

INSTRUCTIONS FOR SPRUE PICKER



MODEL NO.

SERIAL NO.

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PLASTIC PROCESS EQUIPMENT, INC.

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A. Getting Started

- .1 Inspect machine and check for shipping damage.
 - a. Look for shipping damage and unpack contents of shipping container.
- .2 Have qualified personnel read and review the entire manual.
- .3 Plan and prepare Molding machine for installation of picker.
 - a. Check overhead clearances
 - b. Check door height clearances
 - c. Power off and **lockout** IMM
 - d. Drill and tap IMM stationary platen per diagram in section 2.2
- .4 Fasten Picker riser block to IMM stationary platen using hardware provided.
- .5 Lift picker arm into retracted position and lock into place using Safety Lock Pin.
- .6 Lift picker at lifting eye and put into position on top of riser.
 - a. Make sure to use straps and lifting equipment rated for a minimum of 1000 pounds.
- .7 Fasten picker to riser block using hardware provided.
- .8 Follow instructions in chapter 2 and supply compressed air to picker.
- .9 Secure cable for SPI connection and plug into IMM.
- .10 Secure and connect 110 V AC power cord.
- .11 Plug in and secure cable for G-28 Hand control at base of Picker Electrical Compartment.
- .12 Follow instructions in Chapter 4 for Setup and adjustment.
- .13 Follow all required guidelines for guarding of the picker and the IMM.
- .14 If you have any trouble with SPI connection, please contact Plastic Process Equipment. Make sure you have wiring information for the SPI connection on the IMM you are connecting the Picker.



1. SAFETY AND WARRANTY

1.1 Safety Description

Phoenix series swing-arm robots have been designed and manufactured in consideration for the use with any make of *horizontal plastics injection molding machines*, therefore the manufacturer shall be free from any obligation and responsibility for any accident or injury incurred while using this robot with other types of machines or applications. **We strongly suggest you to read the following safety standards thoroughly and observe them before putting the robot into operation:**

1. This robot has been designed and manufactured for the operating of 5,000,000 cycles (Say, 10 years x 280 days x 8 hours x 60 minutes x 4cycles) under normal operating conditions.
2. This robot has been designed and manufactured in conformity with EN292-1 and EN292-2 standards.
3. This robot requires necessary adjustment and maintenance as stipulated in this manual, therefore we strongly suggest you to read and observe the notices carefully before any adjustment or maintenance is carried out.
4. Make sure the necessary warning labels are placed on this robot to minimize residual risks. Please pay attention to and read the warning labels before and during operation.
5. Safety regulations shall be followed while handling moving and installing the robot.
6. Only a fully trained operator should operate this robot.
7. All operations and adjustments of this robot should be carried out in full accordance with the descriptions in this manual by a fully trained technician or engineer.
8. Danger zones are noted in this manual. The user must install appropriate safeguarding surrounding these areas and the IMM.
9. Do not operate this robot if there is a person working or standing in the danger zone.
10. The hand-held pendant must be hung and operated outside the danger zone during operation.
11. During maintenance or a mold change, electrical power must be turned off and locked out also the pneumatic source must be disconnected and locked out.
12. This robot is equipped with troubleshooting functions. The user may rectify the problems according to the trouble-shooting guide or contact Plastic Process Equipment for service.
13. In addition to the replacement of proximity switches, vacuum and grip sensors, please contact Plastic Process Equipment for other repairs and maintenance.



1.2 Warranty and Non-warranty

1.2.1 Warranty Period

Within ONE (1) year from the date of installation, or 1,000,000 running cycles of operation, whichever comes first.

1.2.2 Non-Warranty

The following are non-warranty items:

- (1) Damage due to personal negligence or human error during operation.
- (2) Damage due to natural disaster such as: earthquake, flood, lighting strike and fire etc.
- (3) Damage due to self-modification and poor adjustment by user.
- (4) Consumable items. (As listed below, but not limited)

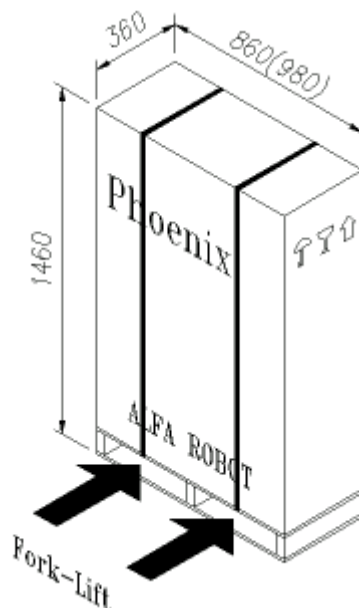
Item	Description	Warranty Period
1.	Shock absorbers	500,000 cycles
2.	Proximity sensor	500,000 cycles
3.	Gripper sensor	500,000 cycles
4.	Magnetic switches	500,000 cycles
5.	Vacuum generator	500,000 cycles



2. INSTALLATION

2.1 Handling and Transportation

(Unit: mm)



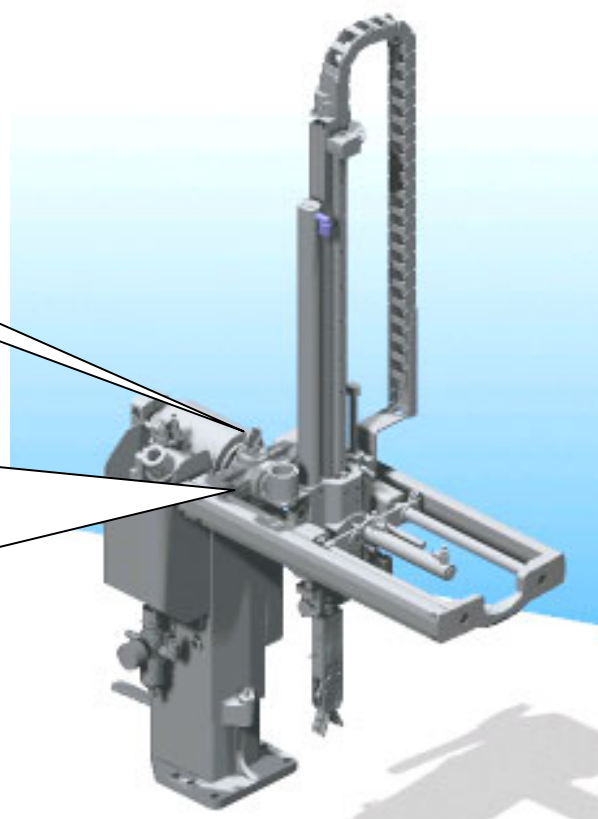
Remark : Dimensions shown in () are for the telescopic version

Lifting Point

CAUTION

Prevent Swing Safety Screw

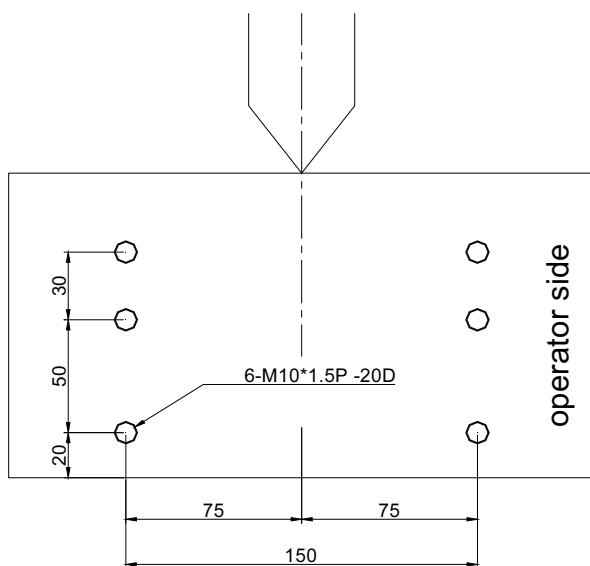
Please make sure screw to be locked up when transportation and take out the screw before operation.



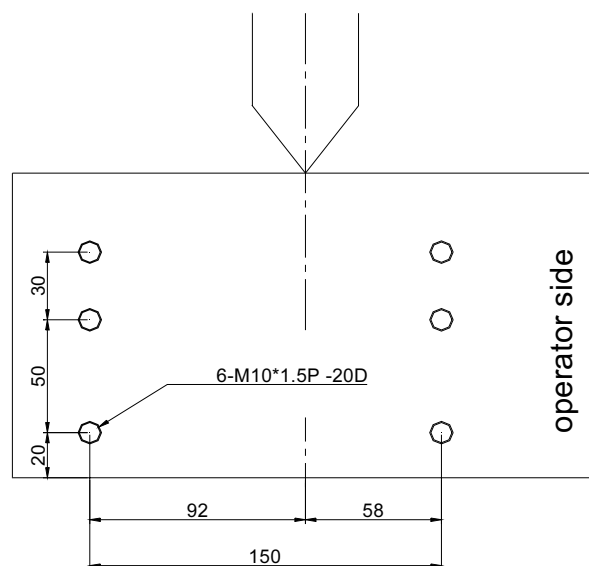
CAUTION: Pay close attention to the gravity center during handling with a fork-lift and be sure to ²⁻¹avoid dropping.

2.2 Installation Dimensions

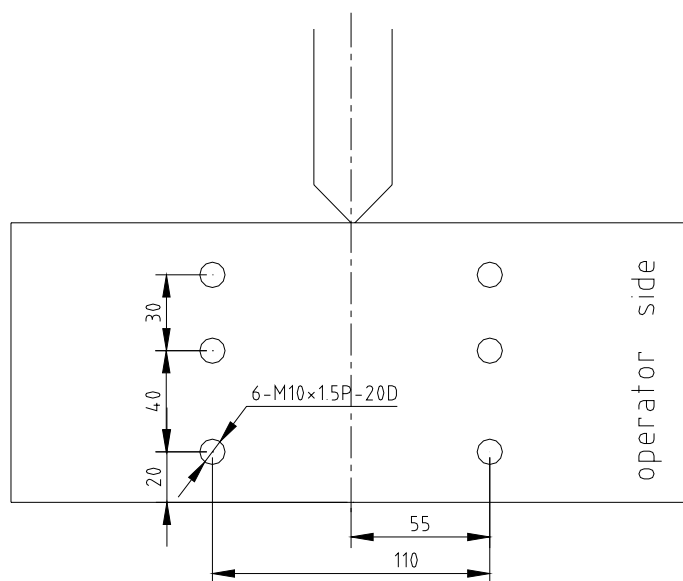
■ For the Machine Platen:



Phoenix 550~650

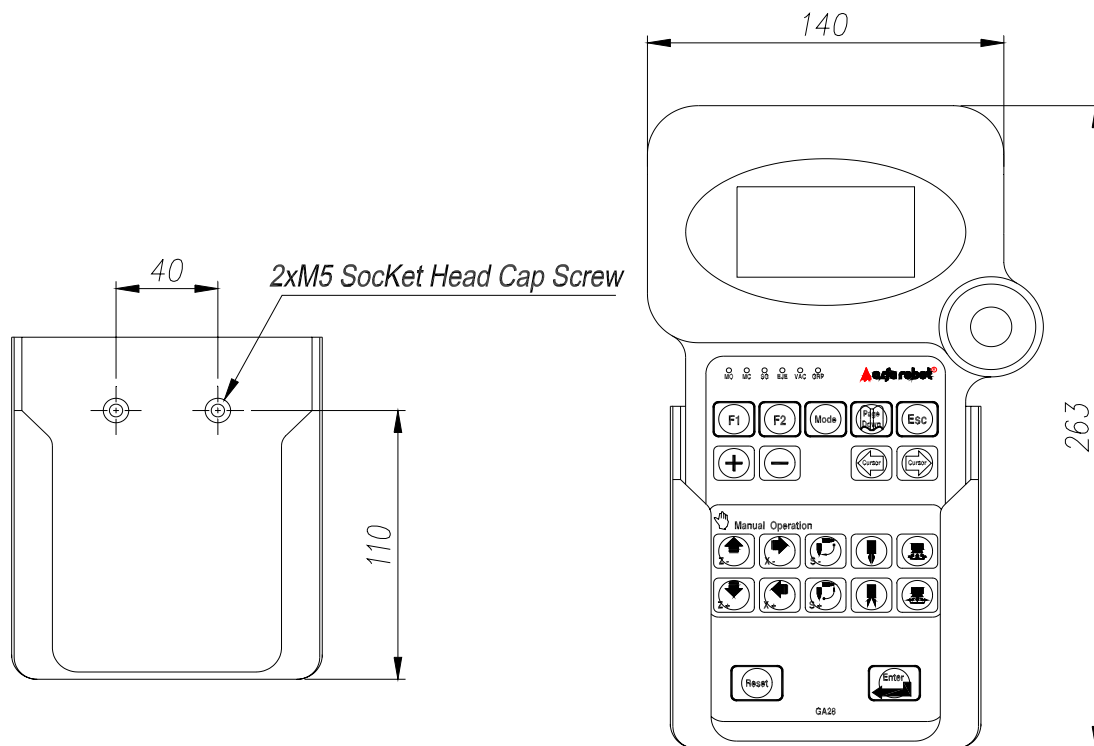


Phoenix 650W~950 W



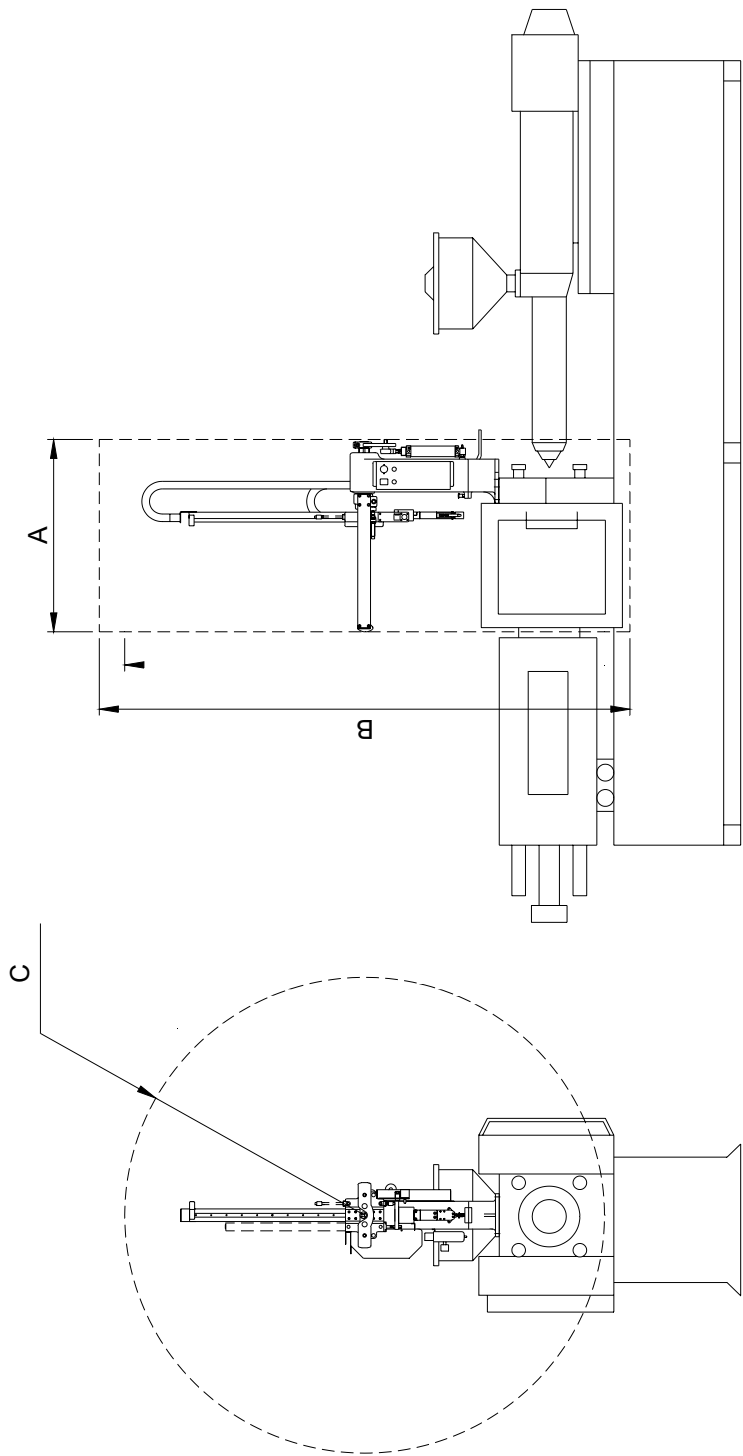
Phoenix 350~450

■ For the Hand-held Pendant's Holder:



2.3 Protective Areas

Appropriate guarding should be designed and installed around the hazard areas by the user.

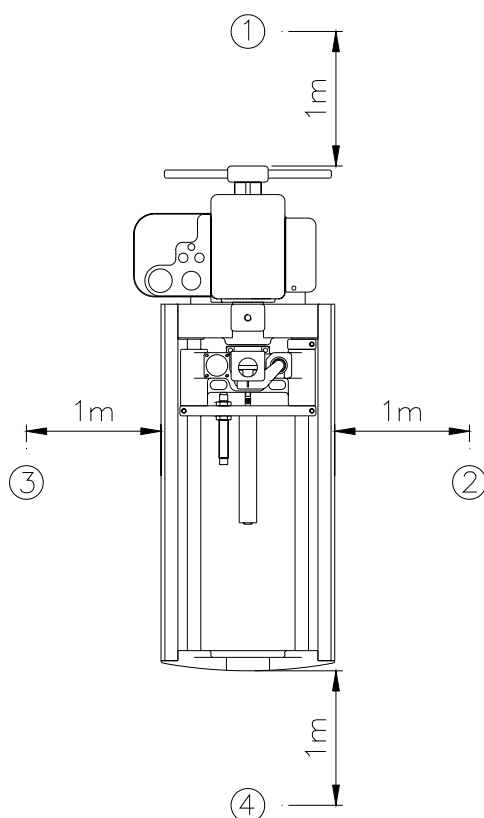


Model	P350	P450	P550	P650	P750W	P850W	P950W
A	550		900		1050		
B	1530	1650	1860	2060	1900	2050	2200
C	800	900	1000	1100	1220	1320	1420



2.4 Measurement of Noise Level

1. Noise Measurement is taken under noise test environment of 60 dB(A).
2. Measuring equipment model RION NA-24 sound level meter.
3. Measurement is based on distance of 1m from robot and 1m above floor.
4. Model P550 is measured.
5. Measurement positions are shown below:

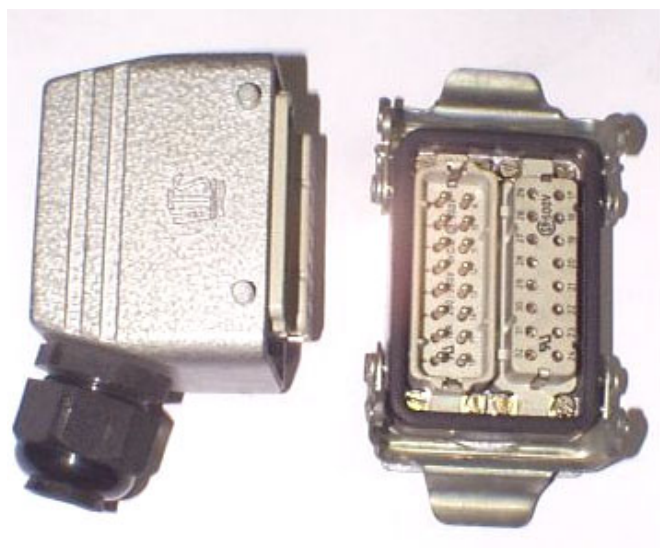
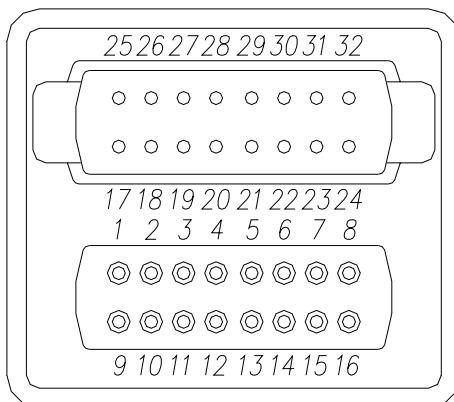


Measurement Position	Noise Level - dB(A)
1	67
2	65
3	67
4	68

2.5 Connection with Injection Moulding Machine

While robot is not in use, you can either set the robot to “ROBOT NOT IN USE” or simply “TURN POWER OFF”, but for maximum safety consideration we strongly suggest that suggest that the power is turned OFF.

2.5.1 Robot and IMM connector (Europe/America-Standard):



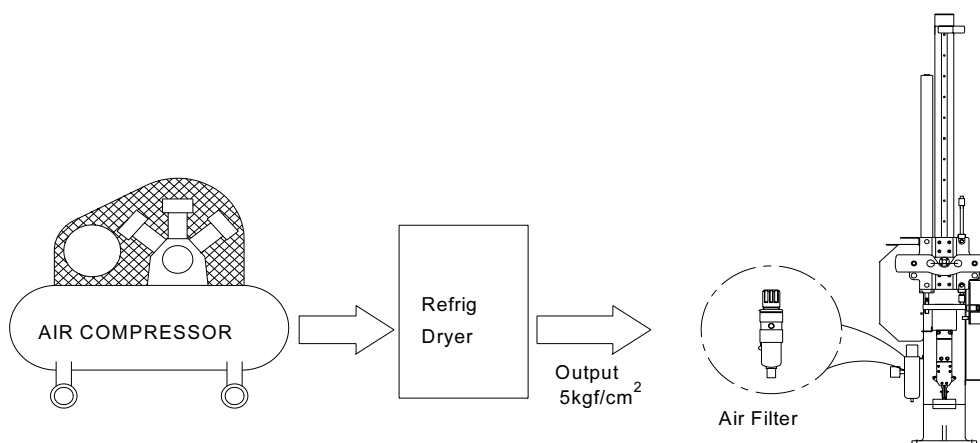
2.5.2 Description of Contact Codes

Phoenix Code	Name of Signal	Euromap/SPI Code	Description
3	Emergency Stop of IMM (ESM)	1	During activation of the IMM emergency stop, (refer to EN60204-1), such contact must be opened. When the contacts are opened, the emergency stop of robot activates.
1	Mold Open End (MOP)	2	When the mold position is fully open this contact should be closed. Caution must be taken to prevent interference between the mold and the robot and/or EOAT. Changes in mold open position, mold, robot kick position, robot EOAT may cause interference. Contact must be kept closed during robot operation and should not be interrupted by I.M.M due to the changing of operational mode of ejector or Core.
2	Safety Devices of machine (SDM)	3	During normal operation of safety circuit of the machine (such as safety door, protective safety equipment, foot pedal and safety equipment etc), this contact must be closed. Thus robot operation will only be allowed with safety guards in place and operating normally. When any guard of safety feature is compromised this circuit must open. This circuit must be functional under any mode of operation for the IMM. According to EN201, signal contact of safety device in mold area must use limit switch and current may not exceed 6A.
4	Common Point (L-)	16,9,11	This is the signal voltage used for inputs to the robot from the IMM.
5, 6	Mold Area Free (MAF)	18, 26	When robot arm is in the full up position, this contact is closed to permit closing the mold. If there is an alarm (in addition to E06: Vacuum suction signal is missing) during auto robot operation, the mold closing will be interrupted.
7, 8	Enable Mold Closure (EMC)	17, 32	Operational condition is same as MAF NO. 18,26 above
11, 12	Emergency Stop of Robot (ESR)	19, 27	When the Red Emergency Stop button on the hand control is pressed this contact will open. This contact should be wired into the IMM Emergency Stop Circuit. Consult with the IMM manufacturer for details on the IMM Emergency Stop Circuit. (refer to EN60204-1)
9	Enable Ejector Forward (EEF)	22	When robot permits ejector forward this contact will close, allowing signal voltage to pin 22.
13	IMM in AUTO mode (AUTO)	10	IMM in Auto. This signal tells the robot when the IMM is in Auto mode.

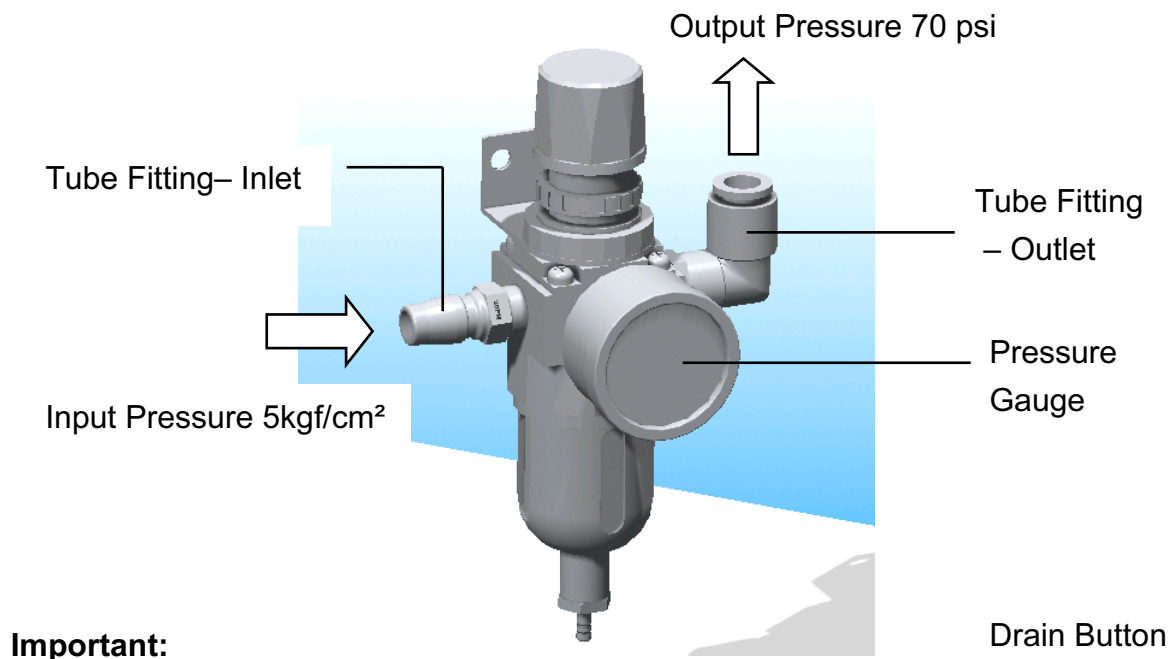
2.6 Connection with Pneumatic Supply Source

2.6.1 Pneumatic Supply

In order to maintain the robot's normal operation, be sure to use a refrigerated air dryer at the outlet of the air compressor to remove the moisture from the air and thus to obtain an extended service life for the robot.



2.6.2 Connection with Pneumatic Source of Supply



1. To minimize air pressure loss use rigid pipe for runs over 10 meters.
2. After completing the connection, adjust the pressure on the Air Filter/Regulator to 70 psi.
3. Check for water trapped in the Air Filter/Regulator and remove it everyday.

2.7 Safety and Function Test

After completion of installation of the robot on the injection molding machine in accordance with the instructions stipulated in paragraph 2.2 to 2.5 of this chapter, the following areas must be fully checked and tested. This will insure that the safety interlocks are functioning.

- (1) "Mold Close Permit" signal,
- (2) "Safety Gate Open" signal,
- (3) "Mold Open End" signal,
- (4) "Auto/Manual Mode of IMM" signal,
- (5) "Emergency Stop" function on both the robot and IMM,
- (6) "Adjustment of Moving Speed" for all axes,
- (7) Detection of "Reset Function",
- (8) "Mold Close Function" after removal of moldings.



[Attention] Connection test must be carried out by a fully trained technician or engineer only. If there is any problem, please feel free to contact PPE.

2.8 Procedures for Robot Dismantlement

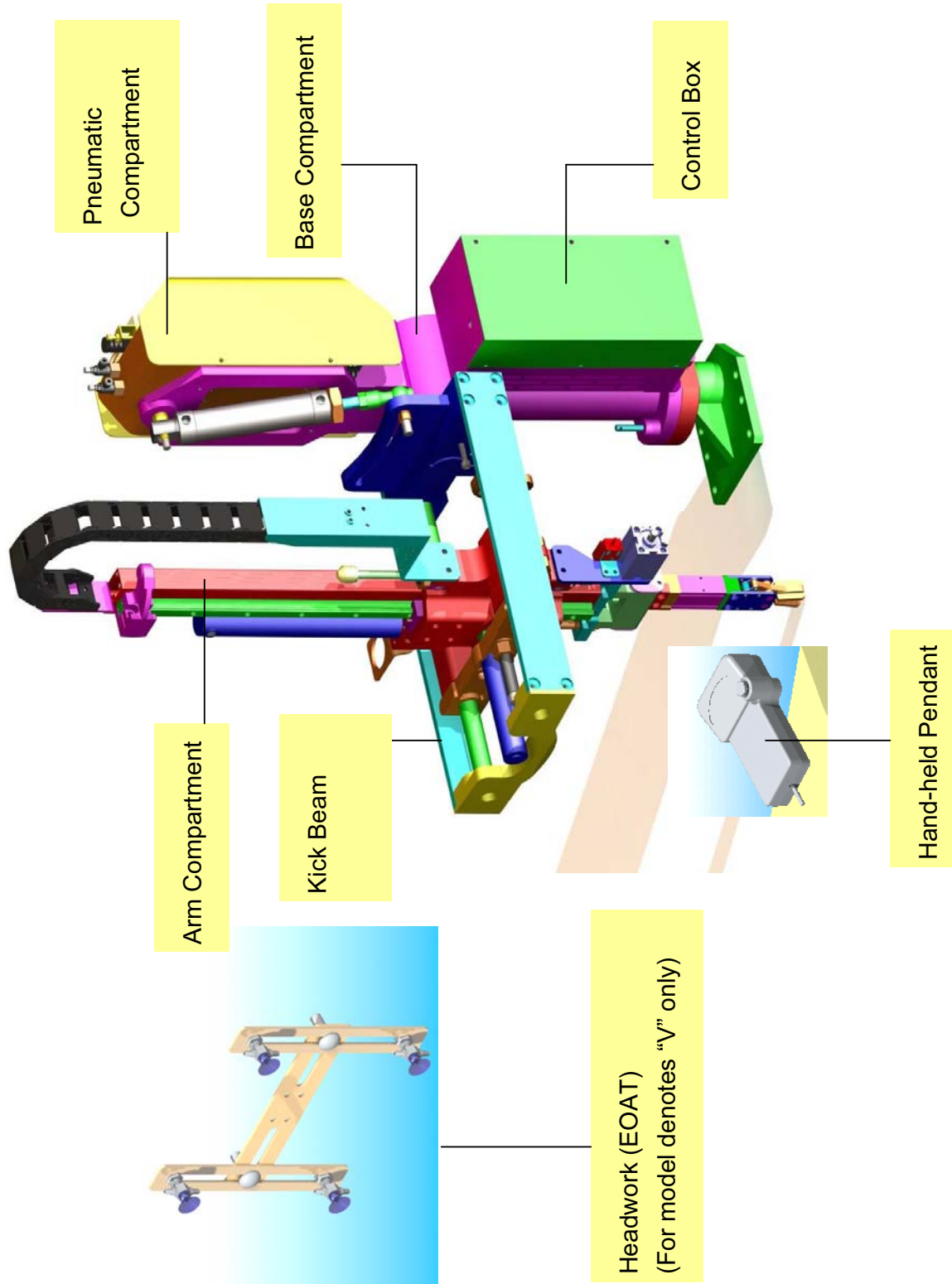
1. Turn OFF power to I.M.M and lockout.
2. Turn OFF power of the robot.
3. Disconnect the pneumatic source to the robot.
4. Exhaust air pressure from the robot. (disconnect air lines at wrist speed control 4.6.4)
5. Loosen mounting bracket for the kick cylinder and move arm to make it closer to traverse beam.
6. Move mounting bracket for shock absorber to make it closer to arm.

