

# **ST1**

## **Single Axis Servo Driven Robot**

### **User Manual**

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Version: V1.4 (English)





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# 1. Safety



Before starting up the robot for the first time, please review this manual thoroughly and familiarize yourself with the operation of the robot. Improper use may injure personnel and/or damage the robot, mold or molding machine.

## 1.1 Safety Regulations

- Please review this manual thoroughly and familiarize yourself with the operation of the robot, before starting up the robot for the first time. Maintenance should be performed by qualified personnel only.
- The ST1 series robot is designed for injection molding machine (IMM) ONLY.
- Any modification or change to the original design of the robot is forbidden.
- Any improper installation and operation may result in injury to personnel and/or damage to equipments.
- Please contact the manufacturer or local vender immediately if there is any problem with robot when operate it.
- Please note that our robot must be cooperated with other safety device (i.e. safety door) in order to operate in normal condition.
- Ensure all installations are met with safety requirements before operating.
- Without the written consent of the manufacturer, any damage or lost caused by the modification or use beyond the user manual, the manufacturer will not have any responsibility.

## 1.2 Safety Concerns

- The maintenance, repair, etc, must be executed by professionally trained personnel.
- Any unrelated personnel should keep away from robot working area while it is operating. All electrical wiring must be completed by professionals, and in accordance with design of specifications and wiring instructions.
- Use safety fence to indicate working area while installation.
- For the safety operation, the hand controller should be placed outside the robot working area.
- Ensure bolts and nuts are tightened with torque wrench while installation.
- Ensure there is no following matters in the compressive air such as phosphate-containing oil, organic solvents, sulfite gas, chlorine, acids and stale compressor oil.
- The air pressure should be kept at  $6\text{MPa} \pm 0.1\text{MPa}$  while operation.
- Remove anything from the top of the robot to prevent falling due to vibration.
- Press EMERGENCY STOP button immediately when accident occurs.
- Do not modify the robot body and control box. Please contact manufacturer or vendor if any change is required.
- Turn off power supply and compressed air before maintenance and adjustment. Also set up warning signs and safety fences.
- Please use parts of SHINI if there is any replacement is required.
- Our robots meet all corresponding safety standards.
- Please read the user manual carefully as a safety guideline.
- Unauthorized personnel must inform the relative supervisor, and understand all safety rules before entering robot working area.
- Please order a new user manual from the manufacturer or vendor if the user manual is damaged.



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



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



The safeguarding required for operation of the robot is not including in our standard scope of supply (except special equipment), since adaptation to specific site conditions is required. If such safeguarding is provided by you, please note that it must be installed prior to startup of the equipment in order to be included in the safety circuit of the system upon startup.

### The warning marks and its meanings

No.	Marks	Meaning
1		DO Not Touch
2		Caution , Danger
3		Caution! Electric shock
4		Caution! Mechanical injury
5		Caution! High temperature

6		No Flame
---	---	----------

### 1.3 Emergency Stop

The emergency stop button is located on the hand controller.

When the emergency stop button is pressed, the power is turned off. The gripper and vacuum valves and the vacuum generator are not disconnected, in order to avoid dropping parts from the gripper. In addition, the control system and the hand controller will remain under power to allow indication of error messages.

The emergency stop button can be released by turning it clockwise.

The emergency stop circuit of the robot and the injection molding machine are connected by the Euromap12 or Euromap67 interface. Therefore when the emergency stop button on the molding machine is pressed the robot will also stop and vice versa.

### 1.4 Transportation and Storage



During transporting the robot, working underneath the robot is forbidden.



If it is necessary to remove or reinstall the robot, please contact the agent or manufacturer for help. The manufacturer and agent do not have any responsibility for injuries or damage if the customers remove robots themselves.

### 1.4.1 Transportation

1. ST1-series robot is fix on a steel structure base and packaged with crate.
2. Before transporting, fasten the sliding base to prevent any collision.
3. The arms are free to slide when electric power and pneumatic supply are off. Push the arms upwards to lock them.
4. During the transporting, please keep the robot away from other objects, in order to avoid damages.
5. Should increase plastic bag out of the robot, and if necessary, pumping vacuum and put desiccant in the packing during the long-distance transportation,
6. The temperature between  $-25^{\circ}\text{C}$  to  $55^{\circ}\text{C}$  during the transportation, for short transportation (inner 24 hours), the temperature can not higher than  $70^{\circ}\text{C}$ .

The robot you order before sending out the factory, it is confirmed in good working condition, please check whether there is any damage during carrying or transporting. Please be carefully, when dismantling of components and packaging, if the robot has found the injury, you can use the package again.

If there is any damage caused by transport, please:

- 1) Feedback immediately to the transportation companies and our company.
- 2) Claim damages to the shipping company; fill in the file requests for compensation.
- 3) Retain the damaged items wait for testing. Until the testing is completed, do not return the damaged items.

### 1.4.2 Transportation after Unpacking

1. After taking apart the package, first removed the supporting plate, so that the arm rotated 90 degrees, and the vertical with beams (see the picture).  
To do as the following:
  - 1) Release 6 fixed screws on the supporting board, remove the packing support plate.
  - 2) Rotating beams and arm slowly, so that the arm and the beam was

vertical.

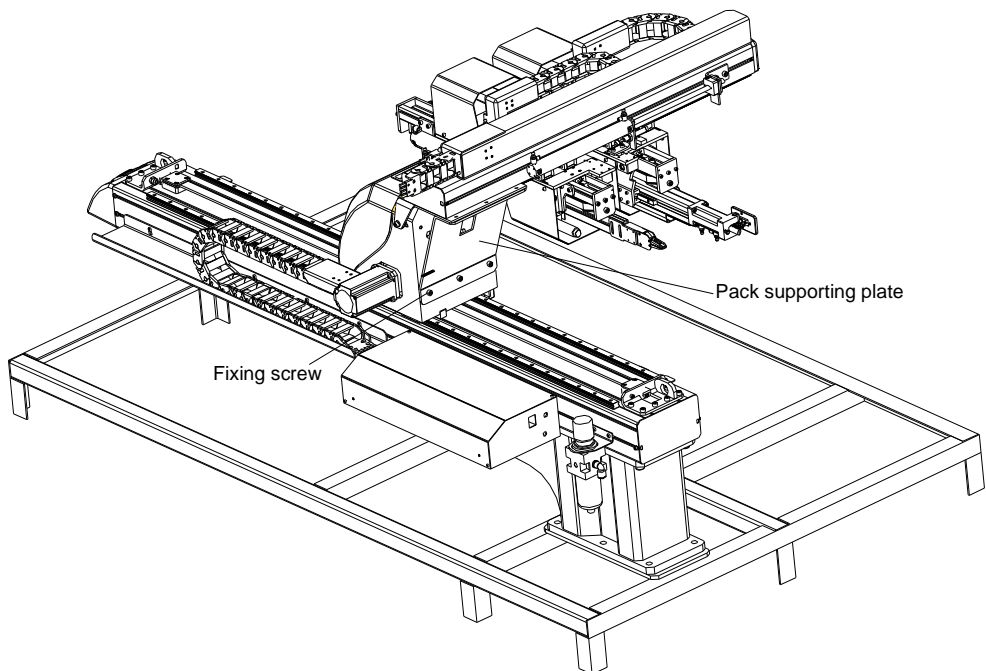
- 3) Lock the arm connecting plate and the sliding seat by the 6 screws on the supporting plate.

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

- 2) Lock the arm connecting plate and the sliding seat, ensure that the arm in vertical state.

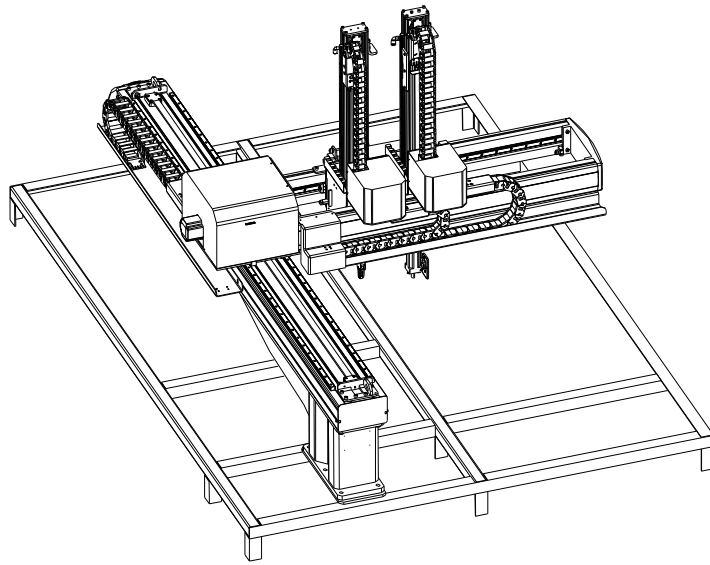
2. There is a ring in the parts box when the robot sent, after taking apart the package, the ring is installed on the "T"-type block of the vertical beam, using with the two ends of beam. (See the picture)

Note: After hoisting, please keep rings of the vertical beam, and use again next time.



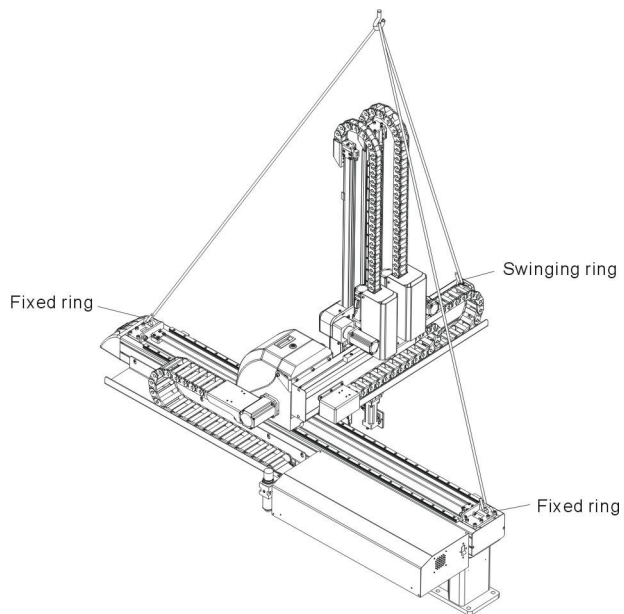
**Picture 1-1**

**Packing of ST1 and ST1-T**



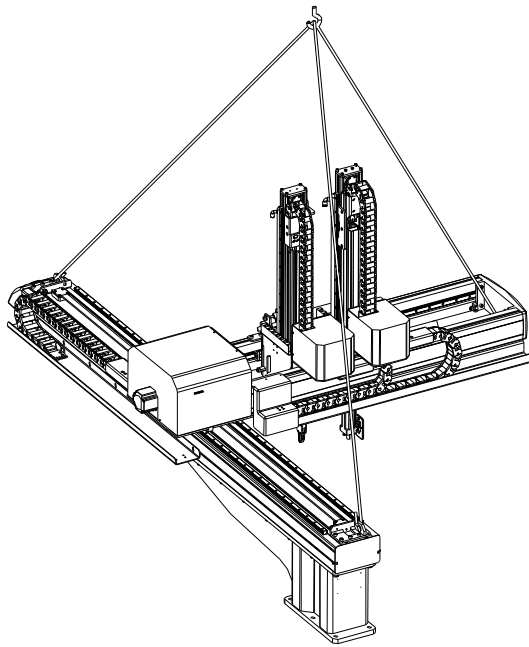
**Picture 1-2**

**Packing of ST1-T(medium telescopic arm)**



**Picture 1-3**

**Hanging transportation of ST1 and ST1-T**



Picture 1-4

#### Hanging transportation of ST1-T (medium telescopic arm)

### 1.4.3 Storage

1. Switch off the main air source and power, if robot is not in use for a long time.
2. Robots should be stored in ventilated, dry room to prevent rust and damping.
3. If not use for a long time, please anti-rust, and if necessary place film to prevent dust and erosion.

### 1.4.4 Operation Environment

1. Temperature: between +5°C to +40°C
2. Humidity: Temperature +40°C, relative humidity 50%
3. Elevation: Under 1000 meters above sea level
4. Stop using the product immediately when the following occurs:
  - I. Power cable is damaged
  - II. Air tube is damaged



- III. Machine breaks down or disassembled by unauthorized personnel.
- IV. There are organic solvent, acidic phospholipids, sulfurous acid, and chlorine, flammable and explosive dangerous matter in compressed air
- V. Air pressure is not enough or too high.

### 1.4.5 Retirement

When the robot goes to its end of service life, it should be demolished according to different material (metal, oil, lubricants, plastics, rubber, etc.) to split in different ways. Deal with the machine according to local requirements; ensure the commission company as the best.

Any problem during using the SHINI ST1 Series Robot, please contact the company or the local vendor.

## 1.5 Exemption Clause

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

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

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

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Dongguan Factory:	TEL: (0769)83313588
Ningbo factory:	TEL: (0574)86719088

## 2. Installation

### 2.1 Instruction

#### 2.1.1 Safety Issue

1. Before installation, please read this chapter carefully.
2. Fix robot on the base before operating.
3. After installing robot, indicate the working area with safety fence.
4. The hand controller should be placed outside of the safety fence.
5. Keep the air pipe in good way during installation.
6. The power connection should be performed only by authorized electrician.
7. Connecting cable and the grounded should obey the local rules and regulations.
8. The grounded wire can not attach to the water pipes, gas pipes, telephone lines or television cables.
9. Use the independent cable and power switch, the diameter of main power wire can not be less than the wire of control box.
10. The end of the power wire must be safety and immobility.

#### 2.1.2 Compressed Air Connection

1. According to the filter specifications to choose a suitable hose connected between the air source and the filter.

Note: Before connecting hoses, clean the hoses by compressed air. To ensure that there is no cuttings, sealing tapes in it.

2. Check the air connection of control box in good conditions, without bending conditions.

#### 2.1.3 Electric Power Connection

1. The electrical connection should be performed only by authorized electrician.
2. Shut off the power supply before connecting.
3. Set up the safety electrical outside of the control system to keep the control

system works in normally.

4. Before installation, wiring, operation, and maintenance must be familiar with instructions guide as well as machinery, electronics and security attentions.
5. Ground the wire before robot operating.
6. Wire grounding should connect to metal and keep away from inflammable matter.

The power requirements are given on the type plate of the robot, the power connection is provided through a normal power cord and a CEE plug.

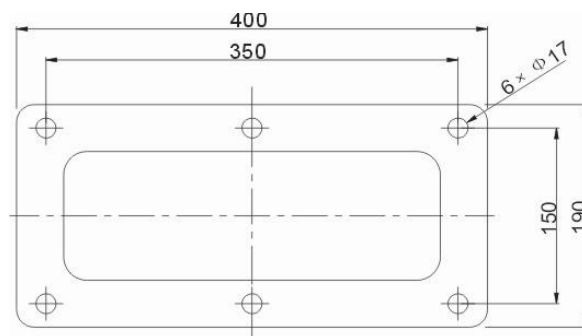


The power connection should be performed only by authorized electrician and should be in accordance with any applicable regulations.

#### 2.1.4 Safety Fence

1. After installing the robot, indicate the safety fence outside the scope of the robot working area.
2. The hand controller should be fixed outside of the safety fence.
3. Stick the warning signals on outstanding place of the fence.

#### 2.1.5 Mounting Preparation



1. Before drilling, switch off the injection molding machine and then turn off the power, avoid the scrap-iron into the mold.
2. Stick the drilling picture on the installing surface of IMM.
3. Use the center punch to assist drilling.
4. Place the magnetic drill on the fixing plate, use drill bits ( $\Phi 14$ ) to drill 6

holes about 30mm depth.

5. Tapping. Use M16 tap to produce internal 6 screws threads about 25mm depth.

### 2.1.6 Mounting Instruction

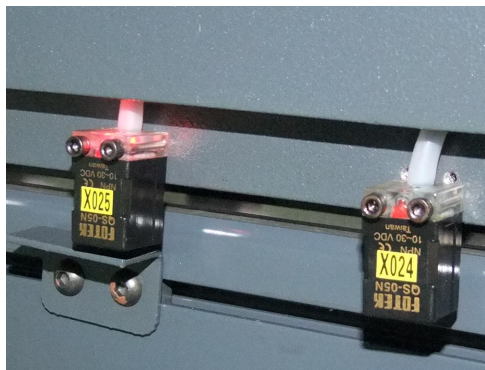
1. Should avoid vibration, collision and falling, when transfer the top of IMM.
2. Alignment holes, using the 8mm torque wrench turn to 77Nm tightens the M16 × 30 hex socket screws.

Note: if with the connection base, fix it on the injection molding machine, then fix robot on connection base.

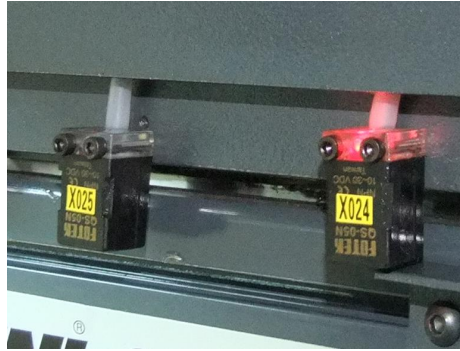
### 2.1.7 Robot Reversing

The following paragraph is the instruction for changing robot dropping side. (Operation side / non-operation side) For safety purpose, please turn off the electrical power and pneumatic supply before carry on the instruction.

1. Unscrew the proximity sensor X024 and move it up to the same level as X025, then screw X024. Unscrew the proximity sensor X025 and move it down to the same level as where X024 was, and then screw X025. See picture 2-1-1, picture 2-1-2.

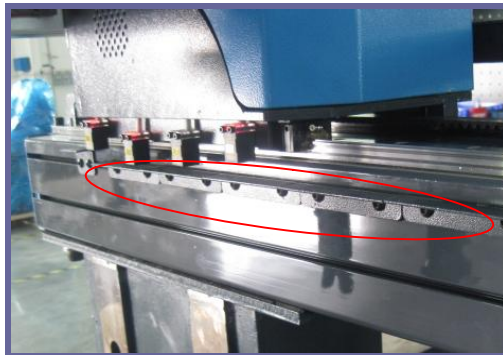


Picture 2-1-1: Before modified



**Picture 2-1-2: Modified**

2. Move all “Outside IMM safety zone blocks” from the right end of the beam to the left end of the beam. See picture 2-1-3 .Move the origin block from the left end of the beam to the right end of beam, 100mm away from the limit block. See picture 2-1-4.

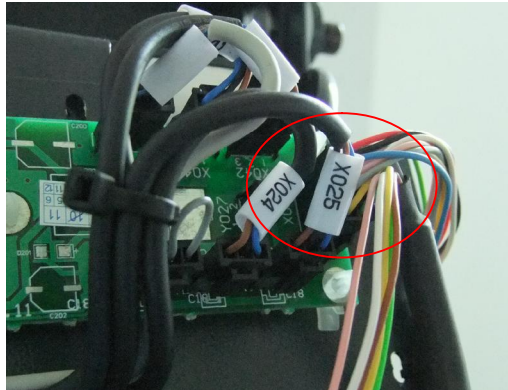


**Picture 2-1-3**

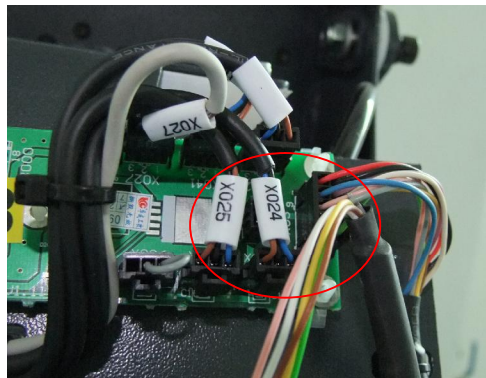


**Picture 2-1-4**

3. Open the sliding seat on the Z-axis, and then exchange the socket position of X024 and X025 on the circuit board U3. See picture 2-1-5, picture 2-1-6.



Picture 2-1-5: Before modified



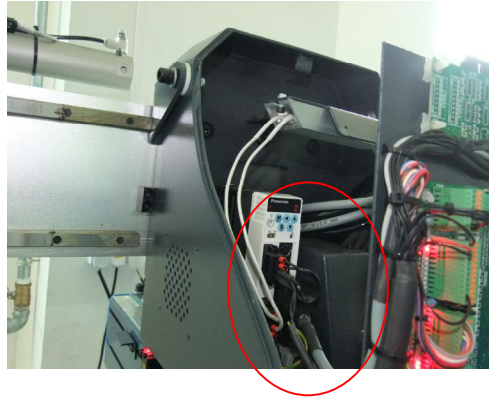
Picture 2-1-6: Modified

4. Adjust the parameter of transverse servo drive Pr41 from 0 to 1, and Pr46 from 1 to 0.

1. Press “S” key toggle the display to “dp\_5pd”, the press “M” key to “PR\_00”. Use “△”“▽” to selected number, use “◀” to move cursor. Press “S” again to set the parameter. Use “△”“▽” to adjust parameter, “◀” to move cursor, “S” to confirm the setting. Do this for Pr41 and Pr46.

2. Save setting: Press “M” and follow by “S”, toggle the display to “EE\_SEE”, press and hold “△” key until “----” show on the display

(Mode→EE\_SEE→Set→Up→----), then switch off the power for at least 3 seconds (if less than 3 seconds cannot save the setting), then switch on the power.



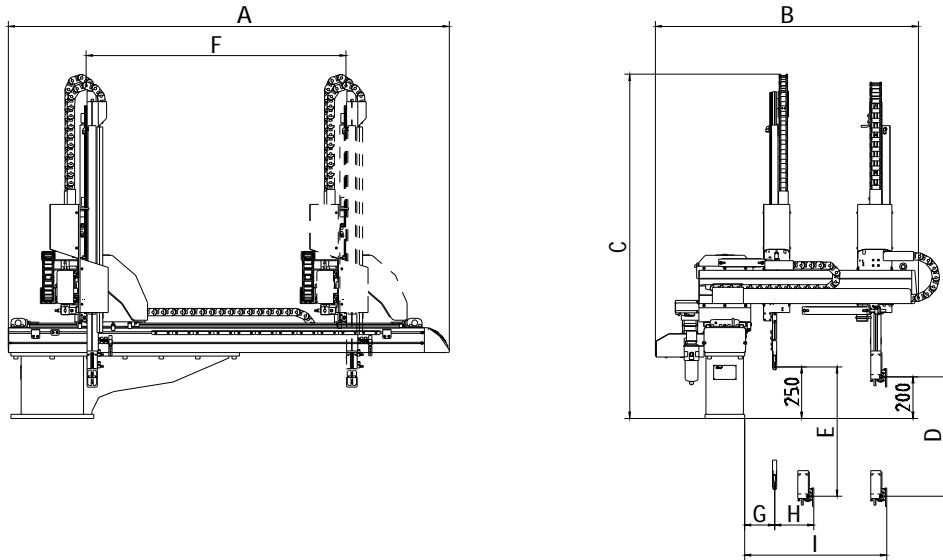
**picture 2-1-7: Servo motor traverse position**

#### 5. Check the result of reversing.

1. When press “HP” back to origin, the traverse direction of robot will opposite with reversing.
- 2 .When press “HP” back to origin, the proximity sensor X024 should light up.
- 3 .The end limit sensors (X041 and X042) should light up if robot operates.

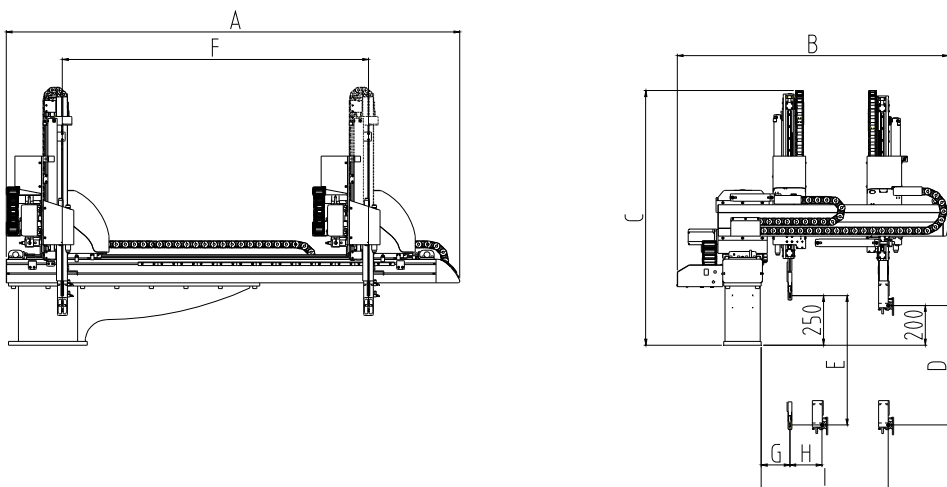
## 2.2 Equipment Specification

### 2.2.1 Dimensions (unit: mm)



Picture 2-1

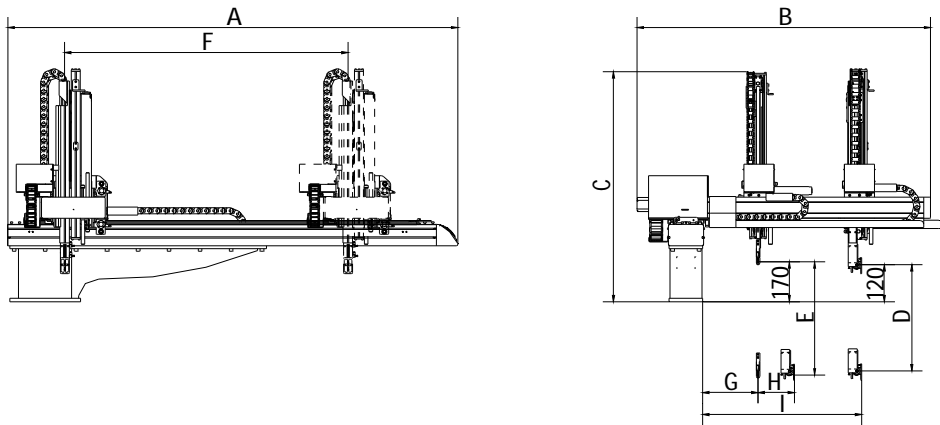
ST1



Picture 2-2

ST1-T





Picture 2-3

STI-T ( medium telescopic arm )

## 2.2.2 Model Specification

Chart 2-1: Specification List (ST1)

Model		ST1-700-1300	ST1-700-1300D
Application IMM(ton)		100-200	100-200
Traverse Stroke(mm)		1300	1300
Crosswise Stroke(mm)	Main Arm	250	250
	Sub-arm		150
Vertical Stroke(mm)	Main Arm	700	700
	Sub-arm		750
Max Load(kg)		3	3
Min Pick-out Time(sec)		2.7	2.7
Min Cycle Time(sec)		8	8
Air Pressure Range(bar)		4-6	4-6
Max Air Consumption(NL/cycle)		11	17
Net Weight(kg)		240	260
Dimensions (mm)	A	2020	2020
	B	1220	1220
	C	1600	1600
	D(max)	700	700
	E(max)		750
	F(max)	1300	1300
	G(max)		170
	H(max)		150
I(max)		660	660

Model		ST1-900-1500	ST1-900-1500D	ST1-1100-1800	ST1-1100-1800D
Application IMM(ton)		200-300	200-300	300-450	300-450
Traverse Stroke(mm)		1500	1500	1800	1800
Crosswise Stroke (mm)	Main Arm	250	250	400	400
	Sub-arm		150		200
Vertical Stroke(mm)	Main Arm	900	900	1100	1100
	Sub-arm		950		1150
Max Load(kg)		5	5	5	5
Min Pick-out Time(sec)		3	3	3.3	3.3
Min Cycle Time(sec)		9	9	10	10
Air Pressure Range(bar)		4-6	4-6	4-6	4-6
Max Air Consumption (N/cycle)		15	22	17	26
Net Weight(kg)		250	270	280	290
Dimensions (mm)	A	2180	2180	2480	2480
	B	1400	1400	1620	1620
	C	1780	1780	1980	1980
	D(max)	900	900	1100	1100
	E(max)		950		1150
	F(max)	1500	1500	1850	1850
	G(max)		170		165
	H(max)		150		165
	I(max)	780	780	1030	1030

- Note: 1. "M" stands for middle mold detector, suit for 3-plate mold.  
 "EM12" stands for EUROMAP12 communication interface.  
 "EM67" stands for EUROMAP 67 communication interface.  
 "N" stands for non-operation side, operation side without "N"
2. Power supply: 1Φ, 200~240V, 50/60Hz.
3. "\*"max air consumption for suction device 60NI/min.

Chart 2-2: Specification List (ST1-T)

Model		ST1-700-1300T	ST1-700-1300DT	ST1-900-1500T	ST1-900-1500DT
Application IMM(ton)		100-200	100-200	200-300	200-300
Traverse Stroke (mm)		1300	1300	1500	1500
Crosswise Stroke(mm)	Main Arm	150	150	250	250
	Sub-arm		100		150
Vertical Stroke(mm)	Main Arm	700	700	900	900
	Sub-arm		750		950
Max Load(kg)		3	3	3	3
Min Pick-out Time(sec)		2.0	2.3	2.0	2.3
Min Cycle Time(sec)		6.8	6.8	7.2	7.2
Air Pressure Range(bar)		4-6	4-6	4-6	4-6
Max Air Consumption(N/cycle)		10	16	12	19
Net weight(kg)		290	310	300	320
Dimensions	A	2100	2100	2300	2300

(mm)	B	1240	1240	1380	1380
	C	1260	1260	1390	1390
	D(max)	700	700	900	900
	E(max)		750		950
	F(max)	1300	1300	1500	1500
	G(max)		200		200
	H(max)		150		150
	I(max)	690	695	815	815

- Note: 1. "M" stands for middle mold detector, suit for 3-plate mold.  
 "EM12" stands for EUROMAP12 communication interface.  
 "EM67" stands for EUROMAP 67 communication interface.  
 "N" stands for non-operation side, operation side without "N"
2. Power supply: 1Φ, 200~240V, 50/60Hz.
3. "\*"max air consumption for suction device 60NI/min.

Chart 2-3: Specification List (ST1-T: middle telescopic arm)

Model		ST1-1100-1800T	ST1-1100-1800DT	ST1-1300-2000T	ST1-1300-2000DT
Application IMM(ton)		300-450	300-450	450-650	450-650
Traverse Stroke(mm)		1800	1800	2000	2000
Crosswise Stroke(mm)	Main Arm	400	400	400	400
	Sub-arm		200		200
Vertical Stroke(mm)	Main Arm	1100	1100	1300	1300
	Sub-arm		1150		1350
Max Load(kg)		5	5	5	5
Min Pick-out Time(sec)		2.5	2.5	2.8	2.8
Min Cycle Time(sec)		7.6	7.6	8	8
Air Pressure Range(bar)		4-6	4-6	4-6	4-6
Max Air Consumption(N/cycle)		24	37	26	41
Net Weight(kg)		420	450	440	470
Dimension (mm)	A	2570	2570	2770	2770
	B	1750	1750	1750	1750
	C	1390	1390	1490	1490
	D(max)	1100	1100	1300	1300
	E(max)		1150		1350
	F(max)	1800	1800	2000	2000
	G(max)		120		120
	H(max)		180		180
I(max)		1150	1150	1150	1150

Model		ST1-1500-2200T	ST1-1500-2200DT
Application IMM(ton)		650-850	650-850
Traverse Stroke(mm)		2200	2200
Crosswise	Main Arm	400	400

Stroke(mm)	Sub-arm		200
Vertical Stroke(mm)	Main Arm	1500	1500
	Sub-arm		1550
Max Load(kg)		6	6
Min Pick-out Time(sec)		3	3
Min Cycle Time(sec)		8.5	8.5
Air Pressure Range(bar)		4-6	4-6
Max Air Consumption(N/cycle)		29	45
Net Weight(kg)		460	490
Dimensions (mm)	A	2970	2970
	B	1750	1750
	C	1590	1590
	D(max)	1500	1500
	E(max)		1550
	F(max)	2200	2200
	G(max)		120
	H(max)		180
	I(max)	1150	1150

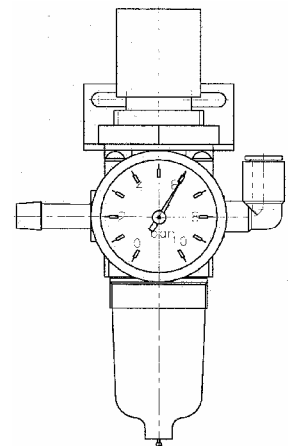
- Note: 1. "M" stands for middle mold detector, suit for 3-plate mold.  
 "EM12" stands for EUROMAP12 communication interface.  
 "EM67" stands for EUROMAP 67 communication interface.  
 "N" stands for non-operation side, operation side without "N"
2. Power supply: 1Φ, 200~240V, 50/60Hz.
  3. "\*"max air consumption for suction device 60NI/min.

### 2.2.3 Pneumatic Source Requirement

Compressed air is connected by 3/8-Φ12 trachea.  
 Filter pressure valve with a clear scale line, convenient adjustment. Bring adjustment knob upward and with a clockwise rotation, pressure increases; counterclockwise rotation, air pressure decreases, the pressure range between 0 to 10bar. After adjustment, Please press the adjustment knob to lock pressure.

Required supply pressure: 4bar-6bar

When the pressure is equal or drop below than 4 bar, the robot will stop working and alarm. When the pressure up to 6bar, It will affect the service life of pneumatic components.  
 Compressed air consumption depends on the robot accessories.



## 2.3 Electrical Connection

### 2.3.1 Main Power Supply

The power requirements are given on the serial plate of the robot, the power connection is provided through cable conductor and CEE plug.



