

Troubleshooting

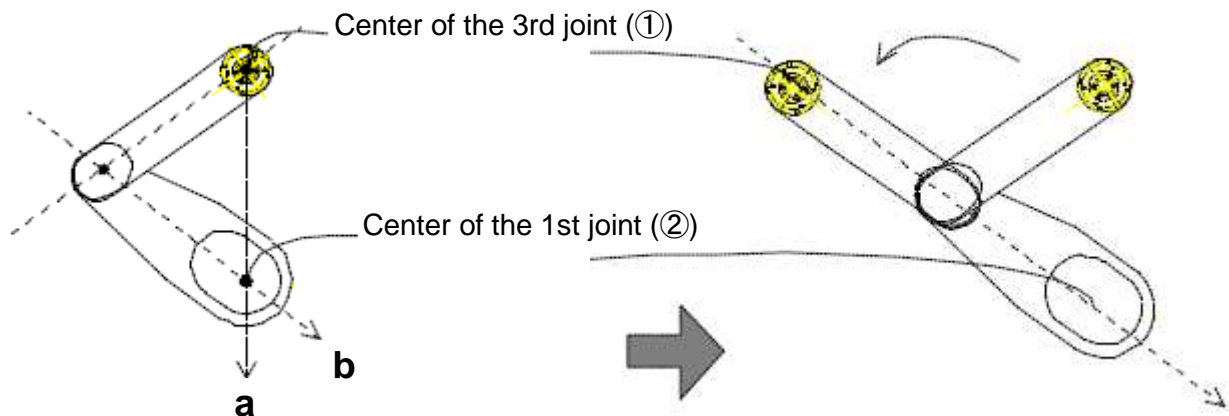
Arm origin adjustment (For single arm robot)

■ Adjustment of rotation direction (Arm extending/retracting direction)

Arm movement direction is on the straight line from the 1st joint to the 3rd joint of the arm. Follow the below procedures to change the arm movement direction.

[Image of the arm movement direction change]

a = Current movement direction **b** = Direction you want the arm to take



Arm movement direction is on the straight line connecting (1) and (2).

1. Remove the cover of the arm 1st joint. Remove 2 of M5 hex socket head cap screws (1) that lock the 1st joint. Then the arm becomes free to move in the extending/retracting direction.
2. Loosen 3 of M5 hex socket head cap screws (2) of the 2nd joint that adjust the rotation direction. It is not necessary to remove the screws. Then the 2nd joint becomes free to move so that both Arm 1 and Arm 2 can move independently from each other.
3. Fix Arm 1 and rotate Arm 2 manually to the required position.
 «Note» As the wrist-block mounting direction and the distance between axes have been changed, the setting has to be restored. Refer to other sections for adjusting the wrist-block and the distance between axes.
4. Move the arm as specified in the robot outline drawing (**Refer to the specifications**). (Move the arm to the required position, if any change is desired.)

