HUACHENG

QC-S2 SERIES
OPERATION MANUAL

DRIVE AND CONTROL INTEGRATED TWO-AXIS MANIPULATOR CONTROL SYSTEM V4.0

深圳市华成工业控制股份有限公司

Shenzhen Huacheng Industrial Control Co., Ltd.

Introduction

First of all, thank you very much for choosing the control system of single- axis manipulator with integrated drive- control system produced by Shenzhen Huacheng Industrial Control Co., Ltd. This is the user manual of the system, which will provide you with relevant rules and precautions for the installation, wiring, system operation, alarms and solutions.

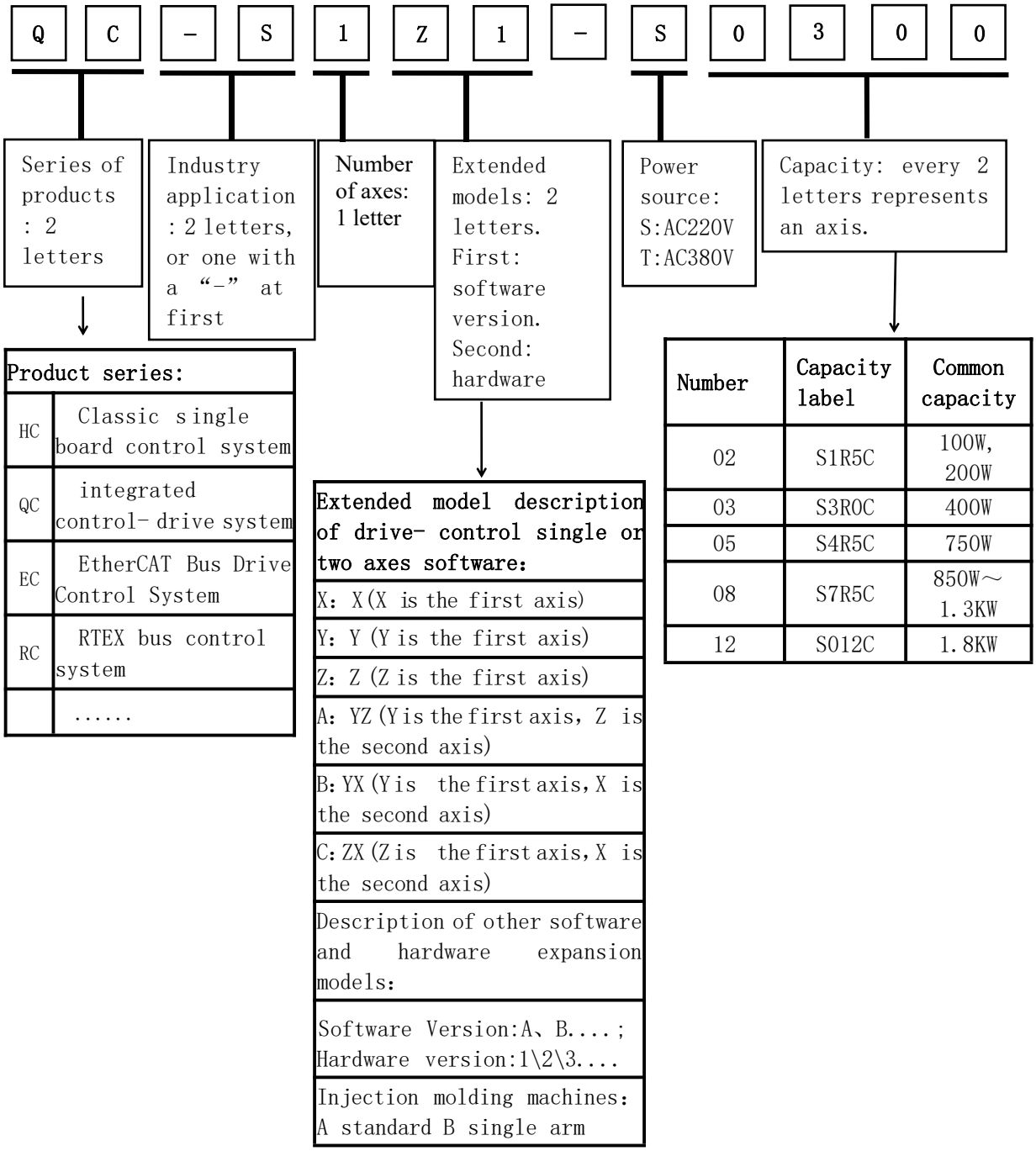
In order to use this control system correctly, give full play to the performance of it and ensure the safety of users and equipment, please read this manual carefully before using. Incorrect operation may lead to abnormal operation of the control system, equipment damage, personal injury or other accidents!

As our company is devoted to the continuous improvement of products, there will be no further notice if the material provided by the company is changed.

CONTENTS

Chapter 1 System Model Selection

1.1 System Model Description



E.g: QC- S2A3- S0503 means control system of YZ axes injection molding machine's manipulator with integrated control- drive system; Y axis servo is 750W/AC220V; Z axis servo is 400W/ AC220V; The servo- power label corresponding to the upper cover is S7R5C, S3R0C.

*** Attention: This product does not support AC380V input for now.**

Chapter 2 System Configuration and Installation

2.1 System Basic Configuration

1) 4.3- inch color display operation panel(Transfer line length optional, 0.5 m standard length) ;
2) Control box with integrated drive and control system;
3) Servo motor(400 W/750 W) ;
4) Brake resistance;
5) Power supply unit(optional) ;
6) UVW power line and encoder line(optional, length is optional) ;
7) Electric positioning board(optional) ;

2.2 Safety Reminders and System Installation

The safety content of this manual is as follows. The description of the safety mark is very important. Please abide by it.

Attention!

Operations against regulations may lead to moderate injury, minor injury or damage to machine.

2.2.1 Precautions for Preservation and Removals

*** Attention: Do not store or place in the following environment, otherwise it may lead to fire, electric shock or machine damage.**

1) Places where has direct sunlight, places where the ambient temperature and relative humidity exceeds the standard storage level, places where the temperature difference is large and dewy.
2) Places close to corrosive gases or flammable gases, places with more dust, dust, salt and metal dust, places where water, oil and medicine drip, vibration or shock can be transmitted to the main place. Do not hold the cable during removals, otherwise the machine will be damaged or malfunction.

2.2.2 Matters Needing Attention

1) Do not pile this product together too much, otherwise it will cause damage or failure.
2) This product is a general industrial product. Don't use machines and systems to hurt people's life and health.
3) If applied to devices that may cause major accidents or damage due to the failure of this product, please configure the safety device.
4) If used in an environment of sulfur or high concentrations of sulfur, please take care that chip resistance may be broken or poor contact due to vulcanization.
5) If the input voltage far exceeds the rated range of the power supply of this product, smoke and fire may occur due to the damage of internal components, please pay full attention to the input voltage.
6) Please note that this product can not guarantee the use beyond the product specification.
7) The company is committed to the continuous improvement of products and may change some parts.

2.2.3 Prohibited Operation

Do not take apart or fix unless by our company.

2.2.4 Precautions in Abandonment

Attention!

When the product needs to be treated as waste after normal use, please abide by relevant department's legal regulations on the recycling of electronic information products.

2.2.5 System Installation

1) Wiring work must be carried out by a professional electrician
2) Make sure that the power supply is disconnected before starting work.
3) Please install the system in metal and other flame retardants and be away from combustible.
4) Be sure to connect the grounding terminal with the ground wire.
5) If the external power supply is abnormal, the control system will fail. Be sure to set a safety circuit outside the control system to guarantee normal running.
6) Must be familiar with the contents of this manual before installation, wiring, operation and maintenance. Cautions related to machinery, electronics and etc are also necessary.
7) The electric box to install controller should be well ventilated, oil- free and dust-free. If it's pressurized, there should be a draft fan to avoid high temperature. The proper temperature is under 50℃. Frozen or dewy places are also should be avoided.
8) When installing the electronic board, it shall avoid placing it too close to the contactor, frequency converter and other AC devices to avoid unnecessary surge interference.

2.2.6 Safety Precautions

 Attention	Encoder must use shielding wire. Ensure that shielding layer is single-end grounded! Do not install devices that generate electromagnetic waves or interference near the servo driver such as transformer, otherwise the servo driver may do wrong action. If there is still a need, do set an anti-jamming shield between.
	Please follow steps specified in electrostatic discharge(ESD) protection when operating the servo driver, otherwise the inside circuit will be damaged by static electricity. Please follow the local standard for branch and short circuit protection. If not protected properly, the servo driver may be damaged. Do not share ground wires with welding machines or power machines that require high current, otherwise the servo driver or machine will not running well. When using several servo drivers, please operate in accordance with this manual. Do not wrap the ground wire into a circle, otherwise the servo driver or machine will not running well. Do not connect or operate if there are obvious damages or lost parts. Let the professional staff do the wiring and check.
	Rotating electrical machines feed power to servo drives, so the servo driver is still live even when the motor stops and the power supply is cut off. Be sure the servo driver is safely disconnected before maintenance.
 Danger	Do not connect when the power supply is on, otherwise there will be risk of electric shock. Please cut off the power of all equipment before checking. Do wait at least 10 minutes after cutting off the power for there is residual voltage in the internal capacitor. Make sure that the servo driver is well grounded because the contact current of it is more than 3.5mA, otherwise there will be risk of electric shock.
	Power on
	Do not open the cover plate after power on. Be careful of electric shock. Do not touch any input or output ports of servo driver. Be careful of electric shock. Do not remove the cover plate of the servo driver or touch the printed circuit board when the power is on. Be careful of electric shock. Do not change the manufacturer parameters of servo driver arbitrarily, otherwise it may cause damage to the equipment!

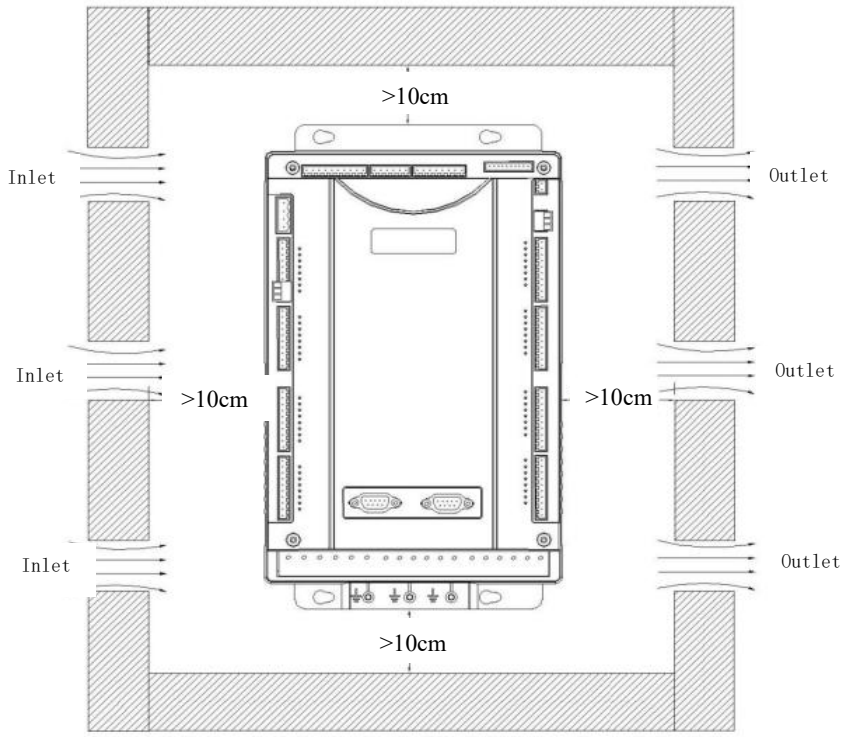
	In service
	Non-professional staff shall not detect signals in operation, otherwise it may cause injury or equipment damage! Do not touch the cooling fan and discharge resistance to test the temperature, otherwise it may cause burns! Make sure there is nothing fallen into the equipment while the servo driver is running, otherwise it may cause damage.
	Maintenance
	Do not repair or maintain servo drivers without professional training, otherwise it may cause injury or equipment damage! Do not maintain with power on. Be careful of electric shock. Before maintenance, do wait at least 10 minutes after cutting off the power of servo driver, for there is residual voltage in the internal capacitor. Make sure that all power supplies are cut off before maintenance. All plug-ins must be plugged in power failure. The parameters must be set and checked after changing the servo driver. Do not power up the damaged machine, otherwise the damage will be severer.
 **Attention**	Ensure that the motor terminals are consistent with the servo driver's terminals. If the phase sequence is inconsistent, it will make the motor rotate in reverse. Do not connect the power supply with the output terminal of servo driver,otherwise it may cause damage or even fire. Some systems may act suddenly when electrified. Be careful of the risk of serious injury or even death. Make sure the cover plate is firmly installed and the motor allows restart before turning on the servo driver. Make sure the rated voltage of servo driver is consistent with the power supply before turning on it. Or it may cause fire. Do not connect the input power with output terminals of servo driver(U,V,W),otherwise it may cause damage to machine. Non-professional staff shall not do installation, maintenance, inspection and components replacement. Be careful of electric shock.

*** Attention: Improper handling may cause risks, including injury or equipment accident.**

2.3 Installation and External Wiring Requirements

2.3.1 Direction and Space Requirements for Installation

Direction: the normal direction of installation is vertical and upright. The interval between the servo driver, box and other equipment must be 10cm at least, as the following picture. The dimension marked is the minimum value. Make sure the intervals are long enough.



Space requirements for installation

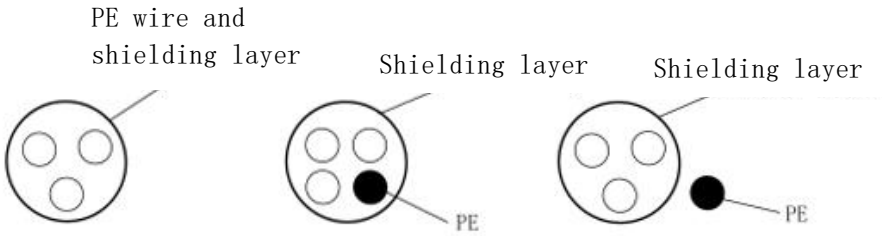
Heat elimination:

The servo driver uses the fan to abstract heat. It is best to install a ventilation slot or a heat dissipation fan in the electrical control cabinet to ensure that the drive-control integrated machine in the chassis is in a place where is cool and airy.

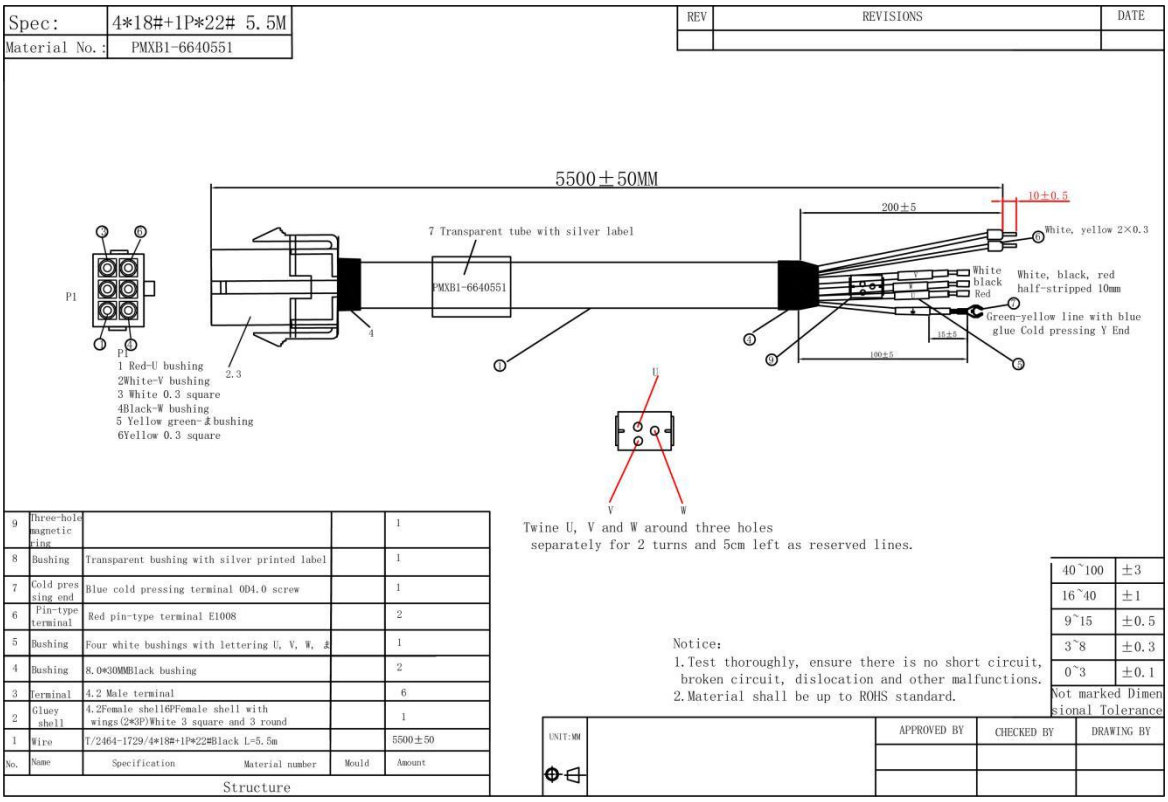
2.3.2 Requirements for Cable and Wiring

2.3.2.1 Shielding cables

To meet the requirements of EMC, it must use shielded cables with shielding layer for encoder line. It's recommended to use shielded cables with shielding layer for power line or install a magnetic ring(suggested spec is R3H 22×28×7.0). Shielded cable is shown as P1. Power line with magnetic ring is shown as P2. As we suggest, installing magnetic ring is more recommended.

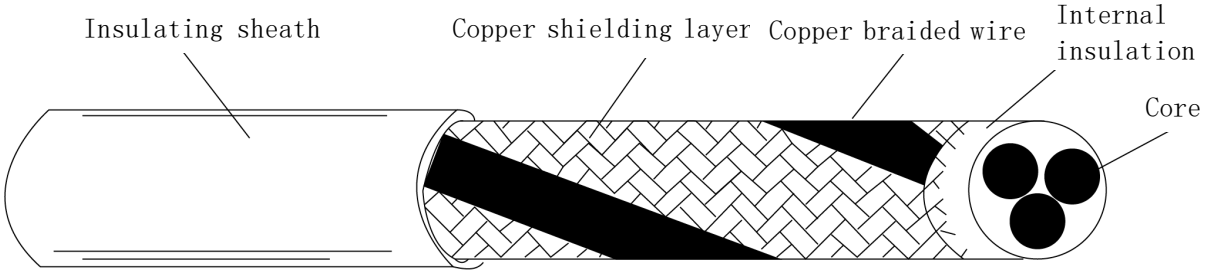


P1 Shielded Cable Requirements(for encoder line)



P2 Power line with magnetic ring

In order to suppress RF interference emission and conduction effectively, the shielding layer of the shielding wire is composed of coaxial copper braided wire. To increase the shielding efficiency and conductivity, the braid density of the shield layer should be greater than 90% as the following picture.



Woven density of shielding layer

Installation cautions:

- Shielded symmetrical cables are recommended for all shielded cables, and four-core cables can also be used as input cables;
- Cables and PE shielded conductor should be as short as possible to decrease EMR, stray current and capacitive current outside;
- It is recommended to use shielded cables as control cables;
- It is recommended to use shielded cables or steel pipe shielded power lines as output power line of driver with the shielding layer well grounded. Cables for equipment under interference shall use shielded twisted-pair with the shielding layer well grounded.

2.3.2.2 Requirements for wiring

1) Motor cables should be far away from others; Motor cables of drivers can be wired paralleled.

2) It is recommended to place motor cables, input power cables and control cables in different chutes. Long-distance parallel wiring should be forbidden to avoid EMR caused by fast change of driver's output voltage.

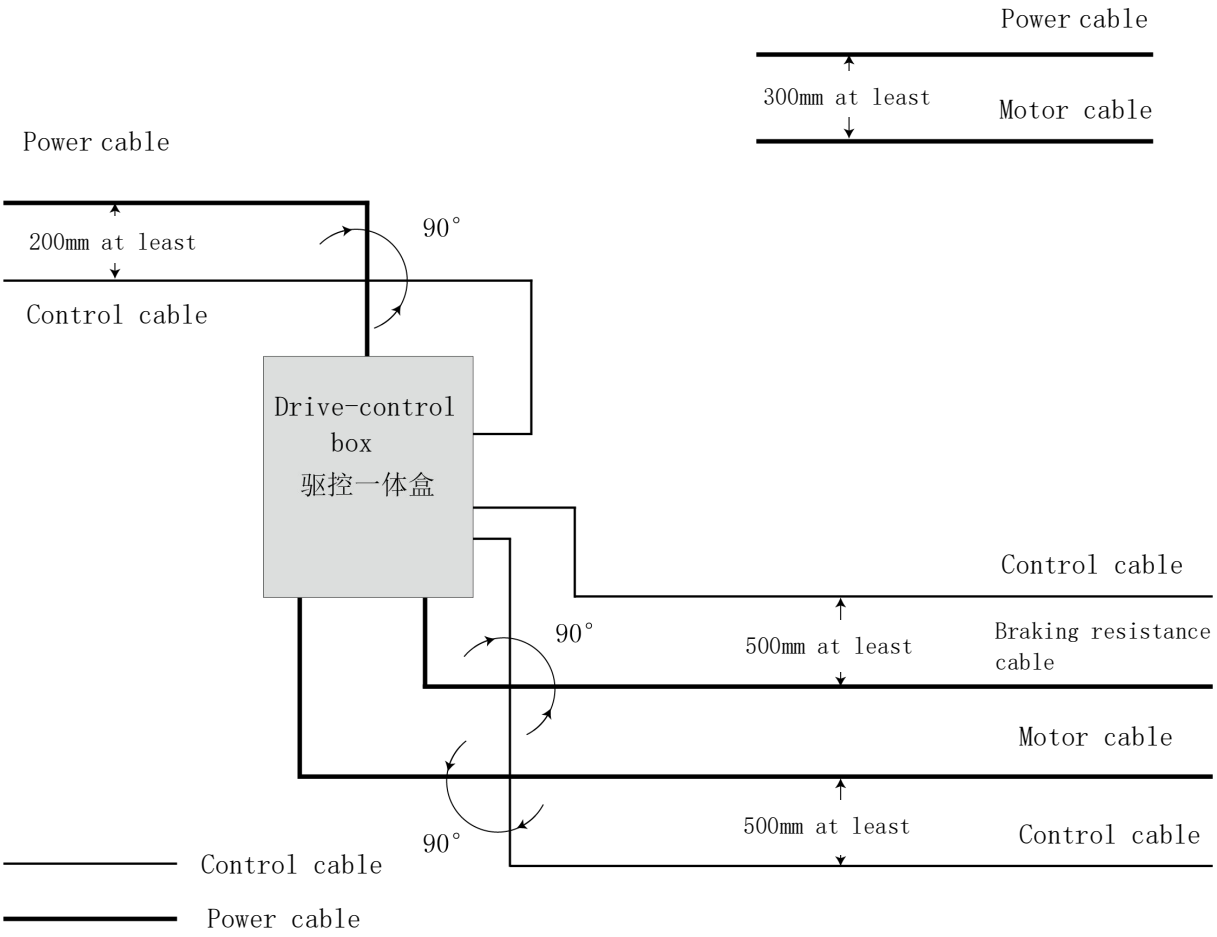
3) Try to keep perpendicular if the control cable has to cross power cable. Do not let other cables cross the driver.

