INSTRUCTIONS
FOR
SPRUE PICKER
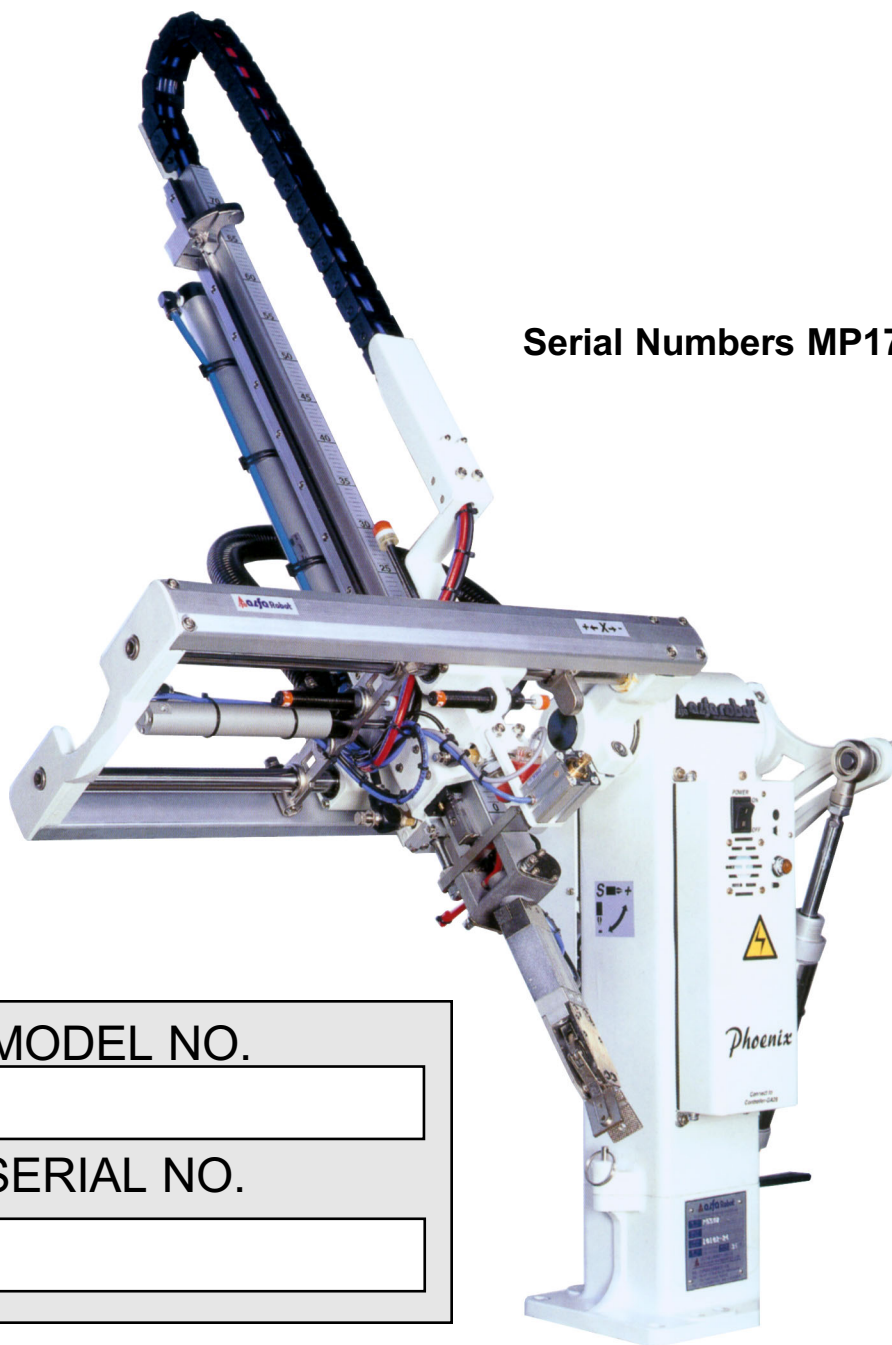
Serial Numbers MP17— & Above

MODEL NO.

SERIAL NO.

CONTENTS

6. PNEUMATIC CIRCUIT DIAGRAM

7. ELECTRICAL SYSTEM

8. OPERATIONAL PROCEDURE

9. DESCRIPTION OF TIMER AND COUNTER

10. DESCRIPTION OF OPERATIONAL MODE

11. DESCRIPTION OF MANUAL OPERATION

1. SAFETY AND WARRANTY
1.1 Description of Safety

Phoenix series swing-arm robot is designed and manufactured in consideration for the safety use of horizontal injection molding machines, therefore the company shall be free from any obligation and responsibility for any accident or injury incurred with using this robot with other type of machine or applications. We strongly suggest you to read the following safety standards thoroughly and observe it before putting the robot into operation.

(1) The service life of robot is 10 years or 5,376,000 cycles (Say, 10 years x 280 days x 8 hours x 60 minutes x 4 cycles) under normal operating conditions.

(2) The robot has been designed and manufactured in conformity with EN292-1 and EN292-2.

(3) This robot requires necessary adjustment and maintenance as stipulated in this manual, therefore we strongly suggest you read this and observe carefully before any adjustment and maintenance is carried out.

(4) The necessary warning labels are posted on the robot to minimize residual risks. Please pay attention to read the warning labels before and during operation.

(5) Safety regulations shall be highly concerned while handling and transporting the robot.

(6) A fully trained operator can only operate the robot.

(7) All operation and adjustment of the robot must be carried out fully accordance with description of this manual.

(8) Danger working areas are noted in this manual. The system integrator must install appropriate safeguarding surrounding the danger working areas in conjunction with an injection molding machine.

(9) Do not operate robot if there is a person working or standing in the danger area.

(10) The controller must be placed outside the danger area.

(11) During maintenance and mould changed, electrical power must be turned off and the pneumatic source disconnected.

(12) The robot is equipped with trouble detective function. The user may rectify the problems according to the trouble-shooting guide or contact agent for service.

1.2 Warranty and Non-warranty

1.2.1 Warranty Period

Within 1 year from the date of installation or 1,000,000 running cycles of operation, whichever comes first. However, it is not restrictive if there is otherwise specified in the sales contract between the purchaser and the supplier.

1.2.2 Non-warranty

The following are non-warranty items.

(1) Damage due to personal negligence or mistake in operation.

(2) Damage due to natural disaster such as: earthquake, typhoon, thunderbolt strike and fire, etc.

(3) Damage due to self-modification and poor adjustment by user.

(4) Consumable item (As listed below, but not limited)

Item	Description	Warranty Period
1.	Shock absorbers	500,000 cycles
2.	Proximity sensor	500,000 cycles
3.	Gripper sensor	500,000 cycles
4.	Magnetic switch	500,000 cycles
5.	Vacuum generator	500,000 cycles
6.	Suction pad	200,000 cycles
7.	End-of-arm tooling	200,000 cycles

2. INSTALLATION

2.1 Handling and Transportation

Unit：mm
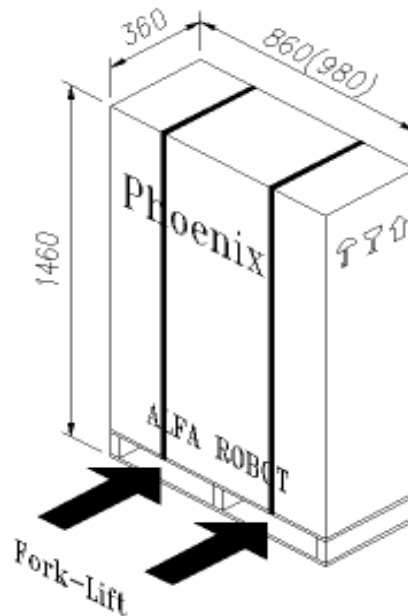
NOTE: Dimensions shown in (   ) are for telescopic type

Lifting point

CAUTION

Prevent Swing Safety Screw
Please make sure screw to be
locked up before transporting and
taking out the screw before
operating.
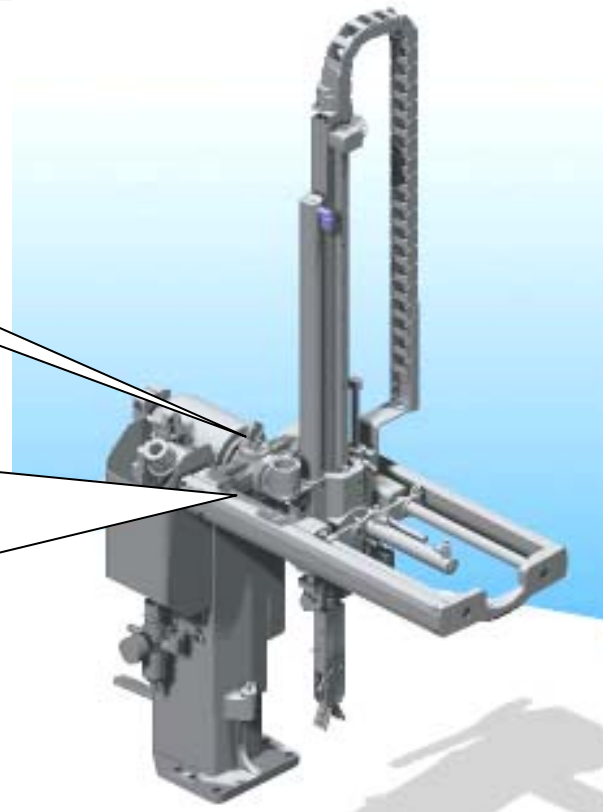
NOTE: Pay attention to the gravity center during transporting
with a fork-lift truck and sure to avoid from dropping.

2.2 Installation Dimensions

■ For the machine platen
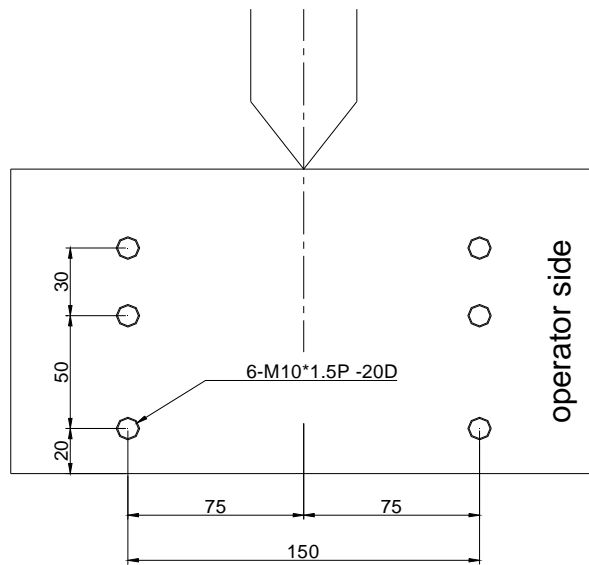
Phoenix 550~650
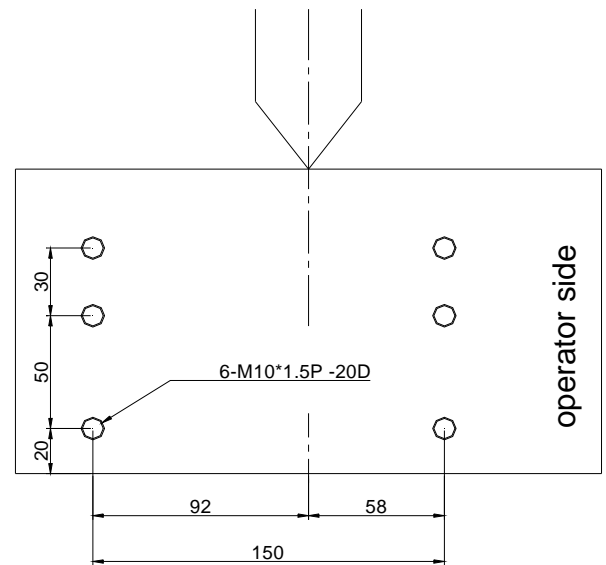
Phoenix 650W~950 W
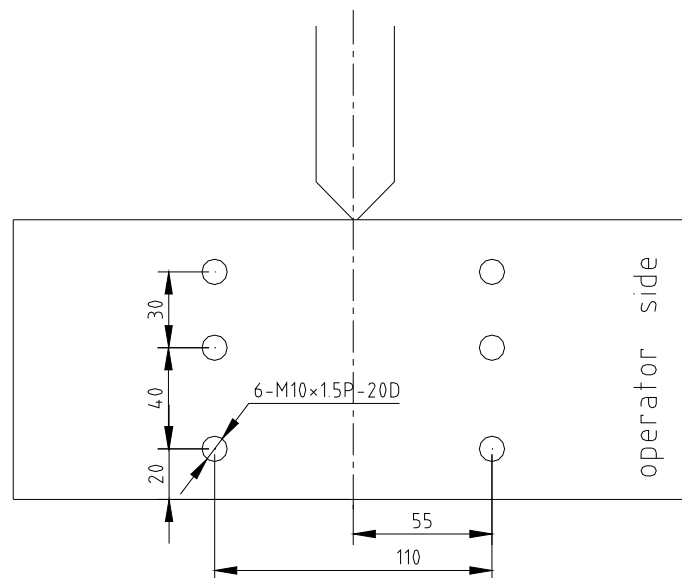
Phoenix350~450

■   For the controller supporting structure
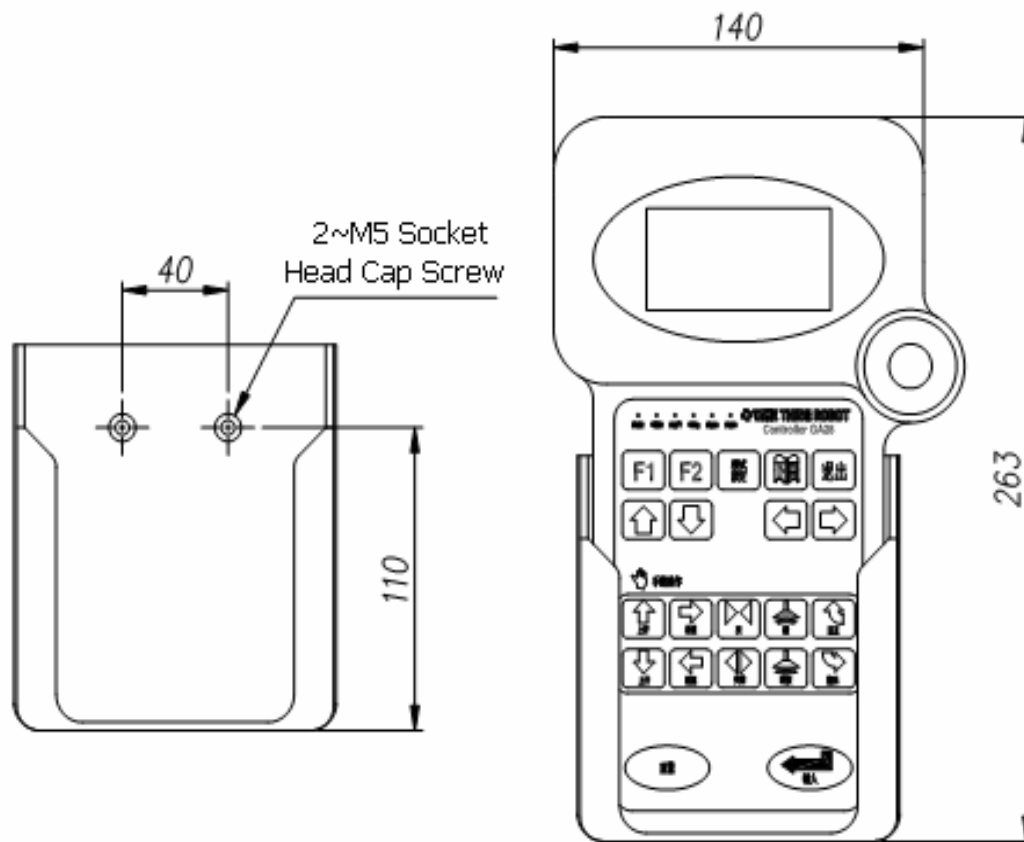
2.3 Protective Area

■ The system integrator should design and install appropriate safeguarding at user's cost.
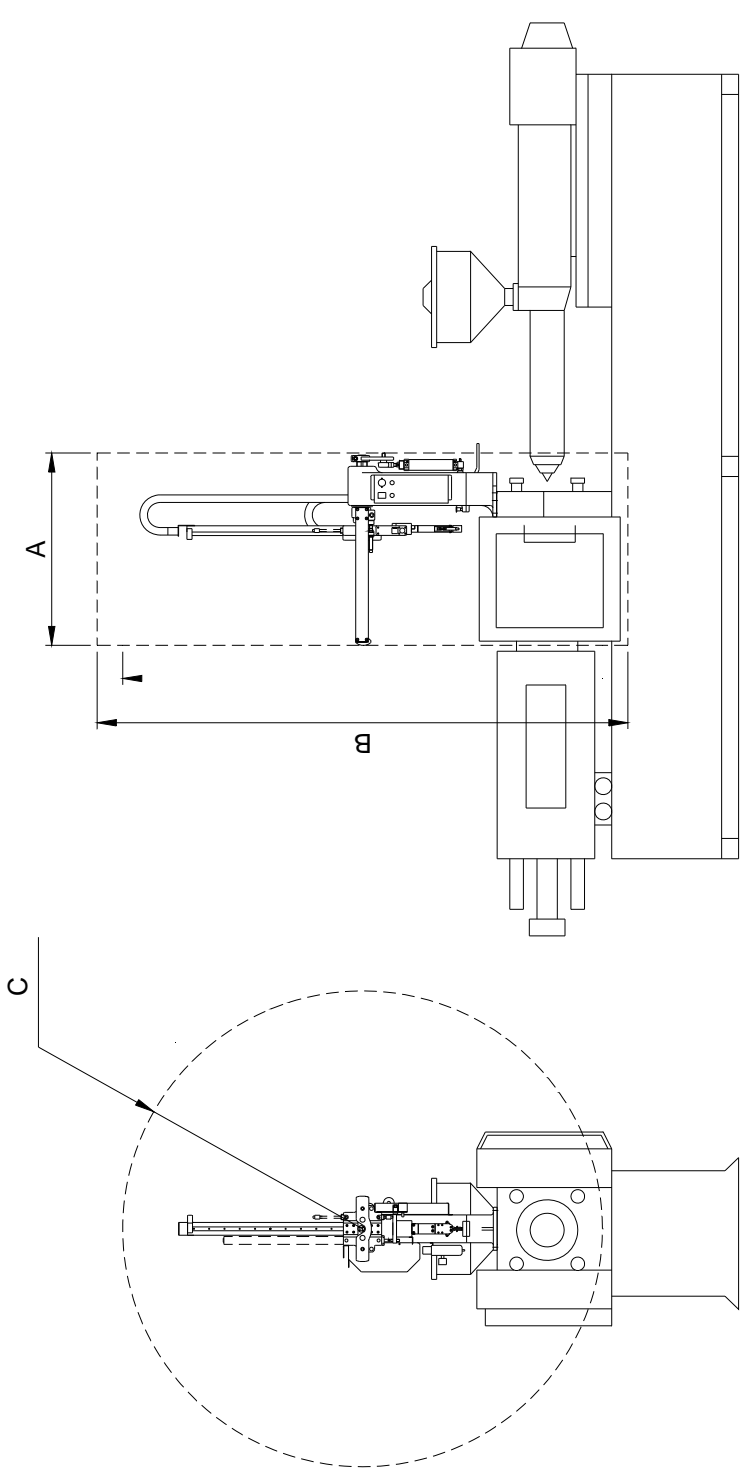
Model	P350	P450	P550	P650	P650W	P750W	P850W	P950W
A	550		900		1050			
B	1530	1650	1860	2060	1750	1900	2050	2200
C	800	900	1000	1100	1120	1220	1320	1420

2.4   Measurement of Noise Level

1. Noise measurement is done under noise test environment of 60 dB(A).

2. Measuring equipment model RION NA-24 sound level gauge.

3. Measurement is based on 1m distant from robot and 1m height from floor.

4. Model P550 is measuring sample, also suitable for other type robot.

5. Measurement position as below:
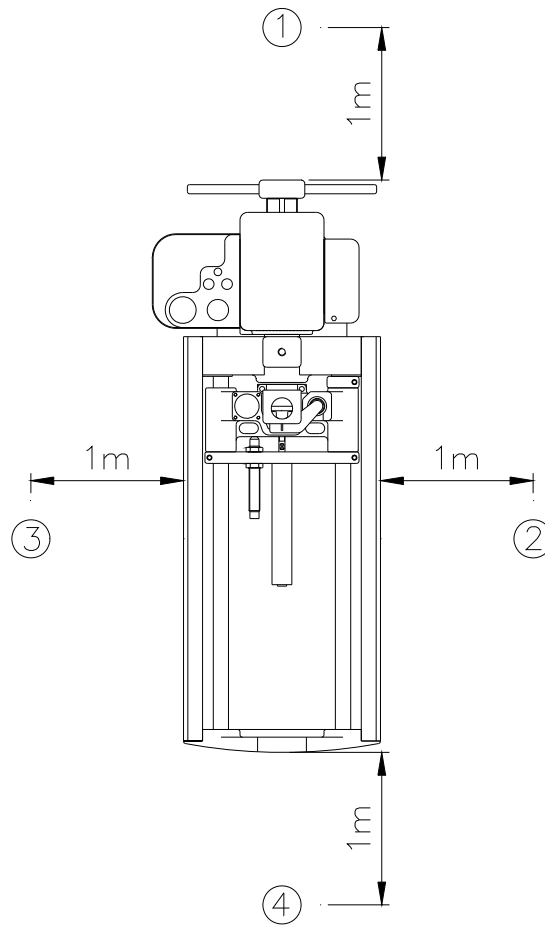
Measurement Position	Noise Level dB(A)
1.	67
2.	65
3.	67
4.	68

2.5   Connection with I.M.M

When robot is not used, user can either set the robot to "ROBOT NOT IN USE" or simply turn the power off. For maximum safety consideration, we strongly suggest that the power is turned off.

2.5.1   Euro map joint layout (Optional)
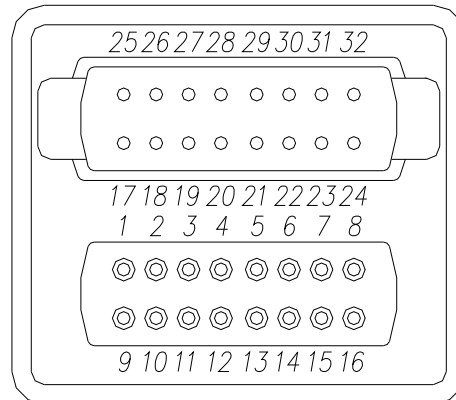
2.5.2 Description of connection of Euro map

PCB Joint No. GA28-PC2	Signal Definition	Euro map code	Description
3	Emergency Stop of Machine (ESM)	1	The switch contact must be opened when the IMM emergency stop is getting started (Refer to EN60204-1). Opening the switch contact to make robot emergency stop.
1	Mould Open Position (MOP)	2	The switch contact must be closed when mould opening position is equal or more than required position. Inadvertent alteration to mould opening stroke smaller than that required for the handling device/ robot to approach must be impossible. The signal must remain closed as long as the mould is open and must not be interrupted by a change of operation mode or safety guard opening.
2	Safety Device of Machine (SDM)	3	The switch contact must be closed when safety device (e.g. safety guard, footboard and safety, etc.) on the injection moulding machine are operative so that dangerous movement of the handling device/ robot are possible. The signal is active in any operation mode. According to regulation of EN201, it must use limit switch series as signal contact within mould safety area and the signal current cannot be greater than 6 Amps.
4	Reference Potential (L－)	16,9,11	This is common potential of robot. The code is L－.
5,6	Enable Mould Close (EMC)	18,26	This switch contact will be closed when robot takes out product and ascend to upper position (LS1) in order to enable mould close. Mould close will be interrupt if robot alarms during motion.
7,8	Mould Ares Free (MAF)	17,32	The switch contact is closed when the handling device/ robot is outside the mould area and does not interfere with mould opening and closing movement. The switch contact must be opened when the handling device leave its start position. If the switch contact is open neither opening nor closing of the mould may occur.
11,12	Emergency Stop pf Robot (ESR)	19,27	This switch contact must be opened when pressing the emergency stop button on robot operator and also the injection moulding machine. (Please refer to EN60204-1)
9,10	Enable Ejector Forward (EEF)	22,32	The switch contact must be closed when robot allow I.M.M forward.

2.6   Connection with Pneumatic Supply Source

2.6.1   Supply of Pneumatic Source

In order to maintain the robot's normal operation, please be sure to fit freezing dryer at the outlet of air compressor to remove the wet and moisture from the air, thus to obtain the extended service life of robot.
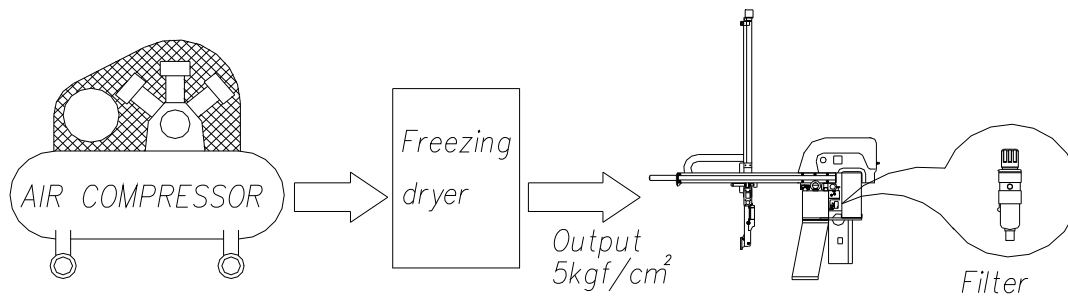
2.6.2   Connection with Pneumatic Supply Source
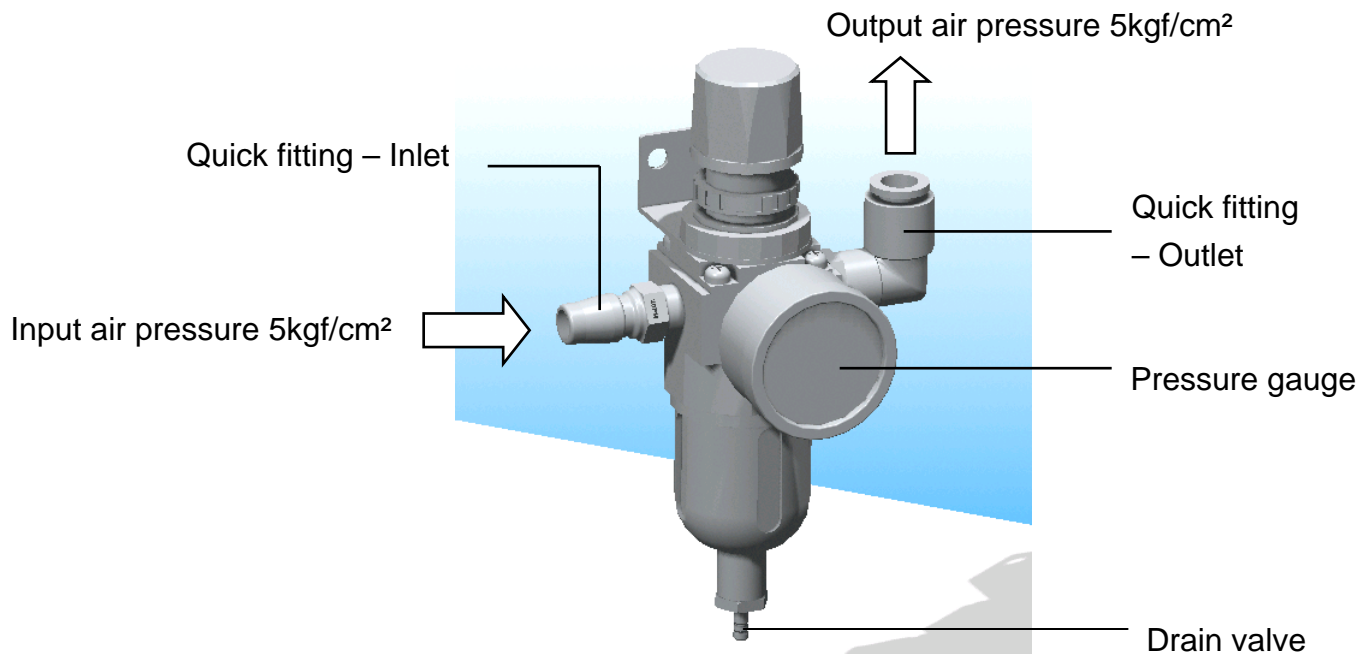
NOTE:
(1) To minimize air pressure loss in the pipe for a long distance source (10 meters away), be sure to use a rigid pipeline.
(2) After completing the connection, adjust the pressure on the Air Filter/ Regulator until it reaches 5kg f/cm^2.
(3) Check the water trapped in Air Filter/ Regulator and drain water away everyday.
    NOTE: According with CE specification could be added slow start valve.

2.7 Connection with Safety and Function Test

After completion of installation of the robot with an I.M.M according to chapter 2.2-2.5, the following areas must be fully checked for safety link and function of the robot.

【**CAUTION**】 **Connection test must be carried out by a fully trained technician or engineer only. If there is any problem, please feel free to notify your local supplier or ALFA.**

(1). Signal of Enable Mould Close

(2). Signal of Safety Gate Open

(3). Signal of Mould Open End

(4). Adjustment of Moving Speed for all axes

(5). Detection of Reset

(6). Mould Close Function after removal of mould

2.8 Procedures for Robot Dismantlement

1. Turn off power of I.M.M.
2. Turn off power of robot.
3. Disconnect supply of pneumatic source.
4. Exhaust air pressure from the robot.
5. Loosen mounting bracket of the crosswise cylinder and move arm to make it close to traverse beam.
6. Move mounting bracket of shock absorber to make it close to arm.
7. Tighten mounting bracket of the crosswise cylinder to make arm unable to be moved.
8. Disassemble controller.
9. Disassemble connection between I.M.M and robot.
10. Connect the short circuit connector.
11. Disassemble electrical power cable of the robot.
12. Disassemble interlock signals and power cable of I.M.M.
13. Disassemble base mounting screws.
14. Disassemble the robot from machine platen.

