

# **NEXIA, ZEST Series Robot Preventive Maintenance and Parts Service**



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Figure and method on this document is based on ZEST-200D Model,  
Actual figure, method and step might be little different.



### 3.1 Maintenance Items

This robot has the following daily inspection and regular inspection for the maintenance items..

- Inspection for the pre-operation
- Inspection after one month operation
- Inspection after three months operation
- Every monthly inspection
- Every three months inspection
- Every six months inspection
- Every yearly inspection

NOTE

- Following the maintenance inspection schedule table, please make the inspection table for each robot.
- Using the table, please check the maintenance of the robot.

Inspection list			Maintenance period											Note
			pre-operation	Initial inspection		Every monthly	Every three months	Every six months	Yearly check					
				After one month	After three month					Inspection date				
Traverse unit	The timing belt pulley													
	1	Looseness and rumble of each installed pulley.			●				●					
	2	Looseness of timing belts		●	●	●	●	●	●					
	The motor													
	1	Looseness and rumble of each installed motor			●	●	●	●	●					
	2	Connection of the pulley			●				●					
	3	Miss the origin location							●					
	The guide rail and track roller bearing													
1	The grease condition			●		●	●	●						
Kick/forward unit	The Motor, pulley and timing belt													
	1	Looseness and rumble of each installed motor			●				●					
	2	Looseness of the motor pulley			●									
	3	Looseness of the passive pulley			●				●					
	4	Looseness of timing belts		●	●	●	●	●	●					
	5	Miss the origin location							●					
	The guide rail													
	1	Grease condition			●		●	●	●					
Chuck rotation unit	The rotational bracket													
	1	Damage of the bracket			●				●					
	2	A looseness of the bracket		●	●	●	●	●	●					
	The rotational cylinder													
	1	Air leakage		●	●	●	●	●	●					
	2	Damage of the cylinder			●				●					
	3	Cylinder load connection		●					●					
	The chuck rotation case													
1	Damage of the case			●				●						

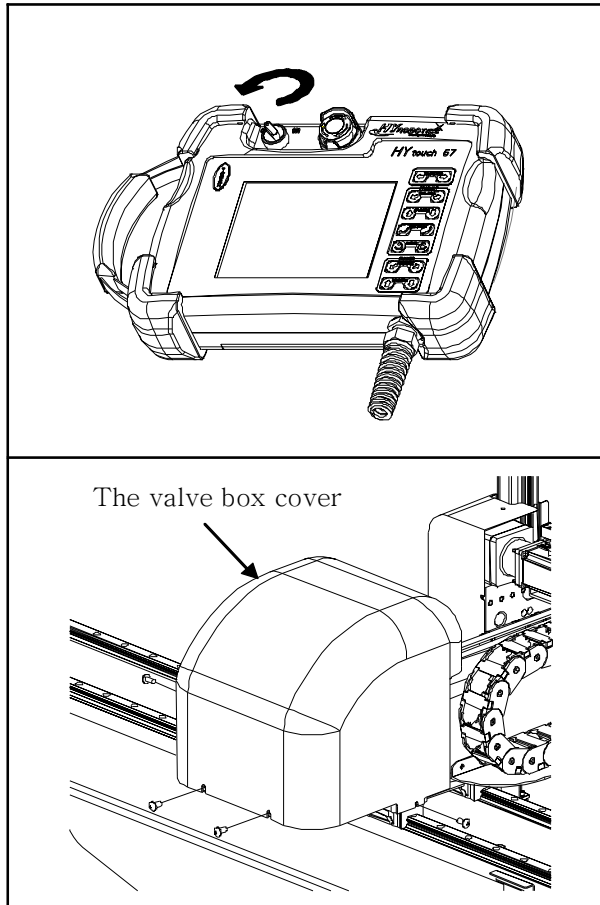
	2	A rumble of the case		●					●								
Inspection list			period											Note			
			Pre-operation	Initial inspection		Every month	Every three months	Every six months	Yearly check	Inspection date							
				After one month	After three month												
Up & down unit	The frame																
	1	Looseness of each installed frame		●						●							
	2	Frame damage and aberration		●	●	●	●	●	●	●							
	3	Unit cover damage and looseness		●						●							
	The timing belt and pulley																
	1	Looseness of each installed pulley		●	●	●	●	●	●	●							
	2	damage of the timing belt		●	●	●	●	●	●	●							
	The guide rail																
	1	Grease condition			●		●	●	●	●							
Pneumatic system	Filter and regulator unit																
	1	Air regulator condition								●							
	2	Adjustment of the air pressure	●	●	●	●	●	●	●	●							
	3	Filter condition	●	●	●	●	●	●	●	●							
	Air pressure piping																
	1	Air leakage	●	●	●	●	●	●	●	●							
	2	Condition of the pipe binder	●	●	●	●	●	●	●	●							
	Vacuum device																
	1	Damage of the vacuum device		●						●							
	2	Function of the device		●	●	●	●	●	●	●							
	3	Function of the filter	●	●	●	●	●	●	●	●							
	The air exhauster																
	1	Damage of the air exhauster		●						●							
	The solenoid valve																
	1	Air leakage	●	●	●	●	●	●	●	●							
2	Damage and looseness		●						●								
3	Function								●								



1	Looseness of the connectors		●					●					
2	Damage of the cables		●	●	●	●	●	●					

## 3.2 Maintenance of Mechanism

### 3.2.1 Inspection of the traverse

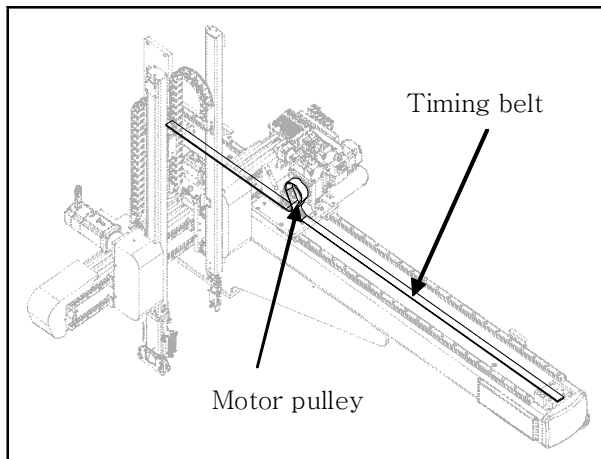


#### STEP 1

Power off and lock out/ tag out for machine maintenance.

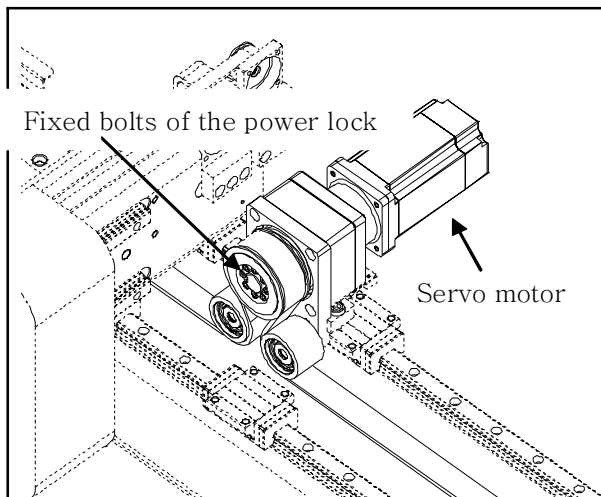
#### STEP 2

Take off the valve box cover.



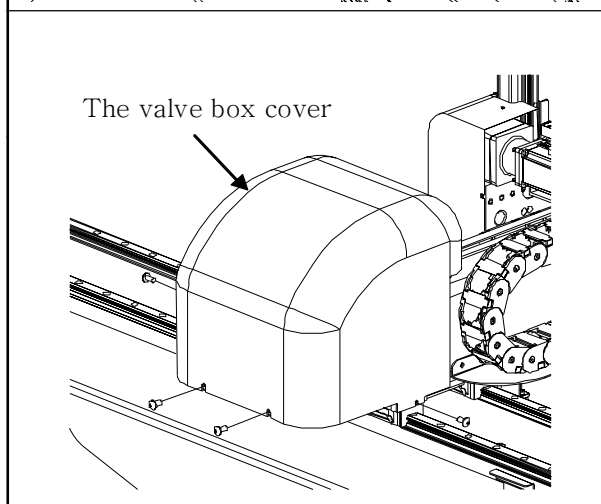
### STEP 3

Inspect the damage and looseness of the motor pulley



### STEP 4

Inspect the looseness of the motor



### STEP 5

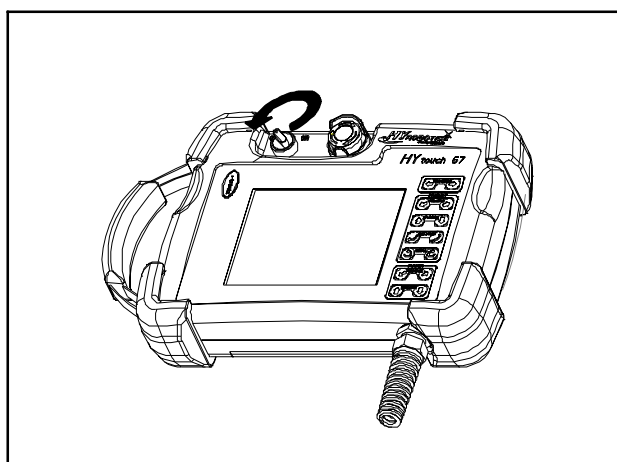
Inspect the damage and looseness of the timing belt

### STEP6

Installed the valve box cover

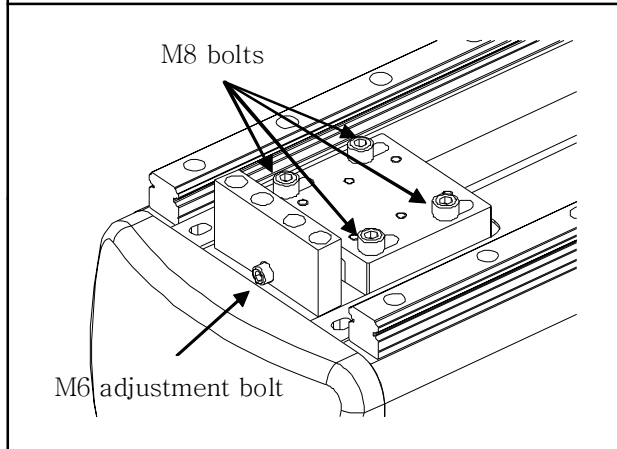


### 3.2.2 Adjustment of the traverse timing belt tension



#### STEP 1

Power off the molding machine and take-out robot.

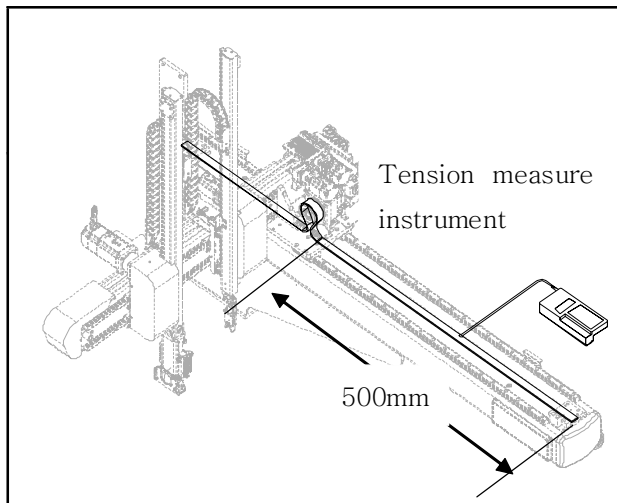


#### STEP2

After loosen the four M8 bolts in the clamp, loosen the lock-nuts

#### STEP3

Adjust the timing belt's tension with M6 adjustment bolts



#### STEP4

Following the figure, move traverse axis by hand.

#### STEP5

Enter the measure condition into the tension measure instrument

The measure condition

- unit tension:  $0.60 \text{ g/cm}^2$
- width: 25mm
- length: 500mm

#### STEP 6

Measure the timing belt's tension by bouncing it off with your fingers

The appropriate tension is  $45 \pm 3 \text{ kgf}$  ( $441 \pm 30 \text{ N}$ ).

Depending on your needs, adjust the tension following the STEP 3.

#### STEP 7

To assemble the robot, follow the disassembling STEPs reversely.

Make sure following before turn on the power of robot

- Confirm there is no person in the motion area of robot
- Confirm the location of handy controller and tool is required place
- Confirm there is no obstacle on the robot and in the area of robot motion.

#### STEP8

Must spend 5-10 minutes for the test drive.

- After change the timing belt, there should be the test drives for several hours.

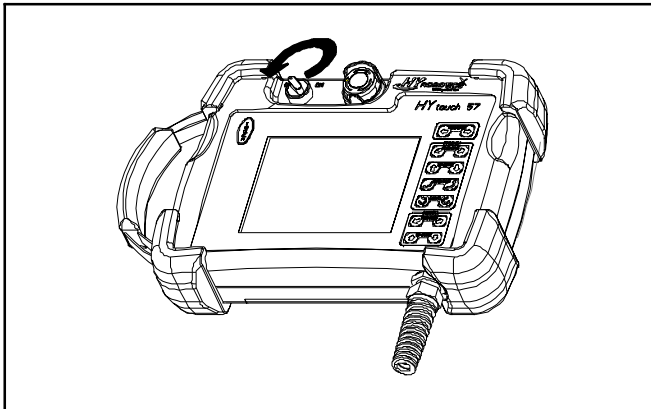
#### STEP9

Wait to get used to the timing belt, must re-measure and adjust it.

### 3.2.3 Lubrication for the traverse axis

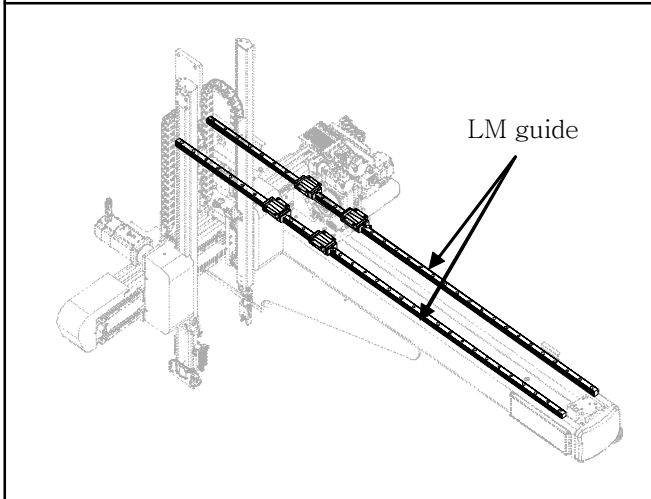
Lubricate with recommended KS M 2310 or KP2K per Din 51825

Do not use the fluoric grease. It cause a chemical reaction and can damage the device..



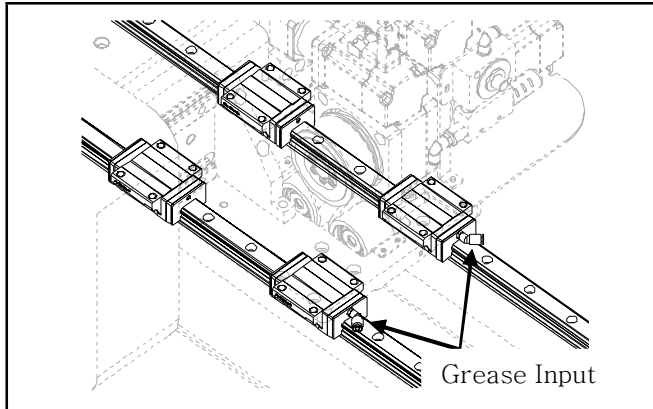
#### STEP1

Power off and lock out/ tag out for machine maintenance.