4) Try not to wire input power line, output power line of driver and weak signal lines such as control lines paralleled, perpendicular if possible.

5) Chutes must be well connected and grounded. Aluminium chutes can improve equipotential.

6) Filter, driver and motor should be well connected with system(machine or equipment). The installed part should be painted and make conductive metal fully contacted.

7) Wiring diagram is shown as bellow:



2.3.2.3 Common EMC problems and solutions

Driver products can cause strong interference. It may happen if there are problems in wiring or grounding. Solutions in this chart can be used.

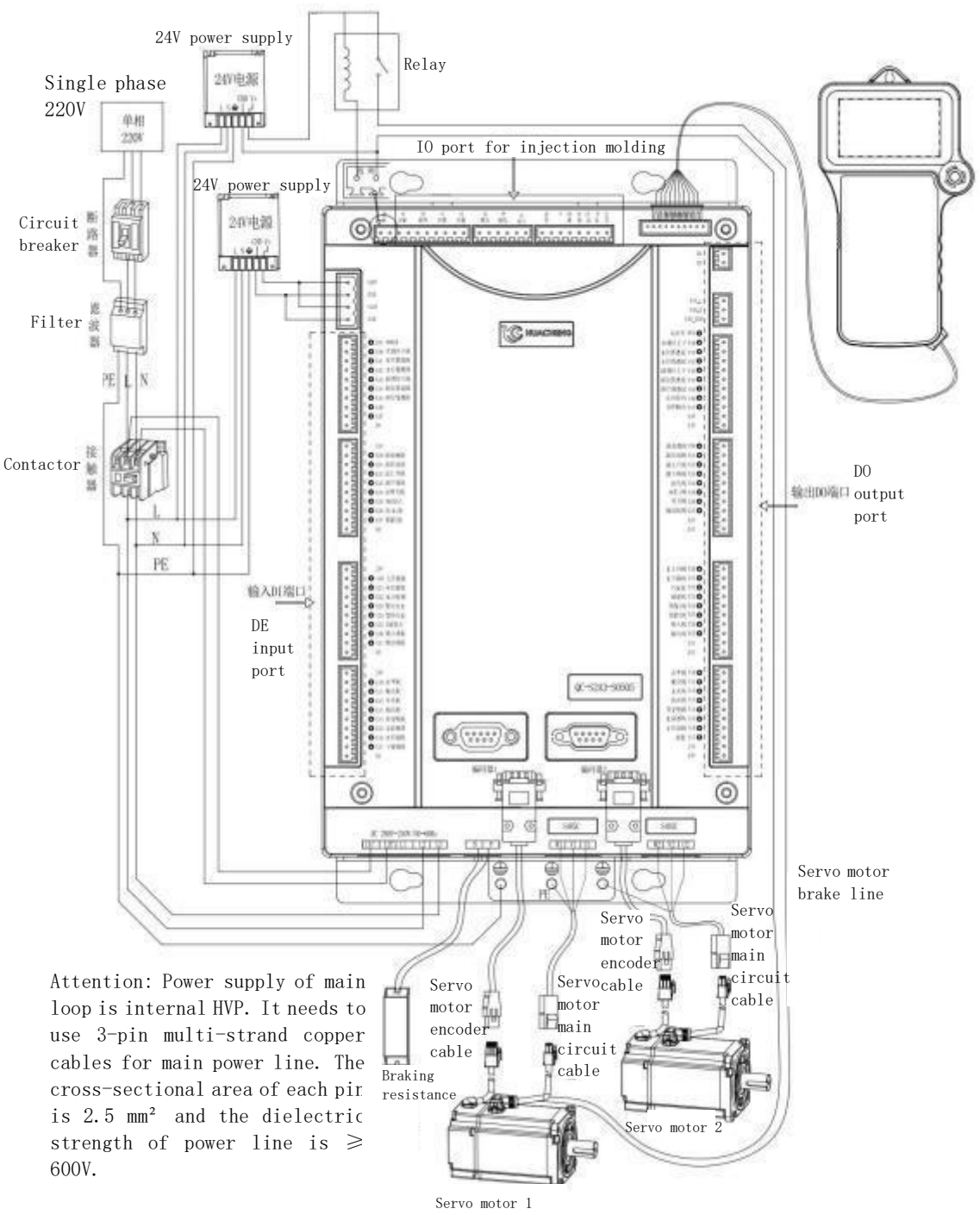
Common EMC problems and solutions

Interference type	Solutions
Trip of current leakage protection circuit breaker	Lower the carrier frequency; Shorten the drive line; Add wound magnetic ring to the input drive line(not PE line); Disconnect the larger capacitance in input port if trip happens the moment power on;(disconnect the ground terminals of internal or external filter and earth Y capacity in input port) For running or enable trip, it needs to take current leakage restraining measures (current leakage filter, safety guage capacitor + wound magnetic ring);
Interference caused by driver running	Connect motor’s shell with PE terminal of driver; Connect PE terminal of driver with PE of electric net; Add wound magnetic ring to the input power line; Add capacitance or wound magnetic ring to interfered signal port; Additional common-ground connection between devices;
Communication interference	Connect motor’s shell with PE terminal of driver; Connect PE terminal of driver with PE of electric net; Add wound magnetic ring to the input power line; Add matching resistance to communication line source and load terminal; Connect differential line of communication line with communication common-ground wire outside; Use shielded lines as communication lines and connect the shielding layer with communication common-ground wire; Use daisy chain in multi-point communication wiring and the length of branches should be less than 30cm;

Chapter 3 System Installation and Wiring Instruction

3.1 System Wiring Diagram

3.1.1 Machine Wiring

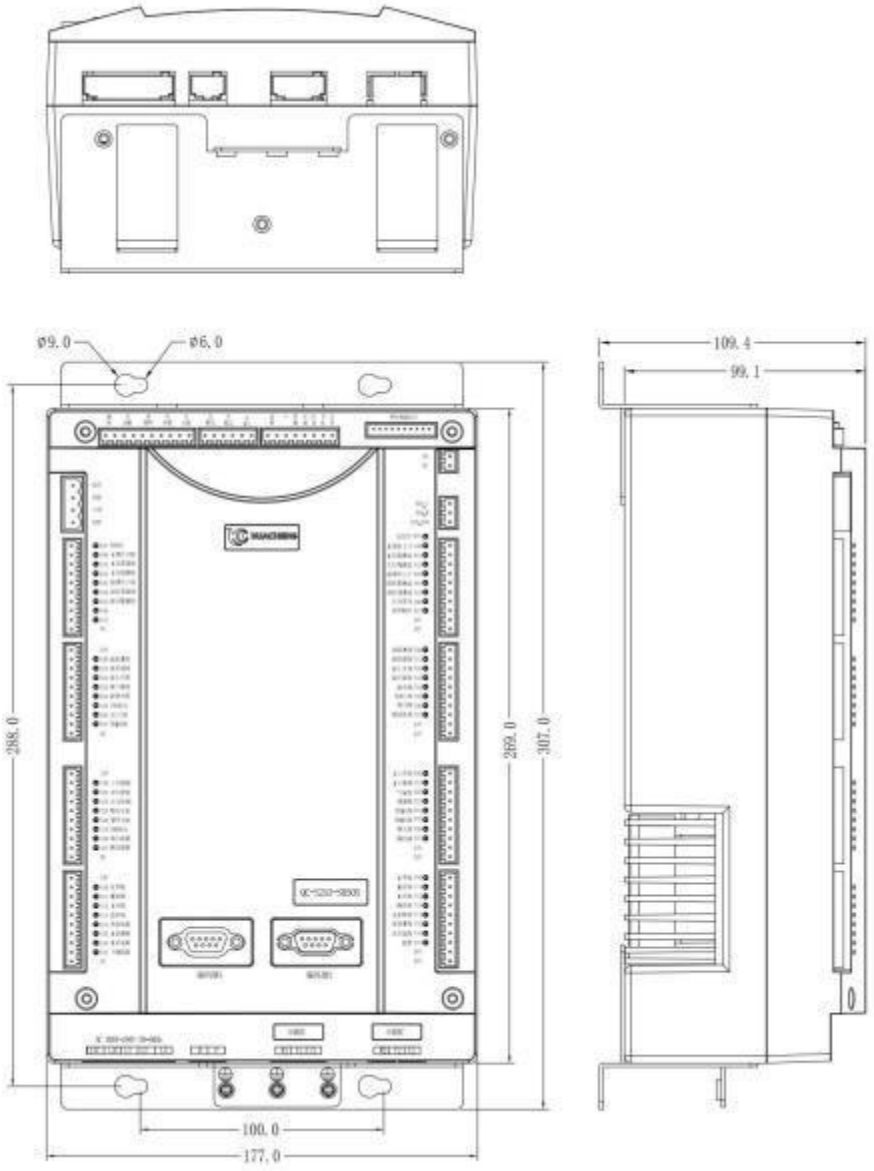


Attention: Power supply of main loop is internal HVP. It needs to use 3-pin multi-strand copper cables for main power line. The cross-sectional area of each pir is 2.5 mm² and the dielectric strength of power line is ⩾ 600V.

* **Attention:** If equipped with a brake motor, a single power supply is required for separate supply.

3.1.2 Dimensional Drawing

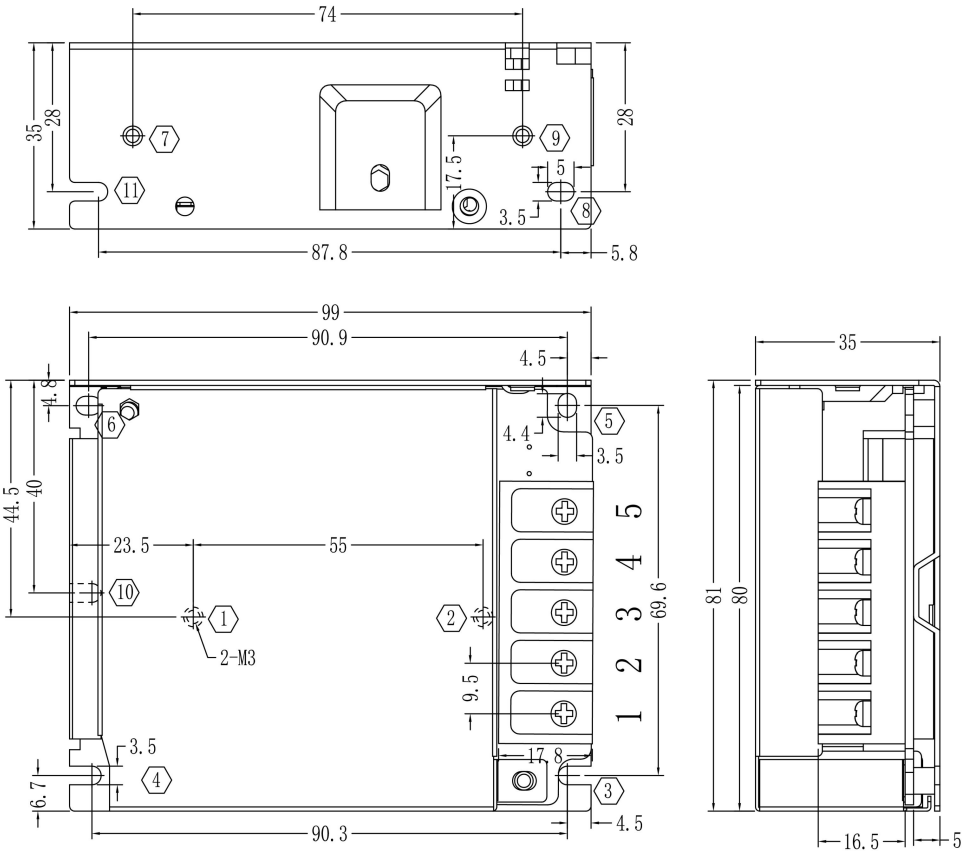
3.1.2.1 Main control dimensions



Installation way	Screw specification	Screw length(max)	Installation torque(max)
Fixed by screw	M5	8mm	7.5kgf.cm

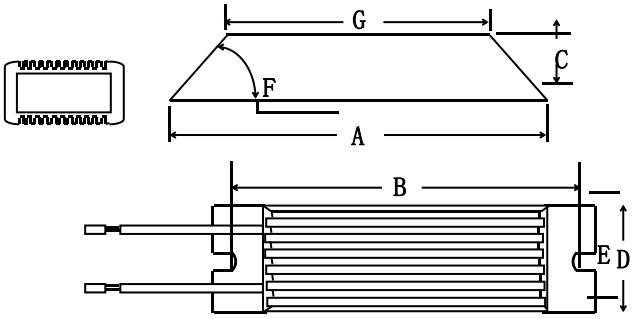
3.1.2.2 Installation dimensions and wiring of single switching power supply

* Note: User shall evaluate whether the power supply specification meets the IO current.



Installation way	Position number	Screw specification	Screw length(max)	Installation torque(max)
Fixed by screw	①--② ⑦--⑨	M3	5mm	6.5kgf.cm
	③--⑥ ⑩--⑫	M3	3mm	7kgf.cm

3.1.2.3 Brake resistance dimension

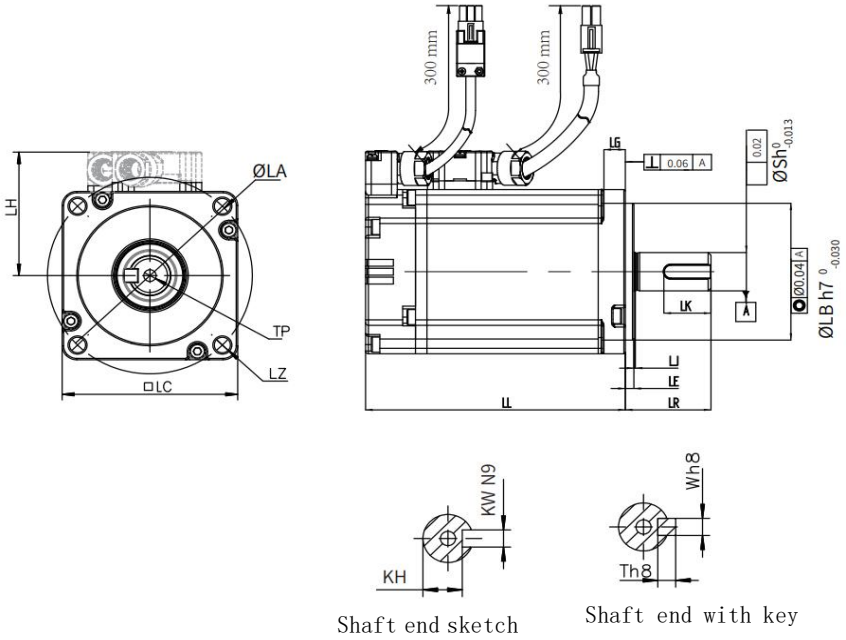


Installation way	Screw specification	Screw length (max)	Installation torque (max)
Fixed by screw	M5	8mm	7.5kgf.cm

Model	25℃-40℃ Power rating(W)	Dimensions(mm)							Resistance range
		Resistor							
		A±1.0	B±1.0	c±1.0	D±1.0	E±0.5	F	G±1.0	
RXLG	300	215	203	30	60	5.5	45°	175	0.1～20K

3.1.2.4 Motor parameters and dimension

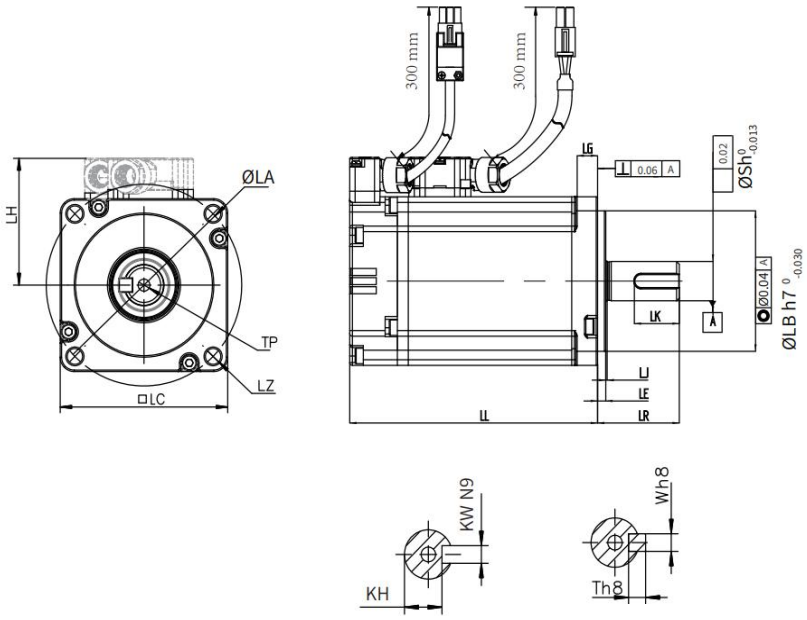
400W Motor Parameters									
Spec / Model	LL	LC	LR	LA	LZ	LH	LG	LE	LJ
400W with brakes	<180	60	30	70	Φ4-5.5	≤50	NA	3±0.5	1±0.35
400W no brakes	<130	60	30	70	Φ4-5.5	≤50	NA	3±0.5	1±0.35
Spec / Model	S	LB	TP	LK	KH	KW	W	T	Weight (kg)
400W with brakes	14	50	M5×10	≤23	11	5	5	5	NA
400W no brakes	14	50	M5×10	≤23	11	5	5	5	NA



(400W Motor Dimensional Drawing)

750W Motor Parameters And Dimensions:

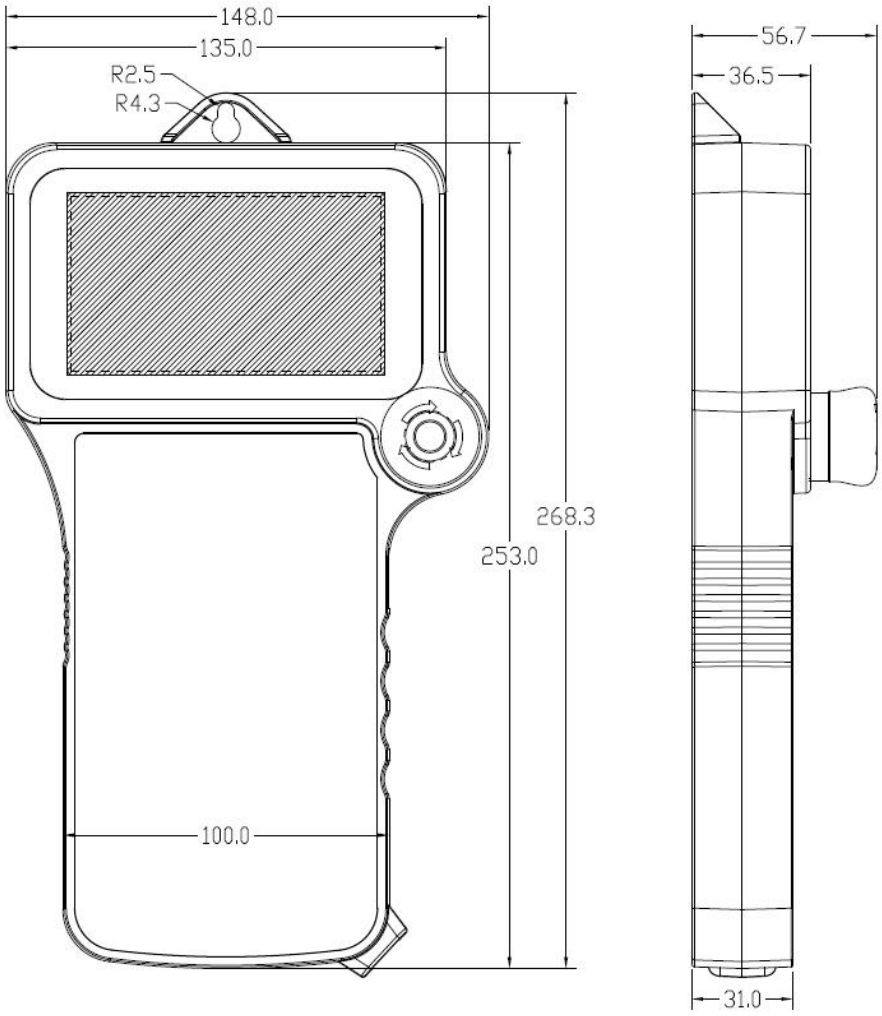
Motor									
Spec / Model	LL	LC	LR	LA	LZ	LH	LG	LE	LJ
750W with brakes	<190	80	35	90	Φ4-7	≤55	NA	3±0.5	1±0.35
750W no brakes	<140	80	35	90	Φ4-7	≤55	NA	3±0.5	1±0.35
Spec / Model	S	LB	TP	LK	KH	KW	W	T	Weight (kg)
750W with brakes	19	70	M6×12	25	16.5	6	6	6	NA
750W no brakes	19	70	M6×12	25	16.5	6	6	6	NA



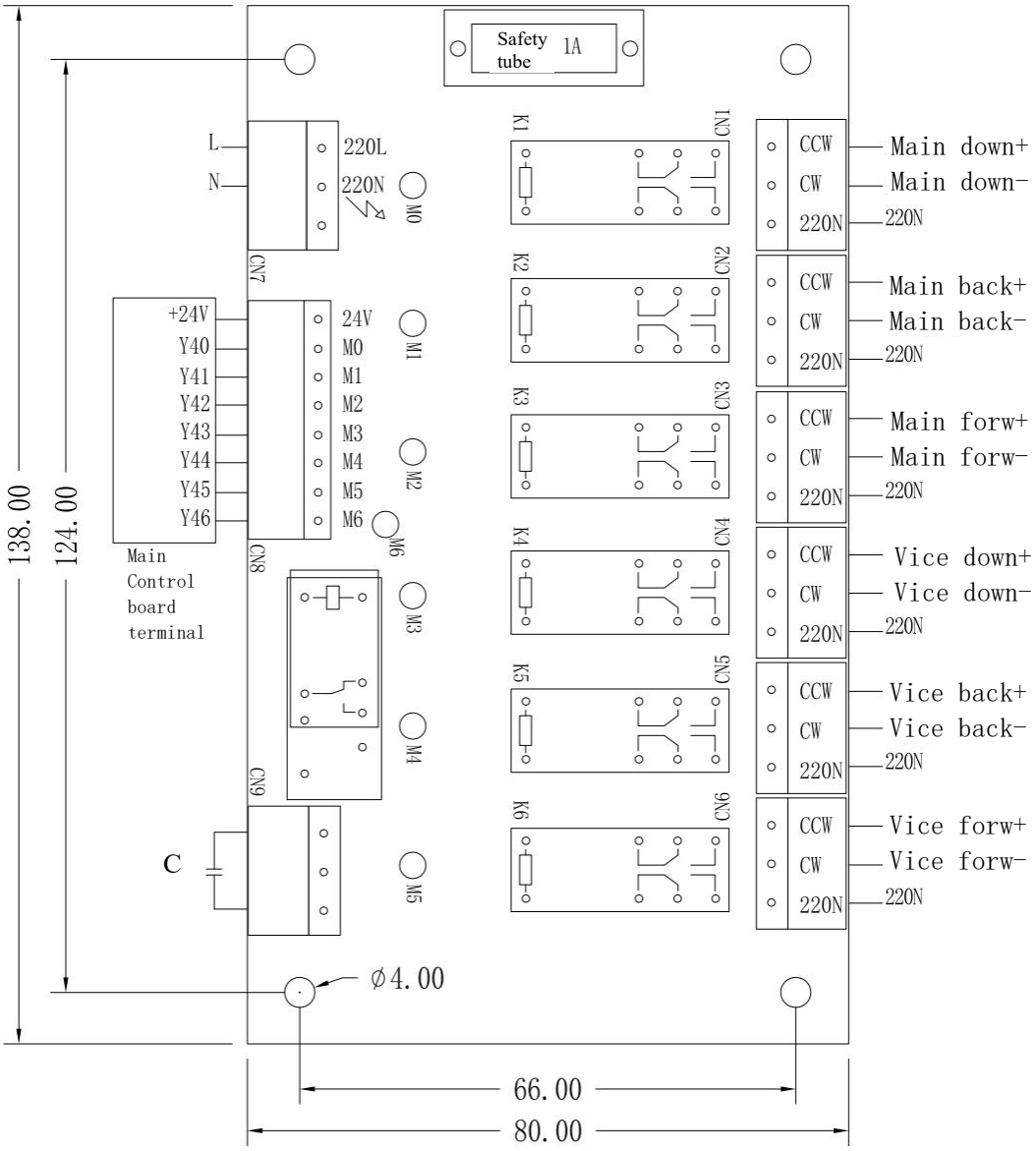
Shaft end sketch　　Shaft end with key

(750W Motor Dimensional Drawing)