3. DESCRIPTION OF ROBOT STRUCTURE

3.1 Illustration

Phoenix350~450

Air Valve Component

Base Component

Electric Control Component

Arm Component

Crosswise Component

Controller

End-of-arm suction tooling
(Option: "V" with vacuum generator)

Phoenix550~950

Arm Component

Base Component

Electric Control Component

Crosswise Component

Controller

Air Valve Component

End-of-arm suction tooling
(Option: "V" with vacuum generator)
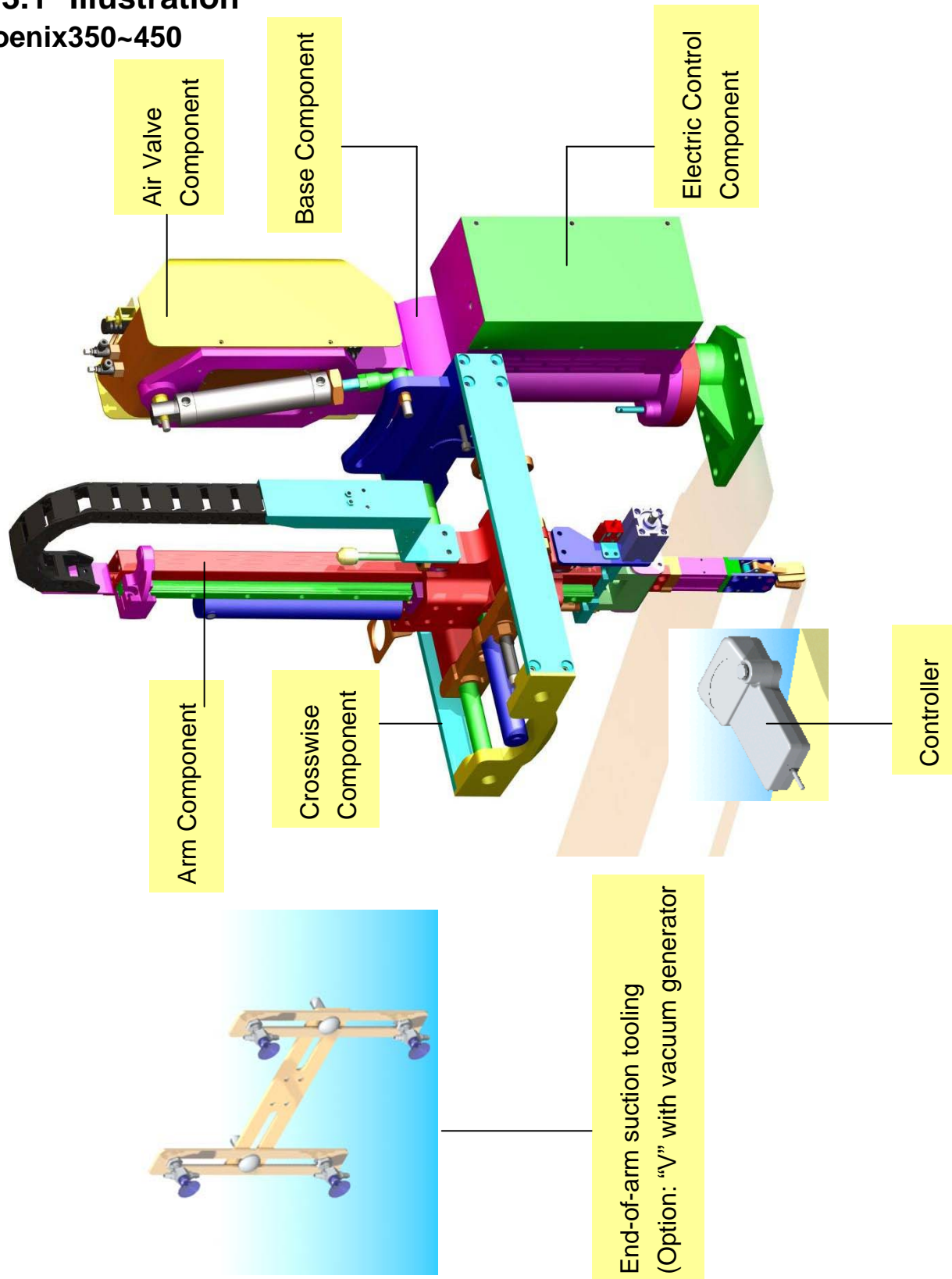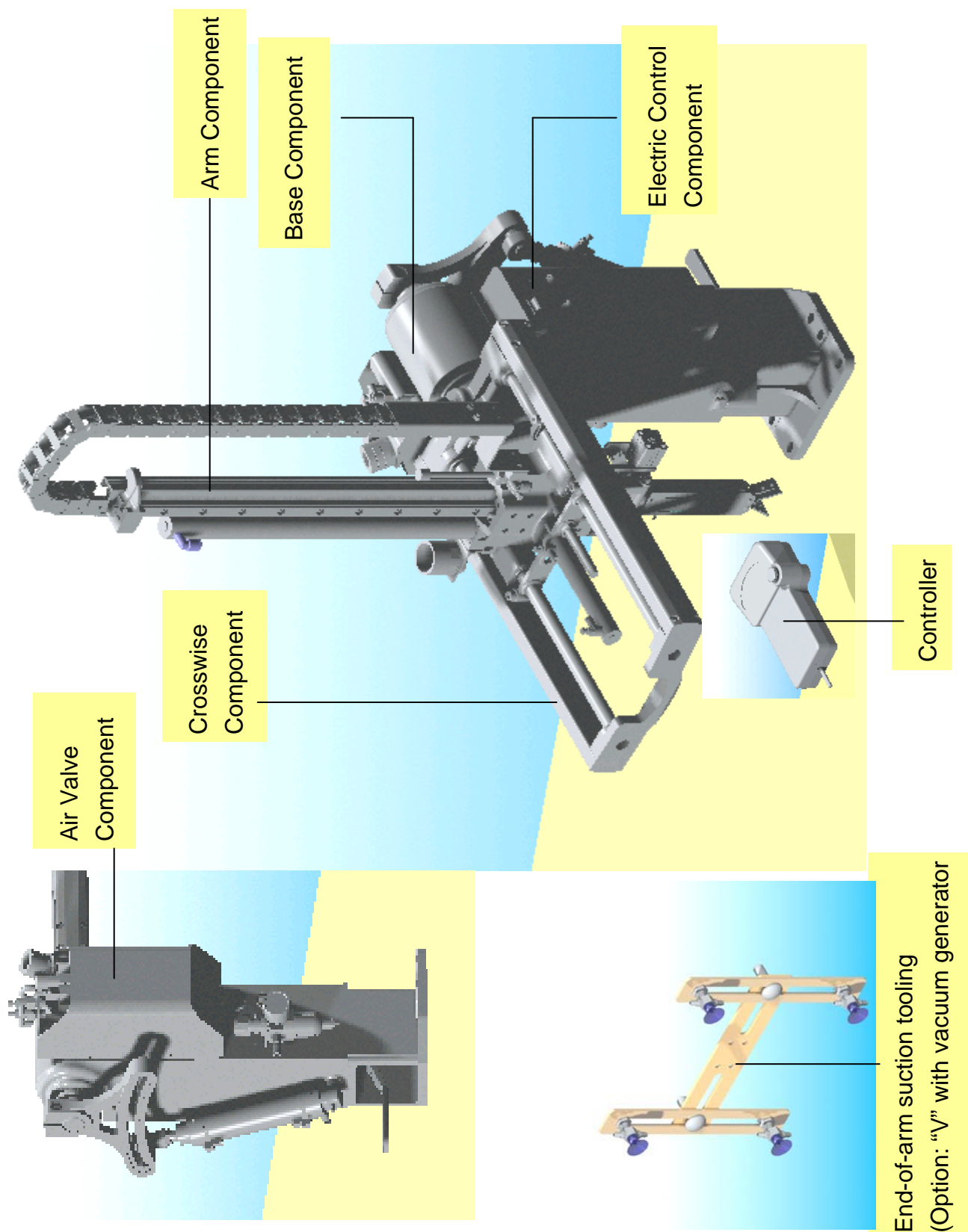
3.2 Specification

Model	Single Stage				Telescopic			
	P350	**P450**	**P550**	**P650**	**P650W**	**P750W**	**P850W**	**P950W**
Recommended I.M.M (ton)	15~30	30~60	50 ~ 150	75 ~ 150	75 ~ 150	100 ~ 200	150 ~ 250	200 ~ 300
Vertical Stroke (mm)	350	450	550	650	650	750	850	950
Crosswise Stroke (mm)	75		120		120	200		
Swing Angle (degree)	60-90		60~90		60~90	60~90		
Max. Loading (Kg)	2.5		3		3	3		
Dry take out Time (sec)	0.6	0.7	0.8	0.9	0.8	1	1.2	1.4
Dry Cycle Time (sec)	3.8	4.0	4.2	4.4	4.2	4.8	5.2	6
Power Capacity (KVA)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Air Consumption (Nl/cycle)	8.5	10	11.5	13	12	13	14.5	15.5
Net Weight (Kg)	30	31	35	36	48	49	52	53
Dimension L x W x H (mm)	550*285*940	550*285*1040	815*300*1200	815*300*1310	865*300*1100	965*300*1120	965*300*1180	965*300*1260
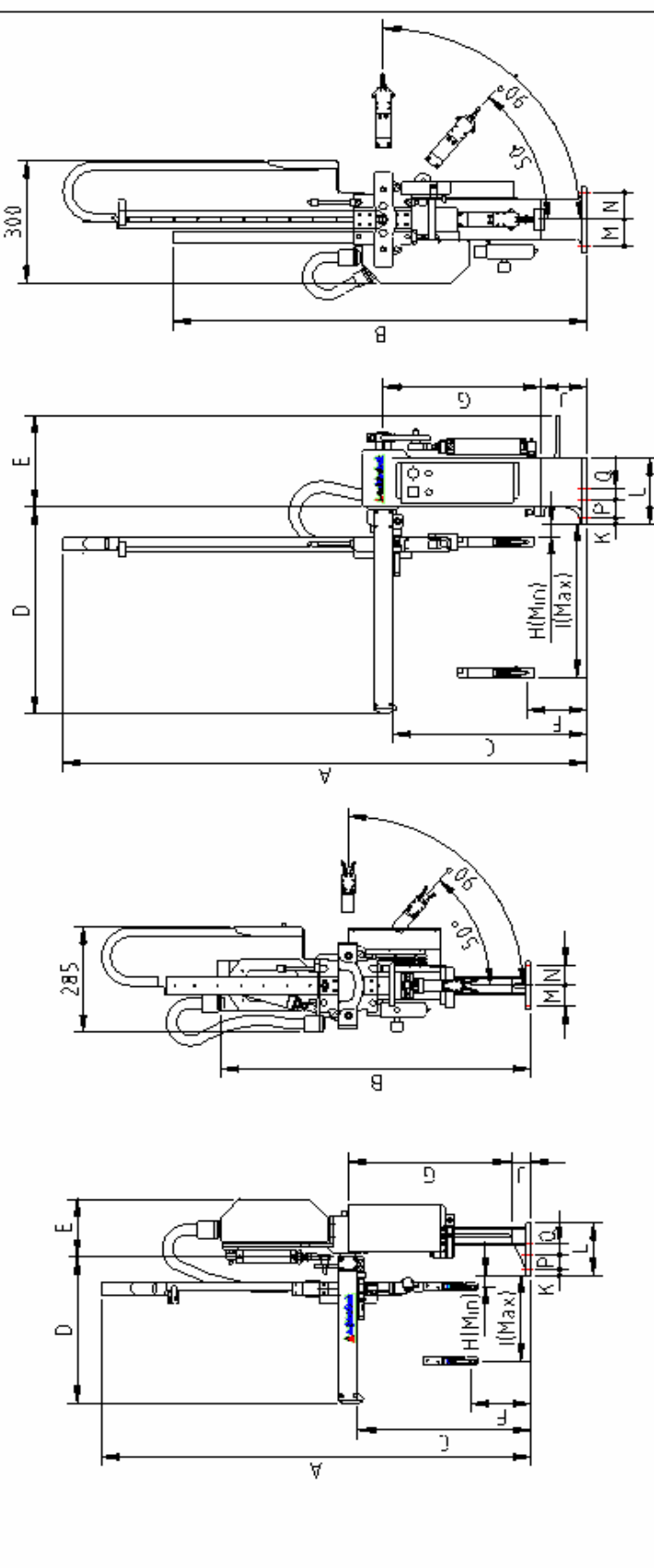
NOTE:

1. Runner/ sprue gripper and wrist rotation mechanism is included as standard features.

2. Option: a. Mode is fitted with vacuum generator and end-of-arm suction tooling are denoted by "V."

   With "V" function, it will require additional air consumption of 5N l/cycle.

   b. Platen spacer with 50, 100, 150 or 200mm height according to demands.
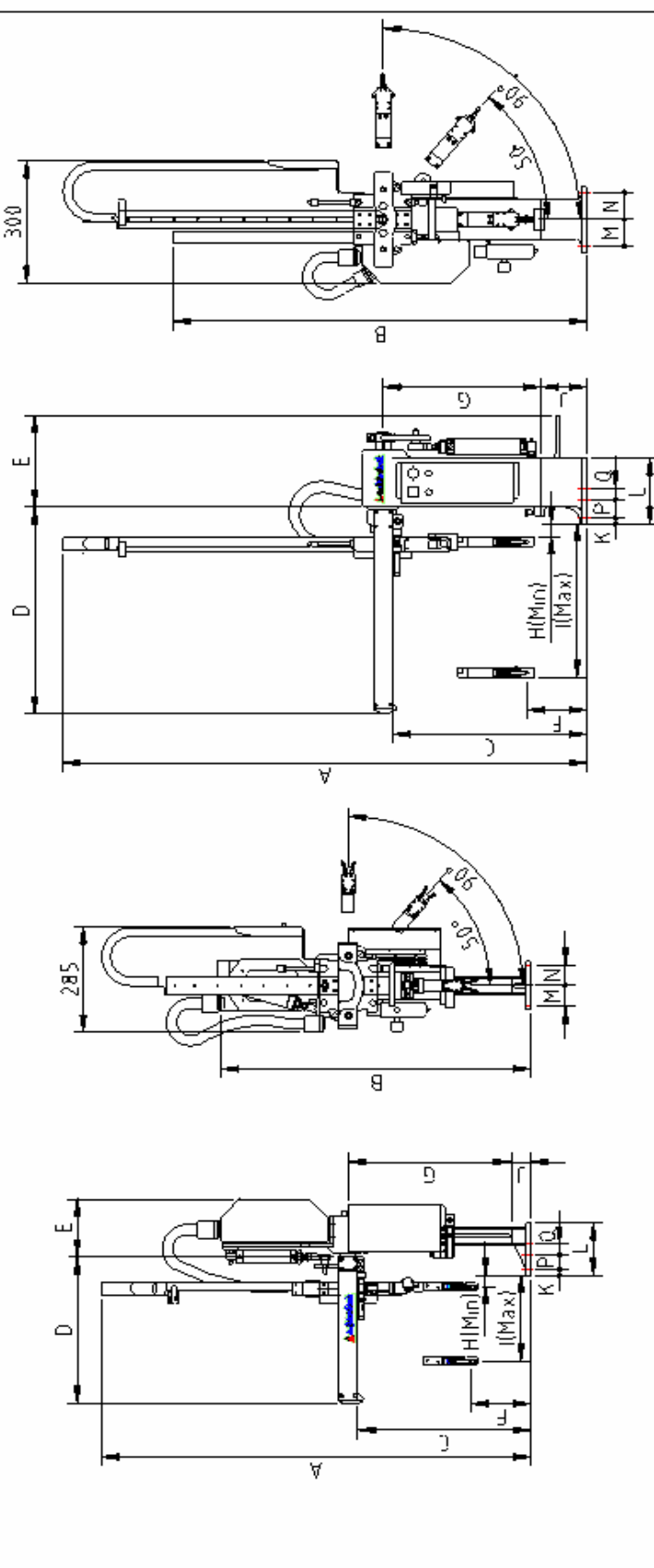
3.3 Dimensions

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q
P350	940	820	300~460	395	150	0~150	30	30	230	50	15	140	55	55	40	30
P450	1040	760														
P550	1200	1080	500	550	260	210	415	45	370	120		175	75	75	50	
P650	1310	1180														
P550W	1080	860				180		80	360							
P650W	1100	900														
P750W	1120	960														
P850W	1180	1100		650												
P950W	1260	1040														

P550-P950 外形尺寸圖

P350-P450 外形尺寸圖

3.4   Explosive Views

3.4.1   Base Component

3.4.1.1   Explosive View of Phoenix350-450 Base
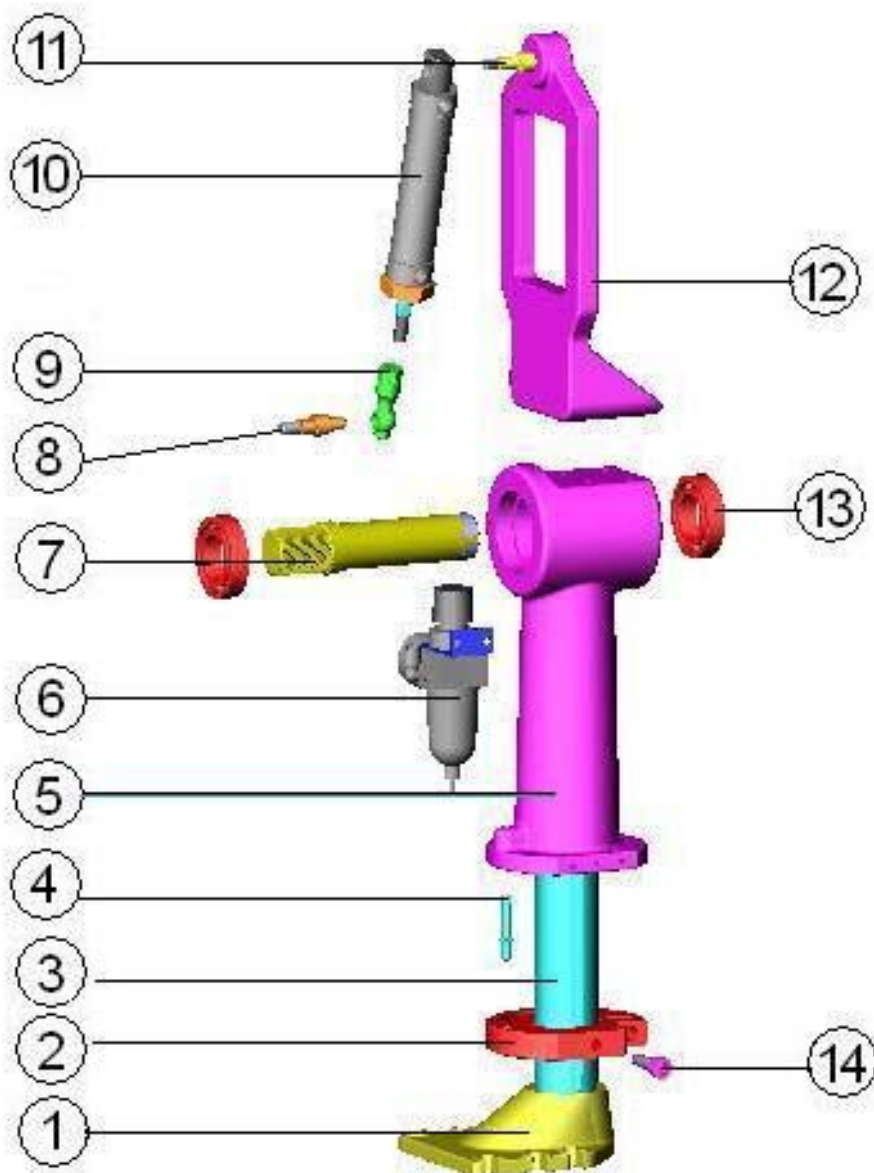
Part list of Poenix350~450 base

Item	Description	Serial No.	Q'ty	Remark
1	PC300 Base	PI03A040	1	
2	PC300 Positioning loop	PI03A070	1	
3	PC300 Base pillar	PI03A090	1	
4	Positioning pin	PI00A080	1	
5	Supporting base	PI03A010	1	
6	Air filter/ regulator AW2000-02G	PET2005	1	
7	PC300 Rotation axis	PI03A030	1	
8	PC300 Swing-angle adjusting shaft	PI03A060	1	
9	Spherical bearing PHS-10	MBG5-PHS10	1	
10	Stainless adjustable cushion cylinder	PCY32-YC320085S	1	
11	PC300 Rotation cylinder shaft	PI03A050	1	
12	PC300 Rotary cylinder block	PI03A020	1	
13	Ball bearing 6007ZZ	MBG1-6007	2	
14	PC300 Setscrew	PI03A080	1	

3.4.1.2 Explosive View of Phoenix550-950 Base
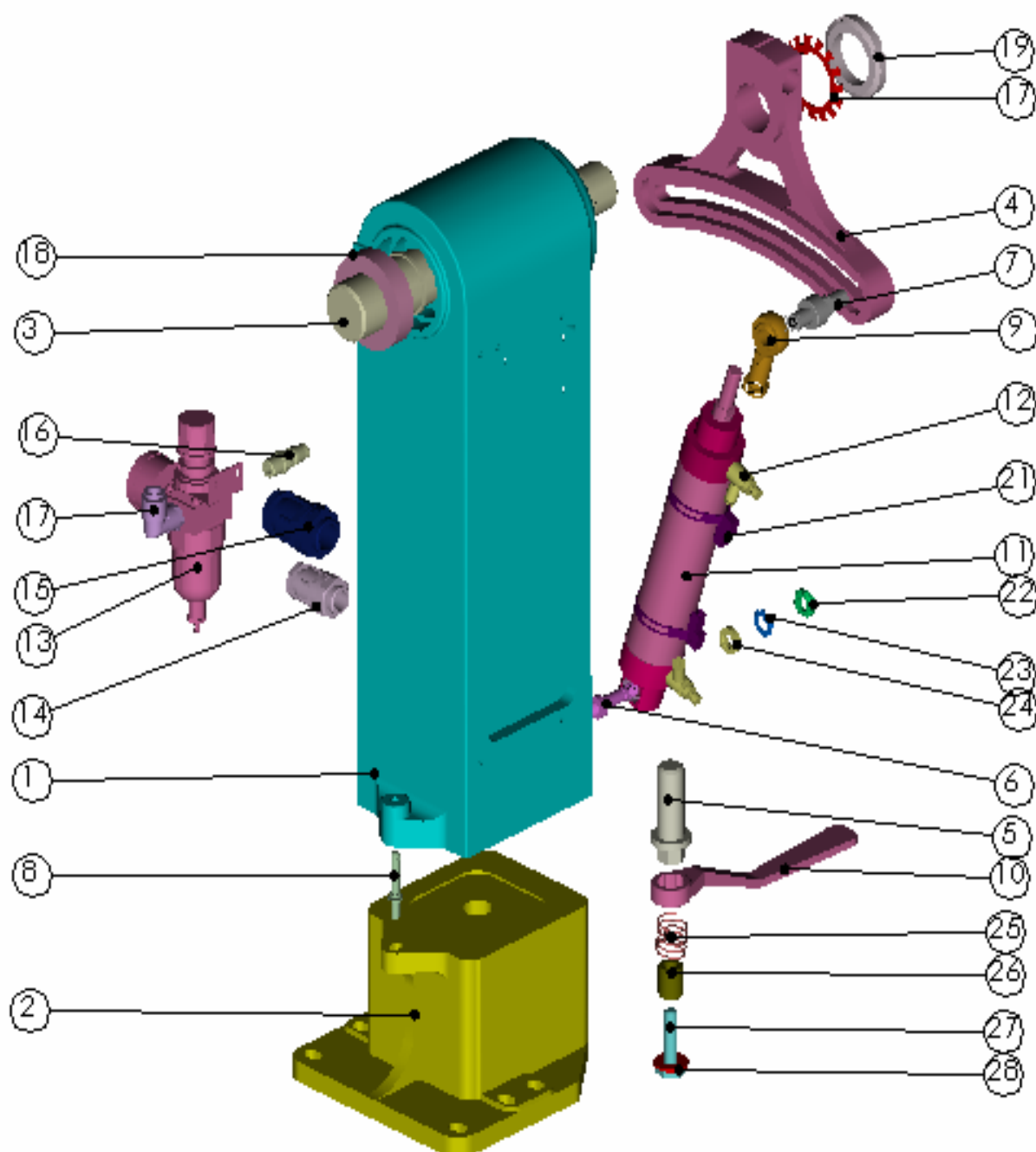
Part list of Phoenix550~950 base

Item	Description	Serial No.	Q'ty	Remark
1	Supporting base	PI00A012	1	
2	Base	PI00A021	1	
3	Rotation axis	PI00A030	1	
4	Swing angle adjustment knob	PI00A040	1	
5	Rotation axis of supporting base	PI00A051	1	
6	Rotation axis for cylinder	PI00A061	1	
7	Swing angle adjustment bracket	PI00A070	1	
8	Positioning pin	PI00A080	1	
9	Spherical bearing PHS12	MBG5-PHS12	1	
10	Ratchet wrench	PI00A110	1	
11	Swing cylinder	PCY40-YC400125S	1	P550/P650
		PCY50-YC500120Y	1	P650W-P950W
12	Speed control joint	PSP1-0401	2	
13	Air filter/ regulator MAFR200-08A	PET2005	1	
14	Cable fixed head M25*1.5	RXE1002	1	
15	Cable fixed head M22*1.5	RXE1001	1	
16	Quick fitting	PFH0200	1	
17	Quick fitting	PQL1002	1	
18	Ball bearing 6008ZZ	MBG1-6008	2	
19	Nut for ball bearing M40*1.5P	MSW8-AN08	1	
20	Lock washer for ball bearing	MSW8-AW08	1	
21	Magnetic switch	RSN2004L	2	
22	Nut for ball bearing	MSW8-AN00	2	
23	Lock washer for ball bearing	MSW8-AW00	1	
24	Ball bearing 6800ZZ	MBG1-6800	2	
25	Spring for ratchet wrench	PI00A120	1	
26	Mat tube of rotation axis	PI00A100	1	
27	Outside hexagonal screw M10*40L	MSW6-1040	1	
28	Plus size of flat washer (M10)	MSW8-1031	1	

3.4.2 Crosswise Component with Single Stage
3.4.2.1 Explosive view of Phoenix350~450
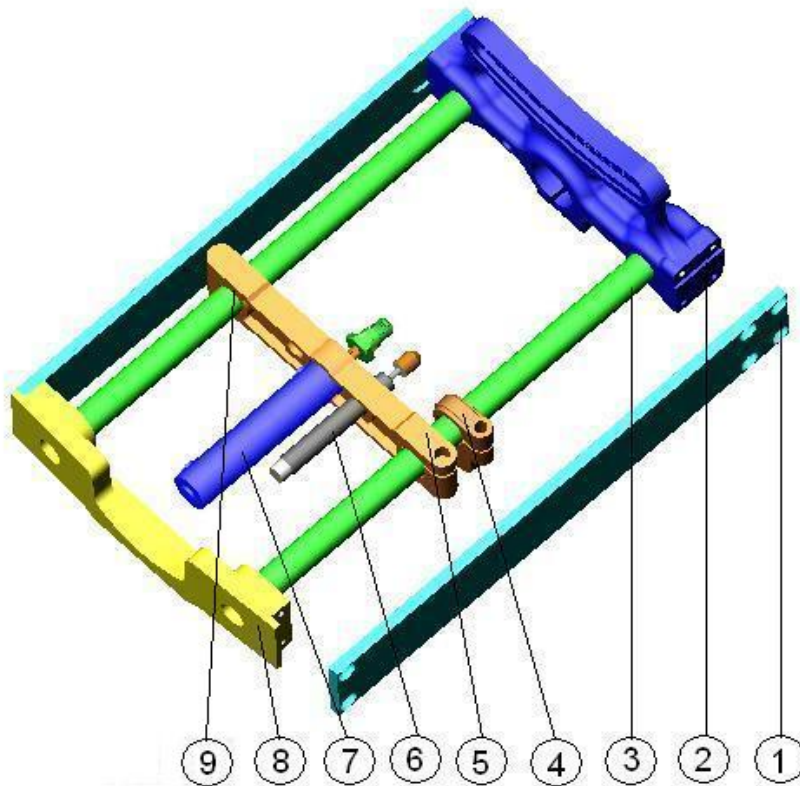
Part list of Phoenix350~450 crosswise

Item	Description	Serial No.	Q'ty	Remark
1	Aluminum profile of crosswise	MFA-PI03B021	2	
2	Mounting bracket of crosswise	PI03B010	1	
3	Crosswise guide-bar	MRD1-YE200350	2	
4	Crosswise baffle	AI00B070	1	
5	Mounting bracket of crosswise cylinder	AI00B060	1	
6	Shock absorber	MAR1416	1	
7	Crosswise cylinder	PCY20-YC200075A	1	
8	Crosswise frame	AI00B011	1	
9	DU dry bearing	MBG2-2012	1	

3.4.2.2 Explosive view of Phoenix550~950

Part list of Phoenix550~950 crosswise

Item	Description	Serial No.	Q'ty	Remark
1	Mounting bracket of crosswise	PI00B011	1	
2	Aluminum profile of crosswise	MFA-PI00B021	2	
3	Crosswise frame	AI00B011	1	
4	Mounting bracket of crosswise cylinder	AI00B060	1	
5	Crosswise baffle	AI00B070	1	
6	Crosswise guide-bar	MRD1-YE200500	2	
7	Eye bolt	MSW9-1001	1	
8	Shock absorber	MAR1416	1	
9	Crosswise cylinder	PCY20-YC200120K	1	
10	Speed control joint	PSP1-0401	2	
11	DU dry bearing	MBG2-2012	1	

