

Bomarc Economical Series

Traverse beam robots

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1. SAFETY AND WARRANTY

1.1 Description of Safety

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

1. The service life of robot is 10 years or 5,376,000 cycles (Say, 10 years x 280 days x 8 hours x 60 minutes x 4 cycles) under normal operating conditions.
2. The robot has been designed and manufactured in conformity with EN ISO 12100-1, EN ISO 12100-2 and EN775 standards.
3. This robot required necessary adjustment and maintenance as stipulated in this manual, therefore we strongly suggest you to read this and observe carefully before any adjustment and maintenance is carried out.
4. The necessary warning labels are posted on the robot to minimize residual risks. Please pay attention to read the warning labels before and during operation.
5. Safety regulations shall be highly concerned while handling and transporting the robot.
6. A fully trained operator can only operate the robot.
7. All operation and adjustment of the robot must be carried out fully accordance with description of this manual.
8. Danger working areas are noted in this manual. The system integrator must install appropriate safeguarding surrounding the danger working areas in conjunction with an injection moulding machine.
9. Do not operate robot if there is a person working or standing in the danger area.
10. The controller must be placed outside the danger area.
11. During maintenance and mould changed, electrical power must be turned off and the pneumatic source disconnected.
12. The robot is equipped with trouble detective function. The user may rectify the problems according to the trouble-shooting guide or contact agent for service.

1.2 Warranty and Non-warranty

1.2.1 Warranty Period

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

1.2.2 Non-Warranty

The following are non-warranty items.

- 1 Damage due to personal negligence or mistake in operation.
- 2 Damage due to natural disaster such as : earthquake, typhoon, thunderbolt strike and fire, etc.
- 3 Damage due to self-modification and poor adjustment by user.
- 4 Consumable item (As listed below, but not limited)

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

2. INSTALLATION

2.1 Handling and Transportation

- (1) Adjust arm to close to traverse beam, and adjust shock absorber, then compress arm.
- (2) Adjust crosswise component to the middle of two hang holes on arch.



- (3) Install lifting ring and fix sling.



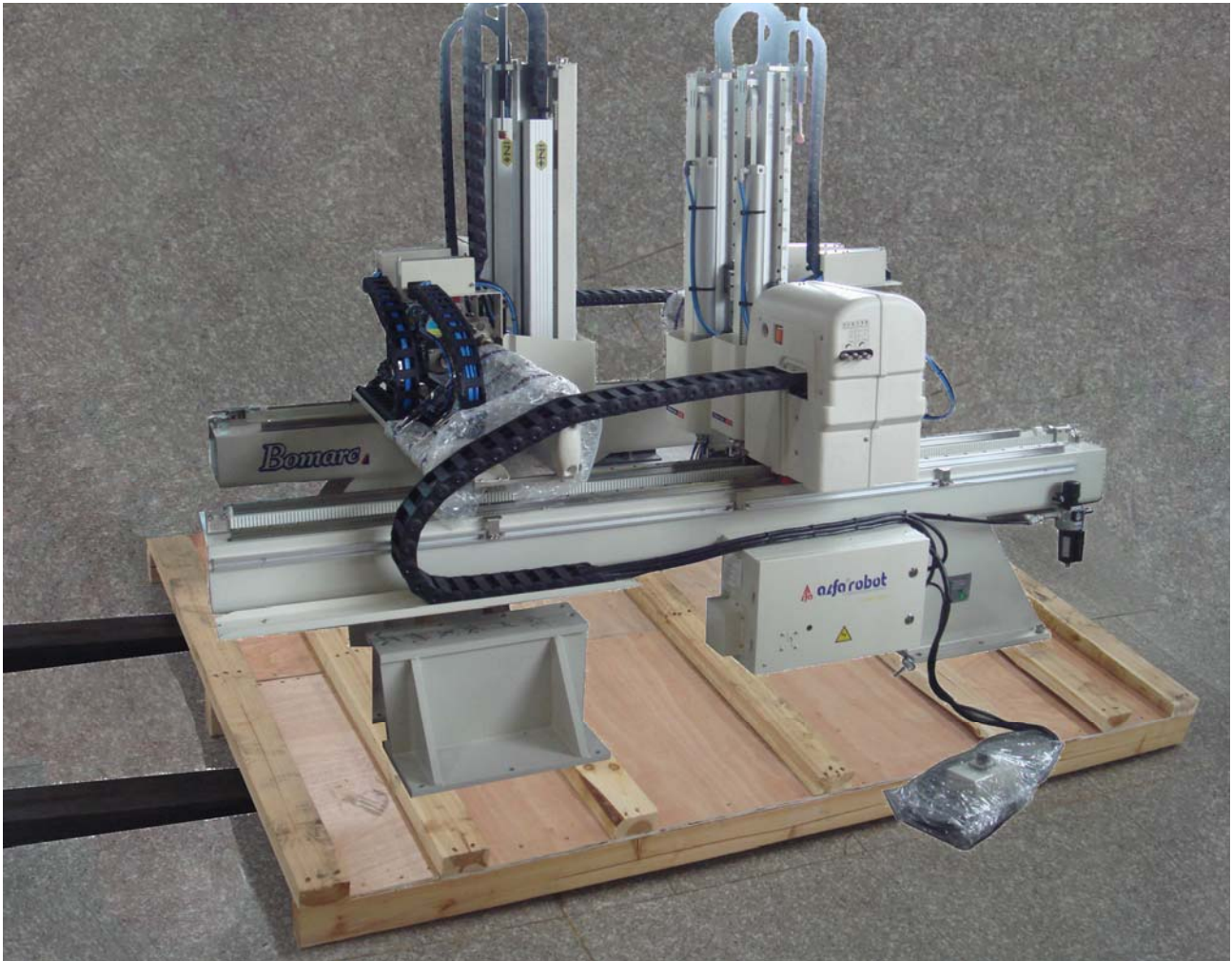
- (4) Moved by crane



[CAUTION]

Pay attention to the gravity center during transporting with a fork-lift and sure to avoid from dropping.

- Use pallet to move



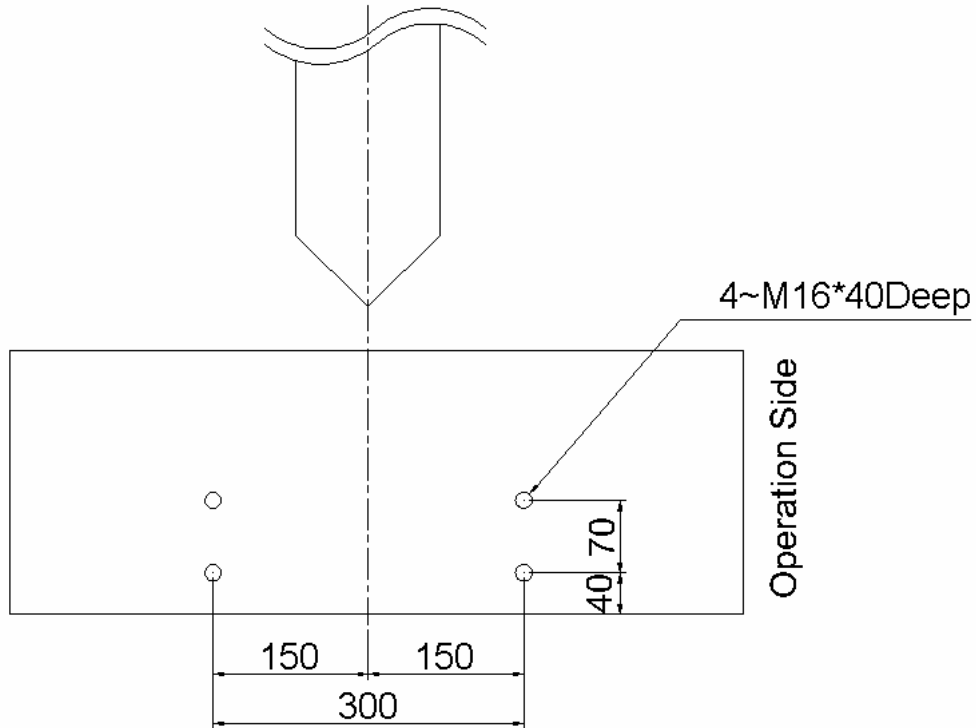
Notice :

- ◇ Robots placed symmetrically to save pallet space.
- ◇ Paying attention to the balance of gravity.
- ◇ Pallet wider side is always smaller than 2250mm.
- ◇ Robot allocation is not allowed out of pallet.
- ◇ Pallet need have strengthened crate (like attached picture).
- ◇ In addition to fastening robots on the pallet with screw, furthermore winding steel wire around robots on the pallet.
- ◇ After robots are fixed on the pallet, oil/grease is applied to easily rusted part.
- ◇ Mantle whole robot with plastic bag on the pallet.

2.2 Installation Dimensions

■ Mounting foundation of 650-850 series

unit: mm



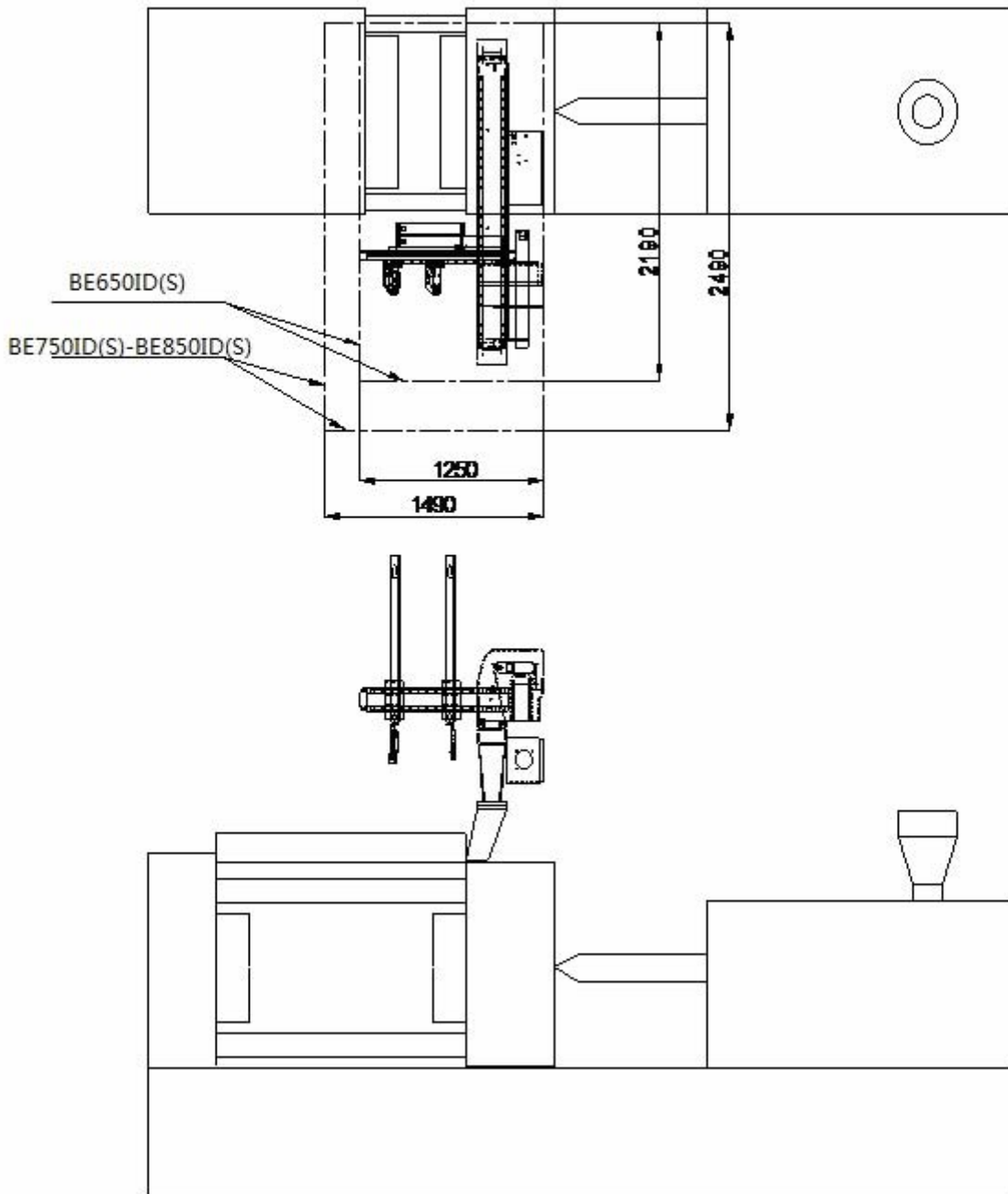
■ For the controller supporting structure (TRC1300C) unit: mm



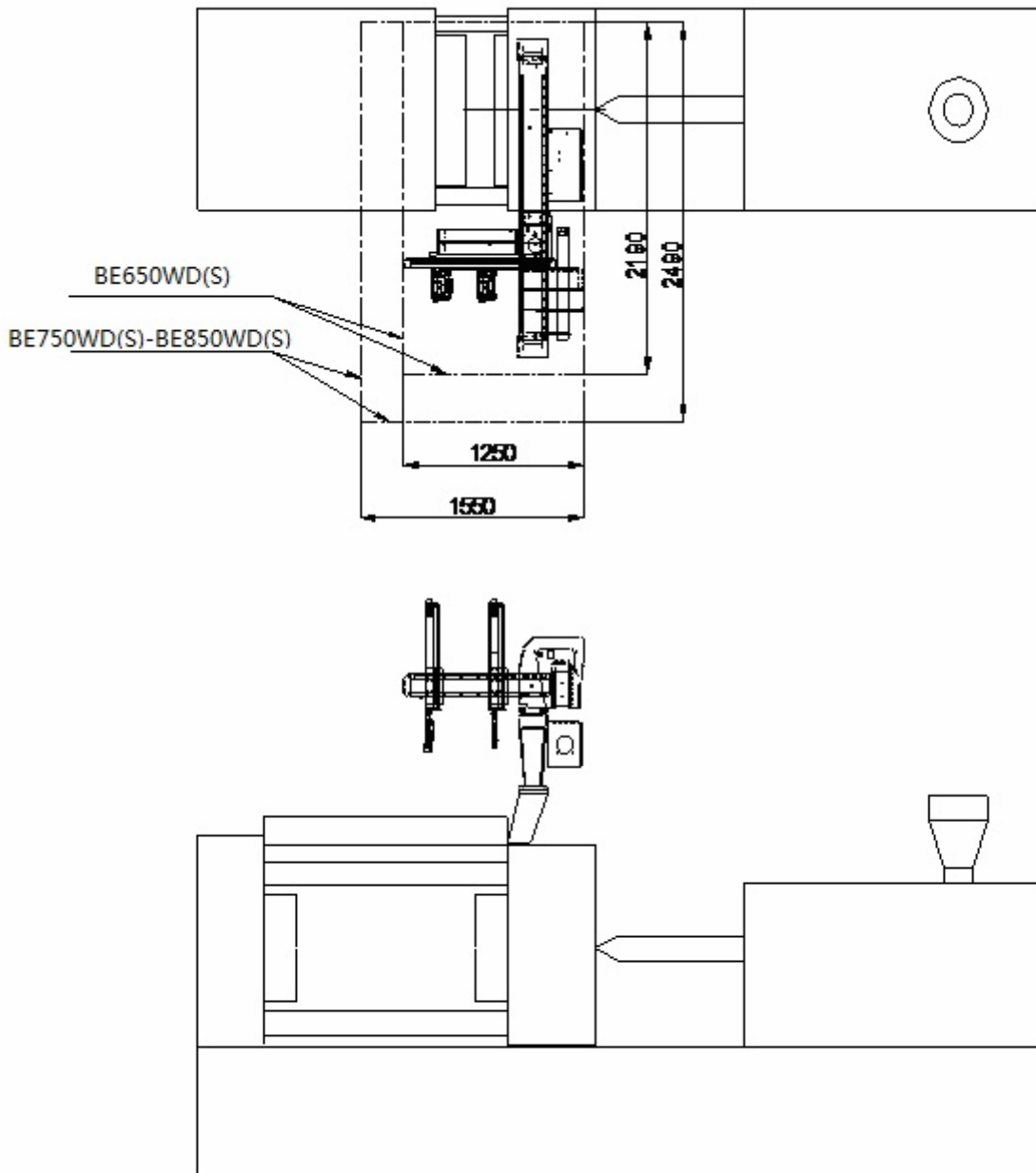
2.3 Protective Area

The system integrator should design and install appropriate safeguarding at user's cost.

2.3.1 Protective area of 650ID(S)-850ID(S)

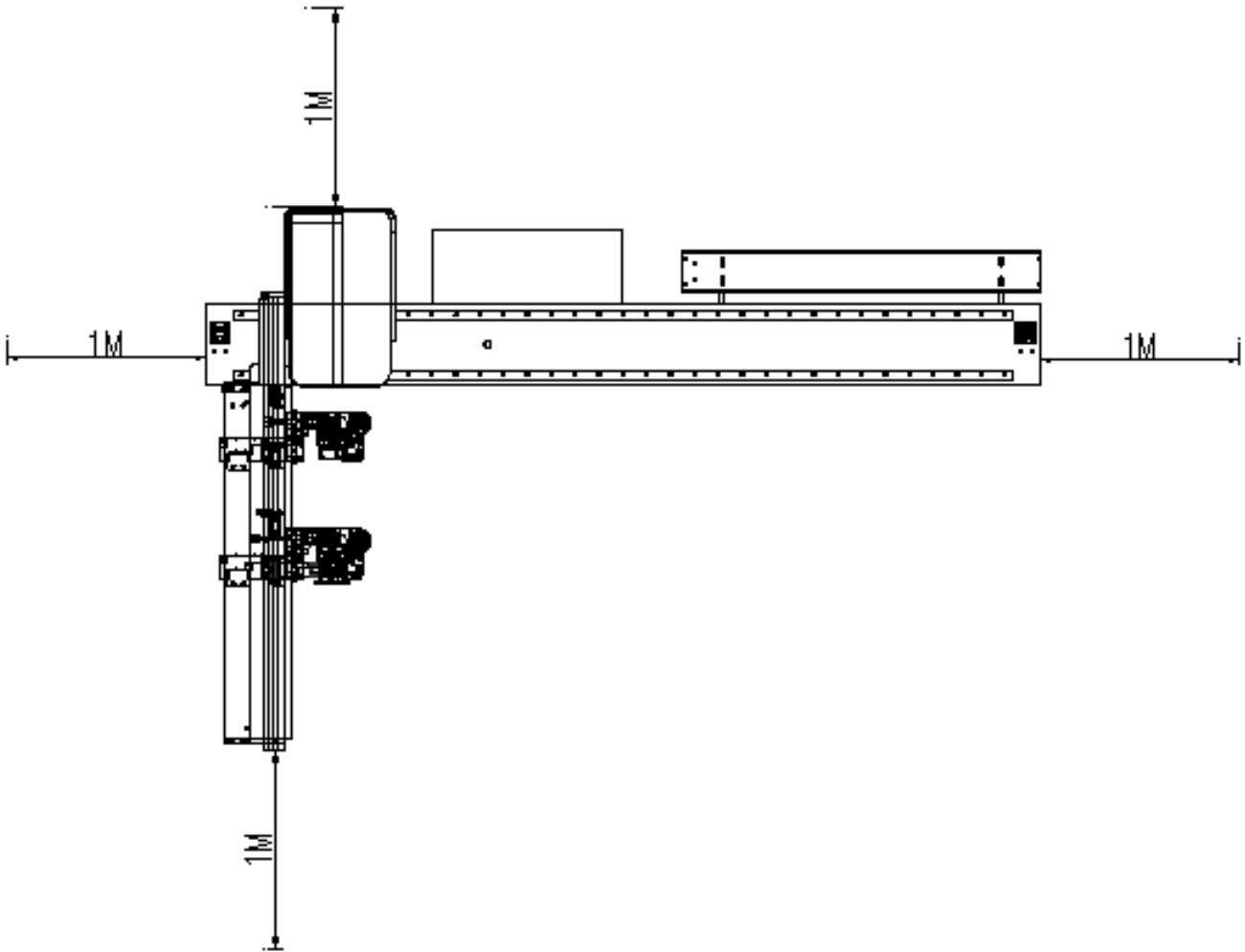


2.3.2 Protective area of 650WD(S)-850WD(S)



2.4 Measurement of Noise Level

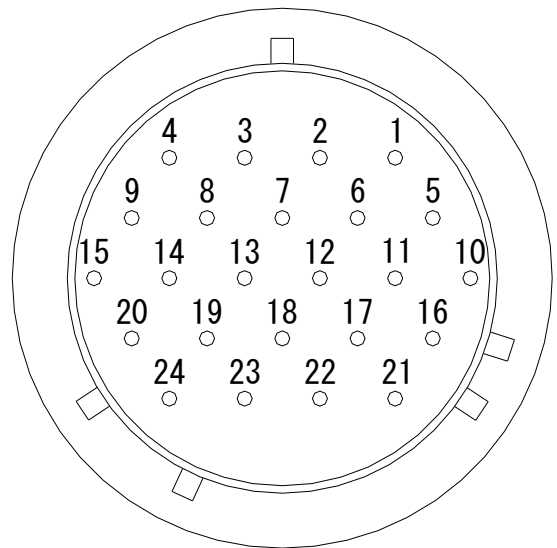
1. Noise measurement is done under noise test environment of 60 dB(A).
2. Measuring equipment mode RION NA-24 sound level gauge.
3. Measurement is based on 1m distant from robot and 1.6m height from floor.
4. Model BE850WD is measuring sample, also suitable for other type robot.
5. Measurement position as below:



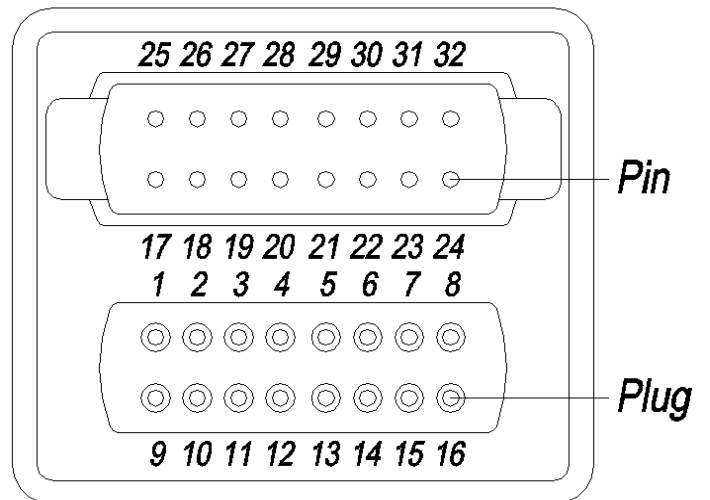
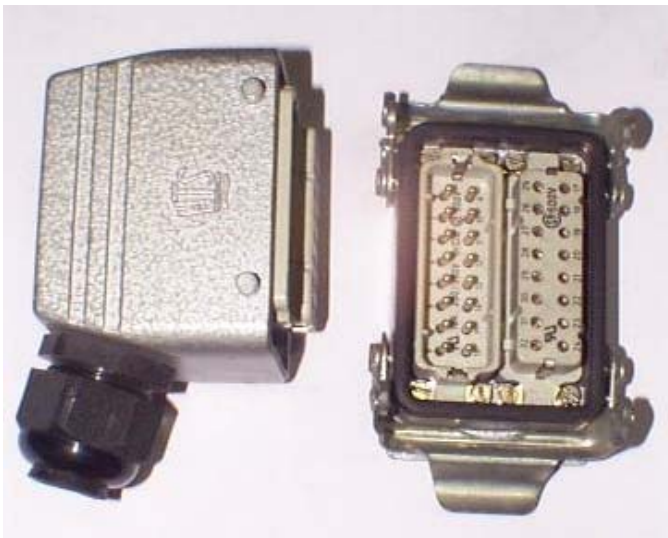
Measurement Position	Noise Level dB(A)
1.	67
2.	65
3.	67
4.	68

2.5 Connection with I.M.M

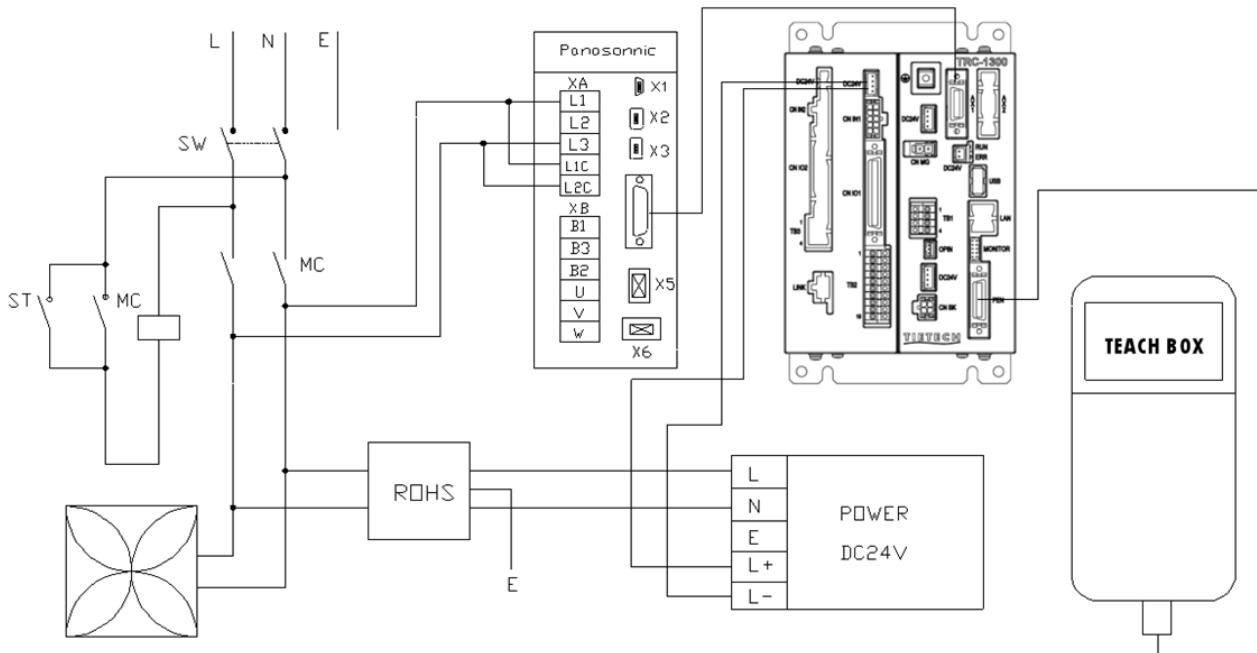
2.5.1 ALFA ROBOT standard connector



2.5.2 EUROMAP 12 joint layout (Optional)



2.5.3 Connection with Power Source



2.5.4 Description of I.M.M connection (CE)

Signal from I.M.M to handling device/ robot (E12)

PCB Joint No.	Cable No.	I.M.M Joint No.	Signal Definition	Description
1ESM 9L-	8 9	1 9	Emergency Stop of Machine (ESM)	The switch contact must be opened when the IMM emergency stop is getting started (Refer to EN60204-1). Opening the switch contact to make robot emergency stop. The signal current cannot be greater than 6 Amps.
2MOP	1	2	Mould Open Position (MOP)	The switch contact must be closed when mould opening position is equal or more than required position. Inadvertent alteration to mould opening stroke smaller than that required for the handling device/ robot to approach must be impossible. The signal must remain closed as long as the mould is open and must not be interrupted by a change of operation mode or safety guard opening.
3SDM 11	6 7	3 11	Safety Device of Machine (SDM)	The switch contact must be closed when safety device (e.g. safety guard, footboard safety, etc.) on the injection moulding machine are operative so that dangerous movement of the handling device/ robot are possible. The signal is active in any operation mode.
5EFP	2	5	Ejector Forward Position (EFP)	This switch contact must be closed when ejector of I.M.M finished forward motion. This signal is the confirm signal of contact No. 22, EEF (Refer to contact No. 22).
8RJT	3	8	Reject (RJT)	This switch contact must be closed when there is mould open with rejected products until enable mould closure signal is sent. (Please refer to contact No. 17)
10 AUTO	4	10	Injection Moulding Machine full automatic	This switch contact must be closed when setting I.M.M to full auto mode. If I.M.M is set from auto mode to manual mode or other mode when robot taking out products, the robot will finish this cycle automatically and return to waiting position.
16L-	5	16	Reference Potential (L-)	This is common potential input of robot. The code is L-.

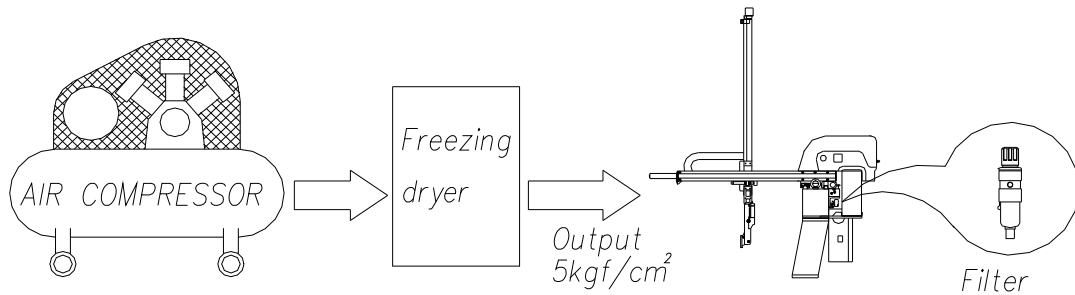
Signal from handling device/ robot to I.M.M

PCB Joint No.	Cable No.	I.M.M Joint No.	Signal Definition	Description
17EMC	10 11	17 32	Enable Mould Close (EMC)	This switch contact will be closed when robot takes out product and ascend to upper position in order to enable mould close. Mould close will be interrupt if robot alarms during motion.
18EMO 26EMO	16 17	18 26	Mould Area Free (MAF)	The switch contact is closed when the handling device/ robot is outside the mould area and does not interfere with mould opening and closing movement. The switch contact must be opened when the handling device leave its start position. If the switch contact is open neither opening nor closing of the mould may occur.
19ESR 27ESR	23 24	19 27	Emergency Stop of Robot (ESR)	This switch contact must be opened when pressing the emergency stop button on robot operator and also stop the injection moulding machine. (Please refer to EN60204-1)
20ROM	12 13	20 32	Robot Operation Mode (ROM)	There is "Robot in use" or "Robot is not used" function to chosen in the system. When robot mode switch to "Robot is not used" function, the injection moulding machine will operate without robot. Press "RESET" to reset the setting function.
22EEF	14 15	22 32	Enable Ejector Forward (EEF)	This switch contact must be closed when robot allows I.M.M forward.
28EMO	18 19	28 32	Enable Mould Open (EMO)	The switch contact is closed when the handling device/ robot has taken the part and allows to continue mould opening.

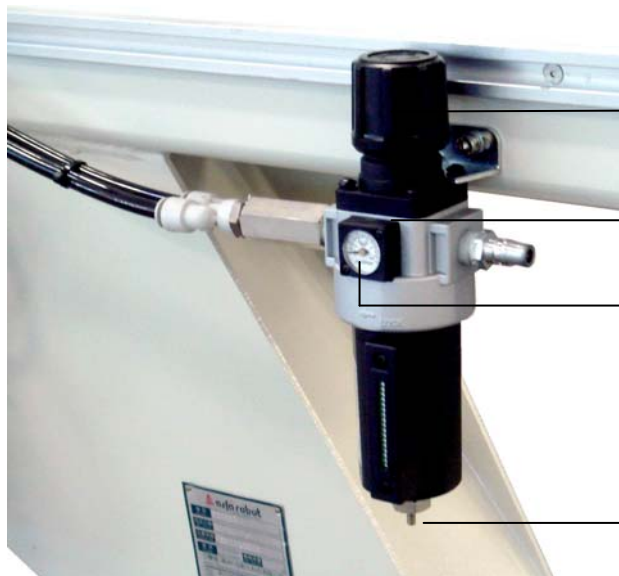
2.6 Connection with Pneumatic Supply Source

2.6.1 Supply of Pneumatic Source

In order to maintain the robot's normal operation, please be sure to fit freezing dryer at the outlet of air compressor to remove the wet and moisture from the air, thus to obtain the extended service life of robot.



2.6.2 Connection with Pneumatic Supply Source



Pressure turret: Pull up and to add pressure through clockwise rotation.

Air source inlet

Pressure gauge

Drain valve

- (1) To minimize air pressure loss in the pipe for a long distance source (10 meters away), be sure to use a rigid pipeline.
- (2) After completing the connection, adjust the pressure on the Air Filter/ Regulator until it reaches 5 kgf/cm².
- (3) Check the water trapped in Air Filter/ Regulator and drain water away everyday.

2.7 Connection with Safety and Function Test

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

- (1) Signal of Enable Mould Close
- (2) Signal of Safety Gate Open
- (3) Signal of Mould Open End
- (4) Adjustment of moving speed for all axes
- (5) Detection of Reset
- (6) Mould Close Function after removal of mould

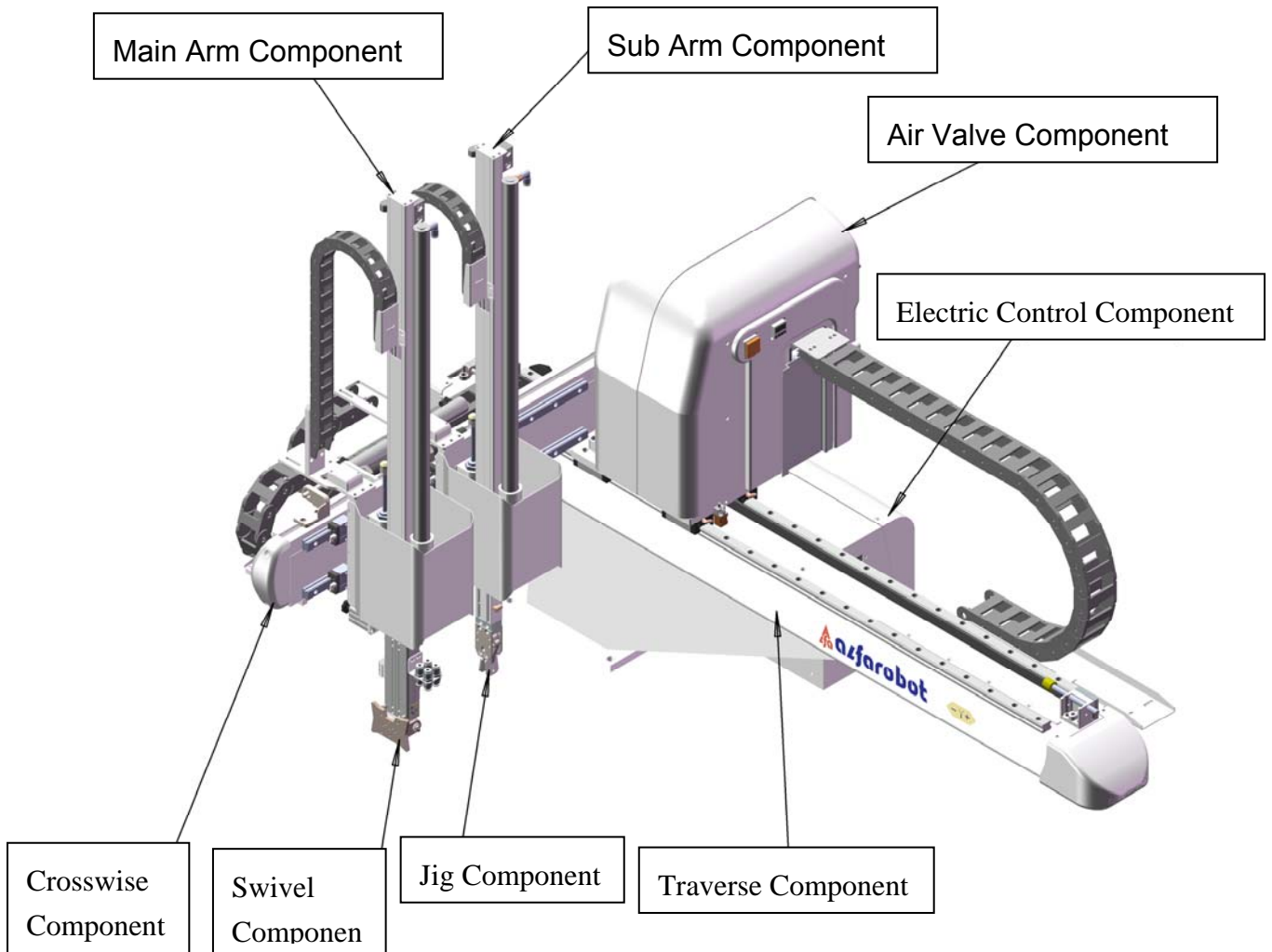
[CAUTION] Connection test must be carried out by a fully trained technician or engineer only. If there is any problem, please feel free to notify your local supplier or ALFA.

2.8 Procedures for Robot Dismantlement

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

3. DESCRIPTION OF ROBOT STRUCTURE

3.1 Robot Illustration



3.2 Specification

3.2 Specification

General Specification

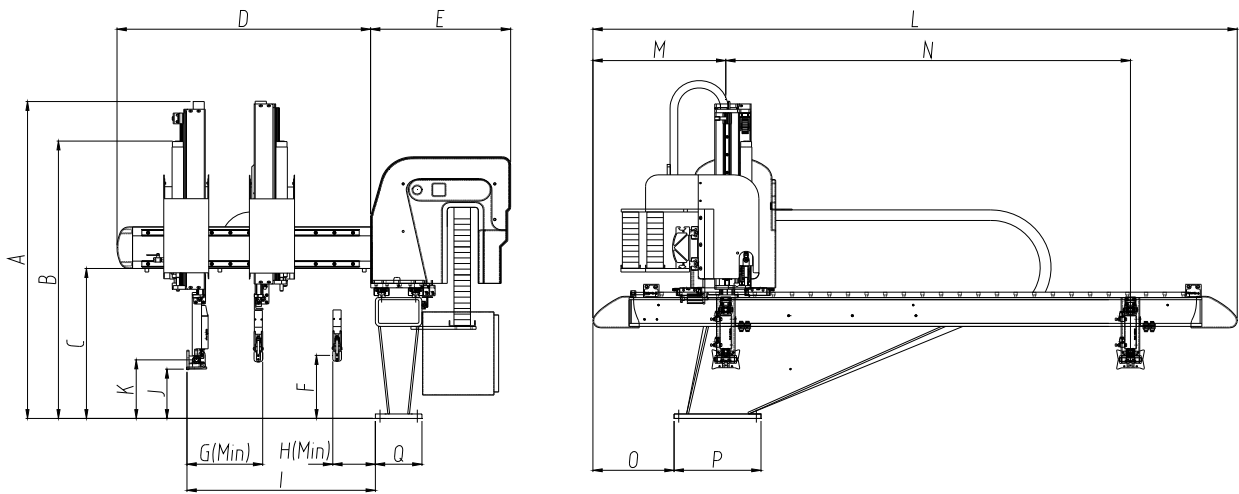
Power Source	Working Pressure	Max. Allowed Pressure	Drive System	Swivel	Control System
3 ϕ AC220V \pm 10V 50/60 HZ	5 Kg/cm ² 0.49 MPa	8Kg/cm ² 0.8 MPa	Y Servo Motor X,Z Pneumatic Cylinder	90° Fixed Pneumatic	TRC1300C Controller

Main Specification

Model	BE650	IDY/ISY/WDY/WSY	BE750	WDY/WSY	850	WDY/WSY
Power Capacity (KVA)	0.5 / 1		1		1	
Recommended IMM (ton)	50-150		150-200		200-280	
Traverse Stroke (mm)	1000 (1300)		1300 (1500)		1300 (1500)	
Crosswise Stroke (mm)	P:180 R:100		P:180 R:100		P:300 R:100	
Vertical Stroke (mm)	650		750		850	
Max. Loading (Kg)	3		3		3	
Dry Take Out Time (sec)	1.3		1.3		1.4	
Dry Cycle Time (sec)	8.0		9.0		9.5	
Air Consumption (NI/cycle)	20		22		23	
Net Weight (Kg)	150-210		160-220		180-260	