7. Tighten mounting bracket for the kick cylinder and make arm unable to be moved.
8. Disconnect the hand-held control pendant.
9. Dismantle connection between the robot and I.M.M.
10. Disconnect electrical power cable to the robot.
11. Insert swing lock screw.
12. Loosen mounting screws and remove the robot from machine platen.

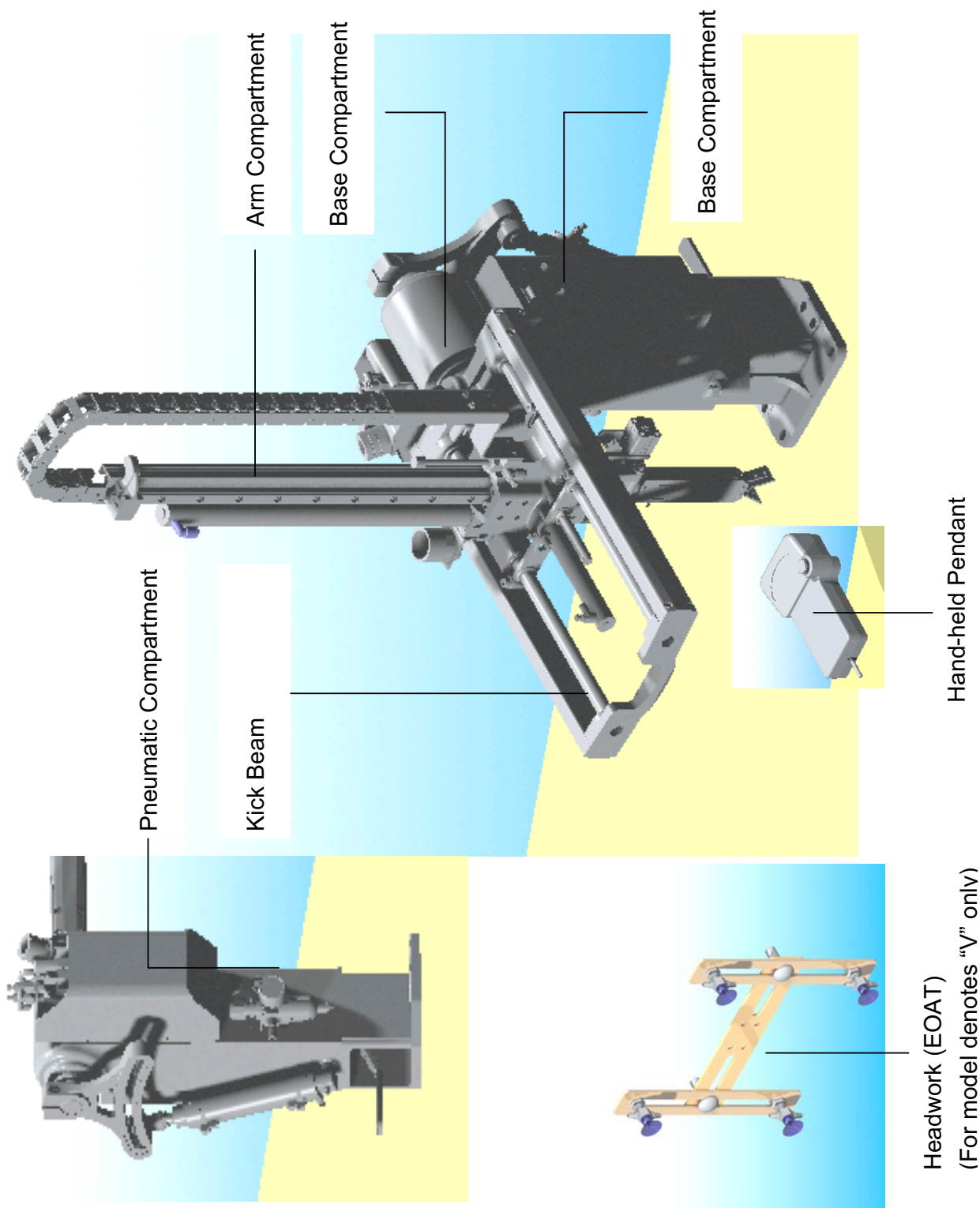
3. DESCRIPTION OF ROBOT STRUCTURE

3.1 Illustration

Phoenix350~450



Phoenix550~950



3.2 Specifications

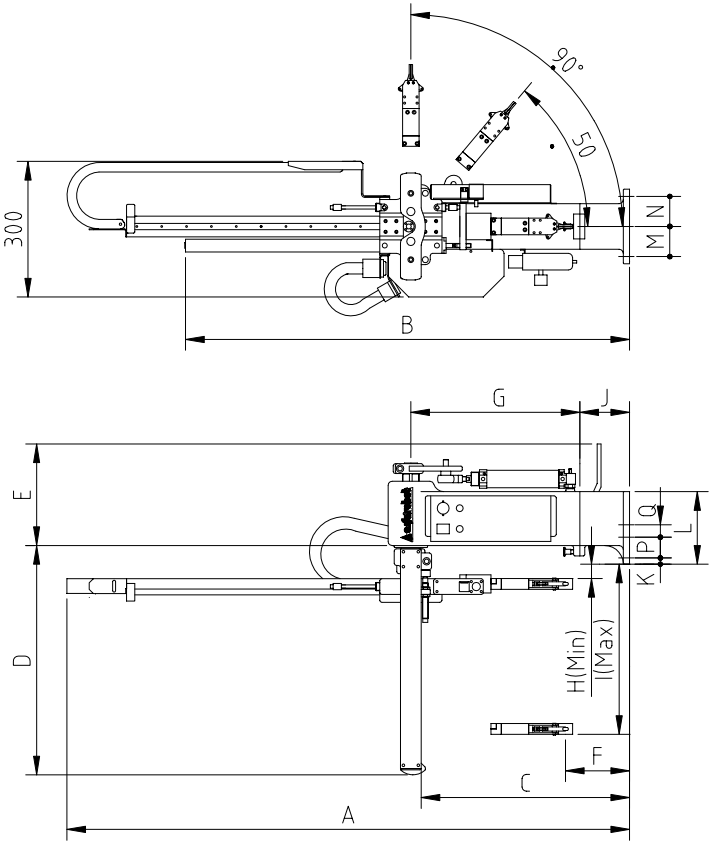
Model	Single-Stage				Telescopic			
	P350	P450	P550	P650	P650W	P750W	P850W	P950W
Suitable IMM Tonnage (ton)	15~30	30~60	50 ~ 150	75 ~ 200	75 ~ 200	100 ~ 250	150 ~ 300	200 ~ 400
Vertical Stroke (mm)	350	450	550	650	650	750	850	950
Kick Stroke (mm)	75		120		200			
SwingOut Angle (degree)	60-90		60~90		60~90			
Max..Kick Position (mm)	230		420		430			
Max. Payload (Kg)	2.5		3		3			
Minimum Take Out Time (sec)	0.6	0.7	0.8	0.9	0.8	1	1.2	1.4
Minimum Dry CycleTime (sec)	3.8	4.0	4.2	4.4	4.2	4.8	5.2	6
Power Consumption (KVA)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Air Consumption (NI/cycle)	1.5	1.5	1.6	1.7	2.2	2.5	2.8	3
Net Weight (Kg)	30	31	35	36	42	43	44	45
Dimension L x W x H (mm)	550*285*1015	550*285*1135	815*300*1390	815*300*1490	965*300*1250	965*300*1300	965*300*1450	965*300*1500

Remarks:

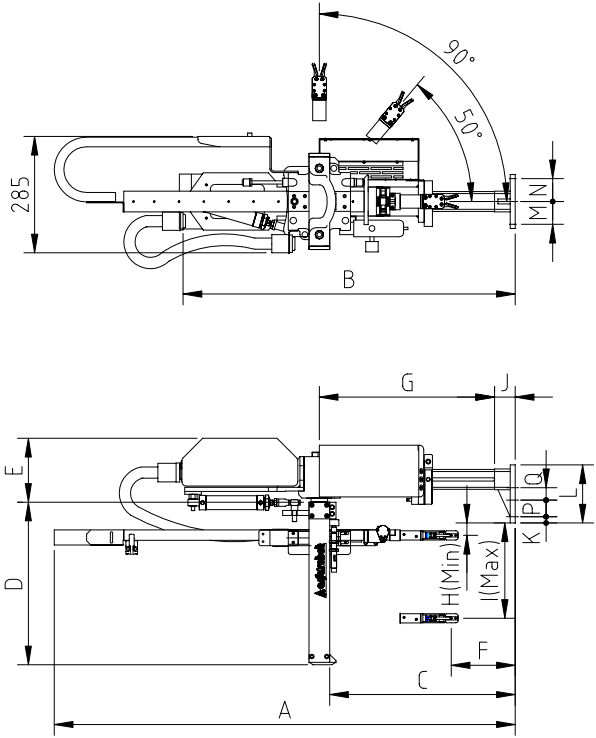
1. Runner/sprue gripper and wrist rotation mechanism is included as standard features.
2. Options: 1) Models fitted with vacuum generator and suction headwork (EOAT) are denoted by 'V'. Note: These models require additional air consumption of 5NI/cycle.
2) Platen spacer of 50, 100, 150 and 200mm height.

3.3 Dimensions

Model P650W(V) ~ P950W(V)



Model P350(V) & P450(V)



Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	
P350	865--1015	817	300--450	395	150	0--150	325--475	30	230	50	15	140	55	55	40	30	
P450	985--1135	917	508	560	255	210	413	50	420	120		175	75	75	93		50
P550	1350	1080															
P650	1450	1180	508	560	255	195	413	135	430	120	15	175	57	93	50	30	
P550W	1060	840															
P650W	1110	890															
P750W	1160	940															
P850W	1210	990	1040														
P950W	1260	1040															

3.3.3 Profiles



Single Stage Version

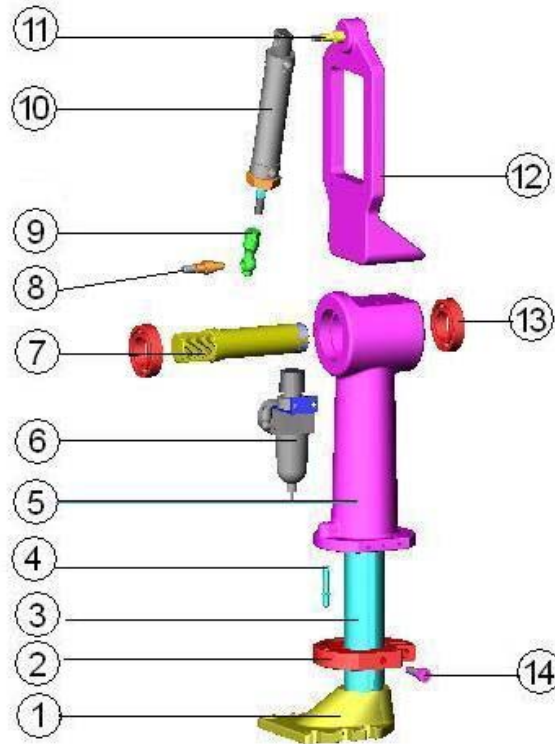


Telescopic Version

3.4 Exploded View

Base Compartment

Phoenix350~450

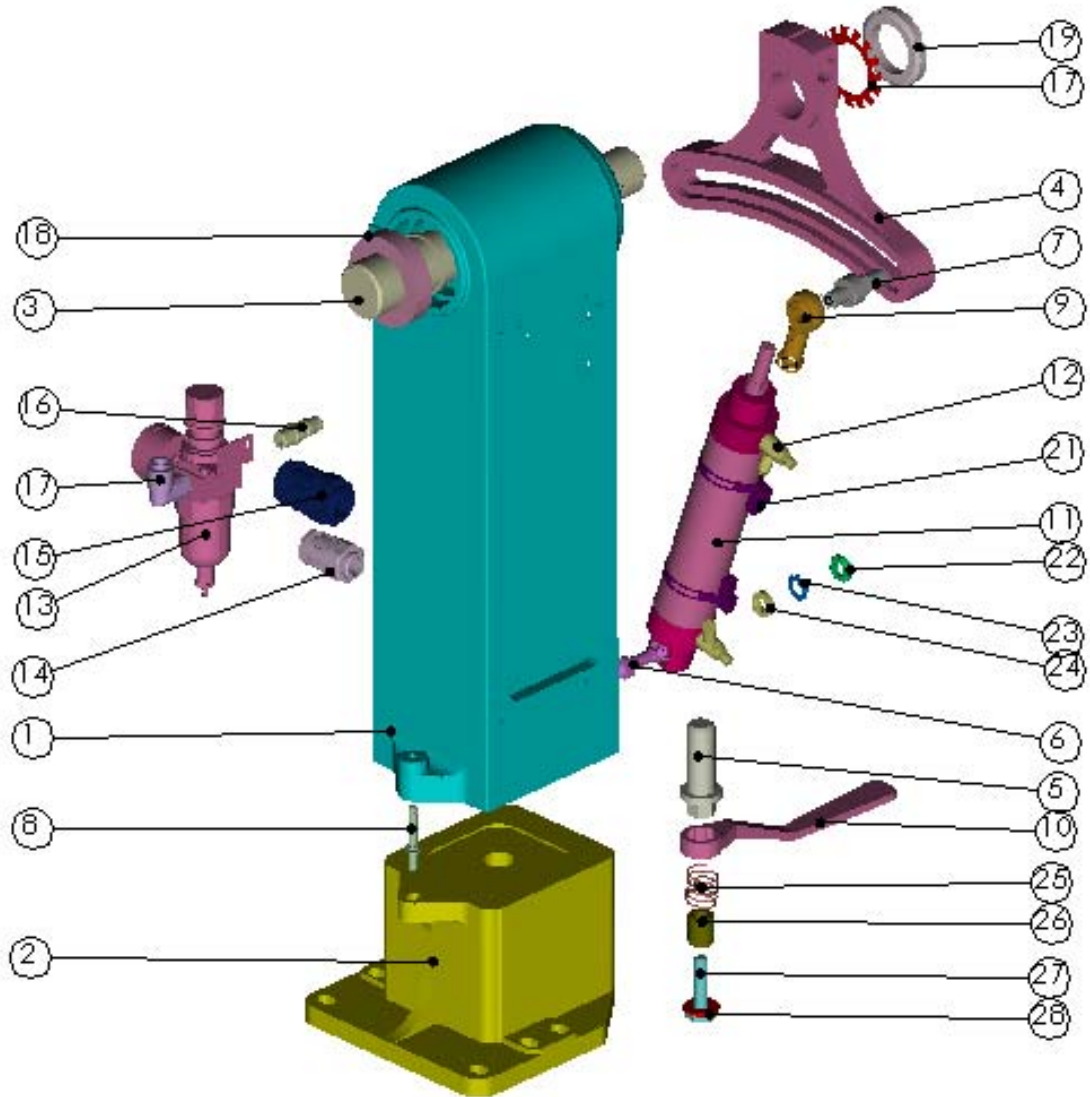


3.4.1.1 Part List for Base Compartment of Poenix350~450

ITEM	DESCRIPTION	PART NO.	Q`TY	REMARK
1	Base Block	PC03A040	1	
2	Location Ring	PC03A070	1	
3	Column	PC03A090	1	
4	Location Pin	PI00A080	1	
5	Arch	PC03A010	1	
6	Tube Fitting, quick release	PET2001	1	
7	Swing Axle	PC03A030	1	
8	Swing Angle Adjustment Knob	PC03A060	1	
9	Connector Block, swing cylinder	MBG5-PHS12	1	
10	Swing Cylinder	YC320080	1	
11	Swivel Shaft, swing cylinder	PC03A050	1	
12	swing cylinder Base	PC03A020		
13	Axle Bearing	MBG1-6007	2	
14	Location Screw	PC03A080	1	



Phoenix550~950



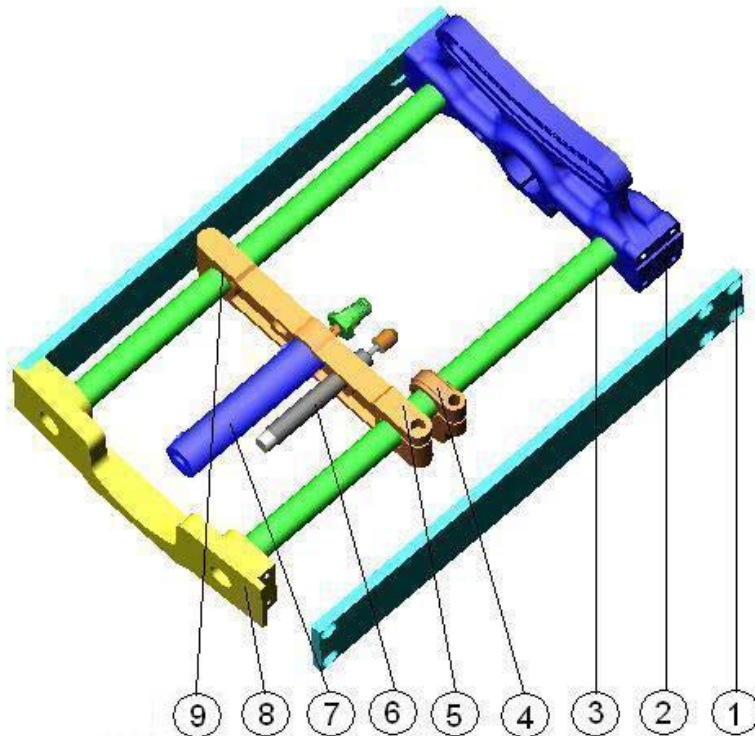


3.4.1.2 Part List for Base Compartment of P550-950

ITEM	DESCRIPTION	PART NO.	Q`TY	REMARK
1	Main Column	PI00A010	1	
2	P550/P650 Base Block	PI00A020	1	
3	Swivel Shaft, swing arm	PI00A030	1	
4	Swing Angle Adjustment Bracket	PB00A041	1	
5	Shaft for Main Column	PB00A052	1	
6	Swivel Shaft, swing cylinder	PB00A061	1	
7	Swing Angle Adjustment Knob	PB00A082	1	M6*12screw
8	Locating Pin	PB00A090	1	
9	Connector Block, swing cylinder	MBG5-PHS12	1	
10	Clamping Wrench	PI00A110	1	
11	P550/P650 Swing Cylinder	PCY40-YC400125	1	
	P650W~P950W Swing Cylinder	PCY50-YC500120Y	1	
12	Tube Fitting, speed control	AS2201F-01-04	2	
13	Air Filter/Regulator	PET2001	1	
14	Cable Holder, lower	RXE1002	1	
15	Cable Holder, upper	RXE1001	1	
16	Tube Fitting, quick release	RFL0200	1	
17	Tube Fitting, quick release	KQL10-02S	1	
18	Bearing	MBG-6008ZZ	2	
19	Lock Nut	MSW8-AN08	1	
20	Spring Washer	MSW8-AW08	1	
21	Magnetic Switch	RSN2002	2	
22	Lock Nut	MSW8-AN00	1	
23	Spring Washer	MSW8-AW00	1	
24	Bearing	MBG-6800ZZ	2	
25	Clamping Wrench Spring	PI00A120	1	
26	Shaft Distance Spacers	PI00A100	1	
27	Screw M10*40L	MSW6-1040	1	
28	Washers for linear shaft	MSW8-1031	1	



Kick Beam (Single-stage version) Phoenix350~450

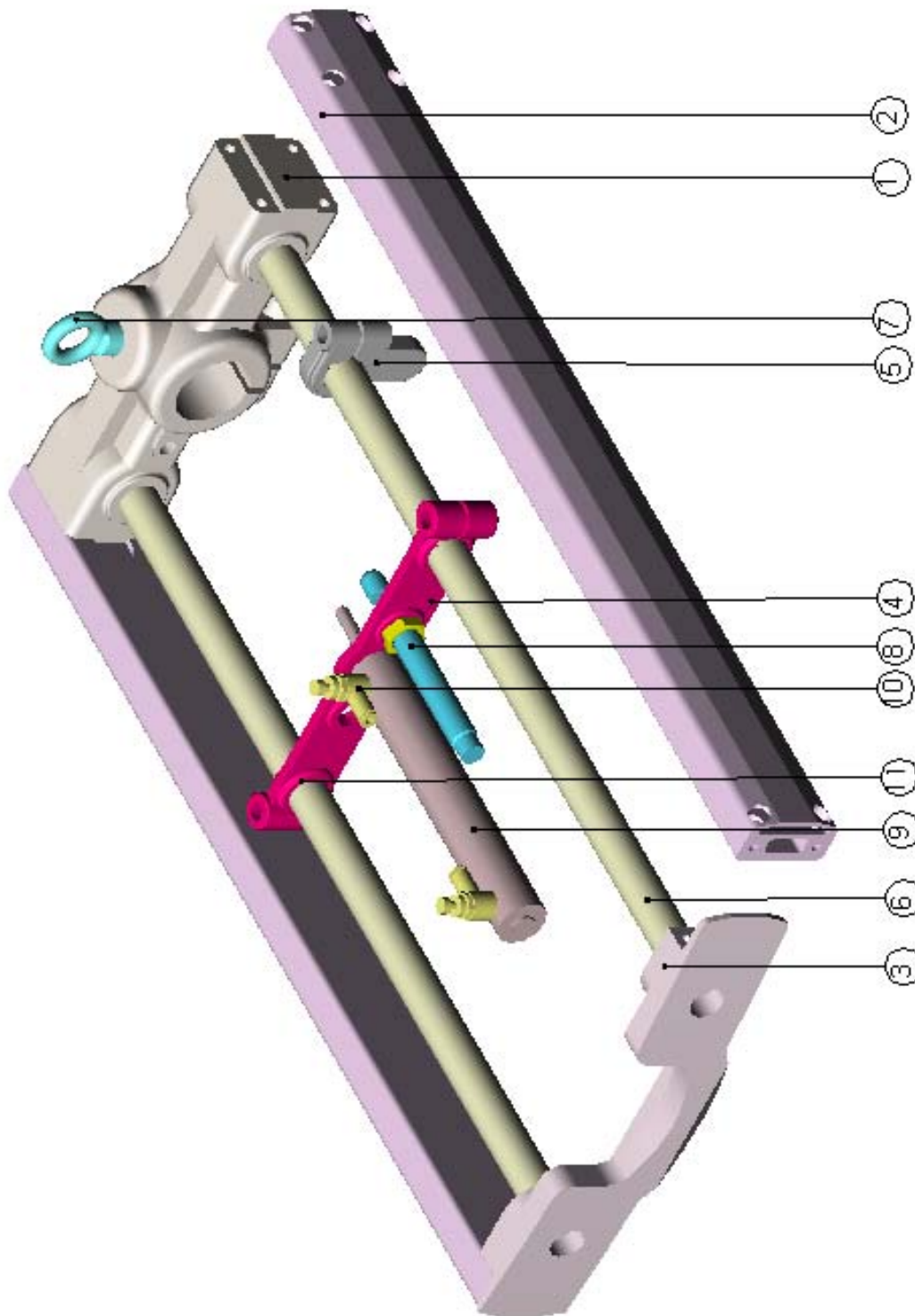


3.4.1.3 Part List for Kick Beam (Single-stage version) Phoenix350~450

ITEM	DESCRIPTION	PART NO.	Q`TY	REMARK
1	Structural Beam	PC03B020	2	
2	Rear Bracket	PC03B010	1	
3	Guide Rod	PC03B030	1	
4	Stroke End-Stopper	AI00B070	1	
5	Cylinder Mounting	AI00B060	1	
6	Shock Absorber	MAR1416	1	
7	Kick Cylinder	YC200075	1	
8	Front Bracket	PC03B040	1	
9	Dry Bearing	MBG2-2012	1	



Phoenix550~950



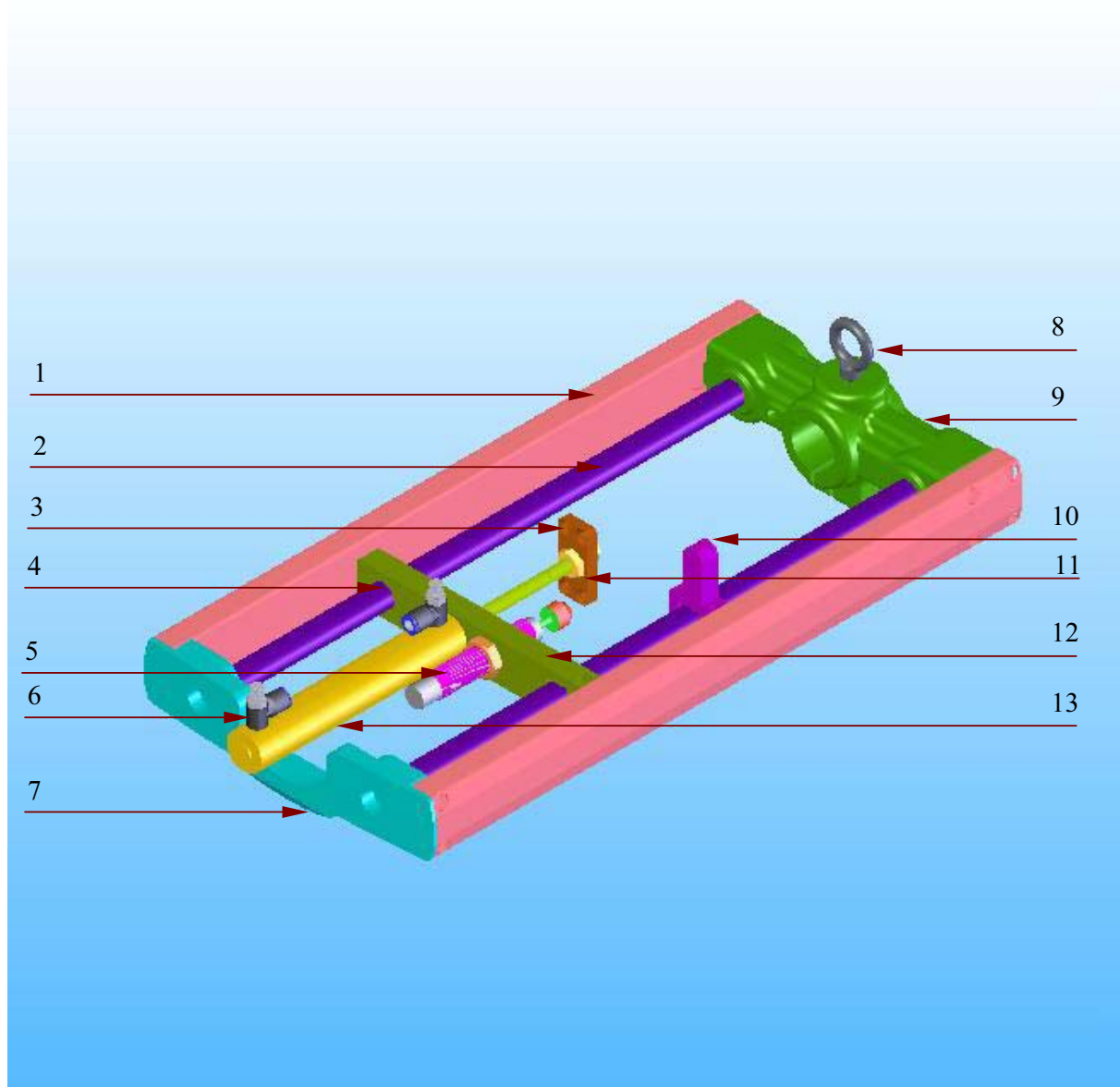


3.4.1.4 Part List for Kick Beam (Single-stage version) Phoenix550~950

ITEM	DESCRIPTION	PART NO.	Q`TY	REMARY
1	Rear Bracket	PI00B010	1	
2	structure beam	MFA-PI00B020	2	
3	Front Bracket	AI00B010	1	
4	Cylinder Mounting Bracket	AI00B060	1	
5	Stroke End-Stopper	AI00B070	1	
6	Guide Rod	YE200500	2	
7	Lifting Bolt	MSW9-1001	1	
8	Shock Absorber	MAR1001	1	
9	Kick Cylinder	PCY20-YC200120K	1	
10	Tube Fitting, speed control	AS2201F-01-04	2	
11	Dry Bearing	MRG2-2012	1	



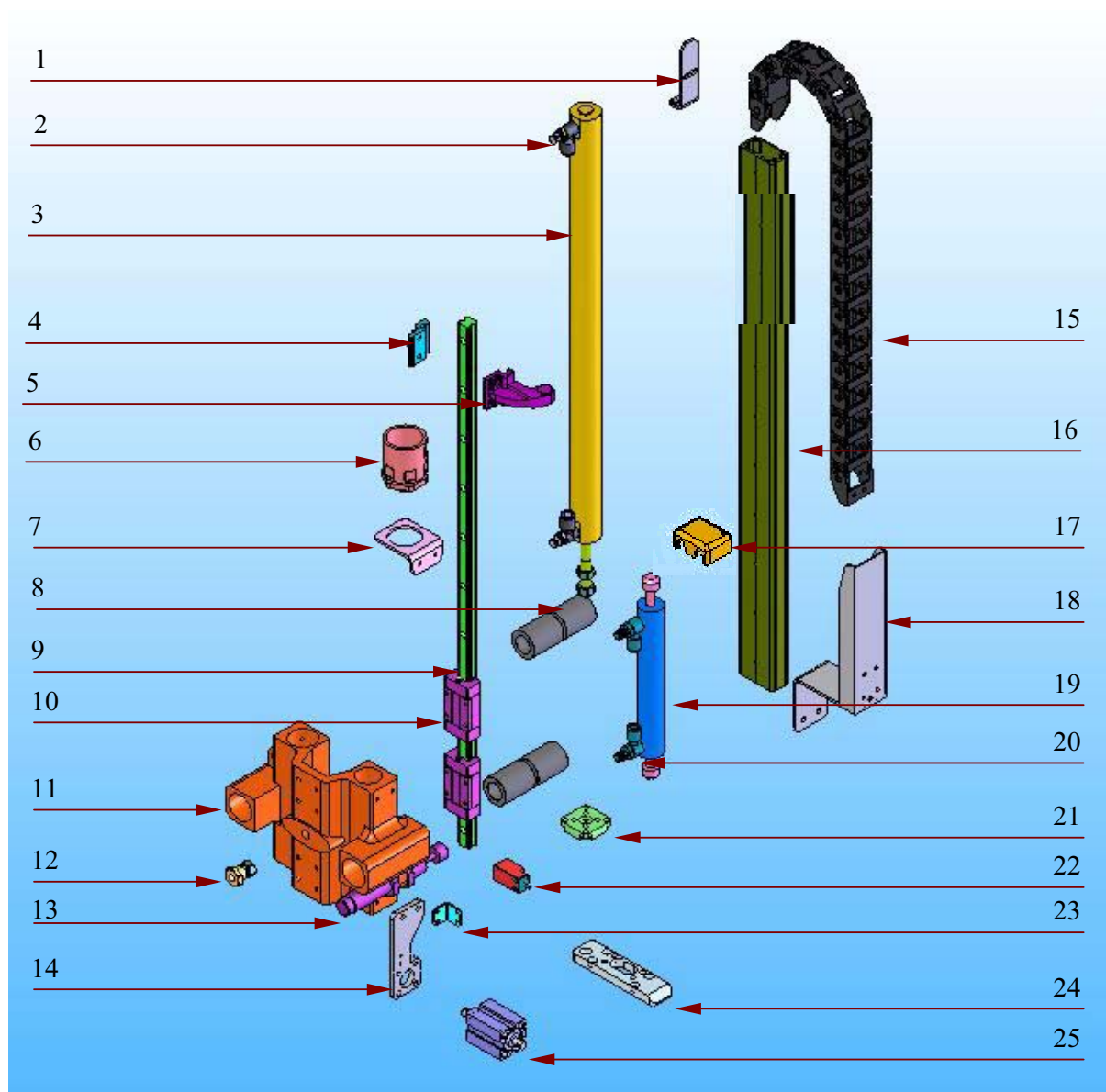
**Kick Beam (Telescopic version)
Phoenix550W~950W**