#### STEP2

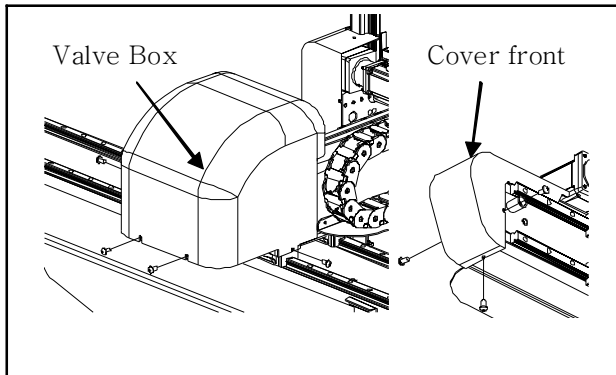
Remove old grease from the shaft and the bearing wiper rings with a rag. Remove old grease from bearing wipers



### STEP 3

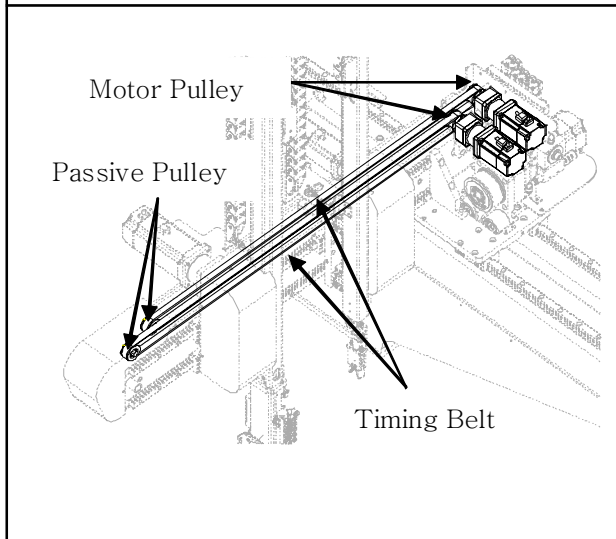
User grease gun to fill the bearing until grease begins to come out of bearing.

## 3.2.4 Kick Unit Frame Maintenance



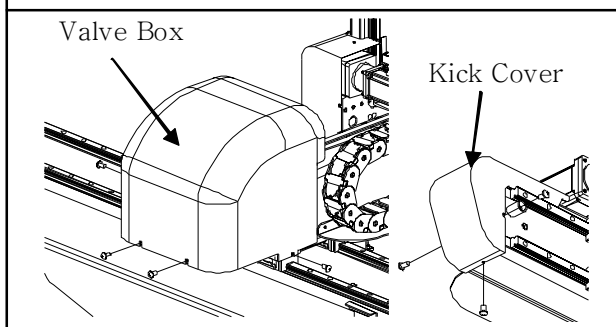
### STEP 1

Open valve box and cover front.



### STEP 2

- Inspect if there is any looseness of motor and pulley connection.
- Inspect if there is any looseness of timing belt and check tension.
- Secure connection and adjust tension of belt if required.

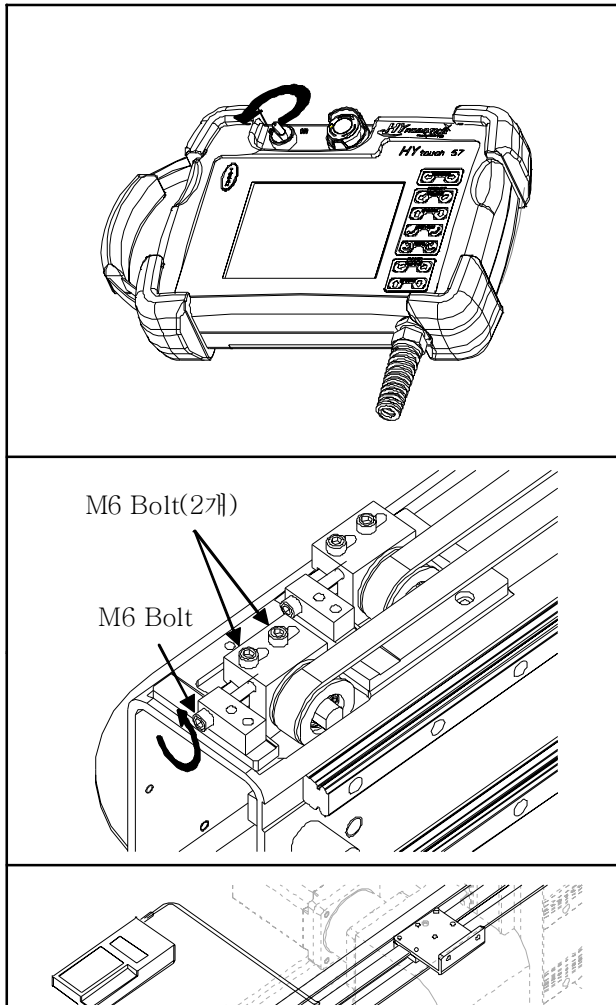


### STEP3

Install valve box cover and kick frame cover back.

### 3.2.4 Timing belt tension adjustment for Kick/Return Arm

This chapter described how to adjust tension for kick arm timing belt. And sprue arm need to follow same step for main arm.



#### STEP 1

Power off and lock out/ tag out for machine maintenance.

#### STEP2

After loosen the four M6 bolts in the clamp, loosen the lock-nuts.

#### STEP3

Adjust the timing belt's tension with M6 adjustment bolts

#### STEP4

Following the figure, move kick axis by hand.

Tension

	<p><b>STEP5</b></p> <p>Enter the measure condition into the tension measure instrument</p> <p>The measure condition</p> <ul style="list-style-type: none"> <li>▪ unit tension: 0.38 g/cm<sup>2</sup></li> <li>▪ width: 15mm</li> <li>▪ length: 300mm</li> </ul>
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## STEP 6

Measure the timing belt's tension by bouncing it off with your fingers

The appropriate tension is 25±3kgf (245±30 N).

Depending on your needs, adjust the tension following the STEP 3.

## STEP 7

Follow reverse to assemble back the robot

Make sure following before turn on the power of robot	
Danger	<ul style="list-style-type: none"> <li>● Confirm there in no person in the motion area of robot</li> <li>● Confirm the location of handy controller and tool is required place</li> <li>● Confirm there is no obstacle on the robot and in the area of robot motion.</li> </ul>

Must spend 5-10 minutes for the test drive.

Reference	<ul style="list-style-type: none"> <li>● After change the timing belt, there should be the test drives for several hours.</li> </ul>
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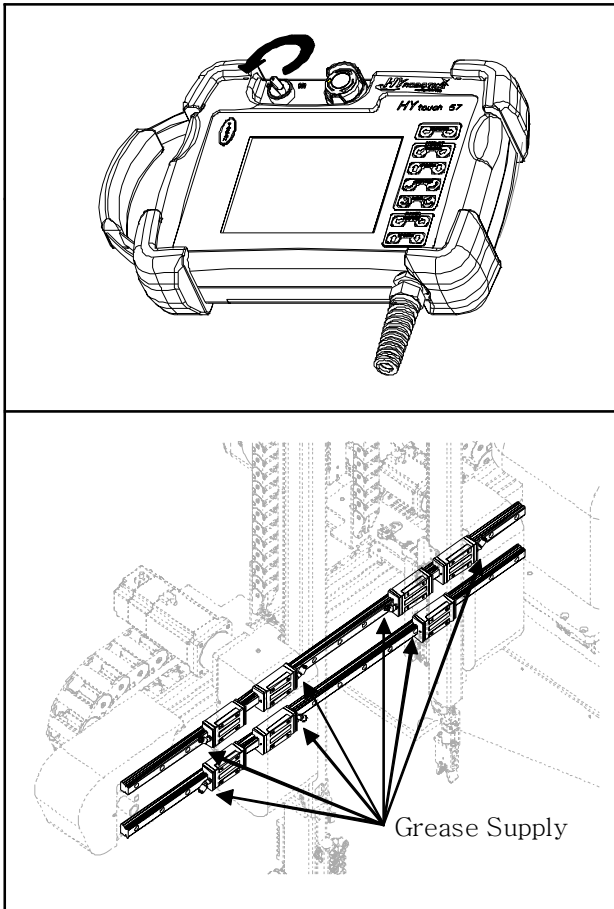
## STEP9

Wait to get used to the timing belt, must re-measure and adjust it.

### 3.2.6 Lubrication for Kick/Front Axis

Lubricate with recommended KS M 2310 or KP2K per Din 51825

Do not use the fluoric grease. It causes a chemical reaction and can damage the device.



#### STEP1

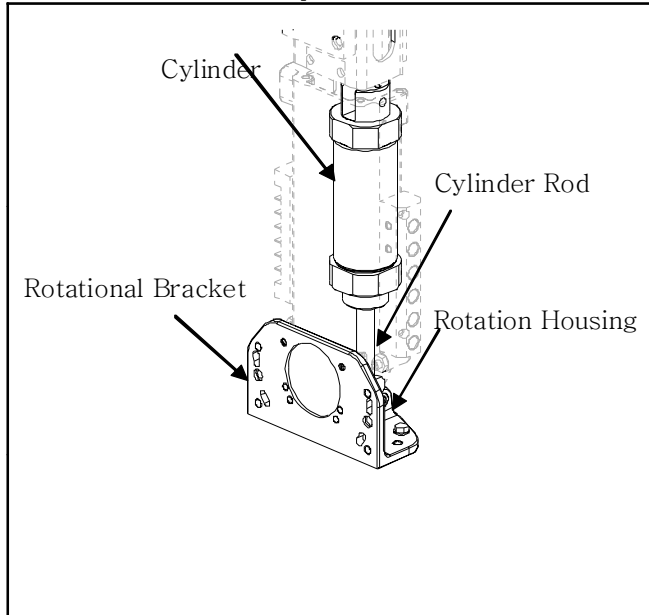
Power off and lock out/ tag out for machine maintenance.

#### STEP2

Remove old grease from the shaft and the bearing wiper rings with a rag. Remove old grease from bearing wipers.

User grease gun to fill the bearing until grease begins to come out of bearing.

### 3.2.7 Inspection Rotation Unit



#### STEP 1

Inspect if there is any damage on Rotation Unit

Inspect looseness on Rotational Bracket.

#### STEP 2

Inspect if there is any air leak

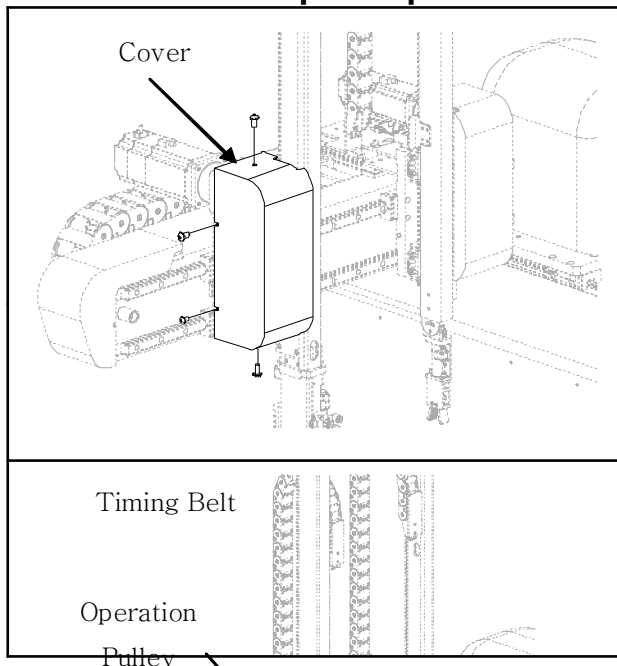
Inspect if any damage on cylinder Rod and rumble.

#### STEP 3

Inspect if any damage on Rotation Housing

Inspect any rumble when chuck rotate 90deg..

### 3.2.8 Inspect Up/Down Unit



#### STEP 1

Inspect any looseness and rumble on up/down body.

Inspect frame and robot arm if there is any bend or damage..

Inspect each cover and looseness.

#### STEP 2

Disassemble cover if require for inspection

#### STEP 3

Inspect each pulley connection and rumble.

Inspect tension of timing belt and damage on belts.



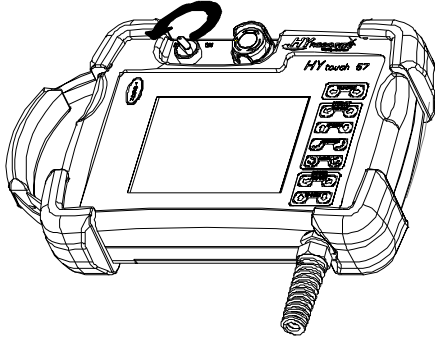
#### STEP 4

Remove cover

### 3.2.9 Tension for up/down timing belt.

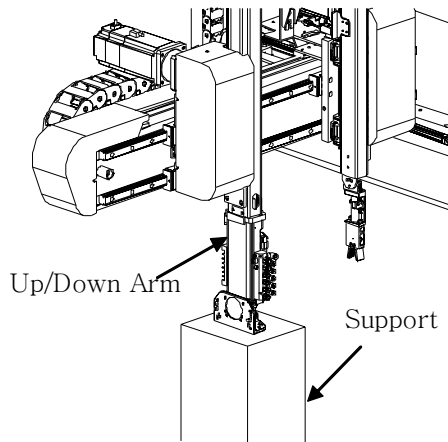
#### STEP 1

Turn off robot and Lock out and Tag out.



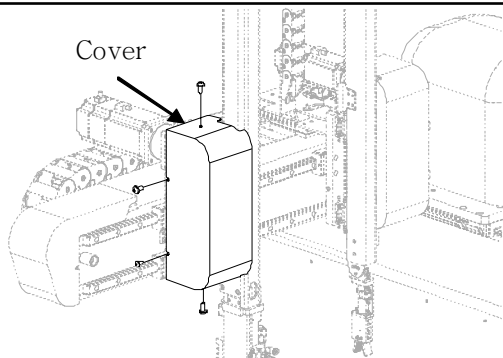
#### STEP 2

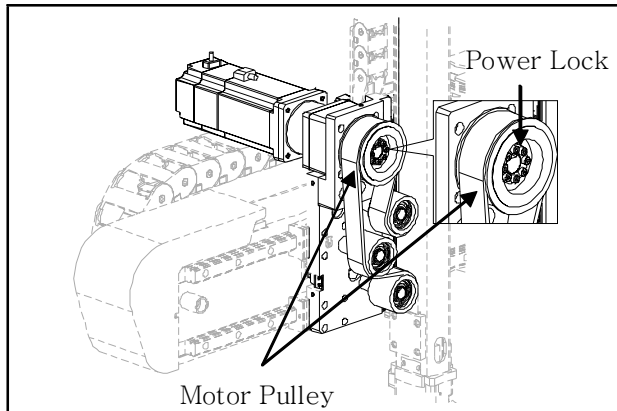
Locate support units on the bottom of up/down arm as figures.



