

# TOPIV ROBOT ( OPTIMIZATION / SERVICE )

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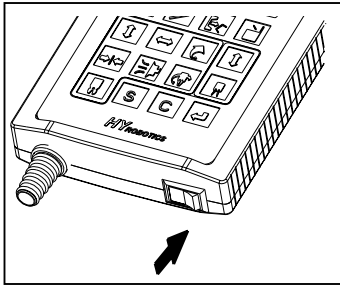
FAX : 1-866-232-5594

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2. Maintenance

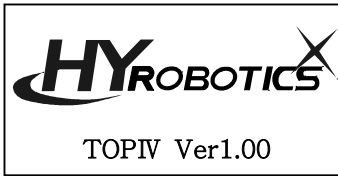
**2.2.9 Speed Control for Down, Swing, Kick**



● **STEP 1**

Normally it is not necessary to adjust speeds because they are factory set.

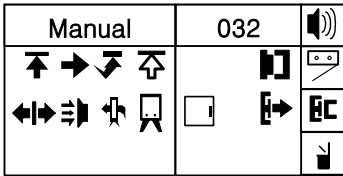
Power On.



● **STEP 2**

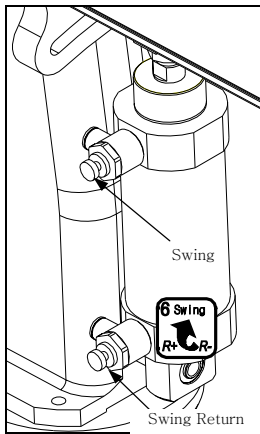
In the manual mode, press each button to operate each axis.

Adjust motion speed with speed control valve ( Air flow control valve )

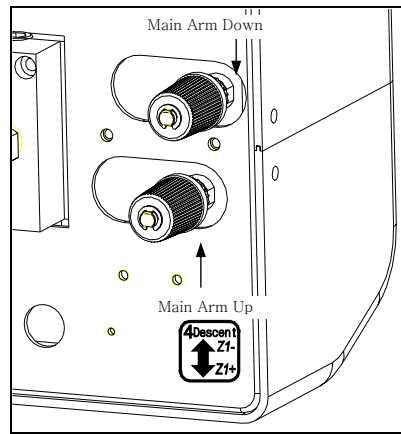


Adjust screw CW for decreasing, CCW for increasing speed.

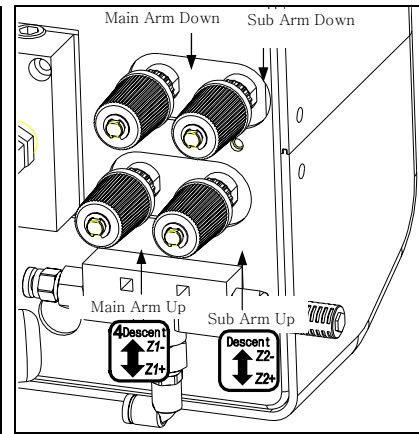
2<sup>nd</sup> extension speed controller controls the extension speed when dropping the part outside the mold.



[ROTATION]



[A, X, XC, XN TYPE]

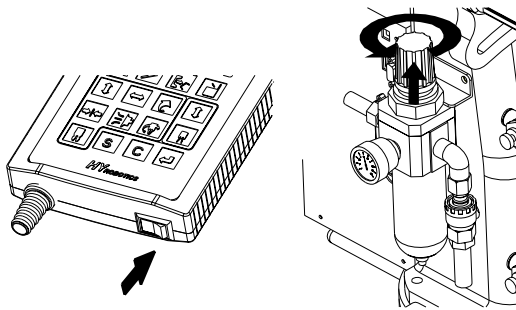


[Twin TYPE]

### 2.2.10 Cushion Control for Up, Kick, Swing

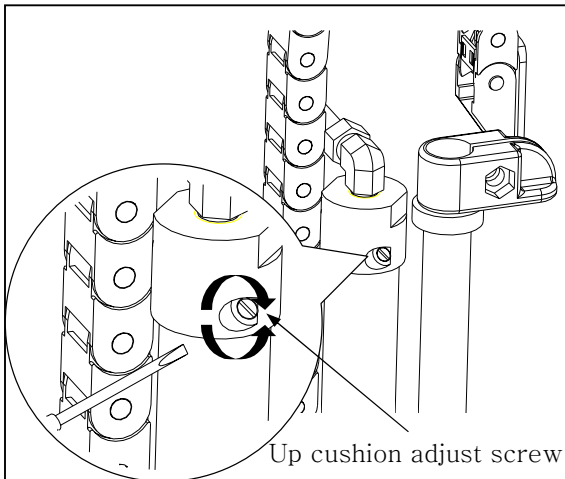
The cushions are adjusted to optimum condition at the factory. You should not need to adjust them If required , follow below step.

**⚠ WARNING** Adjusting Cushion should be done after adjust the speed control



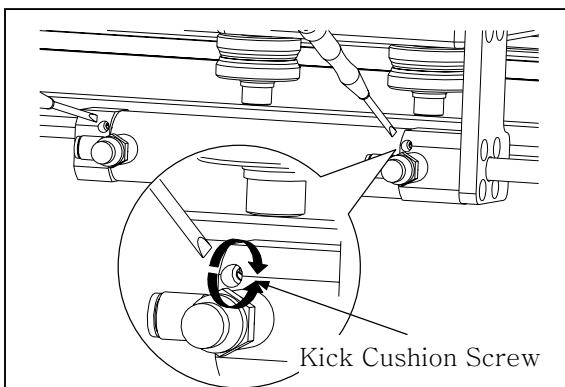
#### ● STEP 1

Turn off Power. Supply the air pressure to the system



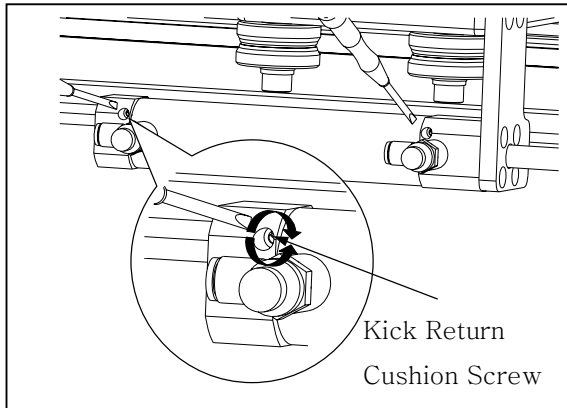
#### ● STEP 2

Up cushion adjust screw will control the shock absorbing ability for Up motion of cylinder  
Adjust screw CW for increasing cushion , CCW for decreasing cushion.



#### ● STEP 3

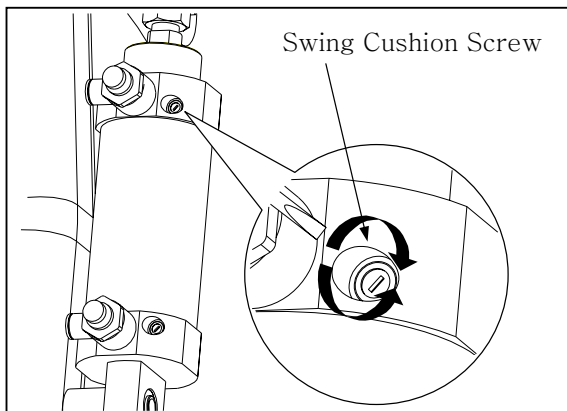
Adjust Kick cushion with kick Cushion adjust screw.  
Adjust screw CW for increasing cushion, CCW for decreasing cushion



● **STEP 3**

Adjust Kick return cushion with kick return Cushion adjust screw.

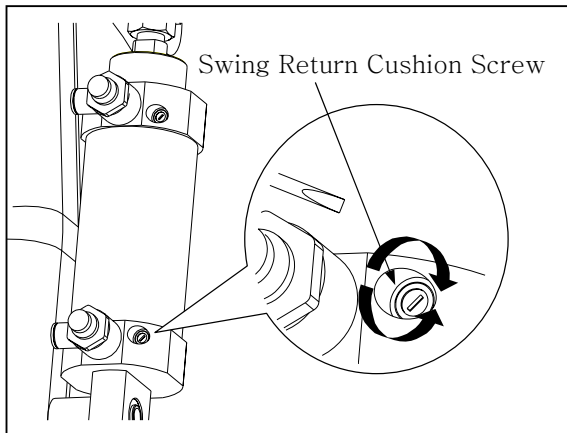
Adjust screw CW for increasing cushion, CCW for decreasing cushion



● **STEP 4**

Adjust swing cushion with swing cushion adjust screw.

Adjust screw CW for increasing cushion , CCW for decreasing cushion .



● **STEP 5**

Adjust swing cushion with swing return cushion adjust screw.

Adjust screw CW for increasing cushion , CCW for decreasing cushion .

**⚠ DANGER**

Do not enter robot motion area. If anyone enter the robot motion area during Auto operation or Manual Operation, serious accident could results.

**MINIMIZE SHOCK AT THE END OF STROKE WHILE ADJUSTING SPEED AND CUSHION FOR EACH OPERATION. IF YOU CHANGE THE SPEED OF ROBOT , MIGHT NEED TO RE ADJUST CUSHION TOO**

## 3.1 Preventative Maintenance Schedule

Before you start daily operation of the robot, perform preventive maintenance. .

### - Daily

- Check air Pressure is 4~5 kg/cm<sup>2</sup> or  $4 \sim 5 \times 10^5$  Pa(Gauge)]
- Inspecting filter regulator unit : Check the bowl for water and contamination and for correct pressure.
- Check Hoses and Cables : Check for kinks, cuts and tears. Replace as needed.
- Inspecting Shock absorbers and cushions. : Make sure the are operating smoothly
- Checking Gripper return spring : Check that the gripper return spring is operating properly
- Checking residue buildup: Inspect the shafts and gripper for buildup of plastic residue. Clean as necessary.
- Checking Interlock functions. : Make sure the interlock functions are working properly.
- Checking part verification: Check that the parts verification is working properly.
- Check Suction cups

### - Weekly or as often as needed.

- Check EOAT mounting screw including gripper : Check EOAT screw for tightness . Tighten as required.
- Inspecting fittings and mounting hardware : Check all fittings, screws, and component mounting hardware for tightness. Tighten as needed.
- Check the safety latch cylinder for descent. : Make sure the safety latch cylinder is working properly
- Testing the Emergency Stop Button. : Verify that the emergency stop works properly.
- Check angle of rotation and bolts tightness : Check for correct angle of rotation of the arm. Adjust as necessary. Tighten as required. **Heavy Vibration will cause to loose the bolts for short period time, Make sure split washers are installed with loc-tite thread sealant for fixed mounting bolts. Do not apply loc-titel bolts sealant to the bolts on adjustable parts like stroke adjustment**

### - Monthly

- Inspecting the filter regulator : Check that the filter regulator is set at the correct pressure. Check the filter and clean or replace it as needed.
- Checking the solenoid valves : Check that the solenoid Valves are working properly. Replace as needed.
- Checking all electrical cables : Inspect all electrical cables for cuts, burns and replace as required

### 3. Regular Maintenance

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- Checking the exhaust filter.
- Inspecting electrical terminal : Check all electrical terminals for tightness, adjust as required.
- Inspect each axis cylinder, make sure operation and the cushion is working properly
- Inspect body for any damage during mold set up or other operation.