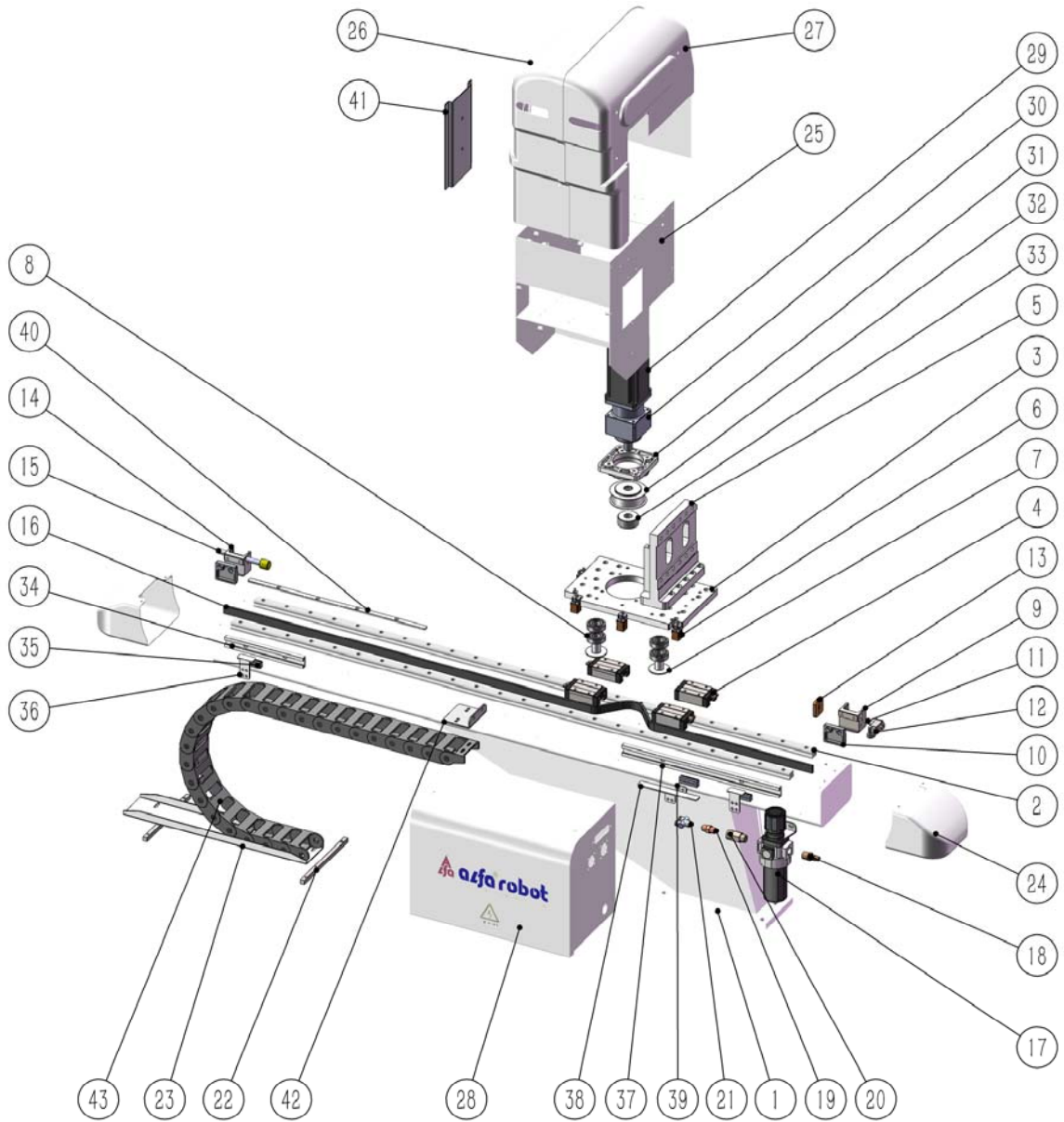
- Dry cycle time is calculated to delay time is 0, vertical stroke and kick stroke at 100mm. There is no guarantee all the robots achieving this cycle time due to every condition is different.
- All statements here subject to change without advance notice.

3.3 Dimensions



Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q					
BE650 ID	1370	1230	505	786	450	260	210	145	700	200	235	1775	400	1000	260	280	130					
BE750 ID	1560	1300	575	786		330		120	670	260	295							2115	475	1300	300	350
BE850 ID	1695	1500		966		220	100	840	280	315												
BE650 WD	1160	940	505	786	450	230	150	190	680	185	215	1775	400	1000	260	280	130					
BE750 WD	1310	1050	575	786		300		170	635	250	285							2115	475	1300	300	350
BE850 WD	1360	1100		966		300	135	160	815													

3.4 Traverse Components



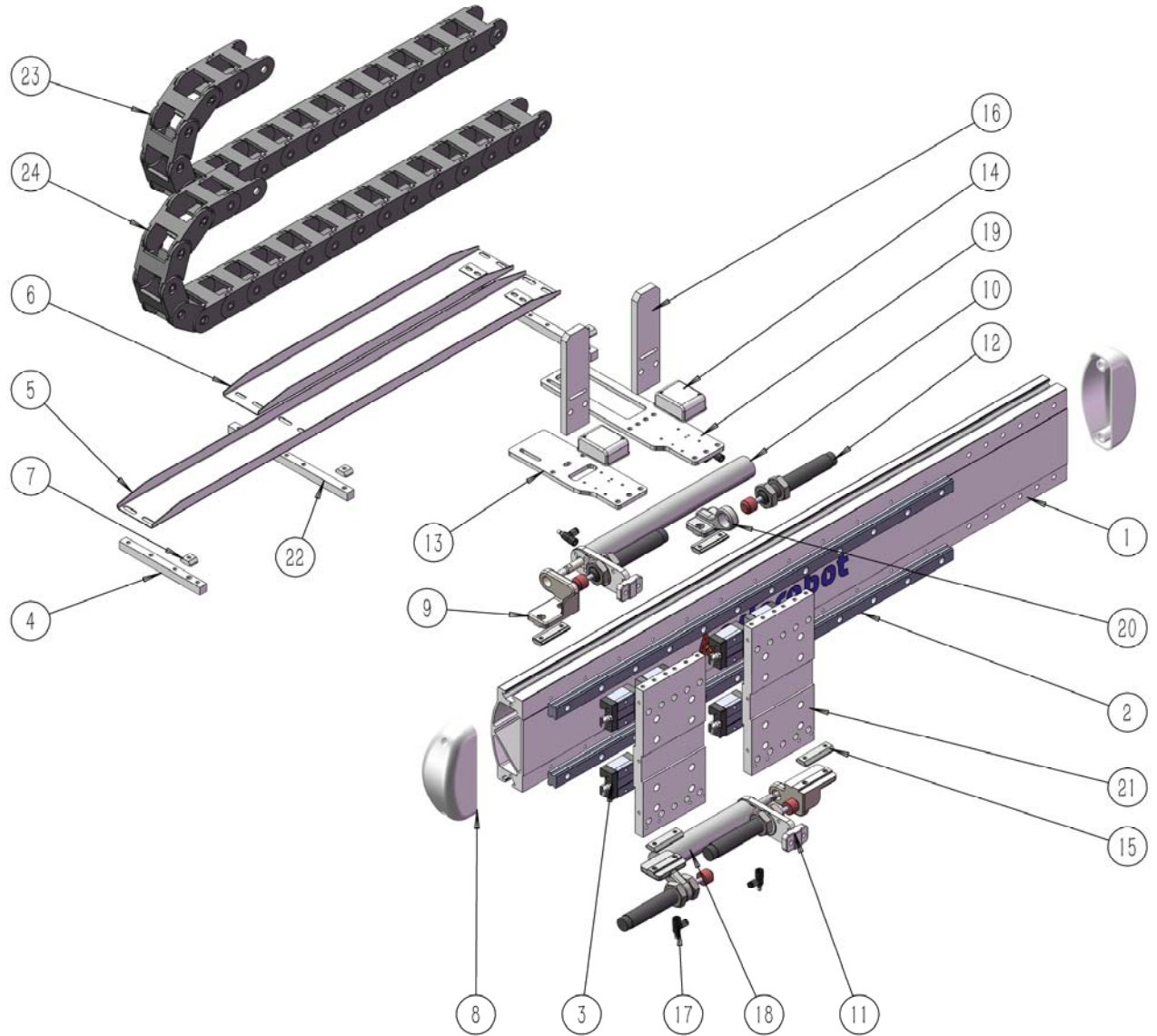
Part list of traverse

Item	Description	Serial No.	Q`ty	Remark
1	Traverse supporting base (ST1000)	AW05A012	1	BE650
	Traverse supporting base (ST1300)	BI07A016	1	BE750-850
2	Slide rail (MSB25 L1420)	MLP25-1420	2	BE650
	Slide rail (MSB25 L1720)	MLP25-1720	2	BE750-850
3	Traverse sliding plate	BA06A010	1	BE650
		RF00A012	1	BE750-850
4	Slide rail block (MSB25S)	MLP25B	4	
5	Traverse standing plate	BA06A020	1	BE650
		RF00A020	1	BE750-850
6	Proximity switch (QL-05NO 1M)	RSN1001	2	
	Proximity switch (QL-05NB-0 1M)(B contact)	RSN1002	1	
7	Idler pin	AW00A050	2	BE650
		BI00A090	2	BE750-850
8	Ball bearing 6004ZZ	MBG1-6004	4	
9	Mounting bracket of traverse-in belt	BI00A050	1	
10	Belt clamping plate	BI00A060	2	
11	Guide-bar	BI00A110	1	
12	Fixed block for adjusting belt	BI00A080	1	
13	Clamping piece of cushion baffle	JE30A401	2	
14	Mounting bracket of traverse-out belt	BI00A040	1	
15	Stop lever of traverse-in	BI00A100	1	
16	Traverse belt (8M20W white)	MBT1-8M20	1	BE650
	Traverse belt (8M25W white)	MBT1-8M25	1	BE750-850
17	Air filter/ regulator (PCRC-F-63-G38-8M-CSH) Attached to the rack	PET2006	1	
18	Quick fitting (male 3/8') (30PM-A*1)	PFH0300	1	
19	Nipple	PTA0303	1	
20	Check valve	PTE0300	1	
21	Quick fitting	PQU1003	1	
22	Traverse protective board supporting frame	AI00A050	2	BE650
		BE00A030	2	BE750-850
23	Traverse protective board	YB0840465	1	BE650

3. Description of Robot Structure

		YB0840710	1	BE750-850
24	Arch end cover (Small)	AW00A140	2	BE650
	Arch end cover (Large)	AW00A200	2	BE750-850
25	Air valve	BF12H010	1	
26	Air valve cover (right)	BI00H020	1	
27	Air valve cover (left)	BI00H030	1	
28	Electric control	RBD-HB44-A1	1	
29	Panasonic motor (A5/ 400W/ no brake) (MHMD042G1U)	MMR2-0401	1	
30	SHIMPO reducer (VRSF-S9C-400-T1)	MMR5-1002	1	
31	Fixed plate of servo motor	RF00A030	1	
32	Traverse servo belt pulley	YF082002A	1	
33	Key-free shaft sleeve A (SEC200- φ 19*47)	MMR3-0005	1	
34	Sensor plate frame (200L)	RF00A060	1	
35	Mounting bracket of sensor contact pad (15*45*10T)	RF00A070	3	
36	Traverse sensor plate	CW13A052	2	
37	Sensor plate frame (400L)	RF00A080	1	
38	Traverse sensor plate	CW13A051	1	
39	Spacer for safety sensor plate	CW13A140	1	
40	Safety area contact pad	YT0312045	1	
		TB19A145	1	
41	Air valve plate	BI00H041	1	
42	Fixed plate of protective chain	AW00A061	1	
43	Protective chain (25*58*21	MCN3140	32	

3.5 Crosswise Components

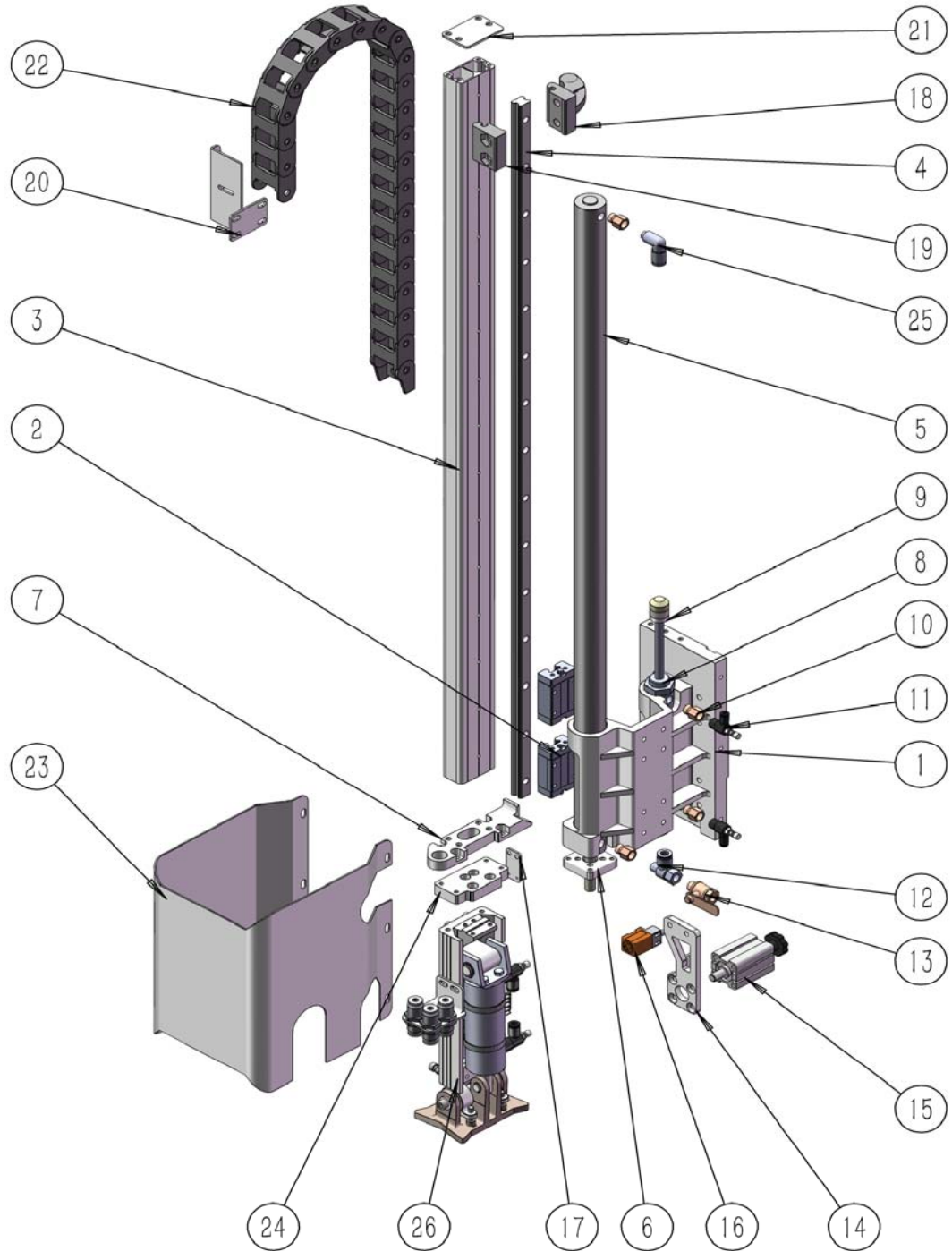


Part list of crosswise

Item	Description	Serial No	Q'ty	Remark
1	Aluminum profile of crosswise MF140001*960L	BI06B010	1	
	Aluminum profile of crosswise MF140001*1140L	BI08B010	1	
2	Slide rail (MSB20 L700)	MLP20-700	2	BE650-750
	Slide rail (MSB20 L880)	MLP20-880	2	BE850
3	Slide rail block (MSB20TS) (Two holes)	MLP20TS	8	
4	Crosswise protective board frame	BI00B070	1	
5	Crosswise protective plate	YB0620721	1	
6	Crosswise protective plate	YB0620451	1	BE650-750
		YB0620901	1	BE850
7	Fixed block	BI00B200	3	
8	Crosswise frame	BI00B110	2	
9	Crosswise driving base	BE00B010	2	
10	Crosswise cylinder for main arm	PCY25-YC250200K	1	BE650-750
		PCY25-YC250300K	1	BE850
11	Mounting bracket of crosswise cylinder	AI00B090	2	
12	Shock absorber	MAR2030	4	
13	Wiring box holder of main arm	BA00B030	1	
14	Terminal cover	AI00B050	2	
15	Fixed block	BI00B060	4	
16	Bottom fixed plate of protective chain	BA00C030	2	
17	Speed control joint	PSP1-0601	4	
18	Crosswise cylinder of sub arm	YC250100K	1	
19	Wiring box holder of sub arm	BA00B040	1	
20	Mounting bracket of crosswise cushion	BE00B020	2	
21	Crosswise sliding plate	BAW00B020	2	Not for BE850ID sub arm
22	Crosswise protective board frame	BE00B050	2	
23	Protective Chain 25*38	MCN3150	17	BE650 sub arm

			20	BE750-850 sub arm
24	Protective Chain 25*38	MCN3150	22	BE650 main arm
			26	BE750-850 main arm

3.6 Main Arm Components (650-750 Single Stage)

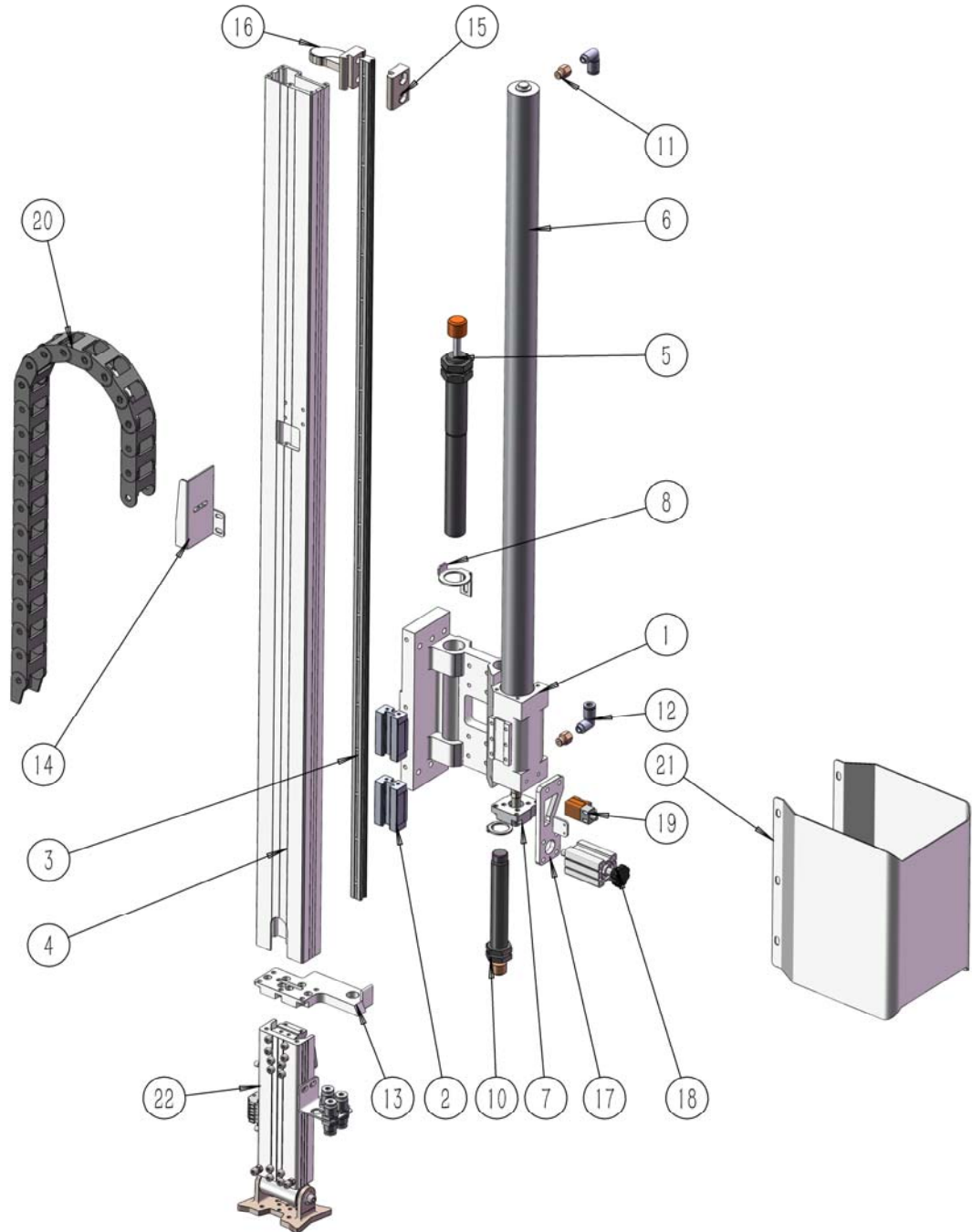


Part list of Main arm (650-750 Single stage)