#### STEP 3

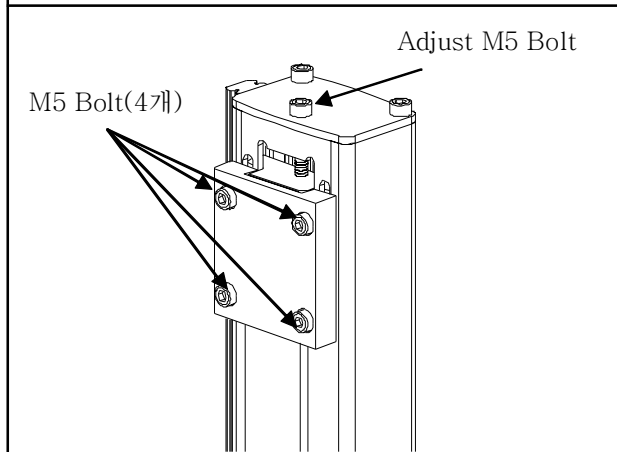
Disassemble Cover





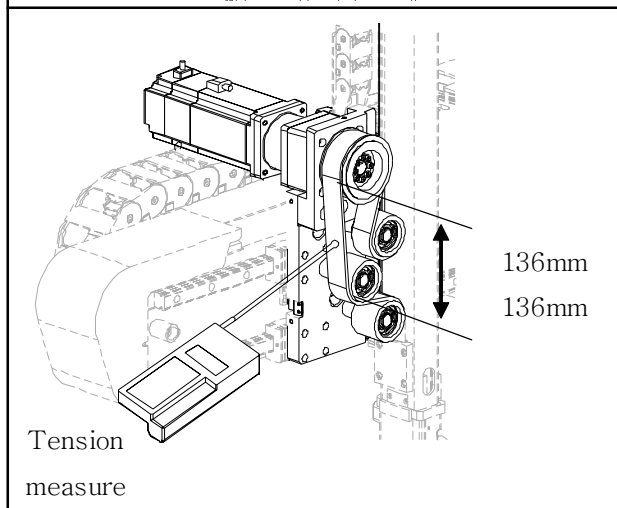
#### STEP 4

Loosen power lock bolt of motor pulley..



#### STEP 5

Loosen M5 Bolt (4 Ea ), Rotate Adjust M5 bolt to adjust tension.



#### STEP 6

Input Tension condition

Condition	Main Arm	Runner Arm
Unit Tension	0.6 g/cm <sup>2</sup>	0.6 g/cm <sup>2</sup>
Width	25mm	25mm
Length	136mm	136mm
Tension	35±3 kgf 343±30 N	35±3 kgf 343±30 N

#### STEP 7

Measure the timing belt's tension by bouncing it off with your fingers

The appropriate tension is on Step 6

Depending on your needs, adjust the tension following the STEP 3.

## STEP 7

Follow reverse to assemble back the robot

Danger	Make sure following before turn on the power of robot	
	●	Confirm there in no person in the motion area of robot
		Confirm the location of handy controller and tool is required place
		Confirm there is no obstacle on the robot and in the area of robot motion.

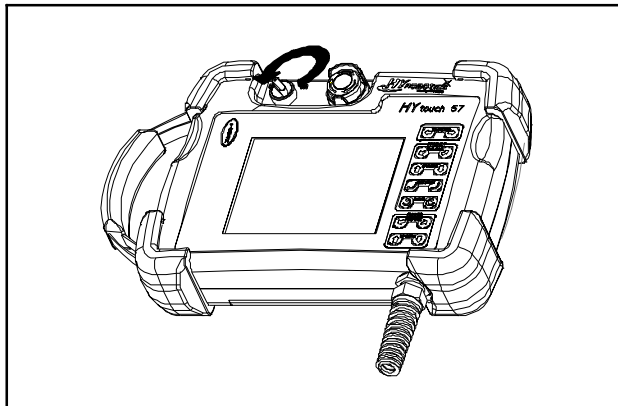
Must spend 5-10 minutes for the test drive.

Ref	● After change the timing belt, there should be the test drives for several hours.
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### 3.2.10 Lubrication for Up/down arm

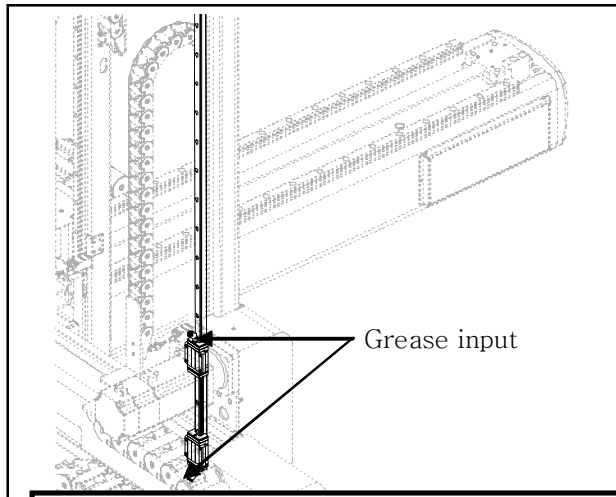
Ref	● This chapter describes main arm lubrication. Follow same step for runner ( sub ) arm.
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Warning	● Lubricate with recommended KS M 2310 or KP2K per Din 51825
	● Do not use the fluoric grease. It cause a chemical reaction and can damage the device...



#### STEP1

Power off and lock out/ tag out for machine maintenance.



## STEP2

Remove old grease from the guide and the bearing wiper rings with a rag. Remove old grease from bearing wipers.

User grease gun to fill the bearing until grease begins to come out of bearing.

Make sure following before turn on the power of robot

### Warning

- Confirm there is no person in the motion area of robot
- Confirm there is no obstacle on the robot and in the area of robot motion.

### Warning

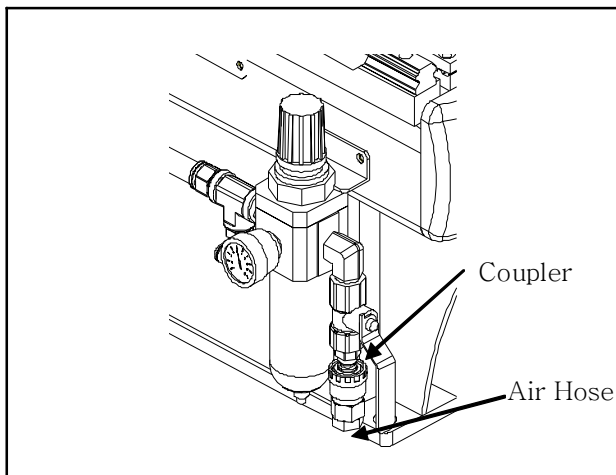
- Do not turn off / on the robot controller continuously, if required, please wait more than 60 Sec to turn on.

## 3.2 Maintenance of Pneumatic System

Ref                      ● This maintenance required for once / 12 month period

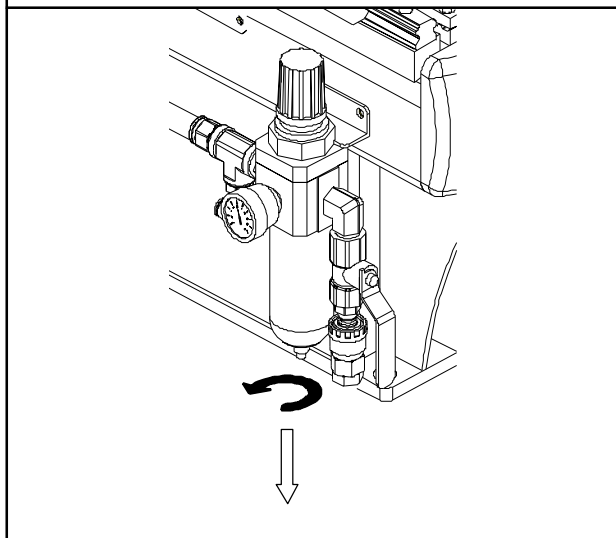
### 3.3.1 Clean Air Filter

Warning            ● Please follow up after Remove air supply



#### STEP 1

Remove air supply to robot.



#### STEP 2

Push Lock Button and Rotate counter clock wise to meet IN with Lock button and bowl will be release from Air regulator.

#### STEP 3

Inspect if any damage and dust inside of filter element.  
If required, replace filter units.

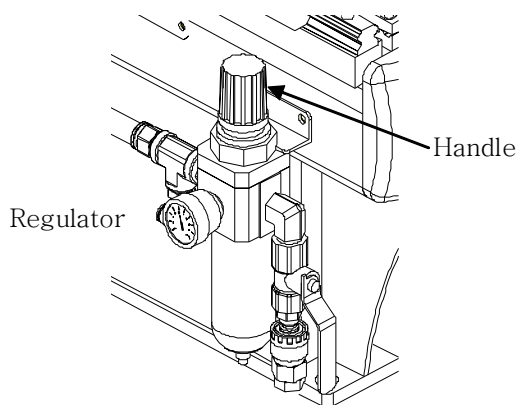
#### STEP 4

Follow reverse to assemble back

### 3.3.2 Vacuum units Maintenance

**Warning** ● Please follow up after Remove air supply

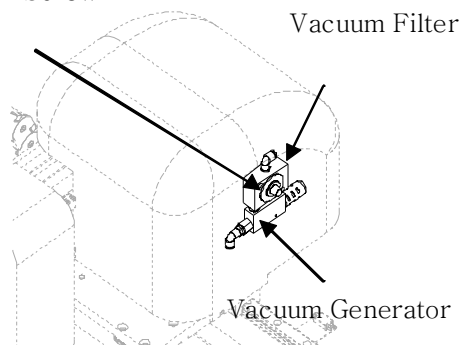
**Ref** ● Follow <1.2.2 Robot body and control box >for air unit location.



#### STEP 1

Either remove air supply to robot or setting press to 0Pa(Gauge) with rotating handle ( With press up )

Filter Install Screw



#### STEP 2

Inspect if any looseness on vacuum  
Inspect if any damage or contamination on filter units.

#### STEP 3

If excess container is on filter, replace filter element.

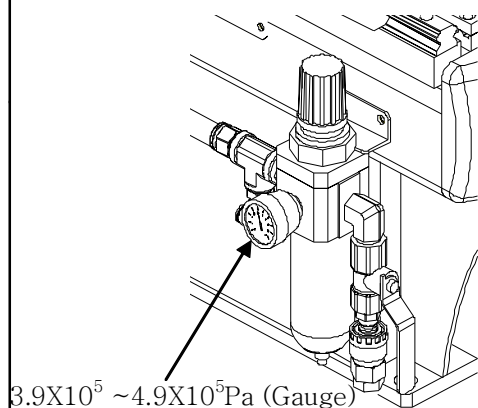
Remove filter element with loosening filter install screw..

#### STEP 4

Follow reverse to assemble back.

#### STEP 5

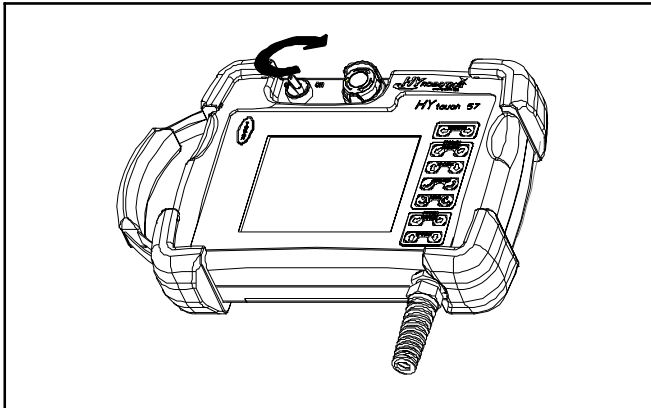
Connect air supply to robot or rotate regulator to adjust setting pressure to  $3.9 \times 10^5 \sim 4.9 \times 10^5$  Pa (Gauge ) and press down to set up.



**Warning**

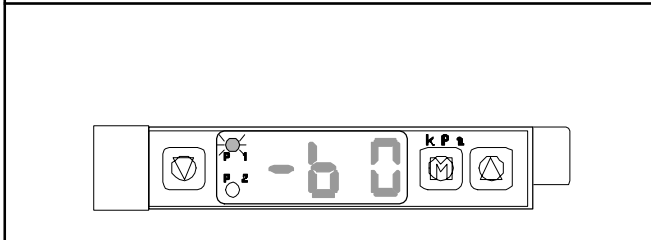
Make sure following before turn on the power of robot

● Confirm there is no person in the motion area of robot , Confirm there is no obstacle on the robot and



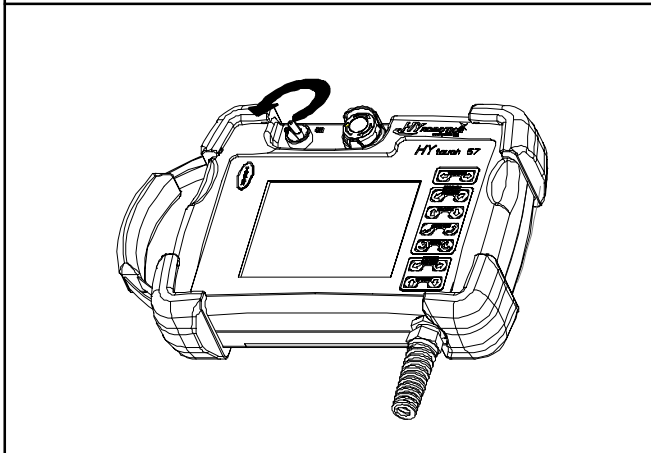
### STEP 6

Turn on robot power, Do not turn of IMM Power this time.



### STEP 7

Check vacuum unit with vacuum sensor.  
Normal set value is -60kPa(Gauge)  
Vacuum sensor is located on Robot arm.



### STEP 8

Turn off Robot arm.

## 3.4 Electric component maintenance

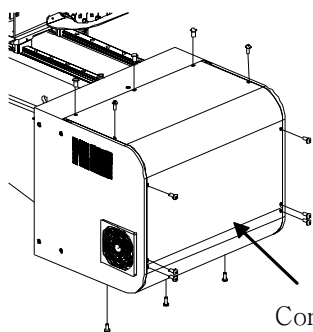
### Warning

- The power connection and maintenance must be made by a qualified electrician in accordance with state and local regulations.

### Ref

- This maintenance required once/ every 12 month period.

### 3.4.1 Inspecting of control box.



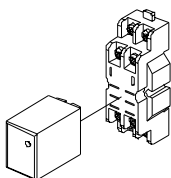
Control Box

#### STEP 1

Open Control Box with disconnecting screws

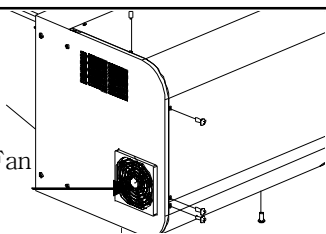
#### STEP 2

Inspect cable connection for electric board and power cable and servo cable. If required, disconnect and reconnect again.



#### STEP 3

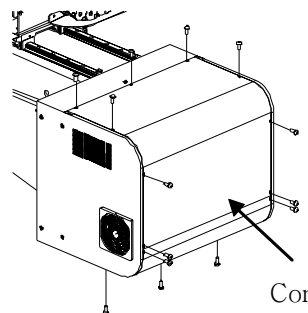
Check relay on/off contact status, replace if required.



Cooling Fan

#### STEP 4

Inspect Cooling Fan filter.  
If any damage or serious contamination, replace with new filter



Control Box

#### STEP 5

Install Control box cover back.



### 3.4.2 Inspect Control Box Status and Operation

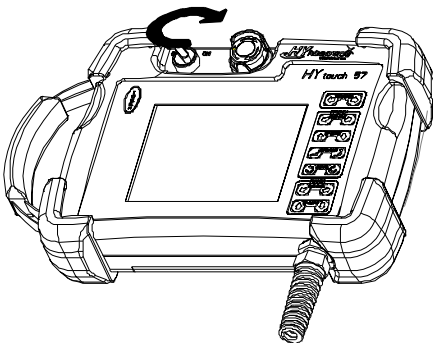
#### Danger

Make sure following before turn on the power of robot

- Confirm there is no person in the motion area of robot, Confirm there is no obstacle on the robot and robot motion area including mold.
- Robot can be operated even IMM Safety door is open when robot is in step operation. Operate robot outside of safety cage. If required two person required for operation emergency stop button when one operator operate robot arm inside of safety cage.