## 3.2 Cleaning the Robot

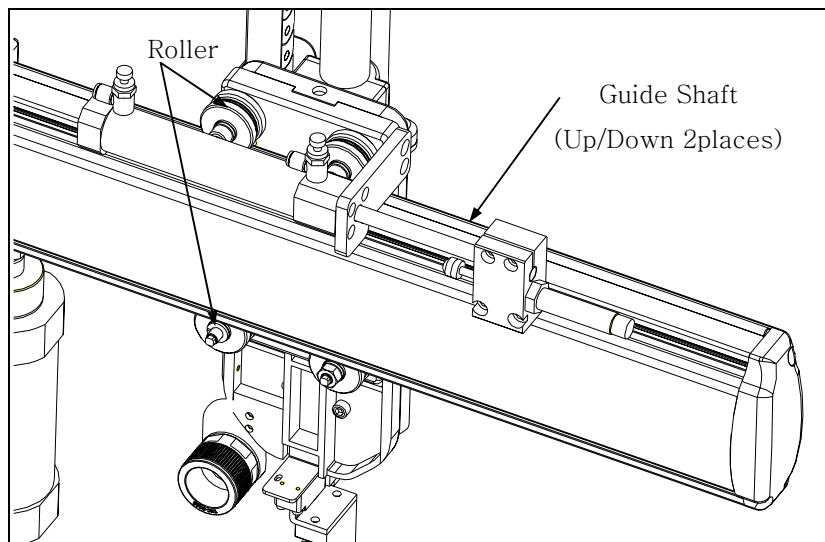
Recommend to clean each parts once a every month for maintenance. Use clean and dried paper towel or cotton towel.

**⚠ WARNING**

Never try to clean up the robot with Water. It might damage the robot or electric shock may occur

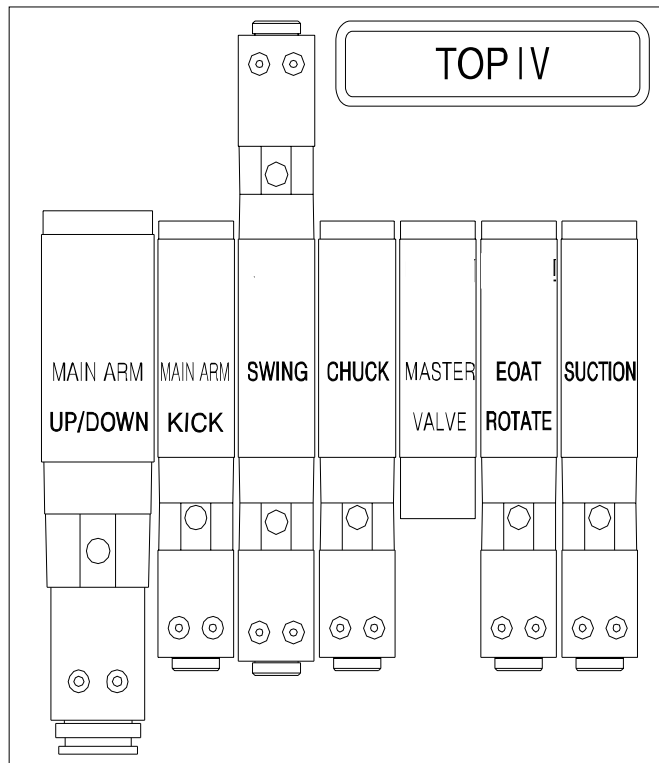
**⚠ WARNING**

- Lock out/ Tag out before maintenance
- Oil need to be applied after clean the guide shaft for longer life