3.4.3 Crosswise Component with Telescopic
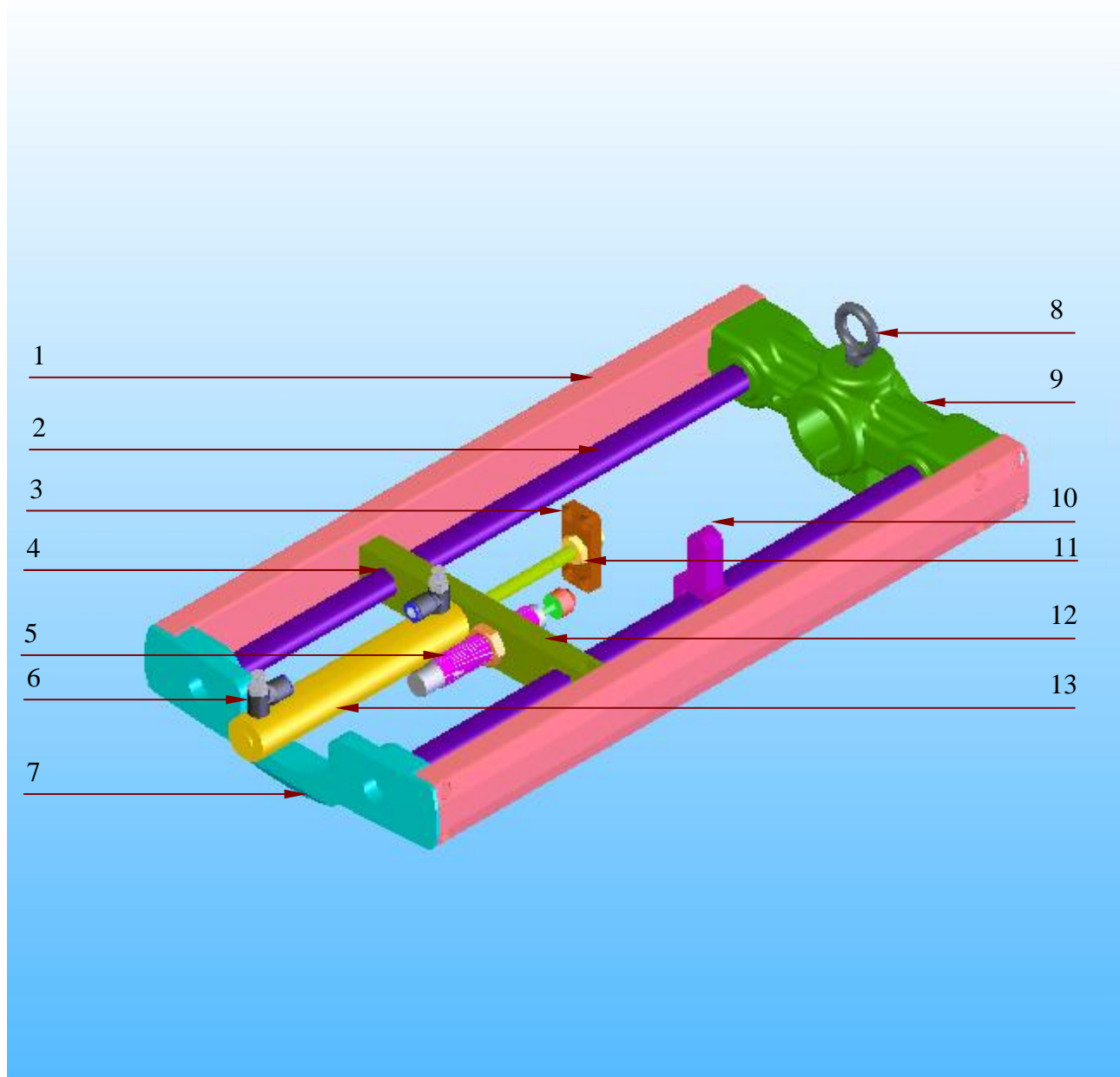
Part list of Crosswise with Telescopic

Item	Description	Serial No.	Q'ty	Remark
1	Aluminum profile of crosswise	MFA-PT07B020	2	
2	Crosswise guide-bar	MRD1-YE200600	2	
3	Crosswise cylinder connecting block	PT00B040	1	
4	DU dry bearing	MBG2-2012	1	
5	Shock absorber	MAR2030	1	
6	Speed control joint	PSP1-0401	2	
7	Crosswise frame	AI00B011	1	
8	Eye bolt	MSW9-1001	1	
9	Mounting bracket of crosswise	PI00B011	1	
10	Crosswise baffle	PT00B020	1	
11	Set screws of crosswise cylinder	PI00B070	1	
12	Mounting bracket of crosswise cylinder	PT00B010	1	
13	Crosswise cylinder	PCY20-YC200200K	1	

3.4.4　Arm component with Single Stage

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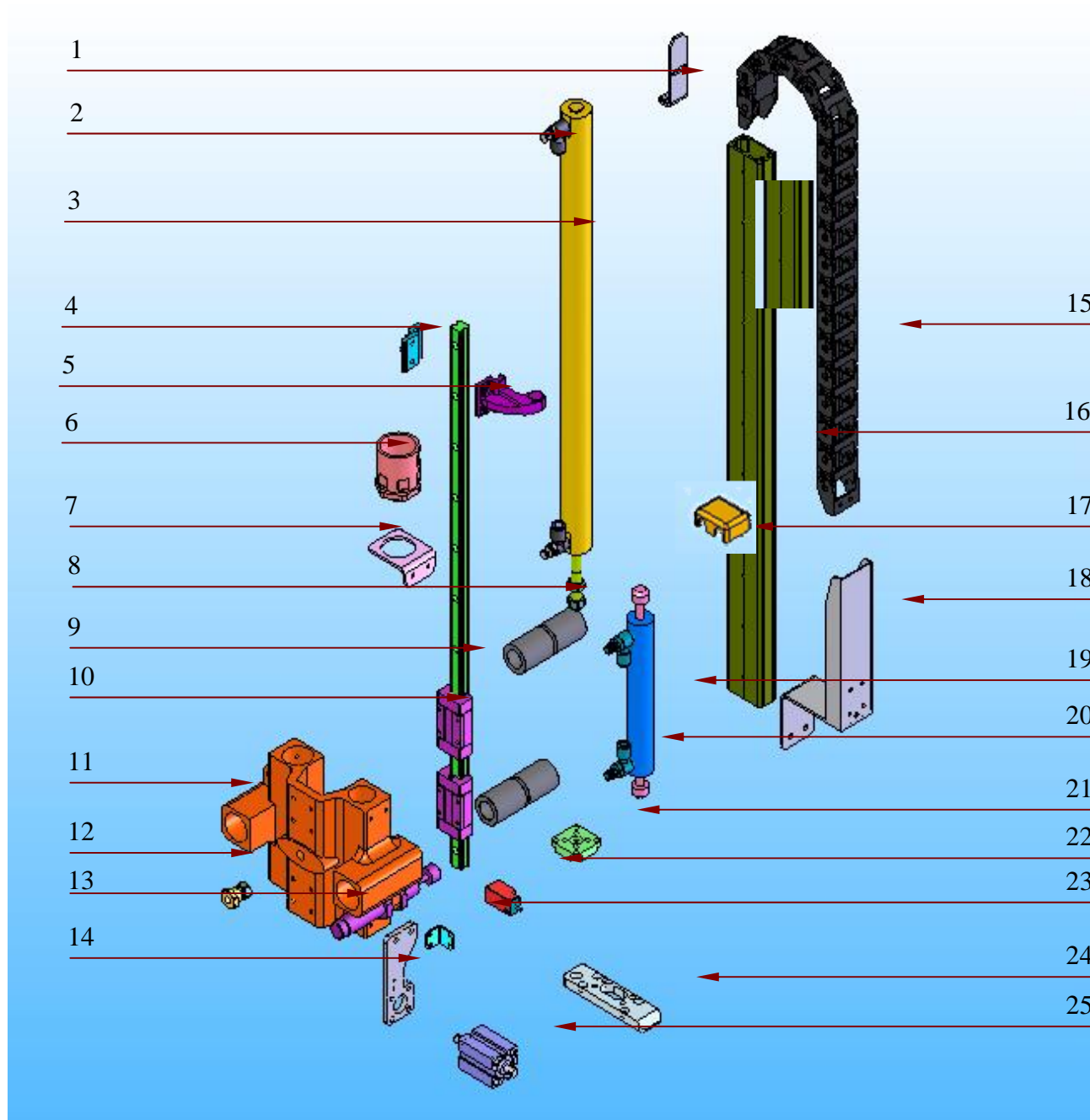
Part list of Arm with Single stage

Item	Description	Serial No.	Q'ty	Remark
1	Upper protective plate	AI00C120	1	
		PI00C080	1	
2	Speed control joint	PSP1-0801	2	
3	Vertical cylinder	PCY25-YC250350K	1	P350
		PCY25-YC250450K	1	P450
		PCY25-YC250550K	1	P550
		PCY25-YC250650K	1	P650
		PCY25-YC250750K	1	P750
		PCY25-YC250850K	1	P850
4	Down stroke fixed block	AI00C140	1	
5	Vertical baffle	AI00C130	1	
6	Protective tube joint	MCN2011	1	
7	Protective tube supporting frame	PI00B030	1	
8	Linear bearing	MBG4-JB38	4	
9	Slide rail	MLP15-580	1	P350
		MLA15-700	1	P450
		MLS15-760	1	P550
		MLP15-880	1	P650
		MLP15-1000	1	P750
		MLP15-1120	1	P850
10	Slide rail block	MLP15B	2	
11	Mounting bracket of vertical	AI00C013	1	
12	Set screws of crosswise cylinder	PI00B070	1	
13	Shock absorber	MAR1416	1	
14	Safety lock cylinder frame	AI00C040	1	

15	Protective chain	MCN30100	20	P350
		MCN30100	20	P450
		MCN30100	24	P550
		MCN30100	24	P650
		MCN30100	30	P750
		MCN30100	30	P850
16	Aluminum profile of arm	MFA-PI03C020	1	P350
		MFA-PI04C020	1	P450
		MFA-PI05C030	1	P550
		MFA-PI06C030	1	P650
		MFA-PI07C030	1	P750
		MFA-PI08C030	1	P850
17	Terminal cover	AI00B050	1	
18	Arm protective board	PI00C070	1	
19	Cushion cylinder	PCY20-YC200084K	1	
20	Speed control joint	PSP1-0401	2	
21	Cylinder fixed plate	AI00C030	1	
22	Proximity switch	RSN1001	1	
23	Proximity switch fixed plate	AI00C060	1	
24	Down fixed plate of arm	AI00D050	1	
25	Safety lock cylinder	PCY2015M	1	

3.4.5 Arm Component with Telescopic
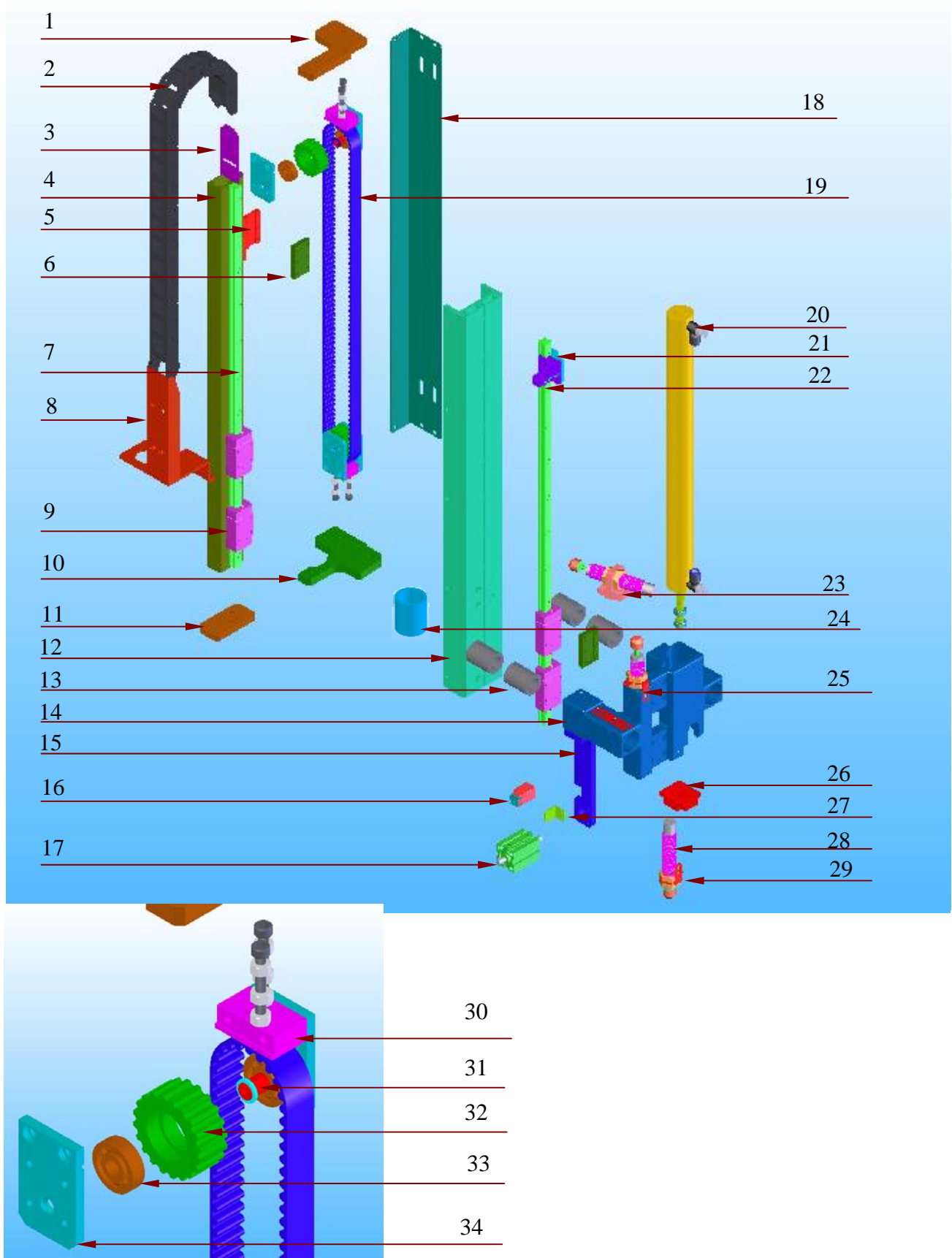
Part list of Arm with Telescopic

Item	Description	Serial No.	Q'ty	Remark
1	Upper fixed plate of arm	AW00C050	1	
2	Protective chain	MCN3010	12	P550W / P650W
		MCN3010	13	P750W / P850W
3	Upper protective plate for main arm	AI00C110	1	
4	Aluminum profile 2 for telescopic	MFA-AW05C030	1	P550W
		MFA-AW06C031	1	P650W
		MFA-AW07C031	1	P750W
		MFA-AW08C031	1	P850W
5	Belt fixed plate	AW00C181	1	
6	Belt clamping plate	AW00C190	2	
7	Slide rail	MLP15-520	2	P550W
		MLP15-520	1	P650W
		MLP15-580	1	
		MLP15-580	1	P750W
		MLP15-640	1	
		MLP15-640	1	P850W
		MLP15-700	1	
8	Arm protective board	PT00B051	1	
9	Slide rail	MLP15B	4	
10	Down fixed plate of arm	AW00C040	1	
11	Mounting plate of rotating cylinder	PT00C010	1	
12	Aluminum profile 1 for telescopic	MFA-AW05C020	1	P550W
		MFA-AW06C020	1	P650W
		MFA-AW07C020	1	P750W
		MFA-AW08C020	1	P850W
13	Linear bearing	MBG4-JB20	4	
14	Mounting bracket of vertical (AW,PW)	AW00C010	1	
15	Safety lock cylinder frame	AW00C151	1	

16	Sensor switch	RSN1001	1	
17	Safety lock cylinder	PCY2015M	1	
18	Arm frame	AW05C040	1	P550W
		AW06C040	1	P650W
		AW07C040	1	P750W
		AW08C040	1	P850W
19	Belt	MBT1-8M15	1m	P550W
		MBT1-8M15	1.12	P650W
		MBT1-8M15	1.3m	P750W
		MBT1-8M15	1.3m	P850W
20	Speed control joint	PSP1-0801	2	
21	AW down stroke fixed block	AI00C140	1	
22	AW down stroke baffle plate	AI00C150	1	
23	Crosswise cushion base	PT00B030	1	
24	Protective tube joint	MCN2011	1	
25	Washer	AW00C080	2	
26	Mounting bracket of vertical cylinder	AW00C060	1	
27	Proximity switch fixed plate	AI00C160	1	
28	Shock absorber	MAR2030	1	
		MAR2050	2	
29	Washer	AW00C070	1	
30	Upper plate of belt pulley	AW00C120	2	
31	Belt pulley pin	AW00C130	2	
32	Belt pulley	MBTI-YF081501A	2	
33	Bearing 6002ZZ	MBG1-6002	4	
34	Side plate of belt pulley	BW00C080	4	

3.4.6 Jig Component
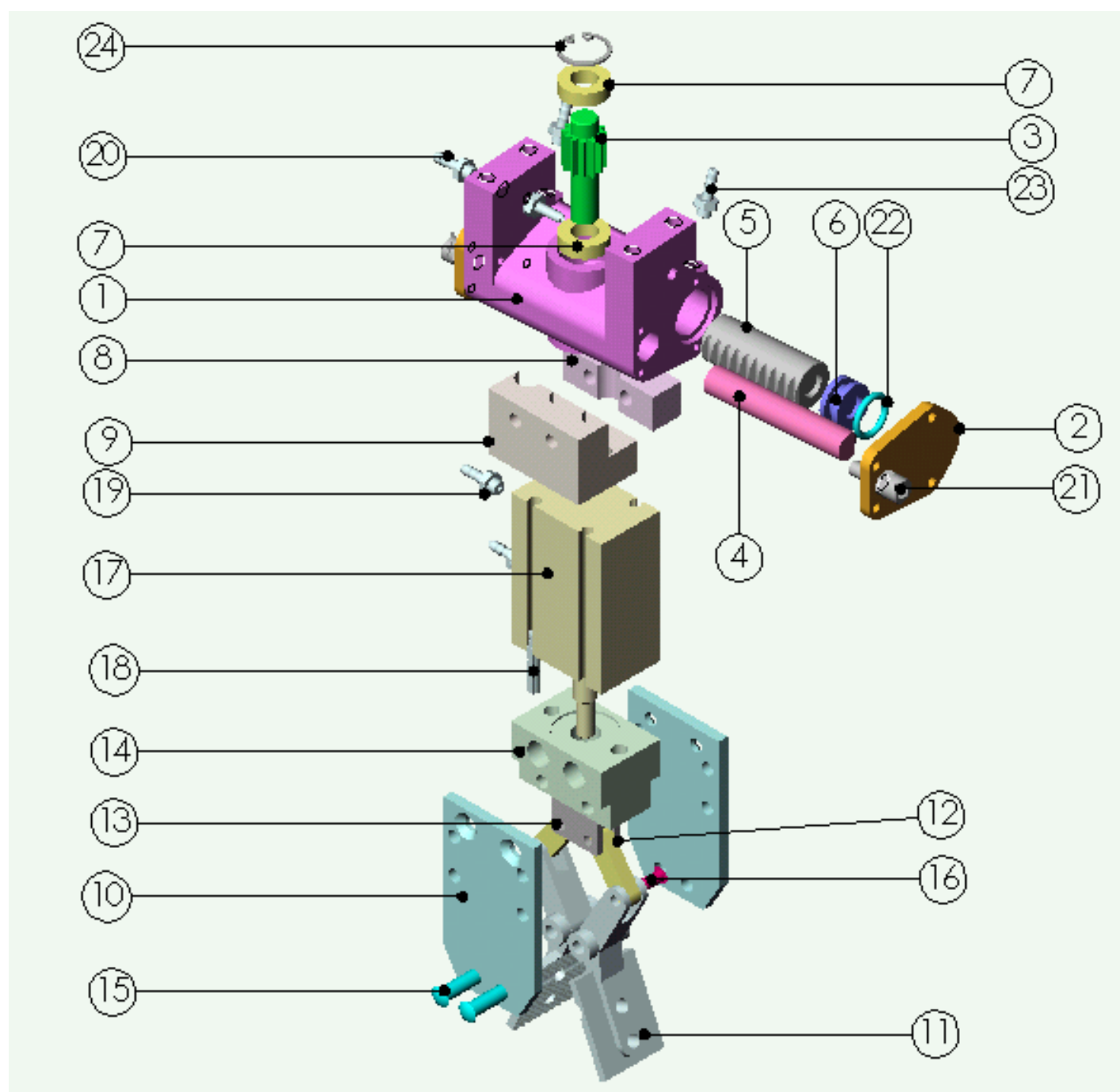
Part list of Jig

Item	Description	Serial No.	Q'ty	Remark
1	Wrist assembly body	JR01B011	1	
2	Side plate of wrist assembly	JR01A020	2	
3	Pinion of wrist assembly	JR01A030	1	
4	Positioning rack of wrist assembly	JR01A040	1	
5	Pinion of wrist assembly	JR01A050	1	
6	Rotary piston	JR01A060	1	
7	Bearing 689ZZ	MBG1-689	2	
8	Jig fixed plate -1	PI00C041	1	
9	Jig fixed plate -2	PI00C031	1	
10	Side plate of jig body 1	JC16B040	1	
	Side plate of jig body 2	JC16B050	1	
11	Clamping piece	JC16B010	2	
12	Chain mesh splice	JC16B060	2	
13	Cylinder driving base	JC16B030	1	
14	Cylinder seal-capping	JC16B070	1	
15	Screw	MSW7-0516	2	
16	Positioning pillar	JC16B020	4	
17	Jig cylinder	JC16R15M	1	
18	Magnetic switch of jig		1	
19	Small insert core	PTF04M5	2	
20	Small insert core	PTF04M5	2	
21	Bolt	MSW2-0512	2	
22	O-shape ring	PRG1017	2	
23	Small insert core	PTF04M5	2	
24	C-shape retaining ring (Inner)	MET2002	1	

3.4.7   Air Valva Component
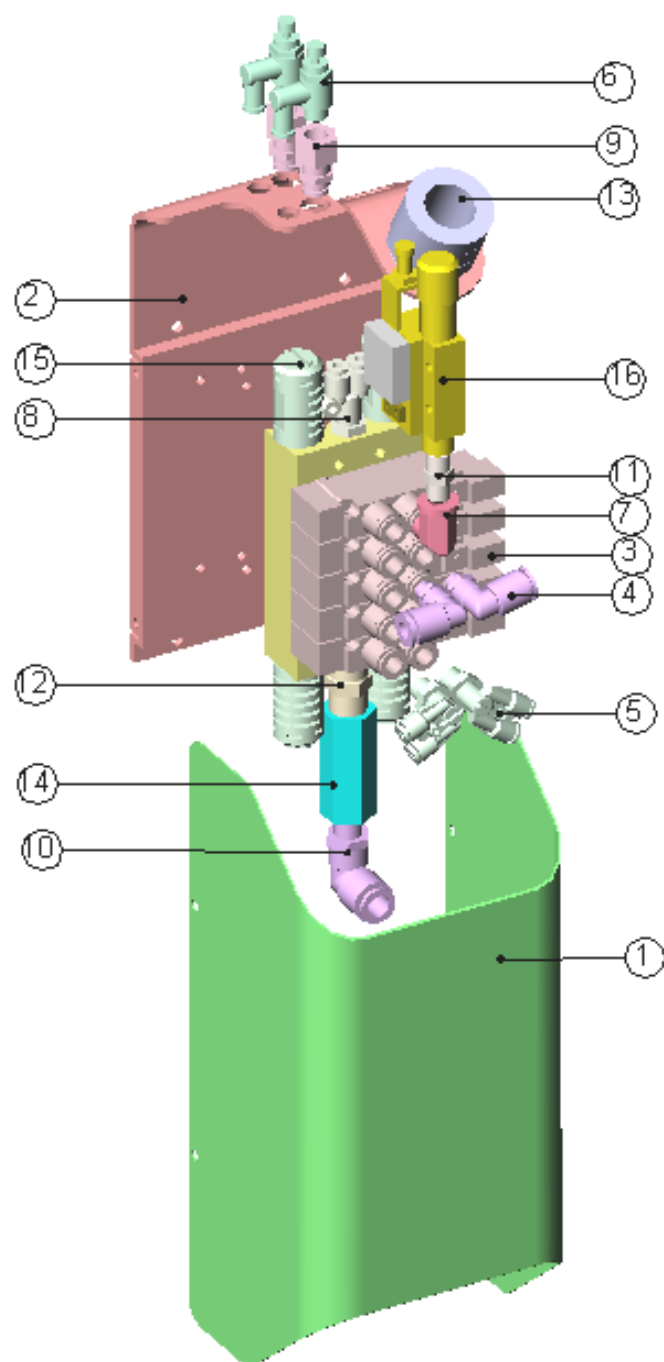
Part list of Air Valve

Item	Description	Serial No.	Q'ty	Remark
1	Cover plate of magnetic valve	PI00H010	1	
2	Fixed plate of magnetic valve	PI00H021	1	
3	Magnetic valve	PSV1-P54S+1D	1	
4	Quick fitting	PQL0801	2	
5	Quick fitting	PQU0401	2	
6	Speed control joint	PSP1-0401	1	
7	Copper elbow	PFL0101	1	
8	Quick fitting	PQU0402	1	
9	Quick fitting	PQE0401	2	
10	Quick fitting	PQL1002	1	
11	Nipple	PTA0101	1	
12	Nipple	PTA0202	1	
13	Protective tube joint	MCN2011	1	
14	Check valve	PTE1002	1	
15	Silencer	PET3001	2	
16	Air generator	PET1001	1	Option with "V" function

3.4.8 Electric Control Component
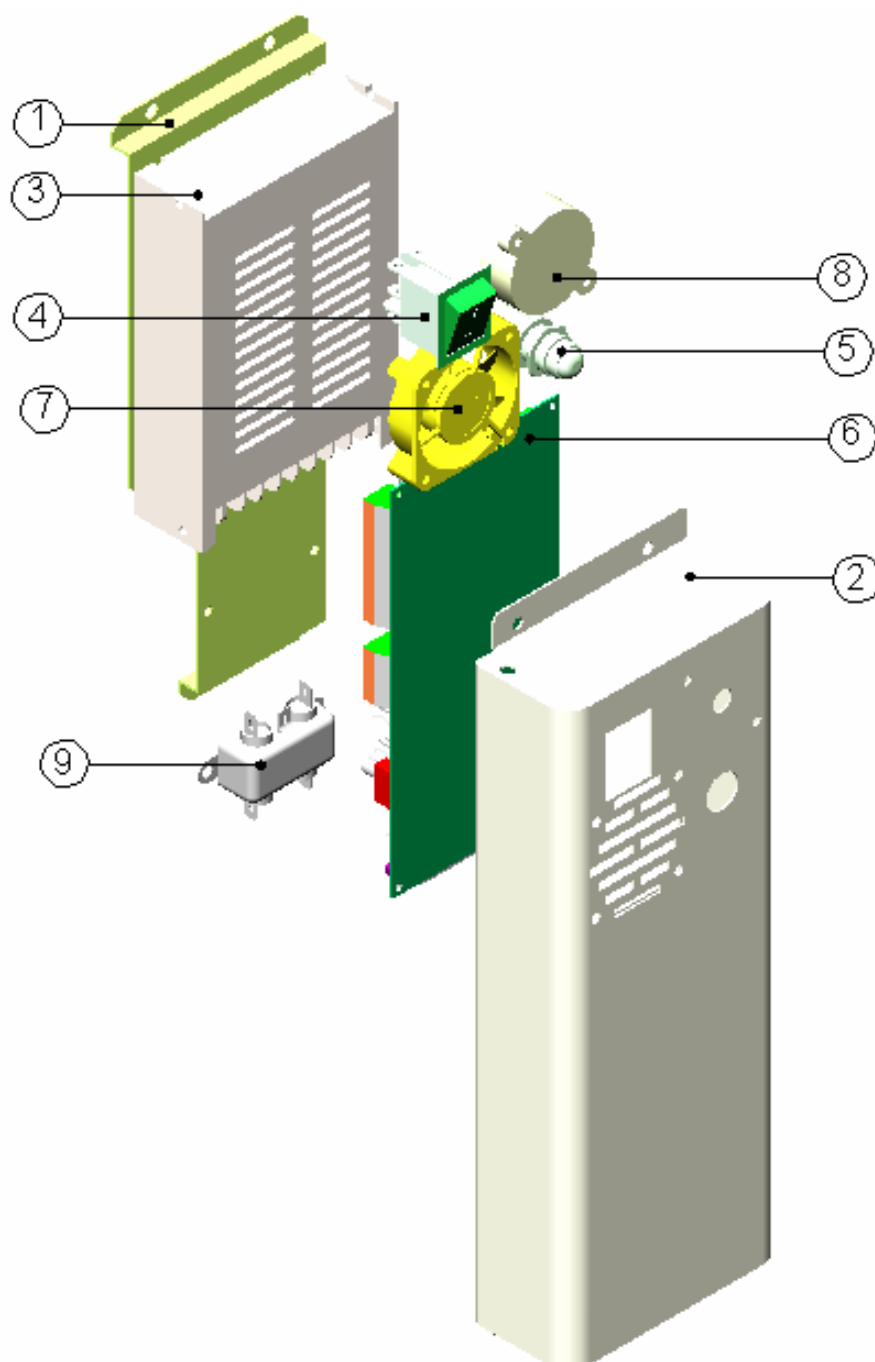
Part list of Electric Control

Item	Description	Serial No.	Q'ty	Remark
1	Fixed plate for power supply	PI00H040	1	
2	Electric control box	PI00H030	1	
3	Power supply	RPW2006	1	
4	Power switch	RBT1001	1	
5	Alarm light	RLT1002	1	
6	Relay board	RBD-GA28-PC2	1	
7	Fan	REL2001	1	
8	Buzzer	REL1001	1	
9	Power filter	RPW3002	1	