#### Warning

- Do not turn on/off robot controller too often, wait 60 sec to turn on back..




#### STEP 1

Turn On Handy controller



#### STEP 2

Make sure no obstacle of robot arm area.

Press Start . Robot arm will go up rotate, kick and traverse to find servo origin. After finish servo origin, it will displays main screen.

### **3.4.3 Sensors and Wire connection maintenance.**

- Inspect each sensor and switch with wiring connection
- Inspect if any wiring damages.
- Inspect any damage on wiring connection.

# 1. How to check Servo Motor Overload ( NEXIA Series )

1. BE CAREFUL IF ROBOT RUNNING.
2. YOU CAN CHECK THE MOTOR OVERLOAD WHILE THE ROBOT RUNNING OR AFTER POWER ON
3. Open Control Box
4. Check Driver Model Number
5. SGD8- XXX
6. XXX BIGGEST NUMBER WILL BE UP /DOWN SERVO MOTOR
7. NEXT ONE WILL BE TRAVERSE
8. SMALLEST NUMBER WILL BE KICK.
9. PRESS MODE BUTTON
10. IT WILL DISPLAY FN000
11. PRESS MODE BUTTON AGAIN
12. PRESS MODE BUTTON AGAIN UNTIL IT DISPLAYS UN000
13. WHEN UN 000 DISPLAY
14. PRESS UP ARROW TO CHANGE THE NUMBER TO UN 009
15. UN 009 IS OVERLOAD STATUS
16. PRESS DATA BUTTON UNTIL IT DISPLAYS 000000
17. AFTER ONE CYCLE IT WILL DISPLAY THE NUMBER AS %

0 ~ 10 is No Load

10 ~ 30 is Normal Load

30 ~ 60 is Operation Load

Over 100 will be considered as overload  
Please inspect precision valve and adjust pressure.



**HYROBOTICS CORP**

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## **4. Disassemble Maintenance**



## 4.1 Before Disassemble Maintenance

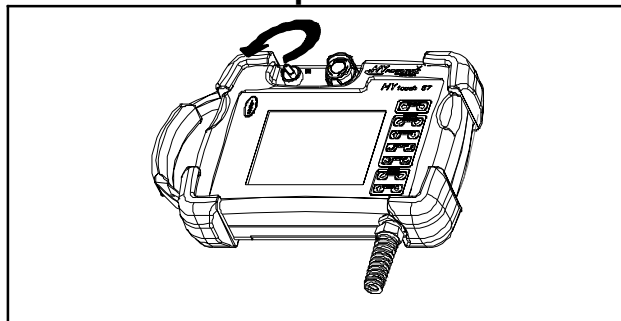
- |         |   |
|---------|---|
| Warning | <ul style="list-style-type: none"><li>● <u>This step only require when need to replace parts or when it requires</u></li><li>● Robot must turn off and lock out / tag out</li><li>● Place [Lock out/Tag Out] for maintenance.</li><li>● If required to supply power to robot, two man required, one man is ready to operate emergency stop at any time.</li></ul> |
|---------|---|

### Parts Replacement

- |         |   |
|---------|---|
| Warning | <ul style="list-style-type: none"><li>● Apply Locktite for bolt connection if required.</li><li>● Genuine parts required for normal operation.</li><li>● Do not use <b>Anaerobic adhesives for cover installation.</b></li><li>● Below locktite for bolt required for installation of cover<br/>1401(ThreeBond)</li></ul> |
|---------|---|

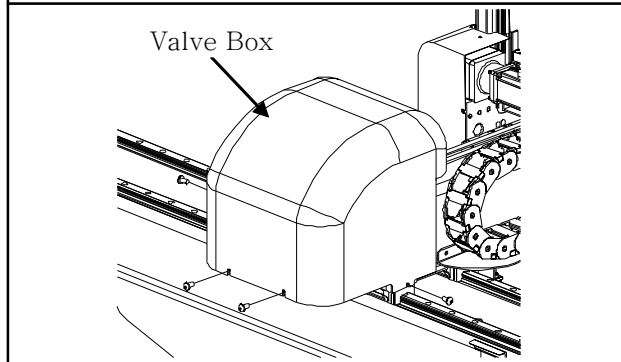
## 4.2 Traverse Axis

### 4.2.1 Replacement of Traverse Timing Belt



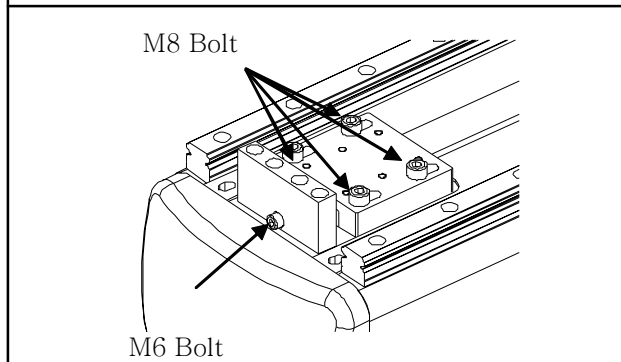
#### STEP 1

Turn of Robot and IMM and Lock out and tag out for machine.



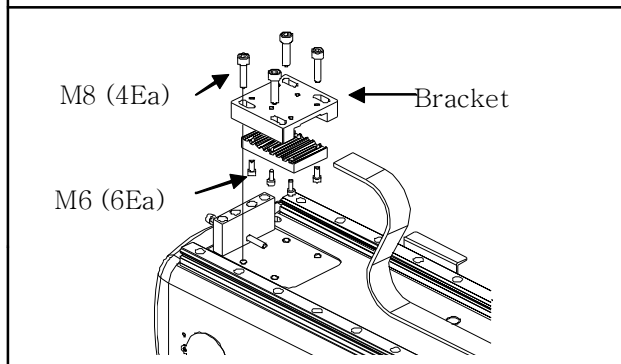
#### STEP 2

Remove Valve box.



#### STEP 3

Loosen M8 bolts and remove M8 and M6 Bolts.



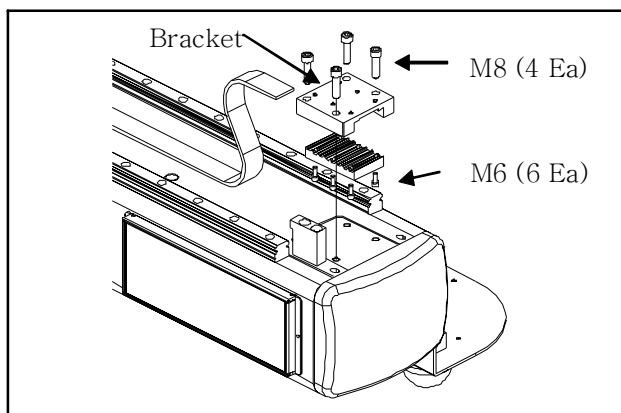
#### STEP 4

Disassemble Bracket with loosening 4 of M8 Bolts.

#### STEP 5

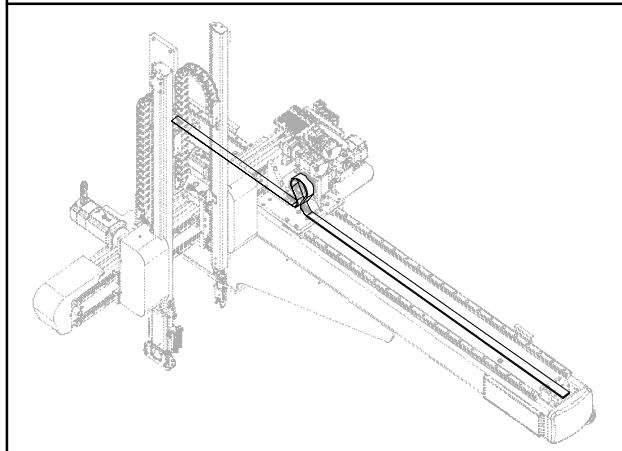
Remove timing belt from bracket with loosening M6 bolts.





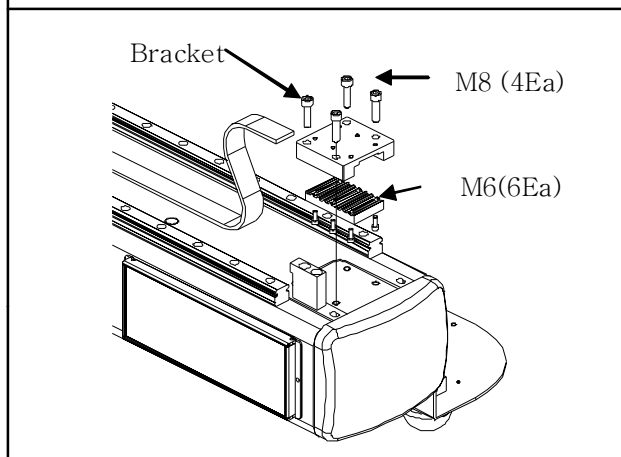
### STEP 6

Use same methods for the other side of timing belt



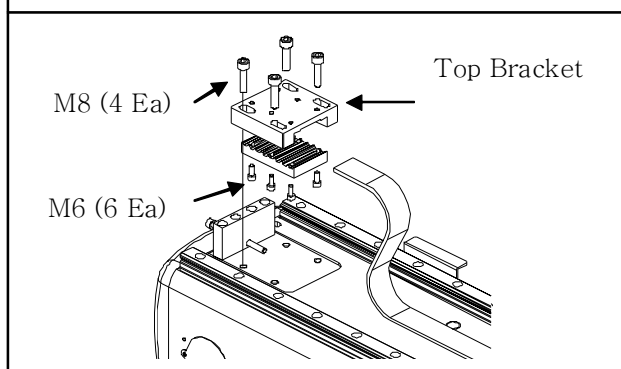
### STEP 7

Replace timing belt with new one.



### STEP 8

Install back bottom bracket Teeth need to be securely connected for timing belt and tight M6 to Top bracket

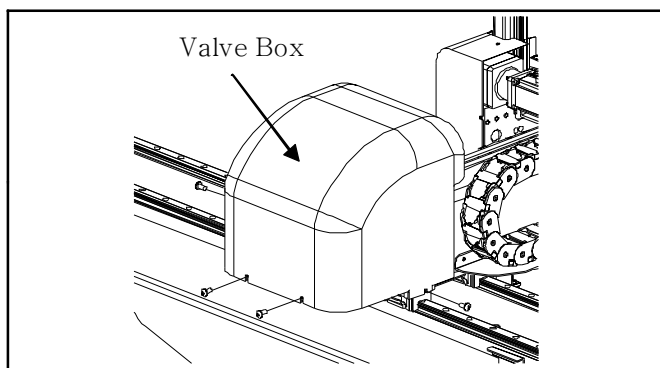


### STEP 9

Tight M8 Bolts to Robot Frame.

### STEP 10

Traverse return side need to be connected with same way.



#### STEP 11

Adjust timing belt tension with mentioned before

#### STEP 13

Install the valve box cover back.

## 4.2.2 Traverse Origin Point Adjustment

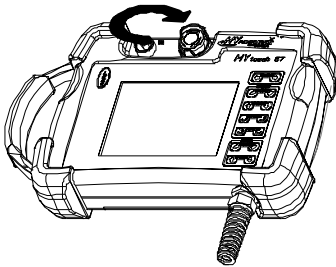
Make sure following before turn on the power of robot

### Warning

- Confirm there is no person in the motion area of robot,
- Confirm there is no obstacle on the robot and robot motion area including mold.

### Danger

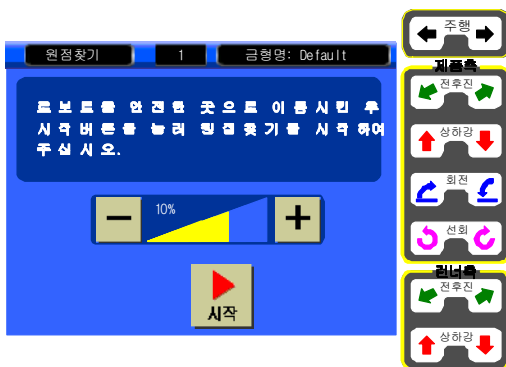
- This job must be performed by 2 qualified personnel. One secures the area of operation and ready to press E-Stop operation button.



### STEP 1

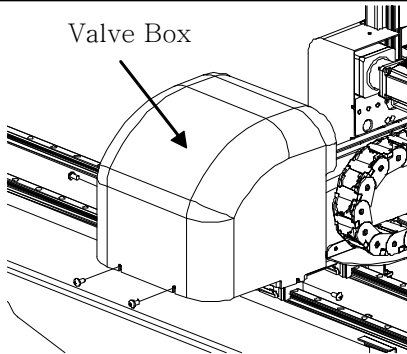
Turn Robot on.

Make sure there is no obstacle for servo homing position.



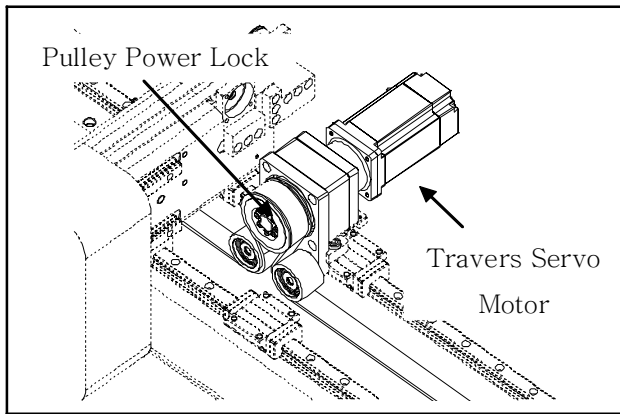
### STEP 2

Press Start button to find servo Origin



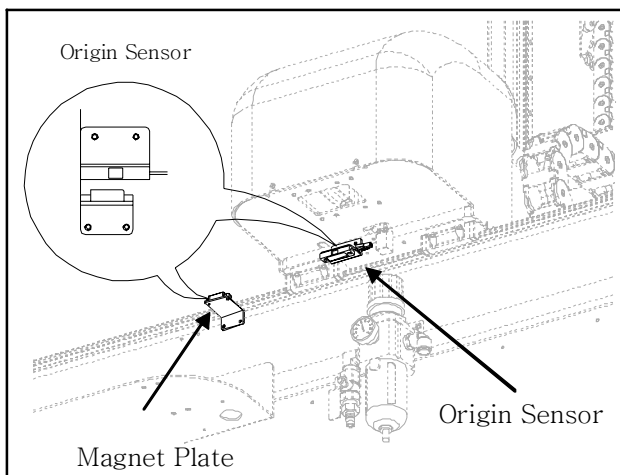
### STEP 3

Open Robot Valve Box.



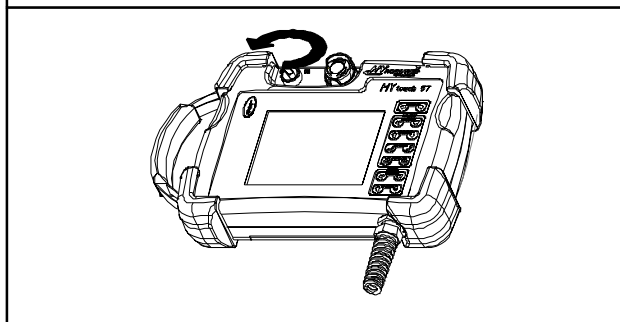
#### STEP 4

Loosen power bolts from Traverse Servo Motor  
Do not move magnetic Plate of servo origin point.