3.4.1.5 Part List for Kick Beam (Telescopic version)

ITEM	DESCRIPTION	PART NO.	Q`TY	REMARK
1	structure beam	MFA-PI00B020	2	
2	Guide Rod	YE200500	2	
3	Cylinder connector	PT00B040	1	
4	Axle Bearing	MBG2-2012	1	
5	Shock Absorber	MAR2030-5k	1	
6	Tube Fitting, speed	AS2201F-01-04	2	
7	Front Bracket	AI00B050	1	
8	Lifting Bolt	MSW9-1001	1	
9	Rear Bracket	PI00B010	1	
10	Stroke End-Stopper	AI00B070	1	
11	Kick Cylinder Link	AI00C070	1	
12	Cylinder Mounting	PT00B010	1	
13	Kick Cylinder	PCY25-YC250200	1	

Arm Compartment (Single-stage version)



3.4.1.6 Part List for Arm Compartment (Single-stage version)

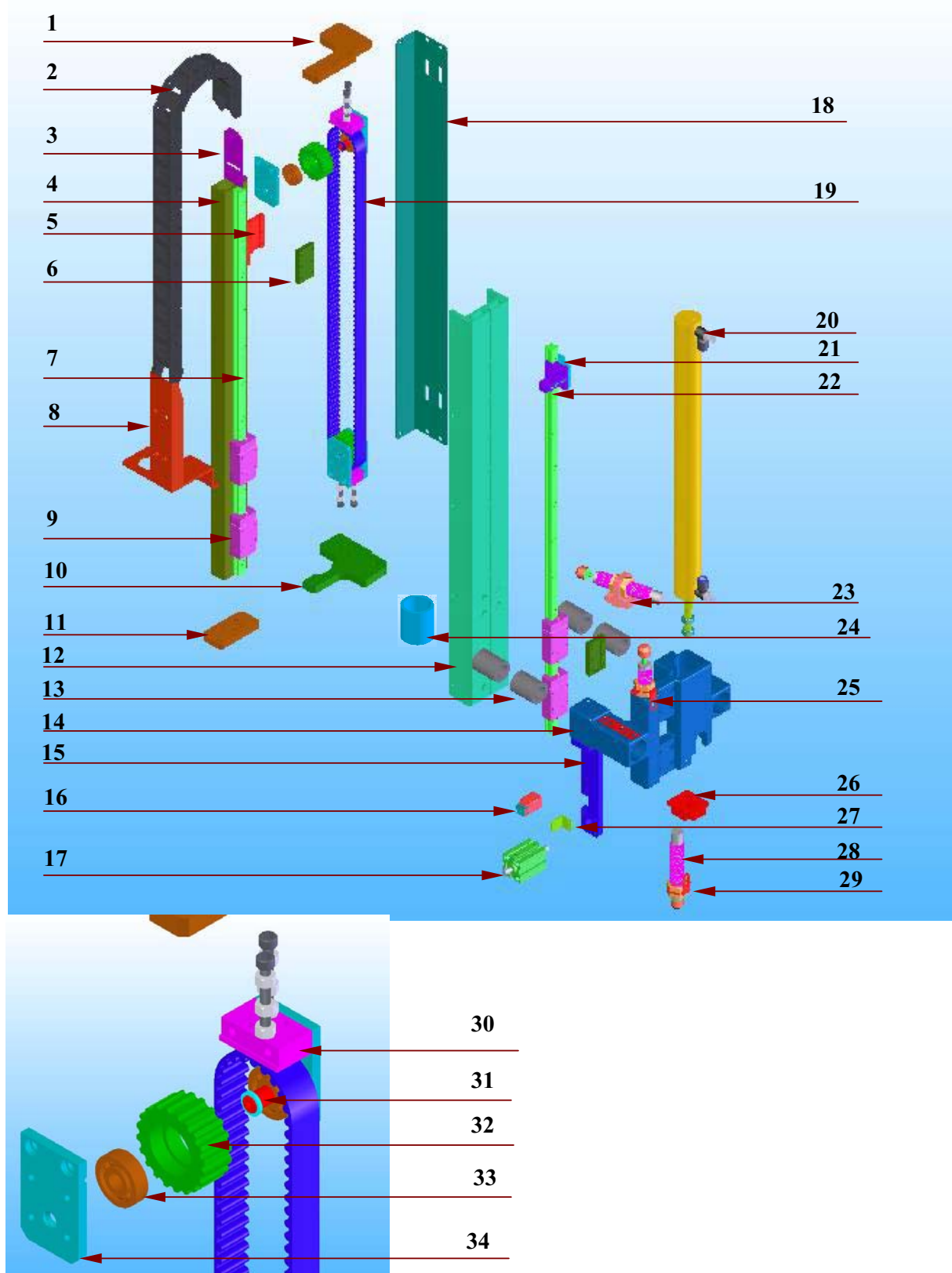
ITEM	DESCRIPTION	PART NO.	Q`TY	REMARK
1	Upper Protective Plate	AI00C120	1	
2	Tube Fitting, speed control	AS2201F-01-08	2	
3	Vertical Cylinder	PCY25-YC250350K	1	P350
	Vertical Cylinder	PCY25-YC250450K	1	P450
	Vertical Cylinder	PCY25-YC250550K	1	P550
	Vertical Cylinder	PCY25-YC250650K	1	P650
4	Stroke stopper Block	AI00C090	1	
5	Stroke End-stopper	AI00C080	1	
6	Cable Holder	MCN2011	1	
7	Cable Holder Bracket,lower	PB03B070	1	P350,P450
	Cable Holder Bracket,lower	PB00B070	1	P550,P650
8	Linear Bearing	MBG4-JB20	4	
9	Slide Rail	MLA15-520	1	P350
	Slide Rail	MLA15-640	1	P450
	Slide Rail	MLA15-760	1	P550
	Slide Rail	MLA15-880	1	P650
10	Sliding Block	MLA15B2	2	
11	Main Bracket	PB00C011	1	
12	Kick Cylinder Linker	AI00C070	1	
13	Shock Absorber	MAR2030-4-5K	1	
14	Cylinder Holder, safety lock	AI00C040	1	
15	Cable Protective Chain	MCN3010	1	P350
	Cable Protective Chain	MCN3010	1	P450
	Cable Protective Chain	MCN3010	1	P550
	Cable Protective Chain	MCN3010	1	P650
16	structure beam	MFA-PC03C020	1	P350
	structure beam	MFA-PC04C020	1	P450
	structure beam	MFA-PI05C020	1	P550



	structure beam	MFA-PI06C020	1	P650
17	Terminal Cover	AI00B050	1	
18	Lower Protective Plate	AI00B030	1	
19	Vertical Cushion Cylinder	PCY20-YC200081	1	
20	Tube Fitting, speed control	AS2201F-01-04	2	
21	Main Cylinder Holder	AI00C030	1	
22	Sensor	RSN1001	1	
23	Sensor Seat	AI00C120	1	
24	Lower Mounting Plate	AI00D050	1	
25	Safety Lock Cylinder	PCY2015	1	



Arm Compartment (Telescopic version)

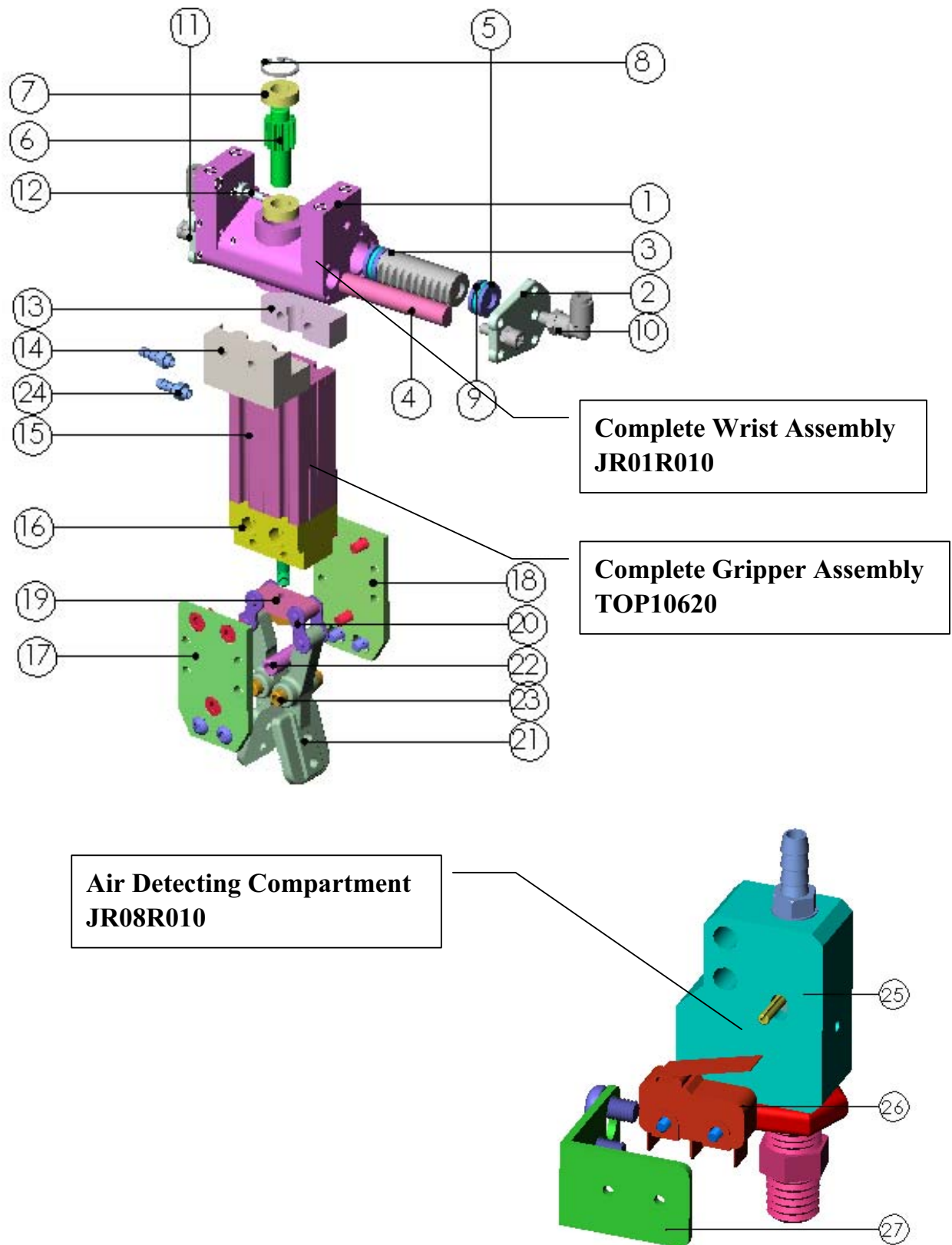


3.4.1.7 Part List for Arm Compartment (Telescopic)

ITEM	DESCRIPTION	PART NO.	Q`TY	REMARK
1	Upper Mounting Plate	AW00C050	1	
2	Cable Protective Chain	MCN3010	18	A550W
		MCN3010	20	A650W
		MCN3010	22	A750W
		MCN3010	24	A850W
3	Upper Protective Plate	AI00C110	1	
4	structure beam II	AW05C030	1	A550W
		AW06C030	1	A650W
		AW07C030	1	A750W
		AW08C030	1	A850W
5	Belt Clamping Plate	AW00C180	1	
6	Belt Clamp	AW00C190	2	
7	Slide Rail	MLA15-520	2	A550W
		MLA15-580	2	A650W
		MLA15-640	2	A750W
		MLA15-720	2	A850W
8	Lower Protective Plate	AW00B070	2	
9	Sliding Block	MLA15B	4	
10	Lower Mounting Plate	AW00C040	1	
11	Swing Cylinder Mounting	PT00C010	1	
12	structure beam I	AW05C020	1	A550W
		AW06C020	1	A650W
		AW07C020	1	A750W
		AW08C020	1	A850W
13	Linear bearing	MBG4-JB20	4	
14	Main Bracket	AW00C010	1	

Item	Description	Part No.	Q'TY	Remark
15	Cylinder Bracket , safety	AW00C150	1	
16	Sensor	RSN1004	1	
17	Safety Lock Cylinder	PCY2005	1	
18	Profile Cover	AW05C040	1	A550W
		AW06C040	1	A650W
		AW07C040	1	A750W
		AW08C040	1	A850W
19	Belt	MBT1-8M20	1.1m	A550W
		MBT1-8M20	1.2m	A650W
		MBT1-8M20	1.3m	A750W
		MBT1-8M20	1.4m	A850W
20	Tube Fitting Speed	AS2201F-01-08	2	
21	Stroke stopper Block	AI00C090	1	
22	Stroke End-stopper	AI00C100	1	
23	Absorber Base	PT00B030	1	
24	Cable Holder	MCN2004	1	
25	Washer	AW00C080	1	
26	Main Cylinder Holder	AW00C060	1	
27	Sensor Seat	AI00C160	1	
28	Shock Absorber	MAR2030-4-5K	3	
29	Washer	AW00C070	1	
30	Belt Wheel Top Mount	AW00C120	2	
31	Belt Wheel Locking Pin	AW00C130	2	
32	pulley	MBTI-YF081501	2	
33	Axle Bearing	MBG1-6002	4	
34	Belt Wheel Side Mount	BW00C080	4	

Gripper Compartment

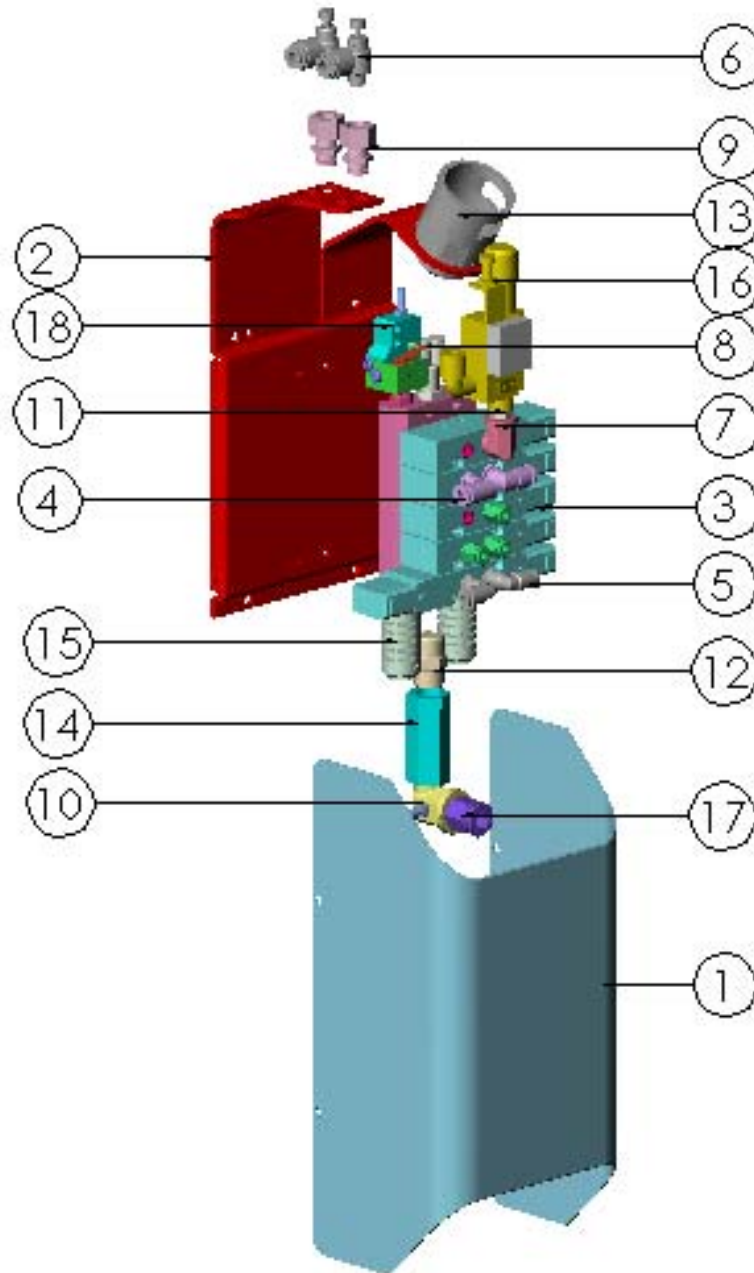


3.4.1.8 Part List for Gripper Compartment

ITEM	DESCRIPTION	PART NO.	Q`TY	REMARK
-	Complete Wrist Assembly	JR01R010	-	
1	Main Wrist Bracket	Not Available	1	
2	Side Cover	Not Available	2	
3	Piston Rack	Not Available	1	
4	Rack	Not Available	1	
5	Piston	Not Available	1	
6	Gear	Not Available	1	
7	Ball Bearing	Not Available	2	
8	Snap Ring	Not Available	1	
9	Packing	Not Available	2	
10	Tube Fitting , quick release	KQL04-M5	2	
11	Screw	Not Available	2	
12	Tube Fitting	TOPM5B4	2	
13	Gripper Mounting Plate 1	CHKA0900	1	
14	Gripper Mounting Plate 2	CHKA0800	1	
-	Complete Gripper Assembly	TOP10620	-	Excl. 24
15	Gripper Cylinder	Not Available	1	
16	Gripper Mounting Block 2	Not Available	1	
17	Gripper Side Plate	Not Available	1	
18	Gripper Side Plate	Not Available	1	
19	Gripper Mounting Block 1	Not Available	1	
20	Gripper Link 2	Not Available	2	
21	Gripper Link 1	Not Available	2	
22	Rivet 2 (10mmL)	Not Available	1	
23	Rivet 1 (26mmL)	Not Available	2	
24	Tube Fitting	TOPM5B4	2	
-	Air Detecting Compartment	JR08R010	-	
25	Air Detecting	Not Available	1	
26	Switch	RSN3008	1	
27	Air Mounting	Not Available	1	



Pneumatic Compartment

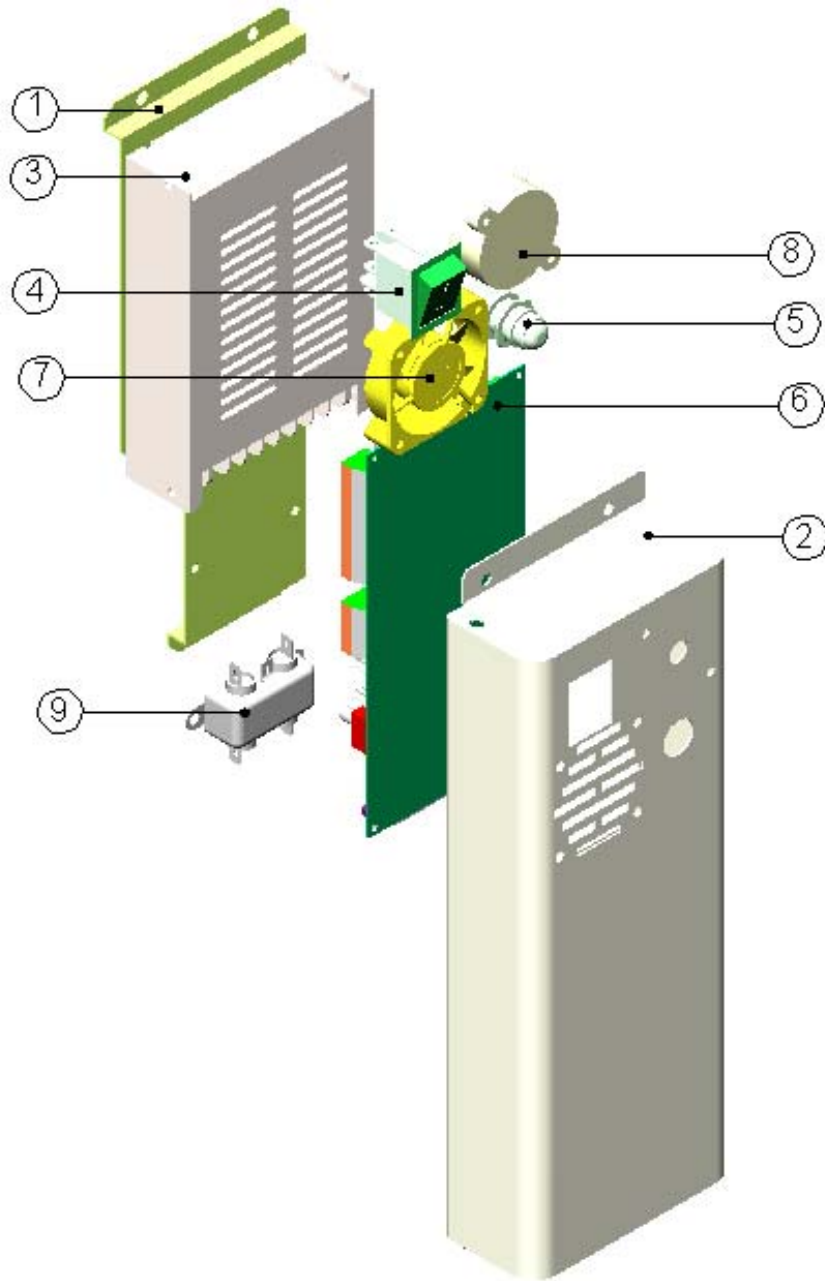


3.4.1.9 Part List for Pneumatic Compartment

ITEM	DESCRIPTION	PART NO.	Q`TY	REMARK
1	Front Cover	PI00H010	1	
2	Mounting Plate	PI00H020	1	
3	Solenoid Valve Asy	PSV-IN4S+1D	1	RCD2413 Double Sol RCS2413 Single Sol
4	Tube Fitting, quick release	KQL08-01S	2	
5	Tube Fitting, quick release	KQL04-01S	2	
6	Tube Fitting, speed control	AS2201F-01-04	2	
7	Copper Elbow	PFL0101	1	
8	Tube Fitting, quick release	KQU04-02S	1	
9	Tube Fitting, quick release	PQE0401	2	
10	Copper Elbow	PFL0202	1	
11	Nipple	PTA0101	1	
12	Nipple	PTA0202	1	
13	Cable Holder	MCN2011	1	
14	Check Valve	PTE0202	1	
15	Silencer	PET3001	2	
16	Vacuum Generator	PET1008	1	For model denotes by 'V' only
17	Tube Fitting, quick release	KQL10-02S	1	
18	Air Detecting	JR08R010	1	



Control Compartment



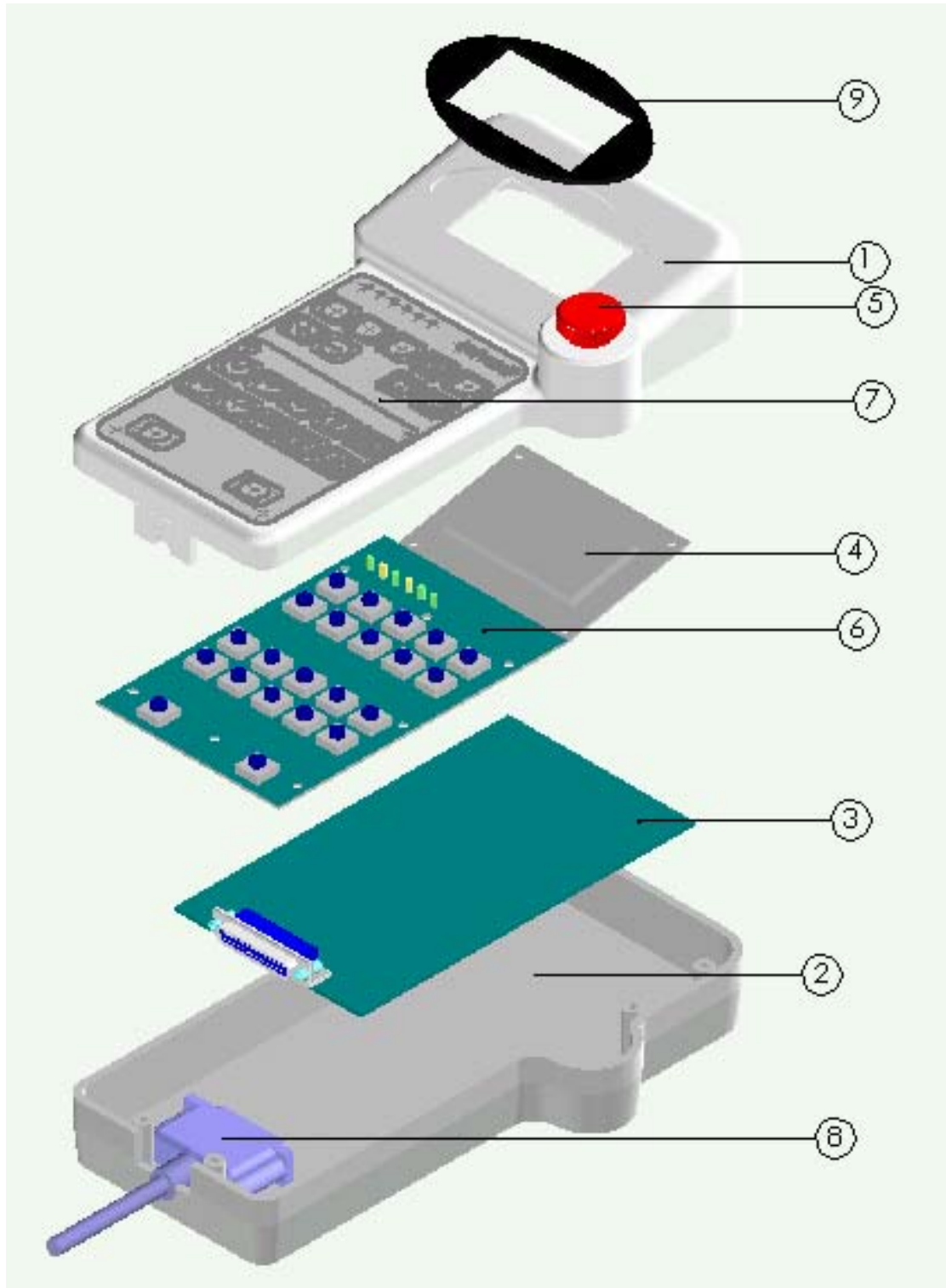
**3.4.1.10 Part List for Control Compartment**

ITEM	DESCRIPTION	PART NO.	Q`TY	REMARK
1	Power Supply Base	PI00H040	1	
2	Control Box	PI00H030	1	
3	Power Supply	RPW2008	1	
4	Rocker Switch	RBT1003	1	
5	Warning Light	RLT1003	1	
6	Relay Board	RBD-GA28-PC2	1	
7	Cooling Fan	REL2008	1	
8	Alarm Buzzer	REL1004	1	
9	Power Filter	RPW2005	1	





Hand-held Pendant



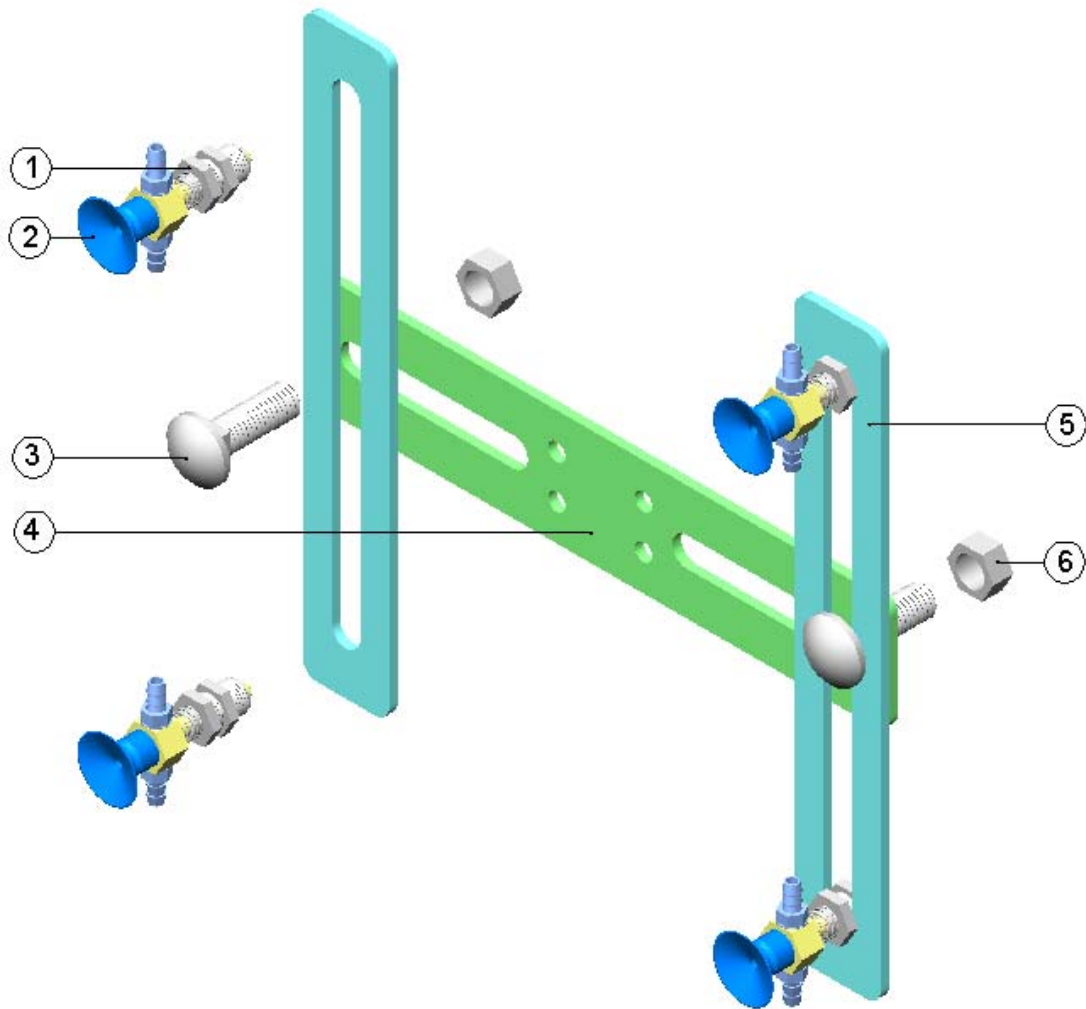
**3.4.1.11 Part List for Hand-held Pendant (RBD1019)**

ITEM	DESCRIPTION	PART NO.	Q`TY	REMARK
1	Panel Case (Upper)	GA28E010	1	
2	Panel Case (Lower)		1	
3	Main Control Board	RBD-GA28-PC3A	1	
4	Panel Screen (LCD)	RBD-GA28-PC4	1	
5	Emergency Stop Button	RSN4004	1	
6	Hand-held Keyboard	RBD-GA28-PC1	1	
7	Film of Keyboard	RBT2-GA28E051	1	
8	Keyboard Cable	RCB1001	1	
9	LCD Cover	GA28E030	1	





Standard Headwork (End-Of-Arm-Tooling)



**3.4.1.12 Part List for Standard Headwork (complete Assembly : JA05-200A1)**

ITEM	DESCRIPTION	PART NO.	Q`TY	REMARK
1	Spring plunger	TOP31060T	4	
2	Suction Pad	TOP33010	4	Changeable
3	Screw	TOP24408	2	
4	Mount Board	TOP30620	1	
5	Mount Board	TOP30200	2	
6	Lock Nut	Included w/ TOP24408	2	

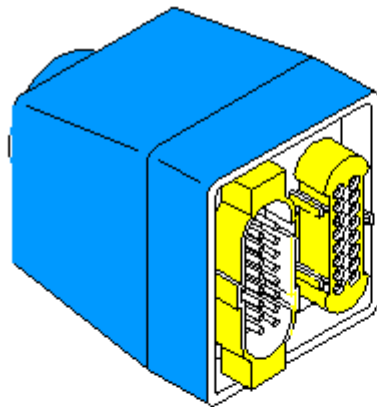
Remark: This headwork assembly is supplied for model denotes by 'V' only.