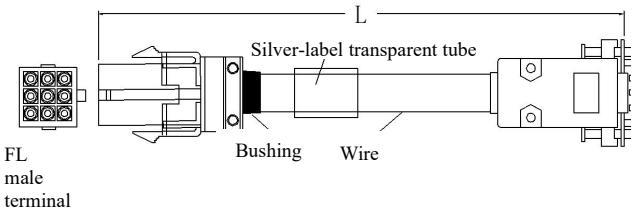
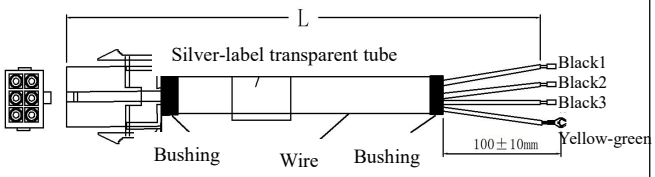
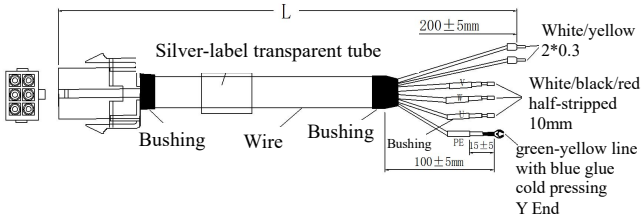
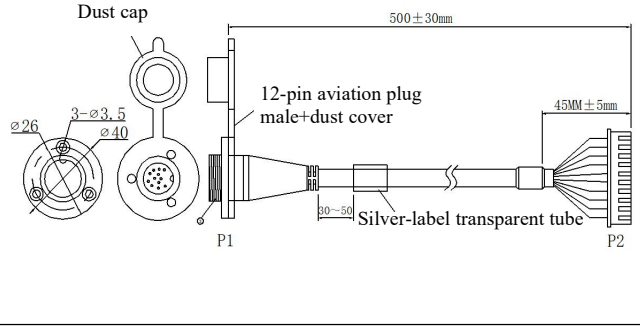
3.1.2.5 Manual controller dimension



3.1.2.6 Electric positioning plate dimension



3.1.2.7 Supporting cables and models

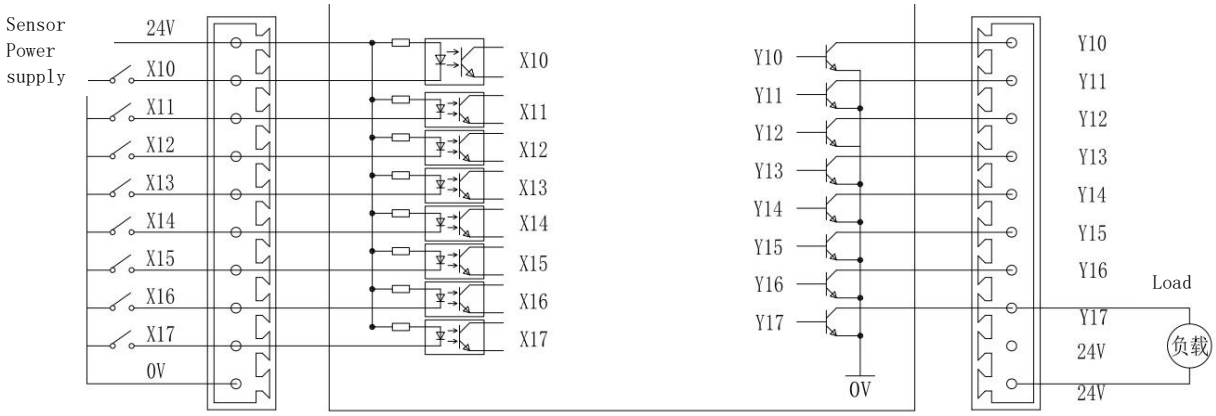
Cable name	Model	L cable length	Appearance
Encoder line (4×0.25)	PMXB1-5610054	0.5M	
	PMXB1-5610254	2.5M	
	PMXB1-5610304	3 M	
	PMXB1-5610454	4.5M	
	PMXB1-5610554	5.5M	
	PMXB1-5610604	6 M	
	PMXB1-5610704	7 M	
	PMXB1-5610104	10 M	
Power line (4×0.75)	PMXB1-5640051	0.5M	
	PMXB1-5640091	0.9M	
	PMXB1-5640301	3 M	
	PMXB1-5640451	4.5M	
	PMXB1-5640551	5.5M	
Power brake line (4×0.75+ 2×0.3)	PMXB1-6640251	2.5M	
	PMXB1-6640451	4.5M	
	PMXB1-6640551	5.5M	
	PMXB1-6640601	6M	
	PMXB1-6640701	7M	
	PMXB1-6640101	10M	
Manual controller line	PMXB1-1301051	0.5M	
	PMXB1-1301101	1M	
Drag chain manual controller line	PMXB1-1303250	2.5M	

3.2 Power Input Definition

Single phase 220V power supply connection			
L1	Null	**L1C**	220V-L
L2	220V-L	**L2C**	220V-N
L3	220V-N		

Terminal identification	Terminal name	Function	Remarks
L1C	Auxiliary power terminal	AC single-phase 220V 50/60HZ	The auxiliary power supply is for internal control circuit. Main power supply lines use 3-core and multi-strand copper cable, single core cross-sectional area 2.5 square millimeter, insulation voltage > = 600 V
L2C			
BP	Brake resistance terminal	External brake resistance access point	External resistance (68Ω120W)
L1	Main circuit power terminal	AC single-phase/ three-phase 220V 50/60HZ	The main circuit power supply is the internal high-voltage power supply. Main power supply lines use 3-core and multi-strand copper cable, single core cross-sectional area 2.5 square millimeter, insulation voltage > = 600 V
L2			
L3			
U	Servo motor access terminal 1-2	Connect three-phase servo motor	Connect according to the UVW corresponding access, otherwise the motor does not turn or has galloping problem.
V			
W			
PE	Ground point	Security protection access point	This point must be grounded.

3.3 I/O Port Wiring Diagram



Other input signals: X20～X27, X30～X37, X40～X47

The connection is the same as in the picture above: X10～X17,

Other output signals: Y20～Y27, Y30～Y37, Y40～Y47,

The connection is the same as in the picture above: Y10～Y17

Input	Definition	Output	Definition
X10	Horizontal limit	Y10	Horizontal valve
X11	Vertical limit	Y11	Vertical valve
X12	Main fixture limit	Y12	Main fixture valve
X13	Hold limit	Y13	Hold valve
X14	Vacuum suction limit	Y14	Vacuum suction valve
X15	Main forward limit	Y15	Main forward valve
X16	Main reverse limit	Y16	Main reverse valve
X17	Main drop limit	Y17	Alarm
X20	Reserve	Y20	Main rise valve
X21	Medium position object	Y21	Main drop valve
X22	Pressure detection	Y22	Low air pressure
X23	Internal safety	Y23	Deceleration valve
X24	External safety	Y24	Reserve 1 valve
X25	Origin signal	Y25	Reserve 2 valve
X26	Transverse limit	Y26	Transverse valve
X27	Cross out limit	Y27	Cross out valve
X30	Auxiliary forward limit	Y30	Auxiliary forward valve
X31	Auxiliary reverse limit	Y31	Auxiliary reverse valve
X32	Auxiliary rise limit	Y32	Auxiliary rise valve
X33	Auxiliary drop limit	Y33	Auxiliary drop valve
X34	Auxiliary arm fixture limit	Y34	Auxiliary fixture valve

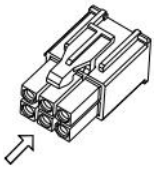
X35	Main rise limit	Y35	Machining 1 valve
X36	Machining 1 limit	Y36	Scissor valve
X37	Reserve 2 limit	Y37	Conveyor Valve
X40	Lower limit of main shift	Y40	Main position up and down
X41	Main position reverse limit	Y41	Main position forward and reverse
X42	Main process forward limit	Y42	Main process forward and reverse
X43	lower limit of auxiliary position	Y43	Auxiliary position up and down
X44	Auxiliary position reverse limit	Y44	Auxiliary position forward and reverse
X45	Auxiliary process forward limit	Y45	Auxiliary process forward and reverse
		Y46	Forward and reverse
Safety gate		Y47	Emergency stop output
Mold Opened		Mold Close Permit	
Mold Closed		Mold Open Permit	
Unqualified product		Recycle	
Fully auto		Thimble	
Medium plate mould		YReserve1	
Top limit		YReserve2	
Emergency stop input		YReserve3	

Terminal	Definition	Explanation	Remarks
24V power port	24V	24V power	Usually used as digital input power supply 24 V±10, maximum output current 100mA.
	0V	Common port for digital input optical coupling	X10-X47 common port for input optical coupling common interface
Input terminal	X10-X47	Connection to optical coupling	The negative electrode of 24V power supply is effective(0 V) .
Output terminal	Y10-Y37	MOS tube leakage output	Connect to 24V of power supply through the load, protection current is 350mA, voltage is 65V. More current loads require relay isolation control.
IMM output port	Relay output	Always open relay	5A/250VAC/30VDC
Communication port (by type)	CAN port	Reserve	
USB monitoring port	DP/DM	USB monitoring, debugging port	Please use manufacturer's special cable and USB electrical interface, for servo system high-performance debugging and monitoring.

3.4 Servo Motor Wiring Definition

3.4.1 Power Line Definition

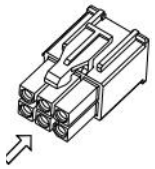
Vision



Plug: MOLEX-50361672 Pin: MOLEX-39000059						
No.	1	2	4	5	3	6
DEF	U	V	W	PE ground	NC air	NC air
Color	Red	Blue	Black	Yellow &Green		

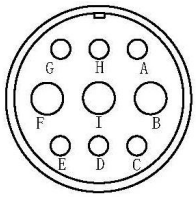
750W below Motor power line - without brake

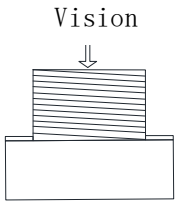
Vision



Plug: MOLEX-50361672 Pin: MOLEX-39000059						
No.	1	2	4	5	3	6
DEF	U	V	W	PE ground	Br brake	Br brake
Color	Red	Blue	Black	Yellow &Green	Brown	White

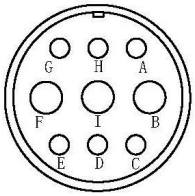
750W below Motor power line - with brake

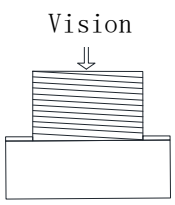




Plug model		MS3102A 20-18P/9 pins		
No.	B	I	F	G
DEF	U	V	W	FG ground

850W above Motor power line - without brake





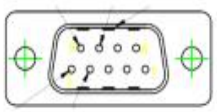
Plug model	MS3102A 20-18P/9 pins					
No.	B	I	F	G	C	E
DEF	U	V	W	FG ground	Brake +	Brake -

850W above Motor power line - with brake

3.4.2 Encoder Line Definition

Host encoder DB9 interface		Motor encoder AMP-TE/ female terminal/170361-1	
Pin number	Description	Pin number	Description
8	SD+	3	SD+
4	SD-	6	SD-
9	5V	9	5V
5	0V	8	0V
		7	FG
		1	Battery+
		4	Battery-

Note：95、84 twisted pair



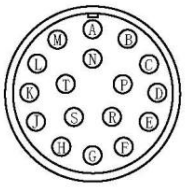
D89 Interface

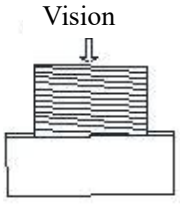
Motor encoder

750W below Motor encoder line

Host encoder DB9 interface		Motor encoder 17-pin aviation plug interface	
Pin number	Description	Pin number	Description
8	SD+	A	SD+
4	SD-	B	SD-
9	5V	G	5V
5	0V	H	0V
		J	FG
		E	Battery+
		F	Battery-

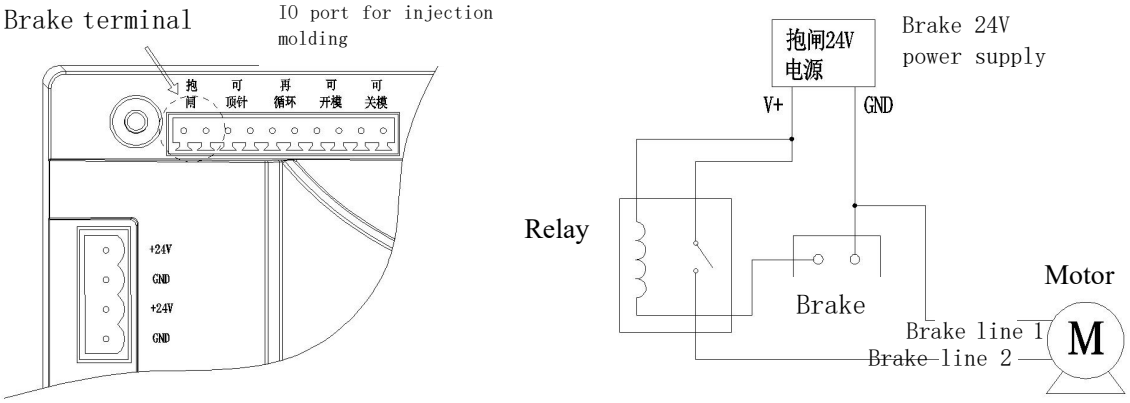
Note：95、84 twisted pair





850W above Motor encoder line

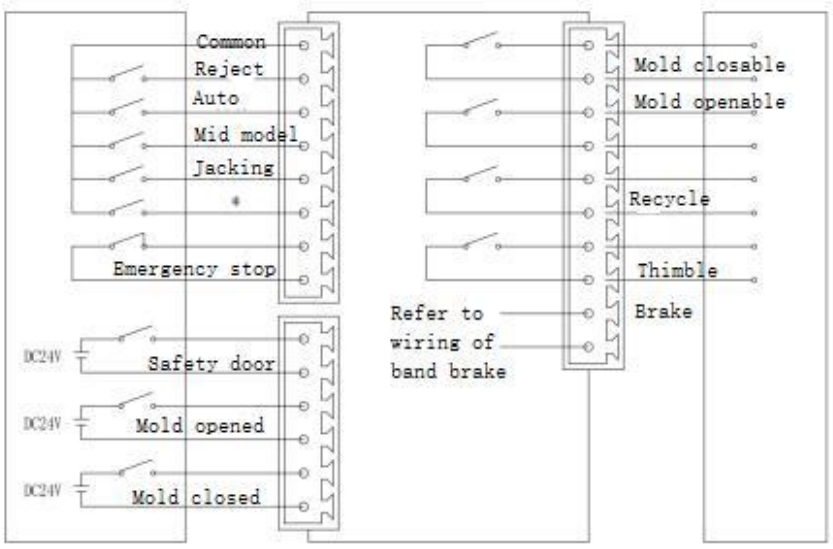
3.4.3 Wiring Diagram of Motor Band Brake



* Notice：Brake port must control the operation by external relay.

3.5 Connection of Manipulator and Injection Molding Machine

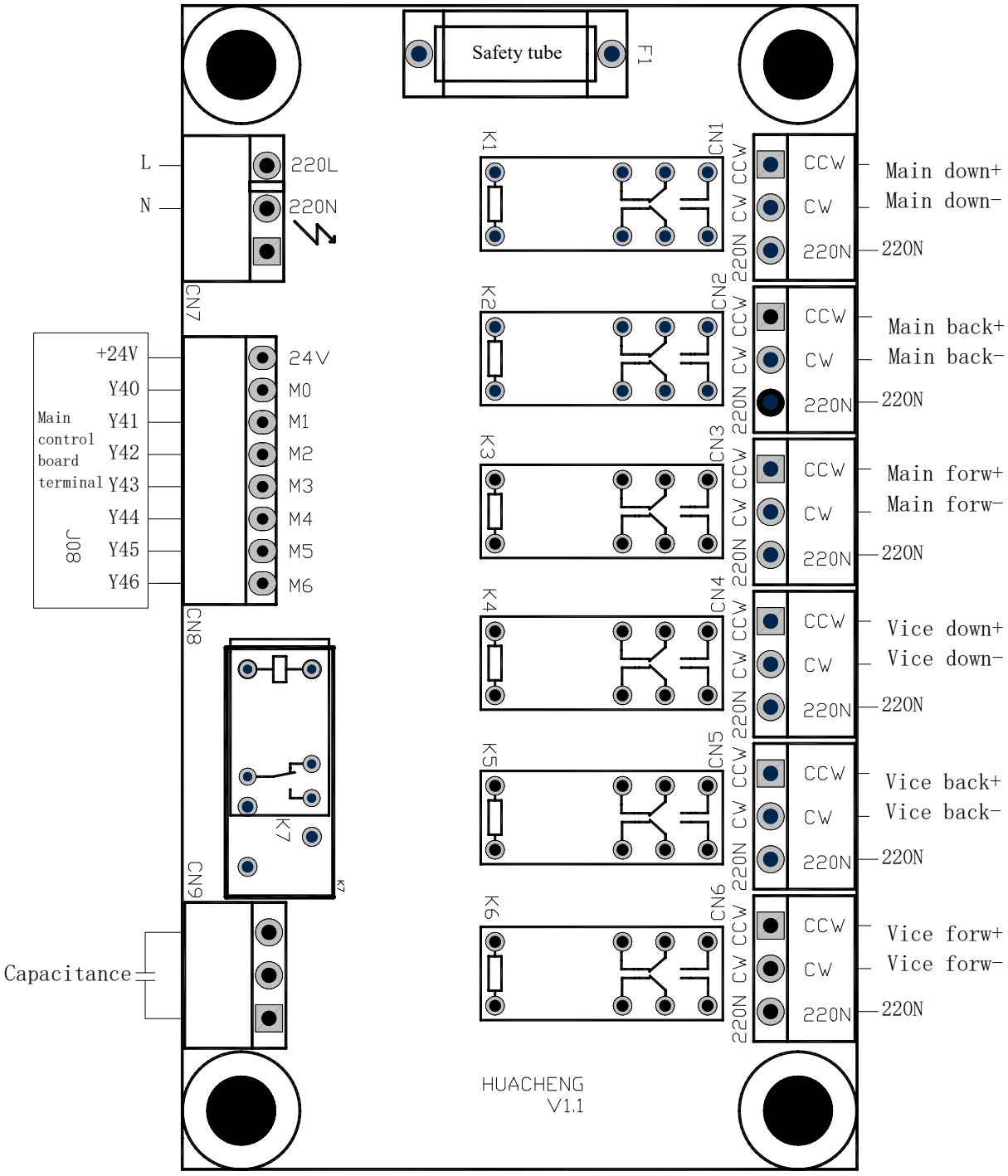
Wiring diagram of injection molding machine



Injection molding machine　　Manipulator　　Injection molding machine

3.6 Wiring of Peripheral Fittings

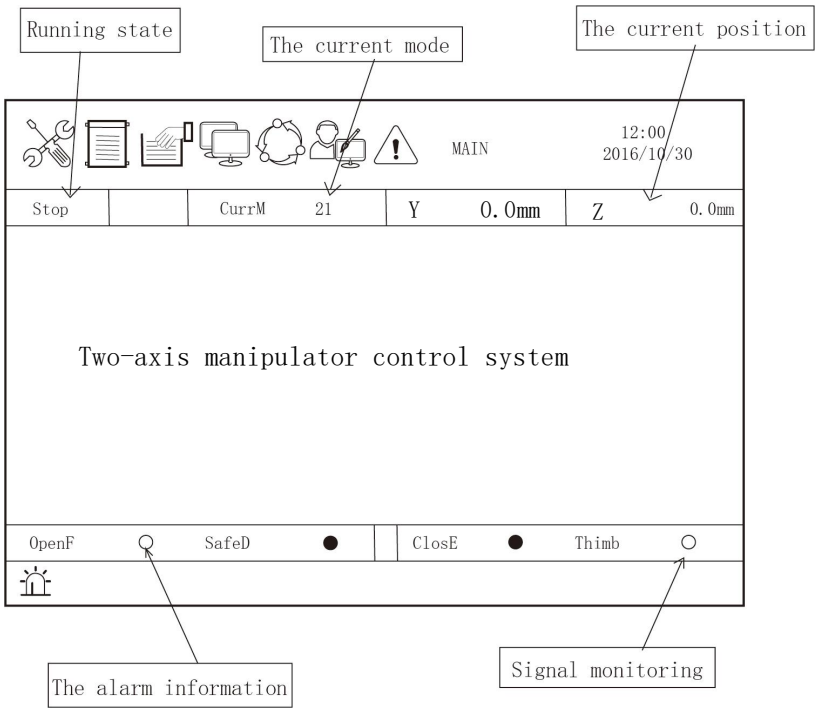
Electrical positioning plate (optional)



Chapter 4 Commissioning and Operation Mode

4.1 Appearance and Description of Manual Controller

4.2 Main Screen



4.3 Operation Mode

4.3.1 Pre-run Inspections

Do check following parts carefully before running.

4.3.1.1 Control host

1、Check connection terminals of the host and ensure them connected correctly and tightly.

2、Check external power supply such as input voltage and output voltage. Ensure the voltage kept in normal range.

3、Check the power line, encoder line and band brake line between the host and the servo to ensure that the wiring is correct and tight.

4.3.1.2 Servo motor

1、Check fixed parts of the servo motor and ensure them connected tightly.

2、Check the axis to ensure smooth rotation.（It’s normal for servo motor with oil seal that the axis is tight.）

3、Check the power line, encoder line and band brake line between the host and the servo to ensure that the wiring is correct and tight.

4.3.1.3 Connection of input and output terminals

1、Check wiring of input/output terminals and ensure it correct and tight. 24V short circuit and 220V access are forbidden.

2、Power on check. Enter system after the host is power on, and then confirm if there is any alarm in manual controller. If it is, clear the faulty before continuing. For servo motor with brake, please do power on check with the motor and machine apart to avoid misoperation cause by gravity or external force such as vertical axis dropping.

3、Check output signal of band brake. Enter system after the host is power on and press the emergency stop button on the manual controller. Check whether the brake output signal is off. Then release the emergency stop button and press “STOP” to clear the alarm. Check again to confirm the brake output signal is on. When the band brake action operated correctly, connect the servo motor and machine to continue running.