The power connection should be performed only by an authorized electrician and according to applicable electric utility regulations.

### 2.3.2 Interface with the Injection Molding Machine

The robot is equipped with standard electrical interfaces according to Euromap12 and Euromap67.



Connection of the interface plug to the machine and testing of all signals must be done by a specialist in injection molding machines and robots. Preferably, this should be done by one of our service engineers together with a qualified service engineer for the injection molding machine.



The interface signal functions must be carefully tested, as improper operation may cause malfunction or damage to the robot and molding machine.



In particular, the functions of the safety circuits must be thoroughly checked.

- Testing the emergency stop signals to and from the IMM.  
When press the emergency stop switch on hand controller, the error message emergency stop must also be indicated at the IMM. And when press the emergency stop on IMM, the emergency stop signal must also be indicated at the robot.

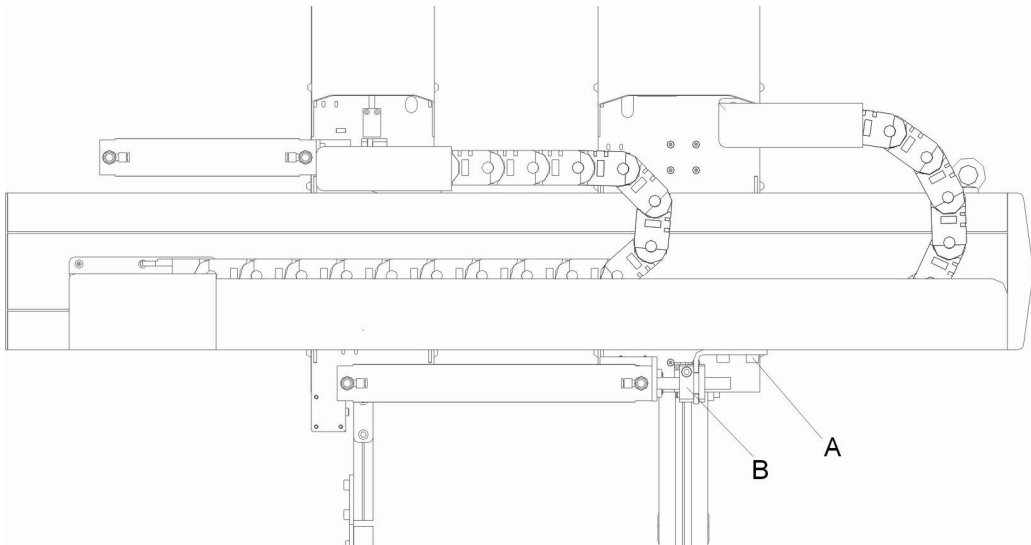
## 2.4 Adjusting the Axis Positions



While adjusting the position, make sure that robot can not be run and the compressed air supply is shut off.

### 2.4.1 Adjusting the X-Position

The X-positions are determined by the stops A, B.



Bracket “A” on X1 axes (main arm) is for adjusting the end-position, and stop package “B” is for adjusting the stroke length and the 0-position.

Bracket “A” on axes X2 (sub-arm) is for adjusting the 0-position, and stop package “B” is for adjusting the stroke length and the end-position.

Before running in to the mold range with the Y-axis for the first time, you must check whether the X-positions can be reached without damaging the mold and the Y-axis. First, the end position of the X-axis must be adjusted.

Adjusting the End –Position of X1 Axis:

- 1) Run the X1-axis to its end position
- 2) Release bracket “A”
- 3) Push bracket “A” to shock absorber, in the compression state
- 4) Fix the stop package “A”

Adjusting the 0-Position of X1-Axis ( the length of stroke ):

- 1) Release stop package “B”
- 2) Run the X1-axis to the 0-position
- 3) Manually push cylinder piston rod to the fully extended state
- 4) Fix the stop package “B”

Adjusting the 0-Position of X2-axis:

- 1) Run the X2 -axis to its 0-position
- 2) Release bracket “A”
- 3) Manually push bracket “A” to ole-strut, in the compression state
- 4) Fix the stop package “A”

Adjusting the End-Position of X2-Axis ( the length of stroke ):

- 1) Release stop package “B”
- 2) Run the X2-axis to its end- position
- 3) Manually push cylinder piston rod to the fully extended state
- 4) Fix the stop package “B”

## 2.4.2 Adjusting the Y- Position

Set the end-position of Y-axis by adjusting up-going shock absorber.

Adjusting the End-Position of Y-axis:

- 1) Loosen shock absorber on the end position
- 2) Push the cylinder on Y-axis to its end position
- 3) Rotate the up-going shock absorber to the in the fully compression state
- 4) Fix the shock absorber

The withdrawal position can be set using the stop package

Adjusting the Withdrawal Position

- 1) Run the Y-axis to its end position
- 2) Seal off the compressed air
- 3) Loosen the Y-axis stop package
- 4) Manually push Y-axis to the desired position
- 5) Push stop package to ole-strut, in the compression state
- 6) Fix the Y-stop-package

Note: The down shock absorber completely compressed, the top position of shock absorber shall not be lower than the origin of position sensor switch,

if not, when arm down, the down-block will damage the origin sensor switch.

### 2.4.3 Adjusting the Z- Position

The Z-axis position can be set using servo control system.

## 2.5 Gripper and Suction Monitoring

### 2.5.1 Gripper Setting

If the gripper didn't clamp parts in opened state or in the closed state, the light of the magnetic switch is off. If the gripper clamped parts, the magnetic switch is on.

Adjusting the Magnetic Switch:

1. Loosen the screw which is fixed on the magnetic switch.
2. Make the light on when gripper clamp the parts, if not make the light off.
3. Tighten the fixing screw after finishing adjustment.

During the robot working, if the grippers not clamp the part, the robot will stop operating and alarm.

### 2.5.2 Suction Setting

1. The default mode of vacuum switch of is testing mode.
2. In testing mode, press the SET key, toggle the display into pressure setting mode, the step as flowing:
  - a. In pressure setting mode, P-1 and the current setting value alternately flashing, press SET key will display settings value, at this time, enter into value setting mode by pressing UP and DOWN key.
  - b. In the value setting mode, the first value in a flashing state, press UP or DOWN key can change values. After setting the first one, press the SET key to set the second value, at this time the second value flashing.
  - c. After the value setting, press the SET key 1 second or stay in 10 seconds without pressing any key, it will return to testing mode.
3. In testing mode, press SET key at least 2 seconds, enter into initial set mode, the initial setting including output patterns, response time, display color and so on, the step as flowing:



- a. In testing mode, press SET key at least 2 seconds into the display color settings, press UP or DOWN key to change display color, press SET key again will toggle to action mode settings.
- b. In testing the mode, press SET key twice, or in the display color setting mode, press SET key once to enter into action mode setting, at this time press UP or DOWN key can select action mode, then press SET key again, the output patterns can be set up, press UP or DOWN key to select the output form. NO meanings normally open, NC for normally closed.
- c. In the output mode, press SET to set, will enter the response time setting mode, press UP or DOWN key to set response time, presses SET to enter preset mode automatically.
- d. In response time setting mode, press SET key to enter into auto-preset mode, now press UP or DOWN key to select manual mode or automatic mode. After selecting, press SET key, it will return to the testing mode.

### 2.5.3 Digital Pressure Switch Setting

1. The default setting is 4bar, it can be adjusted according to the actual needs.
2. Digital pressure switch marked with scale, the internal of the digital pressure switch has a red ruler, which connected with the adjustment screw, when the rotation adjustments screw, the red ruler will move too.
3. Need to adjust the pressure, the user can rotate red ruler to set the value by the hex key, clockwise rotation, the value increased, counter-clockwise rotation, the value decrease.

## 2.6 Robot and IMM Interface

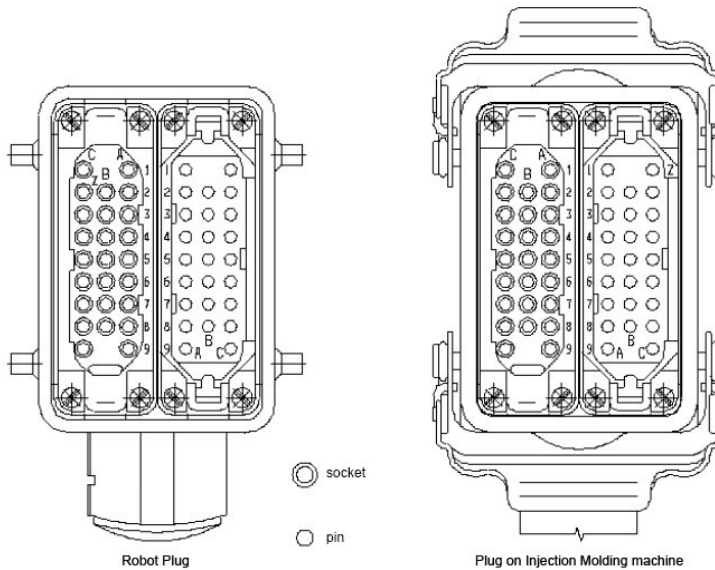
ST1 series robots are available with 2 different interface versions to communicate with the injection molding machine:

- Euromap67
- Euromap12

Both versions are described in the following chapters.

### 2.6.1 Euromap67 Interface

Euromap67 interface defines the connection plug between the injection molding machine and the robot:



The robot-injection molding machine interface is designed according to the directives of Euromap67, which states:

Unless otherwise noted, the signals, which are maintained during the described function.

### 2.6.1.1 The Injection Molding Machine Output Signals

Contact NO.	Function
ZA1 ZC1	<b>Emergency stop channel 1</b> The emergency stop switch of the injection molding machine is used to interrupt the emergency stop circuit of the robot.
ZA2 ZC2	<b>Emergency stop channel 2</b> The emergency stop switch of the injection molding machine is used to interrupt the emergency stop circuit of the robot.
ZA3 ZC3	<b>Safety system active channel 1</b> For protecting against hazardous motions of the robot. The switch is closed when the safety system of the injection molding machine is active.
ZA4 ZC4	<b>Safety system active channel 2</b> For protecting against hazardous motions of the robot. The switch is closed when the safety system of the injection molding machine is active.
ZA5 optional	<b>Reject</b> The signal is HIGH when the molded piece is a reject. The switch is closed when the tool is open and must remain HIGH at least until "close tool enabled" (see pin contact No.A6).
ZA6	<b>Mold closed</b> HIGH signal when tool closing has been completed, the signal "close tool enabled" is no longer necessary (see pin contact No.A6).
ZA7	<b>Mold open</b> HIGH signal if the mold opening position is equal or more than the required position. Inadvertent alteration to mold opening stroke smaller than that required

	for the robot to approach must be impossible.
ZA8 optional	<p><b>Mold at intermediate position</b> HIGH signal when the mold opening has reached the specified intermediate position and remains HIGH until the mold is completely open. the signal may be used in two ways:</p> <p>1 ) The mold stops in the intermediate position, whereupon a signal is sent to the robot. Complete opening of the IMM takes place through the signal “complete mold opening enabled” (see pin A7).</p> <p>2 ) The IMM transmits the signal, but does not remain in the intermediate position. Signal is LOW when the intermediate.</p>
ZA9	<b>Signal voltage robot 24V DC</b>
ZB2	<b>Fully automatic mode injection molding machine</b> HIGH signal, when operating the injection molding machine tighter with the robot is possible.
ZB3	<b>Ejector back position</b> HIGH signal when the ejector is back, regardless of the position of the movable tool plate. The signal acknowledges “ejector back enabled” (see pin contact No.B3).
ZB4	<b>Ejector forward position</b> HIGH signal when the ejector is forward. The signal acknowledges “ejector forward enabled “(see pin contact No.B4).
ZB5	<b>Core pullers 1 free for robot to approach</b> HIGH signal when the core pullers are in position for removal of the injection moiling. ( see pin contact No.B5 )
ZB6	<b>Core pullers 1 in position to remove molding</b> HIGH signal when the core pullers are in position for removal of the injection molding. ( see pin contact No.B6 )
ZB7 optional	<b>Core pullers 2 free for robot to approach</b> HIGH signal when the ejector is back ,regardless of the position of the movable tool plate, are in position for the robot to approach. ( see pin contact No.B7 )
ZB8 optional	<b>Core pullers 2 in position to remove molding</b> HIGH signal when the core pullers are in position for removal of the injection molding. ( see pin contact No.B8 )
ZC5/ZC6/ZC7	Reserved for future Euro map signal
ZC8	Free
ZC9	Signal ground robot 0V

### 2.6.1.2 Robot Output Signals

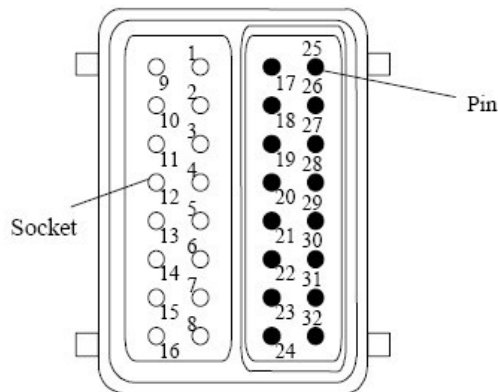
Pin contact No.	Function
A1 C1	<p><b>Emergency stop of robot channel 1</b> Opening of the switch contacts of the robot must shut off the control system of the molding machine.</p>
A2 C2	<p><b>Emergency stop of robot channel 2</b> Opening of the switch contacts of the robot must shut off the control system of the molding machine.</p>
A3 C3	<p><b>Mold Ares Free</b> Signaling is effected by the limit switch at the travel –in rail .the switch is opened when the travel –in rail, in the region of the injection molding machine, leaves its starting position before it is moved into the tool area. If the switch is</p>

	open, neither a closing nor opening motion of the tool may take place. Even when the control system of the robot is shut off, the switch must work as described.
A4 C4	Reserved for future Euromap signal.
A5	free
A6	<b>Complete mold opening enabled</b> HIGH signal when the robot is far enough out of the tool that it can be closed and when other robot control systems enable closing of the tool .the signal remains HIGH signal for the duration of the tool –closing operation, in the event of a LOW signal due to a disturbance, the tool-closing motion must be absorbed. Note: the signal “close tool enabled” may not be linked with other or signals in any operating mode.(see pin contact No.ZA47)
A7 optional	<b>Complete mold opening enabled</b> HIGH signal when the robot is far enough out of the tool that it can be closed and when other robot control systems enable closing of the tool .the signal remains HIGH signal for the duration of the tool –closing operation, in the event of a LOW signal due to a disturbance, the tool-closing motion must be aborted. Note: the signal “close tool enabled” may not be linked with other or signals in any operating mode.(see pin contact No.ZA47)
A8	Reserved for future Euromap signal
A9	Signal ground IMM 24V DC
B2	<b>Robot operation mode</b> LOW signal when the robot mode switch is “operation with injection molding machine”, HIGH signal when the robot mode switch is “no operation with injection molding machine” HIGH signal when the robot is switched off.
B3	<b>Ejector back enabled</b> HIGH signal when the removal operation has been performed far enough for the motion “ejector back “to be carried out. the signal is HIGH for the duration of the motion “ejector back “.the signal must be maintained at least until the signal “ejector back “from the molding machine(see pin contact No.ZB3).
B4	<b>Ejector forward enabled</b> HIGH signal when the removal operation has been performed far enough for the motion “ejector back” to be carried out. the signal is HIGH for the duration of the motion “ejector back “.the signal must be maintained at least until the signal “ejector back “from the molding machine(see pin contact No.ZB4).
B5 optional	<b>Enable movement of core pullers 1 to position for the robot to approach freely.</b> HIGH signal when the motion of the core pullers is to the position for the robot to approach freely is enabled. (see pin contact No.ZB5)
B6 optional	<b>Enable movement of core pullers 1 to position for removal of the molding.</b> When the motion of the core pullers is to the position for removal of the molding is enabled.
B7 optional	<b>Enable movement of core pullers 2 to position for the robot to approach freely.</b> HIGH signal when the motion of the core pullers is to the position for the robot to approach freely is enabled. (see pin contact No.ZB7)
B8 optional	<b>Enable movement of core pullers 2 to position for removal of the molding.</b> When the motion of the core pullers is to the position for removal of the molding is enabled. (see pin contact No.ZB8)
C5 C8	Free
C6	Reserved for future Euromap signal

C7	
C9	Reserved for future Euromap signal

## 2.6.2 Euromap12 Interface

The interface consists of the plug connection between the injection molding machine and the robot:



Picture 2-4

The robot-injection molding machine interface is designed according to Euromap12, which state:

Unless otherwise noted, the signals are maintained during the described function.

### 2.6.2.1 Injection Molding Machine Output Signals

Plug Contact NO.	Function
1, 9	<b>Emergency stop of machine</b> The emergency stop switch of the injection molding machine is used to interrupt the emergency stop circuit of the robot.
2	<b>Mold open</b> The switch contact (pin contact 16) is closed when mould opening position is equal or more than required position. Inadvertent alteration to mould opening stroke smaller than that required for the handing device to approach must be impossible.
3, 11	<b>Safety system active</b> The switch contact is closed when safety devices (e.g. safety guard, footboard safety, etc.) on the injection molding machine are operative so that dangerous movements of the handing device/robot are possible. The signal is active in any operation mode.
4	<b>Ejector back</b> The switch contact is closed when the ejector has been retracted regardless of the moving platen position. (See pin contact No.16) acknowledgement f or

	the “Enable ejector back” signal (see pin contact No 21), when the ejector sequence is selected. (see pin contact No.16)
5	<p><b>Ejector forward</b></p> <p>The switch contact (see pin contact No.16) is closed when the ejector has been advanced. The signal is the acknowledgement signal for the “enable ejector forward” (see pin contact No 22).</p> <p>It is recommended to close the switch contact when the ejector sequence not in use. (see pin contact No.16)</p>
6 optional	<p><b>Core pullers free for robot to travel in</b></p> <p>Switch (see pin contact No.16) is closed when the core pullers, regardless of the position of the movable tool plate, are in position for free travel –in of the robot.</p>
7 optional	<p><b>Core pullers in position for removal of injection moldings</b></p> <p>Switch (pin contact No.16) is closed when the core pullers are in position for removal of the injection molding.</p>
8 optional	<p><b>Reject</b></p> <p>Switch (see pin contact No.16) is closed when the molded piece is a reject. the switch must be closed when the tool is open and must remain closed at least until “enable mould close” (see pin contact No.17)</p>
10	<p><b>Fully automatic mode injection molding machine</b></p> <p>Switch (see pin contact No.16) is closed when the operating mode selector switch is on “semi-automatic” or “fully automatic mode”.</p>
12	<p><b>Mold closed</b></p> <p>Switch (see pin contact No.16) is closed when the mould closing has been completed, the signal “enable close” is no longer necessary. (see pin contact No.17)</p>
13 optional	Free
14 optional	<p><b>Mold at intermediate position</b></p> <p>Switch (see pin contact No.16) is closed when the IMM has reached the specified intermediate position and remains closed until the IMM is completely open .the signal may be used in two ways:</p> <p>1) Mould opening stops on intermediate position and gives start signal to handling device/robot. mould opening restarts with the signal ”Enable full mould opening”(see contact No.28)</p> <p>2) Mould opening doesn’t stop on intermediate position, however gives the signal to handling device/robot. (see pin contact No.16)</p> <p>The switch contact is open when intermediate mould opening position is not in use.</p>
15 optional	Free
16	Signal voltage of robot

### 2.6.2.2 Robot Output Signals

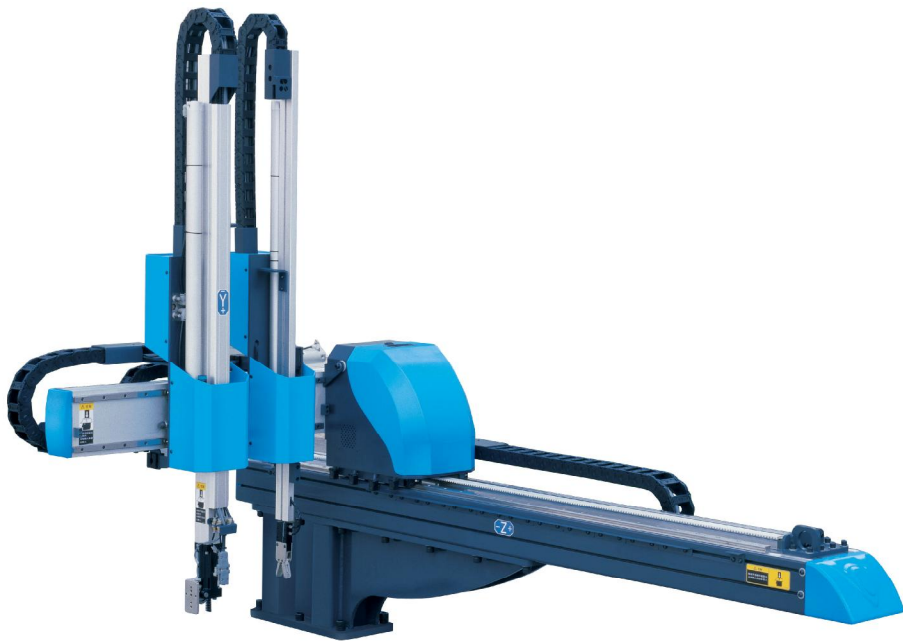
Plug Contact NO.	Function
17	<p><b>Enable mould close</b></p> <p>The switch contact (see pin contact No.32) is closed when the robot is retracted enough for start of mould closure. the switch contact must remain</p>

	closed at least until “mould closed” (see pin contact No.12)
18, 26	<p><b>Mould area free</b></p> <p>The switch contact is closed when the robot is retracted enough for start of mould closure. If the switch contact opens as a result of a fault, mould closing must be interrupted. The switch contact must be closed if the robot is switch off.</p> <p>It is recommended to close the switch contact when the robot is unselected.</p>
19, 27	<p><b>Emergency stop of robot</b></p> <p>Opening of the switch contacts of the robot must shut off the control system of the molding machine.</p>
20	<p><b>Operation with robot</b></p> <p>The switch contact (see pin contact No.32) is open when the robot mode switch is “Operation with injection molding machine”. The switch contact is closed when the handling device mode switch is: “No operation with injection molding machine” the switch contact (see pin contact No.32) is closed when the robot is switched off.</p>
21	<p><b>Enable ejector back</b></p> <p>The switch contact(see pin contact No.32) is closed when the handling device enables the movement for ejector back, the switch contact must remain closed at least until :“Ejector back” signal is given by injection molding machine(see contact No 4)</p>
22	<p><b>Enable ejector forward</b></p> <p>The switch contact (see pin contact No.32) is closed when the handing device enable the movement for ejector forward. the switch contact must remain closed at least until “ejector forward” signal is given by the injection molding machine(see contact No 5)</p>
23 optional	<p><b>Enable motion of core pullers for removal of injection moldings</b></p> <p>The switch contact (contact no. 32)is closed when the enable motion of core pullers for removal of injection moldings</p> <p>It is recommended that the switch contact remains closed at least until “the core back to end” signal is given by injection molding machine(see contact No 7)</p>
24 optional	<p><b>Enable motion of core pullers for removal of injection moldings</b></p> <p>The switch contact (contact no. 32)is closed when the enable motion of core pullers for removal of injection moldings</p> <p>It is recommended that the switch contact remains closed at least until “the core back to end” signal is given by injection molding machine(see contact No 7)</p>
25	Reserved for future use by EUROMAP
28 optional	<p><b>Enable full mould opening</b></p> <p>The switch contact (see pin contact No.32) is closed when the handling device has taken the part and allows to continue mould opening. The switch contact must remain closed until “mould open” signal is give by the injection molding machine (see contact No 2).</p> <p>If the switch contact is not used it must be open.</p>
29	Reserved for future Euomap signal
30	Free
31	Free
32	Voltage of IMM

### 3. General Description

#### 3.1 ST1-series Abstract

It can quickly and accurately carry out the parts from inside of mold and place at accurately position. It has a compact, attractive appearance, running smoothly and user-friendly features. In addition, the series can also increase the single arm and double arm, normal arm and telescopic arm according the customers' requirements. It is the best choice for the 2-plate, 3-plate mold users and hot runner mold plate users.



Model: ST1

#### 3.2 Application

1. ST1-550-1000(D) suitable for the use with plastics injection molding machine under 100T.
2. ST1-700-1400(D) suitable for the use with plastics injection molding machine 100T to 200T.
3. ST1-900-1600(D) suitable for the use with plastics injection molding machine 200T to 300T.
4. ST1-1100-1800(D) suitable for the use with plastics injection molding machine 300T to 450T.
5. ST1-700-1400T (DT) is suitable for the use with plastics injection molding machine 200T to 300T.



6. ST1-900-1600T (DT) is suitable for the use with plastics injection molding machine 300T to 450T.
7. ST1-1100-1800T (DT) is suitable for installed on the injection molding machine with mold clamping force within 300T~450T.
8. ST1-1300-2000T (DT) is suitable for installed on the injection molding machine with mold clamping force within 450T~600T.
9. ST1-1500-2200T (DT) is suitable for installed on the injection molding machine with mold clamping force within 650T~850T.

### 3.3 Features

1. Appearance: European-style streamline, with compact and attractive appearance.
2. Conveniences: I / O circuit connection using convenience plug-in design, easy to installation and maintain.
3. Security: With safety switches on each limited positions.
4. Function: With stack function.
5. Withdrawal: Pick out the spure quickly and accurately, place spure precision, ensure not to collision products.
6. Humanization: Use the humanization control system, easy to operate.
7. Package: Mainly used wrist packing designs, which can save room, avoid damage during transportation.

### 3.4 Functions

#### 3.4.1 Function Description

ST1 series robot is mainly used for injection molding product and the spure removed, all major parts of the robot are equipped with shock absorber devices and magnetic sensor switch, there is a die locking device with high security features on the arms. The main arm with quickly-pick, accurately-put function, it is not only guarantee the glove extract speed also ensure that the object is not damaged. For the convenience of users packaging, this series robot with stack function, users can achieve two-stack (the X-axis and Y-axis) and Z-axis direction of an arbitrary stack.

#### 3.4.2 Malfunction protection

Both the origin position and end position of the robot's stroke parts are with limited sensor switch. The devices of the limited position are on the two ends of the stroke axis (Z axis) and vertical axis (X axis), prevent robot anti-falling.

#### 3.4.3 Shock Absorber

There are shock absorbers on the main arm up/down position, sub-arm up/down position, and the position of main arm forward and sub-arm backward. The main arm backward position and the forward position of sub-arm with air-cushion devices, which can reduce the impact of the robot when it is operating.

#### 3.4.4 Function Detection

ST1 series robot with one magnetic reed switch and one proximity switch on vertical cylinder forward and backward, proximity switch on both up and down cylinders on arm.

One magnetic reed switch on gripper of sub-arm and two on rotation board on main arm, protect gripper clip parts and operate normally. If any parts of robot occur accidents, it will stop working and alarm.

#### 3.4.5 Pick and Place

The arm with quickly-pick and accurately-put function, you can adjust the flow regulating valve on the main arm to change the putting speed.

#### 3.4.6 Stacking Function

This series robot with the stack function, choose the stack function of X axis and Y axis in the control system. Stack on X axis can make two layer (start-point and end-point) stacked. The end-point and middle-point can be stacked through Y-axis stack, while the middle-point can be adjusted as your needed.

#### 3.4.7 Self-protection

There is a cylinder anti-falling cylinder at below of the arm, which can effectively prevent the personal injury or machine damage caused by arm down or lack of air pressure. If air pressure is insufficient, the pressure sensor output signal, the arm back to up-limited, the arm was locked by ejected

anti-falling cylinder piston rod. If the pressure is enough, anti-fall cylinder piston rod returns back.

When the robot's arm in locked state, if need manually push arm up and down, use flat tool to move anti-falling cylinder piston rod back, avoid damage to the arm or anti-falling cylinder.

### 3.4.8 Emergency Stop Function

The emergency stop button is located on the hand controller.

When an emergency stop button is pressed, the power is turned off. The gripper and vacuum valves and the vacuum pump are not disconnected, to avoid dropping parts from the gripper. In addition, the controllers will remain under power to allow indication of error messages.

If robot goes out of order or need emergency stop for examinations, press the emergency stop button to ensure safety operation.

## 3.5 Default Setting

1. Speed of transverse: the initial setting is 85%.
2. Pressure sensor: the initial setting is 4bar, if air pressure is less than 4bar, the robot will stop working and alarm.
3. Filter regulating valve: the factory setting is 6bar.
4. Vacuum pressure switch: the factory setting is -50.

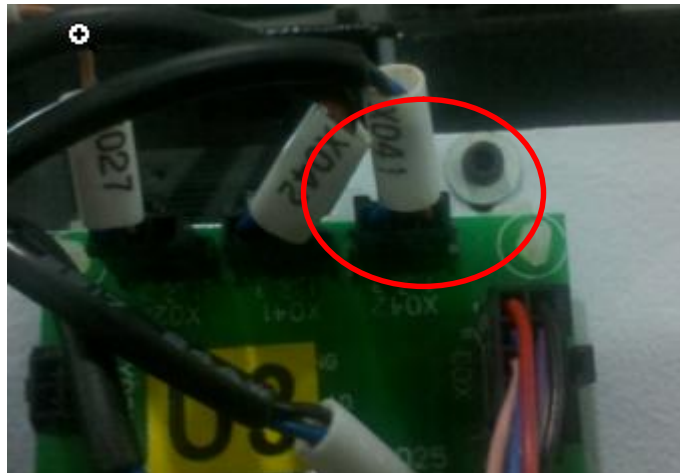
## 3.6 The Description of Single Axis Servo Robot ST1 Reversing

The following paragraph is the instruction for changing robot dropping side (operation side to non-operation side).

1. Exchange max and min limit position. Open sliding seat on Z axis, exchange X041 (min limit position) and X042 (max limit position) position on U3 board. X041 stands for max limit position, X042 stands for min limit position, see picture 1-1, 1-2.



Picture 1-1 before exchanged 换向前

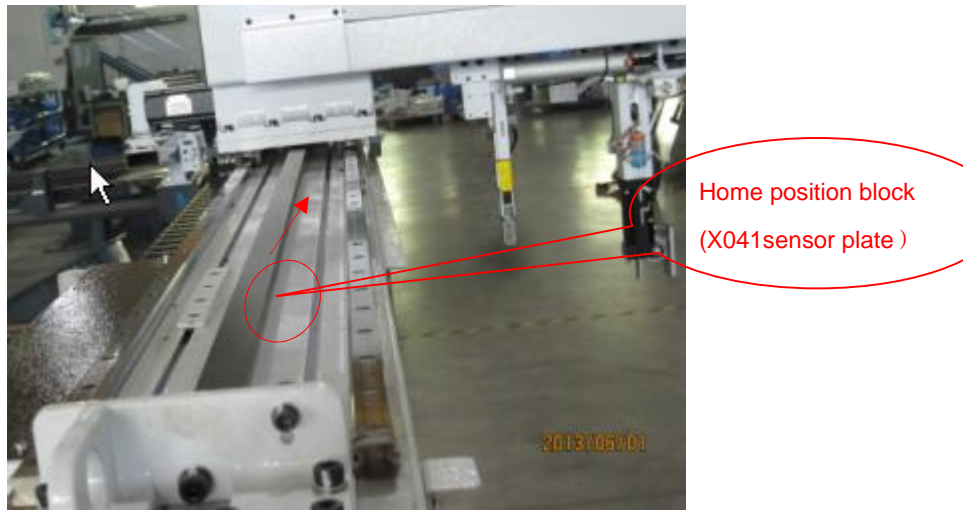


Picture 1-2 after exchanged

2. Adjust home position block. Move sliding seat to X042 sensor block, the distance between sliding and X042 sensor block is 15mm. Unscrew home position block and move it to X042 sensor block till X025 sensor light up. Then tighten home position block. See picture 2-1, 2-2, 2-3, 2-4, 2-5.



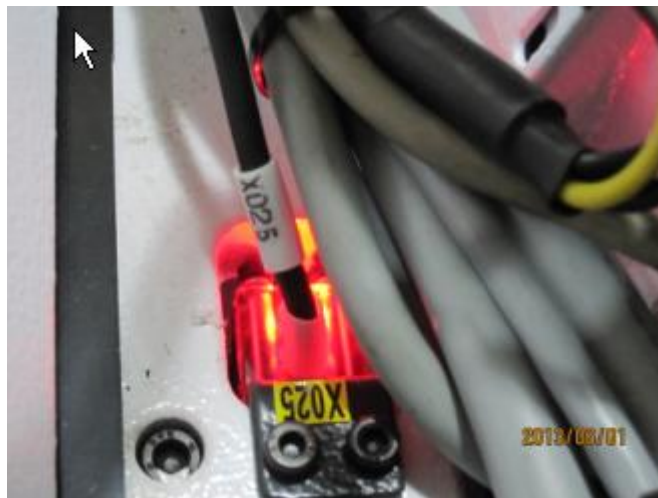
Picture 2-1 sliding and X042 sensor block



Picture 2-2 home position block



Picture 2-3 X025 sensor



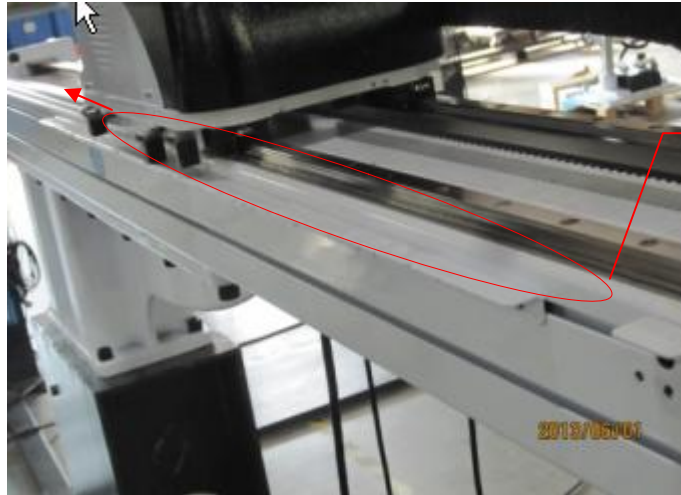
Picture 2-4 X 025 lights up



X042 sensor block

Picture 2-5 after adjusted

3. Adjust “outside IMM safety zone blocks”. Move sliding back to X041 sensor block till X041 sensor switches off. Unscrew all “outside IMM safety zone blocks” and move them to X041 sensor block till X024 sensor lights up. Tighten all “outside IMM safety zone blocks”. See picture 3-1, 3-2.