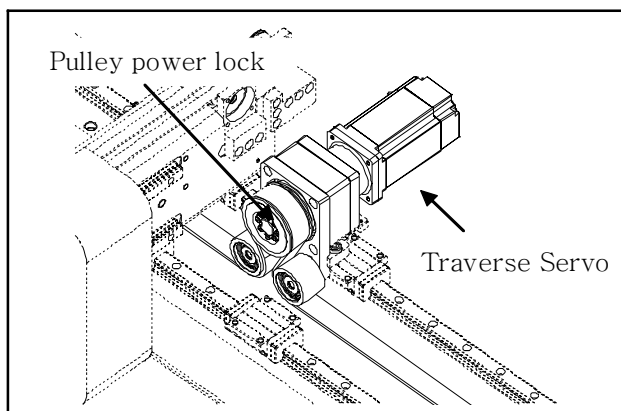
#### STEP 5

Place robot origin sensor with magnetic plate as figures with pushing robot arm manually to move. And Tight Power locks bolt of servo motor.



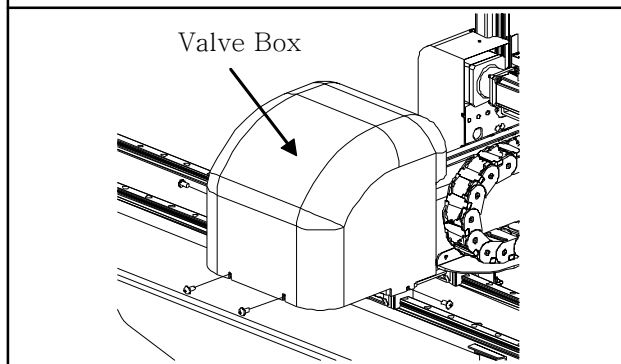
#### STEP 6

Turn off Robot



#### STEP 7

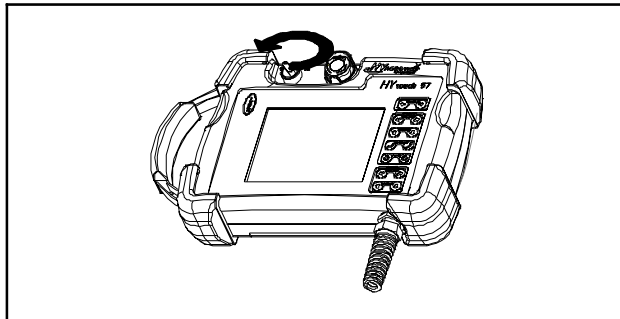
And Tight Power locks bolt of servo motor..



#### STEP 8

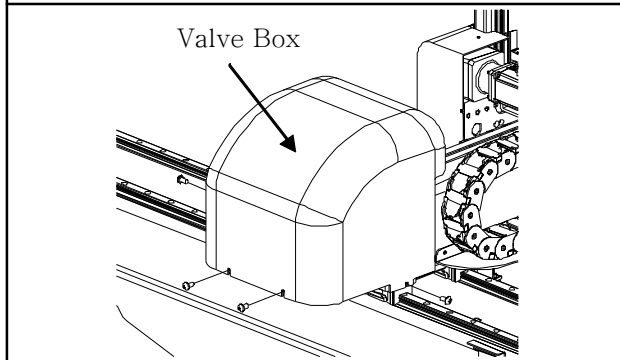
Install Cover back.

## 4.2.3 Traverse Servo Motor Replacement



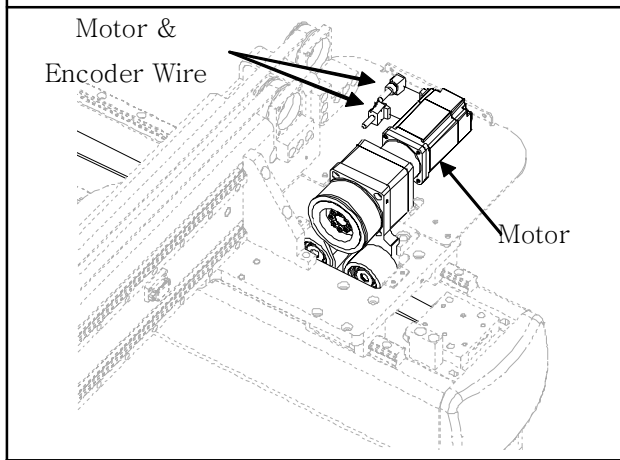
### STEP 1

Turn off IMM and Robot and Lock out and Tag out



### STEP 2

Open Valve Box.

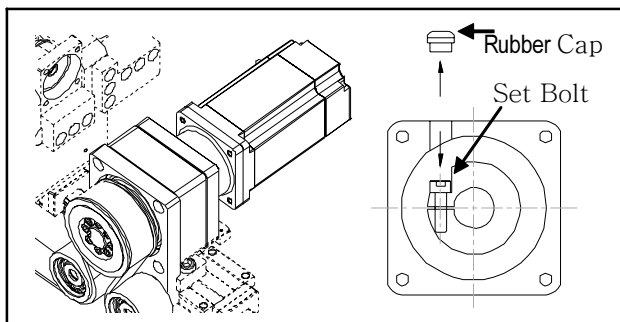


### STEP 3

Disconnect Motor and Encoder Cable Connection.

Warning

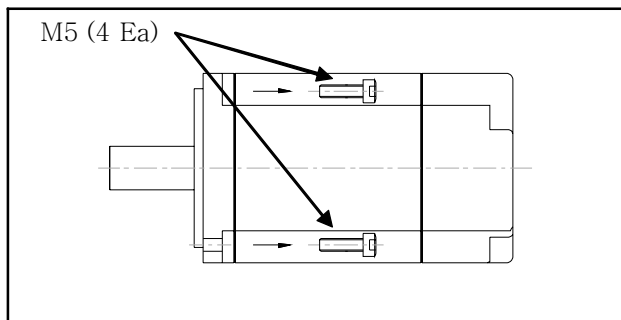
- Do not loose seal for Connector



### STEP 4

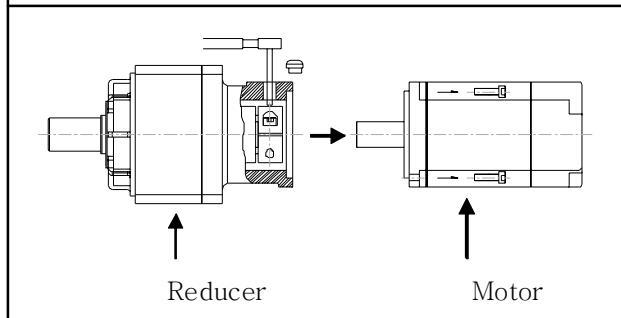
Take off the rubber cap.

Turn the motor pulley until the setting bolts would be seen through the rubber cap hole  
Loosen the setting bolt.



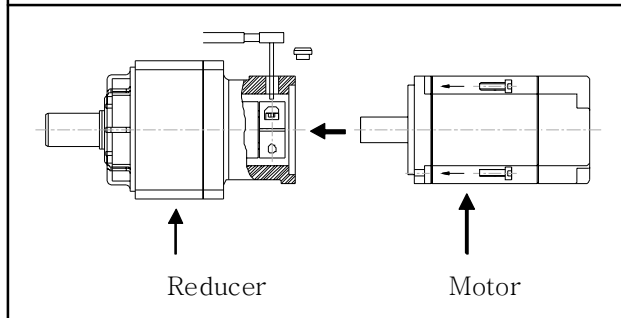
### STEP 5

Hold the bottom of the motor and take off the four M5 bolts from the speed reducer



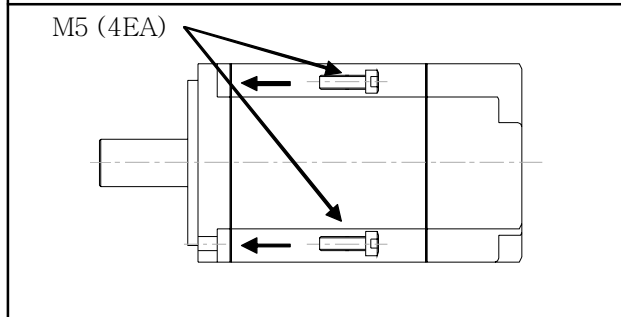
### STEP 6

Remove Speed Reducer



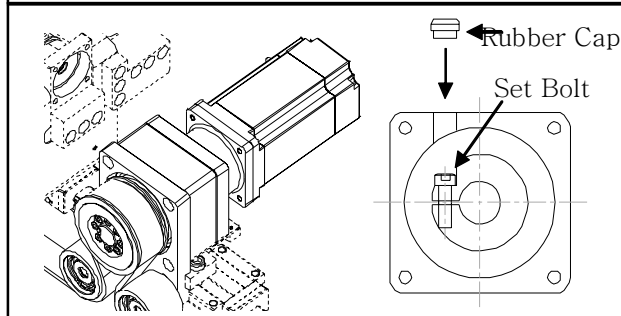
### STEP 7

Place the speed reducer where the setting bolts are seen through the rubber cap hole and put the new motor into the reducer



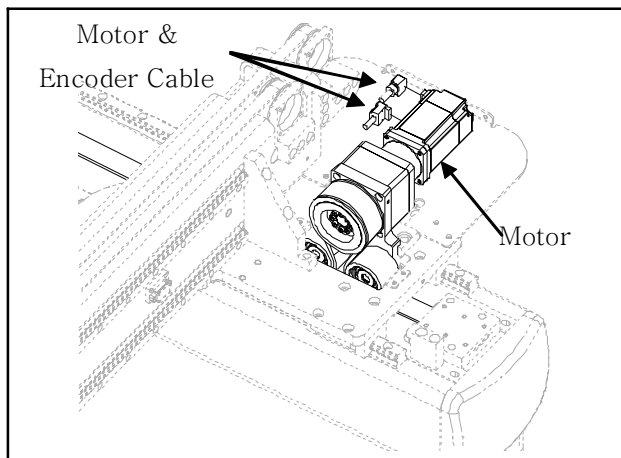
### STEP 8

Hold the bottom of the motor and Tight the four M5 bolts



### STEP 9

Tighten the setting bolts to lock the motor firmly and insert the rubber cap.



#### STEP 10

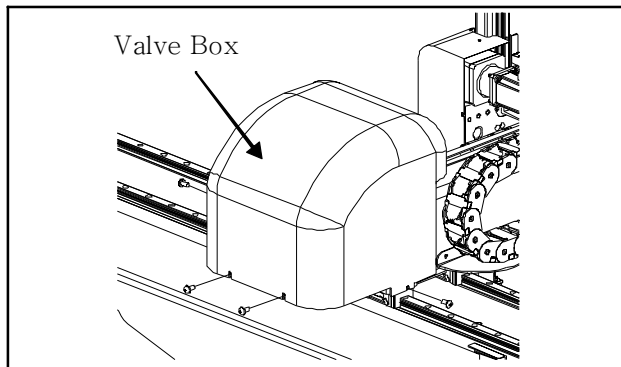
Install the motor lines, brake connector and encoder connector.

#### STEP 11

Adjust servo origin ( Homing Position ).

Warning

- Follow <4.2.2 Traverse Origin > to find servo origin



#### STEP 12

Install Valve Box cover back.

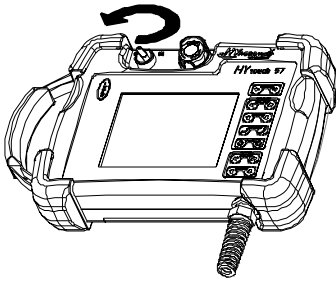


## 4.3 Kick Arm

### 4.3.1 Timing belt replacement for Kick Arm

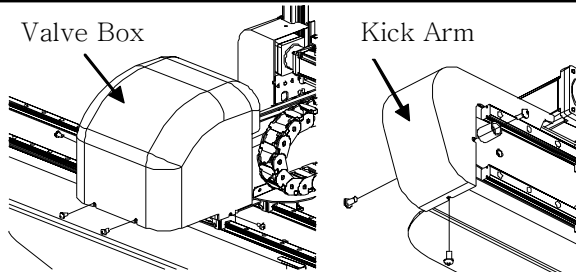
Reference

- This chapter describes for timing belt replacement for Main kick arm, if it requires for runner sub arm, follow same step.



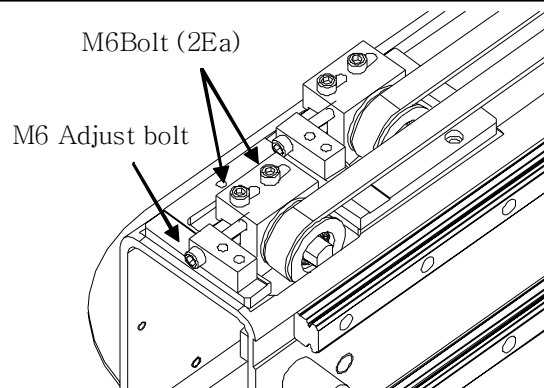
#### STEP 1

Turn of Robot and IMM and Lock out and tag out for machine.



#### STEP 2

Remove Valve box. And cover for kick arm

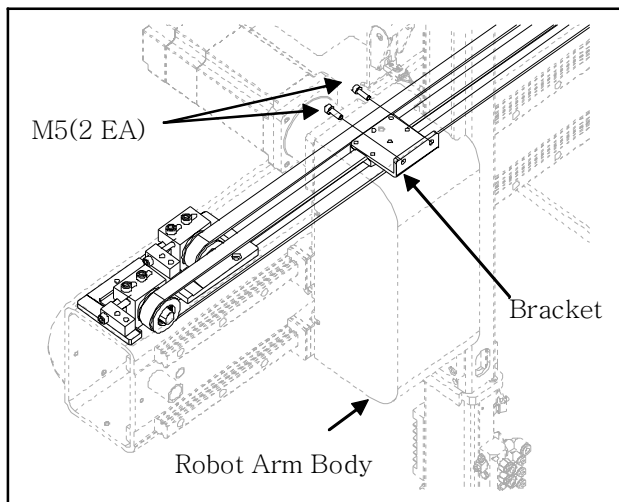


#### STEP 3

Loosen M6 bolts on Passive pulley

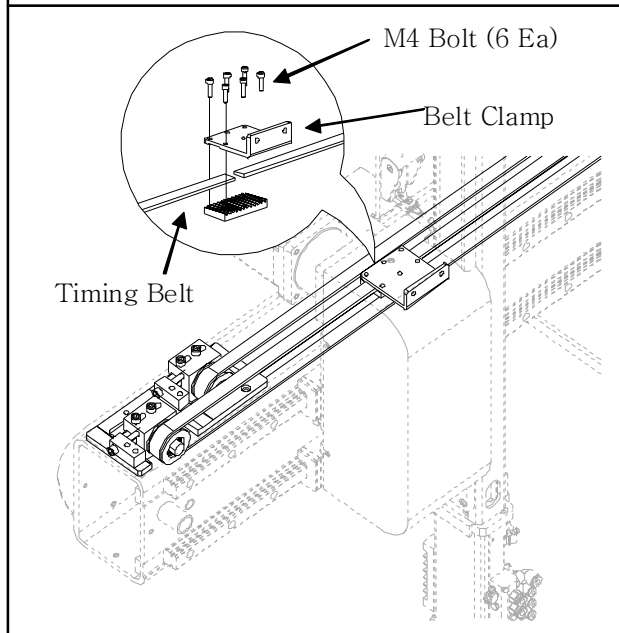
#### STEP 4

Loose M6 Adjust bolt and loose the tension of timing belt



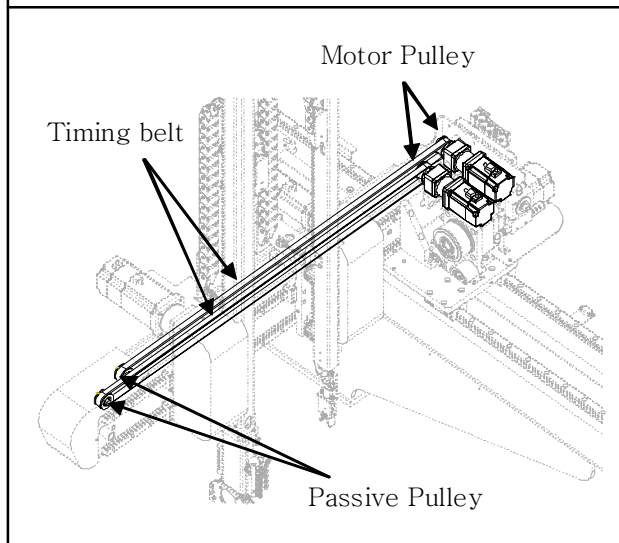
#### STEP 5

Remove 2 of M5 bolts and disassemble robot arm body and belt clamp.