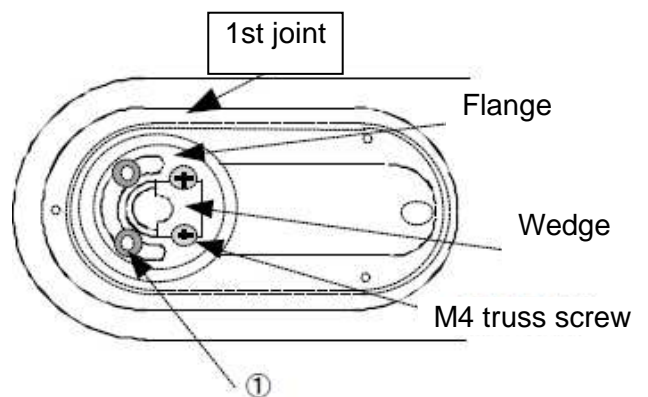


Figure: 1st joint area

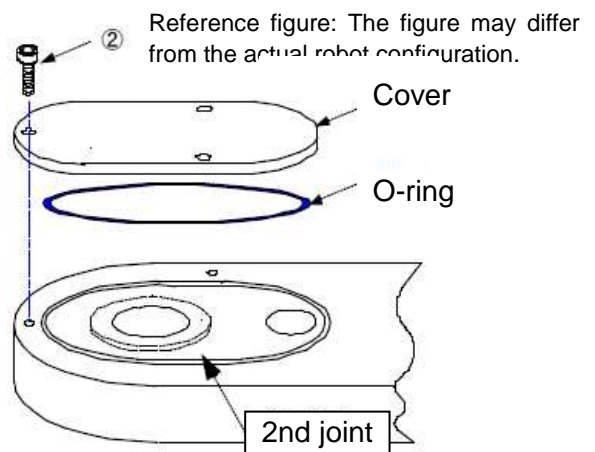


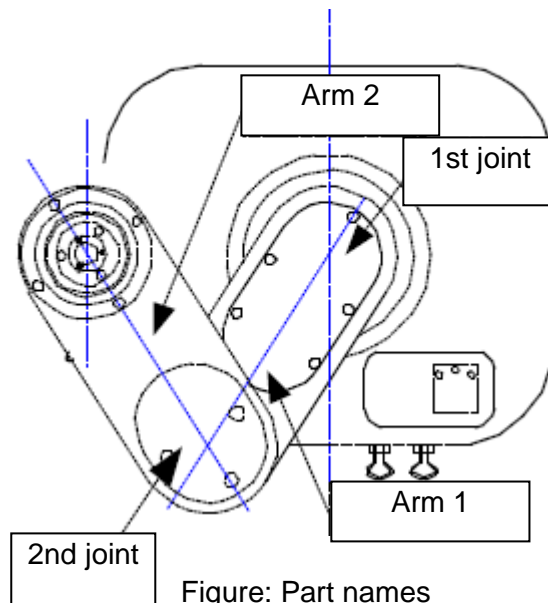
Figure: 2nd joint structure

5. Once the direction has been decided, tighten 3 of M5 hex socket head cap screws (②) of the 2nd joint that have been loosened with the specified torque.
6. In the same way, tighten 2 of M5 hex socket head cap screws (①) that lock the 1st joint with the specified torque.
7. Execute the arm origin search and confirm the direction.
8. Proceed to the “Distance adjustment between the axes”.

«Precautions for installation»

Be sure to read “1. PRECAUTIONS” of the maintenance manual before installing O-rings or screws.

Reference figure:
The figure may differ from the
actual robot configuration.



■ Distance adjustment between the axes

This is the procedures of distance adjustment between the center of the arm 1st and the 3rd joints when the arm is at the origin.

1. Execute the arm origin search.
2. Measure the distance between the axes with a scale.

«Note» Convert the dimension between the 1st and 3rd joints "A" into the dimension "B" (from the 1st joint outer circumference to the 3rd one) to get the dimension, since actual dimension "A" (distance between centers of the 1st and 3rd joints) cannot be measured as shown in the figure below.

[Dimension "B"=Dimension between axes " A " +Radius of 1st joint "C" +Radius of 3rd joint "D"]

3. Follow the procedures below to change the distance.
4. Remove the cover of the 1st joint of the arm to be changed.
5. Loosen 2 of M5 hex socket head cap screws (⑥) that fix the flange (⑩) of the 1st joint. (Loosen to the extent that the shaft gets some pressure from the screws. Excessive loosening can easily cause displacement while tightening the screws.) The arm becomes free to move against the drive axis.
6. Move Arm 1 manually to the drive axis to reach the required distance.
7. Execute the origin search and confirm the distance between the axes. Repeat the procedures from (⑤) to (⑦) until it reaches the required distance.
8. After the adjustment, tighten 2 of M5 hex socket head cap screws (⑥) that have been loosened previously in the procedure (⑤) with the specified torques.
9. Execute the origin search several times and confirm the direction and the distance between the axes.

«Precautions for installation»

Be sure to read "1. PRECAUTIONS" of the maintenance manual before installing O-rings or screws.

Reference figure:
The figure may differ from the actual robot configuration.