X024 sensor blocks (outside IMM safety zone blocks)

Picture 3-1 outside IMM safety zone blocks



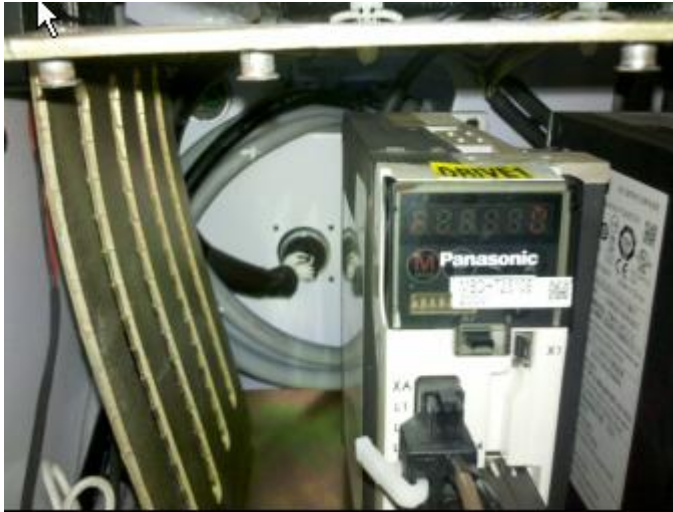
X041 sensor block

outside IMM safety zone blocks

Picture 3-2 after adjusted 换向后

4. Horizontal rotate robot base 180 degree, move it to the other end and tighten it.
5. Adjust parameters of servo drive. For Panasonic A5 servo drive, adjust the parameter of PR006 and PR012. For Panasonic A4 servo drive, adjust the parameter of PR41 and PR46. The following is the adjust steps:





Picture 5-1 Panasonic A5 servo drive

- 5.1 Press “S” into “do1.spd” page. Press “M” into “PR-00” page. Use “ $\Delta$ ” “ $\triangleleft$ ” to choose number, “ $\triangleleft$ ” to move cursor. Press “S” to confirm settings. Adjust PR006 parameter from 0 to 1, adjust PR012 parameter from 1 to 0 (if A4 servo drive: adjust PR41 parameter from 0 to 1, adjust PR46 parameter from 1 to 0).
- 5.2 Save settings. Press “M” once, then press “S” once into “EE-SET” page. Press  $\Delta$  till screen shows “RESET” (Mode  $\rightarrow$  EE-SET  $\rightarrow$  Set  $\rightarrow$  Up  $\rightarrow$  ...  $\rightarrow$  RESET). Turn off power at least 3 seconds (if less than 3 seconds cannot save the settings), then turn on power again.
6. Check reversing.
  - a. When robot traverse in crawl mode, robot running reverse.
  - b. Press “HP” on hand controller, after back to home position, X025 sensor lights up.
  - c. During robot running, limit sensors (X041 and X042) light up.

## 4. Operating Instruction

### 4.1 Hand Controller

#### 4.1.1 Operation Panel of Hand Controller



Picture 4-1

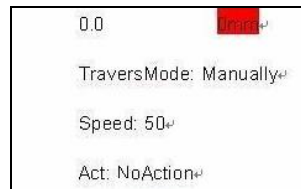
#### 4.1.2 Home Position Setting

After power on, press  key at state of rest to origin.

### 4.1.3 Manual Mode



Press key, show the display as picture 4-2, then can set and adjust robot function manually. ( Ensure “mold opened” signal is on. If at the manual mode, please forbidden touching the mold. )



Picture 4-2

1. Current Position: Meanings robots current position, unit: mm.

2. TraversMode (traverse mode): press to select the manual mode or adjusting micro inching mode.

Manual: Press or , after robot operate traverse in or traverse out, stop press the keys, the robot will stop in the start (origin) point.

Inching: Press or , robot traverse in or traverse out, if stop press keys, robot will stop this action.

3. Speed (manual speed): set the robot's speed of traverse.

4. Act (action): present act.



Main arm /Sub-arm /Double arm



Arm up /down



Arm forward/backward



Clip/put



Vacuum suck/put



Vertical /Horizontal moving



Traverse in



Traverse out



Home Position ( using it in stop state )



Spare for action






Spare action ON/OFF

In order to ensure the safety of robot and injection molding machine, please pay attention to the following:

1. After robot's arm going down, it can not go vertical or horizontal.
2. After robot's arm going down, it can not traverse (except the inside of IMM security zone).
3. No mold open signal, the robot can not go down inside of IMM.

#### 4.1.4 Automation Mode

Press  twice to enter into auto mode display. Press  or  to set the desired functions.

Posi:	1000.0 mm	Mold:	20
AutoT:	25.0s	ProSet:	5000
Time:	0.0 0.5s	ProRel:	10
Act:	OpenDly		





Picture 4-3

1. Posi(position): the position of the robot arm on the beam axis.
2. AutoT(automation time) : record current automatic cycle time use.
3. Time: The delay time of the current action
4. Act: Current act
5. Mold: Current mold
6. ProSet (production quantity setting): Anticipate the production quantity of the enactment. When the current yield arrives to the set the yield, it will alarm.
7. ProRel (realistic production): Take the quantity that the thing completes the production physically.

Note: Remove product without alert, please remove failures of IMM. Then allow robot to move again.

## 4.2 The Function Instructions


### 4.2.1 Basic Function Setting

In STOP display, press , toggle the display to set function, use cursor key press  or  to desires function. Press  to switch options.

Lang:	English	MNipCHK:	NOUSE	ProZero:	OFF
ProSet :	5000	SNipCHK:	POSI		
OpenT:	0.5	VacuCHK:	USE		
EieT:	0.5	HoldCHK:	NOUSE		

Picture 4-4








1. Lang(language): Press  to choice Chinese and English page.
2. ProSet(production setting): When reach the set production, then alarming
3. OpenT(mould open delay): Setting the time, which is from mold stop to cut off the signal of close mode, it will cut off the signal when the time ends.
4. Ejectenable(ejector delay): When it is the time of mold opened, set delay time, when time end the signal of ejector output. (Signals of ejector choose to use)
5. M.ClampCHK(main clamp check):
  - Positive: To clip an object successfully, the switch positive testing, and get a signal of gripper switch "On".
  - Reverse: To clip an object successfully, the switch reverse testing, and get a signal of gripper switch "OFF".
  - NOUSE: The switch of the gripper no testing, the gripper clip the object or not, it should not be recognized signal test.
6. S.ClampCHK(sub clamp heck): Same means as main clip the examination.
7. VacuCHK(vacuum check):
  - NOUSE: The signal of the vacuum switch no testing
  - USE: To suck an object successfully and get a limit signal ON.

8. HoldCHK (holder check): Same means as vacuum testing.

9. Prozero(the number of productions to zero) : Setting ON, the number of current production shows"0", usually set OFF

#### 4.2.2 Special Function 1

In WAITING display, press  key 4 times to enter the password page, input 5488, then press  to enter the special function page1, Press   to move the cursor to each item. Press  to change and confirm.

CyclT: 60.0	Eje: USE
AlamT: 20.0	Safe Door: USE
AccTime: 20.0	MidMold: USE
	Sound: USE
Waitpos: Vert	TransCnt: 1
Waitpos: In	Prep 1Cnt: 1
Downpos: Vert	Prep 2Cnt: 1
Stop safe: NOUSE	
PressCHK : USE	Dot: 1
BadPrdct : USE	Dist : 50.0
AutoChk : USE	X-axes: NOUSE
	Y-axes: NOUSE

Picture 4-5

1. CycleTime ( cycle time ) :

Time set for system check action. Means the maximum time from current cycle complete to the next Injection Machine mold opened limit. If waiting time exceed the set value, alarm raise.

2. AlarmTime(alarm time) : for the alert time period, while panel shows the alarm page unchanged.

3. AccTime(accelerated time): Set the time of servo motor speedup, slowdown.

Note: the unit of the time of the speedup and slowdown is 10ms.

4. Eje ( ejector ) :

NOUSE: Allow the ejector output.

USE: After mold open in place, the delay, allow the ejector output.

5. Safe door:

NOUSE: A signal does not be checked.

USE: Before machine descends to take out object, the signal is checked.

6. MidMold ( middle mold ) :

Use: after robot got “middle mold open” signal, robot arm will down to pick up products. This operation will detect “middle mold open” signal and protect middle mold.

Nouse: after robot got “mold open” signal, robot arm will down to pick up products. This operation no needs to detect “middle mold open” signal.

7. Sound:

Off: No sound while pressing.

On: Sound while pressing.

8. Waitpos(wait posture):

Vertical: Robot in standby modes, the gripper group in the vertical position.

Horizontal: Robot in standby modes, the gripper group in the horizontal position .If subject the mold, and can not in the vertical position ,then can choose vertical stand, when injection molding machine mold open completed, the robot to vertical down, pick things then doing horizontal actions.

9. Waitpos(wait position):

Waiting inside (Waiting inside injection moulding machine): The waiting



position is normal.

Waiting outside (Waiting outside injection moulding machine): If the subject can not stand inside, can choose stay outside. In Auto mode, the arm travel out to the outside waiting position.

10. Downpos(down posture):

Vertical: Robot fall down by a vertical pose, horizontal down will alarm.

Horizontal: Robot fall down by horizontal pose, vertical drop will alarm.

11. StopSafety (stop safety):

NOUSE: When stop, the safe signal of switch-mode still output

USE: When stop, in order to ensure machine safety, open mold to cut off the safe signal of switch-mode, after closing the safe door and then the safe signal of switch-mode output again.

12. Trans Cnt(Conveyer Interval): Conveyer output once every number of model time setting.

13. Prep 1 Cnt: Reservation 1 every number set output once.

14. Prep 2Cnt: Reservation 2 every number set output once.

15. PressCHK(pressure check):

NoUse: Air pressure signal not to check.

Usage: when the air pressure is not reach the setting, arm stop working.

The control box will show that the pressure is not enough.

16. Badprdct(Reject Parts):

NOUSE: Controller does not detect the signal of bad product.

USE: Controller defect the signal of bad product.

17. AutoCHK(auto check):

NOUSE: Robot in automatic state does not test the alarm signal.

USE: Robot in automatic state need test the alarm signal, or will alarming.

18. Dot (dots): When need to stack, it is for the Z-axis placing points, 99 points can be set most.

19. Dist (distance): When setting the stack, this for the distance between each points of Z-axis points.

20. X-axes:

NOUSE: X-axis does not use the stack.

Use: X-axis using the two points stacks.


21. Y-axes:

NOUSE: Y-axis does not use the stack.

Use: Y-axis using the two points stacks.

Note: When the waiting poses, waiting position, down pose changes, need to ensure that automatic procedures match the set function.

### 4.2.3 Mold Choice

In WAITING page, press  , enter the mold choice of action program page.


```
** CopyMode **  
Read: (0-99)? 00  
Writ: (20-99)?20
```

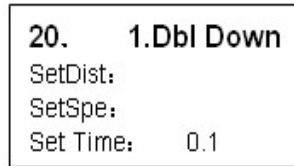
Picture 4-7

Choose one program from the 0-99 to read or then put it into 20-99 to memory as the code of the mold.

### 4.2.4 Teach

Read the standard action program (0-19 set) or user defined program (20-99

set), press  , enter the teach program page.



Picture 4-8

Move the cursor to teach movement to teach current action steps by steps,

and then press  key confirmation, the robot do the action.



Input one no action orders in the teach program



Delete current instruction.

20.: The current module, it is the currently selected of mode number.

1: Current sequence, it is the number of the current action.

Dbl Down (two arms down): Teach action, it is the current action

Set Dist (set the distance): Transverse movement to be taught, the arm will be moved to the position.

Set Spe (set the speed): Transverse movement to be taught, it is the speed of the arm moving to the sequence.

Set Time (set the time): The current action delay time, that is the action after the delay time.




#### 4.2.5 Parameters

In WAITING page, press  , enter the parameters page.

20.	1.Dbl Down
SetDist:	
SetSpe:	
Set Time:	0.1




This page can be set the action position, horizontal speed, and delay time, but can not teach. Setting distance and speed should only in the horizontal movement page.

#### 4.2.6 Monitor

Press , enter the input monitor page, Press to / key to switch monitor pages.

X036 MDownLmt	<input type="radio"/>
X035 MUpLmt	<input checked="" type="radio"/>
X037 MUpMidd	<input type="radio"/>
X022 MoriginSP	<input type="radio"/>

Picture 4-9

Press , enter the output monitor page, Press to / key to switch monitor pages.

Y023 MainDown	<input checked="" type="radio"/>
Y022 MainUp	<input type="radio"/>
Y024 DownSlow	<input checked="" type="radio"/>
Y025 UpSlow	<input type="radio"/>

“○”means no signal, “●” means having signal

Picture 4-10

### 4.3 Standard Action Program

#### Program 0:

Main arm down -> Main arm forward -> Vacuum suck -> Main arm backward  
-> Main arm up -> Dais out ->

Pose horizontal -> Main arm down -> Vacuum put -> Main arm up -> Pose  
vertical -> Dais in

#### Program 1:

Main arm down -> Main arm forward -> Vacuum suck -> Main arm backward  
-> Main arm up -> Pose horizontal -> Dais out -> Main arm down -> Vacuum  
put -> Main arm up -> Pose vertical -> Dais in

#### Program 2:

Main arm down -> Main arm forward -> Main arm clip -> Main arm backward  
-> Main arm up -> Dais out -> Pose horizontal -> Main arm down -> Main arm  
put -> Main arm up -> Pose vertical -> Dais in

#### Program 3:

Main arm down -> Main arm forward -> Main arm clip -> Main arm backward  
-> Main arm up -> Pose horizontal -> Dais out -> Main arm down -> Main arm  
put -> Main arm up -> Pose vertical -> Dais in

#### Program 4:

Sub arm down -> Sub arm forward -> Sub arm clip -> Sub arm backward ->  
Sub arm up -> Dais out -> Sub arm put -> Dais in

#### Program 5:

Double arms down -> Double arms forward -> Vacuum suck -> Sub arm clip  
-> Double arms backward -> Double arms up -> Dais out -> Sub arm put ->  
Dais out -> Pose horizontal -> Main arm down -> Vacuum put -> Main arm up  
-> Pose vertical -> Dais in

#### Program 6:

Double arms down -> Double arms forward -> Vacuum suck -> Sub arm clip

-> Double arms backward -> Double arms up  
Pose horizontal -> Dais out -> Main arm down -> Vacuum put -> Main arm up  
-> Pose vertical -> Dais in -> Sub arm put -> Dais in

#### Program 7:

Double arms down -> Double arms forward -> Main arm clip -> Sub arm clip  
-> Double arms backward -> Double arms up -> Dais out -> Sub arm put ->  
Dais out -> Pose horizontal -> Main arm down -> Main arm put -> Main arm up  
-> Pose vertical -> Dais in

#### Program 8:

Double arms down -> Double arms forward -> Main arm clip > Sub arm clip ->  
Double arms backward -> Double arms up  
Pose horizontal -> Dais out -> Main arm down -> Main arm put -> Main arm  
up -> Pose horizontal -> Dais in -> Sub arm put -> Dais in

## 5. Error Connection

Error	Error Caused	Exclusion mode
Error Number 1 After mold opening ,the signal off, and the robot not back to original point	Mold open no signal input	<ol style="list-style-type: none"> <li>1. IMM not in the mold opens state.</li> <li>2. The signal of the “mold open” in IMM is abnormal.</li> <li>3. Check the I/O’s connecting wire.</li> <li>4. Whether circuit board having errors.</li> </ol>
Error Number 2 Middle-plate limit OFF, the robot not back to original point	The middle plate (total 3-plate) no signal input	<ol style="list-style-type: none"> <li>1. Whether the mid-plate of mold open</li> <li>2. Whether having signal output of proximity switch in mid-plate mould</li> <li>3. Check the I/O’s connecting wire.</li> <li>4. Whether having errors on circuit board.</li> </ol>
Error Number 3 Main arm up limit OFF, the robot not back to original point	Main arm up going no signal input, the robot not in the stand-by state	<ol style="list-style-type: none"> <li>1. Whether the air pressure is too low</li> <li>2. Whether having the signal of main arm up going proximity switch</li> <li>3. Check the I/O’s connecting wire.</li> <li>4. Whether having trouble on circuit board</li> </ol>
Error Number 4 Sub arm up limit OFF, the robot not back to original point	Sub-arm up going no signal input, the robot not in the stand-by state	<ol style="list-style-type: none"> <li>1. Whether the air pressure is too low</li> <li>2. Whether having the signal of sub-arm up going proximity switch.</li> <li>3. Check the I/O’s connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
Error Number 5 Main clip ON, the robot not back to original point	Main clip has signal input, the robot not in the stand-by state	<ol style="list-style-type: none"> <li>1. Whether having the signal of main clip</li> <li>2. Main clip testing right or not</li> <li>3. check the main clip whether clip the products</li> <li>3. Check the I/O’s connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
Error Number 7 Vacuum suck ON, the robot not back to original point	Sucker valve no action, suck signal input	<ol style="list-style-type: none"> <li>1. Whether having the signal of suck</li> <li>2. Whether having the actions of magnetic valve.</li> <li>3. Check the I/O’s connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
Error Number 8 Grasp ON, the robot not back to original point	Grasp valve no action, signal of grasper input	<ol style="list-style-type: none"> <li>1. Whether having the signal of grasper.</li> <li>2. Whether having the actions of magnetic valve in grasper.</li> <li>3. Check the I/O’s connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
Error Number 9	When robot waiting ,do not	1. Whether the power on servo motor

Machine outside the mould, the robot not back to original point	stay inside	<p>ON</p> <p>2. Whether having “dais in” action by electric control.</p> <p>3. Whether having trouble on circuit board.</p>
Error Number 10 Stop inside, the robot not back to original point	When robot waiting ,do not stay outside	<p>1. Whether the power on servo motor ON.</p> <p>2. Whether having “dais out” action by electric control.</p> <p>3. Whether having trouble on circuit board.</p>
Error Number 11 Pose vertical limit OFF, the robot not back to original point	The signal of vertical limit no input	<p>1. Whether the air pressure is too low</p> <p>2. Whether having “vertical” action by electric control.</p> <p>3. Check the I/O’s connecting wire.</p> <p>4. Whether having trouble on circuit board.</p>
Error Number 12 Pose horizontal limit OFF, the robot not back to original point	The signal of horizontal limit no input	<p>1. Whether the air pressure is too low.</p> <p>2. Whether having “horizontal” action by electric control.</p> <p>3. Check the I/O’s connecting wire.</p> <p>4. Whether having trouble on circuit board.</p>
Error Number 13 Robot go down to pick objects, the signal “mold open” OFF	Robot go down to pick objects, the signal “mold open” OFF	<p>1. Whether having the signal “mould open” output from IMM.</p> <p>3. Check the I/O’s connecting wire.</p> <p>4. Whether having trouble on circuit board.</p>
Error Number 14 Robot go down to pick the objects, signal of mild-plate OFF	Robot go down to pick the objects, signal of“ mild-plate open” OFF	<p>1. Whether the mid-plate mould open.</p> <p>2. Whether having signal of proximity switch in mid-plate mould.</p> <p>3. Check the I/O’s connecting wire.</p> <p>4. Whether having trouble on circuit board.</p>
Error Number 15 “Mould open” ON Signal of safety door OFF	Safety door no signal output	<p>1. Whether the door of IMM had closed.</p> <p>2. Whether having signal of safety door.</p> <p>3. Check the I/O’s connecting wire.</p> <p>4. Whether having trouble on circuit board.</p>
Error Number 16 “Mould open” ON Signal of mild-plate OFF	Signal of “mould open” input Signal of mild-plate no input	<p>1. Whether the mid-plate mould open.</p> <p>2. Whether having signal of proximity switch in mid-plate mould.</p> <p>3. Check the I/O’s connecting wire.</p> <p>4. Whether having trouble on circuit board.</p>
Error Number 17 Main arm uplimit ON Main arm downlimit ON	Both up limit and down limit of main arm have signals input at the same time	<p>1. Whether main arm up /down having troubles.</p> <p>2. Check the I/O’s connecting wire.</p> <p>3. Whether having trouble on circuit</p>



		board.
Error Number 18 Main arm forward limit ON Main arm backward ON	Both forward limit and backward limit of main arm have signals input at the same time	<ol style="list-style-type: none"> <li>1. Whether the switch on main arm up /down having troubles.</li> <li>2. Check the I/O's connecting wire.</li> <li>3. Whether having trouble on circuit board.</li> </ol>
Error Number 19 Main arm up limit ON Main arm downward ON	Both up limit and down limit of sub arm have signals input at the same time	<ol style="list-style-type: none"> <li>1. Whether sub arm up /down having troubles.</li> <li>2. Check the I/O's connecting wire.</li> <li>3. Whether having trouble on circuit board.</li> </ol>
Error Number 20 Main arm forward limit ON Main arm backward ON	Both forward limit and backward limit of sub arm have signals input at the same time	<ol style="list-style-type: none"> <li>1. Whether the switch on sub arm up /down having troubles.</li> <li>2. Check the I/O's connecting wire.</li> <li>3. Whether having trouble on circuit board.</li> </ol>
Error Number 21 Dais out limit ON Dais in limit ON	Both dais out limit and dais in limit having signal input at the same time	<ol style="list-style-type: none"> <li>1. Whether Dais out limit and Dais in limit having troubles.</li> <li>2. Check the I/O's connecting wire.</li> <li>3. Whether having trouble on circuit board.</li> </ol>
Error Number 22 Pose horizontal limit ON Pose vertical limit ON	Both pose horizontal limit and pose vertical limit having signal input at the same time	<ol style="list-style-type: none"> <li>1. Whether the switch of pose horizontal limit and pose vertical limit having troubles.</li> <li>2. Check the I/O's connecting wire.</li> <li>3. Whether having trouble on circuit board.</li> </ol>
Error Number 23 Before arm down, the signal of the "mould open" OFF	Before arm down to pick, the signal of the "mould open" OFF	<ol style="list-style-type: none"> <li>1. Whether having signal " mould open" output</li> <li>2. Check the I/O's connecting wire.</li> <li>3. Whether having trouble on circuit board.</li> </ol>
Error Number 24 Before arm down, the signal of mild-plate OFF	Before robot down to pick up the subjects the signal of middle mode OFF	<ol style="list-style-type: none"> <li>1. Whether the mid-plate mould open</li> <li>2. Whether having signal of proximity switch in mid-plate mould</li> <li>3. Check the I/O's connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
Error Number 25 Before arm down, The signal of the safety door OFF	Before arm down, the safety door have no signals	<ol style="list-style-type: none"> <li>1. Whether the safety door close.</li> <li>2. Whether having the signals of safety door.</li> <li>3. Check the I/O's connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
Error Number 26 Before arm downing, the pose vertical limit OFF	When choosing Pose vertical , before arm downing, Pose vertical limit no signal input	<ol style="list-style-type: none"> <li>1. Whether jig in vertical state.</li> <li>2. Whether the vertical testing switch having troubles.</li> <li>3. Check the I/O 's connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>

<p>Error Number 27 Before arm downing, Pose horizontal limit OFF</p>	<p>When choosing Pose horizontal, before arm downing, Pose vertical limit no signal input</p>	<ol style="list-style-type: none"> <li>1. Whether jig in horizontal state.</li> <li>2. Whether the horizontal testing switch having troubles.</li> <li>3. Check the I/O's connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 28 Before arm down, Main clip limit ON</p>	<p>Before arm down, the main arm check switch has signal input</p>	<ol style="list-style-type: none"> <li>1. Whether having main clip action.</li> <li>2. Whether having trouble on main clip testing.</li> <li>3. Check the I/O's connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 29 Before arm down, Sub clip limit ON</p>	<p>Before arm down, the sub arm testing switch has signal input</p>	<ol style="list-style-type: none"> <li>1. Whether having sub clip action.</li> <li>2. Whether having trouble on sub clip testing.</li> <li>3. Check the I/O's connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 30 Before arm down, the vacuum suck limit ON</p>	<p>Before arm down, suck testing switch has signal input</p>	<ol style="list-style-type: none"> <li>1. Whether sucking.</li> <li>2. Whether having troubles of suck testing switch.</li> <li>3. Check the I/O's connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 31 Before arm down, grasp limit ON</p>	<p>Before arm down, grip testing switch has signal input</p>	<ol style="list-style-type: none"> <li>1. Whether sucking.</li> <li>2. Whether having troubles of suck testing switch.</li> <li>3. Check the I/O's connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 32 Before dais out, Main arm down valve ON</p>	<p>Before dais out, main arm down</p>	<ol style="list-style-type: none"> <li>1. Whether main arm down.</li> </ol>
<p>Error Number 33 Before dais out, Main arm down valve ON</p>	<p>Before dais out, sub arm down</p>	<ol style="list-style-type: none"> <li>1. Whether sub arm down.</li> </ol>
<p>Error Number 34 Before dais out, Main arm up limit OFF</p>	<p>Before dais out, main arm up limit no signal input</p>	<ol style="list-style-type: none"> <li>1. Whether main arm at the up going station.</li> <li>2. Whether main arm down.</li> <li>3. Check the I/O's connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 35 Before dais out, sub arm up limit OFF</p>	<p>Before dais out, sub arm up limit no signal input</p>	<ol style="list-style-type: none"> <li>1. Whether sub arm at the up going station.</li> <li>2. Whether sub arm down.</li> <li>3. Check the I/O's connecting wire.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 36 Before changing pose, main arm down valve ON</p>	<p>Before jig horizontal and vertical moving, main arm down valve ON</p>	<ol style="list-style-type: none"> <li>1. Whether main arm down</li> </ol>

<p>Error Number 37 Before changing pose, sub arm down valve ON</p>	<p>Before jig horizontal and vertical moving, main arm down valve ON</p>	<p>1. Whether sub arm down.</p>
<p>Error Number 38 Main arm down valve OFF Main arm down limit ON</p>	<p>After the main arm down, the signal of main arm up limit input</p>	<p>1. Whether the air pressure is too low. 2. Whether arm down. 3. when main arm down, the switch of up limit ON or OFF. 4. Check the I/O's connecting wire. 5. Whether having trouble on circuit board.</p>
<p>Error Number 39 Main arm down valve ON Main arm down limit OFF</p>	<p>After the main arm down, the signal of main arm down limit input</p>	<p>1. Whether the air pressure is too low 2. Whether main arm down 3. Whether the down switch having the signal 4. Check the I/O's connecting wire. 5. Whether having trouble on circuit board.</p>
<p>Error Number 40 Main arm down valve OFF Main arm go up OFF</p>	<p>After the main arm down, no signal of main arm up limit input</p>	<p>1. Whether the air pressure is too low. 2. Whether main arm go up. 3. Whether main arm up switch having signals. 4. Check the I/O's connecting wire. 5. Whether having trouble on circuit board.</p>
<p>Error Number 41 Main arm down valve OFF Main arm down limit ON</p>	<p>After the main arm up, signal of main arm down limit input</p>	<p>1. Whether the air pressure is too low. 2. Whether main arm go up. 3. Whether main arm down switch having signals. 4. Check the I/O's connecting wire. 5. Whether having trouble on circuit board.</p>
<p>Error Number 42 Sub arm down valve ON Sub arm uplimit ON</p>	<p>After the sub arm down, signal of sub arm up limit input</p>	<p>1. Whether the air pressure is too low. 2. Whether sub arm go up. 3. Whether sub arm up switch having signals. 4. Check the I/O's connecting wire. 5. Whether having trouble on circuit board.</p>
<p>Error Number 43 Sub arm down valve ON Sub arm down limit OFF</p>	<p>After the sub arm down, no signal of sub arm down limit input</p>	<p>1. Whether the air pressure is too low. 2. Whether sub arm go up. 3. Whether sub arm down switch having signals. 4. Check the I/O's connecting wire. 5. Whether having trouble on circuit board.</p>
<p>Error Number 44 Sub arm down valve OFF Sub arm uplimit OFF</p>	<p>After the sub arm UP, no signal of sub arm up limit input</p>	<p>1. Whether the air pressure is too low. 2. Whether sub arm go up. 3. Whether sub arm up switch having</p>

		<p>signals.</p> <ol style="list-style-type: none"> <li>4. Check the I/O's connecting wire.</li> <li>5. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 45 Sub arm down valve OFF Sub arm up limit ON</p>	<p>After the sub arm down, signal of sub arm down limit input</p>	<ol style="list-style-type: none"> <li>1. Whether the air pressure is too low.</li> <li>2. Whether sub arm go down.</li> <li>3. Whether sub arm down switch having signals.</li> <li>4. Check the I/O's connecting wire.</li> <li>5. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 46 Main arm forward valve ON Main arm forward limit OFF</p>	<p>After main arm go forward, no signal of main arm forward limit input</p>	<ol style="list-style-type: none"> <li>1. Whether the air pressure is too low.</li> <li>2. Whether main arm go forward.</li> <li>3. Whether the main arm go forward having signals.</li> <li>4. Check the I/O's connecting wire.</li> <li>5. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 47 Main arm forward valve ON Main arm backward limit ON</p>	<p>After main arm go forward, the signal of main arm backward limit input</p>	<ol style="list-style-type: none"> <li>1. Whether the air pressure is too low.</li> <li>2. Whether main arm go forward.</li> <li>3. Whether the main arm go backward switches having signals.</li> <li>4. Check the I/O's connecting wire.</li> <li>5. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 48 Main arm forward valve OFF Main arm forward limit ON</p>	<p>After main arm go back, the signal of main arm forward limit input</p>	<ol style="list-style-type: none"> <li>1. Whether the air pressure is too low.</li> <li>2. Whether main arm go backward.</li> <li>3. Whether the main arm go forward switches having signals.</li> <li>4. Check the I/O's connecting wire.</li> <li>5. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 49 Main arm forward valve OFF Main arm backward limit OFF</p>	<p>After main arm go back ,no signal of main arm backward limit input</p>	<ol style="list-style-type: none"> <li>1. Whether the air pressure is too low.</li> <li>2. Whether main arm go backward.</li> <li>3. Whether the main arm go backward switches having signals.</li> <li>4. Check the I/O's connecting wire.</li> <li>5. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 50 Sub arm forward valve ON Sub arm forward limit OFF</p>	<p>After sub arm go forward, no signal of sub arm forward limit input</p>	<ol style="list-style-type: none"> <li>1. Whether the air pressure is too low.</li> <li>2. Whether sub arm go forward.</li> <li>3. Whether the sub arm go forward switches having signals.</li> <li>4. Check the I/O's connecting wire.</li> <li>5. Whether having trouble on circuit board.</li> </ol>
<p>Error Number 51 Sub arm forward valve ON Sub arm backward limit ON</p>	<p>After sub arm forward, sub arm back ward having signal input</p>	<ol style="list-style-type: none"> <li>1. Whether the air pressure is too low.</li> <li>2. Whether sub arm go forward.</li> <li>3. Whether the sub arm go backward switches having signals.</li> <li>4. Check the I/O's connecting wire.</li> </ol>