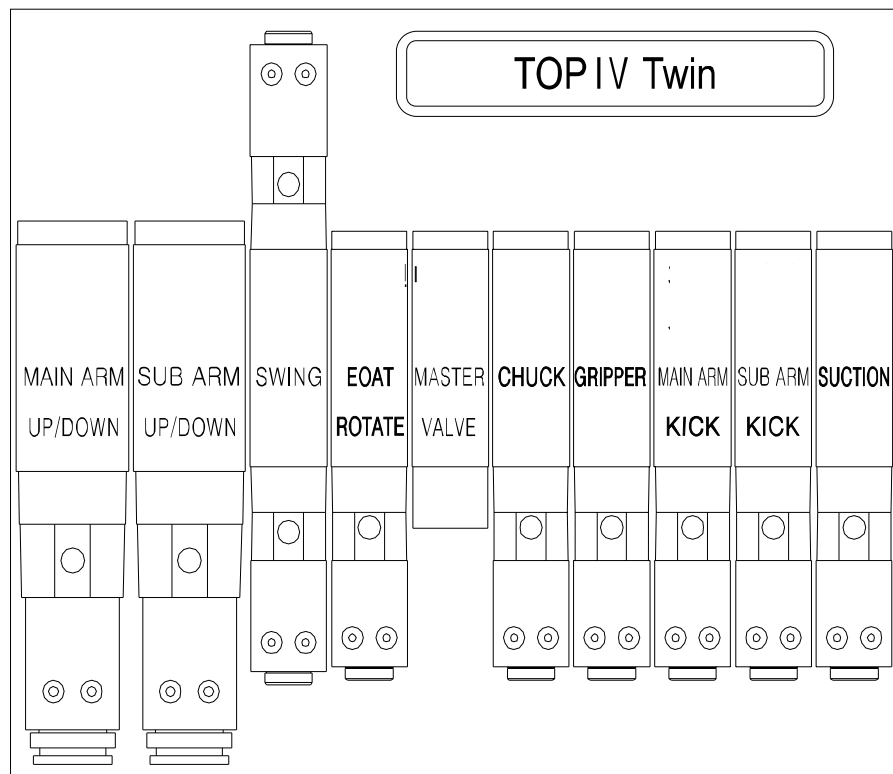


1. Pneumatic

1.1. Pneumatic Solenoid Valve Layout



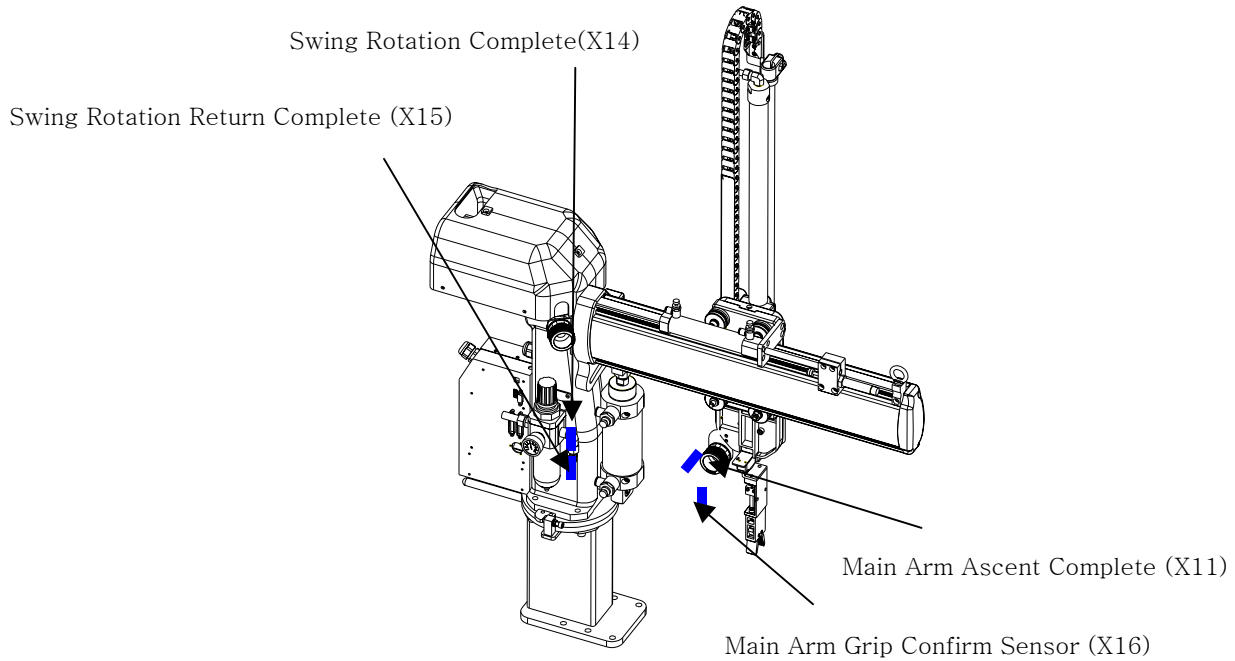
<A, X, XC Type Sol Valve>



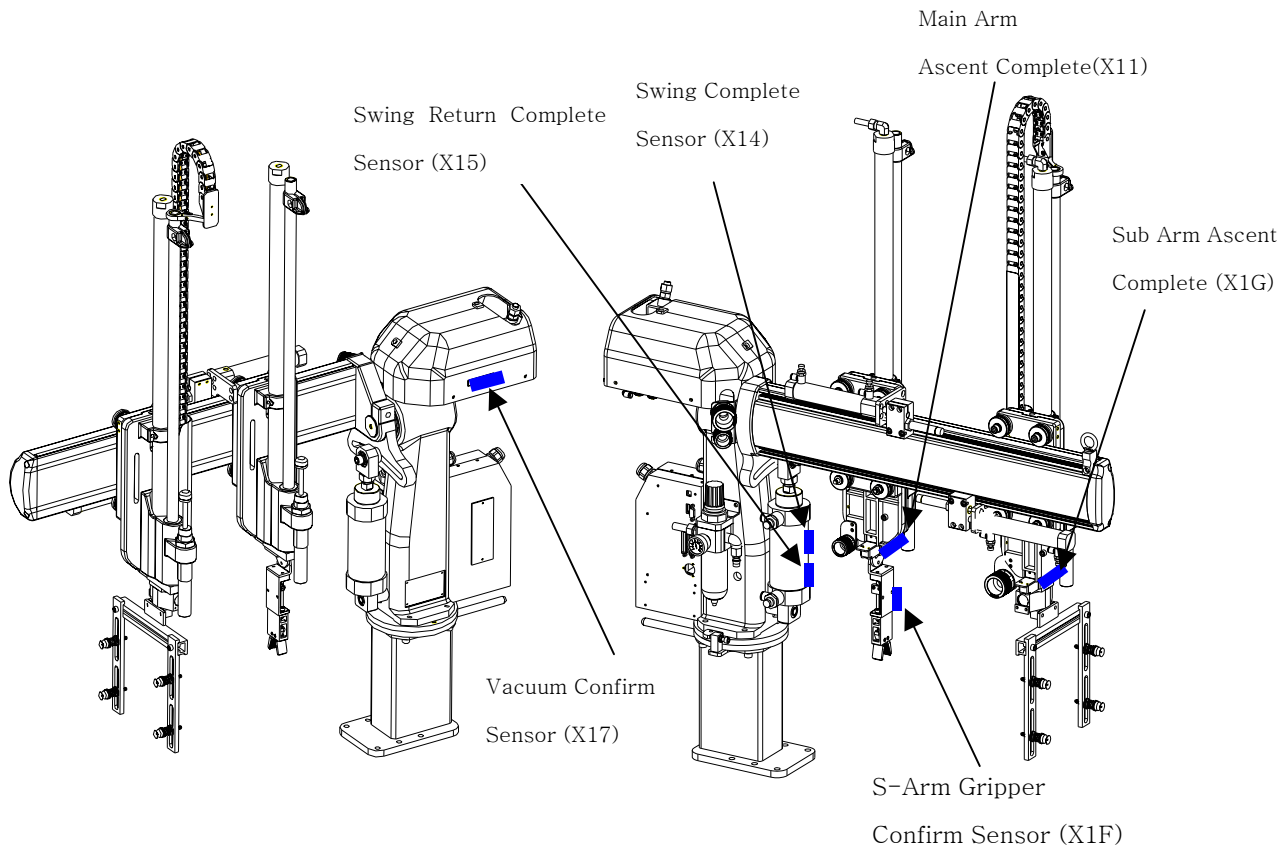
<Twin Type Sol Valve>



## 2. Sensor Location



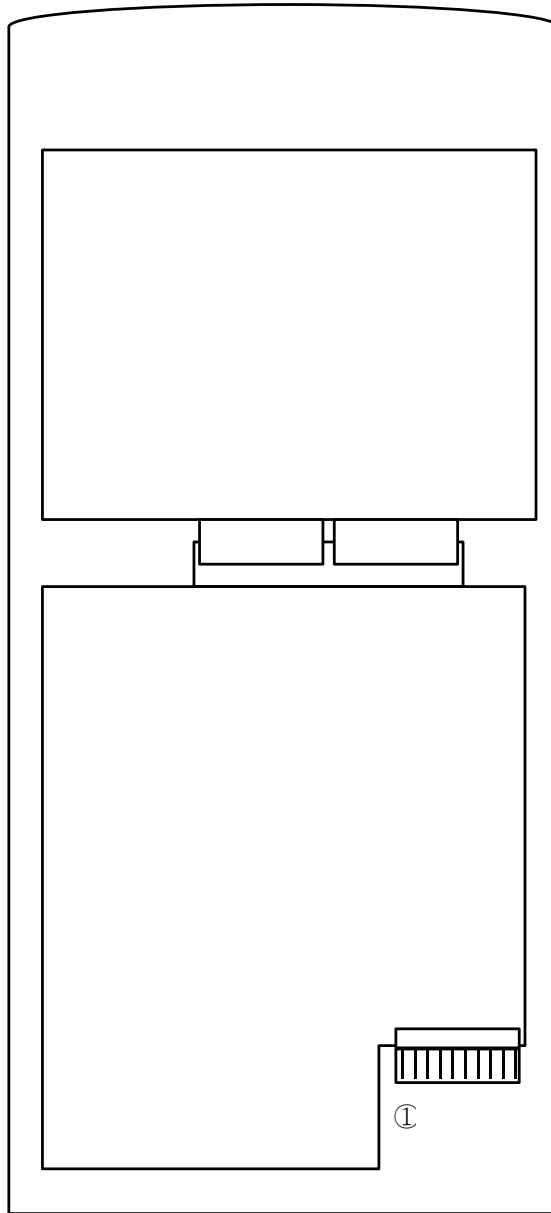
< Sensor Location for A Type >



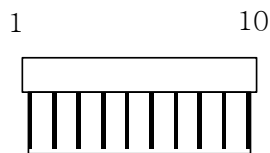
<X, XC, TWIN Type Sensor Location >

## 3. Handy Controller

TP(Teach Pendant)

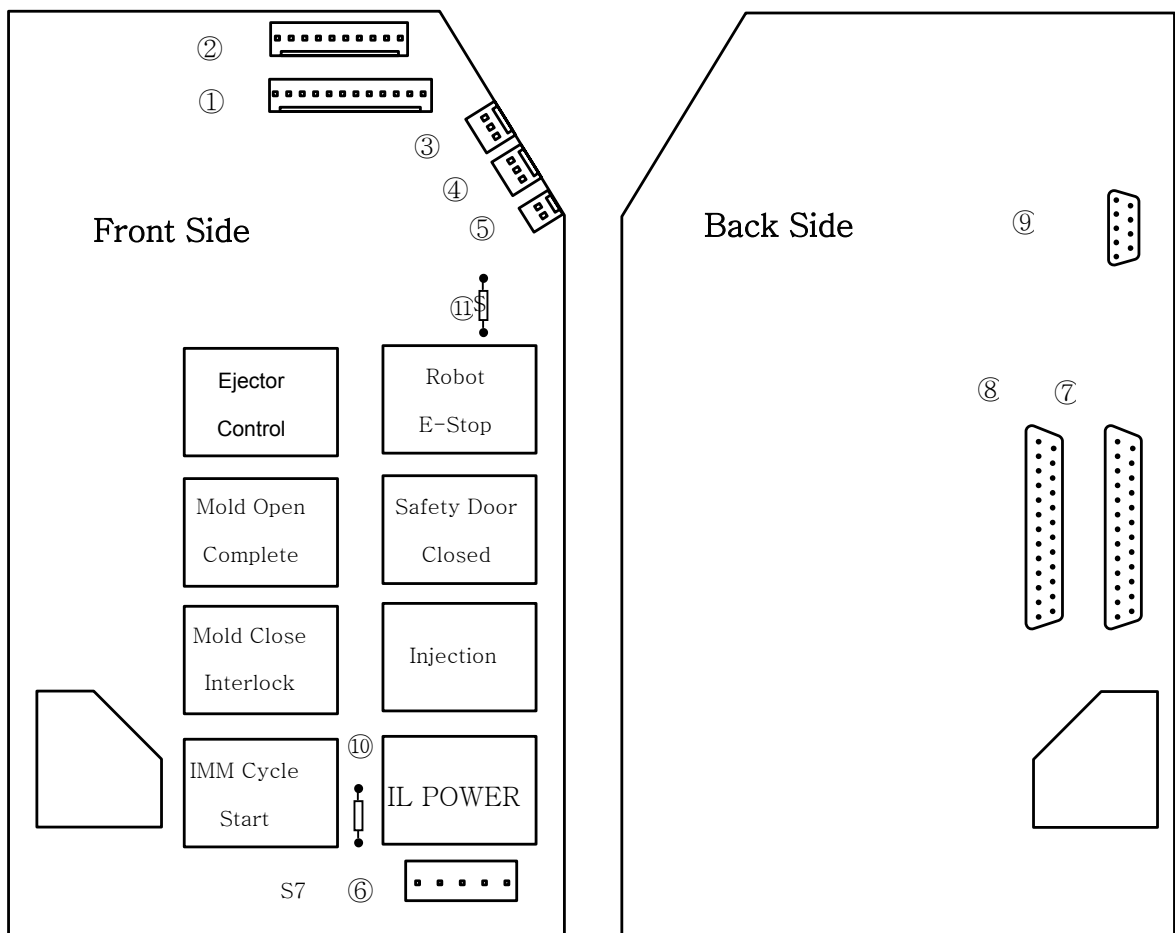


① TP Connector (10 Pin Connector )



No.	Internal Signal
1, 9	P24V
2	Robot E-Stop Output
3	TX (232C)
4	RX (232C)
5	GND
6	IMM E-Stop Input
7	24V
8	24V
10	GND

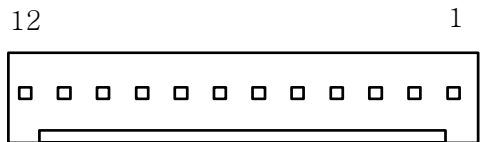
SC(System Controller) and Interlock Box



When the Power of Robot is off, Robot E-Stop is not working.

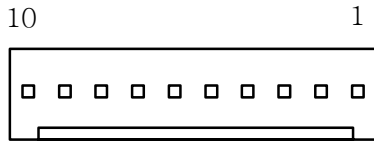
When Handy Controller power is off, Robot E-Stop is not working because Robot E-Stop relay is On ( Used Normally Closed Contact ). If Robot E-Stop is working while Robot Power is turned off, please check Robot E-Stop Relay. Also with Robot Power turned on, if E-Stop is not working with Robot E-Stop pressed, please check Robot E-Stop Relay. Robot E-Stop button will not work while the Power is not on.

① Input (12 Pin Connector , J1)



Pin No.	Signal Name	Robot Signal
01	Alarm Output	Y28
02	Swing Return	Y2F
03	Sub Arm Up/Down	Y2D
04	Sub Arm Kick/Return	Y2E
05	Main Arm Up/Down	Y20
06	Main Arm Kick/Return	Y21
07	Main Arm Gripper	Y22
08	Swing	Y23
09	Chuck Rotation	Y24
10	Vacuum	Y25
11	Nipper	Y26
12	Sub Arm Gripper	Y27

② Output (10 Pin Connector, J2)

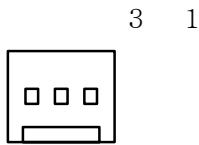


Pin No.	Signal Name	Robot Signal
01	P24V	P24V
02	Sub Arm Ascent Complete	X1G
03	Main Arm Ascent Complete	X11
04	Main Arm Grip Confirm	X16
05	Vacuum Confirm	X17
06	Sub Arm Grip Confirm	X1F
07	Extra Input	R01
08	Swing Input	X14
09	Swing Return Input	X15
10	GND	GND

③ Swing Complete Sensor Input (3Pin Connector, J8) – Same as I.O Board

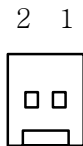
Pin No.	Signal Name	Robot Signal
1	GND Signal	
2	Swing Complete	X14
3	+24V Output	

④ Swing Return Complete Sensor Input (3Pin Connector, J9) – Same as I.O Board



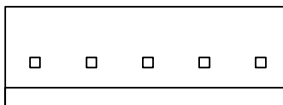
Pin No.	Signal Name	Robot Signal
1	GND Signal	
2	Swing Return Complete	X15
3	+24V Output	

⑤ E-STOP Connector (2P Connector, J4) – IMM or Robot is in Emergency Stop, Output is on



Pin No.	Signal Name	Robot Signal
1	E-Stop Safety	Y2G
2	+24V output	

⑥ Power Connector



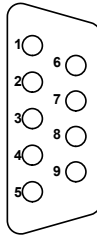
Pin No.	Signal Name
1	GND Input
3	24V Input
4	5V Input
5	GND Input

⑦ Robot Connector

Pin	Signal Name	Pin No.	Signal Name
1	Cycle Start 1	14	Safety Door Closed +
2	Cycle Start 2	15	Safety Door Closed -
3	Mold Close Interlock 1	16	Injection in Auto +
4	Mold Close Interlock 2	17	Injection in Auto -
5	Mold Open Interlock 1	18	Spare
6	Mold Open Interlock 2	19	Conveyor
7	Ejector Control 1	20	Part Rejection
8	Ejector Control 2	21	Full Auto
9	IMM E-Stop 1	22	Alarm
10	IMM E-Stop 2	23	Robot E-Stop 1
11	Mold Open Complete -	24	Robot E-Stop 2
12	Mold Open Complete +	25	IL_GND
13	IL_24V		

⑧ Connector for Robot not in Use

⑨ TP Connector (DSUB 9Pin Connector )



Pin No.	Signal Name
1	P24V
2	Robot E-Stop Input
3	RX (232C)
4	TX (232C)
5	GND
6	IMM E-stop Input
7	24V
8	24V
9	GND