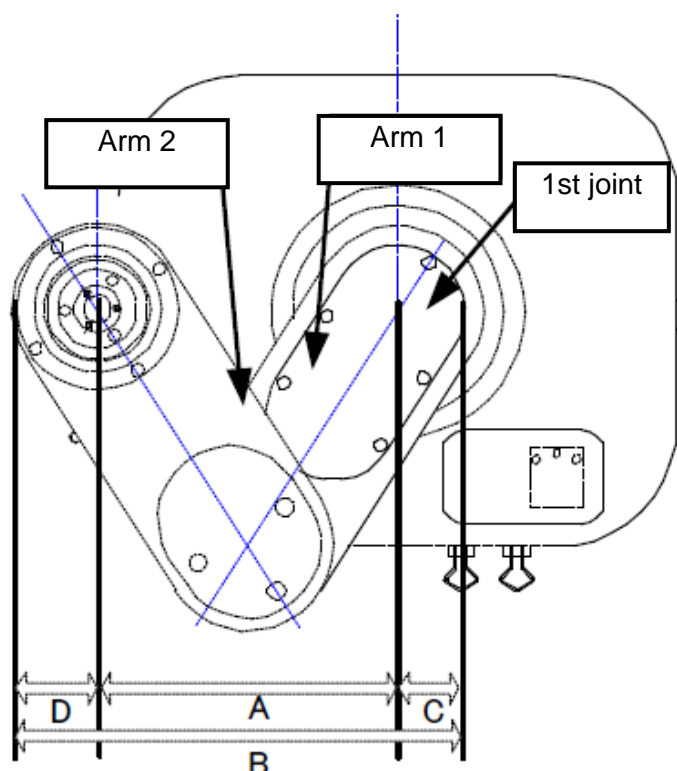


Figure: Measurement of the distance between the axes

■ Wrist-block adjustment

The wrist-block is a part that fixes the end-effector. The wrist-block has to be adjusted preliminarily in a way which the central axis of the end-effector and the arm extending/retracting direction are in line.

«Wrist-block right angle adjustment»

1. If the end-effector is attached, remove the end-effector (①) and the top side of the wrist-block (②) to see the underside of the wrist-block (③).
2. Loosen M3 hex socket head cap screws (④) lightly to the extent that the wrist-block can be rotated manually for temporary tightening (position keeping). (Make sure to loosen 3 of leveling screws (⑤) at this point.)
3. Attach the end-effector (①) and the top side of the wrist-block (②).
4. Overlap the Arm 1 and Arm 2 to fit perfectly. Adjust the wrist-block mounting direction with a speed square to make the side of the wrist-block of the Arm 2 (⑥) and the end-effector (①) a right angle with each other.
5. Once a right angle has been set, remove the top side of the wrist-block (②) and the end-effector (①) in a careful way so as not to move the wrist-block mounting direction. Then similarly tighten 3 of M3 hex socket head cap screws (④) of the underside of the wrist-block (③) that have been tightened temporarily to fix the wrist-block.
6. Attach the top side of the wrist-block (②) and the end-effector (①) once again, confirm the angle with the procedures from (4) to (5).

«Wrist-block level adjustment»

After acquiring the level of the robot base, adjust the end-effector mounting surface of the wrist-block with 3 leveling setscrews (⑤) and 3 mounting bolts (④).

The more tightened the leveling setscrews (⑤), the higher the level becomes.

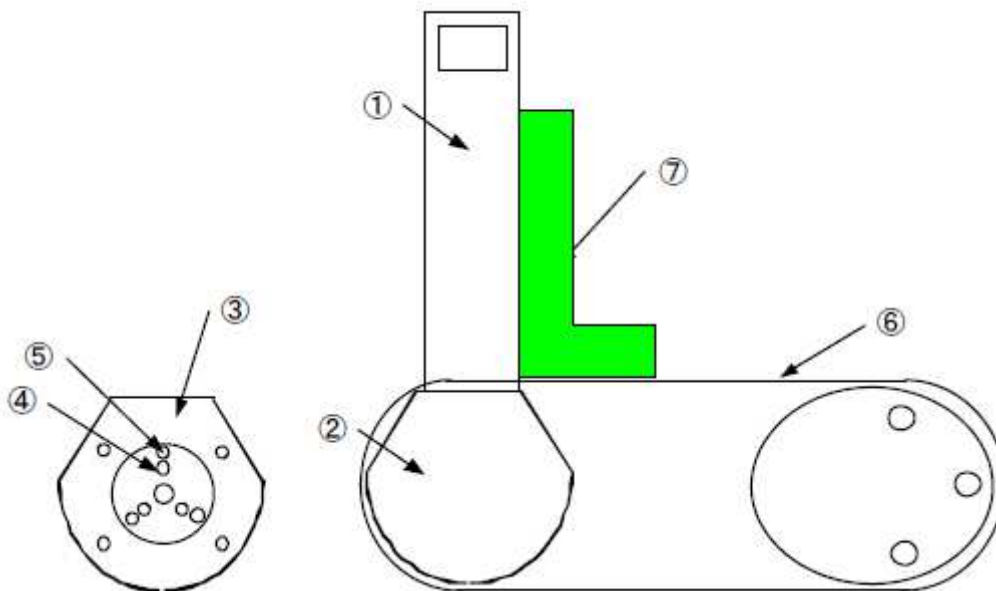


Figure: Arm area (Arm 1 and Arm 2 are overlapped with each other)