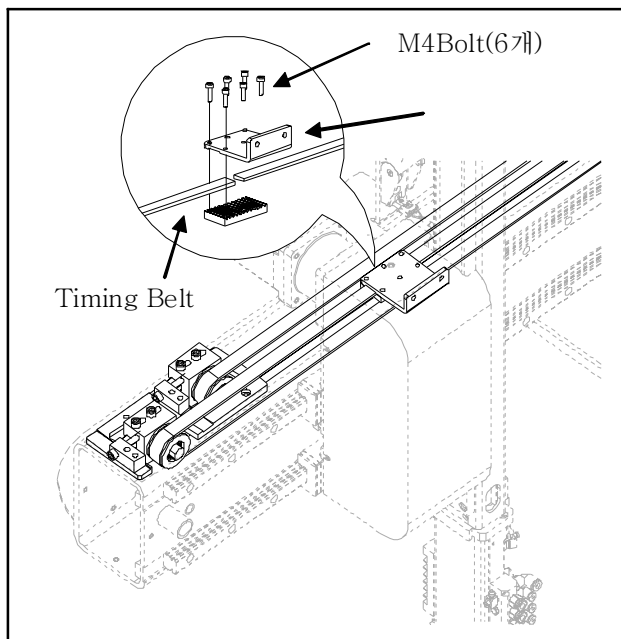
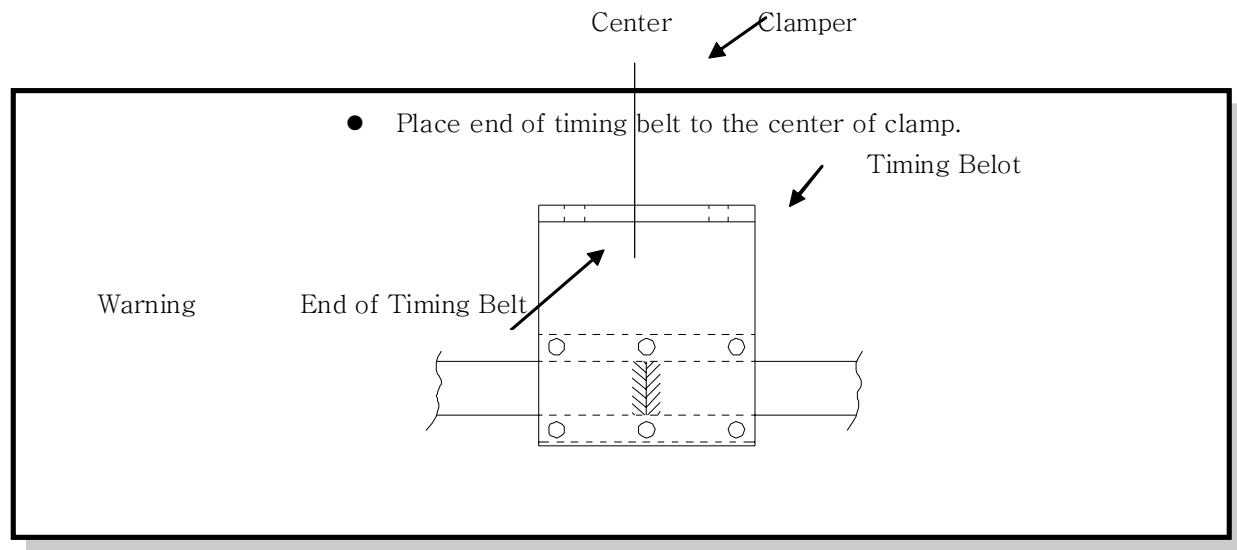
#### STEP 6

Remove 6 of M4 , Disassemble from belt with belt clasper.



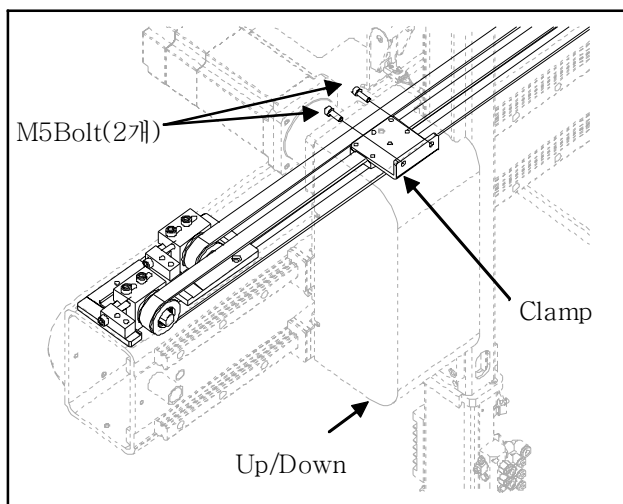
#### STEP 7

Replace timing belt with new one as it was before



#### STEP 8

Install timing belt between belt clamp and robot body and install 6 of M4 bolts securely.



#### STEP 9

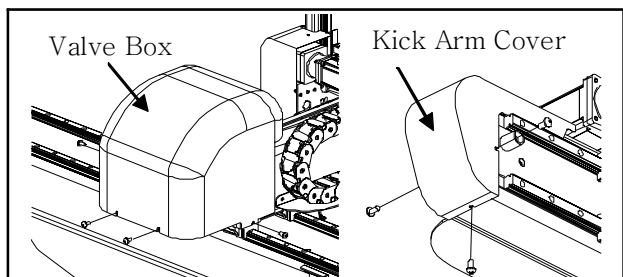
Install 2 of M5 bolts back. Secure connection

#### STEP 10

Adjust timing belt tension

Warning

- Adjust timing belt tension with <3.2.5 Timing belt tension for Kick Arm >.



#### STEP 11

Install back valve cover and kick arm cover.

### 4.3.2 Kick Servo Origin Adjustment

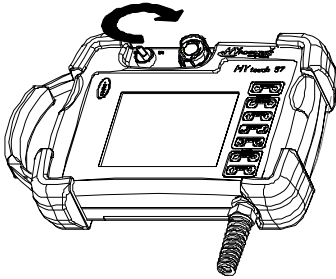
This chapter describes for Main kick arm, if it requires for runner sub arm, follow same step.

This job must performed by 2 qualified personnel. One secure the area of operation and ready to press E-Stop operation button..

Make sure following before turn on the power of robot


Warning

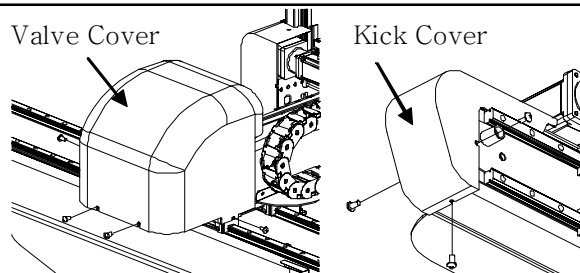
- Confirm there in no person in the motion area of robot,
- Confirm there is no obstacle on the robot and robot motion area including mold.



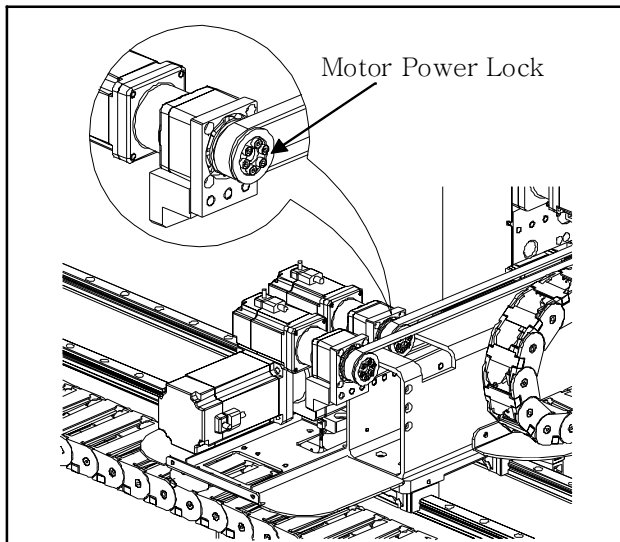
STEP 1  
Turn on Robot Arm.



STEP 2  
Press  to find servo origin

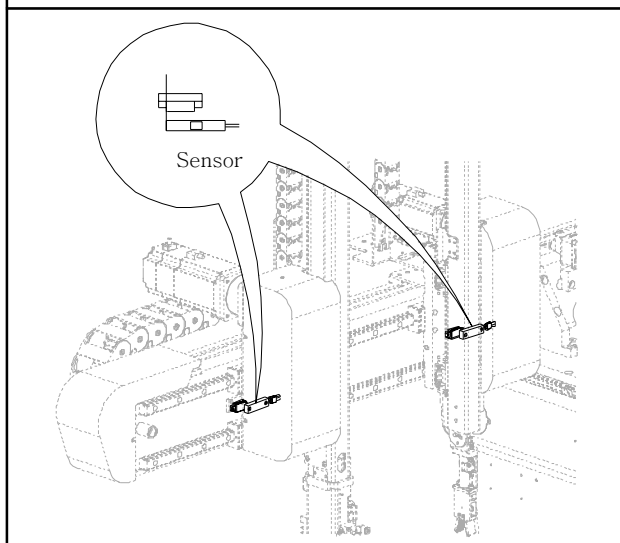


STEP 3  
Open Valve Cover and Kick Cover.



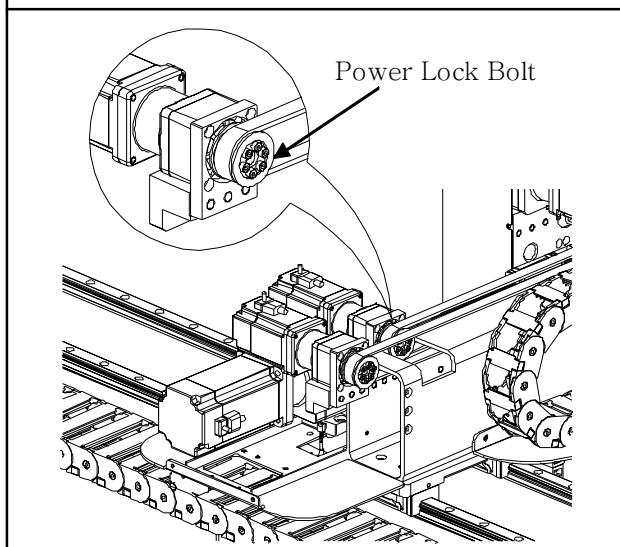
#### STEP 4

Loosen power bolts from Kick Servo Motor



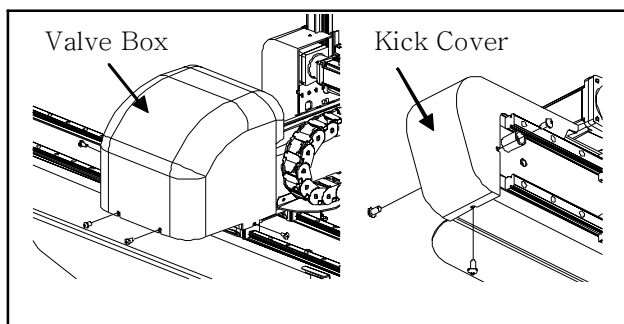
#### STEP 5

Place robot origin sensor with magnetic plate as figures with pushing robot arm manually to move.



#### STEP 6

And Tight Power locks bolt of servo motor..

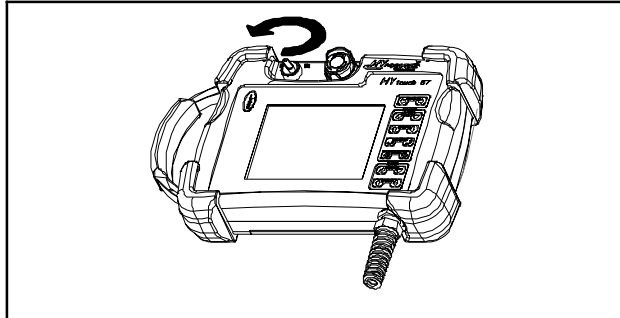


**STEP 7**  
Install Cover back.

### 4.3.3 Replace of the kick axis servo motor

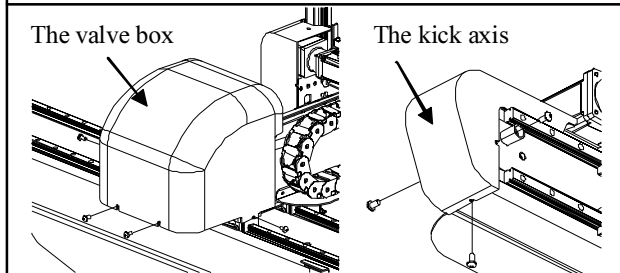
- Please consider the weight of the motor.
- Place the support under the motor.

If there is no support under the motor, it might go down.



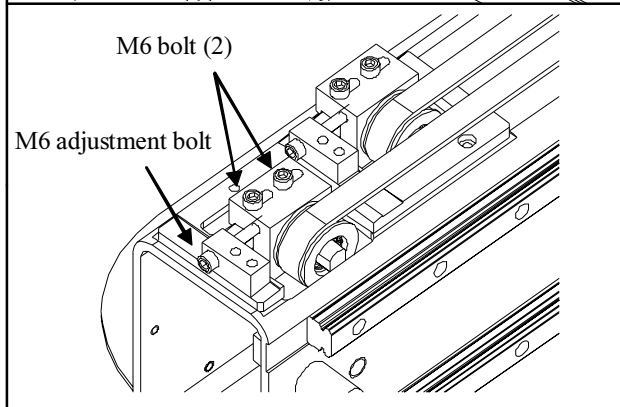
#### STEP 1

Turn off the power of the molding machine and the Take-out robot.



#### STEP 2

Disassemble the valve box cover and the kick axis cover..

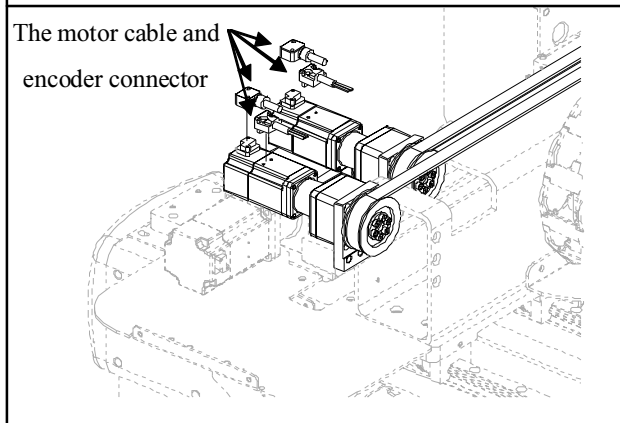


#### STEP 3

Loosen the two M6 bolts.

#### STEP 4

Loosen the M6 adjustment bolt and loosen the tension of the timing belt.