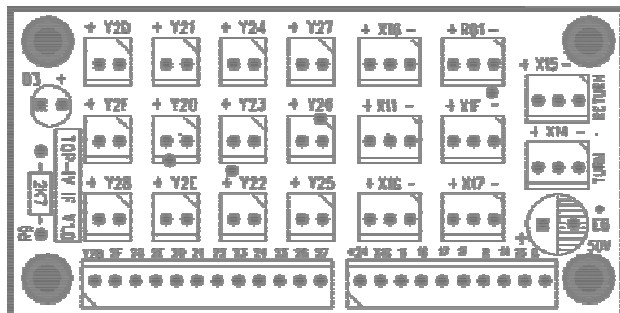
⑩ IL POWER Jumper

When Robot or IMM is in Emergency Stop, IL Power Relay ( Power Interlock ) is off and all other relay will be off. Solenoid Valve will not operate and robot will stop operation. And Pneumatic Shutdown signal will come out until E-Stop is released

Need to Install IL\_POWER Relay, Cut S7, POWER in Interlock Board

⑪ IMM E-stop Jumper

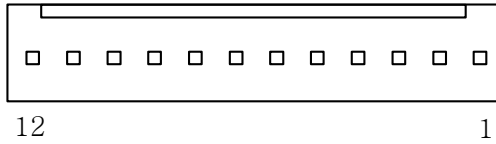
When you want to use IMM E-Stop to activate Robot E-Stop , Cut Jumper between S4 and MEMGIF (Interface board)



①

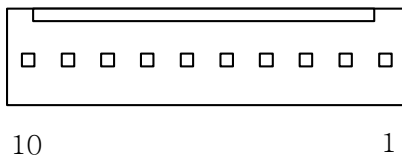
②

① Input (12Pin Connector )



Pin NO	Signal Name	Robot Signal
01	Sub Arm Gripper	Y27
02	Nipper	Y26
03	Vacuum	Y25
04	Chuck Rotation	Y24
05	Swing	Y23
06	Main Arm Gripper	Y22
07	Main Arm Kick / Return	Y21
08	Main Arm Up / Down	Y20
09	Sub Arm Kick / Return	Y2E
10	Sub Arm Up / Down	Y2D
11	Swing Return	Y2F
12	Output Alarm	Y28

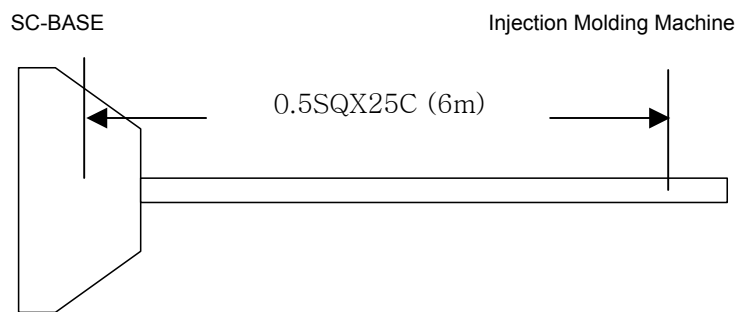
② Output (10Pin Connector)



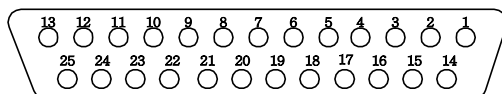
Pin NO	Signal Name	Robot Signal
01	GND	GND
02	Swing Return Complete Input	X15
03	Swing Complete Input	X14
04	Extra Input	R01
05	Sub Arm Gripper Confirm	X1F
06	Vacuum Confirm	X17
07	Main Arm Grip Confirm	X16
08	Main Arm Ascent Complete	X11
09	Sub Arm Ascent Complete	X1G
10	P24V	P24V

#### 4. Cable

##### 4.1 TOPIV Interlock cable



[D-SUB 25P FEMALE]



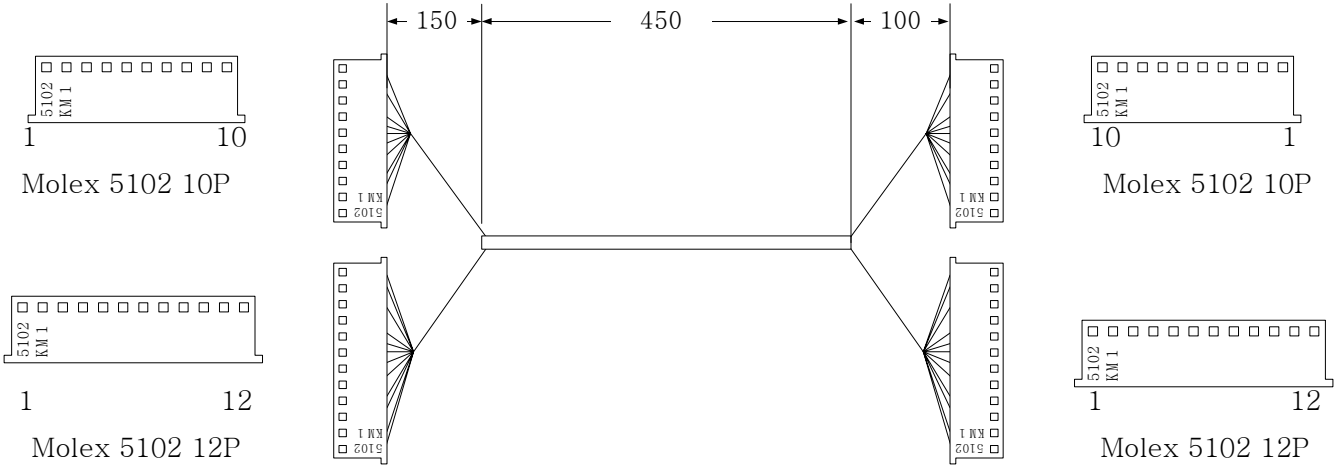
Pin No	Wire No	Signal Name	Signal Description ( Normally )	In / Out	Color(0.5SQ)
1	H	Cycle Start 1	IMM Cycle Start Output 1 ( On / Off Contact )	OUT	Black + White
2	G	Cycle Start 2	IMM Cycle Start Output 2 ( On / Off Contact )	OUT	Black
3	L	Mold Close Interlock 1	Mold Close Interlock Output 1 ( On / Off Contact )	OUT	Green + White
4	K	Mold Close Interlock 2	Mold Close Interlock Output 2 ( On / Off Contact )	OUT	Green
5	I	Mold Open Interlock 1	Mold Open Interlock 1 ( On / Off Contact )	OUT	Brown
6	J	Mold Open Interlock 2	Mold Open Interlock 2 ( On / Off Contact )	OUT	Brown + White
7	M	Ejector Control 1	Ejector Control Output 1 ( On / Off Contact )	OUT	Blue
8	N	Ejector Control 2	Ejector Control Output 2 ( On / Off Contact )	OUT	Blue + White
9	ED	IMM E-Stop 2	IMM E-Stop Input 1 ( On / Off Contact )	IN	Green + Yellow
10	EC	IMM E-Stop 1	IMM E-Stop Input 2 ( On / Off Contact )	IN	Red + Yellow
11	F	Mold Open Complete -	Mold Open Complete 2( DC 0 Volt Required )	IN	Gray
12	C	Mold Open Complete +	Mold Open Complete 1 ( DC +24 Volt Required )	IN	White
13	24V	IL_24V	+ 24 Volt ( Can be used for SPI, Euromap Interlock )	-	Red
14	C2	Safety Door Closed +	Safety Door Closed 2( DC +24 Volt Required )	IN	Purple
15	E	Safety Door Close -	Safety Door Closed 1( DC 0 Volt Required )	IN	Yellow
16	C1	Injection in Auto +	IMM Injection in Auto 2( DC +24 Volt Required )	IN	Red + Green
17	D	Injection in Auto -	IMM Injection in Auto 1( DC 0 Volt Required )	IN	Orange
18	SP	Spare	-		Sky
19	CONV	Conveyor	Conveyor Digital Output	OUT	Red + Blue
20	REJ	Reject	Reject Digital Input ( Connect 0V from Robot)	IN	Yellow + Black
21	R	Full Auto	Full Auto Digital Input ( Connect 0V from Robot)	IN	Red + Black
22	BUZZ	Alarm	Alarm Digital Output	OUT	Yellow + Red
23	EB	Robot E-Stop 1	Robot E-Stop 1 Output ( On / Off Contact )	OUT	Red + White
24	EA	Robot E-Stop 2	Robot E-Stop 2 Output ( On / Off Contact )	OUT	White + Red
25	0V	IL_GND	Not used for over 20mmA	-	Pink





### 4.3 Interlock Board and I.O Board Connection

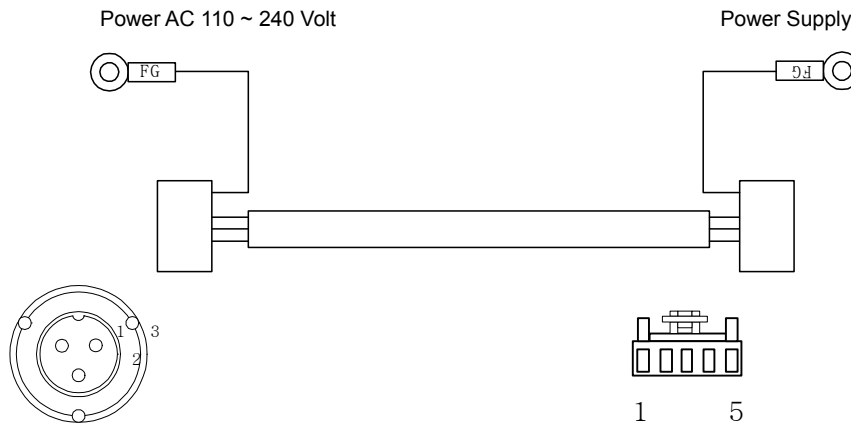
Unit: mm



MOLEX 12Pin			
Pin No	Signal	Robot Signal	Color
MOLEX12, 01	Alarm Output	Y28	Green White
MOLEX12, 02	Swing Return	Y2F	
MOLEX12, 03	Sub Arm Up/Down	Y2D	Yellow White
MOLEX12, 04	Sub Arm Kick/Return	Y2E	
MOLEX12, 05	Main Arm Up/Down	Y20	Yellow Black
MOLEX12, 06	Main Arm Kick/Return	Y21	
MOLEX12, 07	Main Arm Gripper	Y22	Brown White
MOLEX12, 08	Swing	Y23	
MOLEX12, 09	Chuck Rotation	Y24	Orange White
MOLEX12, 10	Vacuum	Y25	
MOLEX12, 11	Nipper	Y26	Gray White
MOLEX12, 12	Sub Arm Gripper	Y27	

MOLEX 10P			
Pin No	Signal	Robot Signal	Color
MOLEX10, 01	GND	GND	Red Yellow
MOLEX10, 02	Swing Return Input	X15	
MOLEX10, 03	Swing Input	X14	Red Green
MOLEX10, 04	Extra Input	R1	
MOLEX10, 05	Sub Arm Grip Confirm	X1F	Red Gray
MOLEX10, 06	Vacuum Confirm	X17	
MOLEX10, 07	Main Grip Confirm	X16	Red Orange
MOLEX10, 08	Main Ascent Complete	X11	
MOLEX10, 09	Runner Ascent Complete	X1G	Red Brown
MOLEX10, 10	P24V	P24V	