Item	Description	Part No.	Q'ty	Remark
1	Mounting bracket of vertical	BA00C010	1	
2	Slide rail block (MSB15S/ 4 holes) (PMI)	MLP15B	2	
3	Aluminum profile of arm (MF050005*890L)	PI06C030	1	BE650
	Aluminum profile of arm (MF050005*1010L)	PI07C030	1	BE750
4	Slide rail (MSB15S-880L) (PMI)	MLP15-880	1	BE650
	Slide rail (MSB15S-1000L) (PMI)	MLP15-1000	1	BE750
5	Vertical cylinder φ 25*650ST(Fontal)	PCY25-YC250650K	1	BE650
	Vertical cylinder φ 25*750ST(Fontal)	PCY25-YC250750K	1	BE750
6	Fixed plate of cylinder	AI00C030	1	
7	Bottom fixed plate of sub arm	AI00D052	1	
8	Buffer cylinder (CM2WB20-80-WS36L043)	PCY25-YC200080	1	
9	Buffer cylinder washer	PI00C060	2	
10	Transition pipe	PTB0101	4	
11	Speed control joint	PSP1-0401	2	
12	Quick fitting (NPQS-F-LT-R18-Q8)	PQT0811	1	
13	Copper corker	PTC0101	1	
14	Safety lock cylinder frame	AI00C040	1	
15	Safety lock cylinder	PCY2015M	1	
16	Proximity switch (QL-05NO*1M)	RSN1001	1	
17	Sensor plate of proximity switch	BI00C030	1	
18	Stroke stopper	AI00C131	1	
19	Stroke fixed block	AI00C141	1	
20	Fixed plate of protective chain	PI00C080	1	
21	Arm top lip	PI00C190	1	
22	Protective chain 20*25	MCN30100-OM	18	BE650
			22	BE750-850
23	Protecting cover of arm	BA00C0470	1	

24	Swivel connected block	AI00C300	1	
25	Quick fitting	PQL0801	1	
26	Swivel component	BW06UCH03	1	

3.7 Main Arm Components (850 Single Stage)

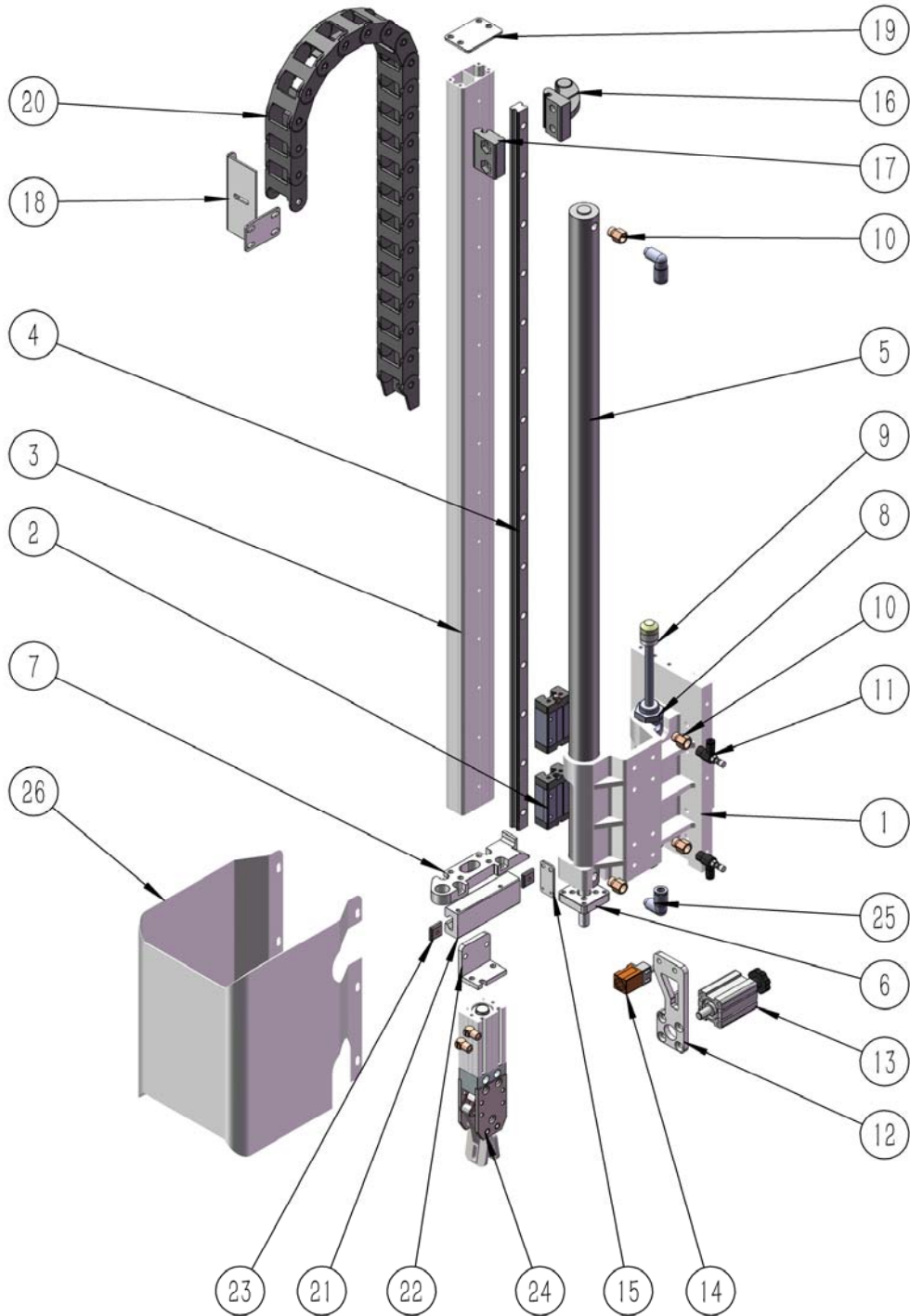


Part list of Main arm (850 Single stage)

Item	Description	Part No.	Q'ty	Remark
1	Mounting bracket of vertical	BA08C050	1	
2	Slide rail block (MSB15S/ 4 holes) (PMI)	MLP15B	2	
3	Slide rail (MSB15-1120L)	MLP15-1120	1	
4	Aluminum profile of arm (MF07005*1160L)	BA08C010	1	
5	Shock absorber 2580	MAR-2580	1	
6	Vertical cylinder (φ 32*850ST) (Fontal)	PCY25-YC320850K	1	
7	Mounting bracket of vertical cylinder	AW00C060	1	
8	Washer	BW00C420	1	
9	Washer	AW00C080	1	
10	Shock absorber (AC2050-11K)	MAR2050	1	
11	Transition pipe	PTB0101	2	
12	Quick fitting	PQL0801	2	
13	Swivel connecting board	BA08C020	1	
14	Fixed plate of protective chain	BA08C030	1	
15	Stroke fixed block	AI00C141	1	
16	Stroke stopper	AI00C151	1	
17	Safety lock cylinder frame	AI00C040	1	
18	Safety lock cylinder	PCY2015M	1	
19	Proximity switch (QL-05NO*1M)	RSN1001	1	
20	Protective chain 25*25	MCN3090	20	
21	Protecting cover of arm	BA08C040	1	
22	Swivel component	BW06UCH03	1	



3.8 Sub Arm Components (650-850 Single Stage)



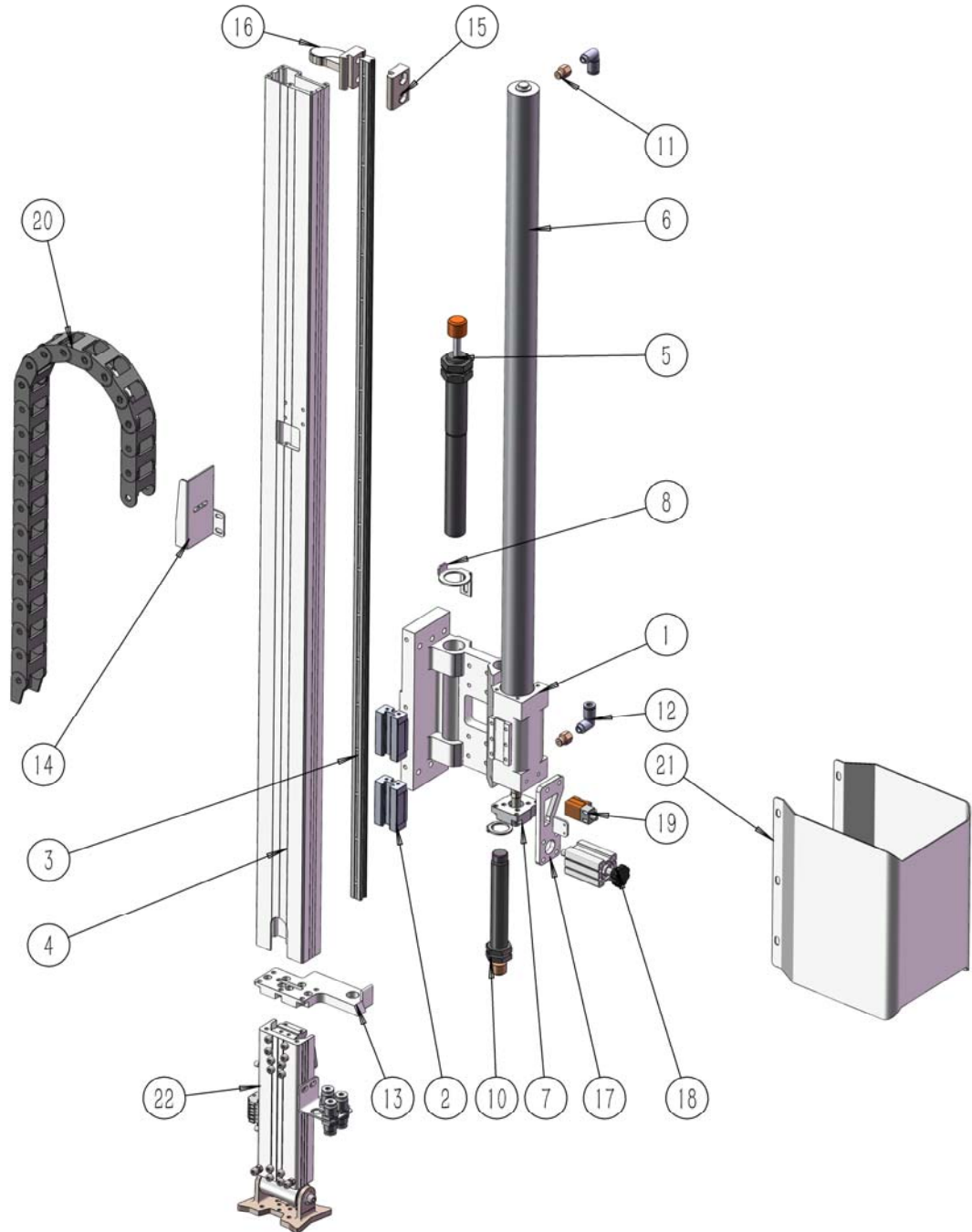
Part list of Sub arm (650-850 Single stage)

No	Description	Part No.	Q'ty	Remark
1	Mounting bracket of vertical	BA00C010	1	
2	Slide rail block (MSB15S/ 4 holes) (PMI)	MLP15B	2	
3	Aluminum profile (MF050005*890L)	PI06C030	1	BE650
	Aluminum profile (MF050005*1010L)	PI07C030	1	BE750
	Aluminum profile of arm (MF050005*1160L)	BA08D010	1	BE850
4	Slide rail (MSB15S-880L)	MLP15-880	1	BE650
	Slide rail (MSB15S-1000L)	MLP15-1000	1	BE750
	Slide rail (MSB15S-1120L)	MLP15-1120	1	BE850
5	Vertical cylinder (φ 25*650ST)(Fontal)	PCY25-YC250650K	1	BE650
	Vertical cylinder (φ 25*750ST)(Fontal)	PCY25-YC250750K	1	BE750
	Vertical cylinder (φ 25*850ST)(Fontal)	PCY25-YC250850K	1	BE850
6	Fixed plate of cylinder	AI00C030	1	
7	Bottom fixed plate of sub arm	AI00D052	1	
8	Buffer cylinder (CM2WB20-80-WS36L043)	YC200080	1	
9	Washer	PI00C060	2	
10	Transition pipe	PTB0101	4	
11	Speed control joint	PSP1-0401	2	
12	Safety lock cylinder frame	AI00C040	1	
13	Safety lock cylinder	PCY2015M	1	
14	Proximity switch (QL-05NO*1M)	RSN1001	1	
15	Sensor plate of proximity switch	BI00C030	1	
16	Stroke stopper	AI00C131	1	
17	Stroke fixed block	AI00C141	1	
18	Fixed plate of protective chain	PI00C080		
19	Arm top lip	PI00C190	1	
20	Protective chain (20*25)	MCN30100-OM	18	BE650
			22	BE750
			27	BE850
21	Gripper adjustment block	AI00D042	1	
22	Gripper fixed plate	BW00D031	1	
23	Fixed block (M5)	AW00B120	2	

3. Description of Robot Structure

24	Gripper	JC20R020S	1	
25	Quick fitting	PQL0801	2	
26	Protecting cover	BA00D040	1	BE650-750
		BA08D040	1	BE850

3.1 Main Arm Components (850 Single Stage)

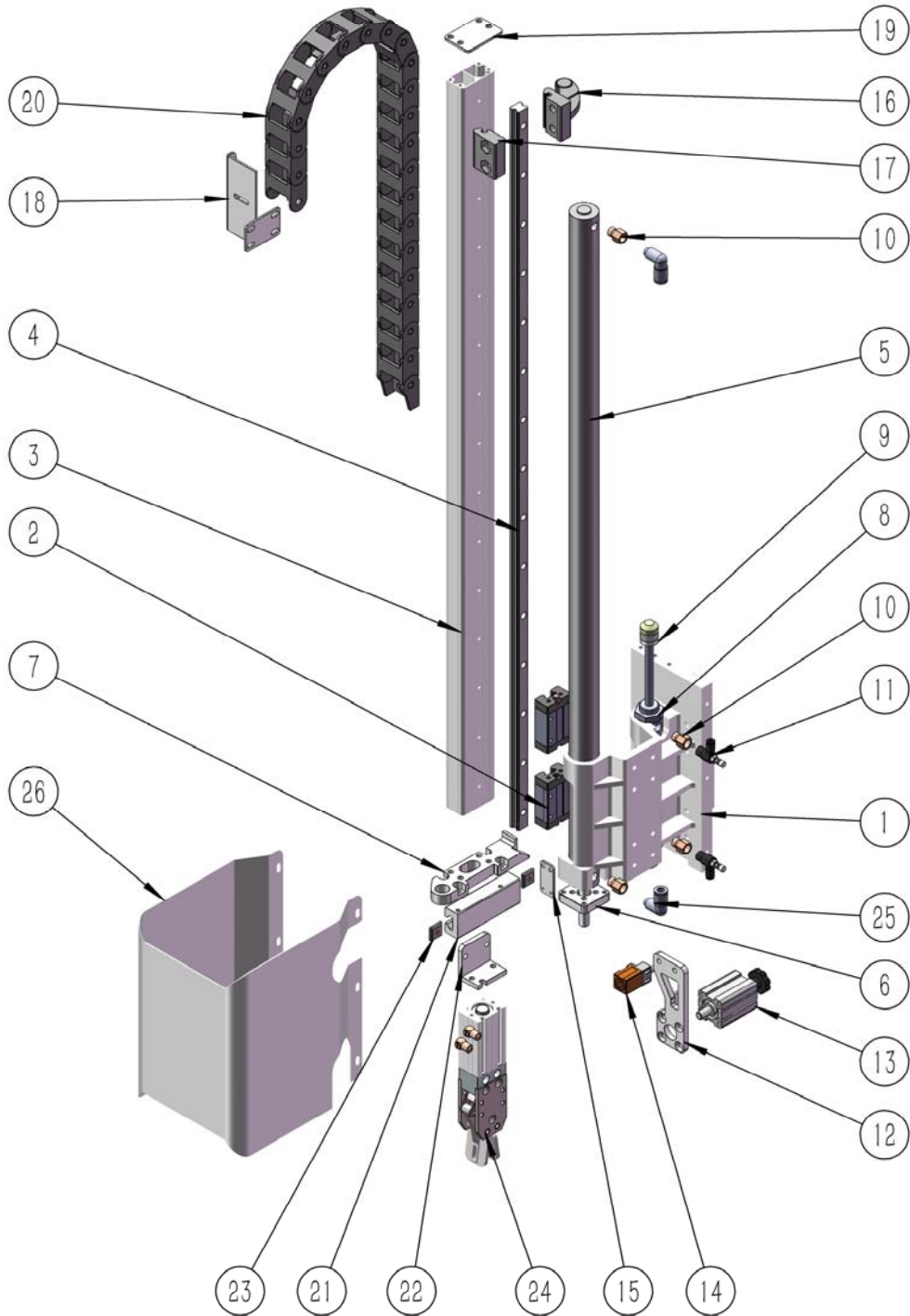


Part list of Main arm (850 Single stage)

Item	Description	Part No.	Q'ty	Remark
1	Mounting bracket of vertical	BA08C050	1	
2	Slide rail block (MSB15S/ 4 holes) (PMI)	MLP15B	2	
3	Slide rail (MSB15-1120L)	MLP15-1120	1	
4	Aluminum profile of arm (MF07005*1160L)	BA08C010	1	
5	Shock absorber 2580	MAR-2580	1	
6	Vertical cylinder (φ 32*850ST) (Fontal)	PCY25-YC320850K	1	
7	Mounting bracket of vertical cylinder	AW00C060	1	
8	Washer	BW00C420	1	
9	Washer	AW00C080	1	
10	Shock absorber (AC2050-11K)	MAR2050	1	
11	Transition pipe	PTB0101	2	
12	Quick fitting	PQL0801	2	
13	Swivel connecting board	BA08C020	1	
14	Fixed plate of protective chain	BA08C030	1	
15	Stroke fixed block	AI00C141	1	
16	Stroke stopper	AI00C151	1	
17	Safety lock cylinder frame	AI00C040	1	
18	Safety lock cylinder	PCY2015M	1	
19	Proximity switch (QL-05NO*1M)	RSN1001	1	
20	Protective chain 25*25	MCN3090	20	
21	Protecting cover of arm	BA08C040	1	
22	Swivel component	BW06UCH03	1	



3.2 Sub Arm Components (650-850 Single Stage)



Part list of Sub arm (650-850 Single stage)