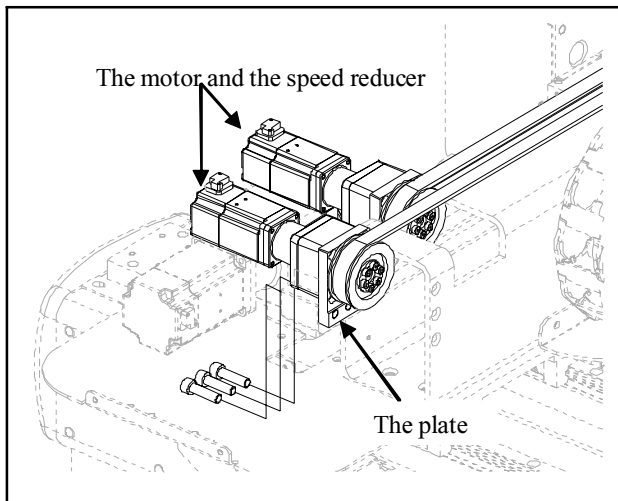
#### STEP 5

Disassemble the motor cable and encoder connector.



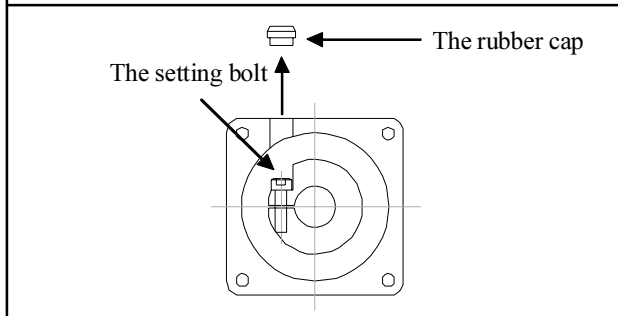
Warning

- Be careful with the installed connectors



#### STEP 6

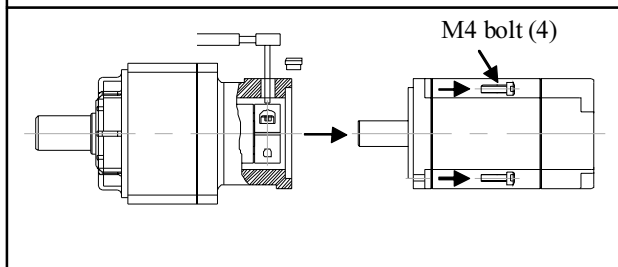
Disassemble the plate first from Robot body, and the speed reducer with the motor.



#### STEP 7

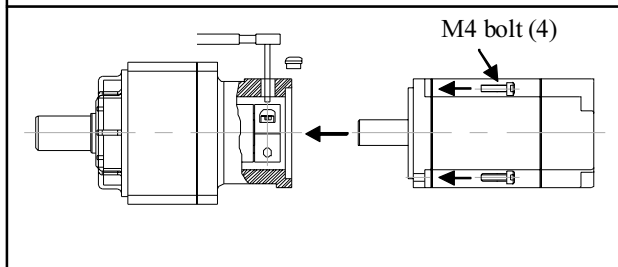
Take off the rubber cap.

Turn the motor pulley until the setting bolts would be seen through the rubber cap hole  
Loosen the setting bolt.



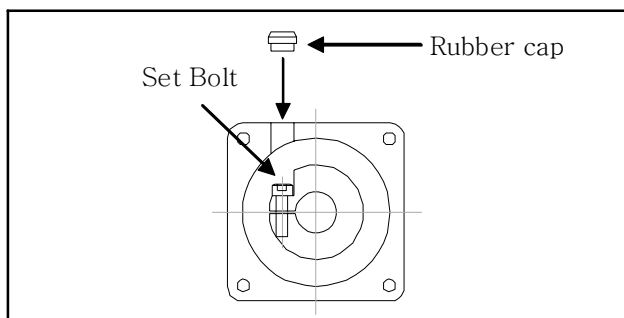
#### STEP 8

Hold the bottom of the motor and take off the four M4 bolts from the speed reducer.



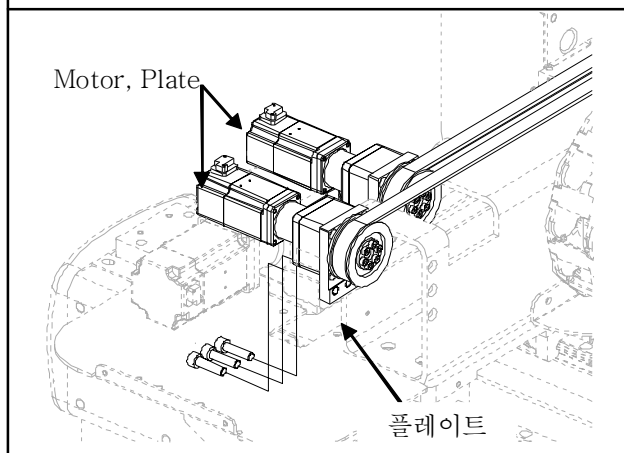
#### STEP 9

Place the speed reducer where the setting bolts are seen through the rubber cap hole and put the new motor into the reducer with four M4 bolts.



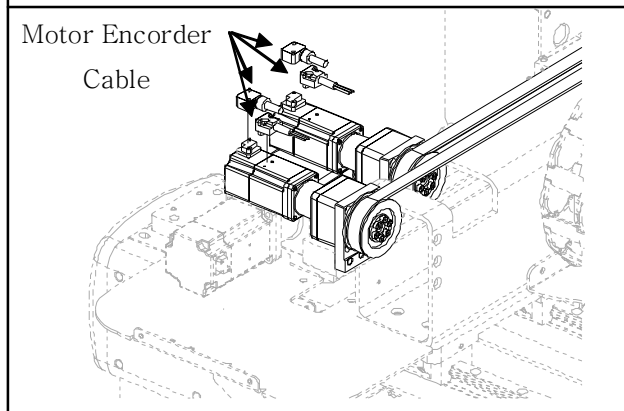
#### STEP 10

Tighten the setting bolts to lock the motor firmly and insert the rubber cap



#### STEP 11

After assemble motor and reducer to plate, , Install motor and reducer with plate to the kick frame..



#### STEP 12

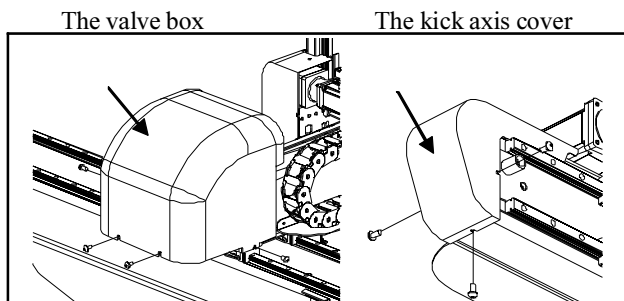
Install the motor lines, brake connector and encoder connector.

#### STEP 13

Adjust the tension of the timing belt.

Ref

- To adjust the tension of the timing belt, follow the steps with <3.2.5 tension adjustment of the kick axis timing belt>.



#### STEP 14

Assemble the valve box cover and the kick axis cover.

## 4.3 The vertical axis

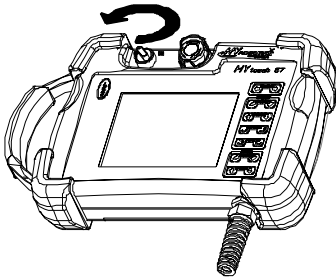
### 4.3.1 The Replacement of the vertical timing belt

Ref

- The Replace of the vertical axis timing belt would be described. (The replace of the runner vertical axis' timing belt would be the same.)

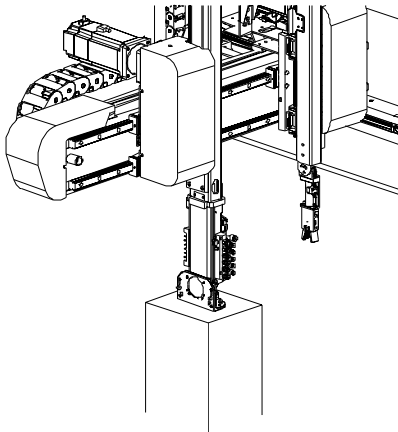
Warning

- Place the supports under the vertical frame  
If there is no support under the frame, it might go down.



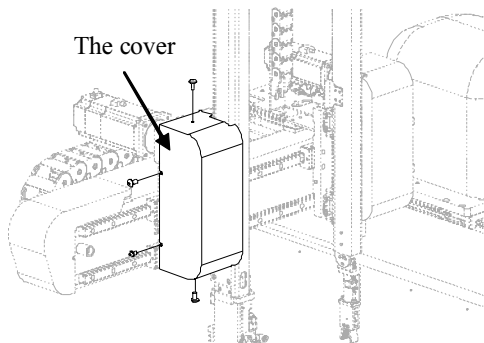
#### STEP 1

Turn off the molding machine and take-out robot.



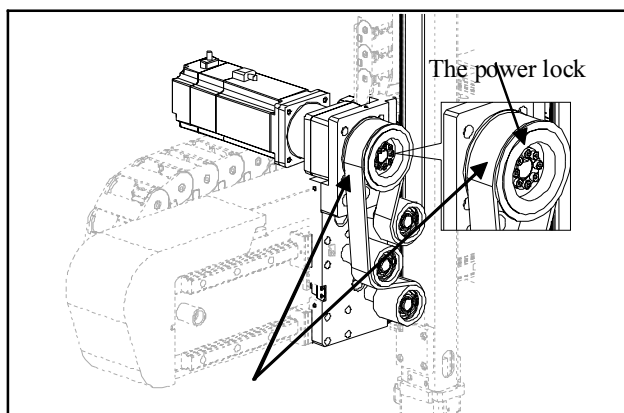
#### STEP 2

Place the supports under the vertical frame



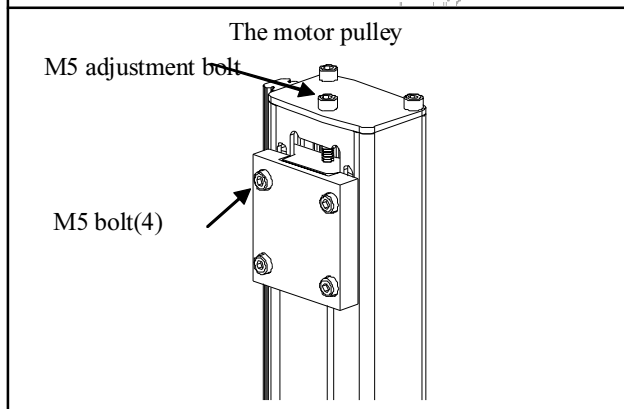
#### STEP 3

Disassemble the cover



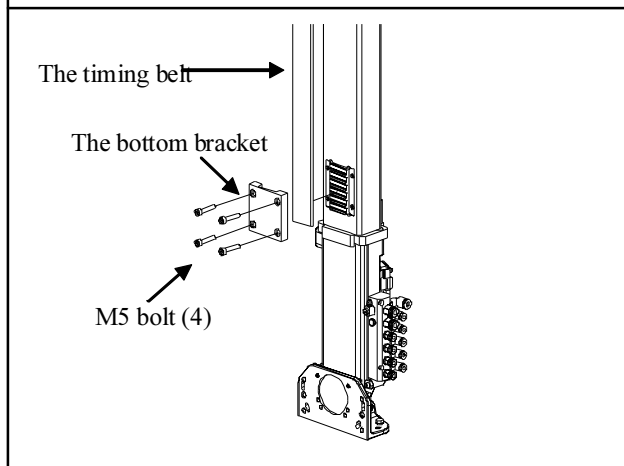
#### STEP 5

Loosen the power lock of the motor pulley and put the frame on the support.



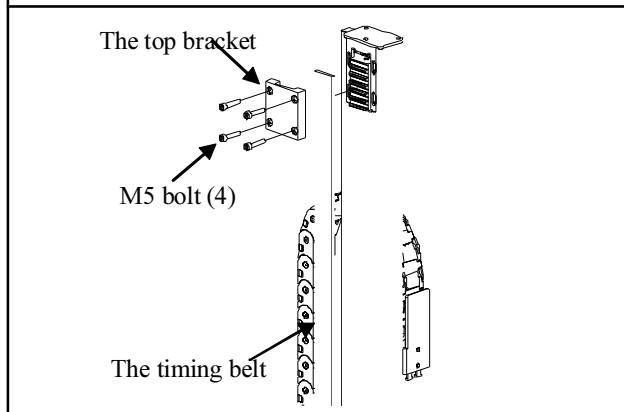
#### STEP 6

After loosens the M5 adjustment bolts, loosens the rest of the M5bolts in the figure. First, M5adjustment bolt, second, M5 bolt (4).



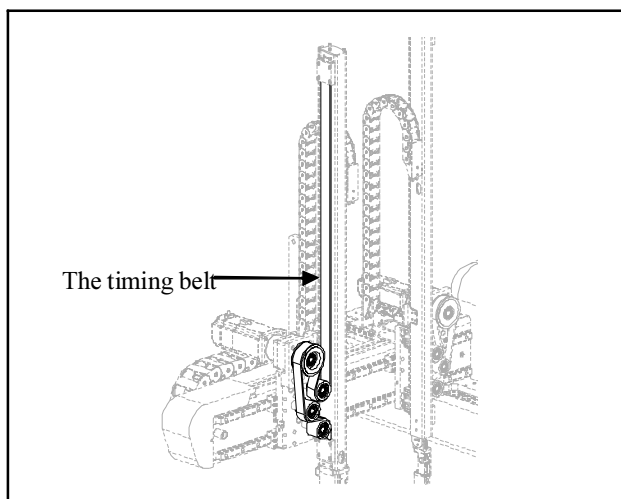
#### STEP 7

Disassemble the bottom bracket.



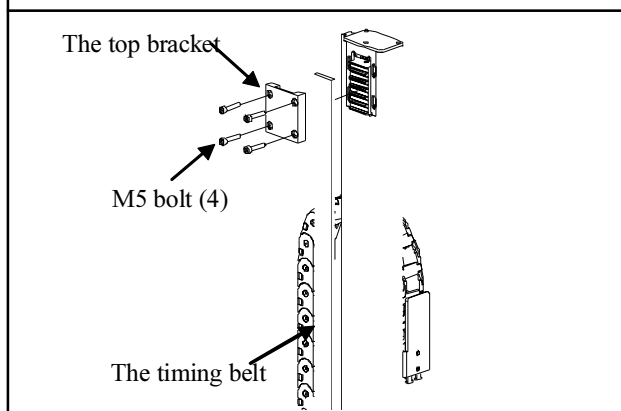
#### STEP 8

Disassemble the top bracket.



#### STEP 9

Replace the old timing belt to the new timing belt.



#### STEP 8

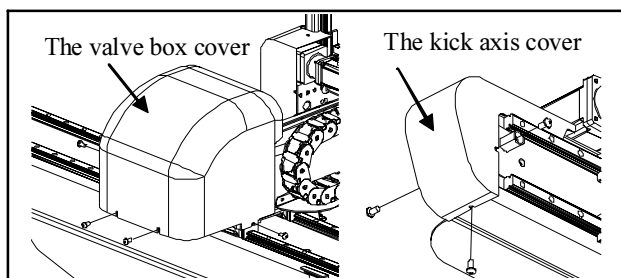
Install the timing belt with the top bracket. Do the same thing with the bottom bracket..

#### STEP 10

Adjust the tension of the timing belt

Ref

- To adjust the tension of the timing belt, follow the steps with <3.2.5 tension adjustment of the kick axis timing belt>.



#### STEP 11

Assemble the valve box cover and the kick axis cover.

### 4.3.2 Adjustment the origin location of the vertical axis

#### Warning

- Place the supports under the vertical frame
- If there is no support under the frame, it might go down.