3.4.9 Controller
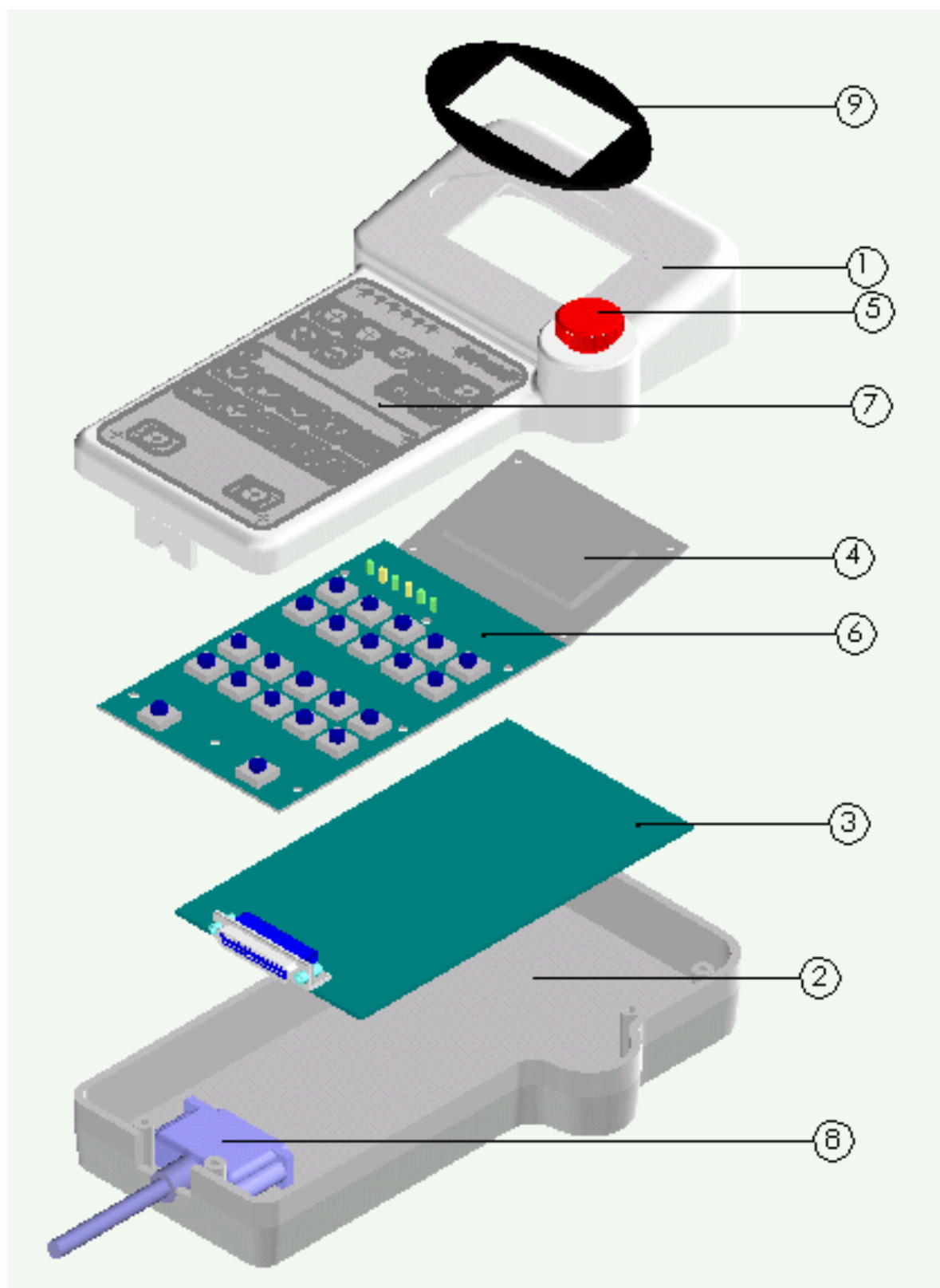
Part list of Controller (RBD-GA28)

Item	Description	Serial No.	Q'ty	Remark
1	Top cover	GA28E010	1	
2	Base cover	GA28E020	1	
3	Control board in controller	RBD-GA28-PC3	1	
4	Liquid crystal display (LCD)	RBD-GA28-PC4	1	
5	Emergency stop button	RSN4004	1	
6	Key-press panel	RBD-GA28-PC1	1	
7	Film	RBT2-GA28E050	1	
8	Connecting line of controller	RCB1001	1	
9	LCD protecting cover	GA28E040	1	

3.4.10 End-of-arm Suction Tooling Component
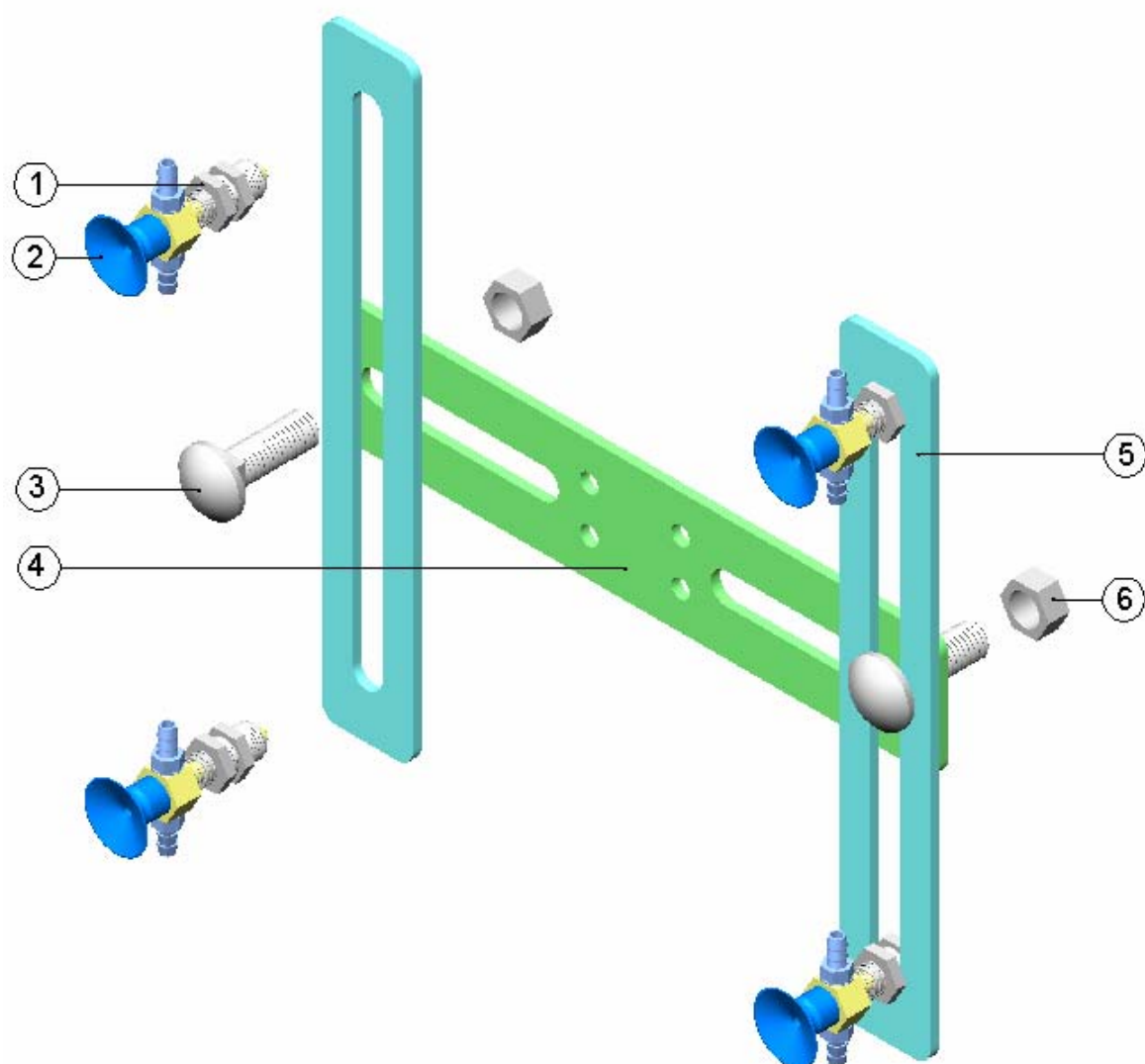
Part list of End-of-arm Suction Tooling (JA05-200A2)

Item	Description	Serial No.	Q'ty	Remark
1	Spring plunger	JE20R070	4	
2	Suction pad	JE07-10S1	4	Replaceable
3	Carriage bolts	MSW1-1030	2	
4	Fixed plate	JB01S-036200	1	
5	Fixed plate	JB01S-030200	2	
6	Nut	MSW8-1003	2	

<u>NOTE</u>: This end-of-arm suction tooling is suitable for P series with optional "V" function robot.

4. SETTING AND ADJUSTMENT BEFORE BOOTING
4.1 Connection with I.M.M (CE Option)

Before putting robot into operation, it must be linked with I.M.M by connecting the Euromap/ SPI-standard interface connector.
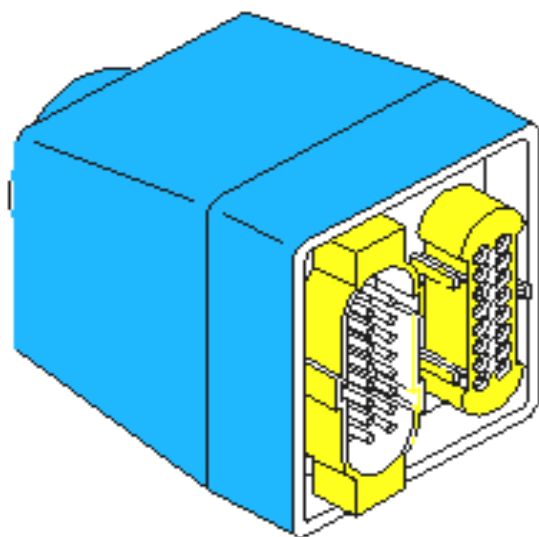
Robot Side Connector   **1.M.M Side Connector**
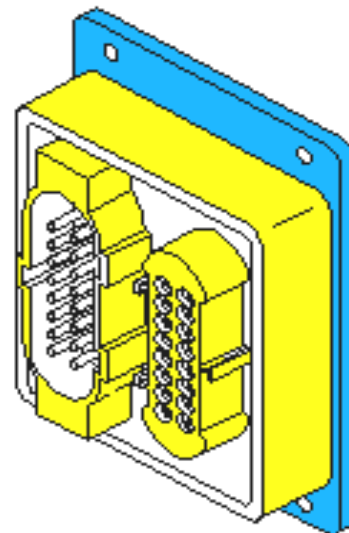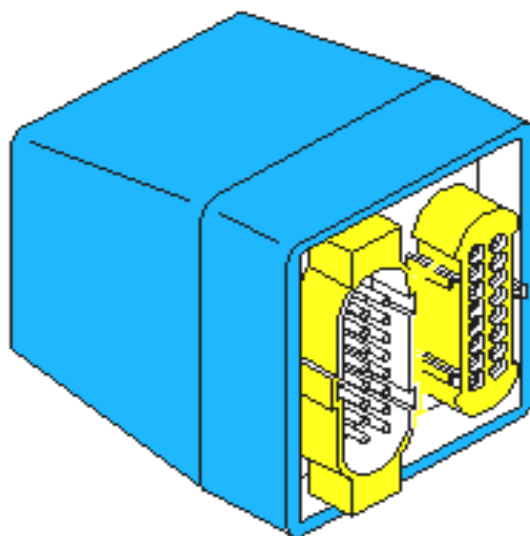
Dummy Plug

NOTE: When robot is not in use, power switch must be turned off or connect with dummy plug.

4.2   Connection with Pneumatic Supply Source

Output air pressure 5kgf/cm²

Quick fitting - Inlet

Quick fitting - Outlet

Input air pressure 5kgf/cm²

Pressure gauge

Drain valve
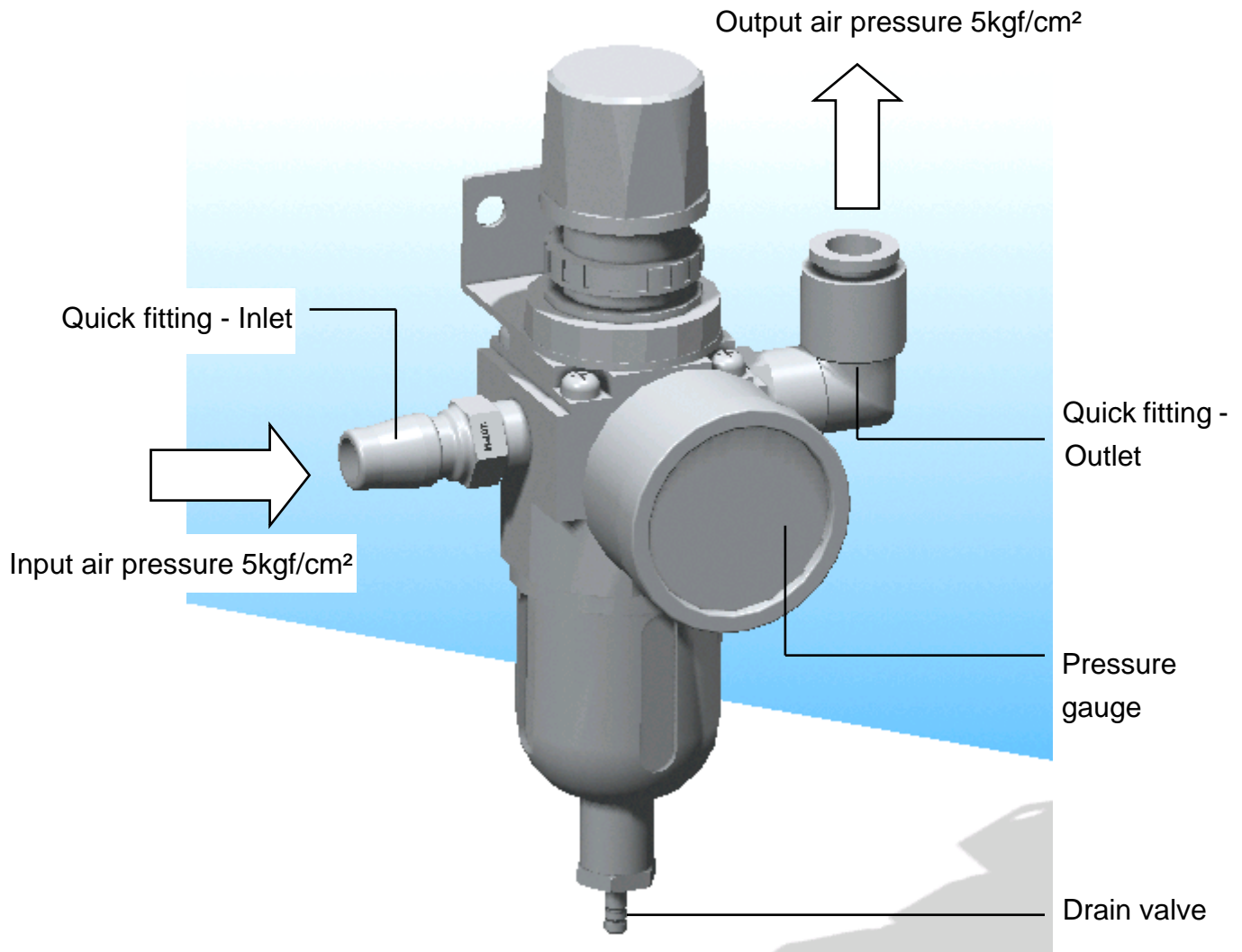
NOTE:

(1)   After completing the connection, **adjust the pressure until it reaches 5kgf/cm².**

(2)   **Check the water trapped in Air filter/ Regulator and drain water away everyday.**

(3)   Pull up pressure tuning knob lightly, turn clockwise to large the pressure; turn counterclockwise to lessen pressure.

4.3 The Flowchart of Booting Procedure

Power switch ——————————————— Buzzer

Fan ——————————————— Alarm light
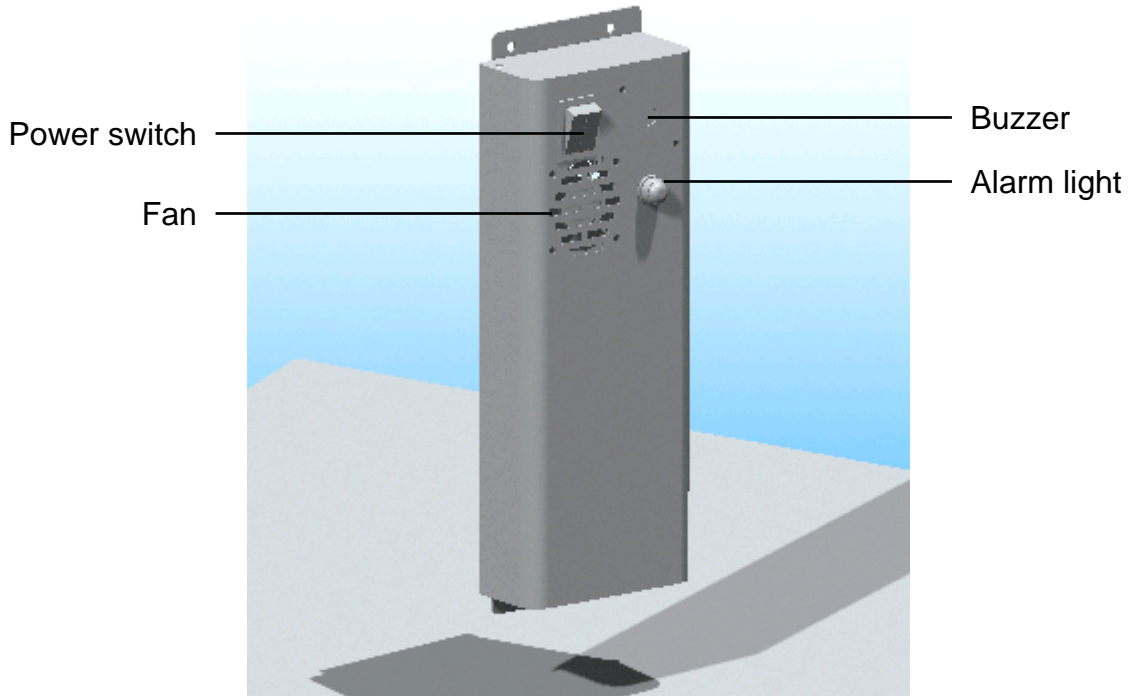
Procedure:

(1) Double check to make sure that safety interlocks between Robot and I.M.M are well connected, and then turns power switch on.

⚠ 【NOTE】 **Please make sure the controller and electric box is well connected before turning ON the power switch.**

(2) After power in, the screen of controller will display as below:

ALFA TOBOT		
F1	F2	Mode 模式設定
AUTO	**MANU**	**MODE**

(3) If there is no display on the screen after power on, it might be caused by burnt control fuses. Please check fuses and replaces it if necessary.

4.4   Adjustment while Mould Changing

⚠️ | **Safety matters must be fully observed** | **After changing mould finished, and ready to adjust the robot, there are some safety matters must be fully observed:**

(1) Do not adjust the robot unless you are fully trained.

(2) Switched the I.M.M to Manual mode and open mould to position, and then turns power off.

(3) Turns the power off and disconnects pneumatic supply source of the robot.

NOTE: Do not adjust the robot unless above mentioned actions are carried out.

4.4.1   Adjustment of Crosswise Stroke

Mounting bracket of crosswise cylinder

Set screws of mounting bracket of crosswise cylinder

Crosswise baffle

Set screws of crosswise baffle

Crosswise cylinder

Safety lock cylinder
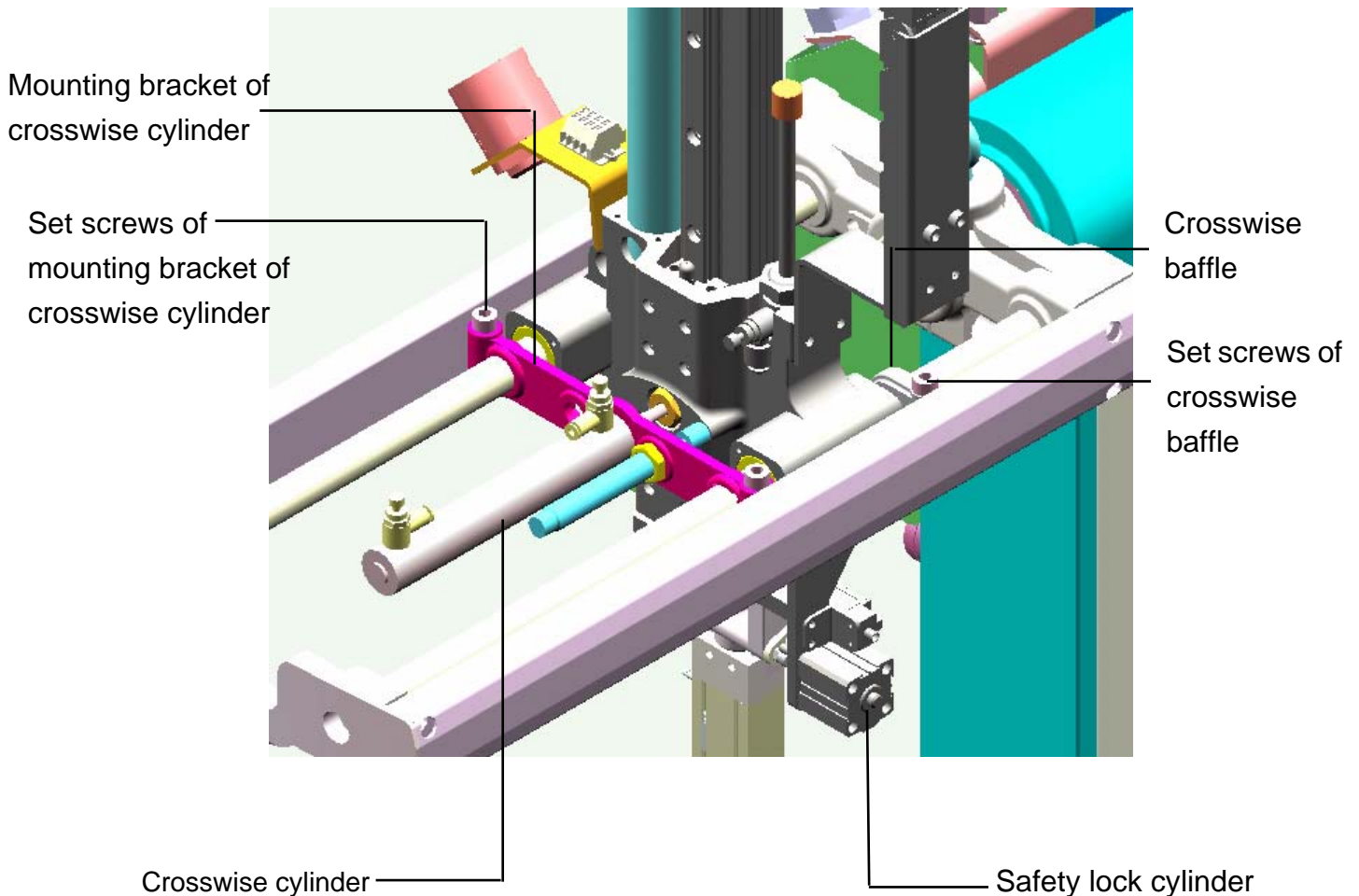
Procedure:

(1) Switch the I.M.M to Manual mode and open mould to position.

(2) Loosen set screws on both crosswise baffle and mounting bracket of crosswise cylinder.

(3) Moves arm horizontally to the middle of mould, put out safety lock cylinder and then moves arm down to the center of mould.

(4) Pushes arm forward to be able to remove the products without damage the mould. Locks set screws on mounting bracket of crosswise cylinder tightly with attention to preserve forward distance of ejector to avoid arm and set screws loosen during to long run.

(5) Pushes arm toward the injection nozzle until the accessible range of product removal and within crosswise cylinder moving stroke, and then locks set screws on the crosswise baffle tightly.

4.4.2　Adjustment of Vertical Stroke
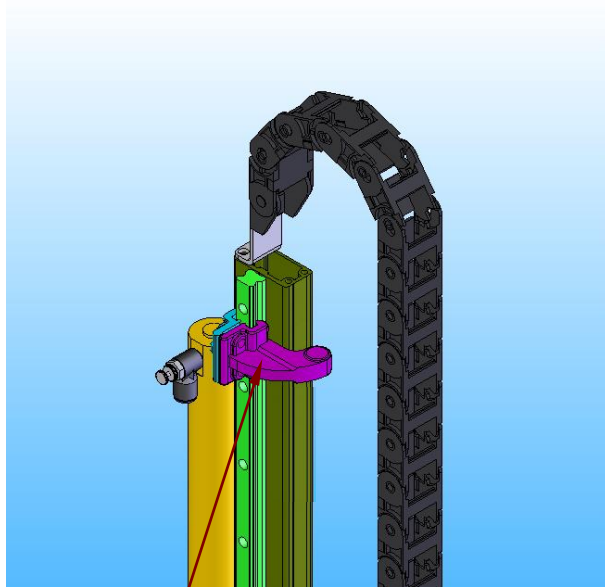
Single stage
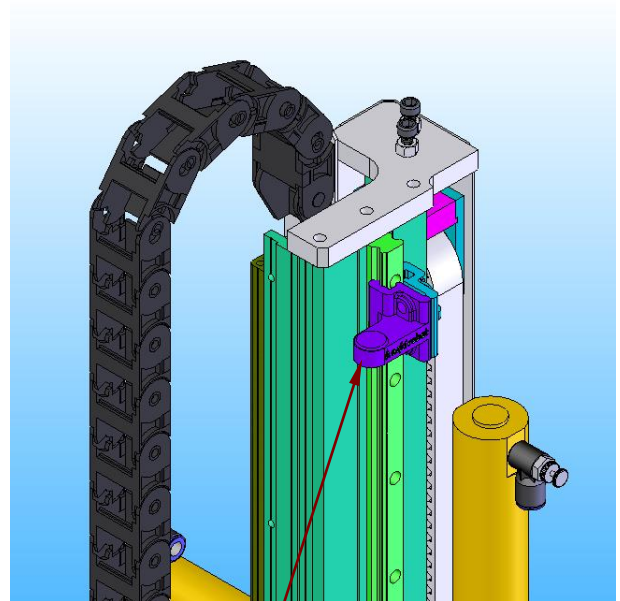
Telescopic

Vertical baffle

Vertical baffle

Procedure:

(1) Loosen set screws on vertical baffle.

(2) Adjust vertical baffle to proper position to allow the EOAT (jig) to be able to remove the product.

(3) Locks set screws tightly.

4.4.3 Left and Right Swing Angular Adjustment

Set screw nut of swing angular adjustment

Dextrorotation 50°~90°

Levorotation50°~90°

Swing out positioning check

Swing back positioning check

Swing out positioning check

Set screw nut of swing angular adjustment

Swing back positioning check

Dextrorotation 50°~90°

Levorotation50°~90°
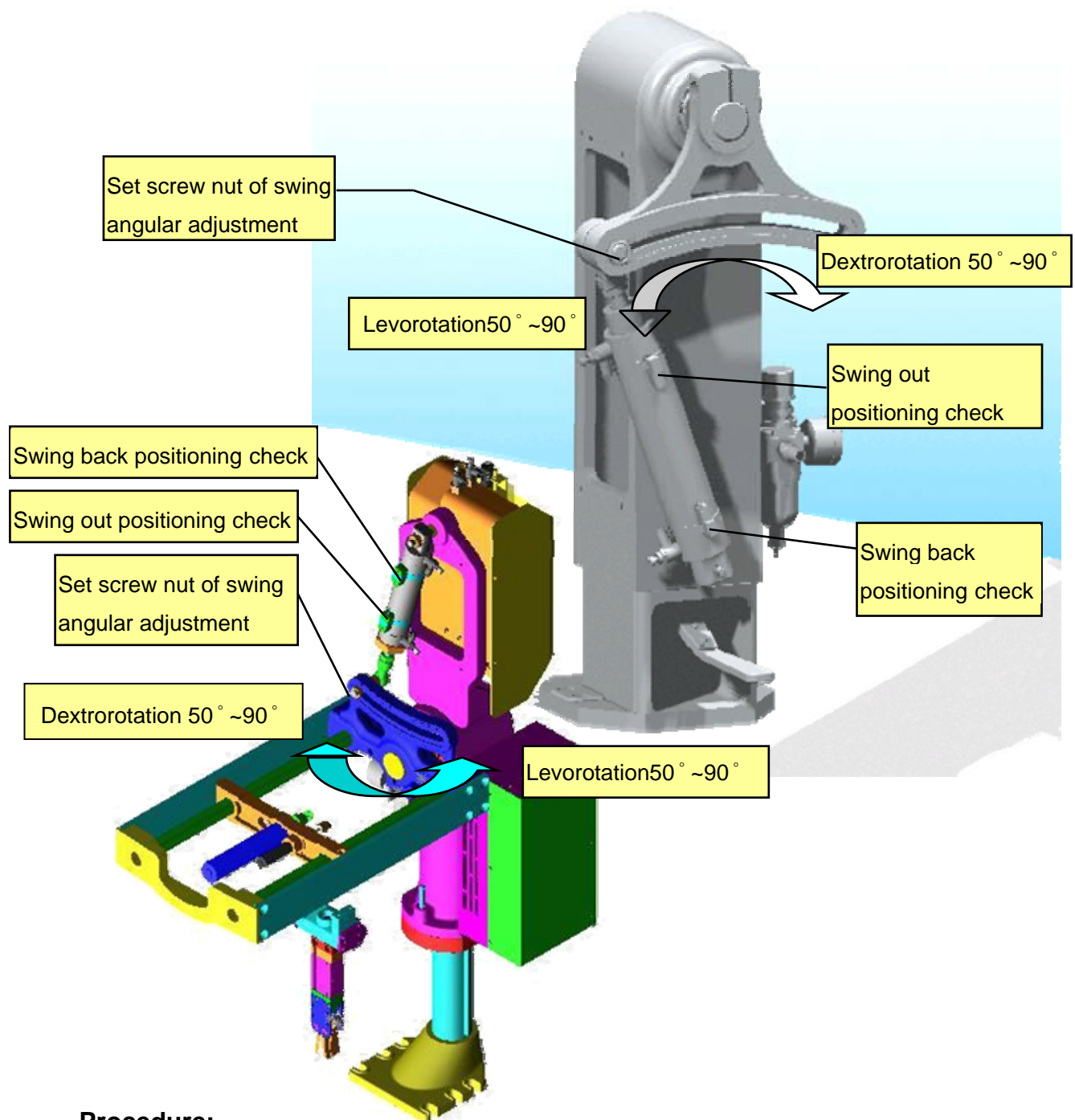
Procedure:

(1) Loosen the set screw nut of swing angular adjustment.