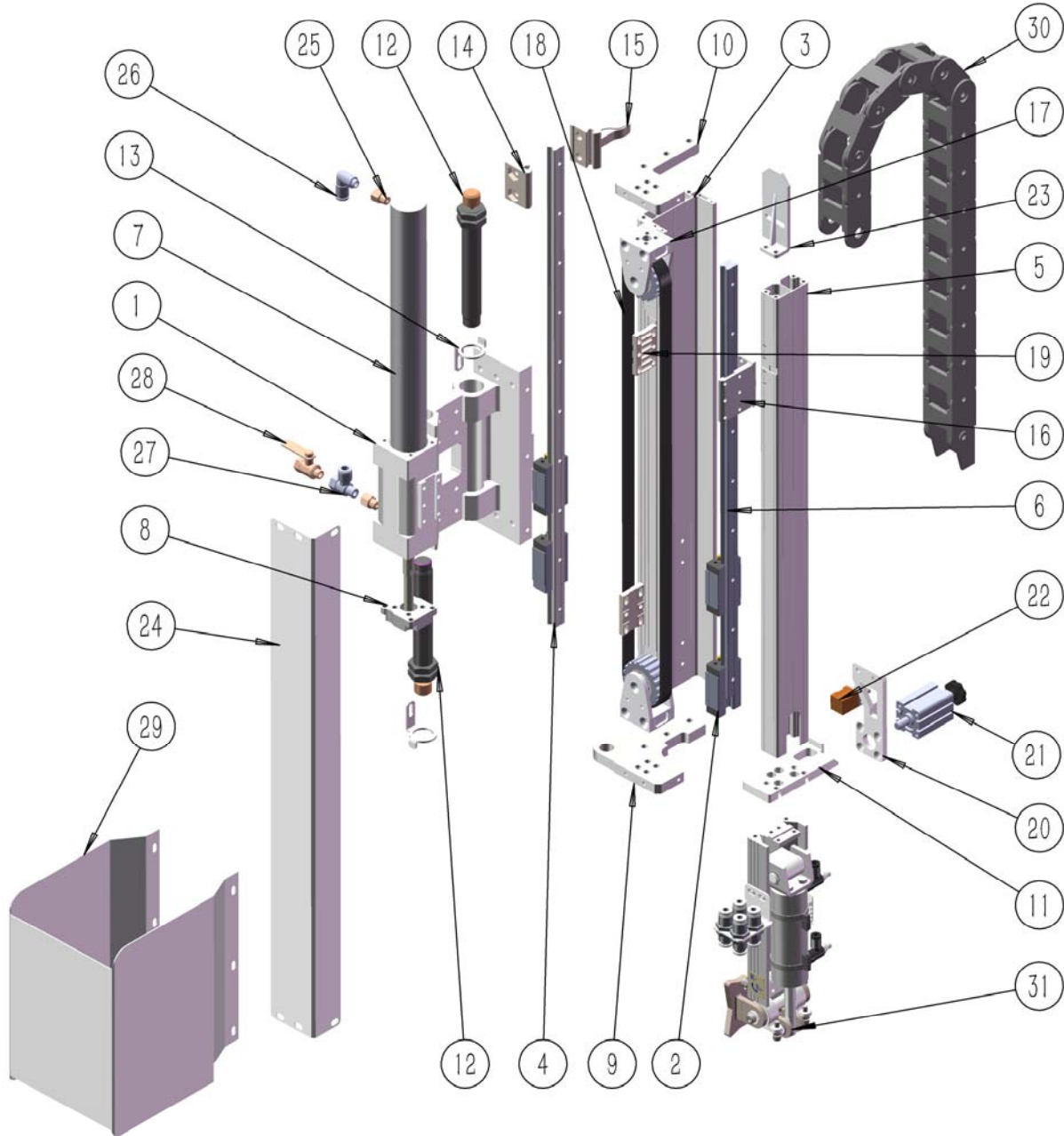
No	Description	Part No.	Q'ty	Remark
1	Mounting bracket of vertical	BA00C010	1	
2	Slide rail block (MSB15S/ 4 holes) (PMI)	MLP15B	2	
3	Aluminum profile (MF050005*890L)	PI06C030	1	BE650
	Aluminum profile (MF050005*1010L)	PI07C030	1	BE750
	Aluminum profile of arm (MF050005*1160L)	BA08D010	1	BE850
4	Slide rail (MSB15S-880L)	MLP15-880	1	BE650
	Slide rail (MSB15S-1000L)	MLP15-1000	1	BE750
	Slide rail (MSB15S-1120L)	MLP15-1120	1	BE850
5	Vertical cylinder (φ 25*650ST)(Fontal)	PCY25-YC250650K	1	BE650
	Vertical cylinder (φ 25*750ST)(Fontal)	PCY25-YC250750K	1	BE750
	Vertical cylinder (φ 25*850ST)(Fontal)	PCY25-YC250850K	1	BE850
6	Fixed plate of cylinder	AI00C030	1	
7	Bottom fixed plate of sub arm	AI00D052	1	
8	Buffer cylinder (CM2WB20-80-WS36L043)	YC200080	1	
9	Washer	PI00C060	2	
10	Transition pipe	PTB0101	4	
11	Speed control joint	PSP1-0401	2	
12	Safety lock cylinder frame	AI00C040	1	
13	Safety lock cylinder	PCY2015M	1	
14	Proximity switch (QL-05NO*1M)	RSN1001	1	
15	Sensor plate of proximity switch	BI00C030	1	
16	Stroke stopper	AI00C131	1	
17	Stroke fixed block	AI00C141	1	
18	Fixed plate of protective chain	PI00C080		
19	Arm top lip	PI00C190	1	
20	Protective chain (20*25)	MCN30100-OM	18	BE650
			22	BE750
			27	BE850
21	Gripper adjustment block	AI00D042	1	
22	Gripper fixed plate	BW00D031	1	
23	Fixed block (M5)	AW00B120	2	

3. Description of Robot Structure

24	Gripper	JC20R020S	1	
25	Quick fitting	PQL0801	2	
26	Protecting cover	BA00D040	1	BE650-750
		BA08D040	1	BE850



3.3 Main Arm Components (650-850 Telescopic)



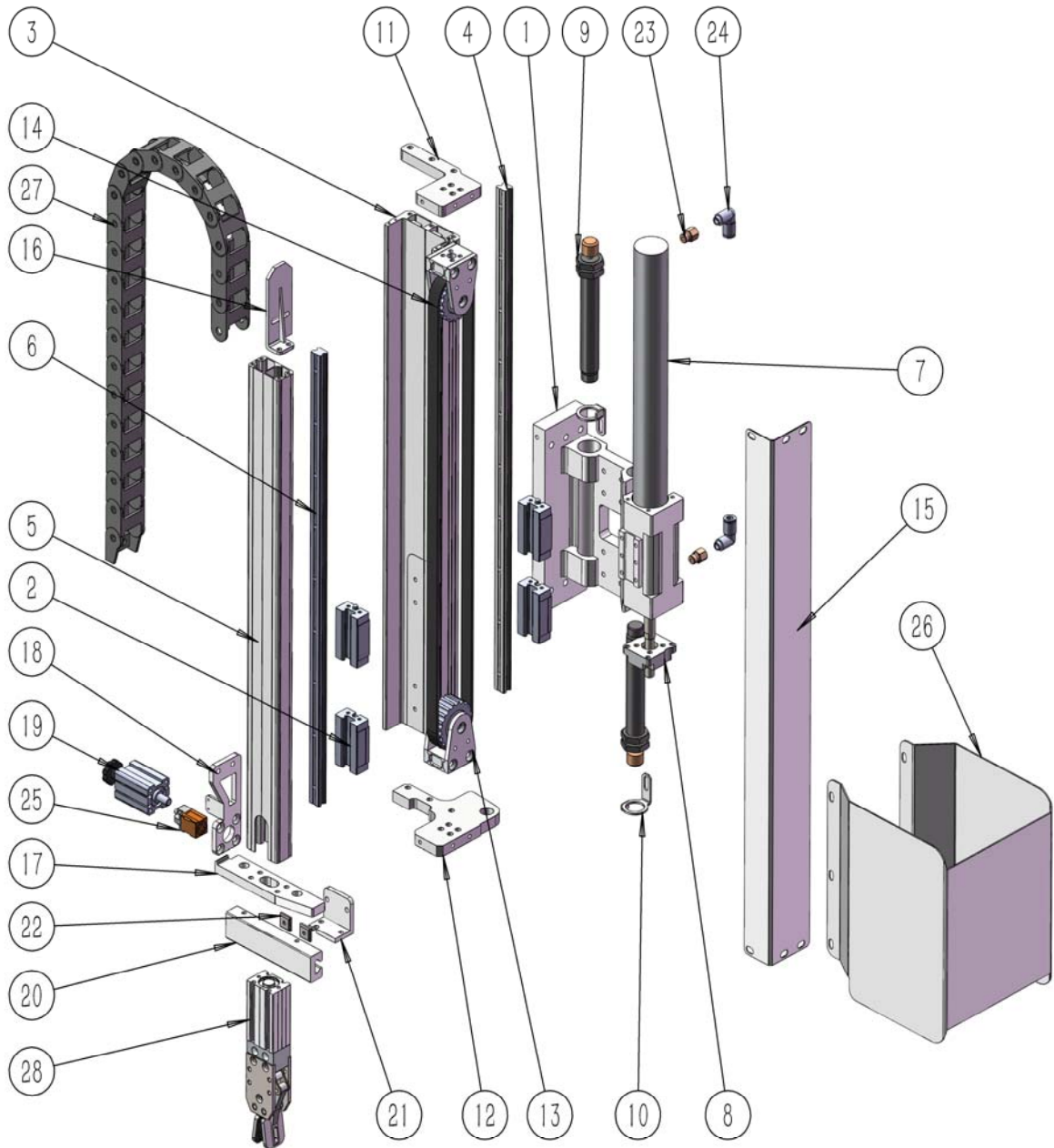
Part list of Main arm (650-850 Telescopic)

Item	Description	Serial No.	Q'ty	Remark
1	Mounting bracket of vertical	BAW00C010	1	
2	Slide rail block (MSB15S/ 4 holes) (PMI)	MLP15B	4	
3	Aluminum profile for telescopic I (MF080006*582L)	AW06C020	1	BE650
	Aluminum profile for telescopic I (MF080006*642L)	AW07C020	1	BE750
	Aluminum profile for telescopic I (MF080006*702L)	AW08C020	1	BE850
4	Slide rail (MSB15S-580L)	MLP15-580	1	BE650
	Slide rail (MSB15S-640L)	MLP15-640	1	BE750
	Slide rail (MSB15S-700L)	MLP15-700	1	BE850
5	Aluminum profile for telescopic II (MF050005*557L)	AW06C031	1	BE650
	Aluminum profile for telescopic II (MF050005*617L)	AW07C031	1	BE750
	Aluminum profile for telescopic II (MF050005*677L)	AW08C031	1	BE850
6	Slide rail (MSB15S-520L)	MLP15-520	1	BE650
	Slide rail (MSB15S-580L)	MLP15-580	1	BE750
	Slide rail (MSB15S-640L)	MLP15-640	1	BE850
7	Vertical cylinder (φ 32*340ST)(Fontal)	PCY32-YC320340K	1	BE650
	Vertical cylinder (φ 32*390ST)(Fontal)	PCY32-YC320390K	1	BE750
	Vertical cylinder (φ 32*440ST)(Fontal)	PCY32-YC320440K	1	BE850
8	Mounting bracket of vertical cylinder	AW00C060	1	
9	Down fixed plate	AW00C040	1	
10	Upper fixed plate	AW00C050	1	
11	Swivel connecting board	AW00C031	1	
12	Shock absorber (AC2050-11K)	MAR2050	2	
13	Washer	AW00C080	2	
14	Stroke fixed block (PMI)	AI00C141	1	
15	Stroke stopper (PMI)	AI00C151	1	
16	Belt fixed plate	AW00C181	1	
17	Belt pulley	AW00UCE01	2	
18	Belt (8M15W/ PU steel wire)	MBT1-8M15	1	

3. Description of Robot Structure

19	Belt clamping plate	AW00C190	2	
20	Safety lock cylinder frame	AI00C040	1	
21	Safety lock cylinder (φ 20 single acting)	PCY2015M	1	
22	Proximity switch (QL-05NO*1M)	RSN1001	1	
23	Upper protective board of main arm	AI00C110	1	
24	Telescopic arm frame I (59*606L)	AW06C040	1	BE650
	Telescopic arm frame I (59*666L)	AW07C040	1	BE750
	Telescopic arm frame I (59*726L)	AW08C040	1	BE850
25	Swivel component (New)	BW06UCH03	1	
26	Transition pipt	PTB0101	1	
27	Quick fitting	PQL0801	1	
28	Quick fitting (NPQS-F-LT-R18-Q8)	PQL0811	1	
29	Copper corker	PTC0101	1	
30	Protective cover of main arm (W type)	BAW00C030	1	
31	Protective chain (25*25/ R75)	MCN3090	15	BE650
			16	BE750
			17	BE850

3.4 Sub Arm Components (650-850 Telescopic)



Part list of Sub arm (650-850 Telescopic)

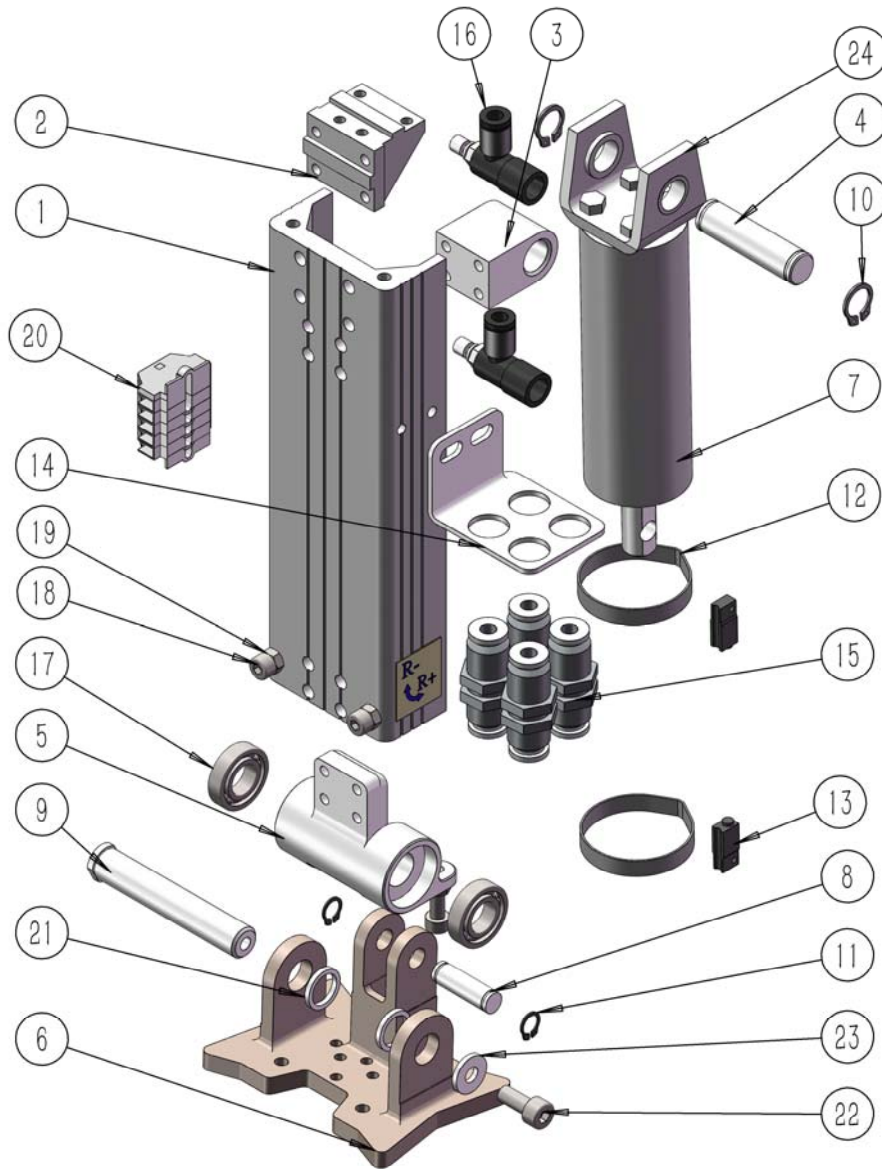
Item	Description	Serial No	Q'ty	Remark
1	Mounting bracket of vertical	BAW00C010	1	
2	Slide rail block(MSB15S/ 4 holes) (PMI)	MLP15B	4	
3	Aluminum profile for telescopic I (MF080006*582L)	AW06D020	1	BE650
	Aluminum profile for telescopic I (MF080006*642L)	AW07D020	1	BE750
	Aluminum profile for telescopic I (MF080006*702L)	AW08D020	1	BE850
4	Slide rail (MSB15S-580L)	MLP15-580	1	BE650
	Slide rail (MSB15S-640L)	MLP15-640	1	BE750
	Slide rail (MSB15S-700L)	MLP15-700	1	BE850
5	Aluminum profile for telescopic I I (MF050005*557L)	AW06D031	1	BE650
	Aluminum profile for telescopic I I (MF050005*617L)	AW07D031	1	BE750
	Aluminum profile for telescopic I I (MF050005*677L)	AW08D031	1	BE850
6	Slide rail (MSB15S-520L)	MLP15-520	1	BE650
	Slide rail (MSB15S-580L)	MLP15-580	1	BE750
	Slide rail (MSB15S-640L)	MLP15-640	1	BE850
7	Vertical cylinder (φ 32*340ST) (Fontal)	PCY32-YC320340K	1	BE650
	Vertical cylinder (φ 32*390ST) (Fontal)	PCY32-YC320390K	1	BE750
	Vertical cylinder (φ 32*440ST) (Fontal)	PCY32-YC320440K	1	BE850
8	Mounting bracket of vertical cylinder	AW00C060	1	
9	Shock absorber (AC2050-11K)	MAR2050	2	
10	Washer	AW00C080	2	
11	Upper fixed plate	AW00C050	1	
12	Down fixed plate	AW00C040	1	
13	Belt pulley	AW00UCE01	2	
14	Belt (8M15W/ PU steel wire)	MBT1-8M15	1	
15	Telescopic arm frame I (59*606L)	AW06C040	1	BE650
	Telescopic arm frame I (59*666L)	AW07C040	1	BE750
	Telescopic arm frame I (59*726L)	AW08C010	1	BE850
16	Upper protective board of sub arm	AI00C120	1	

3. Description of Robot Structure

17	Gripper fixed plate	AW00D032	1	
18	Safety lock cylinder frame	AI00C040	1	
19	Safety lock cylinder (φ 20 single acting)	PCY2015M	1	
20	Gripper adjustment block	AW00D041	1	
21	Gripper fixed plate	BW00D031	1	
22	Fixed block (M5)	AW00B120	2	
23	Transition pipe	PTB0101	1	
24	Quick fitting	PQL0801	1	
25	Proximity switch (QL-05NO*1M)	RSN1001	1	
26	Protective cover of sub arm (W type)	BAW00D030	1	
27	Protective chain (20*25)	MCN30100-OM	20	BE650
			22	BE750
			24	BE850
28	Gripper	JC20R020S	1	



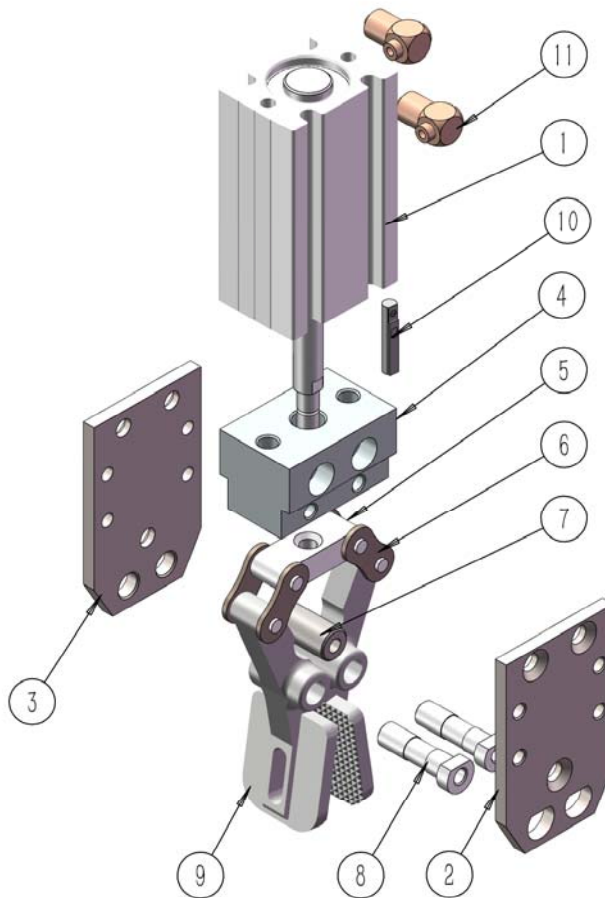
3.5 Swivel Components



Part list of Swivel

Item	Description	Serial No.	Q'ty	Remark
1	Swivel frame	BW00C241	1	
2	Swivel connected block	BW00C290	1	
3	Mounting bracket of swivel cylinder	BW00C250	1	
4	Cylinder rotating pin (φ 12*47L)	YJ12047	1	
5	Swivel rotating supporting frame	BW00C261	1	
6	Swivel rotating plate	BW00C270	1	
7	Swivel cylinder (φ 32*40ST) (SMC)	PCY32-YC320040S	1	
8	Swivel rotating pin (φ 8*27L)	YJ08027	1	
9	Rotating pin (φ 12*71L)	YJ12071	1	
10	Retaining ring (External) (S12)	MET1012	2	
11	Retaining ring (E7)	MET3007	2	
12	Bandage of swivel cylinder	RSN2038	2	
13	Swivel magnetic switch	RSN2004L	2	
14	Circuit patch board	BW00C280	1	
15	Quick fitting (NPQS-F-H-Q6-E)	PQE0600	3	
16	Speed control joint	PSP1-0601	2	
17	Ball bearing (6901ZZ)	MBG1-6901	2	
18	Hexagon socket screw (M5X16)	MSW1-0516D	4	
19	Hexagonal nut (M5)	MSW8-0503	4	
20	Terminal of Euromap	RXB1-1	1	
21	Shim	AW00E100	2	
22	Hexagon socket screw (M6X12)	MSW1-0612D	1	
23	Flat washer (M6)	MSW8-0601	1	

