



Toolkit Doc5 CB  
May 19, 2010

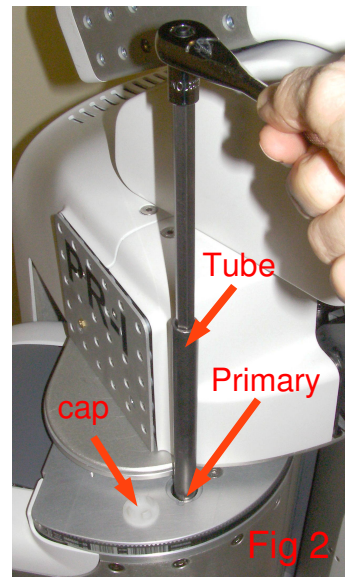
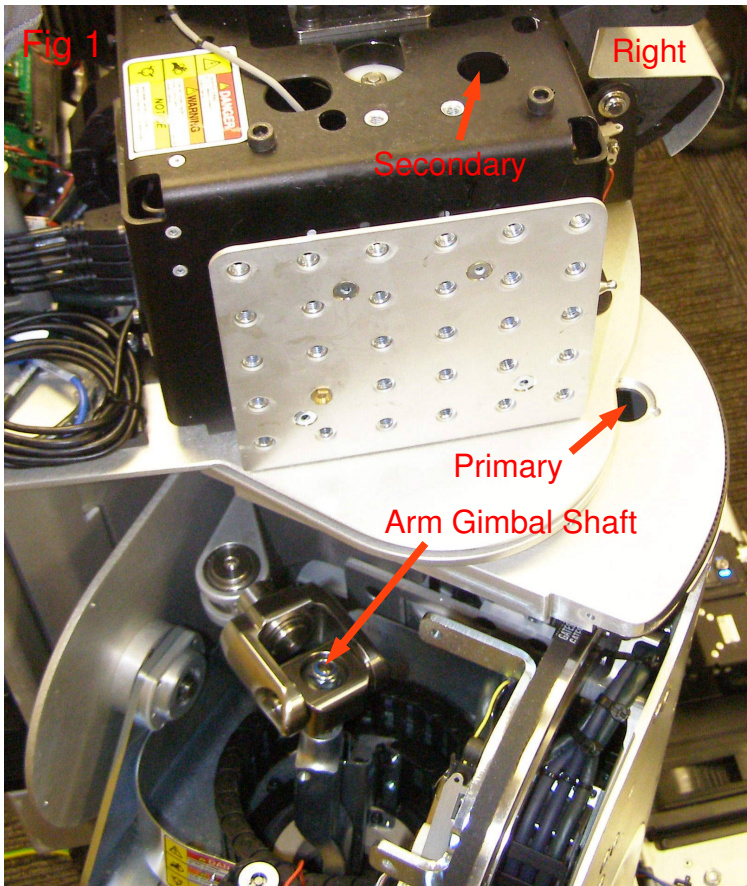


# Counter Balance Adjustment (1)

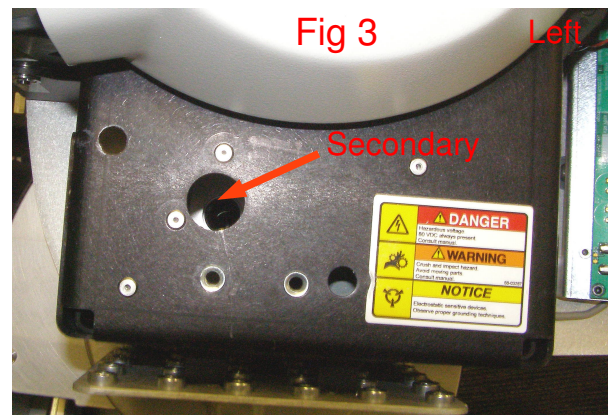
The object of the Counter Balance (CB) adjustment is to compensate for the weight of the Arm assembly so that it has neutral balance in all positions, with the Gripper extended. This is without any motor actuation. Unless the Upper Arm has just been installed we will not have to adjust the Primary spring tension. The other two adjustments are the Arm Gimbal Shaft adjustment and the Secondary Spring. The Arm Gimbal Shaft adjustment is designed to affect the overall Arm balance while the Secondary spring adjustment is intended to normalize the Fore Arm balance, but it will affect the overall Arm balance as well. Turning the Secondary spring adjustment clockwise increases the Fore Arm lift in relation to the Arm, while lifting the Arm as well. Turning the Arm Gimbal Shaft counter-clockwise will raise the Arm.