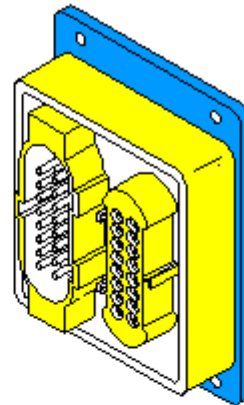
4. SETTING AND ADJUSTMENT BEFORE OPERATING

4.1 Connection with Injection Moulding Machine

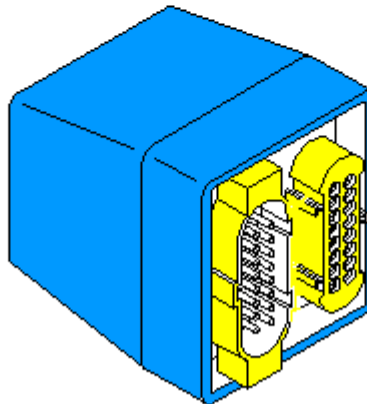
Before putting robot into operation, it must be linked with I.M.M. by connecting the Euromap/PSI-standard Interface Connector.



Robot Side Connector



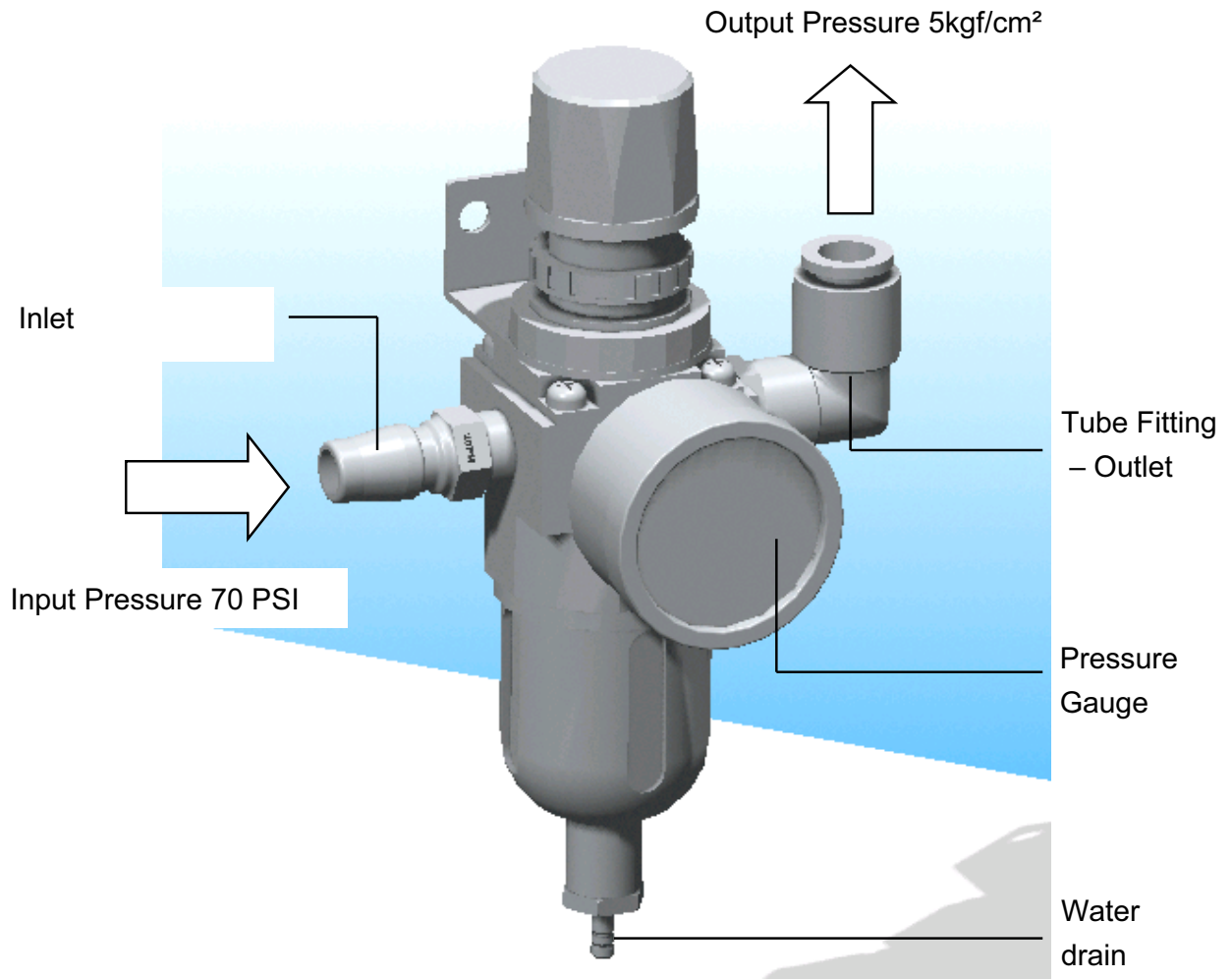
I.M.M Side Connector



Dummy Plug

IMPORTANT: When robot is NOT IN USE, power switch MUST be turned OFF.

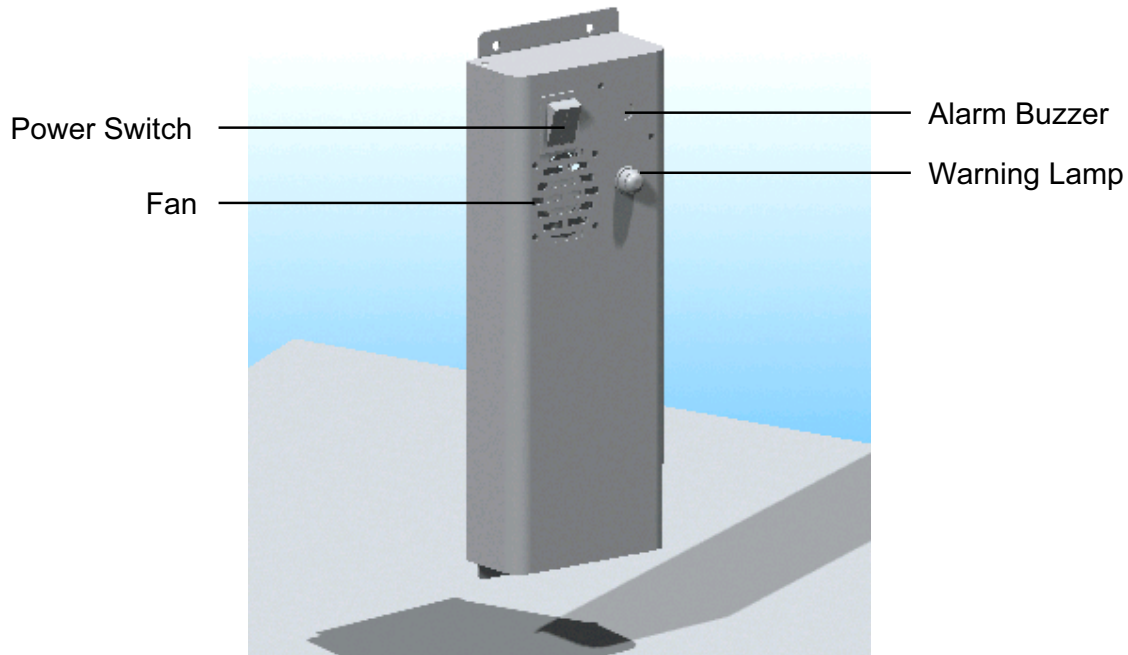
4.2 Pneumatic Supply



IMPORTANT:

- (1) After connecting with the pneumatic supply source, **adjust working pressure to 5kgf/cm² by adjusting the pressure regulator.**
- (2) **Pay attention to check water level in reservoir daily and drain water as required to avoid overflow.**
- (3) To carry out pressure adjustment pull out the knob slightly, turn clockwise for higher pressure or turn counter-clockwise for lower pressure.

4.3 Turning ON Electrical Power Source



PROCEDURES:

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



NOTE PLEASE MAKE SURE THE CABLE FROM THE HAND-HELD PENDANT TO THE CONTROL BOX IS FIRMLY ATTACHED BEFORE TURNING "ON" POWER SWITCH.

- (2) After turning ON power switch, screen on the hand-held pendant will display:

ALFA ROBOT
Phoenix Series
GA28 Control

- (3) If there is no display on the screen after turning ON power, it is may be a blown control fuse. Please check the fuses and replaces it if necessary.

4.4 Adjustment for Mold Change



**SAFETY ITEMS
MUST BE
FULLY
OBSERVED**

AFTER COMPLETION OF A MOLD CHANGE YOU MAY WISH TO ADJUST THE ROBOT, THE FOLLOWING SAFETY RULES MUST BE FULLY OBSERVED.

- (1) Do not adjust the robot unless you are a fully trained person.
- (2) Switch the I.M.M. to Manual mode and move the platen to full open position, and then turn power of the I.M.M. to OFF.
- (3) Turn power OFF to the robot and disconnect pneumatic supply source to the robot.

Important: Unless above actions are complete, do not adjust the robot.

4.4.1 Adjustment of Kick Stroke

Kick Cylinder
Mounting
Plate

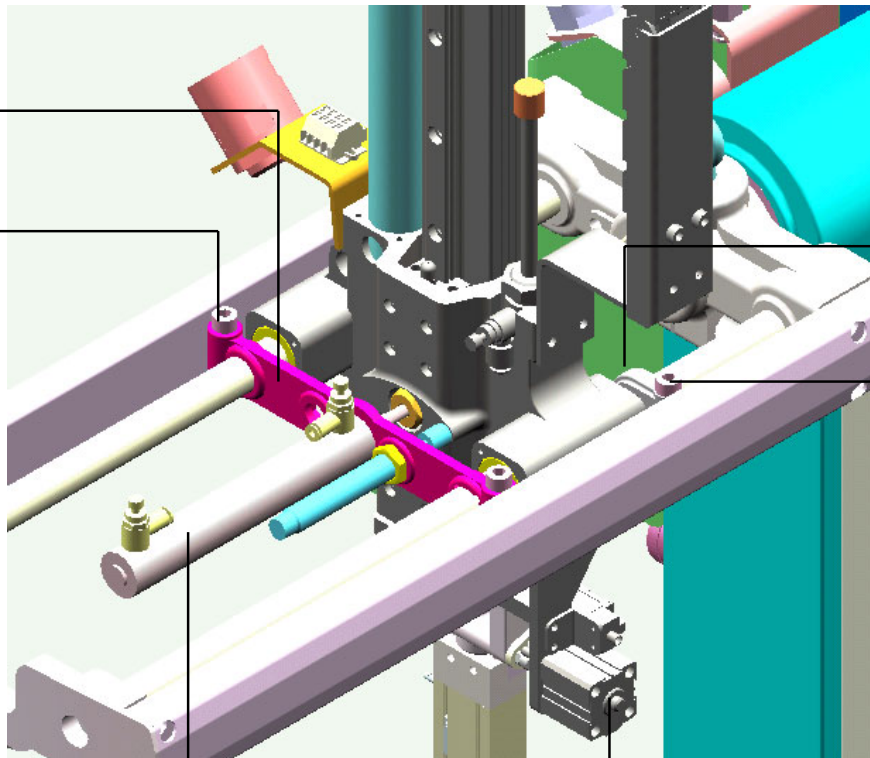
Lock Screw

Kick Stroke
End Stopper

Lock Screw

Kick Cylinder

Safety Lock Cylinder

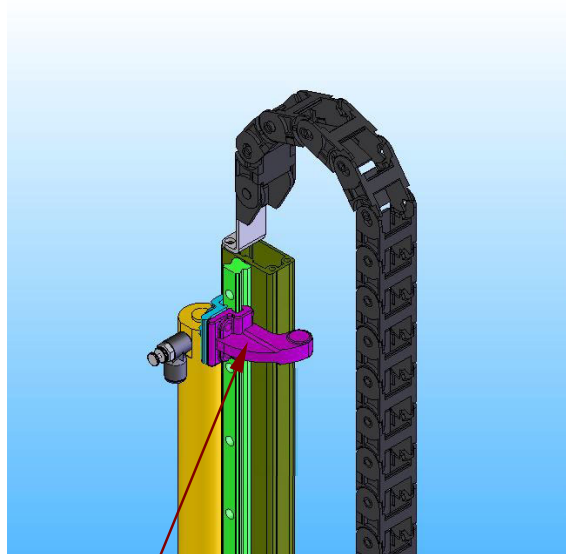




PROCEDURES:

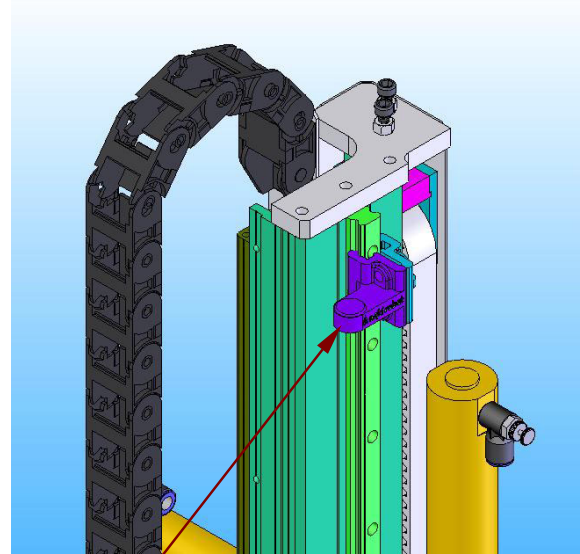
- (1) Loosen lock screws on both the kick cylinder mounting plate and kick stroke end stop.
- (2) Moves arm horizontally to a safe position between mold halves, and pull out safety lock cylinder and allow the arm to descend between the mold halves.
- (3) Push arm forward to the correct position for product/ sprue removal, be careful not to damage mold. Lock tightly lock screw on the kick cylinder mounting plate. Be sure to allow for ejector motion and other factors for consistent take out.
- (4) Pushes arm toward the injection nozzle to a position that is clear for removal and does not interfere with mold. Lock kick stroke end stop in place. Test by pushing against stop. (shock absorber should be fully compressed)

4.4.2 Adjustment of Vertical Strokes



Single Stage Arm

Vertical Stroke Stopper



Telescopic Type Arm

Vertical Stroke Stopper

PROCEDURES:

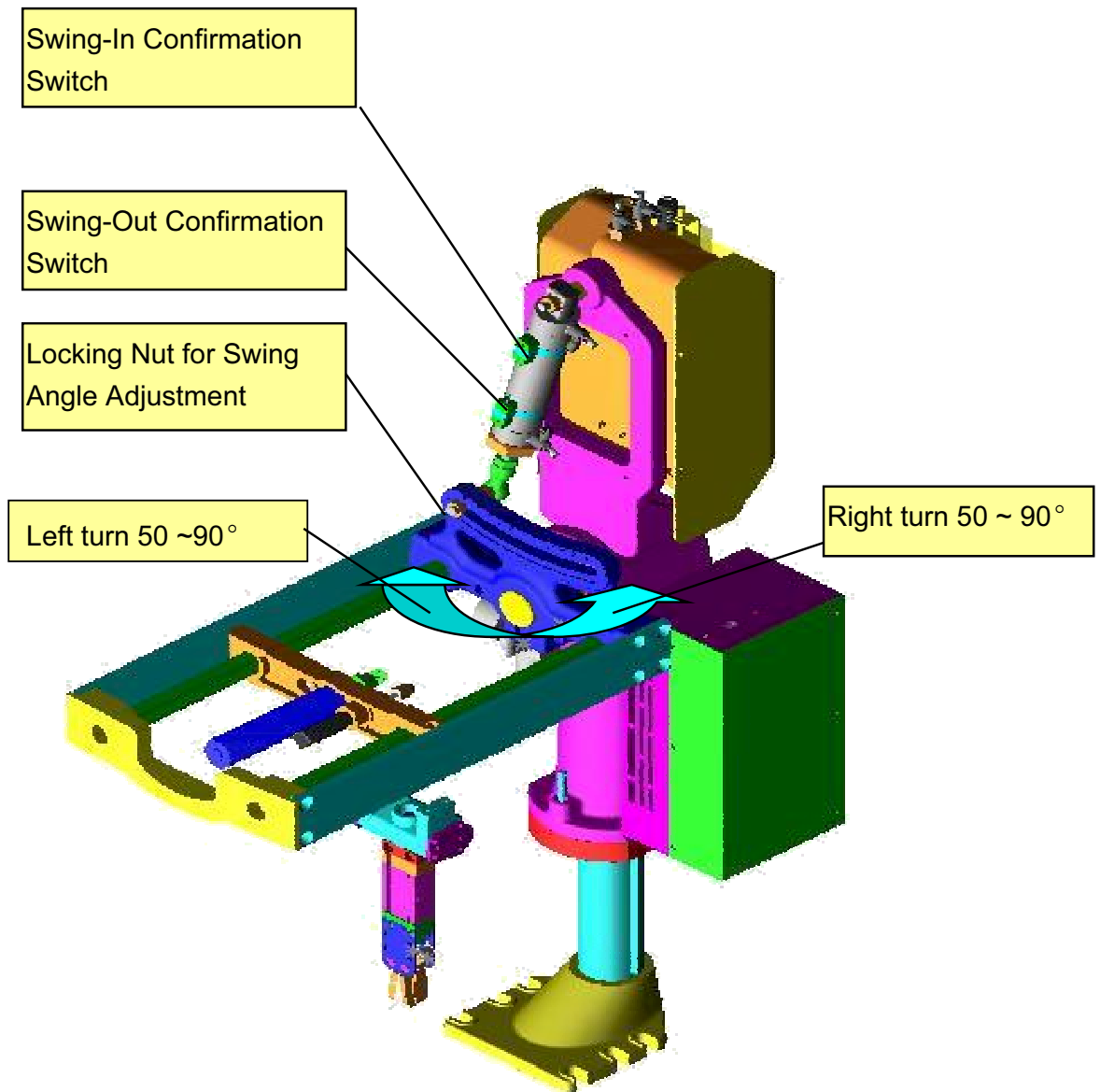
- (1) Loosen set screws on the vertical stroke end stop.
- (2) Move the vertical stroke stop to the proper position to allow the robot to grip sprue/runner or to remove the molded part(s).
- (3) Lock tightly set screws, and then move the arm up and return the safety lock cylinder to the locked position.





4.4.3 Adjustment of Swing Angle

P350~P450

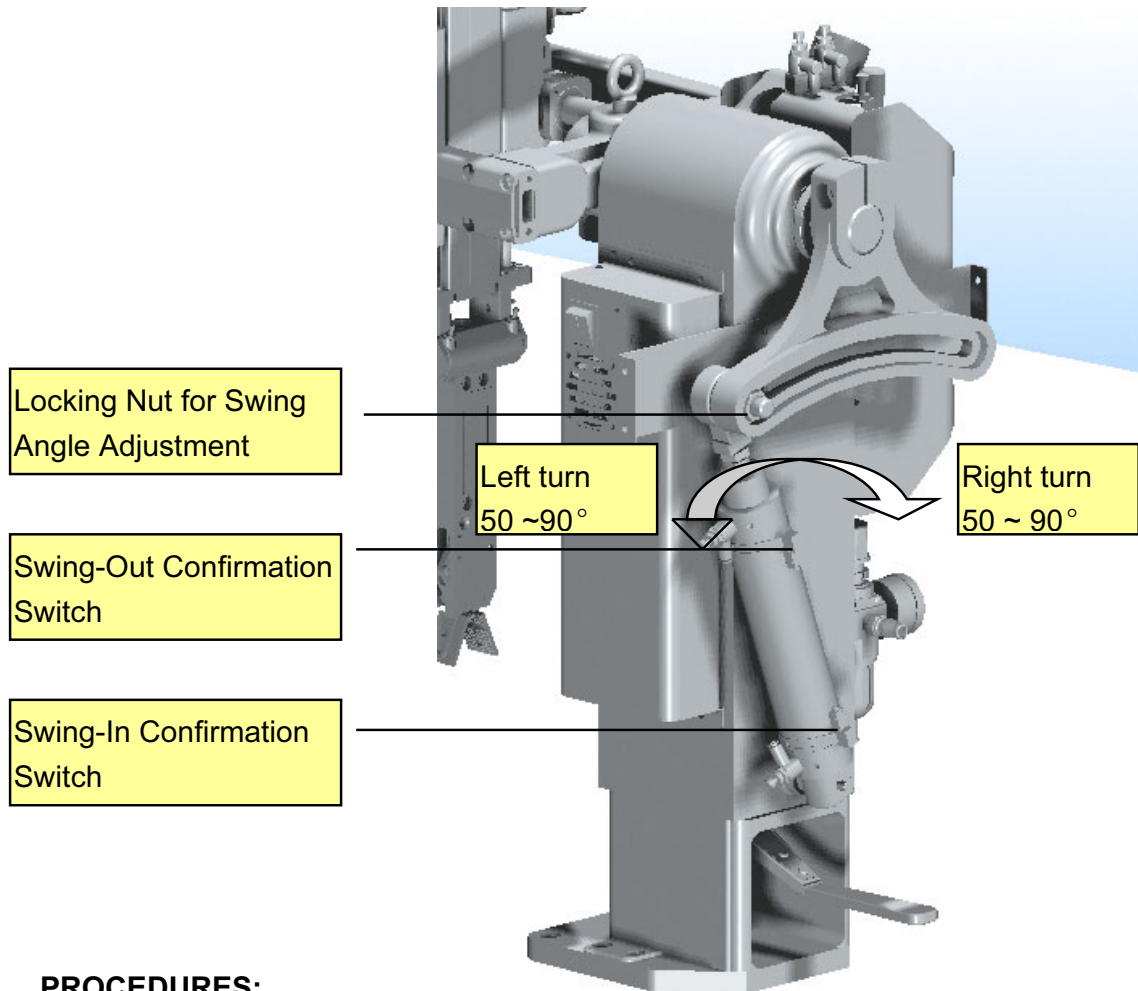


PROCEDURES:

1. Loosen locking nut for the swing angle adjustment.
2. Swing arm manually to the desired swing direction (operator side, or non-operator side) and angle, and also adjust locking nut for the swing angle adjustment. Adjust the safety lock cylinder, and then pull arm down to the fully extended position to see if there is any interference; if not, tighten locking nut of the swing angle adjustment.



P550~P950

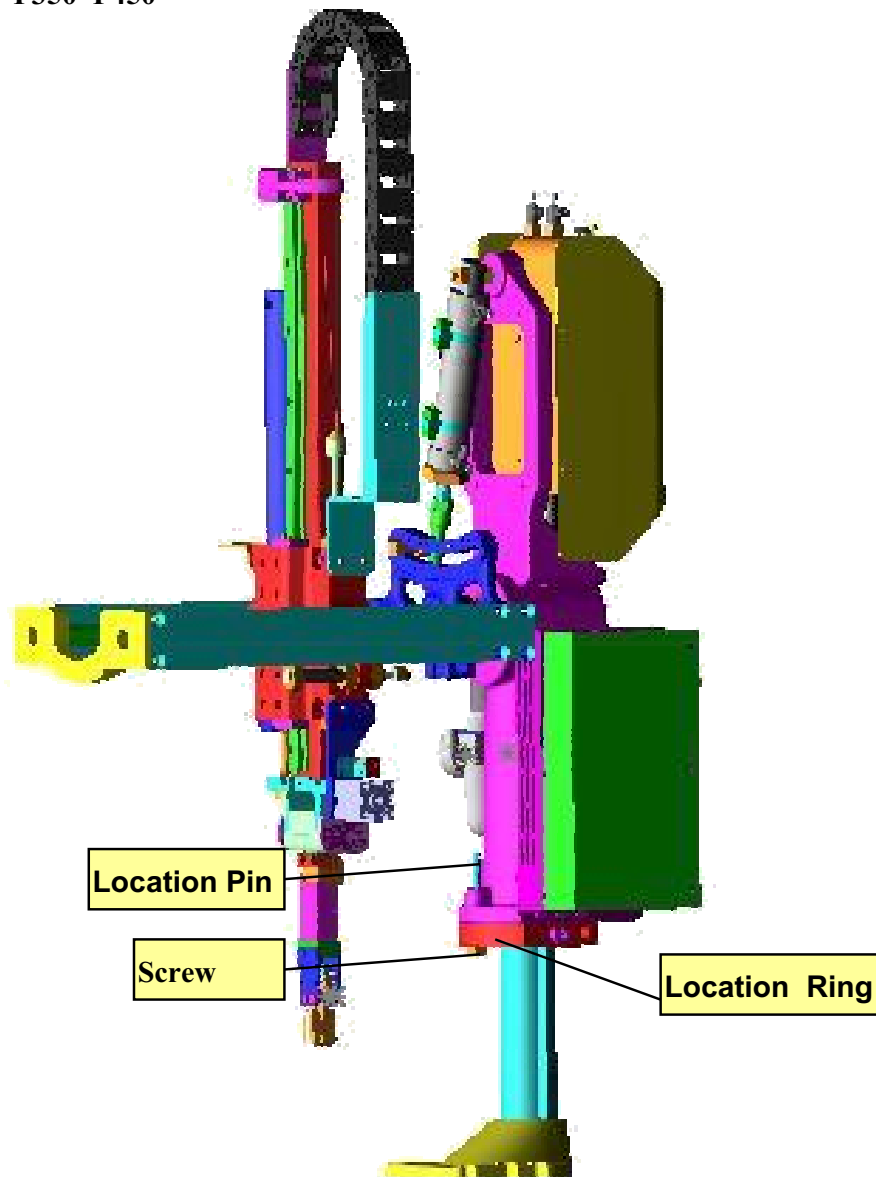


PROCEDURES:

- (1) Loosen locking nut for the swing angle adjustment.
- (2) Swing arm manually to the desired swing direction (operator side, or non-operator side) and angle, and also adjust locking nut for the swing angle adjustment.
- (3) Pull out the safety lock cylinder, and then pull arm down to the fully extended position to see if there is any interference; if not, tighten locking nut of the swing angle adjustment.

Arm Pivoting for Mold Change

P350~P450

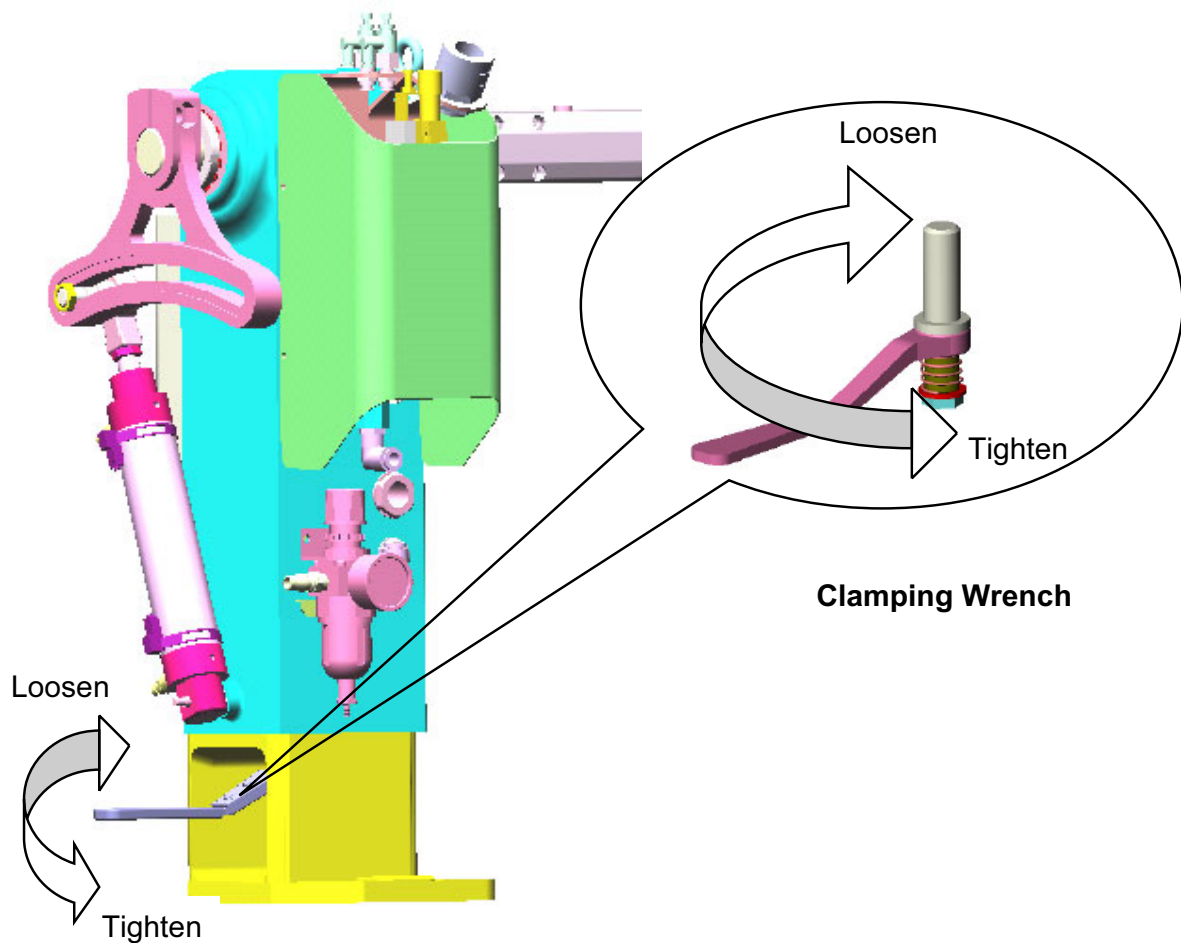


PROCEDURES:

1. Loosen the screw on **location ring**
2. Pull Location Pin and swing round the arm, then change the Mold.
3. Reset the arm and location pin.
4. Tighten the screw.
5. Adjust strokes according to procedures as stipulated in above paragraphs 4.4.1, 4.4.2 and 4.4.3.