		5. Whether having trouble on circuit board.
Error Number 52 Sub arm forward valve OFF Sub arm forward limit ON	Sub arm back, sub arm has signal for forward.	1. Whether the air pressure is too low. 2. Whether sub arm go backward. 3. Whether the sub arm go forward switches having signals. 4. Check the I/O's connecting wire. 5. Whether having trouble on circuit board.
Error Number 53 Sub arm forward valve OFF Sub arm backward limit OFF	Sub arm back,, signal of sub arm back no input	1. Whether the air pressure is too low. 2. Whether sub arm go backward. 3. Whether the sub arm go backward switches having signals. 4. Check the I/O's connecting wire. 5. Whether having trouble on circuit board.
Error Number 54 Main clip valve ON Main clip limit OFF	Main clip ,signal of main clip no input	1. Whether the air pressure is too low. 2. Whether main gripper clip. 3. Whether main gripper clip the products. 4. Check the I/O 's connecting wire. 5. Whether having trouble on circuit board.
Error Number 55 Main clip valve OFF Main clip limit ON	Main put ,main clip having signal input	1. Whether the air pressure is too low. 2. Whether main gripper clip. 3. Whether main gripper clip the products. 4. Check the I/O's connecting wire. 5. Whether having trouble on circuit board.
Error Number 56 Sub clip valve ON. Sub-grip limit OFF	Main clip ,sub clip no signal	1. Whether the air pressure is too low. 2. Whether sub gripper clip. 3. Whether sub gripper clip the products. 4. Check the I/O's connecting wire. 5. Whether having trouble on circuit board.
Error Number 57 Sub clip valve OFF Sub clip limit ON	sub clip ,sub clip has signal	1. Whether having sub put action. 2. Check the I/O's connecting wire. 3. Whether having trouble on circuit board.
Error Number 58 Vacuum valve ON, Vacuum limit OFF	After sucking and putting, the signal of suck not input	1. Whether the air pressure is too low. 2. Whether sucking. 3. Whether suck the objects. 4. Check the I/O's connecting wire. 5. Whether having trouble on circuit board.
Error Number 59 Vacuum valve OFF Vacuum limit ON	After sucking and putting, the signal of suck input	1. Whether having suck and put actions. 2. Check the I/O's connecting wire. 3. Whether having trouble on circuit

		board.
Error Number 60 grasper limit ON grasper limit OFF	After grasping, the signal of the grasp not input	<ol style="list-style-type: none"> <li>1. Whether the air pressure is too low.</li> <li>2. Whether having grasp action.</li> <li>3. Whether grasping objects.</li> <li>4. Check the I/O's connecting wire.</li> <li>5. Whether having trouble on circuit board.</li> </ol>
Error Number 61 grasper limit OFF grasper limit ON	After grasping, the signal of the grasp input	<ol style="list-style-type: none"> <li>1. Whether having grasp and put actions.</li> <li>2. Check the I/O 's connecting wire.</li> <li>3. Whether having trouble on circuit board.</li> </ol>
Error Number 62 Pose horizontal valve ON Pose horizontal limit OFF	Pose horizontal, pose horizontal limit no signal input	<ol style="list-style-type: none"> <li>1. Whether the air pressure is too low.</li> <li>2. Whether having pose horizontal action.</li> <li>3. Whether the switch of pose horizontal having signal.</li> <li>4. Check the I/O's connecting wire.</li> <li>5. Whether having trouble on circuit board.</li> </ol>
Error Number 63 Pose vertical valve ON Pose vertical limit OFF	Pose vertical, Pose vertical limit no signal input	<ol style="list-style-type: none"> <li>1. Whether the air pressure is too low.</li> <li>2. Whether having pose vertical action.</li> <li>3. Whether the switch of pose vertical having signal.</li> <li>4. Check the I/O's connecting wire.</li> <li>5. Whether having trouble on circuit board.</li> </ol>
Error Number 64 The time of dais out is too long	The time of dais out is longer than that of defining	<ol style="list-style-type: none"> <li>1. The speed of dais out slow or not.</li> <li>2. Whether the arm having dais out.</li> <li>3. Whether the servo driven rotating.</li> <li>4. Check whether the connecting is right.</li> <li>5. Whether having trouble on circuit board.</li> </ol>
Error Number 65 The time of dais in is too long	The time of dais in is longer than that of defining	<ol style="list-style-type: none"> <li>1. The speed of dais in slow or not.</li> <li>2. Whether the arm having dais in.</li> <li>3. Whether the servo driven rotating.</li> <li>4. Check whether the connecting is right.</li> <li>5. Whether having trouble on circuit board.</li> </ol>
Error Number 66 Emergency stop	Emergency stop on IMM or robot	<ol style="list-style-type: none"> <li>1. Loose emergency stop button on controller.</li> <li>2. Loose emergency stop on IMM.</li> <li>3. Check the connection line of emergency stop.</li> </ol>
Error Number 67 Action programs incomplete, no action	Teach programs incomplete	<ol style="list-style-type: none"> <li>1. Reset teach program, teaching the last action to be back to start point.</li> </ol>

Error Number 68 Up to set production	Current production has reached the setting	<ol style="list-style-type: none"> <li>1. Increase values of yield.</li> <li>2. Clear the current yield.</li> </ol>
Error Number 69 Action not according with the program	Manual to move arm up /down inside not according with the automatic program	<ol style="list-style-type: none"> <li>1. Manual operation make arm rise inside and fall in forward or backward position which corresponding automatic process, otherwise may damage the mold.</li> </ol>
Error Number 70 The time of waiting open mould delay	The time of the IMM open mould cycle is too long	<ol style="list-style-type: none"> <li>1. Lengthen the cycle time of electronic control of robot, and make the time longer than that of open mold of injection molding machine.</li> </ol>
Error Number 71 Servo-drive failure, no pulse input	Electric receive servo drive feedback pulse or not	<ol style="list-style-type: none"> <li>1. Check servo drive setting parameter.</li> <li>2. Check servo drives and electric control connecting.</li> <li>3. Check setting parameter of electric control.</li> <li>4. Whether having trouble on circuit board.</li> </ol>
Error Number 72 Servo driven alarm	Servo driven alarm	<ol style="list-style-type: none"> <li>1. Check whether the servo driven alarm.</li> <li>2. Check servo driven and electric control connecting.</li> <li>3. Whether having trouble on circuit board.</li> </ol>
Error Number 73 The position of the safety door not set	The position of the safety door not set	<ol style="list-style-type: none"> <li>1. Set the position of the safety door.</li> </ol>
Error Number 74 The position of the placing lower than that of safe door	Setting the position of the placing lower than that of safe door	<ol style="list-style-type: none"> <li>1. Reset the position of the place, the position must be higher than safe door.</li> </ol>
Error Number 75 The position of the placing goods is more than the maximum	The position of the placing goods is set more than the maximum	<ol style="list-style-type: none"> <li>1. Reset the position of the placing goods, make it less than the maximum.</li> </ol>
Error Number 76 Outside waiting position is less than the initiation value position	The outside waiting position is less than the initiation position	<ol style="list-style-type: none"> <li>1. Reset the outside waiting position, must more than the initiation position.</li> </ol>
Error Number 77 The position of the placing goods is more than the maximum	The outside waiting position is more than the maximum	<ol style="list-style-type: none"> <li>1. Reset the outside waiting position, must more than the maximum.</li> </ol>
Error Number 78 Points of cycle placing position is more than safe limits	Maximum of Cycle placing position is more than safe limits	<ol style="list-style-type: none"> <li>1. Reset points of cycle placing or distance of cycle placing.</li> </ol>
Error Number 79 Travel out limit is abnormal	The travel out limit switch has no signal input	<ol style="list-style-type: none"> <li>1. Check whether having the signal of the limit switches.</li> <li>2. Check the I/O's connecting wire.</li> </ol>

		3. Whether having trouble on circuit board.
Error Number 80 Travel in limit is abnormal	The travel in limit switch has no signal input	1. Check whether having the signal of travel in limit switch. 2. Check the I/O's connecting wire. 3. Whether having trouble on circuit board.
Error Number 81 Machine is not in the origin position, travel back to the origin manually	Machine is not in the origin position, travel back to the origin manually	1. Manual back to the origin.
Error Number 82 Machine is not in the waiting position, travel back to the waiting position manually	Machine is not in the waiting position, travel back to the waiting position manually	1. Manual traverse out to waiting position.
Error Number 83 Before travel in /out, the arm is not in horizontal position, horizontal actions first.	Before travel in /out, the arm is not in horizontal position, horizontal actions first.	1. Manually make wrist cylinder in a horizontal position. 2. Check whether the level of limit switch having troubles.
Alarm No. 84 Robot is not at the ends of the traverse beam.	Robot is not at the ends of the traverse beam.	1. Use manual to traverse in (out) the robot to the end. 2. Check the "traverse in limit sensor" signal is available. 3. Check the "traverse out limit sensor" signal is available.
Alarm No. 85 Insufficient inlet pressure.	Insufficient inlet pressure.	1. Check inlet pressure. 2. Check the signal of pressure sensor.
Alarm No. 86 "Mould area free" position setting is smaller than starting position.	"Mould area free" position setting is smaller than starting position.	1. Reset "Mould area free" position, this value must be greater than starting position.
Alarm No. 87 "Mould area free" position setting is greater than safety door position.	"Mould area free" position setting is greater than safety door position.	1. Reset "Mould area free" position, this value must be smaller than safety door position.
Alarm No. 88 "Mould area" descend position is not safe.	"Mould area" descend position is not safe.	1. Reset "mould area" descend position, this value must be smaller than "Mould area free" position.
Alarm No. 89	Traverse out position is	1. Reset traverse out position, this



Traverse out position is smaller than starting position.	smaller than starting position.	value must be greater than starting position.
Alarm No. 90 Traverse out position is greater than maximum position.	Traverse out position is greater than maximum position.	1. Reset traverse out position, this value must be less than maximum position.
Alarm No. 91 Robot does not receive automation signal from IMM.	Robot does not receive automation signal from IMM.	1. Check automation signal from IMM. 2. Check the wiring for automation signal. 3. Check main control board of robot.
Alarm No. 92 Communication fails between control board and hand controller.	Communication fails between control board and hand controller.	1. Check the wiring between control board and hand controller. 2. Check the control board.
Alarm No. 93 Before arm descend outside IMM, does not receive "outside IMM safe zone"	Before arm descend outside IMM, does not receive "outside IMM safe zone"	1. Change the descend position to "outside IMM safe zone"
"Use robot" is not selected.	"Use robot" is not selected.	1. Select "use robot" from IMM.

## 6. Maintenance

### 6.1 General


Please observe the prescribed maintenance intervals. Proper maintenance ensures trouble-free functioning of the robot. Proper maintenance is necessary in order that the warranty be fully enforceable.



Maintenance should be performed by qualified personnel only.



Maintenance should responsibility for safety equipment becomes the responsibility of the system operator once he accepts the robot.

Please note, in particular, that safety instructions marked with  must be observed according to regulations so that fully functionality of this equipment can be guaranteed.



Before carrying out maintenance work, and entering the safety zone of the robot, the main switch and compressed air must be disconnected and the compressed air system must be evacuated.

### 6.2 Lubrication Requirements

Remove the old grease from the guide shafts and scraper rings of the bearing using a cloth. Then apply the new grease to the guide shafts using a brush.

As well as all roller bearing greases according to DIN 51825.

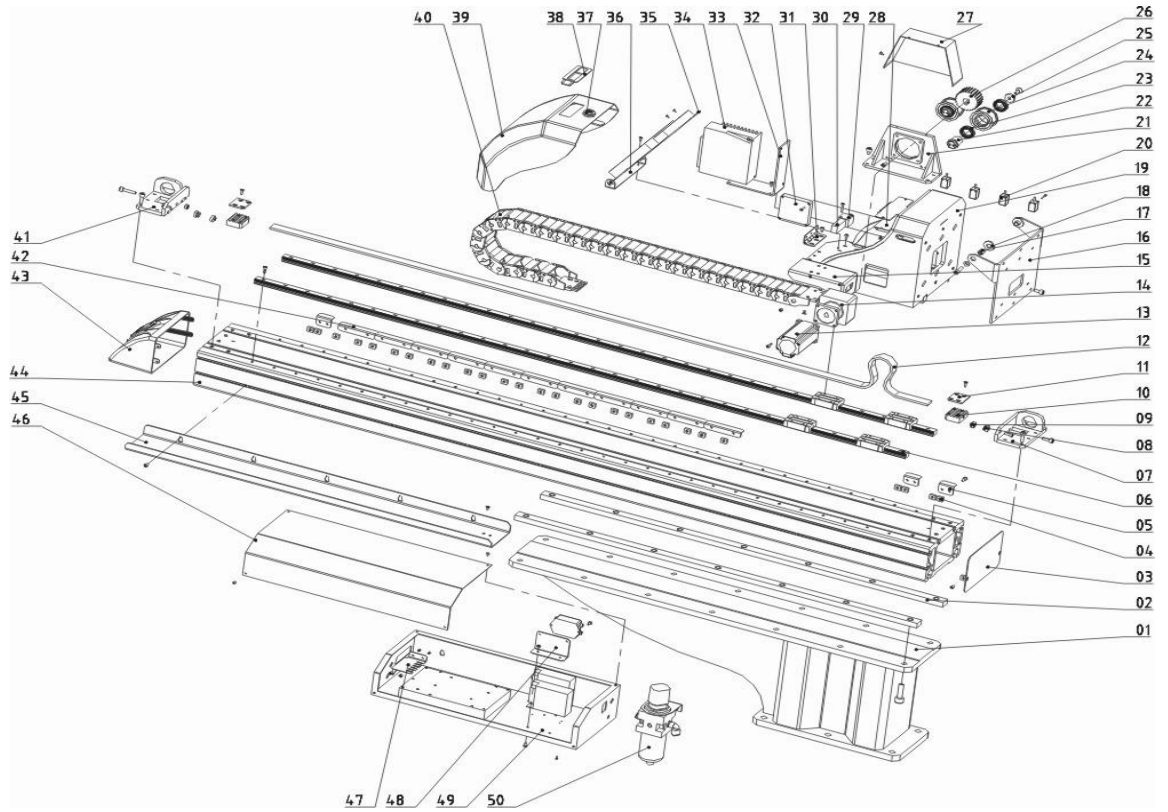
## 6.2.1 Maintenance cycle

In accordance with the maintenance cycle, make work in the best way.

Daily Maintenance	Monthly Maintenance	Quarterly Maintenance
<ol style="list-style-type: none"><li>1. Swab robot.</li><li>2. Filter drainage.</li><li>3. Check the air pressure.</li><li>4. Check bolt connection robot and injection molding machine whether tighten.</li><li>5. Check all block settings whether tightened.</li></ol>	<ol style="list-style-type: none"><li>1. Use air clean filter.</li><li>2. Check the screws on all part whether tightened.</li><li>3. Confirm whether the pipelines break or loose.</li><li>4. Check and adjust the operating speed.</li></ol>	<p>Brush oil on to the axis.</p>

# 7. Assembly Diagram

## 7.1 Traverse Unit (ST1 and ST1-T)



Picture 7-1

## 7.1.1 Parts List

Table 7-1: Parts List

No.	Name	Part number			
		ST1-550-1000	ST1-550-1000D	ST1-700-1400	ST1-700-1400D
1	Base	BH10550700010	BH10550700010	BH10550700010	BH10550700010
2	Fixing plate of beam installation	-	-	-	-
3	End cover of beam	BL70103300020	BL70103300020	BL70103300020	BL70103300020
4	Fixing sliding block	YW09161400110	YW09161400110	YW09161400110	YW09161400110
5	Limited sensor panel	BL69335000020	BL69335000020	BL69335000020	BL69335000020
6	Linear guiding rail	YW31002016000	YW31002016000	YW31002017000	YW31184020000
7	Belt fixing frame 2	-	-	-	-
8	Buffer unit	BH91151200010	BH91151200010	BH91151200010	BH91151200010
9	Buffer cap	YW80200000000	YW80200000000	YW80200000000	YW80200000000
10	Belt holding plate	YW09474000110	YW09474000110	YW09474000110	YW09474000110
11	Belt splint connecting piece	BL70110100020	BL70110100020	BL70110100020	BL70110100020
12	Synchronous belt	YR00082500100	YR00082500100	YR00082500100	YR00082500100
13	Servo motor	-	-	-	-
14	Speed reducer	-	-	-	-
15	Fixing plate of traverse drag chain	BL71555300020	BL71555300020	BL71555300020	BL71555300020
16	Vertical aluminum profile connection board	BL70123000020	BL70123000020	BL70123000020	BL70123000020
17	Fixing shaft on vertical beam	BH91131700010	BH91131700010	BH91131700010	BH91131700010
18	Washer	BH91301400010	BH91301400010	BH91301400010	BH91301400010
19	Sliding seat	-	-	-	-
20	Proximity switch	-	-	-	-
21	Motor supporting frame	BH10155000010	BH10155000010	BH10155000010	BH10155000010

22	Connection shaft	BH91303900010	BH91303900010	BH91303900010	BH91303900010
23	Pulley bearing	YW11600500000	YW11600500000	YW11600500000	YW11600500000
24	Pulley	BH91030000010	BH91030000010	BH91030000010	BH91030000010
25	Special washer	BL70107700040	BL70107700040	BL70107700040	BL70107700040
26	Synchronous pulley	BL70107700040	BL70107700040	BL70107700040	YW08621900100
27	Motor supporting cover	BL70107700040	BL70107700040	BL70107700040	BL21000100520
28	Brake resistor	BL70107700040	BL70107700040	BL70107700040	YE20100500100
29	Fixing plate of pressure switch	BH91282500110	BH91282500110	BH91282500110	BH91282500110
30	Pressure switch	-	-	-	-
31	Hinge	YW06253200000	YW06253200000	YW06253200000	YW06253200000
32	Exhaust fan	YW06253200000	YW06253200000	YW06253200000	YM50801502400
33	Driven mounting plate	BL70553200020	BL70553200020	BL70553200020	BL70553200020
34	Servo drive	-	-	-	-
35	Traverse terminal installation frame	BL70112100020	BL70112100020	BL70112100020	BL70112100020
36	Traverse terminal bottom frame	BL70112100020	BL70112100020	BL70112100020	BL70112020040
37	Lock	BL70112100020	BL70112100020	BL70112100020	YW00000000100
38	Trapezoid plastic handle	BL70112100020	BL70112100020	BL70112100020	YR40914040000
39	Sliding seat cover	BL70112100020	BL70112100020	BL70112100020	BL70127000020
40	Traverse drag chain	BL70112100020	BL70112100020	BL70112100020	YE60250007500
41	Belt fixing frame 1	BL70112100020	BL70112100020	BL70112100020	BL71010900020
42	Safety sensor panel of mold	BL70112100020	BL70112100020	BL70112100020	BL69002200020
43	End cover of traverse beam	BL70112100020	BL70112100020	BL70112100020	BH74000100010
44	Aluminum profile of traverse	BH91159000010	BH91159000010	BH91201200010	BH91201200010
45	Traverse drag chain supporting frame	BL70551300020	BL70551300020	BL70714300020	BL70714300020
46	Cover of control box	BL71071420020	BL71071420020	BL71071420020	BL71071420020
47	Connection plate of grounder	BL71071420020	BL71071420020	BL71071420020	BL70126000020

48	Filter mounting plate	BL71071420020	BL71071420020	BL71071420020	BL70113000020
49	Control box	BL71071420020	BL71071420020	BL71071420020	BL71071400020
50	Filter regulating valve	YE30320400100	YE30320400100	BL71071420020	YE30301000000

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

Table 7-2: Parts List

No.	Name	Part number			
		ST1-900-1600	ST1-900-1600D	ST1-1100-1800	ST1-1100-1800D
1	Base	BH10591100010	BH10591100010	BH10591100010	BH10591100010
2	Fixing plate of beam installation	-	-	-	-
3	End cover of beam	BL70103300020	BL70103300020	BL70103300020	BL70103300020
4	Fixing sliding block	YW09161400110	YW09161400110	YW09161400110	YW09161400110
5	Limited sensor panel	BL69335000020	BL69335000020	BL69335000020	BL69335000020
6	Linear guiding rail	-	-	-	-
7	Belt fixing frame 2	-	-	-	-
8	Buffer unit	BH91151200010	BH91151200010	BH91151200010	BH91151200010
9	Buffer cap	YW80200000000	YW80200000000	YW80200000000	YW80200000000
10	Belt holding plate	YW09474000110	YW09474000110	YW09474000110	YW09474000110
11	Belt splint connecting piece	BL70110100020	BL70110100020	BL70110100020	BL70110100020
12	Synchronous belt	YR00082500100	YR00082500100	YR00082500100	YR00082500100
13	Servo motor	-	-	-	-
14	Speed reducer	-	-	-	-
15	Fixing plate of traverse drag chain	BL71555300020	BL71555300020	BL71555300020	BL71555300020
16	Vertical aluminum profile connection board	BL70123000020	BL70123000020	BL70123000020	BL70123000020
17	Fixing shaft on vertical beam	BH91131700010	BH91131700010	BH91131700010	BH91131700010
18	Washer	BH91301400010	BH91301400010	BH91301400010	BH91301400010
19	Sliding seat	-	-	-	-
20	Proximity switch	-	-	-	-
21	Motor supporting frame	BH10155000010	BH10155000010	BH10155000010	BH10155000010



22	Connection shaft	BH91303900010	BH91303900010	BH91303900010	BH91303900010
23	Pulley bearing	YW11600500000	YW11600500000	YW11600500000	YW11600500000
24	Pulley	BH91030000010	BH91030000010	BH91030000010	BH91030000010
25	Special washer	BL70107700040	BL70107700040	BL70107700040	BL70107700040
26	Synchronous pulley	BL70107700040	BL70107700040	BL70107700040	YW08621900100
27	Motor supporting cover	BL70107700040	BL70107700040	BL70107700040	BL21000100520
28	Brake resistor	BL70107700040	BL70107700040	BL70107700040	YE20100500100
29	Fixing plate of pressure switch	BH91282500110	BH91282500110	BH91282500110	BH91282500110
30	Pressure switch	-	-	-	-
31	Hinge	YW06253200000	YW06253200000	YW06253200000	YW06253200000
32	Exhaust fan	YW06253200000	YW06253200000	YW06253200000	YM50801502400
33	Driven mounting plate	BL70553200020	BL70553200020	BL70553200020	BL70553200020
34	Servo drive	-	-	-	-
35	Traverse terminal installation frame	BL70112100020	BL70112100020	BL70112100020	BL70112100020
36	Traverse terminal bottom frame	BL70112100020	BL70112100020	BL70112100020	BL70112020040
37	Lock	BL70112100020	BL70112100020	BL70112100020	YW00000000100
38	Trapezoid plastic handle	BL70112100020	BL70112100020	BL70112100020	YR40914040000
39	Sliding seat cover	BL70112100020	BL70112100020	BL70112100020	BL70127000020
40	Traverse drag chain	BL70112100020	BL70112100020	BL70112100020	YE60250007500
41	Belt fixing frame 1	BL70112100020	BL70112100020	BL70112100020	BL71010900020
42	Safety sensor panel of mold	BL70112100020	BL70112100020	BL70112100020	BL69002200020
43	End cover of traverse beam	BL70112100020	BL70112100020	BL70112100020	BH74000100010
44	Aluminum profile of traverse	BH91219000010	BH91219000010	BH91243000010	BH91243000010
45	Traverse drag chain supporting frame	BL70916300020	BL70916300020	BL70118300020	BL70118300020

46	Cover of control box	BL70125000020	BL70125000020	BL70125000020	BL70125000020
47	Connection plate of grounder	BL71071420020	BL71071420020	BL71071420020	BL70126000020
48	Filter mounting plate	BL71071420020	BL71071420020	BL71071420020	BL70113000020
49	Control box	BL70124000020	BL70124000020	BL70124000020	BL70124000020
50	Filter regulating valve	BL71071420020	BL71071420020	BL71071420020	YE30301000000

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

Table 7-3: Parts List

No.	Name	Part number			
		ST1-700-1400T	ST1-700-1400DT	ST1-900-1600T	ST1-900-1600T
1	Base	-	-	-	-
2	Fixing plate of beam installation	-	-	-	-
3	End cover of beam	BL70103300020	BL70103300020	BL70103300020	BL70103300020
4	Fixing sliding block	YW09161400110	YW09161400110	YW09161400110	YW09161400110
5	Limited sensor panel	BL69335000020	BL69335000020	BL69335000020	BL69335000020
6	Linear guiding rail	-	-	-	-
7	Belt fixing frame 2	-	-	-	-
8	Buffer unit	BH91151200010	BH91151200010	BH91151200010	BH91151200010
9	Buffer cap	YW80200000000	YW80200000000	YW80200000000	YW80200000000
10	Belt holding plate	-	-	-	-
11	Belt splint connecting piece	BL70110100020	BL70110100020	BL70110100020	BL70110100020
12	Synchronous belt	YR00082500100	YR00082500100	YR00082500100	YR00082500100
13	Servo motor	-	-	-	-
14	Speed reducer	-	-	-	-
15	Fixing plate of traverse drag chain	BL71555300020	BL71555300020	BL71555300020	BL71555300020
16	Vertical aluminum profile connection board	BL70123000020	BL70123000020	BL70123000020	BL70123000020
17	Fixing shaft on vertical beam	BH91131700010	BH91131700010	BH91131700010	BH91131700010
18	Washer	BH91301400010	BH91301400010	BH91301400010	BH91301400010
19	Sliding seat	-	-	-	-
20	Proximity switch	-	-	-	-
21	Motor supporting frame	BH10155000010	BH10155000010	BH10155000010	BH10155000010
22	Connection shaft	BH91303900010	BH91303900010	BH91303900010	BH91303900010
23	Pulley bearing	YW11600500000	YW11600500000	YW11600500000	YW11600500000
24	Pulley	BH91030000010	BH91030000010	BH91030000010	BH91030000010

25	Special washer	BL70107700040	BL70107700040	BL70107700040	BL70107700040
26	Synchronous pulley	-	-	-	-
27	Motor supporting cover	BL70107700040	BL70107700040	BL70107700040	BL21000100520
28	Brake resistor	BL70107700040	BL70107700040	BL70107700040	YE20100500100
29	Fixing plate of pressure switch	BH91282500110	BH91282500110	BH91282500110	BH91282500110
30	Pressure switch	-	-	-	-
31	Hinge	YW06253200000	YW06253200000	YW06253200000	YW06253200000
32	Exhaust fan	YW06253200000	YW06253200000	YW06253200000	YM50801502400
33	Driven mounting plate	BL70553200020	BL70553200020	BL70553200020	BL70553200020
34	Servo drive	-	-	-	-
35	Traverse terminal installation frame	BL70112100020	BL70112100020	BL70112100020	BL70112100020
36	Traverse terminal bottom frame	BL70112100020	BL70112100020	BL70112100020	BL70112020040
37	Lock	BL70112100020	BL70112100020	BL70112100020	YW00000000100
38	Trapezoid plastic handle	BL70112100020	BL70112100020	BL70112100020	YR40914040000
39	Sliding seat cover	BL70112100020	BL70112100020	BL70112100020	BL70127000020
40	Traverse drag chain	BL70112100020	BL70112100020	BL70112100020	BL70127000020
41	Belt fixing frame 1	BL70112100020	BL70112100020	BL70112100020	BL71010900020
42	Safety sensor panel of mold	BL70112100020	BL70112100020	BL70112100020	BL69002200020
43	End cover of traverse beam	BL70112100020	BL70112100020	BL70112100020	BH74000100010
44	Aluminum profile of traverse	-	-	BH91219000010	BH91219000010
45	Traverse drag chain supporting frame	-	-	BL70916300020	BL70916300020
46	Cover of control box	BL71071420020	BL71071420020	BL70125000020	BL70125000020
47	Connection plate of grounder	BL71071420020	BL71071420020	BL71071420020	BL70126000020
48	Filter mounting plate	BL71071420020	BL71071420020	BL71071420020	BL70113000020
49	Control box	BL71071420020	BL71071420020	BL70124000020	BL70124000020

50	Filter regulating valve	-	-	-	-
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\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

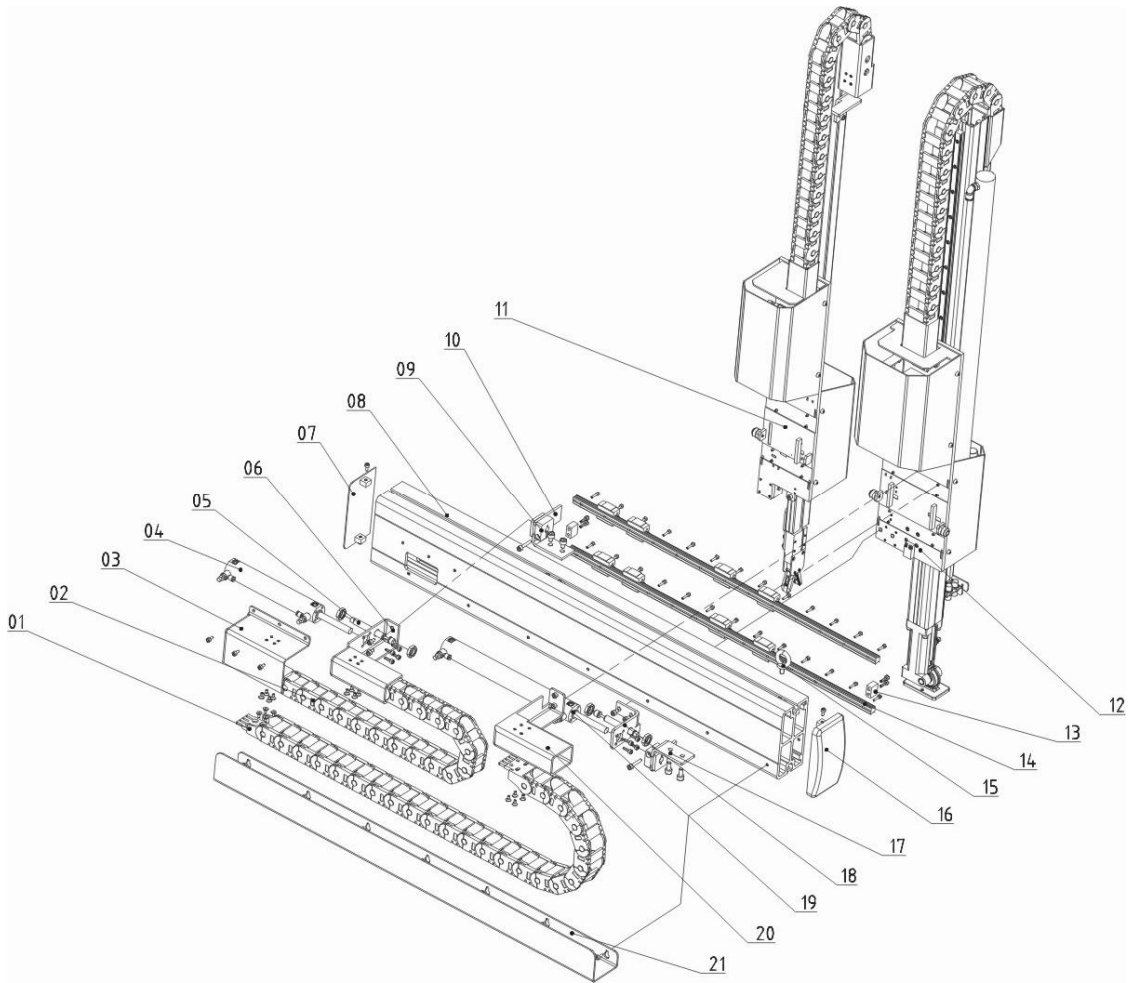
Table 7-4: Parts List

No.	Name	Part number			
		ST1-1100-1800T	ST1-1100-1800DT	ST1-1300-2000T	ST1-1300-2000T
1	Base	BW21132000000	BW21132000000	BL72113200020	BL72113200020
2	Fixing plate of beam installation	-	-	-	-
3	End cover of beam	BL70103300020	BL70103300020	BL70103300020	BL70103300020
4	Fixing sliding block	YW09161400110	YW09161400110	YW09161400110	YW09161400110
5	Limited sensor panel	BL69335000020	BL69335000020	BL69335000020	BL69335000020
6	Linear guiding rail	-	-	-	-
7	Belt fixing frame 2	-	-	-	-
8	Buffer unit	BH91151200010	BH91151200010	BH91151200010	BH91151200010
9	Buffer cap	YW80200000000	YW80200000000	YW80200000000	YW80200000000
10	Belt holding plate	-	-	-	-
11	Belt splint connecting piece	BL70110100020	BL70110100020	BL70110100020	BL70110100020
12	Synchronous belt	YR00082500100	YR00082500100	YR00082500100	YR00082500100
13	Servo motor	-	-	-	-
14	Speed reducer	-	-	-	-
15	Fixing plate of traverse drag chain	BL71555300020	BL71555300020	BL71555300020	BL71555300020
16	Vertical aluminum profile connection board	-	-	-	-
17	Fixing shaft on vertical beam	-	-	-	-
18	Washer	-	-	-	-
19	Sliding seat	BL72118000020	BL72118000020	BL72118000020	BL72118000020
20	Proximity switch	-	-	-	-
21	Motor supporting frame	BL72109000040	BL72109000040	BL72109000040	BL72109000040
22	Connection shaft	BH78111000010	BH78111000010	BH78111000010	BH78111000010
23	Pulley bearing	YW11600500000	YW11600500000	YW11600500000	YW11600500000
24	Pulley	BH91030000010	BH91030000010	BH91030000010	BH91030000010
25	Special washer	BL70107700040	BL70107700040	BL70107700040	BL70107700040

26	Synchronous pulley	YW08304100000	YW08304100000	YW08304100000	YW08304100000
27	Motor supporting cover	BL72108200020	BL72108200020	BL72108200020	BL72108200020
28	Brake resistor	BL70107700040	BL70107700040	BL70107700040	YE20100500100
29	Fixing plate of pressure switch	-	-	-	-
30	Pressure switch	-	-	-	-
31	Hinge	YW06253200000	YW06253200000	YW06253200000	YW06253200000
32	Exhaust fan	YW06253200000	YW06253200000	YW06253200000	YM50801502400
33	Driven mounting plate	-	-	-	-
34	Servo drive	-	-	-	-
35	Traverse terminal installation frame	BL72103000020	BL72103000020	BL72103000020	BL72103000020
36	Traverse terminal bottom frame	BL72104100020	BL72104100020	BL72104100020	BL72104100020
37	Lock	BL70112100020	BL70112100020	BL70112100020	YW00000000100
38	Trapezoid plastic handle	BL70112100020	BL70112100020	BL70112100020	YR40914040000
39	Sliding seat cover	BL72105000020	BL72105000020	BL72105000020	BL72105000020
40	Traverse drag chain	YW06251500000	YW06251500000	YW06251500000	YW06251500000
41	Belt fixing frame 1	BL70112100020	BL70112100020	BL70112100020	BL71010900020
42	Safety sensor panel of mold	BL70112100020	BL70112100020	BL70112100020	BL69002200020
43	End cover of traverse beam	BL70112100020	BL70112100020	BL70112100020	BH74000100010
44	Aluminum profile of traverse	BH72111800010	BH72111800010	BH78113000013	BH78113000013
45	Traverse drag chain supporting frame	BL72110800020	BL72110800020	BL72132200020	BL72132200020
46	Cover of control box	BL72107000020	BL72107000020	BL72107000020	BL72107000020
47	Connection plate of grounder	BL71071420020	BL71071420020	BL71071420020	BL70126000020
48	Filter mounting plate	BL71071420020	BL71071420020	BL71071420020	BL70113000020
49	Control box	BL72106000020	BL72106000020	BL72106000020	BL72106000020
50	Filter regulating valve	YE30400015000	YE30400015000	YE30400015000	YE30400015000