3.6 Jig Components

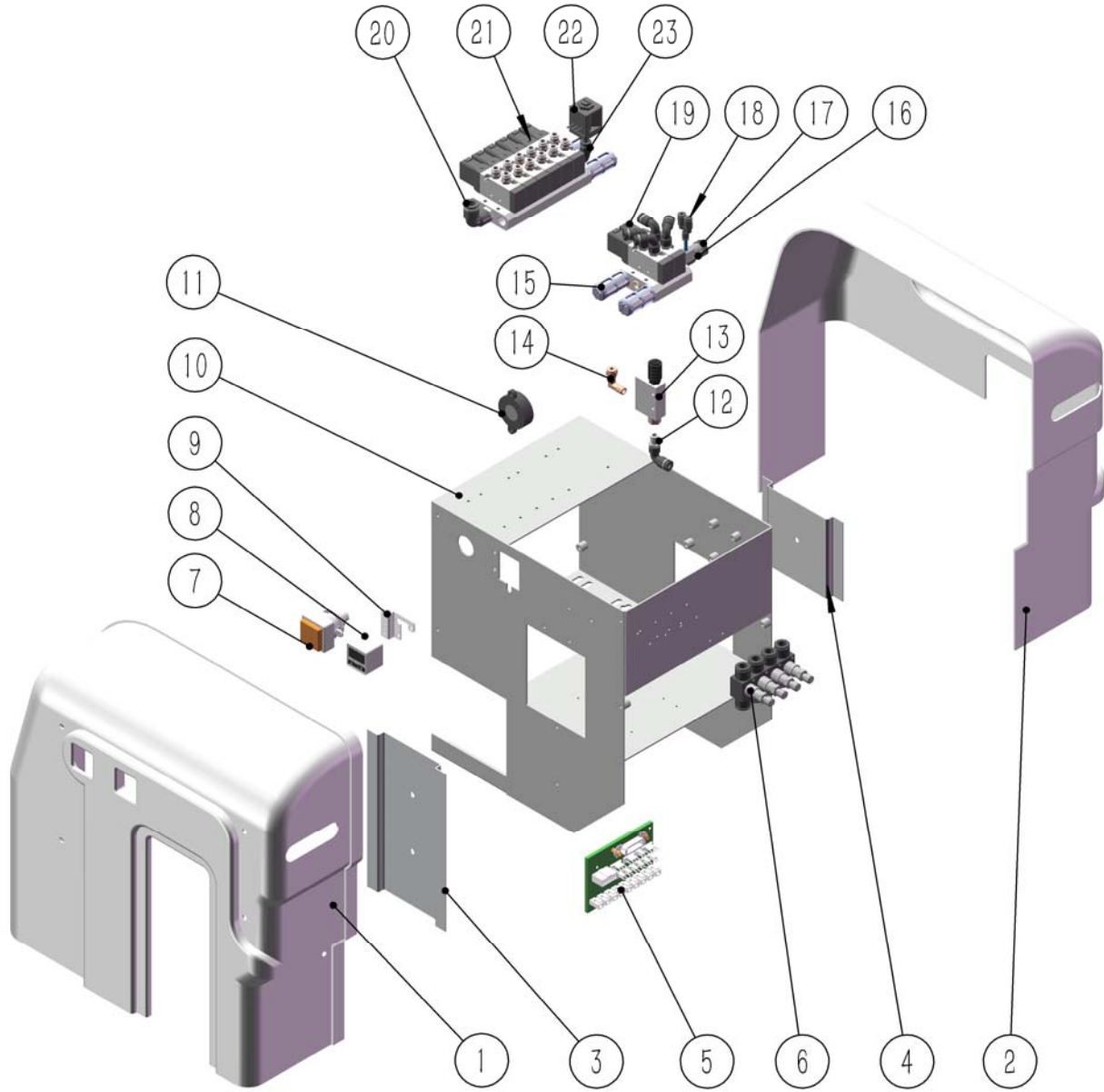


Part list of Jig

Item	Description	Serial No.	Q'ty	Remark
1	Jig cylinder	JC20R20M	1	
2	Side plate 1 of jig body	JC20B040	1	
3	Side plate 2 of jig body	JC20B050	1	
4	Cylinder cover (JC-2020S)	JC20B070	1	
5	Cylinder pull rod	JC20B020	1	
6	Chain mesh (Separation type_	MET4002	2	
7	Positioning pillar	JC20B030	1	
8	Pin	JC20B060	2	
9	Clamping piece	JC20B010	2	
10	Jig magnetic switch (LYD-07RG-0.5M)	RSN2001L	1	

11	L-shape copper joint	PFL04M5	2	
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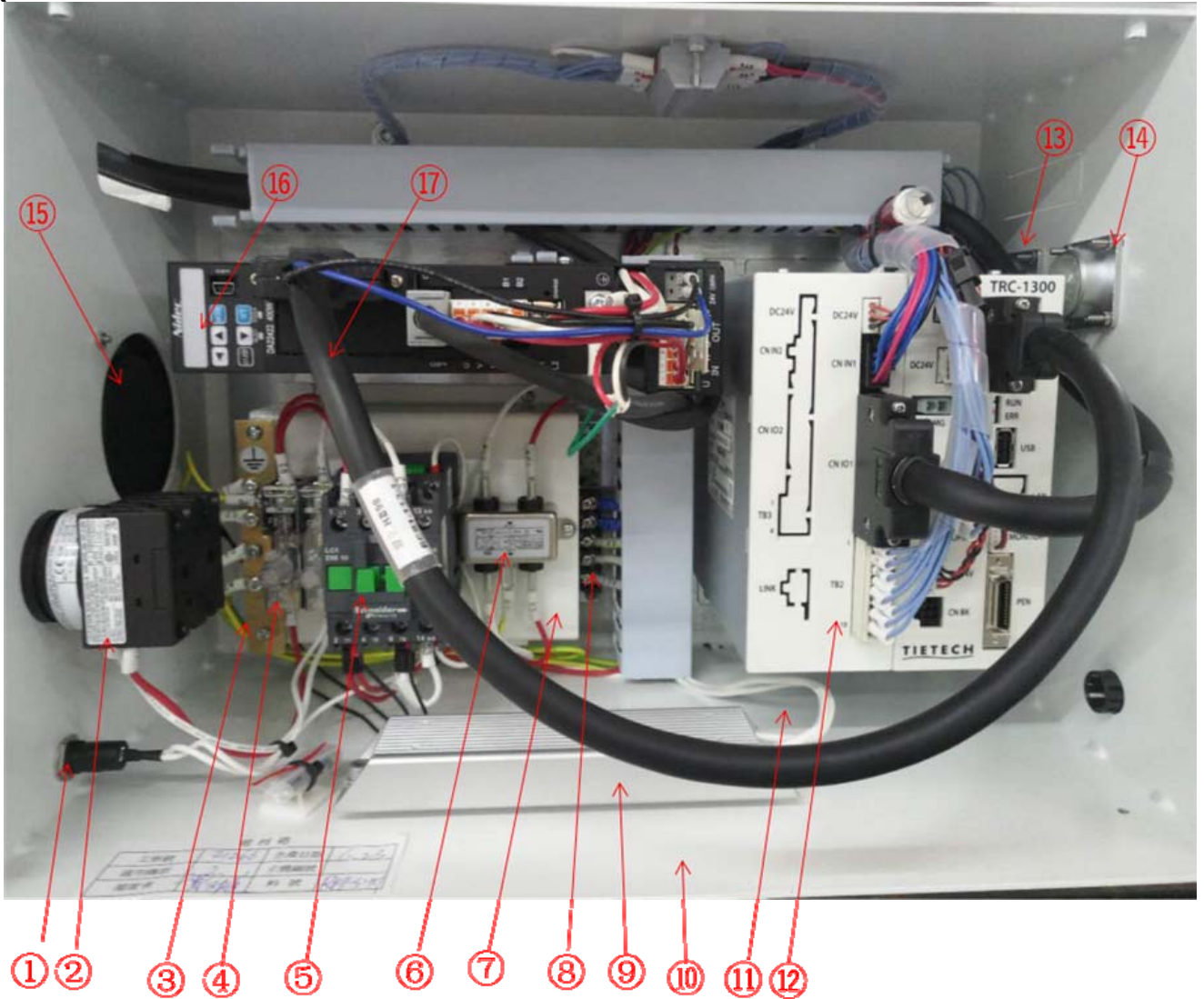
3.7 Air Valve Components



Part list of Air valve

Item	Description	Serial No.	Q'ty	Remark
1	Air valve cover (right)	BI00H021	1	
2	Air valve cover (left)	BI00H031	1	
3	Air valve cover plate	BI00H041	1	
4	Air valve cover plate	AW00H041	1	
5	Relay board (HB44)	RBD-HA44-PC4	1	
6	Throttle valve	PSP2-0800	4	
7	Warning light (TPNS-25/ DV24V/ Square)	RLT1001	1	
8	Negative pressure switch (AFP20P-02-F1)	PET5003A	1	
9	Negative pressure switch seat	AW00H200	1	
10	Air valve (New)	BF12H010	1	
11	Buzzer (PB42W29B/ DC24V)	REL1001	1	
12	Quick fitting (NPQS-F-L-R18-Q6)	PQL0601	1	
13	Vacuum generator without detection (TV-10H/ PET10A01M)	PET1003	1	
14	Copper joint (KFL 06-01)	PFL0601	1	
15	Silencer (SLP-02 1/4")	PET3001	4	
16	Check valve (φ 10)	PTE1002		
17	Quick fitting	PQU0400	1	
18	Tee joint (φ 6)	PQT0601		
19	Solenoid valve set (2 pc) (Parker)	PSV1-P02S		
20	Quick fitting	PQL1002	1	
21	Solenoid valve set (6 pc) (Parker)	PSV1-P06S	1	
22	Pressure switch	PET5004	1	
23	Quick fitting	PQL0602	1	

3.8 Electric Control Components (HB44)



Part list of Electric control (HB44)

Item	Description	Serial No.	Q'ty	Remark
1	Button (16mm)	RBT3003	1	
2	Power switch (TO-2-1/E)	RBT1009	1	
3	Ground terminal (TL-N9)	RXA1013	1	
4	Fuse holder (250V 10A 2P 3cm)	RXF2002	1	
5	AC contactor (NC1-0910 220V 50Hz)	RBT2015	1	
6	Power filter (10A 50/60Hz AC250V)	RPW3002		
7	Power supplier cover	HA80D070	1	
8	Power supplier (50W DC24V output)	RPW2002-T	1	
9	Brake resistance (50 Ohm 100W/for driver)	REP1-1	1	
10	Control cabinet	HB44D020	1	
11	Base plate of control cabinet	HB44D030	1	
12	TRC1300C control board (one axis servo)	RBDQ3-31	1	
13	IMM connecting line (0.6M/ metal joint)	RCB1014	1	
14	Metal joint (male type)	REL3002	1	
15	Fan (UF80B 23BWH AC Fan 220V)	REL2002	1	
16	Drive (Sankyo/ 400W/ DA22401) /(Panasonic/400W)	MMR7-0402-S MMR7-0402A6E	1	
17	Servo controlling cable (Sankyo) /(Panasonic)	RCB1-113 RDB1-114	1	

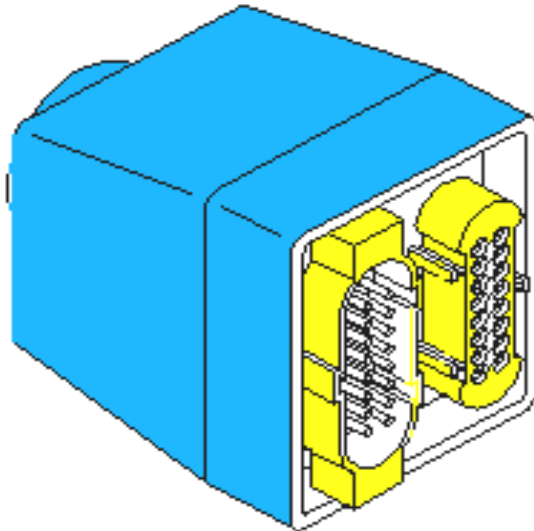


3. Description of Robot Structure

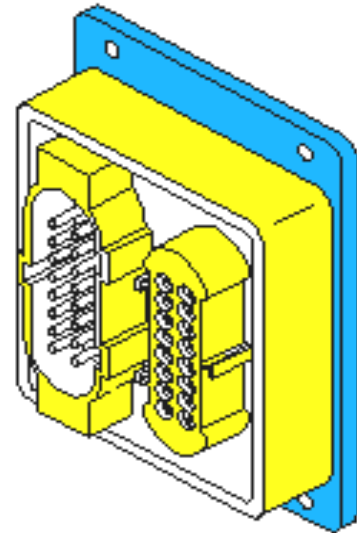
4. SETTING AND ADJUSTMENT BEFORE BOOTING

4.1 Connection with I.M.M (CE Option)

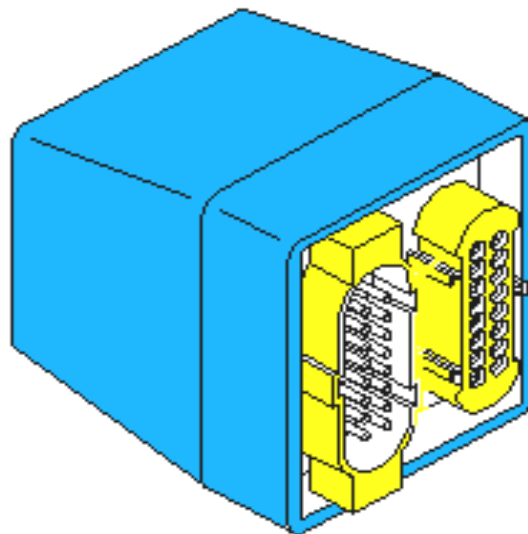
Before putting robot into operation, it must be linked with I.M.M by connecting the Euromap/ SPI-standard interface connector.



Robot Side Connector



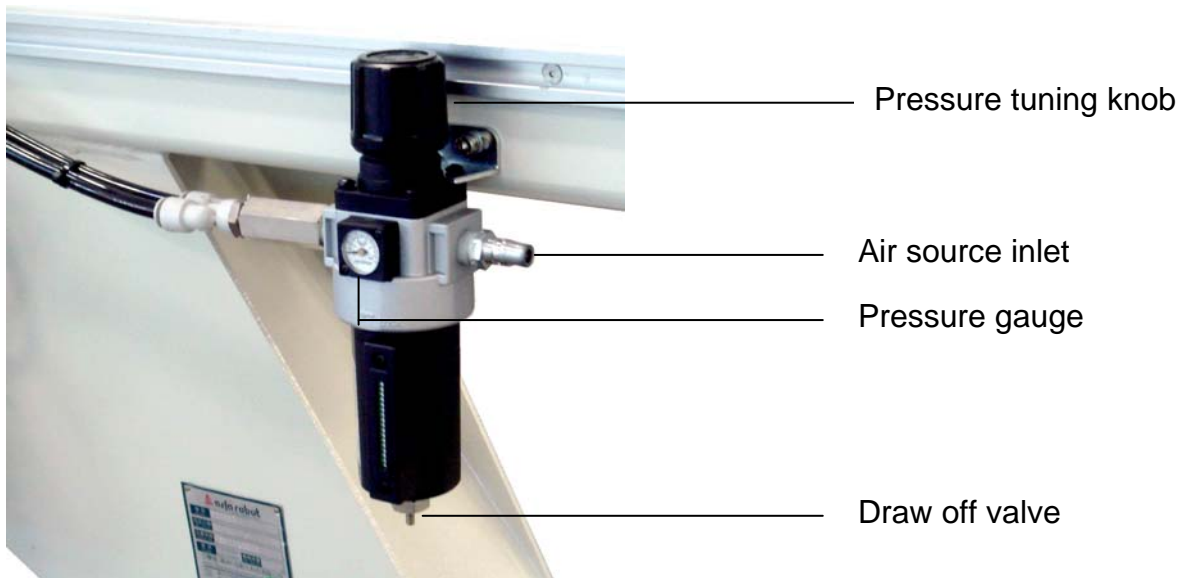
I.M.M Side Connector



Dummy Plug

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

4.2 Connection with Pneumatic Supply Source



NOTE:

- (1) After completing the connection, **adjust the pressure until it reaches 5kgf/cm² to 7kgf/cm².**
- (2) **Check the water trapped in Air filter/ Regulator and drain water away everyday.**
- (3) Pull up pressure tuning knob lightly, turn clockwise to large the pressure; turn counterclockwise to lessen pressure.

4.3 The Flowchart of Booting Procedure



Power switch

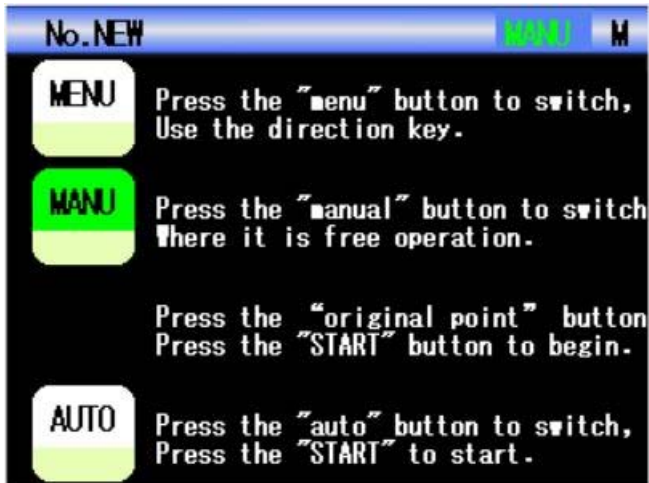
Starting button

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



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

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



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

4.4 Adjustment while Mould Changing



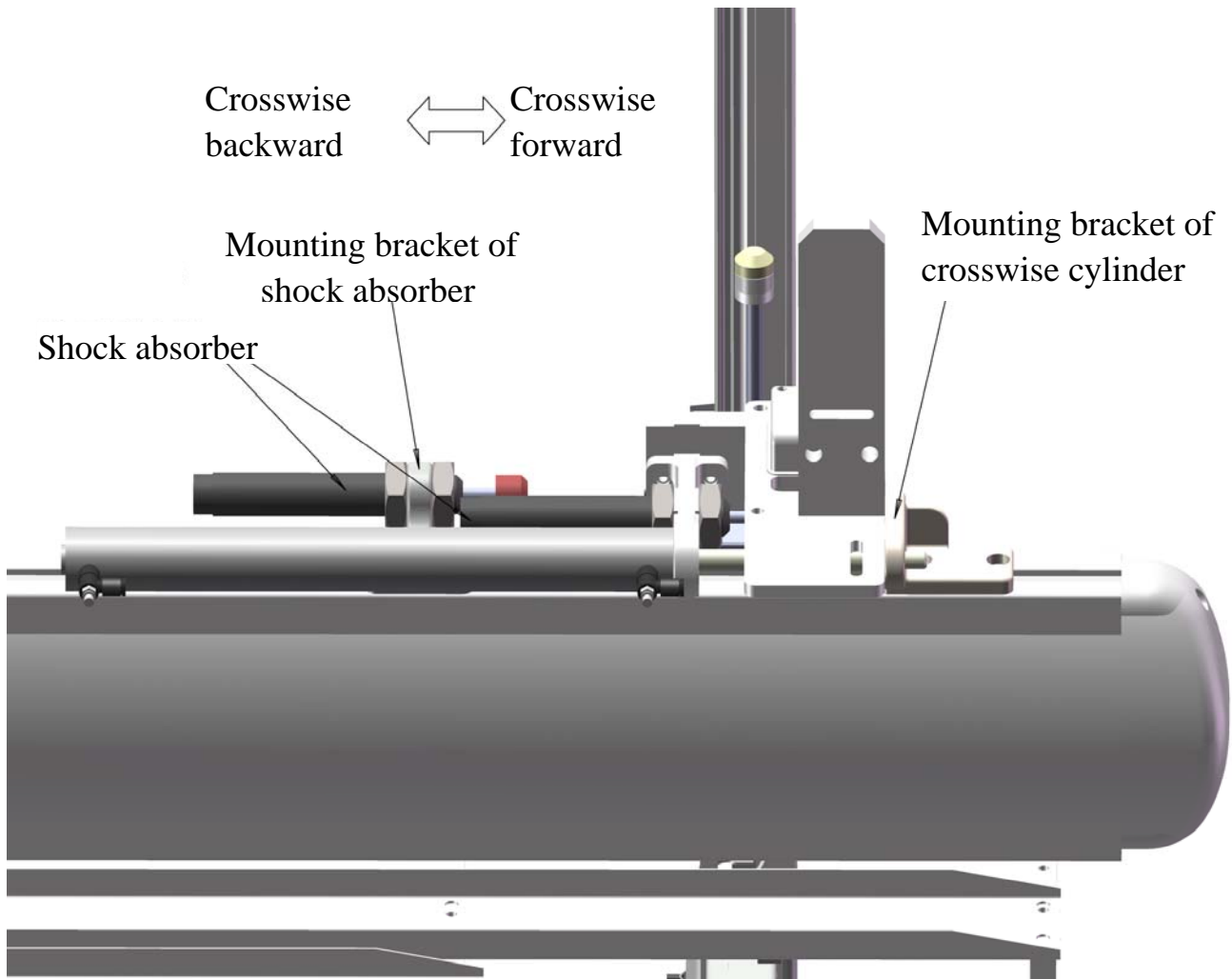
**Safety matters
must be fully
observed**

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

- (1) Do not adjust the robot unless you are fully trained.
- (2) Switches the I.M.M to Manual Mode and open mould to position, and then turns power off.
- (3) Turns the power off and disconnects pneumatic supply source of the robot.