P550~P950



PROCEDURES:

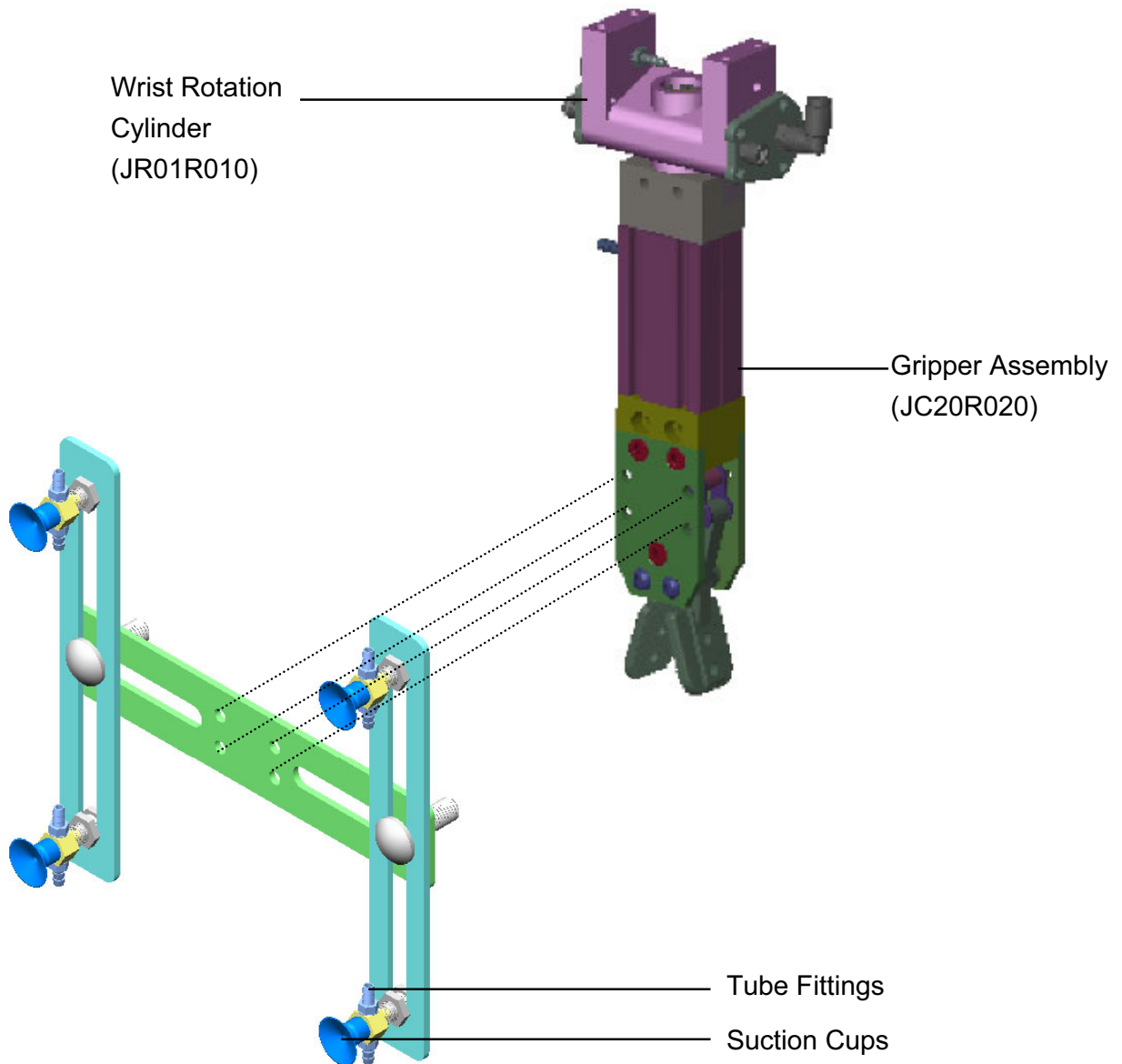
- (1) Position the clamping wrench to allow for loosening the clamp pivot.
- (2) Loosen the pivot clamp and lift up the locking pin from the base so that the arm can be pivoted out to facilitate mold change..
- (3) After completion of mold change pivot the arm back into position and push the locking pin into the base.
- (4) Turn the clamping wrench to tighten the pivot clamp.
- (5) Adjust strokes according to procedures as stipulated in above paragraphs 4.4.1, 4.4.2 and 4.4.3.



NOTE: DURING MOLD CHANGING, PLEASE BE CAREFUL NOT TO COLLIDE WITH THE ROBOT.



4.5 Installation and Adjustment of Headwork (EOAT)



Headwork (EOAT)

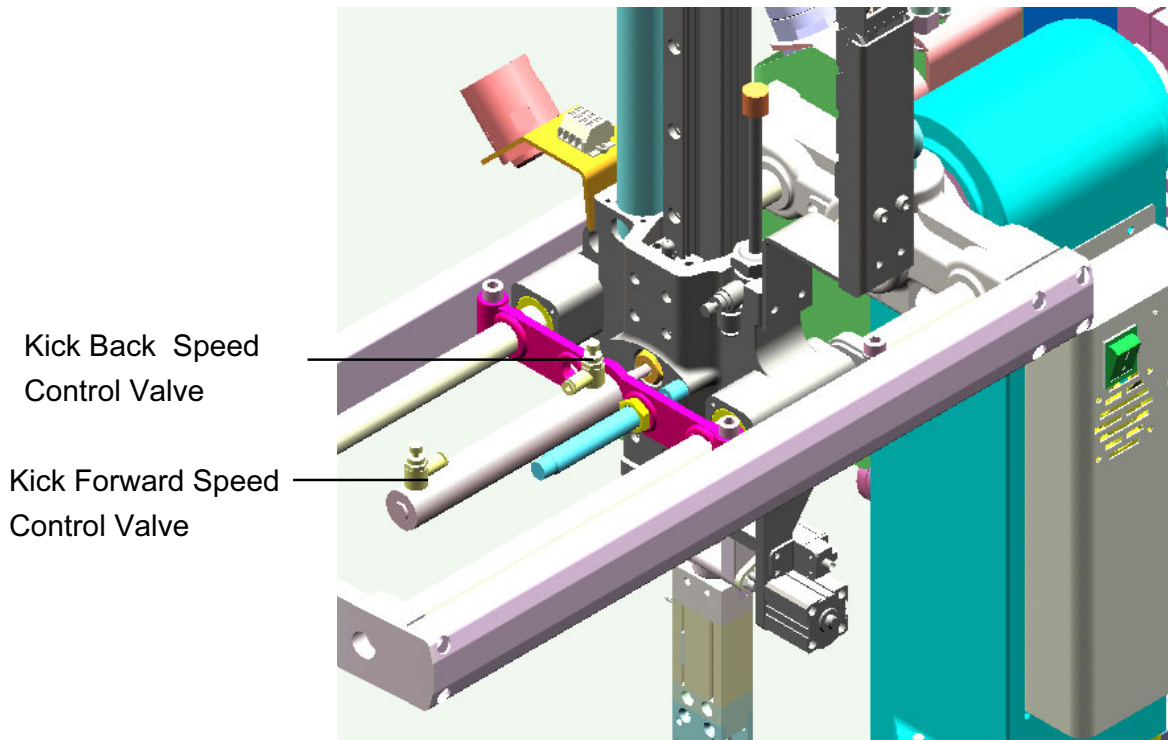
PROCEDURES:

- (1) Standard headwork (EOAT) shall be assembled as per the above diagram and then installed on the gripper assembly.
- (2) Use the "RED" tubing to supply Vacuum to the EOAT.



4.6 Adjustment of Moving Speeds

4.6.1 Speed Adjustment for Kick Forward and Back

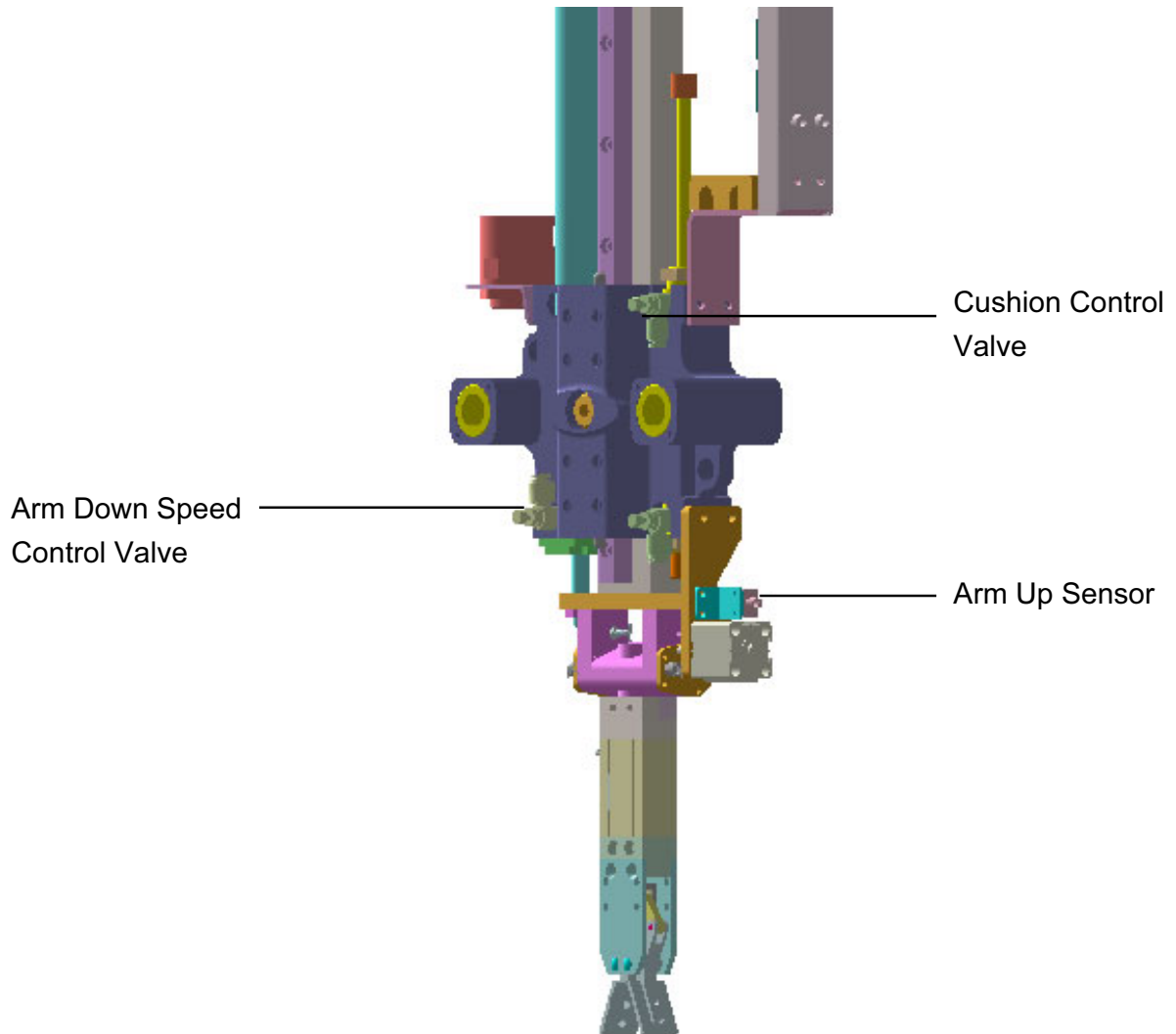


PROCEDURES:

- (1) Turns the kick forward speed control valve for the adjustment of kick forward moving speed.
- (2) Turns the kick back speed control valve for the adjustment of kick back moving speed.
- (3) Turns clockwise for reducing speed, and turns counter-clockwise for increasing speed.
- (4) After proper adjustment is made, lock with locking nuts.



4.6.2 Speed and Cushion Adjustment for Arm Down



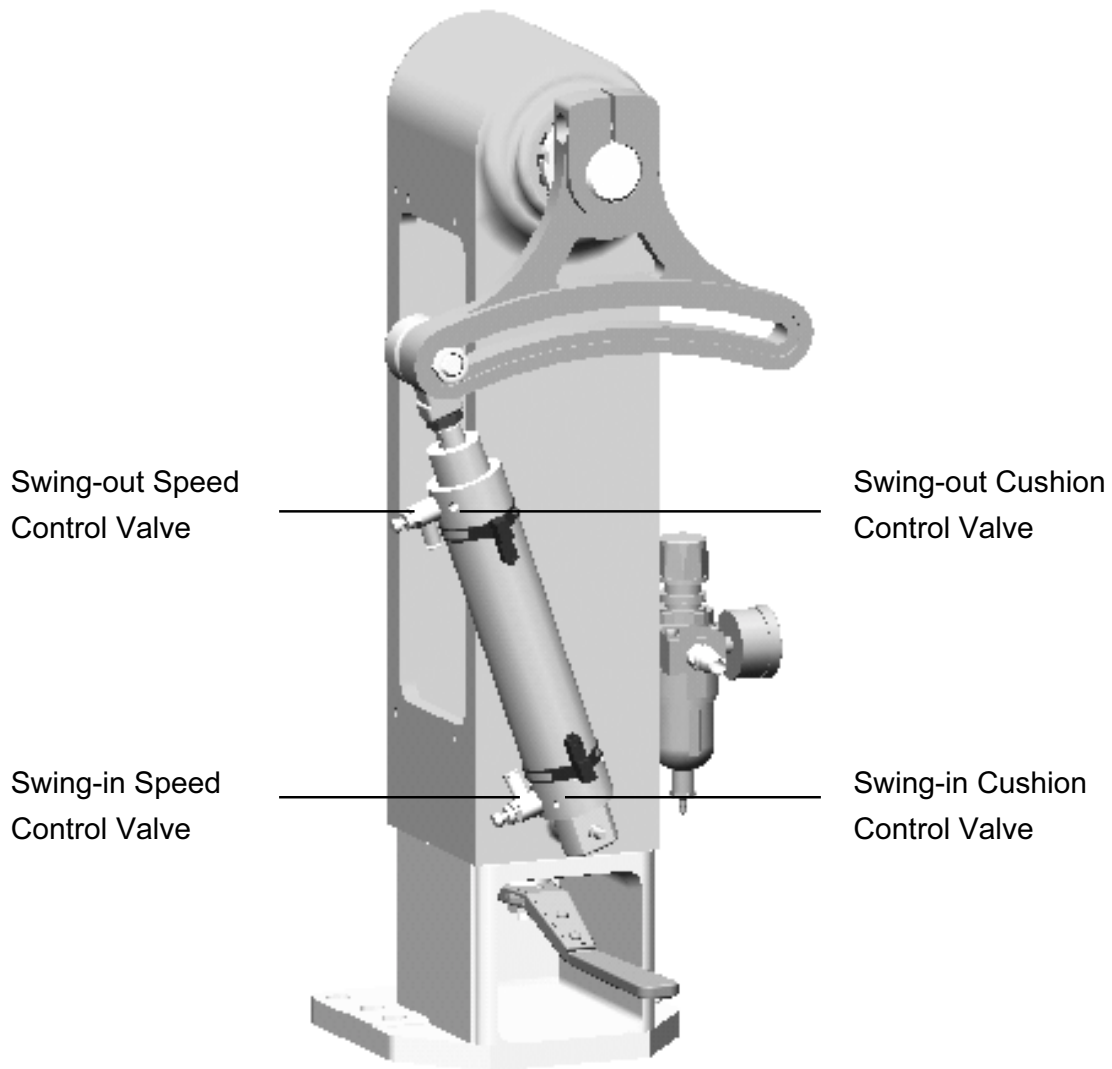
PROCEDURES:

- (1) Turn the arm down speed control valve for the adjustment of arm down speed.
- (2) Before moving arm down make sure that the arm up sensor is activated. Adjust distance between the arm up sensor and the sensing piece to make it ON.
- (3) Turns the cushion control valve for the adjustment of arm down cushion control.
- (4) Turns clockwise for reducing speed, and turn counter-clock-wise for increasing speed.
- (5) After proper adjustment is made, lock with the locking nuts.





4.6.3 Speed & Cushion Adjustment for Swing-in and Swing-out



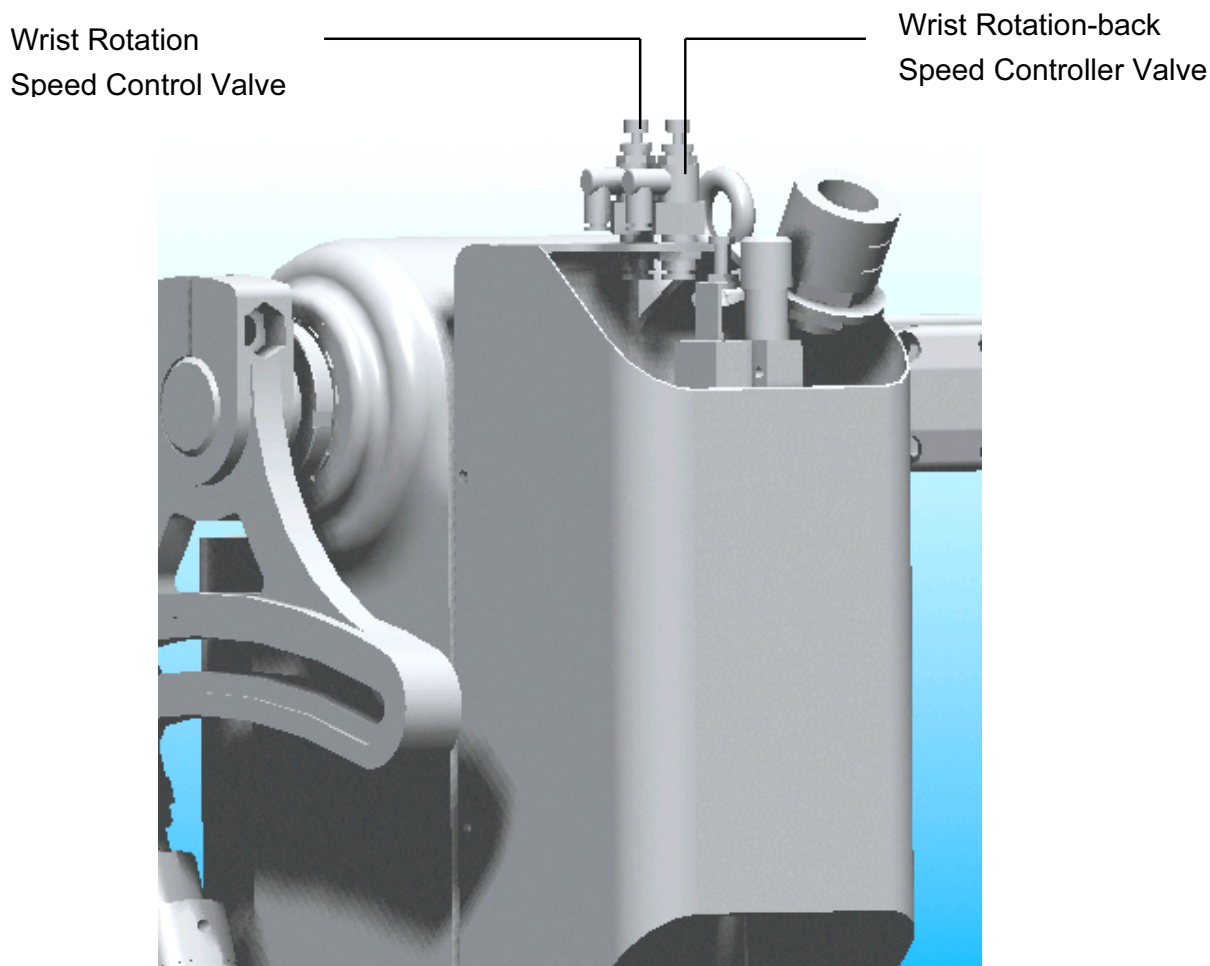
PROCEDURES:

- (1) Turn the swing-out speed control valve for the adjustment of swing-out speed.
- (2) Turn the swing-out cushion control valve for the swing-out cushion control.
- (3) Turn the swing-in speed control valve for the adjustment of swing-in speed.
- (4) Turn the swing-in cushion control valve for the swing-in cushion control.
- (5) Turn clockwise for reducing speed, and turn counter-clockwise for increasing speed.
- (6) After proper adjustment is made, lock with the locking nuts.





4.6.4 Speed Adjustment for Wrist Rotation



PROCEDURES:

- (1) Turn the wrist rotation speed control valve for the adjustment of wrist rotation speed.
- (2) Turn the wrist rotation-back speed control valve for the adjustment of wrist rotation-back speed.
- (3) Turns clockwise for reducing speed, turn counter-clockwise for increasing speed.
- (4) After proper adjustment is made, lock with the locking nuts.



5. MAINTENANCE

5.1 Maintenance and Repair Safety

NOTE *MAINTENANCE PERSONNEL, PLEASE READ THE FOLLOWING SAFETY REQUIREMENTS BEFORE PERFORMING ANY MAINTENANCE.*

1. Turn the power switch of the ROBOT to **OFF** and **lock** the switch before performing maintenance to the I.M.M.
2. Disconnect pneumatic supply source, and **Bleed Out** residual compressed air inside the pneumatic circuits of the ROBOT before performing maintenance to the ROBOT. Bleed system by removing air lines at wrist speed control valves. (see 4.6.4 for picture)
3. Proximity switches, sensors, and faulty solenoid valves can be repaired by the user, other items should only be repaired by a fully trained technician.
4. Do not make any changes or modifications to the ROBOT.
5. During adjustment of the ROBOT or mold change, be careful to avoid injury.
6. After completion of adjustment or maintenance of the ROBOT, please clear danger zones before re-starting.
7. During maintenance, do not turn **ON** the power supply source, or re-connect pneumatic supply source to the ROBOT.
8. Make sure all safety guards are in place prior to restarting ROBOT.

5.2 Maintenance Schedule

Please carry out the following necessary inspections, maintenance and replacement as required below :

Item	Area of Inspections	Frequency
1	Check to make sure functions of the gripper and vacuum suction headwork (EOAT) are normal.	Daily
2	Drain water from the air filter/regulator assembly.	Daily
3	Tighten connecting screws on the vacuum suction headwork (EOAT)	Daily
4	Drain water from the air compressor	Daily
5	Check the connections between ROBOT and I.M.M., and between hand-held pendant and control box.	Daily
6	Check for any loose parts on the ROBOT.	Daily
7	Re-lubricate bearings on the kick stroke axis.	Weekly
8	Clean and restore the appearance of the ROBOT.	Weekly
9	Re-lubricate slide rail(s) and sliding blocks on the vertical axis	Monthly
10	Check the pneumatic hose lines and the speed control valves for damage and leaks.	Monthly
11	Check function of the vacuum generator.	Monthly
12	Check that the mounting bolts between the base and machine platen are secure.	Monthly
13	Check function of the shock absorbers	Monthly
14	Replace the pneumatic hoses, electrical wires and cables entirely	3 year

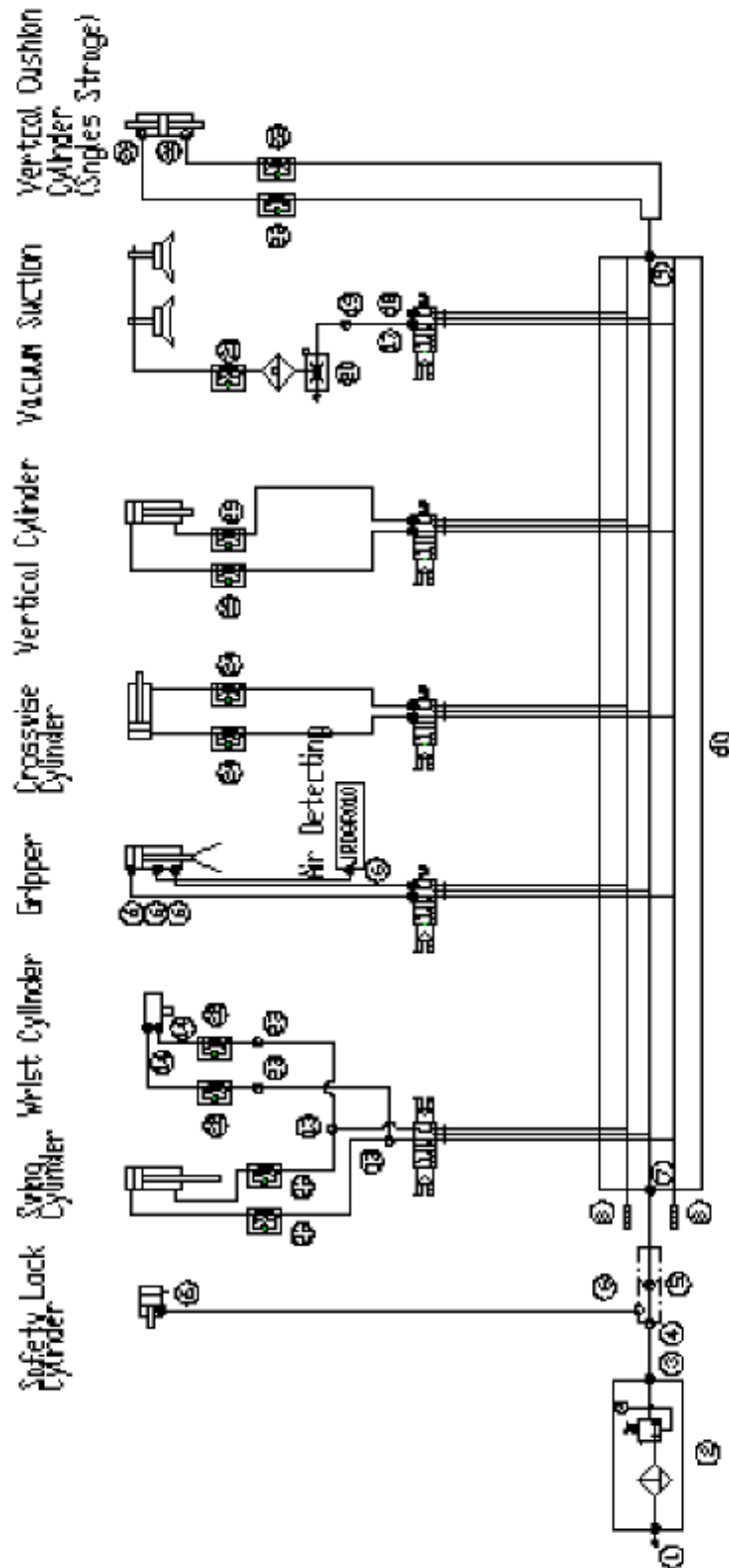
5.3 Basic Maintenance Tools

1. Allen Wrenchs 2.5 to 8mm
2. Adjustable Wrench 8 to 14mm
3. Screwdrivers
4. Pliers
5. Multi-Meter
6. Air Gun
7. Grease Gun

5.4 Lubrication

- 5.4.1 Regular lubrication of the **linear slide rails, linear bearings, and roller bearings** is absolutely necessary.
- 5.4.2 Frequency of Lubrication: Re-lubrication should be made about every 50,000 cycles or every month.
- 5.4.3 Type of Grease: Yellow grease or soap lubricant oil No. 2 series:
 - 1/ ISEVG32-68..... Transparent smooth lubricating oil.
 - 2/ ALVANIA GREASE NO.2 (SHELL Brand).
 - 3/ ALVANIA EP\2 (SHELL Brand).
- 5.4.4 Location of Lubrication:
 - 1/ Vertical slide rails and sliding blocks.
 - 2/ Crosswise guide rod and linear bearings.
- 5.4.5 Method of Lubrication
 - (1) Sliding blocks Squeeze grease into the sliding blocks for lubrication.
 - (2) Slide Rails and Bearings Apply grease on the surfaces by brushing.
- 5.4.6 Lubrication-free air cylinders are utilized on this ROBOT, therefore no lubrication is necessary for the air cylinders.

5.5 Pneumatic Circuit Diagram

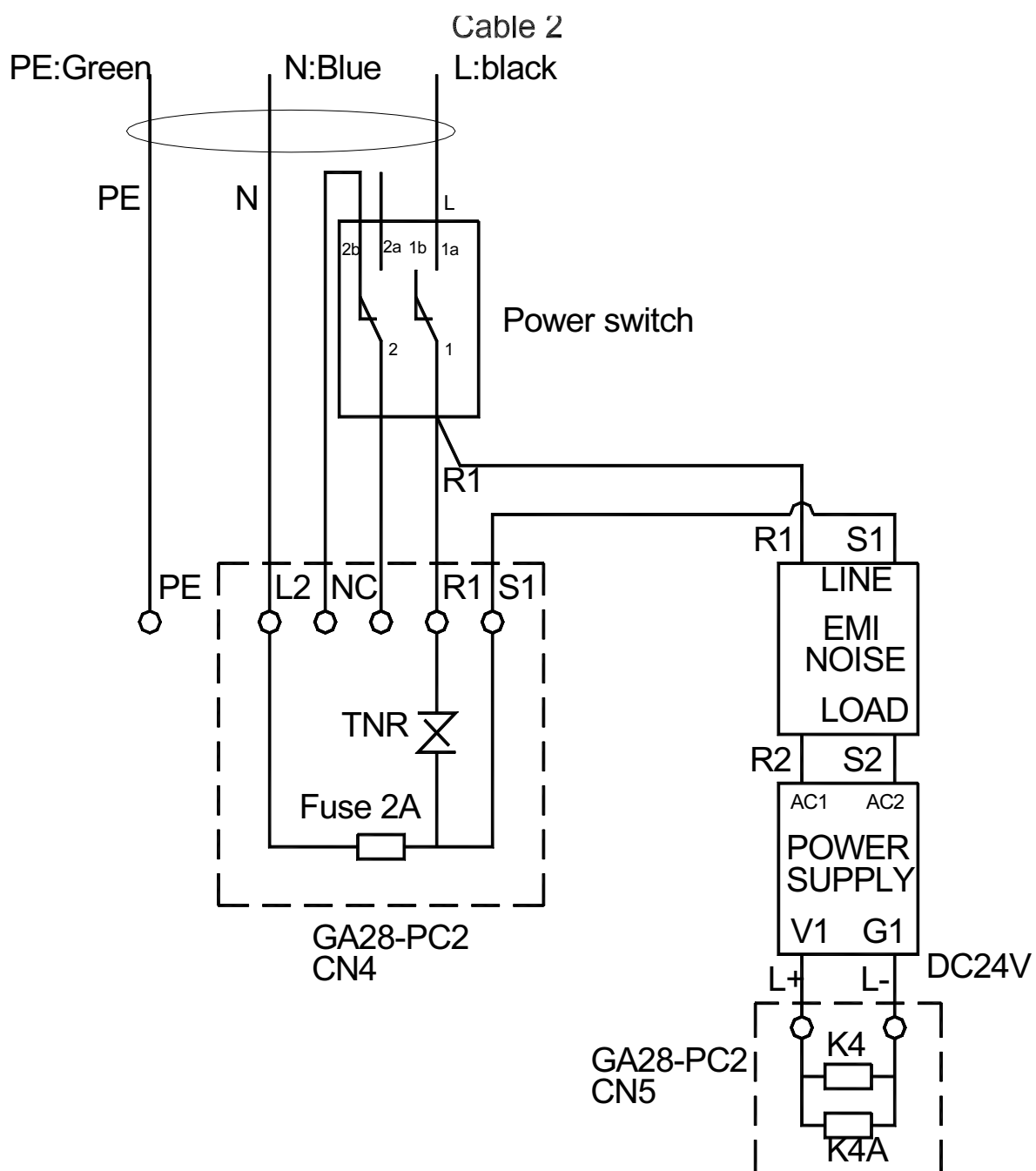


5.5.1 Pneumatic Part List

NO.	DESCRIPTION	PART NO.	Q'TY	REMARK
1	Quick Coupler	PFL0200	1	
2	Filter/ Regulator	PET1020	1	
3	Instant Fitting	KQL10-02S	1	
4	Instant Fitting	KQH10-02S	1	
5	Check Valve	PET0202	1	
6	Insert Core	PTF0002	5	
7	Nipple	PTA0202	1	
8	Muffler/Silencer	PET2024	2	
9	Instant Fitting	KQU04-02S	1	
11	Solenoid Valve	PSV1-N54S+1D	1SET	
13	Instant Fitting	KQL04-01S	2	
14	Instant Fitting	KQH04-01S	2	
15	Instant Fitting	KQH04-01S	2	
16	Instant Fitting	KQL10-01S	2	
17	Brass Elbow	PFL0101	1	
18	Screw Plug	MSW3-PT(1/8)	1	
19	Nipple	PTA0101	1	
20	Vacuum Generator	PET1008	1	
21	Brass Elbow	PFL0601	1	
22	Speed Control Valve	AS2201F-01-04	6	
23	Brass Elbow	PQE0401	2	
24	Speed Control Valve	AS2201F-01-04	2	
25	Speed Control Valve	AS2201F-01-08	2	
26	Brass Elbow	PTB0101	2	