(2) Swing arm manually to the desired swing-out direction and angle, and adjust fixing nut of swing angular adjustment.

(3) Pulls out the safety lock cylinder and moves arm down to position to check if there is any interruption when swinging out. If not, locks fixing nut of swing angular adjustment tightly.

4.4.4   Adjustment of Mould Changing

Positioning pin
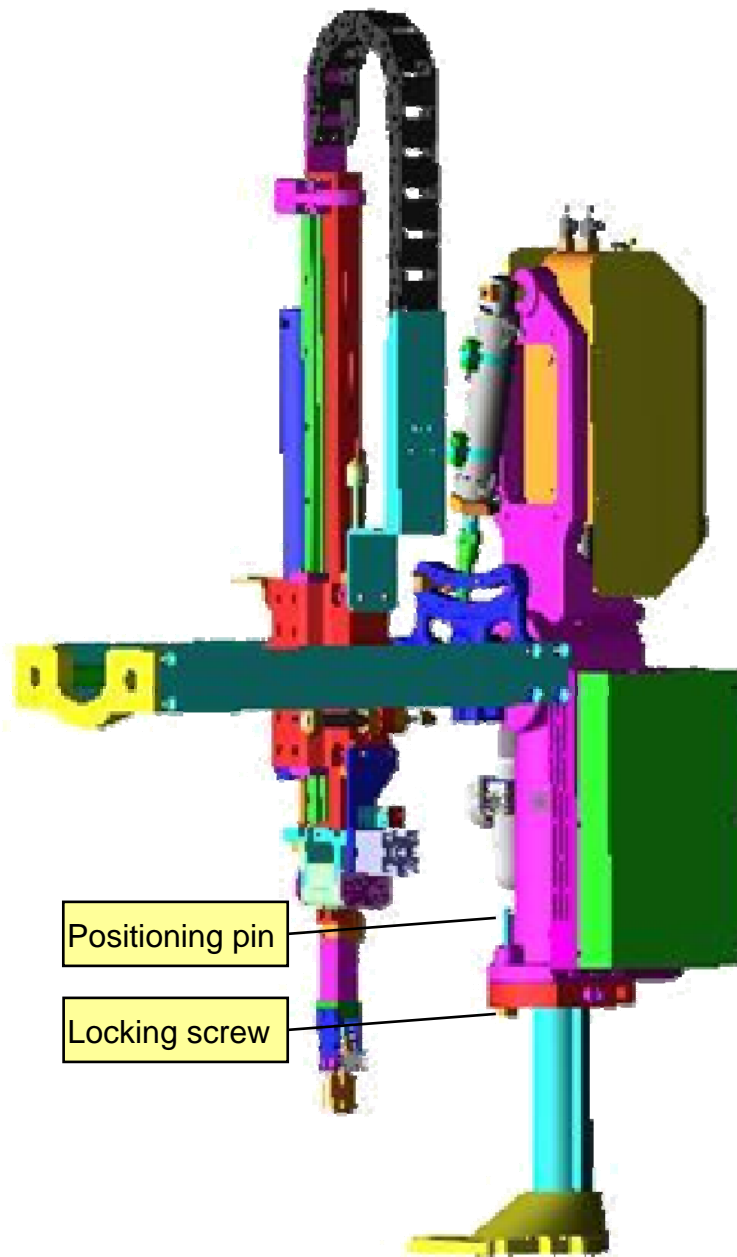
Locking screw

Procedure:

(1)   Loosen the locking screw with rotary wrench.

(2)   Lift up the positioning pin away in order to pivot out arm to facilitate mould changing.

(3)   After mould changing completed, pivots arm back to position and put positioning pin back into base.

(4)   Lock the locking screw tightly.

(5)   Adjust strokes according to procedures 4.4.4, 4.4.2 and 4.4.3.

⚠   **NOTE: Please do not collide with robot while mould changing.**

Loosen

Right/left-handed tenon

Tighten

Ratchet wrench

Loosen

Tighten
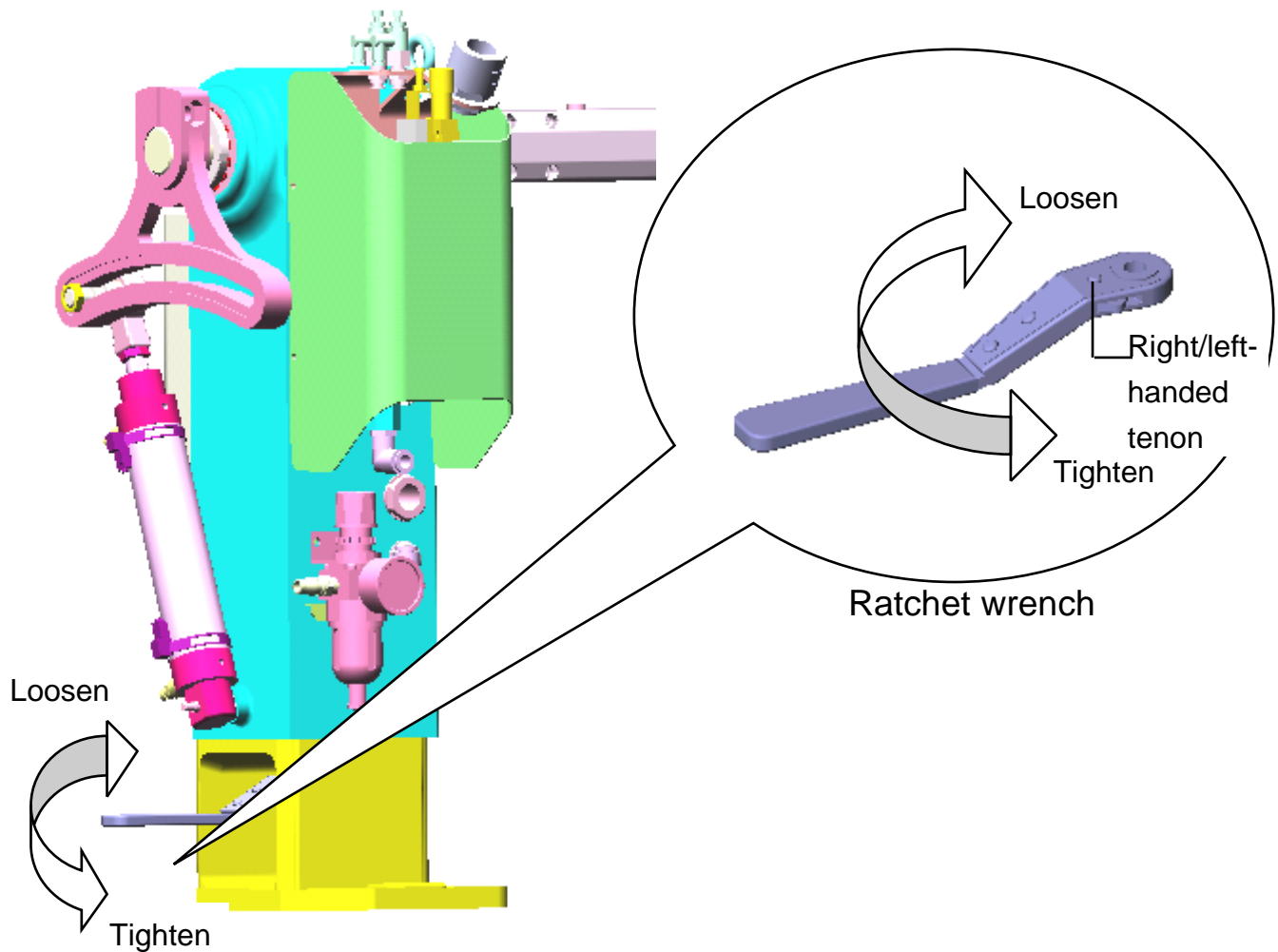
Procedure:

(1) Loosen the right/left-handed tenon with ratchet wrench as picture showed.

(2) Lift up the positioning pin away in order to pivot out arm to facilitate mould changing.

(3) After mould changing completed, pivot arm back to position and put position pin back into base.

(4) Tighten the right/left-handed tenon with ratchet wrench as picture showed.

(5) Adjust strokes according to procedures 4.4.1, 4.4.2 and 4.4.3.

⚠ **CAUTION: Please do not collide with robot while mould changing.**

4.5   Installation and Adjustment of EOAT

Wrist assembly

Magnetic switch
(RSN2009)

Gripper set
(JC20R1010)

Insert core

Suction pad

Jig
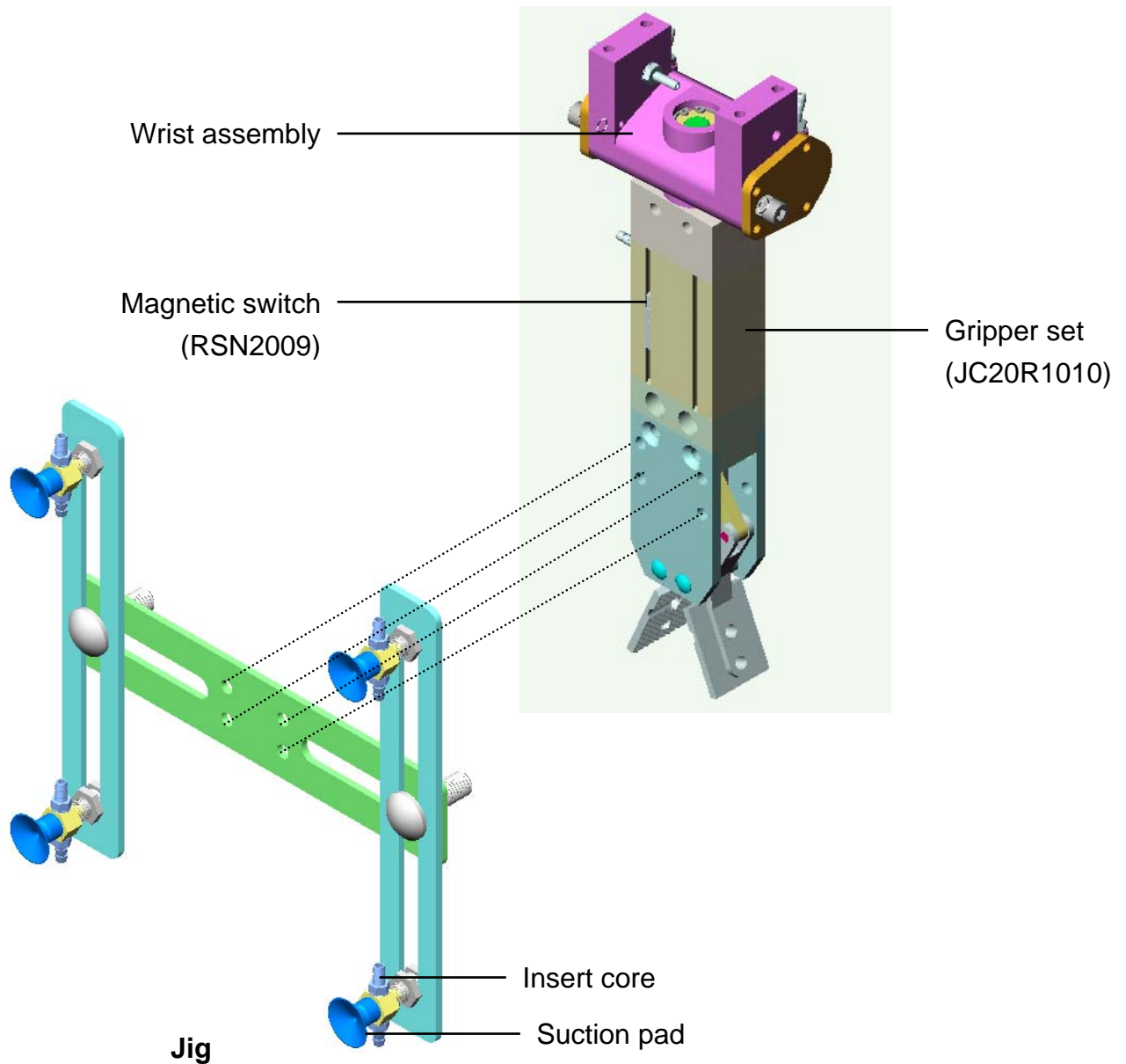
Procedure:

(1) Adjust magnetic switch till light ON as soon as the gripper tightly clamps the product/ sprue.

(2) Assembles standard EOAT as picture showed and installs on the gripper set.

(3) Connect red PU tube and standard EOAT with quick fitting.

4.6   Adjustment of Moving Speed

4.6.1   Speed Adjustment for Crosswise Forward and Backward

Crosswise back ward speed control valve

Crosswise forward speed control valve
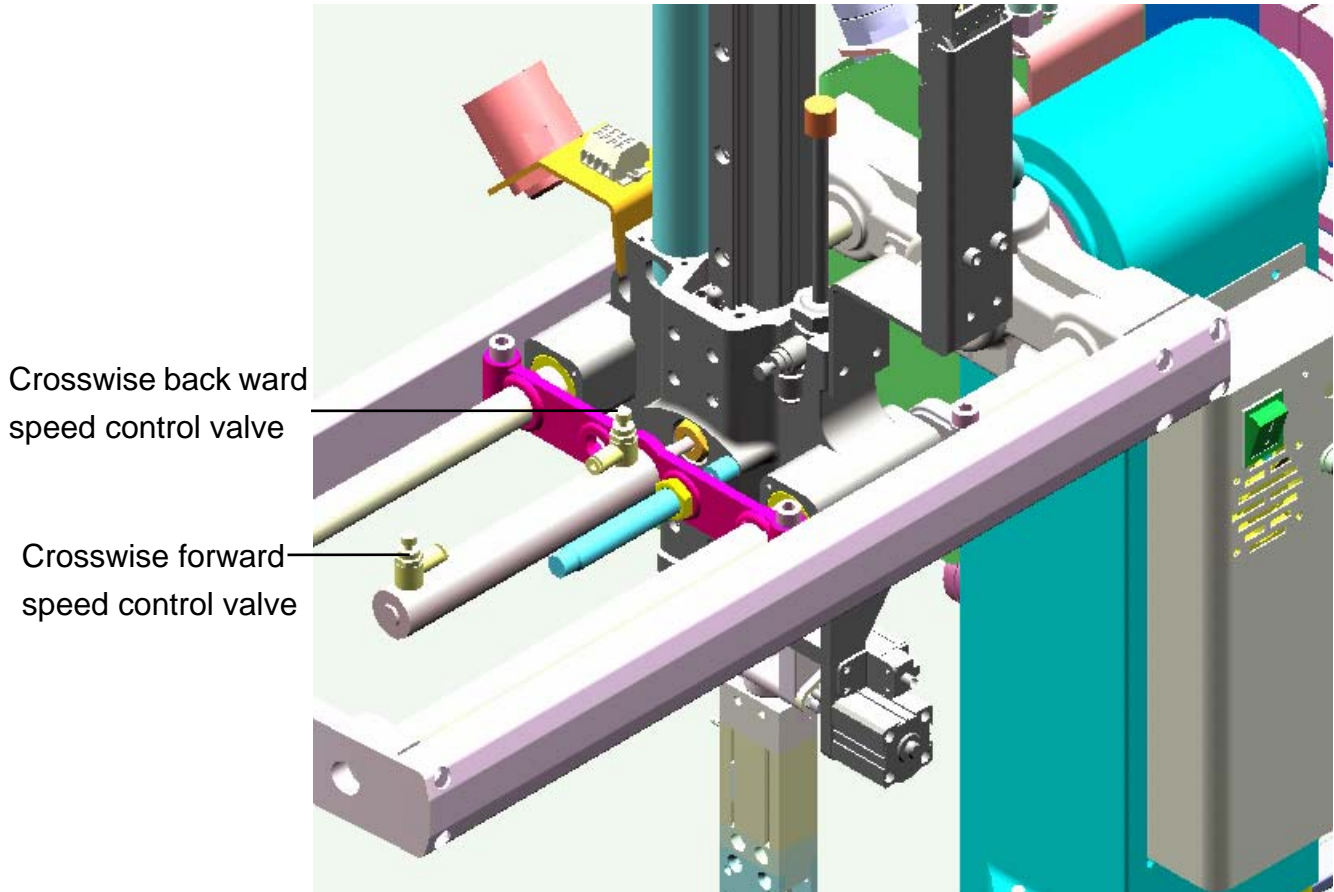
Procedure:

(1)   Adjust crosswise forward speed control valve when the speed of arm moving forward to remove the product needs to be changed.

(2)   Adjust crosswise backward speed control valve when the speed of arm moving backward after removing the product needs to be changed.

(3)   Turning clockwise to slow down; turning counterclockwise to speed up.

(4)   After proper adjustment, please lock the locking nut tightly.

4.6.2 Speed and Proximity Switch Adjustment for Arm Down

Arm down cushion control valve

Arm down speed control valve

Arm up detector (Proximity switch)
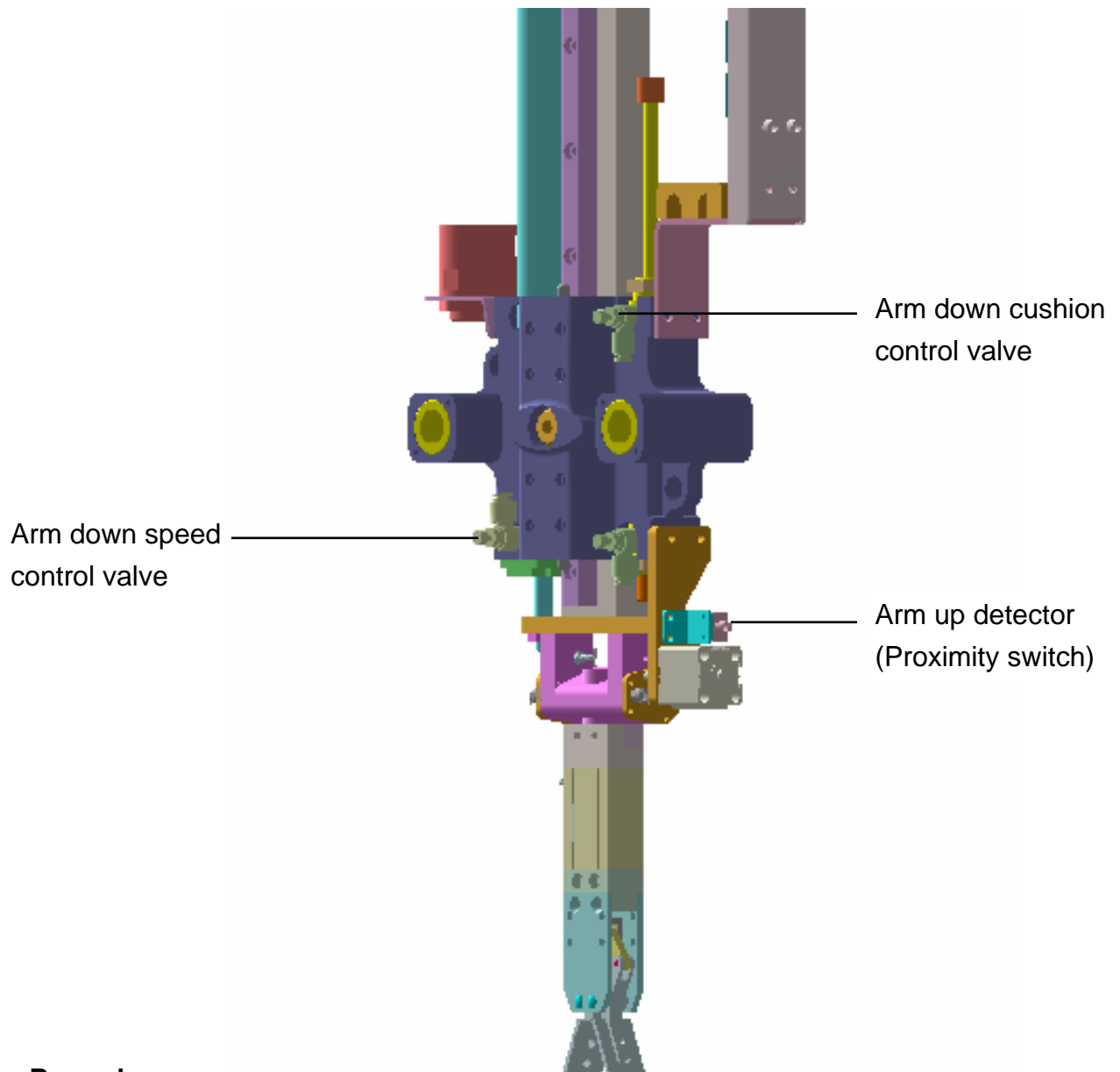
Procedure:

(1) Adjust arm down speed control valve when the speed of arm moving down needs to be changed.

(2) Adjust the distance between arm up detector (proximity switch) and arm with arm being at upper position if the arm up detector (proximity switch) is not motioned.

(3) Adjust arm down cushion control valve if cushioning effect is not well while arm moved up and down.

(4) Turning clockwise to slow down; turning counterclockwise to speed up.

(5) **After proper adjustment, please lock the locking nut tightly.**

4.6.3 Speed and Cushion Adjustment for Swing-back and Swing-out

Swing out speed control valve — Swing out cushion control valve

Swing back speed control valve — Swing back cushion control valve
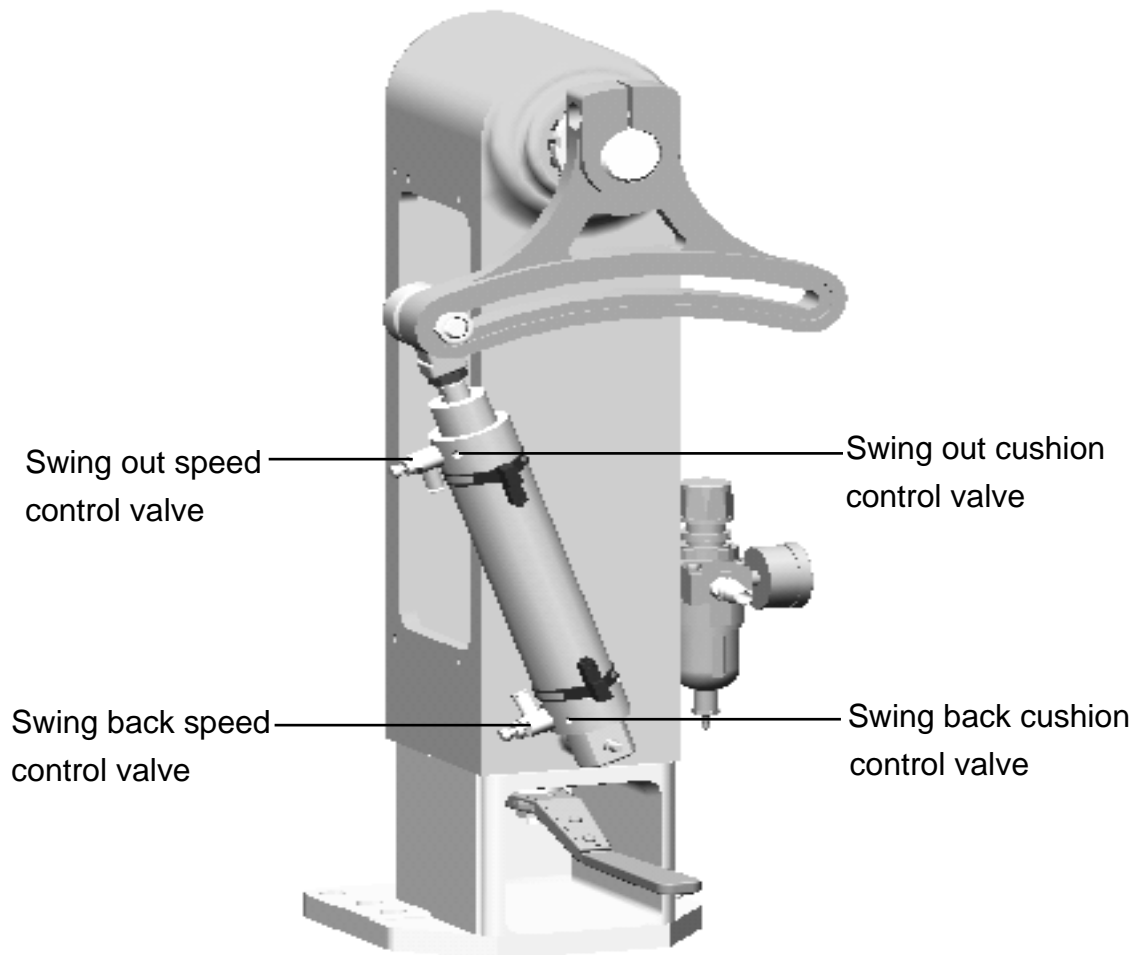
Procedure:

(1) Adjusting swing out speed control valve when the speed of arm swings out needs to be changed.

(2) Adjusting swing out cushion control valve when the cushion of arm swings out is abnormal.

(3) Adjusting swing back speed control valve when the speed of arm swings back needs to be changed.

(4) Adjusting swing back cushion control valve when the cushion of arm swings back is abnormal.

(5) Turning clockwise to slow down; turning counterclockwise to speed up.

(6) **After proper adjustment, please lock the locking nut tightly.**

4.6.4   Speed Adjustment for Wrist Assembly

Wrist assembly rotating
speed control valve

Wrist assembly swing
back speed control valve
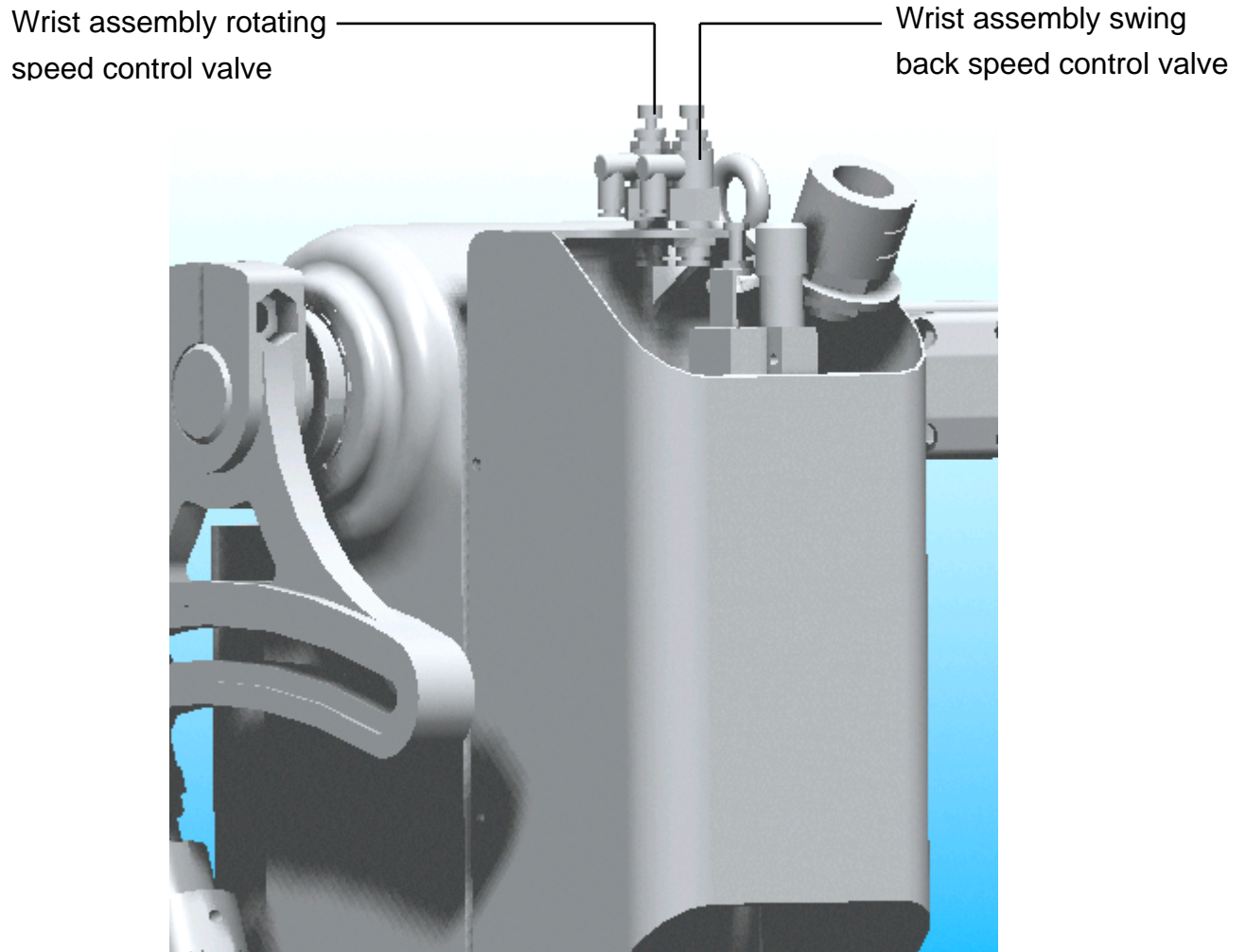
Procedure:

(1)   Adjusting wrist assembly rotating speed control valve when the rotating speed of wrist assembly needs to be changed.

(2)   Adjusting wrist assembly swing back speed control valve when the speed of wrist assembly swinging back needs to be changed.

(3)   Turning clockwise to slow down; turning counterclockwise to speed up.

(4)   **After proper adjustment, please lock the locking nut tightly.**

5. MAINTENANCE
5.1 Maintenance and Repair Safeties

【NOTE】Serviceman should read the following safety requirements before or during maintenance.

1. Please turn the robot power off before examine and repair the I.M.M.

2. Please turn the robot and I.M.M power off and disconnect pneumatic supply source, also evacuate residual compressed air before adjusting and maintaining.

3. In addition to the replacement of proximity switches, vacuum and grip sensors, please contact your local supplier for other repairs and maintenance.