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

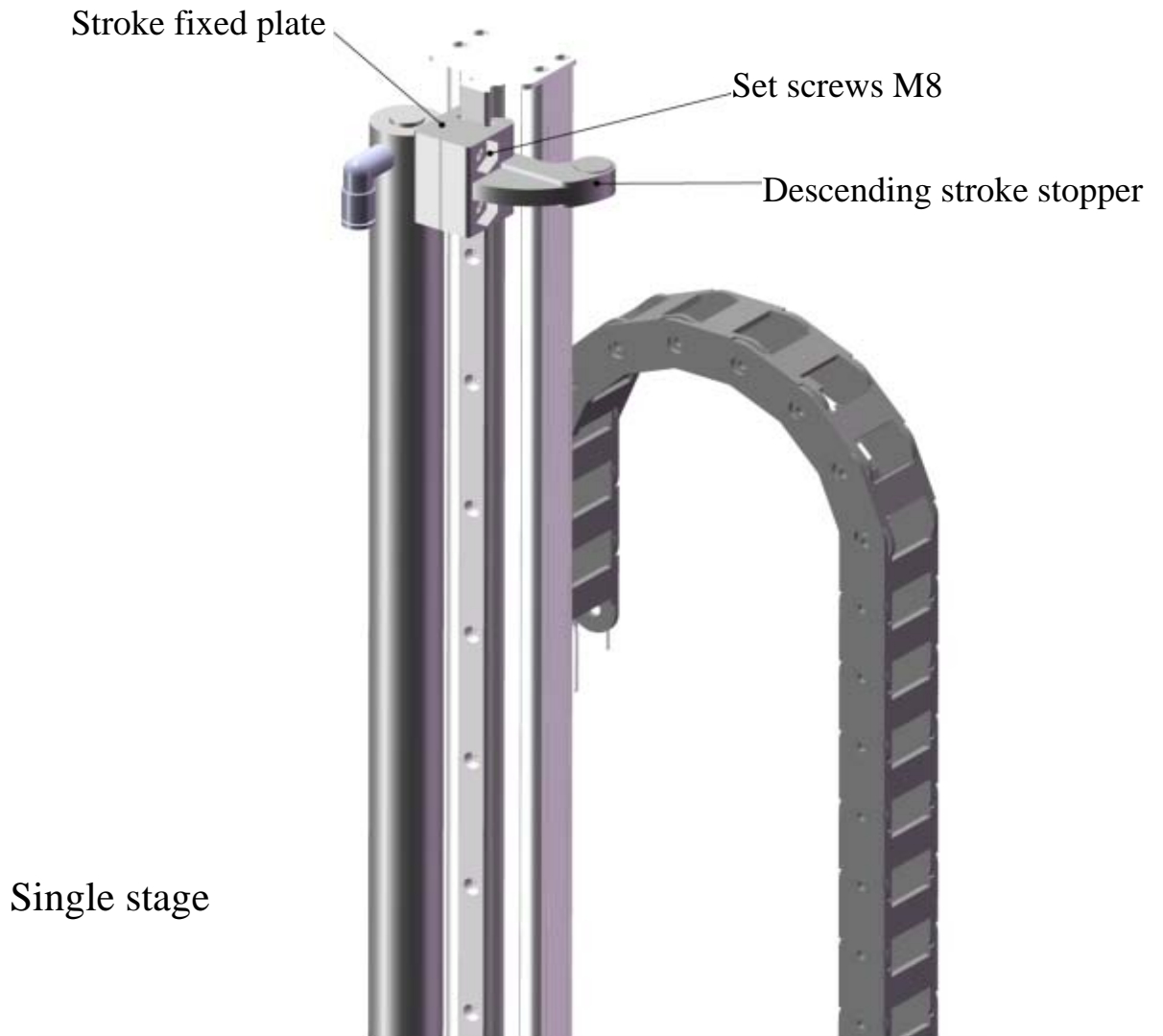
4.4.1 Adjustment of Crosswise Stroke

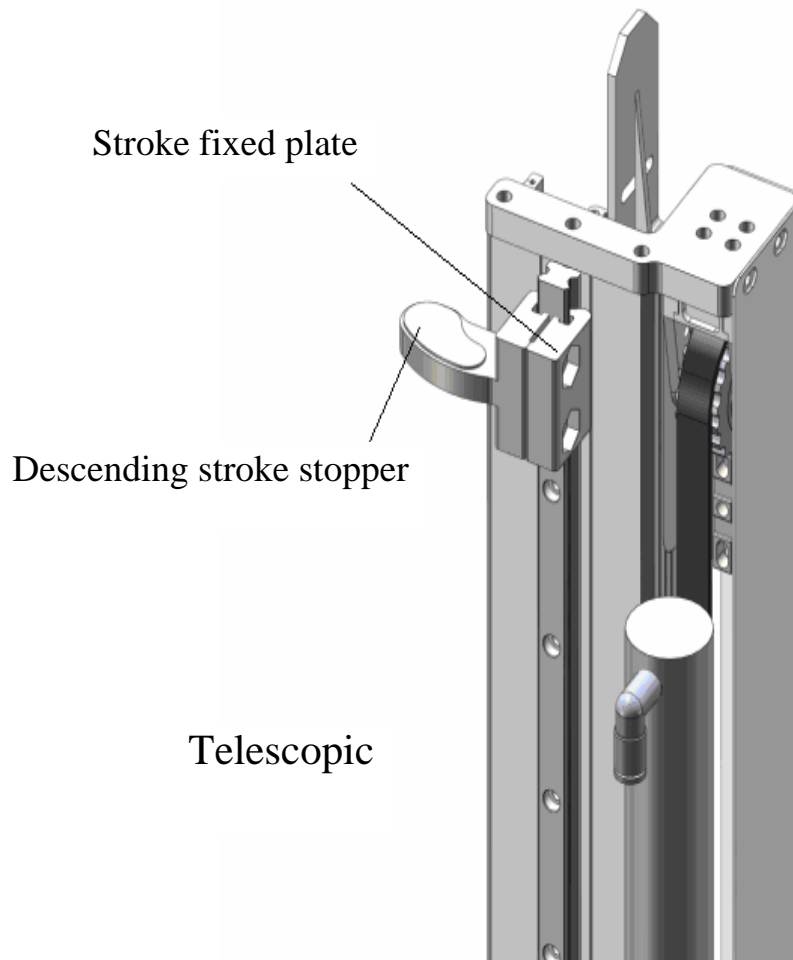


Procedure:

1. Open mould of I.M.M to the position.
2. Loosen set screws on mounting bracket of crosswise cylinder.
3. Moves product arm horizontally to the middle of mould, pull out safety lock cylinder and then moves product arm down to the center of mould.
4. Pushes product arm forward to be able to remove the products without damage the mould. Locks set screws on mounting bracket of crosswise cylinder tightly with attention to preserve forwarder distance of ejector to avoid arm and set screws loosen during to long run.
5. Pushes product arm toward the nozzle until the accessible range of product removal and then locks set screws on the crosswise baffle tightly.
6. Please compress shock absorber tightly.

4.4.2 Adjustment of Vertical Stroke

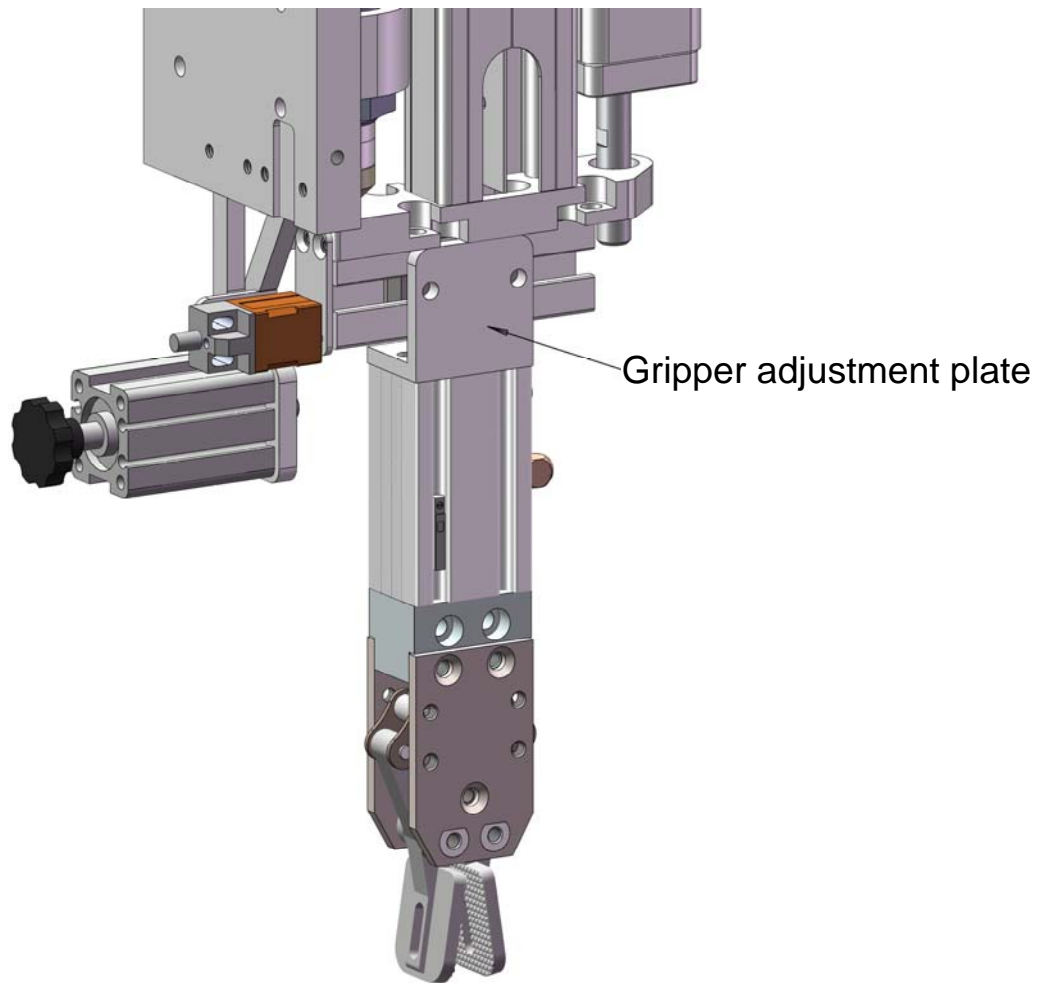




Procedure:

1. Loosen set screws on descending stroke stopper.
2. Along slide rail to adjust descending stroke stopper to proper position.
3. Locks set screws.

4.4.3 Adjustment of Gripper

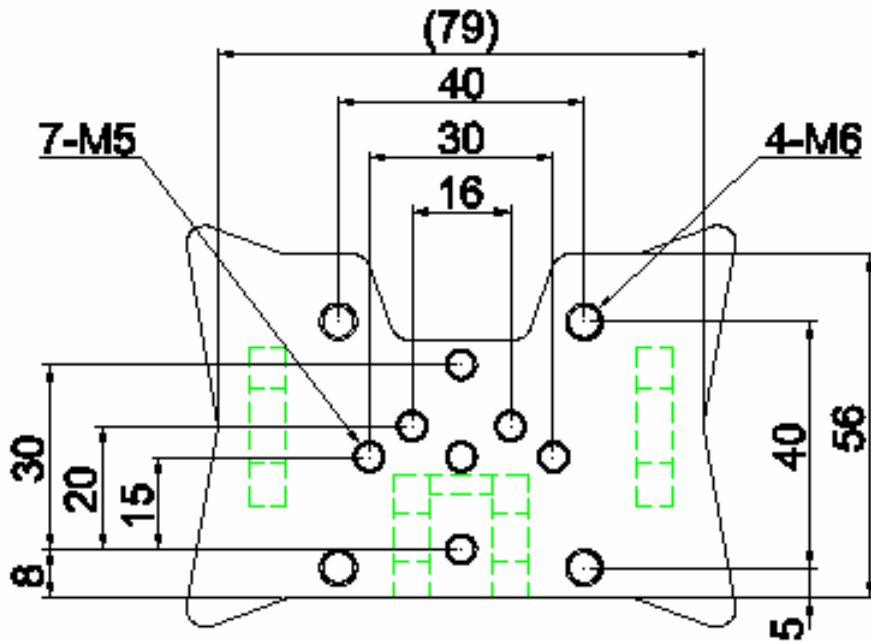


Procedure:

Adjust grip adjustment plate right and left until accessible range of sprue removal position and then lock the screws tightly.

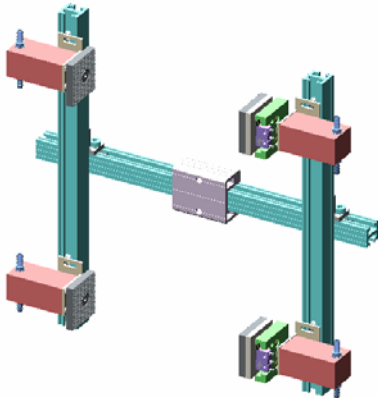
4.5 Jig Installation and Adjustment

Dimensions of Mounting Fixture

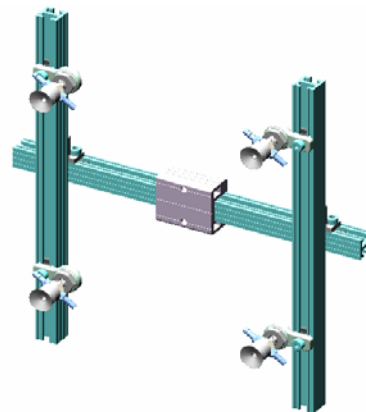


4.5.1 Standard End of Arm Tooling (EOAT)

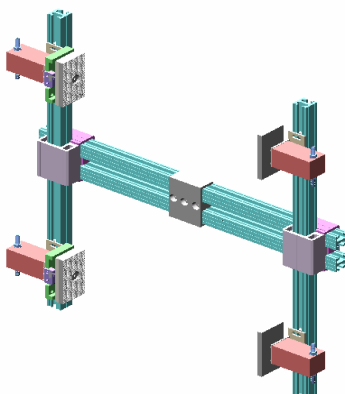
Standard Clamp Assembly
(JA06-300B1-BE 650/750)



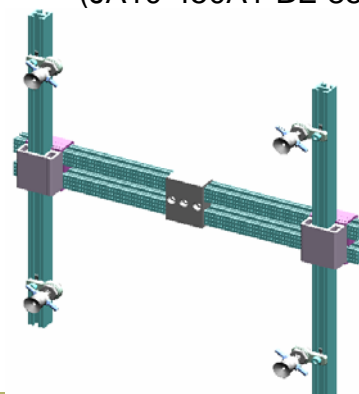
Standard Vacuum Assembly
(JA06-300A1-BE 650/750)



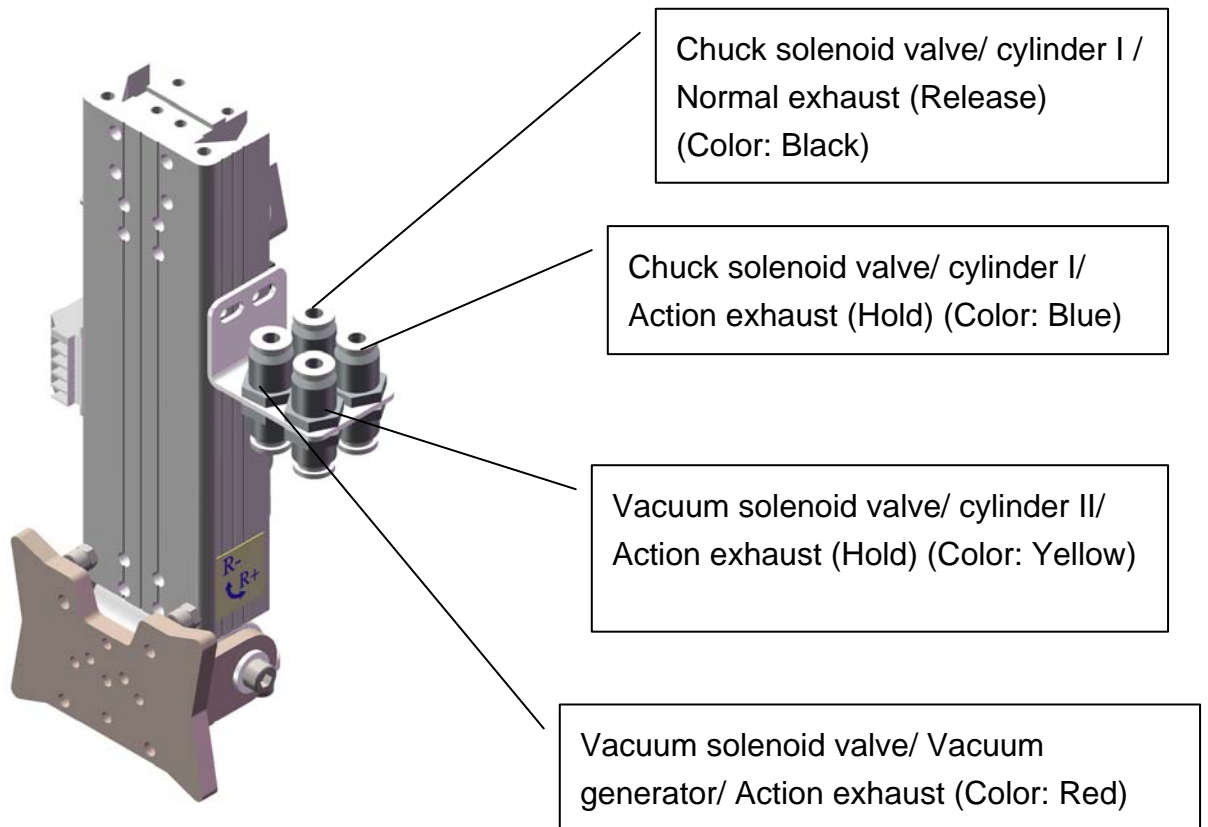
Standard Clamp Assembly
(JA08-350B1-BE 850)
(JA10-450B1-BE 850)



Standard Vacuum Assembly
(JA08-350A1-BE 850)
(JA10-450A1-BE 850)