\* means possible broken parts. \*\* means easy broken part. and spare backup is suggested. Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 7.2 Vertical Unit (ST1)



Picture 7-2



## 7.2.1 Parts List

Table 7-5: Parts List

No.	Name	Part number			
		ST1-550-1000	ST1-550-1000D	ST1-700-1400	ST1-700-1400D
1	Vertical drag on main arm	YE60250003100	YE60250003100	YE60250003100	YE60250003100
2	Vertical drag on sub-arm	YE60250003100	YE60250003100	YE60250003100	YE60250005500
3	Cover of drag	YE60250003100	YE60250003100	YE60250003100	BL70105000020
4	Vertical cylinder on sub-arm	-	-	-	-
5	Shock absorber	-	-	-	-
6	Vertical drag frame on sub-arm	BL70150900020	BL70150900020	BL70150900020	BL70150900020
7	Left cover of vertical arm	BL70107000020	BL70107000020	BL70107000020	BL70107000020
8	Vertical aluminum profile	BH91801600010	BH91801600010	BH91801600010	BH91801600010
9	Piston rod	YW09055000300	YW09055000300	YW09055000300	YW09055000300
10	Vertical cylinder holder frame of sub arm	-	BL70104000040	-	BL70104000040
11	Sub-arm	-	-	-	-
12	Main arm	-	-	-	BH72701400010
13	Limit block	BH91202500110	BH91202500110	BH91202500110	BH91202500110
14	Linear guiding rail	-	-	-	-
15	Lifting rings	YW09000800000	YW09000800000	YW09000800000	YW09000800000
16	Right cover of vertical	BH91905000010	BH91905000010	BH91905000010	BH91905000010
17	Cylinder holder frame on main arm	BL70104000040	BL70104000040	BL70104000040	BL70104000040
18	Fixing frame of vertical cylinder	BL70103000040	BL70103000040	BL70103000040	BL70103000040
19	Vertical cylinder on main arm	-	-	-	YE30321500000

20	Vertical drag frame on main arm	BL70111000020	BL70111000020	BL70111000020	BL70111000020
21	Vertical drag supporting frame	BL70550900020	BL70550900020	BL70550900020	BL70550900020

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

Table 7-6: Parts List

No.	Name	Part number			
		ST1-900-1600	ST1-900-1600D	ST1-1100-1800	ST1-1100-1800D
1	Vertical drag on main arm	YE60250003100	YE60250003100	YE60250003100	YE60250003100
2	Vertical drag on sub-arm	YE60250003100	YE60250003100	YE60250003100	YE60250005500
3	Cover of drag	YE60250003100	YE60250003100	YE60250003100	BL70105000020
4	Vertical cylinder on sub-arm	-	-	-	-
5	Shock absorber	-	-	-	-
6	Vertical drag frame on sub-arm	BL70150900020	BL70150900020	BL70150900020	BL70150900020
7	Left cover of vertical arm	BL70107000020	BL70107000020	BL70107000020	BL70107000020
8	Vertical aluminum profile	BH91115000010	BH91115000010	BH91139000010	BH91139000010
9	Piston rod	YW09055000300	YW09055000300	YW09055000300	YW09055000300
10	Vertical cylinder holder frame of sub arm	-	BL70104000040	-	BL70104000040
11	Sub-arm	-	-	--	-
12	Main arm	-	BH72901600010	-	BH78180022010
13	Limit block	BH91202500110	BH91202500110	BH91202500110	BH91202500110
14	Linear guiding rail	-	-	-	-
15	Lifting rings	YW09000800000	YW09000800000	YW09000800000	YW09000800000
16	Right cover of vertical	BH91905000010	BH91905000010	BH91905000010	BH91905000010
17	Cylinder holder frame on main arm	BL70104000040	BL70104000040	BL70104000040	BL70104000040
18	Fixing frame of vertical cylinder	BL70103000040	BL70103000040	BL70103000040	BL70103000040
19	Vertical cylinder on main arm	-	-	-	-

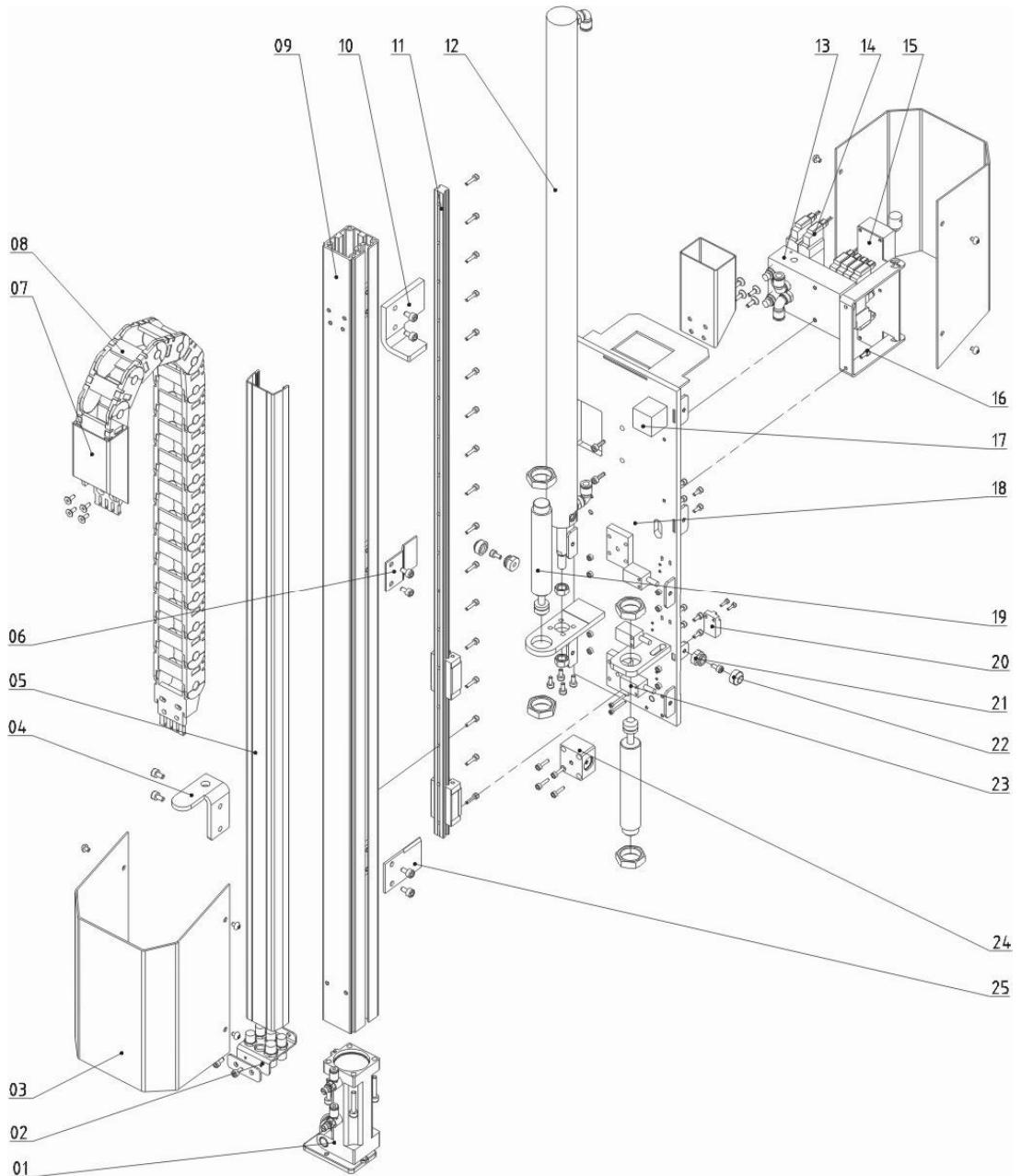
20	Vertical drag frame on main arm	BL70111000020	BL70111000020	BL70111000020	BL70111000020
21	Vertical drag supporting frame	BL70190900020	BL70190900020	BL70110900020	BL70110900020

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

### 7.3 Main arm unit (ST1)



Picture 7-3

### 7.3.1 Parts List

Table 7-7: Parts List

No.	Name	Part number			
		ST1-550-1000	ST1-550-1000D	ST1-700-1400	ST1-700-1400D
1	Rotation board	BH10550900020	BH10550900020	BH10550900020	BH10550900020
2	Spare frame for air pipe	BH10550900020	BH10550900020	BH10550900020	BL70102600020
3	Steel covers of main arm	BH10550900020	BH10550900020	BH10550900020	BL70109000020
4	Cylinder holder frame on main arm	BH10550900020	BH10550900020	BH10550900020	BL70115500040
5	Aluminum cover of main arm	-	-	BH91502550010	BH91502550010
6	Stack sensor sheet	BH91502550010	BH91502550010	BH91502550010	BL70112000040
7	Drag chain connector on main arm	BL70108000020	BL70108000020	BL70108000020	BL70108000020
8	Drag chain on main arm (up/down)	YE60250003700	YE60250003700	YE60250003700	YE60250003700
9	Main arm aluminum profile	BH91106500010	BH91106500010	BH91505400010	BH91505400010
10	Down sensor sheet on main arm	-	-	-	-
11	Linear guiding rail	-	-	-	-
12	Cylinder on main arm (up/down)	-	-	-	-
13	Pneumatic distribution block on main arm	BH72551100050	BH72551100050	BH72551100050	BH72551100050
14	Magnetic valve	-	-	-	-
15	Connection mounting plate on main arm	-	-	-	-
16	Terminal bottom frame on main arm	BL70119000040	BL70119000040	BL70119000040	BL70119000040
17	Digital display	YE15300102500	YE15300102500	YE15300102500	YE15300102500

	pressure switch				
18	Main arm mounting plate	BL71080100020	BL71080100020	BL71080100020	BL71080100020
19	Shock absorber	YW82141600000	YW82141600000	YW82141600000	YW82141600000
20	Proximity switch	-	-	-	-
21	Buffer unit	BH91181200010	BH91181200010	BH91181200010	BH91181200010
22	Buffer cap	YW80200000000	YW80200000000	YW80200000000	YW80200000000
23	Proximity switch	-	-	-	YE15050100300
24	Falling- proof cylinder	YE30055000350	YE30055000350	YE30055000350	YE30055000350
25	Up-going sensor sheet on main arm	BL70101000040	BL70101000040	BL70101000040	BL70101000040

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

Table 7-8: Parts List

No.	Name	Part number			
		ST1-900-1600	ST1-900-1600D	ST1-1100-1800	ST1-1100-1800D
1	Rotation board	BH10550900020	BH10550900020	BH10550900020	BH10550900020
2	Spare frame for air pipe	BL70102600020	BL70102600020	BL70102600020	BL70102600020
3	Steel covers of main arm	BH10550900020	BH10550900020	BH10550900020	BL70109000020
4	Cylinder holder frame on main arm	BH10550900020	BH10550900020	BH10550900020	BL70115500040
5	Aluminum cover of main arm	-	-	-	-
6	Stack sensor sheet	BH91502550010	BH91502550010	BH91502550010	BL70112000040
7	Drag chain connector on main arm	BL70108000020	BL70108000020	BL70108000020	BL70108000020
8	Drag chain on main arm (up/down)	YE60250003700	YE60250003700	YE60250003700	YE60250003700
9	Main arm aluminum profile	BH91142500010	BH91142500010	BH91166500010	BH91166500010
10	Down sensor sheet on main arm	-	-	-	-
11	Linear guiding rail	-	-	-	-
12	Cylinder on main arm (up/down)	-	-	-	-
13	Pneumatic distribution block on main arm	BH72551100050	BH72551100050	BH72551100050	BH72551100050
14	Magnetic valve	-	-	-	-
15	Connection mounting plate on main arm	-	-	-	-
16	Terminal bottom frame on main arm	BL70119000040	BL70119000040	BL70119000040	BL70119000040
17	Digital display pressure switch	YE15300102500	YE15300102500	YE15300102500	YE15300102500
18	Main arm mounting plate	BL71080100020	BL71080100020	BL71080100020	BL71080100020
19	Shock absorber	YW82141600000	YW82141600000	YW82141600000	YW82141600000
20	Proximity switch	-	-	-	-



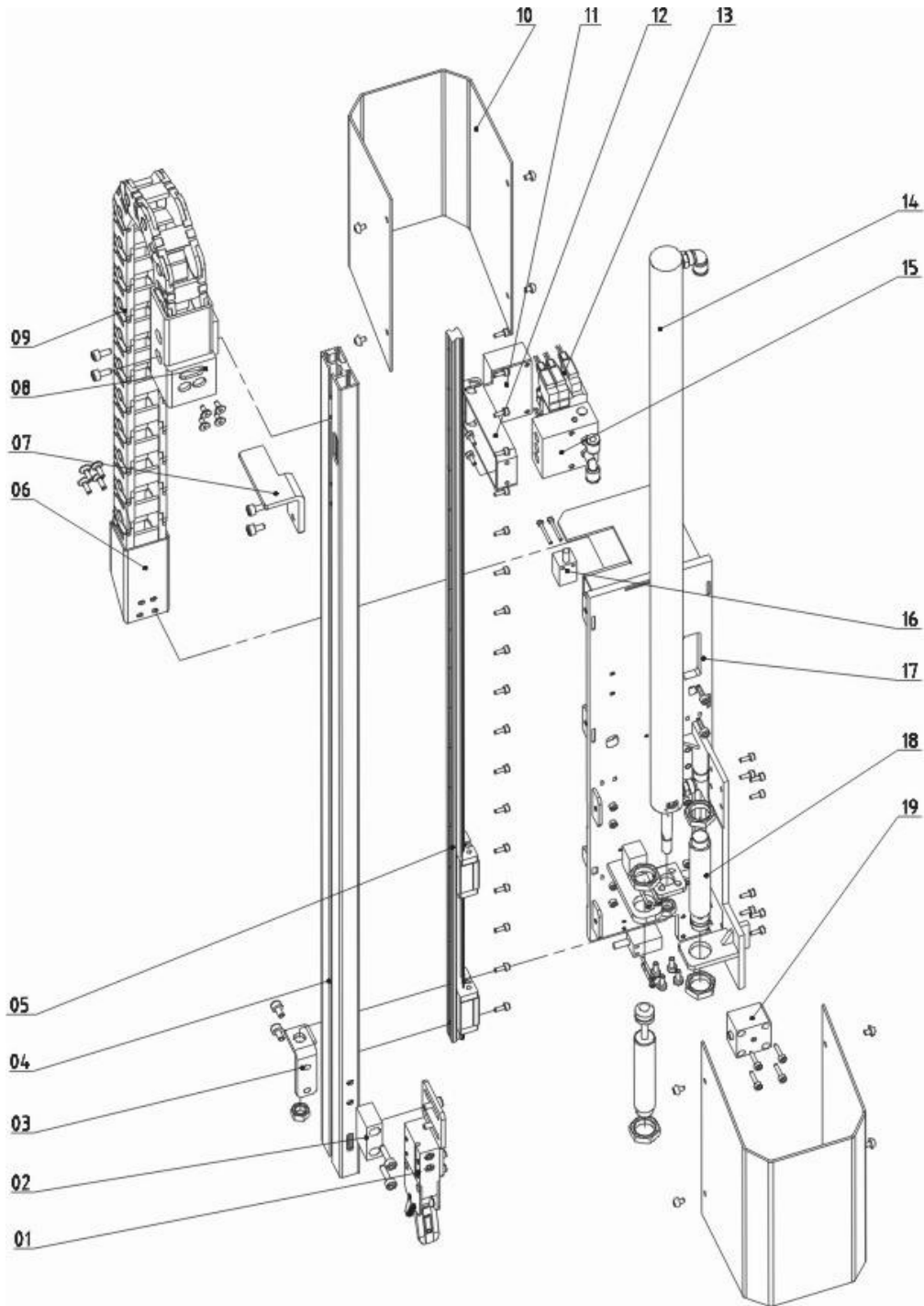
21	Buffer unit	BH91181200010	BH91181200010	BH91181200010	BH91181200010
22	Buffer cap	YW80200000000	YW80200000000	YW80200000000	YW80200000000
23	Proximity switch	-	-	-	-
24	Falling- proof cylinder	-	YE30055000350	-	YE30055000350
25	Up-going sensor sheet on main arm	BL70101000040	BL70101000040	BL70101000040	BL70101000040

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 7.4 Sub-Arm unit (ST1)



Picture 7-4

## 7.4.1 Parts List

Table 7-9: Parts List

No.	Name	Part number			
		ST1-550-1000	ST1-550-1000D	ST1-700-1400	ST1-700-1400D
1	Gripper	-	BH70401200040	-	BH70401200040
2	Up-going buffer block	-	BH70401200040	-	BH91502700110
3	Cylinder holder frame on sub-arm	-	BH70401200040	-	BH91952400110
4	Aluminum profile of sub-arm	-	BH91102500010	-	BH91502000010
5	Linear guide	-	-	-	YW31001562000
6	Drag chain connector on sub arm	-	BL70011200020	-	BL70011200020
7	Down baffle on sub ar	-	BL70101240040	-	BL70101240040
8	Drag chain connector unit on sub arm (up /down) 1	-	-	-	-
9	Drag chain on sub arm (up/down)	-	-	-	YE60152500000
10	Steel cover on sub arm	-	BL70101100020	-	BL70101100020
11	Terminal mounting plate on sub-arm	-	BL70111200040	-	BL70111200040
12	Terminal bottom frame on sub-arm	-	BL70101200040	-	BL70101200040
13	Magnetic valve	-	-	-	-
14	Cylinders on sub arm (up /down)	-	-	-	YE30257000000
15	Pneumatic distribution block on sub-arm	-	BH72550000050	-	BH72550000050
16	Proximity switch	-	-	-	-
17	Sub arm mounting plate	-	BL71018000040	-	BL71018000040
18	Shock absorber	-	-	-	-
19	Anti-falling cylinder	-	YE30055000350	-	YE30055000350

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

Table 7-10: Parts List

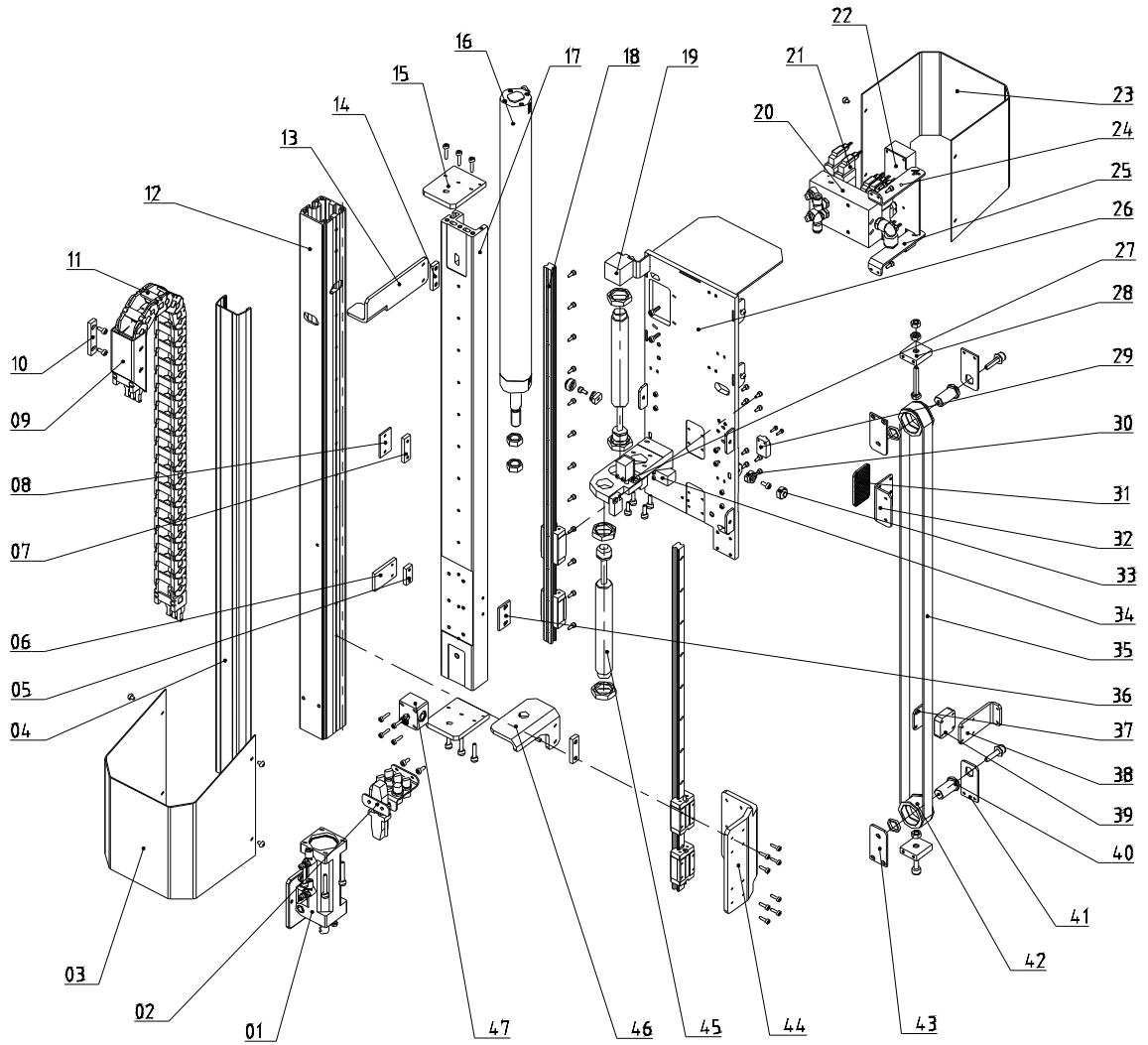
No.	Name	Part number			
		ST1-900-1600	ST1-900-1600D	ST1-1100-1800	ST1-1100-1800D
1	Gripper	-	BH70401200040	-	BH70401200040
2	Up-going buffer block	-	BH70401200040	-	BH91502700110
3	Cylinder holder frame on sub-arm	-	BH70401200040	-	BH70401200040
4	Aluminum profile of sub-arm	-	-	-	-
5	Linear guide	-	-	-	-
6	Drag chain connector on sub arm	-	BL70011200020	-	BL70011200020
7	Down baffle on sub ar	-	BL70101240040	-	BL70101240040
8	Drag chain connector unit on sub arm (up /down) 1	-	-	-	-
9	Drag chain on sub arm (up/down)	-	-	-	-
10	Steel cover on sub arm	-	BL70101100020	-	BL70101100020
11	Terminal mounting plate on sub-arm	-	BL70111200040	-	BL70111200040
12	Terminal bottom frame on sub-arm	-	BL70101200040	-	BL70101200040
13	Magnetic valve	-	-	-	-
14	Cylinders on sub arm (up /down)	-	-	-	-
15	Pneumatic distribution block on sub-arm	-	BH72550000050	-	BH72550000050
16	Proximity switch	-	-	-	-
17	Sub arm mounting plate	-	BL71018000040	-	BL71018000040
18	Shock absorber	-	-	-	-
19	Anti-falling cylinder	-	YE30055000350	-	YE30055000350

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 7.5 Main Arm (ST1-T)



Picture 7-5

## 7.5.1 Parts List

Table 7-11: Parts List

No.	Name	Part number			
		ST1-700-1400T	ST1-700-1400DT	ST1-900-1600T	ST1-900-1600DT
1	Upturning setup	BH10550900020	BH10550900020	BH10550900020	BH10550900020
2	Spare frame for air tube	BH10550900020	BH10550900020	BH10550900020	BL70102600020
3	Steel cover of main arm 2	BL70122000020	BL70122000020	BL70122000020	BL70122000020
4	Aluminum cover of main arm	BH13171300010	BH13171300010	BH13019130010	BH13019130010
5	Fixing plate	YW09601400110	YW09601400110	YW09601400110	YW09601400110
6	Origin sensor plate	BL69363000020	BL69363000020	BL69363000020	BL69363000020
7	Sensor fixing plate	YW09601400110	YW09601400110	YW09601400110	YW09601400110
8	Stack sensor sheet	BH91502550010	BH91502550010	BH91502550010	BH91502550010
9	Drag chain connector parts of main arm 1	-	-	-	-
10	Drag chain connector parts of main arm 2	-	-	-	-
11	Drag chain on main arm (up/down)	BL70012800020	BL70012800020	BL70012800020	BL70012800020
12	Aluminum profile of main arm	BH13170300010	BH13170300010	BH13019160010	BH13019160010
13	Down buffer plate 1 of main arm	BL70102400040	BL70102400040	BL70102400040	BL70102400040
14	Sensor fixing plate	YW09601400110	YW09601400110	YW09601400110	YW09601400110
15	Belt fixing plate 1	BL70019000020	BL70019000020	BL70019000020	BL70019000020
16	Cylinder on main arm (up/down)	-	-	-	-
17	Aluminum profile of main arm	BH13171400010	BH13171400010	BH13019120010	BH13019120010
18	Linear guide	YW31002017000	YW31002017000	-	-
19	Pressure switch with digital display	YE15300102500	YE15300102500	YE15300102500	YE15300102500
20	Pneumatic distribution block on main arm	BH72551100050	BH72551100050	BH72551100050	BH72551100050
21	Magnetic valve	-	-	-	-
22	Trunking mounting plate of main arm	BL70160100040	BL70160100040	BL70160100040	BL70160100040

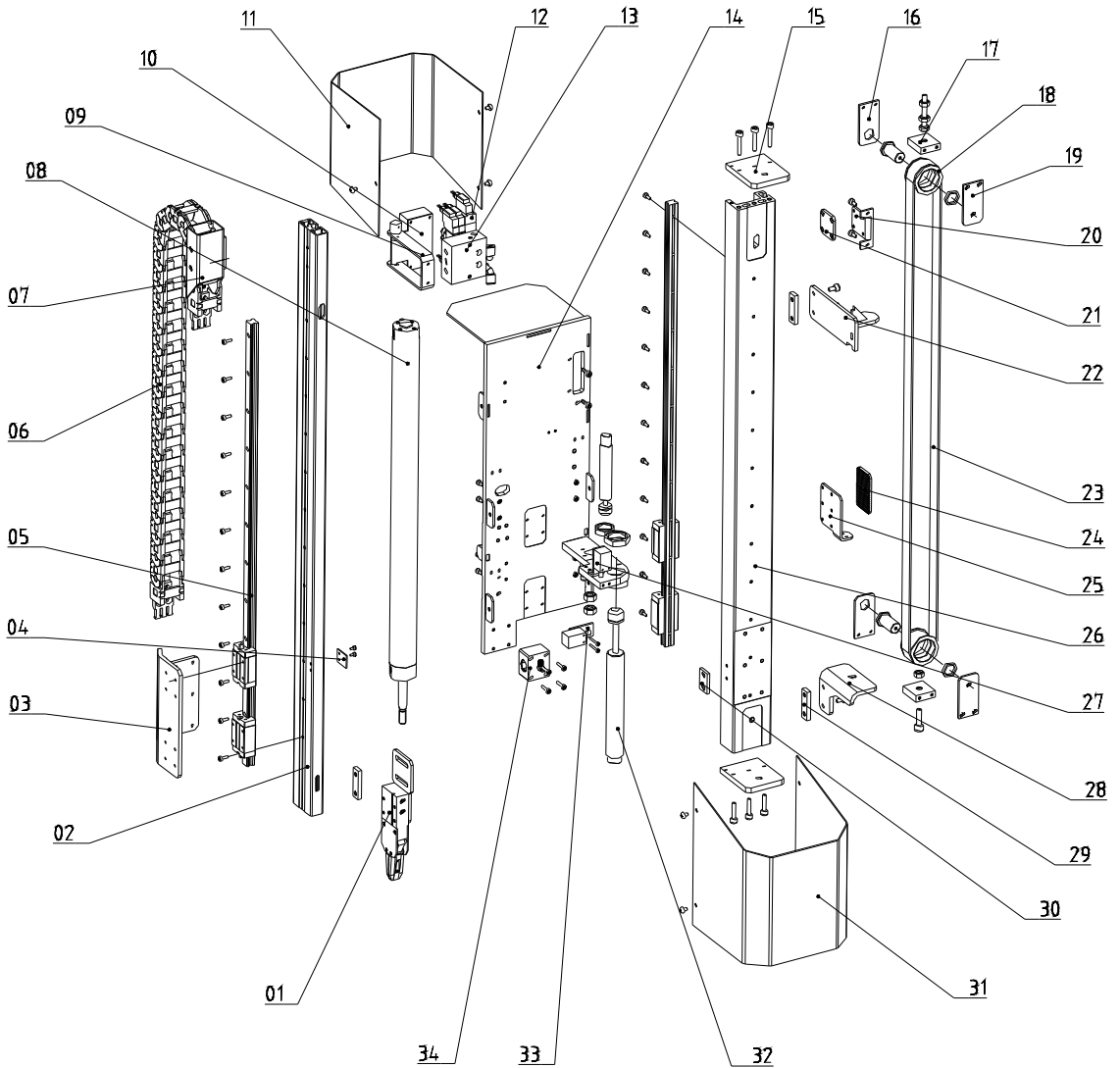
23	Steel cover of main arm 1	BL70120900020	BL70120900020	BL70120900020	BL70120900020
24	Terminal bottom frame 1	BL70110700040	BL70110700040	BL70110700040	BL70110700040
25	Terminal bottom 2	BL70110800040	BL70110800040	BL70110800040	BL70110800040
26	Main arm mounting plate	BL70102900040	BL70102900040	BL70102900040	BL70102900040
27	Proximity switch mounting plate	-	-	-	-
28	Fixing plate of pulley 3	BL70103600040	BL70103600040	BL70103600040	BL70103600040
29	Proximity switch	-	-	-	-
30	Buffer mounting unit	BH78133000010	BH78133000010	BH78133000010	BH78133000010
31	Tooth plate 2 of arm belt	-	-	-	-
32	Up-going fixing plate 1 of sub arm belt	-	BL72022800020	-	BL72022800020
33	Buffer cap	YW80200000000	YW80200000000	YW80200000000	YW80200000000
34	Proximity switch	-	-	-	-
35	Synchronous belt	-	-	-	-
36	Stack sensor sheet	BH91502550010	BH91502550010	BH91502550010	BL70112000040
37	Tooth plate 1 of arm belt	-	-	-	-
38	Up-going fixing plate of belt	BL70100500040	BL70100500040	BL70100500040	BL70100500040
39	Tooth plate 2 of arm belt	-	-	-	-
40	Connection shaft of telescopic arm	BH13011210010	BH13011210010	BH13011210010	BH13011210010
41	Fixing plate of pulley 1	BL70001200020	BL70001200020	BL70001200020	BL70001200020
42	Pulley on telescopic arm	BH13014130010	BH13014130010	BH13014130010	BH13014130010
43	Fixing plate of pulley 2	BL70102500020	BL70102500020	BL70102500020	BL70102500020
44	Linear slides mounting plate 1	BL70021000040	BL70021000040	BL70021000040	BL70021000040
45	Shock absorber	-	-	-	-
46	Cylinder holder frame of main arm	BL70110500040	BL70110500040	BL70110500040	BL70110500040
47	Anti-falling cylinder	YE30055000350	YE30055000350	YE30055000350	YE30055000350

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 7.6 Sub-arm (ST1-T: Telescopic Arm)



Picture 7-6



## 7.6.1 Parts List

Table 7-12: Parts List

No.	Name	Part number			
		ST1-700-1400T	ST1-700-1400DT	ST1-900-1600T	ST1-900-1600DT
1	Gripper	-	BH70401200040	-	BH70401200040
2	Aluminum profile of sub-arm	-	BH78071430110	-	BH79901600510
3	Linear slides fixing plate 1	-	BL70021000040	-	BL70021000040
4	Sensor sheet	-	-	-	-
5	Linear guide	-	YW09601400110	-	YW09601400110
6	Drag chain on sub-arm (up/down)	-	-	-	-
7	Drag connector 1 on sub-arm	-	-	-	-
8	Cylinder (up/down) on sub-arm	-	-	-	-
9	Terminal bottom frame on sub-arm	-	BL70101200040	-	BL70101200040
10	Trunking frame on sub-arm	-	-	-	-
11	Steel cover 1 of sub arm	-	BL70102100020	-	BL70102100020
12	Magnetic valve	-	-	-	-
13	Pneumatic distribution block on sub-arm	-	BH72550000050	-	BH72550000050
14	Sub-arm mounting plate	-	BL72002400040	-	BL72002400040
15	Belt fixing plate 1	-	BL70019000020	-	BL70019000020
16	Pulley fixing plate 1	-	BL70001200020	-	BL70001200020
17	Pulley fixing plate 3	-	BL70103600040	-	BL70103600040
18	Pulley on telescopic arm	-	BH13014130010	-	BH13014130010
19	Pulley fixing plate 2	-	BL70102500020	-	BL70102500020
20	Up-going fixing plate 1 of sub-arm belt	-	BL70010300040	-	BL70010300040