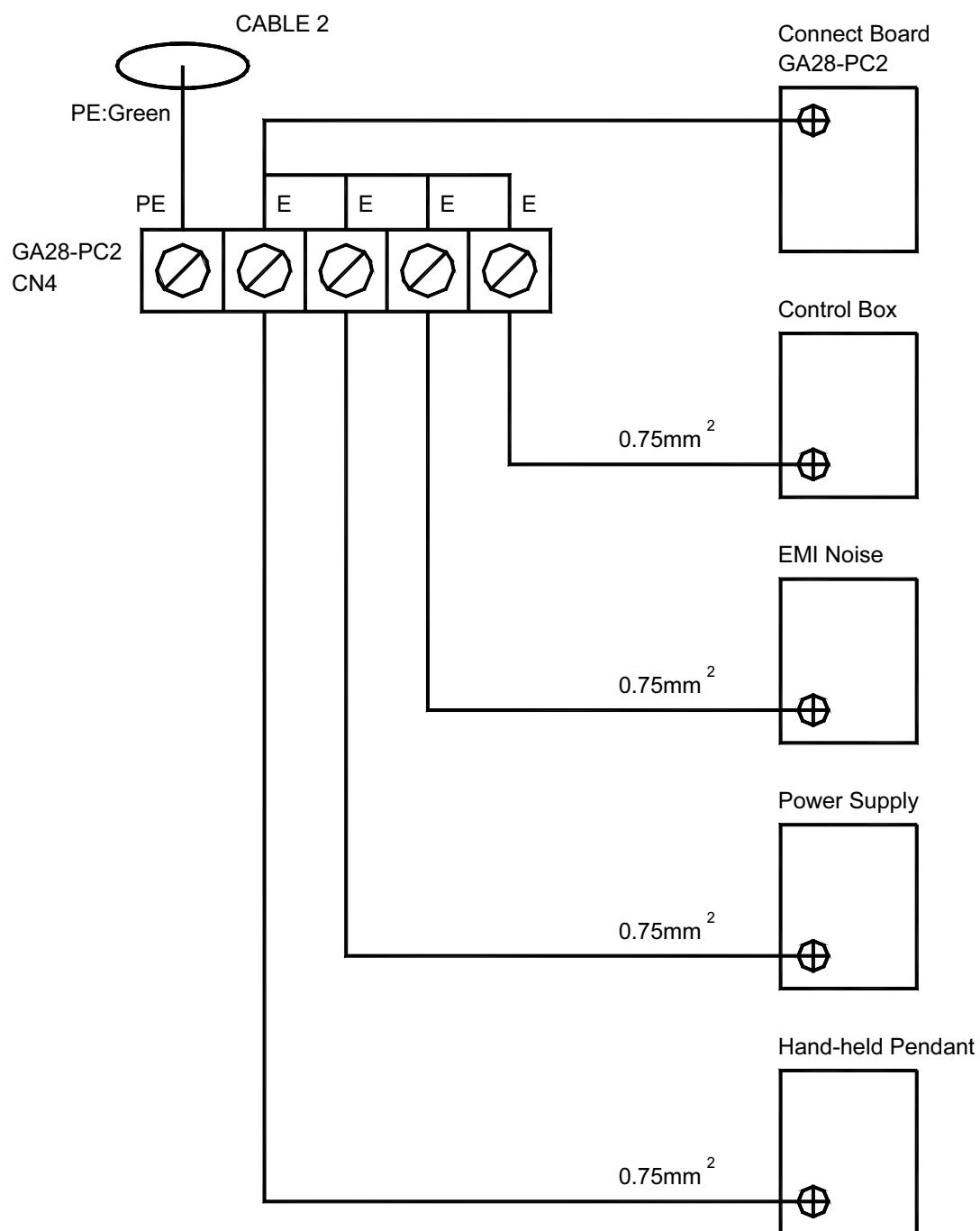
6. ELECTRICAL SYSTEM

6.1 Power System Circuit Diagram

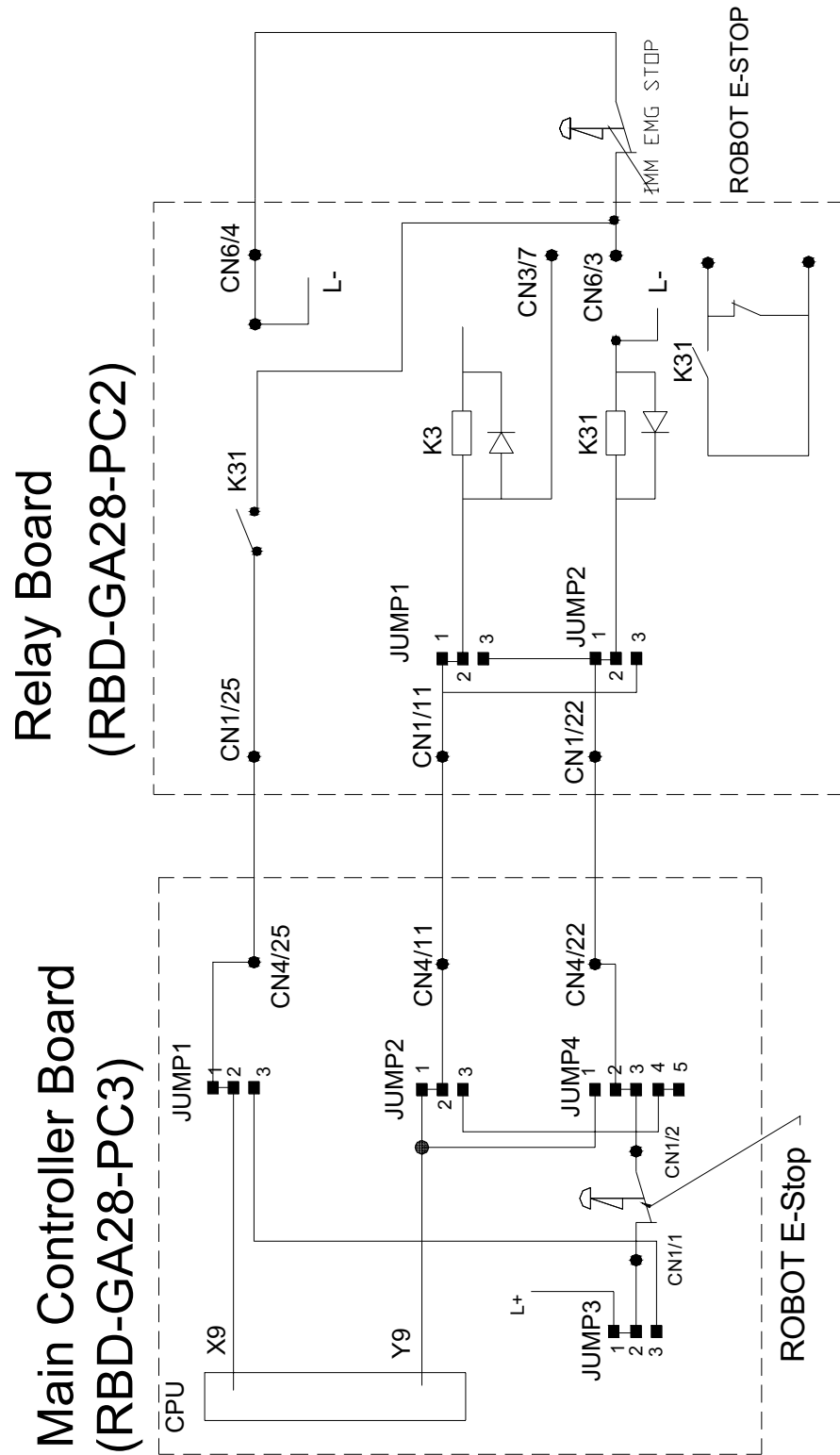




6.2 Safety Ground Circuit Diagram



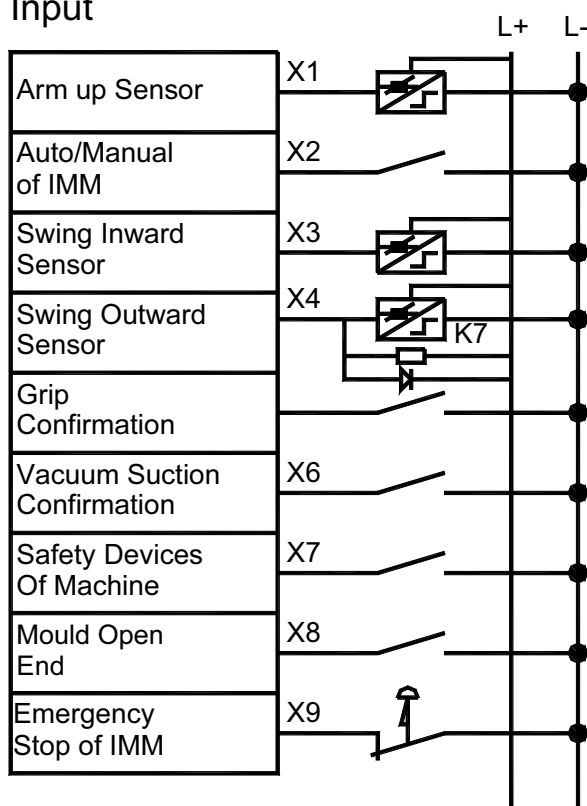
6.3 Emergency Stop Circuit Diagram



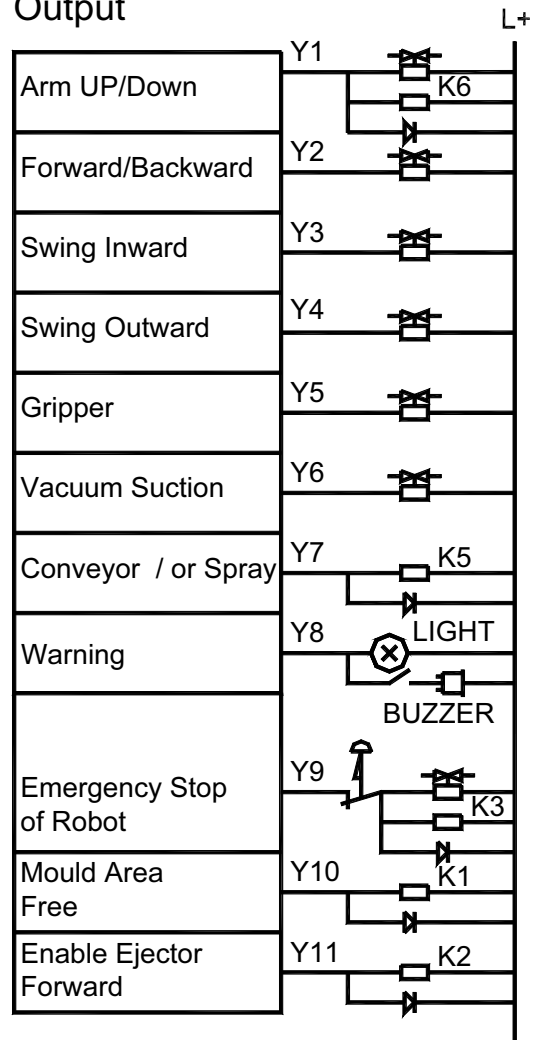


6.4 Input / Output Diagram

Input



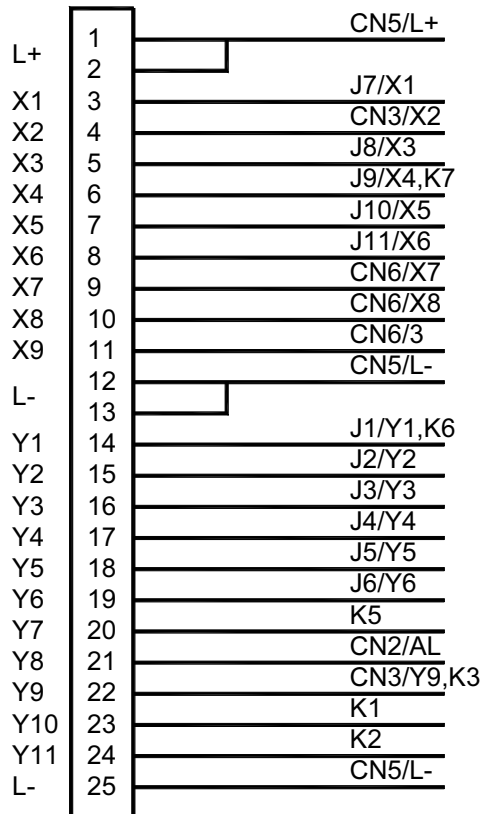
Output



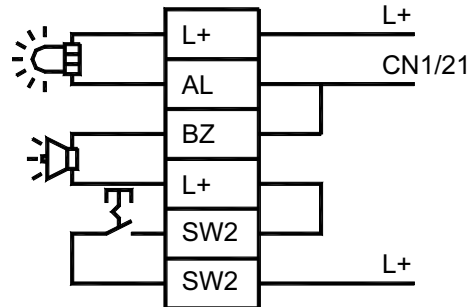


6.5 RBD-GA28-PC2 Connection Diagram

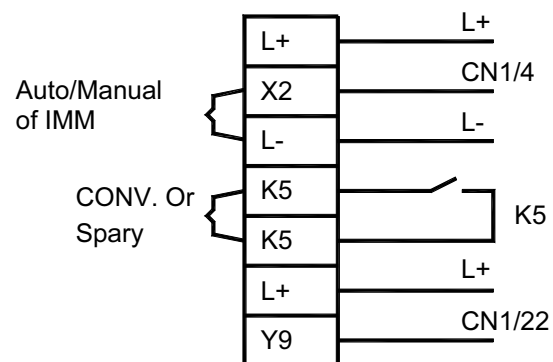
CN1: Connect To Controller



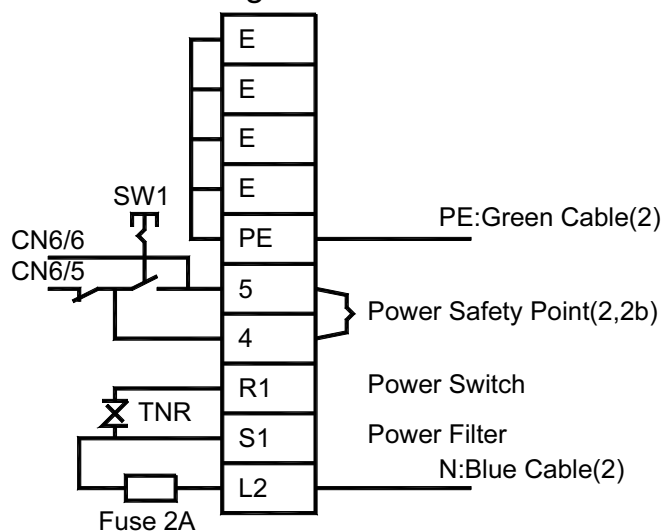
CN2: Buzzer And Warning Light



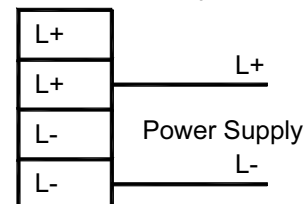
CN3: Other Connect



CN4: Connect To Power And Earthing

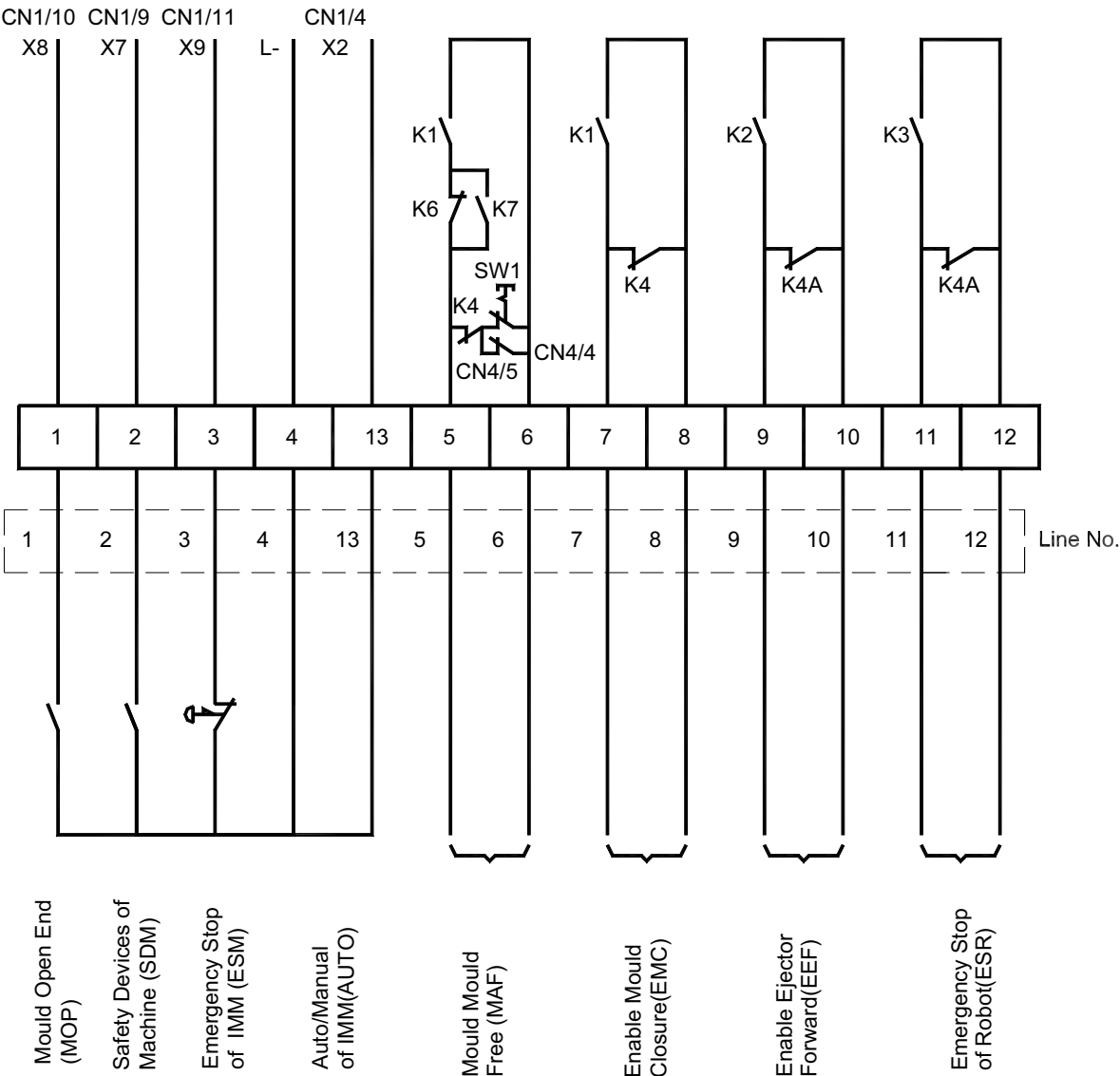


CN5: Connect To Power Supply





6.6 I.M.M. Connection Diagram





6.7 Cable Code and Definition

6.7.1 IMM Connection Cable

Cable Code	Definition	Remarks
1	Mold Open End MOP	
2	Safety Device of Machine SDM	
3	Emergency Stop of I.M.M. ESM	
4	Common Point (L-)	
5	Mold Area Free MAF	
6	Mold Area Free MAF	
7	Enable Mold Closure EMC	
8	Enable Mold Closure EMC	
9	Enable Ejector Forward EEF	
10	Enable Ejector Forward EEF	
11	Emergency Stop of Robot ESR	
12	Emergency Stop of Robot ESR	
13	Auto/Manual of I.M.M. AUTO	
14		
15		
16		

6.7.2 Power Cable

Cable Code	Definition	Remarks
Black L	Power Supply (AC80~170V or AC170~260V Single-phase)	Dual Voltage Switchable
Blue N	Neutral	
Green PE	Ground / Earth	

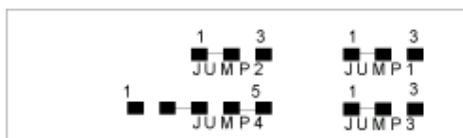
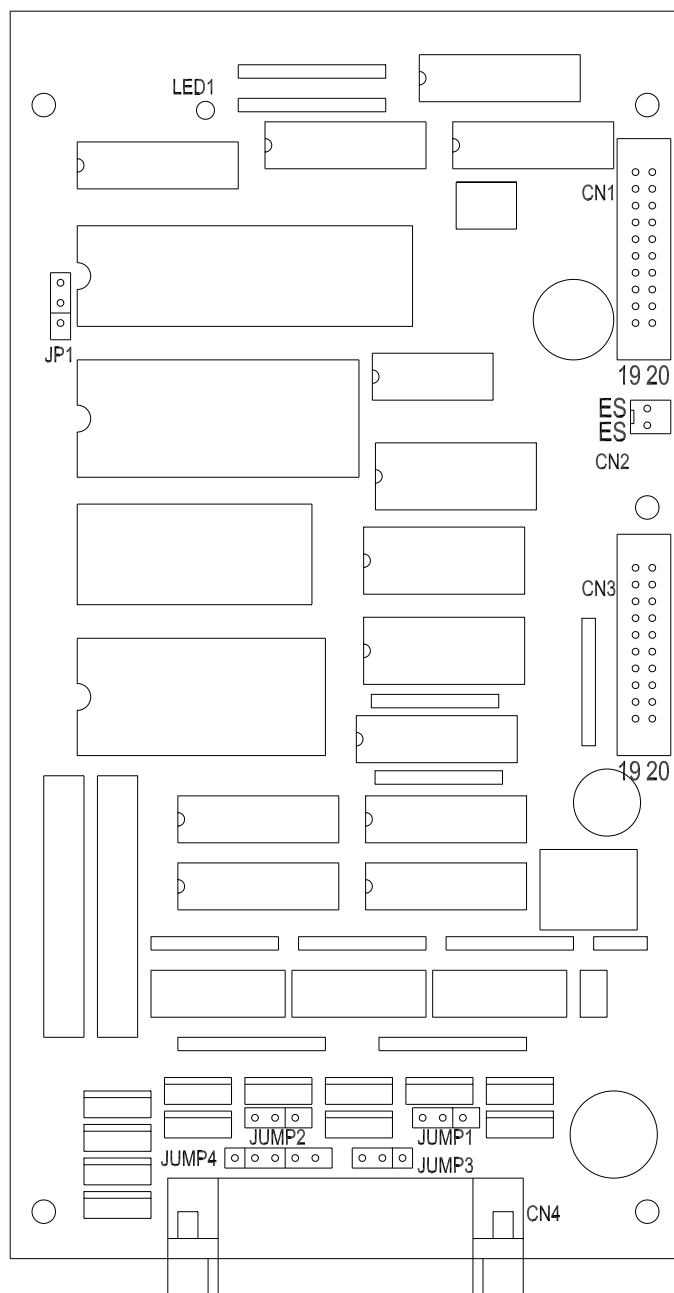


6.7.3 IMM Connection Cable (Euromap/SPI standards)

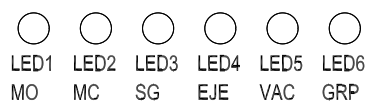
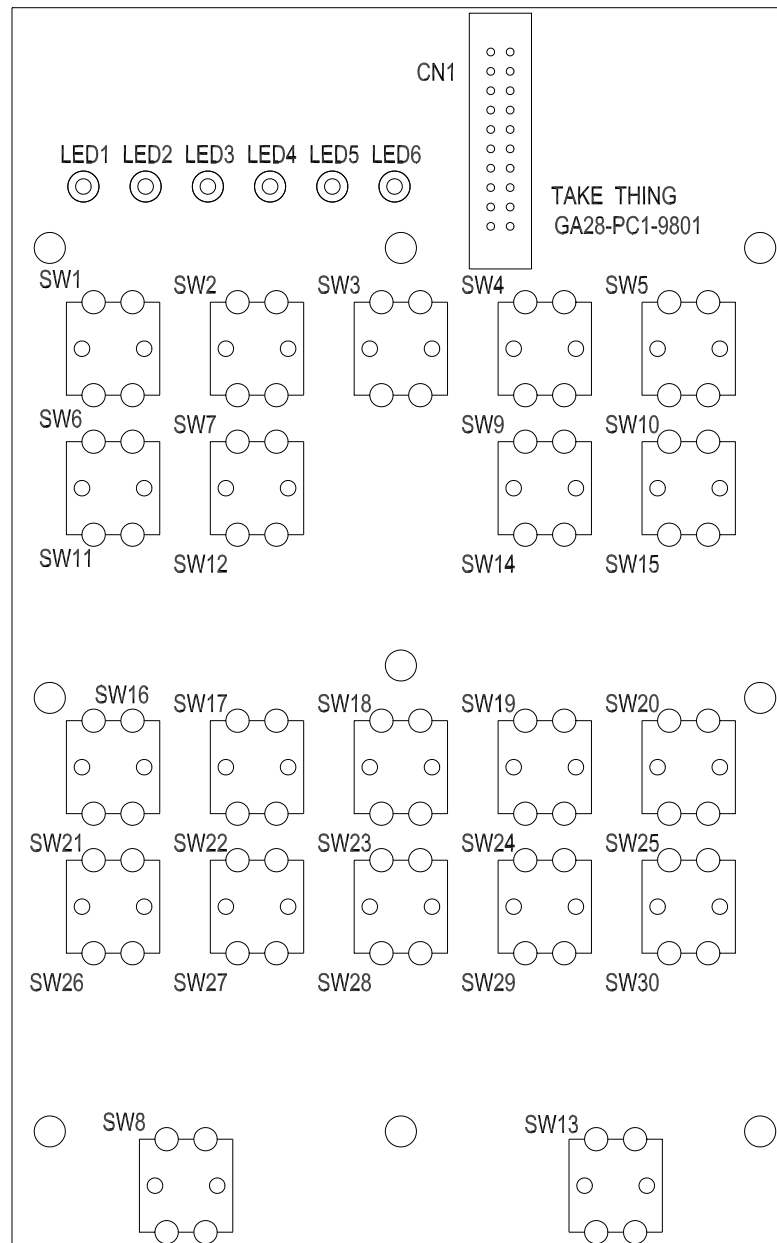
Euromap/SPI Code	Cable code	Connection Illustration
2	1	Mold Open End MOP
4		
5		
6		
7		
8		
10	13	Auto/Manual of I.M.M. AUTO
12		
15		
16	4	Common Point (L-)
3	2	Safety Device of Machine SDM
11	4	Common Point (L-)
1	3	Emergency Stop of I.M.M. ESM
9	4	Common Point (L-)
17	7	Enable Mold Closure EMC
20		
21	10, 8	
22	9	Enable Ejector Forward (EEF)
23	10, 8	
24	10, 8	
28	10, 8	
32	10, 8	Common Point
26	5	Mold Area Free MAF
18	6	Mold Area Free MAF
19	11	Emergency Stop of Robot ESR
27	12	Emergency Stop of Robot ESR



6.8 Main Control Board (RBD-GA28-PC3)

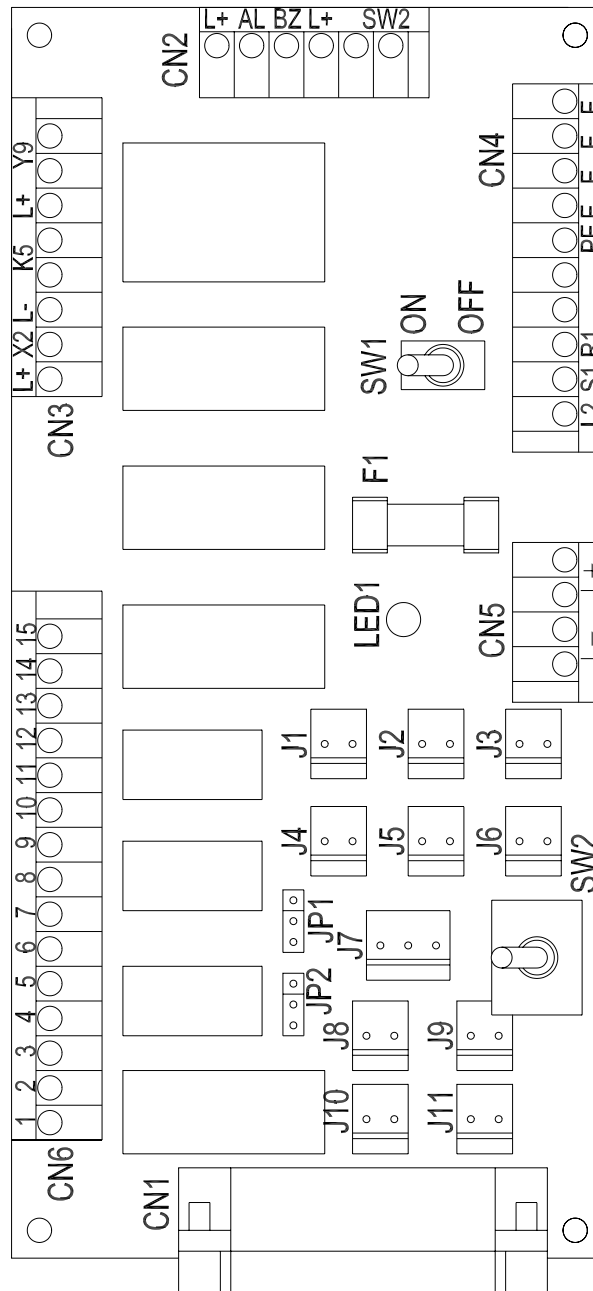


6.9 Hand-held Board (RBD-GA28-PC1)

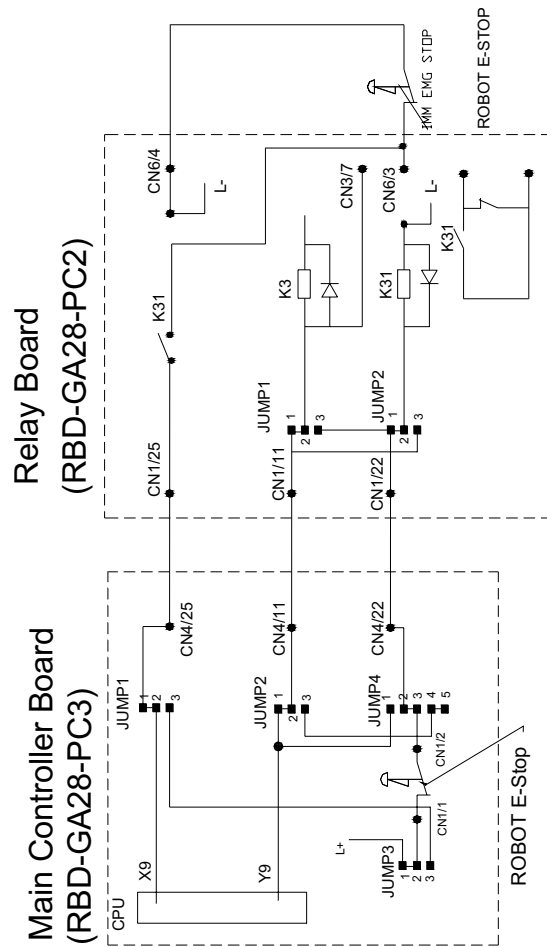


3
1
3
1

JP1
JP2

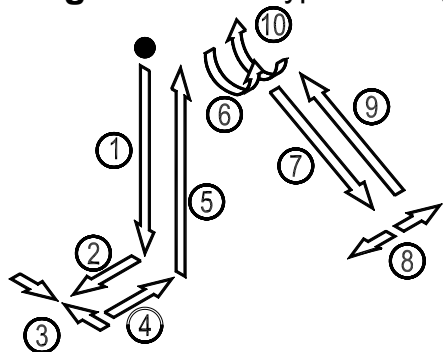


6.11 PC2 & PC3 Board Jumpers



7. STANDARD PRE-SET PROGRAMS

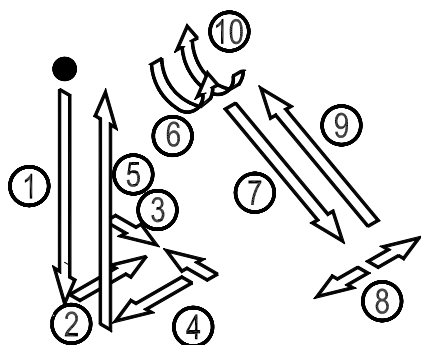
Prog. No. 01 L Type motion, gripping work-piece from moving half:



● Motion sequence

- | | |
|------------------|-----------------------|
| 1. Vertical Down | 6. Swing Out |
| 2. Kick | 7. Vertical Down |
| 3. Grip(Vacuum) | 8. Release Work-piece |
| 4. Kick Back | 9. Vertical Up |
| 5. Vertical Up | 10. Swing In |