4.3.2 Test Run of Servo Axis

In order to ensure the running of manipulator, it needs to confirm that the servo axes can run correctly before the first power on.

1、Enter system after the host is power on. If there is no alarm, press the 

key to enter the manual screen.

2、When cursor is at【TravMode】, press the 

key to switch to【InchMode】.

3、Press the 

key continually. The transverse axis of manipulator would move toward external(opposite to origin switch), and stop when the key is released. If the axis moves toward internal(origin point), it needs to modify the direction of servo. (Enter 7752 password screen and reset the value of【Motor Direction】. Change to 1 if it is 0 and vice versa.)

4、Press the 

key continually. The transverse axis of manipulator would move toward internal(origin switch), and stop when the key is released.

4.3.3 Origin Point Reset

In order to ensure the running of manipulator, every time the power is turned on, the origin reset action must be carried out in the stop state. The origin reset action resets the electric axis of the driving manipulator to the origin position and the vacuum and fixture to the closed state.

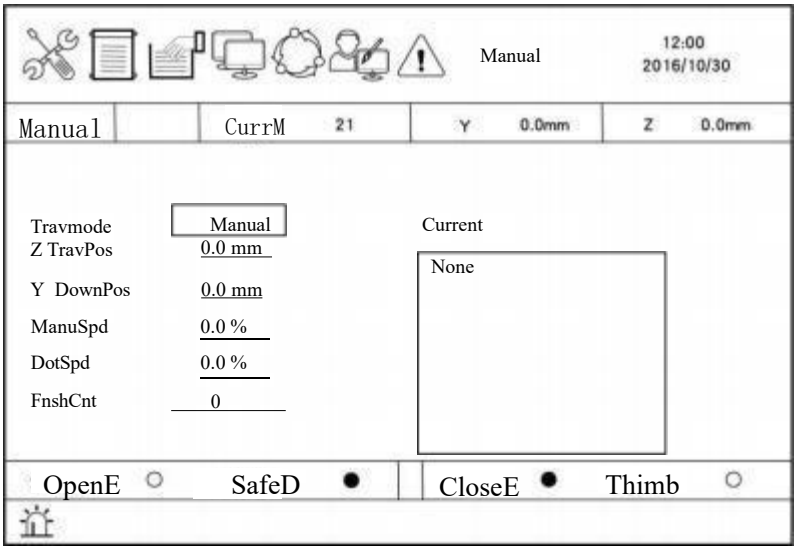
In the stop state, press the [HP.] key to reset origin. The electric axis will return to the original position. Only after the origin point is reset, can the automatic running and manual operation can be carried out. While the origin is being reset, the user cannot carry out manual operation, automatic operation and parameter setting for the manipulator. In case of emergency, press the "STOP" button to stop the reset or press emergency stop switch.

4.3.4 Manual Operation

Press the [手动/MO] key to enter the manual screen for manual operation. Operate each single action of the manipulator and adjust each part of the machine(Confirm the mold opened signal before manual operation and ensure no touch to the mould). Following restrictions are for the safety of the manipulator and injection molding machine mould:

- The manipulator can not do the vertical or horizontal movement after descending inside.
- The manipulator cannot do the transverse movement after descending inside.(Except for internal safe zone)
- The manipulator cannot do the internal descending movement without mold opened signal.

4.3.4.1 Manual screen



1、 **TravMode:** Press the [输入 ENTER] key to select manual or inching mode.
Manual: Press the "OUT" (Down)key once and the manipulator will stop at the manual position(Y descends); press the "IN" (Up)key once and the manipulator will stop at the standby position(Y zero position).
Inching: Press and hold the OUT(IN, Down, Up)key, and the manipulator will perform the out(in, down, up)action. The robot stops once release the key.
2、 **Z TravPos:** Monitor the terminal position of spinning out in manual mode, unit: mm.
3、 **Y DownPos:** Monitor the terminal position of descending in manual mode, unit: mm.
4、 **ManuSpd:** Monitor the set speed of the manipulator in manual mode.
5、 **DotSpd:** Monitor the set speed of the manipulator in inching mode.
6、 **FnshCnt:** The actual number of products taken.

4.3.4.2 Manual key

[臂选] Main arm/auxiliary arm/double arm selection key, after selecting the arm, press other action keys to perform the corresponding action.

[Y- 上升] Y axis up key. Manual: press once, arm up to the standby position.
Y axis up key. Inching: press and hold, the arm will rise; release to stop.

Y axis down key. Manual: press once, arm up to the specific position.
Y axis down key. Inching: press and hold, the arm will descend; release to stop.

Arm forward key. Press once, arm moves forward to the end position.

Arm backward key. Press once, arm moves backward to the starting position.

Fixture key. Press once to perform the clamping action, and then press again to release it.

Sucker key. Press once to perform the suction action, and then press again to release.

The jig flip button. Press once, the jig gets flattened, and then press again to straighten it.

Spin in key. Manual mode: press once and the arm will spin in to the fetch position.
Spin in key. Inching mode: press and hold, the arm will spin in; release the key to stop.

Spin out key. Manual mode: press once and the arm will spin out to the set position.
Spin out key. Inching mode: press and hold, the arm will spin out; release the key to stop.

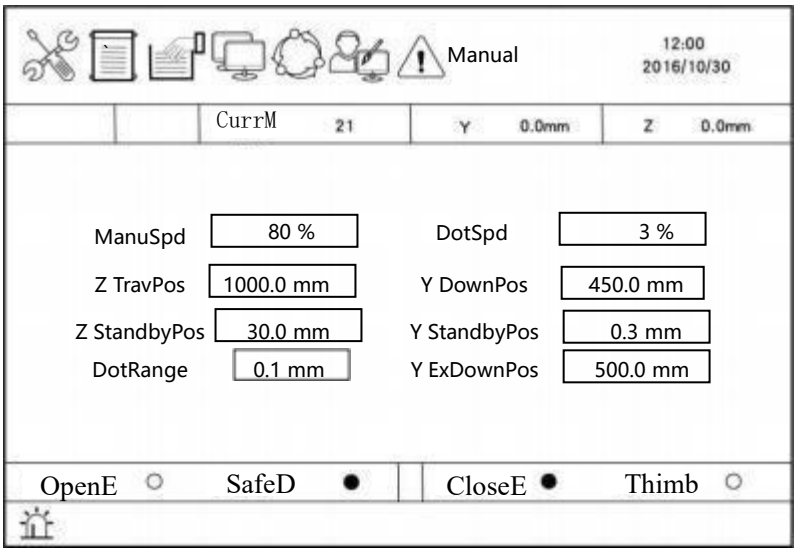
Origin reset key. Press the key once, the manipulator will perform the origin reset action(Must be in the stop state.)When the signal of the molding machine can be taught, this key can be selected in the teaching mode: after the mold is opened, the mold is allowed to close and the thimble is allowed, waiting for X37, synchronous start and synchronous end.

Reserve action selection key. Press this key to select: reserve 1, reserve 2, scissors, conveyor, processing 1 and other reserved actions.

The on/off key of the reserved action. After selecting the reserved action, press this key to control the execution and stop of the action.

4.3.4.3 Manual parameter

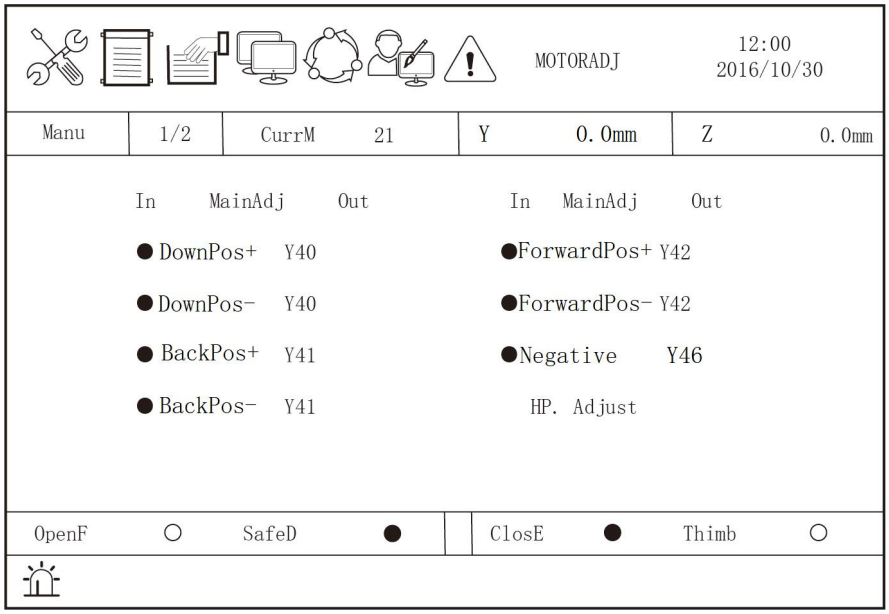
Press the parameter key in manual state to enter the screen of manual parameter adjustment. The screen is shown as following:

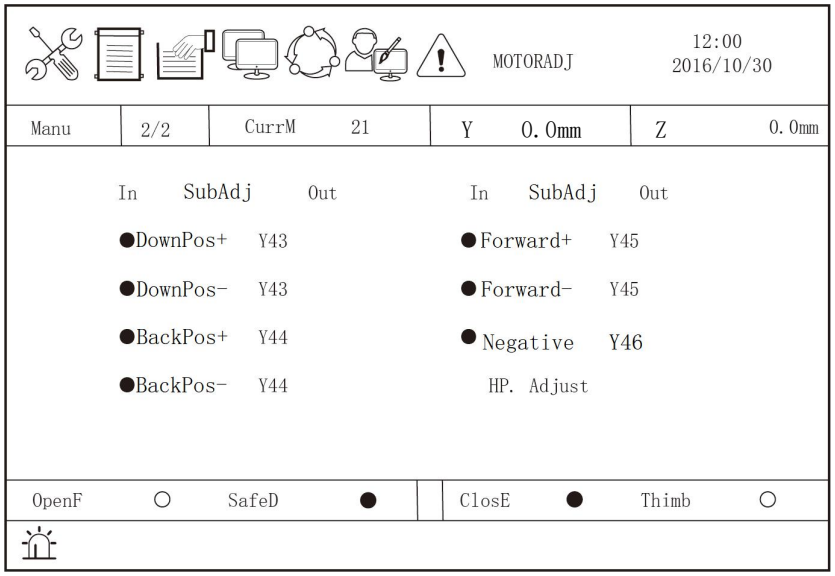


1、**ManuSpd:** Set the horizontal speed in manual mode. Move the cursor to this position and press Enter key to change the setting value.
2、**Z TravPos:** Set the terminal position of spinning out in manual mode. Move the cursor to this position and press Enter key to change the setting value.
3、**Z StandbyPos:** Monitor current standby position of Z axis. Press Enter key to set current position as standby position and press HP. Key to change.
4、**DotRange** (Need to be customized. Standard program does not have this function.): Press the axis key, the axis moves for the set length.
5、**DotSpd:** Set the horizontal speed in inching mode. Move the cursor to this position and press Enter key to change the setting value.
6、**Y DownPos:** Set the position that Y axis descends in manual mode. Move the cursor to this position and press Enter key to change the setting value.
7、**Y StandbyPos:** Monitor current standby position of Y axis. Press Enter key to set current position as standby position and press HP. Key to change.
8、**Y ExDownPos:** The position of external descending of Y axis, unit: mm.(Need to be customized. Standard program does not have this function.)

4.3.4.4 Electric positioning

After pressing the 手动/MO key twice, enter the electric positioning screen. The screen is shown as following:



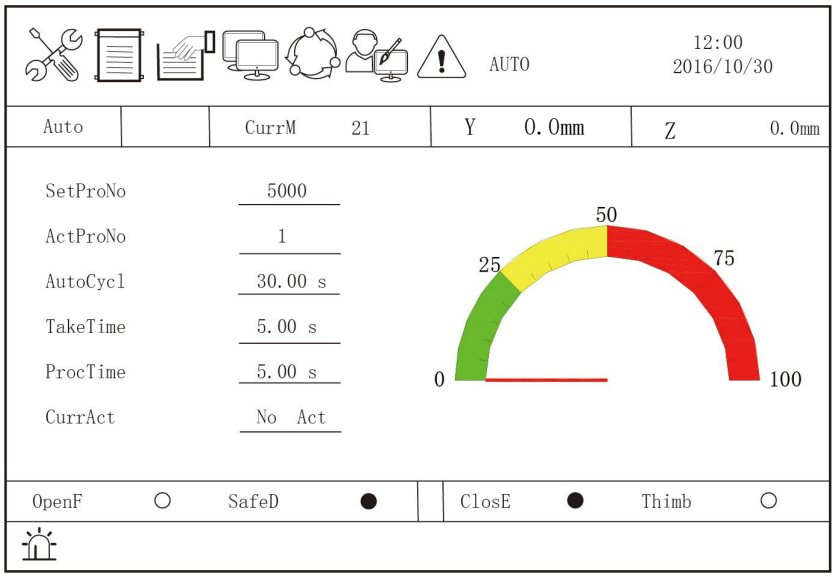


Move the cursor up and down to the position to be adjusted. Press the HP. key and the manipulator will adjust the position in the direction.

*** Note: The machine must have the mechanical structure of electric position adjustment to have this function.**

4.3.5 Automatic Operation

Press the 自动/AUTO key to enter the automatic screen, and then press the "START" button to enter the automatic operation mode. The manipulator will drop down to take the object immediately after the injection molding machine finishes mold opening.



1、**SetProNo:** Production quantity preset. When the actual output reaches the number, an alarm will be sent.

2、**ActProNo:** The actual number of finished products.

3、**AutoCycl:** Time taken to run an auto complete mode.

4、**TakeTime:** Time taken by the manipulator from starting fetch to the allowable injection mold when running automatically.

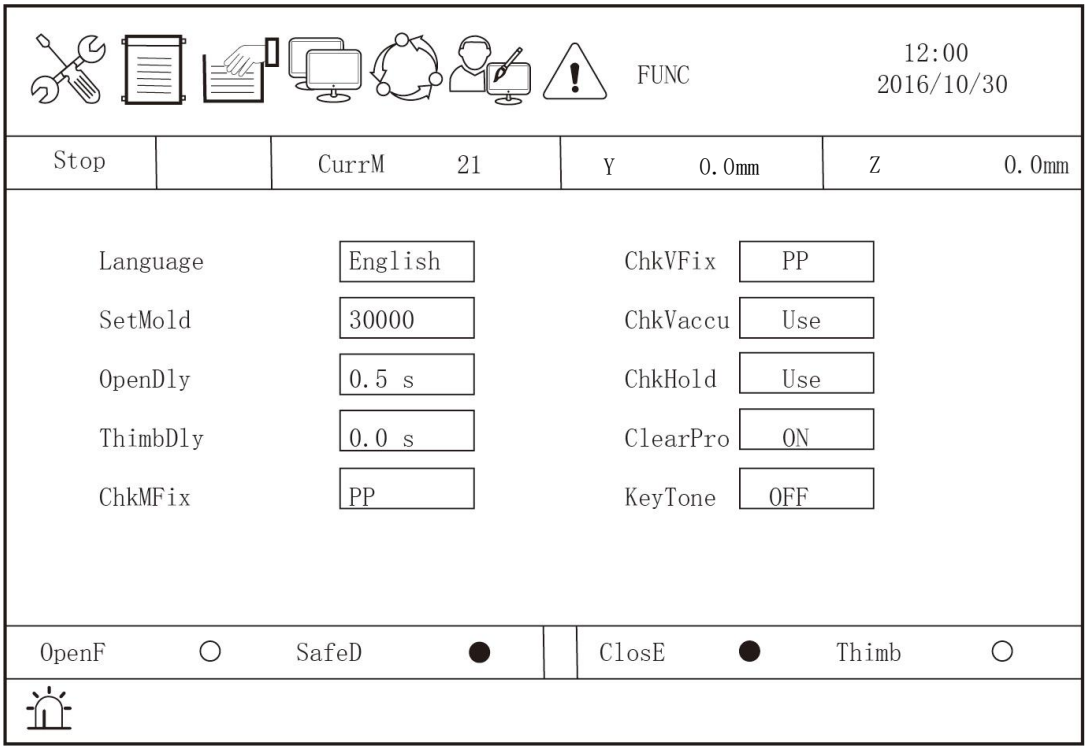
5、**ProcTime:** Time set for current action in teaching mode.

6、**CurrAct:** The action currently executed.

Chapter 5 Function Setting

5.1 Basic Function

Press the 功能/同步 FUNC/SYN key in the stop screen to enter the function selection screen, and the up/down cursor key can be pressed to move to each function setting item. Press the 输入 ENTER key to change the option.



1、**Language:** Press the "ENTER" key to select Chinese and English display.

2、**ChkVFix:**

PP: Positive phase detection of fixture signal. When the fixture switch signal has input, it means the fixture has successfully taken the object; On the contrary, the fixture failed to fetch if there is no signal input.

RP: Reverse phase detection of fixture signal. When the fixture switch signal has input, it means the fixture failed to take the object; On the contrary, the fixture fetched successfully if there is no signal input.

No Use: Do not detect the fixture signal whether the fixture fetch the object or not.

3、**SetMold:** The number of products planned to produce. When the actual output reaches the set value, an alarm will be sent.

4、**ChkVaccu:**

Use: Detect the vacuum switch signal. When the vacuum suction limit has signal input, it means the sucker has successfully taken the object; On the contrary, the sucker failed to fetch if there is no signal input.

No Use: Do not detect vacuum switch signal.

5、**OpenDly:** While running automatically till the mold opened signal is given, it needs to wait for the set delay time before the mold closing signal is disconnected from the output. The mold opening delay time is valid when set within 0~0.5s.

6、**ChkHold:** Same as vacuum detection.

7、**ThimbDly:** While running automatically till the mold opened signal is given, it needs to wait for the set delay time before starting to output thimble signal.【Only when the thimble on the 2011 password page is selected for use】

8、**ClearPro**: When set as “ON”, the actual number of products is cleared. Set as “OFF” for normal use.

9、**ChkMFix**: Same as vice fixture detection.

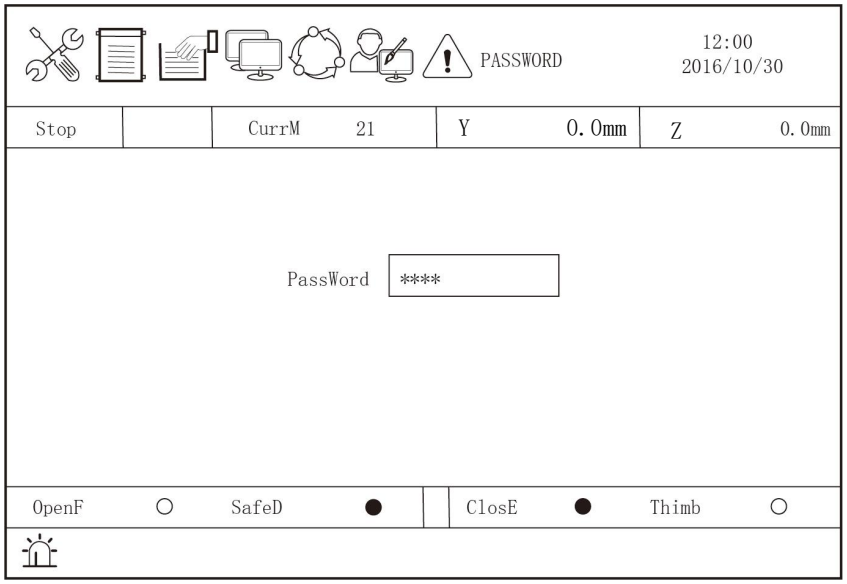
10、**KeyTone**:

ON: There is a sound when pressing keys.

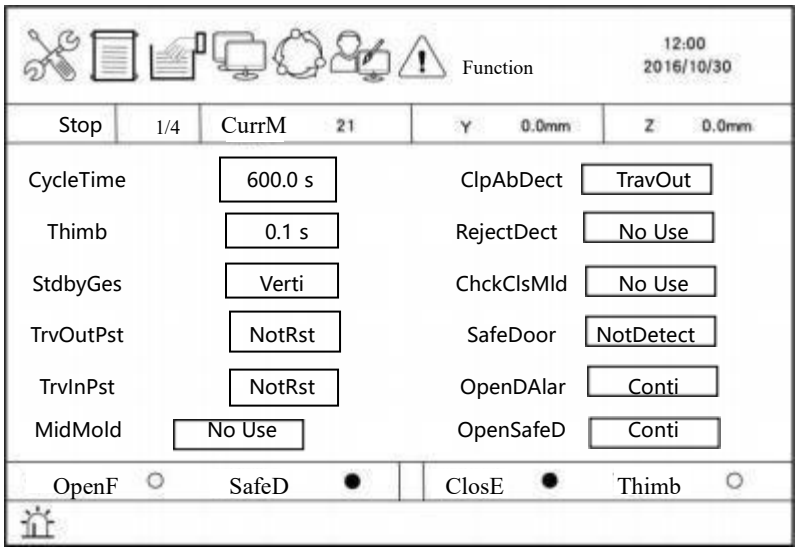
OFF: There is no sound when pressing keys.

5.2 Special Function

Press the 功能/同步 FUNC/SYN key twice in the stop screen to enter the password screen.



Enter the password “2011” and press the 输入 ENTER key to enter the screen of special function 1. There are four setting screens. The up/down cursor keys can be used to move to each setting item. Press the 输入 ENTER key again after modifying parameters to change set values.



1、**CycleTime**: Time taken to wait for the mold opened signal of injection molding machine to input again. If the time exceeds the set value, the alarm will be sent.

2、**ClpAbDect**:

TravOut: Clamping and suction confirmation signals are detected both in the mold and in the process of spinning out.

InMold: Clamping and suction confirmation signals can be detected only in the mold.

FullRun: The manipulator detects the clamping and suction confirmation signals in the whole automatic operation process.

3、**Thimb**:

No Use: Allow a thimble signal to be output all the time.

Use: After the mold is in place, the delay output allows the thimble signal.

4、**RejectDect**:

No Use: The manipulator does not detect reject signal.

Use: The manipulator detects reject signal. Operate Reject program(Mold number44)when reject signal is detected.

5、**StdbyGes**:

Verti: When the manipulator is automatically standby, the jig is in the vertical position.

Hori: When the manipulator is automatically standby, the jig is in the horizontal position. If the jig cannot be vertical because of the mould, horizontal position is an option. After the injection molding machine opened mold, the robot goes vertical and then down to fetch. Do horizontal action standby after finishing placement.

6、**ChckClsMld**:

No Use: The manipulator does not detect the clamping stop signal.

Use: When the manipulator is running automatically, the clamping stop signal must be detected first and when the mold opening stop signal is detected,the robot can descend and fetch objects.

7、**TrvOutPst**:

NotRst: When the manipulator spins out, do not limit the vertical or horizontal position of the jig.

Verti: When the manipulator spins out, the jig must be vertical cross out, horizontal cross out will alarm.

Hori: When the manipulator spins out, the jig must be horizontal cross out, vertical cross out will alarm.

8、**SafeDoor**:

FullRun: Detect safety door signal while running automatically. Alarm if there is no input.

InMold: Detect safety gate signal input only in internal actions. Alarm if there is no input.

NotDetect: The manipulator does not detect safety door signal.

9、**TrvInPst**:

NotRst: When the manipulator spins in, do not limit the vertical or horizontal position of the jig.

Verti: When the manipulator spins in, the jig must be vertical cross in, horizontal cross in will alarm.