4. Do not make any change or modification to the robot.

5. Please be careful to prevent from hurt by robot during adjustment or mould changing.

6. Please stay away from danger area before testing after adjusting or maintaining completed.

7. Do not turn the power on or connect pneumatic supply source during maintenance.

5.2   Maintenance Schedules

Please carry out the following necessary inspections, maintenances and replacements frequently

Item	Inspecting Area	Period
1	Check to make sure functions of the gripper, suction pad and EOAT are normal.	Daily
2	Draining water from air filter/ regulator.	Daily
3	Set screws on jig.	Daily
4	Draining water from air compressor.	Daily
5	Check I.M.M connecting line and connecting line of controller are well tightened.	Daily
6	Check if any parts loosen or not.	Daily
7	Lubricating on bearings and crosswise guide-bar.	Weekly
8	Lubricating on vertical slide rail and slide rail block.	Monthly
9	Check if air compression tube and speed adjusting button are normal or not.	Monthly
10	Clean appearance	Weekly
11	Check the function of vacuum generator.	Monthly
12	Check set screws on base.	Monthly
13	Check the function of shock absorber.	Monthly
14	Replace air compression tube and electric wires.	3 years

5.3   Maintenance Tools

1. Hex wernch   2.5 to 8mm

2. Monkey wrench   8 to14mm

3. Cross-bladed screwdriver and flat-bladed screwdriver

4. Diagonal pliers and long-noes pliers

5. Avometer

6. Air gun

7. Oil gun

5.4 Lubrications

5.4.1 Regular lubrication of the linear slide rails, linear bearings, roller bearings or other composites are absolutely necessary.

5.4.2 Period of lubrication : Every 50,000 cycles or every month.

5.4.3 Type of grease : with yellow grease or soap base lubrication No. 2 series.

   (1) ISEVG32-68……….. or transparent lubricating oil

   (2) ALVANIA GREASE NO.2 (SHELL brand).

   (3) ALVANIA EP\2 (SHELL brand).

5.4.4 Position of lubricating :

   (1) Vertical slide rail and slide block

   (2) Crosswise guide-bar and bearing

5.4.5 Way of lubrication :

   (1) Slide rail block : To squash grease into slide block for lubricating.

   (2) Slide rail and bearing: To paint grease on the surfaces by brush.

5.4.6 No need to lubricate due to oil-free cylinder is utilized on the robot.

6. PNEUMATIC CIRCUIT DIAGRAM
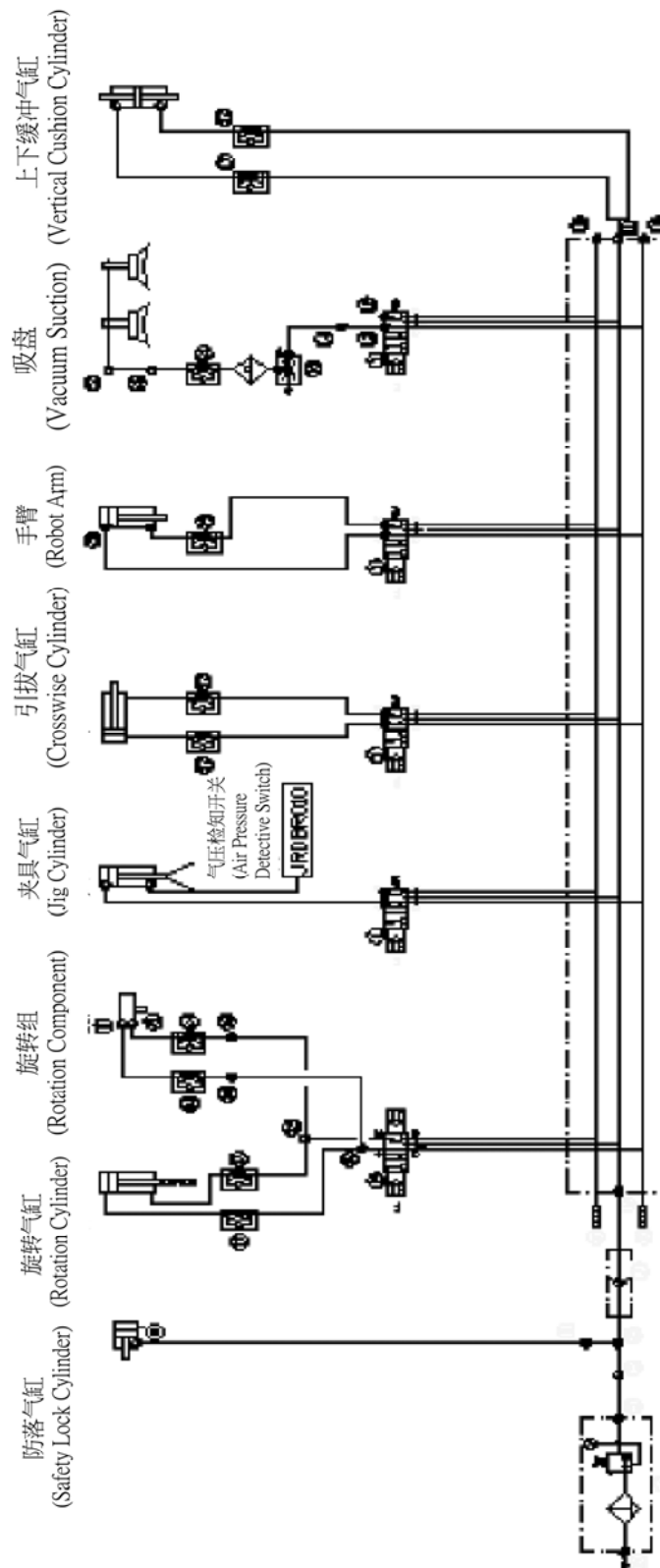
■P550~P650 Part List

Item	Description	Serial No.	Q'ty	Remark
1	Quick fitting	PFL0200	1	
2	Air filter/ regulator	PET2001	1	
3	Quick fitting	PQL1002	1	
4	Quick fitting	PQH1002	1	
5	Check valve	PTE0202	1	
6	Small insert core	PTF04M5	4	
7	Nipple	PTA0202	1	
8	Silencer	PET3001	2	
9	Quick fitting	PQU0402	1	
11	Magnetic valve set	PSV1-P04S	1	
13	Quick fitting	PQLU0401	2	
14	Quick fitting	PQL0401	2	
15	Quick fitting	PQH0401	2	
16	Quick fitting	PQL0801	2	
17	Copper elbow joint	PFL1-0202	1	
18	Socket set screw	MSW3-PT1/8	1	
19	Nipple	PTA0101	1	
20	Air generator	PET1001	1	
21	Copper joint	PFL0601	1	
22	Speed control joint	PSP1-0401	6	
23	Quick fitting	PQE0401	2	
24	Speed control joint	PSP1-0401	2	
25	Speed control joint	PSP1-0801	2	
26	Concentric reducer	PTB0101	2	

7. ELECTRICAL SYSTEM
7.1 Power System Layout

N:Blue Wire

Cable

PE:Yellow/Green Wire

L:Blaok Wire

L2

L1

2b   2a 1b 1a

2   1

Power

R1

R1   S1

PE   L2   NC   R1   S1

LINE

EMI
NOISE

LOAD

R2   S2

AC1   AC2

POWER
SUPPLY

V1   G1

TNR

Fuse 2A

GA28-PC2
CN4

L+   L-   DC24V

GA28-PC2
CN5

K4

K4A
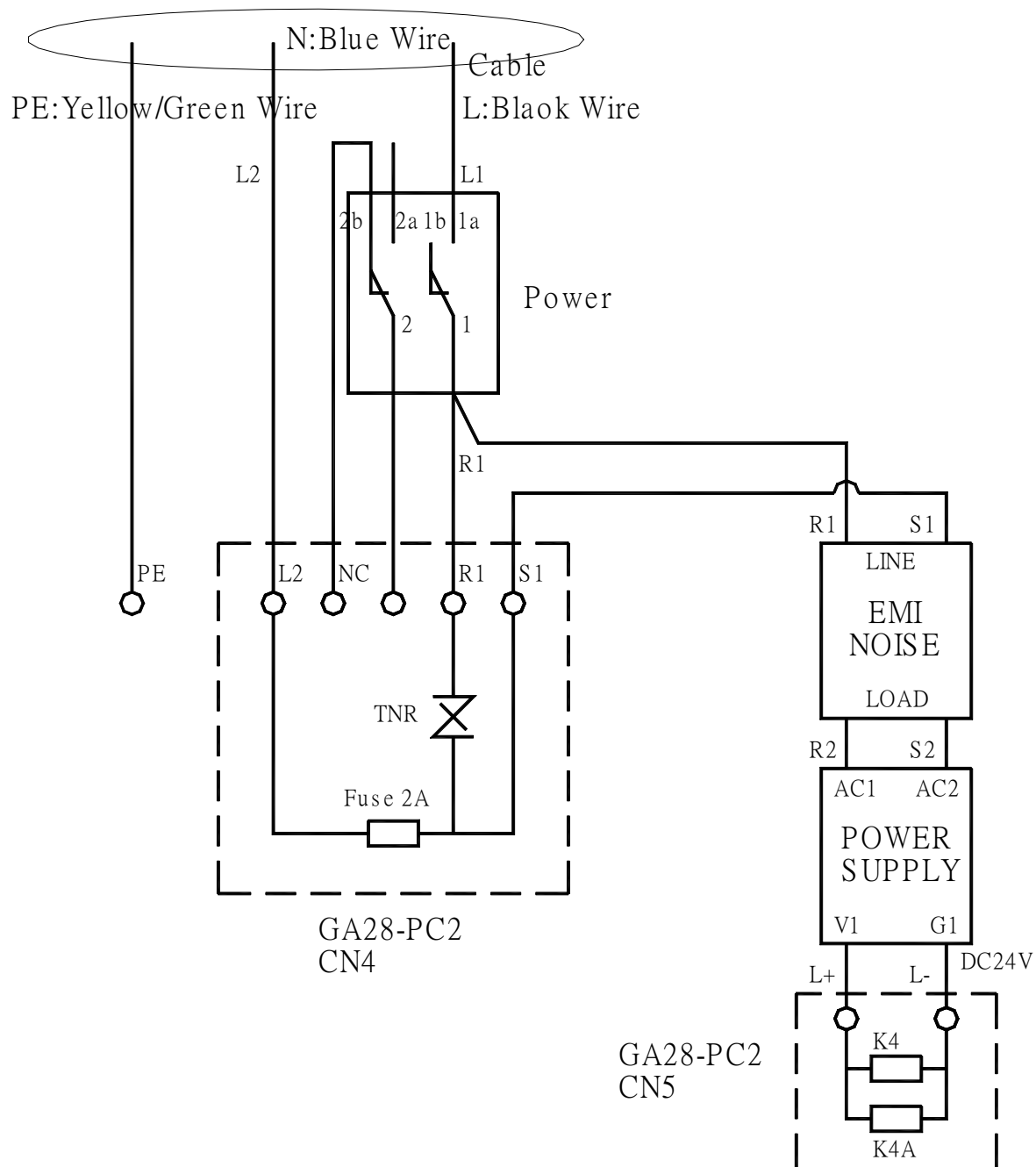
7.2   Grounding System Layout
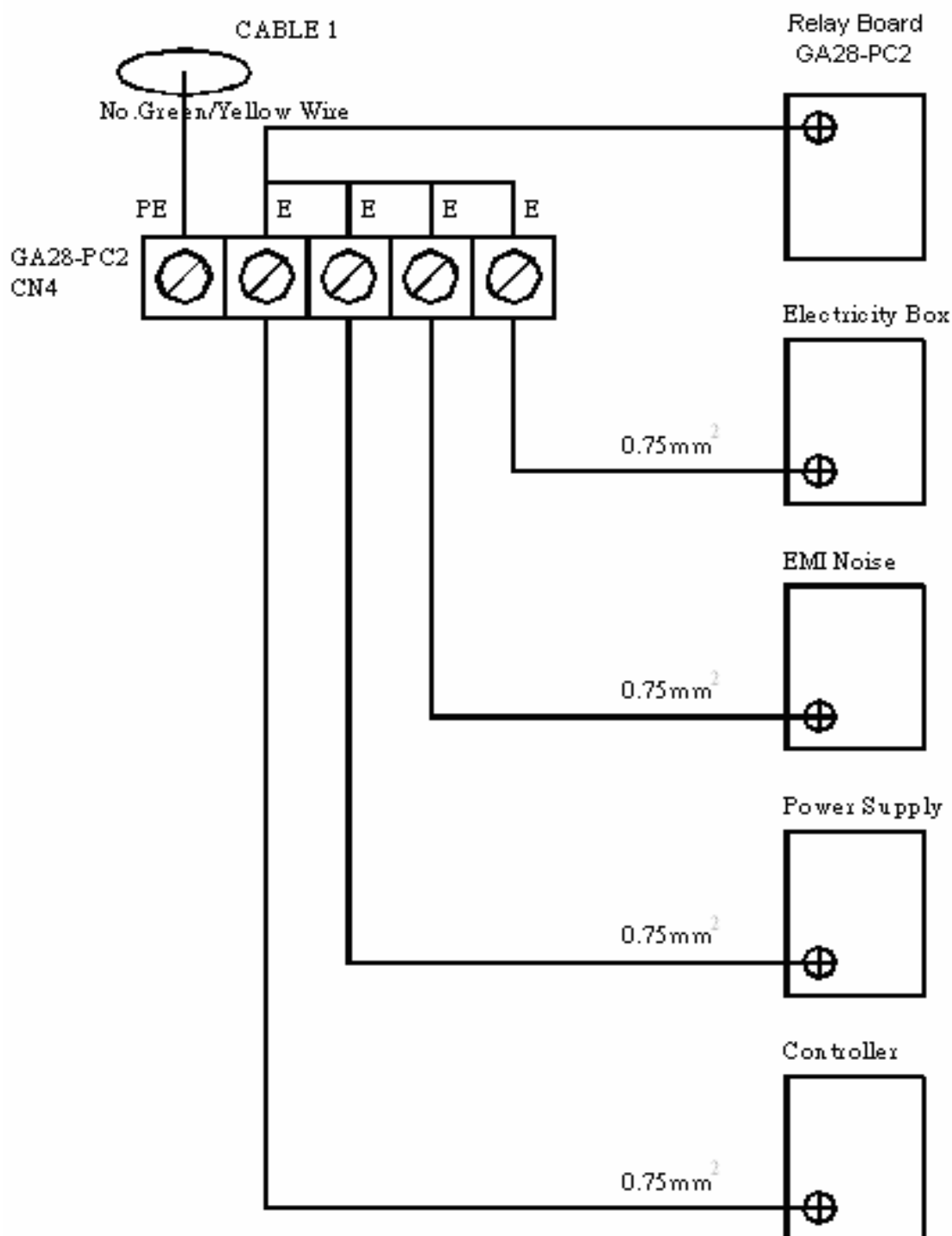
7.3 Emergency Stop Layout

Midway Board GA28-PC2-9901

Controller Board GA28-PC3-9901
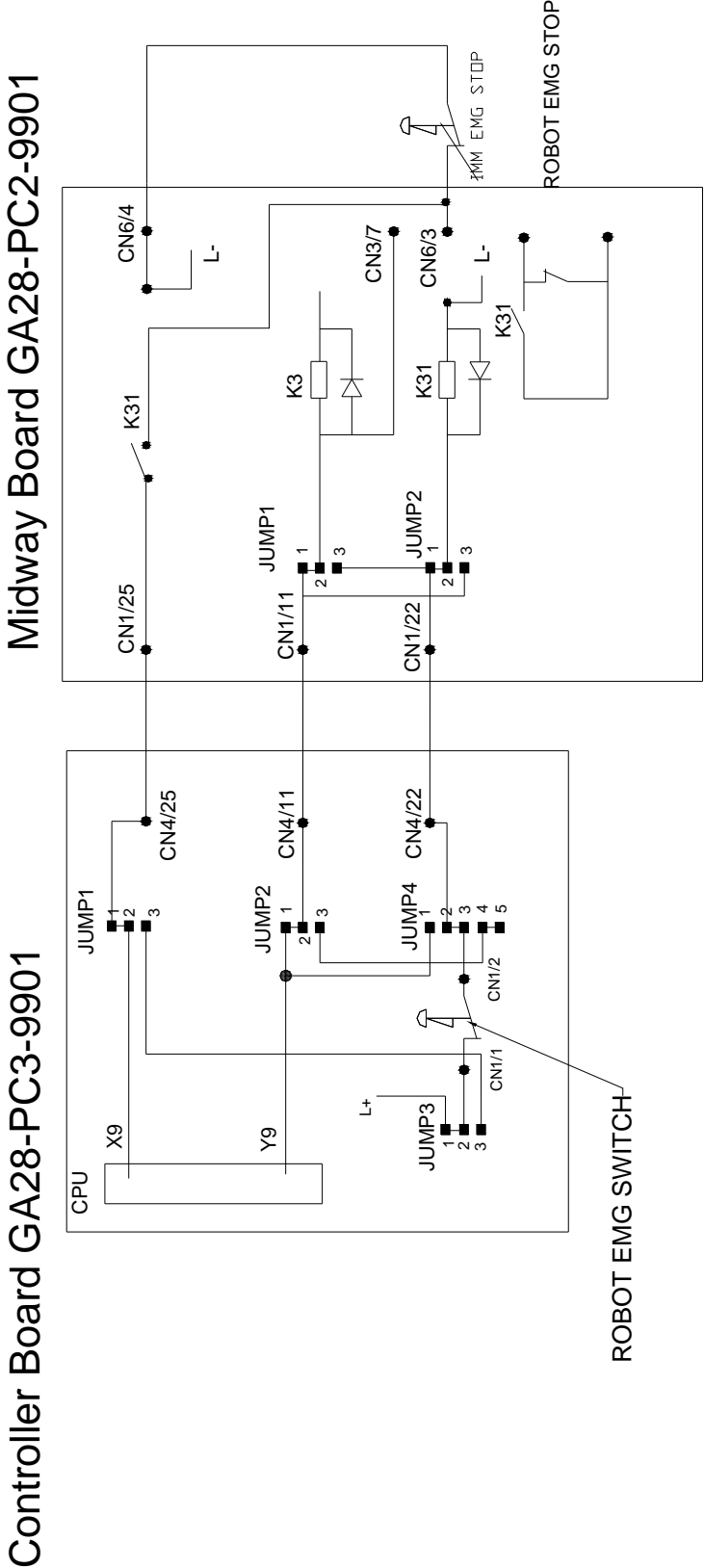
7.4   Description of Input/ Output

Input

		L+ L-
Arm up Sensor	X1	
Mold Moddle Sensor	X2	
Swing Inward Sensor	X3	
Swing Outward Sensor	X4	K7
Grip Confirmation	X5	
Vac.Suction Confirmation	X6	
Safety Devices Of Machine	X7	
Mould Open End	X8	
Emergency Stop of IMM	X9	

Output

Arm UP/Down	Y1	K6
Forward/Backward	Y2	
Swing Inward	Y3	
Swing Outward	Y4	
Gripper	Y5	
Vacuum Suction	Y6	
Conv.or.Spray	Y7	K5
Warning	Y8	LIGHT
		BUZZER

		L+
Emergency Stop of Robot	Y9	K3
Mould Area Free	Y10	K1
Enable Ejector Forward	Y11	K2

7.5 GA28-PC2 Joint Illustration

CN1:Connect To Controllor

Pin	Signal	Connection
1		CN5/L+
2	L+	
3	X1	J7/X1
4	X2	CN3/X2
5	X3	J8/X3
6	X4	J9/X4,K7
7	X5	J10/X5
8	X6	J11/X6
9	X7	CN6/X7
10	X8	CN6/X8
11	X9	CN6/3
12		CN5/L-
13	L-	
14	Y1	J1/Y1,K6
15	Y2	J2/Y2
16	Y3	J3/Y3
17	Y4	J4/Y4
18	Y5	J5/Y5
19	Y6	J6/Y6
20	Y7	K5
21	Y8	CN2/AL
22	Y9	CN3/Y9,K3
23	Y10	K1
24	Y11	K2
25	L-	CN5/L-
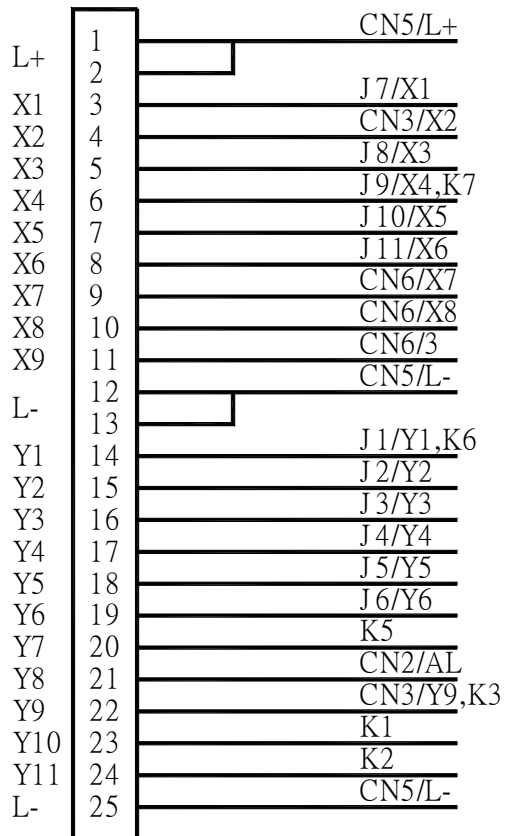
CN2:Buzzer And Warning Light

Signal	Connection
L+	L+
AL	CN1/21
BZ	
L+	
SW2	
SW2	L+

CN3:Spare Point

Signal		Connection
Middle Signal	L+	L+
	X2	CN1/4
	L-	L-
Canv Or Pulse	K5	K5
	K5	
Soft Start-Up Valve	L+	L+
	Y9	CN1/22
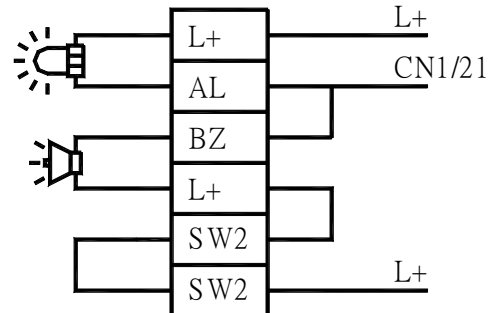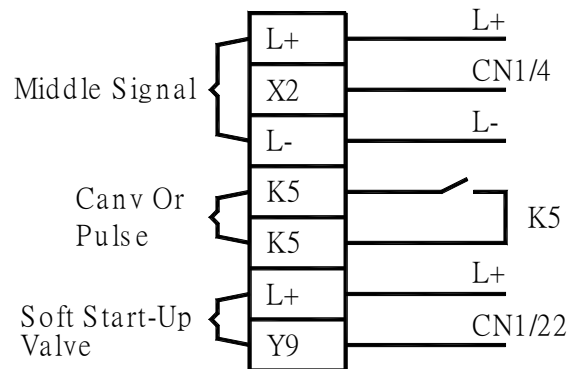
CN4:Connect To Power And Earthing

Signal	Connection
E	
E	
E	
E	
PE	Yellow/Green Wire
5	Power Safety Point(2,2b)
4	
R1	Power(1)
S1	Power Filter
L2	N:Bule Wire

SW1
CN6/6
CN6/5
TNR
Fuse 2A
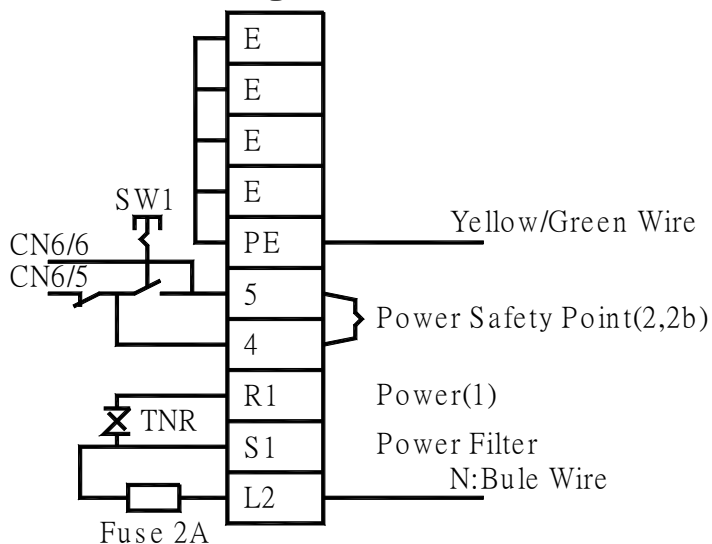
CN5:Connect To Power Supply

Signal	Connection
L+	L+
L+	Power Supply
L-	L-
L-	

Fan
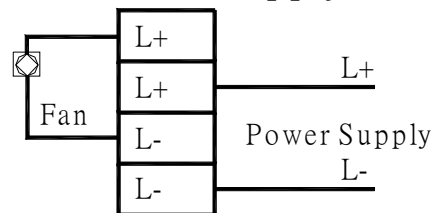
7.6 CN6: Connect to I.M.M Diagram

CN1/10 CN1/9 CN1/11

X8 X7 X9 L-

K1 K1 K2 K3

K6 K7

SW1

K4 K4 K4A K4A

CN4/4

CN4/5

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Line NO. |

Mould open End (MOP)

Safety Device of Machince (SDM)

Emergency Stop of IMM (ESM)

Mould Area Free (MAF)

Enable Mould Closure (EMC)

Enable Ejector Forward (EEF)

Emergency Stop of Robot (ESR)
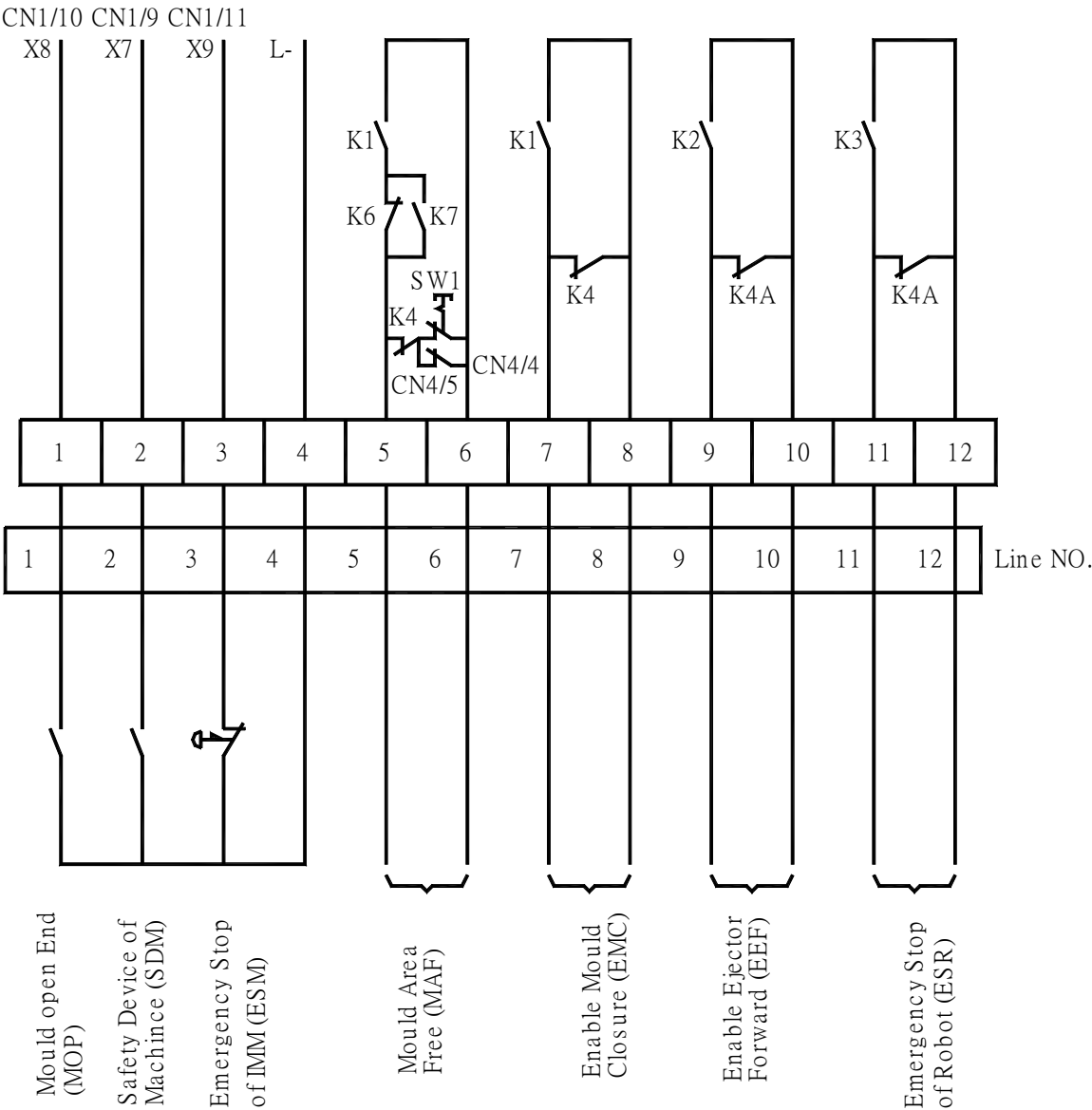
7.7 Cable Code and Definition

Cable No.	Definition	Remark
1	Mould open position	
2	Safety device of machine	
3	Emergency stop of machine	
4	Reference potential (L-)	
5	Enable mould close	
6	Enable mould close	
7	Mould area free	
8	Mould area free	
9	Enable ejector forward	
10	Enable ejector forward	
11	Emergency stop of robot	
12	Emergency stop of robot	