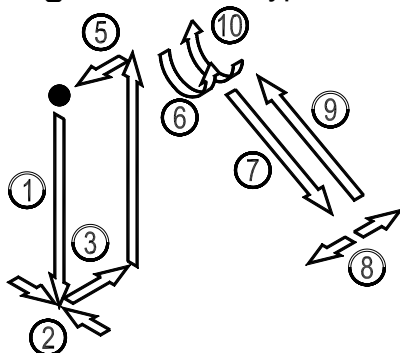
Prog. No. 02 L Type motion, gripping work-piece from stationary half:



● Motion sequence

- | | |
|------------------|-----------------------|
| 1. Vertical Down | 6. Swing Out |
| 2. Kick Back | 7. Vertical Down |
| 3. Grip(Vacuum) | 8. Release Work-piece |
| 4. Kick | 9. Vertical Up |
| 5. Vertical Up | 10. Swing In |

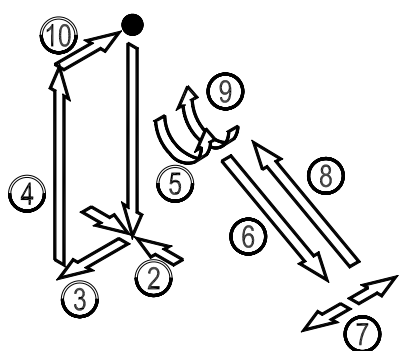
Prog. No. 03 U Type motion Gripping work-piece from moving half:



● Motion sequence

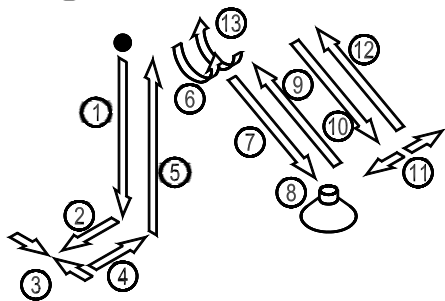
- | | |
|------------------|-----------------------|
| 1. Vertical Down | 6. Swing Out |
| 2. Grip(Vacuum) | 7. Vertical Down |
| 3. Kick Back | 8. Release Work-piece |
| 4. Vertical Up | 9. Vertical Up |
| 5. Kick | 10. Swing In |

Prog. No. 04 U Type motion, gripping work-piece from stationary half:

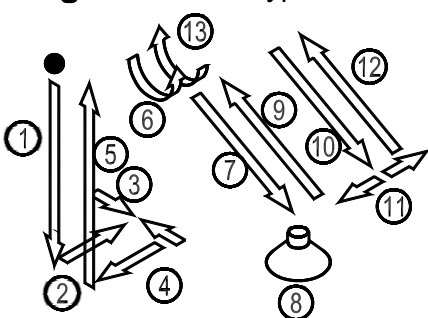


● Motion sequence

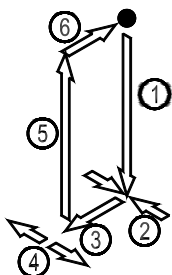
- | | |
|------------------|-----------------------|
| 1. Vertical Down | 6. Vertical Down |
| 2. Grip(Vacuum) | 7. Release Work-piece |
| 3. Kick | 8. Vertical Up |
| 4. Vertical Up | 9. Swing In |
| 5. Swing Out | 10. Kick Back |

Prog. No. 05 L Type motion, gripping work-piece & sprue from moving half:● **Motion sequence**

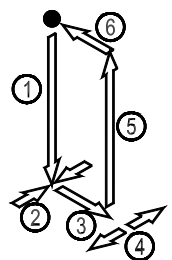
- | | |
|------------------|--------------------------------|
| 1. Vertical Down | 7. Vertical Down |
| 2. Kick | 8. Release Work-piece (Vacuum) |
| 3. Grip & Vacuum | 9. Vertical Up |
| 4. Kick Back | 10. Vertical Down |
| 5. Vertical Up | 11. Release Sprue (Grip) |
| 6. Swing Out | 12. Vertical Up |
| | 13. Swing In |

Prog. No. 06 L Type motion, gripping work-piece & sprue from stationary half:● **Motion sequence**

- | | |
|------------------|-----------------------------|
| 1. Vertical Down | 7. Vertical Down |
| 2. Kick Back | 8. Release Product (Vacuum) |
| 3. Grip & Vacuum | 9. Vertical Up |
| 4. Kick | 10. Vertical Down |
| 5. Vertical Up | 11. Release Sprue (Grip) |
| 6. Swing Out | 12. Vertical Up |
| | 13. Swing In |

Prog. No. 07 U Type motion Gripping work-piece from station half and releasing sprue in between molds:● **Motion sequence**

- | | |
|----------------------|----------------|
| 1. Vertical Down | 5. Vertical Up |
| 2. Grip | 6. Kick Back |
| 3. Kick | |
| 4. Release Workpiece | |

Prog. No. 08 U Type motion Gripping work-piece from moving half and releasing sprue in between molds:● **Motion sequence**

- | | |
|-----------------------|----------------|
| 1. Vertical Down | 5. Vertical Up |
| 2. Grip | 6. Backward |
| 3. Forward | |
| 4. Release Work-piece | |

8. TIMERS AND COUNTERS

8.1 Definition of Timers



Kick back delay. Start time counting after completion of previous motion, kick back initiates after completion of timer counting.



Kick forward delay. Start timer counting after completion of previous motion, kick forward initiates after completion of timer counting.



Arm up delay. Start timer counting after completion of previous motion, arm up initiates after completion of timer counting.



Arm down delay. Start timer counting after completion of previous motion, arm down initiates after completion of timer counting.



Arm swing in delay. Start timer counting after completion of previous motion, arm swing inward initiates after completion of timer counting.



Arm swing out delay. Start timer counting after completion of previous motion, arm swing outward initiates after completion of timer counting.



Gripper action delay. Start timer counting after completion of previous motion, gripper action initiates after completion of timer counting.



Gripper release delay. Start timer counting after completion of previous motion, gripper release initiates after completion of timer counting.



Vacuum delay. Start time counting after completion of previous motion, vacuum initiates after completion of timer counting.



Vacuum release delay. Start timer counting after completion of previous motion, vacuum release initiates after completion of timer counting.



Ejector forward delay. Start time counting after fully opening of the mold, ejector forward of the IMM initiates after completion of timer counting.



Mould close delay. Start time counting after receipt mold close permit signal from the ROBOT, mold close initiates after completion of timer counting.

AUXI : Time delay setting for the conveyor or silicon spraying motions.

Note: The last four timers described can be accessed from the timer screen by pressing the page down twice.

8.2 Definition of Counters

Total Number of Cycles: 7 digit displays total number of cycles of the robot, helps to plan regular maintenance.

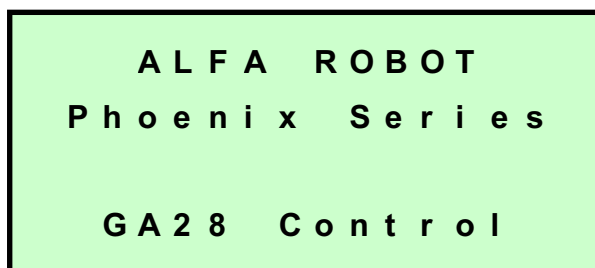
Pre-set Cycles: 4 digit displays preset running cycles, robot will stop and sounds alarm as soon as the pre-set cycles is reached, if this setting is 0000 means no pre- setting, then such function will be invalid.

Current Cycles: 4 digit displays current running cycles, it can be set to “zero” after each mold change. Each cycle will be counted as one, robot will stop and sound alarm as soon as the preset cycle number is reached.

Auxiliary Counters: Interruption counters for the conveyor motion or silicon spray.

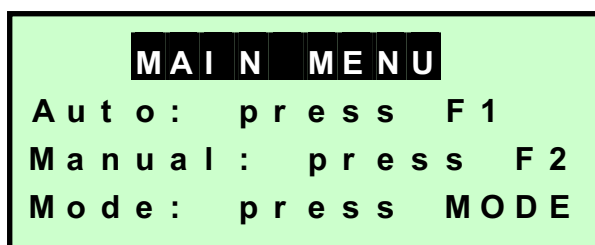
9. DESCRIPTION OF CONTROL

9.1 Operation Modes:



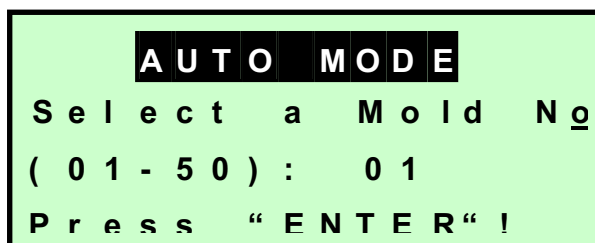
(Page 1000)

- After switching the power ON, page 1000 displays on the screen.
- An internal system test is performed, upon completion, page 2000 will be displayed.
- If the emergency stop button is pressed, then page 1100 will be displayed. (Refer paragraph 9.3 for more information)



(Page 2000)

- If page 2000 is displayed, the system is in normal working order.
- Now you can press F1 button for "Auto" mode, press F2 button for "Manual" mode, or press MODE button for "Mode Setting".(Programming)
- **"Auto Mode"** (page 3000): This mode allows you to run a program in "full-cycle" or "single-cycle". First, select the mold number (01 to 50) that you wish to run. The Mold number selected should be programmed prior to use. Programming is accomplished by using "Mode Setting" (see chapter 10). Before starting the cycle you will have the opportunity to view the program number used, method of product detection and type of auxiliary equipment that was selected during programming. While in "Auto Mode" you can modify timers and counters for the active mold Number.



(Page 3000)

- **"Manual Mode"** (page 4000): This mode is designed for adjusting the robot, particularly after changing to a new mold. You can press any motion button to check if the stroke lengths and moving speeds the robot are properly set. Under this mode you can also monitor "input/output signals", change "file lock or unlock", "robot in use or not in use", select "auxiliary equipment", view "total number of cycles" and "ex-works date of the robot" also "version of the software", and even check previous 5 alarm records.

```

MANUAL MODE
Press any motion
key to operate!
I/O: F1    SYSTM: F2
    
```

(Page 4000)

- “Mode Setting” (page 5000): ***This mode provides a powerful teach option with simple preprogrammed cycles.*** Under this mode you can create a program for a specific mold (up to 50) by selecting one of the eight (8) standard pre-set programs or by teaching a custom program (up to 12 custom programs can be saved). Motion delay timers and counters may also be set in this mode.

```

MODE SETTING
Select a Mode No
( 01 - 50 ) : 01
Press "ENTER"!
    
```

(Page 5000)

- While in automatic mode, various screens may be displayed (page 6000... or 7000...) to alert you what was wrong.

```

TROUBLE !!
E01: Arm up
      signal is
      missing.
    
```

(Page 6000....)

```

WARNING !!
Pre-set cycle
counter is
completed.
    
```

(Page 7000....)

- If the robot is set to “not in use” page 8000 will display provided the power is ON. This mode is set from the Manual Mode

```

[ ROBOT IS NOT
  IN USE ! ]
Press "F1" for
re-acting again.
    
```

(Page 8000)

9.2 Input Methods:

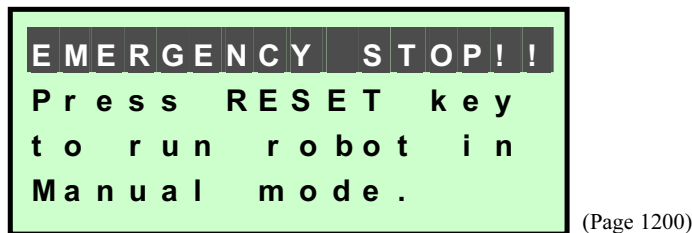
- Press “←” or “→” button to move cursor “up” and “down”, or “left” and “right” to the desired location for value settings, or making function selections.
- Press “+” or “-” button for increasing or decreasing setting values.
- Press “**Page Down**” button to jump to the next screen or page.
- Press “**Esc**” button to jump to the previous screen or page.
- Press “**Enter**” button to confirm your setting.
- Press “**Reset**” button to reset the system.

9.3 Emergency Stop:

- In case the emergency stop button is pressed, the following page (1100) will display.

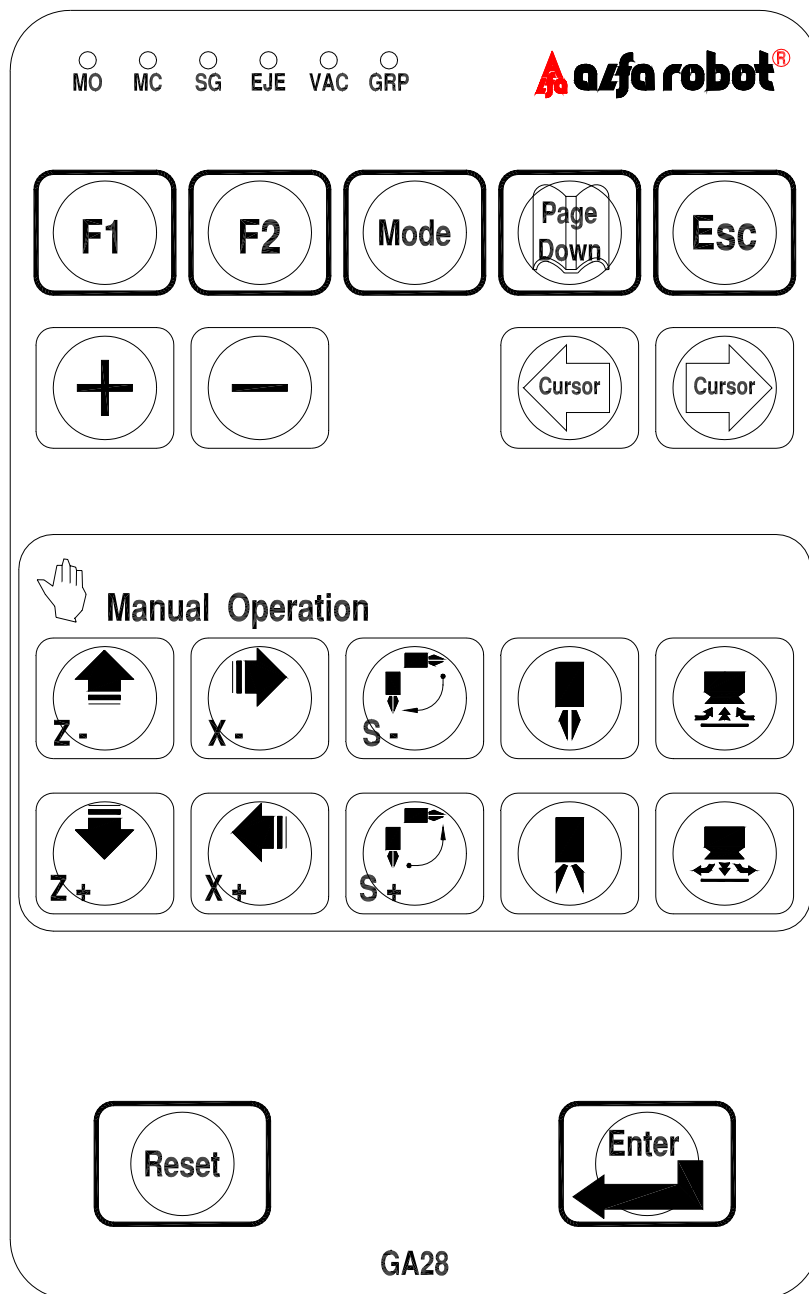


- To run the robot pull out the emergency stop button first, the following page (1200) will be displayed.



- Press “Reset” button system will reset and enter into the “Manual Mode” (page 4000)
- If “Reset” button is not pressed, system will be unable to operate.

9.4 Operator Panel:



10. AUTO MODE

10.1 Select a Mold Number:

- Under page 2000, press “F1” button to display page 3000.
- Under page 3000: Using arrow keys, select a mold number (01 to 50) in which a program has been saved previously, and then press “ENTER” button.

```

  A U T O   M O D E
S e l e c t   a   M o l d   N o
( 0 1 - 5 0 ) :   0 1
P r e s s   “ E N T E R “ !
  
```

(Page 3000)

- After “ENTER” button is pressed page 3100 will display briefly if there is no program pre-saved in the mold number that has been selected. The control then jumps to page 5000 automatically to enable you to carry out programming.

```

N O   P R O G   I S   S A V E D
I N   T H I S   M O L D   N O .
P r e s s   “ M O D E “   f o r
p r o g r a m   s e t t i n g .
  
```

(Page 3100)

- Under page 3000, after pressing “ENTER” page 3200 will display if there is already a pre-saved program in the mold number that you have selected. With this page you can view which program number was pre-saved, method of E-O-A-T detection and type of auxiliaries that were selected previously, before starting cycle, or just press “F1” or “F2” to initiate cycle(s).

```

P r o g .   N o : 0 1   A U T O
E - O - A : G r i p + V a C
A u x i : C o n v e y o r
S T A R T : F 1       S - C Y C : F 2
  
```

(Page 3200)

- Under page 3200, page 7004 will display if you did not move the arm to the pre-defined HOME position before pressing “F1” or “F2” button for “full-cycle start” or “single-cycle start”.

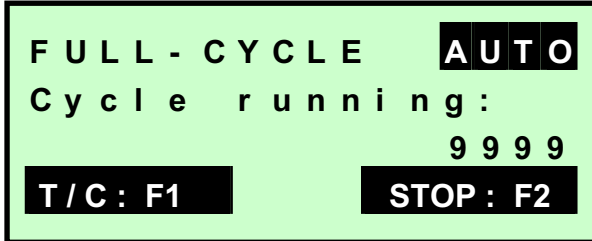
```

O P E R A T I N G   E R R O R !
A r m   m u s t   r e t u r n
t o   h o m e   p o s i t i o n
b e f o r e   S T A R T .
  
```

(Page 7004)

10.2 Automatic Full-Cycle:

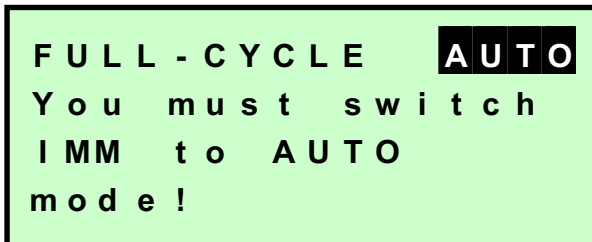
- Under page 3200, if the IMM has been switched to AUTO mode, press “F1” button to display page 3210 and to run “automatic full-cycle”. Under page 3210 press “F1” to modify timers and counters (pages 3211 to 3215), or press “F2” to stop running and return to page 2000.



FULL - CYCLE AUTO
Cycle running:
9999
T/C: F1 STOP: F2

(Page 3210)

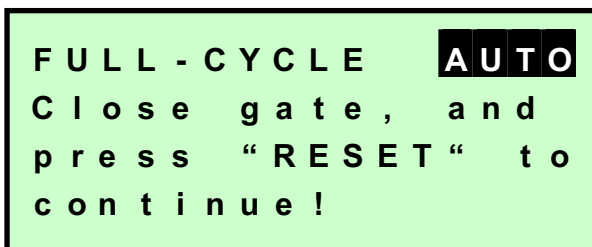
- Under page 3200, if the IMM is switched in MANUAL mode and you press the “F1” button, page 3220 displays automatically to remind you to switch the IMM to AUTO mode before cycle can be initiated.



FULL - CYCLE AUTO
You must switch
IMM to AUTO
mode!

(Page 3220)

- Under page 3210, if the safety gate of the IMM is opened page 3230 displays automatically and stops cycling. To continue cycle, close the safety gate and then press “RESET” button.



FULL - CYCLE AUTO
Close gate, and
press “RESET” to
continue!

(Page 3230)

10.3 Automatic Single-Cycle:

- Under page 3200, if the IMM is in the MANUAL mode, you may press “F2” button to run “automatic single-cycle” (Page 3240 displays automatically). After completion of one cycle you can press “F1” button to run another “single cycle”, or press “ESC” button to return to page 2000. Mold open signal must be present to allow cycle to start. Note: if the mold is open, the robot will start a cycle as soon as “F2” is pressed.

S I N G L E - C Y C L A U T O
P r e s s “ F 1 “ t o r u n
a g a i n , o r p r e s s
“ E S C “ t o e x i t .

(Page 3240)

- Under page 3200, if the IMM is in the AUTO mode and you press the “F2” button, page 3250 displays automatically to remind you to switch the IMM to MANUAL mode before single cycle can be initiated.

S I N G L E - C Y C L A U T O
Y o u m u s t s w i t c h
I M M t o M A N U A L
m o d e !

(Page 3250)

10.4 Timers and Counters

- During “automatic full-cycle” under page 3210, you can press “F1” button to view and modify all the motion delay timers via pages 3211 thru 3213 Use cursor keys to select value and +/- keys to change value.





Note: Press “Page Down” button to go next page, or “ESC” button to return to page 3210.

↓	0.	03	←	0.	04	AUTO
■	0.	04	→	0.	04	
↑	0.	04	↻	0.	04	
↓	0.	04	■	0.	04	1/5

(Page 3211)

↑	0.	03	↻	0.	03	AUTO
	0.	03		0.	03	
	0.	03		0.	03	
	0.	03		0.	03	2/5

(Page 3212)

↑	0.	03	↻	0.	03	AUTO
	0.	03		0.	03	
	0.	03		0.	03	
	0.	03		0.	03	3/5

(Page 3213)

- Under page 3213, to view and modify counters press “Page Down” button to go to page 3214 and again for page 3215.

CYC - COUNTER					4 / 5
Pre - set :					9 9 9 9
Current :					9 9 9 9
ZERO : F1		AUXI : F2			

(Page 3214)

- Under page 3214, you can press “F1” button to reset the counter to zero, or press “F2” to go to page 3215.

AUXILIARY					5 / 5
(Conv . or Spray)					
Counter :					0 0
Timer :					0 0 . 0 0 (sec)

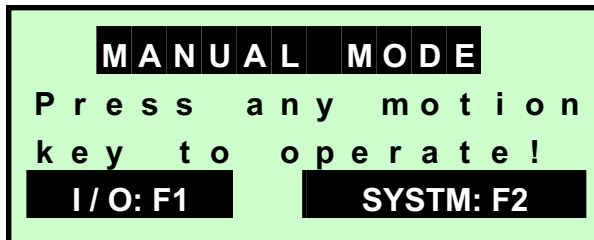
(Page 3215)

- Under page 3215, you can modify counter and timer for the auxiliary equipment (conveyor or spraying device) but you won't be able to activate the Aux device here.















11. MANUAL MODE

11.1 How to Operate:

- Under page 2000, press “F2” button to display page 4000.



(Page 4000)

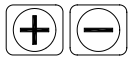
- Under page 4000, press any motion button to operate the robot manually.
- Definition of all manual motion buttons are:
 -  **Function Key (1)**, view inputs and outputs.
 -  **Function Key (2)**, view system data.
 -  **Page- Down Key**, switch screens.
 -  **Escape Key**, when various operational functions are entered, press to escape.
 -  **Arm Up Key**
 -  **Arm Down Key**
 -  **Kick Back Key**
 -  **Kick Forward Key**
 -  **Swing In Key**
 -  **Swing Out Key**
 -  **Gripper Close Key**
 -  **Gripper Open Key**
 -  **Vacuum ON Key**
 -  **Vacuum OFF Key**



Reset Key.



Enter Key.



Value Increase/Decrease Key.

In TEACH MODE, “+” Enter Mold Open.
“- ” Enter Mold Close.



Cursor Forward/Backward and Up/Down Key.

11.2 LED Indicator Lamps on the Hand-held Pendant:

- 1/ MO : “Mold Open ” signal
- 2/ MC : “Mold Close Permit” signal
- 3/ SG : “Safety Gate Close” signal
- 4/ EJE : “Ejector Forward Permit” signal
- 5/ VAC: “Vacuum Confirmation” signal
- 6/ GRP: “Gripper Confirmation” signal

11.3 Input Signals:

- Under page 4000, press “F1” button to display page 4100 for the first 4 input signals. To read the next 4 input signals press “Page Down” button, or press “ESC” to return to page 4000 at any time.

Arm Up	INPUT
IMM Auto	
Swing-In	
Swing-Out	1 / 4

(Page 4100)

Grip	INPUT
Vacuum	
Gate Close	
Mold Open	2 / 4

(Page 4101)

- “Solid Circle” indicates ON, and “Hollow Circle” indicates OFF.

11.4 Output Signals:

- Under page 4101, press “Page Down” button to display page 4102 for the first signals. To read the next 4 output signals press “Page Down” button, or press “ESC” to return to page 4000 at any time.

Arm Down	OUTPUT
Swing-In	
Swing-Out	
Kick Fwd	3 / 4

(Page 4102)

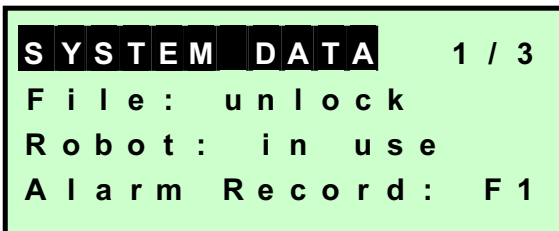
Gripper	OUTPUT
Vacuum	
MC Able	
Auxiliary	4 / 4

(Page 4103)

- “Solid Circle” indicates ON, and “Hollow Circle” indicates OFF.

11.5 System Data:

- Under page 4000, press “F2” button to display page 4200. With this page you will be able to select the following data:
 - 1) File: “lock” or “unlock”. (Once “file lock” is selected, Mode key is disabled and program setting is not possible)
 - 2) Robot: “in use” or “not in use”. (Once “robot not in use” is selected, page 8000 will display to remind you of this status)
 - 3) Alarm Record: To review the last five (5) alarm records, press “F1” to display page 4300 up to 4314.
- You can press “Page Down” button to display page 4201, or press “ESC” button to return to page 4000.



S Y S T E M D A T A 1 / 3
 F i l e : u n l o c k
 R o b o t : i n u s e
 A l a r m R e c o r d : F 1

(Page 4200)

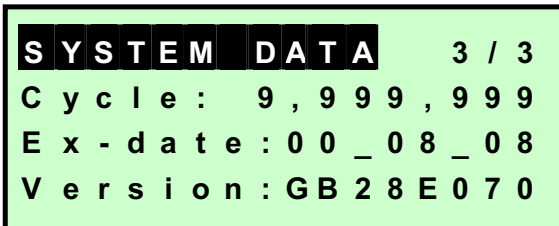
- Under this page(4201) you can make a selection of auxiliary equipment to be used:
 - 1) Spray: This indicates the use of silicon spraying device.
 - 2) Conveyor: This indicates the use of belt conveyor.
- You can press “Page Down” button to display page 4202, or press “ESC” button to return to page 4000.



S Y S T E M D A T A 2 / 3
 S e l e c t a n a u x i -
 l i a r y : S p r a y
 P r e s s “ E N T E R ” !

(Page 4201)

- Under this page you will be able to view the following information:
 - 1) Cycle: This indicates “Total Number of Cycles” this robot has running after installation.
 - 2) Ex-date: This indicates “Date of Ex-works” of this robot.
 - 3) Version: This indicates “Version of Software” prepared by the manufacturer.
- After viewing of this page, press “ESC” button to return to page 4000.

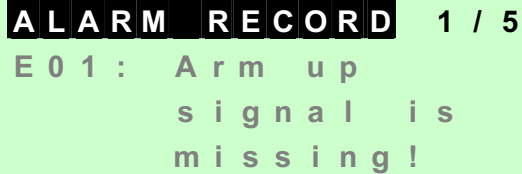


S Y S T E M D A T A 3 / 3
 C y c l e : 9 , 9 9 9 , 9 9 9
 E x - d a t e : 0 0 _ 0 8 _ 0 8
 V e r s i o n : G B 2 8 E 0 7 0

(Page 4202)

11.6 Alarm Records:

- Under page 4200, press “F1” button you can view the last five (5) alarm records.
- Alarm message shown in page 4300 is just an example for your reference.
- You can press “Page Down” button repeatedly to jump to another four pages in sequence, or press “ESC” button to return to page 4200 at any time.

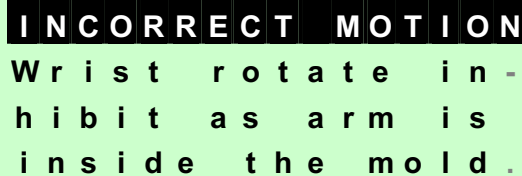


ALARM RECORD 1 / 5
E 0 1 : A r m u p
s i g n a l i s
m i s s i n g !

(Page 4300)

11.7 Incorrect Motions:

- Under manual mode, one of the following warning messages may be display while you are operating this robot manually:
 - 1) Wrist rotate inhibit as arm is inside the mold.
 - 2) Mold close inhibit as arm is inside the mold.
 - 3) Swing-inward or swing-outward inhibit as arm is down.
 - 4) Arm down inhibit as no mold open signal present.
 - 5) Safety gate is open, no motion is allowed.
 - 6) Motion key you have pressed is already made.
- Warning messages shown in page 4400 is just an example for your reference only.
- Screen will return to the previous page automatically in 3 seconds.

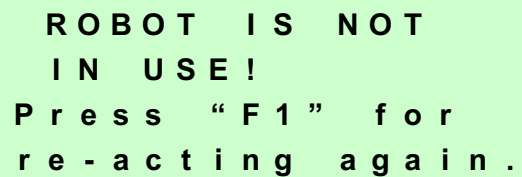


INCORRECT MOTION
W r i s t r o t a t e i n -
h i b i t a s a r m i s
i n s i d e t h e m o l d .

(Page 4400)

11.8 Robot Not In Use:

- Once robot is set to “Not in Use”, page 8000 will display automatically to remind you of this status.



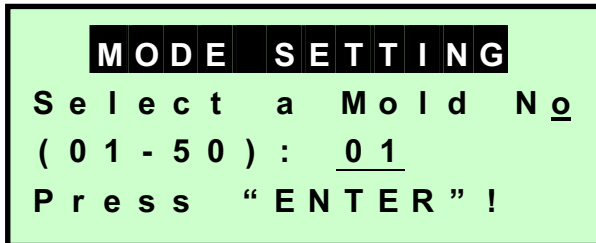
**ROBOT IS NOT
IN USE!**
P r e s s “ F 1 ” f o r
r e - a c t i n g a g a i n .

(Page 8000)

12. MODE SETTING (PROGRAMING)

12.1 Select a Mold Number


- Under page 2000 (Main Menu), press “MODE” button to display page 5000 for Mode Setting. Using the arrow keys select a mold number that you are going to use to store your program. Then press “ENTER” button to confirm this selection.



MODE SETTING
 Select a Mold No
 (01 - 50) : 01
 Press “ENTER” !

(Page 5000)

- If there is a program already stored in the mold number you selected, page 5100 will display. Confirm your selection of this mold number by pressing “F1” button to display page 5200, or press “ESC” button to return to page 5000.



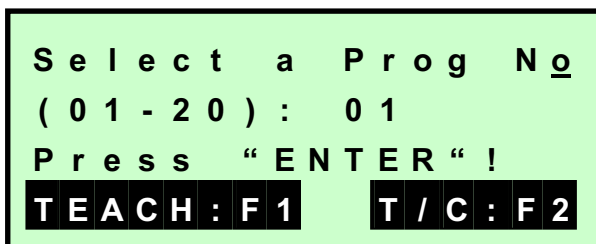
REALLY WANT TO
 USE THIS MOLD
 NO? Press “F1”
 to cover !

(Page 5100)

- If the mold number you have selected is empty, page 5200 will display automatically.

12.2 Select a Program Number

- Under page 5200, select any of the following program numbers, and then press “ENTER” button:
 - Standard programs: 01 ~ 08,
 - Teachable programs: 09 ~ 20.