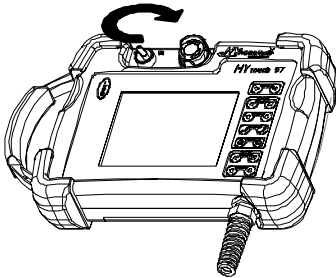
#### Danger

Before turning on the robot, Make sure following before turn on the power of robot

- Confirm there in no person in the motion area of robot
- Confirm the location of handy controller and tool is required place
- Confirm there is no obstacle on the robot and in the area of robot motion.

#### Warning

- Do not frequently power on and off. If it were needed, please give some time between on and off actions.




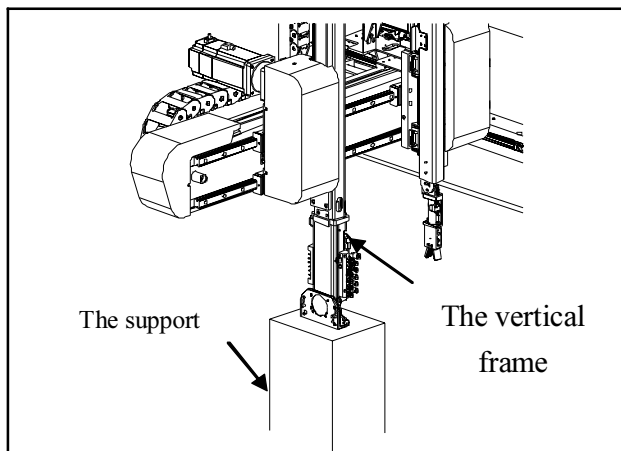
#### STEP 1

Turn on the power.



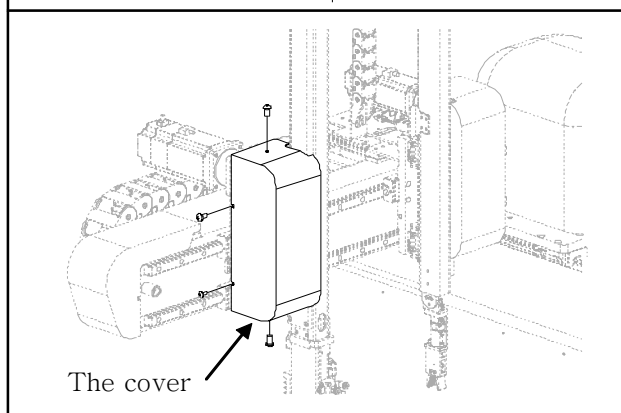
#### STEP 2

Press  to find the origin location.



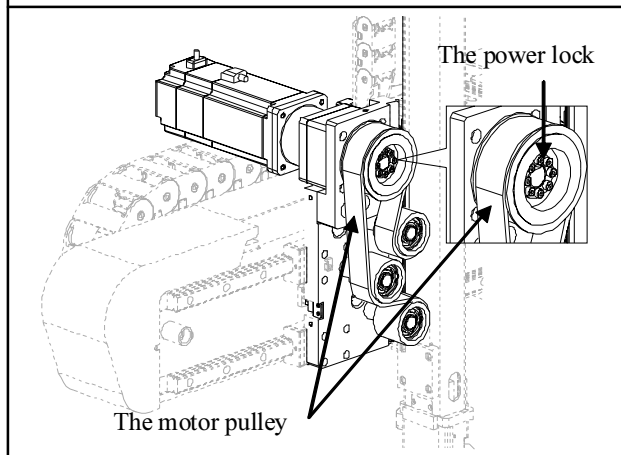
### STEP 3

Place the support under the vertical frame.



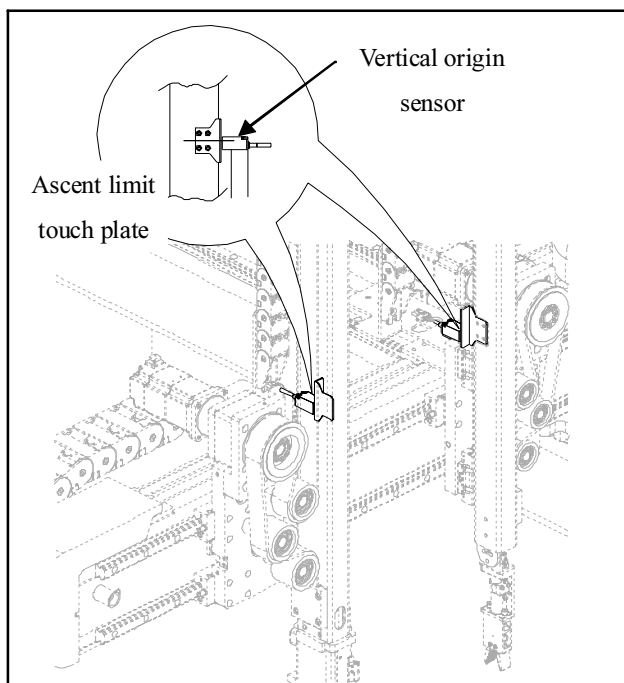
### STEP 4

Disassemble the cover.



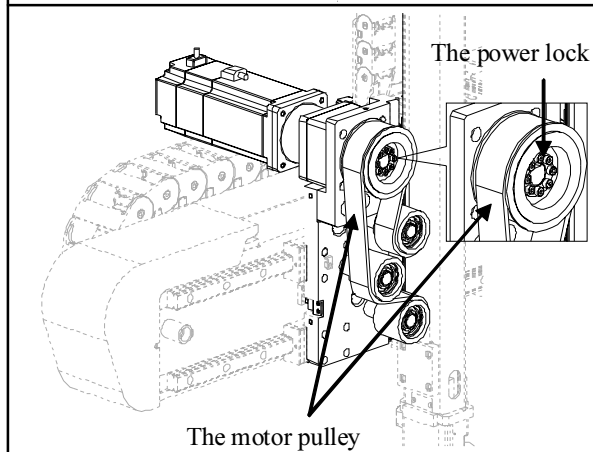
### STEP 5

Loosen the power lock of the vertical motor pulley.



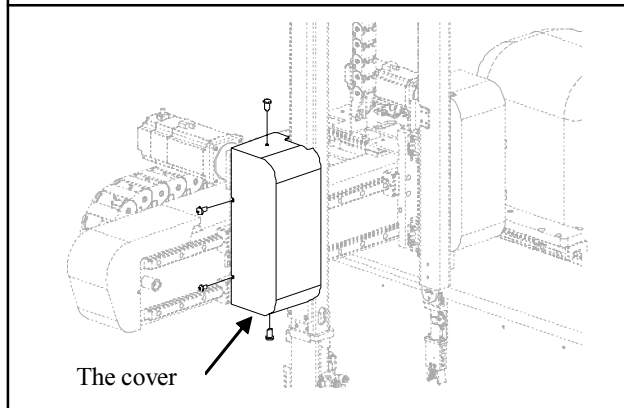
#### STEP 6

Move the vertical frame to place the vertical origin sensor in center of the ascent limit touch plate.



#### STEP 7

Tighten the power lock of the motor pulley.



#### STEP 8

Assemble the cover



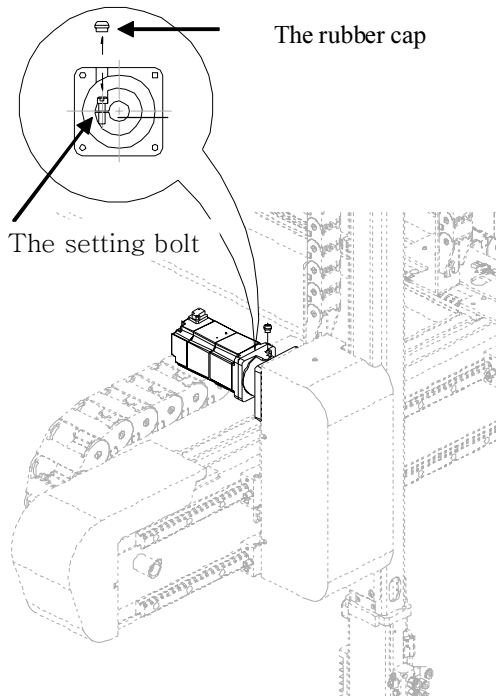
### 4.3.3 Replacement of the vertical servo motor

Ref

- The steps of replacement vertical servo motor would be described in following steps. (The runner vertical servo motor adjustment would be the same.)

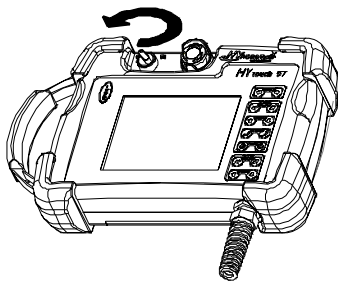
Warning

- Please consider the weight of the motor.
  - Place the support under the vertical frame.
- If there is no support under the frame, it might go down.



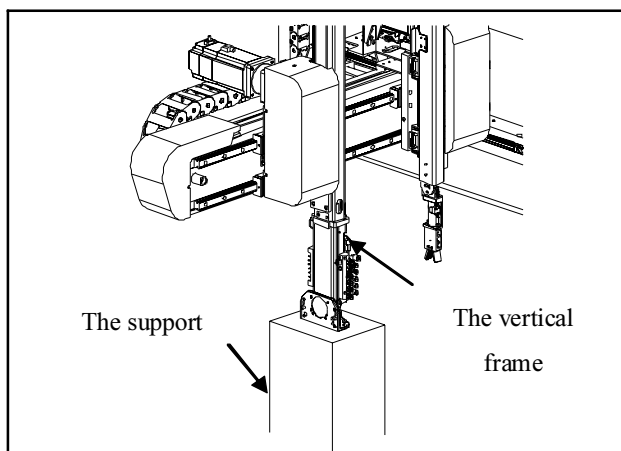
#### STEP 1

Take off the rubber cap of the speed reducer and drive it until the setting bolt is visible.



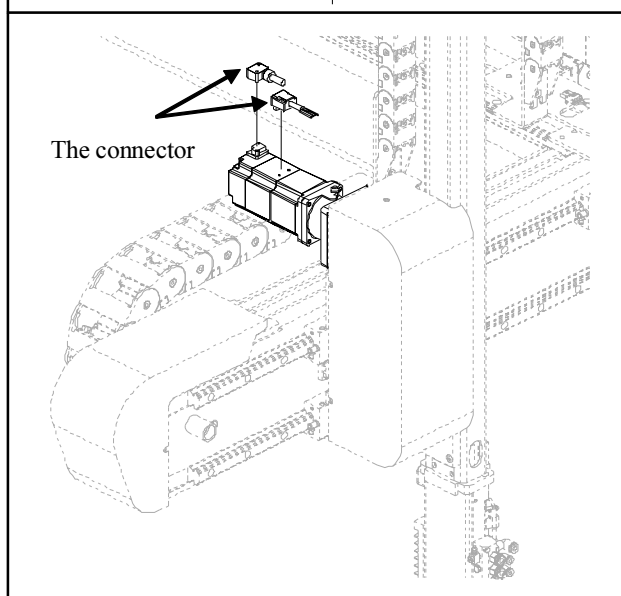
#### STEP 2

Turn off the molding machine and take-out robot



### STEP 3

Place the support under the vertical frame.

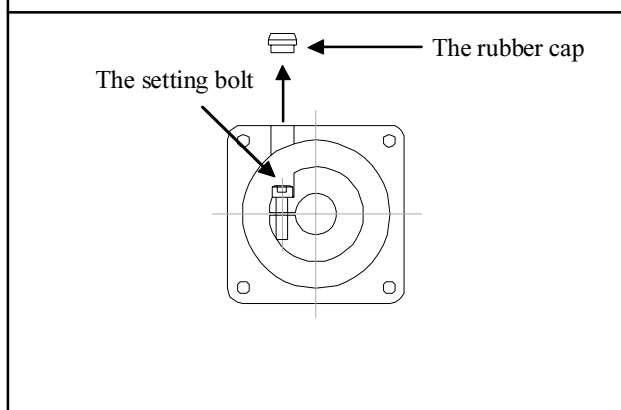


### STEP 4

Remove the motor lines, brake connector and encoder connector.

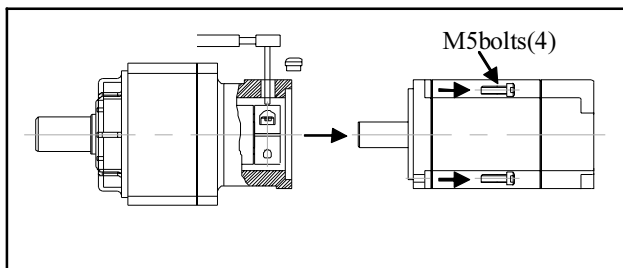
### Warning

- Be careful with the installed connectors.



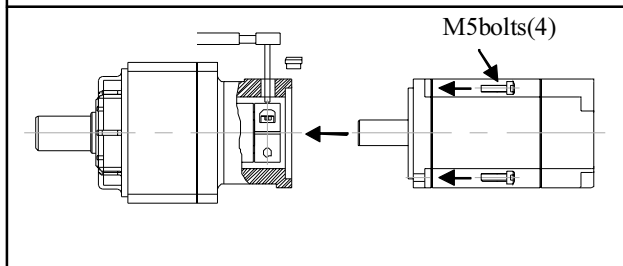
### STEP 4

Take off the rubber cap and loosen the setting bolts.



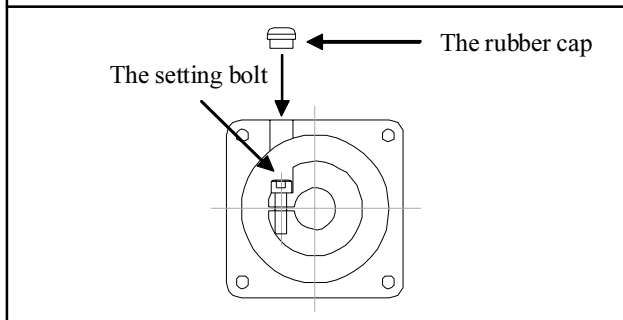
#### STEP 5

Hold the bottom of the motor and take off the four M5 bolts from the speed reducer.



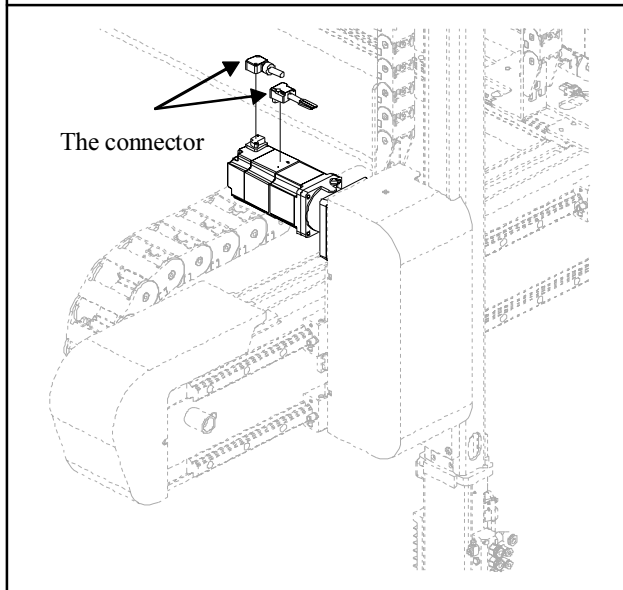
#### STEP 6

Place the speed reducer where the setting bolts are seen through the rubber cap hole and put the new motor into the reducer with four M5 bolts.



#### STEP 7

Tighten the setting bolts to lock the motor firmly and insert the rubber cap.



#### STEP 8

Install the motor lines, brake connector and encoder connector.