7.8 Control Board GA28 Layout (RBD-GA28-PC3)
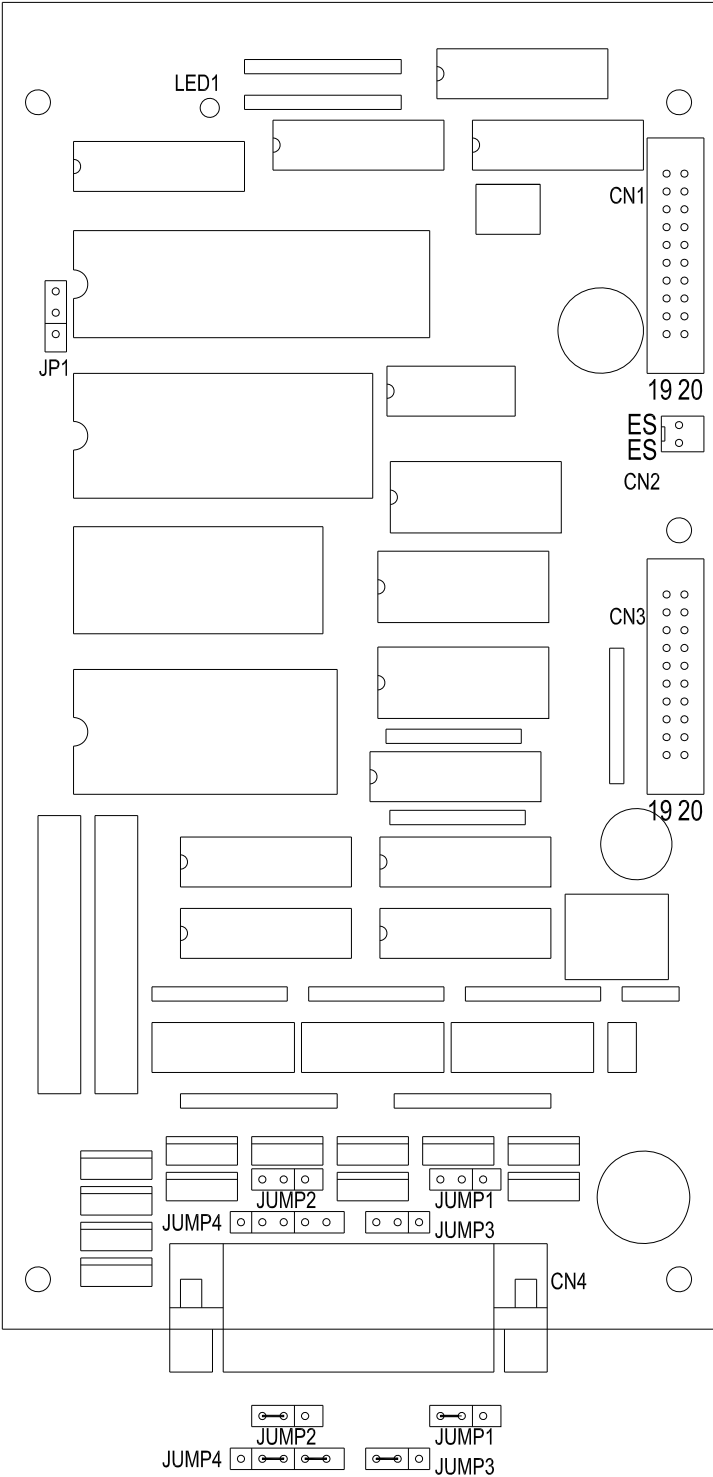
7.9 Control Key Pad GA28-PC1 Layout (RBD-GA28-PC1)
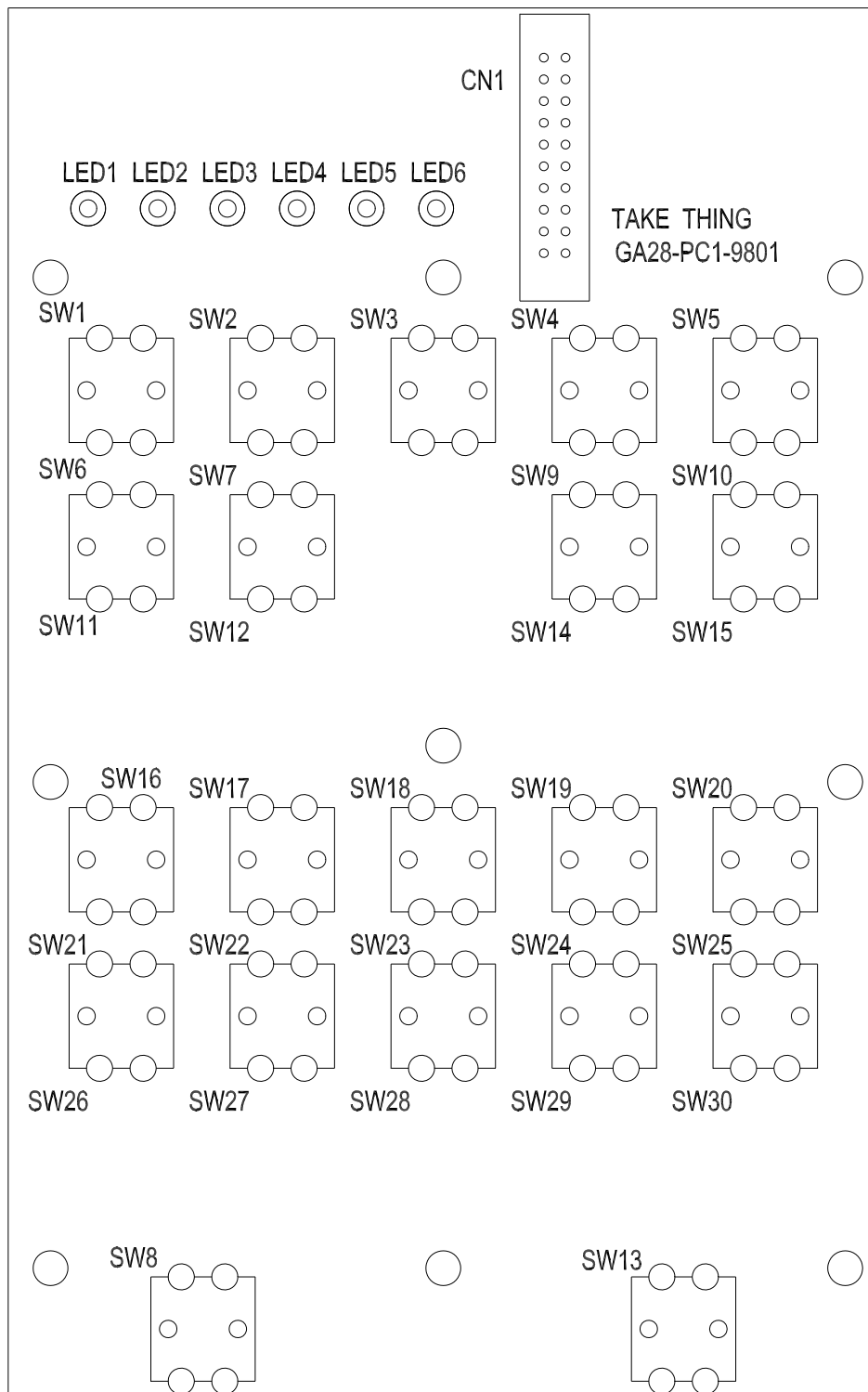
7.10 Relay Board GA28-PC2 Layout (RBD-GA28-PC2)
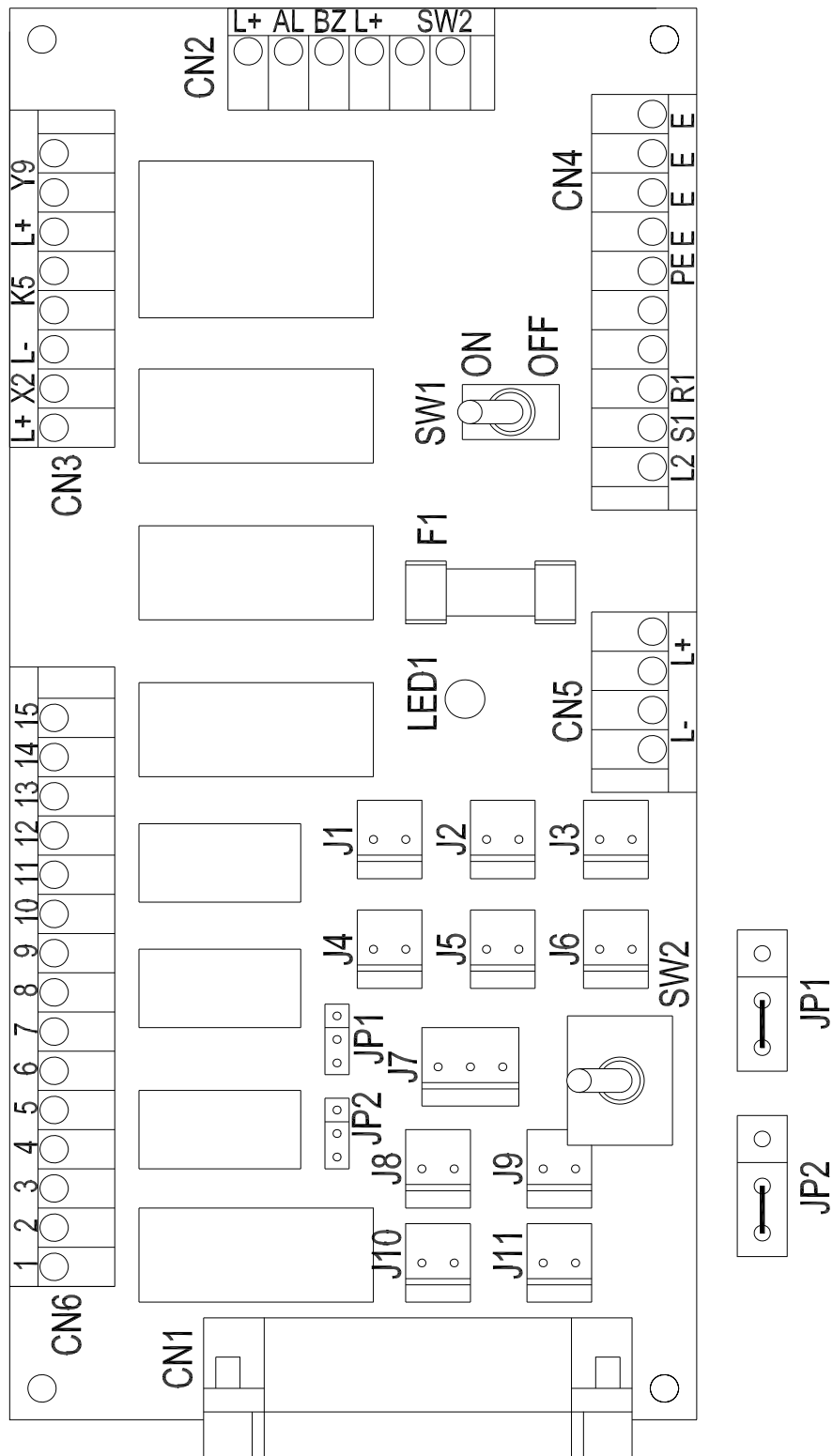
7.11 PC Board JUMP Illustration

Controller Board GA28-PC3-9901

Midway Board GA28-PC2-9901
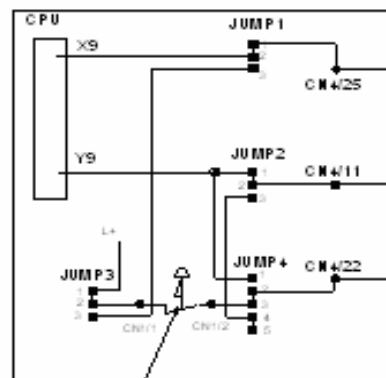
ROBOT EMG SWITCH

Instruction of Control board GA28-PC3-9901 JUMP

1. When Relay board is GA28-PC-9801 (Old type), please connect JUMP1, JUMP2 and JUMP3 with (1,2); JUMP4 with (1,2)(3,4).

2. When Relay board is GA28-PC2-9901, please connect JUMP1, JUMP2 and JUMP3 with (1,2); JUMP4 with (2,3)(4,5).
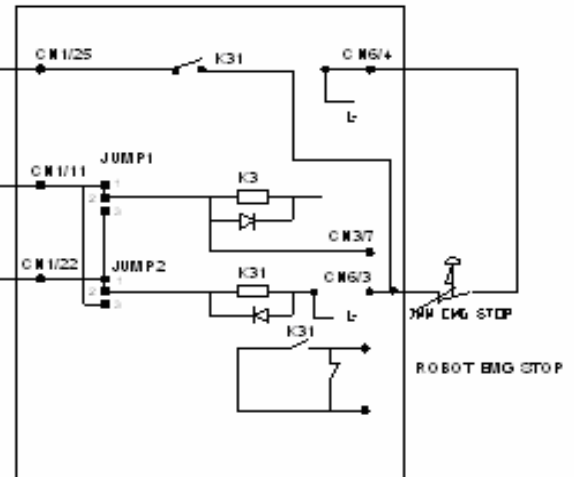
Instruction of Relay board GA28-PC2-9901:

1. If the control board is GA28-PC3-9909 (New type), connects JUMP1 and JUMP2 with (1,2) and SW2 selected is left side.

2. If the control board is GA28-PC3-9901 (Old type), connects JUMP1 and JUMP2 with (2,3) and SW2 selected is right side.

8. OPERATIONAL PROCEDURE
8.1 Operational Schematic (1)

10	12	13	14
Auto F1	Start F1	Count And Reckon By Time F1	Change page

	16	16
	Count F2	Reset F1

12	17	12
Exit ESC	Carry F2	Reckon By Time F1

1	12	12
Stop F2	Exit ESC	Exit ESC

0		1
System Test	System Normal	Original Page

2 3

Emergency Stop,Plese Restore
Push Reset Into Manual Mode

11	12
Single Cycle F2	Start F1

11

Recycle F2

Exit ESC

20	21	22	21	22
Manual F2	I/O F1	Input Page/DN	Output Page/DN	Input Page

20

Exit ESC

20

Exit ESC

20

Exit ESC

24	25	24
Function F2	Breakdown Record F1	Exit ESC

26	24
Lock File F2	Exit ESC

20

Exit ESC

8.2 Operational Schematic (2)

```
    30          32          33          34
mode       Teach F1  Continue  Continue
setting              F1        F1
                     (Teach 2) (Teach 3  )
                              35        35        36          30
                         End F2    End F2    Teach     Teach Suc- Mold
                                             Set       Cees
                                             F1               (Reveal 5 SEC)
                              30        30        30
                         Exit ESC  Exit ESC  Exit ESC


            37          38          39
        Count And  Reckon By  Reckon By  Reckon By
        Reckon By  Time 1     Time 2     Time 3
        Time F2    page/DN    page/DN    page/DN
                          40
                     Count F2  Reset F1

                          37        41        37
                     Exit ESC  Carry F2  Count And
                                         Reckon By
                                         Time F1
                                   37        37
                              Exit ESC  Exit ESC


            42          43          30
        Remember   Data      Remember  Mold
        Enter      Confirm   Success
                   Enter
                          30
                     Exit ESC


            30
        Exit ESC
```
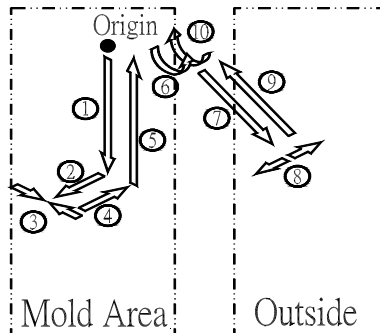
8.3 Description of Fixed Mode

(1).L-Type Motion Gripping Workpiece From Mold (Moving Side)

■ Motion Sequence

1.Vertical Down	6.Swing Outward
2.Reach	7.Vertical Down
3.Grip(Suck)	8.Release Workpiece
4.Retract	9.Vertical Up
5.Vertical Up	10.Swing Inward

(2).L-Type Motion Gripping Workpiece From Mold (Stationary Side)
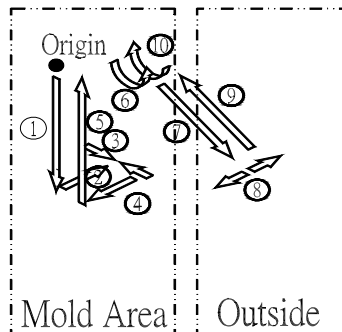
■ Motion Sequence

1.Vertical Down	6.Swing Outward
2.Retract	7.Vertical Down
3.Grip(Suck)	8.Release Workpiece
4.Reach	9.Vertical Up
5.Vertical Up	10.Swing Inward

(3).U-Type Motion Gripping Workpiece From Mold (Moving Side)
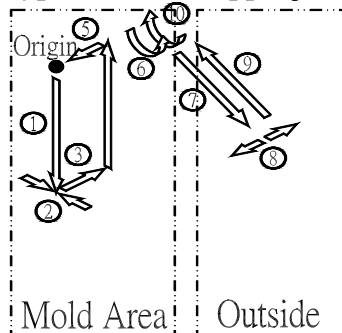
■ Motion Sequence

1.Vertical Down	6.Swing Outward
2.Grip(Suck)	7.Vertical Down
3.Retract	8.Release Workpiece
4.Vertical Up	9.Vertical Up
5.Reach	10.Swing Inward

(4).U-Type Motion Gripping Workpiece From Mold (Stationary Side)
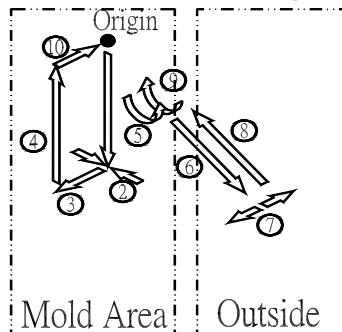
■ Motion Sequence

|	
1.Vertical Down	6.Vertical Down
2.Grip(Suck)	7.Release Workpiece
3.Reach	8.Vertical Up
4.Vertical Up	9.Swing Inward
5.Swing Outward	10.Retract

(5).Time Releasings(Workpiece &Spur) After Gripping Workpiece
From Mold (Moving Side)Both Suck And Jaw Grip
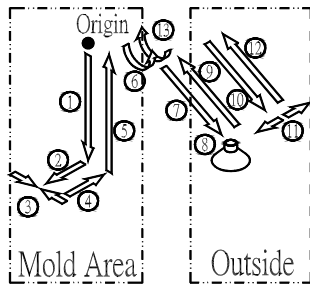
■ Motion Sequence
1.Vertical Down   7.Vertical Down
2.Reach   8.Release(Suck) Workpiece
3.Grip,Suck   9.Vertical Up
4.Retract   10.Vertical Down
5.Vertical Up   11.Release(Grip) Workpiece
6.Swing Outward   12.Vertical Up
   13.Swing Inward

(6).Time Releasings(Workpiece &Spur) After Gripping Workpiece
From Mold (Stationary Side)Both Suck And Jaw Grip
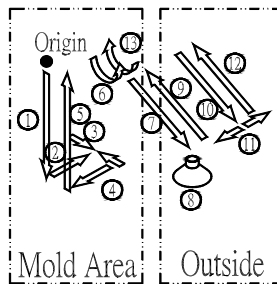
■ Motion Sequence
1.Vertical Down   7.Vertical Down
2.Retract   8.Release(Suck) Workpiece
3.Grip,Suck   9.Vertical Up
4.Reach   10.Vertical Down
5.Vertical Up   11.Release(Grip) Workpiece
6.Swing Outward   12.Vertical Up
   13.Swing Inward

(7).U-Type Motion Gripping Workpiece From Mold (Stationary Side)Releases Spur
In Between Molds
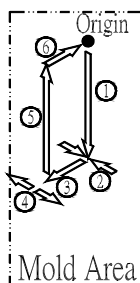
■ Motion Sequence
1.Vertical Down
2.Grip
3.Reach
4.Release Workpiece
5.Vertical Up
6.Retract

(8).U-Type Motion Gripping Workpiece From Mold (Moving Side)Releases Spur
In Between Molds
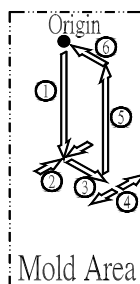
■ Motion Sequence
1.Vertical Down
2.Grip
3.Retract
4.Release Workpiece
5.Vertical Up
6.Reach

9. DESCRIPTION OF TIMER AND COUNTER
9.1 Definition of Timer

：Crosswise backward delay: Starting time counting after previous motion completed, and then crosswise backward after time counting completed.

：Crosswise forward delay: Starting time counting after previous motion completed, and then crosswise forward after time counting completed.

：Arm up delay: Starting time counting after previous motion completed, and then arm up after time counting completed.

：Arm down delay: Starting time counting after previous motion completed, and then arm down after time counting completed.

：Arm swing back delay: Starting time counting after previous motion completed, and then arm swing back after time counting completed.

：Arm swing out delay: Starting time counting after previous motion completed, and then arm swing out after time counting completed.

：Arm pick up delay: Starting time counting after previous motion completed, and then arm pick up after time counting completed.

：Arm release delay: Starting time counting after previous motion completed, and then arm release after time counting completed.

：Arm suck delay: Starting time counting after previous motion completed, and then arm suck after time counting completed.

：Arm suck release delay: Starting time counting after previous motion completed, and then arm suck release after time counting completed.

Eje:　Ejector delay: Starting time counting after mould open completed, and then ejector forward allowed after time counting completed.

Time:　Time delay of conveyor or spray.

9.2   Definition of Counter

（1）Time of cycle: 8 digits. Robot will add one time on every cycle and calculate amount of total cycling times. It can be according to this amount to do the regular maintenance.

（2）Number of mould setting: 4 digits. The produced mould number will be set. When accumulated number reaches to setting times, robot will give E80 alarm signal. Setting 0000 means this function is invalid.

（3）Present mould number: 4 digits. After number of mould setting finished, reset the present mould number to zero. The mould number will add up after robot finishing every one cycle. When the accumulated number reaches to setting times, robot will give E80 alarm signal.

（4）Times: Conveyor or spray motion can be set according to mould number.

10.   DESCRIPTION OF OPERATIONAL MODE
10.1   Description of Operational Mode

0

```
┌─────────────────────────────────┐
│                                 │
│     ↗  ↘      GA28              │
│     ↖  ↙      ALFA              │
│           ROBOT                 │
│                                 │
└─────────────────────────────────┘
```
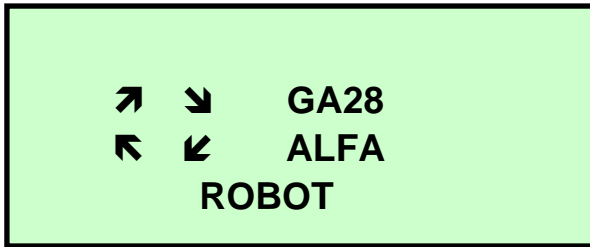
- Turn on the power and the monitor displays page 0.
- Please wait for internal system test if it is normal, the monitor displays page 1.
- Press emergency stop button for emergency stop and the monitor displays page 2.

1

```
┌─────────────────────────────────┐
│         ALFA ROBOT              │
│            GA28                 │
│                          ┌────┐ │
│                          │Mode│ │
│                          │模式設定│ │
│  AUTO      MANU      MODE       │
└─────────────────────────────────┘
```

- Enter into initial page when the system is normal.
- There are F1, F2 and MODE keys to operate functions.
- F1: AUTO – Automatic mode. Operating mode, time, counter, mould memory, conveyor and signal run test functions can be set under this mode. The monitor displays page 10.
- F2: MANU – Manual operate. I/O check, function setting and alarm code functions can be set under this mode. The monitor displays page 20.
- MODE: The user can set up mode, product detecting type, mould memory and timer/ cycle changed, etc. The monitor displays page 30.

10.1.1   Setting Parameter:
（1）Press ←, → to move cursor.
（2）Press ＋, － to change value.
（3）After changing value, the changed information is saved directly.

10.1.2　Emergency Stop

2

```
          ALFA

      『EMERGENCY STOP』
       PLEASE RESET
```
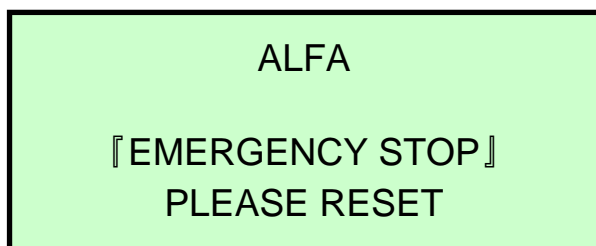
- System abnormal with 『EMERGENCY STOP』, please reset the emergency stop button and the monitor displays page 2.
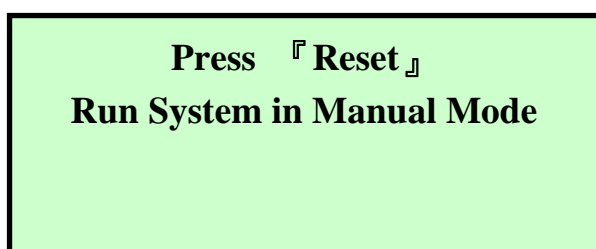- Release emergency stop button to reset and the monitor displays page 3.

3

```
     Press 『Reset』
   Run System in Manual Mode
```

- Please press Reset to run system and enter into manual mode.
- System will be unable to operate if not pressing Reset button.

10.1.3　Automatic Mode – Mould No. Select

10

```
   Mold No.    01        AUTO
   Prog        01        READY
   Check     Grip


   F1  START          F2  S-CYC
```
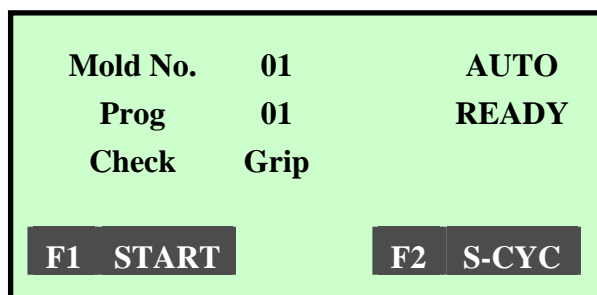
（1）Press F1 under page 10 to turn into START mode, and monitor displays page 12.
（2）Mold No.: Select 01 to 50. (Only show content under this page.)
（3）Press F2 under page 10 to turn into S-CYC mode, and monitor displays page 11.
（4）Prog: Built-in standard mode 01 to 08. Free teaching mode by user 09 to 20.
（5）Check Method: Grip – Grip accurately and magnetic switch ON. Grip inaccurately and magnetic switch OFF.
　　　　　　　Vac – Vacuum switch
　　　　　　　Grip & Vac simultaneously – Grip & Vac check simultaneously.
（6）Press ESC to exit to return to initial page 1.
（7）When setting Grip & Vac simultaneously, please refer to page 3 for time of suck and release.

10.1.4　Under page 10, there are 3 selections:

（1）Press F1 to start robot with full auto mode and the monitor will displays page 1.

（2）Press F2 S-CYC to display one cycle automatically and then stop. The monitor will display page 11.

（3）Press ESC to return to page 1.

10.2　Auto/ Start – Auto Mode Operation

12

```
                         AUTO START

          COUNT          :    00   50


      F1    TIM/CUN          F2    STOP
```
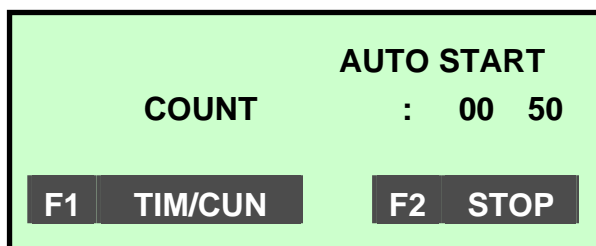
（1）Press F1 under page 10 to turn into START mode, and monitor display page 12.

（2）Number or mould refers to operation times.

（3）Please open safety gate or press RESET if there is alarm.

10.2.1　Under page 12, there are 2 selections:

（1）Press F1 TIM/CUN to adjust timer, counter, etc. The monitor displays page 13.

（2）Press F2 STOP to stop robot right after robot motion completed and the monitor displays page 1.

10.3　Single Cycle

11

```
      Mold No.    01          AUTO
        Prog      01          S-CYC
      Check     Grip
       F1  START              F2  S-CYC
```
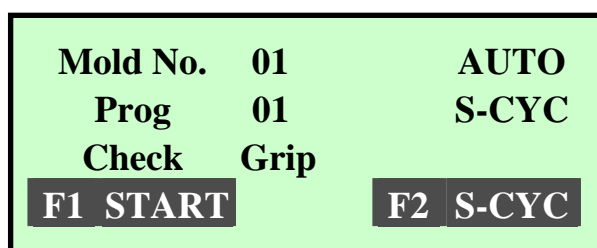
（1）Press F2 under page 10 to start a single cycle running of robot. The monitor displays page 11.

10.3.1　Under page 11, there are 4 selections:

（1）Press F1 START to start robot auto motion, and the monitor will display page 12.

（2）Press F2 S-CYC and robot will execute another single cycle running and the monitor displays page 11.

（3）Press ESC to exit and return to page 1.

（4）Please open the safety gate or press RESET if there is alarm.

10.4 Timer

↓ 0. 0**3** ← 0. 04 AUTO	↑ 0. 0**3** ⤵ 0. 03 AUTO
▮ 0. 04 → 0. 04 🕐 1	0. 03 0. 03 🕐 2
↑ 0. 04 ⤵ 0. 04 [F2]	0. 03 0. 03 [F2]
↓ 0. 04 ▮ 0. 04 CUNT	0. 03 0. 03 CUNT
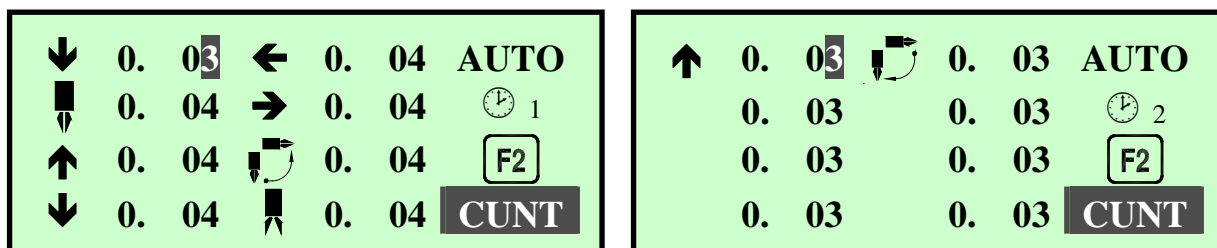
（1） Press F1 TIM/CUN under page 12 to adjust time. The monitor will display page 13.
（2） There are 2 pages of Timer, page 14 and page 15.
（3） Please refer to TIM/CUN for time definition.

10.4.1　Setting Parameter
（1） Press ←, → to move cursor.
（2） Press ＋, － to change value.
（3） After changing value, the changed information is saved directly.

10.4.2　Under page 13, 14 and 15, there are 3 selections:
（1） Press F2 CUNT to adjust counter. The monitor will display page 16.
（2） Press page/DN to go to next page to adjust time.
（3） Press ESC to exit and return to page 12.