- If the Upper Arm has been replaced, execute the following steps:

1. Rotate the Arm so as to expose the Primary spring adjustment access hole cap and if it is not already removed, remove it with a small flathead screwdriver (not supplied). Insert the steel guide tube through the Primary access hole. Using the 10mm rod together with the 10mm 1/4 drive socket and the 1/4 drive ratchet wrench, turn the Primary adjustment clockwise until it is fully seated and will not turn further. Back off the adjustment half a turn to break the lock. (Fig 2)



2. Rotate the Arm so as to align the Secondary adjustment access hole. The position required will be different from the left side to right side (Fig 3)



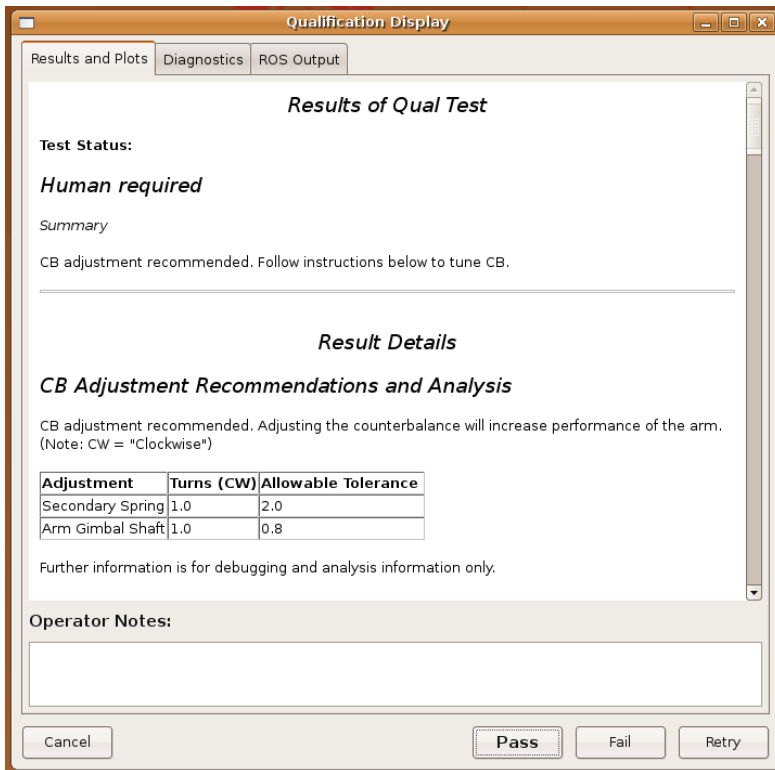
- Remove Shoulder Covers
- Remove Front and Rear Top Covers

# Counter Balance Adjustment (2)

3. Turn the Secondary adjustment clockwise until the fully extended Arm will hold position. It can drift up or down some. (Fig 4)

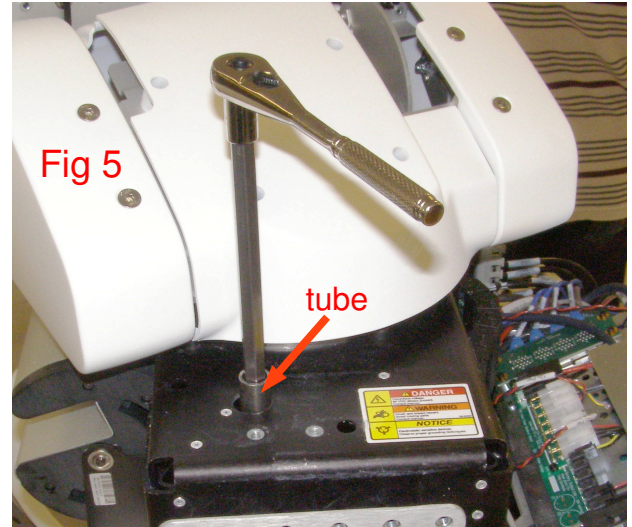


4. Note: It is assumed that the Arm Gimbal Shaft has already been adjusted in accordance with the Upper Arm Installation procedure.
- Run the CB Check program. Make sure there is adequate clearance around the robot for the Arms to move freely. The results should look something like this:



- To adjust the Secondary spring:

1. First install the steel guide tube through the Secondary access hole making sure that it is bottomed out and protrudes about 1.5cm. (Fig 5)

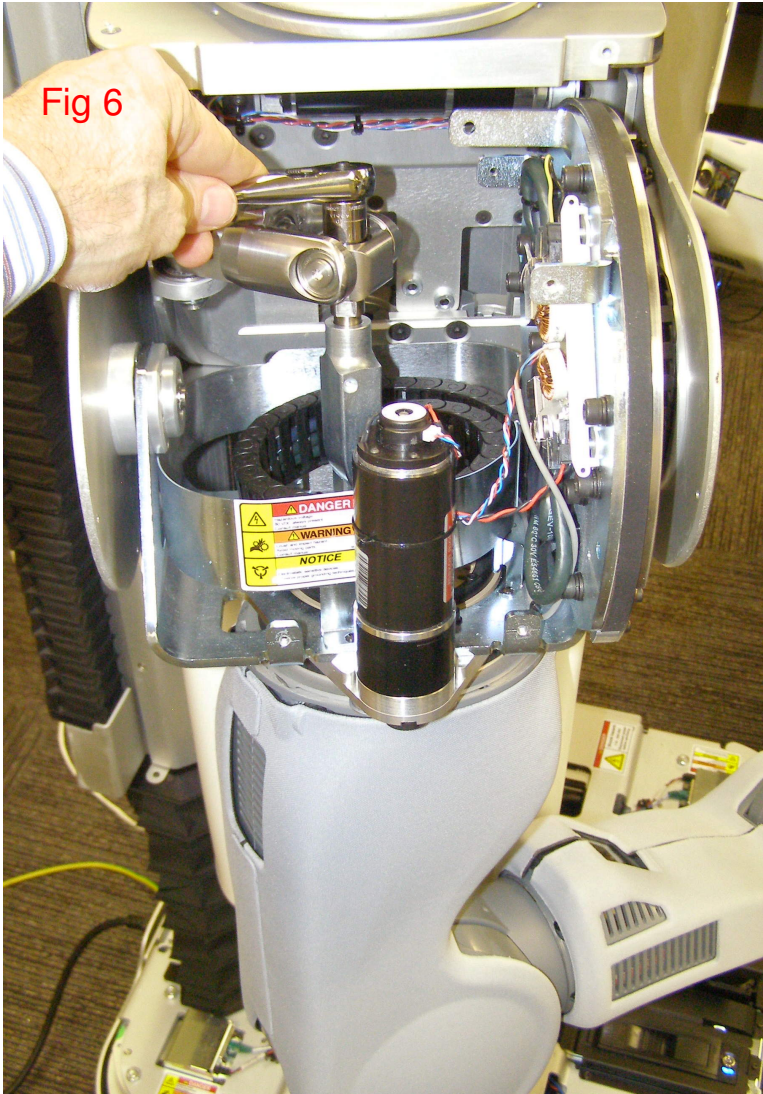


2. Use the 10mm rod together with the 10mm 1/4 drive socket and the 1/4 drive ratchet wrench to adjust the Secondary spring tension, and insert into the steel guide tube making sure the 10mm hex rod is completely bottomed in the top of the adjustment bolt.
4. Follow the Check program results for the Secondary Spring and rotate the 10mm hex shaft the required turns.



# Counter Balance Adjustment (3)

- To adjust the Arm Gimbal Shaft:
  1. The Arm should be lowered and rotated to the right to facilitate access to the Arm Gimbal Shaft nut. Use the  $\frac{1}{4}$  drive ratchet wrench with the  $\frac{1}{4}$  drive 13mm socket. (Fig 6)



3. Follow the Check program results for the Arm Gimbal shaft and rotate the 13mm nut the required turns,  $\frac{1}{4}$  turn at a time.
4. The Check procedure should be run again to verify that the Arm is within its balance tolerance. The check / adjustment cycle may need to be done a couple of times to achieve acceptable tolerance levels.