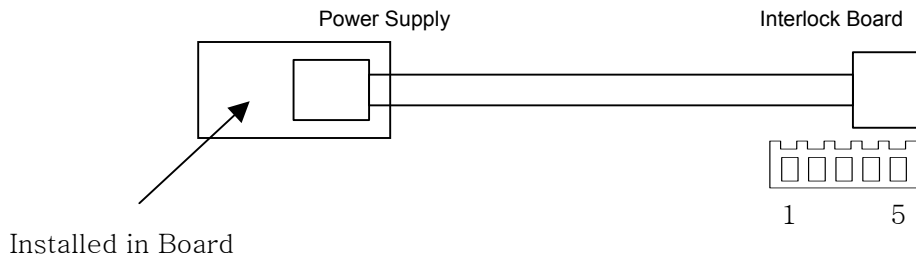
#### 4.4 100Vac-240Vac Power



Power		
Pin No	Signal	Color
1	110 ~ 220V	Black
2	110 ~ 220V	White
3	Ground	Green

Power Supply MOLEX 5P		
Pin No	Signal	Color
1	Ground	Green
3	110 ~ 220V	Black
5	110 ~ 220V	White

#### 4.5 Power Supply from 24V to Interlock Board



Interlock Board MOLEX 5Pin		
Pin No	Signal	Color
1	GROUND	BLACK
3	24V INPUT	RED
4	5V INPUT	WHITE
5	GNDINPUT	BLACK

## 5. Interlock

### 5.1 Interlock Status in Manual Mode

- ① Ejector : ON, Mold Open Interlock : ON
- ② While Robot arm is descent Position, Mold Close Interlock is OFF
- ③ External Waiting Function is in USE, Mold Close Interlock is OFF until Robot arm is in external waiting function
- ④ Injection in Auto : ON (Pulse), Mold Close Interlock is off when Mold Open Complete is ON

### 5.2 Interlock Status in Auto Mode

- ① Ejector control is OFF, Mold Interlock is ON (Initial Status )
- ② Ejector control is ON : When Robot arm down and Kick
- ③ Ejector control is Off : Take out and ascent complete, Mold is Closed
- ④ Mold Close Interlock is ON : External Waiting Function is not in use, Ascent Complete ON, Takeout Complete ON.
- ⑤ Mold Close Interlock is ON : External Waiting Function is in use, Ascent Complete ON, Swing On, Takeout Complete ON.
- ⑥ Mold Close Interlock is Off : Injection in Auto is ON( Pulse), Mold Close Complete is ON
- ⑦ Pressing Auto button, : When Mold Open Complete On, Take out complete is On. When Mold Open Complete is Off, Take Out Complete is Off
- ⑧ After release the sprue or products, When the robot is in Ascent position, Conveyor is ON(Pulse)

# Injection Molding Machine and Robot Interface Interlocking.

without SPI Plug

Read carefully and make sure all the voltage and wiring with actual IMM operation. ( Not following all the step might cause damage on IMM and Robot. )

## Products : HYRobotics TOPIV Sprue Picking Robot

### FROM IMM TO ROBOT ( IMM TEST )

After finishing Robot body set up. Must test all the IMM voltage ( DC 24, AC 110 or Contact ) with actual operation.

#### Emergency Stop

1. Locate Emergency Stop Wiring No. ( Two Point Required )
2. For Example ES1(Emergency Stop1) and ES2 ( Emergency Stop 2 ).
3. PRESS Emergency Stop Button
4. Measure Voltage ES1 and ES2 ( DC 0 Volts, AC 0 Volts or No Continuity )
5. Release Emergency Stop Button
6. Measure Voltage ES1 and ES2 ( DC 24 Volts, AC 110 Volts or Continuity )

#### Mold Open Limit

1. Locate Mold Open Complete ( Limit ) Wiring No. ( Two Point Required )
2. For Example MOC1(MoldOpenComplete1) and MOC2 ( MoldOpenComplete 2 ).
3. Mold Close
4. Measure Voltage MOC1 and MOC2 ( DC 0 Volts, AC 0 Volts or No Continuity )
5. Mold Open
6. Measure Voltage MOC1 and MOC2 ( DC 24 Volts, AC 110 Volts or Continuity )

#### Safety Door Closed

1. Locate Safety Door Closed Wiring No. ( Two Point Required ) \_\_\_\_\_
2. For Example SDC1 ( Safety Door Closed1 ) , and SDC2 ( Safety Door Closed 2 ).
3. Close Safety Door
4. Measure Voltage SDC1 and SDC2 ( DC 0 Volts, AC 0 Volts or No Continuity )
5. Open Safety Door
6. Measure Voltage SDC1 and SDC2 ( DC 24 Volts, AC 110 Volts or Continuity )

#### Injection Signal

1. Locate Injection Signal Wiring No. ( Two Point Required ) \_\_\_\_\_
2. For Example IS1 ( Injection Signal 1 ) , and IS2 ( Injection Signal 2 ).
3. Measure Voltage IS1 and IS2 with No Injection
4. ( DC 0 Volts, AC 0 Volts or No Continuity )
5. Measure Voltage IS1 and IS2 with Injection
6. ( DC 24 Volts, AC 110 Volts or Continuity )

#### Full Auto

1. Locate Full Auto Wiring No. ( Two Point Required ) \_\_\_\_\_
2. For Example FA1 ( Full Auto 1 ) , and FS2 ( Full Auto 2 ).
3. Measure Voltage FA1 and FA2 without Full Auto
4. ( DC 0 Volts, AC 0 Volts or No Continuity )
5. Measure Voltage FA1 and FA2 with Full Auto
6. ( DC 24 Volts, AC 110 Volts or Continuity )

#### Mold Close Limit ( Might Not Required )

1. Locate Mold Close Complete ( Limit ) Wiring No. ( Two Point Required )
2. For Example MCC1(MoldCloseComplete1) and MCC2 ( MoldCloseComplete 2 ).
3. Mold Close
4. Measure Voltage MCC1 and MCC2 ( DC 0 Volts, AC 0 Volts or No Continuity )
5. Mold Open
6. Measure Voltage MCC1 and MCC2 ( DC 24 Volts, AC 110 Volts or Continuity )

There might be same common and write down the each number that actually reading from Voltmeter.

### FROM ROBOT TO IMM ( ROBOT TEST )

After Mounting the robot on IMM, even though Robot fully tested before shipping, we recommend actual voltage or contact reading from Robot before wiring IMM. After finishing IMM Electric Test recommended test all the ROBOT wire and Make sure all the relay and cable is working properly with ( Contact On and Off ) with actual robot operation.

To turn on the Robot, Connect the Power and Make Jumper on EC, ED ( IMM E-Stop )

#### Cable Test

1. Test Continuity between C, C1, C2 ( Each of two wire ) : No Continuity
2. Test Continuity between D, E, F ( Each of two wire ) : No Continuity  
( There should no continuity on each of two wire )

#### Robot E-Stop Test

1. Test Continuity EA and EB with No Robot E-Stop ( Continuity )
2. Press Robot E-Stop
3. Test Continuity EA and EB ( No Continuity )

#### Mold Close Interlock

1. Adjust Robot arm stroke to prevent damaging Robot arm or mold
2. Test Continuity Between K and L ( Continuity )
3. Press Descent Button
4. Test Continuity Between K and L ( No Continuity )

Ejector Interlock need to run with Molding Machine ( In Auto Mode ) N, M ( Continuity in Manual )  
Auto Cycle Start need to run with Molding Machine ( In Auto Mode ) G, H ( No Continuity in Manual )

Follow instruction Manual to test Ejector Interlock and Auto Cycle Start

Also it's possible to test robot relay without IMM operation.

Mold Open Complete ( C, F ), Safety Door Closed, ( C2, E ), Auto Injection ( C1, D ).

From Robot wire

Test : Mold Open Complete ( C, F )

Supply 0 Volt to F and 24 Volt to C, It will activate Mold Open Complete relay ( RED Bright LED )  
Supply 0 Volt to C and 24 Volt to F, It will activate Mold Open Complete relay ( But No LED )

Test : Auto Injection ( C1, D )

Supply 0 Volt to D and 24 Volt to C1, It will activate Auto Injection relay ( RED Bright LED )  
Supply 0 Volt to C1 and 24 Volt to D, It will activate Auto Injection relay ( But No LED )

Test : Safety Door Closed, ( C2, E )

Supply 0 Volt to E and 24 Volt to C2, It will activate Safety Door Closed relay ( RED Bright LED )  
Supply 0 Volt to C2 and 24 Volt to E, It will activate Safety Door Closed relay( But No LED )

Test : IMM Full Auto Signal ( R ( Red + Black ) )

Also Supply 0 Volt to R, Will see Full Auto Icon in Handy Controller Screen.

Make sure all the test is working properly and Follow interface interlock

If you have any question, Please contact

Sam Lee ( Tel : 1-636-578-6059 )



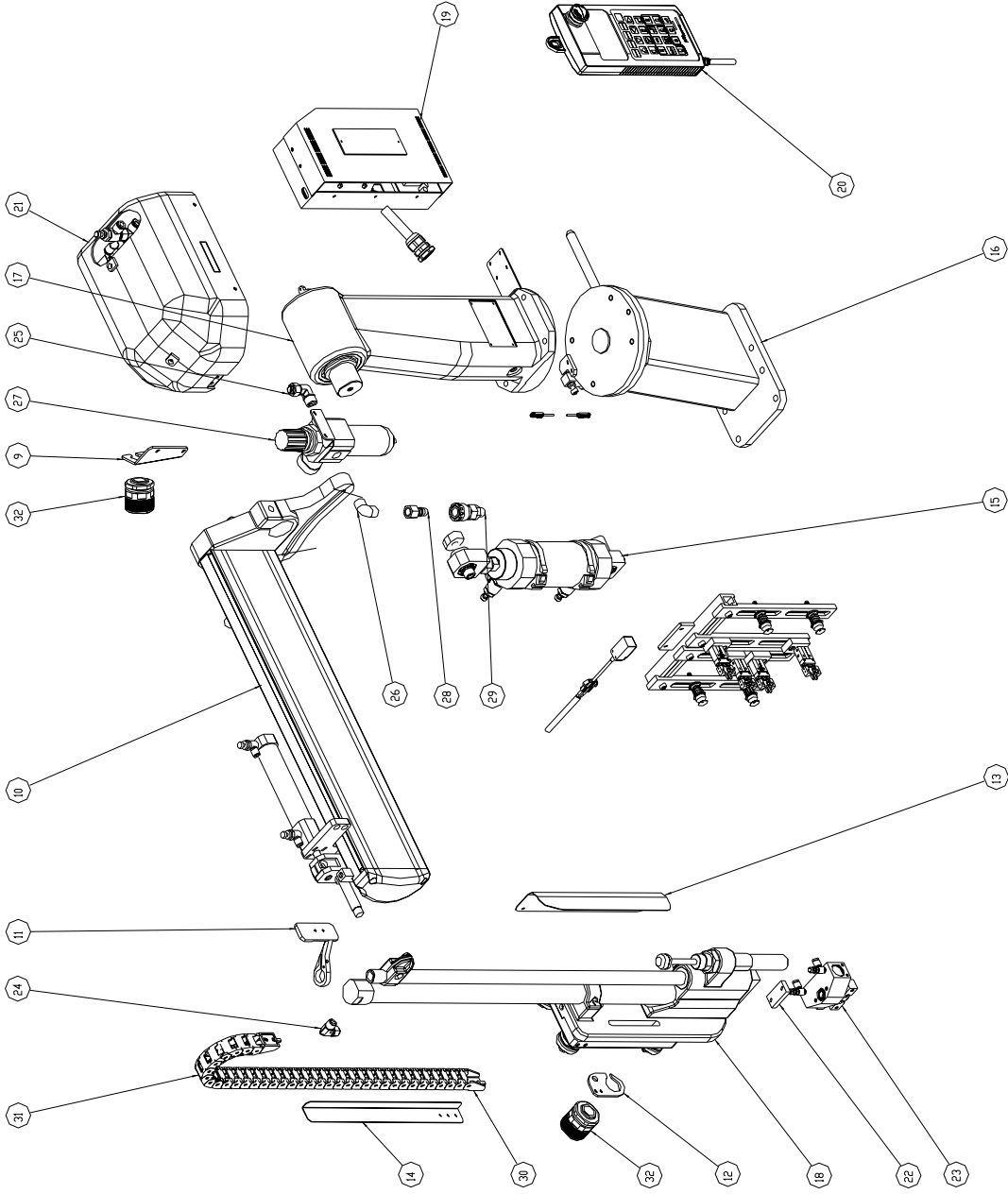
HYROBOTICS CORP.  
5988 MID RIVER MALL DR.  
ST. LOUIS MO 63304  
Www.hyrobot.com