Hori: When the manipulator spins in, the jig must be horizontal cross in, vertical cross in will alarm.

10、**OpenDAlar**:

Stop: When the safety door alarm occurs in automatic state, close the safety door alarm to stop the alarm, but the manipulator can not continue automatic operation. Press the “STOP” button to restart.

Conti: When the safety door alarm occurs in automatic state, close the safety door manipulator to continue.

11、**MidMold:**

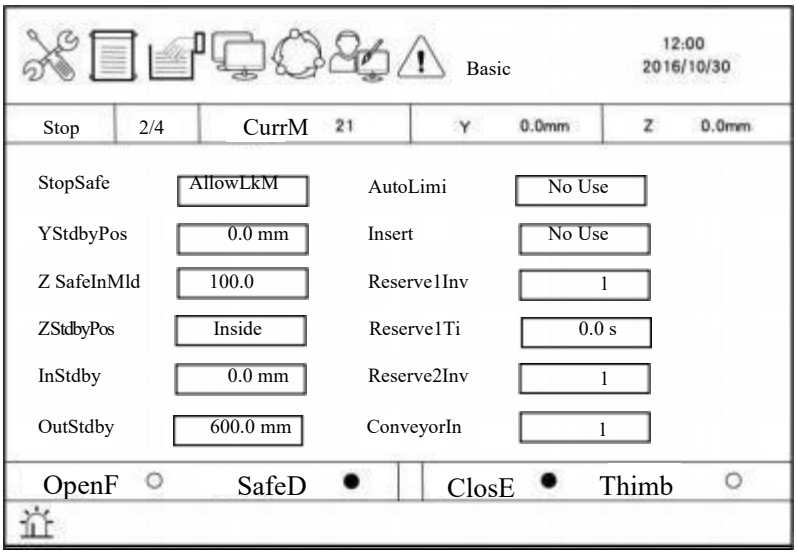
No Use: When the manipulator descends to fetch the object, it does not detect the plate mold signal.

Use: Detect the plate mold signal when the manipulator descends to fetch the object.

12、**OpenSafeD:**

Conti: When the alarm fails to fetch the object, the safety door switch manipulator continues to complete the current cycle.

Rest: When the alarm fails to fetch the object, the safety door switch manipulator releases the fixture and sucker, and then return to the automatic standby state, waiting for the next mold opened signal to descend and fetch.



13、**StopSafe:**

NoLockM: In the stop state, to ensure the safety of the machine, when the mold opening is at the ending position, the allowable on/off signals shall be cut off till the safety door is opened and closed once.

AllowLkM: In stop state, mold opening/closing switch signal can be output all the time.

14、**Y StdbyPos:** Standby position of Y axis in auto running. Y axis arm descends to this point to wait for mold opened signal after the automatic state starts.

15、**Z SafeInMld:** The maximum allowable range of Z axis for the manipulator to descend and run sideways in the mold. Beyond this position, the arm cannot descend and run sideways in the mold.

16、**Z axis StdbyPos**

Inside: The manipulator stands by to fetch on the top of the mold.

Outside: If the manipulator cannot do internal standby because of the mould, external is an option. The arm does transverse movement to external standby position in automatic state.

17、**InStdby:** When the standby position is set internal, the position of the transverse axis. When started automatic, the arm does transverse movement to this position and wait for mold opened signal.

18、**OutStdby:** When the standby position is set external, the manipulator is in the external standby position. When started automatic, the arm does transverse movement to the external standby position.

19、**AutoLimit:**

No Use: the manipulator does not detect the automatic signal of the injection molding machine.

Use: Automatic signal of injection molding machine can be detected by the manipulator. If there is no automatic signal, the alarm will be triggered.

20、**Insert:**

No Use: Unable to teach the manipulator to fetch from external into module.

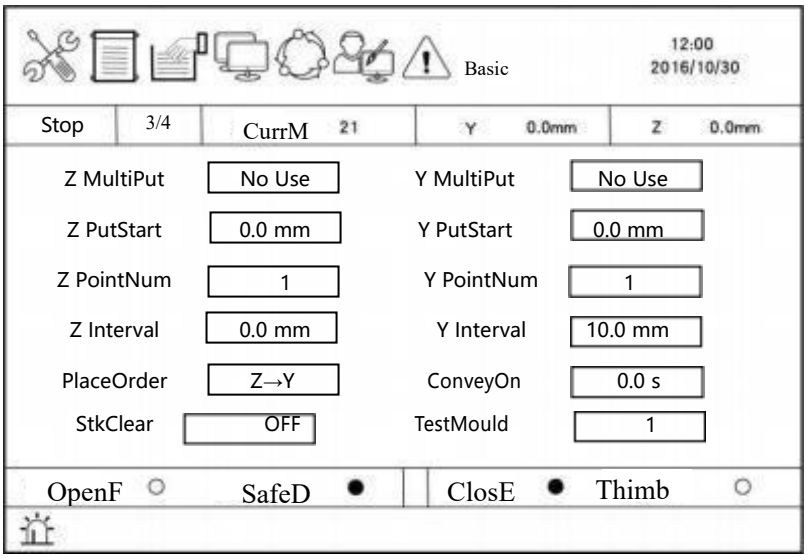
Use: Able to teach the manipulator to fetch from external into module. Able to teach second descending or transverse axis movement inside.

21、**Reserve1Inv:** When the program teaches "Reserve1 ON/OFF" actions, it acts after mold number as set in automatic state.

22、**Reserve1Time:** When the program teaches Reserve1 ON, action time of Reserve1 ON in automatic state.

23、**Reserve2Inv:** When the program teaches "Reserve2 ON/OFF" actions, it acts after mold number as set in automatic state.

24、**ConvCnt:** When the program teaches "Conveyor ON/OFF" actions, it acts after mold number as set in automatic state.



25、**Z MultiPut:**

No Use: Not use the multi points placement function of Z axis.

Use: Use the multi points placement function of Z axis. Be able to stack in Z axis direction.

26、**Z PutStart:** Set the starting point when the manipulator does cyclic arrangement placement in Z axis direction. It can be set as the same as transverse position.

27、**Z PointNum:** Number of products put when Z axis is set as cyclic arrangement placement. It can be set as 32767 at most. Set as 1 if not using cyclic arrangement placement.

28、**Z Interval:** Interval between every two products when Z axis is set as cyclic arrangement placement.

29、**PlaceOrder:**

Z→Y: When both of Z axis and Y axis use multi points placement, Move to Y axis after placement in Z is finished and repeat.

Y→Z: When both of Z axis and Y axis use multi points placement, Move to Z axis after placement in Y is finished and repeat.

30、**StkClear:** The product count of stack is reset. The manipulator will stack again from the first point.

31、**Y MultiPut:**

No Use: Not use the multi points placement function of Y axis.

Use: Use the multi points placement function of Y axis. Be able to stack in Y axis direction.

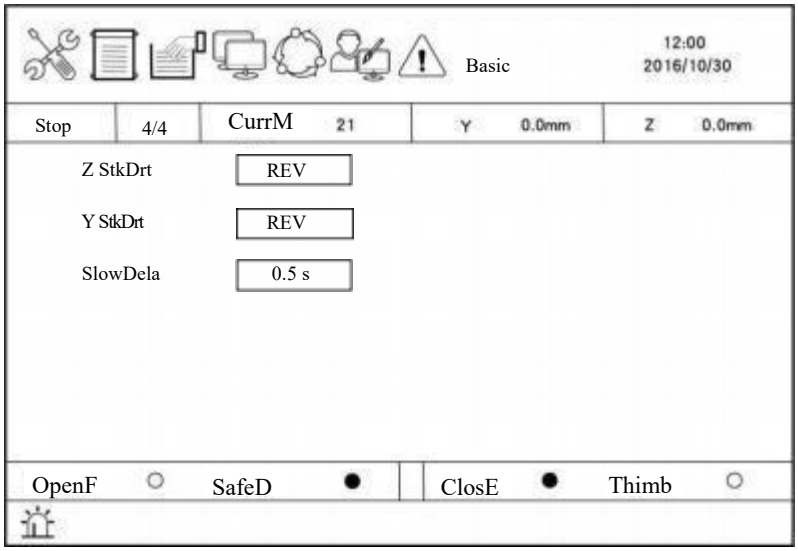
32、**Y PutStart:** Set the starting point when the manipulator does cyclic arrangement placement in Y axis direction. It can be set as the same as transverse position.

33、**Y PointNum:** Number of products put when Y axis is set as cyclic arrangement placement. It can be set as 32767 at most. Set as 1 if not using cyclic arrangement placement.

34、**Y Interval:** Interval between every two products when Y axis is set as cyclic arrangement placement.

35、**ConveyOn:** Time for conveyor on action in active mode after the program teaches the conveyor on action.

36、**TestMould:**Product module needed for trial production. Every time the automatic mode is started, the robot will execute actions in trial mold No. 43 progress within the trial production mould, and when set as 0, it means this function is not used.



37、**Z StkDrt:**

REVS: When using stacking, Z axis decreases the stacking objects from starting point to the origin.

PSTV: When using stacking, the transverse axis increases the stacking objects from starting point to the ending point.

38、**Y StkDrt:**

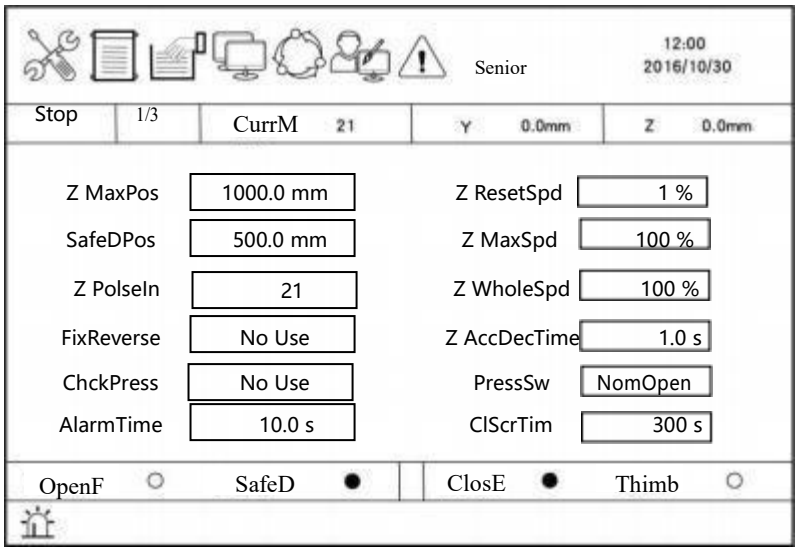
REVS: When using stacking, Z axis decreases the stacking objects from starting point to the origin.

PSTV: When using stacking, the transverse axis increases the stacking objects from starting point to the ending point.

39、**SlowDelay:** Time of transverse movement in spin in/out. When the deceleration signal is output, the mechanical hand runs slowly to the end/starting position. (Only used for frequency conversion crosswalk manipulator.)

*** Note: when the standby posture, standby position, spin out posture and spin in posture are changed, it needs to ensure that the automatic program is consistent with the setting function, or the manipulator cannot run normally.**

Press the 功能/同步 FUNC/SYN key twice in the stop screen to enter password screen. Enter password "****" and then press the 输入 ENTER key to enter the special function 2 screen. Press the up/down cursor key to move to function setting items and change the set value.



*1、**Z MaxPos:** Set the maximum position of the Z axis, which shall be used in conjunction with the actual position of the machine. All positions of the Z axis shall be set no lager than this value.

*2、**SafeDPos:** Set the position of safe door. The placement position of the manipulator must be larger than this value.

*3、**Z PolseIn:** Ratio of the number of command pulses required per revolution of the servo motor to the distance the machine moves per revolution of the servo motor. (The servo driver can be set to 10000 pulses for one cycle, or can be modified as needed.)

Assuming that the servo motor needs 10,000 pulses per revolution and the motor moves 20 mm per revolution, then:

10000 / (20×10) = 50 (20×10 represents converting 20 mm to 0.1 mm units. Then gear ratio is set as 50.

*4、**Z ResetSpd:** Speed of Z axis when the origin resets.

*5、**Z MaxSpd:** The maximum speed of Z axis servo motor, unit: %.

*6、**Z WholeSpeed:** The overall running speed of the Z axis servo motor, counted in %.

E.g: The whole speed is set as 80%, and the transverse speed is set as 50%. Then the actual transverse speed is 80% × 50% = 40%.

*7、**Z AccDecTime:** Set the acceleration and deceleration time of the Z axis servo motor.

*8、**FixReverse:**

No Use: The jig is in the position of fetching the moving die.

Use: The jig is in the position of fetching the fixed model. The horizontal and vertical posture will be automatically reversed.

9、**ChckPress:**

No Use: No not detect the intake air pressure of manipulator。

Use: Detect the intake air pressure of manipulator. If the pressure is lower than set, an alarm will be sent.

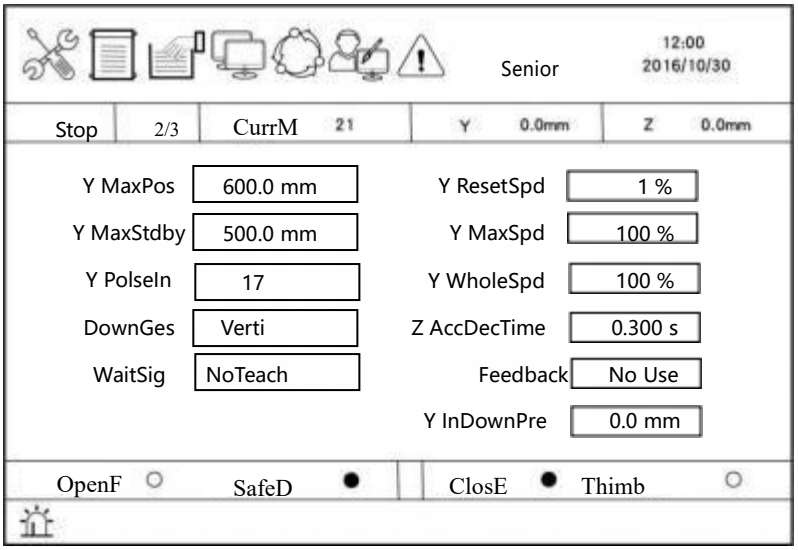
10、**PressSw:**

NomOpen: When using the air pressure detection, the switch is normally open signal.

NomClo: When using the air pressure detection, the switch is normally close signal.

11、**AlarmTime:** Set the time of alarm. Alarm stops when time out, but the information is saved.

12、**ClScrTim**: Time the screen can keep light for if there is no operation for manual controller to perform.



*13、**Y MaxPos**: Set the maximum position of the Y axis, which shall be used in conjunction with the actual position of the machine. All positions of the Y axis shall be set no lager than this value.

*14、**Y MaxStdby**: The maximum allowed standby position of Y axis. The standby position must be set smaller than this value.

*15、**Y PolseIn**: The same as Z axis.

*16、**DownGes**:

Verti: when the manipulator descends, it must be in a vertical position. When it is in a horizontal position, it will give an alarm.

Hori: when the manipulator descends, it must be in a horizontal position. When it is in a vertical position, it will give an alarm.

*17、**WaitSig**:

NoTeach: The program is not allowed to teach the associated signal of the manipulator and the injection molding machine. (E.g: wait for mold opened, mold closing allowed) The program operates as normal requirements.

Teach: The program is allowed to teach the associated signal of the manipulator and the injection molding machine.【E.g: wait for mold opened, mold closing allowed】Users can teach program to control.

*18、**Y ResetSpd**: Speed of Y axis when the origin resets.

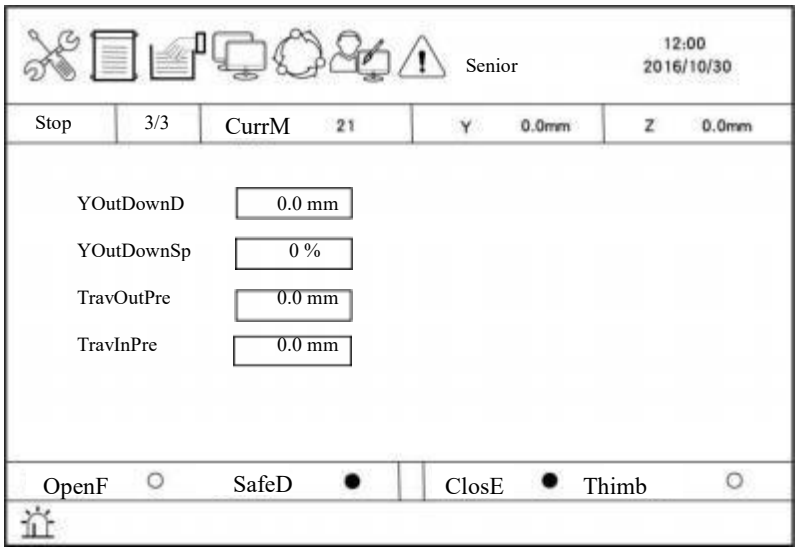
*19、**Y MaxSpd**: The maximum speed of Y axis servo motor, unit: %.

*20、**Y WholeSpeed**: The basic speed of Y axis servo motor, unit: %.

*21、**Y AccDecTime**: Set the acceleration and deceleration time of the Y axis servo motor.

*22、**FeedBack**: After selected for use, the actual position of finished products will display the number of feedback pulses received for debugging the machine.

*23、**Y InDownPre**: Early position of Y axis internal descending. The program teaches that the descending position is 800mm, and the early position is 100mm. Then it will execute next action, such as main arm moves forward, when Y axis descends to 700mm.



24、**Y OutDownDec:** The pre deceleration position in external descending.

25、**Y OutDownSpd:** The pre deceleration speed in external descending.

26、**TravOutPre:** Early end position of Z axis transverse exit. The program teaches that the transverse exit position is 800mm, and the transverse exit early end position is 100mm. When running automatically, it will start to run the next program if the transverse exit position reaches 700mm.

27、**TravInPre:** Early end position of Z axis transverse entry. The program teaches that the transverse entry position is 0mm, the transverse exit position is 800mm, and the transverse exit early end position is 100mm. When running automatically, it will start to run the next program if the transverse entry position reaches 100mm.

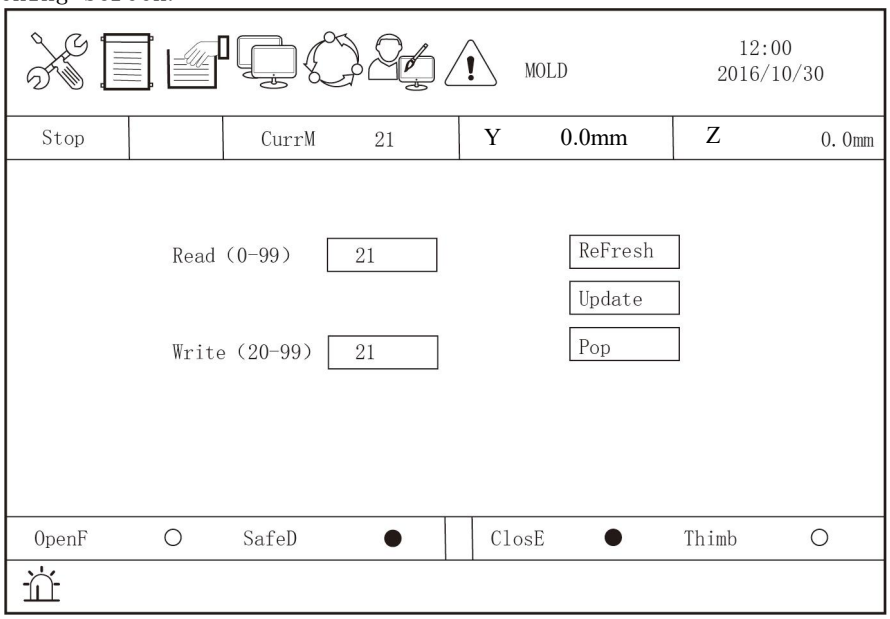
*** Note: Ensure that the setting is correct when setting the descending position and jig reverse, or it may cause damage to mould.**

Parameters with * are set by the manufacturer. Do not adjust them while using.

Chapter 6 Program Setting

6.1 Program Selection

Press the 程序 PROG key in the stop screen to enter the mold program selection screen and program teaching screen.

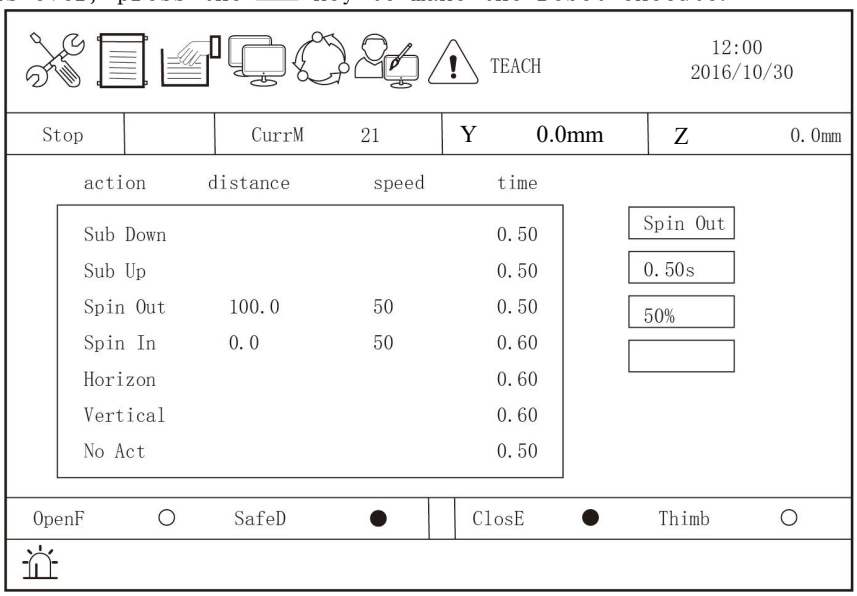


Enter stored mold number(0-99) in the input box next to "READ(0-99)" and press the 输入 ENTER key to load the program it represents. Operate the program in auto mode.

Pick one from No.0-99 mold program to read and enter one from No.20-99 that needs teaching. Enter the program teaching screen and press "START" again to enter teaching mode.

6.2 Program Teaching

While teaching program, press the 输入 ENTER key to move the cursor to the taught action. Press the manual buttons to teach current step sequence action. Press "ENTER" at the same time and move to Time, Speed and Position respectively to set current step sequence action. When action set is over, press the 输入 ENTER key to make the robot execute.



插入 INS Press “INS” in teaching mode to insert a line of no action instruction before the selected teaching action. At the same time, press action key to be executed and then press the “ENTER” to insert a group of action.

删除 DEL Delete a line of action instruction in teaching program to delete redundant action.

Sequence number: Step sequence number of current action.

Action: Action command taught currently.

Time: Delay time of current action. The action will not be executed until delay time is over.

Speed: Speed at which the robot moves to current position.

Position: While teaching actions, the position to which the robot will move.

【Important】While programming, It needs to press “ENTER” to carry out current action and then write the opposite action to complete programming.

【Tips】While programming, it needs to press “ENTER” twice for pneumatic action and three times for axis action.