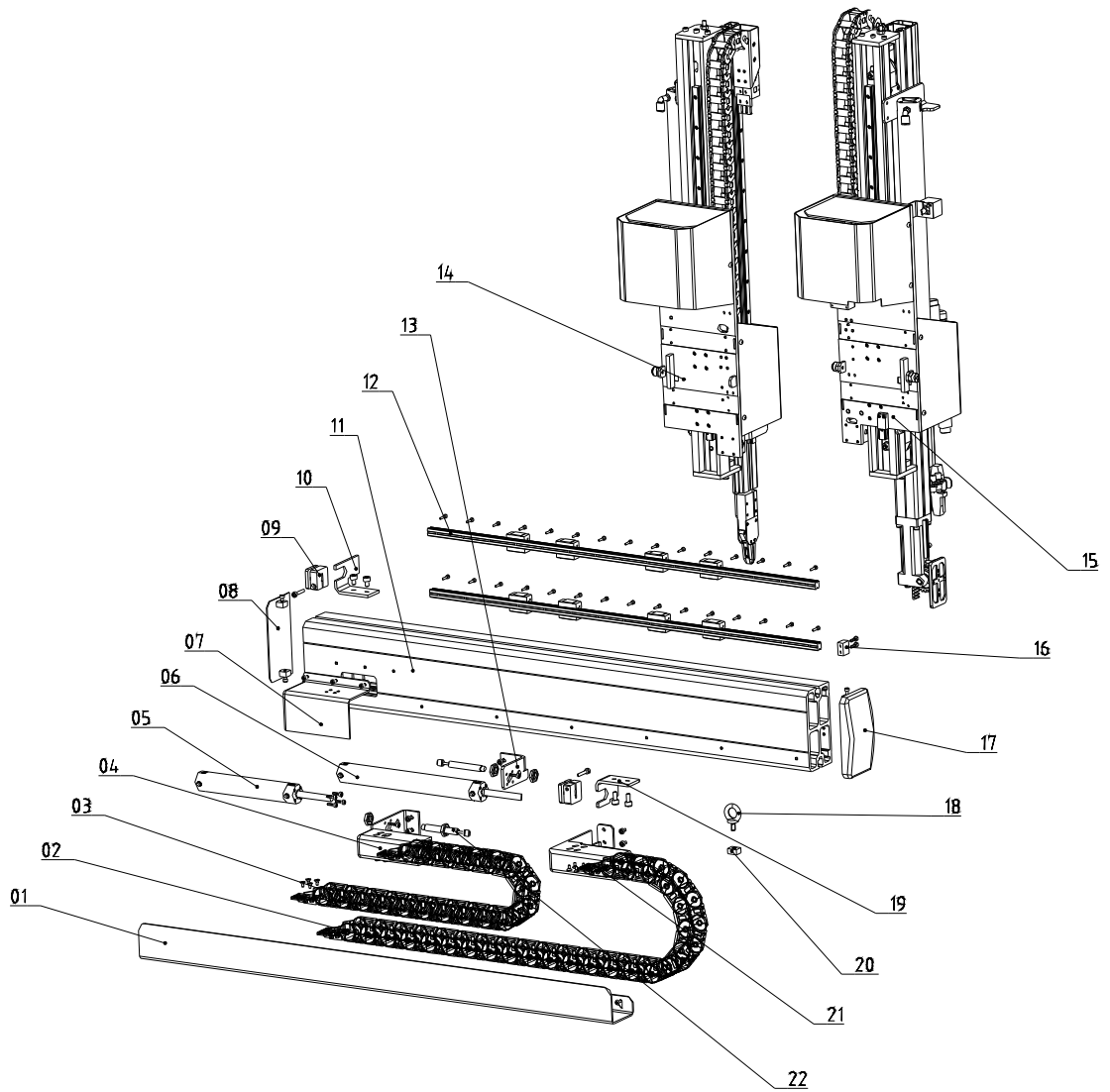
21	Tooth plate 2 of Arm belt	-	-	-	-
22	Tooth plate 2 of Arm belt	-	BL72022700040	-	BL72022700040
23	Synchronous belt	-	-	-	-
24	Tooth plate 3 of Arm belt	-	BL70210800040	-	BL70210800040
25	Belt fixing plate	-	BL70140400020	-	BL70140400020
26	Aluminum profile of sub-arm	-	BH78714180010	-	BH79901600410
27	Proximity switch	-	-	-	-
28	Cylinder supporting frame on sub arm	-	BL72201900040	-	BL72201900040
29	Sensor fixing plate	-	YW09601400110	-	YW09601400110
30	Up-going sensor plate of main arm	-	-	-	-
31	Steel cover 2 of sub arm	-	BL70100100020	-	BL70100100020
32	Shock absorber	-	-	-	-
33	Mounting plate of proximity switch	-	-	-	-
34	Anti-falling cylinder	-	YE30055000350	-	YE30055000350

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 7.7 Vertical (ST1-T: Telescopic Arm)



Picture 7-7

## 7.7.1 Parts List

Table 7-13: Parts List

No.	Name	Part number			
		ST1-700-1400T	ST1-700-1400DT	ST1-900-1600T	ST1-900-1600DT
1	Drag supporting frame on vertical	BL70550900020	BL70550900020	BL70190900020	BL70190900020
2	Drag chain of main arm	-	-	-	-
3	Vertical drag of sub-arm	BL70150900020	BL70150900020	BL70150900020	BL70150900020
4	Vertical drag frame of sub-arm	-	-	-	-
5	Vertical cylinder of sub-arm	-	-	-	-
6	Vertical cylinder of main-arm	-	-	-	-
7	Drag cover of vertical	BL70105000020	BL70105000020	BL70105000020	BL70105000020
8	Left cover of vertical arm	BL70107000020	BL70107000020	BL70107000020	BL70107000020
9	Piston rod	YW09055000300	YW09055000300	YW09055000300	YW09055000300
10	Cylinder holder frame of sub-arm	BL70150900020	BL70150900020	BL70150900020	BL70150900020
11	Aluminum profile of vertical	BH91801600010	BH91801600010	-	-
12	Linear guide	-	-	-	-
13	Fixing frame of vertical cylinder	BL70103000040	BL70103000040	BL70103000040	BL70103000040
14	Sub-arm	-	BH78701400110	-	BH78901600110
15	Main arm	BH78701400010	BH78701400010	BH78901600010	BH78901600010
16	Limit baffler	BH91202500110	BH91202500110	BH91202500110	BH91202500110
17	Right cover of vertical arm	BH91905000010	BH91905000010	-	-
18	Lift ring	BH13014130010	BH13014130010	BH13014130010	BH13014130010
19	Vertical cylinder holder frame of main arm	BH91801600010	BH91801600010	-	-

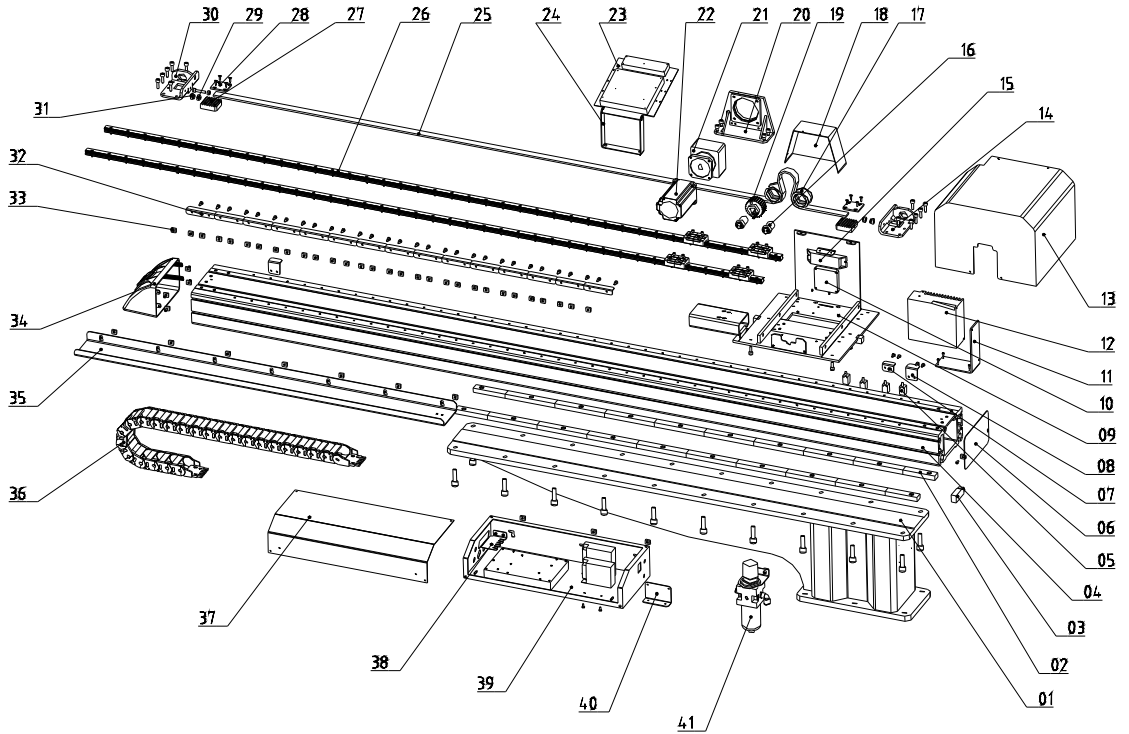
20	Fixing block	-	-	-	-
21	Vertical drag frame of main arm	BH91801600010	BH91801600010	BH91801600010	BH91801600010
22	Shock absorber	-	-	-	-

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 7.8 Traverse unit (ST1-T: Middle Telescopic Arm)



Picture 7-8

## 7.8.1 Parts List

Table 7-14: Parts List

No.	Name	Part number			
		ST1-1100-1800T	ST1-1100-1800DT	ST1-1300-2000T	ST1-1300-2000T
1	Base	BW21132000000	BW21132000000	BW21132000000	BW21132000000
2	Beams fixed block	-	-	-	-
3	Pressure switch	-	-	-	-
4	Beam	BH72111800010	BH72111800010	-	-
5	Proximity switch	-	-	-	-
6	Beam's end cover	BL70103300020	BL70103300020	BL70103300020	BL70103300020
7	Origin sensor plate	BL69363000020	BL69363000020	-	-
8	Limitation sensor plate	BL69363000020	BL69363000020	BL69363000020	BL69363000020
9	Sliding base	BL72118000020	BL72118000020	BL72118000020	BL72118000020
10	Exhaust fan	YM50801502400	YM50801502400	YM50801502400	YM50801502400
11	Driver mounting plate	-	-	-	-
12	Servo driver	-	-	-	-
13	Cover of sliding base	BL72105000020	BL72105000020	BL72105000020	BL72105000020
14	Belt fixing supporting frame 2	-	-	-	-
15	Braking resistor	YE20200450000	YE20200450000	YE20200450000	YE20200450000
16	Connection shaft	BH91304800010	BH78111000010	BH78111000010	BH78111000010
17	Pulley	BH91030000010	BH78112000010	BH78112000010	BH78112000010
18	Cover of motor supporting frame	BL72108200020	BL72108200020	BL72108200020	BL72108200020
19	Synchronous pulley	YW08621900000	-	YW08621900000	-
20	Motor supporting frame	BL72109000040	BL72109000040	BL72109000040	BL72109000040
21	Speed reducer	-	-	-	-
22	Servo motor	-	-	-	-
23	Transverse Terminal mounting plate	BL72103000020	BL72103000020	BL72103000020	BL72103000020

24	Transverse terminal bottom supporting frame	BL72104100020	BL72104100020	BL72104100020	BL72104100020
25	Synchronous belt	YR00082500100	YR00082500100	YR00082500100	YR00082500100
26	Linear guide	YW31002526000	YW31002526000	-	-
27	Belt pressing plate	YW09564900110	YW09564900110	YW09564900110	YW09564900110
28	Belt cleat connecting parts	-	-	-	-
29	Buffer cap	-	-	-	-
30	Belt fixing frame 1	-	-	-	-
31	Buffer	BH91151200010	BH91151200010	BH91151200010	BH91151200010
32	Safety mold sensor plate	BL69002200020	BL69002200020	BL69002200020	BL69002200020
33	Fixing plate	-	-	-	-
34	End cover of transverse beam	BH74000100010	BH74000100010	BH74000100010	BH74000100010
35	Traverse drag supporting frame	BL72110800020	BL72110800020	-	-
36	Traverse drag	YW06251500000	YW06251500000	YW06251500000	YW06251500000
37	Cover of control box	BL72107000020	BL72107000020	BL72107000020	BL72107000020
38	Connecting plate of grounded	BL70126000020	BL70126000020	BL70126000020	BL70126000020
39	Control box	BL72106000020	BL72106000020	BL72106000020	BL72106000020
40	Wave filter fixing plate	-	-	-	-
41	Filter regulating valve	YE30400015000	YE30400015000	YE30400015000	YE30400015000

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.



Table 7-15: Parts List

No.	Name	Part number	
		ST1-1500-2200T	ST1-1500-2200DT
1	Base	BL72182470020	BL72182470020
2	Beams fixed block	-	-
3	Pressure switch	-	-
4	Beam	BH72152200010	BH72152200010
5	Proximity switch	-	-
6	Beam's end cover	BL70103300020	BL70103300020
7	Origin sensor plate	-	-
8	Limitation sensor plate	BL69363000020	BL69363000020
9	Sliding base	BL72118000020	BL72118000020
10	Exhaust fan	YM50801502400	YM50801502400
11	Driver mounting plate	-	-
12	Servo driver	-	-
13	Cover of sliding base	BL72105000020	BL72105000020
14	Belt fixing supporting frame 2	-	-
15	Braking resistor	YE20200450000	YE20200450000
16	Connection shaft	BH78111000010	BH78111000010
17	Pulley	BH78112000010	BH78112000010
18	Cover of motor supporting frame	BL72108200020	BL72108200020
19	Synchronous pulley	YW08621900000	YW08621900000
20	Motor supporting frame	BL72109000040	BL72109000040
21	Speed reducer	-	-
22	Servo motor	-	-
23	Transverse Terminal mounting plate	BL72103000020	BL72103000020
24	Transverse terminal bottom supporting frame	BL72104100020	BL72104100020
25	Synchronous belt	YR00082500100	YR00082500100
26	Linear guide	-	-
27	Belt pressing plate	YW09564900110	YW09564900110
28	Belt cleat connecting parts	-	-

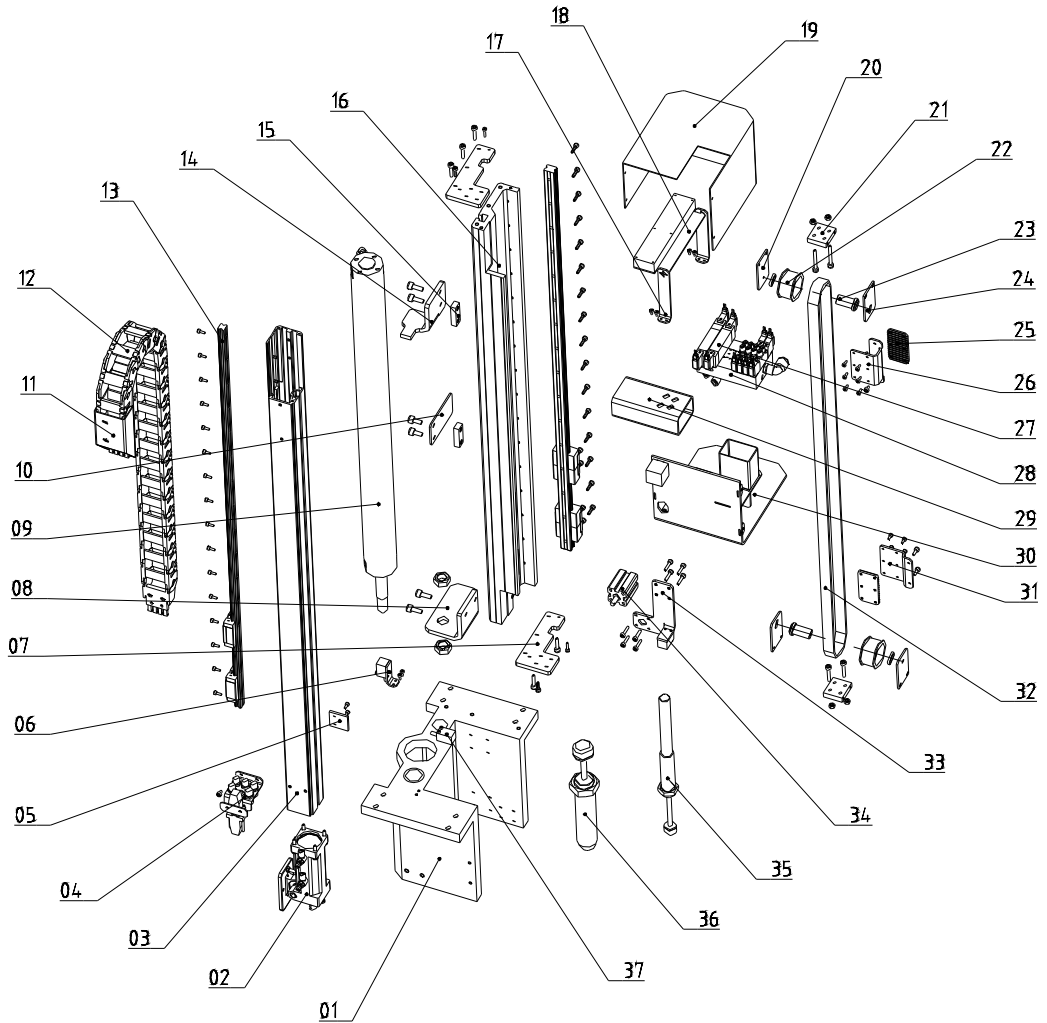
29	Buffer cap	-	-
30	Belt fixing frame 1	BL71010900020	BL71010900020
31	Buffer	BH91151200010	BH91151200010
32	Safety mold sensor plate	BL69002200020	BL69002200020
33	Fixing plate	-	-
34	End cover of transverse beam	BH74000100010	BH74000100010
35	Traverse drag supporting frame	-	-
36	Traverse drag	YW06251500000	YW06251500000
37	Cover of control box	BL72107000020	BL72107000020
38	Connecting plate of grounded	BL70126000020	BL70126000020
39	Control box	BL72106000020	BL72106000020
40	Wave filter fixing plate	-	-
41	Filter regulating valve	YE30400015000	YE30400015000

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 7.9 Main Arm (ST1-T: Middle Telescopic Arm)



Picture 7-9

## 7.9.1 Parts List

Table 7-16: Parts List

No.	Name	Part number			
		ST1-1100-1800T	ST1-1100-1800DT	ST1-1300-2000T	ST1-1300-2000T
1	Main arm mounting frame	BH13000400010	BH13000400010	BH13000400010	BH13000400010
2	Rotation unit	BH73000100050	BH73000100050	BH73000100050	BH73000100050
3	Aluminum profile of main arm	BH72111801010	BH72111801010	-	-
4	Spare frame for air tube	BL70102600020	BL70102600020	BL70102600020	BL70102600020
5	Up-going sensor plate	BL72112000020	BL72112000020	BL72112000020	BL72112000020
6	Mounting plate of proximity switch	BL72128000020	BL72128000020	BL72128000020	BL72128000020
7	Pulley tightening plate	BL72113000020	BL72113000020	BL72113000020	BL72113000020
8	Cylinder holder frame of main arm (up/down)	BL72301600040	BL72301600040	BL72301600040	BL72301600040
9	Cylinder on main arm (up/down)	YE31505500000	YE31505500000	-	-
10	Arm belt fixing plate	-	-	-	-
11	Drag connector of main arm	BL70108000020	BL70108000020	BL70108000020	BL70108000020
12	Drag chain on main arm (up/down)	YE60250003100	YE60250003100	YE60250003100	YE60250003100
13	Linear guide	YW31008202000	YW31008202000	-	-
14	Arm down-going baffle	BL72112000040	BL72112000040	-	-
15	Sensor fixing plate	YW09601400110	YW09601400110	YW09601400110	YW09601400110
16	Aluminum profile of main arm	BH72111803010	BH72111803010	-	-
17	Terminal bottom frame on main arm	-	-	-	-
18	Terminal mounting plate of main arm	-	-	-	-
19	Steel cover of main arm	BL72111000020	BL72111000020	BL72111000020	BL72111000020
20	Pulley fixing plate 2	BL72110600020	BL72110600020	BL72110600020	BL72110600020

21	Pulley fixing plate 3	BL72300500040	BL72300500040	BL72300500040	BL72300500040
22	Pulley on telescopic arm	BH78011000010	BH78011000010	BH78011000010	BH78011000010
23	Connecting shaft of telescopic arm	BH78010900010	BH78010900010	BH78010900010	BH78010900010
24	Pulley fixing plate 1 of pulley	BL72301700020	BL72301700020	BL72301700020	BL72301700020
25	Belt pressing plate	BL72122000040 BL72227000040	BL72122000040 BL72227000040	BL72122000040 BL72227000040	BL72122000040 BL72227000040
26	Belt down-going fixing plate on main arm	BL72111900020	BL72111900020	BL72111900020	BL72111900020
27	Magnetic valve	-	-	-	-
28	Pneumatic distribution block on main arm	BH78010100050	BH78010100050	BH78010100050	BH78010100050
29	Vertical drag connector on main arm	BL72121000020	BL72121000020	BL72121000020	BL72121000020
30	Air tube connection plug on main arm	BL72111700020	BL72111700020	BL72111700020	BL72111700020
31	Main arm belt up-going fixing plate	BL72111800020	BL72111800020	BL72111800020	BL72111800020
32	Synchronous belt	YR00052000200	YR00052000200	YR00052000200	YR00052000200
33	Anti-falling cylinder frame on main arm	BL72122000020	BL72122000020	BL72122000020	BL72122000020
34	Anti-falling cylinder	YE30201540000	YE30201540000	YE30201540000	YE30201540000
35	Shock absorber 1	YW10258020000	YW10258020000	YW10258020000	YW10258020000
36	Shock absorber 2	YW80366000000	YW80366000000	YW80366000000	YW80366000000
37	Proximity switch	-	-	-	-

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

Table 7-17: Parts List

No.	Name	Part number	
		ST1-1500-2200T	ST1-1500-2200DT
1	Main arm mounting frame	BH13000400010	BH13000400010
2	Rotation unit	BH73000100050	BH73000100050
3	Aluminum profile of main arm	-	-
4	Spare frame for air tube	BL70102600020	BL70102600020
5	Up-going sensor plate	BL72112000020	BL72112000020
6	Mounting plate of proximity switch	BL72128000020	BL72128000020
7	Pulley tightening plate	BL72113000020	BL72113000020
8	Cylinder holder frame of main arm (up/down)	BL72301600040	BL72301600040
9	Cylinder on main arm (up/down)	-	-
10	Arm belt fixing plate	-	-
11	Drag connector of main arm	BL70108000020	BL70108000020
12	Drag chain on main arm (up/down)	YE60250003100	YE60250003100
13	Linear guide	-	-
14	Arm down-going baffler	-	-
15	Sensor fixing plate	YW09601400110	YW09601400110
16	Aluminum profile of main arm	-	-
17	Terminal bottom frame on main arm	-	-
18	Terminal mounting plate of main arm	-	-
19	Steel cover of main arm	BL72111000020	BL72111000020
20	Pulley fixing plate 2	BL72110600020	BL72110600020
21	Pulley fixing plate 3	BL72300500040	BL72300500040
22	Pulley on telescopic arm	BH78011000010	BH78011000010
23	Connecting shaft of telescopic arm	BH78010900010	BH78010900010
24	Pulley fixing plate 1 of pulley	BL72301700020	BL72301700020
25	Belt pressing plate	BL72122000040	BL72122000040
		BL72227000040	BL72227000040

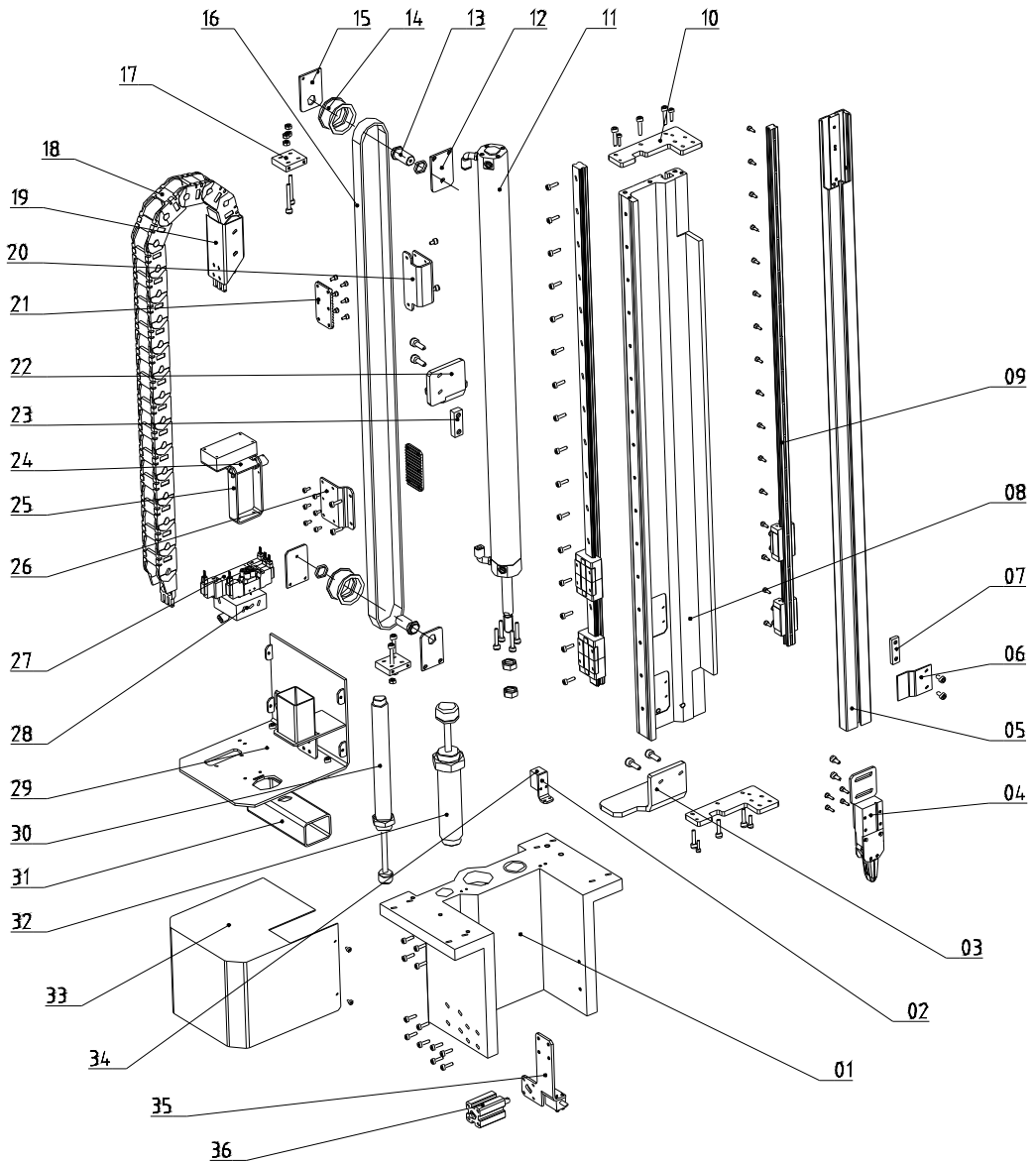
26	Belt down-going fixing plate on main arm	BL72111900020	BL72111900020
27	Magnetic valve	-	-
28	Pneumatic distribution block on main arm	BH78010100050	BH78010100050
29	Vertical drag connector on main arm	BL72121000020	BL72121000020
30	Air tube connection plug on main arm	BL72111700020	BL72111700020
31	Main arm belt up-going fixing plate	BL72111800020	BL72111800020
32	Synchronous belt	YR00052000200	YR00052000200
33	Anti-falling cylinder frame on main arm	BL72122000020	BL72122000020
34	Anti-falling cylinder	YE30201540000	YE30201540000
35	Shock absorber 1	YW10258020000	YW10258020000
36	Shock absorber 2	YW80366000000	YW80366000000
37	Proximity switch	-	-

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 7.10 Sub-arm (ST1-T: Middle Telescopic Arm)



Picture 7-10



## 7.10.1 Parts List

Table 7-18: Parts List

No.	Name	Part number			
		ST1-1100-1800T	ST1-1100-1800DT	ST1-1300-2000T	ST1-1300-2000T
1	Sub-arm mounting plate	-	BH13000303010	-	BH13000303010
2	Fixing plate of proximity switch	-	BL72001120020	-	BL72001120020
3	Cylinder (up/down) holder frame on sub arm	-	BL72100800040	-	BL72100800040
4	Gripper	-	BH70401200040	-	BH70401200040
5	Aluminum profile of sub-arm	-	BH78180020010	-	BH78180020010
6	Stack sensor sheet	-	BL72110500020	-	BL72110500020
7	Sensor fixing plate	-	YW09601400110	-	YW09601400110
8	Connection aluminum profile of sub-arm	-	BH78180100040	-	-
9	Linear guide	-	YW31008202000	-	-
10	Pulley tightening plate	-	BL72113000020	-	BL72113000020
11	Cylinder (up/down) on sub-arm	-	YE31405750000	-	-
12	Pulley fixing plate 2	-	BL72110600020	-	BL72110600020
13	Connecting shaft of telescopic arm	-	BH78010900010	-	BH78010900010
14	Pulley on telescopic arm	-	BH78011000010	-	BH78011000010
15	Pulley fixing plate 1	-	BL72301700020	-	BL72301700020
16	Synchronous belt	-	YR00052000200	-	YR00052000200
17	Pulley fixing plate 3	-	BL72300500040	-	BL72300500040
18	Drag (up/down) on sub arm	-	YE60250005500	-	YE60250005500
19	Drag (up/down) connector on sub arm	-	BL72000900020	-	BL72000900020
20	Belt down-going fixing plate on sub arm	-	-	-	-

21	Belt pressing plate	-	BL72122000040	-	BL72122000040
22	Arm down-going baffle	-	BL72001100040	-	BL72001100040
23	Cylinder fixing plate	-	BH91451600110	-	BH91451600110
24	Terminal mounting plate on sub arm	-	-	-	-
25	Terminal bottom frame on sub arm	-	-	-	-
26	Belt up-going fixing plate on sub arm	-	BL72100400020	-	BL72100400020
27	Magnetic valve	-	-	-	-
28	Pneumatic distribution block on sub arm	-	BH70258300040	-	BH70258300040
29	Air tube connection plug on sub-arm	-	BL72100700020	-	BL72100700020
30	Shock absorber 1	-	YW10258020000	-	YW10258020000
31	Vertical drag connector on sub arm	-	BL72000900020	-	BL72000900020
32	Shock absorber 2	-	YW80366000000	-	YW80366000000
33	Steel cover of sub-arm	-	BL72100600020	-	BL72100600020
34	Proximity switch	-	-	-	-
35	Anti-falling cylinder supporting frame of sub-arm	-	BL72100500020	-	BL72100500020
36	Anti-falling cylinder	-	YE30201540000	-	YE30201540000

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

Table 7-19: Parts List

No.	Name	Part number	
		ST1-1500-2200T	ST1-1500-2200DT
1	Sub-arm mounting plate	-	BH13000303010
2	Fixing plate of proximity switch	-	BL72001120020
3	Cylinder (up/down) holder frame on sub arm	-	BL72100800040
4	Gripper	-	BH70401200040
5	Aluminum profile of sub-arm	-	BH78180020010
6	Stack sensor sheet	-	BL72110500020
7	Sensor fixing plate	-	YW09601400110
8	Connection aluminum profile of sub-arm	-	-
9	Linear guide	-	-
10	Pulley tightening plate	-	BL72113000020
11	Cylinder (up/down) on sub-arm	-	-
12	Pulley fixing plate 2	-	BL72110600020
13	Connecting shaft of telescopic arm	-	BH78010900010
14	Pulley on telescopic arm	-	BH78011000010
15	Pulley fixing plate 1	-	BL72301700020
16	Synchronous belt	-	YR00052000200
17	Pulley fixing plate 3	-	BL72300500040
18	Drag (up/down) on sub arm	-	YE60250005500
19	Drag (up/down) connector on sub arm	-	BL72000900020
20	Belt down-going fixing plate on sub arm	-	-
21	Belt pressing plate	-	BL72122000040
22	Arm down-going baffler	-	BL72001100040
23	Cylinder fixing plate	-	BH91451600110
24	Terminal mounting plate on sub arm	-	-
25	Terminal bottom frame on sub arm	-	-
26	Belt up-going fixing plate on sub arm	-	BL72100400020

