System communication error: the operator and the main control module cannot communicate normally. Please shut down the system. Then check whether the communication link is normal.	1.Check the communication cable connecting between the controller and the main board. 2.Then check the system software match the main board or not.
[300]	File system not found!	Contact your agent or manufacturer.
[304]	File system initialization error!	Contact your agent or manufacturer.

7. Maintenance


7.1 General Maintenance

Please check and maintain by the prescribed maintenance intervals. Proper maintenance brings trouble-free of the robot. Proper maintenance is necessary to apply to the warranty policy. Maintenance should be managed by qualified personnel only.



Maintenance and responsibility for safety equipment becomes the responsibility of the customer when the robot was accepted.



Notice, that safety instructions marked with a  must check according to the safety regulations so that fully functionality of this equipment will be guaranteed.

7.2 Lubrication

Wipe the old grease from bearings, linear guides and linear sliders with a cloth, then grease new lubrication by using a brush. All roller bearings greases apply to DIN 51825.

7.3 Maintenance Cycle

In accordance with the maintenance cycle to make the robot work in the best and safest condition.

Table 7-1: Maintenance Specification

Daily Maintenance	Monthly Maintenance	Quarterly Maintenance
<ol style="list-style-type: none"> 1. Wipe and clean it. 2. Filter draining. 3. Check the pressure of air supply. 4. Check bolts and which connected the robot and injection molding machine whether tighten. 5. Check all the bolts, nuts and screws on the robot and structure. 6. Check all the suction cups, grippers and holders working normally or not. 	<ol style="list-style-type: none"> 1. Use air gun to clean filter. 2. Check the screws on all parts of robot. 3. Confirm whether the wires and pipelines breaks or loosed. 4. Check and adjust the running speed. 5. wipe and clean dust on the control box. 	<ol style="list-style-type: none"> 1. Add lubricating oil (Req.: Add lubricating oil to all moving parts of the machine.)