6.3 Fixed Program

01 Main arm L-type male suction mold:

Main Down -> Main Forw -> Vac Suck -> Main Back -> Main UP ->Main Forw -> Horizon -> Spin Out -> Main Down -> Vac Put - >Main Up - >Spin In ->Vertical ->Main Back

02 Main arm L-type female suction mold:

Main Forw -> Main Down -> Main Back -> Vac Suck -> Main Forw -> Main Up -> Horizon -> Spin Out -> Main Down -> Vac Put ->Main Up - >Spin In - > Vertical

03 Main arm U-type male suction mold:

Main Forw -> Main Down -> Vac Suck -> Main Back ->Main Up ->Main Forw -> Horizon -> Spin Out-> Main Down -> Vac Put ->Main Up - > Spin In - > Vertical

04 Main arm U-type female suction mold:

Main Down -> Vac Suck -> Main Forw -> Main Up -> Horizon-> Spin Out -> Main Down ->Var Put ->Main Up -> Spin In -> Vertical -> Main Back

05 Auxiliary arm L-type female clamping mold:

Sub Forw-> Sub Down -> Sub Back -> Sub Fix -> Sub Forw -> Sub Up-> Spin Out -> Sub Put -> Spin In

06 Auxiliary arm L-type male clamping mold:

Sub Down -> Sub Forw -> Sub Fix ->Sub Back -> Sub Up -> Sub Forw -> Spin Out -> Sub Put -> Spin In ->Sub Back

07 Auxiliary arm U-type female clamping mold:

Sub Down -> Sub Fix -> Sub Forw -> Sub Up -> Spin Out -> Sub Put -> Spin In -> Sub Back

08 Auxiliary arm U-type male clamping mold:

Sub Forw -> Sub Down -> Sub Fix -> Sub Back -> Sub Up -> Sub Forw ->Spin Out ->Sub Put -> Spin In

09 Internal material of auxiliary arm L-type female clamping mold:

Sub Forw -> Sub Down -> Sub Back -> Sub Fix -> Sub Forw -> Sub Put ->Sub Up

10 Internal material of auxiliary arm L-type male clamping mold:

Sub Down -> Sub Forw -> Sub Fix -> Sub Back -> Sub Put -> Sub Up

11 Internal material of auxiliary arm U-type male clamping mold:

Sub Forw -> Sub Down -> Sub Fix -> Sub Back -> Sub Put -> Sub Up

12 Internal material of auxiliary arm U-type female clamping mold:

Sub Forw -> Sub Down -> Sub Fix -> Sub Back -> Sub Put

13 Double arms L-type clamping and suction:

Dob Down -> Dob Forw -> Vac Suck -> Sub Fix -> Dob Back -> Dob Up -> Dob Forw -> Horizon -> Spin Out -> Sub Put -> Spin out -> Main Down - > Vac Put - > Main Up - > Spin In -> Vertical ->Dob Back

14 Double arms U-type clamping and suction:

Dob Forw -> Dob Down -> Vac Suck -> Sub Fix -> Dob Back -> Dob Up -> Dob Forw -> Horizon -> Spin Out -> Sub Put - > Spin Out - > Main Down - > Vac Put - > Main Up - > Spin In - > Vertical

15 Main arm L-type male clamping mold:

Main Down -> Main Forw -> Main Fix -> Main Back -> Main Up -> Main Forw -> Horizon ->Spin Out -> Main Down -> Main Put -> Main Up - > Spin In - > Vertical->Main Back

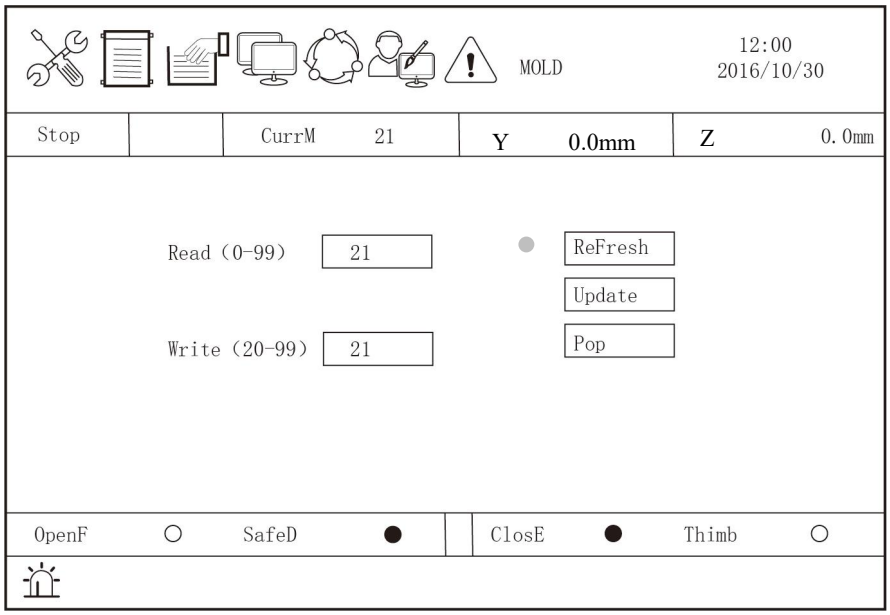
16 Main arm L-type male clamping and suction mold:

Main Down -> Main Forw -> Main Fix -> Vac Suck -> Main Back -> Main Up -> Main Forw -> Horizon -> Spin Out -> Main Down -> Main Put - > Vac Put - > Main Up - > Spin In -> Vertical -> Main Back

17 Double-arm L-type clamping:

Dob Down -> Dob Forw> Main Fix -> Sub Fix -> Dob Back -> Dob Up -> Dob Forw -> Horizon -> Spin Out ->Sub Put -> Spin Out - >Main Down -> Main Put-> Main Up- > Spin In - > Vertical ->Dob Back

6.4 Program Update



1、Update manual control program

Insert USB flash disk into the interface right to manual controller and press the emergency stop button to cut the power and restart. Enter the main screen and 2014 password screen to check the version number. (USB disk can not be pulled out before entering the main screen.)

2、Update host program

Insert USB flash disk and click program button to enter the program screen. Update as following steps.

(1) Refresh: Click the "Refresh" key on the right. If no USB is detected, the left lamp is still gray; If USB is detected, the lamp turns green, and then click "Update".

(2) Update: If the left lamp turns red from green, operation lamp of host flickers frequently and the updating rate is increasing, the update will be completed when the rate turns to 100% and the note (**Update Completed**!) shows on the bottom of the screen.

(3) Pop up: Click "Pop Up" to disconnect the USB. Pull out when the left lamp turns red and end the update.

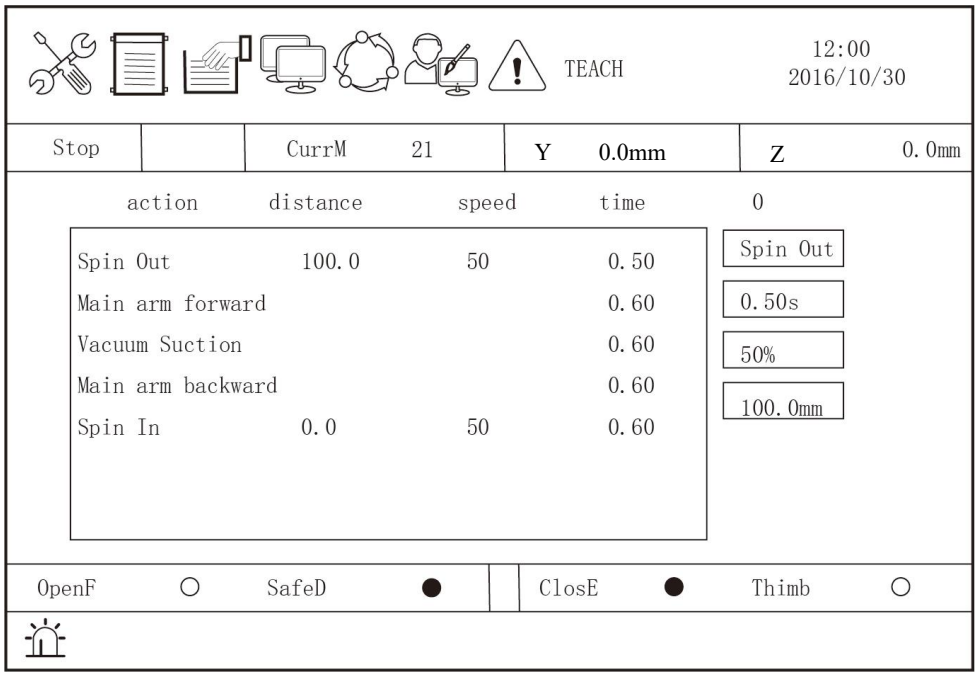
*** Notice:**

1.Host program update takes about 2 minutes.

2.Once click "Pop Up" or pull out USB disk, it needs to restart to detect USB disk again.

6.5 Parameter Modification

Press the parameter key in the stop screen to enter the screen of action parameter setting. Action delay time and other parameters can be modified here, but it can not do teaching.

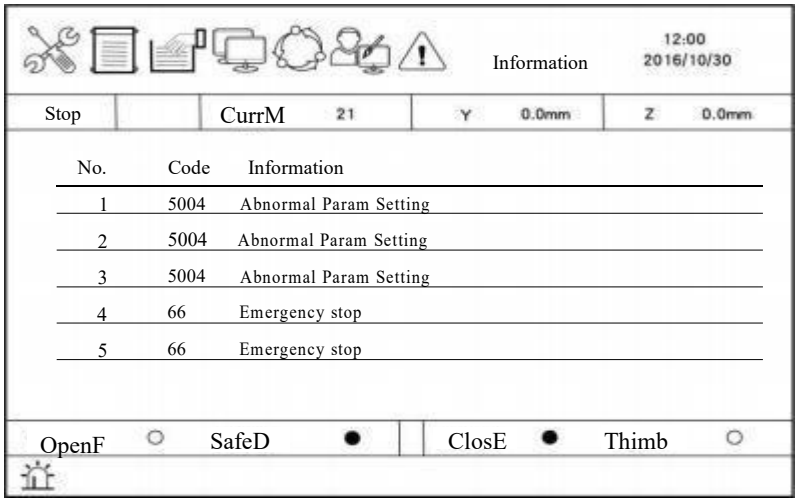


Press the up/down key to move cursor to the action option that needs modification. Then press the 输入 ENTER key to enter when finished and modify the next one.

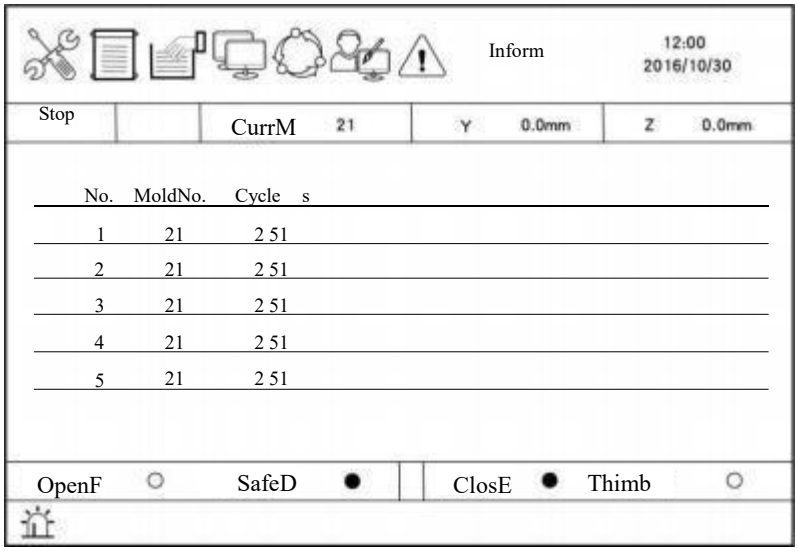
Chapter 7 Operation Information

7.1 Alarm Record

Press the 信息 IFOR key in the standby screen to enter the alarm record screen. The latest 15 alarm records are kept here.

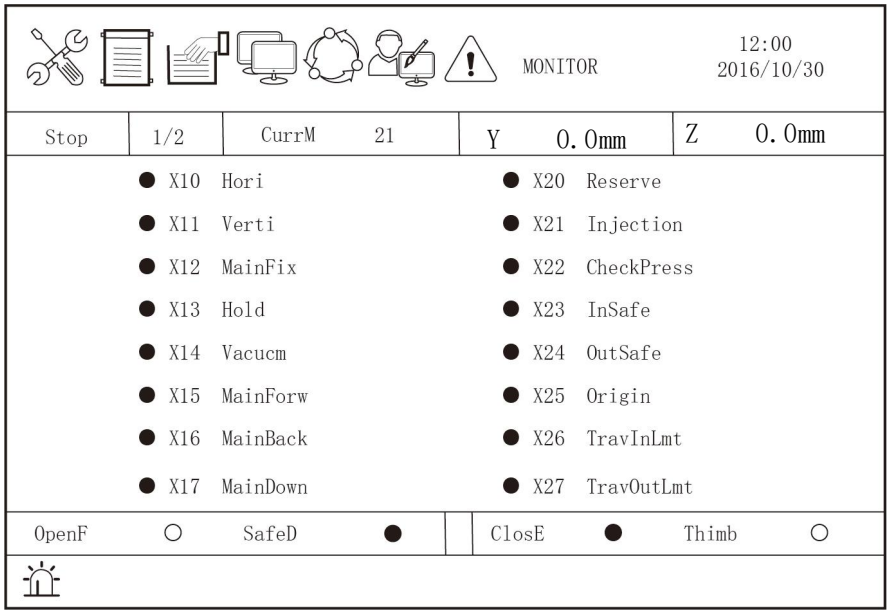


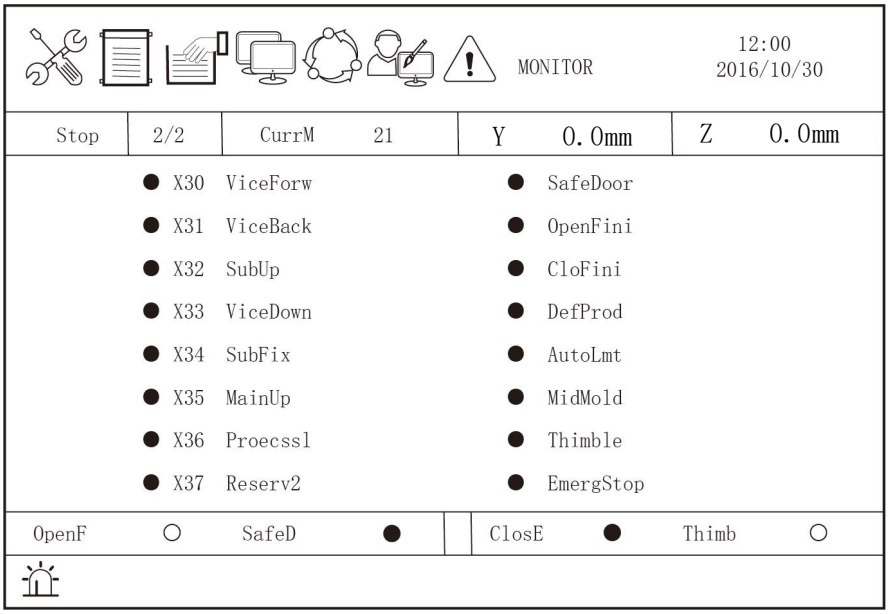
Press the 信息 IFOR key again to enter the automatic cycle time recording screen, which can record the cycle time of the latest 5 modules.



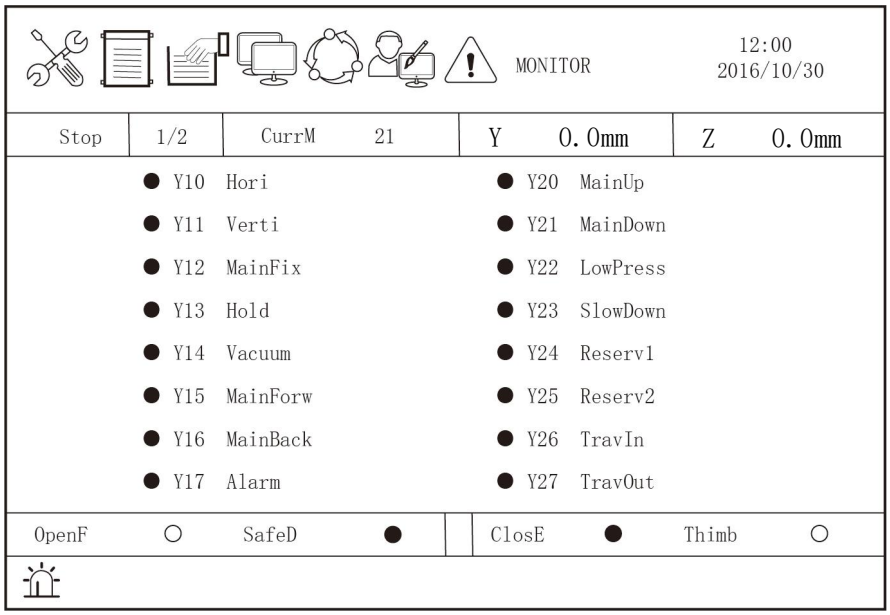
7.2 I/O Monitor

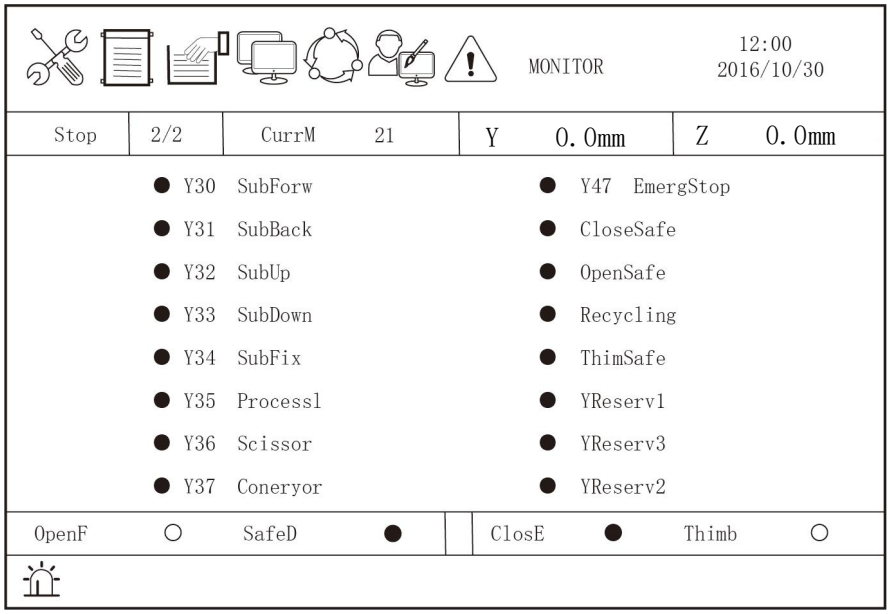
Press the 监视 WATCH key to enter the signal monitoring screen. Press the up/down key to switch the screen.



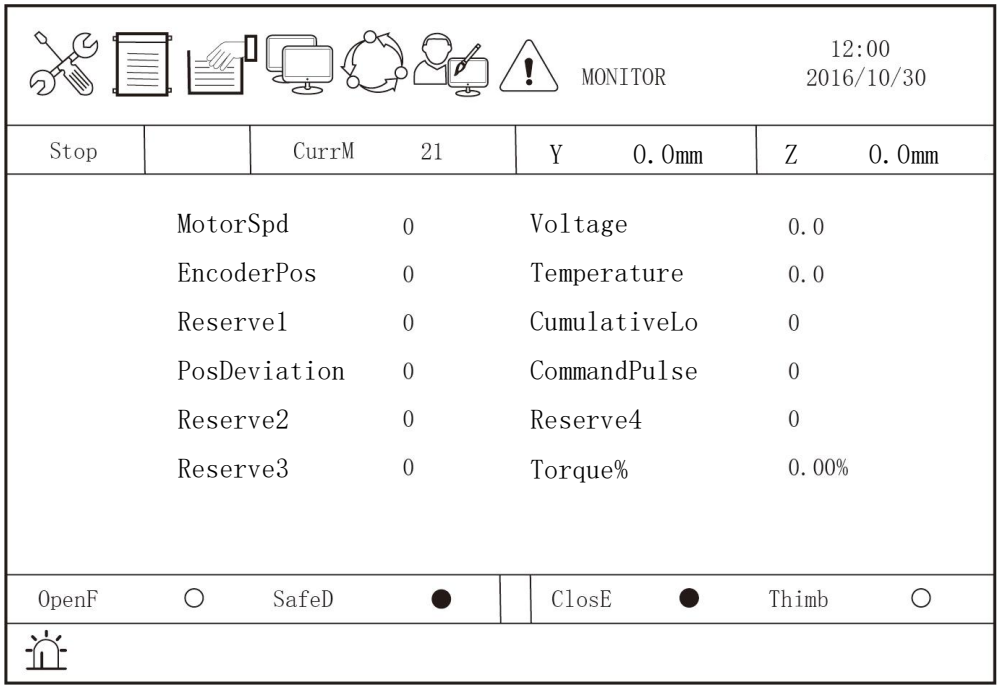


Press the 监视 WATCH key twice to enter the output monitoring screen. Press the up/down key to switch the screen.

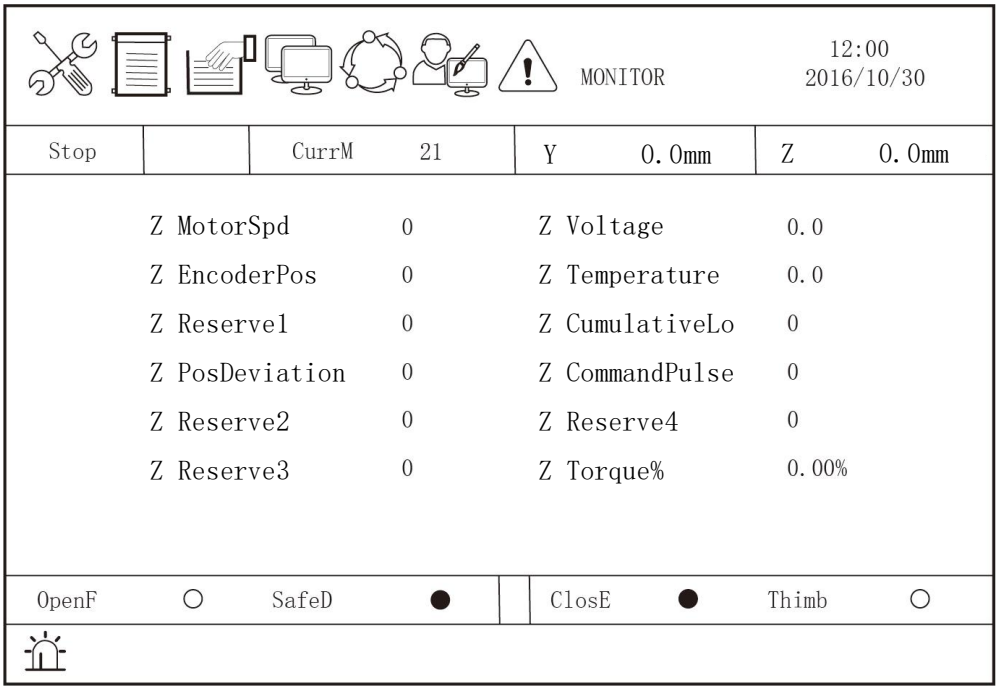




Press the 监视 WATCH key three times to enter the Y-axis servo monitoring screen. This page is for the Y-axis servo motor status monitoring, which contents real-time monitoring Y-axis speed, current, voltage, temperature and other data.



Press the 监视 WATCH key four times to enter the Z-axis servo monitoring screen. This page is for the Z-axis servo motor status monitoring, which contents real-time monitoring Z-axis speed, current, voltage, temperature and other data.