## **6. Layout**

### **6.1 XC TYPE**

#### **6.1.1 XC-550**

NO.	REVISIONS	DATE	APPROVE	REMARK
1				



NO	DESCRIPTION	DRAWING NO	QTY	MATERIAL	FINISH	REMARK
33	TOP_JIG-ASSY		1			
32	FLEXIBLE COUPLING	PNM71KCS2R8B	2			
31	CYL LINK	PCV1H8103726	1			
30	END_BK	PCV1H8103088	1			
29	COUPLER	PAC1M4K20888	1			
28	REGULATOR	PANV3J0003358	1			
27	ELBOW	PANF5E10338	1			
26	FITTING	PANF1A0053388	1			
25	FITTING	PANF1A0053114	1			
24	CHUCK_ROT_UNIT	MCS5T1241000	1			
23	BRACKET	MCS5T1241000	1	A4661		
22	320_BDY	MS55XC410000	1			
21	PERMANENT ASSY	MS55T4100000	1			
20	INTER_LOCK	MS55T4700000	1			
19	VERTICAL_ASSY	MS55T4500000	1			
18	BODY_ASSY	MS55T4200000	1			
17	BASE_ASSY	MS55T4100000	1			
16	SWIVEL_CTL_ASSY	MS55T4010000	1			
15	CABLE_BK	MS55T4000P40	1	SS41		
14	CABLE_COVER	MS55T4000P40	1	SS41		
13	BK	MS55T4000P40	1	SS41		
12	CABLE_BK	MS55T4000P40	1	SS41		
11	PULL_OUT_ASSY	MS55T400000	1	85		
10	BK	MS55T4000410	1	SS41		
9	BK	MS55T4000410	1	SS41		
8	HSP100B_1B-M		1			
7	BUZZER	ES55T4610000E	1			
6	SENSOR_CABLE	ES55T4610000E	1			
5	SENSOR	ES55T4610000E	1			
4	PRNGR_CABLE	ES55T4610000E	1			
3	INTERLOCK_CABLE	ES55T4610000E	1			
2	ID_CABLE	ES55T4610000E	1			
1	ID_CABLE	ES55T4610000E	1			
NO	DESCRIPTION	DRAWING NO	QTY	MATERIAL	FINISH	REMARK
TITLE			TOP_IV			
A3 SCALE:0.250			DESIGN	CHECK	APPROVE	DRAWING NO. TOP_IV_A550
UNIT : M/M						MS55XC40000000
DATE :						
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<b>Hydraulics</b>						

6.1.2 XC-550 Solenoid Valve Box

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

NO	DESCRIPTION	DRAWING NO	Q'TY	MATERIAL	FINISH	REMARK
11	BOARD	PBBSSTW0001888	1			
10	SILENCER	PAXZSILENCER18	1			
9	SENSOR	PAAVFS610EVM4M	1			
8	VACCUIM_PUMP	PAAV193508P43	1			
7	FITTING	PAXFPH10618888	1			
6	FITTING	PAXFE106M5888	1			
5	FITTING	PAXFEC06180888	1			
4	MANL_FOLD	MS55XC4220000	1			
3	COVER_B	MS55T142103M00	1			
2	COVER_A	MS55T142102M00	1			
1	SOL_BOX	MS55A142101P40	1	SS41		

TITLE		TOP_IV		PART NAME		SOL_BOX	
A3	SCALE: 3/10	DESIGN	CHECK	APPROVE	DRAWING NO.		
UNIT :	M/M						
DATE :							

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### 6.1.3 XC-550 Pull out Assembly

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

12	ABSORBER	PSAK1E107206CH	1		
11	FITTING	PANFESC041808B	2		
10	CYL	PAM347870998	1		
9	BLOCK	MS551W43008N10	1	SS41	
8	STOPPER	MS551W43007N10	1	SS41	
7	COLLAR	MS551W43006N10	1	S45C	
6	CYL_PLATE	MS551W43005N10	1	S45C	
5	FILE_COVER	MS551W43004M00	1	ABS	
4	BLOCK	MS551W43003N10	1	S45C	
3	SWIVEL_PLATE	MS551W43002Z80	1	AC4C	
2	PULL_OUT_FRAME	MS55A143001MCO	1	A6063-T5	
1	GUIDE_SHAFT	MS55A133004MCO	2	SUJ2	

NO	DESCRIPTION	DRAWING NO	Q'TY	MATERIAL	FINISH	REMARK
TITLE TOP_IV PART NAME PULL_OUT_ASSY						
A3	SCALE: 3/10	DESIGN	CHECK	APPROVE	DRAWING NO.	
UNIT :	M/M					
DATE :	05.01.28					
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6.1.4 XC-550 Vertical Assembly

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

28	SPRING_WASHER	PWSSM080800ZC0	4	
27	WASHER	PWSPM080800ZCA	4	
26	ABSORBER	PSAKIEM4506CE	1	
25	O_RING	PPAP0188888888	1	
24	PACKING	PPAAMYA0788888	1	
23	PACKING	PPAAMYA0488888	1	
22	HEX_NUT	PNTHM080802ZC0	2	
21	SOCKETHEAD_BOLT	PBTHM08040Z80	2	
20	SOCKETHEAD_BOLT	PBTHM06020Z80	3	
19	BALL_BUSH	PBSBLM20JL08888	2	
18	FITTING	PAXFPH081808888	1	
17	PLATE	PAXBRE081818888	1	
16	CYL	PAXA3478905508	1	
15	SLIDESHAFT	MS55TW4500MCO	1	SUJ2
14	SENSOR_B/K	MS55TW45009ZW0	1	SS41
13	HOLDER	MS55TW45008M00	1	NYLON
12	BLOCK	MS55TW45007M00	1	NYLON
11	COLLAR	MS55TW45006Z80	2	S45C
10	SHAFT	MS55TW45005Z80	2	S45C
9	CYL_BLOCK	MS55TW45004PW0	1	AC4C
8	HOLDER_PLATE_B	MS55TW45003PW0	1	AC4C
7	BEARING-COLLAR	MS55TW45002Z80	2	S45C
6	HOLDER_PLATE_A	MS55TW45001Z80	1	AC4C
5	B/K	MS55AT3402Z80	1	SS41
4	SPRING	MS55AT34206MCO	1	PW1
3	PISTON	MS55AT34204Z80	1	SS41B
2	BEARING	MS55AT34103MCO	4	
1	STOPPER_DUG	MS55AT34007Z80	1	S45C

NO	DESCRIPTION	DRAWING NO	Q'TY	MATERIAL	FINISH	REMARK
TITLE TOP_IV PART NAME VER TICAL_ASSY						
A3 SCALE: 1/5 DESIGN CHECK APPROVE		DRAWING NO.				
UNIT :	M/M					MS55TW45000000
DATE :	05.04.18					

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6.1.5 XC-550 Swivel Cylinder Assembly

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

weight:1.8kg

16	SPRING_WASHER	PWSSM01000ZCO	1		
15	WASHER	PWSPM01000ZCA	1		
14	HEX_NUT	PNTHM01600ZCO	1		
13	SUCTIONHEAD_BOLT	PBTHM01006ZB0	1		
12	BEARING	PBRNHK1420888	1		
11	BEARING	PBRAG200Z28E88	2		
10	SENSOR_BAND	PAXK3MR863888	2		
9	SPEED_CON	PAXFESC0614688	2		
8	BUSHING	PAXB3814088888	2		
7	CYL	PAXA3478800756	1		
6	BLOCK	MS55TW40104Z80	1	SS41	
5	WASHER	MS55TW40103Z80	1	SS41	
4	BLOCK	MS55TW40102Z80	1	S45C	
3	BLOCK	MS55TW40101Z80	1	SS41	
2	SENSOR	ESS5TW4520052E	1		
1	SENSOR	ESS5TW4510052E	1		

TITLE		TOP_IV		PART NAME	
A3	SCALE: 1/2	DESIGN	CHECK	APPROVE	DRAWING NO.
UNIT :	M/M				MS55TW40100000
DATE :	05.04.18				

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6.1.6 XC-550 Base Assembly

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

weight:9.3kg

9	SPRING_WASHER	PWSSM0800ZC0	1		
8	SPRING_WASHER	PWSSM0600ZC0	1		
7	HEX_NUT	PNTHM0602ZC0	1		
6	SOCKETHEAD_BOLT	PBTHM08015ZB0	1		
5	SOCKETHEAD_BOLT	PBTHM06030ZB0	1		
4	RET_PLATE_ASSY	MS55TW4100000	1		
3	STOPPER	MS55TW4100ZB0	1	SS4I	
2	BASE	MS55TW4100PW0	1	SS4I	
1	STOPPER	MS55AT3100ZB0	1	SS4I	

TITLE				PART NAME			
TOP_IV		DRAWING NO		FINISH		REMARK	
A3	SCALE:0.400	DESIGN	CHECK	APPROVE	DRAWING NO.		
UNIT :	M/M				MS55TW41000000		
DATE :	05.04.18						

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6.1.7 XC-550 Body Assembly

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

weight:5.6kg

NO	DESCRIPTION	DRAWING NO	Q'TY	MATERIAL	FINISH	REMARK
6	SNAP_RING	PRGS940S868888	1			
5	BEARING	PBRA600BZ28888	2			
4	CABLE_B/K	MS55TW42004NID	1	SS4I		
3	COLLAR	MS55TW42002ZW0	1	SS4I		
2	SHAFT	MS55TW42002ZB0	1	S45C		
1	BODY	MS55TW4200PW0	1	AC4C		

TITLE			
A3	SCALE:0.400	DESIGN	CHECK
UNIT : M/M		APPROVE	
DATE : 05.04.18		DRAWING NO.	
		PART NAME	
		BODY_ASSY	
		DRAWING NO.	
		MS55TW42000000	

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6.1.8 XC-550 Interlock Box Assembly