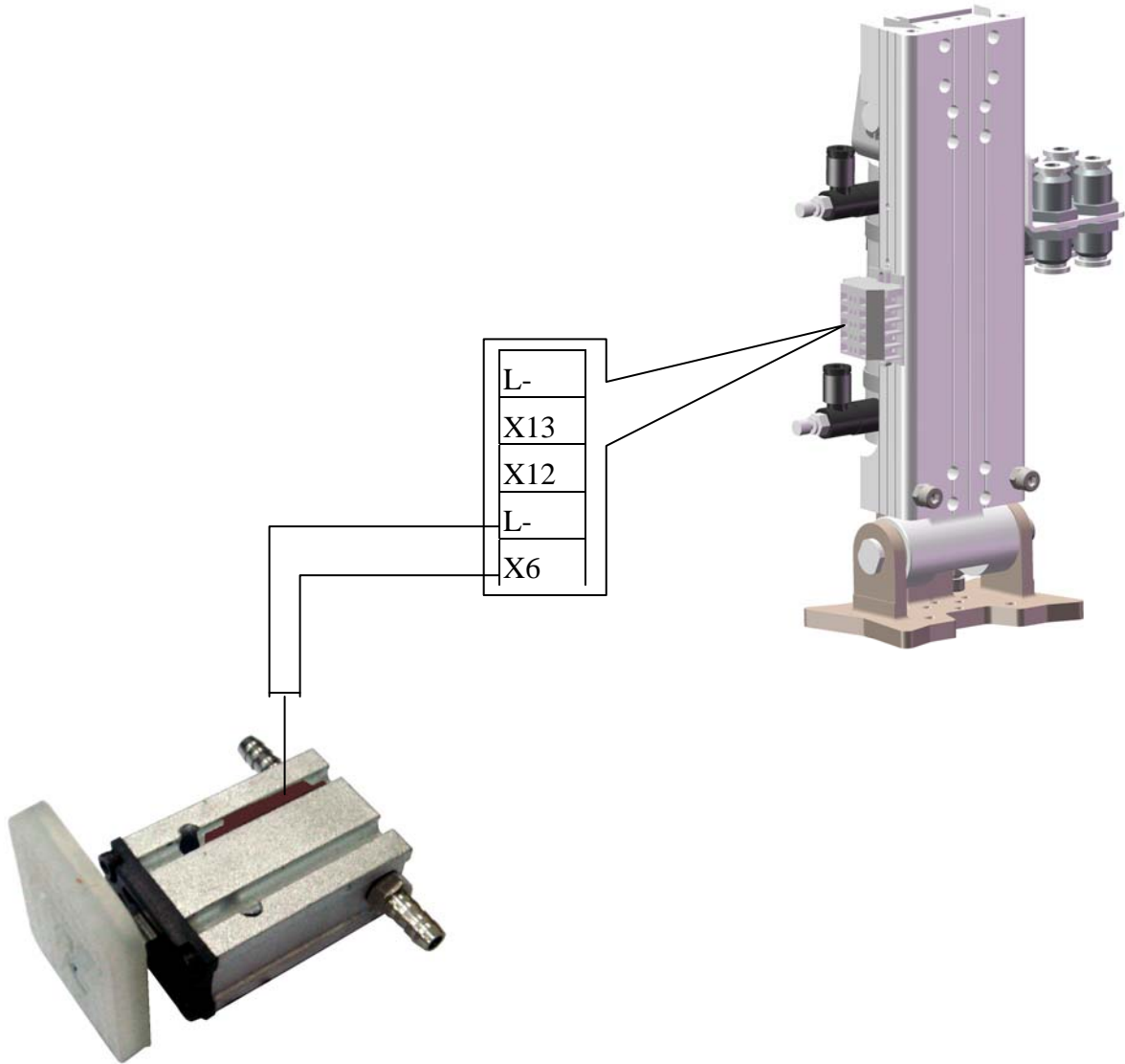


4.5.2 Standard End of Arm Tooling (EOAT)



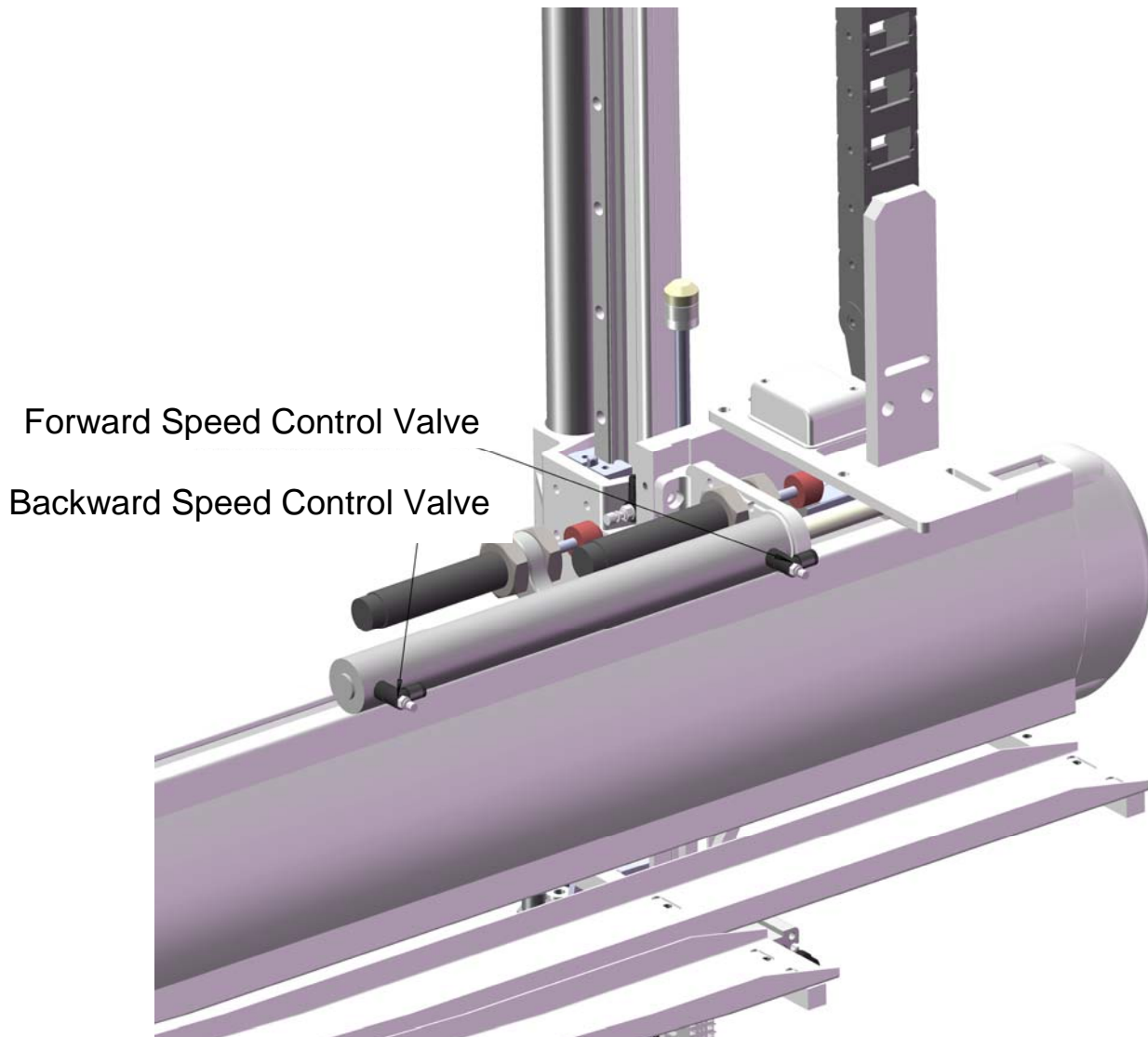


4. Setting and Adjustment before Booting



4.6 Adjustment of Moving Speed

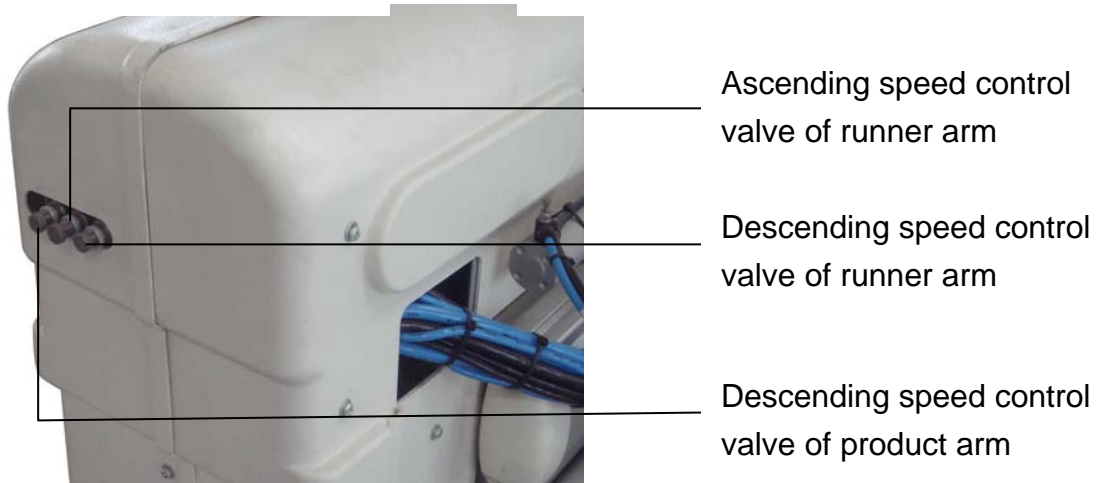
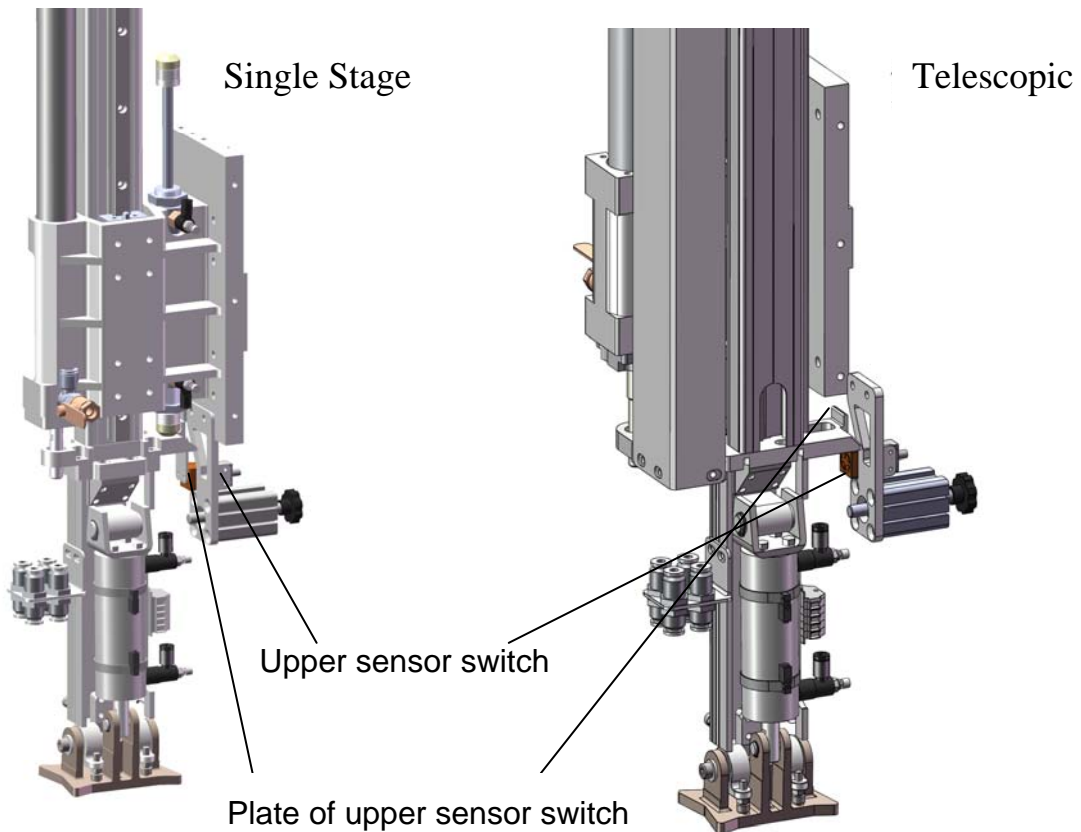
4.6.1 Speed Control Valve of Air Valve



Procedure:

1. Adjust crosswise forwarder speed control valve of product arm/ runner arm when speed of crosswise forwarder needs to be changed.
2. Adjust crosswise backward speed control valve of product arm/ runner arm when speed of corsswise backward needs to be changed.
3. Turn the valve clockwise to slow down the speed; turn the valve counterclockwise to increase the speed.
4. After proper adjustment, lock nut tightly.
5. When robot is on AUTO mode or MANUAL mode, backward sensor LS19 must be on.

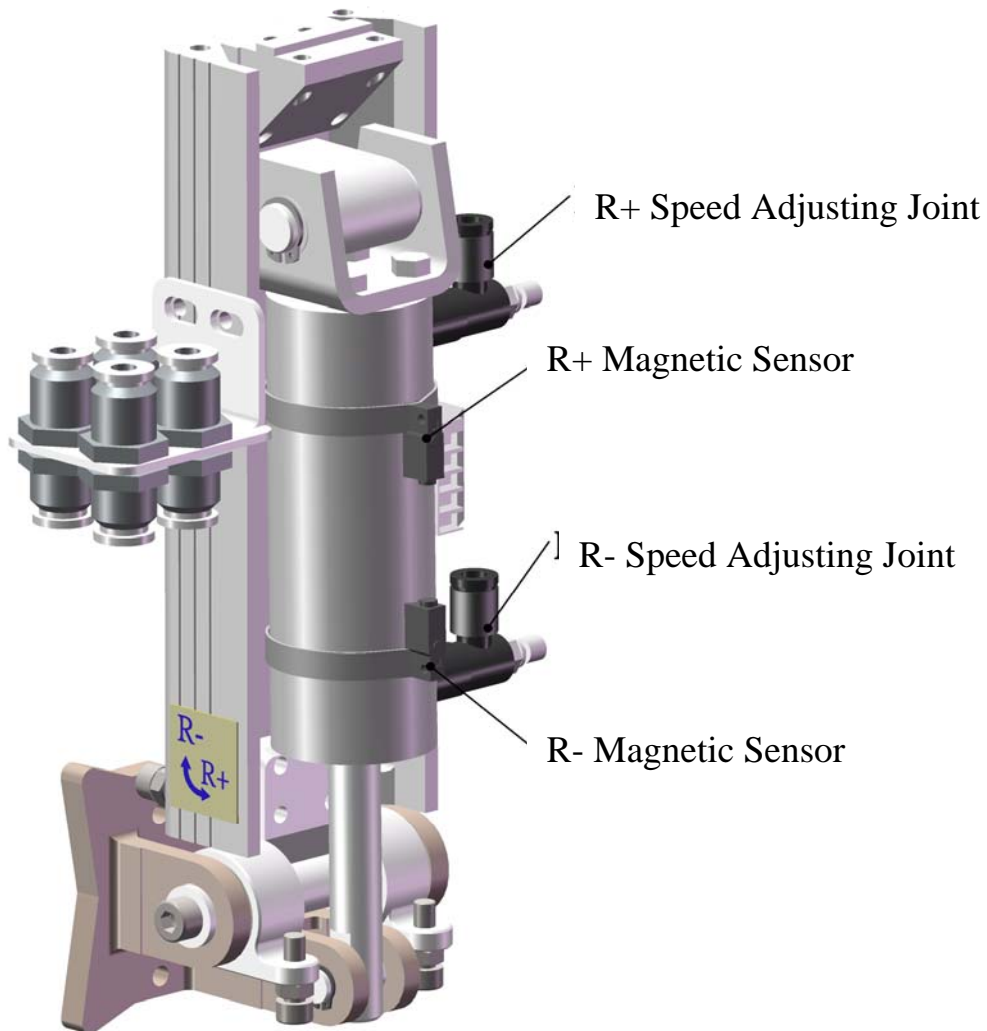
4.6.2 Adjustment of Vertical Speed



Procedure:

1. Adjust descending speed control valve of product arm/ runner arm when descending speed needs to be changed.
2. Adjust ascending speed control valve of product arm/ runner arm when ascending speed needs to be changed.
3. After proper adjustment, lock nut tightly.

4.6.3 Adjustment of Swivel



5. MAINTENANCE

5.1 Maintenance and Repair Safeties

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

1. Please turn the robot power off before examine and repair the I.M.M.
2. Please turn the robot and I.M.M power off and disconnect pneumatic supply source, also evacuate residual compressed air before adjusting and maintaining.
3. In addition to the replacement of proximity switches, vacuum and grip sensors, please contact your local supplier for other repairs and maintenance.
4. Do not make any change or modification to the robot.
5. Please be careful to prevent from hurt by robot during adjustment or mould changing.
6. Please stay away from danger area before testing after adjusting or maintaining completed.
7. Do not turn the power on or connect pneumatic supply source during maintenance.

5.2 Maintenance Schedules

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

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

5.3 Maintenance Tools

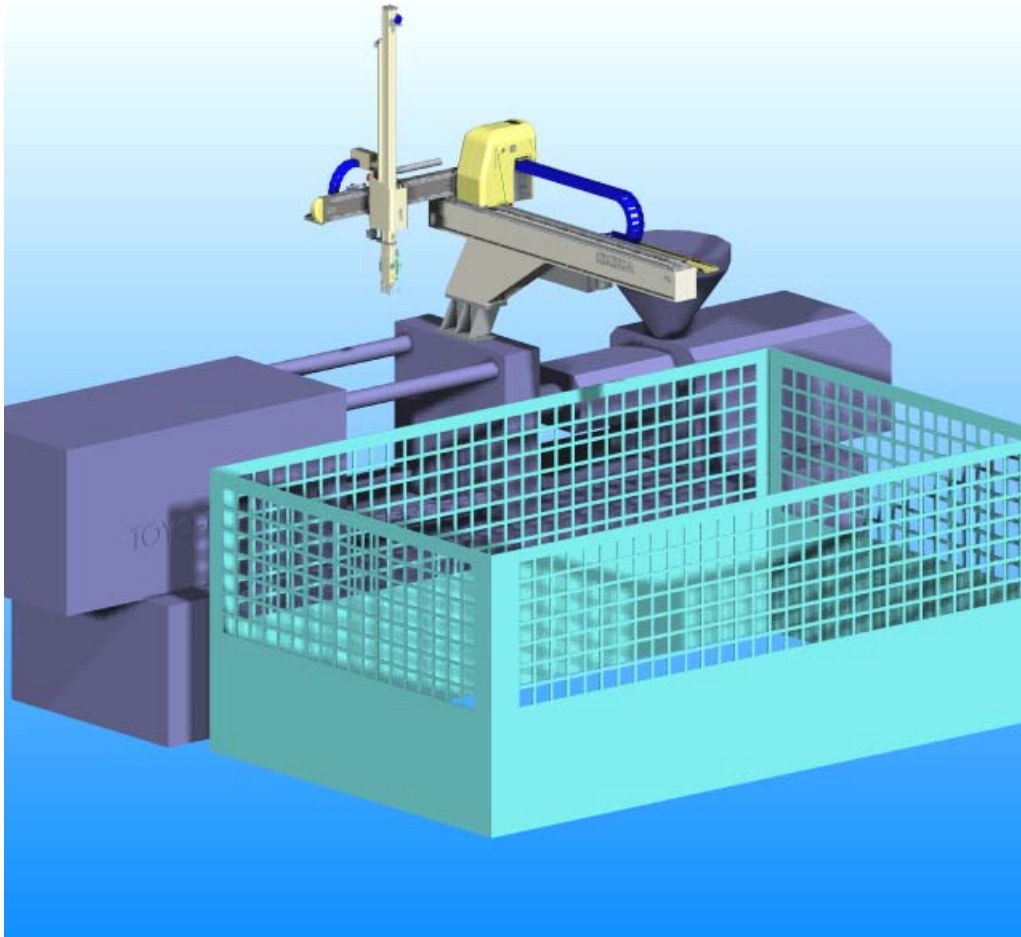
1. Hex wernch 2.5 to 8mm
2. Monkey wrench 8 to14mm
3. Cross-bladed screwdriver and flat-bladed screwdriver
4. Diagonal pliers and long-noes pliers
5. Avometer
6. Air gun
7. Oil gun

5.4 Lubrications

- 5.4.1 Regular lubrication of the linear slide rails, linear bearings, roller bearings or other composites are absolutely necessary.
- 5.4.2 Period of lubrication : Every 50,000 cycles or every month.
- 5.4.3 Type of grease : with yellow grease or soap base lubrication No. 2 series.
 - (1) ISEVG32-68..... or transparent lubricating oil
 - (2) ALVANIA GREASE NO.2 (SHELL brand).
 - (3) ALVANIA EP\2 (SHELL brand).
- 5.4.4 Position of lubricating :
 - (1) Vertical slide rail and slide block
 - (2) Crosswise guide-bar and bearing
- 5.4.5 Way of lubrication :
 - (1) Slide rail block : To squash grease into slide block for lubricating.
 - (2) Slide rail and bearing: To paint grease on the surfaces by brush.
- 5.4.6 No need to lubricate due to oil-free cylinder is utilized on the robot.

6. APPENDIX

6.1 Safety Guard Device



【CAUTION】

1. The safety guard device installation drawing is only for reference. The design and manufacture of safety guard device will be subject to the actual situation.
2. Pay attention to the following matters after safety guard device installed.
 - 2.1 For the safety guard device switch, there should be interlocking function with injection molding machine and robot. When the gate of safety guard is opened, the injection molding machine and robot will be stopped. Or the gate of safety guard won't be able to open unless the injection molding machine and robot is stop.
 - 2.2 There shouldn't be other operational device installed around the safety guard device.
 - 2.3 The emergency stop of safety guard device should be connected with IMM and robot.
 - 2.4 Only trained people can enter into protected zone to do maintain or other operation.