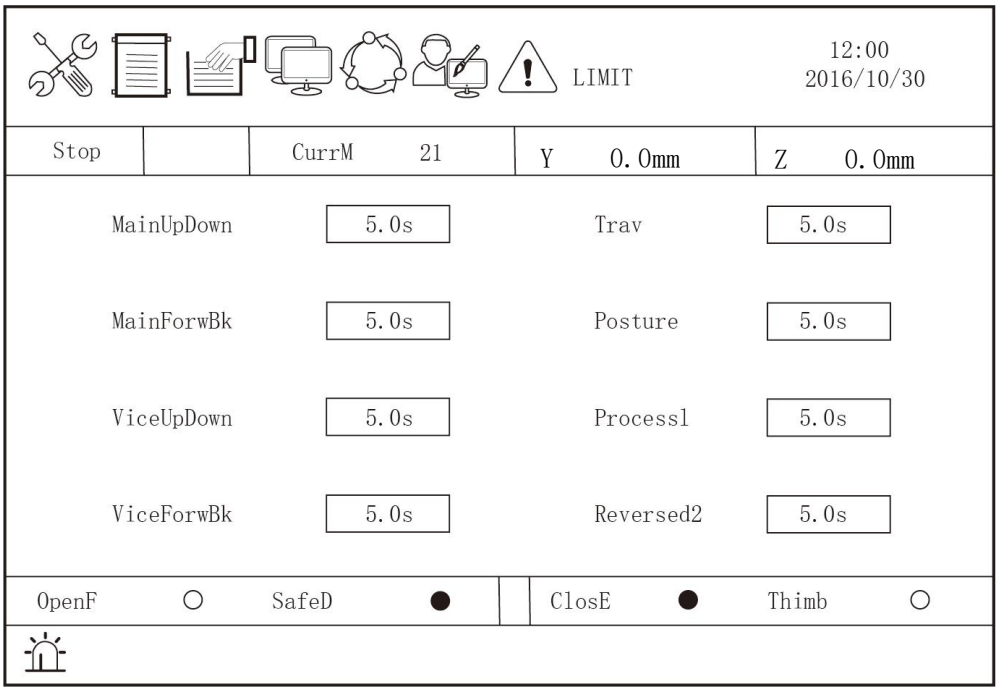


Chapter 8 System Setting

This chapter contents parameters set by the machine manufacturer. Users should not adjust these values.

8.1 Action Limit Time

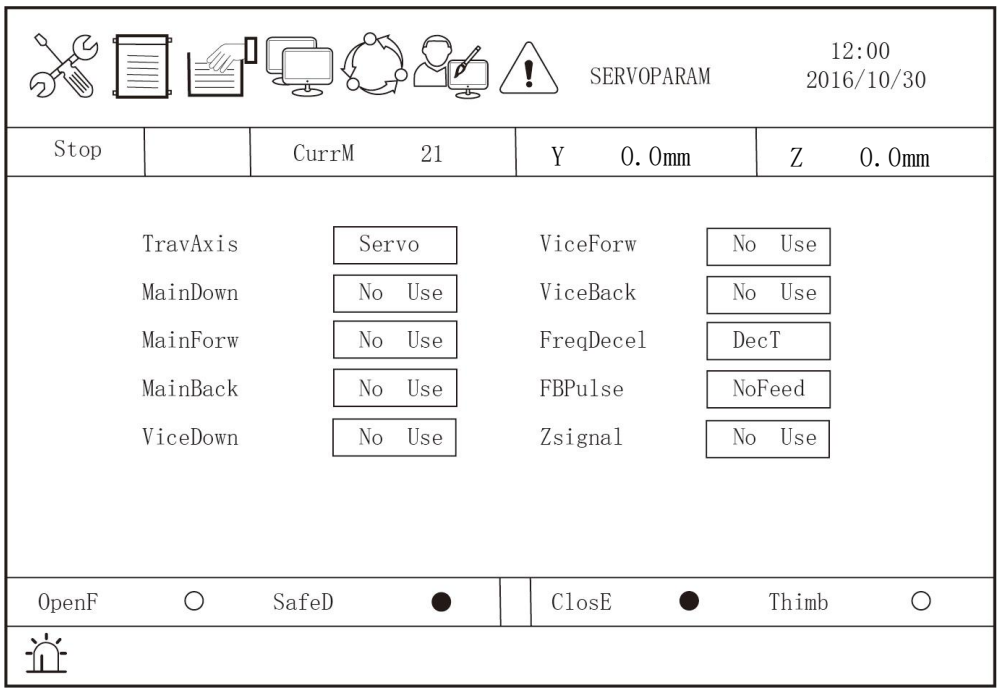
Press the 功能/同步 FUNC/SYN key twice in the stop screen to enter the password screen. Enter the password "****" and press the 输入 ENTER key to enter the limited time screen of the action. Press the up/down cursor key to move to the limit time of each action.



1、MainUpDown: The limit time of the main arm's down/up action. The alarm will be raised if the action is not completed within this time.
2、MainForwBk: The limit time of the main arm's forward/backward action, same as above.
3、ViceUpDown: The limit time of the auxiliary arm's down/up action, same as above.
4、ViceForwBk: The limit time of the auxiliary arm's forward/backward action, same as above.
5、Trav: The limit time of transverse action, same as above.
6、Posture: The limit time of horizontal/vertical movements, same as above.
7、Processl: The limited time of processing 1 on/off action, same as above.
8、Reversed2: The limited time of reserve 2 on/off action, same as above.

8.2 The Mechanical Parameter

Press the 功能/同步 FUNC/SYN key twice in the stop screen to enter the password screen. Enter the password "****" and press the 输入 ENTER key again to enter the page of mechanical setting. The function options of this picture can be set according to the configuration of the machine.



1、**TravAxis** **Servo:** The transverse axis is driven by servo motor.
FreqCv: The transverse axis is driven by a frequency conversion motor.
Pneu: The transverse axis is driven by cylinder.

2、**MainDown** **No Use:** The manipulator does not use the main arm descending limit proximity switch.
Use: The manipulator uses the main arm descending limit proximity switch.

3、**MainForw** **No Use:** The manipulator does not use the main arm forward limit proximity switch.
Use: The manipulator uses the main arm forward limit proximity switch.

4、**MainBack** **No Use:** The manipulator does not use the main arm back limit proximity switch.
Use: The manipulator uses the main arm back limit proximity switch.

5、**ViceDown** **No Use:** The manipulator does not use the lower limit proximity switch of the auxiliary arm.
Use: The manipulator uses lower limit proximity switch of the auxiliary arm.

6、**ViceForw** **No Use:** The manipulator does not use the auxiliary arm forward limit proximity switch.
Use: The manipulator uses the auxiliary arm forward limit proximity switch.

7、**ViceBack** **No Use:** The manipulator does not use the auxiliary arm back limit proximity switch.
Use: The manipulator uses the auxiliary arm back limit proximity switch.

8、**FreqDecel:** (For frequency conversion cross walk manipulator; Servo cross walk manipulator does not have this function.)
DecT: The mode of transverse deceleration is time deceleration, that is, in the process of transverse exit/entry, the deceleration delay starts timing, and the timing ends with deceleration.
DecSw: Thee mode of transverse deceleration is switch deceleration, that is, in the process of transverse exit/entry, the deceleration delay starts to time after the deceleration switch is detected twice, and the time starts to slow down.

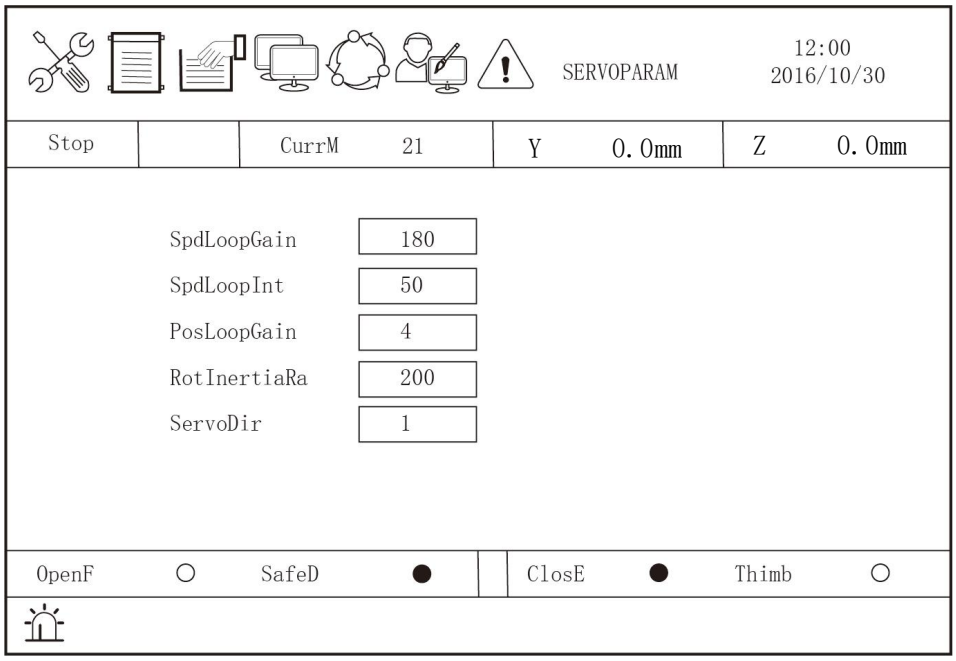
9、**FBPulse** **No Feed:** The manipulator control system does not detect the feedback pulse of the servo motor.
Feedback: The manipulator control system detects the feedback pulse of the servo motor. When the feedback pulse is inconsistent with the command pulse, the alarm will be given.

10、**Zsignal** **No Use**：No need to detect Z signal of motor when origin point resets.
Use：Need to detect Z signal of motor when origin point resets.

8.3 Servo Parameter Setting

8.3.1 Gain Parameter Setting

Press the 功能/同步 FUNC/SYN key twice in the stop screen to enter the password screen, and enter the password "7752" and then press the 输入 ENTER key to enter the special function screen 3. The gain parameters of the servo can be modified here.



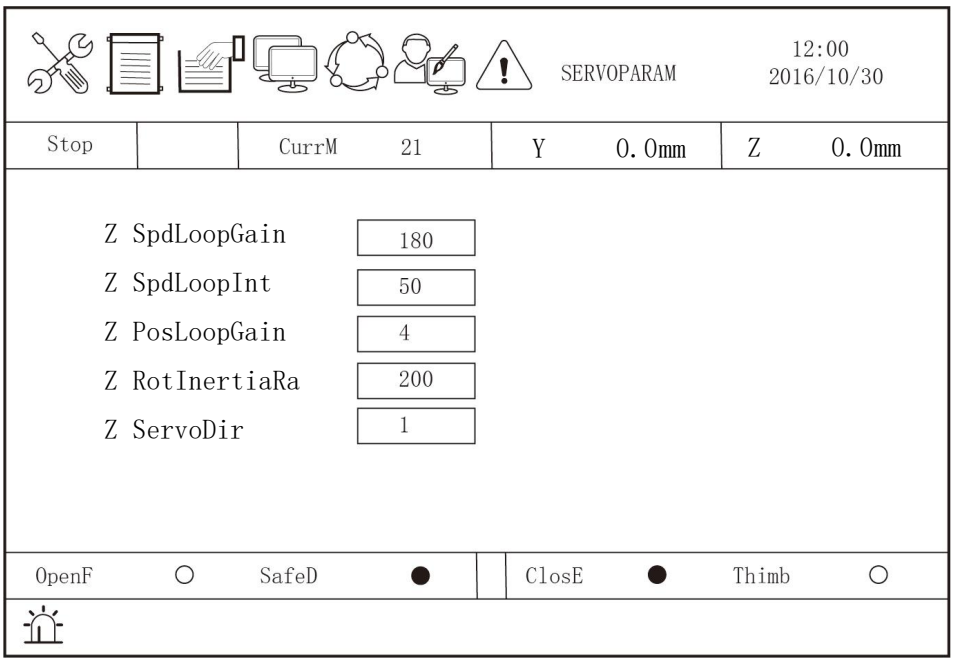
*1、SpdLoopGain: Set the velocity loop gain value of the servo.(range 0-500) No need to adjust. Adjust automatically with the rigidity coefficient.(Larger value means faster respond)**【efficient in time】**

*2、SpdLoopInt: Set the servo velocity loop integral value.(range 0-300)No need to adjust.Adjust automatically with the rigidity coefficient.(Smaller value means better integral action and speed track)**【efficient in time】**

*3、PosLoopGain: Set the position loop gain value of the servo.(range 0-20) No need to adjust.Adjust automatically with the rigidity coefficient.(Larger value means faster respond)**【efficient in time】**

*4、PotIntertiaRa: Adjust the overall gain parameter of the machine. (range 50-300).The first three items will be adjusted at the same time (Larger value means better response)**【efficient in time, it is recommended to modify this only】**

*5、ServoDir: Adjust the positive negative rotation of motor(range 0-1).**【modify in emergency stop state, effective after power off and restart】**



*1、Z SpdLoopGain: Set the velocity loop gain value of the servo.(range 0-500) No need to adjust. Adjust automatically with the rigidity coefficient.(Larger value means faster respond)【efficient in time】

*2、Z SpdLoopInt: Set the servo velocity loop integral value.(range 0-300)No need to adjust.Adjust automatically with the rigidity coefficient.(Smaller value means better integral action and speed track)【efficient in time】

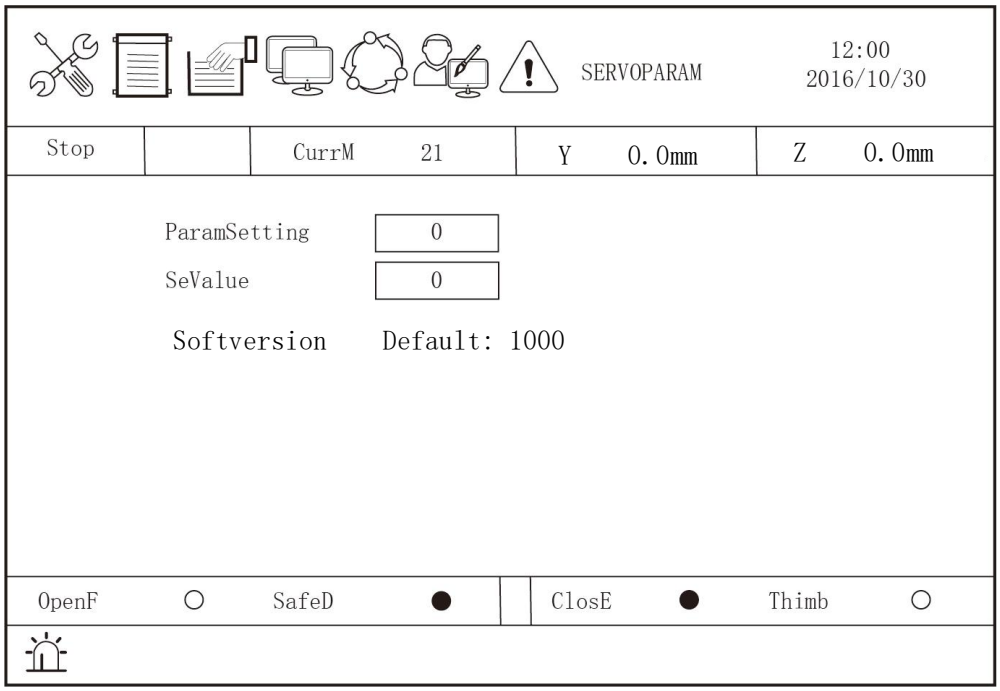
*3、Z PosLoopGain: Set the position loop gain value of the servo.(range 0-20) No need to adjust.Adjust automatically with the rigidity coefficient.(Larger value means faster respond)【efficient in time】

*4、Z PotIntertiaRa: Adjust the overall gain parameter of the machine. (range 50-300) .The first three items will be adjusted at the same time (Larger value means better response)【Efficient in time, it is recommended to modify this only】

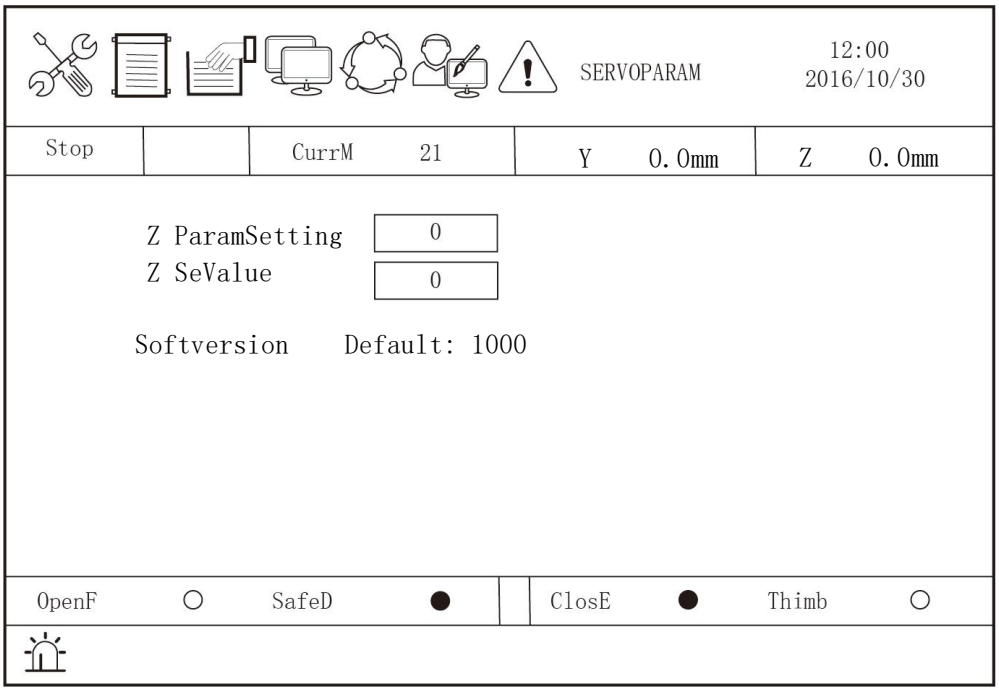
*5、Z ServoDir: Adjust the positive negative rotation of motor (range 0-1).【modify in emergency stop state, effective after power off and restart】

8.3.2 All Parameters Setting

All parameters are set in the stop screen. Press the 功能/同步 FUNC/SYN key twice to enter the password screen. Enter password “****” and press the 输入 ENTER key again to enter the special function 4 screen. Press up/down cursor key to move to exact function setting and change the parameter.



*1、**Paramsetting:** Set the index number of servo parameter.
*2、**SeValue:** Set the value of “Paramsetting” index.



*** Note: Parameters are listed in the appendix. Do not modify. Please contact technical support personnel for details.**

Chapter 9 Alarm Information and Solutions

9.1 Manipulator Alarm

When the alarm occurs automatically, press the "STOP" key to cancel the alarm.

No.	Information	Reason	Solution
1	When the signal of mold opened breaks, the robot did not return to the original point.	No input signal after mold opened.	1. The injection molding machine is not in the mold end state. 2. The injection molding machine has an abnormal signal after mold opened. 3. Ensure that the robot I/O board is wired correctly. 4. Check the board faulty.
2	The mid-plate mode confirms the limit but the robot does not return to the origin.	The mid-plate mold confirmation signal of the three-plate mode has no input.	1. Ensure the middle plate mold of the mold is fully open. 2. Ensure there is a signal output from the proximity switch of the mid-plane module. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
3	The main arm rises and is cut off but the robot does not return to the origin.	The main arm upper signal has no input, and the robot is not in the standby position.	1. Check if the air pressure is too low. 2. Check if the main arm upper proximity switch has a signal. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
4	The jib rises and is cut off but the robot does not return to the origin.	There is no input to the jib upper signal, and the robot is not in the standby position.	1. Check if the air pressure too low. 2. Check if the jib upper proximity switch has a signal. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
5	The main fixture confirms the restriction but the robot does not return to the origin.	The main fixture confirmation signal has an input and the robot is not in the standby position.	1. Check if the main fixture confirmation switch is off. 2. Check if the main fixture detection function is selected correctly. 3. Check if the main fixture is caught in the product. 4. Ensure that the I/O board is wired correctly. 5. Check the board faulty.

6	The auxiliary fixture confirms the restriction but the robot does not return to the origin.	The auxiliary fixture confirmation signal has an input and the robot is not in the standby position.	1. Check if the auxiliary fixture confirmation switch is off. 2. Check if the auxiliary fixture detection function is selected correctly. 3. Check if the auxiliary fixture is caught in the product. 4. Ensure that the I/O board is wired correctly. 5. Check the board faulty.
7	Vacuum suction limit is confirmed but the robot does not return to the origin.	The suction cup valve is not actuated and the vacuum suction signal is input.	1. Check if the suction confirmation switch is off. 2. Check the suction solenoid valve for action. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
8	Conveyor limit is confirmed but the robot does not return to the origin.	The conveyor valve is not actuated and the confirmation signal has input.	1. Check that the conveyor confirmation switch is off. 2. Check if the conveyor solenoid valve is moving. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
9	The machine is parked outside the model. The robot does not return to the origin.	The robot is not in standby position.	1. Check if the electronic control has a transverse entry action. 2. Check the board faulty.
10	The machine is parked inside the model. The robot does not return to the origin.	The robot is not in standby position.	1. Check if the electronic control has a transverse out action. 2. Check the board faulty.
11	The posture is vertically limited but the robot does not return to the origin.	Fixture vertical limit without signal input.	1. Check if the air pressure is too low. 2. Check if the electronic control outputs vertical motion. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.

26	Before the arm falls, the posture vertical limit is broken.	When the vertical drop is selected, there is no signal input before the arm falls.	1. Check if the fixture is vertical. 2. Check if the vertical detection switch is faulty. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
27	Before the arm falls, the posture horizontal limit is broken.	When the horizontal drop is selected, there is no signal input before the arm falls.	1. Check if the fixture is horizontal. 2. Check if the horizontal detection switch is faulty. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
28	Before the arm falls, main fixture is restricted.	Main fixture detection switch has signal input before the arm falls.	1. Check if there is a main fixture action. 2. Check if the main fixture detection switch is faulty. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
29	Before the arm falls, auxiliary fixture is restricted.	Auxiliary fixture detection switch has signal input before the arm falls.	1. Check if there is a auxiliary fixture action. 2. Check if the auxiliary fixture detection switch is faulty. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
30	Before the arm falls, the vacuum suction is limited.	Suction detection switch has signal input before the arm falls.	1. Check if there is a suction action. 2. Check if the suction cup detection switch is faulty. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
31	Before the arm falls, the conveyor is restricted.	Before the arm falls, the conveyor detection switch has a signal input.	1. Check if the hug action has been performed. 2. Check if the conveyor detection switch is faulty. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
32	Before transverse movement of machine, main arm down valve on	The main arm lowering action was performed before the traverse.	1. Check if the main arm has been lowered.
33	Before transverse movement of machine, jib down valve on	The jib lowering action was performed before the traverse.	1. Check if the jib has been lowered.