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

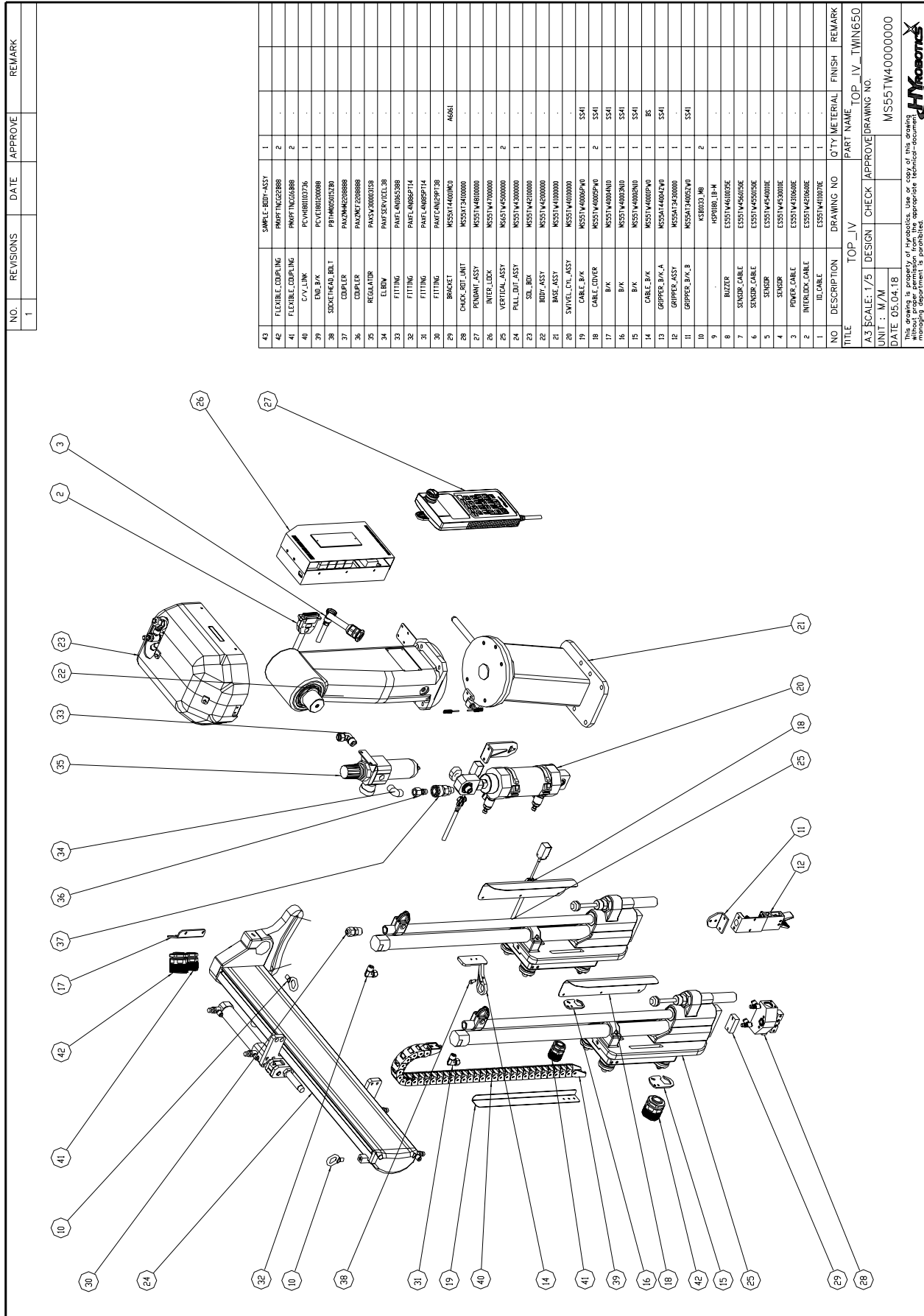
  

7	POWER RELAY	PSMASMP32440LB	1			
6	RELAY	PRLAM4NDC248	8			
5	SC_BOARD	PBDS4SC000000	1			
4	COVER	MSS5TW47003MCO	1	34A7±		
3	COVER	MSS5TW47002PW0	1	SS41		
2	INTER_LOCK_BOX	MSS5TW47001PW0	1	SS41		
1	CONNECTOR	ESS5TW432010E	1			
NO	DESCRIPTION	DRAWING NO	Q'TY	METERIAL	FINISH	REMARK
TITLE		TOP_IV	PART NAME		INTER_LOCK	
A3	SCALE: 2/5	DESIGN	CHECK	APPROVE	DRAWING NO.	
UNIT	M/M				MS55TW47000000	
DATE	04.08.17					

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6.2 TWIN , 6.2.1 TWIN 650



NO.	REVISIONS	DATE	APPROVE	REMARK
1				

NO	DESCRIPTION	DRAWING NO	QTY	MATERIAL	FINISH	REMARK
43	FLEXIBLE COUPLING	SAMPLE-BODY-ASSY	1			
42	FLEXIBLE COUPLING	PMPT1NC62888	2			
41	FLEXIBLE COUPLING	PMPT1NC66888	2			
40	CVY LINK	PCVH0103726	1			
39	END B/K	PCVE081020088	1			
38	SOCKETHEAD_BBLT	PRH400017280	1			
37	COUPLER	PAC2M6C2208888	1			
36	COUPLER	PAC2MKT2208888	1			
35	REGULATOR	PAN55130003358	1			
34	ELBOW	PANF50001328	1			
33	FITTING	PANF4N652588	1			
32	FITTING	PANF4N658714	1			
31	FITTING	PANF4N658714	1			
30	FITTING	PANF4N658714	1			
29	BRACKET	MS55144001M0	1	A6041		
28	CHECK_ROT_UNIT	MS5513400000	1			
27	PERMANENT ASSY	MS55144500000	1			
26	INTER_LDKA	MS55144000000	1			
25	VERTICAL ASSY	MS55144200000	2			
24	PULL_DOWN_ASSY	MS55144200000	1			
23	SHL_IDR	MS55144200000	1			
22	BODY_ASSY	MS55144500000	1			
21	BASE_ASSY	MS55144000000	1			
20	SWIVEL_CVL_ASSY	MS55144000000	1			
19	CABLE_B/K	MS551440000P0	1	SS41		
18	CABLE_COVER	MS551440000P0	2	SS41		
17	B/K	MS5514400000	1	SS41		
16	B/K	MS5514400000	1	SS41		
15	B/K	MS5514400000	1	SS41		
14	CABLE_B/K	MS551440000P0	1	BS		
13	GRIPPER_B/K-A	MS551440000P0	1	SS41		
12	GRIPPER_ASSY	MS55134000000	1			
11	GRIPPER_B/K-B	MS551340000P0	1	SS41		
10		MS551340000P0	2	MS551340000P0		
9		MS551340000P0	1	MS551340000P0		
8	BUZZER	ES55144000000	1			
7	SENSOR_CABLE	ES55144000000	1			
6	SENSOR_CABLE	ES55144000000	1			
5	SENSOR	ES55144500000	1			
4	SENSOR	ES55144500000	1			
3	POWER_CABLE	ES55144500000	1			
2	INTERLOCK_CABLE	ES55144500000	1			
1	ID_CABLE	ES55144100000	1			

TITLE TOP-IV PART NAME TOP\_IV\_TWIN650  
 A3 SCALE: 1/5 DESIGN CHECK APPROVE DRAWING NO. MS55144000000  
 UNIT : M/M  
 DATE 05.04.18  
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6.2.2 TWIN-650 Solenoid Valve Box

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

weight:4.5kg

NO	DESCRIPTION	DRAWING NO	Q'TY	MATERIAL	FINISH	REMARK
12	BOARD	PBDSSTW0001888	1			
11	SILENCER	PAVZSILENCER18	1			
10	SENSOR	PAXVPS602VNAM	1			
9	VACCUUM_PUMP	PAXV193500R043	1			
8	FITTING	PAXFPH0618888	1			
7	FITTING	PAXFEST06W5088	1			
6	FITTING	PAXFEC06180888	1			
5	FITTING	PAXFCME29PT38	1			
4	MANI_FOLD	MS55TW4220000	1			
3	COVER_B	MS55TW42103M00	1			
2	COVER_A	MS55TW42102M00	1			
1	SOL_BOX	MS55TW42101Pw0	1	SS41		

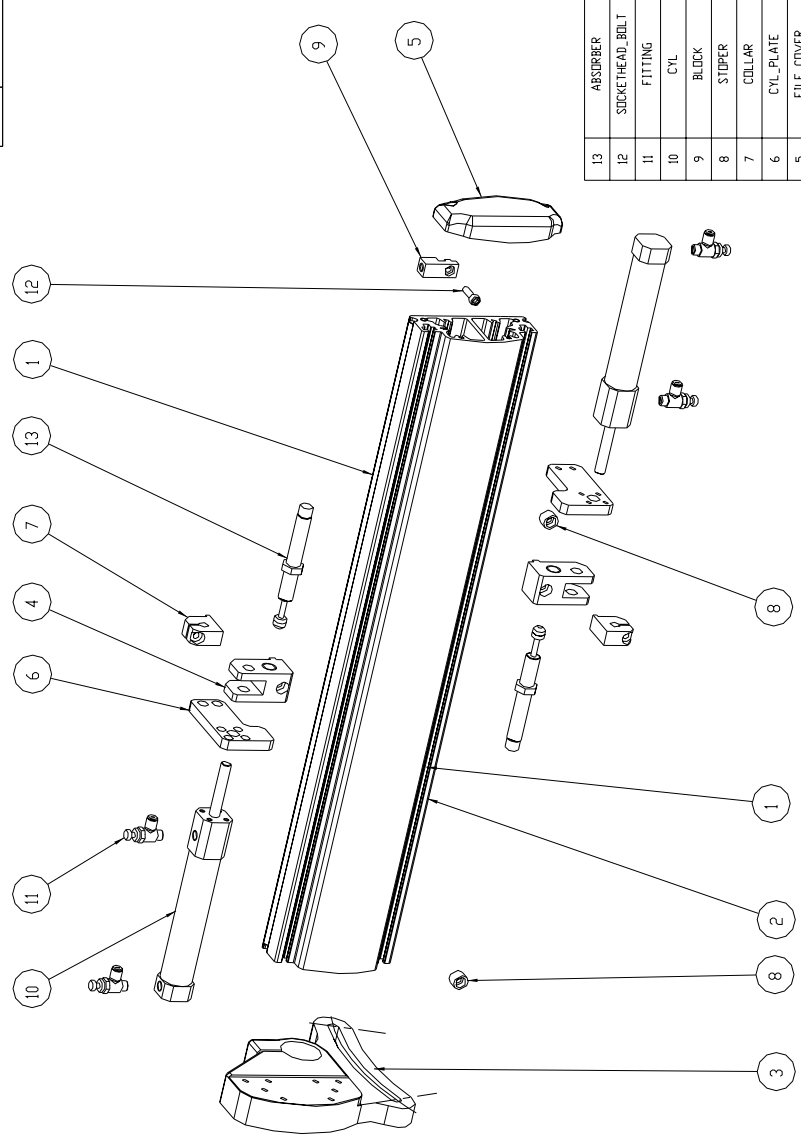
  

TITLE		TOP_IV		PART NAME		SOL_BOX	
A3	SCALE0.350	DESIGN	CHECK	APPROVE	DRAWING NO.		
UNIT :	M/M						MS55TW42100000
DATE :	05.04.18						

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6.2.3 TWIN-650 Pull out Assembly

NO.	REVISIONS	DATE	APPROVE	REMARK
1				


  