Select a Prog No
 (01 - 20) : 01
 Press “ENTER” !
TEACH : F1 T / C : F2

(Page 5200)



12. Mode Setting

- Under page 5200, if you know that none of the pre-set standard programs or existing teach programs suit your application, press “F1” button to display page 5400 and teach a new program.
- If you know that the program number you have selected is what you want to save in this mold number and you would like to view timers and counters that are pre-set with the program, you can press “F2” button to display page 3211 thru 3215 for confirmation or adjustment.
Note: Refer paragraph 10.4 for display.
- Under page 5200, **in case the “program number you have selected does not exist”**, after pressing “ENTER” button page 5201 will display for 3 seconds and then jump to page 5400 to teach a new program.

```
P r o g   N o   y o u   h a v e  
s e l e c t e d   i s   n o t  
e x i s t e d ,   T E A C H   a  
n e w   p r o g r a m !
```

(Page 5201)

```
M o v e   a r m   t o   d e -  
f i n e   h o m e   p o s i . ,  
t h e n   p r e s s   E N T E R  
( M O : ' + ' ,   M C : ' - ' )
```

(Page 5400)

- Under page 5200, **in the case that one of the “standard pre-set programs” is selected**, after pressing the “ENTER” button page 5202 will display.

```
A   S T ' D   P R E - S E T  
P R O G   I S   S E L E C T E D  
V i e w   d e t a i l s :   F 1  
o r   p r e s s   E N T E R !
```

(Page 5202)

- Under page 5200, **in the case that one of the “pre-composed teach programs” is selected**, after pressing “ENTER” button page 5203 will display.

```
A   P R E - S E T   T E A C H  
P R O G   I S   S E L E C T E D  
V i e w   d e t a i l s :   F 1  
o r   p r e s s   E N T E R !
```

(Page 5203)

12.3 A Standard Pre-set Program is Selected:





12. Mode Setting

- Under page 5200, once a “standard pre-set program” is selected page 5202 will display.

A S T ' D P R E - S E T
P R O G I S S E L E C T E D
V i e w d e t a i l : F 1 ,
o r p r e s s E N T E R !

(Page 5202)

- Under page 5202, you can press “F1” button to display page 5220 and view the motion sequence of this program (in case the standard pre-set program is longer than one page), to see the next page 5221 press “Page Down”, or press “ESC” to return to page 5202.

↓	0.03	←	0.03	STD
■	0.03	→	0.03	01
↑	0.03	↺	0.03	
↓	0.03	↻	0.03	1/2

(Page 5220)

↑	0.03	↺	0.03	STD
				01
				2/2

(Page 5221)

- Under page 5202, you can press “ENTER” button to confirm your selection of program to be saved in this mold number, page 5222 will then display to enable you to make a selection of the following EOAT detection method:
 - 1) “**Gripper Sensor**” only.
 - 2) “**Vacuum Sensor**” only.
 - 3) Both “**Gripper and Vacuum Sensors**”.

S e l e c t a n E - O - A
c h e c k i n g m e t h o d :
G R I P
P r e s s “ E N T E R ” !

(Page 5222)

- After a selection of EOAT detection method is made, press “ENTER” button page





12. Mode Setting

5300 will display to confirm that the program has been saved.

NEWLY COMPOSED
MODE SETTING HAS
BEEN SUCCESSFUL -
LY SAVED !

(Page 5300)









12.4 A Pre-set Teach Program is Selected:

- Under page 5200, if a “pre-set teach program” is selected page 5203 will display.





A PRE - SET TEACH
PROG IS SELECTED
View detail : F1 ,
or press ENTER !

(Page 5203)

- Under page 5203, you can press “F1” button to display page 5230 and view the motion sequence of this teach program, to see next page 5231 press “Page Down”, or press “ESC” to return to page 5203.

	0.03		0.03	TEACH
	0.03		0.03	09
	0.03		0.03	
	0.03		0.03	1/2

(Page 5230)

	0.03		0.03	TEACH
	0.03		0.03	09
				2/2

(Page 5231)

- Under page 5203, press “ENTER” button page 5300 will display to confirm that the program has been successfully saved.

NEWLY COMPOSED
MODE SETTING HAS
BEEN SUCCESSFUL -
LY SAVED !

(Page 5300)

12.5 Teach A New Program:

- Upon entering into “teach mode”, page 5400 will display first to remind you to define home position for this program. Press manual motion buttons to move arm to define the initial start-up position and then press “ENTER”.
- This page also reminds you to press “+” button to act as “Mold Open” and press “-” button to act as “Mold Close” while teaching a new program. Mold close is the step in the sequence where the robot allows the IMM to close mold.

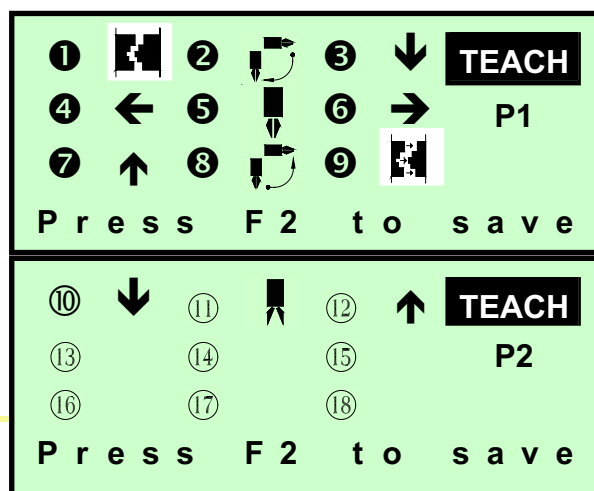
Move arm to de -
fine home posi . ,
then press ENTER
(MO : ' + ' , MC : ' - ')

(Page 5400)

- Under page 5400, once “ENTER” button is pressed, a “blank” page 5401 will display. First, you will have to press “+” button to enter “**Mold Open**” as the first step of any teach program, and then press motion buttons to carry out the desired steps. **You must press enter after each step.**
- Press “F2” button to save if total number of steps is less than nine (9), or it will automatically jump to page 5402 to continue sequence input. However, you must press “F2” button when you have completed your inputting the teach sequence.

Note: 1) After each step is input you must press “ENTER” or it won’t jump to the next step. **Do not forget to press enter after each step.**

2) During teaching do not forget to press “—” button to enter “**Mold Close**” as part of the in the sequence or you won’t be able to successfully complete the input. Mold close is the step in the sequence when the robot has cleared the mold area and the next molding cycle may begin.



(Page 5401)

(Page 5402)

- After pressing “F2” button for saving, page 5403 may display for 3 seconds to remind you that your teaching of a new program was not complete, the control will then return to “blank” page 5401 to begin input from start.

A T T E N T I O N ! !
I n c o m p l e t e T E A C H
s e q . , a r m m u s t
r e t u r n t o H O M E .

(Page 5403)

- Once “teach a new program” is successfully completed, page 5404 will then display. You can now select a program number to save it under (09 to 20) and then press “F1” button so that the new teach program can be saved there.

T E A C H M O D E
S e l e c t a P r o g N o
(0 9 - 2 0) : 0 9
P r e s s “ E N T E R ” !

(Page 5404)

- Page 5405 will display if the program number that you have selected a program that has been used previously, you can press “F1” button to say “yes” or press “ESC” button to return to page 5404 for selecting of another program number.

R E A L L Y W A N T T O
R E P L A C E P R O G R A M
N O ? P r e s s “ F 1 ”
t o c o v e r !

(Page 5405)

- Page 5406 will display to confirm that you have selected. This page is also displayed when an unused program number is selected from page 5404.

N E W L Y E N T E R E D
T E A C H P R O G H A S
B E E N S U C C E S S -
F U L L Y S A V E D !

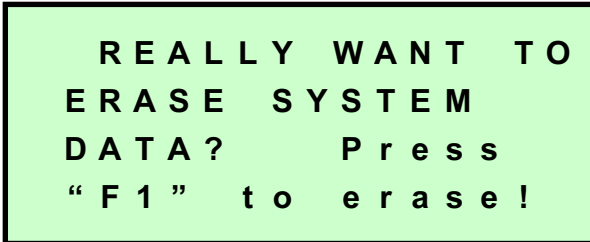


T E A C H M O D E												
S	e	l	e	c	t	a	P	r	o	g	N	o
(0	9	-	2	0)	:	0	9			
P	r	e	s	s	F	1	t	o	s	a	v	e



13. ERASING SYSTEM DATA

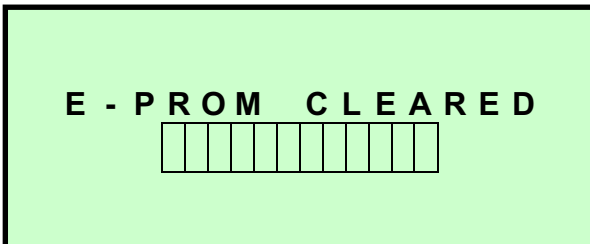
- Under page 2000, press   and  buttons consecutively until all three buttons are pressed page 9000 will display.



REALLY WANT TO
ERASE SYSTEM
DATA? Press
" F 1 " t o e r a s e !

(Page 9000)

- Under page 9000, press "F1" button the following page will display until all stored data are completely cleared.



E - P R O M C L E A R E D

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

(Page 9001)

- When the erasing action is completed, turn main power OFF and then re-start the robot again.

[CAUTION]

ERASING SYSTEM DATA it will erase all Mold No. data in EPROM including Teach Programs, timer settings, mold No. memory and so on. Unless robot data has been corrupted, do not perform this action.

14. TROUBLE SHOOTING

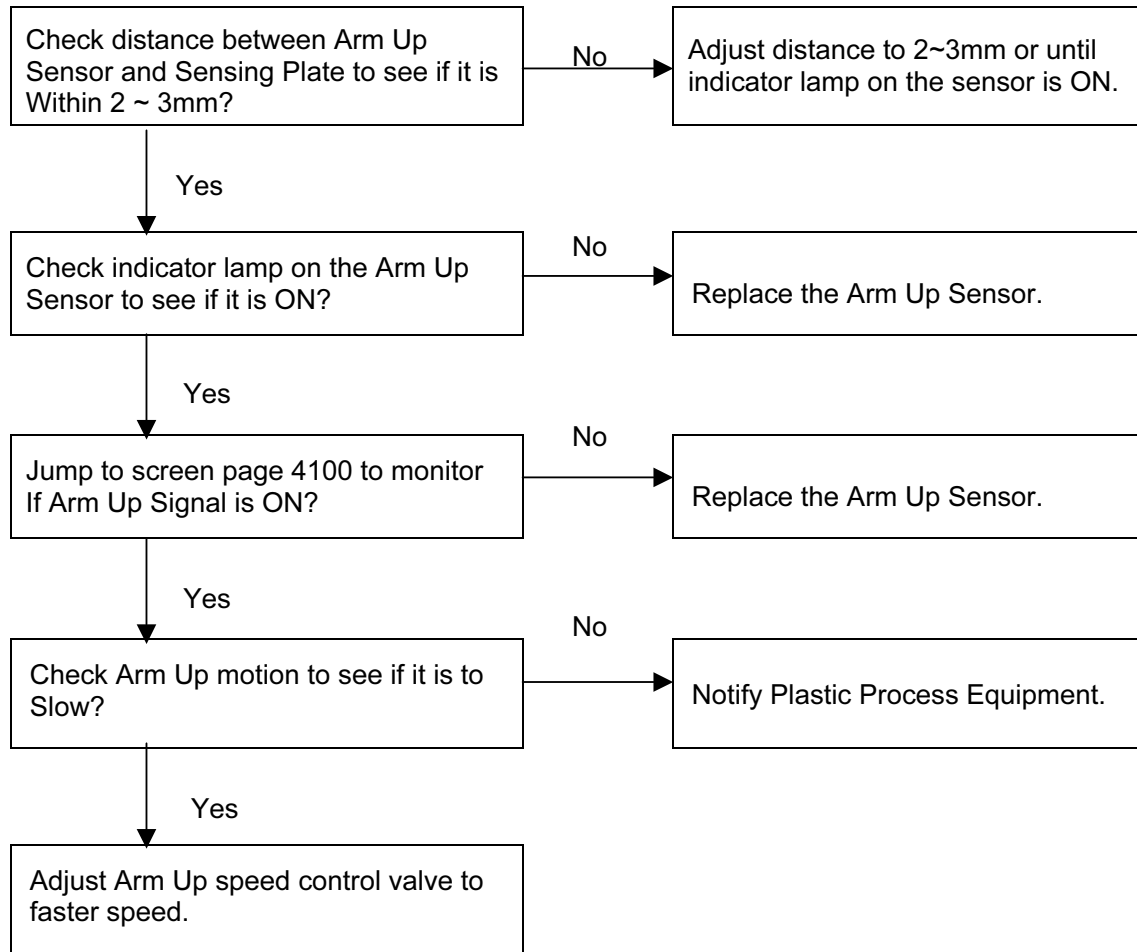
14.1 Troubleshooting Codes

- (1) E01: **Arm Up Signal is missing!**
- (2) E02: **IMM Auto Mode Signal is missing!**
- (3) E03: **Swing-in Signal is missing!**
- (4) E04: **Swing-out Signal is missing!**
- (5) E05: **Gripper Signal is missing!**
- (6) E06: **Vacuum Suction Signal is missing!**
- (7) E11: **Arm Up/Down Valve is faulty!**
- (8) E13: **Swing-in Valve is faulty!**
- (9) E14: **Swing-out Valve is faulty!**
- (10) E16: **Swing-in/out signals both lit simultaneously!**
- (11) E17: **Swing-in/out signals both missing!**

NOTE: In case a Trouble/Alarm is incurred, press “RESET” button and return to Main Menu (page 2000) for troubleshooting.

14.2 Troubleshooting

1. E01: Arm Up Signal is Missing!



2. E02: IMM Auto Mode Signal is Missing!

- 1) Jump to screen page 4100 to monitor if IMM Auto signal is turned OFF?
- 2) Check if IMM has been switched to Manual Mode?

3. E03: Swing-in Signal is Missing!

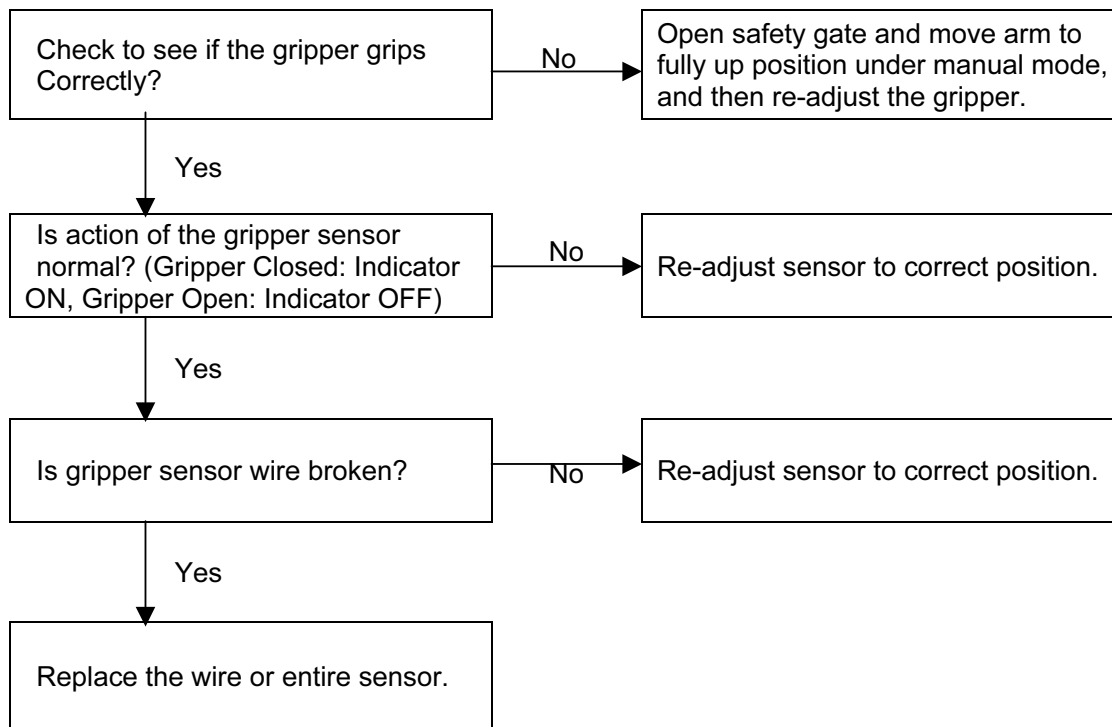
Method of troubleshooting is the same as the flow diagram for E01.

4. E04: Swing-out Signal is Missing!

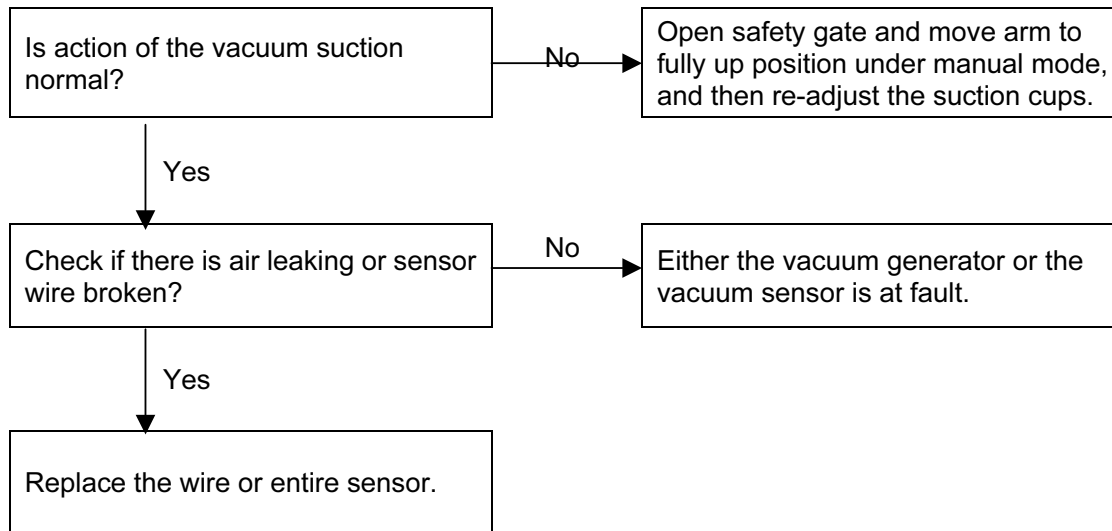
Method of troubleshooting is the same as the flow diagram for E01.



5. E05: Gripper Signal is Missing!

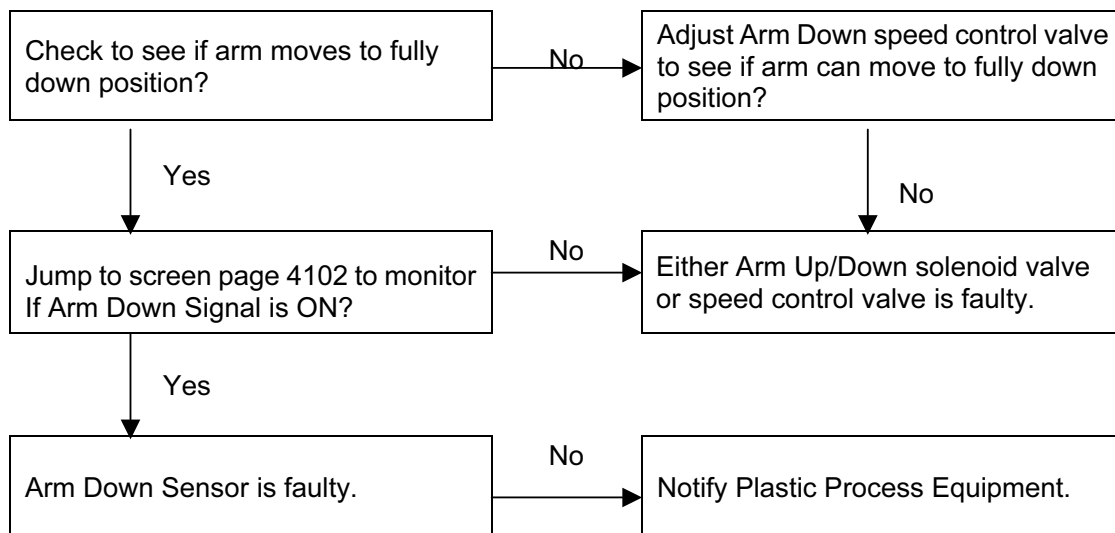


6. E06: Vacuum Suction Signal is Missing!





7. E11: Arm Up and Down Solenoid Valve is Faulty!



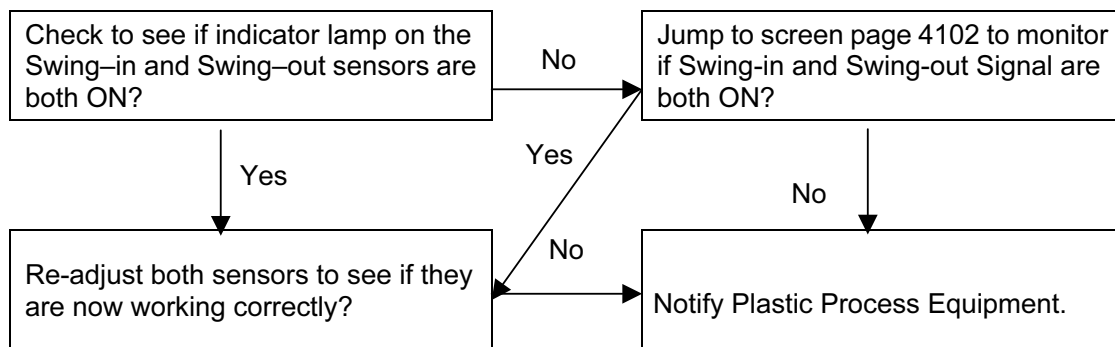
8. E13: Swing-in Solenoid Valve is faulty!

Method of troubleshooting is the same as inspection flow for E11.

9. E14: Swing-out Solenoid Valve is in faulty!

Method of troubleshooting is the same as inspection flow for E11.

10. E16: Swing-in and Swing-out Signals are lit simultaneously!



11. E17: Swing-in and Swing-out Signals are both missing!

Method of troubleshooting is the same as inspection flow for E16.

Appendix A, Control of Auxiliary Equipment (Sprayer/Conveyor)

The robot control provides an output signal that may be used to control an auxiliary device like a conveyor or sprayer. This output is in the form of a single normally open dry contact on relay K5, Connection to this circuit may be made on the terminal strip “CAN” located on the inside of the door of the robot control box. (See section 6.5 for location.)

1 The output is controlled as follows:

- a. When Sprayer is selected. K5 closes as the “Allow Mold Close” line of the robot program is read. K5 remains closed for the amount of time programmed in the timer section of the program that is running. (See section 4 for timer setting) The mold close enable output signal is not made until the timer times out. The cycle counter controls the frequency of the spray action. If the counter is set to 3 then the sprayer is activated every third cycle. (See section 3 for counter setting)
- b. When conveyor is selected. K5 closes at the end of the robot program. K5 stays closed for the amount of time set on the timer. (See section 3 for timer setting) In this mode K5 closes every cycle.

2 Sprayer/ conveyor is selected as follows

- a. From the main menu press F2 for manual Mode
- b. From manual mode press F2 for System
- c. From the System page press page down to get to page 2/3.
- d. Use +/- to change between Sprayer and Conveyor
- e. Press Esc to return to Manual Mode Menu

3 Setting the Timer and Counter

- a. Auxiliary timer controls how long the relay K5 stays closed when activated. Aux counter controls the frequency of K5 activation during Sprayer Mode.
From the Main menu press F1 to select Auto Mode



A. Auxiliary Control Circuit

From the Auto mode select the Mold Number you wish to run/modify

Press F1 to start

Page down until page 4/5 “CYC-Counter”

Press F2 for Aux page 5/5.

Use arrow keys to select field and +/- keys to change value.

Press Esc key to exit.

Press F1 to select timers/counters.

Note: If you do not want K5 to activate, set timer to 0.0



A. Auxiliary Control Circuit



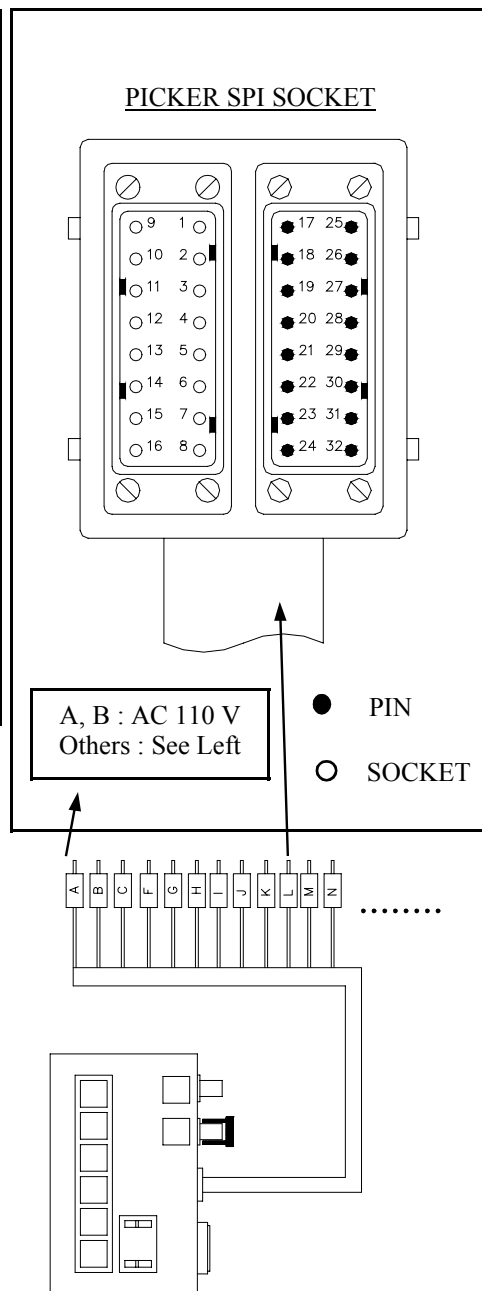
2-14 SPI Interface Definition

PIN#1	PIN#2	<u>SIGNAL (FROM IMM TO ROBOT)</u>	
1	9	EMERGENCY STOP (I.M.M)	While the injection molding machine emergency stop is activated, the circuit will open and will activate the emergency stop circuit of the robot. The injection molding machine emergency stop circuit will be hard wired in series with the robot emergency stop circuit. The current of this signal must not exceed 6 amps
2	16	MOLD FULLY OPEN (I.M.M)	This signal is present when the contacts are closed and indicates that the mold is in a predetermined fully open position. The signal is maintained whenever the mold is the predetermined fully open position.
3	11	MOVABLE GATES CLOSED (I.M.M)	This signal is present when the contacts are closed and indicates that the movable gates and guard that prevent access to robot motions are closed. The signal maintained as long as the movable gates and guard are closed.
4	16	EJECTOR FULLY RE-TRACTED	This signal is present when the contacts are closed and indicates that the ejector are fully retracted. The signal is maintained while the ejectors are fully retracted
5	16	EJECTOR FULLY FORWARD	This signal is present when the contacts are closed and indicates that the ejectors are fully forward. The signal is maintained while the ejectors are fully forward
6	16	CORE FULLY SET	This signal is present when the contacts are closed and indicates that the cores are fully set. The signal is maintained while the ejectors are fully forward.
7	16	CORE FULLY PULLED	This signal is present when the contacts are closed and indicates that the cores are fully pulled. The signal is maintained while the cores are fully pulled
8	16	REJECT PART	This signal is present when the contacts closed and indicates that the molded part is not acceptable. The signal must be given on/or before the mold fully open signal and removed with the start of mold closing.
10	16	FULLY AUTOMATIC	This signal is present when the contacts are closed and indicates that the mode of operation of the injections molding machine is fully automatic. This signal is maintained as long as the injection molding machine is in fully automatic
12	16	MOLD FULLY CLOSED	This signal is present when the contacts are closed and indicates that the injection molding machine has reached tonnage set point. The signal is maintained as long as the mold is fully closed.
15	16	NO PART AVAILABLE	This signal is present when the contacts are closed and indicates that no molded part is available. The signal must be given before the start of mold opening and removed with the start of mold closing.
PIN#1	PIN#2	<u>SIGNAL (FROM ROBOT TO IMM)</u>	
17	32	PERMIT CLAMP CLOSE	The closing of this contact indicates that the robot is in a predetermined safe position and allows the IMM clamp to close. Clamp closing motion must be interrupted whenever this signal is not present. This signal is no longer required once the mold is fully closed.
18	26	PERMIT CLAMP MOTION	The closing of this contact indicates that the robot is in a predetermined safe position and allows IMM clamp motion. Both clamp closing and clamp opening motion must be interrupted whenever this signal is not present. The current of this signal must not exceed 6 amps
19	27	EMERGENCY STOP	While the robot emergency stop is activated, the circuit will open and activate the emergency stop circuit of the injection molding machine. The robot emergency stop circuit will be hardwired in series with the injection molding machine emergency stop circuit. The current of this signal must not exceed 6 amps.
20	32	ROBOT NON-OPERATIONAL	The switch contact is open when the I.M.M is operated with the robot. The switch is closed when the machine is operated without the robot. When the switch is closed, the signal permit Clamp Close (17,32) Permit Clamp Motion (18,26) and Emergency Stop (Robot) (19,27) are still monitored. All other signals can be in an undetermined state.
21	32	PERMIT EJECTOR RE-TRACT	The closing of this contact permits the ejectors to retract. This signal is maintained until the ejectors are fully retract.
22	32	PERMIT EJECTOR FORWARD	The closing of this contact permits the ejectors to go forward. The signal is maintained until the ejectors are fully forward.
23	32	PERMIT CORE PULL	The closing of this contact permits the cores to be pulled. The signal is maintained until the cores are fully pulled.
24	32	PERMIT CORE SET	The closing of this contact permits the cores to be set. The signal is maintained until the cores are fully set.

2-15 SPI and Top Swing Sprue Picker Interface connector number (For SPI)

<u>SPI PIN</u>	<u>TOP PIN</u>	<u>SPI PIN</u>	<u>TOP PIN</u>	<u>SIGNAL (FROM IMM TO ROBOT)</u>
1	IEG	9	IEP	EMERGENCY STOP (I.M.M)
2	F	16	C	MOLD FULLY OPEN (I.M.M)
3	E	16	C	MOVABLE GATES CLOSED (I.M.M)
4		16		EJECTOR FULLY RETRACTED
5		16		EJECTOR FULLY FORWARD
6		16		CORE FULLY SET
7		16		CORE FULLY PULLED
8		16		REJECT PART
10		16		FULLY AUTOMATIC
12	D	16 and 11	C1	MOLD FULLY CLOSED
15		16		NO PART AVAILABLE

<u>SPI PIN</u>	<u>TOP PIN</u>	<u>SPI PIN</u>	<u>TOP PIN</u>	<u>SIGNAL (FROM ROBOT TO IMM)</u>
17	L	32	K	PERMIT CLAMP CLOSE
18	J	26	I	PERMIT CLAMP MOTION
19	REIN	27	REOUT	EMERGENCY STOP
20		32		ROBOT NON-OPERATIONAL
21	●	32	●	PERMIT EJECTOR RETRACT
22	N	32	M	PERMIT EJECTOR FORWARD
23	●	32	●	PERMIT CORE PULL
24	●	32	●	PERMIT CORE SET



NOTE 1

SPI robot Interface has a number of signals. It is not necessary to connect all the SPI robot interface signal to the TOP series Sprue Picker. Connect A,B to power (AC 110 Volt) and connect the wiring as shown above.

You may not find a Cycle start signal from picker to Injection Molding Machine at SPI robot interface. Concerning SPI interface, please contact your machine builder with any question. (E-STOP Function (IEG,IEP, REIN, REOUT) was added after the machine S/N : 04011301) ● ——— ● ← : Jumper in the Robot SPI plug

NOTE 2

To operate molding machine without Robot, operation Disconnect Robot SPI plug from Molding Machine and connect SPI dummy plug which was plugged in the molding machine. (Robot Non- Operational and other permits function should be jumper in the dummy plug)