34	Before transverse movement of machine, main arm rise is not limited.	There is no signal input for the main arm rise limit switch before the traverse.	1. Check if the main arm is at the rise limit position. 2. Check if the main arm has been lowered. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
35	Before transverse movement of machine, jib rise is not limited.	There is no signal input for the jib rise limit switch before the traverse.	1. Check if the jib is at the rise limit position. 2. Check if the jib has been lowered. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
36	Before the posture changes,Main arm down valve on	Main arm down valve opens before the jig executes horizontal or vertical action.	1. Check if the main arm has been lowered.
37	Before the posture changes, jib down valve on	Jib down valve opens before the jig executes horizontal or vertical action	1. Check if the jib has been lowered.
38	Main arm down valve on, main arm rise limit on	After the main arm down action is performed, the main arm rise limit has signal input.	1. Check if the arm-drop action has been performed. 2. Check if the rise limit switch has been turned off while the main arm is descending. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
39	Main arm down valve on, main arm down limit off	Jib down valve off, jib rise limit off	1. Check if the main arm performs the drop action. 2. Check if the lower switch of main arm has signal. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
40	Main arm down valve off, main arm rise limit off	After the main arm rise action is performed, the main arm rise limit has no signal input.	1. Check if the main arm performs the rise action. 2. Check if the upper switch of main arm has signal. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
41	Main arm down valve off, main arm down limit on	After the main arm rise action is performed, the main arm down limit has signal input.	1. Check if the main arm performs the rise action. 2. Check if the lower switch of main arm is turned off. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.

42	Jib down valve on, jib rise limit on	After the jib down action is performed, the jib rise limit has signal input.	1. Check if the jib performs the drop action. 2. Check if the upper switch of jib is turned off. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
43	Jib down valve on, jib down limit off	After the jib down action is performed, the jib down limit has no signal input.	1. Check if the jib performs the drop action. 2. Check if the lower switch of jib has signal. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
44	Jib down valve off, jib rise limit off	After the jib rise action is performed, the jib rise limit has no signal input.	1. Check if the jib performs the rise action. 2. Check if the upper switch of jib has signal. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
45	Jib down valve off, jib down limit on	After the jib down action is performed, the jib down limit has signal input.	1. Check if the jib performs the drop action. 2. Check if the lower switch of jib is turned off. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
46	Main arm forward valve on, main arm forward limit off	After the main arm forward action is performed, the main arm forward limit has no signal input.	1. Check if the air pressure is too low. 2. Check if the main arm performs the forward action. 3. Check if the main arm forward switch has signal. 4. Ensure that the I/O board is wired correctly. 5. Check the board faulty.
47	Main arm forward valve on, main arm backward limit on	After the main arm forward action is performed, the main arm backward limit has signal input.	1. Check if the air pressure is too low. 2. Check if the main arm performs the forward action. 3. Check if the main arm retreat switch is turned off. 4. Ensure that the I/O board is wired correctly. 5. Check the board faulty.

48	Main arm forward valve off, main arm forward limit on	After the main arm backward action is performed, the main arm forward limit has signal input.	1. Check if the main arm performs the retreat action. 2. Check if the main arm forward switch is turned off. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
49	Main arm forward valve off, main arm backward limit off	After the main arm backward action is performed, the main arm backward limit has no signal input.	1. Check if the main arm has a retreat action. 2. Check if the retreat switch of main arm has signal. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
50	The jib forward valve on, jib forward limit off	After the jib forward action is performed, the jib forward limit has no signal input.	1. Check if the pressure is too low. 2. Check if the jib has a forward action. 3. Check if the jib forward switch has signal. 4. Ensure that the I/O board is wired correctly. 5. Check the board faulty.
51	The jib forward valve on, jib backward limit on	After the jib forward action is performed, the jib backward limit has signal input.	1. Check if the air pressure is too low. 2. Check if the jib has a forward action. 3. Check if the retreat switch of jib is turned off. 4. Ensure that the I/O board is wired correctly. 5. Check the board faulty.
52	The jib forward valve off, jib forward limit on	After the jib backward action is performed, the jib forward limit has signal input.	1. Check if the jib has a retreat action. 2. Check if the jib forward switch is turned off. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
53	The jib forward valve off, jib backward limit off	After the jib backward action is performed, the jib backward limit has no signal input.	1. Check if the jib has a retreat action. 2. Check if the jib retreat switch has signal. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.

54	Main fixture valve on, main fixture limit off	After performing the main fixture action, the main fixture confirmation signal has no input.	1. Check if the air pressure is too low. 2. Check if the main fixture acts. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
55	Main fixture valve off, main fixture limit on	After performing the main fixture lifting action, the main fixture confirmation signal has input.	1. Check if the main fixture has a lifting action. 2. Ensure that the I/O board is wired correctly. 3. Check the board faulty.
56	Secondary fixture valve on, secondary fixture limit off	After performing the auxiliary fixture action, the auxiliary fixture confirmation signal has no input.	1. Check if the air pressure is too low. 2. Check if the auxiliary fixture acts. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
57	Secondary fixture valve off, secondary fixture limit on	After performing the auxiliary fixture lifting action, the auxiliary fixture confirmation signal has input.	1. Check if the auxiliary fixture acts. 2. Ensure that the I/O board is wired correctly. 3. Check the board faulty.
58	Vacuum valve on, vacuum limit off	After the suction action is performed, the suction confirmation signal has no input.	1. Check if the air pressure is too low. 2. Check if there is a suction action. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
59	Vacuum valve off, vacuum limit on	After the suction-discharge operation is performed, the suction confirmation signal has input.	1. Check if there is a suction-discharge operation. 2. Ensure that the I/O board is wired correctly. 3. Check the board faulty.
60	The conveyor valve on, conveyor limit off	After performing the hug action, the confirmation signal has no input.	1. Check if the air pressure is too low. 2. Check if the conveyor acts. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
61	The conveyor valve off, conveyor limit on	After performing the lifting action, the confirmation signal has input.	1. Check if the conveyor acts the lifting action. 2. Ensure that the I/O board is wired correctly. 3. Check the board faulty.

62	The posture horizontal valve on, posture horizontal limit off	The posture horizontal limit has no signal input after performing the action.	1. Check if the air pressure is too low. 2. Check if there is posture horizontal action. 3. Check if the posture horizontal switch has a signal. 4. Ensure that the I/O board is wired correctly. 5. Check the board faulty.
63	The posture vertical valve on, posture vertical limit off	The posture vertical limit has no signal input after performing the action.	1. Check if the air pressure is too low. 2. Check if there is posture vertical action. 3. Check if the posture vertical switch has a signal. 4. Ensure that the I/O board is wired correctly. 5. Check the board faulty.
64	The machine has been spinning out for too long.	Time taken to spin out is longer than limited.	1. Check if the speed of spinning out is set too slow. 2. Check if the arm does spin out. 3. Check if the servo motor rotates. 4. Ensure that the servo motor is wired correctly. 5. Check the board faulty.
65	The machine has been spinning in for too long.	Time taken to spin in is longer than limited.	1. Check if the speed of spinning in is set too slow. 2. Check if the arm does spin in. 3. Check if the servo motor rotates. 4. Ensure that the servo motor is wired correctly. 5. Check the board faulty.
66	Emergency stop	The injection molding machine or robot performs an emergency stop.	1. Release the electronically controlled emergency stop button. 2. Release the injection molding machine for an emergency stop. 3. Check the relevant connections of the emergency stop signal.
67	The action program is incomplete. Not executable.	The procedure of teaching is incomplete.	1. Complete the teaching program again. The last action of teaching must be returning to origin point.
68	Production set has been achieved.	The current production output has reached the set value.	1. Increase the set value of production output. 2. Clear the current output value.

69	The action does not follow the mode.	In the manual type, the arm is raised and lowered without following the automatic procedure.	1. In the manual type, the arm should be raised or lowered in the forward or backward position corresponding to the automatic program, otherwise the mould may be damaged.
70	Waiting for mold opening timeout	Time for mold opening cycle of the injection molding machine is too long.	1. Increase the manipulator's electronic-control cycle time and make it longer than time of the injection molding machine.
71	Servo drive failure; No pulse input	The electronic controller did not receive a feedback pulse from the servo drive.	1. Check the parameter settings of the servo driver. 2. Check the connection of servo driver and electronic controller. 3. Check the parameter settings of electronic controller. 4. Check the board faulty.
72	Servo driver alarm.	Servo driver alarm.	1. Check if the servo driver sends an alert. 2. Check the connection of servo driver and electronic controller. 3. Check the board faulty.
73	The position of safety gate is not set.	The position of safety gate is not set.	1. Set the safety gate position of electrical controller.
74	Location point, smaller than the safety door	The position of the storage point is set smaller than the safety door.	1. Reset the position of the storage point, which must be larger than the position of the safety door.
75	Location point, greater than the max	The position of the storage point is set greater than the maximum value.	1. Reset the position of the storage point, which must be smaller than the max value.
76	Outside standby position, smaller than the starting value position	The external standby position is smaller than the starting value.	1. Reset the position of external standby, which must be larger than the starting position.
77	Outside standby position, greater than the max	The external standby position is greater than the maximum value.	1. Reset the position of external standby, which must be smaller than the max value.
78	Distance or number of points of circulating storage is beyond safety range	The maximum position of the circulating storage exceeds the safe range.	1. Reset the distance or points of circulating storage.
79	Spinning out limit is abnormal.	There is no signal input across the limit switch.	1. Check if the spinning out limit switch has signal. 2. Ensure that the I/O board is wired correctly. 3. Check the board faulty.

80	Transverse entry limit is abnormal.	There is no signal input when crossing the limit switch.	1. Check if the transverse entry limit switch has signal. 2. Ensure that the I/O board is wired correctly. 3. Check the board faulty.
81	The machine is not in the starting position, please manually enter the starting point.	The machine is not in the starting position and needs to be manually traversed to the starting point.	1. Manually traverse back to the starting point.
82	The origin point needs detection again. Please press “HP”.	It needs to detect the origin point again when the power is on or the servo driver sends an alert.	1. Press “HP” key to reset the origin point in the stop state.
83	Execute horizontal action before spinning in/out	Execute horizontal action before transverse movement in manual mode.	1. Execute horizontal action before transverse movement. 2. Check horizontal limit switch. 3. Check horizontal valve.
84	Cannot descend, machine is not at both ends of horizontal axis	Machine is not at both ends of horizontal axis. (For inverter traverse robot)	1. Spin in(out) manually to the spin in(out) limit. 2. Check the spin in limit switch for a signal. 3. Check the spin out limit switch for a signal.
85	Insufficient air pressure.	The intake air pressure is too low.	1. Check the intake air pressure. 2. Check if the air pressure detection switch has signal.
86	Internal drop safety point, smaller than starting position	Position set for internal safety zone is smaller than starting position.	1. Reset position of internal safety zone, which must be larger than starting position.
87	Internal drop safety point, larger than safety door position	Position set for internal safety zone is larger than the safety door position.	1. Reset position of internal safety zone, which must be smaller than the safety door position.
88	Alert No.88 Cannot descend, not in internal drop safety zone	Internal descending position is not safe.	1. Reset internal drop position, which must be smaller than internal safety zone position.
89	Transverse position, smaller than starting position	Transverse position is set smaller than starting point.	1. Reset transverse position, which must be larger than starting point.
90	Transverse position, larger than the max	Transverse position is set larger than the max value.	1. Reset transverse position, which must be smaller than the max value.

91	Before the outer arm falls, type outside safety zone is not limited.	The limit switch of the outside safety zone is broken before the arm falls.	1. Check if the outside safety zone limit switch has a signal. 2. Ensure that the I/O board is wired correctly. 3. Check the board faulty.
92	Before the inner arm falls, inner type safety zone is not limited.	The limit switch of the inner safety zone is broken before the arm falls.	1. Check if the inner safety zone limit switch has a signal. 2. Ensure that the I/O board is wired correctly. 3. Check the board faulty.
93	The trial period is over.	The trial period is over.	Please contact with the manufacturer.
94	Before spinning out, please be horizontal.	No horizontal signal before the robot spins out.	1. Perform horizontal motion before spinning out. 2. Check if the horizontal limit switch has a signal. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
95	Before spinning out, please be vertical.	No vertical signal before the robot spins out.	1. Perform vertical motion before spinning out. 2. Check if the vertical limit switch has a signal. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
96	Before spinning in, please be horizontal.	No horizontal signal before the robot spins in.	1. Perform horizontal motion before spinning in. 2. Check if the horizontal limit switch has a signal. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
97	Before spinning in, please be vertical.	No vertical signal before the robot spins in.	1. Perform vertical motion before spinning in. 3. Check if the vertical limit switch has a signal. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
98	Processing 1 valve to pass, Processing 1 is not limited.	After the machining 1 pass action is executed, the machining 1 limit has no signal input.	1. Check if the air pressure is too low. 2. Check if there is a processing 1 action 3. Check if the processing 1 switch has a signal. 4. Ensure that the I/O board is wired correctly. 5. Check the board faulty.

99	Processing 1 valve broken, Processing1 restricted	After the machining 1 break operation is performed, the machining 1 limit confirmation signal has input.	1. Check if there is a processing 1 valve action. 2. Ensure that the I/O board is wired correctly. 3. Check the board faulty.
100	Reserve 2 valve to pass, reserve 2 is not limited.	After the reserved 2-way action is performed, the reserved 2 limit has no signal input.	1. Check if the air pressure is too low. 2. Check if there is a reserve 2 action. 3. Check if the reserve 2 switch has a signal. 4. Ensure that the I/O board is wired correctly. 5. Check the board faulty.
101	Reserve 2 valve broken, reserve 2 restricted.	After the reserved 2 break action is performed, the reserved 2 limit confirmation signal has input.	1. Check if there is a reserve 2 valve action. 2. Ensure that the I/O board is wired correctly. 3. Check the board faulty.
102	Horizontal standby without mold opened signal and can not be vertical	No mold opened signal when performing vertical motion	1. Ensure the standby posture is set correctly. 2. Check if there is a signal after the mold opened. 3. Ensure that the I/O board is wired correctly. 4. Check the board faulty.
103	Before the posture changes, the outer safety zone is cut off.	Before the fixture is executed horizontally and vertically, the limit switch of the outer safety zone is broken.	1. Check if the limit switch of the outer safety zone has a signal. 2. Ensure that the I/O board is wired correctly. 3. Check the board faulty.
104	No fully auto signal	When the robot is running automatically, there is no automatic signal of the injection molding machine.	1. Check if there is a signal from the fully automatic signal of the injection molding machine 2. Ensure that the I/O board is wired correctly. 3. Check the board faulty.
105	Did not teach mold opened	When the press signal is set as “teachable”, the program does not teach the “wait for mold opened” action.	1. Add the “wait for mold opened” action to program teaching. 2. The press signal is set as unteachable.
106	Y axis rising limit on, Y axis down limit on	Y axis rising limit and down limit have signal input at the same time.	1. Check Y axis rising and down limit 2. Check I/O board wiring. 3. Check circuit board.

107	Y axis is not at the starting point before transverse movement	Y axis is not at the standby position before the machine board does transverse movement.	1. Check whether Y axis descends. 2. Check whether Y axis origin has signal. 3. Check I/O board wiring. 4. Check circuit board.
108	Y axis is not at the starting point before posture changes	Y axis is not at the standby position before fixture does vertical/horizontal movement.	1. Check whether Y axis descends. 2. Check whether Y axis origin has signal. 3. Check I/O board wiring. 4. Check circuit board.
109	Y axis max position is not set	Y axis max position is not set	1. Set the max position of Y axis movement.
110	Y axis descending points× distance exceeds safe range	The Y axis position of cyclic descending exceeds safe range.	1. Reset distance or point number of cyclic descending.
111	Y axis down limit is abnormal	Y axis down limit switch has no signal input.	1. Check whether the down limit switch has signal. 2. Check I/O board wiring. 3. Check circuit board.
112	Y axis up limit is abnormal	Y axis up limit switch has no signal input.	4. Check whether the up limit switch has signal. 5. Check I/O board wiring. 6. Check circuit board.
113	Y axis is not at the starting point. Need to rise manually	Y axis is not at the starting point. Please lift manually and reset.	1. Lift to Y axis standby position manually. 2. Check whether Y axis origin has signal 3. Check I/O board wiring. 4. Check the circuit board.
114	Y axis down for too long	The descending action time of Y axis is over the limit time.	1. Check whether the descending speed is set too slow. 2. Check whether the descending limit time is set too short. 3. Check whether the servo motor rotates. 4. Check the wiring of servo motor. 5. Check the circuit board.
115	Y axis up for too long	The rising action time of Y axis is over the limit time.	1. Check whether the rising speed is set too slow. 2. Check whether the rising limit time is set too short. 3. Check whether the servo motor rotates. 4. Check the wiring of servo motor. 5. Check the circuit board.

116	Y axis descending position is less than starting point	Y axis descending position is set less than starting position.	1. Reset descending position of Y axis and ensure the value is larger than starting point.
117	Y axis descending position is more than the max	Y axis descending position is set larger than the max position of Y axis.	1. Reset descending position of Y axis or the max value and ensure the value is less than the max value.
119	Y axis max standby position is larger than the max	The maximum Y axis standby position is set larger than the max position of Y axis.	1. Change the set value of the maximum Y axis standby position and ensure the value is less than the max position of Y axis.。
120	Y axis standby position is larger than the max	The set value of Y axis standby position is larger than the max standby position.	1. Decrease the set value of Y axis standby position. 2. Increase the set value of the max Y axis standby position.
121	Not teach waiting for mold opened	When the IMM signal is set as “Allow teaching”, the program does not teach “Wait for mold opened” action.	1. Add the action into program teaching. 2. Set IMM signal as “Not allow teaching”.

9.2 Servo Alarm

No.	Information	Reason	Solution
5001	Emergency stop alarm	Servo has emergency stop signal input	1、Stop the hand controller 2、Short the host emergency stop signal
5002	Axis 1 over-current	Exceeding the maximum current	1、Check if the motor is blocked 2、Replace if the motor fails 3、Replace if the host fails
5003	Axis 2 over-current	Module over-current protection	1、Check if the motor is blocked 2、Pull out the power line and brake line then power on again. If it alarms when power on, it is the host malfunction and change it, otherwise check the motor and wiring.
5005	Axis 1 overload	Exceeding the maximum load	1、Check the load.
5006	Axis 2 overload	Exceeding the maximum load	1、Check the load. 2、Check if the motor is blocked.
5007	Axis 1 motor initialization	Motor power-on initialization	Power on again
5008	Axis 2 motor initialization	Motor power-on initialization	1、Press Stop button to clear. 2、Power on again if it cannot clear. 3、Host malfunction. Replace it.
5009	Axis 1 UVW phase current is abnormal	Current exceeds alarm value	1、Line order error 2、Lack of phase 3、Motor code does not match the motor
5010	Axis 2 UVW phase current is abnormal		
5011	VDC low-voltage	220V voltage is too low	1、Too much load and too high accelerated speed, so the voltage drops too much. 2、External input voltage is too low. 3、Host malfunction. Replace it.
5012	VDC over-voltage	220V voltage is too high	1、Too much load and too high decelerated speed, so the voltage increases too much. 2、Brake resistor is broken or not conductive. 3、Host malfunction. Replace it.
5013	Axis 1 over-speed	Exceeding the maximum speed	

5014	Axis 2 over-speed	Exceeding the maximum speed	
5015	Driver overheating	Temperature is too high	1、Check the fan. 2、Host malfunction. Replace it.
5016	IIC failed to send	Memory chip exception	Replace the host
5017	IIC failed to read		
5018	Axis 1 position deviation is too large	The deviation between command value and the actual encoder value is larger than the set value of param49.	1、Set servo param49 to increase deviation range. 2、The acceleration and deceleration are set too small. 3、System abnormality.
5019	Axis 2 position deviation is too large	The deviation between command value and the actual encoder value is larger than the set value of param49.	1、Set servo param49 to increase deviation range. 2、The acceleration and deceleration are set too small. 3、System abnormality.
5020	Axis 1 encoder error	Encoder communication failure	1、The encoder line is abnormal. 2、The encoder joint has poor contact. 3、Motor encoder is abnormal.
5021	Axis 1 speed abnormal	Abnormal rotation of motor	1、Motor code is set incorrect. 2、The gain param is not reasonable. 3、The motor is abnormal and rotates randomly.
5022	Axis 1 encoder initialization	Encoder initialization	1、The encoder line is abnormal. 2、The encoder joint has poor contact. 3、Motor encoder is abnormal.
5023	Axis 1 motor code error	Motor code is not supported by system	Set param4 as 1 and manually set param2 as correct motor code.
5024	Axis 2 motor code error	Motor code is not supported by system	Set param4 as 1 and manually set param2 as correct motor code.
5028	Axis 2 encoder error	Encoder communication failure	1、The encoder line is abnormal. 2、The encoder joint has poor contact. 3、Motor encoder is abnormal.
5029	Axis 2 speed abnormal	Abnormal rotation of motor	1、Motor code is set incorrect. 2、The gain param is not reasonable. 3、The motor is abnormal and rotates randomly.
5030	Axis 2 encoder initialization	Encoder initialization	1、The encoder line is abnormal. 2、The encoder joint has poor contact. 3、Motor encoder is abnormal.

APPENDIX 1 Servo Parameter List

Code	Name	Parameter description	Set range	Unit	Original
00	Software version		0～65535		1000
01	Driver model	2:100～200W; 3:400W; 4:750W; 5:850～1300W 6:1800W	2～6		4
02	Motor code		1000～1600		1400
03	Parameters management	Send 256to reset	0x00～ 0x1111		0x0000
04	Forced motor code	1：Forced			
05	Max rotate speed threshold	0～6000	0～6000	rpm	4500
06	Max positive torque limit	0～300	0～300	%	300
07	Max negative torque limit	0～300	0～300	%	300
08	Motor direction logic	0：Positive CCW 1：Negative CCW	0～1		0
11	Band brake ON delay time	Delay time from when servo receives Servo On to band brake ON.	100～500	ms	100
12	Delay time from brake OFF to servo OFF at static state	Delay time from when servo receives Servo OFF to the motor is power off.	1～1000	ms	100
13	Encoder battery failure clearing	When driver sends alert of encoder battery failure, set it as 0 to clear.			
15	Motor overload protection coefficient	10～100	10～100	%	50
17	Enable		0～1		0
18	Eternal emergency stop shield		0～1		0
21	Velocity loop gain	Larger value means faster respond, it may shake if the gain is too large. Position mode corresponds with position loop gain.	0～500	Hz	90

22	Integration time constant of velocity loop	Smaller value means better integral action and speed track. It needs to correspond with velocity loop gain and position loop gain.	0～300	ms	25
23	Position loop gain	Larger value means faster respond, it may shake if the gain is too large. Position mode corresponds with velocity loop gain.	0～20	1/s	4
28	Velocity feed-forward gain	Increase the value to decrease the position deviation. It may cause overshoot if value is too large.	0～100	%	0
30	Damping coefficient	Position loop damping coefficient	100～500		100
31	Velocity feedback low-pass filter coefficient *		100～20000		20000
32	Current feedback low-pass filter coefficient *	Detect real current direction	100～20000		20000
33	Torque feed-forward coefficient *		0～100		0
34	Velocity loop differential gain (low frequency) *		0～1000		0
39	Curve S smoothness level	Level 1～7, higher level means lower smoothness	1～7		3
41	Moving average filter constant	0～200.0	0～200.0	ms	0
42	First-order low-pass filter constant	0～6000.0	0～6000.0	ms	0
49	Position deviation limit	0.1～50.0 r	0.1～50.0		5.0
69	Torque order low-pass filter coefficient		100～20000		20000
72	Notch filter frequency		0～10000		0
73	Notch filter bandwidth		0～1000		0
99	Software version	Software version	0x000～0xFFFF		0x0000

* Note: Values with * are defaults set by the manufacturer.

HUACHENG

Core supplier in the field of industrial control

Shenzhen Huacheng Industrial Control Co.,LTD

0755-26417678/27470348

Fax：（86）075526417678

Official Website：www.hc-system.com

Address：8/F,Zhengqilong Building No.108,Gushu 1st Road,Baoan.Shenzhen