13	ABS DRIVER	PSAKIEN07206CH	2	
12	SOCKET HEAD BOLT	PBTHM060202ZB0	1	
11	FITTING	PAWTESS041808B	4	
10	CYL	PAXA34787009I8	2	
9	BLOCK	MS55TW43008ND	1	SS41
8	STIPER	MS55TW43007ND	2	SS41
7	COLLAR	MS55TW43006ND	2	S45C
6	CYL_PLATE	MS55TW43005ND	2	S45C
5	FILE_COVER	MS55TW43004ND	1	ABS
4	BLOCK	MS55TW43003ND	2	S45C
3	SWIVEL_PLATE	MS55TW43002ZB0	1	AC4C
2	PULL_OUT_FRAME	MS55TW43001MCO	1	A6063-T5
1	GUIDE_SHAFT	MS55TW43009MCO	2	SUJ2

NO	DESCRIPTION	DRAWING NO	QTY	MATERIAL	FINISH	REMARK
TITLE TOP_IV						
PART NAME PULL_OUT_ASSY						
A3	SCALE:0.250	DESIGN	CHECK	APPROVE	DRAWING NO.	
UNIT :	M/M				MS55TW43000000	
DATE :	05.04.18					

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6.2.4 TWIN-650 Vertical Assembly

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

28	SPRING_WASHER	PWSM00800ZC0	4	
27	WASHER	PWSPM00800ZCA	4	
26	ABSORBER	PSAKITEM450BCE	1	
25	O_RING	PPAF0168888888	1	
24	PACKING	PPAAMYA0788888	1	
23	PACKING	PPAAMYA0488888	1	
22	HEX_NUT	PNTHM08002ZC0	2	
21	SOCKETHEAD_BOLT	P8THM08040ZB0	2	
20	SOCKETHEAD_BOLT	P8THM06020ZB0	3	
19	BALL_BUSH	PBSBLM20U8888	2	
18	FITTING	PAFFPH808180888	1	
17	µ: ?Pa>>	PAHREJ0181888	1	
16	CYL	PAAK3478906508	1	
15	SLIDESHAFT	MS65TW45010MCO	1	SUJ2
14	SENSOR_B/K	MSS5TW45092W0	1	SS41
13	HOLDER	MSS5TW45008M00	1	NYLON
12	BLOCK	MSS5TW45007M00	1	NYLON
11	COLLAR	MSS5TW45006ZB0	2	S45C
10	SHAFT	MSS5TW45005ZB0	2	S45C
9	CYL_BLOCK	MSS5TW45004PW0	1	AC4C
8	HOLDER_PLATE_B	MSS5TW45003PW0	1	AC4C
7	BEARING-COLLAR	MSS5TW45002ZB0	2	S45C
6	HOLDER_PLATE_A	MSS5TW45001ZB0	1	AC4C
5	B/K	MSS5AT34402ZB0	1	SS41
4	SPRING	MSS5AT34206MCO	1	PW1
3	PISTON	MSS5AT34204ZB0	1	SS41B
2	BEARING	MSS5AT34103MCO	4	
1	STOPER_D0G	MSS5AT34007ZB0	1	S45C

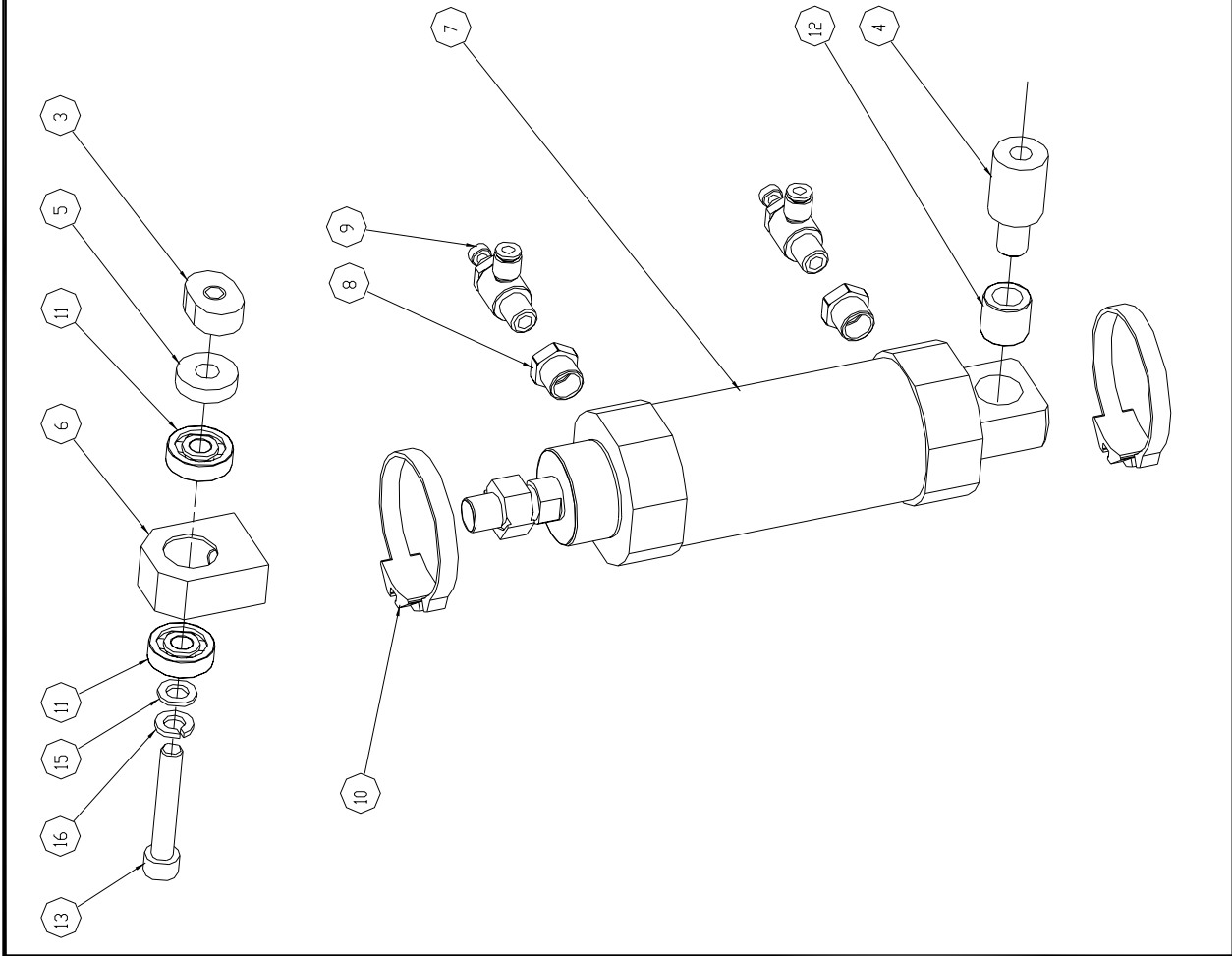
TITLE	TOP_IV	PART NAME	Q'TY	MATERIAL	FINISH	REMARK
VERTICAL_ASSY						
A3	SCALE: 1/5	DESIGN	CHECK	APPROVE	DRAWING NO.	
UNIT :	M/M				MS65TW45000000	
DATE :	05.04.18					

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6.2.5 TWIN-650 Swivel Cylinder Assembly

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

weight:1.8kg



NO	DESCRIPTION	DRAWING NO	Q'TY	METERIAL	FINISH	REMARK
16	SPRING_WASHER	PWSSM01000ZCO	1	.	.	
15	WASHER	PWSPM01000ZCA	1	.	.	
14	HEX_NUT	PNTHM01600ZCO	1	.	.	
13	SUB-ASSEMBLY	PBTHM01006ZB0	1	.	.	
12	BEARING	PBRNHKK1420888	1	.	.	
11	BEARING	PBRAG200Z28888	2	.	.	
10	SENSOR_BAND	PAXK3MR863888	2	.	.	
9	SPEED_CON	PAXFESC0614888	2	.	.	
8	BUSHING	PAXB3814088888	2	.	.	
7	CYL	PAXA3478800758	1	.	.	
6	BLOCK	MS55TW40104Z80	1	SS41		
5	WASHER	MS55TW40103Z80	1	SS41		
4	BLOCK	MS55TW40102Z80	1	S45C		
3	BLOCK	MS55TW40101Z80	1	SS41		
2	SENSOR	ESS5TW4520052E	1	.	.	
1	SENSOR	ESS5TW4510052E	1	.	.	

TITLE		PART NAME	
TOP_IV		SWIVEL_CYL_ASSY	
A3 SCALE: 1/2	DESIGN	CHECK	APPROVE
UNIT : M/M			
DATE : 05.04.18			MS55TW40100000

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6.2.6 TWIN-650 Base Assembly

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

Weight: 9.3kg

NO	DESCRIPTION	DRAWING NO	Q'TY	MATERIAL	FINISH	REMARK
9	SPRING_WASHER	PWSSM06000ZC0	1			
8	SPRING_WASHER	PWSSM06000ZC0	1			
7	HEX_NUT	PNTHM06002ZC0	1			
6	SOCKETHEAD_BOLT	PBTHM08015ZB0	1			
5	SOCKETHEAD_BOLT	PBTHM06030ZB0	1			
4	RET_PLATE_ASSY	MSS5TW4100000	1			
3	STOPPER	MSS5TW41002ZB0	1	SS41		
2	BASE	MSS5TW41001PW0	1	SS41		
1	STOPPER	MSS5A131002ZB0	1	SS41		

TITLE		TOP_IV		PART NAME		BASE_ASSY	
A3	SCALE:0.400	DESIGN	CHECK	APPROVE	DRAWING NO.		
UNIT :	M/M						
DATE :	05.04.18						
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6.2.7 TWIN-650 Body Assembly

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

weight:5.6kg

6	SNAP_RING	PRGS040S888888	1	.		
5	BEARING	PBRAG008Z8888	2	.		
4	CABLE_B/K	MS55TW42004N0	1	SS41		
3	COLLAR	MS55TW42003ZV0	1	SS41		
2	SHAFT	MS55TW42002ZB0	1	S45C		
1	BODY	MS55TW4200PW0	1	AC4C		
NO	DESCRIPTION	DRAWING NO	Q'TY	MATERIAL	FINISH	REMARK
TITLE		TOP_IV	PART NAME BODY_ASSY			
A3	SCALE:0.400	DESIGN	CHECK	APPROVE	DRAWING NO.	
UNIT	M/M			MS55TW42000000		
DATE	05.04.18					
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6.2.8 TWIN 650 Interlock Box Assembly

NO.	REVISIONS	DATE	APPROVE	REMARK
1				

NO	DESCRIPTION	DRAWING NO	Q'TY	METERIAL	FINISH	REMARK
7	POWER RELAY	PSMASMP32440LB	1			
6	SC_BOARD	PRLAM4NDC248	8			
5	COVER	PBDS4SC000000	1			
4	COVER	MSS5TW47003MCO	1	3/4x1 1/2		
3	INTER_LOCK_BOX	MSS5TW47002PW0	1	SS4I		
2	CONNECTOR	MSS5TW47001PW0	1	SS4I		
1	CONNECTOR	ESS5TW432010E	1			

TITLE		TOP_IV		DRAWING NO.	
A3	SCALE: 2/5	DESIGN	CHECK	APPROVE	DRAWING NO.
UNIT :	M/M				MS55TW47000000
DATE :	04.08.17				

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