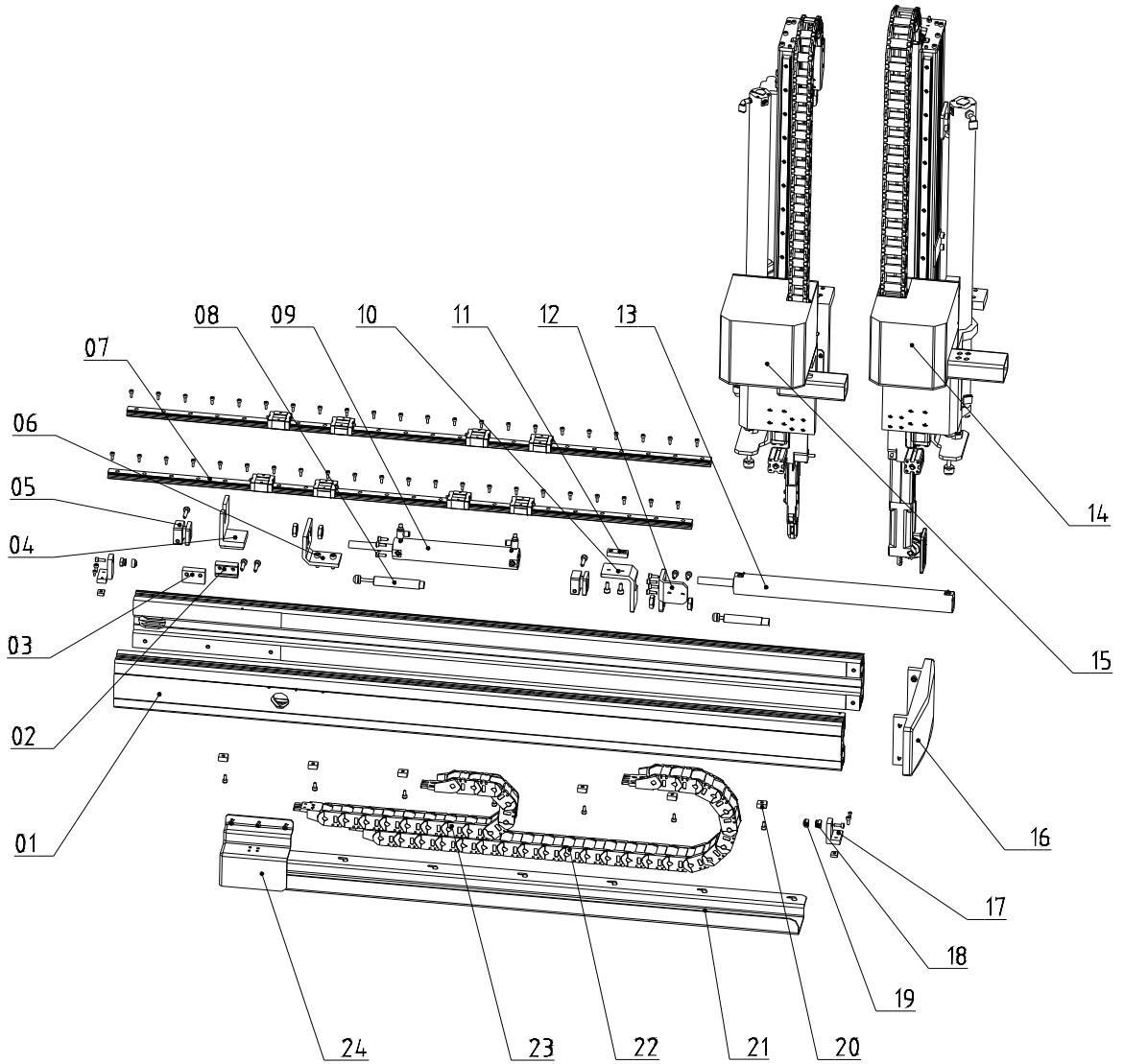
27	Magnetic valve	-	-
28	Pneumatic distribution block on sub arm	-	BH70258300040
29	Air tube connection plug on sub-arm	-	BL72100700020
30	Shock absorber 1	-	YW10258020000
31	Vertical drag connector on sub arm	-	BL72000900020
32	Shock absorber 2	-	YW80366000000
33	Steel cover of sub-arm	-	BL72100600020
34	Proximity switch	-	-
35	Anti-falling cylinder supporting frame of sub-arm	-	BL72100500020
36	Anti-falling cylinder	-	YE30201540000

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

### 7.11 Crosswise Unit (ST1-T: Middle Telescopic Arm)



Picture 7-11

## 7.11.1 Parts List

Table 7-20: Parts List

No.	Name	Part number			
		ST1-1100-1800T	ST1-1100-1800DT	ST1-1300-2000T	ST1-1300-2000T
1	Crosswise beam base	-	-	-	-
2	Buffer fixing block 6	BH78511300040	BH78511300040	BH78511300040	BH78511300040
3	Buffer fixing block 5	BH78511200040	BH78511200040	BH78511200040	BH78511200040
4	Cylinder holder frame on sub-arm	-	-	-	-
5	Crosswise cylinder rod clamping device	BH78110000040	BH78110000040	BH78110000040	BH78110000040
6	Crosswise cylinder fixing frame on sub-arm	-	BL72104000040	-	BL72104000040
7	Linear guide	-	YW31002011000	-	-
8	Shock absorber	-	-	-	-
9	Crosswise cylinder on sub-arm	-	BL72100800040	-	BL72100800040
10	Crosswise cylinder holder on main arm	-	-	-	-
11	Sensor fixing sheet	YW09601400110	YW09601400110	YW09601400110	YW09601400110
12	Crosswise cylinder fixing frame of main arm	BL72101100040	BL72101100040	BL72101100040	BL72101100040
13	Crosswise cylinder on main arm	YE31140108400	YE31140108400	YE31140108400	YE31140108400
14	Main arm	BH78111800010	BH78111800010	BH78111800010	BH78111800010
15	Sub arm	-	BH78180021010	-	BH78180021010
16	Right cover of Crosswise beam	BH91905000010	BH91905000010	BH91905000010	BH91905000010
17	Limitation baffle 3	-	-	-	-
18	Buffer installing part	-	-	-	-

19	Buffer cap	-	-	-	-
20	Crosswise drag mounting plate	-	-	-	-
21	Crosswise drag supporting frame	-	-	-	-
22	Crosswise drag on main arm	YE60250003100	YE60250003100	YE60250003100	YE60250003100
23	Crosswise drag on sub-arm	-	YE60250005500	-	YE60250005500
24	Cover of Crosswise	BL72101800020	BL72101800020	BL72101800020	BL72101800020

\* means possible broken parts.

\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

Table 7-21: Parts List

No.	Name	Part number	
		ST1-1500-2200T	ST1-1500-2200DT
1	Crosswise beam base	-	-
2	Buffer fixing block 6	BH78511300040	BH78511300040
3	Buffer fixing block 5	BH78511200040	BH78511200040
4	Cylinder holder frame on sub-arm	-	-
5	Crosswise cylinder rod clamping device	BH78110000040	BH78110000040
6	Crosswise cylinder fixing frame on sub-arm	-	BL72104000040
7	Linear guide	-	-
8	Shock absorber	-	-
9	Crosswise cylinder on sub-arm	-	BL72100800040
10	Crosswise cylinder holder on main arm	-	-
11	Sensor fixing sheet	YW09601400110	YW09601400110
12	Crosswise cylinder fixing frame of main arm	BL72101100040	BL72101100040
13	Crosswise cylinder on main arm	YE31140108400	YE31140108400
14	Main arm	BH78111800010	BH78111800010
15	Sub arm	-	BH78180021010
16	Right cover of Crosswise beam	BH91905000010	BH91905000010
17	Limitation baffler 3	-	-
18	Buffer installing part	-	-
19	Buffer cap	-	-
20	Crosswise drag mounting plate	-	-
21	Crosswise drag supporting frame	-	-
22	Crosswise drag on main arm	YE60250003100	YE60250003100
23	Crosswise drag on sub-arm	-	YE60250005500
24	Cover of Crosswise	BL72101800020	BL72101800020

\* means possible broken parts.

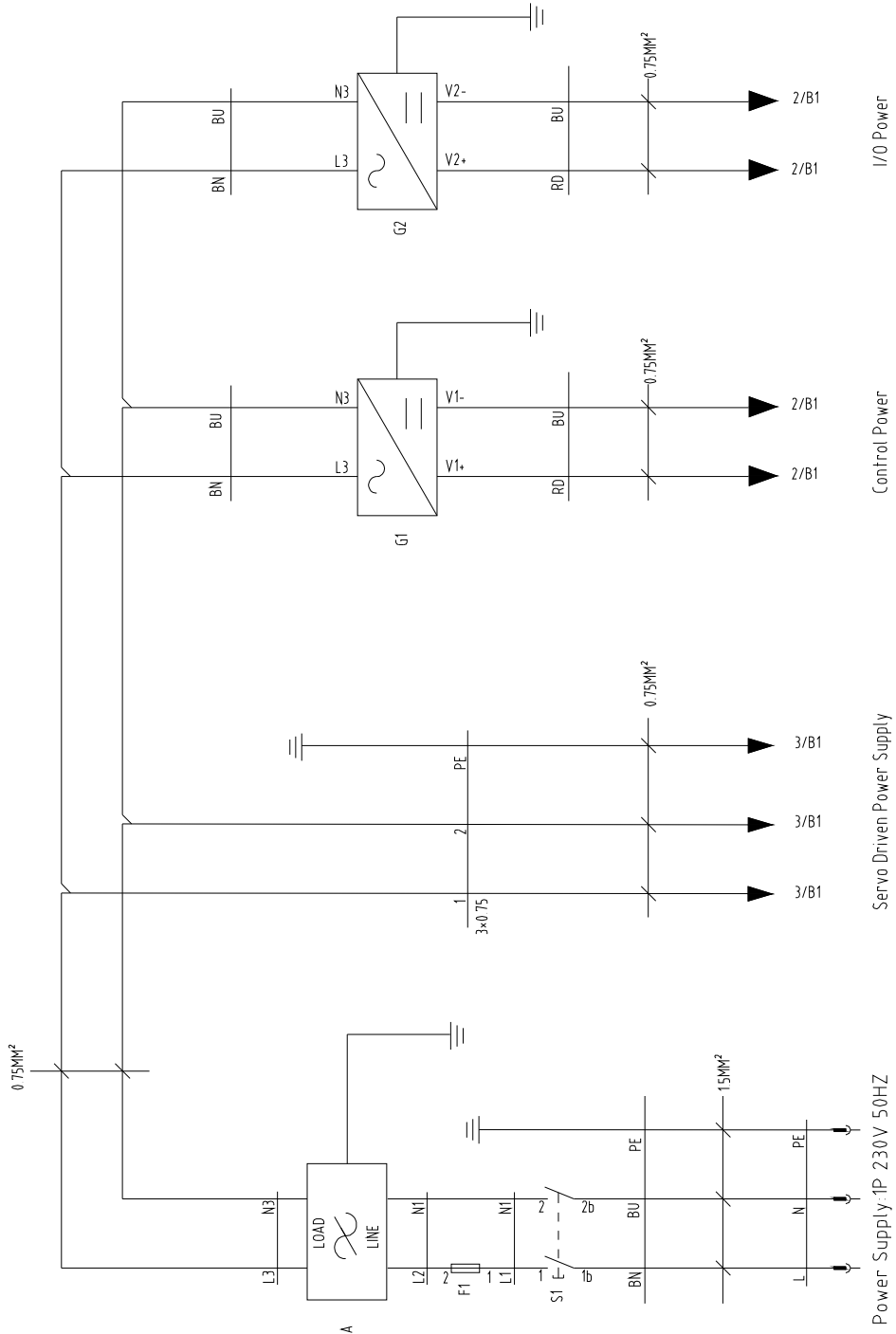
\*\* means easy broken part. and spare backup is suggested.

Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.



## 8. Electric Control Chart

### 8.1 The Power Input Wiring Diagram

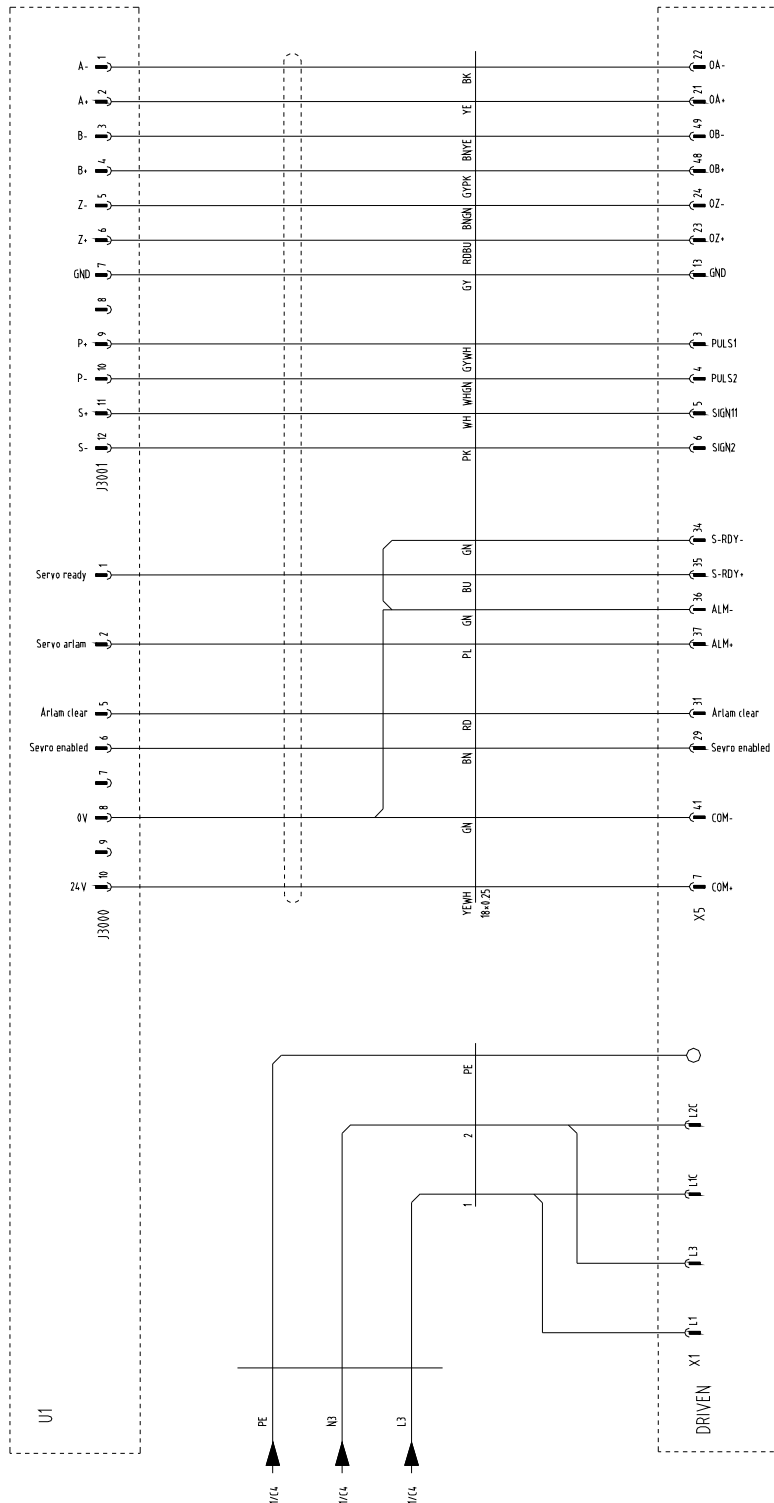


Picture 8-1

129(147)

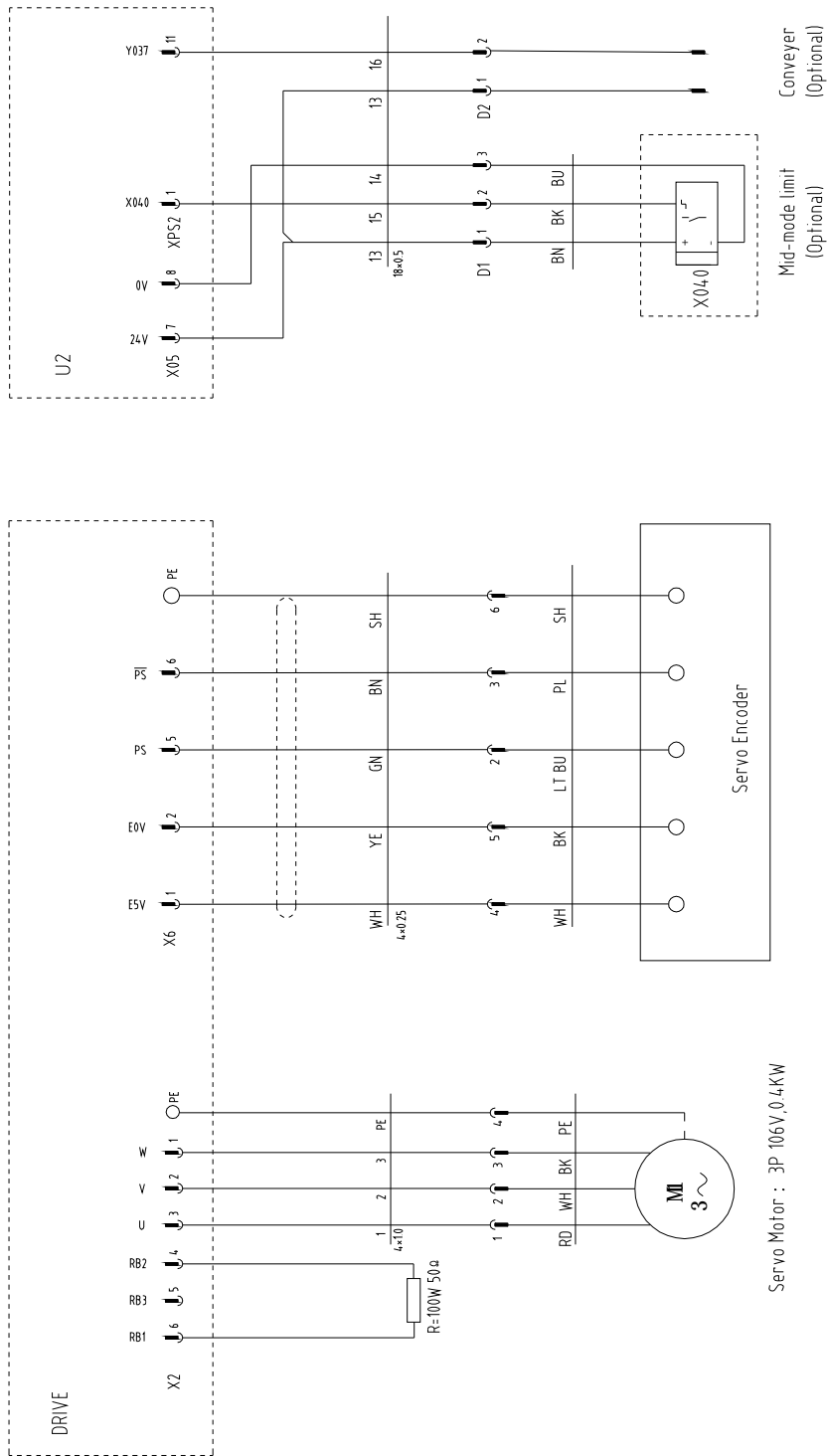


### 8.3 Panasonic Servo Motor Wiring Diagram 1



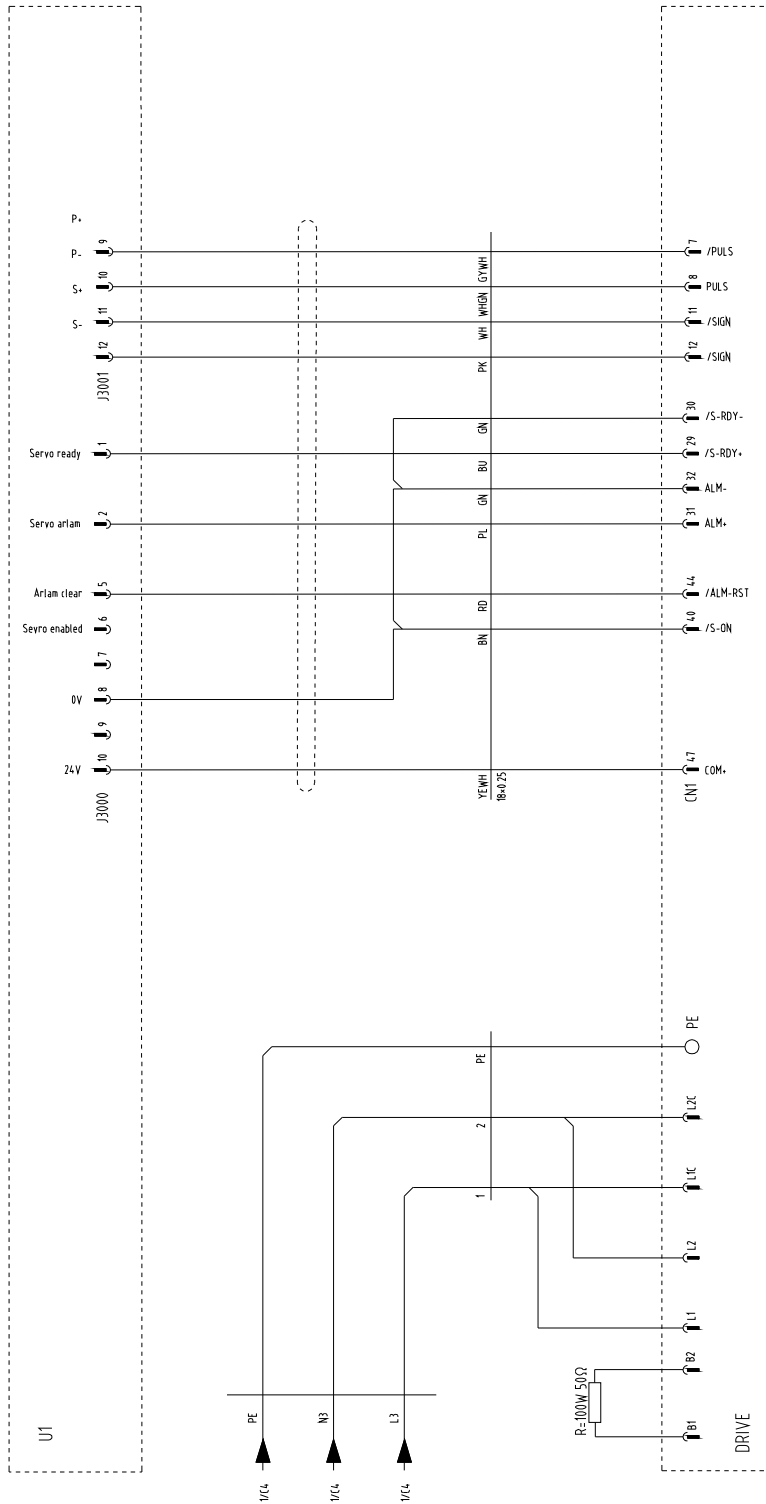
Picture 8-3

## 8.4 Panasonic Servo Motor Wiring Diagram and Spare Wiring Diagram



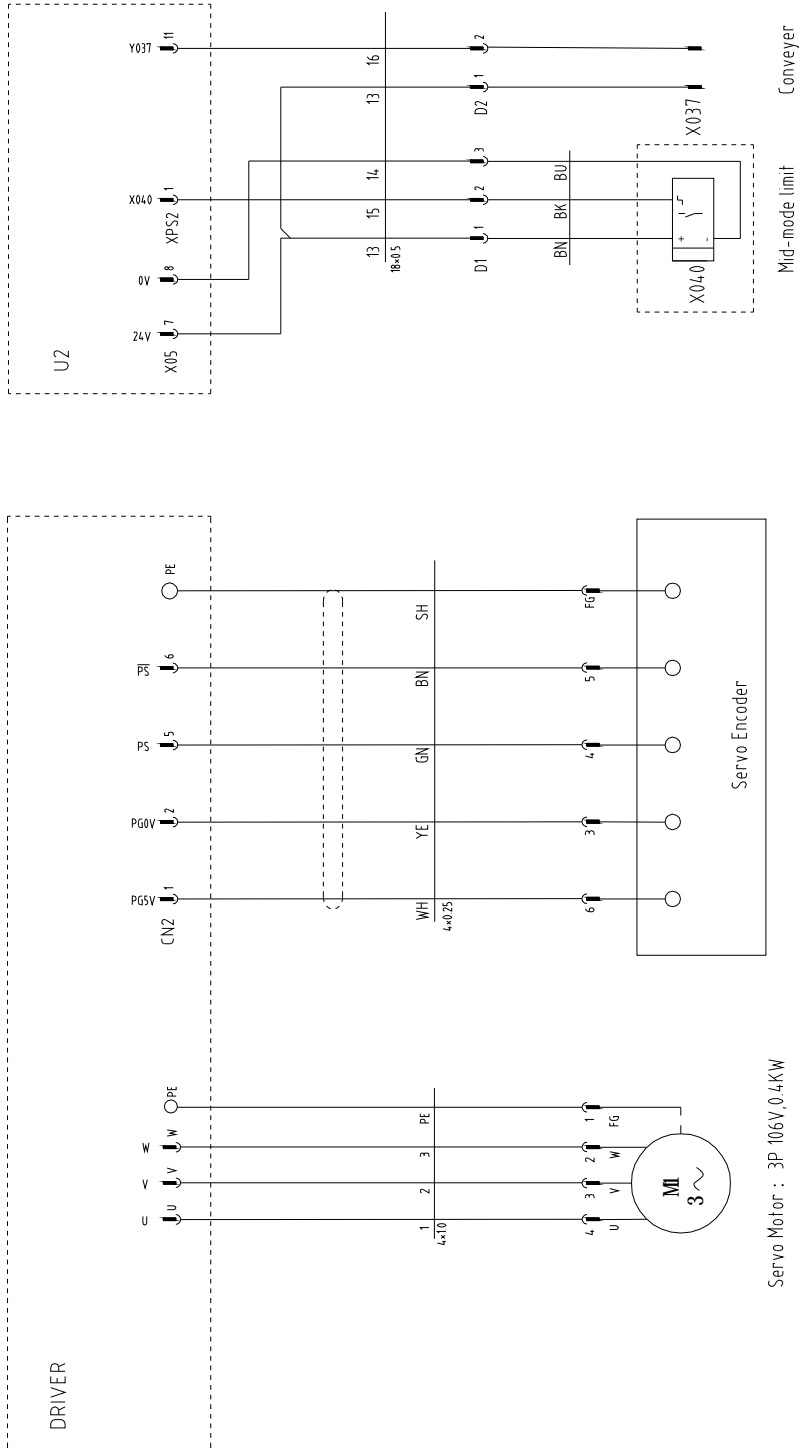
Picture 8-4  
132(147)