10.5　Counter
16

| P_SET　:　　00 0**0**　　　　AUTO |
| RUN　:　　05 64　　　　CUNT |
| EJE　:　　　0 .08 |
| F1　ZERO　　　　　1 F2　CONV |

（1） Press F2 CUNT under TIM/CUN to adjust counter setting. The monitor will display page16.
（2） Please refer to TIM/CUN for counter definition.
（3） EJE 0.08 refers to allow ejector ejecting time 0.08 sec.
（4） The mould number will add up after robot finishing every one cycle. When the accumulated number reaches to setting times, robot will give E80 alarm signal and stop.

10.5.1　Setting Parameter
（1） Press ←, → to move cursor.
（2） Press ＋, － to change value.
（3） After changing value, select ENTER to finish setting.

10.5.2　Under page 16, there are 2 selections:
（1）Press F1 Zero to reset the present mould number to zero.
（2）Press F2 CONV to adjust stop time and time setting of conveyor or spray. The monitor will display page 17.

10.6　Conveyor/ Spray

17

```
COUN  :    00          CONV
TIME  :    00 00       SPRY

  F1  TIME
```

（1）Press F2 CONV under page 16 to adjust conveyor parameter. The monitor will display page 17.
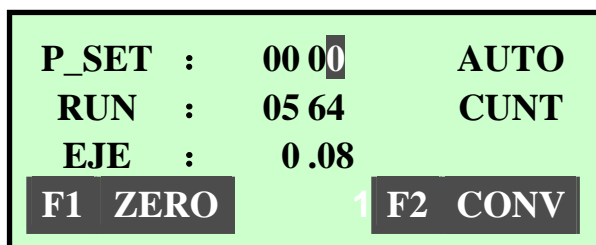（2）Please refer to TIM/CUN for time and counter definition.

10.6.1　Setting Parameter
（1）Press ←, → to move cursor.
（2）Press ＋, － to change value.
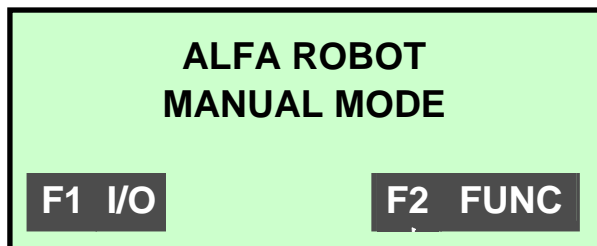（3）After changing value, the changed information is saved directly.

10.6.2　Under page 17, there are 2 selections:
（1）Press F1 TIME to adjust time setting, and the monitor displays page 13.
（2）Press ESC to exit and return to page 12.

11. DESCRIPTION OF MANUAL OPERATION
11.1 Manual
20

```
┌────────────────────────────────────────┐
│                                        │
│            ALFA ROBOT                   │
│            MANUAL MODE                  │
│                                        │
│  ┌──────────┐        ┌──────────┐      │
│  │ F1  I/O  │        │ F2  FUNC │      │
│  └──────────┘        └──────────┘      │
└────────────────────────────────────────┘
```

（1）Press F2 MANU under page 1 to turn into manual operating mode. The monitor will display page 20.

（2）

|	
F1	Functional key: Please operate with selected functions.
F2	Functional key: Please operate with selected functions.
Mode 模式設定	Functional key: Please select it to enter into mode operation setting.
PgDn 換頁	To change pages.
ESC 退出	To exit each function page.
Z-上升	Arm up
Z-下降	Arm down: The mould open position signal is required to manual operate arm down.
X-後退	Crosswise backward (toward the fixed mould)
X+前進	Crosswise forward (away from the fixed mould)
S-旋入	Swing in: Arm swing into mould.
S+旋出	Swing out: Arm swing outside mould.
	Grip clamp: To clamp product and detective lights on.
	Grip release: To release grip.
	Suck vacuum: Vacuum generator acts.
	Suck release: To release suction.

When there is alarm, press this RESET button to dismiss alarm.

Enter key to save data.
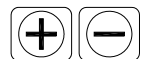
To increase, decrease time parameter or various functional settings.

To move cursor.

11.1.1　Under page 20, there are 3 selections:

（1）Press F1 I/O to check all input signals from robot. The monitor will display page 21.

（2）Press F2 FUNC to set special function. The monitor will display page 24.

（3）Press ESC to exit and return to page 1.

11.1.2　Description of LED Indicator Light

11.2　Input

21

```
●   ARM UP          MANU
○   M-PLAT          INPUT
●   SWIN-IN
○   SWIN-OUT          P1
```

27

```
●   GRIP            MANU
○   VACUUM          INPUT
●   G-OPEN
○   M-OPEN            P2
```

（1）Press F1 I/O under page 20 to examine input signal changes. The monitor will display page 21.

11.2.1　Under page 21, there are 2 selections:

（1）Press Page/DN to examine output signals. The monitor will display page 27.

（2）Press ESC to exit and return to page 20.

11.2.2 Output

22

○ ARM DOWN	MANU
○ SWIN-IN	OUTPUT
○ SWIN-OUT	
○ Kick Fwd	P1

28

○ GRIP	MANU
○ VACUUM	OUTPUT
○ MC Able	
○ CONV	P2

（1）Press Page/DN under page 27 to examine output signal changes. The monitor will display page 22.

11.2.3 Under page 22, there are 2 selections:
（1）Press Page/DN to examine input signals. The monitor will display page 28.
（2）Press ESC to exit and return to page 20.

11.3 Function

24

```
XDATE  :  98  03  01
CYCLE  :  00  00  .0  01  0
 VER   :  98 -03 -01
F1  ALARM        F2  LOCK
```

（1）Press F2 FUNC under page 20 to examine total number of running, error record, ex factory date. The monitor will display page 24.

11.3.1 Under page 24, there are 3 selections:
（1）Press F1 ALARM to examine and track alarm record content. The monitor will display page 25.
（2）Press F2 LOCK to select robot in use or robot not in use, displayed language and file lock protection or not. The monitor will display page 26.
（3）Press ESC to exit and return to page 20.

11.4   Trouble Record

25

```
00     0 0    00     0 0     ALRM
00     0 0    00     0 0     CODE
00     0 0    00     0 0
01     0 1    01     0 1
```

（1）   Press F1 ALARM under page 24 to enter into Alarm page. The monitor will display page 25.

11.5   File Lock

26

```
CHINESE                    LOCK
File Unlock
Robot in use          SG_REST
Pulse                 SG-ON-DN
```

（1）   Robot in use or Robot not in use
Robot in use: When setting this function, robot will interlock with IMM to operate.
Robot not in use: When setting this function, robot will not control any motion of IMM.

（2）   Language select: Chinese and English switches
Chinese: The monitor displays Chinese.
English: The monitor displays English.

（3）   Lock – Mode locked or Mode is not locked
Mode locked: Mode page is locked that any change is disabled.
Mode is not locked: Mode page is opened that any change is allowed.

（4）   Pulse signal: When arm up to position, there will give pulse output signal.
Conveyor: After taking out product and return to position, conveyor motions and counts time until stops.
Spray: After taking out product and upward to position, spray motions until stops.

（5）   SG-ON-DN: Robot will descend to take out product only if safety gate is closed.
SG-OFF: Robot will descend to take out product even if safety gate is opened.

（6）   SG-REST: If opened the safety gate when robot arm is at take-out side, robot will reset and return to waiting position. If opened the safety gate when robot arm is at placing side, robot will stop the motion and will continue the following motion after closing safety gate.
SG-STOP: Robot will stop the motion if opened the safety gate. Robot will continue the motion after safety gate is closed.

11.5.1 Setting Parameter

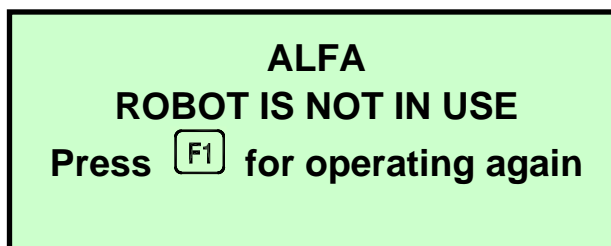（1） Press ←, → to move cursor.

（2） Press ＋, － to change value.

11.5.2 Under page 26, there is 1 selection:

（1） Press ESC to exit and return to page 24.

11.6 Robot is not Used

23

```
              ALFA
       ROBOT IS NOT IN USE
  Press  [F1]  for operating again
```

（1） The screen shows that robot not in use. The user can press F1 and robot will operate normally.

12. MODE
12.1 Mode
30

```
Mold No.  :  01              MODE
   Prog.   :  01              GRIP
Setting: OK              ENTER
  F1  TEACH        F2  TIM/CUN
```

（1） Press MODE under page 01 to set running mode. The monitor will display page 30.
（2） Mold No.: Select 01 ~ 20.
（3） When mold no. is changed, M-arm, S-arm, product check, each taking-time, etc. are the memory value under the mold number.
        Mode: 01~08 are built-in standard model.
             09~20 are teachable mode (set by user).
        Check selection:
             Suction (vacuum) pad: Vacuum switch check
             Grip: Magnetic switch check
             Vacuum and grip simultaneously: Check at the same time

12.1.1
32

```
        Move arm to de-
        Fine Home posi
        Then press ENTER
   (    □   +     □   -    )
```

```
←  ←  ↑  ↓  →  ➔  MODE
↓      °       ±      TEACH
"      ≥      ×        ←
 F1  PG-DN     F2   END
```

```
∝      ⑪      ⑫        MODE
⑬      ⑭      ⑮        TEACH
⑯      ⑰      ⑱         ↑
 F1  PG-DN     F2   END
```

（1） Under teach mode, arm needs to be moved to waiting position first. After setting, arm needs to be returned back to waiting position to finish the setting.
（2） Under teach mode, the "mode open finished signal" and "mold close allowed signal" are needed to be set, otherwise the teach mode is not completed.
（3） Press F1 TEACH under page 30 to operate mode teaching setting. (Please refer to operational key for action symbols)
（4） Operating with white manual operational key and press ↵ (enter key) when executing every step and action symbols will be displayed on screen.
（5） Maximum carried out motion is 9 steps in one page. After 9 steps, it will turn to next page automatically.

（6） After setting finished, press F2 END to save the settings.

（7） Under teach mode, user can teach the settings according to requirement.

（8） Maximum procedure of teaching mode is 20 sequence motions.

（9） If teaching motion is not correct, user has to re-start teaching.

ATTENTION
"MO" or "MC" must
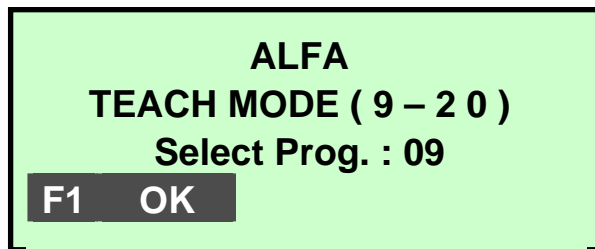**Be enter as**
Teach motions

ATTENTION
Incomplete Teach
Seq arm must
Return to Home

12.1.2   Under page 32, there are 3 selections:

（1） Press F2 END to finish the teaching and save teaching moves into memory.

（2） Press ESC to exit without saving and return to mode page. The monitor will display page 30.

12.2 Teach

35

```
                ALFA
        TEACH MODE ( 9 – 2 0 )
           Select Prog. : 09
    F1    OK
```

（1）Press F2 END under page 32 to finish teaching motion and the monitor will display page 35.

（2）If the teaching motion is correct, press ↵-ENTER to finish saving motion.

12.2.1　Under page 35, there are 2 selections:

（1）　Press ↵-ENTER to continue saving motion and the monitor will display page 36.

（2）　Press ESC to quit saving and exit TEACHING page. The monitor will display page 30.

12.2.2　Teach Successful
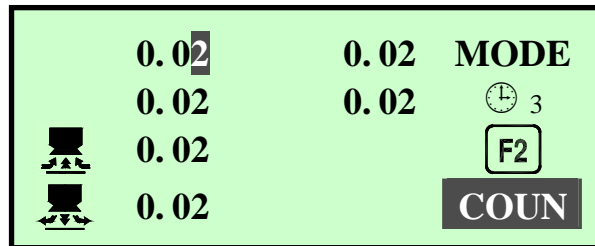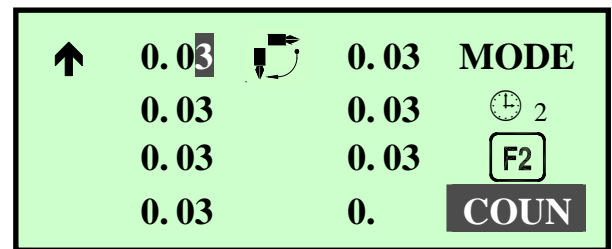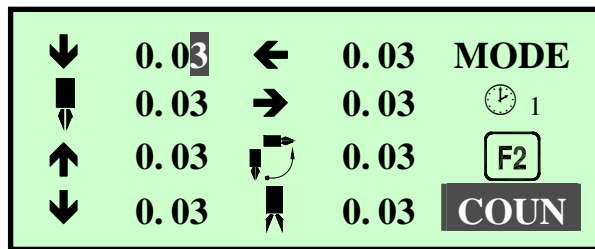
36

```
                ALFA
        『TEACH SUCCESSFUL 』
       ☺        ☺        ☺        ☺
```

（1）Above screen shows the teaching is saved into memory successfully.

（2）It will display above 5 sec and return to page 30 automatically.

12.3 Timer

37

（1） Press F2 TIM/CUN under page 30 to change time settings and the monitor will display page 37.
（2） There are 3 pages of Timer, page 37, 38 and 39.
（3） Please refer to Chapter 9 for timer definition.
（4） When suck and grip are action simultaneously, please refer to page 3 of timer definition for time of suck and release.

12.3.1 Setting Parameter
（1） Press ←, → to move cursor.
（2） Press +, − to change value.
（3） After setting value, press ↵-ENTER to finish setting.

12.3.2 Under page 37, 38 and 39, there are 3 selections:
（1） Press F2 COUN to adjust counter setting. The monitor will display page 40.
（2） Press page/DN to turn to next page for time setting.
（3） Press ESC to exit and return to page 30.

12.4 Counter

40

```
SET   :0   00  0        MOLD
RUN   :0   00  0        CTR
REJ   :0   00  0
 F1  ZERO      F2  CONV
```

（1）   Press F2 COUN under page 37, 38 and 39 to adjust counter setting. The monitor will display page 40.
（2）   Please refer to Chapter 9 for counter definition.
（3）   REJ is to set the ejector action time.
（4）   Press F1 ZERO, the present mould number is reset to zero.
（5）   The mould number will add up after robot finishing every one cycle. When the accumulated number reaches to setting times, robot will give E80 alarm signal and stops.

12.4.1   Setting Parameter

（1） Press ←, → to move cursor.
（2） Press ＋, － to change value.
（3） After setting value, press ENTER to finish setting.

12.4.2   Under page 40, there are 2 selections:

（1） Press F1 ZERO, the present mould number is reset to zero.
（2） Press F2 CONV to adjust conveyor move and time setting. The monitor will display page 41.

12.5 Conveyor/ Spray

41

```
COUN  :  00        CONV
TIME  :  00  00    SPRAY
```

（1） Function on page 41 is available only if setting conveyor or spray function under functional page.
（2） Press F2 CONV under page 40 to adjust conveyor or spray parameter. The monitor will display page 41.
（3） Please refer to number and time counting chapter for count and time description.
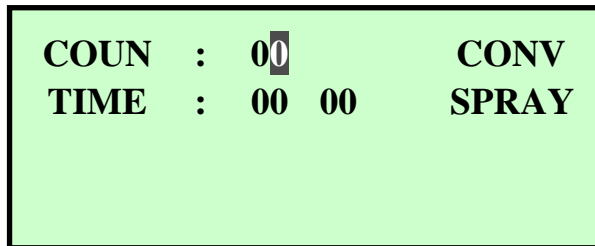
12.5.1   Setting Parameter
（1） Press ←, → to move cursor.
（2） Press ＋, － to change value.
（3） After setting value, press ENTER to finish setting.

12.5.2   Under page 41, there are 2 selections:
（1） Press F1 TIME to adjust time setting and the monitor will display page 37.
（2） Press ESC to exit and return to page 30.

12.6 Memory

42

```
DATA INPUT OKAY?
   Press        enter   to
Save or      Press    ESC
        To exit
```
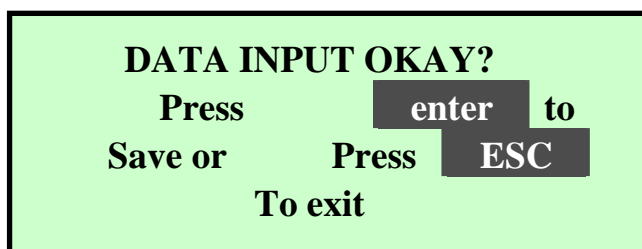
（1） Press ENTER under page 30 for preparatory motion of save. The monitor will display page 42.
（2） Press ESC under page 30 to return to page 1.
（3） This is saving page to save all setting functions.

12.6.1   Under page 42, there are 2 selections:
（1） Press ENTER to enter into mode saving finished page. The monitor displays page 43.
（2） Press ESC to exit without saving setting information. The monitor displays page 30.

12.7 Completing of Memory

```
☺      ☺      ☺      ☺

『 SAVE SUCCESSFULLY 』


☺      ☺      ☺      ☺
```
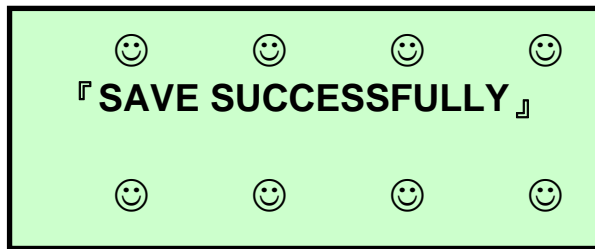
The set info is saved successfully when monitor displays "SAVE SUCCESSFULLY," and 8 smiling faces appears accordingly, the monitor will display directly return to mode page, page 30.

13.   ZERO CLEANING
13.1

50

```
『REALLY WANT TO
ERASE SYSTEM DATA? 』
     ☺   ☺   ☹   ☺
F1   ZERO
```
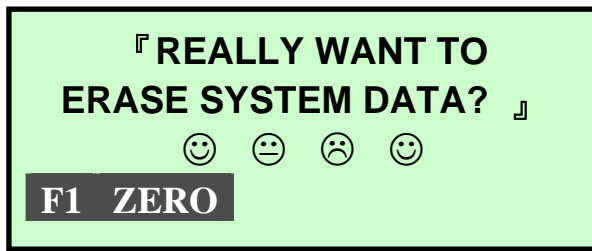
（1） Press ⊕ 🔼 🔽 accordingly under initial page 1 to enter into ZERO page.

（2） Press F1 ZERO to clear system data.

13.1.1   Zero Motion

51

```
EPROM CLEAR
```
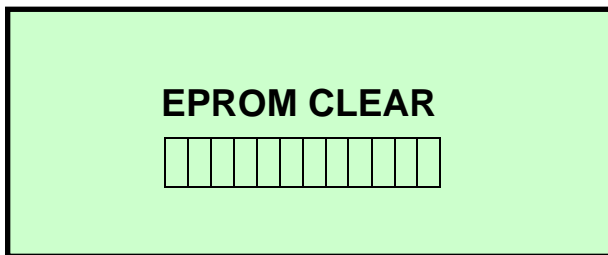
Press F1 ZERO under page 50 to clear all stored data to zero and the monitor will display page 51. After zero cleaning, please re-start the machine to set data.

14. ALARM AND TROUBLE SHOOTING

14.1 Description of Alarm Error Code

(1) E01: Arm up sensor

(2) E02: MID sensor

(3) E03: Swing-in sensor

(4) E04: Swing-out sensor

(5) E05: Grip sensor

(6) E06: Vac sensor

(7) E11: Arm solenoid

(8) E13: Swing-in sol

(9) E14: Swing-out sol

(10) E16: Swing error

(11) E17: In or out NG

(12) E38: Emerg-Stop

(13) E80: Set complet

(14) E92: NO MO signal

(15) E93: MO signal int (Robot is not finish a cycle but IMM has starting next cycle of mould open. Robot motion is too slow that is unable to coordinate with IMM.)

14.2 Description of Alarm Error Signal

Warning signal is not mechanical failure but unqualified operation.

(1) W01: Operate err – When robot descends the swing-in and out action is not allowed.

(2) W04: Machine has not selected – If operation mode is not selected, press AUTO START and W04 will appear.

(3) W05: Motion error – If robot fails to operate accordingly, W05 will appear.

(4) W10: Not reach home pos – When robot does not reach home position to pick up products, W10 will appear when user press AUTO START.

(5) Warning signal: Incomplete TEACH, seq. arm must return to HOME – Teaching incomplete and not back to waiting position.

(6) Warning signal: "MO" "MC" must be entered as teach motions – Teaching incomplete and not teaching mold open position or enable mold close.

14.3 Alarm Eliminate

(1) Turn back to page 0000 to dismiss the alarm error codes listed on 14.1.

(2) Trouble shooting according to alarm signal.

(3) When there is E05 or E06 error code, it can be dismissed through opening safety gate or pressing RESET button.

14.4   Alarm-Trouble Shooting Flowchart

E01: Arm up Sensor

| Check if the distance between sensor and induction plate is within 2~3 mm. | →NO→ | Adjusting the distance between sensor and induction plate within 2~3 mm (light on means normal). |

↓ YES

| Check if (proximity) sensor lights on or not. | →NO→ | Sensor is breakdown. |

↓ YES

| Check if upper signal is 1 at I/O page. | →NO→ | Sensor is breakdown. |

↓ YES

| Check if arm up speed is too slow. | →NO→ | Inform ALFA company or Agent. |

↓ YES

| Adjust arm up speed control valve to normal speed. |

E03: Swing-in Sensor
Trouble shooting flowchart is same as E01.

E04: Swing-out Sensor
Trouble shooting flowchart is same as E01.

E02: MID Sensor

| Check if distance between sensor and induction plate is within 2~3 mm. | →NO→ | Adjusting the distance between sensor and induction plate within 2~3 mm. (light on means normal) |

↓ YES

| Check if (proximity) sensor lights on or not. | →NO→ | Sensor is breakdown. |

↓ YES

| Check if upper signal is 1 at I/O page. | →NO→ | Sensor is breakdown. |

E05: Grip Sensor

| Check if jig pick up product exactly. | →NO→ | Open safety gate and wait robot return to waiting position. Adjust the jig. |

↓ YES

| Check if magnetic switch motion is normal or not. Pick up product: light on Not pick up: light off | →NO→ | Re-adjust |

↓ YES

| Check if tube breaking. | →NO→ | Re-adjust to right position. |

↓ YES

| Change or connect back again. |

E06: Vac Sensor

| Check if main arm hold/ suck product exactly. | → NO → | Open safety gate and wait robot return to waiting position. Adjust the jig. |

↓ YES

| Check if air leaking or tube breaking. | → NO → | Vacuum detector is breakdown or limit switch is breakdown. |

↓ YES

| Change or connect back again. |

E11: Arm Solenoid

| Check if robot down to position. | → NO → | Adjust speed control valve and then check if arm down. |

↓ YES   NO ↓   YES ↓

| Check if upper signal is 1 at I/O page. | → NO → | Solenoid valve or speed control valve is breakdown. | The adjustment of speed control valve is not proper. |

↓ YES

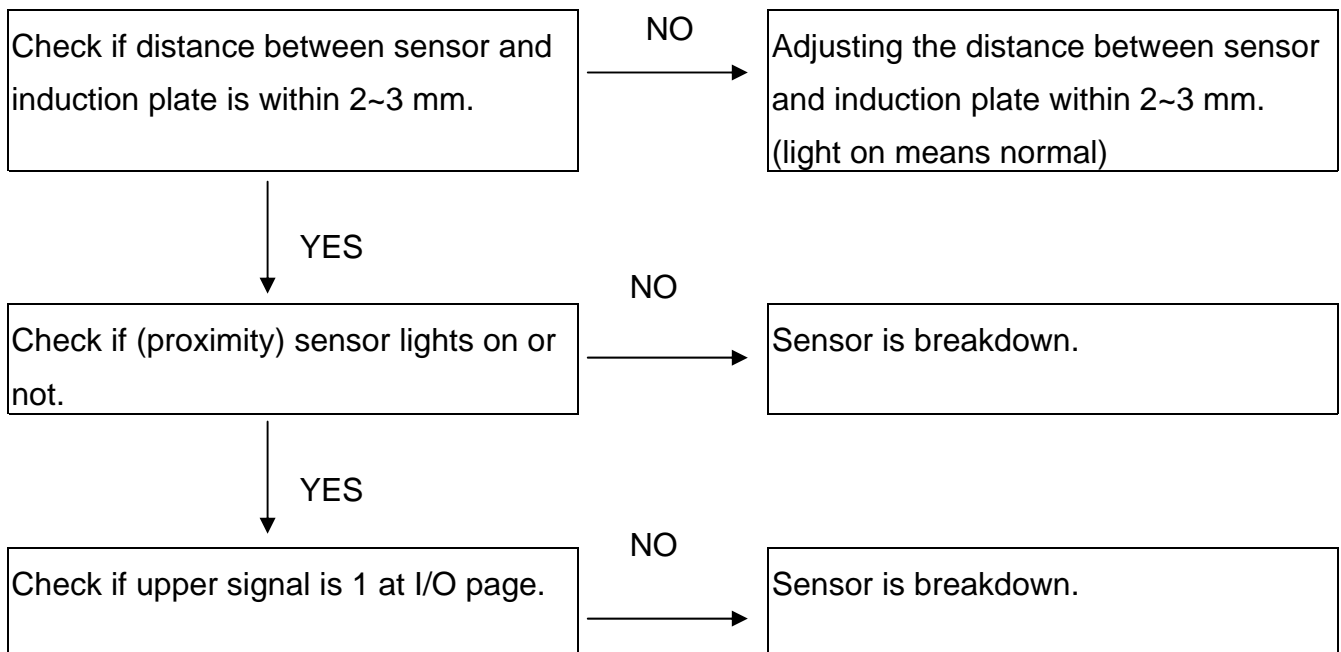| Proximity switch is breakdown. | → NO → | Inform ALFA company or Agent. |

E13: Swing-in Sol
    Trouble shooting flowchart is same as E11.

E14: Swing-out sol
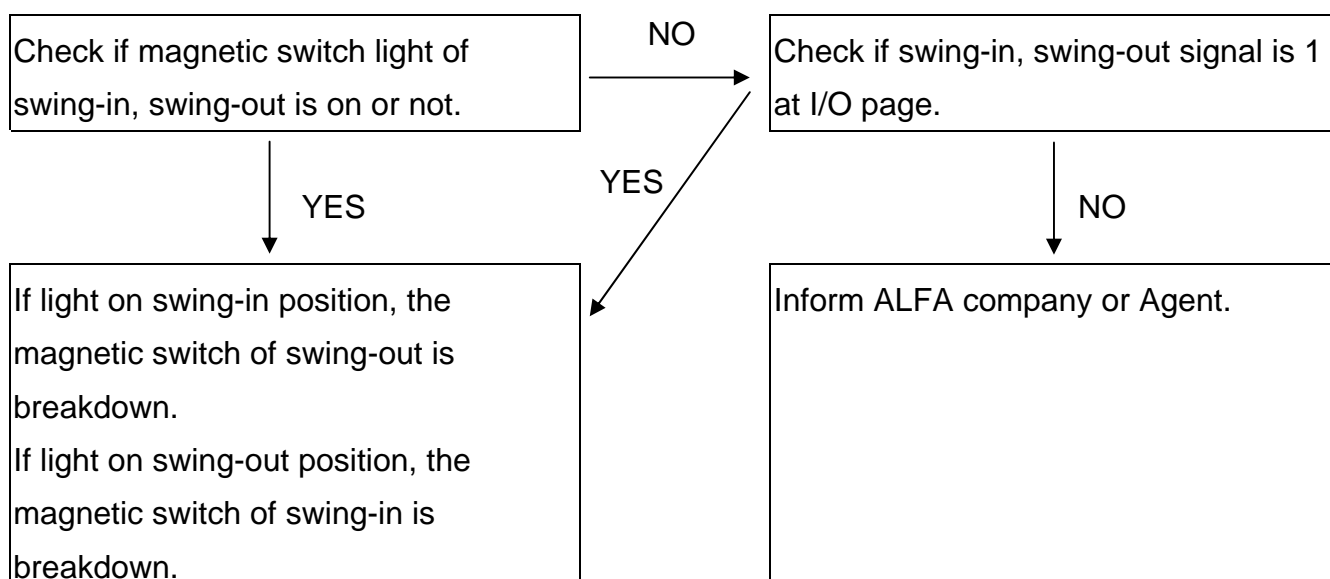   Trouble shooting flowchart is same as E11.

E16: Swing Error

| Check if magnetic switch light of swing-in, swing-out is on or not. | NO → | Check if swing-in, swing-out signal is 1 at I/O page. |

↓ YES   ↙ YES   ↓ NO

| If light on swing-in position, the magnetic switch of swing-out is breakdown. If light on swing-out position, the magnetic switch of swing-in is breakdown. | Inform ALFA company or Agent. |

E17: In or Out NG

| Check if magnetic switch light of swing-in/ swing-out in on or not. | NO → | Check if swing-in/ swing-out signal is 0 at I/O page. |

↓ YES   ↙ YES   ↓ NO

| If light on swing-in position, the magnetic switch of swing-out is breakdown. If light on swing-out position, the magnetic switch of swing-in is breakdown. Adjust magnetic swicth up and down. | Inform ALFA company or Agent. |

E38: Emerg-Stop

Under AUTO START mode, press red button of Emergency Stop to stop the robot in place. To dismiss the alarm is to loosen switch.

Press Reset ⟶ Enter into Manual mode ⟶ Operate robot to position

E80: Set Complet

Clean the molding number to zero or reset the setting.

E92: No MO Signal

Check if mold open finished signal is 1 or not.	→ NO → Please check I.M.M mold open finished signal.

↓ YES

Check if mold open finished signal is flicker or not.	→ NO → Inform ALFA company or Agent.

↓ YES

Please check mold open finished signal.

E93: MO Signal Int
Please check if mold open finished signal of I.M.M is ON-OFF-ON.