## 8.5 YASKAWA Servo Motor Wiring Diagram 1



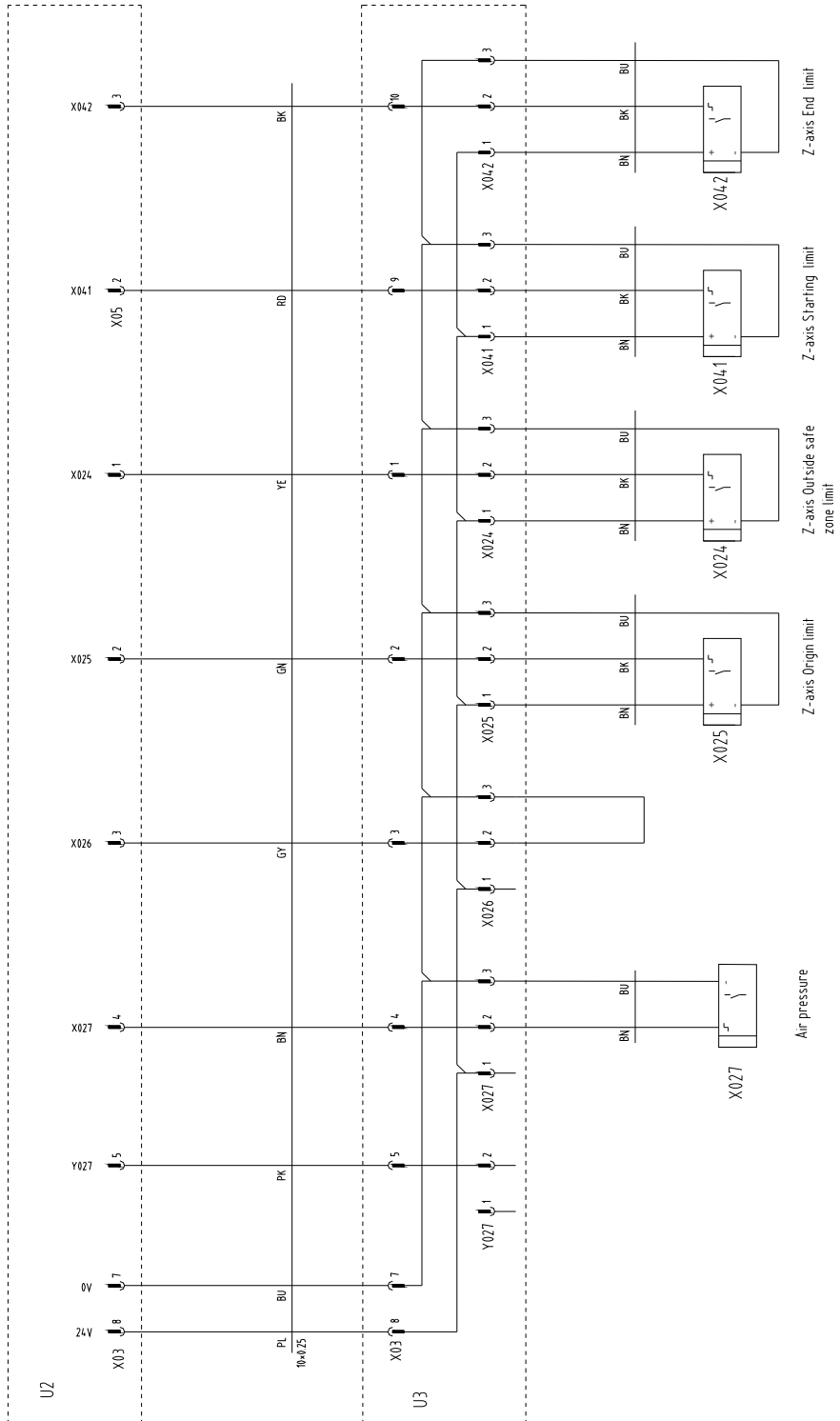
Picture 8-5

# 8.6 YASKAWA Servo Motor Wiring Diagram and Spare Wiring Diagram



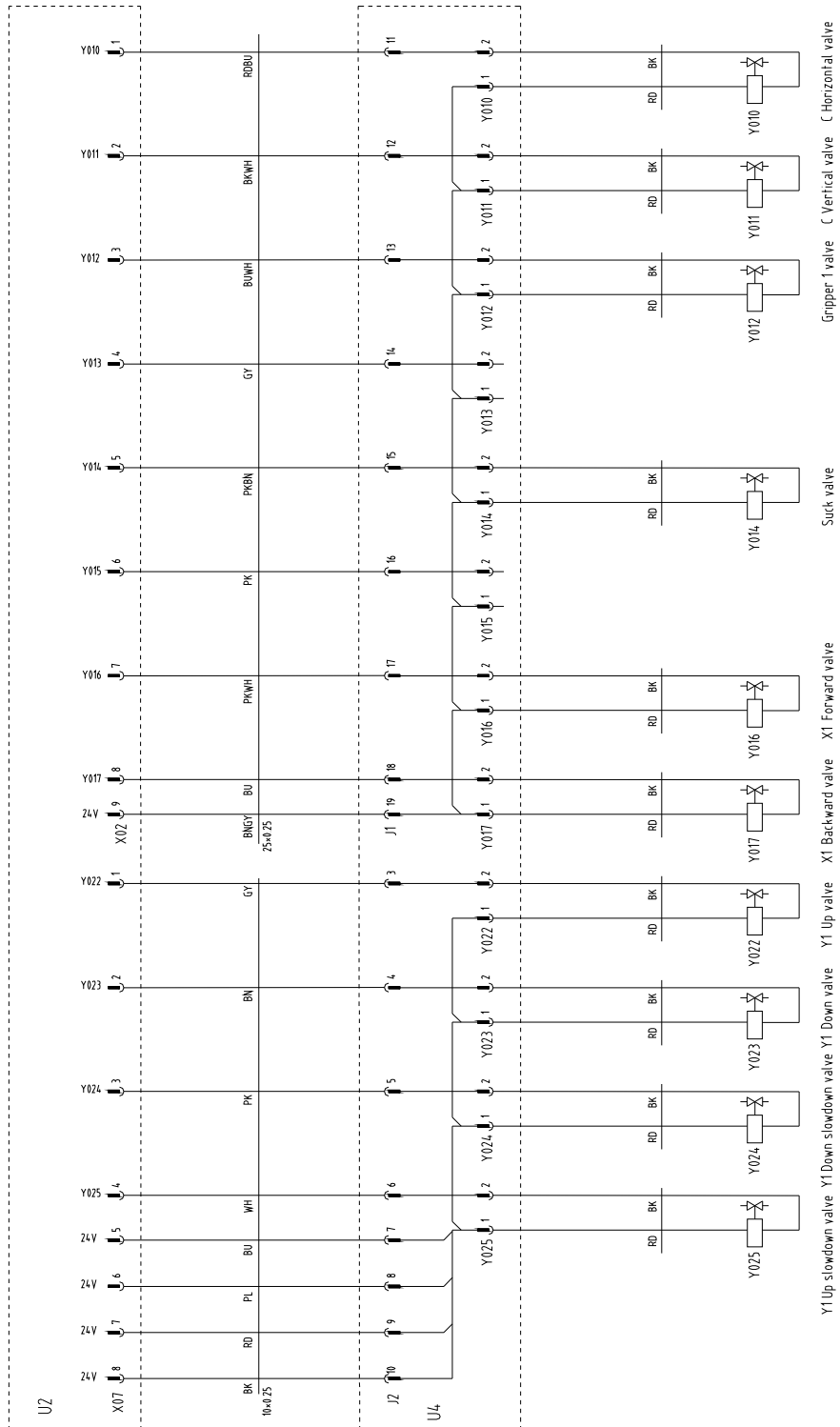
Picture 8-6

## 8.7 Z-axis Wiring Diagram



Picture 8-7

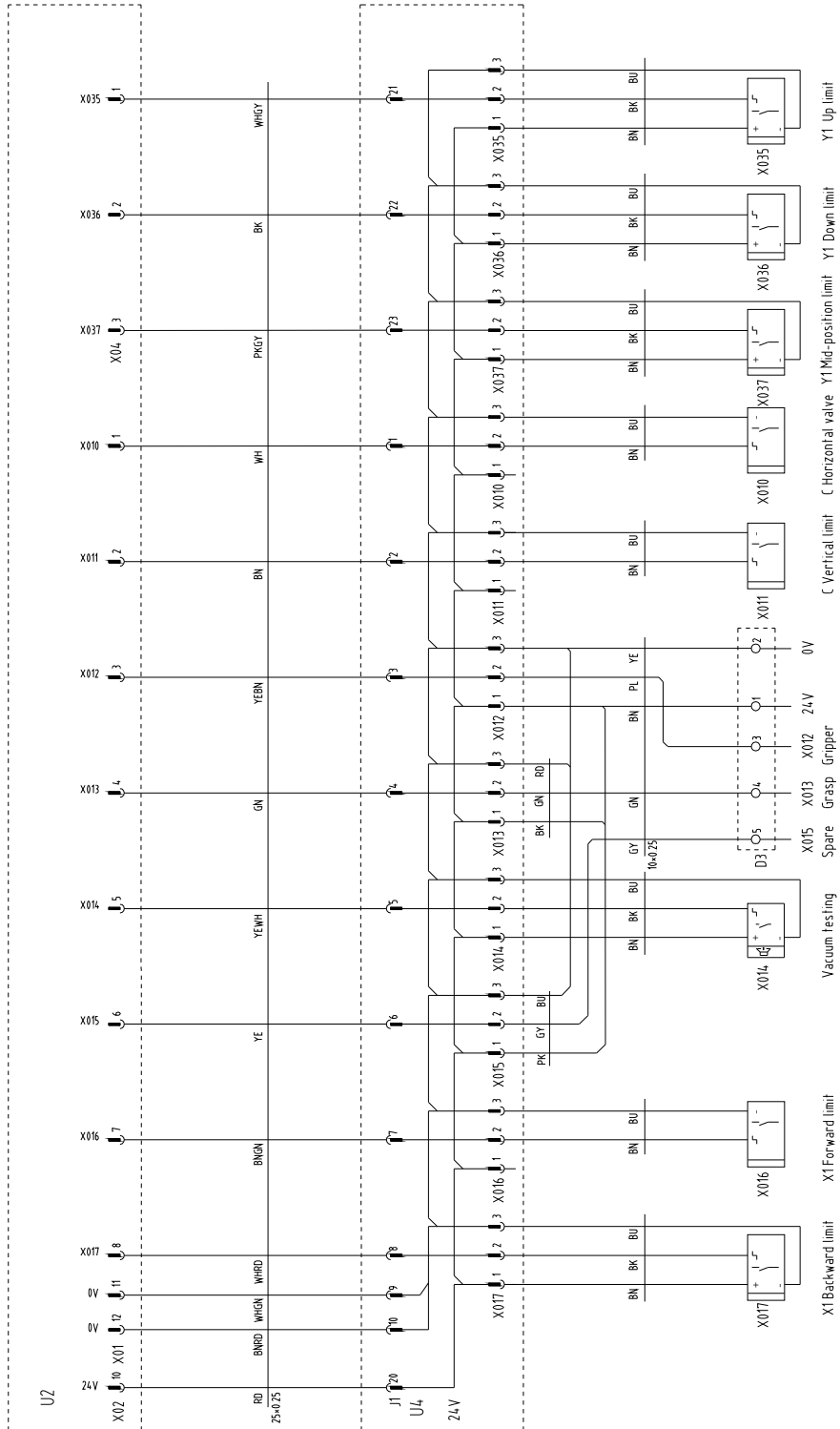
## 8.8 Main Arm Wiring Diagram 1



Picture 8-8

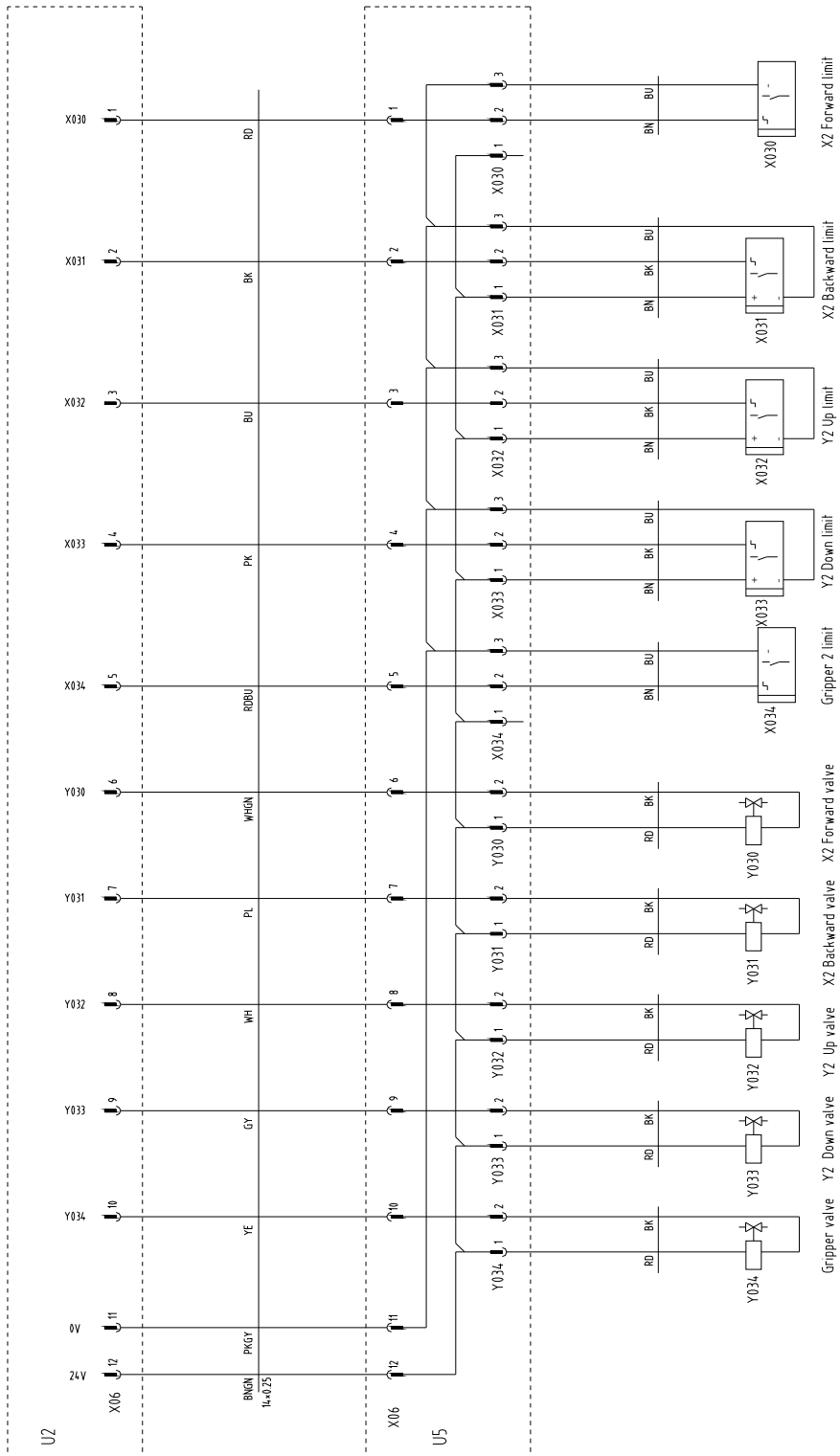


## 8.9 Main Arm Wiring Diagram 2



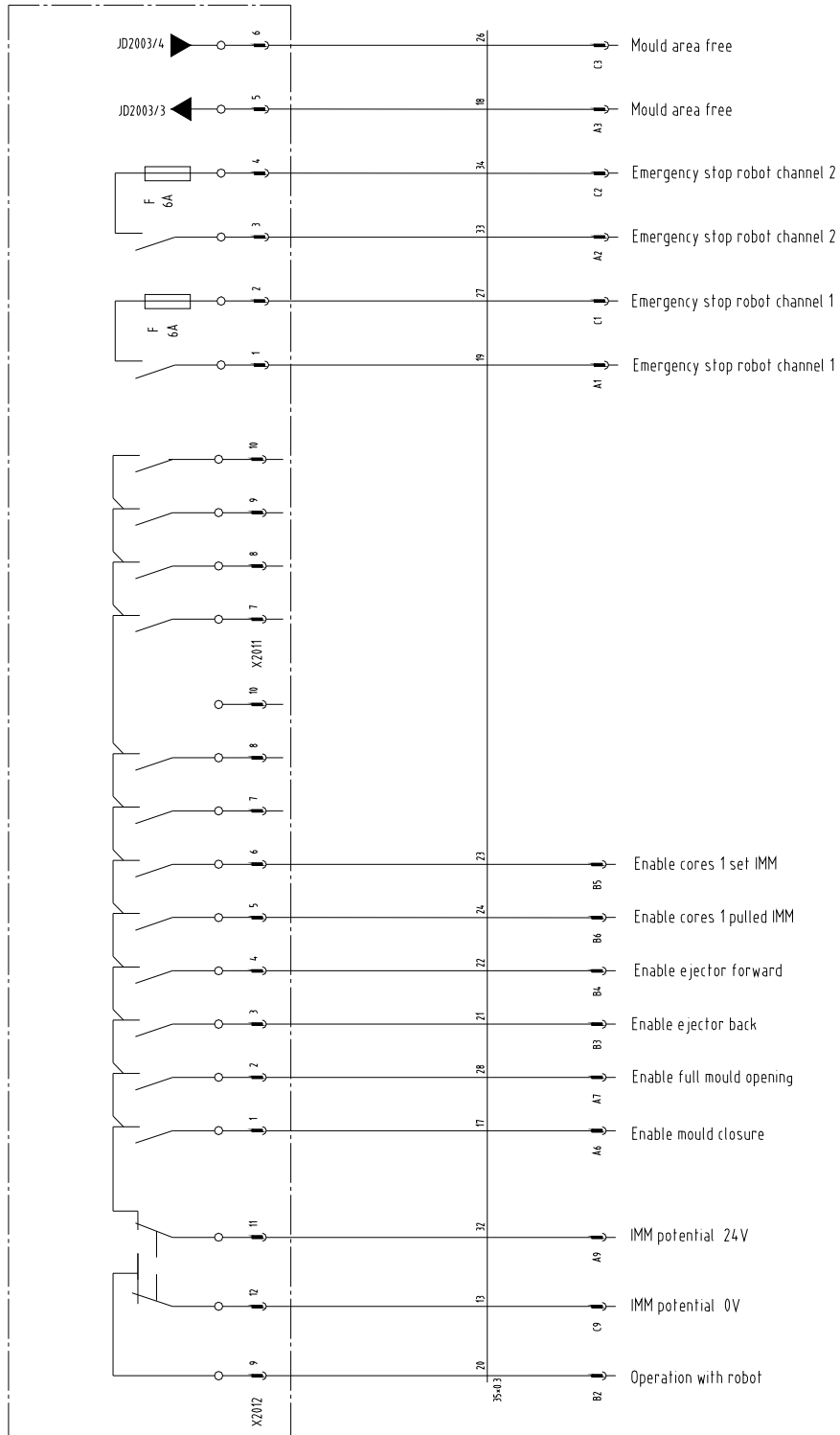
Picture 8-9

## 8.10 Sub Arm Wiring Diagram



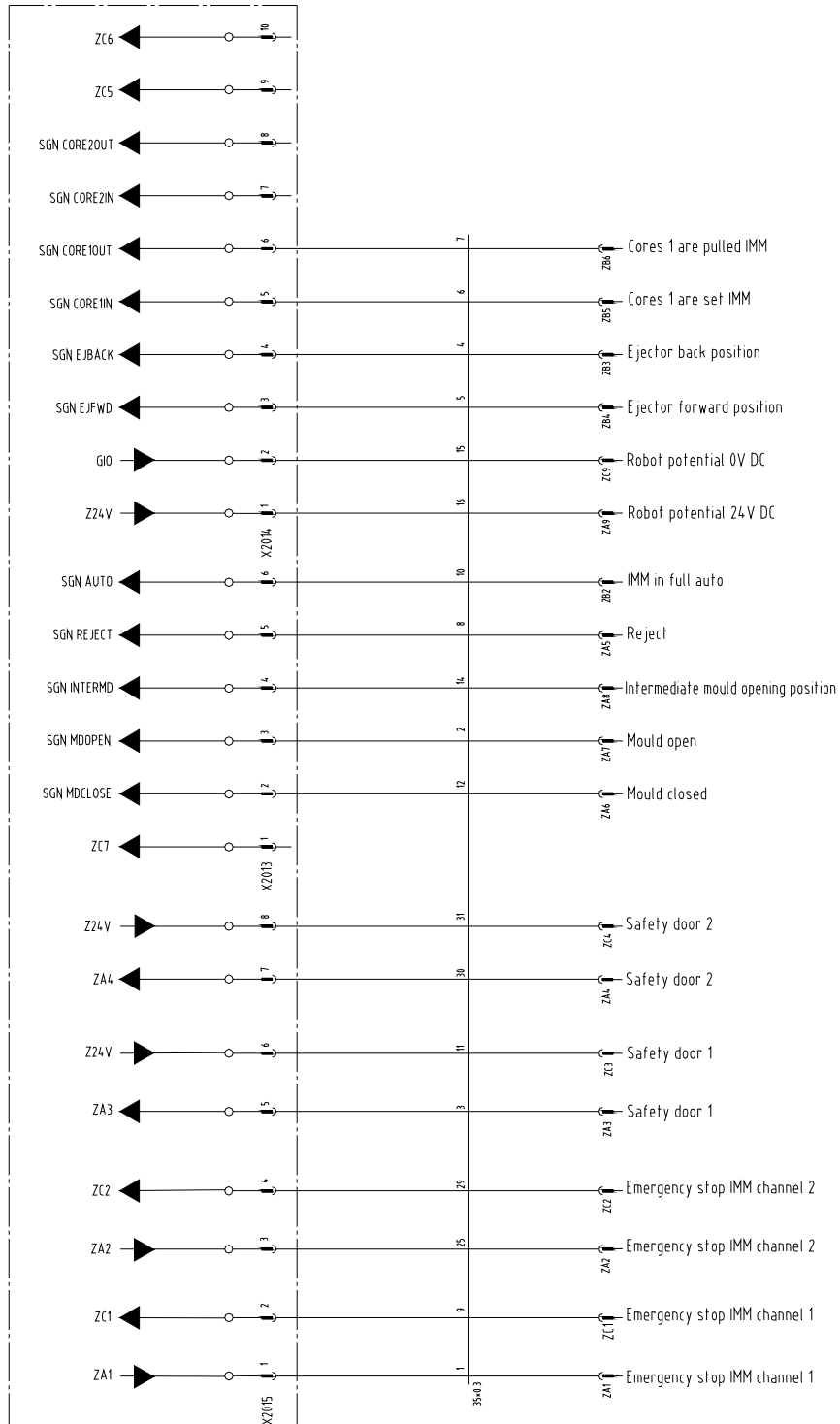
Picture 8-10

## 8.11 EM67 Signal Input Wiring Diagram



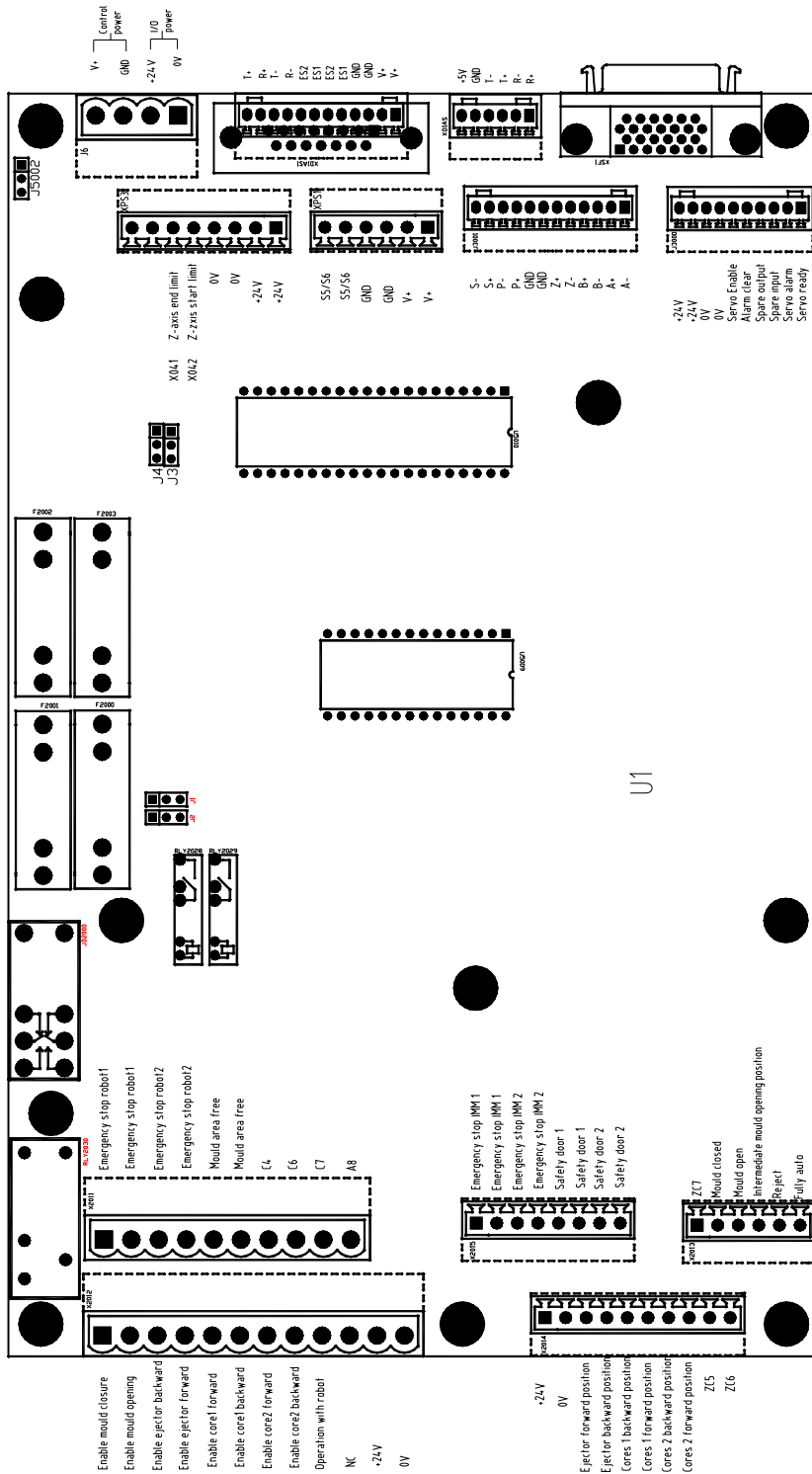
Picture 8-11

## 8.12 EM67 Signal Output Wiring Diagram



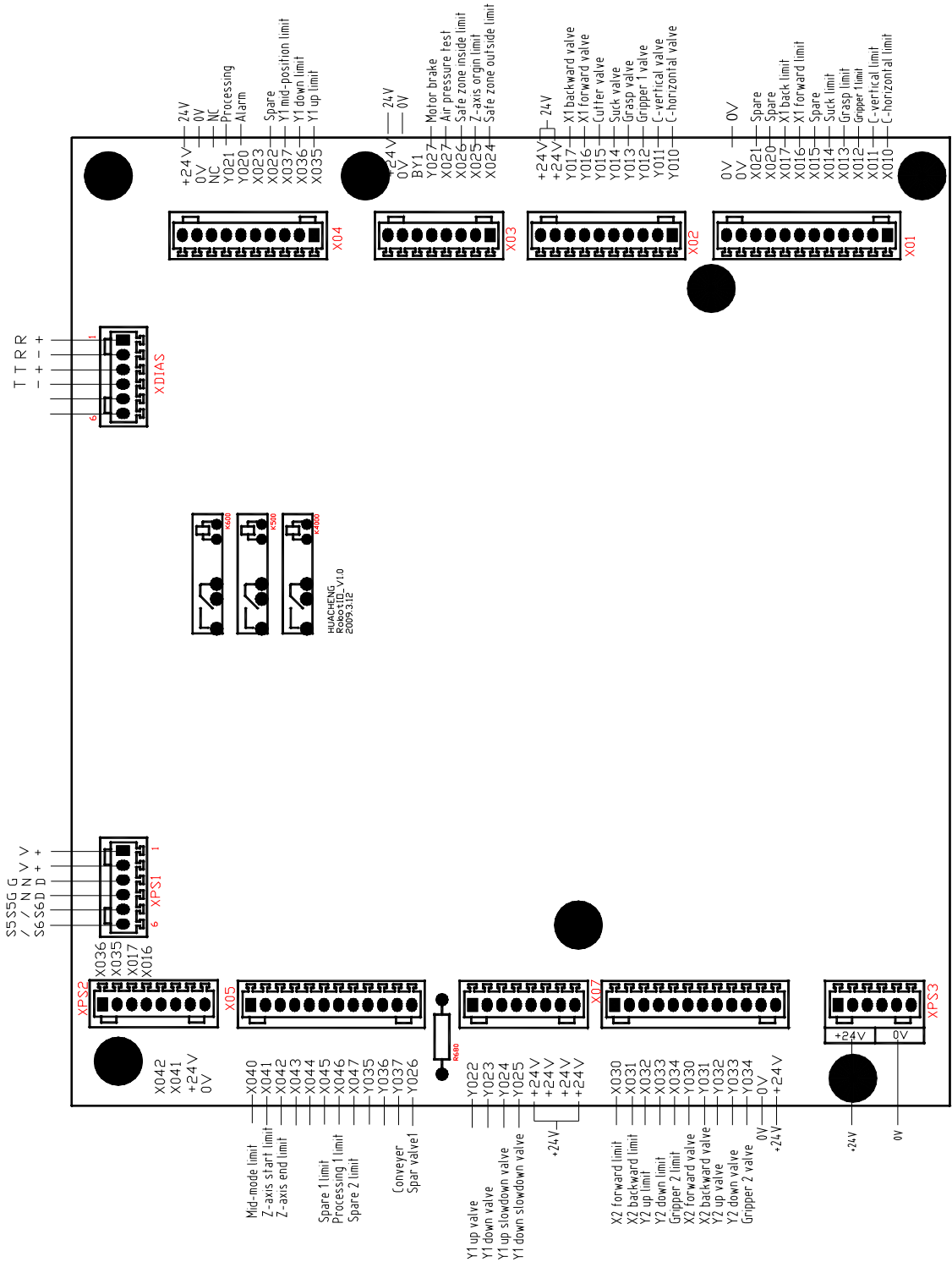
Picture 8-12

## 8.13 Main Control Board Component Layout



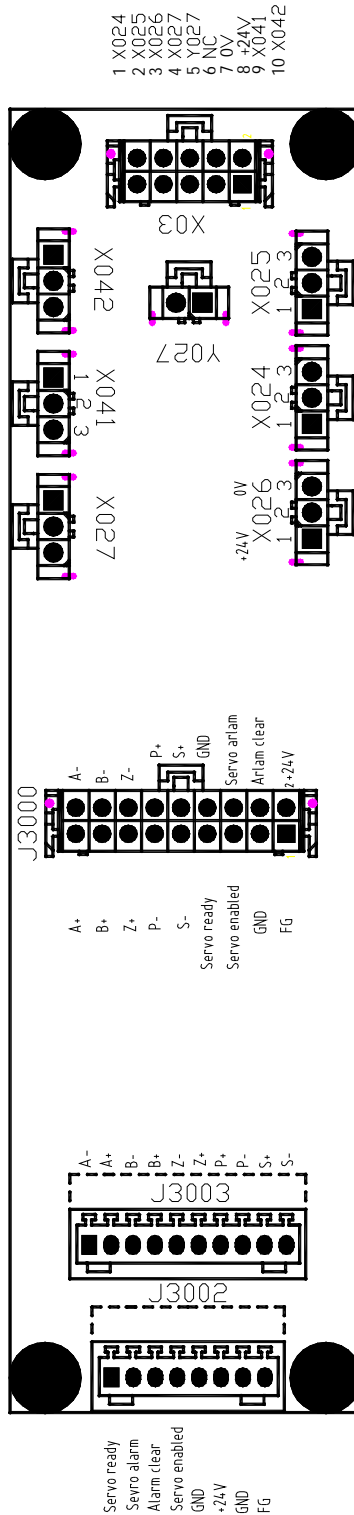
Picture 8-13

## 8.14 I / O (U2) Board Component Layout



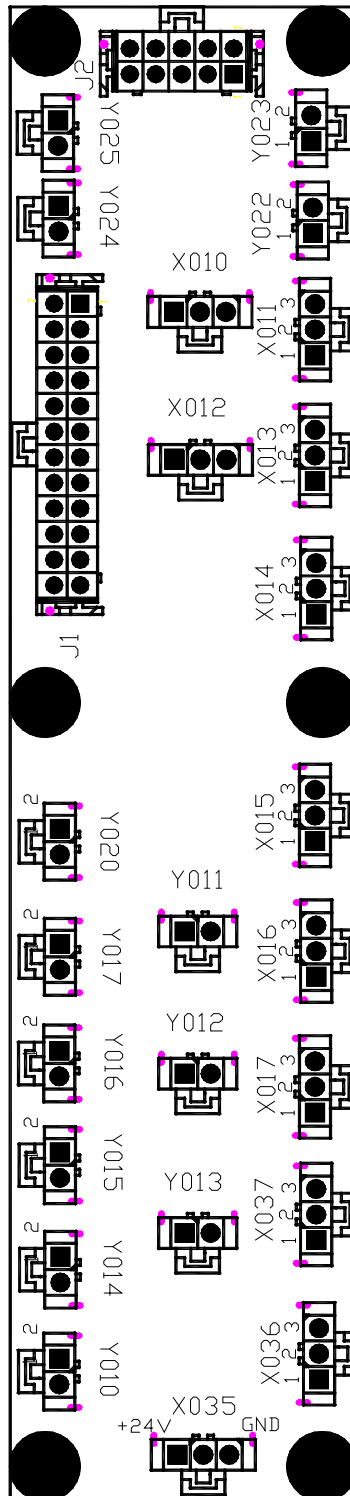
Picture 8-14

## 8.15 Z-axis Travel-in Board (U3) Component Layout



Picture 8-15

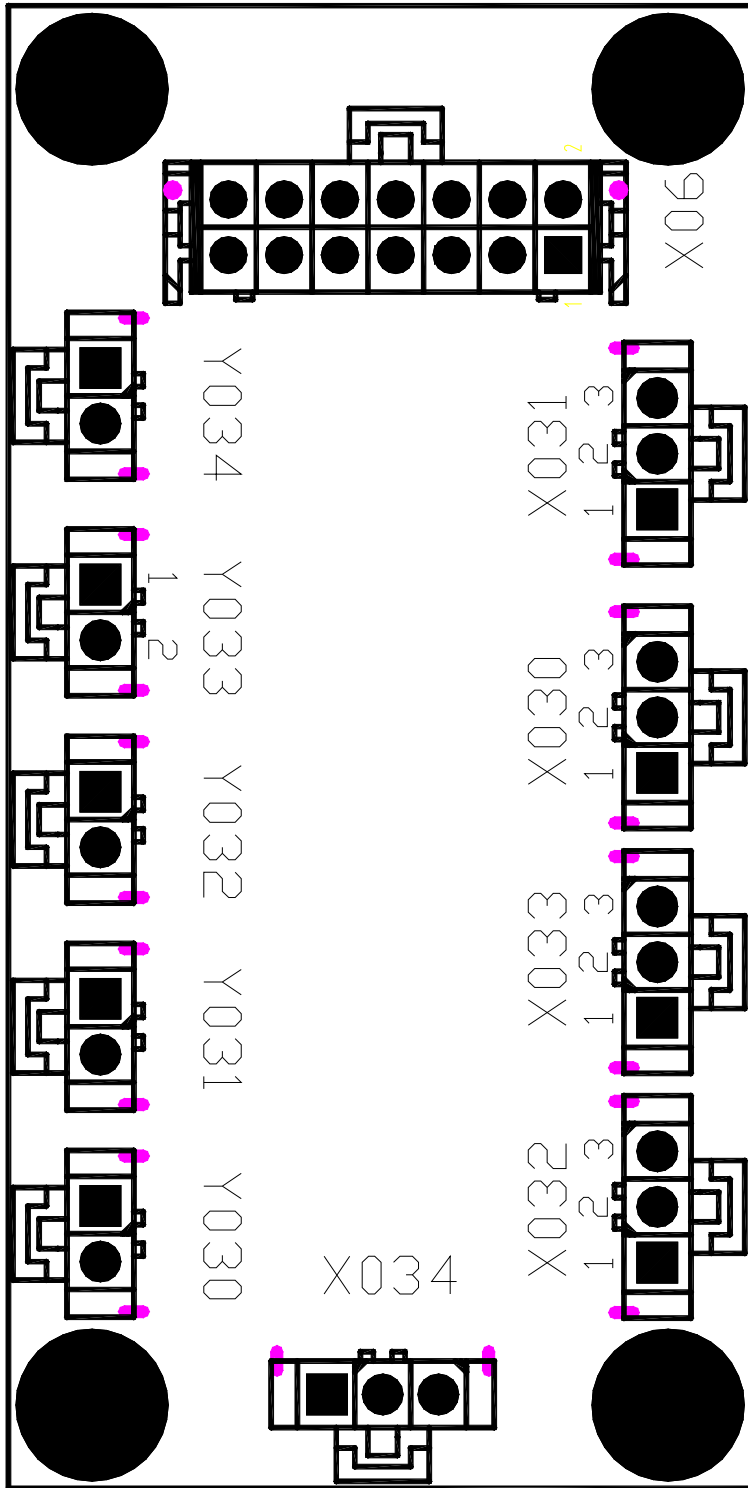
## 8.16 Main Arm (U4) Layout



Picture 8-16

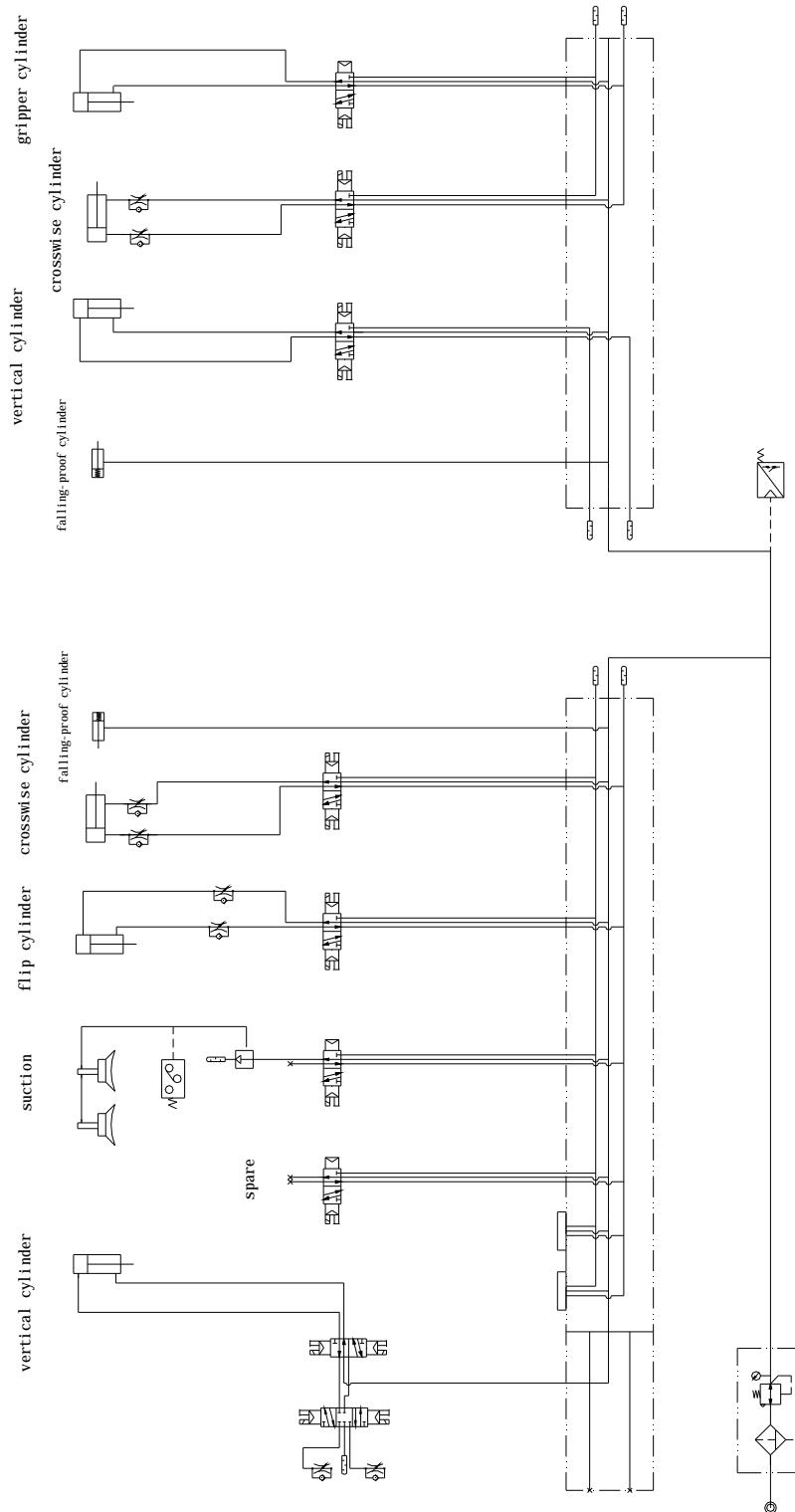


### 8.17 Sub-arm (U5) Component Layout



Picture 8-17

## 8.18 Pneumatic Schematic Diagram



**Picture 8-18**

